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*Performance curves and detailed data for Mini-Circuits newest products are contained on the Internet.

Using This Guide

Over 2000 Mini-Circuits IF/RF/Microwave Signal-Processing components are completely specified and described in this Guide.

The large number of available models is offered so that the design engineer may select a model that closely fits the application requirement. In situations where there is a need for special electrical performance, mechanical configurations, environmental screening, or very low cost units, please contact our Applications Department. See page 211. In many cases, we produce special components in less than two weeks.

table of contents

The table of contents on pages 4, 5 lists product sub groups with corresponding specification pages and product group technical information including articles.

model number index

In each product group, model numbers are listed in alphanumeric order with page references to electrical specifications. All surface-mount models are highlighted with an indicator. See pages 14-17.

BLUE CELL™ TECHNOLOGY

A process utilizing multi-layer ceramic substrates to provide low cost, high performance RF/Microwave components that are temperature stable, highly repeatable, and miniature in size. Protected by a number of patents.

tape and reel packaging

Designers applying automated assembly procedures for surface-mount components will find a listing for tape width, reel size, package number, and number of devices on a reel; “footprints” for the various packages are shown on pages 34, 35.

specifications

The specification pages in each section include, for every model, a photo, complete electrical specifications, price, schematic diagram, pin connections (for pc board models) or connector markings, and reference designations for the case style and outline drawing. Each model within a series has a case style and outline drawing reference. Comments applicable to the specifications are listed under Notes which appear for each page spread.

Using the latest industry criteria for specifying mixer and I and Q modulator performance, “typical” conversion loss has been deleted and replaced with x and σ (sigma) average value and standard deviation of values for conversion loss. A discussion of these parameter listings is given. See pages 32, 33.

SURFACE MOUNT Available Tape & Reel

This "quick reference" headline and footer can be found on various product specification pages. It denotes that all the models featured on that page, or spread are surface mount and conveniently packaged on tape & reel.

PARTNER PROGRAM®

A revolutionary new concept that lets you lower the cost of doing business in the millenium. A true partnership is described where your savings keep growing year in and year out. Details of the program and the easy procedure to join are simply explained. See pages 12, 13.

The Design Engineers Search Engine To find actual performance data of units to match your requirements from Mini-Circuits web site at: http://www.minicircuits.com. See pages 8, 9.

case style outline drawings

Case Style and Outline Drawings include information on case dimensions, tolerances, case material and finish, bracket options and "footprint" sketches for pc board design using surface-mount units. See pages 36 through 61.

The information is arranged in tabular form with alphanumeric reference designations. Each alpha designation refers to a particular outline drawing. A photo of each case style is shown and designated on the model specification page.

SMD

Surface-mount devices are included in almost every product group. See model number index page 14-17. Product group specification sections indicate non-hermetic and tape and reel package availability. Technical articles are listed on pages 20 through 33.

ULTRA-REL® MIXERS 5-YR. GUARANTEE*

This symbol identifies products that are manufactured with extra reliability. See page 30 for a complete explanation.

prices

The prices shown are the U.S. unit list prices for the quantity indicated. For unit prices in higher quantities, and for a formal quote, contact our nearest distribution center, authorized local distributor, sales office or the factory. See back cover.

ordering information and warranty

For ordering information, warranty, terms of payment, and shipping instructions, see pages 8 and 9.

applications support/ technical assistance

For literature requests, assistance in selecting models, understanding model specifications, requesting additional model performance data, contact our Applications Engineering Department. See page 211.

sales assistance

For assistance in purchasing products, obtaining quotes, opening up an account, requesting order status information, assistance in obtaining same or next day delivery, contact our Sales Department.

NSN numbers

Specification pages contain a listing of Mini-Circuits' models that have been assigned a National Stock Number (NSN).

listing of reps, authorized distributors distribution centers

A complete list of Mini-Circuits' sales representatives, local distributors, and major Distribution Centers puts you in immediate contact with our Sales Support team to answer questions, assist in component selection, and expedite orders. See back cover.

Model Index

● Dot indicates surface mount models.

mixers

high power combiners/ splitters

power splitters / combiners

power splitters / combiners (con't)

impedance pads

fixed attenuators terminations

Model Index

● Dot indicates surface mount models.

bi-phase attenuators

digital step attenuators

amplifiers

instrumentation amplifiers

pulse amplifiers

directional couplers

filters

Mini-Circuits®

INTERNET http://www.minicircuits.com

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417 335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

filters (con't)

frequency doublers

phase detectors

phase shifters

modulators/ demodulators

BPSK, I/Q & QPSK

switches

electronic line stretchers

limiters

bias-tees

oscillators

transformers

rf chokes

designers kits

Mini-Circuits offers a wide range of plug-in, surface-mount and coaxial component kits to aid the engineer during the evaluation, design, and prototype stages; in addition, there are kits offered to provide components for use in the testing laboratory. These kits contain a carefully-selected group of models that will enable the largest versatility of usage by the engineer.

As an example of Mini-Circuits quest to exceed our customer's expectations, these kits are priced up to 40 percent lower than the cost of individual units and are available from stock.

TYPE	KIT NO.	QTY. EACH MODEL	MODEL NUMBERS	TOTAL QUANTITY UNITS	PRICE
FREQUENCY MIXERS	K-SYM*	1	SYM-2, -11, -860, -11LH, 11MH, 11H	6	59.95
	K-TUF*	1	TUF-1, 1SM, -2, -2SM, -3, -3SM, -5, -5SM, -11A, -11ASM, -860, -860SM	12	79.95
	K1-RMS*	1	RMS-1, -1W, -2, -2D, -2U, -5, -11A, -860	8	59.95
	K1-LRMS*	1	LRMS-1, -1W, -2, -2D, -2U, -5, -11A, -860	8	59.95
	K2-LRMS*	1	LRMS-1LH, -2LH, 5LH, -1MH, -2MH, 5MH, -1H, -2UH, -5H	9	89.95
	K-SM*	2	SYM-2, RMS-2, LRMS-2, SCM-2, TUF-2SM	10	59.95
	K-860*	2	SYM-860, RMS-860, LRMS-860, TUF-860SM	8	82.60
POWER SPLITTERS	K1-PS*	1	SCP-2-1A, SCP-3-1, SCPQ-21.4, SCPQ-90, SCPQ-180,		
			SCPQ-400	6	59.95
	K2-PS	1	PSCQ-2-21.4, -2-50, -2-90, -2-180, -2-250, -2-400	6	99.95
	K3-PS	2	PSC-2-1-75, -3-1-75, -4-1-75	6	99.95
	K4-PS	2	PSC-2-1, PSCJ-2-1, AND 1 EACH PSC-3-1A, PSC-4-3	6	99.95
AMPLIFIERS	DAK-2SM*	5	MAR-1SM, -2SM, -3SM -4SM, -6SM, -7SM, -8SM	35	61.95
	K1-MAN	1	MAN-1LN, 1HLN, -1, -2	4	59.95
	K2-MAN	1	MAN-1AD, 11AD, 2AD	3	59.95
	K-ZFL	1	ZHL-6A, ZFL-1000, ZFL-2000	3	395.00
	KZHL-318	1	ZHL-6A, ZHL-1042J, ZRON-8G	3	1095.00
CHIP CAPACITORS	KCAP-1	50	10PF, 22PF, 47PF, 68PF, 100PF, 220PF, 470PF, 680PF, 1000PF, 2200PF, 4700PF, 6800PF, .010UF, .022UF, .047UF, .068UF, .100UF	850	99.95
DIGITAL STEP ATTENUATORS	K-TOAT	1	TOAT-124, -3610, -51020	3	149.95
	K-ZFAT	1	ZFAT-R512, -124, -3610, -51020	4	299.95
ELECTRONIC ATTENUATORS	K-PAS	1	PAS-1, -3, -2000	3	99.95

TYPE	KIT NO.	QTY. EACH MODEL	MODEL NUMBERS	TOTAL QUANTITY UNITS	PRICE
FIXED ATTENUATORS/ TERMINATIONS	K1-AT	4	AT-3, -6, -10, -20	16	49.95
	K2-AT	1	AT-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, AT-12, -15, -20, -30, -40, -3-75, -6-75, AT-10-75, -15-75, -20-75	20	49.95
	K1-MAT	2	MAT-3, 6, 9, 10, 12, 15, 20, 40	16	49.95
	K2-MAT	1	MAT-1, -2, -3, -4, -5, -6, -7, -8, -9 MAT-10, -12, -15, -20, -25, -30, -40	16	49.95
	K1-CAT	2	CAT-3, -6, -10, -20	8	89.95
	K2-CAT	1	CAT-1, -2, -3, -4, -5, -6, -7, -8, -9, CAT-10, -12, -15, -20, -30, -40	15	199.95
	K-CAT-75	1	CAT-3-75, -6-75, -10-75, -15-75, -20-75	5	74.95
	K1-SAT	2	SAT-3, -6, -10, -20	8	109.95
	K2-SAT	1	SAT-1, -2, -3, -4, -5, -6, -7, -8, -9, -9, SAT-10, -12, -15, -20, -30, -40	15	219.95
	K-NAT	2	NAT-3, -6, -10, -20	8	149.95
DIRECTIONAL COUPLERS	K1-DC	1	ZFDC-10-5, -15-5, -20-5 (BNC CONNECTORS)	3	199.95
	K2-DC	1	ZFDC-10-1, -20-4 (BNC CONNECTORS)	2	89.95
	K3-DC	1	PDC-10-6, -15-21, -20A-5	3	79.95
	K5-DC	1	PDC-10-1, -10-54, -10-6	3	53.95
	K7-DC	1	ZEDC-10-2B, -15-2B, ZFDC-20-4 (SMA CONNECTORS)	3	149.95
FILTERS	K-SCF*	1	SCLF-21.4, -30, -45, -135, -190, -380, -420	7	59.95
	K-PHP	1	PHP-50, -100, -150, -175, -200, -250, -300, PHP-400, -500, -600, -700, -800, -900, -1000	14	149.95
	K-LHP	1	SLP-50, -100, -300, -550, -1000, SHP-200, -400, -700	8	249.00
	K-PLP	1	PLP-5, -10.7, -21.4, -30, -50, -70, -90, PLP-100, -150, -200, -250, -300, -450, -550, PLP-600, -750, -800, -850, -1000, -1200	20	159.95
PHASE DETECTORS	K-PD*	1	MPD-1, MPD-2, MPD-21, SYPD-1, SYPD-2	5	79.95
SWITCHES	K1-KSW*	1	KSW-2-46, KSWA-2-46, KSWHA-1-20	3	99.95
	K-ZFSW	1	ZFSW-2-46, ZFSWA-2-46	2	139.95
RF TRANSFORMERS	K-ADT1	2	ADT1-1, ADT2-1T, ADT3-1T, ADT4-1WT, ADT9-1T	10	33.95
	TTK-1	2	TT1-6, 1.5-1, 2.5-6, 4-1, 4-1A, 16-1, 25-1	14	79.95
	TK-5	2	T1-1T, T1-6T, T2-1T, T2.5-6T, T3-1T, T4-1T, T4-6T, T5--1T, T8-1T, T13-1T, T16-6T	22	79.95
	TK-6	2	T1-1, 1.18-3, 1-6, 1.5-1, 1.5-6, 2.5-6, 4-6, 9-1, 16-1, 36-1	20	79.95
	THK-1	3	T1-1H, T4-1H AND 2 EACH T9-1H, T16-1H	10	59.95
	TMK-2	2	TMO-1-1, -2-1, -4-1, -9-1, -16-1	10	59.95

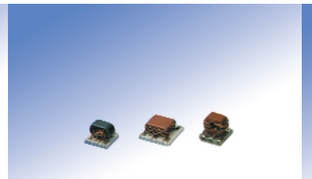
NOTES: *KITS CONTAINING SURFACE-MOUNT UNITS.
(1) AVAILABLE FROM MINI-CIRCUITS DISTRIBUTOR CENTERS.
(2) SORRY, NO SUBSTITUTIONS ALLOWED
(3) PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

001106

Mini-Circuits® Surface Mount Devices actual size


1 2 3


4 5 6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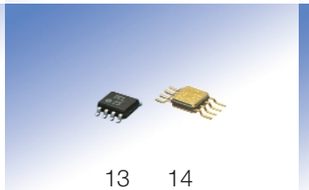
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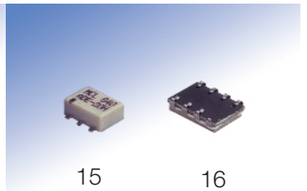
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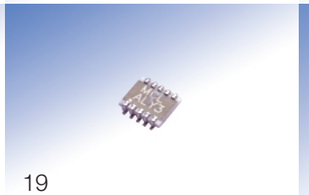
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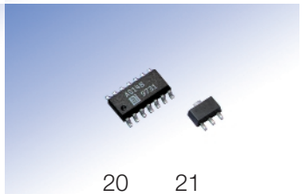
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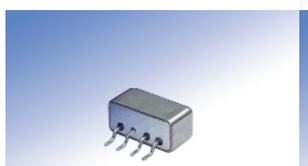
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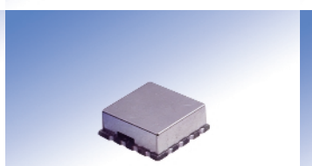
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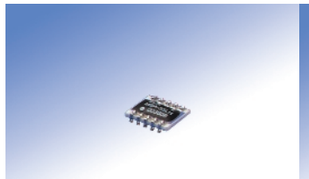
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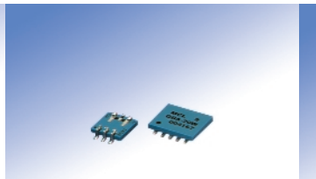
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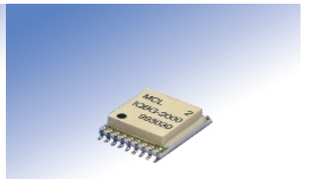
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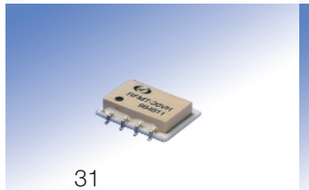
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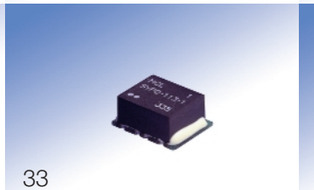
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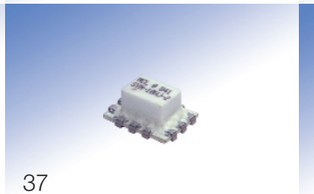
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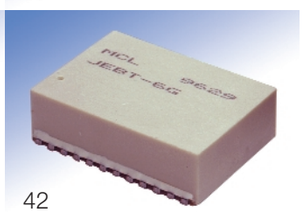
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Photo#	Case Style	Series Name
1	CA531	D
2	AF190	RAM
3	MMM168	VAM, LAT
4	AF320	PAT
5	WW107	MAR-SM, ERA-SM
6	RRR137	MAV-SM
7	AT224	TC
8	AT577	HPQ
9	DB714	TCM, TCD, TCP
10	CJ608	ADM
	CJ725	ADPS
11	BH292	JMS, JPS, JDC, JTX
12	TT100	RMS, RPQ, RAS, TX
	TT240	
13	XX211	VNA, MSW, MSWA, MSWT, BP
14	XX112	KSW, KSWA, KSWHA
15	CD541	ADE, ADP, ADC, ADT, ADCH
	CD542	
	CD636	
	CD637	
16	BJ398	SKY
17	KK81	ASK, T, TT
18	QQQ130	LRMS, LRPQ, LRPS, LRAS, LRDC
19	CB518	ALY
	CB539	
20	CL620	RSW
21	DF782	GAL
22	NNN150	TUF-SM
23	CK605	ROS
24	BG291	JCIQ, JCPS, JCOS
25	BL372	JEPS

Photo#	Case Style	Series Name
26	SM2	MBA, SBA
27	SM31	SBB
28	SM33	QBA
29	SM1	SBA
30	SM20	IQBG
31	SM18	MBY
32	TTT166	HJK, SYM, SYAS, SYPD
	TTT167	SYK
33	AH202	SYPQ
34	BJ293	JYM, JYPS, JYPQ
35	CM624	HELA
36	AN213	GSWA
37	CG581	SYM-J
38	QQQ569	LRMS-J, LRPQ-J, LRPS-J, LRAS-J, LRDC-J
39	BK276	HUD, JSPQ, JSPHS
	BK343	JSPQW
	BK377	JTOS
40	BJ360	JS4PS
41	YY101	SCM, SCPQ, SCP
	YY161	SCPJ, SCDC, SCLF, SCHF
42	BL301	JEBT

Mini-Circuits®
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
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see us on the web
www.minicircuits.com

surface mount environmental specifications

All MCL products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications a fter being subjected to any or all of the following physical and environmental tests of MIL-STD-202, unless otherwise noted.

Rating or Test	MIL-STD-202		Package Type	
	Method		Hermetic	Non-Hermetic[4]
Temperature Operating, °C[1]	—	—	-55° to 100°	-40° to 85°
Temperature Storage, °C[1]	—	—	-55° to 100°	-55° to 100°
Altitude: 150,000 feet	105	E	Yes	—
Humidity: 90%RH, 65°C	106	—	Yes[2]	—
Thermal Shock	107	B	-65° to 125°	-55° to 100°
Fine & Gross Leak	112	C&D	$1x10^{-7}$	Not Appl.
Solderability: 95% coverage	208	—	Yes	Yes
Solder Heat[3]	—	—	Yes	Yes
Solvent Resistance	215	—	Yes	Yes

Notes: 1. Extended temperature ranges are available for some models; consult factory. Operating Temperature for RAM models, -55°C to 125°C and VNA, -40°C to 70°C, or as noted on spec. page.
2. Humidity not guaranteed for VSW, VSWA models.
3. Peak temperature during reflow soldering 230°C, see typical profiles page 22. Technical Section.
4. Including aqueous washable models.

understanding surface mount

The main reason for the utilization of surface mount technology today is PWB area efficiency and the corresponding reduction of the system volume. Small surface mount components are used to manufacture electronic assemblies that are significantly smaller than the similar function assemblies using thru-hole components. Usually, the board area for most systems can be reduced by a factor of two for a single sided board. When components are mounted on both sides of the board, size reduction by another factor of two can be achieved. Conversely, the functional density can be doubled in the same area with the use of surface mount components. Since the height of surface mount components are generally smaller, significant reduction in system volume can also be achieved. Fewer, denser assemblies and correspondingly fewer connectors, less mechanical hardware and shorter lead lengths can yield another reduction factor of 2 to 4. Add to that the use of Application Specific IC's (ASIC's), and a total volume amounting to approximately 20 percent of the original system can result.

Size reduction however, is not the only SMT benefit. As a secondary benefit, the ever increasing demand for higher speed circuitry causes time delay reductions of even nanoseconds to be beneficial. Typically, an SMT package will have significantly lower values of inductance, capacitance and resistance compared to dual in-line packages (DIP). This is shown in the table below. Surface mount assembly essential is a four step manufacturing process:

1 Print the solder paste
2 Place components
3 Reflow the paste to form the solder interconnection between the component an the land area on the PWB
4 Clean-up

The use of a pick-and-place machined can perform the equivalent function handled by 3 to 4 machines in a standard thru-hole assembly area. Additionally, an automated SMT manufacturing line conserves space, used fewer people, has a shorter cycle time and reduces work in progress inventory. This helps achieve higher yields through more rapid feedback and use of statistical process control data. In all, the savings from automated SMT manufacturing can be as great as 50% compared to a thru-hole manufacturing area designed to build a similar electronic function.

SURFACE MOUNT VS. DUAL IN-LINE PACKAGES
INDUCTANCE AND CAPACITANCE VALUE COMPARISONS

	DUAL IN-LINE PKG. (DIP)		SMALL OUTLINE (SO)		PLASTIC LEADED CHIP CARRIER (PLCC)	
LEADS	L (nH)	C (pF)	L (nH)	C (pF)	L (nH)	C (pF)
8	3.2-9.3	0.35-1.0	2.3-3.8	0.22-0.48	--	--
14	3.2-10.2	0.38-1.1	2.6-3.8	0.22-0.54	--	--
16	3.3-10.5	0.44-1.1	2.4-4.3	0.22-0.50	--	--
20	3.4-13.7	0.53-1.5	4.9-8.5	0.45-0.85	4.2-5.0	0.60-0.65
24	3.8-18.1	0.53-1.6	4.9-9.5	0.43-1.86	--	--
28	3.8-14.4	0.58-1.7			5.3-6.9	0.70-0.75
40/44	3.8-15.3	0.60-1.9			5.3-6.6	0.75-0.80
64/68	7.1-28.1	0.63-2.4			5.1-6.4	0.78-0.83

Values given are Min. and Max.

understanding surface mount

The main reason for the utilization of surface mount technology today is PWB area efficiency and the corresponding reduction of the system volume. Small surface mount components are used to manufacture electronic assemblies that are significantly smaller than the similar function assemblies using thru-hole components. Usually, the board area for most systems can be reduced by a factor of two for a single sided board. When components are mounted on both sides of the board, size reduction by another factor of two can be achieved. Conversely, the functional density can be doubled in the same area with the use of surface mount components. Since the height of surface mount components are generally smaller, significant reduction in system volume can also be achieved. Fewer, denser assemblies and correspondingly fewer connectors, less mechanical hardware and shorter lead lengths can yield another reduction factor of 2 to 4. Add to that the use of Application Specific IC's (ASIC's), and a total volume amounting to approximately 20 percent of the original system can result.

Size reduction however, is not the only SMT benefit. As a secondary benefit, the ever increasing demand for higher speed circuitry causes time delay reductions of even nanoseconds to be beneficial. Typically, an SMT package will have significantly lower values of inductance, capacitance and resistance compared to dual in-line packages (DIP). This is shown in the table below. Surface mount assembly essential is a four step manufacturing process:

1 Print the solder paste
2 Place components
3 Reflow the paste to form the solder interconnection between the component an the land area on the PWB
4 Clean-up

The use of a pick-and-place machined can perform the equivalent function handled by 3 to 4 machines in a standard thru-hole assembly area. Additionally, an automated SMT manufacturing line conserves space, used fewer people, has a shorter cycle time and reduces work in progress inventory. This helps achieve higher yields through more rapid feedback and use of statistical process control data. In all, the savings from automated SMT manufacturing can be as great as 50% compared to a thru-hole manufacturing area designed to build a similar electronic function.

SURFACE MOUNT VS. DUAL IN-LINE PACKAGES INDUCTANCE AND CAPACITANCE VALUE COMPARISONS

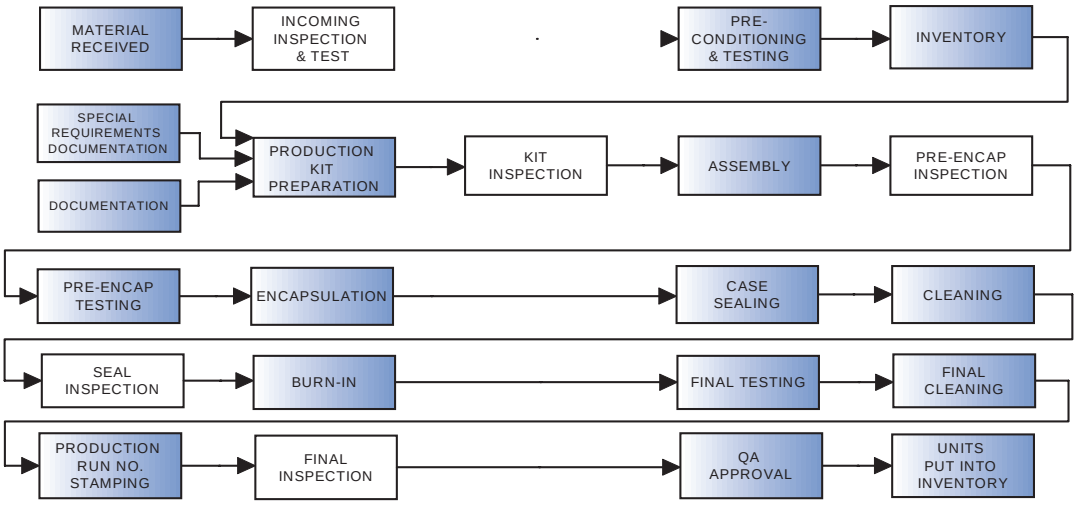
	DUAL IN-LINE PKG. (DIP)		SMALL OUTLINE (SO)		PLASTIC LEADED CHIP CARRIER (PLCC)	
LEADS	L (nH)	C (pF)	L (nH)	C (pF)	L (nH)	C (pF)
8	3.2-9.3	0.35-1.0	2.3-3.8	0.22-0.48	--	--
14	3.2-10.2	0.38-1.1	2.6-3.8	0.22-0.54	--	--
16	3.3-10.5	0.44-1.1	2.4-4.3	0.22-0.50	--	--
20	3.4-13.7	0.53-1.5	4.9-8.5	0.45-0.85	4.2-5.0	0.60-0.65
24	3.8-18.1	0.53-1.6	4.9-9.5	0.43-1.86	--	--
28	3.8-14.4	0.58-1.7			5.3-6.9	0.70-0.75
40/44	3.8-15.3	0.60-1.9			5.3-6.6	0.75-0.80
64/68	7.1-28.1	0.63-2.4			5.1-6.4	0.78-0.83

Values given are Min. and Max.

Mini-Circuits Guarantees Quality

Although we have gone beyond our past objective of exceeding 0.1% AQL- no rejects, not even one per 1000 units-this is not satisfactory anymore. Our present commitments are to achieve a Cpk of 1.5, or 4.5 sigma: not even 4 rejects per million units. Mini-Circuits' process controls using SPC, pre-control and design of experiments reduce variability of performance. "Skinny Sigma" is our way of life and it can be yours. Specify Mini-Circuits RF signal processing components to reduce your inspection costs and improve your production yields.

How Mini-Circuits achieves high reliability



Environmental Specifications

All MCL products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental tests of MIL-STD-202, unless otherwise noted. For amplifiers, see the table of environmental specifications at the beginning of the amplifier section of the Handbook.

Rating or Test	MIL-STD-202		Package Type			
	Method	Condition	Hermetic	Non-Hermetic		
				Metal	Plastic	Connectored
Temperature Operating, °C[1]	—	—	-55° to 100°	-55° to 100°	-40° to 85°	-55° to 100°
Temperature Storage, °C[1]	—	—	-55° to 100°	-55° to 100°	-55° to 100°	-55° to 100°[4]
Altitude: 150,000 feet	105	E	Yes	Yes	Yes	Yes
Humidity: 90%RH, 65°C	106	—	Yes	Yes[2]	[3]	Yes[2]
Thermal Shock: -65 to 125°C	107	B	Yes	Yes	-55° to 100°	-55° to 100°
Fine Leak, atm-cc/s	112	C	1x10-7	Not Appl.	Not Appl.	Not Appl.
Gross Leak, atm-cc/s	112	D	1x10-5	Not Appl.	Not Appl.	Not Appl.
Drop: random, 45 minutes	203	—	Yes	Yes	Yes	Yes
Vibration: 2 to 2000 Hz, 20 G's, 12 hours	204	D	Yes	Yes	Yes	Yes
Solderability: 95% coverage	208	—	Yes	Yes	Yes	Not Appl.
Solder heat: 260°C 10 seconds	210	B	Yes	Yes	Yes	Not Appl.
Terminal tensile strength: 4-1/2 lbs., 10 seconds	211	A	Yes	Yes	Yes	Not. Appl.
Terminal fatigue: 2 lbs. 3 cycles	211	C	Yes	Yes	Yes	Not. Appl.
Mechanical shock: 100 G's, 6 ms	213	I	Yes	Yes	Yes	Yes
Solvent resistance	215	—	Yes	Yes	Yes	Not. Appl.

For surface mount models, see surface mount environmental specifications in General Information (section 0)

Notes:
1. Extended temperature ranges are available for some models; consult factory.
2. Non-hermetic metal-cased units may require bake-out after test to restore full performance.
3. Humidity capabilities of plastic-cased units available on special request.
4. For BW attenuators, with connectors unmated -55° to +85°C.

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Product Testing For High Reliability

Ultra-Rel®

Mini-Circuit's mixers, phase detectors, frequency doublers and limiters are "Ultra-Rel®": They carry a five-year guarantee, a reliability breakthrough attributed mainly to unique Ultra-Rel® diodes that easily meet and exceed MIL-STD-883 tests. Each type of diode must pass the following grueling tests:

LIFE	1000 hrs. TA + 125°C, 50 mA ac
THERMAL SHOCK	-65° to +125°C, 200 cycles, 5 min. dwell
MECHANICAL SHOCK	1.5k G's, 0.5 msec pulse
VIBRATION	variable frequency 20 to 2,000 Hz.
TEMPERATURE CYCLE	-65°C to +125°C, 200 cycles, 10 min. dwell
MOISTURE RESISTANCE	85°C/@85%humidity 1000 hrs., no bias
HI-TEMPERATURE STORAGE	125°C, 160 hrs.

/MIL and Hi-Rel Products

All hermetically sealed MCL models can be subjected to screening and to environmental testing. These tests are designed to eliminate early failures and to ensure performance in hostile environments. Many models having such testing performed are available from stock parts, designated by a /MIL, or Hi-Rel suffix to the model number. For your convenience, the table below summarizes availability and applicable MIL Spec by product line. A brief description of the test procedures follows the table.

Of course, if you have a specific screening requirement for any model, which is not available from a stock item, or for a non-hermetic model, contact our Applications Engineering staff and they will suggest the most cost-effective means of satisfying your reliability needs.

/MIL Models

Mixers, Frequency Doublers and Phase Detectors are tested in accordance with MIL-M-28837. Pre-conditioning, Group A (screened) and Group B are performed on each inspection lot.

Power Splitters are tested in accordance with MIL-P-23971. Group A and Group B are performed on each inspection lot.

These models may be ordered by adding the suffix /MIL to the model number.

Product Line	Applicable Suffix		Applicable Std. or Specification for reference
	*Hi-Rel	*/MIL	
Amplifiers	No	No	MIL-STD-883
Digital Step Attenuators	No	No	MIL-STD-883
Directional Couplers	Yes	No	MIL-C-15370
Electronic Attenuators/			
Switches	Yes	Yes	MIL-M-28837
Filters	Yes	No	MIL-F-18327
Fixed Attenuators	Yes	No	MIL-A-3933
Frequency Doublers	Yes	Yes	MIL-M-28837
I & Q Modulators and Demodulators	No	No	MIL-M-28837
Limiters	No	No	MIL-M-28837
Mixers	Yes	Yes	MIL-M-28837
Phase Detectors	Yes	Yes	MIL-M-28837
Phase Modulators	No	No	MIL-M-28837
Power Splitter/ Combiners	Yes	Yes	MIL-P-23971
Switches	Yes	No	MIL-STD-883
Terminations	No	No	MIL-D-39030
Transformers	Yes	No	MIL-T-55631

*Check with our Sales Department for specific models available as Hi-Rel. or MIL.

Hi-Rel Models

Mixers, Phase Detectors, Frequency Doublers and Electronic Attenuators/Switches are tested to the following per MIL-STD-202:

I) THERMAL SHOCK	Method 107, Cond. A (100°C)
2) BURN-IN	Method 108, Cond. A (100°C, 8mA ac)
3) FINE AND GROSS LEAK	Method 112, Cond. C and D

Power splitter/combiners, Directional Couplers, Transformers, Fixed Attenuators, Filters and Limiters are tested to the following per MIL-STD-202:

1) BAKE-IN	Method 108, Cond. A (100°C, no excitation)
2) THERMAL SHOCK	Method 107, Cond. A (100°C)
3) FINE & GROSS LEAK	Method 112, Cond. C and D

Switches incorporating PIN diodes are tested to the following per MIL-STD-202, as a minimum:

1) THERMAL SHOCK	Method 107, Cond. A (100°C)
2) BURN-IN	Method 108, Cond. A (100°C, diode current applied)

For additional tests applicable to specific switch models, please consult our Sales Department.

These models may be ordered by adding the suffix Hi-Rel to the model number.

Compatibility with Cleaning Methods

Mini-Circuits products in hermetic packages will withstand all cleaning methods commonly applied by users when soldering onto PC boards, such as aqueous wash. **Caution**: Ultrasonic cleaning is not recommended; it may cause damage to internal parts.

Many non-hermetic models are also guaranteed to be aqueous washable. These include the plastic and ceramic case styles CG581 and QQQ569, for example, as well as wash-through and monolithic devices. Care should be taken regarding aqueous wash for other non-hermetic models, by noting the technical guidance given in this article, and requesting assistance as needed from our Sales or Applications departments. Often, selection or simple adaptation of our product will enhance its washability.

"Aqueous wash", as generally understood, means the use of high pH (caustic) saponifiers, and such chemicals can affect internal materials. These may attack copper, and/or may dissolve magnet wire insulation and soften epoxy-based bonding material if they remain in contact for an extended time.

"Water wash" generally means the use of DI (deionized) water only, without a saponifier. The only consequence of using water wash on a design which does not guarantee complete sealing is the possible need for a dry-out step after cleaning.

Connector Specifications

All coaxial connectors used in MCL products meet applicable requirements of MIL-PRF-39012 including mating compatibility, coupling proof torque, and contact retention. For applications with specific materials and finish requirements, consult factory.

Meeting Customer Needs

The following table outlines generic types of tests we do to satisfy customer's needs per specific contractual requirements. Each entry encompasses one or more QCPs (Quality Control Procedures) which are particularized as to test conditions. The principal MIL standards referenced in the QCPs are listed as a guide.

MINI-CIRCUITS QCP GROUP	TEST	METHODS OF MIL-STD -202	-810	-883
02-00	THERMAL SHOCK	107	503	1010
03-00	RANDOM VIBRATION	214		
04-00	MECHANICAL SHOCK	207,213	516	
05-00	CONSTANT ACCELERATION	212		2001
06-00	BAKE-IN/BURN-IN	108		1015
07-00	SEAL TESTS	112		
08-00	MOISTURE RESISTANCE	106	507	
09-00	RADIOGRAPHIC	209		2012
10-00	SINE VIBRATION	201	514	
11-00	HIGH FREQUENCY VIBRATION	204		
12-00	HUMIDITY	103		
13-00	ALTITUDE (BAROMETRIC PRESSURE)	105	500	
14-00	SALT-SPRAY	101	509	
15-00	TERMINAL STRENGTH	211		
16-00	RESISTANCE TO SOLVENTS	215		
17-00	SOLDERABILITY	208		
18-00	RESISTANCE TO SOLDERING HEAT	210		
19-00	IMMERSION	104		
20-00	EXPLOSION	109	511	
21-00	SAND AND DUST	110	510	
22-00	FUNGUS TEST		508	
25-00	PARTICLE IMPACT NOISE DETECTION (PIND)			2020

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statistical process control... key to competitive manufacturing

In today's tough world market environment, the need to be better is more demanding, and the need to be more competitive is a necessity to survive. A company cannot rest on the success of past performance and expect to continue to remain successful. There are many well known examples of companies both large and small that were once leaders in their field and now are skeletons of themselves or just plain dead and buried.

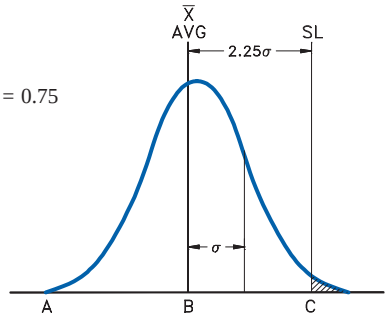
How does one get more competitive? The answer is simple. Exceed your customers' needs and expectations...provide, in the manner required by the customer, a quality product at low cost, on time, every time. In most manufacturing organizations a significant cost factor is attributed to the cost of purchased materials and they may range from 25% to 80% of the cost of the entire product. Because of the significance of purchased material to total cost, the quality of the purchased material is important and essential to the competitiveness of the manufacturing organization.

This paper will discuss the effects of quality on the direct and indirect causes that contribute to the *real cost* of the purchased material. A measure of the quality of the material will be described by a quality factor, Cpk. The higher the value of Cpk, the better the quality of the product. Cpk is a measure of the repeatability of material performance. The higher the number, the better is the consistency of performance or the less is the variation in performance. Therefore, once designed in, the material should be consistent enough so that its variations are not transparent to the final product.

$$C_{pk} = \frac{2.25\,\sigma}{3\sigma} = 0.75$$

or

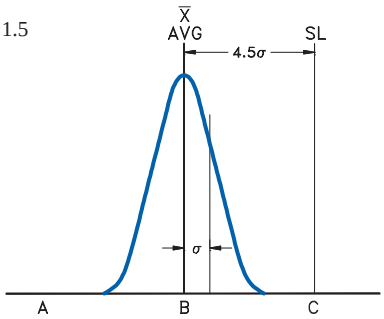
SP=2.25



$$C_{pk} = \frac{4.5\,\sigma}{3\sigma} = 1.5$$

or

SP=4.5



In manufacturing, variation is evil! If the value of Cpk for a purchased part is low, and Cpk varies from production lot-to-lot, then it can be projected the process for manufacturing the part is not in control, performance will be inconsistent, rejects can be expected, and the true cost of the purchased part will be significantly higher than the price shown on the purchase order.

With the abundance of low cost computers and hand held scientific calculators, the ability to calculate Cpk is easily attainable. Cpk is a quality factor that is based on the statistical calculation of mean value, $\bar{x}$ and standard deviation, sigma. Cpk is the difference in value between the mean value and the closest spec limit divided by 3 sigma.

$$Cpk = \frac{\text{(spec limit - mean value)}}{\text{3 sigma}}$$

At Mini-Circuits we use SP (Sigma Performance) = 3 times Cpk. We must *measure* variation to control it. If we can measure it we can tell when it gets better or worse. We need to know what works and what doesn't work. How much a manufacturing process varies is measured by Sigma (σ). In the figures shown, the average (AVG) tells us where the process is centered. The spread or width is measured by sigma. The figures show how the product is distributed. The height of the graph measures how often values occur. The spread measures how far the values are from the AVG. If the product is well controlled, there will be little variation, more values of units will occur nearer the target, $\bar{x}$, and sigma will be small.

Manufactured products are either good or bad depending on whether they do what the customer wants them to do. Specification limits were the measure of success, where product within spec was good and out of spec bad. It is not enough in today's market place to *just* meet spec! In the figures shown, a spec limit (SL) is compared to the product distribution. Product built outside, or to the right of the spec limit, is very bad; even product built just to the left of the spec limit is not good. Small (skinny) Sigma means the product will be far from the spec limit and close to the AVG value (very good product, what today's customers demand).

We can compare different processes by measuring variation and the distance from the average to the spec limit. But only if we measure the distance in terms if sigma, as shown in the figures. The real distance is the same for both figures (C-B), meaning both processes are centered and the AVG values are equal. But, in terms of product quality, the figure on the bottom is far superior (4.5>2.25) because the variation between units is much less as given by the skinnier value of sigma.

For convenience, we normalize by dividing the distance (C-B) by sigma (considered a relative ideal), and get the capability index, Cpk, a figure of merit. The skinnier the σ is, the higher the Cpk, and the less variation, unit-to-unit.

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The "goodness" of the purchased parts, Cpk, will affect the actual *real cost* of the purchased material. This real cost can vary and will depend on the original design and the specifications describing the purchased material. The real cost depends on the sum of both direct and indirect costs. These are:

Costs additive to the cost of purchased parts:

A. Direct costs of poor quality parts:

1. Warranty
2. Scrap and repair
3. Inspection/test

B. Indirect costs of poor quality parts:

1. Lost sales-customers switching to competition
2. Field trips, retrofits, settlements
3. Downtime, line shut downs, delinquencies, rescheduling
4. Inventory build-up, obsolete material, MRB, material expediting, material shrinkage
5. Engineering changes and redesign, documentation changes, material selection and separation

C. Indirect costs, demands of the manufacturing system on company's resources:

1. Space
2. Manpower, receiving, production control, manufacturing,sales, finance, engineering, QA, accounting, maintenance, house cleaning
3. Utilities (lighting, heating, air conditioning, telephone)
4. Capital equipment (testing, incoming inspection and production, data processing)
5. Finances, cost to maintain higher inventory of material
6. Data processing and data entry

Description of costs to the manufacturer of poor quality parts received.

When poor quality parts are received, the manufacturer must maintain an incoming inspection department to check parts for conformance to specifications. *If* all parts were received with a Sigma Performance = 4.5 or, Cpk =1.5, then the demands for incoming inspection would evaporate. However, this is not the case in the real world today. Therefore, the cost of the inspection department is visually spread out and amortized as a percentage of the total cost of all material received. However, when poor quality parts are received, there are direct additional costs that are incurred by the manufacturing organization. These costs include additional testing and inspection so that additional manpower and capital equipment are required. In addition, there are added costs associated with documents DMR, RTV etc.; MRB meetings; purchasing costs such as expediting, search for alternatives, rescheduling and issuing of p.o. change orders; and engineering costs for evaluation and test.

In addition to incoming inspection costs, the delays of incoming material to the production floor will generate additional manufacturing costs. These include rescheduling and smaller production runs (less parts available); inefficiency of resources, such as manpower and machines, increased space requirements and WIP; increased material shrinkage and increased manufacturing throughput time.

The results of these manufacturing delays and costs will cause shipment delays and increased manufacturing costs that may be passed on to customers. Both factors contributing to a less competitive position!

To pursue Mini-Circuits' goal to exceed our customer's expectations, Mini-Circuits is striving to achieve an SP of 4.5 or, Cpk = 1.5. All mixer and I&Q modulator conversion loss is specified in statistical terms. We are vigorously pursuing statistical process control and statistical specifications on all our products to enable our customers to receive the highest quality and value, at the lowest cost...the key to competitive manufacturing.

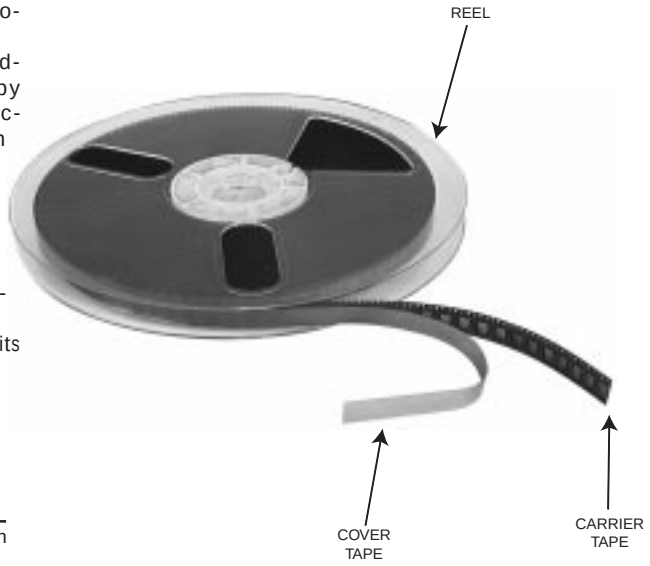
tape and reel packaging for surface mount devices

Design-For-Assembly (DFA) and Design-For-Manufacture (DFM) stand tall alongside CAD/CAM in the quest to optimize profitability, production efficiency and equipment operating usage.

Automation of surface-mount assembly by the use of pick-and-place equipment to handle tiny components has been enhanced by evolutionary improvements in tape-and-reel systems which can accommodate as many as 4000 parts on a 13-inch reel. This results in less frequent component reloading and less downtime of the assembly equipment. Other advantages of tape feeders include versatility or the ability to handle a variety of parts.

Mini-Circuits has kept pace with the trend towards automated assembly and offers RF/Microwave signal-processing components (mixers, amplifiers, transformers, power splitters, switches and others) in tape-and-reel format as shown below.

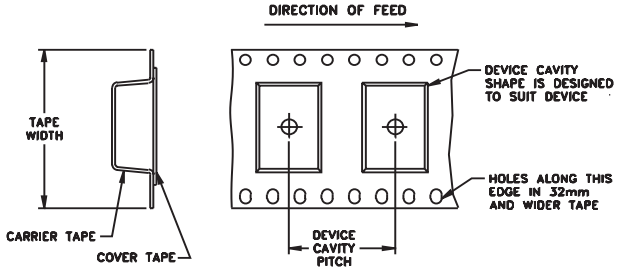
To order a tape-and-reel packaged product, add suffix -TR to its model number.

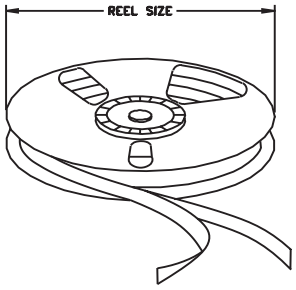


packaging information[1]

Packaging Part No.	Case Style	Tape Width (mm)	Reel Size (inches)	Device Cavity Pitch (mm)	Devices per Reel	Orientation Figure No.
F1	KK81	24	13	12	900	T-001
F2	TT100	16	13	12	500	T-002
F3	TT240	16	13	12	500	T-002
F4	WW107	12	7	8	1000	T-003
F5	YY101	32	13	16	500	T-015
F6	YY161	32	13	16	500	T-015
F7	KKK155	24	13	16	500	T-005
F8	MMM168	8	7	8	3000	T-006
F9	NNN150	24	13	16	500	T-007
F10	QQQ130	24	13	16	500	T-015
F11	RRR137	12	7	8	500	T-009
F12	TTT166	24	13	12	500	T-010
F13	TTT167	24	13	12	500	T-010
F14	AF190	12	7	8	500,1000	T-011A
F15	AG191	16	13	12	500	T-005
F16	XX211(2)	12	7	8	1000,2500	T-015
F17	AT224/577	12	13	8	1000 (3)	T-012
F18	AN213	24	13	16	500	T-013
F19	XX112	16	7	8	500	T-001
F20	CTT248	16	13	12	500	T-002
F21	BG291	32	13	32	200	T-015
F22	BK276	32	13	16	500	T-015
F23	BJ293	24	13	16	500	T-015
F24	BH292	16	13	12	500	T-015
F25	BL301	44	13	32	125	T-015
F26	AF320	12	7	8	1000	T-011B
F27	BK343	32	13	16	500	T-015
F28	BK377	32	13	20	500	T-015
F29	BJ398	24	13	12	500	T-015
F30	QQQ569	32	13	16	500	T-015
F31	CA531	8	7	4	1000	T-001
F32	CB518	16	13	12	500	T-015
F33	CB539	16	13	12	500	T-015
F34	CD541	16	13	12	1000	T-015
F35	CD542	16	13	12	1000	T-015
F36	CG581	24	13	12	500	T-010
F37	CK605	24	13	16	500	T-010
F38	BJ360	32	13	16	500	T-015
F42	CJ608	24	13	16	500	T-015
F43	CL620	16	7	8	500	T-015
F44	CM624	16	13	12	1000	T-015
F45	CD636	16	13	12	1000	T-015
F46	CD637	16	13	12	900	T-015
F47	DB714	12	13	8	1000 (3)	T-008
F48	SM18	24	13	16	1000	T-015
F49	SM1/SM2	16	13	12	1000	T-015
F50	TT241	24	13	12	500	T-002
F51	SM34	24	13	16	500	T-015
F52	SM33	16	13	12	1000	T-015
F53	SM20	32	13	16	500	T-015
F54	SM31	16	13	12	1000	T-014
F55	DF782	12	7	8	1000	T-004

tape illustration





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NOTES:

1. For device marking & outline, see case style/outline drawings.
2. For VNA-25, 1000 devices per 7" reel or 2500 devices per 13" reel.
   For BP models, 1000 devices per reel. MSW/A models, 2500 devices per 13" reel.
3. For other quantities contact Mlni-Circuits Sales.

device orientation

Fig. T-001

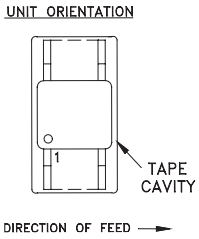


Fig. T-002

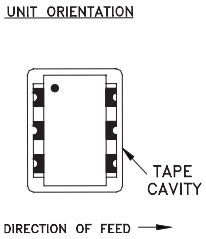


Fig. T-003

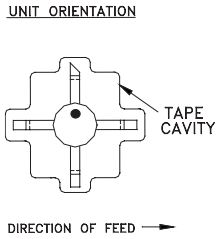


Fig. T-004

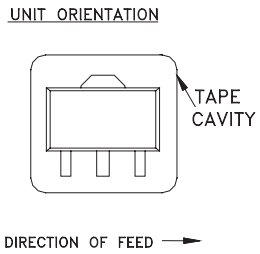


Fig. T-005

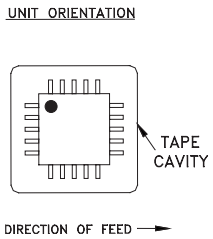


Fig. T-006

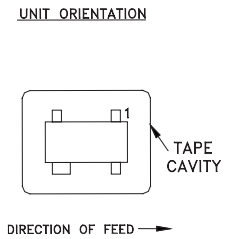


Fig. T-007

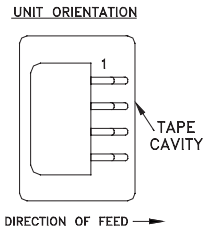


Fig. T-008

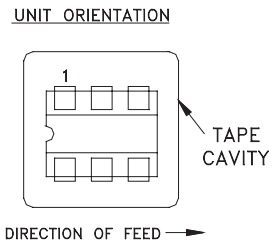


Fig. T-009

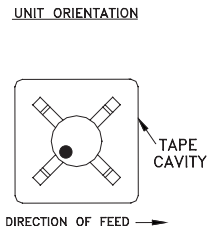


Fig. T-010

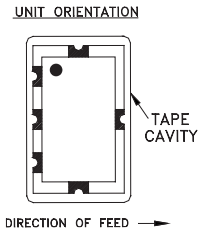


Fig. T-011A

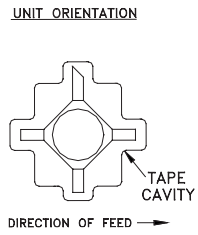


Fig. T-011B

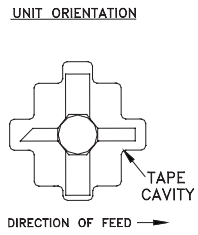


Fig. T-012

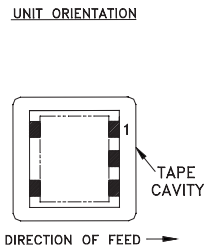


Fig. T-013

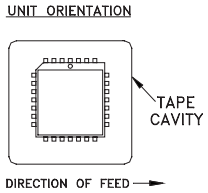


Fig. T-014

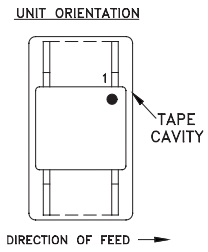
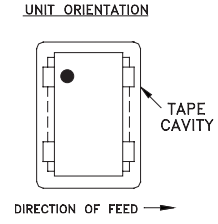


Fig. T-015



010723

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
A01	.770 19.56	.800 20.32	.385 9.78	.400 10.16	.370 9.40	.400 10.16	.200 5.08	.20 5.08	.14 3.56	.031 .79									5.2	A1,B3,E1,B7
A03	.480 12.19	.500 12.70	.390 9.91	.405 10.29	.210 5.33	.230 5.84	.100 2.54	.20 5.08	.14 3.56	.020 .51									2.3	A1,B4,E1,B7
A04	.770 19.56	.800 20.32	.200 5.08	.210 5.33	.370 9.40	.400 10.16	.200 5.08	.20 5.08	.14 3.56	.031 .79									3.7	A1,B3,E1,B7
A05	.770 19.56	.800 20.32	.240 6.10	.250 6.35	.370 9.40	.400 10.16	.200 5.08	.20 5.08	.14 3.56	.031 .79									3.7	A1,B3,E1,B7
A06	.770 19.56	.800 20.32	.285 7.24	.310 7.87	.370 9.40	.400 10.16	.200 5.08	.20 5.08	.14 3.56	.031 .79									5.2	A1,B3,E1,B7
A11	.480 12.19	.500 12.70	.240 6.10	.255 6.48	.210 5.33	.230 5.84	.100 2.54	.20 5.08	.14 3.56	.020 .51									1.9	A1,B4,E1,B7
B02	.480 12.19	.500 12.70	.240 6.10	.255 6.48	.210 5.33	.230 5.84	.16 4.06	.100 2.54	.14 3.56	.20 5.08	.020 .51								1.9	A1,B4,E1,B7
B13	.480 12.19	.500 12.70	.390 9.91	.405 10.29	.210 5.33	.230 5.84	.16 4.06	.100 2.54	.14 3.56	.20 5.08	.020 .51								2.3	A1,B4,E1,B7
C07	.770 19.56	.810 20.57	.380 9.65	.410 10.41	.030 .76	.200 5.08	.20 5.08	.14 3.56											11.0	A1,E1,B7
C145	.770 19.56	.810 20.57	.380 9.65	.410 10.41	.030 .76	.200 5.08	.20 5.08	.14 3.56											11.0	A1,E1,B7
D08	1.000 25.40	1.025 26.04	.390 9.91	.430 10.92	.500 12.70	.525 13.34	.025 .64	.300 7.62	.200 5.08	.09 2.29	.13 3.30	.150 3.81	.20 5.08	.14 3.56					8.5	A1,E1,B7
D09	1.000 25.40	1.025 26.04	.240 6.10	.280 7.11	.500 12.70	.525 13.34	.025 .64	.300 7.62	.200 5.08	.09 2.29	.13 3.30	.150 3.81	.20 5.08	.14 3.56					7.5	A1,E1,B7
E10	1.580 40.13	1.620 41.15	.380 9.65	.410 10.41	.770 19.56	.810 20.57	.030 .76	.200 5.08	.10 2.54	.20 5.08	.14 3.56								23.0	A1,E1,B7
F14	2.00 50.80	2.00 50.80	.75 19.05	1.00 25.40	.25 6.35	1.500 38.10	.125 3.18	.39 9.91	1.00 25.40	.50 12.70	1.00 25.40								170.0	A10, C1,D2
F53	2.00 50.80	2.0 50.80	.75 19.05	1.00 25.40	.13 3.30	1.750 44.45	.125 3.18	.39 9.91	1.00 25.40	.50 12.70	1.00 25.40								170.0	A10 C1,D2
F183	1.26 32.00	1.00 25.40	.70 17.78	.200 5.08	.200 5.08	.860 21.84	.125 3.18	.35 8.89	.63 16.00	.38 9.65	.50 12.70								24	A4,B1,D17
G15	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	.61 15.49	— —	.80 20.32	.80 20.32	.76 19.30	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				85.0	A10,A18,B1, D1,D7
G144	1.25 31.75	1.25 31.75	— —	.63 16.00	.38 9.65	.61 15.49	— —	— —	— —	.76 19.30	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				85.0	A10,A18, B6,D6
H16	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	1.000 25.40	.125 3.18	1.000 25.40	— —	— —	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				70.00	A10,A18,B1, D2,D3,D4
J17	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	1.000 25.40	.125 3.18	1.000 25.40	— —	— —	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				75.0	A10,A18, B1,D2,D3
K18	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	1.000 25.40	.125 3.18	1.000 25.40	— —	— —	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				70.0	A10,A18,B1, C1,D2,D3
K558	1.25 31.75	1.25 31.75	.94 23.88	.63 16.00	.47 11.94	1.000 25.40	.125 3.18	1.000 25.40											117.0	A4,C1, D14
L19	1.50 38.10	1.13 28.70	1.00 25.40	.50 12.70	.155 3.94	2.345 59.56	.138 3.51	.987 25.07	2.50 63.50	.10 2.54	.31 7.87	1.19 30.23	— —	.66 16.76	— —	— —	.150 3.81		37.0	A6,A11,A18, B2,D6
L20	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.10 2.54	.40 10.16	1.86 47.24	— —	.64 16.26	— —	— —	.150 3.81		74.0	A6,A11,A18, B2,D5
M21	1.50 38.10	1.13 28.70	1.00 25.40	.50 12.70	.155 3.94	2.345 59.56	.138 3.51	.987 25.07	2.50 63.50	.10 2.54	.31 7.87	.75 19.05	1.19 30.23	.66 16.76	— —	— —	.150 3.81		40.0	A6,A11,A18, B2,C1,D6
M22	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.10 2.54	.40 10.16	1.15 29.21	1.86 47.24	.64 16.26	— —	— —	.150 3.81		74.0	A6,A11,A18, B2,C1,D5

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A1. Header material: C.R.S. Pin material: #52 alloy. Finish: electro tin, hot-oil flowed. Cover material: cupro-nickel.
- A4. Case material: aluminum alloy. Finish: iridite per MIL-C-5541
- A6. Case material: aluminum alloy. Finish: blue paint over iridite.
- A10. Case material: aluminum alloy. Finish: grey paint or yellow iridite.
- A11. Case material: aluminum alloy. Finish: blue anodized.
- A18. Mounting bracket finish: iridite or clear anodize.

B. MOUNTING
- B1. Mounting bracket available on request. Add suffix B to part number.
- B2. Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and $5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add $1.50 to unit cost.
- B3. Insulated spacer available. Request P/N B14-045-01.
- B4. Insulated spacer available. Request P/N B-14-047-01.
- B6. Bracket version only.
- B7. Pin's meniscus (of header): 0.015" max.

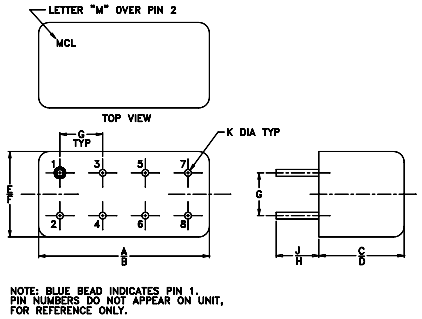
C. MARKING
- C1. For port markings 1, 2, and 3 see specification data sheet.

D. CONNECTORS
- D1. Connectors: SMA Standard. BNC on request (no charge). Male SMA on request, onsult factory.
- D2. Connectors: please specify, unless otherwise noted; BNC is standard, TNC, SMA and Type N, consult factory. (ZAPD -4 units not available with BNC).
- D3. For Bracket Version, Option B, this dimension, "C*", changes from 0.75 to 0.94 inches when connectors are type N or TNC.
- D4. FTB Models available:
  *A15 female BNC/isolated female BNC.
  *C15 male BNC/isolated female BNC.
  FT Models available:
  *A16 female BNC/female BNC 75 ohms.
  *B16 female BNC/male BNC 75 ohms.
  *C16 male BNC/female BNC 75 ohms.
- D5. Connectors: BNC standard, TNC consult factory.
- D6. Connectors: Female SMA only. Male SMA available on request, consult factory.
- D7. For ZFSC-5 a fifth connector is offered as Port 5 in-line and opposite of sum(s) port.
- D14. Connectors: Male N, Female N standard.
- D17. Connectors: Female SMA only.

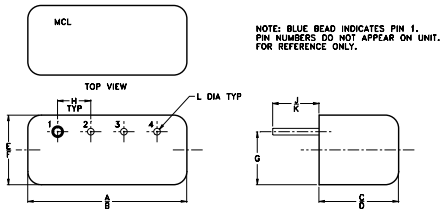
E. SPECIAL TOLERANCES
- E1. Pin diameter ±.005 inch.

OUTLINE DRAWINGS

A



B



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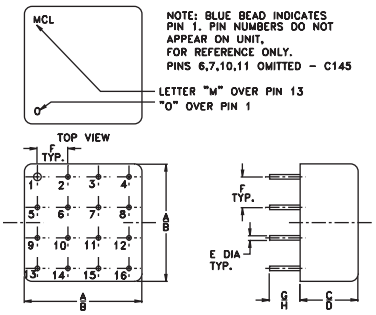

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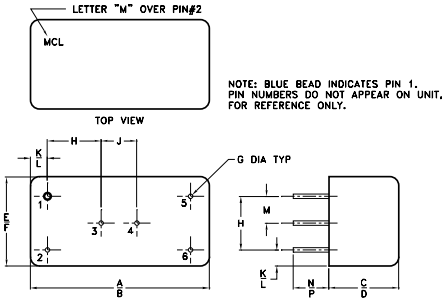

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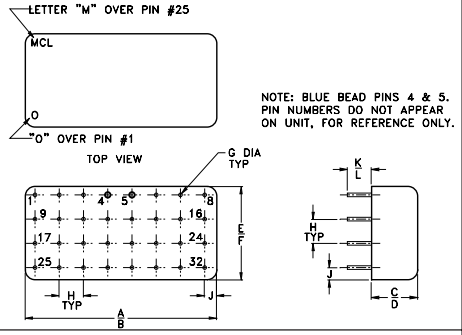

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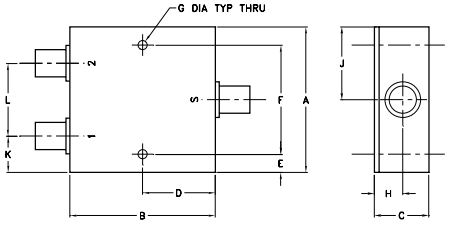

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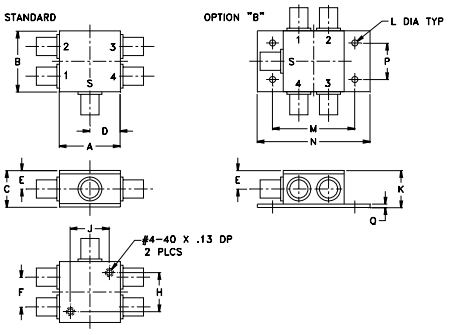

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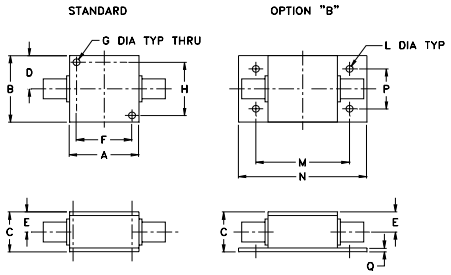
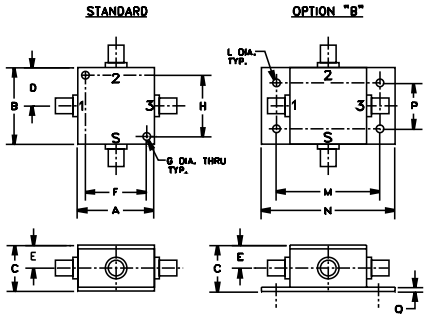
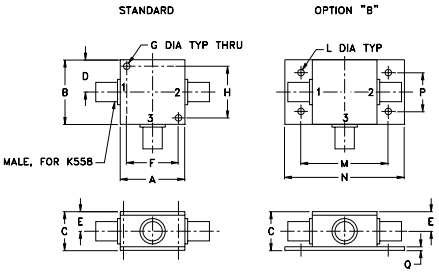


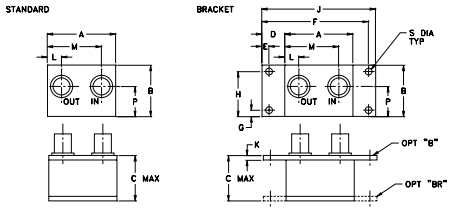
J



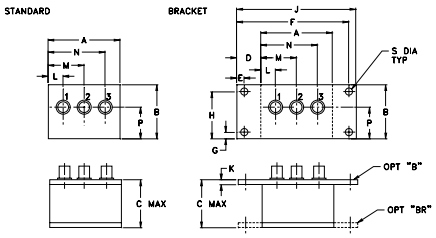
K



L



M



CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
N24	1.50 38.10	1.13 28.70	1.00 25.40	.50 12.70	.155 3.94	2.345 59.56	.138 3.51	.987 25.07	2.50 63.50	.10 2.54	.32 8.13	.75 19.05	1.18 29.97	.31 7.87	.56 14.22	.81 20.57	.150 3.81		45.0	A6, A11, A18, B2, D6
N27	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.10 2.54	.48 12.19	1.13 28.70	1.78 45.21	.36 9.14	.69 17.53	1.01 25.65	.150 3.81		92.0	A6, A11, A18, B2, D8
P25	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.10 2.54	.78 19.81	1.47 37.34	— —	.38 9.65	1.00 25.40	— —	.150 3.81		86.0	A6, A11, A18, B2, D8
P26	1.50 38.10	1.13 28.70	1.00 25.40	.50 12.70	.155 3.94	2.345 59.56	.138 3.51	.987 25.07	2.50 63.50	.10 2.54	.50 12.70	1.00 25.40	— —	.31 7.87	.81 20.57	— —	.150 3.81		42.5	A6, A11, A18, B2, D6
Q28	4.06 103.12	1.60 40.64	1.50 38.10	3.56 90.42	.24 6.10	.88 22.35	.36 9.14	.160 4.06	.4 10.16	.69 17.53	.58 14.73	.66 16.76	3.13 79.50	.8 20.32	.06 1.53				300.0	A10, A18, D9
R29	4.06 103.12	1.60 40.64	1.50 38.10	3.56 90.42	.24 6.10	.88 22.35	.36 9.14	.160 4.06	.4 10.16	.69 17.53	.58 14.73	.66 16.76	3.13 79.50	.8 20.32	.06 1.53				300.0	A10, A18, C2, D9
R30	6.69 169.93	1.60 40.64	1.50 38.10	6.22 157.99	.24 6.10	.88 22.35	.36 9.14	.160 4.06	.40 10.16	.69 17.53	.55 13.97	.66 16.76	5.72 145.29	.81 20.57	.06 1.53				500.0	A10, A18, C2, D9
R31	9.31 236.47	1.60 40.64	1.50 38.10	8.84 224.54	.24 6.10	.88 22.35	.36 9.14	.160 4.06	.40 10.16	.69 17.53	.54 13.72	.66 16.76	8.34 211.84	.81 20.57	.06 1.53				700.0	A10, A18, C2, D9
R67	6.69 169.93	1.60 40.64	1.50 38.10	6.22 157.99	.24 6.10	.88 22.35	.36 9.14	.160 4.06	.40 10.16	.69 17.53	1.22 30.99	.66 16.76	5.72 145.29	.81 20.57	.06 1.53				500.0	A10, A18, D9
S32	3.75 95.25	2.00 50.80	1.8 45.72	.19 4.83	3.375 85.72	.19 4.83	1.625 41.27	.156 3.96	.6 15.24	.4 10.16	.5 12.70	1.30 33.02	.09 2.29	.38 9.65	3.00 76.20	.30 7.62	2.60 66.04		220.0	A7, A18, D9
T34	4.75 120.65	2.00 50.80	2.21 56.13	.19 4.83	4.375 111.13	.23 5.84	1.540 39.12	.144 3.66	.58 14.73	.34 8.64	.50 12.70	1.50 38.10	1.00 25.40	.12 3.05	.38 9.65	4.00 101.60	.30 7.62	2.60 66.04	440.0	A7, A8, A18, D16
T35	4.75 120.65	2.00 50.80	2.40 60.96	.19 4.83	4.375 111.13	.23 5.84	1.540 39.12	.144 3.66	.58 14.73	.34 8.64	.50 12.70	1.50 38.10	1.00 25.40	.12 3.05	.38 9.65	4.00 101.60	1.50 38.10	5.00 127.00	700.0	A7, A8, A18, D16
U36	7.00 177.80	3.25 82.55	2.13 54.10	.25 6.35	6.500 165.10	.38 9.65	2.500 63.50	.156 3.96	.73 18.54	.88 22.35	.63 16.00	1.13 28.70	2.23 56.64	.125 3.17	.50 12.70	6.00 152.40			900.0	A7, A8, A18, D6
U200	7.00 177.80	3.25 82.55	2.13 54.10	.25 6.35	6.500 165.10	.38 9.65	2.500 63.50	.156 3.96	.53 13.46	.73 18.54	.20 5.08	.70 17.78	1.25 31.75	.125 3.17	.50 12.70	6.00 152.40	2.15 54.61	.50 12.70	1000.0	A7, A18, D6
V37	.83 21.08	.83 21.08	.75 19.05	.37 9.40	.42 10.67	1.25 31.75	.100 2.54	1.150 29.21	.095 2.41	.735 18.67	.21 5.33	.106 2.69	.06 1.52						34.0	A10, A18, C1, D17
W38	.30 7.62	.27 6.86	.23 5.84	.010 0.25	.042 1.07	.020 0.51	.100 2.54	.05 1.27	.09 2.29	.31 7.87	.036 0.91								.50	A13, E2
X65	.30 7.62	.27 6.86	.23 5.84	.010 0.25	.042 1.07	.020 0.51	.100 2.54	.05 1.27	.04 1.02	.11 2.79	.300 7.62	.35 8.89							.50	A13, E2
Y39	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.36 9.15	1.000 25.4	1.000 25.4	.125 3.2	.125 3.2	.46 11.7	2.18 55.4	1.688 42.9	.07 1.8	.750 19.0	.50 12.7	.80 20.3	.45 11.4	.29 7.4	50.0	A4, A18, B1, D6, D22
Y460	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.36 9.15	1.000 25.4	1.000 25.4	.125 3.2	.125 3.2	.46 11.7	2.18 55.4	1.688 42.9	.07 1.8	.750 19.0	.50 12.7	.80 20.3	.45 11.4	.29 7.4	50.0	A4, A18, B1, D6
Z41	7.06 179.32	3.13 79.50	.88 22.35	.250 6.35	1.750 44.45	5.310 134.87	6.810 172.97	.250 6.35	2.875 73.03	.144 3.66	3.53 89.66	.44 11.18	.415 10.54	.89 22.61					800.0	A10, D11
Z54	3.50 88.90	2.13 54.10	.88 22.35	.250 6.35	— —	— —	3.250 82.55	— —	— —	.125 3.17	1.750 44.45	.44 11.18	.415 10.54	.89 22.61	.250 6.35	1.813 46.05			250	A10, D11
Z184	2.26 57.40	2.00 50.80	.70 17.78	.200 5.08	— —	— —	2.060 52.32	— —	— —	.125 3.17	1.13 28.70	.35 8.89	.38 9.65	.500 12.70	.200 5.08	— —			59	A4, D17
Z259	7.06 179.32	3.13 79.50	.88 22.35	.250 6.35	1.750 44.45	5.310 134.87	6.810 172.97	.250 6.35	2.875 73.03	.144 3.66	3.53 89.66	.44 11.18	1.31 33.27	.89 22.61					800.0	A4, C2 D24
Z667	7.06 179.32	3.13 79.50	1.00 25.40	.250 6.35	1.430 36.32	5.630 143.00	6.810 172.97	.250 6.35	2.875 73.03	.156 3.96	3.53 89.66	.44 11.18	.73 18.54	2.80 71.12					810.0	A4, D25
Z668/689	7.06 79.32	3.13 79.50	1.00 25.40	.250 6.35	1.430 36.32	5.630 143.00	6.810 172.97	.250 6.35	2.875 73.03	.156 3.96	3.53 89.66	.44 11.18	.73 18.54	1.40 35.56					810.0	A4, D25

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541.
- A6. Case material: aluminum alloy. Finish: blue paint over irridite
- A7. Case material: aluminum alloy. Finish: case black paint. Heat sink: black anodize. Baseplate iridite per MIL-C-5541.
- A8. Case material: aluminum alloy. Finish: case irridite. Heat sink: black anodize.
- A10. Case material: aluminum alloy. Finish: grey paint, or yellow iridite.
- A11. Case material: aluminum alloy. Finish: blue anodized.
- A13. Case material: plastic. Lead Finish: tin-lead plate.
- A18. Mounting bracket finish: irridite or clear anodize.

B. MOUNTING
- B1. Mounting bracket available on request. Add suffix B to part number.
- B2. Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and $5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add $1.50 to unit cost.

C. MARKING
- C1. For port markings 1, 2, and 3 see specification data sheet.
- C2. Consecutive marking, n = no. of way power-splitter.

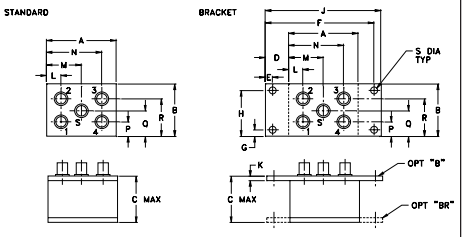
D. CONNECTORS
- D6. Connectors: Female SMA only. Male SMA available on request, consult factory.
- D8. Connectors: BNC only.
- D9. Connectors: BNC standard. TNC or Female SMA on request, consult factory.
- D11. Connectors: Please specify; Type N or SMA.
- D16. Connectors: Please specify, unless otherwise noted SMA is standard for model ZHL-2-12 for all other models BNC is standard. TNC, N, or SMA available on request. consult factory.
- D17. Connectors: Female SMA only.
- D22. Gain Control Terminal on Models ZFL-1000G and ZFL-1000GH only.
- D24. Connectors: Female BNC standard. Type N or SMA consult factory.
- D25. Connectors: Female N standard. For other connectors consult factory.

E. SPECIAL TOLERANCES
- E1. Pin diameter ±.005 inch.
- E2. Lead width ±.010; lead thickness ±.005 inch.

001113

OUTLINE DRAWINGS

N



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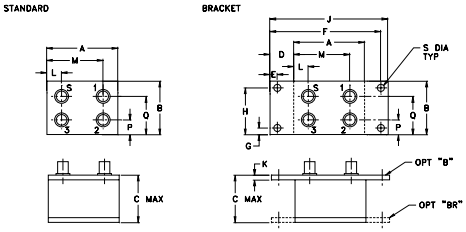

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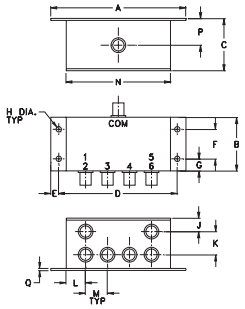

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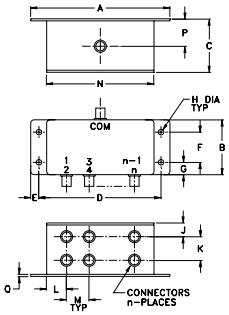

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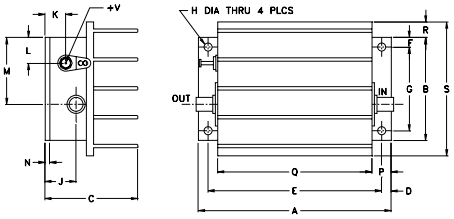

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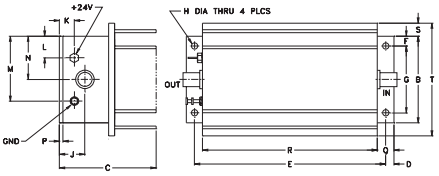

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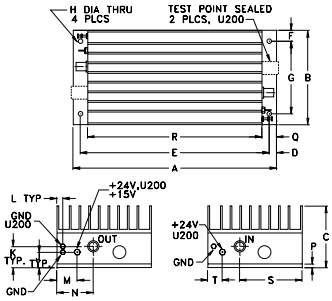

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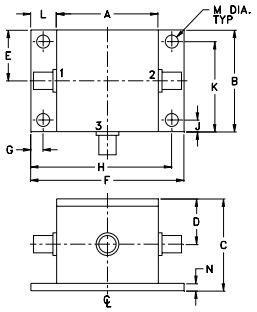

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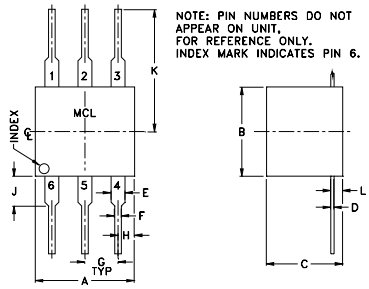

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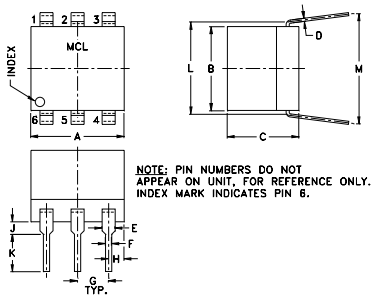

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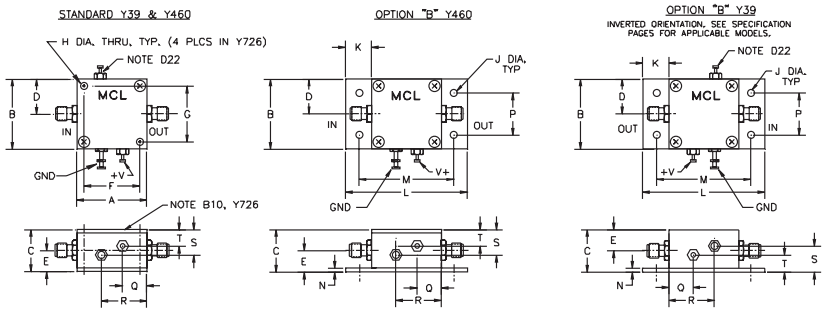

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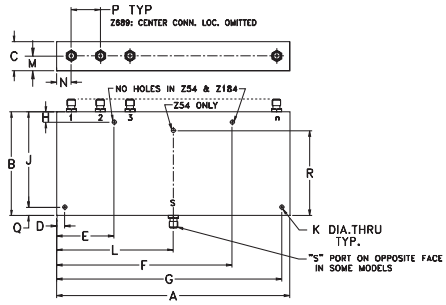

991110

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
AB185	4.76 120.90	3.00 76.20	.53 13.46	.150 3.81	4.610 117.09	1.500 38.10	.125 3.18	.50 12.70	.25 6.35	1.13 28.70	.500 12.70								183	A4, D17
AB186	4.76 120.90	3.00 76.20	.53 13.46	.150 3.81	4.610 117.09	1.500 38.10	.125 3.18	.38 9.65	.25 6.35	.88 22.35	.500 12.70								153	A4, D17
AB204	6.13 155.70	3.00 76.20	.53 13.46	.162 4.11	5.962 151.43	1.500 38.10	.116 2.95	.50 12.70	.25 6.35	1.13 28.70	.50 12.70								215	A4, C2, D17
AF190	.180 4.57	.090 2.29	.020 .51	.100 2.54	.083 2.11	.076 1.93	.005 .13	.022 .56	.210 5.33	.060 1.52	.060 1.52	.060 1.52	.020 0.51						.04	A16, C6, E3, F14
AF320	.200 5.08	.100 2.54	.020 .51	.070 1.78	.068 1.73	.057 1.45	.005 .13	.020 .51	.230 5.84	.065 1.65	.060 1.52	.080 2.03	.040 1.02						.04	A28, C8, E3, F26
AG191	.310 7.87	.400 10.16	.095 2.41	.003 .08	.007 .18	.035 .89	.055 1.40	.020 .51	.050 1.27										.40	A17, C7, E4, F15
AH202	.375 9.53	.500 12.70	.25 6.35	.020 .51	.035 .89	.050 1.27	.140 3.56	.180 4.57	.320 8.13	.360 9.14	.450 11.43	.465 11.81	.095 2.41	.135 3.43	.240 6.10	.280 7.11			.80	A19
AN213	.456 11.58	.487 12.37	.170 4.32	.020 .51	.029 .74	.017 .43	.050 1.27	.035 .89	.022 0.56	.087 2.21	.441 11.20	.300 7.62							2.0	A23, E6, F18
AR214	2.25 57.15	1.38 35.05	1.25 31.75	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.12 3.05	.69 17.53	1.50 38.10	.30 7.62	.41 10.41	.71 18.03	.41 10.41	.150 3.81		74.0	A6, A18, D17
AT224	.150 3.81	.150 3.81	.150 3.81	.050 1.27	.030 .76	.025 .64	.028 .71	.065 1.65	.190 4.83	.030 0.76									.15	A21, F17
AT577	.200 5.08	.200 5.08	.200 5.08	.075 1.91	.050 1.27	.025 0.64	.026 0.66	.070 1.78	.220 5.59	.035 0.89									.15	A21, F17
AV243	1.01 25.65	1.63 41.40	1.59 40.39	.30 7.62	1.05 26.67	.14 3.56	.46 11.68	.12 3.05	.030 .76										18	A22, D17
AW254	3.00 76.20	2.06 52.32	1.90 48.26	.100 2.54	2.500 63.50	1.525 38.74	.125 3.18	1.000 25.40	.50 12.70	2.00 50.80									280	A8, C2, D24
AW256	4.50 114.30	2.25 57.15	1.69 42.93	.125 3.18	4.000 101.60	1.625 41.28	.125 3.18	.890 22.61	.44 11.18	3.50 88.90									500	A8, C2, D24
AW257	8.06 204.72	3.25 82.55	2.38 60.45	.125 3.18	7.560 192.02	2.625 66.68	.125 3.18	.890 22.61	.44 11.18	7.06 179.32									1240	A8, C2, D24
AX255	3.00 76.20	2.00 50.80	1.90 48.26	.100 2.54	2.500 63.50	1.525 38.74	.125 3.18	.125 31.75	.50 12.70	— —									300	A8, D24

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

*NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541.
- A6. Case material: aluminum alloy. Finish: blue paint over irridite.
- A8. Case material: aluminum alloy. Finish: case irridite, heat sink black anodize.
- A16. Case material: ceramic. Lead material: #42 alloy. Finish: tin-lead plate.
- A17. Case material: CRS. Lead material: kovar. Finish: gold plate 50 micro inches.
- A18. Mounting bracket finish: irridite or clear anodize.
- A19. Case material plastic, G-10 base. Termination finish: solder plate
- A21. Open-style, ceramic base. Termination finish: solder plate over nickel.
- A22. Case material: aluminum alloy. Finish: nickel plate; heat sink: black anodize.
- A23. Case material: plastic. Lead finish: solder plate.
- A28. Case material: ceramic. Lead material: Kovar. Finish: Solder plate over nickel.

C. MARKING
- C2. Consecutive marking n = no. of way power splitter.
- C6. RF input lead (1) identified by diagonally cut lead.
- C7. Lead #6 is identified by diagonally cut lead.
- C8. Lead (1) may have diagonal cut. Input and output interchangeable for PAT models only.

D. CONNECTORS
- D17. Connectors; Female SMA only.
- D24. Connectors: BNC female standard. Type N or SMA consult factory.

E. SPECIAL TOLERANCES
- E3. Lead width ±.005; lead thickness ±.002; cap diameter ±.005 inch.
- E4. All tolerances are ±.005 except where minimum or maximum limits are shown.
- E6. Lead width ±.005 inch.

F. PACKAGING
- F1-29. Tape and reel packaging available. See Tape & Reel packaging information for details. To order Tape & Reel version add -TR suffix to model.

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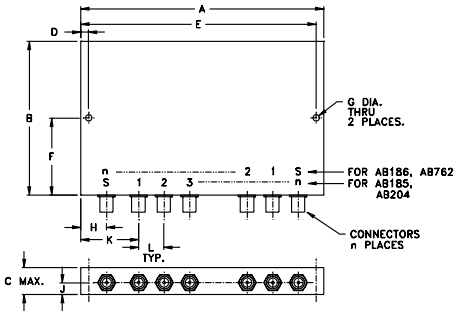
ISO 9001 CERTIFIED

OUTLINE DRAWINGS

AB



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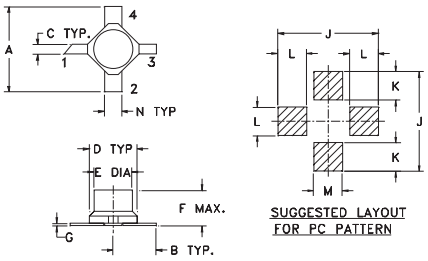

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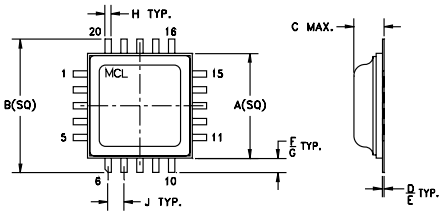

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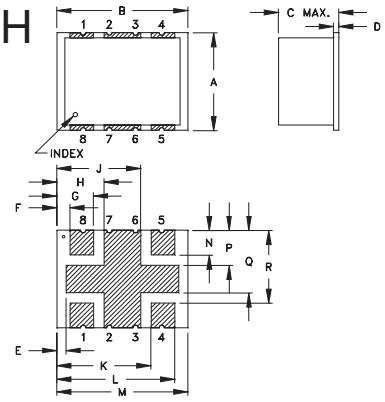

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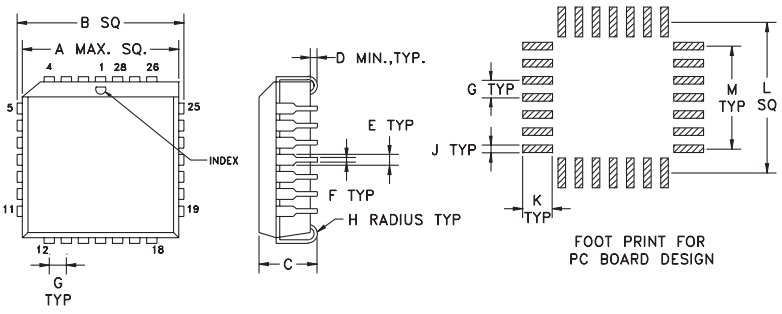

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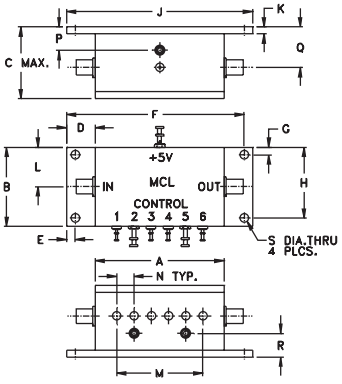

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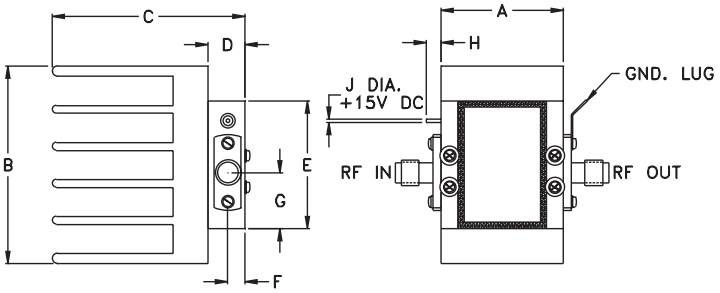

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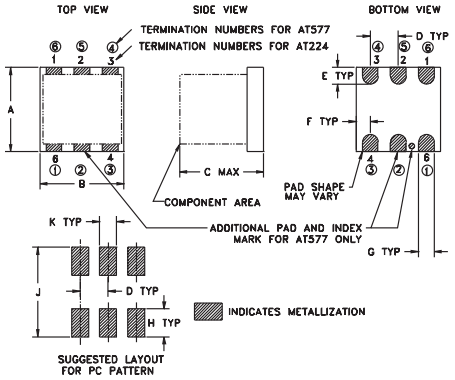

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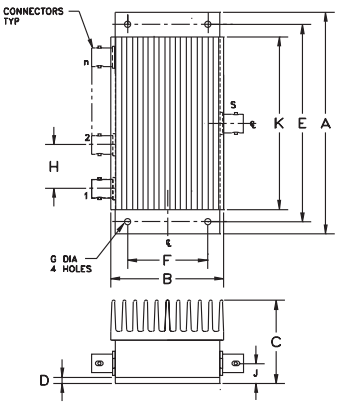

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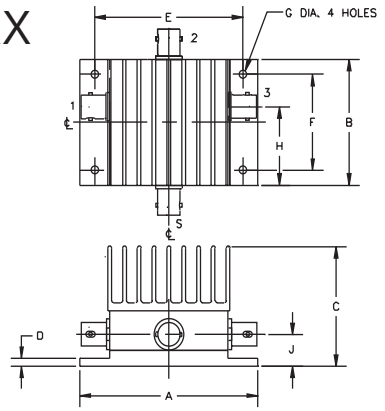


000309

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
BB48	.50 12.70	.39 9.91	.225 5.72	.025 0.63	.07 1.78	.100 2.54	.250 6.35	.350 8.89	.06 1.52	.31 7.87									3.0	A1, E1
BG291	.870 22.09	.800 20.32	— —	.100 2.54	.250 6.35	.100 2.54	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.890 22.60								4.0	A27, F21
BG419	.870 22.09	.800 20.32	— —	.100 2.54	.400 10.16	.100 2.54	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.890 22.60								6.4	A27
BH292	.280 7.11	.31 7.87	— —	.100 2.54	.225 5.72	.055 1.40	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.300 7.62								.45	A24, F24
BJ293	.395 10.03	.500 12.70	— —	.100 2.54	.230 5.84	.100 2.54	.100 2.54	.047 1.19	.065 1.65	.060 1.52	.425 10.08								.80	A19, F23
BJ360	.450 11.43	.800 20.32	— —	.100 2.54	.250 6.35	.100 2.54	.200 5.08	.047 1.19	.065 1.65	.065 1.65	.480 12.19								1.7	A31, F38
BJ398	.305 7.75	.390 9.91	— —	.100 2.54	.100 2.54	.045 1.14	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.325 8.26								.20	A19, F29
BK276	.470 11.94	.803 20.40	— —	.100 2.54	.250 6.35	.102 2.59	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.490 12.45								3.0	A27, F22
BK343	.460 11.68	.768 19.51	— —	.100 2.54	.155 3.94	.084 2.13	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.480 12.19								1.5	A27, F27
BK377	.505 12.83	.789 20.04	— —	.100 2.54	.250 6.35	.095 2.41	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.525 13.34								3.0	A27, F28
BL301	.940 23.88	1.260 32.00	— —	.100 2.54	.390 9.91	.080 2.03	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.970 24.64								7.2	A19, F25
BL372	.940 23.88	1.426 36.22	— —	.100 2.54	.250 6.35	.163 4.14	.100 2.54	.047 1.19	.065 1.65	.065 1.65	.970 24.64								6.4	A27, F39
BN333	1.680 42.67	2.130 54.10	3.6 91.44	7.5 190.50	.740 18.80	.42 10.67	1.32 33.53	.30 7.62	.55 13.97	.14 3.56									755	A22, D17
BR386	3.25 82.55	1.38 35.05	1.25 31.75	.71 18.03	1.13 28.70	.125 3.18	2.25 57.15	.71 18.03	.41 10.41	.98 24.89	1.28 32.51	2.950 74.93	.15 3.81	1.100 27.94	.14 3.56	.150 3.81			180	A4,A18,D17
BT412	9.50 241.30	7.3 185.42	6.3 160.02	6.00 152.40	.98 24.89	3.75 95.25	.13 3.30	.75 19.05	.30 7.62	1.00 25.40	.48 12.18	1.91 48.51	1.3 33.02	2.50 63.50	.9 22.86	5.30 134.62	5.1 129.54	5.2 132.08	4000	A8, D17
BT451	9.50 241.30	7.3 185.42	6.3 160.02	6.00 152.40	.98 24.89	3.75 95.25	.13 3.30	.78 19.81	.31 7.87	1.48 37.59	1.48 37.59	2.45 62.23	1.1 27.94	2.95 74.93	.5 12.7	6.00 152.40	5.1 129.54	5.2 132.08	4000	A8, D17
BU413	1.00 25.40	.75 19.05	.58 14.73	.50 12.70	.29 7.37	.38 9.65	1.40 3.56	— —	.687 17.45	— —	.32 8.13	.13 3.30	.10 2.54	.16 4.06	— —	— —			25	A4,C1,D6

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

*NOTES:

A. MATERIAL AND FINISH
- A1. Header material: C. R. S. Pin material: #52 alloy. Finish: electro tin, hot oil flowed. Cover material: cupro-nickel.
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541
- A8. Case material: aluminum alloy. Finish: case irridite. Heat sink black anodize.
- A18. Mounting bracket finish: irridite or clear anodize.
- A19. Case material: plastic, G-10 base. Termination finish: solder plate
- A22. Case material: aluminum alloy. finish: nickel plate. Heat sink: black anodize.
- A24. Case material: ceramic, Lead finish: solder plate
- A27. Header: Glass epoxy laminate. Cover: Cupro-nickel, bright-burnish Leads: Solder-plated iron-nickel alloy.
- A31. Case material: Brass alloy, tin plated. Header: G-10 base. Termination finish: solder plate.

C. MARKING:
- C1. For port markings 1,2, and 3 see specification data sheet.

D. CONNECTORS
- D6. Connectors: female SMA only. Male SMA available on request, consult factory.
- D16. Connectors: please specify. Unless otherwise noted SMA is standard for ZHL-2-12; for all other models BNC is standard. TNC, N, SMA available on request, consult factory.
- D17. Connectors: Female SMA only.

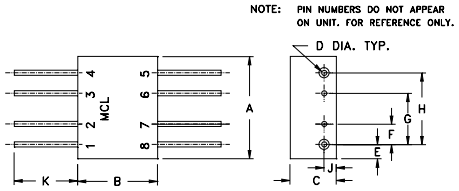
E. SPECIAL TOLERANCES
- E1. Pin diameter ±.005 inch.

F. PACKAGING
- F1-39. Tape and reel packaging available. See Tape & Reel packaging information for details. To order Tape & Reel version add -TR suffix to model.

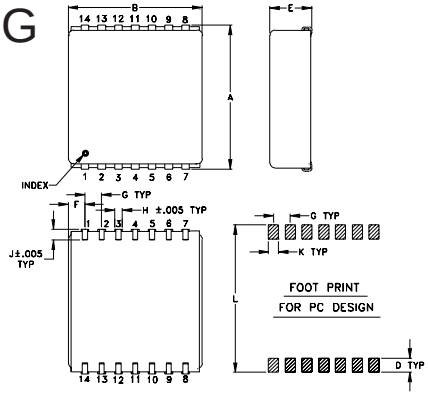
001127

OUTLINE DRAWINGS

BB



BG



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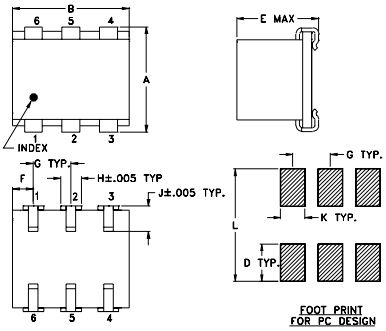

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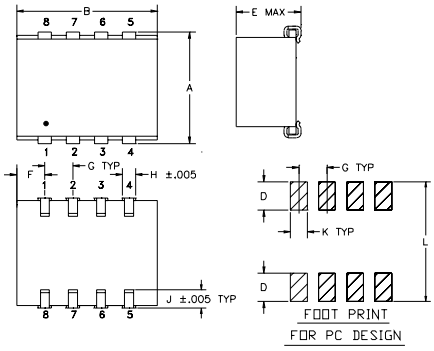

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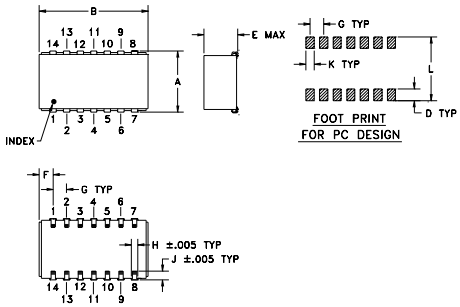

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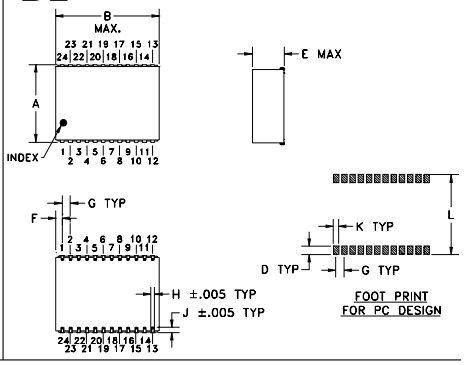

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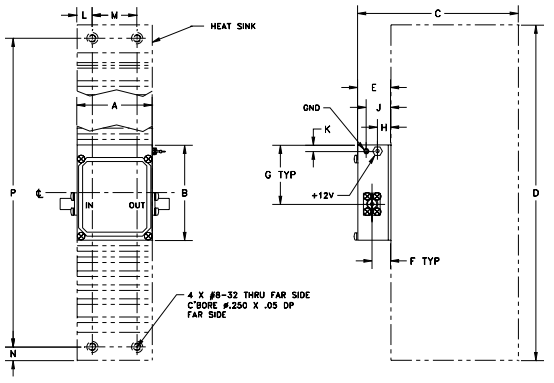

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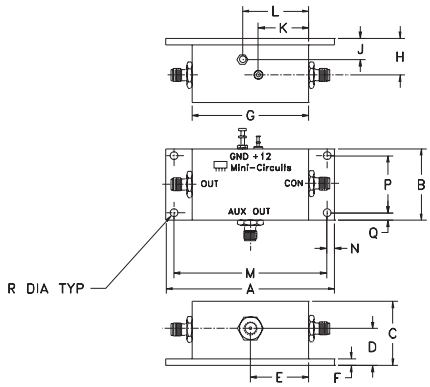

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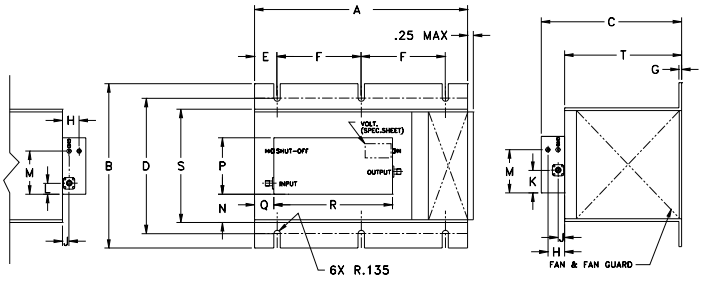

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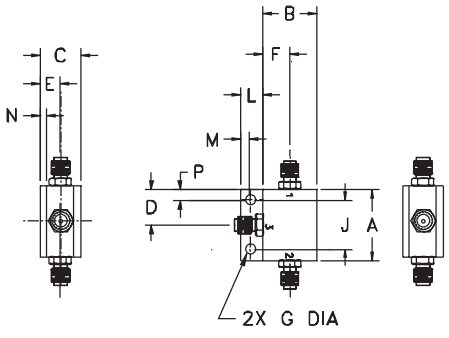


000929

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
BV278	6.00 152.40	4.50 114.30	1.38 35.05	.15 3.81	5.700 144.78	.15 3.81	4.200 106.68	.38 9.65	2.25 57.15	.75 19.05	.75 19.05	.156 3.96							960	A8,D16
BW459	1.00 25.40	.75 19.05	.61 15.49	.38 9.65	.29 7.37	.25 6.35	.26 6.60	.35 8.89	.65 16.51	.688 17.48	.156 3.96	.13 3.30	1.07 27.18	.140 3.56					25	A4,A18,D17
BY493	1.38 35.05	1.00 25.40	.75 19.05	.125 3.18	.35 8.89	.52 13.21	.27 6.86	.78 19.81	.68 17.27	.125 3.18	1.50 38.10	1.281 32.54	1.000 25.40	.19 4.83	.11 2.79	.35 8.89			40	A4,D17
CA531	.052 1.32	.067 1.70	.106 2.69	.122 3.10	.040 1.02	.064 1.63	.087 2.21	.118 3.00	.067 1.70	.083 2.11	.033 .84	.042 1.07	.014 0.36	.020 0.51	.012 0.30	.007 0.18	.020 0.51	.012 0.30	.020	A13, F31
CB518	.270 6.86	.310 7.87	— —	.090 2.29	.080 2.03	.055 1.40	.050 1.27	.018 0.46	.074 1.88	.030 0.76	.290 7.37								.30	A21, F32
CB539	.293 7.44	.300 7.62	— —	.090 2.29	.085 2.16	.050 1.27	.050 1.27	.018 0.46	.067 1.70	.030 0.76	.315 8.00								.30	A21, F33
CC51	2.00 50.80	2.00 50.80	.75 19.05	.938 23.83	.13 3.30	1.750 44.45	.125 3.17	.38 9.65	1.00 25.40	1.25 31.75									120.0	A10, D11
CC258	2.00 50.80	2.00 50.80	.75 19.05	.938 23.83	.13 3.30	1.750 44.45	.125 3.17	.38 9.65	1.00 25.40	1.25 31.75									200.0	A4, D24
CD541	.280 7.11	.310 7.87	.220 5.58	.100 2.54	.082 2.08	.055 1.40	.100 2.54	.030 0.76	— —	.065 1.65	.300 7.62								.40	A23, F34
CD542	.280 7.11	.310 7.87	.220 5.58	.100 2.54	.112 2.84	.055 1.40	.100 2.54	.030 0.76	— —	.065 1.65	.300 7.62								.40	A23, F35
CD636	.280 7.11	.310 7.87	.220 5.58	.100 2.54	.162 4.11	.055 1.40	.100 2.54	.030 0.76	— —	.065 1.65	.300 7.62								.45	A23, F45
CD637	.280 7.11	.310 7.87	.220 5.58	.100 2.54	.206 5.23	.055 1.40	.100 2.54	.030 0.76	— —	.065 1.65	.300 7.62								.45	A23, F46
CF564	.282 7.16	.382 9.70	.069 1.75	.0083 0.21	.318 8.08	.002 0.05	.060 1.52	.030 0.76	.012 0.30	.09 2.29	.428 10.87	.060 1.52	.030 0.76	.282 7.16	.020 0.51	.010 0.25	.235 5.97	.120 3.05	.40	A13, F41
CG581	.375 9.53	.500 12.70	.230 5.84	.087 2.21	— —	.150 3.81	.100 2.54	.510 12.95	.155 3.94	.093 2.36	.385 9.78	.040 1.02	.080 2.03	.024 0.61	.060 1.52				.60	A24, F36

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

*NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541
- A8. Case material: aluminum alloy. Finish: case irridite. Heat sink black anodize.
- A10. Case material: aluminum alloy. Finish: grey paint or yellow irridite.
- A13. Case material: plastic, Lead finish: tin-lead plate.
- A18. Mounting bracket finish: irridite or clear anodize.
- A21. Open-style, ceramic base. Termination finish: solder plate over nickel
- A23. Case materal: plastic. Lead finish: solder plate.
- A24. Case material: ceramic. Lead finish: solder plate.

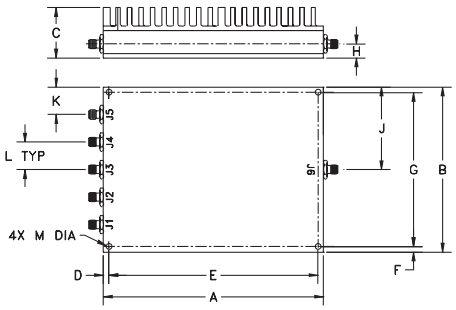
D. CONNECTORS
- D11. Connectors: Please specify; Type N or SMA
- D16. Connectors: please specify. Unless otherwise noted SMA is standard for ZHL-2-12; for all other models BNC is standard. TNC, N, SMA available on request, consult factory.
- D17. Connectors: Female SMA only.
- D24. Connectors: female BNC standard. Type N or SMA consult factory.

F. PACKAGING
- F1-46. Tape and reel packaging available. See Tape & Reel packaging information for details. To order Tape & Reel version add -TR suffix to model.

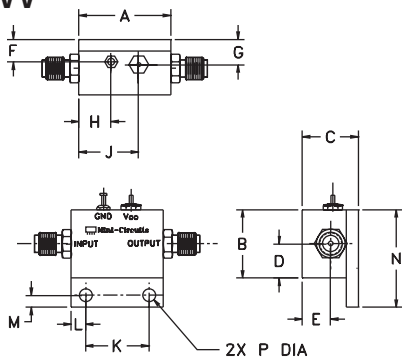
991129

OUTLINE DRAWINGS

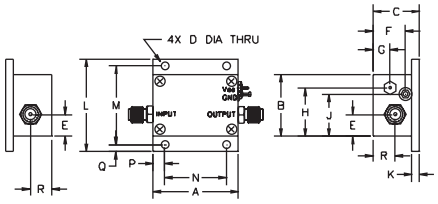
BV



BW



BY



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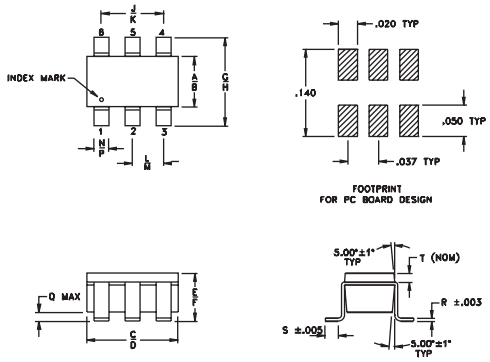

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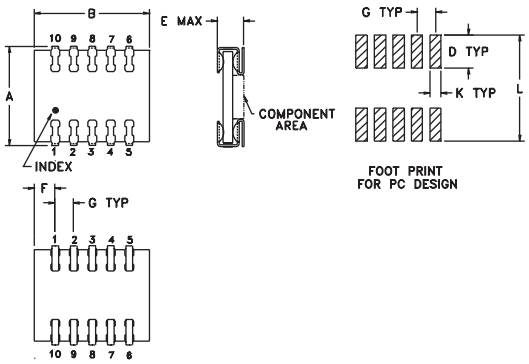

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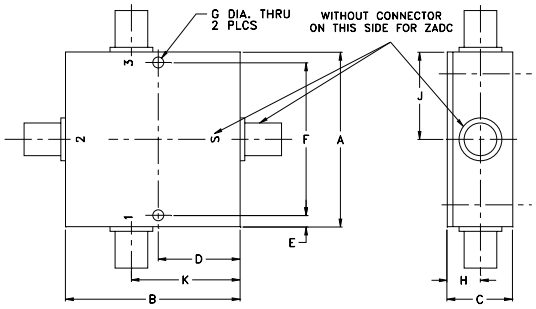

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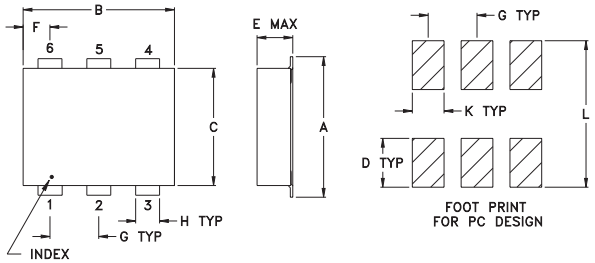

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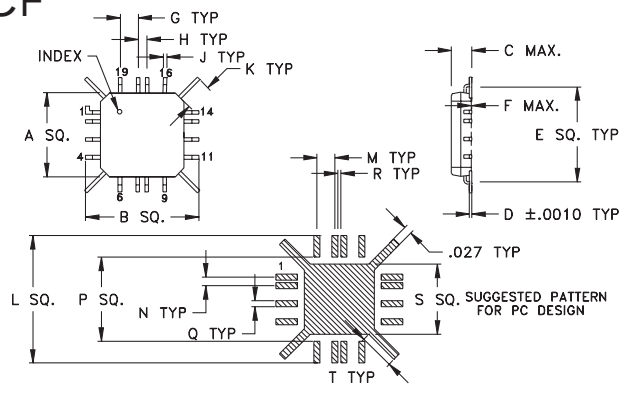
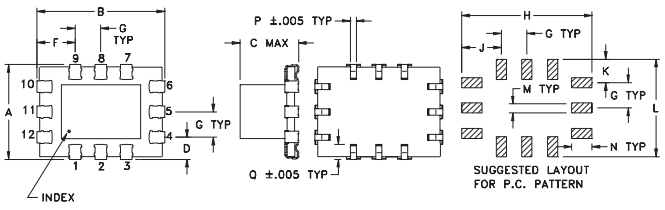


CG



1102

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
CJ608	.360 9.14	.400 10.16	.29 7.37	.120 3.04	.155 3.94	.050 1.27	.100 2.54	.030 0.76	.065 1.65	.060 1.52	.420 10.67								.40	A23, F42
CJ725	.360 9.14	.400 10.16	.29 7.37	.120 3.05	.215 5.46	.050 1.27	.100 2.54	.040 1.02	.065 1.65	.060 1.52	.420 10.67								.45	A23, F42
CK605	.500 12.70	.500 12.70	.180 4.57	.100 2.54	.080 2.03	.115 2.92	.060 1.52	.040 1.02	.540 13.72	.060 1.52	.100 2.54	.135 3.45	.135 3.45	.115 2.92	.140 3.56	.070 1.78	.150 3.81	.070 1.78	1.0	A31, F37
CL620	.154 3.91	.340 8.64	.068 1.73	.236 5.99	— —	.050 1.27	.016 0.41	.008 0.20	.010 0.25	.032 0.81	.059 1.50	.095 2.41	.028 0.71	.287 7.29					.14	A13, F43
CM624	.295 7.49	.405 10.29	.095 2.41	.406 10.31	— —	.050 1.27	.016 0.41	.008 0.20	.004 0.10	.032 0.81	.091 2.31	.102 2.59	.028 0.71	.460 11.68	— —	.130 3.30	.340 8.64		0.67	A13, F44
CP641	4.75 120.65	4.375 111.13	4.11 104.39	1.540 39.12	2.00 50.80	3.36 85.34	.144 3.66	4.24 107.70	1.12 28.45	.58 14.73	.125 3.18	2.38 60.45	1.50 38.10	1.00 25.40	.50 12.70	.34 8.64	.19 4.83	.23 5.84	850	A7, D17
CV665	1.61 40.89	4.00 101.6	1.20 30.48	.45 11.43	1.33 33.78	.35 8.89	.161 4.09	3.560 90.42	.880 22.35	.36 9.14	.22 5.59	.44 11.18	1.56 39.62	1.06 26.92	.80 20.32	3.12 79.25	.06 1.52	.59 14.99	250.0	A4, D28
CW686	1.77 44.96	2.42 61.47	.55 13.97	.13 3.30	.12 3.05	2.165 55.00	1.535 39.00	.126 3.20	.22 5.59	.28 7.11	.51 12.95	.61 15.46	.39 9.91						71	A4, D17
CY353	3.24 82.30	2.00 50.80	1.50 38.10	.62 15.75	.31 7.87	2.620 66.55	.75 19.05	.62 15.75	.250 6.35	.25 6.35	.50 12.70	.31 7.87	.50 12.70	1.00 25.40	.13 3.30				.65	A4, A18, D6

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. finish: irridite per MIL-C-5541
- A7. Case material: aluminum alloy. finish: case black paint; Heat sink: black anodize; base plate iridite per MIL-C-5541.
- A13. Case material: plastic. Lead Finish: tin-lead plate.
- A18. Mounting bracket finish: irridite or clear anodize.
- A23. Case material: plastic. Lead Finish: solder plate.
- A31. Case material: Brass alloy, tin plated. Header: G-10 base. Termination finish: solder plate.

