RF MANUAL 19TH EDITION

Application and design manual for High Performance RF products

May 2015

Take the next step in RF performance

At NXP, we are committed to innovation in RF. Our dedication to best-in-class technology means we're always working to develop smart solutions that help you take the next step in RF. Every solution we offer builds on 50 years of RF leadership, ensuring that you get higher efficiency, smaller footprints, and faster time-to-market. We also have an established supplier infrastructure with dedicated manufacturing capacity, so you can be certain we are a partner for the long term.

Technology leadership

We leverage leading-edge process technologies for higher performance (SiGe:C, GaN, LDMOS), and our leadless WL-CSP packages enable smaller, more efficient designs. We offer proven RF solutions, with a leading portfolio of options for RF power, RF small-signal, and RF transceivers.

Comprehensive support

We build on decades of RF leadership and expertise. You can rely on our dedicated application experts to help you solve your design challenges, so you can create a clear competitive advantage.

50 years of RF innovation

- Introduced first RF wideband transistors in the 1960s
- Recognized as a technology leader for more than 35 years
- First with fully integrated, silicon-based MMICs and ICs for satellite LNB
- Best-in-class LDMOS technology since 2004
- Best-in-class solutions for RF energy

Key supplier to industry leaders

- 9 out of the top 10 smartphone OEMs use NXP GPS LNAs
- Leading supplier of RF silicon tuners for DTV/STB/CMTS
- #2 in RF wideband transistors
- Industry-leading RF power technology and application solutions

What's new?

The 19th edition of the RF Manual expands our coverage of applications, with new material on broadband communications, TVs, and set-top boxes, featuring a discussion of fiber-optic options (FTTx), as well as new sections on QUAD LNBs, for use in satellites, and LNAs for LTE.

Of special note is the detailed coverage of solid-state RF energy, an approach that replaces large, inflexible power sources with small, controllable, and accurate sources of power based on solid-state circuitry. Operating in the unlicensed and widely available ISM bands, LDMOS-based power transistors and other solid-state solutions for RF energy support the trend toward greener, more efficient systems, including plasma lights (LEPs), cooktops, and microwave ovens.
www.nxp.com/rfenergy

In terms of products, our RF power portfolio continues to grow, with recently added options for base stations, avionics, L- and S-band radar, and UHF/VHF/ISM applications. Also new are next-generation devices and enhanced products in several categories, including 9th generation (Gen9) LDMOS transistors, MMIC broadband amplifiers for TV and distribution systems, downconverters for satellite, GaN power amplifiers, and LNAs for GPS, LTE, WLAN, and wireless infrastructure.

More design support

We've expanded the section on design support, adding the most recent tools, documents, materials, and links that make design-in easier. We also provide links our RF community, a growing online engineer-to-engineer community for RF small-signal design that lets you collaborate, get technical support, and share ideas with other developers.
www.nxp.com/RFcommunity

How to use the RF Manual

This document is a resource that lets you explore our RF portfolio.

Chapter 1 – Products by application

Discusses trends and requirements for particular applications, and lists the products we recommend for target systems.

Chapter 2 – NXP technologies

Describes the special process and packaging technologies that position us as a leader in RF.

Chapter 3 – Products by category

Presents products by function, with detailed specs for easy comparison.

Chapter 4 – Design resources

Summarizes the design-support resources that help make it easier to work with our products and reduce time-to-market.

Chapter 5 – Products by competitor type number

Provides an alphanumeric listing of competitive replacements, so you can easily find the NXP equivalent of a product from another manufacturer.

Chapter 6 – Shipping formats

Describes how we ship our RF products, with the quantities included for each packing format.

Chapter 7 – Acronyms

Lists the abbreviations used in the manual, with their definitions.

Chapter 8 – Online resources

Suggests links that can help you answer a question, learn more about a product, or place an order.

Chapter 9 – Products by NXP type number

Gives all the NXP type numbers mentioned in this manual, in alphanumeric order, so you can quickly find the details for a specific product.

RF Manual web page

www.nxp.com/rfmanual

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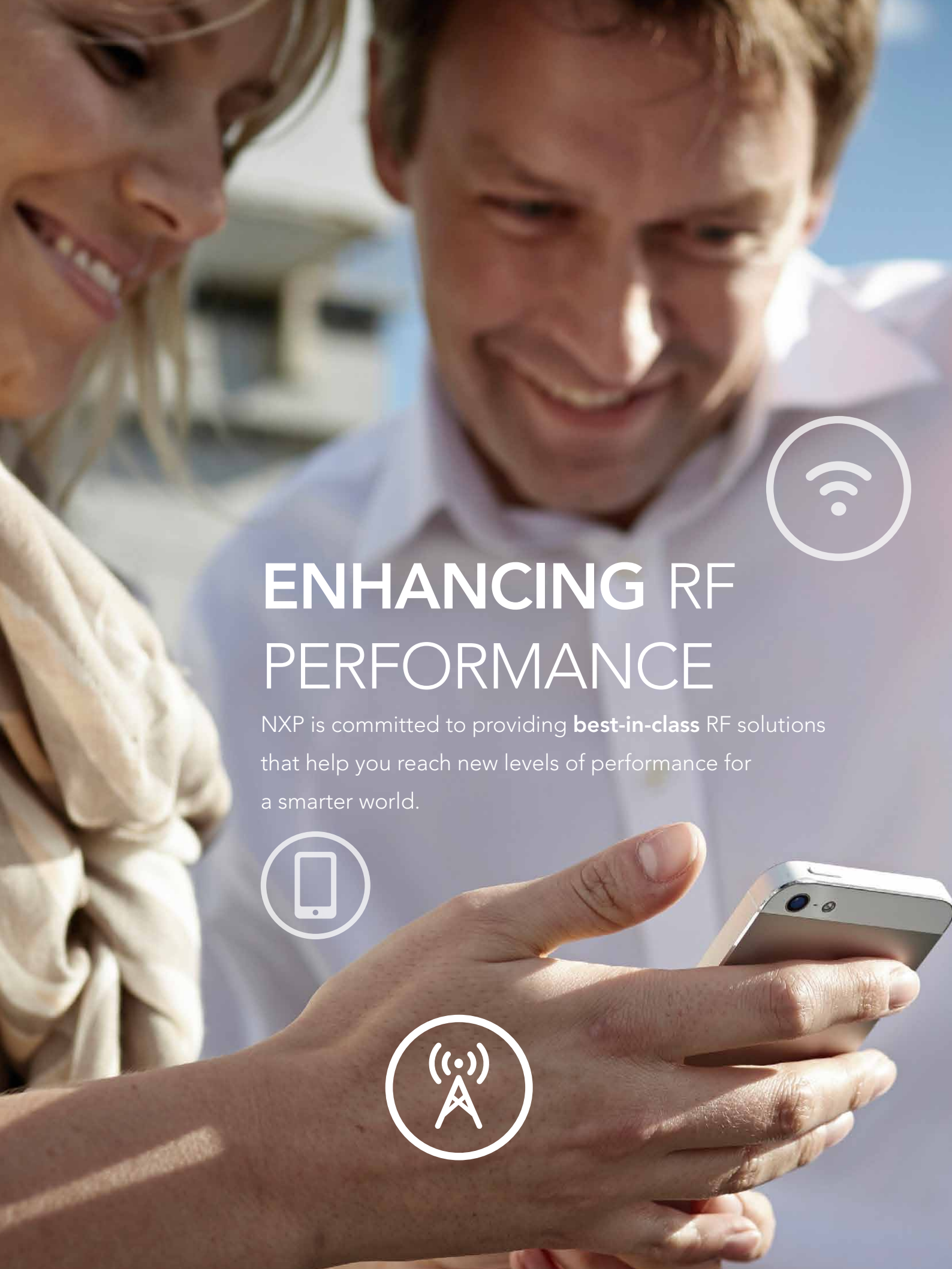


ENHANCING RF PERFORMANCE

NXP is committed to providing **best-in-class** RF solutions that help you reach new levels of performance for a smarter world.

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 WCDMA 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 latest 9th 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.

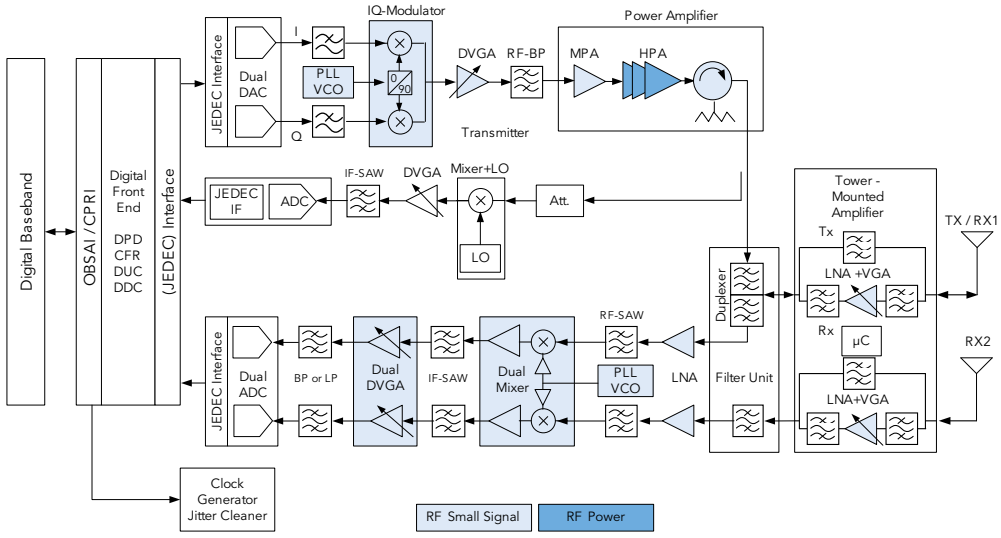
New: Single-Package Asymmetric Doherty (PAD) transistors and MMICs

PAD devices offer the highest efficiency, smallest footprint, and 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 450 MHz to 3.8 GHz 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 discretes and amplifiers (LNA, VGA, MPA) to mixers/oscillators.

Application diagram of base station showing Tx, Rx, and Tx feedback functions



Tx functions are in the upper region, Rx in the lower, and Tx feedback in the middle.

Product highlight:
LDMOS 2-stage power MMIC BLM7G1822S-40PBG

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. The BLM7G1822S-40PBG is a dual path 2-stage power MMIC. This device is perfectly suited as a general-purpose driver in the frequency range from 1800 to 2200 MHz.

Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Type
HPA	Driver	700	2700	5	BLP7G22-05
		700	2700	5	BLP8G27-5*
		1	2200	10	BLF6G21-10G
		3400	3600	10	BLF6G38-10(G)
		700	2700	10	BLP7G22-10
		700	2700	10	BLP8G27-10*
	MMIC	700	1000	15	BLM8G0710S-15PB(G)*
		1805	2170	20	BLM7G1822S-20PB(G)
	Driver/final	3400	3800	25	BLF6G38(S)-25
	MMIC	2100	2400	30	BLM7G24S-30BG
		700	1000	30	BLM8G0710S-30PB(G)
	Driver/final	2400	2690	32	BLC8G27LS-60AV*
		2110	2170	40	BLF6G22L(S)-40P
		2500	2700	40	BLF6G27L(S)-40P(G)
	MMIC	1805	2170	40	BLM7G1822S-40AB(G)*
		1805	2170	40	BLM7G1822S-40PB(G)
		700	1000	45	BLM8G0710S-45AB(G)*
	Driver/final	700	1000	45	BLP8G10S-45P(G)
	Integrated Doherty	2010	2025	50	BLD6G21LS-50
	Driver/final	3400	3800	50	BLF6G38(LS)-50
	MMIC	2100	2200	60	BLM7G22S-60PB(G)
	Final	2300	2700	75	BLF7G27L(S)-75P
		3400	3800	75	BLF8G38LS-75V
	MMIC	1805	2170	80	BLM7G1822S-80AB(G)
		1805	2170	80	BLM7G1822S-80PB(G)*
	Driver/final	1800	2200	80	BLP8G20S-80P
	Final	2500	2700	90	BLF7G27L(S)-90P
		3400	3600	90	BLF9G38LS-90P*
		2496	2690	100	BLC8G27LS-100AV
		3400	3600	100	BLF6G38LS-100
		2000	2200	100	BLF7G22L(S)-100P
		2300	2400	100	BLF8G24LS-100(G)V
		2500	2700	100	BLF8G27LS-100(GV)
		2500	2700	100	BLF8G27LS-100P(V)
		1800	2000	120	BLF9G20LS-120V*
		2496	2690	140	BLC8G27LS-140AV
		1805	1990	140	BLF8G20LS-140(G)V
		2000	2200	140	BLF8G22LS-140
		2600	2700	140	BLF8G27LS-140(V)
		700	1000	140	BLP7G07S-140P
		2496	2690	150	BLC9G27LS-150AV

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Type
HPA	Final	2500	2700	150	BLF8G27LS-150(G)V
		2300	2400	150	BLF9G24LS-150V*
		1800	2000	158	BLC9G20LS-360AV*
		1805	2025	160	BLC8G21LS-160AV
		729	960	160	BLF6H10LS-160
		1800	2050	160	BLF7G21LS-160(P)
		2000	2200	160	BLF7G22L(S)-160
		920	960	160	BLF8G10L(S)-160(V)
		1800	2000	160	BLF8G20LS-160V
		2000	2200	160	BLF8G22LS-160BV
		1800	2000	160	BLF9G20LS-160V*
		1880	2025	160	BLP8G21S-160PV
		1880	2025	160	BLP8G21S-162AV*
		2300	2400	170	BLC9G24LS-170AV*
		1800	1990	170	BLF8G19LS-170BV
		2500	2700	200	BLC8G27LS-210PV
		1450	1550	200	BLF7G15LS-200
		1800	2000	200	BLF8G20LS-200V
		2110	2170	200	BLF8G22LS-200(G)V
		2110	2170	200	BLF8G22LS-205*
		2300	2400	200	BLF8G24L-200P
		2300	2400	200	BLF8G24LS-200P(N)
		1800	2000	220	BLF8G20LS-220
		2110	2170	220	BLF8G22LS-220
		1800	2000	230	BLF8G20LS-230V
		2300	2400	230	BLF9G24LS-230V*
		2300	2400	240	BLC8G24LS-241AV*
		2110	2170	240	BLF8G22LS-240
		920	960	250	BLF7G10L(S)-250
		1805	1880	250	BLF7G20L(S)-250P
		2110	2170	250	BLF7G22L(S)-250P
		716	960	270	BLF8G09LS-270(G)W
		790	960	270	BLF8G10LS-270(GV)
		2110	2170	270	BLF8G22LS-270(GV)
		1450	1550	300	BLF7G15LS-300P
		700	1000	300	BLF8G10LS-300P
		1900	2000	310 [1]	BLC8G20LS-310AV*
		1800	2000	310	BLC8G20LS-400AV*
		716	960	400	BLF8G09LS-400P(G)W
		1805	1995	400	BLF8G20LS-400P(G)V
		2110	2170	450	BLC8G22LS-450AV*

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

[1] P3dB

For the complete product selection please see section 3.6.1

Doherty amplifiers 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

A 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.

Recommended products

Function	Product		Package	Type
Discrete attenuator	RF diode	PIN diode	SOT753	BAP64Q
			SOT753	BAP70Q
			SOD523	BAP64
			SOD323	
			SOT23	
			SOT323	

Function	Product		Package	Type
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU725F/N1
				BFU690F
				BFU730F
				BFU760F
				BFU790F
	MMIC	SiGe:C MMIC	SOT650	BGU7051
				BGU7052
				BGU7053
			SOT1327	BGU8051
				BGU8052
				BGU8053
LNA + bypass	MMIC	SiGe:C MMIC	SOT650	BGU8062
LNA + bypass + VGA	MMIC	SiGe:C MMIC	SOT1301	BGU7060
				BGU7061
				BGU7062N2
				BGU7063
				BGU7073
				BGU7075

Function	Product	Gain (dB)	Package	Type
Single VGA	MMIC	30	SOT167	BGA7210
		18.5		BGA7204

Function	Product	Gain (dB)	Package	Type
Single VGA	MMIC	24	SOT167	BGA7350
		28		BGA7351

Function	Product	$PL_{(1dB)}$ @ 940 MHz (dBm)	Package	Type
MPA	MMIC	24	SOT89	BGA7024
		28		BGA7027
		25		BGA7124
		28	SOT908	BGA7127
		30		BGA7130

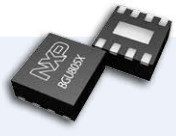
Function	Product	Frequency range (GHz)	Package	Type
Dual mixer	MMIC	0.7 - 1.2	SOT1092	BGX7220
		1.7 - 2.7		BGX7221

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

For the complete product selection please see sections 3.2.2, 3.3.1, 3.4.1, and 3.4.2

Product highlight: Integrated low-noise, high-linearity amplifier with bypass BGU8062

Building on the success of the ultra-low noise BGU805x series, the BGU8062 is a SiGe:C BiCMOS LNA with integrated bypass and fast shutdown. The BGU8062 is a perfect 3rd stage gain block in the Rx chain in wireless infrastructure applications. The high-performance bypass function enables high dynamic range, while the fast shutdown function makes it well suited for TDD applications. The BGU8062 is housed in a 10-pin package that measures 3 x 3 mm.

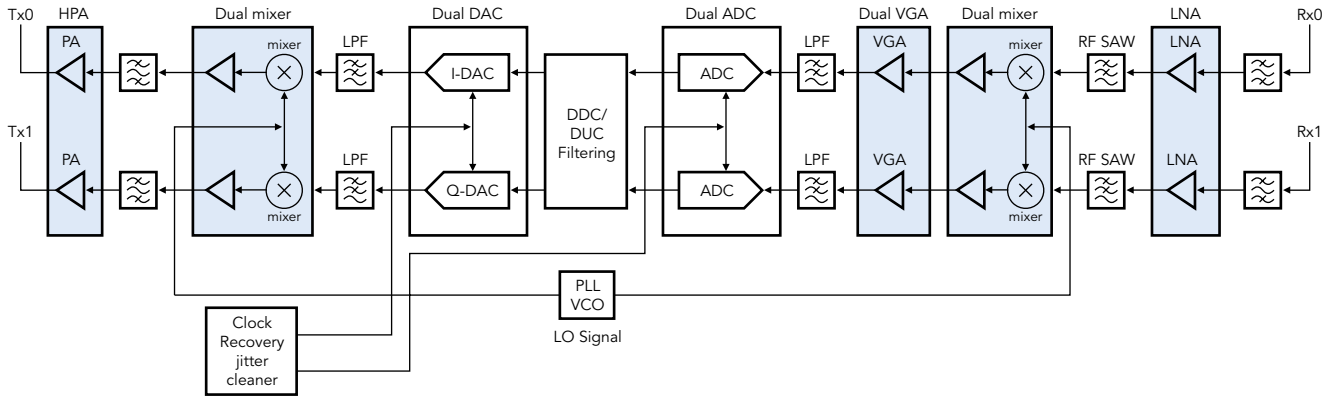


Product highlight: Base-station LNAs with ultra-low noise BGU805x

The BGU8051, BGU8052, and BGU8053 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 (37 dB OIP3), ultra-low noise figures (e.g. 0.4 dB), and wideband S11<20 dB behavior. These ultra-low noise amplifiers enable 2G/3G/4G macro and micro base-station performance at unsurpassed value.

1.1.2 Repeater

Application diagram of the components used in a repeater system



Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver/final	2300	2700	10	SOT975C	BLF6G27-10(G)
		3400	3600	10	SOT975C	BLF6G38-10(G)
		700	2700	10	SOT1179	BLP7G22-10
		700	2700	10	SOT1371	BLP8G27-10*
		3400	3800	25	SOT608B	BLF6G38(S)-25
	MMIC	700	1000	30	SOT1212	BLM8G0710S-30PB(G)
	Driver/final	2400	2690	32	SOT1275	BLC8G27LS-60AV*
		1450	1550	40	SOT1135B	BLF6G15LS-40RN
		2000	2200	40	SOT1112A	BLF6G22L(S)-40BN
		2110	2170	40	SOT1121A	BLF6G22L(S)-40P
		2500	2700	40	SOT1121B	BLF6G27L(S)-40P(G)
	MMIC	1805	2170	40	SOT1211	BLM7G1822S-40AB(G)*
	Driver/final	700	1000	45	SOT608A	BLF6G10(S)-45
		1800	2000	45	SOT608A	BLF6G20(S)-45
		2000	2200	45	SOT608A	BLF6G22-45
		2500	2700	45	SOT608B	BLF6G27(S)-45
	MMIC	700	1000	45	SOT1212	BLM8G0710S-45AB(G)*
	Driver/final	700	1000	45	SOT1224	BLP8G10S-45P(G)
	Integrated Doherty	2010	2025	50	SOT1130B	BLD6G21LS-50
	Driver/final	2500	2700	50	SOT1112A	BLF6G27L-50BN
		3400	3800	50	SOT502B	BLF6G38(LS)-50
	MMIC	2100	2200	60	SOT1212	BLM7G22S-60PB(G)
	Final	2300	2700	75	SOT1121B	BLF7G27L(S)-75P
	MMIC	1805	2170	80	SOT1212	BLM7G1822S-80AB(G)
	Driver/final	1800	2200	80	SOT1223	BLP8G20S-80P
	Final	1427	2170	90	SOT1121B	BLF7G20L(S)-90P
		2500	2700	90	SOT1121B	BLF7G27L(S)-90P
		3400	3600	90	SOT1121B	BLF9G38LS-90P*
		2000	2200	100	SOT1121B	BLF7G22L(S)-100P

Function	Product	$P_{L(1\ dB)}$ @ 940 MHz (dBm)	Package	Type
MPA	MMIC	24	SOT89	BGA7024
		28		BGA7027

Function	Product	Frequency range (GHz)	Package	Type
MPA	MMIC	1.7 - 2.7	SOT1092	BGX7220
		0.7 - 1.2		BGX7221

Function	Product	Gain (dB)	Package	Type
Dual VGA	MMIC	24	SOT617	BGA7350
		28		BGA7351
				BGA7352

Function	Product	Package	Type
LNA	SiGe:C MMIC	SOT650	BGU7051
			BGU7052
			BGU7053
		SOT1327	BGU8051
			BGU8052
			BGU8053
LNA + bypass	SiGe:C MMIC	SOT650	BGU8062
LNA + bypass + VGA	SiGe:C MMIC	SOT1301	BGU7060
			BGU7061
			BGU7062N2
			BGU7063
			BGU7072
			BGU7073
			BGU7075

* Check status in section 3.1, as this type is not yet released for mass production
For the complete product selection please see sections 3.4.1, 3.4.2, and 3.6.1

Product highlight:
MMIC dual down-mixer BGX7221

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.

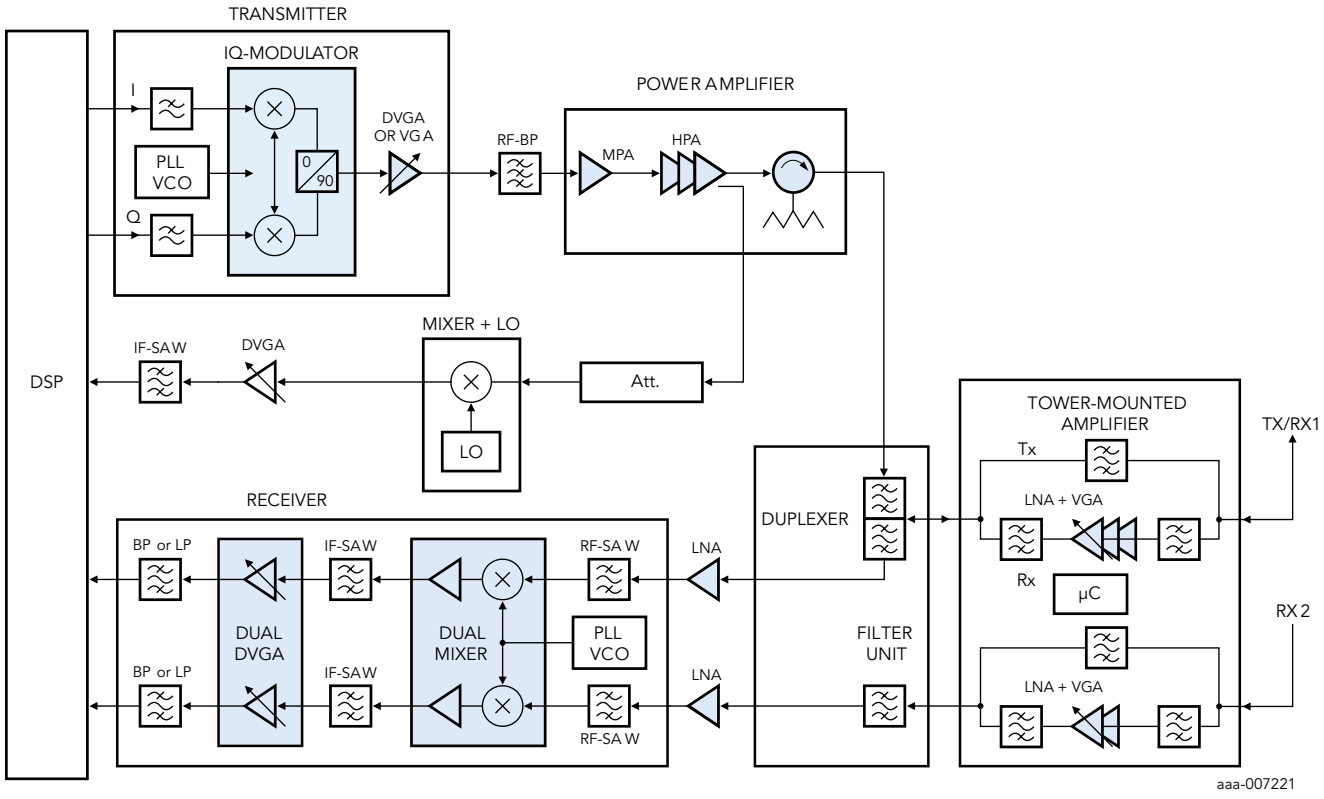
Features

- 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 of a typical small-cell line-up



Product highlight: Power transistor BLP8G27-10

The BLP8G27-10 is a 10 W plastic LDMOS power transistor for base-station applications. This cost-effective, wideband device has an ultrasmall footprint and 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
- Complies with Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

Recommended products

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

Function	Product	Gain (dB)	Package	Type
Single VGA	MMIC	30	SOT617	BGA7210
		18.5		BGA7204

Function	Product	$P_{L(1\ dB)}$ @ 940 MHz (dBm)	Package	Type
MPA	MMIC	24	SOT89	BGA7024
		28		BGA7027

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver/final	1	2200	10	SOT538A	BLF6G21-10G
		2300	2700	10	SOT975C	BLF6G27-10(G)
		3400	3600	10	SOT975C	BLF6G38-10(G)
	MMIC	700	1000	15	SOT1212-1	BLM8G0710S-15PB(G)*
		1805	2170	20	SOT1212-1	BLM7G1822S-20PB(G)
	Driver/final	3400	3800	25	SOT608B	BLF6G38(S)-25
	MMIC	2100	2400	30	SOT1212-1	BLM7G24S-30BG
		700	1000	30	SOT1212-1	BLM8G0710S-30PB(G)
	Driver/final	2400	2690	32	SOT1275-3	BLC8G27LS-60AV*
		2110	2170	40	SOT1121A	BLF6G22L(S)-40P
		2500	2700	40	SOT1121B	BLF6G27L(S)-40P(G)
	MMIC	1805	2170	40	SOT1211	BLM7G1822S-40AB(G)*
		700	1000	45	SOT1212-1	BLM8G0710S-45AB(G)*
	Integrated Doherty	2010	2025	50	SOT1130B	BLD6G21LS-50
	MMIC	2100	2200	60	SOT1212-1	BLM7G22S-60PB(G)
	Final	2300	2700	75	SOT1121B	BLF7G27L(S)-75P
	MMIC	1805	2170	80	SOT1212-1	BLM7G1822S-80AB(G)

Function	Product	Package	Type
LNA	SiGe:C MMIC	SOT650	BGU7051
			BGU7052
			BGU7053
		SOT1327	BGU8051
			BGU8052
			BGU8053
LNA + bypass	SiGe:C MMIC	SOT650	BGU8062
LNA + bypass + VGA	SiGe:C MMIC	SOT1301	BGU7060
			BGU7061
			BGU7062N2
			BGU7063
			BGU7072
			BGU7073
			BGU7075

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

Function	Product	Gain (dB)	Package	Type
Dual VGA	MMIC	24	SOT617	BGA7350
		28		BGA7351

* Check status in section 3.1, as this type is not yet released for mass production
For the complete product selection please see sections 3.4.1, 3.4.2, and 3.6.1

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 by 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)

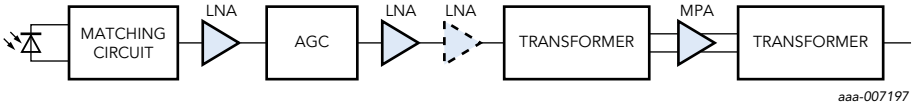
1.2 Broadband communication, TV and STB

The increasing demand for bandwidth is very visible in broadband communication: fibers are moving closer to the home, and RF requirements are changing, due to the increased use of digital communication protocols. NXP offers a wide range of products which can be used in the network and in the home. For the network, we support fiber-optics with products for down- and upstream communication. For the home, we focus on down- and upstream communication for TVs and set-top boxes.

1.2.1 Optical mini- and midi-node line-up

We provide a complete system solution for optical mini- and midi-node line-ups, for use in systems that take the broadband TV signal from an optical network and amplify the signal onto a coaxial distribution network. Depending on the placement of the node, this might go straight into a home (FTTH), an apartment building (FTTB), or deeper in the network (FTTC).

Application diagram of an MMIC broadband amplifier for TV and distribution systems



NXP delivers all the components for optical mini- and midi-node line-ups, for FTTx applications:

- BGA301x input stages are LNAs that keep overall noise low
- BGA302x MPAs deliver high output power with excellent overall performance
- The BAP70Q PIN diode enables an adjustable-gain control circuit

Recommended products

Function	Product		Package	Type
Discrete AGC	RF diode	PIN diode	SOT753	BAP70Q

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

Function	Product	Frequency range (MHz)	Gain (dB)	IP3 (dBm)	IP2 (dBm)	P1dB (dBm)	Package	Type
MPA	MMIC	40 - 1200	16	46	75	30	SOT786-2	BGA3021
			18					BGA3022
			20					BGA3023

For the complete product selection please see sections 3.2.2 and 3.4.1

Product highlight:
MMIC wideband amplifiers with internal biasing BGA302x

These are MPAs, specifically designed as the output stage for high-linearity CATV optical mini- and midi-nodes. They operate over a frequency range of 40 to 1200 MHz, and are housed in a lead-free HSO8 package.

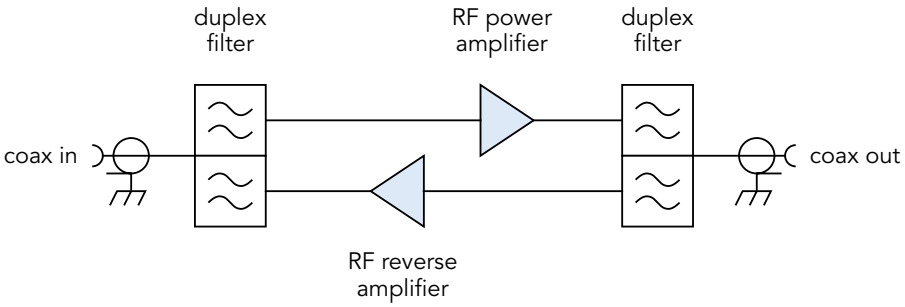
Features

- Internally biased
- Flat gain between 40 and 1200 MHz
- High linearity with an IP3o of 46 dBm and an IP2o of 75 dBm
- High gain output 1dB compression point of 30 dBm
- 75 Ω input and output impedance
- Icc (total) can be controlled between 175 and 350 mA

1.2.2 Broadband line extenders

Larger coaxial distribution networks often require longer distances and additional amplification. Our broadband solutions are ideally suited for use in bidirectional line extenders.

Application diagram of a bidirectional line extender



Recommended products

Function	Product	Frequency (MHz)	Gain (dB)	Type
RF forward amplifier	Drop amplifier	1006	12	BGA3012
			15	BGA3015
			18	BGA3018

Function	Product	Frequency range (MHz)	Gain (dB)	Type
RF reverse amplifier	Drop amplifier	5 - 300	12	BGA3012
		5 - 300	15	BGA3015
		5 - 300	18	BGA3018

For the complete product selection please see section 3.4.1

Product highlight:
Extreme-broadband amplifiers BGA301x

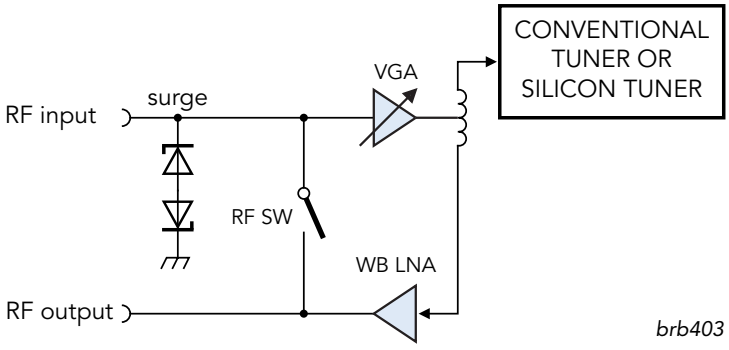
The BGA3012, BGA3015, and BGA3018 are extreme-broadband amplifiers that deliver 12, 15, and 18 dB of gain from 40 to 1006 MHz, while providing outstanding linearity performance. These amplifiers can also be used as a return path amplifier from 5 to 300 MHz, or in a combined TV and satellite system from 40 to 2600 MHz. At the low end of the frequency band, these amplifiers outperform competing 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 5 to 8 V. These amplifiers are very well suited for various broadband TV distribution system applications, such as FFTH, home gateways, and set-top boxes.

1.2.3 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 conventional can tuners. The BGU704x family operates at 3.3 V and works seamlessly with Si tuner ICs, which also operate at 3.3 V.

Application diagram of an STB input stage with improved NF performance using the BGU703x and BGU704x



Recommended products

Function	Product	V_{cc} (V)	Gain (dB)	Package	Type
VGA	MMIC	5	10	SOT363	BGU7031
		5	10	SOT363	BGU7032
			-2		
		5	10	SOT363	BGU7033
			5		
			-2		
		3.3	10	SOT363	BGU7041
		3.3	10	SOT363	BGU7042
			-2		
		3.3	14	SOT363	BGU7044
		3.3	14	SOT363	BGU7045
			-2		

Function	Product		Package	Type
RF/PLT switch	MOSFET	5 V silicon RF switch	SOT343	BF1108W
			SOT343R	BF1108WR
		3.3 V silicon RF switch	SOT143B	BF118
			SOT143R	BF118R
			SOT343	BF118W
			SOT343R	BF118WR

For the complete product selection please see sections 3.4.1 and 3.5.2

Product highlight:
VGAs for TVs/STBs BGU703x and BGU704x

Designed for high linearity and low noise, these 3.3 and 5 V wideband VGAs 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.

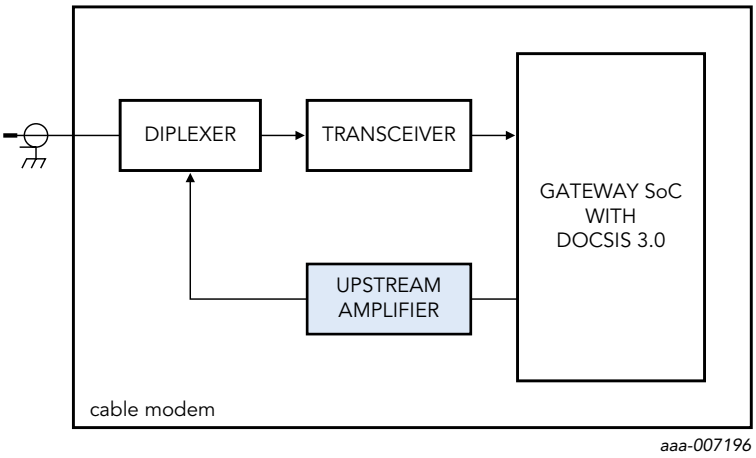
Features

- Flat gain between 40 MHz and 1 GHz
- Output power at 1 dB gain compression ($P_{L(1\ dB)}$) 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

1.2.4 Cable modem based on DOCSIS 3.0

DOCSIS, the cable-modem standard from the CableLabs research consortium, supports IP traffic over digital cable-TV channels. The BGA3031 addresses the need for a high-performance amplifier in the upstream path, and exceeds the requirements of the DOCSIS 3.0 standard.

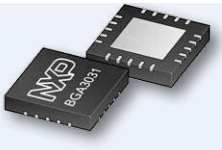
Application diagram of a DOCSIS cable modem with the BGA3031 upstream amplifier



Recommended products

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

Product highlight: DOCSIS 3.0 plus upstream amplifier BGA3031

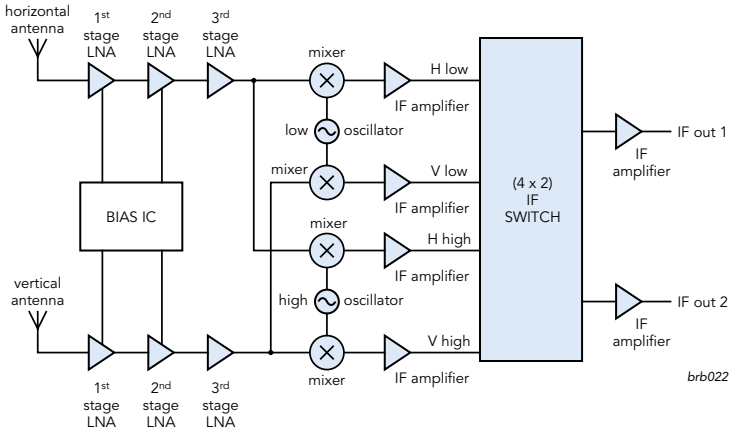


The BGA3031 MMIC is an upstream amplifier meeting the Data Over Cable Service Interface Specifications (DOCSIS 3.0) operating from 5 to 85 MHz is designed for cable modems, CATV STBs, and VoIP modems. It provides a 58 dB gain control range in 1 dB increments with high incremental accuracy. At maximum 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). The BGA3031 is capable of transmitting 1 to 8 64-QAM and 1 to 8 QPSK modulated carriers while meeting the DOCSIS 3.0 ACLR specification under DOCSIS 3.0 + 4 dB conditions.

1.3 Satellite

1.3.1 Satellite outdoor unit, twin LNB with discrete components

Application diagram of a twin LNB with discrete components



Recommended products

Function	Product		Package	Type
1st stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU910F
2nd and 3rd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU730F
				BFU910F

Function	Product		Package	Type
Oscillator	RF transistor	SiGe:C transistor	SOT343F	BFU660F
				BFU710F
				BFU730F

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

Function	Product		Package	Type
1st stage IF amplifier	MMIC	IF gain block	SOT363	BGA2800
			SOT363	BGA2801
			SOT363	BGA2802
			SOT363	BGA2803
			SOT363	BGA2815
			SOT363	BGA2851
			SOT363	BGA2866
	RF transistor	SiGe:C transistor	SOT343F	BFU660F

Function	Product		Package	Type
Output stage IF amplifier	MMIC	IF gain block	SOT363	BGA2800
			SOT363	BGA2801
			SOT363	BGA2815
			SOT363	BGA2818
			SOT363	BGA2866
			SOT363	BGA2867
			SOT363	BGA2870
			SOT363	BGA2874
	RF transistor	SiGe:C transistor	SOT343F	BFU660F

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

* Also available in ultrasmall leadless package SOD882D
For the complete product selection please see sections 3.2.2, 3.3.1, and 3.4.1

Product highlight: IF gain blocks BGA28xx

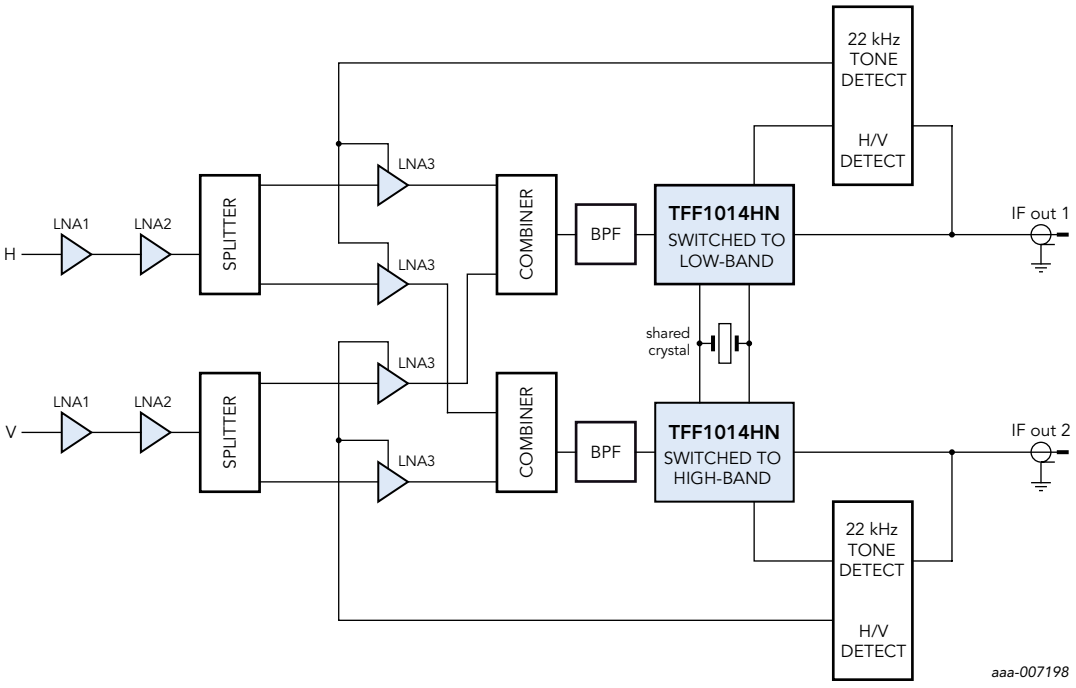
These MMIC wideband amplifiers are equipped with internal matching circuitry and are housed in a 6-pin SOT363 plastic SMD package.

