RF discretes

Selection guide

Infrastructure | Multicopter | Navigation | Bluetooth | Radar | Automotive

Mobile Devices | Radio | TV | WiFi | Consumer | Telecom

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Introduction RF discretes

Robust, flexible, small and reliable devices for complementary wireless solutions

As society becomes ever more mobile, 24/7 universal network availability and connectivity will play a big role in our future. Data traffic in mobile systems and infrastructure will continue to increase tremendously and by 2020 there will be 50.1 billion units of expected connected devices and data rates will reach 1 Gbps through 5G deployment, because people will continue to expand the role of mobile data in their everyday life. Multiple devices connected to one another will be used to post, share and stream content, with videos making up the bulk of this traffic.

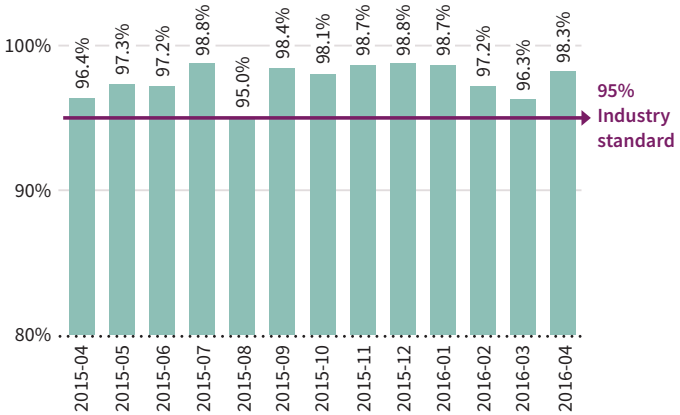
As a part of this constant increase the growing of access points under the form of small cells, infotainment and navigation assistance in automotive for instance will play a major role in tomorrow's communications. Granting stable and reliable wireless reception and transmission at multiple or specific bands will enable users to access the net through devices equipped with wireless network interface, while roaming within the range of fixed Access Points (AP) or a public cell.

Our products stand for

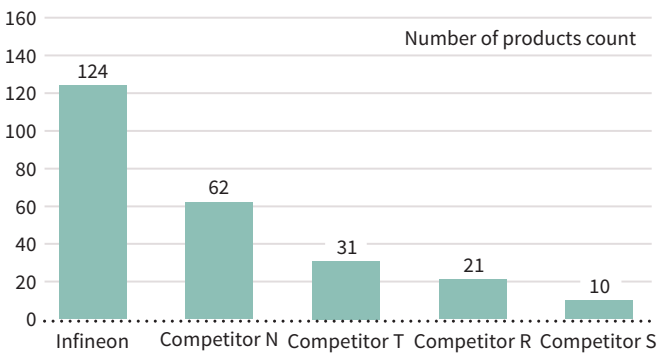
- **Performance**: Our 8th gen. RF transistors deliver the best NF available on the market – 0.6 dB as measured in the application – delivering an improvement in system sensitivity and interference immunity enhancement, and making receiving and transmitting signals more stable and reliable
- **Versatility**: With regard to product portfolio availability, we outdo our competitors by a factor of 2 and provide our customers with the necessary versatility during design-in by offering a wide choice of different packages, conventional SOTs or miniaturized TSLPs, and device features
- **Supply security**: We provide competitive lead times of ≤ 6 weeks, while ensuring the ability to handle demand upswings with two dedicated FEs and two BEs. Our commitment to customers' shipment dates and supply performance always exceeds industry standards by 2 percent, i.e. 97 percent instead of 95 percent
- **Quality and reliability**: Our field failure rates are on average < 0.1 PPM, providing the quality standards for which Infineon is renowned throughout the semiconductor industry
- **Design-in and sales support**: We support our customers with a worldwide field application engineering and sales team, providing a professional and flexible design-in service

Last but not least, we lead innovation and have a proven ability to flexibly support our customers in fragmented and rapidly developing markets.

Customer Shipment Date (CSD) performance on average ≥ 97%



Infineon provides with the broadest RF discretes portfolio for complementary wireless



The following pages provide guidance in selecting suitable products for particular applications.

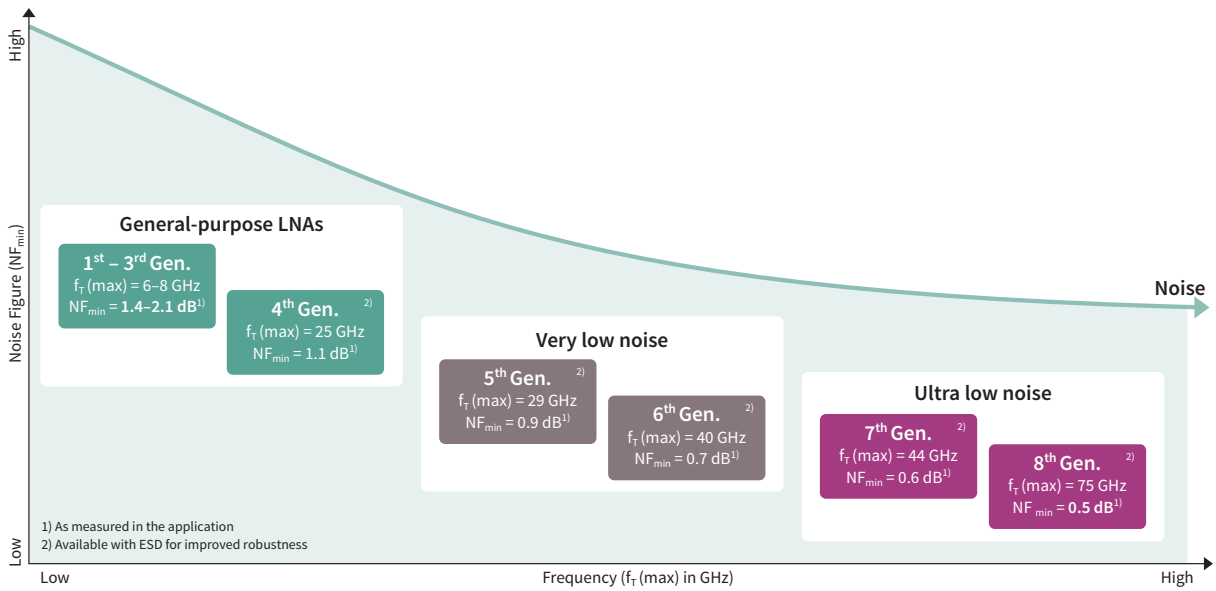
RF transistors

For over a decade, Infineon Technologies have paved the way in all radio frequency segments, with RF transistors providing an outstanding RF performance, superior signal quality and robustness – all this at a highly attractive price.

Silicon-germanium (SiGe) based on B9 technology benefits from in-house process builds and years of experience in high-volume SiGe:C bipolar technology, which has been in mass production since 2002.

