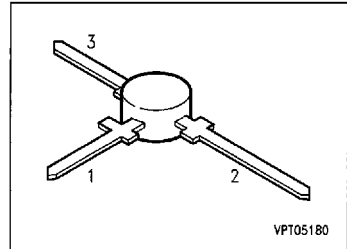


## NPN Silicon RF Transistor

**BFQ 69**

- For low-noise broadband amplifiers in antenna and telecommunications systems at collector currents from 1 mA to 25 mA.



**ESD:** Electrostatic discharge sensitive device, observe handling precautions!

Type	Marking	Ordering Code	Pin Configuration			Package <sup>1)</sup>
			1	2	3	
BFQ 69	BFQ 69	Q62702-F780	E	C	B	T-plast

### Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	$V_{CE0}$	15	V
Collector-base voltage	$V_{CB0}$	25	
Emitter-base voltage	$V_{EB0}$	2	
Collector current	$I_C$	30	mA
Base current	$I_B$	4	
Total power dissipation, $T_s \leq 102 \text{ }^\circ\text{C}^{3)}$	$P_{tot}$	300	mW
Junction temperature	$T_J$	150	$^\circ\text{C}$
Ambient temperature range	$T_A$	- 65 ... + 150	
Storage temperature range	$T_{stg}$	- 65 ... + 150	

### Thermal Resistance

Junction - ambient <sup>2)</sup>	$R_{th JA}$	$\leq 240$	K/W
Junction - soldering point <sup>3)</sup>	$R_{th JS}$	$\leq 160$	

<sup>1)</sup> For detailed dimensions see chapter Package Outlines.

<sup>2)</sup> Package mounted on alumina 15 mm × 16.7 mm × 0.7 mm.

<sup>3)</sup>  $T_s$  is measured on the collector lead at the soldering point to the pcb.

**Electrical Characteristics**at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

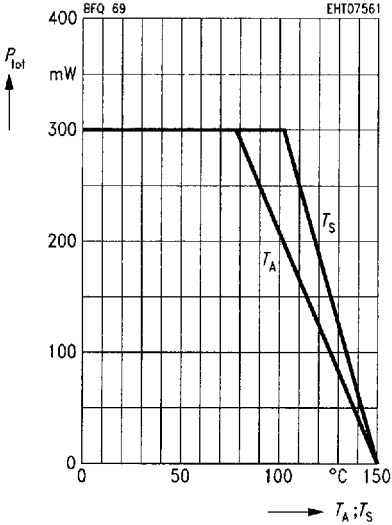
**DC Characteristics**

Collector-emitter breakdown voltage $I_C = 1\text{ mA}$ , $I_B = 0$	$V_{(BR)CE0}$	15	–	–	V
Collector-emitter cutoff current $V_{CE} = 25\text{ V}$ , $V_{BE} = 0$	$I_{CES}$	–	–	100	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 10\text{ V}$ , $I_E = 0$	$I_{CBO}$	–	–	50	nA
Emitter-base cutoff current $V_{EB} = 2\text{ V}$ , $I_C = 0$	$I_{EBO}$	–	–	100	$\mu\text{A}$
DC current gain $I_C = 15\text{ mA}$ , $V_{CE} = 10\text{ V}$	$h_{FE}$	50	120	250	–

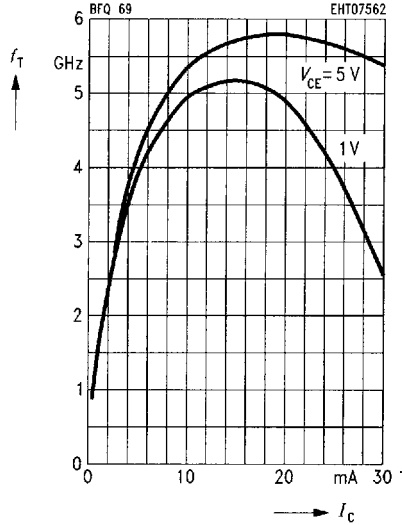
**AC Characteristics**

Transition frequency $I_C = 15\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 200\text{ MHz}$	$f_t$	–	5.8	–	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{cb}$	–	0.35	0.5	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{ce}$	–	0.29	–	
Output capacitance $V_{CE} = 10\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{obs}$	–	0.65	–	
Noise figure $I_C = 3\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 10\text{ MHz}$ , $Z_S = 75\ \Omega$ $I_C = 5\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 800\text{ MHz}$ , $Z_S = 50\ \Omega$	$F$	–	0.9	1.3	dB
		–	1.4	–	
Power gain $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 800\text{ MHz}$ , $Z_S = 50\ \Omega$ , $Z_L = Z_{Lopt}$	$G_{pe}$	–	16.5	–	
Linear output voltage two-tone intermodulation test $I_C = 25\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $d_{IM} = 60\text{ dB}$ , $f_1 = 806\text{ MHz}$ , $f_2 = 810\text{ MHz}$ , $Z_S = Z_L = 50\ \Omega$	$V_{o1} = V_{o2}$	–	170	–	mV
Third order intercept point $I_C = 25\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 800\text{ MHz}$	$IP_3$	–	27.5	–	dBm

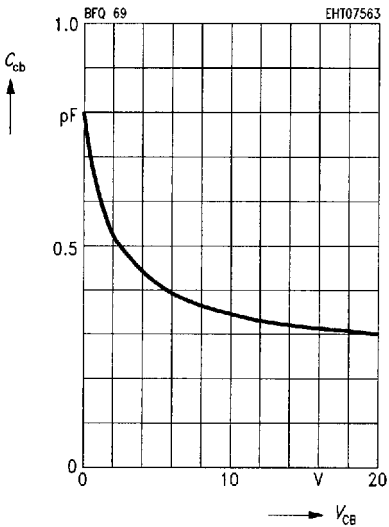
**Total power dissipation  $P_{tot} = f(T_A^*; T_S)$**   
 \*Package mounted on alumina



**Transition frequency  $f_T = f(I_C)$**   
 $f = 200$  MHz



**Collector-base capacitance  $C_{cb} = f(V_{CB})$**   
 $V_{BE} = V_{\text{base}} = 0, f = 1$  MHz



**Noise figure  $F = f(I_C)$**   
 $V_{CE} = 10$  V,  $f = 10$  MHz