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)

1.3.2 Satellite outdoor unit, twin LNB with integrated mixer/oscillator/downconverter

Application diagram of a twin LNB based on the TFF101x



Recommended products

Function	Product		Package	Type
1st stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU910F
2nd and 3rd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU730F
				BFU910F

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

For the complete product selection please see sections 3.3.1 and 3.4.3

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

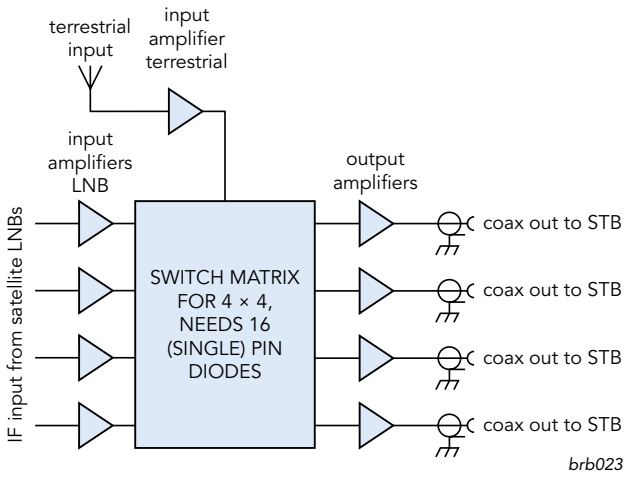
These Universal DVB-S compliant Ku-band downconverters consume about 50% less current (52 mA) than other integrated solutions. They are fully integrated (PLL synthesizer/mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Stability of the local oscillator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

Features

- Ultralow current consumption (I_{CC} = 52 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

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

Application diagram of a satellite multi-switch box



Recommended products

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

Function	Product		Package	Type
Input amplifier LNB	MMIC	General-purpose amplifier	SOT363	BGA2771
				BGA2866
				BGA2867
				BGA2818
	RF bipolar transistor	Wideband transistor	SOT143	BFG520
				BFG540
			SOT343F	BFU630F
				BFU660F
		SiGe:C transistor		BFU725F/N1
				BFU730F

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

* Also available in ultrasmall leadless package SOD882D

Function	Product		Package	Type
Output amplifier	MMIC	General-purpose MPA	SOT89	BGA6489
				BGA6589
				BGA7024
				BGA3012
				BGA3015
				BGA3018
			SOT908	BGA7124
		General-purpose amplifier	SOT363	BGA2869
			SOT143	BFG540
		SiGe:C transistor	SOT343F	BFU630F
				BFU660F
				BFU725F/N1
				BFU730F

For the complete product selection please see sections 3.2.2, 3.3.1, 3.4.1

Product highlight:
NPN wideband SiGe RF transistor BFU730F

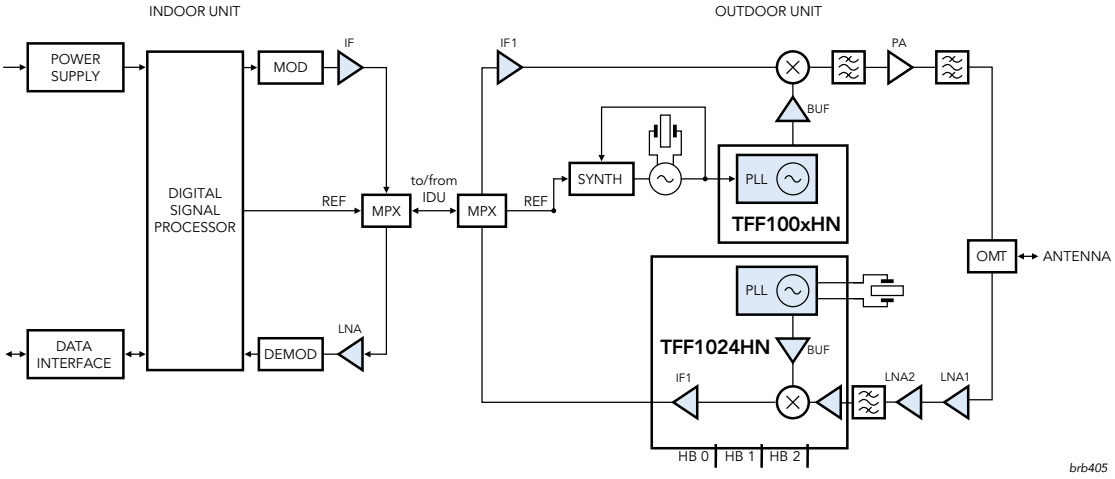
The BGU730F is part of the family of 6th (Si) and 7th (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better 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 $IP3_I$ of +4.7 dBm

1.3.4 VSAT with integrated mixer/oscillator/downconverter

Application diagram of a VSAT using a flexible TFF1024HN downconverter



Recommended products

Indoor unit

Function	Product		Package	Type
IF	MMIC	IF gain block	SOT363	BGA2771
				BGA2800
				BGA2801
				BGA2815

Function	Product		Package	Type
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU725F/N1
				BFU730F
				BFU910F

Outdoor unit

Function	Product	Package	Type
Mixer/oscillator/downconverter	RF IC	SOT763	TFF1024HN

Function	Product		Package	Type
IF	MMIC	IF gain block	SOT363	BGA2800
				BGA2801
				BGA2815
				BGA2866
				BGM1013

Function	Product		Package	Type
LNA1	RF transistor	SiGe:c transistor	SOT343F	BFU910F
LNA2	RF transistor	SiGe:C transistor		BFU710F
				BFU730F
				BFU910F

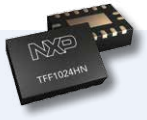
Function	Product		Package	Type
PLL	RF IC	SiGe:C IC	SOT616	TFF1003HN
				TFF1007HN
			SOT763	TFF1024HN

Function	Product		Package	Type
Oscillator	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

For the complete product selection please see sections 3.3.1, 3.4.1, 3.4.4, and 3.4.5



Product highlight:
Downcoverter with PLL/VCO for VSAT TFF1024HN

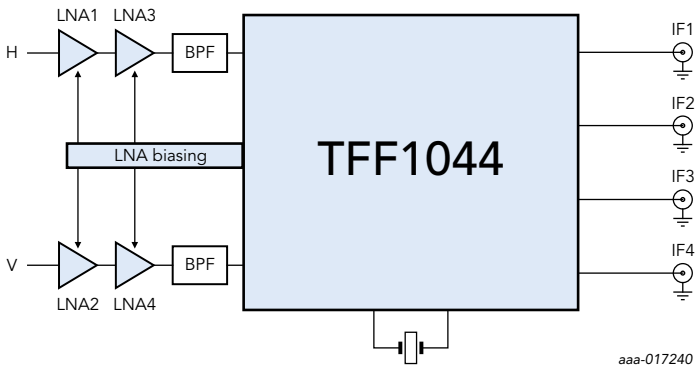
This VSAT Ku-band downconverter consumes about 35% less current (60 mA) than other integrated solutions. It's fully integrated (PLL synthesizer/ mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Unlike dielectric resonance oscillators, which are mechanical components, the PLL-based TFF1024HN guarantees stable performance over lifetime and temperature, enabling high Service (QoS) 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 Xtal values
- Ultralow current consumption (I_{CC} = 60 mA)
- Low phase noise (1.0° RMS typ)
  - 10 kHz to 13 MHz integration bandwidth
- Flat gain over frequency (< 2 dBpp)
- High linearity of > 16 dBm IP3o
- High P1dBo > 6 dBm

1.3.5 Satellite outdoor unit, QUAD LNB with integrated mixer/oscillator/downconverter/ switch matrix

Application diagram of a QUAD LNB



Recommended products

Function	Product		Package	Type
1st stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU910F
2nd stage LNA	RF transistor	SiGe:C transistor	SOT343F	BFU710F
				BFU910F

Function	Product	Package	Type
Mixer/oscillator/downconverter	RF IC	HVLGA	TFF1044HN

For the complete product selection please see sections 3.3.1 and 3.4.2

Product highlight:

World's first fully integrated Quad Ku-band to L-band downconverter IC TFF1044HN

This universal Quad DVB-S/DVB-S2 compliant Ku-band downconverter enables significant size reduction for Quad or Quattro LNB's. It reduces total costs, since it enables alignment-free production, and significantly decreases manufacturing time, since it's fully tested.

Features

- Integrated voltage/tone detection, 4 x 4 matrix switch
- Low current consumption (Icc = 170 mA for 4 users active)
- Low Phase Noise (1.6 degrees RMS PJ typ)
- Selectable gain (30, 33, 36 dB)
- Small PCB footprint – HVLGA36 (5.0 x 5.0 x 0.72 mm) – low external component count

DRIVING RF TO THE NEXT LEVEL

Our commitment to **innovation** results into providing best-in-class RF solutions for a smarter world.

1.4 Broadcast

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

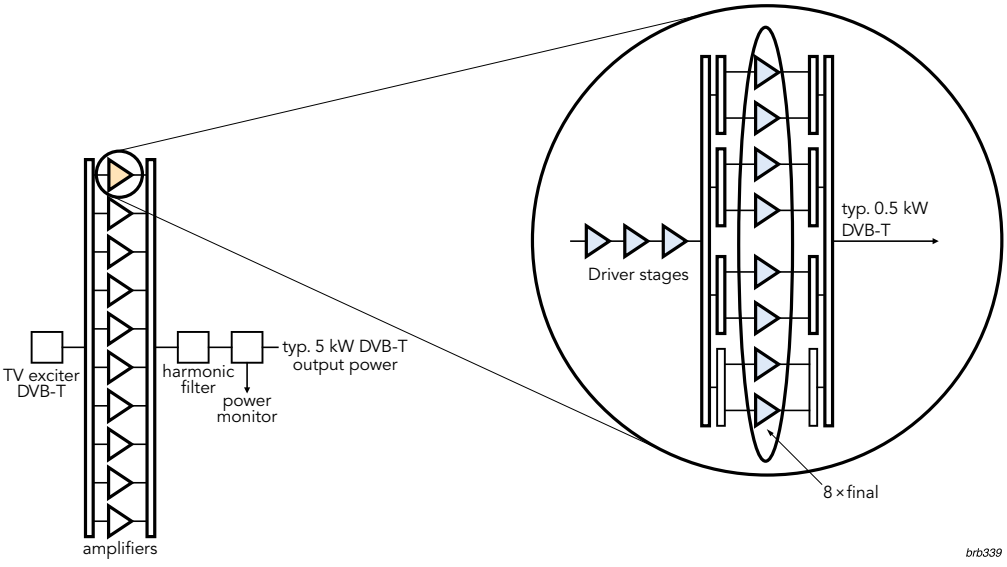
Narrowband, wideband, and ultra-wideband Doherty amplifiers for UHF TV

The UHF TV market has taken a step in a new direction, supporting narrowband, wideband, and ultra-wideband (UWB) Doherty amplifiers that deliver higher efficiency for greener systems. Our Doherty amplifiers and RF Power transistors set the benchmark, enabling PA efficiencies of 45% and beyond. We are committed to the UHF-TV industry, and continue to invest in UHF-TV LDMOS technology, so we can deliver products that support the increasingly rich content supplied by the broadcast industry.

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 reap the benefits of LDMOS-based solutions, and that will continue for many years into the future. We will also continue to support our legacy products through the customer product life-cycles. We recently enhanced our offering with a full range of of eXtremely Rugged (XR) products suited for broadcast. We are also developing a range of Over-Molded Plastic (OMP) parts for the lower-power, more cost-sensitive markets.

Application diagram of a TV transmitter



Product highlight:
Power transistor BLF888D

Designed for broadcast Doherty transmitter applications, including broadcast transmitters in the UHF band and digital broadcasting systems, this 650 W LDMOS RF power transistor delivers excellent ruggedness and is ideally suited for use in digital and analog environments.

Features

- High efficiency
- High power gain
- Excellent ruggedness (VSWR > 40:1 through all phases)
- Excellent thermal stability
- integrated ESD protection

Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
FM/VHF	Driver	10	500	20	SOT467C	BLF571
		1	1400	35	SOT467C	BLF642
		10	600	35	SOT1223	BLP05H635XR*
		10	600	75	SOT1223	BLP05H675XR*
	Driver/final	1	1000	100	SOT467	BLF871(S)
		10	600	110	SOT1223	BLP05H6110XR*
		1	1000	140	SOT467	BLF881(S)
		10	600	150	SOT1223	BLP05H6150XR*
		1	1500	160	SOT1223	BLP15M7160P
	Final	1	1500	200	SOT1121	BLF647P(S)
		10	600	200	SOT1223	BLP05H6200XR*
		10	600	200	SOT1121	BLF182XR(S)*
		10	600	350	SOT1121	BLF183XR(S)
		10	600	350	SOT1223	BLP05H6350XR*
UHF		470	860	500	SOT539	BLF879P(S)
		470	860	200	SOT502	BLF882(S)*
		470	860	350	SOT1121	BLF884P(S)
		470	806	600	SOT539	BLF888D(S)
		470	860	600	SOT539	BLF888A(S)
		470	860	650	SOT539	BLF888B(S)
FM/VHF		10	600	700	SOT1214	BLF184XR(S)
		10	600	700	SOT1338	BLP05H6700XR*
		10	128	1200	SOT539A	BLF178P
		10	600	1400	SOT539	BLF188XR(S)

* Check status in section 3.1, as this type is not yet released for mass production
For the complete product selection please see section 3.6.2

Product highlight:
Power transistor BLF882(S)

A 200 W LDMOS RF power transistor for broadcast transmitter applications and industrial applications, this transistor can can deliver 200 W in broadband applications from HF to 860 MHz. The excellent ruggedness and broadband performance of this device make it ideal for digital transmitter applications.

Features

- Integrated ESD protection
- Excellent ruggedness
- High power gain
- High efficiency
- Excellent reliability
- Easy power control

LEADING IN ADVANCED RF SOLUTIONS

We're **trusted** by the world's top businesses. That's why 9 out of the top 10 smartphone OEMs use NXP GPS LNAs.

1.5 Wireless connectivity

1.5.1 GPS for smartphones and tablets: high linearity

BGU600x/700x/800x 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 series 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 one external component, 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 smartphones, wearables, and tablets to digital still 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.

The BGU700x/800x 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/800x series requires only one input-matching inductor and an optional 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 0.55 dB
- System-optimized gain from 16 to 19 dB
- Low supply current of 3.1 mA
- High out-of-band IP3 of 9 dBm
- Requires only one input matching inductor and and an optional 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), measuring just 0.65 x 0.44 x 0.2 mm
- Small 6-pin leadless package (1.1 x 0.7 x 0.37 mm)

Footprint on PCB						
	NXP	NXP	NXP	Competitor A	Competitor B	Competitor C
Package (mm)	0.65 x 0.44	1.1 x 0.7	1.1 x 0.9	1.1 x 0.7	1.26 x 0.86	1.13 x 1.1
Number of external components	1	1	2	3	6	9
Footprint (mm^2)	1.82	2.48	3.95	4.88	8.85	12.66

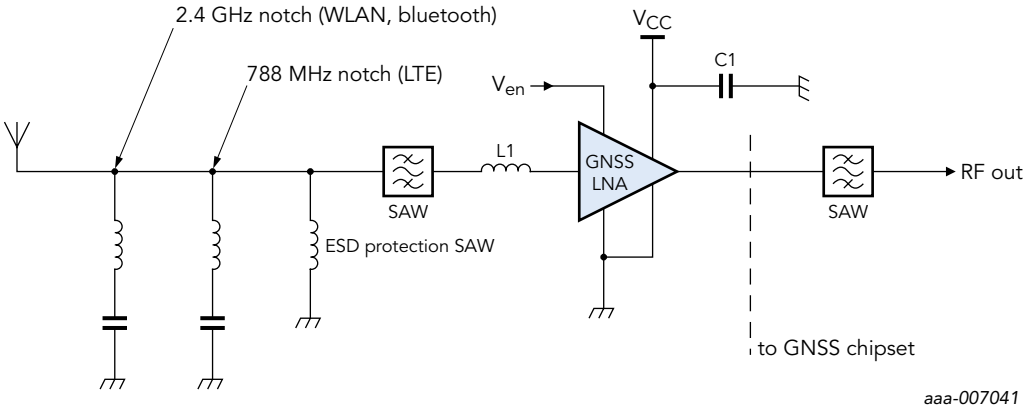
Product highlight: GPS LNA BGU8019

BGU8019 adapts itself to the changing environment resulting from co-habitation of different radios in smartphones. Designed for low power consumption, it gives optimized performance when jammers from coexisting cellular and connectivity transmitters occur. At low jamming power levels, it delivers 18.5 dB gain at a noise figure of 0.55 dB. The BGU8019 requires only one external matching inductor.

Features

- Smallest 6-pin leadless package (1.1 x 0.7 x 0.37 mm)
- Covers full GNSS L1 band, from 1559 to 1610 MHz
- Noise figure = 0.55 dB
- Gain 18.5 dB
- High 1 dB compression point of -7 dBm
- High out-of-band IP3i of 6 dBm
- Supply voltage 1.5 to 3.1 V
- Power-down mode current consumption < 1 uA
- Optimized performance at low supply current of 4.4 mA
- Integrated, temperature-stabilized bias for easy design

Application diagram of a GNSS LNA with pre- and post-SAWs and notches, implemented as discretes, for 788 MHz (LTE) and 2.4 GHz (WLAN) suppression



Recommended products

Function	Product		Package	Type
LNA	MMIC	SiGe:C MMIC	SOT886	BGU6005
				BGU7004
				BGU7005
				BGU7007
				BGU7008
			SOT1230	BGU6009
				BGU8009
				BGU8010
				BGU8011
			SOT1232	BGU8019
				BGU8020
				BGU8103
			WL-CSP	BGU8004
				BGU8006

For automotive applications, the BGU7004 and BGU7008 have been qualified against AEC-Q100 and operate in even the harshest environments, such as the car body.
For the complete product selection please see section 3.4.1

Product highlight: Basic GPS LNAs BGU6005 and BGU6009

Aimed at entry-level smartphones, these devices are housed in easy-to-solder packages.

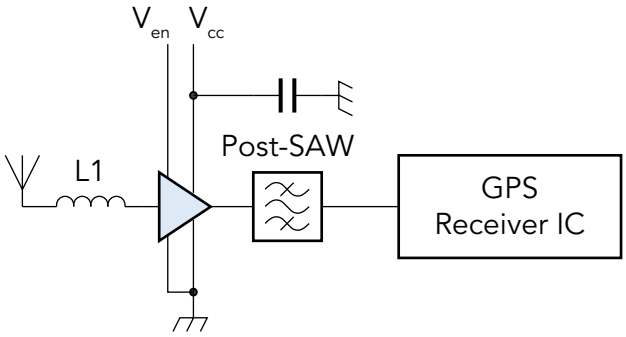
Features

- BGU6005 in SOT886 (1.0 x 1.45 x 0.5 mm), BGU6009 in SOT1230 (1.1 x 0.9 x 0.47 mm)
- Covers full GNSS L1 band, from 1559 to 1610 MHz
- Noise figure (NF) = 0.85 dB
- Gain = 17.5 dB
- High 1 dB compression point of -6 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 4.8 mA
- Integrated, temperature-stabilized bias for easy design
- Requires only one input matching inductor

1.5.2 Wearable health and fitness: low current

In wearable health and fitness applications like smart watches, low current is critical, but linearity requirements can be relaxed since the only relevant on-board jammers are Bluetooth and 2.4 GHz WLAN. For these low-current applications, NXP offers the BGU8010, which uses 3 mA of current and has a gain of 16 dB, the BGU8020, which uses 2 mA of current and has a gain of 16.5 dB, and the BGU8103, which uses 1.2 mA of current and has a gain of 17 dB.

Application diagram of wearable health and fitness device, showing the input-match inductor (L1) and a post-SAW



This application consists of the input match inductor L1 and a post SAW. Because no strong jammer signals are present, a pre-SAW is unnecessary.

Recommended products

Function	Product		Package	Type
LNA	MMIC	SiGe:C MMIC	SOT1230	BGU8010
			SOT1232	BGU8020
				BGU8103

For the complete product selection please see section 3.4.1

Product highlight: Low-current GPS LNA BGU8103

Designed for extremely low power consumption, the BGU8103 delivers optimal performance even when exposed to jammers from coexisting cellular and connectivity transmitters.

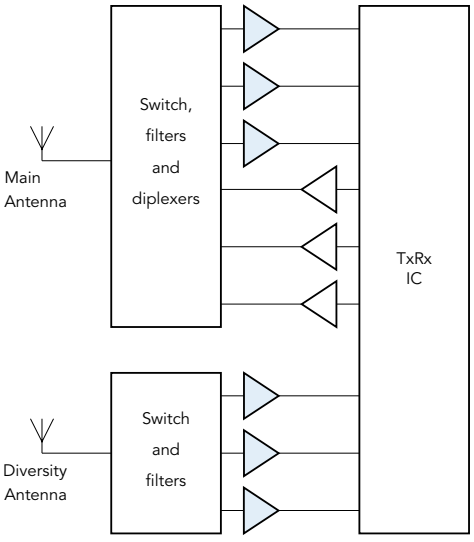
Features

- Covers full GNSS L1 band, from 1559 to 1610 MHz
- Noise figure (NF) = 0.85 dB
- Gain 17.3 dB
- Input 1 dB compression point of -16 dBm
- Out-of-band IP3i of -8 dBm
- Supply voltage 1.5 to 3.1 V
- Optimized performance at low supply current of 1.2 mA
- Power-down mode current consumption < 1 µA

1.5.3 LTE LNA

While LTE/4G offers consumers much higher data rates (up to 300 Mbits/s) compared to UMTS/3G, LTE smartphones are more complex because they need more antennas, are used for multiple cellular and connectivity frequencies, and require additional switches and duplexers. BGS8x2 and BGU8x1 LTE LNAs increase the receive sensitivity of LTE main and diversity receivers by offering system-optimized gain, low noise figure, and high third-order linearity. As a result, LTE smartphone users enjoy higher and more consistent data rates. These features also mean RF designers have more options, as they can amplify the LTE signal close to the antenna and decrease line losses - something that is especially important for large tablet and combination phone/tablet ("phablet") form factors. The BGU8x1 and BGS8x2 LTE LNAs are available for Low (BGU8L1, BGS8L2), Mid (BGU8M1, BGS8M2) and High (BGU8H1, BGS8H2) cellular bands. The difference between the BGS8x2 and the BGU8x1 is that the BGS8x2 has a switch to bypass the LNA. This is beneficial when high RF signal levels are available at the input and there is no need for additional gain, because the LNA can be bypassed and switched off to lower the power consumption.

Application diagram of an LTE LNA in a mobile phone



Recommended products

Function	Product		Package	Type
LNA	RF	MMIC	SOT1232	BGU8L1
				BGU8M1
				BGU8H1
LNA + bypass	RF	MMIC	SOT1232	BGS8L2
				BGS8M2
				BGS8H2

For the complete product selection please see section 3.4.1

Product highlight: LTE LNAs with bypass BGS8x2

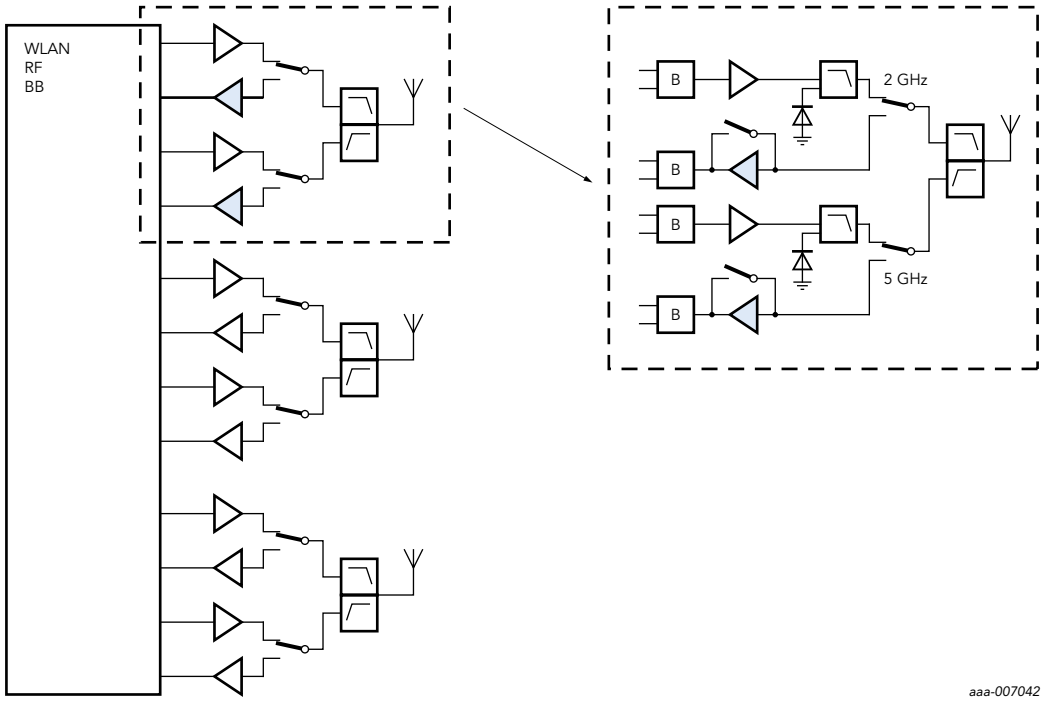
BGS8x2 deliver system-optimized gain for both Primary and Diversity applications where sensitivity improvement is required. The high linearity of these low noise devices ensures the required receive sensitivity independent of cellular transmit power level in Frequency Division Duplex systems. When receive signal strength is sufficient, BGS8x2 can be switched off to operate in bypass mode at a 1uA current, to lower power consumption. The BGS8x2 requires only one external matching inductor.

Features

- Smallest 6-pin leadless package (1.1 mm x 0.7 mm x 0.37mm)
- Cover all bands with a Low (from 728 to 960 MHz), Mid (from1805 to 2200 MHz) and High (from 2300 to 2690 MHz)
- Noise figure (NF) = 0.8 to 1.0 dB
- Optimized gain of 13 or 14 dB
- High 1 dB compression point of -3, -1 or 1 dBm
- High in-band IP3i of 1, 3.5 or 4 dBm
- Low insertion loss, in bypass mode, of 1.9 or 2.3 dB
- Supply voltage 1.5 to 3.1 V
- Bypass mode current consumption < 1 µA
- Optimized performance at supply current of 5 mA
- Require only one input matching inductor

1.5.4 WLAN: access points and routers, fixed consumer electronics

Application diagram for WLAN



Recommended products

Function	Product		Package	Type
LNA	RF transistor	SiGe:C transistor	SOT343F	BFU730F
				BFU768F
				BFU730LX
	RF	MMIC	SOT1189	BGU7224
				BGU7258

For the complete product selection please see section 3.3.1

Product highlight:
WLAN LNAs with bypass BGU7224 and BGU7258

These fully integrated LNAs enable IEEE 802.11b/g/n/ac WLANs and ISM applications in the 2.4 and 5 GHz bands. Manufactured in our high-performance QUBiC4x SiGe:C technology, they combine best-in-class gain, noise figure, linearity, and efficiency with the process stability and ruggedness that SiGe technology is known for.

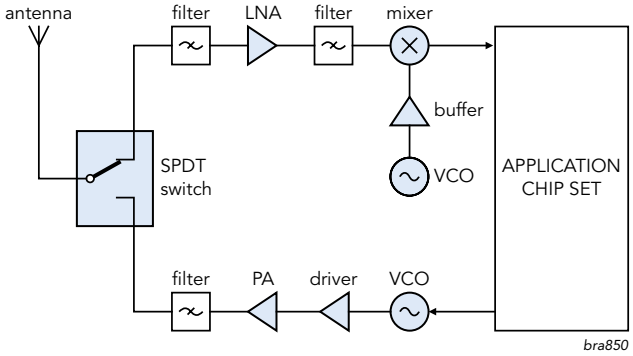
Features

- Fully integrated, high-performance LNA with built-in bypass (no external matching or DC blocking required)
- Noise figure (NF) of 1.0 dB (2.4 GHz) and 1.6 dB (5 GHz), with low current consumption of 13 mA
- Low bypass current of 2 µA
- Single-supply operation from 3.0 to 3.6 V
- Integrated, temperature-stabilized bias network
- High ESD protection of 2 kV HBM on all pins
- Ultrasmall QFN-style package (1.6 x 1.6 x 0.5 mm, 0.5 mm pitch), MSL 1 at 260 °C

1.5.5 Generic RF front-end

In a typical RF front-end, RF signals are received and transmitted anywhere in the range of DC to 20 GHz. All our wideband SiGe amplifiers can be used for high-speed, low-noise applications along this entire spectrum. Because our wideband transistors are so versatile, they are used in a broad range of functions and are an especially good choice for cost-sensitive applications that also need flexibility. In LNA applications, they support GPS, satellite radio, cordless phones, and WLAN. They also enable oscillators and drivers in consumer, ISM, and automotive applications. Many designers use varicap diodes principally as voltage-variable capacitors, with the diode function a secondary option, but these devices are ideally suited for use as VCOs in ISM-band applications.

Application diagram of a typical RF front-end interface



Recommended products

Function	Product		Package	Type
SPDT switch	RF diode	Bandswitch diode	SOD523	BA891
			SOD323	BA591
		PIN diode	Various	BAP51*
			Various	BAP1321*

Function	Product		Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT23	BFU520A
				BFU530A
			SOT143	BFU520
				BFU530
			SOT143X	BFU520X
				BFU530X
			SOT143XR	BFU520XR
				BFU530XR
			SOT323	BFU520W
				BFU530W
				PRF947
			SOT363	BFU520Y
		SiGe:C transistor	SOT343F	BFU610F
				BFU630F
				BFU660F
				BFU690F
				BFU710F
				BFU725F/N1
				BFU730F
				BFU760F
				BFU790F

* Also available in ultrasmall leadless package SOD882D

Function	Product		Package	Type
LNA	MMIC	Low-noise wideband amplifier	SOT1209	BGU6101
				BGU6102
				BGU6104

Function	Product		Package	Type
Driver	RF bipolar transistor	Wideband transistor	SOT23	BFU530A
				BFU550A
			SOT143	BFU530
				BFU550
			SOT143X	BFU530X
				BFU550X
			SOT143XR	BFU530XR
				BFU550XR
			SOT323	BFU530W
				BFU550W
	MMIC	General-purpose wideband amplifier	SOT363	BGA2771
			SOT363	BGA2866

Function	Product		Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
				BFG480W

Function	Product		Package	Type
Buffer	RF bipolar transistor	Wideband transistor	SOT23	PRF947

For the complete product selection please see sections 3.2.3, 3.3.1, and 3.4.1

Product highlight: NPN wideband SiGe RF transistor BFU730F

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 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 1 dB gain compression (Pi(1dB)) of -15 dBm
- Input third-order intercept point IP3I of +4.7 dBm

Recommended products

Function	Product		Package	Type
Power amplifier	RF bipolar transistor	Wideband transistor	SOT89	BFU580Q
				BFU590Q
			SOT223	BFU580G
				BFU590G
				BGA6489
				BGA6589
				BGA7024
				BGA7027

Function	Product		Package	Type
VCO	Varicap diode	VCO varicap diode	SOD523	BB181
			SOD323	BB156
	RF bipolar transistor	Wideband transistor	SOT23	BFU520A
				BFU530A
			SOT323	BFU520W
				BFU530W
			SOT143	BFU520
				BFU530
			SOT143X	BFU520X
				BFU530X
			SOT143XR	BFU520XR
				BFU530XR

For the complete product selection please see section 3.2.1 and 3.3.1

Product highlight:
PNP wideband Si RF transistor BFU520x

Supporting broadband amplifiers up to 2 GHz, LNAs for ISM applications, and ISM-band oscillators, the BFU520X delivers high speed and low noise in a plastic, 4 inch, dual-emitter SOT143B package.

Features

- Low-noise, high-breakdown RF transistor
- AEC-Q101 qualified
- Minimum noise figure (NFmin) = 0.7 dB at 900 MHz
- Maximum stable gain of 20 dB at 900 MHz
- 11 GHz fT silicon technology

1.6 Automotive

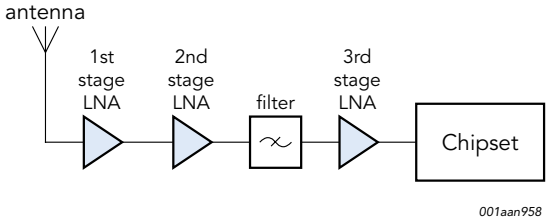
NXP is very active in the automotive market and is present in nearly every automotive application that uses RF. The examples in this section provide evidence that our portfolio covers all the key RF functions typically used in cars.

We recently expanded our portfolio by adding the BFU5x0 series, a new generation of best-in-class, AEC-Q101 qualified wideband transistors. Each BFU5x0 device has a different drain current and is available in up to six different packages, ranging from very small to ultrasmall. Overall, the series delivers ultra-low noise, very high breakdown voltage, and a maximum stable gain of 18 dB at 900 MHz.

1.6.1 SDARS and HD radio

In a Satellite Digital Audio Radio Service (SDARS) system equipped with an active-antenna LNA, a BFU730F wideband transistor can drive the first stage in a three-stage SIRIUS LNA chain, while the BFU690F can drive the second and third stages.

Application diagram of an SDARS Active Antenna LNA - 2320-2332.5 (SIRIUS, 3 stages)



Recommended products

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

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

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

For the complete product selection please see sections 3.3.1 and 3.4.1

Function	Product		Package	Type
LNA or driver or VCO	RF bipolar transistor	Wideband transistor	SOT23	BFU520A
				BFU530A
				BFU550A
			SOT143	BFU520
				BFU530
				BFU550
			SOT143X	BFU520X
				BFU530X
				BFU550X
			SOT143XR	BFU520XR
				BFU530XR
				BFU550XR
			SOT89	BFU580Q
				BFU590Q
			SOT223	BFU580G
				BFU590G
			SOT323	BFU520W
				BFU530W
				BFU550W
			SOT363	BFU520Y

For the complete product selection please see section 3.3.1

Product highlight:
NPN wideband silicon RF transistors BFU5xx

The BFU5xx transistor family is designed for applications up to 2 GHz such as communication, and automotive and industrial equipment. Due to the high gain at low supply current, these devices are also a good choice for battery-powered systems. All are available in multiple, small form-factor packages that ease design-in.

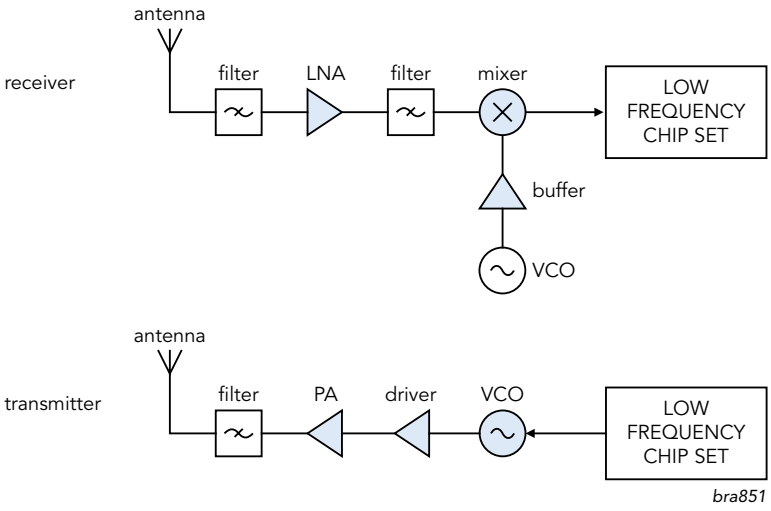
Features

- Low-noise, high-breakdown RF transistor
- AEC-Q101 qualified
- Minimum noise figure (NFmin) = 0.7 dB at 900 MHz
- Maximum stable gain of 18 dB at 900 MHz
- 11 GHz fT silicon technology

1.6.2 Remote Keyless Entry (RKE), RF generic front-end with dedicated antenna for reception and transmission

With an RKE system, drivers can lock or unlock a vehicle by using a key fob equipped with a transmitter that sends data to a receiver in the vehicle. In the Tx chain, the driver and PA play major roles in ensuring a long range and accurate transmission. In the Rx chain, a discrete LNA is often used to ensure efficiency and security. We offer a wide selection of VCOs, drivers, and PAs that let the designer build the right configuration for their application.

Application diagram of a remote keyless entry system



Recommended products

Function	Product		Package	Type
LNA	RF bipolar transistor	Wideband transistor	SOT323	PRF947
	MMIC	Low-noise wideband amplifier	SOT1209	BGU6101
				BGU6102
				BGU6104
		SiGe:C MMIC	SOT886	BGU7003W

Function	Product		Package	Type
Driver	MMIC	General-purpose wideband amplifier	SOT363	BGA2866

Function	Product		Package	Type
VCO	Varicap diode	VCO varicap diode	SOD323	BB156
			SOD323	BB170
			SOD323	BB174
			SOD523	BB181

For the complete product selection please see sections 3.2.1, 3.3.1, and 3.4.1

Function	Product		Package	Type
Mixer	RF bipolar transistor	Wideband transistor	SOT343	BFG410W
			SOT343	BFG480W

Function	Product		Package	Type
Buffer	RF bipolar transistor	Wideband transistor	SOT323	PRF947

Function	Product		Package	Type
Power amplifier	MMIC	General-purpose wideband amplifier	SOT363	BGA2771
			SOT363	BGA2866
			SOT908	BGA7124

For the complete product selection please see sections 3.3.1 and 3.4.1

Product highlight: Varicap diodes as VCOs

Varicap diodes are principally used as voltage-variable capacitors, with their diode function a secondary option, but they're ideal for use as VCOs in ISM-band applications.

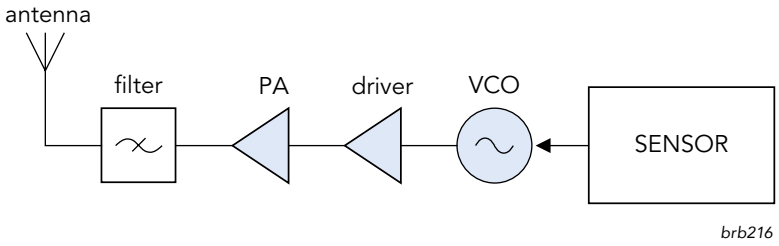
Features

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

1.6.3 Tire-pressure monitoring system

Tire-pressure monitoring systems use a transmitter similar to that of an RKE system (see section 1.6.2). Range and accuracy are a must, so discrete drivers and/or PAs are mandatory. NXP offers a wide selection of VCOs, drivers, and PAs that support these requirements.

Application diagram of a tire-pressure monitoring system



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Recommended products

Function	Product		Package	Type
PA	RF bipolar transistor	Wideband transistor	SOT323	BFR93AW

Function	Product		Package	Type
Driver	MMIC	Amplifier	SOT363	BGA2031/1
		General-purpose wideband amplifier	SOT363	BGA2771
			SOT363	BGA2866

Function	Product		Package	Type
VCO	Varicap diode	VCO varicap diode	SOD323	BB156
			SOD323	BB171

* AEC-Q101 qualified (some limitations apply)
For the complete product selection please see sections 3.2.1, 3.3.1, and 3.4.1

Product highlight: MMIC wideband amplifier BGU6101

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.