B9-based product series deliver an RF performance comparable to GaAs in terms of linearity and noise figures; while also providing higher robustness given the ESD protection, strong design reliability and the option of integrating dense analog circuitry and digital control on the same mixed-signal IC. Not only does this allow wireless equipment manufacturers to add more functionality onto devices where space is a constraint, but it is also available at a competitive price, while offering the ultimate in quality and manufacturing efficiency.

B9 comes in different variants, but the 7th and 8th generations – each with its own optimization for specific application areas – are our focus series.



RF transistors – 7th generation

Ease of use for complementary wireless connectivity

Infineon's 7th generation RF transistor family is an easy-to-use series of discrete Heterojunction Bipolar Transistors (HBT) which is suitable as a single- and dual-band Low-Noise Amplifier (LNA) solution for a vast range of WiFi connectivity applications.

This series of devices combines a 44 GHz f_T silicon-germanium:carbide (SiGe:C) B9HFM process with advanced device geometry engineering conceived to reduce the parasitic capacitance in order to enhance high-frequency characteristics. Furthermore, they allow engineers to increase the RF link budget and Signal-to-Noise Ratio (SNR) of their AP routers and mobile stations when wider coverage areas are needed and especially when a higher order modulation scheme, such as 256 Quadrature Amplitude Modulation (QAM), is used. They offer a high throughput where a more stringent SNR for both the AP and client is required.

Key features

Ease of use RF performance

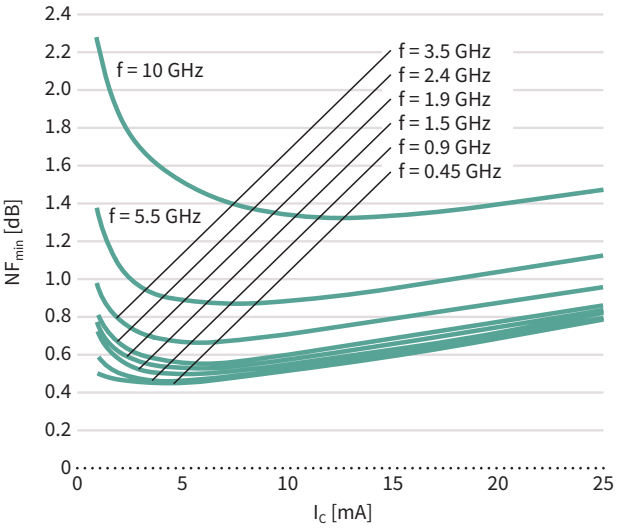
- High transition frequency f_T = 45 GHz
- High gain (19 dB) and NF level (0.65 dB)
- High linearity OP1dB +8.5 dBm and OIP3 +19 dBm at 2.4 GHz at low current consumption of 13 mA
- High maximum RF input power 1.5 kV HBM ESD robustness

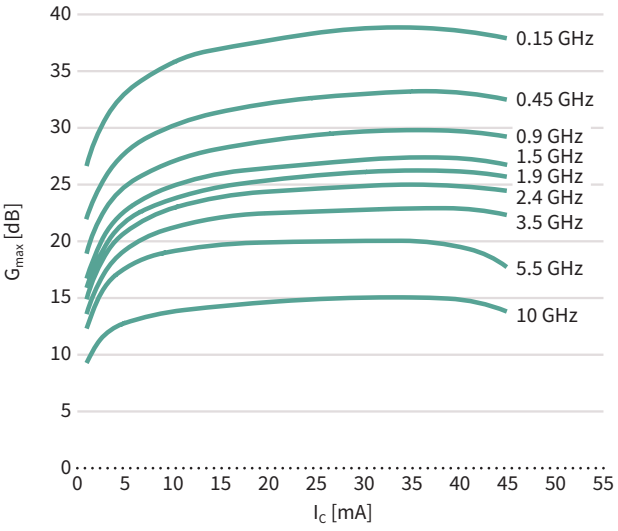
Technical benefits

- **Broad frequency range:** from 450 MHz to 12 GHz
- **Reduced** power consumption
- **Device suitability** under input signal power-stress

Customer benefits

- **Unmatched** general purpose device for high flexibility in vast frequency range
- **Energy savings** and extended battery life
- Improved high input power robustness





Infineon's 7th generation general-purpose transistors offer RF engineers an outstanding performance. With noise figures of as low as 0.45 dB in sub-GHz range and of 0.9 dB at 5.5 GHz, this transistor series functions as a low-noise amplifier and provides improved system sensitivity in wireless communication and broadcasting systems.

With G_{max} of more than 10 dB at 10 GHz, Infineon's 7th generation product portfolio can also be used as a gain block for buffer or driver amplifiers, or as a mixer or VCO for frequencies higher than 10 GHz.

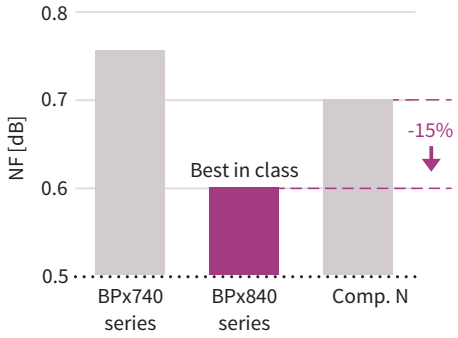
RF transistors – 8th generation

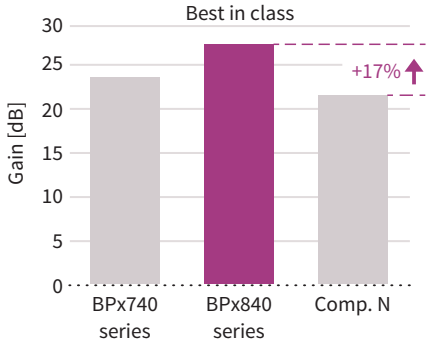
Best-in-class performance for WiFi connectivity

The BFx840x product family is a series of discrete Heterojunction Bipolar Transistors (HBT) addressing dual- and fixed-frequency Low-Noise Amplifier (LNA) solutions for high-performance WiFi connectivity applications. It combines an 80 GHz f_T silicon-germanium:carbide (SiGe:C) B9HFM process and adopts dedicated device geometry reducing the parasitic capacitance between substrate and transistor degrades high-frequency characteristics and ultimately improved.

8th generation RF transistors allow engineers to increase the RF link budget and Signal-to-Noise Ratio (SNR) of their AP routers and mobile stations when wider coverage areas are needed mostly when a higher order modulation scheme is used, such as in emerging very high throughput wireless specifications like 256 Quadrature Amplitude Modulation (QAM) in IEEE 802.11ac, which has more stringent SNR requirements for both the AP client.

