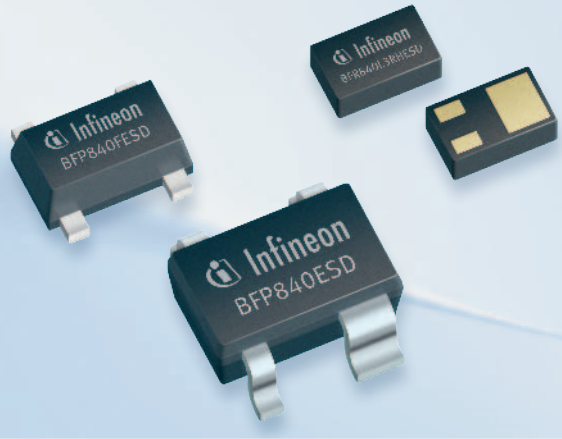
Product Brief



Next Generation RF Transistors

High Performance 840 RF Transistor Series for Emerging Wi-Fi Connectivity Trends

Wireless Fidelity or "Wi-Fi" plays a major role in today's communications by enabling constant connection in the 2.4GHz and 5GHz bands and broadband Internet access for users with laptops or devices equipped with wireless network interface while roaming within the range of fixed access points (AP) or a public hotspot.

The BFx840xESD product family is a series of discrete Hetero-junction Bipolar Transistors (HBT) specifically designed for high performance 5GHz band Low Noise Amplifier (LNA) solutions for Wi-Fi connectivity applications. BFx840x transistors combine the 80GHz f_T silicon-germanium:carbide (SiGe:C) B9HFM process with special device geometry engineering to reduce the parasitic capacitance between substrate and transistor that degrades high-frequency characteristics. As a result, the BFx840xESD series achieves 18dB gain and best-in-class 0.96dB noise figure in a 5GHz band application circuit without input matching elements requiring only 8 passives in total.

BFx840xESD RF transistor series 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 is used as in emerging very high throughput wireless specifications such as 256 Quadrature Amplitude Modulation (QAM) in IEEE 802.11ac with more stringent SNR requirements for both the AP and the client.

The first B9HFM SiGe:C transistors are housed in the standard SOT343 package (BFP840ESD), in the flat-lead TSFP-4-1 package (BFP840FESD) and in the low-height 0.3mm TSLP-3-9 package specifically fitting into modules (BFR840L3RHESD).

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Features

- High transition frequency f_T = 80GHz
- Best-in-class RF performance
- High maximum RF input power
- 1.5kV HBM ESD hardness
- Inherently matched in the 5GHz band
- Achieves highest gain (18dB) and best-in-class noise figure level (0.95dB) with only 8 external passives
- Low power consumption, ideal for mobile applications
- Low voltage supply capability e.g. V_{CC} = 1.2V and 1.8V
- Available in standard, flat lead and ultra low height packages

Benefits

- Modelling competence: SPICE models and Microwave Office/ ADS design kits
- Circuit layout/design support
- Abundant distribution channels and sales offices worldwide

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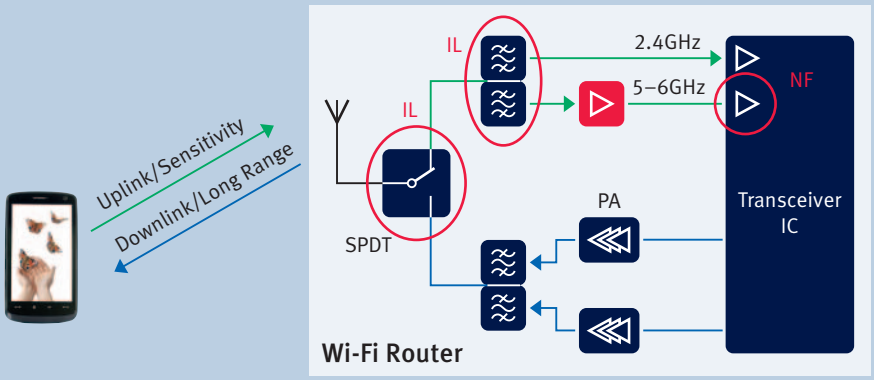
Challenges for IEEE 802.11a/n/ac Wi-Fi



Challenge for 5–6GHz Wi-Fi system:
Achieve a system noise figure about 2dB level

Problem:
High system noise figure generated by switch, diplexer and integrated LNA

Solution:
External LNA with < 1dB noise figure and high gain

Target Applications

- BFx840xESD series is specifically designed to be used as a 5–6GHz Low Noise Amplifier (LNA) for Wi-Fi 802.11a/n/ac standards.
- Focus are consumer products like Wi-Fi Access Point (AP) routers and Wi-Fi modules.

Other possible applications include

- Mobile and fixed connectivity applications: WiMAX and UWB
- Satellite communication systems, such as satellite radio (SDARs, DAB), navigation systems (e.g. GPS, Glonass) and C-band LNB (1st and 2nd stage LNA)
- Ku-band LNB front-end (2nd stage or 3rd stage LNA and active mixer)
- Ka-band oscillators (DROs)

	Package	$V_{CE,max.}$ [V]	$I_{c,max.}$ [mA]	f [GHz]	$G_{max.}$, 10mA [dB]	$NF_{min.}$, 5mA [dB]	OP1dB, 10mA [dBm]	OIP3, 10mA [dBm]
BFP840ESD	SOT343	2.25	35	5.5	22.5	0.85	5	22
BFP840FESD	TSFP-4-1	2.25	35	5.5	23	0.75	5	22
BFR840L3RHESD	TSLP-3-9	2.25	35	5.5	22	0.65	5	22

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