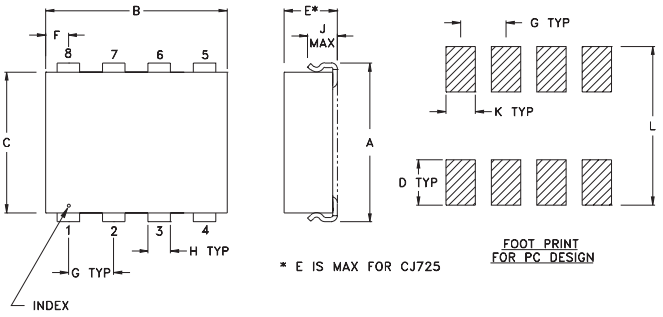
D. CONNECTORS
- D6. Connectors: female SMA only. Male SMA available on request, consult factory.
- D11. Connectors: Please specify; Type N or SMA.
- D17. Connectors: Female SMA only.
- D28. Connectors: Female SMA standard. For other connectors consult factory.

F. PACKAGING
- F1-45. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

000602

OUTLINE DRAWINGS

CJ



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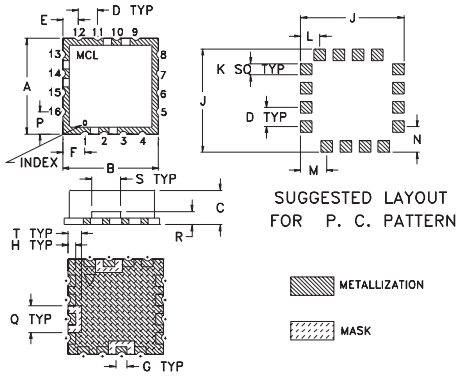

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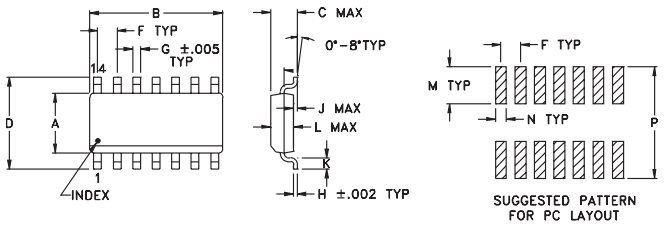

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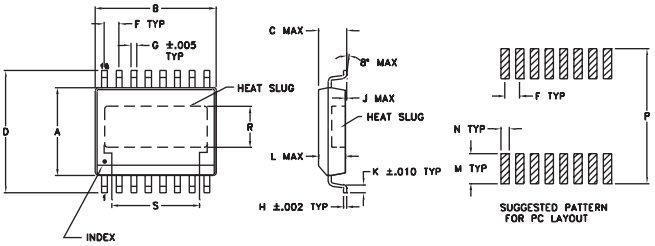

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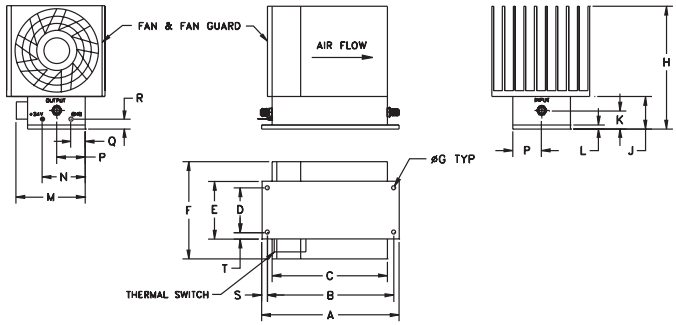
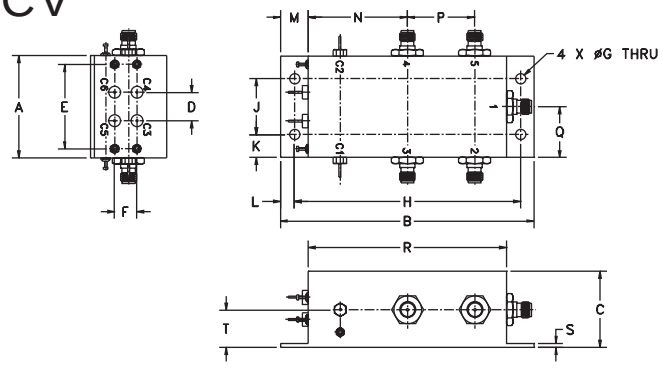
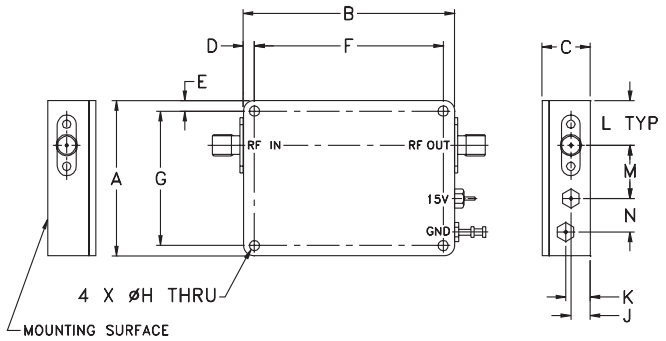


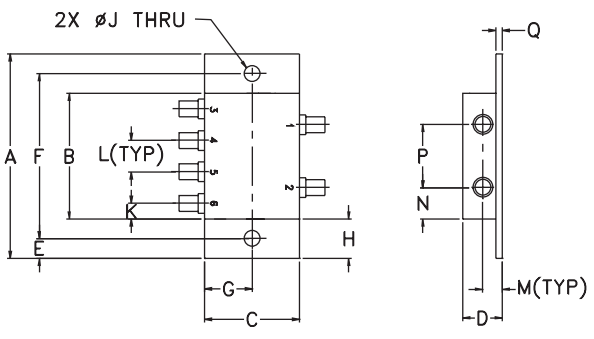
CV



CW



CY



000602

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
DB714	.160 4.06	.150 3.81	.160 4.06	.050 1.27	.040 1.02	.025 .064	.028 .71	.065 1.65	.190 4.83	.030 0.76									.15	A13, F47
DC736	— —	.61 15.49	— —	1.90 48.26	.812 20.64														49.7	A38, D29
DC737	— —	.61 15.49	— —	1.20 30.48	.312 7.94														9.1	A38, D13
DD52	2.00 50.80	2.00 50.80	.75 19.05	.90 22.86	.156 3.96	1.688 42.88	.125 3.18	3.92 9.96	1.00 25.40	.50 12.70	1.00 25.40	1.25 31.75							225.0	A10, D11
DD477	2.00 50.80	2.00 50.80	.75 19.05	.90 22.86	.156 3.96	1.688 42.88	.125 3.18	3.92 9.96	— —	.50 12.70	1.00 25.40	1.25 31.75							225.0	A10, D17
DD749	8.50 215.90	4.00 101.60	.50 12.70	.170 4.32	8.160 207.26	1.70 43.18	.150 3.81	8.200 208.28	.190 4.83	4.25 107.95	.50 12.70	2.50 63.50	4.50 114.30	6.50 165.10	1.50 38.10	.201 5.11			400.0	A4, D6
DF782	.102 2.59	.090 2.29	.181 4.60	.173 4.39	.063 1.60	.167 4.24	.155 3.94	.059 1.50	.118 3.00	.015 0.38	.041 1.04	.016 0.41	.019 0.48	.065 1.65					.2	A13

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541
- A10. Case material: aluminum alloy. Finish: grey paint or yellow irraite
- A13. Case material: plastic. Lead Finish: tin-lead plate.
- A38. Case material: aluminum alloy. Finish: Black anodize.

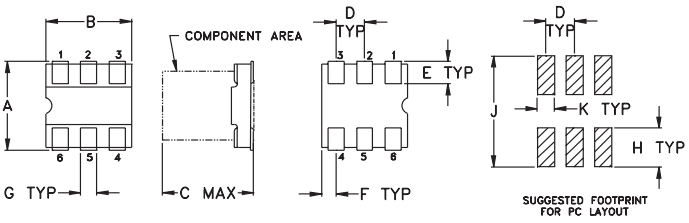
D. CONNECTORS
- D6. Connectors: female SMA only. Male SMA available on request, consult factory.
- D13. Connectors: Male SMA. Female SMA only.
- D17. Connectors: Female SMA only.
- D29. Connectors: Male N, female N only.

F. PACKAGING
- F1-47. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

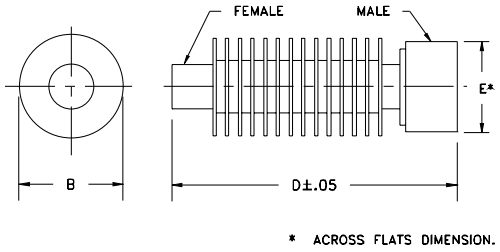
001206

OUTLINE DRAWINGS

DB



DC



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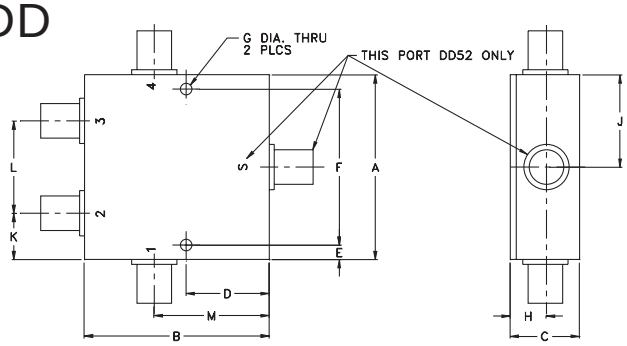

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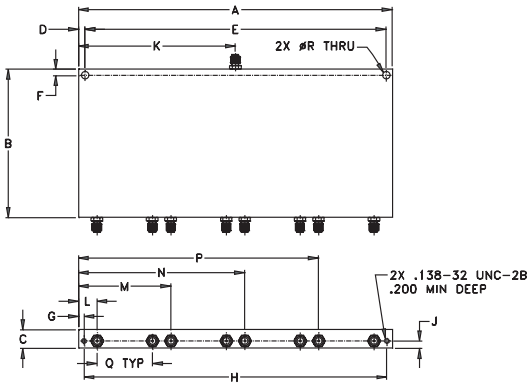
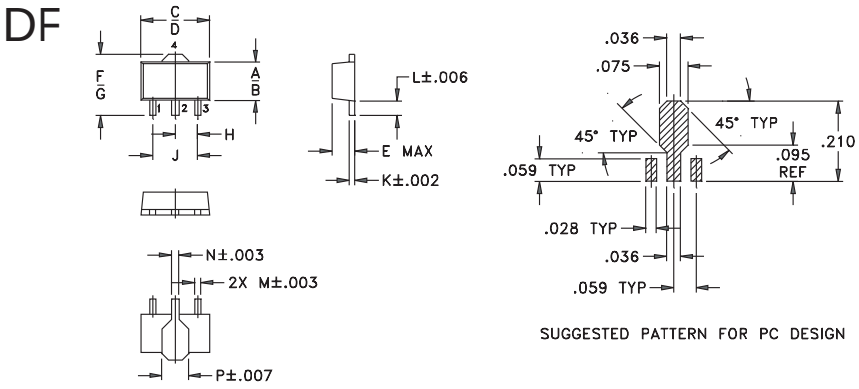


DF



001206

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
FF55	— —	.58 14.73	— —	2.59 65.79	— —														40.0	A9, D12
FF56	— —	.43 10.92	— —	1.70 43.18	.312 7.92														18.0	A9, D13
FF57	— —	.72 18.29	— —	3.08 78.23	.82 20.83														90.0	A9, D14
FF99	— —	.72 18.29	— —	1.98 50.29	.312 7.92														42.0	A9, D13
FF658	— —	.365 9.27	— —	.85 21.59	.312 7.92														4.3	A32, D13
FF659	— —	.365 9.27	— —	.99 25.15	.312 7.92														5.1	A32, D13
GG60	2.31 58.67	1.20 30.48	.60 15.24	.125 3.18	2.062 52.37	.30 7.62	.53 13.46	.63 16.00											75.0	A10, D10
HH68	9.31 236.47	1.60 40.64	3.57 90.68	8.84 224.54	.25 6.35	.88 22.35	.36 9.14	.160 4.06	.34 8.64	.69 17.53	.54 13.72	.66 16.76	8.34 211.84	.33 8.38	.06 1.52				1090.0	A10, A18, D10
JJ77	1.50 38.10	1.13 28.70	.97 24.64	.50 12.70	.155 3.94	2.345 59.56	.14 3.56	.850 21.59	2.50 63.50	.10 2.54	.44 11.18	.75 19.05	.63 16.00	.54 13.72	.37 9.40	.43 10.92	.150 3.81	.73 18.54	50.0	A6, A11, A18, D17
KK81	.30 7.62	.27 6.86	.23 5.84	.010 .25	.042 1.07	.020 .51	.100 2.54	.05 1.27	.05 1.27	.035 .89	.036 .91	.26 6.60	.575 14.61						.50	A13, E2, F1
LL85	1.43 36.32	.58 14.73	.75 19.05																21.5	A9, D18
LL86	1.19 30.23	.58 14.73	.51 12.95																14.0	A9, D19
LL87	1.43 36.32	.82 20.83	.68 17.27																48.5	A9, D20
LL561	.58 14.73	.36 9.14	.36 9.14																4.0	A34, D19
LL604	.55 13.97	.36 9.14	.33 8.38																4.0	A34, D27
LL718	1.10 27.94	.69 17.53	.68 17.27																30.0	A37, D20
NN92	3.66 92.96	3.25 82.55	2.13 54.10	.25 6.35	3.16 80.26	.38 9.65	2.50 63.50	.156 3.96	.72 18.29	.64 16.26	.74 18.80	1.78 45.21	2.30 58.42	.125 3.18	.50 12.70	2.66 67.56			440.0	A7, A8, A18, D6
PP94	.360 9.14	.250 6.35	.25 6.35	.016 .41	.020 .51	.04 1.02	.200 5.08												1.5	A26, C3
PP120	.50 12.70	.21 5.33	.150 3.81	.016 .41	.020 .51	.04 1.02	.300 7.62												1.5	A12, C3
PP163	.360 9.14	.250 6.35	.350 8.89	.016 .41	.020 .51	.040 1.02	.200 5.08												2.9	A12, C3
PP230	.50 12.70	.250 6.35	.240 6.10	.016 .41	.020 .51	.04 1.02	.300 7.62												1.8	A12, C3
QQ95	.500 12.70	.250 6.35	.25 6.35	.016 .41	.020 .51	.04 1.02	.300 7.62	.150 3.81	.150 3.81	.075 1.91									3.5	A12, C3
QQ96	.600 15.24	.250 6.35	.25 6.35	.016 .41	.020 .51	.04 1.02	.400 10.16	.200 5.08	.200 5.08	.100 2.54									4.0	A12, C3
RR93	4.06 103.12	1.60 40.64	2.125 53.98	3.56 90.42	.25 6.35	.88 22.35	.36 9.14	.160 4.06	.4 10.16	.69 17.53	.58 14.73	.66 16.76	3.13 79.50	.8 20.32	.06 1.52	.33 8.38			350.0	A10, A18, D9

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A6. Case material: aluminum alloy. Finish: blue paint over iridite.
- A7. Case material: aluminum alloy. Finish: case black paint. Heat sink: black anodize. Baseplate iridite per MIL-C-5541.
- A8. Case material: aluminum alloy. Finish: case iridite. Heat sink: black anodize.
- A9. Case material: brass. Finish: nickel plate.
- A10. Case material: aluminum alloy. Finish: grey paint or yellow iridite.
- A11. Case material: aluminum alloy. Finish: blue anodized.
- A12. Header and lead finish: gold plate per MIL-G-45204. Case material: Nickel
- A13. Case material: plastic. Lead Finish: tin-lead plate.
- A18. Mounting bracket finish: irridite or clear anodize.
- A26. Header material: C.R.S., pin material: #52 alloy; finish: electro tin, hot-oil flowed. Cover material: nickel.
- A32. Case material: Stainless steel, passivated.
- A34. Case material: Brass, Finish: Gold plate.
- A37. Case material: Brass, Finish: Tri-metal (Cu/Sn/Zn) plate.

C. MARKING
- C3. For Pin designations see specification data sheet.

D. CONNECTORS
- D6. Connectors: Female SMA only. Male SMA available on request, consult factory.
- D9. Connectors: BNC standard. TNC or Female SMA on request, consult factory.
- D10. Connectors: BNC standard. SMA on request, consult factory.
- D11. Connectors: Please specify; Type N or SMA.
- D12. Connectors: Male BNC, Female BNC standard. Other combinations with SMA, TNC available on request, consult factory.
- D13. Connectors: Male SMA. Female SMA only.
- D14. Connectors: Male N, Female N standard. Combinations with BNC, SMA, TNC available on request, consult factory.
- D17. Connectors. Female SMA only.
- D18. Connectors: Male BNC only.
- D19. Connectors: Male SMA only.
- D20. Connectors: Male Type N only.
- D24. Connectors: female BNC standard. Type N or SMA consult factory.
- D27. Connectors: female SMB only.

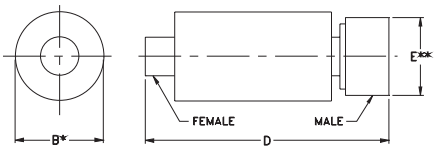
E. SPECIAL TOLERANCES
- E2. Lead width ±.010; lead thickness ±.005 inch.

F. PACKAGING
- F1-29. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

000222

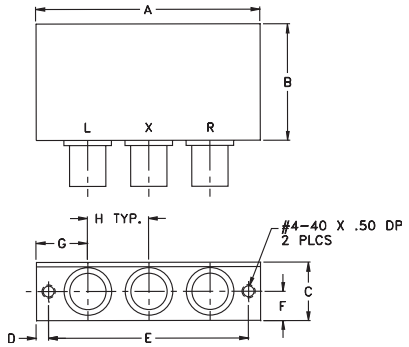
OUTLINE DRAWINGS

FF



* MAX FOR FF658, 659, 704, 747
** ACROSS FLATS FOR FF56, 99, 658, 659, 704

GG



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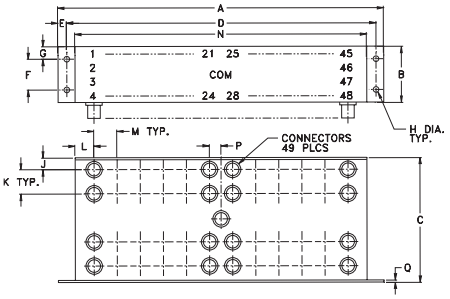

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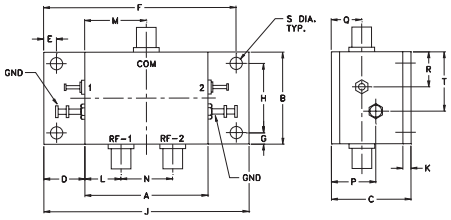

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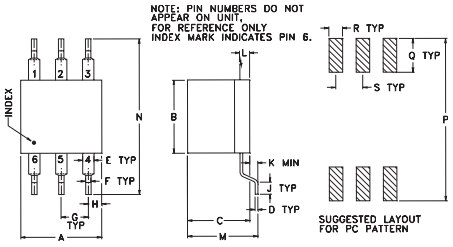
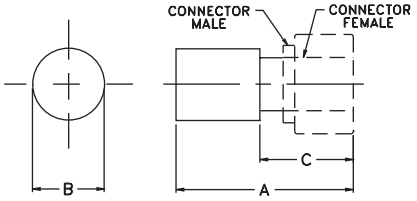


LL



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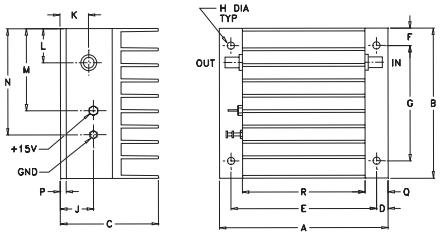
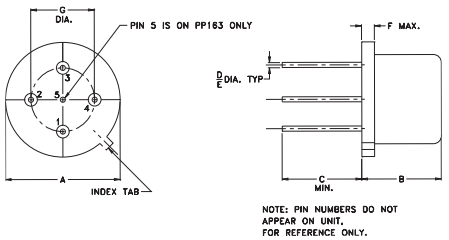
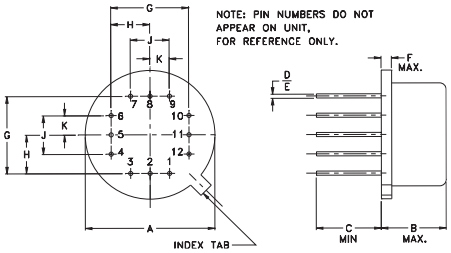


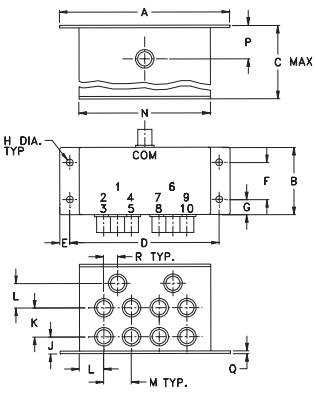
PP



QQ



RR



000929

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
SM1	.250 6.35	.300 7.62	.070 1.78	.290 7.37	.050 1.27	.015 .38	.050 1.27	.060 1.52	.030 .76	.080 2.03	.300 7.62	.100 2.54	.020 .51	.015 .38	.070 1.78	.014 .36			.3	A21, F49
SM2	.250 6.35	.300 7.62	.070 1.78	.290 7.37	.050 1.27	.015 .38	.050 1.27	.060 1.52	.030 .76	.080 2.03	.300 7.62	.100 2.54	.020 .51	.015 .38	.070 1.78	.014 .36			.3	A21, F49
SM18	.375 9.53	.510 12.95	.140 3.56	.425 10.80	.100 2.54	.015 .38	.100 2.54	.060 1.52	.040 1.02	.100 2.54	.460 11.68	.140 3.56	.180 4.57	— —	— —	.020 .51			.4	A21, F48
SM20	.500 12.70	.460 11.68	.130 3.30	.575 14.61	.050 1.27	.015 .38	.025 .635	.070 1.70	.030 .76	.095 2.41	.600 15.24	.120 3.05	.160 4.06	— —	— —	.012 .30			.5	A21, F53

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

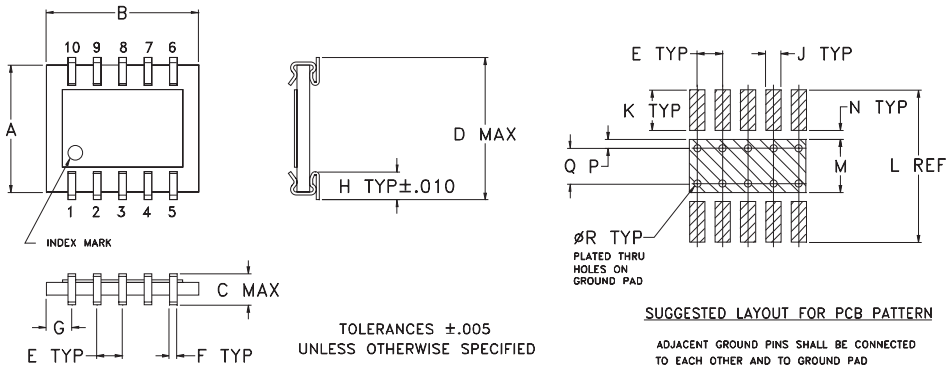
A. MATERIAL AND FINISH
A21. Open-style, ceramic base. Termination finish: solder plate over nickel.

F. PACKAGING
F1-53. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

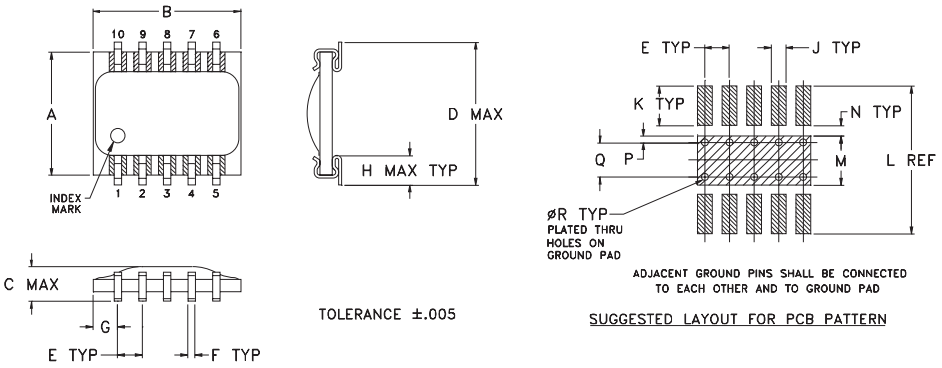
001205

OUTLINE DRAWINGS

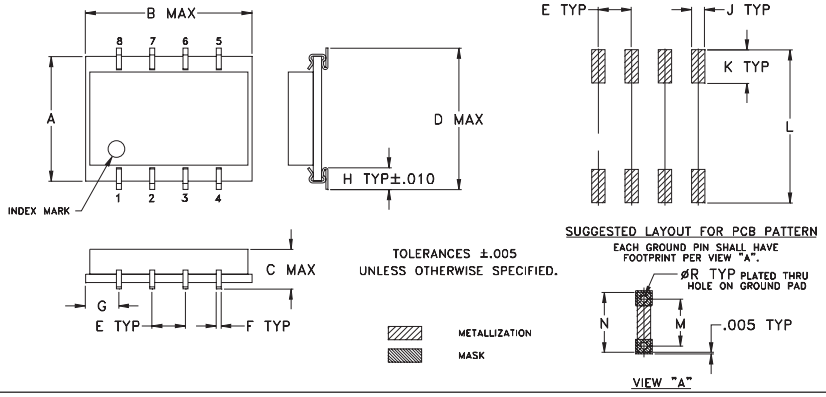
SM1



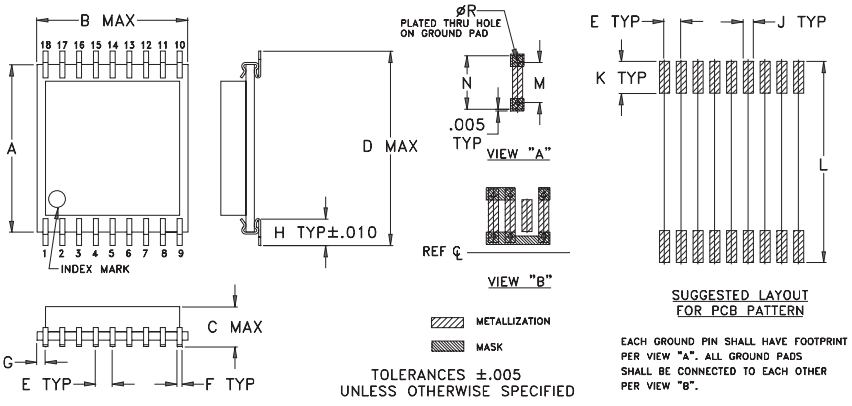
SM2



SM18



SM20



001205

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
SM31	.200 5.08	.200 5.08	.070 1.78	.275 6.99	.050 1.27	.015 .38	.050 1.27	.085 2.16											0.1	A24, F54
SM33	.250 6.35	.300 7.62	.050 1.27	.310 7.87	.050 1.27	.015 .38	.050 1.27	.066 1.68											0.2	A24, F52
SM34	.380 9.65	.400 10.16	.067 1.70	.420 10.67	.050 1.27	.015 .38	.050 1.27	.060 1.52											0.3	A24, F51

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

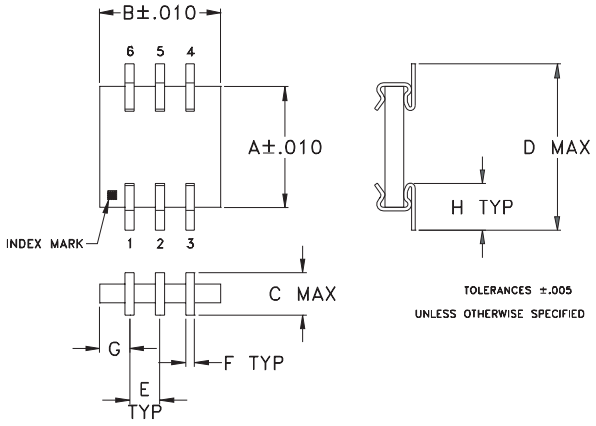
A. MATERIAL AND FINISH
A24. Case material ceramic. Lead finish: solder plate.

F. PACKAGING
F1-54. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

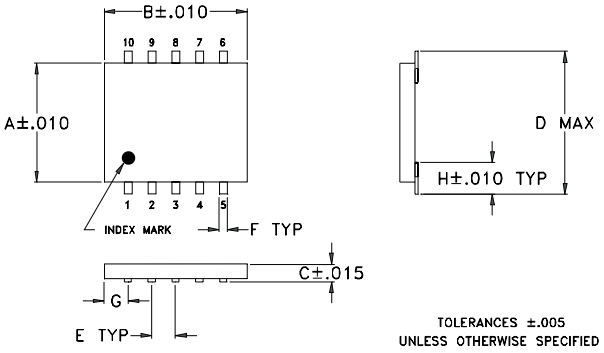
001205

OUTLINE DRAWINGS

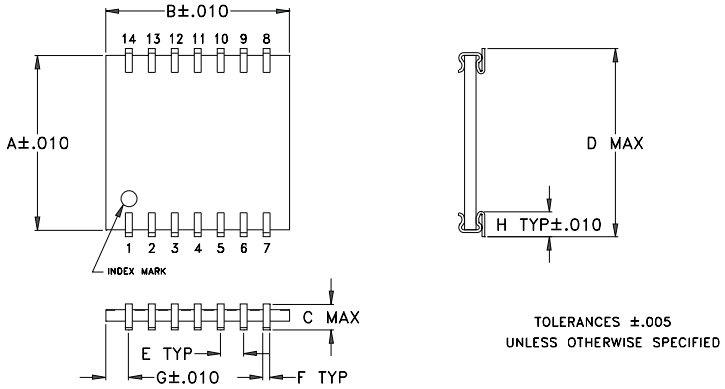
SM31



SM33



SM34



001205

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
SS98	1.25 31.75	1.56 39.62	.75 19.05	.63 16.00	.39 9.91	1.50 38.10	1.000 25.40	— —	.125 3.18	.46 11.68	2.18 55.37	1.688 42.88	.07 1.78	.750 19.05	.50 12.70	.80 20.32	.45 11.43	.29 7.37	85.0	A8, A18, B1, D6
TT100	.250 6.35	.31 7.87	.20 5.08	.100 2.54	.050 1.27	.055 1.40	.040 1.02	.070 1.78	.270 6.86	.050 1.27									.50	A14, F2
TT240	.250 6.35	.31 7.87	.20 5.08	.100 2.54	.050 1.27	.055 1.40	.040 1.02	.070 1.78	.270 6.86	.050 1.27									.50	A20, F3
TT241	.250 6.35	.31 7.87	.275 6.99	.100 2.54	.050 1.27	.055 1.40	.040 1.02	.070 1.78	.270 6.86	.050 1.27									.50	A20, F50
UU102	3.50 88.90	2.00 50.80	.50 12.70	.150 3.81	3.350 85.09	1.00 25.40	.125 3.18	1.75 44.45	.20 5.08	.55 13.97									120.0	A10, C2, D17
UU179	8.50 215.90	3.95 100.33	.75 19.05	.250 6.35	8.250 209.55	— —	.187 4.75	4.250 107.95	.38 9.65	.500 12.70	.475 12.07	3.475 88.27							710	A4, D17
UU181	2.25 57.15	2.30 58.42	.63 16.00	.125 3.18	2.125 53.98	— —	.125 3.18	1.13 28.70	.31 7.87	.500 12.70	.125 3.18	2.175 55.24							94	A4, D17
UU182	2.75 69.85	2.80 71.12	.63 16.00	.125 3.18	2.625 66.68	— —	.125 3.18	1.38 35.05	.31 7.87	.500 12.70	.125 3.18	2.675 67.95							140	A4, D17
UU187	6.00 152.40	1.62 41.15	.88 22.35	.250 6.35	5.750 146.05	.810 20.57	.144 3.66	3.00 76.20	.44 11.18	1.00 25.40	— —	— —							340	A4, D23
UU188	3.50 88.90	2.13 54.10	.88 22.35	.150 3.81	3.350 85.09	1.06 26.92	.125 3.18	1.75 44.45	.44 11.18	.89 22.61	— —	— —							260	A4, D23
UU215	4.00 101.60	1.25 31.75	.38 9.65	.125 3.18	3.875 98.43	.500 12.70	#2-56 —	2.00 50.80	.19 4.83	.500 12.70	— —	1.125 28.58							77	A4, D17
UU233	1.50 38.10	1.00 25.40	.38 9.65	.125 3.18	1.375 34.93	.500 12.70	#2-56 —	.75 19.05	.19 4.83	.50 12.70									28.0	A8, B8, C2, D17
UU586	3.50 88.90	3.00 76.20	.63 16.00	.130 3.30	3.380 85.85	1.50 38.10	.125 3.17	1.75 44.45	.32 8.13	.500 12.70									180.0	A4, D17
UU589	6.60 167.64	3.28 83.31	.75 19.05	.150 3.81	6.45 163.83	1.64 41.66	.144 3.66	3.30 83.82	.38 9.53	.500 12.70	— —	— —							370	A4, D17
UU640	8.50 215.90	4.00 101.60	.50 12.70	.170 4.32	8.330 211.58	— —	.201 5.11	4.25 107.95	.19 4.83	.500 12.70	— —	3.830 97.28	.150 3.81	8.350 212.09					450	A4, D17
VV105	.085 2.16	.060 1.52	.008 .20	.020 .51	.256 6.50	.012 .30	.025 .64												.015	A13, C4, E2
WW107	.020 .51	.10 2.54	.020 .51	.092 2.34	.085 2.16	.060 1.52	.008 .20	.026 .66	.235 5.97	.118 3.00	.235 5.97	.118 3.00	.072 183	.040 1.02					.015	A13, C4, E2, F4
XX112	.18 4.57	.18 4.57	.060 1.52	.40 10.16	.35 8.89	.050 1.27	.015 .38	.005 .13	.005 .13	.07 1.78	— —	.105 2.67	.025 0.63	.420 10.69	.19 4.83	.18 4.57			.15	A15, E2, F19
XX211	.163 4.14	.202 5.13	.077 1.96	.25 6.35	.22 5.59	.050 1.27	.017 .43	.009 .23	.025 .63	.03 .76	— —	.050 1.27	.03 0.76	.270 6.86	— —	— —			.10	A13, E2, F16
YY101	.75 19.05	.38 9.65	.20 5.08	.010 .25	.050 1.27	.020 .51	.200 5.08	.075 1.91	.600 15.24	.450 11.43	— —	.47 11.94	.100 2.54	.150 3.81					1.6	A13, E2, E5 F5
YY109	.75 19.05	.38 9.65	.20 5.08	.010 .25	.050 1.27	.020 .51	.200 5.08	.075 1.91	.600 15.24	.72 18.29	— —	.74 18.80	.100 2.54	.150 3.81					1.6	A13, E2, E5, F0
YY161	.75 19.05	.38 9.65	.28 7.11	.010 .25	.050 1.27	.020 .51	.200 5.08	.075 1.91	.600 15.24	.450 11.43	— —	.47 11.94	.100 2.54	.150 3.81					1.6	A13, E2, F6
ZZ121	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	.61 15.49	— —	.800 20.32	.800 20.32	.76 19.30	.125 3.18	1.688 42.88	2.18 55.37	.75 19.05	.07 1.78				85.0	A10, A18, B1, D6

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
- A4. Case material: aluminum alloy. Finish: iridite per MIL-C-5541.
- A8. Case material: aluminum alloy. Finish: case iridite Heat sink, black anodize.
- A10. Case material: aluminum alloy. Finish: grey paint or yellow iridite.
- A13. Case material: plastic. Lead Finish: tin-lead plate.
- A14. Case material: ceramic or plastic, ceramic base. Terminations: palladium platinum silver.
- A15. Case material: kovar. Lead material: kovar. Finish: gold plate per MIL-G-45204 .
- A18. Mounting bracket finish: iridite or clear anodize.
- A20. Case material: ceramic. Terminations: solder plate over nickel. Board edges straight.

B. MOUNTING
- B1. Mounting bracket available on request. Add suffix B to part number.
- B7. Pin's meniscus (of header) 0.015" max.
- B8. #2-56 UNC-2B mounting holes provided to .32" deep minimum.

C. MARKING
- C2. Consecutive marking n = no. of way power splitter.
- C4. RF input lead (1) identified by one or both of the following at factory option: (a) diagonally cut lead, which may be 45°(ref) in either direction; (b) orientation mark on the case. Model dash number identified by color dot or alphanumeric code on case. See specification data sheet.
- C5. RF output is identified by index mark, model dash number by alphanumeric code.

D. CONNECTORS
- D6. Connectors: Female SMA only. Male SMA available on request, consult factory.
- D17. Connectors: Female SMA only.
- D23. Connectors: Please specify female type N or SMA.

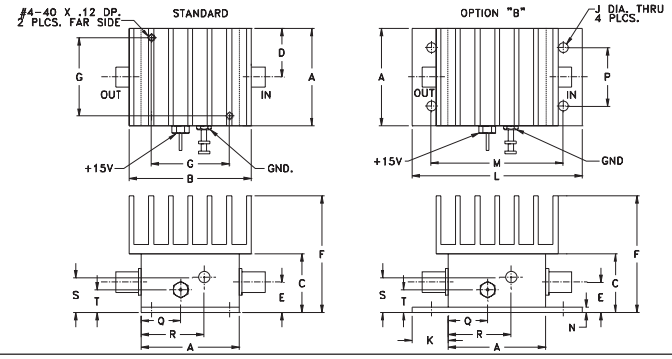
E. SPECIAL TOLERANCES
- E1. Pin diameter ±.005 inch.
- E2. Lead width ±.010; lead thickness ±.005 inch.
- E5. For SCM mixers, long lead version (YY109) is available upon request; consult factory. To order short lead version (case YY101) add -NL suffix.

F. PACKAGING
- F1-50. Tape and reel packaging available. See Tape and Reel Packaging Information for details. To order Tape & Reel version add -TR suffix to model.

010522

OUTLINE DRAWINGS

SS



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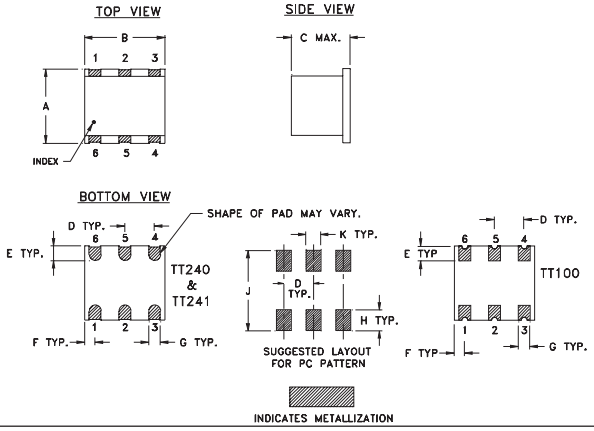

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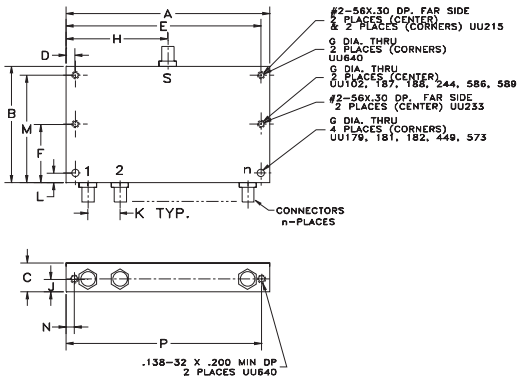
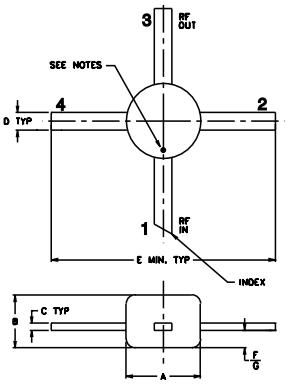
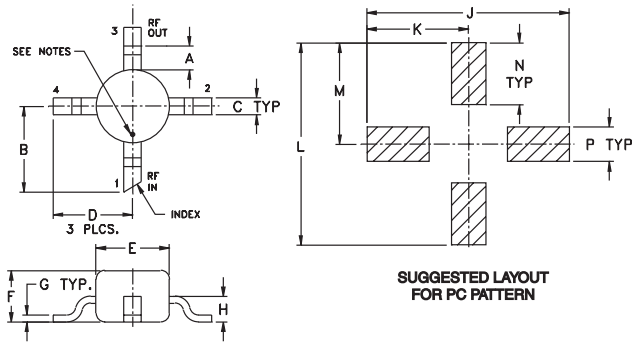


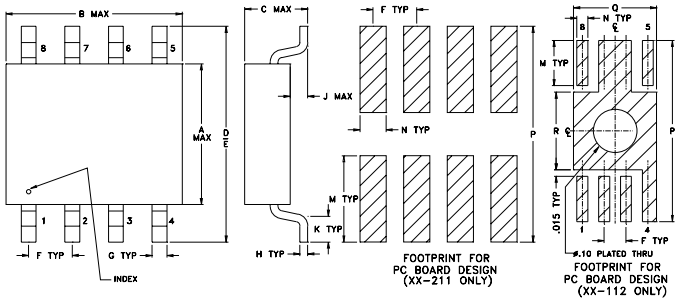
VV



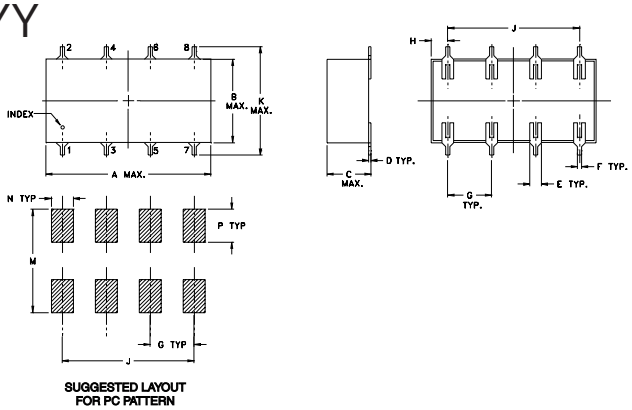
WW



XX



YY



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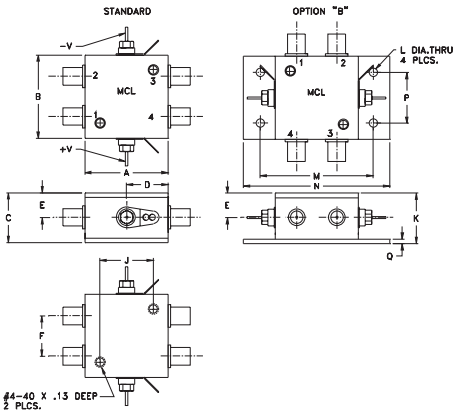


001205

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
AAA118	1.50 38.10	.50 12.70	.935 23.75	.040 1.02	1.100 27.94	.19 4.83	.400 10.16	.15 3.81	.600 15.24	.300 7.62	.20 5.08	.14 3.56							19	A1, E1, B7
BBB123	.145 3.69	.100 2.54	.04 1.02	.006 .15	.030 .76	.488 12.40													.015	A13, C5, E2
CCC127	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.12 3.05	.80 20.32	.69 17.53	1.60 40.64	.60 15.24	1.200 30.48	.52 13.21	.82 20.83	.150 3.81	80.0	A6, A11, A18, D17
DDD131	7.00 177.80	3.25 82.55	3.13 79.50	.25 6.35	6.500 165.10	.38 9.65	2.500 63.50	.156 3.96	.88 22.35	.43 10.92	.62 15.75	1.00 25.40	2.63 66.68	.125 3.18	.50 12.70	6.00 152.40	2.23 56.64	8.35 212.09	1884.0	A7, A18, D6
DDD338	7.00 177.80	3.25 82.55	3.13 79.50	.25 6.35	6.500 165.10	.38 9.65	2.500 63.50	.156 3.96	.88 22.35	.73 18.54	.62 15.75	1.13 28.70	2.23 56.64	.125 3.18	.50 12.70	6.00 152.40	2.23 56.64	8.35 212.09	1884.0	A7, A18, D6
EEE132	.90 22.86	.90 22.86	.675 17.15	.245 6.22	.45 11.43	1.34 34.04	.09 2.29	1.152 29.26	.09 2.29	.712 18.08	.22 5.59	.106 2.69	.05 1.27						50.0	A4, A18, D6
FFF122	.83 21.08	.83 21.08	.18 4.57	.10 2.54	.100 2.54	.600 15.24	.95 24.13	.017 .43	.15 3.81										5.0	A15, E1
GGG126	2.25 57.15	1.38 35.05	1.24 31.50	.50 12.70	.150 3.81	3.100 78.74	.138 3.51	1.238 31.45	3.25 82.55	.12 3.05	.80 20.32	.69 17.53	— —	.60 15.24	1.200 30.48	.52 13.21	.82 20.83	.150 3.81	80.0	A6, A11, A18, D17
HHH141	2.00 50.80	2.00 50.80	.95 24.13	1.062 26.98	0.125 3.18	1.75 44.45	.125 3.18	0.575 14.60	1.00 25.40	1.35 34.29									200.0	A10, C1, D6
JJJ142	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	.32 8.13	— —	.80 20.32	.80 20.32										70.0	A10, D17
JJJ245	.75 19.05	1.00 25.40	.58 14.73	.38 9.65	.29 7.37	.35 8.89													22.0	A4, B9, D6
KKK155	.32 8.13	.445 11.30	.090 2.29	.006 .152	.012 .30	.070 1.78	.050 1.270	.010 .254	.015 .38	.030 .762	.050 1.270	.050 1.270							.40	A13, F7
MMM168	.045 1.14	.055 1.40	.105 2.67	.120 3.05	.047 1.19	.005 0.13	.083 2.11	.104 2.64	.070 1.78	.080 2.03	.018 0.46	.024 0.61	.030 0.76	.036 0.91	.015 0.38	.021 0.53	.023 0.58	.004 0.10	1.0	A13, F8

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

* NOTES:

A. MATERIAL AND FINISH
A1. Header material C.R.S. Pin material: #52 alloy. Finish: electro tin, hot oil flowed. Cover material: cupro-nickel.
A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541.
A6. Case material: aluminum alloy. Finish: blue paint over irridite.
A7. Case material: aluminum alloy. Finish: case black paint. Heat sink: black anodize. Baseplate irridite per MIL-C-5541.
A10. Case material: aluminum alloy. Finish: grey paint or yellow iridite.
A11. Case material: aluminum alloy. Finish: blue anodized.
A13. Case material: plastic. Lead finish: tin-lead plate.
A15. Case material: kovar. Lead material: kovar. Finish: gold plate per MIL-G-45204.
A18. Mounting bracket finish: irridite or clear anodize.

B. MOUNTING
B7. Pin's meniscus (of header) 0.015" max.
B9. No mounting holes.

C. MARKING
C1. For port markings 1, 2, and 3 see specification data sheet.
C5. RF output is identified by index mark, model dash number by alphanumeric code.

D. CONNECTORS
D6. Connectors: Female SMA only. Male SMA available on request, consult factory.
D17. Connectors: Female SMA only.

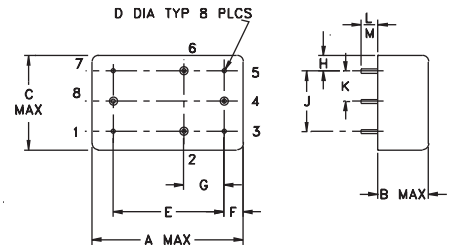
E. SPECIAL TOLERANCES
E1. Pin diameter ±.005 inch.
E2. Lead width ±.010; lead thickness ±.005 inch

F. PACKAGING
F1-29. Tape and reel packaging available. See Tape and Reel Packaging Information for details.
To order Tape & Reel version add -TR suffix to model.

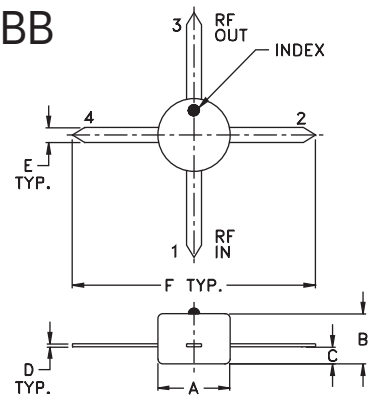
001204

OUTLINE DRAWINGS

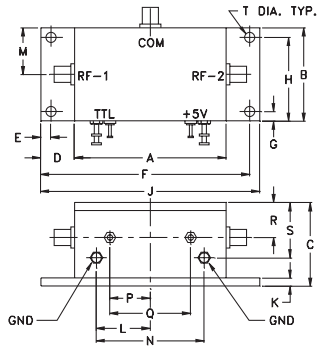
AAA



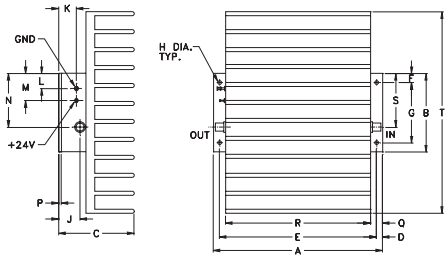
BBB



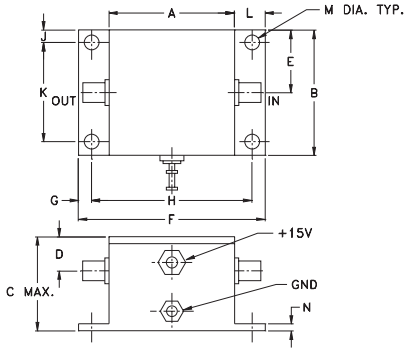
CCC



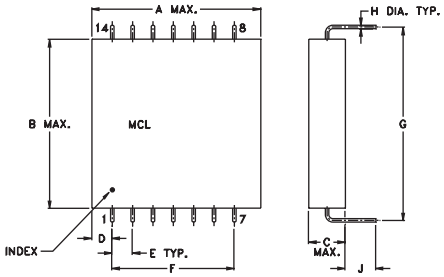
DDD



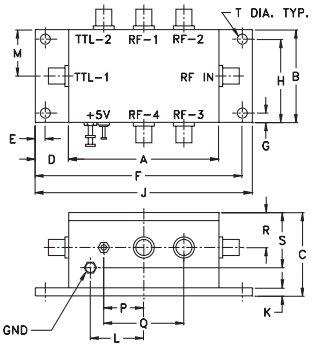
EEE



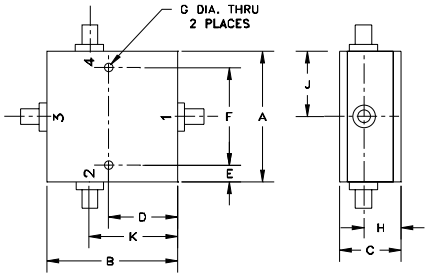
FFF



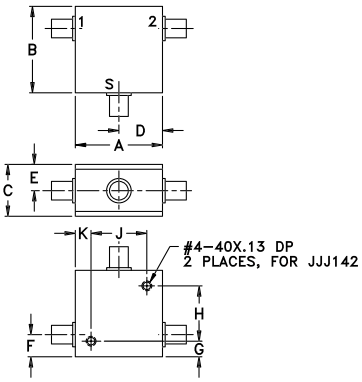
GGG



HHH



JJJ



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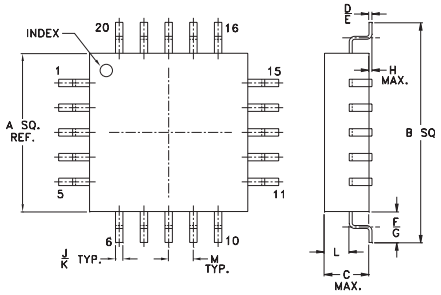
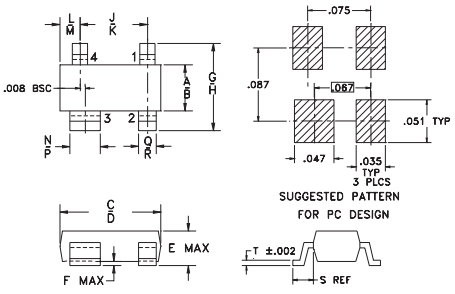


MMM



001204

CASE STYLES

OUTLINE DIMENSIONS (inch / mm)

case no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt. grams.	NOTES*
NNN150	50 12.70	.48 12.19	.255 6.48	.240 6.10	.23 5.84	.21 5.33	.06 1.52	.100 2.54	.09 2.29	.16 4.06	.020 .51	.09 2.29	.005 .13						1.9	A1, E1, F9, B7
PPP83	.75 19.05	.38 9.65	.20 5.08	.010 .25	.05 1.27	.020 .51	.200 5.08	.075 1.91	.200 5.08	.14 3.56	.060 1.52								1.6	A13, E2
QQQ130	— —	.31 7.87	.20 5.08	.10 2.54	.010 .25	.100 2.54	.050 1.27	.400 10.16	.420 10.67	.120 3.05	.060 1.52	.100 2.54	.020 .51						.55	A24, E2, F10
QQQ569	— —	.31 7.87	.225 5.72	— —	— —	.100 2.54	.045 1.14	.390 9.90	.420 10.67	.120 3.05	.060 1.52	.100 2.54	— —						.50	A24, F30
RRR137	.28 7.11	.14 3.56	.030 .76	.020 .51	.145 3.68	.110 2.79	.006 .15	.010 .25	.030 .76										.015	A13, C5, E2, F11
SSS173	1.25 31.75	1.25 31.75	.75 19.05	.63 16.00	.38 9.65	1.000 25.40	.125 3.18	1.000 25.40	— —	— —	.125 3.18	1.688 42.88	2.18 55.38	.75 19.05	.07 1.78				75	A10, A18, D17
TTT166	.375 9.53	.500 12.70	.15 3.81	.020 .51	.075 1.91	.250 6.35	.425 10.80	.187 4.75	.050 1.27	.050 1.27	.070 1.78	.270 6.86	.540 13.72	.060 1.52	.095 2.41	.445 11.30	.208 5.28	.415 10.54	.8	A19, F12
TTT167	.375 9.53	.500 12.70	.23 5.84	.020 0.51	.075 1.91	.250 6.35	.425 10.80	.187 4.75	.050 1.27	.050 1.27	.070 1.78	.270 6.86	.540 13.72	.060 1.52	.095 2.41	.445 11.30	.208 5.28	.415 10.54	.8	A19, F13
VVV180	1.80 45.72	1.75 44.45	.66 16.76	.125 3.18	1.675 42.55	.125 3.18	.125 3.18	1.625 41.28	.31 7.87	.63 16.00	1.13 28.70	.88 22.35							34	A4, D17

tolerance .x±.1 .xx±.03 .xxx±.015 inch **oz. = grams x.0353**

*NOTES:

A. MATERIAL AND FINISH
- A1. Header material C.R.S Pin materal: #52 alloy. Finish: clectro tin, hot oil flowed. Cover material: cupro-nickel.
- A4. Case material: aluminum alloy. Finish: irridite per MIL-C-5541.
- A10. Case material: aluminum alloy. Finish: grey paint or yellow iridite.
- A13. Case material: plastic. Lead finish: tin-lead plate.
- A18. Mounting bracket finish: irridite or clear anodize.
- A19. Case material plastic, G-10 base. Termination finish: solder plate
- A24. Case material ceramic. Lead finish: solder plate.

B. MOUNTING
- B7. Pin's meniscus (of header) 0.015" max.

C. MARKING
- C5. RF output is identified by index mark, model dash number by alphanumeric code.

D. CONNECTORS
- D17. Connectors; Female SMA only.

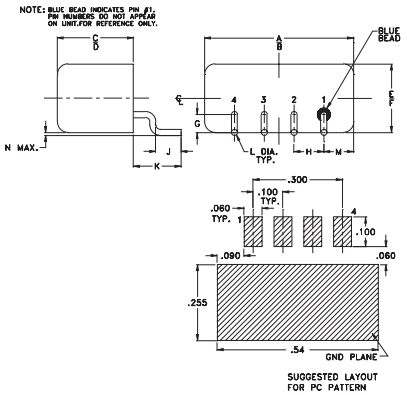
E. SPECIAL TOLERANCES
- E1. Pin diameter ±.005 inch.
- E2. Lead width ±.010; lead thickness ±.005 inch.

F. PACKAGING
- F1-30. Tape and reel packaging available. See Tape & Reel packaging information for details. To order Tape & Reel version add -TR suffix to model.

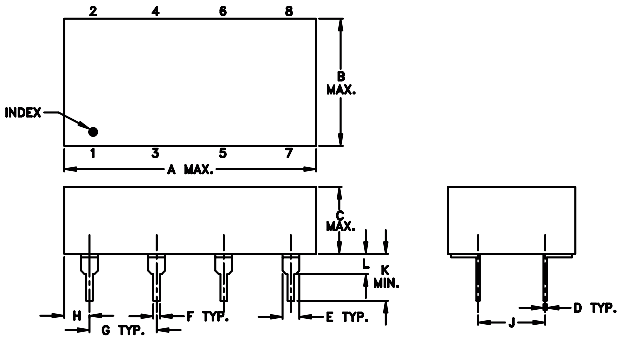
980311

OUTLINE DRAWINGS

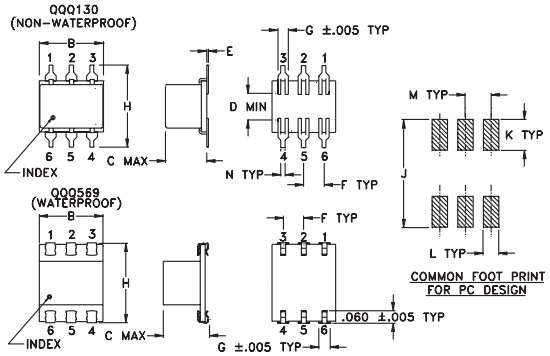
NNN



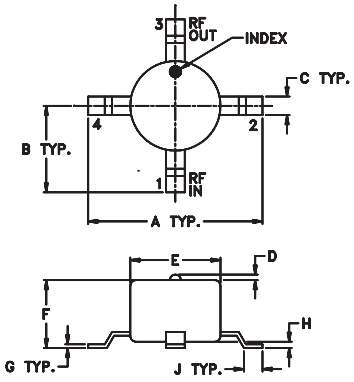
PPP



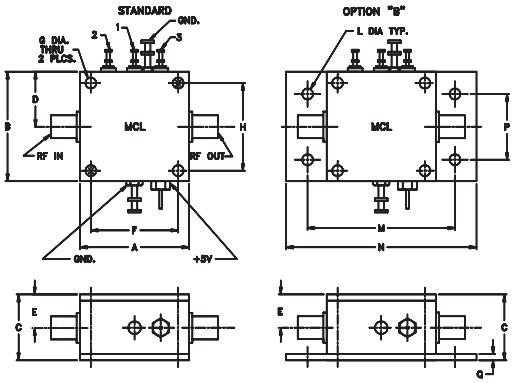
QQQ



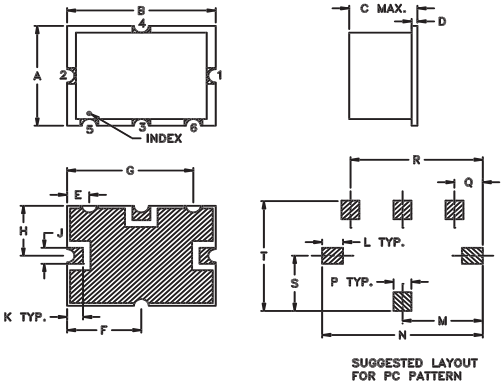
RRR



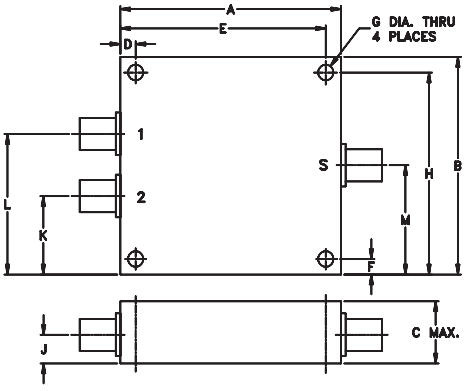
SSS



TTT



VVV



001009

FREQUENCY MIXERS

Surface Mount

HIGH IP3 (up to 38 dBm) 140 to 1910 MHz

HJK

HUD

MODEL NO.	FREQUENCY (MHz) RF	LO	IF	IP3 (dBm) Typ.	LO level (dBm)	RF @ 1dB compr. (dBm) Typ.	CONVERSION LOSS (dB) Typ.	σ	Max.	LO-RF ISOLATION (dB) Typ.	Min.	LO-IF ISOLATION (dB) Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
HJK-9	818-853	753-778	40-100	22	7	10	7.1	0.3	8.7	36	24	26	20	TTT167	x	10.95
HJK-19	1850-1910	1780-1840	70-130	21	7	10	8.0	0.2	9.5	30	20	24	16	TTT167	x	10.95
HJK-21	1850-1910	2090-2150	180-300	22	7	10	7.5	0.3	9.5	28	18	19	13	TTT167	x	10.95
HJK-9LH	818-853	753-778	40-100	27	10	13	6.7	0.2	8.0	37	24	27	20	TTT167	x	12.95
HJK-19LH	1850-1910	1780-1840	70-130	25	10	13	7.5	0.2	9.4	30	20	23	15	TTT167	x	12.95
HJK-21LH	1850-1910	2090-2150	180-300	25	10	13	7.2	0.3	8.9	28	20	19	13	TTT167	x	12.95
HJK-9MH	818-853	753-778	40-100	31	13	16	6.7	0.2	8.0	37	24	27	20	TTT167	x	14.95
HJK-19MH	1850-1910	1780-1840	70-130	30	13	16	7.4	0.2	8.9	30	20	23	15	TTT167	x	14.95
HJK-21MH	1850-1910	2090-2150	180-300	29	13	16	7.2	0.2	8.9	29	20	19	13	TTT167	x	14.95
NEW HJK-3H*	140-180	160	0.5-20	37	16	19	8.0	0.1	9.2	44	35	44	30	TTT167	x	16.95
NEW HUD-3H*	140-180	160	0.5-20	37	16	19	8.1	0.1	9.2	47	40	45	38	BK276	mx	15.95
HJK-9H	818-853	753-778	40-100	33	17	20	6.7	0.2	8.0	35	24	31	23	TTT167	x	16.95
HJK-19H	1850-1910	1780-1840	70-130	34	17	20	7.7	0.2	8.9	28	20	22	16	TTT167	x	16.95
HJK-21H	1850-1910	2090-2150	180-300	36	17	20	7.6	0.2	8.9	28	20	25	18	TTT167	x	16.95
◆HUD-19SH*	1819-1910	1710-1769	50-200	38	19	22	7.5	0.2	8.9	38	27	36	25	BK276	mx	19.95

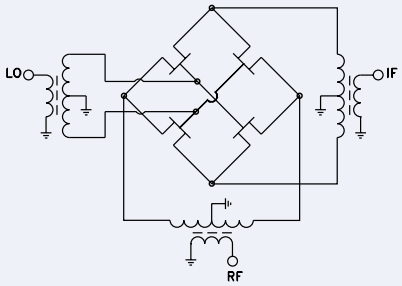
features

- high IP3, up to 38 dBm
- compression, 3 dB higher than LO power

applications

- base stations
- communication systems, cellular, PCS

electrical schematic



NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency ($f_L+f_U/4$)
σ Standard deviation
◆ Aqueous washable
* Patent pending
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. LO & RF power: 16 dBm for level 7,10,13
19 dBm for level 16
20 dBm for level 17
22 dBm for level 19

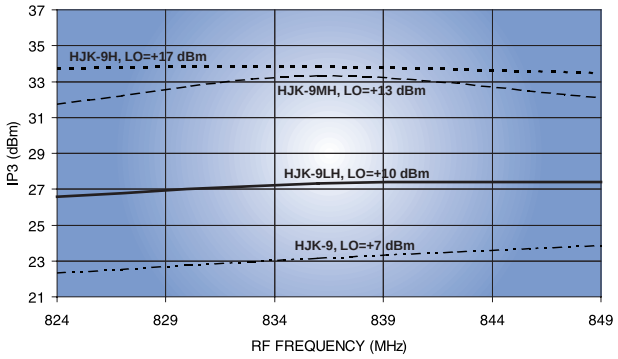
pin connections

see case style outline drawings

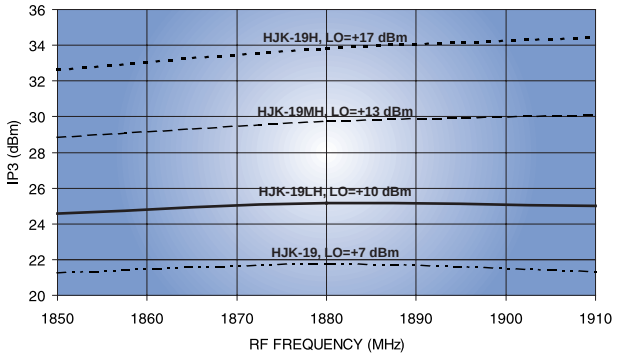
PORT	x	mx
LO	2	1
RF	1	8
IF	3	5
GND EXT.	4,5,6	all others
DEMO BOARD	TB-12	TB-107

010511

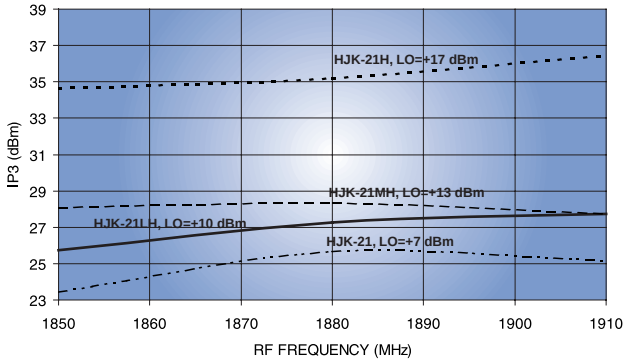
HJK-9/-9LH/-9MH/-9H
IP3 VS. FREQUENCY



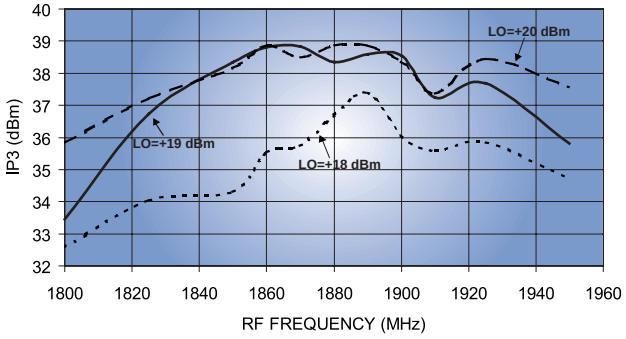
HJK-19/-19LH/-19MH/-19H
IP3 VS. FREQUENCY



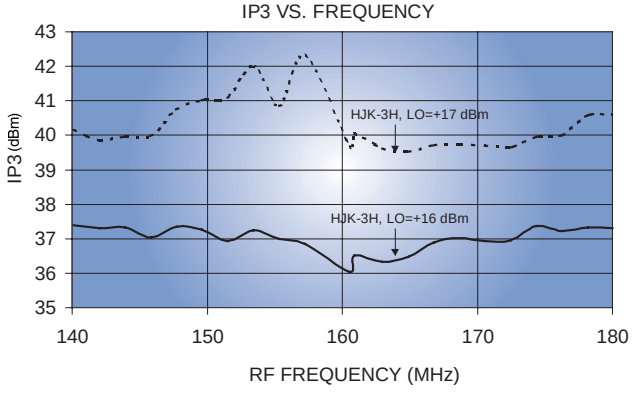
HJK-21/-21LH/-21MH/-21H
IP3 VS. FREQUENCY



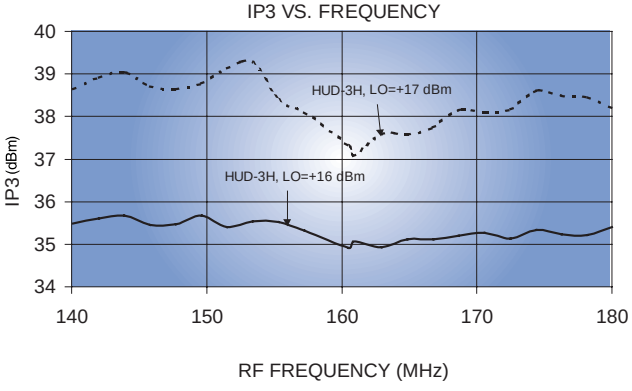
HUD-19SH
IP3 VS. FREQUENCY



HJK-3H
IP3 VS. FREQUENCY

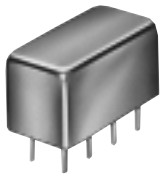


HUD-3H
IP3 VS. FREQUENCY



001218

ACTIVE, LOAD INSENSITIVE 10 to 500 MHz



UNCL-X1MH

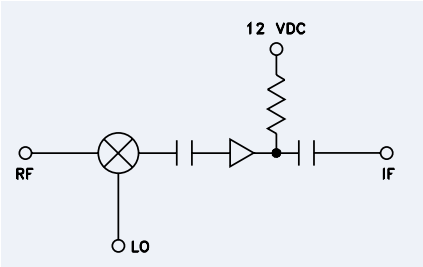
UNCL-X1MH (+13 dBm LO, up to +7 dBm RF)

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION GAIN, dB Mid-Band m $\bar{x}$	CONVERSION GAIN, dB Mid-Band m σ	CONVERSION GAIN, dB Mid-Band m Min.	CONVERSION GAIN, dB Total Range Min.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	INPUT POWER (dBm) 1 dB Comp Typ.	DC POWER Volt	DC POWER Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
UNCL-X1MH	1-500	10-500	2.41	.015	0.5	0	60	40	35	25	30	20	50	30	25	18	18	14	7	12	60	A01	a	29.95

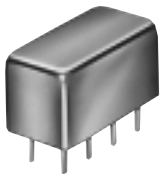
L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

features

- 2-tone 3rd-order IM
- insensitive to IF load
- VSWR 1.2:1, IF/RF ports



ACTIVE, LOW NOISE (4.3 dB typ.) 10 to 500 MHz

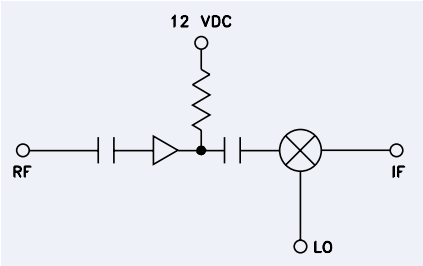


UNCL-R1

UNCL-R1 (+7 dBm LO, up to -10 dBm RF)

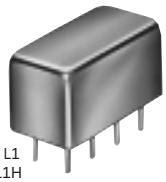
MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION GAIN, dB Mid-Band m $\bar{x}$	CONVERSION GAIN, dB Mid-Band m σ	CONVERSION GAIN, dB Mid-Band m Min.	CONVERSION GAIN, dB Total Range Typ.	CONVERSION GAIN, dB Total Range Min.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	INPUT POWER (dBm) 1 dB Comp Typ.	DC POWER Volt	DC POWER Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
UNCL-R1	10-500	DC-500	5.53	.11	2	5	2	65	45	55	40	47	35	40	30	30	20	25	17	-10	12	35	A01	b	25.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



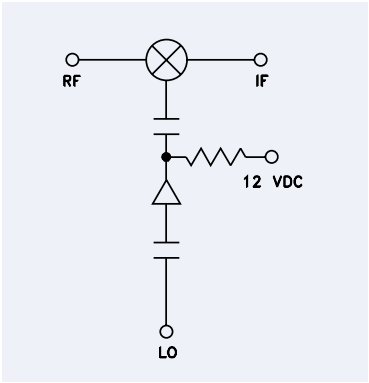
ACTIVE, LOW LO DRIVE 10 to 500 MHz

UNCL-L1 (-4 dBm LO, up to 1 dBm RF)
UNCL-L1H (+6 dBm LO, up to 14 dBm RF)


UNCL - L1
UNCL-L1H

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS, dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	INPUT POWER (dBm) 1 dB Comp Typ.	DC POWER Volt	Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
UNCL-L1	10-500	DC-500	5.73	.08	8.0	8.5	45	30	35	20	25	17	32	20	23	15	18	12	1	12	35	A01	c	25.95
UNCL-L1H	10-500	DC-500	5.73	.07	8.0	8.5	45	25	36	20	24	17	32	18	25	15	18	10	14	12	60	A01	c	29.95

L = low range [f_L to 10 f_L]
M = mid range [10 f_L to f_U/2]
m = mid band [2f_L to f_U/2]
U = upper range [f_U/2 to f_U]



NSN GUIDE

MCL NO.	NSN
UNCL-X1MH	5895-01-391-0040

NOTES:

$\bar{X}$ Average of conversion loss at center of mid-band frequency($f_L + f_U/4$)
σ Standard deviation
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.

pin connections

PORT	a	b	c
LO	7	7	1
RF	8	1	7
IF	1	8	8
DC	4	4	4
GND EXT.	3,5,6	3,5,6	3,5,6
CASE GND	3,5,6	3,5,6	3,5,6
NOT USED	2	2	2

991220

IMAGE REJECT 500 to 2550 MHz

JCIR

JCIR-4MH (+15 dBm LO)
JCIR-25 (+13 dBm LO)

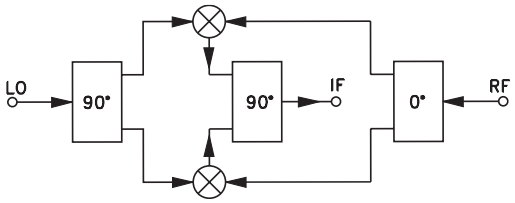
MODEL NO.	FREQUENCY MHz RF f_L-f_U	LO f_L-f_U	IF	CONVERSION LOSS dB $\bar{x}$	σ	Max.	IMAGE REJECTION dBc RF>LO	LO>RF	Typ.	Min.	LO-RF ISOLATION dB M Typ.	M Min.	LO-IF ISOLATION dB M Typ.	M Min.	RF-IF ISOLATION dB M Typ.	M Min.	IP3@ center band (dBm) Typ.	CASE STYLE	CONNECTION	PRICE $ QTY. (1-9)
◆ JCIR-4MH	430-930	500-1000	65-75	7.9	0.15	9.0	●		28	18	55	40	25	20	25	15	20	BG291	kj	54.95
◆ JCIR-25	2490-2550	2420-2480	57-83	7.0	—	8.5		●	27	17	35	25	26	18		25	16	BG291	kk	44.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

BLUE CELL

features

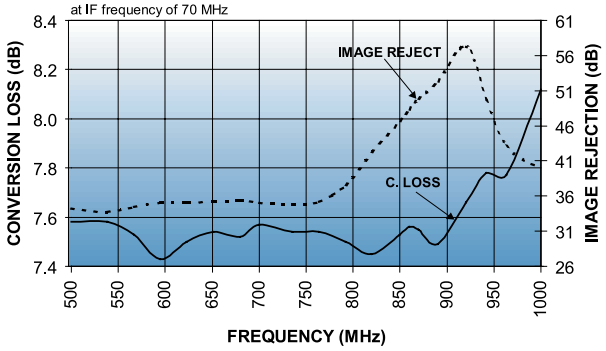
- excellent image rejection, 28 dB typ. (JCIR-4MH)
- low conversion loss, 7.9 dB typ. (JCIR-4MH)
  7.0 dB typ. (JCIR-25)
- solder plated J-leads for excellent solderability & strain relief



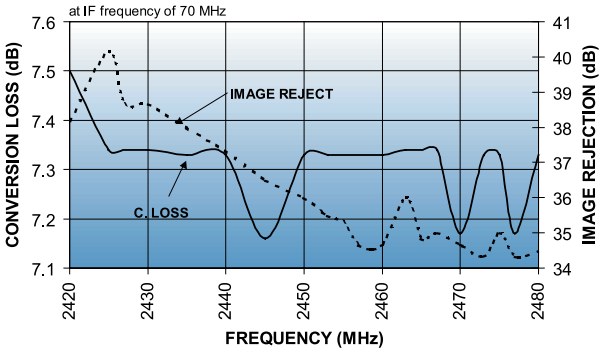
applications

- cellular
- ISM

JCIR-4MH
CONVERSION LOSS & IMAGE REJECTION



JCIR-25
CONVERSION LOSS & IMAGE REJECTION



NOTES:
◆ Aqueous washable.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 100mW (JCIR-4MH); 200mW (JCIR-25)
1b. IF current, 40mA

pin connections

see case style outline drawings

PORT	kj	kk
LO	2	9
RF	9	2
IF	11	11
GND	1,3,5,6,7,8 10,12,13,14	1,3,4,5,6,7,8 10, 12, 13, 14
50 OHM TERM	4	—

000426

FREQUENCY MIXERS *Surface Mount*

LOW LEVEL *200 kHz to 5900 MHz*


ADE


† LRMS-J

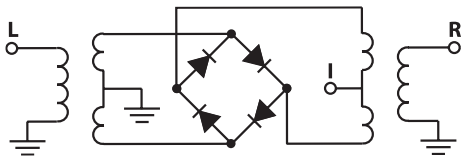

MBA


† RMS

BLUE CELL

	MODEL NO.	LO LEVEL dBm	RF @ 1dB Comp. Typ. dBm	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	Mid-Band m σ	Mid-Band m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3 @ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
◆	ADE-1L**	+3	0	2-500	DC-500	5.2	0.1	7.2	8.0	68	50	55	30	44	30	55	40	45	30	35	25	16	CD542	ht	3.95
◆	ADE-3L**	+3	-3	0.2-400	DC-400	5.3	.01	6.5	9.0	58	50	47	34	38	28	55	50	38	25	30	20	10	CD636	ht	4.25
◆	MBA-10L*	+3	0	800-1000	DC-200	8.0	0.1	—	9.5	20 (typ.)		13 (min.)				15 (typ.)		8 (min.)				9	SM2	ld	6.95
◆	MBA-10VL*	0	-3	800-1000	DC-200	7.4	0.1	—	9.8	18 (typ.)		14 (min.)				14 (typ.)		8 (min.)				3	SM2	ld	5.95
◆	MBA-15L*	+4	0	1200-2400	DC-600	6.5	0.1	—	8.5	27 (typ.)		15 (min.)				20 (typ.)		10 (min.)				10	SM2	ld	6.95
◆	MBA-18L*	+4	-1	1600-3200	DC-500	6.5	0.15	—	8.9	24 (typ.)		17 (min.)				16 (typ.)		10 (min.)				8	SM2	ld	6.95
◆	MBA-25L*	+4	0	2000-3000	DC-600	6.2	0.15	—	8.6	28 (typ.)		18 (min.)				15 (typ.)		7 (min.)				10	SM2	ld	6.95
◆	MBA-35L*	+4	0	3000-4000	DC-700	5.5	0.1	—	8.5	26 (typ.)		20 (min.)				17 (typ.)		7 (min.)				9	SM2	ld	6.95
◆	MBA-591L*	+4	+1	4950-5900	DC-1000	7.0	0.1	—	9.0	35 (typ.)		25 (min.)				26 (typ.)		17 (min.)				15	SM2	le	6.95
																									Qty. (1-9)
◆	LRMS-2LJ	+3	-3	800-1000	DC-200	7.0	0.2	—	8.4	24 (typ.)		16 (min.)				20 (typ.)		12 (min.)				—	QQQ569	w	6.95
◆	LRMS-5LJ	+3	-3	400-1400	DC-800	7.0	0.2	—	9.8	22 (typ.)		14 (min.)				18 (typ.)		6 (min.)				—	QQQ569	w	13.95
	RMS-2L	+3	-3	800-1000	DC-200	7.0	0.2	—	8.4	24 (typ.)		16 (min.)				20 (typ.)		12 (min.)				—	TT240	w	6.95
	RMS-5L	+3	-3	400-1400	DC-800	7.0	0.2	—	9.8	22 (typ.)		14 (min.)				22 (typ.)		6 (min.)				—	TT240	w	13.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

NOTES:
- $\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
- σ Standard deviation
- ◆ Aqueous washable. For non-aqueous requirements, LRMS units available in case style QQQ130.
- † Phase detection, positive polarity.
- * BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
- ** Protected under U.S. patent 6133525
- A. Environmental specifications and re-flow soldering information available in General Information Section.
- B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current ratings:
  - 1a. RF power, 50mW
  - 1b. Peak IF current, 40mA

pin connections

PORT	w	ht[1]	ld	le
LO	1	6	10	10
RF	4	3	5	6
IF	5	2	3	1
GND EXT.	2,3,6	1,4,5	all others	all others
DEMO BOARD	TB-03	TB-03	—	—

[1] pin connection physically same as w

010508

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to allow for the correct viewing of
continuous facing pages.**

FREQUENCY MIXERS

Surface Mount

LEVEL 7 150 kHz to 4.3 GHz


ALY


ASK-KK81


†JMS


† LRMS-J


†RMS

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	Mid-Band m σ	Mid-Band m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	ALY-3	2300-2600	DC-400	5.5	.15	—	7.0		31 (typ.)		25 (min.)				15 (typ.)		12 (min.)			CB539	jx	5.95
◆	ALY-4	3300-4300	DC-600	5.7	.15	—	8.0		28 (typ.)		23 (min.)				15 (typ.)		12 (min.)			CB539	jx	5.95
	ASK-1-KK81	1-600	DC-600	5.58	.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	KK81	w	6.95
†	ASK-2-KK81	1-1000	DC-1000	6.79	.10	8.0	9.8	60	40	35	18	26	16	50	30	25	17	15	10	KK81	w	8.25
	JMS-1	2-500	DC-500	5.75	.10	7.0	8.0	55	50	45	30	40	25	55	45	45	25	32	20	BH292	ht	4.95
	JMS-2	20-1000	DC-1000	7.0	.15	8.4	9.5	63	40	50	28	35	20	56	30	47	22	37	20	BH292	ht	7.45
	JMS-2W	5-1200	DC-500	6.8	.10	8.0	9.0	60	40	60	30	37	20	60	40	48	20	31	15	BH292	ht	7.95
	JMS-5	5-1500	DC-1000	6.0	.10	8.0	9.5	63	40	50	25	35	20	60	40	30	18	15	8	BH292	ht	9.95
	JMS-11X	5-1900	5-1000	6.7	.15	8.2	9.8	58	45	35	20	27	18	56	45	37	20	27	20	BH292	hu	4.25***
◆	LRMS-1J	0.5-500	DC-500	5.94	.05	7.0	8.5	55	50	33	25	27	20	55	45	30	23	24	19	QQQ569	w	6.25
◆	LRMS-1WJ	2-750	DC-750	5.83	.21	7.5	8.5	70	45	45	28	38	22	60	45	40	25	30	20	QQQ569	w	6.75
◆	LRMS-2J	5-1000	DC-1000	6.67	.26	8.0	9.5	60	40	40	20	25	18	55	30	30	20	20	12	QQQ569	w	6.95
◆	LRMS-2DJ	5-1000	DC-1000	6.81	.06	8.0	10.0	59	40	40	30	33	22	55	30	40	22	30	20	QQQ569	w	7.25
◆	LRMS-2UJ	10-1000	10-750	6.79	.16	8.0	9.5	55	40	40	30	30	25	55	30	35	25	30	22	QQQ569	w	11.45
◆	LRMS-5J	5-1500	DC-1000	5.92	.34	7.5	9.5	60	40	40	20	30	18	55	30	30	18	15	8	QQQ569	w	13.95
◆	LRMS-11AJ	1500-1900	40-400	7.44	.36	—	9.0		25 (typ.)		17 (min.)				23 (typ.)		15 (min.)			QQQ569	w	16.95
◆	LRMS-860J	800-1050	DC-250	5.5	.23	7.5	7.5		36 (typ.)		25 (min.)				24 (typ.)		18 (min.)			QQQ569	w	11.45
◆	LRMS-30J	200-3000	DC-1000	6.8	.30	9.0	9.8		30 (typ.)		17 (min.)				27 (typ.)		7 (min.)			QQQ569	w	7.95***
	RMS-1	0.5-500	DC-500	5.94	.05	7.0	8.5	55	50	33	25	27	20	55	45	30	23	24	19	TT240	w	6.25
	RMS-1W	2-750	DC-750	5.83	.21	7.5	8.5	70	45	45	28	38	22	60	45	40	25	30	20	TT240	w	6.75
	RMS-1BM	5-600	DC-600	6.0	.05	7.0	7.5	65	45	50	32	35	23	55	40	40	25	35	22	TT240	w	6.25
	RMS-2	5-1000	DC-1000	6.67	.26	8.0	9.5	60	40	40	20	25	18	55	30	30	20	20	12	TT240	w	6.95
	RMS-2D	5-1000	DC-1000	6.81	.06	8.0	10.0	59	40	40	30	33	22	55	30	40	22	30	20	TT240	w	7.25
	RMS-2U	10-1000	10-750	6.79	.16	8.0	9.5	55	40	40	30	30	25	55	30	35	25	30	22	TT240	w	11.45
	RMS-5	5-1500	DC-1000	5.92	.34	7.5	9.5	60	40	40	20	30	18	55	30	30	18	15	8	TT240	w	13.95
	RMS-11A	1500-1900	40-400	7.44	.36	—	9.0		25 (typ.)		17 (min.)				23 (typ.)		15 (min.)			TT240	w	16.95
✪	RMS-11F	350-2000	DC-400	5.5	.20	7.0	9.2	37	26	36	20	32	20	22	14	29	20	28	20	TT240	w	4.95***
	RMS-11X	5-1900	5-1000	7.1	.10	8.2	9.8	58	45	35	20	27	18	56	45	37	20	27	20	TT240	gk	3.95***
	RMS-30	200-3000	DC-1000	6.5	.20	9.0	9.8		27 (typ.)		17 (min.)				20 (typ.)		7 (min.)			TT240	w	6.95***
	RMS-860	800-1050	DC-250	5.5	.23	7.5	7.5		36 (typ.)		25 (min.)				24 (typ.)		18 (min.)			TT240	w	11.45

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)

σ Standard deviation

◆ Aqueous washable. For non-aqueous requirements, LRMS units available in case style QQQ130

† Phase detection, positive polarity except RMS-860 and LRMS-860

✪ Frequency ranges specified: m = 350-1000 MHz, L = 350-750 MHz, M = 750-1000 MHz, U = 1000-2000 MHz

*** Price for quantities 10-49

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:
   1a. RF power, 50mW
   1b. Peak IF current, 40mA

NSN GUIDE

MCL NO.	NSN
RMS-1	5895-01-415-6798
RMS-2	5895-01-447-3489
RMS-2TR	5895-01-382-2092
SCM-1NL	5895-01-374-9561

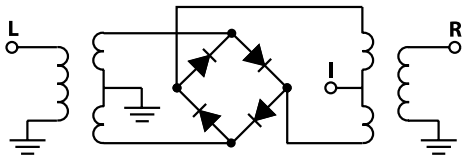
991222

SCM SKY SYM-J SYM TUF-SM

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	SCM-1	1-500	DC-500	5.72	.10	7.0	8.0	60	40	45	35	40	30	50	40	45	35	40	25	YY101	d	4.25
	SCM-2	5-1000	DC-500	5.76	.03	8.3	9.8	50	40	40	25	35	20	55	30	40	25	30	18	YY101	k	5.45
	SCM-2500	500-2500	DC-500	5.88	.08	6.9	10.0	35	22	35	22	35	22	18	12	18	12	18	12	YY101	r	11.95
	SKY-5G	2000-5000	DC-1000	6.6	.10	—	9.5	28 (typ.)		20 (min.)				13 (typ.)		7 (min.)				BJ398	je	14.95
	SKY-7G	2000-7000	DC-1000	7.0	.10	—	9.8	28 (typ.)		15 (min.)				20 (typ.)		7 (min.)				BJ398	je	16.95
	SKY-42	2000-4200	DC-1200	5.0	.30	—	8.5	31 (typ.)		20 (min.)				17 (typ.)		12 (min.)				BJ398	je	14.95
	SKY-53R	2800-5300	DC-500	5.7	.20	—	9.5	28 (typ.)		15 (min.)				12 (typ.)		8 (min.)				BJ398	hp	14.95
	SKY-60	2500-6000	DC-1500	6.2	.20	—	9.7	28 (typ.)		17 (min.)				14 (typ.)		8 (min.)				BJ398	je	14.95
	SYM-2	2-1000	DC-1000	5.4	.10	7.2	9.5	70	45	50	30	40	25	63	40	48	24	37	20	TTT166	x	11.95
	SYM-860	800-1050	DC-250	5.6	.10	7.0	7.0	39 (typ.)		25 (min.)				37 (typ.)		20 (min.)				TTT166	x	8.95
	SYM-11	1-2500	10-600	7.0	.30	9.0	10.5	63	40	40	24	34	20	61	40	35	20	28	15	TTT167	x	9.95
◆	SYM-11J	1-2500	10-500	7.4	.10	8.0	9.8	64	40	43	24	35	20	60	40	35	20	30	15	CG581	ka	10.95
	SYM-12	5-1200	DC-1000	6.5	.30	8.0	9.0	68	45	50	30	37	25	56	40	46	25	29	18	TTT167	x	9.45
	SYM-2500	1-2500	DC-500	6.5	.10	8.5	9.8	70	50	50	25	36	20	60	45	30	10	16	8	TTT167	x	11.95
	SYM-42	1000-4200	DC-200	6.7	.20	—	10.2	35 (typ.)		20 (min.)				30 (typ.)		8 (min.)				TTT167	kv	15.95
	TUF-1SM	2-600	DC-600	5.85	.04	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22	NNN150	z	4.25
	TUF-2SM	50-1000	DC-1000	5.85	.07	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	NNN150	z	5.20
†	TUF-3SM	0.15-400	DC-400	4.7	.02	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	NNN150	z	6.10
	TUF-5SM	20-1500	DC-1000	5.7	.04	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	NNN150	z	10.45
	TUF-11ASM	1400-1900	40-500	6.8	.30	8.6	8.6	33 (typ.)		20 (min.)				29 (typ.)		15 (min.)				NNN150	z	16.95
	TUF-860SM	800-1050	DC-250	5.6	.24	7.75	7.75	35 (typ.)		25 (min.)				27 (typ.)		20 (min.)				NNN150	z	9.45

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]



pin connections see case style outline drawings

PORT	d	k	r	w	x	z	gk	ht[1]	hu[2]	hp	je	jx	ka	kv
LO	8	8	1	1	2	4	1	6	6	5	1	5	11	1
RF	1	1	8	4	1	1	5	3	2	1	5	10	5	2
IF	3,4^	3	3	5	3	2	4	2	3	7	7	8	2	3
GND EXT.	2,5,6,7	2,5,6,7	2,4,5,6,7	2,3,6	4,5,6	3	2,3,6	1,4,5	1,4,5	2,3,4,6,8	2,3,4,6,8	all others	all others	4,5,6
CASE GND	—	—	—	—	—	3	—	—	—	—	—	—	—	—
NOT USED	—	4	—	—	—	—	—	—	—	—	—	—	—	—

^ pins must be connected together externally
[1] pin connection physically same as w
[2] pin connection physically same as gk

010723

FREQUENCY MIXERS

Surface Mount

LEVEL 7 50 kHz to 6.7 GHz

ADE

+7 dBm LO, up to +1 dBm RF

MODEL NO. ◆	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	m σ	m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
ADE-1**	0.5-500	DC-500	5.0	.10	6.5	7.8	70	50	55	35	45	30	65	45	40	25	30	20	15	CD636	ht	1.99✱
† ADE-1ASK**	2-600	DC-600	5.3	.10	6.5	7.5	55	45	50	30	40	25	50	40	45	24	35	18	16	CD542	ht	3.95
† ADE-2ASK**	1-1000	DC-1000	5.4	.10	6.8	9.5	55	45	45	30	36	20	50	40	32	22	22	12	12	CD542	ht	4.25
† ADE-3G**	2300-2700	DC-400	5.6	.10	—	7.0			36 (typ.)		25 (min.)				26 (typ.)		17 (min.)		13	CD542	ht	3.45
ADE-3GL**	2100-2600	DC-600	6.0	.25	—	8.8			34 (typ.)		25 (min.)				20 (typ.)		7 (min.)		17	CD541	jw	4.95
☆ ADE-4**	200-1000	DC-800	6.8	0.1	8.5	8.5	60	45	53	40	45	30	45	30	40	22	35	20	15	CD542	ht	4.25
† ADE-5**	5-1500	DC-1000	6.6	.10	7.5	9.3	50	40	40	25	33	23	50	40	30	20	20	10	15	CD542	ht	3.45
ADE-6**	0.05-250	DC-200	4.6	.05	7.0	8.4	62	49	40	30	40	20	58	44	45	24	25	15	10	CD637	ht	4.95
NEW ADE-11X**	10-2000	5-1000	7.1	0.1	8.2	9.8	62	45	36	20	27	18	60	45	37	20	38	20	9	CD542	nd	1.99✱
ADE-12**	50-1000	DC-1000	7.0	.15	8.0	9.0	40	25	—	—	33	22	44	26	—	—	37	20	17	CD541	jv	2.95
ADE-13**	50-1600	50-1000	8.1	.10	9.0	9.8	50	25	40	25	33	20	49	30	35	20	32	20	11	CD541	ju	3.10
ADE-14**	800-1000	DC-200	7.4	.20	—	8.9			32 (typ.)		22 (min.)				34 (typ.)		20 (min.)		17	CD541	jv	3.25
ADE-18**	1700-2500	DC-600	4.9	.20	—	7.3			27 (typ.)		22 (min.)				10 (typ.)		7 (min.)		10	CD542	jw	3.45
ADE-18W**	1750-3500	DC-700	5.4	.30	8.9	8.9			33 (typ.)		20 (min.)				12 (typ.)		7 (min.)		11	CD542	jw	3.95
ADE-20**	1500-2000	DC-300	5.4	.10	—	7.8			31 (typ.)		22 (min.)				28 (typ.)		20 (min.)		14	CD542	jv	4.95
ADE-28**	1500-2800	DC-1000	5.1	.25	—	8.2			30 (typ.)		21 (min.)				27 (typ.)		17 (min.)		8	CD542	jv	5.95
ADE-30**	200-3000	DC-1000	4.5	.20	9.0	9.8			35 (typ.)		20 (min.)				20 (typ.)		7 (min.)		14	CD542	ht	6.95
ADE-30W**	300-4000	DC-950	6.8	.20	9.0	9.8			35 (typ.)		17 (min.)				16 (typ.)		7 (min.)		12	CD542	ht	8.95
ADE-32**	2500-3200	DC-1200	5.4	0.2	—	9.4			29 (typ.)		20 (min.)				30 (typ.)		20 (min.)		15	CD542	jv	6.95
† ADE-35**	1600-3500	DC-1500	6.3	.50	—	9.8			25 (typ.)		16 (min.)				22 (typ.)		12 (min.)		11	CD542	jv	4.95
ADE-901**	800-1000	DC-200	5.9	.10	—	7.3			32 (typ.)		22 (min.)				26 (typ.)		18 (min.)		13	CD542	jv	2.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

features

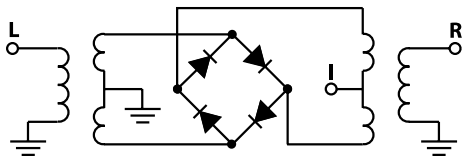
- low conversion loss, down to 4.9 dB typ.
- excellent isolation, up to 55 dB typ.
- IP3, up to 17 dBm typ.
- ultra low profile package (patent pending)
- solder plated leads for excellent solderability
- waterwash compatibility
- low cost

applications

- cellular
- PCN
- ISM
- instrumentation
- wireless/VSAT systems
- PCMCIA cards

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
◆ Aqueous washable
† Phase detection, positive polarity.
☆ L=200-400 MHz M=400-500 MHz U=500-1000 MHz
✱ Quantity 100
* BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
** Protected under U.S. patent 6133525
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 50mW
1b. Peak IF current, 40mA



010521

MBA

+7 dBm LO, up to +1 dBm RF

BLUE CELL

MODEL NO.◆	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Total Range Max.	LO-RF ISOLATION, dB Typ.	Min.	LO-IF ISOLATION, dB Typ.	Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
MBA-9*	800-1000	DC-200	7.3	.20	9.0	22	20	17	12	10	SM2	lc	5.95
MBA-12*	800-2500	DC-500	7.5	.10	9.0	30	20	15	8	12	SM2	lc	5.95
MBA-26*	2200-2700	DC-500	5.7	.10	8.0	40	32	33	18	9	SM2	ld	5.95
MBA-591*	2800-5900	DC-1000	6.5	.10	9.0	36	20	26	17	10	SM2	le	6.95
MBA-671*	2400-6700	DC-1000	6.5	.10	9.2	36	20	26	17	10	SM2	le	8.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

features

- excellent temperature stability
- performance repeatability
- solder plated leads with strain relief
- very low cost
- ultra low height, 0.07"

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

applications

- cellular
- WLAN
- satellite communication
- ISM band
- PCMCIA
- PCN/PCS/ wideband CDMA
- VSAT systems

pin connections

see case style outline drawings

PORT	ju	jv	jw	ht	lc	ld	le	nd
LO	6	6	4	6	10	10	10	6
RF	3	4	6	3	5	5	6	2
IF	4	3	3	2	3	3	1	3
GND	1,2,5	1,2,5	1,2,5	1,4,5	1,4,7,8,9	all others	all others	1,4,5
ISOLATE	—	—	—	—	2,6	—	—	—
DEMO BOARD	TB-02	TB-02	TB-02	TB-03	—	—	—	—

010521

FREQUENCY MIXERS

Surface Mount

LEVEL 7 50 kHz to 6.7 GHz

ADE

+7 dBm LO, up to +1 dBm RF

MODEL NO. ◆	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	m σ	m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
ADE-1**	0.5-500	DC-500	5.0	.10	6.5	7.8	70	50	55	35	45	30	65	45	40	25	30	20	15	CD636	ht	1.99✱
† ADE-1ASK**	2-600	DC-600	5.3	.10	6.5	7.5	55	45	50	30	40	25	50	40	45	24	35	18	16	CD542	ht	3.95
† ADE-2ASK**	1-1000	DC-1000	5.4	.10	6.8	9.5	55	45	45	30	36	20	50	40	32	22	22	12	12	CD542	ht	4.25
† ADE-3G**	2300-2700	DC-400	5.6	.10	—	7.0			36 (typ.)		25 (min.)				26 (typ.)		17 (min.)		13	CD542	ht	3.45
ADE-3GL**	2100-2600	DC-600	6.0	.25	—	8.8			34 (typ.)		25 (min.)				20 (typ.)		7 (min.)		17	CD541	jw	4.95
☆ ADE-4**	200-1000	DC-800	6.8	0.1	8.5	8.5	60	45	53	40	45	30	45	30	40	22	35	20	15	CD542	ht	4.25
† ADE-5**	5-1500	DC-1000	6.6	.10	7.5	9.3	50	40	40	25	33	23	50	40	30	20	20	10	15	CD542	ht	3.45
ADE-6**	0.05-250	DC-200	4.6	.05	7.0	8.4	62	49	40	30	40	20	58	44	45	24	25	15	10	CD637	ht	4.95
NEW ADE-11X**	10-2000	5-1000	7.1	0.1	8.2	9.8	62	45	36	20	27	18	60	45	37	20	38	20	9	CD542	nd	1.99✱
ADE-12**	50-1000	DC-1000	7.0	.15	8.0	9.0	40	25	—	—	33	22	44	26	—	—	37	20	17	CD541	jv	2.95
ADE-13**	50-1600	50-1000	8.1	.10	9.0	9.8	50	25	40	25	33	20	49	30	35	20	32	20	11	CD541	ju	3.10
ADE-14**	800-1000	DC-200	7.4	.20	—	8.9			32 (typ.)		22 (min.)				34 (typ.)		20 (min.)		17	CD541	jv	3.25
ADE-18**	1700-2500	DC-600	4.9	.20	—	7.3			27 (typ.)		22 (min.)				10 (typ.)		7 (min.)		10	CD542	jw	3.45
ADE-18W**	1750-3500	DC-700	5.4	.30	8.9	8.9			33 (typ.)		20 (min.)				12 (typ.)		7 (min.)		11	CD542	jw	3.95
ADE-20**	1500-2000	DC-300	5.4	.10	—	7.8			31 (typ.)		22 (min.)				28 (typ.)		20 (min.)		14	CD542	jv	4.95
ADE-28**	1500-2800	DC-1000	5.1	.25	—	8.2			30 (typ.)		21 (min.)				27 (typ.)		17 (min.)		8	CD542	jv	5.95
ADE-30**	200-3000	DC-1000	4.5	.20	9.0	9.8			35 (typ.)		20 (min.)				20 (typ.)		7 (min.)		14	CD542	ht	6.95
ADE-30W**	300-4000	DC-950	6.8	.20	9.0	9.8			35 (typ.)		17 (min.)				16 (typ.)		7 (min.)		12	CD542	ht	8.95
ADE-32**	2500-3200	DC-1200	5.4	0.2	—	9.4			29 (typ.)		20 (min.)				30 (typ.)		20 (min.)		15	CD542	jv	6.95
† ADE-35**	1600-3500	DC-1500	6.3	.50	—	9.8			25 (typ.)		16 (min.)				22 (typ.)		12 (min.)		11	CD542	jv	4.95
ADE-901**	800-1000	DC-200	5.9	.10	—	7.3			32 (typ.)		22 (min.)				26 (typ.)		18 (min.)		13	CD542	jv	2.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

features

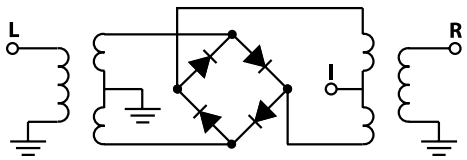
- low conversion loss, down to 4.9 dB typ.
- excellent isolation, up to 55 dB typ.
- IP3, up to 17 dBm typ.
- ultra low profile package (patent pending)
- solder plated leads for excellent solderability
- waterwash compatibility
- low cost

applications

- cellular
- PCN
- ISM
- instrumentation
- wireless/VSAT systems
- PCMCIA cards

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
◆ Aqueous washable
† Phase detection, positive polarity.
☆ L=200-400 MHz M=400-500 MHz U=500-1000 MHz
✱ Quantity 100
* BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
** Protected under U.S. patent 6133525
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 50mW
1b. Peak IF current, 40mA



010521

MBA

+7 dBm LO, up to +1 dBm RF

BLUE CELL

MODEL NO.◆	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Total Range Max.	LO-RF ISOLATION, dB Typ.	Min.	LO-IF ISOLATION, dB Typ.	Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
MBA-9*	800-1000	DC-200	7.3	.20	9.0	22	20	17	12	10	SM2	lc	5.95
MBA-12*	800-2500	DC-500	7.5	.10	9.0	30	20	15	8	12	SM2	lc	5.95
MBA-26*	2200-2700	DC-500	5.7	.10	8.0	40	32	33	18	9	SM2	ld	5.95
MBA-591*	2800-5900	DC-1000	6.5	.10	9.0	36	20	26	17	10	SM2	le	6.95
MBA-671*	2400-6700	DC-1000	6.5	.10	9.2	36	20	26	17	10	SM2	le	8.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

features

- excellent temperature stability
- performance repeatability
- solder plated leads with strain relief
- very low cost
- ultra low height, 0.07"