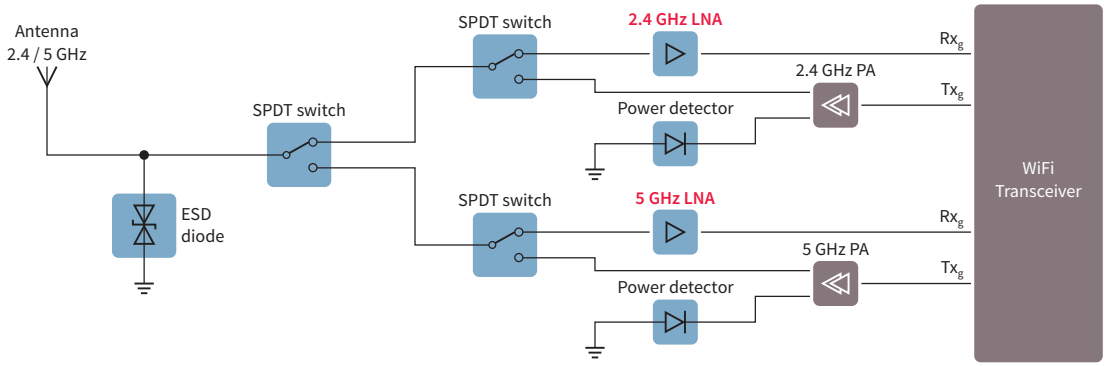
Best-in-class 8th generation RF transistors: NF and G_{max} SiGe competitor comparison





8th generation RF transistors come with an improved BiC in relation to NF and power gain G_{max} compared to previous generations and closest SiGe competitors.

Block diagram



Low-Noise Amplifiers (LNA) are key components required to increase the system sensitivity and extend the max. connecting distance for WiFi applications. Their primary purpose involves delivering a superior performance where losses of the whole RF front end become critical due to long routing paths, for instance in WiFi architectures with 4 x 4 MIMO or 8 x 8 MIMO functions.

Infineon's 8th generation RF SiGe Bipolar transistors act as an LNA, delivering the lowest Noise Figure (NF) of 0.6 dB at 5.5 GHz, and the highest gain thanks to their high frequency (f_T) and superior linearity compared to other solutions on the market. This outstanding performance delivers an improvement in system sensitivity and interference immunity enhancement, helping engineers to design high-performance WiFi applications at an attractive price.

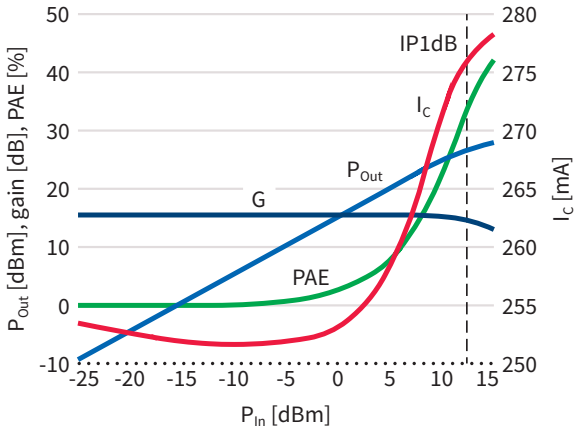
Medium-power amplifiers

Infineon's first generation

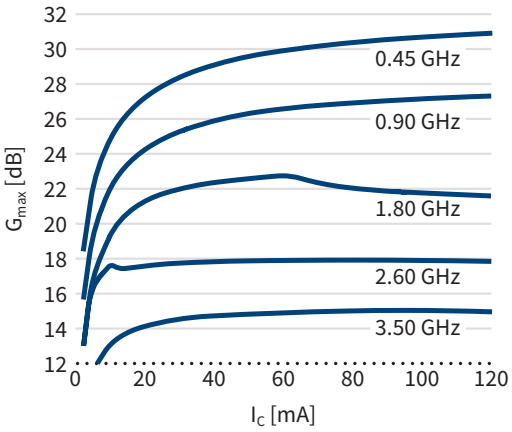
The BFP780 and BFQ790 are Infineon's new general-purpose high-gain driver amplifiers based on Infineon's cost-effective Silicon Germanium (SiGe) technology. Optimized for power gain and addressing a broad range of wireless applications, they are a new addition to the existing RF product portfolio.

Suitable for commercial and industrial wireless infrastructure – such as 3G/4G, set-top boxes and CATV, along with indoor and outdoor wireless access points – these single-stage driver amplifiers provide high linearity and high gain for use at frequencies up to 3.0 GHz, while also ensuring great flexibility in designs where high linearity is a determining factor in component selection.

The emitter-base diode design provides the BFP780 and BFQ790 with high ruggedness even at high maximum RF input power, whereas the silicon substrate conductivity and low thermal resistance of the package make the devices thermally resistant, facilitating high dissipated power values during operation.

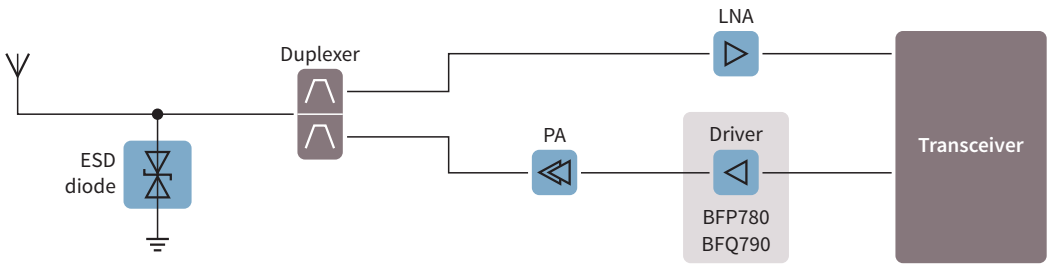


P_{Out}, gain, I_C, PAE vs. P_{In} at V_{CE} = 5 V, I_{Cq} = 250 mA, f = 2.6 GHz, $Z_l = Z_{Opt}$



Maximum power gain G_{max} vs. I_C at V_{CE} = 5 V, f = parameter

Block diagram



Driver amplifiers, also known as high linear gain blocks, are an important functional block in RF transceiver systems. The final stage of the transmitter chain in the transceiver system, Power Amplifier (PA), requires a certain input power level to operate in the linear mode, which usually cannot be delivered by the transceiver IC directly.

In these cases, external one- or two-stage driver amplifiers are required. Driver amplifiers provide the high gain linear signal amplification from the transceiver IC to the PA. They are generally operated in linear class-A mode to enable simultaneous high linearity and high gain, thereby keeping the spurious signals generated by the PA down to a minimum.

