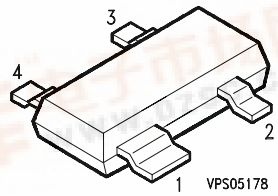
SIEMENS

BFP 180

NPN Silicon RF Transistor

- For low-power amplifiers in mobile communication systems (pager) at collector currents from 0.2 to 2.5mA
  f_T = 7GHz
- F = 2.1dB at 900MHz



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

Type	Marking	Ordering Code	Pin Configuration				Package
BFP 180	RDs	Q62702-F1377	1 = C	2 = E	3 = B	4 = E	SOT-143

Maximum Ratings

Parameter	Symbol	Values	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	4	mA
Base current	I_B	0.5	
Total power dissipation $T_S \leq 124$ °C	P_{tot}	30	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	- 65 ... + 150	
Storage temperature	T_{stg}	- 65 ... + 150	

Thermal Resistance

Junction - soldering point 1)	R_{thJS}	≤ 875	K/W

1) T_S is measured on the collector lead at the soldering point to the pcb.

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 = 1 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					
Transition frequency I_C = 3 mA, V_{CE} = 5 V, f = 500 MHz	f_T	5	7	-	GHz
Collector-base capacitance V_{CB} = 5 V, V_{BE} = v_{be} = 0 , f = 1 MHz	C_{cb}	-	0.19	0.35	pF
Collector-emitter capacitance V_{CE} = 5 V, V_{BE} = v_{be} = 0 , f = 1 MHz	C_{ce}	-	0.27	-	
Emitter-base capacitance V_{EB} = 0.5 V, V_{CB} = v_{cb} = 0 , f = 1 MHz	C_{eb}	-	0.13	-	
Noise figure I_C = 1 mA, V_{CE} = 5 V, Z_S = Z_{Sopt} f = 900 MHz f = 1.8 GHz	F	 - -	 2.1 2.25	 - -	dB
Power gain [1)] I_C = 1 mA, V_{CE} = 5 V, Z_S = Z_{Sopt} Z_L = Z_{Lopt} f = 900 MHz f = 1.8 GHz	G_{ms}	 - -	 15 12	 - -	
Transducer gain I_C = 1 mA, V_{CE} = 5 V, Z_S =Z_L= 50 Ω f = 900 MHz f = 1.8 GHz	$\|S_{21e}\|^2$	 - -	 8.5 7	 - -	

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

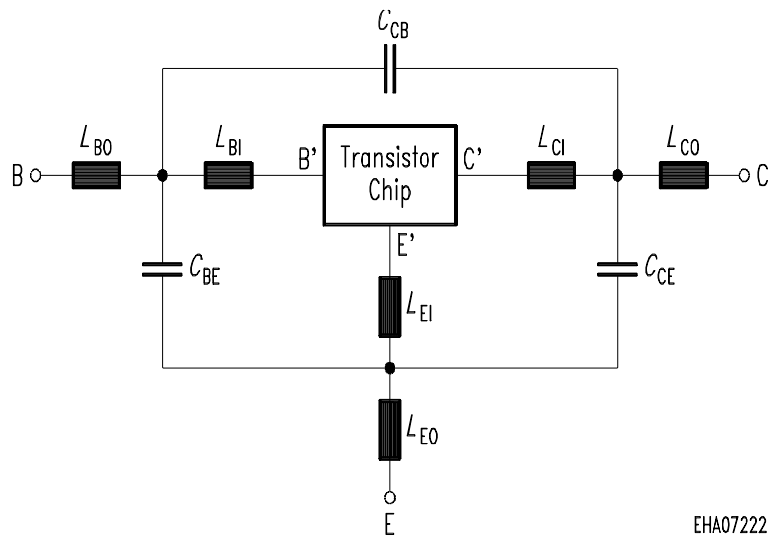
SPICE Parameters (Gummel-Poon Model, Berkeley-SPICE 2G.6 Syntax) :