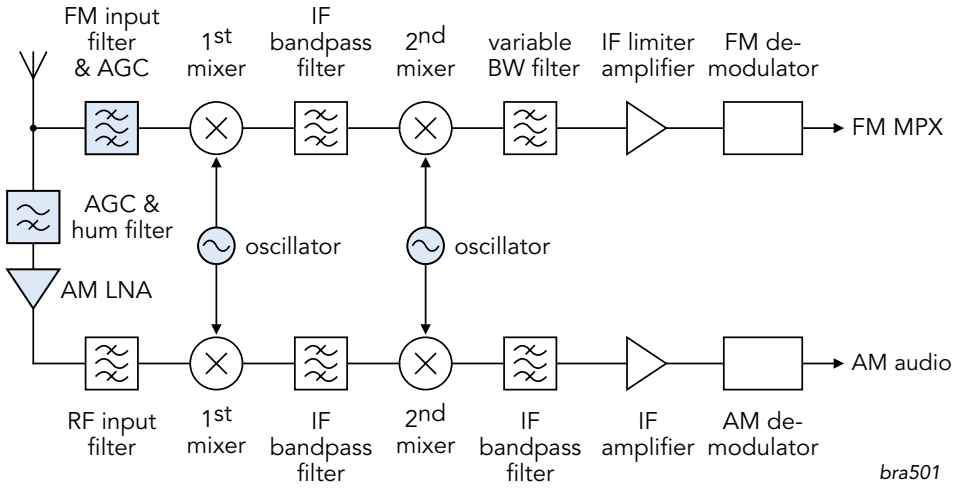
Features

- 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 µA
- ESD protection > 1 kV HBM on all pins

1.6.4 Car radio receiver (CREST ICs: TEF6862HL)

The discrete devices used in typical multimode car radio receivers are also applicable to the very small can tuners that enable a higher level of integration. Our portfolio, which includes JFETs, varicaps, and PIN diodes, supports the design of advanced applications that use FM, AM, and digital radio.

Application diagram of a multimode car radio receiver



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

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

*OIRT band

For the complete product selection please see sections 3.2.1, 3.2.2, and 3.5.1,

Product highlight: JFET BF862

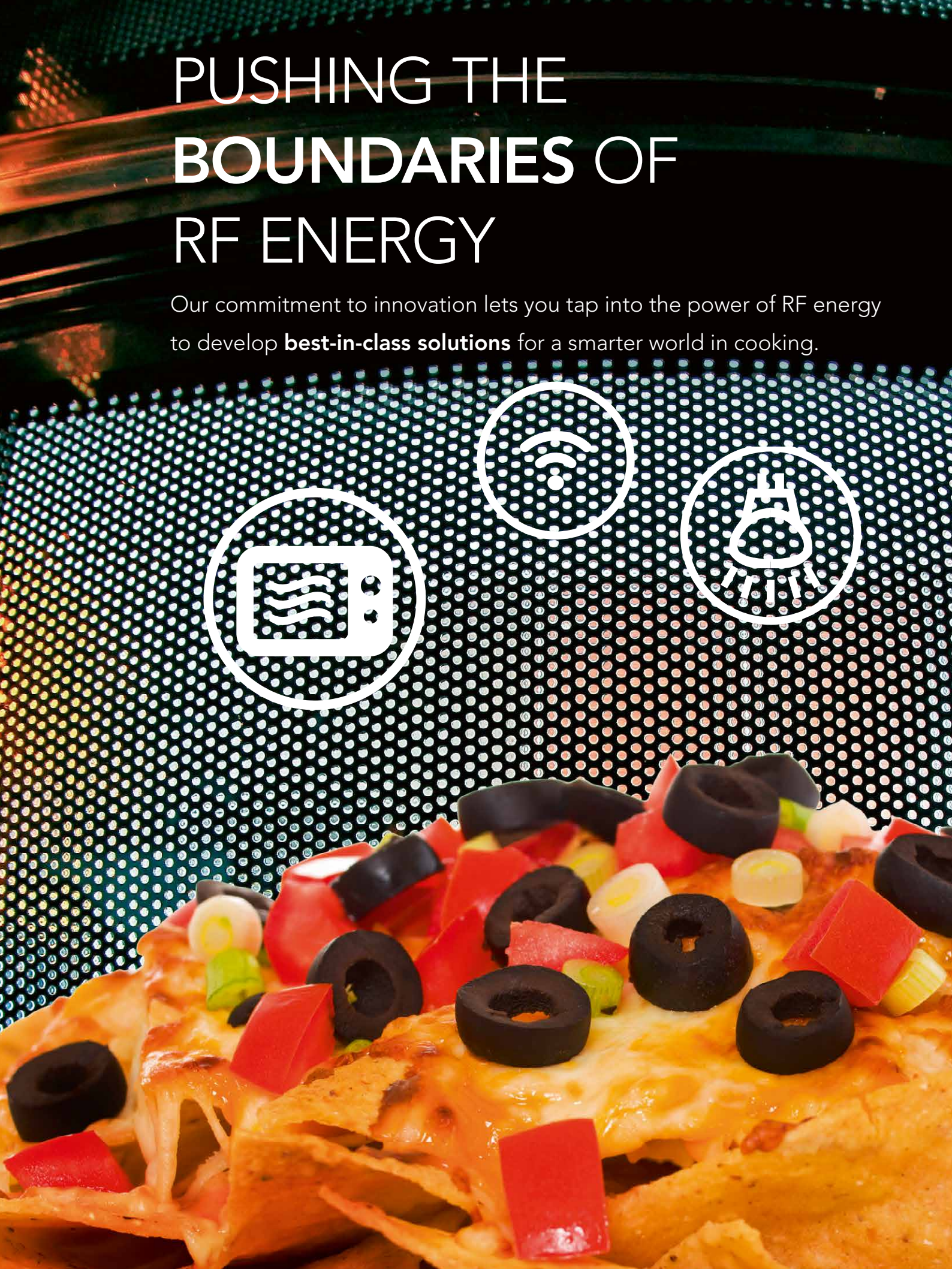
Our tuning portfolio contains advanced products for car radio reception applications and in-vehicle media platforms. The NXP devices for this application ensure excellent reception quality and ease of design-in. Performance is demonstrated in reference designs. The high-performance junction FET BF862 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
- Housed in versatile, easy-to-use SOT23 package

PUSHING THE **BOUNDARIES** OF RF ENERGY

Our commitment to innovation lets you tap into the power of RF energy to develop **best-in-class solutions** for a smarter world in cooking.



1.7 Industrial, Scientific, and Medical (ISM)

As unlicensed radio bands, the industrial, scientific and medical (ISM) frequency bands are available for a whole host of purposes, including applications such as chemical processing, magnetic resonance imaging (MRI), electro coagulation surgical equipment, precipitation monitoring, and wind profiling. In recent years, the ISM bands have also had to share the bandwidth with short-range, low-power communications systems and radio-frequency identification (RFID), however these low power emitters are not considered ISM.

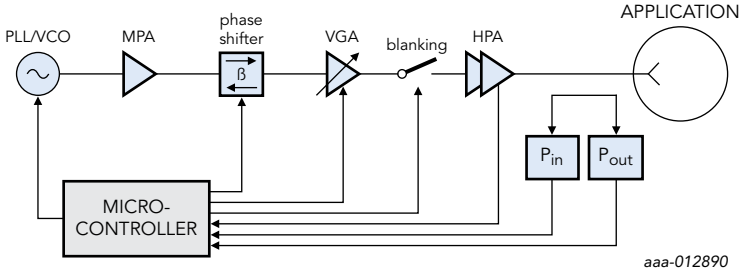
NXP offers 35+ years of experience delivering RF power transistors, and nearly a decade of leadership expertise in the ISM market. Our product portfolio supports all the key ISM frequencies, power levels, ruggedness, control functionality, and interconnectivity standards.

ISM bandwidths supported by NXP:

Frequency range (MHz)		Availability
26.957	27.283	Worldwide
40.660	40.700	Worldwide
433.050	434.790	Subject to local acceptance
902	928	Subject to local acceptance
2400	2500*	Worldwide

*For NXP's portfolio in the ISM 902 -928 and 2400 -2500 bands, please see section 1.8

Application diagram of an ISM system



In a typical ISM application, a small-signal generator – built using an RF synthesizer, a variable gain amplifier (VGA), an RF switch, and an optional phase shifter - is followed by a high power amplifier (HPA) that delivers the necessary output power level.
A feedback mechanism that uses a coupler or detector can easily be added. This kind of generator can be built using discrete components, but also lends itself to integration.

Product highlight:
Power transistor BLF188XR(S)

This is a 1400 W extreme rugged LDMOS power transistor for broadcast and industrial applications, capable of providing an outstanding 1600 W of peak output power. It can operate as high as 50 V and still pass extreme ruggedness testing. The BLF188XR can be used in a Class-C mode of operation, and offers several enhancements that make it easy to configure in multiple applications, including ISM and broadcast transmitter applications.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability

1.7.1 ISM band 0 to 500 MHz

Typical applications:

- RF drying
- RF welding
- Citizens' Band (CB) radio communication
- Magnetic resonance imaging (MRI)
- CO_2 lasers
- Plasma generators
- Particle accelerators

Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	0	500	3	SOT1352	BLP10H603
		0	500	5	SOT1352	BLP10H605
		0	500	10	SOT1352	BLP10H610
		0	500	20	SOT467	BLF571
		0	500	35	SOT1223	BLP05H635XR*
	Driver/final	0	500	75	SOT1223	BLP05H675XR*
	Final	0	500	100	SOT467	BLF871(S)
		0	500	110	SOT1223	BLP05H110XR*
		0	500	120	SOT467	BLF881(S)
		0	500	150	SOT1223	BLP05H6150XR*
		0	500	200	SOT1138	BLP05M7200
		0	500	200	SOT1121	BLF182XR(S)*
		0	500	300	SOT502	BLF573(S)
		0	500	350	SOT1121	BLF183XR(S)
		0	500	350	SOT1223	BLP05H6350XR*
		0	500	600	SOT1214	BLF574XR(S)
		0	500	600	SOT1214	BLF174XR(S)
		0	500	600	SOT539	BLF574
		0	500	700	SOT1214	BLF184XR(S)
		0	500	1200	SOT539	BLF578
		0	500	1200	SOT539	BLF178P
		0	500	1400	SOT539	BLF188XR(S)
		0	500	1400	SOT539	BLF578XR(S)
		0	500	1400	SOT539	BLF178XR(S)

For the complete product selection please see sections 3.6.1 and 3.6.2

Product highlight:
Power transistor BLF184XR(S)

This is a 700 W, extreme rugged LDMOS power transistor for broadcast and industrial applications, capable of withstanding a load mismatch corresponding to VSWR > 65:1 through all phases. It can operate as high as 50 V and still pass extreme ruggedness testing. The BLF184XR can be used in a Class-C mode of operation, and offers several enhancements that make it easy to configure in multiple applications, including ISM and broadcast transmitters.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF to 600 MHz)

1.7.2 ISM band 0 to 1600 MHz

In ISM bands, RF power supports a wide range of applications - from high-powered gas lasers to particle accelerators, plasma generators, and medical imaging – and these systems frequently use custom RF amplifiers from solid-state sources. Our portfolio includes field-proven LDMOS devices that help developers create ISM systems that deliver high performance and a long lifetime.

Typical applications:

- RF heating
- RF drying
- RF thawing
- Chemical processing
- Plasma lighting
- Particle accelerators

Recommended products

Function	Product	Package	Type
Oscillator	RF transistor	SOT23	BFR520
		SOT143	BFG520
		SOT323	BFR93AW
		SOT323	BFS520
		SOT343	BFG520W
		SOT363	BFM520

Function	Product	Package	Type
MPA	MMIC	SOT89	BGA6589
			BGA7024
			BGA7027
		SOT908	BGA7124
			BGA7127
			BGA7130

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	10	2500	5	SOT1179	BLP25M705
		2400	2500	5	SOT1371	BLP25M805*
		10	2200	10	SOT538	BLF640
		10	2500	10	SOT1179	BLP25M710
		2400	2500	10	SOT1371	BLP25M810*
		1	1400	35	SOT467	BLF642
	Final/driver	13	1300	70	SOT1228	BLF644P
	Final	0	1000	100	SOT467	BLF871(S)
		1	1400	100	SOT540	BLF645
		700	1000	135	SOT502	BLF10M6(LS)135
		0	1000	140	SOT467	BLF881(S)
		700	1000	160	SOT502	BLF10M6(LS)160
		10	1500	160	SOT1223	BLP15M7160P
		10	1500	200	SOT1121	BLF647P(S)
		700	1000	200	SOT502	BLF10M6(LS)200
		1300	1300	250	SOT1121	BLF6G13L(S)-250P
		1400	1500	500	SOT539	BLF6G15L(S)-500H
		400	1000	600	SOT539	BLF10H6600P(S)

For the complete product selection please see sections 3.3.1, 3.4.1, and 3.6.2

Product highlight:
Power transistor BLP25M705 and BLP25M710

The BLP25M705 and BLP25M710 are plastic LDMOS power transistors for broadcast and industrial applications. These cost-effective devices cover all frequencies in the HF to 2500 MHz band.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- High power gain

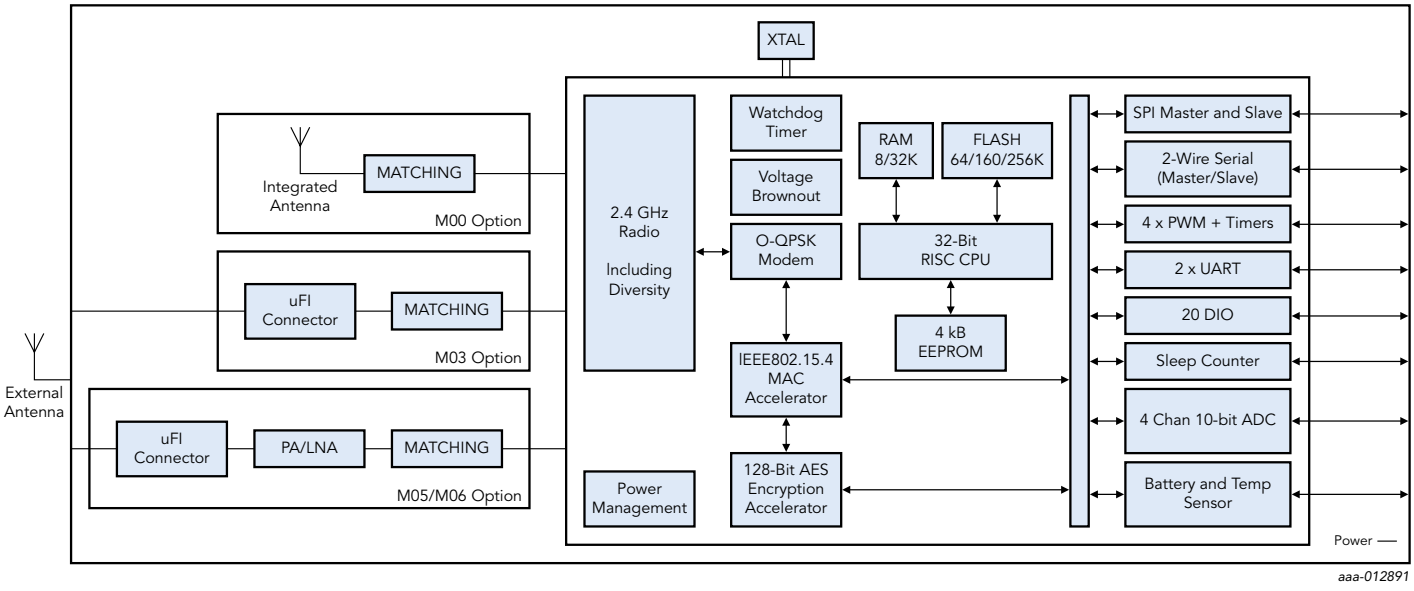
1.7.3 Wireless microcontrollers IEEE 802.15.4/ZigBee

Wireless microcontrollers for the Internet of Things (IoT)

Our wireless network solutions provide all the necessary hardware and software components to develop applications that use ZigBee PRO, RF4CE, JenNet-IP, or IEEE 802.15.4. Our JN516x wireless microcontroller chips provide the optimum hardware platform for building wireless network nodes, and combine high-performance processing and radio communications.

We also supply JN516x wireless microcontrollers mounted on modules, as well as an evaluation kit for use with custom applications. The JN516x architecture includes a rich mix of on-chip peripherals, such as 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 also support a large switch matrix of up to 100 elements or a 20-key capacitive touchpad. The latest JN5169 device offers 512 kB of memory, supporting over-the-air downloads with no external flash memory and +10 dBm output power for best range.

Application diagram of an ultralow-power, high-performance microcontroller



Products

- JN5161-001: 64 kB Flash, 8 kB RAM for RF4CE and IEEE 802.15.4 applications
- N5164-001: 160 kB Flash, 32 kB RAM for RF4CE, JenNet-IP and IEEE 802.15.4 applications
- JN5168-001: 256 kB Flash, 32 kB RAM for ZigBee PRO, RF4CE, JenNet-IP and IEEE 802.15.4 applications
- JN5168-001-M00, JN5168-001-M03, JN5168-001-M05, and JN5168-001-M06 modules
- JN5169-001: 512 kB Flash, 32 kB RAM and +10 dBm Tx power for ZigBee PRO, RF4CE, JenNet-IP and IEEE 802.15.4 applications

Product highlight: Wireless microcontrollers JN516x

The JN516x series is a range of ultralow-power, high-performance wireless microcontrollers supporting JenNet-IP, ZigBee PRO, and 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, and offer 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 IEEE 802.15.4-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 0.6 µA sleep timer mode, gives excellent battery life and allows operation direct from a coin cell.

Features

- Ultra low-power MCU together with a single-chip IEEE 802.15.4-compliant radio transceiver to run stack and application
- Very low-current solution for long battery life (10+ years)
- Supports multiple network stacks
- Enhanced 32-bit RISC processor for high performance and low power
- A rich mix of analog and digital peripherals
- Standard- and high-power modules
- Software Development Kit (SDK) with JenNet-IP and ZigBee network stacks

Software

A selection of network protocol stacks, based on the IEEE 802.15.4 standard, support wireless connectivity. 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, which is suitable for all proprietary applications, provides IPv6 connectivity to the end node.

JN516x-EK001 evaluation kit

Product highlight: MMIC MPA BGA7127

The BGA7127 MMIC is a one-stage driver amplifier offered in a low-cost, ultrasmall 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
- Single-supply operation from 3.3 or 5 V
- Simple quiescent current adjustment
- 1 µA shutdown mode

1.8. RF energy

Solid-state RF energy represents a radical approach to powering applications. It replaces large, inflexible power sources, such as magnetron tubes, by providing a small, controllable, and accurate source for power.

Solid-state RF for robust, highly efficient, and controllable energy

The ISM bands near 433 MHz, 915 MHz, and between 2.4 and 2.5 GHz are free for use, and as a result have been used to support a variety of applications. Many of these applications now use solid-state RF power generators.

Switching to solid-state RF energy has given new life to familiar applications, including microwave ovens, and outdoor lighting solutions. These new, RF-powered systems break through existing limitations by being cleaner, more efficient, and more effective.

A prerequisite: dedicated 2.45 GHz LDMOS transistors

Dedicated transistors are a prerequisite in this arena, and we offer a range of LDMOS-based power transistors just for the 2.45 GHz segment. Optimized for performance in this band, our dedicated LDMOS transistors provide the right balance of power, efficiency, and ruggedness, while meeting the cost restrictions for volume production and the technical standards for global operation.

NXP's portfolio supports complete solid-state RF energy solutions using a range of power frequencies and efficiencies. Our portfolio delivers the performance and integration required by RF energy, and we provide the kinds of industry-leading system support that help designers move quickly to capture this market.

Key benefits

- A full range of output power levels, from 5 to 600 W continuous wave albeit for 915 MHz only (BLF10H6600P(S))
- Best-in-class efficiencies (final-stage devices >50%)
- Field-proven ruggedness and long-term reliability
- The ability to drive variable load impedances
- All products use thermally enhanced packages

Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	2400	2500	5	SOT1371	BLP25M805*
		10	2500	5	SOT1179	BLP25M705
		2400	2500	10	SOT1371	BLP25M810*
		10	2500	10	SOT1179	BLP25M710
		2400	2500	30	SOT1135	BLF2425M9L(S)30*
		2400	2500	60	SOT1211	BLM2425M7S60P*
	Driver/final	2400	2500	100	SOT502	BLF2425M7L(S)100
	Final	2400	2500	140	SOT502	BLF2425M7L(S)140
		2400	2500	140	SOT502	BLF2425M9L(S)140*
		2400	2500	180	SOT539	BLF2425M6L(S)180P
		2400	2500	250	SOT539	BLF2425M7L(S)250P
		2400	2500	300	SOT1250	BLC2425M8L(S)300P*

For the complete product selection please see section 3.6.2

Product highlight: Power transistor BLC2425M8L(S)300P

This is a 300 W push-pull LDMOS transistor in a thermally enhanced ceramic package for applications in the range of 2400 to 2500 MHz. The BLC2425M8L(S)300P uses NXP's Gen8 LDMOS technology to deliver best-in-class power density, achieving 51% efficiency and 15 dB gain from a 28 V supply. It enables a wide range of RF applications, including cooking, lighting, heating, drying, ignition, and ablation.

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

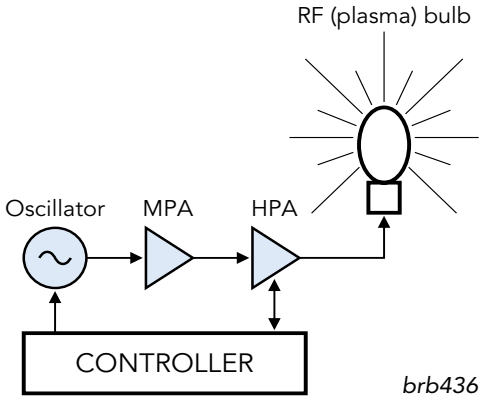
1.8.1 RF Light-Emitting Plasma (LEP)

Recent improvements in RF technology have increased ruggedness, and RF power transistors are now able to drive changing and extreme loads with repeatable and reliable RF energy. One application that puts this ruggedness to use is solid-state plasma lighting, which competes with other kinds of outdoor area lighting in architectural, entertainment, and agricultural applications. Solid-state plasma lighting offers energy savings of around 40% over high-pressure sodium and metal halide systems, and the format's long lamp life helps reduce maintenance costs.

Key benefits

- Controllability, with available feedback loop
- Energy saving
- Cleaner-burning microplasmas

Application diagram of RF Light-Emitting Plasma (LEP)



Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	10	2500	5	SOT1179	BLP25M705
		2400	2500	5	SOT1371	BLP25M805*
		10	2500	10	SOT1179	BLP25M710
		2400	2500	10	SOT1371	BLP25M810*
	Final	425	450	200	SOT1138	BLP05M7200

For the complete product selection please see section 3.6.2

Product highlight: Power transistor BLP05M7200

A 200 W LDMOS over-mold plastic power transistor for various applications, such as ISM and RF plasma lighting, at frequencies from 425 MHz to 450 MHz.

Features

- High efficiency
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Easy power control
- Designed for ISM operation (425 to 450 MHz)
- Input integration for simple board design

1.8.2 Solid-state cooking/RF heating

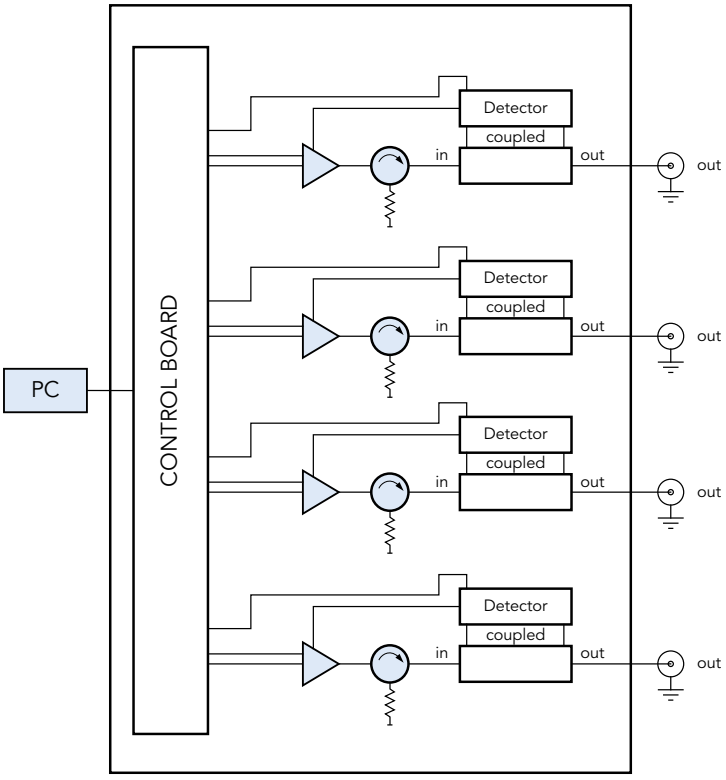
Conventional and microwave ovens waste energy during heating, due to the inefficiency of conduction- and convection-based heating mechanisms. In solid-state cooking, RF energy acts as a volumetric heat source that effectively depositing energy inside loads, and thus preventing large temperature gradients.

Replacing a single magnetron with multiple solid-state sources brings additional possibilities for control of signals inside a cavity. The frequency can be chosen, and the relative phase of the two signals can be adapted. This has a direct effect on the energy distribution in the cavity, moving the hot spots and also improving return losses on each RF port.

Key benefits

- Controllability, with available feedback loop
- Heat spreads evenly across entire target
- Prevention of local overheating
- Improved product quality
- Unprecedented system reliability

Application diagram of a solid-state cooking system



Product highlight:
Power transistor BLP25M705 and BLP25M710

The BLP25M705 and BLP25M710 are plastic LDMOS power transistors for broadcast and industrial applications. These cost-effective devices cover all frequencies in the HF to 2500 MHz band.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- High power gain

Recommended products for 915 MHz

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	10	1400	3	SOT1352	BLP10H603
		10	1400	5	SOT1352	BLP10H605
		10	2200	10	SOT538	BLF640
		10	1400	10	SOT1352	BLP10H610
		10	500	20	SOT467	BLF571
		10	1000	30	SOT1223	BLP10H630P*
		1	1400	35	SOT467	BLF642
		10	1000	60	SOT1223	BLP10H660P*
	Driver/final	10	1300	70	SOT1228	BLF644P
	Final	10	1000	90	SOT1223	BLP10H690P*
		1	1400	100	SOT540	BLF645
		10	1000	120	SOT1223	BLP10H6120P*
		1	1000	140	SOT467	BLF881
		10	1500	200	SOT1121	BLF647P(S)
		400	1000	600	SOT539	BLF10H6600P(S)

Recommended products for 2400 - 2500 MHz

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	2400	2500	5	SOT1371	BLP25M805*
		10	2500	5	SOT1179	BLP25M705
		2400	2500	10	SOT1371	BLP25M810*
		10	2500	10	SOT1179	BLP25M710
		2400	2500	30	SOT1135	BLF2425M9L(S)30*
		2400	2500	60	SOT1211	BLM2425M7S60P*
	Driver/final	2400	2500	100	SOT502	BLF2425M7L(S)100*
	Final	2400	2500	140	SOT502	BLF2425M7L(S)140
		2400	2500	140	SOT502	BLF2425M9L(S)140*
		2400	2500	180	SOT539	BLF2425M6L(S)180P
		2400	2500	250	SOT539	BLF2425M7L(S)250P
		2400	2500	300	SOT1250	BLC2425M8L(S)300P*

For the complete product selection please see section 3.6.2

Product highlight:
Power transistor BLP10H690P

The BLP10H690P, a plastic 90 W LDMOS power transistor for broadcast and industrial applications, is a cost-effective option for frequencies in the HF to 1000 MHz band.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- High power gain

DRIVING RF TO THE **NEXT LEVEL**

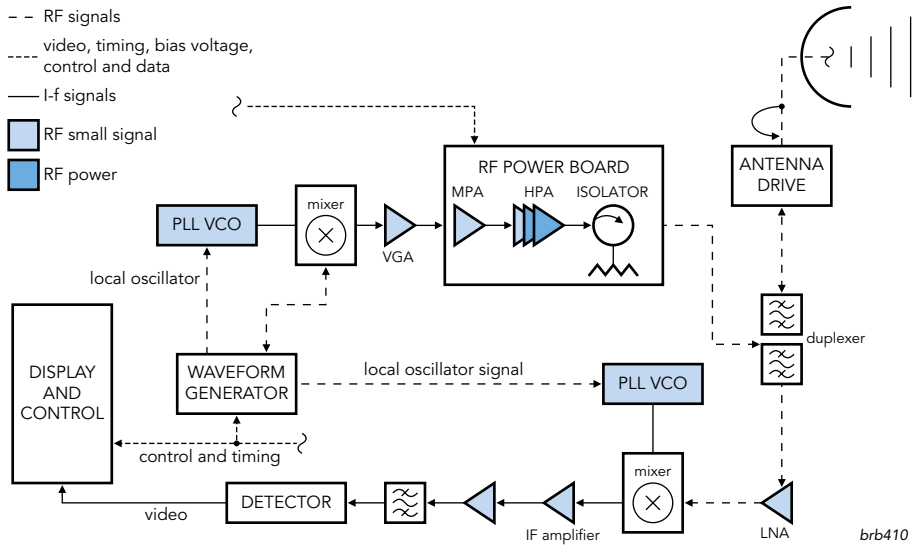
Our **commitment** to innovation results in providing best-in-class RF solutions for a smarter world.

1.9 Aerospace and defense

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

For more than three decades, we have led in providing high-performance RF technologies for microwave applications. NXP 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 for the future, we are also developing new high-power and high-bandwidth technologies based on GaN material (see section 2.3 for more details on GaN).

Application diagram of microwave application



Recommended products

Function	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Package	Type
HPA	Driver	500	1400	25	SOT467C	BLL8H0514-25
		2700	3500	30	SOT1135	BLS6G2735L(S)-30
	Final	500	1400	130	SOT1135	BLL8H0514L(S)-130
		1030	1090	200	SOT502	BLA6G1011L(S)-200RG
		1200	1400	250	SOT502	BLL8H1214L(S)-250
		1200	1400	250	SOM039	BLL6H1214P2S-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	BLL8H1214L(S)-500
		1030	1090	600	SOT539A	BLA6H1011-600
		1000	1100	300	SOT502	BLA8G1011L(S)-300(G)
		2700	3100	400	SOT539	BLS8G2731L(S)-400P*

* Check status in section 3.1, as this type is not yet released for mass production
For the complete product selection please see section 3.6.3

Product highlight:

Power transistor BLS8G2731L(S)-400P

The BLS8G2731L(S)-400P is a 400 W LDMOS power transistor intended for radar applications in the range of 2.7 to 3.1 GHz.

Features

- Easy power control
- Integrated ESD protection
- High flexibility with respect to pulse formats
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2.7 to 3.1 GHz)
- Internally matched for ease of use

Recommended products

Type	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	Package
CLF1G0060(S)-10*	Driver	0	6000	10	50	33.2	SOT1227
CLF1G0060(S)-30*		0	6000	30	50	59	SOT1227
CLF1G0035-50	Driver/final	0	3500	50	50	49	SOT467
CLF1G0035S-50*		0	3500	50	50	49	SOT467
CLF1G0035-100	Final	0	3500	100	50	59.5	SOT467
CLF1G0035S-100*		0	3500	100	50	59.5	SOT467
CLF1G0035(S)-100P*		0	3500	100	50	50.1	SOT1228
CLF1G0035(S)-200P*		0	3500	200	50	43.5	SOT1228

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

Function	Product		Package	Type
LNA 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
		General-purpose wideband amplifier		BGM1013

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

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

Function	Product	Gain range (dB)	Package	Type
Dual VGA	MMIC	24	SOT617	BGA7350
		28		BGA7351
				BGA7352

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

For the complete product selection please see sections 3.3.1, 3.4.1, and 3.4.5

Product highlight:
IF gain blocks BGA28xx

The BGA28xx IF gain blocks are silicon 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

INSPIRING RF SOLUTIONS

Our broad portfolio and **collaborative** approach help you advance your RF designs for a smarter world.

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, along with equipment for communications infrastructure. The QUBiC4 process also helps speed satellite tracking and better connectivity with GPS signals for GPS systems, enhances satellite, WLAN, and microwave radio applications, 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 on mature processes that have been in mass production since 2002. The QUBiC4 process can integrate 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 four variants (QUBiC4+, QUBiC Gen7RF, QUBiC Gen8RF, and the newly released QUBiC Gen9RF), 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, and 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 f_T implanted base Si double poly NPNs with 3.8 V breakdown voltage (BV_CEO) and low noise figure (NF < 1.1 dB @ 2 GHz), 5 GHz f_T VPNPs, 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 f_T lateral PNPs, 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 isolated NMOS, and optional 3.3 V CMOS and RF-CMOS transistors. The QUBiC4+ process is ideal for applications up to 5 GHz.

QUBiC Gen7RF (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 f_T NPN with 2.0 V breakdown voltage (BV_CEO) and very low noise figure (NF < 1.0 dB @ 10 GHz), a 60 GHz f_T NPN with 3.1 V BV_CEO, 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, satellite communications, and point-to-point or wireless connectivity.

QUBiC Gen8RF (QUBiC4Xi)

The QUBiC4Xi process further enhances the QUBiC4X process. It offers 200 GHz f_T / 1.5 V BV_CEO NPNs and offers ultra-low noise figure (NF < 0.6 dB @ 10 GHz), 90 GHz f_T / 2.5 V BV_CEO NPN, 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, but also offers extremely low noise in the 1 - 2 GHz range. A recent process

update provides high-power devices for use in applications that require high output power and high linearity. This Extended High Voltage device combines high breakdown capabilities with high speed. The BV_CEO is increased to 4 V and the BV_CBO equals 18 V. The f_T / f_max of this optional device is 50 / 160 GHz.

QUBIC4 Gen9RF

The latest release of the QUBIC family provides best-in-class noise figures at millimeter wave frequencies. The latest generation is optimized for NFmin, which is measured at 0.27 dB at 2 GHz, 0.35 dB at 5 GHz, and 0.49 dB at 10 GHz.

2.2 Best-in-class LDMOS to drive any RF power 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. LDMOS also offers a strong cost advantage combined with a large industrial base versus other technologies, such as GaN HBT.

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 their 9th 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. The latest generation, Gen9, has been in full production since late 2014. It has been optimized for LTE and takes efficiency yet one step further, with modulated efficiencies in the range of 50% at 2.6 GHz and an even larger performance increase at 3.4 to 3.8 GHz. Gen9 also moves the performance needle for LDMOS used in S-band radar applications.

Advanced processes and architectures

These high efficiencies are achieved by combining LDMOS devices with specific amplifier circuit designs such as Doherty. The technology enables Doherty amplifiers with higher power, higher efficiencies, lower memory effects, and better pre-distortion capabilities. Doherty amplifiers are available fully integrated into a single transistor package, so engineers don't 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 and 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 as Gen6XR to enable devices with ruggedness on par with legacy VDMOS technology. The Gen6XR process is essential for ISM applications, which often suffer from severe mismatch conditions, since Gen6XR enables products that withstand these mismatches without compromising the RF performance.

NXP has risen to the 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. For example, NXP has raised the bar for LDMOS with 350 W S-band devices in the range of 2.7 to 3.5 GHz.

Solid-state RF energy

The promise of RF energy is a cleaner, more efficient, and more effective power source. From solid-state cooking and RF sparkplugs, to RF plasma lighting and medical therapy, the possibilities for RF energy are nearly limitless. A radical approach is sometimes what's needed to break through existing limitations, and that's exactly what NXP's solid-state RF portfolio offers - a radically different way to power applications.

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

- Gen8/9 with enhanced VBW performance for 28-32 V base-station, aerospace, and defense applications
- Gen6XR for 42-50 V ISM applications requiring extreme ruggedness
- Gen6HV for 42-50 V high power-density for broadcast

2.3 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 and 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

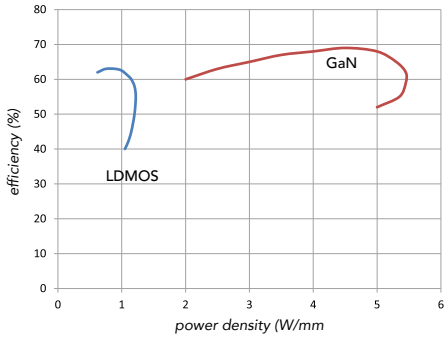
GaN products are termed High-Electron Mobility Transistors (HEMT), a name that captures one of the intrinsic benefits of GaN – the high electron drift velocity. However, these transistors are depletion-mode devices, so they are normally on and require a negative gate bias to switch them off. This biasing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

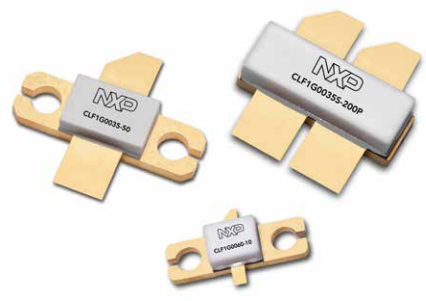
A further advantage of GaN is that it is a very strong semiconductor material, so it's capable of withstanding very high temperatures. NXP's GaN transistors are specified to a maximum temperature of 250 °C, compared to 225 °C for Si LDMOS. With such high temperature capability, there is a greater need 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 technology makes a step increase in efficiency and power-density performance over Si LDMOS in several applications (see figure). It is expected, by independent market analyst firms, that GaN product sales will grow into new application areas beyond aerospace and defense applications. This growth needs to be supported by mainstream RF Power companies such as NXP, who have invested in GaN technology for years.

Currently, NXP is releasing a portfolio of GaN products using its industrial base that brings customers excellence in product reliability, performance, and a high degree of confidence in the supply chain. As we like to say, we are taking GaN mainstream.

GaN vs LDMOS comparison @ 2.1 GHz





2.4 High-performance, small-size packaging

NXP's 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).

SOT343

SOT343F

SOT1230

SOT1232

- For space-restricted applications, there are two ways 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.

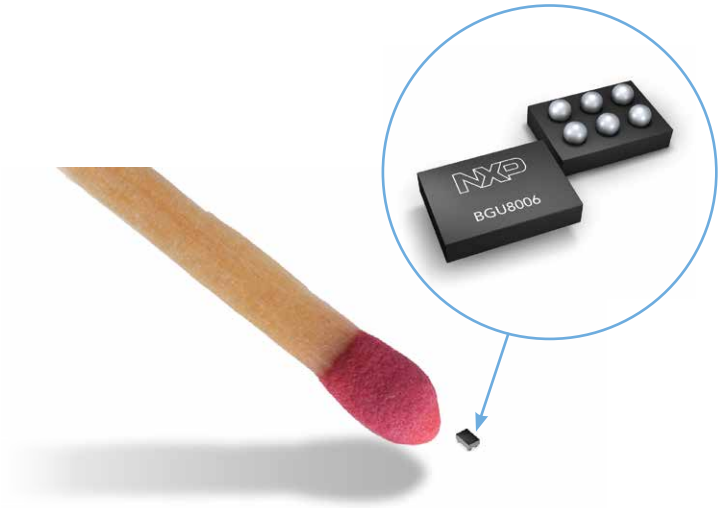
Because of the compact size of the design, wire lengths and parasitic impedance are also restricted. The absence of leads further reduces the inductance.

Wafer-Level Chip-Scale Package technology is ideal for RF functions where the I/O pitch fits within the chip area. With smaller designs (and thus little effective chip area), it is more difficult to apply these on board due to smaller I/O pitches. Such small functions can now be flipped inside the SOT1232 package and still be mounted like a normal leadless package with 0.4 mm pitch. 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

2.5 RF power transistor packages

Packaging is an important element in RF power transistors, influencing both the cost-effectiveness and performance of a given device. Since peak powers can vary widely, from as low as 5 watts to more than 1 kW, a range of packages are needed to cover every application. The choice of package format (air-cavity or over-molded plastic), often depends on the design requirements, and any trade-offs to be made between performance and cost.

Air-cavity packages

The traditional package for RF power transistors is the air-cavity package with a ceramic lid. The flange (or heatsink) material has evolved over the years and the most commonly used material today is CPC (Cu/Mo70Cu/Cu), a laminate of copper and copper-molybdenum. This material has been selected for its thermal properties, providing a low Rth (compared to the Cu-W used earlier) as well as a good CTE (thermal expansion coefficient) match with the silicon used for the active dies and the internal matching capacitors.