RF transistors – product portfolio

RF transistors 7th generation

P/N	OPN [mA]	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	Package
BFP720	20.0	0.5	26.0	20.5	6.0	SOT343
BFP720F	20.0	0.5	26.0	20.5	6.0	TSFP-4-1
BFP720ESD	25.0	0.6	27.0	22.0	6.5	SOT343
BFP740	45.0	0.5	27.0	25.0	11.0	SOT343
BFP740F	45.0	0.5	27.5	25.0	11.0	TSFP-4-1
BFP740ESD	35.0	0.6	27.0	25.0	10.0	SOT343
BFP740FESD	35.0	0.6	27.0	24.5	10.0	TSFP-4-1
BFR740L3RH	30.0	0.5	24.5	25.0	11.0	TSLP-3-9
BFP760	70.0	0.5	25.0	31.5	14.5	SOT343

RF transistors 8th generation

Product type	OPN	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	Package
BFP843	BFP843H6327XTSA1	0.95	22.5	24.0	7.0	SOT343
BFP843F	BFP843FH6327XTSA1	0.90	23.5	23.5	7.0	TSFP
BFR843EL3	BFR843EL3E6327XTSA1	0.95	24.0	21.0	7.0	TSLP-3-9
BFP840ESD	BFP840ESDH6327XTSA1	0.60	27.0	21.0	4.5	SOT343
BFP840FESD	BFP840FESDH6327XTSA1	0.55	27.5	21.0	4.5	TSFP
BFP842ESD	BFP842ESDH6327XTSA1	0.40	23.5	24.5	8.0	SOT343
BFR840L3RHESD	BFR840L3RHESDE6327XTSA1	0.50	26.5	17.0	4.0	TSLP-3-9

RF drivers

Product type	OPN	At 1.9 GHz			At 2.7 GHz			Package
		Gain [dB]	OIP3 [dBm]	OP1dB [dBm]	Gain [dB]	OIP3 [dBm]	OP1dB [dBm]	
BFP780	BFP780H6327XTSA1	18	35	23	14.4	35	23	SOT343
BFQ790[1)]	BFQ790H6327XTSA1	17	40	27	14.0	40	27	SOT89

1) Available as of Q4/2016

RF transistors – product portfolio

Low-noise Si transistor up to 2.5 GHz

Infineon P/N	SP No	OPN	Electrical characteristics								Package
			V_{CEO} (max) [V]	I_C (max) [mA]	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	f_T (typ) [GHz]	P_{tot} (max) [mW]	
BFP181	SP000011013	BFP181E7764HTSA1	12.0	20.0	0.9	21.0	16.5	-2.0	8.0	175.0	SOT143-4-1
BFR181	SP000011047	BFR181E6327HTSA1	12.0	20.0	0.9	18.5	18.0	-1.0	8.0	175.0	SOT23
BFR181W	SP000750418	BFR181WH6327XTSA1	12.0	20.0	0.9	19.0	18.0	-1.0	8.0	175.0	SOT323
BFP182R	SP000011016	BFP182RE7764HTSA1	12.0	35.0	0.9	22.0	24.0	5.0	8.0	250.0	SOT143-4-1
BFP182W	SP000745176	BFP182WH6327XTSA1	12.0	35.0	0.9	22.0	24.0	5.0	8.0	250.0	SOT343
BFR182	SP000011051	BFR182E6327HTSA1	12.0	35.0	0.9	18.0	24.5	5.0	8.0	250.0	SOT23
BFR182W	SP000750420	BFR182WH6327XTSA1	12.0	35.0	0.9	19.0	25.0	5.0	8.0	250.0	SOT323
BFP183W	SP000745244	BFP183WH6327XTSA1	12.0	65.0	0.9	22.0	26.5	8.5	8.0	450.0	SOT343
BFR183	SP000011054	BFR183E6327HTSA1	12.0	65.0	0.9	17.5	27.0	9.0	8.0	450.0	SOT23
BFR35AP	SP000011060	BFR35APE6327HTSA1	15.0	45.0	1.4	16.0	24.0	9.0	5.0	280.0	SOT23
BFR92P	SP000011062	BFR92PE6327HTSA1	15.0	45.0	1.4	16.0	24.0	9.0	5.0	280.0	SOT23
BFS17P	SP000011073	BFS17PE6327HTSA1	15.0	25.0	3.5	12.7	21.5	10.0	1.4	280.0	SOT23
BFS17S	SP000750448	BFS17SH6327XTSA1	15.0	25.0	3.0	12.7	22.5	11.0	1.4	280.0	SOT363
BFS17W	SP000750450	BFS17WH6327XTSA1	15.0	25.0	3.5	12.7	22.5	11.0	1.4	280.0	SOT323
BFS481	SP000750462	BFS481H6327XTSA1	12.0	20.0	0.9	20.0	18.0	-1.0	8.0	175.0	SOT363
BFS483	SP000750464	BFS483H6327XTSA1	12.0	65.0	0.9	19.0	26.5	9.0	8.0	450.0	SOT363
BFR340F	SP000750426	BFR340FH6327XTSA1	6.0	10.0	1.15	16.5	13.0	-1.0	14.0	60.0	TSFP-3-1
BFR340L3	SP000013558	BFR340L3E6327XTMA1	6.0	10.0	1.15	17.5	12.5	-1.0	14.0	60.0	TSLP-3-7
BFR360F	SP000750428	BFR360FH6327XTSA1	6.0	35.0	1.0	15.5	24.0	9.0	14.0	210.0	TSFP-3-1
BFR360L3	SP000013561	BFR360L3E6765XTMA1	6.0	35.0	1.0	16.0	24.0	9.0	14.0	210.0	TSLP-3-1
BFP183	SP000011018	BFP183E7764HTSA1	12.0	65.0	0.9	22.0	26.5	8.5	8.0	250.0	SOT143

Low-noise Si transistor up to 5 GHz

Infineon P/N	SP No	OPN	Electrical characteristics								Package
			V_{CEO} (max) [V]	I_C (max) [mA]	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	f_T (typ) [GHz]	P_{tot} (max) [mW]	
BFP405	SP000745254	BFP405H6327XTSA1	4.5	12.0	1.25	23.0	15.0	5.0	25.0	55.0	SOT343
BFP405F	SP000745258	BFP405FH6327XTSA1	4.5	12.0	1.25	22.5	14.0	0.0	25.0	55.0	TSFP-4-1
BFP410	SP000762244	BFP410H6327XTSA1	4.5	40.0	1.2	21.5	23.5	10.5	25.0	150.0	SOT343
BFP420	SP000745260	BFP420H6327XTSA1	4.5	35.0	1.1	21.0	22.0	12.0	25.0	160.0	SOT343
BFP420F	SP000745268	BFP420FH6327XTSA1	4.5	35.0	1.1	19.5	24.0	10.5	25.0	160.0	TSFP-4-1
BFP460	SP000745276	BFP460H6327XTSA1	4.5	50.0	1.1	17.5	27.5	11.5	22.0	200.0	SOT343
BFP520	SP000745280	BFP520H6327XTSA1	2.5	40.0	0.95	23.5	25.0	12.0	45.0	100.0	SOT343
BFP520F	SP000745282	BFP520FH6327XTSA1	2.5	40.0	0.95	22.5	23.5	10.5	45.0	100.0	TSFP-4-1
BFP540	SP000745288	BFP540H6327XTSA1	4.5	80.0	0.9	21.5	24.5	11.0	30.0	250.0	SOT343
BFP540ESD	SP000745298	BFP540ESDH6327XTSA1	4.5	80.0	0.9	21.5	24.5	11.0	30.0	250.0	SOT343
BFP540FESD	SP000745300	BFP540FESDH6327XTSA1	4.5	80.0	0.9	20.0	24.5	11.0	30.0	250.0	TSFP-4-1
BFR460L3	SP000014238	BFR460L3E6327XTMA1	4.5	50.0	1.1	16.0	27.0	11.5	22.0	200.0	TSLP-3-1