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

applications

- cellular
- WLAN
- satellite communication
- ISM band
- PCMCIA
- PCN/PCS/ wideband CDMA
- VSAT systems

pin connections

see case style outline drawings

PORT	ju	jv	jw	ht	lc	ld	le	nd
LO	6	6	4	6	10	10	10	6
RF	3	4	6	3	5	5	6	2
IF	4	3	3	2	3	3	1	3
GND	1,2,5	1,2,5	1,2,5	1,4,5	1,4,7,8,9	all others	all others	1,4,5
ISOLATE	—	—	—	—	2,6	—	—	—
DEMO BOARD	TB-02	TB-02	TB-02	TB-03	—	—	—	—

010521

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continuous facing pages.**

FREQUENCY MIXERS

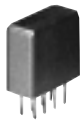
Plug-In & Flatpack

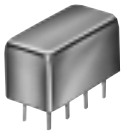
LEVEL 7 500 Hz to 4.3 GHz


ASK-X65


ASK-W38


ROSE


SAM


SRA


SBL
SIMA

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	CONVERSION LOSS dB Mid-Band m σ	CONVERSION LOSS dB Mid-Band m Max.	CONVERSION LOSS dB Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
❑	ASK-1[1]	1-600	DC-600	5.58	.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	W38	w	6.95
†❑	ASK-2[1]	1-1000	DC-1000	6.79	.10	8.0	9.8	60	40	35	18	26	16	50	30	25	17	15	10	W38	w	8.25
	ROSE-1	1-600	DC-600	5.08	.03	6.5	7.5	40	30	35	25	30	20	55	40	40	20	25	18	PP94	ab	12.95
	ROSE-2	1-1000	DC-1000	5.60	.23	7.0	8.0	61	45	37	22	25	18	55	40	26	17	16	12	PP94	ab	18.95
	SAM-1	1-600	DC-600	5.67	.05	7.0	8.5	55	45	45	30	35	20	50	40	40	25	30	20	A03	e	18.95
	SAM-2	1-1000	DC-1000	5.68	.08	7.5	9.5	55	45	40	25	35	20	50	40	40	25	30	25	A03	f	22.45
	SAM-3	0.1-500	DC-500	5.04	.07	7.0	8.5	60	50	50	35	35	30	50	40	45	30	30	20	A03	e	21.95
	SRA-1	.5-500	DC-500	5.11	.09	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	A01	e	14.45
	SRA-1W	1-750	DC-750	5.80	.04	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	A01	f	17.95
	SRA-1-1	.1-500	DC-500	4.81	.11	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	A01	e	15.95
	SRA-2	1-1000	.5-500	5.66	.07	7.5	8.5	45	30	35	20	30	20	45	30	30	20	30	20	A01	j	17.95
	SRA-2CM	5-1000	DC-1000	5.27	.04	7.0	8.5	60	50	35	30	30	25	50	45	30	25	25	20	A01	f	15.95
	SRA-3	.025-200	DC-200	4.61	.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	A01	e	17.95
	SRA-5	5-1500	10-600	6.69	.07	8.0	8.5	50	45	35	30	30	20	45	40	30	25	25	15	A06	m	26.95
	SRA-6	.003-100	DC-100	4.58	.05	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	A01	d	26.95
	SRA-8	.0005-10	DC-10	5.69	.11	7.5	8.5	60	50	50	40	45	35	60	50	50	40	45	35	A01	d	31.95
	SRA-11	5-2000	10-600	6.72	.07	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	A06	m	22.95
	SRA-12	800-1250	50-90	6.21	.13	7.5	7.5	32	25	35	25	35	25	30	20	30	20	30	20	A06	m	31.95
	SRA-149***	5-500	DC-500	5.61	.07	6.5	8.0	60	50	55	45	53	40	50	40	35	25	30	24	A06	p	10.95
	SRA-2000	100-2000	DC-600	8.60	.15	9.5	9.5	37 (Typ.)		20 (Min.)				30 (Typ.)		20 (Min.)				A06	m	23.95
	SRA-2400	750-2400	DC-400	5.95	.26	9.0	9.0	30	20	30	20	30	20	30	8	30	8	30	8	A06	s	24.95
	SRA-3500**	500-3500	DC-1000	7.28	.31	9.5	9.5	30	17	30	17	30	17	20	8	20	8	20	8	A06	s	30.95
❑	SBL-1	1-500	DC-500	5.60	.09	7.0	8.0	60	45	45	35	40	25	45	35	40	25	30	20	A06	d	5.75
❑	SBL-1X	10-1000	5-500	5.88	.10	7.5	8.0	50	40	40	30	30	20	50	45	40	35	35	25	A06	j	7.45
❑	SBL-1Z	10-1000	DC-500	6.27	.09	7.5	9.0	50	40	35	25	25	20	40	25	25	18	19	15	A06	s	8.45
❑	SBL-1-1	0.1-400	DC-400	4.84	.04	7.0	8.0	50	45	45	30	35	25	45	30	40	25	30	20	A06	d	8.45
❑	SBL-3	.025-200	DC-200	4.81	.05	7.5	8.5	55	50	45	30	35	25	45	35	40	30	30	20	A06	e	8.45
❑	SBL-11	5-2000	10-600	7.08	.11	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	A06	m	21.95
	SIMA-5	2-1500	DC-1000	7.01	.08	8.0	9.0	65	44	44	23	31	22	54	38	30	18	25	11	A06	m	26.95

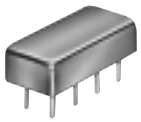
L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

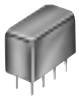
NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
❑ Non-hermetic
† Phase detection, positive polarity
• ASK plug-in mounting case X65
•• Below 10°C, f_L is 0.2 MHz.
* Conversion loss 9.5 dB maximum from 0.01 to 0.015 MHz
** Conversion loss 10dB maximum at IF=1000 MHz
*** Blue bead pin 4
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power, 50 mW
1b. Peak IF current, 40 mA

NSN GUIDE

MCL NO.	NSN MIL-M-28837/1*
ASK-1	5895-01-320-0366
SAM-1	5895-01-117-2926
SAM-2	5895-01-165-6621
SAM-3	5895-01-062-9973
SBL-1	5895-01-126-4913
SBL-1X	5895-01-179-8084
SRA-1	5895-00-008-8272 03
SRA-1-1	5962-01-113-5431
SRA-1W	5895-01-163-0433 09
SRA-3	5895-01-021-5914
SRA-6	5895-01-124-0117
SRA-8	5985-01-081-0977
SRA-11	5895-01-273-0883
SBL-3	5895-01-326-6030
TAK-5	5895-01-271-0842
TAK-6	5895-01-231-2372
TFM-2	5895-01-135-1852
TFM-3	5895-01-112-0031
TFM-4	5895-01-317-9388
TFM-11	5895-01-409-1158
TFM-12	5895-01-179-5686
TSM-3	5895-01-373-2444


TAK


TSM

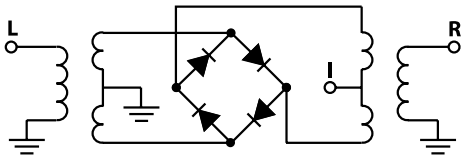

TFM


TUF

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	CONVERSION LOSS dB Mid-Band m σ	CONVERSION LOSS dB Mid-Band m Max.	CONVERSION LOSS dB Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	TAK-5*	.01-250	DC-250	4.65	.02	7.0	8.5	60	50	50	35	40	35	55	45	45	30	35	25	A04	e	22.95
	TAK-6	.5-600	DC-600	5.58	.04	7.5	8.5	60	50	50	30	40	25	55	45	45	30	30	20	A04	e	22.95
	TSM-3	.1-500	DC-500	4.75	.04	7.5	8.5	60	50	50	35	35	25	55	45	45	30	35	25	A11	e	23.95
	TFM-2	1-1000	DC-1000	5.74	.07	7.5	8.5	50	45	40	25	30	25	45	40	35	25	25	18	B02	z	14.95
†	TFM-3●●	0.04-400	DC-400	4.70	.06	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25	B02	z	23.45
†	TFM-4	5-1250	DC-1250	6.47	.05	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20	B02	z	25.45
	TFM-5	5-1500	DC-1000	6.33	.06	8.5	9.5	60	45	35	25	30	25	60	40	35	15	25	14	B02	aa	27.95
	TFM-11	1-2000	5-600	7.16	.07	8.5	9.0	50	45	35	25	25	20	45	40	27	20	25	20	B13	z	48.95
	TFM-12	800-1250	50-90	5.71	.14	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	B13	z	48.95
	TFM-2400	750-2400	DC-400	6.65	.20	—	9.0	30	20	30	20	30	20	30	10	30	10	30	10	B13	aa	30.95
	TFM-4300	300-4300	DC-800	5.87	.13	—	10.5	30	20	—	—	30	17	15	7	—	—	10	7	B13	aa	40.95
❑	TUF-1	2-600	DC-600	5.85	.04	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22	B02	z	5.25
❑	TUF-2	50-1000	DC-1000	5.85	.07	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	B02	z	6.20
❑	TUF-3	0.15-400	DC-400	4.7	.02	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	B02	z	7.05
❑	TUF-5	20-1500	DC-1000	5.7	.04	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	B02	z	10.45
❑	TUF-11A	1400-1900	40-500	6.8	.30	8.6	8.6	33 (typ.)		20 (min.)				29 (typ.)		15 (min.)				B02	z	18.95
❑	TUF-860	800-1050	DC-250	5.6	.24	7.75	7.75	35 (typ.)		25 (min.)				27 (typ.)		20 (min.)				B02	z	10.45

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



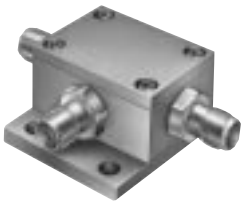
pin connections see case style outline drawings

PORT	d	e	f	j	m	p	s	w	z	aa	ab
LO	8	8	8	8	8	8	1	1	4	1	1
RF	1	1	1	3,4^	1	2	8	4	1	4	3
IF	3,4^	3,4^	3,4^	1	3	5,6^	3	5	2	2	2
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	1,3,4,7	2,5,6,7	2,3,6	3	3	4
CASE GND	—	2	2,5,6,7	2,5,6,7	2,5,6,7	3,4,7	2,5,6,7	—	3	3	4
NOT USED	—	—	—	—	4	—	4	—	—	—	—

^ pins must be connected together externally

001110

LEVEL 7 500 Hz to 10 GHz


ZMX


ZP


ZLW


ZAD

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	Mid-Band m σ	Mid-Band m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZMX-7GR	3700-7000	DC-1000	5.0	.30	—	8.2	30 (typ.)		20 (min.)				36 (typ.)		20 (min.)				BU413	af	71.95
	ZMX-10G	3700-10000	DC-2000	5.0	.10	—	8.5	37 (typ.)		20 (min.)*				17 (typ.)		8 (min.)				BU413	ad	81.95
	ZP-1	2-600	DC-600	5.85	.10	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22		ag	39.95
	ZP-2	50-1000	DC-1000	5.85	.10	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	GG60	ag	39.95
†	ZP-3	0.15-400	DC-400	4.7	.10	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	GG60	ag	39.95
	ZP-5	20-1500	DC-1000	5.7	.10	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	GG60	ag	47.95
	ZP-5X	1-1500	1-1000	5.9	.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	GG60	hg	47.95
	ZP-11A	1400-1900	40-500	6.8	.30	8.6	8.6	33(typ.)		20 (min.)				29 (typ.)		15 (min.)				GG60	ag	47.95
	ZP-860	800-1050	DC-250	5.6	.24	7.75	7.75	35(typ.)		25 (min.)				27 (typ.)		20 (min.)				GG60	ag	47.95
	ZP10514	.2-500	DC-500	5.18	.10	7.0	8.5	55	45	50	35	35	30	50	40	36	30	30	20	GG60	ag	62.95
▲	ZLW-1	.5-500	DC-500	5.81	.08	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	M21	ae	51.95
▲	ZLW-1W	1-750	DC-750	5.74	.05	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M21	ae	56.95
▲	ZLW-1-1	.1-500	DC-500	4.82	.07	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M21	ae	53.95
▲	ZLW-2	1-1000	DC-1000	5.68	.08	7.5	9.5	55	45	40	25	35	20	50	40	40	25	30	20	M21	ae	56.95
▲	ZLW-3	.025-200	DC-200	4.61	.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	M21	ae	53.95
▲	ZLW-5	5-1500	10-600	5.81	.08	7.5	8.5	55	40	35	25	30	20	50	40	35	25	30	20	M21	ae	61.95
▲	ZLW-6	.003-100	DC-100	4.58	.05	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	25	M21	ae	64.95
▲	ZLW-11	5-2000	10-600	6.85	.10	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	M21	ae	71.95
▲	ZLW-12	800-1250	50-90	6.21	.13	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	M21	ae	71.95
	ZAD-1	.5-500	DC-500	5.24	.10	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	M22	ae	43.95
	ZAD-1-1	.1-500	DC-500	4.83	.04	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M22	ae	44.95
	ZAD-2	1-1000	.5-500	5.66	.07	7.5	8.5	45	30	35	20	30	20	45	30	35	20	30	20	M22	ad	49.95
	ZAD-3	.025-200	DC-200	4.61	.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	M22	ae	45.95
	ZAD-6	.003-100	DC-100	4.65	.08	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	M22	ae	51.95
	ZAD-8	.0005-10	DC-10	5.79	.05	7.5	8.5	60	50	50	40	45	35	60	50	50	40	45	35	M22	ae	54.95
	ZAD-11	5-2000	10-600	7.12	.12	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	M22	ae	61.95
	ZAD-12	800-1250	50-90	6.21	.13	7.5	7.5	35	25	35	25	35	25	30	20	30	20	30	20	M22	ae	61.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
▲ Available only with SMA connectors
† Phase detection, positive polarity
* 15 dB min. 8.5 to 10 GHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power, 50mW
1b. Peak IF current, 40mA

000815


ZEM


ZFM


ZAM

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	CONVERSION LOSS dB Mid-Band m σ	CONVERSION LOSS dB Mid-Band m Max.	CONVERSION LOSS dB Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
▲	ZEM-2B	10-1000	DC-1000	5.74	.07	7.0	8.5	55	50	30	25	25	20	55	45	30	20	25	20	V37	ad	59.95
▲	ZEM-4300	300-4300	DC-1000	6.65	.06	—	9.5	40	20	—	—	30	17	15	8	—	—	15	8	V37	af	79.95
	ZFM-1W	10-750	DC-750	5.42	.14	7.0	8.0	50	45	45	30	35	25	45	40	40	25	27	20	K18	ad	51.95
	ZFM-2	1-1000	DC-1000	5.72	.06	7.5	8.5	50	45	40	25	30	25	45	40	35	25	25	20	K18	ad	53.95
	ZFM-3	0.04-400	DC-400	4.78	.03	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25	K18	ad	61.95
†	ZFM-4	5-1250	DC-1250	5.70	.34	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20	K18	ad	61.95
	ZFM-5X	1-1500	1-1000	5.9	.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	K18	ae	59.95
	ZFM-11	1-2000	5-600	7.03	.17	8.5	9.0	50	45	35	25	25	20	45	40	27	20	25	20	K18	ad	89.95
	ZFM-12	800-1250	50-90	5.67	.12	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	K18	ad	79.95
▲	ZFM-2000	100-2000	DC-600	7.49	.20	9.5	9.5	—	—	37	20	—	—	—	—	—	—	30	20	K18	ad	71.95
▲	ZFM-4212	2000-4200	DC-1300	5.44	.088	—	8.5	—	—	25	17	—	—	—	—	18	10	—	—	K18	ad	54.95
▲	ZAM-42	1500-4200	DC-500	5.67	.11	—	8.5	25	14	25	14	25	14	18	10	18	10	18	10	F14	af	54.95

L = low range [f_L to 10 f_L]

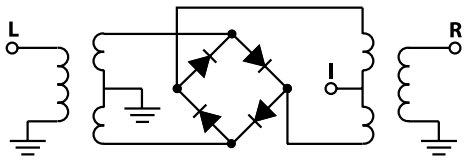
M = mid range [10 f_L to f_U/2]

m = mid band [2f_L to f_U/2]

U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
ZAD-1B(BNC)	5985-00-280-7750
ZAD-4B	5895-01-127-0376
ZAD-6B	5895-01-344-7843
ZEM-2	5895-01-235-7834
ZFM-1W	5895-01-412-3037
ZFM-2	4935-01-230-3782
ZFM-3	5895-01-257-9523
ZFM-3 (SMA)	5895-01-214-7362
ZFM-3B	5895-01-381-9289
ZFM-11(SMA)	6625-01-415-2182
ZLW-1W	5895-00-607-7010
ZLW-2	6920-01-037-1974
ZLW-2B	5840-01-186-8398
ZP-10514	6625-01-108-6156
ZP-10514(BNC)	5895-01-384-7453



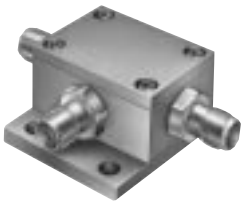
coaxial connections

see case style outline drawings

PORT	ad	ae	af	ag	hg
LO	1	1	2	L	L
RF	2	3	1	R	X
IF	3	2	3	X	R
GND EXT.	—	—	—	—	—
CASE GND	—	—	—	—	—
NOT USED	—	—	—	—	—

000614

LEVEL 7 500 Hz to 10 GHz


ZMX


ZP


ZLW


ZAD

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	Mid-Band m σ	Mid-Band m Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZMX-7GR	3700-7000	DC-1000	5.0	.30	—	8.2	30 (typ.)		20 (min.)				36 (typ.)		20 (min.)				BU413	af	71.95
	ZMX-10G	3700-10000	DC-2000	5.0	.10	—	8.5	37 (typ.)		20 (min.)*				17 (typ.)		8 (min.)				BU413	ad	81.95
	ZP-1	2-600	DC-600	5.85	.10	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22		ag	39.95
	ZP-2	50-1000	DC-1000	5.85	.10	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	GG60	ag	39.95
†	ZP-3	0.15-400	DC-400	4.7	.10	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	GG60	ag	39.95
	ZP-5	20-1500	DC-1000	5.7	.10	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	GG60	ag	47.95
	ZP-5X	1-1500	1-1000	5.9	.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	GG60	hg	47.95
	ZP-11A	1400-1900	40-500	6.8	.30	8.6	8.6	33(typ.)		20 (min.)				29 (typ.)		15 (min.)				GG60	ag	47.95
	ZP-860	800-1050	DC-250	5.6	.24	7.75	7.75	35(typ.)		25 (min.)				27 (typ.)		20 (min.)				GG60	ag	47.95
	ZP10514	.2-500	DC-500	5.18	.10	7.0	8.5	55	45	50	35	35	30	50	40	36	30	30	20	GG60	ag	62.95
▲	ZLW-1	.5-500	DC-500	5.81	.08	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	M21	ae	51.95
▲	ZLW-1W	1-750	DC-750	5.74	.05	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M21	ae	56.95
▲	ZLW-1-1	.1-500	DC-500	4.82	.07	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M21	ae	53.95
▲	ZLW-2	1-1000	DC-1000	5.68	.08	7.5	9.5	55	45	40	25	35	20	50	40	40	25	30	20	M21	ae	56.95
▲	ZLW-3	.025-200	DC-200	4.61	.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	M21	ae	53.95
▲	ZLW-5	5-1500	10-600	5.81	.08	7.5	8.5	55	40	35	25	30	20	50	40	35	25	30	20	M21	ae	61.95
▲	ZLW-6	.003-100	DC-100	4.58	.05	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	25	M21	ae	64.95
▲	ZLW-11	5-2000	10-600	6.85	.10	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	M21	ae	71.95
▲	ZLW-12	800-1250	50-90	6.21	.13	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	M21	ae	71.95
	ZAD-1	.5-500	DC-500	5.24	.10	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	M22	ae	43.95
	ZAD-1-1	.1-500	DC-500	4.83	.04	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	M22	ae	44.95
	ZAD-2	1-1000	.5-500	5.66	.07	7.5	8.5	45	30	35	20	30	20	45	30	35	20	30	20	M22	ad	49.95
	ZAD-3	.025-200	DC-200	4.61	.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	M22	ae	45.95
	ZAD-6	.003-100	DC-100	4.65	.08	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	M22	ae	51.95
	ZAD-8	.0005-10	DC-10	5.79	.05	7.5	8.5	60	50	50	40	45	35	60	50	50	40	45	35	M22	ae	54.95
	ZAD-11	5-2000	10-600	7.12	.12	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	M22	ae	61.95
	ZAD-12	800-1250	50-90	6.21	.13	7.5	7.5	35	25	35	25	35	25	30	20	30	20	30	20	M22	ae	61.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
▲ Available only with SMA connectors
† Phase detection, positive polarity
* 15 dB min. 8.5 to 10 GHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power, 50mW
1b. Peak IF current, 40mA

000815


ZEM


ZFM


ZAM

+7 dBm LO, up to +1 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	CONVERSION LOSS dB Mid-Band m σ	CONVERSION LOSS dB Mid-Band m Max.	CONVERSION LOSS dB Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
▲	ZEM-2B	10-1000	DC-1000	5.74	.07	7.0	8.5	55	50	30	25	25	20	55	45	30	20	25	20	V37	ad	59.95
▲	ZEM-4300	300-4300	DC-1000	6.65	.06	—	9.5	40	20	—	—	30	17	15	8	—	—	15	8	V37	af	79.95
	ZFM-1W	10-750	DC-750	5.42	.14	7.0	8.0	50	45	45	30	35	25	45	40	40	25	27	20	K18	ad	51.95
	ZFM-2	1-1000	DC-1000	5.72	.06	7.5	8.5	50	45	40	25	30	25	45	40	35	25	25	20	K18	ad	53.95
	ZFM-3	0.04-400	DC-400	4.78	.03	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25	K18	ad	61.95
†	ZFM-4	5-1250	DC-1250	5.70	.34	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20	K18	ad	61.95
	ZFM-5X	1-1500	1-1000	5.9	.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	K18	ae	59.95
	ZFM-11	1-2000	5-600	7.03	.17	8.5	9.0	50	45	35	25	25	20	45	40	27	20	25	20	K18	ad	89.95
	ZFM-12	800-1250	50-90	5.67	.12	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	K18	ad	79.95
▲	ZFM-2000	100-2000	DC-600	7.49	.20	9.5	9.5	—	—	37	20	—	—	—	—	—	—	30	20	K18	ad	71.95
▲	ZFM-4212	2000-4200	DC-1300	5.44	.088	—	8.5	—	—	25	17	—	—	—	—	18	10	—	—	K18	ad	54.95
▲	ZAM-42	1500-4200	DC-500	5.67	.11	—	8.5	25	14	25	14	25	14	18	10	18	10	18	10	F14	af	54.95

L = low range [f_L to 10 f_L]

M = mid range [10 f_L to f_U/2]

m = mid band [2f_L to f_U/2]

U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
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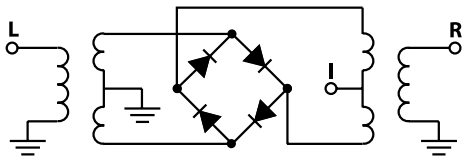
ZAD-4B	5895-01-127-0376
ZAD-6B	5895-01-344-7843
ZEM-2	5895-01-235-7834
ZFM-1W	5895-01-412-3037
ZFM-2	4935-01-230-3782
ZFM-3	5895-01-257-9523
ZFM-3 (SMA)	5895-01-214-7362
ZFM-3B	5895-01-381-9289
ZFM-11(SMA)	6625-01-415-2182
ZLW-1W	5895-00-607-7010
ZLW-2	6920-01-037-1974
ZLW-2B	5840-01-186-8398
ZP-10514	6625-01-108-6156
ZP-10514(BNC)	5895-01-384-7453



coaxial connections

see case style outline drawings

PORT	ad	ae	af	ag	hg
LO	1	1	2	L	L
RF	2	3	1	R	X
IF	3	2	3	X	R
GND EXT.	—	—	—	—	—
CASE GND	—	—	—	—	—
NOT USED	—	—	—	—	—

000614

FREQUENCY MIXERS

Surface Mount

LEVEL 10 150 kHz to 6 GHz


ADE


†JMS


†LRMS-J


MBA

+10 dBm LO, up to +5 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	FREQUENCY MHz IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	CONVERSION LOSS dB Mid-Band m σ	CONVERSION LOSS dB Mid-Band m Max.	CONVERSION LOSS dB Total Range Max.	LO-RF ISOLATION, dB L Typ.	LO-RF ISOLATION, dB L Min.	LO-RF ISOLATION, dB M Typ.	LO-RF ISOLATION, dB M Min.	LO-RF ISOLATION, dB U Typ.	LO-RF ISOLATION, dB U Min.	LO-IF ISOLATION, dB L Typ.	LO-IF ISOLATION, dB L Min.	LO-IF ISOLATION, dB M Typ.	LO-IF ISOLATION, dB M Min.	LO-IF ISOLATION, dB U Typ.	LO-IF ISOLATION, dB U Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (1-9)
◆ ADE-1LH**	0.5-500	DC-500	5.0	0.10	6.5	8.2	65	50	55	35	47	26	52	40	45	22	34	20	15	CD636	ht	2.99***
◆ ADE-1LHW**	2-750	DC-750	5.3	0.1	6.8	8.5	66	50	52	35	46	27	64	40	50	27	40	20	15	CD542	ht	4.95***
JMS-1LH	2-500	DC-500	5.75	.10	7.0	8.0	67	50	55	30	42	25	50	40	45	25	32	20	—	BH292	ht	8.45
JMS-2LH	20-1000	DC-1000	6.5	.10	7.5	9.0	60	40	48	25	37	20	45	30	35	20	27	11	—	BH292	ht	9.45
JMS-5LH	5-1500	DC-1000	6.0	.20	8.0	9.5	60	40	50	25	35	20	55	40	35	14	15	6	—	BH292	ht	10.95
◆ LRMS-1LHJ	2-500	DC-500	5.36	.08	7.0	8.0	58	45	44	25	30	20	55	40	40	25	28	17	—	QQQ569	w	7.95
◆ LRMS-2LHJ	5-1000	DC-1000	6.44	.10	8.0	9.5	58	40	39	20	22	16	52	30	30	17	18	11	—	QQQ569	w	8.95
◆ LRMS-5LHJ	10-1500	DC-900	5.27	.09	8.0	9.8	58	35	38	20	25	18	56	30	38	14	17	6	—	QQQ569	w	14.95
◆ LRMS-20J	1500-2000	DC-500	5.0	.15	—	7.5	35 (Typ.)		22 (Min.)				26 (Typ.)		18 (Min.)				18	QQQ569	w	6.95***
◆ LRMS-25J	750-2500	DC-600	5.2	.15	—	9.5	35 (Typ.)		17 (Min.)				20 (Typ.)		7 (Min.)				18	QQQ569	w	7.95***
BLUE CELL ◆ MBA-15LH*	1200-2400	DC-600	5.6	0.1	—	8.5	26 (Typ.)		17 (Min.)				22 (Typ.)		10 (Min.)				15	SM2	ld	6.95***
◆ MBA-18LH*	1600-3200	DC-500	5.8	0.1	—	8.5	30 (Typ.)		17 (Min.)				22 (Typ.)		10 (Min.)				12	SM2	ld	6.95***
◆ MBA-25LH*	2200-3600	DC-500	7.0	0.1	—	9.2	32 (Typ.)		21 (Min.)				20 (Typ.)		10 (Min.)				12	SM2	ld	6.95***
◆ MBA-35LH*	3000-4000	DC-700	4.8	0.1	—	8.5	26 (Typ.)		18 (Min.)				13 (Typ.)		7 (Min.)				10	SM2	ld	6.95***

L = low range [f_L to 10 f_L]

M = mid range [10 f_L to f_U/2]
m = mid band [2f_L to f_U/2]

U = upper range [f_U/2 to f_U]

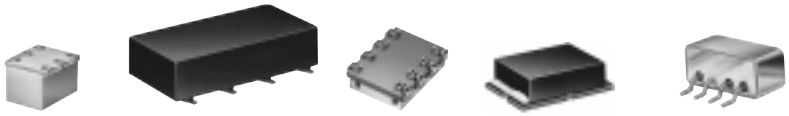
NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
◆ Aqueous washable. For non-aqueous requirements, LRMS units availabe in case style QQQ130.
† Phase detection, positive polarity.
‡ Conversion loss increases up to 6 dB higher as IF frequency decreases from 5 MHz to DC.
☆ L=50-100 MHz, M=100-500 MHz
* BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
** Protected under U.S. Patent 6133525
*** Price for quantities 10-49
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 50mW
1b. Peak IF current, 40mA

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

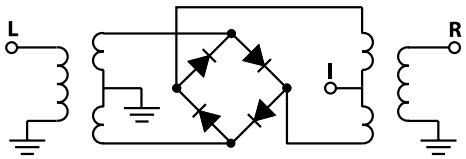
010605



†RMS SCM SKY SYM TUF-SM

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (1-9)
RMS-1LH	2-500	DC-500	5.36	.08	7.0	8.0	58	45	44	25	30	20	55	40	40	25	28	17	—	TT240	w	7.95
RMS-2LH	5-1000	DC-1000	6.44	.10	8.0	9.5	58	40	39	20	22	16	52	30	30	17	18	11	—	TT100	w	8.95
RMS-5LH	10-1500	DC-900	5.27	.09	8.0	9.8	58	35	38	20	25	18	56	30	38	14	17	6	—	TT240	w	14.95
SCM-2500LH	500-2500	DC-500	5.6	.20	6.8	10.0	35 (Typ.)		20 (Min.)				18 (Typ.)		10 (Min.)				—	YY101	r	13.95
SKY-53LHR	2800-5300	DC-500	5.7	.20	—	9.5	28 (typ.)		15 (min.)				12 (typ.)		8 (min.)				14	BJ398	hp	16.95
SKY-60LH	2500-6000	DC-1500	6.2	.20	—	9.7	28 (typ.)		17 (min.)				14 (typ.)		8 (min.)				15	BJ398	je	16.95
SYM-11LH	1-2000	10-600	7.0	.10	8.3	9.85	60	40	45	25	37	25	59	40	33	20	25	20	—	TTT167	x	11.95
NEW SYM-25DLHW	40-2500	DC-1000‡	6.3	.10	7.5	8.8	48	28	40	25	38	22	36	25	33	25	39	21	22	TTT167	x	7.95***
SYM-30LH	800-3000	1-300	6.5	.25	—	8.8	—	—	35	20	—	—	—	—	35	20	—	—	21	TTT167	x	11.95
TUF-1LHSM	2-600	DC-600	6.0	.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	—	NNN150	z	6.25
TUF-2LHSM☆	50-1000	DC-1000	5.2	.30	7.0	8.5	58	40	44	30	39	25	60	35	50	25	38	20	—	NNN150	z	7.20
TUF-3LHSM	0.15-400	DC-400	4.8	.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	—	NNN150	z	8.10
TUF-5LHSM	20-1500	DC-1000	6.9	.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	—	NNN150	z	11.45
TUF-11ALHSM	1400-1900	40-500	7.0	.20	8.6	8.6	36 (Typ.)		20 (Min.)				28 (Typ.)		15 (Min.)				—	NNN150	z	18.95
TUF-860LHSM	800-1050	DC-250	6.3	.27	7.9	7.9	35 (Typ.)		25 (Min.)				27 (Typ.)		18 (Min.)				—	NNN150	z	11.45

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



pin and coaxial connections see case style outline drawings for pin locations

PORT	r	w	x	z	ht[1]	hp	je	ld
LO	1	1	2	4	6	5	1	10
RF	8	4	1	1	3	1	5	5
IF	3	5	3	2	2	7	7	3
GND EXT.	2,4,5,6,7	2,3,6	4,5,6	3	1,4,5	2,3,4,6,8	2,3,4,6,8	1,2,4,6,7,8,9
CASE GND	—	—	—	3	—	—	—	—
NOT USED	—	—	—	—	—	—	—	—
DEMO BOARD	—	TB-03	TB-12	—	TB-03	TB-11	TB-11	—

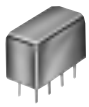
[1] pin connection physically same as w

010605

LEVEL 10 50 kHz to 8 GHz


TFM / TUF


ROK


SBL / SRA

+10 dBm LO, up to +5 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TFM-15	10-3000	10-800	6.75	.08	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20	B13	aa	51.95
TFM-150**	10-2000	DC-1000	6.19	.11	8.0	8.0	32	25	35	25	35	25	33	20	30	20	30	20	B13	aa	47.45
❑ TUF-1LH	2-600	DC-600	6.0	.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	B02	z	7.25
❑ TUF-2LH*	50-1000	DC-1000	5.2	.30	7.0	8.5	58	40	44	30	39	25	60	35	50	25	38	20	B02	z	8.20
❑ TUF-3LH	0.15-400	DC-400	4.8	.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	B02	z	9.10
❑ TUF-5LH	20-1500	DC-1000	6.9	.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	B02	z	12.45
❑ TUF-11ALH	1400-1900	40-500	7.0	.20	8.6	8.6	36 (Typ.)		20 (Min.)				28 (Typ.)		15 (Min.)				B02	z	19.95
❑ TUF-860LH	800-1050	DC-250	6.3	.27	7.9	7.9	35 (Typ.)		25 (Min.)				27 (Typ.)		18 (Min.)				B02	z	12.45
ROK-2500LH	1-2500	DC-500	6.4	.20	8.4	9.0	55	40	48	20	30	20	55	38	27	15	22	15	PP230	ah	34.95
❑ SBL-1LH	2-500	DC-500	5.8	.03	7.0	8.0	75	45	68	35	56	25	61	35	45	25	36	20	A06	d	6.75
❑ SBL-1-1LH	.2-400	DC-400	5.2	.06	7.0	9.0	67	45	64	30	51	25	62	30	52	25	34	20	A06	d	9.45
❑ SBL-1XLH	10-1000	5-500	6.0	.12	7.5	8.5	50	40	40	25	30	20	70	45	55	40	45	30	A06	j	8.45
❑ SBL-2LH	5-1000	DC-1000	5.9	.09	7.5	9.5	67	45	61	30	57	30	68	40	54	30	43	20	A06	h	9.45
❑ SBL-11LH	5-2000	10-600	7.0	.11	8.5	9.5	60	45	45	30	30	20	50	35	30	20	25	16	A06	m	22.95
SRA-2CR	10-1000	5-500	5.68	.12	7.5	8.0	50	40	40	30	30	20	40	25	30	18	25	15	A01	s	19.95
SRA-215	.05-1500	.05-500	5.20	.08	7.5	9.0	25	20	35	25	30	20	25	20	35	25	25	15	A01	m	30.95
SRA-220	.05-2000	.05-500	5.59	.11	8.0	9.0	25	20	40	30	30	20	25	20	40	30	25	15	A01	m	33.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
❑ Non-hermetic
* L=50-100 MHz; M=100-500 MHz
** Below 10 MHz IF, conversion loss increase up to 6 dB higher as frequency decreases to DC.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 50mW;
1b. Peak IF current, 40mA

NSN GUIDE

MCL NO.	NSN
TFM-15	5895-01-292-2759
ZFM-15	5895-01-412-3035
ZFM-150	5895-01-217-6878

001109

ZMX

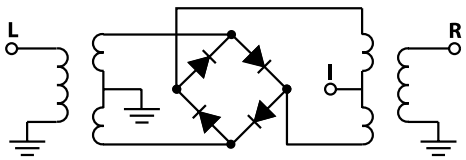
ZP

ZFM

+10 dBm LO, up to +5 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZMX-7GLHR	3700-7000	DC-1500	5.4	.30	—	8.5	33 (Typ.)	20 (Min.)					35 (Typ.)	20 (Min.)					BU413	af	71.95
ZMX-8GLH	3700-8000	DC-2000	5.5	.20	—	8.5	40 (Typ.)	20 (Min.)					18 (Typ.)	8 (Min.)					BU413	ad	74.95
ZP-1LH	2-600	DC-600	6.0	.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	GG60	ag	41.95
ZP-3LH	0.15-400	DC-400	4.8	.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	GG60	ag	41.95
ZP-5LH	20-1500	DC-1000	6.9	.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	GG60	ag	45.95
ZP-11ALH	1400-1900	40-500	7.0	.20	8.6	8.6	36 (Typ.)	20 (Min.)					28 (Typ.)	15 (Min.)					GG60	ag	45.95
ZP-860LH	800-1050	DC-250	6.3	.27	7.9	7.9	35 (Typ.)	25 (Min.)					27 (Typ.)	18 (Min.)					GG60	ag	45.95
ZFM-15	10-3000	10-800	6.13	.14	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20	K18	ad	89.95
ZFM-150**	10-2000	DC-1000	6.05	.12	8.0	8.0	32	25	35	25	35	20	33	20	30	20	25	20	K18	ad	69.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



pin and coaxial connections see case style outline drawings for pin locations

PORT	d	h	j	m	s	z	aa	ad	af	ag	ah
LO	8	8	8	8	1	4	1	1	2	L	4
RF	1	1	3,4^	1	8	1	4	2	1	R	2
IF	3,4^	3,4^	1	3	3	2	2	3	3	X	1
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	3	3	—	—	—	3
CASE GND	—	2,5,6	2,5,6,7	2,5,6,7	2,5,6,7	3	3	—	—	—	3
NOT USED	—	—	—	4	4	—	—	—	—	—	—

^ pins must be connected together externally

001109

ZMX

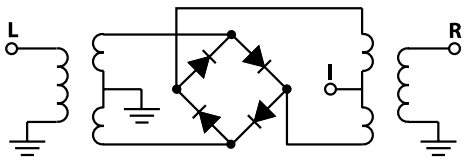
ZP

ZFM

+10 dBm LO, up to +5 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZMX-7GLHR	3700-7000	DC-1500	5.4	.30	—	8.5	33 (Typ.)	20 (Min.)					35 (Typ.)	20 (Min.)					BU413	af	71.95
ZMX-8GLH	3700-8000	DC-2000	5.5	.20	—	8.5	40 (Typ.)	20 (Min.)					18 (Typ.)	8 (Min.)					BU413	ad	74.95
ZP-1LH	2-600	DC-600	6.0	.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	GG60	ag	41.95
ZP-3LH	0.15-400	DC-400	4.8	.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	GG60	ag	41.95
ZP-5LH	20-1500	DC-1000	6.9	.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	GG60	ag	45.95
ZP-11ALH	1400-1900	40-500	7.0	.20	8.6	8.6	36 (Typ.)	20 (Min.)					28 (Typ.)	15 (Min.)					GG60	ag	45.95
ZP-860LH	800-1050	DC-250	6.3	.27	7.9	7.9	35 (Typ.)	25 (Min.)					27 (Typ.)	18 (Min.)					GG60	ag	45.95
ZFM-15	10-3000	10-800	6.13	.14	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20	K18	ad	89.95
ZFM-150**	10-2000	DC-1000	6.05	.12	8.0	8.0	32	25	35	25	35	20	33	20	30	20	25	20	K18	ad	69.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



pin and coaxial connections see case style outline drawings for pin locations

PORT	d	h	j	m	s	z	aa	ad	af	ag	ah
LO	8	8	8	8	1	4	1	1	2	L	4
RF	1	1	3,4^	1	8	1	4	2	1	R	2
IF	3,4^	3,4^	1	3	3	2	2	3	3	X	1
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	3	3	—	—	—	3
CASE GND	—	2,5,6	2,5,6,7	2,5,6,7	2,5,6,7	3	3	—	—	—	3
NOT USED	—	—	—	4	4	—	—	—	—	—	—

^ pins must be connected together externally

001109

FREQUENCY MIXERS

Surface Mount

LEVEL 13 150 kHz to 6 GHz


ADE


ALY


† JMS


† LRMS-J


MBA

+13 dBm LO, up to +9 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band $\bar{x}$	σ_m	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (10-49)
	◆ ADE-1MH**	2-500	DC-500	5.2	.10	6.5	8.0	60	45	50	35	48	25	55	40	45	30	40	22	17	CD542	ht	5.95
	◆ ADE-1MHW**	0.5-600	DC-600	5.2	.10	6.9	8.0	63	50	53	32	43	20	56	40	44	25	30	20	17	CD636	ht	6.45
NEW	◆ ADE-10MH**	800-1000	10-200	7.0	0.2	—	8.5	34 (Typ.)		20 (Min.)				29 (Typ.)		20 (Min.)				26	CD636	ht	6.95
	◆ ADE-12MH**	10-1200	DC-1200	6.3	.10	8.0	8.5	62	45	45	32	40	26	68	40	42	27	30	20	22	CD542	ht	6.45
	◆ ADE-25MH**	5-2500	5-1500	6.9	.10	8.5	9.8	47	28	34	23	34	23	34	23	32	20	23	17	18	CD542	ht	6.95
	◆ ADE-35MH**	5-3500	5-2500	6.9	.10	9.3	10.5	47	28	33	23	38	18	34	23	28	18	23	17	18	CD542	ht	9.95
	◆ ADE-42MH**	5-4200	5-3500	7.5	.20	9.8	11.8	47	28	29	20	30	15	34	23	26	17	23	17	17	CD542	ht	14.95
BLUE CELL	◆ MBA-9MH*	800-1000	DC-200	6.7	0.1	—	9.0	25 (Typ.)		20 (Min.)				18 (Typ.)		12 (Min.)				15	SM2	lc	7.95
BLUE CELL	◆ MBA-12MH*	800-2500	DC-500	7.5	0.1	—	9.5	30 (Typ.)		20 (Min.)				15 (Typ.)		7 (Min.)				15	SM2	lc	7.95
BLUE CELL	◆ MBA-15MH*	1400-2400	DC-600	5.5	0.1	—	8.5	28 (Typ.)		16 (Min.)				16 (Typ.)		8 (Min.)				18	SM2	ld	7.95
BLUE CELL	◆ MBA-18MH*	1600-3200	DC-650	5.5	0.1	—	8.0	35 (Typ.)		18 (Min.)				18 (Typ.)		10 (Min.)				16	SM2	ld	7.95
BLUE CELL	◆ MBA-25MH*	2000-3000	DC-500	6.5	0.1	—	8.6	36 (Typ.)		18 (Min.)				20 (Typ.)		7 (Min.)				16	SM2	ld	7.95
BLUE CELL	◆ MBA-35MH*	3000-4000	DC-700	5.1	0.1	—	8.7	22 (Typ.)		15 (Min.)				14 (Typ.)		8 (Min.)				15	SM2	ld	7.95
																							Qty. (1-9)
	◆ ALY-44MH	2400-4400	DC-1400	7.5	.20	—	8.9	30 (Typ.)		20 (Min.)				20 (Typ.)		10(Min.)				—	CB518	jy	18.95
	◆ ALY-44MHW	1800-4900	DC-1400	7.5	.20	—	9.2	30 (Typ.)		20 (Min.)				14 (Typ.)		8 (Min.)				—	CB518	jy	19.95
	JMS-1MH	2-500	DC-500	5.75	.10	7.0	8.0	70	55	60	40	44	25	55	42	45	25	35	20	—	BH292	ht	9.45
	JMS-2MH	20-1000	DC-1000	7.0	.15	8.4	9.5	63	40	50	28	35	20	56	30	47	22	37	20	—	BH292	ht	10.45
	JMS-5MH	5-1500	DC-1000	5.7	.10	8.0	9.5	67	40	57	25	35	20	60	40	35	18	15	8	—	BH292	ht	11.95
	◆ LRMS-1MHJ	2-500	DC-500	5.65	.08	7.0	8.0	58	45	44	25	30	20	55	40	36	25	28	17	—	QQQ569	w	8.95
	◆ LRMS-2MHJ	5-1000	DC-1000	6.72	.08	8.5	9.5	55	40	39	20	22	16	52	35	30	17	18	12	—	QQQ569	w	9.95
	◆ LRMS-2UMHJ	10-1000	20-500	7.0	.10	8.5	9.5	52	40	43	30	33	25	53	30	44	25	39	22	—	QQQ569	w	14.45
	◆ LRMS-5MHJ	10-1500	DC-900	5.67	.09	9.0	9.5	58	40	40	20	26	18	50	30	38	18	17	8	—	QQQ569	w	15.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
◆ Aqueous washable. For non-aqueous requirements, LRMS units available in case style QQQ130.
❑ Non-hermetic
† Phase detection, positive polarity
‡ Conversion loss increases up to 6 dB higher as IF frequency decreases from 5 MHz to DC.
✪ Frequency Specified RMS-42MH m=1000 - 2000 MHz, L=800 - 2100 MHz, U=2100 - 4200 MHz; TUF-2MHSM L=50-100 MHz M=100-500 MHz
* BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
** Protected under U.S. Patent 6133525
*** Prices for quantities 10-49
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings: 1a. RF power 200mW; 1b. Peak IF current, 40mA

BLUE CELL™ TECHNOLOGY

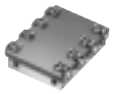
Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

NSN GUIDE

MCL NO.	NSN
ROK-186MH	5895-01-392-2276
SRA-1MH	5895-01-391-0113
TFM-3MH	5895-01-302-7047
TFM-42MH	5895-01-408-6093

010605


† RMS


SKY

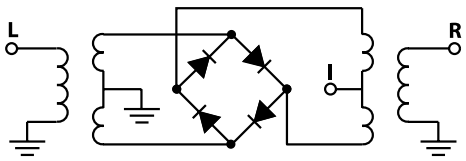

SYM


TUF-SM

+13 dBm LO, up to +9 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band $\bar{x}$	σ^m	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE	CONNECTION	PRICE $ Qty. (1-9)
RMS-1MH	2-500	DC-500	5.65	.08	7.0	8.0	58	45	44	25	30	20	55	40	36	25	28	17	—	TT240	w	8.95
RMS-2MH	5-1000	DC-1000	6.72	.08	8.5	9.5	55	40	39	20	22	16	52	35	30	17	18	12	—	TT100	w	9.95
RMS-5MH	10-1500	DC-900	5.67	.09	9.0	9.5	58	40	40	20	26	18	50	30	38	18	17	8	—	TT240	w	15.95
RMS-25MH	5-2500	5-1500	7.0	.20	8.5	9.8	54	28	32	23	32	20	34	23	32	25	28	17	—	TT240	w	9.95
✪RMS-42MH	800-4200	DC-800	5.3	.20	9.0	10.8	35	25	—	—	28	17	18	10	—	—	15	7	—	TT240	w	24.95
SKY-53MHR	2800-5300	DC-500	5.7	.20	—	9.5	28 (Typ.)		15 (Min.)				12 (Typ.)		8 (Min.)				19	BJ398	hp	17.95
SKY-60MH	2500-6000	DC-1500	6.2	.20	—	9.5	28 (Typ.)		17 (Min.)				14 (Typ.)		8 (Min.)				19	BJ398	je	17.95
SYM-11MH	50-2000	50-1000	6.6	.10	8.0	9.9	55	35	44	25	30	20	40	25	36	20	29	20	—	TTT167	x	15.95
NEW SYM-25DMHW	40-2500	DC-1000‡	6.6	.10	8.0	9.0	47	32	37	27	35	22	38	28	35	25	38	20	26	TTT167	x	8.95***
SYM-1020MH	1000-2000	DC-800	6.5	.55	—	9.8	32 (Typ.)		20 (Min.)				20 (Typ.)		10 (Min.)				18	TTT167	lq	9.95
SYM-8022MH	800-2200	DC-800	7.6	0.3	—	9.8	26 (Typ.)		18 (Min.)				20 (Typ.)		9 (Min.)				18	TTT167	lp	11.95
TUF-1MHSM	2-600	DC-600	6.3	.12	7.0	8.0	68	50	50	30	43	25	65	45	48	30	37	22	—	NNN150	z	7.25
✪ TUF-2MHSM	50-1000	DC-1000	6.0	.25	7.5	9.0	58	40	47	30	37	25	55	35	47	20	32	18	—	NNN150	z	8.20
TUF-3MHSM	0.15-400	DC-400	5.0	.33	7.0	8.0	60	50	46	30	35	25	60	40	42	25	35	20	—	NNN150	z	9.10
TUF-5MHSM	20-1500	DC-1000	7.0	.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8	—	NNN150	z	12.45
TUF-11AMHSM	1400-1900	40-500	7.4	.20	8.6	8.6	33 (Typ.)		20 (Min.)				24 (Typ.)		15 (Min.)				—	NNN150	z	19.95
TUF-860MHSM	800-1050	DC-250	6.8	.32	8.3	8.3	35 (Typ.)		25 (Min.)				27 (Typ.)		18 (Min.)				—	NNN150	z	12.45
TUF-2500MHSM	400-2500	30-800	7.3	.15	8.5	10.0	32 (Typ.)		24 (Min.)				27 (Typ.)		17 (Min.)				—	NNN150	z	24.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



pin and coaxial connections see case style outline drawings

PORT	w	x	z	hp	ht	je	jy	lc	ld	lp	lq
LO	1	2	4	5	6	1	1	10	10	3	3
RF	4	1	1	1	3	5	6	5	5	1	2
IF	5	3	2	7	2	7	10	3	3	2	1
GND EXT.	2,3,6	4,5,6	3	2,3,4,6,8	1,4,5	2,3,4,6,8	all others	1,4,7,8,9	1,2,4,6,7,8,9	4,5,6	4,5,6
ISOLATE	—	—	—	—	—	—	—	2,6	—	—	—
DEMO BOARD	TB-03	TB-12	—	TB-11	TB-03	TB-11	—	—	—	—	—

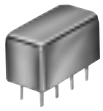
010727

FREQUENCY MIXERS

Plug-In

LEVEL 13 25 kHz to 7 GHz


ROK


SBL / SIMA/ SRA


TFM / TUF

+13 dBm LO, up to +9 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ROK-186MH	5-2500	10-1000	6.57	.11	8.5	9.5	33	25	35	25	25	20	33	20	31	25	27	20	QQ96	v	47.95
❑ SBL-1MH	1-500	DC-500	5.73	.08	7.5	8.5	50	35	45	30	35	25	45	30	40	25	30	20	A06	d	11.45
❑ SBL-1ZMH	2-1100	DC-500	6.63	.10	8.0	9.0	50	40	40	30	30	20	40	30	25	20	25	15	A06	s	13.45
SRA-1MH	.5-500	DC-500	5.65	.04	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	A01	e	15.95
SRA-3MH	.025-200	DC-200	4.77	.07	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	A01	e	18.95
SRA-2010MH	10-2000	DC-600	7.50	.20	8.5	9.8	50	45	45	30	40	25	45	45	35	30	35	20	A06	m	40.95
TFM-1MH	2-500	DC-500	5.80	.05	7.5	8.5	50	45	40	30	30	20	45	40	35	25	25	20	B02	z	26.95
TFM-3MH	1-250	DC-250	4.79	.23	7.0	8.5	50	45	40	30	28	23	45	40	35	25	26	20	B02	z	26.95
TFM-12MH	0.5-2000	0.2-600	6.99	.16	8.0	9.5	60	45	35	30	30	25	55	40	30	25	25	20	B13	z	48.95
TFM-42MH	10-4200	10-1000	7.46	.12	8.5	11	35	25	40	25	35	25	35	20	35	25	27	20	B13	aa	69.95
❑ TUF-1MH	2-600	DC-600	6.3	.12	7.0	8.0	68	50	50	30	43	25	65	45	48	30	37	22	B02	z	8.25
❑ TUF-2MH*	50-1000	DC-1000	6.0	.25	7.5	9.0	58	40	47	30	37	25	55	35	47	20	32	18	B02	z	9.20
❑ TUF-3MH	0.15-400	DC-400	5.0	.33	7.0	8.0	60	50	46	30	35	25	60	40	42	25	35	20	B02	z	10.20
❑ TUF-5MH	20-1500	DC-1000	7.0	.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8	B02	z	13.45
❑ TUF-11AMH	1400-1900	40-500	7.4	.20	8.6	8.6	33 (Typ.)		20 (Min.)				24 (Typ.)		15 (Min.)				B02	z	21.95
❑ TUF-860MH	800-1050	DC-250	6.8	.32	8.3	8.3	35 (Typ.)		25 (Min.)				27 (Typ.)		18 (Min.)				B02	z	13.45
❑ TUF-2500MH	400-2500	30-800	7.3	.15	8.5	10.0	32 (Typ.)		24 (Min.)				27 (Typ.)		17 (Min.)				B02	z	26.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

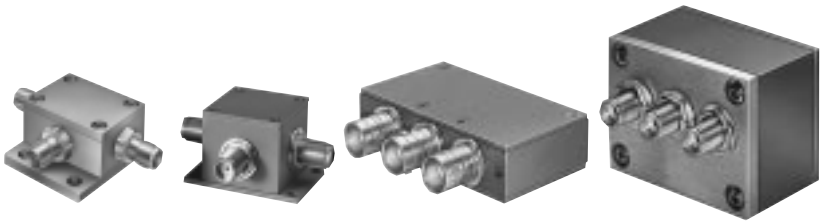
NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
❑ Non-hermetic
* L=50-100 MHz; M=100-500 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 200mW; 1b. Peak IF current, 40mA

NSN GUIDE

MCL NO.	NSN
ROK-186MH	5895-01-392-2276
SRA-1MH	5895-01-391-0113
TFM-3MH	5895-01-302-7047
TFM-42MH	5895-01-408-6093

001110

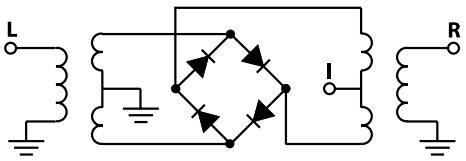


ZMX ZEM ZP ZLW

+13 dBm LO, up to +9 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZMX-7GMH	3700-7000	DC-2000	4.7	.20	—	8.0	37 (Typ.)		20 (Min.)				17 (Typ.)		8 (Min.)				BU413	ad	74.95
ZEM-4300MH	300-4300	DC-1000	6.42	.15	—	8.5	40	20	—	—	40	20	14	7	—	—	12	7	V37	af	89.95
ZEM-M2TMH	10-2400	10-1000	6.9	.10	9.0	9.5	49	40	43	35	42	35	49	40	44	30	40	30	V37	hq	114.95
ZP-1MH	2-600	DC-600	6.3	.12	7.0	8.0	68	50	50	30	43	25	65	45	48	30	37	22	GG60	ag	43.95
ZP-2MH*	50-1000	DC-1000	6.0	.25	7.5	9.0	58	40	47	30	37	25	55	35	47	20	32	18	GG60	ag	43.95
ZP-3MH	0.15-400	DC-400	5.0	.33	7.0	8.0	60	50	46	30	35	25	60	40	42	25	35	20	GG60	ag	43.95
ZP-5MH	20-1500	DC-1000	7.0	.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8	GG60	ag	47.95
ZP-11AMH	1400-1900	40-500	7.4	.20	8.6	8.6	33 (Typ.)		20 (Min.)				24 (Typ.)		15 (Min.)				GG60	ag	47.95
ZLW-186MH	2-2500	2-1000	6.9	.11	8.5	9.5	33	25	35	25	30	20	42	25	49	25	32	20	M21	ae	69.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



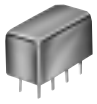
pin and coaxial connections see case style outline drawings

PORT	d	e	m	s	v	z	aa	ad	ae	af	ag	hq
LO	8	8	8	1	5	4	1	1	1	2	L	3
RF	1	1	1	8	11	1	4	2	3	1	R	2
IF	3,4^	3,4^	3	3	2	2	2	3	2	3	X	1
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	1,3,4,6,7,8,9,10,12	3	3	—	—	—	—	—
CASE GND	—	2	2,5,6,7	2,5,6,7	1,3,4,6,7,8,9,10,12	3	3	—	—	—	—	—
NOT USED	—	—	4	4	—	—	—	—	—	—	—	—

^ pins must be connected together externally

001109


SBL/SIMA


SRA


TFM/TUF


TAK

+17 dBm LO, up to +10 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
❑	SBL-173H	5-1200	1-1200	5.70	.10	7.0	8.5	40	35	35	25	35	20	40	35	35	20	30	20	A06	u,f	17.95
	SRA-1H	.5-500	DC-500	6.01	.08	7.5	8.5	55	45	45	30	35	25	45	35	40	30	30	20	A01	e	22.95
	SRA-1WH	1-750	DC-750	5.85	.11	7.5	8.5	50	40	45	25	35	25	45	35	40	30	30	20	A01	f	26.95
	SRA-2H	2-1000	DC-1000	6.34	.14	7.5	10.0	50	40	35	25	35	25	45	30	30	20	25	20	A01	f	40.95
	SRA-3H	.05-200	DC-200	5.18	.05	7.0	7.5	50	45	40	30	35	25	45	35	40	30	30	20	A01	e	24.95
	SRA-11H	10-3000	10-1000	6.83	.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	A01	m	48.95
	SRA-17WH	20-700	5-340	7.7	.01	9.0	10.5	60	45	55	40	50	32	50	32	45	25	32	18	A01	f	24.95
	SRA-173H**	5-1200	DC-1200	5.38	.05	7.0	8.5	40	35	35	25	35	20	40	35	35	20	30	20	A01	u,f	33.95
	SIMA-5H	2-1500	DC-1000	6.94	.07	8.5	8.5	65	35	44	23	40	22	54	25	30	23	25	13	A06	m	34.95
❑	TUF-18DH	100-1800	50-750	7.3	.15	8.5	9.0	41 (Typ.)		23 (Min.)				33 (Typ.)		20 (Min.)				B02	z	23.95

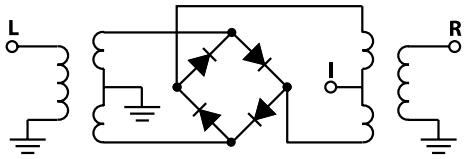
+17 dBm LO, up to +14 dBm RF

	TFM-1H	2-500	DC-500	6.14	.11	7.5	8.5	50	45	40	30	30	20	45	40	35	25	25	20	B02	z	27.95
	TFM-2H	5-1000	DC-1000	6.12	.12	7.0	10.0	50	45	40	30	30	20	45	40	35	25	25	17	B02	z	38.95
	TFM-3H	.1-250	DC-250	4.58	.11	7.0	8.5	50	45	40	30	28	23	45	40	35	25	26	20	B02	z	27.95
†	TFM-4H	5-1200	DC-1200	5.24	.05	8.0	9.0	50	40	35	25	30	20	50	40	35	20	30	20	B13	z	41.20
❑	TUF-1H	2-600	DC-600	5.90	.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	B02	z	10.20
❑	TUF-2H	50-1000	DC-1000	6.20	.22	7.5	9.0	58	40	47	30	42	25	58	35	44	25	28	18	B02	z	11.20
❑	TUF-3H	0.15-400	DC-400	5.00	.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	B02	z	12.45
❑	TUF-5H	20-1500	DC-1000	7.50	.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	B02	z	15.45
❑	TUF-11AH	1400-1900	40-500	7.30	.28	9.0	9.0	35 (Typ.)		25 (Min.)				30 (Typ.)		15 (Min.)				B02	z	23.95
❑	TUF-860H	800-1050	DC-250	6.80	.31	8.3	8.3	38 (Typ.)		25 (Min.)				24 (Typ.)		18 (Min.)				B02	z	15.45
	TAK-1H	2-500	DC-500	5.93	.08	7.5	8.5	50	40	40	30	30	25	45	35	35	25	25	20	A05	e	23.45
	TAK-1WH	5-750	DC-750	5.71	.08	7.5	9.0	50	40	40	30	30	25	45	35	35	25	30	20	A05	f	27.95
	TAK-3H	.05-300	DC-300	4.82	.09	7.0	8.5	55	45	40	30	30	25	50	40	35	25	25	20	A05	e	25.45
	SRA-2500SH	5-2500	1-1000	5.8	.10	7.5	10.5	40	25	37	28	30	18	50	35	42	25	25	17	A06	f	37.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
❑ Non-hermetic
** Below 1 MHz IF, conversion loss increases up to 6 dB higher as frequency decreases to DC.
† Phase detection, positive polarity.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel, and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 200mW 1b. Peak IF current, 40mA
2. Two-Tone 3rd order IM below IF, each tone at 0dBm (200 and 202 MHz), LO at +17dBm (180 MHz). All models 60dB typ., 55dB min. , except 55 dB typ., 45 dBm min. for TFM-3H, TAK-3H, ZFM-3H, ZLW-3SH, ZAD-3SH.



010326

LEVEL 17 50 kHz to 8 GHz


ZLW


ZAD


ZFM


ZP


ZMX

+17 dBm LO, up to +10 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	LO-IF ISOLATION, dB L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZLW-1H	.5-500	DC-500	6.13	.08	7.5	8.5	55	45	45	30	35	25	45	35	40	30	30	20	M21	ae	56.95
ZLW-2H	2-1000	DC-1000	6.34	.14	7.5	10.0	50	40	35	25	35	25	45	35	30	20	25	20	M21	ae	64.95
ZLW-11H	10-3000	10-1000	6.83	.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	M21	ae	99.95
ZAD-1H	.5-500	DC-500	6.16	.08	7.5	8.5	50	45	45	30	35	25	45	35	40	30	30	20	M22	ae	48.95
ZAD-3H	.05-200	DC-200	4.89	.09	7.0	7.5	55	45	45	30	35	25	45	35	40	30	30	20	M22	ae	50.95
ZAD-11H	10-3000	10-1000	6.83	.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	M22	ae	89.95

+17 dBm LO, up to +14 dBm RF

	ZFM-1H	2-500	DC-500	6.14	.11	7.5	8.5	50	45	40	30	30	25	45	35	35	25	25	20	K18	ad	64.95
	ZFM-2H	5-1000	DC-1000	6.12	.12	7.0	10.0	50	40	40	30	30	20	45	40	35	25	25	17	K18	ad	71.95
	ZFM-3H	.05-300	DC-300	5.18	.11	7.0	8.5	55	45	40	30	30	25	50	40	35	25	25	20	K18	ad	64.95
†	ZFM-4H	5-1200	DC-1200	4.97	.11	8.0	9.0	50	40	35	25	30	20	50	40	35	20	30	20	K18	ad	73.95
	ZP-1H	2-600	DC-600	5.90	.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	GG60	ag	45.95
	ZP-2H	50-1000	DC-1000	6.20	.22	7.5	9.0	58	40	47	30	42	25	58	35	44	25	28	18	GG60	ag	45.95
	ZP-3H	0.15-400	DC-400	5.00	.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	GG60	ag	45.95
	ZP-5H	20-1500	DC-1000	7.50	.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	GG60	ag	49.95
	ZP-11AH	1400-1900	40-500	7.30	.28	9.0	9.0	35 (Typ.)		25 (Min.)				30 (Typ.)		15 (Min.)				GG60	ag	49.95
	ZMX-7GHR	3700-7000	DC-1000	5.3	.30	—	8.5	33 (Typ.)		20 (Min.)				34 (Typ.)		20 (Min.)				BU413	af	84.95
	ZMX-8GH	3700-8000	DC-2000	5.8	.30	—	8.5	40 (Typ.)		20 (Min.)				18 (Typ.)		8 (Min.)				BU413	ad	89.95
	ZLW-1SH	2-500	DC-500	5.93	.08	7.5	8.5	50	40	40	30	30	25	45	35	35	25	25	20	M21	ae	62.95
	ZLW-1WSH	5-750	DC-750	5.83	.07	7.5	9.0	50	45	40	30	30	20	45	40	35	25	30	20	M21	ae	66.95
	ZAD-1WSH	5-750	DC-750	5.64	.08	7.5	9.0	50	45	40	30	30	20	45	40	35	25	30	20	M22	ae	56.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

pin and coaxial connections

see case style outline drawings

PORT	e	f	m	u	x	z	ad	ae	af	ag
LO	8	8	8	3,4 ^	2	4	1	1	2	L
RF	1	1	1	1	1	1	2	3	1	R
IF	3,4 ^	3,4 ^	3	8	3	2	3	2	3	X
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	4,5,6	3	—	—	—	—
CASE GND	2	2,5,6,7	2,5,6,7	2,5,6,7	—	3	—	—	—	—
NOT USED	—	—	4	—	—	—	—	—	—	—

^ pins must be connected together externally

NSN GUIDE

MCL NO.	NSN	MIL-M-28837/1*
SRA-1H	6625-00-594-0223	08
SRA-1WH	5895-00-576-0716	
SRA-2H	5895-01-063-1078	
SRA-3H	5895-01-117-4537	
SRA-11H	5895-01-192-0173	
ZAD-1WH	5895-01-045-4647	
ZAD-3H	5895-01-149-0771	
ZLW-1H	5985-01-080-7637	
ZLW-1HB	5962-01-045-7500	
ZLW-1HB(SMA)	5895-01-141-4646	

* units are not QPL listed

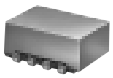
000807

FREQUENCY MIXERS

Surface Mount

LEVEL 17 150 MHz to 6 GHz


ADE


JYM


MBA


MBY


SYM-J


SYM


TUF-SM

+17 dBm LO, up to +10 dBm RF

	MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band $\bar{x}$	m σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	◆ ADE-1H**	0.5-500	DC-500	5.3	.10	6.8	8.0	65	50	52	35	40	26	53	40	42	25	32	20	23	CD636	ht	4.95***
NEW	◆ ADE-1HW**	5-750	DC-750	6.0	0.1	7.2	8.8	64	45	48	35	42	28	50	35	40	30	30	18	26	CD542	ht	6.45***
	◆ ADE-10H**	400-1000	DC-500	7.0	.10	—	8.5	39 (Typ.)		29 (Min.)				25 (Typ.)		17 (Min.)				30	CD542	jw	7.95***
	◆ ADE-20H**	1500-2000	DC-300	5.2	.20	—	7.8	29 (Typ.)		22 (Min.)				31 (Typ.)		20 (Min.)				24	CD542	jv	8.95***
	JYM-20H	2-2000	4-700	5.7	.20	8.5	9.0	40	30	44	28	40	25	40	35	40	22	29	15	—	BJ293	hp	17.95
	JYM-28H	400-2800	4-700	6.3	.20	8.0	9.0	40 (Typ.)		25 (Min.)				30 (Typ.)		15 (Min.)				—	BJ293	hp	21.95
	JYM-30H	2-3000	4-1400	6.0	.20	8.9	10.6	40	30	40	25	30	25	40	35	30	20	22	15	—	BJ293	hp	23.95
BLUE CELL	◆ MBA-9H*	800-1000	DC-200	6.4	.30	—	9.0	30 (Typ.)		18 (Min.)				17 (Typ.)		12 (Min.)				18	SM2	lc	9.95***
BLUE CELL	◆ MBA-12H*	800-2500	DC-500	6.8	.20	—	9.5	30 (Typ.)		18 (Min.)				13 (Typ.)		7 (Min.)				18	SM2	lc	9.95***
BLUE CELL	◆ MBY-20H*	1700-2200	DC-700	5.5	.07	—	8.5	31 (Typ.)		24 (Min.)				30 (Typ.)		23 (Min.)				23	SM18	hp	11.95***
	◆ SYM-10HJ	400-1000	DC-400	6.6	.10	—	8.0	46 (Typ.)		33 (Min.)				32 (Typ.)		18 (Min.)				25	CG581	ka	9.95***
	SYM-11H	50-2000	50-1950	6.3	.10	7.5	9.0	45	35	40	25	37	25	40	25	32	20	30	20	—	TTT167	x	17.95
	SYM-10DH	800-1000	20-200	7.6	—	—	9.3	45 (Typ.)		34 (Min.)				29 (Typ.)		20 (Min.)				31	TTT167	x	9.95***
	SYM-10DHW	50-1000	20-800	7.0	—	8.5	9.8	48 (Typ.)		30 (Min.)				29 (Typ.)		20 (Min.)				25	TTT167	x	16.95
	SYM-22H	1500-2200	DC-200	5.6	.30	—	8.8	33 (Typ.)		22 (Min.)				38 (Typ.)		22 (Min.)				30	TTT167	x	9.95***
	SYM-25H	10-2400	1-1100	6.1	.10	8.5	9.2	38	20	40	20	30	18	54	40	40	22	33	20	25	TTT167	lp	21.95
	SYM-36H	1500-3600	DC-600	6.3	0.4	—	9.0	—	—	30	20	—	—	—	—	34	20❄	—	—	25	TTT167	x	21.95
	TUF-18DHSM	100-1800	50-750	7.3	.15	8.5	9.0	41 (Typ.)		23 (Min.)				33 (Typ.)		20 (Min.)				27	NNN150	z	21.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (fL+fU/4)
σ Standard deviation
◆ Aqueous washable. For non-aqueous washable requirements, LRMS units available in case style QQQ130
† Phase detection, positive polarity
‡ Conversion loss increases up to 6 dB higher as IF frequency decreases from 5 MHz to DC.
❄ 15 dB min. over 1500-1800MHz
✢ Conversion loss measured at IF frequency between 10 and 1300 MHz.
* BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
** Protected under U.S. Patent 6133525
*** Prices for quantities 10-49
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF power 200mW
1b. Peak IF current, 40mA

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

NSN GUIDE

MCL NO.	NSN
LMX-123	5895-01-367-9005
LMX-148	5962-01-357-4432
TFM-15	5895-01-292-2759
ZFM-15	5895-01-412-3035
ZFM-150	5895-01-217-6878

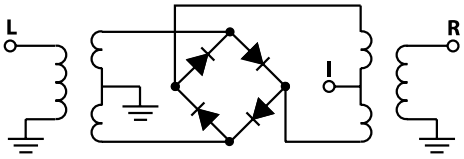
010607

ADE †JMS †LRMS-J †RMS SKY SYM TUF-SM

+17 dBm LO, up to +14 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band $\bar{x}$	σ_m	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center band Typ. (dBm)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆ ADE-12H*	500-1200	DC-250	6.7	.20	—	8.2	34 (Typ.)		25 (Min.)				28 (Typ.)		20 (Min.)				28	CD542	jv	8.95***
◆ ADE-17H**	100-1700	50-1500	7.2	.10	8.5	9.5	32	20	—	—	36	22	32	20	—	—	37	22	25	CD542	ht	8.95***
JMS-1H	2-500	DC-500	5.90	.10	7.0	8.5	60	45	50	25	37	22	55	45	50	25	37	22	—	BH292	ht	11.45
JMS-2H	20-1000	DC-1000	7.00	.15	8.4	9.5	63	40	50	28	35	20	56	30	47	22	37	20	—	BH292	ht	12.45
JMS-5H	5-1500	DC-1000	5.90	.10	8.0	9.5	70	50	50	25	35	20	60	40	35	18	20	8	—	BH292	ht	12.95
◆ LRMS-1HJ	2-500	DC-500	6.25	.034	7.0	8.5	55	44	44	25	33	20	50	34	45	25	37	22	—	QQQ569	w	10.95
◆ LRMS-1WHJ	10-750	DC-750	7.00	.11	8.5	8.8	55	40	43	22	28	20	52	30	38	22	29	20	—	QQQ569	w	11.95
◆ LRMS-2HJ	5-1000	DC-900	6.98	.054	8.5	9.3	55	40	39	22	33	20	52	30	45	22	30	17	—	QQQ569	w	11.95
◆ LRMS-2UHJ	10-1000	10-750	7.10	.083	9.2	9.9	50	40	38	30	30	23	50	30	40	25	34	22	—	QQQ569	w	14.45
◆ LRMS-5HJ	10-1500	DC-900	6.36	.05	8.0	9.8	65	40	36	20	22	15	50	30	30	18	17	7	—	QQQ569	w	17.95
RMS-1H	2-500	DC-500	6.25	.034	7.0	8.5	55	44	44	25	33	20	50	34	45	25	37	22	—	TT240	w	10.95
RMS-1WH	10-750	DC-750	7.00	.11	8.5	8.8	55	40	43	22	28	20	52	30	38	22	29	20	—	TT240	w	11.95
RMS-2H	5-1000	DC-900	6.98	.054	8.5	9.3	55	40	39	22	33	20	52	30	45	22	30	17	—	TT240	w	11.95
RMS-5H	10-1500	DC-900	6.36	.05	8.0	9.8	65	40	36	20	22	15	50	30	30	18	17	7	—	TT240	w	17.95
SKY-53HR	2800-5300	DC-500	5.70	.20	—	9.5	28 (Typ.)		15 (Min.)				12 (Typ.)		8 (Min.)				—	BJ398	hp	18.95
SKY-60H	2500-6000	DC-1500	6.20	.20	—	9.7	28 (Typ.)		17 (Min.)				14 (Typ.)		8 (Min.)				—	BJ398	je	18.95
SYM-14H	100-1370	10-1000	6.50	.20	7.4	8.9	36 (Typ.)		28 (Min.)				30 (Typ.)		24 (Min.)				30	TTT167	x	9.95***
SYM-18H	5-1800	10-1500	5.75	.10	7.6	8.9✛	50	28	45	35	40	24	39	22	50	30	30	22	30	TTT167	x	9.95***
SYM-20DH	1700-2000	10-300	6.70	.16	—	8.2	35 (Typ.)		22 (Min.)				34 (Typ.)		22 (Min.)				32	TTT167	x	9.95***
SYM-20DHW	10-2000	10-1800	6.20	.10	7.5	8.8	33	20	40	25	37	22	44	30	42	28	34	22	27	TTT167	x	17.95
NEW SYM-24DH	1400-2400	10-250	7.0	0.2	—	9.3	32 (Typ.)		22 (Min.)				36 (Typ.)		23 (Min.)				29	TTT167	x	9.95***
SYM-25DHW	80-2500	DC-1000‡	6.40	.10	8.0	8.6	46	29	37	25	35	20	38	26	33	24	36	20	30	TTT167	x	9.95***
TUF-1HSM	2-600	DC-600	5.90	.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	—	NNN150	z	9.25
TUF-2HSM	50-1000	DC-1000	6.20	.22	7.5	9.0	58	40	47	30	42	25	58	35	44	25	28	18	—	NNN150	z	10.20
TUF-3HSM	0.15-400	DC-400	5.00	.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	—	NNN150	z	11.10
TUF-5HSM	20-1500	DC-1000	7.50	.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	—	NNN150	z	14.45
TUF-11AHSM	1400-1900	40-500	7.30	.28	9.0	9.0	35 (Typ.)		25 (Min.)				30 (Typ.)		15 (Min.)				—	NNN150	z	21.95
TUF-860HSM	800-1050	DC-250	6.80	.31	8.3	8.3	38 (Typ.)		25 (Min.)				24 (Typ.)		18 (Min.)				—	NNN150	z	14.45

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



pin connections

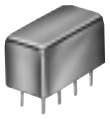
see case style outline drawings

PORT	w	x	z	hp	ht[1]	je	jv	jw	ka	lc	lp
LO	1	2	4	5	6	1	6	4	11	10	3
RF	4	1	1	1	3	5	4	6	5	5	1
IF	5	3	2	7	2	7	3	3	2	3	2
GND EXT.	2,3,6	4,5,6	3	2,3,4,6,8	1,4,5	2,3,4,6,8	1,2,5	1,2,5	all other	1,4,7,8,9	4,5,6
CASE GND	—	—	3	—	—	—	—	—	pins	—	—
ISOLATE	—	—	—	—	—	—	—	—	—	2,6	—
DEMO BOARD	TB-44	TB-12	—	TB-11	TB-03	TB-11	TB-02	TB-02	—	—	TB-12

[1] pin connection physically same as w

010605

LEVEL 23 10 kHz to 2.5 GHz


RAY

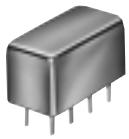

ZMY


ZAY

+23 dBm LO, up to +15 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
RAY-1	5-500	DC-500	6.57	.09	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	A01	e	42.95
RAY-2	10-1000	DC-1000	6.89	.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20	A01	f	64.45
RAY-3	.07-200	DC-200	5.53	.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	A01	e	42.95
RAY-6	0.03-50	DC-50	5.36	.15	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	A01	d	52.45
RAY-6U	0.01-100	DC-100	5.09	.15	7.0	8.0	60	50	50	40	40	30	50	45	40	30	35	25	A01	e	48.95
RAY-11	100-2500	DC-500	6.23	.21	9.0	9.0	35	25	32	25	32	25	14	10	20	10	20	10	A01	s	74.95
ZMY-1	5-500	DC-500	6.62	.10	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	M21	ae	67.95
ZMY-2	10-1000	DC-1000	6.89	.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20	M21	ae	84.95
ZMY-3	.07-200	DC-200	5.53	.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	M21	ae	69.95
ZAY-1	5-500	DC-500	6.57	.09	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	M22	ae	64.95
ZAY-2	10-1000	DC-1000	6.89	.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20	M22	ae	84.95
ZAY-3	.07-200	DC-200	5.53	.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	M22	ae	64.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]


SAY

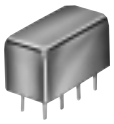

ZFY

+23 dBm LO, up to +20 dBm RF

MODEL NO.	FREQUENCY MHz LO/RF f_L-f_U	IF	CONVERSION LOSS dB Mid-Band m $\bar{x}$	σ	Max.	Total Range Max.	LO-RF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
SAY-1	0.1-500	.01-500*	4.85	.18	6.0	7.5	40	20	46	35	40	30	37	23	46	35	40	30	A01	m	62.95
SAY-2	0.1-1000	.01-500*	5.40	.24	7.5	9.5	40	20	40	30	30	25	37	23	40	25	25	15	A01	m	67.95
SAY-11	10-2400	5-1000	7.40	.09	8.5	10	28	20	26	20	25	20	28	20	26	20	25	20	A01	m	72.95
ZFY-1	0.1-500	.01-500	4.85	.18	6.0	7.5	40	20	46	35	40	30	37	23	46	35	40	30	K18	ad	74.95
ZFY-2	0.1-1000	.01-500	5.40	.24	7.5	9.5	40	20	40	30	30	25	37	23	40	25	25	15	K18	ad	79.95
ZFY-11	10-2400	5-1000	7.40	.09	8.5	10	28	20	25	20	25	20	28	20	26	20	25	20	K18	ad	84.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

LEVEL 27 0.5 to 500 MHz



VAY

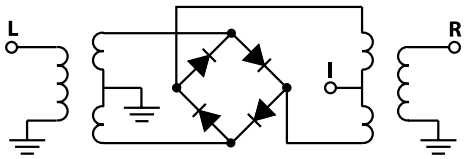
+27 dBm LO, up to +24 dBm RF

MODEL NO.	FREQUENCY MHz		CONVERSION LOSS dB				LO-RF ISOLATION, dB						LO-IF ISOLATION, dB						CASE STYLE	CONNECTION	PRICE $
	LO/RF	IF	Mid-Band m			Total Range	L		M		U		L		M		U				
	f_L-f_U		$\bar{x}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Note B		Qty. (1-9)
VAY-1	0.5-500	.02-500	5.79	.15	7.5	8.5	47	40	46	35	35	25	35	28	46	35	35	25	A01	m	84.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
* IF response from .01 to .1 MHz falls off 3 dB
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Level 23 mixers, RF power 350mW
1b. Level 27 mixers, RF power 500mW
1c. Peak IF current, 40mA



pin and coaxial connections

see case style outline drawings

PORT	d	e	f	m	s	ad	ae
LO	8	8	8	8	1	1	1
RF	1	1	1	1	8	2	3
IF	3,4^	3,4^	3,4^	3	3	3	2
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7		
CASE GND	—	2	2,5,6,7	2,5,6,7	2,5,6,7		
NOT USED	—	—	—	4	4		

^ pins must be connected together externally

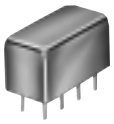
NSN GUIDE

MCL NO.	NSN
RAY-1	5895-01-105-6188
RAY-2	5895-01-111-7368
RAY-3	5895-01-064-5082
RAY-6	5895-01-317-5882
SAY-11	5895-01-199-3893
VAY-1	5895-01-232-5890
ZMY-1B	5895-01-213-3888
ZMY-2	4935-01-080-7636

*units are not QPL listed

010418

LEVEL 27 0.5 to 500 MHz



VAY

+27 dBm LO, up to +24 dBm RF

MODEL NO.	FREQUENCY MHz		CONVERSION LOSS dB				LO-RF ISOLATION, dB						LO-IF ISOLATION, dB						CASE STYLE	CONNECTION	PRICE $
	LO/RF	IF	Mid-Band m			Total Range	L		M		U		L		M		U				
	f_L-f_U		$\bar{x}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Note B		Qty. (1-9)
VAY-1	0.5-500	.02-500	5.79	.15	7.5	8.5	47	40	46	35	35	25	35	28	46	35	35	25	A01	m	84.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
σ Standard deviation
* IF response from .01 to .1 MHz falls off 3 dB
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
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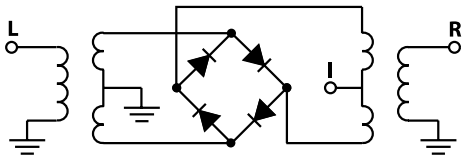
1a. Level 23 mixers, RF power 350mW
1b. Level 27 mixers, RF power 500mW
1c. Peak IF current, 40mA



pin and coaxial connections

see case style outline drawings

PORT	d	e	f	m	s	ad	ae
LO	8	8	8	8	1	1	1
RF	1	1	1	1	8	2	3
IF	3,4^	3,4^	3,4^	3	3	3	2
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7	2,5,6,7		
CASE GND	—	2	2,5,6,7	2,5,6,7	2,5,6,7		
NOT USED	—	—	—	4	4		

^ pins must be connected together externally

NSN GUIDE

MCL NO.	NSN
RAY-1	5895-01-105-6188
RAY-2	5895-01-111-7368
RAY-3	5895-01-064-5082
RAY-6	5895-01-317-5882
SAY-11	5895-01-199-3893
VAY-1	5895-01-232-5890
ZMY-1B	5895-01-213-3888
ZMY-2	4935-01-080-7636

*units are not QPL listed

010418

dBm - volts - watts conversion

(50-ohm system)

dBm	V	P_o	dBm	V	P_o	dBm	mV	P_o	dBm	µV	P_o
+53	100.0	200W	0	.225	1.0 mW	-49	0.80		-98	2.9	
+50	70.7	100W	-1	.200	.80 mW	-50	0.71	.01 µW	-99	2.51	
+49	64.0	80W	-2	.180	.64 mW	-51	0.64		-100	2.25	.1 pW
+48	58.0	64W	-3	.160	.50 mW	-52	0.57		-101	2.0	
+47	50.0	50W	-4	.141	.40 mW	-53	0.50		-102	1.8	
+46	44.5	40W	-5	.125	.32 mW	-54	0.45		-103	1.6	
+45	40.0	32W	-6	.115	.25 mW	-55	0.40		-104	1.41	
+44	32.5	25W	-7	.100	.20 mW	-56	0.351		-105	1.27	
+43	32.0	20W	-8	.090	.16 mW	-57	0.32		-106	1.18	
+42	28.0	16W	-9	.080	.125 mW	-58	0.286				
+41	26.2	12.5W	-10	.071	.10 mW	-59	0.251		**dBm**	**nV**	
+40	22.5	10W	-11	.064		-60	0.225	.001 µW	-107	1000	
+39	20.0	8W	-12	.058		-61	0.200		-108	900	
+38	18.0	6.4W	-13	.050		-62	0.180		-109	800	
+37	16.0	5W	-14	.045		-63	0.160		-110	710	.01 pW
+36	14.1	4W	-15	.040		-64	0.141		-109	640	
+35	12.5	3.2W	-16	.0355					-112	580	
+34	11.5	2.5W				**dBm**	**µV**		-113	500	
+33	10.0	2W	**dBm**	**mV**		-65	128		-114	450	
+32	9.0	1.6W	-17	31.5		-66	115		-115	400	
+31	8.0	1.25W	-18	28.5		-67	100		-116	355	
+30	7.10	1.0W	-19	25.1		-68	90		-117	825	
+29	6.40	800 mW	-20	22.5	.01 mW	-69	80		-118	285	
+28	5.80	640 mW	-21	20.0		-70	71	.1nW	-119	251	
+27	5.00	500 mW	-22	17.9		-71	65		-120	225	.001 pW
+26	4.45	400 mW	-23	15.9		-72	58		-121	200	
+25	4.00	320 mW	-24	14.1		-73	50		-122	180	
+24	3.55	250 mW	-25	12.8		-74	45		-123	160	
+23	3.20	200 mW	-26	11.5		-75	40		-124	141	
+22	2.80	160 mW	-27	10.0		-76	35		-125	128	
+21	2.52	125 mW	-28	8.9		-77	32		-126	117	
+20	2.25	100 mW	-29	8.0		-78	29		-127	100	
+19	2.00	80 mW	-30	7.1	.001mW	-79	25		-128	90	
+18	1.80	64 mW	-31	6.25		-80	22.5	.01 nW	-129	80	.1ƒW
+17	1.60	50 mW	-32	5.8		-81	20.0		-130	71	
+16	1.41	40 mW	-33	5.0		-82	18.0		-131	61	
+15	1.25	32 mW	-34	4.5		-83	16.0		-132	58	
+14	1.15	25 mW	-35	4.0		-84	11.1		-133	50	
+13	1.00	20 mW	-36	3.5		-85	12.9		-134	45	
+12	.90	16 mW	-37	3.2		-86	11.5		-135	40	
+11	.80	12.5 mW	-38	2.85		-87	10.0		-136	35	
+10	.71	10 mW	-39	2.5		-88	9.0		-137	33	
+9	.64	8 mW	-40	2.25	.1µW	-89	8.0		-138	29	
+8	.58	6.4 mW	-41	2.0		-90	7.1	.001 nW	-139	25	
+7	.500	5 mW	-42	1.8		-91	6.1		-140	23	.01ƒW
+6	.445	4 mW	-43	1.6		-92	5.75				
+5	.400	3.2 mW	-44	1.4		-93	5.0				
+4	.355	2.5 mW	-45	1.25		-94	4.5				
+3	.320	2.0 mW	-46	1.18		-95	4.0				
+2	.280	1.6 mW	-47	1.00		-96	3.51				
+1	.252	1.25 mW	-48	0.90		-97	3.2				

080702

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return loss Vs. VSWR

table of return loss vs. voltage standing wave ratio

RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR
46.064	1.01	13.842	1.51	9.485	2.01	7.327	2.51	5.999	3.01
40.086	1.02	13.708	1.52	9.428	2.02	7.294	2.52	5.970	3.02
36.607	1.03	13.577	1.53	9.372	2.03	7.262	2.53	5.956	3.03
34.151	1.04	13.449	1.54	9.317	2.04	7.230	2.54	5.935	3.04
32.256	1.05	13.324	1.55	9.262	2.05	7.198	2.55	5.914	3.05
30.714	1.06	13.201	1.56	9.208	2.06	7.167	2.56	5.893	3.06
29.417	1.07	13.081	1.57	9.155	2.07	7.135	2.57	5.872	3.07
28.299	1.08	12.964	1.58	9.103	2.08	7.105	2.58	5.852	3.08
27.318	1.09	12.849	1.59	9.051	2.09	7.074	2.59	5.832	3.09
26.444	1.10	12.736	1.60	8.999	2.10	7.044	2.60	5.811	3.10
25.658	1.11	12.625	1.61	8.949	2.11	7.014	2.61	5.791	3.11
24.943	1.12	12.518	1.62	8.899	2.12	6.984	2.62	5.771	3.12
24.289	1.13	12.412	1.63	8.849	2.13	6.954	2.63	5.751	3.13
23.686	1.14	12.308	1.64	8.800	2.14	6.925	2.64	5.732	3.14
23.127	1.15	12.207	1.65	8.752	2.15	6.896	2.65	5.712	3.15
22.607	1.16	12.107	1.66	8.705	2.16	6.867	2.66	5.693	3.16
22.120	1.17	12.009	1.67	8.657	2.17	6.839	2.67	5.674	3.17
21.664	1.18	11.913	1.68	8.611	2.18	6.811	2.68	5.654	3.18
21.234	1.19	11.818	1.69	8.565	2.19	6.783	2.69	5.635	3.19
20.828	1.20	11.725	1.70	8.519	2.20	6.755	2.70	5.617	3.20
20.443	1.21	11.634	1.71	8.474	2.21	6.728	2.71	5.598	3.21
20.079	1.22	11.545	1.72	8.430	2.22	6.700	2.72	5.579	3.22
19.732	1.23	11.457	1.73	8.386	2.23	6.673	2.73	5.561	3.23
19.401	1.24	11.370	1.74	8.342	2.24	6.646	2.74	5.542	3.24
19.085	1.25	11.285	1.75	8.299	2.25	6.620	2.75	5.524	3.25
18.783	1.26	11.202	1.76	8.257	2.26	6.594	2.76	5.506	3.26
18.493	1.27	11.120	1.77	8.215	2.27	6.567	2.77	5.488	3.27
18.216	1.28	11.039	1.78	8.173	2.28	6.541	2.78	5.470	3.28
17.949	1.29	10.960	1.79	8.138	2.29	6.516	2.79	5.452	3.29
17.690	1.30	10.881	1.80	8.091	2.30	6.490	2.80	5.435	3.30
17.445	1.31	10.804	1.81	8.051	2.31	6.465	2.81	5.417	3.31
17.207	1.32	10.729	1.82	8.011	2.32	6.440	2.82	5.400	3.32
16.977	1.33	10.654	1.83	7.972	2.33	6.415	2.83	5.383	3.33
16.755	1.34	10.581	1.84	7.933	2.34	6.390	2.84	5.365	3.34
16.540	1.35	10.509	1.85	7.894	2.35	6.366	2.85	5.348	3.35
16.332	1.36	10.437	1.86	7.856	2.36	6.341	2.86	5.331	3.36
16.131	1.37	10.367	1.87	7.818	2.37	6.317	2.87	5.315	3.37
15.936	1.38	10.298	1.88	7.781	2.38	6.293	2.88	5.298	3.38
15.747	1.39	10.230	1.89	7.744	2.39	6.270	2.89	5.281	3.39
15.563	1.40	10.163	1.90	7.707	2.40	6.246	2.90	5.265	3.40
15.385	1.41	10.097	1.91	7.671	2.41	6.223	2.91	5.248	3.41
15.211	1.42	10.032	1.92	7.635	2.42	6.200	2.92	5.232	3.42
15.043	1.43	9.968	1.93	7.599	2.43	6.177	2.93	5.216	3.43
14.879	1.44	9.904	1.94	7.564	2.44	6.154	2.94	5.200	3.44
14.719	1.45	9.842	1.95	7.529	2.45	6.131	2.95	5.184	3.45
14.564	1.46	9.780	1.96	7.494	2.46	6.109	2.96	5.168	3.46
14.412	1.47	9.720	1.97	7.460	2.47	6.086	2.97	5.152	3.47
14.264	1.48	9.660	1.98	7.426	2.48	6.064	2.98	5.137	3.48
14.120	1.49	9.601	1.99	7.393	2.49	6.042	2.99	5.121	3.49
13.979	1.50	9.542	2.00	7.360	2.50	6.021	3.00	5.105	3.50

991109

dBm - volts - watts conversion

(50-ohm system)

dBm	V	Po	dBm	V	Po	dBm	mV	Po	dBm	µV	Po
+53	100.0	200W	0	.225	1.0 mW	-49	0.80		-98	2.9	
+50	70.7	100W	-1	.200	.80 mW	-50	0.71	.01 µW	-99	2.51	
+49	64.0	80W	-2	.180	.64 mW	-51	0.64		-100	2.25	.1 pW
+48	58.0	64W	-3	.160	.50 mW	-52	0.57		-101	2.0	
+47	50.0	50W	-4	.141	.40 mW	-53	0.50		-102	1.8	
+46	44.5	40W	-5	.125	.32 mW	-54	0.45		-103	1.6	
+45	40.0	32W	-6	.115	.25 mW	-55	0.40		-104	1.41	
+44	32.5	25W	-7	.100	.20 mW	-56	0.351		-105	1.27	
+43	32.0	20W	-8	.090	.16 mW	-57	0.32		-106	1.18	
+42	28.0	16W	-9	.080	.125 mW	-58	0.286				
+41	26.2	12.5W	-10	.071	.10 mW	-59	0.251		**dBm**	**nV**	
+40	22.5	10W	-11	.064		-60	0.225	.001 µW	-107	1000	
+39	20.0	8W	-12	.058		-61	0.200		-108	900	
+38	18.0	6.4W	-13	.050		-62	0.180		-109	800	
+37	16.0	5W	-14	.045		-63	0.160		-110	710	.01 pW
+36	14.1	4W	-13	.050		-64	0.141		-109	640	
+35	12.5	3.2W	-16	.0355					-112	580	
+34	11.5	2.5W				**dBm**	**µV**		-113	500	
+33	10.0	2W	**dBm**	**mV**		-65	128		-114	450	
+32	9.0	1.6W	-17	31.5		-66	115		-115	400	
+31	8.0	1.25W	-18	28.5		-67	100		-116	355	
+30	7.10	1.0W	-19	25.1		-68	90		-117	825	
+29	6.40	800 mW	-20	22.5	.01 mW	-69	80		-118	285	
+28	5.80	640 mW	-21	20.0		-70	71	.1nW	-119	251	
+27	5.00	500 mW	-22	17.9		-71	65		-120	225	.001 pW
+26	4.45	400 mW	-23	15.9		-72	58		-121	200	
+25	4.00	320 mW	-24	14.1		-73	50		-122	180	
+24	3.55	250 mW	-25	12.8		-74	45		-123	160	
+23	3.20	200 mW	-26	11.5		-75	40		-124	141	
+22	2.80	160 mW	-27	10.0		-76	35		-125	128	
+21	2.52	125 mW	-28	8.9		-77	32		-126	117	
+20	2.25	100 mW	-29	8.0		-78	29		-127	100	
+19	2.00	80 mW	-30	7.1	.001mW	-79	25		-128	90	
+18	1.80	64 mW	-31	6.25		-80	22.5	.01 nW	-129	80	.1*f*W
+17	1.60	50 mW	-32	5.8		-81	20.0		-130	71	
+16	1.41	40 mW	-33	5.0		-82	18.0		-131	61	
+15	1.25	32 mW	-34	4.5		-83	16.0		-132	58	
+14	1.15	25 mW	-35	4.0		-84	11.1		-133	50	
+13	1.00	20 mW	-36	3.5		-85	12.9		-134	45	
+12	.90	16 mW	-37	3.2		-86	11.5		-135	40	
+11	.80	12.5 mW	-38	2.85		-87	10.0		-136	35	
+10	.71	10 mW	-39	2.5		-88	9.0		-137	33	
+9	.64	8 mW	-40	2.25	.1µW	-89	8.0		-138	29	
+8	.58	6.4 mW	-41	2.0		-90	7.1	.001 nW	-139	25	
+7	.500	5 mW	-42	1.8		-91	6.1		-140	23	.01*f*W
+6	.445	4 mW	-43	1.6		-92	5.75				
+5	.400	3.2 mW	-44	1.4		-93	5.0				
+4	.355	2.5 mW	-45	1.25		-94	4.5				
+3	.320	2.0 mW	-46	1.18		-95	4.0				
+2	.280	1.6 mW	-47	1.00		-96	3.51				
+1	.252	1.25 mW	-48	0.90		-97	3.2				

980601

return loss Vs. VSWR

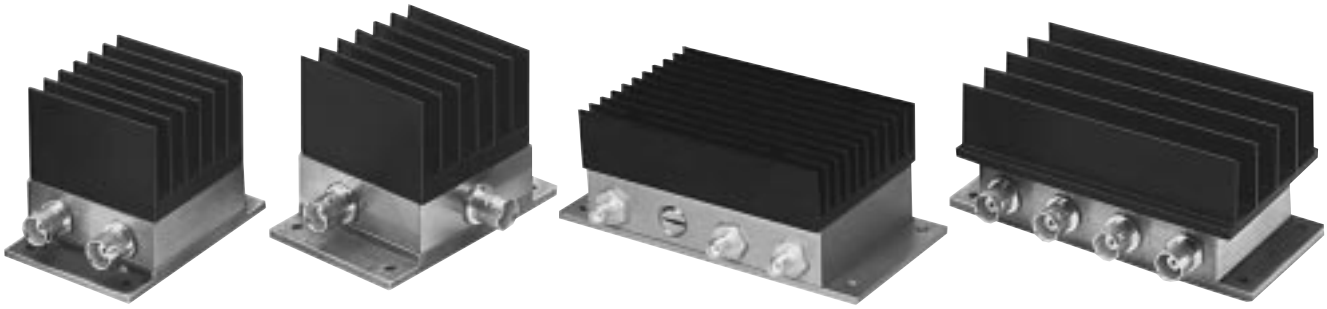
table of return loss vs. voltage standing wave ratio

RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR	RETURN LOSS (dB)	VSWR
46.064	1.01	13.842	1.51	9.485	2.01	7.327	2.51	5.999	3.01
40.086	1.02	13.708	1.52	9.428	2.02	7.294	2.52	5.970	3.02
36.607	1.03	13.577	1.53	9.372	2.03	7.262	2.53	5.956	3.03
34.151	1.04	13.449	1.54	9.317	2.04	7.230	2.54	5.935	3.04
32.256	1.05	13.324	1.55	9.262	2.05	7.198	2.55	5.914	3.05
30.714	1.06	13.201	1.56	9.208	2.06	7.167	2.56	5.893	3.06
29.417	1.07	13.081	1.57	9.155	2.07	7.135	2.57	5.872	3.07
28.299	1.08	12.964	1.58	9.103	2.08	7.105	2.58	5.852	3.08
27.318	1.09	12.849	1.59	9.051	2.09	7.074	2.59	5.832	3.09
26.444	1.10	12.736	1.60	8.999	2.10	7.044	2.60	5.811	3.10
25.658	1.11	12.625	1.61	8.949	2.11	7.014	2.61	5.791	3.11
24.943	1.12	12.518	1.62	8.899	2.12	6.984	2.62	5.771	3.12
24.289	1.13	12.412	1.63	8.849	2.13	6.954	2.63	5.751	3.13
23.686	1.14	12.308	1.64	8.800	2.14	6.925	2.64	5.732	3.14
23.127	1.15	12.207	1.65	8.752	2.15	6.896	2.65	5.712	3.15
22.607	1.16	12.107	1.66	8.705	2.16	6.867	2.66	5.693	3.16
22.120	1.17	12.009	1.67	8.657	2.17	6.839	2.67	5.674	3.17
21.664	1.18	11.913	1.68	8.611	2.18	6.811	2.68	5.654	3.18
21.234	1.19	11.818	1.69	8.565	2.19	6.783	2.69	5.635	3.19
20.828	1.20	11.725	1.70	8.519	2.20	6.755	2.70	5.617	3.20
20.443	1.21	11.634	1.71	8.474	2.21	6.728	2.71	5.598	3.21
20.079	1.22	11.545	1.72	8.430	2.22	6.700	2.72	5.579	3.22
19.732	1.23	11.457	1.73	8.386	2.23	6.673	2.73	5.561	3.23
19.401	1.24	11.370	1.74	8.342	2.24	6.646	2.74	5.542	3.24
19.085	1.25	11.285	1.75	8.299	2.25	6.620	2.75	5.524	3.25
18.783	1.26	11.202	1.76	8.257	2.26	6.594	2.76	5.506	3.26
18.493	1.27	11.120	1.77	8.215	2.27	6.567	2.77	5.488	3.27
18.216	1.28	11.039	1.78	8.173	2.28	6.541	2.78	5.470	3.28
17.949	1.29	10.960	1.79	8.138	2.29	6.516	2.79	5.452	3.29
17.690	1.30	10.881	1.80	8.091	2.30	6.490	2.80	5.435	3.30
17.445	1.31	10.804	1.81	8.051	2.31	6.465	2.81	5.417	3.31
17.207	1.32	10.729	1.82	8.011	2.32	6.440	2.82	5.400	3.32
16.977	1.33	10.654	1.83	7.972	2.33	6.415	2.83	5.383	3.33
16.755	1.34	10.581	1.84	7.933	2.34	6.390	2.84	5.365	3.34
16.540	1.35	10.509	1.85	7.894	2.35	6.366	2.85	5.348	3.35
16.332	1.36	10.437	1.86	7.856	2.36	6.341	2.86	5.331	3.36
16.131	1.37	10.367	1.87	7.818	2.37	6.317	2.87	5.315	3.37
15.936	1.38	10.298	1.88	7.781	2.38	6.293	2.88	5.298	3.38
15.747	1.39	10.230	1.89	7.744	2.39	6.270	2.89	5.281	3.39
15.563	1.40	10.163	1.90	7.707	2.40	6.246	2.90	5.265	3.40
15.385	1.41	10.097	1.91	7.671	2.41	6.223	2.91	5.248	3.41
15.211	1.42	10.032	1.92	7.635	2.42	6.200	2.92	5.232	3.42
15.043	1.43	9.968	1.93	7.599	2.43	6.177	2.93	5.216	3.43
14.879	1.44	9.904	1.94	7.564	2.44	6.154	2.94	5.200	3.44
14.719	1.45	9.842	1.95	7.529	2.45	6.131	2.95	5.184	3.45
14.564	1.46	9.780	1.96	7.494	2.46	6.109	2.96	5.168	3.46
14.412	1.47	9.720	1.97	7.460	2.47	6.086	2.97	5.152	3.47
14.264	1.48	9.660	1.98	7.426	2.48	6.064	2.98	5.137	3.48
14.120	1.49	9.601	1.99	7.393	2.49	6.042	2.99	5.121	3.49
13.979	1.50	9.542	2.00	7.360	2.50	6.021	3.00	5.105	3.50

991109

HIGH POWER COMBINERS/SPLITTERS

2,3 AND 4 WAY 2 MHz to 2100 MHz



ZA2CS ZA3CS ZB3CS ZB4CS

	MODEL NO.	No. of WAYS	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS+ dB (above theoretical) Typ.	INSERTION LOSS+ dB (above theoretical) Max.	PHASE UNBALANCE Degrees Typ.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Typ.	AMPLITUDE UNBALANCE dB Max.	POWER INPUT, W[1] as Combiner[2] Max.	POWER INPUT, W[1] as Splitter Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZA2CS-500-15W	2	200-500	31	20	0.3	1.0	0.3	3.0	0.10	0.4	15	15	AW254	—	74.95
	ZA2CS-600-10W	2	100-600	27	15	0.4	1.3	0.4	3.0	0.15	0.5	10	10	AW254	—	74.95
▲	ZA2CS-2G-20W	2	1800-2000	30	20	0.2	0.5	0.5	4.0	0.05	0.2	20	20	AW254	—	89.95
	ZA2CS-10-20W	2	900-1000	38	20	0.2	0.5	0.5	3.0	0.11	0.3	20	20	AW254	—	89.95
	ZAPD-2-21-3W*	2	700-2100	25	20	0.4	1.2	0.7	3.0	0.05	0.3	2.5	10	F53	—	49.95
	ZA3CS-400-3W*	3	2-400	25	17	0.5	1.2	0.2	3.0	0.15	0.5	3	10	CC258	—	59.95
	ZA3CS-450-9W	3	100-450	22	15	0.9	1.8	2.5	8.0	0.20	0.7	9	12	AX255	—	99.95
	ZB3CS-640-6W*	3	424-640	27	20	0.2	0.7	2.0	5.0	.06	0.3	6	20	Z667	—	69.95
	ZB3CS-900-6W*	3	440-900	24	17	0.2	1.0	3.0	6.0	0.1	0.4	6	20	Z667	—	79.95
▲	ZB3CS-920-15W	3	825-920	27	17	0.2	0.8	1.7	6.0	0.11	0.5	15	15	AW256	—	114.95
	ZB4CS-440-12W	4	100-440	27	17	0.6	1.2	0.8	4.0	0.15	0.5	12	10	AW256	—	134.95
NEW	ZB4CS-700-10W*	4	400-700	25	20	0.35	0.8	0.6	4.0	0.1	0.3	10	20	Z689	—	134.95
	ZB4CS-870-10W*	4	570-870	28	20	0.35	0.8	0.6	3.0	0.1	0.3	10	20	Z689	—	134.95
▲	ZB4CS-960-12W	4	820-960	28	17	0.3	0.8	2.0	6.0	0.2	0.6	12	12	AW256	—	134.95

features

- low insertion loss
- very low amplitude unbalance
- low phase unbalance
- as a combiner, ideal for VHF transmitter applications
- cellular applications

+Theoretical Insertion Loss

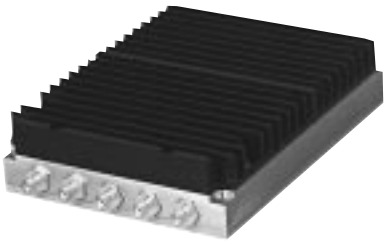
2-Way ..... 3.0 dB
3-Way ..... 4.8 dB
4-Way ..... 6.0 dB
5-Way ..... 7.0 dB
6-Way ..... 7.8 dB
8-Way ..... 9.0 dB

NSN GUIDE

MCL NO.	NSN
ZA2CS-500-15W(N)	1680-01-434-4480

001106

5,6 AND 8 WAY 50 MHz to 950 MHz



ZB5PD

ZB5CS

ZB6CS

ZB8CS

	MODEL NO.	No. of WAYS	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS+ dB (above theoretical) Typ.	INSERTION LOSS+ dB (above theoretical) Max.	PHASE UNBALANCE Degrees Typ.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Typ.	AMPLITUDE UNBALANCE dB Max.	POWER INPUT, W[1] as Combiner[2] Max.	POWER INPUT, W[1] as Splitter Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW	ZB5CS-920-10W	5	450-920	26	18	0.4	1.0	2.0	7.0	0.10	0.6	10	20	Z668	—	144.95
▲	ZB5PD-894-50W	5	800-894	32	20	0.4	0.8	—	—	0.15	0.45	50	50	BV278	—	274.95
	ZB6CS-150-12W	6	50-150	32	20	0.5	1.2	3.0	9.0	0.15	0.5	12	10	Z259	—	159.95
	ZB8CS-950-32W	8	800-950	30	18	0.4	1.0	2.0	6.0	0.10	0.5	32	32	AW257	—	199.95

NOTES:

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted option, case finishes are given in section 0, see "Case styles & Outline drawings".

C. Prices and Specifications subject to change without notice.

Photo for ZAPD-2-21-3W not shown. See outline drawing F53.

* Photo for ZA3CS-400-3W not shown. See outline drawing CC258.
Photo for ZB3CS-640-6W, ZB3CS-900-6W not shown. See outline drawing Z667.
Photo for ZB4CS-700-10W & ZB4CS-870-10W not shown. See outline drawing Z689.