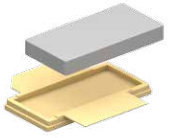
The package is made of three parts: flange, ringframe, and lid. The flange is brazed with the ringframe at high temperature and the resulting component is known as a header. Active and passive dies are then soldered to the flange and wire bonds are used to create the matching circuits and the connections with the leads. The transistor is then closed by gluing the lid on top. The final step consists of testing the product for compliance to specification.

Air-Cavity Ceramic (ACC) packages

Air-cavity ceramic packages have proven their reliability and performance over the years, and exist in a variety of sizes and power levels. They present a number of advantages but also some disadvantages. They are assembled one by one, thereby demanding a high handling time, and the brazing of the ringframe with the flange creates stress and distortions. Also, each package variation (such as additional leads, or shorter leads) demands the creation of a unique header and there are limited economies of scale.

SOT608

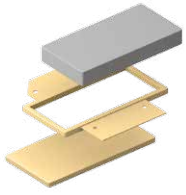
SOT1120



ACC package structure

SOT1121

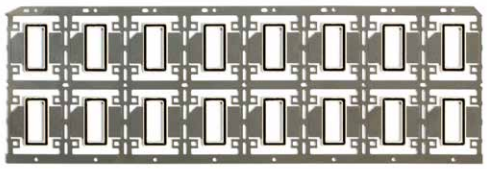
SOT539



The three components of an ACP transistor: CPC flange, polymer ringframe, polymer lid

Air-Cavity Plastic (ACP) packages

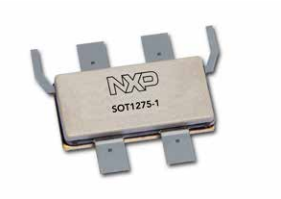
In order to circumvent the limitations of the ACC package, while keeping its performance advantages, NXP has introduced a new family of packages known as Air-Cavity Plastic (ACP). Their structure is similar to ACC but the lid and the ringframe are made of polymers instead of ceramic. This enables the ringframe to be glued to the flange rather than brazed and reduces the stress and distortions of the flange. This in turn allows the use of thinner matching capacitors, reducing RF losses both at the gate and the drain. The result is higher gain and efficiency compared to the ACC format.



A strip of ACP transistors

In addition, the assembly process uses strips rather than individual headers, reducing handling time and allowing more variation in lead shape and length while simplifying logistics. In a nutshell, ACP packages provide more performance at a reduced cost.

NXP produces ACP packages in the SOT502 and SOT539 package formats. A number of variants are already in volume production, including the two shown below.



SOT1275

SOT1251

Over-Molded Plastic (OMP) packages

A third transistor package family is used for cost-sensitive applications: OMP. Its structure is similar to that of an integrated circuit, with a copper flange and a molded body, but discrete wire bonds are often used in the matching network for improved RF performance. OMP packages are declined in a number of outlines, from the HVQFN package used for low-power drivers to the SOT502 format of packages used for drivers, MMICs, and discretes.

HVQFN

MMIC

Driver

Discrete final

Discrete finals now come very close in performance (gain, efficiency, VBW) and power to air-cavity transistors. However, for high-performance applications where the last percentage and decible matter, air-cavity packages remain the best option.

In conclusion, the wide range of packages offered by NXP enables you to select the right device optimized for your precise application and allows to find the best compromise between cost and performance.

ENHANCING RF **PERFORMANCE**

NXP has a **proven** record in delivering the best RF performance.
That's why half of all satellite solutions use NXP components.
RF for a smarter world.

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 = Released For Supply

Type	Application/description	Expected status June 2015	Planned release	Section
NEW: SiGe:C LNAs (for GPS and others)				
BGU8020	GPS LNA, low-current, 2 mA	RFS	Released	3.4.1
BGU8103	GPS LNA, low-current, 1 mA	RFS	Released	3.4.1
NEW: LNAs for LTE				
BGS8L2	LTE LNA with bypass from 0.7 to 1 GHz, 0.8 dB NF, 13 dB gain	RFS	Released	3.4.1
BGS8M2	LTE LNA with bypass from 1.8 to 2.2 GHz, 0.8 dB NF, 14 dB gain	RFS	Released	3.4.1
BGS8H2	LTE LNA with bypass from 2.3 to 2.7 GHz, 1.0 dB NF, 13 dB gain	RFS	Released	3.4.1
NEW: LNAs for WLAN				
BGU7224	2.4 GHz LNA for WLAN, 802.11b/g/n	RFS	Released	3.4.1
BGU7258	5.8 GHz LNA for WLAN, 802.11a/n/ac	RFS	Released	3.4.1
NEW: MMIC broadband amplifiers for TV and distribution systems				
BGA3021	Extreme broadband amplifier, 16 dB gain, SOIC8	RFS	Released	3.4.1
BGA3022	Extreme broadband amplifier, 18 dB gain, SOIC8	RFS	Released	3.4.1
BGA3023	Extreme broadband amplifier, 20 dB gain, SOIC8	RFS	Released	3.4.1
NEW: LNAs for wireless infrastructures				
BGU7073	Variable-gain, high-linearity LNA 1.9 GHz, 0.8 dB NF	RFS	Released	3.4.1
BGU7075	Variable-gain, high-linearity LNA 2.3-2.6 GHz, 1.1 dB NF	RFS	Released	3.4.1
BGU8062	High-linearity LNA with bypass 1.5-2.7 GHz, 1.5 dB NF	RFS	Released	3.4.1
NEW: Downconverters for satellite				
TFF1024HN	Downconverter with PLL/VCO for VSAT, eight different Ku sub-bands with one crystal	RFS	Released	3.4.4
TFF1044HN	Downconverter with PLL/VCO for quad satellite LNBs, dual simultaneuos LO	RFS	Released	3.4.3
EW: RF wideband transistors for DC - 20 GHz applications				
BFU910F	High-speed, low-noise RF transistor for LNA applications, SOT343F	RFS	Released	3.3.1
NEW: RF power transistors for base stations				
BLC8G21LS-160AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G22LS-450AV	LDMOS PAD transistor for base station applications	DEV	Released	3.6.1
BLC8G24LS-240AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G24LS-241AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-100AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-140AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-180AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-210PV	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-240AV	LDMOS PAD transistor for base station applications	CQS	Q4 2015	3.6.1
BLC8G27LS-245AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC8G27LS-60AV	LDMOS small-cell transistor for base station applications	RFS	Released	3.6.1
BLC9G20LS-120(P)V	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLC9G20LS-360AV	LDMOS PAD transistor for base station applications	CQS	Q4 2015	3.6.1
BLC9G20LS-470AV	LDMOS PAD transistor for base station applications	DEV	Q3 2015	3.6.1
BLC9G22LS-450AV	LDMOS PAD transistor for base station applications	DEV	Q3 2015	3.6.1
BLC9G24LS-170AV	LDMOS PAD transistor for base station applications	DEV	Q3 2015	3.6.1
BLC9G24LS-440AV	LDMOS PAD transistor for base station applications	DEV	Q3 2015	3.6.1

Type	Application/description	Expected status June 2015	Planned release	Section
BLC9G27LS-150AV	LDMOS PAD transistor for base station applications	RFS	Released	3.6.1
BLF8G20LS-140GV	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF8G20LS-160V	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF8G22LS-160BV	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF8G22LS-205	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF8G38LS-75V	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF9G20LS-120V	LDMOS transistor for base station applications	DEV	Q3 2015	3.6.1
BLF9G20LS-160V	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF9G24LS-150V	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF9G24LS-230V	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLF9G38LS-90P	LDMOS transistor for base station applications	RFS	Released	3.6.1
BLM7G1822S-20PB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM7G1822S-40AB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM7G1822S-40PB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM7G1822S-80AB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM7G1822S-80PB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM8G0710S-15PB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM8G0710S-30PB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLM8G0710S-45AB(G)	LDMOS MMIC transistor for base station applications	RFS	Released	3.6.1
BLP8G20S-80P	LDMOS OMP transistor for base station applications	RFS	Released	3.6.1
BLP8G21S-160PV	LDMOS OMP transistor for base station applications	RFS	Released	3.6.1
BLP8G21S-162AV	LDMOS OMP transistor for base station applications	RFS	Released	3.6.1
BLP8G27-10	LDMOS OMP transistor for base station applications	CQS	Q3 2015	3.6.1
BLP8G27-5	LDMOS OMP transistor for base station applications	CQS	Q3 2015	3.6.1
NEW: RF power LDMOS transistors for UHF/VHF/RF energy - ISM				
BLF182XR(S)	XR ceramic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLF183XR(S)	XR ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLF184XRG	XR ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLM2425M7S60P	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLF2425M7L(S)100	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLF2425M8L(S)300P	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLF2425M9L(S)140	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLF2425M9L(S)30	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q4 2015	3.6.2
BLF882(S)	Ceramic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP05H110XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP05H6110XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP05H6150XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP05H6200XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q4 2015	3.6.2
BLP05H6350XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP05H635XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP05H6700XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP05H675XR	XR plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP10H603	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP10H605	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP10H610	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP10H6120P	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP10H630P	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP10H660P	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP10H690P	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP15M7160P	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	RFS	Released	3.6.2
BLP25M805	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
BLP25M810	Plastic LDMOS transistor for broadcast/RF energy - ISM applications	DEV	Q3 2015	3.6.2
NEW: RF power LDMOS transistors for avionics				
BLA1011L(S)-300(G)	LDMOS transistor for avionics applications	RFS	Released	3.6.3
BLA6H0912L(S)-1000	LDMOS pulsed transistor intended for TCAS and IFF applications	DEV	Q2 2015	3.6.3
BLA8G1011L(S)-300(G)	LDMOS transistor for avionics applications	RFS	Released	3.6.3
NEW: RF power LDMOS transistors for L-band				
BLL6H1214P2S-250	LDMOS power module for L-band radar applications	RFS	Released	3.6.3
BLL8H0514-25	LDMOS transistor for L-band radar applications	RFS	Released	3.6.3
BLL8H0514L(S)-130	LDMOS transistor for L-band radar applications	RFS	Released	3.6.3
BLL8H1214L(S)-250	LDMOS transistor for L-band radar applications	RFS	Released	3.6.3

Type	Application/description	Expected status June 2015	Planned release	Section
BLL8H1214L(S)-500	LDMOS transistor for L-band radar applications	RFS	Released	3.6.3
NEW: RF power LDMOS transistors for S-band				
BLS8G2731L(S)-400P	LDMOS power transistor for S-band radar applications	RFS	Released	3.6.3
NEW: Gallium Nitride (GaN) RF power amplifiers				
CLF1G0060(S)-10	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4
CLF1G0060(S)-30	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4
CLF1G0035-50	Gen1 broadband GaN HEMT	RFS	Released	3.6.4
CLF1G0035S-50	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4
CLF1G0035-100	Gen1 broadband GaN HEMT	RFS	Released	3.6.4
CLF1G0035(S)-100	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4
CLF1G0035(S)-100P	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4
CLF1G0035(S)-200P	Gen1 broadband GaN HEMT	DEV	Q3 2015	3.6.4

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	Config	@ f = 1 MHz					r_s typ	r_s max	@ f =
				C_{d1} typ	@ V_R =	C_{d2} typ	@ V_R =	C_{d1}/C_{d2} typ			
				pF	V	pF	V		Ω	Ω	MHz
BB145B	SOD523	1	SG	6.8	1	2.75	4	2.5	-	0.6	470
BB156	SOD323	1	SG	16	1	4.8	7.5	2.5	0.4	0.7	470
BB201	SOT23	2	CC	95	1	27.6	7.5	3.4	0.25	0.5	100
BB202^	SOD523	1	SG	30.9	0.2	9.2	2.3	3.4	0.35	0.6	100
BB207*	SOT23	2	CC	81	1	27.6	7.5	2.9	0.2	0.4	100
BB208-02*	SOD523	1	SG	21.6	1	4.9	7.5	4.4	0.35	0.5	100
BB208-03*	SOD323	1	SG	21.6	1	4.9	7.5	4.4	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 = common cathode

SG = single

UHF varicap diodes

Type	Package	@ f = 1 MHz					r_s typ	r_s max	@ f =
		C_{d1} typ	@ V_R =	C_{d2} typ	@ V_R =	C_{d1}/C_{d2} typ			
		(pF)	(V)	(pF)	(V)		(Ω)	(Ω)	(MHz)
BB174	SOD523	19	1	2.1	28	9.0	0.6	0.75	470
BB135	SOD323	20	0.5	1.9	28	9.5	-	0.75	470

VHF varicap diodes

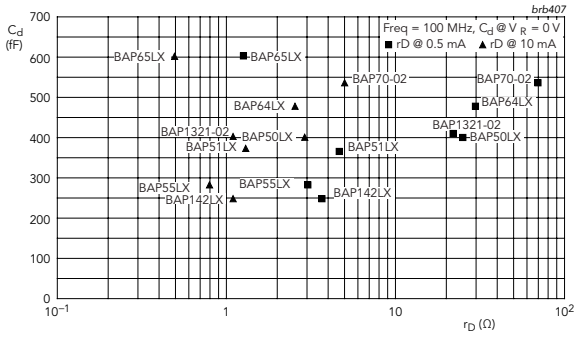
Type	Package	C_{d1} typ	@ V_R =	C_{d2} typ	@ V_R =	C_{d1}/C_{d2} typ	r_s typ	r_s max	@ f =
		(pF)	(V)	(pF)	(V)		(Ω)	(Ω)	(MHz)
BB170	SOD323	39.3	1	2.6	28	15	-	0.9	100
BB171	SOD323	57.0	1	2.7	28	21	1	1.2	100
BB172	SOD323	38.5	1	2.6	28	15	0.65	0.8	100
BB173	SOD523	38.5	1	2.6	28	15	0.65	0.8	100
BB175	SOD523	57.0	1	2.7	28	21	1	1.2	100
BB131	SOD323	12.5	0.5	0.9	28	14	-	3	470
BB181	SOD523	12.5	0.5	0.9	28	14	-	3	470
BBY40	SOT23	29.0	3	5.1	25	6	-	0.7	200

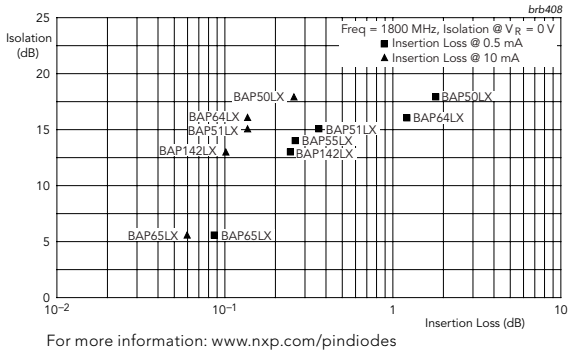
3.2.2 PIN diodes

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
- Unrivaled performance
- Short lead time
- Low series inductance
- Low insertion loss
- Low capacitance





For more information: www.nxp.com/pindiodes

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
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
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	0.9	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	-

SG = single
SR = series
CC = common cathode
CA = common anode

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 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	-

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
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*

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

^ attenuator / switching diode * @ VR = 20 V

3.2.3 Band-switch diodes

Band-switch diode selection guide on www.nxp.com/products/diodes
Easy-to-use parametric filters help you choose the right Band-switch diode for your design.

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

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.

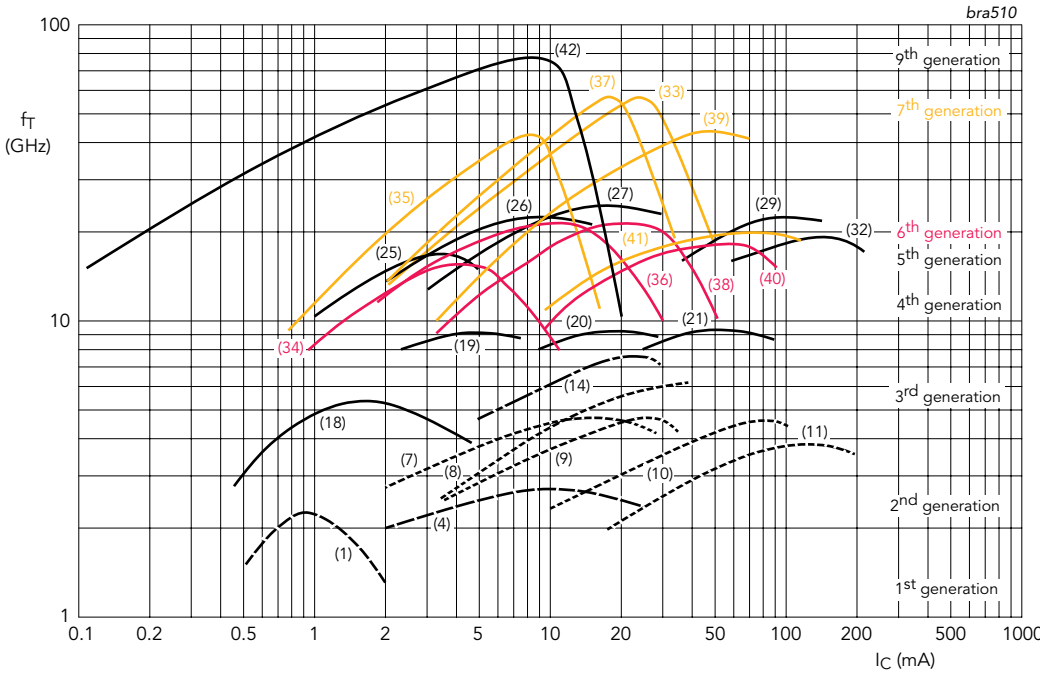
Why choose NXP's wideband transistors:

- 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 by frequency



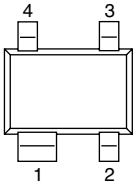


Figure 1

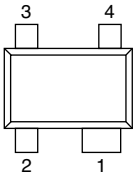


Figure 2

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 drives			Oscillators		
Frequency range	<2 GHz	<6 GHz	6-10 GHz	12-18 GHz	<2 GHz	<6 GHz	6-10 GHz	12-18 GHz	<6 GHz	6-10 GHz	12-18 GHz
Band type	ISM433, ISM866	L, S, C	X, Ku low	Ku high, Ka	ISM433, ISM866	L, S, C	X, Ku low	Ku high, Ka	L, S, C	X, Ku low	Ku high, Ka
BFU520*	•										
BFU530*	•										
BFU550*	•										
BFU580*					•						
BFU590*					•						
BFU610F		•	•								•
BFU630F		•	•			•			•		•
BFU660F		•				•			•	•	
BFU690F		•	•			•			•	•	
BFU725F/N1		•	•	•		•	•		•		•
BFU710F		•	•	•							•
BFU730F		•	•	•		•	•	•	•		•
BFU760F		•	•			•	•		•		
BFU790F		•				•			•		

* Multiple package types available

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)
BLT50	SOT223	10	500	2000	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)
BFT25	1	1	SOT23	2.3	5	6.5	30	NPN	18	500	1	1	12	800	1	1	3.8	500	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	-	-	-	-	-	-	-	-
BFQ149	2	10	SOT89	5	-15	-100	1000	PNP	12	500	-50	-10	-	-	-	-	3.75	500	-50	-10	-	-	-	-
BFQ18A	2	11	SOT89	4	18	150	1000	NPN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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
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
BFQ67W	3	14	SOT323	8	10	50	300	NPN	13	1000	15	8	8	2000	15	8	1.3	1000	5	8	2.7	2000	15	8
BFR93A	3	8	SOT23	6	12	35	300	NPN	13	1000	30	8	7	2000	30	8	1.9	1000	5	8	3	2000	5	8
BFR93AW	3	8	SOT323	5	12	35	300	NPN	13	1000	30	8	8	2000	30	8	1.5	1000	5	8	2.1	2000	5	8

RF wideband transistors generations 4 and 4.5

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)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	PL(1dB) (typ) (dBmW)	@ V_{CE} = (V)	@ f = (MHz)	@ I_C = (mA)	IP3 (typ) (dBm)	@ IC = (mA)	@ VCE = (V)
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
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	1,2	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	-	-	-	-	-	-	-
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
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	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-

RF broadband generations 5 to 9

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)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	PL(1dB) (typ) (dBmW)	@ V_{CE} = (V)	@ f = (MHz)	@ I_C = (mA)	IP3 (typ) (dBm)	@ IC = (mA)	@ VCE = (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	1	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
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	5800	10.8	2.1	5	2.1	5800	10.8	19	10.8	2.1
BFU910F	9	42	SOT343F	90	2.0	15	300	NPN	15.5	10700	10	2	0.6	10700	6	2	0.65	12700	6	2	2	2	12000	10	12.5	10	2

RF wideband transistors for DC - 2 GHz applications

Type	Package	f_T (typ) (GHz)	h_{FE} (typ)	V_{CEO} (max) (V)	V_{CES} (max) (V)	V_{EBO} (max) (V)	I_C (max) (mA)	P_{tot} (max) (mW)	$G_{p(max)}$ (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	$G_{p(max)}$ (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF_{min} (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	NF_{min} (typ) (dB)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	$P_{L(1dB),\ 50\Omega}$ (typ) (dBm)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)	$IP3_{o,\ 50\Omega}$ (typ) (dBm)	@ f = (MHz)	@ I_C = (mA)	@ V_{CE} = (V)
BFU520W	SOT323	10	95	12	24	2	30	450	23	433	5	8	19	900	5	8	0.7	433	5	8	0.8	900	5	8	7	900	10	8	17	900	10	8
BFU530W	SOT323	11	95	12	24	2	40	450	24	433	10	8	19	900	10	8	0.8	433	10	8	0.9	900	10	8	10	900	15	8	20	900	15	8
BFU550W	SOT323	11	95	12	24	2	50	450	24	433	15	8	18	900	15	8	0.9	433	15	8	0.9	900	15	8	14	900	25	8	23	900	25	8
BFU520A	SOT23	10	95	12	24	2	30	450	23	433	5	8	18	900	5	8	0.7	433	5	8	0.8	900	5	8	7	900	10	8	17	900	10	8
BFU530A	SOT23	11	95	12	24	2	40	450	23	433	10	8	18	900	10	8	0.8	433	10	8	0.9	900	10	8	10	900	15	8	20	900	15	8
BFU550A	SOT23	11	95	12	24	2	50	450	24	433	15	8	18	900	15	8	0.9	433	15	8	1.0	900	15	8	14	900	25	8	23	900	25	8
BFU520	SOT143	11	95	12	24	2	30	450	20	900	5	8	17	1800	5	8	0.8	900	5	8	0.9	1800	5	8	7	1800	10	8	17	1800	10	8
BFU530	SOT143	11	95	12	24	2	40	450	21	900	10	8	17	1800	10	8	0.9	900	10	8	1.0	1800	10	8	10	1800	15	8	19	1800	15	8
BFU550	SOT143	11	95	12	24	2	50	450	21	900	15	8	15	1800	15	8	1.0	900	15	8	1.1	1800	15	8	13	1800	25	8	23	1800	25	8
BFU520X	SOT143X	11	95	12	24	2	30	450	20	900	5	8	17	1800	5	8	0.8	900	5	8	0.9	1800	5	8	10	1800	10	8	20	1800	10	8
BFU530X	SOT143X	11	95	12	24	2	40	450	21	900	10	8	17	1800	10	8	0.9	900	10	8	1.0	1800	10	8	10	1800	15	8	20	1800	15	8
BFU550X	SOT143X	11	95	12	24	2	50	450	22	900	15	8	16	1800	15	8	1.0	900	15	8	1.1	1800	15	8	14	1800	25	8	23	1800	25	8
BFU520XR	SOT143XR	11	95	12	24	2	30	450	20	900	5	8	17	1800	5	8	0.8	900	5	8	0.9	1800	5	8	7	1800	10	8	17	1800	10	8
BFU530XR	SOT143XR	11	95	12	24	2	40	450	21	900	10	8	17	1800	10	8	0.9	900	10	8	1.0	1800	10	8	10	1800	15	8	19	1800	15	8
BFU550XR	SOT143XR	11	95	12	24	2	50	450	22	900	15	8	16	1800	15	8	1.0	900	15	8	1.1	1800	15	8	13	1800	25	8	23	1800	25	8
BFU580Q	SOT89	11	95	12	24	2	60	1000	20	433	20	8	14	900	20	8	1.0	433	20	8	1.1	900	20	8	15	900	30	8	25	900	30	8
BFU590Q	SOT90	8	95	12	24	2	200	2000	18	433	50	8	11	900	50	8	-	433	50	8	-	900	50	8	22	900	80	8	32	900	80	8
BFU580G	SOT223	11	95	12	24	2	60	1000	22	433	20	8	16	900	20	8	1.0	433	20	8	1.1	900	20	8	15	900	30	8	24	900	30	8
BFU590G	SOT223	9	95	12	24	2	200	2000	20	433	50	8	13	900	50	8	-	433	50	8	-	900	50	8	22	900	80	8	31	900	80	8
BFU520Y	SOT363	10	95	12	24	2	30	450	23	433	5	8	19	900	5	8	0.7	433	5	8	0.8	900	5	8	7	900	10	8	17	900	10	8

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			Gp [dB]			Pl(1dB) [dBm]			NF [dB]			IP3o [dBm]		Zout	External Inductor
		Vcc (V)	Is (mA)	250 MHz	500 MHz	750 MHz	250 MHz	500 MHz	750 MHz	250 MHz	500 MHz	750 MHz	250 MHz	750 MHz	[Ω]	
BGA2870	SOT363	2.5	15.6	31.2	31.1	31	5	4	4	3.1	3.2	3.7	15	13	50	N
BGA2874	SOT363	2.5	16	31.1	31	30.6	5	4	4	3	3.1	3.4	19	17	50	N
BGA2800	SOT363	3	10.5	19.9	20.5	20.2			-2	3.7	3.6	3.7	11	8	50	N
BGA2803	SOT363	3	5.8	23.6	23.4	23	-6	-6	-8	3.7	3.6	3.4	5	2	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	2.4	2.2	3	2.1	0	50	N
BGA2801	SOT363	3	14.3	22.2	22.4	23	2	2	0	3.8	3.8	3.9	14	9	50	N
BGA2802	SOT363	3	12.5	25.6	25.8	25.5	3	1	-3	4.2	4.1	3.6	13	6	50	N
BGA2815	SOT363	3	18.2	25.8	25.3	25.2	8	5	1	3.7	3.8	3.7	17	10	50	N
BGA2817	SOT363	3	20	24.5	24.7	25.1	6	6	5	3.9	3.9	3.8	18	15	50	N
BGA2818	SOT363	3	19.9	30.1	29.8	30	7	6	4	3.5	3.3	3.3	18	14	50	N
BGA2851	SOT363	5	7	23.3	24.7	25.2	-3	-4	-5	4	3.2	3	8	5	50	N
BGA2866	SOT363	5	17.4	23.2	23.9	24.3	4	4	3	3.9	3.8	3.9	17	12	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
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
BGA2869	SOT363	5	22	30.9	30.9	32.2	8.8	8.8	7.6	3.8	3.9	4	20	19	50	N
BGM1013	SOT363	5	27.5	35.3	35.6	32.1		13	8.1	4.6	4.6	4.9	22.7	18.6	75	Y

General-purpose LNA MMICs

Type	Package			$\|S21\|^2$ [dB]					Pl (1dB) [dBm]			NF_{min} [dB]					IP3o [dBm]					ESD protection
		V_{cc} (V)	Is (mA)	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	kV HBM
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			-
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	
BGU7224	SOT1189	3.3	13				15[5]			-3					1.0					5.5[6]		2
BGU7258	SOT1189	3.3	12					13 [7]			-4					1.5					8[8]	2

[1] AEC-Q101 qualified [2] I_{cc} 3 mA [3] I_{cc} 6 mA [4] I_{cc} 12 mA
[5] -5.5 dB in bypass mode [6] -19 dB in bypass mode [7] -7.5 dB in bypass mode [8] 18 dB in bypass mode

SiGe:C LNAs (for GPS and others)

Type	Package	Supply voltage		Supply current			Insertion power gain			Noise figure	Input power at 1 dB gain compression									Input third-order intercept point f_1 = 1713 MHz, f_2 = 1851 MHz								
		V_{cc}		I_{cc}			$\|s_{21}\|^2$			NF	$P_{L(1dB)}$									$IP3_i$								
		(V)		(mA)			(dB)			(dB)	(dBm)									(dBm)								
		Min	Max	Min	Typ	Max	Min	Typ	Max	Typ	V_{cc} = 1.5 V, Min	V_{cc} = 1.5 V, Typ	V_{cc} = 1.8 V, Min	V_{cc} = 1.8 V, Typ	V_{cc} = 2.2 V, Min	V_{cc} = 2.2 V, Typ	V_{cc} = 2.5 V, I_{cc} = 5 mA	V_{cc} = 2.85 V, Min	V_{cc} = 2.85 V, Typ	V_{cc} = 1.5 V, Min	V_{cc} = 1.5 V, Typ	V_{cc} = 1.8 V, Min	V_{cc} = 1.8 V, Typ	V_{cc} = 2.2 V, Min	V_{cc} = 2.2 V, Typ	V_{cc} = 2.5 V, I_{cc} = 5 mA	wV_{cc} = 2.85 V, Min	V_{cc} = 2.85 V, Typ
BGU6005	SOT1230	1.5	3.1	-	5,7	-	-	17,5	-	0.85#	-	-	-	-9	-	-	-	-	-6	-	-	-	3	-	-	-	-	6
BGU6009	SOT1230	1.5	3.1	-	5,5	-	-	17,5	-	0.95#	-	-	-	-7	-	-	-	-	-4	-	-	-	5	-	-	-	-	7
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
BGU8004	WP-CSP	1.5	3.1	-	3.4	-	-	17 / 18*		0.6#	-	-	-	-10	-	-	-	-	-8	-	-	-	4	-	-	-	-	6
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
BGU8019	SOT1232	1.5	3.1	-	4.4	-	-	18.5 / 20*	-	0.55#	-	-	-	-10	-	-	-	-	-7	-	-	-	2	-	-	-	-	6
BGU8020	SOT1232	1.5	3.1	-	2	-	-	16.5 / 18*	-	0.8#	-	-	-	-14	-	-	-	-	-11	-	-	-	-2	-	-	-	-	-2
BGU8103	SOT1232	1.5	3.1	-	1,2	-	-	17.6 / 19.1*	-	0.8#	-	-	-	-16	-	-	-	-	-13	-	-	-	-8	-	-	-	-	-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	Mode	@		Gain (1)	NF	$P_{L(1dB)}$	OIP3	FL (2)	RL_{out}	RL_{in}
				V_{CC}	I_{CC}							
		(MHz)		(V)	(mA)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(dB)	(dB)
BGU7031	SOT363	40 - 1000	GP 10 dB	5	43	10	4.5	14	29	-0.2	12	18
BGU7032	SOT363	40 - 1000	GP 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	GP 10 dB	5	43	10	4.5	14	29	-0.2	12	18
			GP 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	GP 10 dB	3.3	38	10	4	12	29	-0.2	12	21
BGU7042	SOT363	40 - 1000	GP 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	GP 14 dB	3.3	34	14	2.8	13	29	-0.2	12	20
BGU7045	SOT363	40 - 1000	GP 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 LTE (50 Ω)

Type	Package	V_{cc}	I_{cc}	Icc_Bypass	Frequency	Gain	Gain_ Bypass	NF	IP3i	$P_{L(1dB)}$	t_{on}	t_{off}
		(V)	(mA)	(µA)	(MHz)	(dB)	(dB)	(dB)	(dB)	(dB)	(µs)	(µs)
BGU8L1	SOT1232	2.8	4.6	-	740	14.5	-	0.7	1	-5	3	1
					882	14.5	-	0.7	2	-3		
					943	14.0	-	0.8	2	-3		
BGU8M1	SOT1232	2.8	5.0	-	1843	13.5	-	0.8	4	-2		
					1960	13.5	-	0.8	5	-2		
					2140	13.0	-	0.9	6	-2		
BGU8H1	SOT1232	2.8	5.0	-	2350	13.0	-	0.9	8	-1		
					2655	12.5	-	1.0	8	0		
BGS8L2	SOT1232	2.8	4.9	< 1	740	13.5	-1.6	0.84	1	-2	4	1
					882	13	-1.9	0.84	1.5	-1		
					943	12.5	-2	0.84	1.5	-0.5		
BGS8M2	SOT1232	2.8	5.4	< 1	1843	14.3	-2.3	0.8	2.5	-3.3	4	1
					1960	14.4	-2.1	0.8	3.5	-3.5		
					2140	13.7	-2.3	0.8	5	-2.5		
BGS8H2	SOT1232	2.8	5.4	< 1	2350	13	-2.3	1.0	4	-1.5		
					2655	11.2	-2.6	1.0	4	0		

LNAs for wireless infrastructure (50 Ω)

Type	Package	@ V_{CC}	@ I_{CC}	frange	frange	Gass	NF	$P_{L(1dB)}$	$IP3_O$	$IP3_O$ bypass	RL_{in}	RL_{out}
		[typ]	[typ]	[min]	[max]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dB)	(dB)	(dBm)	(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	SOT1301-1	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	SOT1301-1	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
BGU7062N2	SOT1301-1	5	215	1710	1785	3	22.1	10.9	30			
						17	10.5	5.8	20.9		22	17.3
						18	5.95	-6.1	4.6			
						35	0.94	-12.3	1		23.5	17.5
BGU7063	SOT1301-1	5	190	1920	1980	18	6.4	-6.4	5.4		35	15
			230			35	1.05	-12.5	0.9		31	15
BGU7073	SOT1301-1	5	243	1850	2010	3	19.9	11.5	20.6			
						17	10	5.3	18.3		24	16.9
						18	6.2	-5.8	4.8			
						35	1	-11.5	1.2		29.3	16.9
BGU7075	SOT1301-1	5		2500	2570	3	20	10.3	22.2			
						17	10	9.5	17.7		19	16
						18	6	-5.9	4.6			
						35	1.2	-12.2	-0.4		23	18
BGU8051	SOT1327-1	5	50	500	900							
				900	900	18	0.43	19.3	41		27	20
				900	1500							
BGU8052	SOT1327-1	5	47	1500	1900							
				1900	1900	18	0.52	19	39		27	12
				1900	2300							
BGU8053	SOT1327-1	5	51	2300	2500							
				2500	2500	18	0.63	20	39		23	12
				2500	5000							
BGU8062	SOT650-1	5	70	1500	2700							
				1500	1500	19.8	1.14	20.2		45.3	14.6	13.7
				1900	1900	17.8	1.27	20.2		44.5	17.1	13.3
				2700	2700	14.7	1.42	19.4		42.19	19.52	15.7

VGAs for wireless infrastructure

Type	Package	Type	@ V_{CC}	@ I_{CC}	f_{range}	f_{range}	Gp @ minimum attenuation	Attenuation range	NF	$P_{L(1dB)}$	$IP3_O$
			[typ]	[typ]	[min]	[max]			[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
			5	185	3400	3800	26	29.5	8	19	27
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

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	23	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	24	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	25	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
BGA3021	SOT786-2	40 - 1200	8	350	16	5,5	29	47	85
			8	175	16	4,1	26	38	68
			5	165	16	4,1	23	38	69
BGA3022	SOT786-2	40 - 1200	8	350	18	5,1	30	47	85
			8	175	18	3,8	24	38	69
			5	165	18	3,8	24	38	71
BGA3023	SOT786-2	40 - 1200	8	350	20	5	30	46,5	85
			8	175	19	3,7	25	38	67
			5	165	19	3,7	23	38	68

General-purpose medium power amplifiers

Type	Package	@ V_{CC}	@ I_{CC}	Frequency range	RF input frequency	Gain	$P_{L(1dB)}$	$IP3_O$	NF
		[typ]	[typ]	[min]	[max]	[typ]	[typ]	[typ]	[typ]
		(V)	(mA)	(MHz)	(MHz)	(dB)	(dBm)	(dBm)	(dB)
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

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)	(dBmV)	(dBc)
BGA3031	SOT662	Single	5	310	5	85	34	58	3.5	74	-70

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

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

3.4.2 Wireless infrastructure ICs

IQ modulators for wireless infrastructure

Type	Package	@ V_{cc}	@ I_{cc}	flo range	flo	Po	BWmod	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			1	11.5	62	26	60	-45
			184		3650			1	11.5	60	25	53	-43
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			1	12	65	26	50	-45
			188		3650			1	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	$IP3_i$	Gconv
		[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

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
TFF1044HN	SOT1359-1	10.7 - 12.75	5	190	30 - 36	8	15	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
						$f_{o(RF)}$	Po	$RL_{out(RF)}$	S_i
			Typ	Typ	Max		Typ	Max	Min
		(MHz)	(V)	(mA)	(dBc/Hz)	(GHz)	(dBm)	(dB)	(dBm)
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
							fo(RF)			Po	RLout(RF)	S_i	
			Typ	Typ	@ 100 kHz	@ 10 MHz	Min	Typ	Max	Typ	Max	Min	
		(MHz)	(V)	(mA)	(dBc/Hz)	(dBc/Hz)	(GHz)	(GHz)	(GHz)	(dBm)	(dB)	(dBm)	
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
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
TFF11142HN	SOT616	55 - 901	3.3	100	-95	-131	14.13	14.27	14.42	-4	-10	-10	X
TFF11145HN	SOT616	55 - 927	3.3	100	-95	-131	14.17	14.5	14.83	-5	-10	-10	Ka

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}	I_G	Characteristics											
				I_{DSS}		V_{gsoff}		R_{DSON}	C_{rs}		t_{on}		t_{off}		
		(V)	(mA)	(mA)		(V)		(Ω)	(pF)		(ns)		(ns)		
		max	max	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		
PMBFJ112	SOT23	40	50	5	-	1	5	50	-	3 (typ)	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}	I_G	Characteristics											
				I_{DSS}		V_{gsoff}		R_{DSON}	C_{rs}		t_{on}		t_{off}		
		(V)	(mA)	(mA)		(V)		(Ω)	(pF)		(ns)		(ns)		
		max	max	min	max	min	max	max	min	max	typ	max	typ	max	
PMBFJ174	SOT23	30	50	20	135	5	10	85	4 (typ)		7	-	15	-	
PMBFJ175	SOT23	30	50	7	70	3	6	125	4 (typ)		15	-	30	-	
PMBFJ177	SOT23	30	50	1.5	20	0.8	2.25	300	4 (typ)		45	-	45	-	

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

Type	Package	V_{DS}	I_G	Characteristics							
				I_{DSS}		V_{gsoff}		|Yfs|		C_{rs}	
		(V)	(mA)	(mA)		(V)		(mS)		(pF)	
		max	max	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	-	typ 1.9	-
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

[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}	Characteristics														
			I_D	I_{DSS}		$V_{GS(th)}$		R_{DSON}	C_{rs}		t_{on}		t_{off}		$\|S_{21(on)}\|_2$	$\|S_{21(off)}\|_2$	MODE
		(V)	(mA)	(mA)		(V)		(Ω)	(pF)		(ns)		(ns)		(dB)	(dB)	
		max	max	min	max	min	max	max	min	max	typ	max	typ	max	max	min	
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.

N-channel, dual-gate MOSFETs

Type	Package	V_{DS}	I_D	Characteristics										
				I_{DSX}		$V_{GS(th)}$		|Yfs|		C_{is}	C_{os}	F @ 800 MHz	VHF	UHF
		(V)	(mA)	(mA)		(V)		(mS)			(pF)	(pF)	(dB)		
		max	max	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
Fully internal bias															
BF1105R	SOT343R	7	30	8	16	-	0.3	2	25		-2.2 [3]	1.2[2]	1.7	X	X

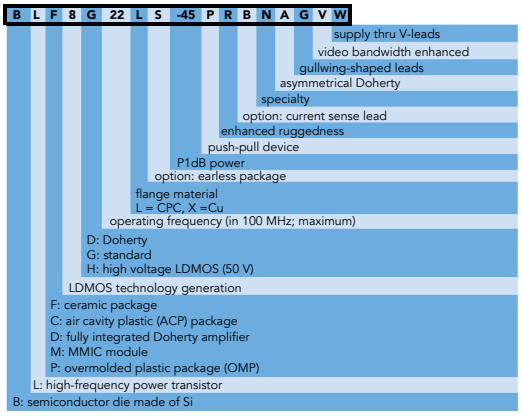
[1] @ 200 MHz
[2] COSS
[3] Cig

3.6 RF power transistors

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.

3.6.1 RF power transistors for base stations

Device naming conventions for RF power transistors for base stations



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

- Leading technology (generations 7, 8 and 9 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 [GSM/EDGE, CDMA, TD-SCDMA, W-CDMA/UMTS, LTE] and WiMAX infrastructures.

