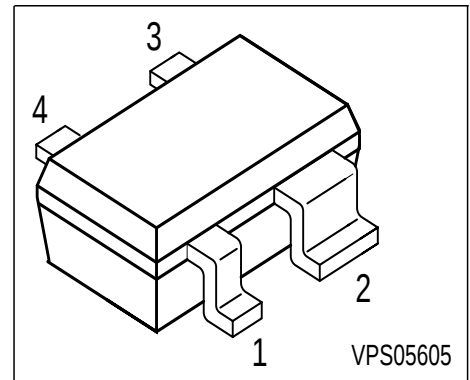


NPN Silicon RF Transistor

- For power amplifier in DECT and PCN systems
- $f_T = 5.5\text{GHz}$
- Gold metalization for high reliability



ESD: Electrostatic discharge 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 $T_S \leq 60^\circ\text{C}^{1)}$	P_{tot}	1000	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}	≤ 90	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 $I_C = 1\text{ mA}$, $I_B = 0$	$V_{(BR)CEO}$	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}	-	-	50	nA
Emitter-base cutoff current $V_{EB} = 1\text{ V}$, $I_C = 0$	I_{EBO}	-	-	1	μA
DC current gain $I_C = 80\text{ mA}$, $V_{CE} = 5\text{ V}$	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 $I_C = 80\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 500\text{ MHz}$	f_T	4	5.5	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{cb}	-	1.7	2.5	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ce}	-	0.7	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{eb}	-	6.8	-	
Noise figure $I_C = 30\text{ mA}$, $V_{CE} = 5\text{ V}$, $Z_S = Z_{Sopt}$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	F	- -	2 3.3	- -	dB
Power gain, maximum available ¹⁾ $I_C = 80\text{ mA}$, $V_{CE} = 5\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	G_{ma}	- -	15.5 9.5	- -	
Transducer gain $I_C = 80\text{ mA}$, $V_{CE} = 5\text{ V}$, $Z_S = Z_L = 50\Omega$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	- -	9 3	- -	
Third order intercept point $I_C = 80\text{ mA}$, $V_{CE} = 5\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	IP_3	-	33	-	dBm

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

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

Transistor Chip Data

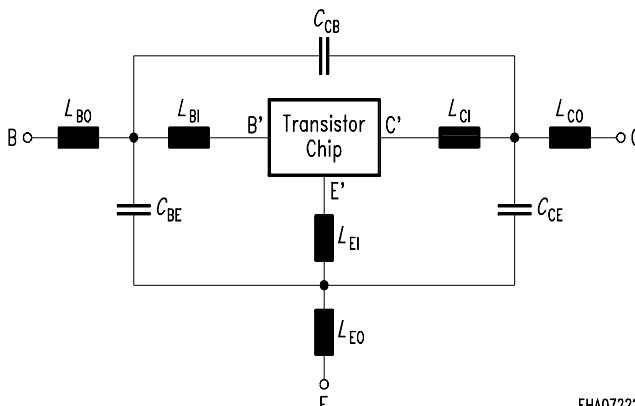
IS =	1.5813	fA	BF =	113.32	-	NF =	1.0653	-
VAF =	12.331	V	IKF =	1.4907	A	ISE =	46.37	fA
NE =	1.4254	-	BR =	86.717	-	NR =	1.8047	-
VAR =	31.901	V	IKR =	0.033605	A	ISC =	0.0080864	fA
NC =	1.8821	-	RB =	0	Ω	IRB =	0.83992	mA
RBM =	1.0078	Ω	RE =	0.22081	Ω	RC =	0.01636	Ω
CJE =	33.904	fF	VJE =	0.71518	V	MJE =	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 scaling is necessary.