1. Over -55°C to +55°C. Derate linearly to 20% of rating at 90°C.
2. As a combiner of noncoherent signals, max. power per port is power rating divided by number of ports.
3. Operating temperature: -55°C to 90°C
   Storage temperature: -55°C to 100°C

001129

POWER SPLITTERS/COMBINERS 50 & 75Ω

2 WAY-0° 100 kHz to 2.6 GHz


ADP


BP2


JPS


JYPS

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB L Min.	ISOLATION dB M° Typ.	ISOLATION dB M° Min.	ISOLATION dB U Typ.	ISOLATION dB U Min.	INSERTION LOSS, dB Above 3dB L Typ.	INSERTION LOSS, dB Above 3dB L Max.	INSERTION LOSS, dB Above 3dB M° Typ.	INSERTION LOSS, dB Above 3dB M° Max.	INSERTION LOSS, dB Above 3dB U Typ.	INSERTION LOSS, dB Above 3dB U Max.	PHASE UNBALANCE Degrees L Max.	PHASE UNBALANCE Degrees M° Max.	PHASE UNBALANCE Degrees U Max.	AMPLITUDE UNBALANCE dB L Max.	AMPLITUDE UNBALANCE dB M° Max.	AMPLITUDE UNBALANCE dB U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
◆ ADP-2-1*	0.5-400	25	20	25	20	25	20	0.2	0.4	0.3	0.6	0.5	1.0	1.0	2.0	3.0	0.1	0.2	0.3	CD636	mp	7.95
◆ ADP-2-1W*	1-650	30	20	30	20	24	20	0.2	0.8	0.25	0.8	0.5	1.0	2.0	2.0	3.0	0.15	0.2	0.3	CD636	hv	6.95
◆ ADP-2-4*	10-1000	25	20	23	16	19	14	0.3	0.5	0.4	0.9	0.8	1.5	1.0	3.0	5.0	0.15	0.2	0.4	CD636	mp	11.95
NEW◆ ADP-2-9*	200-900			27	20					0.4	0.8				2.0			0.3		CD636	mp	9.95
◆ ADP-2-10*	5-1000	25	15	23	15	20	15	0.3	0.9	0.4	0.9	0.6	1.2	2.0	2.0	3.0	0.2	0.2	0.3	CD636	hv	12.95
◆■ ADP-2-10-75*	50-1000	26	20	—	—	22	18	0.6	1.0	—	—	0.8	1.4	2.0	—	3.0	0.15	—	0.3	CD542	mp	12.95
NEW◆■ ADP-2-10W-75*	5-1000	24	14	23	18	24	18	0.2	0.6	0.3	0.9	0.5	1.1	1	3	5	0.1	0.2	0.3	CD636	mp	12.95
◆ ADP-2-20*	20-2000	18	15	18	15	18	15	0.5	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7	CD542	hv	16.95
◆■ ADP-2-20-75*	5-2000	16	12	16	13	28	15	0.4	0.9	0.5	1.2	0.6	1.4	1.0	4.0	5.0	0.15	0.3	0.6	CD542	hv	17.95
◆ BP2C	810-960			25	18					0.6	0.9				3.0			0.2		XX211	jm	1.29
◆ BP2G	1420-1660			28	20✧					0.6	1.0				3.0			0.2		XX211	jm	0.99
◆ BP2P	1710-1990			30	18					0.7	1.0				3.0			0.2		XX211	jm	1.24
																						Qty. (1-9)
JPS-2-1	1-500	34	20	30	20	27	20	0.2	0.8	0.25	0.7	0.4	0.9	1.0	2.0	3.0	0.1	0.2	0.3	BH292	me	9.95
JPS-2-1-75	5-500	25	18	35	20	20	18	0.15	0.5	0.15	0.7	0.25	0.7	1.0	2.0	3.0	0.1	0.2	0.4	BH292	me	9.95
JPS-2-1N	350-550			30	20					0.25	0.5				3.0			0.3		BH292	hv	8.95
JPS-2-1W	3-750	36	20	28	17	19	16	0.5	0.8	0.4	1.0	0.9	1.4	1.0	2.0	4.0	0.2	0.3	0.4	BH292	hv	8.95
JPS-2-4	100-1000			22	16					0.5	1.4				5.0			0.4		BH292	hv	9.95
NEW■ JPS-2-4-75	20-1000	27	20	29	20	27	16	0.35	0.7	0.4	0.8	0.45	1.0	2	2	3	0.2	0.2	0.3	BH292	mr	10.95
JPS-2-900	400-900			24	18					0.5	1.2				3.0			0.4		BH292	hv	9.95
■ JYPS-2-4-75	5-1000	24	17	25	20	30	18	0.4	0.8	0.4	1.0	0.8	1.5	3.0	4.0	5.0	0.2	0.3	0.4	BJ293	jf	16.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

❄ Smaller size package available. See outline drawing CA531, TP model series.
◆ Aqueous washable. For non-aqueous requirements, LRPS units available in case style QQQ130.
✪ When only specification for M range given, specification applies to entire frequency range.
✧ 18 dB min. at frequencies 1500 - 1660 MHz.
■ Denotes 75 Ohm model
* Protected under U.S. Patent 6133525
** BLUE CELL™ power splitters protected by U.S patents 5,534,830 and 5,640,132
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Casse Styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating,

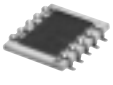
Models BP2C, BP2G, BP2P	1.5 Watts
Models JYPS-2-4-75, ADP-2-10, ADP-2-10-75,	0.5 Watt
ADP-2-20-75, ADP-2-1, ADP-2-9, TCP	0.5 Watt
Models SBA, ADP-2-1W	2 Watts
SBB models	10 Watts
All other models	1 Watt

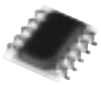
1b. Internal load dissipation,

Models BP2C, BP2G, BP2P	0.375 Watt
Models ADP-2-10-75, SBB	0.250 Watt
All other models	0.125 Watt

010529


LRPS-J


SBA(SM1)


SBA(SM2)


SBB


SCP


SYPS


TCP

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB L Min.	ISOLATION dB M° Typ.	ISOLATION dB M° Min.	ISOLATION dB U Typ.	ISOLATION dB U Min.	INSERTION LOSS, dB Above 3dB L Typ.	INSERTION LOSS, dB Above 3dB L Max.	INSERTION LOSS, dB Above 3dB M° Typ.	INSERTION LOSS, dB Above 3dB M° Max.	INSERTION LOSS, dB Above 3dB U Typ.	INSERTION LOSS, dB Above 3dB U Max.	PHASE UNBALANCE Degrees L Max.	PHASE UNBALANCE Degrees M° Max.	PHASE UNBALANCE Degrees U Max.	AMPLITUDE UNBALANCE dB L Max.	AMPLITUDE UNBALANCE dB M° Max.	AMPLITUDE UNBALANCE dB U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆ LRPS-2-1J	5-500	50	25	33	24	30	23	0.25	0.5	0.3	0.6	0.5	1.2	1.0	2.0	3.0	0.15	0.2	0.3	QQQ569	am	8.95
◆■ LRPS-2-1-75J	2-500	35	18	35	25	27	20	0.30	0.8	0.35	0.6	0.5	1.0	1.0	2.0	3.0	0.15	0.2	0.3	QQQ569	am	8.95
◆■ LRPS-2-1W-75J	10-650	28	22	29	24	30	20	0.5	1.0	0.6	0.75	0.6	1.2	1.0	2.0	3.0	0.15	0.2	0.3	QQQ569	am	9.95
◆ LRPS-2-4J	10-1000	25	20	23	16	19	14	0.3	0.5	0.4	0.9	0.8	1.5	1.0	3.0	5.0	0.15	0.2	0.4	QQQ569	am	19.95
◆ LRPS-2-11J	20-2000	19	15	21	15	30	15	0.6	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7	QQQ569	gn	24.95
◆ LRPS-2-25J	1700-2500			20	16					0.8	1.3				10.0			0.9		QQQ569	gn	21.95
◆ LRPS-2-980J	800-980			30	18					0.5	1.0				3.0			0.5		QQQ569	am	8.95
SCP-2-1	0.1-400	25	15	30	20	25	20	0.3	1.2	0.2	0.6	0.4	1.1	2.0	2.0	3.0	0.15	0.2	0.3	YY101	aq	10.45
SCP-2-1A	1-550	25	20	25	20	25	20	0.3	0.6	0.3	0.6	0.7	1.3	2.0	2.0	3.0	0.15	0.2	0.4	YY101	aq	10.45
SYPS-2-1	2-500	40	20	32	20	30	20	0.2	0.6	0.3	0.75	0.6	1.0	2.0	3.0	4.0	0.2	0.3	0.5	TTT167	hk	12.95 Qty. (10-49)
BLUE CELL ◆ SBA-2-14**	1200-1600			16	10					0.6	1.0				5.0			0.5		SM1	lg	6.95
◆ SBA-2-18**	1600-2000			19	13					0.4	1.0				6.0			0.6		SM1	lg	6.95
◆ SBA-2-20**	1800-2200			22	13					0.5	1.1				7.0			0.7		SM2	lg	6.95
◆ SBA-2-22**	2000-2600			18	10					0.8	1.6				10.0			0.8		SM2	lg	6.95
BLUE CELL ◆ SBB-2-10**	800-1000			24	15					0.6	1.2				3.0			0.3		SM31	mu	4.95
◆ SBB-2-13**	950-1300			24	15					0.6	1.3				3.0			0.6		SM31	mu	4.95
◆ SBB-2-18**	1425-1800			22	16					0.6	1.2				4.0			0.3		SM31	mu	4.95
◆ SBB-2-21W**	1700-2100			22	15					0.6	1.1				4.0			0.3		SM31	mu	4.95
	1800-2000			24	18					0.5	0.9				4.0			0.3				
◆ SBB-2-23**	2000-2300			24	17					0.6	1.0				3.0			0.3		SM31	mu	4.95
	2100-2200			25	18					0.5	0.9				3.0			0.5				
																						Qty. (25)
◆ TCP-2-10	5-1000	25	17	25	16	21	16	0.3	0.9	0.5	0.9	0.5	1.4	4.0	4.0	6.0	0.6	0.6	0.3	DB714	mt	1.49
◆■ TCP-2-10-75	5-1000	24	14	29	19	30	16	0.3	1.4	0.3	0.9	0.6	1.3	6.0	4.0	3.0	1.2	0.6	0.5	DB714	mt	1.99
NEW◆ TCP-2-25	200-2500			18	10					0.8	1.3				6.0			0.8		DB714	nb	1.99

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

pin connections see case style outline drawings for pin locations

PORT	am	aq	gn	hk	hv	jf	jm	me	lg	mp[1]	mr	mt[2]	mu	nb[3]
SUM PORT	6	1	6	3	1	1	2	1	3	1	1	6	2	6,5,2
PORT 1	4	5	4	1	3	3	8	3	10	3	3	3	6	3
PORT 2	3	6	3	2	4	6	5	4	6	4	4	4	4	4
GND EXT.	1	2,3,4,7,8	1,2,5	4,5,6	6	7,8	1,3,4,6,7	2,5,6	all others	6	5	1	1,3,5	1
CASE GND	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NOT USED	2,5	—	—	—	2,5	2,4,5	—	—	—	—	2,6	—	—	—
ISOLATE	—	—	—	—	—	—	—	—	—	2,5	—	—	—	—
SHORT	—	—	—	—	—	—	—	—	—	—	—	2,5	—	—

[1] pins 2&5 must be connected together on PC board.

[2] pins 2&5 must be connected together on PC board and grounded via 1.5pF capacitors. A resistor must be placed between pins 3&4. **Suggested PCB layouts for TCP-2-10 (98-PL-001), TCP-2-10-75 (98-PL-002)** available upon request.

[3] A 475 ohm resistor must be placed between pins 3&4. **Suggested PCB layout for TCP-2-25 (98-PL-008)** available upon request. Please contact Applications Department or consult our Website for PCB layouts.

010531

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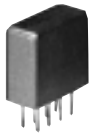
continuous facing pages.**

POWER SPLITTERS/COMBINERS 50 & 75Ω

2 WAY-0° 4 kHz to 2 GHz


MSC

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 3dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
MSC-2-1	0.1-450	20	15	30	20	30	20	0.3	0.5	0.4	0.75	0.6	1.0	2.0	3.0	4.0	0.15	0.2	0.3	A03	ap	20.95
MSC-2-1W	2-650	22	18	30	20	22	18	0.3	0.5	0.5	0.8	0.8	1.2	1.0	2.0	4.0	0.3	0.2	0.3	A03	ap	22.95
MSC-2-5	5-1500	18	16	20	16	20	14	0.6	0.8	0.6	0.8	0.6	1.1	2.0	3.0	5.0	0.2	0.3	0.4	A03	ap	26.95
MSC-2-11	5-2000	18	16	20	16	18	11	0.6	0.8	0.6	0.8	1.2	1.8	2.0	3.0	5.0	0.2	0.3	0.5	A03	ap	31.95
PSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.6	0.4	0.75	0.6	1.0	2.0	3.0	4.0	0.15	0.2	0.3	A01	ap	11.95
PSC-2-1W	1-650	25	20	35	20	25	20	0.3	0.6	0.5	0.9	0.7	1.0	2.0	3.0	4.0	0.15	0.2	0.3	A01	ap	18.95
✣ PSC-2-2	0.004-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2.0	3.0	4.0	0.15	0.25	0.3	A01	ap	25.95
PSC-2-4	10-1000	30	25	25	20	25	20	0.6	1.0	0.6	1.2	0.7	1.3	2.0	4.0	8.0	0.15	0.2	0.4	A01	ap	25.95
PSC-2-5	10-1400	28	18	22	17	24	17	0.3	0.6	0.6	1.0	0.9	1.6	2.0	3.0	4.0	0.15	0.2	0.4	A01	ap	31.95
PSC-2-11	5-2000	21	16	22	18	19	9	0.5	0.8	0.6	0.9	0.7	1.5	1.0	3.0	6.0	0.20	0.4	1.0	A01	ap	36.95
PSC-2-45	700-900			20	17					0.2	0.4				3.0			0.2		A01	ap	24.95
PSC-2-1000	400-1000			35	25					0.5	1.0				2.0			0.3		A06	ap	24.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

✪ When only specification for M range given, specification applies to entire frequency range.

✣ At low range frequency band (f_L to 10 f_L), linearly derate maximum input power by 13 dB.

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

* VSWR typical 1.1:1 over total range of frequency, max 1.2:1 for low and upper range, max 1.15:1 for mid range.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

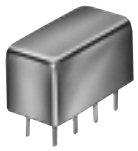
C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating,
Model PSC-2-11 0.5 Watt
All other models 1 Watt

1b. Internal load dissipation, 0.125 Watt

001113



PSC

TSC

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 3dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
■ PSC-2-1-75	0.25-300	20	15	30	20	20	15	0.4	0.75	0.4	0.75	0.4	1.0	2.0	3.0	5.0	0.15	0.2	0.3	A01	ap	14.45
■ PSC-2-1-75A*	1-200	35	27	46	35	36	25	0.1	0.3	0.2	0.4	0.35	0.6	1.0	1.0	2.0	0.1	0.15	0.15	A06	ap	15.45
✣■ PSC-2-2-75	0.008-60	35	20	40	25	30	22	0.1	0.4	0.15	0.4	0.3	0.8	1.0	1.0	1.0	0.15	0.15	0.15	A01	ap	25.95
■ PSC-2-4-752	10-850	31	20	32	23	23	15	0.3	0.5	0.4	0.6	0.5	1.0	2.0	5.0	10.0	0.1	0.2	0.5	A01	ap	25.95
■ PSC-2375	55-85			35	25					0.3	0.5				1.0			0.1		A01	ap	25.95
TSC-2-1	1-400	30	25	30	25	30	20	0.25	0.5	0.4	0.75	0.8	1.0	2.0	3.0	4.0	0.15	0.2	0.6	B02	aj	17.95
		L2		U2				L2		U2				L2	U2		L2	U2				
TSC-2-1W	200-1000	26	20	23	14			0.3	0.8	0.7	1.5			5	10		0.7	0.5		B02	aj	21.95

L = low range [f_L to 10 f_L]
L_2 = (f_L to f_U/2)

M = mid range [10 f_L to f_U/2]
U_2 = (f_U/2 to f_U)

U = upper range [f_U/2 to f_U]

pin connections

see case style outline drawings for pin locations

PORT	aj	ap
SUM PORT	1	1
PORT 1	2	5
PORT 2	4	6
GND EXT.	3	2,3,4,7,8
CASE GND	3	2,3,4,7,8
NOT USED	—	—

NSN GUIDE

MCL NO.	NSN	MIL-P-23971/15*
MSC-2-1	6625-01-124-8595	02
MSC-2-1W	5985-01-437-3528	
PSC-2-1	6625-00-548-0739	01
PSC-2-1W	5985-01-190-7701	
PSC-2-2	6625-01-143-2571	
PSC-2-4	6625-01-230-0492	
TSC-2-1	5895-01-332-8100	

* units are not QPL listed

POWER SPLITTERS/COMBINERS 50 & 75Ω

2 WAY-0° 2 kHz to 10 GHz

ZESC-2

ZFSC-2

ZMSC-2

ZSC-2

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 3dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZESC-2-11	10-2000	19	10	18	13	20	11	0.5	0.9	0.5	1.0	0.6	1.2	1	3	6	0.20	0.30	0.50					V37	ar	71.95
	ZFSC-2-1	5-500	30	25	28	20	25	20	0.2	0.5	0.3	0.6	0.6	0.8	2	4	4	0.15	0.15	0.30					K18	ar	44.95
■	ZFSC-2-1-75	0.25-300	20	15	30	25	25	20	0.4	0.75	0.4	0.75	0.4	1.0	2	3	5	0.15	0.20	0.30					K18	ar	45.95
■	ZFSC-2-1W-75	5-600	44	26	45	30	31	20	0.22	0.6	0.27	0.7	0.46	0.9	1	2	3	0.20	0.30	0.40					K18	ar	50.95
	ZFSC-2-1W	1-750	30	20	28	20	25	20	0.2	0.5	0.4	0.8	0.8	1.0	2	4	4	0.15	0.15	0.30					K18	ar	48.95
	ZFSC-2-2	10-1000	30	20	25	20	23	18	0.2	0.5	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30					K18	ar	51.95
			L1		U1				L1		U1				L1	U1		L1	U1								
	ZFSC-2-9G	3500-9000	18	12	20	12			0.5	1.5	0.6	1.2			7	10		0.30	0.50						JJJ142	as	59.95
	ZFSC-2-10G	2000-10000	15	9	20	12			0.5	1.5	0.6	1.6			7	12		0.60	0.50		see Yoni for				JJJ142	as	69.95
	ZFSC-2-4	0.2-1000	20	15	25	20	23	18	0.2	0.8	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30					K18	ar	55.95
	ZFSC-2-5	10-1500	25	15	30	20	25	18	0.25	0.6	0.5	1.0	0.8	1.5	2	3	4	0.15	0.20	0.50	Performance				K18	ar	59.95
✣	ZFSC-2-6*	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.20	0.30					K18	ar	49.95
✣■	ZFSC-2-6-75	0.004-60	30	20	35	20	25	20	0.5	0.8	0.4	0.8	0.7	1.0	1	2	3	0.15	0.20	0.30	Data and				K18	ar	51.95
	ZFSC-2-11	10-2000	14	10	16	14	20	15	1.2	1.5	1.2	1.5	1.0	2.2	1	2	4	0.20	0.30	0.50					K18	ar	64.95
▲	ZFSC-2-2500	10-2500	16	11	17	14	17	14	0.5	0.8	0.6	1.4	0.8	1.5	1	4	8	0.20	0.30	0.40	curves				K18	ar	74.95
	ZMSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30					M21	at	49.95
	ZMSC-2-1W	1-650	25	20	35	20	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30					M21	at	54.95
✣	ZMSC-2-2*	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M21	at	59.95
	ZSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30					M22	at	47.95
	ZSC-2-1W	1-650	25	20	35	25	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30					M22	at	49.95
✣	ZSC-2-2*	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M22	at	52.95
✣■	ZSC-2-2-75**	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M22	at	53.95
	ZSC-2-4	10-1000	25	20	35	20	25	20	0.2	0.5	0.5	0.8	0.7	1.3	2	4	6	0.15	0.20	0.30					M22	at	52.95
■	ZSC-2375	55-85			35	25					0.3	0.5				1			0.10						M22	at	52.95
■	ZSC-2-1-75	0.25-300	20	15	30	20	20	15	0.4	0.75	0.4	0.75	0.4	1.0	2	3	5	0.15	0.20	0.30					M22	at	49.95

NOTES:

* Isolation specified to 0.004 MHz

** Insertion loss and Isolation specified to -20°C from 0.002 MHz to 0.004 MHz

✪ When only specification for M range given, specification applies to entire frequency range.

✣ At low range frequency band (fL to 10 fL), linearly derate maximum input power by 13 dB.

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating, models ZAPD, ZN2PD, ZC2PD 10 Watt
ZAPD-900-5W, ZN2PD-20, 5W (as a splitter), ZAPD-30 and other models 1 Watt

1b. Internal load dissipation 0.125 Watt; ZAPD-900-5W, 1W max.;
ZN2PD-20, 0.725W max.; ZN2PD-9G, ZAPD-2-22-75, 0.25W max.

coaxial connections

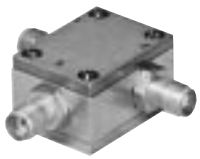
see case style outline drawing for pin locations

PORT	ar	as	at
SUM PORT	3	S	2
PORT 1	1	1	1
PORT 2	2	2	3
GND EXT.	—	—	—
CASE GND	—	—	—
NOT USED	—	—	—

001127

ZC2PD

ZN2PD



IZY2PD

ZAPD

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB L Min.	ISOLATION dB M° Typ.	ISOLATION dB M° Min.	ISOLATION dB U Typ.	ISOLATION dB U Min.	INSERTION LOSS, dB Above 3dB L Typ.	INSERTION LOSS, dB Above 3dB L Max.	INSERTION LOSS, dB Above 3dB M° Typ.	INSERTION LOSS, dB Above 3dB M° Max.	INSERTION LOSS, dB Above 3dB U Typ.	INSERTION LOSS, dB Above 3dB U Max.	PHASE UNBAL. Degrees L Max.	PHASE UNBAL. Degrees M° Max.	PHASE UNBAL. Degrees U Max.	AMPLITUDE UNBAL. dB L Max.	AMPLITUDE UNBAL. dB M° Max.	AMPLITUDE UNBAL. dB U Max.	VSWR (:1) S Typ.	VSWR (:1) S Max.	VSWR (:1) OUT Typ.	VSWR (:1) OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZC2PD-900	800-900			30	20				0.1	0.4				2			0.20			1.10	1.30	1.10	1.30	F183	as	64.95
			L^0				U^0																				
	ZN2PD-20	750-2000	18	15	25	20	18	15		0.2	0.5				4			0.30			1.16	1.5	1.10	1.35	VVV180	as	67.95
	ZN2PD-920	800-920			30	20				0.15	0.4				2			0.20			1.10	1.20	1.04	1.20	VVV180	as	59.95
	ZN2PD-920W	700-1050			22	15				0.15	0.5				3			0.30			1.20	1.50	1.04	1.20	VVV180	as	54.95
	ZN2PD-1900	1600-1900			30	20				0.18	0.4				2			0.20			1.20	1.35	1.04	1.20	VVV180	as	69.95
	ZN2PD-1900W	1500-2000			24	15				0.2	0.5				3			0.30			1.20	1.50	1.04	1.20	VVV180	as	64.95
	ZN2PD-9G	1700-9000			22	15				0.5	1.4				4			0.60							VVV180	as	69.95
		GHz																									
	IZY2PD-64	5.8-6.4			35	24				0.2	0.5				5			0.30			1.05	1.30	1.20	1.35	JJJ245	as	89.95
	IZY2PD-86	7.0-8.6			30	18				0.1	0.5				6			0.25			1.10	1.45	1.10	1.40	JJJ245	as	94.95
	ZAPD-1	0.5-1.0			25	19				0.25	0.6				2			0.20							F14	as	54.95
	ZAPD-2	1.0-2.0			25	19				0.25	0.6				2			0.20							F14	as	54.95
■	ZAPD-2-22-75	0.91-2.15			30	20				0.2	0.7				2			0.40			1.15	1.60	1.10	1.30	F14	as	58.95
	ZAPD-20	0.7-2.0			30	20				0.30	0.7				3			0.40			1.15	1.35	1.10	1.30	F53	as	59.95
	ZAPD-21	0.5-2.0			25	18				0.25	1.0				3			0.20							F53	as	59.95
NEW▲	ZAPD-30	0.02-3.0	14	12	16	12	20	14	1.1	1.5	1.1	1.8	1.4	2.3	3	5	9	0.30	0.40	0.80	1.50	1.95	1.55	2.10	F14	as	79.95
	ZAPD-4	2.0-4.2			25	19				0.4	0.8				6			0.40			see Yoni for				F14	as	59.95
	ZAPD-50	4.4-5.0			26	20				0.3	0.8				5			0.50			Performance Data				F14	as	54.95
	ZAPD-50W	4.2-6.0			26	16				0.3	0.8				5			0.70			and curves				F14	as	64.95
	ZAPD-900-5W	0.1-0.9			23	18				0.3	1.0				3			0.30			1.15	1.50	1.22	1.50	F14	as	59.95
	ZAPD-1750	0.95-1.75			30	22				0.2	0.4				4			0.50			1.15	1.50	1.22	1.50	F14	as	54.95

L = low range [f_L to 10 f_L]
L1 = f_L to 6 GHz
L^0 = 750 to 875 MHz

M = mid range [10 f_L to f_U/2]
U1 = 6 GHz to f_U
U^0 = 1850 to 2000 MHz

U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
ZAPD-1(TNC)	5985-01-250-4883
ZAPD-2(SMA)	5895-01-229-7431
ZAPD-4	6625-01-173-1887
ZAPD-4(SMA)	5985-01-383-0636
ZESC-2-11	5985-01-381-9081
ZFSC-2-1	6625-01-139-3499
ZFSC-2-1(SMA)	6625-01-213-6490
ZFSC-2-1(BNC)	5985-01-176-4551
ZFSC-2-1-75	5895-01-325-4795
ZFSC-2-1W(SMA)	6625-01-200-5094
ZFSC-2-1W	5895-01-348-3534
ZFSC-2-2B(SMA)	6625-01-362-1801
ZFSC-2-2(SMA)	6625-01-333-1127

MCL NO.	NSN
ZFSC-2-2B	5895-01-330-4416
ZFSC-2-4(TNC)	5985-01-250-4882
ZFSC-2-5	6625-01-253-2444
ZFSC-2-6	6625-01-419-4241
ZFSC-2-6(BNC)	5895-01-408-6857
ZFSC-2-6B	5985-01-315-2869
ZFSC-2-10G	5895-01-467-5372
ZFSC-2-11(SMA)	6625-01-415-2183
ZMSC-2-1	5985-01-333-1128
ZMSC-2-1B	5895-01-253-2445
ZMSC-2-1BR	5985-01-338-9329
ZMSC-2-1W	5895-01-127-0232

MCL NO.	NSN
ZSC-2-1(TNC)	6625-01-310-2129
ZSC-2-1	5895-01-214-6032
ZSC-2-1B	6625-01-018-1066
ZSC-2-1B(TNC)	6625-01-109-3706
ZSC-2-1(BNC)	5895-01-036-6254
ZSC-2-1B(BNC)	6625-00-270-3055
ZSC-2-1W	5895-01-283-0850
ZSC-2-1WB	6625-01-264-8985
ZSC-2-1-75B	5895-01-136-8182
ZSC-2-2B	5820-01-136-7245
ZSC-2-2-75B	5915-01-012-8162
ZSC-2375	5895-01-229-0157

001128

POWER SPLITTERS/COMBINERS 50 & 75Ω

2 WAY-0° 2 kHz to 10 GHz

ZESC-2

ZFSC-2

ZMSC-2

ZSC-2

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 3dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZESC-2-11	10-2000	19	10	18	13	20	11	0.5	0.9	0.5	1.0	0.6	1.2	1	3	6	0.20	0.30	0.50					V37	ar	71.95
	ZFSC-2-1	5-500	30	25	28	20	25	20	0.2	0.5	0.3	0.6	0.6	0.8	2	4	4	0.15	0.15	0.30					K18	ar	44.95
■	ZFSC-2-1-75	0.25-300	20	15	30	25	25	20	0.4	0.75	0.4	0.75	0.4	1.0	2	3	5	0.15	0.20	0.30					K18	ar	45.95
■	ZFSC-2-1W-75	5-600	44	26	45	30	31	20	0.22	0.6	0.27	0.7	0.46	0.9	1	2	3	0.20	0.30	0.40					K18	ar	50.95
	ZFSC-2-1W	1-750	30	20	28	20	25	20	0.2	0.5	0.4	0.8	0.8	1.0	2	4	4	0.15	0.15	0.30					K18	ar	48.95
	ZFSC-2-2	10-1000	30	20	25	20	23	18	0.2	0.5	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30					K18	ar	51.95
			L1		U1				L1		U1				L1	U1		L1	U1								
	ZFSC-2-9G	3500-9000	18	12	20	12			0.5	1.5	0.6	1.2			7	10		0.30	0.50						JJJ142	as	59.95
	ZFSC-2-10G	2000-10000	15	9	20	12			0.5	1.5	0.6	1.6			7	12		0.60	0.50		see Yoni for				JJJ142	as	69.95
	ZFSC-2-4	0.2-1000	20	15	25	20	23	18	0.2	0.8	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30					K18	ar	55.95
	ZFSC-2-5	10-1500	25	15	30	20	25	18	0.25	0.6	0.5	1.0	0.8	1.5	2	3	4	0.15	0.20	0.50	Performance				K18	ar	59.95
✣	ZFSC-2-6*	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.20	0.30					K18	ar	49.95
✣■	ZFSC-2-6-75	0.004-60	30	20	35	20	25	20	0.5	0.8	0.4	0.8	0.7	1.0	1	2	3	0.15	0.20	0.30	Data and				K18	ar	51.95
	ZFSC-2-11	10-2000	14	10	16	14	20	15	1.2	1.5	1.2	1.5	1.0	2.2	1	2	4	0.20	0.30	0.50					K18	ar	64.95
▲	ZFSC-2-2500	10-2500	16	11	17	14	17	14	0.5	0.8	0.6	1.4	0.8	1.5	1	4	8	0.20	0.30	0.40	curves				K18	ar	74.95
	ZMSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30					M21	at	49.95
	ZMSC-2-1W	1-650	25	20	35	20	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30					M21	at	54.95
✣	ZMSC-2-2*	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M21	at	59.95
	ZSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30					M22	at	47.95
	ZSC-2-1W	1-650	25	20	35	25	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30					M22	at	49.95
✣	ZSC-2-2*	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M22	at	52.95
✣■	ZSC-2-2-75**	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30					M22	at	53.95
	ZSC-2-4	10-1000	25	20	35	20	25	20	0.2	0.5	0.5	0.8	0.7	1.3	2	4	6	0.15	0.20	0.30					M22	at	52.95
■	ZSC-2375	55-85			35	25					0.3	0.5				1			0.10						M22	at	52.95
■	ZSC-2-1-75	0.25-300	20	15	30	20	20	15	0.4	0.75	0.4	0.75	0.4	1.0	2	3	5	0.15	0.20	0.30					M22	at	49.95

NOTES:

* Isolation specified to 0.004 MHz

** Insertion loss and Isolation specified to -20°C from 0.002 MHz to 0.004 MHz

✪ When only specification for M range given, specification applies to entire frequency range.

✣ At low range frequency band (fL to 10 fL), linearly derate maximum input power by 13 dB.

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating, models ZAPD, ZN2PD, ZC2PD 10 Watt
ZAPD-900-5W, ZN2PD-20, 5W (as a splitter), ZAPD-30 and other models 1 Watt

1b. Internal load dissipation 0.125 Watt; ZAPD-900-5W, 1W max.;
ZN2PD-20, 0.725W max.; ZN2PD-9G, ZAPD-2-22-75, 0.25W max.

coaxial connections

see case style outline drawing for pin locations

PORT	ar	as	at
SUM PORT	3	S	2
PORT 1	1	1	1
PORT 2	2	2	3
GND EXT.	—	—	—
CASE GND	—	—	—
NOT USED	—	—	—

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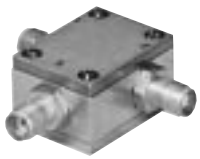
ZC2PD

ZN2PD



IZY2PD

ZAPD

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB L Min.	ISOLATION dB M° Typ.	ISOLATION dB M° Min.	ISOLATION dB U Typ.	ISOLATION dB U Min.	INSERTION LOSS, dB Above 3dB L Typ.	INSERTION LOSS, dB Above 3dB L Max.	INSERTION LOSS, dB Above 3dB M° Typ.	INSERTION LOSS, dB Above 3dB M° Max.	INSERTION LOSS, dB Above 3dB U Typ.	INSERTION LOSS, dB Above 3dB U Max.	PHASE UNBAL. Degrees L Max.	PHASE UNBAL. Degrees M° Max.	PHASE UNBAL. Degrees U Max.	AMPLITUDE UNBAL. dB L Max.	AMPLITUDE UNBAL. dB M° Max.	AMPLITUDE UNBAL. dB U Max.	VSWR (:1) S Typ.	VSWR (:1) S Max.	VSWR (:1) OUT Typ.	VSWR (:1) OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZC2PD-900	800-900			30	20				0.1	0.4				2			0.20			1.10	1.30	1.10	1.30	F183	as	64.95
			L^0				U^0																				
	ZN2PD-20	750-2000	18	15	25	20	18	15		0.2	0.5				4			0.30			1.16	1.5	1.10	1.35	VVV180	as	67.95
	ZN2PD-920	800-920			30	20				0.15	0.4				2			0.20			1.10	1.20	1.04	1.20	VVV180	as	59.95
	ZN2PD-920W	700-1050			22	15				0.15	0.5				3			0.30			1.20	1.50	1.04	1.20	VVV180	as	54.95
	ZN2PD-1900	1600-1900			30	20				0.18	0.4				2			0.20			1.20	1.35	1.04	1.20	VVV180	as	69.95
	ZN2PD-1900W	1500-2000			24	15				0.2	0.5				3			0.30			1.20	1.50	1.04	1.20	VVV180	as	64.95
	ZN2PD-9G	1700-9000			22	15				0.5	1.4				4			0.60							VVV180	as	69.95
		GHz																									
	IZY2PD-64	5.8-6.4			35	24				0.2	0.5				5			0.30			1.05	1.30	1.20	1.35	JJJ245	as	89.95
	IZY2PD-86	7.0-8.6			30	18				0.1	0.5				6			0.25			1.10	1.45	1.10	1.40	JJJ245	as	94.95
	ZAPD-1	0.5-1.0			25	19				0.25	0.6				2			0.20							F14	as	54.95
	ZAPD-2	1.0-2.0			25	19				0.25	0.6				2			0.20							F14	as	54.95
■	ZAPD-2-22-75	0.91-2.15			30	20				0.2	0.7				2			0.40			1.15	1.60	1.10	1.30	F14	as	58.95
	ZAPD-20	0.7-2.0			30	20				0.30	0.7				3			0.40			1.15	1.35	1.10	1.30	F53	as	59.95
	ZAPD-21	0.5-2.0			25	18				0.25	1.0				3			0.20							F53	as	59.95
NEW▲	ZAPD-30	0.02-3.0	14	12	16	12	20	14	1.1	1.5	1.1	1.8	1.4	2.3	3	5	9	0.30	0.40	0.80	1.50	1.95	1.55	2.10	F14	as	79.95
	ZAPD-4	2.0-4.2			25	19				0.4	0.8				6			0.40			see Yoni for				F14	as	59.95
	ZAPD-50	4.4-5.0			26	20				0.3	0.8				5			0.50			Performance Data				F14	as	54.95
	ZAPD-50W	4.2-6.0			26	16				0.3	0.8				5			0.70			and curves				F14	as	64.95
	ZAPD-900-5W	0.1-0.9			23	18				0.3	1.0				3			0.30			1.15	1.50	1.22	1.50	F14	as	59.95
	ZAPD-1750	0.95-1.75			30	22				0.2	0.4				4			0.50			1.15	1.50	1.22	1.50	F14	as	54.95

L = low range [f_L to 10 f_L]
L1 = f_L to 6 GHz
L^0 = 750 to 875 MHz

M = mid range [10 f_L to f_U/2]
U1 = 6 GHz to f_U
U^0 = 1850 to 2000 MHz

U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
ZAPD-1(TNC)	5985-01-250-4883
ZAPD-2(SMA)	5895-01-229-7431
ZAPD-4	6625-01-173-1887
ZAPD-4(SMA)	5985-01-383-0636
ZESC-2-11	5985-01-381-9081
ZFSC-2-1	6625-01-139-3499
ZFSC-2-1(SMA)	6625-01-213-6490
ZFSC-2-1(BNC)	5985-01-176-4551
ZFSC-2-1-75	5895-01-325-4795
ZFSC-2-1W(SMA)	6625-01-200-5094
ZFSC-2-1W	5895-01-348-3534
ZFSC-2-2B(SMA)	6625-01-362-1801
ZFSC-2-2(SMA)	6625-01-333-1127

MCL NO.	NSN
ZFSC-2-2B	5895-01-330-4416
ZFSC-2-4(TNC)	5985-01-250-4882
ZFSC-2-5	6625-01-253-2444
ZFSC-2-6	6625-01-419-4241
ZFSC-2-6(BNC)	5895-01-408-6857
ZFSC-2-6B	5985-01-315-2869
ZFSC-2-10G	5895-01-467-5372
ZFSC-2-11(SMA)	6625-01-415-2183
ZMSC-2-1	5985-01-333-1128
ZMSC-2-1B	5895-01-253-2445
ZMSC-2-1BR	5985-01-338-9329
ZMSC-2-1W	5895-01-127-0232

MCL NO.	NSN
ZSC-2-1(TNC)	6625-01-310-2129
ZSC-2-1	5895-01-214-6032
ZSC-2-1B	6625-01-018-1066
ZSC-2-1B(TNC)	6625-01-109-3706
ZSC-2-1(BNC)	5895-01-036-6254
ZSC-2-1B(BNC)	6625-00-270-3055
ZSC-2-1W	5895-01-283-0850
ZSC-2-1WB	6625-01-264-8985
ZSC-2-1-75B	5895-01-136-8182
ZSC-2-2B	5820-01-136-7245
ZSC-2-2-75B	5915-01-012-8162
ZSC-2375	5895-01-229-0157

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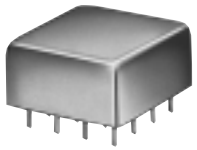
continuous facing pages.**

POWER SPLITTERS/COMBINERS 50Ω

2 WAY-0° RESISTIVE DC to 4200 MHz

ZFRSC



PRSC

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB M Typ.	ISOLATION dB U Typ.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	PHASE UNBALANCE Degrees M Max.	PHASE UNBALANCE Degrees U Max.	AMPLITUDE UNBALANCE dB L Max.	AMPLITUDE UNBALANCE dB M Max.	AMPLITUDE UNBALANCE dB U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
▲	ZFRSC-42	DC-4200	6.2	6.5	7.0	0.1	0.2	0.1	0.5	0.4	1.4	1	3	5	0.1	0.2	0.5	K18	ar	59.95
■	ZFRSC-2075	DC-2000	6.2	6.6	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1	2	5	0.1	0.2	0.5	K18	ar	59.95
	ZFRSC-2050	DC-2000	6.2	6.6	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1	2	5	0.1	0.2	0.5	K18	ar	59.95
	PRSC-2050	DC-2000	6.0	6.2	6.5	0.1	0.3	0.2	0.7	0.5	1.0	1	3	5	0.1	0.3	0.5	C145	au	31.95

L = DC to 100 MHz M = mid range [100 MHz to f_U/2] U = upper range [f_U/2 to f_U]

Above models are resistive power dividers to enable frequency coverage from dc to the highest rated frequency. Since resistive power dividers do not provide a high degree of isolation (basically isolation equals the insertion loss between ports), an amplifier such as Mini-Circuits' ZFL series is recommended when high isolation is required. Matched power rating 0.75W, internal load dissipation 0.375W.

NOTES:

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating,
model ZAPDQ 10 Watt
all other models 1 Watt

1b. Internal load dissipation, 0.125 Watt

001114

2 WAY-90° 25 to 4200 MHz

ZAPDQ

ZMSCQ-2

ZSCQ-2

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZAPDQ-2	1000-2000	22	16	0.4	1.4	6.0	0.8	F14	ar	79.95
ZAPDQ-4	2000-4200	22	16	0.4	0.9	8.0	1.0	F14	ar	79.95
ZMSCQ-2-50	25-50	30	20	0.3	0.7	3.0	1.5	M21	at	61.95
ZMSCQ-2-90	55-90	30	20	0.3	0.7	3.0	1.2	M21	at	61.95
ZMSCQ-2-120	80-120	25	18	0.3	0.7	3.0	1.5	M21	at	61.95
ZMSCQ-2-180	120-180	23	15	0.3	0.7	4.0	1.2	M21	at	61.95
ZSCQ-2-90	55-90	30	20	0.3	0.7	3.0	1.2	M22	at	54.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
ZAPDQ-4	5985-01-412-9064
ZMSCQ-2-250	5985-01-394-4982
ZFRSC-2050B	5985-01-310-5748
ZFRSC-2075	5985-01-266-6144
ZFRSC-42	5985-01-332-3083

* units are not QPL listed

pin and coaxial connections

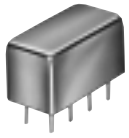
see case style outline drawings for pin connections

PORT	ar	at	au
SUM PORT	3	2	5
PORT 1	1	1	3
PORT 2	2	3	15
GND EXT.	—	—	1,2,4,8,9,12,13,14,16
CASE GND	—	—	1,2,4,8,9,12,13,14,16

608000

POWER SPLITTERS/COMBINERS 50Ω Plug-In

2 WAY-90° 0.42 MHz to 1875 MHz



PSCQ-2 / PQW-2

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PQW-2-90	30-90	27	20	0.3	0.6	3	1.0	A01	gy	29.95
PQW-2-270	90-270	20	17	0.4	0.7	4	1.4	A01	gy	31.95
PSCQ-2-0.455	0.42-0.51	30	25	0.1	0.5	3	1.2	A01	aw	27.95
PSCQ-2-1.25	1.13-1.38	29	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-3.4	3.0-3.8	30	25	0.4	0.7	3.8	1.2	A01	aw	21.95
PSCQ-2-4	3.5-4.5	36	25	0.4	0.7	3	1.5	A01	aw	15.95
PSCQ-2-7.5	7-8	35	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-8	2-8	36	27	0.3	0.7	6	0.5	A01	gx	51.95
PSCQ-2-10.5	9-11	25	20	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-13	12-14	29	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-14	12-16	30	25	0.3	0.6	3	1.8	A01	aw	21.95
PSCQ-2-21.4	20-23	30	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-26	14-30	25	20	0.4	0.7	3	1.5	A01	aw	25.95
PSCQ-2-32	3.2-32	32	25	0.4	0.8	5	0.4	A01	gx	91.95
PSCQ-2-40	23-40	21	18	0.3	0.7	3	1.5	A01	aw	21.95
PSCQ-2-50	25-50	30	20	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-70	40-70	30	20	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-70N	66-74	22	19	0.2	0.5	0.8	0.25	A01	aw	25.95
PSCQ-2-85A	55-85	35	20	0.3	0.6	3	0.6	A01	ax	26.95
PSCQ-2-90	55-90	30	20	0.3	0.7	3	1.2	A01	aw	25.95
PSCQ-2-120	80-120	25	18	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-160	100-160	24	19	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-180	120-180	23	15	0.3	0.7	4	1.2	A01	aw	25.95
PSCQ-2-250	150-250	30	22	0.4	0.8	4	1.5	A01	aw	25.95
PSCQ-2-400	250-400	23	16	0.5	0.9	4	1.5	A01	aw	25.95
PSCQ-2-450	350-450	23	16	0.5	0.9	5	1.5	A01	aw	25.95
PSCQ-2-550	450-550	19	15	0.4	0.7	5	1.5	A01	aw	25.95
PSCQ-2-1000	800-1000	27	20	0.28	0.6	3	1.3	A05	ax	27.95

NOTES:

◆ Aqueous washable. For non-aqueous requirements, LRPQ units available in case style QQQ130.
❑ Non-hermetic
* Protected under U.S. patent 6133525
** LRPQ units have bottom barrier ground plane insulated with glass barrier.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Matched power rating
models PSCQ-2-8,PSCQ-2-32 50mWatt
models SCPQ-10.5 0.5 Watt
all other models 1Watt
1b. Internal load dissipation 0.125 Watt

NSN GUIDE

MCL NO.	NSN
PSCQ-2-21.4	6625-01-415-3074
PSCQ-2-180	6625-01-186-4456
PSCQ-2-90	6625-01-160-0151
PSCQ-2-70	5985-01-292-8834
PSCQ-2-50	5895-01-374-0023
PSCQ-2-550	5895-01-347-0206

001130


ADPQ


JSPQ (BK343)


JSPQ (BK276)


JYPQ


LRPQ-J


RPQ


SCPQ


SYPQ

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW◆	ADPQ-2-250*	150-250	24	17	0.2	0.7	4	1.4	CD637	ay	9.95
◆	JSPQ-80	10-80	44	30	0.45	1.4	6	0.6	BK276	mq	19.95
◆	JSPQ-350	150-350	20	13	0.5	1.0	5	1.5	BK276	lu	14.95
◆	JSPQ-1875W	1325-1875	28	18	0.2	0.5	6	1.0	BK343	ja	17.95
◆	JSPQW-100	40-100	24	18	0.2	0.6	3	1.2	BK276	hm	14.95
NEW◆	JSPQW-100A	30-100	41	30	0.5	1.1	4	0.6	BK276	mq	19.95
NEW	JYPQ-16	10-16	43	25	0.2	0.6	4	0.9	BJ293	kx	19.95
	JYPQ-30	16-30	28	20	0.2	0.7	3	1.5	BJ293	kx	14.95
	JYPQ-160	105-160	24	17	0.25	0.6	3	1.5	BJ293	kx	14.95
◆	LRPQ-70J**	65-75	30	20	0.1	0.5	3	1	QQQ569	ay	9.95
◆	LRPQ-700J**	500-700	23	18	0.2	0.6	3	1.8	QQQ569	ay	9.95
◆	LRPQ-980J**	820-980	28	20	0.15	0.5	4	1	QQQ569	ay	13.95
◆	LRPQ-320J**	270-320	21	18	0.3	0.6	3	1.2	QQQ569	lr	10.95
	RPQ-820	760-860	22	15	0.15	0.7	4	1	TT240	gp	13.95
	RPQ-1495	1400-1600	18	14	0.3	0.8	5	1	TT240	gp	15.95
	SCPQ-10.5	9-11	31	20	0.15	0.7	3	1.2	YY101	aw	13.95
	SCPQ-21.4	20-23	32	25	0.15	0.5	2.5	1	YY101	aw	13.95
	SCPQ-50	25-50	25	20	0.15	0.7	3	1.5	YY101	aw	14.95
	SCPQ-60	30-60	30	20	0.15	0.7	3	1.5	YY101	aw	14.95
	SCPQ-85C	55-85	30	20	0.3	0.6	3	0.6	YY101	gy	14.95
	SCPQ-90	55-90	26	20	0.2	0.7	3	1.2	YY101	aw	13.95
	SCPQ-150	95-150	22	18	0.3	0.7	3	1.2	YY101	aw	14.95
	SCPQ-180	120-180	20	16	0.3	0.7	3	1.2	YY161	aw	13.95
	SCPQ-400	250-400	20	16	0.3	0.7	3	1.2	YY161	aw	14.95
	SYPQ-70	65-75	31	24	0.1	0.4	3	1.1	AH202	av	13.95

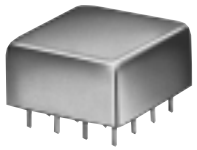
pin connections see case style outline drawings

PORT	av	aw	ax	ay	gp	gx	gy	hm	ja	kx	lu	lr	mq
SUM PORT	1	1	1	6	4	1	1	9	1	8	1	1	1
PORT 1	5	2	2	4	1	2	2(0°)	2(0°)	8	1	3(0°)	3	7
PORT 2	8	5	8	1	3	5	6(90°)	6(-90°)	14	4	12(90°)	6	8
GND EXT.	2,3,6,7	3,4,7,8	3,4,5,6 3,5,6	2,5	2,5	3,4,7,8 —	3,4,7,8	1,3,4,5,7,8 10,11,12,14	2,3,4,5,6,9 10,11,12,13	2,3,6,7	5,7,8,10	2,5	2,3,4,5,6,9 10,11,12,13,14
50 OHM TERM.	4	6	7	3	6	—	5	13	7	5	14	4	—
NOT USED	—	—	—	—	—	—	—	—	—	—	2,4,6,9,11,13	—	—

POWER SPLITTERS/COMBINERS 50Ω

2 WAY-0° RESISTIVE DC to 4200 MHz

ZFRSC



PRSC

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB M Typ.	ISOLATION dB U Typ.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	PHASE UNBALANCE Degrees M Max.	PHASE UNBALANCE Degrees U Max.	AMPLITUDE UNBALANCE dB L Max.	AMPLITUDE UNBALANCE dB M Max.	AMPLITUDE UNBALANCE dB U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
▲	ZFRSC-42	DC-4200	6.2	6.5	7.0	0.1	0.2	0.1	0.5	0.4	1.4	1	3	5	0.1	0.2	0.5	K18	ar	59.95
■	ZFRSC-2075	DC-2000	6.2	6.6	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1	2	5	0.1	0.2	0.5	K18	ar	59.95
	ZFRSC-2050	DC-2000	6.2	6.6	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1	2	5	0.1	0.2	0.5	K18	ar	59.95
	PRSC-2050	DC-2000	6.0	6.2	6.5	0.1	0.3	0.2	0.7	0.5	1.0	1	3	5	0.1	0.3	0.5	C145	au	31.95

L = DC to 100 MHz M = mid range [100 MHz to f_U/2] U = upper range [f_U/2 to f_U]

Above models are resistive power dividers to enable frequency coverage from dc to the highest rated frequency. Since resistive power dividers do not provide a high degree of isolation (basically isolation equals the insertion loss between ports), an amplifier such as Mini-Circuits' ZFL series is recommended when high isolation is required. Matched power rating 0.75W, internal load dissipation 0.375W.

NOTES:

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating,
model ZAPDQ 10 Watt
all other models 1 Watt

1b. Internal load dissipation, 0.125 Watt

001114

2 WAY-90° 25 to 4200 MHz

ZAPDQ

ZMSCQ-2

ZSCQ-2

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZAPDQ-2	1000-2000	22	16	0.4	1.4	6.0	0.8	F14	ar	79.95
ZAPDQ-4	2000-4200	22	16	0.4	0.9	8.0	1.0	F14	ar	79.95
ZMSCQ-2-50	25-50	30	20	0.3	0.7	3.0	1.5	M21	at	61.95
ZMSCQ-2-90	55-90	30	20	0.3	0.7	3.0	1.2	M21	at	61.95
ZMSCQ-2-120	80-120	25	18	0.3	0.7	3.0	1.5	M21	at	61.95
ZMSCQ-2-180	120-180	23	15	0.3	0.7	4.0	1.2	M21	at	61.95
ZSCQ-2-90	55-90	30	20	0.3	0.7	3.0	1.2	M22	at	54.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
ZAPDQ-4	5985-01-412-9064
ZMSCQ-2-250	5985-01-394-4982
ZFRSC-2050B	5985-01-310-5748
ZFRSC-2075	5985-01-266-6144
ZFRSC-42	5985-01-332-3083

* units are not QPL listed

pin and coaxial connections

see case style outline drawings for pin connections

PORT	ar	at	au
SUM PORT	3	2	5
PORT 1	1	1	3
PORT 2	2	3	15
GND EXT.	—	—	1,2,4,8,9,12,13,14,16
CASE GND	—	—	1,2,4,8,9,12,13,14,16

608000

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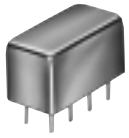
POWER SPLITTERS/COMBINERS 50Ω Plug-In

2 WAY-90° 0.42 MHz to 1875 MHz



PSCQ-2 / PQW-2

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PQW-2-90	30-90	27	20	0.3	0.6	3	1.0	A01	gy	29.95
PQW-2-270	90-270	20	17	0.4	0.7	4	1.4	A01	gy	31.95
PSCQ-2-0.455	0.42-0.51	30	25	0.1	0.5	3	1.2	A01	aw	27.95
PSCQ-2-1.25	1.13-1.38	29	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-3.4	3.0-3.8	30	25	0.4	0.7	3.8	1.2	A01	aw	21.95
PSCQ-2-4	3.5-4.5	36	25	0.4	0.7	3	1.5	A01	aw	15.95
PSCQ-2-7.5	7-8	35	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-8	2-8	36	27	0.3	0.7	6	0.5	A01	gx	51.95
PSCQ-2-10.5	9-11	25	20	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-13	12-14	29	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-14	12-16	30	25	0.3	0.6	3	1.8	A01	aw	21.95
PSCQ-2-21.4	20-23	30	25	0.4	0.7	3	1.2	A01	aw	15.95
PSCQ-2-26	14-30	25	20	0.4	0.7	3	1.5	A01	aw	25.95
PSCQ-2-32	3.2-32	32	25	0.4	0.8	5	0.4	A01	gx	91.95
PSCQ-2-40	23-40	21	18	0.3	0.7	3	1.5	A01	aw	21.95
PSCQ-2-50	25-50	30	20	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-70	40-70	30	20	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-70N	66-74	22	19	0.2	0.5	0.8	0.25	A01	aw	25.95
PSCQ-2-85A	55-85	35	20	0.3	0.6	3	0.6	A01	ax	26.95
PSCQ-2-90	55-90	30	20	0.3	0.7	3	1.2	A01	aw	25.95
PSCQ-2-120	80-120	25	18	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-160	100-160	24	19	0.3	0.7	3	1.5	A01	aw	25.95
PSCQ-2-180	120-180	23	15	0.3	0.7	4	1.2	A01	aw	25.95
PSCQ-2-250	150-250	30	22	0.4	0.8	4	1.5	A01	aw	25.95
PSCQ-2-400	250-400	23	16	0.5	0.9	4	1.5	A01	aw	25.95
PSCQ-2-450	350-450	23	16	0.5	0.9	5	1.5	A01	aw	25.95
PSCQ-2-550	450-550	19	15	0.4	0.7	5	1.5	A01	aw	25.95
PSCQ-2-1000	800-1000	27	20	0.28	0.6	3	1.3	A05	ax	27.95

NOTES:

◆ Aqueous washable. For non-aqueous requirements, LRPQ units available in case style QQQ130.
❑ Non-hermetic
* Protected under U.S. patent 6133525
** LRPQ units have bottom barrier ground plane insulated with glass barrier.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Matched power rating
models PSCQ-2-8,PSCQ-2-32 50mWatt
models SCPQ-10.5 0.5 Watt
all other models 1Watt
1b. Internal load dissipation 0.125 Watt

NSN GUIDE

MCL NO.	NSN
PSCQ-2-21.4	6625-01-415-3074
PSCQ-2-180	6625-01-186-4456
PSCQ-2-90	6625-01-160-0151
PSCQ-2-70	5985-01-292-8834
PSCQ-2-50	5895-01-374-0023
PSCQ-2-550	5895-01-347-0206

001130


ADPQ


JSPQ (BK343)


JSPQ (BK276)


JYPQ


LRPQ-J


RPQ


SCPQ


SYPQ

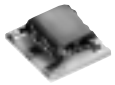
	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW◆	ADPQ-2-250*	150-250	24	17	0.2	0.7	4	1.4	CD637	ay	9.95
◆	JSPQ-80	10-80	44	30	0.45	1.4	6	0.6	BK276	mq	19.95
◆	JSPQ-350	150-350	20	13	0.5	1.0	5	1.5	BK276	lu	14.95
◆	JSPQ-1875W	1325-1875	28	18	0.2	0.5	6	1.0	BK343	ja	17.95
◆	JSPQW-100	40-100	24	18	0.2	0.6	3	1.2	BK276	hm	14.95
NEW◆	JSPQW-100A	30-100	41	30	0.5	1.1	4	0.6	BK276	mq	19.95
NEW	JYPQ-16	10-16	43	25	0.2	0.6	4	0.9	BJ293	kx	19.95
	JYPQ-30	16-30	28	20	0.2	0.7	3	1.5	BJ293	kx	14.95
	JYPQ-160	105-160	24	17	0.25	0.6	3	1.5	BJ293	kx	14.95
◆	LRPQ-70J**	65-75	30	20	0.1	0.5	3	1	QQQ569	ay	9.95
◆	LRPQ-700J**	500-700	23	18	0.2	0.6	3	1.8	QQQ569	ay	9.95
◆	LRPQ-980J**	820-980	28	20	0.15	0.5	4	1	QQQ569	ay	13.95
◆	LRPQ-320J**	270-320	21	18	0.3	0.6	3	1.2	QQQ569	lr	10.95
	RPQ-820	760-860	22	15	0.15	0.7	4	1	TT240	gp	13.95
	RPQ-1495	1400-1600	18	14	0.3	0.8	5	1	TT240	gp	15.95
	SCPQ-10.5	9-11	31	20	0.15	0.7	3	1.2	YY101	aw	13.95
	SCPQ-21.4	20-23	32	25	0.15	0.5	2.5	1	YY101	aw	13.95
	SCPQ-50	25-50	25	20	0.15	0.7	3	1.5	YY101	aw	14.95
	SCPQ-60	30-60	30	20	0.15	0.7	3	1.5	YY101	aw	14.95
	SCPQ-85C	55-85	30	20	0.3	0.6	3	0.6	YY101	gy	14.95
	SCPQ-90	55-90	26	20	0.2	0.7	3	1.2	YY101	aw	13.95
	SCPQ-150	95-150	22	18	0.3	0.7	3	1.2	YY101	aw	14.95
	SCPQ-180	120-180	20	16	0.3	0.7	3	1.2	YY161	aw	13.95
	SCPQ-400	250-400	20	16	0.3	0.7	3	1.2	YY161	aw	14.95
	SYPQ-70	65-75	31	24	0.1	0.4	3	1.1	AH202	av	13.95

pin connections see case style outline drawings

PORT	av	aw	ax	ay	gp	gx	gy	hm	ja	kx	lu	lr	mq
SUM PORT	1	1	1	6	4	1	1	9	1	8	1	1	1
PORT 1	5	2	2	4	1	2	2(0°)	2(0°)	8	1	3(0°)	3	7
PORT 2	8	5	8	1	3	5	6(90°)	6(-90°)	14	4	12(90°)	6	8
GND EXT.	2,3,6,7	3,4,7,8	3,4,5,6 3,5,6	2,5	2,5	3,4,7,8 —	3,4,7,8	1,3,4,5,7,8 10,11,12,14	2,3,4,5,6,9 10,11,12,13	2,3,6,7	5,7,8,10	2,5	2,3,4,5,6,9 10,11,12,13,14
50 OHM TERM.	4	6	7	3	6	—	5	13	7	5	14	4	—
NOT USED	—	—	—	—	—	—	—	—	—	—	2,4,6,9,11,13	—	—

POWER SPLITTERS/COMBINERS 50Ω

2 WAY-90° 380 MHz to 1460 MHz



HPQ

MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Typ.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Typ.	AMPLITUDE UNBALANCE dB Max.	VSWR (:1) S Typ.	VSWR (:1) OUT Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
HPQ-05	410 - 455	25	20	0.17	0.35	0.5	3	0.5	1.0	1.12	1.12	AT577	km	6.95
HPQ-05W	380 - 490	25	20	0.20	0.40	0.6	3	1.1	1.6	1.12	1.12	AT577	km	6.95
HPQ-06	510 - 570	26	18	0.20	0.40	0.6	3	0.5	1.2	1.10	1.12	AT577	km	6.95
HPQ-06W	480 - 600	26	18	0.20	0.40	0.6	3	0.9	1.6	1.10	1.12	AT577	km	6.95
HPQ-07	580 - 690	24	18	0.20	0.40	0.5	3	0.8	1.6	1.17	1.17	AT577	km	6.95
HPQ-08	680 - 790	24	18	0.25	0.40	0.8	3	0.6	1.6	1.10	1.20	AT577	km	6.95
HPQ-09	730 - 800	25	20	0.20	0.40	0.6	3	0.6	1.2	1.14	1.14	AT577	km	6.95
HPQ-09W	690 - 830	24	20	0.20	0.40	0.7	3	1.1	1.6	1.14	1.14	AT577	km	6.95
HPQ-10	900 - 970	22	17	0.25	0.45	0.7	4	0.5	1.2	1.17	1.17	AT577	km	6.95
HPQ-10W	880 - 1030	22	16	0.28	0.50	1.0	4	0.85	1.6	1.17	1.17	AT577	km	6.95
HPQ-11	980 - 1070	23	18	0.25	0.50	0.5	3.5	0.4	1.2	1.17	1.17	AT577	km	6.95
HPQ-12	990 - 1100	21	16	0.25	0.45	0.8	4	0.5	1.2	1.20	1.20	AT577	km	6.95
HPQ-12W	940 - 1130	21	16	0.30	0.50	1.0	4	0.8	1.6	1.20	1.20	AT577	km	6.95
HPQ-15	1320 - 1430	19	15	0.30	0.50	1.8	5	0.35	1.2	1.22	1.22	AT577	km	6.95
HPQ-15W	1240 - 1460	19	15	0.30	0.60	1.8	5	0.8	1.6	1.22	1.22	AT577	km	6.95

features

- excellent amplitude and phase unbalance
- good insertion loss
- good isolation
- excellent input VSWR
- excellent output VSWR
- excellent unit-to-unit repeatability

applications

- image rejection mixer
- wideband amplifier matching
- I&Q modulator

NOTES:

◆ HPQ models, aqueous washable.

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating 1Watt

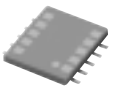
pin connections

see case style outline drawings

PORT	km
SUM PORT	3
PORT 1	6
PORT 2	4
GND EXT.	2,5
50 OHM TERM.	1
DEMO BOARD	TB-43

000324

800 MHz to 2400 MHz



QBA

BLUE CELL

MODEL NO.◆	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	✦INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB fL $\bar{x}$	fU $\bar{x}$	σ	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
QBA-12N*	800-900	28	20	0.25	0.30	.02	3.0	1.0	SM33	lf	6.95
QBA-12*	800-1200	23	14	0.25	0.44	.02	6.0	1.2	SM33	lf	6.95
QBA-20*	1800-2000	23	18	0.47	0.54	.02	4.0	0.7	SM33	lf	6.95
QBA-20W*	1500-2200	23	16	0.41	0.58	.02	5.0	1.2	SM33	lf	6.95
QBA-24*	1900-2400	21	17	0.54	0.71	.02	6.0	0.8	SM33	lf	6.95
QBA-24W*	1700-2400	21	15	0.49	0.71	.02	6.0	1.2	SM33	lf	6.95

✦ Includes test fixture losses.

features

- low insertion loss, 0.25 dB typ. (QBA-12N)
- high power capability (50 watts for QBA-12N)
- high isolation, 28 dB typ. (QBA-12N)
- ceramic body, good for heat dissipation
- solder plated leads for excellent solderability

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

applications

- cellular
- instrumentation
- PCN

NOTES:

◆ QBA models, aqueous washable.

* BLUE CELL™ power splitters protected by U.S. Patents 5534830 & 5640699

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating, as splitters
QBA-12N/-12, 50W max. below 25°C. Derate linearly to 10W at 85°C.
QBA-20/-20W, 25W max. below 25°C. Derate linearly to 5W at 85°C.
QBA-24/-24W, 20W max. below 25°C. Derate linearly to 4W at 85°C.

pin connections

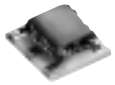
see case style outline drawings

PORT	lf
SUM PORT	1
PORT 1	10(0°)
PORT 2	6(-90°)
GND EXT.	2,3,4,7,8,9
50 OHM TERM.	5
NOT USED	—

001204

POWER SPLITTERS/COMBINERS 50Ω

2 WAY-90° 380 MHz to 1460 MHz



HPQ

MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE Degrees Typ.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Typ.	AMPLITUDE UNBALANCE dB Max.	VSWR (:1) S Typ.	VSWR (:1) OUT Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
HPQ-05	410 - 455	25	20	0.17	0.35	0.5	3	0.5	1.0	1.12	1.12	AT577	km	6.95
HPQ-05W	380 - 490	25	20	0.20	0.40	0.6	3	1.1	1.6	1.12	1.12	AT577	km	6.95
HPQ-06	510 - 570	26	18	0.20	0.40	0.6	3	0.5	1.2	1.10	1.12	AT577	km	6.95
HPQ-06W	480 - 600	26	18	0.20	0.40	0.6	3	0.9	1.6	1.10	1.12	AT577	km	6.95
HPQ-07	580 - 690	24	18	0.20	0.40	0.5	3	0.8	1.6	1.17	1.17	AT577	km	6.95
HPQ-08	680 - 790	24	18	0.25	0.40	0.8	3	0.6	1.6	1.10	1.20	AT577	km	6.95
HPQ-09	730 - 800	25	20	0.20	0.40	0.6	3	0.6	1.2	1.14	1.14	AT577	km	6.95
HPQ-09W	690 - 830	24	20	0.20	0.40	0.7	3	1.1	1.6	1.14	1.14	AT577	km	6.95
HPQ-10	900 - 970	22	17	0.25	0.45	0.7	4	0.5	1.2	1.17	1.17	AT577	km	6.95
HPQ-10W	880 - 1030	22	16	0.28	0.50	1.0	4	0.85	1.6	1.17	1.17	AT577	km	6.95
HPQ-11	980 - 1070	23	18	0.25	0.50	0.5	3.5	0.4	1.2	1.17	1.17	AT577	km	6.95
HPQ-12	990 - 1100	21	16	0.25	0.45	0.8	4	0.5	1.2	1.20	1.20	AT577	km	6.95
HPQ-12W	940 - 1130	21	16	0.30	0.50	1.0	4	0.8	1.6	1.20	1.20	AT577	km	6.95
HPQ-15	1320 - 1430	19	15	0.30	0.50	1.8	5	0.35	1.2	1.22	1.22	AT577	km	6.95
HPQ-15W	1240 - 1460	19	15	0.30	0.60	1.8	5	0.8	1.6	1.22	1.22	AT577	km	6.95

features

- excellent amplitude and phase unbalance
- good insertion loss
- good isolation
- excellent input VSWR
- excellent output VSWR
- excellent unit-to-unit repeatability

applications

- image rejection mixer
- wideband amplifier matching
- I&Q modulator

NOTES:

◆ HPQ models, aqueous washable.

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating 1Watt

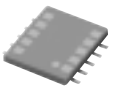
pin connections

see case style outline drawings

PORT	km
SUM PORT	3
PORT 1	6
PORT 2	4
GND EXT.	2,5
50 OHM TERM.	1
DEMO BOARD	TB-43

000324

800 MHz to 2400 MHz



QBA

BLUE CELL

MODEL NO.◆	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	✦INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB fL $\bar{x}$	fU $\bar{x}$	σ	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
QBA-12N*	800-900	28	20	0.25	0.30	.02	3.0	1.0	SM33	If	6.95
QBA-12*	800-1200	23	14	0.25	0.44	.02	6.0	1.2	SM33	If	6.95
QBA-20*	1800-2000	23	18	0.47	0.54	.02	4.0	0.7	SM33	If	6.95
QBA-20W*	1500-2200	23	16	0.41	0.58	.02	5.0	1.2	SM33	If	6.95
QBA-24*	1900-2400	21	17	0.54	0.71	.02	6.0	0.8	SM33	If	6.95
QBA-24W*	1700-2400	21	15	0.49	0.71	.02	6.0	1.2	SM33	If	6.95

✦ Includes test fixture losses.

features

- low insertion loss, 0.25 dB typ. (QBA-12N)
- high power capability (50 watts for QBA-12N)
- high isolation, 28 dB typ. (QBA-12N)
- ceramic body, good for heat dissipation
- solder plated leads for excellent solderability

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

applications

- cellular
- instrumentation
- PCN

NOTES:

◆ QBA models, aqueous washable.

* BLUE CELL™ power splitters protected by U.S. Patents 5534830 & 5640699

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating, as splitters
QBA-12N/-12, 50W max. below 25°C. Derate linearly to 10W at 85°C.
QBA-20/-20W, 25W max. below 25°C. Derate linearly to 5W at 85°C.
QBA-24/-24W, 20W max. below 25°C. Derate linearly to 4W at 85°C.

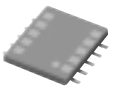
pin connections

see case style outline drawings

PORT	If
SUM PORT	1
PORT 1	10(0°)
PORT 2	6(-90°)
GND EXT.	2,3,4,7,8,9
50 OHM TERM.	5
NOT USED	—

001204

800 MHz to 2400 MHz



QBA

BLUE CELL

MODEL NO.◆	FREQ. RANGE MHz f_L-f_U	ISOLATION dB Typ.	ISOLATION dB Min.	✦INSERTION LOSS, dB Avg. of Coupled Outputs less 3 dB fL $\bar{x}$	fU $\bar{x}$	σ	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE dB Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
QBA-12N*	800-900	28	20	0.25	0.30	.02	3.0	1.0	SM33	lf	6.95
QBA-12*	800-1200	23	14	0.25	0.44	.02	6.0	1.2	SM33	lf	6.95
QBA-20*	1800-2000	23	18	0.47	0.54	.02	4.0	0.7	SM33	lf	6.95
QBA-20W*	1500-2200	23	16	0.41	0.58	.02	5.0	1.2	SM33	lf	6.95
QBA-24*	1900-2400	21	17	0.54	0.71	.02	6.0	0.8	SM33	lf	6.95
QBA-24W*	1700-2400	21	15	0.49	0.71	.02	6.0	1.2	SM33	lf	6.95

✦ Includes test fixture losses.

features

- low insertion loss, 0.25 dB typ. (QBA-12N)
- high power capability (50 watts for QBA-12N)
- high isolation, 28 dB typ. (QBA-12N)
- ceramic body, good for heat dissipation
- solder plated leads for excellent solderability

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

applications

- cellular
- instrumentation
- PCN

NOTES:

◆ QBA models, aqueous washable.

* BLUE CELL™ power splitters protected by U.S. Patents 5534830 & 5640699

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating, as splitters
QBA-12N/-12, 50W max. below 25°C. Derate linearly to 10W at 85°C.
QBA-20/-20W, 25W max. below 25°C. Derate linearly to 5W at 85°C.
QBA-24/-24W, 20W max. below 25°C. Derate linearly to 4W at 85°C.

pin connections

see case style outline drawings

PORT	lf
SUM PORT	1
PORT 1	10(0°)
PORT 2	6(-90°)
GND EXT.	2,3,4,7,8,9
50 OHM TERM.	5
NOT USED	—

001204

POWER SPLITTERS/COMBINERS 50 & 75Ω

2 WAY-180° 10 kHz to 2 GHz

SURFACE MOUNT

SCPJ PSCJ-2 ZFSCJ-2 ZAPDJ-2 ZMSCJ-2 ZSCJ-2

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	ISOLATION dB L Min.	ISOLATION dB M◆ Typ.	ISOLATION dB M◆ Min.	ISOLATION dB U Typ.	ISOLATION dB U Min.	INSERTION LOSS, dB Above 3dB L Typ.	INSERTION LOSS, dB Above 3dB L Max.	INSERTION LOSS, dB Above 3dB M◆ Typ.	INSERTION LOSS, dB Above 3dB M◆ Max.	INSERTION LOSS, dB Above 3dB U Typ.	INSERTION LOSS, dB Above 3dB U Max.	PHASE UNBALANCE Degrees L Max.	PHASE UNBALANCE Degrees M◆ Max.	PHASE UNBALANCE Degrees U Max.	AMPLITUDE UNBALANCE dB L Max.	AMPLITUDE UNBALANCE dB M◆ Max.	AMPLITUDE UNBALANCE dB U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW	SCPJ-2-9	200-900			24	17					1.0	1.8				6			0.7		YY161	az	28.95
NEW	SCPJ-2-750	30-750	24	18	21	16	20	16	0.7	1.5	1.5	2.2	1.5	2.2	3	4	6	0.8	0.8	0.8	YY161	az	27.95
■	SCPJ-2-1W-75	10-500	30	25	27	20	22	16	1.0	1.5	1.1	1.6	1.5	2.2	3	4	6	0.3	0.5	0.9	YY161	az	26.95
**■	SCPJ-2-750-75	30-750	26	20	—	—	26	16	1.0	1.5	—	—	1.5	2.2	3	—	6	0.8	—	0.9	YY161	az	27.95
	PSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1	0.5	0.8	0.75	1.2	2	2.5	4	0.3	0.15	0.3	A01	az	25.95
	PSCJ-2-1W	100-600			30	20					1.0	1.9				6			0.5		A06	az	28.95
✣	PSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1*	2	2.5	0.1	0.1	0.2	A01	az	36.95
■	PSCJ-2-1-75	1-200	35	30	31	25	26	20	0.6	1.2	0.8	1.2	1.2	1.8	2	4	6	0.25	0.2	0.5	A01	az	25.95
	ZFSCJ-2-1	1-500	30	20	33	25	30	18	1	1.5	1	1.5	1	1.5	2	4	7	0.5	0.2	0.5	K18	as	59.95
▲✣	ZFSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1*	2	2.5	0.1	0.1	0.2	K18	as	57.95
	ZFSCJ-2-3	5-300	30	20	33	25	30	18	1	1.5	1	1.5	1	1.5	2	4	6	0.15	0.2	0.5	K18	as	49.95
▲	ZFSCJ-2-4	50-1000	30	20	—	—	25	18	1.2	1.9	—	—	1.6	2.4	6	—	7	0.6	—	0.6	K18	as	69.95
	ZMSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1	0.6	0.8	0.75	1.2	2	2.5	4	0.3	0.15	0.3	M21	at	57.95
✣	ZMSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1*	2	2.5	0.1	0.1	0.2	M21	at	67.95
	ZSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1	0.6	0.8	0.75	1.2	2	2.5	4	0.3	0.15	0.3	M22	at	51.95
✣	ZSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1*	2	2.5	0.1	0.1	0.2	M22	at	59.95
	ZAPDJ-2	1000-2000	22	18	22	18	22	18	1.3	1.8	1.3	1.8	1.3	1.8	6	6	6	0.8	0.8	0.8	F53	as	71.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

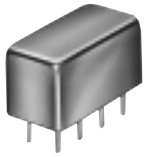
◆ Aqueous washable
❑ Non-hermetic
* Phase unbalance is 3 degrees max from fL to 3 fL.
** For SCPJ-2-750-75: L=30-375 MHz, U=375-750 MHz
✪ When only specification for M range given, specifications applied to entire frequency range.
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
▲ Available only with SMA connectors.
✣ At low range frequency band (fL to 10 fL), linearly derate maximum input power by 13 dB.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Matched power rating, 1 Watt, except models PSCJ-2-1W and SCPJ-2-1W-75, SCPJ-2-750, SCPJ-2-750-75, AMT-2 0.5 Watt
1b. Internal load dissipation 0.125 Watt

001128

2 WAY-0°/180° 5 to 200 MHz

SURFACE MOUNT

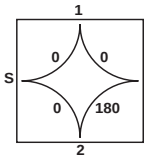
AMT



PMT

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 3dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10)
◆ AMT-2	50-200			35	20					0.8	1.2			2			0.3			CD636	ls	12.95
PMT-1	5-200	22	20	24	20	24	18	0.8	1.0	0.9	1.1	1.0	1.5	2	4	8	0.1	0.2	0.5	A04	ba	21.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]



- S-J ports, isolation 40 dB typical
- Inphase ports, S-1 and S-2, insertion loss 0.2 dB typical
- Amplitude unbalance defined by input S or J ports to output 1 and 2

pin and coaxial connections

see case style outline drawing

PORT	as	at	az	ba	ls
SUM PORT	S	2	1	1	3
PORT 1	1	1	5	2	6
PORT 2	2	3	6	3	4
PORT J	—	—	—	4	1
GND EXT.	—	—	—	5,6,7,8	2,5
CASE GND	—	—	2,3,4,7,8	5,6,7,8	—

NSN GUIDE

MCL NO.	NSN
PSCJ-2-1	6625-01-413-2386
PSCJ-2-2	5985-01-332-3084
ZSCJ-2-2	5895-01-340-7761

001113

POWER SPLITTERS/COMBINERS 50&75Ω

3 WAY-0° 10 kHz to 4.2 GHz

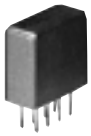
SURFACE MOUNT

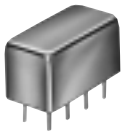

ADPS


JPS


LRPS-J


SCP


MSC-3


PSC-3


ZN3PD

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 4.8dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	AD3PS-1	1-300	40	23	35	20	27	18	0.3	0.8	0.4	1.0	0.8	1.5	1	4	6	0.2	0.3	0.5					CJ725	ma	9.95***
NEW	JPS-3-1	5-300	34	25	33	23	32	20	0.3	0.6	0.3	0.7	0.5	1.4	2	4	6	0.4	0.4	0.6					BH292	jg	13.95
			L2		U2				L2				U2			L2	U2		L2	U2						
	JPS-3-1W	50-750	23	17	26	17			0.4	1.0	0.9	1.4			6	7		0.3	0.6						BH292	jg	14.95
	MSC-3-1W	50-750	22	18	22	17			0.4	1.0	0.9	1.5			4	7		0.4	0.7						A03	jq	21.95
◆	LRPS-3-1J	10-300	25	20	25	20	25	20	0.2	0.6	0.3	0.8	0.5	1.2	2	3	4	0.1	0.3	0.7	see Yoni for				QQQ569	gt	19.95
◆	LRPS-3-850J	500-850			23	16					0.7	1.6				8			0.9						QQQ569	hc	16.95
	SCP-3-1	1-300	30	25	25	20	20	15	0.3	0.6	0.4	0.8	0.7	1.5	1	2	4	0.1	0.15	0.5	Performance				YY101	bd	16.95
	PSC-3-1	1-200	45	30	40	30	40	25	0.6	1.0	0.4	0.7	0.6	1	1	2	4	0.15	0.2	0.3	Data and				A01	bb	25.95
	PSC-3-1A	1-300	38	30	33	23	29	22	0.2	0.5	0.2	0.7	0.6	1.5	1	3	5	0.2	0.3	0.6	curves				A01	bb	28.95
	PSC-3-1W	5-500	25	20	31	15	25	15	0.4	0.8	0.4	1.4	0.8	1.4	2	3	5	0.1	0.3	0.6					A01	bc	37.95
✣	PSC-3-2	0.01-30	35	30	40	25	30	25	0.25	0.45	0.15	0.45	0.45	0.75	1	2	4	0.2	0.3	0.4					A01	bb	37.95
■	PSC-3-1-75	1-200	35	23	35	25	35	25	0.6	1.0	0.3	0.7	0.6	1	2	3	4	0.15	0.2	0.3						bb	25.95
	PSC-3-13	1-200	45	35	45	30	37	30	0.25	0.5	0.35	0.6	0.35	0.8	1	3	4	0.1	0.2	0.2					A01	bb	31.95
	PSC-3-13-39	0.5-50	47	33	46	35	40	33	0.15	0.4	0.15	0.4	0.15	0.4	1	1	2	0.1	0.1	0.1					A01	bb	31.95
	ZN3PD-900	800-900			30	20					0.2	0.4				—			0.5		1.09	1.30	1.09	1.30	UU181	be	74.95
	ZN3PD-900W	650-1050			22	15					0.3	0.8				—			0.8		1.09	1.80	1.09	1.30	UU181	be	69.95

L = low range [f_L to 10 f_L]
L_2 = (f_L to f_U/2)

M = mid range [10 f_L to f_U/2]
U_2 = (f_U/2 to f_U)

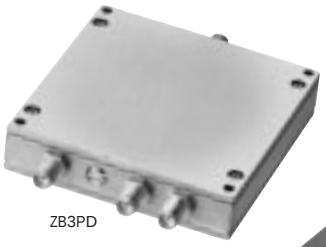
U = upper range [f_U/2 to f_U]

NOTES:

◆ Aqueous washable. For non-aqueous washable requirements, LRPS models available in case style QQQ130.
❑ Non-hermetic
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
✣ At low range frequency band (f_L to 10 f_L), linearly derate maximum input power by 13 dB.
✪ When specification for only M range given, specifications apply to entire frequency range.
*** Price for quantities 10-49.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Matched power rating, models ZA3PD, ZN3PD 10 Watt
model AD3PS-1 0.5 Watt
other models 1 Watt
1b. Internal load dissipation 0.375 Watt, except models JPS-3-1, JPS-3-1W, MSC-3-1W, ZFSC-3-4-75, 0.5 Watt.
AD3PS-1, ZB3PD-2400, 0.25 Watt

010712

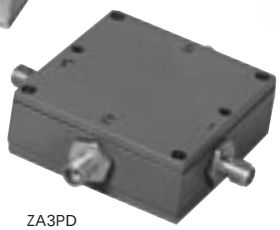
Surface Mount ❑, Plug-In & Coaxial


ZB3PD


ZCSC-3


ZSC-3


ZFSC-3


ZA3PD


ZMSC-3

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M* Typ.	M* Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 4.8dB L Typ.	L Max.	M* Typ.	M* Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M* Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M* Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
**	ZFSC-3-1	1-500	30	20	30	20	25	18	0.4	0.75	0.5	0.9	0.8	1.2	2	3	4	0.2	0.3	0.4	J17	be	51.95
	ZFSC-3-1W	2-750	30	20	30	20	25	18	0.4	0.75	0.5	1.0	1.0	1.6	3	5	7	0.2	0.3	0.5	J17	be	53.95
	ZFSC-3-13	1-200	45	30	48	35	37	30	0.25	0.5	0.35	0.6	0.35	0.6	1	3	5	0.1	0.2	0.2	J17	be	51.95
	ZFSC-3-4	1-1000	35	20	20	18	20	17	0.2	0.5	0.7	1.4	1.0	2.0	3	6	10	0.2	0.4	0.9	J17	be	59.95
■	ZFSC-3-4-75	1-1000	34	22	27	17	23	15	0.2	0.5	0.4	1.2	1.2	2.0	3	6	10	0.5	0.7	0.9	J17	be	59.95
NEW	ZB3PD-2400W	700-2400			25	17					0.5	1.2				8			0.9		UU182	mw	99.95
	ZA3PD-1	500-1000	20	14	20	14	20	14	0.3	0.6	0.3	0.6	0.3	0.6	—	—	—	0.4	0.4	0.4	CC51	be	89.95
	ZA3PD-1.5	750-1500	20	14	20	14	20	14	0.3	0.7	0.3	0.7	0.3	0.7	—	—	—	0.4	0.4	0.4	CC51	be	89.95
	ZA3PD-2	1000-2000	20	15	20	15	20	15	0.3	0.6	0.3	0.6	0.3	0.6	—	—	—	0.3	0.3	0.3	CC51	be	89.95
	ZA3PD-4	2000-4200	18	14	18	14	18	14	0.7	1.0	0.7	1.0	0.7	1.0	—	—	—	0.9	0.9	0.9	CC51	be	89.95
	ZCSC-3-R3	2-300	32	28	31	28	32	22	0.3	0.8	0.4	1.0	0.8	1.2	1	2	3	0.1	0.3	0.3	UU233	be	43.95
	ZMSC-3-1	1-200	45	35	40	25	40	25	0.3	0.5	0.4	0.7	0.6	1	1	2	4	0.15	0.2	0.3	P26	be	57.95
	ZSC-3-1	1-200	45	30	40	25	40	25	0.3	0.5	0.4	0.7	0.6	1.0	1	2	4	0.15	0.2	0.3	P25	be	51.95
❖	ZSC-3-2*	0.01-30	35	30	40	25	30	25	0.25	0.45	0.15	0.45	0.45	0.75	1	2	4	0.2	0.3	0.4	P25	be	61.95
■	ZSC-3-1-75	1-200	35	30	35	25	35	25	0.6	1.0	0.4	0.7	0.6	1.0	2	3	4	0.15	0.2	0.3	P25	be	52.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections

see case style outline drawings

PORT	bb	bc	bd	be	gt	hc	jg	jq	ma	mw
SUM PORT	6	1	6	S	6	6	1	1	1	S
PORT 1	1	5	1	1	1	1	6	5	8	1
PORT 2	2	7	2	2	2	3	4	6	5	2
PORT 3	5	8	5	3	3	4	3	2	4	4
NOT USED	—	—	—	—	—	—	—	—	—	3
GND EXT.	3,4,7,8	2,3,4,6	3,4,7,8	—	4,5	2,5	2,5	3,4,7,8	2,3,6,7	—
CASE GND	3,4,7,8	2,3,4,6	—	—	—	—	—	3,4,7,8	—	—

MIL-P-23971/15, NSN GUIDE

MCL NO.	NSN
PSC-3-1	6625-01-015-6027
PSC-3-1W	5985-01-295-5898
PSC-3-13	6625-01-249-8011
ZA3PD-2	5895-01-357-3919
ZFSC-3-1(SMA)	5895-01-361-8520
ZFSC-3-1	6625-01-235-6873
ZFSC-3-13	5895-01-335-1824
ZFSC-3-13(SMA)	5985-01-409-0884
ZFSC-3-4(SMA)	6625-01-333-1126
ZFSC-3-4(BNC)	6625-01-454-7617
ZMSC-3-1B(SMA)	6625-01-170-0102
ZSC-3-1	6625-01-327-4755
ZSC-3-1B(BNC)	6625-01-008-9566
ZSC-3-2BR	5985-01-315-2870
ZSC-3-2B(BNC)	5820-01-120-9320

010525

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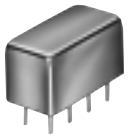
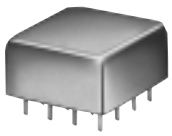
POWER SPLITTERS/COMBINERS 50&75Ω Plug-In

4 WAY-0° 10 kHz to 1000 MHz



PSC-4



PSC-4A

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	PSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1	4	6	8	0.15	0.2	0.25	A01	bf	37.95
	PSC-4-1W	1-500	29	20	27	18	25	18	0.4	0.8	0.5	1	0.8	1.5	1	3	5	0.2	0.3	0.5	A01	bf	40.95
■	PSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.9	0.7	1.2	2	3	4	0.15	0.2	0.3	A01	bf	34.95
	PSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	8	0.15	0.2	0.25	A01	bf	33.95
	PSC-4-5	1-800	29	20	24	18	25	17	0.4	0.8	0.6	1.5	1.3	2.5	1	4	5	0.2	0.5	0.6	A01	bf	47.45
❖	PSC-4-6	0.01-40	35	18	32	25	25	18	0.4	0.8	0.3	0.5	0.5	1	2	2	2	0.1	0.15	0.2	A01	bf	38.95
	PSC-4A-4	10-1000	25	20	21	15	18	15	0.5	0.8	0.8	1.8	1.5	2.5	4	16	20	0.2	0.5	0.7	C07	bg	64.95
✛■	PSC-4A-1W-75	30-600	27	20	—	—	22	18	0.6	0.8	—	—	0.8	1.1	2	—	5	0.2	—	5	C07	bg	51.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:
- ◆ Aqueous washable.
- ❑ Non-hermetic
- ■ Denotes 75 Ohm model
- ✪ When only specification for M range given, specification applies to entire frequency range.
- ❖ At low range frequency band (f_L to 10f_L), linearly derate maximum power by 13 dB.
- ✛ Maximum VSWR: input 1.5:1, output 1.3:1
- * BLUE CELL™ power splitters protected by U.S patents 5,534,830 and 5,640,132
- ✧ 18 dB min. above 900 MHz for BP4C and above 1900 MHz for BP4P
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
- C. Prices and specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current ratings:
  - 1a. Matched power rating,
    - Model JS4PS-1W-75 0.250 Watt
    - Models PSC-4-5, PSC-4-1W, SCP-4-1W-75, 0.5 Watt
    - JS4PS-9-75, AD4PS-1 0.5 Watt
    - Models BP4C, BP4P 1.5 Watt
    - Model SBD-4-25 10 Watt
    - All other models 1 Watt
  - 1b. Internal load dissipation,
    - Model JS4PS-1, JS4PS-9-75 0.5 Watt
    - Models SCP-4-1W-75, SCP-4-4-75, 0.375 Watt
    - BP4C, BP4P, SBD-4-25 0.375 Watt
    - All other models 0.250 Watt

BLUE CELL™ TECHNOLOGY

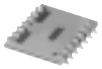
Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

001114

1 to 2600 MHz


ADPS


BP


SBD


JS4PS


SCP

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
◆	AD4PS-1	1-500	32	18	30	20	25	18	0.4	1.2	0.5	1.2	0.8	1.8	2	5	7	0.4	0.5	0.8	CJ725	kb	14.95
◆	BP4C	810-960			25	19✧					1.0	1.5				8			0.6		XX211	js	1.99
◆	BP4P	1710-1990			23	19✧					0.8	1.3				15			0.5		XX211	js	1.79
◆	SBD-4-25	**1800-2600**			**20**	**12**					**1.0**	**1.9**				**8**			**0.7**		SM34	lj	9.95
		1800-2000			18	12					0.9	1.4				6			0.4				
		2100-2200			21	15					0.9	1.4				6			0.4				
		2200-2400			22	15					1.0	1.6				7			0.6				
		2400-2500			22	16					1.0	1.8				7			0.7				
																							Qty. (1-9)
◆	JS4PS-1	80-520			36	20					0.8	1.5				5			0.5		BJ360	kb	19.95
◆■	JS4PS-1W-75	5-750	34	25	35	25	30	18	0.6	1.2	0.6	1.5	0.8	1.5	3	5	6	0.2	0.3	0.6	BJ360	kb	18.95
◆■	JS4PS-9-75	50-860			25	16					0.6	1.9				5			0.8		BJ360	kb	20.95
	SCP-4-1	1-400	32	23	26	18	21	17	0.4	1.2	0.6	1.2	1.0	1.5	1	4	9	0.2	0.3	0.5	YY101	bv	24.95
	SCP-4-1W	10-650	34	28	23	18	21	15	0.7	1.0	0.9	1.5	1.1	1.9	3	7	12	0.2	0.4	0.7	YY101	bv	26.95
■	SCP-4-1W-75	10-750	36	20	32	20	24	15	0.5	1.0	0.65	1.3	0.8	2.0	1.5	3	6	0.2	0.4	0.9	YY161	bv	27.95
	SCP-4-4	800-1000			24	17					0.7	1.5				12			1.0		YY101	bv	21.95
■	SCP-4-4-75	10-1000	36	20	32	18	24	14	0.5	1.0	0.65	1.3	0.8	2.0	3	6	12	0.2	0.4	0.9	YY161	bv	28.95

BLUE CELL

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections

see case style outline drawing

PORT	bf	bg	bv	js	kb	lj
SUM PORT	4	2	3	2	2	4
PORT 1	7	8	2	1	8	8
PORT 2	8	12	4	8	7	10
PORT 3	1	5	6	5	6	12
PORT 4	2	9	8	4	5	14
GND EXT.	3,5,6	All other pins	1,5,7	3,6,7	1,3,4	2,3,5,6,9,13
CASE GND	3,5,6	All other pins	—	—	—	—
NOT USED	—	—	—	—	—	1,7,11

NSN GUIDE

MCL NO.	NSN	MIL-P-23971/15*
PSC-4-1	5895-01-065-0106	-10
PSC-4-2	5825-01-044-8945	
PSC-4-3	5895-01-105-6189	-11
PSC-4-5	5985-01-423-7929	
PSC-4-6	5985-01-332-3086	
PSC-4A-4	5895-01-347-0205	

010925

POWER SPLITTERS/COMBINERS 50&75Ω

4 WAY-0° 2 kHz to 8.4 GHz


ZBSC-4


ZFSC-4


ZMSC-4


ZSC-4

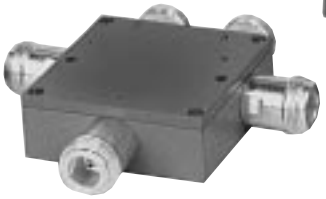
MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZBSC-413	10-800	26	20	18	15	18	15	0.6	1	1	1.5	1.6	2	4	8	8	0.2	0.4	0.6	UU102	bh	99.95
ZFSC-4-1	1-1000	25	20	23	18	20	15	0.4	1.2	0.6	1.5	1.6	2.5	4	8	8	0.2	0.4	0.7	G15	bh	89.95
ZFSC-4-1W	10-500	23	20	23	20	23	20	0.6	1.5	0.6	1.5	0.6	1.5	4	8	8	0.2	0.3	0.4	G15	bh	84.95
ZFSC-4-3	10-300	32	28	38	30	38	30	0.5	0.8	0.6	0.9	0.9	1.2	4	6	8	0.1	0.1	0.2	G15	bh	78.95
■ ZFSC-4375	50-90	34	30	34	30	34	30	0.3	0.8	0.3	0.8	0.3	0.8	4	6	8	0.15	0.15	0.15	G15	bh	89.95
■ ZFSC-4-175	10-1000	35	25	38	20	22	18	0.5	0.8	0.6	1.2	0.9	2	—	—	—	0.2	0.3	0.6	G15	bh	89.95
■ ZFSC-4-175W	5-1000	34	22	36	22	27	20	0.5	0.8	0.5	1.2	0.9	1.9	1	3	5	0.2	0.2	0.5	G15	bh	89.95
ZMSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	N24	bh	66.95
✣ ZMSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	N24	bh	76.95
ZMSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	N24	bh	64.95
ZSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	N27	bh	59.95
■ ZSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.8	0.7	1.2	4	6	10	0.15	0.20	0.30	N27	bh	59.95
✣ ZSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	N27	bh	74.95
ZSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	N27	bh	56.95
■ ZSC-4-3-75	0.25-250	28	20	30	20	27	20	0.4	0.8	0.3	0.7	0.5	1.0	1	2	3	0.15	0.20	0.25	N27	bh	56.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
✪ When specification for only M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors.
✣ At low range frequency band (f_L to 10f_L), linearly derate maximum power by 13 dB.
* Maximum VSWR: input 1.5:1, output 1.3:1

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating,
   Models ZA4PD, ZB4PD, ZB4PD1(except -500-75), ZN4PD, ZC4PD 10W
   Model ZC4PD-18 5 W
   All other models 1W
   1b. Internal load dissipation,
   Model ZB4PD-1750-75 0.750W
   Models ZA4PD, ZB4PD-4, ZB4PD, ZB4PD1, ZN4PD, ZC4PD 0.375W
   ZFSC-4-175W 0.5W
   All other models 0.250W



ZA4PD

ZB4PD
ZB4PD1

ZC4PD

ZN4PD

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZA4PD-2	1000-2000			25	16				0.3		1.0				6			0.70						DD52	bh	89.95
ZA4PD-4	2000-4200			25	16				0.5		1.0				16			0.80						DD52	bh	89.95
■ ZB4PD-1750-75	875-1750			30	20				0.4		0.8				3			0.40		1.08	1.50	1.25	1.50	UU188	bh	99.95
ZB4PD-42	1700-4200			23	16				0.5		1.4				8			0.80						Z54	bh	99.95
ZB4PD-4	3700-4200			24	15				0.6		1.1				8			0.80						Z54	bh	94.95
▲ ZB4PD-6.4	5400-6800			25	18				0.6		1.2				9			0.90		1.15	1.30	1.10	1.30	UU188	bh	99.95
ZB4PD1-500	5-500	34	20	34	20	28	20	0.4	1.0	0.5	0.9	0.9	1.5	1	3	6	0.2	0.2	0.4					UU188	bh	79.95
■ ZB4PD1-500-75	5-500	34	20	34	20	30	20	0.45	1.0	0.6	0.9	1.0	1.5	1	3	6		0.20						UU188	bh	89.95
ZB4PD1-930	850-930			30	20					0.3	0.5				5			0.25		1.10	1.25	1.09	1.25	UU188	bh	99.95
ZB4PD1-930W	725-1050			22	15					0.3	0.8				5			0.40		1.20	1.80	1.10	1.30	UU188	bh	94.95
ZB4PD1-2000	800-2000			25	18					0.6	1.2				—			0.30		1.20	1.60	1.10	1.30	UU188	bh	94.95
ZB4PD1-5.8	4600-5800			25	16					0.4	0.9				5			0.40		1.10	1.60	1.15	1.55	UU188	bh	129.95
ZB4PD1-8.4	6700-8400			29	18					0.5	1.3				9			0.90		1.12	1.50	1.27	1.50	UU188	bh	149.95
ZC4PD-18	1000-1800			32	18					0.3	0.8				6			0.40		1.05	1.55	1.08	1.45	Z184	bh	91.95
ZC4PD-900	800-900			30	20					0.3	0.6				3			0.20		1.08	1.25	1.17	1.30	Z184	bh	89.95
ZN4PD-920	800-920			30	20					0.25	0.5				2			0.20		1.08	1.25	1.07	1.25	UU182	bh	84.95
ZN4PD-920W	670-1000			22	15					0.3	0.6				3			0.20		1.20	1.60	1.07	1.25	UU182	bh	79.95
ZN4PD-20	1800-2000			31	20					0.3	0.7				4			0.50						UU182	bh	89.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

coaxial connections

see case style outline drawing

PORT	bh
SUM PORT	S
PORT 1	1
PORT 2	2
PORT 3	3
PORT 4	4

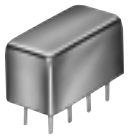
NSN GUIDE

MCL NO.	NSN
ZBSC-413(SMA)	5985-01-370-6145
ZFSC-4-1	6625-01-303-4623
ZFSC-4-1(SMA)	6625-01-303-4623
ZFSC-4-1A	5825-01-227-6681
ZFSC-4-1W(SMA)	5985-01-372-6418
ZFSC-4-1WB(SMA)	5985-01-364-1944
ZFSC-4-3B	5985-01-253-2843
ZMSC-4-1B	4935-01-229-3228
ZMSC-4-1BR	5895-01-451-0601
ZSC-4-1B	5820-00-270-3056
ZSC-4-1B(BNC)	6625-00-270-3056
ZSC-4-1B(TNC)	6625-01-109-3707
ZSC-4-1-75	5998-01-228-8995
ZSC-4-2BR	6625-01-357-2227
ZSC-4-2B(BNC)	5820-01-120-5238
ZSC-4-3B	6625-01-038-8553

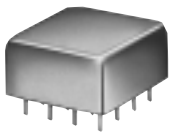
000324

POWER SPLITTERS/COMBINERS 50&75Ω Plug-In

4 WAY-0° 10 kHz to 1000 MHz



PSC-4



PSC-4A

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	PSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1	4	6	8	0.15	0.2	0.25	A01	bf	37.95
	PSC-4-1W	1-500	29	20	27	18	25	18	0.4	0.8	0.5	1	0.8	1.5	1	3	5	0.2	0.3	0.5	A01	bf	40.95
■	PSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.9	0.7	1.2	2	3	4	0.15	0.2	0.3	A01	bf	34.95
	PSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	8	0.15	0.2	0.25	A01	bf	33.95
	PSC-4-5	1-800	29	20	24	18	25	17	0.4	0.8	0.6	1.5	1.3	2.5	1	4	5	0.2	0.5	0.6	A01	bf	47.45
❖	PSC-4-6	0.01-40	35	18	32	25	25	18	0.4	0.8	0.3	0.5	0.5	1	2	2	2	0.1	0.15	0.2	A01	bf	38.95
	PSC-4A-4	10-1000	25	20	21	15	18	15	0.5	0.8	0.8	1.8	1.5	2.5	4	16	20	0.2	0.5	0.7	C07	bg	64.95
✛■	PSC-4A-1W-75	30-600	27	20	—	—	22	18	0.6	0.8	—	—	0.8	1.1	2	—	5	0.2	—	5	C07	bg	51.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:
- ◆ Aqueous washable.
- ❑ Non-hermetic
- ■ Denotes 75 Ohm model
- ✪ When only specification for M range given, specification applies to entire frequency range.
- ❖ At low range frequency band (f_L to 10f_L), linearly derate maximum power by 13 dB.
- ✛ Maximum VSWR: input 1.5:1, output 1.3:1
- * BLUE CELL™ power splitters protected by U.S patents 5,534,830 and 5,640,132
- ✧ 18 dB min. above 900 MHz for BP4C and above 1900 MHz for BP4P
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
- C. Prices and specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current ratings:
  - 1a. Matched power rating,
    - Model JS4PS-1W-75 0.250 Watt
    - Models PSC-4-5, PSC-4-1W, SCP-4-1W-75, 0.5 Watt
    - JS4PS-9-75, AD4PS-1 0.5 Watt
    - Models BP4C, BP4P 1.5 Watt
    - Model SBD-4-25 10 Watt
    - All other models 1 Watt
  - 1b. Internal load dissipation,
    - Model JS4PS-1, JS4PS-9-75 0.5 Watt
    - Models SCP-4-1W-75, SCP-4-4-75, 0.375 Watt
    - BP4C, BP4P, SBD-4-25 0.375 Watt
    - All other models 0.250 Watt

BLUE CELL™ TECHNOLOGY

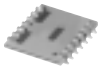
Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

001114

1 to 2600 MHz


ADPS


BP


SBD


JS4PS


SCP

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
◆ AD4PS-1	1-500	32	18	30	20	25	18	0.4	1.2	0.5	1.2	0.8	1.8	2	5	7	0.4	0.5	0.8	CJ725	kb	14.95
◆ BP4C	810-960			25	19✧					1.0	1.5				8			0.6		XX211	js	1.99
◆ BP4P	1710-1990			23	19✧					0.8	1.3				15			0.5		XX211	js	1.79
◆ SBD-4-25	**1800-2600**			**20**	**12**					**1.0**	**1.9**				**8**			**0.7**		SM34	lj	11.95
BLUE CELL	1800-2000			18	12					0.9	1.4				6			0.4				
	2100-2200			21	15					0.9	1.4				6			0.4				
	2200-2400			22	15					1.0	1.6				7			0.6				
	2400-2500			22	16					1.0	1.8				7			0.7				
																						Qty. (1-9)
◆ JS4PS-1	80-520			36	20					0.8	1.5				5			0.5		BJ360	kb	19.95
◆■ JS4PS-1W-75	5-750	34	25	35	25	30	18	0.6	1.2	0.6	1.5	0.8	1.5	3	5	6	0.2	0.3	0.6	BJ360	kb	18.95
◆■ JS4PS-9-75	50-860			25	16					0.6	1.9				5			0.8		BJ360	kb	20.95
SCP-4-1	1-400	32	23	26	18	21	17	0.4	1.2	0.6	1.2	1.0	1.5	1	4	9	0.2	0.3	0.5	YY101	bv	24.95
SCP-4-1W	10-650	34	28	23	18	21	15	0.7	1.0	0.9	1.5	1.1	1.9	3	7	12	0.2	0.4	0.7	YY101	bv	26.95
■ SCP-4-1W-75	10-750	36	20	32	20	24	15	0.5	1.0	0.65	1.3	0.8	2.0	1.5	3	6	0.2	0.4	0.9	YY161	bv	27.95
SCP-4-4	800-1000			24	17					0.7	1.5				12			1.0		YY101	bv	21.95
■ SCP-4-4-75	10-1000	36	20	32	18	24	14	0.5	1.0	0.65	1.3	0.8	2.0	3	6	12	0.2	0.4	0.9	YY161	bv	28.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections

see case style outline drawing

PORT	bf	bg	bv	js	kb	lj
SUM PORT	4	2	3	2	2	4
PORT 1	7	8	2	1	8	8
PORT 2	8	12	4	8	7	10
PORT 3	1	5	6	5	6	12
PORT 4	2	9	8	4	5	14
GND EXT.	3,5,6	All other pins	1,5,7	3,6,7	1,3,4	2,3,5,6,9,13
CASE GND	3,5,6	All other pins	—	—	—	—
NOT USED	—	—	—	—	—	1,7,11

NSN GUIDE

MCL NO.	NSN	MIL-P-23971/15*
PSC-4-1	5895-01-065-0106	-10
PSC-4-2	5825-01-044-8945	
PSC-4-3	5895-01-105-6189	-11
PSC-4-5	5985-01-423-7929	
PSC-4-6	5985-01-332-3086	
PSC-4A-4	5895-01-347-0205	

010712

POWER SPLITTERS/COMBINERS 50&75Ω

4 WAY-0° 2 kHz to 8.4 GHz


ZBSC-4


ZFSC-4


ZMSC-4


ZSC-4

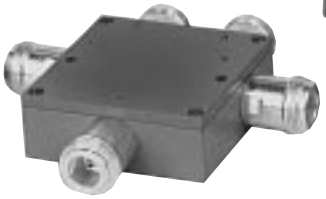
MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZBSC-413	10-800	26	20	18	15	18	15	0.6	1	1	1.5	1.6	2	4	8	8	0.2	0.4	0.6	UU102	bh	99.95
ZFSC-4-1	1-1000	25	20	23	18	20	15	0.4	1.2	0.6	1.5	1.6	2.5	4	8	8	0.2	0.4	0.7	G15	bh	89.95
ZFSC-4-1W	10-500	23	20	23	20	23	20	0.6	1.5	0.6	1.5	0.6	1.5	4	8	8	0.2	0.3	0.4	G15	bh	84.95
ZFSC-4-3	10-300	32	28	38	30	38	30	0.5	0.8	0.6	0.9	0.9	1.2	4	6	8	0.1	0.1	0.2	G15	bh	78.95
■ ZFSC-4375	50-90	34	30	34	30	34	30	0.3	0.8	0.3	0.8	0.3	0.8	4	6	8	0.15	0.15	0.15	G15	bh	89.95
■ ZFSC-4-175	10-1000	35	25	38	20	22	18	0.5	0.8	0.6	1.2	0.9	2	—	—	—	0.2	0.3	0.6	G15	bh	89.95
■ ZFSC-4-175W	5-1000	34	22	36	22	27	20	0.5	0.8	0.5	1.2	0.9	1.9	1	3	5	0.2	0.2	0.5	G15	bh	89.95
ZMSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	N24	bh	66.95
✣ ZMSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	N24	bh	76.95
ZMSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	N24	bh	64.95
ZSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	N27	bh	59.95
■ ZSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.8	0.7	1.2	4	6	10	0.15	0.20	0.30	N27	bh	59.95
✣ ZSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	N27	bh	74.95
ZSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	N27	bh	56.95
■ ZSC-4-3-75	0.25-250	28	20	30	20	27	20	0.4	0.8	0.3	0.7	0.5	1.0	1	2	3	0.15	0.20	0.25	N27	bh	56.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
✪ When specification for only M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors.
✣ At low range frequency band (f_L to 10f_L), linearly derate maximum power by 13 dB.
* Maximum VSWR: input 1.5:1, output 1.3:1

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating,
   Models ZA4PD, ZB4PD, ZB4PD1(except -500-75), ZN4PD, ZC4PD 10W
   Model ZC4PD-18 5 W
   All other models 1W
   1b. Internal load dissipation,
   Model ZB4PD-1750-75 0.750W
   Models ZA4PD, ZB4PD-4, ZB4PD, ZB4PD1, ZN4PD, ZC4PD 0.375W
   ZFSC-4-175W 0.5W
   All other models 0.250W



ZA4PD

ZB4PD
ZB4PD1

ZC4PD

ZN4PD

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 6dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZA4PD-2	1000-2000			25	16				0.3		1.0				6			0.70						DD52	bh	89.95
ZA4PD-4	2000-4200			25	16				0.5		1.0				16			0.80						DD52	bh	89.95
■ ZB4PD-1750-75	875-1750			30	20				0.4		0.8				3			0.40		1.08	1.50	1.25	1.50	UU188	bh	99.95
ZB4PD-42	1700-4200			23	16				0.5		1.4				8			0.80						Z54	bh	99.95
ZB4PD-4	3700-4200			24	15				0.6		1.1				8			0.80						Z54	bh	94.95
▲ ZB4PD-6.4	5400-6800			25	18				0.6		1.2				9			0.90		1.15	1.30	1.10	1.30	UU188	bh	99.95
ZB4PD1-500	5-500	34	20	34	20	28	20	0.4	1.0	0.5	0.9	0.9	1.5	1	3	6	0.2	0.2	0.4					UU188	bh	79.95
■ ZB4PD1-500-75	5-500	34	20	34	20	30	20	0.45	1.0	0.6	0.9	1.0	1.5	1	3	6		0.20						UU188	bh	89.95
ZB4PD1-930	850-930			30	20					0.3	0.5				5			0.25		1.10	1.25	1.09	1.25	UU188	bh	99.95
ZB4PD1-930W	725-1050			22	15					0.3	0.8				5			0.40		1.20	1.80	1.10	1.30	UU188	bh	94.95
ZB4PD1-2000	800-2000			25	18					0.6	1.2				—			0.30		1.20	1.60	1.10	1.30	UU188	bh	94.95
ZB4PD1-5.8	4600-5800			25	16					0.4	0.9				5			0.40		1.10	1.60	1.15	1.55	UU188	bh	129.95
ZB4PD1-8.4	6700-8400			29	18					0.5	1.3				9			0.90		1.12	1.50	1.27	1.50	UU188	bh	149.95
ZC4PD-18	1000-1800			32	18					0.3	0.8				6			0.40		1.05	1.55	1.08	1.45	Z184	bh	91.95
ZC4PD-900	800-900			30	20					0.3	0.6				3			0.20		1.08	1.25	1.17	1.30	Z184	bh	89.95
ZN4PD-920	800-920			30	20					0.25	0.5				2			0.20		1.08	1.25	1.07	1.25	UU182	bh	84.95
ZN4PD-920W	670-1000			22	15					0.3	0.6				3			0.20		1.20	1.60	1.07	1.25	UU182	bh	79.95
ZN4PD-20	1800-2000			31	20					0.3	0.7				4			0.50						UU182	bh	89.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

coaxial connections

see case style outline drawing

PORT	bh
SUM PORT	S
PORT 1	1
PORT 2	2
PORT 3	3
PORT 4	4

NSN GUIDE

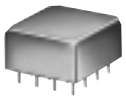
MCL NO.	NSN
ZBSC-413(SMA)	5985-01-370-6145
ZFSC-4-1	6625-01-303-4623
ZFSC-4-1(SMA)	6625-01-303-4623
ZFSC-4-1A	5825-01-227-6681
ZFSC-4-1W(SMA)	5985-01-372-6418
ZFSC-4-1WB(SMA)	5985-01-364-1944
ZFSC-4-3B	5985-01-253-2843
ZMSC-4-1B	4935-01-229-3228
ZMSC-4-1BR	5895-01-451-0601
ZSC-4-1B	5820-00-270-3056
ZSC-4-1B(BNC)	6625-00-270-3056
ZSC-4-1B(TNC)	6625-01-109-3707
ZSC-4-1-75	5998-01-228-8995
ZSC-4-2BR	6625-01-357-2227
ZSC-4-2B(BNC)	5820-01-120-5238
ZSC-4-3B	6625-01-038-8553

000324

POWER SPLITTERS/COMBINERS 50&75Ω

5 WAY-0° 1 MHz to 750 MHz

SURFACE MOUNT


PSC-5


SCP-5


AD5PS


ZBSC-5


ZFSC-5

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 7.0dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	AD5PS-1	1-400	35	18	25	20	27	20	0.15	0.5	0.3	1.0	0.8	1.8	1	6	9	0.3	0.4	0.6	CJ725	mb	19.95***
	PSC-5-1	1-300	25	20	23	18	20	17	0.2	0.5	0.6	1.0	1.5	2.0	2	4	8	0.2	0.3	0.6	C07	bj	64.45
	PSC-5-2	250-750			22	17					1.1	2.5				14			0.7		C07	gq	67.95
■	PSC-5-1-75	1-300	35	20	30	18	25	17	0.4	0.6	0.6	0.9	0.9	1.3	2	4	8	0.2	0.3	0.6	C07	bj	64.45
	SCP-5-1	2-200	30	20	29	20	30	20	0.2	0.5	0.3	0.75	0.6	1.5	1	3	5	0.2	0.3	0.6	YY161	md	26.95
	ZBSC-5-1	120-520			25	18					1.0	2.0				8			0.9		UU102	bm	119.95
	ZFSC-5-1	1-300	25	20	23	18	20	17	0.2	0.5	0.6	1.0	1.5	2.0	2	4	8	0.2	0.3	0.6	G15	bm	99.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

◆ Aqueous washable.

