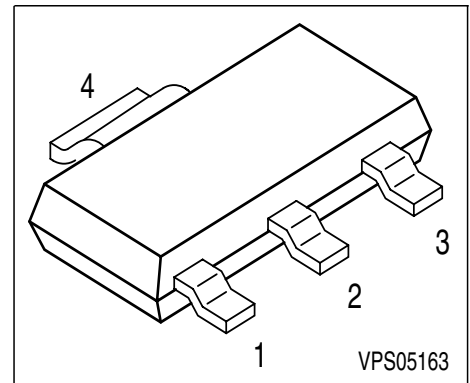


**NPN Silicon RF Transistor**

- For low-distortion broadband amplifier stages in antenna and telecommunication systems up to 2 GHz at collector currents from 70 mA to 130 mA
- Power amplifiers for DECT and PCN systems
- Integrated emitter ballast resistor
- $f_T = 6$  GHz



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

Type	Marking	Pin Configuration				Package
BFG 135A	BFG135A	1 = E	2 = B	3 = E	4 = C	SOT-223

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	15	V
Collector-emitter voltage	$V_{CES}$	25	
Collector-base voltage	$V_{CBO}$	25	
Emitter-base voltage	$V_{EBO}$	2	
Collector current	$I_C$	150	mA
Base current	$I_B$	20	
Total power dissipation, $T_S \leq 100$ °C F)	$P_{tot}$	1	W
Junction temperature	$T_j$	150	°C
Ambient temperature	$T_A$	-65 ... 150	
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

Junction - soldering point	$R_{thJS}$	$\leq 50$	K/W
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<sup>1</sup> $T_S$  is measured on the collector lead at the soldering point to the pcb

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	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 $V_{EB} = 1\text{ V}, I_C = 0$	$I_{EBO}$	-	-	1	$\mu\text{A}$
DC current gain $I_C = 100\text{ mA}, V_{CE} = 8\text{ V}$	$h_{FE}$	80	120	250	-

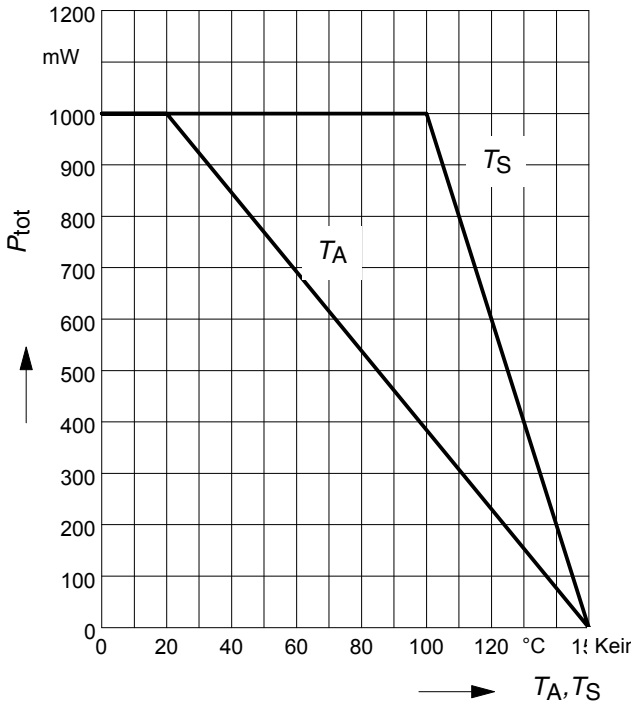
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC characteristics</b> (verified by random sampling)					
Transition frequency $I_C = 100\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 200\text{ MHz}$	$f_T$	4.5	6	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$	$C_{cb}$	-	1.3	1.8	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$	$C_{ce}$	-	0.8	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$	$C_{eb}$	-	7.5	-	
Noise figure $I_C = 30\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$F$	-	2 3.7	-	dB
Power gain, maximum available <sup>F)</sup> $I_C = 100\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$G_{\text{ma}}$	-	14 9	-	
Transducer gain $I_C = 100\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	-	10 4	-	
Third order intercept point $I_C = 100\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 900\text{ MHz}$	$IP_3$	-	38	-	dBm

