Frequency Mixer

ADE-92+

Level 7 (LO Power +7 dBm) 400 to 900 MHz

The Big Deal

- Excellent IP3: +20dBm with reduced LO power (+7dBm)
- High LO-RF Isolation across the entire band
- Low cost, miniature size

CASE STYLE: CD636

Product Overview

The ADE-92+ is passive double balanced mixer featuring a FET quad in a ring configuration providing high dynamic range performance in a small, low cost, RoHS-compliant package. The ADE-92+ provides RF/LO response from 400 to 900 MHz and IF response from DC to 150 MHz. It is especially useful in systems where cost and performance are critical, such as GSM cellular system applications. This mixer is ideal for upconverter and downconverter applications and does not require external matching components or DC power.

Key Features

Feature	Advantages
High IP3, +20 dBm typ. with reduced LO power requirement.	Allows for improved dynamic range, a critical factor in receiver applications.
Low conversion loss, 7 dB typ.	Enables lower NF front ends, which can improve system sensitivity.
High LO to RF isolation, 39 dB typ.	Reduced levels of unwanted responses that can interfere with system performance.
Broadband matching	The IF port VSWR is less than 1.6 to 1 over the specified frequency range, which simplifies impedance matching with adjoining components.
Insensitive to LO power level variations	Allows the use of an LO amplifier with less stringent gain flatness, enabling the use of lower cost amplifiers.
Small package 0.310” x 0.220” x 0.162”	Enables high density packaging.

High IP3

Frequency Mixer

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CASE STYLE: CD636

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	100 mW
IF Current	40 mA

Permanent damage may occur if any of these limits are exceeded.

Pin Connections

LO	6
RF	3
IF	2
GROUND	1,4,5

Features

- high IP3, +20 dBm typ.
- good L-R isolation, 39 dB typ.
- good L-I isolation, 26 dB typ.
- aqueous washable
- patent pending

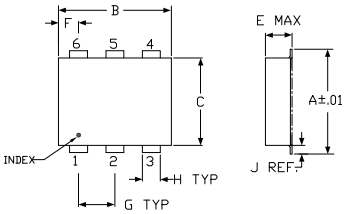
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

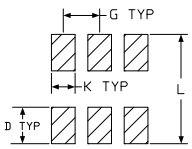
Applications

- cellular
- GSM
- ISM

Outline Drawing



PCB Land Pattern



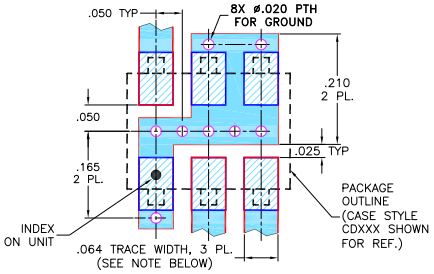
Suggested Layout
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	**.310**	**.220**	**.100**	**.162**	**.055**	**.100**
6.91	7.87	5.58	2.54	4.11	1.40	2.54

H	J	K	L	wt
.030	**.026**	**.065**	**.300**	**grams**
0.76	0.66	1.65	7.62	.25

Demo Board MCL P/N: TB-03
Suggested PCB Layout (PL-052)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Electrical Specifications

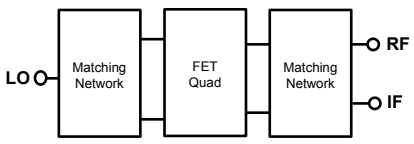
FREQUENCY (MHz)		CONVERSION LOSS (dB)			LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
LO/RF	IF								
f_L-f_U		$\bar{X}$	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.
400-900	DC-150*	6.8	0.1	9.5	39	32	26	18	20

1 dB COMP.: +11 dBm typ.
* Conversion Loss increases up to 10dB @ IF Frequency 120-150MHz.

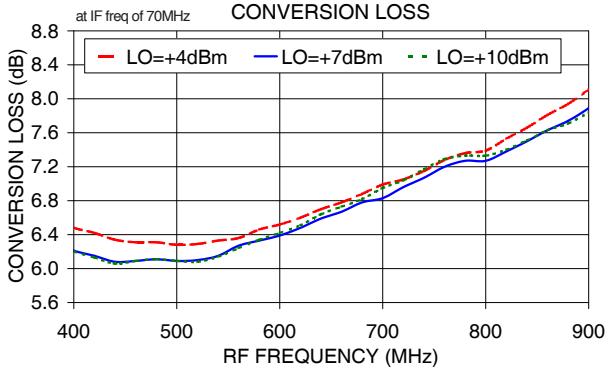
Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF PORT (:1)	VSWR LO PORT (:1)	IP3 (dBm)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
400.10	470.10	6.21	40.48	28.63	1.87	23.18	15.22
420.10	490.10	6.15	40.86	29.04	1.87	22.30	15.08
460.10	530.10	6.09	41.35	29.36	1.94	19.26	16.35
500.10	570.10	6.09	41.55	28.75	2.01	15.39	21.58
520.10	590.10	6.10	41.49	27.91	2.03	13.50	22.04
540.10	610.10	6.15	41.05	27.00	2.08	11.79	19.98
580.10	650.10	6.33	39.88	25.54	2.28	8.69	21.23
600.10	670.10	6.39	39.17	24.96	2.35	7.44	23.28
620.10	690.10	6.48	38.46	24.46	2.43	6.37	25.2
640.10	710.10	6.59	37.76	24.06	2.50	5.48	29.29
680.10	750.10	6.78	36.74	23.65	2.66	4.19	27.42
700.10	770.10	6.83	36.59	23.54	2.73	3.77	23.91
740.10	810.10	7.07	36.99	23.55	2.83	3.26	20.7
760.10	830.10	7.20	37.70	23.75	2.87	3.14	22.99
780.10	850.10	7.27	38.58	24.04	2.87	3.11	27.33
800.10	870.10	7.27	38.88	24.41	2.84	3.14	26.02
840.10	910.10	7.50	38.34	25.13	2.94	3.31	30.06
860.10	930.10	7.63	38.13	25.31	3.04	3.43	27.58
880.10	950.10	7.74	38.03	25.37	3.10	3.57	25.41
900.10	970.10	7.89	37.94	25.52	3.18	3.73	23.43

