

UNLEASH^{RF}



RF Manual 17th edition

Application and design manual for
High Performance RF products
June 2013



NXP enables you to unleash the performance of next-generation RF and microwave designs

NXP's RF Manual is one of the most important reference tools on the market for today's RF designers. It features our complete range of RF products, from low- to high-power signal conditioning, organized by application and function, and with a focus on design-in support.

When it comes to RF, the first thing on the designer's mind is to meet the specified performance. NXP brings clarity to every aspect of your design challenge, so you can unleash the performance of your RF and microwave designs. NXP delivers a portfolio of high-performance RF technology that lets you differentiate your product – no matter where in the RF world you are. That's why customers trust us with their mission-critical designs. Whether it's LDMOS and GaN for high-power RF applications or Si and SiGe:C BiCMOS for your small-signal needs, we've got you covered. Our broad portfolio of far-reaching technologies gives you the freedom to design with confidence.

Shipping more than four billion RF products annually, NXP is a clear industry leader in High Performance RF. From satellite receivers, cellular base stations, and broadcast transmitters to ISM (industrial, scientific, medical) and aerospace and defense applications, you will find the High Performance RF products that will help you realize a clear advantage in your products, your reputation, and your business.

So if you're looking to improve your RF performance, design a highly efficient signal chain, or break new ground with an innovative ISM application, NXP will help you unleash the performance of your next-generation RF and microwave designs.

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What's new?

This edition highlights several important applications, including small cell, optical mini and midi node, cable modem, GPS for mobile health and fitness, GPS for L2 and L5 bands, RF energy, and ISM up to 1600 Mhz.

New products added to this edition include broadband amplifiers for TV and satellite systems, and also an upstream VGA for Docsis 3.0, and a VSAT downconverter. Also included are next-generation devices and enhanced products such as 8th generation LDMOS transistors (Gen8), GPS LNAs, wireless infrastructure LNAs, satellite downconverters, CATV power doublers, overmolded plastic (OMP) RF power transistors, GaN power amplifiers, and low-power wireless microcontrollers.

More design support

The section on design support is updated and includes the most recent tools, documents, materials, and links that make design-in easier.

Also new for this edition is the Engineer's Corner, an online engineer-to-engineer community for RF small-signal design that lets you collaborate, get technical support, and share ideas with other developers. Curious? Check it out at www.nxp.com/engineerscorner.

RF Manual web page

www.nxp.com/rfmanual

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1. Products by application

1.1 Wireless communication infrastructure

1.1.1 Base stations (all cellular standards and frequencies)

RF power transistors for base stations

NXP is the fastest growing supplier of LDMOS transistors for cellular infrastructure, leading the W-CDMA and LTE markets. Our promise is unprecedented performance combined with best-in-class application support and constant innovation. Our design and manufacturing technologies ensure the best PA manufacturing yields in the industry. Our 8th generation LDMOS RF transistors offer the best solutions for all cellular frequency bands. With the current industry focus on cost reduction, we complement our product portfolio with OMP and MMIC product families, which combine high performance with low cost.

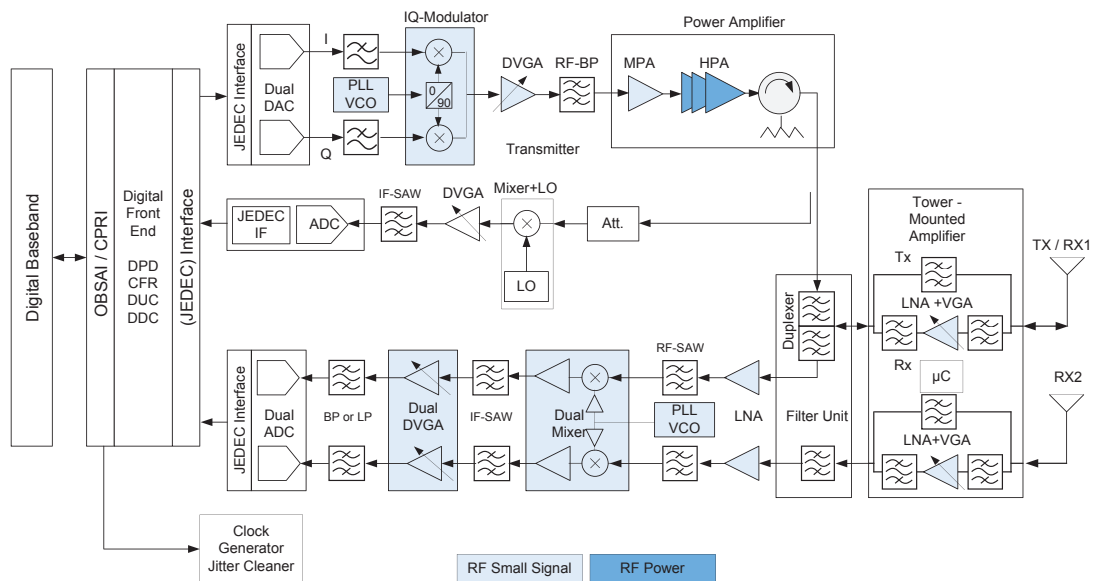
New: Single Package Asymmetric Doherty (PAD) Transistors and MMICs

PAD devices offer the highest efficiency, smallest footprint, best cost-effectiveness, and can deliver P1dB power levels up to 460 W. These products are DPD-friendly and show excellent video bandwidth. The wide product portfolio covers frequency bands from 1800 to 2700 MHz and average power levels from 2 to 80 W. Discrete single-stage transistors and asymmetric MMICs are available to suit most applications, from picocells to macrocells.

RF components for transmit line-ups and receive chains

As a global leader in RF technology and component design, NXP Semiconductors offers a complete portfolio of RF products, from low- to high-power signal conditioning, that delivers advanced performance and helps simplify your design and the development process. Our solutions range from discretely and amplifiers (LNA, VGA, MPA) to mixers/oscillators.

Application diagram



The block diagram shows base station transmit (upper part, Tx) and receive (lower part, Rx) functions, and includes the Tx feedback function (middle part, Tx feedback).

Product highlight: MMIC BLM7G22S-60PBG



MMICs have two main applications: drivers in macro base station power amplifiers (generally in class AB), and final stages in small cells (generally in Doherty configuration). For Doherty applications, asymmetric MMICs are preferred as they increase the efficiency in backoff. As drivers, symmetric MMICs are often preferred, for more linearity. We are pleased to offer both configurations thanks to a flexible architecture that enables quick sampling of different variants.

BLM7G22S-60PBG is a dual path 2-stage power MMIC. This device is perfectly suited as general-purpose driver in the frequency range from 2100 to 2200 MHz.

Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type	
HPA	Driver	700	2200	5	SOT1179	BLP7G22-05	
		700	2200	10	SOT1179	BLP7G22-10	
		3400	3600	10	SOT975	BLF6G38-10(G)	
	Driver/final	700	1000	45	SOT1223/4	BLP8G10S-45P(G)	
		1800	2200	60	SOT1223/4	BLP8G22S-60P(G)*	
		2500	2700	40	SOT1121	BLF6G27L(S)-40P	
		3400	3800	50	SOT502	BLF6G38(LS)-50	
		700	900	140	SOT1223	BLP7G07S-140P	
		700	1000	160	SOT467	BLF6H10L(S)-160	
	Final	700	1000	300	SOT1247	BLF8G10LS-300PV*	
		820	960	270	SOT502	BLF8G10LS-270	
		900	1000	140	SOT1223/4	BLP7G09S-140P(G)*	
		920	960	160	SOT502	BLF8G10L(S)-160	
		925	960	160	SOT1244	BLF8G10LS-160V	
		1427	2170	90	SOT1121	BLF7G20L(S)-90P	
		1800	2025	160	SOT1223	BLP8G21S-160PV	
		1800	1990	170	SOT1120	BLF8G19LS-170BV	
		1800	2000	200	SOT1120	BLF8G20LS-200V	
		1800	1900	260	SOT539	BLF8G20LS-260A	
		2000	2200	140	SOT502	BLF8G22LS-140	
		2000	2200	160	SOT1120	BLF8G22LS-160BV	
		2110	2170	220	SOT502	BLF8G22LS-220	
		2110	2170	270	SOT502	BLF8G22LS-270	
		2110	2170	310	SOT1110	BLF8G22LS-310AV*	
		2300	2700	75	SOT1121	BLF7G27L(S)-75P	
		2300	2400	100	SOT502	BLF7G24L(S)-100	
		2300	2400	140	SOT502	BLF7G24L(S)-140	
		2300	2400	160	SOT539	BLF7G24L(S)-160P	
		2300	2400	200	SOT539	BLF8G24L(S)-200P	
		2500	2700	100	SOT502	BLF7G27L(S)-100	
		2500	2700	100	SOT1244	BLF8G27LS-100V	
		2500	2700	100	SOT1121	BLF8G27LS-100P	
		2500	2700	140	SOT502	BLF7G27L(S)-140	
		2500	2700	160	SOT1275	BLC8G27LS-160AV*	
		2600	2700	140	SOT1244	BLF8G27LS-140V	
		3400	3600	100	SOT502	BLF6G38(LS)-100	
		Integrated Doherty	2010	2025	50	SOT1130	BLD6G21L(S)-50
			2110	2170	50	SOT1130	BLD6G22L(S)-50
		MMIC	2000	2200	60	SOT1212	BLM7G22S-60PB(G)

* Check status in section 3.1, as this type is not yet released for mass production

Doherty amplifier technology for state-of-the art wireless infrastructure

In order to achieve the highest efficiencies currently possible, NXP combines its latest generations of LDMOS technology with the Doherty concept. We offer the world's first fully integrated Doherty transistor but also reference designs for very efficient, high power, discrete 2- and 3-way Doherty amplifiers.

The world's first fully integrated Doherty transistor looks like an ordinary class-AB transistor but contains a splitter, main and peak devices, delay lines, and a combiner integrated inside the package. With the ease of design of an ordinary class AB transistor, it also provides significant space and cost savings. It is ideally suited for space-constrained applications like small-cell base stations and antenna arrays.

Product highlight

3-way Doherty BLF8G22LS-160BV



The 3-way Doherty design based on three BLF8G22LS-160BV devices achieves 48% efficiency at 49 dBm (80 W) average output power and 15.0 dB gain with a 2 carrier W-CDMA signal. It has a peak power capability (P3dB) of 57 dBm (500 W) at 28 V supply voltage. This design covers the W-CDMA standard for band one (2.11 - 2.17 GHz) operation and is tailored to very high peak power and volume manufacturing with high yields without tuning. Additional features are enhanced video bandwidth and an auto-biasing function.

Function	Product		Package	Type
Discrete attenuator	RF diode	PIN diode	SOT753	BAP64Q
			SOT753	BAP70Q
			Various	BAP64*

Function	Product		Package	Type
LNA (low noise amplifier)	RF transistor	SiGe:C transistor	SOT343F	BFU725F/N1
				BFU690F
				BFU730F
				BFU760F
				BFU790F
	MMIC	SiGe:C MMIC	SOT650	BGU7051
				BGU7052
			SOT1327	BGU7053
				BGU8051
				BGU8052
LNA + bypass + VGA	MMIC	SiGe:C MMIC	SOT1301	BGU8053
				BGU7060
				BGU7061
				BGU7062
				BGU7063

Function	Product	Gain range	Package	Type
Single VGA (variable-gain amplifier)	MMIC	30 dB	SOT617	BGA7210
		18.5 dB		BGA7204

Function	Product	Gain range	Package	Type
Dual VGA (variable-gain amplifier)	MMIC	24 dB	SOT617	BGA7350
		28 dB		BGA7351

Function	Product	P_L (1dB) @ 940 MHz	Package	Type
MPA (medium power amplifier)	MMIC	24 dBm	SOT89	BGA7024
		28 dBm		BGA7027
		25 dBm	SOT908	BGA7124
		28 dBm		BGA7127
		30 dBm		BGA7130

Function	Product	Frequency	Package	Type
Dual mixer	MMIC	0.7 - 1.2 GHz	SOT1092	BGX7220
		1.7 - 2.7 GHz		BGX7221

Function	Product	Output power	Package	Type
IQ modulator	MMIC	0 dBm	SOT616	BGX7100
		4 dBm		BGX7101

* SOD523, SOD323, SOT23, and SOT323

Product highlight: BGU706x integrated multi-stage base station LNAs with lowest NF



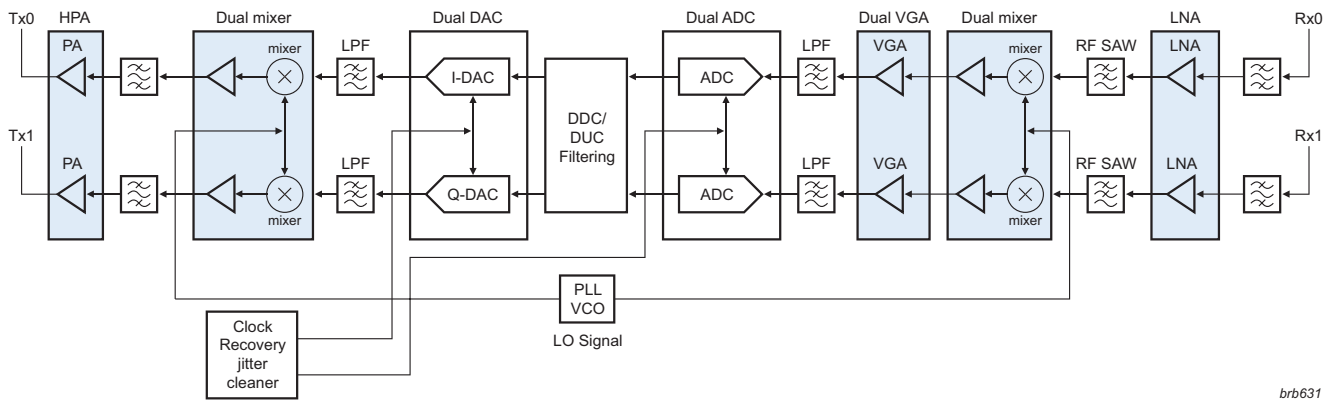
By integrating a bypass LNA, an analog VGA, and second LNA in one design, these SiGe:C BiCMOS LNAs (BGU706x) deliver the industry's lowest noise figure of 0.9 dB for a receive chain in silicon, while saving up to 80% in component count. Additionally, the analog gain control up to 35 dB, RF input power overdrive of 10 - 15 dBm and high linearity (09 dBm IP3I at maximum gain) make them very suitable in small cell sizes.

Product highlight: BGU805X base station LNAs with ultra low-noise

These three monolithic SiGe:C BiCMOS LNAs are designed to support high-performance communications systems from 900 up to 5000 MHz. Key enablers of maintaining sensitivity, even in adverse signal conditions, are high linearity (37dB OIP3), ultra low noise figures (e.g. 0.4 dB) and wideband S11<20 dB behavior. These ultra-low amplifiers enable 2G/3G/4G macro and micro base station performance at unsurpassed value.

1.1.2 Repeater

Application diagram



brb631

Recommended products

Function	Product	f_{\min} (MHz)	f_{\max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	700	2200	10	SOT1179	BLP7G22-10
		2300	2700	10	SOT975	BLF6G27-10(G)
	Driver/final	700	1000	45	SOT1223/4	BLP8G10S-45P(G)
		1450	1550	40	SOT1135	BLF6G15L(S)-40RN
		1800	2000	45	SOT608	BLF6G20(S)-45
		1800	2200	60	SOT1223/4	BLP8G22S-60P(G)*
		2110	2170	40	SOT1121	BLF6G22L(S)-40P
		2500	2700	40	SOT1121	BLF6G27L(S)-40P
		3400	3800	50	SOT502	BLF6G38(LS)-50
		2010	2025	50	SOT1130	BLD6G21L(S)-50
Integrated Doherty	2110	2170	50	SOT1130	BLD6G22L(S)-50	

Function	Product	$P_{L(f_{dB})}$ @ 940 MHz	Package	Type	Function	Product	Frequency range	Package	Type
MPA (medium power amplifier)	MMIC	24 dBm	SOT89	BGA7024	Dual mixer	MMIC	1.7 - 2.7 GHz	SOT1092	BGX7220
		28 dBm		BGA7027			0.7 - 1.2 GHz		BGX7221

Function	Product	Gain range	Package	Type	Function	Product	Package	Type
Dual VGA (variable-gain amplifier)	MMIC	24 dB	SOT617	BGA7350	LNA	SiGe:C MMIC	SOT650	BGU7051
		28 dB		BGA7351				BGU7052
				BGA7352				BGU7053
LNA + bypass + VGA	SiGe:C MMIC	SOT1301	SOT1301	BGU8051			BGU8052	
				BGU8053			BGU7060	
				BGU7061			BGU7062	
				BGU7063				

* Check status in section 3.1, as this type is not yet released for mass production

Product highlight: BGX7221 MMIC dual down-mixer



The BGX7221 combines a pair of high-performance, high-linearity down-mixers for use in receivers that have a common local oscillator used with, for example, main and diversity paths. The device covers frequency bands from 1700 to 2700 MHz with an extremely flat behavior.

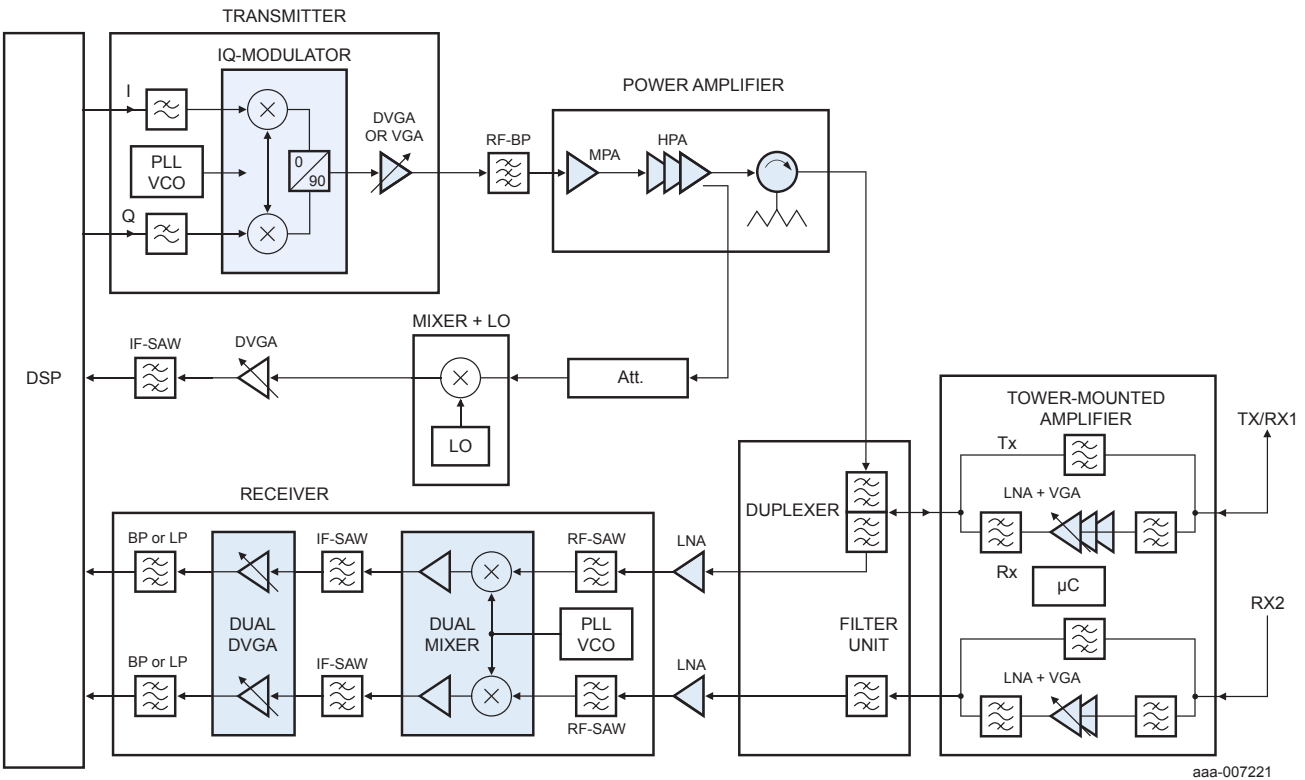
Features

- ▶ 8.5 dB conversion gain over all bands
- ▶ 13 dBm input, 1 dB compression point
- ▶ 25.5 dBm input third-order intercept point
- ▶ 10 dB (typ) small-signal noise figure
- ▶ Integrated active biasing
- ▶ Single +5 V supply operation
- ▶ Power-down per mixer with hardware control pins
- ▶ Low bias current in power-down mode
- ▶ Matched 50 Ω single-ended RF and LO input impedances
- ▶ ESD protection at all pins

1.1.3 Small cells

With the explosion of cellular data usage and the limited number of sites available for new macro base stations, operators have to find new ways of offering high data rates and excellent quality of service. One of the options is to complement the macro network with small cells, known as picocells (1 to 2 W average) and microcells (5 to 20 W average). NXP offers and develops several types of solutions to the small cell PAs designer, optimized for performance, integration or cost.

Application diagram



Product highlight: BLP7G22-10 power transistor



The BLP7G22-10 is a 10 W plastic LDMOS power transistor for base station applications. This cost effective wideband device with an ultra small footprint covers all base station frequencies from 700 to 2700 MHz. It operates in a supply range from 12 to 30 V.

Features

- ▶ High efficiency
- ▶ Excellent ruggedness
- ▶ Designed for broadband operation
- ▶ Excellent thermal stability
- ▶ High power gain
- ▶ Integrated ESD protection
- ▶ Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

Recommended products

Function	Product	Output power	Package	Type		
IQ modulator	MMIC	0 dBm	SOT616	BGX7100		
		4 dBm		BGX7101		
Function	Product	Gain range	Package	Type		
Single VGA (variable-gain amplifier)	MMIC	30 dB	SOT617	BGA7210		
		18.5 dB		BGA7204		
Function	Product	$P_{1\text{dB}}$ @ 940 MHz	Package	Type		
MPA (medium power amplifier)	MMIC	24 dBm	SOT89	BGA7024		
		28 dBm		BGA7027		
Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Final 1-2 W	700	2200	5	SOT1179	BLP7G22-05
		700	2200	10	SOT1179	BLP7G22-10
	Dual-Stage Final 1-2 W	1800	2200	12@24V, 20@28V	SOT1212	BLM7G1822S-12/20PB(G)
	Final 1-2 W	700	2200	10	SOT538	BLF6G21-10(G)
		2300	2700	10	SOT975	BLF6G27-10(G)
		3400	3600	10	SOT975	BLF6G38-10(G)
	Final 5-12 W	700	1000	45	SOT1223/4	BLP8G105-45P(G)
		1800	2200	60	SOT1223/4	BLP8G22S-60P(G)*
		2500	2700	60	SOT1121	BLF6G27L(S)-40P
		3400	3800	50	SOT502	BLF6G38(LS)-50
	ID Final 5-12 W	2010	2025	50	SOT1130	BLD6G21L(S)-50
		2110	2170	50	SOT1130	BLD6G22L(S)-50
	Dual-Stage Final 5-12 W	1800	2200	40	SOT1211	BLM7G1822S-40PB(G)*
		2000	2200	60	SOT1212	BLM7G22S-60PB(G)
	Dual-Stage Asymmetric Final 5-12 W	1800	2200	50	SOT1212	BLM7G1822S-50AB(G)*
1800		2200	80	SOT1212	BLM7G1822S-80AB(G)*	
Function	Product	Package	Type			
LNA	SiGe:C MMIC	SOT650	BGU7051			
			BGU7052			
			BGU7053			
		SOT1327	BGU8051			
			BGU8052			
			BGU8053			
LNA + bypass + VGA	SiGe:C	SOT1301	BGU7060			
			BGU7061			
			BGU7062			
			BGU7063			
Function	Product	Frequency range	Package	Type		
Dual mixer	MMIC	1.7 - 2.7 GHz	SOT1092	BGX7220		
		0.7 - 1.2 GHz		BGX7221		
Function	Product	Gain range	Package	Type		
Dual VGA (variable-gain amplifier)	MMIC	24 dB	SOT617	BGA7350		
		28 dB		BGA7351		
				BGA7352		

* Check status in section 3.1, as this type is not yet released for mass production

Product highlight: Digital VGAs BGA7204 and BGA7210



These 6-bit digital VGAs offer high linearity (35 dBm @ 2.2-2.8 GHz) and high output power (23 dBm @ 2.2-2.8 GHz) across a large bandwidth without external matching. Smart routing with no connection crosses simplifies design and decreases footprint by 25%. The unique power-save mode can effectively reduce the current consumption in TDD systems up to 45%. The BGA7210 adds flexible current distribution across its two amplifiers, depending on the attenuation state, to save current.

Features

- ▶ Internally matched for 50 Ω
 - BGA7204 = 0.4 to 2.75 GHz
 - BGA7210 = 0.7 to 3.8 GHz
- ▶ High maximum power gain
 - BGA7204 = 18.5 dB
 - BGA7210 = 30 dB
- ▶ Attenuation range of 31.5 dB, 0.5 dB step size (6 bit)
- ▶ Fast switching power-save mode (power-down pin)
- ▶ Simple control interfaces (SPI)
- ▶ ESD protection on all pins (HBM 4 kV; CDM 2 kV)

1.2 Broadband communication infrastructure

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

NXP high-gain power doublers CGD104xHi and push-pulls CGY104x are 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.

Connecting people, protecting your network: NXP's CATV C-family for the Chinese SARFT standard

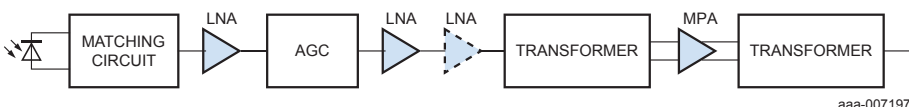
Specially designed for the Chinese Hybrid Fiber Coax (HFC) infrastructure, NXP's CATV C-family offers a total solution for cable TV networks. It is both flexible enough for connecting rural communities as part of China's "Connecting to Every Village" program and powerful enough for upgrading major cities 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 from 550 MHz to 1 GHz.

C-family application information

NXP C-family by application							
Application	BGY588C	BGE788C	CGY888C	BGD712C	BGO807C BGO807CE	CGD942C CGD944C	CGD982HCi CGD985HCi CGD987HCi
Optical node				•	•	•	•
Optical receiver				•	•	•	•
Distribution amplifier			•	•		•	•
Line-extender amplifier			•	•		•	•
Terminating amplifier	•	•	•				•

1.2.1 Optical mini- and midnode line-up

Application diagram



Recommended products

Function	Product	Frequency range MHz	Gain (dB)	NF (dB)	Package	Type
LNA/MPA	MMIC	40 - 1006	12	3.1	SOT89	BGA3012
			15	2.5		BGA3015
			18	2.2		BGA3018

Product highlight: BGA3012, BGA3015, BGA3018

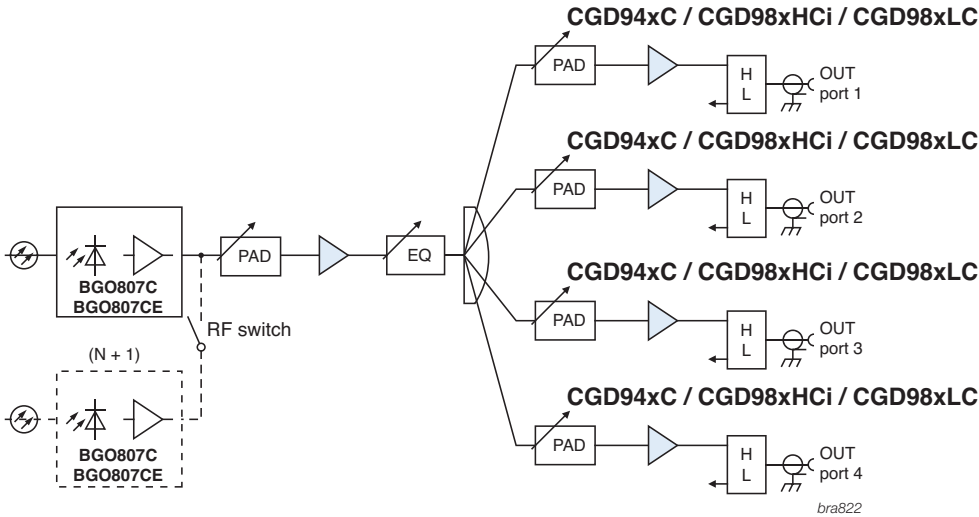


The BGA3012, BGA3015 and BGA3018 are extreme-broadband amplifiers that deliver 12, 15, and 18 dB of gain from 40 to 1006 MHz, while providing outstanding linearity performance. These amplifiers can also be used as a return path amplifier from 5 to 300 MHz, or in a combined TV and Satellite system from 40 to 2600 MHz. At the low end of the frequency band, these amplifiers outperform competitors'

GaAs devices in noise figure performance by 5 dB and in input power rating by more than 20 dB, while offering a superior ESD rating of 2 kV and a larger supply voltage operating range of 8 to 5 V. These amplifiers are very well suited for various broadband TV distribution system applications, such as FFTH, home gateways and set-top boxes.

1.2.2 CATV optical node with multiple out-ports for Chinese SARFT standard

Application diagram



Recommended products

Function	Product	Frequency	Package	Type
RF forward receiver	Forward path receiver	870 MHz	SOT115	BGO807C
			SOT115	BGO807CE

Function	Product	Frequency	Gain (dB)	Type
RF pre-amplifier	Push-pulls	870 MHz	18 - 19	BGY885A
			21 - 22	BGY887
			34.5 - 36.5	CGY888C

Function	Product	Frequency	Gain (dB)	Type
RF power amplifier	Power doublers	870 MHz	22 - 24	CGD942C
			24 - 26	CGD944C
			22 - 24	CGD982HCi
		1003 MHz	23.5 - 25.5	CGD985HCi
			26 - 28	CGD987HCi
			22 - 24	CGD982LC
			24 - 26	CGD9825LC



Product highlight: CGD982LC, CGD985LC, CGD1042L CATV power doublers

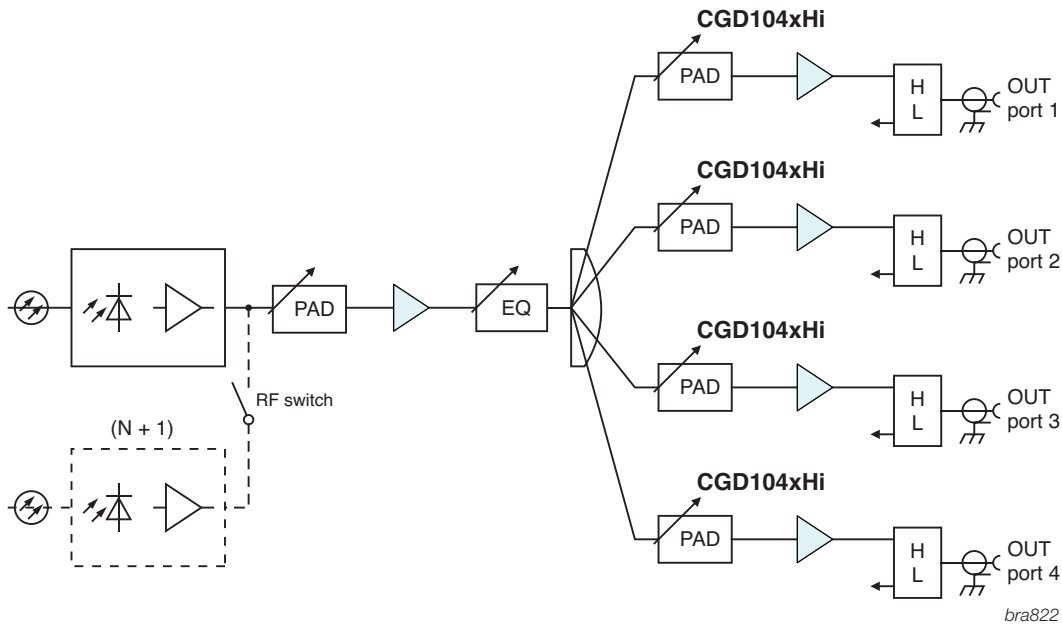
The market is asking for more environmental products. These power doubler modules use 17% less power consumption than the original products (365 mA). These 1 GHz power doublers are ideal for use in line extenders and trunk amplifiers.

Features

- ▶ Gain compensation over temperature
- ▶ Excellent linearity
- ▶ Rugged construction
- ▶ Optimized for PAL D loading
- ▶ Unconditionally stable
- ▶ Superior levels of ESD protection
- ▶ Extremely low noise
- ▶ Adjustable supply current
- ▶ Excellent return loss properties
- ▶ Compliant to Directive 2002/95/EC, regarding RoHs

1.2.3 CATV optical node with multiple out-ports for 1 GHz networks

Application diagram



Recommended products

Function	Product	Frequency	Package	Type
RF forward receiver	Forward path receiver	870 MHz	SOT115	BGO807C
			SOT115	BGO807CE

Function	Product	Frequency	Gain (dB)	Type
RF pre-amplifier	Push-pulls	1 GHz	23 - 24.5	CGY1043
			27 - 28.5	CGY1047
			32 - 34	CGY1032

Function	Product	Frequency	Gain (dB)	Type
RF power amplifier	Power doublers	1 GHz	22 - 23.5	CGD1042Hi
			23.5 - 25.5	CGD1044Hi
			26.5 - 28	CGD1046Hi



Product highlight:

CGD104xH(i) power doublers and CGY104x push-pulls

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, and lower current.

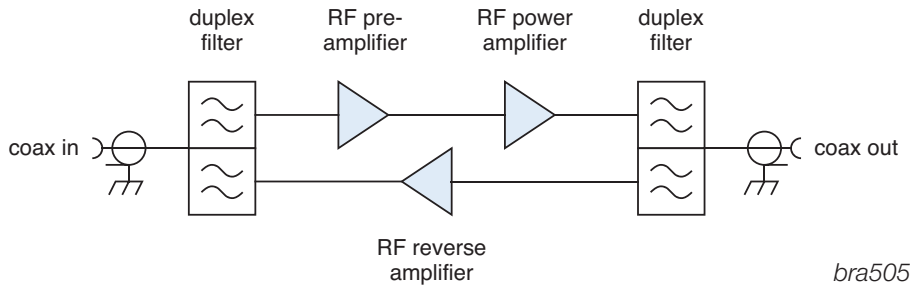
The new NXP CGY104x push-pull family is the first line-up on the market to combine very low noise, best-in-class distortion parameters, and low, "carbon footprint" capabilities.

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.

1.2.4 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	BGY588C
			33.2 - 35.2	BGE788C
		750 MHz	18 - 19	BGY785A
			21 - 22	BGY787
			18 - 19	BGY885A
		870 MHz	21 - 22	BGY887
			33.5 - 34.5	BGY888
			34.5 - 36.5	CGY888C
			18 - 19	BGY1085A
		1003 MHz	21 - 22.5	CGY1041
			23 - 24.5	CGY1043
			27 - 28.5	CGY1047
29 - 31	CGY1049			
32 - 34	CGY1032			

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

Function	Product	Frequency	Gain (dB)	Type
RF power amplifier	Power doublers	750 MHz	18.2 - 18.8	BGD712
			18.2 - 18.8	BGD712C
			20 - 20.6	BGD714
		870 MHz	18.2 - 18.8	BGD812
			19.7 - 20.3	BGD814
			22 - 23	CGD942C
			24 - 26	CGD944C
		1003 MHz	22 - 24	CGD1042H
			24 - 26	CGD1044H
			19.5 - 22	CGD1040Hi
			22 - 23.5	CGD1042Hi
			23.5 - 25.5	CGD1044Hi
			26 - 28	CGD1046Hi
			22 - 24	CGD982HCi
			23.5 - 25.5	CGD985HCi
			26 - 28	CGD987HCi
			22 - 24	CGD982LC
			24 - 26	CGD9825LC
22 - 24	CGD1042L			

All available in SOT115 package

Product highlight: CGD1046Hi



Capable of supporting high output power, the CGD1046Hi is primarily designed for use in fiber deep-optical-node applications (N+1/2/3). This 1 GHz hybrid amplifier solution offers an extended temperature range, high-power overstress capabilities in case of surges, and high ESD levels. The result is a low cost of ownership, with durability and superior ruggedness.

Features

- ▶ High output power
- ▶ 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
- ▶ Optimized for digital channel loading
- ▶ Temperature-compensated gain response
- ▶ Optimized heat management
- ▶ Excellent temperature resistance

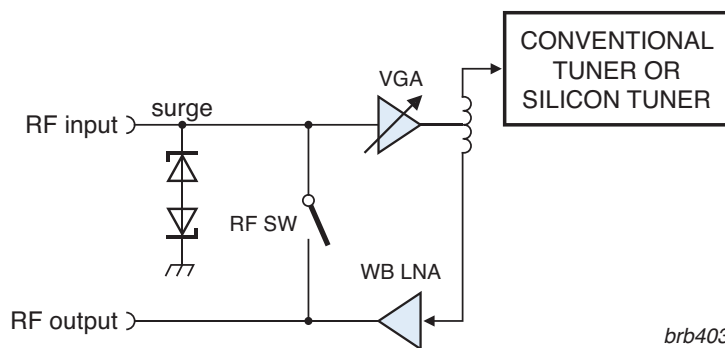
1.3 TV and satellite

1.3.1 Network interface module (NIM) for TV reception

Make a high-performance active splitter in a NIM tuner with the BGU703x/BGU704x

Today's TV tuners require complicated signal handling and benefit from flexibility in design. The front-end of a TV signal receiver is no longer just a tuned receiver, but has evolved into an RF network interface module (NIM) with tuned demodulators, active splitters, and remodulators. The active splitter requires an LNA with excellent linearity. NXP has developed two new series of LNA/VGA MMICs (BGU703x/BGU704x), designed especially for high linearity (P3O of 29 dBm) in low-noise applications such as an active splitter in a NIM tuner. The BGU703x family operates at a supply voltage of 5 V and is intended for use with normal can tuners. The BGU704x family operates at 3.3 V and works seamlessly with our Si tuner ICs, which also operate at 3.3 V.

Application diagram



Recommended products

Function	Product	V _{cc} (V)	Gain (db)	Package	Type	
LNA	MMIC	5	10	SOT363	BGU7031	
			10	SOT363	BGU7032	
		5	10	SOT363	BGU7033	
			5			
		3.3	10	SOT363	BGU7041	
			10			
		3.3	-2	14	SOT363	BGU7044
				14		
		3.3	-2	14	SOT363	BGU7045
				14		

Recommended products

Function	Product	Package	Type	
RF Switch / PLT switch	MOSFET	5 V silicon RF switch	SOT23	BF1107
			SOT143B	BF1108
			SOT143R	BF1108R
			SOT343	BF1108W
			SOT343R	BF1108WR
		3.3 V silicon RF switch	SOT143B	BF1118
			SOT143R	BF1118R
			SOT343	BF1118W
			SOT343R	BF1118WR

Product highlight:

BGU703x and BGU704x LNAs for TVs/STBs



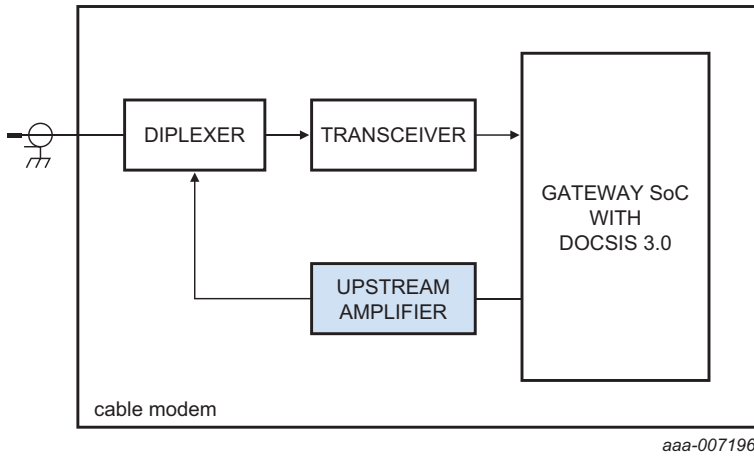
Designed for high linearity and low noise, these 3.3 and 5 V wideband LNAs support multi-tuner applications in TVs, DVR/PVRs, and STBs operating between 40 MHz and 1 GHz. A unique programmable gain with bypass mode compensates for tuner switch signal loss (important in multi-tuner systems), and improves overall system performance by 7 to 10 dB.

Features

- ▶ Flat gain between 40 MHz and 1 GHz
- ▶ Output power at 1 dB gain compression ($P_{L(1\text{dB})}$) ranging from 9 to 14 dBm
- ▶ Noise figure as low as 2.8 dB
- ▶ High linearity with an OIP3 of 29 dBm
- ▶ 75 Ω input and output impedance
- ▶ Power-down during bypass mode
- ▶ ESD protection >2 kV HBM, >1.5 kV CDM on all pins

1.3.2 Cable modem based on DOCSIS 3.0

Application diagram



Recommended products

Function	Product	Package	Type
Upstream VGA for DOCSIS 3.0	MMIC	SOT662	BGA3031

Product highlight: BGA3031

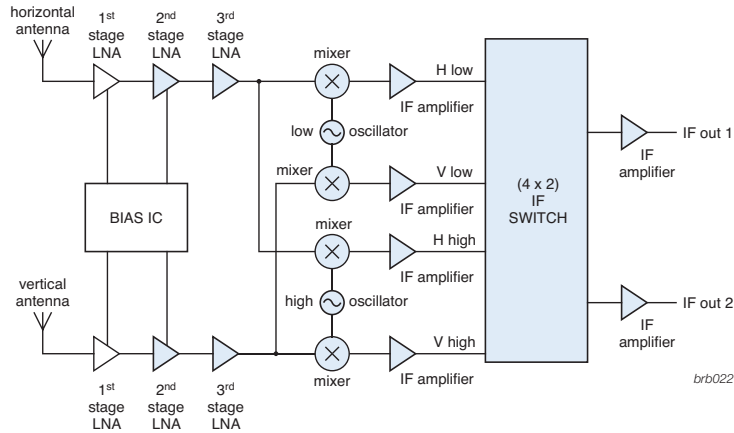
The BGA3031 MMIC is an upstream amplifier meeting the Data Over Cable Service Interface Specifications (DOCSIS 3.0) operating from 5 to 85 MHz. It is designed for cable modem, CATV set top box and VOIP modem applications.



BGA3031 provides a 58 dB gain control range in 1 dB increments with high incremental accuracy. At maximum gain setting, it delivers 34 dB of voltage gain and superior linear performance. It supports high output voltage levels up to 67 dBmV with low distortion and output noise levels. It is housed in a 20-pin leadless HVQFN package (5 x 5 mm).

