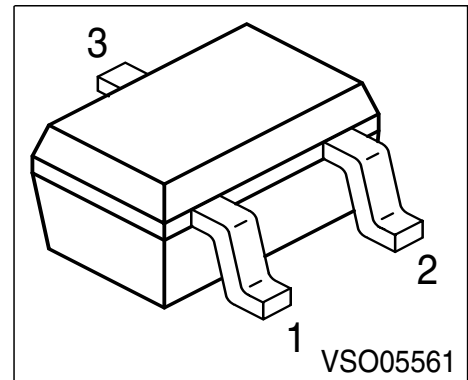


NPN Silicon RF Transistor

- For low noise, low-power amplifiers in mobile communication systems (pager, cordless telephone) at collector currents from 0.2 mA to 8 mA
- $f_T = 7.5$ GHz
 $F = 1.5$ dB at 900 MHz



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration			Package
BFR 280W	REs	1 = B	2 = E	3 = C	SOT-323

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	8	V
Collector-emitter voltage	V_{CES}	10	
Collector-base voltage	V_{CBO}	10	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	10	mA
Base current	I_B	1.2	
Total power dissipation, $T_S = 115$ °C ¹⁾	P_{tot}	80	mW
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}	≤ 435	K/W
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¹⁾ 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.	
DC characteristics					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	8	-	-	V
Collector-emitter cutoff current $V_{CE} = 10\text{ V}, V_{BE} = 0$	I_{CES}	-	-	100	μA
Collector-base cutoff current $V_{CB} = 8\text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	I_{EBO}	-	-	1	μA
DC current gain $I_C = 3\text{ mA}, V_{CE} = 5\text{ V}$	h_{FE}	30	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 $I_C = 6 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $f = 500 \text{ MHz}$	f_T	5	7.5	-	GHz
Collector-base capacitance $V_{CB} = 5 \text{ V}$, $f = 1 \text{ MHz}$	C_{cb}	-	0.27	0.45	pF
Collector-emitter capacitance $V_{CE} = 5 \text{ V}$, $f = 1 \text{ MHz}$	C_{ce}	-	0.18	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}$, $f = 1 \text{ MHz}$	C_{eb}	-	0.22	-	
Noise figure $I_C = 1.5 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $Z_S = Z_{Sopt}$, $f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$	F	-	1.5	-	dB
		-	2	-	
Power gain, maximum stable ¹⁾ $I_C = 3 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$	G_{ms}	-	17.5	-	
		-	13.5	-	
Transducer gain $I_C = 3 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $Z_S = Z_L = 50\Omega$, $f = 900 \text{ MHz}$ $I_C = 3 \text{ mA}$, $V_{CE} = 5 \text{ V}$	$ S_{21e} ^2$	-	14	-	
		-	9	-	

$$^1G_{ms} = |S_{21} / S_{12}|$$

SPICE Parameters (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax) :

Transistor Chip Data

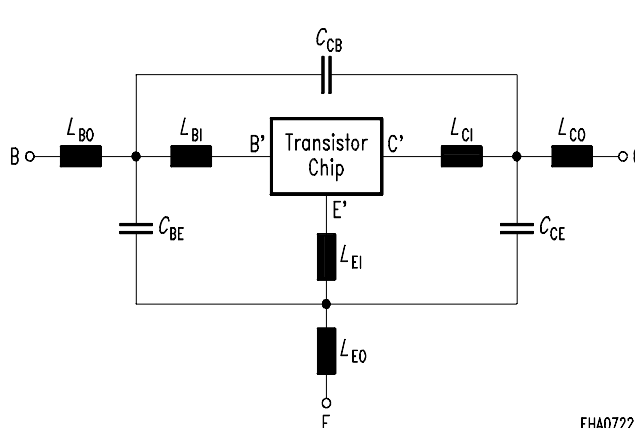
IS =	6.472	fA	BF =	89.888	-	NF =	1.0801	-
VAF =	25.609	V	IKF =	0.073457	A	ISE =	15.596	fA
NE =	1.6163	-	BR =	20.238	-	NR =	0.83403	-
VAR =	5.6909	V	IKR =	0.012696	A	ISC =	1.409	fA
NC =	1.0651	-	RB =	15	Ω	IRB =	0.031958	mA
RBM =	14.999	Ω	RE =	2.4518	Ω	RC =	6.989	Ω
CJE =	36.218	fF	VJE =	0.70035	V	MJE =	0.69773	-
TF =	11.744	ps	XTF =	0.21585	-	VTF =	0.2035	V
ITF =	6.2179	mA	PTF =	0	deg	CJC =	252.99	fF
VJC =	1.1943	V	MJC =	0.30017	-	XCJC =	0.19188	-
TR =	2.3693	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.96275	-	TNOM	300	K

All parameters are ready to use, no scaling is necessary.