Extracted on behalf of Infineon Technologies AG by:

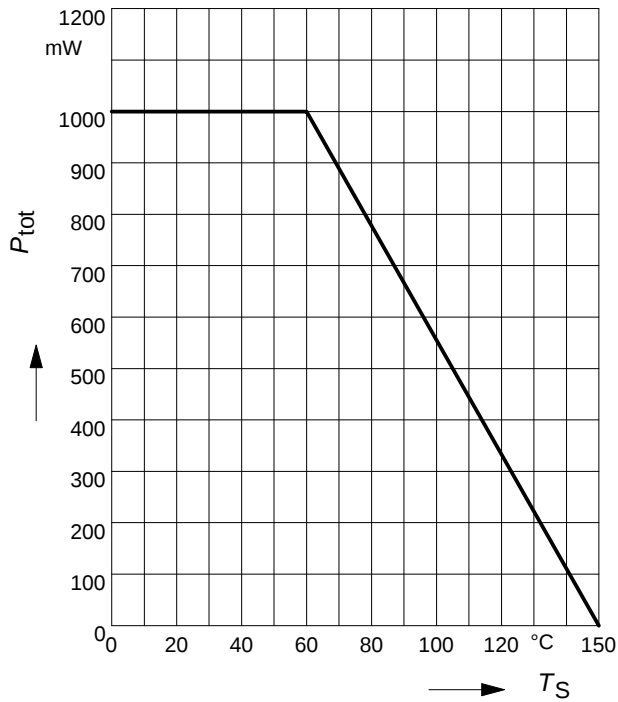
Institut für Mobil-und Satellitentechnik (IMST)

Package Equivalent Circuit:

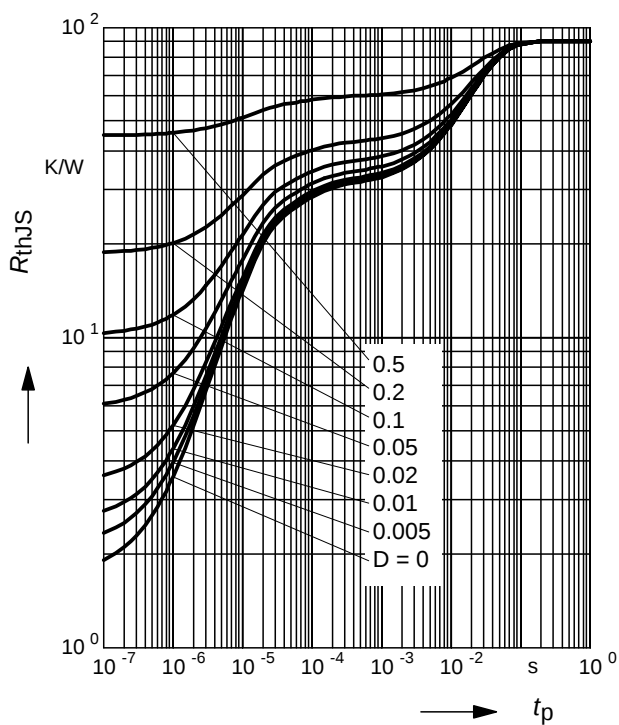
	$L_{BI} =$	0.5	nH
	$L_{BO} =$	0.51	nH
	$L_{EI} =$	0.18	nH
	$L_{EO} =$	0.14	nH
	$L_{CI} =$	0.05	nH
	$L_{CO} =$	0.35	nH
	$C_{BE} =$	78	fF
	$C_{CB} =$	48	fF
	$C_{CE} =$	244	fF
	Valid up to 6GHz		

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>

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

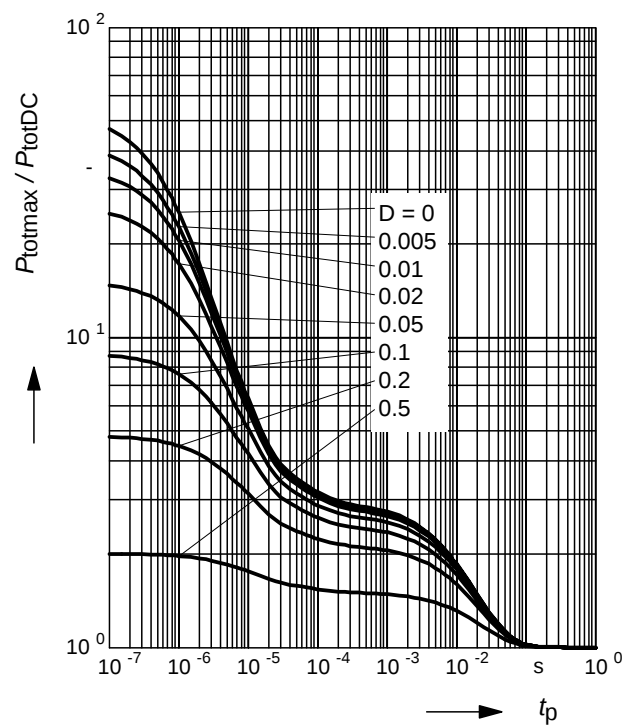


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



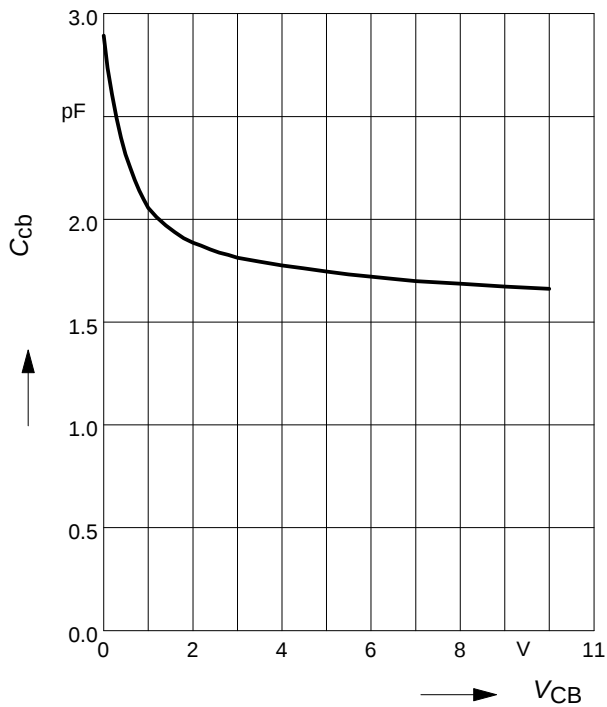
Permissible Pulse Load

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



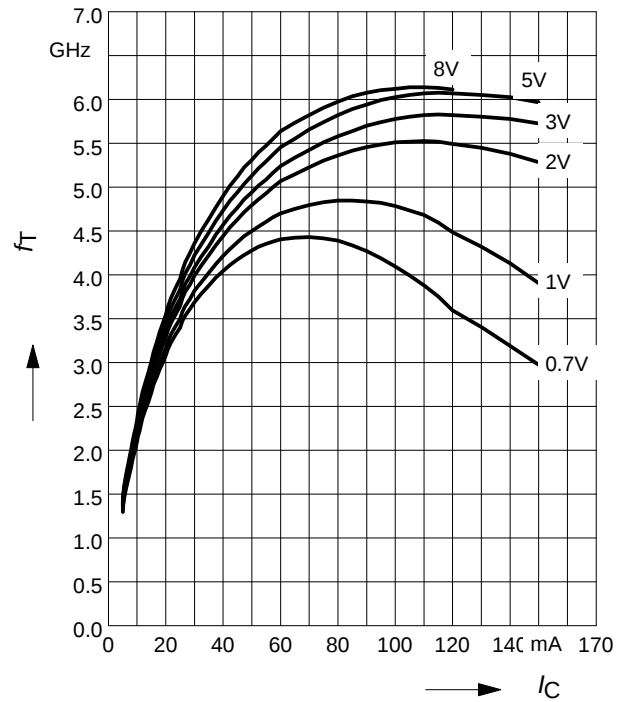
Collector-base capacitance $C_{cb} = f(V_{CB})$