1.3.3 Satellite outdoor unit, twin low-noise block (LNB) with discrete components

Application diagram



Products by application

Recommended products

Function	Product		Package	Type
2 nd and 3 rd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU730F

Function	Product		Package	Type
Oscillator	RF bipolar transistor	Wideband transistor	SOT343	BFG424W
				SOT343F
	RF transistor	SiGe:C transistor	SOT343F	BFU660F
				BFU710F
BFU730F				

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

Function	Product		Package	Type
1 st stage IF amplifier	MMIC	IF gain block	SOT363	BGA2800
			SOT363	BGA2801
			SOT363	BGA2802
			SOT363	BGA2803
			SOT363	BGA2815
			SOT363	BGA2850
			SOT363	BGA2851
			SOT363	BGA2866
	RF bipolar transistor	Wideband transistor	SOT343	BFG424W
			SOT343F	BFG424F

* Also available in ultra-small leadless package SOD882D

Function	Product		Package	Type
Output stage IF amplifier	MMIC	IF gain block	SOT363	BGA2800
			SOT363	BGA2801
			SOT363	BGA2815
			SOT363	BGA2816
			SOT363	BGA2818
			SOT363	BGA2865
			SOT363	BGA2866
			SOT363	BGA2867
	RF bipolar transistor	Wideband transistor	SOT363	BGA2870
			SOT363	BGA2874
2 nd stage LNA	RF transistor	SiGe:C	SOT343F	BFU710F
				BFU730F

Function	Product		Package	Type
Mixer	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU730F

Product highlight: BGA28xx-family of IF gain blocks

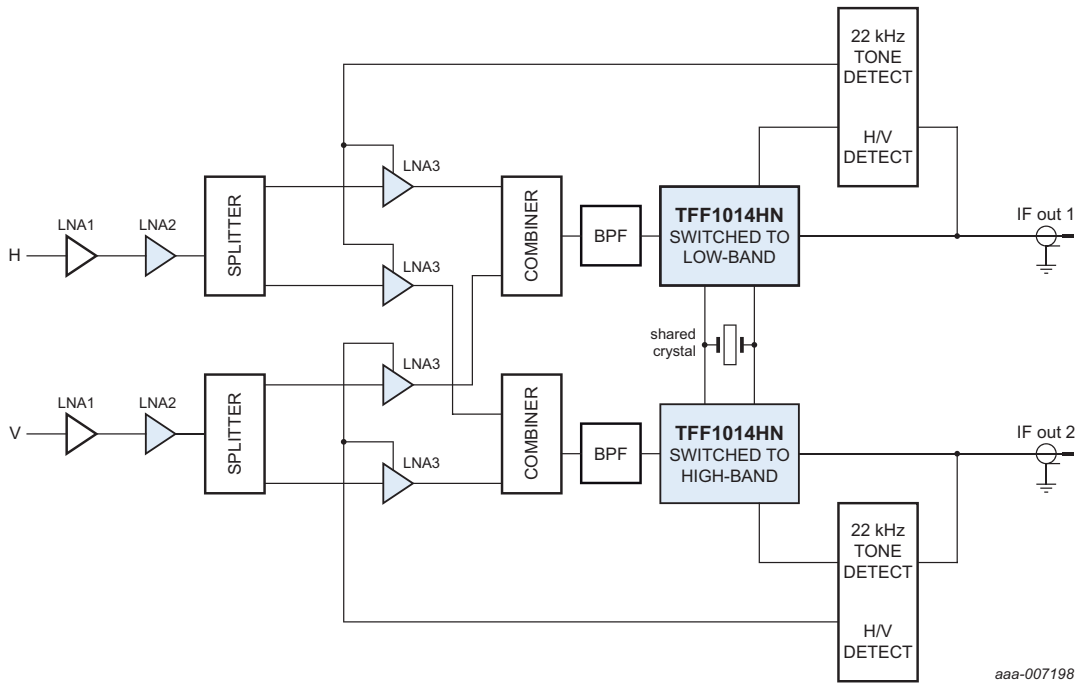


The BGA28xx IF gain blocks are silicon Monolithic Microwave Integrated Circuit (MMIC) wideband amplifiers with internal matching circuitry in a 6-pin SOT363 plastic SMD package.

Features

- ▶ No output inductor necessary when used at the output stage
- ▶ Internally matched to 50 Ω
- ▶ Reverse isolation > 30 dB up to 2 GHz
- ▶ Good linearity with low second- and third-order products
- ▶ Unconditionally stable ($K > 1$)

Application diagram



aaa-007198

Recommended products

Function	Product	Package	Type	
2 nd and 3 rd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU730F

Function	Product	Package	Type
Mixer/oscillator/downconverter	RF IC	SOT763	TFF1012HN
			TFF1013HN
			TFF1014HN

Product highlight:
TFF101xHN Industry's lowest-power integrated Ku-band downconverters

These Universal DVB-S compliant Ku-band downconverters consume about 50% less current (52 mA) than other integrated solutions. They are fully integrated (PLL synthesizer/mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Stability of the local oscillator is guaranteed, which improves overall system reliability over temperature and time, and eliminates the need for manual alignment in production.

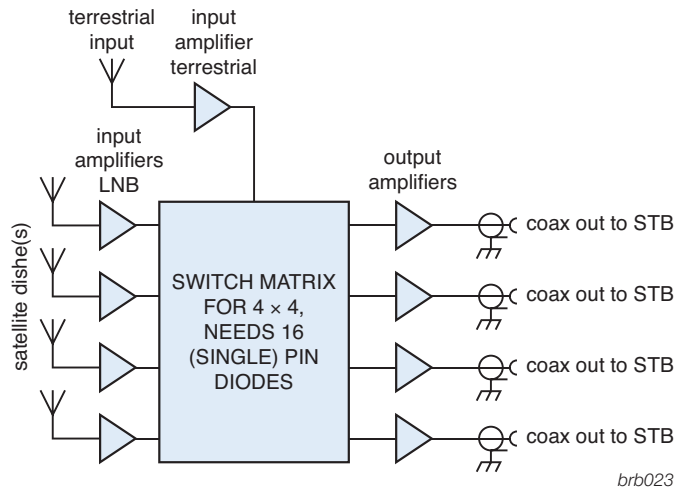


Features

- ▶ Ultra-low current consumption ($I_{CC} = 52 \text{ mA}$)
- ▶ Low phase noise (1.5° RMS typ)
- ▶ Integration bandwidth from 10 kHz to 13 MHz
- ▶ Small PCB footprint
 - DHVQFN16 package (2.5 x 3.5 x 0.85 mm)
 - Only seven external components
 - No inductors necessary

1.3.5 Satellite multi-switch box - 4 x 4 (up to 16 x 16)/DiSEqC/SMATV

Application diagram



Recommended products

Function	Product	Package	Type	
Input amplifier terrestrial	MMIC	General-purpose medium power amplifier	SOT89	BGA6289
			BGA6489	
			BGA6589	
			BGA7024	
			BGA3012	
			BGA3015	
			BGA3018	
SOT908	BGA7124			

Function	Product	Package	Type		
Input amplifier LNB	MMIC	General-purpose amplifier	SOT363	BGA2771	
			SOT363	BGA2866	
			SOT363	BGA2867	
			SOT363	BGA2818	
	RF bipolar transistor	Wideband transistor	SOT343	BFG325	
			SOT343	BFG425W	
			SOT143	BFG520	
			SOT143	BFG540	
			SiGe:C transistor	SOT343F	BFU660F
					BFU725F/N1
BFU730F					

Function	Product	Package	Type	
Switch matrix	RF diode	PIN diode	Various	BAP50*
				BAP51*
				BAP63*
				BAP64*
				BAP70*
				BAP1321*
	RF transistor	SiGe:C transistor	SOT343F	BFU725F/N1
				BFU730F

Function	Product	Package	Type	
Output amplifier	MMIC	General-purpose medium power amplifier	SOT89	BGA6289
			BGA6489	
			BGA6589	
			BGA7024	
			BGA3015	
			BGA3018	
	SOT908	BGA7124		
	RF bipolar transistor	General-purpose amplifier	SOT363	BGM1011
			SOT363	BGA2869
			Wideband transistor	SOT223
SOT223				BFG 591
SiGe:C transistor	SOT343F	SOT223	BFG198	
		SOT143	BFG540	
BFU725F/N1				
BFU730F				

* Also available in ultra-small leadless package SOD882D



Product highlight:

BFU730F NPN wideband silicon germanium RF transistor

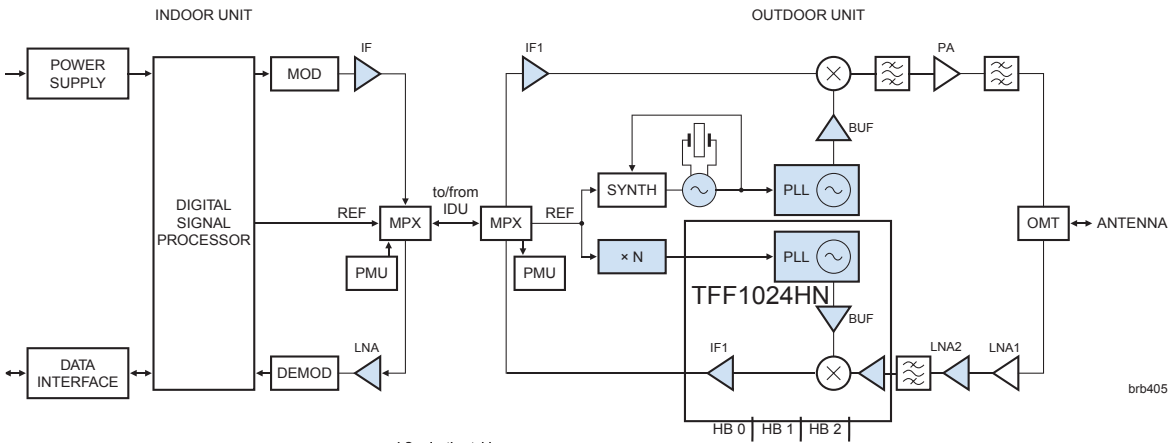
The BGU730F is part of the family of 6th (Si) and 7th (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments.

Features

- ▶ Operates at 2.3 GHz
- ▶ High maximum power gain (Gp) of 17.6 dB
- ▶ Noise figure (NF) of 0.8 dB
- ▶ Input 1dB gain compression ($P_{i(1dB)}$) of -15 dBm
- ▶ Input third order intercept point $IP3_1$ of +4.7 dBm

1.3.6 VSAT with integrated mixer/oscillator/downconverter

Application diagram



LO selection table

HB2	HB1	HB0	LO Freq [GHz]
GND	GND	GND	9,75
GND	GND	open	10,00
GND	open	GND	10,25
GND	open	open	10,55
open	GND	GND	10,60
GND	open	GND	10,75
open	open	GND	11,25
open	open	open	11,30

Recommended products

Indoor unit

Function	Product		Package	Type
IF	MMIC	IF gain block	SOT363	BGA2714
				BGA2748
				BGA2771
				BGA2800
				BGA2801
				BGA2815
				BGA2816
				BGM1012
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU725F/N1
				BFU730F



Product highlight:

TFF1024HN downconverter with PLL/VCO for VSAT

This VSAT Ku-band downconverter consumes about 35% less current (60 mA) than other integrated solutions. It's fully integrated (PLL synthesizer/mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Unlike mechanical components like DROs, the PLL-based TFF1024HN guarantees stable performance over lifetime and temperature, enabling high Quality of Service for end-users. This downconverter operates at eight of the most-used Ku sub-bands using only one crystal.

Features

- ▶ Switched LO frequency:
 - Eight selectable frequencies from 9.75 to 11.30 GHz
 - More LO frequencies obtainable with different X-tal values
- ▶ Ultra-low current consumption ($I_{CC} = 60 \text{ mA}$)
- ▶ Low phase noise ($1.0^\circ \text{ RMS typ}$)
 - 10 kHz - 13 MHz integration bandwidth
- ▶ Flat gain over frequency ($< 2 \text{ dBpp}$)
- ▶ High linearity of $> 16 \text{ dBm IP3o}$
- ▶ High P1dB $> 6 \text{ dBm}$

Recommended products

Outdoor unit

Function	Product		Package	Type
IF	MMIC	IF gain block	SOT363	BGA2800
				BGA2801
				BGA2815
				BGA2816
				BGA2850
				BGA2865
				BGA2866
				BGM1014
				BGM1013
				BGM1012
BGA2714				

Function	Product		Package	Type
LNA2	RF transistor	SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
				BFU690F
				BFU710F
				BFU725F/N1
				BFU730F
				BFU760F
				BFU790F
	MMIC	SiGe:C MMIC	SOT891	BGU7003

Function	Product		Package	Type
PLL	RF IC	SiGe:C IC	SOT616	TFF1003HN
			SOT763	TFF1007HN
				TFF1024HN

Function	Product		Package	Type
Oscillator	RF transistor	Wideband transistor	SOT343R	BFG424W
				BFG425W
	RF transistor	SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
				BFU690F
				BFU710F
				BFU725F/N1
				BFU730F
				BFU760F
				BFU790F

Function	Product		Package	Type
Buffer	RF transistor	SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
				BFU690F
				BFU710F
				BFU725F/N1
				BFU730F
				BFU760F
				BFU790F

* 8 different types with LO ranges: 7-15 GHz, see 3.4.4

Product highlight:

TFF1007HN low phase noise

LO generator for VSAT applications



The TFF1007HN is a Ku-band frequency generator intended for low phase noise local-oscillator (LO) circuits for Ku-band VSAT transmitters and transceivers. The specified phase noise complies with IESS-308 from Intelsat.

Features

- ▶ Divider settings: 64
- ▶ Input signal 230.46 to 234.38 MHz
- ▶ Internally stabilized voltage references for loop filter and output power level
- ▶ LO generator with VCO range: 14.75 to 15 GHz
- ▶ Output level -4 dBm minimum
- ▶ Phase noise compliant with IESS-308 (Intelsat)
- ▶ Third- or fourth-order PLL

1.4 Broadcast

LDMOS solutions from the industry leader for all segments of the broadcast market

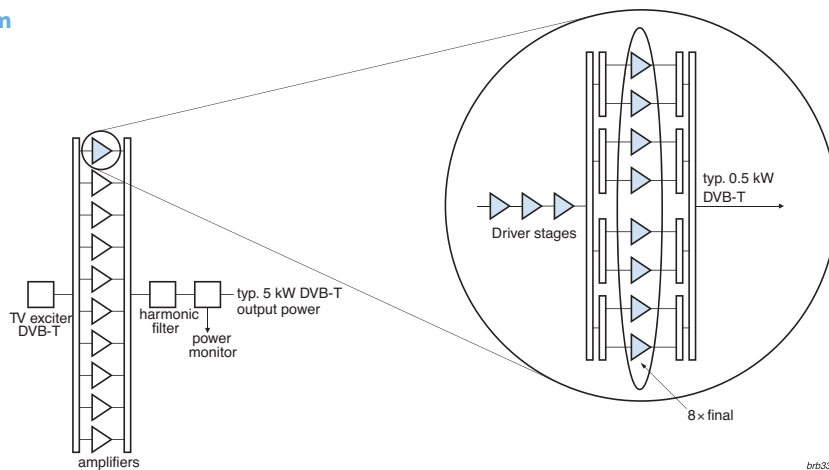
UWB Doherty for UHF-TV

The UHF TV market is taking a step in a new direction with the adoption of ultra-wideband (UWB) Doherty amplifiers using NXP's existing benchmark LDMOS transistors. With the need to deliver Greener (ie lower energy consumption) systems matched with the ability to broadcast ever-richer content, incremental improvements soon run out. There comes a time when a step-change is needed in approach, and for the UHF market that means UWB Doherty. Previously, NXP has led the way in the mass-adoption of narrowband LDMOS Doherty amplifiers for the base station market, and now is the time to take a new direction with a range of UWB Doherty solutions to cover the 470 to 860 MHz band used for UHF transmitters.

VHF, FM, and analog TV markets

NXP's commitment to the broadcast market is second to none. We enabled the market to transition to and then reaped the benefits of LDMOS based solutions, and that will continue for many years into the future. As well as supporting our legacy products through the customer product life-cycles, we will enhance our offering with a full range of XR products suited for broadcast, and will introduce a range of OMP (over-molded plastic) parts for the lower power, more cost-sensitive markets.

Application diagram



Recommended

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	10	500	20	SOT467C	BLF571
		1	1400	35	SOT467C	BLF642
		1	1000	100	SOT467	BLF871(S)
	Final	1	1000	140	SOT467	BLF881(S)
		1	1500	160	SOT1223-1	BLP15M7160P*
		1	1500	200	SOT1121	BLF647P(S)
		470	860	350	SOT1121	BLF884P(S)
		470	860	500	SOT539	BLF879P(S)
		470	860	600	SOT539	BLF888A(S)
		470	860	650	SOT539	BLF888B(S)
		10	128	1200	SOT539A	BLF178P

* Check status in section 3.1, as this type is not yet released for mass production

Product highlight: BLF647P(S) power transistor



A 200 W push-pull LDMOS transistor in a thermally enhanced ceramic package for broadband applications. The BLF647P(S) is unmatched, making it suitable for operation in applications from 1 to 1500 MHz, achieving 70% efficiency and 18 dB gain from a 32 V supply.

Features

- ▶ Designed for broadband operation (1 to 1500 MHz)
- ▶ Excellent efficiency and reliability
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Excellent ruggedness
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ Analog and digital TV transmitters

1.5 Wireless connectivity

1.5.1 GPS for smartphone and tablets: high linearity

BGU700x/800x low-noise amplifiers (LNAs) are designed to improve the linearity, noise figure, and reception of GPS signals, including GloNass and Compass, while offering the smallest footprint in the market. As the industry's first GPS LNAs to dynamically suppress strong cellular, Bluetooth, and WLAN transmit signals, the NXP BGU700x/800x family offers the best reception for weak GPS signals, delivering an improvement of 10 dB or better IP3 under -40 to -20 dBm jamming conditions, while the noise figure remains below 1 dB. Requiring only two external components, the BGU700x/800x LNAs save up to 70% in PCB size and 10% in component cost.

GPS is a standard feature in a wide range of consumer products, from personal navigation devices to digital video cameras, watches, electric cars, and more. GPS signal power levels are weak and below the noise floor at -155 dBm. In many of these products, especially smartphones and tablets, strong transmitters such as Bluetooth, WLAN, and cellular can drive the GPS LNA into compression. When the GPS LNA is in compression, it has lower gain, which causes poor GPS reception; it also generates inter-modulation products and harmonics from the transmitter signals, capable of overpowering weak signals and leading to loss of GPS reception.

BGU700x/BGU800x series use adaptive biasing to immediately detect any output power from jammers, and compensate by temporarily increasing the current. As a result, optimal GPS signal reception is maintained for as long as possible. Each device in the BGU700x/BGU800x series requires only one input matching inductor and one supply decoupling capacitor to complete the design. This creates a very compact design and lowers the bill of materials.

Features

- ▶ Low noise figure of 0.60 dB
- ▶ System optimized gain from 16 to 19 dB
- ▶ Low 3.1 mA supply current
- ▶ High out-of-band IP3 of 9 dBm
- ▶ Requires only one input matching inductor and one supply decoupling capacitor
- ▶ AEC-Q100 qualified (BGU7004, BGU7008) for highest reliability in harsh conditions
- ▶ World's smallest 6-bump Wafer Level Chip Scale Package (WLCSP) 0.65 x 0.44 x 0.2 mm
- ▶ Small 6-pin leadless package 1.1 x 0.9 x 0.5 mm

Footprint on PCB

	NXP	NXP	NXP	Competitor A	Competitor B	Competitor C
Package (mm)	0.65 x 0.44	1.1 x 0.9	1.1 x 0.9	1.1 x 0.7	1.26 x 0.86	1.13 x 1.1
Number of external components	2	2	2	3	6	9
Footprint (mm ²)	3.02	3.95	3.95	4.88	8.85	12.66



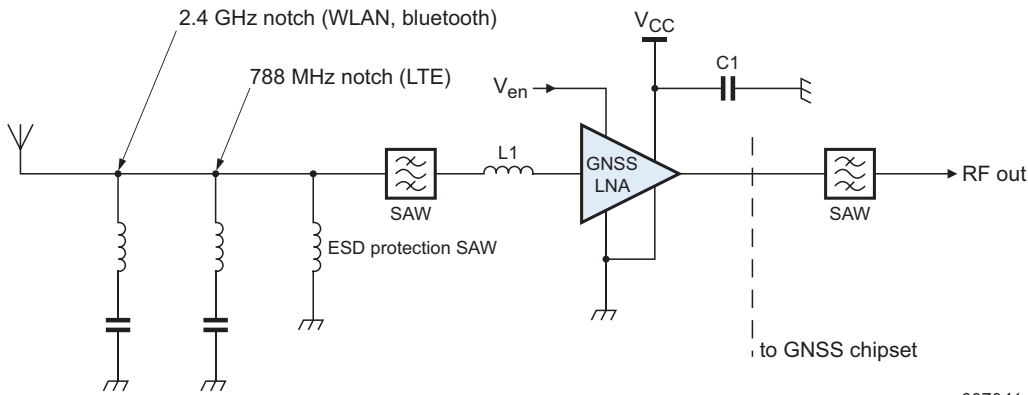
Product highlight: BGU7008 AEC-Q100 qualified LNA for GNSS receiver applications

The BGU7008 adapts itself to the changing environment resulting from co-habitation of different radio systems in modern cellular handsets. It has been designed for low power consumption and optimal performance when jamming signals from co-existing cellular transmitters are present. At low jamming power levels it delivers 18.5 dB gain at a noise figure of 0.85 dB. The BGU7008 requires only one external matching inductor and one external decoupling capacitor.

Features

- ▶ AEC-Q100 qualified
- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure = 0.85 dB
- ▶ Gain 18.5 dB
- ▶ High 1 dB compression point of -12 dBm
- ▶ High out of band IP3i of 4 dBm
- ▶ Supply voltage 1.5 to 2.85 V
- ▶ Power down mode current consumption < 1 uA
- ▶ Optimized performance at low supply current of 4.8 mA
- ▶ Integrated temperature stabilized bias for easy design

Application diagram



aaa-007041

Recommended products

Function	Product	Package	Type	
LNA	MMIC	SiGe:C MMIC	SOT886	BGU7004
				BGU7005
				BGU7007
				BGU7008
			SOT1230	BGU8009
				BGU8011
		WL-CSP	BGU8006	

For automotive applications, BGU7004 and BGU7008 have been qualified against AECQ100 and operate in even the harshest environments, such as the car body.

Product highlight: BGU8011 SiGe:C LNA MMIC for GPS, GLONASS, and Galileo



The BGU8011 is a low-noise amplifier (LNA) for GNSS receiver applications in a plastic leadless 6-pin extremely-small SOT1230 package. It requires only one external matching inductor and one external decoupling capacitor.

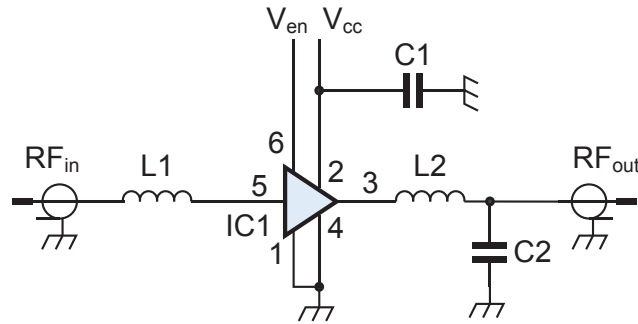
Features

- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure (NF) = 0.65 dB
- ▶ Gain = 16 dB
- ▶ High 1 dB compression point of -6 dBm
- ▶ High out-of-band IP₃ of 7 dBm
- ▶ Supply voltage 1.5 to 3.1 V
- ▶ Power-down mode current consumption < 1 μA
- ▶ Optimized performance at low supply current of 4.2 mA
- ▶ Integrated temperature stabilized bias for easy design
- ▶ Requires only one input matching inductor and one supply decoupling capacitor

1.5.2 GPS L2 and L5 bands

For professional applications, the L2 and L5 GPS bands are gaining interest. All BGU700x/BGU800x products can be easily matched to the L2 and L5 bands.

Application diagram



L2 application diagram for all GNSS LNAs

Recommended products

Function	Product	Package	Type	
LNA	MMIC	SiGe:C MMIC	SOT886	BGU7004
				BGU7005
				BGU7007
				BGU7008
				BGU8007
				BGU8009
			SOT1230	BGU8010
				BGU8011

For automotive applications, BGU7004 and BGU7008 have been qualified against AECQ100 and operate in even the harshest environments, such as the car body.

Product highlight:

BGU8009 SiGe:C LNA

MMIC for GPS, GLONASS, and Galileo



The BGU8009 is a low-noise amplifier (LNA) for GNSS receiver applications in a plastic leadless 6-pin extremely-small SOT886 package. It requires only one external matching inductor and one external decoupling capacitor.

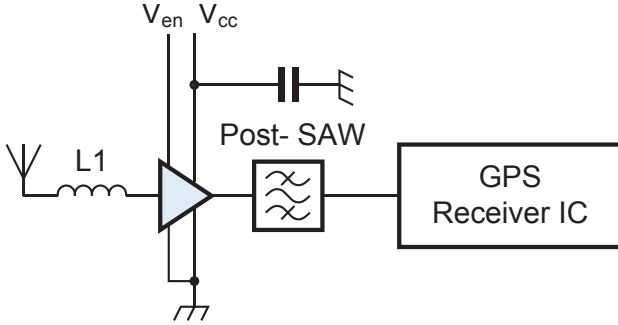
Features

- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure (NF) = 0.65 dB
- ▶ Gain = 18 dB
- ▶ High 1 dB compression point of -7 dBm
- ▶ High out-of-band IP₃ of 6 dBm
- ▶ Supply voltage 1.5 to 3.1 V
- ▶ Power-down mode current consumption < 1 μA
- ▶ Optimized performance at low supply current of 4.2 mA
- ▶ Integrated temperature stabilized bias for easy design
- ▶ Requires only one input matching inductor and one supply decoupling capacitor

1.5.3 Mobile health and fitness: low current

In mobile health and fitness applications like GPS sports watches, low current is critical but linearity requirements can be relaxed since only 2.4 G WLAN and Bluetooth on-boards jammers are relevant. For these low-current applications, NXP offers the BGU8010, which requires only 3.2 mA of current and 16 dB of gain.

Application diagram



Mobile health and fitness block diagram

Recommended products

Function	Product		Package	Type
LNA	MMIC	SiGe:C MMIC	SOT891	BGU7003
			SOT886	BGU7003W
			SOT1209	BGU6101
				BGU6102
				BGU6104
SOT1230	BGU8010			

Product highlight: BGU8010 SiGe:C LNA MMIC for GPS, GLONASS, Galileo and Compass

The BGU8010 adapts itself to the changing environment resulting from co-habitation of different radio systems in modern cellular handsets. It has been designed for low power consumption and optimal performance when jamming signals from co-existing cellular transmitters are present.

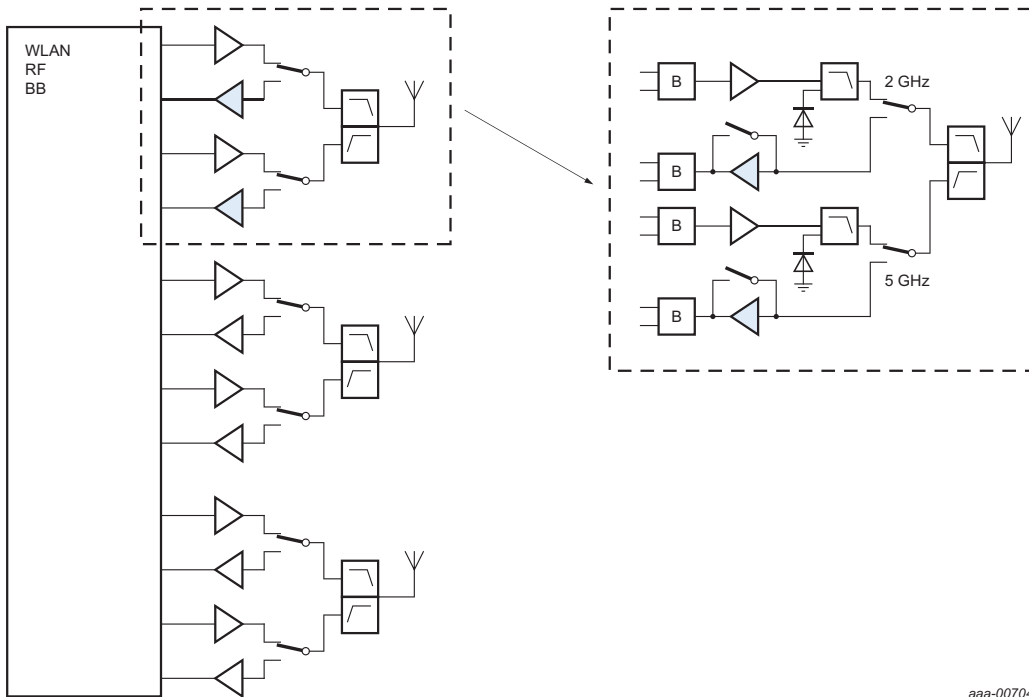


Features

- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure (NF) = 0.7 dB
- ▶ Gain 16.1 dB
- ▶ Input 1 dB compression point of -9 dBm
- ▶ Out of band IP3i of 3 dBm
- ▶ Supply voltage 1.5 to 3.1 V
- ▶ Optimized performance at low supply current of 3.0 mA
- ▶ Power-down mode current consumption < 1 mA

1.5.4 WLAN: Access points and routers

Application diagram



aaa-007042

Recommended products

Function	Product	Package	Type	
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU730F
				BFU760F
				BFU710F
				BFU725F/N1
				BFU730LX
				BFU790F
	RF	MMIC	SOT1189	BGU7224
				BGU7258

Product highlight:

BFU760F NPN silicon germanium microwave transistor

The BGU760F is part of the family of 6th (Si) and 7th (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments. The BFU760F delivers exceptional WLAN performance, meeting the latest 802.11ac Gigabit WLAN standard.



Features

- ▶ Meets 802.11ac WLAN standard
- ▶ System optimized gain of 12.5 dB at 2.4 GHz and 11 dB at 5.5 GHz
- ▶ Low noise figure (NF) of 1.1 dB @ 2.4 GHz and 5.5 GHz
- ▶ High input 1 dB gain compression ($P_{i(1dB)}$) of -8 dBm at 2.4 GHz and -5 dBm at 5.5 GHz
- ▶ High input third order intercept point IP₃ of +3 dBm at 2.4 GHz and +8 dBm at 5.5 GHz
- ▶ Only eight external components required

1.5.5 FM radio

With NXP's FM LNAs, consumers can listen to FM radio on their mobile phone speaker. These devices amplify the weak signal solving impedance mismatch between embedded antennas and the FM radio receiver, offering best-in-class performance.

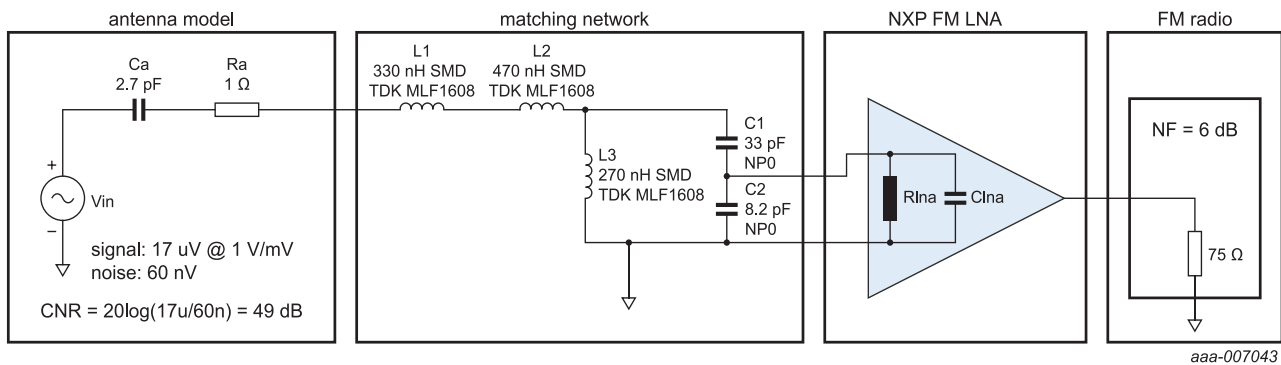
With most handsets, users can listen only to FM radio via the headset, which also serves as the antenna. The FM RF signal is picked up by the FM receiver while the audio is sent to the speaker by the audio amplifier.

By using the headset as a quarter wave length antenna of 75 cm, there is maximum signal pick-up as the antenna is used at the resonance frequency. Also, the antenna output is matched to the FM receiver's input for maximum power transfer.

An embedded antenna allows users to listen to FM radio without using the headset, which gives them more freedom to do something else at the same time or listen to the radio together with friends or family.

The embedded antenna is about the same size as the handset, around 10 cm. The resonance frequency is higher than the FM band and the antenna cannot couple directly to the FM receiver due to impedance mismatch.

Application diagram



The NXP FM LNA serves as an interface that buffers the received voltage from high input to low output impedance, while adding minimal noise to maintain signal integrity.

Aside from delivering best-in-class performance (for a demonstration, visit www.youtube.com/watch?v=IxSAPVLRTw), NXP's FM LNAs come in three different current-optimized versions for 1, 2, and 4 mA operation to allow for system-optimized gain and linearity.

NXP FM LNAs can be operated from a 1.5 to 5 V supply, and offer the lowest external component count, while still enabling matching to any high impedance antenna. This gives designers maximum flexibility.

Recommended products

Function	Product		Package	Type
LNA	MMIC	SiGe:C MMIC	SOT1209	BGU6101
				BGU6102
				BGU6104
			SOT886	BGU7003W



Product highlight: BGU6102 MMIC wideband amplifier

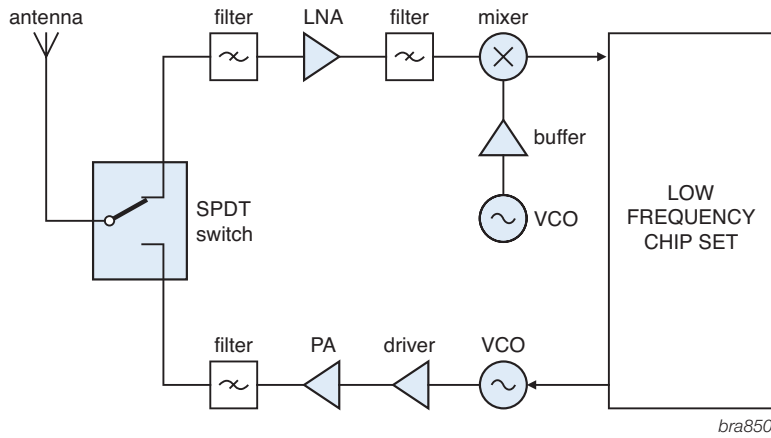
The BGU6102 is an unmatched MMIC featuring an integrated bias-enable function and a wide supply voltage. It is part of a family of three products (BGU6101, BGU6102, BGU6104), and is optimized for 2 mA operation.

Features

- ▶ Applicable between 40 MHz and 4 GHz
- ▶ High-ohmic FM LNA: 13 dB gain and 1.0 dB NF at 100 MHz
- ▶ 50 Ω FM LNA: 15 dB gain and 1.3 dB NF at 100 MHz
- ▶ Integrated temperature-stabilized bias for easy design
- ▶ Bias current configurable with external resistor
- ▶ Power-down mode current consumption < 6 μ A
- ▶ ESD protection > 1 kV Human Body Model (HBM) on all pins
- ▶ Supply voltage from 1.5 to 5 V

1.5.6 Generic RF front-end

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	SOT343 BFG480W
			SOT363 BGA2022

Function	Product	Package	Type	
LNA	RF bipolar transistor	Wideband transistor	SOT23 PBR951	
			SOT323 PRF957	
			SOT323 PRF947	
		SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
	BFU690F			
	BFU710F			
	BFU725F/N1			
	BFU730F			
	BFU760F			
	BFU790F			
	MMIC	Low-noise wideband ampl.		SOT1209
				BGU6101 BGU6102 BGU6104

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

Function	Product	Package	Type
Power amplifier	MMIC	General-purpose wideband amplifier	SOT89
			BGA6289
			BGA6489
			BGA6589
			BGA7024 BGA7027

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

Function	Product	Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323 PRF957
			SOT23 PBR951
	MMIC	Gen-purp wideband amp	SOT363 BGA2771
			SOT363 BGA2866

* Also available in ultra-small leadless package SOD882D



Product highlight:

BFU730F NPN wideband silicon germanium RF transistor

The BGU730F is part of the family of 6th (Si) and 7th (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments.

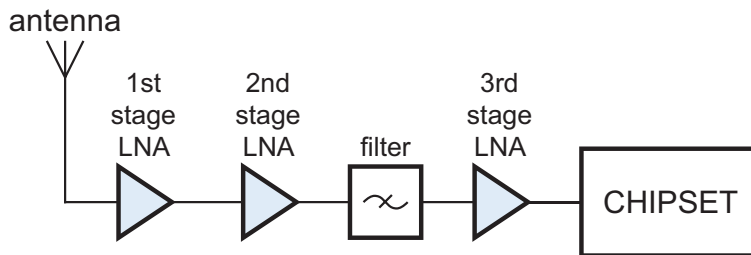
Features

- ▶ Operates at 2.3 GHz
- ▶ High maximum power gain (Gp) of 17.6 dB
- ▶ Noise figure (NF) of 0.8 dB
- ▶ Input 1dB gain compression (Pi(1dB)) of -15 dBm
- ▶ Input third order intercept point IP3I of +4.7 dBm

1.6 Automotive

1.6.1 SDARS and HD radio

Application diagram



001aan958

Recommended products

Function	Product	Package	Type
1 st stage LNA	RF transistor SiGe:C transistor	SOT343F	BFU730F

Function	Product	Package	Type
2 nd stage LNA	MMIC General-purpose wideband amplifier	SOT343F	BFU690F
		SOT363	BGA2869
			BGA2851
			BGA2803

Function	Product	Package	Type
3 rd stage LNA	RF transistor Si/SiGe:C transistor	SOT343F	BFU690F
			BFU725F/N1
			BFU790F



Product highlight:

BFU790F silicon NPN germanium microwave transistor

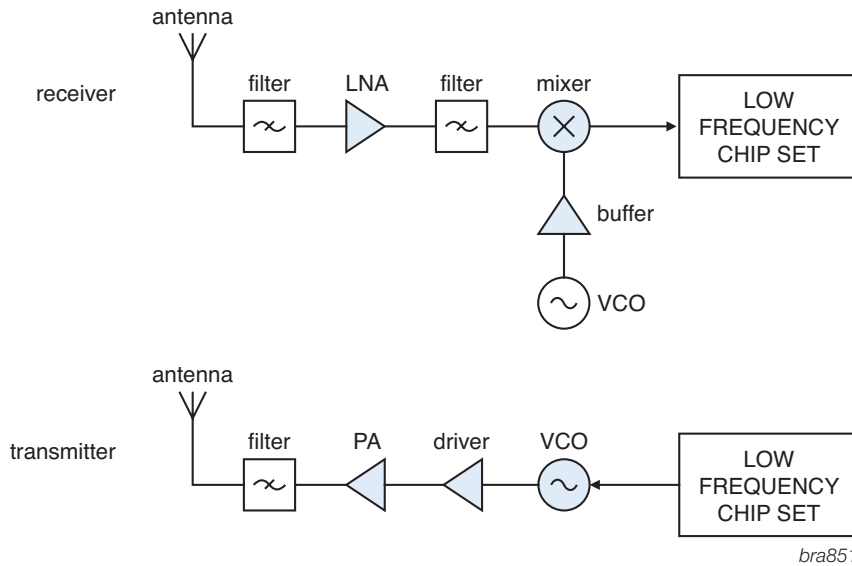
A silicon NPN germanium microwave transistor for high-speed, low-noise applications in a plastic, 4-pin dual-emitter SOT343F package.

Features

- ▶ Low-noise, high-linearity microwave transistor
- ▶ 110 GHz f_T silicon germanium technology
- ▶ High maximum output power at 1 dB compression of 20 dBm at 1.8 GHz

1.6.2 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.	SOT1209	BGU6101
				BGU6102
	SiGe:C MMIC	SOT886	BGU7003W	
Function	Product		Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323	PRF957
			SOT23	PBR951
	MMIC	Gen-purp wideband amp	SOT363	BGA2771
			SOT363	BGA2866
Function	Product		Package	Type
VCO	Varicap diodes	VCO varicap diodes	SOD323	BB170
			SOD323	BB174
			SOD523	BB198
			SOD323	BB156

* AEC-Q101 qualified (some limitations apply)

Function	Product		Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG425W
			SOT343	BFG480W
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
	MMIC	General-purpose wideband amplifier	SOT363	BGA2771
			SOT363	BGA2866
			SOT908	BGA7124

Product highlight: Varicap diodes as VCOs

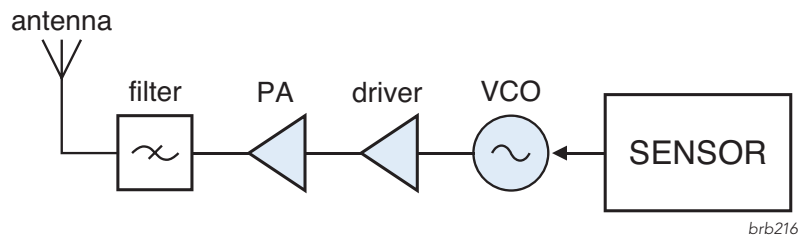
Varicap diode are principally used as voltage varicap capacitors, with their diode function a secondary option. These devices are ideal for voltage controlled oscillators (VCOs) in ISM band applications.

Features

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

1.6.3 Tire pressure monitoring system

Application diagram



Recommended products

Function	Product		Package	Type
PA	RF bipolar transistor	Wideband transistor	SOT23	BFR92A
			SOT323	BFR92AW
			SOT23	BFR94A*
			SOT323	BFR93AW
			SOT323	BFR94AW*

Function	Product		Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT323	PRF957
		Amplifier	SOT23	PBR951
	MMIC	Gen-purp wideband amp	SOT363	BGA2031/1
			SOT363	BGA2771
			SOT363	BGA2866

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

* AEC-Q101 qualified (some limitations apply)

Product highlight: BGU6101 MMIC wideband amplifier



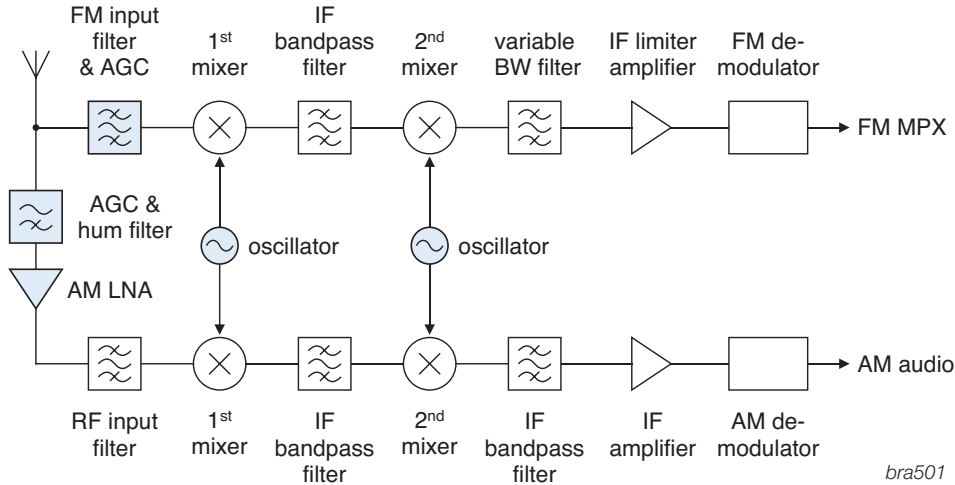
The BGU6101 is an unmatched MMIC featuring an integrated bias-enable function and a wide supply voltage. It is part of a family of three products (BGU6101, BGU6102, BGU6104), and is optimized for 2 mA operation.