3.6.1.1 0.4 - 1.0 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLM8G0710S-15PB(G)*	MMIC	700	1000	15	28	27	35	1-c WCDMA	SOT1212
BLM8G0710S-30PB(G)		700	1000	30	28	27	35	1-c WCDMA	SOT1212
BLF6G10L-40BRN	Driver	700	1000	40	28	15	23	2-c WCDMA	SOT1112A
BLF6G10(S)-45	Driver/final	700	1000	45	28	7.8	22.5	2-c WCDMA	SOT608A
BLM8G0710S-45AB(G)*	MMIC	700	1000	45	28	27	35	1-c WCDMA	SOT1212
BLP8G10S-45P(G)	Driver/final	700	1000	45	28	19.8	20.8	2-c WCDMA	SOT1224
BLF6G10LS-135RN	Final	700	1000	135	28	28	21	2-c WCDMA	SOT502B
BLP7G07S-140P		700	1000	140	28	29.6	20.9	2-c WCDMA	SOT1223
BLF6G10LS-160RN		700	1000	160	32	27	22.5	2-c WCDMA	SOT502B
BLF6H10LS-160		729	960	160	50	34	20	2-c WCDMA	SOT467B
BLF8G10L(S)-160(V)		920	960	160	30	29	19.7	2-c WCDMA	SOT502B
BLF6G10(LS)-200RN		700	1000	200	28	28.5	20	2-c WCDMA	SOT502B
BLF7G10L(S)-250		920	960	250	30	30.5	19.5	2-c WCDMA	SOT502B
BLF6G10L(S)-260PRN		700	1000	260	28	26.5	22	2-c WCDMA	SOT539B
BLF8G09LS-270(G)W		716	960	270	28	33	20	2-c WCDMA	SOT1244C
BLF8G10LS-270(GV)		790	960	270	28	31	19.5	2-c WCDMA	SOT1244C
BLF8G10LS-300P		700	1000	300	28	32	20.5	2-c WCDMA	SOT539B
BLF8G09LS-400P(G)W		716	960	400	28	30	20.6	2-c WCDMA	SOT1242C

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

3.6.1.2 1.3 - 1.7 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP7G22-05	Driver/final	700	2700	5	28	23	16	2-c WCDMA	SOT1179
BLP8G27-5*		700	2700	5	28	19	17	2-c WCDMA	SOT1371
BLF6G21-10G		1	2200	10	28	15	18.5	2-c WCDMA	SOT538A
BLP7G22-10		700	2700	10	28	25	17.4	2-c WCDMA	SOT1179
BLP8G27-10*		700	2700	10	28	19	17	2-c WCDMA	SOT1371
BLF6G15L-40(B)RN	Driver	1450	1550	40	28	13	22	2-c WCDMA	SOT1112A
BLF6G15LS-40RN	Friver/final	1450	1550	40	28	13.5	22.5	2-c WCDMA	SOT1135B
BLF7G20L(S)-90P	Final	1427	2170	90	28	41	19.5	GSM EDGE	SOT1121B
BLF7G15LS-200		1450	1550	200	28	29	19.5	2-c WCDMA	SOT502B
BLF6G15L(S)-250PBRN		1450	1550	250	28	34	18.5	2-c WCDMA	SOT1110B
BLF7G15LS-300P		1450	1550	300	28	31	18	2-c WCDMA	SOT539B

3.6.1.3 1.8 - 2.0 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP7G22-05	Driver/final	700	2700	5	28	23	16	2-c WCDMA	SOT1179
BLP8G27-5*		700	2700	5	28	19	17	2-c WCDMA	SOT1371
BLF6G21-10G		1	2200	10	28	15	18.5	2-c WCDMA	SOT538A
BLP7G22-10		700	2700	10	28	25	17.4	2-c WCDMA	SOT1179
BLP8G27-10*		700	2700	10	28	19	17	2-c WCDMA	SOT1371
BLM7G1822S-20PB(G)	MMIC	1805	2170	20	28	23.6	32.2	1-c WCDMA	SOT1212
BLF6G22L(S)-40P	Driver/final	2110	2170	40	28	30	19	2-c WCDMA	SOT1121A
BLM7G1822S-40PB(G)	MMIC	1805	2170	40	28	24.5	31.5	1-c WCDMA	SOT1212
BLF6G20(S)-45	Driver/final	1800	2000	45	28	14	19.2	2-c WCDMA	SOT608A
BLF6G20(LS)-75		1800	2000	75	28	37.5	19	GSM EDGE	SOT502B
BLM7G1822S-80AB(G)	MMIC	1805	2170	80	28	24	28.3	1-c WCDMA	SOT1212
BLP8G20S-80P	Driver/final	1800	2200	80	28	33	17.5	2-c WCDMA	SOT1223
BLF7G20L(S)-90P	Final	1427	2170	90	28	41	19.5	GSM EDGE	SOT1121B
BLF6G20(LS)-110		1800	2000	110	28	32	19	2-c WCDMA	SOT502B
BLF9G20LS-120V*		1800	2000	120	28	35	20	2-c WCDMA	SOT1120B
BLF6G20LS-140		1800	2000	140	28	30	16.5	2-c WCDMA	SOT502B
BLF7G20LS-140P		1800	2000	140	28	41	17.5	GSM EDGE	SOT1121B
BLF8G20LS-140(G)V		1805	1990	140	28	32	18.5	2-c WCDMA	SOT1244C
BLC8G21LS-160AV		1805	2025	160	28	45	15	1-c WCDMA	SOT1275
BLF8G20LS-160V		1800	2000	160	28	34	20	2-c WCDMA	SOT1239B
BLF9G20LS-160V*		1800	2000	160	28	33.5	19.8	2-c WCDMA	SOT1120B
BLF8G19LS-170BV		1800	1990	170	32	32	18	2-c WCDMA	SOT1120B
BLF7G20L(S)-200		1805	1990	200	28	33	18	2-c WCDMA	SOT502B
BLF8G20LS-200V		1800	2000	200	28	33	17.5	2-c WCDMA	SOT1120B
BLF8G20LS-220		1800	2000	220	28	34	18.9	2-c WCDMA	SOT502B
BLF6G20-230PRN		1800	2000	230	28	32	17.5	2-c WCDMA	SOT539A
BLF8G20LS-230V		1800	2000	230	28	31.7	18	2-c WCDMA	SOT1239B
BLF7G20L(S)-250P		1805	1880	250	28	35	18	2-c WCDMA	SOT539B
BLF8G20LS-260A		1805	1880	260	28	45.5	15.9	2-c WCDMA	SOT539B
BLF8G20LS-400P(G)V		1805	1995	400	28	28	19	2-c WCDMA	SOT1242C

3.6.1.4 2.1 - 2.2 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLF6G22LS-130	Final	2000	2200	130	28	28.5	17	2-c WCDMA	SOT502B
BLF7G22L(S)-130		2000	2200	130	28	32	18.5	2-c WCDMA	SOT502B
BLF8G22LS-140		2000	2200	140	28	32.5	18.5	2-c WCDMA	SOT502B
BLC8G21LS-160AV		1805	2025	160	28	45	15	1-c WCDMA	SOT1275
BLF7G21LS-160(P)		1800	2050	160	28	34	18	2-c WCDMA	SOT1121B
BLF7G22L(S)-160		2000	2200	160	28	30	18	2-c WCDMA	SOT502B
BLF8G22LS-160BV		2000	2200	160	32	32	18	2-c WCDMA	SOT1120B
BLP8G21S-160PV		1880	2025	160	28	31	17.5	2-c WCDMA	SOT1221
BLF6G22(LS)-180PN		2000	2200	180	32	27.5	17.5	2-c WCDMA	SOT539B
BLF7G22L(S)-200		2110	2170	200	28	31	18.5	2-c WCDMA	SOT502B
BLF8G22LS-200(G)V*		2110	2170	200	28	29	19	2-c WCDMA	SOT1244C
BLF8G22LS-205		2110	2170	200	28	32.5	18.3	1-c WCDMA	SOT1239B
BLF8G22LS-220		2110	2170	220	28	33	17	2-c WCDMA	SOT502B
BLF8G22LS-240		2110	2170	240	28	28.5	19	2-c WCDMA	SOT502B
BLF7G22L(S)-250P		2110	2170	250	28	31	18.5	2-c WCDMA	SOT539B
BLF8G22LS-270(GV)		2110	2170	270	28	29	17.3	2-c WCDMA	SOT1244C
BLC8G22LS-450AV*		2110	2170	450	28	41	14	1-c WCDMA	SOT1258

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

3.6.1.5 2.3 - 2.4 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP7G22-05	Driver/final	700	2700	5	28	23	16	2-c WCDMA	SOT1179
BLP8G27-5*		700	2700	5	28	19	17	2-c WCDMA	SOT1371
BLP7G22-10		700	2700	10	28	25	17.4	2-c WCDMA	SOT1179
BLM7G24S-30BG	MMIC	2100	2400	30	28	11.3	31.5	2-c WCDMA	SOT1212
BLF7G24L(S)-100	Final	2300	2400	100	28	27	18	NCDMA/IS95	SOT502B
BLF8G24LS-100(G)V		2300	2400	100	28	32	19	2-c WCDMA	SOT1244C
BLF7G24L(S)-140		2300	2400	140	28	26.5	18.5	NCDMA/IS95	SOT502B
BLF8G24LS-150(G)V		2300	2400	150	28	33	19	2-c WCDMA	SOT1244C
BLF9G24LS-150V*		2300	2400	150	28	33	18.5	1-c WCDMA	SOT1239B
BLF7G24L(S)-160P		2300	2400	160	28	27.5	18.5	NCDMA/IS95	SOT539B
BLC9G24LS-170AV*		2300	2400	170	28	48	15.5	1-c WCDMA	SOT1275
BLF8G24L-200P		2300	2400	200	28	32	17.2	1-c WCDMA	SOT539A
BLF8G24LS-200P(N)		2300	2400	200	28	32	17.2	1-c WCDMA	SOT539B
BLF9G24LS-230V*		2300	2400	230	28	30	18.5	1-c WCDMA	SOT1239B
BLC8G24LS-240AV		2300	2400	240	28	44	15	1-c WCDMA	SOT1252

3.6.1.6 2.5 - 2.7 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP7G22-05	Driver/final	700	2700	5	28	23	16	2-c WCDMA	SOT1179
BLP8G27-5*		700	2700	5	28	19	17	2-c WCDMA	SOT1371
BLF6G27-10(G)		2300	2700	10	28	20	19	NCDMA/IS95	SOT975C
BLF6G27L(S)-40P(G)		2500	2700	40	28	37	17.5	1-c WCDMA	SOT1121B
BLF6G27(S)-45		2500	2700	45	28	24	18	NCDMA/IS95	SOT608B
BLF6G27L-50BN		2500	2700	50	28	14.5	16.5	2-c WCDMA	SOT1112A
BLF7G27L(S)-75P	Final	2300	2700	75	28	26	17	NCDMA/IS95	SOT1121B
BLF7G27L(S)-90P		2500	2700	90	28	29	18.5	NCDMA/IS95	SOT1121B
BLC8G27LS-100AV		2496	2690	100	28	44	15.5	1-c WCDMA	SOT1275
BLF7G27L(S)-100		2500	2700	100	28	28	18	NCDMA/IS95	SOT502B
BLF8G27LS-100(GV)		2500	2700	100	28	28	17	2-c WCDMA	SOT1244C
BLF8G27LS-100P(V)		2500	2700	100	28	33	18	1-c WCDMA	SOT1121B
BLC8G27LS-140AV		2496	2690	140	28	43	14.5	1-c WCDMA	SOT1275
BLF7G27L(S)-140		2500	2700	140	28	22	16.5	NCDMA/IS95	SOT502B
BLF8G27LS-140(V)		2600	2700	140	32	30	17.4	2-c WCDMA	SOT1120B
BLC9G27LS-150AV		2496	2690	150	28	44	15	1-c WCDMA	SOT1275
BLF7G27L(S)-150P		2500	2700	150	28	26	16.5	NCDMA/IS95	SOT539B
BLF8G27LS-150(G)V		2500	2700	150	28	30	18	2-c WCDMA	SOT1244C
BLC8G27LS-160AV		2496	2690	160	28	41	14.3	1-c WCDMA	SOT1275
BLC8G27LS-180AV		2496	2690	180	28	43.5	14	1-c WCDMA	SOT1275
BLC8G27LS-210PV		2500	2700	200	28	30	17	2-c WCDMA	SOT1251
BLF7G27L-200PB		2600	2700	200	32	29	16.5	2-c WCDMA	SOT1110A
BLC8G27LS-240AV*		2500	2700	240	28	45	15.5	1-c WCDMA	SOT1252

3.6.1.7 3.5 - 3.8 GHz transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLF6G38-10(G)	Driver/final	3400	3600	10	28	20	14	NCDMA/IS95	SOT975C
BLF6G38(S)-25		3400	3800	25	28	24	15	NCDMA/IS95	SOT608B
BLF6G38(LS)-50		3400	3800	50	28	23	14	NCDMA/IS95	SOT502B
BLF8G38LS-75V	Final	3400	3800	75	30	26	15.5	1-c WCDMA	SOT1239B
BLF9G38LS-90P*		3400	3600	90	28	37.5	13	NCDMA/IS95	SOT1121B
BLF6G38LS-100		3400	3600	100	28	21.5	13	NCDMA/IS95	SOT502B

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

3.6.1.8 Power LDMOS Doherty designs

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
462 - 468 MHz								
462 - 468	56	48.5	28	18.7	51.5	SYM	1/2 BLP8G05S-200	1/2 BLP8G05S-200
716 - 768 MHz								
716 - 768	56	47.5	28	18.1	46.6	SYM	1/2 BLP8G10S-270PW	1/2 BLP8G10S-270PW
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
728 - 768	48.3	41	28	19	45	SYM	1/2 BLP8G10S-45P	1/2 BLP8G10S-45P
728 - 768	58	50	32	20.5	47	SYM	BLF6G10LS-200RN	BLF6G10LS-200RN
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
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	2x BLF6H10L-160
920 - 960	55.2	48	30	16.9	46.3	SYM	BLF8G10LS-160V	BLF8G10LS-160V
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
925 - 960	47.4S	39.4	28	18	47.3	SYM	1/2 BLP8G10S-45P	1/2 BLP8G10S-45P
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	2x BLF7G10LS-250
920 - 960	43	36	28	24.3	38	CLASS AB	BLP7G22-10P	
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	2x BLF8G10LS-270
920-960	56.4	49.3	28	15.1	47	SYM	1/2 BLF8G09LS-400PW	1/2 BLF8G09LS-400PW
860-895	47.5	39.2	28	18	47	SYM	1/2 BLP8G10LS-45P	1/2 BLP8G10LS-45P
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
2300 - 2400 MHz (LTE)								
2300 - 2400	49.5	42	28	14.6	44	SYM	1/2 BLF7G27L(S)-75P	1/2 BLF7G27L(S)-75P
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	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

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
1930 - 1990 MHz (PCS)								
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	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	BLF6G10G + 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
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	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	1/2 BLF7G22LS-100P	1/2 BLF7G22LS-100P
2110 - 2170	49	40.5	28	28	34	SYM	1/2 BLM7G22S-60PBG	1/2 BLM7G22S-60PBG
2110 - 2170	49	40.5	28	28	34	SYM	1/2 BLM7G22S-60PBG	1/2 BLM7G22S-60PBG
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	55.5	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	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	57.2	49.2	28	16	47	3-WAY	BLF7G22LS-160	2x BLF7G22L(S)-160
2110 - 2170	56.8	50.5	28	30	49	E-SYM	BLF6G21L-10G + BLF8G22LS-220	BLF6G21L-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
2300 - 2400 MHz (LTE)								
2300 - 2400	47	39.5	22	15	41	SYM	1/2 BLF6G27LS-40PG	1/2 BLF6G27LS-40PG
2300 - 2400	50	42	28	15.2	43	SYM	1/2 BLF7G27LS-75P	1/2 BLF7G27LS-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 - 2401	56.8	49	28	15.5	42.1	SYM	BLF8G24LS-200P	BLF8G24LS-200P
2500 - 2700 MHz (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	50.3	42.3	28	14.5	39	SYM	1/2 BLF7G27LS-90P	1/2 BLF7G27LS-90P
2500 - 2700	52.5	44.5	28	14	38	SYM	1/2 BLF7G27LS-150P	1/2 BLF7G27LS-150P
2530 - 2630	53	45	28	14	43	ASYM	BLC8G27LS-160AV_main	BLC8G27LS-160AV_peak
2620 - 2690	55.2	47.2	30	15	41	ASYM	BLF7G27LS-100	BLF7G27LS-140
2620 - 2690	57.5	48	28	13	37	ASYM	BLF8G27LS-140G	2x BLF8G27LS-140G
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	1/2 BLF8G27LS-100P
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

Freq band (MHz)	PPEAK (dBm)	POUT-AVG (dBm)	VDS (V)	Gain (dB)	Drain efficiency (%)	Type	Main transistor	Peak transistor
2620 - 2690	55	47.5	30	15.7	43.5	ASYM	BLF7G27LS-100	BLF7G27LS-140
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
3300 - 3800 MHz (TDD-LTE)								
3400 - 3700	52	44.5	28	12.5	35	SYM	BLF8G38LS-75V	BLF8G38LS-75V
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
3400 - 3600	46	39	28	12.3	36	SYM	BLF6G38S-10G	BLF6G38S-10G

3.6.1.9 Single Package Asymmetric Doherty (PAD) power transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLM7G1822S-40AB(G)*	MMIC	1805	2170	40	28	26.5	31.5	1-c WCDMA	SOT1211
BLM8G0710S-45AB(G)*		700	1000	45	28	27	35	1-c WCDMA	SOT1212
BLM7G1822S-80AB(G)		1805	2170	80	28	24	28.3	1-c WCDMA	SOT1212
BLC8G27LS-100AV	Final	2496	2690	100	28	44	15.5	1-c WCDMA	SOT1275
BLC8G27LS-140AV		2496	2690	140	28	43	14.5	1-c WCDMA	SOT1275
BLC9G27LS-150AV		2496	2690	150	28	44	15	1-c WCDMA	SOT1275
BLC9G20LS-360AV*		1800	2000	158	28	52	15	1-c WCDMA	SOT1258
BLC8G21LS-160AV		1805	2025	160	28	45	15	1-c WCDMA	SOT1275
BLC8G27LS-160AV		2496	2690	160	28	41	14.3	1-c WCDMA	SOT1275
BLP8G21S-162AV*		1880	2025	160	28	43	16	2-c WCDMA	SOT1221
BLC9G24LS-170AV*		2300	2400	170	28	48	15.5	1-c WCDMA	SOT1275
BLC8G27LS-180AV		2496	2690	180	28	43.5	14	1-c WCDMA	SOT1275
BLC8G24LS-241AV*		2300	2400	240	28	44	15	1-c WCDMA	SOT1252
BLC8G24LS-240AV		2300	2400	240	28	44	15	1-c WCDMA	SOT1252
BLC8G27LS-240AV*		2500	2700	240	28	45	15.5	1-c WCDMA	SOT1252
BLF8G20LS-260A		1805	1880	260	28	45.5	15.9	2-c WCDMA	SOT539B
BLC9G20LS-470AV*		1800	2000	263	28	49	16	1-c WCDMA	SOT1258
BLC9G24LS-440AV*		2300	2400	440	28	46	14.5	1-c WCDMA	SOT1258
BLC8G22LS-450AV*		2110	2170	450	28	41	14	1-c WCDMA	SOT1258

3.6.1.10 OMP power transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP7G22-05	Driver/final	700	2700	5	28	23	16	2-c WCDMA	SOT1179
BLP8G27-5*		700	2700	5	28	19	17	2-c WCDMA	SOT1371
BLP7G22-10		700	2700	10	28	25	17.4	2-c WCDMA	SOT1179
BLP8G27-10*		700	2700	10	28	19	17	2-c WCDMA	SOT1371
BLP8G10S-45P(G)		700	1000	45	28	19.8	20.8	2-c WCDMA	SOT1224
BLP8G20S-80P		1800	2200	80	28	33	17.5	2-c WCDMA	SOT1223
BLP7G07S-140P	Final	700	1000	140	28	29.6	20.9	2-c WCDMA	SOT1223
BLP8G21S-160PV		1880	2025	160	28	31	17.5	2-c WCDMA	SOT1221
BLP8G21S-162AV*		1880	2025	160	28	43	16	2-c WCDMA	SOT1221

3.6.1.11 MMIC power transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLM8G0710S-15PB(G)*	MMIC	700	1000	15	28	27	35	1-c WCDMA	SOT1212
BLM7G1822S-20PB(G)		1805	2170	20	28	23.6	32.2	1-c WCDMA	SOT1212
BLM6G10-30		860	960	30	28	11.5	29	2-c WCDMA	SOT834
BLM6G22-30(G)		2100	2200	30	28	9	29.5	2-c WCDMA	SOT822
BLM7G24S-30BG		2100	2400	30	28	11.3	31.5	2-c WCDMA	SOT1212
BLM8G0710S-30PB(G)		700	1000	30	28	27	35	1-c WCDMA	SOT1212
BLM7G1822S-40AB(G)*		1805	2170	40	28	26.5	31.5	1-c WCDMA	SOT1211
BLM7G1822S-40PB(G)		1805	2170	40	28	24.5	31.5	1-c WCDMA	SOT1212
BLM8G0710S-45AB(G)*		700	1000	45	28	27	35	1-c WCDMA	SOT1212
BLM7G22S-60PB(G)		2100	2200	60	28	11.3	31.5	2-c WCDMA	SOT1212
BLM7G1822S-80AB(G)		1805	2170	80	28	24	28.3	1-c WCDMA	SOT1212
BLM7G1822S-80PB(G)*		1805	2170	80	28	24	28.3	1-c WCDMA	SOT1211

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

3.6.1.12 Small-cell power transistors

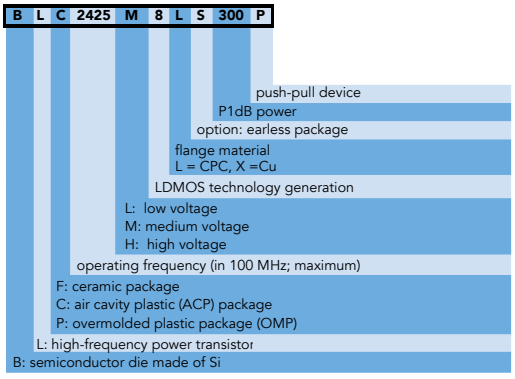
					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLM7G24S0BG	MMIC	2100	2400	30	28	11.3	31.5	2-c WCDMA	SOT1212
BLM8G0710S0PB(G)		700	1000	30	28	27	35	1-c WCDMA	SOT1212
BLC8G27LS-60AV*	Driver/final	2400	2690	32	28	48	15.5	1-c WCDMA	SOT1275
BLF6G22L(S)-40P		2110	2170	40	28	30	19	2-c WCDMA	SOT1121A
BLF6G27L(S)-40P(G)		2500	2700	40	28	37	17.5	1-c WCDMA	SOT1121B
BLM7G1822S-40AB(G)*	MMIC	1805	2170	40	28	26.5	31.5	1-c WCDMA	SOT1211
BLM7G1822S-40PB(G)		1805	2170	40	28	24.5	31.5	1-c WCDMA	SOT1212
BLM8G0710S-45AB(G)*		700	1000	45	28	27	35	1-c WCDMA	SOT1212
BLD6G21LS-50	Integrated Doherty	2010	2025	50	28	43	14.5	TD-SCDMA	SOT1130B
BLM7G22S-60PB(G)	MMIC	2100	2200	60	28	11.3	31.5	2-c WCDMA	SOT1212
BLF7G27L(S)-75P	Final	2300	2700	75	28	26	17	NCDMA/IS95	SOT1121B
BLM7G1822S-80AB(G)	MMIC	1805	2170	80	28	24	28.3	1-c WCDMA	SOT1212
BLM7G1822S-80PB(G)*		1805	2170	80	28	24	28.3	1-c WCDMA	SOT1211
BLF7G20L(S)-90P	Final	1427	2170	90	28	41	19.5	GSM EDGE	SOT1121B
BLF7G27L(S)-90P	Final	2500	2700	90	28	29	18.5	NCDMA/IS95	SOT1121B
BLF9G38LS-90P*	Final	3400	3600	90	28	37.5	13	NCDMA/IS95	SOT1121B

3.6.1.13 High-voltage power transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLF6H10LS-160	Final	729	960	160	50	34	20	2-c WCDMA	SOT467B

3.6.2 RF power transistors for broadcast/ISM applications

Device naming conventions for 2.45 GHz ISM band



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

Our leading LDMOS technologies, together with our advanced package concepts, yield power amplifiers that deliver best-in-class performance. We offer the industry's highest power capabilities and best ruggedness for all broadcast technologies, and our portfolio includes transistors for UHF, VHF, and HF applications.

We build on more than 35 years of leadership in RF power transistors, and have supported ISM applications for more than a decade. Our RF Energy evaluation module lets us offer readily usable application and design-in support.

3.6.2.1 1 - 1600 MHz (HF/VHF/ISM) LDMOS transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP10H603	Driver	10	1400	2.5	50	62	22.8	CW	SOT1352
BLP10H605		10	1400	5	50	59.6	22.4	CW	SOT1352
BLP25M705		10	2500	5	28	50	16.4	CW	SOT1179
BLF640		10	2200	10	28	31	19.3	1-c WCDMA	SOT538
BLP10H610		10	1400	10	50	60	22	CW	SOT1352
BLP25M710		10	2500	10	28	64.5	16.2	Pulsed RF	SOT1179
BLF571		10	500	20	50	70	27.5	CW	SOT467
BLF642		1	1400	35	32	63	19	CW	SOT467
BLF644P	Driver/final	10	1300	70	32	66	23.5	CW	SOT1228
BLF645	Final	1	1400	100	32	56	18	CW	SOT540
BLF871(S)		1	1000	100	40	60	21	CW	SOT467
BLF10M6(LS)135		700	1000	135	28	28	21	2-c WCDMA	SOT502
BLF881(S)		1	1000	140	50	49	21	CW	SOT467
BLF10M6(LS)160		700	1000	160	32	27	22.5	2-c WCDMA	SOT502
BLP15M7160P		10	1500	160	28	59.7	19.4	CW	SOT1223
BLF10M6(LS)200		700	1000	200	28	28.5	20	2-c WCDMA	SOT502
BLF647P		10	1500	200	32	70	18	Pulsed RF	SOT1121
BLF2324M8LS200P		2300	2400	200	28	32	17.2	1-c WCDMA	SOT539
BLF6G13L(S)-250P		1300	1300	250	50	56	17	CW	SOT1121
BLF6G15L(S)-500H		1400	1500	500	50	19	16	DVB-T	SOT539
BLF10H6600P(S)		400	1000	600	50	46	20.8	CW	SOT539

3.6.2.2 470 - 860 MHz (UHF) LDMOS transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP10H603	Driver	10	1400	2.5	50	62	22.8	CW	SOT1352
BLP10H605		10	1400	5	50	59.6	22.4	CW	SOT1352
BLP10H610		10	1400	10	50	60	22	CW	SOT1352
BLF571		10	500	20	50	70	27.5	CW	SOT467
BLF642		1	1400	35	32	63	19	CW	SOT467
BLF871(S)	Final	1	1000	100	40	60	21	CW	SOT467
BLF881(S)		1	1000	140	50	49	21	CW	SOT467
BLP15M7160P		10	1500	160	28	59.7	19.4	CW	SOT1223
BLF882(S)*		10	860	200	50	65	21	CW	SOT502
BLF884P(S)		470	860	300	50	46	21	CW	SOT1121
BLF879P(S)		470	860	500	42	47	21	CW	SOT539
BLF888A(S)		470	860	600	50	31	20	DVB-T	SOT539
BLF888D(S)		470	806	600	50	40	17	DVB-T	SOT539
BLF888B(S)		470	860	650	50	33	21	DVB-T	SOT539

3.6.2.3 0 - 500 MHz (HF/VHF) LDMOS transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP10H603	Driver	10	1400	2.5	50	62	22.8	CW	SOT1352
BLP10H605		10	1400	5	50	59.6	22.4	CW	SOT1352
BLP25M705		10	2500	5	28	50	16.4	CW	SOT1179
BLF640		10	2200	10	28	31	19.3	1-c WCDMA	SOT538
BLP10H610		10	1400	10	50	60	22	CW	SOT1352
BLP25M710		10	2500	10	28	64.5	16.2	Pulsed RF	SOT1179
BLF571		10	500	20	50	70	27.5	CW	SOT467
BLP10H630P*		10	1000	30	50	tbd	tbd	tbd	SOT1223
BLF642		1	1400	35	32	63	19	CW	SOT467
BLP05H635XR*		10	600	35	50	75	27	Pulsed RF	SOT1223
BLF644P	Driver/final	10	1300	70	32	66	23.5	CW	SOT1228
BLP05H675XR*		10	600	75	50	75	27	Pulsed RF	SOT1223
BLP10H690P*		10	1000	90	50	tbd	tbd	tbd	SOT1223
BLF645	Final	1	1400	100	32	56	18	CW	SOT540
BLF871(S)		1	1000	100	40	60	21	CW	SOT467
BLP05H6110XR*		10	600	110	50	75	27	Pulsed RF	SOT1223
BLP10H6120P*		10	1000	120	50	tbd	tbd	tbd	SOT1223
BLF881(S)		1	1000	140	50	49	21	CW	SOT467
BLP05H6150XR*		1	500	150	50	75	27	Pulsed RF	SOT1223
BLP05H6200XR*		10	600	200	50	75	28	Pulsed RF	SOT1223
BLF182XR(S)*		10	600	200	50	75	28	Pulsed RF	SOT1121
BLF647P(S)		10	1500	200	32	70	17.5	Pulsed RF	SOT1121
BLF882(S)*		10	860	200	50	65	21	CW	SOT502
BLP05M7200		425	450	200	28	77	21	CW	SOT1138
BLF573(S)		10	500	300	50	70	27.2	CW	SOT502
BLP05H6350XR*		10	600	350	50	75	27	Pulsed RF	SOT1223
BLF183XR(S)		10	600	350	50	75	25	Pulsed RF	SOT1121

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

3.6.2.3 0 - 500 MHz (HF/VHF) LDMOS transistors (continued)

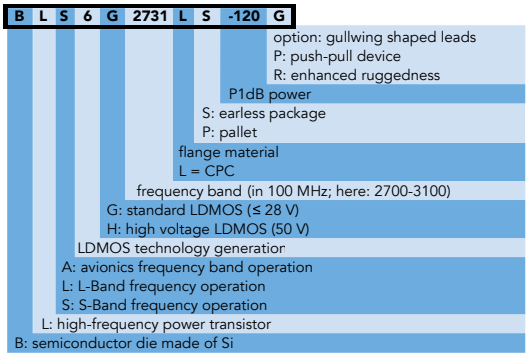
					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLF174XR(S)	Final	10	128	600	50	73	29	Pulsed RF	SOT1214
BLF574		10	500	600	50	70	26.5	CW	SOT539
BLF574XR(S)		10	500	600	50	74.7	24	Pulsed RF	SOT1214
BLF184XR(G)		10	600	700	50	73.5	23.9	Pulsed RF	SOT1214
BLF184XRS		10	600	700	50	73.5	23.9	Pulsed RF	SOT1214
BLP05H6700XR*		10	600	700	50	tbd	tbd	tbd	SOT1338
BLF178P		10	128	1200	50	75	28.5	Pulsed RF	SOT539
BLF578		10	500	1200	50	75	26	CW	SOT539
BLF178XR(S)		10	128	1400	50	72	28	Pulsed RF	SOT539
BLF188XR(S)		10	600	1400	50	73	24.4	Pulsed RF	SOT539
BLF188XRG		10	600	1400	50	73	24.4	Pulsed RF	SOT1248
BLF578XR(S)		10	500	1400	50	69	23.5	Pulsed RF	SOT539

3.6.2.4 2.45 GHz ISM LDMOS transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLP25M705	Driver	10	2500	5	28	50	16.4	CW	SOT1179
BLP25M805*		2400	2500	5	32	tbd	tbd	CW	SOT1371
BLP25M710		10	2500	10	28	64.5	16.2	Pulsed RF	SOT1179
BLP25M810*		2400	2500	10	32	tbd	tbd	CW	SOT1371
BLF25M612(G)		2400	2500	12	28	60	19	CW	SOT975
BLF2425M9L(S)30*		2400	2500	30	32	61	18.5	CW	SOT1135
BLM2425M7S60P*		2400	2500	60	32	45	27.5	CW	SOT1211
BLF2425M7L(S)100	Final	2300	2400	100	28	27	18	1-c WCDMA	SOT502
BLF2425M7L(S)140		2400	2500	140	28	52	18.5	CW	SOT502
BLF2425M8L(S)140		2400	2500	140	28	56	19	CW	SOT502
BLF2425M9L(S)140*		2400	2500	140	28	60	20	CW	SOT502
BLF2425M6L(S)180P		2400	2500	180	28	53.5	13.3	CW	SOT539
BLF2425M7L(S)250P		2400	2500	250	28	51	15	CW	SOT539
BLC2425M8L(S)300P*		2400	2500	300	28	51	15	CW	SOT1250

3.6.3 RF power transistors for aerospace and defense

Device naming conventions for RF power transistors for aerospace and defense



Why choose NXP's microwave RF power transistors:

- High gain and 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
- Very low thermal resistance design for unrivalled performance

3.6.3.1 Avionics LDMOS transistors

					Test signal performance				
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLL6H0514-25	Driver	500	1400	25	50	50	19	Pulsed RF	SOT467
BLA6G1011-200R	Final	1030	1090	200	28	65	20	Pulsed RF	SOT502
BLA6G1011L(S)-200RG		1030	1090	200	28	65	20	Pulsed RF	SOT502
BLA8G1011L-300(G)		1030	1090	300	32	56	16.5	Pulsed RF	SOT502
BLA8G1011L(S)-300(G)		1030	1090	300	32	56	16.5	Pulsed RF	SOT502
BLA6H0912-500		960	1215	500	50	50	17	Pulsed RF	SOT634
BLA6H1011-600		1030	1090	600	48	52	17	Pulsed RF	SOT539

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

3.6.3.1 Avionics LDMOS transistors (continued)

Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Test signal performance				
					VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLF988(S)	Final	500	1000	600	50	58	19.8	Pulsed RF	SOT539
BLU6H0410L(S)-600P		400	900	600	50	58	20	Pulsed RF	SOT539
BLA6H0912L(S)-1000*		960	1215	1000	50	50	15.5	Pulsed RF	SOT539

3.6.3.2 L-band LDMOS transistors

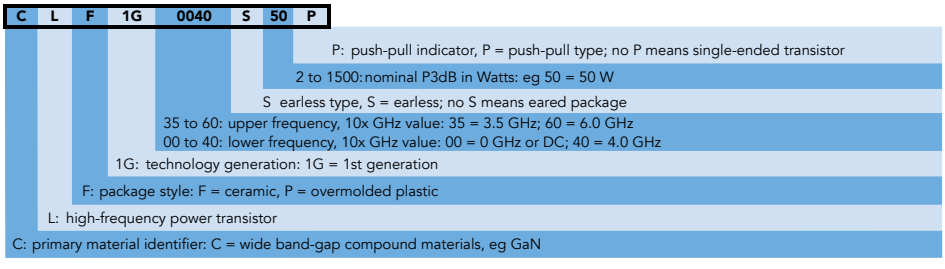
Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Test signal performance				
					VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLL6H0514-25	Driver	500	1400	25	50	50	19	Pulsed RF	SOT467
BLL8H0514-25		500	1400	25	50	59	21	Pulsed RF	SOT467
BLL6H0514L(S)-130	Final	500	1400	130	50	50	17	Pulsed RF	SOT1135
BLL8H0514L(S)-130		500	1400	130	50	50	17	Pulsed RF	SOT1135
BLL6G1214L(S)-250		1200	1400	250	36	45	15	Pulsed RF	SOT502
BLL6H1214L(S)-250		1200	1400	250	50	55	17	Pulsed RF	SOT502
BLL6H1214P2S-250		1200	1400	250	45	48	27	Pulsed RF	SOM039
BLL8H1214L(S)-250		1200	1400	250	50	55	17	Pulsed RF	SOT502
BLL6H1214(LS)-500		1200	1400	500	50	50	17	Pulsed RF	SOT539
BLL8H1214L(S)-500		1200	1400	500	50	50	17	Pulsed RF	SOT539

3.6.3.3 S-band LDMOS transistors

Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Test signal performance				
					VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
BLS6G2731-6G	Driver	2700	3100	6	32	33	15	Pulsed RF	SOT975
BLS6G3135(S)-20		3100	3500	20	32	45	15.5	Pulsed RF	SOT608
BLS6G2735L(S)-30		2700	3500	30	32	50	13	Pulsed RF	SOT1135
BLS7G2325L-105	Final	2300	2500	105	30	55	16.5	Pulsed RF	SOT502
BLS6G2731(S)-120		2700	3100	120	32	48	13.5	Pulsed RF	SOT502
BLS6G3135(S)-120		3100	3500	120	32	43	11	Pulsed RF	SOT502
BLS6G2731S-130		2700	3100	130	32	50	12	Pulsed RF	SOT922
BLS6G2933S-130		2900	3300	130	32	47	12.5	Pulsed RF	SOT922
BLS7G2933S-150		2900	3300	150	32	47	13.5	Pulsed RF	SOT922
BLS7G2730L(S)-200P		2700	3000	200	32	48	12	Pulsed RF	SOT539
BLS7G3135LS-200		3100	3500	200	32	43	12	Pulsed RF	SOT502
BLS7G2729L(S)-350P		2700	2900	350	32	50	13	Pulsed RF	SOT539
BLS7G3135L(S)-350P		3100	3500	350	32	43	12	Pulsed RF	SOT539
BLS8G2731L(S)-400P*		2700	3100	400	32	40	11	Pulsed RF	SOT539

3.6.4 Gallium Nitride (GaN) RF power amplifiers

Device naming conventions for GaN RF power amplifiers



Type number	Product	f_{min} (MHz)	f_{max} (MHz)	P1dB (W)	Test signal performance				
					VDS (V)	η_D (%)	G_p (dB)	Test signal	Package version
CLF1G0060(S)-10*	Driver	0	6000	10	50	33.2	17	Pulsed RF	SOT1227
CLF1G0060(S)-30*		0	6000	30	50	59	15.9	Pulsed RF	SOT1227
CLF1G0035-50	Driver/final	0	3500	50	50	49	13	Pulsed RF	SOT467
CLF1G0035S-50*		0	3500	50	50	49	13	Pulsed RF	SOT467
CLF1G0035-100	Final	0	3500	100	50	59.5	13.9	Pulsed RF	SOT467
CLF1G0035S-100*		0	3500	100	50	59.5	13.9	Pulsed RF	SOT467
CLF1G0035-100P*		0	3500	100	50	50.1	12.7	Pulsed RF	SOT1228
CLF1G0035S-100P*		0	3500	100	50	50.1	12.7	Pulsed RF	SOT1228

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

BUILDING ON DECADES OF RF **LEADERSHIP**

Our application **experts** work with you to solve any design challenge to help you realize a clear competitive advantage.

4. Design support

This chapter guides you through the available tools, documents, materials, and links that ease the design-in of our products.

4.1 Explore 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 is the place to find training modules that introduce you to our products and applications, watch hands-on trainings, and even get certified. The training modules can be viewed on mobile devices.
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 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.

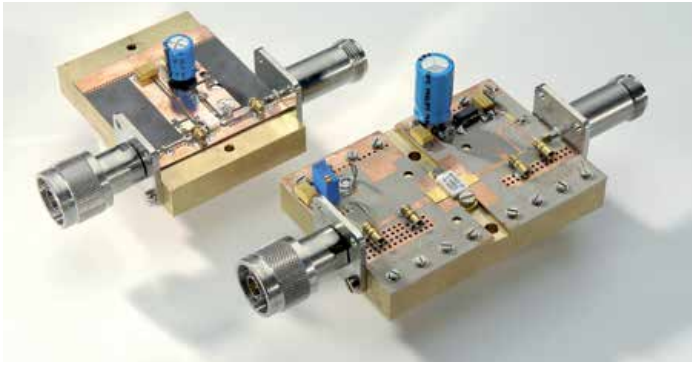
Datasheets and application notes

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 datasheets or in the Application Notes section of the NXP website, **www.nxp.com/products/all_appnotes**

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), Genesys, 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 product evaluation. Boards are provided with industry-standard RF connectors to facilitate measurements and design-in. The features and contents 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 RF Power Lifetime Calculator

The RF Power Lifetime Calculator enables an interactive estimation of our LDMOS device lifetime. Median-Time-to-Failure (MTF), the time that 50% of the population has failed, is calculated as a function of junction temperature of the device, assuming electromigration as the wear-out failure mechanism. This allows our customers to optimize the thermal characteristics of their projects to generate an optimal system-level solution.

The online selection and calculation process also eliminates the need to browse through large amounts of product information to quickly find a specific RF Power transistor and its performance characteristics.