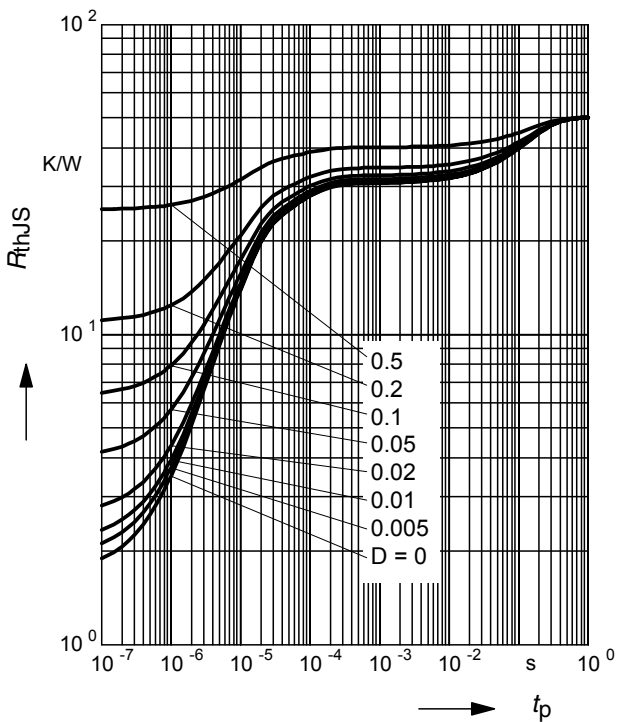
$${}^1G_{\text{ma}} = |S_{21} / S_{12}| (k - (k^2 - 1)^{1/2})$$

**Total power dissipation  $P_{tot} = f(T_A^*, T_S)$**

\* Package mounted on epoxy

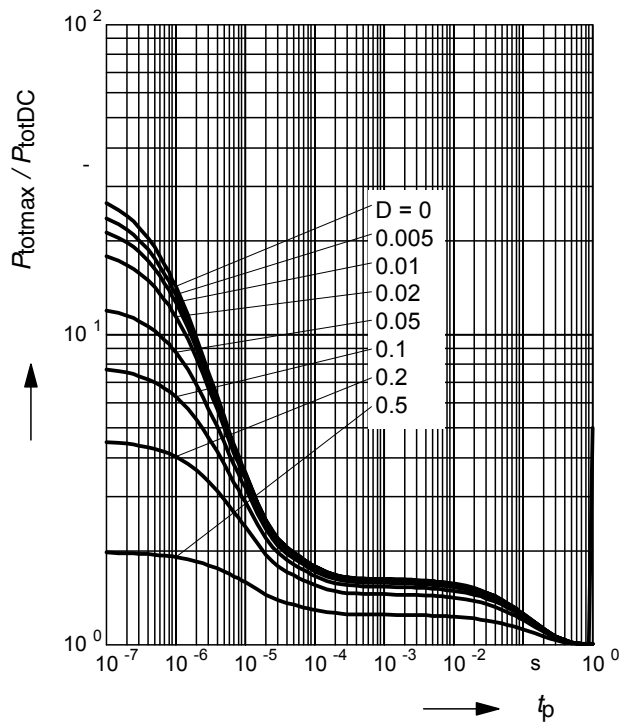


**Permissible Pulse Load  $R_{thJS} = f(t_p)$**



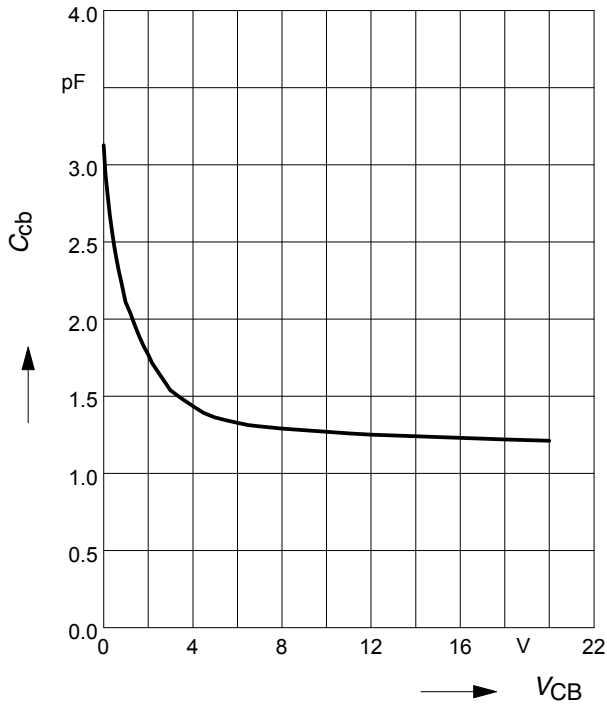
**Permissible Pulse Load**

$P_{totmax} / P_{totDC} = f(t_p)$



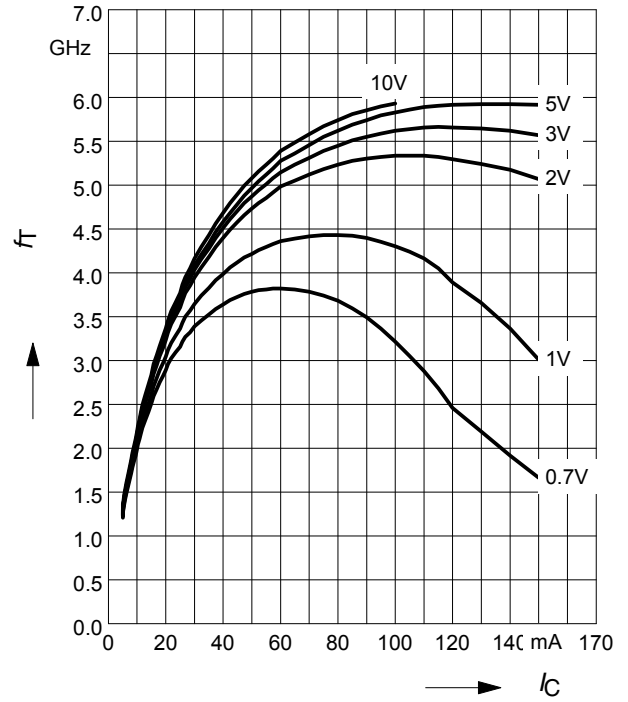
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