Ultra-low-noise SiGe:C transistors up to 12 GHz

Infineon P/N	SP No	OPN	Electrical characteristics								Package
			V_{CEO} (max) [V]	I_C (max) [mA]	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	f_T (typ) [GHz]	P_{tot} (max) [mW]	
BFP640ESD	SP000785482	BFP640ESDH6327XTSA1	4.1	50.0	0.65	25.0	27.0	12.0	46.0	200.0	SOT343
BFP640FESD	SP000890034	BFP640FESDH6327XTSA1	4.1	50.0	0.55	26.5	26.0	11.5	46.0	200.0	TSFP-4-1
BFP620	SP000745302	BFP620H7764XTSA1	2.3	80.0	0.7	21.5	25.5	14.5	65.0	185.0	SOT343
BFP620F	SP000745304	BFP620FH7764XTSA1	2.3	80.0	0.7	21.0	25.0	14.0	65.0	185.0	TSFP-4-1
BFP640	SP000745306	BFP640H6327XTSA1	4.0	50.0	0.65	24.0	26.5	13.0	40.0	200.0	SOT343
BFP640F	SP000750404	BFP640FH6327XTSA1	4.0	50.0	0.65	23.0	27.5	13.5	40.0	200.0	TSFP-4-1

High-linearity Si-and SiGe:C transistors up to 6 GHz

Infineon P/N	SP No	OPN	Electrical characteristics								Package
			V_{CEO} (max) [V]	I_C (max) [mA]	NF_{min} (typ) [dB]	G_{max} (typ) [dB]	OIP3 [dBm]	OP1dB [dBm]	f_T (typ) [GHz]	P_{tot} (max) [mW]	
BFQ19S	SP000011042	BFQ19SE6327HTSA1	15.0	210.0	1.8	11.5	32.0	22.0	5.5	1.0	SOT89
BFR93A	SP000011066	BFR93AE6327HTSA1	12.0	90.0	1.5	14.5	30.0	15.0	6.0	300.0	SOT23
BFR93AW	SP000734402	BFR93AWH6327XTSA1	12.0	90.0	1.5	15.5	30.0	15.0	6.0	300.0	SOT323
BFR106	SP000011044	BFR106E6327HTSA1	15.0	210.0	1.8	13.0	32.0	22.0	5.0	700.0	SOT23
BFP193	SP000011024	BFP193E6327HTSA1	12.0	80.0	1.0	18.0	29.5	15.0	8.0	580.0	SOT143-4-1
BFP193W	SP000745248	BFP193WH6327XTSA1	12.0	80.0	1.0	20.5	29.5	15.0	8.0	580.0	SOT343
BFR193	SP000011056	BFR193E6327HTSA1	12.0	80.0	1.0	15.0	30.0	15.0	8.0	580.0	SOT23
BFR193F	SP000750424	BFR193FH6327XTSA1	12.0	80.0	1.0	19.0	29.0	14.8	8.0	580.0	TSFP-3-1
BFR193W	SP000734404	BFR193WH6327XTSA1	12.0	80.0	1.3	16.0	30.0	15.0	8.0	580.0	SOT323
BFR193L3	SP000013557	BFR193L3E6327XTMA1	12.0	80.0	1.0	19.0	29.0	15.0	8.0	580.0	TSLP-3-1
BFP196W	SP000745250	BFP196WH6327XTSA1	12.0	150.0	1.3	19.0	32.0	19.0	7.5	700.0	SOT343
BFR380F	SP000750444	BFR380FH6327XTSA1	6.0	80.0	1.1	13.5	29.0	17.0	14.0	380.0	TSFP-3-1
BFR380L3	SP000013562	BFR380L3E6327XTMA1	6.0	80.0	1.1	13.5	29.5	16.0	14.0	380.0	TSLP-3-1
BFP450	SP000745270	BFP450H6327XTSA1	4.5	100.0	1.25	15.5	29.0	19.0	24.0	450.0	SOT343
BFP650	SP000750406	BFP650H6327XTSA1	4.0	150.0	0.8	21.5	29.5	18.0	37.0	500.0	SOT343
BFP650F	SP000750408	BFP650FH6327XTSA1	4.0	150.0	0.8	21.5	31.0	17.5	42.0	500.0	TSFP-4-1
BFP196	SP000011027	BFP196E6327HTSA1	12.0	150.0	1.3	19.0	32.0	19.0	7.5	700.0	SOT143-4-1

PIN diodes

Operating at up to 3 GHz with high-voltage handling capabilities, Infineon Technologies PIN diodes are ideal for a wide range of mobile communication and RF applications. Their low loss and low distortion levels improve battery life and quality in cellular and cordless phones.

Along with an outstanding RF performance, these diodes simplify design-in thanks to their extremely low forward resistance, diode capacitance and series inductance. These inherent qualities are largely due to a state-of-the-art planar diffusion process. Available in a range of highly compact package options – including TSLP and the leadless – significant board space savings can be made, helping designers create smaller, lighter end-products.

Key features

- Low insertion loss (low r_f)
- High isolation (low capacitance C_t)
- Low power consumption (low I_F)
- Low level of high-frequency distortion
- Broad product portfolio
- Package miniaturization

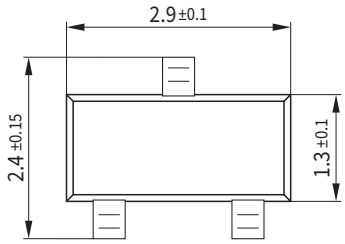
Technical benefits

- Single and dual configuration
- High linearity
- Fast switching time for Rx-Tx antenna switches
- Low insertion loss and low dissipated power in Rx-Tx antenna switches
- Enhanced overall RF performance

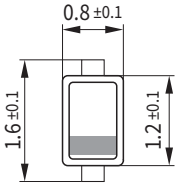
Customer benefits

- Flexibility in circuit design with a focus on required parameters
- Easily adaptable to different applications/ frequencies
- Enhanced versatility in design conception
- Improved system efficiency