The RF Power Lifetime Calculator is available at the NXP Design Portal **www.nxp.com/design-portal/mtf.html** and is linked to product pages.

4.5 RF small signal community

Our online community is an engineer-to-engineer space that lets RF small-signal enthusiasts collaborate, get technical support, and share ideas. Have a 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.
Visit **www.nxp.com/RFcommunity**

4.6 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.

4.7 Application notes

Description	File name
Product category: RF power transistors	
Mounting and Soldering of RF transistors	AN10896
Bias module for 50 V GaN demonstration boards	AN11130
Life-time requirements of NXP HVSON12 plastic drivers	AN11198
TTL bias switching	AN11226
Life-time requirements of NXP Semiconductors HVSON12 high-voltage (50 V) plastic drivers	AN11520
Broadband DVB-T UHF power amplifier with BLF888	AN10869
Using BLF574 in the 88 - 108 MHz FM band	AN10714
Using BLF578 in the 88 to 108 MHz FM band	AN10800
174 to 230 MHz DVB-T power amplifier with BLF578	AN10858
Dependency of BLF578 gate bias voltage ontemperature	AN10882
174 to 230 MHz DVB-T power amplifier with BLF881	AN10945
1805 to 1880 MHz asymmetrical Doherty amplifier with BLF7G20LS-90P and BLF7G21LS-160P	AN10951
BLF645 10 to 600 MHz 120 W amplifier	AN10953
BLF578 demo for 352 MHz 1 kW CW power	AN10967
Broadband DVB-T UHF power amplifier with BLF888A	AN11062
Using BLF574 in the 88 - 108 MHz FM band	AN10714
Using BLF578 in the 88 to 108 MHz FM band	AN10800
174 to 230 MHz DVB-T power amplifier with BLF578	AN10858

Application notes (continued)

Description	File name
Broadband DVB-T UHF power amplifier with BLF888	AN10869
Dependency of BLF578 gate bias voltage on temperature	AN10882
174 to 230 MHz DVB-T power amplifier with BLF881	AN10945
BLF645 10 to 600 MHz 120 W amplifier	AN10953
BLF578 demo for 352 MHz 1 kW CW power	AN10967
Broadband DVB-T UHF power amplifier with BLF888A	AN11062
Doherty RF performance using BLF6G20-230PRN	AN10847
Doherty RF performance analysis using BLF7G22LS-130	AN10885
BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier	AN10921
1.5 GHz Doherty power amplifier for base station applications using BLF6G15L-250PBRN	AN10923
2.5 to 2.7 GHz Doherty power amplifier using BLF7G27LS-150P	AN10933
1930 to 1990 MHz Doherty amplifier using BLF7G20LS-200	AN10944
Doherty RF performance analysis using BLF7G22LS-130	AN10885
BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier	AN10921
1.5 GHz Doherty power amplifier for base station applications using BLF6G15L-250PBRN	AN10923
2.5 to 2.7 GHz Doherty power amplifier using BLF7G27LS-150P	AN10933
1930 to 1990 MHz Doherty amplifier using BLF7G20LS-200	AN10944
1805 to 1880 MHz asymmetrical Doherty amplifier with BLF7G20LS-90P and BLF7G21LS-160P	AN10951
Doherty RF performance using BLF6G20-230PRN	AN10847
Product category: automotive	
SDARS active antenna 2nd stage LNA with BFU690, 2.33 GHz	AN11024
SDARS active antenna 1st stage LNA with BFU730F, 2.33 GHz	AN11066
Product category: broadband communication	
Set-Top Box LNAs BGU703X and BGU704X	AN11209
BGA3012 - 1 GHz 12 dB gain wideband amplifier MMIC	AN11220
BGA3015 - 1 GHz 15 dB gain wideband amplifier MMIC	AN11221
BGA3018 - 1 GHz 18 dB gain wideband amplifier MMIC	AN11222
BGA301x Wideband Variable Gain Amplifier Application	AN11228
BGA3012 - 5 MHz to 300 MHz 12 dB reverse amplifier application	AN11293
BGA3015 - 5 MHz to 300 MHz 15 dB reverse amplifier application	AN11294
BGA3018 - 5 MHz to 300 MHz 18 dB reverse amplifier application	AN11295

Description	File name
BGA3018 - 40 MHz to 2600 MHz wideband amplifier application	AN11296
BGA301x - 40 MHz to 1006 MHz push-pull application	AN11299
BGA3023 - 1.2 GHz 20 dB gain CATV amplifier	AN11545
BGA3022 - 1.2 GHz 18 dB gain CATV amplifier	AN11546
BGA3021 - 1.2 GHz 16 dB gain CATV amplifier	AN11547
Product category: general-purpose applications	
Single stage 2.3_2.7GHz LNA with BFU730F	AN11006
Reducing the Spurs at RF_out caused by the biasing choke during fast switching on and off in TDD system	AN11152
General Purpose Wideband Amp in SOT363 Demo Board	UM10414
BFU6xx/BFU7xx Transistor Starter Kit Users Manual	UM10559
User Manual BFU5xx series starter kits	UM10772
Product category: general-purpose LNA	
BGU7003 400 MHz and 900 MHz application	AN11072
Externally-matched 900 MHz LNA using BGU7005	AN11103
BFU725F/N1 1.5 GHz LNA evaluation board	AN11118
BGU7003 1900MHz to 2100MHz LNA Application	AN11148
Maximum RF Input Power BFU730LX	AN11339
BFU520A ISM 433 MHz LNA design	AN11377
BFU520A ISM 866 MHz LNA design	AN11378
BFU530A ISM 433 MHz LNA design	AN11379
BFU530A ISM 866 MHz LNA design	AN11380
BFU550A ISM 433 MHz LNA design	AN11381
BFU550A ISM 866 MHz LNA design	AN11382
BFU520W ISM 433 MHz LNA design	AN11421
BFU520W ISM 866 MHz LNA design	AN11422
BFU530W ISM 433 MHz LNA design	AN11423
BFU530W ISM 866 MHz LNA design	AN11424
BFU550W ISM 433 MHz LNA design	AN11425
BFU550W ISM 866 MHz LNA design	AN11426
BFU520 ISM 433 MHz LNA design	AN11427
BFU520 ISM 866 MHz LNA design	AN11428

Application notes (continued)

Description	File name
BFU530 ISM 433 MHz LNA design	AN11429
BFU530 ISM 866 MHz LNA design	AN11430
BFU550 ISM 433 MHz LNA design	AN11431
BFU550 ISM 866 MHz LNA design	AN11432
BFU520X ISM 433 MHz LNA design	AN11433
BFU520X ISM 866 MHz LNA design	AN11434
BFU530X ISM 433 MHz LNA design	AN11435
BFU530X ISM 866 MHz LNA design	AN11436
BFU550X ISM 433 MHz LNA design	AN11437
BFU550X ISM 866 MHz LNA design	AN11438
BFU520XR ISM 433 MHz LNA design	AN11439
BFU520XR ISM 866 MHz LNA design	AN11440
BFU530XR ISM 433 MHz LNA design	AN11441
BFU530XR ISM 866 MHz LNA design	AN11442
BFU550XR ISM 433 MHz LNA design	AN11443
BFU550XR ISM 866 MHz LNA design	AN11444
2.62 ~ 2.69GHz LNA by using BGU7003	AN11481
Highly Linear FM LNA design with BFU580Q	AN11499
Highly Linear FM LNA design with BFU580G	AN11500
User manual for the BGU7003 100MHz LNA evaluation board	UM10455
BFU725F/N1 2.4 GHz to 6.0 GHz LNA demonstration board	UM10483
User manual for the BGU7003 868 MHz LNA evaluation board	UM10517

Product category: general-purpose MPA

Replacing HMC625 by NXP BGA7204	AN11135
Application Note for the BGA7130 EVB 865 - 880 MHz	AN11190
Application Note for the BGA7130 EVB 1930 - 1995 MHz	AN11191
BFU590G ISM 866 MHz PA design	AN11501
BFU590Q ISM 866 MHz PA design	AN11502
BFU590G ISM 433 MHz PA design	AN11503
BFU590Q ISM 433 MHz PA design	AN11504
User Manual for OM7828/BGA6130/Kit	UM10565

Description	File name
User Manual for OM7941/BGA7130LTE	UM10566
User Manual for OM7942/BGA7130WCDMA	UM10567

Product category: GPS

BGU7003 LNA application for GPS L2 band	AN11086

Product category: mobile FM

High Ohmic FM LNA for embedded Antenna in Portable applications with BGU7003W	AN11034
50 Ohm FM LNA for embedded Antenna in Portable applications with BGU7003W	AN11035
50 Ohm FM LNA for embedded Antenna in Portable applications with BGU6102	AN11090
High ohmic FM LNA for embedded Antenna in Portable applications with BGU6102	AN11091

Product category: mobile GPS

BGU8007/BGU7005 Matching Options for Improved LTE Jammer Immunity	AN11068
BGU7007 GPS front end evaluation board	AN11101
BGU8006 GNSS LNA evaluation board	AN11230
BGU8006 GNSS front end evaluation board	AN11284
BGU8009 GNSS LNA evaluation board	AN11288
BGU8009 GNSS front end evaluation board	AN11317
BGU8010 GNSS LNA evaluation board	AN11336
BGU8011 GNSS LNA evaluation board	AN11337
BGU8011 GNSS front end evaluation board	AN11338
BGU8009/BGU7005 L2 and L5 Band LNA Application	AN11353
BGU8009 Matching Options for 850 MHz / 2400 MHz Jammer Immunity	AN11357
BGU8019 GNSS LNA evaluation board	AN11368
BGU8004 GNSS LNA evaluation board	AN11369
NXP GPS LNA - GPS LNA voltage supply via a coax cable coming from the GPS receiver	AN11420
BGU6005/N2 GNSS LNA evaluation board	AN11515
BGU6009/N2 GNSS LNA evaluation board	AN11525
BGU8103 GNSS LNA evaluation board	AN11573
BGU8020 GNSS LNA evaluation board	AN11586
User Manual for the BGU7003 GPS LNA demo boards v2.0	UM10339
User manual for the BGU7005 GPS Front-end evaluation board	UM10381
2-Tone Test BGU7005 and BGU7007 GPS LNA	UM10453

Application notes (continued)

Description	File name
User manual for the BGU7003 2.4 GHz LNA evaluation board	UM10454
User manual for the BGU7007 GPS LNA evaluation board	UM10459
User manual for the BGU7008 GPS LNA evaluation board	UM10488
2-Tone Test BGU7004 and BGU7008 GPS LNA	UM10489
User manual for the BGU7004 GPS Front end evaluation board	UM10490
User manual for the BGU7004 GPS LNA evaluation board	UM10491
User manual for the BGU8007 GPS LNA evaluation board	UM10497

Product category: mobile LTE

BGU8L1 LTE LNA evaluation board	AN11512
BGU8M1 LTE LNA evaluation board	AN11513
BGU8H1 LTE LNA evaluation board	AN11514
BGS8L2 LTE LNA with bypass switch evaluation board	AN11654
BGS8M2 LTE LNA with bypass switch evaluation board	AN11655
BGS8H2 LTE LNA with bypass switch evaluation board	AN11656
BGS815L LTE SP5T switch with LNA evaluation board	AN11637
BGS815M LTE SP5T switch with LNA evaluation board	AN11636
BGS815H LTE SP5T switch with LNA evaluation board	AN11635

Product category: mobile TV

CMMB LNA with BGU7003, 400 MHz to 800 MHz	AN11097

Product category: satellite

Single stage Ku band LNA using BFU730F	AN11010
Universal Single LNB with TFF101x FIMOD IC	AN11144
Low Noise Flat Gain 40M~1 GHz DVB-C LNA with BFG425W	AN11449

Description	File name
TFF1024 EVB and application recommendations	AN11516
TFF1044 EVB Evaluation Results	AN11571
TFF1044 Quad DCV Application Recommendations	AN11640
Integrated clean-up-PLL, TFF1xxxx and buffer amplifier	UM10484

Product category: wireless infrastructure

BGX7221 evaluation board application note	AN10998
BGX7100 evaluation board application note	AN11014
BGX7220 evaluation board application note	AN11132
BGU7063 evaluation board application note	AN11171
BGX7101 evaluation board application note	AN11189
1900 MHz low noise, high linearity amplifier using BGU8052	AN11416
900 MHz low noise, high linearity amplifier using BGU8051	AN11417
2500 MHz low noise, high linearity amplifier using BGU8053	AN11418

Product category: WLAN

2.4-5.9GHz Broadband WiFi LNA With BFU730F	AN11114
Low Noise Fast Turn ON/OFF 5-5.9 GHz WiFi LNA with BFU730F	AN11140
Low Noise Fast Turn ON/OFF 2.4-2.5 GHz WiFi LNA with BFU730LX	AN11223
Low Noise Fast Turn ON/OFF 5-5.9 GHz WiFi LNA with BFU730LX	AN11224
High Linearity Low Noise 2.4-2.5 GHz WiFi LNA with ON5096	AN11283
BGU7224 Low Noise Amplifier (256 QAM) 2.4 GHz WiFi LNA MMIC with Bypass	AN11390
Low Noise Fast Turn ON-OFF 2.4-2.5 GHz WiFi LNA with BFU730F	AN11448
BGU7258 802.11 a/n/ac Low Noise Amplifier 5-6 GHz WiFi LNA MMIC with Bypass	AN11453
Low Cost High Gain Fast Turn On/Off 5-5.9 GHz WiFi LNA with BFU730F	AN11454

4.8 Demonstration boards

Avionics: 915 - 1215 MHz

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
BLP25M705	1030 - 1090	>8.4	1	28	12 µs, 10%	>21.5	>55	CA-275-13
BLP10H610	950 - 1225	>13	1	50	CW	>16	>42	CA-335-13
BLF642	1000 - 1060	25	-	32	CW, 2T	>21	>45	NA1381
BLL6H0514-25	1030	25	-	48	20 µs, 2%	22.8	23	CA-058-12
BLL6H0514-25	960 - 1215	25	-	50	128 µs, 10%	>19	>49	NA1350
BLL6H0514-130	960 - 1215	130	-	50	100 µs, 10%	>18.2	>57	CA-169-11
BLL6H0514-130	1030	130	-	48	20 µs, 2%	20	48	CA-063-12
BLA6G1011-200R	1030 - 1090	200	-	28	50 µs, 2%	>20	>65	NA1449
BLA6G1011-200RG	1030 - 1090	200	-	28	50 µs, 2%	>19	>62	NA1549
BLF6G13L-250P	960 - 1215	>300	3	50	40 µs, 1%	>12	>42	CA-344-13
BLF6G13L-250P	1090	355	-	50	100 µs, 10%	17	65	CA-013-13
BLA6H0912-500	960 - 1215	450	-	50	128 µs, 10%	>17.5	>48	NA1209
BLA6H0912-500	1030	500	-	48	20 µs, 2%	20.6	56	CA-076-12
BLA6H0912-500	1090	500	2	48	300 µs, 10%	35.5	60	NA1938
BLA6H0912-500	915	566	1	50	100 µs, 10%	19.6	58	CA-161-12
BLA6H1011-600	1030 - 1090	600	-	48	50 µs, 2%	>17	>52	NA1617
BLA6H0912-1000	960 - 1215	800	-	50	40 µs, 1%	>14.6	>44	CA-139-13
BLA6H0912-1000	1000 - 1150	>980	3	50	50 µs, 5%	>15.5	>37	CA-294-12

L-band: 1200 - 1400 MHz

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
BLP10H610	1200 - 1400	10	-	50	100 µs, 10%	>15.5	>47.5	CA-281-14
BLL6H0514-25	1200 - 1400	25	-	50	300 µs, 10%	>18	>59	NA-1786
BLL6H0514-130	1200 - 1400	130	-	50	300 µs, 10%	>16	>50	NA-1787
BLL6H1214-250	1200 - 1400	250	-	50	300 µs, 10%	>17	>54	NA-1385
BLL6H1214-500	1200 - 1400	500	-	50	300 µs, 10%	>15.5	>50	NA-1720

S-band: 2700 - 3500 MHz

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
2700 - 2900 MHz								
BLS7G2729L-350P	2700 - 2900	360	3	32	300 µs, 10%	>11.8	>49	CA-145-12
BLS7G2729L-350P	2700 - 2900	350	1.2	32	300 µs, 10%	>12.8	>48	NA-1690
BLS8G2731L-400P	2700 - 2900	550	2	32	300 µs, 10%	>10.1	>47	CA-260-14
2700 - 3100 MHz								
BLS6G2731-6	2700 - 3100	6		32	100 µs, 10%	>16	>38	NA-1598
BLS6G2731-120	2700 - 3100	120	-	32	100 µs, 10%	>12.8	>47	NA-1103
BLS6G2731P-200	2700 - 3100	215	-	32	300 µs, 10%	>12.2	>49	NA-1273
BLS8G2731-400	2700 - 3100	455	2	32	50 µs, 2%	>10	>49	
2700 - 3500 MHz								
BLS6G2735L-30	3100 - 3500	>28	1	32	300 µs, 10%	>12.5	>49.9	NA-1335
2900 - 3300 MHz								
BLS7G2933S-150	2900 - 3300	150	-	32	300 µs, 10%	>13.2	>47	NA-1093
BLS6G2933P-200	2900 - 3300	>215	1	32	300 µs, 10%	>11	>44.8	NA-1081
3100 - 3500 MHz								
BLS6G3135-20	3100 - 3500	20	-	32	300 µs, 10%	>14	>44	NA-1428
BLS6G3135-120	3100 - 3500	120	-	32	300 µs, 10%	>10.8	>43	NA-1429
BLS7G3135L-350P	3100 - 3500	>320	1	32	300 µs, 10%	>10	>38	NA-1716

FM broadcast: 88 - 108 MHz

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
BLP10H610	88 - 108	16	1	50	CW	25	62	CA-253-13
BLF571	88 - 108	>22	1	50	CW	>29	>65	NA-1037
BLF881	88 - 108	>110	1	50	CW	>22	>57	CD-101-14
BLF183XR	88 - 108	300	3	50	CW	>25.5	>82.5	CA-283-14
BLF573	108	>325	3	50	CW	>25.5	>80	CA-226-11
BLF184XR	88 - 108	500	<3.0	39.5 - 41.5	CW	>20.4	>83.7	CA-281-13
BLF574	88 - 108	>600	1	50	CW	>25	>70	AN10714
BLF174XR	88 - 108	>670	-	50	CW	>23	>82	SA
BLF178XR	88 - 108	700	<5.3	41 - 43	CW	>21.5	>85	CA-065-12
BLF184XR	88 - 108	>728	3	50	CW	>21.0	>82.3	CA-281-13
BLF184XR	88 - 108	>740	2,5	50	CW	>20	>80	CD-104-14
BLF188XR	88 - 108	850	<3.5	42.5 - 44	CW	>24	>86	CA-288-12
BLF188XR	88 - 108	1000	<3.2	46 - 48	CW	>24.5	>86.5	CA-288-12
BLF188XR	88 - 108	1000	<2.9	45.5 - 47.5	CW	>23.0	>83.0	CA-311-13
BLF188XR	88 - 108	>1107	3	50	CW	>22.8	>82.2	CA-311-13
BLF178P	108	>1200	1	50	100 µs, 20%	>29	>75	Datasheet
BLF178XR	88 - 108	1200	<5.3	50	CW	>22	>79	CA-074-12
BLF188XR	88 - 108	>1250	3	50	CW	>24.5	>83.5	CA-271-12
BLF188XR	88 - 108	>1320	5	50	CW	>22.5	>85	CA-271-12

VHF-TV: 174 - 230 MHz

Type	Frequency (MHz)	DVB-T P_{out} (W)	Modulation	VDS (V)	ACPR ± 4.3 MHz (dBc)	Gain (dB)	Drain efficiency (%)	Report
BLP10H610	174 - 230	4	DVB-T	50	<-35	>25	>30	CA-448-13
BLF571	174 - 230	25	CW	50	-	>26	>60	NA-2051
BLP05H6120XR	174 - 230	25	DVB-T	50	<-36	>23	>29	CA-236-14
BLF881	174 - 230	40	DVB-T	50	<-30	>28	>28	CA-182-10
BLF183XR	174 - 230	50	DVB-T	50	<-33	>27	>32	CA-231-14
BLF573	174 - 230	100	DVB-T	50	<-31	>24.5	>31	CA-183-10
BLF184XR	170 - 250	100	DVB-T	50	<-45 [1]	>24.9	>30	CA-062-14
BLF574	174 - 230	125	DVB-T	50	<-30	>26	>35	AN10738_1 and CA-307-10
BLF578	174 - 230	200	DVB-T	50	<-30	>24.5	>30	AN10858
BLF188XR	174 - 230	225	DVB-T	50	<-36 [1]	>23.8	>29	CA-170-13

Test signal: DVB-T (8 k OFDM) with PAR = 9.5 dB @ 0.01% probability on the CCDF

[1] Corrected performance with DVB-T exciter

UHF-TV: 470 - 860 MHz

Type	Frequency (MHz)	DVB-T P_{out} (W)	CCDF @ 0.01% probability (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	ACPR ± 4.3 MHz (dBc)	VSWR @ rated P_{out}	Report
BLP25M710	470 - 860	1	>9.3	28	DVB-T	>20.4	>16	<-37.5	-	NA-1790
BLP10H610	860	1	-	50	DVB-T	>21	-	-	-	-
BLP10H610	470 - 810	2	-	50	DVB-T	>19	>42	<-37		CA-252-14
BLP10H610	470 - 860	2	-	50	DVB-T	>20	-	<-39	-	CD-103-14
BLF642	470 - 860	5		28	DVB-T	>21.5	>22	<38	-	CD-103-13
BLF571	470 - 860	7	>8	50	DVB-T	>13.5	>27	<-32	10:1	NA-1473
BLF871	470 - 860	24	>7.9	42	DVB-T	>19.5	>28	<-32	10:1	NA-1329, DS
BLF881	470 - 860	33	>8.2	50	DVB-T	>19.5	>27	<-34	10:1	NA-1502, DS
BLF882	470 - 705	33	>8.0	50	DVB-T	>20.6	>27.7	-	10:1	CA-234-14
BLF888A	470 - 802	40	Quadrature driver	50	DVB-T	>17.8	>13.6	<-52	-	CA-049-14
BLF884P	470 - 860	70	>7.9	50	DVB-T	>20	>28	<-32	40:1	NA-1382, DS

UHF-TV: 470 - 860 MHz (continued)

Type	Frequency (MHz)	DVB-T P_{out} (W)	CCDF @ 0.01% probability (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	ACPR ± 4.3 MHz (dBc)	VSWR @ rated P_{out}	Report
BLF878	470 - 860	77	>7.8	42	DVB-T	>18	>29	<-30	10:1	Datasheet
BLF879P	470-860	95	>7.7	42	DVB-T	>19	>30	<-30	40:1	Datasheet
BLF888	470-860	110	>8.0	50	DVB-T	>18.5	>28	<-32	10:1	AN10869, DS
BLF10H6600P	470-860	110	>8.0	50	DVB-T	>18.5	>28	<-32	10:1	NA-2020
BLF888A	470-860	110	>8.0	50	DVB-T	>19.5	>28	<-32	40:1	AN11062, DS
BLF888B	470-860	120	>8.0	50	DVB-T	>19.5	>30	<-33	20:1	Datasheet

Test signal: DVB-T (8 k OFDM) with PAR = 9.5 dB @ 0.01% probability on the CCDF

ISM: 1 - 2500 MHz

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
Broadband								
BLP10H610	1.8 - 13	10	-	50	CW, 2T	>26	>40	CA-185-14
BLP10H610	1.8 - 42	>10	1	50	CW, 2T	>25	>42	CA-190-14
BLP10H610	20 - 520	10	-	50	CW, 2T	>21.8	36-57	CA-005-14
BLP10H610	225 - 460	10	-	50	CW, 2T	>19	39-44	CA-461-13
BLF571	1.8 - 520	20	-	50	CW	>14.5	>37	-
BLF571	200 - 800	25	3	50	2T	>14	>40	CA-008-14
BLF644P	10 - 600	30	-	14	2T	>18	>29	CA-326-12
BLF642	30 - 512	30	-	24 - 28	2T, CW	>21	>70	CA-180-12
BLF647P	10 - 600	100	-	32	2T, CW	>22.4	>51.5	CA-356-12
BLF647P	30 - 512	120	-	27	2T	>22	>44	SA-095-12
BLF645	10 - 600	120	-	32	CW	>22.5	>50	AN10953
BLF881	30 - 512	>106	3	50	CW, 2T	>17.5	>59	CA-001-14
BLF881	30 - 174	>125	3	50	CW, 2T	>22	>66	CA-433-13
BLF881	225 - 512	>117	3	50	CW, 2T	>18	>57	CA-432-13
BLF183XR	30 - 512	>400	3	50	50% pulsed	>15	>48	CA-201-14
BLF574	10 - 550	400	-	50	CW	>16	>46	CA-212-10
2 - 30 MHz								
BLP10H610	27	10	0	50	CW	26.7	46	CA-420-13
BLP05H6120XR	2 - 30	>117	3	50	CW	26	65	CA-208-14
BLF178XR	2 - 30	>1000	-	50	CW	-	-	SA
BLF184XR	27	730	3	50	CW	21.6	70	CA-419-13
BLF188XR	2 - 30	>1127	3	50	CW	>25	>70	CA-292-14
BLF188XR	27	1400	3	50	CW	23.7	73	CA-296-12
41 MHz								
BLP10H610	40	20	1	50	CW	25	65	CA-250-13
BLF188XR	41	1200	4	50	CW	22	82	NA-1686
60 MHz								
BLP10H610	60	19	1	50	CW	24	65	CA-251-13
BLF574	60	800	1.3	50	CW	24	78.5	CA-266-09
BLF178XR	60	1125	3	48	CW	26.4	81.3	CA-080-12
BLF188XR	60	1240	3	48	CW	22	77	CA-277-12
70 - 100 MHz								
BLP10H610	80	19	1	50	CW	25	67	CA-252-13
BLF881	81	150	2	50	CW	28	75	NA-1688
BLF182XR	81	>220	3	50	CW	27.5	82.4	CA-001-15
BLF174XR	76 - 90	>625	-	41.5	CW	>21	>85	SA
BLF178XR	100	1109	1	50	CW	24.8	73	NA-1487
BLF178XR	80	1137	1	50	CW	27	76	NA-1527
BLF188XR	81.4	1200	1.5	50	50 µs / 25%	25.8	85	CA-246-12

ISM: 1 - 2500 MHz (continued)

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
BLF188XR	81.4	1200	0.8	50	CW	27.1	77.8	CA-022-13
BLF188XR	81.4	1200	1	50	CW	26.5	75.4	CA-081-13
BLF188XR	72.5	1350	3	50	CW	23.1	83	CD-102-13
BLF188XR	81.4	1400	2.6	50	400 µs, 60%	25.4	81	CA-022-13
BLF188XR	81.4	1400	2.8	50	400 µs, 60%	24.7	80.4	CA-081-13
88 - 108 MHz								
BLP10H610	88 - 108	16	1	50	CW	25	62	CA-253-13
BLF571	88 - 108	>22	1	50	CW	>29	>65	NA-1037
BLF881	88 - 108	>110	1	50	CW	>22	>57	CD-101-14
BLF183XR	88 - 108	300	3	50	CW	>25.5	>82.5	CA-283-14
BLF573	108	>325	3	50	CW	>25.5	>80	CA-226-11
BLF184XR	88 - 108	500	<3.0	39.5 - 41.5	CW	>20.4	>83.7	CA-281-13
BLF574	88 - 108	>600	1	50	CW	>25	>70	AN10714
BLF174XR	88 - 108	>670	-	50	CW	>23	>82	SA
BLF178XR	88 - 108	700	<5.3	41 - 43	CW	>21.5	>85	CA-065-12
BLF184XR	88 - 108	>728	3	50	CW	>21.0	>82.3	CA-281-13
BLF184XR	88 - 108	>740	2.5	50	CW	>20	>80	CD-104-14
BLF188XR	88 - 108	850	<3.5	42.5 - 44	CW	>24	>86	CA-288-12
BLF188XR	88 - 108	1000	<3.2	46 - 48	CW	>24.5	>86.5	CA-288-12
BLF188XR	88 - 108	1000	<2.9	45.5 - 47.5	CW	>23.0	>83.0	CA-311-13
BLF188XR	88 - 108	>1107	3	50	CW	>22.8	>82.2	CA-311-13
BLF178P	108	>1200	1	50	100 µs, 20%	>29	>75	Datasheet
BLF178XR	88 - 108	1200	<5.3	50	CW	>22	>79	CA-074-12
BLF188XR	88 - 108	>1250	3	50	CW	>24.5	>83.5	CA-271-12
BLF188XR	88 - 108	>1320	5	50	CW	>22.5	>85	CA-271-12
108 - 118 MHz (VOR)								
BLF184XR	108 - 118	500	3	40.5	CW	>23.2	>82.3	CA-188-13
BLF184XR	108 - 118	750	3	50	CW	>23.5	>81.9	CA-188-13
BLF188XR	108 - 118	850	3.5	46.5	CW	>26.2	>78.6	CA-201-13
BLF188XR	108 - 118	1000	<4.0	50	CW	>24.1	>78.3	CA-201-13
BLF178XR	108 - 118	1200	3	50	CW	>24.5	>80	CA-111-12
118 - 152 MHz								
BLP05H6120XR	118 - 152	120		50	CW	>26	>66	CA-242-14
BLF183XR	118 - 137	400	3	50	CW	20	40 (at 90 W)	Powerpoint
128 MHz								
BLF188XR	128	1474	1	50	500 µs, 25%	24.8	66	CA-183-14
160 - 298 MHz								
BLF573	225	250	3	50	CW	25	80	NA-512
BLF184XR	160 - 175	600	3.5	50	CW	>23.5	>74	CA-125-14
BLF184XR	230 - 240	>830	3	50	3 µs, 25%	>23	>74	CA-299-14
BLF578XR	175	1000	3.3	50	CW	22.5	80.5	CA-118-12
BLF578	230 - 280	1100	-	50	Pulsed	>20.8	>56	SA-033-12
BLF578	298	1100	2.8	50	CW	20	74	NA-1898
BLF188XR	174 - 230	225	-36	50	DVB-T	>23.8	>29	CA-170-13
300 - 352 MHz								
BLP25M710	330	12.7	1	28	CW	>21.5	>50.6	NA-1812
BLF571	325	25	1	50	CW	23.8	69	NA-1275
BLF188XR	325	1150	3	50	CW	20	73	CD-102-14
BLF578	352	1150	2.7	50	CW	19	73	NA-1739
BLF188XR	352	1000	3	50	CW	>18	>67	NA-2270
434 MHz								
BLF573	434	240	3	50	CW	19	74	NA-512

ISM: 1 - 2500 MHz (continued)

Type	Frequency (MHz)	P_{out} (W)	Compression (dB)	VDS (V)	Modulation	Gain (dB)	Drain efficiency (%)	Report
BLF574	434	655	2.5	48	CW, pulsed	16.2	71.2	CA-136-13
BLF574XR	434	680	4	50	CW	15	68	CA-422-13
400 - 465 MHz								
BLP25M710	420 - 470	>10	1	28	CW	>24	>53	CA-249-13
BLP10H610	400 - 450	>14	1	50	CW	>25.5	>62	CA-329-13
BLF184XR	440 - 460	>500	3	50	CW	>21	>57	CA-327-12
BLF184XR	400 - 450	>820	3	50	100 µs, 10%	>21	>53	CA-322-12
BLF574	420 - 450	>640	2	50	16 µs, 28%	>17	>58	CA-038-13
BLF574XR	434	650	3	50	CW	16	77	CA-422-13
BLF578	500	>800	1	50	CW	17.4	70	NA-1649
BLF578XR	400 - 450	>1100	3	50	100 µs, 10%	>16.5	>56	CA-332-11
BLF578	405 - 465	>1126	3	50	100 µs, 10%	>19.5	>64	NA-1119
650 - 950 MHz								
BLF888B	650	600	2	50	CW	>18.8	>66	NA-1399
BLF888A	738 - 758	>400	<2	50	CW	>20.4	>58	NA-1930
BLF988	850 - 950	500	3	50	CW	>16	>45	CA-273-11
1200 - 2500 MHz								
BLF642	1300	35	1	32	CW	>18	>65	NA-1479
BLF6G13L-250P	1280 - 1320	250	1	50	CW	>17	>52	NA-1188
BLF6G13L-250P	1280 - 1320	270	1	50	CW	>17	>56	NA-1237
BLF25M612	2400 - 2480	>12.5	1	28	CW	>19	>67	NA-1257
BLF2425M6L180P	2400 - 2500	>13.5	<1	28	CW	>13.5	>54	NA-1969
BLM7G22S-60PBG	2400 - 2500	>105	3	32	100 µs, 10%	>25	>43.5	CA-051-14
BLF2425M7L200	2400 - 2500	>215	1	28	CW	>15	>50	NA-1563
BLF2425M7L250P	2400 - 2500	>240	<1.4	28	CW	>14.3	>49	NA-1765
BLF2425M7L250P	2400 - 2500	>340	3	32	CW	>14.7	>44	CA-134-12

4.9 Simulation models

4.9.1 Simulation models for RF power devices

Updates of this overview are available in PDF format at:
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	ADS 2012	Library manual	Simulation example		
BLA0912-250						36 V, 150 mA	
BLA6G1011-200R	Available			Available			
BLA6H0912-500	Available			Available			
BLA6H0912L-1000	Available	Available		Available			
BLA6H1011-600	Available			Available			
BLC8G24LS-240AV	Available						
BLC8G27LS-160AV	Available						
BLC8G27LS-240AV	Available						
BLD6G22L-50	Available			Available			
BLD6G22LS-50	Available			Available			
BLF1043						28 V, 50 mA	
BLF1046						28 V, 300 mA	
BLF145						14 V, 250 mA	28 V, 250 mA
BLF147						14 V, 1000 mA	28 V, 1000 mA
BLF174XR	Available			Available			
BLF174XRS	Available			Available			
BLF175						25 V, 150 mA	50 V, 150 mA
BLF177						25 V, 100 mA	50 V, 100 mA
BLF178XR	Available			Available			
BLF178XRS	Available			Available			
BLF184XR	Available			Available			
BLF184XRS	Available			Available			
BLF188XR	Available	Available		Available			
BLF188XRS	Available	Available		Available			
BLF202						6.25 V, 20 mA	12.5 V, 20 mA
BLF242						14 V, 10 mA	28 V, 10 mA
BLF2425M7L140	Available						
BLF2425M7L250P	Available	Available		Available			
BLF2425M7LS140	Available						
BLF2425M7LS250P	Available	Available		Available			
BLF2425M8L140	Available						
BLF2425M8LS140	Available						
BLF244						12.5 V, 25 mA	14 V, 25 mA
BLF245						12.5 V, 50 mA	14 V, 50 mA
BLF246						14 V, 50 mA	14 V, 100 mA
BLF248						14 V, 250 mA	28 V, 250 mA
BLF278						25 V, 500 mA	50 V, 500 mA
BLF346						14 V, 3000 mA	28 V, 3000 mA
BLF368						14 V, 250 mA	16 V, 250 mA
BLF369	Available						

Overview of RF power models (continued)

Type	ADS model			Microwave Office model		S-parameter data	
	ADS 2009	ADS 2011	ADS 2012	Library manual	Simulation example		
BLF3G21-30						26 V, 450 mA	
BLF368						14 V, 250 mA	16 V, 250 mA
BLF369	Available						
BLF3G21-30						26 V, 450 mA	
BLF3G21-6	Available						
BLF404						6.25 V, 50 mA	12.5 V, 50 mA
BLF521						6.25 V, 10 mA	12.5 V, 10 mA
BLF542						14 V, 10 mA	14 V, 50 mA
BLF544						14 V, 40 mA	28 V, 40 mA
BLF548						14 V, 160 mA	28 V, 160 mA
BLF571	Available	Available		Available			
BLF573	Available			Available			
BLF573S	Available			Available			
BLF574	Available			Available			
BLF574XR	Available			Available			
BLF574XRS	Available			Available			
BLF578	Available	Available		Available			
BLF578XR	Available			Available			
BLF578XRS	Available			Available			
BLF642	Available			Available			
BLF644P	Available			Available			
BLF645	Available			Available			
BLF647P	Available	Available					
BLF647PS	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			
BLF6G13L-250P	Available			Available			
BLF6G13LS-250P	Available			Available			
BLF6G15L-250PBRN	Available						
BLF6G15L-40BRN	Available						
BLF6G15L-500H	Available						
BLF6G15LS-500H	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			Available			
BLF6G22LS-180RN	Available						

Overview of RF power models (continued)

Type	ADS model			Microwave Office model		S-parameter data	
	ADS 2009	ADS 2011	ADS 2012	Library manual	Simulation example		
BLF6G22LS-40P	Available			Available			
BLF6G22S-45	Available			Available			
BLF6G27-10	Available						
BLF6G27-10G	Available			Available			
BLF6G27-45	Available			Available			
BLF6G27-75	Available						
BLF6G27L-40P	Available			Available			
BLF6G27LS-135	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			Available			
BLF6H10LS-160	Available			Available			
BLF7G10L-250	Available	Available					
BLF7G10LS-250	Available	Available					
BLF7G15LS-200	Available						
BLF7G15LS-300P	Available						
BLF7G20L-200	Available			Available			
BLF7G20L-250P	Available			Available			
BLF7G20L-90P	Available			Available			
BLF7G20LS-140P	Available						
BLF7G20LS-200	Available			Available			
BLF7G20LS-250P	Available			Available			
BLF7G20LS-90P	Available			Available			
BLF7G21L-160P	Available						
BLF7G21LS-160P	Available						
BLF7G22L-100P	Available						
BLF7G22L-130	Available			Available			
BLF7G22L-160	Available						
BLF7G22L-200	Available			Available			
BLF7G22L-250P	Available						
BLF7G22LS-100P	Available						
BLF7G22LS-130	Available			Available			
BLF7G22LS-160	Available						
BLF7G22LS-200	Available			Available			
BLF7G22LS-250P	Available						
BLF7G24L-100	Available						
BLF7G24L-140	Available						

Overview of RF power models (continued)

Type	ADS model			Microwave Office model		S-parameter data	
	ADS 2009	ADS 2011	ADS 2012	Library manual	Simulation example		
BLF7G24L-160P	Available						
BLF7G24LS-100	Available						
BLF7G24LS-140	Available						
BLF7G24LS-160P	Available						
BLF7G27L-100	Available			Available			
BLF7G27L-140	Available	Available		Available			
BLF7G27L-150P	Available						
BLF7G27L-200PB	Available						
BLF7G27L-75P	Available						
BLF7G27L-90P	Available			Available			
BLF7G27LS-100	Available			Available			
BLF7G27LS-140	Available	Available		Available			
BLF7G27LS-150P	Available						
BLF7G27LS-75P	Available						
BLF7G27LS-90P	Available			Available			
BLF871	Available			Available			
BLF871S	Available			Available			
BLF878	Available			Available			
BLF879P	Available			Available			
BLF879PS	Available			Available			
BLF881	Available			Available			
BLF881S	Available			Available			
BLF884P	Available			Available (separate from library)			
BLF884PS	Available			Available (separate from library)			
BLF888	Available						
BLF888A	Available			Available			
BLF888AS	Available			Available			
BLF8G09LS-270GW	Available						
BLF8G09LS-270W	Available						
BLF8G10L-160		Available					
BLF8G10LS-160		Available					
BLF8G10LS-160V	Available						
BLF8G10LS-270	Available	Available					
BLF8G10LS-270GV	Available						
BLF8G19LS-170BV	Available						
BLF8G20LS-200V				Available			
BLF8G20LS-220	Available						
BLF8G20LS-230V	Available						
BLF8G20LS-260A	Available						
BLF8G20LS-400PGV	Available						
BLF8G22LS-140	Available						
BLF8G22LS-200GV	Available						
BLF8G22LS-220	Available						
BLF8G22LS-240	Available			Available			
BLF8G22LS-270GV	Available						
BLF8G24L-200P		Available					

Overview of RF power models (continued)