$f = 1\text{MHz}$



Transition frequency $f_T = f(I_C)$

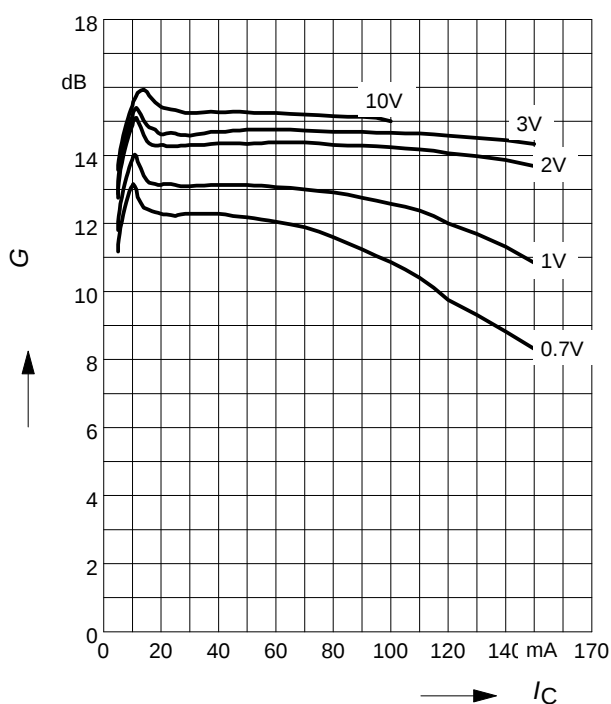
$V_{CE} = \text{Parameter}$



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

$f = 0.9\text{GHz}$

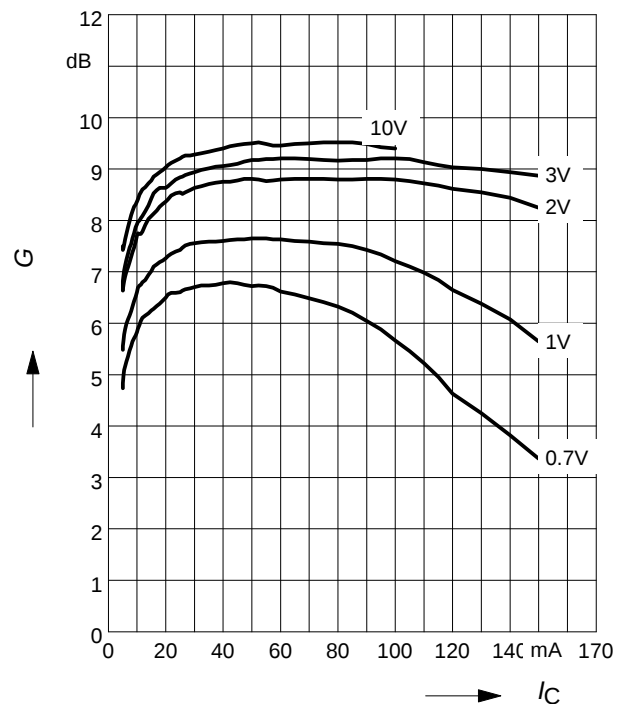
$V_{CE} = \text{Parameter}$



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

$f = 1.8\text{GHz}$

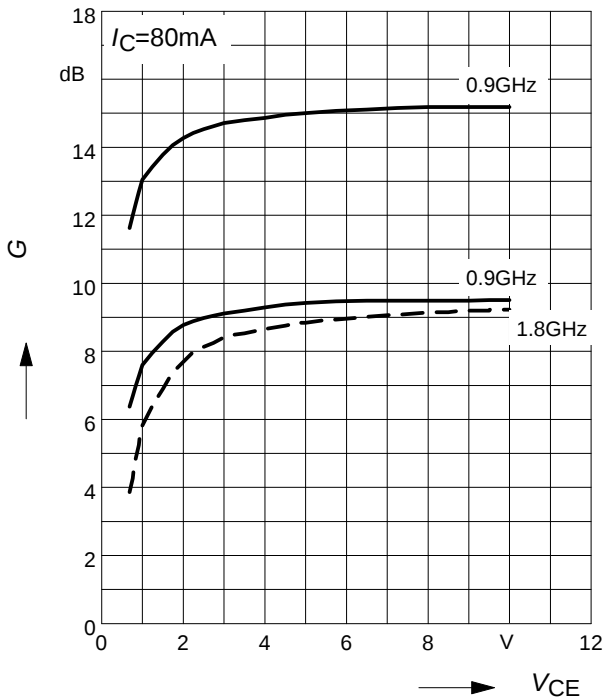
