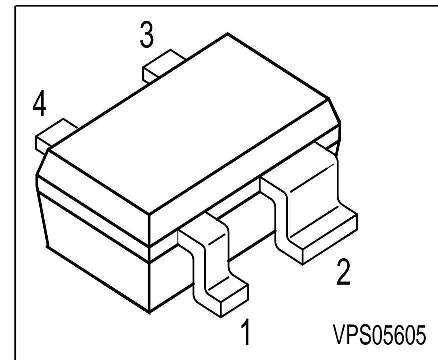
NPN Silicon RF Transistor

- For power amplifier in DECT and PCN systems
- f_T = 5.5GHz
- Gold metalization for high reliability



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

Type	Marking	Pin Configuration				Package
BFP136W	PAs	1 = E	2 = C	3 = E	4 = B	SOT343

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	150	mA
Base current	I_B	20	
Total power dissipation $T_S \leq 60°C$ [1)	P_{tot}	1000	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}	$\leq$ 90	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

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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	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	-	50	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	1	µA
DC current gain I_C = 80 mA, V_{CE} = 5 V	h_{FE}	50	100	200	-

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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 = 80 mA, V_{CE} = 5 V, f = 500 MHz	f_T	4	5.5	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	1.7	2.5	pF
Collector-emitter capacitance V_{CE} = 10 V, f = 1 MHz	C_{ce}	-	0.7	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	6.8	-	
Noise figure I_C = 30 mA, V_{CE} = 5 V, $Z_S = Z_{Sopt}$, f = 900 MHz f = 1.8 GHz	F	 - -	 2 3.3	 - -	dB
Power gain, maximum available [1)] I_C = 80 mA, V_{CE} = 5 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 900 MHz f = 1.8 GHz	G_{ma}	 - -	 15.5 9.5	 - -	
Transducer gain I_C = 80 mA, V_{CE} = 5 V, $Z_S = Z_L = 50\Omega$, f = 900 MHz f = 1.8 GHz	$\|S_{21e}\|^2$	 - -	 9 3	 - -	
Third order intercept point I_C = 80 mA, V_{CE} = 5 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 1.8 GHz	IP_3	-	33	-	dBm

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

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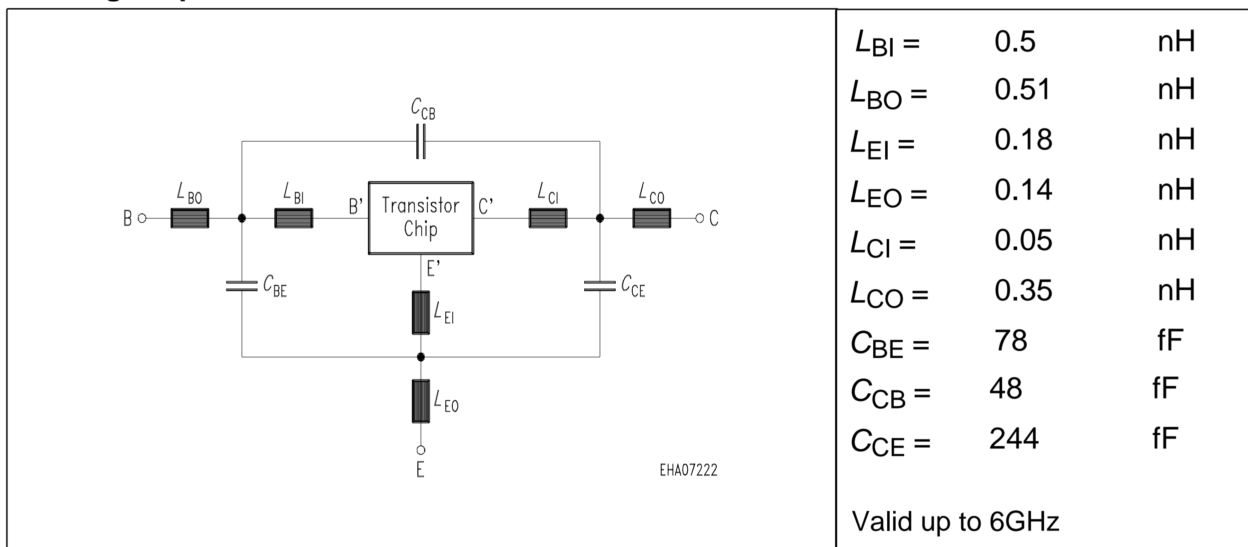
SPICE Parameters (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax) :

