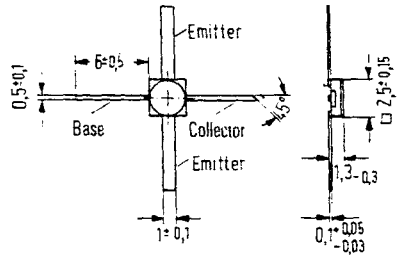


Low-Noise NPN Silicon Microwave Transistor up to 4 GHz BFQ 58

BFQ 58 is a bipolar silicon NPN microwave transistor in hermetically sealed metal ceramic 100 mil package similar to TO 120. State-of-the-art manufacturing processes such as ion implantation technique, titanium-platinum-gold metallization as well as a glass passivated chip surface ensure very high reliability. The transistor is particularly intended for use in low-noise amplifiers and oscillators up to 4 GHz. It is marked on its package with the short designation "58".

Type	Mark	Ordering code
BFQ 58	58	Q62702-F653



Approx. weight 0.05 g

Dimensions in mm

Maximum ratings

Collector-emitter voltage	V_{CE0}	16	V
Collector-emitter voltage ($R_{BE} = 0$)	V_{CES}	30	V
Collector-base voltage	V_{CBO}	25	V
Emitter base voltage	V_{EBO}	1	V
Collector current	I_C	30	mA
Storage temperature range	T_{stg}	-65 to +175	°C
Junction temperature	T_j	200	°C
Total power dissipation ($T_{amb} \leq 87^\circ\text{C}$)	P_{tot}	450	mW

Thermal resistance

Junction to ambient air (when mounted on Al_2O_3 ceramics or glass-fiber reinforced Teflon 40x25x1.5 mm.)	R_{thJA}	≤ 250	K/W
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Static characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Collector-emitter breakdown voltage ($I_C = 100 \mu\text{A}$)	$V_{(BR)CES}$	30	V
Collector cutoff current ($V_{CBO} = 15 \text{ V}$)	I_{CBO}	100	nA
Collector cutoff current ($V_{CEO} = 15 \text{ V}$)	I_{CEO}	500	nA
DC current gain ($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}$)	h_{FE}	120	-

Dynamic characteristics ($T_{amb} = 25^{\circ}\text{C}$)

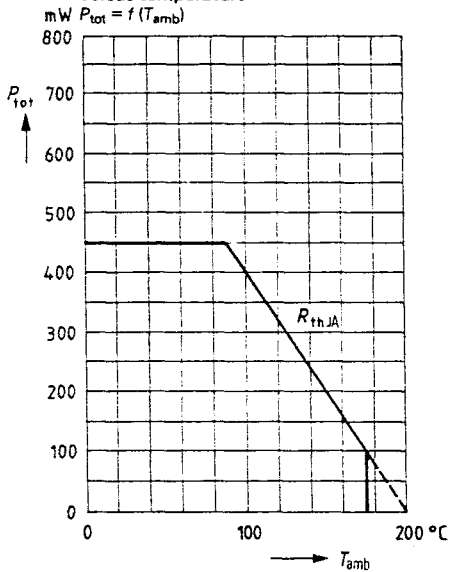
Transition frequency ($V_{CE} = 15 \text{ V}; I_C = 25 \text{ mA}$)	f_T	6.5	GHz
Noise figure ($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 4 \text{ GHz}$)	NF_{min}	3.8	dB
($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 1.5 \text{ GHz}$)	NF_{min}	2.2	dB
Power gain at noise matching ($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 4 \text{ GHz}$)	G_{GP}	9	dB
($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 1.5 \text{ GHz}$)	G_{GP}	15	dB
Output power ($G_{popt} - 1 \text{ dB}$) ($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 4 \text{ GHz}$)	$P_1 \text{ dB}$	14	dBm
Noise figure (measured) ¹⁾ ($V_{CE} = 15 \text{ V}; I_C = 15 \text{ mA}; f = 4 \text{ GHz}$)	NF_{min}	4.2	dB
Reverse transfer capacitance ($V_{CE} = 10 \text{ V}; I_C = 1 \text{ mA}; f = 1 \text{ MHz}$)	C_{12e}	0.33	pF

