



INCLUDING
RF POWER

RF Manual 12th edition

Application and design manual for RF products
June 2009

Experience high-performance analog

NXP's RF Manual makes design work much easier

NXP's RF Manual – one of the most important reference tools on the market for today's RF designers – features our complete range of RF products, from low to high power.

With the new 12th edition of the RF Manual, we've made a great design tool even better. We've broadened the scope of the document, adding new material that makes RF design simpler than ever. We've updated the content on RF small-signal products, and have added a new section on RF power transistors.

New developments and new products

We've expanded the content to include several new developments and new products, including GPS LNAs with industry-leading sensitivity, ultra-low-noise LO generators, a highly efficient line-up of 1-GHz CATV modules, best-in-class medium-power MMICs, a comprehensive portfolio of satellite solutions (including IF gain blocks), and the world's best RF power transistors for basestations, broadcast/ISM, and microwave applications.

Interactive

The online edition of the RF Manual continues to offer interactive features that link designers to more detailed information. Simply click on a product type and you're automatically taken to the corresponding product information page on the NXP website, where you'll find data sheets, application notes, design-support documents, and more. To access the manual, go to www.nxp.com/rfmanual or just search for "RF Manual".

"I'm proud to present the latest edition of our RF Manual. It covers the entire range of our RF products in one comprehensive manual, and I'm convinced that you'll find even more ways to use the 12th edition in your daily design work."

Kind regards,



John Croteau

Vice President & General Manager
Business Line Analog Mixed Signal

RF Manual web page

www.nxp.com/rfmanual

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Experience faster time to first fix with GPS LNAs

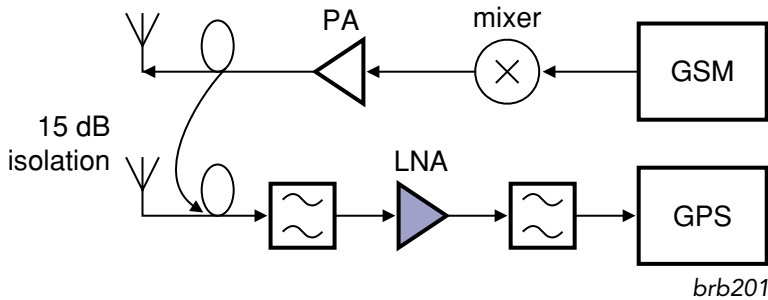
Look at BGU7005, chapter 2.1

1. Applications & recommended products

NXP RF Applications
<http://www.nxp.com/rf>

1.1 Global Positioning System (GPS)

Application diagram



Recommended products

Function	Product		Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
			SOT343	BFG410W
	MMIC	Low noise wideband amplifier	SOT343R	BGA2001
			SOT343R	BGA2003
		SiGe:C MMIC	SOT891	BGU7003
		SiGe:C MMIC	SOT886	BGU7005
	RF transistor	SiGe:C transistor	SOT343F	BFU725F

Product highlight: BGU7005 SiGe:C MMIC

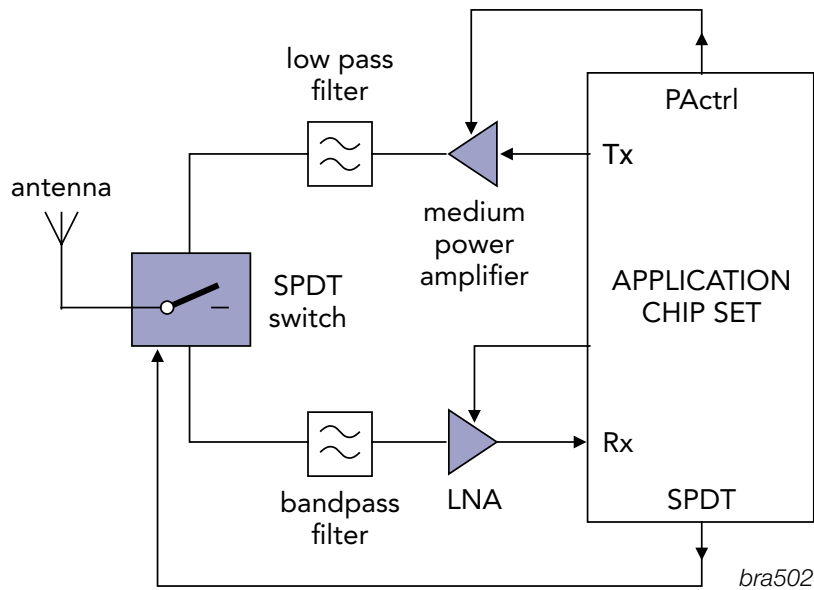
Get the fastest TTFF with GPS LNAs that use proven QUBiC4Xi SiGe:C. The BGU7005 is ideally suited for discrete implementation of the GPS front end. The BGU7005 has an enable functionality. In the power-down mode the products consume less than 1 μ A.

Features

- ▶ Requires only 4 external components (including decoupling) to build complete GPS front-end.
- ▶ Small size 6-pins SOT886 leadless package (1.45 x 1.0 x 0.5 mm³)
- ▶ Low current consumption (5 mA)
- ▶ Low noise figure (NF): 0.9 dB at 1.575 GHz
- ▶ High insertion power gain: 16 dB at 1.575 GHz
- ▶ Low current consumption in power-down mode (< 1 μ A)
- ▶ ESD protection on all pins
- ▶ Supply voltage: 1.5 V to 2.85 V, optimized for 1.8 V
- ▶ Proven, robust QUBiC4X SiGe:C process technology ($f_T = 110$ GHz)

1.2 A 2.4 GHz front-end for WLAN, Bluetooth™, DECT, ZigBee™, etc.

Application diagram



Recommended products

Function	Product	Package	Type
SPDT switch	RF diode	PIN diode	SOD523 BAP51-02
			SOD882T BAP51LX
			SOD882T BAP55LX

Function	Product	Package	Type
Medium power amplifier	MMIC	Medium power amplifier	SOT89 BGA6589
			SOT908 BGA7124
			BGA7127

Function	Product	Package	Type
LNA	MMIC	Low noise wideband amplifier	SOT343R BGA2003
			SOT343R BGA2001
	RF Transistor	SiGe:C transistor	SOT343F BFU725F
	MMIC	SiGe:C MMIC	SOT891 BGU7003

Product highlight: BGA6289 MMIC medium power amplifier

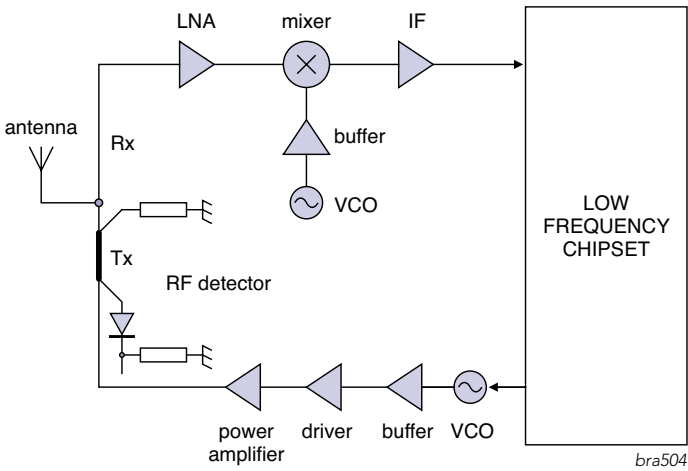
Silicon Monolithic Microwave Integrated Circuit (MMIC) wideband medium power amplifier with internal matching circuit in a 4-pin SOT89 plastic low thermal resistance SMD package. The BGA6x89 series of medium power gain blocks provides large bandwidth and high-quality performance in 2.4 GHz wireless applications.

Features

- ▶ 17 dBm output power
- ▶ Single supply voltage needed

1.3 Low-cost cellular phone front-end for ODM/CEM designs

Application diagram



Recommended products

Function	Product	Package	Type	
RF detector	RF schottky diode	Low Cd schottky	SOT323	1PS70SB84
			SOD323	1PS76SB17
			SOD882	1PS10SB82
			SOT666	1PS66SB82
Buffer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG425W
			SOT343	BFG480W
			SOT23	BFR520T
			SOT416	BFR505T
			SOT323	BFS540
Antenna switch	RF diode	PIN diode	various**	BAP50
			various**	BAP51
			various**	BAP55
			various**	BAP63
			various**	BAP64
			various**	BAP65
			various**	BAP1321
VCO	Varicap diodes	VCO varicap diodes	SOD523	BB145B
			SOD523	BB179
VCxO	Varicap diodes	VCxO varicap diodes	SOD523	BB198
			SOD523	BB199
LNA	MMIC	Low noise wideband amplifier	SOT343R	BGA2001
			SOT343R	BGA2003
			SOT363	BGA2011
			SOT363	BGA2012

Function	Product	Package	Type	
Driver	Bipolar transistor	Wideband transistor	SOT343	BFG21W
			SOT343	BFG425W
			SOT343	BFG480W
	MMIC	Amplifier*	SOT363	BGA2031/1
			SOT363	BGA2771
	Gen. purpose wideband ampl.	SOT363	BGA2776	
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG425W
			SOT343	BFG480W
	MMIC	Linear mixer	SOT363	BGA2022
IF	MMIC	Low noise amplifier	SOT343R	BGA2001
			SOT343R	BGA2003
		RF bipolar transistor	Gen. purpose amplifier	SOT363
	SOT363			BGA2776
	SOT363			PRF949
		Wideband transistor	SOT363	BFS17W
Power amplifier	Bipolar transistor	Wideband transistor	SOT343	BFG21W
			SOT343	BFG480W
			SOT363	BGA2031/1
	MMIC	Amplifier*	SOT363	BGA2031/1
			SOT363	BGA2771
	Gen. purpose wideband ampl.	SOT363	BGA2776	

* = 2 stage variable gain linear amplifier
 ** = also available in ultra small leadless package SOD882T.

Product highlight: BGA2771 MMIC General - purpose wideband amplifier

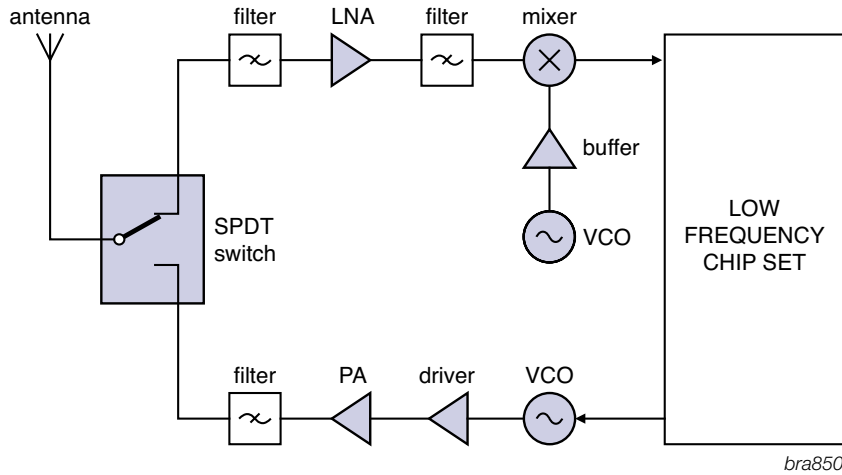
Silicon Monolithic Microwave Integrated Circuit (MMIC) wideband amplifier with internal matching circuit in a 6-pin SOT363 SMD plastic package. The BGA27xx series amplifier provides large bandwidth and high quality in wireless system applications.

Features

- ▶ Internally matched
- ▶ Wide frequency range
- ▶ Very flat gain
- ▶ High output power
- ▶ High linearity
- ▶ Unconditionally stable

1.4 Walkie-talkie, RF generic front-end with a single antenna

Application diagram



Recommended products

Function	Product	Package	Type
SPDT Switch	RF diode	Bandswitch diode	SOD523 BA277
			SOD323 BA591
	PIN diode	various	BAP51*
		various	BAP1321*

Function	Product	Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343 BFG410W
			SOT343 BFG425W
	MMIC	Linear mixer	SOT363 BFG480W
			SOT363 BGA2022

Function	Product	Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT23 PBR951
			SOT323 PRF957
			SOT323 PRF947
	MMIC	Low noise wideband ampl.	SOT343R BGA2001
		SOT343R	BGA2003

Function	Product	Package	Type
Buffer	RF bipolar transistor	Wideband transistor	SOT23 PBR951
			SOT323 PRF957
			SOT323 PRF947
			SOT416 PRF949

Function	Product	Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323 PRF957
			SOT23 PBR951
		Amplifier	SOT363 BGA2031/1
	MMIC	Gen. purpose wideband ampl.	SOT363 BGA2771
			SOT363 BGA2776

Function	Product	Package	Type
Power amplifier	MMIC	Gen. purpose wideband ampl.	SOT89 BGA6289
			BGA6489
			BGA6589

* = also available in ultra small leadless package SOD882T

Function	Product	Package	Type
VCO	Varicap diodes	VCO varicap diodes	SOD523 BB198
			SOD323 BB156

Product highlight: PRF957 silicon NPN UHF wideband transistor

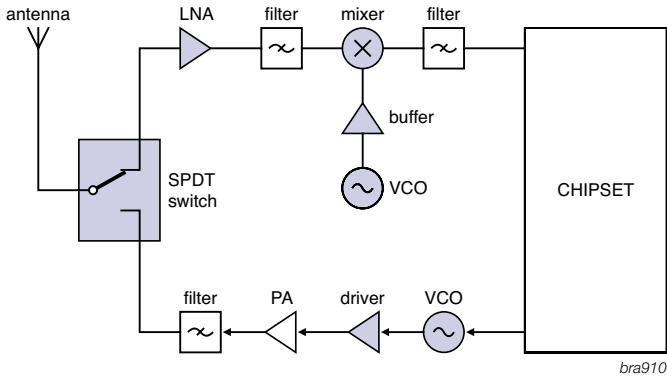
Silicon NPN UHF wideband transistor in a surface mount 3-pin SOT323 package is primarily intended for wideband applications in the RF front end. The transistor is widely built as LNA, power amplifier, driver and buffer in the UHF band application.

Features

- ▶ Small 3-pin plastic surface mounted package
- ▶ Low noise (1.3 dB at 1 GHz) and high power gain (15 dB at 1 GHz)
- ▶ Gold metallization ensures excellent reliability

1.5 Cordless Phone (Analog)

Application diagram



Recommended products

Function	Product	Package	Type	
RF Switch	RF diode	PIN Diode	various*	BAP51
			various*	BAP63
			various*	BAP64

Function	Product	Package	Type	
LNA	RF bipolar transistor	Wideband transistor	SOT23	BFT25
			SOT23	PBR951
			SOT323	PRF957
			SOT343	BFG425W
			SOT343F	BFG424F

Function	Product	Package	Type	
Mixer	RF bipolar transistor	Wideband transistor	SOT323	PRF957
			SOT143	BFG540
			SOT343	BFG410W
			SOT343	BFG425W
			SOT343	BFG480W
	MMIC		Linear mixer	SOT363

* = also available in ultra small leadless package SOD882T.

Function	Product	Package	Type	
VCO	Varicap diodes	VCO varicap diodes	SOD323	BB131
			SOD523	BB145B
			SOD323	BB148
			SOD523	BB149

Function	Product	Package	Type	
Driver/Buffer	RF bipolar transistor	Wideband transistor	SOT23	PBR951
			SOT323	PRF957
			SOT343	BFG425W
			SOT343F	BFG424F

Product highlight:

BAP64xx PIN diode for RF switch

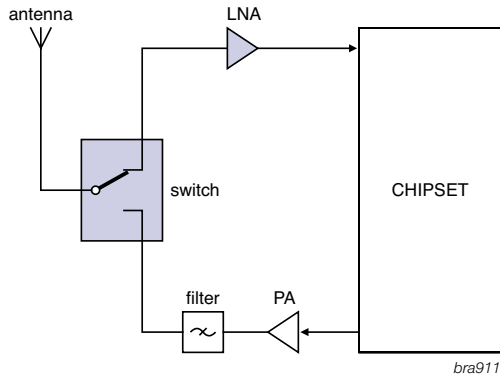
Operating up to 3 GHz with high-voltage handling capabilities, NXP's PIN diodes are ideal for a wide range of wireless communication application. Together with outstanding RF performance, this component simplify design-in because of its extremely low forward resistance, diode capacitance and series inductance. Significant board space saving by supplying a range of high compact package options – including SOD523, SOD323 and leadless SOD882T.

Features

- ▶ Operate up to 3 GHz
- ▶ High isolation, low distortion, low insertion loss
- ▶ Low forward resistance (R_d) and diode capacitance (C_d)
- ▶ Ultra-small package options

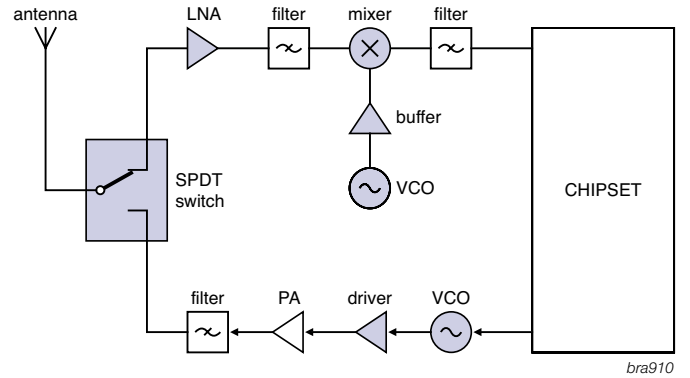
Cordless Phone (DECT front-end)

Application diagram



(DECT in-house basestation)

Application diagram



Recommended products

Function	Product	Package	Type	
RF Switch	RF diode	PIN Diode	various	BAP51*
			various	BAP55*
			various	BAP142*
			various	BAP63*
			various	BAP64*
			various	BAP1321*

Function	Product	Package	Type	
LNA	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
			SOT343F	BFG424F
	RF transistor	SiGe:C transistor	SOT343F	BFU725F
	MMIC	SiGe:C MMIC	SOT891	BGU7003

* = also available in ultra small leadless package SOD882T.

Recommended products

Function	Product	Package	Type	
RF Switch	RF diode	PIN Diode	various	BAP51*
			various	BAP55*
			various	BAP142*
			various	BAP63*
			various	BAP64*
			various	BAP1321*

Function	Product	Package	Type	
LNA	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
			SOT343F	BFG424F
	RF transistor	SiGe:C transistor	SOT343F	BFU725F
	MMIC	SiGe:C MMIC	SOT891	BGU7003

Function	Product	Package	Type	
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG425W
	MMIC	Linear mixer	SOT343	BFG480W
			SOT363	BGA2022

Function	Product	Package	Type	
VCO	Varicap diodes	VCO varicap diodes	SOD523	BB145B

Function	Product	Package	Type	
Driver/Buffer	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
			SOT343F	BFG424F
	RF transistor	SiGe:C transistor	SOT343	BFG480W
			SOT343F	BFU725F

Product highlight:

BFG425W NPN wideband transistor

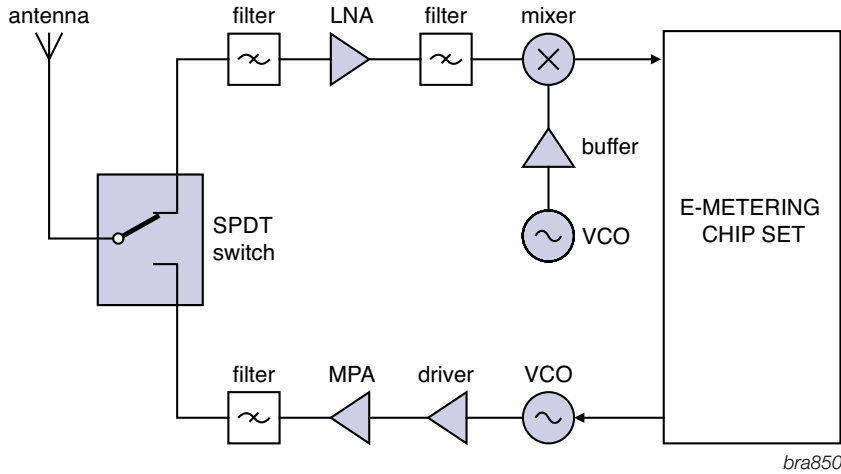
NXP NPN double polysilicon wideband transistor with buried layer is for low voltage and low noise applications in a plastic, 4-pin dual-emitter SOT343R package.

Features

- ▶ Very high maximum power gain (20 dB for 2 GHz)
- ▶ Low noise figure (1.2 dB for 2 GHz)
- ▶ High transition frequency (25 GHz)
- ▶ Emitter is thermal lead
- ▶ Low feedback capacitance (95 fF)

1.6 E-metering, RF generic front-end with a single antenna

Application diagram



Recommended products

Function	Product	Package	Type
SPDT Switch	RF diode	Bandswitch diode	SOD523 BA277
		SOD323	BA591
	PIN diode	various	BAP51*
		various	BAP1321*

Function	Product	Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343 BFG410W
		SOT343	BFG425W
	SOT343	BFG480W	
MMIC	Linear mixer	SOT363 BGA2022	

Function	Product	Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT23 PBR951
		SOT323	PRF957
		SOT323	PRF947
	RF transistor	SiGe:C transistor	SOT343F BFU725F
	MMIC	Low noise wideband ampl.	SOT343R BGA2001
SOT343R		BGA2003	

Function	Product	Package	Type
Buffer	RF bipolar transistor	Wideband transistor	SOT23 PBR951
		SOT323	PRF957
	SOT323	PRF947	
	SOT416	PRF949	

Function	Product	Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323 PRF957
		SOT23	PBR951
		SOT363	BGA2031/1
	MMIC	Amplifier	SOT363 BGA2771
		Gen. purpose wideband ampl.	SOT363 BGA2776

Function	Product	Package	Type
Medium power amplifier	MMIC	Gen. purpose wideband ampl.	SOT89 BGA6289
			BGA6489
	SOT908	BGA6589	
	SOT908	BGA7124	

* = also available in ultra small leadless package SOD882T.

Function	Product	Package	Type
VCO	Varicap diodes	VCO varicap diodes	SOD523 BB198
		SOD323	BB156

Product highlight: BGA7127 MMIC medium power amplifier

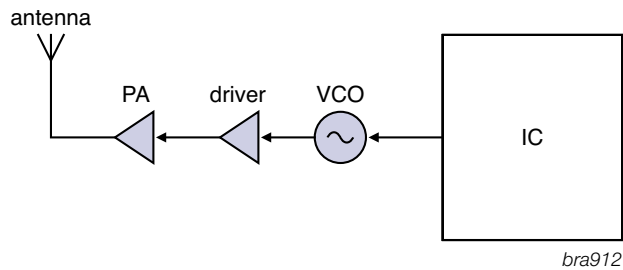
The BGA7127 MMIC is a one-stage driver amplifier, offered in a low-cost ultra small SOT908 leadless package. It delivers 27 dBm output power at 1 dB gain compression and a superior performance for various narrowband-tuned application circuits for frequencies up to 2700 MHz.

Features

- ▶ 400 MHz to 2700 MHz frequency operating range
- ▶ 16 dB small signal gain at 2 GHz
- ▶ 27 dBm output power at 1 dB gain compression
- ▶ Integrated active biasing
- ▶ 3.3 V / 5 V single supply operation
- ▶ Simple quiescent current adjustment
- ▶ 1 μ A shutdown mode

1.7 Wireless Microphone

Application diagram



Recommended products

Function	Product	Package	Type
PA/Driver	RF bipolar transistor	SOT23	BFT93
		SOT323	BFT93W
	Wideband transistor	SOT23	PBR951
		SOT323	PRF957
		SOT343	BFG21W
		SOT343	BFG425W
SOT343	BFG480W		

Function	Product	Package	Type	
VCO	Varicap diodes	VCO varicap diodes	SOD523	BB145B
		SOD323	BB149	

Operation frequency:

- 70M - 72 M
- 150 MHz - 270 MHz
- 470 MHz - 1000 MHz
- 2400 MHz

Product highlight:

BFG480W NPN wideband transistor

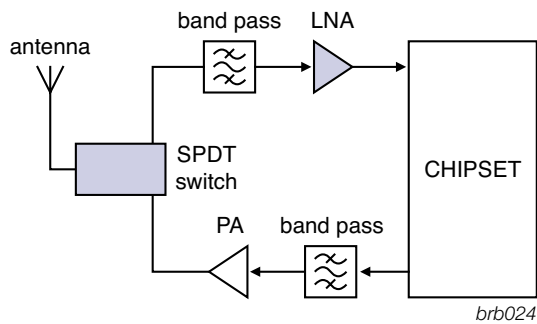
NXP NPN double polysilicon wideband transistor with buried layer is for low voltage and low noise applications in a plastic, 4-pin dual-emitter SOT343 package.

Features

- ▶ High power gain
- ▶ Low noise figure
- ▶ High efficiency
- ▶ High transition frequency
- ▶ Emitter is thermal lead
- ▶ Low feedback capacitance
- ▶ Linear and non-linear operation

1.8 Wireless USB

Application diagram



Recommended products

Function	Product	Package	Type
LNA	RF transistor SiGe:C transistor	SOT343F	BFU725F

Function	Product	Package	Type
SPDT Switch	RF diode PIN diode	various	BAP51*
		various	BAP63*
		various	BAP64*
		SOD882T	BAP55LX
		SOD882T	BAP142LX
		various	BAP1321*

* = also available in ultra small leadless package SOD882T.

Product highlight:

BFU725F SiGe:C microwave NPN transistor

Meet the trend towards higher frequencies. The BFU725F provides high switching frequencies plus extreme high gain and low noise.

Features

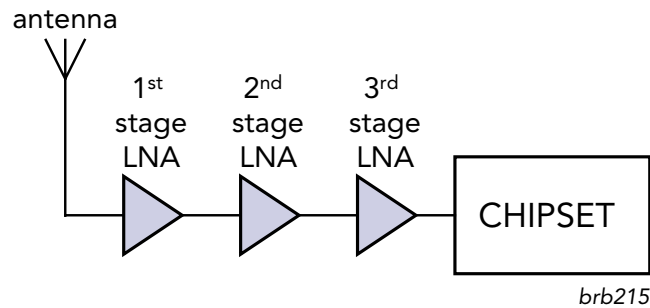
- ▶ Very low noise (0.4 dB at 1.8 GHz / 0.67 dB at 5.8 GHz)
- ▶ High maximum stable gain (27.8 dB at 1.8 GHz / 10 dB at 18 GHz)
- ▶ High switching frequency ($f_T > 100$ GHz / $f_{MAX} > 150$ GHz)
- ▶ Plastic surface-mount SOT343F package

Benefits

- ▶ SiGe:C process delivers high switching frequency from a silicon-based device
- ▶ Cost-effective alternative to GaAs devices
- ▶ RoHS compliant

1.9 Active antenna

Application diagram



Recommended products

Function	Product		Package	Type
1 st stage LNA	MMIC	Low noise wideband amplifier	SOT343R	BGA2001
			SOT343R	BGA2003

Function	Product		Package	Type
2 nd stage LNA	MMIC	General purpose wideband amplifier	SOT363	BGM1013
			SOT363	BGM1011
			SOT363	BGA2715
			SOT363	BGA2748

Function	Product		Package	Type
3 rd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU725F
	MMIC	SiGe:C MMIC	SOT891	BGU7003

Product highlight:

BGU7003 SiGe:C MMIC

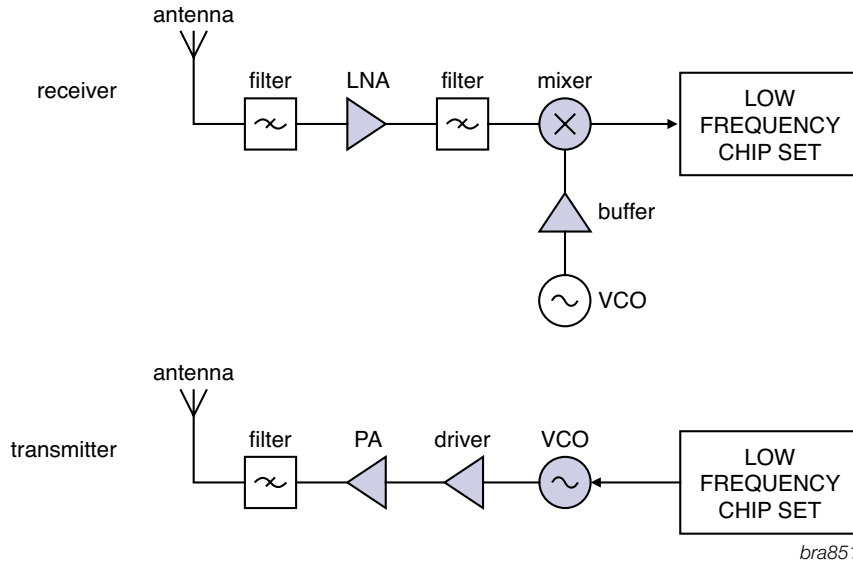
Manufactured in NXP's latest SiGe:C process, this high-frequency RF MMIC delivers high-quality reception with extended battery life. It is a cost-effective, silicon based alternative to GaAs devices, and offers higher integration and easier design-in than discrete bipolar transistors.

Features

- ▶ Low-noise, high-gain microwave MMIC
- ▶ Maximum stable gain = 19 dB at 1.575 GHz
- ▶ 110-GHz f_T -Silicon Germanium technology
- ▶ Optimized performance at low (5-mA) supply current
- ▶ Extremely thin, leadless 6-pin SOT891 package
- ▶ Integrated biasing and shutdown for easy integration

1.10 Remote keyless entry, RF generic front-end with dedicated antenna for reception and transmission

Application diagram



Recommended products

Function	Product	Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT23 PBR951
			SOT323 PRF957
			SOT323 PRF947
	MMIC	Low noise wideband ampl.	SOT343R BGA2001
			SOT343R BGA2003

Function	Product	Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323 PRF957
			SOT23 PBR951
		Amplifier	SOT363 BGA2031/1
	MMIC	Gen. purpose wideband ampl.	SOT363 BGA2771
			SOT363 BGA2776

Function	Product	Package	Type
VCO	Varicap diodes	VCO varicap diodes	SOD323 BB148
			SOD323 BB149A
	VCO varicap diodes		SOD523 BB198
			SOD323 BB156

Function	Product	Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343 BFG410W
			SOT343 BFG425W
			SOT343 BFG480W
	MMIC	Linear mixer	SOT363 BGA2022

Function	Product	Package	Type
Buffer	RF bipolar transistor	Wideband transistor	SOT23 PBR951
			SOT323 PRF957
			SOT323 PRF947
			SOT416 PRF949

Function	Product	Package	Type
Power amplifier	RF bipolar transistor	Wideband transistor	SOT323 PRF957
			SOT23 PBR951
		Amplifier	SOT363 BGA2031/1
	MMIC	Gen. purpose wideband ampl.	SOT363 BGA2771
			SOT363 BGA2776

Product highlight: NXP varicap diodes for VCO

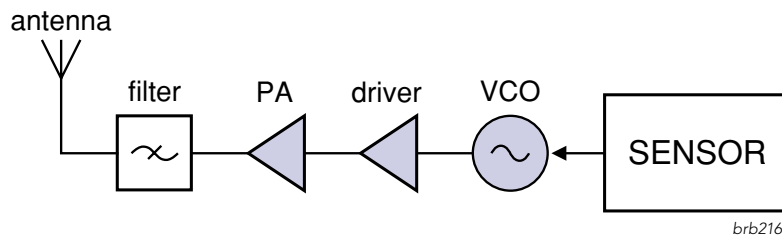
Varicap diodes are principally used as voltage varicap capacitors with their diode function a secondary option. These devices are ideal for voltage controlled oscillators (VCO) in ISM band applications.

Features

- ▶ Excellent linearity
- ▶ Excellent matching
- ▶ Very low series resistance
- ▶ High capacitance ratio

1.11 Tire pressure monitoring system

Application diagram



Recommended products

Function	Product		Package	Type
PA	RF bipolar transistor	Wideband transistor	SOT23	BFR92A
			SOT323	BFR92AW
	SOT323	BFR93AW		

Function	Product		Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323	PRF957
			SOT23	PBR951
	MMIC	Amplifier	SOT363	BGA2031/1
			SOT363	BGA2771
			SOT363	BGA2776

Function	Product		Package	Type
VCO	Varicap diodes	VCO varicap diodes	SOD523	BB198
			SOD323	BB156

Product highlight:

BFR92AW silicon NPN transistor

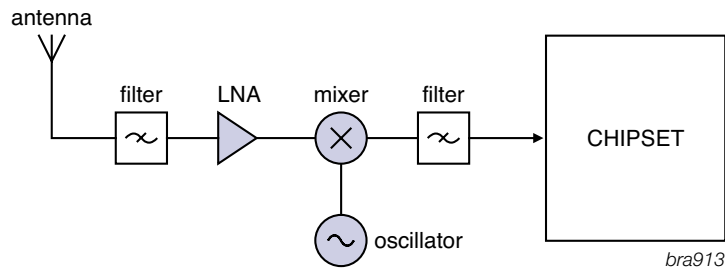
It is designed for use in RF amplifiers, mixers and oscillators with signal frequencies up to 1 GHz. This silicon NPN transistor encapsulated in a plastic SOT323 (S-mini) package. The BFR92AW uses the same crystal as the SOT23 version, BFR92A.

Features

- ▶ High power gain
- ▶ Gold metallization ensures excellent reliability
- ▶ SOT323 (S-mini) package

1.12 Digital Audio Broadcasting (DAB)

Application diagram



Recommended products

Function	Frequency	Product	Package	Type		
LNA	VHF band	RF bipolar transistor	Wideband transistor	SOT23	BFS17	
				SOT323	BFS17W	
		RF transistor	JFET	SOT23	BF862	
		Mosfet	5 V		SOT143	BF904
					SOT143R	BF904R
					SOT143	BF909
					SOT143	BF1201
					SOT143	BF1202
					SOT143	BF1105
					SOT143	BF1211
		9 V	SOT143	BF1100		
			SOT143	BF1109		
	S-band/ L-band	RF transistor	SiGe:C transistor	SOT343F	BFU725F	
		RF bipolar transistor	Wideband transistor	SOT343	BFG425W	
				SOT343	BFG410W	
MMIC		Low noise wideband amplifier		SOT343R	BGA2001	
		General purpose wideband amplifier		SOT343R	BGA2003	
			SOT363	BGM1013		
			SOT363	BGM1011		
			SOT363	BGA2715		
			SOT363	BGA2748		

Function	Product	Package	Type	
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG425W
			SOT343	BFG480W
	MMIC	Linear mixer	SOT363	BGA2022

Function	Product	Package	Type	
VCO	Varicap diodes	VCO varicap diodes	SOD323	BB149

Suitable frequencies for DAB identified on VHF band, L-band and S-band:

- VHF band I: 47 - 68 MHz
- VHF band III: 174 - 240 MHz
- L-band: 1452 - 1467.5 MHz
- S-band: 2310 - 2360 MHz

Product highlight: BFG410W NPN wideband transistor

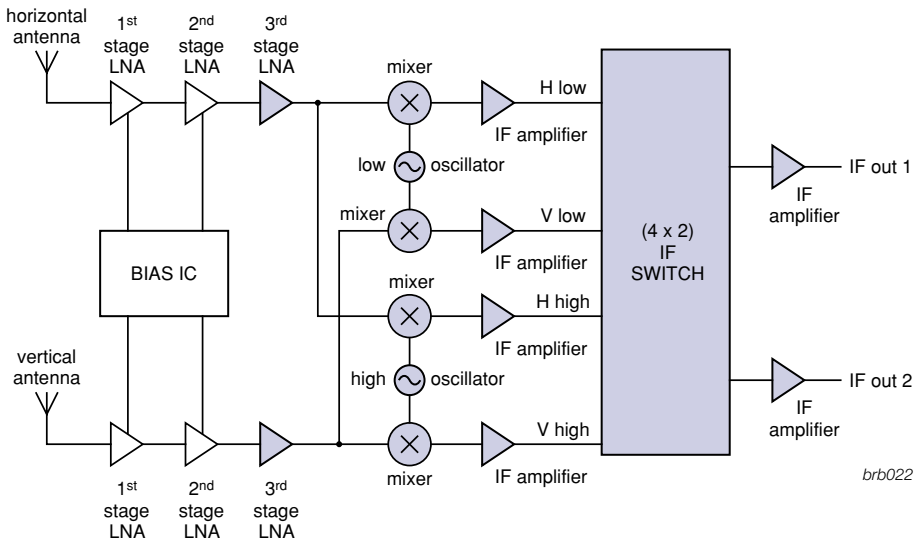
NXP NPN double polysilicon wideband transistor with buried layer is for low voltage and low noise applications in a plastic, 4-pin dual-emitter SOT343R package.

Features

- ▶ Very high power gain (18 dB at 2 GHz)
- ▶ Low noise figure (1.2 dB at 2 GHz)
- ▶ High transition frequency (22 GHz)
- ▶ Emitter is thermal lead
- ▶ Low feedback capacitance (45 fF)

1.13 Satellite outdoor unit, low noise block (LNB) for multiple users

Application diagram



Recommended products

Function	Product	Package	Type
Oscillator	RF bipolar transistor	Wideband transistor	SOT343 BFG424W
	RF transistor	SiGe:C transistor	SOT343F BFG424F
			SOT343F BFU725F

Function	Product	Package	Type
1 st stage IF amplifier	MMIC	General purpose amplifier	SOT363 BGA2711
			SOT363 BGA2712
			SOT363 BGA2748
			SOT363 BGA2714
			SOT363 BGA2717
		IF gain block	SOT363 BGA2800
			SOT363 BGA2801
			SOT363 BGA2815
			SOT363 BGA2816
			SOT363 BGA2850
	RF bipolar transistor	Wideband transistor	SOT363 BGA2865
			SOT363 BGA2866
			SOT343 BFG424W
			SOT343F BFG424F

Function	Product	Package	Type
IF switch	RF diode	PIN diode	various BAP64*
			various BAP51*
			various BAP1321*
			various BAP50*
			various BAP63*

* = also available in ultra small leadless package SOD882T.

Function	Product	Package	Type
Output stage IF amplifier	MMIC	General purpose amplifier	SOT363 BGA2709
			SOT363 BGA2776
			SOT363 BGM1014
			SOT363 BGM1012
			SOT363 BGA2716
		IF gain block	SOT363 BGA2800
			SOT363 BGA2801
			SOT363 BGA2815
			SOT363 BGA2816
			SOT363 BGA2850
	SOT363 BGA2865		
SOT363 BGA2866			
RF bipolar transistor	Wideband transistor	SOT343	BFG325

Function	Product	Package	Type
3 rd stage LNA	RF transistor	SiGe:C transistor	SOT343F BFU725F

Function	Product	Package	Type
Mixer	RF transistor	SiGe:C transistor	SOT343F BFU725F

Product highlight: BGA28xx-family, IF gain blocks

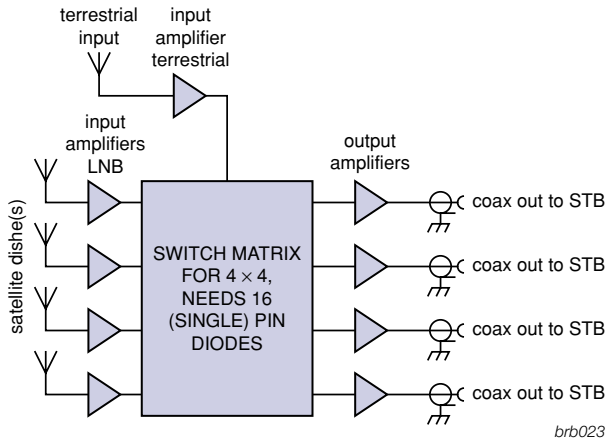
The BGA28xx IF gain blocks are Silicon Monolithic Microwave Integrated Circuit (MMIC) wideband amplifiers with internal matching circuit in a 6-pin SOT363 plastic SMD package.

Features

- ▶ Internally matched to 50 Ω
- ▶ Reverse isolation > 30 dB up to 2 GHz
- ▶ Good linearity with low second order and third order products
- ▶ Unconditionally stable (K > 1)

1.14 Satellite Multi Switch Box - 4 x 4 (up to 16 x 16)

Application diagram



Recommended products

Function	Product		Package	Type
Input amplifier terrestrial	MMIC	General purpose medium power amplifier	SOT89	BGA6289
				BGA6489
				BGA6589

Function	Product		Package	Type
Input amplifier LNB	MMIC	General purpose amplifier	SOT363	BGA2771
			SOT363	BGA2776
			SOT363	BGA2709
			SOT363	BGM1012
			SOT343	BFG325
	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
			SOT143	BFG520
			SOT143	BFG540

Function	Product		Package	Type
Switch matrix	RF diode	PIN diode	Various	BAP50*
				BAP51*
				BAP63*
				BAP64*
				BAP70*
				BAP1321*

* = also available in ultra small leadless package SOD882T.

Function	Product		Package	Type	
Output amplifier	MMIC	General purpose medium power amplifier	SOT89	BGA6289	
				BGA6489	
				BGA6589	
				SOT363	BGM1011
				SOT363	BGM1013
	RF bipolar transistor	Wideband transistor	SOT363	BGM1014	
			SOT223	BFG135	
			SOT223	BFG 591	
			SOT223	BFG198	
			SOT143	BFG540	

Product highlight:

PIN diodes for switching matrix

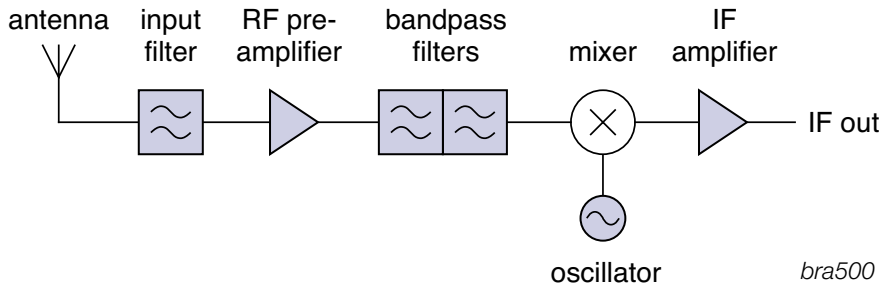
Together with outstanding RF performance, this component simplify design-in because of its extremely low forward resistance, diode capacitance and series inductance. Significant board space saving by supplying a range of high compact package options – including SOD523, SOD323 and leadless SOD882T.