❑ Non-hermetic

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

✪ When only specification for M range given, specification applies to entire frequency range.

*** Price for quantities 10-49.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating:

Models ZB6PD, ZC6PD	10 Watt
Model PSC-5-2	2 Watt
Models AD5PS-1, AD6PS-1	0.5 Watt
Model JCPS-6-3	0.25 Watt
All other models	1 Watt

1b. Internal load dissipation:

Models ZB6PD, ZC6PD	0.875 Watt
ZB6PD-1700	0.750 Watt
Models PSC-5-2, SCP-5-1, ZBSC-5-1	0.625 Watt
Model AD5PS-1	0.40 Watt
All other models	0.5 Watt

NSN GUIDE

MCL NO.	NSN
PSC-5-1	6625-01-255-3143
ZFSC-6-1(BNC)	6625-01-225-6965
ZFSC-6-1(SMA)	6625-01-263-9871
PSC-6-1	6625-01-249-8012
ZBSC-615	6625-01-391-5026

011001

6 WAY-0° 1 MHz to 2 GHz

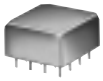

ZC6PD


ZB6PD

SURFACE MOUNT


AD6PS


JCPS


PSC-6


ZBSC-6


ZFSC-6

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 7.8dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	AD6PS-1	2-250	35	17	30	20	27	20	0.2	0.6	0.2	0.8	0.6	1.5	2	6	9	0.3	0.4	0.5					CJ725	mc	26.95***
◆	JCPS-6-3	75-425			23	18					0.9	1.8				9			0.7						BG291	mf	69.95
	PSC-6-1	1-175	30	24	26	18	26	18	0.5	0.8	0.7	1.0	1.0	1.5	4	6	12	0.2	0.4	0.8					C07	bk	74.95
■	PSC-6-1-75	1-300	35	25	30	23	25	18	0.6	1.2	0.6	1.1	0.6	1.3	2	4	8	0.2	0.3	0.6					C07	bk	78.95
	ZC6PD-960	890-960			30	20					0.4	0.8			—	—	—		0.4		1.20	1.50	1.10	1.50	AB185	bn	124.95
	ZC6PD-960W	700-1000			28	15					0.4	1.0			—	—	—		0.6		1.30	1.50	1.20	1.50	AB185	bn	119.95
	ZC6PD-1900	1700-1900			30	20					0.4	0.8			—	—	—		0.5		1.10	1.40	1.10	1.50	AB185	bn	134.95
	ZC6PD-1900W	1500-2000			30	15					0.5	1.0			—	—	—		0.6		1.10	1.68	1.10	1.50	AB185	bn	129.95
	ZBSC-611	10-200	28	22	26	20	23	20	0.5	0.8	0.7	1.0	0.9	1.2	4	5	6	0.2	0.3	0.5					UU102	bn	114.95
	ZBSC-615	1-500	30	25	26	18	24	18	0.5	0.8	0.7	1.2	1.0	2.2	4	8	20	0.2	0.4	1.2					UU102	bn	119.95
	ZB6PD1-900	800-900			32	20					0.3	0.7			—	—	—		0.5		1.10	1.50	1.13	1.35	UU187	bn	139.95
	ZB6PD1-960	890-960			35	20					0.3	0.8			—	—	—		0.6		1.10	1.30	1.10	1.30	UU187	bn	139.95
	ZB6PD1-1900	1700-1900			32	20					0.4	0.8			—	—	—		0.6		1.10	1.30	1.09	1.40	UU187	bn	149.95
	ZB6PD-2	800-2000			27	17					0.7	1.7			—	—	—		0.7		1.20	1.60	1.13	1.30	Z259	bn	158.95
	ZB6PD-17	600-1700			25	18					0.35	0.9				7			0.5		1.22	1.60	1.15	1.35	UU586	bn	139.95
	ZB6PD-1700	1500-1700			30	20					0.5	1.0			—	—	—		0.6		1.15	1.50	1.30	1.50	Z41	bn	149.95
	ZFSC-6-1	1-175	27	22	26	20	26	20	0.75	1.0	0.75	1.2	0.8	1.2	2	6	12	0.2	0.4	0.6					Q28	bn	99.95
■	ZFSC-6-1-75	1-200	30	25	30	22	20	18	0.75	1.0	0.75	1.0	0.9	1.2	2	6	12	0.2	0.4	0.6					Q28	bn	102.95
	ZFSC-6-110	1-500	35	25	26	20	25	20	0.5	0.8	0.6	1.1	1.0	1.7	2	6	12	0.3	0.3	0.8					Q28	bn	109.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections

see case style outline drawing for pin locations

PORT	bj	bk	bm	bn	gq	mb	mc	md	mf
SUM PORT	1	1	S	S (COM)	1	1	1	1	11
PORT 1	4	3	1	1	3	8	8	6	1
PORT 2	8	4	2	2	8	7	7	8	2
PORT 3	12	8	3	3	12	6	6	7	3
PORT 4	16	12	4	4	16	5	5	5	5
PORT 5	15	16	5	5	15	4	4	3	6
PORT 6	—	15	—	6	—	—	3	—	7
GND EXT.	2,5,7,11,13,14	2,5,7,11,13,14	—	—	2,5,7,11,13,14	2,3	2	2,4	all others
CASE GND	2,5,7,11,13,14	2,5,7,11,13,14	—	—	4,6,9,10	—	—	—	—
NOT USED	3,6,9,10	6,9,10	—	—	—	—	—	—	—

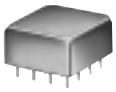
011001

POWER SPLITTERS/COMBINERS 50&75Ω

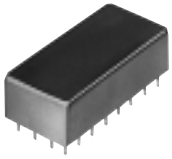
8 WAY-0° 10 kHz to 1000 MHz

SURFACE MOUNT

JCPS-8



PSC-8



PSC-8A

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 9dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆■	JCPS-8-10-75	5-1000	34	20	25	15	20	13	0.8	1.5	1.0	2.5	1.8	3.0	3	8	10	0.4	0.5	1.3	BG291	hn	71.95
◆■	JCPS-8-850-75	10-850	34	20	25	15	20	15	0.7	1.5	1.0	2.0	1.8	3.0	—	—	—	0.6	0.7	1.0	BG291	hn	69.95
◆	JCPS-8-850	10-850	34	20	25	17	20	15	0.8	1.5	1.0	2.5	1.8	3.0	5	10	15	0.6	0.7	1.0	BG291	hn	69.95
	PSC-8-1	0.5-175	30	25	30	20	25	18	0.8	1.2	0.8	1.2	1.0	1.6	1.0	2.5	5.0	0.2	0.3	0.5	C07	bp	74.95
	PSC-8-1W	10-600	25	20	23	16	20	16	1.0	1.8	1.2	2.2	1.7	2.8	2.0	4.0	10.0	0.3	0.6	0.9	C07	bp	109.95
■	PSC-8-1-75	0.5-175	25	20	30	20	25	20	0.5	1.0	0.6	1.1	0.7	1.3	1.0	2.5	5.0	0.2	0.2	0.3	C07	bp	78.95
✜	PSC-8-6	0.01-10	40	20	40	25	28	23	0.3	1.0	0.5	1.0	0.6	1.1	4.0	2.5	4.0	0.4	0.2	0.3	C07	bp	93.95
	PSC-8A-4	5-500	25	20	23	18	20	15	0.7	1.2	1.0	1.8	1.4	2.5	3.0	8.0	16.0	0.2	0.3	0.5	E10	bq	103.95
■	PSC-8A4-75	1-300	26	20	30	25	30	23	0.8	1.2	0.7	1.1	0.9	1.3	1.0	3.0	8.0	0.2	0.2	0.4	E10	br	93.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

◆ Aqueous washable
❑ Non-hermetic
* VSWR, input 1.06:1 typical, 1.2:1 max; output 1.17:1 typical, 1.35:1 max
** VSWR, input 1.22:1 typical, 1.5:1 max; output 1.11:1 typical, 1.30:1 max
*** VSWR, input 1.25:1 typical, 1.8:1 max; output 1.10:1 typical 1.40:1 max
✜ Below 0.1 MHz power handling decrease as to typically 15 dBm at 0.01 MHz, 23 dBm at 0.025 MHz, and 29 dBm at 0.05 MHz.
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
✪ When specification for only M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Matched power rating,
Models ZB8PD, ZC8PD 10 Watt
All other models, 1 Watt
1b. Internal load dissipation,
Model ZC8PD1 2 Watt
Models JCPS-8-850/75, ZB8PD, ZC8PD 0.875 Watt
All other models, 0.62 Watt

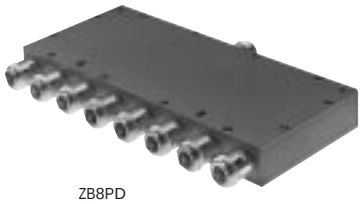
001127

500 kHz to 8.4 GHz


ZC8PD1


ZC8PD


ZCSC-8


ZB8PD


ZFSC-8

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 9dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZC8PD-900*	800-900			30	20					0.4	0.7				5.0			0.4		AB186	—	158.95
NEW	ZC8PD1-10	300-1000			27	17					0.6	1.4				8.0			0.7		DE749	—	169.95
	ZCSC-8-1	2-250	37	27	30	20	24	18	0.65	1.2	0.8	1.2	1.0	1.6	2.0	4.0	8.0	0.2	0.3	0.5	UU215	—	119.95
	ZFSC-8-1	0.5-175	30	25	30	20	25	18	0.8	1.2	0.8	1.2	1.0	1.6	1.0	2.5	5.0	0.2	0.2	0.3	R29	—	99.95
■	ZFSC-8-1-75	0.5-175	25	20	30	20	25	20	0.5	1.0	0.6	1.1	0.7	1.3	1.0	2.5	5.0	0.2	0.3	0.5	R29	—	102.95
■	ZFSC-8-4-75	5-1000	35	20	25	16	20	15	0.4	1.0	0.6	1.6	1.6	2.7	2.0	7.0	13.0	0.3	0.5	1.2	R29	—	139.95
■	ZFSC-84-75	1-300	26	20	30	25	30	23	0.8	1.5	0.7	1.1	0.9	1.5	4.0	3.0	8.0	0.2	0.2	0.4	R29	—	119.95
■	ZFSC-8375	50-90	30	25	30	25	25	25	1.0	1.0	1.0	1.3	1.3	1.3	2.0	2.0	2.0	0.2	0.2	0.2	R29	—	119.95
	ZFSC-8-4	5-700	35	20	25	17	20	17	0.8	1.2	1.2	1.8	1.8	2.5	2.0	5.0	15.0	0.2	0.4	0.7	R29	—	128.95
	ZFSC-8-43	10-1000	23	20	25	20	26	20	1.0	1.6	1.4	2.1	2.1	2.9	5.0	10.0	20.0	0.4	0.4	0.7	R29	—	138.95
	ZB8PD-1**	800-960			30	20					0.4	0.9				8.0			0.4		Z41	—	138.95
	ZB8PD-2	1000-2000			24	17					0.8	1.3				18.0			0.8		Z41	—	138.95
	ZB8PD-4	2000-4200			23	16					0.8	1.8				10.0			1.2		Z41	—	138.95
▲	ZB8PD-6.4	5600-6800			26	18					0.8	1.7				15.0			0.7		Z41	—	138.95
	ZB8PD-8.4	7200-8400			25	20					0.9	1.6				15.0			0.8		Z41	—	149.95
▲	ZB8PD-2000***	800-2000			26	18					0.8	1.7				—			0.7		Z41	—	149.95
■	ZB8PD-22-75	950-2200			24	16					0.7	1.6				—			0.7		Z41	—	189.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NSN GUIDE

MCL NO.	NSN
PSC-8-1	6625-01-365-5615
ZB8PD-4(SMA)	5985-01-372-8880
ZFSC-8-1(BNC)	5820-01-136-7244
ZFSC-8-1(SMA)	6620-01-223-1235
ZFSC-8-1-75	5895-01-326-8664
ZFSC-8-43(SMA)	6625-01-333-1125
ZFSC-8375	5895-01-229-0156

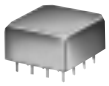
pin connections see case style outline drawings

PORT	SUM	#1	#2	#3	#4	#5	#6	#7	#8	NOT USED	GND EXT.	CASE GND
bp	2	1	5	9	13	16	12	8	4	10,11	3,6,7,14,15	3,6,7,14,15
bq	29	7	16	31	24	9	2	26	17	4,5,15	—	All other pins
br	29	7	16	31	24	9	2	26	17	15	—	All other pins
hn	1	3	4	5	6	9	10	11	12	—	2,7,8,13,14	2,7,8,13,14

010305

POWER SPLITTERS/COMBINERS 50Ω Plug-In & Coaxial

9 WAY-0° 2 to 1000 MHz



PSC-9

ZC9PD

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 9.6dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PSC-9-1	2-300	38	25	26	20	22	15	0.6	1.1	0.9	1.4	1.5	2.0	2.0	5.0	10.0	0.2	0.3	0.8	—	—	—	—	C07	gr	93.95
ZC9PD-1000	800-1000			30	20					0.6	1.2			—				0.6		1.22	1.60	1.11	1.30	AB204	—	169.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

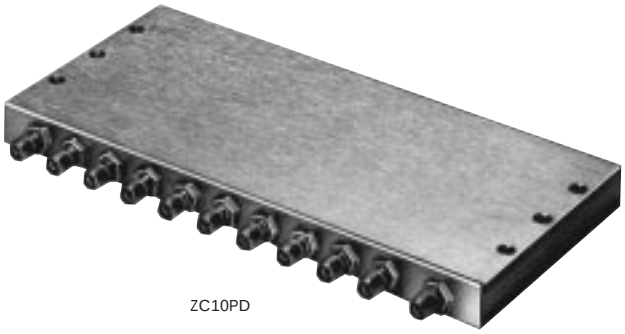
* VSWR, input 1.2:1 typ., 1.6:1 max; output 1.2:1 typ., 1.35:1 max.
** Input 1.3:1 typ., 1.7 max.; output 1.2:1 typ., 1.6:1 max.
✪ When only specification for M range given, specification applies to entire frequency range.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating,
   Models PSC-9-1, ZC9PD-1000 0.5 Watt
   Model ZC10PD 10 Watt
   All other models 1 Watt
   1b. Internal load dissipation,
   Models PSC-9-1, ZC9PD-1000, ZC10PD 1.5 Watt
   ZC10PD-26 0.80 Watt
   All other models 0.87 Watt

000330

10 WAY-0° 0.5 to 2600 MHz

PSC-10

ZFSC-10



ZC10PD

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 10dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M° Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PSC-10-1	1-150	36	23	27	23	23	18	0.3	0.6	0.4	0.8	1.0	1.3	3	6	10	0.2	0.3	0.4	E10	bs	85.95
ZFSC-10-1	0.5-100	28	20	30	24	27	20	0.5	0.8	0.4	1.0	0.8	1.5	3	6	10	0.2	0.3	0.4	RR93	—	119.95
ZC10PD-900	800-900			25	20					1.5	2.0				—			0.8		AB204	—	178.95
ZC10PD-900W*	750-900			30	20					0.4	1.0				—			0.6		AB204	—	189.95
NEW ZC10PD-26**	2300-2600			35	20					0.7	1.9				15			1.1		AB204	—	199.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections see case style outline drawings for pin locations

PORT	SUM	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	NOT USED	GND EXT.	CASE GND
bs	29	7	16	31	24	9	2	26	17	4	5	15	All other pins	All other pins
gr	1	9	13	14	15	16	12	8	4	3	—	—	All other pins	All other pins

000324

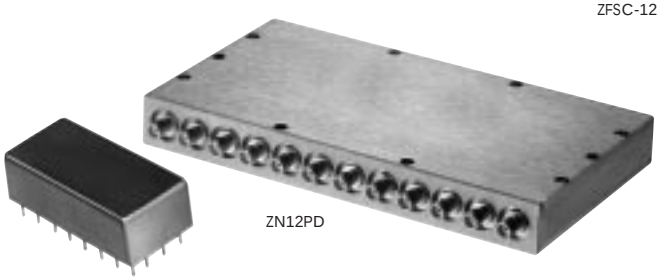
POWER SPLITTERS/COMBINERS 50&75Ω

12 WAY-0° 1 to 1700 MHz

ZFSC-12

SURFACE MOUNT

JEPS-12



PSC-12 ZN12PD

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 10.8dB L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE Degrees L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆ JEPS-12-10	50-1000	25	16	—	—	23	14	1.6	2.5	—	—	2.2	4.0	10	—	23	0.7	—	1.4	BL372	lx	109.95
PSC-12-1	1-200	35	30	27	20	21	18	0.5	0.8	0.8	1.2	1.0	1.4	4	8	16	0.2	0.4	0.7	E10	bu	88.95
ZN12PD-17	800-1700			30	18					0.45	1.2				14			0.7		UU589	—	249.00
ZFSC-12-1	1-200	30	25	35	20	28	20	0.8	1.2	1.1	1.4	1.3	1.6	4	8	16	0.3	0.2	0.3	R67	—	174.95
■ ZFSC-12-1W-75	5-860	33	22	30	20	26	18	0.5	1.2	0.8	2.5	1.6	4.2	2	8	20	0.7	0.8	1.5	R67	—	199.95
ZFSC-12-11	10-300	28	20	33	25	28	20	1.1	1.3	1.1	1.5	1.5	1.8	2	4	6	0.2	0.3	0.4	R67	—	174.95
■ ZFSC-12-1-75	10-200	35	27	—	—	27	20	0.5	0.8	—	—	0.8	1.3	—	—	—	0.25	—	0.4	R67	—	179.95
■ ZFSC-12-175	10-500	23	20	24	20	22	18	0.9	1.2	1.0	1.3	1.2	2.0	—	—	—	0.4	0.5	0.8	R67	—	197.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

◆ Aqueous washable
❑ Non-hermetic
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
✪ When only specification for M range given, specification applies to entire frequency range.
✣ At low range frequency band (f_L to 10 f_L), linearly derate maximum input power by 13 dB.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:

1a. Matched power rating,

Model ZC16PD	10 Watt
Model ZN12PD	5 Watt
Model ZC16PD-23	2 Watt
Model JEPS	0.5 Watt
All other models	1 Watt

1b. Internal load dissipation,

Model ZC16PD, ZC16PD-24	2.4 Watt
Model ZN12PD, ZC16PD-23	2 Watt
Model ZC16PD-2185	1.75 Watt
Model ZFSC-12-1W-75	1.5 Watt
Model JEPS	0.275 Watt
All other models	0.87 Watt

NSN GUIDE

MCL NO.	NSN
ZFSC-16-1(BNC)	5820-01-9321

001127

16 WAY-0° 10 kHz to 2.6 GHz

ZC16PD

SURFACE MOUNT

ZFSC-16

JEPS-16

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	INSERTION LOSS, dB Above 12dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	PHASE UNBAL. Degrees L Max.	M° Max.	U Max.	AMPLITUDE UNBAL. dB L Max.	M° Max.	U Max.	VSWR (:1) S Typ.	S Max.	OUT Typ.	OUT Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆■	JEPS-16-1W-75	10-800	32	20	23	15	20	15	1.6	3.5	1.9	3.5	2.2	4.0	10	15	30	0.8	1.2	2.1	1.40	—	1.16	—	BL372	kf	139.95
	ZFSC-16-1	0.5-125	30	24	25	18	20	15	1.0	1.2	1.1	1.3	1.2	1.4	1	3	5	0.3	0.2	0.5	see Yoni for				R30	—	172.95
■	ZFSC-16-1-75	1-150	30	25	30	25	25	20	0.8	1.1	0.7	1.1	1.0	1.3	3	6	10	0.4	0.2	0.4	Performance				R30	—	182.95
	ZFSC-16-3	1-30	—	—	45	28	—	—	0.5	0.9	0.5	0.9	0.5	0.9	1	2	3	0.1	0.1	0.1	Data and				R30	—	172.95
✣■	ZFSC-16-675	0.01-25	25	20	40	25	25	20	0.8	1.1	0.4	0.8	1.0	1.6	1	3	5	0.1	0.2	0.4					R30	—	189.95
	ZFSC-16-12	0.1-200	33	20	27	20	26	20	0.6	1.5	0.7	1.0	0.9	1.5	2	6	9	0.4	0.2	0.4	curves				R30	—	189.95
NEW	ZC16PD-24	650-2400			25	14					0.8	2.25				14			0.9		1.20	1.90	1.10	1.50	UU640	—	349.00
	ZC16PD-900	800-900			30	20					0.5	1.0							0.5		1.06	1.20	1.06	1.20	UU179	—	295.00
	ZC16PD-960	890-960			28	20					0.5	1.0							0.5		1.06	1.30	1.06	1.20	UU179	—	295.00
	ZC16PD-960W	700-1000			26	15					0.5	1.3							0.6		1.10	1.60	1.06	1.30	UU179	—	265.00
	ZC16PD-1900	1700-1900			30	20					0.5	1.0							0.8		1.15	1.35	1.06	1.30	UU179	—	309.00
	ZC16PD-1900W	1500-2100			30	15					0.7	1.4							0.8		1.25	1.60	1.15	1.35	UU179	—	319.00
	ZC16PD-23	1500-2300			32	20					0.8	1.4				11			0.6		1.15	1.60	1.10	1.40	UU640	—	319.00
	ZC16PD-2185	1800-2600			30	16					0.5	1.4				6			0.7		1.15	1.60	1.05	1.30	UU179	—	319.00

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

pin and coaxial connections see case style outline drawings

PORT	SUM	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	NOT USED	GND EXT.	CASE GND
bu	5	7	8	1	2	31	32	25	26	22	30	19	27	—	—	—	—	11,14,21	4	all other pins
kf	18	2	3	4	5	9	10	11	12	13	14	15	16	20	21	22	23	—	all other pins	—
lx	18	2	3	4	5	8	9	10	11	14	15	22	23	—	—	—	—	—	all other pins	—

001127

POWER SPLITTERS/COMBINERS 50 & 75Ω

24 WAY-0° 200 kHz to 200 MHz

48 WAY-0° 10 to 300 MHz

ZFSC-24 ZFSC-48

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	ISOLATION dB L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, dB 24 WAY (above 13.8dB) 48 WAY (above 16.8 dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	AMPLITUDE UNBALANCE dB L Max.	M Max.	U Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	ZFSC-24-1	0.2-100	25	20	25	20	25	20	1.0	2.0	1.0	2.0	1.0	2.0	0.6	0.4	0.5	R31	—	264.95
	ZFSC-24-11	1-200	33	25	22	20	20	17	0.9	1.7	1.0	1.8	1.3	2.2	0.6	0.8	0.8	R31	—	274.95
■	ZFSC-24-11-75	1-200	35	25	33	20	27	20	0.6	1.3	0.8	1.5	1.1	2.0	0.6	0.4	0.6	R31	—	274.95
	ZFSC-48-1	10-300	30	25	28	20	23	20	1.2	2.0	2.1	2.5	2.8	4.0	0.6	0.7	1.0	HH68	—	590.00

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current ratings:
   1a. Matched power rating, 1 Watt
   1b. Internal load dissipation, 0.87 Watt

NSN GUIDE

MCL NO.	NSN
ZFSC-24-11-75	5895-01-446-1161

000711

FIXED ATTENUATORS 50 Ω Surface Mount

1/2W MINIATURE 1 to 30 dB, DC to 2500 MHz

LAT

	MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	MAX. INPUT POWER, W 25°C	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
	LAT-1	DC-2500	1±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.50	MMM168	jk	1.95
	LAT-2	DC-2500	2±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.50	MMM168	jk	1.95
	LAT-3	DC-2500	3±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.50	MMM168	jk	1.95
	LAT-4	DC-2500	4±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.50	MMM168	jk	1.95
	LAT-5	DC-2500	5±0.3	0.3	0.4	0.7	1.3	1.3	1.5	0.50	MMM168	jk	1.95
	LAT-6	DC-2500	6±0.3	0.3	0.4	0.7	1.3	1.4	1.5	0.50	MMM168	jk	1.95
	LAT-7	DC-2500	7±0.3	0.3	0.4	0.7	1.3	1.4	1.5	0.50	MMM168	jk	1.95
	LAT-8	DC-2500	8±0.4	0.3	0.5	0.8	1.3	1.4	1.5	0.50	MMM168	jk	1.95
	LAT-9	DC-2500	9±0.4	0.3	0.5	0.8	1.3	1.4	1.5	0.50	MMM168	jk	1.95
	LAT-10	DC-2500	10±0.5	0.3	0.5	0.8	1.3	1.4	1.5	0.50	MMM168	jk	1.95
	LAT-12	DC-2500	12±0.8	0.3	0.5	0.8	1.3	1.4	1.6	0.50	MMM168	jk	1.95
	LAT-15	DC-2500	15±0.8	0.3	0.5	0.8	1.3	1.4	1.6	0.50	MMM168	jk	1.95
	LAT-20	DC-2500	20±1.5	0.3	0.5	0.8	1.3	1.4	1.6	0.50	MMM168	jk	1.95
NEW	LAT-30	DC-1000	30±1.7	0.5	1.2	—	1.2	1.3	—	0.50	MMM168	jk	1.95

L = DC-500 MHz M = DC-1000 MHz U = DC-2500

features

- wideband DC - 2500 MHz frequency coverage.
- excellent VSWR throughout entire band.
- miniature size SOT-143 package
- low cost

marking code:

2 digits for nominal attenuation value.
examples: 03 for LAT-3, 20 for LAT-20

NOTES:
◆ Aqueous washable
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. RF power at 25°C case temp.: 1/2 Watt.
2. Attenuation and VSWR at 25°C case temp.

designers kits available

KIT NO.	MODEL TYPE	No. of Units in Kit	DESCRIPTION	PRICE $ per kit
K1-LAT	LAT	36	4 of each 3,6,10, 15, 20 2 of each 1,2,4,5,7,8,9,12	59.95

pin connections

see case style outline drawings

PORT	jk
INPUT	4
OUTPUT	2
GND	1,3

001013

1W MINIATURE CERAMIC 1 to 30 dB, DC to 7000 MHz

PAT

MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
PAT-1	DC-7000	1±0.2	0.3	0.4	0.7	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-2	DC-7000	2±0.2	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-3	DC-7000	3±0.3	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-4	DC-7000	4±0.3	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-5	DC-7000	5±0.3	0.3	0.5	1.0	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-6	DC-7000	6±0.3	0.3	0.5	1.1	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-7	DC-7000	7±0.3	0.4	0.6	1.3	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-8	DC-7000	8±0.4	0.4	0.6	1.5	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-9	DC-7000	9±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-10	DC-7000	10±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-12	DC-7000	12±0.6	0.5	0.6	1.8	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-15	DC-7000	15±0.6	0.5	0.7	2.4	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-20	DC-7000	20±1.3	0.5	0.7	2.6	1.4	1.4	1.5	1	AF320	hl	2.95
PAT-30	DC-7000	30±1.7	0.4	0.9	2.8	1.4	1.4	1.5	1	AF320	hl	2.95

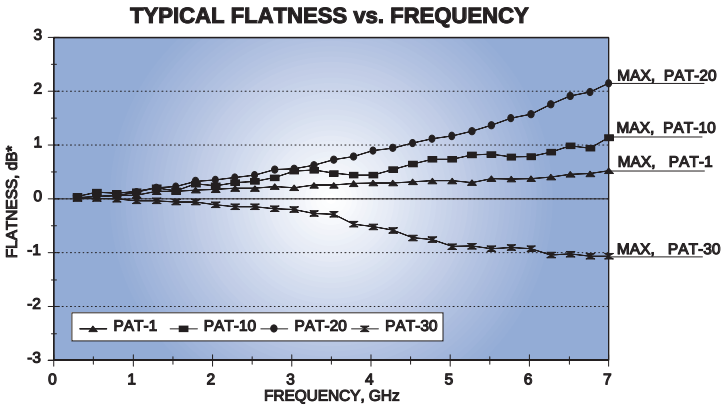
L = DC-1000 MHz M = DC-2500 MHz U = DC-f_U

features

- low-cost ceramic package.
- wideband DC - 7 GHz frequency coverage.
- excellent VSWR throughout entire band.
- miniature size.

marking code:

2 digits for nominal attenuation value.
examples: 03 for PAT-3, 20 for PAT-20



*0 dB on flatness graph corresponds to actural low frequency attenuation value.

designers kits available

KIT NO.	MODEL TYPE	No. of Units in Kit	DESCRIPTION	PRICE $ per kit
K1-PAT	PAT	20	4 of each 3, 6, 10, 15, 20	49.95

pin connections

see case style outline drawings

PORT	cr	hl
INPUT	1	1
OUTPUT	8	3
GND	2,3,4,5,6,7	2,4

991230

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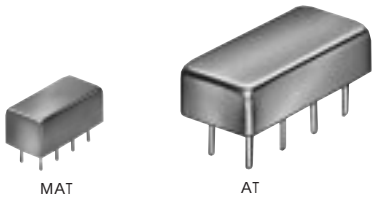
continuous facing pages.**

FIXED ATTENUATORS 50 & 75 Ω Plug-In

1/2W, 1W 1 to 40 dB, DC to 2000 MHz



MODEL NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
MAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7		A11	cr	4.45
MAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	0.5	A11	cr	4.45
MAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	0.5	A11	cr	4.45
MAT-25	DC-1500	25±0.5	0.4	0.8	1.3	1.3	1.6	1.8	0.5	A11	cr	4.45
MAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	0.5	A11	cr	4.45
MAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	0.5	A11	cr	4.45
AT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	1	A04	cr	3.65
AT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	1	A04	cr	3.65
AT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
■ AT-3-75	DC-500	3±0.2	0.9	—	—	2.0	—	—	1	A04	cr	3.65
AT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
■ AT-6-75	DC-500	6±0.3	1.0	—	—	2.0	—	—	1	A04	cr	3.65
AT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
■ AT-10-75	DC-500	10±0.4	1.0	—	—	2.0	—	—	1	A04	cr	3.65
AT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	A04	cr	3.65
AT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	1	A04	cr	3.65
■ AT-15-75	DC-500	15±0.4	0.8	—	—	1.5	—	—	1	A04	cr	3.65
AT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	1	A04	cr	3.65
■ AT-20-75	DC-500	20±0.5	1.1	—	—	2.0	—	—	1	A04	cr	3.65
AT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	1	A04	cr	3.65
AT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	1	A04	cr	3.65

L = DC-500 MHz M = DC-1000 MHz U = DC-f_U

NOTES:

◆ PAT models, aqueous washable
❑ Non-hermetic
■ Denotes 75 ohm models.
* Attenuation Flatness over DC-2000 MHz: 0.75 dB typ.
** VSWR over DC-2000 MHz: 1.45 (typ.)
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
For PAT models:
1. RF power at 25° C case temp.: 1 Watt.
2. Attenuation and VSWR at 25° C case temp.

NSN GUIDE

MCL NO.	NSN		
AT-6	5985-01-275-0339	MAT-6	5985-01-295-0261
MAT-1	5985-01-265-8138	MAT-7	5985-01-326-6978
MAT-10	5985-01-294-4719	MAT-9	5985-01-332-4595
MAT-15	5985-01-294-4720	PAT-3	5985-01-460-6040
MAT-2	5985-01-336-3058	PAT-6	5985-01-460-6042
MAT-20	5985-01-294-4721	PAT-10	5985-01-460-6045
MAT-3	5985-01-274-6609	PAT-15	5985-01-460-6043
MAT-4	5985-01-326-6977		
MAT-5	5985-01-336-3720		

010521

1W MINIATURE CERAMIC 1 to 30 dB, DC to 7000 MHz

PAT

MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
PAT-1	DC-7000	1±0.2	0.3	0.4	0.7	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-2	DC-7000	2±0.2	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-3	DC-7000	3±0.3	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-4	DC-7000	4±0.3	0.3	0.5	0.9	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-5	DC-7000	5±0.3	0.3	0.5	1.0	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-6	DC-7000	6±0.3	0.3	0.5	1.1	1.2	1.3	1.4	1	AF320	hl	2.95
PAT-7	DC-7000	7±0.3	0.4	0.6	1.3	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-8	DC-7000	8±0.4	0.4	0.6	1.5	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-9	DC-7000	9±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-10	DC-7000	10±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-12	DC-7000	12±0.6	0.5	0.6	1.8	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-15	DC-7000	15±0.6	0.5	0.7	2.4	1.3	1.4	1.5	1	AF320	hl	2.95
PAT-20	DC-7000	20±1.3	0.5	0.7	2.6	1.4	1.4	1.5	1	AF320	hl	2.95
PAT-30	DC-7000	30±1.7	0.4	0.9	2.8	1.4	1.4	1.5	1	AF320	hl	2.95

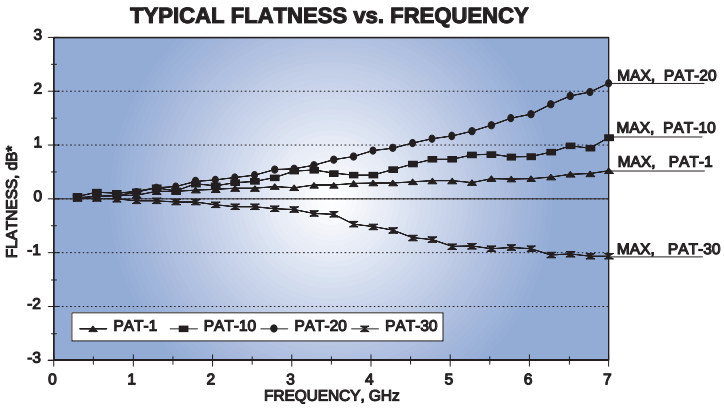
L = DC-1000 MHz M = DC-2500 MHz U = DC-f_U

features

- low-cost ceramic package.
- wideband DC - 7 GHz frequency coverage.
- excellent VSWR throughout entire band.
- miniature size.

marking code:

2 digits for nominal attenuation value.
examples: 03 for PAT-3, 20 for PAT-20



*0 dB on flatness graph corresponds to actural low frequency attenuation value.

designers kits available

KIT NO.	MODEL TYPE	No. of Units in Kit	DESCRIPTION	PRICE $ per kit
K1-PAT	PAT	20	4 of each 3, 6, 10, 15, 20	49.95

pin connections

see case style outline drawings

PORT	cr	hl
INPUT	1	1
OUTPUT	8	3
GND	2,3,4,5,6,7	2,4

991230

FIXED ATTENUATORS 50 & 75Ω Coaxial

UP TO 2W 0.5 to 40 dB, DC to 6000 MHz

CAT

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
CAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	1	FF55	-	16.95
CAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	1	FF55	-	16.95
CAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-3-75	DC-500	3±0.2	0.9	—	—	2.0	—	—	1	FF55	-	16.95
CAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-6-75	DC-500	6±0.3	1.0	—	—	2.0	—	—	1	FF55	-	16.95
CAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-10-75	DC-500	10±0.4	1.0	—	—	2.0	—	—	1	FF55	-	16.95
CAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-15-75	DC-500	15±0.4	0.8	—	—	1.5	—	—	1	FF55	-	16.95
CAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	1	FF55	-	16.95
■ CAT-20-75	DC-500	20±0.5	1.1	—	—	2.0	—	—	1	FF55	-	16.95
CAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	1	FF55	-	16.95
CAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	1	FF55	-	16.95

L = DC-500 MHz M = DC-1000 MHz U = DC-f_U

NOTES:

■ Denotes 75 ohm models. For coax connector models 75 ohm BNC connectors are standard.

* Attenuation Flatness over DC-2000 MHz:
NAT-1-2W, 0.20 dB typ.; NAT-2-2W, 0.40 dB typ.; NAT-3-2W, 0.50 dB typ.
NAT-4-2W, 0.8 dB typ.; NAT-5-2W, 0.9 dB typ.; NAT-6-2W, 1.0 dB typ.

** VSWR over DC-2000 MHz:
NAT-2W models, 1.25 (typ.)

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

NSN GUIDE

MCL NO.	NSN
CAT-3	5985-01-447-0901
CAT-5	5985-01-299-9258
CAT-6	5985-01-300-0481
CAT-10	5985-01-380-3801
CAT-15	5985-01-299-9257
CAT-20	5985-01-265-0338
CAT-30	5985-01-296-0943
NAT-3	5985-01-298-0747
NAT-10	5985-01-291-5548
NAT-30	5985-01-298-0746
SAT-3	5985-01-418-0247
SAT-6	5985-01-237-5343
SAT-10	5985-01-250-4812
SAT-15	5985-01-418-0250
SAT-20	5985-01-454-7333
SAT-30	5985-01-190-6838

010521

SAT

NAT

TAT (Consult factory)

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
SAT-0.5	DC-1500	0.5±0.1	0.2	0.3	0.3	1.2	1.2	1.3	1	FF56	–	20.95
SAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-2.5	DC-1500	2.5±0.2	0.2	0.4	0.7	1.2	1.2	1.3	0.25	FF56	–	20.95
SAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	0.5	FF56	-	20.95
SAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	0.5	FF56	-	20.95
SAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	0.5	FF56	-	20.95
NAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	1	FF57	-	23.95
NAT-1-2W	DC-2000	1±0.2	0.2	0.3	0.5*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	1	FF57	-	23.95
NAT-2-2W	DC-2000	2±0.2	0.2	0.4	0.7*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-3-2W	DC-2000	3±0.2	0.3	0.4	0.7*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-4-2W	DC-2000	4±0.2	0.2	0.5	1.2*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-5-2W	DC-2000	5±0.2	0.2	0.5	1.2*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-6-2W	DC-2000	6±0.2	0.2	0.5	1.5*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	1	FF57	-	23.95
NAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	1	FF57	-	23.95
NAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	1	FF57	-	23.95
NAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	1	FF57	-	23.95
			L_1	M_1	U_1	L_1	M_1	U_1				
NAT-1-60	DC-6000	1±0.2	0.4	0.8	1.1	1.2	1.5	1.5	1	FF57	-	26.95
NAT-2-60	DC-6000	2±0.2	0.4	0.8	1.2	1.2	1.4	1.4	0.9	FF57	-	26.95
NAT-3-60	DC-6000	3±0.2	0.4	1.0	1.4	1.2	1.4	1.4	0.65	FF57	-	26.95
NAT-4-60	DC-6000	4±0.2	0.4	1.0	1.5	1.2	1.3	1.5	0.5	FF57	-	26.95
NAT-5-60	DC-6000	5±0.2	0.4	0.9	1.2	1.2	1.3	1.5	0.5	FF57	-	26.95
NAT-6-60	DC-6000	6±0.2	0.4	0.7	0.9	1.15	1.25	1.5	0.5	FF57	-	26.95
NAT-7-60	DC-6000	7±0.2	0.3	0.7	0.9	1.2	1.3	1.4	0.45	FF57	-	26.95
NAT-8-60	DC-6000	8±0.2	0.2	0.5	1.0	1.2	1.3	1.4	0.35	FF57	-	26.95
NAT-9-60	DC-6000	9±0.2	0.2	0.7	1.3	1.2	1.2	1.45	0.225	FF57	-	26.95
NAT-10-60	DC-6000	10±0.2	0.3	0.9	1.9	1.2	1.2	1.5	0.225	FF57	-	26.95
NAT-12-42	DC-4200	12±0.2	0.3	0.8	1.8	1.2	1.2	1.2	0.25	FF57	-	26.95
NAT-15-30	DC-3000	15±0.2	0.3	0.8	1.5	1.2	1.2	1.2	0.2	FF57	-	26.95
NAT-20-21	DC-2100	20±0.3	0.3	0.9	1.6	1.15	1.15	1.15	0.2	FF57	-	26.95
NAT-25-21	DC-2100	25±0.3	0.4	1.0	1.9	1.2	1.2	1.2	0.175	FF57	-	26.95
NAT-30-15	DC-1500	30±0.3	0.5	0.9	1.7	1.15	1.2	1.25	0.15	FF57	-	26.95

L = DC-500 MHz M = DC-1000 MHz U = DC-f_U

L_1 = DC-(1/3)f_u M_1 = DC-(2/3)f_u U_1 = DC-f_U

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FIXED ATTENUATORS 50 & 75Ω Coaxial

UP TO 2W 0.5 to 40 dB, DC to 6000 MHz

CAT

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
CAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	1	FF55	-	16.95
CAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	1	FF55	-	16.95
CAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-3-75	DC-500	3±0.2	0.9	—	—	2.0	—	—	1	FF55	-	16.95
CAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-6-75	DC-500	6±0.3	1.0	—	—	2.0	—	—	1	FF55	-	16.95
CAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-10-75	DC-500	10±0.4	1.0	—	—	2.0	—	—	1	FF55	-	16.95
CAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF55	-	16.95
CAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	1	FF55	-	16.95
■ CAT-15-75	DC-500	15±0.4	0.8	—	—	1.5	—	—	1	FF55	-	16.95
CAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	1	FF55	-	16.95
■ CAT-20-75	DC-500	20±0.5	1.1	—	—	2.0	—	—	1	FF55	-	16.95
CAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	1	FF55	-	16.95
CAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	1	FF55	-	16.95

L = DC-500 MHz M = DC-1000 MHz U = DC-f_U

NOTES:

■ Denotes 75 ohm models. For coax connector models 75 ohm BNC connectors are standard.

* Attenuation Flatness over DC-2000 MHz:
NAT-1-2W, 0.20 dB typ.; NAT-2-2W, 0.40 dB typ.; NAT-3-2W, 0.50 dB typ.
NAT-4-2W, 0.8 dB typ.; NAT-5-2W, 0.9 dB typ.; NAT-6-2W, 1.0 dB typ.

** VSWR over DC-2000 MHz:
NAT-2W models, 1.25 (typ.)

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

NSN GUIDE

MCL NO.	NSN
CAT-3	5985-01-447-0901
CAT-5	5985-01-299-9258
CAT-6	5985-01-300-0481
CAT-10	5985-01-380-3801
CAT-15	5985-01-299-9257
CAT-20	5985-01-265-0338
CAT-30	5985-01-296-0943
NAT-3	5985-01-298-0747
NAT-10	5985-01-291-5548
NAT-30	5985-01-298-0746
SAT-3	5985-01-418-0247
SAT-6	5985-01-237-5343
SAT-10	5985-01-250-4812
SAT-15	5985-01-418-0250
SAT-20	5985-01-454-7333
SAT-30	5985-01-190-6838

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SAT

NAT

TAT (Consult factory)

MODEL NO.	FREQ. RANGE MHz f_L-f_U	ATTENUATION dB Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	POWER W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
SAT-0.5	DC-1500	0.5±0.1	0.2	0.3	0.3	1.2	1.2	1.3	1	FF56	–	20.95
SAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-2.5	DC-1500	2.5±0.2	0.2	0.4	0.7	1.2	1.2	1.3	0.25	FF56	–	20.95
SAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	0.5	FF56	-	20.95
SAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	0.5	FF56	-	20.95
SAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	0.5	FF56	-	20.95
SAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	0.5	FF56	-	20.95
NAT-1	DC-1500	1±0.2	0.3	0.4	0.5	1.3	1.5	1.7	1	FF57	-	23.95
NAT-1-2W	DC-2000	1±0.2	0.2	0.3	0.5*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-2	DC-1500	2±0.2	0.3	0.4	0.8	1.3	1.5	1.7	1	FF57	-	23.95
NAT-2-2W	DC-2000	2±0.2	0.2	0.4	0.7*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-3	DC-1500	3±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-3-2W	DC-2000	3±0.2	0.3	0.4	0.7*	1.3	1.4	1.5**	2	FF57	–	26.95
NAT-4	DC-1500	4±0.2	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-4-2W	DC-2000	4±0.2	0.2	0.5	1.2*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-5	DC-1500	5±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-5-2W	DC-2000	5±0.2	0.2	0.5	1.2*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-6	DC-1500	6±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-6-2W	DC-2000	6±0.2	0.2	0.5	1.5*	1.3	1.4	1.5**	2	FF57	-	26.95
NAT-7	DC-1500	7±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-8	DC-1500	8±0.3	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-9	DC-1500	9±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-10	DC-1500	10±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-12	DC-1500	12±0.4	0.3	0.6	1.0	1.3	1.5	1.7	1	FF57	-	23.95
NAT-15	DC-1500	15±0.4	0.4	0.7	1.1	1.3	1.5	1.7	1	FF57	-	23.95
NAT-20	DC-1500	20±0.5	0.4	0.8	1.3	1.3	1.6	1.8	1	FF57	-	23.95
NAT-30	DC-1000	30±0.5	0.5	1.0	—	1.3	1.6	—	1	FF57	-	23.95
NAT-40	DC-500	40±0.6	1.0	—	—	1.5	—	—	1	FF57	-	23.95
			L_1	M_1	U_1	L_1	M_1	U_1				
NAT-1-60	DC-6000	1±0.2	0.4	0.8	1.1	1.2	1.5	1.5	1	FF57	-	26.95
NAT-2-60	DC-6000	2±0.2	0.4	0.8	1.2	1.2	1.4	1.4	0.9	FF57	-	26.95
NAT-3-60	DC-6000	3±0.2	0.4	1.0	1.4	1.2	1.4	1.4	0.65	FF57	-	26.95
NAT-4-60	DC-6000	4±0.2	0.4	1.0	1.5	1.2	1.3	1.5	0.5	FF57	-	26.95
NAT-5-60	DC-6000	5±0.2	0.4	0.9	1.2	1.2	1.3	1.5	0.5	FF57	-	26.95
NAT-6-60	DC-6000	6±0.2	0.4	0.7	0.9	1.15	1.25	1.5	0.5	FF57	-	26.95
NAT-7-60	DC-6000	7±0.2	0.3	0.7	0.9	1.2	1.3	1.4	0.45	FF57	-	26.95
NAT-8-60	DC-6000	8±0.2	0.2	0.5	1.0	1.2	1.3	1.4	0.35	FF57	-	26.95
NAT-9-60	DC-6000	9±0.2	0.2	0.7	1.3	1.2	1.2	1.45	0.225	FF57	-	26.95
NAT-10-60	DC-6000	10±0.2	0.3	0.9	1.9	1.2	1.2	1.5	0.225	FF57	-	26.95
NAT-12-42	DC-4200	12±0.2	0.3	0.8	1.8	1.2	1.2	1.2	0.25	FF57	-	26.95
NAT-15-30	DC-3000	15±0.2	0.3	0.8	1.5	1.2	1.2	1.2	0.2	FF57	-	26.95
NAT-20-21	DC-2100	20±0.3	0.3	0.9	1.6	1.15	1.15	1.15	0.2	FF57	-	26.95
NAT-25-21	DC-2100	25±0.3	0.4	1.0	1.9	1.2	1.2	1.2	0.175	FF57	-	26.95
NAT-30-15	DC-1500	30±0.3	0.5	0.9	1.7	1.15	1.2	1.25	0.15	FF57	-	26.95

L = DC-500 MHz M = DC-1000 MHz U = DC-f_U

L_1 = DC-(1/3)f_u M_1 = DC-(2/3)f_u U_1 = DC-f_U

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PRECISION FIXED ATTENUATORS 50Ω SMA

2W 1 to 40 dB, DC to 18 GHz

BW

MODEL NO.	FREQ. RANGE GHz f_L-f_U	ATTENUATION dB Nom.	ATTENUATION dB ACCURACY*	VSWR (:1) Max. L	VSWR (:1) Max. M	VSWR (:1) Max. U	POWER W**	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-49)
BW-S1W2	DC-18	1	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S2W2	DC-18	2	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S3W2	DC-18	3	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S4W2	DC-18	4	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S5W2	DC-18	5	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S6W2	DC-18	6	±0.40	1.20	1.25	1.30	2	FF658	_	29.95
BW-S7W2	DC-18	7	±0.60	1.20	1.25	1.30	2	FF658	_	29.95
BW-S8W2	DC-18	8	±0.60	1.20	1.25	1.30	2	FF658	_	29.95
BW-S9W2	DC-18	9	±0.60	1.20	1.25	1.30	2	FF658	_	29.95
BW-S10W2	DC-18	10	±0.60	1.20	1.25	1.30	2	FF658	_	29.95
BW-S12W2	DC-18	12	±0.60	1.20	1.25	1.30	2	FF658	_	29.95
BW-S15W2	DC-18	15	±0.60	1.20	1.25	1.30	2	FF659	_	29.95
BW-S20W2	DC-18	20	±0.60	1.20	1.25	1.30	2	FF659	_	29.95
BW-S30W2	DC-18	30	±0.85	1.20	1.25	1.30	2	FF659	_	29.95
BW-S40W2	DC-18	40	±0.85	1.20	1.25	1.30	2	FF659	_	29.95

L = DC-4 GHz M = 4-8 GHz U = 8-12.4 GHz

features

- precision attenuation
- excellent VSWR, 1.2:1 typ.
- high temperature stability
- SMA male and female connectors

applications

- matching
- instrumentation
- test set-ups

designers kits available

KIT No.	No. of Units in KIT	Description	Price $ per KIT
K2-BW1	6	2 of each: 3,6,10	150.00
K2-BW2	6	1 of each: 3,6,10,20,30,40	150.00
K2-BW3	10	1 of each: 1,2,3,4,5,6,7,8,9,10	200.00

NOTES:

* At 25°C includes power & frequency variations up to 12.4 GHz. Above 12.4 GHz add 0.5 dB typ. to accuracy and 0.3 typ. to VSWR in the U range. Temperature coefficient for attenuation .0004 dB/dB/°C typ.

** Average power at 25°C ambient, derate linearly to 0.5 W at 100°C. Peak Power 125W max., 5µsec pulse width, 100 Hz PRF.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

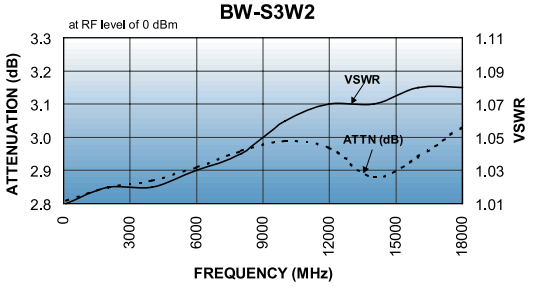
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

001027

DC to 18000 MHz

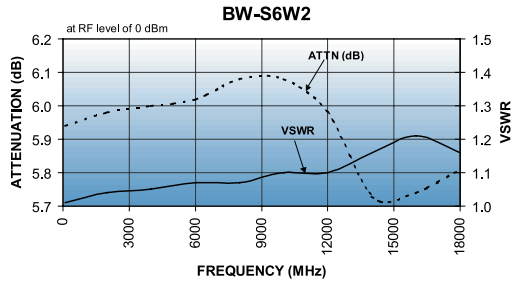
BW-S3W2



FREQUENCY (MHz)	ATTENUATION $\bar{X}$ (dB)	ATTENUATION σ (dB)	VSWR $\bar{X}$	VSWR σ
100.00	2.81	0.02	1.01	0.01
2000.00	2.85	0.02	1.02	0.01
4000.00	2.87	0.03	1.02	0.01
6000.00	2.91	0.04	1.03	0.00
8000.00	2.96	0.05	1.04	0.01
10000.00	2.99	0.05	1.06	0.01
12000.00	2.97	0.04	1.07	0.02
14000.00	2.88	0.17	1.07	0.02
16000.00	2.94	0.17	1.08	0.03
18000.00	3.03	0.13	1.08	0.02

DC to 18000 MHz

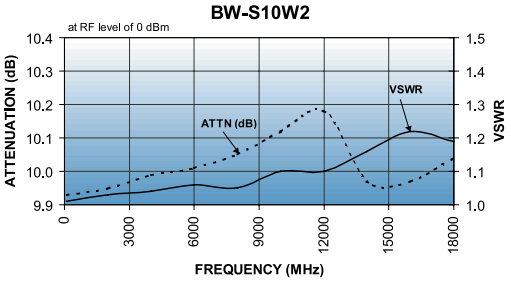
BW-S6W2



FREQUENCY (MHz)	ATTENUATION $\bar{X}$ (dB)	ATTENUATION σ (dB)	VSWR $\bar{X}$	VSWR σ
100.00	5.94	0.03	1.01	0.00
2000.00	5.98	0.02	1.04	0.00
4000.00	6.00	0.02	1.05	0.01
6000.00	6.02	0.04	1.07	0.01
8000.00	6.08	0.10	1.07	0.01
10000.00	6.08	0.12	1.10	0.03
12000.00	5.98	0.11	1.10	0.03
14000.00	5.73	0.07	1.16	0.02
16000.00	5.74	0.08	1.21	0.03
18000.00	5.81	0.10	1.16	0.02

DC to 18000 MHz

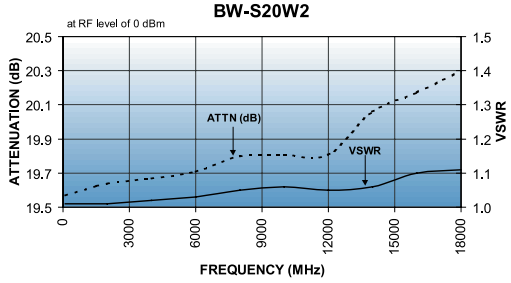
BW-S10W2



FREQUENCY (MHz)	ATTENUATION $\bar{X}$ (dB)	ATTENUATION σ (dB)	VSWR $\bar{X}$	VSWR σ
100.00	9.93	0.03	1.01	0.00
2000.00	9.95	0.02	1.03	0.00
4000.00	9.99	0.01	1.04	0.00
6000.00	10.01	0.01	1.06	0.01
8000.00	10.05	0.01	1.05	0.01
10000.00	10.12	0.03	1.10	0.02
12000.00	10.18	0.10	1.10	0.03
14000.00	9.97	0.15	1.16	0.04
16000.00	9.97	0.18	1.22	0.04
18000.00	10.04	0.21	1.19	0.04

DC to 18000 MHz

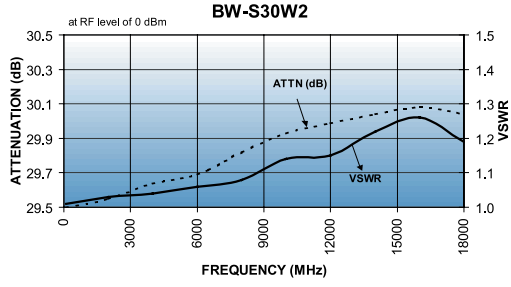
BW-S20W2



FREQUENCY (MHz)	ATTENUATION $\bar{X}$ (dB)	ATTENUATION σ (dB)	VSWR $\bar{X}$	VSWR σ
100.00	19.57	0.06	1.01	0.00
2000.00	19.64	0.07	1.01	0.00
4000.00	19.67	0.08	1.02	0.00
6000.00	19.71	0.09	1.03	0.00
8000.00	19.80	0.13	1.05	0.01
10000.00	19.81	0.14	1.06	0.01
12000.00	19.81	0.16	1.05	0.01
14000.00	20.06	0.26	1.06	0.00
16000.00	20.17	0.29	1.10	0.00
18000.00	20.30	0.32	1.11	0.01

DC to 18000 MHz

BW-S30W2



FREQUENCY (MHz)	ATTENUATION $\bar{X}$ (dB)	ATTENUATION σ (dB)	VSWR $\bar{X}$	VSWR σ
100.00	29.50	0.08	1.01	0.00
2000.00	29.55	0.02	1.03	0.00
4000.00	29.64	0.03	1.04	0.00
6000.00	29.69	0.04	1.06	0.01
8000.00	29.82	0.11	1.08	0.02
10000.00	29.93	0.17	1.14	0.02
12000.00	29.99	0.22	1.15	0.02
14000.00	30.04	0.33	1.22	0.03
16000.00	30.08	0.41	1.26	0.03
18000.00	30.04	0.49	1.19	0.05

000324

PRECISION FIXED ATTENUATORS 50Ω SMA

5W 1 to 40 dB, DC to 18 GHz

BW-SXW5

MODEL NO.	FREQ. RANGE GHz f_L-f_U	ATTENUATION dB Nom.	ATTENUATION dB ACCURACY*	VSWR (:1) Max. L	VSWR (:1) Max. M	VSWR (:1) Max. U	POWER W**	CASE STYLE Note B	PRICE $ Qty. (1-49)
BW-S1W5	DC-18	1	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S2W5	DC-18	2	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S3W5	DC-18	3	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S4W5	DC-18	4	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S5W5	DC-18	5	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S6W5	DC-18	6	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S7W5	DC-18	7	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S8W5	DC-18	8	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S9W5	DC-18	9	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S10W5	DC-18	10	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S12W5	DC-18	12	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S15W5	DC-18	15	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S20W5	DC-18	20	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S30W5	DC-18	30	±0.85	1.20	1.25	1.30	5	DC737	44.95
BW-S40W5	DC-18	40	±0.85	1.20	1.25	1.30	5	DC737	44.95

L = DC-4 GHz M = 4-8 GHz U = 8-12.4 GHz

NOTES:

* At 25°C includes power & frequency variations up to 12.4 GHz. Above 12.4 GHz add 0.5 dB typ. to accuracy and 0.3 typ. to VSWR in the U range. Temperature coefficient for attenuation .0004 dB/dB/°C typ.

** Average power at 25°C ambient, derate linearly to 2 W at 100°C. Peak Power 125W max., 5µsec pulse width, 100 Hz PRF.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

designers kits available

KIT No.	No. of Units in KIT	Description	Price $ per KIT
K5-BW1	8	1 of each: 1,2,3,4,5,6,8,10	299.00

001109

BW-NXW5

MODEL NO.	FREQ. RANGE GHz f_L-f_U	ATTENUATION dB Nom.	ATTENUATION dB ACCURACY*	VSWR (:1) Max. L	VSWR (:1) Max. M	VSWR (:1) Max. U	POWER W**	CASE STYLE Note B	PRICE $ Qty. (1-49)
BW-N1W5	DC-18	1	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N2W5	DC-18	2	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N3W5	DC-18	3	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N4W5	DC-18	4	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N5W5	DC-18	5	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N6W5	DC-18	6	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N7W5	DC-18	7	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N8W5	DC-18	8	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N9W5	DC-18	9	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N10W5	DC-18	10	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N12W5	DC-18	12	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N15W5	DC-18	15	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N20W5	DC-18	20	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N30W5	DC-18	30	±0.85	1.20	1.25	1.30	5	DC736	54.95
BW-N40W5	DC-18	40	±0.85	1.20	1.25	1.30	5	DC736	54.95

L = DC-4 GHz M = 4-8 GHz U = 8-12.4 GHz

features

- DC to 18 GHz
- precision attenuation
- excellent VSWR, 1.2:1 typ.
- high temperature stability
- stainless steel male and female connectors

applications

- matching
- instrumentation
- test set-ups

001109

PRECISION FIXED ATTENUATORS 50Ω SMA

5W 1 to 40 dB, DC to 18 GHz

BW-SXW5

MODEL NO.	FREQ. RANGE GHz f_L-f_U	ATTENUATION dB Nom.	ATTENUATION dB ACCURACY*	VSWR (:1) Max. L	VSWR (:1) Max. M	VSWR (:1) Max. U	POWER W**	CASE STYLE Note B	PRICE $ Qty. (1-49)
BW-S1W5	DC-18	1	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S2W5	DC-18	2	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S3W5	DC-18	3	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S4W5	DC-18	4	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S5W5	DC-18	5	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S6W5	DC-18	6	±0.40	1.20	1.25	1.30	5	DC737	44.95
BW-S7W5	DC-18	7	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S8W5	DC-18	8	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S9W5	DC-18	9	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S10W5	DC-18	10	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S12W5	DC-18	12	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S15W5	DC-18	15	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S20W5	DC-18	20	±0.60	1.20	1.25	1.30	5	DC737	44.95
BW-S30W5	DC-18	30	±0.85	1.20	1.25	1.30	5	DC737	44.95
BW-S40W5	DC-18	40	±0.85	1.20	1.25	1.30	5	DC737	44.95

L = DC-4 GHz M = 4-8 GHz U = 8-12.4 GHz

NOTES:

* At 25°C includes power & frequency variations up to 12.4 GHz. Above 12.4 GHz add 0.5 dB typ. to accuracy and 0.3 typ. to VSWR in the U range. Temperature coefficient for attenuation .0004 dB/dB/°C typ.

** Average power at 25°C ambient, derate linearly to 2 W at 100°C. Peak Power 125W max., 5µsec pulse width, 100 Hz PRF.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

designers kits available

KIT No.	No. of Units in KIT	Description	Price $ per KIT
K5-BW1	8	1 of each: 1,2,3,4,5,6,8,10	299.00

001109

BW-NXW5

MODEL NO.	FREQ. RANGE GHz f_L-f_U	ATTENUATION dB Nom.	ATTENUATION dB ACCURACY*	VSWR (:1) Max. L	VSWR (:1) Max. M	VSWR (:1) Max. U	POWER W**	CASE STYLE Note B	PRICE $ Qty. (1-49)
BW-N1W5	DC-18	1	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N2W5	DC-18	2	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N3W5	DC-18	3	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N4W5	DC-18	4	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N5W5	DC-18	5	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N6W5	DC-18	6	±0.40	1.20	1.25	1.30	5	DC736	54.95
BW-N7W5	DC-18	7	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N8W5	DC-18	8	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N9W5	DC-18	9	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N10W5	DC-18	10	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N12W5	DC-18	12	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N15W5	DC-18	15	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N20W5	DC-18	20	±0.60	1.20	1.25	1.30	5	DC736	54.95
BW-N30W5	DC-18	30	±0.85	1.20	1.25	1.30	5	DC736	54.95
BW-N40W5	DC-18	40	±0.85	1.20	1.25	1.30	5	DC736	54.95

L = DC-4 GHz M = 4-8 GHz U = 8-12.4 GHz

features

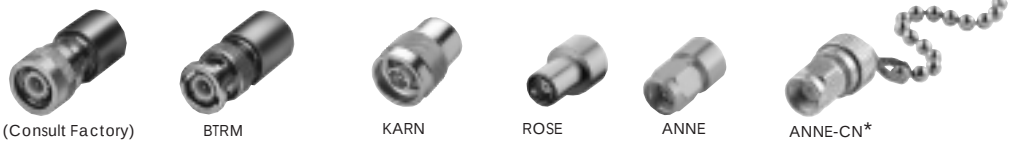
- DC to 18 GHz
- precision attenuation
- excellent VSWR, 1.2:1 typ.
- high temperature stability
- stainless steel male and female connectors

applications

- matching
- instrumentation
- test set-ups

001109

DC to 20 GHz



TTRM (Consult Factory) BTRM KARN ROSE ANNE ANNE-CN*

	MODEL NO.	IMPEDANCE OHMS	FREQ. RANGE (GHz)	RETURN LOSS (dB) Min. DC-.5 GHz	DC-1 GHz	DC-2 GHz	DC-4 GHz	DC-6 GHz	DC-8 GHz	8-12 GHz	12-20 GHz	CASE STYLE Note B	CONNECTOR	PRICE $ Qty. (1-9)
	BTRM-50	50	DC-2	35	30	21	—	—	—	—	—	LL85	M-BNC	8.25
■	BTRM-75	75	DC-1	30	20	—	—	—	—	—	—	LL85	M-BNC, 75Ω	9.95
	KARN-50	50	DC-6	36	32	28	20	18	—	—	—	LL718	M-TYPE N	11.95
NEW	KARN-50L	50	DC-2	35	30	21	—	—	—	—	—	LL718	M-TYPE N	9.45
	ROSE-50	50	DC-6	—	—	30	22	17	—	—	—	LL604	SMB-PLUG	9.95
	ANNE-50	50	DC-20	—	—	—	30	—	25	20	15	LL561	M-SMA	11.95
NEW	ANNE-50L	50	DC-8	—	—	—	26	—	21	—	—	LL561	M-SMA	9.95

*To order ANNE-50 with cap and 3½" length chain and .130" diameter end coupling use part no. ANNE-50CN. Price is $13.95, qty 1-9.

NOTES:

■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

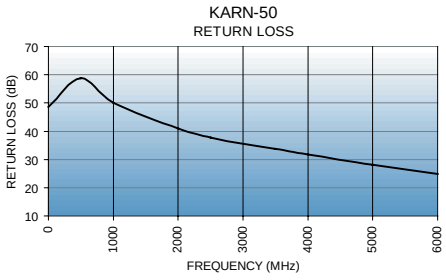
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".

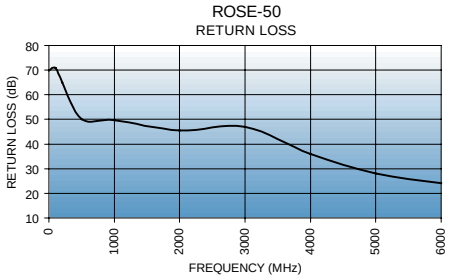
C. Prices and Specifications subject to change without notice.

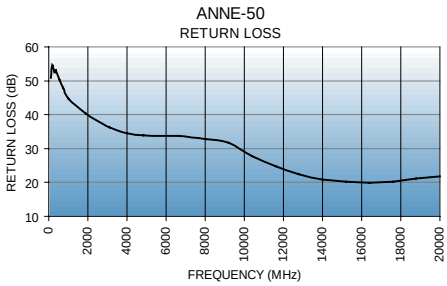
1. Absolute maximum power, voltage and current ratings:
1a. RF input power, 0.25 Watt.
0.50 Watt for ANNE-50, ANNE-50L, ROSE-50, 2 Watt for KARN-50, KARN-50L (at 70°C derate linearly at 0.025W/°C to 1.25W at 100°C)

NSN GUIDE

MCL NO.	NSN
BTRM-50	6625-01-325-7972
BTRM-75	5985-01-328-7420
ANNE-50	5985-01-466-1331







010418

MATCHING PADS *Surface Mount ❑ & Coaxial*

MINIMUM LOSS *DC to 3000 MHz, 50 to 75Ω*

SURFACE MOUNT

ALMP

BMP

◆	MODEL NO.	FREQ. RANGE (MHz) f_L-f_U	ATTENUATION (dB) Nom.	Flatness Max. L	M	U	VSWR (:1) Max. L	M	U	CASE STYLE Note B	CONNECTOR	PRICE $ Qty. (1-9)
◆	ALMP-5075	DC-3000	5.7±0.2	0.2	0.4	0.4	1.06:1	1.4:1	1.45:1	CB518	see ml pin connections	7.95
	BMP-5075	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06:1	1.22:1	1.4:1	FF55	75ΩM-BNC 50ΩF-BNC	24.95
	BMP-5075R	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06:1	1.22:1	1.4:1	FF55	75ΩF-BNC 50ΩM-BNC	24.95

L=DC to 100MHz M=100MHz to 1000MHz U=1000MHz to f_U

features

- minimum loss pad for resistive matching of 75 ohm impedance to 50 ohms and vice versa
- excellent VSWR 1.15:1 Typical

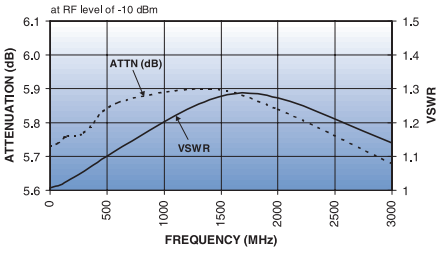
NOTES:

◆ Aqueous washable
❑ Non-hermetic
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF input power, 0.25 Watt.

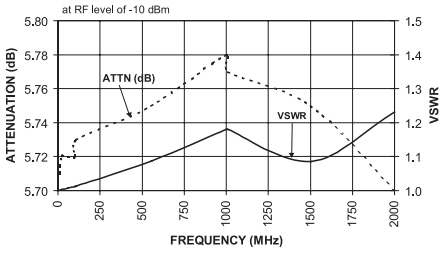
pin connections

PORT	ml
50 OHM	2
75 OHM	6
GND EXT.	all others
DEMO BOARD	TB-25

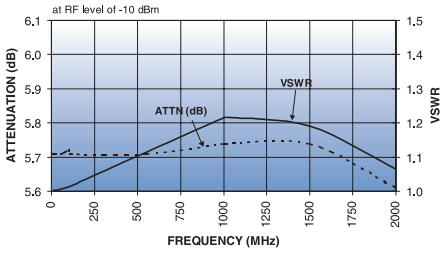
ALMP-5075
ATTENUATION vs. VSWR



BMP-5075
ATTENUATION vs. VSWR



BMP-5075R
ATTENUATION vs. VSWR



010601

MATCHING PADS *Surface Mount ❑ & Coaxial*

MINIMUM LOSS *DC to 3000 MHz, 50 to 75Ω*

SURFACE MOUNT

ALMP

BMP

◆	MODEL NO.	FREQ. RANGE (MHz) f_L-f_U	ATTENUATION (dB) Nom.	Flatness Max. L	M	U	VSWR (:1) Max. L	M	U	CASE STYLE Note B	CONNECTOR	PRICE $ Qty. (1-9)
◆	ALMP-5075	DC-3000	5.7±0.2	0.2	0.4	0.4	1.06:1	1.4:1	1.45:1	CB518	see ml pin connections	7.95
	BMP-5075	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06:1	1.22:1	1.4:1	FF55	75ΩM-BNC 50ΩF-BNC	24.95
	BMP-5075R	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06:1	1.22:1	1.4:1	FF55	75ΩF-BNC 50ΩM-BNC	24.95

L=DC to 100MHz M=100MHz to 1000MHz U=1000MHz to f_U

features

- minimum loss pad for resistive matching of 75 ohm impedance to 50 ohms and vice versa
- excellent VSWR 1.15:1 Typical

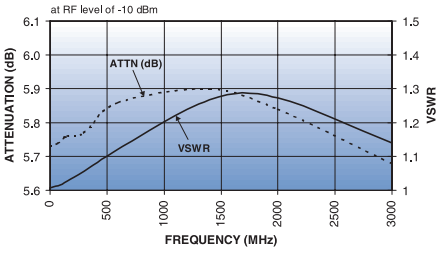
NOTES:

◆ Aqueous washable
❑ Non-hermetic
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. RF input power, 0.25 Watt.

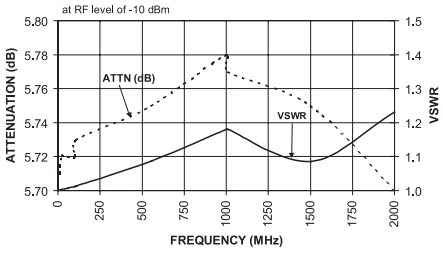
pin connections

PORT	ml
50 OHM	2
75 OHM	6
GND EXT.	all others
DEMO BOARD	TB-25

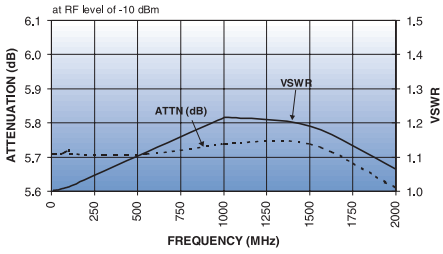
ALMP-5075
ATTENUATION vs. VSWR



BMP-5075
ATTENUATION vs. VSWR



BMP-5075R
ATTENUATION vs. VSWR



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AMPLIFIER SELECTION GUIDE

		MODEL NO.	FREQ. [MHz] f_L f_U	GAIN [dB] MIN.	MAX[1] POWER [dBm]	N.F. [dB] TYP.	3rd ORDER I.P. [dBm]	VSWR[2] IN	VSWR[2] OUT	DC POWER V VOLT	DC POWER I [mA]	CASE STYLE	STD. CONN.	OPTION
MONOLITHIC	PIN	ERA-1	DC-8000	9.0	+12	4.3	+26	1.5:1	1.5:1	+3.4	40	VV105		
		ERA-2	DC-6000	13.0	+13	4.0	+26	1.3:1	1.2:1	+3.4	40	VV105		
		ERA-3	DC-3000	16.0	+12.5	3.5	+25	1.5:1	1.4:1	+3.2	35	VV105		
		ERA-4	DC-4000	11.0	+17.3	4.2	+34	1.2:1	1.3:1	+4.5	65	VV105		
		ERA-5	DC-4000	16.0	+18.4	4.3	+32.5	1.3:1	1.3:1	+4.9	65	VV105		
		ERA-6	DC-4000	10.5	+17.9	4.5	+36	1.3:1	1.6:1	+5.0	70	VV105		
	SMT●	MAR-1SM	DC-1000	13.0	+1.5	5.5	+14	1.3:1	1.3:1	+5.0	17	WW107		
		MAR-2SM	DC-2000	8.5	+4.5	6.5	+17	1.3:1	1.4:1	+5.0	25	WW107		
		MAR-3SM▼	DC-2000	8.0	+10	6.0	+23	1.5:1	1.7:1	+5.0	35	WW107		
		MAR-4SM	DC-1000	7.0	+12.5	6.5	+25.5	1.6:1	2.0:1	+5.25	50	WW107		
		MAR-6SM▼	DC-2000	9.0	+2	3.0	+14.5	1.5:1	1.4:1	+3.5	16	WW107		
		MAR-7SM▼	DC-2000	8.5	+5.5	5.0	+19	1.4:1	1.5:1	+4.0	22	WW107		
		MAR-8SM	DC-1000	19.0	+12.5	3.3	+27	3.1:1	3.1:1	+7.8	36	WW107		
		MAV-11SM	50-1000	9.0	+17.5	3.6	+30	1.5:1	1.7:1	+5.5	60	RRR137		
		ERA-1SM	DC-8000	9.0	+12	4.3	+26	1.5:1	1.5:1	+3.4	40	WW107		
		ERA-2SM	DC-6000	13.0	+13	4.0	+26	1.3:1	1.2:1	+3.4	40	WW107		
		ERA-21SM	DC-8000	11.2	+12.6	4.7	+26	1.1:1	1.3:1	+3.5	40	WW107		
		ERA-3SM	DC-3000	16.0	+12.5	3.5	+25	1.5:1	1.4:1	+3.2	35	WW107		
		ERA-33SM	DC-3000	15.0	+13.5	3.9	+28.5	1.6:1	1.25:1	+4.3	40	WW107		
		ERA-4SM	DC-4000	11.0	+17.3	4.2	+34	1.2:1	1.3:1	+4.5	65	WW107		
		ERA-5SM	DC-4000	16.0	+18.4	4.3	+32.5	1.3:1	1.2:1	+4.9	65	WW107		
		ERA-50SM	DC-1500	16.0	+17.2	3.5	+32.5	1.3:1	1.2:1	+4.4	60	WW107		
		ERA-51SM	DC-4000	14.0	+18.1	4.1	+33	1.1:1	1.2:1	+4.5	65	WW107		
		ERA-6SM	DC-4000	10.5	+17.9	4.5	+36	1.3:1	1.6:1	+5.0	70	WW107		
		HELA-10	50-1000	10.5	+30	3.5	+47	1.22:1	1.22:1	+12.0	525	CM624		
		RAM-1	DC-1000	13.0	+1.5	5.5	+14	1.3:1	1.3:1	+5.0	17	AF190		
		RAM-2	DC-2000	8.5	+4.5	6.5	+17	1.2:1	1.4:1	+5.0	25	AF190		
		RAM-3	DC-2000	8.0	+10	6.0	+23	1.6:1	1.7:1	+5.0	35	AF190		
		RAM-4	DC-1000	7.0	+12.5	6.5	+25.5	1.4:1	1.9:1	+5.25	50	AF190		
		RAM-6	DC-2000	9.0	+2	2.8	+14.5	1.4:1	1.3:1	+3.5	16	AF190		
		RAM-7	DC-2000	8.5	+5.5	4.5	+19	2.0:1	1.8:1	+4.0	22	AF190		
		RAM-8	DC-1000	19.0	+12.5	3.0	+27	3.1:1	3.1:1	+7.8	36	AF190		
		VAM-93	DC-3000	17.0	+12.7	3.7	+27	1.5:1	1.1:1	+3.2	35	MMM168		
		VNA-25	500-2500	11.5	+15.5	5.5	+27	1.5:1*	1.6:1	+5.0	85	XX211		
VAR. GAIN	CON	ZFL-1000G	10-1000	17.0	+3	12.0	+13	2.0:1	2.0:1	+15	100	Y39	SMA	—
		ZFL-1000GH	10-1200	24.0	+13	15.0	+25	2.2:1	2.0:1	+15	170	Y39	SMA	—
LOW NOISE (N.F.<4.0 dB)	PIN	MAN-1LN	0.5-500	28.0	+8	2.8	+18	1.8:1	1.8:1	+12	60	A05		
		AMP-76	5-500	26.0	+13.5	3.1	+28	2.0:1	2.0:1	+15	68	PP120		
		AMP-77	5-500	15.0	+16	3.3	+32	2.0:1	2.0:1	+15	56	PP120		
		AMP-75	5-500	19.0	+12	2.4	+28	2.0:1	2.0:1	+15	29	PP120		
		AMP-15	5-1000	13.0	+8	2.8	+22	2.0:1	2.0:1	+15	29	PP120		
		AMP-11-2	5-1000	14.0	+3.5	3.0	+13	2.0:1	2.0:1	+15	12	PP120		
		MAN-1HLN	10-500	10.0	+15	3.7	+30	1.8:1	1.8:1	+12	70	A06		
		TO-0812LN	800-1200	20.0	+8	1.6	+18	2.5:1	2.5:1	+15	70	QQ96		
		TO-1217LN	1200-1700	20.0	+10	1.6	+25	2.5:1	2.5:1	+15	70	QQ96		
		TO-1724LN	1700-2400	20.0	+10	1.6	+22	2.5:1	2.5:1	+15	70	QQ96		
	CON	ZFL-500LN	0.1-500	24.0	+5	2.9	+14	1.5:1	1.6:1	+15	60	Y39	SMA	BNC
		ZFL-1000LN	0.1-1000	20.0	+3	2.9	+14	1.5:1	2.0:1	+15	60	Y39	SMA	—
		ZFL-500HLN	10-500	19.0	+16	3.8	+30	1.5:1	1.5:1	+15	110	Y39	SMA	—
		ZEL-0812LN	800-1200	20.0	+8	1.5	+18	2.5:1	2.5:1	+15	70	EEE132	SMA	—
		ZHL-0812HLN	800-1200	30.0	+26	1.5	+36	2.4:1	2.4:1	+15	725	NN92	SMA	
		ZHL-0812MLN	800-1200	28.0	+20	1.3	+33	1.5:1	1.6:1	+15	300	S32	SMA	—
		ZEL-1217LN	1200-1700	20.0	+10	1.5	+25	2.5:1	2.5:1	+15	70	EEE132	SMA	—
		ZHL-1217HLN	1200-1700	30.0	+26	1.5	+36	2.4:1	2.4:1	+15	725	NN92	SMA	
		ZHL-1217MLN	1200-1700	30.0	+20	1.2	+34	1.5:1	1.6:1	+15	300	S32	SMA	—
		ZEL-1724LN	1700-2400	20.0	+10	1.5	+22	2.5:1	2.5:1	+15	70	EEE132	SMA	—
		ZHL-1724HLN	1700-2400	30.0	+26	1.5	+36	2.4:1	2.4:1	+15	725	NN92	SMA	
		ZHL-1724MLN	1700-2400	28.0	+20	1.2	+32	1.5:1	1.6:1	+15	300	S32	SMA	—
		ZQL-900LNW	800-900	13.0	+21	1.0	+35	1.2:1	1.1:1	+15	160	CW686	SMA	—
		ZQL-900MLNW	800-900	22.0	+23	1.2	+41	1.3:1	1.4:1	+15	230	CW686	SMA	—
		ZQL-900LN	824-849	15.0	+21	1.0	+35	1.2:1	1.1:1	+15	160	CW686	SMA	—
		ZQL-900MLN	824-849	25.5	+24.5	1.0	+41	1.3:1	1.4:1	+15	230	CW686	SMA	—
		ZQL-1900LNW	1700-2000	14.0	+18.5	0.9	+37	1.15:1	1.25:1	+15	160	CW686	SMA	—
		ZQL-1900MLNW	1800-2000	23.0	+25	1.1	+41	1.4:1	1.25:1	+15	310	CW686	SMA	—
		ZQL-1900LN	1850-1910	15.0	+19	0.9	+37	1.15:1	1.25:1	+15	160	CW686	SMA	—
		ZQL-1900MLN	1850-1910	25.0	+26	1.1	+41	1.25:1	1.20:1	+15	310	CW686	SMA	—
		ZQL-2700MLNW	2200-2700	25.0	+25	1.0	+38	1.25:1	1.15:1	+15	325	CW686	SMA	—

[1] Minimum output power at 1 dB gain compression.
[2] For ERA models, VSWR given as DC-3GHz; ERA-50SM at 1.5 GHz.
● SMT Surface Mount.
▼ Alternate package style SOT 143, see VAM series.
* Increase below 1500 MHz.

Using the Selection Guide:
Locate the Mini-Circuits' amplifier best suited for your particular application quickly with this convenient Selection Guide. Amplifiers are grouped into ten major categories and then listed in the sequence of frequency span. If your amplifier requirements are not met by the catalog models listed, we encourage you to contact our Application Engineering Department. You will find them courteous and eager to support your needs with their depth of knowledge coupled with our extensive database on engineering and catalog models.

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		MODEL NO.	FREQ. [MHz] f_L f_U	GAIN [dB] MIN.	MAX[1] POWER [dBm]	N.F. [dB] TYP.	3rd ORDER I.P. [dBm]	VSWR IN	VSWR OUT	DC POWER V VOLT	DC POWER I [mA]	CASE STYLE	STD. CONN.	OPTION
HIGH ISOLATION	PIN	MAN-2AD	2-1000	9.0	-3.5	6.5	+14	2.0:1	2.0:1	+15	22	A05		
		MAN-11AD	2-2000	8.0	-3.5	6.5	+14	3.0:1	2.0:1	+15	22	A05		
		MAN-1AD	5-500	16.0	+7	7.2	+20	1.6:1	1.7:1	+12	85	A05		
	CON	ZFL-2AD	2-1000	9.0	-3.5	6.5	+14	2.0:1	2.0:1	+15	22	Y39	SMA	—
		ZFL-11AD	2-2000	8.0	-3.5	6.5	+14	2.5:1	2.0:1	+15	22	Y39	SMA	—
		ZFL-1HAD	10-500	10.0	+20	7.5	+30	1.3:1	1.35:1	+15	115	SS98	SMA	—
		ZFL-2HAD	50-1000	11.0	+20	5.0	+33	2.0:1	2.0:1	+15	110	SS98	SMA	
		ZHL-1HLD	225-400	23.0	+27	2.5	+40	2.0:1	2.0:1	+24	525	T34	SMA	—
LOW POWER	PIN	MAN-1	0.5-500	28.0	+8	4.5	+18	1.8:1	1.8:1	+12	60	A05		
		MAN-2	0.5-1000	18.0	+9	6.0	+19	1.8:1	1.8:1	+12	85	A05		
		AMP-74	5-500	27.0	+7	5.0	+20	2.0:1	2.0:1	+15	44	PP120		
		AMP-3G	30-3000	8.0	+9.5	3.5	+20	2.6:1	2.5:1	+15	55	PP230		
	CON	ZFL-500	0.05-500	20.0	+9	5.3	+18	1.9:1	1.9:1	+15	60	Y460	SMA	BNC
		ZFL-1000	0.1-1000	17.0	+9	6.0	+18	1.5:1	2.0:1	+15	105	Y460	SMA	—
		ZFL-750	0.2-750	18.0	+9	6.0	+18	1.5:1	2.0:1	+15	90	Y460	SMA	—
		ZJL-7G	20-7000	7.5	+9	5.0	+24	1.5:1	1.5:1	+12	50	BW459	SMA	—
		ZJL-6G	20-6000	10.0	+10	4.5	+24	1.5:1	1.4:1	+12	50	BW459	SMA	—
		ZJL-3G	20-3000	14.0	+8	3.8	+22	1.4:1	1.6:1	+12	45	BW459	SMA	—
MEDIUM POWER	PIN	AMP-2000	10-2000	20.0	+15	5.0	+25	2.0:1	2.0:1	+150	100	QQ96		
	CON	ZHL-6A	.0025-500	21.0	+23	9.5	+34	1.8:1	2.0:1	+24	350	S32	BNC	—
		ZFL-1000H	10-1000	28.0	+20	5.0	+33	2.0:1	2.0:1	+15	150	SS98	SMA	—
		ZFL-1000VH	10-1000	20.0	+25	4.5	+38	2.0:1	2.5:1	+15	320	SS98	SMA	—
		ZFL-1000VH2	10-1000	26.0	+25	5.0	+38	2.0:1	2.5:1	+15	320	SS98	SMA	—
		ZFL-2000	10-2000	20.0	+16	7.0	+25	2.0:1	2.0:1	+15	120	SS98	SMA	—
		ZFL-2500	500-2500	28.0	+15	8.0	+27	2.5:1	2.5:1	+5	220	Y460	SMA	—
		ZFL-2500VH	10-2500	20.0	+24	5.5	+35	1.7:1	2.0:1	+15	300	SS98	SMA	—
		ZHL-1042J	10-4200	25.0	+20	4.5	+30	2.5:1	2.5:1	+15	300	NN92	SMA	—
		ZJL-4G	20-4000	10.0	+11	5.5	+30.5	1.4:1	1.6:1	+12	75	BW459	SMA	—
		ZJL-4HG	20-4000	13.0	+12	4.5	+30.5	1.5:1	1.4:1	+12	75	BW459	SMA	—
		ZJL-5G	20-5000	7.0	+9.5	8.5	+32	1.6:1	1.3:1	+12	80	BW459	SMA	—
		ZKL-2R7	10-2700	20.0	+11	5.0	+30	1.3:1	1.4:1	+12	120	BY493	SMA	—
		ZKL-2R5	10-2500	26.0	+15	5.0	+31	1.4:1	1.4:1	+12	120	BY493	SMA	—
		ZKL-2	10-2000	30.0	+15	4.0	+31	1.4:1	1.4:1	+12	120	BY493	SMA	—
		ZKL-1R5	10-1500	36.0	+15	3.0	+31	1.4:1	1.6:1	+12	115	BY493	SMA	—
		ZRON-8G	2000-8000	20.0	+20	6.0	+30	2.0:1	2.0:1	+15	310	AV243	SMA	—
MEDIUM HIGH POWER	CON	ZHL-32A	.05-130	25.0	+29	10.0	+38	2.0:1	2.0:1	+24	600	S32	BNC	SMA,N
		ZHL-3A	.4-150	24.0	+29.5	11.0	+38	2.0:1	2.0:1	+24	600	S32	BNC	SMA,N
		ZHL-1A	2-500	16.0	+28	11.0	+38	2.0:1	2.0:1	+24	600	S32	BNC	SMA,N
		ZHL-450-75	5-450	9.3	+26	3.5	+48	2.5:1	1.6:1	+12	525	S32	BNC	—
		ZHL-1010-75	50-1000	9.5	+26	3.5	+47	1.5:1	1.5:1	+12	525	S32	BNC	—
		ZHL-2	10-1000	16.0	+29	9.0	+38	2.0:1	2.0:1	+24	600	T34	BNC	SMA,N
		ZHL-2-8	10-1000	27.0	+29	10.0	+38	2.0:1	2.0:1	+24	600	T34	BNC	SMA,N
		ZHL-2-12	10-1200	24.0	+29	4.0	+38	2.0:1	2.0:1	+24	750	T34	SMA	—
		ZHL-1010	50-1000	9.5	+26	3.5	+46	1.5:1	1.5:1	+12	525	S32	SMA	—
		ZHL-2010	50-1000	20.0	+26	3.7	+46	1.5:1	1.5:1	+12	900	S32	SMA	—
		ZHL-3010	50-1000	30.0	+26	5.5	+46	2.0:1	1.6:1	+12	1000	S32	SMA	—
		ZHL-42W	10-4200	30.0	+28	8.0	+38	2.5:1	2.5:1	+15	880	U36	SMA	—
		ZHL-4240W	10-4200	40.0	+28	8.0	+38	2.5:1	2.5:1	+15	900	U36	SMA	—
		ZHL-42	700-4200	30.0	+28	10.0	+38	2.5:1	2.5:1	+15	880	U36	SMA	—
		ZHL-211	800-950	20.0	+29	8.0	+38	1.8:1	1.8:1	+24	600	T34	BNC	SMA
		ZHL-4240	700-4200	40.0	+28	8.0	+38	2.5:1	2.5:1	+15	900	U36	SMA	—
		ZVE-8G	2000-8000	30.0	+30	4.0	+40	2.0:1	2.0:1	+12	2000	BN333	SMA	—
HIGH POWER	CON	ZHL-03-5WF	60-300	30.0	+36	4.0	+47	1.4:1	1.5:1	+24	2800	CP641	SMA	—
		ZHL-5W-1	1-500	40.0	+37	8.0	+49	2.0:1	2.5:1	+24	3300	DDD131	SMA	—
		ZHL-1-2W	5-500	29.0	+33	12.0	+44	2.0:1	2.0:1	+24	900	T35	BNC	SMA,N
		ZHL-900-10W	480-900	19.0	+38	10.0	+50	2.0:1	2.0:1	+24	5500	DDD131	SMA	—
		ZHL-1000-3W	500-1000	38.0	+35	9.0	+45	2.0:1	2.5:1	+24	2000	DDD131	SMA	—
		ZHL-7-2W	600-800	28.0	+33	12.0	+43	2.0:1	2.0:1	+24	900	T35	BNC	SMA,N
VERY HIGH POWER	CON	LZY-1	20-512	39.0	+44	8.6	+54	2.0:1	9.0:1	+26	7300	BT412	SMA	—
		LZY-2	500-1000	40.0	+43	8.0	+54	2.0:1	3.5:1	+28	8000	BT451	SMA	—
LOW DISTORTION FEED FORWARD	CON	ZHL-2-50P3	50-1000	21.0	+25	8.0	+43	2.0:1	2.0:1	+24	650	U200	SMA	—

See Environmental Specifications on the following page.

001113

Environmental Specifications

MODEL NO.	OPERATING TEMP.	AMBIENT	CASE	STORAGE TEMP.	STABILIZATION BAKE [NON-OPER.] 125°C 24 HR.	TEMPERATURE CYCLING [NON-OPER.] -55°C TO 100°C	CONSTANT ACCELERATION (Y1 PLANE) ONLY	BURN-IN (DC. ON) 85°C* 160 HR	SEAL TEST FINE	SEAL TEST GROSS
AMP	-54°C - 85°C		✔	-55°C - 100°C	✔	✔	✔	✔	✔	✔
ERA	-45°C - 85°C		✔	-65°C - 150°C	✔	✔	N.A.	✔	N.A.	N.A.
HELA	-40°C - 110°C		✔	-40°C - 150°C	✔	✔	N.A.	✔	N.A.	N.A.
LZY	-10°C - 50°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
MAN	-54°C - 85°C		✔	-55°C - 100°C	✔	✔	✔	✔	✔	✔
MAR	-20°C - 85°C		✔	-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
MAV	-20°C - 85°C		✔	-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
RAM	-54°C - 125°C		✔	-65°C - 150°C	✔	✔	✔	✔	✔	✔
TO	-54°C - 85°C		✔	-55°C - 100°C	✔	✔	✔	✔	✔	✔
VAM	-20°C - 85°C		✔	-55°C-100°C	✔	✔	N.A.	✔	N.A.	N.A.
VNA	-40°C - 70°C		✔	-55 °C - 150°C	✔	✔	N.A.	✔	N.A.	N.A.
ZEL	-54°C - 85°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZFL	-20°C - 71°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZFL-2500	-20°C - 65°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZHL	-20°C - 65°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZHL-HLN	-54°C - 65°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZHL-03-5WF	-10°C - 65°C	✔		-55 °C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZJL	-40°C - 75°C	✔		-55 °C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZKL	-40°C - 75°C	✔		-55°C - 100°C	✔	✔	N.A.	✔	N.A.	N.A.
ZQL	-40°C - 70°C	✔		-55°C - 100°C	100°C	-55°C - 85°C	N.A.	✔	N.A.	N.A.
ZRON	0°C - 60°C		✔	-55 °C - 125°C	✔	✔	✔	✔	N.A.	✔
ZVE-8G	-55°C - 90°C		✔	-65 °C - 150°C	✔	✔	N.A.	✔	N.A.	N.A.

NOTES: Units are designed and manufactured to meet the environmental specifications as indicated.
* Or max. operating temperature, whichever is less.

MONOLITHIC AMPLIFIERS 50 & 75Ω Surface Mount

HIGH IP3 5 to 1000 MHz

HELA

All specifications at 25°C

KIT◆ NO.	APPLICATION CIRCUIT	FREQ.✪ (MHz) f_L - f_U	OHMS	GAIN[1] (dB) Min.	GAIN[1] (dB) Typ.	GAIN[1] (dB) Max.	GAIN[1] (dB) Typ. Flatness	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR[2] (:1) Typ. In	VSWR[2] (:1) Typ. Out	DC POWER Volt Typ.	DC POWER Current (mA)	THERMAL RESISTANCE[3] θjc °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
HELA-10A	A	50 - 1000	75	10	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6	CM624	kl	19.95
HELA-10B	B	50 - 1000	50	10★	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6	CM624	kl	19.95
HELA-10C	C	5 - 450	75	9.3	11.4	12.5	±0.4	30	26	20	3.5	48	1.3	1.22	12	525	6	CM624	kl	19.95
HELA-10D	D	8 - 300	50	9.3	11.0	12.5	±0.4	30	26	20	3.5	48	1.2	1.2	12	525	6	CM624	kl	19.95

❖ Kit consists of HELA-10 plus transformers, see table below.

features

- very high IP3, 49 dBm typ at 150 MHz & 45 dBm typ at 800 MHz
- excellent flatness, ±0.4 dB typ.
- very high IP2, 88 dBm typ.
- low noise figure, 3.5 dB typ.

applications

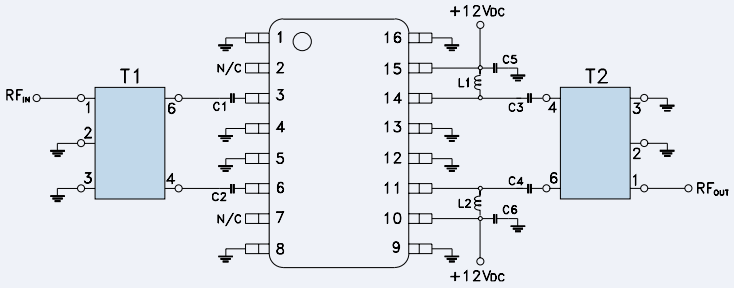
- cellular
- instrumentation
- CATV

absolute maximum ratings

heat slug temperature: 110°C max.
storage temperature: -40°C to 150°
dc voltage: 13V
dc power: 7.15W

Application Schematic Diagram

(see table below for values C1 to C6, L1&L2)



APPLICATION CIRCUIT	T1	T2	C1 TO C6	L1,L2	PCB LAYOUT	EVALUATION BOARD
A	ADTL1-18-75	ADTL1-18-75	0.01µF	0.75µH	B14-TB-30	TB-16
B	ADTL1-12	ADTL1-12	0.01µF	0.75µH	B14-TB-17	TB-17
C	ADT1-1WT	ADTL1-4-75	0.039µF	3.3µH	B14-TB-16	TB-30
D	ADT1.5-1	ADT1.5-1	0.039µF	3.3µH	B14-TB-17	TB-45

Assembly Guideline

Reflow solder the slug to the ground plane; PC board layouts for 75 ohm (B14-TB-16), (B14-TB-30) and for 50 ohm (B14-TB-17) are available upon request. Please contact Applications Department or consult our website.

NOTES:

◆ Aqueous washable
† Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.
★ 9.5 dB min., 800-1000 MHz.
✪ Tested with recommended application schematic diagram.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Includes transformer losses at input & output.
2. For 75 ohm. For 50 ohm, VSWR increases from 1.2:1 at 1 GHz to 2.0:1 at 500 MHz.
3. Thermal resistance is from junction to heat slug.

pin connections

PORT	kl
RF IN	3,6
RF OUT	11,14
DC	10,15
GND EXT.	1,4,5,8,9,12,13,16
NOT USED	2,7

000602

MONOLITHIC AMPLIFIERS 50 & 75Ω Surface Mount

HIGH IP3 5 to 1000 MHz

HELA

All specifications at 25°C

KIT◆ NO.	APPLICATION CIRCUIT	FREQ.✪ (MHz) f_L - f_U	OHMS	GAIN[1] (dB) Min.	GAIN[1] (dB) Typ.	GAIN[1] (dB) Max.	GAIN[1] (dB) Typ. Flatness	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR[2] (:1) Typ. In	VSWR[2] (:1) Typ. Out	DC POWER Volt Typ.	DC POWER Current (mA)	THERMAL RESISTANCE[3] θjc °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
HELA-10A	A	50 - 1000	75	10	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6	CM624	kl	19.95
HELA-10B	B	50 - 1000	50	10★	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6	CM624	kl	19.95
HELA-10C	C	5 - 450	75	9.3	11.4	12.5	±0.4	30	26	20	3.5	48	1.3	1.22	12	525	6	CM624	kl	19.95
HELA-10D	D	8 - 300	50	9.3	11.0	12.5	±0.4	30	26	20	3.5	48	1.2	1.2	12	525	6	CM624	kl	19.95

❖ Kit consists of HELA-10 plus transformers, see table below.

features

- very high IP3, 49 dBm typ at 150 MHz & 45 dBm typ at 800 MHz
- excellent flatness, ±0.4 dB typ.
- very high IP2, 88 dBm typ.
- low noise figure, 3.5 dB typ.

applications

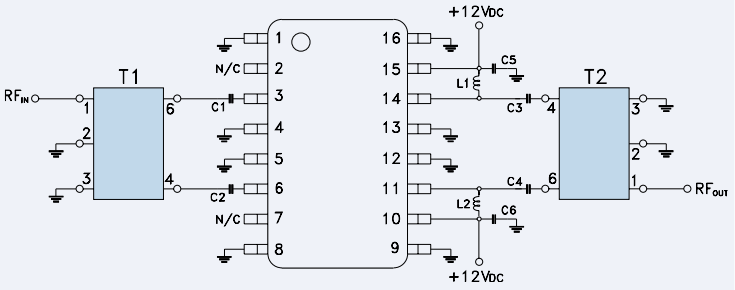
- cellular
- instrumentation
- CATV

absolute maximum ratings

heat slug temperature: 110°C max.
storage temperature: -40°C to 150°
dc voltage: 13V
dc power: 7.15W

Application Schematic Diagram

(see table below for values C1 to C6, L1&L2)



APPLICATION CIRCUIT	T1	T2	C1 TO C6	L1,L2	PCB LAYOUT	EVALUATION BOARD
A	ADTL1-18-75	ADTL1-18-75	0.01µF	0.75µH	B14-TB-30	TB-16
B	ADTL1-12	ADTL1-12	0.01µF	0.75µH	B14-TB-17	TB-17
C	ADT1-1WT	ADTL1-4-75	0.039µF	3.3µH	B14-TB-16	TB-30
D	ADT1.5-1	ADT1.5-1	0.039µF	3.3µH	B14-TB-17	TB-45

Assembly Guideline

Reflow solder the slug to the ground plane; PC board layouts for 75 ohm (B14-TB-16), (B14-TB-30) and for 50 ohm (B14-TB-17) are available upon request. Please contact Applications Department or consult our website.

NOTES:

◆ Aqueous washable
† Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.
★ 9.5 dB min., 800-1000 MHz.
✪ Tested with recommended application schematic diagram.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Includes transformer losses at input & output.
2. For 75 ohm. For 50 ohm, VSWR increases from 1.2:1 at 1 GHz to 2.0:1 at 500 MHz.
3. Thermal resistance is from junction to heat slug.

pin connections

PORT	kl
RF IN	3,6
RF OUT	11,14
DC	10,15
GND EXT.	1,4,5,8,9,12,13,16
NOT USED	2,7

000602

MONOLITHIC AMPLIFIERS 50Ω

BROADBAND DC to 8 GHz


ERA


ERA-SM

low power, up to +13.5 dBm output

all specifications at 25°C

MODEL◆ NO.	✪ FREQ. GHz f_L - f_u	GAIN, dB Typical over frequency, GHz 0.1	1	2	3	4	6	8	Min.@ 2 GHz	Flatness DC-2 GHz	MAXIMUM POWER (dBm) at 2 GHz* Output (1 dB Comp.) Typ.	Min.	Input (no dmg)	DYNAMIC RANGE at 2 GHz* NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In DC-3 GHz	3-f_u** GHz	Out DC-3 GHz	3-f_u** GHz	ABSO-LUTE MAX. RATING[3] I (mA)	P (mW)	DC OPERATING POWER[4] at Pin 3 Current (mA)	Volt. Typ	Min	Max	THERMAL RESIS-TANCE θjc Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (30)
ERA-1	DC-8	12.3	12.1	11.8	10.9	9.7	7.9	8.2	9	±0.3	12.0	10.0	15	4.3	26	1.5	1.8	1.5	1.9	75	330	40	3.4	3.0	4.1	178	VV105	cb	1.37
ERA-2	DC-6	16.2	15.8	15.2	14.4	13.1	11.2	—	13	±0.5	13.0	11.0	15	4.0	26	1.3	1.4	1.2	1.6	75	330	40	3.4	3.0	4.1	155	VV105	cb	1.52
ERA-3	DC-3	22.1	21.0	18.7	16.8	—	—	—	16	±1.7	12.5	9	13	3.5	25	1.5	—	1.4	—	75	330	35	3.2	3.0	4.1	154	VV105	cb	1.67
ERA-1SM	DC-8	12.3	12.1	11.8	10.9	9.7	7.9	8.2	9	±0.3	12.0	10.0	15	4.3	26	1.5	1.8	1.5	1.9	75	330	40	3.4	3.0	4.1	183	WW107	cb	1.42
NEW ERA-21SM	DC-8	14.2	13.9	13.2	12.2	10.8	8.7	8.9	11.2	±0.5	12.6	10.6	15	4.7	26	1.1	1.4	1.3	1.9	75	330	40	3.5	3.0	4.1	194	WW107	cb	1.57
ERA-2SM	DC-6	16.2	15.8	15.2	14.4	13.1	11.2	—	13	±0.5	13.0	11.0	15	4.0	26	1.3	1.4	1.2	1.6	75	330	40	3.4	3.0	4.1	160	WW107	cb	1.57
NEW ERA-33SM	DC-3	19.3	18.7	17.4	15.9	—	—	—	15	±0.9	13.5	11.5	13	3.9	28.5	1.6	—	1.25	—	75	330	40	4.3	3.8	4.8	140	WW107	cb	1.72
ERA-3SM	DC-3	22.1	21.0	18.7	16.8	—	—	—	16	±1.7	12.5	9	13	3.5	25	1.5	—	1.4	—	75	330	35	3.2	3.0	4.1	159	WW107	cb	1.72

features

- low thermal resistance
- miniature microwave amplifier
- available in drop-in & surface mount (sm) versions
- frequency range, DC to 8 GHz, usable to 10 GHz
- up to 18.5 dBm typ. (16.5 dBm min) output power

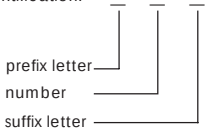
absolute maximum ratings

operating temperature: -45°C to 85°C
storage temperature: -65° to 150°C

model identification

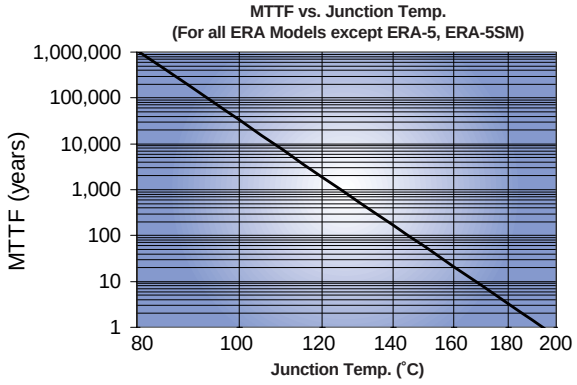
Model	marking (see note below)
ERA-1, ERA-1SM	1
ERA-2, ERA-2SM	2
ERA-21SM	21
ERA-3, ERA-3SM	3
ERA-33SM	33
ERA-4, ERA-4SM	4
ERA-5, ERA-5SM	5
ERA-50SM	50
ERA-51SM	51
ERA-6, ERA-6SM	6

Note: Prefix letter (optional) designates assembly location. Suffix letters (optional) are for wafer identification.