1) $NF_{min} = 10 \log \left(1 + \frac{NF_{min} - 1}{1 - \frac{1}{G_{GP}}} \right)$

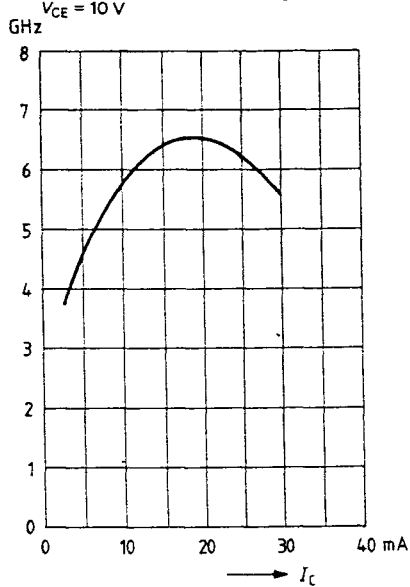
S parameter:Operating point: $V_{CE} = 15 \text{ V}$, $I_C = 15 \text{ mA}$, $Z_o = 50 \Omega$

f (GHz)	S_{11}	φ	S_{21}	φ	S_{12}	φ	S_{22}	φ	G_{\max} (dB)
0,1	0,615	- 42	25,67	153	0,013	67	0,913	- 17	38,0
0,2	0,591	- 81	21,93	134	0,022	52	0,743	- 29	32,2
0,3	0,568	-106	18,07	121	0,028	48	0,673	- 36	29,5
0,4	0,583	-123	14,90	113	0,030	45	0,588	- 37	27,1
0,5	0,582	-133	12,51	104	0,033	42	0,538	- 40	25,2
0,6	0,558	-142	10,81	98	0,036	40	0,496	- 39	23,5
0,7	0,538	-152	9,41	92	0,037	41	0,464	- 40	22,0
0,8	0,550	-160	8,36	88	0,039	42	0,424	- 40	20,9
0,9	0,546	-166	7,47	84	0,041	43	0,403	- 44	19,8
1	0,550	-170	6,75	81	0,044	43	0,407	- 44	19,0
1,1	0,552	-175	6,10	78	0,046	43	0,379	- 46	18,0
1,2	0,563	-177	5,60	74	0,048	43	0,390	- 48	17,4
1,3	0,545	178	5,18	71	0,050	44	0,367	- 48	16,4
1,4	0,562	174	4,87	68	0,054	42	0,389	- 53	16,1
1,5	0,562	172	4,55	66	0,055	45	0,370	- 47	15,4
1,6	0,548	168	4,28	64	0,058	46	0,377	- 56	14,9
1,7	0,557	164	3,97	61	0,059	46	0,387	- 50	14,3
1,8	0,564	165	3,73	58	0,062	46	0,359	- 57	13,7
1,9	0,532	160	3,56	57	0,065	47	0,403	- 55	13,2
2	0,534	158	3,40	56	0,069	45	0,366	- 58	12,7
2,5	0,558	151	2,79	42	0,083	43	0,371	- 72	11,2
3	0,532	140	2,33	31	0,097	41	0,388	- 79	9,5
3,5	0,556	132	2,02	22	0,111	39	0,380	- 92	8,4
4	0,521	121	1,78	9	0,128	33	0,423	-100	7,3
4,5	0,546	110	1,63	0	0,146	28	0,418	-109	6,6
5	0,538	97	1,51	-11	0,164	24	0,451	-119	6,1
5,5	0,568	86	1,37	-21	0,181	21	0,442	-129	5,4
6	0,590	76	1,23	-33	0,194	10	0,442	-144	4,6

Total perm. power dissipation versus temperature



Transition frequency $f_T = f(I_C)$



Noise figure $NF = f(I_C)$