Features

- ▶ High isolation, low distortion, low insertion loss
- ▶ Low forward resistance (Rd) and diode capacitance (Cd)
- ▶ Ultra-small package options

1.15 TV / VCR / DVD / HDD tuning

Application diagram



Recommended products

Function	Product	Package	Type	
Input filter	Varicap diode	VHF low	SOD323	BB152
			SOD523	BB182
			SOD882T	BB182LX
		VHF high	SOD323	BB153
			SOD523	BB178
			SOD523	BB187
			SOD882T	BB178LX
			SOD882T	BB187LX
		UHF	SOD323	BB149A
			SOD882T	BB179LX
			SOD523	BB179
			SOD523	BB189

Function	Product	Package	Type	
Bandpass filter	Varicap diode	VHF low	SOD323	BB152
			SOD882T	BB182LX
			SOD523	BB182
		VHF high	SOD323	BB153
			SOD882T	BB178LX
			SOD523	BB178
			SOD882T	BB187LX
			SOD523	BB187
		UHF	SOD323	BB149A
			SOD882T	BB179LX
			SOD523	BB179
			SOD523	BB189

Function	Product	Package	Type	
RF pre-amplifier	MOSFET	5 V	SOT143	BF904
			SOT143	BF909
			SOT143	BF1201
			SOT143	BF1202
			SOT143	BF1105
			SOT143	BF1211
		9 V	SOT143	BF1212
			SOT143	BF1100
		2-in-1 @ 5 V	SOT143	BF1109
			SOT363	BF1102R
			SOT363	BF1203
			SOT363	BF1204
			SOT363	BF1205
			SOT363	BF1205C
			SOT363	BF1206
			SOT363	BF1207
			SOT666	BF1208
			SOT666	BF1208D
			SOT363	BF1210
			SOT363	BF1214
2-in-1 @ 3 V	SOT666	BF1206F		

Function	Product	Package	Type	
Oscillator	Varicap diode	VHF low	SOD323	BB152
			SOD882T	BB182LX
			SOD523	BB182
		VHF high	SOD323	BB153
			SOD882T	BB178LX
			SOD523	BB178
			SOD882T	BB187LX
			SOD523	BB187
		UHF	SOD323	BB149A
			SOD882T	BB179LX
			SOD523	BB179
			SOD523	BB189

Function	Product	Package	Type	
IF amplifier	MMIC	Wideband amplifier	SOT363	BGA2717

Product highlight:

BF1206F dual gate mosfet double amplifier specified for low power applications.

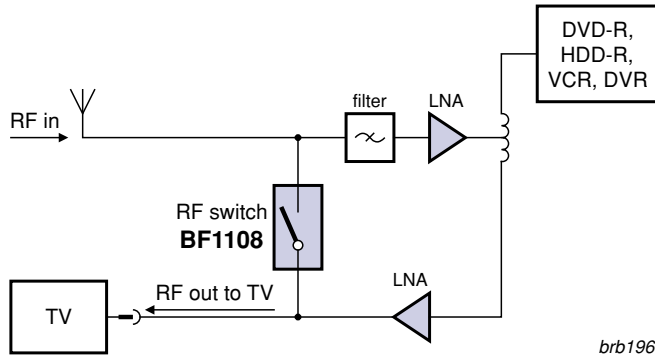
The device consists of two dual gate mosfet amplifiers in a small SOT666 flatlead package. The BF1206F is a true low power device specified for low voltage and low currents, intended for use in mobile applications where power consumption is critical. Performance is suitable for application at supply voltages of 3 Volts and draincurrents of 4 mA.

Features

- ▶ Low power specified
- ▶ Two amplifiers in one small SOT666 package
- ▶ Shared gate 2 and Source leads
- ▶ Each amplifier is biased by an external bias resistor
- ▶ Excellent noise and crossmodulation performance

1.16 Antenna loop through

Application diagram



Recommended products

Function	Product	Package	Type	
RF switch	MOSFET	Silicon RF switch	SOT23	BF1107
			SOT143B	BF1108
			SOT143R	BF1108R

Function	Product	Package	Type	
LNA	RF bipolar transistor	Wideband transistor	SOT143	BFG520
			SOT143	BFG540
			SOT89	BFQ540

Using the BF1108 as a RF switch saves considerable use of energy. The recording device (DVD-R, HDD-R, VCR, DVR) can be powered off but people can remain watching TV, although the antenna is looped via the recording device. Without using a BF1108 the antenna signal is lost.

How does it work ?

At the moment the power of the recording device is on, the BF1108 is open, so the RF signal travels via the recording device to the TV tuner.

At the moment the power of the recording device is completely off, the BF1108 closes. This ensures that the RF signal is looped through directly to the TV tuner. TV reception is guaranteed.

Product highlight: BF1108 silicon RF switch, Mosfet

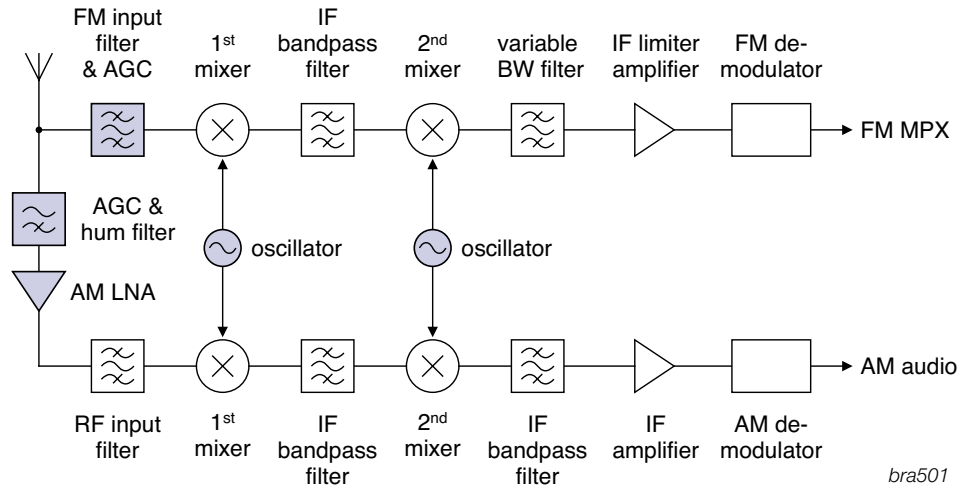
This switch is a combination of a depletion type field-effect transistor and a bandswitching diode in an SOT143B package. The low loss and high isolation capabilities of this device provide excellent RF switching functions. The gate of the MOSFET can be isolated from ground with the diode, resulting in low losses. Integrated diodes between gate and source and between gate and drain protect against excessive input voltage surges.

Features

- ▶ Specially designed for low loss RF switching up to 1 GHz
- ▶ Easy to design-in
- ▶ Power ON: low losses
- ▶ Power OFF: high isolation
- ▶ ON or OFF, ZERO power consumption

1.17 Car radio receiver (CREST ICs: TEF6860HL, TEF6862HL)

Application diagram



bra501

Recommended products

Function	Product	Package	Type	
AM LNA	RF transistor	JFET	SOT23	BF862
FM input filter & AGC	RF diode	Varicap diode	SOT23	BB201*
			SOT23	BB207
		PIN diode	SOD523	BAP70-02
			SOD323	BAP70-03

* = OIRT

Function	Product	Package	Type	
AGC & hum filter	RF diode	PIN diode	SOT363	BAP70AM
Oscillator	RF diode	Varicap diode	SOD323	BB156
			SOD523	BB208-02

Note 1:

All these recommended discrete products are applicable for NICEPACS, CCC and DDICE: NICE:TEA6840H,TEA6845H,TEA6846H, NICEPACS:TEA6848H,TEA6849H; CCC:TEF6901H,TEF6903H; DDICE:TEA6721HL. All these recommended discrete products are applicable excluding AM LNA in: DICE2:TEF6730HWCE.

Note 2:

Phone and portable radio (IC:TEA5767/68) use varicap BB202 as FM oscillator.

Product highlight:

BF862 Junction Field Effect Transistor

Our Tuning component portfolio contains excellent products for car radio reception applications, playing a vital role for in-vehicle media platforms. The NXP devices for this application ensure excellent reception quality and ease of design in. Performance is demonstrated in reference designs.

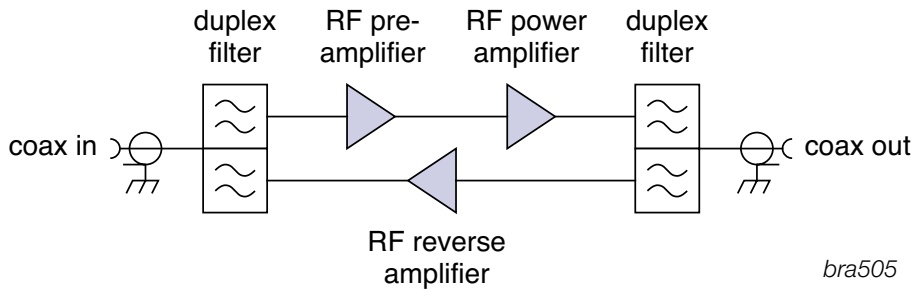
High performance Junction Fet BF862, specially designed for car radio AM amplifiers.

Features

- ▶ High transition frequency and optimized input capacitance for excellent sensitivity
- ▶ High transfer admittance resulting in high gain
- ▶ Encapsulated in the versatile and easy to use SOT23 package

1.18 CATV electrical (line extenders)

Application diagram



Recommended products

Function	Product	Frequency	Gain (dB)	Type	
RF pre-amplifier	Push-Pulls	550 MHz	33.5 - 35.5	BGY588N	
			33.5 - 35.5	BGY588C	
			26.2 - 27.8	BGY587B	
		600 MHz	21 - 22	BGY687	
			750 MHz	33.5 - 35.2	BGE788C
				33.5 - 34.5	BGE788
		870 MHz	18 - 19	BGY785A	
			21 - 22	BGY787	
			18 - 19	BGY885A	
			21 - 22	BGY887	
			1000 MHz	33.5 - 34.5	BGY888
				34.5 - 36.5	CGY888C
				18 - 19	BGY1085A
				22	CGY1041
		24	CGY1043		
		28	CGY1047		

Function	Product	Frequency	Gain (dB)	Type
RF power amplifier	Power doublers	550 MHz	18-19	BGD502
			19.5 - 20.5	BGD704
		750 MHz	18.2 - 18.8	BGD712
			18.2 - 18.8	BGD712C
			20 - 20.6	BGD714
		870 MHz	18 - 19	BGD802
			18.2 - 18.8	BGD812
			19.7 - 20.3	BGD814
			20.5 - 22.5	CGD942C
			23 - 25	CGD944C
		1000 MHz	21	CGD1040Hi
			23	CGD1042H
			23	CGD1042Hi
			25	CGD1044H
			25	CGD1044Hi

Function	Product	Frequency	Gain (dB)	Type
RF reverse amplifier	Reverse hybrids	5-75 MHz	29.2 - 30.8	BGY68
		5-120 MHz	24.5 - 25.5	BGY66B
		5-200 MHz	23.5 - 24.5	BGY67A

All available in SOT115 package.

Product highlight:

CGD1044Hi

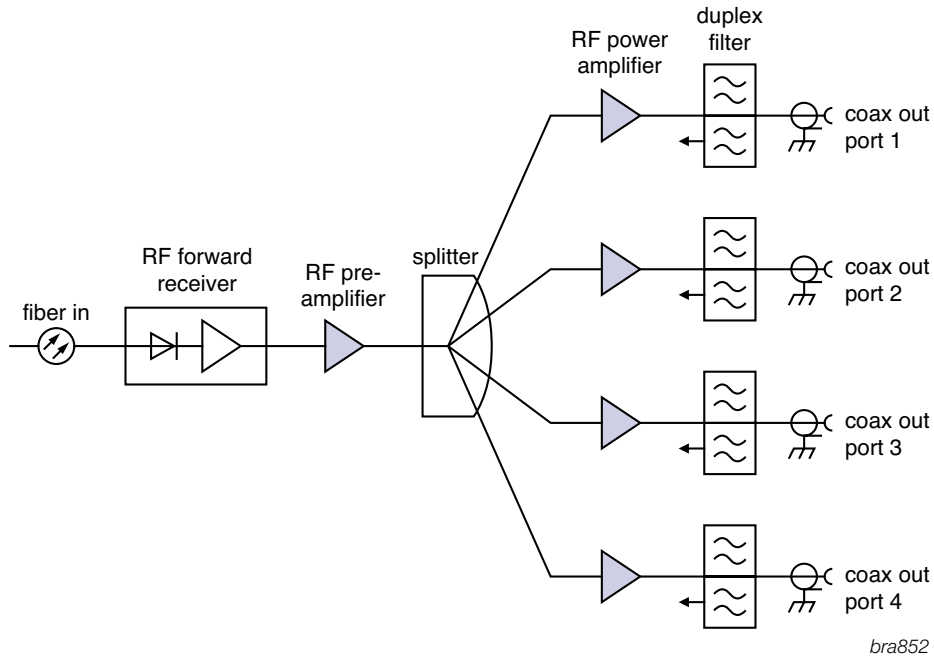
CGD1044Hi with high-output power is primarily designed for use in fiber deep-optical-node applications (N+0/1/2). This 1 GHz solution offers an extended temperature range, high power overstress capabilities and high ESD levels resulting in a low cost of ownership. It's designed for durability and offering superior ruggedness.

Features

- ▶ High-output power
- ▶ Excellent linearity, stability, and reliability
- ▶ High power gain
- ▶ Extremely low noise
- ▶ Silicon Nitride passivity
- ▶ GaAs HFET dies for high-end applications

1.19 CATV optical (optical node with multiple out-ports)

Application diagram



Recommended products

Function	Product	Frequency	Package	Type
RF forward receiver	Forward path receiver	870 MHz	SOT115	BGO807
			SOT115	BGO807C
			SOT115	BGO827

Function	Product	Frequency	Gain (dB)	Type
RF pre-amplifier	Push-Pulls	870 MHz	18 - 19	BGY885A
			21 - 22	BGY887
	Power doubler	870 MHz	18.2 - 18.8	BGD812

Function	Product	Frequency	Gain (dB)	Type
RF power amplifier	Power doublers	870 MHz	20.5 - 22.5	CGD942C
			23 - 25	CGD944C

Product highlight: BGO807C

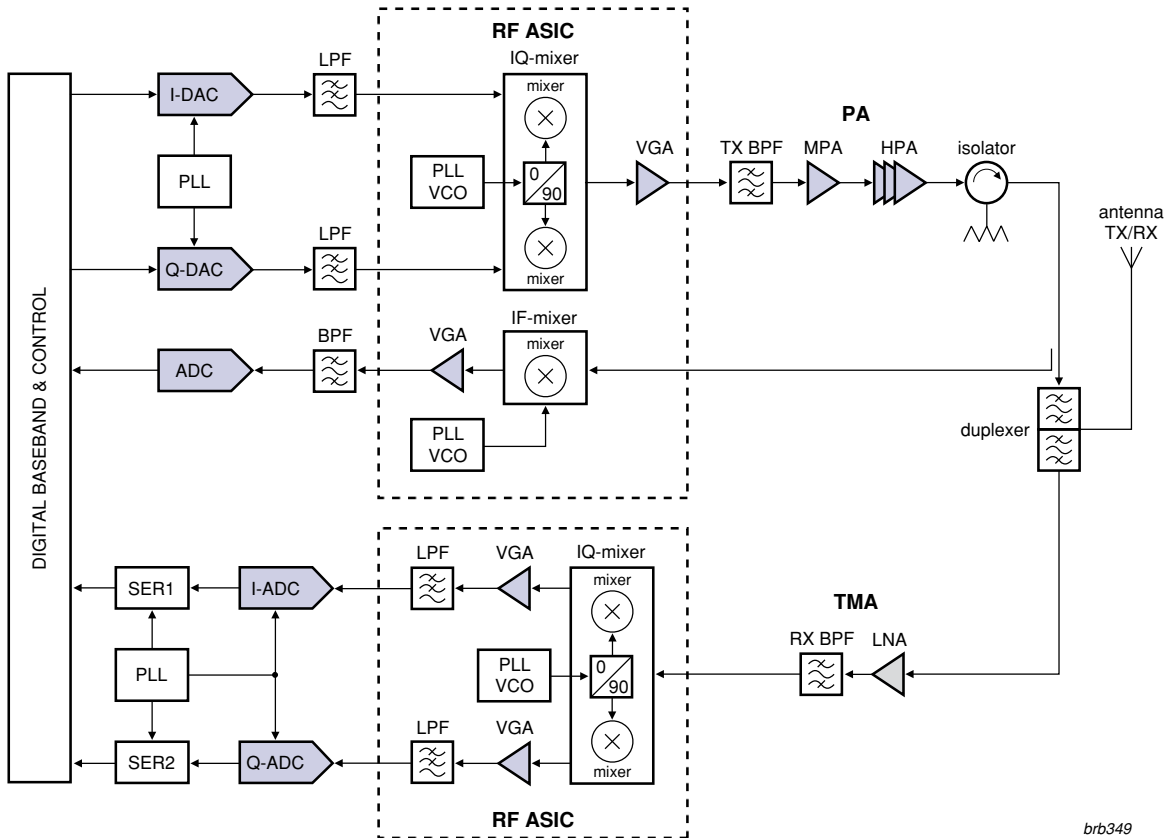
BGO807C is an integrated optical receiver module that provides high output levels and includes an integrated temperature compensated circuitry. In your optical node design, BGO807C enables a high performance/ price ratio and ruggedness. When upgrading an HFC network from analog to digital our BGO807C is the perfect fit.

Features

- ▶ Excellent linearity
- ▶ Low noise
- ▶ Excellent flatness
- ▶ Standard CATV outline
- ▶ Rugged construction
- ▶ Gold metallization ensures excellent reliability
- ▶ High optical input power range

1.20 Base stations (all cellular standards and frequencies & WiMAX infrastructure)

Application diagram



brb349

Recommended products

Function	Sub function	Type	f_{range}	$P_{L(AV)}$	η_D	G_p	Mode of operation
			MHz	W	%	dB	
HPA (high power amplifier)	driver	10 - 2200	BLF6G21-10G	0.6	15	18.5	WCDMA, TD-SCDMA, GSM, EDGE
	MMIC driver	800 - 1000	BLM6G10-30	2	10	30	WCDMA
	final	800 - 1000	BLF6G10-160RN	32	27	22.5	WCDMA
			BLF6G10-200RN	40	28.5	20	WCDMA
	MMIC driver	2100 - 2200	BLM6G22-30	2	9	30	WCDMA
	integrated Doherty driver	2010 - 2025	BLD6G21L-50	8	39	12.6	TD-SCDMA
			BLD6G22L-50	8	39	12.6	WCDMA
	final	2000 - 2200	BLF7G22L-130	30	29.5	17	WCDMA
			BLF6G22-180PN	50	27.5	17.5	WCDMA
			BLF6G22-180RN	40	25	16	WCDMA
	driver	2500 - 2700	BLF6G27-10	2	20	19	WiMAX
	final		BLF6G27-135	20	22.5	16	WiMAX
	final		BLF7G27L-200P	20	25	16.5	WiMAX
	driver	3400 - 3600	BLF6G38-10	2	20	14	WiMAX
	final		BLF6G38-100	18.5	21.5	13	WiMAX

Product highlight:

high power amplifier BLF7G22L-130

NXP's LDMOS Gen6 and Gen7 enable the world's most efficient base station designs by combining very high intrinsic (Si technology) and extrinsic (amplifier design) efficiencies. Gen7 is specifically designed for Doherty amplifiers.

Features

- ▶ unrivalled ruggedness
- ▶ very consistent device performance
- ▶ highest Doherty amplifier efficiencies to date
- ▶ the world's first fully integrated Doherty amplifier: BLD6G21LS-50

Function	Sub function	Status
LNA	receive	in development
VGA's (variable gain amplifier)	receive & transmit	
RF ASIC's	transceivers	

Function	Sub function	f _{range}	Type	V _{cc}		I _{Cq}	I _{cc}	P _{L(1dB)}	OIP3	NF
		MHz		Typ	Max	Max	Max	Typ / f = 900 MHz		
				(V)	(V)	(mA)	(mA)	(dBm)	(dBm)	dB
MPA (medium power amplifier)	transmit	400 - 2700	BGA7124	5	5.2	170	190	25	38	4.5
		400 - 2700	BGA7127	5	5.2	260	280	27	40	4.5
		400 - 2700	BGA7024	5	5.2	135	155	25	38	4.5
		400 - 2700	BGA7027	5	5.2	260	280	27	40	4.5
		400 - 2700	BGA7130	5	5.2	500	520	30	43	4.5
		400 - 2700	BGA7133	5	5.2	960	980	33	46	4.5

Function	Sub function	Max. sampling frequency	Type	# of bits	Interface
Dataconverters	dual channel DAC	650 Msps	DAC1405D650	14	LVC MOS
		160 Msps	DAC1405D160	14	LVC MOS
		125 Msps	DAC1401D125	14	LVC MOS
		650 Msps	DAC1408D650	14	JESD204A
	single channel ADC	80 Msps	ADC1207S080	12	LVC MOS
		125 Msps	ADC1415S125	14	LVC MOS&LVDS DDR
		125 Msps	ADC1410S125	14	LVC MOS&LVDS DDR
	dual channel ADC	125 Msps	ADC1412D125	14	LVC MOS&LVDS DDR
		125 Msps	ADC1413D125	14	JES204A

Product highlight:
medium power amplifier BGA7124 MMIC

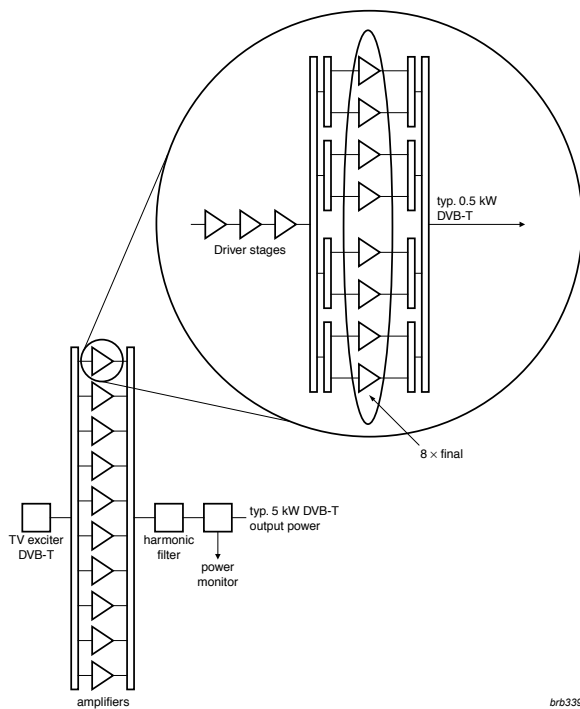
The BGA7124 MMIC is a one-stage driver amplifier, offered in a low-cost ultra small SOT908 leadless package. It delivers 25 dBm output power at 1 dB gain compression and a superior performance for various narrowband-tuned application circuits for frequencies up to 2700 MHz.

Features

- ▶ 400 MHz to 2700 MHz frequency operating range
- ▶ 16 dB small signal gain at 2 GHz
- ▶ 27 dBm output power at 1 dB gain compression
- ▶ Integrated active biasing
- ▶ 3.3 V / 5 V single supply operation
- ▶ Simple quiescent current adjustment
- ▶ 1 μA shutdown mode

1.21 Broadcast / ISM (industrial, scientific & medical)

Application diagram



brb339

Recommended products

Function	Type	f range	P $L(AV)$	G P	Mode of operation
		MHz	W	dB	
driver	BLF871(S)	0 - 1000	100	21	2-TONE; CW
		0 - 1000	24	22	DVB-T
driver	BLF881	0 - 1000	120	21	2-TONE
		0 - 1000	30	21	DVB-T
driver	BLF571	0 - 1000	20	27.5	1-TONE; 2-TONE; CW
final	BLF573S	0 - 1000	300	27.2	1-TONE; 2-TONE; CW
final	BLF574	0 - 1000	400	26.5	1-TONE; 2-TONE; CW
final	BLF578	0 - 1000	1200	24	1-TONE; PULSED RF
		0 - 1000	1000	24	1-TONE; CW
final	BLF645	0 - 1300	100	18	2-TONE
		0 - 1300	100	17	CW
final	BLF878	470 - 860	75	21	2-TONE; CW
		470 - 860	300	21	DVB-T
final	BLF888	470 - 860	250	20	2-TONE; CW
		470 - 860	110	20	DVB-T

Product highlight:

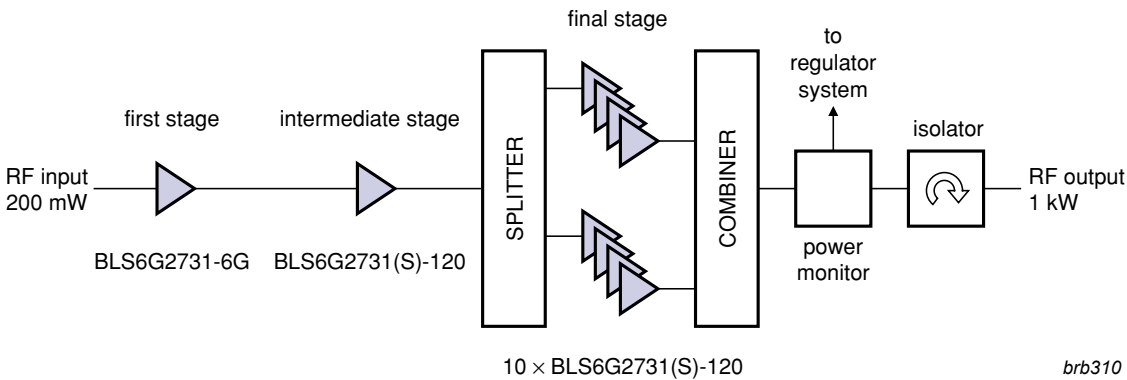
NXP's 50 V high voltage LDMOS process enables highest power, unequalled ruggedness.
 BLF578: 1000 W CW operation - highest power LDMOS transistor
 BLF888: optimized for digital broadcasting;

Features

- ▶ Best broadband efficiency
- ▶ Highest power devices
- ▶ Unrivalled ruggedness
- ▶ Low-thermal resistance design for very reliable operation
- ▶ Very consistent device performance

1.22 Microwave products for Avionics, L- and S-band Radar applications

Application diagram



Recommended products

Application	Function	Name	Packageld	f_{range}	$P_{L(AV)}$	G_p
				MHz	W	dB
S-band	driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	20
	final	BLS6G2731-120	SOT502A	2700 - 3100	120	13,5
		BLS6G2731S-120	SOT502B	2700 - 3100	120	13,5
		BLS6G2933S-130	SOT922-1	2900 - 3300	130	12,5
		BLS6G3135-120	SOT502A	3100 - 3500	120	11
		BLS6G3135S-120	SOT502B	3100 - 3500	120	11
L-band	driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	20
	final	BLL6H1214-500	SOT539A	1200 - 1400	600	17
avionics	driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	20
	final	BLA6H0912-500	SOT643A	960 - 1215	500	17
		BLA6H1011-600	SOT539A	1030 - 1090	600	19

Product highlight:

NXP's 6th generation LDMOS process technology enables power density of Bipolar with the benefits of LDMOS. Highest power LDMOS radar transistors: BLL6H1214-500 and BLA6H1011-600

Features

- ▶ higher gain
- ▶ better pulse droop and insertion phase
- ▶ overdrive to +5 dB without problems





Experience increasing your network capacity for high-end services

Look at 1-GHz CATV, chapter 2.8

2. Focus applications & products

NXP RF applications:
<http://www.nxp.com/rf>

2.1 Get the fastest TTFF* with GPS LNA that use proven QUBiC4X SiGe:C

NXP GPS LNA BGU7005

Manufactured in NXP's breakthrough QUBiC4X SiGe:C process technology and available in the industry's smallest package, this highly integrated GPS LNA reduces cost while delivering better sensitivity, greater immunity against jamming signals, and higher linearity.



Features

- ▶ Requires only 4 external components (including decoupling) to build complete GPS front-end.
- ▶ Small, 6-pin SOT886 leadless package (1.45 x 1.0 x 0.5 mm)
- ▶ Requires only one external matching component
- ▶ Low current consumption (5 mA)
- ▶ Low noise figure (NF): 0.9 dB at 1.575 GHz
- ▶ High insertion power gain: 16 dB at 1.575 GHz
- ▶ Low current consumption in power-down mode (<1 μ A)
- ▶ ESD protection on all pins
- ▶ Supply voltage: 1.5 to 2.85 V, optimized for 1.8 V
- ▶ Proven, robust QUBiC4X SiGe:C process technology ($f_T = 110$ GHz)

This LNA designed for GPS receiver applications, is produced in NXP's industry-leading QUBiC4X process, a 0.25- μ m SiGe:C technology. It has very low noise figures and superior linearity performance, so it helps to improve overall sensitivity, which in turn leads to faster Time-To-First-Fix (TTFF) and better tracking.

The proven QUBiC4Xi process improves overall RF performance and means the LNAs are less expensive and offer higher, more flexible performance than their GaAs counterparts.

It restores sensitivity, provide greater immunity against out-of-band cellular signals, reduce filtering requirements, and lower overall cost. It can be placed close to the GPS antenna, minimizing the noise figure. Additional gain amplifies the GPS signal and raises the on-board signal-to-jammer ratio.

The GPS receiver can be put close to the primary phone antenna, for the best GSM/UMTS performance, while the GPS antenna can be placed far away. This improves antenna-to-antenna isolation and results in higher performance.

The BGU7005 has an enable function. In power-down mode, it consumes less than 1 μ A.

*TTFF = Time-To-First-Fix

		@ 1.575 GHz													
Type	Package	supply voltage		supply current	insertion power gain	noise figure	input power at 1 dB gain compression				input third-order intercept point $f_1 = 1713$ MHz, $f_2 = 1851$ MHz				
		V_{cc}		I_{cc}	$ S_{21} ^2$	NF	$P_{I(1dB)}$				IP ₃				
		V		mA	dB	dB	dBm				dBm				
		Min	Max	Typ	Typ	Typ	$V_{cc} = 1.8$ V, Min	$V_{cc} = 1.8$ V, Typ	$V_{cc} = 2.85$ V, Min	$V_{cc} = 2.85$ V, Typ	$V_{cc} = 1.8$ V, Min	$V_{cc} = 1.8$ V, Typ	$V_{cc} = 2.85$ V, Min	$V_{cc} = 2.85$ V, Typ	
BGU7005	SOT886	1.5	2.85	5	16	0.9	-14	-10	-11	-8	5	10	5	12	

2.2 A perfect match up to 20 GHz

SiGe:C microwave NPN transistor BFU725F

Meet the trend towards higher frequencies. With NXP Semiconductors' latest SiGe:C microwave NPN transistor BFU725F, you get high switching frequencies plus extremely high gain and low noise. All this in an easy-to-use SOT343F package. It's the ideal solution for applications up to 20 GHz.



Features

- ▶ Very low noise (0.4 dB at 1.8 GHz / 0.67 dB at 5.8 GHz)
- ▶ High maximum stable gain (27.8 dB at 1.8 GHz / 10 dB at 18 GHz)
- ▶ High switching frequency ($f_T > 100$ GHz / $f_{MAX} > 150$ GHz)
- ▶ Plastic surface-mount SOT343F package

Benefits

- ▶ SiGe:C process delivers high switching frequency from a silicon-based device
- ▶ Cost-effective alternative to GaAs devices
- ▶ RoHS compliant

Applications

- ▶ GPS systems
- ▶ DECT phones
- ▶ Low noise amplifier (LNA) for microwave communications systems
- ▶ 2nd stage LNA and mixer in direct broadcast satellite (DBS) low-noise blocks (LNBS)
- ▶ Satellite radio
- ▶ WLAN and CDMA applications
- ▶ Low-noise microwave applications

Quick reference data

Parameter	Symbol	Conditions	Value
Collector-emitter breakdown voltage	BV_{CEO}	$I_C = 1$ mA; $I_B = 0$	3.2 V
Maximum collector current	$I_{C(max)}$		40 mA
Transition frequency	f_T	$V_{CE} = 2$ V; $I_C = 25$ mA; $f = 2$ GHz	68 GHz
Noise figure	NF	$V_{CE} = 2$ V; $I_C = 5$ mA; $f = 1.8$ GHz; $\Gamma_s = \Gamma_{opt}$	0.4 dB
		$V_{CE} = 2$ V; $I_C = 5$ mA; $f = 2.4$ GHz; $\Gamma_s = \Gamma_{opt}$	0.45 dB
		$V_{CE} = 2$ V; $I_C = 5$ mA; $f = 5.8$ GHz; $\Gamma_s = \Gamma_{opt}$	0.7 dB
		$V_{CE} = 2$ V; $I_C = 5$ mA; $f = 12$ GHz; $\Gamma_s = \Gamma_{opt}$	1.0 dB
Maximum stable power gain	MSG / $G_{P(max)}$	$V_{CE} = 2$ V; $I_C = 25$ mA; $f = 1.8$ GHz	26.6 dB
		$V_{CE} = 2$ V; $I_C = 25$ mA; $f = 2.4$ GHz	25.5 dB
		$V_{CE} = 2$ V; $I_C = 25$ mA; $f = 5.8$ GHz	17 dB
		$V_{CE} = 2$ V; $I_C = 25$ mA; $f = 12$ GHz	13 dB

¹ Calculated from noise figure using a lowpass bandwidth filter at 0.7 x bit rate and a source with an extinction ratio of 10% and a photodiode responsivity of 0.9A/W.

The NPN microwave transistor BFU725F delivers an unbeatable blend of high switching frequency, high gain and very low noise. Thanks to its ultra-low noise figure, it's perfect for your sensitive RF receivers particularly those for high-performance cell phones. Alternatively, with its high cut-off frequency, it's your ideal solution for microwave applications in the 10 GHz to 30 GHz range, such as satellite TV receivers and automotive collision avoidance radar.

The BFU725F get its outstanding performance from our innovative silicon-germanium-carbon (SiGe:C) BiCMOS process. QUBiC4X was designed specifically to meet the needs of real-life, high-frequency applications and delivers an unrivalled fusion of high power gain and excellent dynamic range. It combines the performance of gallium-arsenide (GaAs) technologies with the reliability of a silicon-based process. In addition, with the BFU725F, you don't need a biasing IC or negative biasing voltage. So it's a much more cost-effective solution than GaAs pHEMT devices.

2.3 NXP wideband LNA MMIC BGU7003 in SiGe:C process

High-quality reception at high RF frequencies

Manufactured in NXP's latest SiGe:C process, this high-frequency RF MMIC delivers high-quality reception with extended battery life. It is a cost-effective, siliconbased alternative to GaAs devices, and offers higher integration and easier design-in than discrete bipolar transistors.



Features

- ▶ Low-noise, high-gain microwave MMIC
- ▶ Minimum noise figure is 0.8 dB at 1.575 GHz
- ▶ Maximum stable gain = 20 dB at 1.575 GHz
- ▶ 110-GHz f_T -Silicon Germanium Carbon technology
- ▶ Optimized performance at low (5-mA) supply current
- ▶ ESD protection on all pins
- ▶ Extremely thin, leadless 6-pin SOT891 package

Benefits

- ▶ Integrated biasing and shutdown for easy integration
- ▶ Power-down mode consumes less than 1 μ A
- ▶ Temperature-stabilized bias

Applications

- ▶ GPS
- ▶ E-metering
- ▶ WLAN and CDMA wireless communication
- ▶ Satellite radio
- ▶ Analog/digital cordless applications (DECT)
- ▶ Microwave communications systems

The BGU7003 is designed for high-speed, low-noise mobile applications. In GPS units, for example, it delivers high-quality reception with maximum battery life. That means consumers always know where they are, and can receive continuous directions, between high rises and under heavy overcast skies. It also means having a GPS device that can run for days, instead of hours.

The BGU7003 gets its outstanding performance from NXP's innovative silicon-germanium-carbon (SiGe:C) BiCMOS process, called QUBiC4X. This groundbreaking process technology was designed specifically to meet the needs of real-life, high-frequency applications and delivers an unrivalled fusion of high power gain and excellent dynamic range. It combines the performance of gallium-arsenide (GaAs) technologies with the reliability of a silicon-based process.

The BGU7003 includes an integrated bias generator that simplifies the application and makes design-in easier. Biasing is done away from the RF input line, and the device offers the same full flexibility as the working range of the NXP BFU725F. The bias adapts over temperature to ensure the gain is well controlled. There is no matching on the die, and no limit to the application area.

As the latest member of NXP's growing SiGe:C portfolio, the BGU7003 joins the highly successful BFU725F device. It is available in a demo board that lets the designer evaluate noise figures, gain, input and output reflection coefficients, and reverse isolation.

Symbol	Parameter	Conditions	Typ	Unit
V_{CC}	supply voltage	RF input AC coupled	2.5	V
I_{CC}	supply current		3.3	mA
$G_{p(max)}$	maximum power gain	$V_{CC} = 2.5$ V; $I_{CC} = 5.0$ mA; $f = 1.575$ GHz; $T_{amb} = 25$ °C ⁽¹⁾	19	dB
NF	noise figure	$V_{CC} = 2.5$ V; $I_{CC} = 5.0$ mA; $f = 1.575$ GHz; $I_S = I_{opt}$	0.8	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	$V_{CC} = 2.5$ V; $I_{CC} = 15.0$ mA; $f = 1.575$ GHz; $T_{amb} = 25$ °C	8	dBm
$IP3_O$	output third-order intercept point	$V_{CC} = 2.5$ V; $I_{CC} = 15.0$ mA; $f = 1.575$ GHz; $T_{amb} = 25$ °C	18	dBm

2.4 Ultra-low-noise LO generators for microwave radios

NXP LO generators TFF11xxxHN

Manufactured in NXP's breakthrough QUBiC4X SiGe:C process technology, these highly integrated, alignment-free LO generators are low power consumption and low-spurious solutions that simplify design-in and lower the total cost of ownership.



Features

- ▶ TFF11xxxHN family: Lowest noise LO generators for a full family in range 7 to 15 GHz
- ▶ Maximum power consumption for all types does not exceed 400 mW
- ▶ Phase-noise compliant with IESS-308 (Intelsat)
- ▶ Proven QUBiC4X SiGe:C technology (120-GHz f_T process)
- ▶ External loop filter
- ▶ Differential input and output
- ▶ Lock-detect output
- ▶ Internally stabilized voltage reference for loop filter
- ▶ 24-pin HVQFN (SOT616-1) package

Applications: TFF11xxxHN family

- ▶ Industrial/Medical Test and Measurement Equipment
- ▶ Electronic Warfare (EW)
- ▶ Electronic Countermeasures (ECM)
- ▶ Point to Point
- ▶ Point to Multi-Point
- ▶ Satellite Communication

These ultra-low-noise local-oscillator (LO) generators, optimized for use in many different microwave applications between 7 and 15 GHz, deliver highly accurate performance in a small footprint. They require no alignment or frequency modification on the production line, so they simplify manufacturing. High integration saves board space and makes design-in easier, for lower overall cost and faster development, enabling quick time-to-market.

Since these ICs are manufactured in NXP's industry-leading QUBiC4X SiGe:C process, they offer better overall RF performance, are more robust than their GaAs equivalents, and consume much less power. The process technology also enables higher integration, for added features. NXP owns the industrial base for production (wafer fab, test, assembly), so volume supplies can be assured.

The TFF1003HN (see chapter 2.6) is the basis for the entire family of LO generators. It has VCO coverage of 12.8 to 13.05 GHz and accepts input signals from 50 to 816 MHz. The divider can be set for 16, 32, 64, 128, or 256, and the output level is -5 dBm with a stability of ± 2 dB. The family of LO generators is completed by a range of 18 different devices operating in a center frequency ranging from 7 to 15 GHz. The RF performance of all these devices is consistent with the TFF1003HN.

All the LO generators have very low power dissipation (not exceeding 400 mW), and all are available in a space-saving 24-pin HVQFN package.

Full portfolio overview of low noise LO generators for general microwave applications at chapter 3.4.2

2.5 Complete satellite portfolio for all LNB architectures

NXP satellite LNB devices BFU725F and BGA28xx

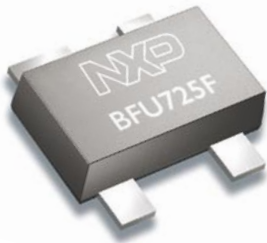
Designed for use in LNAs, mixers, and IF amplifiers, these robust, small-footprint products are manufactured in NXP's groundbreaking QUBiC4X SiGe:C and QUBiC4+ process technology and are the latest additions to NXP's leading portfolio for satellite LNB.

BFU725F RF transistor

The BFU725F is an RF transistor that can be used in the LNA part and as a mixer for a DBS LNB. In either application, it delivers low power consumption, good noise and linearity, and the lowest cost compared to GaAs pHEMT solution.

