NPN Silicon Transistor for RF Broadband Amplifier BFX 89

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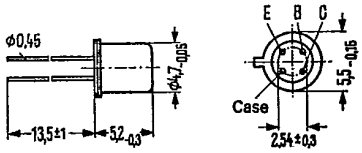
BFX 89 is an epitaxial NPN silicon RF transistor in TO 72 case (18 A 4 DIN 41876). The leads are electrically insulated from the case. This transistor is suitable for general applications up to the GHz range, e.g. for use in antenna and RF amplifiers.

Type	Ordering code
BFX 89	Q62702-F296



Approx. weight 0.4 g

Dimensions in mm

Maximum ratings

Collector-base voltage	V_{CBO}	30	V
Collector-emitter voltage ($R_{BE} \leqq 50\ \Omega$)	V_{CER}	30	V
Collector-emitter voltage	V_{CEO}	15	V
Emitter-base voltage	V_{EBO}	2.5	V
Collector current	I_C	25	mA
Collector peak current ($t < 1\ \mu s$)	I_{CM}	50	mA
Junction temperature	T_j	200	°C
Storage temperature range	T_{stg}	−65 to +175	°C
Total power dissipation ($T_{amb} \leqq 60$ °C)	P_{tot}	200	mW

Thermal resistance

Junction to ambient air	R_{thJA}	≦ 700	K/W
Junction to case	R_{thJC}	≦ 400	K/W

Static characteristics (T_{amb} = 25 °C)

Collector cutoff current (V_{CBO} = 15 V)	I_{CBO}	≤10	nA
Collector-emitter saturation voltage (I_C = 20 mA)	V_{CEsat}	≤0.75	V
DC current gain			
(I_C = 2 mA; V_{CE} = 1 V)	h_{FE}	20 to 150	–
(I_C = 25 mA; V_{CE} = 1 V)	h_{FE}	20 to 125	–

Dynamic characteristics (T_{amb} = 25 °C)

Transition frequency (I_C = 2 mA; V_{CE} = 5 V; f = 200 MHz)	f_T	1.2	GHz
Reverse transfer capacitance (I_C = 2 mA; V_{CE} = 5 V; f = 1 MHz)	C_{12e}	0.7	pF
Collector-base capacitance (V_{CB} = 10 V; I_E = 0; f = 1 MHz)	C_{CBO}	≤1.2	pF
Noise figure (I_C = 2 mA; V_{CE} = 5 V)			
(f = 200 MHz; R_g = 100 Ω)	NF	3 (≤4)	dB
(f = 500 MHz; R_g = 60 Ω)	NF	≤6.5	dB
(f = 800 MHz; R_g = 60 Ω)	NF	7	dB
Power gain (I_C = 14 mA, V_{CE} = 10 V; f = 200 MHz; R_g = 60 Ω)	G_{pe}	23	dB
Output voltage[1] (I_C = 14 mA; V_{CE} = 5 V; R_L = 75 Ω; d_{IM} = 60 dB)	V_O	150	mV

1) Measured with three tone modulation f approx. 800 MHz

S parameter
Operating point: I_C = 12 mA; V_{CE} = 5 V; Z_o = 50 Ω

f (GHz)	S_{11}	φ	S_{21}	φ	S_{12e}	φ	S_{22e}	φ	G_{max} (dB)
0,2	0,258	– 78	7,249	107	0,058	76	0,592	–14	19,38
0,3	0,160	–100	5,095	97	0,080	80	0,529	–12	15,68
0,4	0,132	–122	3,918	90	0,104	83	0,514	–10	13,27
0,5	0,130	–140	3,229	86	0,125	86	0,465	– 9	11,31
0,6	0,143	–151	2,788	83	0,149	88	0,463	–12	10,04
0,7	0,150	–155	2,410	80	0,171	89	0,455	–13	8,75
0,8	0,160	–159	2,137	76	0,190	90	0,456	–15	7,72
0,9	0,160	–158	2,009	73	0,214	90	0,467	–17	7,24
1,0	0,152	–157	1,837	71	0,233	91	0,473	–20	6,48
1,1	0,136	–153	1,684	69	0,252	92	0,508	–21	5,90
1,2	0,117	–146	1,573	66	0,269	93	0,522	–22	5,38
1,3	0,092	–135	1,466	63	0,275	94	0,563	–24	5,02
1,4	0,074	–114	1,371	60	0,287	93	0,595	–25	4,66
1,5	0,070	– 89	1,267	56	0,298	92	0,637	–26	4,34

Total perm. power dissipation versus temperature
mW $P_{tot} = f(T)$