NOTES:

◆ Aqueous washable
* at 1 GHz for ERA-4,5,6, 4SM, 5SM, 50SM, 51SM, 6SM
** f_u is the upper frequency limit for each model as shown in the table.
*** Gain, gain flatness, and VSWR are specified at 1.5 GHz.
✪ Low frequency cutoff determined by external coupling capacitors.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Model number designated by alphanumeric code marking.
2. ERA-SM models available on tape and reel.
3. Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.
4. Reliability predictions and normal operating conditions are applicable at current specified.



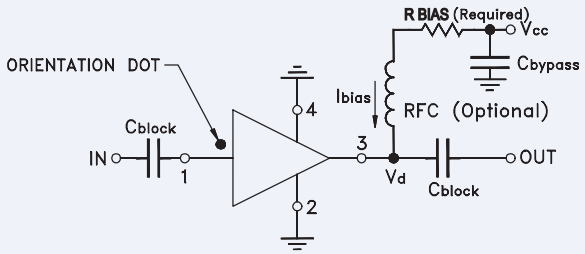
010510

medium power, up to +18.4 dBm output

all specifications at 25°C

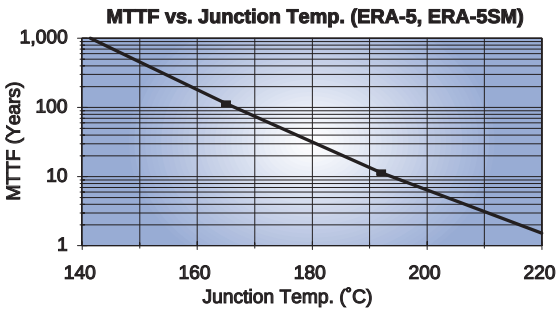
MODEL◆ NO.	✪ FREQ. GHz f_L - f_u	GAIN, dB Typical over frequency, GHz 0.1	1	2	3	4	6	8	Min.@ 2 GHz	Flatness DC- 2 GHz	MAXIMUM POWER (dBm) at 2 GHz* Output (1 dB Comp.) Typ.	Min.	Input (no dmg)	DYNAMIC RANGE at 2 GHz* NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In DC-3 GHz	3-f_u** GHz	Out DC-3 GHz	3-f_u** GHz	ABSO-LUTE MAX. RATING[3] I (mA)	P (mW)	DC OPERATING POWER[4] at Pin 3 Current (mA)	Volt. Typ	Min	Max	THERMAL RESIS-TANCE θjc Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (30)
ERA-6	DC-4	12.6	12.5	12.2	11.7	11.3	—	—	10.5	±0.2	17.9	16	20	4.5	36	1.3	1.2	1.6	1.8	120	650	70	5.0	4.6	5.6	170	VV105	cb	3.85
ERA-4	DC-4	14.3	14.0	13.4	12.7	11.8	—	—	11	±0.4	17.3	15	20	4.2	34	1.2	1.2	1.3	1.8	120	650	65	4.5	4.2	5.5	163	VV105	cb	3.85
ERA-5	DC-4	20.2	19.5	18.5	17.3	16.2	—	—	16	±1.0	18.4	16.5	13	4.3	32.5	1.3	1.3	1.2	1.3	120	650	65	4.9	4.2	5.5	278	VV105	cb	3.85
ERA-6SM	DC-4	12.6	12.5	12.2	11.7	11.3	—	—	10.5	±0.2	17.9	16	20	4.5	36	1.3	1.2	1.6	1.8	120	650	70	5.0	4.6	5.6	175	WW107	cb	3.90
ERA-4SM	DC-4	14.3	14.0	13.4	12.7	11.8	—	—	11	±0.4	17.3	15	20	4.2	34	1.2	1.2	1.3	1.8	120	650	65	4.5	4.2	5.5	168	WW107	cb	3.90
NEW ERA-51SM	DC-4	18.0	17.4	16.1	14.8	12.5	—	—	14	±1.0	18.1	16.5	13	4.1	33	1.1	1.2	1.2	1.9	120	650	65	4.5	4.2	5.5	154	WW107	cb	3.90
ERA-5SM	DC-4	20.2	19.5	18.5	17.3	16.2	—	—	16	±1.0	18.4	16.5	13	4.3	32.5	1.3	1.3	1.2	1.3	120	650	65	4.9	4.2	5.5	283	WW107	cb	3.90
NEW ERA-50SM***	DC-1.5	20.7	19.4	18.3	—	—	—	—	16	±1.2	17.2	16.0	13	3.5	32.5	1.3	—	1.2	—	120	650	60	4.4	4.0	4.9	177	WW107	cb	2.95

typical biasing configuration



R BIAS
"1%" Resistor Values (ohms) for Optimum Biasing of ERA Models

Vcc	ERA-1, 1SM	ERA-2, 2SM	ERA-21SM	ERA-3, 3SM	ERA-33SM	ERA-4, 4SM	ERA-5, 5SM	ERA-50SM, 51SM	ERA-6, 6SM
7	90.9	88.7	88.7	107	69.8	38.3	40.2	40.2	30.1
8	113	113	113	133	93.1	52.3	53.6	53.6	43.2
9	137	137	137	162	115	66.5	68.1	68.1	56.2
10	162	162	162	191	140	80.6	82.5	82.5	69.8
11	187	187	187	221	165	95.3	97.6	97.6	84.5
12	215	215	210	249	191	110	113	113	97.6
13	237	237	237	280	215	127	127	127	113
14	261	261	261	309	243	143	143	143	127
15	287	287	287	340	267	158	158	158	140
16	309	316	316	365	287	174	174	174	154
17	332	340	340	392	316	187	191	191	169
18	357	365	365	422	340	205	205	205	182
19	383	392	392	453	365	221	221	221	196
20	412	412	412	475	392	237	237	237	210



designers kits available

KIT NO.	Model Type	No. of Units in Kit	Description	Price $ per kit
K1-ERA	ERA	30	10 of each 1,2,3	49.95
K2-ERA	ERA	20	10 of each 4,5	69.95
K1-ERASM	ERA-SM	30	10 of each 1SM, 2SM,3SM	49.95
K2-ERASM	ERA-SM	20	10 of each 4SM, 5SM	69.95
K3-ERASM	ERA-SM	30	10 of each 4SM, 5SM, 6SM	99.95

pin connections

PORT	cb
RF IN	1
RF OUT	3
DC	3
CASE GND	2,4
NOT USED	—

NSN GUIDE

MCL NO.	NSN
ERA-1SM	5962-01-459-9075
ERA-2SM	5962-01-459-7410
ERA-3SM	5962-01-459-9314

010621

MONOLITHIC AMPLIFIERS 50 Ω

BROADBAND DC to 3 GHz


MAR-SM


MAV-SM

up to +17.5 dBm output

MODEL◆ NO.	FREQ.✪ (MHz)	GAIN (dB) Typical at MHz 100	1000	2000	Note 1 Min.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In	Out	ABSOLUTE MAXIMUM RATING[7] (25°C) I (mA)	P (mW)	DC OPERATING POWER[8] at Pin 3 Current (mA)	Volt Typ.	THERMAL RESISTANCE[6] θjc °C/W	CASE STYLE Note B1	CONNECTION	PRICE $ Qty. (30)
MAR-1SM	DC-1000	18.5	15.5	—	13.0	+1.5	+13	5.5	+14.0	1.3	1.2	40	200	17	5.00	115	WW107	cb	1.04
MAR-2SM	DC-2000	12.5	12.0	11.0	8.5	+4.5	+13	6.5	+17.0	1.5	1.4	60	325	25	5.00	105	WW107	cb	1.17
MAR-3SM	DC-2000	12.5	12.0	10.5	8.0	+10.0	+13	6.0	+23.0	1.5	1.7	70	400	35	5.00	115	WW107	cb	1.24
MAR-4SM	DC-1000	8.3	8.0	—	7.0	+12.5	+13	7.0	+25.5	1.5	1.9	85	500	50	5.25	100	WW107	cb	1.34
MAR-6SM	DC-2000	20.0	16.0	11.0	9.0	+2.0	+13	3.0	+14.5	1.7	1.7	50	200	16	3.50	120	WW107	cb	1.21
MAR-7SM	DC-2000	13.5	12.5	11.0	8.5	+5.5	+13	5.0	+19.0	1.7	1.7	60	275	22	4.00	120	WW107	cb	1.36
MAR-8SM	DC-1000	32.5	22.5	—	19.0	+12.5	+13	3.3	+27.0	#	#	65	500	36	7.80	140	WW107	cb	1.32
MAV-11SM	50-1000	12.7	10.5	—	9.0	+17.5	+13	3.6	+30.0	1.5	1.7	80	550	60	5.50	125	RRR137	cb	1.62

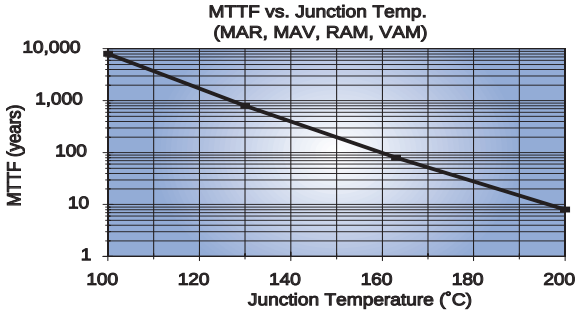
NOTES:

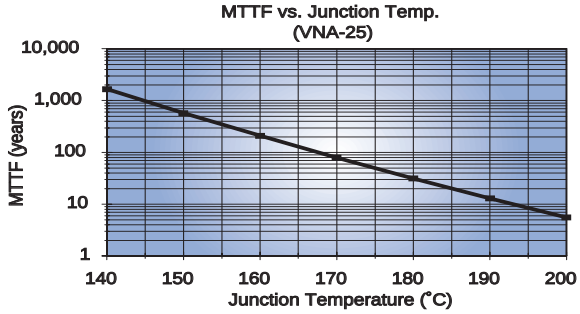
◆ Aqueous washable
☆ Increases below 1500 MHz.
* RAM models are hermetically sealed.
★ Max. Voltage 7V at pin 1 (DC power). Max. voltage 10V at pins 3,6, DC or transient.
❖ Price of RAM models is for 1-9 quantity.
\# Dash-8 models input and output impedances are not 50 ohms, see S-parameter data. Conditionally stable, source and load VSWR<3:1 required. Dash-6 models conditionally stable, source and load VSWR<5:1 required.
✪ Low frequency cutoff determined by external coupling capacitors.
† Specification at 500 MHz.
†† Specification at 2500 MHz.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B1. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings". Alternative case styles VV105 or BBB123 available, consult factory.
C. Prices and Specifications subject to change without notice.
1. Minimum gain at highest frequency, except VAM-93 at 2 GHz. Full temperature range, except room temperature for Dash-4 models.
2. Model number designated by color dot or alphanumeric code marking.
3. Frequency at which output power, NF and IP3 are specified: 500 MHz for MAR-1SM, MAR-6SM, RAM-1, RAM-6, MAV-11SM, VAM-6, 2 GHz for VAM-93, 1000 MHz for all other models.
4. Dash-6 models potentially unstable with very high VSWR terminations.
6. Thermal resistance θjc is from hottest junction in the device to the mounting surface of the leads.
7. Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.
8. Reliability predictions and normal operating conditions are applicable at current specified.

model identification

Model	marking (see note below)
MAR-1SM (see note below)	01
MAR-2SM	02
MAR-3SM	03
MAR-4SM	04
MAR-6SM	06
MAR-7SM	07
MAR-8SM	08
RAM-1	1 or 01
RAM-2	2 or 02
RAM-3	3 or 03
RAM-4	4 or 04
RAM-6	6 or 06
RAM-7	7 or 07
RAM-8	8 or 08
MAV-11SM	A
VAM-3	03
VAM-6	06
VAM-7	07
VAM-93	93
VNA-25	-25

Notes:
- Prefix letter (optional) designates assembly location.
- MAR-1SM: limited availability; consult factory.





010524

* RAM

VAM

VNA

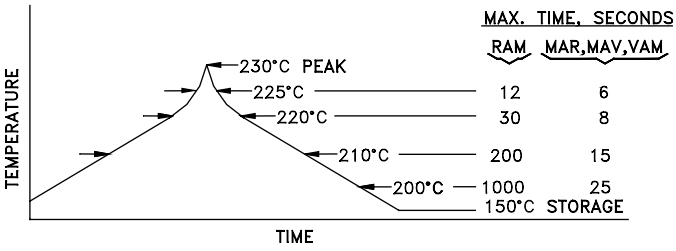
up to +18.2 dBm output

MODEL◆ NO.	FREQ.✪ (MHz)	GAIN (dB) Typical at MHz 100	1000	2000	3000	Note 1 Min.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In	Out	ABSOLUTE MAXIMUM RATING[7] (25°C) I (mA)	P (mW)	DC OPERATING POWER[8] at Pin 3 Current (mA)	Volt Typ.	THERMAL RESISTANCE[6] θjc °C/W	CASE STYLE Note B	CONNECTION	PRICE◆ $ Qty. (30)
* RAM-1	DC-1000	19.0	15.5	—	—	13.0	+1.5	+13	5.5	+14.0	1.3	1.3	40	200	17	5.00	150	AF190	cb	4.95
* RAM-2	DC-2000	12.5	11.8	11.0	—	8.5	+4.5	+13	6.5	+17.0	1.2	1.4	60	325	25	5.00	145	AF190	cb	4.95
* RAM-3	DC-2000	12.5	12.0	10.5	—	8.0	+10.0	+13	6.0	+23.0	1.6	1.7	80	425	35	5.00	150	AF190	cb	4.95
* RAM-4	DC-1000	8.5	8.0	—	—	7.0	+12.5	+13	6.5	+25.5	1.4	1.9	100	540	50	5.25	140	AF190	cb	4.95
* RAM-6	DC-2000	20.0	16.0	11.0	—	9.0	+2.0	+13	2.8	+14.5	1.4	1.3	50	200	16	3.50	155	AF190	cb	4.95
* RAM-7	DC-2000	13.5	12.5	11.0	—	8.5	+5.5	+13	4.5	+19.0	2.0	1.8	60	275	22	4.00	155	AF190	cb	4.95
* RAM-8	DC-1000	32.5	23.0	—	—	19.0	+12.5	+13	3.0	+27.0	#	#	65	420	36	7.80	175	AF190	cb	4.95
VAM-3	DC-2000	11.5	11.0	9.5	—	7.5	+9.0	+13	6.0	+22.0	1.5	1.7	60	240	35	4.70	500	MMM168	cb	1.19
VAM-6	DC-2000	19.5	15.0	10.0	—	8.0	+2.0	+13	3.0	+14.0	1.6	1.5	40	125	16	3.30	505	MMM168	cb	1.16
VAM-7	DC-2000	13.0	12.0	9.8	—	7.8	+5.5	+13	5.0	+18.0	1.5	1.5	50	175	22	3.80	505	MMM168	cb	1.31
NEW VAM-93	DC-3000	22.3	21.2	19.1	17.1	17.0	+12.7	+13	3.7	+27.0	1.5	1.1	75	330	35	3.2	159	MMM168	cb	1.19
VNA-25	500-2500	14.0†	18.0	16.0††	—	11.5	+18.2	+10	5.5	+27.0	1.5☆	1.6	105	1000	85	5.0★	125	XX211	hj	4.25

features

- cascadable
- excellent repeatability
- wide bandwidth, DC to 2500 MHz
- unconditionally stable, most models
- low cost
- hermetically sealed, RAM models
- low noise figure, 2.8 dB typ
- high output power, up to +18 dBm typ

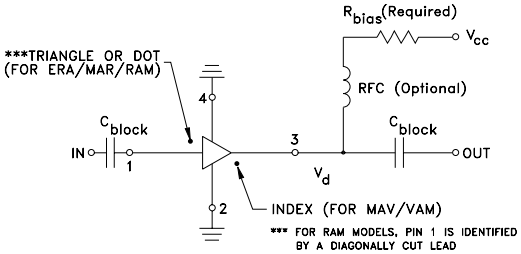
REFLOW – SOLDERING PROFILE



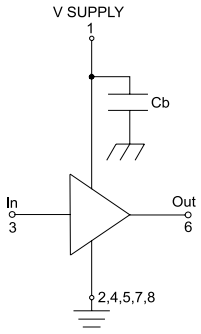
pin connections

PORT	cb	hj
RF IN	1	3
RF OUT	3	6
DC	3	1
GND EXT	2,4	2,4,5,7,8
NOT USED	—	—

typical biasing configuration
ERA/MAR/MAV/RAM/VAM



biasing configuration
VNA



NSN GUIDE

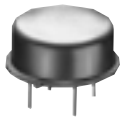
MCL NO.	NSN
MAR-1SM	5962-01-414-8635
MAR-3SM	5962-01-423-1569
MAR-6SM	5962-01-460-6063
RAM-6	5996-01-450-5504

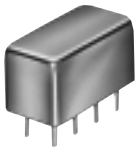
DESIGNERS KITS AVAILABLE
SEE PAGES 16&17

010522

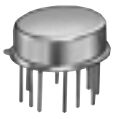
LOW-NOISE AMPLIFIERS 50Ω

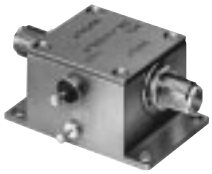
BROADBAND, LINEAR 0.1 to 2700 MHz


AMP


MAN


ZFL


TO


ZEL

up to +16 dBm output

MODEL NO.	FREQ. (MHz) f_L-f_U	NF (dB) Typ.	GAIN (dB) Min.	Flatness m	Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.)	MAXIMUM POWER (dBm) Input (no damage)	INTERCEPT POINT (dBm) IP3 Typ.	VSWR Typ. In	VSWR Typ. Out	DC POWER Volt (V)	DC POWER Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
AMP-11-2	5-1000	3.0	14	±1.0	±1.0	-3.5	+13	+13	2:1	2:1	15	12	PP120	cd	44.95
AMP-15	5-1000	2.8	13	±0.6	±1.2	+8	+13	+22	2:1	2:1	15	29	PP120	cd	49.95
AMP-75	5-500	2.4	19	±0.4	±1.0	+12	+13	+28	2:1	2:1	15	29	PP120	cd	49.95
AMP-76	5-500	3.1	26	±0.7	±1.0	+13.5	+6	+28	2:1	2:1	15	68	PP120	cd	78.95
AMP-77	5-500	3.3	15	±0.4	±1.0	+16	+13	+32	2:1	2:1	15	56	PP120	cd	55.95
MAN-1LN**	0.5-500	3.0	28	±0.5	±1.4	+7	+15	+18	1.8:1	1.8:1	12	60	A05	cc	19.95
MAN-1HLN	10-500	3.7	10	±0.5	±0.8	+15	+15	+30	1.8:1	1.8:1	12	70	A06	cc	19.95
ZFL-500HLN	10-500	3.8	19	—	±0.4	+16	+15	+30	2:1	2:1	15	110	Y460	—	99.95
ZFL-500LN*	0.1-500	2.9	24	—	±0.5	+5	+5	+14	1.5:1	1.6:1	15	60	Y460	—	79.95
ZFL-1000LN	0.1-1000	2.9	20	—	±0.5	+3	+5	+14	1.5:1	2:1	15	60	Y460	—	89.95

m = mid range [2 f_L to f_U/2]

features

- very low noise
- ideal for printed-circuit designs (AMP,MAN & TO series)
- high dynamic range (ZHL- HLN & ZQL series)
- smooth response over entire band, no external resonances
- low impedance, less susceptible to EMI
- easy to use, 50 ohm input/output
- all models are cascadable

NOTES:

* VSWR 1.6:1 maximum from 0.1 to 0.2 MHz. Also available with BNC connectors.
** Below 5 MHz, 1 dB compression point decreases to 6.5 dBm.
▲ Available only with SMA connectors
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Absolute maximum power, voltage and current rating:
1a. AMP models, 17V DC. 1b. MAN models, 12.5V DC. 1c. ZQL models, 17V DC.
2. Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.
3. ZEL and TO models, NF specified at room temperature, increases to 2 dB typical at +85 deg.C.
4. ZHL models, NF specified at room temperature, increases to 2.3 dB maximum at +65 deg.C.

NSN GUIDE

MCL NO.	NSN
AMP-15	5895-01-350-9550
AMP-75	5895-01-350-9551
AMP-77	5895-01-350-9549
ZFL-1000LN	5996-01-412-3031

000614

ZQL

ZHL-case S32

ZHL-case NN92

up to +27 dBm output

	MODEL NO.	FREQ. (MHz) f_L-f_U	NF (dB) Max.	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	MAXIMUM POWER (dBm) Input (no damage)	INTERCEPT POINT (dBm) IP3 Typ.	VSWR Max. In	VSWR Max. Out	DC POWER Volt (V)	DC POWER Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	TO-0812LN	800-1200	1.6	20	±1.0	+8	+13	+18	2.5:1	2.5:1	15	70	QQ96	ce	199.00
	TO-1217LN	1200-1700	1.6	20	±1.0	+10	+13	+25	2.5:1	2.5:1	15	70	QQ96	ce	199.00
	TO-1724LN	1700-2400	1.6	20	±1.0	+10	+13	+22	2.5:1	2.5:1	15	70	QQ96	ce	199.00
▲	ZEL-0812LN	800-1200	1.5	20	±1.0	+8	+13	+18	2.5:1	2.5:1	15	70	EEE132	—	274.95
▲	ZEL-1217LN	1200-1700	1.5	20	±1.0	+10	+13	+25	2.5:1	2.5:1	15	70	EEE132	—	274.95
▲	ZEL-1724LN	1700-2400	1.5	20	±1.0	+10	+13	+22	2.5:1	2.5:1	15	70	EEE132	—	274.95
▲	ZHL-0812MLN	800-1200	1.6	28	±1.0	+20	0	+33	2.5:1	2.5:1	15	300	S32	—	295.00
▲	ZHL-1217MLN	1200-1700	1.5	30	±1.0	+20	0	+34	2.5:1	2.5:1	15	300	S32	—	295.00
▲	ZHL-1724MLN	1700-2400	1.5	28	±1.0	+20	0	+32	2.5:1	2.5:1	15	300	S32	—	295.00
▲	ZHL-0812HLN	800-1200	1.5	30	±1.0	+26	+10	+36	2.4:1	2.4:1	15	725	NN92	—	399.50
▲	ZHL-1217HLN	1200-1700	1.5	30	±1.0	+26	+10	+36	2.4:1	2.4:1	15	725	NN92	—	399.50
▲	ZHL-1724HLN	1700-2400	1.5	30	±1.0	+26	+10	+36	2.4:1	2.4:1	15	725	NN92	—	399.50
									Typ.						
	ZQL-900LNW	800-900	1.6	13	±1.6	+21	+10	+35	1.2:1	1.1:1	15	160	CW686	—	229.00
	ZQL-900LN	824-849	1.3	15	±0.5	+21	+10	+35	1.2:1	1.1:1	15	160	CW686	—	229.00
	ZQL-1900LNW	1700-2000	1.6	14	±1.8	+18.5	+10	+37	1.15:1	1.25:1	15	160	CW686	—	249.00
	ZQL-1900LN	1850-1910	1.5	15	±0.5	+19	+10	+37	1.15:1	1.25:1	15	160	CW686	—	249.00
	ZQL-900MLNW	800-900	1.7	22	±2.2	+23	+3	+41	1.3:1	1.4:1	15	230	CW686	—	249.00
	ZQL-900MLN	824-849	1.5	25.5	±0.5	+24.5	+3	+41	1.3:1	1.4:1	15	230	CW686	—	249.00
	ZQL-1900MLNW	1800-2000	1.6	23	±2.0	+25	+3	+41	1.4:1	1.25:1	15	310	CW686	—	265.00
	ZQL-1900MLN	1850-1910	1.5	25	±0.7	+26	+3	+41	1.25:1	1.2:1	15	310	CW686	—	265.00
NEW	ZQL-2700MLNW	2200-2400	1.3	25	±1.0	+25	+3	+38	1.25:1	1.15:1	15	325	CW686	—	281.95
		2200-2700	1.5	25	±2.3	+25	+3	+38	1.25:1	1.15:1	15	325			

pin connections

PORT	cc	cd	ce
RF IN	1	2	5
RF OUT	8	4	11
DC	5	1	2
CASE GND	2,3,4,6	3	1,3,4,6,7,8,9,10,12
NOT USED	7	—	—

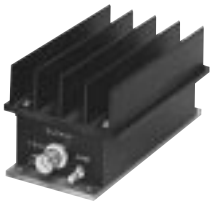
010523


AMP-case QQ96


AMP-case PP120


MAN


ZFL-case Y39/460


ZHL-1HLD

VARIABLE GAIN 10 to 1200 MHz

up to 20 mW (+13 dBm) output

MODEL NO.	FREQ. (MHz)	GAIN (dB)			MAXIMUM POWER (dBm)		DYNAMIC RANGE		VSWR		DC POWER		CASE STYLE	CONNECTION	PRICE $
	f_L-f_U	Min.	Flatness Max.	Control range	Output (1 dB Comp.)	Input (no damage)	NF (dB) Typ.	IP3 (dBm) Typ.	In	Out	Volt (V)	Current (mA)	Note B		Qty. (1-9)
ZFL-1000GH *	10-1200	24	±1.5	30**	+13	+10	15	+25	2.2:1	2:1	15	170	Y39	-	219.00
ZFL-1000G *	10-1000	17	±1.5	30**	+3	+10	12	+13	2:1	2:1	15	100	Y39	-	199.00

* ZFL-1000GH and ZFL-1000G, all specifications at 0 Volts control voltage.
** Response time (10% to 90%) 25µsec., control voltage 0 to 5 volts.

HIGH ISOLATION 2 to 2000 MHz

up to 500 mW (+27 dBm) output

MODEL NO.	FREQ. (MHz)	GAIN (dB)			MAXIMUM POWER (dBm)			DYNAMIC RANGE		VSWR Typ.		ACTIVE DIRECTIVITY* (dB)				DC POWER		CASE STYLE	CONNECTION	PRICE $
			Flatness Max.		Output (1 dB Comp.)		Input (no damage)	NF (dB) Typ.	IP3 (dBm) Typ.			L_w		U		Volt (V)	Current (mA)			Qty. (1-9)
	f_L-f_U	Min.	m	Total range	L_w	U				In	Out	Typ.	Min	Typ.	Min			Note B		
MAN-1AD	5-500	16	±0.5	±1.0	+7	+6	+15	7.2	+20	1.6	1.7	35	25	30	20	12	85	A05	cc	26.45
MAN-11AD	2-2000	8	±0.5	±1.5	-2	-3.5[a]	+10	6.5	+14	3.0	2.0	21	14	16	12	15	22	A06	cc	31.95
MAN-2AD	2-1000	9	±0.4	±0.7	-2	-3.5	+10	6.5	+14	2.0	2.0	24	19	19	14	15	22	A06	cc	23.95
ZFL-11AD	2-2000	8	±0.5	±1.3	-2	-3.5[a]	+10	6.5	+14	2.5	2.0	21	14	16	12	15	22	Y39	-	91.95
ZFL-2AD	2-1000	9	±0.4	±0.5	-2	-3.5	+10	6.5	+14	2.0	2.0	24	19	19	14	15	22	Y39	-	83.95
ZFL-1HAD**	10-500	10	—	±1.0	+20	+20	+17	7.5	+30	1.3	1.35	30	20	25	18	15	115	SS98	-	210.00
ZFL-2HAD	50-1000	11	±0.7	±1.0	+20	+20	+15	5.0	+33	2.0	2.0	30	20	21	15	15	110	SS98	-	264.95
▲ ZHL-1HLD	225-400	23	—	±1.0	+27	+27	+10	2.5	+40	2.0	2.0	34	28	34	28	24	525	T34	-	395.00

L_w = low range [f_L to $f_U/2$] m = mid range [$2f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]

* Active Directivity (dB) = Isolation (dB) - Gain (dB)
**Input VSWR of ZFL-1HAD in 10-20 MHz band increases to 1.45:1 at -55 deg.C.
Below 50 MHz, NF increases to 11 dB typ at 10 MHz.
[a]Above 1 GHz, -5 dBm min.

NOTES:
✣ Max. voltage Vdc
❋ Available only with BNC connectors
▲ Available only with SMA connectors
▼ SMA standard: Also available with BNC or type N connectors, please consult factory.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Absolute maximum power, voltage and current rating (for medium-pwr see note ✣)
1a. AMP models, 17V DC
1b. 12-V MAN models, 12.5V DC (except MAN-1AD, 14 V DC),15-V MAN models, 16V DC
1c. ZFL models, 17V DC (except ZFL-AD, 16V DC)
1d. ZHL-1HLD, 25V DC
1e. ZJL models, 13V DC
2. Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.

NSN GUIDE

MCL NO.	NSN
ZFL-1000G	5996-01-464-8970
ZFL-1000H	5996-01-299-5588
ZFL-1000VH	5996-01-454-6938
ZFL-2000	5996-01-220-2213
ZFL-2000B	5996-01-220-2213
ZHL-6A	5996-01-330-3533

pin connections

PORT	cc	cd	ce
RF IN	1	2	5
RF OUT	8	4	11
DC	5	1	2
CASE GND	2,3,4,6	3	1,3,4,6,7 8,9,10,12
NOT USED	7	—	—

010717


ZJL


ZKL


ZFL-case SS98


ZRON


ZHL-A


ZHL-1042J

LOW POWER 50 kHz to 7000 MHz

up to 16 mW (+12 dBm) output

MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Typ.	Min.	Flatness Typ.(1)	Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) L_w	U	Input (no damage)	DYNAMIC RANGE(1) NF (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. In	Out	DC POWER Volt (V)	Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZJL-7G	20-7000	10	7.5	±1.0	—	+8	+9	+15	5.0	+24	1.5:1	1.5:1	12	50	BW459	–	99.95
ZJL-6G	20-6000	13	10	±1.6	—	+9	+10	+15	4.5	+24	1.5:1	1.4:1	12	50	BW459	–	114.95
ZJL-3G	20-3000	19	14	±2.2	—	+8	+8	+13	3.8	+22	1.4:1	1.6:1	12	45	BW459	–	114.95
▼ ZFL-500	0.05-500	—	20	—	±1.0	—	+9	+5	5.3	+18	1.9:1	1.9:1	15	80	Y460	-	69.95
ZFL-750	0.2-750	—	18	—	±0.5	—	+9 ***	+5	6.0	+18	1.5:1	2:1	15	90	Y460	-	74.95
ZFL-1000	0.1-1000	—	17	—	±0.6	—	+9 *	+5	6.0	+18	1.5:1	2:1*	15	105	Y460	-	79.95
AMP-3G	30-3000	—	8	—	±0.75	+9.5	+9.5	+13	3.5**	+20	2.6:1	2.5:1	15	55	PP230	cd	89.95
AMP-74	5-500	—	27	—	±1.0	+7.0	+7.0	+13	5.0	+20	2:1	2:1	15	44	PP120	cd	54.95
MAN-1	0.5-500	—	28	—	±1.4	+8	+8	+15	4.5	+18	1.8:1	1.8:1	12	60	A05	cc	15.95
MAN-2	0.5-1000	—	18	—	±1.5	+9	+7	+15	6.0	+19	1.8:1	1.8:1	12	85	A05	cc	19.95

L_w = low range [f_L to f_U/2] U = upper range [f_U/2 to f_U]

* ZFL-1000 output VSWR 2.8:1 maximum over 750-1000 MHz; 1 dB compression +7 dBm at 500-1000 MHz
** NF increases with decreasing frequency, 5 dB typical at 300 MHz, and 10 dB typical at 30 MHz.
*** +7 dBm from 500 to 750 MHz.
(1) ZJL models: Flatness specified to 0.75 f_U, dynamic range at 2 GHz

MEDIUM POWER 2.5 kHz to 8000 MHz

up to 320 mW (+25 dBm) output

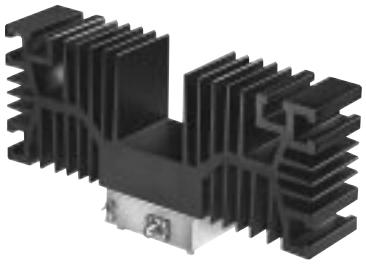
MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Typ.	Min.	Flatness Typ.(1)	Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.)	Input (no damage)	DYNAMIC RANGE(1) NF (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. In	Out	DC POWER Volt✣ (V)	Current (mA)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
AMP-2000	10-2000	—	20	—	±1.5	+15	+5	5	+25	2:1	2:1	15	100	QQ96	ce	139.95
ZFL-2000	10-2000	—	20	—	±1.5	+16*	+5	7	+25	2:1	2:1	15	120	SS98	–	219.00
ZFL-2500	500-2500	—	28	—	±1.5	+15	+5	8	+27	2.5:1	2.5:1	5	220	Y460	–	99.95
ZFL-2500VH	10-2500	—	20	—	±1.5	+23	+10	5.5	+35	1.7:1*	2:1*	15	300	SS98	–	264.95
ZFL-1000H	10-1000	—	28	—	±1.0	+20	+5	5	+33	2:1	2:1	15	160	SS98	–	219.00
ZFL-1000VH	10-1000	—	20	—	±1.0	+25	+15	4.5	+38	2:1**	2.5:1	15	320	SS98	–	229.00
ZFL-1000VH2	10-1000	28	26	—	±1.0	+25	+15	5.0	+38	2:1	2.5:1	15	320	SS98	–	249.00
ZRON-8G	2000-8000	—	20	—	±1.5★	+20	+10	6	+30	2:1	2:1	15	310	AV243	–	495.00
✱ ZHL-6A	.0025-500	25	21	—	±1.2	+22	+10	9.5***	+34	1.8:1	2:1***	24	350	S32	–	199.00
ZHL-1042J	10-4200	—	25	—	±1.5	+20	+10	6	+30	2.5:1	2.5:1	15	330	NN92	–	495.00
						L_w	U									
ZJL-4G	20-4000	12.4	10.0	±0.25	—	+13.5	+11	+20	5.5	+30.5	1.4:1	1.6:1	12	75	BW459	–	129.95
ZJL-4HG	20-4000	17.0	13.0	±1.5	—	+15.0	+12	+13	4.5	+30.5	1.5:1	1.4:1	12	75	BW459	–	129.95
ZJL-5G	20-5000	9.0	7.0	±0.55	—	+15.0	+9.5	+20	8.5	+32	1.6:1	1.3:1	12	80	BW459	–	129.95
ZKL-2R7	10-2700	24.0	20.0	—	±0.7	+13	+11	+13	5.0	+30	1.3:1	1.4:1	12	120	BY493	–	149.95
ZKL-2R5	10-2500	30.0	26.0	—	±1.5	+15	+15	+13	5.0	+31	1.4:1	1.4:1	12	120	BY493	–	149.95
ZKL-2	10-2000	33.5	30.0	—	±1.0	+15	+15	+13	4.0	+31	1.4:1	1.4:1	12	120	BY493	–	149.95
ZKL-1R5	10-1500	40.0	36.0	—	±1.2	+15	+15	+13	3.0	+31	1.4:1	1.6:1	12	115	BY493	–	149.95

L_w = low range [f_L to f_U/2] U = upper range [f_U/2 to f_U]

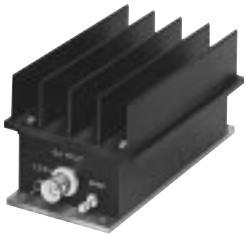
* +15 dBm below 1000 MHz
** Input VSWR 2:1 max, increasing below 20 MHz to 2.25:1 max at 10 MHz.
*** NF continually increases from 70 MHz to 10 MHz by approximately 4 dB.
• Max. VSWR In 2.0:1, Out 2.5:1
★ Measured at 25°C.
(1) ZJL models: Flatness specified to 0.75 f_U, dynamic range at 2 GHz.

001103

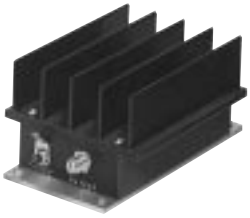
MEDIUM HIGH POWER 50 kHz to 8 GHz



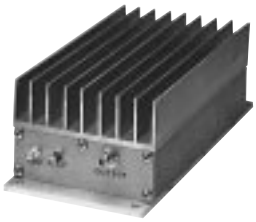
✤ ZVE



ZHL-case T34



ZHL-case S32



ZHL-42

up to 1W (+30 dBm) output

	MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR Max. In	VSWR Max. Out	DC POWER Volt (V)	DC POWER Current (A)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
■▲	ZHL-450-75	5-450	9.3	±0.7	+26	+20	3.5✦	+48	2.5:1	1.6:1	12	0.525	S32	—	149.95
■▲	ZHL-1010-75	50-1000	9.5	±0.7	+26	+20	3.5	+47	1.5:1	1.5:1	12	0.525	S32	—	149.95
▲☆	ZHL-1010	50-1000	9.5	±0.6	+26	+22	3.5	46	2:1	2:1	12	0.525	S32	—	149.95
▲☆	ZHL-2010	50-1000	20	±0.8	+26	+11	3.7	46	2:1	2:1	12	0.90	S32	—	169.95
▲☆	ZHL-3010	50-1000	30	±1.0	+26	-3	5.5	46	2.5:1	2:1	12	1.0	S32	—	179.95
✤	ZVE-8G	2000-8000	30	±2.0	+30☆	+20	4	40	2:1	2:1	12	2.0	BN333	—	1095.00
	ZHL-1A	2-500	16	±1.0	+28	+20	11	+38	2:1	2.1	24	0.60	S32	—	229.00
	ZHL-2	10-1000	16	±1.0	+29	+15	9	+38	2:1	2:1	24	0.60	T34	—	349.00
	ZHL-2-8	10-1000	27	±1.0	+29	+5	10	+38	2:1	2:1	24	0.60	T34	—	525.00
	ZHL-211	800-950	20	±0.4	+29	+15	8	+38	1.8:1	1.8:1	24	0.60	T34	—	295.00
▲	ZHL-2-12	10-1200	24	±1.0	+29*	+10	4✱	+38	2:1	2:1	24	0.75	T34	—	625.00
	ZHL-3A	0.4-150	24	±1.0	+29.5	+10	11	+38	2:1	2:1	24	0.60	S32	—	229.00
	ZHL-32A	0.05-130	25	±1.0	+29	+10	10	+38	2:1	2:1	24	0.60	S32	—	229.00
	ZHL-42	700-4200	30	±1.0★	+28	+5	10	+38	2.5:1	2.5:1	15	0.88	U36	—	895.00
	ZHL-4240	700-4200	40	±1.5★	+28	-5	8	+38	2.5:1	2.5:1	15	0.90	U36	—	1395.00
	ZHL-42W	10-4200	30	±1.5★	+28**	0	8***	+38	2.5:1	2.5:1	15	0.88	U36	—	1095.00
	ZHL-4240W	10-4200	40	±1.5★	+28**	-5	8***	+38	2.5:1	2.5:1	15	0.90	U36	—	1495.00

* +28.5 dBm maximum at 1000-1200 MHz
** +27 dBm at 10-700 MHz
*** Below 100 MHz NF increases to 15 dB at 10 MHz
✱ Below 100 MHz NF increases to 16 dB at 10 MHz
☆ At +25°C, +29 dBm typ. at 90°C case
★ Measured at 25°C.
✦ NF gradually increases from 3.5 dB at 50 MHz to 10 dB typ. at 10 MHz

ZHL-50P3

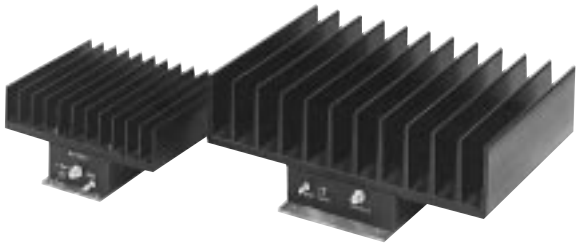
feed-forward, low-distortion

MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.)	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE Intercept Point (dBm) Min. 2nd** order In-Band	DYNAMIC RANGE Intercept Point (dBm) Min. 3rd* order	VSWR In/Out	DC POWER Volt (V)	DC POWER Current (A)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZHL-2-50P3	50-1000	21	±1.0	+25	+15	8	+63	+43	2.0:1	24	0.65	U200	—	~~895.00~~ 358.00★

★ ***WHILE SUPPLIES LAST***
* IP3 measured at +15 dBm output each fundamental tone, at room temperature.
** IP2 +50 dBm typical for out band products.

HIGH POWER 1 to 1000 MHz

ZHL-WF



ZHL-2W

ZHL-3W
ZHL-5W
ZHL-10W

up to 5W (+37 dBm) output

MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.)	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR In	VSWR Out	DC POWER Volt (V)	DC POWER Current (A)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)	
ZHL-03-5WF	60-300	30	±1.0	+36	+10	4	+47	1.4:1	1.5:1	24	2.8	CP641	—	495.00	
ZHL-1-2W	5-500	29	±1.0	+33	+10	12	+44	2:1	2:1	24	0.9	T35	—	525.00	
ZHL-7-2W	600-800	28	±1.0	+33	+10	12	+43	2:1	2:1	24	0.9	T35	—	~~590.00~~	495.00★
ZHL-1000-3W	500-1000	38	±1.0*	+35**	0	9	+45	2:1	2.5:1	24	2.0	DDD338	—	695.00	
ZHL-5W-1	1-500	40	±1.5	+37	0	9	+49	2:1	2.5:1	24	3.3	DDD131	—	995.00	
ZHL-900-10W	480-900	19	±1.0	+38	+25	10	+50	2:1	2:1	24	5.5	DDD338	—	1995.00	

★ ***WHILE SUPPLIES LAST***
* 1.5 dB over temperature range -20 to +65 deg. C.
** +37 dBm typical

NOTES:
☆ High IP3, very high IP2, 68-83 dBm typ.
✤ Hermetically sealed with field replaceable connectors.
▲ Available only with SMA connectors
■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
1. Absolute maximum power, voltage and current rating:
   1a. 12V amps, 13 VDC (except ZVE-8G, 18VDC)
   1b. 15V amps, 20 VDC
   1c. 24V amps, 25 VDC (except ZHL-1A, 24.5 VDC; ZHL-03-5WF & ZHL-7-2W, 28 VDC)
2. Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.

NSN GUIDE

MCL NO.	NSN
ZHL-1A	6130-01-088-2322
ZHL-1A(BNC)	5895-01-123-0792
ZHL-1A(SMA)	5895-01-201-4500
ZHL-2-12	5996-01-400-0753
ZHL-3A	5895-01-194-1718
ZHL-32A	5895-01-238-7973
ZHL-42(SMA)	5895-01-253-2397
ZHL-1042J	5996-01-412-3038
ZHL-4240	5895-01-263-5871
ZHL-5W-1	5825-01-339-2539

010618

HIGH POWER 0.5 to 1000 MHz

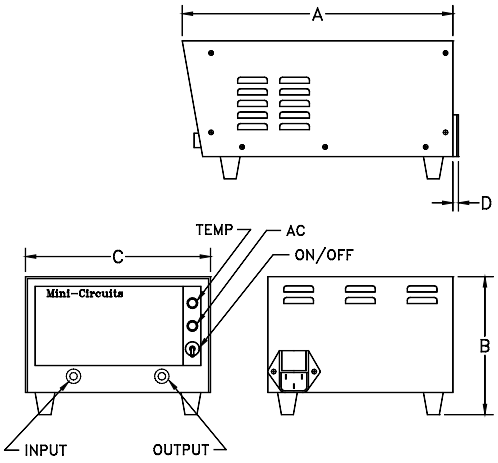
TIA

up to 10W (+40 dBm) output

MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	MAXIMUM POWER (dBm) Input Max. (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR In	VSWR Out	AC POWER Volt (note1)	AC POWER Freq. Hz	AC POWER VA Max.	CASE STYLE	CONNECTION	PRICE $ Qty. (1-9)
TIA-900-10	100-900	28	±2.5	+42	+40	+25	13	51	2.5:1	2.5:1	110	50/60	475	AP176	—	3,695.00
TIA-1000-4	100-1000	19	±1.5	+39	+36	+25	12	48	2.5:1	2.5:1	110	50/60	400	AP176	—	1,995.00
TIA-1000-1R8	0.50-1000	35	±2.0	+35	+32	+7	8*	45	1.9:1	2.5:1	110	50/60	140	AP175	—	1,495.00

features

- wide bandwidth, 0.5-1000 MHz
- instrument model, with built-in power supply,110/220V operation
- high power output, (at 3.5 dB compression)
  45 dBm typical for TIA-900-10
  42 dBm typical for TIA-1000-4
  37 dBm typical for TIA-1000-1R8
- high gain, 38 dB typical for TIA-1000-1R8
  34 dB typical for TIA-900-10
- high reverse isolation, 80 dB typical for TIA-900-10, TIA-1000-1R8
  55 dB typical for TIA-1000-4
- 100% Burn-In at +25°C, 48 hours
- thermally self-protected, led indicator



NOTES:

* NF above 400 MHz. At low frequency, NF Increases to 16 dB Typ.
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, see "Mini-Circuits Guarantees Quality" article.
1. For TIA-1000 models, add dash 2 (-2) to model no. for 220V operation.
2. Gain and maximum output power specified at 25°C±5°C., over temperature, specifications degrade approximately 1dB, gain flatness ±2.5dB maximum for TIA-10001R8 and TIA-1000-4.
3. Open load is not recommended, potentially can cause damage. With no load, derate max input power by 20 dB.
4. VSWR specified at:
   350-900 MHz for TIA-900-10
   350-1000 MHz for TIA-1000-4
   340-1000 MHz for TIA-1000-1R8
5. Operating temperature: 0°C to +55°C.
   Storage temperature: -40°C to +70°C.
6. All TIA models are protected under U.S. patent 5, 101, 171.

Outline drawing and dimensions

case no.		A	B	C	D	wt. grams	NOTES
AP175	inch	9.8	5.0	6.7	0.2	3500	A10, D7, G1, G2
	mm	248.9	127.0	170.2	5.1		
AP176	inch	19.5	6.0	12.5	0.2	9500	A10, D7, G1, G2
	mm	495.3	152.4	317.5	5.1		

A10. Case material: aluminum alloy. Finish: grey paint.
D7. Connectors: BNC only.
G1. Keep area adjacent to fan and louvers clear to permit air flow to pass. Caution: Do not insert anything especially conductors or fingers into case opening. Physical injury, shock or death may occur.
G.2 Configured for either 110 volt or 220 volt AC operation; specify when ordering.

VERY HIGH POWER 50W, 20 to 1000MHz

LZY-X ❄

LZY

up to 50W (+47 dBm) output

MODEL NO.	FREQ. (MHz)	GAIN (dB)		POWER (dBm)			DYNAMIC RANGE		VSWR		DC POWER		CASE STYLE	CONNECTION	PRICE $
	f_L-f_U	Min.	Flatness Max.	Min. Output (1 dB Comp.)	Max. Output Typ.	Max. Input (no damage)	NF (dB) Typ.	IP3 (dBm) Typ.	In	Out	Volt (V)	Max. Current** (A)	Note B		Qty. (1-9)
LZY-1	20 - 512	39	±1.5	+44	+47	+10	8.6*	54	2.0:1	❄	+26	7.3	BT412	—	1995.00
LZY-2	500 -1000	40	±1.5	+43	+45	+10	8.0	54	2.0:1	3.5:1	+28	8.0	BT451	—	2195.00

❄ To order without heat sink and fan, add suffix -X to model number. Alternative heat sinking and heat removal must be provided by customer to ensure proper performance. See application note AN-60-004 for LZY-1, AN-60-005 for LZY-2 . Deduct $100 from price list.

features

- saturated power 50W typ. (LZY-1) and 32W typ. (LZY-2)
- high power with low distortion, -32 dBc typ. (LZY-1) and -45 dBc typ. (LZY-2) harmonics at 20 watts
- wide bandwidth, usable 10 - 525 MHz and 475 - 1050 MHz
- high gain, 42 dB typ. (LZY-1) and 47 dB typ. (LZY-2)
- unconditionally stable
- self protected against excessive drive, high case temp., reverse polarity and shorting/unshorting transients at dc input
- electronic shutoff by grounding the shut-off terminal, reduces output by 50 dB. Open circuiting terminal restores full power within 100 µ sec.
- cool operation with integral fan, 15° C typ. rise
- graceful degradation, +20 to +30V DC
- can withstand short and open circuit at output for 2 minutes while delivering 20 watts

NOTES:

* 80-512 MHz, at 20 MHz 11.6 dB typ.
** At 25W output for LZY-1 and 20W for LZY-2; includes fan
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For environmental Specifications see Amplifier Selection Guide.
1. Absolute max. dc voltage: +30V
2. Operating air-ambient temp. for specified performance: -10°C to 50°C
3. Max. storage temp.: -55°C to 100°C
❄ VSWR 9:1 typ. up to 450 MHz, all specifications for 50 ohm load.

000512

VERY HIGH POWER 50W, 20 to 1000MHz

LZY-X ❄

LZY

up to 50W (+47 dBm) output

MODEL NO.	FREQ. (MHz)	GAIN (dB)		POWER (dBm)			DYNAMIC RANGE		VSWR		DC POWER		CASE STYLE	CONNECTION	PRICE $
	f_L-f_U	Min.	Flatness Max.	Min. Output (1 dB Comp.)	Max. Output Typ.	Max. Input (no damage)	NF (dB) Typ.	IP3 (dBm) Typ.	In	Out	Volt (V)	Max. Current** (A)	Note B		Qty. (1-9)
LZY-1	20 - 512	39	±1.5	+44	+47	+10	8.6*	54	2.0:1	❄	+26	7.3	BT412	—	1995.00
LZY-2	500 -1000	40	±1.5	+43	+45	+10	8.0	54	2.0:1	3.5:1	+28	8.0	BT451	—	2195.00

❄ To order without heat sink and fan, add suffix -X to model number. Alternative heat sinking and heat removal must be provided by customer to ensure proper performance. See application note AN-60-004 for LZY-1, AN-60-005 for LZY-2 . Deduct $100 from price list.

features

- saturated power 50W typ. (LZY-1) and 32W typ. (LZY-2)
- high power with low distortion, -32 dBc typ. (LZY-1) and -45 dBc typ. (LZY-2) harmonics at 20 watts
- wide bandwidth, usable 10 - 525 MHz and 475 - 1050 MHz
- high gain, 42 dB typ. (LZY-1) and 47 dB typ. (LZY-2)
- unconditionally stable
- self protected against excessive drive, high case temp., reverse polarity and shorting/unshorting transients at dc input
- electronic shutoff by grounding the shut-off terminal, reduces output by 50 dB. Open circuiting terminal restores full power within 100 µ sec.
- cool operation with integral fan, 15° C typ. rise
- graceful degradation, +20 to +30V DC
- can withstand short and open circuit at output for 2 minutes while delivering 20 watts

NOTES:

* 80-512 MHz, at 20 MHz 11.6 dB typ.
** At 25W output for LZY-1 and 20W for LZY-2; includes fan
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For environmental Specifications see Amplifier Selection Guide.
1. Absolute max. dc voltage: +30V
2. Operating air-ambient temp. for specified performance: -10°C to 50°C
3. Max. storage temp.: -55°C to 100°C
❄ VSWR 9:1 typ. up to 450 MHz, all specifications for 50 ohm load.

000512

PULSE AMPLIFIERS

Coaxial

INVERTING & NON-INVERTING up to 200 mW, 2.5 KHz to 700 MHz

ZPUL

Up to 200 mW

MODEL NO.	FREQ. (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	RISE/FALL TIME ns Max.	PULSE WIDTH* µs Max.	POLARITY	MAXIMUM POWER (dBm) Output (1 dB Comp.)	MAXIMUM POWER (dBm) Input (no damage)	DYNAMIC RANGE NF** dB Typ.	DYNAMIC RANGE Intercept 3rd order Typ.	VSWR Typ. In	VSWR Typ. Out	DC POWER Volt V.	DC POWER Current (mA)	CASE STYLE * Note B	CONNECTION	PRICE $ Qty. (1-9)
ZPUL-21	0.0025-700	21	±1	1.5	6	Inverting	22	+10	7.3	34	2:1	2:1	24	350	S32	—	249.00
ZPUL-30P	0.0025-700	29	±1	1.5	6	Non-inverting	22	+10	7.2	34	2:1	2:1	24	400	S32	—	295.00

L_w = low range [f_L to $f_U/2$] m = mid range [$2f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]

* pulse width for less than 10% droop
** NF tested above 10 MHz

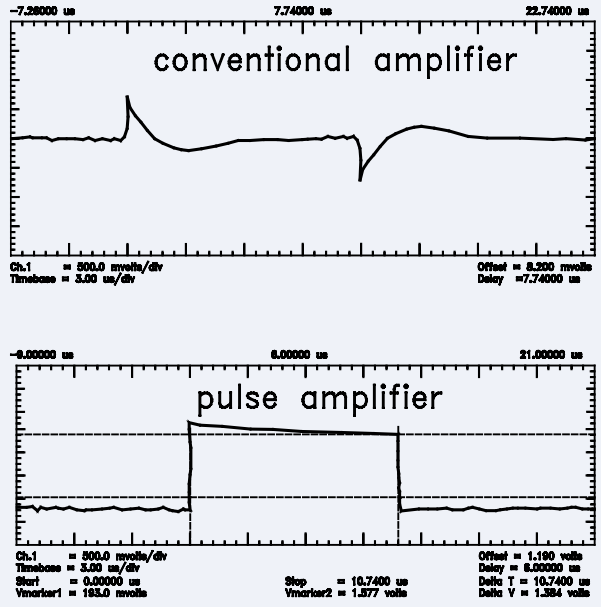
features

- wide bandwidth 2.5 KHz to 700 MHz, useable to 1 GHz
- excellent flatness ±0.6 dB typical
- can handle wide pulse width & (15 µs typ.) with excellent rise/fall time (1.1 ns typ.)
- inverting (ZPUL-21) & non-inverting (ZPUL-30P) configurations
- delay time, 1.5 ns typical

applications

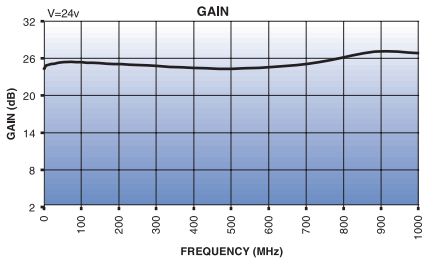
- computers
- digital communication
- medical test set-ups

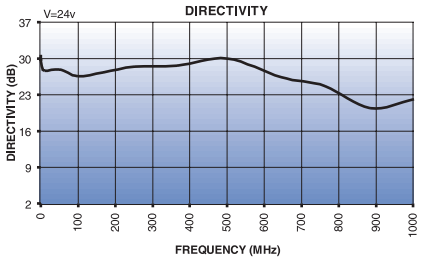
typical amplifier response to a pulse input

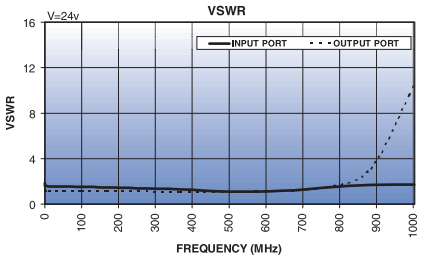


NOTES:
* Available only with BNC connectors
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
D. For Quality Control Procedures see Table of Contents, Section 0, see "Mini-Circuits Guarantees Quality" article.
1. Operating temperature: -20°C to 65°C
Storage temperature: -55°C to 100°C

ZPUL-21

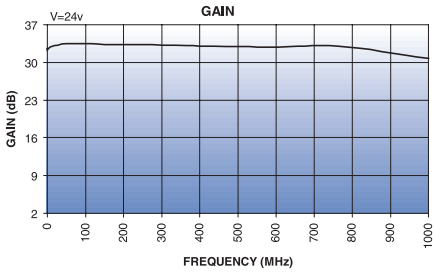


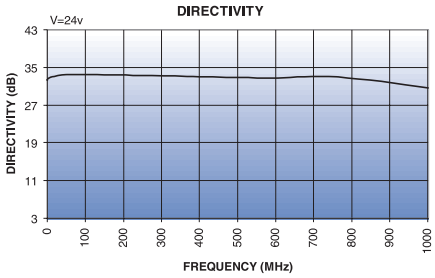


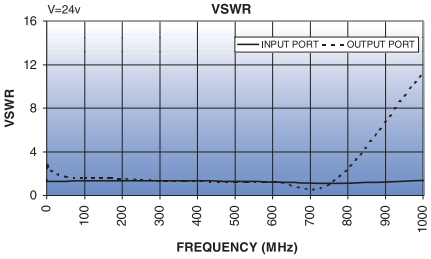


FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1) IN	VSWR (:1) OUT	N.F. (dB)		Pout (@1dB COMPR) (MHz)	Pout (@1dB COMPR) (dBm)
0.002	24.14	30.72	1.85	1.40	10.00	7.37	0.002	24.63
0.012	24.47	29.52	1.61	1.20	106.00	7.15	0.012	24.76
0.050	24.42	29.95	1.58	1.18	202.00	7.20	0.050	24.70
1.008	24.43	28.89	1.58	1.17	298.00	7.27	1.008	24.82
10.078	24.92	27.56	1.57	1.17	418.00	7.29	8.930	25.50
50.000	25.41	27.85	1.54	1.18	466.00	7.26	50.000	25.58
98.875	25.40	26.60	1.52	1.18	514.00	7.23	98.875	25.44
167.875	25.17	27.34	1.48	1.17	562.00	7.22	176.500	25.30
251.250	24.92	28.45	1.39	1.15	610.00	7.18	300.125	24.91
366.250	24.56	28.65	1.26	1.10	658.00	7.17	349.000	24.64
501.375	24.29	30.00	1.09	1.11	706.00	7.12	501.375	24.34
645.125	24.76	26.40	1.18	1.17	754.00	7.05	661.750	24.14
763.000	25.71	24.64	1.45	1.50	802.00	6.97	817.625	23.06
883.750	27.09	20.40	1.70	3.10	898.00	6.77	944.125	20.65
1001.625	26.82	22.14	1.73	10.56	970.00	6.67	1073.500	14.21

ZPUL-30P







FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1) IN	VSWR (:1) OUT	N.F. (dB)		Pout (@1dB COMPR) (MHz)	Pout (@1dB COMPR) (dBm)
0.002	32.16	32.16	1.53	2.50	10.00	7.41	0.003	24.26
0.010	32.60	32.60	1.32	2.57	97.00	7.16	0.050	24.67
0.050	32.49	32.49	1.30	2.72	126.00	7.16	1.026	24.83
0.118	32.47	32.47	1.31	2.77	155.00	7.15	9.866	25.30
1.106	32.51	32.51	1.30	2.80	213.00	7.17	50.000	25.61
10.172	32.98	32.98	1.29	2.27	271.00	7.20	98.875	25.51
50.000	33.45	33.45	1.30	1.74	329.00	7.23	133.375	25.36
98.875	33.48	33.48	1.31	1.66	416.00	7.24	297.250	24.96
167.875	33.35	33.35	1.31	1.58	503.00	7.23	377.750	24.42
248.375	33.28	33.28	1.32	1.48	561.00	7.21	501.375	24.38
366.250	33.13	33.13	1.32	1.34	619.00	7.20	541.625	24.06
501.375	32.91	32.91	1.29	1.30	706.00	7.16	625.000	23.98
604.785	32.81	32.81	1.25	1.26	793.00	7.20	708.375	23.89
763.000	33.01	33.01	1.11	1.30	909.00	7.29	872.250	23.46
1001.625	30.68	30.68	1.35	11.38	996.00	7.24	952.750	20.75

001218

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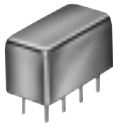
continuous facing pages.**

BI-PHASE 1 MHz to 2 GHz

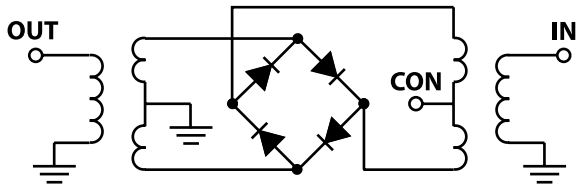
TFAS



PAS
GAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\bar{X}$ (±20 mA) Typ. Δ AMP (dB) m	Δ AMP (dB) Total Range	Phase(deg) deviation from 180° m	Phase(deg) deviation from 180° Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PAS-1*	5-450	DC-0.05	3.5	4.0	3.5	4.7	20	29	65	50	45	35	35	25	0.1	0.1	0.5	1.2	A01	cf	33.95
PAS-2*	10-1000	DC-0.05	4.0	6.0	6.5	8.5	20	29	50	40	40	30	35	25	0.1	0.3	0.5	1.0	A01	cg	47.95
PAS-3*	1-200	DC-0.05	1.4	2.0	1.6	2.5	15	29	65	50	50	40	50	35	0.1	0.1	0.5	1.0	A01	cf	34.95
PAS-2000**	100-2000	DC-0.5	4.2	6.5	5.4	7.5	19R	25	30	22	—	—	26	20	0.3	0.4	5.0	8.0	A05	ch	24.95
❑ TFAS-1*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20<	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	B02	cm	13.95
❑ TFAS-2**	10-1000	DC-0.5	3.7	4.5	5.0	8.0	17O	25	50	30	42	20	31	20	0.1	0.2	2.0	3.0	B02	cm	17.95
❑ GAS-1**	5-450	DC-0.05	3.3	4	3.5	5.0	20	25	60	48	45	35	35	25	0.10	0.1	1.0	1.5	A05	cf	13.95
❑ GAS-2**	10-1000	DC-0.05	4.3	6	5.2	8.5	20	25	55	40	35	25	28	20	0.10	0.3	1.5	3.0	A05	cg	15.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



NOTES:
* Recommended for electronic attenuator
** Recommended for bi-phase modulator
■ Denotes 75 Ohm model.
❑ Non-hermetic
✲ +15 dBm from 100-800 MHz
✣ +15 dBm from 2-10 MHz
★ +13 dBm from 10-500 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Control current, 30mA
1b. Max. Power at room temperature
2. Performance specifications apply for input power up to 10 dB below stated 1dB compression;
example: +5dBm in 2-10MHz range for TFAS-1, TFAS-1SM

000807


TFAS-SM


SYAS

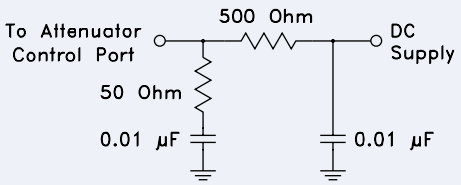

RAS


LRAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\overline{X}$ (±20 mA) Typ. Δ AMP (dB) m	Δ AMP (dB) Total Range	Phase(deg) deviation from 180° m	Phase(deg) deviation from 180° Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TFAS-1SM*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20✣	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	NNN150	cm	13.95
TFAS-2SM**	10-1000	DC-0.5	3.7	4.5	5.0	8.0	17★	25	50	30	42	20	31	20	0.1	0.2	2.0	3.0	NNN150	cm	17.95
SYAS-1*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20✣	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	TTT167	ck	9.95
SYAS-2**	10-1000	DC-0.05	4.0	6.0	4.5	7.0	17★	25	59	40	42	28	28	20	0.1	0.3	2.0	3.0	TTT167	ck	13.95
SYAS-860**	600-1000	DC-0.5	—	—	2.7	5.7	14	25	25	(typ.)	18	(min.)			—	0.5	—	4.0	TTT166	ck	15.95
RAS-1**	2-400	DC-0.05	1.4	2.4	1.6	3.2	20R	25	65	45	45	28	32	22	0.10	0.1	1.0	2.0	TT241	ge	7.95
■ RAS-2-75**	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0	TT240	cj	9.95
■ LRAS-2-75**	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0	QQQ130	cj	9.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

suggested control port biasing configuration



pin and coaxial connections

see case style outline drawings for pin locations

PORT	cf	cg	ch	cj	ck	cm	ge
INPUT	1	1	1	4	1	1	4
OUTPUT	8	8	8	1	2	4	1
CONTROL	3,4 ^	3,4 ^	3	5	3	2	5
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,3,6	4,5,6	3	2,3,6
CASE GND	2	2,5,6,7	2,5,6,7	—	—	3	—
NOT USED	—	—	4	—	—	—	—

^ Pins must be connected together externally.

NSN GUIDE

MCL NO.	NSN
PAS-1	5985-01-282-2105
PAS-2	5985-01-192-0100
PAS-3	5895-01-067-3035

000807

BI-PHASE 1 MHz to 2 GHz

ZFAS

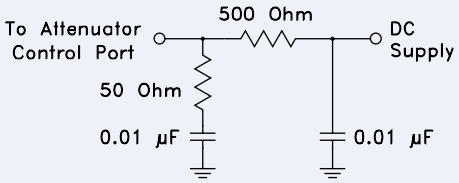
ZMAS

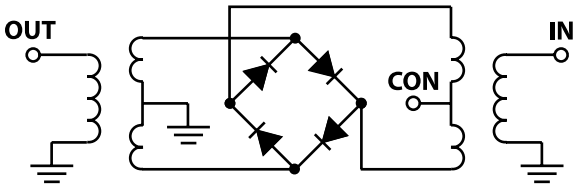
ZAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\bar{X}$ (±20 mA) Typ. Δ AMP (dB) Total m	Total Range	Phase(deg) deviation from 180° Total m	Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZMAS-1*	5-450	DC-0.05	3.5	4	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2	M21	cp	66.95
ZMAS-3*	1-200	DC-0.05	1.4	2	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0	M21	cp	67.95
ZAS-1*	5-450	DC-0.05	3.5	4	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2	M22	cp	59.95
ZAS-3*	1-200	DC-0.05	1.4	2	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0	M22	cp	59.95
▲ ZFAS-2000**	100-2000	DC-0.5	4.2	6.5	5.4	7.5	19R	25	30	22	—	—	26	20	0.3	0.4	5.0	8.0	K18	cn	64.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

suggested control port biasing configuration





NSN GUIDE

MCL NO.	NSN
ZAS-3B	5985-01-267-2832
ZMAS-1	5985-01-140-4291

NOTES:
* Recommended for electronic attenuator
** Recommended for bi-phase modulator
▲ Available only with SMA connectors.
✲ +15 dBm from 100-800 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings: 1a. Control current, 30mA
2. Performance specifications apply for input power up to 10 dB below stated 1dB compression.

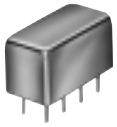
coaxial connections
see case style outline drawings

PORT	cn	cp
INPUT	2	3
OUTPUT	1	1
CONTROL	3	2
GND EXT.	—	—
CASE GND	—	—
NOT USED	—	—

001004

BI-PHASE 1 MHz to 2 GHz

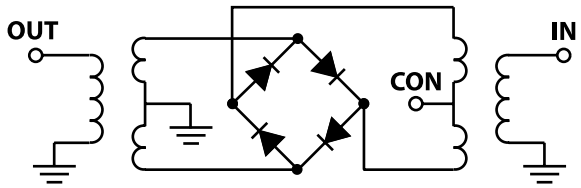
TFAS



PAS
GAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\bar{X}$ (±20 mA) Typ. Δ AMP (dB) m	Δ AMP (dB) Total Range	Phase(deg) deviation from 180° m	Phase(deg) deviation from 180° Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PAS-1*	5-450	DC-0.05	3.5	4.0	3.5	4.7	20	29	65	50	45	35	35	25	0.1	0.1	0.5	1.2	A01	cf	33.95
PAS-2*	10-1000	DC-0.05	4.0	6.0	6.5	8.5	20	29	50	40	40	30	35	25	0.1	0.3	0.5	1.0	A01	cg	47.95
PAS-3*	1-200	DC-0.05	1.4	2.0	1.6	2.5	15	29	65	50	50	40	50	35	0.1	0.1	0.5	1.0	A01	cf	34.95
PAS-2000**	100-2000	DC-0.5	4.2	6.5	5.4	7.5	19R	25	30	22	—	—	26	20	0.3	0.4	5.0	8.0	A05	ch	24.95
❑ TFAS-1*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20<	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	B02	cm	13.95
❑ TFAS-2**	10-1000	DC-0.5	3.7	4.5	5.0	8.0	17O	25	50	30	42	20	31	20	0.1	0.2	2.0	3.0	B02	cm	17.95
❑ GAS-1**	5-450	DC-0.05	3.3	4	3.5	5.0	20	25	60	48	45	35	35	25	0.10	0.1	1.0	1.5	A05	cf	13.95
❑ GAS-2**	10-1000	DC-0.05	4.3	6	5.2	8.5	20	25	55	40	35	25	28	20	0.10	0.3	1.5	3.0	A05	cg	15.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]



NOTES:
* Recommended for electronic attenuator
** Recommended for bi-phase modulator
■ Denotes 75 Ohm model.
❑ Non-hermetic
✲ +15 dBm from 100-800 MHz
✣ +15 dBm from 2-10 MHz
★ +13 dBm from 10-500 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
1a. Control current, 30mA
1b. Max. Power at room temperature
2. Performance specifications apply for input power up to 10 dB below stated 1dB compression;
example: +5dBm in 2-10MHz range for TFAS-1, TFAS-1SM

000807


TFAS-SM


SYAS

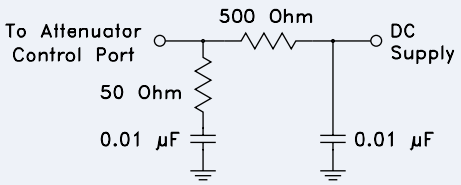

RAS


LRAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\overline{X}$ (±20 mA) Typ. Δ AMP (dB) m	Δ AMP (dB) Total Range	Phase(deg) deviation from 180° m	Phase(deg) deviation from 180° Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TFAS-1SM*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20✣	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	NNN150	cm	13.95
TFAS-2SM**	10-1000	DC-0.5	3.7	4.5	5.0	8.0	17★	25	50	30	42	20	31	20	0.1	0.2	2.0	3.0	NNN150	cm	17.95
SYAS-1*	2-400	DC-0.05	1.4	2.0	1.6	3.0	20✣	25	65	45	45	33	35	25	0.1	0.1	1.0	2.0	TTT167	ck	9.95
SYAS-2**	10-1000	DC-0.05	4.0	6.0	4.5	7.0	17★	25	59	40	42	28	28	20	0.1	0.3	2.0	3.0	TTT167	ck	13.95
SYAS-860**	600-1000	DC-0.5	—	—	2.7	5.7	14	25	25	(typ.)	18	(min.)			—	0.5	—	4.0	TTT166	ck	15.95
RAS-1**	2-400	DC-0.05	1.4	2.4	1.6	3.2	20R	25	65	45	45	28	32	22	0.10	0.1	1.0	2.0	TT241	ge	7.95
■ RAS-2-75**	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0	TT240	cj	9.95
■ LRAS-2-75**	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0	QQQ130	cj	9.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

suggested control port biasing configuration



pin and coaxial connections

see case style outline drawings for pin locations

PORT	cf	cg	ch	cj	ck	cm	ge
INPUT	1	1	1	4	1	1	4
OUTPUT	8	8	8	1	2	4	1
CONTROL	3,4 ^	3,4 ^	3	5	3	2	5
GND EXT.	2,5,6,7	2,5,6,7	2,5,6,7	2,3,6	4,5,6	3	2,3,6
CASE GND	2	2,5,6,7	2,5,6,7	—	—	3	—
NOT USED	—	—	4	—	—	—	—

^ Pins must be connected together externally.

NSN GUIDE

MCL NO.	NSN
PAS-1	5985-01-282-2105
PAS-2	5985-01-192-0100
PAS-3	5895-01-067-3035

000807

BI-PHASE 1 MHz to 2 GHz

ZFAS

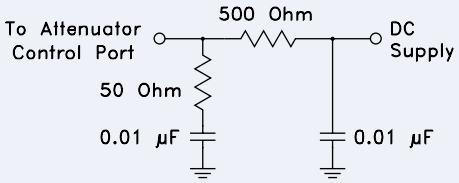
ZMAS

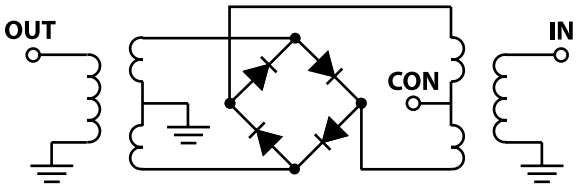
ZAS

MODEL NO.	FREQUENCY MHz IN f_L-f_U	CON	INSERTION LOSS dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR dBm (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\bar{X}$ (±20 mA) Typ. Δ AMP (dB) Total m	Total Range	Phase(deg) deviation from 180° Total m	Total Range	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZMAS-1*	5-450	DC-0.05	3.5	4	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2	M21	cp	66.95
ZMAS-3*	1-200	DC-0.05	1.4	2	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0	M21	cp	67.95
ZAS-1*	5-450	DC-0.05	3.5	4	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2	M22	cp	59.95
ZAS-3*	1-200	DC-0.05	1.4	2	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0	M22	cp	59.95
▲ ZFAS-2000**	100-2000	DC-0.5	4.2	6.5	5.4	7.5	19R	25	30	22	—	—	26	20	0.3	0.4	5.0	8.0	K18	cn	64.95

L = low range [f_L to 10 f_L] M = mid range [10f_L to f_U/2] U = upper range [f_U/2 to f_U]
m = mid band [2f_L to f_U/2]

suggested control port biasing configuration





NSN GUIDE

MCL NO.	NSN
ZAS-3B	5985-01-267-2832
ZMAS-1	5985-01-140-4291

NOTES:
* Recommended for electronic attenuator
** Recommended for bi-phase modulator
▲ Available only with SMA connectors.
✲ +15 dBm from 100-800 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings: 1a. Control current, 30mA
2. Performance specifications apply for input power up to 10 dB below stated 1dB compression.

coaxial connections
see case style outline drawings

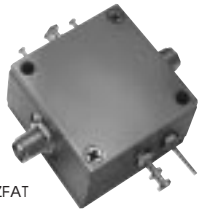
PORT	cn	cp
INPUT	2	3
OUTPUT	1	1
CONTROL	3	2
GND EXT.	—	—
CASE GND	—	—
NOT USED	—	—

001004

DIGITAL STEP ATTENUATORS 50Ω Precision

TTL CONTROL, PIN DIODE 10 MHz to 1 GHz


TOAT


ZFAT


ZSAT

MODEL NO.	FREQUENCY MHz f_L	f_U	PRIMARY ATTENUATION STEPS dB @TTL CONTROL PORT #1	#2	#3	ATTENUATION dB LOGIC STATE* (1,1,1)** Nom.	(0,0,0) Max.	VSWR (:1) L	M	U	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TOAT-R512	10	1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-124	10	1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-3610	10	1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-4816	10	1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
ZFAT-R512	10	1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-124	10	1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-3610	10	1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-4816	10	1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
			SIX CONTROL PORTS										
ZSAT-31R5	10	1000	(1) 0.5±0.18 (4) 4±0.3	(2) 1±0.25 (5) 8±0.4	(3) 2±0.25 (6)16±0.5	31.5	7.0	1.7	1.5	1.6	AR214	-	119.00

L = 10 to 100 MHz M = 100 to 500 MHz U = 500 to 1000 MHz

features

- wide frequency band, 10-1000 MHz
- excellent step accuracy, 0.2 dB typ.
- excellent VSWR, 1.3 typ.
- low DC current, 6 mA typ.
- operates over -55° to 100 °C
- small case, 0.6" dia., TO-8

ADDITIONAL SPECIFICATIONS

DC Voltage +5V
DC current 12mA max.
Switching Time (50% TTL to within specified accuracy of the next-selected attenuation step, and to within 0.1 dB of steady-state Thru-Loss) 10 µs typ., 15µs max.
TTL input High Threshold 2V min.
TTL input Low Threshold 0.8V max.
TTL Toggle Rate: 50 kHz typ.
1dB compression: 0 dBm (10-100MHz)
+10dBm (100-1000MHz)
For ZSAT-31R5:
1dB compression: +10 dBm (10-100 MHz)
+15 dBm (100-1000 MHz)

Logic function:

TTL High activates associated in-line attenuation
TTL Low bypasses this attenuation

NSN GUIDE

MCL NO.	NSN
TOAT-124	5985-01-416-9021
TOAT-51020	5985-01-416-9020

NOTES:
* For ZSAT-31R5: Total attenuation (1,1,1,1,1,1)
Thru-Loss (0,0,0,0,0,0)
** Total attenuation above thru-loss.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. Input power, 15 dBm
1b. DC voltage, 5.5 Volts
1c. TTL, 5.5 Volts
1d. Storage temperature -55°C to +125°C for TOAT models.
2. Step accuracy is specified for basic steps. For combination of steps accuracy is additive.
3. Thru-loss is minimum insertion loss with all attenuation elements bypassed (All TTL controls state are Low).
4. For optimum operation of TOAT models, ensure the device case is properly connected to the ground plane (of PC board).

pin connections

see case style outline drawing

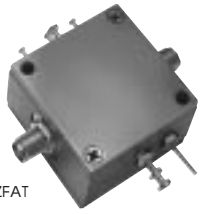
PORT	cq
RF IN	4
RF OUT	11
TTL CONTROL #1	2
TTL CONTROL #2	3
TTL CONTROL #3	1
+5V DC	12
CASE GND	5,6,7,8,9,10

000414

DIGITAL STEP ATTENUATORS 50Ω Precision

TTL CONTROL, PIN DIODE 10 MHz to 1 GHz


TOAT


ZFAT


ZSAT

MODEL NO.	FREQUENCY MHz f_L	f_U	PRIMARY ATTENUATION STEPS dB @TTL CONTROL PORT #1	#2	#3	ATTENUATION dB LOGIC STATE* (1,1,1)** Nom.	(0,0,0) Max.	VSWR (:1) L	M	U	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TOAT-R512	10	1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-124	10	1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-3610	10	1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-4816	10	1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
TOAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5	QQ96	cq	59.95
ZFAT-R512	10	1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-124	10	1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-3610	10	1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-4816	10	1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
ZFAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5	SSS173	-	89.95
			SIX CONTROL PORTS										
ZSAT-31R5	10	1000	(1) 0.5±0.18 (4) 4±0.3	(2) 1±0.25 (5) 8±0.4	(3) 2±0.25 (6)16±0.5	31.5	7.0	1.7	1.5	1.6	AR214	-	119.00

L = 10 to 100 MHz M = 100 to 500 MHz U = 500 to 1000 MHz

features

- wide frequency band, 10-1000 MHz
- excellent step accuracy, 0.2 dB typ.
- excellent VSWR, 1.3 typ.
- low DC current, 6 mA typ.
- operates over -55° to 100 °C
- small case, 0.6" dia., TO-8

ADDITIONAL SPECIFICATIONS

DC Voltage +5V
DC current 12mA max.
Switching Time (50% TTL to within specified accuracy of the next-selected attenuation step, and to within 0.1 dB of steady-state Thru-Loss) 10 µs typ., 15µs max.
TTL input High Threshold 2V min.
TTL input Low Threshold 0.8V max.
TTL Toggle Rate: 50 kHz typ.
1dB compression: 0 dBm (10-100MHz)
+10dBm (100-1000MHz)
For ZSAT-31R5:
1dB compression: +10 dBm (10-100 MHz)
+15 dBm (100-1000 MHz)

Logic function:

TTL High activates associated in-line attenuation
TTL Low bypasses this attenuation

NSN GUIDE

MCL NO.	NSN
TOAT-124	5985-01-416-9021
TOAT-51020	5985-01-416-9020

NOTES:
* For ZSAT-31R5: Total attenuation (1,1,1,1,1,1)
Thru-Loss (0,0,0,0,0,0)
** Total attenuation above thru-loss.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. Input power, 15 dBm
1b. DC voltage, 5.5 Volts
1c. TTL, 5.5 Volts
1d. Storage temperature -55°C to +125°C for TOAT models.
2. Step accuracy is specified for basic steps. For combination of steps accuracy is additive.
3. Thru-loss is minimum insertion loss with all attenuation elements bypassed (All TTL controls state are Low).
4. For optimum operation of TOAT models, ensure the device case is properly connected to the ground plane (of PC board).

pin connections

see case style outline drawing

PORT	cq
RF IN	4
RF OUT	11
TTL CONTROL #1	2
TTL CONTROL #2	3
TTL CONTROL #3	1
+5V DC	12
CASE GND	5,6,7,8,9,10

000414

DIRECTIONAL COUPLERS 50 & 75Ω Surface Mount

6 to 20 dB COUPLING 2 MHz to 2600 MHz

ADC

D

	MODEL◆ NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M✪ Typ.	MAINLINE LOSS dB M✪ Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M✪ Typ.	DIRECTIVITY dB M✪ Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
	ADC-6-1R*	5-200	6.2±0.3	±0.3	1.6	2.0	1.7	2.0	1.7	2.1	35	22	25	18	17	13	1.33	.5	.5	CD542	hz	7.95
	ADC-10-1R*	5-900	10.5±0.5	±0.5	0.7	1.2	0.8	1.2	0.9	1.5	40	25	30	20	18	12	1.3	1	1	CD542	hz	7.95
■	ADC-6-10-75*	20-1000	6.6±0.5	±0.5	2.1	2.8	2.1	2.5	2.2	2.8	15	12	15	12	15	9	1.3	.5	.5	CD542	kd	6.95
NEW	ADC-6-13*	200-1300	6.3±0.5	±0.9			1.8	2.5					17	10			1.3	.5	.5	CD542	lt	6.95
■	ADC-8-4-75*	5-1000	7.9±0.5	±0.5	1.55	2.6	1.6	2.2	2.0	2.7	18	14	17	14	16	10	1.2	1	1	CD542	kd	6.95
	ADC-10-4*	5-1000	10.5±0.5	±1.0	0.8	1.3	0.8	1.2	1.0	1.5	40	23	40	20	25	13	1.2	1	1	CD542	kd	6.95
■	ADC-10-4-75*	5-1000	10.5±0.5	±0.5	0.85	1.4	0.9	1.4	1.0	1.4	40	20	18	12	12	8	1.2	1	1	CD542	kd	6.95
■	ADC-12-4-75*	20-1000	12.6±0.5	±0.5	0.8	1.2	0.9	1.3	1.2	1.8	28	20	23	15	17	10	1.2	1	1	CD542	kd	6.95
	ADC-15-4*	5-1000	15.5±0.5	±0.5	0.6	1.0	0.6	1.0	0.8	1.2	23	20	24	20	28	17	1.2	1	1	CD542	kd	6.95
■	ADC-15-4-75*	5-1000	15.5±0.5	±0.5	0.7	1.2	0.7	1.0	0.8	1.2	23	18	20	14	16	11	1.2	1	1	CD542	kd	6.95
■	ADC-16-4-75*	5-1000	16.2±0.5	±0.5	0.7	1.2	0.7	1.0	0.8	1.2	38	25	30	16	18	12	1.15	.5	1	CD542	kd	6.95
■	ADC-18-4-75*	20-1000	17.4±0.5	±0.5	0.4	0.8	0.4	1.0	0.5	1.2	17	14	18	14	17	12	1.15	1	1	CD542	kd	6.95
	ADC-20-4*	5-1000	20.0±0.5	±0.8	0.4	0.8	0.5	1.0	0.7	1.3	20	18	21	17	21	15	1.1	1	1	CD542	kd	6.95
■	ADC-20-4-75*	5-1000	19.7±0.5	±0.5	0.5	0.8	0.5	1.0	0.6	1.2	22	18	23	15	20	13	1.15	1	1	CD542	kd	6.95
	ADC-20-12*	100-1200	20±0.75	±0.7			0.5	1.1					26	13			1.17	1	1	CD542	kd	6.95
	D20C	810-960	19.2±1.6	—			0.3	0.5					15	7			1.1	1	1	CA531	jn	0.99
	D19G	1420-1660	18.2±1.2	—			0.3	0.5					15	10			1.2	1	1	CA531	jn	0.99
	D18P	1710-1990	18.0±1.8	—			0.3	0.5					15	10			1.2	1	1	CA531	jn	0.99
	D17I	2300-2600	17.5±1.3	—			0.5	0.8					14	9			1.3	1	1	CA531	jn	0.99

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

features

- **ADC & TCD, extremely flat bandwide coupling**
- ADC low height 0.112" max.
- low insertion loss
- wideband frequency
- TCD & JDC models, solder plated leads for strain relief & excellent solderability.

applications

- communications
- cable tv
- level detecting
- signal sampling
- reflective power measurements

NOTES:

◆ Aqueous washable. For non-aqueous requirements, LRDC units available in case style QQQ130.
■ Denotes 75 ohm models.
✪ When specification for only M range given, specification applies to entire frequency range.
* TCD models protected under U.S. Patent 6140887; ADC models protected under U.S. Patents 6140887, 6133525
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Mainline Loss includes theoretical power loss at coupled port.

001129


JDC


LRDC-J


SCDC


TCD

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M* Typ.	MAINLINE LOSS dB M* Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M* Typ.	DIRECTIVITY dB M* Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	JDC-6-1	5-400	6.5±0.5	±0.5	1.6	2.0	1.7	2.4	2.0	2.4	35	30	25	20	20	15	1.25	.5	.5	BH292	hz	14.95
	JDC-10-2	5-750	10.0±0.5	±0.6	1.0	1.5	1.0	1.5	1.0	1.5	20	15	20	17	20	16	1.13	1	1	BH292	hz	14.95
	JDC-10-4	5-1000	10.5±0.5	±0.6	1.0	1.5	1.0	1.5	1.3	1.8	23	18	23	18	24	15	1.15	1	1	BH292	hz	14.95
■	JDC-10-4-75	10-1000	10.5±0.5	±0.5	1.2	1.6	1.4	1.7	1.6	2.0	27	18	25	18	28	18	1.3	1	1	BH292	hz	14.95
■	JDC-20-3-75	2-250	19.2±0.5	±0.5	0.4	0.8	0.3	0.7	0.4	0.7	24	16	30	20	20	15	1.1	.5	1	BH292	hz	14.95
	JDC-20-1W	50-750	19.5±0.5	±0.5			0.5	0.9					22	15			1.2	.5	.5	BH292	hz	14.95
■	JDC20-1W-75	50-750	19.5±0.5	±0.5	0.5	0.9	0.5	0.7	0.5	0.9	25	18	23	15	20	15	1.2	.5	.5	BH292	hz	14.95
	JDC-20-2	400-900	20.5±1.0	±1.0			0.2	0.6					19	13			1.15	2	2	BH292	hz	14.95
	JDC-20-5	50-1500	20.5±0.5	±0.75	0.4	0.8	0.5	0.9	1.0	1.5	25	18	22	16	20	13	1.2	.5	.5	BH292	lt	17.95
◆	LRDC-10-1J	5-500	10.7±0.5	±0.5	0.9	1.4	0.9	1.4	1.2	1.9	31	25	30	20	25	16	1.2	1	1	QQQ569	cz	15.95
◆	LRDC-20-2J	300-1100	20.5±1.0	±1.3			0.25	0.6					22	10			1.2	2	2	QQQ569	cz	15.95
◆■	LRDC-10-1-75J	5-600	10.7±0.5	±0.5	1.1	1.5	1.0	1.4	1.2	1.8	19	15	21	17	21	16	1.3	1	1	QQQ569	cz	11.95
◆■	LRDC-10-2-75J	30-1000	10.0±0.5	±0.6	1.0	1.5	1.1	1.5	1.3	1.8	21	17	22	17	19	15	1.3	1	1	QQQ569	cz	13.95
◆■	LRDC-10-2W-75J	30-1200	10.0±0.5	±0.8	1.0	1.5	1.1	1.6	1.3	2.0	21	17	22	17	18	15	1.3	1	1	QQQ569	cz	15.95
◆■	LRDC-12-1-75J	5-600	12.2±0.5	±0.6	0.4	0.8	0.5	1.0	0.8	1.5	20	17	21	18	20	12	1.3	1	1	QQQ569	cz	11.95
	SCDC-11-2	500-1100	11.3±0.5	±0.6			1.1	1.8					20	10			1.4	2	2	YY161	cx	11.95 Qty. (25)
NEW	TCD-9-1W*	5-750	8.9±0.5	±0.5	1.2	2.1	1.2	1.8	1.5	1.9	21	17	17	10	15	—	1.30	0.5	1	DB714	mm	1.49
NEW■	TCD-9-1W-75*	5-500	8.9±0.5	±0.5	1.3	2.1	1.2	1.8	1.3	1.9	21	17	17	10	12	—	1.30	0.5	1	DB714	mm	1.49
NEW	TCD-10-1W*	10-750	10.3±0.5	±0.8	1.3	2.1	1.2	1.6	1.4	2.0	22	17	18	14	15	—	1.30	0.5	1	DB714	mm	1.49
NEW■	TCD-10-1W-75*	10-750	10.5±0.5	±0.7	1.6	2.1	1.4	1.9	1.5	2.0	22	17	18	14	14	—	1.30	0.5	1	DB714	mm	1.49
NEW	TCD-13-4*	5-1000	13.0±0.5	±0.6	0.7	1.3	0.7	1.3	0.8	1.5	21	17	18	12	15	—	1.20	0.5	1	DB714	mm	1.49
NEW■	TCD-13-4-75*	5-1000	13.0±0.5	±0.9	1.0	1.8	0.8	1.3	1.1	1.5	22	17	15	—	12	—	1.20	0.5	1	DB714	mm	1.49
NEW	TCD-18-4*	5-1000	17.9±0.5	±0.6	0.7	1.3	0.7	1.1	1.0	1.4	22	11	20	15	18	—	1.20	1	1	DB714	mm	1.49
NEW■	TCD-18-4-75*	10-1000	18.0±0.5	±0.9	0.9	1.3	0.7	1.2	0.8	1.3	20	15	22	15	18	—	1.20	1	1	DB714	mm	1.49
NEW	TCD-20-4*	5-1000	20.0±0.5	±0.8	0.3	0.9	0.4	0.8	0.7	1.1	20	11	21	15	15	—	1.20	1	1	DB714	mm	1.49

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

Suggested PCB layout (98-PL-010) for TCD models available upon request.
Please contact Applications Department or consult our website.

pin connections

See case style outline drawing for pin locations

PORT	cx	cz	hz	jn	kd*	lt*	mm*
INPUT	1	6	1	4	1	1	3
OUTPUT	2	1	6	6	6	6	4
COUPLED (forward)	5	4	3	3	3	3	1
NOT USED (isolate)	3,6	3	4	—	5	—	5
TERMINATION	—	—	—	—	4	4	6
GND	4,7,8	2,5	2,5	1,2,5	2	2,5	2

*external resistor required

001128

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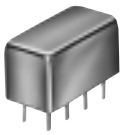
continuous facing pages.**

DIRECTIONAL COUPLERS

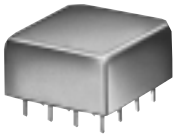
50 & 75Ω

6 to 30 dB COUPLING 5 kHz to 2000 MHz

TDC



PDC



P4DC
PDC-20A-5

MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	Flatness	MAINLINE LOSS dB L Typ.	L Max.	M° Typ.	M° Max.	U Typ.	U Max.	DIRECTIVITY dB L Typ.	L Min.	M° Typ.	M° Min.	U Typ.	U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TDC-6-1	10-400	6.3±0.4	±0.4	2.0	2.4	2.0	2.4	2.0	2.5	36	30	30	25	20	15	1.5	1	2	B02	cw	23.95
TDC-10-1	1-400	10.0±0.5	±0.5	1.2	1.5	1.0	1.3	1.2	1.5	35	25	30	20	20	15	1.5	1	2	B02	cw	17.95
TDC-10-2	5-1000	11±0.5	±0.6	1.4	1.8	1.5	1.8	1.6	2.0	50	35	25	20	20	15	1.5	0.5	0.5	B02	cw	25.95
PDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3	A01	cu	13.45
✦ PDC-10-1BD	1-400	11.5±0.5	±0.5	0.6	0.9	0.8	1.1	0.9	1.3	55	35	35	20	22	15	1.2	2.0	4	A01	cv	11.45
✣ PDC-10-2	250-1000	10.5±0.5	±0.6	1.4	1.6	—	—	1.6	2.0	30	23	—	—	25	15	1.5	—	5	A01	cu	34.45
PDC-10-5	1-2000	10.5±0.5	±1.0	1.2	1.9	1.3	1.9	2.0	2.5	38	25	30	18	22	15	1.3	0.5	0.5	A01	cu	40.95
PDC-10-6	0.005-20	11±0.5	±0.5	0.4	1.2	0.4	0.8	0.4	1.0	40	30	40	30	35	25	1.3	1.5	3	A01	cu	23.95
PDC-10-21**	1-1000	11±0.5	±0.5	1.2	1.7	1.2	1.7	1.6	2	40	30	25	20	25	20	1.3	1	2	A01	cu	32.95
PDC-10-22	5-750	11±0.5	±0.5	1.1	1.6	1.2	1.7	1.6	1.9	35	30	25	20	25	20	1.25	1	2	A01	cu	23.95
PDC-10-54	10-1500	10.5±0.5	±0.7	1.2	1.8	1.3	1.9	1.6	2.3	35	25	28	23	28	23	1.3	0.5	0.5	A01	cu	35.95
PDC-15-6	0.01-35	15±0.5	±0.5	0.3	0.6	0.2	0.4	0.3	0.6	38	30	35	25	28	20	1.15	2	4	A01	cu	23.95
PDC-15-21	1-500	14.7±0.5	±0.6	0.7	1.1	0.7	1.1	0.8	1.2	35	30	35	30	30	23	1.4	1	2	A01	cu	23.95
PDC-20-1*	25-400	21±0.75	±0.5	0.2	0.25	0.3	0.35	0.35	0.5	25	20	35	25	25	20	1.25	3	5	A01	cu	23.95
✦ PDC-20-1BD	0.5-200	19.2±0.5	±0.5	0.3	0.7	0.3	0.5	0.4	0.6	40	30	35	20	22	18	1.1	3	5	A01	cv	16.95
PDC-20-1W	10-700	19.2±0.5	±0.5	0.25	0.5	0.4	0.7	0.7	1.1	34	30	27	23	23	20	1.4	1	2	A01	cu	23.95
❄ PDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.25	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4	A01	cu	15.95
✦ PDC-20-3BD	0.2-250	19.5±0.5	±0.5	0.3	1.0	0.25	0.9	0.35	0.7	47	25	40	25	30	20	1.1	1.5	4	A01	cv	17.95
PDC-20A-5	0.1-2000	20.0±0.5	±1.0	0.6	1.5	0.6	1.5	1.9	2.9	34	20	25	15	20	10	1.5	0.5	2	C145	cy	44.95
■ PDC-10-1-75	1-250	10.5±0.5	±0.75	1.1	1.5	1.1	1.5	1.1	1.5	30	20	30	20	30	20	2.0	2	4	A01	cu	14.95
■ PDC-10-6-75	0.2-100	10.0±0.5	±0.2	1.2	1.6	0.9	1.2	0.9	1.3	50	30	40	25	37	25	1.5	1	2	A01	cu	23.95
■ PDC-15-6-75	0.02-35	14.5±0.5	±0.5	0.3	0.7	0.3	0.7	0.3	0.7	35	20	35	20	35	20	1.3	1.5	4	A01	cu	25.95
■ PDC-20-3-75	1-150	19.5±0.5	±0.75	0.35	0.8	0.35	0.8	0.35	0.8	25	20	25	20	25	20	2.0	2	4	A01	cu	14.95
■ PDC-20-6-75	0.05-40	20.4±0.3	±0.25	0.1	0.25	0.1	0.2	0.1	0.3	45	35	35	20	25	18	1.2	1.5	3	A01	cu	23.95
✷ P4DC-30A-2	5-1000	30.5±0.5	±1	0.7	1.2	0.7	1.2	0.8	1.5	30	15	32	20	20	10	1.15	1	2	C07	da	34.95

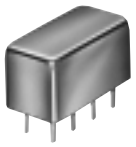
L = low range [f_L to $10f_L$] M = mid range [$10\ f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]

NOTES:

* L = 25-50 MHz, M = 50-300 MHz, U = 300-400 MHz
** Upper range coupling ±0.75 dB
● L = 30-100 MHz, M = 100-200 MHz, Operating Temperature +50°C
●● L = 40-100 MHz, M = 100-200 MHz
✦ Bi-directional
✣ L = f_L-$2f_L$
✷ 4-coupled ports, Isolation between coupled ports, 25 dB minimum.
❄ Insertion loss specification in L range may degrade up to 1dB at cold temperature, -55°C
✪ When only specification for M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors
■ Denotes 75 Ohm models
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Mainline Loss includes theoretical power loss at coupled port.
2. For PDC-HP models, external heat sinking is recommended to reduce case temperature.

001121

10&20 dB COUPLING up to 25W 30 to 2500 MHz



PDC

ZABDC

ZFDC/ZFBDC

MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M● Typ.	MAINLINE LOSS dB M● Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M● Typ.	DIRECTIVITY dB M● Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PDC20-400HP●●	40-400	21.5±0.5	±0.6	0.1	0.3	0.2	0.4	0.2	0.5	30	20	30	20	27	18	1.1	10	10	A01	gh	49.95
PDC20-900HP	800-900	20.2±0.6	±0.5			0.25	0.5					24	20			1.1	5	5	A01	cu	39.95
PDC20-970HP	860-970	20.2±0.6	±0.5			0.25	0.5					24	20			1.1	5	5	A01	cu	39.95
✦ ZABDC10-25HP	1500-2500	10±1.0	±0.5			0.55	0.9					26	18			1.1	10	10	DD477	jp	89.95
✦ ZABDC20-2400	1500-2400	19.5±1.0	±1.0			0.3	0.5					25	18			1.2	10	10	DD477	jp	89.95
✦ ZFDC-20-1H●	30-400	20.5±0.5	±0.4	0.15	0.4	0.15	0.4	0.3	0.4	30	25	30	25	30	23	1.2	25	25	J17	de	58.95
▲✦ ZFBDC20-900HP	800-900	20.7±0.6	±0.6			0.1	0.4					28	20			1.1	10	10	J17	gj	79.95
▲✦ ZFBDC20-970HP	860-970	20.4±0.6	±0.6			0.1	0.4					28	20			1.1	10	10	J17	gj	79.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

features

- high power operation
- very low insertion loss
- excellent directivity
- excellent VSWR, 1.1:1 typical
- wide bandwidth, 30-400 MHz model ZFDC-20-1H and 40-400 MHz model PDC20-400HP
- cellular application, models PDC-HP ZFDC-HP
- communications applications, ZABDC20-2400, ZABDC10-25HP

pin and coax connections

see case style outline drawing

Port	ct	cu	cv	cw	cy	da	de	gh	gj	jp
Input	5	1	1	1	14	8	S	1	2	1
Output	8	4	4	2	8	12	1	2	3	4
Coupled (forward)	2	3	3	4	5	2,1,13,14*	3	5	1	2
Coupled (reverse)	—	—	6	—	—	—	2	—	S	3
Not Used	11	6	—	—	—	—	—	—	—	—
Case GND	All other pins	2,5,7,8	2,5,7,8	3	All other pins	All other pins	—	3,4,6,7,8	—	—
							—	—	—	—

* 4-coupled ports #1, #2, #3, #4 consecutively

NSN GUIDE

MCL NO.	NSN	MIL-C 15370/18*
PDC-10-1	5985-01-178-4406	002
PDC-10-1-75	5985-01-294-3796	
PDC-10-2		008
PDC-10-5	5895-01-389-9497	
PDC-10-21	5985-01-130-0177	003
PDC-10-22	5985-01-190-7738	
PDC-10-54	5895-01-394-6080	
PDC-15-6	5985-01-147-0160	009
PDC-20-3	5985-01-076-8477	001
TDC-10-1	5905-01-226-3428	

* units are not QPL listed.

000616

DIRECTIONAL COUPLERS 50 & 75Ω Coaxial

6 to 30 dB COUPLING 5 KHz to 2000 MHz

ZADC - case F14

ZADC - case CC51

ZDC

ZEDC

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M° Typ.	MAINLINE LOSS dB M° Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M° Typ.	DIRECTIVITY dB M° Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
■	ZADC-10-4-75	10-1000	10.7±0.5	±0.5	1.18	1.9	1.28	1.9	1.32	1.9	27	20	22	15	18	13	1.17	1	1	F14	jz	54.95
■	ZADC-20-18-75	800-1750	19.8±0.6	±0.7			0.4	0.9					22	13			1.2	—	1	F14	ky	54.95
	ZADC-10-10	800-1000	10±0.6	±1.0			.85	1.2					22	17			1.16	—	5	CC51	kc	49.95
	ZADC-10-17	1000-1700	9.8±0.5	±1.0			0.8	1.3					25	17			1.2	5	5	CC51	kc	49.95
	ZADC-10-17W	800-1900	10.2±1.0	±1.5			0.8	1.3					24	14			1.2	5	5	CC51	kc	49.95
	ZADC-20-10	800-1000	20±0.6	±1.2			0.4	0.7					21	17			1.18	—	5	CC51	kc	49.95
	ZADC-30-10	800-1000	30±0.6	±1.4			0.4	0.7					21	16			1.15	—	5	CC51	kc	49.95
	ZDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3	M22	dd	44.95
	ZDC-20-1*	25-400	20±0.5	±0.5	0.2	0.25	0.3	0.35	0.35	0.5	25	20	35	25	25	20	1.25	3	5	M22	dd	51.95
	ZDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.25	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4	M22	dd	44.95
■	ZDC-10-1-75	1-250	10.5±0.5	±0.75	1.1	1.5	1.1	1.5	1.1	1.5	30	20	30	20	30	20	2	2	4	M22	dd	44.95
■	ZDC-20-3-75	1-150	19.5±0.5	±0.75	0.35	0.8	0.35	0.8	0.35	0.8	25	20	25	20	25	20	2	2	4	M22	dd	45.95
■	ZDC-2375	50-100	10.5±0.3	±0.2	—	—	—	—	1.1	1.3	—	—	—	—	35	30	1.3	—	4	M22	dd	52.95
■	ZDC-20-3-75-1	55-90	18.6±0.5	±0.3	0.4	0.6	0.4	0.6	0.4	0.6	35	30	35	30	35	30	1.2	—	4	M22	dd	52.95
	ZEDC-10-2B	1-1000	11±0.5	±0.75	1.3	1.8	1.5	1.8	1.5	1.8	35	30	30	20	18	13	1.3	1.5	3	V37	db	64.95
	ZEDC-15-2B	1-1000	15±0.5	±0.5	0.5	1.4	0.8	1.2	1.0	1.4	35	30	30	20	25	15	1.15	1.5	3	V37	db	64.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

* L = 25-50 MHz, M = 50-300 MHz, U = 300-400 MHz
** Upper range coupling ±0.75 dB
*** Above 1000 MHz, coupling flatness ±1 dB.
❄ Insertion loss specification in L range may degrade up to 1dB at cold temperature, -55°C
✪ When only specification for M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Mainline Loss includes theoretical power loss at coupled port.