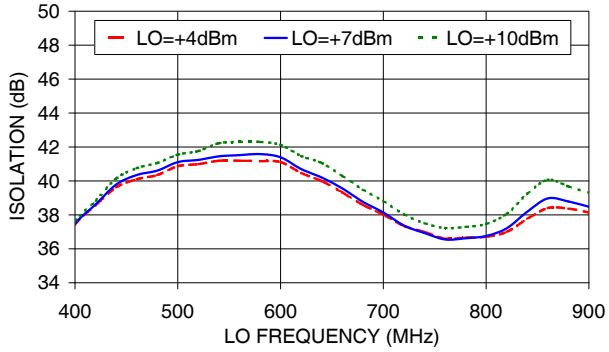
Electrical Schematic



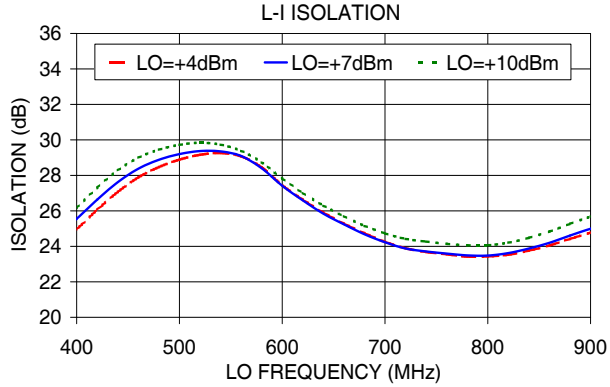
ADE-92+
CONVERSION LOSS



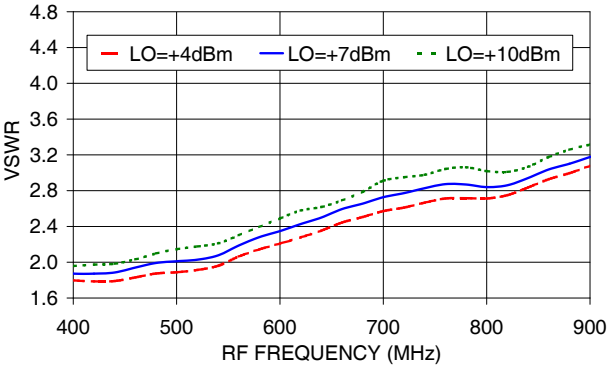
ADE-92+
L-R ISOLATION



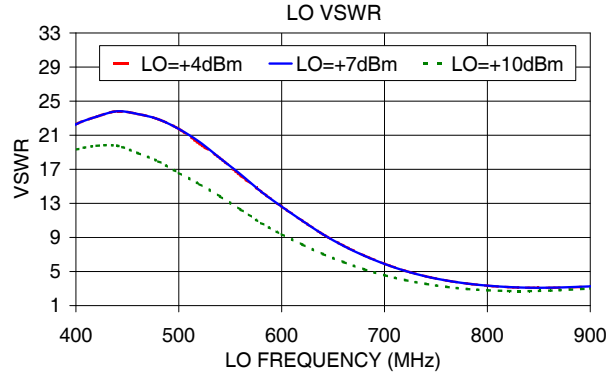
ADE-92+
L-I ISOLATION



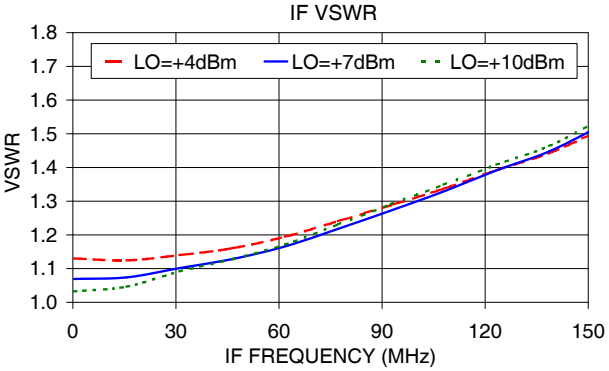
ADE-92+
RF VSWR



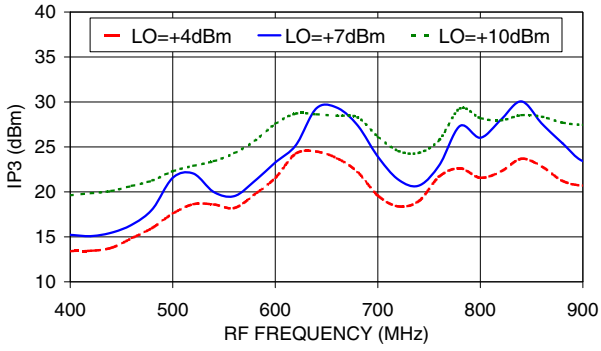
ADE-92+
LO VSWR



ADE-92+
IF VSWR



ADE-92+
IP3



Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp