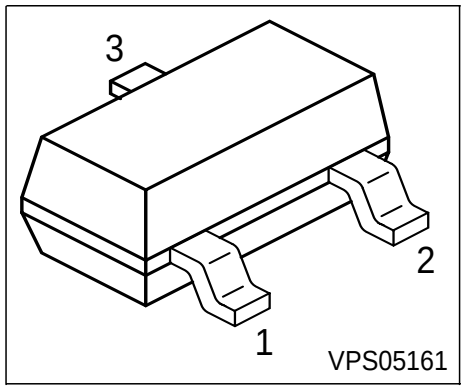
NPN Silicon RF Transistor

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



ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration			Package
BFR280	REs	1 = B	2 = E	3 = C	SOT23

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 $T_S \leq 116$ °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[2)]	R_{thJS}	≤ 425	K/W

[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°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	8	-	-	V
Collector-emitter cutoff current V_{CE} = 10 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 8 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	1	µA
DC current gain I_C = 3 mA, V_{CE} = 5 V	h_{FE}	30	100	200	-

Electrical Characteristics at T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics (verified by random sampling)					
Transition frequency I_C = 6 mA, V_{CE} = 5 V, f = 500 MHz	f_T	5	7.5	-	GHz
Collector-base capacitance V_{CB} = 5 V, f = 1 MHz	C_{cb}	-	0.27	0.45	pF
Collector-emitter capacitance V_{CE} = 5 V, f = 1 MHz	C_{ce}	-	0.18	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	0.22	-	
Noise figure I_C = 1.5 mA, V_{CE} = 5 V, Z_S = Z_{Sopt} , f = 900 MHz f = 1.8 GHz	F	 - -	 1.5 2	 - -	dB
Power gain, maximum stable [1)] I_C = 3 mA, V_{CE} = 5 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 900 MHz f = 1.8 GHz	G_{ms}	 - -	 17 11.5	 - -	
Transducer gain I_C = 3 mA, V_{CE} = 5 V, Z_S = Z_L = 50Ω , f = 900 MHz f = 1.8 GHz	$\lvert S_{21e}\rvert^2$	 - -	 13 8	 - -	

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

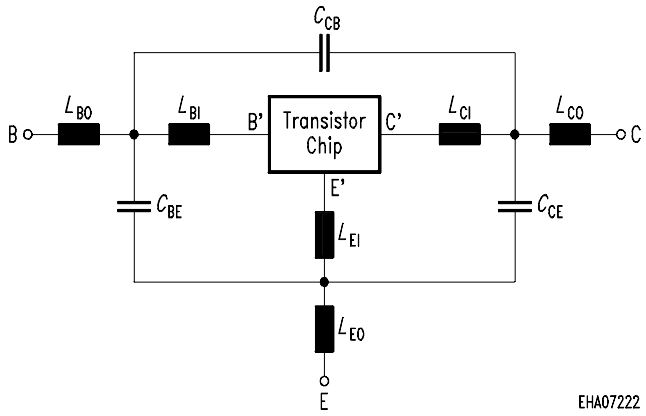
SPICE Parameters (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax) :

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		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 scalling is necessary.
Extracted on behalf of Infineon Technologies AG by:
Institut für Mobil-und Satellitentechnik (IMST)

Package Equivalent Circuit:

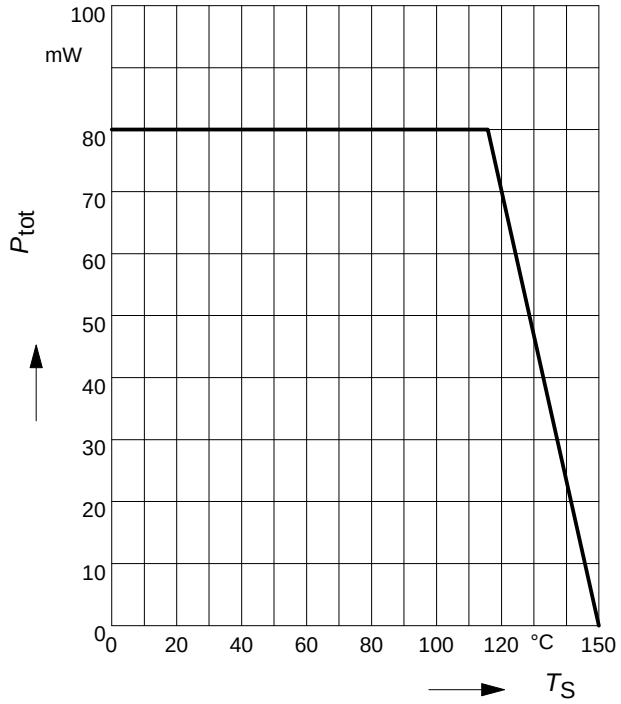


L_{BI} =	0.85	nH
L_{BO} =	0.51	nH
L_{EI} =	0.69	nH
L_{EO} =	0.61	nH
L_{CI} =	0	nH
L_{CO} =	0.49	nH
C_{BE} =	73	fF
C_{CB} =	84	fF
C_{CE} =	165	fF