Features

- ▶ Applicable between 40 MHz and 6 GHz
- ▶ 13 dB gain and 0.8 dB NF at 450 MHz
- ▶ 50 Ω FM LNA: 15 dB gain and 1.4 dB NF at 100 MHz
- ▶ Integrated temperature-stabilized bias for easy design
- ▶ Bias current configurable with external resistor
- ▶ Power-down mode current consumption < 1 μ A
- ▶ ESD protection > 1 kV Human Body Model (HBM) on all pins

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

Application diagram



bra501

Recommended products

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

*OIRT

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

Note 1:

The following recommended discrete products are applicable for NICEPACS, CCC, and DDICE:

- ▶ NICE:TEA6840H, TEA6845H, TEA6846H,
- ▶ NICEPACS:TEA6848H, TEA6849H,
- ▶ CCC:TEF6901H, TEF6903H,
- ▶ DDICE:TEA6721HL.

All recommended discrete products are applicable, excluding AM LNA in: DICE2:TEF6730HWCE.

Note 2:

Phones and portable radios (TEA5767/68) use varicap BB202 as the FM oscillator.

Product highlight: BF862 junction FET



Our tuning portfolio contains advanced products for car radio reception applications and 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. The high-performance junction FET BF862 is specially designed for AM radio 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

1.7 Industrial, scientific, and medical (ISM)

1.7.1 E-metering, RF generic front-end with a single antenna/ZigBee

Wireless microcontrollers for the Internet of things

NXP provides a complete approach for the development of IEEE802.15.4-based JenNet-IP, RF4CE, IEEE802.15.4, and ZigBee wireless network solutions, incorporating all the necessary hardware and software components. NXP's JN516x wireless microcontroller chips provide the optimum hardware platform around which wireless network nodes can be designed, combining high-performance processing and radio communications. NXP also supplies JN516x wireless microcontrollers mounted on modules, and an evaluation kit on which custom applications can be developed.

The on-chip peripherals support a wide range of applications. They include a 2-wire I²C port, an SPI port that can operate as either master or slave, a four-channel ADC with battery monitor, and a temperature sensor. Each device can support a large switch matrix of up to 100 elements or a 20-key capacitive touchpad.

Products

- ▶ JN5161-001 with 64 kB flash and 8 kB RAM for RF4CE and IEEE802.15.4 applications
- ▶ JN5164-001 with 160 kB flash and 32 kB RAM for JenNet-IP, RF4CE, and IEEE802.15.4 applications
- ▶ JN5168-001 with 256 kB flash and 32 kB RAM for JenNet-IP, IEEE802.15.4, RF4CE, and ZigBee applications
- ▶ JN5168-001-M00, JN5168-001-M03, JN5168-001-M05, JN5168-001-M06 modules

Features

- ▶ Single-chip device to run stack and application
- ▶ Very low-current solution for long battery life (10+ year)
- ▶ Ultra low-power MCU together with an IEEE802.15.4-compliant radio transceiver
- ▶ Supports multiple network stacks
- ▶ Enhanced 32-bit RISC processor for high performance and low power
- ▶ A rich mix of analog and digital peripherals
- ▶ Standard-power and high-power modules
- ▶ Software Developer's Kit (SDK), including JenNet-IP and ZigBee networking stacks

Software

A selection of network protocol stacks, based on the industry-standard IEEE802.15.4, are available to support the wireless connectivity requirements of your application. These include JenNet-IP and ZigBee Smart Energy, Light Link, Home Automation and Remote Control, which are provided as a set of software libraries. ZigBee is used for applications where interoperability is required. JenNet-IP is suitable for all proprietary applications, provides IPv6 connectivity to the end node, and is quickly emerging as a standard for lighting and automation applications in buildings.



Product highlight: BGA7127 MMIC medium power amplifier

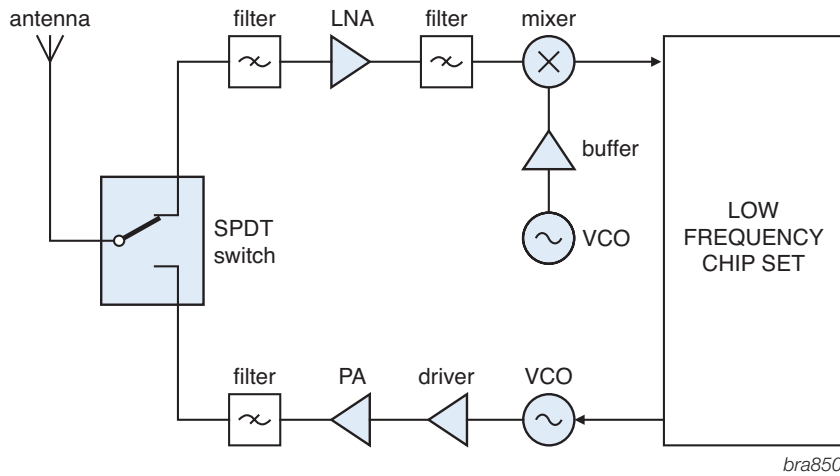


The BGA7127 MMIC is a one-stage driver amplifier offered in a low-cost, ultra-small SOT908 leadless package. It delivers 27 dBm output power at 1 dB gain compression, and superior performance for various narrowband-tuned application circuits at frequencies up to 2700 MHz.

Features

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

Application diagram



Recommended products

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

Function	Product		Package	Type
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
				BFU690F
				BFU710F
				BFU725F/N1
				BFU730F
				BFU760F
	BFU790F			
MMIC	SiGe:C MMIC	SOT886	BGU7003W	

Function	Product		Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT343	BFG425W
	MMIC	Gen-purp wideband amp	SOT363	BGA2771
			SOT363	BGA2866

* Also available in ultra-small leadless package SOD882D

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
Buffer	RF bipolar transistor	Wideband transistor	SOT23	PBR951
			SOT323	PRF957
			SOT323	PRF947
			SOT416	PRF949

Function	Product		Package	Type
Medium power amplifier	RF bipolar transistor	Wideband transistor	SOT343	BFG21W
				MMIC
	BGA6489			
	SOT908	BGA7124		
				SOT908

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

Product highlight: JN5168 wireless microcontroller



The JN516x series is a range of ultra low-power, high-performance wireless microcontrollers supporting JenNet-IP, ZigBee PRO, or RF4CE networking stacks to facilitate the development of home automation, smart energy, light link, and remote-control applications. They feature an enhanced 32-bit RISC processor with embedded Flash and EEPROM memory, offering high coding efficiency through

variable width instructions, a multi-stage instruction pipeline, and low-power operation with programmable clock speeds. They also include a 2.4 GHz IEEE802.15.4-compliant transceiver and a comprehensive mix of analog and digital peripherals. Three memory configurations are available to suit different applications. The best-in-class operating current of 15 mA, with a 0.6µA sleep timer mode, gives excellent battery life and allowing operation direct from a coin cell.

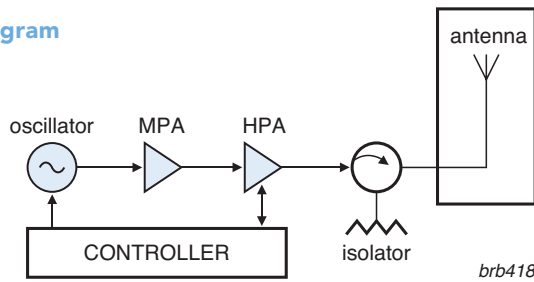
Whatever the need, NXP has the LDMOS solution tailored to fit Yesterday, today and tomorrow

The RF power industrial, scientific and medical (ISM) market covers a wide range of applications, from high-powered lasers to particle accelerators and ablation. These markets tend to exploit the benefits of applying RF energy for a very particular end use, served by bespoke RF amplifier designs. Our customers require suppliers who are true partners in providing devices that meet these specific needs through life-cycles that last a decade or more. At NXP, we pride ourselves in the way we manage the technology transitions that these timelines bring about, with our support in minimizing any disruption to our customers. By staying ahead of the game in terms of technology development, NXP has maintained a leadership position in this market segment and, going forward, our growing XR range and new OMP (over-molded plastic) parts will continue this trend for years to come.

Expanding XR

To meet the multiple demands of enhanced RF performance, security of supply, and cost-efficiency, the ISM market is currently in a transition from RF power solutions that use VDMOS transistors to ones that use new LDMOS transistors. LDMOS clearly exceeds VDMOS in terms of all technical and commercial parameters, apart from ruggedness in fault conditions. Of all RF power applications, those in the ISM segment have the most severe requirements in terms of ruggedness. To meet these needs, NXP has developed the XR technology, which enables a family of LDMOS devices that will meet all current and future market needs.

Application diagram



Recommended products

Function	Product	Package	Type	Function	Product	Package	Type
Oscillator	RF transistor	SOT143	BFG520	MPA (medium power amplifier)	MMIC	SOT89	BGA6289
		SOT143	BFG325/XR			SOT89	BGA6489
		SOT23	BFR520				BGA6589
		SOT323	BFR92AW			SOT908	BGA7124
		SOT323	BFR93AW			SOT89	BGA7024
		SOT323	BFS520			SOT908	BGA7127
		SOT343	BFG520W			SOT89	BGA7027
		SOT343	BFG325W/XR			SOT908	BGA7130
		SOT363	BFM520				
		SOT416	BFR520T				

* Check status in section 3.1, as this type is not yet released for mass production

Function	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	1	2500	12	SOT975	BLF25M612(G)*
		425	450	200	SOT1138	BLP05M7200*
	Final	1300	1300	250	SOT1121	BLF6G13L(S)-250P
		400	1000	600	SOT539	BLF10H6600P(S)*
		10	128	600	SOT1214	BLF174XR(S)
		10	500	600	SOT1214	BLF574XR(S)
		10	128	1400	SOT539	BLF178XR(S)
		10	500	1400	SOT539	BLF578XR(S)

Product highlight: BLF174XR(S) power transistor



An extremely rugged 600 W push-pull LDMOS transistor in a thermally enhanced ceramic package for broadband applications in the range 10 to 128 MHz. The BLF174XR(S) is an addition to NXP's leading XR range of LDMOS transistors, achieving 73% efficiency and 29 dB gain from a 50 V supply.

Features

- ▶ Extremely rugged performance in all fault conditions (VSWR >65:1)
- ▶ Excellent efficiency and reliability
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Designed for broadband operation (10 to 128 MHz)
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ Industrial lasers, RF heating, RF lighting, particle accelerators, synchrotrons, plasma generators

1.7.3 RF energy

RF power as a robust and highly efficient energy source

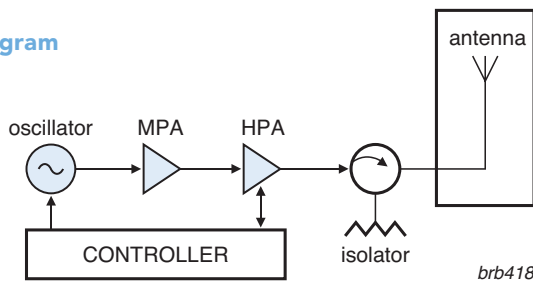
Opening up the 2.45 GHz band

The 100 MHz band between 2400 and 2500 MHz was long since allocated to commercial applications, the most popular being microwave ovens. This band is essentially unlicensed, meaning that it is best suited to applications that are tolerant to external emissions in this band, and that usually means applications that do not rely on a high level of two-way communication. For this reason, the 2.45 GHz band is now seeing an abundance of applications, like microwave cooking, that depend on a controlled delivery of a quantity of RF Energy. Some of these applications have the potential to take the world of RF power to new levels of volume, maybe 10 or 100 times higher than today's run rates. For this potential to be realized, the market needs a supplier that can deliver the necessary breakthroughs in performance, system support, and the vital price-per-Watt level required to make the solutions commercially viable. As a broad-based semiconductor supplier with comprehensive RF coverage, NXP is set to play a leading role in making this market happen as soon as possible.

The first step: Dedicated 2.45 GHz LDMOS transistors

NXP is applying its latest generations of LDMOS technology to bring to market a range of ceramic-packaged transistors that are designed and characterized to meet the RF performance requirements for the 2.45 GHz segment. These products take the best components available today and tune them to get the best possible performance for the particular needs of these new applications. In this way, customers can move on from 'paper-only' concept designs and address a critical phase of hardware development, today. These products are more than engineering samples, they will be fully released and supported, just like all other LDMOS devices.

Application diagram



Recommended products

Function	Product	Package	Type	Function	Product	Package	Type
Oscillator	RF transistor	SOT343F	BFU630F	MPA (medium power amplifier)	MMIC	SOT89	BGA6289
			BFU660F				BGA6489
			BFU690F				BGA6589
			BFU730F				BGA7124
			BFU760F				BGA7024
			BFU790F				BGA7127
						SOT908	BGA7127
							BGA7027
							BGA7130

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	1	2500	12	SOT975	BLF25M612(G)*
		2400	2500	140	SOT502	BLF2425M7L(S)140
	Final	2400	2500	180	SOT539	BLF2425M6L(S)180P
		2400	2500	250	SOT539	BLF2425M7L(S)250P

* Check status in section 3.1, as this type is not yet released for mass production

Product highlight: BLF2425M7L(S)250P power transistor



A 250 W push-pull LDMOS transistor in a thermally enhanced ceramic package for applications in the range of 2400 to 2500 MHz. The BLF2425M7L(S)250P uses NXP's Gen7 LDMOS technology to provide a device that delivers best-in-class power density, achieving 51% efficiency and 15 dB gain from a 28 V supply.

Features

- ▶ High efficiency (51%) and high gain (15 dB) in continuous wave (CW) operation
- ▶ Excellent ruggedness in fault conditions (VSWR >10:1)
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Optimized for 2.45 GHz operation
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ RF cooking, RF lighting, RF heating, RF drying, RF ignition, RF ablation

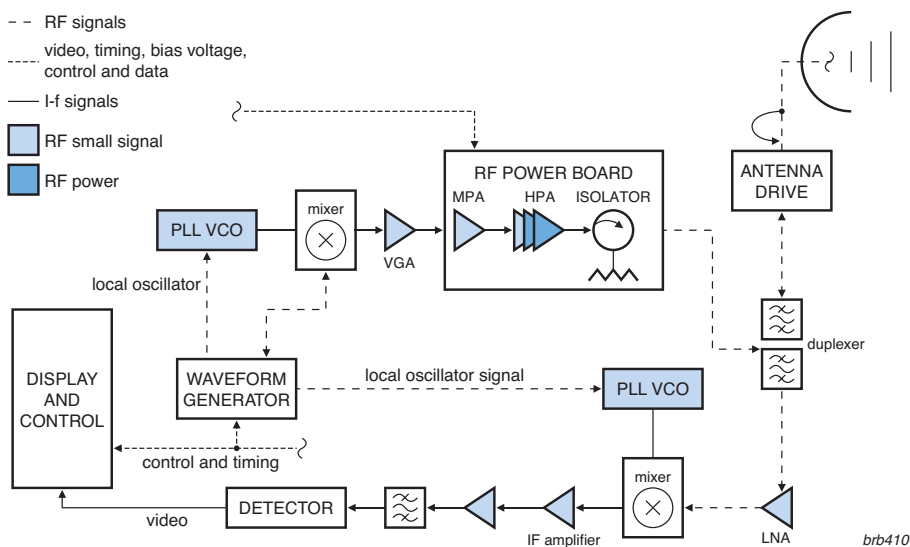
1.8 Aerospace and defense

1.8.1 Microwave products for L- and S-band radar and avionics applications

NXP builds on more than 50 years of history in semiconductor technology and component design. For more than three decades, we have led in providing high-performance RF technologies for microwave applications. The company has built a strong position in the field of RF small-signal and power transistors for microwave amplifiers with best-in-class Si devices and processing technologies.

We were the first semiconductor company to supply S-band transistors (2700 to 3500 MHz) based on LDMOS. To further strengthen our position towards the future, we are currently developing new high-power and high-bandwidth technologies based GaN material.

Application diagram



Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	500	1400	25	SOT467C	BLL6H0514-25
		2700	3500	30	SOT1135	BLS6G2735L(S)-30
	Final	500	1400	130	SOT1135	BLL6H0514L(S)-130
		1030	1090	200	SOT502	BLA6G1011L(S)-200RG
		1200	1400	250	SOT502	BLL6H1214L(S)-250
		2700	2900	350	SOT539	BLS7G2729L(S)-350P*
		3100	3500	350	SOT539	BLS7G3135L(S)-350P*
		960	1215	500	SOT634A	BLA6H0912-500
		1200	1400	500	SOT539A	BLL6H1214-500
1030	1090	600	SOT539A	BLA6H1011-600		

* Check status in section 3.1, as this type is not yet released for mass production

Product highlight:

BLS6G2735L(S)-30 power transistor



The BLS6G2735L(S)-30 is a broadband transistor that encompasses many of the features that make NXP the leading supplier of semiconductors for the microwave and radar markets. Using the tried and trusted Gen6 LDMOS technology, NXP's unparalleled matching techniques, and the best thermally enhanced packaging the

BLS6G2735L(S)-30 can be applied in any number of applications as a driver in S-band radar amplifiers.

Features

- ▶ Internal matching to cover full S-band between 2700 and 3500 MHz
- ▶ High gain and efficiency in broad- and narrowband applications
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Excellent ruggedness in fault conditions

Function	Product		Package	Type
LNA (low-noise amplifier) and Mixer	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU725F/N1
				BFU730F

Function	Product		Package	Type
IF amplifier	MMIC	MMIC	SOT363	BGA2800
				BGA2801
				BGA2815
				BGA2816
				BGA2850
				BGA2865
				BGA2866
				BGM1014
		BGM1013		
		BGM1012		
		General-purpose wideband amplifiers		

Function	Product		Package	Type
PLL/VCO LO generator	RF IC	SiGe:C IC	SOT616	TFF1003HN
				TFF1007HN

Function	Product	Gain range	Package	Type
Single VGA (variable-gain amplifier)	MMIC	31 dB	SOT617	BGA7210
				BGA7204

Function	Product	Gain range	Package	Type
Dual VGA (variable-gain amplifier)	MMIC	24 dB	SOT617	BGA7350
		28 dB		BGA7351

Function	Product	$P_{L(1\text{ dB})}$ @ 940 MHz	Package	Type
MPA (medium power amplifier)	MMIC	24 dBm	SOT89	BGA7024
		28 dBm		BGA7027
		25 dBm		BGA7124
		28 dBm	SOT908	BGA7127
		30 dBm		BGA7130

* 8 different types with LO ranges: 7-15 GHz, see 3.4.4

Product highlight: BGA28xx-family of IF gain blocks

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



Features

- ▶ No output inductor necessary when used at the output stage
- ▶ Internally matched to 50 Ω
- ▶ Reverse isolation > 30 dB up to 2 GHz
- ▶ Good linearity with low second order

2. Technologies

2.1 Looking for a leader in SiGe:C? You just found us!

NXP's QUBiC4 BiCMOS SiGe:C technology enables future generations of RF products – including low-noise amplifiers, medium-power amplifiers and local oscillator (LO) generators – to operate at higher performance levels, including higher frequency and higher integration. Use cases include increasing the performance of base stations, mobile phones, and other mobile platforms and communications infrastructure equipment. The QUBiC4 process also helps speed satellite tracking and better connectivity with GPS signals for GPS systems, enhances satellite, WLAN, and microwave radio applications, and strengthens performance in radar, and more.

Excellent RF signal quality and more functionality in one design

Silicon-germanium (SiGe) process technology-based QUBiC4 offers high RF performance at a competitive cost, while ensuring excellence in signal quality via robust, highly integrated functionalities and value-added solutions. This in-house process builds upon mature processes in mass production since 2002. The QUBiC4 process allows integrating more functionality onto devices at a smaller footprint and with greater reliability and manufacturing efficiency, offering a clear competitive advantage to our customers.

More than an alternative

QUBiC4 delivers several benefits. It achieves RF performance comparable to GaAs for linearity, noise figure, and phase noise. It also provides higher robustness and reliable design (active ESD protection), and offers the option to integrate dense analog circuitry and digital control on the same mixed-signal IC. SiGe also offers lower DC power consumption. It allows wireless equipment manufacturers to add more functionality onto devices with less space, at a competitive cost, and with greater reliability and manufacturing efficiency. With QUBiC4, customers can speed their migration from GaAs technology to silicon by enabling cutting-edge, low-noise performance and IP availability.

QUBiC4 comes in three variants (QUBiC4+, QUBiC4x, and QUBiC4xi), each with its own optimization for specific application areas.

QUBiC4+

The QUBiC4+ process features 0.25 μm CMOS with five metal layers for integration of dense digital logic-based smart functionality, a rich set of active and passive devices for

high-frequency mixed-signal designs, including thick top metal layers for high-quality inductors. The device set includes 35 GHz fT NPNs with 3.8 V breakdown voltage (BV_{ce0}) and low noise figure (NF < 1.1 dB @ 2 GHz), 5 GHz fT VPNNs, a 28 GHz high-voltage NPN with 5.9 V breakdown voltage, differential and single-ended varicaps with Q-factor > 30, scalable inductors with Q-factor > 20, 800 MHz FT lateral PNNs, 0.25 μm CMOS, 137, 220, and 12 to 2000 Ω/sq . poly and active resistors, a 270 Ω/sq . SiCr thin film resistor, a 5.7 fF/ μm^2 oxide capacitor and a 5 fF/ μm^2 MIM capacitor, one to six fF/ μm^2 oxide capacitors and various other devices including L-PNNs, isolated NMOS, 3.3 V CMOS and RF-CMOS transistors capacitor. The QUBiC4+ process is silicon-based and ideal for applications up to 5 GHz (fT = 35 GHz, NF < 1.1 dB @ 2 GHz), as well as for medium-power QUBiC4X.

QUBiC4X

The QUBiC4X process is a SiGe:C-based extension of the QUBiC4 process for high-frequency mixed-signal designs and offers a rich set of transistor devices, including a 110 GHz fT NPN with 2.0 V breakdown voltage and very low noise figure (NF < 1.0 dB @ 10 GHz), 0.25 μm CMOS, a variety of resistors, a 5.7 fF/ μm^2 oxide capacitor, and a 5 fF/ μm^2 MIM capacitor. QUBiC4x is ideal for applications that typically operate at up to 30 GHz such as wireless infrastructure, Satcom, point-to-point or wireless connectivity.

QUBiC4Xi

The QUBiC4Xi process further enhances the QUBiC4X process. It offers 200 GHz fT NPNs and offers ultra-low noise figure (NF < 0.6 dB @ 10 GHz), 0.25 μm CMOS, several resistors, a 5.7 fF/ μm^2 oxide capacitor and a 5 fF/ μm^2 MIM capacitor. QUBiC4xi is ideal for applications operating at high frequencies (> 20 GHz), such as wireless infrastructure point-to-point, car radar, and aerospace.

2.2 Gallium-Nitride (GaN): Gain a clear advantage as NXP takes GaN mainstream

With 35+ years of experience delivering RF power transistors, NXP leads the industry in offering GaN RF power devices through a secure and reliable mainstream supply chain for wireless infrastructure, Industrial Scientific & Medical (ISM), and Aerospace & Defense applications.

NXP's first-generation GaN process technology features best-in-class linearity while at the same time allowing designers to maintain power, ruggedness, and efficiency. This enables an uncompromised amplifier design that can minimize component count and reduce amplifier footprint.

Our leading back-end assembly facility consistently leverages the high power density of GaN into smaller and more broadband circuitry. Through a broad portfolio of high-performance GaN and LDMOS products, NXP offers you an unbiased choice in enabling optimized designs for your application.

Key features

- ▶ High frequencies, bandwidth up to 6 GHz
- ▶ High efficiencies
- ▶ Excellent linearity
- ▶ High power density
- ▶ High thermal conductivity
- ▶ Operation at higher temperatures, without loss of reliability (250 °C compared to 225 °C for Si LDMOS)
- ▶ Excellent ruggedness

Applications

- ▶ Commercial wireless infrastructure (base stations)
- ▶ Radar systems
- ▶ Broadband and narrowband general-purpose amplifiers
- ▶ Public mobile radios
- ▶ ISM applications
- ▶ Jammers
- ▶ Test instrumentation
- ▶ EMC testing

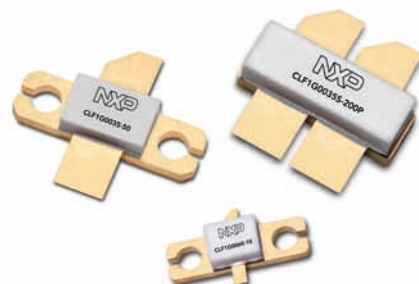
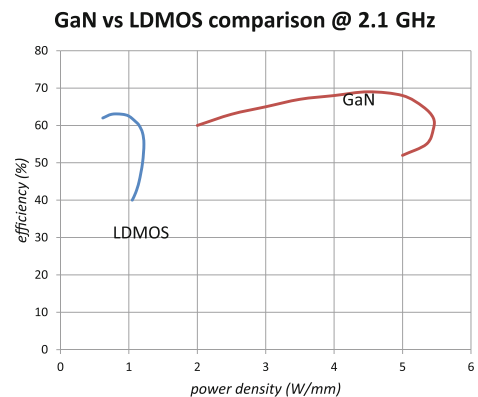
Setting new performance boundaries for RF power amplifiers

GaN products are termed High-Electron Mobility Transistors (HEMT), a name that captures one of the intrinsic benefits of GaN – the high electron drift velocity. However, these transistors are depletion-mode devices, so they are normally on and require a negative gate bias to switch them off. This biasing is not straightforward, so NXP also has a tried-and-tested bias circuit available.

A further advantage of GaN is that it is a very hard structure, so it's capable of withstanding very high temperatures. NXP's GaN transistors are specified to a maximum temperature of 250 °C, compared to 225 °C for Si LDMOS. With such high temperature capability, there is a greater need to have packages capable of exploiting this feature. For this, customers benefit from NXP's 35-year legacy in RF power products.

Simply put, GaN makes a step increase in efficiency and power density performance over Si LDMOS in most applications (see figure). If independent market research claims come true, GaN product sales will exceed US\$ 300 million in 2014. But this can only happen if GaN is made available through mainstream semiconductor companies.

Currently, NXP is the only GaN supplier with the industrial base that brings customers excellence in product reliability, cost, and a high degree of confidence in the supply chain. As we like to say, we are taking GaN mainstream.



2.3 Best-in-class LDMOS to drive almost any RF application

LDMOS (Laterally Diffused Metal Oxide Semiconductor) is the dominant device technology used in high-power RF amplifiers for frequencies ranging from 10 MHz to 3.8 GHz. LDMOS offers significant advantages over silicon bipolar transistors, including very high ruggedness and efficiency, high gain, and compatibility with low-cost packaging platforms. In all but a few markets, LDMOS is the most commercially viable solution compared to GaN-based power amplifiers.

NXP's LDMOS technology platforms are designed for devices that run from supply voltages in the range of 28 to 50 V, with outstanding efficiency, power, and ruggedness. The technology draws on NXP's heritage of proven product and technology innovation in RF, which spans over 35 years. Now in its 8th-generation, our LDMOS devices deliver record performance up to 3.8 GHz and can be used to, for example, help wireless network operators realize best-in-class efficiencies for wireless base stations and hence reduce operating costs.

Advanced processes and architectures

These high efficiencies are achieved by combining Gen8 LDMOS devices with specific amplifier circuit designs such as Doherty. The technology enables Doherty amplifiers with higher power, higher efficiencies, fewer memory effects and better pre-distortion capabilities. Doherty amplifiers are available fully integrated into a single transistor package, so engineers do not need to worry about the intricate design of such a circuit - All splitters, delay lines, and combiners are already included, so design-in is similar to that of a Class-AB circuit.

Higher power densities and ruggedness

For the aerospace and defense, broadcast, and ISM markets, NXP uses the proven Gen6 & Gen7 LDMOS platforms for devices fine-tuned to the specific needs required by these applications. For example, the Gen6 technology has been re-optimized for 42 to 50 V operation with the Gen6HV process, and then improved further again as Gen6XR to enable devices with extreme ruggedness, equivalent to the older VDMOS technology. The Gen6XR process is essential for ISM applications that suffer from severe mismatch conditions, since the technology enables products that withstand them all without compromising the RF performance.

Historically, the broadcast market has led the way in terms of power demands. NXP has risen to this challenge, time and again, with a succession of LDMOS products that set new milestones in terms of power density. These products clearly demonstrate the strengths of NXP's LDMOS to deliver new levels of consistency in power distribution over a die, and also in production, from batch to batch and year to year.

The improvements in LDMOS technology have enabled the aerospace and defense radar markets to migrate from designs using Si bipolar power transistors to LDMOS. LDMOS RF performance now equals Si bipolar in most respects and exceeds it in the remaining few. LDMOS is also an easier technology to apply and has significant cost of ownership benefits in these markets. In these markets, NXP has raised the bar for LDMOS with 350 W S-band devices in the range of 2.7 to 3.5 GHz.

Benefits

- ▶ Competitive products to fit all applications covered by LDMOS
- ▶ Continuous technology improvements to keep pace with market needs
- ▶ Dedicated technology nodes designed around specific application requirements

Features

- ▶ Gen8 with enhanced VBW performance for 28-32 V base station applications
- ▶ Gen7 core technology for 28-32 V applications: base stations, aerospace and defense
- ▶ Gen6XR for 42-50 V ISM applications requiring extreme ruggedness
- ▶ Gen6HV for 42-50 V high power density broadcast applications

2.4 High-performance, small-size packaging enabled by NXP's leadless package platform and WL-CSP technology

RF small-signal packaging is driven by two major trends which partly overlap

- ▶ Lower parasitics for better RF performance
- ▶ Smaller form factors for portable applications

To cope with these trends, NXP uses several approaches

- ▶ For non-space-restricted applications, the use of flat-pack packages instead of gull-wing versions reduces the parasitic impedance because of shorter lead length (e.g. SOT343F instead of SOT343). This results in better RF performance in the Ku and Ka bands (13 to 20 GHz). To reduce PCB board space, a smaller version (SOT1206) is also available.



SOT343



SOT343F



SOT1230

- ▶ For space-restricted applications there are two routes to reduce the form factor and parasitics:
 - Leadless package platform
 - Wafer Level Chip Scale Package (WL-CSP) technology

The **leadless package platform** (>25 variants already released) is highly flexible with respect to package size, package height, and I/O pitch. For example, the 6-pin packages range in size from 1.45 x 1 x 0.5 mm with 0.5 mm pitch to 0.8 x 0.8 x 0.35 mm with 0.3 mm pitch.

Because of the compact size of the design, wire lengths and parasitic impedance are also restricted. The absence of leads further reduces the inductance.

Wafer Level Chip Scale Package technology is ideally for RF functions where the I/O pitch has to fit within the chip area. With larger pitches and smaller designs (and thus little effective chip area), it is more cost-effective to do the fan-out using a leadless package instead of increasing the chip size.

The absence of wires gives the lowest parasitic inductance available.

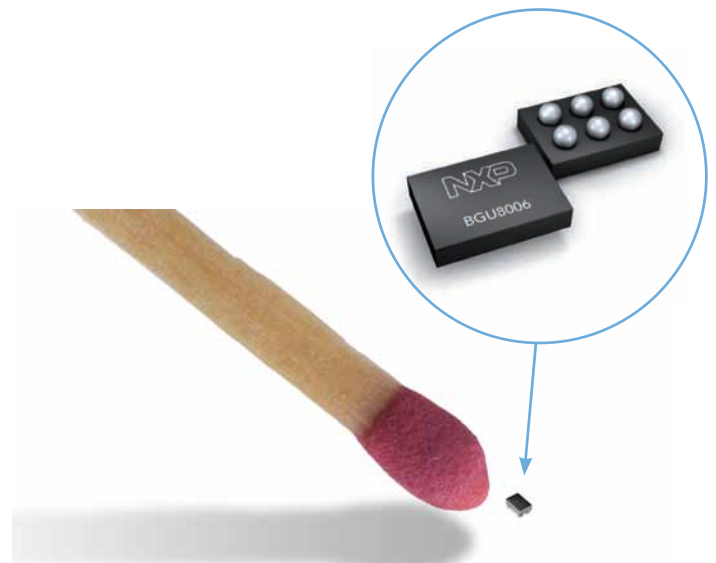


SOT886

SOT891



SOT1208



0.65 x 0.44 x 0.29 mm (including 0.09 mm balls)
5 I/Os @ 0.22 mm pitch

3. Products by function

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	Expected status June 2013	Planned release	Chapter
NEW: SiGe:C LNAs (for e.g. GPS)				
BGU8009	GPS LNA, 18 dB gain	RFS	Released	3.4.1
BGU8010	GPS LNA, 16 dB gain	RFS	Released	3.4.1
BGU8011	GPS LNA, 16 dB gain	RFS	Released	3.4.1
NEW: MMIC broadband amplifiers for TV and distribution systems				
BGA3012	Extreme broadband amplifier, 12 dB gain, SOT89	RFS	Released	3.4.1
BGA3015	Extreme broadband amplifier, 15 dB gain, SOT89	RFS	Released	3.4.1
BGA3018	Extreme broadband amplifier, 18 dB gain, SOT89	RFS	Released	3.4.1
NEW: upstream VGA for Docsis 3.0				
BGA3031	5 - 85 MHz high-linearity variable-gain amplifier, 58 dB gain range	RFS	Released	3.4.1
NEW: LNAs for WLAN				
BGU7224	2.4 GHz LNA for WLAN, 802.11b/g/n	DEV	Q4 2013	3.4.1
BGU7258	5.8 GHz LNA for WLAN, 802.11a/n/ac	DEV	Q4 2013	3.4.1
NEW: LNAs for wireless infrastructures				
BGU8051	LNA 900 MHz - from 0.5 to 1.5 GHz, 0.43 NF	RFS	Released	3.4.1
BGU8052	LNA 1.9 GHz - from 1.5 and 2.5 GHz, 0.52 NF	RFS	Released	3.4.1
BGU8053	LNA 2.5 GHz - from 2.3 and 2.8 GHz, 0.63 NF	RFS	Released	3.4.1
NEW: VGA for wireless infrastructures				
BGA7352	10 - 200 MHz high-linearity Si variable gain amplifier; 31.5 dB gain range	CQS	Q4 2013	3.4.1
NEW: Downconverters for satellite				
TFF1024HN	Downconverter with PLL/VCO for VSAT, eight different Ku sub-bands with one crystal	CQS	Q4 2013	3.4.1
TFF1012HN	Downconverter with PLL/VCO for Satellite LNBS	CQS	Q4 2013	3.4.1
NEW: CATV power doublers				
CGD982LC	1 GHz power doubler, 22 - 24 dB, 48 dBmV	RFS	Released	3.6.3
CGD985LC	1 GHz power doubler, 24 - 26 dB, 48 dBmV	RFS	Released	3.6.3
CGD1042L	1 GHz power doubler, 22 - 24 dB, 54 dBmV	RFS	Released	3.6.3
NEW: RF Power transistors for base stations				
BLF6H10L(S)-160	Gen6 ceramic high-voltage LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1
BLF7G10L(S)-250	Gen7 ceramic LDMOS transistor for GSM, WCDMA & LTE applications	RFS	Released	3.7.1
BLF7G21LS-160	Gen7 ceramic LDMOS transistor for CDMA applications	RFS	Released	3.7.1
BLF7G27L-135	Gen7 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF7G27L-200PB	Gen7 ceramic push-pull LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G10L(S)-160	Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G10LS-160V	Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G10LS-270	Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G10LS-270(G)V	Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLF8G19LS-170BV	Gen8 VBW ceramic LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1

Type	Application/description	Expected status June 2013	Planned release	Chapter
BLF8G20LS-200V	Gen8 ceramic LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1
BLF8G20LS-260A	Gen8 ceramic asymmetrical Doherty LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1
BLF8G20L(S)-220	Gen8 ceramic LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1
BLF8G20LS-400P(G)V	Gen8 ceramic LDMOS transistor for GSM & LTE applications	RFS	Released	3.7.1
BLF8G22LS-140	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G22LS-200(G)V	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLF8G22LS-220	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G22LS-240	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G22LS-270	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G22LS-270(G)V	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLF8G22LS-310AV	Gen8 ceramic asymmetrical Doherty LDMOS transistor for Multi band applications	DEV	Q3 2013	3.7.1
BLF8G24L(S)-200P	Gen8 ceramic push-pull LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G27LS-100V	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G27LS-100P	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G27LS-140	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G27LS-140V	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications	RFS	Released	3.7.1
BLF8G27LS-150(G)V	Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLC8G27LS-160AV	Gen8 ceramic asymmetrical Doherty LDMOS transistor for Multi band applications	DEV	Q3 2013	3.7.1
BLM7G22S-60PB(G)	Gen7 LDMOS MMIC for WCDMA applications (gull-wing)	RFS	Released	3.7.1
BLP7G07S-140P(G)	Gen7 OMP push-pull LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLP7G22-05	Gen7 OMP LDMOS transistor general purpose applications	RFS	Released	3.7.1
BLP7G22-10	Gen7 OMP LDMOS transistor general purpose applications	RFS	Released	3.7.1
BLP8G10S-45P(G)	Gen7 OMP push-pull LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing)	RFS	Released	3.7.1
BLP8G21S-160PV	Gen8 OMP push-pull LDMOS transistor for GSM, TDSCDMA applications	DEV	Q3 2013	3.7.1
BLP8G22S-60P(G)	Gen8 OMP push-pull LDMOS transistor for Multi applications	DEV	Q3 2013	3.7.1

NEW: RF power LDMOS transistors for 1 - 1600 MHz (UHF/VHF/ISM)

BLF10H6600P(S)	Gen6 ceramic push-pull LDMOS transistor for ISM applications	RFS	Released	3.7.2
BLF174XR(S)	XR ceramic push-pull LDMOS transistor for ISM applications	RFS	Released	3.7.2
BLF25M612(G)	Gen6 ceramic LDMOS driver transistor for 2.45 GHz ISM applications (gull-wing)	DEV	Q3 2013	3.7.2
BLF574XR(S)	XR ceramic push-pull LDMOS transistor for ISM applications	RFS	Released	3.7.2
BLF644P	Ceramic LDMOS transistor for microwave, broadcast/ISM applications	DEV	Q3 2013	3.7.2
BLF988(S)	Ceramic push-pull LDMOS transistor for microwave, broadcast & ISM applications	RFS	Released	3.7.2
BLP05M7200	Gen7 OMP LDMOS transistor for broadcast & ISM applications	DEV	Q3 2013	3.7.2
BLP15M7160P	Gen7 OMP LDMOS transistor for broadcast & ISM applications	DEV	Q3 2013	3.7.2
BLP25M710	Gen7 OMP LDMOS driver transistor for broadcast & ISM applications	DEV	Q3 2013	3.7.2

NEW: RF power LDMOS transistors for L-band

BLL6G1214L(S)-250	Gen6 ceramic LDMOS transistor for L-band applications	DEV	Q3 2013	3.7.2
BLL6H1214LS-500	Gen6 high-voltage ceramic LDMOS transistor for L-band applications	DEV	Q3 2013	3.7.2

NEW: RF power LDMOS transistors for S-band

BLS7G2729L(S)-350P	Gen7 ceramic push-pull LDMOS transistor for S-band radar applications	DEV	Q3 2013	3.7.2
BLS7G2730L(S)-200P	Gen7 ceramic push-pull LDMOS transistor for S-band radar applications	RFS	Released	3.7.2
BLS7G3135L(S)-200	Gen7 ceramic LDMOS S-band radar power transistor	DEV	Q3 2013	3.7.2
BLS7G3135L(S)-350P	Gen7 ceramic push-pull LDMOS transistor for S-band radar applications	DEV	Q3 2013	3.7.2

NEW: Gallium Nitride (GaN) RF power amplifiers

CLF1G0035(S)-50	Gen1 ceramic GaN broadband amplifier	DEV	Q1 2014	3.7.4
CLF1G0035(S)-100	Gen1 ceramic GaN broadband amplifier	DEV	Q1 2014	3.7.4
CLF1G0035(S)-100P	Gen1 ceramic GaN push-pull broadband amplifier	DEV	Q2 2014	3.7.4
CLF1G0035(S)-200P	Gen1 ceramic GaN push-pull broadband amplifier	DEV	Q2 2014	3.7.4
CLF1G0060(S)-10	Gen1 ceramic GaN broadband driver amplifier	DEV	Q2 2014	3.7.4
CLF1G0060(S)-30	Gen1 ceramic GaN broadband driver amplifier	DEV	Q2 2014	3.7.4

NEW: Low power wireless microcontrollers and networking stacks

JNS161-001	2.4 - 2.4835 GHz Single chip RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS164-001	2.4 - 2.4835 GHz Single chip JenNet-IP & RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS168-001	2.4 - 2.4835 GHz single chip JenNet-IP & ZigBee & RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS168-001-M00	2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS168-001-M03	2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS168-001-M05	2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4	RFS	Released	3.8
JNS168-001-M06	2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4	RFS	Released	3.8

3.2 RF diodes

3.2.1 Varicap diodes

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

Why choose NXP's varicap diodes:

- ▶ Reference designs for TV and radio tuning
- ▶ Direct matching process
- ▶ Small tolerances
- ▶ Short lead time
- ▶ Complete portfolio covering broad range of frequencies and packages (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
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

* Includes special design for FM car radio (CREST-IC:TEF6860)

^ Includes special design for mobile phone tuner ICs

Type of connection:

CC:

SG:

common cathode

single

UHF varicap diodes

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)	(Ω)								
Unmatched																			
BB174	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	
BB174LX	SOD882D	1.95	2.1	2.22	28	8.45	9	10.9	1	28	0.65	-	470	30	2	1	28	5	
Unmatched																			
BB135	SOD323	1.7	-	2.1	28	8.9	-	12	0.5	28	-	0.75	470	9	-	-	-	-	