$V_{CE} = \text{Parameter}$



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

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

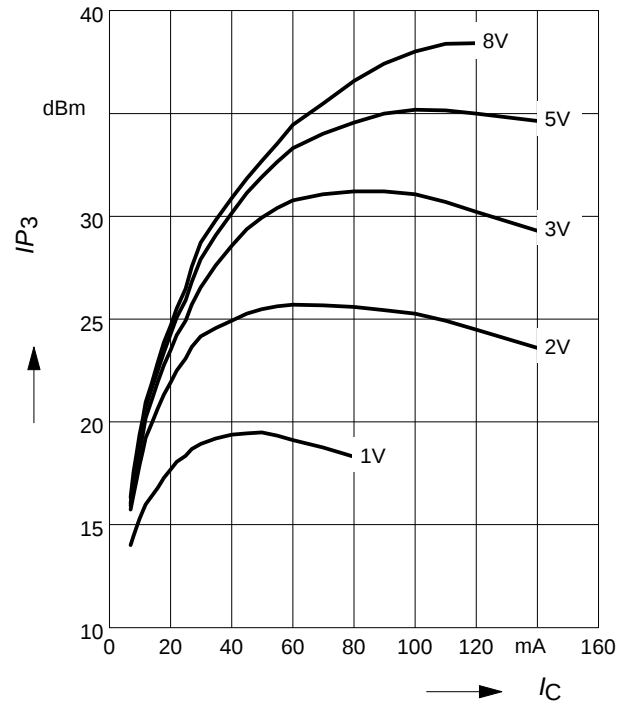
f = Parameter



Intermodulation Intercept Point $IP_3 = f(I_C)$

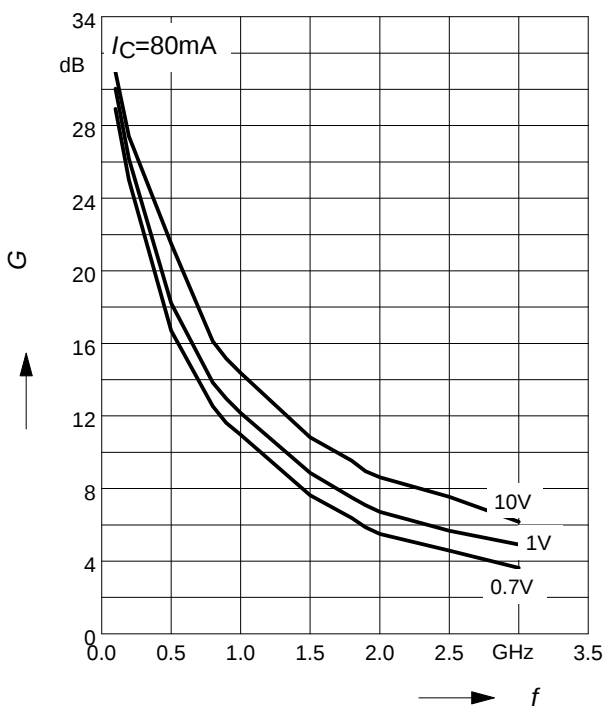
(3rd order, Output, $Z_S = Z_L = 50\Omega$)

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