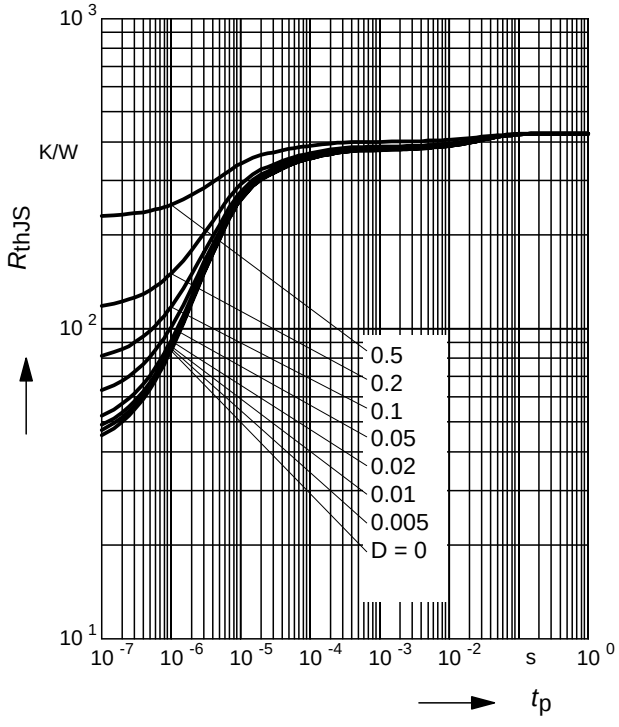
Valid up to 6GHz

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 $P_{tot} = f(T_S)$

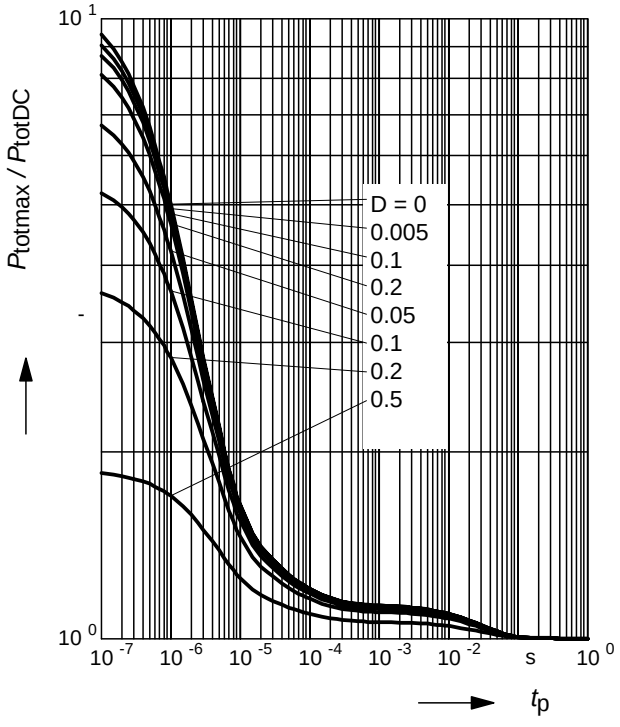


Permissible Pulse Load $R_{thJS} = f(t_p)$



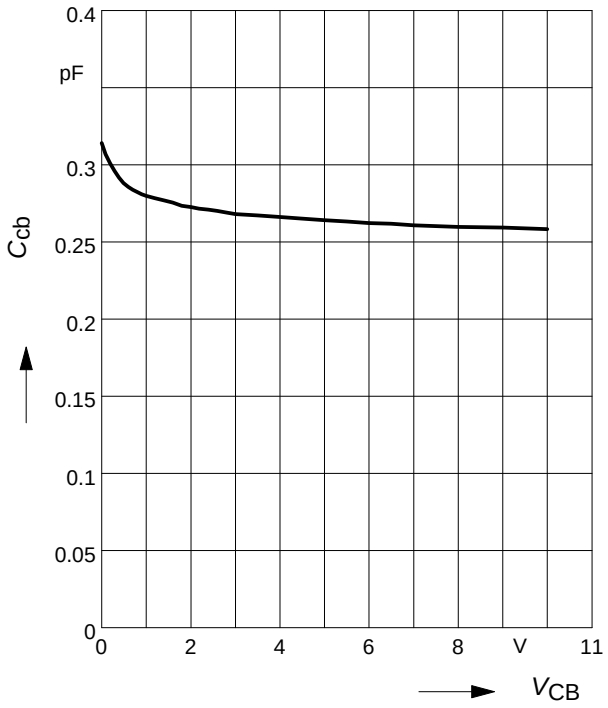
Permissible Pulse Load

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



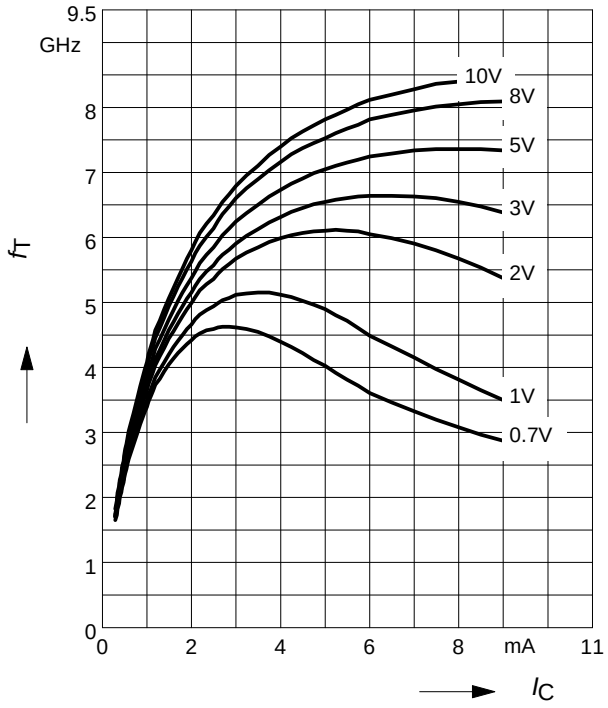
Collector-base capacitance $C_{cb} = f(V_{CB})$

f = 1MHz



Transition frequency $f_T = f(I_C)$

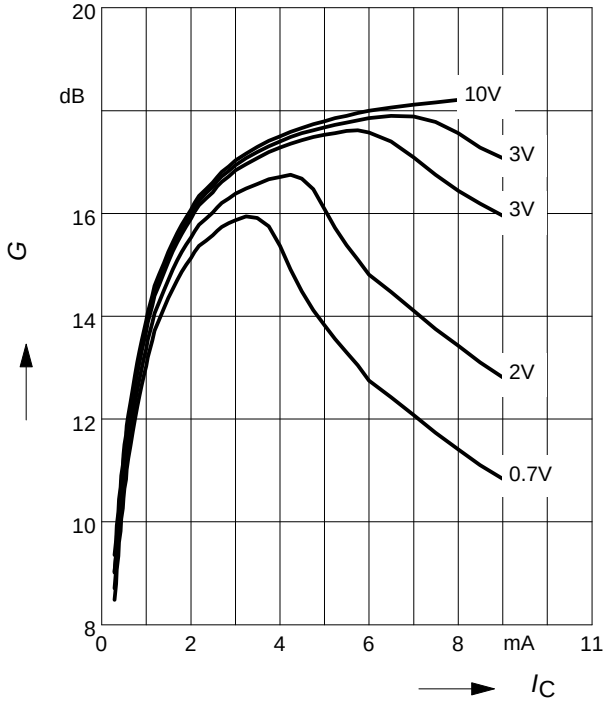
V_{CE} = Parameter



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

f = 0.9GHz

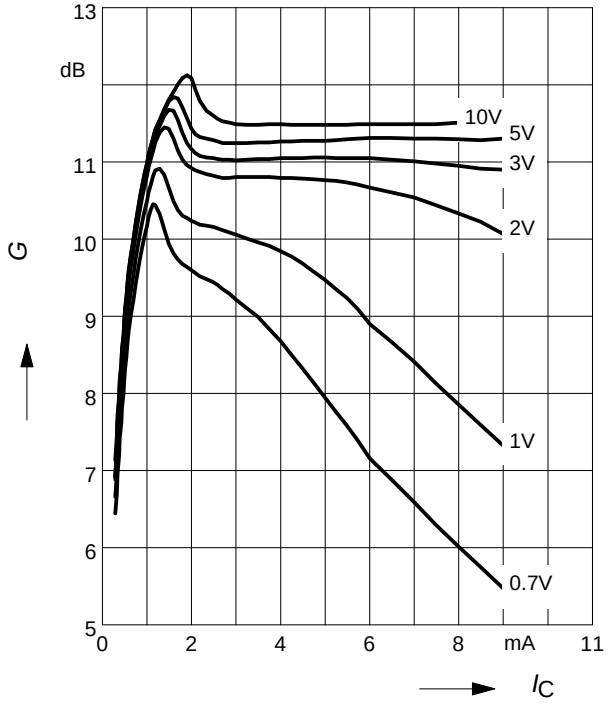
V_{CE} = Parameter



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

f = 1.8GHz

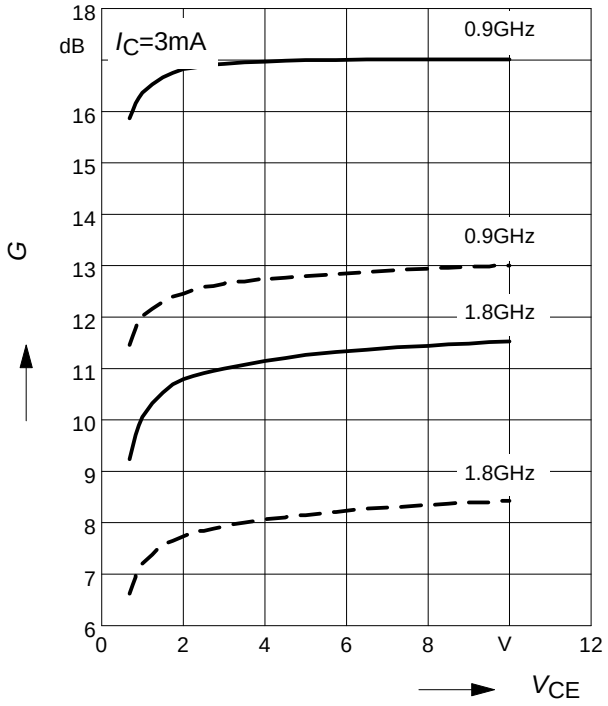
V_{CE} = Parameter



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

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

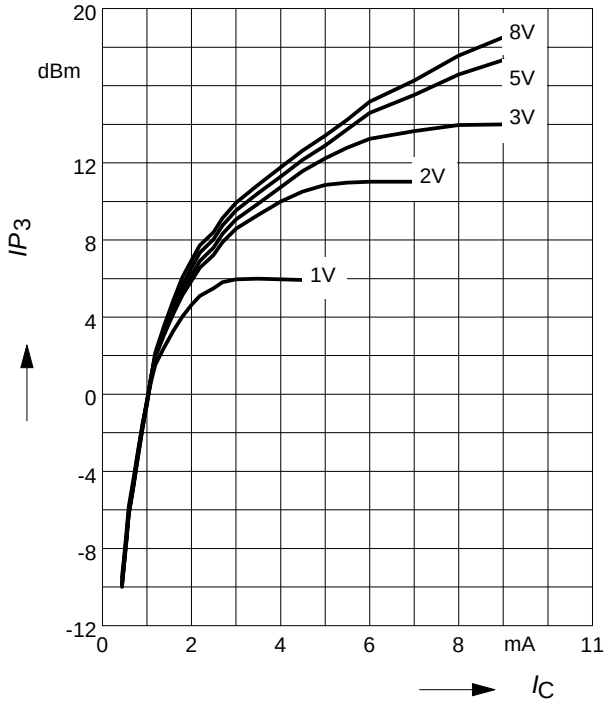
f = Parameter



Intermodulation Intercept Point IP_3=$f(I_C)$

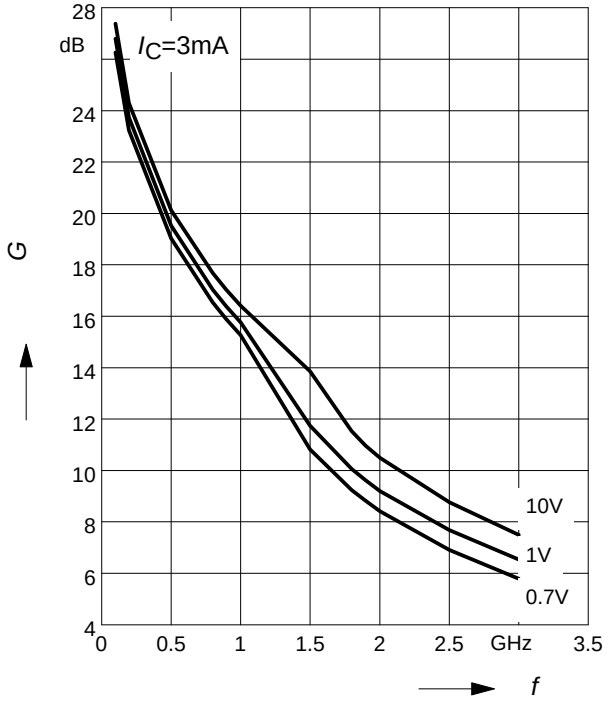
(3rd order, Output, Z_S=Z_L=50Ω)

V_{CE} = Parameter, f = 900MHz



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

V_{CE} = Parameter



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

V_{CE} = Parameter

