Silicon NPN Planar RF Transistor

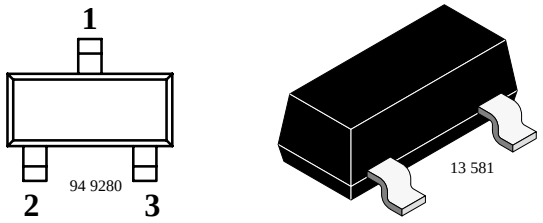
Electrostatic sensitive device.
Observe precautions for handling.

Applications

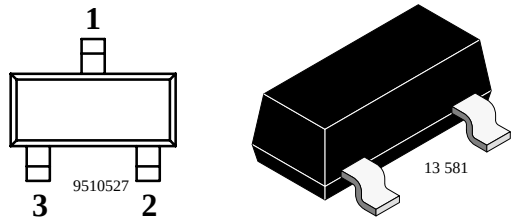
Low noise small signal amplifiers up to 2 GHz. This transistor has superior noise figure and associated gain performance at UHF, VHF and microwave frequencies.

Features

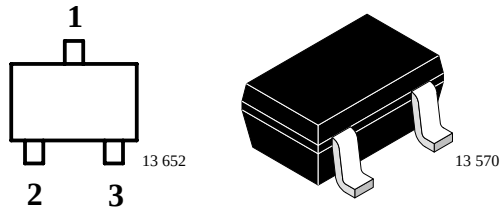
- Small feedback capacitance
- Low noise figure
- High transition frequency



BFQ67 Marking: V2
Plastic case (SOT 23)
1 = Collector, 2 = Base, 3 = Emitter



BFQ67R Marking: R67
Plastic case (SOT 23)
1 = Collector, 2 = Base, 3 = Emitter



BFQ67W Marking: WV2
Plastic case (SOT 323)
1 = Collector, 2 = Base, 3 = Emitter

Absolute Maximum Ratings

T_{amb} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Value	Unit
Collector-base voltage		V_{CBO}	20	V
Collector-emitter voltage		V_{CEO}	10	V
Emitter-base voltage		V_{EBO}	2.5	V
Collector current		I_C	50	mA
Total power dissipation	$T_{amb} \leq 60$ °C	P_{tot}	200	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	–65 to +150	°C

Maximum Thermal Resistance

T_{amb} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Value	Unit
Junction ambient	on glass fibre printed board (25 x 20 x 1.5) mm^3 plated with 35µm Cu	R_{thJA}	450	K/W

Electrical DC Characteristics

T_{amb} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector cut-off current	V_{CE} = 20 V, V_{BE} = 0	I_{CES}			100	µA
Collector-base cut-off current	V_{CB} = 15 V, I_E = 0	I_{CBO}			100	nA
Emitter-base cut-off current	V_{EB} = 1 V, I_C = 0	I_{EBO}			1	µA
Collector-emitter breakdown voltage	I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	10			V
Collector-emitter saturation voltage	I_C = 50 mA, I_B = 5 mA	V_{CEsat}		0.1	0.4	V
DC forward current transfer ratio	V_{CE} = 5 V, I_C = 15 mA	h_{FE}	65	100	150	

Electrical AC Characteristics

T_{amb} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Transition frequency	V_{CE} = 8 V, I_C = 15 mA, f = 500 MHz	f_T		7.5		GHz
Collector-base capacitance	V_{CB} = 10 V, f = 1 MHz	C_{cb}		0.4		pF
Collector-emitter capacitance	V_{CE} = 8 V, f = 1 MHz	C_{ce}		0.2		pF
Emitter-base capacitance	V_{EB} = 0.5 V, f = 1 MHz	C_{eb}		0.85		pF
Noise figure	V_{CE} = 8 V, Z_S = Z_{Sopt}, f = 800 MHz, I_C = 5 mA	F		0.8		dB
	V_{CE} = 8 V, Z_S = Z_{Sopt}, f = 800 MHz, I_C = 15 mA	F		1.5		dB
	V_{CE} = 8 V, Z_S = 50 Ω, f = 2 GHz, I_C = 5 mA	F		2.5		dB
	V_{CE} = 8 V, Z_S = 50 Ω, f = 2 GHz, I_C = 15 mA	F		3.0		dB
Power gain	V_{CE} = 8 V, Z_S = 50 Ω, Z_L = Z_{Lopt}, I_C = 15 mA, f = 800 MHz	G_{pe}		15.5		dB
	V_{CE} = 8 V, Z_S = 50 Ω, Z_L = Z_{Lopt}, I_C = 15 mA, f = 2 GHz	G_{pe}		8		dB
Linear output voltage – two tone intermodulation test	V_{CE} = 8 V, I_C = 15 mA, d_{IM} = 60 dB, f_1 = 806 MHz, f_2 = 810 MHz, Z_S = Z_L = 50 Ω	V_1 = V_2		160		mV
Third order intercept point	V_{CE} = 8 V, I_C = 15 mA, f = 800 MHz	IP_3		26		dBm