Bold = highly recommended product

VHF varicap diodes

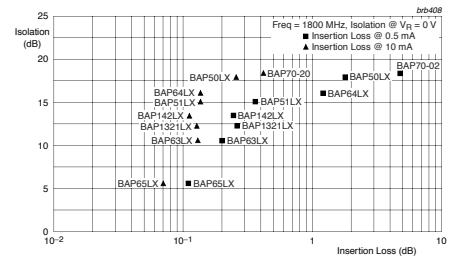
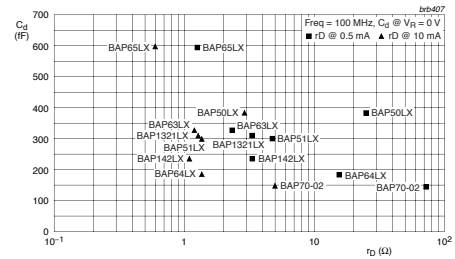
Type	Package	@ f = 1 MHz									r _s typ (Ω)	r _s max (Ω)	@ f = (MHz)	@ C _d = (pF)	ΔC _d /C _d	@ V ₁ = (V)	@ V ₂ = (V)	@ N _s =
		C _d min	C _d typ	C _d max	@ V _R = (V)	C _{d1} /C _{d2} min	C _{d1} /C _{d2} typ	C _{d1} /C _{d2} max	@ V ₁ = (V)	@ V ₂ = (V)								
		(pF)	(pF)	(pF)	(V)				(V)	(V)								
Unmatched																		
BB170	SOD323	2.4	2.6	2.75	28	14.5	15	-	1	28	-	0.9	100	12	2	0.5	28	10
BB171	SOD323	2.48	2.7	2.89	28	20.6	22	-	1	28	1	1.2	100	30	2	1	28	10
BB172	SOD323	2.361	2.6	2.754	28	13.5	15	-	1	28	0.65	0.8	100	30	2	1	28	10
BB173	SOD523	2.361	2.6	2.754	28	13.5	15	-	1	28	0.65	0.8	100	30	2	1	28	10
BB173LX	SOD882D	2.36	2.6	2.75	28	13.5	15	-	1	28	0.7	-	470	30	2	1	28	5
BB175	SOD523	2.48	2.7	2.89	28	20.6	22	-	1	28	1	1.2	100	30	2	1	28	10
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	-	-	-	-
BBY40	SOT23	4.3	-	6	25	5	-	6.5	3	25	-	0.7	200	25	-	-	-	-

3.2.2 PIN diodes

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

Why choose NXP's PIN diodes:

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



For more information: www.nxp.com/pindiodes

PIN diodes: typical r_D @ 1 mA ≤ 2, switching diodes

Type	Package	Number of diodes	Config	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 max (pF)	C _d typ (pF)	C _d max (pF)	C _d typ (pF)	C _d max (pF)
BAP65LX	SOD882D	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	SOD882D	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 diode: selection on isolation and insertion loss in SOD882D

Type	ISL (isolation)			IL (Insertion loss)																	
	f = 900 MHz	f = 1800 MHz	f = 2450 MHz	f = 900 MHz						f = 1800 MHz						f = 2450 MHz					
	VR = 0 V	VR = 0 V	VR = 0 V	IF = 0.5 mA	IF = 1 mA	IF = 10 mA	IF = 100 mA	IF = 0.5 mA	IF = 1 mA	IF = 10 mA	IF = 100 mA	IF = 0.5 mA	IF = 1 mA	IF = 10 mA	IF = 100 mA						
BAP65LX	10	5.5	3.9	0.09	0.06	0.06	0.05	0.09	0.07	0.07	0.06	0.1	0.08	0.08	0.07						
BAP63LX	15.9	10.5	8.3	0.2	0.17	0.12	0.11	0.2	0.17	0.13	0.11	0.21	0.19	0.15	0.15						
BAP55LX	19	14	12	0.24	0.17	0.08	0.05	0.25	0.18	0.09	0.07	0.26	0.19	0.1	0.08						
BAP1321LX	17	12	10	0.25	0.19	0.11	0.09	0.26	0.2	0.13	0.11	0.27	0.21	0.14	0.12						
BAP142LX	18	13	11	0.24	0.18	0.1	0.07	0.24	0.19	0.11	0.09	0.25	0.25	0.12	0.1						
BAP51LX	19	15	13	0.36	0.25	0.12	0.09	0.36	0.26	0.14	0.1	0.38	0.27	0.15	0.12						
BAP64LX	22	16	14	1.22	0.22	0.12	0.09	1.21	0.23	0.13	0.1	1.22	0.24	0.15	0.11						
BAP50LX	20.3	17.9	16.5	1.82	1.07	0.25	-	1.8	1.06	0.26	-	1.81	1.08	0.27	-						

Bold = highly recommended product

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

Type	Package	Number of diodes	Config	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	SOD882D	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	SOD882D	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	SOD882D	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, switching diodes

Type	Package	Number of diodes	Config	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	SOD882D	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, attenuator/switching diodes

Type	Package	Number of diodes	Config	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)
BAP64Q	SOT753	4	SR	100	100	20	40	10	20	2	3.8	0.52	0.37	-	0.23	0.35
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
BAP64LX[^]	SOD882D	1	SG	60	100	31	50	16	26	2.6	4.4	0.48	0.34	-	0.17*	0.3*

[^] = attenuator / switching diode * = @ $V_R = 20$ V

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

Type	Package	Number of diodes	Config	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		@ $V_R = 5$ 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)
BAP50-02	SOD523	1	SG	50	50	25	40	14	25	3	5	0.4	0.3	0.55	0.22	0.35
BAP50-03	SOD323	1	SG	50	50	25	40	14	25	3	5	0.4	0.3	0.55	0.2	0.35
BAP50-04	SOT23	2	SR	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5
BAP50-04W	SOT323	2	SR	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5
BAP50-05	SOT23	2	CC	50	50	25	40	14	25	3	5	0.45	0.3	0.5	0.35	0.6
BAP50-05W	SOT323	2	CC	50	50	25	40	14	25	3	5	0.45	0.35	0.6	0.3	0.5
BAP50LX	SOD882D	1	SG	50	50	26	40	14	25	3	5	0.4	0.28	0.55	0.19	0.35

PIN diodes: typical r_D @ 1 mA = 40, attenuator diodes

Type	Package	Number of diodes	Config	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 max (pF)	C_d typ (pF)
BAP70Q	SOT753	4	SR	50	100	77	100	40	50	5.4	7	0.6	0.43	-	0.25	0.3
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

SG = single
SR = series

CC = common cathode
CA = common anode

3.2.3 Band-switch diodes

Why choose NXP's band-switch diodes:

- ▶ Reliable volume supplier
- ▶ Short lead time
- ▶ Low series inductance
- ▶ Low insertion loss
- ▶ Low capacitance
- ▶ High reverse isolation

Type	Package	V_R max (V)	IF max (mA)	r_D max (Ω)	@ IF = (mA)	@ f = (MHz)	C_D max (pF)	@ V_R = (V)	@ f = (MHz)
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

3.2.4 Schottky diodes

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

Why choose NXP's Schottky diodes:

- ▶ Low diode capacitance
- ▶ Low forward voltage
- ▶ Single- and triple-isolated diode
- ▶ 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 @ IF = 1 mA	1 @ VR = 0 V
PMBD353	SOT23	Dual-series	4	30	450 @ IF = 1 mA	1 @ VR = 0 V
PMBD354^	SOT23	Dual-series	4	30	450 @ IF = 1 mA	1 @ VR = 0 V
1PS76SB17	SOD323	Single	4	30	450 @ IF = 1 mA	1 @ VR = 0 V
1PS66SB17	SOT666	Triple-isolated	4	30	450 @ IF = 1 mA	1 @ VR = 0 V
1PS79SB17	SOD523	Single	4	30	450 @ IF = 1 mA	1 @ VR = 0 V
1PS88SB82	SOT363	Triple-isolated	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS70SB82	SOT323	Single	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS70SB84	SOT323	Dual-series	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS70SB85	SOT323	Dual c.c	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS70SB86	SOT323	Dual c.a.	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS66SB82	SOT666	Triple-isolated	15	30	340 @ IF = 1 mA	1 @ VR = 0 V
1PS10SB82	SOD882	Single	15	30	340 @ IF = 1 mA	1 @ VR = 0 V

Bold = highly recommended product

^ Diodes have matched capacitance

3.3 RF bipolar transistors

3.3.1 Wideband transistors

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

Why choose NXP's wideband transistors:

- ▶ Broad portfolio (1st - 7th generation)
- ▶ Short lead time
- ▶ 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 seven generations of RF wideband transistors. A group of transistors having the same I_C and similar f_T represents a curve. The curve number matches the products in the selection tables of this section (third column of each table), detailing their RF characteristics.

Wideband transistor line-ups per frequency

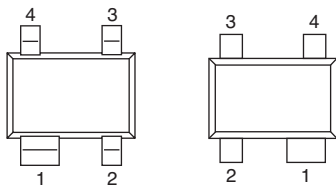
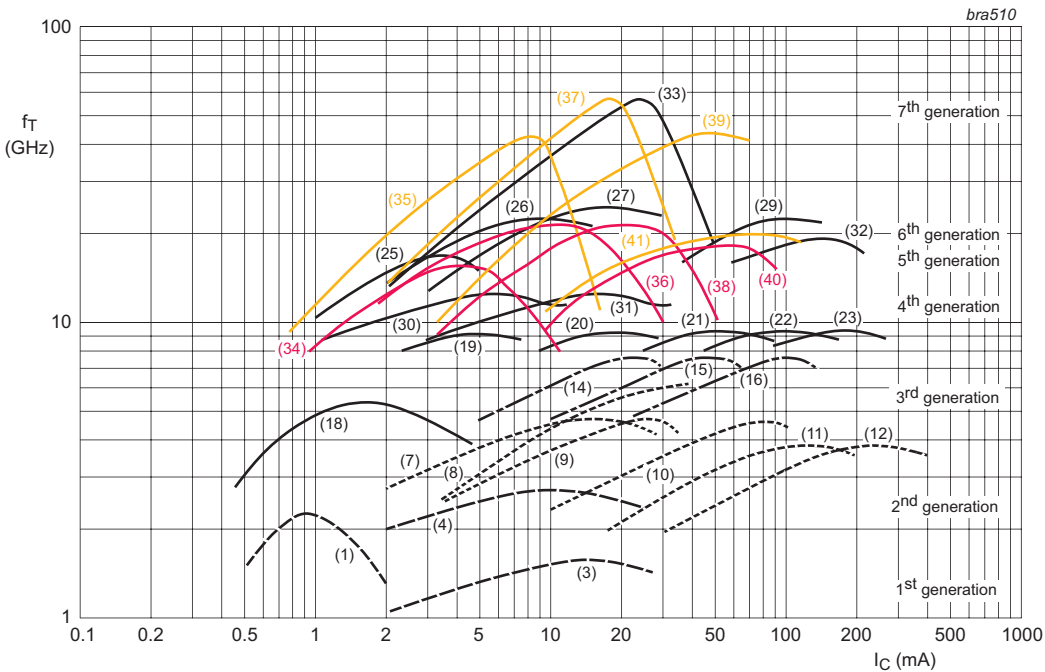


Figure 1

Figure 2

Pin	Description
Type (Figure 1)	
1	Collector
2	Base
3	Emitter
4	Emitter
Type/X (Figure 1)	
1	Collector
2	Emitter
3	Base
4	Emitter
Type/XR (Figure 2)	
1	Collector
2	Emitter
3	Base
4	Emitter

Wideband transistors

Function	LNAs, mixers, frequency multipliers, buffers			High-linearity, high-output amplifiers and drivers			Oscillators		
	Frequency range	<6 GHz	6 – 12 GHz	12 – 18 GHz	<6 GHz	6 – 12 GHz	12 – 18 GHz	<6 GHz	6 – 12 GHz
Band Type	L, S, C	X, Ku low	Ku high, Ka	L, S, C	X, Ku low	Ku high	L, S, C	X, Ku low	Ku high, Ka
BFU610F	•	•							•
BFU630F	•	•		•			•		•
BFU660F	•			•			•		
BFU690F	•			•			•	•	
BFU725F/N1	•	•	•	•	•		•		•
BFU710F	•	•	•	•			•		•
BFU730F	•	•	•	•	•	•	•		•
BFU760F	•	•		•	•		•		
BFU790F	•			•			•		

Red = application note available on NXP.com

RF power transistors for portable equipment (VHF)

Type	Package	V _{CEO} (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 generations 1 to 3

Type	Generation	Curve	Package	f _T (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)
BFS17	1	3	SOT23	1	15	25	300	NPN	-	-	-	-	-	-	-	-	4.5	500	2	5	-	-	-	-
BFS17W	1	3	SOT323	1.6	15	50	300	NPN	-	-	-	-	-	-	-	-	4.5	500	2	5	-	-	-	-
BFT25	1	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	18	SOT143B	5	5	6.5	32	NPN	-	-	-	-	18	1000	0.5	1	1.8	1000	0.5	1	-	-	-	-
BFG25AW	2	18	SOT343N	5	5	6.5	500	NPN	-	-	-	-	16	2000	0.5	1	2	1000	1	1	-	-	-	-
BFG25AW/X	2	18	SOT343N	5	5	6.5	500	NPN	16	1000	0.5	1	8	2000	0.5	1	2	1000	1	1	-	-	-	-
BFG31	2	10	SOT223	5	-15	-100	1000	PNP	16	500	-70	-10	12	800	-70	-10	-	-	-	-	-	-	-	-
BFG35	2	11	SOT223	4	18	150	1000	NPN	15	500	100	10	11	800	100	10	-	-	-	-	-	-	-	-
BFG92A/X	2	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	10	SOT223	5.5	15	100	1000	NPN	16	500	70	10	12	800	70	10	-	-	-	-	-	-	-	-
BFG149	2	10	SOT89	5	-15	-100	1000	PNP	12	500	-50	-10	-	-	-	-	3.75	500	-50	-10	-	-	-	-
BFG18A	2	11	SOT89	4	18	150	1000	NPN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BFG19	2	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	10	SOT23	5	15	100	500	NPN	-	-	-	-	11.5	800	30	6	3.5	800	30	6	-	-	-	-
BFR92A	2	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	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	4	SOT23	2.8	15	25	300	NPN	-	-	-	-	13.5	800	14	10	2.5	800	2	5	-	-	-	-
BFS25A	2	18	SOT323	5	5	6.5	32	NPN	-	-	-	-	13	1000	0.5	1	1.8	1000	1	1	-	-	-	-
BFT25A	2	18	SOT23	5	5	6.5	32	NPN	-	-	-	-	15	1000	0.5	1	1.8	1000	0.5	1	-	-	-	-
BFT92	2	7	SOT23	5	-15	-25	300	PNP	18	500	-14	-10	-	-	-	-	2.5	500	-5	-10	-	-	-	-
BFT92W	2	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	9	SOT23	5	-12	-35	300	PNP	16.5	500	-30	-5	-	-	-	-	2.4	500	-10	-5	-	-	-	-
BFT93W	2	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	16	SOT223	7	15	150	1000	NPN	16	500	100	10	12	800	100	10	-	-	-	-	-	-	-	-
BFG198	3	15	SOT223	8	10	100	1000	NPN	18	500	50	8	15	800	50	8	-	-	-	-	-	-	-	-
BFG590	3	22	SOT143B	5	15	200	400	NPN	13	900	80	4	7.5	2000	80	4	-	-	-	-	-	-	-	-
BFG590/X	3	22	SOT143B	5	15	200	400	NPN	13	900	80	4	7.5	2000	80	4	-	-	-	-	-	-	-	-
BFG591	3	22	SOT223	7	15	200	2000	NPN	13	900	70	12	7.5	2000	70	12	-	-	-	-	-	-	-	-
BFG67	3	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	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	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	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	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3	1000	45	10
BFG94	3	8	SOT223	6	12	60	700	NPN	-	-	-	-	13.5	1000	45	10	2.7	500	45	10	3</			

RF wideband transistors generations 4 and 4.5

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)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	PL ₁ (dB) (typ) (dBmW)	@ V_{CE} = (V)	@ f = (MHz)	@ I_C = (mA)	IP3 (typ) (dBm)	@ I_C = (mA)	@ V_{CE} = (V)
BFG505	4	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	19	SOT363A	9	8	18	500	NPN	10	2000	5	3	1.1	900	1	3	1.9	2000	5	3	-	-	-	-	-	-	-
BFM520	4	20	SOT363A	9	8	70	1000	NPN	9	2000	20	3	1.2	900	5	3	1.9	2000	5	3	-	-	-	-	-	-	-
BFQ540	4	21	SOT89	9	15	120	1,200	NPN	-	-	-	-	1.9	900	40	8	-	-	-	-	-	-	-	-	-	-	-
BFQ67	4	14	SOT23	8	10	50	300	NPN	8	2000	15	8	1.7	1000	15	8	2.7	2000	15	8	-	-	-	-	-	-	-
BFR505	4	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	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	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	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	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	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	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	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	20	SOT23	8	10	50	360	NPN	9.5	2000	15	6	1.4	1000	5	6	2	2000	5	6	-	-	-	-	-	-	-
PBR951	4	21	SOT23	8	10	100	365	NPN	8	2000	30	6	1.3	1000	5	6	2	2000	5	6	-	-	-	-	-	-	-
PRF947	4	20	SOT323	8.5	10	50	250	NPN	10	2000	15	6	1.5	1000	5	6	2.1	2000	5	6	-	-	-	-	-	-	-
PRF949	4	20	SOT416	9	10	50	150	NPN	10	2000	15	6	1.5	1000	5	6	2.1	2000	5	6	-	-	-	-	-	-	-
PRF957	4	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	SOT343R	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 generations 5 to 7

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)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	PL ₁ (dB) (typ) (dBmW)	@ V_{CE} = (V)	@ f = (MHz)	@ I_C = (mA)	IP3 (typ) (dBm)	@ I_C = (mA)	@ V_{CE} = (V)
BFG21W	5	32	SOT343R	-	4.5	500	600	NPN	10	1900	1	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BFG403W	5	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	10	6	1	1
BFG410W	5	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	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	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	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	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
BFU610F	6	34	SOT343F	40	5	10	50	NPN	21	5800	8	2	0.75	2400	1	2	1.4	5800	1	2	-	-	-	-	14	8	5
BFU630F	6	36	SOT343F	40	5	30	130	NPN	28	2400	25	2	0.58	1500	5	2	0.73	2400	5	2	-	-	-	-	23	25	5
BFU660F	6	38	SOT343F	40	5	70	200	NPN	28.5	1500	60	2	0.6	1500	20	2	0.75	2400	20	2	-	-	-	-	30	60	5
BFU690F	6	40	SOT343F	40	5	100	300	NPN	25.6	1500	90	2	0.7	1500	50	2	0.9	2400	50	2	-	-	-	-	35	90	5
BFU710F	7	35	SOT343F	70	2.8	10	30	NPN	16.5	12000	8	2	0.9	5800	2	2	1.5	12000	2	2	-	-	-	-	14.5	8	2
BFU725F/N1	7	37	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
BFU730F	7	33	SOT343F	70	2.8	30	130	NPN	18.5	5800	25	2	0.56	2400	5	2	0.8	5800	5	2	-	-	-	-	20.5	25	2
BFU730LX	7	-	SOT883C	53	3.0	30	160	NPN	13.3	5800	25	2	0.55	2400	5	2	0.8	5800	5	2	-	-	-	-	26	12.4	2.3
BFU760F	7	39	SOT343F	70	2.8	70	220	NPN	25	2400	60	2	0.5	1500	20	2	0.6	2400	20	2	-	-	-	-	23	60	2
BFU790F	7	41	SOT343F	70	2.8	100	250	NPN	20.4	2400	90	2	0.56	1500	50	2	0.7	2400	50	2	-	-	-	-	24	90	2
BFU768F	7	39	SOT343F	70	2.8	70	220	NPN	13	5800	10.8	2.1	0.5	2400	10.8	2.1	0.7	580									

3.4 RF ICs

3.4.1 RF MMIC amplifiers and mixers

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

Why choose NXP's RF MMIC amplifiers and mixers:

- ▶ Reduced RF component count
- ▶ Easy circuit design-in
- ▶ Reduced board size
- ▶ Short time-to-market
- ▶ Broad portfolio
- ▶ Volume delivery
- ▶ Short lead time



General-purpose wideband amplifiers (50 Ω)

Type	Package	V _{cc} (V)	I _s (mA)	G _p [dB]			P ₁ (1dB) [dBm]			NF [dB]			IP _{3o} [dBm]		Z _{out} [Ohm]	External Inductor	
				250 MHz	500 MHz	750 MHz	250 MHz	500 MHz	750 MHz	250 MHz	500 MHz	750 MHz	250 MHz	750 MHz			250 MHz
BGA2870	SOT363	2.5	15.6	31.2	31.1	31.0	5.0	4.0	4.0	3.1	3.2	3.7	15.0	13.0	50	N	
BGA2874	SOT363	2.5	16.0	31.1	31.0	30.6	5.0	4.0	4.0	3.0	3.1	3.4	19.0	17.0	50	N	
				250 MHz	950 MHz	2150 MHz	250 MHz	950 MHz	2150 MHz	250 MHz	950 MHz	2150 MHz	250 MHz	950 MHz	2150 MHz		
BGA2800	SOT363	3	10.5	19.9	20.5	20.2			-2.0	3.7	3.6	3.7	11.0	8.0	50	N	
BGA2803	SOT363	3	5.8	23.6	23.4	23.0	-6.0	-6.0	-8.0	3.7	3.6	3.4	5.0	2.0	50	N	
BGA2748	SOT363	3	5.7	17.6	21.9	17.8		-9.2	-10.9	1.7	1.9	2.4	-1.9	-1.4	50	N	
BGA2714	SOT363	3	4.6	20.7	20.4	20.8	-7.8	-7.9	-9.0	2.4	2.2	3.0	2.1	0.0	50	N	
BGA2801	SOT363	3	14.3	22.2	22.4	23.0	2.0	2.0	0.0	3.8	3.8	3.9	14.0	9.0	50	N	
BGA2802	SOT363	3	12.5	25.6	25.8	25.5	3.0	1.0	-3.0	4.2	4.1	3.6	13.0	6.0	50	N	
BGA2815	SOT363	3	18.2	25.8	25.3	25.2	8.0	5.0	1.0	3.7	3.8	3.7	17.0	10.0	50	N	
BGA2817	SOT363	3	20.0	24.5	24.7	25.1	6.0	6.0	5.0	3.9	3.9	3.8	18.0	15.0	50	N	
BGM1012	SOT363	3	14.6	19.6	20.0	20.4		6.0	3.4	4.9	4.8	4.9	18.0	13.0	50	Y	
BGA2816	SOT363	3	22.0	31.9	32.0	26.9	7.0	5.0		3.2	3.2	3.2	15.0	8.0	50	N	
BGA2818	SOT363	3	19.9	30.1	29.8	30.0	7.0	6.0	4.0	3.5	3.3	3.3	18.0	14.0	50	N	
BGA2850	SOT363	5	9.1	23.2	24.0	22.9			-2.0	4.2	4.1	4.0	10.0	8.0	50	N	
BGA2851	SOT363	5	7.0	23.3	24.7	25.2	-3.0	-4.0	-5.0	4.0	3.2	3.0	8.0	5.0	50	N	
BGA2715	SOT363	5	4.3	15.6	21.5	23.3		-8.0	-8.5	2.6	2.6	3.1	2.3	0.6	50	N	
BGA2717	SOT363	5	8.0	20.0	24.2	25.1		-2.6	-3.1	2.3	2.3	2.9	10.0	6.3	50	N	
BGA2712	SOT363	5	12.3	21.1	21.2	22.0		0.2	-2.0	4.2	3.9	4.3	11.0	6.0	50	N	
BGA2866	SOT363	5	17.4	23.2	23.9	24.3	4.0	4.0	3.0	3.9	3.8	3.9	17.0	12.0	50	N	
BGA2867	SOT363	5	21.7	26.4	27.2	27.2	6.8	6.5	4.9	3.7	3.8	3.7	18.8	14.1	50	N	
BGA2709	SOT363	5	23.5	22.5	22.7	23.0		8.3	5.7	4.3	4.0	5.1	22.0	14.0	50	Y	
BGA2716	SOT363	5	15.9	22.4	22.8	22.9		8.9	6.1	5.5	5.3	5.5	22.2	15.9	50	Y	
BGA2776	SOT363	5	24.4	22.9	23.2	23.2		7.2	6.0	4.7	4.9	5.3	18.6	14.4	50	Y	
BGA2865	SOT363	5	26.4	30.9	32.2	29.6	9.0	8.0	2.0	3.8	3.9	4.0	19.0	10.0	50	N	
BGA2869	SOT363	5	22.0	30.9	30.9	32.2	8.8	8.8	7.6	3.8	3.9	4.0	20.0	19.0	50	N	
BGM1013	SOT363	5	27.5	35.3	35.6	32.1		13.0	8.1	4.6	4.6	4.9	22.7	18.6	75	Y	
BGM1014	SOT363	5	21.0	30.2	32.2	34.3		11.2	5.7	4.3	4.2	4.2	20.5	15.1	75	Y	

Products by function

General-purpose LNA MMICs

Type	Package	V _{cc} (V)	I _s (mA)	S ₂₁ ² [dB]					P ₁ (1dB) [dBm]			NF _{min} [dB]					IP _{3o} [dBm]					ESD protection kV HBM			
				450 MHz	900 MHz	1800 MHz	2400 MHz	5800 MHz	450 MHz	900 MHz	2400 MHz	450 MHz	900 MHz	1800 MHz	2400 MHz	5800 MHz	450 MHz	900 MHz	1800 MHz	2400 MHz	5800 MHz				
BGA2001	SOT343R	2.5	4.0		18.0	14.0						1.3	1.3					-7.4	-4.5						
BGA2002 ⁽¹⁾	SOT343R	2.5	4.0		18.0	14.0						1.3	1.3					-7.4	-4.5						
BGA2003	SOT343R	2.5	10.0		19.0	14.0						1.8	1.8					-6.5	-4.8						
BGA2011	SOT363	3	15.0		19.0							1.5						10.0							
BGA2012	SOT363	3	7.0		16.0								1.7					10.0							
BGU7003	SOT891	2.5	5.0		20.0	15.2	11.4					0.6	0.8	1.5											1
BGU7003W	SOT886	2.5	5.0		20.0	15.2	11.4					0.6	0.8	1.5											1
BGU6101	SOT1209	3	1.5	13.0	12.0		13.0 ⁽²⁾			-11.0	-11.5	-6.5 ⁽²⁾	0.8	0.8		1.3 ⁽²⁾		-2.5	-2.0			6.5 ⁽²⁾	3		
BGU6102	SOT1209	3	3.0	18.5	16.5		14.0 ⁽³⁾			-5.0	-5.5	0 ⁽³⁾	0.7	0.8		1.2 ⁽³⁾		5.5	6.0			11.5 ⁽³⁾	3		
BGU6104	SOT1209	3	6.0	22.5	18.5		12.8 ⁽⁴⁾			0.5	0.5	6.5 ⁽⁴⁾	0.8	0.8		1.1 ⁽⁴⁾		11.0	12.0			18.5 ⁽⁴⁾	3		

Bold = highly recommended product

⁽¹⁾ AEC-Q101 qualified ⁽²⁾ I_{cc} 3 mA ⁽³⁾ I_{cc} 6 mA ⁽⁴⁾ I_{cc} 12 mA

SiGe:C LNAs (for GPS and others)

		@ 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 $f_1 = 1713 \text{ MHz}, f_2 = 1851 \text{ MHz}$															
		V_{cc}		I_{cc}			$ s_{21} ^2$			NF	$P_{L(1dB)}$						IP ₃															
		(V)		(mA)			(dB)			(dB)	(dBm)						(dBm)															
		Min	Max	Min	Typ	Max	Min	Typ	Max	Typ	$V_{cc} = 1.5 \text{ V, Min}$	$V_{cc} = 1.5 \text{ V, Typ}$	$V_{cc} = 1.8 \text{ V, Min}$	$V_{cc} = 1.8 \text{ V, Typ}$	$V_{cc} = 2.2 \text{ V, Min}$	$V_{cc} = 2.2 \text{ V, Typ}$	$V_{cc} = 2.5 \text{ V, } I_{cc} = 5 \text{ mA}$	$V_{cc} = 2.85 \text{ V, Min}$	$V_{cc} = 2.85 \text{ V, Typ}$	$V_{cc} = 1.5 \text{ V, Min}$	$V_{cc} = 1.5 \text{ V, Typ}$	$V_{cc} = 1.8 \text{ V, Min}$	$V_{cc} = 1.8 \text{ V, Typ}$	$V_{cc} = 2.2 \text{ V, Min}$	$V_{cc} = 2.2 \text{ V, Typ}$	$V_{cc} = 2.5 \text{ V, } I_{cc} = 5 \text{ mA}$	$V_{cc} = 2.85 \text{ V, Min}$	$V_{cc} = 2.85 \text{ V, Typ}$				
BGU7003	SOT891	2.2	2.85	3	-	15	16	18.3	20	0.8	-	-	-	-	-	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
BGU7004 [^]	SOT886	1.5	2.85	-	4.5	-	-	16.5 / 17.5*	-	0.9	-	-	-14	-11	-	-	-11	-8	-	-	-	5	9	-	-	-	-	-	5	12		
BGU7005	SOT886	1.5	2.85	-	4.5	-	-	16.5 / 17.5*	-	0.9	-	-	-14	-11	-	-	-11	-8	-	-	-	5	9	-	-	-	-	5	12			
BGU7007	SOT886	1.5	2.85	-	4.8	-	-	18.5 / 19.5*	-	0.9	-	-	-15	-12	-	-	-14	-11	-	-	1	4	-	-	-	-	-	2	5			
BGU7008 [^]	SOT886	1.5	2.85	-	4.8	-	-	18.5 / 19.5*	-	0.9	-	-	-15	-12	-	-	-14	-11	-	-	1	4	-	-	-	-	-	2	5			
BGU8006	WL-CSP	1.5	3.1	-	4.1	-	-	17.5 / 19.0	-	0.6 [#]	-	-	-	-10	-	-	-	-8	-	-	-	5	-	-	-	-	-	-	8			
BGU8007	SOT886	1.5	2.2	-	4.6	-	-	19.0 / 20.5*	-	0.75 [#]	-15	-12	-	-	-13	-10	-	-	1	4	-	-	2	5	-	-	-	-				
BGU8009	SOT1230	1.5	3.1	-	4.4	-	-	17.6 / 20*	-	0.65 [#]	-	-	-	-10	-	-	-	-7	-	-	-	3	-	-	-	-	-	-	6			
BGU8010	SOT1230	1.5	3.1	-	3.0	-	-	16.1 / 17*	-	0.70 [#]	-	-	-	-12	-	-	-	-9	-	-	-	0	-	-	-	-	-	-	3			
BGU8011	SOT1230	1.5	3.1	-	4.4	-	-	16.3 / 17.5*	-	0.65 [#]	-	-	-	-8	-	-	-	-6	-	-	-	6	-	-	-	-	-	-	7			

* dB with/without jammer

[^] AEC-Q101 qualified (some limitations apply)

[#] Evaluation board losses excluded

LNAs for set-top boxes (75 Ω)

Type	Package	Frequency range (MHz)	Mode	@		Gain ⁽¹⁾ (dB)	NF (dB)	$P_{L(1dB)}$ (dBm)	OIP3 (dBm)	FL ⁽²⁾ (dB)	RL _{out} (dB)	RL _{in} (dB)
				V_{cc}	I_{cc}							
				(V)	(mA)							
BGU7031	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
BGU7032	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
			Bypass	5	4	-2	2.5	-	29	-0.2	8	8
BGU7033	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
			G _p 5 dB	5	43	5	6	9	29	-0.2	12	17
			Bypass	5	4	-2	2.5	-	29	-0.2	8	8
BGU7041	SOT363	40 - 1000	G _p 10 dB	3.3	38	10	4	12	29	-0.2	12	21
BGU7042	SOT363	40 - 1000	G _p 10 dB	3.3	38	10	4	12	29	-0.2	12	21
			Bypass	3.3	3	-2	2.5	-	29	-0.2	10	10
BGU7044	SOT363	40 - 1000	G _p 14 dB	3.3	34	14	2.8	13	29	-0.2	12	20
BGU7045	SOT363	40 - 1000	G _p 14 dB	3.3	34	14	2.8	13	29	-0.2	12	20
			Bypass	3.3	3	-2	2.5	-	27	-0.2	10	9

LNAs for wireless infrastructures (50 Ω)

Type	Package	@ V_{cc}	@ I_{cc}	frange	frange	G _{ass}	NF	$P_{L(1dB)}$	IP ₃ _O	RL _{in}	RL _{out}
		[typ]	[typ]	[min]	[max]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(dB)
BGU7051	SOT650-1	3.3	65	500	750	23.5	0.6	17	32	27.5	18
				750	850	21.5	0.63	16.5	32	26	17.5
				900	1500	21	0.65	16.5	33	24.5	18
BGU7052	SOT650-1	3.3	80	1500	1750	21.5	0.76	15.5	37	23	22
				1850	1900	20	0.76	14.5	35.5	23	22
				1950	2500	19.7	0.79	14.5	35	22	21
BGU7053	SOT650-1	3.3	90	2300	2500	18.5	0.85	13.5	36	23	19.5
				2700	2800	17.5	0.9	13	36	26	23
BGU7060	SOT1301AA	5	200	700	800	3	21	11	25.5	20	19
						12	15	7.5	22.5	20	19
						18	7.2	-7	4.5	20	19
						35	1	-12.5	2.5	24	19
BGU7061	SOT1301AA	5	200	800	950	3	21	11	25.5	20	19
						12	15	7.5	22.5	20	19
						18	7.2	-7	4.5	20	19
						35	1	-12.5	2.5	24	19

Bold red = new, highly recommended product

LNAs for wireless infrastructures (50 Ω)

Type	Package	@ V _{cc}	@ I _{cc}	frange	frange	G _{ass}	NF	P _{L(1dB)}	IP _{3o}	RL _{in}	RL _{out}
		[typ]	[typ]	[min]	[max]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(dB)
BGU7062	SOT1301AA	5	185	1710	1785	3	20.6	10.7	25.6	23	16
						12	15	5.4	21	23	16
						18	9.3	-7	3.4	23	16
						35	0.98	-12.8	1	26	16
BGU7063	SOT1301AA	5	190	1920	1980	18	6.4	-6.4	5.4	35	15
			230			35	1.05	-12.5	0.9	31	15
BGU8051	SOT1327	5	50	500	900	18	0.43	19.3	41	27	20
				900	900						
				900	1500						
BGU8052	SOT1327	5	47	1500	1900	18	0.52	19	39	27	12
				1900	1900						
				1900	2300						
BGU8053	SOT1327	5	51	2300	2500	18	0.63	20	39	23	12
				2500	2500						
				2500	5000						
BGU7224	SOT1189	3.3	12	2400	2500	14	1.0	4	8	10	12
BGU7258	SOT1189	3.3	12	5000	6000	12	1.4	0	7	10	12

General-purpose medium power amplifiers

Type	Package	@ V _{cc}	@ I _{cc}	Frequency range	RF input frequency	Gain	P _{L(1dB)}	IP _{3o}	NF
		[typ]	[typ]	[min]	[max]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dB)	(dBm)	(dBm)	(dB)
BGA6289	SOT89	4.1	84	100-3000	900	15.0	17.0	31.0	3.5
					1800	13.0	15.0	28.0	3.7
BGA6489	SOT89	5.1	78	100-3000	900	20.0	20.0	33.0	3.1
					1800	16.0	17.0	30.0	3.3
BGA6589	SOT89	4.8	81	100-3000	900	22.0	21.0	33.0	3
					1800	17.0	20.0	32.0	3.3
BGA7024	SOT89	5	110	400 - 2700	940	22.0	24.0	37.5	2.9
					1960	16.0	25.5	38.0	3.7
					2140	15.0	25.5	38.0	3.7
					2445	14.0	24.5	37.5	4.0
BGA7027	SOT89	5	165	400 - 2700	940	19.0	29.0	41.5	2.6
					1960	11.5	27.5	43.0	3.8
					2140	11.0	28.0	42.5	3.9
BGA7124	SOT908	5	140	400 - 2700	940	23.0	25.0	38.5	5.2
					1960	16.5	24.5	38.0	4.6
					2140	16.0	24.5	37.5	4.8
					2445	14.0	23.5	36.0	5.4
BGA7127	SOT908	5	180	400 - 2700	940	20.0	27.5	41.5	3.1
					1960	13.0	28.5	42.5	4.5
					2140	12.0	28.0	42.0	4.6
					2445	10.5	27.5	41.5	4.7
BGA7130	SOT908	5	450	400 - 2700	750	18.0	30.0	43.0	5.0
					2140	10.0	30.0	44.0	5.0
BGA6130	SOT908	3.6	70	400 - 2700	434	17.0	28.0	29.5	4.5
					915	14.0	29.0	30.0	4.0

Bold = highly recommended product

Bold red = new, highly recommended product

Extreme broadband amplifiers

Type	Package	Frequency range	@ V _{cc}	@ I _{cc}	Gain	NF	P1dB	OIP3	OIP2
			[typ]	[typ]					
		MHz	(V)	(mA)	(dB)	(dB)	(dBm)	(dBm)	(dBm)
BGA3012	SOT89	40 - 1006	8	110	12	3.1	21.5	40	60
			5	70	12	2.9	18.0	36	54
		5 - 300	8	110	12	3.0	23.0	40	60
			5	70	12	2.9	17.0	40	55
BGA3015	SOT89	40 - 1006	8	110	15	2.5	22.5	40	60
			5	70	15	2.3	18.0	36	55
		5 - 300	8	110	15	2.3	24.0	40	60
			5	70	15	2.3	18.0	40	55
BGA3018	SOT89	40 - 1006	8	120	18	2.1	23.5	40	60
			5	75	18	2.2	18.0	36	54
		5 - 300	8	120	18	1.9	25.0	40	60
			5	75	18	1.9	20.0	36	54

VGAs for wireless infrastructures

Type	Package	Type	@ V _{cc}	@ I _{cc}	f _{range}	f _{range}	Gp @ minimum attenuation	Attenuation range	NF	P _{L(1dB)}	IP _{3o}
			[typ]	[typ]	[min]	[max]	(dB)	(dB)	[typ]	[typ]	[typ]
			(V)	(mA)	(MHz)	(MHz)	(dB)	(dB)	(dB)	(dBm)	(dBm)
BGA7204	SOT617-3	Single	5	115	400	700	18.5	31.5	7	21	38
			5	115	700	1450	18.5	31.5	6.5	21	37.5
			5	115	1450	2100	17.5	30.5	6.5	20.5	36
			5	115	2100	2750	16.5	30	7	20	34
BGA7210	SOT617-3	Single	5	185	700	1400	30	31.5	6.5	21	39
			5	185	1400	1700	29.5	31.5	6.5	21	37
			5	185	1700	2200	29	31.5	6.5	21	35
			5	185	2200	2800	28	30.5	7	23	35
BGA7350	SOT617-1	Dual	5	245	50	250	18.5	24	6	17	43
BGA7351	SOT617-1	Dual	5	280	50	250	22	28	6	16.5	46
BGA7352	SOT617-1	Dual	5	225	10	200	24	31.5	6.5	16	45

Upstream VGA for DOCSIS 3.0

Type	Package	Type	@ V _{cc}	@ I _{cc}	f _{range}	f _{range}	Gp @ minimum attenuation	Attenuation range	NF	P _{L(1dB)}	IMD3 @ 64 dBmV
			[typ]	[typ]	[min]	[max]	(dB)	(dB)	[typ]	[typ]	[typ]
			(V)	(mA)	(MHz)	(MHz)	(dB)	(dB)	(dB)	(dBmV)	(dBc)
BGA3031	SOT662	Single	5	310	5	85	34	58	3.5	74	-70

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)	(dB)	(dB)	(dBm)	(dBc)	(dB)	(dB)	(dBm)	(dBc)	(V)	(mA)	(mW)	
BGA2031/1	SOT363	3	51	800 - 2500	24	62	11	49	23	56	13	49	3.3	77	200

⁽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)	(dB)	(dB)	(dBm)	(dB)	(dB)	(dBm)	(dB)	(dB)	(dBm)	(V)	(mA)
BGA2022	SOT363	3	6	800 - 2500	50 - 500	9	5	4	9	6	10	4	10	40

Bold = highly recommended product

Bold red = new, highly recommended product

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

3.4.2 Wireless infrastructure ICs

IQ modulators for wireless infrastructure

Type	Package	@ V _{CC}	@ I _{CC}	f _{lo} range	f _{lo}	P _o	BW _{mod}	Nflr(o) *	P _{L(1dB)}	IP2 _o	IP3 _o	SBS	CF
		[typ]	[typ]			[typ]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dBm)	(MHz)	(dBm/Hz)	(dBm)	(dBm)	(dBm)	(dBc)	(dBm)
BGX7100	SOT616-3	5	165	400 - 4000	750	-0.2	400	-159 / -158.5	11.5	71	29	55	-55
			165		910			-159 / -158.5	11.5	72	29	49	-55
			173		1840			-158.5 / -158	11.5	69	27	47	-50
			173		1960			-158.5 / -158	11.5	72.5	27	49	-48
			178		2140			-158.5 / -158	11.5	74	27	51	-45
			178		2650			-158 / -158	11.5	62	26	60	-45
			184		3650			-158 / -158	11.5	60	25	53	-43
			184		3650			-158 / -158	11.5	65	25	57	-42
BGX7101	SOT616-3	5	172	400 - 4000	750	4	650	-159 / -158.5	12	71	28	63	-51
			172		910			-159 / -158.5	12	75	28	49	-57
			180		1840			-158.5 / -158	12	71	27	55	-50
			180		1960			-158.5 / -158	12	72	27	57	-47
			178		2140			-158.5 / -158	12	75	27	63	-45
			182		2650			-158 / -158	12	65	26	50	-45
			182		3650			-158 / -158	12	65	25	57	-42
			188		3650			-158 / -158	12	65	25	57	-42

* Without modulation/with modulation

Dual mixers for wireless infrastructure

Type	Package	@ V _{CC}	@ I _{CC}	RF input frequency	RF input frequency	Local oscillator frequency	Local oscillator frequency	Second-order spurious rejection 2RF-2LO	NFSSB single-sideband	IP3 _i	G _{conv}
		[typ]	[typ]	[min]	[max]	[min]	[max]	[max]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(MHz)	(MHz)	(dBc)	(dB)	(dBm)	(dB)
BGX7220	SOT1092-2	5	330	700	950	500	1150	-60	10	26	8
BGX7221	SOT1092-2	5	365	1400	2700	1500	2500	-60	10	25.5	8.5

Bold = highly recommended product

3.4.3 Satellite LNB RF ICs

Downconverter with PLL/VCO

Type	Package	Input freq range	V _{cc}	I	G _{conv}	NF	OIP3	LO Freq	Integrated phase noise density (degrees RMS)
			(V)	(mA)	(dB)	(dB)	(dBm)	(GHz)	
TFF1012HN	SOT763-1	10.7 - 12.75	5	56	30	8	17	9.75 / 10.6	1.5
TFF1013HN	SOT763-1	10.7 - 12.75	5	56	34	8	17	9.75 / 10.6	1.5
TFF1014HN	SOT763-1	10.7 - 12.75	5	52	36	7	13	9.75 / 10.6	1.5
TFF1015HN	SOT763-1	10.7 - 12.75	5	52	39	7	13	9.75 / 10.6	1.5
TFF1017HN	SOT763-1	10.7 - 12.75	5	52	42	7	13	9.75 / 10.6	1.5
TFF1018HN	SOT763-1	10.7 - 12.75	5	52	45	7	13	9.75 / 10.6	1.5

3.4.4 VSAT LNB RF ICs

Downconverter with PLL/VCO for VSAT

Type	Package	Input freq range	V _{cc}	I	G _{conv}	NF	OIP3	LO Freq	Integrated phase noise density (degrees RMS)
			(V)	(mA)	(dB)	(dB)	(dBm)	(GHz)	
TFF1024HN	SOT763-1	10.7 - 12.75	5	54	30	7	16	9.75 / 11.3	1

3.4.5 Low-noise LO generators for VSAT and general microwave applications

Why choose NXP's 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	Output buffer		Input
			Typ	Typ			Max	S _i	
		(MHz)	(V)	(mA)	(dBc/Hz)	(GHz)	P _o	RL _{out(RF)}	Min
TFF1003HN	SOT616	50 - 815	3.3	100	-92	12.8 - 13.05	-5	-10	-10
TFF1007HN	SOT616	230.46 - 234.38	3.3	100	-104	14.62 - 15	-3	-10	-10

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	Frequency band
			Typ	Typ	@ 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		
TFF11088HN	SOT616	34 - 562	3.3	100	-95	-131	8.59	8.79	8.99	-5	-10	-10	X	
TFF11092HN	SOT616	35 - 588	3.3	100	-95	-131	8.99	9.2	9.41	-5	-10	-10	X	
TFF11096HN	SOT616	37 - 616	3.3	100	-95	-131	9.41	9.63	9.85	-5	-10	-10	X	
TFF11101HN	SOT616	39 - 633	3.3	100	-95	-131	9.92	10.02	10.13	-3	-10	-10	X	
TFF11142HN	SOT616	55 - 901	3.3	100	-95	-131	14.3	14.27	14.42	-4	-10	-10	X	
TFF11132HN	SOT616	51 - 846	3.3	100	-95	-131	12.9	13.2	13.5	-5	-10	-10	Ku	
TFF11139HN	SOT616	53 - 886	3.3	100	-95	-131	13.54	13.85	14.17	-5	-10	-10	Ka	
TFF11145HN	SOT616	55 - 927	3.3	100	-95	-131	14.17	14.5	14.83	-5	-10	-10	Ka	

Bold = highly recommended product

Bold red = new, highly recommended product

3.5 RF MOS transistors

3.5.1 JFETs

JFET selection guide on www.nxp.com/rffets

Easy-to-use parametric filters help you choose the right junction field-effect transistor for your design.

