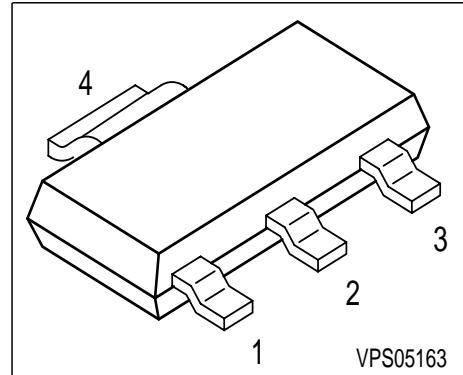


NPN Silicon RF Transistor

- For low noise, low distortion broadband amplifiers in antenna and telecommunication systems up to 1.5 GHz at collector currents from 20 mA to 80 mA
- Power amplifier for DECT and PCN Systems
- $f_T = 7.5$ GHz
- $F = 1.5$ dB at 900 GHz



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration				Package
BFG196	BFG196	1 = E	2 = B	3 = E	4 = C	SOT223

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	100	mA
Base current	I_B	12	
Total power dissipation $T_S \leq 90^\circ\text{C}$ ¹⁾	P_{tot}	800	mW
Junction temperature	T_J	150	$^\circ\text{C}$
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point ²⁾	R_{thJS}	≤ 75	K/W
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¹ T_S is measured on the collector lead at the soldering point to the pcb

² For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

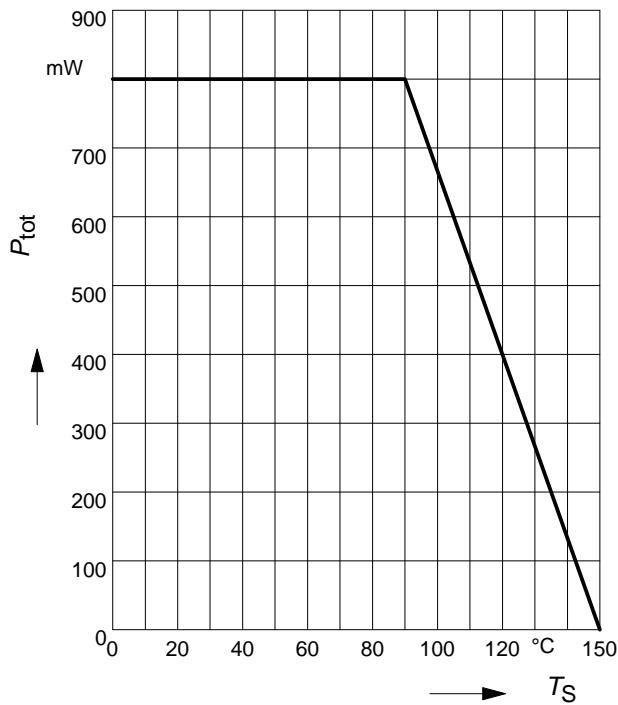
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CEO}}$	12	-	-	V
Collector-emitter cutoff current $V_{CE} = 20 \text{ V}, V_{BE} = 0$	I_{CES}	-	-	100	μA
Collector-base cutoff current $V_{CB} = 10 \text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1 \text{ V}, I_C = 0$	I_{EBO}	-	-	1	μA
DC current gain $I_C = 50 \text{ mA}, V_{CE} = 8 \text{ V}$	h_{FE}	50	100	200	-

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

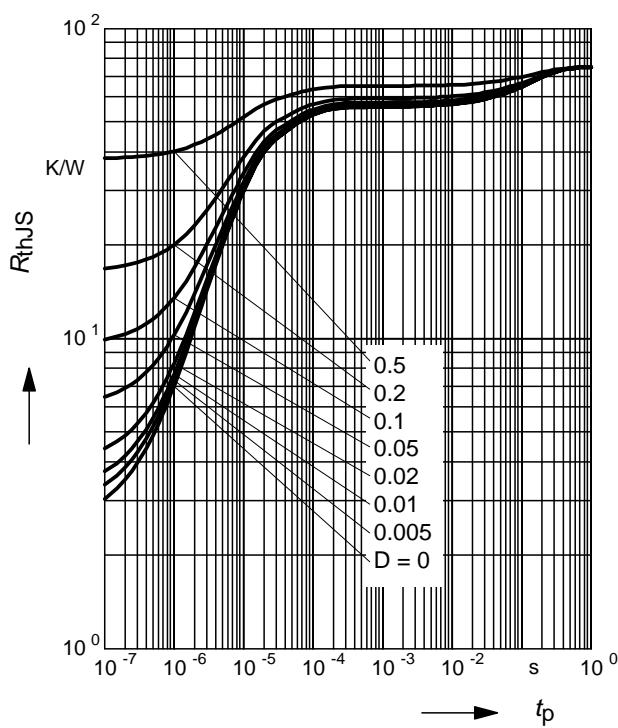
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics (verified by random sampling)					
Transition frequency $I_C = 70 \text{ mA}, V_{CE} = 8 \text{ V}, f = 500 \text{ MHz}$	f_T	5	7.5	-	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	C_{cb}	-	0.97	1.4	pF
Collector-emitter capacitance $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}$	C_{ce}	-	0.4	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}$	C_{eb}	-	4	-	
Noise figure $I_C = 20 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$	F	-	1.5	-	dB
 Power gain, maximum available ¹⁾ $I_C = 50 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$					
Transducer gain $I_C = 50 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_L = 50\Omega, f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$	$ S_{21e} ^2$	-	14	-	
		-	8.5	-	
		-	11.5	-	
		-	6	-	

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

Total power dissipation $P_{\text{tot}} = f(T_S)$

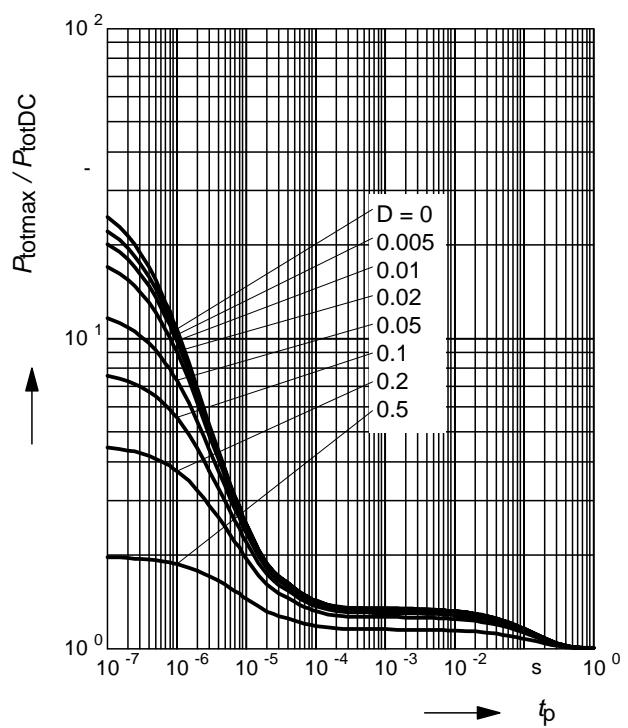


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



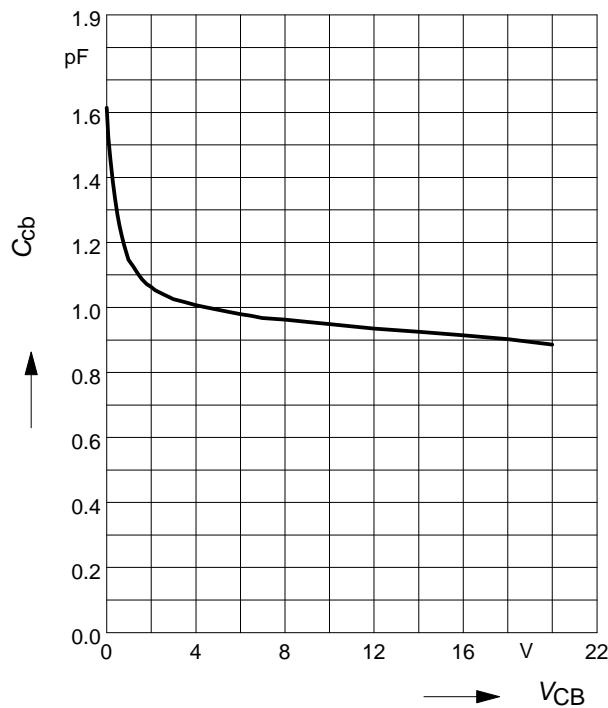
Permissible Pulse Load

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



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

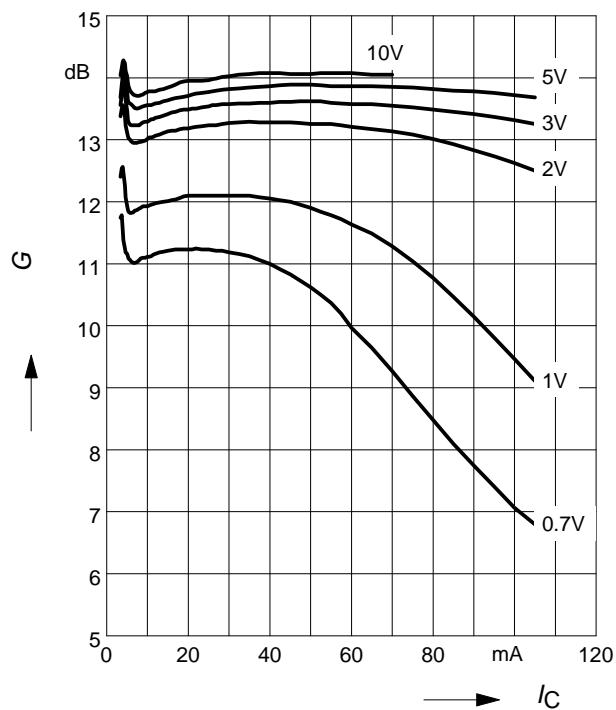
$f = 1\text{MHz}$



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

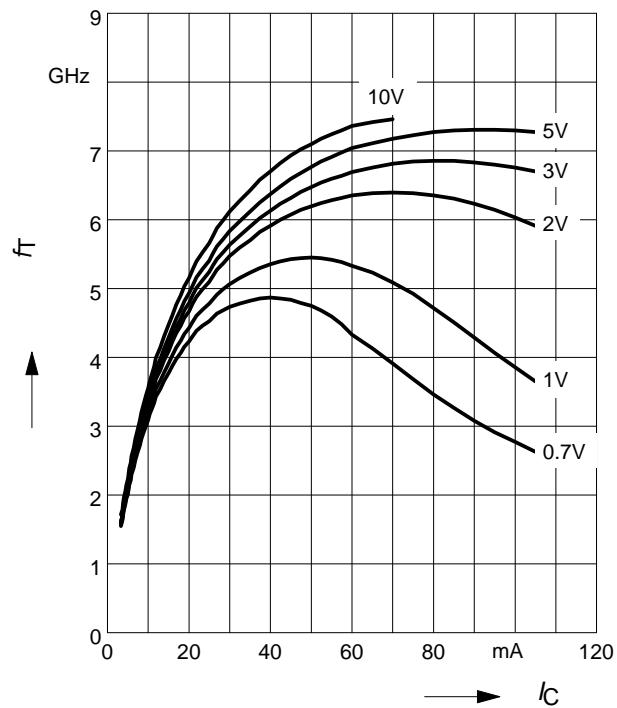
$f = 0.9\text{GHz}$

V_{CE} = Parameter



Transition frequency $f_T = f(I_C)$

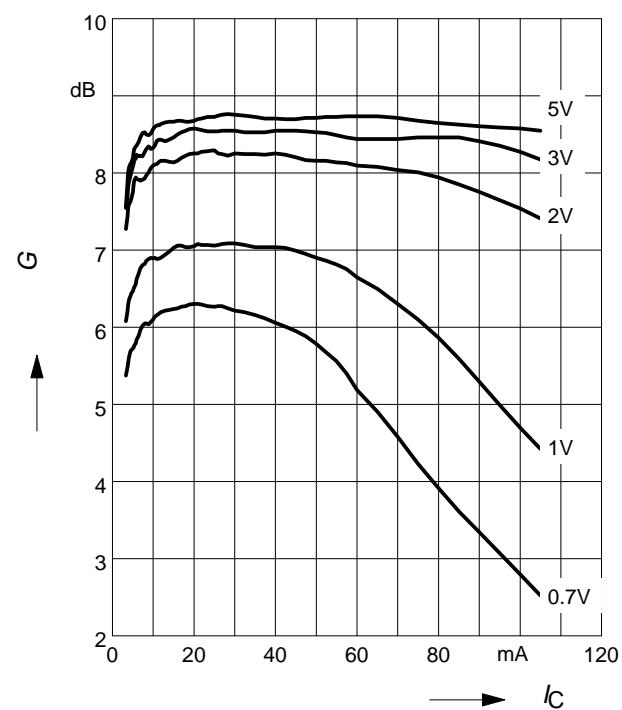
V_{CE} = Parameter



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

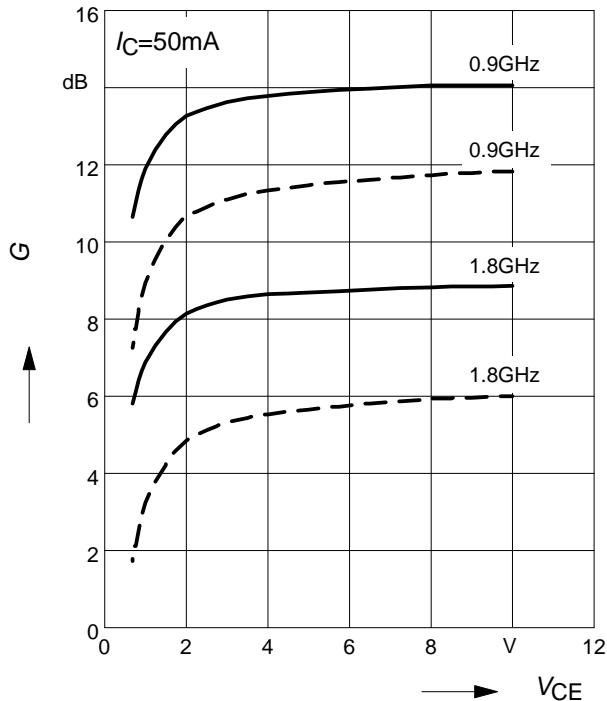
$f = 1.8\text{GHz}$

V_{CE} = Parameter



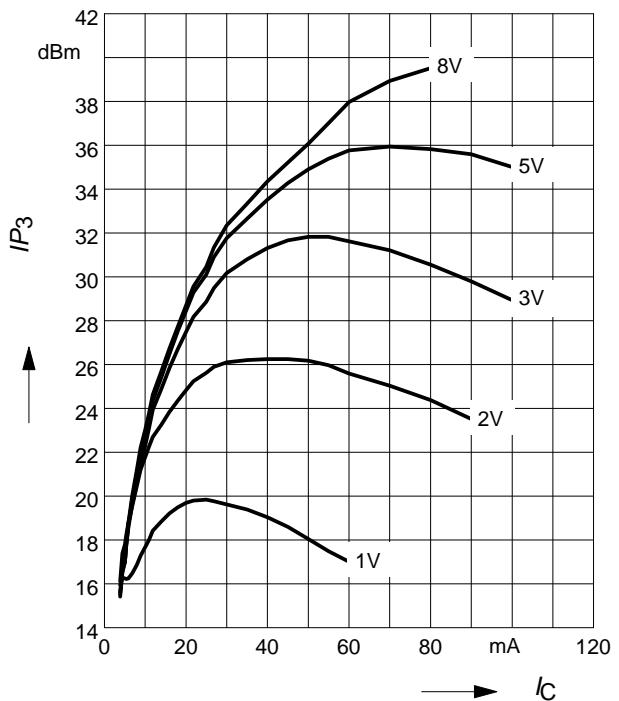
Power Gain G_{ma} , $G_{ms} = f(V_{CE})$:
 $|S_{21}|^2 = f(V_{CE})$:

f = Parameter



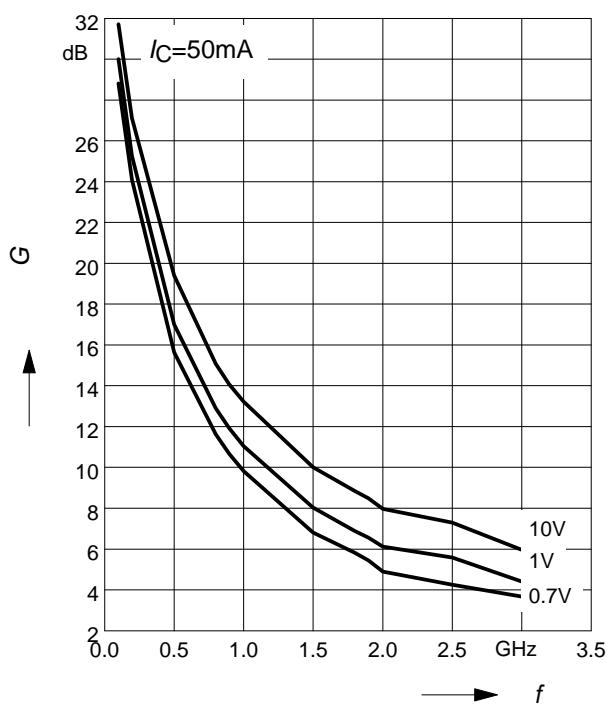
Intermodulation Intercept Point $IP_3=f(I_C)$
(3rd order, Output, $Z_S=Z_L=50\Omega$)

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