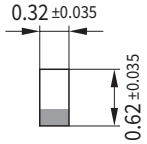
Customer benefits – space saving



SOT23



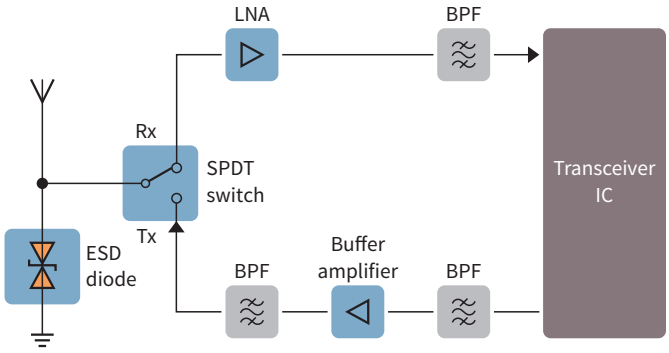
SC79



TSSLP-2-1, -2

- Small form factor: 70% of package profile increases design flexibility
- 90% reduction of parasitics
- Improved RF performance at insertion

Application example: single-antenna cordless phone



- Two single PIN diodes or one dual diode are at the core of an SPDT switch
- Depending on the bias voltage, one of the diodes is in “short”, another in “open” state, effectively connecting either the Tx or Rx path to the antenna
- Infineon PIN diodes are ideal for building a switch which simultaneously delivers a low insertion loss and high isolation

Low-noise amplifier
BFP640, BFP740, BFP840

Buffer amplifier
BFP450, BFP650, BFP750

ANT SW
PIN diodes
BAR64-xx, BAR63-xx,
BAR90-xx

TVS diode
ESD108, ESD128,
ESD129

Pin diodes – product portfolio

C_T series [pF]	Type		C_T at 1 V [pF]	R_f at 10 mA [Ω]	τ_{rr}	Package
> 50 pF	BA592		0.92	0.36	120 ns	SOD323
< 50 pF	BAR14-1/15-1/16-1	D	0.50	7.00	1.0 µs	SOT23
	BAR61		0.50	7.00	1.0 µs	SOT143
	BAR64-03W, -02V		0.45	2.10	1.55 µs	SOD323, SC79
	BAR64-02EL		0.45	2.10	1.55 µs	TSLP-2
	BAR64-04/05/06/*07	D	0.45	2.20	1.55 µs	SOT23, *SOT143
	BAR64-04W/05W/06W	D	0.45	2.30	1.55 µs	SOT323
	BAR65-03W, -02V		0.45	0.60	80 ns	SOD323, SC79
	BAR66		0.45	1.00	700 ns	SOT23
	BAR67-02V		0.40	1.00	700 ns	SC79
	BAR67-04	D	0.40	1.00	700 ns	SOT23
	BA885, BA595		0.35	4.50	1.6 µs	SOT23, SOD323
	BA895-02V		0.35	4.50	1.6 µs	SC79
	BAR88-02V		0.30	0.60	0.5 µs	SC79
	BAR88-02LRH[1)]		0.30	0.60	0.5 ms	TSLP-2-RH
≤ 25 pF	BAR89-02LRH[1)]		0.25	0.80	0.8 µs	TSLP-2-RH
	BAR90-02EL, -02ELS		0.25	0.80	0.75 µs	TSLP-2, TSSLP-2
	BAR90-02LRH[1)]		0.25	0.80	0.75 µs	TSLP-2-RH
	BAR90-081LS	Q	0.25	0.80	0.75 µs	TSSLP-8
	BAT18-04,-05	D	0.75	0.40	120 ns	SOT23
	BAR50-03W, -02V		0.24	3.00	1.1 µs	SOD323, SC79
	BAR50-02L		0.24	3.00	1.1 µs	TSLP-2
	BAR63-03W, -02V		0.23	1.00	75 ns	SOD323, SC79
	BAR63-02L		0.23	1.00	75 ns	TSLP-2
	BAR63-04/05/06	D	0.23	1.00	75 ns	SOT23
	BAR63-04W/05W/06W	D	0.23	1.00	75 ns	SOT323

1) Not recommended for new designs

D = Double configuration
Q = Quad configuration

Schottky diodes

Infineon RF Schottky diodes are silicon low-barrier N-type devices and, unlike other solutions available on the market, they come with **various junction diode configurations** which can be used for highly sensitive power detector circuits, and in sampling or mixer circuits.

A very **low barrier height** and **very small forward voltage**, along with **low junction capacitance**, make this series of devices an excellent choice as a detector function at frequencies as high at 24 GHz.

Key features

- Low leakage current (low R_f)
- Low signal distortion level
- High efficiency / low losses
- Low power consumption
- Guard-ring protection on chip
- Broad product portfolio
- Package miniaturization

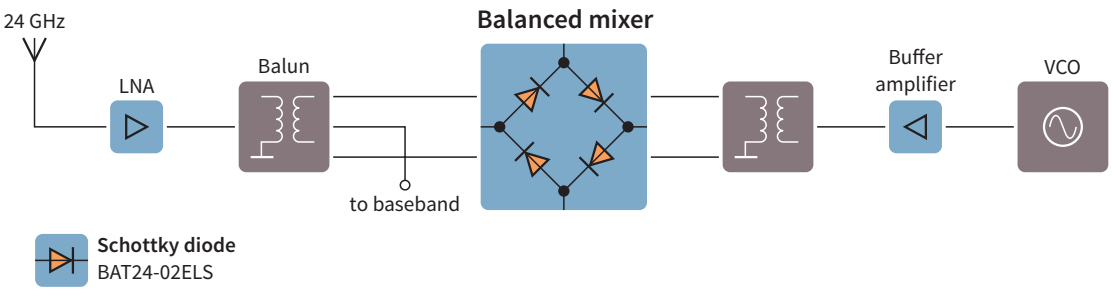
Technical benefits

- Fast switching
- Tailored for low-/medium-power detection circuits
- Wide dynamic range in detector applications
- Higher linearity and power handling capability compared to integrated mixers

Customer benefits

- Flexibility in circuit design with a focus on required parameters
- Easy adaptability to different applications/frequencies
- Easy detector/mixer design due to width
- Enhanced versatility in design conception
- Improved system efficiency

Application example: 24GHz radar system



- Unbalanced, single-balanced or double-balanced mixer topology depending on application requirements
- Balanced mixer offers good RF isolation
- Double-balanced mixer also provides good isolation between LO, RF and IF

Target applications

- Wireless LAN and WiFi routers
- Mobile devices
- 24 GHz radar system preferring discretes solutions