Why choose NXP's JFETs:

- ▶ Reliable volume supplier
- ▶ Short lead time
- ▶ Broad portfolio

N-channel junction field-effect transistors for switching

Type	Package	V _{DS} (V)	I _G (mA)	Characteristics										
				I _{DSS} (mA)		V _{GS(off)} (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	-
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 _{GS(off)} (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	-

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

Type	Package	V _{DS} (V)	I _G (mA)	Characteristics								
				I _{DSS} (mA)		V _{GS(off)} (V)		Y _{fs} (mS)		C _{rs} (pF)		
				min	max	min	max	min	max	min	max	
DC, LF, and HF amplifiers												
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	-	
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	-	1.9 (typ)	-	
RF stages FM portables, car radios, main radios, and 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

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

Why choose NXP's MOSFETs:

- ▶ Reference designs for TV tuning
- ▶ Short lead time
- ▶ Broad portfolio
- ▶ Smallest packages
- ▶ 2-in-1 FETs for tuner applications
- ▶ Reliable volume supply
- ▶ Highest performing MOSFETs for TV tuning



N-channel, single MOSFETs for switching

Type	Package	V _{DS} (V)	Characteristics													MODE		
			I _b (mA)		I _{DSS} (mA)		V _{GS(th)} (V)		R _{DS(on)} (Ω)	C _{rs} (pF)		t _{on} (ns)		t _{off} (ns)			S _{21(on)} ₂ (dB)	S _{21(off)} ₂ (dB)
			max	max	min	max	min	max	max	min	max	typ	max	typ	max		max	min
BSS83	SOT143	10	50	-	-	0.1	2	45		typ.0.6	-	1	-	5	-	-	Enh.	
Silicon RF Switches																		
BF1107	SOT23	3	10	-	100	-	7	20	-	-	-	-	-	-	2.5	30	Depl.	
BF1108	SOT143B	3	10	-	100	-	7	20	-	-	-	-	-	3	30	Depl.		
BF1108R	SOT143R	3	10	-	100	-	7	20	-	-	-	-	-	3	30	Depl.		
BF1108W	SOT343	3	10	-	100	-	7	20	-	-	-	-	-	3	30	Depl.		
BF1108WR	SOT343R	3	10	-	100	-	7	20	-	-	-	-	-	3	30	Depl.		
BF1118	SOT143B	3	10	-	100	-	7	22	-	-	-	-	-	3	30	Depl.		
BF1118R	SOT143R	3	10	-	100	-	7	22	-	-	-	-	-	3	30	Depl.		
BF1118W	SOT343	3	10	-	100	-	7	22	-	-	-	-	-	3	30	Depl.		
BF1118WR	SOT343R	3	10	-	100	-	7	22	-	-	-	-	-	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 _{GS(th)} (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 ⁽¹⁾	X	-			
BF994S	SOT143	20	30	4	20	-	-2.5	15	-	2.5	1	1 ⁽¹⁾	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																	
BF1105R	SOT343R	7	30	8	16	-	0.3	2	25	-2.2 ⁽³⁾	1.2 ⁽²⁾	1.7	X	X			

⁽¹⁾ @ 200 MHz

⁽²⁾ COSS

⁽³⁾ Cig

3.6 RF modules

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

Why choose NXP's 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 1 GHz GaAs HFET line-ups

The C-types are specially designed for the Chinese market, customized for two major governmental projects. The GaAs HFET family includes a complete 1 GHz line-up for high-end applications around the world.

C-types (China)

- ▶ CATV push-pulls, section 3.6.1: BGY588C, BGE788C, CGY888C
- ▶ CATV power doublers, section 3.6.3: BGD712C, CGD982HCi, CGD985HCi, CGD987HCi
- ▶ CATV optical receivers, section 3.6.4: BGO807C, BGO807CE

1 GHz GaAs HFET high-end hybrids

- ▶ CATV push-pulls, section 3.6.2: CGY1032, CGY1041, CGY1043, CGY1047, CGY1049
- ▶ CATV power doublers, section 3.6.3: CGD1040Hi, CGD1042Hi, CGD1044Hi, CGD1046Hi, CGD1042H, CGD1044H

3.6.1 CATV push-pulls

Type	Frequency range (MHz) ⁽¹⁾	Gain (dB)	Slope (dB)	FL (dB) ⁽²⁾	RL _{IN} /RL _{OUT} (dB)	CTB (dB) ⁽³⁾	X _{mod} (dB) ⁽³⁾	CSO (dB) ⁽³⁾	@ Ch	@ Vo (dBmV)	NF @ f _{max} (dB)	I _{tot} (mA)
BGY588C	40 - 550	33.5 - 35.5	0.2 - 1.7	0.5	16 / 16	-57		-62	77	44	8	345
BGY785A	40 - 750	18 - 19	0 - 2	0.1	20 / 20	-54.5	-57.5	-62	110	44	6	225
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	0.2	20 / 20	-54.5	-54	-57.5	110	44	5	220
BGE787B		28.5 - 29.5	0.2 - 2.2	0.45	20 / 20	-48	-52	-56	110	44	6.5	340
BGE885	40 - 870	16.5 - 17.5	0.2 - 1.2	0.5	14 / 14						8	240
BGX885N		16.5 - 17.5	0.2 - 1.4	0.3	20 / 20						8	240
BGY885A		18 - 19	0 - 2	0.2	20 / 20	-65	-65	-67	49	44	6	225
BGY887		21 - 22	0.2 - 2	0.2	20 / 20	-64.5	-64.5	-67.5	49	44	5	220
CGY888C		34.5 - 36.5	1.5	0.25	20 / 20	-65	-72	-63	112	44	4	280
BGY835C		33.5 - 34.5	0.5 - 2.5	0.5	20 / 20	-60		-55	49	44	7	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	0.2	20 / 20	-63.5	-63	-64	49	44	5.5	325

3.6.2 CATV push-pulls 1 GHz

Type	Frequency range (MHz) ⁽¹⁾	Gain (dB)	Slope (dB)	FL (dB) ⁽¹⁾	RL _{IN} /RL _{OUT} (dB)	CTB (dB) ⁽³⁾	X _{mod} (dB) ⁽³⁾	CSO (dB) ⁽³⁾	@ Ch	@ Vo (dBmV)	NF @ f _{max} (dB)	I _{tot} (mA)
CGY1041	40 - 1003	21 - 22.5	1.2 - 2.7	0.9	20 / 18	-62	-58	-64	79 NTSC channels + 75 digital channels	44	4.3	265
CGY1043		23 - 24.5	1.2 - 2.7	0.9	20 / 18	-62	-58	-64	79 NTSC channels + 75 digital channels	44	4.2	265
CGY1047		27 - 28.5	1.5 - 2.5	0.8	20 / 18	-64	-60	-66	79 NTSC channels + 75 digital channels	44	4.5	250
CGY1049		29 - 31	0.85 - 2.35	0.85	20 / 18	-62	-58	-64	79 NTSC channels + 75 digital channels	44	4.5	265
CGY1032		32 - 34	1.05 - 2.55	0.85	20 / 18	-62	-58	-64	79 NTSC channels + 75 digital channels	44	4.4	265
BGY1085A		18 - 19	0 - 2	0.3	20 / 20	-53	-54	-56	150	40	7.5	240

Bold = highly recommended product

⁽¹⁾ Frequency range: minimum and maximum frequency in MHz at which data are characterized (@ Ch / @ Vo)

⁽²⁾ FL is flatness of frequency response

⁽³⁾ The number of channels and the output voltage at which CTB, Xmod, CSO, IMD2, and IMD3 are characterized, are @ fmax

⁽⁴⁾ S is minimum responsivity of optical receivers

3.6.3 CATV power doublers

Type	Frequency range (MHz) ⁽¹⁾	Gain (dB)	Slope (dB)	FL (dB) ⁽¹⁾	RL _{IN} /RL _{OUT} (dB)	CTB (dB) ⁽³⁾	X _{mod} (dB) ⁽³⁾	CSO (dB) ⁽³⁾	@ Ch	@ Vo (dBmV)	NF @ f _{max} (dB)	I _{tot} (mA)
BGD712	40 - 750	18.2 - 18.8	0.5 - 1.5	0.35	17 / 17	-62	-63	-63	112	44	7	395
BGD712C		18.2 - 18.8	0.5 - 1.5	0.35	17 / 17	-62		-63	112	44	7	410
BGD714		20 - 20.6	0.5 - 1.5	0.35	23 / 23	-61	-62	-62	112	44	7	395
BGD812	40 - 870	18.2 - 18.8	0.4 - 1.4	0.5	25 / 23	-57	-62	-58	132	44	7.5	395
BGD814		19.7 - 20.3	0.5 - 1.5	0.5	25 / 24	-56	-61	-57	132	44	7.5	395
BGD816L		21.2 - 21.8	0.5 - 1.5	0.5	22 / 25	-55	-58	-56	132	44	7.5	360
CGD942C		22 - 24	1 - 2	0.5	20 / 20	-66	-66	-66	98	48	3.5	450
CGD944C		24 - 26	1 - 2	0.5	20 / 20	-66	-66	-66	98	48	3.5	450
CGD1040HI		19.5 - 22	0.5 - 2	1	20 / 20	-70	-66	-76	79	58.4	5.5	440
CGD1042HI	22 - 23.5	0.5 - 2	1	20 / 20	-70	-65	-75	79	58.4	5.5	440	
CGD1044HI	23.5 - 25.5	0.5 - 2	1	20 / 20	-70	-64	-75	79	58.4	5	440	
CGD1046HI	26.5 - 28	0.7 - 2.2	1	20 / 20	-75	-68	-70	79	56.4	5	450	
CGD1042H	22 - 24	1.5	0.5	20 / 21	-75	-67	-76	79	59	5	450	
CGD1044H	24 - 26	1	0.5	20 / 21	-75	-67	-76	79	59	5	450	
CGD982HC	22 - 24	0.5 - 2	1	20 / 20	-66	-68	-69	98	48	5.5	440	
CGD985HC	23.5 - 25.5	0.5 - 2	1	20 / 20	-66	-68	-69	98	48	5	440	
CGD987HC	26 - 28	0.7 - 2	1	20 / 20	-66	-68	-66	98	48	5	440	
CGD982LC	22 - 24	0.5 - 2	0.8	20 / 20	-65	-60	-70	98	48	6.5	365	
CGD985LC	24 - 26	0.5 - 2	0.8	20 / 20	-65	-60	-70	98	48	6.5	365	
CGD1042L	22 - 24	0.5 - 2	0.8	20 / 20	-75	-68	-77	79	54	6.5	375	

3.6.4 CATV optical receivers

Type	Frequency range (MHz) ⁽¹⁾	S (V/W) ⁽⁴⁾	Slope (dB)	FL (dB) ⁽¹⁾	RL _{OUT} (dB)	IMD3 (dB) ⁽³⁾	IMD2 (dB) ⁽³⁾	@ f _{measured} (MHz)	@ P _(lept) (mW)	NF @ f _{max} (dB)	I _{tot} (mA)	Connectors
BGO807C	40 - 870	750	0 - 2	1	11	-71	-55	854.5	1	8.5	205	FC and SC
BGO807CE		750	0 - 2	1	11	-69	-53	854.5	1	8.5	205	FC and SC

3.6.5 CATV reverse hybrids

Type	Frequency range (MHz) ⁽¹⁾	Gain (dB)	Slope (dB)	FL (dB) ⁽¹⁾	RL _{IN} /RL _{OUT} (dB)	CTB (dB) ⁽³⁾	X _{mod} (dB) ⁽³⁾	CSO (dB) ⁽³⁾	@ Ch	@ Vo (dBmV)	NF @ f _{max} (dB)	I _{tot} (mA)
BGY68	5 - 75	29.2 - 30.8	-0.2 - 0.5	0.2	20 / 20	-68	-60		4	50	3.5	135
BGY66B	5 - 120	24.5 - 25.5	-0.2 - 0.5	0.2	20 / 20	-66	-54		14	48	5	135
BGY67	5 - 200	21.5 - 22.5	-0.2 - 0.5	0.2	20 / 20	-67	-60		22	50	5.5	215
BGY67A		23.5 - 24.5	-0.2 - 0.5	0.2	20 / 20	-67	-59		22	50	5.5	215
BGR269		34.5 - 35.5	-0.2 - 0.6	0.5	20 / 20	-57	-50	-66	28	50	5.5	160

Bold = highly recommended product

⁽¹⁾ Frequency range: minimum and maximum frequency in MHz at which data are characterized (@ Ch / @ Vo)

⁽²⁾ FL is flatness of frequency response

⁽³⁾ The number of channels and the output voltage at which CTB, X_{mod}, CSO, IMD2, and IMD3 are characterized, are @ f_{max}

⁽⁴⁾ S 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 choose the right RF power transistor for your design.

3.7.1 RF power transistors for base stations

Device naming conventions RF power transistors for base stations

B	L	F	8	G	22	L	S	-45	P	R	B	N	G	V	A
															asymmetrical Doherty
															video bandwidth enhanced
															gullwing-shaped leads
															specialty
															option: current sense lead
															enhanced ruggedness
															push-pull device
															P1dB power
															option: earless package
															option: low thermal resistivity
															operating frequency (in 100MHz; maximum)
															G: standard
															H: high voltage LDMOS (50V)
															LDMOS technology generation
															F: ceramic package
															C: air cavity plastic (ACP) package
															D: fully integrated Doherty amplifier
															M: MMIC module
															P: overmolded plastic package (OMP)
															L: high frequency power transistor
															B: semiconductor die made of Si

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

- ▶ Leading technology (generations 6, 7, and 8 of LDMOS)
- ▶ Highest efficiency
- ▶ Best ruggedness
- ▶ Advanced Doherty amplifier designs
- ▶ Very broadband (video bandwidth enhanced) devices
- ▶ Industry's first 3.8 GHz Doherty
- ▶ Industry's first three-way, 900 MHz Doherty
- ▶ Industry's first 50 V, 600 W, single-package Doherty

NXP offers complete line-ups of RF power transistors operating 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, LTE] and WiMAX infrastructures.

3.7.1.1 0.7 - 1.0 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						Test signal	Package
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _P (dB)			
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179	
BLF6G21-10G		1	2200	10	-	28	0.7	11.5	15	18.5	2-c WCDMA	SOT538	
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179	
BLM6G10-30(G)	MMIC	920	960	30	I/O	28	2	11.8	11.5	29	2-c WCDMA	SOT822	
BLF6G10L-40BRN		700	1000	40	I	28	2.5	12.1	15	23	2-c WCDMA	SOT1112	
BLF6G10(S)-45	Driver/final	700	1000	45	I	28	1	16.5	8	23	2-c WCDMA	SOT608	
BLP8G10S-45P(G)		700	1000	45	I/O	28	2.5	12.6	21.4	21.5	2-c WCDMA	SOT1223/4	
BLF6G10(LS)-135RN	Final	700	1000	135	I	28	26.5	7.1	28	21	2-c WCDMA	SOT502	
BLP7G07S-140P		700	900	140	O	28	35	6.0	28	19	2-c WCDMA	SOT1223	
BLP7G09S-140P(G)*		900	1000	140	O	28	35	6.0	28	19	2-c WCDMA	SOT1223/4	
BLF6G10(LS)-160RN		700	1000	160	I	32	32	7.0	27	22.5	2-c WCDMA	SOT502	
BLF6H10L(S)-160		700	1000	160	-	50	45	5.5	30	20	2-c WCDMA	SOT467	
BLF8G10L(S)-160		920	960	160	I/O	30	35	6.6	29	19.7	2-c WCDMA	SOT502	
BLF8G10LS-160V		925	960	160	I/O	30	35	6.6	29	20	2-c WCDMA	SOT1244	
BLF6G10(LS)-200RN		688	1000	200	I	28	40	7.0	28.5	20	2-c WCDMA	SOT502	
BLP8G10S-200P(G)*		700	1000	200	I/O	28	40	7.0	28.5	20	2-c WCDMA	SOT1223/4	
BLF7G10L(S)-250		920	960	250	I/O	30	60	6.2	30.5	19.5	2-c WCDMA	SOT502	
BLF6G10L(S)-260PRN		700	1000	260	I	28	40	8.1	26.5	22	2-c WCDMA	SOT539	
BLF8G10LS-270		820	960	270	I/O	28	67	6.1	33	18.5	2-c WCDMA	SOT502	
BLF8G10LS-270(G)V		720	960	270	I/O	28	50	7.3	27	19.6	2-c WCDMA	SOT1244	
BLF8G10LS-300PV*		700	1000	300	I/O	28	62	6.8	43	18	2-c WCDMA	SOT1247	
BLF8G09LS-400PG(V)*		700	1000	400	I/O	28	79	7.0	27	19.4	2-c WCDMA	SOT1242	

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.1.2 1.4 - 1.6 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _p (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLF6G21-10G		1	2200	10	-	28	0.7	11.5	15	18.5	2-c WCDMA	SOT538
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLF6G15L(S)-40RN	Driver/final	1450	1550	40	I/O	28	2.5	12.0	13	21.5	2-c WCDMA	SOT1135
BLF7G15LS-200	Final	1450	1550	200	I/O	28	50	6.0	29	19.5	2-c WCDMA	SOT502
BLF6G15L(S)-250PBRN		1450	1550	250	I/O	28	60	6.2	33	18.5	2-c WCDMA	SOT1110
BLF7G15LS-300P		1450	1550	300	I/O	28	85	5.5	31	18	2-c WCDMA	SOT539

3.7.1.3 1.8 - 2.0 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _p (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLF6G21-10G		1	2200	10	-	28	0.7	11.5	15	18.5	2-c WCDMA	SOT538
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLF6G20-40	Driver/final	1800	2000	40	I/O	28	2.5	12.0	15	18.8	2-c WCDMA	SOT608
BLM7G1822S-40PB(G)*	MMIC	1800	2200	40	I/O	28	2	13.0	11	30	2-c WCDMA	SOT1212
BLF6G20(S)-45	Driver/final	1800	2000	45	I/O	28	2.5	12.6	14	19.2	2-c WCDMA	SOT608
BLF6G20(LS)-75	Final	1800	2000	75	I/O	28	29.5	4.1	37.5	19	GSM EDGE	SOT502
BLF6G20(LS)-110		1800	2000	110	I/O	28	25	6.4	32	19	2-c WCDMA	SOT502
BLF6G20LS-140		1800	2000	140	I/O	28	35.5	6.0	30	16.5	2-c WCDMA	SOT502
BLF7G20LS-140P		1800	2000	140	I/O	28	60	3.7	41	17.5	GSM EDGE	SOT1121
BLF7G21LS-160		1800	2050	160	I/O	28	45	5.5	34	18	2-c WCDMA	SOT1121
BLF7G21L(S)-160P		1800	2050	160	I/O	28	45	5.5	34	18	2-c WCDMA	SOT1121
BLP8G21S-160PV*		1800	2025	160	I/O	28	45	5.5	33	18	2-c WCDMA	SOT1223
BLF8G19LS-170BV		1800	1990	170	I/O	32	60	4.5	32	18	2-c WCDMA	SOT1120
BLF6G20-180PN		1800	2000	180	I/O	32	50	5.6	29.5	18	2-c WCDMA	SOT539
BLF6G20(LS)-180RN		1800	2000	180	I/O	30	40	6.5	27	17.2	2-c WCDMA	SOT502
BLF7G20L(S)-200		1805	1990	200	I/O	28	55	5.6	33	18	2-c WCDMA	SOT502
BLF8G20LS-200V		1800	2000	200	I/O	28	55	5.6	33	17.5	2-c WCDMA	SOT1120
BLF8G20L(S)-220		1800	1900	220	I/O	28	55	6.0	31	17	2-c WCDMA	SOT502
BLF8G20L(S)-220V*		1800	1900	220	I/O	28	55	6.0	31	17	2-c WCDMA	SOT1120
BLF7G20L(S)-250P		1805	1880	250	I/O	28	70	5.5	35	18	2-c WCDMA	SOT539
BLF8G20LS-260A		1800	1900	260	I/O	28	50	7.2	44 *	15.5	2-c WCDMA	SOT539
BLF8G20LS-400P(G)V*		1800	1900	400	I/O	28	80	7.0	27	19	2-c WCDMA	SOT1242
BLF8G20LS-410P(G)V*		1800	1900	400	I/O	28	80	7.0	27	19	2-c WCDMA	SOT1242

3.7.1.4 2.0 - 2.2 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _p (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLF6G21-10G		1	2200	10	-	28	0.7	11.5	15	18.5	2-c WCDMA	SOT538
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLM6G22-30(G)	MMIC	2100	2200	30	I/O	28	2	11.8	9	29.5	2-c WCDMA	SOT822
BLF6G22L-40BN	Driver/final	2000	2200	40	I/O	28	2.5	12.0	16	19	2-c WCDMA	SOT1112
BLF6G22LS-40BN		2000	2200	40	I/O	28	2.5	12.0	16	19	2-c WCDMA	SOT1112
BLF6G22L(S)-40P		2110	2170	40	I/O	28	13.5	4.7	30	19	2-c WCDMA	SOT1121
BLM7G1822S-40PB(G)*	MMIC	1800	2200	40	I/O	28	2	13.0	11	30	2-c WCDMA	SOT1212
BLF6G22(S)-45	Driver/final	2000	2200	45	I/O	28	2.5	12.6	13	18.5	2-c WCDMA	SOT608
BLD6G21L(S)-50	Integrated Doherty	2010	2025	50	O	28	8	8.0	43	14.5	TD-SCDMA	SOT1130
BLD6G22L(S)-50		2110	2170	50	I/O	28	8	8.0	40	14	TD-SCDMA	SOT1130
BLM7G22S-60PB(G)	MMIC	2000	2200	60	I/O	28	3.2	12.7	10	30	2-c WCDMA	SOT1212
BLP8G22S-60P(G)*	Driver/final	1800	2200	60	I/O	28	4	11.8	20	18	2-c WCDMA	SOT1223/4
BLF6G22LS-75	Final	2000	2200	75	I/O	28	17	6.4	30.5	18.7	2-c WCDMA	SOT502
BLF6G22LS-100		2000	2200	100	I/O	28	25	6.0	29	18.5	2-c WCDMA	SOT502
BLF7G22L(S)-100P		2000	2200	100	I/O	28	20	7.0	28.5	19.1	2-c WCDMA	SOT1121
BLF6G22LS-130		2000	2200	130	I/O	28	30	6.4	28.5	17	2-c WCDMA	SOT502
BLF7G22L(S)-130		2000	2200	130	I/O	28	30	6.4	32	18.5	2-c WCDMA	SOT502
BLF8G22LS-140		2000	2200	140	I/O	28	33	6.3	32.5	18.5	2-c WCDMA	SOT502
BLF7G22L(S)-160		2000	2200	160	I/O	28	43	5.7	30	18	2-c WCDMA	SOT502
BLF8G22LS-160BV		2000	2200	160	I/O	32	55	4.6	32	18	2-c WCDMA	SOT1120
BLF6G22(LS)-180PN		2000	2200	180	I/O	32	50	5.6	27.5	17.5	2-c WCDMA	SOT539
BLF6G22(LS)-180RN		2000	2200	180	I/O	30	40	6.5	25	16	2-c WCDMA	SOT502
BLF7G22L(S)-200		2110	2170	200	I/O	28	55	5.6	31	18.5	2-c WCDMA	SOT502
BLF8G22LS-200(G)V		2000	2200	200	I/O	28	48	6.2	27	20	2-c WCDMA	SOT1244
BLF8G22LS-220		2110	2170	220	I/O	28	55	6.0	31	17	2-c WCDMA	SOT502
BLF8G22LS-240		2110	2170	240	I/O	28	55	6.4	28	19	2-c WCDMA	SOT502
BLF7G22L(S)-250P		2110	2170	250	I/O	28	70	5.5	31	18.5	2-c WCDMA	SOT539
BLP8G22S-250V*		2110	2170	250	I/O	28	70	5.5	30	19	2-c WCDMA	SOT1223
BLF8G22LS-270		2110	2170	270	I/O	28	80	5.3	30	17.7	2-c WCDMA	SOT502
BLF8G22LS-270(G)V		2000	2200	270	I/O	28	50	7.3	25	17.7	2-c WCDMA	SOT1244
BLF8G22LS-310AV*	2110	2170	310	I/O	30	63	6.9	45	15.8	2-c WCDMA	SOT1110	
BLF8G22LS-460AV*	2110	2170	460	I/O	30	83	7.4	44	14.5	2-c WCDMA	SOT1110	

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.1.5 2.3 - 2.4 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _P (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLF7G24L(S)-100	Final	2300	2400	100	I/O	28	20	7.0	27	18	N-CDMA/IS95	SOT502
BLF8G24LS-100(G)V*		2300	2400	100	I/O	28	25	6.0	31	18	2-c WCDMA	SOT1244
BLF7G24L(S)-140		2300	2400	140	I/O	28	30	6.7	26.5	18.5	N-CDMA/IS95	SOT502
BLF7G24L(S)-160P		2300	2400	160	I/O	28	30	7.3	27.5	18.5	N-CDMA/IS95	SOT539
BLF8G24L(S)-200P		2300	2400	200	I/O	28	60	5.2	31	17	1-c WCDMA	SOT539
BLC8G24LS-240A*		2300	2400	240	I/O	28	63	7.5	29	18	1-c WCDMA	SOT1250

3.7.1.6 2.5 - 2.7 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _P (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLF6G27L(S)-40P	Driver/ final	2500	2700	40	I/O	28	20	3.0	37	17.5	1-c WCDMA	SOT1121
BLF6G27(S)-45		2500	2700	45	I/O	28	7	8.1	24	18	N-CDMA/IS95	SOT608
BLF6G27L(S)-50BN	Final	2500	2700	50	I/O	28	3	12.2	14.5	16.5	2-c WCDMA	SOT1112
BLF6G27(LS)-75		2500	2700	75	I/O	28	9	9.2	23	17	N-CDMA/IS95	SOT502
BLF7G27L(S)-75P		2300	2700	75	I/O	28	12	8.0	26	17	N-CDMA/IS95	SOT1121
BLF7G27L(S)-90P		2500	2700	90	I/O	28	16	7.5	29	18.5	N-CDMA/IS95	SOT1121
BLF6G27(LS)-100		2500	2700	100	I/O	28	14	8.5	23	17	1-c WCDMA	SOT502
BLF7G27L(S)-100		2500	2700	100	I/O	28	25	6.0	28	18	N-CDMA/IS95	SOT502
BLF8G27LS-100V		2500	2700	100	I/O	28	25	6.0	28	17	2-c WCDMA	SOT1244
BLF8G27LS-100P		2500	2700	100	I/O	28	25	6.0	29	17.5	2-c WCDMA	SOT1121
BLF6G27L(S)-135		2500	2700	135	I/O	32	20	8.3	22.5	16	N-CDMA/IS95	SOT502
BLF7G27L-135		2600	2700	135	I/O	28	25	7.3	24	16.5	N-CDMA/IS95	SOT502
BLF7G27L(S)-140		2500	2700	140	I/O	28	30	6.7	22	16.5	N-CDMA/IS95	SOT502
BLF8G27LS-140		2500	2700	140	I/O	28	50	4.5	31	18	2-c WCDMA	SOT502
BLF8G27LS-140V		2600	2700	140	I/O	32	45	4.9	30	16.5	2-c WCDMA	SOT1244
BLF7G27L(S)-150P		2500	2700	150	I/O	28	30	7.0	26	16.5	N-CDMA/IS95	SOT539
BLF8G27LS-150(G)V*		2500	2700	150	I/O	28	40	5.7	28	18	2-c WCDMA	SOT502
BLC8G27LS-160AV*		2500	2700	160	I/O	28	30	8.0	29	18	2-c WCDMA	SOT1275
BLF7G27L-200PB		2600	2700	200	I/O	32	65	4.9	29	16.5	2-c WCDMA	SOT1110
BLF8G27LS-200GV*		2500	2700	200	I/O	28	32	8.0	23	17	2-c WCDMA	SOT1244
BLF8G27LS-200AV*		2500	2700	200	I/O	28	40	7.0	28	17	2-c WCDMA	SOT1242
BLF8G27LS-200V*		2500	2700	200	I/O	28	32	8.0	23	17	2-c WCDMA	SOT1244

3.7.1.7 3.5 - 3.8 GHz line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	Test signal performance						
						VDS (V)	P _L (W)	BO (dB)	η _D (%)	G _P (dB)	Test signal	Package
BLF6G38-10(G)	Driver	3400	3600	10	I/O	28	2	7.0	20	14	N-CDMA/IS95	SOT975
BLF6G38(S)-25		3400	3800	25	I/O	28	4.5	7.4	24	15	N-CDMA/IS95	SOT608
BLF6G38(LS)-50	Driver/final	3400	3800	50	I/O	28	9	7.4	23	14	N-CDMA/IS95	SOT502
BLF6G38(LS)-100	Final	3400	3600	100	I/O	28	18.5	7.3	21.5	13	N-CDMA/IS95	SOT502

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.1.8 Power LDMOS Doherty designs

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
758 - 803 MHz								
773 - 803	50.5	41.5	28	17.1	39	SYM	1/2 BLP7G10LS-140P	1/2 BLP7G10LS-140P
773 - 803	52.2	44.5	28	17.8	46.5	SYM	1/2 BLP7G07LS-140P	1/2 BLP7G07LS-140P
758 - 803	55	48.4	28	16.5	49	SYM	BLP7G10LS-140P	BLP7G10LS-140P
758 - 803	55.6	48.4	28	17.8	47	SYM	BLF8G10LS-160	BLF8G10LS-160
728 - 821 MHz								
728 - 768	51.7	45	28	19	48	SYM	1/2 BLP7G10LS-140P	1/2 BLP7G10LS-140P
790 - 821	55.5	47	28	19	42	SYM	1/2 BLF6G10L(S)-260PRN	1/2 BLF6G10L(S)-260PRN
728 - 768	48.3	41	28	19	45	SYM	1/2 BLP8G10S-45P	1/2 BLP8G10S-45P
790 - 821	57.2	49.5	32	20	42	SYM	BLF6G10LS-200RN	BLF6G10LS-200RN
728 - 768	58	50	32	20.5	47	SYM	BLF6G10LS-200RN	BLF6G10LS-200RN
758 - 803	55.8	47.9	28	17.8	44	SYM	1/2 BLF8G10LS-300PV	1/2 BLF8G10LS-300PV
790 - 821	55.7	47.9	28	19.3	44	SYM	1/2 BLF8G10L-300P	1/2 BLF8G10L-300P
728 - 768	56	47.7	28	19.4	44	SYM	1/2 BLF8G10L-300P	1/2 BLF8G10L-300P
790 - 960 MHz								
790 - 960	55.4	47	50	18.5	40	SYM	BLF6H10L-160	BLF6H10L-160
790 - 960	55.2	47	50	18.5	40	SYM	1/2 BLF6H10L(S)-300P	1/2 BLF6H10L(S)-300P
790 - 960	58.2	50	50	18.5	38.5	SYM	BLF6H10L(S)-300P	BLF6H10L(S)-300P
869 - 960 MHz								
925 - 960	46	35.5	30	20	38	SYM	BLP7G22S-10	BLP7G22S-10
925 - 960	48	40	28	17	47	SYM	1/2 BLP8G10S-45P	1/2 BLP8G10S-45P
869 - 960	55.8	48	50	18.7	42	SYM	BLF6H10L-160	BLF6H10L-160
925 - 960	57.4	49	50	16.8	49	3-WAY	BLF6H10L-160	2xBLF6H10L-160
920 - 960	46	38	28	24	51	SYM	BLF6G21-10G	BLF6G21-10G
869 - 894	52	44	28	20	48	SYM	BLF6G10S-45	BLF6G10S-45
869 - 894	52.7	44.5	28	15	50	3-WAY	BLF6G10S-45	2x BLF6G10S-45
920 - 960	54.7	47.5	28	17.3	48	SYM	BLF6G10LS-135RN	BLF6G10LS-135RN
920 - 960	55.2	48	30	16.9	46.3	SYM	BLF8G10LS-160V	BLF8G10LS-160V
920 - 960	55.1	47.1	28	20.5	44	SYM	1/2 BLF6G10L(S)-260PRN	1/2 BLF6G10L(S)-260PRN
920 - 960	55.5	48	28	16.5	48.5	SYM	1/2 BLF8G10L-300P	1/2 BLF8G10L-300P
920 - 960	56.2	48	28	18.5	40	SYM	BLF6G10LS-135RN	BLF6G10LS-135RN
920 - 960	56.6	50	30	18.8	44.5	SYM	BLF6G10LS-200RN	BLF6G10LS-200RN
920 - 960	57.1	49	30	16.1	46.7	ASYM	BLF8G10LS-160	BLF7G10LS-250
920 - 960	57.1	49	28	15	48	ASYM	BLF8G10LS-160	2xBLF8G10LS-160
920 - 960	57.3	49.3	30	16	50	ASYM	BLF8G10LS-160	BLF7G10LS-250
869 - 894	57.5	50.8	30	18	48.8	ASYM	BLF6G10LS-200RN	BLF7G10LS-250
925 - 960	57.7	49.7	28	20.5	40	SYM / MPPM	BLF6G10L(S)-260PRN	BLF6G10L(S)-260PRN
869 - 894	57.9	52	28	18.2	50.1	SYM/MMPP	BLF6G10LS-260PRN	BLF6G10LS-260PRN
869 - 894	58	50	32	20.5	46	SYM	BLF6G10-200RN	BLF6G10-200RN
925 - 960	58.9	50.9	32	22	47	SYM / MMPP	BLF6G10L(S)-260PRN	BLF6G10L(S)-260PRN
920 - 960	57	49.2	28	15.8	48	SYM	BLF7G10LS-250	BLF7G10LS-250
869 - 894	57.2	49.3	28	16.5	49.5	SYM	BLF7G10LS-250	BLF7G10LS-250
869 - 894	59.2	50.4	28	16	52	ASYM	BLF7G10LS-250	BLF7G10LS-250X2
920 - 960	43	36	28	24.3	38	CLASS AB	BLP7G22-10P	
869 - 894	58.9	52	28	16.1	49.1	ASYM	BLF6G10LS-200RN	2xBLF7G10LS-250
869 - 895	58.5	50.5	28	16.4	49	SYM	BLF8G10LS-270	BLF8G10LS-270
869 - 895	57.3	49	28	17	46	SYM	BLF7G10LS-250	BLF7G10LS-250
869 - 895	51.5	44	28	16.6	46	SYM	1/2 BLP7G10LS-140P	1/2 BLP7G10LS-140P
869 - 895	59.9	52	28	15.2	580	ASYM	BLF8G10LS-270	2xBLF8G10LS-270
920 - 960	59.1	51.5	32	15.6	53	3-WAY	BLF8G10LS-200V	2x BLF8G10LS-200V
1476 - 1555 MHz								
1526 - 1555	56.6	48.6	28	18.4	42	SYM	BLF7G15LS-200	BLF7G15LS-200
1476 - 1511	58.1	49.6	28	16	42	ASYM	BLF7G15LS-200	BLF7G15LS-300P
1476 - 1511	58.6	50.6	32	16.5	42	SYM	BLF6G15LS-250PBRN	BLF6G15LS-250PBRN
1805 - 1880 MHz (DCS)								
1845 - 1880	52.6	45	28	14.5	46.5	SYM	1/2 BLF7G21LS-160P	1/2 BLF7G21LS-160P
1805 - 1880	48	40	28	15.4	42.4	SYM	1/2 BLF6G22LS-40P	1/2 BLF6G22LS-40P
1805 - 1880	50	42.8	28	15.8	48	SYM	1/2 BLF7G20LS-90P	1/2 BLF7G20LS-90P
1805 - 1880	52.5	44.5	28	16	44	SYM	1/2 BLF7G21LS-160P	1/2 BLF7G21LS-160P
1805 - 1880	55	49	28	15.5	47	SYM	BLF7G21LS-160	BLF7G21LS-160
1805 - 1880	55.4	47.5	31	16.3	49	ASYM	BLF7G20LS-90P	BLF7G21LS-160
1805 - 1880	55.5	47	28	16	41	SYM	1/2 BLF7G20L(S)-250P	1/2 BLF7G20L(S)-250P
1805 - 1880	56.1	48.1	30	15.2	48	ASYM	BLF7G20LS-90P	BLF7G20LS-200

* Check status in section 3.1, as this type is not yet released for mass production

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
1805 - 1881	56.2	49	28	15	52.3	ASYM	BLF8G19LS-170BV	BLF8G20LS-220
1805 - 1880	57.1	49	28	14.3	45.1	ASYM	BLF7G21LS-160	2x BLF7G21LS-160
1805 - 1880	57.5	49.5	30	16	42	SYM	BLF7G20LS-200	BLF7G20LS-200
1805 - 1880	57.5	50.5	28	14	48	ASYM	BLF7G20LS-200	BLF7G20LS-250P
1805 - 1880	58.2	50	28	16	42	SYM MPPM	BLF7G20LS-250P	BLF7G20LS-250P
1805 - 1880	58.6	51	28	16	47.6	3-WAY	BLF7G20LS-200	2x BLF7G20LS-200
1805 - 1880	54	47	28	16	49	SYM	BLF6G20LS-110V	BLF6G20LS-110
1805 - 1880	56.2	49.3	28	15	47.5	SYM	BLF8G20LS-200V	BLF8G20LS-200V
1805 - 1880	56.5	49	28	32	45.5	E-SYM	BLF6G21-10G+BLF7G20LS-200	BLF6G21-10G+BLF7G20LS-200
1805 - 1880	57.8	50.4	30	16	41.5	SYM	BLF7G20LS-250P	BLF7G20LS-250P
1805 - 1880	57.3	50	28	15.7	48	ASYM	BLF8G20LS-200V	BLF7G20LS-250P
1805 - 1880	57.3	50.5	30	17	50	ASYM	BLF8G20LS-220	BLF8G20LS-220
1805 - 1880	58.2	50.5	28	14.2	50	ASYM	BLF8G20LS-220	2XBLF8G20LS-220
1930 - 1990 MHz (PCS)								
1930 - 1990	53	45	28	16.5	40	SYM	BLF6G20-75	BLF6G20-75
1930 - 1990	54.2	47.4	28	16.6	47.7	SYM	BLF6G20LS-110	BLF6G20LS-110
1930 - 1990	54.3	47.4	28	16.7	48.2	SYM	BLF6G20LS-110	BLF6G20LS-110
1930 - 1990	55.2	47.2	28	16	40	SYM	1/2 BLF7G20LS-250P	1/2 BLF7G20LS-250P
1930 - 1990	55.5	47.5	28	14.5	46	ASYM	BLF7G20LS-90P	BLF7G20LS-200
1930 - 1990	55.7	49	28	14.5	48	ASYM	BLF7G21LS-160	BLF7G20LS-200
1930 - 1990	56	48	31	15.3	38	SYM	BLF6G20LS-140	BLF6G20LS-140
1930 - 1990	56	48	28	14.8	45	ASYM	BLF7G20LS-140P	BLF7G20LS-200
1930 - 1990	57	49	30	17.2	41	SYM	BLF7G20LS-200	BLF7G20LS-200
1930 - 1990	57	49.5	28	15.1	46	ASYM	BLF7G21LS-160	2x BLF7G21LS-160
1930 - 1990	58.2	50	28	16	40	SYM	BLF7G20LS-250P	BLF7G20LS-250P
1930 - 1990	56.8	49.1	28	32	42.3	E-SYM	BLF6G21-10G+BLF7G20LS-200	BLF6G10-G+BLF7G20LS-200
1930 - 1990	58.5	50.5	30	15.7	43	3-WAY	BLF7G20LS-200	2x BLF7G20LS-200
1930 - 1990	57.3	50.5	30	17	50	ASYM	BLF8G20LS-220	BLF8G20LS-220
1930 - 1990	57.3	50	28	16.2	44	ASYM	BLF8G20LS-200V	BLF7G20LS-250P
1930 - 1990	58.5	50.7	32	15.9	44	3-WAY	BLF8G19LS-170BV	2x BLF8G19LS-170BV
1930 - 1990	55.3	47.5	28	16.8	46	ASYM	BLF8G20LS-260A_main	BLF8G20LS-260A_peak
1805 - 2025 MHz (TD - SCDMA)								
2010 - 2025	47	39	28	14.4	41	SYM	BLD6G21L(S)-50	BLD6G21L(S)-50
1880 - 2025	50	42	28	17	46	SYM	1/2 BLF7G20L(S)-90P	1/2 BLF7G20L(S)-90P
2010 - 2025	50	42	28	17.2	47.2	SYM	1/2 BLF7G20L(S)-90P	1/2 BLF7G20L(S)-90P
1805 - 2050	52	44.5	28	15.2	41.5	SYM	1/2 BLF7G21LS-160P	1/2 BLF7G21LS-160P
1880 - 1920	52.5	44.5	28	16	44	SYM	1/2 BLF7G21LS-160P	1/2 BLF7G21LS-160P
2010 - 2025	52.2	44	28	15.6	43	SYM	1/2 BLF7G21LS-160P	1/2 BLF7G21LS-160P
2110 - 2170 MHz (UMTS/LTE)								
2110 - 2170	55.8	48	28	16	41	SYM	BLP7G22LS-140P	BLP7G22LS-140P
2110 - 2170	47	39	28	13	38	SYM	BLD6G22L(S)-50	BLD6G22L(S)-50
2110 - 2170	48.3	40	28	17	44	SYM	1/2 BLF6G22LS-40P	1/2 BLF6G22LS-40P
2110 - 2170	48.5	40.5	28	17.2	46	SYM	1/2 BLF6G22L-40P	1/2 BLF6G22L-40P
2110 - 2170	50	42	28	17	42	SYM	½ BLF7G22LS-100P	½ BLF7G22LS-100P
2110 - 2170	49	40.5	28	28	34	SYM	½ BLM7G22S-60PBG	½ BLM7G22S-60PBG
2110 - 2170	49	40.5	28	28	34	SYM	½ BLM7G22S-60PBG	½ BLM7G22S-60PBG
2110 - 2170	54.7	46.5	28	16.5	43	SYM	BLF6G22LS-100	BLF6G22LS-100
2110 - 2170	54.9	47	28	17	43	SYM	BLF7G22L(S)-130	BLF7G22L(S)-130
2110 - 2170	55	46.7	28	16	43	SYM	BLF8G22LS-140	BLF8G22LS-140
2110 - 2170	55	47	28	17	43	SYM	1/2 BLF7G22LS-250P	1/2 BLF7G22LS-250P
2110 - 2170	55	47	28	15.5	38	SYM	BLF6G22L(S)-130	BLF6G22L(S)-130
2110 - 2170	55.5	46.4	28	15	43	ASYM	BLF7G22L(S)-130	BLF7G22L(S)-200
2110 - 2171	55.6	49	28	15	52	ASYM	BLF8G22LS-140	BLF8G22LS-220
2110 - 2170	55.7	49	28	14.5	47	ASYM	BLF7G22LS-130	BLF7G22LS-200
2110 - 2170	55.9	47.9	28	17.3	42	SYM	BLF7G22LS-160	BLF7G22LS-160
2110 - 2170	56	48	30	16	47	ASYM	BLF8G22LS-310A_main	BLF8G22LS-310A_peak
2110 - 2170	56	48	30	15.8	45	ASYM	BLF8G22LS-310AV_main	BLF8G22LS-310AV_peak
2110 - 2170	56	48	28	15	48	3-WAY	BLF7G22L(S)-130	2x BLF7G22L(S)-130
2110 - 2170	56.5	48.5	28	16.2	41	SYM	BLF7G22L(S)-200	BLF7G22L(S)-200
2110 - 2170	57	49	32	14.5	41	ASYM	BLF6G22-100	BLF6G22-180PN
2110 - 2170	57.2	49.2	28	16	47	3-WAY	BLF7G22LS-160	2x BLF7G22L(S)-160
2110 - 2170	58	50	32	15	40	SYM	BLF6G22-180PN	BLF6G22-180PN
2110 - 2170	56.8	50.5	28	30	49	E-sym.	BLF6G21s-10G + BLF8G22LS-220	BLF6G21s-10G + BLF8G22LS-220
2110 - 2170	56.5	49	28	14.2	46	ASYM	BLF7G22LS-160	BLF7G22LS-200
2110 - 2170	57.6	50	28	17.2	40	SYM	BLF8G22LS-200V	BLF8G22LS-200V
2110 - 2170	58	50	32	17.5	40	SYM	BLF7G22LS-250P	BLF7G22LS-250P