BFU725F as mixer in Ku-band LNB

- ▶ Power consumption: 2 mA at 5 V
- ▶ Single supply: 3, 5, or 6 V
- ▶ Noise, Single Side Band: 7 dB (including BPF)
- ▶ Linearity: better than 0 dBm OIP3
- ▶ Gain, SSB: 2 dB (including BPF)
- ▶ RF/LO/IF Match: better than 12/15/18 dB
- ▶ Broadband unconditionally stable
- ▶ LO-RF isolation better than 18 dB



BFU725F as 2nd or 3rd stage LNA in Ku-band LNB

- ▶ Power consumption: 11 mA at 5 V
- ▶ Single supply: 3, 5, or 6 V
- ▶ Noise, SSB: typically 1.3 dB
- ▶ Linearity: better than 10 dBm OIP3
- ▶ Gain, SSB: typically 10.5 dB
- ▶ In/Out match: better than 7/12 dB
- ▶ Broadband unconditionally stable

BFU725F as LNA for C-band LNB

- ▶ Power consumption: 7 mA at 5 V
- ▶ Single supply: 5 or 6 V
- ▶ Noise: 0.65 dB
- ▶ Linearity: better than 10 dBm OIP3
- ▶ Gain: 15 dB
- ▶ In/Out Match: better than 10 dB
- ▶ Broadband unconditionally stable

BGA28xx MMICs as IF amplifiers (1st stage & output stage)

For compatibility with existing designs, the series uses a market standard package, the SOT363 and the pin-compliant SOT363F package. The pinning is identical to NXP's current gain block family, and the blocks deliver similar noise figures. New features include flatter gain, a gain slope of 0.5 dB, improved P_{1dB} vs. I_{cc} , and no necessity of an output inductor (also not at high P_{1dB} models).

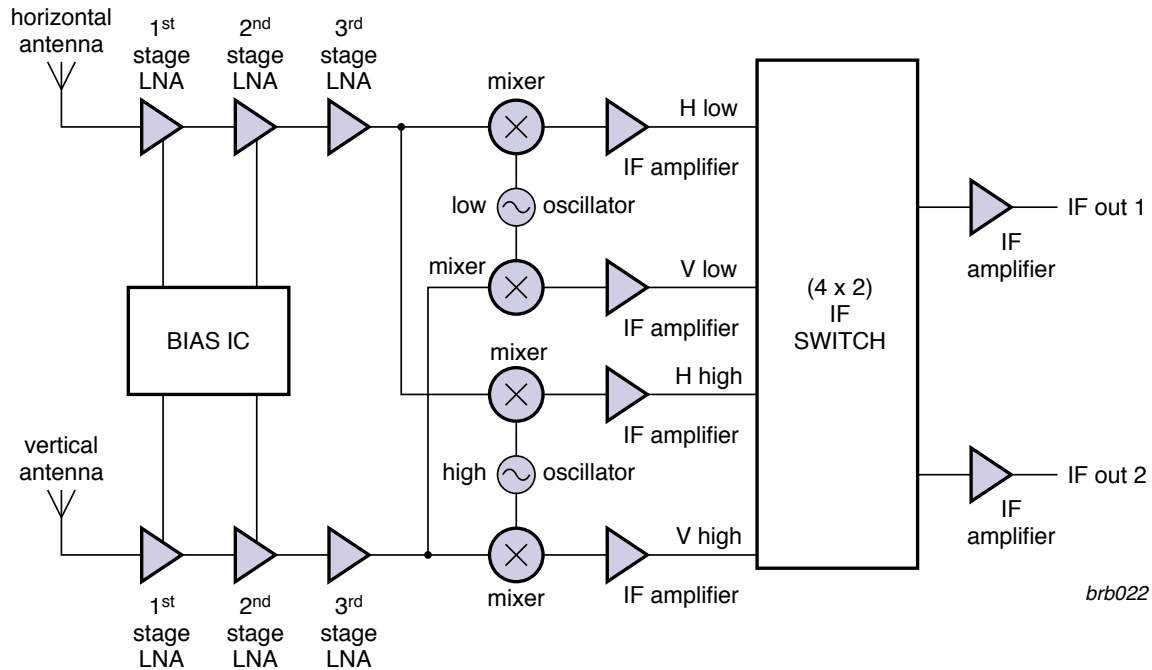
- ▶ Internally matched at 50 Ω
- ▶ Flexible gain
 - At 250 MHz: 19 dB to 32 dB
 - At 2150 MHz: 20 dB to 33 dB
- ▶ Output power at 1dB gain compression: 0, 5, or 8 dB
- ▶ Single supply current
 - At 3.3 V: 12 to 20 mA
 - At 5 V: 6 to 27 mA
- ▶ Reverse isolation: >30 dB up to 2 GHz
- ▶ Best-in-class linearity vs current consumption
- ▶ Noise figure: 4 to 6 dB at 1 GHz
- ▶ Unconditionally stable ($K > 1$)
- ▶ High compression point models work without output inductor
- ▶ 6-pin SOT363 plastic SMD package



These products – the BFU725F transistor for LNA and mixer applications, and the BGA28xx series of MMICs for IF amplifiers – are the most recent additions to NXP’s leading portfolio for satellite LNB. They join the other discrete products, including oscillators, amplifiers, switches, and biasing, to provide complete coverage for all LNB architectures.

Since the transistor and the MMICs are manufactured in NXP’s industry-leading QUBiC4X SiGe:C and QuBiC4+ process, they offer better overall RF performance and are more robust than their GaAs equivalents for the lowest cost. The process technology also enables higher integration, for added features. NXP owns the industrial base for production (wafer fab, test, assembly), so volume supplies can be assured.

Satellite outdoor unit, LNB for multiple users



brb022

NOTE: Also look at chapter 1.13 satellite outdoor unit.

Quick reference satellite IF gain MMICs

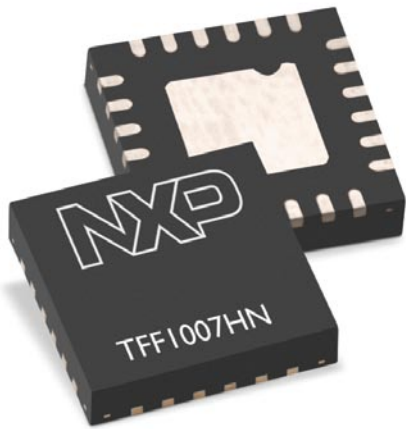
Type	Package	@		F_u @-3dB (GHz)	@ 1 GHz			Gain (dB) @			
		V_s	I_s		NF	Gain	OIP3	250	950	1550	2150
		(V)	(mA)		(dB)	(dB)	(dBm)	(MHz)	(MHz)	(MHz)	(MHz)
BGA2800	SOT363	3.3	9.7	>3	3.4	20.2	11.5	20.0	20.2	20.6	20.6
BGA2801	SOT363	3.3	12.4	3.0	3.6	22.1	13.6	22.3	22.1	23.0	23.8
BGA2815	SOT363	3.3	16.4	>3	3.4	25.4	18.2	26.2	25.4	25.5	25.8
BGA2816	SOT363	3.3	19.6	2.3	2.8	31.2	16.1	32.0	31.2	30.6	28.7
BGA2850	SOT363	5.0	7.7	>3	3.9	23.3	8.7	22.9	23.2	23.9	24.0
BGA2865	SOT363	5.0	22.7	2.6	3.7	31.9	20.9	31.2	31.8	32.6	31.4
BGA2866	SOT363	5.0	15.4	>3	3.6	23.4	17.7	23.0	23.3	24.0	24.3

2.6 VSAT, 2-way communication via satellite

Design a Ku-band VSAT transmitter or transceiver that meets IESS-308

NXP Ku-band RF PLL IC's for VSAT

The TFF100xHN family are Ku-band RF PLLs intended for low phase-noise Local Oscillator (LO) circuits in Ku-band VSAT transmitters and transceivers. Manufactured in a high-performance SiGe:C process, it delivers extremely low phase noise and complies with the IESS-308 from Intelsat.



Features

- ▶ Phase noise compliant with IESS-308 (Intelsat)
- ▶ Differential input and output
- ▶ Divider settings at 16, 32, 64, 128 or 256
- ▶ Lock-detect output
- ▶ SiGe:C technology (120-GHz f_T process)
- ▶ HVQFN24 (SOT616-1) package

Applications

- ▶ VSAT up-converters
- ▶ Local oscillator signal generation

VSAT networks are commonly used to transmit narrowband data, such as point-of-sale transactions for credit cards, or to transmit broadband data that supports satellite Internet access to a remote location, VoIP, or video.

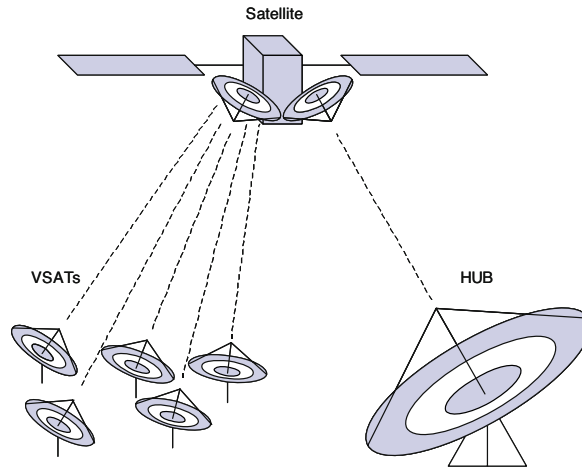
The network typically consists of a dish antenna, an outdoor unit, and an indoor unit. The outdoor unit is used for frequency translation between RF and IF, and usually includes a microwave-based uplink/downlink separator, a Low Noise Block (LNB) for receiving the downlink signals, and a Block Up Converter (BUC).

The VSAT IC's can be used to create the LO generator for a linear BUC (meaning the IF or RF conversion is done by mixing with an LO).

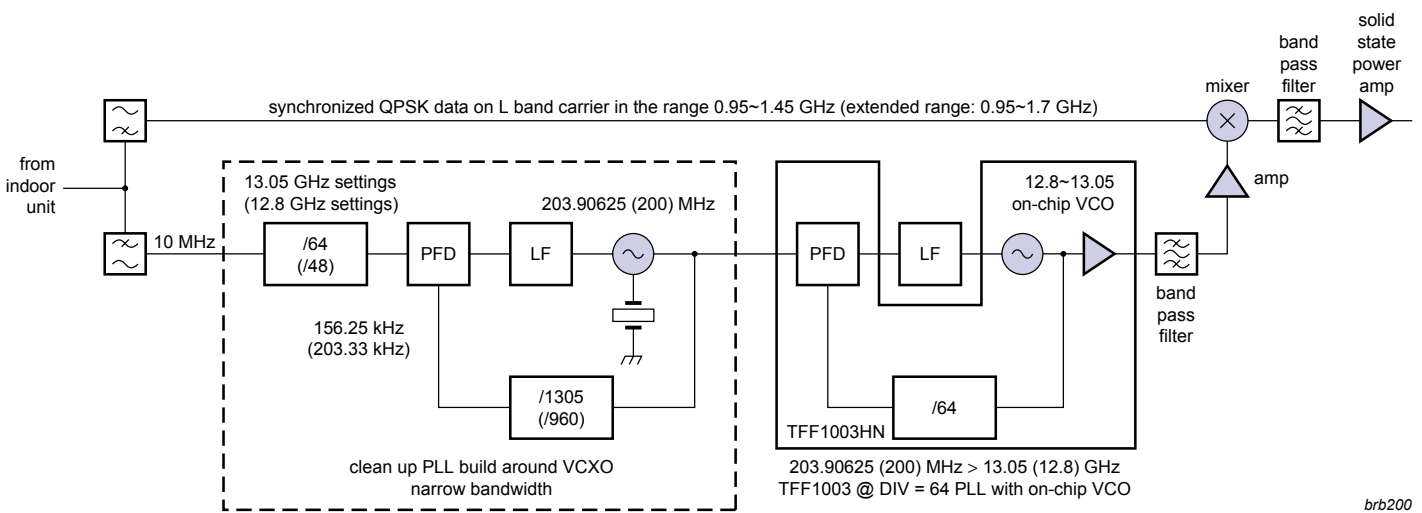
To enable precise frequency and time multiplexing, the downlink signal provides an accurate frequency reference of 10 MHz. The indoor unit frequency multiplexes this with the uplink IF signal, and the LO signal in the BUC needs to be frequency locked to the reference.

The TFF100xHN IC's are housed in a 24-pin HVQFN (SOT616-1) package. The pins have been assigned for optimal performance. Three voltage domains are used to separate the block on the IC, and two pins for each output (OUT-P) and OUT-N) have been reserved to match a typical layout using a linewidth of $Z = 50 \Omega$ microstrip on a 20-mil RO4003 board (1.1 mm).

The ground pins have been placed next to the reference input and the output, and, to minimize crossings in the application, all the supply pins are on the same side of the IC.



Typical VSAT network



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Complete LO generator for linear BUC with TFF1003HN

Type	Package	$f_{IN(REF)}$ MHz	V_{CC}		PLL phase noise @ N=64 @ 100 kHz Max dBc/Hz	PLL $f_{o(RF)}$ (GHz)	Output buffer		Input S_i dBm
			Typ	Max			P_o Typ	$RL_{out(RF)}$ Max	
			V	mA			dBm	dB	
TFF1003HN	SOT616	50~815	3,3	130	-92	12.8~13.05	-5	-10	-10
TFF1006HN	SOT616	36~586	3,3	130	-92	9.375	-5	-10	-10
TFF1007HN	SOT616	230.46~234.38	3,3	130	-104	14.75~15	-3	-10	-10

2.7 NXP CATV C-family for the Chinese SARFT standard

Connecting people, protecting your network

Specially designed for the Chinese Hybrid Fiber Coax (HFC) infrastructure, NXP CATV C-family offers you a total solution for cable TV networks. It is both flexible enough for connecting rural communities as part of China's 'Connecting every village' program and powerful enough for upgrading major cities from analog to high-end digital services. All C-type devices are compliant with the Chinese State Administration for Radio, Film and Television (SARFT) standard, and cover most HFC applications in the 550 - 870 MHz range.



Products

- ▶ BGY588C, BGE788C and CGY888C push-pull amplifiers
- ▶ BGD712C, CGD944C and CGD942C power doublers
- ▶ BGO807C optical receiver

Features

- ▶ Excellent linearity, stability and reliability
- ▶ High power gain
- ▶ Extremely low noise
- ▶ Silicon Nitride passivity
- ▶ GaAs HFET dies for high end devices

Benefits

- ▶ Compliant with Chinese SARFT HFC networks standard
- ▶ Transparent cap allows confirmation of product authenticity
- ▶ Rugged construction

Further extending our high quality CATV portfolio, this new family lets you address an even wider range of HFC applications. Dedicated solutions for the implementation of CATV systems in China, our C-type devices deliver the performance you need for modern TV infrastructures.

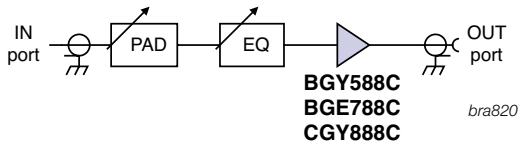
The BGY588C, BGE788C and BGD712C devices cover the frequency range from 550 MHz to 750 MHz. Extending the C-family portfolio into the high-end segment, the CGD944C, CGD942C, CGY888C and BGO807C operate between 40 MHz and 870 MHz and have been specifically tested under Chinese raster conditions. Manufactured using our GaAs HFET die process, the CGD942C, and CGD944C are high-gain, high-performance 870 MHz power doublers. They are capable of satisfying the demanding requirements of top-end applications including high-power optical nodes.

Our GaAs HFET MMIC dies are providing 'by design' the best ESD protection levels with no needs for external TVS components normally used with GaAs pHEMT devices.

All CATV C-type devices feature a see-through cap that makes it easy to distinguish them from counterfeit products.

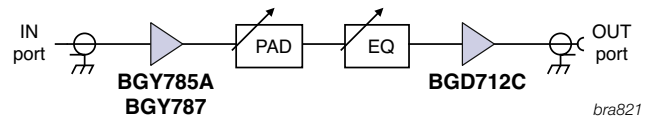
BGY588C, BGE788C and CGY888C

The last stage of an HFC network structure is called a terminating amplifier or 'user amplifier' as it is close to the subscribers. Each terminating amplifier requires a single module such as BGY588C for 550 MHz, BGE788C for 750 MHz and CGY888C for 860 MHz systems. These modules are fitting perfectly in the Chinese 'Connecting to Every Village' projects.



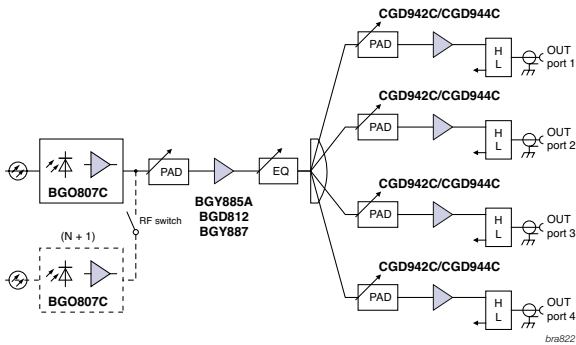
BGD712C

The BGD712C is a 750 MHz, 18 dB power doubler module. It has been designed for 750 MHz optical nodes including ordinary or optical receivers and distribution amplifiers. It can also be used in line extender amplifiers together with a 750 MHz push-pull module, such as BGY785A or BGY787. As such it can be used widely in Chinese 'Connecting to Every Village' projects.



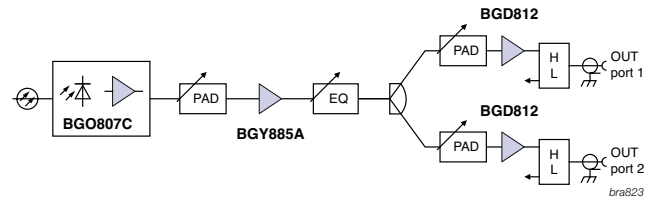
CGD944C and CGD942C

Our full GaAs power doublers modules, CGD942C and CGD944C offer high output power and better CTB and CSO than other modules. Designed for high-end HFC networks containing optical nodes with multiple out-ports, these modules enable each port to directly cover at least 125 subscribers. These two devices are ideal when used in upgrading HFC networks to 860 MHz.



BGO807C

BGO807C is an integrated optical receiver module that provides high output levels and includes an integrated temperature compensated circuitry. In your optical node design, BGO807C enables a high performance/ price ratio and ruggedness. When upgrading an HFC network from analog to digital our BGO807C is the perfect fit.



C-family application information

Application	BGY588C	BGE788C	CGY888C	BGD712C	BGO807C	CGD944C	CGD942C
Optical node				•	•	•	•
Optical receiver				•	•	•	•
Distribution amplifier			•	•	•	•	
Line extender amplifier			•	•	•	•	
Terminating amplifier	•	•	•				

Push-pull amplifiers

Parameters		BGY588C	BGE788C	CGY888C
Power gain (dB)	typ.	34,5	34,2	35,5
Slope cable equivalent (dB)	range	0.2 - 1.7	0.3 - 2.3	1.5 typ.
Composite triple beat (dB)	max.	-57	-49	-66
Composite 2 nd order distortion (dB)	max.	-62	-52	-64
Noise (@ f_{MAX}) (dB)	max.	8	8	3 typ.
Total current consumption (mA)	typ.	325	305	280
Frequency range (MHz)	range	40 - 550	40 - 750	40 - 870

Power doublers

Parameters		BGD712C	CGD944C	CGD942C
Power gain (dB)	typ.	18,5	25	23
Slope cable equivalent (dB)	range	0.5 - 1.5	1 - 2	1 - 2
Composite triple beat (dB)	max.	-62	-66	-66
Composite 2 nd order distortion (dB)	max.	-63	-67	-67
Noise (@ f_{MAX}) (dB)	max.	7	5	5
Total current consumption (mA)	typ.	395	450	450
Frequency range (MHz)	range	40 - 750	40 - 870	40 - 870

Optical receiver

Parameters		BGO807C
Responsivity (R _{min})	min.	800
Slope cable equivalent (dB)	range	0 - 2
Composite triple beat (dB)	max.	-71
Composite 2 nd order distortion (dB)	max.	-55
Noise (@ f_{MAX}) (dB)	max.	8,5
Total current consumption (mA)	typ.	190
Frequency range (MHz)	range	40 - 870
Connector		- / SCO / FCO

Complete GaAs amplifier solutions for Chinese HFC networks

These high-performance GaAs solutions, specially designed for the Chinese SARFT HFC standard, provide complete functionality in a format that reduces chip-count and lowers overall cost.

Products

- ▶ 870-MHz push-pull amplifier: CGY888C
- ▶ 870-MHz power doublers: CGD942C (23-dB gain), CGD944C (25-dB gain)

Features

- ▶ GaAs HFET process for best performance and lowest chip-count
- ▶ Excellent linearity, stability, and reliability
- ▶ High power gain
- ▶ Extremely low noise
- ▶ Excellent return-loss properties

Benefits

- ▶ Fully compliant with Chinese SARFT HFC networks standard
- ▶ Transparent cap confirms product authenticity
- ▶ Rugged construction
- ▶ Unconditionally stable
- ▶ Thermally optimized design

Applications

- ▶ Hybrid Fiber Coax (HFC) applications
- ▶ Line extenders
- ▶ Trunk amplifiers
- ▶ Fiber deep-optical-node (N+0/1/2)

To support Chinese HFC CATV infrastructure applications as a single-source supplier, NXP offers the C-family, a complete line of dedicated RF amplifier modules that deliver the very high level of performance required for next-generation HFC TV networks.

The family includes the 870-MHz push-pull amplifier CGY888C, a GaAs upgrade of NXP's industry-leading BGY888 and BGY835C products, and two 870-MHz power doublers: the CGD942C, which has a typical gain of 23 dB, and the CGD944C, with a typical gain of 25 dB.

The modules are flexible enough to connect rural communities as part of China's 'Connect Every Village' project, and powerful enough to upgrade major cities from analog to high-end digital services.

The modules have been tested under Chinese raster conditions and fully comply with the Chinese SARFT standard. They also cover most HFC applications in the range of 550 to 870 MHz and are compatible with previous generations of NXP HFC solutions, so they can be used to upgrade existing networks to a higher level of performance.

Produced in NXP's advanced GaAs HFET die process, the modules deliver excellent linearity with extremely low noise, and work seamlessly together. The GaAs process improves performance and, by reducing chip count, saves overall cost. It offers stronger signal strength than Si, so there are fewer amplifiers required, and it provides superior ESD protection compared to GaAs pHEMT processes, so there's no need for external TVS components. The CGY888C is well suited for use in the last stage of an HFC network, which is known as a terminating amplifier or a user amplifier since it is close to subscribers.

The CGD942C and the CGD944C offer higher output power and better CTB and CSO than other power doublers, so they are ideal for use in HFC networks that have optical nodes with multiple out-ports. The modules enable each port to cover at least 125 subscribers directly.

All the C-family modules are delivered with transparent caps that make it easy to distinguish them from counterfeit products.

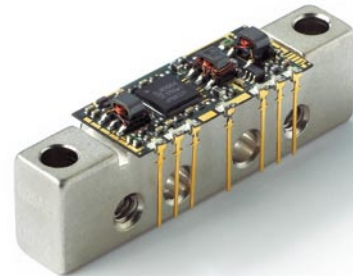
Unmatched new ESD protection levels:

All new standard NXP CATV SOT115 hybrids, power doublers or push pulls, released in 2009 and onwards will have a build-in extra protection on top of the existing one for very high level ESD surges. Those surge levels will leave our devices without any damage or destruction. Human body or biased ESD levels will increase respectively to 2000 V and 1500 V which is making now NXP CATV devices the most ESD robust product on the market today.

2.8 Highly efficient line-up of 1 GHz GaAs modules for sustainable CATV networks

NXP high-gain power doublers CGD104xH and push-pulls CGY104x

Designed for 1-GHz “sustainable networks,” these high-performance GaAs devices enable extended bandwidth and higher data rates. They deliver increased network capacity and make way for high-end services like HDTV, VoIP, and digital simulcasting.



Key features

- ▶ Excellent linearity, stability, and reliability
- ▶ High power gain for power doublers
- ▶ Extremely low noise
- ▶ Dark Green products
- ▶ GaAs HFET dies for high-end applications
- ▶ Rugged construction
- ▶ Superior levels of ESD protection
- ▶ Integrated ringwave protection
- ▶ Design optimized for digital channel loading
- ▶ Temperature compensated gain response
- ▶ Optimized heat management
- ▶ Excellent temperature resistance

Key benefits

- ▶ Simple upgrade to 1-GHz capable networks
- ▶ Low total cost of ownership
- ▶ High power-stress capability
- ▶ Highly automated assembly

Key applications

- ▶ Hybrid Fiber Coax (HFC) applications
- ▶ Line extenders
- ▶ Trunk amplifiers
- ▶ Fiber deep-optical-node (N+0/1/2)
- ▶ Bridgers

New CATV GaAs platform lay-out

The NXP power doublers CGD104xH and CGD104xHi are ideal for use in line extenders and trunk amplifiers. They support fiber deep-optical-node applications (N+0/1/2), delivering the highest output power on the market today. The GaAs HFET die process delivers high gain, excellent CTB and CSO ratings, along with lower current.

The new NXP CGY1047 push-pull is the first product on the market combining very low noise, best-in-class distortion parameters, and low “carbon footprint” capabilities. It delivers the best performance for the lowest power consumption, so it reduces OPEX and CO₂ emissions

All of NXP’s 1-GHz solutions are designed for durability and offer superior ruggedness, an extended temperature range, high power overstress capabilities, and extremely high ESD levels. As a result, they also reduce the cost of ownership.

The GaAs die is inserted in a HVQFN package that is then mounted on thermal vias that manage heat transfer to the heat sink. Temperature-control circuitry keeps the module’s high performance stable over a wide range of temperature. Assembly is fully automated and requires almost no human intervention, so repeatability remains very high.

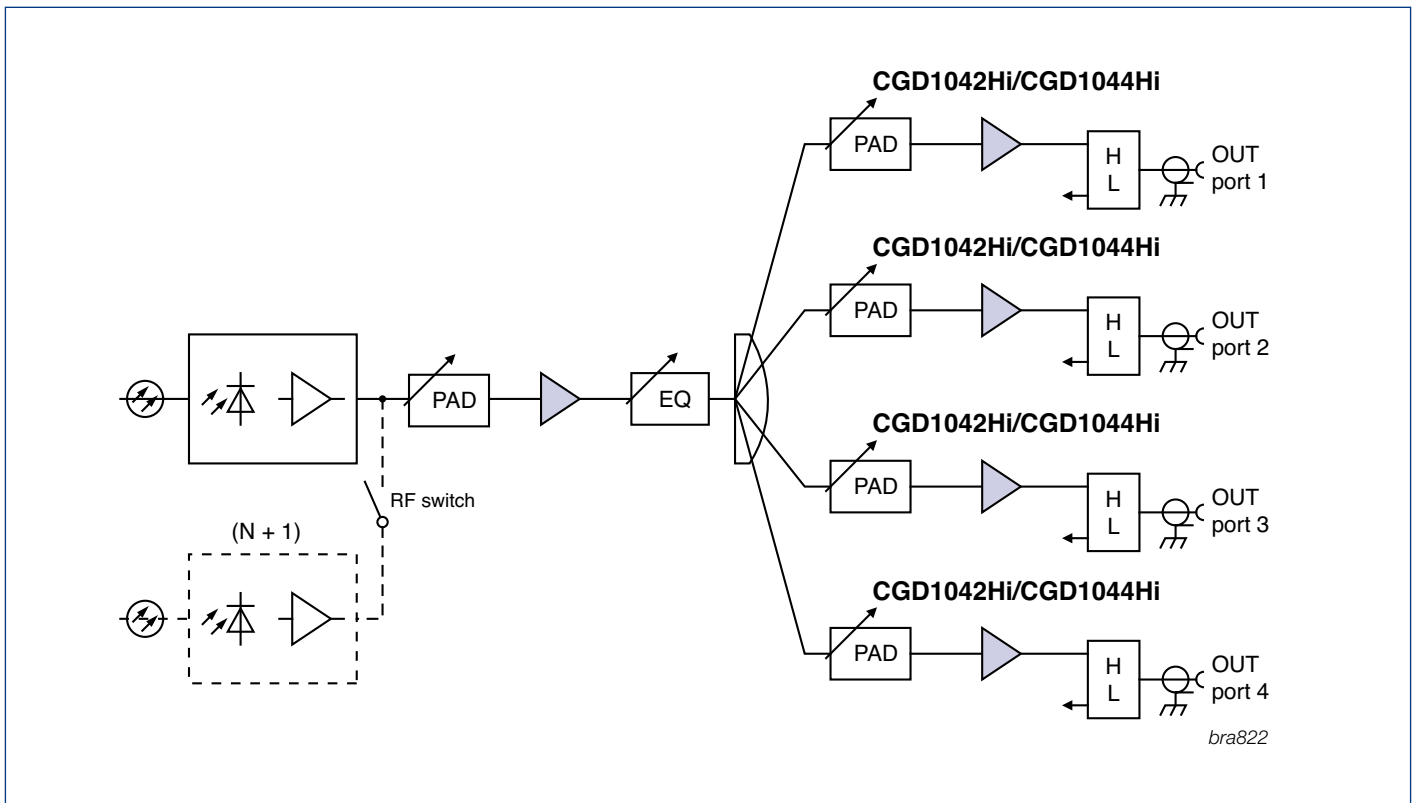
Upcoming products

Additional push-pulls, currently under development, will extend the capabilities of the power doublers even further, supporting almost all modern HFC applications. The push-pull CGY1041 will deliver a gain of 21 dB, the CGY1043 a gain of 23 dB.

NXP is also developing a new, highly integrated power doubler. The CGD1047Hi will deliver, in one IC, a 27-dB power gain with 60-dBmV output power and excellent ESD protection, for the ultimate in high-quality, distortionless devices.

Quick reference data CATV 1 GHz power doublers and push pulls

Parameters		CATV 1-GHz power doublers					CATV 1-GHz push-pulls		
		CGD1040Hi	CGD1042H	CGD1042Hi	CGD1044H	CGD1044Hi	CGY1041	CGY1043	CGY1047
Power gain (dB)	typ.	21	23	23	25	25	22	24	28
Slope cable equivalent (dB)	typ.	1.5	1.5	1.5	1	1.5	1.5	1.5	1.5
Composite triple beat (dB)	typ.	-69	-69	-69	-69	-69	-62	-64	-62
Composite 2 nd order distortion (dB)	typ.	-68	-68	-68	-68	-68	-62	-64	-64
Noise (@f _{MAX}) (dB)	max.	6	6	6	6	6	4	4	4,5
Total current consumption (mA)	typ.	440	450	440	450	440	220	220	250
Frequency range (MHz)	range	40 - 1000	40 - 1000	40 - 1000	40 - 1000	40 - 1000	40 - 1000	40 - 1000	40 - 1000



An optical node with multiple out-ports using the CGD1042Hi / CGD1044Hi

2.9 LDMOS technology optimized for high-power use and Doherty applications

NXP Gen7 LDMOS technology

NXP's seventh-generation (Gen7) LDMOS delivers record performance up to 3.8 GHz and offers 25 percent lower output capacitance. It enables wideband output matching and makes it easier to design high-performance Doherty amplifiers.

Key features

- ▶ Next-generation LDMOS Gen7
- ▶ Optimized for Doherty amplifiers
- ▶ Relative to Gen 6
 - 2% higher efficiency
 - 25% lower output capacitance
 - 20% higher power density
 - 25% lower Rth

Key benefits

- ▶ High efficiency
- ▶ High peak power
- ▶ High gain
- ▶ Good linearity

Key applications

- ▶ Macrocell basestations
- ▶ UMTS band 1
- ▶ LTE/WiMAX OFDM
- ▶ Final stage
- ▶ Multi-carrier
- ▶ DPD architecture
- ▶ Feed-forward architecture
- ▶ Remote radio heads

The seventh-generation of NXP's LDMOS (Laterally Diffused Metal Oxide Semiconductor) technology enables solutions with the highest possible efficiency. Compared to the previous generation, Gen7 increases power density by 20 percent, improves power efficiency by two percent, and reduces thermal resistance (Rth) by more than 25 percent.

The gate length is 0.3 μm , and the technology is processed in an advanced 8-inch CMOS fab, for a further reduction down to 0.14 μm .

Doherty has emerged as the amplifier architecture of choice for new basestation transmitters, helping wireless network operators increase efficiency and reduce operating costs. Gen7 is optimized for Doherty applications and enables Doherty amplifiers with higher power, higher efficiency, less memory effects, and better pre-distortion capabilities.

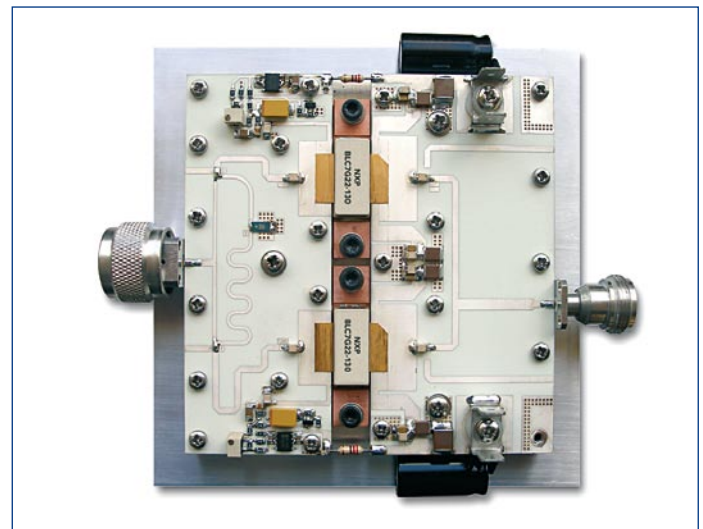


Figure 1. The Gen7 Doherty reference design, with two BLF7G22LS-130 devices.

2C-WCDMA Doherty PA with BLF7G22LS-130	
VDS	28 V
Frequency	2.14 GHz
POUT-PEAK	55 dBm
POUT-AVG	47 dBm
Efficiency	44%
IM3	-28 dBc
Gain	16 dB

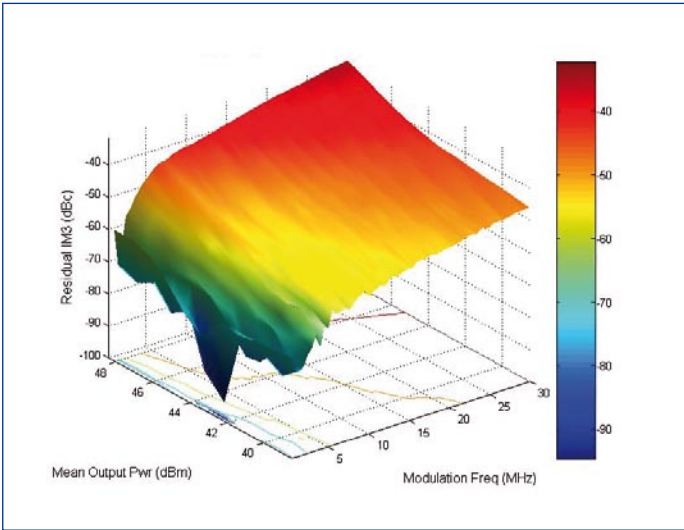


Figure 2. The memory effect of the Gen7 Doherty amplifier is measured up to an IF bandwidth of 30 MHz. The figure shows that the magnitude level of the residual IM3 is very low, which enhances pre-distortion capabilities.

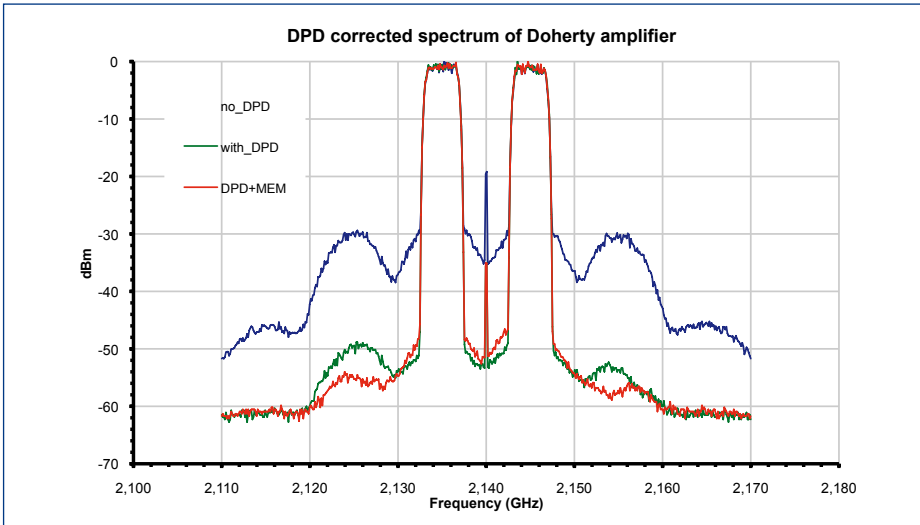


Figure 3. Pre-distorted spectrum of the Gen7 Doherty amplifier, with $P_{o-avg} = 47.0$ dBm, PAE = 43.0%, and Gain = 15.7 dB with $V_{ds} = 28$ V.

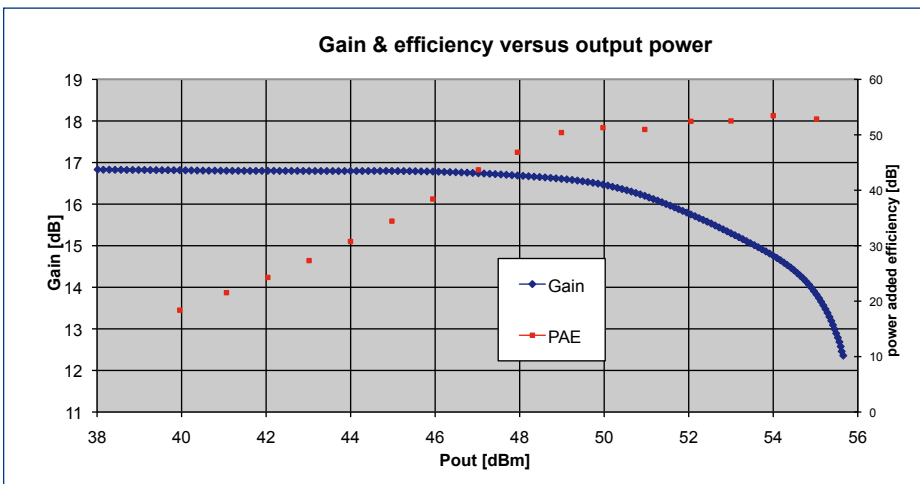


Figure 4. CW power sweep at 2.14 GHz and $V_{ds} = 28$ V. NXP's Gen7 technology improves the efficiency and gain of the Doherty amplifier, which makes the overall line-up more efficient.

2.10 Boost efficiency and lower system cost in wireless infrastructure with GaN

NXP GaN technology for RF power

This new gallium-nitride (GaN) technology, the result of a collaborative development effort, enables high-power amplifiers that deliver very high efficiency in next-generation wireless communication systems.

Features

- ▶ Power density that is up to five times higher than Si LDMOS
- ▶ 50 V operation
- ▶ High gain
- ▶ High efficiency
- ▶ High reliability
- ▶ Low parasitics

Benefits

- ▶ High frequency combined with high power
- ▶ Broadband operation that lets a single power amplifier function at multiple frequencies
- ▶ Enabling technology for next-generation, high-power, Switch Mode Power Amplifier (SMPA) architectures
- ▶ Lowers system costs and operational expenditures
- ▶ Ideal for tower-top basestations

Applications

- ▶ Cellular basestations
- ▶ WiMAX
- ▶ Broadcast
- ▶ Radar

Collaborating with United Monolithic Semiconductors and the Fraunhofer Institute for Applied Solid State Physics, NXP Semiconductors is developing a gallium-nitride (GaN) process technology that boosts performance of next-generation RF power amplifiers.

The new GaN process, with its high frequency combined with high power, puts NXP in the ideal position of being able to support future applications while continuing to evolve its well-established LDMOS technology.

The GaN technology delivers numerous benefits to manufacturers of infrastructure equipment. Using the GaN technology in a transmitter represents a significant cost savings in system manufacturing, along with major improvements in system performance and flexibility.

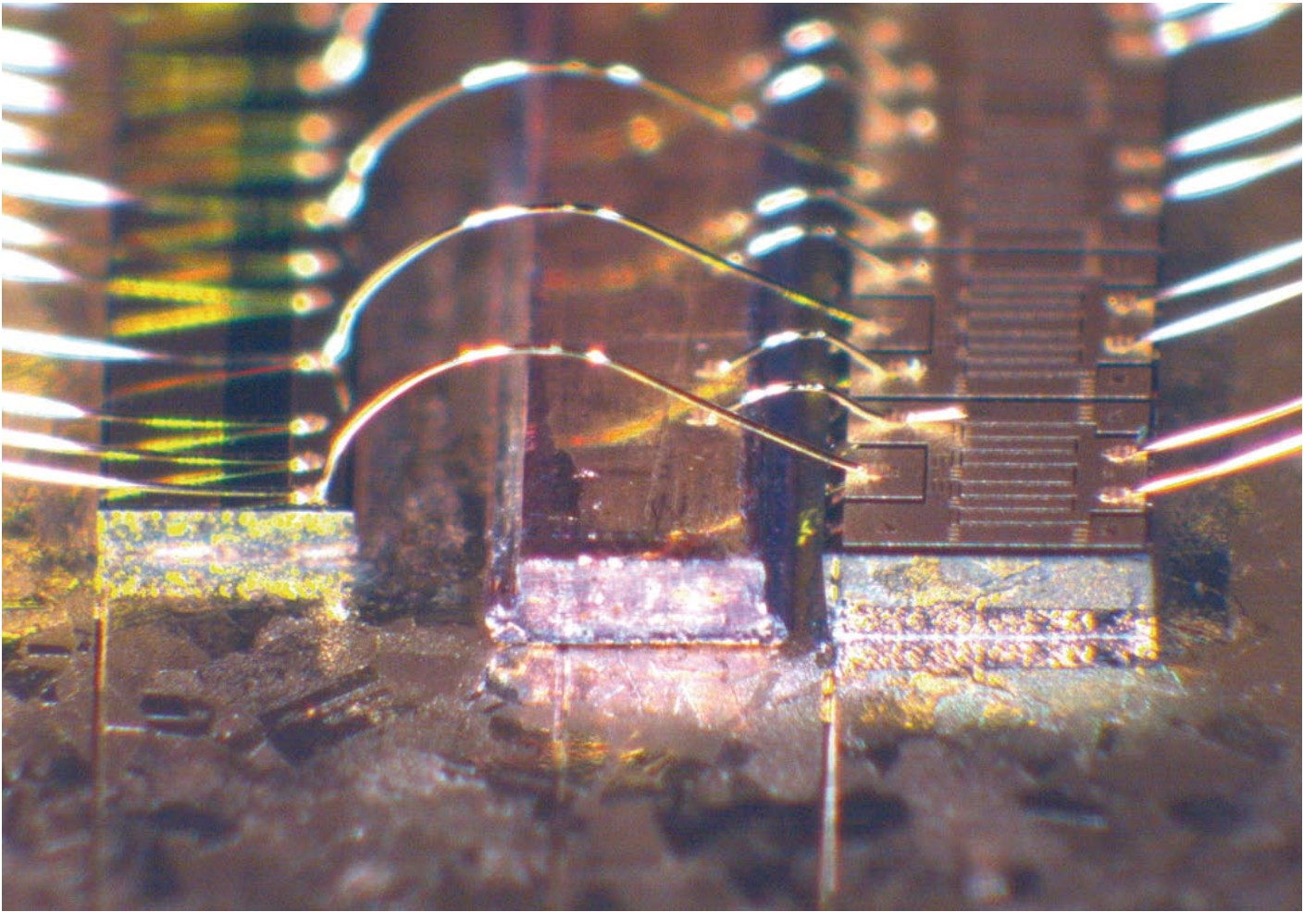
Most of today's basestation power amplifiers are limited to specific applications. The new GaN-based technology lets operators use a "universal transmitter" to switch between systems and frequencies, so they can instantly meet demands in the basestation's coverage area.

GaN transistors enable much more efficient power amplifiers and as a result drive down the operational costs of telecom operators.

GaN transistors can operate at much higher junction temperatures than Si- and GaAs-based devices, so GaN is an ideal candidate for environments with reduced cooling capabilities, such as tower-top basestations. Also, with its high power densities, GaN has the potential to expand into other areas, including high-power broadcast applications, where solid-state power amplifiers built with vacuum tubes are still the norm.

NXP's first GaN broadband power amplifiers are expected to be available in 2009, with Switch Mode Power Amplifiers (SMPAs) following quickly thereafter.

Performance (targets)	
Saturated output power at 50 V	100 W
Frequency	2.2 GHz
Maximum PAE	68%
Linear power gain	19 dB
2C-WCDMA linear efficiency with DPD	40% at -52 dBc IM3 at 8 dB OPBO



Assembly of GaN power bar in standard ceramic package





Experience world's best performing RF power transistors

Look at RF power transistors, chapter 3.7

3. Product portfolio

NXP RF product catalog:
<http://www.nxp.com/rf>

3.1 New products

DEV = In development

CQS = Customer qualification samples

RFS = Release for supply

Type	Application / Description	Status June 2009	Planned release	Chapter
NEW: RF diodes				
BB189	Varicap for UHF TV tuning	RFS	Released	3.2.1
NEW: SiGe:C transistors & MMICs				
BGU7003	SiGe:C MMIC for high frequency applications, with ESD protection on RF input	RFS	Released	3.4.1
BGU7005	SiGe:C MMIC, incl matching output for GPS LNA	DEV	Q4 2009	3.4.1
NEW: Medium power amplifier MMICs				
BGA7124	Medium power amplifier for all 400 - 2700 MHz applications	CQS	Q4 2009	3.4.1
BGA7127	Medium power amplifier for all 400 - 2700 MHz applications	DEV	Q2 2010	3.4.1
BGA7024	Medium power amplifier for all 400 - 2700 MHz applications	DEV	Q1 2010	3.4.1
BGA7027	Medium power amplifier for all 400 - 2700 MHz applications	DEV	Q2 2010	3.4.1
BGA7130	Medium power amplifier for all 400 - 2700 MHz applications	DEV	Q4 2010	3.4.1
BGA7133	Medium power amplifier for all 400 - 2700 MHz applications	DEV	Q4 2010	3.4.1
NEW: Satellite IF gain blocks and LO generators				
BGA2800	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2801	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2815	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2816	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2850	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2865	Satellite IF gain block	DEV	Q4 2009	3.4.1
BGA2866	Satellite IF gain block	DEV	Q4 2009	3.4.1
TFF1003HN	Low noise LO generator for VSAT applications	CQS	Q4 2009	3.4.2
TFF1006HN	Low noise LO generator for VSAT applications	CQS	Q4 2009	3.4.2
TFF1007HN	Low noise LO generator for VSAT applications	DEV	Q2 2010	3.4.2
TFF11070HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11073HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11077HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11080HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11084HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11088HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11092HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11096HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11101HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11105HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11110HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11115HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11121HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11126HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11132HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11139HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11145HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2
TFF11152HN	Low noise LO generator for general microwave applications	CQS	Q4 2009	3.4.2

Type	Application / Description	Status June 2009	Planned release	Chapter
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NEW: RF CATV 1 GHz modules

CGY1041	1 GHz, 21 dB gain Push Pull, GaAs HFET SOT115	DEV	Q3 2009	3.6.2
CGY1043	1 GHz, 23 dB gain Push Pull, GaAs HFET SOT115	DEV	Q3 2009	3.6.2
CGY1047	1 GHz, 27 dB gain Push Pull, GaAs HFET SOT115	RFS	Released	3.6.2
CGD1040Hi	1 GHz, Power Doubler, protected against ring tones	RFS	Released	3.6.2
CGD1042Hi	1 GHz, Power Doubler, protected against ring tones	RFS	Released	3.6.2
CGD1044Hi	1 GHz, Power Doubler, protected against ring tones	RFS	Released	3.6.2

NEW: RF power transistors

Base Station transistors

BLF6G21-10G	Power LDMOS transistor for base station applications	DEV	Q3 2009	3.7.1.3
BLF6G22L(S)-180RN	Power LDMOS transistor for base station applications	RFS	Released	3.7.1.3
BLF6G20-230PRN	Power LDMOS transistor for base station applications	DEV	Q3 2009	3.7.1.3
BLF6G10L(S)-260PRN	Power LDMOS transistor for base station applications	DEV	Q4 2009	3.7.1.3
BLF7G22L(S)-130	RF power transistor for W-CDMA base station	CQS	Q3 2009	3.7.1.3
BLD6G21L(S)-50	Fully integrated Doherty RF power amplifier for TDS-CDMA base station	CQS	Q3 2009	3.7.1.3
BLM6G10-30(G)	W-CDMA 800 MHz - 1000 MHz power MMIC	DEV	Q3 2009	3.7.1.1
BLM6G22-30(G)	W-CDMA 2000 MHz - 2200 MHz power MMIC	RFS	Released	3.7.1.1
BLF7G21L(S)-10	Power Gen7 LDMOS transistor for base station applications	DEV	Q3 2009	3.7.1.3
BLF7G22L(S)-130	Power Gen7 LDMOS transistor for base station applications	DEV	Q2 2009	3.7.1.3
BLF7G21L(S)-10	Power Gen7 LDMOS transistor for base station applications	DEV	Q3 2009	3.7.1.3
BLF7G22L(S)-130	Power Gen7 LDMOS transistor for base station applications	DEV	Q2 2009	3.7.1.3

BLF6G27L(S)-75	WiMAX power LDMOS transistor	DEV	Q2 2009	3.7.1.4
BLF6G27L(S)-100	WiMAX power LDMOS transistor	DEV	Q3 2009	3.7.1.4
BLF7G27L(S)-230P	WiMAX power LDMOS transistor	DEV	Q1 2010	3.7.1.4

Broadcast / ISM transistors

BLF571	High Voltage RF power transistor driver for broadcast / ISM	RFS	Released	3.7.2.2 + 3
BLF574	High Voltage RF power transistor for broadcast / ISM	RFS	Released	3.7.2.2
BLF578	High Voltage RF power transistor for broadcast / ISM	CQS	Q2 2009	3.7.2.2
BLF871	High Voltage RF power transistor driver for UHF broadcast - DVB-T	DEV	Q2 2009	3.7.2
BLF871S	High Voltage RF power transistor driver for UHF broadcast - DVB-T	DEV	Q3 2009	3.7.2
BLF881	High Voltage RF power transistor driver for UHF broadcast - DVB-T	DEV	Q3 2009	3.7.2
BLF888	High Voltage RF power transistor for UHF broadcast - DVB-T	CQS	Q3 2009	3.7.2.3

Microwave transistors

BLL6H0514-25	High Voltage RF power transistor driver for avionics up to L-band radar systems	DEV	Q4 2009	3.7.3
BLA6G1011-200R	Gen 6 RF high power transistor for avionics applications	DEV	Q1 2010	3.7.3.1
BLA6H0912-500	High Voltage RF high power transistor for avionics applications	DEV	Q4 2009	3.7.3.1
BLA6H1011-600	High Voltage RF high power transistor for avionics applications	DEV	Q4 2009	3.7.3.1
BLL6H1214-500	High Voltage RF high power transistor for L-band radar systems	DEV	Q4 2009	3.7.3.2
BLS7G2933P-200	Gen 6 RF high power transistor for S-band radar systems	DEV	Q4 2009	3.7.3.3

3.2 RF diodes

3.2.1 Varicap diodes

NEW: Varicap selection guide on www.nxp.com/varicaps
Easy-to-use parametric filters help you to choose the right varicap for your design.

Why choose NXP semiconductors' varicap diodes:

- ▶ Reference designs for TV and radio tuning
- ▶ Direct matching process
- ▶ Small tolerances
- ▶ Short leadtimes
- ▶ Complete portfolio covering broad frequency range and variety in package (including leadless)
- ▶ Reliable volume supply

VCO and FM radio tuning varicap diodes

Type	Package	Number of diodes	Configuration	@ f = 1 MHz												r _s typ	r _s max	@ f =
				C _d min	C _d typ	C _d max	@ V _R =	C _d min	C _d typ	C _d max	@ V _R =	C _{d1} /C _{d2} min	C _{d1} /C _{d2} max	@ V1 =	@ V2 =			
				(pF)	(pF)	(pF)	(V)	(pF)	(pF)	(pF)	(V)			(V)	(V)			
BB145B	SOD523	1	SG	6.4	-	7.2	1	2.55	-	2.95	4	2.2	-	1	4	-	0.6	470
BB156	SOD323	1	SG	14.4	16	17.6	1	4.2	4.8	5.4	7.5	2.7	3.9	1	7.5	0.4	0.7	470
BB198	SOD523	1	SG	25	-	28.5	1	4.8	-	6.8	4	-	-	-	-	-	0.8	100
BB199	SOD523	1	SG	36.5	-	42.5	0.5	11.8	-	13.8	2	2.8	-	0.5	2	0.25	-	100
BB201	SOT23	2	CC	89	95	102	1	25.5	27.6	29.7	7.5	3.1	3.8	1	7.5	0.25	0.5	100
BB202**	SOD523	1	SG	28.2	-	33.5	0.2	7.2	-	11.2	2.3	2.5	-	0.2	2.3	0.35	0.6	100
BB202LX**	SOD882T	1	SG	28.2	-	33.5	0.2	7.2	-	11.2	2.3	2.5	-	0.2	2.3	0.35	-	100
BB207*	SOT23	2	CC	76	81	86	1	25.5	27.6	29.7	7.5	2.6	3.3	1	7.5	0.2	0.4	100
BB208-02*	SOD523	1	SG	19.9	-	23.2	1	4.5	-	5.4	7.5	3.7	5.2	1	7.5	0.35	0.5	100
BB208-03*	SOD323	1	SG	19.9	-	23.2	1	4.5	-	5.4	7.5	3.7	5.2	1	7.5	0.35	0.5	100

Bold = Highly recommended product

* = Including special design for FM car radio (CREST-IC:TEF6860).

** = Including special design for mobile phone tuner ICs.

Type of connection:

SG: Single

CC: Common Cathode

TV / VCR / DVD / HDD varicap diodes - UHF tuning

Type	Package	@ f = 1 MHz									r _s typ	r _s max	@ f =	@ C _d =	ΔC _d / C _d	@ V ₁ =	@ V ₂ =	@ N _s =
		C _d min	C _d typ	C _d max	@ V _R =	C _{d1} /C _{d2} min	C _{d1} /C _{d2} typ	C _{d1} /C _{d2} max	@ V ₁ =	@ V ₂ =								
		(pF)	(pF)	(pF)	(V)				(V)	(V)								
Matched																		
BB149	SOD323	1.9	2.1	2.25	28	8.2	9	10	1	28	-	0.75	470	9	2	0.5	28	10
BB149A	SOD323	1.951	2.1	2.225	28	8.45	9	10.9	1	28	0.6	0.75	470	9	2	1	28	10
BB179	SOD523	1.951	2.1	2.225	28	8.45	9	10.9	1	28	0.6	0.75	470	9	2	1	28	10
BB179B	SOD523	1.9	2.1	2.25	28	8.45	9	10	1	28	0.6	0.75	470	9	2	1	28	10
BB179BLX	SOD882T	1.9	-	2.25	28	-	9	-	1	28	0.65	-	470	9	2	1	28	10
BB179LX	SOD882T	1.95	2.1	2.22	28	8.45	9	10.9	1	28	0.65	-	470	30	2	1	28	5
BB184	SOD523	1.87	2	2.13	10	6	7	-	1	10	0.65	-	470	9	2	1	10	5
BB189	SOD523	1.89	2.04	2.18	25	6.3	7.3	-	2	25	0.65	0.7	470	9	1.8	2	25	10
Unmatched																		
BB135	SOD323	1.7	-	2.1	28	8.9	-	12	0.5	28	-	0.75	470	9	-	-	-	-

Bold = Highly recommended product

Bold Red = New, highly recommended product

TV / VCR / DVD / HDD varicap diodes - VHF tuning

Type	Package	@ f = 1 MHz									r _s typ	r _s max	@ f =	@ C _d =	ΔC _d / C _d	@ V ₁ =	@ V ₂ =	@ N _s =
		C _d min	C _d typ	C _d max	@ V _R =	C _{d1} /C _{d2} min	C _{d1} /C _{d2} typ	C _{d1} /C _{d2} max	@ V ₁ =	@ V ₂ =								
		(pF)	(pF)	(pF)	(V)				(V)	(V)								
Matched																		
BB148	SOD323	2.4	2.6	2.75	28	14.5	15	-	1	28	-	0.9	100	12	2	0.5	28	10
BB152	SOD323	2.48	2.7	2.89	28	20.6	22	-	1	28	1	1.2	100	30	2	1	28	10
BB153	SOD323	2.361	2.6	2.754	28	13.5	15	-	1	28	0.65	0.8	100	30	2	1	28	10
BB178	SOD523	2.361	2.6	2.754	28	13.5	15	-	1	28	0.65	0.8	100	30	2	1	28	10
BB178LX	SOD882T	2.36	2.6	2.75	28	13.5	15	-	1	28	0.7	-	470	30	2	1	28	5
BB182	SOD523	2.48	2.7	2.89	28	20.6	22	-	1	28	1	1.2	100	30	2	1	28	10
BB182LX	SOD882T	2.48	2.7	2.89	28	-	22	-	1	28	1	-	100	30	2	1	28	10
BB187	SOD523	2.57	2.75	2.92	25	11	-	-	2	25	-	0.75	470	-	2	2	25	10
BB187LX	SOD882T	2.57	2.75	2.92	25	11	-	-	2	25	-	0.75	470	-	2	2	25	10
Unmatched																		
BB131	SOD323	0.7	-	1.055	28	12	-	16	0.5	28	-	3	470	9	-	-	-	-
BB181	SOD523	0.7	-	1.055	28	12	-	16	0.5	28	-	3	470	9	-	-	-	-
BB181LX	SOD882T	0.7	-	1.055	28	-	14	-	0.5	28	2	-	470	9	-	-	-	-
BBY40	SOT23	4.3	-	6	25	5	-	6.5	3	25	-	0.7	200	25	-	-	-	-

Bold = Highly recommended product

3.2.2 PIN diodes

NEW: Pin diode selection guide on www.nxp.com/pindiodes
Easy-to-use parametric filters help you to choose the right pin diode for your design.

Why choose NXP Semiconductors' PIN diodes:

- ▶ Broad portfolio
- ▶ Unrivalled performance
- ▶ Short leadtimes
- ▶ Low series inductance
- ▶ Low insertion loss
- ▶ Low capacitance

PIN diodes: typical r_D @ 1 mA ≤ 2

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)
BAP65LX	SOD882T	1	SG	30	100	-	-	0.94	-	0.49	0.9	0.61	0.48	0.85	0.37	-
BAP65-02	SOD523	1	SG	30	100	-	-	1	-	0.56	0.9	0.65	0.55	0.9	0.375	-
BAP65-03	SOD323	1	SG	30	100	-	-	1	-	0.56	0.9	0.65	0.55	0.9	0.375	-
BAP65-05	SOT23	2	CC	30	100	-	-	1	-	0.56	0.9	0.7	0.575	0.9	0.425	-
BAP65-05W	SOT323	2	CC	30	100	-	-	1	-	0.56	0.9	0.7	0.575	0.9	0.425	-
BAP63LX	SOD882T	1	SG	50	100	2.3	3.3	1.87	3	1.19	1.8	0.34	0.29	-	0.24	0.3
BAP63-02	SOD523	1	SG	50	100	2.5	3.5	1.95	3	1.17	1.8	0.36	0.32	-	0.25	0.32
BAP63-03	SOD323	1	SG	50	100	2.5	3.5	1.95	3	1.17	1.8	0.4	0.35	-	0.27	0.32
BAP63-05W	SOT323	2	CC	50	100	2.5	3.5	1.95	3	1.17	1.8	0.4	0.35	-	0.3	0.35

PIN diodes: typical r_D @ 1 mA = 2.2 - 2.4

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	@ f = 100 MHz						@ f = 1 MHz				
						@ IF = 0.5 mA		@ IF = 1 mA		@ IF = 10 mA		@ $V_R = 0$ V	@ $V_R = 1$ V		@ $V_R = 20$ V	
						r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)
BAP55LX	SOD882T	1	SG	50	100	3.3	4.5	2.2	3.3	0.8	1.2	0.28	0.23	-	0.18	0.28
BAP1321-02	SOD523	1	SG	60	100	3.4	5	2.4	3.6	1.2	1.8	0.4	0.35	0.45	0.25	0.32
BAP1321-03	SOD323	1	SG	60	100	3.4	5	2.4	3.6	1.2	1.8	0.4	0.35	0.45	0.25	0.32
BAP1321-04	SOT23	2	SR	60	100	3.4	5	2.4	3.6	1.2	1.8	0.42	0.375	0.45	0.275	0.325
BAP1321LX	SOD882T	1	SG	60	100	3.3	5	2.4	3.6	1.2	1.8	0.32	0.27	0.38	0.21	0.28
BAP142LX	SOD882T	1	SG	50	100	3.3	5	2.4	3.6	1	1.8	0.25	0.22	-	0.16	0.26

PIN diodes: typical r_D @ 1 mA = 3.2 - 3.6

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	@ f = 100 MHz						@ f = 1 MHz				
						@ IF = 0.5 mA		@ IF = 1 mA		@ IF = 10 mA		@ $V_R = 0$ V	@ $V_R = 1$ V		@ $V_R = 20$ V	
						r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)
BAP51LX	SOD882T	1	SG	60	100	4.9	9	3.2	6.5	1.4	2.5	0.3	0.22	0.4	0.17	0.3
BAP51-02	SOD523	1	SG	60	50	5.5	9	3.6	6.5	1.5	2.5	0.4	0.3	0.55	0.2	0.35
BAP51-03	SOD323	1	SG	50	50	5.5	9	3.6	6.5	1.5	2.5	0.4	0.3	0.55	0.2	0.35
BAP51-04W	SOT323	2	SR	50	50	5.5	9	3.6	6.5	1.5	2.5	0.4	0.3	0.55	0.2	0.35
BAP51-05W	SOT323	2	CC	50	50	5.5	9	3.6	6.5	1.5	2.5	0.4	0.3	0.55	0.2	0.35
BAP51-06W	SOT323	2	CA	50	50	5.5	-	3.6	-	2	-	0.4	0.3	-	0.2	-

PIN diodes: typical r_D @ 1 mA = 10

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	@ f = 100 MHz						@ f = 1 MHz				
						@ IF = 0.5 mA		@ IF = 1 mA		@ IF = 10 mA		@ $V_R = 0$ V	@ $V_R = 1$ V		@ $V_R = 20$ V	
						r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)
BAP64-02	SOD523	1	SG	175	100	20	40	10	20	2	3.8	0.48	0.35	-	0.23	0.35
BAP64-03	SOD323	1	SG	175	100	20	40	10	20	2	3.8	0.48	0.35	-	0.23	0.35
BAP64-04	SOT23	2	SR	175	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
BAP64-04W	SOT323	2	SR	100	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
BAP64-05	SOT23	2	CC	175	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
BAP64-05W	SOT323	2	CC	100	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
BAP64-06	SOT23	2	CA	175	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
BAP64-06W	SOT323	2	CA	100	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35

PIN diodes: typical r_D @ 1 mA = 14 - 16

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	@ f = 100 MHz						@ f = 1 MHz					
						@ IF = 0.5 mA		@ IF = 1 mA		@ IF = 10 mA		@ $V_R = 0$ V	@ $V_R = 1$ V		C_d typ (pF)	C_d max (pF)	@ $V_R =$ (V)
						r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)			
BAP50-02	SOD523	1	SG	50	50	25	40	14	25	3	5	0.4	0.3	0.55	0.22	0.35	5
BAP50-03	SOD323	1	SG	50	50	25	40	14	25	3	5	0.4	0.3	0.55	0.2	0.35	5
BAP50-04	SOT23	2	SR	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5	5
BAP50-04W	SOT323	2	SR	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5	5
BAP50-05	SOT23	2	CC	50	50	25	40	14	25	3	5	0.45	0.3	0.5	0.35	0.6	1
BAP50-05W	SOT323	2	CC	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5	5
BAP50LX	SOD882T	1	SG	50	50	26	40	14	25	3	5	0.4	0.28	0.55	0.19	0.35	5
BAP64LX	SOD882T	1	SG	60	100	31	50	16	26	2.6	4.4	0.48	0.34	-	0.17	0.3	20

PIN diodes: typical r_D @ 1 mA = 40

Type	Package	Number of diodes	Conf	V_R max (V)	IF max (mA)	@ f = 100 MHz						@ f = 1 MHz				
						@ IF = 0.5 mA		@ IF = 1 mA		@ IF = 10 mA		@ $V_R = 0$ V	@ $V_R = 1$ V		@ $V_R = 20$ V	
						r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)
BAP70-02	SOD523	1	SG	50	100	77	100	40	50	5.4	7	0.57	0.4	-	0.2	0.25
BAP70-03	SOD323	1	SG	50	100	77	100	40	50	5.4	7	0.57	0.4	-	0.2	0.25
BAP70-04W	SOT323	2	SR	50	100	77	100	40	50	5.4	7	0.6	0.43	-	0.25	0.3
BAP70-05	SOT23	2	CC	50	100	77	100	40	50	5.4	7	0.6	0.43	-	0.25	0.3
BAP70AM	SOT363	4	SR	50	100	77	100	40	50	5.4	7	0.57	0.4	-	0.2	0.25

Bold = highly recommended product

3.2.3 Band-switch diodes

Why choose NXP Semiconductors' bandswitch diodes:

- ▶ Reliable volume supplier
- ▶ Short leadtimes
- ▶ Low series Inductance
- ▶ Low Insertion loss
- ▶ Low capacitance
- ▶ High reverse Isolation

Type	Package	V_R max (V)	I_F max (mA)	r_D max (Ω)	@ I_F = (mA)	@ f = (MHz)	C_D max (pF)	@ V_R = (V)	@ f = (MHz)
BA277	SOD523	35	100	0.7	2	100	1.2	6	1
BA591	SOD323	35	100	0.7	3	100	0.9	3	1
BA891	SOD523	35	100	0.7	3	100	0.9	3	1
BAT18	SOT23	35	100	0.7	5	200	1	20	1

Bold = Highly recommended product

3.2.4 Schottky diodes

NEW: Schottky diode selection guide on www.nxp.com/rf/schottkydiodes
Easy-to-use parametric filters help you to choose the right schottky diode for your design.

Why choose NXP Semiconductors' schottky diodes:

- ▶ (Very) low diode capacitance
- ▶ (Very) low forward voltage
- ▶ Single and triple-isolated diode
- ▶ (Ultra / very) small package

Applications

- ▶ Digital applications:
 - ultra high-speed switching
 - clamping circuits
- ▶ RF applications:
 - diode ring mixer
 - RF detector
 - RF voltage doubler

Low-capacitance Schottky diodes

Type	Package	Configuration	V_R max. (V)	I_F max. (mA)	V_F max. (mV)	C_D max. (pF)
BAT17	SOT23	single	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
PMBD353	SOT23	dual series	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
PMBD354	SOT23	dual series	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS76SB17	SOD323	single	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS66SB17	SOT666	triple isolated	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS79SB17	SOD523	single	4	30	450 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS88SB82	SOT363	triple isolated	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS70SB82	SOT323	single	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS70SB84	SOT323	dual series	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS70SB85	SOT323	dual c.c	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS70SB86	SOT323	dual c.a.	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS66SB82	SOT666	triple isolated	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V
1PS10SB82	SOD882	single	15	30	340 @ $I_F = 1$ mA	1 @ $V_R = 0$ V

3.3 RF Bipolar transistors

3.3.1 Wideband transistors

NEW: RF wideband transistor selection guide on www.nxp.com/rftransistors
Easy-to-use parametric filters help you to choose the right RF wideband transistor for your design.

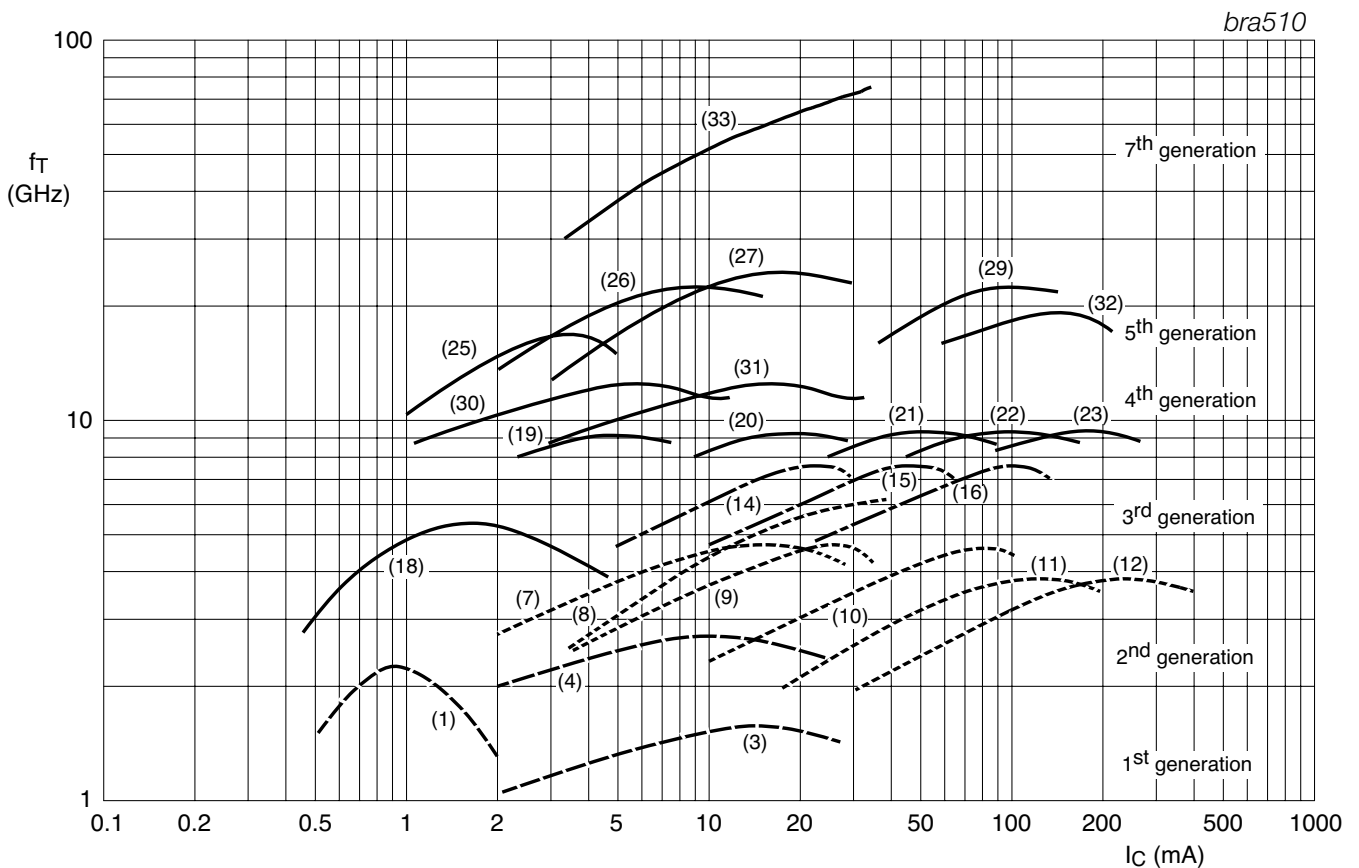
Why choose NXP Semiconductors' wideband transistors:

- ▶ Broad portfolio (1st - 7th generation)
- ▶ Short leadtimes
- ▶ Smallest packages
- ▶ Volume delivery

Wideband transistors

The f_T - I_C curve represents Transition Frequency (f_T) characteristics as a function of collector current (I_C) for the six generations of RF wideband transistors. A group of transistors having the same collector current (I_C) & similar transition frequencies (f_T) represents a curve. The curve number matches products in the table, detailing their RF characteristics.

Wideband transistors line-up per frequency



Wideband transistors (RF small signal)

RF power transistors for handheld equipment

Type	Package	V_{CE0} (max) (V)	I_C (max) (mA)	P_{tot} (max) (mW)	Polarity	GUM (typ) (dB)	@ $f =$ (MHz)	@ $I_C =$ (mA)	@ $V_{CE} =$ (V)
BFG10	SOT143	8	250	400	NPN	7	1900	1	3.6
BFG10/X	SOT143	8	250	400	NPN	7	1900	1	3.6
BFG10W/X	SOT343	10	250	400	NPN	7	1900	1	3.6
BLT50	SOT223	10	500	2000	NPN	-	-	-	-
BLT70	SOT223H	8	250	2100	NPN	-	-	-	-
BLT80	SOT223	10	250	2000	NPN	-	-	-	-
BLT81	SOT223	9.5	500	2000	NPN	-	-	-	-

RF wideband transistors generation 1 / 2 / 3

Type	Generation	Curve	Package	f_T (typ) (GHz)	V_{CE0} (max) (V)	I_C (max) (mA)	P_{tot} (max) (mW)	Polarity	GUM (typ) (dB)	@ $f =$ (MHz)	@ $I_C =$ (mA)	@ $V_{CE} =$ (V)	GUM (typ) (dB)	@ $f =$ (MHz)	@ $I_C =$ (mA)	@ $V_{CE} =$ (V)	NF (typ) (dB)	@ $f =$ (MHz)	@ $I_C =$ (mA)	@ $V_{CE} =$ (V)	NF (typ) (dB)	@ $f =$ (MHz)	@ $I_C =$ (mA)	@ $V_{CE} =$ (V)
BFS17	1 st	3	SOT23	1	15	25	300	NPN	-	-	-	-	-	-	-	-	4.5	500	2	5	-	-	-	-
BFS17W	1 st	3	SOT323	1.6	15	50	300	NPN	-	-	-	-	-	-	-	-	4.5	500	2	5	-	-	-	-
BFT25	1 st	1	SOT23	2.3	5	6.5	30	NPN	18	500	1	1	12	800	1	1	3.8	500	1	1	-	-	-	-
BFG25A/X	2 nd	18	SOT143B	5	5	6.5	32	NPN	-	-	-	-	18	1000	0.5	1	1.8	1000	0.5	1	-	-	-	-
BFG25AW	2 nd	18	SOT343N	5	5	6.5	500	NPN	-	-	-	-	16	2000	0.5	1	2	1000	1	1	-	-	-	-
BFG25AW/X	2 nd	18	SOT343N	5	5	6.5	500	NPN	16	1000	0.5	1	8	2000	0.5	1	2	1000	1	1	-	-	-	-
BFG31	2 nd	10	SOT223	5	-15	-100	1000	PNP	16	500	-70	-10	12	800	-70	-10	-	-	-	-	-	-	-	-
BFG35	2 nd	11	SOT223	4	18	150	1000	NPN	15	500	100	10	11	800	100	10	-	-	-	-	-	-	-	-
BFG92A/X	2 nd	7	SOT143B	5	15	25	400	NPN	16	1000	15	10	11	2000	15	10	2	1000	5	10	3	2000	5	10
BFG97	2 nd	10	SOT223	5.5	15	100	1000	NPN	16	500	70	10	12	800	70	10	-	-	-	-	-	-	-	-
BFQ149	2 nd	10	SOT89	5	-15	-100	1000	PNP	12	500	-50	-10	-	-	-	-	3.75	500	-50	-10	-	-	-	-
BFQ18A	2 nd	11	SOT89	4	18	150	1000	NPN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BFQ19	2 nd	10	SOT89	5.5	15	100	1000	NPN	11.5	500	50	10	7.5	800	50	10	3.3	500	50	10	-	-	-	-
BFR106	2 nd	10	SOT23	5	15	100	500	NPN	-	-	-	-	11.5	800	30	6	3.5	800	30	6	-	-	-	-
BFR92A	2 nd	7	SOT23	5	15	25	300	NPN	14	1000	15	10	8	2000	15	10	3	2000	5	10	2.1	1000	5	10
BFR92AW	2 nd	7	SOT323	5	15	25	300	NPN	14	1000	15	10	8	2000	15	10	2	1000	5	10	3	2000	5	10
BFS17A	2 nd	4	SOT23	2.8	15	25	300	NPN	-	-	-	-	13.5	800	14	10	2.5	800	2	5	-	-	-	-
BFS25A	2 nd	18	SOT323	5	5	6.5	32	NPN	-	-	-	-	13	1000	0.5	1	1.8	1000	1	1	-	-	-	-
BFT25A	2 nd	18	SOT23	5	5	6.5	32	NPN	-	-	-	-	15	1000	0.5	1	1.8	1000	0.5	1	-	-	-	-
BFT92	2 nd	7	SOT23	5	-15	-25	300	PNP	18	500	-14	-10	-	-	-	-	2.5	500	-5	-10	-	-	-	-
BFT92W	2 nd	7	SOT323	4	-15	-35	300	PNP	17	500	-15	-10	11	1000	-15	-10	2.5	500	-5	-10	3	1000	-5	-10
BFT93	2 nd	9	SOT23	5	-12	-35	300	PNP	16.5	500	-30	-5	-	-	-	-	2.4	500	-10	-5	-	-	-	-
BFT93W	2 nd	9	SOT323	4	-12	-50	300	PNP	15.5	500	-30	-5	10	1000	-30	-5	2.4	500	-10	-5	3	1000	-10	-5
BFG135	3 rd	16	SOT223	7	15	150	1000	NPN	16	500	100	10	12	800	100	10	-	-	-	-	-	-	-	-
BFG198	3 rd	15	SOT223	8	10	100	1000	NPN	18	500	50	8	15	800	50	8	-	-	-	-	-	-	-	-
BFG590	3 rd	22	SOT143B	5	15	200	400	NPN	13	900	80	4	7.5	2000	80	4	-	-	-	-	-	-	-	-
BFG590/X	3 rd	22	SOT143B	5	15	200	400	NPN	13	900	80	4	7.5	2000	80	4	-	-	-	-	-	-	-	-
BFG591	3 rd	22	SOT223	7	15	200	2000	NPN	13	900	70	12	7.5	2000	70	12	-	-	-	-	-	-	-	-
BFG67	3 rd	14	SOT143B	8	10	50	380	NPN	17	1000	15	8	10	2000	15	8	1.7	1000	15	8	2.5	2000	5	8
BFG67/X	3 rd	14	SOT143B	8	10	50	380	NPN	17	1000	15	8	10	2000	15	8	1.7	1000	15	8	2.5	2000	5	8
BFG93A	3 rd	8	SOT143B	6	12	35	300	NPN	16	1000	30	8	10	2000	30	8	1.7	1000	5	8	2.3	2000	5	8
BFG93A/X	3 rd	8	SOT143B	6	12	35	300	NPN	16	1000	30	8	10	2000	30	8	1.7	1000	5	8	2.3	2000	5	8
BFG94	3 rd	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFQ591	3 rd	22	SOT89	7	15	200	2250	NPN	11	900	70	12	5.5	2000	70	12	-	-	-	-	-	-	-	-
BFQ67W	3 rd	14	SOT323	8	10	50	300	NPN	13	1000	15	8	8	2000	15	8	1.3	1000	5	8	2.7	2000	15	8
BFR93A	3 rd	8	SOT23	6	12	35	300	NPN	13	1000	30	8	7	2000	30	8	1.9	1000	5	8	3	2000	5	8
BFR93AR	3 rd	8	SOT23	6	12	35	300	NPN	13	1000	30	8	7	2000	30	8	1.9	1000	5	8	3	2000	5	8
BFR93AW	3 rd	8	SOT323	5	12	35	300	NPN	13	1000	30	8	8	2000	30	8	1.5	1000	5	8	2.1	2000	5	8

Bold = Highly recommended product

RF wideband transistors generation 4 - 4.5

Type	Generation	Curve	Package	f _r (typ) (GHz)	V _{CEO} (max) (V)	I _C (max) (mA)	P _{tot} (max) (mW)	Polarity	GUM (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	GUM (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	IP3 (typ) (dBm)	@ IC = (mA)	@ VCE = (V)
BFG505	4 th	19	SOT143B	9	15	18	150	NPN	13	2000	5	6	1.6	900	5	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFG505/X	4 th	19	SOT143B	9	15	18	150	NPN	13	2000	5	6	1.6	900	5	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFG505W	4 th	19	SOT343N	9	15	18	500	NPN	12	2000	5	6	1.6	900	5	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFG505W/X	4 th	19	SOT343N	9	15	18	500	NPN	12	2000	5	6	1.6	900	5	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFG505W/XR	4 th	19	SOT343R	9	15	18	500	NPN	12	2000	5	6	1.6	900	5	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFG520	4 th	20	SOT143B	9	15	70	300	NPN	13	2000	20	6	1.6	900	20	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFG520/X	4 th	20	SOT143B	9	15	70	300	NPN	13	2000	20	6	1.6	900	20	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFG520/XR	4 th	20	SOT143R	9	15	70	300	NPN	13	2000	20	6	1.6	900	20	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFG520W	4 th	20	SOT343N	9	15	70	500	NPN	11	2000	20	6	1.1	900	5	6	1.85	2000	5	6	17	6	900	20	26	20	6
BFG520W/X	4 th	20	SOT343N	9	15	70	500	NPN	11	2000	20	6	1.1	900	5	6	1.85	2000	5	6	17	6	900	20	26	20	6
BFG540	4 th	21	SOT143B	9	15	120	400	NPN	11	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG540/X	4 th	21	SOT143B	9	15	120	400	NPN	11	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG540/XR	4 th	21	SOT143R	9	15	120	400	NPN	11	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG540W	4 th	21	SOT343N	9	15	120	500	NPN	10	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG540W/X	4 th	21	SOT343N	9	15	120	500	NPN	10	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG540W/XR	4 th	21	SOT343R	9	15	120	500	NPN	10	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFG541	4 th	21	SOT223	9	15	120	650	NPN	9	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFM505	4 th	19	SOT363A	9	8	18	500	NPN	10	2000	5	3	1.1	900	1	3	1.9	2000	5	3	-	-	-	-	-	-	-
BFM520	4 th	20	SOT363A	9	8	70	1000	NPN	9	2000	20	3	1.2	900	5	3	1.9	2000	5	3	-	-	-	-	-	-	-
BFQ540	4 th	21	SOT89	9	15	120	1,200	NPN	-	-	-	-	1.9	900	40	8	-	-	-	-	-	-	-	-	-	-	-
BFQ67	4 th	14	SOT23	8	10	50	300	NPN	8	2000	15	8	1.7	1000	15	8	2.7	2000	15	8	-	-	-	-	-	-	-
BFR505	4 th	19	SOT23	9	15	18	150	NPN	10	2000	5	6	1.2	900	5	6	1.9	2000	5	6	4	6	900	5	10	5	6
BFR505T	4 th	19	SOT416	9	15	18	150	NPN	10	2000	5	6	1.2	900	1.25	6	1.9	2000	1.25	6	5	6	900	5	10	5	6
BFR520	4 th	20	SOT23	9	15	70	300	NPN	9	2000	20	6	1.1	900	5	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFR520T	4 th	20	SOT416	9	15	70	150	NPN	9	2000	20	6	1.1	900	5	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFR540	4 th	21	SOT23	9	15	120	500	NPN	7	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
BFS505	4 th	19	SOT323	9	15	18	150	NPN	10	2000	5	6	1.2	900	1.25	6	1.9	2000	1.25	6	4	6	900	5	10	5	6
BFS520	4 th	20	SOT323	9	15	70	300	NPN	9	2000	20	6	1.1	900	5	6	1.9	2000	5	6	17	6	900	20	26	20	6
BFS540	4 th	21	SOT323	9	15	120	500	NPN	8	2000	40	8	1.3	900	10	8	2.1	2000	10	8	21	8	900	40	34	40	8
PBR941	4 th	20	SOT23	8	10	50	360	NPN	9.5	2000	15	6	1.4	1000	5	6	2	2000	5	6	-	-	-	-	-	-	-
PBR951	4 th	21	SOT23	8	10	100	365	NPN	8	2000	30	6	1.3	1000	5	6	2	2000	5	6	-	-	-	-	-	-	-
PRF947	4 th	20	SOT323	8.5	10	50	250	NPN	10	2000	15	6	1.5	1000	5	6	2.1	2000	5	6	-	-	-	-	-	-	-
PRF949	4 th	20	SOT416	9	10	50	150	NPN	10	2000	15	6	1.5	1000	5	6	2.1	2000	5	6	-	-	-	-	-	-	-
PRF957	4 th	21	SOT323	8.5	10	100	270	NPN	9.2	2000	30	6	1.3	1000	5	6	1.8	2000	5	6	-	-	-	-	-	-	-
BFG310/XR	4.5	30	SOT143R	14	6	10	60	NPN	18	1800	5	3	-	-	-	-	1	2000	1	3	1.8	3	1800	5	8.5	5	3
BFG310W/XR	4.5	30	SOT343R	14	6	10	60	NPN	18	1800	5	3	-	-	-	-	1	2000	1	3	1.8	3	1800	5	8.5	5	3
BFG325/XR	4.5	31	SOT143R	14	6	35	210	NPN	18.3	1800	15	3	-	-	-	-	1.1	2000	3	3	8.7	3	1800	15	19.4	15	3
BFG325W/XR	4.5	31	SOT143R	14	6	35	210	NPN	18.3	1800	15	3	-	-	-	-	1.1	2000	3	3	8.7	3	1800	15	19.4	15	3

RF wideband transistors generation 5 - 7

Type	Generation	Curve	Package	f _r (typ) (GHz)	V _{CEO} (max) (V)	I _C (max) (mA)	P _{tot} (max) (mW)	Polarity	GUM (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	GUM (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I _C = (mA)	@ V _{CE} = (V)	IP3 (typ) (dBm)	@ IC = (mA)	@ VCE = (V)
BFG21W	5 th	32	SOT343R	-	4.5	500	600	NPN	10	1900	1	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BFG403W	5 th	25	SOT343R	17	4.5	3.6	16	NPN	22	2000	3	2	1	900	1	2	1.6	2000	1	2	5	1	900	1	6	1	1
BFG410W	5 th	26	SOT343R	22	4.5	12	54	NPN	21	2000	10	2	0.9	900	1	2	1.2	2000	1	2	5	2	2000	10	15	10	2
BFG424F	5 th	27	SOT343F	25	4.5	30	135	NPN	23	2000	25	2	0.8	900	2	2	1.2	2000	2	2	12	2	2000	25	22	25	2
BFG424W	5 th	27	SOT343R	25	4.5	30	135	NPN	22	2000	25	2	0.8	900	2	2	1.2	2000	2	2	12	2	2000	25	22	25	2
BFG425W	5 th	27	SOT343R	25	4.5	30	135	NPN	20	2000	25	2	0.8	900	2	2	1.2	2000	2	2	12	2	2000	25	22	25	2
BFG480W	5 th	29	SOT343R	21	4.5	250	360	NPN	16	2000	80	2	1.2	900	8	2	1.8	2000	8	2	20	3.6	2000	1	28	80	2
BFU725F	7 th	33	SOT343F	70	2.8	40	136	NPN	18	5800	25	2	0.47	2400	5	2	0.7	5800	5	2	8	2	5800	25	19	25	2

Bold = Highly recommended product

3.4 RF ICs

3.4.1 MMICs

NEW: RF MMIC selection guide on www.nxp.com/mmics
Easy-to-use parametric filters help you to choose the right zRF MMIC for your design.

Why choose NXP Semiconductors' MMICs:

- ▶ Reduced RF component count
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- ▶ Volume delivery
- ▶ Short leadtimes
- ▶ Excellent gain flatness*
- ▶ No output inductor necessary anymore*

* = only for new satellite IF gain blocks, BGA28xx-family.

General-purpose wideband amplifiers (50 Ohm gain blocks)

Type	Package	@		Fu ⁽¹⁾	@ 1 GHz					Gain ⁽³⁾ (dB) @				Limits		
		V _s	I _s	@-3 dB	NF	P _{sat}	Gain ⁽³⁾	P _{1dB}	OIP3	100	2.2	2.6	3.0	V _s	I _s	P _{tot}
		(V)	(mA)	(GHz)	(dB)	(dBm)	(dB)	(dBm)	(dBm)	MHz	GHz	GHz	GHz	(V)	(mA)	(mW)
BGA2711	SOT363	5	12.6	3.6 ⁽²⁾	4.8	2.8	13.1	-0.7	8.3	13.0	14.1	13.8	12.7	6	20	200
BGA2748	SOT363	3	5.7	1.9	1.9 ⁽²⁾	-2.3	21.8	-9.2	-1.9	14.8	17.6	15.0	11.9	4	15	200
BGA2771	SOT363	3	33.3	2.4	4.5	13.2 ⁽²⁾	21.4	12.1	21.9	20.3	20.4	17.9	15.5	4	50	200
BGA2776	SOT363	5	24.4	2.8	4.9	10.5	23.2 ⁽²⁾	7.2	18.6	22.4	23.2	21.8	19.3	6	34	200
BGA2709	SOT363	5	23.5	3.6	4.0	12.5	22.7	8.3	22	22.2	23.0	22.1	21.1	6	35	200
BGA2712	SOT363	5	12.3	3.2	3.9	4.8	21.3	0.2	11	20.8	21.9	21.2	19.3	6	25	200
BGM1011	SOT363	5	25.5	-	4.7	13.8	30 ⁽²⁾	12.2	23	25.0	37.0	32.0	28.0	6	35	200
BGM1012	SOT363	3	14.6 ⁽²⁾	3.6	4.8	9.7	20.1	5.6	18	19.5	20.4	19.9	18.7	4	50	200
BGM1013	SOT363	5	27.5	2.1	4.6	14.0	35.5 ⁽²⁾	12.0	22.7	35.2	31.8	29.7	26.1	6	35	200
BGM1014	SOT363	5	21.0 ⁽²⁾	2.5	4.2	12.9	32.3	11.2	20.5	30.0	34.1	30.5	26.4	6	30	200
BGA2714	SOT363	3	4.58	2.7	2.2	-3.4	20.4	-7.9	2.1	20.8	20.8	19.4	16.8	4	10	200
BGA2715	SOT363	5	4.3 ⁽²⁾	3.3	2.6	-4.0	21.7	-8.0	2.3	13.3	23.3	22.1	20.1	6	8	200
BGA2716	SOT363	5	15.9 ⁽²⁾	3.2	5.3	11.6	22.9	8.9	22.2	22.1	22.8	22.1	20.8	6	25	200
BGA2717	SOT363	5	8.0	3.2	2.3 ⁽²⁾	1.4	23.9	-2.6	10.0	18.6	25.1	24.0	22.1	6	15	200

Notes: ⁽¹⁾ Upper -3 dB point, to gain at 1 GHz. ⁽²⁾ Optimized parameter ⁽³⁾ Gain = |S₂₁|²

IF satellite gain blocks

Type	Package	@		Fu	@ 1 GHz			Gain (dB) @			
		V _s	I _s	@-3 dB	NF	Gain	OIP3	250	950	1550	2150
		(V)	(mA)	(GHz)	(dB)	(dB)	(dBm)	(MHz)	(MHz)	(MHz)	(MHz)
BGA2800	SOT363	3.3	9.7	>3	3.4	20.2	11.5	20.0	20.2	20.6	20.6
BGA2801	SOT363	3.3	12.4	3.0	3.6	22.1	13.6	22.3	22.1	23.0	23.8
BGA2815	SOT363	3.3	16.4	>3	3.4	25.4	18.2	26.2	25.4	25.5	25.8
BGA2816	SOT363	3.3	19.6	2.3	2.8	31.2	16.1	32.0	31.2	30.6	28.7
BGA2850	SOT363	5.0	7.7	>3	3.9	23.3	8.7	22.9	23.2	23.9	24.0
BGA2865	SOT363	5.0	22.7	2.6	3.7	31.9	20.9	31.2	31.8	32.6	31.4
BGA2866	SOT363	5.0	15.4	>3	3.6	23.4	17.7	23.0	23.3	24.0	24.3

Bold = Highly recommended product

Bold Red = New, highly recommended product

2-stage variable-gain linear amplifier

Type	Package	@		Frequency Range	@ 900 MHz				@1900 MHz				Limits		
		V _s	I _s		Gain ⁽¹⁾	DG ⁽²⁾	P _{1dB}	ACPR	Gain ⁽¹⁾	DG ⁽²⁾	P _{1dB}	ACPR	V _s	I _s	P _{tot}
		(V)	(mA)												
BGA2031/1	SOT363	3	51	800-2500	24	62	11	49	23	56	13	49	3.3	77	200

Notes: ⁽¹⁾ Gain = GP, power gain. ⁽²⁾ DG = Gain control range

Wideband linear mixer

Type	Package	@		RF Input Frequency Range	IF Output Frequency Range	@ 880 MHz			@1900 MHz			Limits		
		V _s	I _s			NF	Gain ⁽¹⁾	OIP3	NF	Gain ⁽¹⁾	OIP3	V _s	I _s	P _{tot}
		(V)	(mA)											
BGA2022	SOT363	3	6	800-2500	50-500	9	5	4	9	6	10	4	10	40

Notes: ⁽¹⁾ Gain = GP, power gain. ⁽²⁾ DG = Gain control range

Low-noise wideband amplifiers

Type	Package	@		@ 900 MHz			@1800 MHz			Gain ⁽³⁾ (dB) @				Limits		
		V _s	I _s	NF	Gain	IIP3	NF	Gain	IIP3	100	1	2.6	3.0	V _s	I _s	P _{tot}
		(V)	(mA)	(dB)	(dB)	(dBm)	(dB)	(dB)	(dBm)	MHz	GHz	GHz	GHz	(V)	(mA)	(mW)
BGA2001	SOT343R	2.5	4	1.3	22 ⁽¹⁾	-7.4	1.3	19.5 ⁽¹⁾	-4.5	20	17.1	11.6	10.7	4.5	30	135
BGA2003	SOT343R	2.5	10 ⁽²⁾	1.8	24 ⁽¹⁾	-6.5	1.8	16 ⁽¹⁾	-4.8	26	18.6	11.1	10.1	4.5	30	135
BGA2011	SOT363	3	15	1.5	19 ⁽³⁾	10	-	-	-	24	14.8	8	6.5	4.5	30	135
BGA2012	SOT363	3	7	-	-	-	1.7	16 ⁽³⁾	10	22	18.2	11.6	10.5	4.5	15	70

Notes: ⁽¹⁾ MSG ⁽²⁾ Adjustable bias ⁽³⁾ |S₂₁|² **Bold Red** =

General-purpose, med. power ampl. (50 ohm gain blocks)

Type	Package	@		@ 900 MHz				@1800 MHz				Gain ⁽²⁾		Limits		
		V _s ⁽¹⁾	I _s	NF	Gain ⁽²⁾	OIP3	P _{1dB}	NF	Gain ⁽²⁾	OIP3	P1 dB	2.5	V _s ⁽¹⁾	I _s	P _{tot}	
		(V)	(mA)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	GHz	(V)	(mA)	(mW)	
BGA6289	SOT89	4.1	84	3.5	15	31	17	3.7	13	28	15	12	6	120	480	
BGA6489	SOT89	5.1	78	3.1	20	33	20	3.3	16	30	17	15	6	120	480	
BGA6589	SOT89	4.8	81	3.0	22	33	21	3.3	17	32	20	15	6	120	480	

Notes: ⁽¹⁾ Device voltage without bias resistor. ⁽²⁾ Gain = |S₂₁|²

Medium power amplifier MMICs for all 400 - 2700 MHz applications

Type	Package	f	V _{cc}				I _{CQ}		V _{I(D)L(SHDN)}		V _{I(D)H(SHDN)}		I _{I(D)L(SHDN)}	P _{L(1 dB)}	OIP3	NF
			Typ		Max		Max	Max	Min	Max	Min	Max	Typ	Typ / f = 900 MHz		
			(MHz)	(V)	(V)	(mA)	(mA)	(V)	(V)	(V)	(V)	(μA)	(dBm)	(dBm)	(dB)	
BGA7124	SOT908	leadless	400 - 2700	5	5.2	170	190	0	1.5	2.5	5.2	4	25	38	4.5	
BGA7127	SOT908	leadless	400 - 2700	5	5.2	260	280	0	1.5	2.5	5.2	4	27	40	4.5	
BGA7024	SOT89	leadless	400 - 2700	5	5.2	135	155	-	-	-	-	-	25	38	4.5	
BGA7027	SOT89	leadless	400 - 2700	5	5.2	260	280	-	-	-	-	-	27	40	4.5	
BGA7130	SOT908	leadless	400 - 2700	5	5.2	500	520	-	-	-	-	-	30	43	4.5	
BGA7133	SOT908	leadless	400 - 2700	5	5.2	960	980	-	-	-	-	-	33	46	4.5	

Bold Red = New, highly recommended product

SiGe:C MMICs:

Type	Package	Supply voltage		Supply current		@ 1.575 GHz														
		V _{cc}		I _{cc}		Insertion power gain		Noise figure	Input power at 1 dB gain compression				Input third-order intercept point f ₁ = 1713 MHz, f ₂ = 1851 MHz							
		V		mA		s ₂₁ ²		NF	P _{I(1 dB)}				IP _{3i}							
		Min	Max	Min	Typ	Max	Min	Typ	Max	Typ	V _{cc} = 1.8 V, Min	V _{cc} = 1.8 V, Typ	V _{cc} = 2.5 V, I _{cc} = 5 mA	V _{cc} = 2.85 V, Min	V _{cc} = 2.85 V, Typ	V _{cc} = 1.8 V, Min	V _{cc} = 1.8 V, Typ	V _{cc} = 2.5 V, I _{cc} = 5 mA	V _{cc} = 2.85 V, Min	V _{cc} = 2.85 V, Typ
BGU7003	SOT891	2.2	2.85	3	-	15	16	18.3	20	0.8	-	-	-20	-	-	-	-	0	-	-
BGU7005	SOT886	1.5	2.85	-	5	-	-	16	-	0.9	-14	-10	-	-11	-8	5	10	-	5	12

Bold Red = New, highly recommended product

3.4.2 Low noise LO generators for VSAT and general microwave applications

Why choose NXP Semiconductors' low noise LO generators:

- ▶ Lowest total cost of ownership
- ▶ Alignment free concept
- ▶ Easy circuit design-in
- ▶ Improved LO stability

Low noise LO generators for VSAT applications

Type	Package	$f_{IN(REF)}$	V_{CC}	I_{CC}	PLL phase noise @ N=64, @100 kHz	PLL $f_{o(RF)}$	Output buffer		Input
			Typ	Max			Max	P_o	$RL_{out(RF)}$
		MHz	V	mA	dBc/Hz	(GHz)	dBm	dB	dBm
TFF1003HN	SOT616	50~815	3.3	130	-92	12.8~13.05	-5	-10	-10
TFF1006HN	SOT616	36~586	3.3	130	-92	9.375	-5	-10	-10
TFF1007HN	SOT616	230.46~234.38	3.3	130	-104	14.75~15	-3	-10	-10

Bold Red = New, highly recommended product

Low noise LO generators for general microwave applications

Type	Package	$f_{IN(REF)}$	V_{CC}	I_{CC}	PLL phase noise @ N=64		PLL			Output buffer		Input
			Typ	Max	@ 100 kHz	@ 10 MHz	$f_o(RF)$			P_o	$RL_{out(RF)}$	S_i
		MHz	V	mA	dBc/Hz	dBc/Hz	Min	Typ	Max	Typ	Max	Min
TFF11070HN	SOT616	27 - 448	3.3	100	-95	-131	6.84	7.00	7.16	-5	-10	-10
TFF11073HN	SOT616	28 - 468	3.3	100	-95	-131	7.16	7.33	7.49	-5	-10	-10
TFF11077HN	SOT616	29 - 490	3.3	100	-95	-131	7.49	7.67	7.84	-5	-10	-10
TFF11080HN	SOT616	31 - 513	3.3	100	-95	-131	7.84	8.02	8.21	-5	-10	-10
TFF11084HN	SOT616	32 - 537	3.3	100	-95	-131	8.21	8.40	8.59	-5	-10	-10
TFF11088HN	SOT616	34 - 562	3.3	100	-95	-131	8.59	8.79	8.99	-5	-10	-10
TFF11092HN	SOT616	35 - 588	3.3	100	-95	-131	8.99	9.20	9.41	-5	-10	-10
TFF11096HN	SOT616	37 - 616	3.3	100	-95	-131	9.41	9.63	9.85	-5	-10	-10
TFF11101HN	SOT616	38 - 644	3.3	100	-95	-131	9.85	10.07	10.31	-5	-10	-10
TFF11105HN	SOT616	40 - 674	3.3	100	-95	-131	10.31	10.54	10.79	-5	-10	-10
TFF11110HN	SOT616	42 - 706	3.3	100	-95	-131	10.79	11.03	11.29	-5	-10	-10
TFF11115HN	SOT616	44 - 738	3.3	100	-95	-131	11.29	11.55	11.81	-5	-10	-10
TFF11121HN	SOT616	46 - 773	3.3	100	-95	-131	11.81	12.09	12.36	-5	-10	-10
TFF11126HN	SOT616	48 - 809	3.3	100	-95	-131	12.36	12.65	12.94	-5	-10	-10
TFF11132HN	SOT616	51 - 846	3.3	100	-95	-131	12.94	13.24	13.54	-5	-10	-10
TFF11139HN	SOT616	53 - 886	3.3	100	-95	-131	13.54	13.85	14.17	-5	-10	-10
TFF11145HN	SOT616	55 - 927	3.3	100	-95	-131	14.17	14.50	14.83	-5	-10	-10
TFF11152HN	SOT616	58 - 970	3.3	100	-95	-131	14.83	15.18	15.52	-5	-10	-10

Bold Red = New, highly recommended product

3.5 RF MOS transistors

3.5.1 JFETs

NEW: JFET selection guide on www.nxp.com/rffets
Easy-to-use parametric filters help you to choose the right junction field effect transistor for your design.

Why choose NXP Semiconductors' JFETs:

- ▶ Reliable volume supplier
- ▶ Short leadtimes
- ▶ Broad portfolio

N-channel junction field-effect transistors for switching

Type	Package	V _{DS} (V)	I _G (mA)	CHARACTERISTICS										
				I _{DSS} (mA)		-V _{GSoff} (V)		R _{DS(on)} (Ω)	C _{rs} (pF)		t _{on} (ns)		t _{off} (ns)	
				min	max	min	max	max	min	max	typ	max	typ	max
BSR56	SOT23	40	50	50	-	4	10	25	-	5	-	-	-	25
BSR57	SOT23	40	50	20	100	2	6	40	-	5	-	-	-	50
BSR58	SOT23	40	50	8	80	0.8	4	60	-	5	-	-	-	100
PMBFJ108	SOT23	25	50	80	-	3	10	8	-	15	4	-	6	-
PMBFJ109	SOT23	25	50	40	-	2	6	12	-	15	4	-	6	-
PMBFJ110	SOT23	25	50	10	-	0.5	4	18	-	15	4	-	6	-
PMBFJ111	SOT23	40	50	20	-	3	10	30	-	typ.3	13	-	35	-
PMBFJ112	SOT23	40	50	5	-	1	5	50	-	typ.3	13	-	35	-
PMBFJ113	SOT23	40	50	2	-	0.5	3	100	-	typ.3	13	-	35	-
J108	SOT54	25	50	80	-	3	10	8	-	15	4	-	6	-
J109	SOT54	25	50	40	-	2	6	12	-	15	4	-	6	-
J110	SOT54	25	50	10	-	0.5	4	18	-	15	4	-	6	-
J111	SOT54	40	50	20	-	3	10	30	-	typ.3	13	-	35	-
J112	SOT54	40	50	5	-	1	5	50	-	typ.3	13	-	35	-
J113	SOT54	40	50	2	-	0.5	3	100	-	typ.3	13	-	35	-
PMBF4391	SOT23	40	50	50	150	4	10	30	-	3.5	-	15	-	20
PMBF4392	SOT23	40	50	25	75	2	5	60	-	3.5	-	15	-	35
PMBF4393	SOT23	40	50	5	30	0.5	3	100	-	3.5	-	15	-	50

P-channel junction field-effect transistors for switching

Type	Package	V _{DS} (V)	I _G (mA)	CHARACTERISTICS										
				I _{DSS} (mA)		-V _{GSoff} (V)		R _{DS(on)} (Ω)	C _{rs} (pF)		t _{on} (ns)		t _{off} (ns)	
				min	max	min	max	max	min	max	typ	max	typ	max
PMBFJ174	SOT23	30	50	20	135	5	10	85	-	typ.4	7	-	15	-
PMBFJ175	SOT23	30	50	7	70	3	6	125	-	typ.4	15	-	30	-
PMBFJ176	SOT23	30	50	2	35	1	4	250	-	typ.4	35	-	35	-
PMBFJ177	SOT23	30	50	1.5	20	0.8	2.25	300	-	typ.4	45	-	45	-
J174	SOT54	30	50	20	135	5	10	85	-	typ.4	7	-	15	-
J175	SOT54	30	50	7	70	3	6	125	-	typ.4	15	-	30	-
J176	SOT54	30	50	2	35	1	4	250	-	typ.4	35	-	35	-
J177	SOT54	30	50	1.5	20	0.8	2.25	300	-	typ.4	45	-	45	-

N-channel junction field-effect transistors for general RF applications

Type	Package	V_{DS}		I_G		CHARACTERISTICS							
		(V)		(mA)		I_{DSS}		$V_{GS(off)}$		$ Y_{fs} $		C_{rs}	
		max	max	min	max	min	max	min	max	min	max	min	max
DC, LF and HF amplifiers													
BF245A	SOT54	30	10	2	6.5	<8		3	6.5	Typ.=1.1		-	
BF245B	SOT54	30	10	6	15	<8		3	6.5	Typ.=1.1		-	
BF245C	SOT54	30	10	12	25	<8		3	6.5	Typ.=1.1		-	
BF545A	SOT23	30	10	2	6.5	0.4	7.5	3	6.5	0.8	-		
BF545B	SOT23	30	10	6	15	0.4	7.5	3	6.5	0.8	-		
BF545C	SOT23	30	10	12	25	0.4	7.5	3	6.5	0.8	-		
BF556A	SOT23	30	10	3	7	0.5	7.5	4.5	-	0.8	-		
BF556B	SOT23	30	10	6	13	0.5	7.5	4.5	-	0.8	-		
BF556C	SOT23	30	10	11	18	0.5	7.5	4.5	-	0.8	-		
Pre-amplifiers for AM tuners in car radios													
BF861A	SOT23	25	10	2	6.5	0.2	1.0	12	20	2.1	2.7		
BF861B	SOT23	25	10	6	15	0.5	1.5	16	25	2.1	2.7		
BF861C	SOT23	25	10	12	25	0.8	2	20	30	2.1	2.7		
BF862	SOT23	20	10	10	25	0.3	2	35	-	typ=1.9	-		
RF stages FM portables, car radios, main radios & mixer stages													
BF510 ⁽¹⁾	SOT23	20	10	0.7	3	typ. 0.8		2.5		0.4	0.5		
BF511 ⁽¹⁾	SOT23	20	10	2.5	7	typ. 1.5		4		0.4	0.5		
BF512 ⁽¹⁾	SOT23	20	10	6	12	typ. 2.2		6		0.4	0.5		
BF513 ⁽¹⁾	SOT23	20	10	10	18	typ. 3		7		0.4	0.5		
Low-level general purpose amplifiers													
BFR30	SOT23	25	5	4	10	<5		1	4	1.5	-		
BFR31	SOT23	25	5	1	5	<2.5		1.5	4.5	1.5	-		
General-purpose amplifiers													
BFT46	SOT23	25	5	0.2	1.5	<1.2		>1		1.5	-		
AM input stages UHF/VHF amplifiers													
PMBFJ308	SOT23	25	50	12	60	1	6.5	>10		1.3	2.5		
PMBFJ309	SOT23	25	50	12	30	1	4	>10		1.3	2.5		
PMBFJ310	SOT23	25	50	24	60	2	6.5	>10		1.3	2.5		
PMBFJ620	SOT363	25	50	24	60	2	6.5	10		1.3	2.5		

Bold = Highly recommended product

⁽¹⁾ Asymmetrical

3.5.2 MOSFETs

NEW: RF MOSFET selection guide on www.nxp.com/rffets
Easy-to-use parametric filters help you to choose the right RF MOSFET for your design.

Why choose NXP Semiconductors' MOSFETs:

- ▶ Reference designs for TV tuning
- ▶ Short leadtimes
- ▶ Broad portfolio
- ▶ Smallest packages
- ▶ 2-in-1 FETs for tuner applications
- ▶ Reliable volume supply
- ▶ Best performance MOSFETs for TV tuning

N-channel, single MOSFETs for switching

Type	Package	V _{DS} (V)	CHARACTERISTICS															
			I _b (mA)		I _{DSS} (mA)		V _{(th)GS} (V)		R _{DS(ON)} (Ω)	C _{rs} (pF)		t _{on} (ns)		t _{off} (ns)		S _{21(on)} ₂ (dB)	S _{21(off)} ₂ (dB)	MODE
			max	max	min	max	min	max	max	min	max	typ	max	typ	max	max	min	
BSS83	SOT143	10	50	-	-	0.1 ⁽²⁾	2 ⁽¹⁾	45	-	-	-	1	-	5	-	-	enh.	
Silicon RF Switches																		
BF1107	SOT23	3	10	-	100 ⁽³⁾	-	7 ⁽⁴⁾	20	-	-	-	-	-	-	2.5	30	depl.	
BF1108⁵⁾	SOT143B	3	10	-	100 ⁽³⁾	-	7 ⁽⁴⁾	20	-	-	-	-	-	3	30	depl.		
BF1108R⁵⁾	SOT143R	3	10	-	100 ⁽³⁾	-	7 ⁽⁴⁾	20	-	-	-	-	-	3	30	depl.		

Bold = Highly recommended product

N-channel, dual-gate MOSFETs

Type	Package	V _{DS} (V)	I _b (mA)	CHARACTERISTICS											VHF	UHF
				I _{DSX} (mA)		V _{(th)GS} (V)		Y _{fs} (mS)		C _{is} (pF)	C _{os} (pF)	F @ 800 MHz (dB)				
				min	max	min	max	min	max	typ	typ	typ				
With external bias																
BF908	SOT143	12	40	3	27	-	-2	36	50	3.1	1.7	1.5	X	X		
BF908R	SOT143R	12	40	3	27	-	-2	36	50	3.1	1.7	1.5	X	X		
BF908WR	SOT343R	12	40	3	27	-	-2	36	50	3.1	1.7	1.5	X	X		
BF991	SOT143	20	20	4	25	-	-2.5	10	-	2.1	1.1	1	X	-		
BF992	SOT143	20	40	-	-	-	-1.3	20	-	4	2	1.2 ⁽⁷⁾	X	-		
BF994S	SOT143	20	30	4	20	-	-2.5	15	-	2.5	1	1 ⁽⁷⁾	X	-		
BF996S	SOT143	20	30	4	20	-	-2.5	15	-	2.3	0.8	1.8	-	X		
BF998	SOT143	12	30	2	18	-	-2.0	21	-	2.1	1.05	1	X	X		
BF998R	SOT143R	12	30	2	18	-	-2.0	21	-	2.1	1.05	1	X	X		
BF998WR	SOT343R	12	30	2	18	-	-2.5	22	-	2.1	1.05	1	X	X		
Fully internal bias																
BF1105	SOT143	7	30	8	16	0.3	1.2 ⁽⁶⁾	25	-	2.2 ⁽⁹⁾	1.2 ⁽⁸⁾	1.7	X	X		
BF1105R	SOT143R	7	30	8	16	0.3	1.2 ⁽⁶⁾	25	-	2.2 ⁽⁹⁾	1.2 ⁽⁸⁾	1.7	X	X		
BF1105WR	SOT343R	7	30	8	16	0.3	1.2 ⁽⁶⁾	25	-	2.2 ⁽⁹⁾	1.2 ⁽⁸⁾	1.7	X	X		
BF1109	SOT143	11	30	8	16	0.3	1.2 ⁽⁶⁾	24	-	2.2 ⁽⁹⁾	1.3 ⁽⁸⁾	1.5	X	X		
BF1109R	SOT143R	11	30	8	16	0.3	1.2 ⁽⁶⁾	24	-	2.2 ⁽⁹⁾	1.3 ⁽⁸⁾	1.5	X	X		
BF1109WR	SOT343R	11	30	8	16	0.3	1.2 ⁽⁶⁾	24	-	2.2 ⁽⁹⁾	1.3 ⁽⁸⁾	1.5	X	X		
Partly internal bias																
BF904(A)	SOT143	7	30	8	13	0.3	1 ⁽⁶⁾	22	30	2.2	1.3	2	X	X		
BF904(AR)	SOT143R	7	30	8	13	0.3	1 ⁽⁶⁾	22	30	2.2	1.3	2	X	X		
BF904(AWR)	SOT343R	7	30	8	13	0.3	1 ⁽⁶⁾	22	30	2.2	1.3	2	X	X		
BF909 (A)	SOT143	7	40	12	20	0.3	1 ⁽⁶⁾	36	50	3.6	2.3	2	X	X		
BF909(AR)	SOT143R	7	40	12	20	0.3	1 ⁽⁶⁾	36	50	3.6	2.3	2	X	X		
BF909(AWR)	SOT343R	7	40	12	20	0.3	1 ⁽⁶⁾	36	50	3.6	2.3	2	X	X		

⁽¹⁾ Asymmetrical

⁽²⁾ V_{GS(th)}

⁽³⁾ I_D

⁽⁴⁾ V_{SG}

⁽⁵⁾ Depletion FET plus diode in one package

⁽⁶⁾ V_{GS(th)}

⁽⁷⁾ @ 200 MHz

⁽⁸⁾ C_{OSS}

⁽⁹⁾ C_{IG}

N-channel, dual-gate MOSFETs

Type	Package	V_{DS}	I_D	CHARACTERISTICS										VHF	UHF
				I_{DSX}		$V_{(th)igs}$		$ Y_{fs} $		C_{is}	C_{os}	$F @ 800 \text{ MHz}$			
		(V)	(mA)	(mA)		(V)		(mS)		(pF)	(pF)	(dB)			
		max	max	min	max	min	max	min	max	typ	typ	typ			
Partly internal bias															
BF1100	SOT143	14	30	8	13	0.3	1.2 ⁽⁶⁾	24	33	2.2	1.4	2	X	X	
BF1100R	SOT143R	14	30	8	13	0.3	1.2 ⁽⁶⁾	24	33	2.2	1.4	2	X	X	
BF1100WR	SOT343R	14	30	8	13	0.3	1.2 ⁽⁶⁾	24	33	2.2	1.4	2	X	X	
BF1101	SOT143	7	30	8	16	0.3	1 ⁽⁶⁾	25	-	2.2	1.2 ⁽⁸⁾	1.7	X	X	
BF1101R	SOT143R	7	30	8	16	0.3	1 ⁽⁶⁾	25	-	2.2	1.2 ⁽⁸⁾	1.7	X	X	
BF1101WR	SOT343R	7	30	8	16	0.3	1 ⁽⁶⁾	25	-	2.2	1.2 ⁽⁸⁾	1.7	X	X	
BF1102(R) ⁽¹⁰⁾	SOT343	7	40	12	20	0.3	1.2 ⁽⁶⁾	36	-	2.8 ⁽⁹⁾	1.6 ⁽⁸⁾	2	X	X	
BF1201	SOT143	10	30 ⁽¹⁾	11	19	0.3	1.2 ⁽⁶⁾	23	35	2.6	0.9	1.9	X	X	
BF1201R	SOT143R	10	30 ⁽¹⁾	11	19	0.3	1.2 ⁽⁶⁾	23	35	2.6	0.9	1.9	X	X	
BF1201WR	SOT343R	10	30 ⁽¹⁾	11	19	0.3	1.2 ⁽⁶⁾	23	35	2.6	0.9	1.9	X	X	
BF1202	SOT143	10	30	8	16	0.3	1.2 ⁽⁶⁾	25	40	1.7	0.85	1.1	X	X	
BF1202R	SOT143R	10	30	8	16	0.3	1.2 ⁽⁶⁾	25	40	1.7	0.85	1.1	X	X	
BF1202WR	SOT343R	10	30	8	16	0.3	1.2 ⁽⁶⁾	25	40	1.7	0.85	1.1	X	X	
BF1203 ⁽¹¹⁾	SOT363	10	30	11	19	0.3	1.2 ⁽⁶⁾	23	35	2.6	0.9	1.9	X	-	
		10	30	8	16	0.3	1.2	25	40	1.7	0.85	1.1	-	X	
BF1204 ⁽¹⁰⁾	SOT363	10	30	8	16	0.3	1.2 ⁽⁶⁾	25	40	1.7	0.85	1.1	X	X	
BF1205C ⁽¹¹⁾⁽¹²⁾⁽¹³⁾	SOT363	6	30	14	24	0.3	1	26	41	2.2	0.9	1.4	X	-	
		6	30	9	17	0.3	1	28	43	2	0.85	1.4	-	X	
BF1205 ⁽¹¹⁾⁽¹²⁾⁽¹³⁾	SOT363	10	30	8	16	0.3	1.0	26	40	1.8	0.75	1.2	X	-	
		7	30	8	16	0.3	1.0	26	40	2.0	0.85	1.4	-	X	
BF1206 ⁽¹¹⁾	SOT363	6	30	14	23	0.3	1.0	33	48	2.4	1.1	1.6	X	-	
		6	30	9	17	0.3	1.0	29	44	1.7	0.85	1.4	-	X	
BF1206F ⁽¹¹⁾	SOT666	6	30	3	6.5	0.3	1.0	17	32	2.4	1.1	1.1	X	-	
		6	30	3	6.5	0.3	1.0	17	32	1.7	0.85	1.0	-	X	
BF1207 ⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	SOT363	6	30	13	23	0.3	1.0	25	40	2.2	0.9	1.4	X	-	
		6	30	9	19	0.3	1.0	26	41	1.8	0.8	1.4	-	X	
BF1208 ⁽¹¹⁾⁽¹²⁾⁽¹³⁾	SOT666	6	30	14	24	0.3	1	26	41	2.2	0.9	1.4	X	-	
		6	30	9	17	0.3	1	28	43	2	0.85	1.4	-	X	
BF1208D ⁽¹¹⁾⁽¹²⁾⁽¹³⁾	SOT666	6	30	14	24	0.3	1	26	41	2.1	0.8	1.1	X	-	
		6	30	10	20	0.3	1	25	40	2.1	0.85	1.4	-	X	
BF1210 ⁽¹¹⁾⁽¹²⁾	SOT363	6	30	14	24	0.3	1	26	41	2.2	0.9	1.4	X	-	
		6	30	9	17	0.3	1	28	43	2	0.85	1.4	-	X	
BF1211	SOT143	6	30	11	19	0.3	1.0	25	40	2.1	0.9	1.3	X	-	
BF1211R	SOT143R	6	30	11	19	0.3	1.0	25	40	2.1	0.9	1.3	X	-	
BF1211WR	SOT343	6	30	11	19	0.3	1.0	25	40	2.1	0.9	1.3	X	-	
BF1212	SOT143	6	30	8	16	0.3	1.0	28	43	1.7	0.9	1.1	-	X	
BF1212R	SOT143R	6	30	8	16	0.3	1.0	28	43	1.7	0.9	1.1	-	X	
BF1212WR	SOT343	6	30	8	16	0.3	1.0	28	43	1.7	0.9	1.1	-	X	
BF1214 ⁽¹⁰⁾	SOT363	6	30	13	23	0.3	1.0	25	35	2.2	0.9	1.4	X	X	

Bold = Highly recommended product

⁽¹⁾ Asymmetrical

⁽²⁾ $V_{GS(th)}$

⁽³⁾ I_D

⁽⁴⁾ V_{SG}

⁽⁵⁾ Depletion FET plus diode in one package

⁽⁷⁾ @200 MHz

⁽⁸⁾ C_{OSS}

⁽⁹⁾ C_{ig}

⁽¹⁰⁾ Two equal dual gate MOSFETs in one package

⁽¹¹⁾ Two low noise gain amplifiers in one package

⁽¹²⁾ Transistor A: fully internal bias, transistor B: partly internal bias

⁽¹³⁾ Internal switching function

⁽¹⁴⁾ Transistor A: partly internal bias, transistor B: fully internal bias

3.6 RF Modules

NEW: CATV module selection guide on www.nxp.com/catv
Easy-to-use parametric filters help you to choose the right CATV module for your design.

Why choose NXP Semiconductors' RF Modules:

- ▶ Excellent linearity, stability and reliability
- ▶ Rugged construction
- ▶ Extremely low noise
- ▶ High power gain
- ▶ Low total cost of ownership

CATV types for Chinese (C-types) and Indian market (OM-types)

New in our CATV Hybrid portfolio are two families of products. The C types are specially designed for the Chinese market, fitting two major governmental projects. And the OM types, also called the INDI types, are designed for low-end CATV

infrastructure networks deployed in India. Both families will be extended in the following months to cover most of those two specific market segments.

C types (China)

- ▶ CATV push pulls, chapter 3.6.2 : BGY588C, BGE788C, CGY888C
- ▶ CATV power doublers, chapter 3.6.3 : BGD712C
- ▶ CATV optical receivers, chapter 3.6.4 : BGO807C

OM types (India)

- ▶ CATV push pulls, chapter 3.6.2 : OM7650 and OM7670

3.6.1 CATV Reverse Hybrids

Frequency range	Type number	Gain (dB)	Slope (dB)	FL	RL _{IN} /RL _{OUT}	CTB	XMOD	CSO	@ Ch	@ Vo (dBmV)	F @ f _{MAX}	I _{tot} (mA)
5 -75 MHz	BGY68	29.2 - 30.8	-0.2 - 0.5	± 0.2	20/20	-68	-60	-	4	50	3.5	135
5 -120 MHz	BGY66B	24.5 - 25.5	-0.2 - 0.5	± 0.2	20/20	-66	-54	-	14	48	5	135
5 -200 MHz	BGY67	21.5 - 22.5	-0.2 - 0.5	± 0.2	20/20	-67	-60	-	22	50	5.5	230
	BGY67A	23.5 - 24.5	-0.2 - 0.5	± 0.2	20/20	-67	-59	-	22	50	5.5	230
5-200 MHz	BGR269	34.5 - 35.5	0 - 0.6	± 0.4	20/20	-57	-50	-70	28	50	5.2	160

3.6.2 CATV Push-Pulls

Frequency range	Type number	Gain (dB)	Slope (dB)	FL	RL _{IN} /RL _{OUT}	CTB	XMOD	CSO	@ Ch	@ Vo (dBmV)	F @ f _{MAX}	I _{tot} (mA)
40 - 550 MHz	OM7650	33.2 - 35.5	0.2 - 2	-	10/10	-45	-	-57	77	44	8	340
	BGY588C	33.2 - 35.5	0.2 - 1.7	± 0.5	16/16	-57	-	-62	77	44	8	345
	BGY585A	17.7 - 18.7	0.5 - 2	± 0.2	20/20	-59	-62	-59	77	44	8	240
	BGY587	21.5 - 22.5	0.2 - 1.5	± 0.2	20/20	-57	-58	-54	77	44	7	240
	BGY587B	26.2 - 27.8	0.5 - 2.5	± 0.4	20/20	-57	-60	-57	77	44	6.5	340
	BGY588N	33.5 - 35.5	0.5 - 1.5	± 0.4	20/20	-57	-59	-62	77	44	6	340
40 - 600 MHz	BGY685A	17.7 - 18.7	0.5 - 2.2	± 0.2	20/20	-55	-60	-56	85	44	8.5	240
	BGY687	21 - 22	0.8 - 2.2	± 0.2	20/20	-54	-54	-52	85	44	6.5	240
40 - 750 MHz	OM7670	33.2 - 35.2	1/4	-	10/8	-43	-	-54	110	44	8	340
	BGY785A	18 - 19	0 - 2	± 0.3	20/20	-53	-56	-53	110	44	7	240
	BGE788C	33.2 - 35.2	0.3 - 2.3	± 0.6	16/16	-49	-	-52	110	44	8	325
	BGY787	21 - 22	0 - 1.5	± 0.5	20/20	-53	-52	-53	110	44	6.5	240
	BGE787B	28.5 - 29.5	0.2 - 2.2	± 0.5	20/20	-50	-54	-56	110	44	7	320
	BGE788	33.5 - 34.5	0.5 - 2.5	± 0.5	20/20	-49	-51	-52	110	44	7	320
40 - 870 MHz	BGY883	14.5 - 15.5	0 - 2	± 0.3	20/20	-61	-61	-61	49	44	8.5	235
	BGE885	16.5 - 17.5	0.2 - 1.2	± 0.5	14/14	-	-	-	129	59	8	240
	BGX885N	16.5 - 17.5	0.2 - 1.4	± 0.3	20/20	-	-	-	129	59	8	240
	BGY885A	18 - 19	0 - 2	± 0.3	20/20	-61	-61	-61	49	44	8	240
	BGY887	21 - 22	0.2 - 2	± 0.3	20/20	-55	-61	-57	129	40	6.5	235
	CGY888C	34.5 - 36.5	0.5 - 2.5	± 0.5	20/20	-68	-	-66	112	44	4.0	280
	BGY835C	33.5 - 34.5	0.5 - 2.5	± 0.6	21/21	-60	-59	-55	49	44	7.0	340
	BGY887B	28.5 - 29.5	0.5 - 2.5	± 0.5	20/20	-60	-60	-60	49	44	6.5	340
	BGY888	33.5 - 34.5	0.5 - 2.5	± 0.5	20/20	-60	-59	-55	49	44	7	340
40 -1000 MHz	BGY1085A	18 - 19	0 - 2	± 0.3	20/20	-53	-54	-56	150	44	7.5	240

CATV Push-Pulls 1 GHz

Freq range	Type	Gain	Slope	fl	RL _{IN} /RL _{OUT}	CTB	Xmod	CSO	@ Ch	@ Vout	NF	I _{tot}
40-1000 MHz	CGY1041	22	1.0 - 2.0 dB	±0.5	20/18 dB	-62 dBc	-58 dBc	-64 dBc	79NTSC+75digital	44 dBmV flat	4.0 dB	270 mA
40-1000 MHz	CGY1043	24	1.0 - 2.0 dB	±0.5	20/18 dB	-62 dBc	-58 dBc	-64 dBc	79NTSC+75digital	44 dBmV flat	4.0 dB	270 mA
40-1000 MHz	CGY1047	28	1.0 - 2.0 dB	±0.5	20/18 dB	-62 dBc	-58 dBc	-64 dBc	79NTSC+75digital	44 dBmV flat	4.0 dB	270 mA

Bold Red = New, highly recommended product

3.6.3 CATV power doublers

Frequency range	Type number	Gain (dB)	Slope (dB)	FL	RL _{IN} /RL _{OUT}	CTB	XMOD	CSO	@ Ch	@ Vo (dBmV)	F @ f _{MAX}	I _{tot} (mA)
40 - 550 MHz	BGD502	18 - 19	0.2 - 2.2	± 0.3	20/20	-65	-68	-62	77	44	8	435
	BGD702	18 - 19	0.2 - 2	± 0.5	20/20	-58	-62	-58	110	44	8.5	435
40 - 750 MHz	BGD702N	18 - 19	0.2 - 2	± 0.25	20/20	-58	-62	-58	110	44	8.5	435
	BGD712	18.2 - 18.8	0.5 - 1.5	± 0.35	23/23	-62	-63	-63	112	44	7	410
	BGD712C	18.2 - 18.8	0.5 - 1.5	± 0.4	17/17	-62	-	-63	112	44	7	410
	BGD704	19.5 - 20.5	0 - 2	± 0.5	20/20	-57	-61	-56	110	44	8.5	435
	BGD714	20 - 20.6	0.5 - 1.5	± 0.35	23/23	-61	-62	-62	112	44	7	410
	BGD885	16.5 - 17.5	0.2 - 1.6	± 0.5	20/20	-	-	-	129	59	8	450
40 - 870 MHz	BGD802	18 - 19	0.2 - 2	± 0.5	20/20	-54	-59	-56	129	44	9	410
	BGD812	18.2 - 18.8	0.4 - 1.4	± 0.5	23/23	-58	-62	-60	132	44	7.5	410
	BGD804	19.5 - 20.5	0.2 - 2	± 0.5	20/20	-53	-61	-54	129	44	7.5	410
	BGD814	19.7 - 20.3	0.4 - 1.4	± 0.5	22/25	-57.5	-62	-59	132	44	7.5	410
	BGD816L	21.2 - 21.8	0.5 - 1.5	± 0.5	22/25	-55	-58	-56	129	44	7.5	375
	CGD942C	20.5 - 22.5	1 - 2	± 0.3	18/18	-66	-58	-68	132	48	3.5	450
	CGD944C	23 - 25	1 - 2	± 0.3	18/18	-66	-58	-68	132	48	3.5	450
	CGD1040Hi	21	1.5	0.5	-20/-20	-65	-68	-68	79 channels	50	<6	470
CGD1042Hi	23	1.5	0.5	-20/-20	-65	-68	-68	79 channels	50	<6	470	
40 - 1000 MHz	CGD1044Hi	25	1.5	0.5	-20/-20	-65	-68	-68	79 channels	50	<6	470
	CGD1042H	23	0 - 1.5	± 0.3	17.5/20	-70	-67	-68	79 + 75*	59	5.0	450
	CGD1044H	25	0 - 1	± 0.3	17.5/20	-70	-67	-68	79 + 75*	59	5.0	450

Bold Red = New, highly recommended product

Bold = Highly recommended product

* = digital channels

3.6.4 CATV optical receivers

Frequency range	Type number	Rmin (V/W)	Slope (dB)	FL	S22 (dB)	d3	d2	@fm (MHz)	@Pi (mW)	F @ f _{MAX}	Conn.	I _{tot} (mA)
Forward Path Receiver												
40 - 870 MHz	BGO807	800	0 - 2	1	11	-71	-55	854.5	1	8.5		205
	BGO807/FC0	750	0 - 2	1	11	-71	-55	854.5	1	8.5	FC	205
	BGO807/SC0	750	0 - 2	1	11	-71	-55	854.5	1	8.5	SC	205
	BGO807C	800	0 - 2	1	11	-71	-54	854.4	1	8.5		205
	BGO807C/FC0	750	0 - 2	1	11	-71	-55	854.5	1	8.5	FC	205
	BGO807C/SC0	750	0 - 2	1	11	-71	-55	854.5	1	8.5	SC	205
	BGO827	800	0 - 2	1	11	-73	-57	854.5	1	8.5		205
	BGO827/FC0	750	0 - 2	1	11	-73	-57	854.5	1	8.5	FC	205
	BGO827/SC0	750	0 - 2	1	11	-73	-57	854.5	1	8.5	SC	205

Bold = Highly recommended product

* NOTES: This table is for reference only.

For full data please refer to the latest datasheet.

For availability please check the NXP Sales office.

Description

Frequency range: minimum and maximum frequency in MHz at which data are characterized @Ch/@Vo. The number of channels and the output voltage at which CTB, XM, CSO and d2 are characterized @fm. Measurement frequency is F. Noise Figure is in dB or Noise in pA/Sqrt(Hz). FL is Flatness. Rmin is Minimum responsivity of optical receivers.

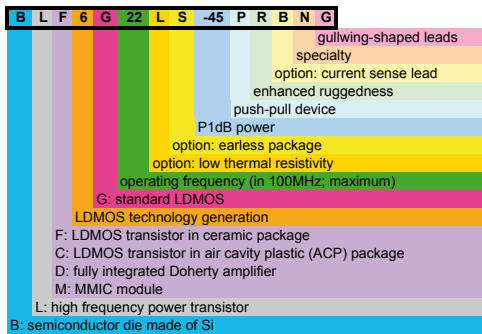
3.7 RF power transistors

NEW: RF power transistor selection guide on www.nxp.com/rfpower
Easy-to-use parametric filters help you to choose the right RF power transistor for your design.

3.7.1 Base Station transistors

http://www.nxp.com/products/mosfets/rf_power_transistors_ldmos/basestations/index.html#preview

Device naming conventions RF power base stations transistors



Why choose NXP Semiconductors' RF power transistors for base stations:

- ▶ Leading technology (generation 6 and 7 of LDMOS)
- ▶ Highest (system) efficiency
- ▶ Best ruggedness
- ▶ Advanced Doherty amplifier designs
- ▶ Industry's first 3.8 GHz Doherty
- ▶ Industry's first fully integrated Doherty amplifier

NXP offers complete line-ups of RF power transistors operation from 800 MHz right up to 3.8 GHz for base stations, covering all cellular technologies (MC-GSM/EDGE, TDMA, (TD-S)CDMA, W-CDMA/UMTS) and WiMAX infrastructures.

3.7.1.1 0.8 - 1.0 GHz line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_p	$@V_{DS}$	Mode of operation
			MHz	W	%	dB	V	
driver	BLF6G21-10G	SOT538A	10 - 2200	0.6	15	18.5	28	WCDMA, TD-SCDMA, GSM, EDGE
driver	BLM6G10-30	SOT834-1	800 - 1000	2	10	30	28	WCDMA
driver	BLM6G10-30G	SOT822-1	800 - 1000	2	10	30	28	WCDMA
driver	BLF6G10-45	SOT608A	800 - 1000	1	7.8	22.5	28	WCDMA
driver	BLF6G10S-45	SOT608B	800 - 1000	1	8	23	28	WCDMA
final	BLF6G10-135RN	SOT502A	800 - 1000	26.5	28	21	28	WCDMA
final	BLF6G10LS-135RN	SOT502B	800 - 1000	26.5	28	21	28	WCDMA
final	BLF6G10-160RN	SOT502A	800 - 1000	32	27	22.5	32	WCDMA
final	BLF6G10LS-160RN	SOT502B	800 - 1000	32	27	22.5	32	WCDMA
final	BLF6G10-200RN	SOT502A	688 - 1000	40	28.5	20	28	WCDMA
final	BLF6G10LS-200RN	SOT502B	688 - 1000	40	28.5	20	28	WCDMA

3.7.1.2 1.8 - 2.0 GHz line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF6G21-10G	SOT538A	10 - 2200	0.6	15	18.5	28	WCDMA, TD-SCDMA, GSM, EDGE
driver	BLF6G20-40	SOT608A	1800 - 2000	2.5	15	18.8	28	WCDMA
driver	BLF6G20-45	SOT608A	1800 - 2000	2.5	14	19.2	28	WCDMA
driver	BLF6G20S-45	SOT608B	1800 - 2000	2.5	14	19.2	28	WCDMA
final	BLF6G20-75	SOT502A	1800 - 2000	29.5	37.5	19	28	EDGE
			1800 - 2000	63	52	19	28	CW
final	BLF6G20LS-75	SOT502B	1800 - 2000	29.5	37.5	19	28	EDGE
			1800 - 2000	63	52	19	28	CW
final	BLF6G20-110	SOT502A	1800 - 2000	25	31	19	28	WCDMA
final	BLF6G20LS-110	SOT502B	1800 - 2000	25	31	19	28	WCDMA
final	BLF6G20LS-140	SOT502B	1800 - 2000	35.5	30	16.5	28	WCDMA
final	BLF6G20-180PN	SOT539A	1800 - 2000	50	29.5	18	32	WCDMA
final	BLF6G20-180RN	SOT502A	1800 - 2000	40	27	17.2	30	WCDMA
final	BLF6G20LS-180RN	SOT502B	1800 - 2000	40	27	17.2	30	WCDMA
final	BLF6G20-230PRN	SOT539A	1800 - 2000	50	29.5	16.5	30	WCDMA

3.7.1.3 2.0 - 2.2 GHz line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF6G21-10G	SOT538A	10 - 2200	0.6	15	18.5	28	WCDMA, TD-SCDMA, GSM, EDGE
driver	BLM6G22-30	SOT834-1	2100 - 2200	2	9	30	28	WCDMA
driver	BLM6G22-30G	SOT882-1	2100 - 2200	2	9	30	28	WCDMA
driver	BLF6G22-45	SOT608A	2000 - 2200	2.5	13	18.5	28	WCDMA
driver	BLF6G22S-45	SOT608B	2000 - 2200	2.5	13	18.5	28	WCDMA
final	BLF6G22LS-75	SOT502B	2000 - 2200	17	30.5	18.7	28	WCDMA
final	BLF6G22LS-100	SOT502B	2000 - 2200	25	29	18.5	28	WCDMA
final	BLF6G22LS-130	SOT502B	2000 - 2200	30	28.5	17	28	WCDMA
final	BLF7G22L-130	SOT502A	2000 - 2200	44.8	32	18.5	28	WCDMA
final	BLF7G22LS-130	SOT502B	2000 - 2200	44.8	32	18.5	28	WCDMA
final	BLF6G22-180PN	SOT539A	2000 - 2200	50	27.5	17.5	32	WCDMA
final	BLF6G22-180RN	SOT502A	2000 - 2200	40	25	16	30	WCDMA
final	BLF6G22LS-180RN	SOT502B	2000 - 2200	40	25	16	30	WCDMA
integrated Doherty	BLD6G21L-50	SOT1130A	2010 - 2025	8	38.9	12.6	28	TD-SCDMA
integrated Doherty	BLD6G21LS-50	SOT1130B	2010 - 2025	8	38.9	12.6	28	TD-SCDMA
integrated Doherty	BLD6G22L-50	SOT1130A	2110 - 2170	8	39	12.6	28	WCDMA
integrated Doherty	BLD6G22LS-50	SOT1130B	2110 - 2170	8	39	12.6	28	WCDMA

3.7.1.4 2.5- 2.7 GHz line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF6G27-10	SOT975B	2500 - 2700	2	20	19	28	WiMAX
driver	BLF6G27-10G	SOT975C	2500 - 2700	2	20	19	28	WiMAX
driver	BLF6G27-45	SOT608A	2500 - 2700	7	24	18	28	WiMAX
driver	BLF6G27S-45	SOT608B	2500 - 2700	7	24	18	28	WiMAX
driver	BLF6G27-75	SOT502A	2500 - 2700	9	23	17	28	WiMAX
driver	BLF6G27LS-75	SOT502B	2500 - 2700	9	23	17	28	WiMAX
final	BLF6G27-135	SOT502A	2500 - 2700	20	22.5	16	32	WiMAX
final	BLF6G27LS-135	SOT502B	2500 - 2700	20	22.5	16	32	WiMAX
final	BLF7G27L-200P	SOT539A	2500 - 2700	20	25	16.5	28	WiMAX
final	BLF7G27LS-200P	SOT539B	2500 - 2700	20	25	16.5	28	WiMAX

3.7.1.5 3.5 - 3.8 GHz line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF6G38-10	SOT975B	3400 - 3600	2	20	14	28	WiMAX
driver	BLF6G38-10G	SOT975C	3400 - 3600	2	20	14	28	WiMAX
driver	BLF6G38-25	SOT608A	3400 - 3800	4.5	24	15	28	WiMAX
driver	BLF6G38S-25	SOT608B	3400 - 3800	4.5	24	15	28	WiMAX
driver	BLF6G38-50	SOT502A	3400 - 3800	9	23	14	28	WiMAX
driver	BLF6G38LS-50	SOT502B	3400 - 3800	9	23	14	28	WiMAX
final	BLF6G38-100	SOT502A	3400 - 3600	18.5	21.5	13	28	WiMAX
final	BLF6G38LS-100	SOT502B	3400 - 3600	18.5	21.5	13	28	WiMAX

3.7.2 Broadcast / ISM (industrial, scientific, medical) RF power transistors

http://www.nxp.com/products/mosfets/rf_power_transistors_ldmos/broadcast_ism/index.html#preview

Why choose NXP Semiconductors' RF power transistors for broadcast / ISM applications:

- ▶ Highest power
- ▶ Best ruggedness
- ▶ Best broadband performance
- ▶ Best-in-class design support
- ▶ Very low thermal resistance design for unrivalled reliability

NXP's leading LDMOS technologies together with advanced package concepts enable best in class performing power amplifiers. We offer industry's highest power and best ruggedness for all broadcast technologies.

Our portfolio includes transistors for Ultra High Frequency (UHF), Very High Frequency (VHF) and High Frequency (HF) applications as well as covering ISM frequency bands.

3.7.2.1 0 - 1000 MHz (HF / VHF / ISM) high voltage LDMOS line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF871	SOT467C	0 - 1000	100	47	21	42	2-TONE
			0 - 1000	24	33	22	42	DVB-T
driver	BLF871S	SOT467B	0 - 1000	100	47	21	42	2-TONE
			0 - 1000	24	33	22	42	DVB-T
driver	BLF881	SOT467C	0 - 1000	120	48	21	50	2-TONE
			0 - 1000	30	31	21	50	DVB-T
final	BLF645	SOT540A	0 - 1300	100	43	18	32	2-TONE
			0 - 1300	100	60	17	32	CW

3.7.2.2 10 - 500 MHz (HF / VHF / ISM) LDMOS line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF871	SOT467C	0 - 1000	100	47	21	42	2-TONE; CW
			0 - 1000	24	33	22	42	DVB-T
driver	BLF871S	SOT467B	0 - 1000	100	47	21	42	2-TONE; CW
			0 - 1000	24	33	22	42	DVB-T
driver	BLF881	SOT467C	0 - 1000	120	48	21	50	2-TONE
			0 - 1000	30	31	21	50	DVB-T
driver	BLF571	SOT467C	0 - 1000	20	70	27,5	50	1-TONE; 2-TONE; CW
final	BLF573S	SOT502B	0 - 1000	300	70	27,2	50	1-TONE; 2-TONE; CW
final	BLF574	SOT539A	0 - 1000	400	70	26,5	50	1-TONE; 2-TONE; CW
final	BLF578	SOT539A	0 - 1000	1000	80	24	50	1-TONE, CW
			0 - 1000	1200	70	24	50	1-TONE; PULSED RF
final	BLF645	SOT540A	0 - 1300	100	43	18	32	2-TONE
			0 - 1300	100	60	17	32	CW

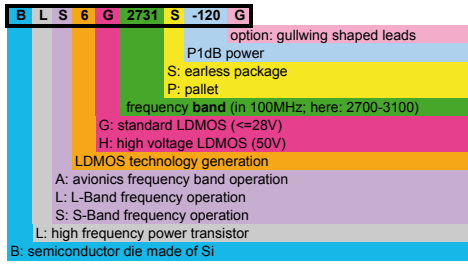
3.7.2.3 460 - 870 MHz (UHF) LDMOS line-up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF571	SOT467C	0 - 1000	20	70	27,5	50	1-TONE; 2-TONE; CW
driver	BLF871	SOT467C	0 - 1000	100	47	21	42	2-TONE; CW
			0 - 1000	24	33	22	42	DVB-T
driver	BLF871S	SOT467B	0 - 1000	100	47	21	42	2-TONE; CW
			0 - 1000	24	33	22	42	DVB-T
driver	BLF881	SOT467C	0 - 1000	120	48	21	50	2-TONE
			0 - 1000	30	31	21	50	DVB-T
final	BLF645	SOT540A	0 - 1200	100	43	18	32	2-TONE
			0 - 1200	100	60	17	32	CW
final	BLF878	SOT979A	470 - 860	300	60	21	42	CW; class AB
			470 - 860	75	32	21	42	DVB-T
final	BLF888	SOT979A	470 - 860	250	45	20	50	2-TONE
			470 - 860	110	30	20	50	DVB-T

3.7.3 Microwave LDMOS RF power transistors

http://www.nxp.com/products/mosfets/rf_power_transistors_ldmos/microwave_ldmos/index.html#preview

Device naming conventions RF power microwave transistors



Why choose NXP Semiconductors' microwave RF power transistors:

- ▶ High gain
- ▶ High efficiency
- ▶ Highest reliability
- ▶ Improved pulse droop and insertion phase
- ▶ Improved ruggedness - overdrive without risk to +5 dB
- ▶ Reduces component count and helps simplify L- and S-band radar design
- ▶ Uses non-toxic, ROHS compliant packages

3.7.3.1 Avionics LDMOS transistors

Function	Type	Package	f_{range}	P_L	η_D	G_p	$@V_{DS}$	Mode of operation
			MHz	W	%	dB	V	
driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	55	20	50	PULSED RF; class AB
final	BLA6H0912-500	SOT643A	960 - 1215	500	50	17	50	PULSED RF; class AB
final	BLA6H1011-600	SOT539A	1030 - 1090	600	52	19	50	PULSED RF; class AB
final	BLA6G1011-200R	SOT502A2	1030 - 1090	200	65	20	28	PULSED RF; class AB

3.7.3.2 L-band LDMOS transistors

Function	Type	Package	f_{range}	P_L	η_D	G_p	$@V_{DS}$	Mode of operation
			MHz	W	%	dB	V	
driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	55	20	50	PULSED RF; class AB
final	BLL6H1214-500	SOT539A	1200 - 1400	600 (min)	50	17	50	PULSED RF; class AB

3.7.3.3 S-band LDMOS transistors

Function	Type	Package	f_{range}	P_L	η_D	G_p	$@V_{DS}$	Mode of operation
			MHz	W	%	dB	V	
driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	55	20	50	PULSED RF; class AB
driver	BLS6G2731-6G	SOT975C	2700 - 3100	6	33	15	32	PULSED RF; class AB
driver	BLS6G3135-20	SOT608A	3100 - 3500	20	45	15,5	32	PULSED RF; class AB
driver	BLS6G3135S-20	SOT608B	3100 - 3500	20	45	15,5	32	PULSED RF; class AB
final	BLS6G2731-120	SOT502A	2700 - 3100	120	48	13,5	32	PULSED RF; class AB
final	BLS6G2731S-120	SOT502B	2700 - 3100	120	48	13,5	32	PULSED RF; class AB
final	BLS6G2933S-130	SOT922-1	2900 - 3300	130	47	12,5	32	PULSED RF; class AB
final	BLS6G3135S-120	SOT502A	3100 - 3500	120	43	11	32	PULSED RF; class AB
final	BLS6G3135S-120	SOT502B	3100 - 3500	120	43	11	32	PULSED RF; class AB
final	BLS7G2933P-200	pallet	2900 - 3300	200	45	11	32	PULSED RF; class AB



Experience 2-way communication via satellite

Look at TFF1xxxHN RF ICs for VSAT, chapter 2.6

4. Design-in tools

This chapter will make it easier to find and get hold of design-in information and materials, with web links or references to the NXP representative / authorized distributor.

4.1 S-Parameters

S-Parameters help you to simulate the behaviour of our devices to your specific adjustments for e.g. voltage, current.

Wideband transistors, FETs & MMICs

First, click on the type number, which takes you directly to the corresponding product information page on the NXP Semiconductors internet.

Second, scroll down on this product information page to find the S-Parameters.

Wideband transistors		
BF67	BFG540W	BFR93AW
BFG135	BFG541	BFS17
BFG198	BFG590	BFS17A
BFG21W	BFG591	BFS17W
BFG25A/X	BFG93A	BFS25A
BFG31	BFG94	BFS505
BFG35	BFG97	BFS520
BFG310/XR	BFM505	BFS540
BFG310W/XR	BFM520	BFT25
BFG325/XR	BFQ149	BFT25A
BFG325W/XR	BFQ18A	BFT92
BFG403W	BFQ19	BFT92W
BFG410W	BFQ67	BFT93
BFG424F	BFQ67W	BFT93W
BFG424W	BFR106	BFU725F
BFG425W	BFR505	BRF505T
BFG480W	BFR520	PBR941
BFG505	BFR540	PBR951
BFG520	BFR92A	PRF947
BFG520W	BFR92AW	PRF949
BFG540	BFR93A	PRF957

FETs		
BF1211	BF1212	BF511
BF1211R	BF1212R	BF513
BF1211WR	BF1212WR	BF862

MMICs		
BGA2001	BGM1012	BGA6489
BGA2003	BGM1013	BGA6589
BGA2711	BGM1014	BGA2800
BGA2748	BGM2011	BGA2801
BGA2771	BGA2715	BGA2815
BGA2776	BGA2716	BGA2816
BGA2709	BGA2717	BGA2850
BGU7003	BGA2011	BGA2865
BGA2712	BGA2012	BGA2866
BGM1011	BGA6289	

4.2 Simulation models

4.2.1 Spice models

Spice models help you to create the optimal performance and to understand which external components have a certain influence on that performance.

Wideband transistors, FETs & Varicap diodes

First, click on the type number which takes you directly to the corresponding product information page on the NXP Semiconductors internet.

Second, scroll down on this product information page to find the Spice models.

Wideband transistors			
BFG10	BFG505	BFG92A/X	BFR93AW
BFG10/X	BFG505/X	BFG93A	BFS17
BFG10W/X	BFG505W/X	BFG94	BFS17A
BFG135	BFG520	BFG97	BFS17W
BFG198	BFG520/X	BFM505	BFS25A
BFG21W	BFG520/XR	BFM520	BFS505
BFG25A/X	BFG520W	BFQ149	BFS520
BFG25AW/X	BFG520W/X	BFQ18A	BFS540
BFG31	BFG540	BFQ19	BFT25A
BFG310/XR	BFG540/X	BFQ540	BFT92
BFG310W/XR	BFG540/XR	BFQ67	BFT92W
BFG325/XR	BFG540W	BFQ67W	BFT93
BFG325W/XR	BFG540W/X	BFR106	BFT93W
BFG35	BFG540W/XR	BFR505	PBR941
BFG403W	BFG541	BFR505T	PBR951
BFG410W	BFG590	BFR520	PRF947
BFG424F	BFG590/X	BFR540	PRF949
BFG424W	BFG591	BFR92A	PRF957
BFG425W	BFG67	BFR92AW	
BFG480W	BFG67/X	BFR93A	

FETs			
BF862	BF908	BF909	BF998
BF904			

Varicap diodes			
BB145B	BB156	BB201	BB208-02
BB149	BB179	BB202	
BB149A	BB179B	BB207	

4.2.2 ADS large signal models

For easy design-in, NXP provides best-in-class large signal models for most of the RF power transistors. Please refer to the links provided on the respective product information pages under www.nxp.com/rfpower.

The following models are currently available:

ADS Models			
BLF7G22_130	BLF6G10-200R	BLF6G22-45	BLF6G38-25
BLD6G22-150P	BLF6G10-45	BLF6G27-10	BLF6G38-50
BLF571	BLF6G20-180P	BLF6G27-10G	BLF871
BLF573	BLF6G20-230P	BLF6G27LS-135	BLF878
BLF574	BLF6G20-45	BLF6G27-45	BLF888
BLF578	BLF6G20LS-180RN	BLF6G38LS-100	BLS6G3135-120
BLF645	BLF6G22-180P	BLF6G38-10	BLS6G3135-20
BLF6G10-135R	BLF6G22LS-180RN	BLF6G38-10G	

4.3 Application notes

http://www.nxp.com/products/all_appnotes/

For the application notes we refer you to chapter 1 of this manual. For each application, we have given the recommended application notes which are available on the internet (with interactive link) or via your local NXP representative or authorized distributor (look at the last chapter: Web Links and Contacts).

4.4 Demo boards



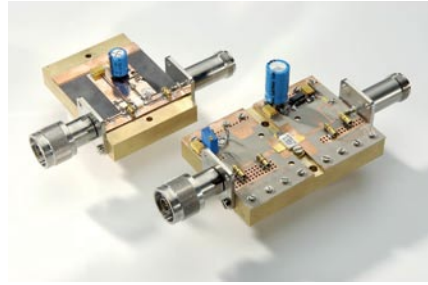
4.4.1 IC, MMIC and SiGe:C transistor demo boards

MMIC demo boards are available (although limited) via your local NXP representative or authorized distributor (look at the last chapter: Web Links and Contacts).

RF small signal demo boards			
BFU725F	BGA2771	BGM1011	TFF11088HN
BGA2001	BGA2776	BGM1012	TFF11092HN
BGA2003	BGA2800	BGM1013	TFF11096HN
BGA2011	BGA2801	BGM1014	TFF11101HN
BGA2012	BGA2815	BGU7003	TFF11105HN
BGA2031	BGA2816	BGU7005	TFF11110HN
BGA2709	BGA2850	TFF11003HN	TFF11115HN
BGA2711	BGA2865	TFF11006HN	TFF11121HN
BGA2712	BGA2866	TFF11070HN	TFF11126HN
BGA2714	BGA6289	TFF11073HN	TFF11132HN
BGA2715	BGA6489	TFF11077HN	TFF11139HN
BGA2716	BGA6589	TFF11080HN	TFF11145HN
BGA2748	BGA6589	TFF11084HN	TFF11152HN

4.4.2 RF power transistor demo boards

Demo boards are available (although limited) via your local NXP representative (see the last chapter: Web Links and Contacts).



4.5 Samples of products in development

For development samples, please ask your local NXP representative or authorized distributor (see last chapter: Web Links and Contacts) to order the latest versions at the RF development team.

4.6 Samples of released products

For all released and most non-released products for RF power, samples are available in the sample warehouse. Look on the home page of the NXP web site for the link to the online sample store: www.nxp.com

4.7 Datasheets

For all released and most non-released products for RF power, datasheets are available on the NXP Semiconductors internet. Simply 'clicking' on a product type (in this manual chapter 1 or 2) takes you to the corresponding product information page on the NXP Semiconductors website.

4.8 Design-in support

If you need special design-in support from our design-in engineers, please ask your local NXP representative or authorized distributor (see last chapter: Web Links and Contacts), to pass on your request to the RF development teams.

4.9 NEW: interactive selection guides

For all RF product groups, you can find easy-to-use parametric filters to help you to choose the right device for your design, e.g. www.nxp.com/mmics, click on selection guide.

5. Cross-references & replacements

NXP cross-references:

<http://www.nxp.com/search/index.html>

NXP end-of-life:

<http://www.nxp.com/products/eol/>

5.1 Cross-references: Manufacturer types versus NXP types

In alphabetical order of manufacturer type

Abbreviations:

BS diode	Band Switch Diode
CATV PD	CATV Power Doubler
CATV PPA	CATV Push Pull Amplifier
CATV PPA/HG	CATV Push Pull Amplifier High Gain
CATV RA	CATV Reverse Amplifier
FET	Field Effect Transistor
Standard	Standard in Industry
MMIC	Monolithic Microwave Integrated Circuit
Varicap	Varicap Diode
WB trs 1-4	Wideband Transistor 1-4 generation
WB trs 5-7	Wideband Transistor 5-7 generation

Manufacturer type	Manufacturer	NXP type	Product family
1SS314	Toshiba	BA591	BS diode
1SS356	Rohm	BA591	BS diode
1SS381	Toshiba	BA277	BS diode
1SS390	Rohm	BA891	BS diode
1SV172	Toshiba	BAP50-04	PIN diode
1SV214	Toshiba	BB149	Varicap
1SV214	Toshiba	BB149A	Varicap
1SV215	Toshiba	BB153	Varicap
1SV228	Toshiba	BB201	Varicap
1SV231	Toshiba	BB152	Varicap
1SV232	Toshiba	BB148	Varicap
1SV233	Sanyo	BAP70-03	PIN diode
1SV234	Sanyo	BAP64-04	PIN diode
1SV239	Toshiba	BB145B	Varicap
1SV241	Sanyo	BAP64-02	PIN diode
1SV246	Sanyo	BAP64-04W	PIN diode
1SV247	Sanyo	BAP70-02	PIN diode
1SV248	Sanyo	BAP50-02	PIN diode
1SV249	Sanyo	BAP50-04W	PIN diode
1SV250	Sanyo	BAP50-03	PIN diode
1SV251	Sanyo	BAP50-04	PIN diode
1SV252	Toshiba	BAP50-04W	PIN diode
1SV254	Toshiba	BB179	Varicap
1SV263	Sanyo	BAP50-02	PIN diode
1SV264	Sanyo	BAP50-04W	PIN diode
1SV266	Sanyo	BAP50-03	PIN diode
1SV267	Sanyo	BAP50-04	PIN diode
1SV269	Toshiba	BB148	Varicap
1SV270	Toshiba	BB156	Varicap
1SV271	Toshiba	BAP50-03	PIN diode
1SV278	Toshiba	BB179	Varicap
1SV279	Toshiba	BB179	Varicap
1SV282	Toshiba	BB178	Varicap
1SV282	Toshiba	BB187	Varicap
1SV283	Toshiba	BB178	Varicap
1SV283	Toshiba	BB187	Varicap

Manufacturer type	Manufacturer	NXP type	Product family
1SV284	Toshiba	BB156	Varicap
1SV288	Toshiba	BB152	Varicap
1SV290	Toshiba	BB182	Varicap
1SV294	Sanyo	BAP70-03	PIN diode
1SV305	Toshiba	BB202	Varicap
1SV307	Toshiba	BAP51-03	PIN diode
1SV308	Toshiba	BAP51-02	PIN diode
1SV322	Toshiba	BB202LX	Varicap
1T362	PEC	BB149	Varicap
1T362A	PEC	BB149A	Varicap
1T363A	PEC	BB153	Varicap
1T368A	PEC	BB148	Varicap
1T369	PEC	BB152	Varicap
1T379	PEC	BB131	Varicap
1T397	PEC	BB152	Varicap
1T399	PEC	BB148	Varicap
1T402	PEC	BB179B	Varicap
1T403	PEC	BB178	Varicap
1T404A	PEC	BB187	Varicap
1T405A	PEC	BB187	Varicap
1T406	PEC	BB182	Varicap
1T408	PEC	BB187	Varicap
2F1G20DS	RFHIC	CGD1042H	CATV PD
2F1G20P	RFHIC	CGY1041	CATV PP
2F1G22DS	RFHIC	CGD1042H	CATV PD
2F1G23P	RFHIC	CGY1043	CATV PP
2F1G24DS	RFHIC	CGD1044H	CATV PD
2F722DS	RFHIC	BGD816L	CATV PD
2F8718P	RFHIC	BGY885A	CATV PP
2F8719DS	RFHIC	BGD812	CATV PD
2F8720DS	RFHIC	BGD814	CATV PD
2F8723P	RFHIC	BGY887	CATV PP
2F8734P	RFHIC	CGY888C	CATV PP
2N3330	Standard	J176	FET
2N3331	Standard	J176	FET
2N4220	Standard	BF245A	FET

Manufacturer type	Manufacturer	NXP type	Product family
2N4856	Standard	BSR56	FET
2N4857	Standard	BSR57	FET
2N4858	Standard	BSR58	FET
2N5114	Standard	J174	FET
2N5115	Standard	J175	FET
2N5116	Standard	J175	FET
2N5432	Standard	J108	FET
2N5433	Standard	J108	FET
2N5434	Standard	J109	FET
2N5457	Standard	BF245A	FET
2N5458	Standard	BF245A	FET
2N5459	Standard	BF245B	FET
2N5653	Standard	J112	FET
2N5654	Standard	J111	FET
2SC4094	NEC	BFG520/XR	WB trs 1-4
2SC4095	NEC	BFG520/XR	WB trs 1-4
2SC4182	NEC	BFS17W	WB trs 1-4
2SC4184	NEC	BFS17W	WB trs 1-4
2SC4185	NEC	BFS17W	WB trs 1-4
2SC4186	NEC	BFR92AW	WB trs 1-4
2SC4226	NEC	PRF957	WB trs 1-4
2SC4227	NEC	BFQ67W	WB trs 1-4
2SC4228	NEC	BFS505	WB trs 1-4
2SC4247	Toshiba	BFR92AW	WB trs 1-4
2SC4248	Toshiba	BFR92AW	WB trs 1-4
2SC4315	Toshiba	BFG520/XR	WB trs 1-4
2SC4320	Toshiba	BFG520/XR	WB trs 1-4
2SC4321	Toshiba	BFQ67W	WB trs 1-4
2SC4325	Toshiba	BFS505	WB trs 1-4
2SC4394	Toshiba	PRF957	WB trs 1-4
2SC4536	NEC	BFQ219	WB trs 1-4
2SC4537	Renesas	BFR93AW	WB trs 1-4
2SC4592	Renesas	BFG520/XR	WB trs 1-4
2SC4593	Renesas	BFS520	WB trs 1-4
2SC4703	NEC	BFQ219	WB trs 1-4
2SC4784	Renesas	BFS505	WB trs 1-4
2SC4807	Renesas	BFQ18A	WB trs 1-4
2SC4842	Toshiba	BFG540W/XR	WB trs 1-4
2SC4899	Renesas	BFS505	WB trs 1-4
2SC4900	Renesas	BFG520/XR	WB trs 1-4
2SC4901	Renesas	BFS520	WB trs 1-4
2SC4988	Renesas	BFQ540	WB trs 1-4
2SC5011	NEC	BFG540W/XR	WB trs 1-4
2SC5012	NEC	BFG540W/XR	WB trs 1-4
2SC5065	Toshiba	PRF957	WB trs 1-4
2SC5085	Toshiba	PRF957	WB trs 1-4
2SC5087	Toshiba	BFG520/XR	WB trs 1-4
2SC5088	Toshiba	BFG540W/XR	WB trs 1-4
2SC5090	Toshiba	BFS520	WB trs 1-4
2SC5092	Toshiba	BFG520/XR	WB trs 1-4
2SC5095	Toshiba	BFS505	WB trs 1-4
2SC5107	Toshiba	BFS505	WB trs 1-4
2SC5463	Toshiba	BFQ67W	WB trs 1-4
2SC5593	Renesas	BFG410W	WB trs 5-7
2SC5594	Renesas	BFG425W	WB trs 5-7
2SC5623	Renesas	BFG410W	WB trs 5-7
2SC5624	Renesas	BFG425W	WB trs 5-7
2SC5631	Renesas	BFQ540	WB trs 1-4
2SC6023	Sanyo	BFG424W	WB trs 5-7
2SJ105GR	Standard	J177	FET
2SK163-K	Renesas	J113	FET
2SK163-L	Renesas	J113	FET
2SK163-M	Renesas	J113	FET
2SK163-N	Renesas	J113	FET
2SK210BL	Renesas	PMBFJ309	FET
2SK370BL	Renesas	J109	FET
2SK370GR	Renesas	J109	FET
2SK370V	Renesas	J109	FET
2SK381	Renesas	J113	FET
2SK43	Renesas	J113	FET
2SK435	Renesas	J113	FET
2SK508	Renesas	PMBFJ308	FET
3SK290	Renesas	BF998WR	FET
BA592	Infineon	BA591	BS diode
BA595	Infineon	BAP51-03	PIN diode
BA595	Infineon	BAP70-03	PIN diode
BA597	Infineon	BAP70-03	PIN diode
BA885	Infineon	BAP70-03	PIN diode
BA892	Infineon	BA891	BS diode
BA892-02V	Infineon	BA277	PIN diode
BA892-02V	Infineon	BA891	PIN diode

Manufacturer type	Manufacturer	NXP type	Product family
BA892V-02V-GS08	Vishay	BA891	PIN diode
BA895	Infineon	BAP70-02	PIN diode
BAR14-1	Infineon	BAP70-03	PIN diode
BAR15-1	Infineon	BAP70-03	PIN diode
BAR16-1	Infineon	BAP70-03	PIN diode
BAR17	Infineon	BAP50-03	PIN diode
BAR50-02L	Infineon	BAP50LX	PIN diode
BAR50-02V	Infineon	BAP50-02	PIN diode
BAR50-02V	Infineon	BAP50-03	PIN diode
BAR50-02V	Infineon	BAP50-05	PIN diode
BAR50-03W	Infineon	BAP70-02	PIN diode
BAR60	Infineon	BAP50-03	PIN diode
BAR61	Infineon	BAP50-03	PIN diode
BAR63	Infineon	BAP63-03	PIN diode
BAR63-02L	Infineon	BAP63-02	PIN diode
BAR63-02L	Infineon	BAP63LX	PIN diode
BAR63-02V	Infineon	BAP63-02	PIN diode
BAR63-02W	Infineon	BAP63-02	PIN diode
BAR63-03W	Infineon	BAP63-03	PIN diode
BAR63-05	Infineon	BAP63-05W	PIN diode
BAR63-05W	Infineon	BAP63-05W	PIN diode
BAR63V-02V-GS08	Vishay	BAP63-02	PIN diode
BAR63V-05W-GS08	Vishay	BAP63-05W	PIN diode
BAR64-02LRH	Infineon	BAP64LX	PIN diode
BAR64-02V	Infineon	BAP64-02	PIN diode
BAR64-02W	Infineon	BAP64-02	PIN diode
BAR64-03W	Infineon	BAP64-03	PIN diode
BAR64-04	Infineon	BAP64-04	PIN diode
BAR64-04W	Infineon	BAP64-04W	PIN diode
BAR64-05	Infineon	BAP64-05	PIN diode
BAR64-05W	Infineon	BAP64-05W	PIN diode
BAR64-06	Infineon	BAP64-06	PIN diode
BAR64-06W	Infineon	BAP64-06W	PIN diode
BAR64V-02V-GS08	Vishay	BAP64-02	PIN diode
BAR64V-04-GS08	Vishay	BAP64-04	PIN diode
BAR64V-05-GS08	Vishay	BAP64-05	PIN diode
BAR64V-06-GS08	Vishay	BAP64-06	PIN diode
BAR64V-06W-GS08	Vishay	BAP64-06W	PIN diode
BAR65-02L	Infineon	BAP65LX	PIN diode
BAR65-02V	Infineon	BAP65-02	PIN diode
BAR65-02W	Infineon	BAP65-02	PIN diode
BAR65-03W	Infineon	BAP65-03	PIN diode
BAR65V-02V-GS08	Vishay	BAP65-02	PIN diode
BAR66	Infineon	BAP1321-04	PIN diode
BAR67-02W	Infineon	BAP1321-02	PIN diode
BAR67-03W	Infineon	BAP1321-03	PIN diode
BAT18-04	Infineon	BAT18	PIN diode
BB304C	Renesas	BF1201WR	FET
BB304M	Renesas	BF1201R	FET
BB305C	Renesas	BF1201WR	FET
BB305M	Renesas	BF1201R	FET
BB403M	Renesas	BF909R	FET
BB501C	Renesas	BF1202WR	FET
BB501M	Renesas	BF1202R	FET
BB502C	Renesas	BF1202WR	FET
BB502M	Renesas	BF1202R	FET
BB503C	Renesas	BF1202WR	FET
BB503M	Renesas	BF1202R	FET
BB535	Infineon	BB149	Varicap
BB545	Infineon	BB149A	Varicap
BB555	Infineon	BB179B	Varicap
BB565	Infineon	BB179	Varicap
BB601M	Renesas	BF1202	FET
BB639	Infineon	BB148	Varicap
BB639	Infineon	BB153	Varicap
BB640	Infineon	BB152	Varicap
BB641	Infineon	BB152	Varicap
BB659	Infineon	BB178	Varicap
BB664	Infineon	BB178	Varicap
BB664	Infineon	BB187	Varicap
BB669	Infineon	BB152	Varicap
BB814	Infineon	BB201	Varicap
BB831	Infineon	BB131	Varicap
BB833	Infineon	BB131	Varicap
BB835	Infineon	BB131	Varicap
BBY58-02V	Infineon	BB202	Varicap
BBY65	Infineon	BB202	Varicap
BF1005S	Infineon	BF1105	FET
BF1009S	Infineon	BF1109	FET
BF1009SW	Infineon	BF1109WR	FET
BF2030	Infineon	BF1101	FET

Manufacturer type	Manufacturer	NXP type	Product family
BF2030R	Infineon	BF1101R	FET
BF2030W	Infineon	BF1101WR	FET
BF244A	Standard	BF245A	FET
BF244B	Standard	BF245B	FET
BF244C	Standard	BF245C	FET
BF247A	Standard	J108	FET
BF247B	Standard	J108	FET
BF247C	Standard	J108	FET
BF256A	Standard	BF245A	FET
BF256B	Standard	BF245B	FET
BF256C	Standard	BF245C	FET
BF770A	Infineon	BFR93A	WB trs 1-4
BF771	Infineon	PBR951	WB trs 1-4
BF771W	Infineon	BFS540	WB trs 1-4
BF772	Infineon	BFG540	WB trs 1-4
BF775	Infineon	BFR92A	WB trs 1-4
BF775A	Infineon	BFR92A	WB trs 1-4
BF775W	Infineon	BFR92AW	WB trs 1-4
BF851A	Standard	BF861A	FET
BF851B	Standard	BF861B	FET
BF851C	Standard	BF861C	FET
BF994S	Vishay	BF994S	FET
BF996S	Vishay	BF996S	FET
BF998	Infineon	BF998	FET
BF998	Vishay	BF998	FET
BF998-GS08	Vishay	BF998	FET
BF998R	Vishay	BF998R	FET
BF998R-GS08	Vishay	BF998R	FET
BF998RW	Vishay	BF998WR	FET
BF998W	Infineon	BF998WR	FET
BFG135A	Infineon	BFG135	WB trs 1-4
BFG193	Infineon	BFG198	WB trs 1-4
BFG194	Infineon	BFG31	WB trs 1-4
BFG196	Infineon	BFG541	WB trs 1-4
BFG19S	Infineon	BFG97	WB trs 1-4
BFG235	Infineon	BFG135	WB trs 1-4
BFP180	Infineon	BFG505/X	WB trs 1-4
BFP181	Infineon	BFG67/X	WB trs 1-4
BFP181T-GS08	Vishay	BFG67/X	WB trs 1-4
BFP182	Infineon	BFG67/X	WB trs 1-4
BFP183	Infineon	BFG520/X	WB trs 1-4
BFP183R	Infineon	BFG520/XR	WB trs 1-4
BFP183T-GS08	Vishay	BFG520/X	WB trs 1-4
BFP183TW-GS08	Vishay	BFG520W/X	WB trs 1-4
BFP193	Infineon	BFG540/X	WB trs 1-4
BFP193W	Infineon	BFG540W/XR	WB trs 1-4
BFP196T-GS08	Vishay	BFG540/X	WB trs 1-4
BFP196TR-GS08	Vishay	BFG540/XR	WB trs 1-4
BFP196TRW-GS08	Vishay	BFG540W/XR	WB trs 1-4
BFP196W	Infineon	BFG540W/XR	WB trs 1-4
BFP280	Infineon	BFG505/X	WB trs 1-4
BFP405	Infineon	BFG410W	WB trs 5-7
BFP420	Infineon	BFG425W	WB trs 5-7
BFP450	Infineon	BFG480W	WB trs 5-7
BFP67-GS08	Vishay	BFG67/X	WB trs 1-4
BFP67R-GS08	Vishay	BFG67/X	WB trs 1-4
BFP740	Infineon	BFU725F	WB trs 5-7
BFP740F	Infineon	BFU725F	WB trs 5-7
BFP81	Infineon	BFG92A/X	WB trs 1-4
BFP92A-GS08	Vishay	BFG92A/X	WB trs 1-4
BFP93A	Infineon	BFG93A/X	WB trs 1-4
BFP93A-GS08	Vishay	BFG93A/X	WB trs 1-4
BFQ193	Infineon	BFQ540	WB trs 1-4
BFQ19S	Infineon	BFQ19	WB trs 1-4
BFQ67-GS08	Vishay	BFQ67W	WB trs 1-4
BFR106	Infineon	BFR106	WB trs 1-4
BFR180	Infineon	BFR505	WB trs 1-4
BFR180W	Infineon	BFS505	WB trs 1-4
BFR181	Infineon	BFR520	WB trs 1-4
BFR181T-GS08	Vishay	BFR520	WB trs 1-4
BFR181TW-GS08	Vishay	BFS520	WB trs 1-4
BFR181W	Infineon	BFS520	WB trs 1-4
BFR182	Infineon	PBR941	WB trs 1-4
BFR182W	Infineon	PRF947	WB trs 1-4
BFR183	Infineon	PBR951	WB trs 1-4
BFR183T-GS08	Vishay	PBR951	WB trs 1-4
BFR183TW-GS08	Vishay	PRF957	WB trs 1-4
BFR183W	Infineon	PRF957	WB trs 1-4
BFR193	Infineon	PBR951	WB trs 1-4
BFR193TW-GS08	Vishay	PRF957	WB trs 1-4

Manufacturer type	Manufacturer	NXP type	Product family
BFR193W	Infineon	PRF957	WB trs 1-4
BFR196T-GS08	Vishay	BFR540	WB trs 1-4
BFR196TW-GS08	Vishay	BFS540	WB trs 1-4
BFR35AP	Infineon	BFR92A	WB trs 1-4
BFR92AL	Freescale	BFR92A	WB trs 1-4
BFR92AW-GS08	Vishay	BFR92AW	WB trs 1-4
BFR92P	Infineon	BFR92A	WB trs 1-4
BFR92W	Infineon	BFR92AW	WB trs 1-4
BFR93A	Infineon	BFR93A	WB trs 1-4
BFR93AL	Freescale	BFR93A	WB trs 1-4
BFR93AW	Infineon	BFR93AW	WB trs 1-4
BFR93AW-GS08	Vishay	BFR93AW	WB trs 1-4
BFR93-GS08	Vishay	BFR93A	WB trs 1-4
BFS17-GS08	Vishay	BFS17	WB trs 1-4
BFS17-GS08	Vishay	BFS17A	WB trs 1-4
BFS17L	Freescale	BFS17	WB trs 1-4
BFS17P	Infineon	BFS17A	WB trs 1-4
BFS17W	Infineon	BFS17W	WB trs 1-4
BFS17W-GS08	Vishay	BFS17W	WB trs 1-4
BFS481	Infineon	BFM505	WB trs 1-4
BFS483	Infineon	BFM520	WB trs 1-4
BFT92	Infineon	BFT92	WB trs 1-4
BFT93	Infineon	BFT93	WB trs 1-4
BIC701C	Renesas	BF1105WR	FET
BIC701M	Renesas	BF1105R	FET
BIC702C	Renesas	BF1105WR	FET
BIC702M	Renesas	BF1105R	FET
BIC801M	Renesas	BF1105	FET
BSR111	Standard	PMBFJ111	FET
BSR112	Standard	PMBFJ112	FET
BSR113	Standard	PMBFJ113	FET
BSR174	Standard	PMBFJ174	FET
BSR175	Standard	PMBFJ175	FET
BSR176	Standard	PMBFJ176	FET
BSR177	Standard	PMBFJ177	FET
CA901	Standard	BGX885N	CATV PPA
CA901A	Standard	BGX885N	CATV PPA
CA922	Standard	BGD885	CATV PD
CA922A	Standard	BGD885	CATV PD
CMY91	Infineon	BGA2022	MMIC
CMY91	Infineon	BGA2022	WB trs 1-4
CXE1089Z	RFMD	BGA6489	MMIC
CXE1089Z	RFMD	BGA6589	MMIC
D5540185	Standard	BGD502	CATV PD
D7540185	Standard	BGD702	CATV PD
D7540200	Standard	BGD704	CATV PD
D8640185	Standard	BGD802	CATV PD
EC2C03C	Sanyo	BB145B	Varicap
F2046	POLYFET	BLF542	Broadcast
F2048	POLYFET	BLF543	Broadcast
F2247	POLYFET	BLF522	Broadcast
FSD273TA	Skyworks	BB148	Varicap
FSD273TA	Skyworks	BB178	Varicap
HBFP0405	Agilent	BFG410W	WB trs 5-7
HBFP0420	Agilent	BFG425W	WB trs 5-7
HBFP0450	Agilent	BFG480W	WB trs 5-7
HSC277	Renesas	BA277	BS diode
HSMP3800	Agilent	BAP70-03	PIN diode
HSMP3802	Agilent	BAP50-04	PIN diode
HSMP3804	Agilent	BAP50-05	PIN diode
HSMP3810	Agilent	BAP50-03	PIN diode
HSMP3814	Agilent	BAP50-05	PIN diode
HSMP381B	Agilent	BAP50-03	PIN diode
HSMP381C	Agilent	BAP50-05	PIN diode
HSMP381F	Agilent	BAP64-05W	PIN diode
HSMP3820	Agilent	BAP1321-03	PIN diode
HSMP3822	Agilent	BAP1321-04	PIN diode
HSMP3830	Agilent	BAP64-03	PIN diode
HSMP3832	Agilent	BAP64-04	PIN diode
HSMP3833	Agilent	BAP64-06	PIN diode
HSMP3834	Agilent	BAP64-05	PIN diode
HSMP3860	Agilent	BAP50-03	PIN diode
HSMP3862	Agilent	BAP50-04	PIN diode
HSMP3864	Agilent	BAP50-05	PIN diode
HSMP386B	Agilent	BAP50-02	PIN diode
HSMP386E	Agilent	BAP50-04W	PIN diode
HSMP386L	Agilent	BAP50-05W	PIN diode
HSMP3880	Agilent	BAP51-03	PIN diode
HSMP3890	Agilent	BAP51-03	PIN diode
HSMP3892	Agilent	BAP64-04	PIN diode
HSMP3894	Agilent	BAP64-05	PIN diode

Manufacturer type	Manufacturer	NXP type	Product family
HSMP3895	Agilent	BAP51-02	PIN diode
HSMP389B	Agilent	BAP51-02	PIN diode
HSMP389C	Agilent	BAP64-04	PIN diode
HSMP389F	Agilent	BAP51-05W	PIN diode
HVB145	Renesas	BAP50-04W	PIN diode
HVC131	Renesas	BAP65-02	PIN diode
HVC132	Renesas	BAP51-02	PIN diode
HVC200A	Renesas	BB178	Varicap
HVC200A	Renesas	BB187	Varicap
HVC202A	Renesas	BB179	Varicap
HVC202B	Renesas	BB179B	Varicap
HVC300A	Renesas	BB182	Varicap
HVC300B	Renesas	BB182	Varicap
HVC306A	Renesas	BB187	Varicap
HVC306B	Renesas	BB187	Varicap
HVC355B	Renesas	BB145B	Varicap
HVC359	Renesas	BB202	Varicap
HVC363A	Renesas	BB178	Varicap
HVC376B	Renesas	BB198	Varicap
HVC376B	Renesas	BB202	Varicap
HVD132	Renesas	BAP51-02	PIN diode
HVU131	Renesas	BAP65-03	PIN diode
HVU132	Renesas	BAP51-03	PIN diode
HVU202(A)	Renesas	BB149	Varicap
HVU202(A)	Renesas	BB149A	Varicap
HVU300A	Renesas	BB152	Varicap
HVU307	Renesas	BB148	Varicap
HVU315	Renesas	BB148	Varicap
HVU316	Renesas	BB131	Varicap
HVU363A	Renesas	BB148	Varicap
HVU363A	Renesas	BB153	Varicap
HVU363B	Renesas	BB148	Varicap
INA-51063	Agilent	BGA2001	MMIC
J270	Standard	J177	FET
J308	Standard	J108	FET
J309	Standard	J109	FET
J310	Standard	J110	FET
JDP2S01E	Toshiba	BAP65-02	PIN diode
JDP2S01U	Toshiba	BAP65-03	PIN diode
JDP2S02AFS	Toshiba	BAP51-02	PIN diode
JDP2S02AS	Toshiba	BAP51-03	PIN diode
JDP2S02T	Toshiba	BAP63-02	PIN diode
JDP2S04E	Toshiba	BAP50-02	PIN diode
JDS2S03S	Toshiba	BA891	BS diode
KP2310R	Toko	BAP64-04W	PIN diode
KTK920BT	KEC	BF1108	FET
KTK920T	KEC	BF1108R	FET
KV1835E	Toko	BB199	Varicap
LC421	POLYFET	BLF544	Broadcast
MA2S077	Standard	BA277	BS diode
MA2S357	Matsushita	BB178	Varicap
MA2S357	Matsushita	BB187	Varicap
MA2S372	Matsushita	BB179	Varicap
MA2S374	Matsushita	BB182	Varicap
MA2SV01	Renesas	BB202	Varicap
MA357	Matsushita	BB153	Varicap
MA366	Matsushita	BB148	Varicap
MA368	Matsushita	BB131	Varicap
MA372	Matsushita	BB149	Varicap
MA372	Matsushita	BB149A	Varicap
MA4CP101A	Matsushita	BAP65-03	PIN diode
MA4P274-1141	Matsushita	BAP51-03	PIN diode
MA4P275-1141	Matsushita	BAP65-03	PIN diode
MA4P275CK-287	Matsushita	BAP65-05	PIN diode
MA4P277-1141	Matsushita	BAP70-03	PIN diode
MA4P278-287	Matsushita	BAP70-03	PIN diode
MA4P789-1141	Matsushita	BAP1321-03	PIN diode
MA4P789ST-287	Matsushita	BAP1321-04	PIN diode
MC7712	NEC	BGY785A	CATV PPA
MC7716	NEC	BGY787	CATV PPA
MC7722	NEC	BGY785A	CATV PPA
MC7726	NEC	BGY787	CATV PPA
MC-7831	NEC	BGY885A	CATV PP
MC-7831-HA	NEC	BGY1085A	CATV PP
MC-7832	NEC	BGY887	CATV PP
MC-7832-HA	NEC	CGY1041	CATV PP
MC-7833	NEC	BGY887B	CATV PP
MC-7836	NEC	BGY887B	CATV PP
MC-7836	NEC	CGY1047	CATV PP
MC-7845	NEC	BGD802	CATV PD
MC-7846	NEC	CGD942C	CATV PD

Manufacturer type	Manufacturer	NXP type	Product family
MC-7847	NEC	CGD944C	CATV PD
MC7852	NEC	BGY885A	CATV PPA
MC7866	NEC	BGD816L	CATV PD
MC-7881	NEC	BGD802	CATV PD
MC-7882	NEC	BGD814	CATV PD
MC-7883	NEC	CGD942C	CATV PD
MC-7884	NEC	CGD944C	CATV PD
MC-7891	NEC	CGD1042H	CATV PD
MC-7893	NEC	CGD1042H	CATV PD
MC-7894	NEC	CDG1044H	CATV PD
MC-7896	NEC	CGD1044H	CATV PD
MCH4009	Sanyo	BFG424F	WB trs 5-7
MD7P19130	Freescale	BLF6G20LS-110	Base Station
MD7P19130H	Freescale	BLF6G20LS-75	Base Station
MHW10186N	Freescale	BGY1085A	CATV PP
MHW10236N	Freescale	CGY1043	CATV PP
MHW10247AN	Freescale	CGD1044H	CATV PD
MHW10276N	Freescale	CGY1047	CATV PP
MHW1224	Freescale	BGY67	CATV RA
MHW1244	Freescale	BGY67A	CATV RA
MHW1253LA	Freescale	BGY67A	CATV RA
MHW1254L	Freescale	BGY68	CATV RA
MHW1254LA	Freescale	BGY68	CATV RA
MHW1304L	Freescale	BGY68	CATV RA
MHW1304LA	Freescale	BGY68	CATV RA
MHW1304LAN	Freescale	BGY68	CATV RA
MHW1346	Freescale	BGY67A	CATV RA
MHW1353LA	Freescale	BGY67A	CATV RA
MHW1354LA	Freescale	BGY68	CATV RA
MHW5182A	Freescale	BGY585A	CATV PPA
MHW5185B	Freescale	BGD502	CATV PD
MHW5222A	Freescale	BGY587	CATV PPA
MHW5272A	Freescale	BGY587B	CATV PPA/HG
MHW5342A	Freescale	BGY588N	CATV PPA/HG
MHW5342T	Freescale	BGY588N	CATV PPA/HG
MHW6182	Freescale	BGY585A	CATV PPA
MHW6182-6	Freescale	BGY685A	CATV PPA
MHW6182T	Freescale	BGY585A	CATV PPA
MHW6185B	Freescale	BGD502	CATV PD
MHW6185T	Freescale	BGD502	CATV PD
MHW6205	Freescale	BGD704	CATV PD
MHW6222	Freescale	BGY587	CATV PPA
MHW6222B	Freescale	BGY687	CATV PPA
MHW6222T	Freescale	BGY587	CATV PPA
MHW6272	Freescale	BGY587B	CATV PPA
MHW6272T	Freescale	BGY587B	CATV PPA
MHW6342	Freescale	BGY588N	CATV PPA
MHW6342T	Freescale	BGY588N	CATV PPA
MHW7182B	Freescale	BGY785A	CATV PPA
MHW7182C	Freescale	BGY785A	CATV PPA
MHW7185C2	Freescale	BGD712	CATV PD
MHW7185CL	Freescale	BGD712	CATV PD
MHW7205C	Freescale	BGD714	CATV PD
MHW7205CL	Freescale	BGD714	CATV PD
MHW7205CLN	Freescale	BGD714	CATV PD
MHW7222	Freescale	BGY787	CATV PPA
MHW7222A	Freescale	BGY787	CATV PPA
MHW7222B	Freescale	BGY787	CATV PPA
MHW7242A	Freescale	BGE787B	CATV PPA/HG
MHW7272A	Freescale	BGE787B	CATV PPA/HG
MHW7292	Freescale	BGE787B	CATV PPA/HG
MHW7292A	Freescale	BGE787B	CATV PPA/HG
MHW7292AN	Freescale	BGE787B	CATV PPA/HG
MHW7342	Freescale	BGE788	CATV PPA/HG
MHW8142	Freescale	BGY883	CATV PPA
MHW8182B	Freescale	BGY885A	CATV PPA
MHW8182C	Freescale	BGY885A	CATV PPA
MHW8182CN	Freescale	BGY885A	CATV PP
MHW8185	Freescale	BGD814	CATV PD
MHW8185L	Freescale	BGD812	CATV PD
MHW8188AN	Freescale	CGD942C	CATV PD
MHW8205	Freescale	BGD814	CATV PD
MHW820L	Freescale	BGD814	CATV PD
MHW8222BN	Freescale	BGY887	CATV PP
MHW8227A	Freescale	CGD942C	CATV PD
MHW8227AN	Freescale	CGD942C	CATV PD
MHW8247A	Freescale	CGD944C	CATV PPA
MHW8247AN	Freescale	CGD944C	CATV PD
MHW8292	Freescale	BGY887B	CATV PPA
MHW8342	Freescale	BGY888	CATV PPA
MHW8342N	Freescale	CGY888C	CATV PP

Manufacturer type	Manufacturer	NXP type	Product family
MHW9146	Freescale	BGY883	CATV PPA
MHW9182B	Freescale	BGY1085A	CATV PPA
MHW9182C	Freescale	BGY1085A	CATV PPA
MHW9182CN	Freescale	BGY1085A	CATV PP
MHW9186	Freescale	BGY885A	CATV PPA
MHW9186A	Freescale	BGY885A	CATV PPA
MHW9187N	Freescale	CGD942C	CATV PD
MHW9188AN	Freescale	CGD942C	CATV PD
MHW9188N	Freescale	CGD942C	CATV PD
MHW9227AN	Freescale	CGD942C	CATV PD
MHW9242A	Freescale	CGD1042	CATV PD
MHW9247	Freescale	CGD944C	CATV PD
MHW9247A	Freescale	CGD944C	CATV PD
MHW9247AN	Freescale	CGD944C	CATV PD
MHW9247N	Freescale	CGD944C	CATV PD
MHWJ5272A	Freescale	BGY587B	CATV PPA
MHWJ1785A	Freescale	BGD712	CATV PD
MHWJ7205A	Freescale	BGD714	CATV PD
MHWJ7292	Freescale	BGE787B	CATV PPA/HG
MHWJ9182	Freescale	BGY1085A	CATV PPA
MMBF4391	Freescale	PMBF4391	FET
MMBF4392	Freescale	PMBF4392	FET
MMBF4393	Freescale	PMBF4393	FET
MMBF4860	Freescale	PMBFJ112	FET
MMBF5484	Freescale	BFR31	FET
MMBFJ113	Freescale	PMBFJ113	FET
MMBFJ174	Freescale	PMBFJ174	FET
MMBFJ175	Freescale	PMBFJ175	FET
MMBFJ176	Freescale	PMBFJ176	FET
MMBFJ177	Freescale	PMBFJ177	FET
MMBFJ308	Freescale	PMBFJ308	FET
MMBFJ309	Freescale	PMBFJ309	FET
MMBFJ310	Freescale	PMBFJ310	FET
MMBFU310	Freescale	PMBFU310	FET
MMBR5031L	Freescale	BFS17	WB trs 1-4
MMBR5179L	Freescale	BFS17A	WB trs 1-4
MMBR571L	Freescale	PBR951	WB trs 1-4
MMBR901L	Freescale	BFR92A	WB trs 1-4
MMBR911L	Freescale	BFR93A	WB trs 1-4
MMBR920L	Freescale	BFR93A	WB trs 1-4
MMBR931L	Freescale	BFT25A	WB trs 1-4
MMBR941BL	Freescale	PBR941	WB trs 1-4
MMBR941L	Freescale	PBR941	WB trs 1-4
MMBR951AL	Freescale	PBR951	WB trs 1-4
MMBR951L	Freescale	PBR951	WB trs 1-4
MMBV105GLT1	ONSemicond.	BB156	Varicap
MMBV109LT1	ONSemicond.	BB148	Varicap
MMG2001NT1	Freescale	BGD816L	CATV PD
MMG2001T1	Freescale	BGD816L	CATV PD
MPF102	Standard	BF245A	FET
MPF970	Standard	J174	FET
MPF971	Standard	J176	FET
MRF18030ALR3(1)	Freescale	BLF6G21-30	Base Station
MRF18030ALR3(1)	Freescale	BLF6G20-45	Base Station
MRF18030ALSR3(1)	Freescale	BLF6G21-30	Base Station
MRF18030ALSR3(1)	Freescale	BLF6G20-45	Base Station
MRF18030BLR3(1)	Freescale	BLF6G21-30	Base Station
MRF18030BLR3(1)	Freescale	BLF6G20-45	Base Station
MRF18030BLSR3(1)	Freescale	BLF6G21-30	Base Station
MRF18030BLSR3(1)	Freescale	BLF6G20-45	Base Station
MRF18060AL(2)	Freescale	BLC6G20-75	Base Station
MRF18060BL(2)	Freescale	BLC6G20-75	Base Station
MRF18085AL(2)	Freescale	BLC6G20-75	Base Station
MRF18085BL(2)	Freescale	BLC6G20-75	Base Station
MRF18090AR3(1)	Freescale	BLF6G20-110	Base Station
MRF18090B(2)	Freescale	BLF6G20-110	Base Station
MRF19030L(2)	Freescale	BLF6G21-30	Base Station
MRF19030L(2)	Freescale	BLF6G20-45	Base Station
MRF19045L(2)	Freescale	BLF6G20-45	Base Station
MRF19060L(2)	Freescale	BLF6G20-45	Base Station
MRF19085LR3(1)	Freescale	BLF6G20-110	Base Station
MRF19085LSR3(1)	Freescale	BLF6G20-110	Base Station
MRF19090R3(1)	Freescale	BLF6G20-110	Base Station
MRF19090SR3(1)	Freescale	BLF6G20-110	Base Station
MRF19125(2)	Freescale	BLF6G20-140	Base Station
MRF21010LR1(1)	Freescale	BLF3G21-6	Base Station
MRF21010LSR1(1)	Freescale	BLF3G21-6	Base Station
MRF21030LR3(1)	Freescale	BLF6G22-30	Base Station
MRF21030LSR3(1)	Freescale	BLF6G22-45	Base Station
MRF21045LR3(1)	Freescale	BLF6G22-45	Base Station
MRF21045LSR3(1)	Freescale	BLF6G22-45	Base Station

Manufacturer type	Manufacturer	NXP type	Product family
MRF21060L(2)	Freescale	BLF6G22-75	Base Station
MRF21085L(2)	Freescale	BLF6G22-100	Base Station
MRF21090(2)	Freescale	BLF6G22-100	Base Station
MRF21120R6(1)	Freescale	BLF6G22-130	Base Station
MRF21125(2)	Freescale	BLF6G22-130	Base Station
MRF21125SR3(1)	Freescale	BLF6G22-130	Base Station
MRF21180R6(1)	Freescale	BLF6G22-180	Base Station
MRF281SR1(1)	Freescale	BLF6G21-6	Base Station
MRF281ZR1(1)	Freescale	BLF6G21-6	Base Station
MRF282SR1(1)	Freescale	BLF1822-10	Base Station
MRF282ZR1(1)	Freescale	BLF1822-10	Base Station
MRF284LR1(1)	Freescale	BLF3G21-30	Base Station
MRF284LSR1(1)	Freescale	BLF3G21-30	Base Station
MRF377H(2)	Freescale	BLF872	Broadcast
MRF577	Freescale	PRF957	WB trs 1-4
MRF5811L	Freescale	BF693A/X	WB trs 1-4
MRF5P20180HR6(1)	Freescale	BLF6G20-180P	Base Station
MRF5P21180HR6(1)	Freescale	BLF6G20-180P	Base Station
MRF5S19060N(2)	Freescale	BLF6G20-75	Base Station
MRF5S19090HR3(1)	Freescale	BLF6G20-110	Base Station
MRF5S19090HR3(1)	Freescale	BLF6G20-110	Base Station
MRF5S19100H(2)	Freescale	BLF6G20-110	Base Station
MRF5S19130H(2)	Freescale	BLF6G20-140	Base Station
MRF5S19150H(2)	Freescale	BLF6G22-150P	Base Station
MRF5S21045N(2)	Freescale	BLF1822-10	Base Station
MRF5S21090HR3(1)	Freescale	BLF6G22-100	Base Station
MRF5S21090HSR3(1)	Freescale	BLF6G22-100	Base Station
MRF5S21100HR3(1)	Freescale	BLF6G22-100	Base Station
MRF5S21100HSR3(1)	Freescale	BLF6G22-100	Base Station
MRF5S21130HR3(1)	Freescale	BLF6G22-130	Base Station
MRF5S21130HSR3(1)	Freescale	BLF6G22-130	Base Station
MRF5S21150H(2)	Freescale	BLF6G22-150P	Base Station
MRF6P18190HR6(1)	Freescale	BLF6G20-180P	Base Station
MRF6P21190HR6(1)	Freescale	BLF6G20-180P	Base Station
MRF6P3300H(2)	Freescale	BLF878	Broadcast
MRF6S18060N(2)	Freescale	BLF6G20-75	Base Station
MRF6S18100N(2)	Freescale	BLF6G20-110	Base Station
MRF6S18140H(2)	Freescale	BLF6G20-140	Base Station
MRF6S19060N(2)	Freescale	BLF6G20-75	Base Station
MRF6S19100H(2)	Freescale	BLF6G20-110	Base Station
MRF6S19100N(2)	Freescale	BLF6G20-110	Base Station
MRF6S19120H(2)	Freescale	BLF6G20-110	Base Station
MRF6S19140H(2)	Freescale	BLF6G20-140	Base Station
MRF6S20010	Freescale	BLM6G22-30	Base Station
MRF6S20010	Freescale	BLM6G22-30G	Base Station
MRF6S20010N(2)	Freescale	BLF6G21-6	Base Station
MRF6S20010N(2)	Freescale	BLF1822-10	Base Station
MRF6S21050L(2)	Freescale	BLF6G22-45	Base Station
MRF6S21060N(2)	Freescale	BLF6G22-75	Base Station
MRF6S21100H(2)	Freescale	BLF6G22-100	Base Station
MRF6S21100N(2)	Freescale	BLF6G22-100	Base Station
MRF6S21140H(2)	Freescale	BLF6G22-130	Base Station
MRF6S21190H	Freescale	BLF6G22-180P	Base Station
MRF6S21190H	Freescale	BLF6G22-180PN	Base Station
MRF6S27015N	Freescale	BLF6G27-10	Base Station
MRF6S27085H	Freescale	BLF6G27LS-135	Base Station
MRF6S27085HS	Freescale	BLF6G27LS-75	Base Station
MRF6V2010N(2)	Freescale	BLF244	Broadcast
MRF6V2150N(2)	Freescale	BLF177	Broadcast
MRF6V2300N(2)	Freescale	BLF369	Broadcast
MRF6V2300N(2)	Freescale	BLF378	Broadcast
MRF6VP3450	Freescale	BLF878	Broadcast
MRF7S18125AHS	Freescale	BLF6G20LS-140	Base Station
MRF7S18170H(2)	Freescale	BLF6G22-180	Base Station
MRF7S19080H(2)	Freescale	BLF6G20-110	Base Station
MRF7S19080HS	Freescale	BLF6G20LS-75	Base Station
MRF7S19100N(2)	Freescale	BLF6G20LS-110	Base Station
MRF7S19100N(2)	Freescale	BLF6G20-110	Base Station
MRF7S19120N(1)	Freescale	BLF6G20-110	Base Station
MRF7S19170H(2)	Freescale	BLF6G20-180	Base Station
MRF7S19210H	Freescale	BLF6G20-230PRN	Base Station
PTFA192401F	Freescale		
MRF7S21110HS	Freescale	BLF6G22LS-100	Base Station
MRF7S21170	Freescale	BLF6G22LS-100	Base Station
MRF7S38010H	Freescale	BLF6G38-10G	Base Station
MRF7S38040H	Freescale	BLF6G38LS-50	Base Station
MRF917	Freescale	BFQ67W	WB trs 1-4
MRF927	Freescale	BF525A	WB trs 1-4
MRF9411L	Freescale	BF6520/X	WB trs 1-4
MRF947	Freescale	BF5520	WB trs 1-4
MRF947A	Freescale	PRF947	WB trs 1-4

Manufacturer type	Manufacturer	NXP type	Product family
MRF9511L	Freescale	BFG540/X	WB trs 1-4
MRF957	Freescale	PRF957	WB trs 1-4
MRFE6P3300H	Freescale	BLF878	Broadcast
MRFE6S9125N	Freescale	BLF6G10LS-135R	Base Station
MRFE6S9135HS	Freescale	BLF6G10LS-135R	Base Station
MRFE6S9205HS	Freescale	BLF6G10LS-200RN	Base Station
MT4S200T	Toshiba	BFG424W	WB trs 5-7
MT4S200U	Toshiba	BFG425W	WB trs 5-7
MT4S34U	Toshiba	BFG410W	WB trs 5-7
MV2109G	ONSemicond.	BB182LX	Varicap
MW7IC2725N	Freescale	BLF6G27-10G	Base Station
NESG3032M14	NEC	BFU725F	WB trs 5-7
PRF134	POLYFET	BLF242	Broadcast
PRF136	POLYFET	BLF244	Broadcast
PRF947B	Motorola	PRF947	WB trs 1-4
PTF041501E-150W	Infineon	BLF647	Broadcast
PTF041501F-150W	Infineon	BLF647	Broadcast
PTF080101M-10W	Infineon	BLF1043	Base Station
PTF080101S-10W	Infineon	BLF1043	Base Station
PTF081301E-130W	Infineon	BLF4G10-120	Base Station
PTF081301F-130W	Infineon	BLF4G10-120	Base Station
PTF082001E-200W	Infineon	BLF6G10-200	Base Station
PTF180101	Freescale	BLF6G21-10G	Base Station
PTFA043002E-300W	Infineon	BLF878	Broadcast
PTFA080551E-55W	Infineon	BLF6G10-45	Base Station
PTFA080551F-55W	Infineon	BLF6G10-45	Base Station
PTFA081501E-150W	Infineon	BLF6G10-160	Base Station
PTFA081501F-150W	Infineon	BLF6G10-160	Base Station
PTFA091201E-120W	Infineon	BLF4G10-120	Base Station
PTFA091201F-120W	Infineon	BLF4G10-120	Base Station
PZFJ108	Standard	J108	FET
PZFJ109	Standard	J109	FET
PZFJ110	Standard	J110	FET
RO60S250L	Standard	BGY66B	CATV RA
RO60S300L	Standard	BGY68	CATV RA
R2005240	Standard	BGY67A	CATV RA
RN142G	Rohm	BAP1321-03	PIN diode
RN142S	Rohm	BAP1321-02	PIN diode
RN242CS	Rohm	BAP51LX	PIN diode
RN731V	Rohm	BAP50-03	PIN diode
RN739D	Rohm	BAP50-04	PIN diode
RN739F	Rohm	BAP50-04W	PIN diode
S505T	Vishay	BF1101	FET
S505TR	Vishay	BF1101R	FET
S505TRW	Vishay	BF1101WR	FET
S5540220	Standard	BGY587	CATV PPA
S595T	Vishay	BF1105	FET
S595TR	Vishay	BF1105R	FET
S595TRW	Vishay	BF1105WR	FET
S7540185	Standard	BGY785A	CATV PPA
S7540215	Standard	BGY787	CATV PPA
S8740190	Standard	BGD812	CATV PD
S8740220	Standard	BGD814	CATV PD
S8740230	Standard	BGD816L	CATV PD
S949T	Vishay	BF1109	FET
S949TR	Vishay	BF1109R	FET
S949TRW	Vishay	BF1109WR	FET
S974T	Vishay	BF1109	FET
S974T-GS08	Vishay	BF1109	FET
S974TR	Vishay	BF1109R	FET
S974TR-GS08	Vishay	BF1109R	FET
S974TRW	Vishay	BF1109WR	FET
S974TRW-GS08	Vishay	BF1109WR	FET
SA701	POLYFET	BLF145	Broadcast
SA701	POLYFET	BLF245	Broadcast
SA741	POLYFET	BLF175	Broadcast
SD702	POLYFET	BLF246B	Broadcast
SE701	POLYFET	BLF245B	Broadcast
SGA8343Z	Sirena	BFG425W	WB trs 5-7
SK701	POLYFET	BLF544B	Broadcast
SK701	POLYFET	BLF545	Broadcast
SK702	POLYFET	BLF546	Broadcast
SM341	POLYFET	BLF177	Broadcast
SM704	POLYFET	BLF147	Broadcast
SM704	POLYFET	BLF246	Broadcast
SMP1302-004	Skyworks	BAP50-05	PIN diode
SMP1302-005	Skyworks	BAP50-04	PIN diode
SMP1302-011	Skyworks	BAP50-03	PIN diode
SMP1302-074	Skyworks	BAP50-05W	PIN diode
SMP1302-075	Skyworks	BAP50-04W	PIN diode
SMP1302-079	Skyworks	BAP50-02	PIN diode
SMP1304-001	Skyworks	BAP70-03	PIN diode
SMP1304-011	Skyworks	BAP70-03	PIN diode

Manufacturer type	Manufacturer	NXP type	Product family
SMP1307-001	Skyworks	BAP70-03	PIN diode
SMP1307-011	Skyworks	BAP70-03	PIN diode
SMP1320-004	Skyworks	BAP65-05	PIN diode
SMP1320-011	Skyworks	BAP65-03	PIN diode
SMP1320-074	Skyworks	BAP65-05W	PIN diode
SMP1321-001	Skyworks	BAP1321-03	PIN diode
SMP1321-005	Skyworks	BAP1321-04	PIN diode
SMP1321-011	Skyworks	BAP1321-03	PIN diode
SMP1321-075	Skyworks	BAP1321-04	PIN diode
SMP1321-079	Skyworks	BAP1321-02	PIN diode
SMP1322-004	Skyworks	BAP65-05	PIN diode
SMP1322-011	Skyworks	BAP65-03	PIN diode
SMP1322-074	Skyworks	BAP65-05W	PIN diode
SMP1322-079	Skyworks	BAP65-02	PIN diode
SMP1340-011	Skyworks	BAP63-03	PIN diode
SMP1340-079	Skyworks	BAP63-02	PIN diode
SMP1352-011	Skyworks	BAP64-03	PIN diode
SMP1352-079	Skyworks	BAP64-02	PIN diode
SMV1235-004	Skyworks	BB181	Varicap
SMV1236-004	Skyworks	BB156	Varicap
SR341	POLYFET	BLF378	Broadcast
SR341	POLYFET	BLF278	Broadcast
SR401	POLYFET	BLF248	Broadcast
SR401	POLYFET	BLF348	Broadcast
SR401	POLYFET	BLF368	Broadcast
SR703	POLYFET	BLF547	Broadcast
SR704U	POLYFET	BLF548	Broadcast
SST111	Standard	PMBFJ111	FET
SST112	Standard	PMBFJ112	FET
SST113	Standard	PMBFJ113	FET
SST174	Standard	PMBFJ174	FET
SST175	Standard	PMBFJ175	FET
SST176	Standard	PMBFJ176	FET
SST177	Standard	PMBFJ177	FET
SST201	Standard	BFT46	FET
SST202	Standard	BFR31	FET
SST203	Standard	BFR30	FET
SST308	Standard	PMBFJ308	FET
SST309	Standard	PMBFJ309	FET
SST310	Standard	PMBFJ310	FET
SST4391	Standard	PMBF4391	FET
SST4392	Standard	PMBF4392	FET
SST4393	Standard	PMBF4393	FET
SST4856	Standard	BSR56	FET
SST4857	Standard	BSR57	FET
SST4859	Standard	BSR56	FET
SST4860	Standard	BSR57	FET
SST4861	Standard	BSR58	FET
ST704	POLYFET	BLF346	Broadcast
ST744	POLYFET	BLF276	Broadcast
ST744	POLYFET	BLF277	Broadcast
SVC201SPA	Sanyo	BB187	Varicap
TBB1016	Renesas	BF1204	FET
TMF3201J	AUK	BF1204	FET
TMF3202Z	AUK	BF1202WR	FET
TMPF4091	Standard	PMBF4391	FET
TMPF4092	Standard	PMBF4392	FET
TMPF4093	Standard	PMBF4393	FET
TMPF4391	Standard	PMBF4391	FET
TMPF4392	Standard	PMBF4392	FET
TMPF4393	Standard	PMBF4393	FET
TMPFB246A	Standard	BSR56	FET
TMPFB246B	Standard	BSR57	FET
TMPFB246C	Standard	BSR58	FET
TMPFJ111	Standard	PMBFJ111	FET
TMPFJ112	Standard	PMBFJ112	FET
TMPFJ113	Standard	PMBFJ113	FET
TMPFJ174	Standard	PMBFJ174	FET
TMPFJ175	Standard	PMBFJ175	FET
TMPFJ176	Standard	PMBFJ176	FET
TMPFJ177	Standard	PMBFJ177	FET
TSDF54040	Vishay	BF1102	FET
TSDF54040-GS08	Vishay	BF1102	FET
TSDF54040X-GS08	Vishay	BF1102	FET
TSDF54040XR-GS08	Vishay	BF1102R	FET
uPC2709	NEC	BGA2709	MMIC
uPC2711	NEC	BGA2711	MMIC
uPC2712	NEC	BGA2712	MMIC
uPC2745	NEC	BGA2001	MMIC
uPC2746	NEC	BGA2001	MMIC
uPC2748	NEC	BGA2748	MMIC
uPC2771	NEC	BGA2771	MMIC
uPC8112	NEC	BGA2022	MMIC

5.2 Cross-references: NXP discontinued types versus NXP replacement types

In alphabetical order of manufacturer discontinued type

Abbreviations:

BS diode	Band Switch Diode
CATV	Community Antenna Television System
FET	Field Effect Transistor
Varicap	Varicap Diode
WB trs	Wideband Transistor
OM	Optical Module