Transistor Chip Data

IS =	1.5813	fA	BF =	113.32	-	NF =	1.0653	-
VAF =	12.331	V	IKF =	1.4907	A	ISE =	46.37	fA
NE =	1.4254	-	BR =	86.717	-	NR =	1.8047	-
VAR =	31.901	V	IKR =	0.033605	A	ISC =	0.0080864	fA
NC =	1.8821	-	RB =	0	Ω	IRB =	0.83992	mA
RBM =	1.0078	Ω	RE =	0.22081	Ω	RC =	0.01636	Ω
CJE =	33.904	fF	VJE =	0.71518	V	MJE =	0.36824	-
TF =	20.691	ps	XTF =	0.31338	-	VTF =	0.10174	V
ITF =	4.5579	mA	PTF =	0	deg	CJC =	2977.4	fF
VJC =	1.1381	V	MJC =	0.31461	-	XCJC =	0.02899	-
TR =	1.0033	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.99886	-	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} =	0.5	nH
L_{BO} =	0.51	nH
L_{EI} =	0.18	nH
L_{EO} =	0.14	nH
L_{CI} =	0.05	nH
L_{CO} =	0.35	nH
C_{BE} =	78	fF
C_{CB} =	48	fF
C_{CE} =	244	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

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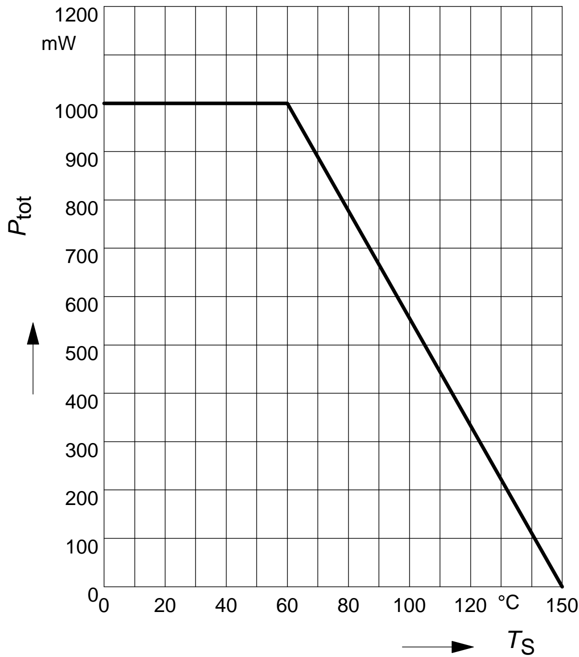
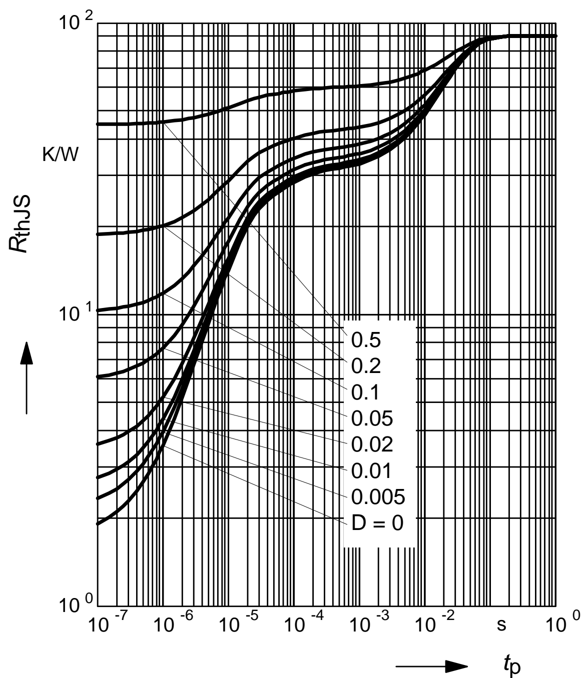
Total power dissipation $P_{tot} = f(T_S)$