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
2300 - 2400 MHz (WiBRO/LTE)								
2300 - 2400	49.5	42	28	14.6	44	SYM	1/2 BLF7G27L(S)-75P	1/2 BLF7G27L(S)-75P
2300 - 2400	53	45	28	15	42.3	SYM	1/2 BLF7G24LS-160P	1/2 BLF7G24LS-160P
2300 - 2400	54.1	47	28	15.5	45	SYM	BLF7G24LS-100	BLF7G24LS-100
2300 - 2400	56.2	48.5	30	15	40	SYM	BLF7G24LS-140	BLF7G24LS-140
2300 - 2400	56.8	48.5	30	15	42	ASYM	BLF7G24LS-100	BLF7G24LS-100 X2
2300 - 2400	55	47.5	28	15.2	44	ASYM	BLF7G24LS-100	BLF7G24LS-140
2300 - 2400	50.6	42	28	15.4	38.4	SYM	1/2 BLF7G27LS-90P	1/2 BLF7G27LS-90P
2300 - 2400	51.1	41.5	30	15.7	34.4	SYM	1/2 BLF7G27LS-90P	1/2 BLF7G27LS-90P
2300 - 2400	51.1	42.5	31	15.5	36.8	SYM	1/2 BLF7G27LS-90P	1/2 BLF7G27LS-90P
2300 - 2401	56.8	49	28	15.5	42.1	SYM	BLF8G24LS-200P	BLF8G24LS-200P
2500 - 2700 MHz (WiMAX/LTE)								
2620 - 2690	46.9	39	28	14.6	46.2	ASYM	BLF6G27-10G	1/2 BLF6G27LS-40P
2580 - 2620	48.2	40	28	14.4	41	SYM	1/2 BLF6G27LS-40P	1/2 BLF6G27LS-40P
2620 - 2690	48.2	40	28	14.6	44	SYM	1/2 BLF6G27LS-40P	1/2 BLF6G27LS-40P
2570 - 2620	49.5	42	28	15	43	SYM	1/2 BLF7G27L(S)-75P	1/2 BLF7G27L(S)-75P
2570 - 2620	49.8	42	28	13.9	39	SYM	1/2 BLF7G27LS-90PG	1/2 BLF7G27LS-90PG
2500 - 2700	50	42	28	15	37.5	SYM	BLF6G27S-45	BLF6G27S-45
2500 - 2700	50.3	42.3	28	14.5	39	SYM	1/2 BLF7G27LS-90P	1/2 BLF7G27LS-90P
2500 - 2600	52	44	28	14	40	ASYM	BLF6G27-45	2x BLF6G27-45
2600 - 2700	52	44	28	14	40	ASYM	BLF6G27-45	2x BLF6G27-45
2600 - 2700	52	44	28	14	40	ASYM	BLF6G27-45	BLF6G27(LS)-100
2500 - 2700	52.5	44.5	28	14	38	SYM	1/2 BLF7G27LS-150P	1/2 BLF7G27LS-150P
2570 - 2620	54.1	47	28	15.2	43	SYM	BLF7G27LS-100	BLF7G27LS-100
2530 - 2630	53	45	28	14	43	ASYM	BLF8G27LS160AV_main	BLF8G27LS160AV_peak
2500 - 2700	54	46	28	13	44.5	ASYM	BLF8G27LS-200AV_main	BLF8G27LS-200AV_peak
2620 - 2690	55.2	47.2	30	15	41	ASYM	BLF7G27LS-100	BLF7G27LS-100
2620 - 2690	57.5	48	28	13	37	ASYM	BLF8G27LS-140G	BLF8G27LS-140G x2
2545 - 2660	54	46.5	28	15.2	45	SYM	BLF8G27LS-100V	BLF8G27LS-100V
2570 - 2620	51.1	43	28	14.2	44.5	SYM	1/2BLF8G27LS-100P	1/2BLF8G27LS-100P
2570 - 2620	55.4	47	28	15	40.4	ASYM	BLF7G27LS-100	BLF7G27LS-140
2545 - 2575	55.3	47.5	28	15.4	43.7	ASYM	BLF7G27LS-100	BLF7G27LS-140
2620 - 2690	54.9	47	28	15.2	41.9	ASYM	BLF7G27LS-100	BLF7G27LS-140
2620 - 2690	55	47.5	30	15.7	43.5	ASYM	BLF7G27LS-100	BLF7G27LS-140
2570 - 2620	55.9	48	32	15.6	41	ASYM	BLF7G27LS-100	BLF7G27LS-140
2620 - 2690	56	48	32	15.6	40	ASYM	BLF7G27LS-100	BLF7G27LS-140
2545 - 2630	53.8	44.9	28	14.1	34.4	SYM	1/2 BLF7G27L-200PB	1/2 BLF7G27L-200PB
2620 - 2690	54.8	45	32	17	19	SYM	1/2 BLF7G27L-200PB	1/2 BLF7G27L-200PB
2620 - 2690	56.17	47.6	32	15.2	33	SYM	BLF7G27L-135	BLF7G27L-135
2620 - 2690	56.2	48	32	15.2	39.1	SYM	BLF8G27LS-140V	BLF8G27LS-140V
2496 - 2690	55.3	47	28	13.6	41.5	ASYM	BLF8G27LS-100GV	BLF8G27LS-150GV
2620 - 2690	58.8	50.2	29	13.4	42.5	ASYM	BLF8G27LS-200PGV	BLF8G27LS-200GV (2X)
3300 - 3800 MHz (WiMAX)								
3500 - 3700	52	45	28	10	30	ASYM	BLF6G38LS-50	BLF6G38LS-100
3400 - 3600	51	43	28	11.5	32	SYM	BLF6G38-50	BLF6G38-50

3.7.1.9 Single Package Asymmetric Doherty (PAD) power transistors

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	B _o (dB)	η _o (%)	G _o (dB)	Test signal	Package
BLC8G27LS-160AV*	Final	2500	2700	160	I/O	28	30	8.0	29	18	2-c WCDMA	SOT1275
BLF8G27LS-200AV*		2500	2700	200	I/O	28	40	7.0	28	17	2-c WCDMA	SOT1242
BLC8G24LS-240A*		2300	2400	240	I/O	28	63	7.5	29	18	1-c WCDMA	SOT1250
BLF8G20LS-260A		1800	1900	260	I/O	28	50	7.2	44 *	15.5	2-c WCDMA	SOT539
BLF8G22LS-310AV*		2110	2170	310	I/O	30	63	6.9	45	15.8	2-c WCDMA	SOT1110
BLF8G22LS-460AV*		2110	2170	460	I/O	30	83	7.4	44	14.5	2-c WCDMA	SOT1110

3.7.1.10 OMP power transistors

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	B _o (dB)	η _o (%)	G _o (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLP7G22-10		700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLP8G10S-45P(G)	Driver/final	700	1000	45	I/O	28	2.5	12.6	21.4	21.5	2-c WCDMA	SOT1223/4
BLP8G22S-60P(G)*		1800	2200	60	I/O	28	4	11.8	20	18	2-c WCDMA	SOT1223/4
BLP7G07S-140P	Final	700	900	140	O	28	35	6.0	28	19	2-c WCDMA	SOT1223
BLP7G09S-140P(G)*		900	1000	140	O	28	35	6.0	28	19	2-c WCDMA	SOT1223/4
BLP8G21S-160PV*		1800	2025	160	I/O	28	45	5.5	33	18	2-c WCDMA	SOT1223
BLP8G10S-200P(G)*		700	1000	200	I/O	28	40	7.0	28.5	20	2-c WCDMA	SOT1223/4
BLP8G22S-250V*		2110	2170	250	I/O	28	70	5.5	30	19	2-c WCDMA	SOT1223

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.1.11 MMIC power transistors

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Matching	VDS (V)	P_L (W)	B_o (dB)	η_D (%)	G_p (dB)	Test signal	Package
BLM6G10-30(G)	MMIC	920	960	30	I/O	28	2	11.8	11.5	29	2-c WCDMA	SOT822
BLM6G22-30(G)		2100	2200	30	I/O	28	2	11.8	9	29.5	2-c WCDMA	SOT822
BLM7G1822S-40PB(G)*		1800	2200	40	I/O	28	2	13.0	11	30	2-c WCDMA	SOT1212
BLM7G22S-60PB(G)		2000	2200	60	I/O	28	3.2	12.7	10	30	2-c WCDMA	SOT1212

3.7.1.12 Small cell power transistors

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Matching	VDS (V)	P_L (W)	B_o (dB)	η_D (%)	G_p (dB)	Test signal	Package
BLP7G22-05	Driver	700	2200	5	-	28	1	7.0	26	17	2-c WCDMA	SOT1179
BLF6G21-10G		1	2200	10	-	28	0.7	11.6	15	18.5	2-c WCDMA	SOT538
BLF6G27-10(G)		2300	2700	10	I	28	2	7.0	20	19	N-CDMA/IS95	SOT975
BLP7G22-10	Driver/final	700	2200	10	-	28	2	7.0	26	17	2-c WCDMA	SOT1179
BLF6G22L(S)-40P		2110	2170	40	I/O	28	13.5	4.8	30	19	2-c WCDMA	SOT1121
BLF6G27L(S)-40P	2500	2700	40	I/O	28	20	3.0	37	17.5	1-c WCDMA	SOT1121	
BLM7G1822S-40PB(G)*	MMIC	1800	2200	40	I/O	28	2	13.0	11	30	2-c WCDMA	SOT1212
BLP8G10S-45P(G)	Driver/final	700	1000	45	I/O	28	2.5	12.6	21.4	21.5	2-c WCDMA	SOT1223/4
BLD6G21L(S)-50	Integrated	2010	2025	50	O	28	8	8.0	43	14.5	TD-SCDMA	SOT1130
BLD6G22L(S)-50	Doherty	2110	2170	50	I/O	28	8	8.0	40	14	TD-SCDMA	SOT1130
BLM7G22S-60PB(G)	MMIC	2000	2200	60	I/O	28	3.2	12.8	10	30	2-c WCDMA	SOT1212
BLP8G22S-60P(G)*	Driver/final	1800	2200	60	I/O	28	4	11.8	20	18	2-c WCDMA	SOT1223/4
BLF7G27L(S)-75P	fFinal	2300	2700	75	I/O	28	12	8.0	26	17	N-CDMA/IS95	SOT1121

3.7.1.13 High voltage power transistors

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Matching	VDS (V)	P_L (W)	B_o (dB)	η_D (%)	G_p (dB)	Test signal	Package
BLF6H10L(S)-160	Final	700	1000	160	-	50	45	5.5	30	20	2-c WCDMA	SOT467

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.2 RF power transistors for broadcast/ISM applications

Why choose NXP's 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 power amplifiers that deliver best-in-class performance. We offer the 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 and covers ISM frequency bands.

3.7.2.1 1 - 1600 MHz (UHF/VHF/HF/ISM) LDMOS line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	η _D (%)	G _P (dB)	Test signal	Package
BLF1043	Driver	1	1000	10	-	26	10	52	18.5	CW	SOT538A
BLF2043F		1	2200	10	-	26	10	35	13.5	CW	SOT467C
BLF640		1	2200	10	-	28	2	31	19.3	1-c WCDMA	SOT538A
BLF571		10	500	20	-	50	20	70	27.5	CW	SOT467C
BLF642		1	1400	35	-	32	35	63	19	CW	SOT467C
BLF1046	Driver/final	1	1000	45	-	26	45	63	15.5	CW	SOT467C
BLF644P*	Final	1	1300	70	-	32	70	-	19	CW	SOT1228A
BLF645		1	1400	100	-	32	100	56	18	CW	SOT540A
BLF871(S)		1	1000	100	-	40	100	60	21	CW	SOT467
BLF881(S)		1	1000	140	-	50	140	49	21	CW	SOT467
BLF10M6(LS)200*		700	1000	200	I	28	40	28.5	20	2-c WCDMA	SOT502
BLF647P(S)		1	1500	200	-	32	200	70	18	Pulsed	SOT1121
BLF573(S)		10	500	300	-	50	300	70	27.2	CW	SOT502
BLF647		1	800	300	-	32	150	60	12.5	CW	SOT540A
BLF369		10	500	500	-	32	500	60	18	CW	SOT800-2
BLF10H6600P(S)*		400	1000	600	I	50	600	58	20	Pulsed	SOT539
BLF174XR(S)		10	128	600	-	50	600	73	29	Pulsed	SOT1214
BLF574		10	500	600	-	50	500	70	26.5	CW	SOT539A
BLF574XR(S)		10	500	600	-	50	600	74.7	24	Pulsed	SOT1214
BLF178P		10	128	1200	-	50	1200	75	28.5	Pulsed	SOT539A
BLF578		10	500	1200	-	50	1200	71	24	Pulsed	SOT539A
BLF178XR(S)		10	128	1400	-	50	1400	72	28	Pulsed	SOT539
BLF578XR(S)		10	500	1400	-	50	1400	69	23.5	Pulsed	SOT539

3.7.2.2 UHF 470-860 MHz LDMOS line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	η _D (%)	G _P (dB)	Test signal	Package
BLF642	Driver	1	1400	35	-	32	35	63	19	CW	SOT467C
BLF871(S)	Final	1	1000	100	-	40	100	60	21	CW	SOT467
BLF881(S)		1	1000	140	-	50	140	49	21	CW	SOT467
BLF861A		470	860	150	I/O	32	150	52	15	CW	SOT540A
BLF647P(S)		1	1500	200	-	32	200	70	18	Pulsed	SOT1121
BLF647		1	800	300	-	32	150	60	12.5	CW	SOT540A
BLF878		470	860	300	I/O	42	300	46	21	CW	SOT979A
BLF884P(S)		470	860	350	I	50	150	46	21	CW	SOT1121
BLF879P(S)		470	860	500	I	42	200	47	21	CW	SOT539
BLF888		470	860	500	I	50	250	46	19	CW	SOT979A
BLF888A(S)		470	860	600	I	50	250	46	21	CW	SOT539
BLF888B(S)		470	860	650	I	50	250	46	21	CW	SOT539
BLF578		10	500	1200	-	50	1200	71	24	Pulsed	SOT539A
BLF578XR(S)		10	500	1400	-	50	1400	69	23.5	Pulsed	SOT539

3.7.2.3 2.45 GHz ISM LDMOS line-up

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	η _D (%)	G _P (dB)	Test signal	Package
BLP25M710*	Driver	10	2500	10	-	28	10	74	24	CW	SOT1179-1
BLF25M612(G)*		1	2500	12	I	28	12	60	19	CW	SOT975
BLF2425M7L(S)140	Final	2400	2500	140	I/O	28	140	52	18.5	CW	SOT502
BLF2425M6L(S)180P		2400	2500	180	I/O	28	180	53.5	13.3	CW	SOT539
BLF2425M7L(S)250P		2400	2500	250	I/O	28	250	51	15	CW	SOT539

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.3 RF power transistors for aerospace and defense

Device naming conventions RF power transistors for aerospace and defense

B	L	S	6	G	2731	S	-120	G
option: gullwing shaped leads								
P: push-pull device								
R: enhanced ruggedness								
P1dB power								
S: earless package								
P: pallet								
frequency band (in 100MHz; here: 2700-3100)								
G: standard LDMOS ($\leq 28V$)								
H: high voltage LDMOS (50V)								
LDMOS technology generation								
A: avionics frequency band operation								
L: L-Band frequency operation								
S: S-Band frequency operation								
L: high frequency power transistor								
B: semiconductor die made of Si								

Why choose NXP's 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

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	P_L (W)	η_D (%)	G_p (dB)	Test signal	Package
BLA1011-2	Driver	1030	1090	2	36	2	-	16	Pulsed	SOT538A
BLA1011-10		1030	1090	10	36	10	40	16	Pulsed	SOT467C
BLA1011(S)-200R	Final	1030	1090	200	36	200	50	15	Pulsed	SOT502
BLA6G1011-200R		1030	1090	200	28	200	65	20	Pulsed	SOT502A
BLA6G1011LS-200RG		1030	1090	200	28	200	65	20	Pulsed	SOT502
BLA0912-250R		960	1215	250	36	250	50	13.5	Pulsed	SOT502A
BLA1011-300		1030	1090	300	32	300	57	16.5	Pulsed	SOT957A
BLA6H0912-500		960	1215	500	50	450	50	17	Pulsed	SOT634A
BLA6H1011-600		1030	1090	600	48	600	52	17	Pulsed	SOT539A
BLU6H0410L(S)-600P		400	1000	600	50	600	57	20	Pulsed	SOT539

3.7.3.2 L-band LDMOS transistors

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Matching	VDS (V)	P_L (W)	η_D (%)	G_p (dB)	Test signal	Package
BLL6H0514-25	Driver	500	1400	25	-	50	25	50	19	Pulsed	SOT467C
BLL1214-35		1200	1400	35	I	36	35	43	13	Pulsed	SOT467C
BLL6H0514L(S)-130	Final	500	1400	130	I	50	130	50	17	Pulsed	SOT1135
BLL1214-250		1200	1400	250	I/O	36	250	47	13	Pulsed	SOT502A
BLL1214-250R		1200	1400	250	I/O	36	250	47	13	Pulsed	SOT502A
BLL6G1214L(S)-250*		1200	1400	250	I/O	36	250	45	15	Pulsed	SOT502
BLL6H1214L(S)-250		1200	1400	250	I/O	50	250	55	17	Pulsed	SOT502
BLL6H1214-500		1200	1400	500	I/O	50	500	50	17	Pulsed	SOT539A
BLL6H1214LS-500*		1200	1400	500	I/O	50	500	50	17	Pulsed	SOT539B

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

3.7.3.3 S-band LDMOS transistors

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	η ₅ (%)	G _p (dB)	Test signal	Package
BLS6G2731-6G	Driver	2700	3100	6	I	32	6	33	15	Pulsed	SOT975C
BLS6G3135(S)-20		3100	3500	20	I/O	32	20	45	15.5	Pulsed	SOT608
BLS6G2735L(S)-30		2700	3500	30	I/O	32	30	50	13	Pulsed	SOT1135
BLS2933-100	Final	2900	3300	100	O	32	100	40	8	Pulsed	SOT502A
BLS7G2325L-105		2300	2500	105	I/O	30	105	55	16.5	Pulsed	SOT502A
BLS6G2731(S)-120		2700	3100	120	I/O	32	120	48	13.5	Pulsed	SOT502
BLS6G3135(S)-120		3100	3500	120	I/O	32	120	43	11	Pulsed	SOT502
BLS6G2731S-130		2700	3100	130	I/O	32	130	50	12	Pulsed	SOT922-1
BLS6G2933S-130		2900	3300	130	I/O	32	130	47	12.5	Pulsed	SOT922-1
BLS7G2933S-150		2900	3300	150	I/O	32	150	47	13.5	Pulsed	SOT922-1
BLS7G2730L(S)-200P		2700	3000	200	I/O	32	200	48	12	Pulsed	SOT539
BLS7G3135L(S)-200*		3100	3500	200	I/O	32	200	43	10	Pulsed	SOT502
BLS7G2729L(S)-350P*		2700	2900	350	I/O	32	350	50	13.5	Pulsed	SOT539
BLS7G3135L(S)-350P*		3100	3500	350	I/O	32	350	37	11.5	Pulsed	SOT539

3.7.4 Gallium Nitride (GaN) RF power amplifiers

Device naming conventions GaN RF power amplifiers

C	L	F	1G	0040	S	50	P
P: push-pull indicator, P = push-pull type; no P means single-ended transistor							
2 to 1500: nominal P3dB in Watts: eg 50 = 50W							
S: earless type, S = earless; no S means eared package							
35 to 60: upper frequency, 10x GHz value: 35 = 3.5GHz; 60 = 6.0GHz							
00 to 40: lower frequency, 10x GHz value: 00 = 0GHz or DC; 40 = 4.0GHz							
1G: technology generation: 1G = 1st generation							
F: package style: F = ceramic, P = overmolded plastic							
L: high frequency power transistor							
C: primary material identifier: C = wide band-gap compound materials, eg GaN							

Type	Product	f _{min} (MHz)	f _{max} (MHz)	P1dB (W)	Matching	VDS (V)	P _L (W)	η _D (%)	G _p (dB)	Test signal	Package
CLF1G0060(S)-10*	Driver	0	6000	10	-	50	10	33.2	17	Pulsed	SOT1227
CLF1G0060(S)-30*		0	6000	30	-	50	30	59	15.9	Pulsed	SOT1227
CLF1G0035(S)-50*	Driver/final	0	3500	50	-	50	50	49	13	Pulsed	SOT467
CLF1G0035(S)-100*		0	3500	100	-	50	100	59.5	13.9	Pulsed	SOT467
CLF1G0035(S)-100P*	Final	0	3500	100	-	50	100	50.1	12.7	Pulsed	SOT1228
CLF1G0035(S)-200P*		0	3500	200	-	50	200	43.5	11.5	Pulsed	SOT1228

3.8 Wireless microcontroller chipsets and modules

Type	Module/single chip	Application	Tx power	Receiver sensitivity	Tx current	Rx current	Operating voltage	Form factor
JN5148-001-M00	Module	2.4 - 2.4835 GHz JenNet & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17.5 mA	2.3 - 3.6 V	Integral antenna 18 x 32 mm
JN5148-001-M03	Module	2.4 - 2.4835 GHz JenNet & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17.5 mA	2.3 - 3.6 V	U.FL connector 18 x 30 mm
JN5148-001-M04	Module	2.4 - 2.4835 GHz JenNet & IEEE802.15.4	+20 dBm	-98 dBm	110mA	23 mA	2.7 - 3.6 V	U.FL connector 18 x 41 mm
JN5148-J01	Single chip	2.4 - 2.4835 GHz JenNet - IP	+2.5 dBm	-95 dBm	15 mA	17.5 mA	2.3 - 3.6 V	8 x 8 mm QFN56
JN5148-001	Single chip	2.4 - 2.4835 GHz JenNet & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17.5 mA	2.3 - 3.6 V	8 x 8 mm QFN56
JN5148-Z01	Single chip	2.4 - 2.4835 GHz ZigBee PRO	+2.5 dBm	-95 dBm	15 mA	17.5 mA	2.3 - 3.6 V	8 x 8 mm QFN56
JN5161-001	Single chip	2.4 - 2.4835 GHz RF4CE & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17 mA	2.3 - 3.6 V	6 x 6 mm QFN40
JN5164-001	Single chip	2.4 - 2.4835 GHz JenNet - IP & RF4CE & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17 mA	2.3 - 3.6 V	6 x 6 mm QFN40
JN5168-001	Single chip	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17 mA	2.3 - 3.6 V	6 x 6 mm QFN40
JN5168-001-M00	Module	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17 mA	2.3 - 3.6 V	Integral antenna 16 x 30 mm
JN5168-001-M03	Module	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	+2.5 dBm	-95 dBm	15 mA	17 mA	2.3 - 3.6 V	UFL connector 16 x 21 mm
JN5168-001-M05	Module	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	+9.5 dBm	-96 dBm	35 mA	22 mA	2.3 - 3.6 V	UFL connector 16 x 30 mm
JN5168-001-M06	Module	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	+22 dBm	-100 dBm	175 mA	22 mA	2.3 - 3.6 V	UFL connector 16 x 30 mm
JN516X-EK001	Evaluation kit	2.4 - 2.4835 GHz JenNet - IP & ZigBee & RF4CE & IEEE802.15.4	n/a	n/a	n/a	n/a	n/a	n/a

Bold red = new, highly recommended product

* Check status in section 3.1, as this type is not yet released for mass production

4. Design support

This chapter guides you through the available tools, documents, materials, and links that ease the design-in of our products. New this year is our online community, the Engineers' Corner.

4.1 Knowing NXP's RF portfolio

Beyond this RF Manual, you can learn about NXP's broad RF portfolio through the NXP Technical Academy, various webinars and the NXP channel on YouTube.

The NXP Technical Academy provides training modules where you can learn about our products and applications, watch hands-on trainings, and even get certified! The training modules can be viewed on mobile devices as well (elearning.nxp.com).

NXP provides RF webinars on a regular basis. (www.nxp.com/news/meet-nxp/webinars-and-podcasts.html#rf)

On NXP's YouTube channel (www.youtube.com/user/nxpsemiconductors), there are short videos that explain NXP's portfolio, application information, tips and tricks to optimize your system's performance, and more.

4.2 Product selection on NXP.com

Every RF product has its own webpage on the NXP website. Pages can be accessed in several ways: by product tree, by application area, or via cross-reference search. Or, simply type 'nxp <product>' in the Google search bar.

Product tree and parametric search

Our online product tree (www.nxp.com/products/rf) categorizes the product by function. The parametric search tool allows you to refine the selection based on performance requirements.

Application area

To find out what NXP offers in each application area, use the Explore Application section of the NXP website.

Cross-reference

NXP maintains a cross-reference of competitor products and NXP alternatives. This list can be searched online via the search tool bar on the NXP website or off-line by installing the X-Reference-Tool.

4.3 Product evaluation

NXP offers a broad range of support material for evaluating RF products and optimizing the performance of your application.

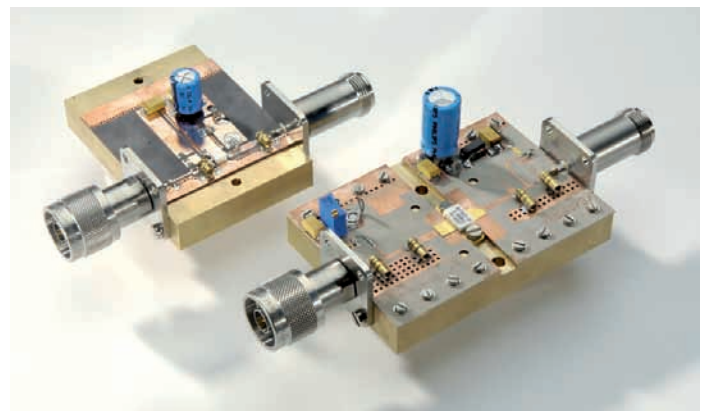
Data sheets and application notes

The first chapter of this RF Manual includes application diagrams, recommended type numbers, and product highlights. More in-depth application information is available in the second chapter, in product data sheets or in the Application Notes section of the NXP website (www.nxp.com/products/all_apnotes).

Simulation tools

To help you evaluate our products in your specific application, NXP offers various simulation tools, including small-signal touchstone S-parameters and parametric models that let you customize the biasing conditions. The parametric models are based on best-in-class Mextram models and RFLDMOS models developed by Philips Research, a recognized leader in physics-based models. The parametric models fully support AC, DC, S-parameter, harmonic balance, and time-domain simulations. These models allow designers to assess the performance of complex systems at an early stage of the development process.

The models are available for Advanced Design System (ADS), Microwave Office (MWO) and Ansoft Designer. Spice versions of the parametric models, which can be used with almost any commercial design tool, are also available.



Customer evaluation kits and samples

Several kits are available for evaluation of our products. Boards are provided with industry-standard RF connectors to facilitate measurements and design-in. The features and content of each kit are described on the NXP website and are listed on the corresponding product page. On the Customer Evaluation Kits page you can also find support materials, such as the latest user manuals and software updates. You can order small quantities of all products to build and evaluate prototypes. To obtain a kit or order samples, please contact your local NXP representative or authorized distributor.



4.4 Engineers' corner

Our new online community, the Engineers' Corner, is an engineer-to-engineer space that lets RF small-signal enthusiasts collaborate, get technical support, and share ideas. Have question? Want to discuss the topics you face in your day-to-day life as an RF engineer? This is the place. NXP's own RF small-signal experts are part of the community, so you can be sure you're connecting with people who know their stuff. Curious? Visit www.nxp.com/engineerscorner

4.5 Additional design-in support

If you need additional design-in support, please contact your local NXP sales representative or authorized distributor. You can also submit a question using the web form on the NXP website.

4.6 Application notes

Product category	Filename	Description
Amplifiers	AN11222	BGA3018 - 1 GHz 18 dB gain wideband amplifier MMIC
Amplifiers	AN11221	BGA3015 - 1 GHz 15 dB gain wideband amplifier MMIC
Amplifiers	AN11220	BGA3012 - 1 GHz 12 dB gain wideband amplifier MMIC
Amplifiers	AN11171	BGU7063 evaluation board application note
Amplifiers	AN11288	BGU8009 GNSS LNA evaluation board
Amplifiers	AN10896	Mounting and Soldering of RF transistors
Amplifiers	AN11284	BGU8006 GNSS front end evaluation board
Amplifiers	AN10967	BLF578 demo for 352 MHz 1 kW CW power
Amplifiers	AN11230	BGU8006 GNSS LNA evaluation board
Amplifiers	AN11228	BGA301x Wideband Variable Gain Amplifier Application
Amplifiers	AN11086	BGU7003 LNA application for GPS L2 band
Amplifiers	AN11072	BGU7003 400 MHz and 900 MHz application
Amplifiers	AN11198	Life-time requirements of NXP HVSON12 plastic drivers
Amplifiers	AN11251	BGA7210 Operation Frequency Extension Down to 400 MHz
Amplifiers	AN11226	TTL bias switching
Amplifiers	AN11191	Application Note for the BGA7130 EVB 1930 - 1995 MHz
Amplifiers	AN11190	Application Note for the BGA7130 EVB 865 - 880 MHz
Amplifiers	AN11068	BGU8007/BGU7005 Matching Options for Improved LTE Jammer Immunity
Amplifiers	AN11097	CMMB LNA with BGU7003, 400 to 800 MHz
Amplifiers	AN11148	BGU7003 1900 to 2100 MHz LNA Application
Amplifiers	AN11152	Reducing the Spurs at RF_out caused by the biasing choke during fast switching on and off in TDD system
Amplifiers	AN11135	Replacing HMC625 by NXP BGA7204
Amplifiers	AN11130	Bias module for 50 V GaN demonstration boards
Amplifiers	AN11103	Externally-matched 900 MHz LNA using BGU7005
Amplifiers	AN11090	50 Ohm FM LNA for embedded Antenna in Portable applications with BGU6102
Amplifiers	AN11091	Ohmic FM LNA for embedded Antenna in Portable applications with BGU6102
Amplifiers	AN11101	BGU7007 GPS front end evaluation board
Amplifiers	AN11035	50 Ohm FM LNA for embedded Antenna in Portable applications with BGU7003W
Amplifiers	AN11034	High Ohmic FM LNA for embedded Antenna in Portable applications with BGU7003W
Amplifiers	AN11062	Broadband DVB-T UHF power amplifier with the BLF888A
Amplifiers	AN10923	1.5 GHz Doherty power amplifier for base station applications using the BLF6G15L-250PBRN

4.6 Application notes (continued)

Product category	Filename	Description
Amplifiers	AN10953	BLF645 10 to 600 MHz 120 W amplifier
Amplifiers	AN10944	1930 to 1990 MHz Doherty amplifier using the BLF7G20LS-200
Amplifiers	AN10951	1805 to 1880 MHz asymmetrical Doherty amplifier with the BLF7G20LS-90P and BLF7G21LS-160P
Amplifiers	AN10945	174 to 230 MHz DVB-T power amplifier with the BLF881
Amplifiers	AN10933	2.5 to 2.7 GHz Doherty power amplifier using the BLF7G27LS-150P
Amplifiers	AN10921	BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier
Amplifiers	AN10869	Broadband DVB-T UHF power amplifier with the BLF888
Amplifiers	AN10858	174 to 230 MHz DVB-T power amplifier with the BLF578
Amplifiers	AN10885	Doherty RF performance analysis using the BLF7G22LS-130
Amplifiers	AN10847	Doherty RF performance using the BLF6G20-230PRN
Amplifiers	AN10714	Using the BLF574 in the 88 - 108 MHz FM band
Amplifiers	AN10882	Dependency of BLF578 gate bias voltage on temperature
Amplifiers	AN10800	Using the BLF578 in the 88 to 108 MHz FM band
Transistors	AN11339	Maximum RF Input Power BFU730LX
Transistors	AN10896	Mounting and Soldering of RF transistors
Transistors	AN11006	Single stage 2.3 - 2.7 GHz LNA with BFU730F
Transistors	AN11223	Low Noise Fast Turn ON/OFF 2.4 - 2.5GHz WiFi LNA with BFU730LX
Transistors	AN11224	Low Noise Fast Turn ON/OFF 5 - 5.9GHz WiFi LNA with BFU730LX
Transistors	AN11007	Single stage 5 - 6 GHz WLAN LNA with BFU730F
Transistors	AN10967	BLF578 demo for 352 MHz 1 kW CW power
Transistors	AN11114	2.4 - 5.9 GHz Broadband WiFi LNA With BFU730F
Transistors	AN11140	Low Noise Fast Turn ON/OFF 5 - 5.9 GHz WiFi LNA with BFU730F
Transistors	AN11147	Low Noise Fast Turn ON/OFF 2.4 - 2.5 GHz WiFi LNA with BFU730F
Transistors	AN11198	Life-time requirements of NXP HVSON12 plastic drivers
Transistors	AN11226	TTL bias switching
Transistors	AN11225	Demonstration of a 1 GHz discrete VCO based on BFR92A
Transistors	AN11130	Bias module for 50 V GaN demonstration boards
Transistors	AN11118	BFU725F/N1 1.5 GHz LNA evaluation board
Transistors	AN11066	SDARS active antenna 1st stage LNA with BFU730F, 2.33 GHz
Transistors	AN11024	SDARS active antenna 2nd stage LNA with BFU690, 2.33 GHz
Transistors	AN11102	BFU725F/N1 2.4 GHz LNA evaluation board
Transistors	AN11062	Broadband DVB-T UHF power amplifier with the BLF888A

Product category	Filename	Description
Transistors	AN10923	1.5 GHz Doherty power amplifier for base station applications using the BLF6G15L-250PBRN
Transistors	AN10953	BLF645 10 to 600 MHz 120 W amplifier
Transistors	AN11010	Single stage Ku band LNA using BFU730F
Transistors	AN10944	1930 to 1990 MHz Doherty amplifier using the BLF7G20LS-200
Transistors	AN10951	1805 to 1880 MHz asymmetrical Doherty amplifier with the BLF7G20LS-90P and BLF7G21LS-160P
Transistors	AN10945	174 to 230 MHz DVB-T power amplifier with the BLF881
Transistors	AN10933	2.5 to 2.7 GHz Doherty power amplifier using the BLF7G27LS-150P
Transistors	AN10921	BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier
Transistors	AN10869	Broadband DVB-T UHF power amplifier with the BLF888
Transistors	AN10858	174 to 230 MHz DVB-T power amplifier with the BLF578
Transistors	AN10885	Doherty RF performance analysis using the BLF7G22LS-130
Transistors	AN10847	Doherty RF performance using the BLF6G20-230PRN
Transistors	AN10714	Using the BLF574 in the 88 - 108 MHz FM band
Transistors	AN10882	Dependency of BLF578 gate bias voltage on temperature
Transistors	AN10800	Using the BLF578 in the 88 to 108 MHz FM band
Mixers/modulators	AN10998	BGX7221 evaluation board application note
Mixers/modulators	AN11132	BGX7220 evaluation board application note
Mixers/modulators	AN11144	Universal Single LNB with TFF101x FIMOD IC
Mixers/modulators	AN11014	BGX7100 evaluation board application note
Mixers/modulators	AN11189	BGX7101 evaluation board application note

4.7 Simulation models

4.7.1 Simulation models for RF power devices

Updates of this overview are available in PDF format at: http://www.nxp.com/wcm_documents/models/RFPower_Model_Overview.pdf

Overview of RF power models

Type	ADS model		MicroWave Office model	S-parameter data
	ADS 2009	ADS 2011		
BLA0912-250				36 V, 150 mA
BLA6G1011-200R	Available		Available	
BLA6G1011L-200RG	Available		Available	
BLA6G1011LS-200RG	Available		Available	
BLA6H0912-500	Available		Available	
BLA6H1011-600	Available		Available	
BLD6G22L-50			Available	
BLD6G22LS-50			Available	
BLF1043				28 V, 50 mA
BLF1046				28 V, 300 mA
BLF174XR			Available	
BLF174XRS			Available	
BLF178XR			Available	
BLF178XRS			Available	
BLF369	Available			
BLF3G21-30				26 V, 450 mA
BLF3G21-6	Available			
BLF571	Available		Available	
BLF573	Available		Available	
BLF573S	Available		Available	
BLF574	Available		Available	
BLF574XR			Available	
BLF574XRS			Available	
BLF578	Available		Available	
BLF578XR			Available	
BLF578XRS			Available	
BLF642			Available	
BLF645	Available		Available	
BLF6G10-200RN	Available			
BLF6G10-45	Available		Available	
BLF6G10L-260PRN	Available			
BLF6G10L-40BRN	Available			
BLF6G10LS-135RN	Available		Available	
BLF6G10LS-200RN	Available			
BLF6G10LS-260PRN	Available			
BLF6G10S-45	Available		Available	
BLF6G15L-250PBRN	Available			
BLF6G15L-40BRN	Available			
BLF6G20-230PRN	Available			
BLF6G20-45	Available		Available	
BLF6G20LS-180RN	Available			
BLF6G20S-45	Available		Available	
BLF6G21-10G	Available		Available	
BLF6G22-45	Available		Available	
BLF6G22L-40P	Available			
BLF6G22LS-180RN	Available			
BLF6G22LS-40P	Available			
BLF6G22S-45	Available		Available	
BLF6G27-10	Available			
BLF6G27-10G	Available		Available	
BLF6G27-45	Available		Available	
BLF6G27-75	Available			
BLF6G27L-40P	Available		Available	
BLF6G27LS-40P	Available		Available	
BLF6G27LS-75	Available			
BLF6G27S-45	Available		Available	
BLF6G38-10	Available			
BLF6G38-100	Available			
BLF6G38-10G	Available		Available	
BLF6G38-25	Available		Available	
BLF6G38-50	Available		Available	
BLF6G38LS-100	Available			
BLF6G38LS-50	Available		Available	
BLF6G38S-25	Available		Available	
BLF6H10L-160			Available	
BLF6H10LS-160			Available	
BLF7G15LS-200	Available			

Overview of RF power models

Type	ADS model		MicroWave Office model	S-parameter data
	ADS 2009	ADS 2011		
BLF7G15LS-300P	Available			
BLF7G20L-200	Available		Available	
BLF7G20L-250P	Available		Available	
BLF7G20L-90P	Available			
BLF7G20LS-140P	Available			
BLF7G20LS-200	Available		Available	
BLF7G20LS-250P	Available		Available	
BLF7G20LS-90P	Available			
BLF7G21L-160P	Available			
BLF7G21LS-160P	Available			
BLF7G22L-130	Available		Available	
BLF7G22L-160	Available			
BLF7G22L-200	Available		Available	
BLF7G22L-250P	Available			
BLF7G22LS-130	Available		Available	
BLF7G22LS-160	Available			
BLF7G22LS-200	Available		Available	
BLF7G22LS-250P	Available			
BLF7G24L-100	Available			
BLF7G24L-140	Available			
BLF7G24LS-100	Available			
BLF7G24LS-140	Available			
BLF7G27L-100	Available		Available	
BLF7G27L-140	Available		Available	
BLF7G27L-150P	Available			
BLF7G27L-200PB	Available			
BLF7G27L-75P	Available			
BLF7G27L-90P	Available		Available	
BLF7G27LS-100	Available		Available	
BLF7G27LS-140	Available		Available	
BLF7G27LS-150P	Available			
BLF7G27LS-75P	Available			
BLF7G27LS-90P	Available		Available	
BLF871	Available		Available	
BLF871S	Available		Available	
BLF878	Available		Available	
BLF879P			Available	
BLF879PS			Available	
BLF881	Available		Available	
BLF881S	Available		Available	
BLF884P	Available			
BLF884PS	Available			
BLF888	Available			
BLF888A	Available		Available	
BLF888AS	Available		Available	
BLL6H0514-25	Available		Available	
BLL6H0514L-130	Available		Available	
BLL6H0514LS-130	Available		Available	
BLL6H1214-500	Available			
BLL6H1214L-250	Available		Available	
BLL6H1214LS-250	Available		Available	
BLM6G22-30	Available			
BLS6G2731-6G	Available			
BLS6G2731S-130	Available		Available	
BLS6G3135-120	Available		Available	
BLS6G3135-20	Available			
BLS6G3135S-120	Available		Available	
BLS6G3135S-20	Available			
BLS7G2729L-350P	Available			
BLS7G2729LS-350P	Available			
CLF1G0035-100	Available	Available	Available	50 V, 330 mA
CLF1G0035-100P	Available	Available	Available	50 V, 340 mA
CLF1G0035-50	Available	Available	Available	50 V, 150 mA
CLF1G0035S-100	Available	Available	Available	50 V, 330 mA
CLF1G0035S-100P	Available	Available	Available	50 V, 340 mA
CLF1G0035S-50	Available	Available	Available	50 V, 150 mA
CLF1G0060-10	Available	Available	Available	50 V, 20 mA
CLF1G0060-30	Available	Available	Available	50 V, 50 mA
CLF1G0060S-10	Available	Available	Available	50 V, 20 mA
CLF1G0060S-30	Available	Available	Available	50 V, 50 mA