NXP discontinued type	Product family NXP	Replacement type NXP	NXP discontinued type	Product family NXP	Replacement type NXP
BA277-01	BS diode	BA277	BFR93AT	WB trs	BFR93AW
BA792	BS diode	BA591	BFR93R	WB trs	BFR93A
BAP142L	PIN diode	BAP142LX	BFU510	WB trs	BFU725F
BAP51-01	PIN diode	BAP51LX	BFU540	WB trs	BFU725F
BAP51L	PIN diode	BAP51LX	BGA2031	WB trs	BGA2031/1
BAP55L	PIN diode	BAP55LX	BGD102/02	CATV	BGD502
BB132	Varicap	BB152	BGD102/04	CATV	BGD502
BB145	Varicap	BB145B	BGD104	CATV	BGD704
BB145B-01	Varicap	BB145B	BGD104/04	CATV	BGD704
BB151	Varicap	BB135	BGD502/01	CATV	BGD502
BB157	Varicap	BB187	BGD502/01	CATV	BGD502
BB178L	Varicap	BB178LX	BGD502/01	CATV	BGD502
BB179BL	Varicap	BB179BLX	BGD502/01	CATV	BGD502
BB179L	Varicap	BB179LX	BGD502/03	CATV	BGD502
BB181L	Varicap	BB181LX	BGD502/03	CATV	BGD502
BB182B	Varicap	BB182	BGD502/05	CATV	BGD502
BB182B	Varicap	BB182	BGD502/07	CATV	BGD502
BB182L	Varicap	BB182LX	BGD502/6M	CATV	BGD702
BB187L	Varicap	BB187LX	BGD502/C7	CATV	BGD502
BB190	Varicap	BB149	BGD502/R	CATV	BGD502
BB202L	Varicap	BB202LX	BGD504	CATV	BGD704
BB804	Varicap	BB207	BGD504/01	CATV	BGD704
BBY42	Varicap	BBY40	BGD504/02	CATV	BGD704
BF1203	FET	BF1203	BGD504/09	CATV	BGD704
BF689K	WB trs	BFS17	BGD602	CATV	BGD702
BF763	WB trs	BFS17	BGD602/02	CATV	BGD702
BF851A	FET	BF861A	BGD602/07	CATV	BGD702
BF851A	FET	BF861A	BGD602/09	CATV	BGD702
BF851C	FET	BF861C	BGD602/14	CATV	BGD702
BF851C	FET	BF861C	BGD602D	CATV	BGD712
BF992/01	FET	BF992	BGD702D	CATV	BGD712
BFC505	WB trs	BFM505	BGD702D/08	CATV	BGD712
BFC520	WB trs	BFM520	BGD704/01	CATV	BGD704
BFET505	WB trs	BFM505	BGD704/07S	CATV	BGD704
BFET520	WB trs	BFM520	BGD704/S9	CATV	BGD704
BFG17A	WB trs	BFS17A	BGD704N	CATV	BGD714
BFG197	WB trs	BFG198	BGD802/09	CATV	BGD802
BFG197/X	WB trs	BFG198	BGD802N	CATV	BGD812
BFG25AW/XR	WB trs	BFG25AW/X	BGD802N	CATV	BGD812
BFG410W/CA	WB trs	BFG410W	BGD802N/07	CATV	BGD812
BFG425W/CA	WB trs	BFG425W	BGD802N/07	CATV	BGD812
BFG425W/CA	WB trs	BFG425W	BGD804N	CATV	BGD814
BFG505/XR	WB trs	BFG505/X	BGD804N	CATV	BGD814
BFG505W/XR	WB trs	BFG505	BGD804N/02	CATV	BGD814
BFG520W/XR	WB trs	BFG520W/X	BGD804N/02	CATV	BGD814
BFG590/XR	WB trs	BFG590/X	BGD902	CATV	BGD812
BFG590W	WB trs	BFG590	BGD902/07	CATV	BGD902
BFG590W/XR	WB trs	BFG590	BGD902L	CATV	BGD812
BFG67/XR	WB trs	BFG67	BGD904	CATV	BGD814
BFG92A	WB trs	BFG92A/X	BGD904/02	CATV	BGD904
BFG92A/XR	WB trs	BFG92A/X	BGD904/07	CATV	BGD904
BFG93A/XR	WB trs	BFG93A/X	BGD904L	CATV	BGD814
BFQ34/01	WB trs	BFG35	BGD906	CATV	CGD942C
BFR92	WB trs	BFR92A	BGD906/02	CATV	BGD906
BFR92AR	WB trs	BFR92A	BGE847BO	CATV	BGO827
BFR92AT	WB trs	BFR92AW	BGE847BO	CATV	BGO827
BFR93	WB trs	BFR92A	BGE847BO	CATV	BGO827

NXP discontinued type	Product family NXP	Replacement type NXP
BGE847BO/FC	CATV	BGO827/SC0
BGE847BO/FC0	CATV	BGO827/SC0
BGE847BO/FC0	CATV	BGO827/SC0
BGE847BO/FC1	CATV	BGO827/SC0
BGE847BO/SC	CATV	BGO827/SC0
BGE847BO/SC0	CATV	BGO827/SC0
BGE847BO/SC0	CATV	BGO827/SC0
BGE887BO	CATV	BGO827
BGE887BO/FC	CATV	BGO827/SC0
BGE887BO/FC1	CATV	BGO827/SC0
BGE887BO/SC	CATV	BGO827/SC0
BGO847/01	CATV	BGO847
BGO847/01	CATV	BGO847
BGO847/FC0	CATV	BGO827/SC0
BGO847/FC0	CATV	BGO827/SC0
BGO847/FC01	CATV	BGO827/SC0
BGO847/FC01	CATV	BGO827/SC0
BGO847/SC0	CATV	BGO827/SC0
BGO34/01	WB	BFG35
BGU2003	WB trs	BGA2003
BGX885/02	CATV	BGX885N
BGY1085A/07	CATV	BGY1085A
BGY584A	CATV	BGY585A
BGY585A/01	CATV	BGY585A
BGY586	CATV	BGY587
BGY586/05	CATV	BGY587
BGY587/01	CATV	BGY587
BGY587/01	CATV	BGY587
BGY587/02	CATV	BGY587
BGY587/02	CATV	BGY587
BGY587/07	CATV	BGY587
BGY587/09	CATV	BGY587
BGY587B/01	CATV	BGY587B
BGY587B/02	CATV	BGY587B
BGY587B/09	CATV	BGY587B
BGY588	CATV	BGY588N
BGY588/04	CATV	BGY588N
BGY66B/04	CATV	BGY66B
BGY67/04	CATV	BGY67
BGY67/09	CATV	BGY67
BGY67/14	CATV	BGY67
BGY67/19	CATV	BGY67
BGY67A/04	CATV	BGY67A
BGY67A/14	CATV	BGY67A
BGY68/01	CATV	BGY68
BGY685A/07	CATV	BGY685A
BGY685AD	CATV	BGY785A
BGY685AD	CATV	BGY785A
BGY685AL	CATV	BGY785A
BGY687/07	CATV	BGY687
BGY687/14	CATV	BGY687
BGY687B	CATV	BGE787B

NXP discontinued type	Product family NXP	Replacement type NXP
BGY687B/02	CATV	BGE787B
BGY785A/07	CATV	BGY785A
BGY785A/09	CATV	BGY785A
BGY785AD	CATV	BGY785A
BGY785AD/06	CATV	BGY785A
BGY785AD/8M	CATV	BGY885A
BGY785AD/8M	CATV	BGY885A
BGY787/02	CATV	BGY787
BGY787/07	CATV	BGY787
BGY787/09	CATV	BGY787
BGY847BO	CATV	BGO827
BGY847BO/SC	CATV	BGO827/SC0
BGY84A	CATV	BGY585A
BGY84A/04	CATV	BGY585A
BGY84A/05	CATV	BGY585A
BGY85	CATV	BGY585A
BGY85A	CATV	BGY585A
BGY85A/04	CATV	BGY585A
BGY85A/05	CATV	BGY585A
BGY85H/01	CATV	BGY585A
BGY86	CATV	BGY587
BGY86/05	CATV	BGY587
BGY87	CATV	BGY587
BGY87/J1	CATV	BGY587
BGY87B	CATV	BGY587B
BGY88	CATV	BGY588N
BGY88/04	CATV	BGY588N
BGY88/04	CATV	BGY588N
BGY88/07	CATV	BGY588N
BGY887/02	CATV	BGY887
BGY887BO	CATV	BGO827
BGY887BO/FC	CATV	BGO827/FC0
BGY887BO/SC	CATV	BGO827/SC0
CGD914	CATV	CGD1042H
CGY887A	CATV	CGY1043
CGY887B	CATV	CGY1047
GD923	CATV	CGD942C
ON4520/09	CATV	BGY687
ON4520/2	CATV	BGY687
ON4594/M5	CATV	BGY585A
ON4749	CATV	BGY588N
ON4749	CATV	BGY588N
ON4831-2	CATV	BGY885A
ON4869	CATV	BGY587
ON4876	CATV	BGY1085A
ON4890	CATV	BGD712
ON4890	CATV	BGD712
ON4990	CATV	BGD885
PMBT3640/AT	WB trs	BFS17
PN4392	FET	PMBF4392
PN4393	FET	PMBF4393

























Experience reducing RF component count in your wireless devices?

Look at RF IC's – MMICs, chapter 3.4.1

6. Packing and packaging information

6.1 Packing quantities per package with relevant ordering code

	Package	Package dimensions	Packing quantity	Product 12NC ending	Packing method
	SOD323/SC-76	1.7 x 1.25 x 0.9	3,000 10,000	115 135	8 mm tape and reel 8 mm tape and reel
	SOD523/SC-79	1.2 x 0.8 x 0.6	3,000 10,000 8,000 20,000	115 135 315 335	8 mm tape and reel 8 mm tape and reel 2 mm pitch tape and reel 2 mm pitch tape and reel
	SOD882T	1.0 x 0.6 x 0.4	15,000	315	8 mm tape and reel
	SOT23	2.9 x 1.3 x 0.9	3,000 10,000	215 235	8 mm tape and reel 8 mm tape and reel
	SOT54	4.6 x 3.9 x 5.1	5,000 5,000 10,000 10,000	112 412 116 126	bulk, delta pinning bulk, straight leads tape and reel, wide pitch tape ammpack, wide pitch
	SOT89/SC-62	4.5 x 2.5 x 1.5	1,000 4,000	115 135	12 mm tape and reel 12 mm tape and reel
	SOT115	44.5 x 13.65 x 20.4	100	112	4 tray/box
	SOT143(N/R)	2.9 x 1.3 x 0.9	3,000 10,000	215 235	8 mm tape and reel 8 mm tape and reel
	SOT223/SC-73	6.7 x 3.5 x 1.6	1,000 4,000	115 135	12 mm tape and reel 12 mm tape and reel
	SOT323/SC-70	2.0 x 1.25 x 0.9	3,000 10,000	115 135	8 mm tape and reel 8 mm tape and reel
	SOT343(N/R)	2.0 x 1.25 x 0.9	3,000 10,000	115 135	8 mm tape and reel 8 mm tape and reel
	SOT360	6.5 x 4.4 x 0.9	2,500	118	16 mm tape and reel
	SOT363/SC-88	2.0 x 1.25 x 0.9	3,000 10,000	115 135	8 mm tape and reel 8 mm tape and reel
	SOT403	5.0 x 4.4 x 0.9	2,500	118	12 mm tape and reel
	SOT416/SC-75	1.6 x 0.8 x 0.75	3,000	115	8 mm tape and reel
	SOT616	4.0 x 4.0 x 0.85	6,000	118	12 mm tape and reel
	SOT666	1.6 x 1.2 x 0.7	4,000	115	8 mm tape and reel
	SOT724	8.7 x 3.9 x 1.47	2,500	118	16 mm tape and reel
	SOT778	6.0 x 6.0 x 0.85	490 4,000	551 518	tray multiple trays
	SOT886	1.45 x 1.0 x 0.5	5000	115	8 mm tape and reel
	SOT891	1.0 x 1.0 x 0.5	5000	132	8 mm tape and reel
	SOT908	3.0 x 3.0 x 0.85	6000	118	12 mm tape and reel

	Package	Package dimensions	Packing quantity	Product 12NC ending	Packing method
	SOT502A	19.8 x 9.4 x 4.1	60	112	blister, tray
			300	135	reel
	SOT502B	19.8 x 9.4 x 4.1	60	112	blister, tray
			100	118	reel
	SOT538A	5.1 x 4.1 x 2.6	160	112	blister, tray
	SOT539A	31.25 x 9.4 x 4.65	60	112	blister, tray
			300	135	reel
	SOT540A	21.85 x 10.2 x 5.4	60	112	blister, tray
	SOT608A	10.1 x 10.1 x 4.2	60	112	blister, tray
			60	112	blister, tray
			300	135	reel
	SOT608B	10.1 x 10.1 x 4.2	60	112	blister, tray
			100	118	reel
			300	135	reel
	SOT822-1	15.9 x 11 x 3.6	180	127	tube
	SOT834-1	15.9 x 11 x 3.15	180	127	tube
	SOT922-1	17.4 x 9.4 x 3.88	60	112	blister, tray
	SOT975B	6.5 x 6.5 x 3.3	180	112	blister, tray
			100	118	Tape and reel
	SOT975C	6.5 x 6.5 x 3.3	180	112	blister, tray
			100	118	Tape and reel
	SOT979A	31.25 x 10.2 x 5.3	60	112	blister, tray

6.2 Marking codes list

Search online on marking code: <http://www.nxp.com/package/>

In alphabetical order of marking code

In case a '%' is given in the marking code, it means this type can be assembled at different assembly sites.

Instead of a '%', you will find:

p = made in Hong-Kong

t = made in Malaysia

W = made in China

Marking code	Type	Package	Marking code	Type	Package	Marking code	Type	Package
%1W	BAP51-05W	SOT323	5K%	BAP64-05	SOT23	B7%	BGA2716	SOT363
%3A	BGA6289	SOT89	5W%	BAP64-05W	SOT323	BC%	BFQ591	SOT89
%4A	BGA6489	SOT89	6F%	BAP1321-04	SOT23	BFG135	BFG135	SOT223
%5A	BGA6589	SOT89	6K%	BAP64-06	SOT23	BFG198	BFG198	SOT223
%6G	PMBF4393	SOT23	6W%	BAP50-04W	SOT323	BFG31	BFG31	SOT223
%6J	PMBF4391	SOT23	7	BA891	SOD523	BFG35	BFG35	SOT223
%6K	PMBF4392	SOT23	7K%	BAP65-05	SOT23	BFG541	BFG541	SOT223
%6S	PMBFJ176	SOT23	8	BB178	SOD523	BFG591	BFG591	SOT223
%6W	PMBFJ175	SOT23	8K%	BAP70-05	SOT23	BFG94	BFG94	SOT223
%6X	PMBFJ174	SOT23	9	BB179	SOD523	BFG97	BFG97	SOT223
%6Y	PMBFJ177	SOT23	10%	BAT18	SOT23	BLT50	BLT50	SOT223
%AB	BF1210	SOT363	13%	BB207	SOT23	BLT70	BLT70	SOT223
%M1	BF908	SOT143	20%	BF545A	SOT23	BLT80	BLT80	SOT223
%M2	BF908R	SOT143	21%	BF545B	SOT23	BLT81	BLT81	SOT223
%M3	BF909	SOT143	22%	BF545C	SOT23	C1%	BGM1011	SOT363
%M4	BF909R	SOT143	24%	BF556A	SOT23	C2%	BGM1012	SOT363
%M5	BF909A	SOT143	25%	BF556B	SOT23	C4%	BGM1013	SOT363
%M6	BF909AR	SOT143	26%	BF556C	SOT23	C5%	BGM1014	SOT363
%M7	BF904A	SOT143	28%	BF861A	SOT23	D2	BAP63-03	SOD323
%M8	BF904AR	SOT143	29%	BF861B	SOT23	D3	BAP65-03	SOD323
%M9	BSS83	SOT143	30%	BF861C	SOT23	D4%	BFR30/B	SOT23
%MA	BF991	SOT143	31%	BFR505	SOT23	E1%	BFS17	SOT23
%MB	BF992	SOT143	32%	BFR520	SOT23	E1%	BFS17/FD	SOT23
%MC	BF904	SOT143	33%	BFR540	SOT23	E1%	BFS17W	SOT323
%MD	BF904R	SOT143	34%	BFT25A	SOT23	E2%	BFS17A	SOT23
%ME	BFG505	SOT143	38%	PMBFJ108	SOT23	E2%	BGA2712	SOT363
%MF	BFG520	SOT143	39%	PMBFJ109	SOT23	E3%	BGA2709	SOT363
%MG	BFG540	SOT143	40%	PMBFJ110	SOT23	E6%	BFG17A	SOT143
%MH	BFG590	SOT143	41%	PMBFJ111	SOT23	FB	BFQ19	SOT89
%MK	BFG505/X	SOT143	42%	PMBFJ112	SOT23	FF	BFQ18A	SOT89
%ML	BFG520/X	SOT143	47%	PMBFJ113	SOT23	FG	BFQ149	SOT89
%MM	BFG540/X	SOT143	48%	PMBFJ308	SOT23	G2	BA278	SOD523
%MN	BFG590/X	SOT143	49%	PMBFJ309	SOT23	G2%	BGA2711	SOT363
%MP	BFG520/XR	SOT143	50%	PMBFJ310	SOT23	G3%	BGA2748	SOT363
%MR	BFG540/XR	SOT143	A1	BA591	SOD323	G4%	BGA2771	SOT363
%MS	BFG10	SOT143	A1	BB208-02	SOD523	G5%	BGA2776	SOT363
%MT	BFG10/X	SOT143	A1	BGA2001	SOT343	K1	BAP51-02	SOD523
%MU	BFG25A/X	SOT143	A2	BAT18	SOT23	K2	BAP51-05W	SOD523
%MV	BFG67/X	SOT143	A2	BB184	SOD523	K4	BAP50-02	SOD523
%MW	BFG92A/X	SOT143	A2	BB208-03	SOD323	K5	BAP63-02	SOD523
%MX	BFG93A/X	SOT143	A2%	BGA2022	SOT363	K6	BAP65-02	SOD523
%MY	BF1100	SOT143	A3	BAP64-03	SOD323	K7	BAP1321-02	SOD523
%MZ	BF1100R	SOT143	A3	BB198	SOD523	K8	BAP70-02	SOD523
1	BA277	SOD523	A3	BGA2003	SOT343	K9	BB199	SOD523
1B%	BGA2717	SOT363	A3%	BGA2031/1	SOT363	L1	BB202LX	SOD882T
1C%	BAP50-05	SOT23	A5	BAP51-03	SOD323	L2	BAP51LX	SOD882T
1N%	BAP70-04W	SOT323	A5%	BGA2011	SOT363	L2	BB202	SOD523
2	BB182	SOD523	A6%	BGA2012	SOT363	L2%	BF1203	SOT363
2A%	BF862	SOT23	A7%	BFG310W/XR	SOT343	L3	BB178LX	SOD882T
2L	BF1208	SOT666	A8	BAP50-03	SOD323	L3%	BF1204	SOT363
2N	BF1206F	SOT666	A8%	BFG325W/XR	SOT343	L4	BB179LX	SOD882T
2R	BF1207F	SOT666	A8%	PMBFJ620	SOT363	L4%	BF1205	SOT363
4A	BF1208D	SOT666	A9	BAP70-03	SOD323	L5	BB179BLX	SOD882T
4K%	BAP64-04	SOT23	B3	BGU7003	SOT891	L6	BB181LX	SOD882T
4L%	BAP50-04	SOT23	B6-	BGA2715	SOT363	L6%	BF1206	SOT363
4W%	BAP64-04W	SOT323	B6%	BFU725F	SOT343F	L7	BB182LX	SOD882T

Marking code	Type	Package	Marking code	Type	Package	Marking code	Type	Package
L8	BB187LX	SOD882T	N0%	BFM505	SOT363	P8	BB148	SOD323
L9%	BF1208	SOT363	N0%	BFS505	SOT323	P9	BB149	SOD323
LA	BF1201WR	SOT343	N1	BFG505W/X	SOT343	PB	BB152	SOD323
LA%	BF1201	SOT143	N2	BFR520T	SOT416	PC	BB153	SOD323
LB%	BF1201R	SOT143	N2%	BFM520	SOT363	PE	BB155	SOD323
LD%	BF1202	SOT143	N2%	BFS520	SOT323	PF	BB156	SOD323
LE	BF1202WR	SOT343	N3	BFG520W	SOT343	PL	BB149A	SOD323
LE%	BF1202R	SOT143	N4	BFG520W/X	SOT343	R2%	BFR93A	SOT23
LF%	BF1211	SOT143	N4	BFQ540	SOT89	R2%	BFR93AW	SOT323
LG%	BF1212	SOT143	N4%	BFS540	SOT323	R5	BFR93AR	SOT23
LH%	BF1211R	SOT143	N6%	BFS25A	SOT323	R7%	BFR106	SOT23
LK%	BF1212R	SOT143	N7	BFG540W/X	SOT343	R8%	BFG93A	SOT143
M08	PMBFJ308	SOT23	N8	BFG540W/XR	SOT343	S	BAP64-02	SOD523
M09	PMBFJ309	SOT23	N9	BFG540W	SOT343	S1%	BFG310/XR	SOT143
M1%	BFR30	SOT23	N9%	BAP70AM	SOT363	S2%	BBY40	SOT23
M10	PMBFJ310	SOT23	NA	BF1105WR	SOT343	S2%	BFG325/XR	SOT143
M2%	BF1207	SOT363	NA%	BF1105R	SOT143	S3%	BF1107	SOT23
M2%	BFR31	SOT23	NB	BF1109WR	SOT343	S6%	BF510	SOT23
M3%	BFT46	SOT23	NB%	BF1109R	SOT143	S7%	BF511	SOT23
M33	BF861A	SOT23	NC	BF1101WR	SOT343	S8%	BF512	SOT23
M34	BF861B	SOT23	NC%	BF1101R	SOT143	S9%	BF513	SOT23
M35	BF861C	SOT23	ND	BFG424W	SOT343	SB%	BF1214	SOT363
M6%	BF1205C	SOT363	ND%	BF1101	SOT143	SC%	BB201	SOT23
M65	BF545A	SOT23	NE	BFG424F	SOT343	T5	BFG10W/X	SOT343
M66	BF545B	SOT23	NE%	BF1105	SOT143	V1	BFG25AW/X	SOT343
M67	BF545C	SOT23	NF%	BF1109	SOT143	V1%	BFT25	SOT23
M84	BF556A	SOT23	NG%	BF1108	SOT143	V10	BFT25A	SOT23
M85	BF556B	SOT23	NH%	BF1108R	SOT143	V2%	BFQ67	SOT23
M86	BF556C	SOT23	P08	PMBFJ108	SOT23	V2%	BFQ67W	SOT323
MB	BF998WR	SOT343	P09	PMBFJ109	SOT23	V3%	BFG67	SOT143
MC	BF904WR	SOT343	P1	BFG21W	SOT343	V4%	BAP64-06W	SOT323
MD	BF908WR	SOT343	P1	BB131	SOD323	V6%	BAP65-05W	SOT323
ME	BF909WR	SOT343	P10	PMBFJ110	SOT23	V8	BAP1321-03	SOD323
MF	BF1100WR	SOT343	P11	PMBFJ111	SOT23	W1	BF1102	SOT363
MG	BF909AWR	SOT343	P12	PMBFJ112	SOT23	W1%	BFT92	SOT23
MG%	BF994S	SOT143	P13	PMBFJ113	SOT23	W1%	BFT92W	SOT323
MH	BF904AWR	SOT343	P2%	BFR92A	SOT23	W2%	BF1102R	SOT363
MH%	BF996S	SOT143	P2%	BFR92AW	SOT323	W4%	BAP50-05W	SOT323
MK	BF1211WR	SOT343	P3	BFG403W	SOT343	W6%	BAP51-04W	SOT323
ML	BF1212WR	SOT343	P4	BFG410W	SOT343	W7%	BAP51-06W	SOT323
MO%	BF998	SOT143	P5	BB135	SOD323	W9%	BAP63-05W	SOT323
MO%	BF998R	SOT143	P5	BFG425W	SOT343	X	BB187	SOD523
N	BB181	SOD523	P6	BFG480W	SOT343	X1%	BFT93	SOT23
N0	BFR505T	SOT416	P7	BB147	SOD323	X1%	BFT93W	SOT323

7. Abbreviations

AM	Amplitude Modulation	MMIC	Monolithic Microwave Integrated Circuit
ASIC	Application Specific Integrated Circuit	MOSFET	Metal–Oxide–Semiconductor Field Effect Transistor
BPF	Band Pass Filter	MPA	Medium Power Amplifier
BUC	Block Up Converter	NF	Noise Figure
CATV	Community Antenna Television	PA	Power Amplifier
CDMA	Code Division Multiple Access	PAR	Peak to Average Ratio
CMOS	Complementary Metal Oxide Semiconductor	PEP	Peak Envelope Power
CQS	Customer Qualification Samples	pHEMT	pseudomorphic High Electron Mobility Transistor
DAB	Digital Audio Broadcasting	PLL	Phase Locked Loop
DECT	Digital Enhanced Cordless Telecommunications	QUBiC	Quality BiCMOS
DSB	Digital Signal Processor	RF	Radio Frequency
DVB	Digital Video Broadcasting	RFS	Release for Supply
EDGE	Enhanced Data Rates for GSM Evolution	RoHS	Restriction of Hazardous Substances
ESD	Electro Static Device	RX	Receive
FET	Field Effect Transistor	SARFT	State Administration for Radio, Film and Television
FM	Frequency Modulation	SER	Serializer
GaAs	Gallium Arsenide	SiGe:C	Silicon Germanium Carbon
GaN	Gallium Nitride	SMD	Surface Mounted Device
Gen	Generation	SPDT	Single Pole, Double Throw
GPS	Global Positioning System	TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
GSM	Global System for Mobile communications	TCAS	Traffic Collision Avoidance Systems
HBT	Heterojunction Bipolar Transistor	TMA	Tower Mounted Amplifier
HDTV	High Definition Television	TX	Transmit
HF	High Frequency (3-30 MHz)	UHF	Ultra High Frequency (470-860MHz)
HFC	Hybrid Fiber Coax	UMTS	Universal Mobile Telecommunications System
HFET	Heterostructure Field Effect Transistor	VCO	Voltage Controlled Oscillator
HPA	High Power Amplifier	VGA	Variable Gain Amplifier
HVQFN	Plastic thermally enhanced Very thin Quad Flat pack No leads	VHF	Very High Frequency (30-300MHz)
IF	Intermediate Frequency	VoIP	Voice over Internet Protocol
ISM	Industrial, Scientific, Medical - reserved frequency bands	VSAT	Very Small Aperture Terminal
LDMOS	Laterally Diffused Metal-Oxide-Semiconductor	WCDMA	Wideband Code Division Multiple Access
LNA	Low Noise Amplifier	WiMAX	Worldwide Interoperability for Microwave Access
LNB	Low Noise Block	WLAN	Wireless Local Area Network
LO	Local Oscillator		
LPF	Low Pass Filter		
MESFET	Metal Semiconductor Field Effect Transistor		

8. Contacts and web links

How to contact your authorized distributor or local NXP representative?

Authorized distributors

Asia Pacific:

http://www.nxp.com/profile/sales/asia_pacific_dist

Europe / Africa / Middle East:

http://www.nxp.com/profile/sales/europe_dist

North America:

http://www.nxp.com/profile/sales/northamerica_dist

South America:

http://www.nxp.com/profile/sales/southamerica_dist

Local NXP Offices

Asia Pacific:

http://www.nxp.com/profile/sales/asia_pacific

Europe / Africa / Middle East:

<http://www.nxp.com/profile/sales/europe>

North America:

<http://www.nxp.com/profile/sales/northamerica>

South America:

<http://www.nxp.com/profile/sales/southamerica>

Web links

NXP Semiconductors:

<http://www.nxp.com>

NXP RF Manual web page:

<http://www.nxp.com/rfmanual>

NXP varicaps:

<http://www.nxp.com/varicaps>

NXP RF PIN diodes:

<http://www.nxp.com/pindiodes>

NXP RF Schottky diodes:

<http://www.nxp.com/rfschottkydiodes>

NXP RF MMICs:

<http://www.nxp.com/mmics>

NXP RF wideband transistors:

<http://www.nxp.com/rftransistors>

NXP RF power & base stations:

<http://www.nxp.com/rfpower>

NXP RF FETs:

<http://www.nxp.com/rffets>

NXP RF CATV electrical & optical:

<http://www.nxp.com/catv>

NXP RF applications:

<http://www.nxp.com/rf>

NXP application notes:

http://www.nxp.com/all_appnotes

NXP cross-references:

<http://www.nxp.com/products/xref>

NXP green packaging:

http://www.nxp.com/green_roadmap

NXP end-of-life:

<http://www.nxp.com/products/eol>

NXP Quality Handbook:

<http://www.standardics.nxp.com/quality/handbook>

NXP literature:

<http://www.nxp.com/products/discretes/documentation>

NXP packaging:

<http://www.nxp.com/package>

NXP sales offices and distributors:

<http://www.nxp.com/profile/sales>

9. Product index

Type	Portfolio chapter	Type	Portfolio chapter	Type	Portfolio chapter	Type	Portfolio chapter	Type	Portfolio chapter	Type	Portfolio chapter	Type	Portfolio chapter
BA277	3.2.1	BB207	3.2.1	BFG135	3.3.1	BGA2716	3.4.1	BLF571	3.7.2	BLT50	3.3.1		
BA591	3.2.1	BB208-02	3.2.1	BFG198	3.3.1	BGA2717	3.4.1	BLF573	3.7.2	BLT70	3.3.1		
BA792	3.2.1	BB208-03	3.2.1	BFG21W	3.3.1	BGA2748	3.4.1	BLF573S	3.7.2	BLT80	3.3.1		
BA891	3.2.1	BBY40	3.2.1	BFG25A/X	3.3.1	BGA2771	3.4.1	BLF574	3.7.2	BLT81	3.3.1		
BAP1321-02	3.2.2	BF1100	3.5.2	BFG25AW/X	3.3.1	BGA2776	3.4.1	BLF578	3.7.2	BSR56	3.5.1		
BAP1321-03	3.2.2	BF1100R	3.5.2	BFG31	3.3.1	BGA2800	3.4.1	BLF645	3.7.2	BSR57	3.5.1		
BAP1321-04	3.2.2	BF1100WR	3.5.2	BFG310/XR	3.3.1	BGA2801	3.4.1	BLF6G10-135RN	3.7.1	BSR58	3.5.1		
BAP1321LX	3.2.2	BF1101	3.5.2	BFG310W/XR	3.3.1	BGA2815	3.4.1	BLF6G10-160RN	3.7.1	BSS83	3.5.2		
BAP142LX	3.2.2	BF1101R	3.5.2	BFG325/XR	3.3.1	BGA2816	3.4.1	BLF6G10-200RN	3.7.1	CGD1040Hi	3.6.3		
BAP50-02	3.2.2	BF1101WR	3.5.2	BFG325W/XR	3.3.1	BGA2850	3.4.1	BLF6G10-45	3.7.1	CGD1042H	3.6.3		
BAP50-03	3.2.2	BF1102	3.5.2	BFG35	3.3.1	BGA2865	3.4.1	BLF6G10LS-135RN	3.7.1	CGD1042Hi	3.6.3		
BAP50-04	3.2.2	BF1105	3.5.2	BFG403W	3.3.1	BGA2866	3.4.1	BLF6G10LS-160RN	3.7.1	CGD1044H	3.6.3		
BAP50-04W	3.2.2	BF1105R	3.5.2	BFG410W	3.3.1	BGA6289	3.4.1	BLF6G10LS-200RN	3.7.1	CGD1044Hi	3.6.3		
BAP50-05	3.2.2	BF1105WR	3.5.2	BFG424F	3.3.1	BGA6489	3.4.1	BLF6G10LS-200RN	3.7.1	CGD914	3.6.3		
BAP50-05W	3.2.2	BF1107	3.5.2	BFG424W	3.3.1	BGA6589	3.4.1	BLF6G10S-45	3.7.1	CGD923	3.6.3		
BAP50LX	3.2.2	BF1108S	3.5.2	BFG425W	3.3.1	BGA7024	3.4.1	BLF6G20-110	3.7.1	CGD942C	3.6.3		
BAP51-02	3.2.2	BF1108R5	3.5.2	BFG480W	3.3.1	BGA7027	3.4.1	BLF6G20-180PN	3.7.1	CGD944C	3.6.3		
BAP51-03	3.2.2	BF1109	3.5.2	BFG505(X)	3.3.1	BGA7124	3.4.1	BLF6G20-180RN	3.7.1	CGY887A	3.6.2		
BAP51-04W	3.2.2	BF1109R	3.5.2	BFG505W/X	3.3.1	BGA7127	3.4.1	BLF6G20-230PRN	3.7.1	CGY887B	3.6.2		
BAP51-05W	3.2.2	BF1109WR	3.5.2	BFG520(X)	3.3.1	BGA7130	3.4.1	BLF6G20-40	3.7.1	CGY888C	3.6.2		
BAP51-06W	3.2.2	BF1201	3.5.2	BFG520W(X)	3.3.1	BGA7133	3.4.1	BLF6G20-45	3.7.1	J108	3.5.1		
BAP51LX	3.2.2	BF1201R	3.5.2	BFG540(X)	3.3.1	BGD502	3.6.3	BLF6G20-75	3.7.1	J109	3.5.1		
BAP55LX	3.2.2	BF1201WR	3.5.2	BFG540W(X/XR)	3.3.1	BGD702	3.6.3	BLF6G20LS-110	3.7.1	J110	3.5.1		
BAP63-02	3.2.2	BF1202	3.5.2	BFG541	3.3.1	BGD702N	3.6.3	BLF6G20LS-140	3.7.1	J111	3.5.1		
BAP63-03	3.2.2	BF1202R	3.5.2	BFG590(X)	3.3.1	BGD704	3.6.3	BLF6G20LS-180RN	3.7.1	J112	3.5.1		
BAP63-05W	3.2.2	BF1202WR	3.5.2	BFG591	3.3.1	BGD712	3.6.3	BLF6G20LS-75	3.7.1	J113	3.5.1		
BAP63LX	3.2.2	BF1203	3.5.2	BFG67(X)	3.3.1	BGD712C	3.6.3	BLF6G21-10G	3.7.1	J174	3.5.1		
BAP64-02	3.2.2	BF1204	3.5.2	BFG92A(X)	3.3.1	BGD714	3.6.3	BLF6G22-180PN	3.7.1	J175	3.5.1		
BAP64-03	3.2.2	BF1205	3.5.2	BFG93A(X)	3.3.1	BGD802	3.6.3	BLF6G22-180RN	3.7.1	J176	3.5.1		
BAP64-04	3.2.2	BF1205C	3.5.2	BFG94	3.3.1	BGD804	3.6.3	BLF6G22-45	3.7.1	J177	3.5.1		
BAP64-04W	3.2.2	BF1206	3.5.2	BFG97	3.3.1	BGD812	3.6.3	BLF6G22-45	3.7.1	OM7650	3.6.2		
BAP64-05	3.2.2	BF1206	3.5.2	BFM505	3.3.1	BGD814	3.6.3	BLF6G22LS-100	3.7.1	OM7670	3.6.2		
BAP64-05W	3.2.2	BF1207	3.5.2	BFM520	3.3.1	BGD816L	3.6.3	BLF6G22LS-130	3.7.1	PBR941	3.3.1		
BAP64-06	3.2.2	BF1208	3.5.2	BFQ149	3.3.1	BGD885	3.6.3	BLF6G22LS-180RN	3.7.1	PBR951	3.3.1		
BAP64-06W	3.2.2	BF1208D	3.5.2	BFQ18A	3.3.1	BGE787B	3.6.2	BLF6G22LS-75	3.7.1	PMBD353	3.2.4		
BAP64LX	3.2.2	BF1210	3.5.2	BFQ19	3.3.1	BGE788	3.6.2	BLF6G22S-45	3.7.1	PMBD354	3.2.4		
BAP65-02	3.2.2	BF1211	3.5.2	BFQ540	3.3.1	BGE788C	3.6.2	BLF6G22S-45	3.7.1	PMBF4391	3.5.1		
BAP65-03	3.2.2	BF1211R	3.5.2	BFQ591	3.3.1	BGE885	3.6.2	BLF6G22S-100	3.7.1	PMBF4392	3.5.1		
BAP65-05	3.2.2	BF1211WR	3.5.2	BFQ67	3.3.1	BGM1011	3.4.1	BLF6G22S-135	3.7.1	PMBF4393	3.5.1		
BAP65-05W	3.2.2	BF1212	3.5.2	BFQ67W	3.3.1	BGM1012	3.4.1	BLF6G27-10G	3.7.1	PMBFJ108	3.5.1		
BAP65LX	3.2.2	BF1212R	3.5.2	BFR106	3.3.1	BGM1013	3.4.1	BLF6G27-135	3.7.1	PMBFJ109	3.5.1		
BAP70-02	3.2.2	BF1212WR	3.5.2	BFR30	3.3.1	BGM1014	3.4.1	BLF6G27-45	3.7.1	PMBFJ110	3.5.1		
BAP70-03	3.2.2	BF1214	3.5.2	BFR31	3.3.1	BGO807	3.6.4	BLF6G27-75	3.7.1	PMBFJ111	3.5.1		
BAP70-04W	3.2.2	BF245A	3.5.1	BFR505	3.3.1	BGO807/FCO	3.6.4	BLF6G27LS-135	3.7.1	PMBFJ112	3.5.1		
BAP70-05	3.2.2	BF245B	3.5.1	BFR505T	3.3.1	BGO807/SCO	3.6.4	BLF6G27LS-75	3.7.1	PMBFJ113	3.5.1		
BAP70AM	3.2.2	BF245C	3.5.1	BFR520	3.3.1	BGO807C	3.6.4	BLF6G27LS-45	3.7.1	PMBFJ174	3.5.1		
BAT17	3.2.4	BF5101	3.5.1	BFR520T	3.3.1	BGO807C/FCO	3.6.4	BLF6G38-10	3.7.1	PMBFJ175	3.5.1		
BAT18	3.2.3	BF5111	3.5.1	BFR540	3.3.1	BGO807C/SCO	3.6.4	BLF6G38-100	3.7.1	PMBFJ176	3.5.1		
BB131	3.2.1	BF5121	3.5.1	BFR92A	3.3.1	BGO827	3.6.4	BLF6G38-100	3.7.1	PMBFJ177	3.5.1		
BB135	3.2.1	BF5131	3.5.1	BFR92AW	3.3.1	BGO827/SCO	3.6.4	BLF6G38-25	3.7.1	PMBFJ308	3.5.1		
BB145B	3.2.1	BF545A	3.5.1	BFR93A(R)	3.3.1	BGU7003	3.4.1	BLF6G38-50	3.7.1	PMBFJ309	3.5.1		
BB148	3.2.1	BF545B	3.5.1	BFR93AW	3.3.1	BGU7005	3.4.1	BLF6G38LS-100	3.7.1	PMBFJ310	3.5.1		
BB149	3.2.1	BF545C	3.5.1	BFS17	3.3.1	BGY1085A	3.6.2	BLF6G38LS-25	3.7.1	PMBFJ620	3.5.1		
BB149A	3.2.1	BF556A	3.5.1	BFS17A	3.3.1	BGY585A	3.6.2	BLF6G38S-25	3.7.1	PRF947	3.3.1		
BB152	3.2.1	BF556B	3.5.1	BFS17W	3.3.1	BGY587	3.6.2	BLF7G22L-130	3.7.1	PRF949	3.3.1		
BB153	3.2.1	BF556C	3.5.1	BFS25A	3.3.1	BGY587B	3.6.2	BLF7G22LS-130	3.7.1	PRF957	3.3.1		
BB156	3.2.1	BF861A	3.5.1	BFS505	3.3.1	BGY588C	3.6.2	BLF7G22LS-200P	3.7.1	TFF1003HN	3.4.2		
BB178	3.2.1	BF861B	3.5.1	BFS520	3.3.1	BGY588N	3.6.2	BLF871	3.7.2	TFF1006HN	3.4.2		
BB178LX	3.2.1	BF861C	3.5.1	BFS540	3.3.1	BGY66B	3.6.1	BLF871S	3.7.2	TFF1007HN	3.4.2		
BB179	3.2.1	BF862	3.5.1	BFT25	3.3.1	BGY67	3.6.1	BLF878	3.7.2	TFF1070HN	3.4.2		
BB179B	3.2.1	BF904	3.5.2	BFT25A	3.3.1	BGY67A	3.6.1	BLF881	3.7.2	TFF1073HN	3.4.2		
BB179BLX	3.2.1	BF904R	3.5.2	BFT46	3.3.1	BGY68	3.6.1	BLF888	3.7.2	TFF1077HN	3.4.2		
BB179LX	3.2.1	BF904WR	3.5.2	BFT92	3.3.1	BGY685A	3.6.2	BLL6H0514-25	3.7.3	TFF11080HN	3.4.2		
BB181	3.2.1	BF908	3.5.2	BFT92W	3.3.1	BGY687	3.6.2	BLL6H1214-500	3.7.3	TFF11084HN	3.4.2		
BB181LX	3.2.1	BF908R	3.5.2	BFT93	3.3.1	BGY785A	3.6.2	BLM6G10-30G	3.7.1	TFF11088HN	3.4.2		
BB182	3.2.1	BF908WR	3.5.2	BFT93W	3.3.1	BGY787	3.6.2	BLM6G10-30G	3.7.1	TFF11092HN	3.4.2		
BB182LX	3.2.1	BF909	3.5.2	BFU725F	3.3.1	BGY835C	3.6.2	BLM6G22-30	3.7.1	TFF11096HN	3.4.2		
BB184	3.2.1	BF909R	3.5.2	BGA2001	3.4.1	BGY883	3.6.2	BLM6G22-30G	3.7.1	TFF11101HN	3.4.2		
BB184LX	3.2.1	BF909WR	3.5.2	BGA2003	3.4.1	BGY885A	3.6.2	BLM6G23-30G	3.7.1	TFF11105HN	3.4.2		
BB185LX	3.2.1	BF991	3.5.2	BGA2011	3.4.1	BGY887	3.6.2	BLM6G2731-120	3.7.3	TFF11110HN	3.4.2		
BB187	3.2.1	BF992	3.5.2	BGA2012	3.4.1	BGY887B	3.6.2	BLM6G2731-120	3.7.3	TFF11115HN	3.4.2		
BB187LX	3.2.1	BF994S	3.5.2	BGA2022	3.4.1	BGY888	3.6.2	BLM6G2731S-120	3.7.3	TFF11121HN	3.4.2		
BB189	3.2.1	BF996S	3.5.2	BGA2031/1	3.4.1	BLA6H0912-500	3.7.3	BLM6G2933S-130	3.7.3	TFF11126HN	3.4.2		
BB198	3.2.1	BF998	3.5.2	BGA2709	3.4.1	BLA6H1011-600	3.7.3	BLM6G3135-120	3.7.3	TFF11132HN	3.4.2		
BB199	3.2.1	BF998R	3.5.2	BGA2711	3.4.1	BLD6G21L-50	3.7.1	BLM6G3135-20	3.7.3	TFF11139HN	3.4.2		
BB201	3.2.1	BF998WR	3.5.2	BGA2712	3.4.1	BLD6G21LS-50	3.7.1	BLM6G3135S-120	3.7.3	TFF11145HN	3.4.2		
BB202	3.2.1	BFG10(X)	3.3.1	BGA2714	3.4.1	BLD6G22L-50	3.7.1	BLM6G3135S-20	3.7.3	TFF11152HN	3.4.2		
BB202LX	3.2.1	BFG10W/X	3.3.1	BGA2715	3.4.1	BLD6G22LS-50	3.7.1						



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