Extremely Low Noise NPN Silicon Broadband Transistors

BFT 66
BFT 67

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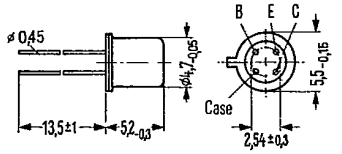
BFT 66 and BFT 67 are epitaxial NPN silicon planar RF transistors in TO 72 case (18 A 4 DIN 41876), intended for input stage applications in extremely low-noise broadband amplifiers up to 1 GHz.

The terminals are electrically insulated from the case.

Type	Ordering code
BFT 66	Q62702-F456
BFT 67	Q62702-F457



Approx. weight 0.4 g Dimensions in mm

Maximum ratings		BFT 66 BFT 67	
Collector-emitter voltage	V_{CEO}	15	V
Collector-base voltage	V_{CBO}	20	V
Emitter-base voltage	V_{EBO}	2.5	V
Collector current	I_C	30	mA
Base current	I_B	4	mA
Junction temperature	T_j	200	°C
Storage temperature range	T_{stg}	–65 to +175	°C
Total power dissipation ($T_{amb} \leq 60$°C)	P_{tot}	200	mW
Thermal resistance			
Junction to ambient air	R_{thJA}	≤700	K/W
Junction to case	R_{thJC}	≤400	K/W

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Static characteristics (T_{amb} = 25°C)		**BFT 66**	**BFT 67**	
Collector-emitter breakdown voltage (I_{CEO} = 500 µA)	$V_{(BR)CEO}$	>15	>15	V
Collector-emitter breakdown voltage (I_{CBO} = 100 µA)	$V_{(BR)CES}$	>20	>20	V
Emitter-base breakdown voltage (I_{EBO} = 100 µA)	$V_{(BR)EBO}$	>2.5	>2.5	V
Collector cutoff current (V_{CBO} = 10 V)	I_{CBO}	<50	<50	nA
DC current gain (I_C = 10 mA; V_{CE} = 6 V)	h_{FE}	≧30	≧30	–
Dynamic characteristics (T_{amb} = 25°C)				
Small signal current gain (I_C = 10 mA; V_{CE} = 6 V; f = 1 kHz)	h_{fe}	70 (>30)	70 (>30)	–
Transition frequency (I_C = 20 mA; V_{CE} = 6 V; f = 200 MHz)	f_T	3.8(>3.6)	3.8(>3.6)	GHz
Reverse transfer capacitance (I_C = 1 mA; V_{CE} = 6 V; f = 1 MHz)	C_{12e}	0.65	0.65	pF
Noise figure (I_C = 3 mA; V_{CE} = 6 V; f = 10 MHz; R_g = 75 Ω)	NF	≦1	≦1.5	dB
(I_C = 3 mA; V_{CE} = 6 V; f = 800 MHz; R_g = 60 Ω)	NF	2.1	2.5	dB
Output voltage[1] (I_C = 20 mA; V_{CE} = 6 V; R_g = R_L = 75 Ω; d_{IM} = 60 dB)	V_0	240	240	mV

S parameter
Operating point: V_{CE} = 5 V, I_C = 3 mA, Z_o = 50 Ω

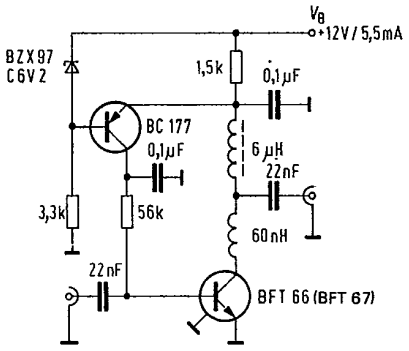
f (GHz)	S_{11}	φ	S_{21}	φ	S_{12}	φ	S_{22}	φ	G_{max} (dB)
0,1	0,62	– 38	18,0	134	0,03	68	0,90	–15	27,32
0,2	0,62	– 49	16,4	133	0,06	77	0,80	–11	22,94
0,4	0,35	– 87	12,3	102	0,09	70	0,68	–14	15,56
0,6	0,24	–138	9,1	86	0,11	68	0,61	–18	11,38
0,8	0,18	–162	7,2	70	0,13	65	0,60	–27	9,28
1,0	0,05	141	5,5	52	0,18	57	0,65	–35	7,30

1) Three tone modulation f approx. 800 MHz

Circuit examples

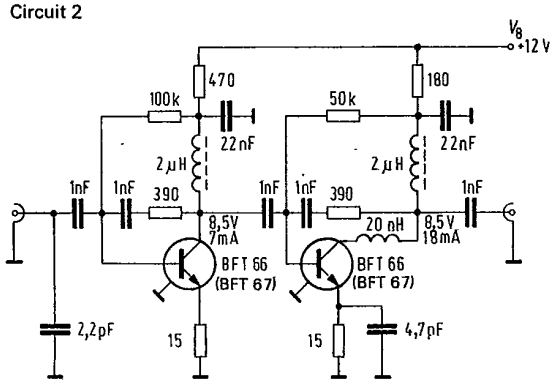
Low-noise preamplifier for the frequency band 1 to 300 MHz