4.7.2 Simulation models for RF bipolar wideband transistors (continued)

Wideband transistors	Demo board	Attached to PIP/model page				Supported simulators			
		S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BFR540		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFR92A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFR92AW		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFR93A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFR93AW		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS17		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS17A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS17W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS25A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS505		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS520		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFS540		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFT25		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BFT25A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFT92		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFT92W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFT93		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFT93W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFU725F	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFU725F/N1	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFU610F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU630F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU660F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU690F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU710F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU730F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU730LX	√	√		√		ADS 2011	ADS 2011	ADS 2011	-
BFU760F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
BFU790F	√	√	√	√		ADS 2009, ADS 2011	ADS 2009, ADS 2011, Microwave Office	ADS 2009, ADS 2011, Microwave Office	-
PBR941		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
PBR951		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
PRF947		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
PRF949		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
PRF957		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BF1211		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF1211R		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF1211WR		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-

4.7.3 Simulation models for RF MOSFET transistors

Wideband transistors	Demo board	Attached to PIP/model page				Supported simulators			
		S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BF1212		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF1212R		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF1212WR		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF511		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF513		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF862		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BF904			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BF908			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BF909			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BF998			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-

4.7.4 Simulation models for RF MMIC amplifiers

MMICs	Demo board	Attached to PIP/model page				Supported simulators			
		S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BGA2001	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2002	√					-	-	-	-
BGA2003	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2711	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2748	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2771	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2776	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2709	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2712	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2714	√					-	-	-	-
BGA2715	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2716	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2717		√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2011	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2012	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2031	√					-	-	-	-
BGA6289	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA6489	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA6589	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2800	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2801	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2815	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2816	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2850	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2865	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA6130	√				√	-	-	-	ADS 2011
BGA2866	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA7024	√	√				-	-	-	-
BGA7027	√	√				-	-	-	-
BGA7124	√	√				-	-	-	-
BGA7127	√	√				-	-	-	-
BGA7130	√				√	-	-	-	ADS 2011
BGM1011	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGM1012	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGM1013	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-

4.7.4 Simulation models for RF MMIC amplifiers (continued)

Wideband transistors	Attached to PIP/model page					Supported simulators			
	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BGM1014	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGU3012	√					ADS 2011	-	-	-
BGU3015	√					ADS 2011	-	-	-
BGU3018	√					ADS 2011	-	-	-
BGU6102	√					-	-	-	-
BGU7031	√					-	-	-	-
BGU7032	√					-	-	-	-
BGU7033	√					-	-	-	-
BGU7041	√					-	-	-	-
BGU7042	√					-	-	-	-
BGU7044	√					-	-	-	-
BGU7045	√					-	-	-	-
BGU7050	√					-	-	-	-
BGU7051	√					-	-	-	-
BGU7052	√					-	-	-	-
BGU7053	√					-	-	-	-
BGU7061	√					-	-	-	-
BGU7062	√					-	-	-	-
BGU7063	√					-	-	-	-
BGU7064	√					-	-	-	-
BGU7003	√	√				-	-	-	-
BGU7003W	√					-	-	-	-
BGU7004	√	√				ADS 2011	-	-	-
BGU7005	√	√			√	ADS 2011	-	-	ADS 2011
BGU7007	√	√			√	ADS 2011	-	-	ADS 2011
BGU8006	√	√			√	ADS 2011	-	-	ADS 2011
BGU8007	√	√				ADS 2011	-	-	-
BGU8009	√	√			√	ADS 2011	-	-	ADS 2011

4.7.5 Simulation models for RF varicap diodes

Varicap	Attached to PIP/model page					Supported simulators			
	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BB145B			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BB156			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BB201			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BB202			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BB207			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BB208-2			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-

5. Cross-references and replacements

NXP cross-references:

<http://www.nxp.com/xref/nxp?typenumber>

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 OR	CATV optical receiver
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
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	Manufacturer type	Manufacturer	NXP type	Product family
1SS314	Toshiba	BA591	BS diode	2F1G22DS	RFHIC	CGD1042Hi	CATV PD
1SS356	Rohm	BA591	BS diode	2F1G22DS	RFHIC	CGD982HCi	CATV PD
1SS390	Rohm	BA891	BS diode	2F1G23P	RFHIC	CGY1041	CATV PP
1SV172	Toshiba	BAP50-04	PIN diode	2F1G23P	RFHIC	CGY1043	CATV PP
1SV215	Toshiba	BB172	Varicap	2F1G24D	RFHIC	CGD1044Hi	CATV PD
1SV228	Toshiba	BB201	Varicap	2F1G24D	RFHIC	CGD985HCi	CATV PD
1SV231	Toshiba	BB171	Varicap	2F1G24DS	RFHIC	CGD1044H	CATV PD
1SV232	Toshiba	BB170	Varicap	2F722DS	RFHIC	BGD816L	CATV PD
1SV233	Sanyo	BAP70-03	PIN diode	2F8718P	RFHIC	BGY885A	CATV PP
1SV234	Sanyo	BAP64-04	PIN diode	2F8719DS	RFHIC	BGD812	CATV PD
1SV239	Toshiba	BB145B	Varicap	2F8720DS	RFHIC	BGD814	CATV PD
1SV241	Sanyo	BAP64-02	PIN diode	2F8723P	RFHIC	BGY887	CATV PP
1SV246	Sanyo	BAP64-04W	PIN diode	2F8734P	RFHIC	CGY888C	CATV PP
1SV247	Sanyo	BAP70-02	PIN diode	2N4856	Standard	BSR56	FET
1SV248	Sanyo	BAP50-02	PIN diode	2N4857	Standard	BSR57	FET
1SV249	Sanyo	BAP50-04W	PIN diode	2N4858	Standard	BSR58	FET
1SV250	Sanyo	BAP50-03	PIN diode	2SA1977(NE97733)	Renesas	BFT93	WB trs 1-4
1SV251	Sanyo	BAP50-04	PIN diode	2SA1978(NE97833)	Renesas	BFT93	WB trs 1-4
1SV252	Toshiba	BAP50-04W	PIN diode	2SC2735	Renesas	BFS17	WB trs 1-4
1SV263	Sanyo	BAP50-02	PIN diode	2SC3356	Renesas	BFO540	WB trs 1-4
1SV264	Sanyo	BAP50-04W	PIN diode	2SC3356	Renesas	BFO591	WB trs 1-4
1SV266	Sanyo	BAP50-03	PIN diode	2SC3357	Renesas	BFO540	WB trs 1-4
1SV267	Sanyo	BAP50-04	PIN diode	2SC3357	Renesas	BFO591	WB trs 1-4
1SV269	Toshiba	BB170	Varicap	2SC3583(NE68133)	Renesas	BFR520	WB trs 1-4
1SV270	Toshiba	BB156	Varicap	2SC3585(NE68033)	Renesas	BFR520	WB trs 1-4
1SV271	Toshiba	BAP50-03	PIN diode	2SC4093(NE85639E)	Renesas	BFR540	WB trs 1-4
1SV284	Toshiba	BB156	Varicap	2SC4094	Renesas Electronics	BFG520/XR	WB trs 1-4
1SV288	Toshiba	BB171	Varicap	2SC4094	NEC	BFG520/XR	WB trs 1-4
1SV294	Sanyo	BAP70-03	PIN diode	2SC4095	Renesas Electronics	BFG520/XR	WB trs 1-4
1SV305	Toshiba	BB202	Varicap	2SC4095	NEC	BFG520/XR	WB trs 1-4
1SV307	Toshiba	BAP51-03	PIN diode	2SC4182	Renesas Electronics	BFS17W	WB trs 1-4
1SV308	Toshiba	BAP51-02	PIN diode	2SC4182	NEC	BFS17W	WB trs 1-4
1T363A	PEC	BB172	Varicap	2SC4184	Renesas Electronics	BFS17W	WB trs 1-4
1T368A	PEC	BB170	Varicap	2SC4184	NEC	BFS17W	WB trs 1-4
1T369	PEC	BB171	Varicap	2SC4185	Renesas Electronics	BFS17W	WB trs 1-4
1T379	PEC	BB131	Varicap	2SC4185	NEC	BFS17W	WB trs 1-4
1T397	PEC	BB171	Varicap	2SC4186	Renesas Electronics	BFR92AW	WB trs 1-4
1T399	PEC	BB170	Varicap	2SC4186	NEC	BFR92AW	WB trs 1-4
2F1G20DS	RFHIC	CGD1040Hi	CATV PD	2SC4226	Renesas Electronics	PRF957	WB trs 1-4
2F1G20DS	RFHIC	CGD1042H	CATV PD	2SC4226	NEC	PRF957	WB trs 1-4
2F1G20P	RFHIC	CGY1041	CATV PP	2SC4227	Renesas Electronics	BFO67W	WB trs 1-4
2F1G22DS	RFHIC	CGD1042H	CATV PD	2SC4227	NEC	BFO67W	WB trs 1-4

Manufacturer type	Manufacturer	NXP type	Product family
2SC4228	Renesas Electronics	BFS505	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	BFG67W	WB trs 1-4
2SC4325	Toshiba	BFS505	WB trs 1-4
2SC4394	Toshiba	PRF957	WB trs 1-4
2SC4536	Renesas Electronics	BFG19	WB trs 1-4
2SC4536	NEC	BFG19	WB trs 1-4
2SC4537	Renesas Electronics	BFR93AW	WB trs 1-4
2SC4537	Renesas	BFR93AW	WB trs 1-4
2SC4570(NE58130)	Renesas	BFR92AW	WB trs 1-4
2SC4571(NE58230)	Renesas	BFR93AW	WB trs 1-4
2SC4592	Renesas Electronics	BFG520/XR	WB trs 1-4
2SC4592	Renesas	BFG520/XR	WB trs 1-4
2SC4593	Renesas Electronics	BFS520	WB trs 1-4
2SC4593	Renesas	BFS520	WB trs 1-4
2SC4703	Renesas Electronics	BFG19	WB trs 1-4
2SC4703	NEC	BFG19	WB trs 1-4
2SC4784	Renesas Electronics	BFS505	WB trs 1-4
2SC4784	Renesas	BFS505	WB trs 1-4
2SC4807	Renesas Electronics	BFG18A	WB trs 1-4
2SC4807	Renesas	BFG18A	WB trs 1-4
2SC4842	Toshiba	BFG540W/XR	WB trs 1-4
2SC4899	Renesas Electronics	BFS505	WB trs 1-4
2SC4899	Renesas	BFS505	WB trs 1-4
2SC4900	Renesas Electronics	BFG520/XR	WB trs 1-4
2SC4900	Renesas	BFG520/XR	WB trs 1-4
2SC4901	Renesas Electronics	BFS520	WB trs 1-4
2SC4901	Renesas	BFS520	WB trs 1-4
2SC4926	Renesas	BFG425W	WB trs 5-7
2SC4957(NE68539E)	Renesas	BFG520/X	WB trs 1-4
2SC4988	Renesas Electronics	BFG540	WB trs 1-4
2SC4988	Renesas	BFG540	WB trs 1-4
2SC5004(NE58219)	Renesas	PRF949	WB trs 1-4
2SC5006	Renesas	BFR520T	WB trs 5-7
2SC5006-T1-A	NEC	BFR520T	WB trs 1-4
2SC5007(NE68119)	Renesas	PRF949	WB trs 1-4
2SC5008(NE68019)	Renesas	PRF949	WB trs 1-4
2SC5010(NE68519)	Renesas	BFR520T	WB trs 1-4
2SC5011	Renesas Electronics	BFG540W/XR	WB trs 1-4
2SC5011	NEC	BFG540W/XR	WB trs 1-4
2SC5012	Renesas Electronics	BFG540W/XR	WB trs 1-4
2SC5012	NEC	BFG540W/XR	WB trs 1-4
2SC5013(NE68018)	Renesas	BFG425W	WB trs 5-7
2SC5015(NE68518)	Renesas	BFG425W	WB trs 5-7
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
2SC5180(NE68618)	Renesas	BFG410W	WB trs 5-7
2SC5181(NE68619)	Renesas	BFG410W	WB trs 5-7
2SC5185(NE68718)	Renesas	BFG425W	WB trs 5-7
2SC5186(NE68719)	Renesas	BFG425W	WB trs 5-7
2SC5288(NE68939)	Renesas	BGA7024	WB trs 1-4
2SC5289(NE69039)	Renesas	BGA7027	WB trs 1-4
2SC5336	Renesas	BFG591	WB trs 1-4
2SC5337(NE461M02)	Renesas	BFR540	WB trs 1-4
2SC5338(NE462M02)	Renesas	BFR540	WB trs 1-4
2SC5369(NE696M01)	Renesas	BFM520	WB trs 1-4
2SC5454(NE67739)	Renesas	BFG520	WB trs 1-4
2SC5455(NE67839)	Renesas	BFG520	WB trs 1-4
2SC5463	Toshiba	BFG67W	WB trs 1-4
2SC5507(NE661M04)	Renesas	BFU610F	WB trs 5-7
2SC5508	Renesas Electronics	BFU660F	WB trs 5-7
2SC5508	Renesas Electronics	BFU660F	WB trs 5-7
2SC5508-T2-A	NEC	BFG424F	WB trs 5-7
2SC5509(NE663M04)	Renesas	BFU690F	WB trs 5-7
2SC5593	Renesas Electronics	BFG410W	WB trs 5-7
2SC5593	Renesas	BFG410W	WB trs 5-7
2SC5594	Renesas Electronics	BFG425W	WB trs 5-7
2SC5594	Renesas	BFG425W	WB trs 5-7
2SC5606(NE66219)	Renesas	BFR520T	WB trs 1-4
2SC5623	Renesas Electronics	BFG410W	WB trs 5-7
2SC5623	Renesas	BFG410W	WB trs 5-7
2SC5624	Renesas Electronics	BFG425W	WB trs 5-7
2SC5624	Renesas	BFG425W	WB trs 5-7
2SC5631	Renesas Electronics	BFG540	WB trs 1-4
2SC5631	Renesas	BFG540	WB trs 1-4
2SC5704(NE662M16)	Renesas	BFU630F	WB trs 5-7
2SC5750(NE67718)	Renesas	BFU660F	WB trs 5-7
2SC5751(NE677M04)	Renesas	BFU660F	WB trs 5-7
2SC5752(NE67818)	Renesas	BFU660F	WB trs 5-7
2SC5753(NE678M04)	Renesas	BFU660F	WB trs 5-7

Manufacturer type	Manufacturer	NXP type	Product family
2SC5754(NE664M04)	Renesas	BGA7027	WB trs 1-4
2SC5772	Renesas	BFG425W	WB trs 5-7
2SC5787(NE894M13)	Renesas	BFU630F	WB trs 5-7
2SC5800-T1-A	NEC	BFR93AW	WB trs 1-4
2SC5801(NE851M13)	Renesas	PBR941	WB trs 1-4
2SC5820	Renesas	BFU630F	WB trs 5-7
2SC6023	Sanyo	BFG424W	WB trs 5-7
2SK163-K	Renesas	J113	FET
2SK163-L	Renesas	J113	FET
2SK163-M	Renesas	J113	FET
2SK163-N	Renesas	J113	FET
2SK210BL	Renesas Electronics	PMBFJ309	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 Electronics	PMBFJ308	FET
2SK508	Renesas	PMBFJ308	FET
3SK290	Renesas Electronics	BF998WR	FET
AD8376	ADI	BGA7350	MMIC
AD8376	ADI	BGA7351	MMIC
ADL5354	ADI	BGX7221	MMIC
ADL5356	ADI	BGX7221	MMIC
ADL5358	ADI	BGX7220	MMIC
ADL5372	ADI	BGX7101	MMIC
ADL5375	ADI	BGX7101	MMIC
ADL5812	ADI	BGX7221	MMIC
ADRF660x	ADI	BGX7211	MMIC
AH118	Triquint	BGA7024	MMIC
AH118	Triquint	BGA7024	MMIC
AH118	Triquint	BGA7124	MMIC
AH118	Triquint	BGA7124	MMIC
AH125	Triquint	BGA7127	MMIC
AH125	Triquint	BGA7027	MMIC
AH125	Triquint	BGA7127	MMIC
AH215	Triquint	BGA7130	MMIC
AH215	Triquint	BGA7130	MMIC
AN26112A	Panasonic	BGU7045	MMIC
AN26120A	Panasonic	BGU7042	MMIC
AN26122A	Panasonic	BGU7045	MMIC
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	BA891	PIN diode
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

Manufacturer type	Manufacturer	NXP type	Product family	Manufacturer type	Manufacturer	NXP type	Product family
BAR65-02W	Infineon	BAP65-02	PIN diode	BFR181TW-GS08	Vishay	BFS520	WB trs 1-4
BAR65-03W	Infineon	BAP65-03	PIN diode	BFR181W	Infineon	BFS520	WB trs 1-4
BAR65V-02V-GS08	Vishay	BAP65-02	PIN diode	BFR182	Infineon	PBR941	WB trs 1-4
BAR66	Infineon	BAP1321-04	PIN diode	BFR182W	Infineon	PRF947	WB trs 1-4
BAR67-02W	Infineon	BAP1321-02	PIN diode	BFR183	Infineon	PBR951	WB trs 1-4
BAR67-03W	Infineon	BAP1321-03	PIN diode	BFR183T-GS08	Vishay	PBR951	WB trs 1-4
BAT18-04	Infineon	BAT18	PIN diode	BFR183TW-GS08	Vishay	PRF957	WB trs 1-4
BB639	Infineon	BB170	Varicap	BFR183W	Infineon	PRF957	WB trs 1-4
BB639	Infineon	BB172	Varicap	BFR193	Infineon	PBR951	WB trs 1-4
BB640	Infineon	BB171	Varicap	BFR193TW-GS08	Vishay	PRF957	WB trs 1-4
BB641	Infineon	BB171	Varicap	BFR193W	Infineon	PRF957	WB trs 1-4
BB669	Infineon	BB171	Varicap	BFR196T-GS08	Vishay	BFR540	WB trs 1-4
BB814	Infineon	BB201	Varicap	BFR196TW-GS08	Vishay	BFS540	WB trs 1-4
BB831	Infineon	BB131	Varicap	BFR35AP	Infineon	BFR92A	WB trs 1-4
BB833	Infineon	BB131	Varicap	BFR92AL	Freescale	BFR92A	WB trs 1-4
BB835	Infineon	BB131	Varicap	BFR92AW-GS08	Vishay	BFR92AW	WB trs 1-4
BBY58-02V	Infineon	BB202	Varicap	BFR92P	Infineon	BFR92A	WB trs 1-4
BBY65	Infineon	BB202	Varicap	BFR92W	Infineon	BFR92AW	WB trs 1-4
BF1005R	Infineon	BF1105R	FET	BFR93-GS08	Vishay	BFR93A	WB trs 1-4
BF1005SR	Infineon	BF1105R	FET	BFR93A	Infineon	BFR93A	WB trs 1-4
BF770A	Infineon	BFR93A	WB trs 1-4	BFR93AL	Freescale	BFR93A	WB trs 1-4
BF771	Infineon	PBR951	WB trs 1-4	BFR93AW	Infineon	BFR93AW	WB trs 1-4
BF771W	Infineon	BFS540	WB trs 1-4	BFR93AW-GS08	Vishay	BFR93AW	WB trs 1-4
BF772	Infineon	BFG540	WB trs 1-4	BFS17-GS08	Vishay	BFS17	WB trs 1-4
BF775	Infineon	BFR92A	WB trs 1-4	BFS17-GS08	Vishay	BFS17A	WB trs 1-4
BF775A	Infineon	BFR92A	WB trs 1-4	BFS17L	Freescale	BFS17	WB trs 1-4
BF775W	Infineon	BFR92AW	WB trs 1-4	BFS17P	Infineon	BFS17A	WB trs 1-4
BF851A	Standard	BF861A	FET	BFS17W	Infineon	BFS17W	WB trs 1-4
BF851B	Standard	BF861B	FET	BFS17W-GS08	Vishay	BFS17W	WB trs 1-4
BF851C	Standard	BF861C	FET	BFS481	Infineon	BFM505	WB trs 1-4
BF994S	Vishay	BF994S	FET	BFS483	Infineon	BFM520	WB trs 1-4
BF996S	Vishay	BF996S	FET	BFT92	Infineon	BFT92	WB trs 1-4
BF998	Infineon	BF998	FET	BFT93	Infineon	BFT93	WB trs 1-4
BF998	Vishay	BF998	FET	BGA428	Infineon	BGU7003	MMIC
BF998-GS08	Vishay	BF998	FET	BGA461	Infineon	BGU7003	MMIC
BF998R	Vishay	BF998R	FET	BGA615	Infineon	BGU7007	MMIC
BF998R	Infineon	BF998R	FET	BGA715	Infineon	BGU8007	MMIC
BF998R-GS08	Vishay	BF998R	FET	BGA725	Infineon	BGU8007	MMIC
BF998RW	Vishay	BF998WR	FET	BGA825L56	Infineon	BGU8011	MMIC
BF998W	Infineon	BF998WR	FET	BGA915	Infineon	BGU7005	MMIC
BFG135A	Infineon	BFG135	WB trs 1-4	BGA925	Infineon	BGU8011	MMIC
BFG193	Infineon	BFG198	WB trs 1-4	BGB707	Infineon	BGU6102	MMIC
BFG194	Infineon	BFG31	WB trs 1-4	BGB717	Infineon	BGU6102	MMIC
BFG196	Infineon	BFG541	WB trs 1-4	BIC701M	Renesas Electronics	BF1105R	FET
BFG19S	Infineon	BFG97	WB trs 1-4	BIC702M	Renesas Electronics	BF1105R	FET
BFG235	Infineon	BFG135	WB trs 1-4	BSR111	Standard	PMBFJ111	FET
BFP180	Infineon	BFG505/X	WB trs 1-4	BSR112	Standard	PMBFJ112	FET
BFP181	Infineon	BFG67/X	WB trs 1-4	BSR113	Standard	PMBFJ113	FET
BFP181T-GS08	Vishay	BFG67/X	WB trs 1-4	BSR174	Standard	PMBFJ174	FET
BFP182	Infineon	BFG67/X	WB trs 1-4	BSR175	Standard	PMBFJ175	FET
BFP183	Infineon	BFG520/X	WB trs 1-4	BSR176	Standard	PMBFJ176	FET
BFP183R	Infineon	BFG520/XR	WB trs 1-4	BSR177	Standard	PMBFJ177	FET
BFP183T-GS08	Vishay	BFG520/X	WB trs 1-4	CA901	Standard	BGX885N	CATV PPA
BFP183TW-GS08	Vishay	BFG520W/X	WB trs 1-4	CA901A	Standard	BGX885N	CATV PPA
BFP193	Infineon	BFG540/X	WB trs 1-4	CMM6004-SC	Mimix	BGA7024	MMIC
BFP193W	Infineon	BFG540W/XR	WB trs 1-4	CMM6004-SC	Mimix	BGA7124	MMIC
BFP196T-GS08	Vishay	BFG540/X	WB trs 1-4	CMM6004-SC	Mimix	BGA7124	MMIC
BFP196TR-GS08	Vishay	BFG540/XR	WB trs 1-4	CMM6004-SC	Mimix	BGA7204	MMIC
BFP196TRW-GS08	Vishay	BFG540W/XR	WB trs 1-4	CMY91	Infineon	BGA2022	MMIC
BFP196TW-GS08	Vishay	BFG540W/X	WB trs 1-4	CMY91	Infineon	BGA2022	WB trs 1-4
BFP196W	Infineon	BFG540W/XP	WB trs 1-4	CXE1089Z	RFMD	BGA6489	MMIC
BFP280	Infineon	BFG505/X	WB trs 1-4	CXE1089Z	RFMD	BGA6589	MMIC
BFP405	Infineon	BFG410W	WB trs 5-7	D10040180GT	RFMD	CGD1042H	CATV PD
BFP420	Infineon	BFG425W	WB trs 5-7	D10040180GTH	RFMD	CGD1042H	CATV PD
BFP450	Infineon	BFG480W	WB trs 5-7	D10040200GT	RFMD	CGD1042H	CATV PD
BFP620	Infineon	BFU660F	WB trs 5-7	D10040200GTH	RFMD	CGD1042H	CATV PD
BFP640	Infineon	BFU630F	WB trs 5-7	D10040200P1	RFMD	CGD1042H	CATV PD
BFP640	Infineon	BFU660F	WB trs 5-7	D10040200PH1	RFMD	CGD1042H	CATV PD
BFP650	Infineon	BFU690F	WB trs 5-7	D10040220GT	RFMD	CGD1042H	CATV PD
BFP650	Infineon	BFU760F	WB trs 5-7	D10040220GTH	RFMD	CGD1042H	CATV PD
BFP650	Infineon	BFU790F	WB trs 5-7	D10040230P1	RFMD	CGD1042H	CATV PD
BFP67-GS08	Vishay	BFG67/X	WB trs 1-4	D10040230PH1	RFMD	CGD1042H	CATV PD
BFP67R-GS08	Vishay	BFG67/X	WB trs 1-4	D10040240GT	RFMD	CGD1044H	CATV PD
BFP720	Infineon	BFU710F	WB trs 5-7	D10040240GTH	RFMD	CGD1044H	CATV PD
BFP720	Infineon	BFU730F	WB trs 5-7	D10040250GT	RFMD	CGD1044H	CATV PD
BFP740	Infineon	BFU710F	WB trs 5-7	D10040250GTH	RFMD	CGD1044H	CATV PD
BFP740	Infineon	BFU725F/N1	WB trs 5-7	D10040270GT	RFMD	CGD1044H	CATV PD
BFP740	Infineon	BFU730F	WB trs 5-7	D10040270GTH	RFMD	CGD1044H	CATV PD
BFP740F	Infineon	BFU725F/N1	WB trs 5-7	D10040270GTL	RFMD	CGD1044H	CATV PD
BFP750	Infineon	BFU690F	WB trs 5-7	D8740180GT	RFMD	CGD942C	CATV PD
BFP750	Infineon	BFU760F	WB trs 5-7	D8740180GTH	RFMD	CGD942C	CATV PD
BFP750	Infineon	BFU790F	WB trs 5-7	D8740220GT	RFMD	CGD942C	CATV PD
BFQ193	Infineon	BFQ540	WB trs 1-4	D8740220GTH	RFMD	CGD942C	CATV PD
BFQ19S	Infineon	BFQ19	WB trs 1-4	D8740240GT	RFMD	CGD944C	CATV PD
BFQ67-GS08	Vishay	BFQ67W	WB trs 1-4	D8740240GTH	RFMD	CGD944C	CATV PD
BFR106	Infineon	BFR106	WB trs 1-4	D8740250GT	RFMD	CGD944C	CATV PD
BFR180	Infineon	BFR505	WB trs 1-4	D8740250GTH	RFMD	CGD944C	CATV PD
BFR180W	Infineon	BFS505	WB trs 1-4	D8740270GT	RFMD	CGD944C	CATV PD
BFR181	Infineon	BFR520	WB trs 1-4	D8740270GTH	RFMD	CGD944C	CATV PD
BFR181T-GS08	Vishay	BFR520	WB trs 1-4	D8740320GT	RFMD	CGY888C	CATV PP

Manufacturer type	Manufacturer	NXP type	Product family	Manufacturer type	Manufacturer	NXP type	Product family
D8740320GTH	RFMD	CGY888C	CATV PP	HVU131	Renesas	BAP65-03	PIN diode
EC2C03C	Sanyo	BB145B	Varicap	HVU132	Renesas Electronics	BAP51-03	PIN diode
FSD273TA	Skyworks	BB170	Varicap	HVU132	Renesas	BAP51-03	PIN diode
HBFP0405	Agilent	BFG410W	WB trs 5-7	HVU187	Renesas	BAP70-02	PIN diode
HBFP0420	Agilent	BFG425W	WB trs 5-7	HVU300A	Renesas Electronics	BB171	Varicap
HBFP0450	Agilent	BFG480W	WB trs 5-7	HVU300A	Renesas	BB171	Varicap
HMC454ST89E	Hittite	BGA7027	MMIC	HVU307	Renesas Electronics	BB170	Varicap
HMC454ST89E	Hittite	BGA7127	MMIC	HVU307	Renesas	BB170	Varicap
HMC454ST89E	Hittite	BGA7127	MMIC	HVU315	Renesas Electronics	BB170	Varicap
HMC617LP3	Hittite	BGU7051	MMIC	HVU315	Renesas	BB170	Varicap
HMC618LP3	Hittite	BGU7052	MMIC	HVU316	Renesas Electronics	BB131	Varicap
HMC625	Hittite	BGA7204	MMIC	HVU316	Renesas	BB131	Varicap
HMC667LP2	Hittite	BGU7053	MMIC	HVU350B	Renesas	BB156	Varicap
HSC277	Renesas	BA891	BS diode	HVU355B	Renesas	BB131	Varicap
HSMP3800	Agilent	BAP70-03	PIN diode	HVU359	Renesas	BB172	Varicap
HSMP3802	Agilent	BAP50-04	PIN diode	HVU363A	Renesas Electronics	BB170	Varicap
HSMP3804	Agilent	BAP50-05	PIN diode	HVU363A	Renesas Electronics	BB172	Varicap
HSMP3810	Agilent	BAP50-03	PIN diode	HVU363A	Renesas	BB170	Varicap
HSMP3814	Agilent	BAP50-05	PIN diode	HVU363B	Renesas Electronics	BB170	Varicap
HSMP381B	Agilent	BAP50-03	PIN diode	HVU363B	Renesas	BB170	Varicap
HSMP381C	Agilent	BAP50-05	PIN diode	HVU383B	Renesas	BB208-03	Varicap
HSMP381F	Agilent	BAP64-05W	PIN diode	INA-51063	Agilent	BGA2001	MMIC
HSMP3820	Agilent	BAP1321-03	PIN diode	JDP2S01E	Toshiba	BAP65-02	PIN diode
HSMP3822	Agilent	BAP1321-04	PIN diode	JDP2S01U	Toshiba	BAP65-03	PIN diode
HSMP3830	Agilent	BAP64-03	PIN diode	JDP2S02AFS	Toshiba	BAP51-02	PIN diode
HSMP3832	Agilent	BAP64-04	PIN diode	JDP2S02AS	Toshiba	BAP51-03	PIN diode
HSMP3833	Agilent	BAP64-06	PIN diode	JDP2S02T	Toshiba	BAP63-02	PIN diode
HSMP3834	Agilent	BAP64-05	PIN diode	JDP2S04E	Toshiba	BAP50-02	PIN diode
HSMP3860	Agilent	BAP50-03	PIN diode	JDS2S03S	Toshiba	BA891	BS diode
HSMP3862	Agilent	BAP50-04	PIN diode	KP2310R	Toko	BAP64-04W	PIN diode
HSMP3864	Agilent	BAP50-05	PIN diode	KTK920*	KEC	BF1108	FET
HSMP386B	Agilent	BAP50-02	PIN diode	KTK920BT	KEC	BF1108	FET
HSMP386E	Agilent	BAP50-04W	PIN diode	KTK920T	KEC	BF1108R	FET
HSMP386L	Agilent	BAP50-05W	PIN diode	LTC5590	Linear Technology	BGX7220	MMIC
HSMP3880	Agilent	BAP51-03	PIN diode	LTC5591	Linear Technology	BGX7221	MMIC
HSMP3890	Agilent	BAP51-03	PIN diode	LTC5592	Linear Technology	BGX7221	MMIC
HSMP3892	Agilent	BAP64-04	PIN diode	MA2SV01	Renesas Electronics	BB202	Varicap
HSMP3894	Agilent	BAP64-05	PIN diode	MA2SV01	Renesas	BB202	Varicap
HSMP3895	Agilent	BAP51-02	PIN diode	MA357	Panasonic	BB172	Varicap
HSMP389B	Agilent	BAP51-02	PIN diode	MA366	Panasonic	BB170	Varicap
HSMP389C	Agilent	BAP64-04	PIN diode	MA368	Panasonic	BB131	Varicap
HSMP389F	Agilent	BAP51-05W	PIN diode	MA4CP101A	Panasonic	BAP65-03	PIN diode
HVB14S	Renesas Electronics	BAP50-04W	PIN diode	MA4P274-1141	Panasonic	BAP51-03	PIN diode
HVB190S	Renesas	BAP70-04W	PIN diode	MA4P275-1141	Panasonic	BAP65-03	PIN diode
HVC131	Renesas Electronics	BAP65-02	PIN diode	MA4P275CK-287	Panasonic	BAP65-05	PIN diode
HVC131	Renesas	BAP65-02	PIN diode	MA4P277-1141	Panasonic	BAP70-03	PIN diode
HVC132	Renesas Electronics	BAP51-02	PIN diode	MA4P278-287	Panasonic	BAP70-03	PIN diode
HVC132	Renesas	BAP51-02	PIN diode	MA4P789-1141	Panasonic	BAP1321-03	PIN diode
HVC190	Renesas	BAP50-02	PIN diode	MA4P789ST-287	Panasonic	BAP1321-04	PIN diode
HVC200A	Renesas	BB173	Varicap	MAX19985A	MAXIM	BGX7220	MMIC
HVC202A	Renesas	BB174	Varicap	MAX19995	MAXIM	BGX7221	MMIC
HVC202B	Renesas	BB174	Varicap	MAX2634	Maxim	BGU6102	MMIC
HVC300A	Renesas	BB175	Varicap	MAX2657	Maxim	BGU8007	MMIC
HVC300B	Renesas	BB175	Varicap	MAX2658	Maxim	BGU7005	MMIC
HVC306A	Renesas	BB187	Varicap	MAX2659	Maxim	BGU7005	MMIC
HVC306B	Renesas	BB187	Varicap	MAX2667	Maxim	BGU8007	MMIC
HVC350B	Renesas	BB208-02	Varicap	MAX2687	Maxim	BGU7005	MMIC
HVC355B	Renesas Electronics	BB145B	Varicap	MAX2694	Maxim	BGU7005	MMIC
HVC355B	Renesas	BB145B	Varicap	MC-7831	Renesas Electronics	BGY885A	CATV PP
HVC358B	Renesas	BB208-02	Varicap	MC-7831-HA	Renesas Electronics	BGY1085A	CATV PP
HVC359	Renesas Electronics	BB202	Varicap	MC-7832	Renesas Electronics	BGY887	CATV PP
HVC359	Renesas	BB202	Varicap	MC-7832-HA	Renesas Electronics	CGY1041	CATV PP
HVC363A	Renesas	BB173, BB178	Varicap	MC-7833	Renesas Electronics	BGY887B	CATV PP
HVC365	Renesas	BB202	Varicap	MC-7836	Renesas Electronics	BGY887B	CATV PP
HVC368B	Renesas	BB208-02	Varicap	MC-7836	Renesas Electronics	CGY1047	CATV PP
HVC375B	Renesas	BB208-02	Varicap	MC-7846	Renesas Electronics	CGD942C	CATV PD
HVC376B	Renesas Electronics	BB202	Varicap	MC-7847	Renesas Electronics	CGD944C	CATV PD
HVC376B	Renesas	BB198	Varicap	MC-7882	Renesas Electronics	BGD814	CATV PD
HVC376B	Renesas	BB202	Varicap	MC-7883	Renesas Electronics	CGD942C	CATV PD
HVC383B	Renesas	BB208-02	Varicap	MC-7884	Renesas Electronics	CGD944C	CATV PD
HVD131KRF-E	Renesas	BAP65-02, BAP1321-02	PIN diode	MC-7891	Renesas Electronics	CGD1042H	CATV PD
HVD132	Renesas Electronics	BAP51-02	PIN diode	MC-7893	Renesas Electronics	CGD1042H	CATV PD
HVD132	Renesas	BAP51-02	PIN diode	MC-7894	Renesas Electronics	CDG1044H	CATV PD
HVD142AKRF-E	Renesas	BAP1321-02	PIN diode	MC-7896	Renesas Electronics	CGD1044H	CATV PD
HVD144AKRF-E	Renesas	BAP63-02	PIN diode	MC7712	Renesas Electronics	BGY785A	CATV PPA
HVD145KRF-E	Renesas	BAP1321-02	PIN diode	MC7716	Renesas Electronics	BGY787	CATV PPA
HVD147KRF-E	Renesas	BAP1321-02	PIN diode	MC7722	Renesas Electronics	BGY785A	CATV PPA
HVD355B	Renesas	BB145B	Varicap	MC7726	Renesas Electronics	BGY787	CATV PPA
HVL142AKRF-E	Renesas	BAP55LX, BAP1321LX	PIN diode	MC7831-HA	Renesas Electronics	BGY1085A	CATV PP
HVL144AKRF-E	Renesas	BAP65LX, BAP1321LX	PIN diode	MC7832-HA	Renesas Electronics	CGY1041	CATV PP
HVL147KRF-E	Renesas	BAP55LX	PIN diode	MC7852	Renesas Electronics	BGY885A	CATV PPA
HVL358C	Renesas	BB174LX	Varicap	MC7866	Renesas Electronics	BGD816L	CATV PD
HVL368C	Renesas	BB174LX	Varicap	MC7893	Renesas Electronics	CGD1042Hi	CATV PD
HVL375C	Renesas	BB174LX	Varicap	MC7893	Renesas Electronics	CGD982HCi	CATV PD
HVM14	Renesas	BAP70-05	PIN diode	MC7894	Renesas Electronics	CGD1044Hi	CATV PD
HVM14S	Renesas	BAP50-04	PIN diode	MC7894	Renesas Electronics	CGD985HCi	CATV PD
HVM14SR	Renesas	BAP50-04	PIN diode	MC7896	Renesas Electronics	CGD1046Hi	CATV PD
HVM187S	Renesas	BAP50-04	PIN diode	MC7896	Renesas Electronics	CGD987HCi	CATV PD
HVM187WK	Renesas	BAP50-05	PIN diode	MCH4009	Sanyo	BFG424F	WB trs 5-7
HVU131	Renesas Electronics	BAP65-03	PIN diode	MGA-633P8	Avago	BGU8051	LNA

Manufacturer type	Manufacturer	NXP type	Product family
MGA-633P8	Avago	BGU8052	LNA
MGA631P8	Avago	BGU7051	MMIC
MGA632P8	Avago	BGU7052	MMIC
MGA632P8	Avago	BGU7053	MMIC
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
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
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
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	CGD1042H	CATV PD
MHW9247	Freescale	CGD944C	CATV PD
MHW9247A	Freescale	CGD944C	CATV PD
MHW9247AN	Freescale	CGD944C	CATV PD
MHW9247N	Freescale	CGD944C	CATV PD
MHWJ7185A	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	PMBFJ310	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

Manufacturer type	Manufacturer	NXP type	Product family
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.	BB170	Varicap
MMG2001NT1	Freescale	BGD816L	CATV PD
MMG2001T1	Freescale	BGD816L	CATV PD
MMG3004NT1	Freescale	BGA7027	MMIC
MMG3004NT1	Freescale	BGA7127	MMIC
MMG3004NT1	Freescale	BGA7127	MMIC
MMG3014	Freescale	BGA7024	MMIC
MMG3014	Freescale	BGA7124	MMIC
MMG3014	Freescale	BGA7124	MMIC
MMG3014	Freescale	BGA7204	MMIC
MRF577	Freescale	PRF957	WB trs 1-4
MRF917	Freescale	BFQ67W	WB trs 1-4
MRF927	Freescale	BFS25A	WB trs 1-4
MRF9411L	Freescale	BFG520/X	WB trs 1-4
MRF947	Freescale	BFS520	WB trs 1-4
MRF947A	Freescale	PRF947	WB trs 1-4
MRF9511L	Freescale	BFG540/X	WB trs 1-4
MRF957	Freescale	PRF957	WB trs 1-4
MT4S200T	Toshiba	BFG424W	WB trs 5-7
MT4S200U	Toshiba	BFG425W	WB trs 5-7
MT4S34U	Toshiba	BFG410W	WB trs 5-7
NE202930	Renesas	BFG425W	WB trs 5-7
NE661M05	Renesas	BFU630F	WB trs 5-7
NESG2021M05	Renesas Electronics	BFU610F	WB trs 5-7
NESG2021M05	Renesas	BFU730F	WB trs 5-7
NESG2021M16	Renesas	BFU630F	WB trs 5-7
NESG2031M05	Renesas Electronics	BFU630F	WB trs 5-7
NESG2031M05	Renesas	BFU630F	WB trs 5-7
NESG2031M16	Renesas	BFU630F	WB trs 5-7
NESG204619	Renesas	BFU630F	WB trs 5-7
NESG2101M05	Renesas Electronics	BFU660F	WB trs 5-7
NESG2101M05	Renesas Electronics	BFU760F	WB trs 5-7
NESG2101M05	Renesas Electronics	BFU790F	WB trs 5-7
NESG2101M05	Renesas	BFU690F	WB trs 5-7
NESG2101M16	Renesas	BFU690F	WB trs 5-7
NESG210719	Renesas	BFU690F	WB trs 5-7
NESG210833	Renesas	BFU690F	WB trs 5-7
NESG220033	Renesas	BFU690F	WB trs 5-7
NESG220034	Renesas	BFU690F	WB trs 5-7
NESG240033	Renesas	BFU690F	WB trs 5-7
NESG240034	Renesas	BFU690F	WB trs 5-7
NESG3031M05	Renesas Electronics	BFU730F	WB trs 5-7
NESG3031M05	CEL	BFU630F	WB trs 5-7
NESG3031M05	CEL	BFU725F	WB trs 5-7
NESG3031M05	CEL	BFU730F	WB trs 5-7
NESG3031M14	Renesas	BFU730F	WB trs 5-7
NESG3032M14	Renesas Electronics	BFU725F/N1	WB trs 5-7
NESG3032M14	NEC	BFU725F	WB trs 5-7
NESG3033M14	Renesas	BFU730F	WB trs 5-7
NESG340033	Renesas	BFU790F	WB trs 5-7
NESG340034	Renesas	BFU790F	WB trs 5-7
NESG3400M01	Renesas	BFU790F	WB trs 5-7
NESG7030M04	Renesas	BFU730F	WB trs 5-7
NJG1140KA1	JRC	BGU7044	MMIC
PRF947B	Motorola	PRF947	WB trs 1-4
PRF947B	Infineon	PRF947	WB trs 1-4
R0605250L	RFMD	BGY67A	CATV RA
R0605250L	Standard	BGY66B	CATV RA
R0605300L	Standard	BGY68	CATV RA
R0605300L	RFMD	BGY68	CATV RA
R1005250L	RFMD	BGY66B	CATV RA
R2005200P12	RFMD	BGY67	CATV RA
R2005240	Standard	BGY67A	CATV RA
R2005240	RFMD	BGY67A	CATV RA
R2005240P12	RFMD	BGY67A	CATV RA
R2005350L	RFMD	BGR269	CATV RA
RF3863	RFMD	BGU7051	MMIC
RF3863	RFMD	BGU7052	MMIC
RF3863	RFMD	BGU7053	MMIC
RFCC2072	RFMD	BGX7211	MMIC
RKP200KP	Renesas	BAP51LX	PIN diode
RKP201KK	Renesas	BAP63-02	PIN diode
RKP201KL	Renesas	BAP63LX	PIN diode
RKP204KP	Renesas	BAP55LX	PIN diode
RKP300KJ	Renesas	BAP50-02, BAP64-02	PIN diode
RKP300KL	Renesas	BAP50-02	PIN diode
RKP300WKQE	Renesas	BAP64-05W	PIN diode
RKP350KV	Renesas	BAP63-03, BAP1321-03	PIN diode
RKS151KJ	Renesas	BA891	BS diode
RKS151KK	Renesas	BA891	BS diode
RKV500KG	Renesas	BB156, BB208-03	Varicap
RKV500KJ	Renesas	BB208-02	Varicap
RKV500KK	Renesas	BB208-02	Varicap
RKV501KG	Renesas	BB171	Varicap
RKV501KJ	Renesas	BB175	Varicap
RKV502KG	Renesas	BB171	Varicap