$f = 1\text{MHz}$



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

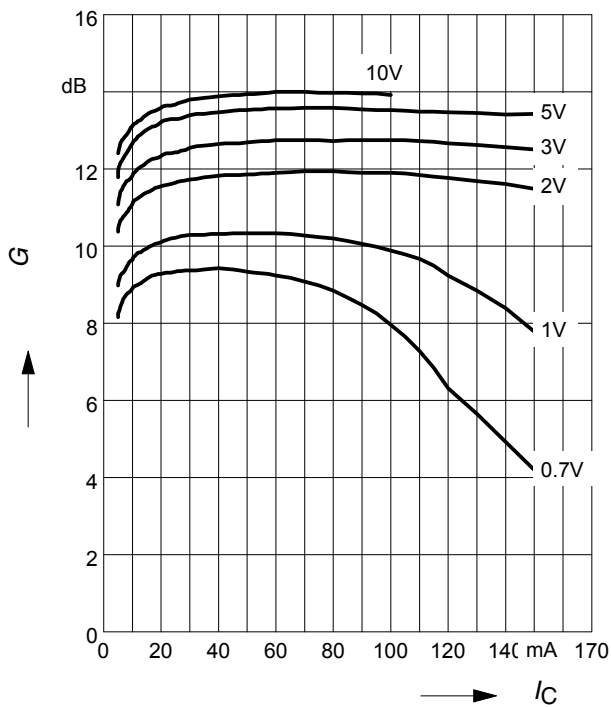
$V_{CE} = \text{Parameter}$



**Power Gain  $G_{ma}, G_{ms} = f(I_C)$**

$f = 0.9\text{GHz}$

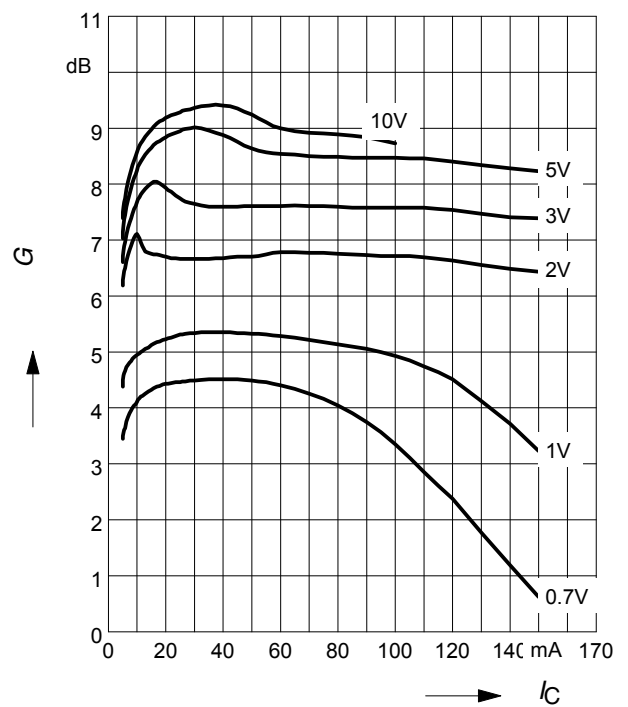
$V_{CE} = \text{Parameter}$



**Power Gain  $G_{ma}, G_{ms} = f(I_C)$**

$f = 1.8\text{GHz}$

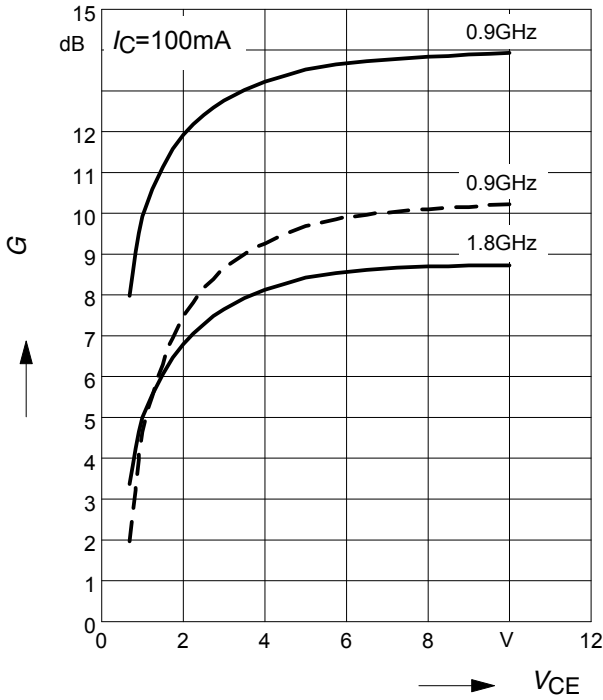
$V_{CE} = \text{Parameter}$



**Power Gain**  $G_{ma}, G_{ms} = f(V_{CE})$ : \_\_\_\_\_

$|S_{21}|^2 = f(V_{CE})$ : -----

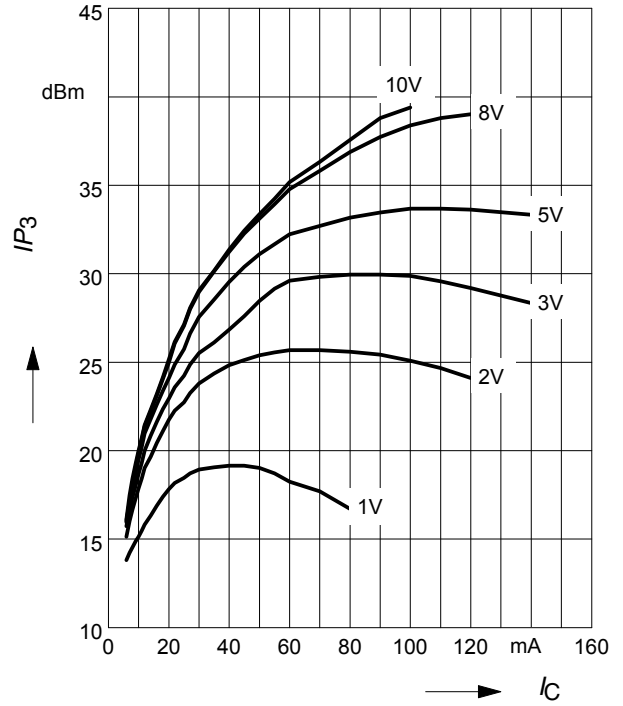
$f$  = Parameter



**Intermodulation Intercept Point**  $IP_3 = f(I_C)$

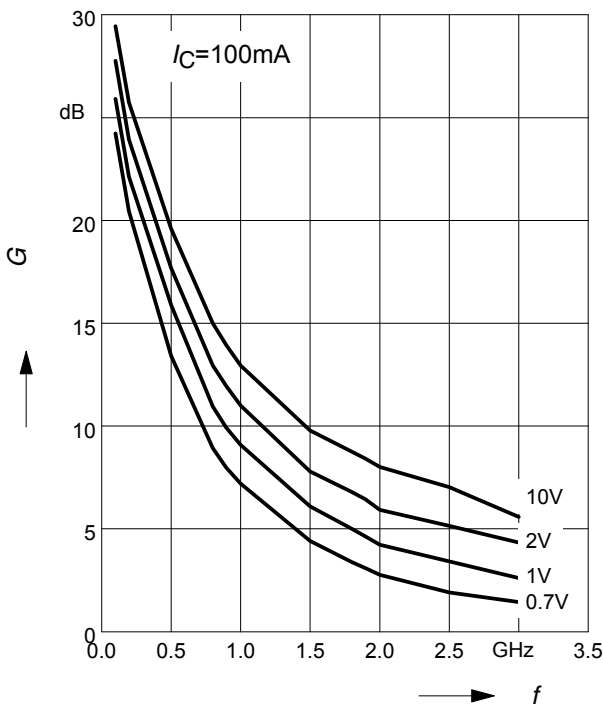
(3rd order, Output,  $Z_S = Z_L = 50\Omega$ )

$V_{CE}$  = Parameter,  $f = 900\text{MHz}$



**Power Gain**  $G_{ma}, G_{ms} = f(f)$

$V_{CE}$  = Parameter



**Power Gain**  $|S_{21}|^2 = f(f)$

$V_{CE}$  = Parameter