Type	ADS model			Microwave Office model		S-parameter data	
	ADS 2009	ADS 2011	ADS 2012	Library manual	Simulation example		
BLF8G24LS-200P		Available					
BLF8G27LS-100	Available						
BLF8G27LS-100GV	Available	Available					
BLF8G27LS-100V	Available						
BLF8G27LS-140	Available						
BLF8G27LS-140V	Available	Available					
BLF8G27LS-150GV	Available	Available					
BLF8G38LS-75V	Available						
BLF988				Available (separate from library)			
BLF988S				Available (separate from library)			
BLL6H0514-25	Available			Available			
BLL6H0514L-130	Available			Available			
BLL6H0514LS-130	Available			Available			
BLL6H1214-500	Available						
BLF8G10LS-300P	Available						
BLL6H1214L-250	Available			Available			
BLL6H1214LS-250	Available			Available			
BLL6H1214LS-500	Available						
BLM6G10-30	Available						
BLM6G22-30	Available						
BLM7G1822S-20PBG		Available	Available				
BLM7G1822S-20PBG		Available	Available				
BLM7G1822S-40PBG	Available	Available	Available				
BLM7G22S-60PBG	Available						
BLM8G0710S-30PB		Available	Available				
BLM8G0710S-30PBG		Available	Available				
BLP15M7160P	Available			Available			
BLP25M705	Available						
BLP25M710	Available						
BLP7G07S-140P	Available			Available			
BLP7G22-05	Available						
BLP7G22-10	Available	Available					
BLP8G10S-45PG	Available						
BLP8G21S-160PV	Available						
BLS6G2731-6G	Available						
BLS6G2731S-130	Available			Available			
BLS6G2735L-30	Available						
BLS6G2735LS-30	Available						
BLS6G3135-20	Available						
BLS6G3135S-120	Available			Available			
BLS6G3135S-20	Available						
BLS7G2729L-350P	Available						
BLS7G2729LS-350P	Available						
BLS7G2730L-200P	Available						
BLS7G2730LS-200P	Available						
BLS7G2933S-150	Available						

Overview of RF power models (continued)

Type	ADS model			Microwave Office model		S-parameter data	
	ADS 2009	ADS 2011	ADS 2012	Library manual	Simulation example		
BLS7G3135L-350P	Available						
BLS7G3135LS-200	Available						
BLS7G3135LS-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

4.9.2 Simulation models for RF bipolar wideband transistors

		Attached to PIP / model page				Supported simulators			
Wideband transistors	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
BFG18A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG21W	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG31		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG35		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG403W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG410W	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG425W	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG480W	√	√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG505		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG505/X			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG505W/X			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG520		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG520/XR			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG520W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG520X			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG540		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG540/X			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG540/XR			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG540W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG541		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG67		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG67/X			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFG93A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFM520		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFQ149		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFQ540			√			-	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFQ67		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFQ67W		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BFR520		√	√		Microwave				
BFR540		√	√			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	-	-
BFS17A		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-

Simulation models for RF bipolar wideband transistors (continued)

		Attached to PIP / model page				Supported simulators			
Wideband transistors	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
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	-	-
BFU520	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU520A	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU520W	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU520X	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU520XR	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU520Y	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU530	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU530A	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU530W	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU530X	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU530XR	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU550	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU550A	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU550W	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU550X	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU550XR	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU580G	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU580Q	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU590G	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
BFU590Q	√	√	√	√		ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012, Microwave office	ADS 2011, ADS 2012	-
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	-
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	-	-

4.9.3 Simulation models for RF MOSFET transistors

		Attached to PIP / model page				Supported simulators			
Wideband transistors	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
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	-
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	-	-

4.9.4 Simulation models for RF MMIC amplifiers

		Attached to PIP / model page				Supported simulators			
Wideband transistors	Demo board	S-parameters	Spice model	Mextram model	Device model	S-parameters	Spice model	Mextram model	Device model
PBR941		√	√			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	-	-
PRF957		√	√			ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-
BGA2001	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2002	√					-	-	-	-
BGA2012	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2031	√					-	-	-	-
BGA2711	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA2714	√					-	-	-	-
BGA2716	√	√				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	-	-	-
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	-	-	-
BGA2866	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA3012	√	√			√	ADS 2011			ADS 2011
BGA3015	√	√			√	ADS 2011			ADS 2011
BGA3018	√	√			√	ADS 2011			ADS 2011
BGA6130	√				√	-	-	-	ADS 2011
BGA6489	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA6589	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-
BGA7027	√	√				-	-	-	-
BGA7124	√	√				-	-	-	-
BGA7127	√	√				-	-	-	-
BGA7130	√				√	-	-	-	ADS 2011
BGM1013	√	√				ADS 2009, ADS 2011, Microwave Office, Ansoft Designer	-	-	-

Simulation models for RF MMIC amplifiers (continued)

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

4.9.5 Simulation models for RF varicap diodes

		Attached to PIP / model page				Supported simulators			
Wideband transistors	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
www.nxp.com/xref/nxp?typenumber

NXP end-of-life listings
www.nxp.com/products/eol/

5.1 Cross-references: manufacturer types versus NXP types

In alphabetical order by manufacturer type

Abbreviations

A&D	Aerospace and Defense
Bcst/ISM	Broadcast/Industrial, Scientific, Medical
Broadband	Broadband RF Power GaN HEMT
FET	Field-Effect Transistor
LNA	Low-Noise Amplifier
MMIC	Monolithic Microwave Integrated Circuit
PIN diode	P-type, Intrinsic, N-type diode
Varicap	Variable capacitance diode
WB trs	WideBand transistor
WRIF	WiReless InFrastructure (base stations)

Manufacturer type	Manufacturer	NXP type	Product family
1SV172	Toshiba	BAP50-04	PIN diode
1SV215	Toshiba	BB172	Varicap
1SV228	Toshiba	BB201	Varicap
1SV231	Toshiba	BB171	Varicap
1SV232	Toshiba	BB170	Varicap
1SV233	Sanyo	BAP70-03	PIN diode
1SV234	Sanyo	BAP64-04	PIN diode
1SV239	Toshiba	BB145B	Varicap
1SV241	Sanyo	BAP64-02	PIN diode
1SV246	Sanyo	BAP64-04W	PIN diode
1SV247	Sanyo	BAP70-02	PIN diode
1SV248	Sanyo	BAP50-02	PIN diode
1SV249	Sanyo	BAP50-04W	PIN diode
1SV250	Sanyo	BAP50-03	PIN diode
1SV251	Sanyo	BAP50-04	PIN diode
1SV252	Toshiba	BAP50-04W	PIN diode
1SV263	Sanyo	BAP50-02	PIN diode
1SV264	Sanyo	BAP50-04W	PIN diode
1SV266	Sanyo	BAP50-03	PIN diode
1SV267	Sanyo	BAP50-04	PIN diode
1SV269	Toshiba	BB170	Varicap
1SV270	Toshiba	BB156	Varicap
1SV271	Toshiba	BAP50-03	PIN diode
1SV284	Toshiba	BB156	Varicap
1SV288	Toshiba	BB171	Varicap
1SV294	Sanyo	BAP70-03	PIN diode
1SV305	Toshiba	BB202	Varicap
1SV307	Toshiba	BAP51-03	PIN diode
1SV308	Toshiba	BAP51-02	PIN diode
1T363A	Sony	BB172	Varicap
1T368A	Sony	BB170	Varicap
1T369	Sony	BB171	Varicap
1T379	Sony	BB131	Varicap
1T397	Sony	BB171	Varicap
1T399	Sony	BB170	Varicap
2N4856	Standard	BSR56	FET
2N4857	Standard	BSR57	FET
2N4858	Standard	BSR58	FET

Manufacturer type	Manufacturer	NXP type	Product family
2SA1977(NE97733)	Renesas	BFT93	WB trs
2SA1978(NE97833)	Renesas	BFT93	WB trs
2SC2735	Renesas	BFU530W	WB trs
2SC3356	Renesas	BFR540 / BFU550A	WB trs
2SC3356	Renesas	BFU590Q	WB trs
2SC3357	Renesas	BFU580Q	WB trs
2SC3357	Renesas	BFU590Q	WB trs
2SC3583(NE68133)	Renesas	BFU520A	WB trs
2SC3585(NE68033)	Renesas	BFU520A	WB trs
2SC4093(NE85639E)	Renesas	BFU550A	WB trs
2SC4094	NEC	BFU520XR	WB trs
2SC4094	Renesas	BFU520XR	WB trs
2SC4095	NEC	BFU520XR	WB trs
2SC4095	Renesas	BFU520XR	WB trs
2SC4182	NEC	BFU530W	WB trs
2SC4182	Renesas	BFU530W	WB trs
2SC4184	NEC	BFU530W	WB trs
2SC4184	Renesas	BFU530W	WB trs
2SC4185	NEC	BFU530W	WB trs
2SC4185	Renesas	BFU530W	WB trs
2SC4186	NEC	BFU520W	WB trs
2SC4186	Renesas	BFU520W	WB trs
2SC4226	NEC	BFU550W	WB trs
2SC4226	Renesas	BFU550W	WB trs
2SC4227	NEC	BFU530W	WB trs
2SC4227	Renesas	BFU530W	WB trs
2SC4228	NEC	BFU520W	WB trs
2SC4228	Renesas	BFU520W	WB trs
2SC4315	Toshiba	BFG520/XR	WB trs
2SC4320	Toshiba	BFG520/XR	WB trs
2SC4321	Toshiba	BFQ67W	WB trs
2SC4325	Toshiba	BFS505	WB trs
2SC4394	Toshiba	PRF957	WB trs
2SC4536	NEC	BFU580Q	WB trs
2SC4536	Renesas	BFU580Q	WB trs
2SC4537	Renesas	BFU530W	WB trs
2SC4537	Renesas	BFU530W	WB trs
2SC4570(NE58130)	Renesas	BFU520W	WB trs

Manufacturer type	Manufacturer	NXP type	Product family
2SC4571(NE58230)	Renesas	BFU530W	WB trs
2SC4592	Renesas	BFU520XR	WB trs
2SC4592	Renesas	BFU520XR	WB trs
2SC4593	Renesas	BFU520W	WB trs
2SC4593	Renesas	BFU520W	WB trs
2SC4703	NEC	BFU580Q	WB trs
2SC4703	Renesas	BFU580Q	WB trs
2SC4784	Renesas	BFU520W	WB trs
2SC4784	Renesas	BFU520W	WB trs
2SC4807	Renesas	BFU590Q	WB trs
2SC4807	Renesas	BFU590Q	WB trs
2SC4842	Toshiba	BFG540W/XR	WB trs
2SC4899	Renesas	BFU520W	WB trs
2SC4899	Renesas	BFU520W	WB trs
2SC4900	Renesas	BFU520XR	WB trs
2SC4900	Renesas	BFU520XR	WB trs
2SC4901	Renesas	BFU520W	WB trs
2SC4901	Renesas	BFU520W	WB trs
2SC4926	Renesas	BFG520/XR	WB trs
2SC4957(NE68539E)	Renesas	BFU520/X	WB trs
2SC4988	Renesas	BFU580Q	WB trs
2SC4988	Renesas	BFU580Q	WB trs
2SC5011	NEC	BFU550W	WB trs
2SC5011	Renesas	BFU550W	WB trs
2SC5012	NEC	BFU550W	WB trs
2SC5012	Renesas	BFU550W	WB trs
2SC5013(NE68018)	Renesas	BFG425W	WB trs
2SC5015(NE68518)	Renesas	BFG425W	WB trs
2SC5065	Toshiba	PRF957	WB trs
2SC5085	Toshiba	PRF957	WB trs
2SC5087	Toshiba	BFG520/XR	WB trs
2SC5088	Toshiba	BFG540W/XR	WB trs
2SC5090	Toshiba	BFS520	WB trs
2SC5092	Toshiba	BFG520/XR	WB trs
2SC5095	Toshiba	BFS505	WB trs
2SC5107	Toshiba	BFS505	WB trs
2SC5180(NE68618)	Renesas	BFG410W	WB trs
2SC5181(NE68619)	Renesas	BFG410W	WB trs
2SC5185(NE68718)	Renesas	BFG425W	WB trs
2SC5186(NE68719)	Renesas	BFG425W	WB trs
2SC5288(NE68939)	Renesas	BGA7024	WB trs
2SC5289(NE69039)	Renesas	BGA7027	WB trs
2SC5336	Renesas	BFU590Q	WB trs
2SC5337(NE461M02)	Renesas	BFU550A	WB trs
2SC5338(NE462M02)	Renesas	BFU550A	WB trs
2SC5369(NE696M01)	Renesas	BFU520W	WB trs
2SC5454(NE67739)	Renesas	BFU520	WB trs
2SC5455(NE67839)	Renesas	BFU520	WB trs
2SC5463	Toshiba	BFQ67W	WB trs
2SC5507(NE661M04)	Renesas	BFU610F	WB trs
2SC5508	Renesas	BFU668F	WB trs
2SC5508	Renesas	BFU668F	WB trs
2SC5509(NE663M04)	Renesas	BFU690F	WB trs
2SC5593	Renesas	BFG410W	WB trs
2SC5593	Renesas	BFG410W	WB trs
2SC5594	Renesas	BFG425W	WB trs
2SC5594	Renesas	BFG425W	WB trs
2SC5623	Renesas	BFG410W	WB trs
2SC5623	Renesas	BFG410W	WB trs
2SC5624	Renesas	BFG425W	WB trs
2SC5624	Renesas	BFG425W	WB trs
2SC5631	Renesas	BFU580Q	WB trs
2SC5631	Renesas	BFU580Q	WB trs
2SC5704(NE662M16)	Renesas	BFU630F	WB trs
2SC5750(NE67718)	Renesas	BFU660F	WB trs
2SC5751(NE677M04)	Renesas	BFU660F	WB trs
2SC5752(NE67818)	Renesas	BFU660F	WB trs
2SC5753(NE678M04)	Renesas	BFU660F	WB trs
2SC5754(NE664M04)	Renesas	BGA7027	WB trs
2SC5772	Renesas	BFG520XR	WB trs
2SC5787(NE894M13)	Renesas	BFU630F	WB trs
2SC5800-T1-A	NEC	BFU530W	WB trs
2SC5801(NE851M13)	Renesas	BFU530A	WB trs
2SC5820	Renesas	BFU630F	WB trs
2SK210BL	Renesas	PMBFJ309	FET
2SK210BL	Renesas	PMBFJ309	FET
2SK508	Renesas	PMBFJ308	FET
2SK508	Renesas	PMBFJ308	FET
ADL5354	Analog Devices	BGX7221	MMIC
ADL5356	Analog Devices	BGX7221	MMIC
ADL5358	Analog Devices	BGX7220	MMIC
ADL5372	Analog Devices	BGX7101	MMIC
ADL5375	Analog Devices	BGX7101	MMIC

Manufacturer type	Manufacturer	NXP type	Product family
ADL5812	Analog Devices	BGX7221	MMIC
ADRF660x	Analog Devices	BGX7211	MMIC
AFT09S282NR3	Freescale	BLF8G09LS-270GW	WRIF
AFT18S230SR3	Freescale	BLF8G20LS-200V	WRIF
AFT18S230SR3	Freescale	BLF8G20LS-210GV	WRIF
AFT20P060-4NR3	Freescale	BLP8G20S-80P	WRIF
AFT20P140-4WGNR3	Freescale	BLF6G20LS-110	WRIF
AFT20P140-4WNR3	Freescale	BLP8G21S-160PV	WRIF
AFT21S230SR3	Freescale	BLF8G22LS-200GV	WRIF
AFT23H200-4S2LR6	Freescale	BLC8G24LS-240AV	WRIF
AFT26H160-4S4R3	Freescale	BLC8G27LS-160AV	WRIF
AFT26H200W03SR6	Freescale	BLF7G27LS-150P	WRIF
AFT26H250-24SR6	Freescale	BLC8G27LS-240AV	WRIF
AFT26P100–4WSR3	Freescale	BLF7G27LS-90P	WRIF
AFT26P100–4WSR3	Freescale	BLF8G27LS-100	WRIF
AH118	Qorvo	BGA7024	MMIC
AH118	Qorvo	BGA7124	MMIC
AH125	Qorvo	BGA7027	MMIC
AH125	Qorvo	BGA7127	MMIC
AH125	Qorvo	BGA7127	MMIC
AH215	Qorvo	BGA7130	MMIC
AN26112A	Panasonic	BGU7045	MMIC
AN26120A	Panasonic	BGU7042	MMIC
AN26122A	Panasonic	BGU7045	MMIC
BA595	Infineon	BAP51-03	PIN diode
BA595	Infineon	BAP70-03	PIN diode
BA597	Infineon	BAP70-03	PIN diode
BA885	Infineon	BAP70-03	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
BAR64-02LRH	Infineon	BAP64LX	PIN diode
BAR64-02V	Infineon	BAP64-02	PIN diode
BAR64-02W	Infineon	BAP64-02	PIN diode
BAR64-03W	Infineon	BAP64-03	PIN diode
BAR64-04	Infineon	BAP64-04	PIN diode
BAR64-04W	Infineon	BAP64-04W	PIN diode
BAR64-05	Infineon	BAP64-05	PIN diode
BAR64-05W	Infineon	BAP64-05W	PIN diode
BAR64-06	Infineon	BAP64-06	PIN diode
BAR64-06W	Infineon	BAP64-06W	PIN diode
BAR64V-02V-GS08	Vishay	BAP64-02	PIN diode
BAR64V-04-GS08	Vishay	BAP64-04	PIN diode
BAR64V-05-GS08	Vishay	BAP64-05	PIN diode
BAR64V-06-GS08	Vishay	BAP64-06	PIN diode
BAR64V-06W-GS08	Vishay	BAP64-06W	PIN diode
BAR65-02L	Infineon	BAP65LX	PIN diode
BAR65-02V	Infineon	BAP65-02	PIN diode
BAR65-02W	Infineon	BAP65-02	PIN diode
BAR65-03W	Infineon	BAP65-03	PIN diode
BAR65V-02V-GS08	Vishay	BAP65-02	PIN diode
BAR66	Infineon	BAP1321-04	PIN diode
BAR67-02W	Infineon	BAP1321-02	PIN diode
BAR67-03W	Infineon	BAP1321-03	PIN diode
BAT18-04	Infineon	BAT18	PIN diode
BB639	Infineon	BB170	Varicap
BB639	Infineon	BB172	Varicap
BB640	Infineon	BB171	Varicap
BB641	Infineon	BB171	Varicap
BB669	Infineon	BB171	Varicap
BB814	Infineon	BB201	Varicap
BB831	Infineon	BB131	Varicap
BB833	Infineon	BB131	Varicap
BB835	Infineon	BB131	Varicap
BBY58-02V	Infineon	BB202	Varicap
BBY65	Infineon	BB202	Varicap
BF1005R	Infineon	BF1105R	FET
BF1005SR	Infineon	BF1105R	FET
BF770A	Infineon	BFR93A	WB trs
BF771W	Infineon	BFS540	WB trs
BF772	Infineon	BFG540	WB trs
BF851A	Standard	BF861A	FET
BF851B	Standard	BF861B	FET
BF851C	Standard	BF861C	FET

Manufacturer type	Manufacturer	NXP type	Product family
BFG194	Infineon	BFG31	WB trs
BFG196	Infineon	BFG541	WB trs
BFP180	Infineon	BFG505/X	WB trs
BFP181	Infineon	BFG67/X	WB trs
BFP181T-GS08	Vishay	BFG67/X	WB trs
BFP182	Infineon	BFG67/X	WB trs
BFP183	Infineon	BFG520/X	WB trs
BFP183R	Infineon	BFG520/XR	WB trs
BFP183T-GS08	Vishay	BFG520/X	WB trs
BFP183TW-GS08	Vishay	BFG520W/X	WB trs
BFP193	Infineon	BFG540/X	WB trs
BFP193W	Infineon	BFG540W/XR	WB trs
BFP196T-GS08	Vishay	BFG540/X	WB trs
BFP196TR-GS08	Vishay	BFG540/XR	WB trs
BFP196TRW-GS08	Vishay	BFG540W/XR	WB trs
BFP196TW-GS08	Vishay	BFG540W/X	WB trs
BFP196W	Infineon	BFG540W/XR	WB trs
BFP280	Infineon	BFG505/X	WB trs
BFP405	Infineon	BFG410W	WB trs
BFP420	Infineon	BFG425W	WB trs
BFP450	Infineon	BFG480W	WB trs
BFP620	Infineon	BFU660F	WB trs
BFP640	Infineon	BFU630F	WB trs
BFP640	Infineon	BFU660F	WB trs
BFP650	Infineon	BFU690F	WB trs
BFP650	Infineon	BFU760F	WB trs
BFP650	Infineon	BFU790F	WB trs
BFP67-GS08	Vishay	BFG67/X	WB trs
BFP67R-GS08	Vishay	BFG67/X	WB trs
BFP720	Infineon	BFU710F	WB trs
BFP720	Infineon	BFU730F	WB trs
BFP740	Infineon	BFU710F	WB trs
BFP740	Infineon	BFU725F/N1	WB trs
BFP740	Infineon	BFU730F	WB trs
BFP740F	Infineon	BFU725F/N1	WB trs
BFP750	Infineon	BFU690F	WB trs
BFP750	Infineon	BFU760F	WB trs
BFP750	Infineon	BFU790F	WB trs
BFQ193	Infineon	BFQ540	WB trs
BFQ67-GS08	Vishay	BFQ67W	WB trs
BFR180W	Infineon	BFS505	WB trs
BFR181	Infineon	BFR520	WB trs
BFR181T-GS08	Vishay	BFR520	WB trs
BFR181TW-GS08	Vishay	BFS520	WB trs
BFR181W	Infineon	BFS520	WB trs
BFR182	Infineon	PBR941	WB trs
BFR182W	Infineon	PRF947	WB trs
BFR183TW-GS08	Vishay	PRF957	WB trs
BFR183W	Infineon	PRF957	WB trs
BFR193TW-GS08	Vishay	PRF957	WB trs
BFR193W	Infineon	PRF957	WB trs
BFR196T-GS08	Vishay	BFR540	WB trs
BFR196TW-GS08	Vishay	BFS540	WB trs
BFR93-GS08	Vishay	BFR93A	WB trs
BFR93A	Infineon	BFR93A	WB trs
BFR93AL	Freescale	BFR93A	WB trs
BFR93AW	Infineon	BFR93AW	WB trs
BFR93AW-GS08	Vishay	BFR93AW	WB trs
BFS17-GS08	Vishay	BFS17A	WB trs
BFS17P	Infineon	BFS17A	WB trs
BFS483	Infineon	BFM520	WB trs
BGA428	Infineon	BGU7003	MMIC
BGA461	Infineon	BGU7003	MMIC
BGA615	Infineon	BGU7007	MMIC
BGA715	Infineon	BGU8007	MMIC
BGA725	Infineon	BGU8007	MMIC
BGA825L56	Infineon	BGU8011	MMIC
BGA915	Infineon	BGU7005	MMIC
BGA925	Infineon	BGU8011	MMIC
BGB707	Infineon	BGU6102	MMIC
BGB717	Infineon	BGU6102	MMIC
BIC701M	Renesas	BF1105R	FET
BIC702M	Renesas	BF1105R	FET
BSR112	Standard	PMBFJ112	FET
BSR174	Standard	PMBFJ174	FET
BSR175	Standard	PMBFJ175	FET
BSR177	Standard	PMBFJ177	FET
CMM6004-SC	Mimix	BGA7024	MMIC
CMM6004-SC	Mimix	BGA7124	MMIC
CMM6004-SC	Mimix	BGA7124	MMIC
CMY91	Infineon	BGA2022	WB trs
CXE1089Z	Qorvo	BGA6489	MMIC
CXE1089Z	Qorvo	BGA6589	MMIC

Manufacturer type	Manufacturer	NXP type	Product family
EC2C03C	Sanyo	BB145B	Varicap
FSD273TA	Skyworks	BB170	Varicap
HBFP0405	Avago	BFG410W	WB trs
HBFP0420	Avago	BFG425W	WB trs
HBFP0450	Avago	BFG480W	WB trs
HMC454ST89E	Hittite	BGA7027	MMIC
HMC454ST89E	Hittite	BGA7127	MMIC
HMC617LP3	Hittite	BGU7051	MMIC
HMC618LP3	Hittite	BGU7052	MMIC
HMC667LP2	Hittite	BGU7053	MMIC
HSMP3800	Avago	BAP70-03	PIN diode
HSMP3802	Avago	BAP50-04	PIN diode
HSMP3804	Avago	BAP50-05	PIN diode
HSMP3810	Avago	BAP50-03	PIN diode
HSMP3814	Avago	BAP50-05	PIN diode
HSMP381B	Avago	BAP50-03	PIN diode
HSMP381C	Avago	BAP50-05	PIN diode
HSMP381F	Avago	BAP64-05W	PIN diode
HSMP3820	Avago	BAP1321-03	PIN diode
HSMP3822	Avago	BAP1321-04	PIN diode
HSMP3830	Avago	BAP64-03	PIN diode
HSMP3832	Avago	BAP64-04	PIN diode
HSMP3833	Avago	BAP64-06	PIN diode
HSMP3834	Avago	BAP64-05	PIN diode
HSMP3860	Avago	BAP50-03	PIN diode
HSMP3862	Avago	BAP50-04	PIN diode
HSMP3864	Avago	BAP50-05	PIN diode
HSMP386B	Avago	BAP50-02	PIN diode
HSMP386E	Avago	BAP50-04W	PIN diode
HSMP386L	Avago	BAP50-05W	PIN diode
HSMP3880	Avago	BAP51-03	PIN diode
HSMP3890	Avago	BAP51-03	PIN diode
HSMP3892	Avago	BAP64-04	PIN diode
HSMP3894	Avago	BAP64-05	PIN diode
HSMP3895	Avago	BAP51-02	PIN diode
HSMP389B	Avago	BAP51-02	PIN diode
HSMP389C	Avago	BAP64-04	PIN diode
HSMP389F	Avago	BAP51-05W	PIN diode
HVB14S	Renesas	BAP50-04W	PIN diode
HVB190S	Renesas	BAP70-04W	PIN diode
HVC131	Renesas	BAP65-02	PIN diode
HVC131	Renesas	BAP65-02	PIN diode
HVC132	Renesas	BAP51-02	PIN diode
HVC132	Renesas	BAP51-02	PIN diode
HVC190	Renesas	BAP50-02	PIN diode
HVC200A	Renesas	BB173	Varicap
HVC202A	Renesas	BB174	Varicap
HVC202B	Renesas	BB174	Varicap
HVC300A	Renesas	BB175	Varicap
HVC300B	Renesas	BB175	Varicap
HVC306A	Renesas	BB173	Varicap
HVC306B	Renesas	BB173	Varicap
HVC350B	Renesas	BB208-02	Varicap
HVC355B	Renesas	BB145B	Varicap
HVC355B	Renesas	BB145B	Varicap
HVC358B	Renesas	BB208-02	Varicap
HVC359	Renesas	BB202	Varicap
HVC359	Renesas	BB202	Varicap
HVC363A	Renesas	BB173	Varicap
HVC365	Renesas	BB202	Varicap
HVC368B	Renesas	BB208-02	Varicap
HVC375B	Renesas	BB208-02	Varicap
HVC376B	Renesas	BB202	Varicap
HVC376B	Renesas	BB202	Varicap
HVC383B	Renesas	BB208-02	Varicap
HVD131KRF-E	Renesas	BAP1321-02	PIN diode
HVD131KRF-E	Renesas	BAP65-02	PIN diode
HVD132	Renesas	BAP51-02	PIN diode
HVD132	Renesas	BAP51-02	PIN diode
HVD142AKRF-E	Renesas	BAP1321-02	PIN diode
HVD145KRF-E	Renesas	BAP1321-02	PIN diode
HVD147KRF-E	Renesas	BAP1321-02	PIN diode
HVD355B	Renesas	BB145B	Varicap
HVL144AKRF-E	Renesas	BAP65LX BAP1321LX	PIN diode
HVL147KRF-E	Renesas	BAP55LX	PIN diode
HVM14	Renesas	BAP70-05	PIN diode
HVM14S	Renesas	BAP50-04	PIN diode
HVM14SR	Renesas	BAP50-04	PIN diode
HVM187S	Renesas	BAP50-04	PIN diode
HVM187WK	Renesas	BAP50-05	PIN diode
HVU131	Renesas	BAP65-03	PIN diode
HVU131	Renesas	BAP65-03	PIN diode
HVU132	Renesas	BAP51-03	PIN diode

Manufacturer type	Manufacturer	NXP type	Product family
HVU132	Renesas	BAP51-03	PIN diode
HVU187	Renesas	BAP70-02	PIN diode
HVU300A	Renesas	BB171	Varicap
HVU300A	Renesas	BB171	Varicap
HVU307	Renesas	BB170	Varicap
HVU307	Renesas	BB170	Varicap
HVU315	Renesas	BB170	Varicap
HVU315	Renesas	BB170	Varicap
HVU316	Renesas	BB131	Varicap
HVU316	Renesas	BB131	Varicap
HVU350B	Renesas	BB156	Varicap
HVU355B	Renesas	BB131	Varicap
HVU359	Renesas	BB172	Varicap
HVU363A	Renesas	BB170	Varicap
HVU363A	Renesas	BB170	Varicap
HVU363A	Renesas	BB172	Varicap
HVU363B	Renesas	BB170	Varicap
HVU363B	Renesas	BB170	Varicap
HVU383B	Renesas	BB208-03	Varicap
INA-51063	Avago	BGA2001	MMIC
JDP2S01E	Toshiba	BAP65-02	PIN diode
JDP2S01U	Toshiba	BAP65-03	PIN diode
JDP2S02AFS	Toshiba	BAP51-02	PIN diode
JDP2S02AS	Toshiba	BAP51-03	PIN diode
JDP2S04E	Toshiba	BAP50-02	PIN diode
KP2310R	TOKO	BAP64-04W	PIN diode
KTK920	KEC	BF1108	FET
KTK920BT	KEC	BF1108	FET
KTK920T	KEC	BF1108R	FET
LF2802A	M/A-com	BLF6G10L-40BRN	WRIF
LTC5590	Linear Tech	BGX7220	MMIC
LTC5591	Linear Tech	BGX7221	MMIC
LTC5592	Linear Tech	BGX7221	MMIC
MA2SV01	Renesas	BB202	Varicap
MA2SV01	Renesas	BB202	Varicap
MA357	Panasonic	BB172	Varicap
MA366	Panasonic	BB170	Varicap
MA368	Panasonic	BB131	Varicap
MA4CP101A	Panasonic	BAP65-03	PIN diode
MA4P274-1141	Panasonic	BAP51-03	PIN diode
MA4P275-1141	Panasonic	BAP65-03	PIN diode
MA4P275CK-287	Panasonic	BAP65-05	PIN diode
MA4P277-1141	Panasonic	BAP70-03	PIN diode
MA4P278-287	Panasonic	BAP70-03	PIN diode
MA4P789-1141	Panasonic	BAP1321-03	PIN diode
MA4P789ST-287	Panasonic	BAP1321-04	PIN diode
MAGX-000912-500L00	M/A-com	BLA6H0912-500	A&D
MAGX-001090-600L00	M/A-com	BLA6H1011-600	A&D
MAGX-001214-250L00	M/A-com	BLL6H1214L-250	A&D
MAGX-001214-500L00	M/A-com	BLL6H1214-500	A&D
MAGX-002731-030L00	M/A-com	CLF1G0060-30	Broadband
MAGX-003135-030L00	M/A-com	CLF1G0060-30	Broadband
MAGX-003135-120L00	M/A-com	BLS6G3135-120	A&D
MAPP-002729-300M00	M/A-com	BLS7G2729L-350P	A&D
MAPR-002729-170M00	M/A-com	BLS7G2730L-200P	A&D
MAPR-002731-115M00	M/A-com	BLS6G2731-120	A&D
MAX19985A	Maxim	BGX7220	MMIC
MAX19995	Maxim	BGX7221	MMIC
MAX2634	Maxim	BGU6102	MMIC
MAX2657	Maxim	BGU8007	MMIC
MAX2658	Maxim	BGU7005	MMIC
MAX2659	Maxim	BGU7005	MMIC
MAX2667	Maxim	BGU8007	MMIC
MAX2687	Maxim	BGU7005	MMIC
MAX2694	Maxim	BGU7005	MMIC
MD7IC2012GNR1	Freescale	BLM7G1822S-40PBG	WRIF
MD7IC2012NR1	Freescale	BLM7G1822S-40PB	WRIF
MD8IC925GNR1	Freescale	BLP8G10S-45PG	WRIF
MD8IC925NR1	Freescale	BLP8G10S-45P	WRIF
MGA-633P8	Avago	BGU8051	LNA
MGA-633P8	Avago	BGU8052	LNA
MGA631P8	Avago	BGU7051	MMIC
MGA632P8	Avago	BGU7052	MMIC
MGA632P8	Avago	BGU7053	MMIC
MHT1001HR5	Freescale	BLF2425M6L180P	Bcast/ISM
MMBF4391	Freescale	PMBF4391	FET
MMBF4392	Freescale	PMBF4392	FET
MMBF4393	Freescale	PMBF4393	FET
MMBF4860	Freescale	PMBFJ112	FET
MMBF5484	Freescale	BFR31	FET
MMBFJ174	Freescale	PMBFJ174	FET
MMBFJ175	Freescale	PMBFJ175	FET
MMBFJ177	Freescale	PMBFJ177	FET

Manufacturer type	Manufacturer	NXP type	Product family
MMBFJ308	Freescale	PMBFJ308	FET
MMBFJ309	Freescale	PMBFJ309	FET
MMBR5179L	Freescale	BFS17A	WB trs
MMBR911L	Freescale	BFR93A	WB trs
MMBR920L	Freescale	BFR93A	WB trs
MMBR931L	Freescale	BFT25A	WB trs
MMBR941BL	Freescale	PBR941	WB trs
MMBR941L	Freescale	PBR941	WB trs
MMBV105GLT1	ON Semi	BB156	Varicap
MMBV109LT1	ON Semi	BB170	Varicap
MMG3004NT1	Freescale	BGA7027	MMIC
MMG3004NT1	Freescale	BGA7127	MMIC
MMG3014	Freescale	BGA7024	MMIC
MMG3014	Freescale	BGA7124	MMIC
MMRF1005HR5	Freescale	BLL6H1214L-250	A&D
MMRF1005HSR5	Freescale	BLL6H1214LS-250	A&D
MMRF1006HR5	Freescale	BLF578	Bcast/ISM
MMRF1007HR5	Freescale	BLA6H0912L-1000	A&D
MMRF1007HSR5	Freescale	BLA6H0912LS-1000	A&D
MMRF1009HR5	Freescale	BLA6H0912-500	A&D
MRF151G	M/A-com	BLF573	Bcast/ISM
MRF577	Freescale	PRF957	WB trs
MRF6P24190HR6	Freescale	BLF2425M6L180P	Bcast/ISM
MRF6P24190HR6	Freescale	BLF2425M7L250P	Bcast/ISM
MRF6P24190HSR6	Freescale	BLF2425M6LS180P	Bcast/ISM
MRF6P24190HSR6	Freescale	BLF2425M7LS250P	Bcast/ISM
MRF6P27160HR6	Freescale	BLF7G27L-150P	WRIF
MRF6S18060NBR1	Freescale	BLF6G20LS-75	WRIF
MRF6S18060NR1	Freescale	BLF6G20-75	WRIF
MRF6S21050LR3	Freescale	BLD6G22L-50	WRIF
MRF6S21050LSR3	Freescale	BLD6G22LS-50	WRIF
MRF6S21100HR3	Freescale	BLF7G22L-100P	WRIF
MRF6S21100HSR3	Freescale	BLF7G22LS-100P	WRIF
MRF6S21140HSR3	Freescale	BLF6G22LS-130	WRIF
MRF6S21190HR3	Freescale	BLF6G22-180PN	WRIF
MRF6S24140HR3	Freescale	BLF2425M7L140	Bcast/ISM
MRF6S24140HR3	Freescale	BLF2425M8L140	Bcast/ISM
MRF6S24140HSR3	Freescale	BLF2425M7LS140	Bcast/ISM
MRF6S24140HSR3	Freescale	BLF2425M8LS140	Bcast/ISM
MRF6S27015GNR1	Freescale	BLF6G27-10G	WRIF
MRF6S27015NR1	Freescale	BLF6G27-10	WRIF
MRF6S27085HSR3	Freescale	BLF8G27LS-140	WRIF
MRF6V13250HR5	Freescale	BLF6G13L-250P	Bcast/ISM
MRF6V13250HSR5	Freescale	BLF6G13LS-250P	Bcast/ISM
MRF6V2010NR1	Freescale	BLF571	Bcast/ISM
MRF6V2300NBR1	Freescale	BLF573	Bcast/ISM
MRF6V2300NBR5	Freescale	BLF573	Bcast/ISM
MRF6V2300NR1	Freescale	BLF573S	Bcast/ISM
MRF6V2300NR5	Freescale	BLF573S	Bcast/ISM
MRF6VP11KHR6	Freescale	BLF178P	Bcast/ISM
MRF6VP3450HR5	Freescale	BLF879P	Bcast/ISM
MRF6VP3450HR6	Freescale	BLF879P	Bcast/ISM
MRF6VP3450HSR5	Freescale	BLF879PS	Bcast/ISM
MRF6VP3450HSR6	Freescale	BLF879PS	Bcast/ISM
MRF7P20040HR3	Freescale	BLD6G21L-50	WRIF
MRF7P20040HSR3	Freescale	BLD6G21LS-50	WRIF
MRF7S15100HSR3	Freescale	BLF7G15LS-200	WRIF
MRF7S21150HR3	Freescale	BLF7G22L-160	WRIF
MRF7S35120HSR3	Freescale	BLS6G3135S-120	A&D
MRF7S38010HSR3	Freescale	BLF6G38-10G	WRIF
MRF7S38075HR3	Freescale	BLF6G38-50	WRIF
MRF7S38075HSR3	Freescale	BLF6G38LS-50	WRIF
MRF8HP21080HR3	Freescale	BLF6G22L-40P	WRIF
MRF8HP21080HSR3	Freescale	BLF6G22LS-40P	WRIF
MRF8P20160HSR3	Freescale	BLF6G20LS-140	WRIF
MRF8P23160WHR3	Freescale	BLF7G24L-100	WRIF
MRF8P23160WHSR3	Freescale	BLF7G24LS-100	WRIF
MRF8P26080HR3	Freescale	BLF6G27L-40P	WRIF
MRF8P26080HSR3	Freescale	BLF6G27-100	WRIF
MRF8P29300HR6	Freescale	BLS7G2729L-350P	A&D
MRF8P29300HSR6	Freescale	BLS7G2729LS-350P	A&D
MRF8S18210WHSR3	Freescale	BLF6G20-180PN	WRIF
MRF8S21100HSR3	Freescale	BLF6G22LS-100	WRIF
MRF8S21120HR3	Freescale	BLF7G22L-130	WRIF
MRF8S21120HSR3	Freescale	BLF7G22LS-130	WRIF
MRF8S21140HSR3	Freescale	BLF8G22LS-140	WRIF
MRF8S26120HR3	Freescale	BLF7G27L-100	WRIF
MRF8S26120HSR3	Freescale	BLF7G27LS-100	WRIF
MRF8S8260HSR3	Freescale	BLF8G10LS-270	WRIF
MRF8S9200NR3	Freescale	BLF6G10LS-200RN	WRIF
MRF8S9260HR3	Freescale	BLF7G10L-250	WRIF
MRF8S9260HSR3	Freescale	BLF7G10LS-250	WRIF
MRF9030LR1	Freescale	BLF642	Bcast/ISM