Circuit 1



Two-stage broadband amplifier for the frequency band 25 to 1000 MHz

Circuit 2



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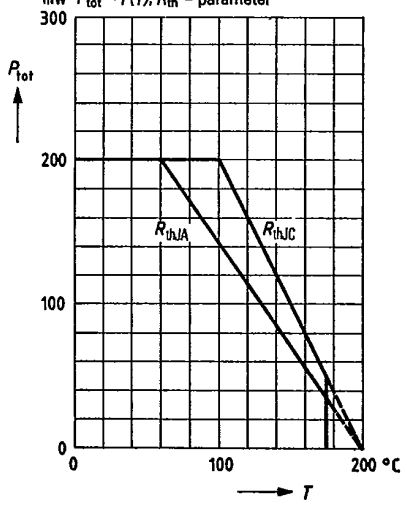
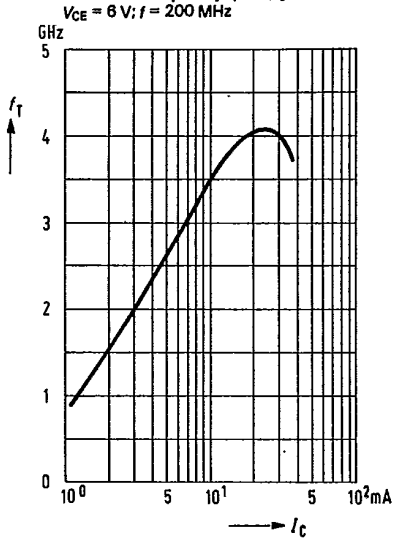
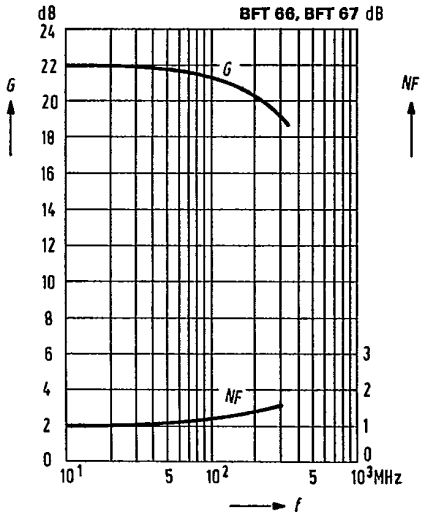
Total perm. power dissipation versus temperature
$P_{tot} = f(T)$; R_{th} = parameter



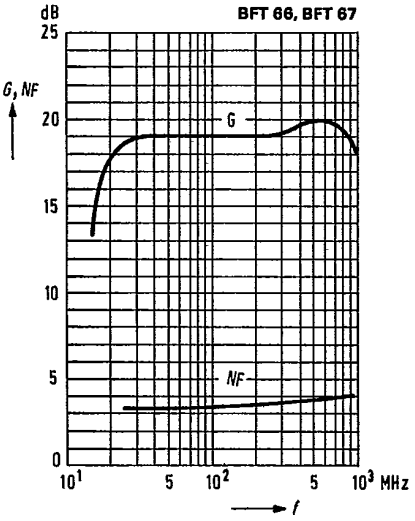
Transition frequency $f_T = f(I_C)$
V_{CE} = 6 V; f = 200 MHz



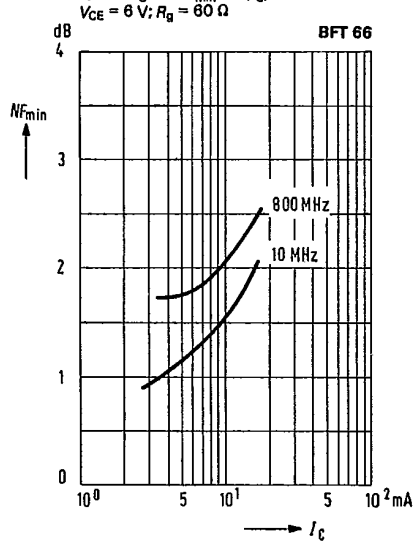
Power gain $G = f(f)$
Noise figure $NF = f(f)$
$R_g = R_L$ = 60 Ω
To circuit 1



Power gain $G = f(f)$
Noise figure $NF = f(f)$
$R_g = R_L$ = 60 Ω
To circuit 2



Noise figure $NF_{min} = f(I_C)$
V_{CE} = 6 V; R_g = 60 Ω



Noise figure $NF = f(R_g)$
V_{CE} = 6 V