NSN GUIDE

MCL NO.	NSN	MCL NO.	NSN
ZDC-10-1B	5985-01-391-5675	ZFDC-15-5	5985-01-298 0144
ZDC-10-1(BNC)	5985-01-125 3467	ZFDC-15-6	5985-01-330-6792
ZDC-20-1	5985-01-178-4405	ZFDC-20-2	5985-01-230-6676
ZDC-20-3(BNC)	5985-01-096-5007	ZFDC-20-3(BNC)	5985-01-146-0478
ZDC-20-3B	5985-01-264-9105	ZFDC-20-3(TNC)	5985-01-226-7882
ZEDC-10-2	5985-01-251-2669	ZFDC-20-3(SMA)	6130-01-383-9709
ZEDC-15-2B	5985-01-337-9981	ZFDC-20 4	5985-01-266-9992
ZFDC-10-1	5985-01-230-6676	ZFDC-20-5(BNC)	5985-01-097-2192
ZFDC-10-1(SMA)	5985-01-179-5122	ZMDC-10-1	4935-01-227-6945
ZFDC-10-1B	5985-01-135-9780	ZMDC-10-1B	4935-01-227-6945
ZFDC-10-2	5985-01-208-5694	ZMDC-20-3	5985-01-193-8515
ZFDC-10-21	5985-01-253-0600		
ZFDC-10-5(SMA)	5985-01-417-0065		
ZFDC-10-6B	5985-01-314-4176		

ZFDC

ZMDC

MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M° Typ.	MAINLINE LOSS dB M° Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M° Typ.	DIRECTIVITY dB M° Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZFDC-10-1	1-500	10.5±0.25	±0.6	1.0	1.3	0.8	1.1	1.0	1.3	32	25	33	25	22	15	1.2	1.5	3	K18	db	44.95
ZFDC-10-2	10-1000	10.75±0.5	±0.5	1.5	2.0	1.2	1.8	1.5	2.0	35	28	30	25	27	20	1.5	1.5	3	K18	db	51.95
ZFDC-10-5	1-2000	10.8±0.5	±1.0	1.2	1.9	1.2	1.8	1.8	2.5	38	25	30	18	22	18	1.3	0.5	0.5	K18	db	84.95
ZFDC-10-6	0.005-20	11±0.5	±0.5	0.4	1.2	0.4	0.8	0.4	1.0	40	30	40	30	35	25	1.3	1.5	3	K18	db	52.95
ZFDC-10-21**	1-1000	11±0.5	±0.5	1.2	2.1	1.2	1.7	1.6	2.0	40	30	25	20	25	20	1.2	1	2	K18	db	54.95
■ ZFDC-10-1-75	1-400	10.5±0.5	±0.5	1.0	1.7	1.1	1.5	1.1	1.6	46	30	44	28	34	20	1.3	2	4	K18	db	45.95
■ ZFDC-10-21-75	10-750	11±0.5	±0.75	1.5	1.8	1.5	1.9	1.7	2.1	36	30	30	20	26	20	1.4	1	2	K18	db	54.95
ZFDC-10-22	1-750	11±0.5	±0.5	1.1	1.9	1.2	1.7	1.4	1.9	35	30	25	20	25	20	1.25	1	2	K18	db	49.95
ZFDC-15-5	1-2000	15.5±0.5	±1.0	1.2	1.8	1.2	1.8	1.3	2.3	30	20	25	20	18	11	1.3	0.5	2	K18	dc	71.95
ZFDC-15-6	0.03-35	15±0.5	±0.5	0.3	0.6	0.2	0.4	0.3	0.6	38	30	35	25	28	20	1.15	2	4	K18	db	49.95
ZFDC-15-10	800-1000	15±1.0	±1.0			0.3	0.7					23	17			1.2	—	5	K18	db	44.95
ZFDC-20-3	0.2-250	19.5±0.5	±0.25	0.35	0.6	0.25	0.5	0.35	0.6	36	25	33	25	25	20	1.2	1.5	4	K18	db	44.95
■ ZFDC-20-3-75	10-250	19.3±0.5	±0.3	0.25	0.4	0.3	0.5	0.4	0.6	29	25	29	25	28	24	1.2	1	2	K18	db	49.95
ZFDC-20-4	1-1000	19.5±0.5	±0.5	0.4	1.2	0.4	0.8	0.8	1.5	36	28	27	20	23	18	1.1	.5	2	K18	dc	64.95
▲ ZFDC-20-4L	10-1000	20.2±0.5	±0.5	0.2	0.5	0.3	0.7	0.7	1.2	40	20	30	16	20	14	1.1	1	1	K18	db	64.95
■ ZFDC-20-5-75	100-1500	20.5±0.5	±0.75	0.9	1.3	0.9	1.2	1.1	1.5	30	20	25	18	22	13	1.3	1	1	K18	db	64.95
ZFDC-20-5***	0.1-2000	19.5±0.5	±0.5	0.3	1	0.7	1.4	1.5	2.3	30	20	27	20	22	10	1.2	.5	2	K18	dc	84.95
▲ ZFDC-20-50***	20-2000	19.5±0.5	±0.8	0.8	1.3	0.7	1.3	1.0	1.6	30	20	25	20	22	10	1.25	1	1	K18	dc	64.95
ZMDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3	M21	dd	49.95
❄ ZMDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.35	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4	M21	dd	49.95
ZMDC-30-1	0.1-250	30±0.5	±0.5	0.4	0.6	0.5	0.8	0.55	0.85	23	18	20	15	17	10	1.5	1.0	3	M21	dd	51.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

coaxial connections

see case style outline drawings

Port	db	dc	dd	de	jz	kc	ky
Input	1	3	3	S	1	1	S
Output	2	1	2	1	2	3	1
Coupled (forward)	3	2	1	3	S	2	2
Coupled (reverse)	—	—	—	2	—	—	—

010509

DIRECTIONAL COUPLERS 50 & 75Ω Coaxial

6 to 30 dB COUPLING 5 KHz to 2000 MHz

ZADC - case F14

ZADC - case CC51

ZDC

ZEDC

	MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M° Typ.	MAINLINE LOSS dB M° Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M° Typ.	DIRECTIVITY dB M° Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
■	ZADC-10-4-75	10-1000	10.7±0.5	±0.5	1.18	1.9	1.28	1.9	1.32	1.9	27	20	22	15	18	13	1.17	1	1	F14	jz	54.95
■	ZADC-20-18-75	800-1750	19.8±0.6	±0.7			0.4	0.9					22	13			1.2	—	1	F14	ky	54.95
	ZADC-10-10	800-1000	10±0.6	±1.0			.85	1.2					22	17			1.16	—	5	CC51	kc	49.95
	ZADC-10-17	1000-1700	9.8±0.5	±1.0			0.8	1.3					25	17			1.2	5	5	CC51	kc	49.95
	ZADC-10-17W	800-1900	10.2±1.0	±1.5			0.8	1.3					24	14			1.2	5	5	CC51	kc	49.95
	ZADC-20-10	800-1000	20±0.6	±1.2			0.4	0.7					21	17			1.18	—	5	CC51	kc	49.95
	ZADC-30-10	800-1000	30±0.6	±1.4			0.4	0.7					21	16			1.15	—	5	CC51	kc	49.95
	ZDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3	M22	dd	44.95
	ZDC-20-1*	25-400	20±0.5	±0.5	0.2	0.25	0.3	0.35	0.35	0.5	25	20	35	25	25	20	1.25	3	5	M22	dd	51.95
	ZDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.25	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4	M22	dd	44.95
■	ZDC-10-1-75	1-250	10.5±0.5	±0.75	1.1	1.5	1.1	1.5	1.1	1.5	30	20	30	20	30	20	2	2	4	M22	dd	44.95
■	ZDC-20-3-75	1-150	19.5±0.5	±0.75	0.35	0.8	0.35	0.8	0.35	0.8	25	20	25	20	25	20	2	2	4	M22	dd	45.95
■	ZDC-2375	50-100	10.5±0.3	±0.2	—	—	—	—	1.1	1.3	—	—	—	—	35	30	1.3	—	4	M22	dd	52.95
■	ZDC-20-3-75-1	55-90	18.6±0.5	±0.3	0.4	0.6	0.4	0.6	0.4	0.6	35	30	35	30	35	30	1.2	—	4	M22	dd	52.95
	ZEDC-10-2B	1-1000	11±0.5	±0.75	1.3	1.8	1.5	1.8	1.5	1.8	35	30	30	20	18	13	1.3	1.5	3	V37	db	64.95
	ZEDC-15-2B	1-1000	15±0.5	±0.5	0.5	1.4	0.8	1.2	1.0	1.4	35	30	30	20	25	15	1.15	1.5	3	V37	db	64.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

NOTES:

* L = 25-50 MHz, M = 50-300 MHz, U = 300-400 MHz
** Upper range coupling ±0.75 dB
*** Above 1000 MHz, coupling flatness ±1 dB.
❄ Insertion loss specification in L range may degrade up to 1dB at cold temperature, -55°C
✪ When only specification for M range given, specification applies to entire frequency range.
▲ Available only with SMA connectors
■ Denotes 75 Ohm model, for coax connector models 75 Ohm BNC connectors are standard.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Mainline Loss includes theoretical power loss at coupled port.

NSN GUIDE

MCL NO.	NSN	MCL NO.	NSN
ZDC-10-1B	5985-01-391-5675	ZFDC-15-5	5985-01-298 0144
ZDC-10-1(BNC)	5985-01-125 3467	ZFDC-15-6	5985-01-330-6792
ZDC-20-1	5985-01-178-4405	ZFDC-20-2	5985-01-230-6676
ZDC-20-3(BNC)	5985-01-096-5007	ZFDC-20-3(BNC)	5985-01-146-0478
ZDC-20-3B	5985-01-264-9105	ZFDC-20-3(TNC)	5985-01-226-7882
ZEDC-10-2	5985-01-251-2669	ZFDC-20-3(SMA)	6130-01-383-9709
ZEDC-15-2B	5985-01-337-9981	ZFDC-20 4	5985-01-266-9992
ZFDC-10-1	5985-01-230-6676	ZFDC-20-5(BNC)	5985-01-097-2192
ZFDC-10-1(SMA)	5985-01-179-5122	ZMDC-10-1	4935-01-227-6945
ZFDC-10-1B	5985-01-135-9780	ZMDC-10-1B	4935-01-227-6945
ZFDC-10-2	5985-01-208-5694	ZMDC-20-3	5985-01-193-8515
ZFDC-10-21	5985-01-253-0600		
ZFDC-10-5(SMA)	5985-01-417-0065		
ZFDC-10-6B	5985-01-314-4176		

ZFDC

ZMDC

MODEL NO.	FREQ. RANGE MHz f_L-f_U	COUPLING dB Nom.	COUPLING dB Flatness	MAINLINE LOSS dB L Typ.	MAINLINE LOSS dB L Max.	MAINLINE LOSS dB M° Typ.	MAINLINE LOSS dB M° Max.	MAINLINE LOSS dB U Typ.	MAINLINE LOSS dB U Max.	DIRECTIVITY dB L Typ.	DIRECTIVITY dB L Min.	DIRECTIVITY dB M° Typ.	DIRECTIVITY dB M° Min.	DIRECTIVITY dB U Typ.	DIRECTIVITY dB U Min.	VSWR (:1) Typ.	POWER INPUT, W L Max.	POWER INPUT, W MU Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
ZFDC-10-1	1-500	10.5±0.25	±0.6	1.0	1.3	0.8	1.1	1.0	1.3	32	25	33	25	22	15	1.2	1.5	3	K18	db	44.95
ZFDC-10-2	10-1000	10.75±0.5	±0.5	1.5	2.0	1.2	1.8	1.5	2.0	35	28	30	25	27	20	1.5	1.5	3	K18	db	51.95
ZFDC-10-5	1-2000	10.8±0.5	±1.0	1.2	1.9	1.2	1.8	1.8	2.5	38	25	30	18	22	18	1.3	0.5	0.5	K18	db	84.95
ZFDC-10-6	0.005-20	11±0.5	±0.5	0.4	1.2	0.4	0.8	0.4	1.0	40	30	40	30	35	25	1.3	1.5	3	K18	db	52.95
ZFDC-10-21**	1-1000	11±0.5	±0.5	1.2	2.1	1.2	1.7	1.6	2.0	40	30	25	20	25	20	1.2	1	2	K18	db	54.95
■ ZFDC-10-1-75	1-400	10.5±0.5	±0.5	1.0	1.7	1.1	1.5	1.1	1.6	46	30	44	28	34	20	1.3	2	4	K18	db	45.95
■ ZFDC-10-21-75	10-750	11±0.5	±0.75	1.5	1.8	1.5	1.9	1.7	2.1	36	30	30	20	26	20	1.4	1	2	K18	db	54.95
ZFDC-10-22	1-750	11±0.5	±0.5	1.1	1.9	1.2	1.7	1.4	1.9	35	30	25	20	25	20	1.25	1	2	K18	db	49.95
ZFDC-15-5	1-2000	15.5±0.5	±1.0	1.2	1.8	1.2	1.8	1.3	2.3	30	20	25	20	18	11	1.3	0.5	2	K18	dc	71.95
ZFDC-15-6	0.03-35	15±0.5	±0.5	0.3	0.6	0.2	0.4	0.3	0.6	38	30	35	25	28	20	1.15	2	4	K18	db	49.95
ZFDC-15-10	800-1000	15±1.0	±1.0			0.3	0.7					23	17			1.2	—	5	K18	db	44.95
ZFDC-20-3	0.2-250	19.5±0.5	±0.25	0.35	0.6	0.25	0.5	0.35	0.6	36	25	33	25	25	20	1.2	1.5	4	K18	db	44.95
■ ZFDC-20-3-75	10-250	19.3±0.5	±0.3	0.25	0.4	0.3	0.5	0.4	0.6	29	25	29	25	28	24	1.2	1	2	K18	db	49.95
ZFDC-20-4	1-1000	19.5±0.5	±0.5	0.4	1.2	0.4	0.8	0.8	1.5	36	28	27	20	23	18	1.1	.5	2	K18	dc	64.95
▲ ZFDC-20-4L	10-1000	20.2±0.5	±0.5	0.2	0.5	0.3	0.7	0.7	1.2	40	20	30	16	20	14	1.1	1	1	K18	db	64.95
■ ZFDC-20-5-75	100-1500	20.5±0.5	±0.75	0.9	1.3	0.9	1.2	1.1	1.5	30	20	25	18	22	13	1.3	1	1	K18	db	64.95
ZFDC-20-5***	0.1-2000	19.5±0.5	±0.5	0.3	1	0.7	1.4	1.5	2.3	30	20	27	20	22	10	1.2	.5	2	K18	dc	84.95
▲ ZFDC-20-50***	20-2000	19.5±0.5	±0.8	0.8	1.3	0.7	1.3	1.0	1.6	30	20	25	20	22	10	1.25	1	1	K18	dc	64.95
ZMDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3	M21	dd	49.95
❄ ZMDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.35	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4	M21	dd	49.95
ZMDC-30-1	0.1-250	30±0.5	±0.5	0.4	0.6	0.5	0.8	0.55	0.85	23	18	20	15	17	10	1.5	1.0	3	M21	dd	51.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

coaxial connections

see case style outline drawings

Port	db	dc	dd	de	jz	kc	ky
Input	1	3	3	S	1	1	S
Output	2	1	2	1	2	3	1
Coupled (forward)	3	2	1	3	S	2	2
Coupled (reverse)	—	—	—	2	—	—	—

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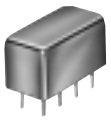
LOW PASS DC to 1000 MHz



PLP

	MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	PLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	A01	cr	13.95
	PLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	A01	cr	14.95
	PLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	A01	cr	11.45
■	PLP-7-75	DC-7	8	11-15	15-200	1.7:1	18:1	A01	cr	12.95
	PLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	A01	cr	11.45
■	PLP-10.7-75	DC-11	14	19-24	24-200	1.7:1	18:1	A01	cr	12.95
	PLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	A01	cr	11.45
■	PLP-15-75	DC-15	17	23-32	32-200	1.7:1	18:1	A01	cr	12.95
	PLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	A01	cr	11.45
■	PLP-21.4-75	DC-22	24.5	32-41	41-200	1.7:1	18:1	A01	cr	12.95
	PLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	A01	cr	11.45
■	PLP-30-75	DC-32	35	47-61	61-200	1.7:1	18:1	A01	cr	12.95
	PLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	A01	cr	11.45
■	PLP-50-75	DC-48	55	70-90	90-200	1.7:1	18:1	A01	cr	12.95
	PLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	A01	cr	11.45
	PLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	A01	cr	11.45
	PLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	A01	cr	11.45
■	PLP-100-75	DC-98	108	146-189	189-400	1.7:1	18:1	A01	cr	12.95
	PLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	A01	cr	11.45
	PLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	A01	cr	11.45
	PLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	A01	cr	11.45
	PLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	A01	cr	11.45
	PLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	A01	cr	11.45
	PLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	A01	cr	11.45
	PLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	A01	cr	11.45
■	PLP-600-75	DC-580	640	840-1120	1120-2000	1.7:1	18:1	A01	cr	12.95
	PLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	A01	cr	11.45
	PLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	A01	cr	11.45
	PLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	A01	cr	11.45
■	PLP-850-75	DC-750	850	1150-1490	1490-2000	1.7:1	18:1	A01	cr	12.95
	PLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	A01	cr	11.45
	PLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	A01	cr	11.45

NOTES:
* 35 dB for SCLF-380, SCLF-420 and SCLF-550 models
** 1dB compression at +13dbm input power
■ Denotes 75 ohm model.
❑ Non-hermetic
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. RF power, 0.5 Watt

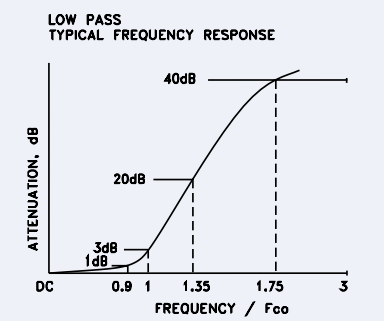
NSN GUIDE

MCL NO.	NSN
PLP-30	5915-01-355-9433
PLP-100	5915-01-332-1091
PLP-150	5915-01-389-3575
PLP-300	5915-01-450-7011
PLP-450	5915-01-389-8302

LOW PASS DC to 1000 MHz

SCLF

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
SCLF-5	DC-5.0	5.8	8-10	10-200	1.7:1	18:1	YY161	cr	14.95
SCLF-8	DC-8.0	9.2	12.5-16.5	16.5-200	1.7:1	18:1	YY161	cr	12.95
SCLF-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	YY161	cr	12.95
SCLF-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	YY161	cr	11.45
SCLF-25	DC-25	28	36-47	47-200	1.7:1	18:1	YY161	cr	11.45
SCLF-30	DC-30	35	47-61	61-200	1.7:1	18:1	YY161	cr	11.45
SCLF-45	DC-45	55	70-90	90-200	1.7:1	18:1	YY161	cr	11.45
SCLF-95	DC-95	108	146-189	189-400	1.7:1	18:1	YY161	cr	11.45
SCLF-135	DC-135	155	210-300	300-600	1.7:1	18:1	YY161	cr	11.45
SCLF-190	DC-190	210	290-390	390-800	1.7:1	18:1	YY161	cr	11.45
SCLF-225	DC-225	250	340-440	440-1200	1.7:1	18:1	YY161	cr	11.45
SCLF-380	DC-380	440	580-750	750-1800*	1.7:1	18:1	YY161	cr	11.45
SCLF-420	DC-420	570	750-920	920-2000*	1.7:1	18:1	YY161	cr	11.45
SCLF-550	DC-550	605	800-1050	1050-2000*	1.7:1	18:1	YY161	cr	12.95
SCLF-700	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	YY161	cr	12.95
SCLF-1000	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	YY161	cr	12.95



pin connections

see case style outline drawings

PORT	cr
INPUT	1
OUTPUT	8
GND	2,3,4,5,6,7

991230

Low Pass DC to 2700 MHz

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
BLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF55	—	34.95
BLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF55	—	35.95
BLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF55	—	32.95
■ BLP-7-75	DC-7	8	11-15	15-200	1.7:1	18:1	FF55	—	33.95
BLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF55	—	32.95
■ BLP-10.7-75	DC-11	14	19-24	24-200	1.7:1	18:1	FF55	—	33.95
BLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF55	—	32.95
■ BLP-15-75	DC-15	17	23-32	32-200	1.7:1	18:1	FF55	—	33.95
BLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF55	—	32.95
■ BLP-21.4-75	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF55	—	33.95
BLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF55	—	32.95
■ BLP-30-75	DC-32	35	47-61	61-200	1.7:1	18:1	FF55	—	33.95
BLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF55	—	32.95
■ BLP-50-75	DC-48	55	70-90	90-200	1.7:1	18:1	FF55	—	33.95
BLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF55	—	32.95
BLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF55	—	32.95
BLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF55	—	32.95
■ BLP-100-75	DC-98	108	146-189	189-400	1.7:1	18:1	FF55	—	33.95
BLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF55	—	32.95
BLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF55	—	32.95
BLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF55	—	32.95
BLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF55	—	32.95
BLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF55	—	32.95
BLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF55	—	32.95
BLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF55	—	32.95
■ BLP-600-75	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF55	—	33.95
BLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF55	—	32.95
BLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF55	—	32.95
BLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF55	—	32.95
■ BLP-850-75	DC-750	850	1150-1490	1490-2000	1.7:1	18:1	FF55	—	33.95
BLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF55	—	32.95
BLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF55	—	32.95

NOTES:

** 1dB compression at +13 dBm input power

■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

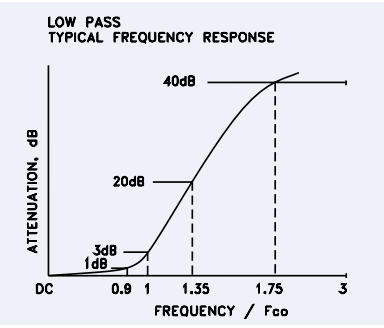
C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current rating: 1a. RF power, 0.5 Watt

2. Models are available with male/female coax connectors, for other configurations and inter-series versions consult factory. See section 0, case styles and outline drawings.

NSN GUIDE

MCL NO.	NSN
BLP-5	5915-01-454-6890
SLP-30	5915-01-327-4692
SLP-21.4	5915-01-414-9165



12.5 to 3000 MHz

TYPE N

NLP

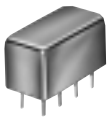
SMA

SLP

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
NLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF57	—	37.95
NLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF57	—	38.95
NLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF57	—	35.95
NLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF57	—	35.95
NLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF57	—	35.95
NLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF57	—	35.95
NLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF57	—	35.95
NLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF57	—	35.95
NLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF57	—	35.95
NLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF57	—	35.95
NLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF57	—	35.95
NLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF57	—	35.95
NLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF57	—	35.95
NLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF57	—	35.95
NLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF57	—	35.95
NLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF57	—	35.95
NLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF57	—	35.95
NLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF57	—	35.95
NLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF57	—	35.95
NLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF57	—	35.95
NLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF57	—	35.95
NLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF57	—	35.95
NLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF57	—	35.95
NLP-1750	DC-1500	1750	2400-3000	3000-6000	1.3:1	18:1	FF57	—	37.95
NLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3:1	18:1	FF57	—	37.95
NLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3:1	18:1	FF57	—	37.95
SLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF99	—	36.95
SLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF99	—	37.95
SLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF99	—	34.95
SLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF99	—	34.95
SLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF99	—	34.95
SLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF99	—	34.95
SLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF99	—	34.95
SLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF99	—	34.95
SLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF99	—	34.95
SLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF99	—	34.95
SLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF99	—	34.95
SLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF99	—	34.95
SLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF99	—	34.95
SLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF99	—	34.95
SLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF99	—	34.95
SLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF99	—	34.95
SLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF99	—	34.95
SLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF99	—	34.95
SLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF99	—	34.95
SLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF99	—	34.95
SLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF99	—	34.95
SLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF99	—	34.95
SLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF99	—	34.95
SLP-1650	DC-1400	1650	2300-2900	2900-6000	1.3:1	18:1	FF99	—	36.95
SLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3:1	18:1	FF99	—	36.95
SLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3:1	18:1	FF99	—	36.95

000331

LOW PASS DC to 1000 MHz



PLP

	MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	PLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	A01	cr	13.95
	PLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	A01	cr	14.95
	PLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	A01	cr	11.45
■	PLP-7-75	DC-7	8	11-15	15-200	1.7:1	18:1	A01	cr	12.95
	PLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	A01	cr	11.45
■	PLP-10.7-75	DC-11	14	19-24	24-200	1.7:1	18:1	A01	cr	12.95
	PLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	A01	cr	11.45
■	PLP-15-75	DC-15	17	23-32	32-200	1.7:1	18:1	A01	cr	12.95
	PLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	A01	cr	11.45
■	PLP-21.4-75	DC-22	24.5	32-41	41-200	1.7:1	18:1	A01	cr	12.95
	PLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	A01	cr	11.45
■	PLP-30-75	DC-32	35	47-61	61-200	1.7:1	18:1	A01	cr	12.95
	PLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	A01	cr	11.45
■	PLP-50-75	DC-48	55	70-90	90-200	1.7:1	18:1	A01	cr	12.95
	PLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	A01	cr	11.45
	PLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	A01	cr	11.45
	PLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	A01	cr	11.45
■	PLP-100-75	DC-98	108	146-189	189-400	1.7:1	18:1	A01	cr	12.95
	PLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	A01	cr	11.45
	PLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	A01	cr	11.45
	PLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	A01	cr	11.45
	PLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	A01	cr	11.45
	PLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	A01	cr	11.45
	PLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	A01	cr	11.45
	PLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	A01	cr	11.45
■	PLP-600-75	DC-580	640	840-1120	1120-2000	1.7:1	18:1	A01	cr	12.95
	PLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	A01	cr	11.45
	PLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	A01	cr	11.45
	PLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	A01	cr	11.45
■	PLP-850-75	DC-750	850	1150-1490	1490-2000	1.7:1	18:1	A01	cr	12.95
	PLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	A01	cr	11.45
	PLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	A01	cr	11.45

NOTES:
* 35 dB for SCLF-380, SCLF-420 and SCLF-550 models
** 1dB compression at +13dbm input power
■ Denotes 75 ohm model.
❑ Non-hermetic
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. RF power, 0.5 Watt

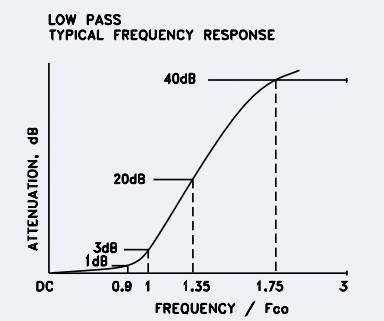
NSN GUIDE

MCL NO.	NSN
PLP-30	5915-01-355-9433
PLP-100	5915-01-332-1091
PLP-150	5915-01-389-3575
PLP-300	5915-01-450-7011
PLP-450	5915-01-389-8302

LOW PASS DC to 1000 MHz

SCLF

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
SCLF-5	DC-5.0	5.8	8-10	10-200	1.7:1	18:1	YY161	cr	14.95
SCLF-8	DC-8.0	9.2	12.5-16.5	16.5-200	1.7:1	18:1	YY161	cr	12.95
SCLF-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	YY161	cr	12.95
SCLF-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	YY161	cr	11.45
SCLF-25	DC-25	28	36-47	47-200	1.7:1	18:1	YY161	cr	11.45
SCLF-30	DC-30	35	47-61	61-200	1.7:1	18:1	YY161	cr	11.45
SCLF-45	DC-45	55	70-90	90-200	1.7:1	18:1	YY161	cr	11.45
SCLF-95	DC-95	108	146-189	189-400	1.7:1	18:1	YY161	cr	11.45
SCLF-135	DC-135	155	210-300	300-600	1.7:1	18:1	YY161	cr	11.45
SCLF-190	DC-190	210	290-390	390-800	1.7:1	18:1	YY161	cr	11.45
SCLF-225	DC-225	250	340-440	440-1200	1.7:1	18:1	YY161	cr	11.45
SCLF-380	DC-380	440	580-750	750-1800*	1.7:1	18:1	YY161	cr	11.45
SCLF-420	DC-420	570	750-920	920-2000*	1.7:1	18:1	YY161	cr	11.45
SCLF-550	DC-550	605	800-1050	1050-2000*	1.7:1	18:1	YY161	cr	12.95
SCLF-700	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	YY161	cr	12.95
SCLF-1000	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	YY161	cr	12.95



pin connections

see case style outline drawings

PORT	cr
INPUT	1
OUTPUT	8
GND	2,3,4,5,6,7

991230

Low Pass DC to 2700 MHz

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
BLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF55	—	34.95
BLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF55	—	35.95
BLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF55	—	32.95
■ BLP-7-75	DC-7	8	11-15	15-200	1.7:1	18:1	FF55	—	33.95
BLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF55	—	32.95
■ BLP-10.7-75	DC-11	14	19-24	24-200	1.7:1	18:1	FF55	—	33.95
BLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF55	—	32.95
■ BLP-15-75	DC-15	17	23-32	32-200	1.7:1	18:1	FF55	—	33.95
BLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF55	—	32.95
■ BLP-21.4-75	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF55	—	33.95
BLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF55	—	32.95
■ BLP-30-75	DC-32	35	47-61	61-200	1.7:1	18:1	FF55	—	33.95
BLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF55	—	32.95
■ BLP-50-75	DC-48	55	70-90	90-200	1.7:1	18:1	FF55	—	33.95
BLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF55	—	32.95
BLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF55	—	32.95
BLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF55	—	32.95
■ BLP-100-75	DC-98	108	146-189	189-400	1.7:1	18:1	FF55	—	33.95
BLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF55	—	32.95
BLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF55	—	32.95
BLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF55	—	32.95
BLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF55	—	32.95
BLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF55	—	32.95
BLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF55	—	32.95
BLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF55	—	32.95
■ BLP-600-75	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF55	—	33.95
BLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF55	—	32.95
BLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF55	—	32.95
BLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF55	—	32.95
■ BLP-850-75	DC-750	850	1150-1490	1490-2000	1.7:1	18:1	FF55	—	33.95
BLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF55	—	32.95
BLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF55	—	32.95

NOTES:

** 1dB compression at +13 dBm input power

■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

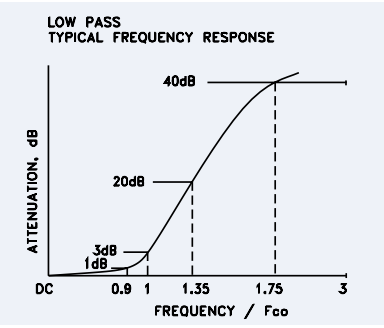
C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current rating: 1a. RF power, 0.5 Watt

2. Models are available with male/female coax connectors, for other configurations and inter-series versions consult factory. See section 0, case styles and outline drawings.

NSN GUIDE

MCL NO.	NSN
BLP-5	5915-01-454-6890
SLP-30	5915-01-327-4692
SLP-21.4	5915-01-414-9165



12.5 to 3000 MHz

TYPE N

NLP

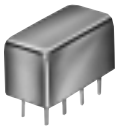
SMA

SLP

MODEL NO.	PASSBAND, MHz (loss < 1 dB)	fco, MHz Nom. (loss 3 dB)	STOP BAND, MHz (loss > 20dB)	STOP BAND, MHz (loss > 40 dB)	VSWR Passband Typ.	VSWR Stopband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (Note 2) Qty. (1-9)
NLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF57	—	37.95
NLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF57	—	38.95
NLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF57	—	35.95
NLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF57	—	35.95
NLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF57	—	35.95
NLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF57	—	35.95
NLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF57	—	35.95
NLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF57	—	35.95
NLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF57	—	35.95
NLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF57	—	35.95
NLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF57	—	35.95
NLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF57	—	35.95
NLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF57	—	35.95
NLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF57	—	35.95
NLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF57	—	35.95
NLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF57	—	35.95
NLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF57	—	35.95
NLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF57	—	35.95
NLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF57	—	35.95
NLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF57	—	35.95
NLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF57	—	35.95
NLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF57	—	35.95
NLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF57	—	35.95
NLP-1750	DC-1500	1750	2400-3000	3000-6000	1.3:1	18:1	FF57	—	37.95
NLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3:1	18:1	FF57	—	37.95
NLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3:1	18:1	FF57	—	37.95
SLP-1.9**	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	FF99	—	36.95
SLP-2.5**	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	FF99	—	37.95
SLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	FF99	—	34.95
SLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	FF99	—	34.95
SLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	FF99	—	34.95
SLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	FF99	—	34.95
SLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	FF99	—	34.95
SLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	FF99	—	34.95
SLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	FF99	—	34.95
SLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	FF99	—	34.95
SLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	FF99	—	34.95
SLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	FF99	—	34.95
SLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	FF99	—	34.95
SLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	FF99	—	34.95
SLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	FF99	—	34.95
SLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	FF99	—	34.95
SLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	FF99	—	34.95
SLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	FF99	—	34.95
SLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	FF99	—	34.95
SLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	FF99	—	34.95
SLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	FF99	—	34.95
SLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	FF99	—	34.95
SLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	FF99	—	34.95
SLP-1650	DC-1400	1650	2300-2900	2900-6000	1.3:1	18:1	FF99	—	36.95
SLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3:1	18:1	FF99	—	36.95
SLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3:1	18:1	FF99	—	36.95

000331

BANDPASS 10.7 to 70 MHz



PIF
PBP
PBLP

NIF
NBP
NBLP

constant impedance

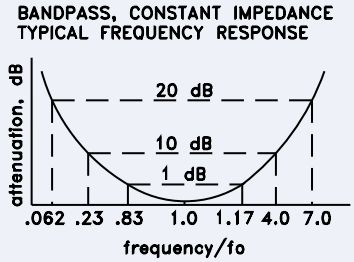
MODEL NO.	CENTER FREQ. MHz	PASSBAND, MHz (loss < 1dB)	STOP BANDS (loss > 10 dB) at MHz	STOP BANDS (loss > 20 dB) at MHz	VSWR, 1.3:1, Typ. TOTAL BAND, MHz	CASE STYLE Note B	CONNECTION	PRICE $ (note 2a) Qty. (1-9)
_IF-21.4	21.4	18-25	4.9 & 85	1.3 & 150	DC-220	▽	cs	14.95
_IF-30	30	25-35	7 & 120	1.9 & 210	DC-330	▽	cs	14.95
_IF-40	42	35-49	10 & 168	2.6 & 300	DC-400	▽	cs	14.95
_IF-50	50	41-58	11.5 & 200	3.1 & 350	DC-440	▽	cs	14.95
_IF-60	60	50-70	14 & 240	3.8 & 400	DC-500	▽	cs	14.95
_IF-70	70	58-82	16 & 280	4.4 & 490	DC-550	▽	cs	14.95

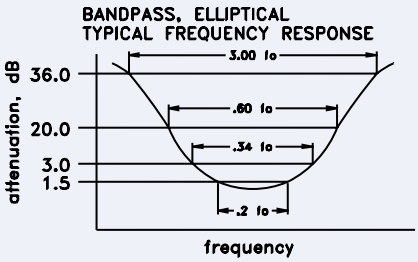
For connector selection, add prefix letter P, B, N or S to _IF where applicable (see note 2)

elliptic response

MODEL NO.	CENTER FREQ. MHz	PASSBAND, MHz I.L. 1.5 dB Max. MHz	3 dB BANDWIDTH Typical MHz	STOP BANDS (I. Loss > 20 dB) at MHz	STOP BANDS (I. loss > 35 dB) at MHz	PASSBAND VSWR Max.	STOP BAND VSWR Typ.	CASE STYLE Note B	CONNECTION	PRICE $ (note 2b) Qty. (1-9)
_BP-10.7	10.7	9.5-11.5	8.9-12.7	7.5 & 15	0.6 & 50-1000	1.7:1	16:1	▽	cr	18.95
_BP-21.4	21.4	19.2-23.6	17.9-25.3	15.5 & 29	3.0 & 80-1000	1.7:1	16:1	▽	cr	18.95
_BP-30	30	27.0-33.0	25-35	22 & 40	3.2 & 99-1000	1.7:1	16:1	▽	cr	18.95
_BP-60	60	55.0-67.0	49.8-70.5	44 & 79	4.6 & 190-1000	1.7:1	16:1	▽	cr	18.95
_BP-70	70	63.0-77.0	58.0-82.0	51 & 94	6.0 & 193-1000	1.7:1	16:1	▽	cr	18.95

For connector selection, add prefix letter P, B, N or S to _BP where applicable (see note 2)





NSN GUIDE

MCL NO.	NSN
SIF-30	5915-01-464-8971

000530

LOW PASS, FLAT TIME DELAY DC to 1.87 GHz

BBLP
BIF
BBP

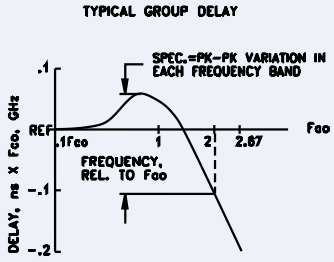
SBLP
SIF
SBP

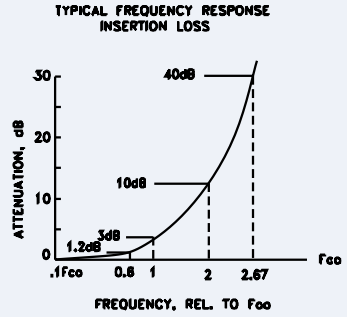
MODEL NO.	PASSBAND, MHz (loss < 1.2 dB) Min.	fco, MHz (loss 3dB) Nom.	STOP BAND, MHz loss > 10 dB	STOP BAND, MHz loss > 20 dB	VSWR DC-0.2fco $\bar{X}$	VSWR DC-0.6fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-2fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-2.67fco $\bar{X}$	CASE STYLE Note B	CONNECTION	PRICE $ (note 2c) Qty. (1-9)
_BLP-39	DC-23	39	78-117	117	1.3:1	2.3:1	0.70	4.0	5.00	▽	cr	19.95
_BLP-117	DC-65	117	234-312	312	1.3:1	2.4:1	0.35	1.4	1.90	▽	cr	19.95
_BLP-156	DC-94	156	312-416	416	1.3:1	1.1:1	0.30	1.1	1.50	▽	cr	19.95
_BLP-200	DC-120	200	400-534	534	1.6:1	1.9:1	0.40	1.3	1.60	▽	cr	19.95
_BLP-300	DC-180	300	600-801	801	1.25:1	2.2:1	0.20	0.6	0.80	▽	cr	19.95
_BLP-467	DC-280	467	934-1246	1246	1.25:1	2.2:1	0.15	0.4	0.55	▽	cr	19.95
▼ _BLP-933	DC-560	933	1866-2490	2490		2.2:1	0.09	0.2	0.28	▽	—	38.95
▼ _BLP-1870	DC-850	1870	3740-5000	5000	1.45:1	2.9:1	0.05	0.1	0.15	▽	—	38.95

For connector selection, add prefix letter P, B, N, or S to _BLP where applicable (see note 2)

features

- Flat group delay for low pulse distortion.
- Delay and selectivity are both controlled by design.
- Wide selection of cutoff frequencies, 48-to-1 range. Custom Fco values are available.
- Choice of pin package or connectorized models.





NOTES:

* Connection for plug-in models (PIF, PBP, PBLP)
▼ _BLP-933 AND _BLP-1870 available only with N and SMA connectors.
▽ Four different case styles available:
For plug-in models, case style A01
SMA connector models, case style FF99
BNC connector models, case style FF55
N-type connector models, case style FF57
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. RF power, 0.5 Watt
2. 2a. Price for PIF-series only, SIF $38.95, BIF $36.95, NIF $39.95
2b Price for PBP-series only, SBP $42.95, BBP $40.95, NBP $43.95
2c. Price for PBLP-series only, SBLP $38.95, BBLP $36.95, NBLP $39.95
3. Models are available with male/ female coax connectors, for other configurations and inter-series versions consult factory. See section 0, case styles and outline drawings.
4. All filters, except pin units (PIF, PBP and PBLP), are non-hermetic.

pin connections

see case style outline drawings

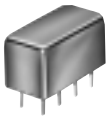
PORT	cr	cs
INPUT	1	1
OUTPUT	8	6
GND	2,3,4,5,6,7	2,3,4,5,7,8

000331

HIGH PASS 16.5 MHz to 2.2 GHz

SURFACE MOUNT

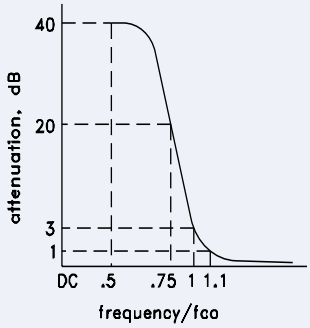
SCHF



PHP

	MODEL NO.	STOP BAND, MHz (loss > 40dB)	STOP BAND, MHz (loss > 20 dB)	fco, MHz Nom. (loss 3 dB)	PASSBAND, MHz (loss < 1 dB)	VSWR Stopband Typ.	VSWR Passband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW	SCHF-17	DC-9	9-13	16.5	18-200	18:1	1.25:1	YY161	cr	15.95
	SCHF-25	DC-13	13-19	25	27.5-200	18:1	1.3:1	YY161	cr	14.95
	SCHF-300	DC-145	145-190	245	290-1200	18:1	1.5:1	YY161	cr	14.95
	PHP-25	DC-13	13-19	25	27.5-200	18:1	1.7:1	A01	cr	16.95
	PHP-50	DC-20	20-26	37	41-200	17:1	1.5:1	A01	cr	14.95
	PHP-100	DC-40	40-55	82	90-400	17:1	1.5:1	A01	cr	14.95
	PHP-150	DC-70	70-95	120	133-600	17:1	1.8:1	A01	cr	14.95
	PHP-175	DC-70	70-105	140	160-800	17:1	1.5:1	A01	cr	14.95
	PHP-200	DC-90	90-116	164	185-800	17:1	1.6:1	A01	cr	14.95
	PHP-250	DC-100	100-150	205	225-1200	17:1	1.3:1	A01	cr	14.95
	PHP-300	DC-145	145-170	245	*290-1200	17:1	1.7:1	A01	cr	14.95
	PHP-400	DC-210	210-290	360	395-1600	17:1	1.7:1	A01	cr	14.95
	PHP-500	DC-280	280-365	454	500-1600	17:1	1.9:1	A01	cr	14.95
	PHP-600	DC-350	350-440	545	600-1600	17:1	2.0:1	A01	cr	14.95
	PHP-700	DC-400	400-520	640	700-1800	17:1	1.6:1	A01	cr	14.95
	PHP-800	DC-445	445-570	710	780-2000	17:1	2.1:1	A01	cr	14.95
	PHP-900	DC-520	520-660	820	910-2100	17:1	1.8:1	A01	cr	14.95
	PHP-1000	DC-550	550-720	900	1000-2200	17:1	1.9:1	A01	cr	14.95

high pass typical frequency response



NOTES:

* Insertion loss 1.5 dB maximum

❑ Non-hermetic

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current rating:
   1a. RF power, 0.5 Watt

2. Models are available with male/female coax connectors, for other configurations and inter-series versions consult factory. See section 0, case styles and outline drawings.

pin connections

see case style outline drawings

PORT	cr
INPUT	1
OUTPUT	8
GND	2,3,4,5,6,7

NSN GUIDE

MCL NO.	NSN
BHP-25	5915-01-425-7519
SHP-200	5915-01-360-0677

991230

BHP

NHP

SHP

MODEL NO.	STOP BAND, MHz (loss > 40dB)	STOP BAND, MHz (loss > 20 dB)	fco, MHz Nom. (loss 3 dB)	PASSBAND, MHz (loss < 1 dB)	VSWR Stopband Typ.	VSWR Passband Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
BHP-25	DC-13	13- 19	25	27.5-200	18:1	1.7:1	FF55	—	38.95
BHP-50	DC-20	20- 26	37	41-200	17:1	1.5:1	FF55	—	36.95
BHP-100	DC-40	40- 55	82	90-400	17:1	1.5:1	FF55	—	36.95
BHP-150	DC-70	70- 95	120	133-600	17:1	1.8:1	FF55	—	36.95
BHP-175	DC-70	70-105	140	160-800	17:1	1.5:1	FF55	—	36.95
BHP-200	DC-90	90-116	164	185-800	17:1	1.6:1	FF55	—	36.95
BHP-250	DC-100	100-150	205	225-1200	17:1	1.3:1	FF55	—	36.95
BHP-300	DC-145	145-190	245	*290-1200	17:1	1.7:1	FF55	—	36.95
BHP-400	DC-210	210-290	360	395-1600	17:1	1.7:1	FF55	—	36.95
BHP-500	DC-280	280-365	454	500-1600	17:1	1.9:1	FF55	—	36.95
BHP-600	DC-350	350-440	545	600-1600	17:1	2.0:1	FF55	—	36.95
BHP-700	DC-400	400-520	640	700-1800	17:1	1.6:1	FF55	—	36.95
BHP-800	DC-445	445-570	710	780-2000	17:1	2.1:1	FF55	—	36.95
BHP-900	DC-520	520-660	820	910-2100	17:1	1.8:1	FF55	—	36.95
BHP-1000	DC-550	550-720	900	1000-2200	17:1	1.9:1	FF55	—	36.95
NHP-25	DC-13	13- 19	25	27.5-200	18:1	1.7:1	FF57	—	41.95
NHP-50	DC-20	20- 26	37	41-200	17:1	1.5:1	FF57	—	39.95
NHP-100	DC-40	40- 55	82	90-400	17:1	1.5:1	FF57	—	39.95
NHP-150	DC-70	70- 95	120	133-600	17:1	1.8:1	FF57	—	39.95
NHP-175	DC-70	70-105	140	160-800	17:1	1.5:1	FF57	—	39.95
NHP-200	DC-90	90-116	164	185-800	17:1	1.6:1	FF57	—	39.95
NHP-250	DC-100	100-150	205	225-1200	17:1	1.3:1	FF57	—	39.95
NHP-300	DC-145	145-190	245	*290-1200	17:1	1.7:1	FF57	—	39.95
NHP-400	DC-210	210-290	360	395-1600	17:1	1.7:1	FF57	—	39.95
NHP-500	DC-280	280-365	454	500-1600	17:1	1.9:1	FF57	—	39.95
NHP-600	DC-350	350-440	545	600-1600	17:1	2.0:1	FF57	—	39.95
NHP-700	DC-400	400-520	640	700-1800	17:1	1.6:1	FF57	—	39.95
NHP-800	DC-445	445-570	710	780-2000	17:1	2.1:1	FF57	—	39.95
NHP-900	DC-520	520-660	820	910-2100	17:1	1.8:1	FF57	—	39.95
NHP-1000	DC-550	550-720	900	1000-2200	17:1	1.9:1	FF57	—	39.95
SHP-25	DC-13	13- 19	25	27.5-200	18:1	1.7:1	FF99	—	40.95
SHP-50	DC-20	20- 26	37	41-200	17:1	1.5:1	FF99	—	38.95
SHP-100	DC-40	40- 55	82	90-400	17:1	1.5:1	FF99	—	38.95
SHP-150	DC-70	70- 95	120	133-600	17:1	1.8:1	FF99	—	38.95
SHP-175	DC-70	70-105	140	160-800	17:1	1.5:1	FF99	—	38.95
SHP-200	DC-90	90-116	164	185-800	17:1	1.6:1	FF99	—	38.95
SHP-250	DC-100	100-150	205	225-1200	17:1	1.3:1	FF99	—	38.95
SHP-300	DC-145	145-190	245	*290-1200	17:1	1.7:1	FF99	—	38.95
SHP-400	DC-210	210-290	360	395-1600	17:1	1.7:1	FF99	—	38.95
SHP-500	DC-280	280-365	454	500-1600	17:1	1.9:1	FF99	—	38.95
SHP-600	DC-350	350-440	545	600-1600	17:1	2.0:1	FF99	—	38.95
SHP-700	DC-400	400-520	640	700-1800	17:1	1.6:1	FF99	—	38.95
SHP-800	DC-445	445-570	710	780-2000	17:1	2.1:1	FF99	—	38.95
SHP-900	DC-520	520-660	820	910-2100	17:1	1.8:1	FF99	—	38.95
SHP-1000	DC-550	550-720	900	1000-2200	17:1	1.9:1	FF99	—	38.95

010425

FREQUENCY DOUBLERS 50Ω

Surface Mount ❑

HIGH HARMONIC REJECTION 50 kHz to 4400 MHz

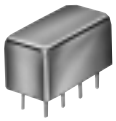
SURFACE MOUNT


KBA


SYK


SK


AK


RK


FD


FK

MODEL NO.	FREQUENCY MHz Input	Output	RF INPUT PWR dBm Min.	Max.	CONVERSION LOSS dB Input freq.	Typ.	Max.	❇HARMONIC OUTPUT dBc F1 Typ.	F1 Min.	F3 Typ.	F3 Min.	F4 Typ.	F4 Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆ KBA-20*	1600-2200	3200-4400	11	15	1600-2200	12	15.8	12	7	20	13	23	10	SM2	ln	9.95***
SYK-2R	10-1000	20-2000	12	16	10-500	10.5	14.0	35	25	42	25	20	10	TTT167	gc	29.95
					500-1000	11.5	16.0	32	20	37	20	20	10			
SK-2	1-500	2-1000	1	10	1-100	13.0	15.0	40	30	50	40	16	12	B02	df	26.45
					100-300	13.5	15.5	25	20	40	30	16	12			
					300-500	14.0	17.5	20	15	30	25	16	12			
AK-2	1-500	2-1000	1	10	1-100	13.0	15.0	40	30	50	40	16	12	A03	dg	20.95
					100-300	13.5	15.5	25	20	40	30	16	12			
					300-500	14.0	17.5	20	15	30	25	16	12			
AK-3000	70-1500	140-3000	12	15	70-1000	10.5	14.0	31	20	40	25	14	10	A03	ga	59.95
					1000-1500	11.5	16.0	22	15	30	20	30	14			
RK-2	5-500	10-1000	1	15	5-100	13.0	16.0	40	30	50	40	16	12	A01	dg	17.95
					100-300	13.5	15.5	25	20	40	30	16	12			
					300-500	14.0	16.5	20	15	30	25	16	12			
RK-3	0.05-150	0.1-300	0	13	0.05-50	11.0	17.0	40	28	45	30	16	8	A01	dh	15.95
					50-150	11.5	15.0	35	20	40	20	16	12			
RK-5	10-800	20-1600	10	20	10-100	13.0	15.0	20	12	25	20	15	12	A01	dg	49.95
					100-400	12.5	16.0	20	12	30	20	15	12			
					400-800	13.0	16.0	20	12	25	18	15	10			
RK-3000	70-1500	140-3000	12	15	70-1000	11.0	14.0	31	20	40	25	15	10	A01	ga	54.95
					1000-1500	12.0	17.5	22	15	30	20	30	14			
FD-2	5-500	10-1000	1	15	5-100	13.0	16.0	40	30	50	40	16	12	FF55	-	40.95
					100-300	13.5	15.5	25	20	40	30	16	12			
					300-500	14.0	16.5	20	15	30	25	16	12			
FK-5	10-1000	20-2000	10**	20	10-600	13.0	15.0	20	10	16	20	15	10	H16	-	69.95
					600-1000	14.0	17.0	20	10	25	20	25	15			
▲ FK-3000	70-1500	140-3000	12	15	70-1000	11.0	14.0	31	20	40	25	15	10	H16	-	79.95
					1000-1500	12.0	17.5	22	15	30	20	30	14			

BLUE CELL

NOTES:
- ◆ Aqueous washable
- ❑ Non-hermetic
- ❇ Harmonic output below power level of F2
- * BLUE CELL™ mixers protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699
- ** Minimum input power +13 dBm above 700 MHz
- *** Price for quantities 10-49
- ▲ Available only with SMA connectors
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current rating:
  1a. RF Input power, 200mW
  1b. FD-2 input is at Male BNC.

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

000807

LK

MK

GK

MODEL NO.	FREQUENCY MHz		RF INPUT PWR dBm		CONVERSION LOSS dB			✽HARMONIC OUTPUT dBc						CASE STYLE	CONNECTION	PRICE $
								F1		F3		F4				
	Input	Output	Min.	Max.	Input freq.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Note B		Qty. (1-9)
LK-3000	70-1500	140-3000	12	15	70-1000	10.5	14.0	31	20	40	25	15	10	BB48	dk	64.95
					1000-1500	11.5	16.0	22	15	35	20	20	14			
MK-2	5-500	10-1000	1	15	5-100	13.0	16.0	40	30	50	40	16	12	L19	-	52.95
					100-300	13.5	15.5	25	20	40	30	16	12			
					300-500	14.0	16.5	20	15	30	25	16	12			
MK-3	0.05-150	0.1-300	0	13	0.05-50	11.0	17.0	40	28	45	30	16	8	L19	-	47.95
					50-150	11.5	15.0	35	20	40	20	16	12			
MK-5	10-1000	20-2000	10**	20	10-600	13.0	15.0	20	10	26	20	15	10	L19	-	76.95
					600-1000	14.0	17.0	20	10	25	20	25	15			
GK-5	10-1000	20-2000	10**	20	10-600	13.0	15.0	20	10	26	20	15	10	L20	-	67.95
					600-1000	14.0	17.0	20	15	25	20	25	15			

pin connections

see case style outline drawings for pin locations

PORT	df	dg	dh	dk	ga	gc	ln
INPUT	1,2 ^	1,3,4 ^	1,3,4 ^	4	1	2	10
OUTPUT	4	8	8	8	8	1	5
GND EXT.	3	2,5,6,7	2,5,6,7	1,2,3,5,6,7	2,3,4,5,6,7	4,5,6	1,2,4,6,7,8,9
CASE GND	3	2,5,6,7	2	1,2,3,5,6,7	2,3,4,5,6,7	—	—
NOT USED	—	—	—	—	—	3	—
SAMPLE(1)	—	—	—	—	—	—	3

^ pins must be connected together externally

(1) sample port output power, -10 dBc typ. Terminate in 50 ohms if not used.

NSN GUIDE

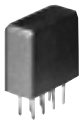
MCL NO.	NSN
AK-2	5895-01-131-4569
FD-2	5895-00-087-7925
FK-5	5985-01-204-9746
MK-3BR	5895-01-332-8582
RK-2	5895-01-268-7337
RK-3	5895-01-143-3726
RK-3-TX	5895-01-160-8656
RK-6	5895-01-450-3793
SK-2	6625-01-247-8425

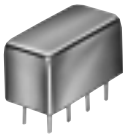
001204

HIGH OUTPUT 1000 mV DC output, 1 to 400 MHz

SURFACE MOUNT


SYPD


MPD

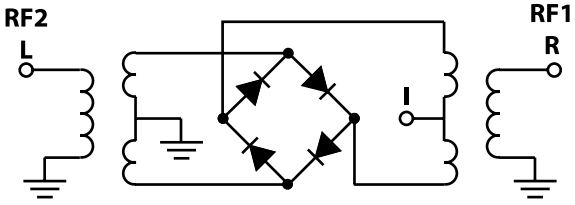

RPD


ZRPD

MODEL NO.	FREQUENCY MHz RF1 RF2	I	POWER IN RF1 RF2 (dBm)	SCALE FACTOR mV/deg.	IMPEDANCE (ohms) output load I	ISOLATION (dB) RF1-RF2 Min.	OUTPUT POLARITY RF1/RF2 in-phase	DC OUTPUT (mV) note2 Max. Typ.	Max. Min.	Offset Typ.	Offset Max.	FIGURE-OF-MERIT M Typ.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
SYPD-1	1-100	DC-50	7	8	500	40	neg.	1000	700	0.2	1	143	TTT167	ec	14.95
SYPD-2	10-200	DC-50	7	8	500	40	neg.	1000	700	0.3	1	143	TTT167	ec	18.95
MPD-1	1-100	DC-50	7	8	500	40	neg.	1000	700	0.2	1	143	A11	ea	21.45
MPD-2	10-200	DC-50	7	8	500	40	neg.	1000	700	0.3	1	143	A11	ea	24.95
MPD-21	50-400	DC-50	7	7	500	40*	neg.	800	500	0.5	1	120	A11	ea	26.95
RPD-1	1-100	DC-50	7	8	500	40	neg.	1000	700	0.2	1	143	A01	ea	18.45
RPD-2	5-150	DC-50	7	8	500	40	neg.	1000	700	0.3	1	143	A01	ea	20.95
ZRPD-1	1-100	DC-50	7	8	500	40	neg.	1000	700	0.2	1	143	M22	gg	57.95

NOTES:

❑ Non-hermetic
* 30 dB from 200 to 400 MHz
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
   1a. RF Input power, 50mW
   1b. Peak IF current, 20mA
2. For MPD-1, RPD-1 & ZRPD-1 DC output decreases to 550 mV over 1-10 MHz as temperature decreases to -55°C



pin connections

see case style outline drawings for pin locations

PORT	ea	ec	gg
RF REF (RF2)	8	2	1
RF IN (RF1)	1	1	3
DC OUT (I)	3,4	3	2
GND EXT.	2,5,6,7	4,5,6	—
CASE GND	2	—	—

NSN GUIDE

MCL NO.	NSN
MPD-1	6625-01-294-7152
MPD-21	5895-01-389-3572
RPD-1	5895-01-250-8525

000807

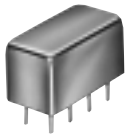
PHASE SHIFTERS

Plug-In & Surface Mount ❑

180° VOLTAGE VARIABLE 8 to 1000 MHz

SURFACE MOUNT

JSPHS



SPH

	MODEL◆ NO.	FREQUENCY (MHz)	PHASE RANGE (Degrees) Min.	INSERTION LOSS (dB) Typ.	Max.	CONTROL VOLTAGE (V)	CONTROL BANDWIDTH Typ.	VSWR (:1) Typ.	Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW	JSPHS-12	8-12	180	0.9	2.5	0-15	DC-50KHz	1.2	1.8	BK276	jh	29.95
	JSPHS-26	18-26	180	1.2	3.0	0-12	DC-50 KHz	1.2	1.7	BK276	jh	29.95
	JSPHS-150	100-150	180	1.2	2.5	0-12	DC-30 KHz	1.2	1.7	BK276	jb	31.95
	JSPHS-446	366-446	180	1.2	2.5	0-12	DC-50 KHz	1.2	1.7	BK276	jb	32.95
NEW	JSPHS-1000	700-850	180	1.2	2.3	0-15	DC-50 KHz	1.2	2.6	BK276	jh	32.95
		850-1000	160	1.2	2.0	0-15	DC-50 KHz	1.2	2.0			
	SPH-16	13-16	180	1.2	2.5	0-7	DC-50 KHz	1.2	1.7	A01	jh	29.95

features

- JSPHS, J-lead surface mount
- SPH, plug-in hermetically sealed
- good vswr, 20% bandwidth
- low voltage bias control, up to 15V
- low insertion loss, 1.2 dB typ.

pin connections

see case style outline drawings

PORT	jb	jh
IN	14	1
OUT	8	7
BIAS	1,7	4,6
GND	all other pins	all other pins

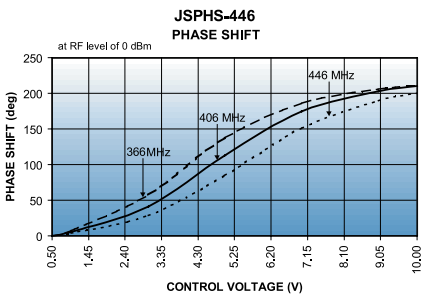
NOTES:

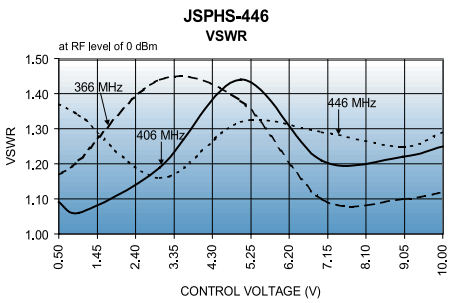
◆ JSPHS models, Aqueous washable.
❑ Non-hermetic
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Maximum input power, 0 dBm
2. Absolute maximum power, voltage and current ratings:
2a. Max. RF input power; +20 dBm
2b. Max. control voltage: 20V

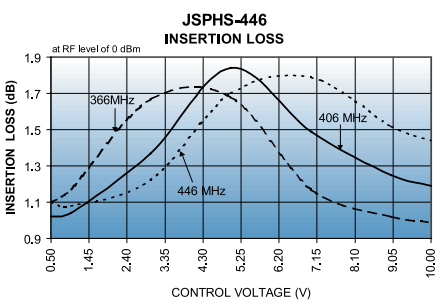
JSPHS-446

Control Valtage (V)	Phase Shift* (Deg) 366 MHz	406 MHz	446 MHz	VSWR (:1) 366 MHz	406 MHz	446 MHz	INSERTION LOSS (dB) 366 MHz	406 MHz	446 MHz
0.5	0.05	0.03	0.01	1.17	1.09	1.37	1.10	1.02	1.10
1	7.65	5.43	4.14	1.21	1.06	1.34	1.17	1.04	1.08
3	57.73	41.01	29.01	1.44	1.19	1.16	1.67	1.37	1.22
5	137.57	112.81	84.75	1.38	1.44	1.32	1.68	1.84	1.70
7	186.22	174.91	151.47	1.10	1.21	1.29	1.17	1.49	1.79
9	205.93	203.06	189.91	1.10	1.22	1.25	1.02	1.25	1.52
10	211.22	210.59	200.96	1.12	1.25	1.29	0.99	1.19	1.44

* Normalized at control voltage=0.5V







010309

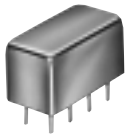
PHASE SHIFTERS

Plug-In & Surface Mount ❑

180° VOLTAGE VARIABLE 8 to 1000 MHz

SURFACE MOUNT

JSPHS



SPH

	MODEL◆ NO.	FREQUENCY (MHz)	PHASE RANGE (Degrees) Min.	INSERTION LOSS (dB) Typ.	Max.	CONTROL VOLTAGE (V)	CONTROL BANDWIDTH Typ.	VSWR (:1) Typ.	Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW	JSPHS-12	8-12	180	0.9	2.5	0-15	DC-50KHz	1.2	1.8	BK276	jh	29.95
	JSPHS-26	18-26	180	1.2	3.0	0-12	DC-50 KHz	1.2	1.7	BK276	jh	29.95
	JSPHS-150	100-150	180	1.2	2.5	0-12	DC-30 KHz	1.2	1.7	BK276	jb	31.95
	JSPHS-446	366-446	180	1.2	2.5	0-12	DC-50 KHz	1.2	1.7	BK276	jb	32.95
NEW	JSPHS-1000	700-850	180	1.2	2.3	0-15	DC-50 KHz	1.2	2.6	BK276	jh	32.95
		850-1000	160	1.2	2.0	0-15	DC-50 KHz	1.2	2.0			
	SPH-16	13-16	180	1.2	2.5	0-7	DC-50 KHz	1.2	1.7	A01	jh	29.95

features

- JSPHS, J-lead surface mount
- SPH, plug-in hermetically sealed
- good vswr, 20% bandwidth
- low voltage bias control, up to 15V
- low insertion loss, 1.2 dB typ.

pin connections

see case style outline drawings

PORT	jb	jh
IN	14	1
OUT	8	7
BIAS	1,7	4,6
GND	all other pins	all other pins

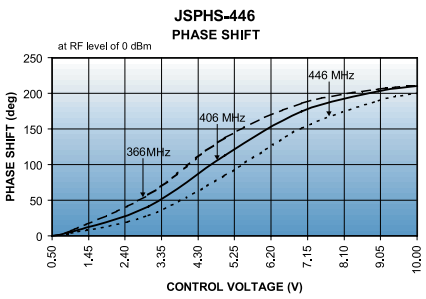
NOTES:

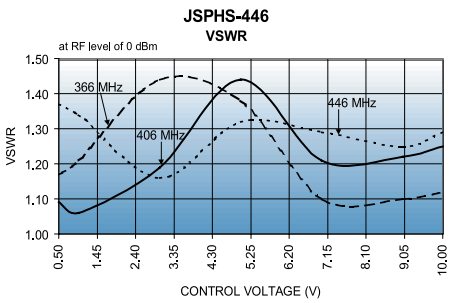
◆ JSPHS models, Aqueous washable.
❑ Non-hermetic
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Maximum input power, 0 dBm
2. Absolute maximum power, voltage and current ratings:
2a. Max. RF input power; +20 dBm
2b. Max. control voltage: 20V

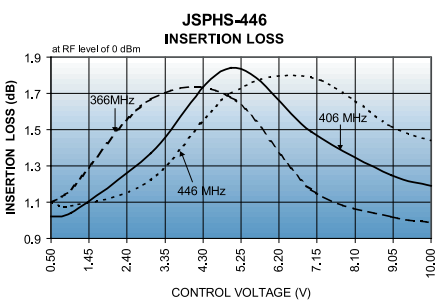
JSPHS-446

Control Valtage (V)	Phase Shift* (Deg) 366 MHz	406 MHz	446 MHz	VSWR (:1) 366 MHz	406 MHz	446 MHz	INSERTION LOSS (dB) 366 MHz	406 MHz	446 MHz
0.5	0.05	0.03	0.01	1.17	1.09	1.37	1.10	1.02	1.10
1	7.65	5.43	4.14	1.21	1.06	1.34	1.17	1.04	1.08
3	57.73	41.01	29.01	1.44	1.19	1.16	1.67	1.37	1.22
5	137.57	112.81	84.75	1.38	1.44	1.32	1.68	1.84	1.70
7	186.22	174.91	151.47	1.10	1.21	1.29	1.17	1.49	1.79
9	205.93	203.06	189.91	1.10	1.22	1.25	1.02	1.25	1.52
10	211.22	210.59	200.96	1.12	1.25	1.29	0.99	1.19	1.44

* Normalized at control voltage=0.5V

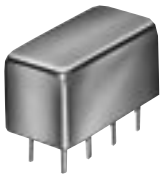






010309

3 to 20 dBm 100 kHz to 900 MHz Minimum Δ Phase



PLS

MODEL NO.	FREQUENCY (MHz)	INPUT (dBm) Min.	INPUT (dBm) Max.	OUTPUT* (dBm) Typ.	CONTROL CURRENT (mA) Typ.	LIMITING input range, Δ Output/Δ 1dB Input dBm	LIMITING amp, dB	LIMITING phase, deg.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
PLS-1	0.1 - 150	6	20	-- 4.0	3	6 to 10 10 to 16 16 to 20	0.10 0.15 0.15	0.8 0.8 0.7	A01	dm	22.95
PLS-2	100 - 900	3	15	-- 5.0	5	3 to 8 8 to 12 12 to 15	0.20 0.40 0.40	2.0 2.0 2.0	A01	dn	22.95

NOTES:

* Typical output level at typical control current, level may be changed by varying current.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum power, voltage and current rating:
   1a. RF input power, 100mW
   1b. Control current, 10mA

pin connections

see case style outline drawings

PORT	dm	dn
INPUT	1	1
OUTPUT	8	8
CONTROL	3,4 ^	3,4 ^
GND EXT.	2,5,6,7	2,5,6,7
CASE GND	2	2,5,6,7

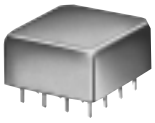
^ pins must be connected together externally

NSN GUIDE

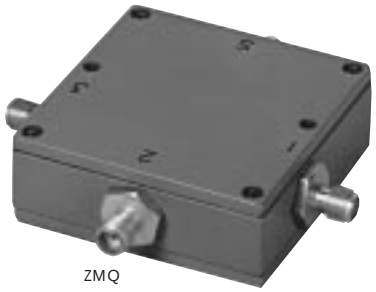
MCL NO.	NSN
PLS-1	5895-01-105-7820
PLS-2	5895-01-390-0151
PLS-6	5820-01-249-8320

000807

QPSK 30 to 1050 MHz


QMC


PMQPW

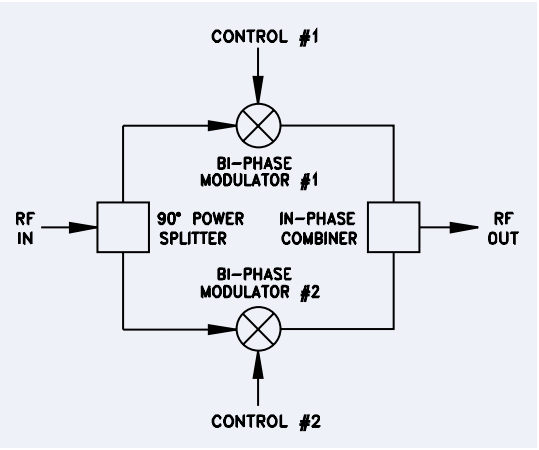

ZMQ

wideband 360° in 90° steps

MODEL NO.	FREQUENCY (MHz)	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	AMPLITUDE UNBALANCE (dB) Typ.	AMPLITUDE UNBALANCE (dB) Max.	PHASE UNBALANCE (Deg.)± Typ.	PHASE UNBALANCE (Deg.)± Max.	1 dB COMPR. (dBm) Typ.	VSWR Typ. In	VSWR Typ. Out	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
QMC-1050	800-1050	5.5	7.5	0.5	1.0	3	7	4	2.0:1	2.0:1	C07	dr	119.95
PMQPW-150*	30-150	6.0	10.5	0.4	0.9	3	8	4	2:1	2:1	AAA118	ds	172.95
▲ ZMQ-1050	800-1050	5.5	7.5	0.5	1.0	3	7	4	2.0:1	2.0:1	HHH141	du	169.95

features

- octave & multi-octave bandwidth
- good phase & amplitude balance
- hermetically sealed metallic enclosure with plug-in version.
- capable of meeting MIL-M-28837 requirements



NOTES:

* Protected under patent No. 4,673,898
▲ Available only with SMA connectors
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. Input power, 100mW; 1b. Control current, 40mA
2. All specifications at control current ±20mA
3. Control ports drive with 50 ohms source

PHASE SHIFT VS. CONTROL CURRENT

CONT-1 (mA)	CONT-2 (mA)	PHASE SHIFT (Deg.)
+20	+20	0 (REF)
+20	-20	90
-20	-20	180
-20	+20	270

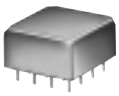
pin and coaxial connections

see case style outline drawings for pin locations

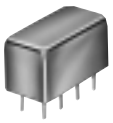
PORT	dr	ds	du
RF IN	13	8	3
RF OUT	2	4	1
CONTROL-1	4	2	4
CONTROL-2	1	6	2
NOT USED	9,12,16	—	—
GND EXT.	3,5,6,7,8, 10,11,14,15	1,3,5,7	—
CASE GND	3,5,6,7,8, 10,11,14,15	1,3,5,7	—

000809

I&Q 9 MHz to 1880 MHz



MIQY
MIQC



MIQA

ZFMIQ

ZAMIQ

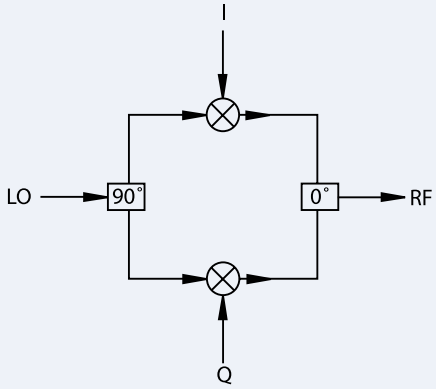
high rejection of carrier and sideband

MODEL NO.	FREQUENCY (MHz) RF(signal)/ LO(carrier) f_L	f_U	I&Q Min.	Max.	CONVERSION LOSS (dB) $\bar{x}$	σ	Max.	CARRIER REJECTION (-dBc) Typ.	Min.	SIDEBAND REJECTION (-dBc) Typ.	Min.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
MIQA-10M	9	11	DC	2	5.8	0.20	7.0	41	30	40	30	58	48	68	58	A06	dv	49.95
MIQA-21M	20	23	DC	3	6.2	0.14	7.0	50	40	40	30	48	40	65	55	A06	gd	39.95
MIQA-70M	66	73	DC	5	6.2	0.10	7.0	38	30	38	30	48	45	58	55	A06	dv	39.95
MIQA-70ML	66	73	DC	5	5.7	0.10	6.5	38	30	38	30	48	43	58	55	A06	dv	49.95
MIQA-91M	86	95	DC	5	5.5	0.10	6.5	38	30	38	30	48	45	58	55	A06	dv	49.95
MIQA-100M	95	105	DC	5	5.5	0.10	6.5	38	30	38	30	48	45	58	55	A06	dv	49.95
MIQA-195M	185	205	DC	5	5.6	0.10	6.5	38	30	38	30	48	45	58	55	A06	dv	49.95
MIQC-88M	52	88	DC	5	5.7	0.10	7.5	41	35	34	30	52	40	66	50	C07	dx	49.95
MIQC-176M	104	176	DC	5	5.5	0.10	7.0	38	30	36	30	47	35	70	50	C07	dx	54.95
MIQC-895M	868	895	DC	5	8.0	0.10	10.5	40	30	40	30	52	35	58	50	C07	dw	99.95
MIQC-1785M	1710	1785	DC	5	9.0	0.30	10.5	35	25	35	25	40	33	65	50	C07	dx	99.95
MIQC-1880M	1805	1880	DC	5	9.0	0.30	10.5	35	25	35	25	40	33	65	50	C07	dx	99.95
▲ ZAMIQ-895M	868	895	DC	5	8.0	0.10	10.5	40	30	40	30	52	35	58	50	HHH141	gv	149.95
▲ ZFMIQ-10M	9	11	DC	2	5.8	0.20	7.0	41	30	40	30	58	45	68	58	J17	dz	89.95
▲ ZFMIQ-70ML	66	73	DC	5	5.7	0.1	6.5	38	30	38	30	48	43	58	55	J17	dz	89.95
▲ ZFMIQ-91M	86	95	DC	5	5.5	0.17	6.5	38	30	38	30	48	45	58	55	J17	dz	89.95
▲ ZFMIQ-100M	95	105	DC	5	5.5	0.17	6.5	38	30	38	30	48	45	58	55	J17	dz	89.95
																		Qty. (1-49)
❑ MIQY-70M	67	73	DC	5	5.8	0.20	7.0	40	35	36	30	47	40	60	50	C07	dy	19.95
❑ MIQY-140M	137	143	DC	5	5.8	0.20	7.0	34	30	36	30	45	35	60	50	C07	dy	19.95

NOTES:

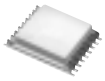
$\bar{x}$ Average of conversion loss at center of mid-band frequency (f_L+f_U/4)
◆ Aqueous washable
σ Standard deviation
❑ Non-hermetic
▲ Available only with SMA connectors
* BLUE CELL™ modulators protected by U.S. Patents 5,534,830 5,640,132 5,640,134 5,640,699, 5,745,017
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. LO power, 50mW
1b. I&Q current, 40mA
2. Operating LO power: 10 ± 1dBm
3. 1dB compression: 0dBm typical
4. Conversion Loss = (I+Q) power, dBm - RF power, dBm
5. Carrier and sideband rejections measured at -5dBm I/Q power.
6. Q=I-90° for MIQA-70M
Q=I+90° for all other models

I&Q modulation block diagram



001013

I&Q 52 MHz to 2000 MHz


IQBG


JCIQ

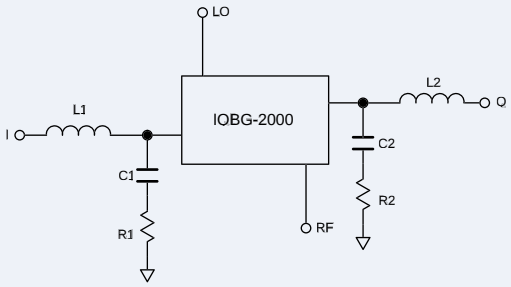
high rejection of carrier and sideband

BLUE CELL	MODEL NO.	FREQUENCY (MHz) RF(signal)/ LO(carrier) f_L	f_U	I&Q Min.	Max.	CONVERSION LOSS (dB) $\bar{x}$	σ	Max.	CARRIER REJECTION (-dBc) Typ.	Min.	SIDEBAND REJECTION (-dBc) Typ.	Min.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	IQBG-2000*	1800	2000	DC	10	7.5	—	9.0	30	20	34	28	50	45	70	50	SM20	lm	39.95
◆	JCIQ-88M	52	88	DC	5	5.6	0.1	7.0	40	32	35	30	45	35	65	50	BG291	hs	49.95
◆	JCIQ-176M	104	176	DC	5	5.6	0.1	7.0	35	30	35	30	45	35	65	50	BG291	hs	54.95

features

- IQBG, excellent temperature stability, low noise floor
- cellular applications, radar and communication systems
- good carrier and sideband rejections
- excellent 3rd and 5th order harmonic suppression
- all MIQA and MIQC models, metal case and hermetically sealed
- JCIQ models, shielded surface mount metal case with solder-plated J-leads

recommended IF diplexer



L1, L2 33nH CHIP INDUCTOR (1206)
C1, C2 10pF NPO CHIP CAPACITOR (0603)
R1, R2 47Ω 5% CHIP RESISTOR (0603)

BLUE CELL™ TECHNOLOGY

Incorporates multi-layer monolithic ceramic substrates for moderate bandwidth and low cost RF/Microwave products

pin and coaxial connections

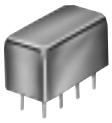
see case style outline drawings

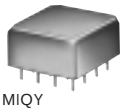
PORT	dv	dw	dx	dy	dz	gd	gv	hs	lm
LO (carrier)	1	13	13	13	1	1	1	2	9
RF (signal)	8	2	1	1	3	8	3	9	14
I (0°)(ref.)	7	4	8	8	S	7	4	4	10
Q (90°)*	4	1	5	5	2	4	2	11	18
ISOLATED**	—	9,12,16	—	10,11	—	—	—	—	—
50W TERM. EXT.	2	—	—	—	—	—	—	—	—
NOT USED	—	—	—	—	—	2	—	—	—
GND EXT.	3,5,6	3,5,6,7,8, 10,11,14,15	2,3,4,6,7,9,10, 11,12,14,15,16	2,3,4,6,7,9, 12,14,15,16	—	3,5,6	—	1,3,5,6,7,8,10 12,13,14	1,2,3,4,5,6,7,8,11 12,13,15,16,17
CASE GND	3,5,6	3,5,6,7,8, 10,11,14,15	3,4,6,7,10,11, 14,15	2,3,4,6,7,9, 12,14,15,16	—	3,5,6	—	—	—

* For I&Q modulators: Q(90°) for lower sideband suppression.
** For MIQY external variable capacitors can be connected at pins 10 & 11 to ground for improvement of sideband rejection.

001201

I&Q 1.15 to 895 MHz


MIQA


MIQY
MIQC


ZFMIQ

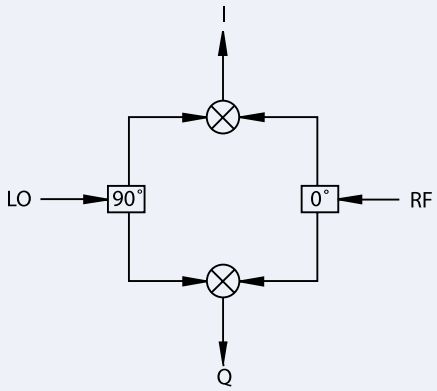

ZAMIQ

MODEL NO.	FREQUENCY (MHz) RF(signal)/ LO(carrier) f_L	f_U	I&Q Min.	Max.	CONVERSION LOSS (dB) $\bar{x}$	σ	Max.	AMPLITUDE UNBAL. (dB) Typ.	Max.	PHASE UNBAL. (Deg.) Typ.	Max.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
MIQA-10D	9	11	DC	2	6.0	0.10	7.0	0.15	0.3	1.0	3.0	50	35	65	55	A06	dv	49.95
MIQA-21D	20	23	DC	3	6.1	0.15	7.0	0.15	0.6	0.7	3.0	64	35	67	50	A06	gd	49.95
MIQA-70D	66	73	DC	3	6.2	0.10	7.0	0.15	0.5	0.7	3.0	56	45	58	55	A06	dv	49.95
MIQC-60WD	20	60	DC	5	5.3	0.10	7.0	0.15	0.6	1.0	5.0	55	45	67	55	C07	dx	79.95
▲ ZFMIQ-10D	9	11	DC	2	6.0	0.10	7.0	0.15	0.3	1.0	3.0	50	35	65	55	J17	dz	89.95
▲ ZFMIQ-70D	66	73	DC	2	6.2	0.10	7.0	0.15	0.5	0.7	3.0	56	45	58	55	J17	dz	89.95
▲ ZAMIQ-895D	868	895	DC	5	8.0	0.20	10.5	0.15	0.3	1.5	4.0	52	35	58	50	HHH141	gv	149.95 Qty. (1-49)
❑ MIQY-70D	67	73	DC	5	5.5	0.25	7.0	0.10	0.6	0.5	3.0	52	40	66	50	C07	dy	19.95
❑ MIQY-140D	137	143	DC	5	5.5	0.25	7.0	0.10	0.6	0.5	3.0	47	35	70	50	C07	dy	19.95

NOTES:

- $\bar{x}$ Average of conversion loss at center of mid-band frequency ($f_L+f_U/4$)
- σ Standard deviation
- ◆ Aqueous washable
- ❑ Non-hermetic
- ▲ Available only with SMA connectors
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
- C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
   1a. LO/RF power, 50mW.
   1b. I&Q current, 40mA
2. Operating LO power: 10 ± 0.5dBm
3. 1dB compression at +4dBm RF input
4. DC offset 1mV typical
5. Conversion Loss = RF power, dBm - (I+Q) power, dBm

I&Q demodulation block diagram



000809

I&Q 104 MHz to 1880 MHz

JCIQ

MODEL NO.	FREQUENCY (MHz) RF(signal)/ LO(carrier) f_L	f_U	I&Q Min.	Max.	CONVERSION LOSS (dB) $\bar{x}$	σ	Max.	AMPLITUDE UNBAL. (dB) Typ.	Max.	PHASE UNBAL. (Deg.) Typ.	Max.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆ JCIQ-176D	104	176	DC	5	5.5	0.1	7.0	0.15	0.6	2	5	52	40	65	50	BG291	hs	54.95
◆ JCIQ-1880D	1805	1880	DC	5	8	0.2	10.5	0.2	0.6	2	5	50	35	65	50	BG291	hs	99.95

features

- shielded surface mount metal case
- solder plated J-leads for excellent solderability and strain relief
- cellular applications, radar and communication systems
- good amplitude and phase unbalance
- excellent 3rd and 5th order harmonic suppression
- small size 0.8 X 0.87 X 0.25 inch

pin and coaxial connections

see case style outline drawings

PORT	dv	dw	dx	dy	dz	gd	gu	gv	hs
LO (carrier)	1	13	13	13	1	1	13	1	2
RF (signal)	8	2	1	1	3	8	1	3	9
I (0°)(ref.)	7	4	8	8	5	7	8	4	4
Q (90°)*	4	1	5	5	2	4	5	2	11
ISOLATED**	—	9,12,16	—	10,11	—	—	10,11	—	—
50W TERM. EXT.	2	—	—	—	—	—	—	—	—
NOT USED	—	—	—	—	—	2	—	—	—
GND EXT.	3,5,6	3,5,6,7,8, 10,11,14,15	2,3,4,6,7,9,10, 11,12,14,15,16	2,3,4,6,7,9, 12,14,15,16	—	3,5,6	2,3,4,6,7,9, 12,14,15,16	—	1,3,5,6,7,8,10 12,13,14
CASE GND	3,5,6	3,5,6,7,8, 10,11,14,15	3,4,6,7,10,11, 14,15	2,3,4,6,7,9, 12,14,15,16	—	3,5,6	3,4,6,7, 14,15	—	—

For I&Q demodulators:

Models MIQA-70D and ZFMIQ-70D: Q= +90° for LO>RF
Q= -90° for LO<RF

All other models: Q=+90° for LO<RF
Q=-90° for LO>RF

** For MIQY external variable capacitors can be connected at pins 10 & 11 to ground for improvement of phase unbalance.

000809

SPDT/SP4T TTL Drivers 10 to 3000 MHz


TOSW


ZSDR

MODEL NO.	TYPE	FREQUENCY (MHz) f_L - f_U	INSERTION LOSS (dB) low-band lw Typ.	lw Max.	upper band U Typ.	U Max.	IN-OUT ISOLATION (dB) frequency band L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
TOSW-230	SPDT	10-3000	1.3	1.9	1.8	2.7	60	40	40	28	35	22	QQ96	ee	49.95
TOSW-425	SP4T	10-2500	1.1	1.7	1.5	2.5	60	40	40	30	35	22	QQ96	ed	69.95
▲ ZSDR-230	SPDT	10-3000	1.3	1.9	1.8	2.7	60	40	40	28	35	22	CCC127	–	89.95
▲ ZSDR-425	SP4T	10-2500	1.1	1.7	1.5	2.5	60	40	40	30	35	22	GGG126	–	109.95

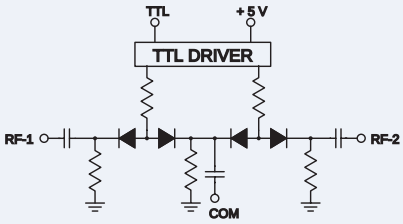
L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]
lw = low band [f_L to f_U/2]

additional specifications

VSWR ("ON" STATE): 1.3 TYP., 1.9 MAX.
SWITCHING TIME (µSEC): 2.0 TYP., 4.0 MAX.
SUPPLY VOLTAGE: +5V
TTL INPUT HIGH THRESHOLD: 2 VOLTS MIN.
TTL INPUT LOW THRESHOLD:0. 8 VOLTS MAX.

control logic

TOSW-230, ZSDR-230

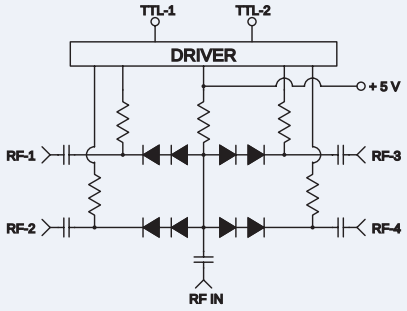


TTL LOGIC

TTL 1:	RF-1/OFF	RF-2/ON
TTL 0:	RF-1/ON	RF-2/OFF

control logic

TOSW-425, ZSDR-425



TTL LOGIC

	TTL-1	TTL-2
RF-1	1	0
RF-2	1	1
RF-3	0	1
RF-4	0	0

NOTES:

▲ Available only with SMA connectors.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".

C. Prices and specifications subject to change without notice.

1. Absolute maximum RF power and control current

Models (all)	Power, dBm L	M	U	Supply Current (mA)	Control Current (mA)
TOSW	+20	+28	+30	10	—
ZSDR	+20	+28	+30	10	—
PSW	+20	+20	+20	—	5
ZMSW	+20	+20	+20	—	5

2. 1 dB Compression point: all models

Frequency, MHz	RF Power, dBm
10 to 100	+6 increase to +19 dBm
above 100	+19 min.

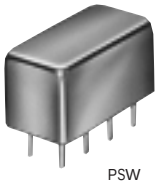
pin and coaxial connections

see case style outline drawings

PORT	ed	ee
RF IN	8	8
RF OUT 1	4	5
RF OUT 2	6	11
RF OUT 3	10	—
RF OUT 4	12	—
TTL-1	2	3
TTL-2	3	—
+5V	1	1
-5V	—	—
GND EXT.	5,7,9,11	2,4,6,7,9,10,12
CASE GND	5,7,9,11	2,4,6,7,9,10,12

001201

SPST/SPDT 10 to 2500 MHz



PSW

ZMSW

MODEL NO.	TYPE	FREQUENCY (MHz)	INSERTION LOSS (dB)				IN-OUT ISOLATION (dB)						CASE STYLE	CONNECTION	PRICE $
			low-band lw		upper band U		frequency band L		M		U				
		f_L - f_U	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Note B		Qty. (1-9)
PSW-1211	SPDT	10-2500	1.1	1.9	1.9	2.7	50	40	35	28	28	22	A06	ep	32.95
ZMSW-1111	SPST	10-2500	1.1	1.9	1.9	2.7	50	45	35	28	28	22	JJ77	eq	69.95
ZMSW-1211	SPDT	10-2500	1.1	1.9	1.9	2.7	50	45	35	28	28	22	JJ77	er	69.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

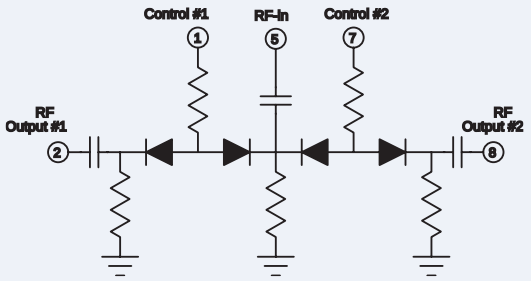
additional specifications

VSWR 1.7 max. ("on" state)
Switching time: 4µ sec. max.
Rise time: 2µ sec typical
Control voltage +5V on condition, 0V off condition
1 dB compression for all pin diode switches from 10 to 200 MHz
increase from 6 to 19 dBm. Above 200 MHz, 19 dBm min.

"RF-1" Connector omitted in ZMSW-1111

control logic

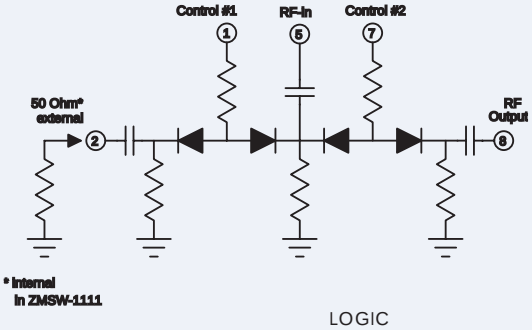
PSW-1211, ZMSW-1211



		LOGIC		
ZMSW: PSW:	Control #1 pin 1	Control#2 pin 7	RF 2 pin 8	RF 1 pin 2
State 1:	0V	+5V	ON	OFF
State 2:	+5V	0V	OFF	ON

control logic

Use of PSW-1211 as SPST, ZMSW-1111



		LOGIC		
ZMSW: PSW:	Control #1 pin 1	Control#2 pin 7	RF 2 pin 8	
State 1:	0V	+5V	ON	
State 2:	+5V	0V	OFF(50Ω)	

pin and coaxial connections

see case style outline drawings

PORT	ep(SPST)	ep(SPDT)	eq	er
RF IN	5	5	com	com
RF OUT 1	8	2	—	RF-1
RF OUT 2	—	8	RF-2	RF-2
CONTROL 1	1	1	1	1
CONTROL 2	7	7	2	2
50-OHM TERM.	2	—	—	—
GND EXT.	3,4,6	3,4,6	—	—
CASE GND	3,6	3,6	—	—

NSN GUIDE

MCL NO.	NSN
PSW-1211	5985-01-328-8006
TOSW-230	5985-01-456-4751
TOSW-425	5985-01-457-4811

001201

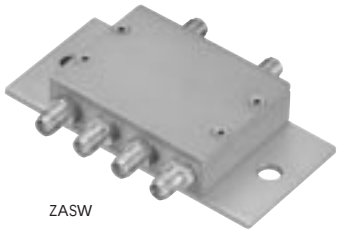
HIGH ISOLATION SWITCHES GaAs Surface Mount ❑ & Coaxial

SPST/SPDT With/ Without TTL Drivers DC to 5 GHz


*KSWHA


RSW


ZFSWHA


ZASW

MODEL NO.	FREQ. GHz f_L - f_U	SPST	SPDT	TTL DRIVER	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) frequency band A Typ.	A Max.	B Typ.	B Max.	C Typ.	C Max.	D Typ.	D Max.	E Typ.	E Max.	1 dB COMPR. (dBm) frequency band A Typ.	B Typ.	C Typ.	D Typ.	IN-OUT ISOLATION (dB) frequency band A Typ.	A Min.	B Typ.	B Min.	C Typ.	C Min.	D Typ.	D Min.	E Typ.	E Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
*◆ KSWHA-1-20	DC-2.0	●		●			0.8	1.2	1.3	1.7	1.3	1.7	—	—	—	—	19	19	26	—	75	60	65	58	65	58	—	—	—	—	XX112	ek	34.95
▲ ZFSWHA-1-20	DC-2.0	●			●		0.8	1.2	1.3	1.7	1.3	1.7	—	—	—	—	19	19	26	—	75	60	65	58	65	58	—	—	—	—	J17	em	74.95
◆ RSW-2-25P	DC-2.5		●			●	0.5	0.9	0.7	1.1	1.0	1.5	1.2	1.8	—	—	26	27	29	28	75	55	49	44	48	43	42	30	—	—	CL620	ke	3.95***
NEW ZASW-2-50DR	DC-5		●●			●	1.3	2.0	1.7	2.5	1.8	3.0	—	—	3.0	4.5	17	20	20	19	100	80	90	75	82	65	—	—	68	46	CY353	lw	89.95
NEW ZASWA-2-50DR	DC-5		●●	●	●		1.3	2.0	1.7	2.5	1.8	3.0	—	—	3.0	4.5	17	20	20	19	100	80	90	75	82	65	—	—	68	46	CY353	lw	89.95

A=DC to 100 MHz B=100 to 1000 MHz C=1000 to 2000 MHz D=2000 to 2500MHz E= 2000 to 5000MHz

additional specifications, all models

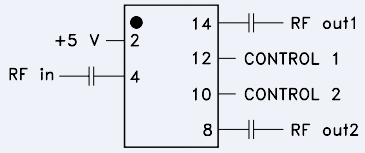
Model Series	KSWHA ZFSWHA	RSW	ZASW, ZASWA
Control Voltage, V Low Threshold, V High Threshold, V	-8/0 for compression -8 to -5/0 other specs	0/+5V -0.2 min., 0.2 max. 3 min., 7 max.	 0 min., 0.8 max. 2 min., 5 max.
Control Current, mA	0.2 max. to -8V 0.5 max. at -9V to -12V typ.	.165 typ.	High V, 5 max. Low V, 0.2 max.
Positive Supply V.	n/a	5 typ., 7 max.	+5+0.5/-0.1
Negative Supply V.	n/a	n/a	-5-0.5/+0.1
Positive Supply Current, mA	n/a	50-100 µA typ.	22 typ., 60 max.
Negative Supply Current, mA	n/a	n/a	22 typ., 60 max.
VSWR(:1) ON, all ports OFF, Input OFF, Output	DC-0.2GHz 0.2-2GHz 1.25 max 1.5 max 1.25 max. 1.5 max. 1.4 max. 1.5 max.	 1.3 typ. 1.7 max. —	 1.3 typ. 1.3 typ. 3.3 typ.
Rise/ Fall time (10% - 90%), ns Switching time, 50% of Control to 90% RF (Turn-on), ns 10% RF (Turn-off), ns	3 typ., 5 max. 7 typ., 10 max. 3 typ., 10 max.	10 typ. 20 typ. 20 typ.	5 typ., 15 max. 10 typ., 20 max. 10 typ., 20 max.
**Video Leakage, mVp-p	30 typ., 50 max.	50 typ.	140 typ.
Operating Temperature, °C Storage Temperature, °C	-55 to 100 -55 to 150	-40 to 85 -65 to 150	-20 to 85 -55 to 150
RF Power Input Max.★	Steady state DC-.02 .02-.5 .5-2 GHz 0/-8V control, +23 +30 +33 dBm As modulator^ +14.5 +20 +27 dBm	1W (>500 MHz)	250 mW

★ Above 20°C derate power linearly to zero at 150°C.
^ In modulator service, unrestricted switching is permitted with RF applied.
** Video leakage or break through is defined as leakage of TTL switching signal to RF output ports.

control logic, all models

Model Series	Control Ports 1	2	RF outputs 1	2
KSWHA	0	-v	Off	—
ZFSWHA	-v	0	On	—
RSW	Low	High	On	Off
	High	Low	Off	On
ZASW/ ZASWA	TTL High		Off	On
	Low		On	Off

RSW-2-25P connection schematic showing external dc blocking capacitors



NOTE: impedance of the capacitor should be less than 5 ohms over the operating frequency range.

pin and coaxial connections

see case style outline drawings for pin locations

PORT	ek	em	ke	lw
RF IN	1	1	4	1
RF OUT 1	5	2	14	3
RF OUT 2	—	—	8	6
TTL IN	—	—	—	4
+5V	—	—	2	2
-5V	—	—	—	5
CONTROL 1	2	4	12	—
CONTROL 2	3	3	10	—
GND CASE	—	—	—	—
GND EXT.	4,6,7,8	—	1,3,5,6 7,9,11,13	—

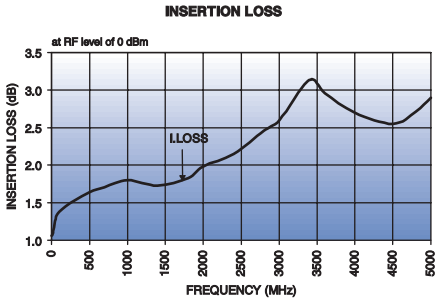
NOTES:
◆ Aqueous washable.
* KSWHA model hermetically sealed.
*** Prices for quantities 10-49
▲ Available with SMA connectors
❑ Non-hermetic
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and Specifications subject to change without notice.

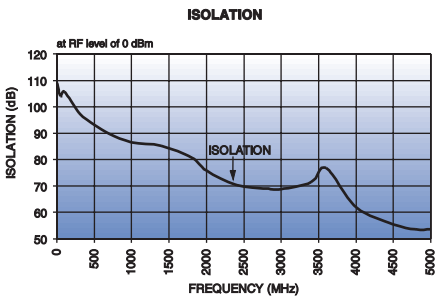
000616

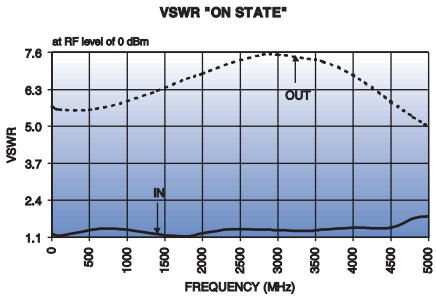
ZASW-2-50DR

reflective

DC to 5.0 GHz







FREQUENCY (MHz)	ON INSERTION LOSS (dB) IN-OUT1 $\bar{X}$	σ
1.00	1.06	0.01
10.00	1.08	0.01
50.00	1.28	0.01
100.00	1.38	0.00
300.00	1.53	0.01
500.00	1.64	0.02
700.00	1.71	0.03
1000.00	1.80	0.05
1400.00	1.73	0.02
1800.00	1.83	0.07
2000.00	1.98	0.07
2400.00	2.15	0.06
2800.00	2.46	0.05
3000.00	2.60	0.13
3400.00	3.13	0.04
3600.00	2.96	0.08
4000.00	2.70	0.13
4500.00	2.55	0.17
4800.00	2.71	0.22
5000.00	2.90	0.16

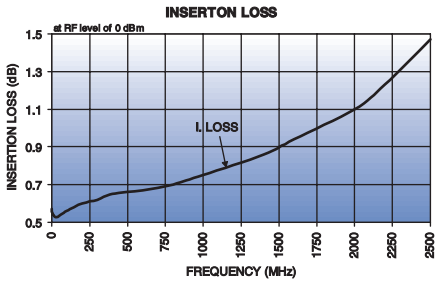
OFF ISOLATION (dB) IN-OUT $\bar{X}$	σ
109.17	3.64
108.91	10.51
104.03	5.94
105.82	7.43
97.50	4.30
93.26	3.56
89.84	2.64
86.55	2.68
85.22	3.42
80.88	1.20
75.82	0.90
70.36	0.67
69.10	0.43
68.74	0.75
71.45	4.25
76.78	3.43
62.02	0.76
55.47	0.73
53.70	0.67
53.70	0.76

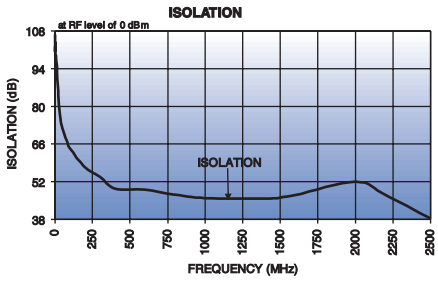
VSWR IN $\bar{X}$	OUT1 ON $\bar{X}$	OUT1 OFF $\bar{X}$
1.20	5.70	1.23
1.19	5.70	1.23
1.17	5.63	1.18
1.16	5.61	1.17
1.25	5.56	1.25
1.34	5.59	1.35
1.40	5.68	1.43
1.37	5.89	1.42
1.20	6.26	1.20
1.13	6.68	1.09
1.24	6.86	1.24
1.39	7.25	1.38
1.36	7.53	1.18
1.34	7.53	1.17
1.33	7.38	1.41
1.36	7.28	1.53
1.43	6.83	1.41
1.43	5.87	1.36
1.78	5.34	1.58
1.85	4.99	1.68

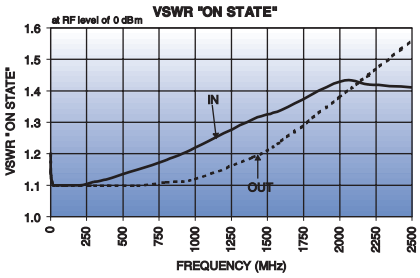
RSW-2-25P

reflective

DC to 2.5 GHz







FREQUENCY (MHz)	ON INSERTION LOSS (dB) IN-OUT1 $\bar{X}$	σ
0.50	0.57	0.00
1.00	0.56	0.00
2.00	0.55	0.00
4.00	0.54	0.00
10.00	0.54	0.01
20.00	0.53	0.00
40.00	0.53	0.00
80.00	0.55	0.00
100.00	0.56	0.00
200.00	0.60	0.00
300.00	0.62	0.00
400.00	0.65	0.00
600.00	0.67	0.00
800.00	0.70	0.00
1000.00	0.75	0.00
1400.00	0.86	0.00
1600.00	0.94	0.00
2000.00	1.10	0.01
2200.00	1.23	0.01
2500.00	1.47	0.01

OFF ISOLATION (dB) IN-OUT $\bar{X}$	σ
106.63	5.38
100.28	2.50
103.85	4.87
100.18	7.91
96.68	2.02
87.15	3.20
73.96	0.57
67.09	0.40
64.43	0.29
57.31	0.27
53.92	0.22
49.51	0.10
49.03	0.26
47.31	0.22
46.03	0.22
45.76	0.24
47.08	0.26
52.10	0.87
47.09	0.76
38.36	0.51

VSWR IN $\bar{X}$	OUT1 ON $\bar{X}$	OUT2 ON $\bar{X}$
1.20	1.20	1.19
1.15	1.15	1.15
1.13	1.13	1.13
1.12	1.12	1.12
1.11	1.11	1.11
1.10	1.10	1.10
1.10	1.10	1.10
1.10	1.10	1.10
1.10	1.10	1.09
1.10	1.10	1.10
1.11	1.10	1.10
1.12	1.10	1.09
1.15	1.10	1.09
1.18	1.11	1.10
1.22	1.12	1.11
1.31	1.19	1.17
1.34	1.24	1.21
1.43	1.38	1.35
1.42	1.45	1.41
1.41	1.56	1.49

990924

SP4T WITH TTL Drivers DC to 3 GHz


GSWA


ZSWA

	MODEL NO.	FREQ. (GHz) f_L - f_U	TTL DRIVER	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) frequency band A Typ.	A Max.	B Typ.	B Max.	C Typ.	C Max.	1 dB COMPRESSION (dBm) frequency band A[3] Typ. Min.	B Typ. Min.	C Typ. Min.	IN-OUT ISOLATION (dB) frequency band A Typ. Min.	B Typ. Min.	C Typ. Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	GSWA-4-30DR	DC-3		●		1.25	1.8	2.0	3.0	2.75	3.9	22 —	28 —	28 —	50 40	37 32	31 26	AN213	hb	19.95
	ZSWA-4-30DR	DC-3		●		1.0	1.8	1.5	3.0	2.0	3.9	22 —	28 —	28 —	50 40	37 32	31 26	CV665	mn	119.95

A = DC to 500MHz B = 500MHz to 2000MHz C = 2000MHz to 3000MHz

features

- excellent repeatability, specification limits 4.5σ typical from mean
- high isolation
- low video break thru, 30 mVP-P typical
- low DC power consumption,120mW typical

control logic, all models

Model Series	Control Ports 1	2	3	4	RF outputs 1	2	3	4
GSWA, ZSWA	Low	High	High	High	On	Off	Off	Off
	High	Low	High	High	Off	On	Off	Off
	High	High	Low	High	Off	Off	On	Off
	High	High	High	Low	Off	Off	Off	On
ZFSW, ZFSWA	-v	0	—	—	On	Off	—	—
	0	-v	—	—	Off	On	—	—
ZYSW, ZYSWA	Low	—	—	—	On	Off	—	—
	High	—	—	—	Off	On	—	—

NOTES:

◆ Aqueous washable.
▲ Available with SMA connectors
Moisture Resistance of models on this page is not guaranteed.
❑ Non-hermetic
★ 1.8 dB max. up to 3 GHz, 2.8 dB max. 3-4.6 GHz.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case styles & outline drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum RF power input ratings.

Models	Power, dBm DC-100	100-500	500-2000	2000-3000	3000-5000
ZSWA/GSWA-4-30DR					
Steady state control:	+20	+24	+30	+30	—
As modulator:	+8	+14	+20	+20	—
ZFSW-2-46	+24	+27	+30	+30	+30
ZFSWA-2-46	+24	+24	+27	+27	+27
ZYSW-2-50DR	+22	+22	+22	+24	+24
ZYSWA-2-50DR	+20	+20	+20	+20	+20

2. For reflective switches ZFSW, ZYSW models, OFF state of RF output is low impedance.
3. Below 100 MHz, 1 dB compression gradually decreases to 10 dBm at 1 MHz.

pin and coaxial connections

see case style outline drawings for pin locations

PORT	eg	ej	hb	mn
RF IN	3	S	1	1
RF OUT 1	2	3	25	2
RF OUT 2	1	2	21	3
RF OUT 3	—	—	9	4
RF OUT 4	—	—	5	5
CONTROL 1	—	4	15	C5
CONTROL 2	—	1	16	C3
CONTROL 3	—	—	13	C4
CONTROL 4	—	—	14	C6
TTL-1	4	—	—	—
TTL-2	—	—	—	—
+5V	+5 VDC	—	12	C2
-5V	-5 VDC	—	18	C1
NOT USED	—	—	—	—
GND EXT.	—	—	all other pins	—

001103

SPDT With/ Without TTL Drivers DC to 5 GHz

ZFSWA
ZFSW

ZYSWA
ZYSW

MODEL NO.	FREQ. (GHz) f_L - f_U	TTL DRIVER	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) frequency band A Typ. Max.	B Typ. Max.	C Typ. Max.	1 dB COMPRESSION (dBm) frequency band A Typ. Min.	B Typ. Min.	C Typ. Min.	IN-OUT ISOLATION (dB) frequency band A Typ. Min.	B Typ. Min.	C Typ. Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
▲ ZFSW-2-46	DC-4.6			●	0.9 1.1	1.0 1.3	1.3 1.8★	10 —	17 —	27 —	60 50	50 40	40 28	G144	ej	79.95
▲ ZFSWA-2-46	DC-4.6		●		0.8 1.1	0.9 1.3	1.5 2.6	10 —	17 —	27 —	60 45	50 40	30 25	G144	ej	89.95
▲ ZYSW-2-50DR	DC-5	●		●	0.9 1.5	1.3 1.7	2.1 —	20 15	23 19	21.0 18	44 38	38 28	20 —	ZZ121	eg	59.95
▲ ZYSWA-2-50DR	DC-5	●	●		1.1 1.5	1.4 1.9	1.9 —	18 13	20 17	22.5 20	42 38	31 27	20 19	ZZ121	eg	69.95

ZFSW, ZFSWA: A = DC to 200MHz B = 200MHz to 1000MHz C = 1000MHz to 4600MHz
ZYSW, ZYSWA: A = DC to 500MHz B = 500MHz to 2000MHz C = 1000MHz to 5000MHz

additional specifications, all models

Model Series	ZFSW, ZFSWA	ZYSW, ZYSWA	GSWA/ZSWA
Control Voltage	-8/0 for compression spec, -8 to -5/0 for all other specs	0/5.5, max.	0/ 5.5
Low Threshold, max.		0.8	0.8
High Threshold, min.		3.5	3.5
Control Current, mA	2.5 typ. at -8V	High V: 2 typ., 5 max. Low V:0.2 max.	High V: 0.2 max Low V: 0.02 max
Positive Supply V.	none	+5 +0.5/-0.1	+5±0.5
Negative Supply V.	none	-5 -0.5/+0.1	-5±0.25
Positive Supply Current, mA	n/a	20 max.	4 max.
Negative Supply Current, mA	n/a	20 max.	20 max.
VSWR(:1)	1.3 typ.	1.4 typ., 2.0 max. DC to 3 GHz 2.5 max. 3 to 5 GHz	1.28 typ., ON 1.24 typ., OFF DC-2GHz
Rise/ Fall time (10% - 90%), ns Switching time, 50% of Control to 90% RF (Turn-on), ns 10% RF (Turn-off), ns	2 typ.	6 typ., 12 max. 20 typ., 40 max.	25 typ. 45 typ.
**Video Leakage, mVp-p 0/-5V Control	30 typ.	30 typ.	30 typ.
Temperature, °C operating storage	-55 to 100 -55 to 150	-20 to 85 -55 to 100	-30 to 85 -55 to 100
MTBF, hrs @85°C case			$30X10^6$

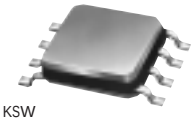
** Video leakage or break through is defined as leakage of TTL switching signal to RF output ports.