Common Emitter S–Parameters

Z_0 = 50 Ω, T_{amb} = 25°C, unless otherwise specified

V_{CE}/V	I_C/mA	f/MHz	S11		S21		S12		S22	
			LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
				deg		deg		deg		deg
5	2	100	0.894	–20.6	6.78	163.0	0.027	77.1	0.967	–8.7
		300	0.749	–56.2	5.61	136.2	0.066	59.2	0.834	–20.8
		500	0.610	–83.8	4.50	117.7	0.086	50.0	0.716	–25.9
		800	0.486	–116.2	3.36	98.8	0.102	46.3	0.623	–28.6
		1000	0.445	–132.4	2.87	90.2	0.109	46.9	0.590	–30.1
		1200	0.419	–147.3	2.50	81.9	0.115	48.7	0.568	–31.8
		1500	0.402	–166.6	2.12	71.7	0.126	53.1	0.546	–35.0
		1800	0.403	177.0	1.83	62.8	0.142	58.1	0.531	–38.8
		2000	0.411	167.0	1.69	58.0	0.156	60.8	0.524	–41.9
		2200	0.423	158.5	1.59	53.0	0.173	63.2	0.516	–45.1
		2500	0.445	146.1	1.45	45.8	0.202	65.2	0.511	–51.7
		2800	0.464	137.1	1.34	39.1	0.232	65.5	0.490	–59.1
		3000	0.490	130.5	1.27	34.7	0.255	64.7	0.471	–64.8
	5	100	0.760	–32.1	14.10	154.1	0.024	72.7	0.912	–15.2
		300	0.522	–79.0	9.62	121.5	0.052	58.5	0.663	–27.9
		500	0.390	–108.5	6.72	104.7	0.067	57.0	0.538	–28.1
		800	0.311	–139.1	4.56	89.9	0.088	60.0	0.473	–26.3
		1000	0.292	–153.5	3.77	83.1	0.103	62.1	0.459	–26.4
		1200	0.282	–166.5	3.21	76.7	0.119	63.6	0.450	–27.4
		1500	0.287	178.0	2.67	68.3	0.143	64.7	0.438	–30.4
		1800	0.298	164.0	2.29	60.9	0.169	65.5	0.428	–34.2
		2000	0.313	157.1	2.10	56.6	0.189	65.2	0.423	–37.1
		2200	0.328	149.6	1.96	52.5	0.209	64.8	0.415	–40.2
		2500	0.353	140.6	1.79	46.4	0.239	63.5	0.406	–46.8
		2800	0.379	133.2	1.65	39.4	0.267	61.5	0.380	–53.8
		3000	0.400	127.4	1.55	35.4	0.286	59.8	0.358	–58.9
	10	100	0.594	–46.3	22.01	144.4	0.021	69.8	0.829	–21.7
		300	0.346	–101.6	12.12	110.8	0.043	63.5	0.524	–29.9
		500	0.264	–130.9	7.86	97.1	0.060	66.0	0.431	–25.7
		800	0.230	–158.2	5.13	85.1	0.088	69.0	0.399	–21.9
		1000	0.224	–169.5	4.21	79.5	0.107	69.7	0.396	–21.8
		1200	0.225	179.8	3.56	73.9	0.126	69.6	0.393	–23.3
		1500	0.235	166.8	2.94	66.8	0.154	68.6	0.387	–26.6
		1800	0.251	156.9	2.51	59.9	0.184	67.6	0.379	–30.7
		2000	0.270	150.2	2.30	56.0	0.206	66.2	0.374	–33.7
		2200	0.287	144.1	2.14	52.1	0.226	65.1	0.366	–36.9
		2500	0.310	136.4	1.95	46.2	0.256	62.6	0.354	–43.6
		2800	0.342	131.0	1.79	39.9	0.284	60.1	0.325	–50.5
		3000	0.362	125.6	1.68	35.9	0.302	57.8	0.301	–55.3