Extracted on behalf of SIEMENS Small Signal Semiconductors by:
 Institut für Mobil-und Satellitentechnik (IMST)

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Package Equivalent Circuit:



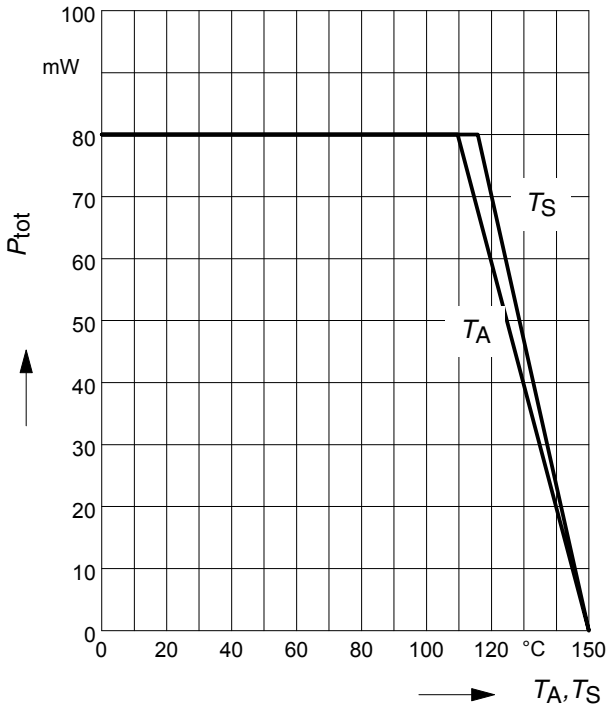
L_{BI} =	0.57	nH
L_{BO} =	0.4	nH
L_{EI} =	0.43	nH
L_{EO} =	0.5	nH
L_{CI} =	0	nH
L_{CO} =	0.41	nH
C_{BE} =	61	fF
C_{CB} =	101	fF
C_{CE} =	175	fF

Valid up to 6GHz

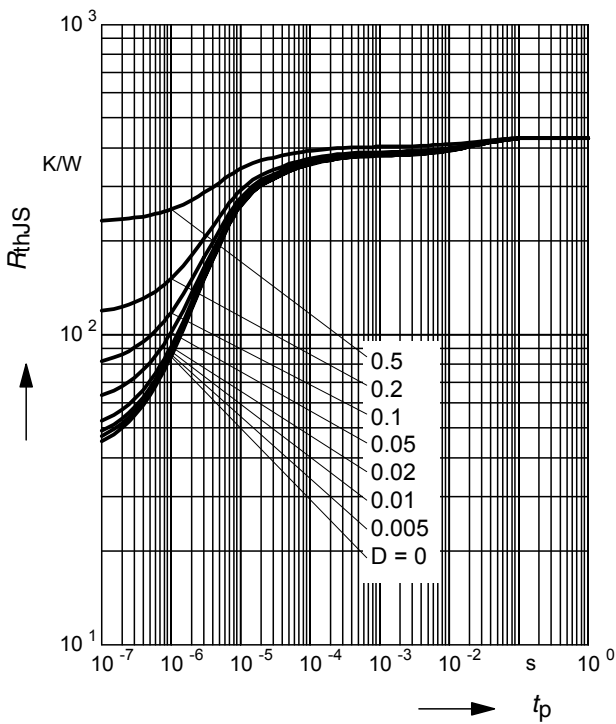
For examples and ready to use parameters please contact your local Infineon Technologies distributor or sales office to obtain a Infineon Technologies CD-ROM or see Internet: <http://www.infineon.com/products/discrete/index.htm>

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

* Package mounted on epoxy

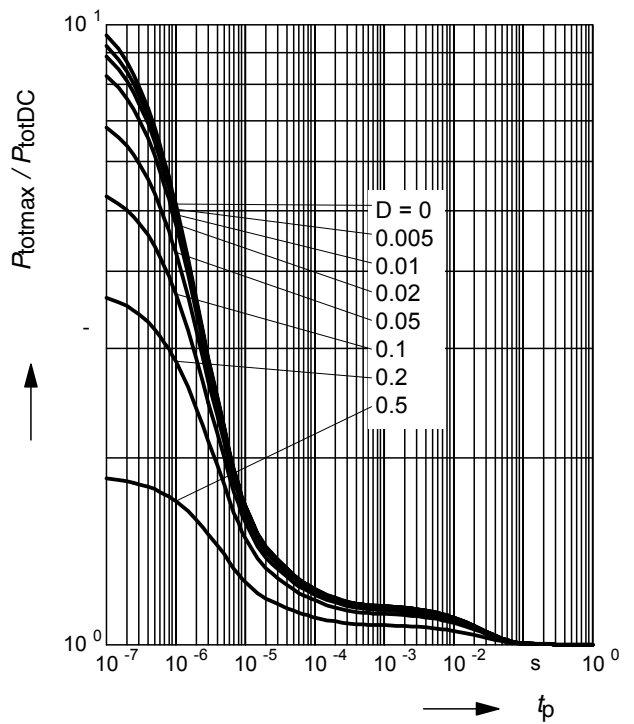


Permissible Pulse Load $R_{thJS} = f(t_p)$



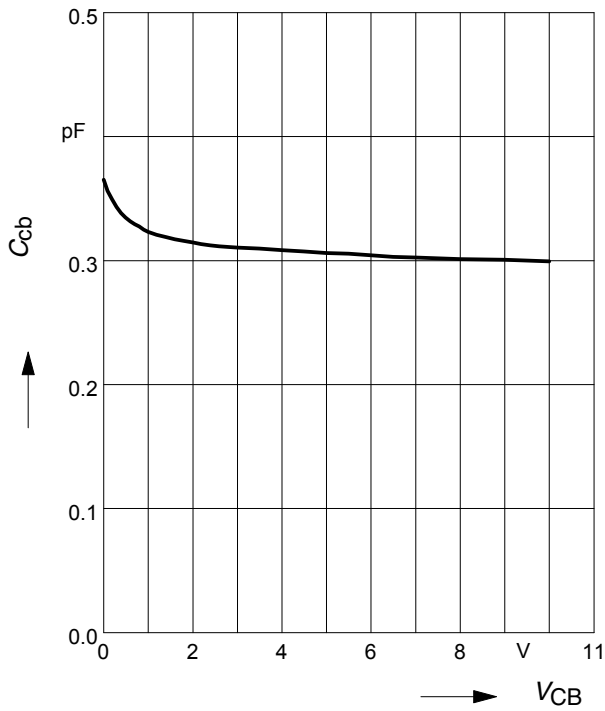
Permissible Pulse Load

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



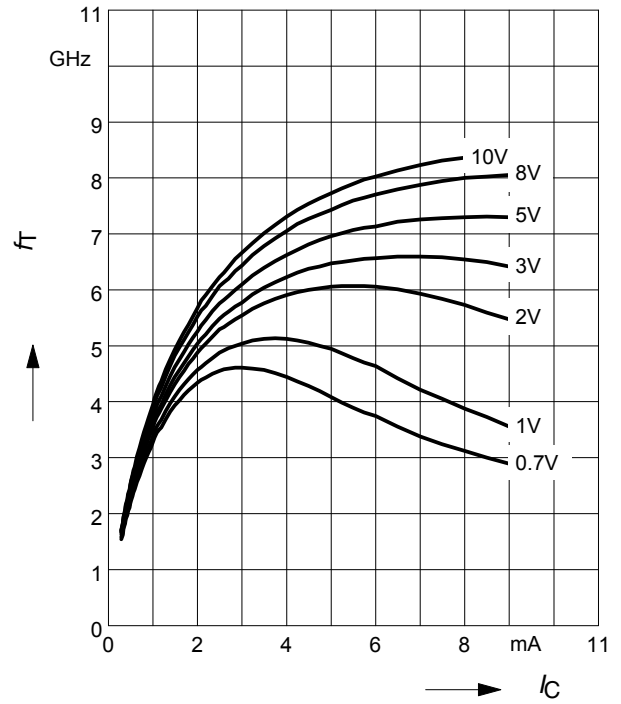
Collector-base capacitance $C_{cb} = f(V_{CB})$

$f = 1\text{MHz}$



Transition frequency $f_T = f(I_C)$

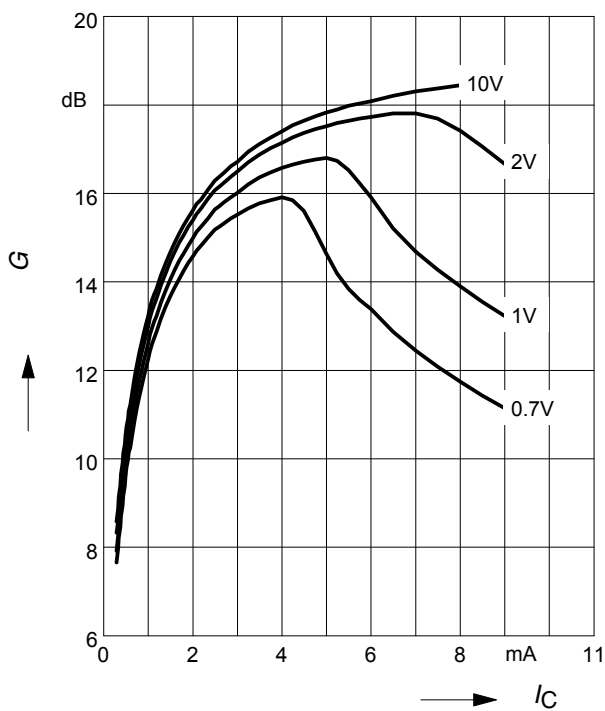
$V_{CE} = \text{Parameter}$



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

$f = 0.9\text{GHz}$

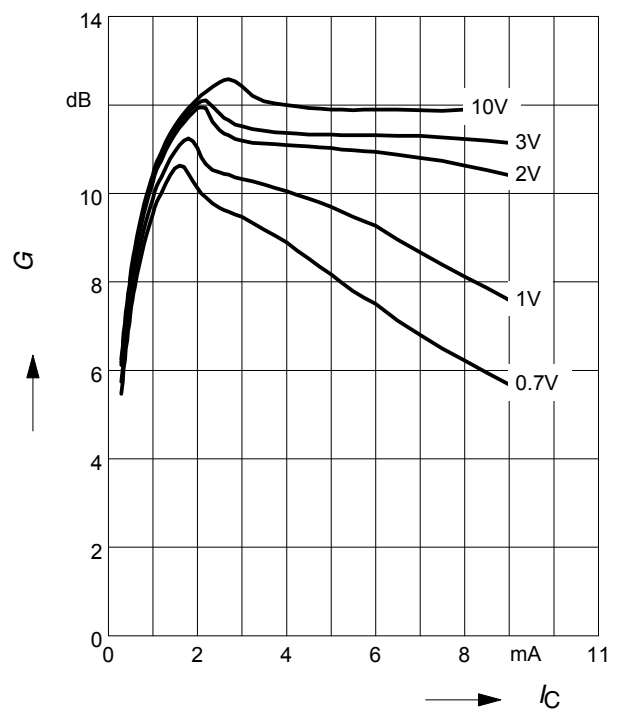
$V_{CE} = \text{Parameter}$



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

$f = 1.8\text{GHz}$

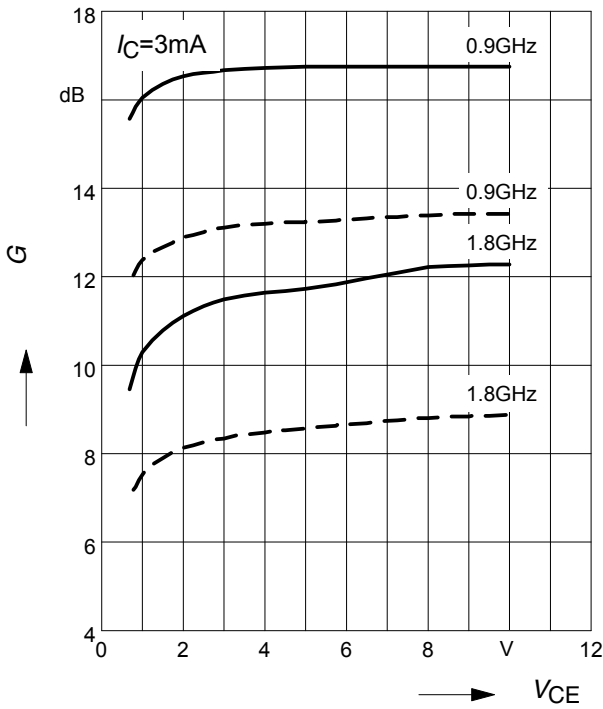
$V_{CE} = \text{Parameter}$



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

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

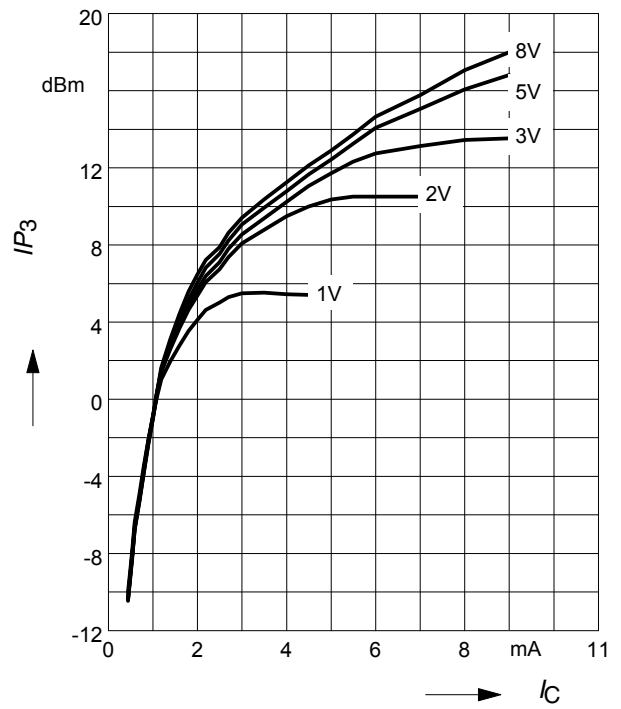
f = Parameter



Intermodulation Intercept Point $IP_3 = f(I_C)$

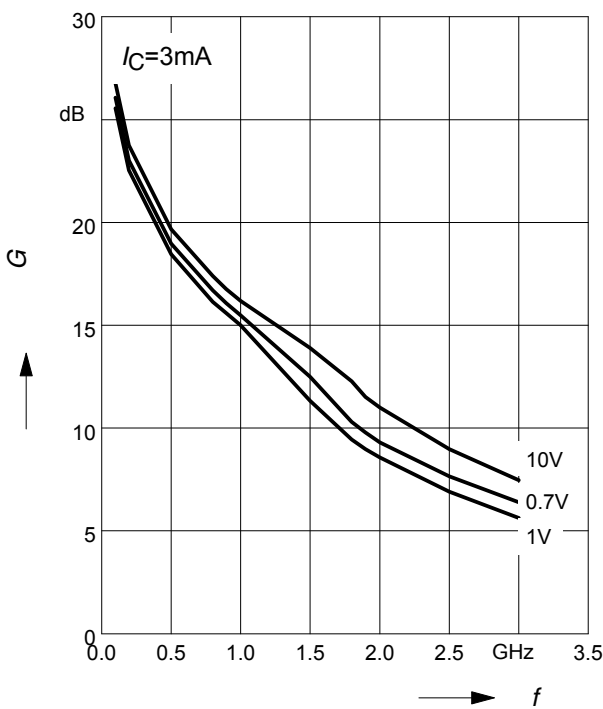
(3rd order, Output, $Z_S = Z_L = 50\Omega$)

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



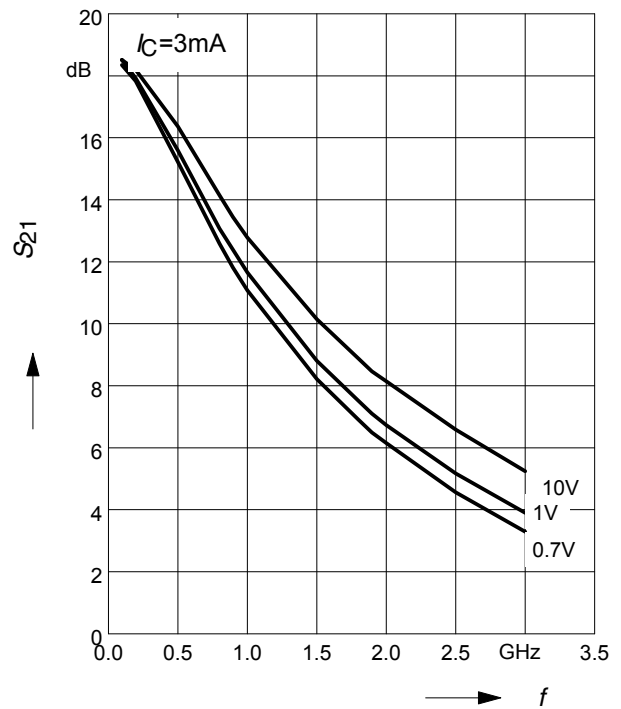
Power Gain $G_{ma}, G_{ms} = f(f)$

V_{CE} = Parameter



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

V_{CE} = Parameter





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