Manufacturer type	Manufacturer	NXP type	Product family
RKV502KJ	Renesas	BB175	Varicap
RKV653KL	Renesas	BB145B	Varicap
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
S10040200P	RFMD	CGY1041	CATV PP
S10040220GT	RFMD	CGY1041	CATV PP
S10040220P	RFMD	CGY1041	CATV PP
S10040230GT	RFMD	CGY1043	CATV PP
S10040240P	RFMD	CGY1043	CATV PP
S10040280GT	RFMD	CGY1047	CATV PP
S595TR	Vishay	BF1105R	FET
S7540185	Standard	BGY785A	CATV PPA
S7540215	Standard	BGY787	CATV PPA
S8740180GT	RFMD	BGY885A	CATV PP
S8740190	Standard	BGD812	CATV PD
S8740190	RFMD	BGY885A	CATV PP
S8740200P	RFMD	BGY887	CATV PP
S8740220	Standard	BGD814	CATV PD
S8740220GT	RFMD	BGY887	CATV PP
S8740220P	RFMD	BGY887	CATV PP
S8740230	Standard	BGD816L	CATV PD
S8740240GT	RFMD	BGY887	CATV PP
S8740240P	RFMD	BGY887	CATV PP
S8740240P12	RFMD	BGY887	CATV PP
S8740340	RFMD	CGY888C	CATV PP
S8740340PT	RFMD	CGY888C	CATV PP
SGA8343Z	Sirenza	BFG425W	WB trs 5-7
SKY65048	Skyworks	BGU7051	MMIC
SKY65066	Skyworks	BGU7053	MMIC
SKY65084	Skyworks	BGU7052	MMIC
SKY67101-396LF	Skyworks	BGU8051	LNA
SMA3101	Sanyo	BGA2851	MMIC
SMA3101	Sanyo	BGA2851	MMIC
SMA3103	Sanyo	BGA2867	MMIC
SMA3103	Sanyo	BGA2867	MMIC
SMA3107	Sanyo	BGA2803	MMIC
SMA3107	Sanyo	BGA2803	MMIC
SMA3109	Sanyo	BGA2817	MMIC
SMA3109	Sanyo	BGA2817	MMIC
SMA3111	Sanyo	BGA2851	MMIC
SMA3111	Sanyo	BGA2851	MMIC
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
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
SPF-5122Z	RFMD	BGU7051	LNA
SPF-5122Z	RFMD	BGU7052	LNA
SPF-5122Z	RFMD	BGU7053	LNA
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

Manufacturer type	Manufacturer	NXP type	Product family
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
SXA-389B	RFMD	BGA7024	MMIC
SXA-389B	RFMD	BGA7124	MMIC
SXA-389B	RFMD	BGA7124	MMIC
SXA-389B	RFMD	BGA7204	MMIC
SXB-4089	RFMD	BGA7127	MMIC
SXB-4089	RFMD	BGA7027	MMIC
SXB-4089	RFMD	BGA7127	MMIC
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
TQP3M9005	Triquint	BGU8052	LNA
TRF370315	TI	BGX7101	MMIC
TRF370417	TI	BGX7101	MMIC
TRF3705	TI	BGX7101	MMIC
UPA800T	Renesas	BFM520	WB trs 1-4
UPA801T	Renesas	BFM520	WB trs 1-4
UPA802T	Renesas	BFM520	WB trs 1-4
UPA804T	Renesas	BFM520	WB trs 1-4
UPA806T	Renesas	BFM520	WB trs 1-4
UPA807T	Renesas	BFM520	WB trs 1-4
UPA808T	Renesas	BFM520	WB trs 1-4
UPA810T	Renesas	BFM520	WB trs 1-4
UPA811T	Renesas	BFM520	WB trs 1-4
UPA812T	Renesas	BFM520	WB trs 1-4
UPA813T	Renesas	BFM520	WB trs 1-4
UPA828TD	Renesas	BFM520	WB trs 1-4
UPA831TD	Renesas	BFM520	WB trs 1-4
UPA860TD	Renesas	BFM520	WB trs 1-4
UPA861TD	Renesas	BFM520	WB trs 1-4
UPA862TD	Renesas	BFM520	WB trs 1-4
UPA863TD	Renesas	BFM520	WB trs 1-4
UPA869TD	Renesas	BFM520	WB trs 1-4
UPA873TD	Renesas	BFM520	WB trs 1-4
UPA895TD	Renesas	BFM520	WB trs 1-4
uPC2709	Renesas Electronics	BGA2709	MMIC
uPC2711	Renesas Electronics	BGA2711	MMIC
uPC2712	Renesas Electronics	BGA2712	MMIC
uPC2745	Renesas Electronics	BGA2001	MMIC
uPC2746	Renesas Electronics	BGA2001	MMIC
uPC2748	Renesas Electronics	BGA2748	MMIC
uPC2771	Renesas Electronics	BGA2771	MMIC
uPC3224	Renesas Electronics	BGA2851	MMIC
uPC3224	Renesas Electronics	BGA2851	MMIC
uPC3226	Renesas Electronics	BGA2867	MMIC
uPC3226	Renesas Electronics	BGA2867	MMIC
uPC3227	Renesas Electronics	BGA2851	MMIC
uPC3227	Renesas Electronics	BGA2851	MMIC
uPC3240	Renesas Electronics	BGA2802	MMIC
uPC3240	Renesas Electronics	BGA2802	MMIC
uPC3241	Renesas Electronics	BGA2817	MMIC
uPC3241	Renesas Electronics	BGA2817	MMIC
uPC3241	Renesas Electronics	BGA2817	MMIC
uPC8112	Renesas Electronics	BGA2022	MMIC
UPC8230TU	Renesas Electronics	BGU7007	MMIC
UPC8236T6N	Renesas Electronics	BGU8007	MMIC
uPD5740T6N	Renesas Electronics	BGU7045	MMIC
uPD5756T6N	Renesas Electronics	BGU7045	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
RFP trs	RF power transistor
Varicap	Varicap diode
WB trs	Wideband transistor




NXP discontinued type	Product family NXP	Replacement type NXP
BA792	BS diode	BA591
BAP142L	PIN diode	BAP142LX
BAP51-01	PIN diode	BAP51LX
BAP51L	PIN diode	BAP51LX
BAP55L	PIN diode	BAP55LX
BB145	Varicap	BB145B
BB145B-01	Varicap	BB145B
BB151	Varicap	BB135
BB181LX	Varicap	BB181
BB202LX	Varicap	BB202
BB804	Varicap	BB207
BBY42	Varicap	BBY40
BF245A	FET	BF545A
BF245B	FET	BF545B
BF245C	FET	BF545C
BF556B	FET	BF556A
BF556C	FET	BF556A
BF689K	WB trs	BFS17
BF763	WB trs	BFS17
BF851A	FET	BF861A
BF851C	FET	BF861C
BF992/01	FET	BF992
BFC505	WB trs	BFM505
BFC520	WB trs	BFM520
BFET505	WB trs	BFM505
BFET520	WB trs	BFM520
BFG17A	WB trs	BFS17A
BFG197	WB trs	BFG198
BFG197/X	WB trs	BFG198
BFG410W/CA	WB trs	BFG410W
BFG425W/CA	WB trs	BFG425W
BFG505/XR	WB trs	BFG505/X
BFG505W/XR	WB trs	BFG505
BFG520W/XR	WB trs	BFG520W/X
BFG590/XR	WB trs	BFG590/X
BFG67/XR	WB trs	BFG67
BFQ34/01	WB trs	BFG35
BFR92	WB trs	BFR92A
BFR92AR	WB trs	BFR92A
BFR92AT	WB trs	BFR92AW
BFR93	WB trs	BFR92A
BFR93AT	WB trs	BFR93AW
BFR93R	WB trs	BFR93A
BFS17/FD	WB trs	BFS17
BFU510	WB trs	BFU725F/N1
BFU540	WB trs	BFU725F/N1
BFU725F	WB trs	BFU725F/N1
BGA2031	WB trs	BGA2031/1
BGD502	CATV	BGD712
BGD602D	CATV	BGD712
BGD702	CATV	BGD712
BGD702D	CATV	BGD712
BGD702D/08	CATV	BGD712
BGD702N	CATV	BGD712
BGD704	CATV	BGD714
BGD704N	CATV	BGD714
BGD802	CATV	BGD812



























NXP discontinued type	Product family NXP	Replacement type NXP
BGD802N	CATV	BGD812
BGD802N/07	CATV	BGD812
BGD804	CATV	BGD814
BGD804N	CATV	BGD814
BGD804N/02	CATV	BGD814
BGD902	CATV	BGD812
BGD902L	CATV	BGD812
BGD904	CATV	BGD814
BGD904L	CATV	BGD814
BGD906	CATV	CGD942C
BGE788	CATV	BGE788C
BGO807C	CATV	BGO807C/FCO
BGO807CE	CATV	BGO807CE/SCO
BGO827	CATV	BGO807CE/FCO
BGO827/SCO	CATV	BGO807CE/SCO
BGQ34/01	WB trs	BFG35
BGU2003	WB trs	BGA2003
BGX885/02	CATV	BGX885N
BGY1085A/07	CATV	BGY1085A
BGY585A	CATV	BGY785A
BGY587	CATV	BGY787
BGY587B	CATV	BGE787B
BGY588N	CATV	BGY588C
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	CATV	BGY785A
BGY685AD	CATV	BGY785A
BGY685AL	CATV	BGY785A
BGY687	CATV	BGY787
BGY687B	CATV	BGE787B
BGY687B/02	CATV	BGE787B
BGY785A/07	CATV	BGY785A
BGY785A/09	CATV	BGY785A
BGY785AD	CATV	BGY785A
BGY785AD/06	CATV	BGY785A
BGY785AD/8M	CATV	BGY885A
BGY787/02	CATV	BGY787
BGY787/07	CATV	BGY787
BGY787/09	CATV	BGY787
BGY883	CATV	BGY885A
BGY887/02	CATV	BGY887
BLF6G20LS-180RN	RFP trs	BLF7G20LS-200
BLC6G10LS-160RN	RFP trs	BLF8G10LS-160
BLF346	RFP trs	BLF642
BLF872	RFP trs	BLF888A
BLA1011-200R	RFP trs	BLA6G1011-200R
BLA1011S-200R	RFP trs	BLA6G1011S-200RG
CGD1042	CATV	CGD1042H
CGD1044	CATV	CGD1044H
CGD914	CATV	CGD1042H
CGY887A	CATV	CGY1043




NXP discontinued type	Product family NXP	Replacement type NXP
CGY887B	CATV	CGY1047
GD923	CATV	CGD942C
J108	FET	PMBFJ108
J109	FET	PMBFJ109
J110	FET	PMBFJ110
J111	FET	PMBFJ111
J112	FET	PMBFJ112
J113	FET	PMBFJ113
J174	FET	PMBFJ174
J175	FET	PMBFJ175
J176	FET	PMBFJ176
J177	FET	PMBFJ177
OM7650	CATV	BGY588C
OM7670	CATV	BGE788C
ON4831-2	CATV	BGY885A
ON4876	CATV	BGY1085A
ON4890	CATV	BGD712
PMBT3640/AT	WB trs	BFS17
PN4392	FET	PMBF4392
PN4393	FET	PMBF4393
TFF1004HN	Satellite IC	TFF1014HN













6. Packing and packaging information

6.1 Packing quantities per package with relevant ordering codes

	Package	Package dimensions L x W x H (mm)	Packing quantity	Product 12NC ending	Packing method	Type		
	SOD323/SC-76	1.7 x 1.25 x 0.9	3,000	115	8 mm tape and reel	Plastic		
			10,000	135	8 mm tape and reel			
	SOD523/SC-79	1.2 x 0.8 x 0.6	3,000	115	8 mm tape and reel			
			10,000	135	8 mm tape and reel			
			8,000	315	2 mm pitch tape and reel			
			20,000	335	2 mm pitch tape and reel			
	SOD882D	1.0 x 0.6 x 0.4	10,000	315	Reel			
	SOT23	2.9 x 1.3 x 0.9	3,000	215	8 mm tape and reel			
			10,000	235	8 mm tape and reel			
	SOT54	4.6 x 3.9 x 5.1	5,000	112	Bulk, delta pinning			
			5,000	412	Bulk, straight leads			
			10,000	116	Tape and reel, wide pitch			
			10,000	126	Tape ammpack, wide pitch			
	SOT89/SC-62	4.5 x 2.5 x 1.5	1,000	115	12 mm tape and reel			
			4,000	135	12 mm tape and reel			
	SOT115	44.5 x 13.65 x 20.4	100	112	4 tray/box		Plastic	
	SOT121B	24.8 x 6.4 x 6.7	40	112	Blister, tray		Air-cavity ceramic	
	SOT143(N/R)	2.9 x 1.3 x 0.9	3,000	215	8 mm tape and reel		Plastic	
			10,000	235	8 mm tape and reel			
	SOT223/SC-73	6.7 x 3.5 x 1.6	1,000	115	12 mm tape and reel		Plastic	
			4,000	135	12 mm tape and reel			
	SOT262A	34 x 9.8 x 5.4	60	112	Blister, tray	Air-cavity ceramic		
	SOT307	10 x 10 x 1.75	1,500	518	13" tape and reel dry pack	Plastic		
			96	551	1 tray dry pack			
			480	557	5 tray dry pack			
	SOT323/SC-70	2.0 x 1.25 x 0.9	3,000	115	8 mm tape and reel	Plastic		
			10,000	135	8 mm tape and reel			
	SOT341	5.3 x 10.2 x 2.0	1,000	118	13" tape and reel			
			658	112	Tube			
	SOT343(N/R)	2.0 x 1.25 x 0.9	3,000	115	8 mm tape and reel			
			10,000	135	8 mm tape and reel			
	SOT343F	2.1 x 1.25 x 0.7	3,000	115	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	115	8 mm tape and reel		Plastic	
			10,000	135	8 mm tape and reel			
	SOT401	5 x 5 x 1.4	2,000	118	13" tape and reel			
			360	151	1 tray			
	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			
	SOT467B	9.7 x 5.8 x 4.3	60	112	Blister, tray			Air-cavity ceramic
			400	118	Tape and reel			
	SOT467C	20.3 x 5.8 x 4.3	60	112	Blister, tray			
	SOT502A	34.0 x 9.8 x 4.1	60	112	Blister, tray			
			300	135	Reel			
			100	118	Tape and reel			

	Package	Package dimensions L x W x H (mm)	Packing quantity	Product 12NC ending	Packing method	Type	
	SOT502B	20.6 x 9.8 x 4.1	60 100	112 118	Blister, tray Tape and reel	Air-cavity ceramic	
	SOT502C	20.6 x 9.8 x 4.1	60	112	Blister, tray		
	SOT502D	34 x 9.8 x 4.1	60	112	Blister, tray		
	SOT502E	20.6 x 9.8 x 4.1	60	112	Blister, tray		
			100	118	Blister, tray		
			24	127	Tube		
			96	127	Tube		
	SOT538A	5.5 x 4.1 x 2.2	500	112	Blister, tray		
	SOT539A	41.2 x 10.2 x 4.5	60	112	Blister, tray		
			300	135	Reel		
			100	118	Tape and reel		
	SOT539B	32.3 x 10.2 x 4.5	60	112	Blister, tray		
	SOT540A	34.0 x 9.8 x 5.4	60	112	Blister, tray		
	SOT608A	20.3 x 10.2 x 4.2	60	112	Blister, tray		
			100	118	Tape and reel		
			300	135	Reel		
	SOT608B	10.2 x 10.16 x 4.2	60	112	Blister, tray		
			300	135	Tape and reel		
	SOT616	4.0 x 4.0 x 0.85	6,000	118	12 mm tape and reel	Plastic	
			1,500	115	8 mm tape and reel		
			100	551	Tray		
	SOT617	5 x 5 x 0.85	6,000	118	Tape and reel		
	SOT618	6 x 6 x 0.85	4,000	118	13" tape and reel		
			1,000	515	7" tape and reel dry pack		
			490	551	1 tray dry pack		
			2,450	157	5 tray		
	SOT634A	34 x 13.7 x 4.3	60	112	Blister, tray		Air-cavity ceramic
	SOT638	14 x 14 x 1	1,000	518	13" tape and reel dry pack		Plastic
			90	551	1 tray dry pack		
			450	557	5 tray dry pack		
	SOT650-1	3.0 x 3.0 x 0.85	6,000	118	Reel		
	SOT666	1.6 x 1.2 x 0.7	4,000	115	8 mm tape and reel		
	SOT684	8 x 8 x 0.85	1,000	518	13" tape and reel dry pack		
			260	151	1 tray		
			260	551	1 tray dry pack		
			1,300	157	5 tray dry pack		
	SOT724	8.7 x 3.9 x 1.47	2,500	118	16 mm tape and reel		
	SOT753	2.9 x 1.5 x 1.0	3,000	125	8 mm tape and reel	Plastic	
	SOT763-1	2.5 x 3.5 x 0.85	3,000	115	Reel		
			6,000	135	Reel		
	SOT778	6.0 x 6.0 x 0.85	490	551	Tray		
			4,000	518	Multiple trays		
	SOT822-1	15.9 x 11 x 3.4	180	127	Tube		
	SOT834-1	15.9 x 11 x 3.4	180	127	Tube		
	SOT883	1.0 x 0.6 x 0.5	3,000	115	8 mm tape and reel		
	SOT886	1.45 x 1.0 x 0.5	5,000	115	8 mm tape and reel		
	SOT891	1.0 x 1.0 x 0.5	5,000	132	8 mm tape and reel		
	SOT908	3.0 x 3.0 x 0.85	6,000	118	12 mm tape and reel	Air-cavity ceramic	

	Package	Package dimensions L x W x H (mm)	Packing quantity	Product 12NC ending	Packing method	Type
	SOT922-1	17.6 x 9.4 x 3.9	60	112	Blister, tray	Air-cavity ceramic
	SOT975B	7.1 x 6.9 x 3.3	180 100	112 118	Blister, tray Tape and reel	
	SOT975C	7.1 x 6.9 x 3.3	180 100	112 118	Blister, tray Tape and reel	
	SOT979A	41.2 x 10.2 x 5.3	60	112	Blister, tray	
	SOT1110A	41.2 x 10.2 x 4.9	60	112	Blister, tray	
	SOT1110B	32.3 x 10.2 x 4.9	60	112	Blister, tray	
	SOT1112A	20.3 x 9.8 x 4.2	60	112	Blister, tray	
	SOT1112B	9.8 x 9.8 x 4.2	60	112	Blister, tray	
	SOT1120A	34.0 x 9.8 x 4.1	60 100	112 118	Blister, tray Tape and reel	
	SOT1120B	20.6 x 9.8 x 4.1	60 100	112 118	Blister, tray Tape and reel	
	SOT1121A	34.0 x 9.8 x 4.1	60 100	112 118	Blister, tray Tape and reel	
	SOT1121B	20.6 x 9.8 x 4.1	60 100	112 118	Blister, tray Tape and reel	
	SOT1121C	20.6 x 9.8 x 4.1	24 96	127 127	Blister, tray Blister, tray	
	SOT1130A	20.3 x 9.8 x 4.2	60	112	Blister, tray	
	SOT1130B	9.8 x 9.8 x 4.2	60	112	Blister, tray	
	SOT1135A	20.3 x 9.8 x 4.1	60 100	112 118	Blister, tray Reel	
	SOT1135B	9.8 x 9.8 x 4.2	60	112	Blister, tray	
	SOT1138-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1179-1	6.0 x 4.0 x 0.9	500	135	Tape and reel	
	SOT1198-1	10.0 x 5.5 x 0.8	1,000	115	Tape and reel	
	SOT1204-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1209	2 x 1.3 x 0.35	5,000	147	8 mm tape and reel	
	SOT1230	1.1 x 0.0 x 0.37	5,000	115	Reel	
	SOT1242B	32.2 x 10 x 4.9	100 15 60	115 127 127	Tape and reel Tube Tube	
	SOT1242C	32.2 x 10.2 x 4.9	100 15 60	115 127 127	Tape and reel Tube Tube	
	SOT1244B	20.6 x 9.8 x 4.1	60 100	112 118	Blister, traytape and reel Blister, traytape and reel	
	SOT1244C	20.6 x 9.8 x 4.1	100 24 96	118 127 127	Tape and reel Tube Tube	Air-cavity ceramic
	SOT1211-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1212-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1214A	34 x 9.8 x 4.1	60	112	Blister, tray	Air-cavity ceramic
	SOT1214B	20.6 x 9.8 x 4.1	60	112	Blister, tray	

	SOT1221-1	20.6 x 10 x 3.6	100	118	Tape and reel	Plastic (OMP)
	SOT1222-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1223-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1224-1	20.6 x 10 x 3.6	100	118	Tape and reel	
	SOT1227A	14 x 4.1 x 2.9	60	112	Blister, tray	Air-cavity ceramic
	SOT1227B	5.1 x 4.1 x 2.9	60	112	Blister, tray	
	SOT1228A	29 x 5.8 x 4.7	60	112	Blister, tray	
	SOT1228B	17.3 x 5.8 x 4.7	60	112	Blister, tray	
	SOT1247B	32.3 x 10.2 x 4.9	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1250-1	32.3 x 10.2 x 4.5	60	112	Blister, tray	Air-cavity plastic
			100	118	Tape and reel	
	SOT1251-1	32.3 x 10.2 x 4.5	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1252-1	32.3 x 10.2 x 4.5	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1270-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1271-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1272-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1273-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1274-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1275-1	20.6 x 9.8 x 4.1	60	112	Blister, tray	
			100	118	Tape and reel	

6.2 Marking codes

In general, device marking includes the part number, some manufacturing information, and the NXP logo. If packages are too small for the full-length part number, a shorter, coded part number – marking code – is used (where % = placeholder for manufacturing site code). The full-length part number is always printed on the packing label on the box or bulk-pack in which the devices are supplied.

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
1	BA277	SOD523	%MY	BF1100	SOT143	6F%	BAP1321-04	SOT23
2	BB182	SOD523	%VA	BGU7041	SOT363	6K%	BAP64-06	SOT23
4	BB189	SOD523	%VB	BGU7042	SOT363	6W%	BAP50-04W	SOT323
4	BB189/L	SOD523	10%	BAT18	SOT23	7	BA891/L	SOD523
7	BA891	SOD523	1000 1001	BB173LX	SOD882D	7K%	BAP65-05	SOT23
8	BB178	SOD523	1000 1010	BB174LX	SOD882D	8	BB178/L	SOD523
9	BB179	SOD523	1001 0001	BAP1321LX	SOD882D	8K%	BAP70-05	SOT23
%13	BB207	SOT23	1001 0010	BAP142LX	SOD882D	9	BB179/L	SOD523
%1V	BFR93AW/DG	SOT323	1001 0011	BAP50LX	SOD882D	A	BGU8009	SOT1230.
%1W	BAP51-05W	SOT323	1001 0100	BAP51LX	SOD882D	A1	BA591	SOD323
%3A	BGA6289	SOT89	1001 0101	BAP63LX	SOD882D	A1	BB208-02	SOD523
%4A	BGA6489	SOT89	1001 0110	BAP65LX	SOD882D	A1	BGA2001	SOT343
%5A	BGA6589	SOT89	1001 0111	BB179BLX	SOD882D	A1	BAP64Q	SOT753
%6G	PMBF4393	SOT23	1111 1111	BAP64LX	SOD882D	A2	BB208-03	SOD323
%6J	PMBF4391	SOT23	1111 1011	BAP55LX/A	SOD882D	A2	BB184	SOD523
%6K	PMBF4392	SOT23	1111 1100	BB179LX	SOD882D	A2	BGA2002	SOT343
%6K	BGA7024	SOT89	1111 1101	BAP55LX	SOD882D	A2	BAP70Q	SOT753
%6L	BGA7027	SOT89	1111 1110	BB178LX	SOD882D	A2%	BGA2022	SOT363
%6N	ON5088	SOT343	1A	BGU6101	SOT1209	A3	BAP64-03	SOD323
%6S	PMBFJ176	SOT23	1B	BGU6102	SOT1209	A3	BB198	SOD523
%6W	PMBFJ175	SOT23	1B%	BGA2717	SOT363	A3	BGA2003	SOT343
%6W	BGA3012	SOT89	1C	BGU6104	SOT1209	A3%	BGA2031/1	SOT363
%6X	PMBFJ174	SOT23	1C%	BAP50-05	SOT23	A5	BAP51-03	SOD323
%6X	BGA3015	SOT89	1E	BGU8131	SOT1209	A5%	BGA2011	SOT363
%6Y	PMBFJ177	SOT23	1N%	BAP70-04W	SOT323	A6%	BGA2012	SOT363
%6Y	BGA3018	SOT89	2	BB182/L	SOD523	A8	BAP50-03	SOD323
%7N	ON5087	SOT343	20%	BF545A	SOT23	A8%	BFG325W/XR	SOT343
%8N	ON5089	SOT343	21%	BF545B	SOT23	A8%	PMBFJ620	SOT363
%AB	BF1210	SOT363	22%	BF545C	SOT23	A9	BAP70-03	SOD323
%BG	PMBFJ177/DG	SOT23	24%	BF556A	SOT23	AC	BGU7005	SOT886
%M1	BF908	SOT143	25%	BF556B	SOT23	B3	BGU7003	SOT891
%M2	BF908R	SOT143	26%	BF556C	SOT23	B5%	BSR12	SOT23
%M3	BF909	SOT143	28%	BF861A	SOT23	B5%	BFG425W/B	SOT343
%M4	BF909R	SOT143	29%	BF861B	SOT23	B6	BGU7007	SOT886
%M5	BF909A	SOT143	2A%	BF862	SOT23	B6%	BGA2715	SOT363
%M6	BF909AR	SOT143	2E	PRF949/DG	SOT416	B7	BGU7008	SOT886
%M7	BF904A	SOT143	2L	BF1208	SOT666	B7%	BF862/B	SOT23
%M8	BF904AR	SOT143	30%	BF861C	SOT23	B7%	BFU725F/N1	SOT343
%M9	BSS83	SOT143	31%	BFR505	SOT23	B7%	BGA2716	SOT363
%M9	ON4906	SOT143	32%	BFR520	SOT23	BA%	BGA2714	SOT363
%MA	BF991	SOT143	33%	BFR540	SOT23	BC%	BFQ591	SOT89
%MB	BF992	SOT143	34%	BFT25A	SOT23	BFG135	BFG135	SOT223
%MC	BF904	SOT143	35%	ON4288	SOT23	BFG198	BFG198	SOT223
%MD	BF904R	SOT143	36%	ON4690	SOT23	BFG31	BFG31	SOT223
%ME	BFG505	SOT143	38%	PMBFJ108	SOT23	BFG35	BFG35	SOT223
%MF	BFG520	SOT143	39%	PMBFJ109	SOT23	BFG541	BFG541	SOT223
%MG	BFG540	SOT143	40%	PMBFJ110	SOT23	BFG591	BFG591	SOT223
%MH	BFG590	SOT143	41%	PMBFJ111	SOT23	BFG94	BFG94	SOT223
%MK	BFG505/X	SOT143	42%	PMBFJ112	SOT23	BFG97	BFG97	SOT223
%ML	BFG520/X	SOT143	47%	PMBFJ113	SOT23	BLT50	BLT50	SOT223
%MM	BFG540/X	SOT143	48%	PMBFJ308	SOT23	BLT70	BLT70	SOT223
%MM	ON4832	SOT143	49%	PMBFJ309	SOT23	BLT80	BLT80	SOT223
%MN	BFG590/X	SOT143	4A	BF1208D	SOT666	BLT81	BLT81	SOT223
%MP	BFG520/XR	SOT143	4H	BB179	SOD323	C	BB179B	SOD523
%MP	ON4973	SOT143	4J	BB171	SOD323	C1%	BGM1011	SOT363
%MR	BFG540/XR	SOT143	4K	BB172	SOD323	C2%	BGM1012	SOT363
%MS	BFG10	SOT143	4K%	BAP64-04	SOT23	C4%	BGM1013	SOT363
%MT	BFG10/X	SOT143	4L%	BAP50-04	SOT23	C5%	BGM1014	SOT363
%MU	BFG25A/X	SOT143	4W%	BAP64-04W	SOT323	CE	BB173	SOD523
%MV	BFG67/X	SOT143	50%	PMBFJ310	SOT23	CF	BB174	SOD523
%MW	BFG92A/X	SOT143	5K%	BAP64-05	SOT23	CH	BB175	SOD523
%MX	BFG93A/X	SOT143	5W%	BAP64-05W	SOT323	D1	BFU610F	SOT343

Marking code	Type	Package
D2	BAP63-03	SOD323
D2	BFU630F	SOT343
D3	BAP65-03	SOD323
D3	BFU660F	SOT343
D4	BFU690F	SOT343
D5	BFU710F	SOT343
D6	BFU730F	SOT343
D7	BFU760F	SOT343
D8	BFU790F	SOT343
D9%	BFG425W/DG/B2	SOT343
DG%	PBR951/A2	SOT23
E1%	BFS17	SOT23
E1%	BFS17/FD	SOT23
E1%	ON4438	SOT23
E1%	BFS17W	SOT323
E2%	BFS17A	SOT23
E2%	ONS5023	SOT23
E2%	BGA2712	SOT363
E3%	BGA2709	SOT363
FB	BFQ19	SOT89
FF	BFQ18A	SOT89
FG	BFQ149	SOT89
G2	BA278	SOD523
G2%	BGA2711	SOT363
G3%	BGA2748	SOT363
G4%	BGA2771	SOT363
G5%	BGA2776	SOT363
JR	BB156/DG/B2	SOD323
JS	BAP64-03/DG/B2	SOD323
K1	BAP51-02	SOD523
K2	BAP51-05W	SOD523
K4	BAP50-02	SOD523
K5	BAP63-02	SOD523
K6	BAP65-02	SOD523
K7	BAP1321-02	SOD523
K8	BAP70-02	SOD523
K9	BB199	SOD523
L2	BB202	SOD523
L2%	BF1203	SOT363
L3%	BF1204	SOT363
L4%	BF1205	SOT363
L6%	BF1206	SOT363
L8	BA792	SOD110
L9%	BF1208	SOT363
LA	BF1201WR	SOT343
LA%	BF1201	SOT143
LB%	BF1201R	SOT143
LB%	PBR941B	SOT23
LD%	BF1202	SOT143
LD%	BF1202/L	SOT143
LE	BF1202WR	SOT343
LE	BF1202WR/L	SOT343
LE%	BF1202R	SOT143
LF%	BF1211	SOT143
LG%	BF1212	SOT143
LH%	BF1211R	SOT143
LJ%	BGU7044	SOT363
LK%	BF1212R	SOT143
LK%	BGU7045	SOT363
LP%	BGA2867	SOT363
LR%	BGA2874	SOT363
LS%	BGA2817	SOT363
M1%	BFR30	SOT23
M2%	BFR31	SOT23
M2%	BF1207	SOT363
M26	BF908	SOT143
M27	BF908R	SOT143
M28	BF909	SOT143
M29	BF909R	SOT143
M3%	BFT46	SOT23
M33	BF909A	SOT143
M34	BF909AR	SOT143
M4%	BSR56	SOT23
M41	BF904A	SOT143
M42	BF904AR	SOT143
M5%	BSR57	SOT23
M5%	BF1216	SOT363
M56	BF1100	SOT143
M6%	BSR58	SOT23
M7%	BF1218	SOT363
M74	BSS83	SOT143

Marking code	Type	Package
M74	ON4906	SOT143
M91	BF991	SOT143
M92	BF992	SOT143
MA%	BGA2802	SOT363
MB	BF998WR	SOT343
MB%	BGA2803	SOT363
MC	BF904WR	SOT343
MC%	BGA2851	SOT363
MD	BF908WR	SOT343
MD%	BGA2869	SOT363
ME	BF909WR	SOT343
MF	BF1100WR	SOT343
MG	BF909AWR	SOT343
MG%	BF994S	SOT143
MH	BF904AWR	SOT343
MH%	BF996S	SOT143
MK	BF1211WR	SOT343
ML	BF1212WR	SOT343
ML	BF1212WR/L	SOT343
MO%	BF998	SOT143
MO%	BF998R	SOT143
MO4	BF904	SOT143
MO6	BF904R	SOT143
MQ%	BFR106/DG/B2	SOT23
MS%	BFR92A/DG/B2	SOT23
MT%	BF862/DG/B2	SOT23
MV%	BFR30/DG/B2	SOT23
N	BB181	SOD523
N0	BFR505T	SOT416
N0%	BFS505	SOT323
N0%	BFM505	SOT363
N2	BFR520T	SOT416
N2%	BFS520	SOT323
N2%	ONS5030	SOT323
N2%	BFM520	SOT363
N3	BFG520W	SOT343
N33	BFG505	SOT143
N36	BFG520	SOT143
N37	BFG540	SOT143
N38	BFG590	SOT143
N39	BFG505/X	SOT143
N4	BFG520W/X	SOT343
N4	BFQ540	SOT89
N4%	BFS540	SOT323
N42	BFG520/X	SOT143
N43	BFG540/X	SOT143
N43	ON4832	SOT143
N44	BFG590/X	SOT143
N48	BFG520/XR	SOT143
N49	BFG540/XR	SOT143
N6%	BFS25A	SOT323
N7	BFG540W/X	SOT343
N70	BFG10	SOT143
N71	BFG10/X	SOT143
N8	BFG540W/XR	SOT343
N9	BFG540W	SOT343
N9%	BAP70AM	SOT363
NA	BF1105WR	SOT343
NA%	BF1105R	SOT143
NC	BF1101WR	SOT343
ND	BFG424W	SOT343
NE	BFG424F	SOT343
NE%	BF1105	SOT143
NG%	BF1108	SOT143
NG%	BF1108/L	SOT143
NGH%	BF1108R	SOT143
NL%	BFR94A	SOT23
none	BFR540	SOT143
ON5026	ON5026	SOT223
ON5046	ON5046	SOT223
P1	BB131	SOD323
P1	BFG21W	SOT343
P2%	BFR92A	SOT23
P2%	ON4640	SOT23
P2%	BFR92AW	SOT323
P3	BFG403W	SOT343
P4	BFG410W	SOT343
P5	BB135	SOD323
P5	BFG425W	SOT343
P6	BFG480W	SOT343
P8	BB148	SOD323

Marking code	Type	Package
P9	BB149	SOD323
PB	BB152	SOD323
PC	BB153	SOD323
PF	BB156	SOD323
PL	BB149A	SOD323
R2%	BFR93A	SOT23
R2%	BFR93AW	SOT23
R5%	BFR93AR	SOT23
R7%	BFR106	SOT23
R8%	BFG93A	SOT143
S	BAP64-02	SOD523
S2%	BFG325/XR	SOT143
S2%	BBY40	SOT23
S3%	BF1107	SOT23
S6%	BF510	SOT23
S7%	BF511	SOT23
S8%	BF512	SOT23
S9%	BF513	SOT23
SB%	BF1214	SOT363
SB%	BF1214/L	SOT363
SC%	BB201	SOT23
SC%	BGU7031	SOT363
SD%	BGU7032	SOT363
SE%	BGU7033	SOT363
T5	BFG10W/X	SOT343
UW	BGU7003W	SOT886
UY	BGU7004	SOT886
UZ	BGU8007	SOT886
V0%	PBR941	SOT23
V0%	PRF947	SOT323
V1	BFG25AW/X	SOT343
V1%	BFT25	SOT23
V11	BFG25A/X	SOT143
V12	BFG67/X	SOT143
V14	BFG92A/X	SOT143
V15	BFG93A/X	SOT143
V2%	BFQ67	SOT23
V2%	ON5042	SOT23
V2%	BFQ67W	SOT323
V3%	BFG67	SOT143
V4%	BAP64-06W	SOT323
V6%	BAP65-05W	SOT323
V8	BAP1321-03	SOD323
VA	BF1217WR	SOT343
VB	BF1118W	SOT343
VC	BF1118WR	SOT343
VC%	BF1118	SOT143
VD%	BF1118R	SOT143
W1	BF1102	SOT363
W1%	BFT92	SOT23
W1%	BFT92W	SOT323
W2%	PBR951	SOT23
W2%	PRF957	SOT323
W2%	BF1102R	SOT363
W4%	BAP50-05W	SOT323
W6%	BAP51-04W	SOT323
W7%	BAP51-06W	SOT323
W9%	BAP63-05W	SOT323
X	BB187	SOD523
X	BB187/L	SOD523
X1%	BFT93	SOT23
X1%	BFT93W	SOT323
XC%	BAP70-04W/ DG/B2	SOT323
XG%	BFR94AW	SOT323
Y3	BAP70-02/ DG/B2	SOD523
Y4	BAP64-02/ DG/B2	SOD523
YB	BGU8009	SOT886
YC%	BGA2870	SOT363
Z	BB145B	SOD523
ZA%	BFU668F	SOT343
ZB%	BFU768F	SOT343
ZD	BFU730LX	SOT883
ZK%	ON5052	SOT23
ZY%	PMBFJ620/A2	SOT363

7. Abbreviations

3-way	Doherty design using three discrete transistors	MHz	MegaHertz
ACC	Air Cavity Ceramic	MIM	Metal Insulator Metal
AM	Amplitude Modulation	MMIC	Monolithic Microwave Integrated Circuit
ASIC	Application Specific Integrated Circuit	MMPP	Main and peak devices realized separately in halves of push-pull transistor
ASYM	Asymmetrical design of Doherty (main and peak device are different)	MPPM	Main and peak device realized in same push-pull transistor (2 times)
BiCMOS	Bipolar Complementary Metal-Oxide Semiconductor	MoCA	Multimedia over Coax Alliance
BS diode	Band switch diode	MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor
BPF	Band Pass Filter	MPA	Medium Power Amplifier
BUC	Block Upconverter	MRI	Magnetic Resonance Imaging
CATV	Community Antenna Television	NF	Noise Figure
CATV PD	CATV power doubler	NIM	Network Interface Module
CATV PPA	CATV push-pull amplifier	NMR	Nuclear Magnetic Resonance
CATV PPA/HG	CATV push-pull amplifier high gain	OMP	Over-Molded Plastic
CATV RA	CATV reverse amplifier	OPEX	Operating Expense
CATV OR	CATV optical receiver	PA	Power Amplifier
CDMA	Code Division Multiple Access	PAD	Single Package Asymmetric Doherty
CMMB	Chinese Multimedia Mobile Broadcasting	PAR	Peak-to-Average Ratio
CMOS	Complementary Metal Oxide Semiconductor	PEP	Peak Envelope Power
CQS	Customer Qualification Samples	pHEMT	pseudomorphic High Electron Mobility Transistor
CSO	Composite Second Order beat	PLL	Phase-Locked Loop
CTB	Composite Triple Beat	QUBiC	Quality BiCMOS
CW	Continuous Waveform	RF	Radio Frequency
DAB	Digital Audio Broadcasting	RFP trs	RF power transistor
dB	Decible	RFS	Release For Supply
DECT	Digital Enhanced Cordless Telecommunications	RF4CE	Radio Frequency for Consumer Electronics
DEV	Development	RoHS	Restriction of Hazardous Substances
DiSEqC	Digital Satellite Equipment Control	Rx	Receive
DOCSIS	Data Over Cable Service Interface Specification	SARFT	State Administration For Radio, Film, and Television
DPD	Division of Parasitic Diseases	SDARS	Satellite Digital Audio Radio Service
DSB	Digital Signal Processor	SER	Serializer
DVB	Digital Video Broadcasting	SiGe:C	Sillicon Germanium Carbon
EDGE	Enhanced Data Rates for GSM Evolution	SMATV	Satellite Master Antenna Television
ESD	ElectroStatic Device	SMD	Surface-Mounted Device
FET	Field-Effect Transistor	SOD	
FM	Frequency Modulation	SOT	
Freq	Frequency	SPDT	Single Pole, Double Throw
GaAs	Gallium Arsenide	SYM	Symmetrical design of Doherty (main and peak device are the same type of transistor)
GaN	Gallium Nitride	TDD	Time-Division Duplexing
Gen	Generation	TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
GHz	GigaHertz	TCAS	Traffic Collision Avoidance Systems
GNSS	Global Navigation Satellite System	TMA	Tower Mounted Amplifier
GPS	Global Positioning System	TTF	Time To First Fix
GSM	Global System for Mobile communications	TTL	Transistor-Transistor Logic
HBM	Human Body Model	Tx	Transmit
HBT	Heterojunction Bipolar Transistor	uA	Microamp
HDTV	High-Definition Television	UHF	Ultra High Frequency (470-860 MHz)
HF	High Frequency (3-30 MHz)	UMTS	Universal Mobile Telecommunications System
HFC	Hybrid Fiber Coax	V	Volt
HFET	Heterostructure Field-Effect Transistor	Varicap	Varicap diode
HPA	High Power Amplifier	VCO	Voltage-Controlled Oscillator
HVQFN	Plastic thermally enhanced Very thin Quad Flat pack No leads	VDMOS	Vertical Double-diffused Metal Oxide Semiconductor
IEEE	Institute of Electrical and Electronics Engineers	VGA	Variable-Gain Amplifier
IF	Intermediate Frequency	VHF	Very High Frequency (30-300 MHz)
IQ	Digital I and Q data	VoIP	Voice over Internet Protocol
ISM	Industrial, Scientific, Medical - reserved frequency bands	VSAT	Very Small Aperture Terminal
JFET	Junction Field-Effect Transistor	W	Watt
KW	KiloWatt	WB trs 1-4	Wideband transistor 1-4 generation
LDMOS	Laterally Diffused Metal-Oxide-Semiconductor	WB trs 5-7	Wideband transistor 5-7 generation
LNA	Low-Noise Amplifier	WCDMA	Wideband Code Division Multiple Access
LNB	Low-Noise Block	WiFi	Wireless Fidelity
LO	Local Oscillator	WiMAX	Worldwide interoperability for Microwave Access
LPF	Low Pass Filter	WLAN	Wireless Local Area Network
LTE	Long-Term Evolution	WL-CSP	Wafer-Level Chip-Scale Package
mA	Milliamp		
MESFET	Metal Semiconductor Field-Effect Transistor		

8. Contacts and web links

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