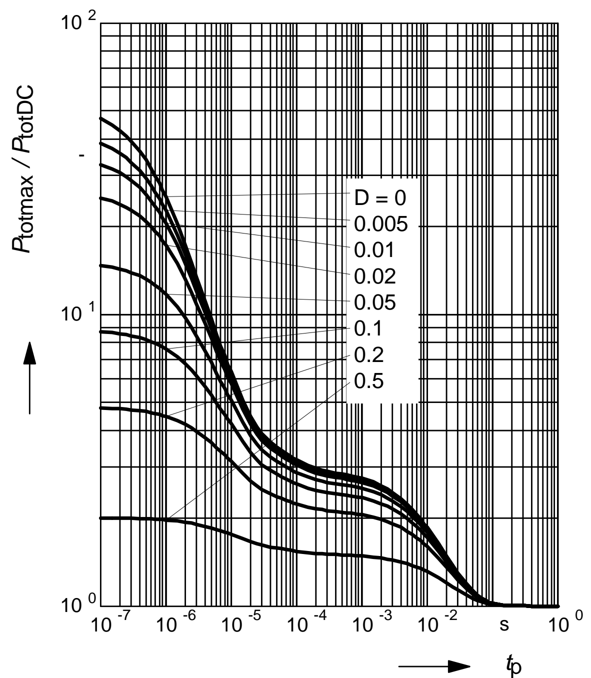


Permissible Pulse Load $R_{thJS} = f(t_p)$



Permissible Pulse Load

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



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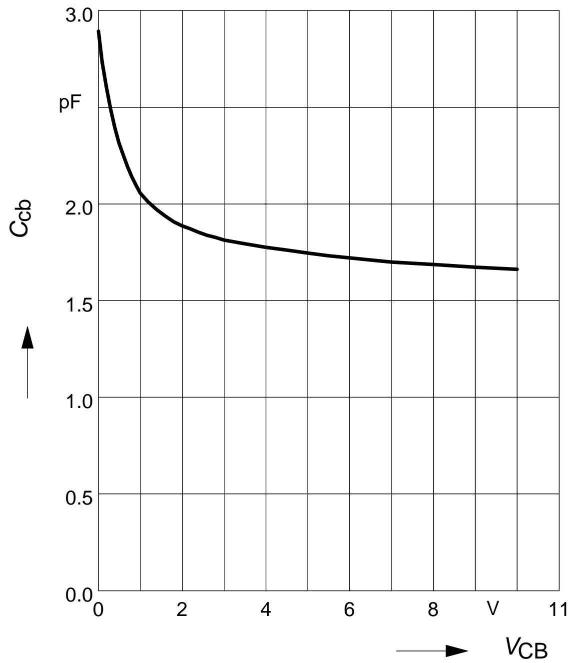
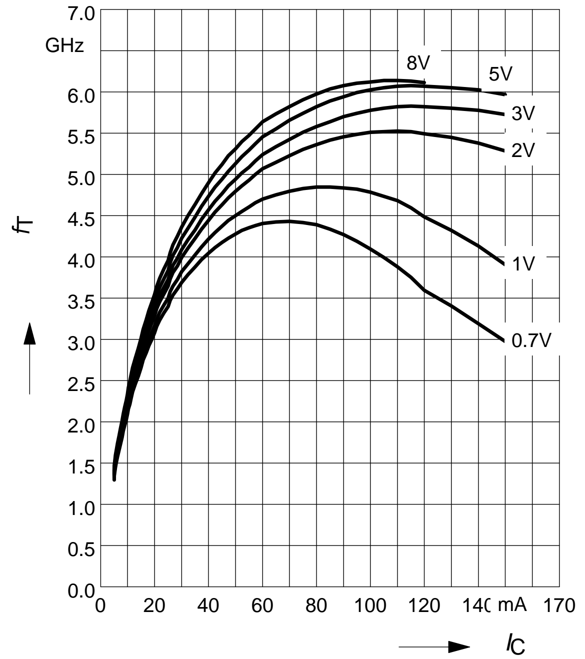
Collector-base capacitance $C_{cb} = f(V_{CB})$