NSN GUIDE

MCL NO.	NSN
ZYSW-2-50DR	5895-01-464-8969
ZYSWA-2-50DR	5895-01-467-3232

010430

SPDT DC to 4.6 GHz



KSW
*KSWA

MODEL◆ NO.	FREQ. (GHz) f_L - f_U	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) frequency band A Typ.	A Max.	B Typ.	B Max.	C_1 Typ.	C_1 Max.	C_2 Typ.	C_2 Max.	1 dB COMPRESSION (dBm) frequency band A Typ.	B Typ.	C Typ.	IN-OUT ISOLATION (dB) frequency band A Typ.	A Min.	B Typ.	B Min.	C Typ.	C Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
KSW-2-46	DC-4.6		●	0.9	1.1	1.0	1.3	1.3	1.8	2.0	2.8	10	17	27	60	50	50	40	40	28	XX112	eh	36.95
* KSWA-2-46	DC-4.6	●		0.8	1.1	0.9	1.3	1.5	2.6	1.5	2.6	10	17	27	60	45	50	40	30	25	XX112	eh	58.95

A = DC to 200MHz B = 200MHz to 1000MHz C = 1000MHz to 4600MHz
C_1= 1000MHz to 3000MHz
C_2= 3000MHz to 4600MHz

additional specifications

Model Series	KSW	KSWA	MSW	MSWA	MSWT
Control Voltage	-8/0 for compression spec, -8 to -5/0 for all other specs				
Control Current, mA	2.5 typ. at -8V		0.2 max to -8V, 0.02 max at 0 to -0.2V		
VSWR (:1)	1.3 typ.		DC-1GHz 1.2 typ.	1-2GHz 1.4 typ. 1.45	DC-.1GHz .1-.5GHz .5-1GHz 1-2GHz 1.2 1.25 1.4 1.4 1.65 1.8 1.9 1.7
Rise/ Fall time (10% - 90%), ns	2 typ.		2 typ.	3 typ.	2 typ.
Switching time, 50% of Control to					
90% RF (Turn-on), ns			4 typ.	5.5 typ.	4 typ.
10% RF (Turn-off), ns			4 typ.	3 typ.	4 typ.
**Video Leakage, mVp-p 0/-5V Control	30 typ.		15 typ.	8 typ.	15 typ.
Temperature, °C operating	-55 to 100		-40 to 85		
storage	-55 to 150		-55 to 100		
MTBF, hrs @100°C case	$7X10^6$	$11X10^6$			

NOTES:
◆ Aqueous washable.
* KSWA model is hermetically sealed.
** Video leakage or break through is defined as leakage of TTL switching signal to RF output ports.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings for KSW, KSWA models:
1a. RF power input, +30 dBm except below 500 MHz +27 dBm;
1b. Control voltage -10 V maximum.
2. Absolute maximum power, voltage & current ratings: MSW, MSWA MSWT models:

2a. RF power input, (25°C)		DC-100	100-500	500-2000	MHz
MSW-2-20:	Steady state 0/-8V control,	+23	+27	+31	dBm
	As modulator	+11	+17	+21	dBm
MSWA-2-20:	Steady state 0/-8V control,	+24	+27	+33	dBm
	As modulator	+12	+17	+23	dBm
MSWT-4-20:	Steady state 0/-8V control	+24	+27	+33	dBm
	modulator application	+12	+17	+23	dBm

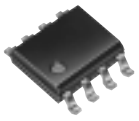
2b. Control current, 500µA (Occurs at -9V to -12V typical)
3. For reflective switches, KSW, MSW, RSW models, OFF state of RF output is low impedance.

NSN GUIDE

MCL NO.	NSN
KSW-2-46	5985-01-393-7219
KSWA-2-46	5985-01-369-4224

000103

SPDT DC to 2 GHz



MSW
MSWA
MSWT

MODEL◆ NO.	FREQ. (GHz) f_L - f_U	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) frequency band A Typ.	A Max.	B Typ.	B Max.	C Typ.	C Max.	D Typ.	D Max.	1 dB COMPRESSION (dBm) frequency band A Typ.	B Typ.	C Typ.	D Typ.	IN-OUT ISOLATION (dB) frequency band A Typ.	A Max.	B Typ.	B Max.	C Typ.	C Max.	D Typ.	D Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
MSW-2-20	DC-2.0		●	0.30	0.6	0.4	0.7	0.50	1.0	0.75	1.3	22	23	24	25	55	50	43	36	34	28	24	20	XX211	et	2.45
MSWA-2-20	DC-2.0	●		0.65	0.9	0.9	1.2	0.95	1.3	1.20	1.5	20	24	27	29	60	50	45	37	40	32	30	25	XX211	es	2.45

TRANSFER DC to 2 GHz Low Video Leakage

		path	INSERTION LOSS (dB)								ISOLATION (dB)										
MSWT-4-20	DC-2.0	Tx-J1/J2	0.9	1.2	1.1	1.5	1.25	1.8	1.45	2.2	18	25	28	29	51	44	34	27	26	21	19	15	XX211	eu	3.45
		J1/J2-Rx	1.1	1.4	1.3	1.7	1.5	2.0	1.6	2.2	16	18	20	22	52	46	37	31	29	24	21	17			
		Tx-Rx													60	53	41	36	34	27	28	21			

A=DC to 100MHz B=100MHz to 500MHz C=500MHz to 1000MHz D=1000MHz to 2000MHz

control logic

Model Series	Control Ports 1	2	3	4	RF outputs 1	2
KSW, KSWA	-v	0	—	—	On	Off
MSW, MSWA	0	-v	—	—	Off	On
MSWT					"On" Path (other paths are "OFF")	
	0	-v	-v	-v	Tx-J2	
	-v	0	-v	-v	Tx-J1	
	-v	-v	0	-v	Rx-J1	
	-v	-v	-v	0	Rx-J2	
	0	-v	0	-v	Tx-J2 & Rx-J1	
	-v	0	-v	0	Tx-J1 & Rx-J2	

pin connections

see case style outline drawings

PORT	eh	ek	es	et
RF IN	2	1	2	1
RF OUT 1	5	5	8	6
RF OUT 2	8	—	5	3
+5V	—	—	—	—
CONTROL 1	3	2	3	5
CONTROL 2	1	3	1	4
GND EXT.	4,6,7	4,6,7,8	4,6,7	2,7,8

PORT	eu
Tx	2
Rx	6
J1	4
J2	8
CONTROL 1	1
CONTROL 2	3
CONTROL 3	5
CONTROL 4	7

Application Note for Model MSWT-4-20 Transmit-Receive Switch:

The functional schematic diagram for a diversity application of the switch is shown in Figure 1, with the required external components including 4 independent drivers at the control ports. When operation as a transfer switch is desired only 2 drivers are needed, one connected to the V1 and V3 ports together, and the other connected to the V2 and V4 ports. In either case, two DC return paths are needed for the control voltages, represented by the ground symbols in the diagram. These returns must be via oppositely situated RF ports (Tx and Rx or J1 and J2), and can be furnished incidentally by the user's RF terminating devices themselves. However, if those devices are AC-coupled (that is, they contain DC blocking capacitors), then the shunt resistors shown in the diagram are needed. The resistors should be installed either at the Tx and Rx ports (connection shown as solid), or at J1 and J2 (shown dotted), with equal effect. If one external RF device has a DC return to ground, for example, then only one resistor is needed; it must be installed at the opposite RF port of the switch. The resistance of each of the external DC returns should be 20K ohms or less, for proper ON/OFF FETs.

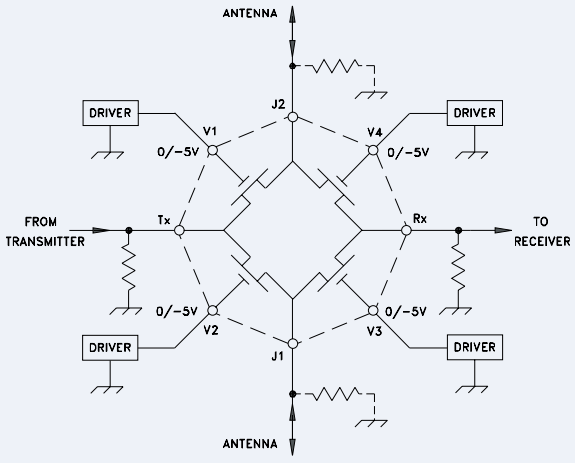


Figure1. functional schematic diagram
(Transmit-Receive application)

000530

HIGH CURRENT 100 kHz to 6000 MHz

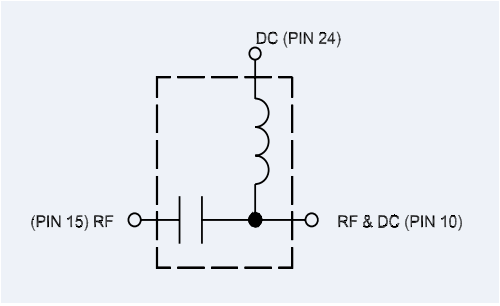
JEBT

MODEL NO.	FREQ. RANGE (MHz) f_L-f_U	INSERTION LOSS* (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	ISOLATION* (dB) (RF-DC, RF&DC-DC) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
JEBT-4R2G	10-4200	0.15	0.6	0.6	1.2	0.6	1.6	32	20	40	20	40	20	BL301	hr	39.95
JEBT-6G	10-6000	0.15	0.6	0.7	1.4	1.3	2.9	32	20	40	20	40	17	BL301	hr	59.95
JEBT-4R2GW	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6	25	15	40	20	40	20	BL301	hr	59.95
JEBT-6GW	0.1-6000	0.15	0.8	0.7	1.4	1.3	2.9	25	15	40	20	30	17	BL301	hr	69.95

L = low range [f_L to 10f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

features

- wide band coverage 0.1 to 6000 MHz
- low insertion loss 0.6 dB typ.
- good isolation 40dB typ.
- small size (JEBT) 1.26 X 0.94 X 0.39 inch
- feedthrough version (FT) available for coaxial models

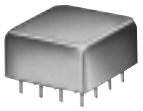


NOTES:

❑ Non-hermetic
* Insertion loss and isolation are guaranteed up to 20 dBm-RF power and 200 mA DC current for PBTC, JEBT, and ZFBT Series; for ZNBT, up to 30 dBm RF power and 500mA DC current.
** VSWR measured with open and short at DC port.
✣ Insertion loss 1 dB Max. and isolation 7 dB Min. 0.1 to 0.3 MHz.
▼ Connectors: SMA-F at "RF", and SMA-M at "RF & DC" port. For DC port, ZFBT available with SMA-F and for ZFBT-FT available with feedthrough terminal. For ZNBT-60-1W, N-M at "RF", N-F at "RF+DC", BNC-F at DC.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
B. Case mounted options, case finishes are given in section 0, see "Case styles & Outline Drawings".
C. Prices and specifications subject to change without notice.
1. Absolute maximum power, voltage and current ratings:
   1a. max. input current: 500 mA
   1b. max. RF power: 30 dBm
   1c. max. voltage at DC port: 30V; JEBT series, 25V.
2. DC resistance from DC to RF & DC port: 4.5 ohm typical.

000103

WIDEBAND 0.1 to 6000 MHz


PBTC


ZNBT▼


ZFBT▼

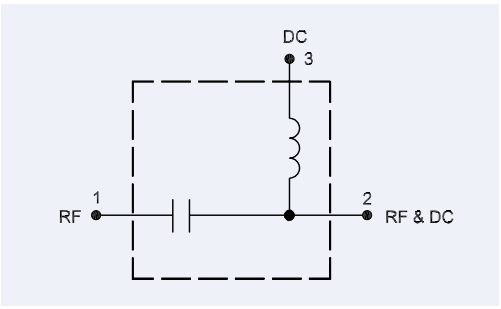

ZFBT-FT▼

	MODEL NO.	FREQ. RANGE (MHz) f_L-f_U	INSERTION LOSS* (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	ISOLATION* (dB) (RF port to DC port) (RF&DC port to DC port) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	VSWR** (:1) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	CASE STYLE ▼ Note B	CONNECTION	PRICE $ Qty. (1-9)
	PBTC-1G	10-1000	0.15	0.7	0.3	0.7	0.3	1.0	27	20	33	20	30	20	1.06	1.2	1.06	1.2	1.1	1.38	CO7	hh	25.95
	PBTC-3G	10-3000	0.15	0.7	0.3	1.5	1.0	2.5	27	20	30	20	35	20	1.06	1.2	1.13	1.66	1.6	1.7	CO7	hh	35.95
❖	PBTC-1GW	0.1-1000	0.15	0.8	0.3	0.7	0.3	1.0	25	15	33	20	30	20	1.06	1.6	1.06	1.2	1.1	1.38	CO7	hh	35.95
❖	PBTC-3GW	0.1-3000	0.15	0.8	0.3	1.5	1.0	2.5	25	15	30	20	35	20	1.06	1.6	1.13	1.66	1.6	1.7	CO7	hh	46.95
NEW	ZNBT-60-1W	2.5-6000	0.2	0.9	0.6	2.0	1.6	2.2	75	45	45	25	35	20	1.1	1.5	1.1	1.3	1.35	1.6	K558	gf	82.95
	ZFBT-4R2G	10-4200	0.15	0.6	0.6	1.2	0.6	1.6	32	20	40	20	50	20	1.06	1.2	1.13	1.3	1.13	1.3	K18	gf	59.95
	ZFBT-4R2G-FT	10-4200	0.15	0.6	0.6	1.2	0.6	1.6							1.06	1.2	1.13	1.3	1.13	1.3	Y460	hf	59.95
	ZFBT-6G	10-6000	0.15	0.6	0.6	1.4	1.0	2.2	32	20	40	20	30	17	1.06	1.2	1.13	1.3	1.13	1.5	K18	gf	79.95
	ZFBT-6G-FT	10-6000	0.15	0.6	0.6	1.4	1.0	2.2							1.06	1.2	1.13	1.3	1.13	1.5	Y460	hf	79.95
❖	ZFBT-4R2GW	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6	25	15	40	20	50	20	1.06	1.6	1.13	1.3	1.13	1.3	K18	gf	79.95
❖	ZFBT-4R2GW-FT	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6							1.06	1.6	1.13	1.3	1.13	1.3	Y460	hf	79.95
❖	ZFBT-6GW	0.1-6000	0.15	0.8	0.6	1.4	1.0	2.2	25	15	40	20	30	17	1.06	1.6	1.13	1.3	1.13	1.5	K18	gf	89.95
❖	ZFBT-6GW-FT	0.1-6000	0.15	0.8	0.6	1.4	1.0	2.2							1.06	1.6	1.13	1.3	1.13	1.5	Y460	hf	89.95

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U]

applications

- biasing amplifiers
- biasing of laser diodes
- DC return
- DC blocking
- good for digital & analog applications



pin & coaxial connections

PORT	gf	hf	hh	hr
RF	1	in	9	15
RF & DC	2	out	12	10
DC	3	+15	3	24
GND	—	—	all other pins	all other pins

000103

ELECTRONIC LINE STRETCHERS *Coaxial*

FIXED MAGNITUDE MISMATCH *110 to 1300 MHz*

ELS

	MODEL NO.	FREQUENCY RANGE (MHz) f_L-f_U	INPUT POWER (dBm) Max.	PHASE RANGE (Degrees) Min.	RETURN LOSS (dB) Typ.	CONTROL VOLTAGE (V)	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW ▲	ELS-210	110-210	10	360	10-12	0.5-25	K18	mv	149.95
NEW ▲	ELS-450	180-450	10	360	10-12	0.5-25	K18	mv	149.95
NEW ▲	ELS-950	400-950	10	360	10-12	0.5-25	K18	mv	149.95
NEW ▲	ELS-1300	750-1300	10	360	10-12	1-25	K18	mv	149.95

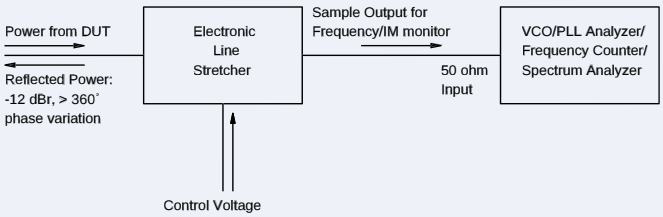
features

- over 360° phase shift of the reflected signal
- normalized and stable magnitude of the reflected signal
- voltage controlled for automated applications
- patent pending

applications

- automated load-pull measurement of oscillators
- see application note AN-45-001 on our website

application block diagram



NOTES:

▲ Available only with SMA connectors

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

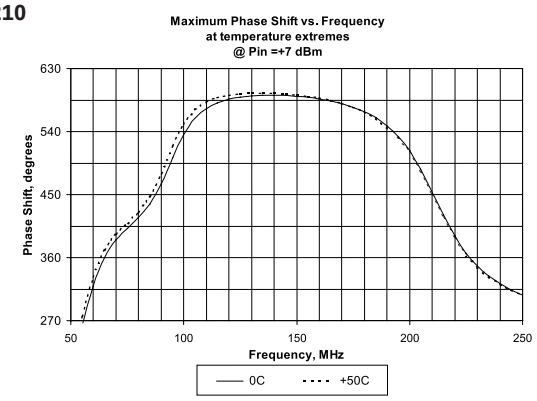
1. Absolute maximum power, voltage and current rating:
   1a. RF Input power, +13 dBm
   1b. Control voltage, 0.5V to 30V
2. Operating temperature, 0°C to 50°C
3. Storage temperature: -40°C to 100°C

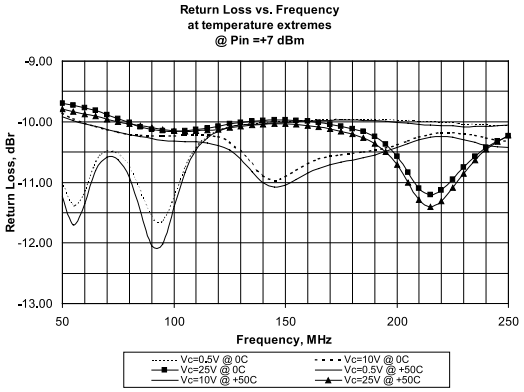
coaxial connections

PORT	mv
RF IN	1
MONITOR OUT	2
CONTROL	3

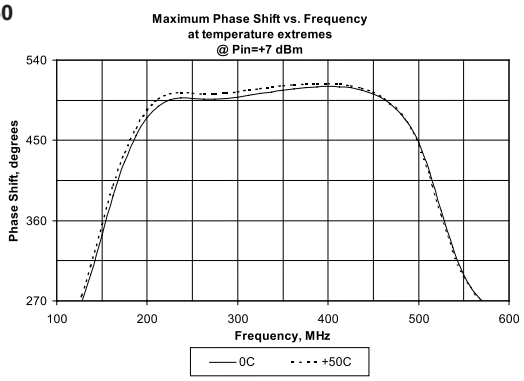
001201

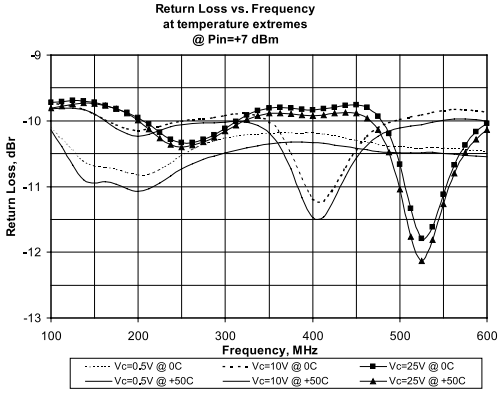
ELS-210



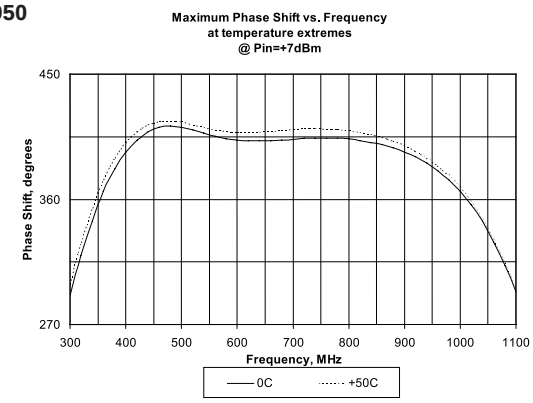


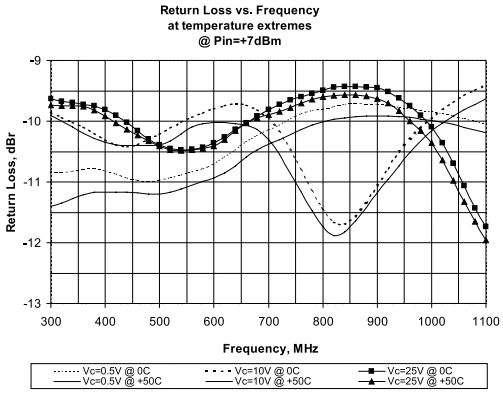
ELS-450



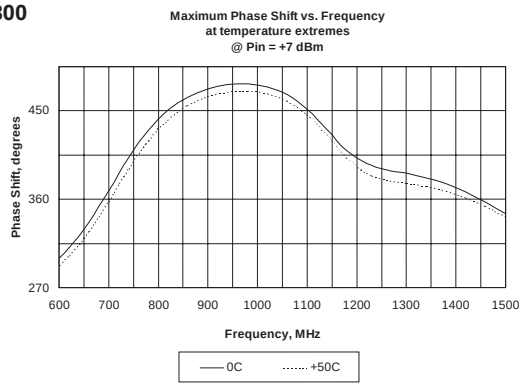


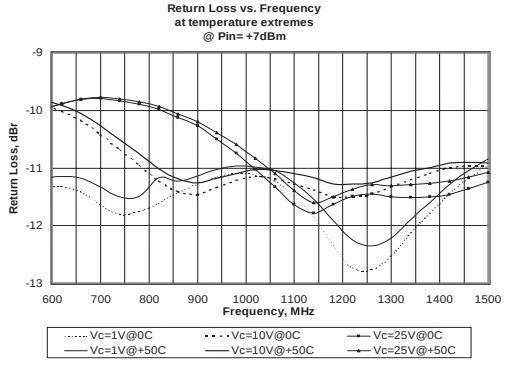
ELS-950





ELS-1300



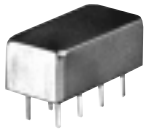


001129

VOLTAGE CONTROLLED OSCILLATORS

Plug-In

LINEAR TUNING 15 to 2000 MHz



POS

MODEL NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
POS-25	15-25		+7.0	1	11	-86	-105	-125	-145	0.06	0.04	1–4	-26	-15	60	12	20	A06	hx	16.95
POS-50	25-50		+8.5	1	16	-88	-110	-130	-150	0.06	0.04	2.0 –2.6	-19	-12	100	12	20	A06	hx	11.95
POS-75	37.5-75		+8.0	1	16	-87	-110	-130	-150	0.15	0.11	3.1–3.8	-27	-16	100	12	20	A06	hx	11.95
POS-100	50-100		+8.3	1	16	-83	-107	-130	-150	0.6	0.2	4.2 –4.8	-23	-18	100	12	20	A06	hx	11.95
POS-150	75-150		+9.5	1	16	-80	-103	-127	-147	0.8	0.3	5.8–6.7	-23	-17	100	12	20	A06	hx	11.95
POS-200	100-200		+10.0	1	16	-80	-102	-122	-142	1.0	0.2	7.1–8.6	-24	-20	100	12	20	A06	hx	11.95
POS-300	150-280		+10.0	1	16	-78	-100	-120	-140	1.8	0.3	9.5 –13	-30	-20	100	12	20	A06	hx	13.95
POS-400	200-380		+9.5	1	16	-76	-98	-120	-140	1.8	0.3	13.7–16.9	-28	-20	100	12	20	A06	hx	13.95
POS-535	300-525		+8.8	1	16	-70	-93	-116	-139	2.0	0.4	10.5–24	-26	-20	100	12	20	A06	hx	13.95
POS-765	485-765		+9.5	1	16	-61	-85	-108	-129	5.0	0.4	18–27	-21	-17	100	12	22	A06	hx	14.95
POS-1025	685-1025		+9.0	1	16	-65	-84	-104	-124	5.0	0.6	21–36	-23	-18	100	12	22	A06	hx	16.95
POS-1060	750-1060		+12.0	1	20	-65	-90	-112	-132	50	3.0	18–32	-11	—	1000	8	30	A06	hx	14.95

NOTES:

A. General Quality Control Procedures, Environmental specifications, Hi-Rel, and MIL description are given in General Information (Section 0).

B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Operating Temperature: -55°C to +85°C

2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})	Model	(V_{cc})	(V_{tune})
POS-25	+15V	+12V	POS-765	+16V	+18V
POS-50	+16V	+17V	POS-800W	+12V	+20V
POS-75	+16V	+18V	POS-900W	+15V	+25V
POS-100	+16V	+18V	POS-1000W	+15V	+20V
POS-150	+16V	+18V	POS-1025	+16V	+18V
POS-200	+16V	+18V	POS-1060	+10V	+22V
POS-300	+16V	+18V	POS-1400A	+10V	+25V
POS-400	+16V	+18V	POS-2000A	+10V	+25V
POS-500W	+15V	+20V	POS-2120W	+15V	+25V
POS-535	+16V	+18V			

designers kits available

KIT No.	No. of Units in KIT	Description	Price $ per KIT
K-POS1	10	1 of each: POS-50, 75, 100, 150, 200, 300, 400, 535, 765, 1025	124.95
K-POS2	7	1 of each: POS-50, 100, 200, 400, 535, 765, 1025	79.95
K-POS3	6	2 of each: POS-1060, 1400A, 2000A	79.95

001228

WIDE BAND 250 to 2120 MHz

POS

	MODEL NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
	POS-500W	250-500		+10.0	1	16	-79	-100	-120	-140	1.5	0.2	17–23	-25	-18	100	12	25	A06	hx	18.95
	POS-800W	400-800		+8.0	0.5	18	-71	-93	-115	-137	3.0	0.5	18–50	-26	-18	100	10	25	A06	hx	16.95
	POS-900W	500-900		+7.0	1	20	-75	-95	-115	-135	2.0	0.3	16–40	-26	-20	100	12	25	A06	hx	16.95
	POS-1000W	500-1000		+7.0	1	16	-73	-93	-113	-133	6.0	1.5	30–42	-26	-20	100	12	20	A06	hx	19.95
NEW	POS-1400A	975-1400		+13.0	1	20	-65	-95	-115	-135	14	2.0	25–30	-16	—	4000	8	30	A06	hx	14.95
NEW	POS-2000A	1370-2000		+11.8	1	20	-73	-97	-117	-137	12	3.0	30–45	-24	-12	4000	8	30	A06	hx	14.95
	POS-2120W	1060-2120		+8.0	0.5	20	-70	-97	-117	-137	27.0	2.5	35–120	-11	—	1000	12	28	A06	hx	21.95

features

- Octave bandwidth range (typ.)
- Linear tuning
- Low phase noise
- Excellent harmonic suppression
- Output suitable for LO drive to mixers
- Low power consumption, typically 190 mW (most models)
- 12-V parts are usable with +15V supply for higher power output, typically 2 dB

applications

- digital cordless phones
- cellular up-and-down converters
- catv distribution set top converters
- wideband frequency synthesizers
- test instruments
- signal generators
- agile communications systems

pin connections

see case style outline drawings

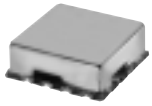
PORT	hx
RF OUT	2
V-CC	1
V-TUNE	8
GND EXT	3,4,5,6,7

001024

VOLTAGE CONTROLLED OSCILLATORS *Surface Mount*

LINEAR TUNING *12.5 to 3000 MHz*

JTOS



ROS

MODEL◆ NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
JTOS-25	12.5	25	+8.0	1	11	-95	-115	-135	-155	0.03	0.02	1.0–4.0	-26	-13	130	12	20	BK377	jc	18.95
JTOS-50	25	47	+8.5	1	15	-88	-108	-127	-147	0.06	0.04	2.0–2.6	-19	-12	50	12	20	BK377	jc	13.95
JTOS-75	37.5	75	+8.0	1	16	-89	-110	-130	-140	0.15	0.11	2.8–4.0	-27	-20	125	12	20	BK377	jc	13.95
JTOS-100	50	100	+8.3	1	16	-83	-108	-128	-140	0.6	0.2	3.7–4.8	-35	-20	100	12	18	BK377	jc	13.95
JTOS-150	75	150	+9.5	1	16	-82	-106	-127	-147	0.8	0.3	5.8– 6.7	-23	-17	112	12	20	BK377	jc	13.95
JTOS-200	100	200	+10.0	1	16	-84	-105	-124	-145	1.0	0.2	6–10	-25	-20	110	12	20	BK377	jc	13.95
JTOS-300	150	280	+9.0	1	16	-82	-102	-122	-142	1.0	0.2	9–14	-28	-20	120	12	20	BK377	jc	15.95
JTOS-400	200	380	+9.0	1	16	-82	-102	-122	-142	1.4	0.4	10.5–17.1	-25	-20	130	12	20	BK377	jc	15.95
JTOS-535	300	525	+9.5	1	16	-75	-97	-117	-137	2.0	0.5	10–24	-28	-20	115	12	20	BK377	jc	15.95
JTOS-765	485	765	+8.0	1	16	-75	-98	-118	-138	2.0	0.5	20–30	-30	-20	100	12	20	BK377	jc	16.95
JTOS-1025	685	1025	+8.6	1	16	-70	-94	-114	-134	5.0	0.6	21–36	-28	-20	100	12	22	BK377	jc	18.95
JTOS-1300	900	1300	+7.0	1	20	-70	-95	-115	-135	12	1.0	25–45	-28	-17	1000	12	30	BK377	jc	18.95
JTOS-1550	1150	1550	+7.0	0.5	20	-73	-101	-121	-141	14	0.7	22–32	-20	-10	2700	12	30	BK377	jc	19.95
JTOS-1650	1200	1650	+7.0	1	13	-70	-95	-115	-135	15	1.5	50–90	-20	-14	1000	12	30	BK377	jc	19.95
JTOS-1750	1350	1750	+7.0	0.5	20	-73	-101	-121	-141	7	0.5	26–35	-16	-10	2700	12	30	BK377	jc	19.95
JTOS-1910	1625	1910	+7	1	12	-69	-97	-117	-137	10	1.0	30–60	-20	-15	2500	12	20	BK377	jc	19.95
JTOS-1950	1550	1950	+7	0.5	20	-75	-103	-125	-144	7	0.6	23–32	-14	-10	8000	12	30	BK377	jc	19.95
NEW JTOS-2700V	2050	2700	+8.0	0.5	18	-72	-94	-114	-134	5.0	1.0	46-56	-25	-10	8000	5	20	BK377	jc	21.95
JTOS-3000	2300	3000	+10.0	0.5	12	-60	-90	-110	-130	50	5.0	50–150	-22	-12	20000	5	25	BK377	jc	20.95
ROS-100	50	100	+8.3	0.5	17	-75	-105	-125	-145	0.6	0.3	3.0–5.0	-30	-20	100	12	20	CK605	kg	12.95
ROS-150	75	150	+9.5	1	18	-80	-103	-127	-144	0.8	0.3	4.0–6.8	-23	-16	100	12	20	CK605	kg	12.95
ROS-200	100	200	+10.0	1	17	-80	-105	-125	-145	0.6	0.3	6–11	-30	-20	100	12	20	CK605	kg	12.95
ROS-300	150	280	+9.0	1	16	-80	-102	-122	-142	0.5	0.3	7–17	-28	-18	100	12	20	CK605	kg	14.95
ROS-400	200	380	+9.5	0.5	17	-80	-100	-120	-140	0.2	0.3	9–22	-24	-18	100	12	20	CK605	kg	14.95
ROS-535	300	525	+6.0	1	17	-75	-98	-118	-138	0.5	0.4	9–27	-20	-15	100	12	20	CK605	kg	14.95
ROS-765	485	765	+6.0	1	16	-74	-95	-115	-135	2	0.5	10–40	-27	-14	100	12	22	CK605	kg	15.95
NEW ROS-1000V	900	1000	0	0.5	12	-74	-102	-122	-140	1.0	0.4	12-16	-30	-20	8000	5	25	CK605	kg	15.95
NEW ROS-1100V	1000	1100	0	0.5	12	-80	-103	-123	-142	1.5	1.5	12-16	-26	-20	8000	5	25	CK605	kg	15.95
NEW ROS-1121V	1060	1121	2.5	1	11	-88	-111	-131	-149	0.7	0.7	8-13	-11	—	10000	5	30	CK605	kg	15.95
ROS-1410	850	1410	+7.0	0.5	11	-73	-99	-119	-138	15	1.0	50–80	-8	—	1000	12	25	CK605	kg	19.95
NEW ROS-1500	1000	1500	+8.0	0.5	20	-79	-104	-124	-144	10	1.2	25-40	-13	—	100000	10	26	CK605	kg	16.95
ROS-1720	1550	1720	+7.0	0.5	12	-73	101	-121	-141	11	1.3	28–34	-17	-10	18000	12	25	CK605	kg	19.95
NEW ROS-1900	1450	1900	+7.0	0.5	20	-80	-106	-126	-146	7	0.7	22-34	-15	-7	100000	10	25	CK605	kg	17.95
NEW ROS-1900V	1450	1900	+8.0	0.5	20	-78	-104	-124	-144	7	0.7	22-34	-18	-10	100000	5	28	CK605	kg	17.95
NEW ROS-2650	2165	2650	+5.0	0.5	19	-75	-101	-121	-141	5	1.0	27-36	-12	—	6000	12	25	CK605	kg	18.95
NEW ROS-3000V	2400	3000	+9.0	0.5	22	-70	-96	-116	-136	30	1.5	20-60	-18	—	20000	5	40	CK605	kg	24.95

NOTES:

◆ Aqueous washable

A. Environmental specifications and re-flow soldering information available in General Information Section.

B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

1. Operating Temperature: -55°C to +85°C

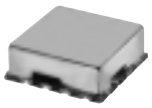
2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})	Model	(V_{cc})	(V_{tune})	Model	(V_{cc})	(V_{tune})
JTOS-25	+15V	+12V	JTOS-1950	+13V	+22V	ROS-1700W	+15V	+30V
JTOS-50	+16V	+17V	JTOS-2000	+10V	+25V	ROS-1720	+13V	+14V
JTOS-75 thru JTOS-765	+16V	+18V	JTOS-2700V	+6V	+20V	ROS-1900	+11V	+22V
JTOS-850VW	+6V	+20V	JTOS-3000	+7V	+15V	ROS-1900V	+6V	+22V
JTOS-1000W	+15V	+25V	ROS-100 thru ROS-765	+13V	+18V	ROS-2000	+13V	+22V
JTOS-1025	+16V	+18V	ROS-1000V	+6V	+15V	ROS-2150VW	+6V	+28V
JTOS-1300	+15V	+22V	ROS-1100V	+6V	+15V	ROS-2160W	+12V	+22V
JTOS-1550	+13V	+22V	ROS-1121V	+6V	+12V	ROS-2500	+15V	+16V
JTOS-1650	+15V	+15V	ROS-1200W	+15V	+25V	ROS-2650	+13V	+20V
JTOS-1750	+13V	+22V	ROS-1410	+13V	+13V	ROS-3000V	+6V	+22V
JTOS-1910	+15V	+15V	ROS-1500	+11V	+22V			

010530

WIDE BAND 400 to 2500 MHz

JTOS



ROS

	MODEL◆ NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
NEW	JTOS-850VW	400-850		+8.0	0.5	18	-74	-96	-116	-136	6.0	1.5	15-80	-20	—	185	5	20	BK377	jc	18.95
	JTOS-1000W	500-1000		+7.0	1.0	18	-73	-94	-114	-134	5.0	1.0	30-40	-26	-20	100	12	25	BK377	jc	21.95
	JTOS-2000	1370-2000		+12.0	1	22	-70	-95	-115	-135	40	1.5	30–50	-11	-8	1000	8	30	BK377	jc	19.95
NEW	ROS-1200W	612-1200		+10.0	0.5	18	-71	-97	-119	-139	9.0	0.45	26-68	-18	-10	20000	12	40	CK605	kg	24.95
NEW	ROS-1700W	770-1700		+8.0	1.0	24	-73	-100	-121	-140	9.0	0.4	26-60	-25	-13	7000	12	40	CK605	kg	24.95
NEW	ROS-2000	1350-2000		+7.0	0.5	20	-75	-100	-120	-140	9	1.3	30-50	-11	—	2000	12	25	CK605	kg	21.95
NEW	ROS-2150VW	970-2150		+4.0	0.5	25	-70	-96	-118	-138	7.0	2.5	30-70	-15	—	6000	5	25	CK605	kg	29.95
NEW	ROS-2160W	1160-2160		+5.0	0.5	20	-70	-97	-117	-137	10.0	1.5	30-80	-11	—	12000	10	30	CK605	kg	24.95
NEW	ROS-2500	1600-2500		+6.5	0.5	14	-66	-90	-113	-133	18	5.0	30-180	-14	-8	6000	12	25	CK605	kg	21.95

features

- Linear tuning
- Low phase noise
- Excellent harmonic suppression
- Output suitable for LO drive to mixers
- Low power consumption, typically 190 mW (most models)
- 12-V parts are usable with +15V supply for higher power output, typically 2 dB

applications

- digital cordless phones
- cellular up-and-down converters
- catv distribution set top converters
- wideband frequency synthesizers
- test instruments
- signal generators
- agile communications systems

pin connections see case style outline drawings

PORT	jc	kg
RF OUT	13	10
V-CC	2	14
V-TUNE	5	2
GND EXT	1,3,4,6,7,8,9, 10,11,12,14	1,3,4,5,6,7,8,9 11,12,13,15,16
DEMO BOARD	TB-04	TB-10

designers kits available

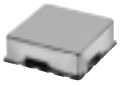
KIT No.	No. of Units in KIT	Description	Price $ per KIT
K-JTOS1	10	1 ot each: JTOS-50, 75, 100, 150, 200, 300, 400, 535, 765, 1025	149.95
K-JTOS2	7	1 of each: JTOS-50, 100, 200, 400, 535, 765, 1025	99.95
K-JTOS3	6	2 of each: JTOS-1300, 1650, 1910	114.95

001228

VOLTAGE CONTROLLED OSCILLATORS Surface Mount ❑

5V TUNING FOR PLL IC's 24 to 2600 MHz


JTOS


ROS

MODEL◆ NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
JTOS-50P	24-29		+9.5	-88	-108	-127	-147	0.06	0.04	2-2.5	-14	-12	50	12	20	BK377	jc	14.95
JTOS-75P	35-43		+9	-89	-110	-130	-140	0.15	0.11	2.5-4	-25	-20	125	12	20	BK377	jc	14.95
JTOS-100P	48-59		+9	-83	-108	-128	-140	0.6	0.2	3.5-4	-30	-20	100	12	18	BK377	jc	14.95
JTOS-150P	72-91		+9.5	-82	-106	-127	-147	0.8	0.3	6-9	-30	-17	112	12	20	BK377	jc	14.95
JTOS-200P	95-120		+8.8	-84	-105	-124	-145	1.0	0.2	7-10	-30	-20	110	12	20	BK377	jc	14.95
JTOS-300P	148-174		+10	-82	-102	-122	-142	1.0	0.2	10-14	-27	-20	120	12	20	BK377	jc	16.95
JTOS-400P	194-220		+11	-82	-102	-122	-142	1.4	0.4	13-18	-25	-20	130	12	20	BK377	jc	16.95
JTOS-535P	278-325		+9.5	-75	-97	-117	-137	2.0	0.5	17-22	-30	-20	115	12	20	BK377	jc	16.95
JTOS-765P	486-510		+9	-75	-98	-118	-138	2.0	0.5	20-30	-30	-20	100	12	20	BK377	jc	17.95
JTOS-1025P	680-755		+9	-70	-94	-114	-134	5.0	0.6	30-40	-27	-20	100	12	22	BK377	jc	19.95
NEW JTOS-2200PA	2000-2200		+6	-65	-92	-112	-132	15	5.0	110-170	-22	-12	10000	5	25	BK377	jc	21.95
JTOS-3000P	2300-2600		+11	-65	-92	-112	-132	50.0	5.0	120-160	-22	-12	20000	5	25	BK377	jc	21.95
NEW ROS-205PV	180-210		+2	-88	-110	-131	-151	0.4	0.4	10-15	-30	-20	2000	5	15	CK605	kg	17.95
ROS-285PV	245-285		+3	-80	-100	-120	-140	2.0	0.2	10-20	-20	-10	100	5	20	CK605	kg	17.95
NEW ROS-550PV	450-550		+6	-81	-104	-124	-144	3.0	0.5	30-60	-15	—	8000	5	15	CK605	kg	19.95
NEW ROS-660PV	640-660		0	-85	-107	-127	-147	0.8	0.6	10-14	-17	-12	2000	5	15	CK605	kg	19.95
NEW ROS-675PV	655-675		0	-85	-107	-127	-145	1.0	0.5	10-14	-23	-10	5000	5	15	CK605	kg	19.95
NEW ROS-725PV	710-725		0	-85	-105	-126	-145	0.9	0.3	8-13	-19	-12	2000	5	15	CK605	kg	19.95
NEW ROS-740PV	720-740		0	-84	-106	-126	-145	1.0	0.8	10-14	-16	-10	5000	5	15	CK605	kg	19.95
ROS-900PV	810-900		+1	-80	-102	-122	-142	3.0	2.0	26-30	-25	-16	1000	4.5	12	CK605	kg	19.95
ROS-960PV	890-960		0	-80	-102	-122	-142	2.0	0.2	25-28	-27	-18	1000	5	12	CK605	kg	19.95
ROS-1000PV	900-1000		+6	-80	-104	-124	-144	2.0	0.7	27-38	-33	-20	1000	5	22	CK605	kg	19.95
NEW ROS-1435PV	1375-1435		+3	-78	-101	-121	-141	4.0	1.7	20-30	-26	-18	5000	5	20	CK605	kg	19.95
ROS-1600PV	1520-1600		+7	-75	-100	-120	-140	10.0	3.0	25-38	-26	-16	1000	5	25	CK605	kg	18.95
NEW ROS-1605PV	1500-1605		0	-74	-98	-118	-138	6.0	0.8	40-50	-17	-8	8000	3.3	16	CK605	kg	19.95

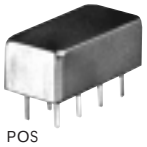
TUNING VOLTAGE TO COVER FREQUENCY RANGE 0.5V TO 5V

NOTES:
- ◆ Aqueous washable
- ❑ Non-hermetic
- A. General Quality Control Procedures, Environmental specifications, Hi-Rel, and MIL description are given in General Information (Section 0).
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
  1. Operating Temperature: -55°C to +85°C.
  2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})	Model	(V_{cc})	(V_{tune})
JTOS-50P thru JTOS-1025P	+16V	+7V	ROS-1605PV	+3.5V	+6V
JTOS-2200PA	+6V	+6V	all other ROS-PV models	+6V	+6V
JTOS-3000P	+7V	+7V	POS-P models	+16V	+7V
ROS-285PV	+8V	+10V			

001023

24 to 755 MHz



POS

MODEL NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (5-49)
POS-50P	24-29		+10	-92	-113	-134	-151	0.06	0.04	2-2.5	-18	-12	50	12	20	A06	hx	12.95
POS-75P	35-43		+9	-91	-113	-135	-151	0.15	0.11	2.5-4	-25	-20	100	12	20	A06	hx	12.95
POS-100P	48-59		+9	-92	-112	-134	-151	0.6	0.2	3.5-5	-30	-18	100	12	20	A06	hx	12.95
POS-150P	72-91		+10	-84	-104	-126	-147	0.8	0.3	6-9	-25	-17	100	12	20	A06	hx	12.95
POS-200P	95-120		+10	-77	-102	-123	-146	1.0	0.2	7-10	-30	-20	100	12	20	A06	hx	12.95
POS-300P	148-174		+10	-83	-105	-125	-145	1.8	0.3	10-14	-27	-20	100	12	20	A06	hx	14.95
POS-400P	194-220		+10.5	-82	-103	-124	-142	1.8	0.3	13-18	-25	-20	100	12	20	A06	hx	14.95
POS-535P	278-325		+10	-66	-95	-120	-138	2.0	0.4	17-22	-30	-20	100	12	20	A06	hx	14.95
POS-765P	486-510		+9.5	-70	-92	-116	-135	5.0	0.4	20-30	-26	-20	100	12	22	A06	hx	15.95
POS-1025P	680-755		+8.5	-74	-96	-116	-135	5.0	0.6	30-40	-24	-18	100	12	22	A06	hx	17.95

TUNING VOLTAGE TO COVER FREQUENCY RANGE 0.5V TO 5V

features

- wide frequency range
- linear tuning characteristics
- low phase noise
- 5V tuning voltage range

applications

- PLL circuitry
- measurement instrumentation
- satellite systems
- frequency synthesizers
- wireless microphones
- cellular

pin connections

see case style outline drawings

PORT	hx	jc	kg
RF OUT	2	13	10
V-CC	1	2	14
V-TUNE	8	5	2
GND EXT	3,4,5,6,7	1,3,4,6,7,8,9 10,11,12,14	1,3,4,5,6,7,8,9 11,12,13,15,16
DEMO BOARD	—	TB-04	TB-10

001019

VOLTAGE CONTROLLED OSCILLATORS

Coaxial

DUAL OUTPUT 25 to 1025 MHz

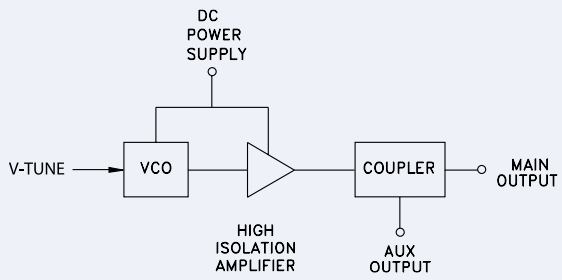
ZOS

MODEL NO.	FREQ. (MHz)		POWER OUTPUT (dBm) Typ.		TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.			PULLING (MHz) pk-pk (open/short)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MOD. BANDWIDTH (kHz)	POWER SUPPLY		CASE STYLE	PRICE $
							10 kHz	100 kHz	1 MHz							Voltage (V) Nom.	Current (mA) Max.		
	Min.	Max.	Main.	Aux.	Min.	Max.				Typ.	Typ.	Typ.	Typ.	Max.	Typ.			Note B	Qty. (1-9)
ZOS-50	25-50		+9	-12	1	16	-107	-126	-141	0.012	0.08	2.5	-22	-12	100	12	140	BR386	119.95
ZOS-75	37.5-75		+9	-12	1	16	-110	-128	-142	0.016	0.15	3.5	-26	-20	100	12	140	BR386	119.95
ZOS-100	50-100		+9	-12	1	16	-111	-131	-143	0.026	0.25	4.5	-29	-20	100	12	140	BR386	119.95
ZOS-150	75-150		+9	-12	1	16	-107	-127	-142	0.017	0.39	5.8	-23	-17	100	12	140	BR386	119.95
ZOS-200	100-200		+10	-11	1	16	-106	-126	-141	0.015	0.42	7.7	-25	-20	100	12	140	BR386	119.95
ZOS-300	150-280		+9	-13	1	16	-103	-123	-142	0.017	0.50	11	-27	-20	100	12	140	BR386	119.95
ZOS-400	200-380		+10	-13	1	16	-100	-120	-136	0.021	0.50	15	-24	-18	100	12	140	BR386	119.95
ZOS-535	300-525		+9	-13	1	16	-96	-118	-131	0.018	0.50	18	-27	-20	100	12	140	BR386	119.95
ZOS-765	485-765		+8.5	-14	1	16	-96	-117	-132	0.033	0.72	22	-27	-17	100	12	140	BR386	119.95
ZOS-1025	685-1025		+8	-13	1	16	-92	-112	-136	0.051	1.00	30	-25	-18	100	12	140	BR386	119.95

features

- octave bandwidth
- linear tuning
- excellent harmonic suppression
- auxiliary output for frequency monitoring/ phase locked loops
- main & auxiliary ports have excellent isolation from main oscillatror (50 dB typ.)
- load insensitive
- at 12 dBr, pulling comparable to short term stability

ZOS schematic



NOTES:

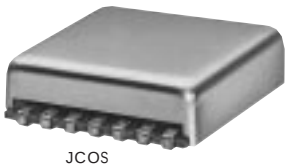
A. General Quality Control Procedures, Environmental specifications, Hi-Rel, and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Operating Temperature: -55°C to +85°C
2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})
ZOS Models except ZOS-50	+16V	+18V
	+16V	+17V

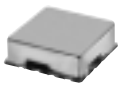
001108

LOW NOISE 125 to 1114 MHz

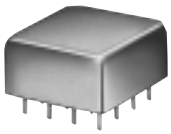
SURFACE MOUNT



JCOS



ROS



POSA

	MODEL NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW◆	JCOS-175LN	125	175	+3.7	1	17	—	-95	-118	-138	-158	0.08	0.05	3-5	-25	-20	2900	12	20	BG419	jd	49.95
◆	JCOS-820WLN	780	860	+9	0	20	-60	-90	-112	-132	-150	4.5	0.3	8	-13	-8	2000	9	25	BG419	jd	49.95
◆	JCOS-820BLN	807	832	+3	1	14	-57	-88	-112	-132	-151	0.4	0.4	6	-24	-20	2000	10	25	BG419	jd	49.95
◆	JCOS-1100LN	1079	1114	+8.5	0	20	-60	-88	-110	-130	-150	7.5	0.5	4.5	-15	-10	2000	8	25	BG419	jd	49.95
NEW◆	ROS-810LN	760	810	+5	0.5	10	—	-90	-115	-135	-155	1.8	0.5	8-10	-24	-18	6000	8	20	CK605	kg	49.95
	POSA-138	118	138	+5	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.3	-40	-30	2000	12	25	C07	jr	46.95
	POSA-158	138	158	+5	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.4	-40	-25	2000	12	25	C07	jr	46.95
	POSA-960	800	960	+16	1	15	—	-84	-112	-130	-150	2.0	0.3	17-22	-30	-16	2000	15	50	C07	mj	49.95

applications

- cellular local oscillator
- VHF and UHF transmitters
- aircraft radios

NOTES:

◆ Aqueous washable
❑ Non-hermetic
A. General Quality Control Procedures, Environmental specifications, Hi-Rel, and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Operating Temperature: -55°C to +85°C
2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})
JCOS-175LN	+15V	+18V
POSA-960	+16V	+16V
ROS-810LN	+9V	+12V
All other models	+15V	+24V

pin connections

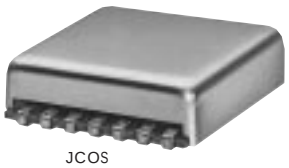
see case style outline drawings

PORT	jd	jr	kg	mj
RF OUT	7	9	10	1
V-CC	8	12	14	4
V-TUNE	1	3	2	16
GND EXT	all others	all others	all others	all others
DEMO BOARD	—	—	TB-10	—

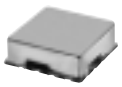
001228

LOW NOISE 125 to 1114 MHz

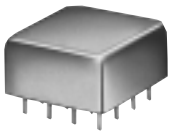
SURFACE MOUNT



JCOS



ROS



POSA

	MODEL NO.	FREQ. (MHz) Min.	Max.	POWER OUTPUT (dBm) Typ.	TUNE VOLTAGE (V) Min.	Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk @12 dBr Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	Max.	3 dB MOD. BANDWIDTH (kHz) Typ.	POWER SUPPLY Voltage (V) Nom.	Current (mA) Max.	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
NEW◆	JCOS-175LN	125	175	+3.7	1	17	—	-95	-118	-138	-158	0.08	0.05	3-5	-25	-20	2900	12	20	BG419	jd	49.95
◆	JCOS-820WLN	780	860	+9	0	20	-60	-90	-112	-132	-150	4.5	0.3	8	-13	-8	2000	9	25	BG419	jd	49.95
◆	JCOS-820BLN	807	832	+3	1	14	-57	-88	-112	-132	-151	0.4	0.4	6	-24	-20	2000	10	25	BG419	jd	49.95
◆	JCOS-1100LN	1079	1114	+8.5	0	20	-60	-88	-110	-130	-150	7.5	0.5	4.5	-15	-10	2000	8	25	BG419	jd	49.95
NEW◆	ROS-810LN	760	810	+5	0.5	10	—	-90	-115	-135	-155	1.8	0.5	8-10	-24	-18	6000	8	20	CK605	kg	49.95
	POSA-138	118	138	+5	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.3	-40	-30	2000	12	25	C07	jr	46.95
	POSA-158	138	158	+5	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.4	-40	-25	2000	12	25	C07	jr	46.95
	POSA-960	800	960	+16	1	15	—	-84	-112	-130	-150	2.0	0.3	17-22	-30	-16	2000	15	50	C07	mj	49.95

applications

- cellular local oscillator
- VHF and UHF transmitters
- aircraft radios

NOTES:

◆ Aqueous washable
❑ Non-hermetic
A. General Quality Control Procedures, Environmental specifications, Hi-Rel, and MIL description are given in General Information (Section 0).
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Operating Temperature: -55°C to +85°C
2. Absolute Maximum Supply Voltage (V_{cc}) & Tuning Voltage (V_{tune}):

Model	(V_{cc})	(V_{tune})
JCOS-175LN	+15V	+18V
POSA-960	+16V	+16V
ROS-810LN	+9V	+12V
All other models	+15V	+24V

pin connections

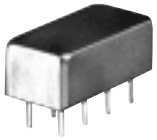
see case style outline drawings

PORT	jd	jr	kg	mj
RF OUT	7	9	10	1
V-CC	8	12	14	4
V-TUNE	1	3	2	16
GND EXT	all others	all others	all others	all others
DEMO BOARD	—	—	TB-10	—

001228

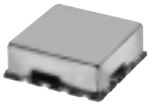
VOLTAGE CONTROLLED OSCILLATORS

Additional Performance Data From Our Engineering Database*



A06

BK377



CK605

REFERENCE NO.	FREQUENCY COVERAGE MHz		TUNE VOLTAGE V		PULLING MHz pk-pk @12 dBr	PUSHING MHz/V	3 dB MOD. BANDWIDTH kHz	POWER SUPPLY		CAPD DATA FOR ADDITIONAL PARAMETERS	CASE STYLE
	Min.	Max.	Min.	Max.	Typ.	Typ.	Typ.	Voltage V	CURRENT mA Max.		
POS-ED5319/1	75	114	0.5	7.0	0.50	1.30	200	5	15		A06
ROS-ED6923/1	99	113	0.3	7.0	0.10	0.15	2000	5	20		CK605
POS-ED4782A/1	114	149	1.0	18.0	0.04	0.02	2000	12	25		C145
POS-ED6684/1	123	271	1.0	20.0	0.50	0.30	1000	12	20		A06
POS-ED4783A/1	134	175	1.0	18.0	0.05	0.03	2000	12	25		C145
ROS-ED6770/3	161	240	1.0	15.0	0.50	0.10	400	12	30		CK605
ROS-EDR4294	182	253	0.5	13.0	0.20	0.50	1700	12	20		CK605
JTOS-ED4905/12	184	249	0.3	6.0	0.07	1.30	120	5	15		BK377
JTOS-ED6869/2	197	444	1.0	20.0	0.60	0.20	260	12	25		BK377
JTOS-ED5955A/2	232	419	0.5	11.0	0.40	0.10	140	12	20		BK377
ROS-ED6845/4	329	388	0.5	7.0	1.00	0.30	1000	12	50		CK605
ROS-EDR4239/2	336	369	0.5	5.0	2.00	0.20	1000	11	12		CK605
POS-ED4638/1	322	473	0.5	7.0	1.40	1.30	50	5	20	FOR	A06
JTOS-ED5563/1	323	478	0.5	10.0	0.90	1.50	450	12	25	DATA	BK377
JTOS-ED5769/2	386	835	1.0	15.0	4.40	1.30	100	10	25	SEE YONI	BK377
ROS-EDR4268	395	489	0.5	5.0	1.50	0.50	330	5	10	ON OUR	CK605
JTOS-ED6579/6	423	997	1.0	19.0	9.60	4.80	100	5	15	WEBSITE	BK377
JTOS-ED4883/5	439	532	0.3	5.0	1.30	0.60	420	10	25		BK377
JTOS-ED6124/2	491	753	0.5	6.0	4.10	3.10	750	5	30		BK377
POS-ED5634B/2	450	1152	0.3	19.0	6.00	1.50	100	12	20		A06
ROS-EDR4142	501	533	0.5	5.0	3.50	0.50	2200	5	8		CK605
JROS-ED5930A/1	476	794	0.3	6.0	3.70	4.70	2000	7	15		CK605
ROS-ED6757/2	621	682	1.0	20	0.70	0.50	1000	12	35		CK605
JCOS-ED6046/3	701	798	0.5	8.0	0.40	0.40	2000	8	30		BG419
JCOS-ED5427/1	717	779	1.0	15.0	0.20	0.50	2000	12	25		BG419
JCOS-ED6707/7	737	809	0.5	8.0	2.50	1.00	2000	10	35		BG419
JCOS-ED6304/4	769	858	1.0	10.0	3.40	0.60	2000	5	22		BG419
JCOS-ED6304A/2	773	917	1.0	8.0	2.70	0.50	2000	5	30		BG419
ROS-EDR4133	769	834	0.5	5.0	0.70	1.00	2000	5	13		CK605
JCOS-ED6772A/1	772	848	0.3	7.0	2.50	0.07	2000	10	25		BG419
ROS-EDR4134	786	860	0.5	5.0	0.50	0.30	2000	5	17		CK605
JCOS-ED6517A/3	796	931	1.0	15.0	2.00	0.30	2000	9	30		BG419
ROS-EDR4135	818	895	0.5	5.0	1.00	0.50	2000	5	18		CK605
POS-ED5507/2	779	975	1.0	15.0	6.50	1.10	300	12	25		A06
JCOS-ED6865/2	849	1013	1.0	15.0	1.00	0.02	2000	11	30		BG419
ROS-EDR4217/2	884	921	0.5	10.0	1.20	0.80	2000	5	10		CK605
JTOS-ED5197/3	889	958	1.0	8.0	4.40	0.60	2000	12	25		BK377
ROS-EDR4295	912	983	0.5	5.0	0.50	0.05	2500	5	27		CK605

THESE ARE NON-STOCK MODELS. CONSULT APPLICATIONS DEPT. FOR FINAL SPECIFICATIONS.
SMALL QUANTITY DELIVERY 6 WEEKS AFTER ORDER ACCEPTANCE

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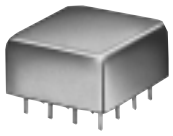
BG419



C145

REFERENCE NO.	FREQUENCY COVERAGE MHz		TUNE VOLTAGE V		PULLING MHz pk-pk @12 dBr	PUSHING MHz/V	3 dB MOD. BANDWIDTH kHz	POWER SUPPLY		CAPD DATA FOR ADDITIONAL PARAMETERS	CASE STYLE
	Min.	Max.	Min.	Max.	Typ.	Typ.	Typ.	Voltage V	CURRENT mA Max.		
POS-ED6986/1	910	1884	1.0	25.0	15.00	2.80	5000	12	28		A06
ROS-ED6824/3	840	1529	1.0	12.0	25.00	5.00	2000	5	25		CK605
ROS-EDR4293	899	1900	1.0	25.0	20.00	3.00	2500	12	17		CK605
JTOS-ED5496/1	1025	1741	1.0	25.0	50.00	2.00	2000	8	30		BK377
ROS-EDR4296	1044	1103	0.5	5.0	0.50	0.50	2500	5	25		CK605
JTOS-ED6640/3	1025	1098	0.3	5.0	0.90	0.10	2000	10	30		BK377
JCOS-ED5151B/2	1064	1138	0.3	9.0	1.00	0.09	2000	8	40		BG419
ROS-EDR4039	1074	1118	0.5	5.0	15.00	2.50	2500	5	8		CK605
ROS-EDR4266	1124	1718	2.0	20.0	26.00	2.00	2500	8	27		CK605
JCOS-ED4735/1	1062	1132	1.0	8.0	1.90	0.60	2000	8	35		BG419
ROS-EDR4255/2	1206	1317	0.5	5.0	0.40	2.00	2500	5	32		CK605
ROS-EDR4348	1220	1337	1.0	5.0	0.50	1.50	2500	5	35		CK605
JTOS-ED4715B/2	1225	1289	0.5	6.0	4.60	0.50	2000	5	25		BK377
JTOS-ED5346/3	1270	2130	1.0	25.0	40.00	1.50	1000	8	30		BK377
ROS-EDR3979/4	1360	1417	0.3	5.0	3.50	2.00	2500	5	24		CK605
ROS-ED6756/2	1486	1672	0.5	10.0	1.10	1.50	2000	5	25		CK605
ROS-EDR4347	1430	1554	0.5	5.0	1.00	1.80	2500	5	23		CK605
ROS-EDR4298	1531	1671	0.5	5.0	0.50	0.90	2500	5	23		CK605
ROS-EDR4318	1544	1840	0.5	5.0	20.00	3.00	2500	5	16		CK605
JTOS-ED6924/14	1595	2710	1.0	15.0	12.00	2.00	2000	12	35		BK377
ROS-EDR4259	1606	2034	1.0	20.0	20.00	1.50	2500	8	27		CK605
ROS-EDR4179/2	1646	1740	1.0	9.0	25.00	3.00	2500	8	21		CK605
ROS-EDR4247	1705	1801	1.0	9.0	5.00	3.00	2500	8	22		CK605
ROS-ED6981/2	1706	1854	0.5	5.0	14.00	2.50	1600	5	25		CK605
JTOS-ED6281/3	1668		0.5	10.0	10.00	2.50	2000	12	25		BK377
JTOS-ED6817	1679	2827	1.0	16.0	11.00	1.50	3000	12	30		BK377
JTOS-ED6530/2	1714	1864	0.5	5.0	13.00	8.00	2000	8	25		BK377
ROS-EDR4249	1823	1946	0.5	8.0	5.00	4.00	2000	8	22		CK605
ROS-EDR4248	1881	2013	1.0	9.0	5.00	2.50	2000	8	22		CK605
JTOS-ED6120/3	1886	2394	0.5	8.0	15.00	5.00	10000	5	25		BK377
ROS-EDR4284/1	2018	2140	0.5	5.0	1.00	1.00	2500	5	21		CK605
ROS-ED6794/2	2151	2841	0.5	7.0	35.00	1.50	10000	5	25		CK605
ROS-EDR4297	2197	2336	0.5	5.0	1.00	3.00	2500	5	20		CK605
JTOS-ED6531/1	2191	2507	1.0	15.0	8.00	0.70	2000	10	30		BK377
ROS-EDR4154	2903	3192	0.5	5.0	20.00	5.00	2500	5	18		CK605

FOR DATA SEE YONI ON OUR WEBSITE

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continuous facing pages.**

RF TRANSFORMERS WIDEBAND 12.5 to 1250 Ω

10 kHz to 1400 MHz

SURFACE MOUNT


ADT

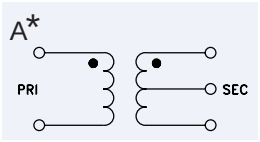

JTX


TCM


T-KK81


TX


TC



	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✻ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
◆■●	ADT1-1WT*	1	0.4-800	0.4-800	0.5-700	1-400	CD542	kz	2.95
◆●	ADT1-6T*	1	0.03-125	0.03-125	0.04-75	0.05-50	CD637	ks	3.45
◆●●	ADT1.5-1*	1.5	0.5-650	0.5-650	0.8-500	1-300	CD542	lb	2.95
	ADT2-1T*	2	0.4-450	0.4-450	0.6-400	1-200	CD542	kt	3.65
◆●●	ADT2-1T-1P*	2	8-600	8-600	10-400	13-300	CD542	ks	4.25
◆	ADT3-1T*	3	1-500	—	1-500	2-300	CD542	kt	3.45
◆●	ADT3-6T*	3	0.06-400	0.06-400	0.1-290	0.2-250	CD636	ks	4.50
◆	ADT4-1WT*	4	2-775	2-775	3-600	6-250	CD542	ks	2.95
◆●●	ADT4-1T*	4	9-625	9-625	10-550	14-500	CD542	ks	3.95
NEW◆	ADT4-5WT*	4	0.3-500	0.3-500	0.5-400	2-250	CD637	ks	4.50
NEW◆	ADT4-6T*	4	.06-300	.06-300	.08-250	0.15-200	CD637	ks	4.50
◆●	ADT4-6WT*	4	0.5-600	0.5-600	0.7-475	2-300	CD636	ks	4.50
◆●	ADT8-1T*	8	0.1-130	0.1-130	0.15-110	0.2-75	CD637	ks	4.50
◆	ADT9-1T*	9	1-250	—	1-250	2-150	CD542	ks	3.95
◆	ADT16-1T*	16	1.5-160	1.5-160	3-105	5-65	CD542	ks	4.25
NEW◆	ADT16-6T*	16	0.1-70	0.1-70	0.18-45	.30-33	CD637	ks	5.95
	JTX-2-10T	2	50-1000	—	—	50-1000	BH292	kt	6.95***
	JTX-4-10T	4	50-1000	—	—	50-1000	BH292	kt	6.95***
									Qty. (1-9)
	T1-1T-KK81	1	0.08-200	0.08-200	0.15-150	.2-80	KK81	ev	4.45
	T1-6T-KK81	1	.015-300	.015-300	.021-150	.03-50	KK81	ev	6.95
	T2-1T-KK81	2	.07-200	.07-200	.1-100	.5-50	KK81	ev	4.95
	T2.5-6T-KK81	2.5	.01-100	.01-100	.02-50	.50-20	KK81	ev	4.95
	T3-1T-KK81	3	.05-250	.05-200	.1-200	.5-70	KK81	ev	4.95
	T4-1-KK81	4	.2-350	.2-350	.35-300	2-100	KK81	ev	3.25
	T4-6T-KK81	4	.02-250	.02-250	.05-150	0.1-100	KK81	ev	5.65
	T5-1T-KK81	5	.3-300	.3-300	.6-200	5-100	KK81	ev	4.95
	T8-1T-KK81	8	.3-140	.3-140	.7-90	1-60	KK81	ev	7.95
	T13-1T-KK81	13	.3-120	.3-120	.7-80	5-20	KK81	ev	4.95
	T16-6T-KK81	16	.03-75	.03-75	.06-30	.1-20	KK81	ev	5.65
	T4-1H-KK81	4	10-350	10-350	15-300	25-200	KK81	ev	5.95
	TX16-R3T	16	40-300	40-300	60-220	70-150	TT240	ev	4.95
◆	TCM2-1T	2	3-300	—	—	3-300	DB714	ha	4.45
◆	TCM3-1T	3	2-500	—	2-500	5-300	DB714	ha	4.45
◆	TCM4-1W	4	3-800	3-800	5-400	10-100	DB714	ha	4.45
◆	TCM4-14	4	200-1400	200-1400	300-1300	800-1000	DB714	gs	4.45
◆	TCM4-6T	4	1.5-600	1.5-600	2-400	3-350	DB714	ha	4.45
◆	TCM8-1	8	2-500	2-500	5-400	10-100	DB714	gs	4.45
NEW◆	TCM9-1	9	2-280	2-280	3-150	5-100	DB714	ha	4.95
◆	TC2-1T	2	3-300	—	—	3-300	AT224	ha	4.95
◆	TC3-1T	3	5-300	—	—	5-300	AT224	ha	4.95
◆	TC4-1T	4	.5-300	—	.5-300	1.5-100	AT224	ha	4.95
◆	TC4-1W	4	3-800	3-800	5-400	10-100	AT224	ha	4.95
◆	TC4-14	4	200-1400	200-1400	300-1300	800-1100	AT224	gs	5.45
◆	TC8-1	8	2-500	2-500	5-400	10-100	AT224	gs	5.45
◆	TC9-1	9	2-200	2-200	3-100	5-40	AT224	ha	5.45
◆	TC16-1T	16	20-300	20-300	30-200	50-150	AT224	lz	5.95

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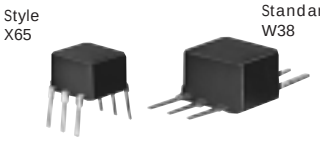

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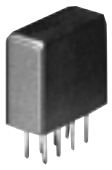
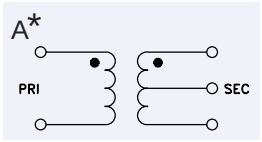


TMO



MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
T1-1T	1	0.08-200	0.08-200	0.15-150	.2-80	✧	ev	4.45
T1-6T	1	.015-300	.015-300	.021-150	.03-50	✧	ev	6.95
T2-1T	2	.07-200	.07-200	.1-100	.5-50	✧	ev	4.95
T2.5-6T	2.5	.01-100	.01-100	.02-50	.50-20	✧	ev	4.95
T3-1T	3	.05-250	.05-200	.1-200	.5-70	✧	ev	4.95
T4-1	4	.2-350	.2-350	.35-300	2-100	✧	ev	3.25
T4-6T	4	.02-250	.02-250	.05-150	0.1-100	✧	ev	5.65
T5-1T	5	.3-300	.3-300	.6-200	5-100	✧	ev	4.95
T8-1T	8	.3-140	.3-140	.7-90	1-60	✧	ev	7.95
T13-1T	13	.3-120	.3-120	.7-80	5-20	✧	ev	4.95
T16-6T	16	.03-75	.03-75	.06-30	.1-20	✧	ev	5.65
T4-1H	4	10-350	10-350	15-300	25-200	✧	ev	5.95
TMO1-1T	1	.05-200	.05-200	.08-150	.2-80	A11	ew	7.95
TMO2-1T	2	.07-200	.07-200	.1-100	.5-50	A11	ew	8.45
TMO2.5-6T	2.5	.01-100	.01-100	.02-50	.05-20	A03	ew	8.45
TMO3-1T	3	.05-250	.05-250	.1-200	.5-70	A03	ew	7.95
TMO4-1	4	.2-350	.2-350	.35-300	2-100	A11	ew	6.25
TMO5-1T	5	.3-300	.3-300	.6-200	5-100	A11	ew	8.45
TMO13-1T	13	.3-120	.3-120	.7-80	5-20	A11	ew	8.45

NOTES:

* FOR A CONFIGURATION:

Typical Amplitude Unbalance: 0.1 dB over 1 dB frequency range; 0.5 dB over entire frequency range.
Typical Phase Unbalance: 1.0° over 1 dB frequency range; 5.0° over entire frequency range.

✲ Insertion loss referenced to mid-band loss
◆ Aqueous washable.
■ Denotes 75 ohm model
❑ Non-hermetic
✧ Two case styles available: Plug-in case style X65; Radial lead case style W38.
* Protected under U.S. Patent 6133525
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. Impedance ratio= secondary/primary
1. Absolute power, voltage and current ratings:
1a. RF input power: all models 0.25W except where noted (● .5W rating; ●● 1W rating)
1b. DC current, 30mA
2. For ADT, JTX, TC,T,TCM, and TX series, operating temperature range is -20°C to +85°C.

pin connections

see case style outline drawings for pin locations

PORT	ev	ew	gs	ha	ks	kt	kz	lb	lz
PRIMARY DOT	4	1	6	6	3	3	3	1	3
PRIMARY	6	5	4	4	1	1	1	3	1
PRIMARY CT	—	—	—	—	—	—	—	—	—
SECONDARY DOT	3	2	3	1	4	6	6	4	4
SECONDARY	1	6	1	3	6	4	4	6	6
SECONDARY CT	2	4	2	2	5	5	2	2	2
GND EXT.	—	—	—	—	—	—	—	—	—
CASE GND	—	7,8	—	—	—	—	—	—	—
NOT USED	5	3	5	5	2	2	5	5	—
DEMO BOARD	—	—	—	—	TB-42	—	—	TB-42	TB-45

NSN GUIDE

MCL NO.	NSN
T1-1T	5950-01-153-0668
T1-1T-KK81	5950-01-431-4604
T1-1T-X65	5950-01-340-7040
T1-6T	5950-01-258-2173
T2-1T-KK81	5950-01-347-0311
T3-1T	5950-01-153-0298
T4-1	5950-01-024-7626
T4-1-KK81	5950-01-460-5700
T4-1-X65	5950-01-349-3181
T4-1H-X65	5950-01-328-8975
T16-6T	5950-01-336-0939
TMO1-1T	5950-01-326-2772
TMO2.5-6T	5950-01-215-8697
TMO3-1T	5950-01-168-7512
TMO5-1T	5950-01-183-0779
TMO-13-1T	5950-01-168-7512

001121

RF TRANSFORMERS WIDEBAND 12.5 to 1800 Ω

4 kHz to 1500 MHz

SURFACE MOUNT


ADT

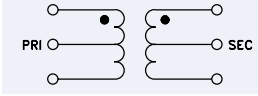

T-KK81


TCM


TC

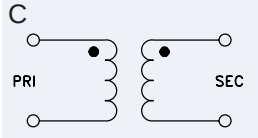

TX

B*



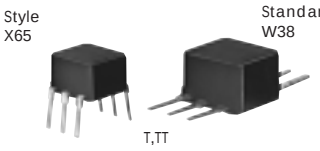
	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	ADTT1-1*	1	0.3-300	0.3-300	0.4-200	0.5-90	CD542	kr	3.95***
NEW◆	ADTT1-6*	1	.015-100	.015-100	.02-50	.06-30	CD637	kr	4.95***
NEW◆	ADTT1.5-1*	1.5	0.25-300	0.25-300	0.3-175	0.5-100	CD636	kr	3.95***
NEW◆	ADTT3-2*	3	0.2-210	0.2-210	0.3-150	0.5-90	CD636	kr	4.50***
NEW◆	ADTT4-1*	4	0.2-120	—	—	0.2-120	CD636	kr	3.95***
NEW◆	TTCM4-4	4	0.5-400	0.5-400	1.3-160	5-100	DB714	ex	4.95
❖	TT1-6-KK81	1	.004-300	.004-300	.02-200	.1-50	KK81	ex	6.95
	TT1.5-1-KK81	1.5	.075-500	.075-500	.2-100	1-50	KK81	ex	5.95
	TT2.5-6-KK81	2.5	.01-50	.01-50	.025-25	.05-10	KK81	ex	6.45
	TT4-1-KK81	3	.05-200	.05-200	.2-50	1-30	KK81	ex	5.95
	TT4-1A-KK81	4	0.1-300	0.1-300	0.2-250	0.3-180	KK81	ex	6.95
	TT16-1-KK81	16	0.1-45	0.1-45	0.14-35	1-20	KK81	ex	9.95
**	TT25-1-KK81	25	.02-30	.02-30	.05-20	.1-10	KK81	ex	9.95
❖	TT1-6	1	.004-300	.004-300	.02-200	.1-50	✧	ex	6.95
	TT1.5-1	1.5	.075-500	.075-500	.2-100	1-50	✧	ex	5.95
	TT2.5-6	2.5	.01-50	.01-50	.025-25	.05-10	✧	ex	6.45
	TT4-1	3	.05-200	.05-200	.2-50	1-30	✧	ex	5.95
	TT4-1A	4	0.1-300	0.1-300	0.2-250	0.3-180	✧	ex	6.95
	TT16-1	16	0.1-45	0.1-45	0.14-35	1-20	✧	ex	9.95
**	TT25-1	25	.02-30	.02-30	.05-20	.1-10	✧	ex	9.95
	TTMO25-1	25	.02-30	.02-30	.05-20	.1-10	A03	ey	11.95
	TTMO1-1	1	.005-100	.005-100	.01-75	.05-40	A03	ey	11.45
	TTMO4-1A	4	0.1-300	0.1-300	0.2-250	0.3-180	A03	ey	13.95

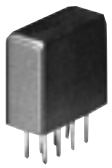
C



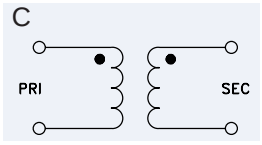
◆	ADT1-1*	1	0.15-400	0.15-400	0.2-200	0.3-100	CD542	kq	2.95***
NEW◆	ADT1.5-2*	1.5	0.3-225	0.3-225	0.5-140	0.7-80	CD636	kg	3.95***
◆●	ADT4-6*	4	0.07-250	.07-250	0.1-220	0.15-150	CD637	kq	4.95***
◆●	ADT16-6*	16	0.25-105	0.25-105	0.45-75	1-40	CD636	kq	4.95***
	T1-1-KK81	1	.15-400	.15-400	.35-200	2-50	KK81	ez	3.25
	T1.18-3-KK81	1.18	0.01-250	0.01-250	0.02-200	0.03-50	KK81	ez	5.65
	T1-6-KK81	1	.01-150	.01-150	.02-100	.05-50	KK81	ez	5.65
	T1.5-1-KK81	1.5	.1-300	.1-300	.2-150	.5-80	KK81	ez	4.45
	T1.5-6-KK81	1.5	.02-100	.02-100	.05-50	0.1-25	KK81	ez	5.65
●●●	T2-1-2W-KK81	2	5-120	—	—	5-120	KK81	ez	5.95
	T2.5-6-KK81	2.5	.01-100	.01-100	.02-50	.05-20	KK81	ez	4.45
●●●	T4-1-2W-KK81	4	10-250	—	—	10-250	KK81	ez	5.95
	T4-6-KK81	4	.02-200	.02-200	.05-150	.1-100	KK81	ez	5.65
	T9-1-KK81	9	.15-200	.15-200	.3-150	2-40	KK81	ez	3.95
	T16-1-KK81	16	.3-120	.3-120	.7-80	5-20	KK81	ez	4.45
	T36-1-KK81	36	.03-20	.03-20	.05-10	.1-5	KK81	ez	6.95
	T1-1H-KK81	1	8-300	8-300	10-200	25-100	KK81	ez	5.95
	T9-1H-KK81	9	2-90	2-90	3-75	6-50	KK81	ez	6.45
	T16-1H-KK81	16	7-85	7-85	10-65	15-40	KK81	ez	6.45
◆	TCM1-1	1	1.5-500	1.5-500	2.5-400	5.350	DB714	hd	4.45
◆	TC1-1	1	1.5-500	1.5-500	2.5-400	5-350	AT224	hd	4.95
††◆	TC1-15	1	800-1500	—	350-1500	800-1500	AT224	gw	4.95
	TX1-1	1	0.3-400	0.3-400	0.6-200	2-50	TT240	ez	3.50
	TX1-R5	1	0.8-500	0.8-500	1.2-350	3.2-180	TT240	ez	3.75
	TX1.5-1	1.5	0.25-300	0.25-300	0.3-150	0.5-80	TT240	ez	4.70
	TX9-1	9	1-200	1-200	1.5-160	3-70	TT240	ez	4.70

001127




TMO, TTMO

	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
	T1-1	1	.15-400	.15-400	.35-200	2-50	✧	ez	3.25
	T1.18-3	1.18	0.01-250	0.01-250	0.02-200	0.03-50	✧	ez	5.65
	T1-6	1	.01-150	.01-150	.02-100	.05-50	✧	ez	5.65
	T1.5-1	1.5	.1-300	.1-300	.2-150	.5-80	✧	ez	4.45
	T1.5-6	1.5	.02-100	.02-100	.05-50	0.1-25	✧	ez	5.65
●●●	T2-1-2W	2	5-120	—	—	5-120	✧	ez	5.95
	T2.5-6	2.5	.01-100	.01-100	.02-50	.05-20	✧	ez	4.45
●●●	T4-1-2W	4	10-250	—	—	10-250	✧	ez	5.95
	T4-6	4	.02-200	.02-200	.05-150	.1-100	✧	ez	5.65
	T9-1	9	.15-200	.15-200	.3-150	2-40	✧	ez	3.95
	T16-1	16	.3-120	.3-120	.7-80	5-20	✧	ez	4.45
	T36-1	36	.03-20	.03-20	.05-10	.1-5	✧	ez	6.95
	TO-75	1	10-500	—	10-500	40-250	PP94	fa	6.95
	T1-1H	1	8-300	8-300	10-200	25-100	✧	ez	5.95
	T9-1H	9	2-90	2-90	3-75	6-50	✧	ez	6.45
	T16-1H	16	7-85	7-85	10-65	15-40	✧	ez	6.45
	TMO1-02	1	1-800	1-800	2-500	—	A11	fc	9.45
	TMO1-1	1	.15-400	.15-400	.35-200	2-50	A11	fb	6.25
	TMO2.5-6	2.5	.01-100	.01-100	.02-50	.05-20	A03	fb	7.95
	TMO4-6	4	.02-200	.02-200	.05-150	.1-100	A03	fb	7.95
	TMO6-1	6	.3-200	.3-200	.5-150	5-50	A11	fb	7.95
	TMO9-1	9	.15-200	.15-200	.3-150	2-40	A11	fb	7.95
	TMO16-1	16	.3-120	.3-120	.7-80	5-20	A11	fb	7.95



NOTES:

* FOR B CONFIGURATION:

Typical Amplitude Unbalance: 0.1 dB over 1 dB frequency range; 0.5 dB over entire frequency range.

Typical Phase Unbalance: 1.0° over 1 dB frequency range; 5.0° over entire frequency range.

✲ Insertion loss referenced to mid-band loss

✣ Insertion loss is specified with input at pin 4 and output at pin1 with pins 6 & 3 grounded and pins 2 & 5 open.

◆ Aqueous washable.

** Below .05 MHz, insertion loss is specified for room temperature and above.

†† Not DC isolated, insertion loss is measured with input at pin 1, output at pin 6, and pin 3, 4 are grounded.

❑ Non-hermetic

✧ Two case styles available: Plug-in case style X65; Radial lead case style W38.

* Protected under U.S. Patent 6133525

*** Price for quantities 10-49.

A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.

B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".

C. Prices and Specifications subject to change without notice.

D. Impedance ratio= secondary/primary

1. Absolute power, voltage and current ratings:
   1a. RF input power: all models 0.25W except where noted (● .5W rating; ●●● 2W rating)
   1b. DC current, 30mA
2. For ADT, TC,T,TCM,TT, and TX series, operating temperature range is -20°C to +85°C.

pin connections

see case style outline drawings for pin locations

PORT	ex	ey	ez	fa	fb	fc	gw	hd	kq	kr
PRIMARY DOT	4	1	4	1	1	1	1	6	3	3
PRIMARY	6	5	6	2	5	3	6	4	1	1
PRIMARY CT	5	3	—	—	—	—	—	—	—	2
SECONDARY DOT	3	2	3	4	2	2	3	1	4	4
SECONDARY	1	6	1	3	6	4	4	3	6	6
SECONDARY CT	2	4	—	—	—	—	—	—	—	5
GND EXT.	—	—	—	—	—	—	—	—	—	—
CASE GND	—	7.8	—	—	7,8	7,8	—	—	—	—
NOT USED	—	—	2,5	—	3,4	2,5	—	2,5	2,5	—
DEMO BOARD	—	—	—	—	—	—	—	—	TB-42	TB-42

NSN GUIDE

MCL NO.	NSN
T1-1-KK81	5950-01-347-0310
T1-1	5950-01-128-3745
T1-1-X65	5950-01-327-5916
T1-1H	5950-01-409-2785
T9-1	5950-01-105-8153
T16-1	5950-01-094-7439
T16-1-X65	5950-01-272-2297
TMO1-1	5950-01-213-3735
TMO2.5-6	5950-01-215-4038
TMO4-6	5950-01-132-8102
TMO6-1	5950-01-364-7803
TMO9-1	5950-01-141-0174
TMO16-1	5950-01-138-4593
TT1-6-X65	5950-01-272-2298
TT4-1A	5950-01-331-7777
TTMO25-T	5950-01-415-7145

001120

RF TRANSFORMERS WIDEBAND 12.5 to 1800 Ω

5 kHz to 2500 MHz

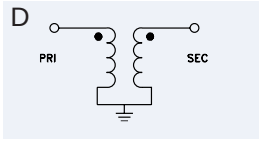
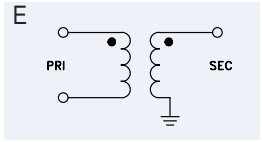
SURFACE MOUNT


ADT


TC


TCM


T-KK81

	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
D 	◆ ADT1.5-17*	1.5	.5-1700	.5-1700	1-1500	2-1100	CD542	la	3.45***
	◆✦ TC4-11	50/12.5	2-1100	—	2-1100	5-700	AT224	kp	4.95
	◆ TC1.5-1	1.5	.5-2200	.5-2200	1-2000	2-1100	AT224	jt	4.95
	◆❍■ TC9-1-75	75/8	0.3-475	0.3-475	0.5-450	0.9-370	AT224	kp	4.95
	T2-1-KK81	2	.050-600	.050-600	.1-400	.5-200	KK81	fd	3.95
	T3-1-KK81	3	.5-800	.5-800	2-400	—	KK81	fd	4.45
	T4-2-KK81	4	.2-600	.2-600	.5-500	2-250	KK81	fd	3.95
	T8-1-KK81	8	.15-250	.15-250	.25-200	2-100	KK81	fd	3.95
	T14-1-KK81	14	.2-150	.2-150	.5-100	2-50	KK81	fd	4.95
	T2-1	2	.050-600	.050-600	.1-400	.5-200	✧	fd	3.95
	T3-1	3	.5-800	.5-800	2-400	—	✧	fd	4.45
	T4-2	4	.2-600	.2-600	.5-500	2-250	✧	fd	3.95
	T8-1	8	.15-250	.15-250	.25-200	2-100	✧	fd	3.95
	T14-1	14	.2-150	.2-150	.5-100	2-50	✧	fd	4.95
	TMO2-1	2	.050-600	.050-600	.1-400	.5-200	A11	fe	7.95
	TMO4-2	4	.2-600	.2-600	.5-500	2-250	A11	fe	7.95
	TMO14-1	14	.2-150	.2-150	.5-100	2-50	A11	fe	8.45
	FT1.22-1	1.22	.005-100	.005-100	.01-50	.05-25	H16	—	35.95
	FT1.5-1	1.5	.1-400	.1-400	.5-200	1-100	H16	—	35.95
E 	FTB1-1	1	.2-500	.2-500	.5-300	1-100	H16	—	36.95
	FTB1-6	1	.01-125	.01-125	.05-50	.1-25	H16	—	36.95
	■ FTB1-1-75	1	.5-500	.5-500	5-300	10-100	H16	—	36.95

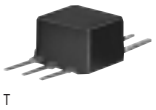
NOTES:

✧ Two case styles available: Plug-in case style X65; Radial lead case style W38.
✲ Insertion loss referenced to mid-band loss.
◆ Aqueous washable.
■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.
❒ Non-hermetic
✦ Stepdown, 50 ohm primary, 5.2 pF across secondary
❍ Stepdown, 75 ohm primary, 51 pF across secondary
* Protected under U.S. Patent 6133525
*** Price for quantities 10-49.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. Impedance ratio= secondary/primary.
1. Absolute power, voltage and current ratings:
   1a. RF input power: all models 0.25W except where noted (●● 1W rating; ●●● 2W rating)
   1b. DC current, 30mA
2. For ADT,ADTL, TC,TCM,TCML, and T series, operating temperature range is -20°C to +85°C.

001122

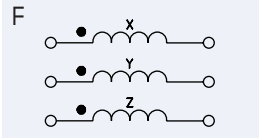
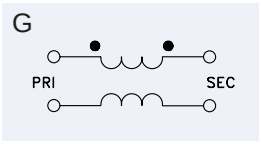
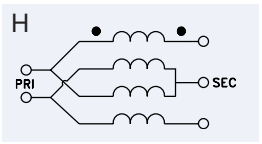

FT,FTB


Style X65


T

Standard W38


TMO

	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
F 	T-622-KK81	1:1:1	0.1-200	0.1-200	0.5-100	5-80	KK81	ff	3.25
	T-626-KK81	1:1:1	0.01-10	0.01-10	0.02-5	.04-2	KK81	ff	3.95
	T2-613-1-KK81	1:1:2	0.07-200	0.07-200	0.1-100	0.5-50	KK81	fg	1.95
	T-622	1:1:1	0.1-200	0.1-200	0.5-100	5-80	✧	ff	3.25
	T-626	1:1:1	0.01-10	0.01-10	0.02-5	.04-2	✧	ff	3.95
	T2-613-1	1:1:2	0.07-200	0 07-200	0.1-100	0.5-50	✧	fg	1.95
G 	◆ TCML1-11	1	600-1100	—	600-1100	700-1000	DB714	mh	4.95
	◆ TCML1-19	1	800-1900	800-1900	—	800-1400	DB714	mh	4.95
	◆●●● ADTL1-12*	1	20 -1200	—	20-1200	50-1000	CD542	kn	2.95***
	◆■ ADTL1-18-75*	1	5 -1800	—	5-1800	25-1200	CD542	kn	2.95***
	◆●●■ ADTL1-4-75*	1	0.5 -1000	0.5-1000	1-600	5-400	CD542	kn	2.95***
	NEW◆ ADTL2-18*	2	30-1800	30-1800	—	100-1500	CD542	kn	3.95***
H 	NEW◆ TCM4-19	4	10-1900	10-1900	20-1000	30-700	DB714	gs	6.95
	◆ TCM4-25	4	500-2500	500-2500	700-1500	750-1200	DB714	gs	5.95

pin connections

see case style outline drawings

PORT	fd	fe	ff	fg	gs	jt	kn	kp	la	mh
PRIMARY DOT	6	1	X1 Y2 Z3	X1 Y5 Z3	6	6	1	6	1	6
PRIMARY	3	6	X6 Y5 Z4	X2 Y6 Z4	4	4	3	3	3	4
PRIMARY CT	—	—	—	—	—	—	—	—	—	—
SECONDARY DOT	1	2	—	—	3	1	6	1	6	1
SECONDARY	3	6	—	—	1	4	4	3	3	3
SECONDARY CT	—	—	—	—	2	—	—	—	—	—
CASE EXT.	3	6	—	—	—	—	—	—	—	—
CASE GND	—	7,8	—	—	—	—	—	—	—	—
NOT USED	2,4,5	3,4,5	—	—	5	2,3,5	2,5	—	2,4,5	2,5
DEMO BOARD	—	—	—	—	—	TB-41	—	—	TB-40	—

NSN GUIDE

MCL NO.	NSN
FTB1-1-75	5950-01-132-8034
FTB1-6	5950-01-225-8773
FT1.5-1	5950-01-325-4686
T2-1	5950-01-106-1218
T4-2	5950-01-361-1794
TMO2-1	5950-01-183-6414
TMO4-2	5950-01-091-3553
TMO8-1	5950-01-442-8008

001120

RF TRANSFORMERS WIDEBAND 12.5 to 1800 Ω

4 kHz to 1500 MHz

SURFACE MOUNT


ADT

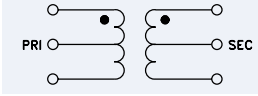

T-KK81


TCM


TC

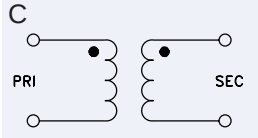

TX

B*



	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
◆	ADTT1-1*	1	0.3-300	0.3-300	0.4-200	0.5-90	CD542	kr	3.95***
NEW◆	ADTT1-6*	1	.015-100	.015-100	.02-50	.06-30	CD637	kr	4.95***
NEW◆	ADTT1.5-1*	1.5	0.25-300	0.25-300	0.3-175	0.5-100	CD636	kr	3.95***
NEW◆	ADTT3-2*	3	0.2-210	0.2-210	0.3-150	0.5-90	CD636	kr	4.50***
NEW◆	ADTT4-1*	4	0.2-120	—	—	0.2-120	CD636	kr	3.95***
NEW◆	TTCM4-4	4	0.5-400	0.5-400	1.3-160	5-100	DB714	ex	4.95
❖	TT1-6-KK81	1	.004-300	.004-300	.02-200	.1-50	KK81	ex	6.95
	TT1.5-1-KK81	1.5	.075-500	.075-500	.2-100	1-50	KK81	ex	5.95
	TT2.5-6-KK81	2.5	.01-50	.01-50	.025-25	.05-10	KK81	ex	6.45
	TT4-1-KK81	3	.05-200	.05-200	.2-50	1-30	KK81	ex	5.95
	TT4-1A-KK81	4	0.1-300	0.1-300	0.2-250	0.3-180	KK81	ex	6.95
	TT16-1-KK81	16	0.1-45	0.1-45	0.14-35	1-20	KK81	ex	9.95
**	TT25-1-KK81	25	.02-30	.02-30	.05-20	.1-10	KK81	ex	9.95
❖	TT1-6	1	.004-300	.004-300	.02-200	.1-50	✧	ex	6.95
	TT1.5-1	1.5	.075-500	.075-500	.2-100	1-50	✧	ex	5.95
	TT2.5-6	2.5	.01-50	.01-50	.025-25	.05-10	✧	ex	6.45
	TT4-1	3	.05-200	.05-200	.2-50	1-30	✧	ex	5.95
	TT4-1A	4	0.1-300	0.1-300	0.2-250	0.3-180	✧	ex	6.95
	TT16-1	16	0.1-45	0.1-45	0.14-35	1-20	✧	ex	9.95
**	TT25-1	25	.02-30	.02-30	.05-20	.1-10	✧	ex	9.95
	TTMO25-1	25	.02-30	.02-30	.05-20	.1-10	A03	ey	11.95
	TTMO1-1	1	.005-100	.005-100	.01-75	.05-40	A03	ey	11.45
	TTMO4-1A	4	0.1-300	0.1-300	0.2-250	0.3-180	A03	ey	13.95

C



◆	ADT1-1*	1	0.15-400	0.15-400	0.2-200	0.3-100	CD542	kq	2.95***
NEW◆	ADT1.5-2*	1.5	0.3-225	0.3-225	0.5-140	0.7-80	CD636	kg	3.95***
◆●	ADT4-6*	4	0.07-250	.07-250	0.1-220	0.15-150	CD637	kq	4.95***
◆●	ADT16-6*	16	0.25-105	0.25-105	0.45-75	1-40	CD636	kq	4.95***
	T1-1-KK81	1	.15-400	.15-400	.35-200	2-50	KK81	ez	3.25
	T1.18-3-KK81	1.18	0.01-250	0.01-250	0.02-200	0.03-50	KK81	ez	5.65
	T1-6-KK81	1	.01-150	.01-150	.02-100	.05-50	KK81	ez	5.65
	T1.5-1-KK81	1.5	.1-300	.1-300	.2-150	.5-80	KK81	ez	4.45
	T1.5-6-KK81	1.5	.02-100	.02-100	.05-50	0.1-25	KK81	ez	5.65
●●●	T2-1-2W-KK81	2	5-120	—	—	5-120	KK81	ez	5.95
	T2.5-6-KK81	2.5	.01-100	.01-100	.02-50	.05-20	KK81	ez	4.45
●●●	T4-1-2W-KK81	4	10-250	—	—	10-250	KK81	ez	5.95
	T4-6-KK81	4	.02-200	.02-200	.05-150	.1-100	KK81	ez	5.65
	T9-1-KK81	9	.15-200	.15-200	.3-150	2-40	KK81	ez	3.95
	T16-1-KK81	16	.3-120	.3-120	.7-80	5-20	KK81	ez	4.45
	T36-1-KK81	36	.03-20	.03-20	.05-10	.1-5	KK81	ez	6.95
	T1-1H-KK81	1	8-300	8-300	10-200	25-100	KK81	ez	5.95
	T9-1H-KK81	9	2-90	2-90	3-75	6-50	KK81	ez	6.45
	T16-1H-KK81	16	7-85	7-85	10-65	15-40	KK81	ez	6.45
◆	TCM1-1	1	1.5-500	1.5-500	2.5-400	5.350	DB714	hd	4.45
◆	TC1-1	1	1.5-500	1.5-500	2.5-400	5-350	AT224	hd	4.95
††◆	TC1-15	1	800-1500	—	350-1500	800-1500	AT224	gw	4.95
	TX1-1	1	0.3-400	0.3-400	0.6-200	2-50	TT240	ez	3.50
	TX1-R5	1	0.8-500	0.8-500	1.2-350	3.2-180	TT240	ez	3.75
	TX1.5-1	1.5	0.25-300	0.25-300	0.3-150	0.5-80	TT240	ez	4.70
	TX9-1	9	1-200	1-200	1.5-160	3-70	TT240	ez	4.70

001127

RF TRANSFORMERS WIDEBAND 12.5 to 1800 Ω

5 kHz to 2500 MHz

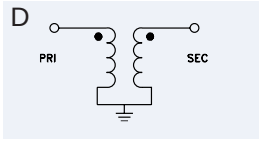
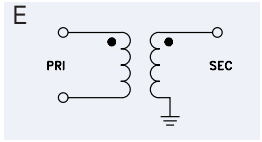
SURFACE MOUNT


ADT


TC


TCM


T-KK81

	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
D 	◆ ADT1.5-17*	1.5	.5-1700	.5-1700	1-1500	2-1100	CD542	la	3.45***
	◆✦ TC4-11	50/12.5	2-1100	—	2-1100	5-700	AT224	kp	4.95
	◆ TC1.5-1	1.5	.5-2200	.5-2200	1-2000	2-1100	AT224	jt	4.95
	◆❍■ TC9-1-75	75/8	0.3-475	0.3-475	0.5-450	0.9-370	AT224	kp	4.95
	T2-1-KK81	2	.050-600	.050-600	.1-400	.5-200	KK81	fd	3.95
	T3-1-KK81	3	.5-800	.5-800	2-400	—	KK81	fd	4.45
	T4-2-KK81	4	.2-600	.2-600	.5-500	2-250	KK81	fd	3.95
	T8-1-KK81	8	.15-250	.15-250	.25-200	2-100	KK81	fd	3.95
	T14-1-KK81	14	.2-150	.2-150	.5-100	2-50	KK81	fd	4.95
	T2-1	2	.050-600	.050-600	.1-400	.5-200	✧	fd	3.95
	T3-1	3	.5-800	.5-800	2-400	—	✧	fd	4.45
	T4-2	4	.2-600	.2-600	.5-500	2-250	✧	fd	3.95
	T8-1	8	.15-250	.15-250	.25-200	2-100	✧	fd	3.95
	T14-1	14	.2-150	.2-150	.5-100	2-50	✧	fd	4.95
	TMO2-1	2	.050-600	.050-600	.1-400	.5-200	A11	fe	7.95
	TMO4-2	4	.2-600	.2-600	.5-500	2-250	A11	fe	7.95
	TMO14-1	14	.2-150	.2-150	.5-100	2-50	A11	fe	8.45
	FT1.22-1	1.22	.005-100	.005-100	.01-50	.05-25	H16	—	35.95
	FT1.5-1	1.5	.1-400	.1-400	.5-200	1-100	H16	—	35.95
E 	FTB1-1	1	.2-500	.2-500	.5-300	1-100	H16	—	36.95
	FTB1-6	1	.01-125	.01-125	.05-50	.1-25	H16	—	36.95
	■ FTB1-1-75	1	.5-500	.5-500	5-300	10-100	H16	—	36.95

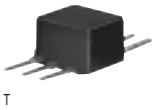
NOTES:

✧ Two case styles available: Plug-in case style X65; Radial lead case style W38.
✲ Insertion loss referenced to mid-band loss.
◆ Aqueous washable.
■ Denotes 75 ohm model, for coax connector models 75 ohm BNC connectors are standard.
❒ Non-hermetic
✦ Stepdown, 50 ohm primary, 5.2 pF across secondary
❍ Stepdown, 75 ohm primary, 51 pF across secondary
* Protected under U.S. Patent 6133525
*** Price for quantities 10-49.
A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
D. Impedance ratio= secondary/primary.
1. Absolute power, voltage and current ratings:
   1a. RF input power: all models 0.25W except where noted (●● 1W rating; ●●● 2W rating)
   1b. DC current, 30mA
2. For ADT,ADTL, TC,TCM,TCML, and T series, operating temperature range is -20°C to +85°C.

001122

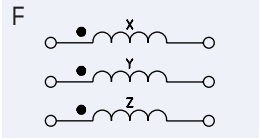
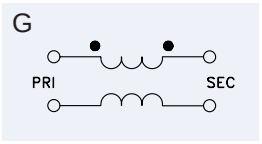
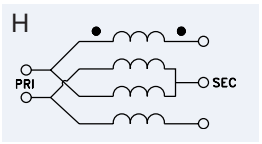

FT,FTB


Style X65


T

Standard W38


TMO

	MODEL NO.	Ω RATIO Note D	FREQUENCY (MHz)	INSERTION LOSS ✲ 3 dB MHz	2 dB MHz	1 dB MHz	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (1-9)
F 	T-622-KK81	1:1:1	0.1-200	0.1-200	0.5-100	5-80	KK81	ff	3.25
	T-626-KK81	1:1:1	0.01-10	0.01-10	0.02-5	.04-2	KK81	ff	3.95
	T2-613-1-KK81	1:1:2	0.07-200	0.07-200	0.1-100	0.5-50	KK81	fg	1.95
	T-622	1:1:1	0.1-200	0.1-200	0.5-100	5-80	✧	ff	3.25
	T-626	1:1:1	0.01-10	0.01-10	0.02-5	.04-2	✧	ff	3.95
	T2-613-1	1:1:2	0.07-200	0 07-200	0.1-100	0.5-50	✧	fg	1.95
G 	◆ TCML1-11	1	600-1100	—	600-1100	700-1000	DB714	mh	4.95
	◆ TCML1-19	1	800-1900	800-1900	—	800-1400	DB714	mh	4.95
	◆●●● ADTL1-12*	1	20 -1200	—	20-1200	50-1000	CD542	kn	2.95***
	◆■ ADTL1-18-75*	1	5 -1800	—	5-1800	25-1200	CD542	kn	2.95***
	◆●●■ ADTL1-4-75*	1	0.5 -1000	0.5-1000	1-600	5-400	CD542	kn	2.95***
	NEW◆ ADTL2-18*	2	30-1800	30-1800	—	100-1500	CD542	kn	3.95***
H 	NEW◆ TCM4-19	4	10-1900	10-1900	20-1000	30-700	DB714	gs	6.95
	◆ TCM4-25	4	500-2500	500-2500	700-1500	750-1200	DB714	gs	5.95

pin connections

see case style outline drawings

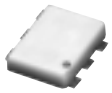
PORT	fd	fe	ff	fg	gs	jt	kn	kp	la	mh
PRIMARY DOT	6	1	X1 Y2 Z3	X1 Y5 Z3	6	6	1	6	1	6
PRIMARY	3	6	X6 Y5 Z4	X2 Y6 Z4	4	4	3	3	3	4
PRIMARY CT	—	—	—	—	—	—	—	—	—	—
SECONDARY DOT	1	2	—	—	3	1	6	1	6	1
SECONDARY	3	6	—	—	1	4	4	3	3	3
SECONDARY CT	—	—	—	—	2	—	—	—	—	—
CASE EXT.	3	6	—	—	—	—	—	—	—	—
CASE GND	—	7,8	—	—	—	—	—	—	—	—
NOT USED	2,4,5	3,4,5	—	—	5	2,3,5	2,5	—	2,4,5	2,5
DEMO BOARD	—	—	—	—	—	TB-41	—	—	TB-40	—

NSN GUIDE

MCL NO.	NSN
FTB1-1-75	5950-01-132-8034
FTB1-6	5950-01-225-8773
FT1.5-1	5950-01-325-4686
T2-1	5950-01-106-1218
T4-2	5950-01-361-1794
TMO2-1	5950-01-183-6414
TMO4-2	5950-01-091-3553
TMO8-1	5950-01-442-8008

001120

VERY WIDEBAND 50 to 10000 MHz



ADCH

MODEL◆ NO.	FREQUENCY MHz	INSERTION LOSS* (dB) Typ.	Max.	VSWR* (:1) Typ.	Max.	DC CURRENT (mA) Max.	INDUCTANCE (µH) Typ. @ 0 mA	@ 50 mA	@ 100 mA	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (10-49)
ADCH-80*	50 - 8000	0.3	1.0	1.1	1.35							
	50-10000	0.3	2.0	1.1	1.6	100	7.0	1.8	1.0	CD542	lv	2.75
ADCH-80A*	50 - 8000	0.3	1.0	1.1	1.35							
	50-10000	0.3	2.0	1.1	1.6	100	7.0	1.8	1.0	CD542	mk	2.75

* Tested with circuit shown below, Zo=50 ohms

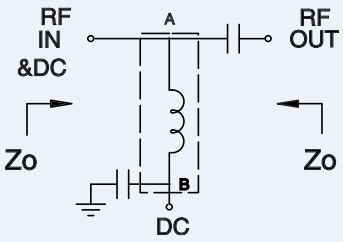
features

- low parasitic capacitance 0.1 PF typ.
- effective parallel resistance, Rch 800 ohm typ.
- patent applied for

applications

- amplifier biasing

Test Circuit *



	A	B
ADCH-80	2	5
ADCH-80A	6	3

NOTES:

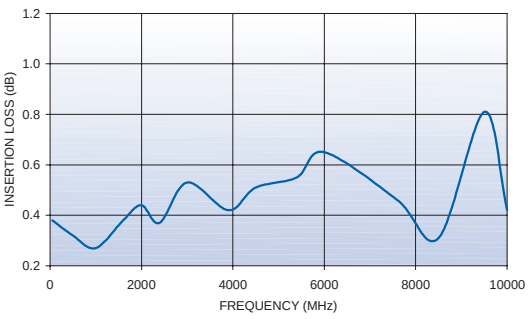
◆ Aqueous washable.
* Protected under U.S. Patent 6133525.
A. Environmental specifications and re-flow soldering information available in General Information Section.
B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
C. Prices and Specifications subject to change without notice.
1. Absolute maximum power, voltage and current rating:
1a. DC current 250mA

pin connections

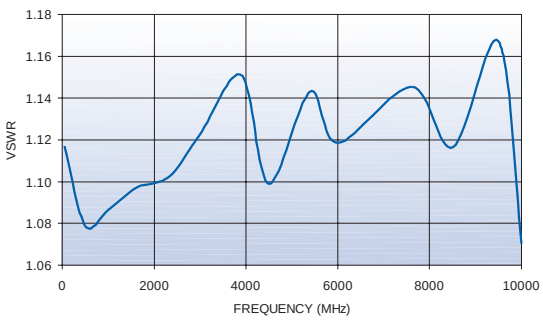
see case style outline drawings

PORT	lv	mk
INPUT	2	6
OUTPUT	5	3
NOT USED	1,3,4,6	1,2,4,5

ADCH-80/-80A
INSERTION LOSS



ADCH-80/-80A
VSWR



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