Schottky diodes – product portfolio

Type		V_R (max) [V]	I_F (max) [mA]	C_T [pF]	V_F at 1 mA [mV]	Package
BAT15-02EL/-02ELS		4	110	0.26	230	TSLP-2/TSSLP-2
BAT15-03W		4	110	0.26	230	SOD323
BAT15-04W	D	4	110	0.26	230	SOT323
BAT15-05W	D	4	110	0.26	230	SOT323
BAT15-04R	D	4	110	0.26	230	SOT23
BAT15-099/-099LRH[1)]	D	4	110	0.26	230	SOT143/TSLP-4
BAT15-099R	Q	4	110	0.38	230	SOT143
BAT17		4	130	0.55	340	SOT23
BAT17-04/W	D	4	130	0.55	340	SOT23/SOT323
BAT17-05	D	4	130	0.55	340	SOT23
BAT17-05W	D	4	130	0.55	340	SOT323
BAT17-06W	D	4	130	0.55	340	SOT323
BAT17-07	D	4	130	0.75	340	SOT143
BAT24-02LS		4	110	0.21	230	TSSLP
BAT62		40	20	0.35	440	SOT143
BAT62-02L/-02LS		40	120	0.35	440	TSLP-2/TSSLP-2
BAT62-02V/-03W		40	20	0.35	440	SC79/SOD323
BAT62-07L4	D	40	20	0.35	440	TSLP-4
BAT62-07W	D	40	20	0.35	440	SOT343
BAT63-02V		3	100	0.65	190	SC79
BAT63-07W	D	3	100	0.65	190	SOT343
BAT68		8	130	0.75	318	SOT23
BAT68-04/W	D	8	130	0.75	318	SOT23/SOT323
BAT68-06/W	D	8	130	0.75	318	SOT23/SOT323

1) Not recommended for new designs

D = Double configuration
Q = Quad configuration

RF diodes portfolio by package

Pin diodes

AEC Qualified

Antenna switch function

SOD323	SC79	SOT23	SOT143	SOT323	TSLP-2	TSSLP-2	TSSLP-8
BAR50-03W BAR63-03W BAR64-03W BAR65-03W	BAR50-02V BAR63-02V BAR64-02V BAR65-02V BAR67-02V	BAR63-04 BAR63-05 BAR63-06 BAR64-04 BAR64-05 BAR64-06 BAR67-04	BAR64-07	BAR63-04W BAR63-05W BAR63-06W BAR63-04W BAR63-05W BAR63-06W	BAR50-02L BAR63-02L BAR64-02EL BAR90-02EL	BAR90-02ELS	BAR90-081LS
	BAR88-02V				BAR88-02LRH BAR89-02LRH	BAR90-02LRH	

RF attenuator function

BA595	BA885-02V	BA885 BAR14-1 BAR15-1 BAR16-1	BAR61				

Recommended for new designs

Not recommended for new designs

Schottky diodes

AEC Qualified

Mixer function

SOD323	SC79	SOT23	SOT143	SOT323	TSLP-2	TSSLP-2	TSLP
BAT15-03W		BAT15-04R BAT17 BAT17-04 BAT17-05	BAT15-099 BAT17-06W	BAT15-04W BAT15-05W BAT17-04W BAT17-05W BAT17-06W	BAT15-02EL	BAT15-02ELS	BAT24-02LS
			BAT15-099				BAT15-099LRH

Detector function

BAT62-03W	BAT62-02V BAT63-02V	BAT68 BAT68-04 BAT68-06	BAT62	BAT62-07W BAT63-07W BAT68-04W BAT68-06W	BAT62-02L	BAT62-02LS	

Recommended for new designs

Not recommended for new designs

Infineon support for RF discretes

Useful links and helpful information

Further information, datasheets and documents

www.infineon.com/rftransistors

www.infineon.com/rfdiodes

www.infineon.com/rf

Evaluationboards

www.infineon.com/rfevalboards

Simulation Models

www.infineon.com/rfcomponentlibraries

Videos

www.infineon.com/mediacenter

Info | Document | Evaluation Board | Simulation | Play

Cross reference list

RF transistors

Infineon product	Manufacturer product	Manufacturer	Product family
BFP181	BFR505/T[1)]	NXP	RF Transistors
BFP182	BFU520X[2)]	NXP	RF Transistors
BFP182R	BFU520XR[2)]	NXP	RF Transistors
BFP182W	BFU520W	NXP	RF Transistors
BFP183	BFU530X	NXP	RF Transistors
BFP183W	BFU530W	NXP	RF Transistors
BFP193	BFG540/X	NXP	RF Transistors
BFP193W	BFG540W/XR	NXP	RF Transistors
BFP196	BFG540/X	NXP	RF Transistors
BFP196W	BFG540W/XR	NXP	RF Transistors
BFR35AP	BFT25A	NXP	RF Transistors
BFR93A	BFT93A	NXP	RF Transistors
BFR93AW	BFT93W	NXP	RF Transistors
BFR181	BFG505XN	NXP	RF Transistors
BFR182	BFU520A	NXP	RF Transistors
BFR182W	BFS520W/PRF947	NXP	RF Transistors
BFR183	BFU530A	NXP	RF Transistors
BFR183W	BFU530W/PRF947	NXP	RF Transistors
BFR193	BFU550A	NXP	RF Transistors
BFS17P	BFS17A	NXP	RF Transistors
BFR340F	BFG325XR[1)]	NXP	RF Transistors
BFP405	BFG410W	NXP	RF Transistors
BFP420	BFG425W	NXP	RF Transistors
BFP450	BFG21W/BFG480W	NXP	RF Transistors
BFP540	BFG480W[1)]/BFU660F	NXP	RF Transistors
BFP540ESD	BFG480W[1)]/BFU660F	NXP	RF Transistors
BFP620	BFU610F	NXP	RF Transistors
BFP640	BFU630F	NXP	RF Transistors
BFP640ESD	BFU630F	NXP	RF Transistors
BFP650	BFU660F	NXP	RF Transistors
BFP720	BFU710F	NXP	RF Transistors
BFP720ESD	BFU710F	NXP	RF Transistors
BFP740	BFU725F/BFU730F	NXP	RF Transistors
BFP740ESD	BFU725F/BFU730F	NXP	RF Transistors
BFP760	BFU760F	NXP	RF Transistors
BFR740EL3	BFU730LX	NXP	RF Transistors
BFP840ESD	BFU710F	NXP	RF Transistors
BFP843	BFU730F	NXP	RF Transistors
BFR843EL3	BFU730LX	NXP	RF Transistors
BGB707L7ESD	BGU6102	NXP	RF Transistors