f = 1MHz



Transition frequency $f_T = f(I_C)$

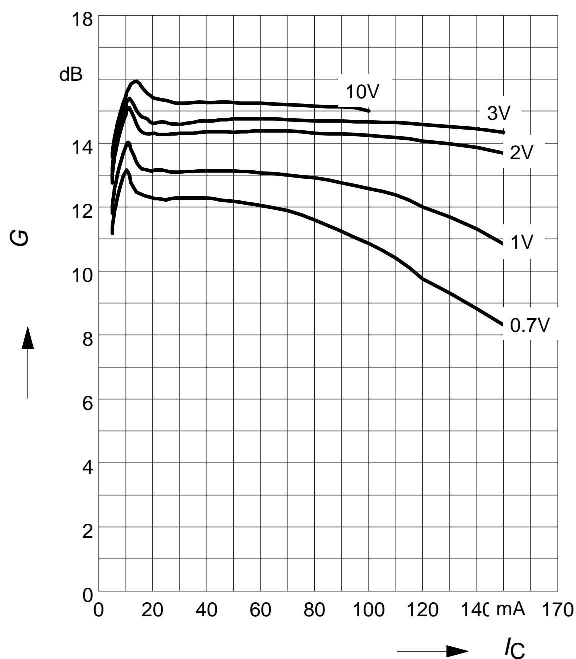
V_{CE} = Parameter



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

f = 0.9GHz

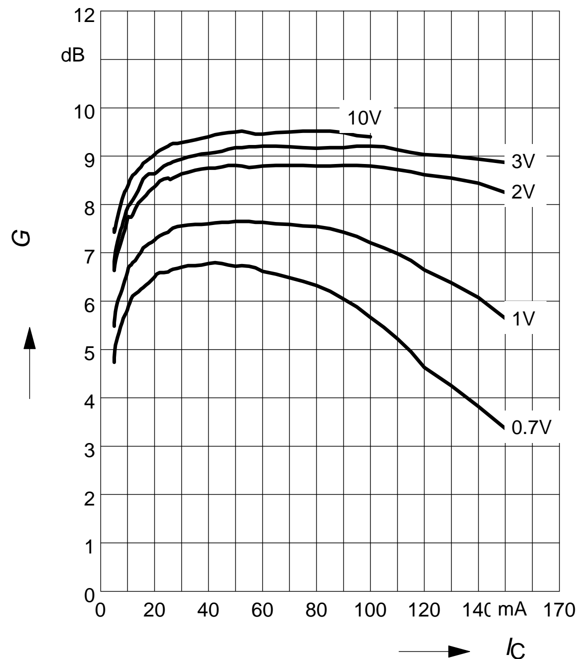
V_{CE} = Parameter



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

f = 1.8GHz

V_{CE} = Parameter



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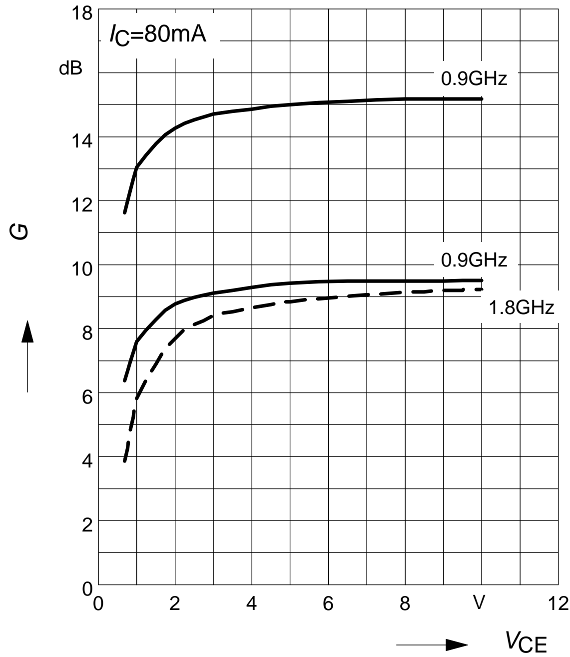
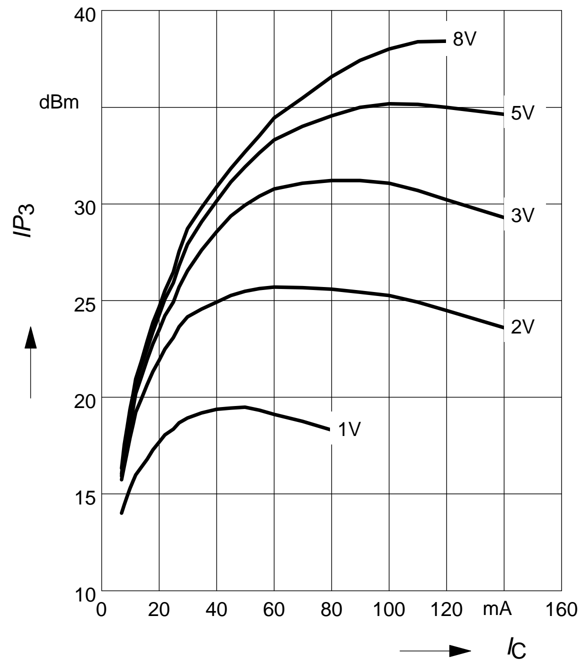
Power Gain G_{ma}, G_{ms} = $f(V_{CE})$: ______
$|S_{21}|^2 = f(V_{CE})$: ---------
f = Parameter