Manufacturer type	Manufacturer	NXP type	Product family
MRF9060LR1	Freescale	BLF645	Bcast/ISM
MRF917	Freescale	BFQ67W	WB trs
MRF927	Freescale	BFS25A	WB trs
MRF9411L	Freescale	BFG520/X	WB trs
MRF947	Freescale	BFS520	WB trs
MRF947A	Freescale	PRF947	WB trs
MRF9511L	Freescale	BFG540/X	WB trs
MRF957	Freescale	PRF957	WB trs
MRFE6VP5600HR6	Freescale	BLF174XR	Bcast/ISM
MRFE6VP5600HR6	Freescale	BLF184XR	Bcast/ISM
MRFE6VP5600HR6	Freescale	BLF574	Bcast/ISM
MRFE6VP5600HSR6	Freescale	BLF174XRS	Bcast/ISM
MRFE6VP5600HSR6	Freescale	BLF184XRS	Bcast/ISM
MRFE6VP5600HSR6	Freescale	BLF574XRS	Bcast/ISM
MRFE6VP61K25HR5/R6	Freescale	BLF188XR	Bcast/ISM
MRFE6VP61K25HR6/R5	Freescale	BLF178XR	Bcast/ISM
MRFE6VP61K25HS/R5	Freescale	BLF178XRS	Bcast/ISM
MRFE6VP61K25HS/R5	Freescale	BLF188XRS	Bcast/ISM
MRFE6VP61K25HS/R6	Freescale	BLF188XRS	Bcast/ISM
MRFE6VP6300HR3	Freescale	BLF573	Bcast/ISM
MRFE6VP6300HSR3	Freescale	BLF573S	Bcast/ISM
MRFE6VP8600HR6	Freescale	BLF10H6600P	Bcast/ISM
MRFE6VP8600HR6	Freescale	BLF888A	Bcast/ISM
MRFE6VP8600HR6	Freescale	BLF988	A&D
MRFE6VP8600HR6	Freescale	BLU6H0410L-600P	A&D
MRFE6VP8600HSR6	Freescale	BLF10H6600PS	Bcast/ISM
MRFE6VP8600HSR6	Freescale	BLF888AS	Bcast/ISM
MRFE6VP8600HSR6	Freescale	BLF988S	A&D
MRFE6VP8600HSR6	Freescale	BLU6H0410LS-600P	A&D
MT4S200U	Toshiba	BFG425W	WB trs
MT4S34U	Toshiba	BFG410W	WB trs
MW6S004NT1	Freescale	BLP25M705	Bcast/ISM
MW7IC2220GNR1	Freescale	BLM6G22-30G	WRIF
MW7IC2220NR1	Freescale	BLF6G22-45	WRIF
MW7IC2220NR1	Freescale	BLM6G22-30	WRIF
NE202930	Renesas	BFG425W	WB trs
NE661M05	Renesas	BFU630F	WB trs
NESG2021M05	Renesas	BFU610F	WB trs
NESG2021M05	Renesas	BFU730F	WB trs
NESG2021M16	Renesas	BFU630F	WB trs
NESG2031M05	Renesas	BFU630F	WB trs
NESG2031M05	Renesas	BFU630F	WB trs
NESG2031M16	Renesas	BFU630F	WB trs
NESG204619	Renesas	BFU630F	WB trs
NESG2101M05	Renesas	BFU660F	WB trs
NESG2101M05	Renesas	BFU690F	WB trs
NESG2101M05	Renesas	BFU760F	WB trs
NESG2101M05	Renesas	BFU790F	WB trs
NESG2101M16	Renesas	BFU690F	WB trs
NESG210719	Renesas	BFU690F	WB trs
NESG210833	Renesas	BFU690F	WB trs
NESG220033	Renesas	BFU690F	WB trs
NESG220034	Renesas	BFU690F	WB trs
NESG240033	Renesas	BFU690F	WB trs
NESG240034	Renesas	BFU690F	WB trs
NESG3031M05	CEL	BFU630F	WB trs
NESG3031M05	CEL	BFU725F	WB trs
NESG3031M05	CEL	BFU730F	WB trs
NESG3031M05	Renesas	BFU730F	WB trs
NESG3031M14	Renesas	BFU730F	WB trs
NESG3032M14	NEC	BFU725F	WB trs
NESG3032M14	Renesas	BFU725F/N1	WB trs
NESG3033M14	Renesas	BFU730F	WB trs
NESG340033	Renesas	BFU790F	WB trs
NESG340034	Renesas	BFU790F	WB trs
NESG3400M01	Renesas	BFU790F	WB trs
NESG7030M04	Renesas	BFU730F	WB trs
NJG1140KA1	JRC	BGU7044	MMIC
PH1090-175L	M/A-com	BLA6G1011-200R	A&D
PH1214-220M	M/A-com	BLL6G1214L-250	A&D
PH1214-25L	M/A-com	BLL6H0514-25	A&D
PH2226-110M	M/A-com	BLS7G2325L-105	A&D
PH2729-130M	M/A-com	BLS6G2731S-130	A&D
PH2729-25M	M/A-com	BLS6G2735L-30	A&D
PH2731-5M	M/A-com	BLS6G2731-6G	A&D
PH3134-25M	M/A-com	BLS6G2735L-30	A&D
PH3135-20M	M/A-com	BLS6G3135-20	A&D
PRF947B	Infineon	PRF947	WB trs
PRF947B	Motorola	PRF947	WB trs
PTFA082201E	Infineon	BLF7G10L-250	WRIF
PTFA082201F	Infineon	BLF7G10LS-250	WRIF
PTFA091503EL	Infineon	BLF8G10L-160	WRIF
PTFA092201E	Infineon	BLF7G10L-250	WRIF

Manufacturer type	Manufacturer	NXP type	Product family
PTFA092201F	Infineon	BLF7G10LS-250	WRIF
PTFA092201FV4	Infineon	BLF8G10LS-270	WRIF
PTFA092213ELV4	Infineon	BLF7G10L-250	WRIF
PTFA180701E	Infineon	BLF6G20-75	WRIF
PTFA180701F	Infineon	BLF6G20LS-75	WRIF
PTFA191001E	Infineon	BLF6G20-110	WRIF
PTFA191001F	Infineon	BLF6G20LS-110	WRIF
PTFA192001E	Infineon	BLF7G21L-160P	WRIF
PTFA192001F	Infineon	BLF7G21LS-160P	WRIF
PTFA210601E	Infineon	BLD6G22L-50	WRIF
PTFA210601E	Infineon	BLF6G22L-40P	WRIF
PTFA210601F	Infineon	BLF640	Bcast/ISM
PTFA210601F	Infineon	BLF6G22LS-40P	WRIF
PTFA211801EV5	Infineon	BLF7G22L-200	WRIF
PTFA212001E	Infineon	BLF6G22-180PN	WRIF
PTFA212001E	Infineon	BLF7G22L-200	WRIF
PTFA212001F	Infineon	BLF7G22LS-200	WRIF
PTFA212001FV4	Infineon	BLF8G22LS-220	WRIF
PTFA220081M	Infineon	BLP7G22-05	WRIF
PTFA220081M	Infineon	BLP7G22-10	WRIF
PTFB182503EL	Infineon	BLF6G20-180PN	WRIF
PTFB182503EL	Infineon	BLF7G20L-200	WRIF
PTFB182503FL	Infineon	BLF7G20LS-200	WRIF
PTFB182503FL	Infineon	BLF8G19LS-170BV	WRIF
PTFB182503FL	Infineon	BLF8G20LS-200V	WRIF
PTFB182503FLV2	Infineon	BLF8G20LS-260A	WRIF
PTFB183404E	Infineon	BLF7G20L-250P	WRIF
PTFB191501F	Infineon	BLF6G20LS-140	WRIF
PTFB211503EL	Infineon	BLF7G22L-130	WRIF
PTFB211503FL	Infineon	BLF6G22LS-130	WRIF
PTFB211503FL	Infineon	BLF7G22LS-130	WRIF
PTFB211803EL	Infineon	BLF6G22LS-180RN	WRIF
PTFB211803EL	Infineon	BLF7G22L-160	WRIF
PTFB211803ELV1	Infineon	BLF7G22L-200	WRIF
PTFB211803FL	Infineon	BLF7G22LS-160	WRIF
PTFB211803FLV2	Infineon	BLF7G22LS-200	WRIF
PTFB211803FLV2	Infineon	BLF8G22LS-200V	WRIF
PTFB212503EL	Infineon	BLF8G22LS-160BV	WRIF
PTFB212507SHV1	Infineon	BLF8G22LS-200GV	WRIF
PTFB241402F	Infineon	BLF2425M7L100	Bcast/ISM
PTFC210202FC	Infineon	BLF6G21-10G	WRIF
PTFC260202FC	Infineon	BLC8G27LS-100AV	WRIF
PTFC260362SC	Infineon	BLC8G27LS-160AV	WRIF
PTFC262808FV	Infineon	BLC8G27LS-240AV	WRIF
PTMA180402EL	Infineon	BLF6G20-45	WRIF
PTMA180402FL	Infineon	BLF6G20S-45	WRIF
PTVA030121EA	Infineon	BLF571	Bcast/ISM
PTVA035002EV	Infineon	BLF574	Bcast/ISM
PTVA042502EC	Infineon	BLF884P	Bcast/ISM
PTVA042502FC	Infineon	BLF884PS	Bcast/ISM
PTVA047002EV	Infineon	BLF879P	Bcast/ISM
PTVA047002EV	Infineon	BLF888A	Bcast/ISM
PTVA101K02EV	Infineon	BLA6H0912L-1000	A&D
PTVA104501EH	Infineon	BLA6H0912-500	A&D
PTVA123501EC	Infineon	BLF6G13L-250P	Bcast/ISM
PTVA123501FC	Infineon	BLF6G13LS-250P	Bcast/ISM
PTVA127002EV	Infineon	BLL6H1214-500	A&D
RF3863	Qorvo	BGU7051	MMIC
RF3863	Qorvo	BGU7052	MMIC
RF3863	Qorvo	BGU7053	MMIC
RF3932	RF Micro	CLF1G0035-50	Broadband
RF3933	RF Micro	CLF1G0035-100	Broadband
RFFC2072	Qorvo	BGX7211	MMIC
RFHA3942	RF Micro	CLF1G0035-50	Broadband
RFHA3942	RF Micro	CLF1G0060-30	Broadband
RKP200KP	Renesas	BAP51LX	PIN diode
RKP204KP	Renesas	BAP55LX	PIN diode
RKP300KJ	Renesas	BAP64-02	PIN diode
RKP300KJ	Renesas	BAP50-02	PIN diode
RKP300KL	Renesas	BAP50-02	PIN diode
RKP300WKQE	Renesas	BAP64-05W	PIN diode
RKP350KV	Renesas	BAP1321-03	PIN diode
RKP350KV	Renesas	BAP63-03	PIN 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
RKV502KJ	Renesas	BB175	Varicap
RKV653KL	Renesas	BB145B	Varicap
RN142G	ROHM	BAP1321-03	PIN diode
RN142S	ROHM	BAP1321-02	PIN diode

Manufacturer type	Manufacturer	NXP type	Product family
RN242CS	ROHM	BAP51LX	PIN diode
RN731V	ROHM	BAP50-03	PIN diode
RN739D	ROHM	BAP50-04	PIN diode
RN739F	ROHM	BAP50-04W	PIN diode
S595TR	Vishay	BF1105R	FET
SGA8343Z	Sirenza	BFG425W	WB trs
SKY65048	Skyworks	BGU7051	MMIC
SKY65066	Skyworks	BGU7053	MMIC
SKY65084	Skyworks	BGU7052	MMIC
SKY67101-396LF	Skyworks	BGU8051	LNA
SKY67971	Skyworks	BGU7224	MMIC
SKY67981	Skyworks	BGU7258	MMIC
SMA3101	Sanyo	BGA2851	MMIC
SMA3103	Sanyo	BGA2867	MMIC
SMA3107	Sanyo	BGA2803	MMIC
SMA3109	Sanyo	BGA2817	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
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	Qorvo	BGU7051	LNA
SPF-5122Z	Qorvo	BGU7052	LNA
SPF-5122Z	Qorvo	BGU7053	LNA
SST112	Standard	PMBFJ112	FET
SST174	Standard	PMBFJ174	FET
SST175	Standard	PMBFJ175	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
SST4391	Standard	PMBF4391	FET
SST4392	Standard	PMBF4392	FET
SST4393	Standard	PMBF4393	FET
SST4856	Standard	BSR56	FET
SST4857	Standard	BSR57	FET

Manufacturer type	Manufacturer	NXP type	Product family
SST4859	Standard	BSR56	FET
SST4860	Standard	BSR57	FET
SST4861	Standard	BSR58	FET
SXA-389B	Qorvo	BGA7124	MMIC
SXB-4089	Qorvo	BGA7027	MMIC
T1G4004532-FL	TriQuint	CLF1G0035-50	Broadband
T1G4012036-FL	TriQuint	CLF1G0035-100	Broadband
T2G4003532-FL	TriQuint	CLF1G0060-30	Broadband
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
TMPFJ112	Standard	PMBFJ112	FET
TMPFJ174	Standard	PMBFJ174	FET
TMPFJ175	Standard	PMBFJ175	FET
TMPFJ177	Standard	PMBFJ177	FET
TQP3M9005	Qorvo	BGU8052	LNA
TRF370315	TI	BGX7101	MMIC
TRF370417	TI	BGX7101	MMIC
TRF3705	TI	BGX7101	MMIC
UPA800T	Renesas	BFM520	WB trs
UPA801T	Renesas	BFM520	WB trs
UPA802T	Renesas	BFM520	WB trs
UPA804T	Renesas	BFM520	WB trs
UPA806T	Renesas	BFM520	WB trs
UPA807T	Renesas	BFM520	WB trs
UPA808T	Renesas	BFM520	WB trs
UPA810T	Renesas	BFM520	WB trs
UPA811T	Renesas	BFM520	WB trs
UPA812T	Renesas	BFM520	WB trs
UPA813T	Renesas	BFM520	WB trs
UPA828TD	Renesas	BFM520	WB trs
UPA831TD	Renesas	BFM520	WB trs
UPA860TD	Renesas	BFM520	WB trs
UPA861TD	Renesas	BFM520	WB trs
UPA862TD	Renesas	BFM520	WB trs
UPA863TD	Renesas	BFM520	WB trs
UPA869TD	Renesas	BFM520	WB trs
UPA873TD	Renesas	BFM520	WB trs
UPA895TD	Renesas	BFM520	WB trs
UPC2711	Renesas	BGA2711	MMIC
UPC2745	Renesas	BGA2001	MMIC
UPC2746	Renesas	BGA2001	MMIC
UPC2748	Renesas	BGA2748	MMIC
UPC2771	Renesas	BGA2771	MMIC
UPC3224	Renesas	BGA2851	MMIC
UPC3226	Renesas	BGA2867	MMIC
UPC3227	Renesas	BGA2851	MMIC
UPC3240	Renesas	BGA2802	MMIC
UPC3241	Renesas	BGA2817	MMIC
UPC8230TU	Renesas	BGU7007	MMIC
UPC8236T6N	Renesas	BGU8007	MMIC
UPD5740T6N	Renesas	BGU7045	MMIC
UPD5756T6N	Renesas	BGU7045	MMIC

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

In alphabetical order by discontinued type

Abbreviations

GPS LNA	GPS Low-Noise Amplifier
RFP trs	RF ower transistor
Varicap	Variable capacitance diode
WB ampl	WideBand amplifier
WB trs	WideBand transistor

NXP discontinued type	Product family NXP	Replacement type NXP
BB148	Varicap	BB170
BB152	Varicap	BB171
BB153	Varicap	BB172
BB173LX	Varicap	BB173
BB174LX	Varicap	BB174
BB178	Varicap	BB173
BB178/L	Varicap	BB173
BB178LX	Varicap	BB173
BB181LX	Varicap	BB181
BB182	Varicap	BB175
BB182/L	Varicap	BB175
BFG135	WB trs	BFU590G
BFG424F	WB trs	BFU668F
BFG424W	WB trs	BFU630F
BFG591	WB trs	BFU590G
BFM505	WB trs	BFU520Y
BFQ19	WB trs	BFU5980Q
BFQ591	WB trs	BFU590Q
BFR106	WB trs	BFU550A
BFR505	WB trs	BFU520A
BFR505T	WB trs	BFU520W
BFR92A	WB trs	BFU530A
BFR92AW	WB trs	BFU520W
BFR94A	WB trs	BFU520A
BFR94AW	WB trs	BFU520W
BFS17	WB trs	BFU520A
BFS17W	WB trs	BFU550W
BGM1014	WB ampl	BGA2869
BGU6005	GPS LNA	BGU6009/N2
BLA0912-250	RFP trs	BLA6H0912-500
BLA0912-250R	RFP trs	BLA6H0912-500
BLA1011-10	RFP trs	BLL6H0514-25
BLA1011-2	RFP trs	BLL6H0514-25
BLA1011-200	RFP trs	BLA6G1011-200R
BLA1011-200R	RFP trs	BLA6G1011-200R
BLA1011-300	RFP trs	BLA8G10L(S)-300(G)
BLA1011S-200	RFP trs	BLA6G1011-200R
BLA1011S-200R	RFP trs	BLA6G1011-200R
BLF1043	RFP trs	BLF640
BLF1046	RFP trs	BLF642
BLF145	RFP trs	BLF642
BLF147	RFP trs	BLF647P
BLF175	RFP trs	BLF642

NXP discontinued type	Product family NXP	Replacement type NXP
BLF177	RFP trs	BLF184XR
BLF1822-10	RFP trs	BLF6G21-10G
BLF2043	RFP trs	BLF6G21-10G
BLF2043F	RFP trs	BLF640
BLF2045	RFP trs	BLF6G22-45
BLF242	RFP trs	BLP25M705
BLF244	RFP trs	BLF184XR
BLF245	RFP trs	BLF642
BLF245B	RFP trs	BLF642
BLF246	RFP trs	BLF645
BLF246B	RFP trs	BLF645
BLF248	RFP trs	BLF184XR
BLF278	RFP trs	BLF184XR
BLF346	RFP trs	BLF642
BLF368	RFP trs	BLF184XR
BLF369	RFP trs	BLF184XR
BLF3G22-30	RFP trs	BLF6G22-45
BLF542	RFP trs	BLP25M705
BLF544	RFP trs	BLF642
BLF546	RFP trs	BLF645
BLF548	RFP trs	BLF647P
BLF647	RFP trs	BLF647P
BLF6G10-135RN	RFP trs	BLF10M6(LS)135
BLF6G10-160RN	RFP trs	BLF10M6(LS)160
BLF6G20-180RN	RFP trs	BLF7G20LS-200
BLF6G20-40	RFP trs	BLF6G20-45
BLF6G20LS-180RN	RFP trs	BLF7G20LS-200
BLF6G22-180RN	RFP trs	BLF7G22LS-200
BLF6G27-75	RFP trs	BLF7G27LS-75P
BLF6G27LS-135	RFP trs	BLF7G27LS-140
BLF6G27LS-75	RFP trs	BLF7G27LS-75P
BLL1214-250	RFP trs	BLL6G1214L-250
BLL1214-250R	RFP trs	BLL6G1214L-250
BLL1214-35	RFP trs	BLL8H0514-25
BLS2731-110	RFP trs	BLS6G2731-120
BLS2731-20	RFP trs	BLS6G2731-6G
BLS2731-50	RFP trs	BLS6G2731-6G
BLS2933-100	RFP trs	BLS6G2933S-130
MX0912B251Y	RFP trs	BLL6G1214L-250
MX0912B351Y	RFP trs	BLL6G1214L-250
MZ0912B100Y	RFP trs	BLL8H0514L-130
MZ0912B50Y	RFP trs	BLL8H0514-25
PRF949	WB trs	BFU550W

6. Packing and packaging information

6.1 Packing quantities per package with relevant ordering codes

	Package	Package dimensions	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	9 mm tape and reel	
	SOD523/SC-79	1.2 x 0.8 x 0.6	3,000	115	10 mm tape and reel	
			10,000	135	11 mm tape and reel	
			8,000	315	2 mm pitch tape and reel	
			20,000	335	2 mm pitch tape and reel	
	SOD882	1.0 x 0.6 x 0.5	10,000	315	Reel	
	SOD882D	1.0 x 0.6 x 0.4	10,000	315	Reel	
	SOT1092-2	6.0 x 6.0 x 0.85	4,000	518	Tape and reel, dry pack	
	SOT1110A	41.2 x 10.2 x 4.7	60	112	Blister, tray	Air-cavity ceramic
	SOT1110B	32.3 x 10.2 x 5.5	60	112	Blister, tray	
	SOT1112A	20.3 x 9.8 x 4.7	60	112	Blister, tray	
	SOT1112B	9.8 x 9.8 x 4.7	60	112	Blister, tray	
	SOT1120A	34.0 x 8.9 x 4.8	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1120B	20.6 x 9.8 x 4.8	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1121A	34.0 x 9.8 x 4.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1121B	20.6 x 9.8 x 4.7	60	112	Blister,tray	
			100	118	Tape and reel	
	SOT1121C	20.6 x 9.8 x 4.7	24	127	Blister, tray	
			96	127	Blister, tray	
	SOT1130A	20.3 x 9.8 x 4.7	60	112	Blister, tray	
	SOT1130B	9.8 x 9.8 x 4.7	60	112	Blister, tray	
	SOT1135A	20.3 x 9.8 x 4.7	60	112	Blister, tray	
			100	118	Reel	
	SOT1135B	9.8 x 9.8 x 4.7	60	112	Blister, tray	
	SOT1138	20.6 x 10.0 x 3.9	100	118	Tape and reel	Plastic (OMP)
	SOT115	44.5 x 13.65 x 20.4	10	112	4 tray/box	Plastic
	SOT1179	6.0 x 4.0 x 1.0	500	135	Tape and reel	Plastic (OMP)
	SOT1189-1	1.6 x 1.6 x 0.5	4,000	115	Tape and reel	
	SOT1198-1	10.0 x 5.5 x 0.8	1,000	115	Tape and reel	
	SOT1204	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1209	2 x 1.3 x 0.35	5,000	147	8 mm tape and reel	
	SOT1211	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1212	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1214A	34.0 x 9.8 x 4.7	60	112	Blister, tray	Air-cavity ceramic
	SOT1214B	20.6 x 9.8 x 4.7	60	112	Blister, tray	

	Package	Package dimensions	Packing quantity	Product 12NC ending	Packing method	Type
	SOT121B	24.8 x 6.4 x 6.7	40	112	Blister, tray	Air-cavity ceramic
	SOT1221	20.6 x 10 x 3.9	100	118	Tape and reel	Plastic (OMP)
			100	518	Tape and reel	
	SOT1222	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1223	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1224	20.6 x 10.0 x 3.9	100	118	Tape and reel	
	SOT1227A	14.0 x 4.1 x 3.7	60	112	Blister, tray	Air-cavity ceramic
	SOT1227B	5.1 x 4.1 x 3.7	60	112	Blister, tray	
	SOT1228A	29.0 x 5.8 x 5.2	60	112	Blister, tray	
	SOT1228B	17.3 x 5.8 x 5.2	60	112	Blister, tray	
	SOT1230	1.1 x 0.9 x 0.47	5,000	115	Reel	Plastic (OMP)
	SOT1232	1.1 x 0.7 x 0.37	5,000	115	Reel	
	SOT1239B	20.6 x 9.8 x 4.8	60	112	Blister, tray	Air-cavity ceramic
			100	118	Tape and reel	
			60	115	Tape and reel	
	SOT1242B	32.3 x 10.2 x 5.5	100	115	Tape and reel	
			15	127	Tube	
			60	127	Tube	
	SOT1242C	32.2 x 10.2 x 4.9	100	115	Tape and reel	
			15	127	Tube	
			60	127	Tube	
	SOT1244B	20.6 x 9.8 x 4.8	60	112	Blister, tray	
			100	118	Blister, tray	
	SOT1244C	20.6 x 9.8 x 4.8	100	118	Tape and reel	
			24	127	Tube	
			96	127	Tube	
	SOT1247B	32.3 x 10.2 x 4.9	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1248C	32.3 x 10.2 x 5.5	60	112	Blister tray	
			100	118	Tape and reel	
	SOT1250-1	32.3 x 10.1 x 4.5	60	112	Blister, tray	Air-cavity plastic
			100	118	Tape and reel	
	SOT1251-1	32.3 x 10.1 x 4.5	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1251-2	32.3 x 10.1 x 4.5	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1252-1	32.3 x 10.1 x 4.5	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1258-1	32.2 x 10.1 x 4.5	100	518	Reel	
			60	517	Blister, tray	
	SOT1258-2	32.2 x 10.1 x 4.5	100	518	Reel	
			60	517	Blister, tray	
	SOT1270-1	20.6 x 9.8 x 3.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1271-1	20.6 x 9.8 x 3.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1271-2	20.6 x 9.8 x 3.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1272-1	20.6 x 9.8 x 3.7	60	112	Blister, tray	
			100	118	Tape and reel	

	Package	Package dimensions	Packing quantity	Product 12NC ending	Packing method	Type
	SOT1273-1	20.6 x 9.8 x 3.7	60	112	Blister, tray	Air-cavity plastic
			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 3.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT1301-1	8.0 x 8.0 x 1.3	2,000	518	Tape and reel, dry pack	Plastic
	SOT1327-1	2.0 x 2.0 x 0.75	2,000	115	Tape and reel	
	SOT1352	6.0 x 5.0 x 1.0	60	531	Tape and reel	Plastic (OMP)
	SOT1359-1	5.0 x 5.0 x 0.72	6,000	518	Tape and reel, dry pack	Plastic
	SOT143(B/R)	2.9 x 1.3 x 0.9	3,000	215	8 mm tape and reel	
			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	
			4,000	135	12 mm tape and 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	
	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	
			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	2.0 x 1.25 x 0.7	3,000	115	8 mm tape and reel	
			10,000	135	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	
			10,000	135	8 mm tape and reel	
	SOT363A	2.0 x 1.25 x 0.95	3,000	115	8 mm tape and reel	
			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 4.7	60	112	Blister, tray	Air-cavity ceramic
			400	118	Tape and reel	
	SOT467C	20.3 x 5.8 x 4.7	60	112	Blister, tray	
	SOT502A	34.0 x 9.8 x 4.7	60	112	Blister, tray	
			300	135	Reel	
			100	118	Tape and reel	
	SOT502B	20.6 x 9.8 x 4.7	60	112	Blister, tray	
			100	118	Tape and reel	
	SOT502C	20.6 x 9.8 x 4.7	60	112	Blister, tray	
	SOT502D	34.0 x 9.8 x 4.7	60	112	Blister, tray	
	SOT502E	20.6 x 9.8 x 4.7	60	112	Blister, tray	
			100	118	Blister, tray	
			24	127	Tube	
			96	127	Tube	

	Package	Package dimensions	Packing quantity	Product 12NC ending	Packing method	Type
	SOT502F	34.0 x 9.8 x 4.7	60	112	Blister, tray	Air-cavity ceramic
	SOT538A	5.5 x 4.1 x 2.4	500	112	Blister, tray	
	SOT539A	41.2 x 10.2 x 4.7	60	112	Blister, tray	
			300	135	Reel	
			100	118	Tape and reel	
	SOT539B	32.3 x 10.2 x 4.7	60	112	Blister, tray	
	SOT54	4.6 x 3.9 x 5.1	5,000	112	Bulk, delt pinning	Plastic
			5,000	412	Bulk straight leads	
			10,000	116	Tape and reel, wede pitch	
			10,000	126	Tape ammopack, wide pitch	
	SOT540A	34.0 x 9.8 x 5.4	60	112	Blister, tray	Air-cavity ceramic
	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	
	SOT638	14 x 14 x 1	1,000	518	13" tape and reel dry pack	
			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	
	SOT662	5.0 x 5.0 x 0.85	1,000	115	Tape and reel	
			6,000	118		
	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	
	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 11.0 x 3.5	180	127	Tube	
	SOT834-1	15.9 x 11.0 x 3.5	180	127	Tube	
	SOT883	1.0 x 0.6 x 0.5	3,000	115	8 mm tape and reel	
	SOT883C	1.0 x 0.6 x 0.34	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	
	SOT89/SC-62	4.5 x 2.5 x 1.5	10,000	115	12 mm tape and reel	
			4,000	135	12 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	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 3.6	180	112	Blister, tray	
		100	118	Tape and reel	
SOT975C	7.1 x 6.9 x 3.6	180	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 (called the "marking code") is used instead. To save space, the marking code uses a % symbol in place of the 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.

t = made in Malaysia
W = made in China

Marking code	Type	Package
10%	BAT18	SOT23
13%	BB207	SOT23
20%	BF545A	SOT23
21%	BF545B	SOT23
22%	BF545C	SOT23
24%	BF556A	SOT23
28%	BF861A	SOT23
29%	BF861B	SOT23
30%	BF861C	SOT23
32%	BFR520	SOT23
33%	BFR540	SOT23
34%	BFT25A	SOT23
38%	PMBFJ108	SOT23
39%	PMBFJ109	SOT23
40%	PMBFJ110	SOT23
42%	PMBFJ112	SOT23
48%	PMBFJ308	SOT23
49%	PMBFJ309	SOT23
7	BA891	SOD523
224	BGU7224	SOT1189
258	BGU7258	SOT1189
%1V	BFR93AW/DG	SOT323
%1W	BAP51-05W	SOT323
%4A	BGA6489	SOT89
%5A	BGA6589	SOT89
%6G	PMBF4393	SOT23
%6J	PMBF4391	SOT23
%6K	PMBF4392	SOT23
%6K	BGA7024	SOT89
%6L	BGA7027	SOT89
%6N	ON5088	SOT343
%6W	PMBFJ175	SOT23
%6W	BGA3012	SOT89
%6X	PMBFJ174	SOT23
%6X	BGA3015	SOT89
%6Y	PMBFJ177	SOT23
%6Y	BGA3018	SOT89
%7N	ON5087	SOT343
%8N	ON5089	SOT343
%M1	BF908	SOT143
%M2	BF908R	SOT143
%MA	BF991	SOT143
%MB	BF992	SOT143
%MC	BF904	SOT143
%ME	BFG505	SOT143
%MF	BFG520	SOT143
%MG	BFG540	SOT143
%MK	BFG505/X	SOT143
%ML	BFG520/X	SOT143
%MM	BFG540/X	SOT143
%MM	ON4832	SOT143
%MP	BFG520/XR	SOT143

Marking code	Type	Package
%MP	ON4973	SOT143
%MR	BFG540/XR	SOT143
%MV	BFG67/X	SOT143
%VA	BGU7041	SOT363
%VB	BGU7042	SOT363
1001 0010	BAP142LX	SOD882D
1001 0011	BAP50LX	SOD882D
1001 0100	BAP51LX	SOD882D
1001 0110	BAP65LX	SOD882D
1111 1101	BAP55LX	SOD882D
1111 1111	BAP64LX	SOD882D
1A	BGU6101	SOT1209
1B	BGU6102	SOT1209
1C	BGU6104	SOT1209
1C%	BAP50-05	SOT23
1N%	BAP70-04W	SOT323
2A%	BF862	SOT23
4H	BB170	SOD323
4J	BB171	SOD323
4K	BB172	SOD323
4K%	BAP64-04	SOT23
4L%	BAP50-04	SOT23
4W%	BAP64-04W	SOT323
5K%	BAP64-05	SOT23
5W%	BAP64-05W	SOT323
6F%	BAP1321-04	SOT23
6K%	BAP64-06	SOT23
6W%	BAP50-04W	SOT323
7K%	BAP65-05	SOT23
8K%	BAP70-05	SOT23
A	BGU8009	SOT1230
A	BGU8019	SOT1232
A1	BA591	SOD323
A1	BB208-02	SOD523
A1	BGA2001	SOT343
A1	BAP64Q	SOT753
A2	BB208-03	SOD323
A2	BGA2002	SOT343
A2	BAP70Q	SOT753
A3	BAP64-03	SOD323
A3%	BGA2031/1	SOT363
A5	BAP51-03	SOD323
A6%	BGA2012	SOT363
A8	BAP50-03	SOD323
A9	BAP70-03	SOD323
AC	BGU7005	SOT886
B3	BGU7003	SOT891
B5%	BSR12	SOT23
B6	BGU7007	SOT886
B7	BGU7008	SOT886
B7%	BFU725F/N1	SOT343
B7%	BGA2716	SOT363

Marking code	Type	Package
BA%	BGA2714	SOT363
BFG31	BFG31	SOT223
BFG35	BFG35	SOT223
BFG541	BFG541	SOT223
BLT50	BLT50	SOT223
BLT80	BLT80	SOT223
BLT81	BLT81	SOT223
C4%	BGM1013	SOT363
CE	BB173	SOD523
CF	BB174	SOD523
CH	BB175	SOD523
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D1	BFU610F	SOT343
D1	BGU6005/N2	SOT886
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
E	BGU8M1	SOT1232
E2%	BFS17A	SOT23
F	BGU6009/N2	SOT1230
F	BGU8H1	SOT1232
F1%	BFU910F	SOT343
FF	BFQ18A	SOT89
FG	BFQ149	SOT89
G	BGU8103	SOT1232
G2%	BGA2711	SOT363
G3%	BGA2748	SOT363
G4%	BGA2771	SOT363
JR	BB156/DG/B2	SOD323
K1	BAP51-02	SOD523
K2	BAP51-05W	SOD523
K4	BAP50-02	SOD523
K6	BAP65-02	SOD523
K7	BAP1321-02	SOD523
K8	BAP70-02	SOD523
L2	BB202	SOD523
LB%	PBR941B	SOT23
LJ%	BGU7044	SOT363
LK%	BGU7045	SOT363
LP%	BGA2867	SOT363
LR%	BGA2874	SOT363
LS%	BGA2817	SOT363
M1%	BFR30	SOT23
M2%	BFR31	SOT23
M26	BF908	SOT143
M27	BF908R	SOT143

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M3%	BFT46	SOT23
M4%	BSR56	SOT23
M5%	BSR57	SOT23
M6%	BSR58	SOT23
M91	BF991	SOT143
M92	BF992	SOT143
MA%	BGA2802	SOT363
MB%	BGA2803	SOT363
MC%	BGA2851	SOT363
MD	BF908WR	SOT343
MD%	BGA2869	SOT363
MG%	BF994S	SOT143
MH%	BF996S	SOT143
MO4	BF904	SOT143
N	BB181	SOD523
N0%	BFS505	SOT323
N2%	BFS520	SOT323
N2%	ON5030	SOT323
N2%	BFM520	SOT363
N3	BFG520W	SOT343
N33	BFG505	SOT143
N36	BFG520	SOT143
N37	BFG540	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
N48	BFG520/XR	SOT143
N49	BFG540/XR	SOT143
N6%	BFS25A	SOT323

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N7	BFG540W/X	SOT343
N8	BFG540W/XR	SOT343
N9	BFG540W	SOT343
N9%	BAP70AM	SOT363
NA%	BF1105R	SOT143
NG%	BF1108	SOT143
NG%	BF1108/L	SOT143
NH%	BF1108R	SOT143
none	BFR540	SOT143
ON5046	ON5046	SOT223
P1	BB131	SOD323
P1	BFG21W	SOT343
P3	BFG403W	SOT343
P4	BFG410W	SOT343
P5	BB135	SOD323
P5	BFG425W	SOT343
P6	BFG480W	SOT343
PF	BB156	SOD323
R2%	BFR93A	SOT23
R2%	BFR93AW	SOT323
R8%	BFG93A	SOT143
S	BAP64-02	SOD523
S2%	BBY40	SOT23
S3%	BF1107	SOT23
S6%	BF510	SOT23
S7%	BF511	SOT23
S8%	BF512	SOT23
S9%	BF513	SOT23
SC%	BB201	SOT23
SC%	BGU7031	SOT363
SD%	BGU7032	SOT363
SE%	BGU7033	SOT363
UW	BGU7003W	SOT886

Marking code	Type	Package
UY	BGU7004	SOT886
UZ	BGU8007	SOT886
V0%	PBR941	SOT23
V0%	PRF947	SOT323
V1%	BFT25	SOT23
V12	BFG67/X	SOT143
V2%	BFQ67	SOT23
V2%	BFQ67W	SOT323
V3%	BFG67	SOT143
V4%	BAP64-06W	SOT323
V6%	BAP65-05W	SOT323
V8	BAP1321-03	SOD323
VB	BF1118W	SOT343
VC	BF1118WR	SOT343
VC%	BF1118	SOT143
VD%	BF1118R	SOT143
W1%	BFT92	SOT23
W1%	BFT92W	SOT323
W2%	PBR951	SOT23
W2%	PRF957	SOT323
W4%	BAP50-05W	SOT323
W6%	BAP51-04W	SOT323
W7%	BAP51-06W	SOT323
X1%	BFT93	SOT23
X1%	BFT93W	SOT323
Y3	BAP70-02/DG/B2	SOD523
YB	BGU8009	SOT886
YC%	BGA2870	SOT363
Z	BB145B	SOD523
ZA%	BFU668F	SOT343
ZB%	BFU768F	SOT343
ZD	BFU730LX	SOT883

7. Abbreviations

A&D	Aerospace and Defense
AC	Alternating Current
ACC	Air-Cavity Ceramic package
ACP	Air-Cavity Plastic package
AGC	Automatic Gain Control
AM	Amplitude Modulation
ASYM	ASYMmetrical design of Doherty (main and peak devices are different)
Bcst/ISM	Broadcast/Industrial, Scientific, Medical
BiCMOS	Bipolar Complementary Metal-Oxide Semiconductor
BS diode	Band-Switch diode
BPF	Band Pass Filter
Broadband	Broadband RF power GaN HEMT
CATV	Community Antenna Television
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
CATV OR	CATV Optical Receiver
CB	Citizens' Band radio
CDMA	Code Division Multiple Access
CFR	Crest Factor Reduction
CMMB	Chinese Multimedia Mobile Broadcasting
CMOS	Complementary Metal Oxide Semiconductor
Config	Configuration
CQS	Customer Qualification Samples
CSO	Composite Second Order beat
CTB	Composite Triple Beat
CW	Continuous Wave
dB	deciBle
DC	Direct Current
DDC	Digital Down-Conversion
DEV	DEVelopment
DiSEqC	Digital Satellite Equipment Control
DOCSIS	Data Over Cable Service Interface Specification
DPD	Digital Pre-Distortion
DSP	Digital-Signal Processor
DUC	Digital Up-Conversion
DVB	Digital Video Broadcasting
EDGE	Enhanced Data Rates for GSM Evolution
ESD	ElectroStatic Discharge
FET	Field-Effect Transistor
FM	Frequency Modulation
Freq	Frequency
FTTx	Fiber To The (Home, Building, Curb)
GaAs	Gallium Arsenide
GaN	Gallium Nitride
Gen	Generation
GHz	GigaHertz
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPS LNA	GPS Low-Noise Amplifier
GSM	Global System for Mobile communications
HBM	Human Body Model
HD	High-Definition
HDTV	High-Definition Television
HEMT	High-Electron Mobility Transistor
HF	High Frequency (3-30 MHz)
HFC	Hybrid Fiber Coax
HFET	Heterostructure Field-Effect Transistor
HPA	High Power Amplifier
HVQFN	Plastic thermally enHanced Very thin Quad Flat pack No leads
IC	Integrated Circuit
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
IoT	Internet of Things
IP	Internet Protocol
IQ	I/Q data (digital)
ISM	Industrial, Scientific, and Medical (reserved frequency bands)
JFET	Junction Field-Effect Transistor
kW	kiloWatt
LDMOS	Laterally Diffused Metal-Oxide-Semiconductor
LEP	Light-Emitting Plasma
LNA	Low-Noise Amplifier
LNB	Low-Noise Block
LO	Local Oscillator
LPF	Low Pass Filter
LTE	Long-Term Evolution
mA	milliAmp
MC-GSM	Multi-Carrier GSM
MHz	MegaHertz
MIM	Metal Insulator Metal
MMIC	Monolithic Microwave Integrated Circuit
MMPP	Main and Peak devices realized separately in halves of push-pull transistor
MPPM	Main and Peak device realized in same push-pull transistor (2 times)
MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor
MPA	Medium Power Amplifier
MRI	Magnetic Resonance Imaging
NF	Noise Figure
NIM	Network Interface Module
OIRT	Organisation Internationale de Radiodiffusion et de Télévision
OMP	Over-Molded Plastic
PA	Power Amplifier
PAD	Single-Package Asymmetric Doherty
PIN diode	P-type, Intrinsic, N-type diode
PLL	Phase-Locked Loop
QFN	Quad Flat No-leads
QoS	Quality of Service
QUBiC	QUality BiCMOS
RF	Radio Frequency
RFP trs	RF Power transistor
RFS	Released For Supply
RF4CE	Radio Frequency for Consumer Electronics
RKE	Remote Keyless Entry
RoHS	Restriction of Hazardous Substances
Rx	Receive
SARFT	State Administration For Radio, Film, and Television
SAW	Surface Acoustic Wave
SDARS	Satellite Digital Audio Radio Service
SDK	Software Development Kit
SiGe:C	Silicon Germanium Carbon
SMATV	Satellite Master Antenna Television
SMD	Surface-Mounted Device
SOD	Small-Outline Diode
SOM	Small-Outline Module
SOT	Small-Outline Transistor
SPDT	Single Pole, Double Throw
STB	Set-Top Box
SYM	SYMmetrical design of Doherty (main and peak devices are the same type of transistor)
TDD	Time-Division Duplexing
TDMA	Time Division Multiple Access
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
TTL	Transistor-Transistor Logic
Tx	Transmit
µA	microAmp
UHF	Ultra High Frequency (470-860 MHz)
UMTS	Universal Mobile Telecommunications System
UWB	Ultra-WideBand
V	Volt
Varicap	Variable capacitance diode
VBW	Video BandWidth
VCO	Voltage-Controlled Oscillator

VDMOS	Vertical Double-diffused Metal Oxide Semiconductor
VGA	Variable-Gain Amplifier
VHF	Very High Frequency (30-300 MHz)
VoIP	Voice over Internet Protocol
VOR	VHF Omnidirectional Radio range
VSAT	Very Small Aperture Terminal
W	Watt
WB ampl	WideBand amplifier
WB trs	WideBand transistor
WB trs 1-4	WideBand transistor generation 1-4
WB trs 5-7	WideBand transistor generation 5-7
WCDMA	Wideband Code Division Multiple Access
WiFi	Wireless Fidelity
WiMAX	Worldwide interoperability for Microwave Access
WLAN	Wireless Local Area Network
WL-CSP	Wafer-Level Chip-Scale Package
WRIF	WiReless InFrastructure (base stations)
XR	eXtremely Rugged

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