Infineon product	Manufacturer product	Manufacturer	Product family
BFP182W	2SC5012[2)]/2SC5015[2)]	Renesas	RF Transistors
BFP183	2SC4094[2)]/2SC4957	Renesas	RF Transistors
BFP193	2SC4093[2)]/2SC5455[2)]	Renesas	RF Transistors
BFP193W	2SC4227[2)]/2SC5011[2)]	Renesas	RF Transistors
BFP196	2SC4093[1) 2)]/2SC4227	Renesas	RF Transistors
BFP196W	2SC4093[2)]	Renesas	RF Transistors
BFR35AP	2SA1977	Renesas	RF Transistors
BFR93AW	2SC4226	Renesas	RF Transistors
BFR181	2SC5508[1)]	Renesas	RF Transistors
BFR181W	2SC5508[1)]/2SC5010[1)]	Renesas	RF Transistors
BFR182W	2SC5007[1)]	Renesas	RF Transistors
BFR183W	2SC5007[1)]	Renesas	RF Transistors
BFR193F	2SC5006[1)]	Renesas	RF Transistors
BFQ19S	2SC3357/4095/4536/4703	Renesas	RF Transistors
BFR340F	2SC5606[1)]	Renesas	RF Transistors
BFR360F	2SC5606[1)]	Renesas	RF Transistors
BFP420	2SC5508[2)]	Renesas	RF Transistors
BFP450	2SC5509[2)]	Renesas	RF Transistors
BFS481	2SC5606[1) 2)]	Renesas	RF Transistors
BFS483	2SC5455[1) 2)]	Renesas	RF Transistors
BFR750EL3	2SC5509(NE663M04)	Renesas	RF Transistors
BFP183W	2SC5087	Toshiba	RF Transistors
BFP193	2SC5087R	Toshiba	RF Transistors
BFP193W	2SC4842	Toshiba	RF Transistors
BFP196W	2SC4842	Toshiba	RF Transistors
BFR35AP	MT3S19R	Toshiba	RF Transistors
BFR93AW	MT3S16U	Toshiba	RF Transistors
BFR106	MT3S113/MT3S111[2)]	Toshiba	RF Transistors
BFR181W	2SC5090	Toshiba	RF Transistors
BFR182	2SC5064	Toshiba	RF Transistors
BFR182W	2SC5065	Toshiba	RF Transistors
BFR183	2SC5084	Toshiba	RF Transistors
BFR183W	2SC5085	Toshiba	RF Transistors
BFR193	2SC5084	Toshiba	RF Transistors
BFR193F	2SC5086[1)]	Toshiba	RF Transistors
BFR193W	2SC5085	Toshiba	RF Transistors
BFP405	MT4S34U	Toshiba	RF Transistors
BFP420	MT4S200U	Toshiba	RF Transistors
BFP450	MT4S24U[1)]/MT4S03BU	Toshiba	RF Transistors
BFP540ESD	MT4S300U/MT4S301U	Toshiba	RF Transistors

1) In a different package
2) In a different pinning

RF diodes

Infineon product	Manufacturer product	Manufacturer	Product family
BAT15-02EL	HSMS286x	Avago	RF Schottky Diodes
BAT15-02ELS	HSMS286x	Avago	RF Schottky Diodes
BAT15-02LRH	HSMS286x	Avago	RF Schottky Diodes
BAT15-02LS	HSMS286x	Avago	RF Schottky Diodes
BAT15-03W	HSMS286x	Avago	RF Schottky Diodes
BAT15-04W	HSMS286x	Avago	RF Schottky Diodes
BAT15-03W	1PS76SB17	NXP	RF Schottky Diodes
BAT17	BAT17	NXP	RF Schottky Diodes
BAT17-04	PMBD353	NXP	RF Schottky Diodes
BAT62	BAS40-07	NXP	RF Schottky Diodes
BAT62-02V	1PS79SB30	NXP	RF Schottky Diodes
BAT63-02V	1PS76SB21	NXP	RF Schottky Diodes
BAT68	1PS70SB82	NXP	RF Schottky Diodes
BAT68-04W	1PS70SB85	NXP	RF Schottky Diodes
BAT68-06	1PS70SB86	NXP	RF Schottky Diodes
BAT15-04W	BAT54SW	ST Microelectronics	RF Schottky Diodes
BAT17	BAT17	ST Microelectronics	RF Schottky Diodes
BAT17-04	BAS70-04	ST Microelectronics	RF Schottky Diodes
BAT17-04W	BAT54SW	ST Microelectronics	RF Schottky Diodes
BAT17-04W	BAS70-04W	ST Microelectronics	RF Schottky Diodes
BAT17-05	BAS70-05	ST Microelectronics	RF Schottky Diodes
BAT17-05W	BAS70-05W	ST Microelectronics	RF Schottky Diodes
BAT17-06	BAS70-06	ST Microelectronics	RF Schottky Diodes
BAT17-06W	BAS70-06W	ST Microelectronics	RF Schottky Diodes
BAT15-099	SMS3926-023	Toshiba	RF Schottky Diodes
BAT17	JDH2S01FS	Toshiba	RF Schottky Diodes
BAT17-04	JDH2S01FS	Toshiba	RF Schottky Diodes
BAT17-04W	JDH2S01FS	Toshiba	RF Schottky Diodes
BAT17-07	JDH2S01FS	Toshiba	RF Schottky Diodes
BAT68-06	1SS271	Toshiba	RF Schottky Diodes
BAT64	1SS294	Toshiba	RF Schottky Diodes
BAT68-06	1SS295	Toshiba	RF Schottky Diodes
BAT15-03W	1SS315	Toshiba	RF Schottky Diodes
BAT15-02EL	JDH2S01FS	Toshiba	RF Schottky Diodes
BAT15-02EL	JDH2S02FS	Toshiba	RF Schottky Diodes
BAT15-02ELS	JDH2S02SL	Toshiba	RF Schottky Diodes
BA595	BAP70-03	NXP	RF Pin Diodes
BAR50-02V	BAP50-02	NXP	RF Pin Diodes
BAR63-02L	BAP142LX	NXP	RF Pin Diodes
BAR64-02V	BAP64-02	NXP	RF Pin Diodes

Infineon product	Manufacturer product	Manufacturer	Product family
BAR64-03W	BAP64-03	NXP	RF Pin Diodes
BAR64-04	BAP64-04	NXP	RF Pin Diodes
BAR64-04W	BAP64-04W	NXP	RF Pin Diodes
BAR64-05	BAP64-05	NXP	RF Pin Diodes
BAR64-05W	BAP64-05W	NXP	RF Pin Diodes
BAR64-06	BAP64-06	NXP	RF Pin Diodes
BAR64-06W	BAP64-06W	NXP	RF Pin Diodes
BAR65-02V	BAP65-02	NXP	RF Pin Diodes
BAR65-03W	BAP65-03	NXP	RF Pin Diodes
BAR67-02V	BAP51-02	NXP	RF Pin Diodes
BAR88-02LRH	BAP65LX	NXP	RF Pin Diodes
BAR88-02V	BAP65-02	NXP	RF Pin Diodes
BAR89-02LRH	BAP142LX	NXP	RF Pin Diodes
BAR14-1	1SV251	Onsemi	RF Pin Diodes
BAR64-04	1SV251	Onsemi	RF Pin Diodes
BAR64-04W	1SV264	Onsemi	RF Pin Diodes
BAR65-03W	MMVL3401	Onsemi	RF Pin Diodes
BA885	BA779-G	Vishay	RF Pin Diodes
BAR14-1	S392D-G	Vishay	RF Pin Diodes
BAR64-05W	BAR64V-05W	Vishay	RF Pin Diodes

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- China, mainland ..... 4001 200 951 (Mandarin/English)
- India ..... 000 800 4402 951 (English)
- USA ..... 1-866 951 9519 (English/German)
- Other countries ..... 00* 800 951 951 951 (English/German)
- Direct access ..... +49 89 234-0 (interconnection fee, German/English)

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