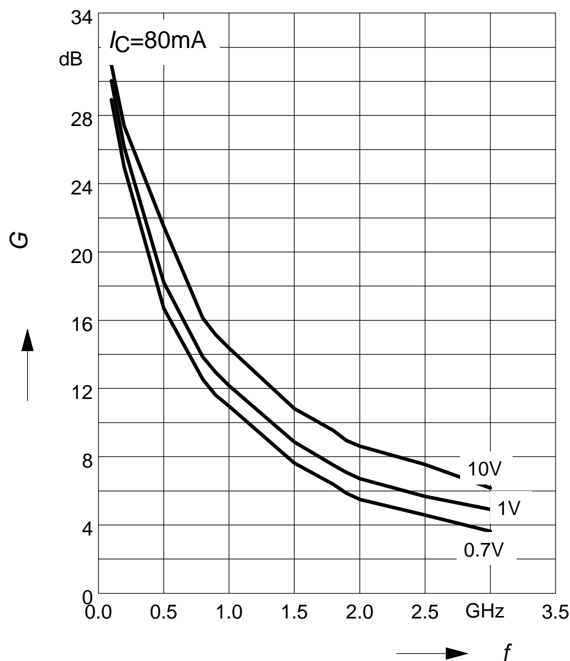


Intermodulation Intercept Point $IP_3=f(I_C)$
(3rd order, Output, $Z_S=Z_L=50\Omega$)
V_{CE} = Parameter, f = 900MHz



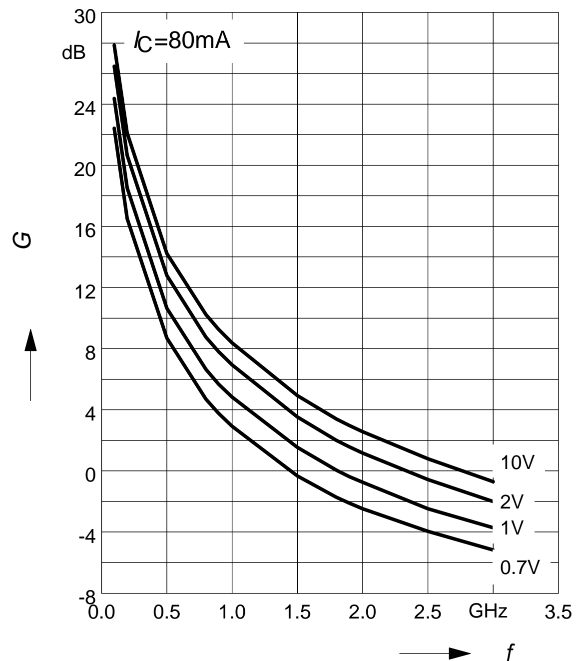
Power Gain G_{ma}, G_{ms} = $f(f)$

V_{CE} = Parameter



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

V_{CE} = Parameter



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