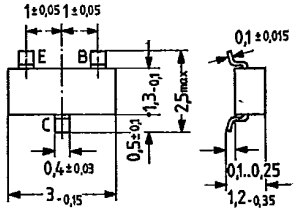
NPN Silicon RF Broadband Transistor

BFT 75

SIEMENS AKTIENGESELLSCHAF

BFT 75 is an epitaxial NPN silicon planar transistor in TO 236 plastic package (23 A 3 DIN 41869), intended for use in low-noise input and intermediate stages in RF amplifiers up to the GHz range, especially for high Q antenna and broadband amplifiers in film circuits. The transistor is marked "KA".

Type	Mark	Ordering code
BFT 75	KA	Q62702-F513



Approx. weight 0.02 g Dimensions in mm

Maximum ratings

Collector-emitter voltage	V_{CEO}	15	V
Collector-emitter voltage ($R_{BE} \leq 50\ \Omega$)	V_{CER}	20	V
Collector-base voltage	V_{CBO}	20	V
Base-emitter voltage	V_{EBO}	2.5	V
Collector current	I_C	50	mA
Base current	I_B	10	mA
Storage temperature range	T_{stg}	−55 to +125	°C
Junction temperature	T_j	150	°C
Total power dissipation ($T_{amb} \leq 25$ °C)	P_{tot}	250	mW

Thermal resistance

Junction to ambient air	R_{thJA}	≤500	K/W
Junction to substrate back[1)]	R_{thJSB}	≤400	K/W

1) Ceramic substrate 0.7 mm; 2.5 $cm^{2)}$area

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

Collector cutoff current (V_{CB} = 10 V)	I_{CBO}	≦50	nA
(V_{CB} = 10 V; T_{amb} = 60°C)	I_{CBO}	≦0.5	µA
Collector cutoff current (V_{CE} = 20 V; V_{BE} = 0)	I_{CES}	≦100	µA
Emitter cutoff current (V_{EB} = 2 V)	I_{EBO}	≦10	µA
DC current gain			
(I_C = 25 mA; V_{CE} = 8 V)	h_{FE}	≧30	–
(I_C = 50 mA; V_{CE} = 5 V)	h_{FE}	≧30	–

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

Small signal current gain			
(I_C = 25 mA; V_{CE} = 8 V; f = 1 kHz)	h_{fe}	80	–
Transition frequency			
(I_C = 25 mA; V_{CE} = 8 V; f = 200 MHz)	f_T	5	GHz
(I_C = 50 mA; V_{CE} = 5 V; f = 200 MHz)	f_T	4.5	GHz
Output capacitance			
(V_{CB} = 8 V; I_E = 0)	C_{ob}	0.8	pF
Input capacitance			
(V_{EB} = 0.5 V; I_E = 0)	C_{ib}	2.1	pF
Reverse transfer capacitance			
(I_C = 1 mA; V_{CE} = 8 V)	C_{12e}	0.65	pF
Noise figure			
(I_C = 10 mA; V_{CE} = 8 V; f = 800 MHz; R_g = 60 Ω)	NF	2.8	dB
(I_C = 3 mA; V_{CE} = 8 V; f = 500 MHz; R_{gopt})	NF_{opt}	1.9	dB
Power gain			
(I_C = 25 mA; V_{CE} = 8 V; f = 800 MHz, R_g = 60 Ω)	G_{pe}	12	dB
Output voltage[1]			
(I_C = 25 mA; V_{CE} = 8 V; d_{IM} = 60 dB;			
R_L = R_g = 75 Ω)	V_O	350	mV

1) Three tone modulation f approx. 800 MHz

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S parameter:
Operating point: V_{CE} = 5 V; I_C = 30 mA, Z_o = 50 Ω

f (GHz)	S_{11e}	φ	S_{21e}	φ	S_{12e}	φ	S_{22e}	φ
0,1	0,316	–110	25,317	115	0,021	68	0,575	–38
0,2	0,260	–141	14,120	99	0,036	69	0,386	–32
0,3	0,262	–164	9,469	90	0,051	71	0,305	–37
0,4	0,246	–166	7,250	84	0,067	70	0,332	–31
0,5	0,241	176	5,848	80	0,082	70	0,278	–31
0,6	0,251	178	4,855	76	0,096	69	0,304	–37
0,7	0,227	167	4,253	72	0,112	68	0,314	–27
0,8	0,246	166	3,673	67	0,126	66	0,247	–31
0,9	0,217	159	3,346	64	0,143	64	0,278	–44
1,0	0,266	150	3,008	61	0,156	63	0,322	–37
1,1	0,241	155	2,782	57	0,171	62	0,254	–35
1,2	0,249	139	2,540	54	0,185	60	0,281	–49
1,3	0,262	139	2,365	50	0,199	57	0,291	–46
1,4	0,282	131	2,221	47	0,215	55	0,246	–50
1,5	0,277	134	2,120	44	0,229	54	0,312	–62
1,6	0,283	122	1,992	40	0,238	52	0,308	–49
1,7	0,327	121	1,863	38	0,251	51	0,181	–54
1,8	0,311	122	1,737	33	0,259	48	0,286	–92
1,9	0,312	114	1,719	30	0,281	45	0,361	–68
2,0	0,330	112	1,662	29	0,295	44	0,251	–56

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