Transistor Chip Data

IS =	0.18519	fA	BF =	94.687	-	NF =	1.0236	-
VAF =	26.867	V	IKF =	0.025252	A	ISE =	130.93	fA
NE =	1.9818	-	BR =	20.325	-	NR =	0.93013	-
VAR =	3.2134	V	IKR =	0.012138	A	ISC =	6.1852	fA
NC =	1.6195	-	RB =	1.4255	Ω	IRB =	0.01	mA
RBM =	60	Ω	RE =	3.7045	Ω	RC =	0.56	Ω
CJE =	3.2473	fF	VJE =	1.1812	V	MJE =	0.41827	-
TF =	14.866	ps	XTF =	0.3062	-	VTF =	0.22023	V
ITF =	1.0202	mA	PTF =	0	deg	CJC =	183.69	fF
VJC =	1.1812	V	MJC =	0.30423	-	XCJC =	0.08334	-
TR =	2.2648	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.87906	-	TNOM	300	K

All parameters are ready to use, no scalling is necessary.
Extracted on behalf of SIEMENS Small Signal Semiconductors by:
Institut für Mobil-und Satellitenfunktechnik (IMST)

Package Equivalent Circuit:



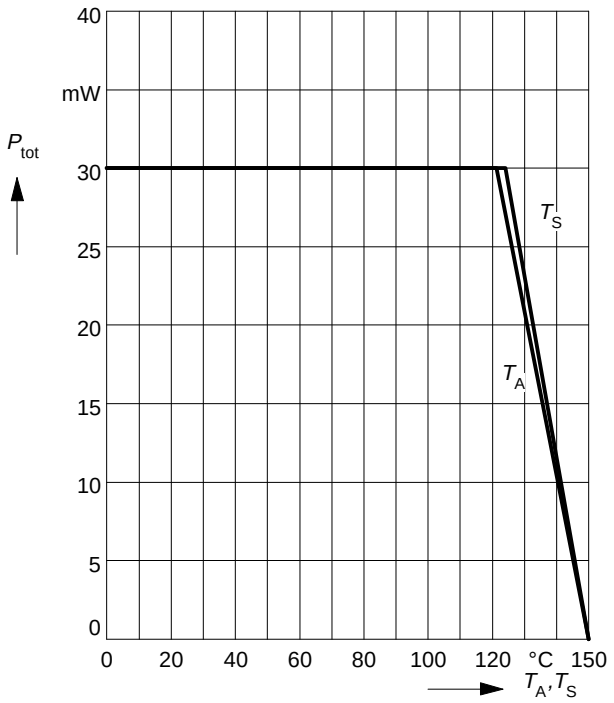
LBI =	0.89	nH
LBO =	0.73	nH
LEI =	0.4	nH
LEO =	0.15	nH
LCI =	0	nH
LCO =	0.42	nH
CBE =	189	fF
CCB =	15	fF
CCE =	187	fF

Valid up to 6 GHz

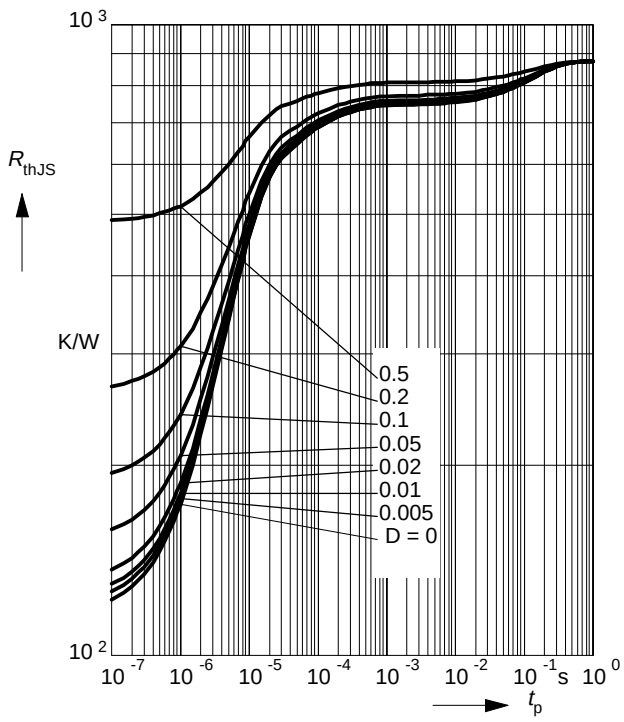
For examples and ready to use parameters please contact your local Siemens distributor or sales office to obtain a Siemens CD-ROM or see Internet: http://www.siemens.de/Semiconductor/products/35/35.htm

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

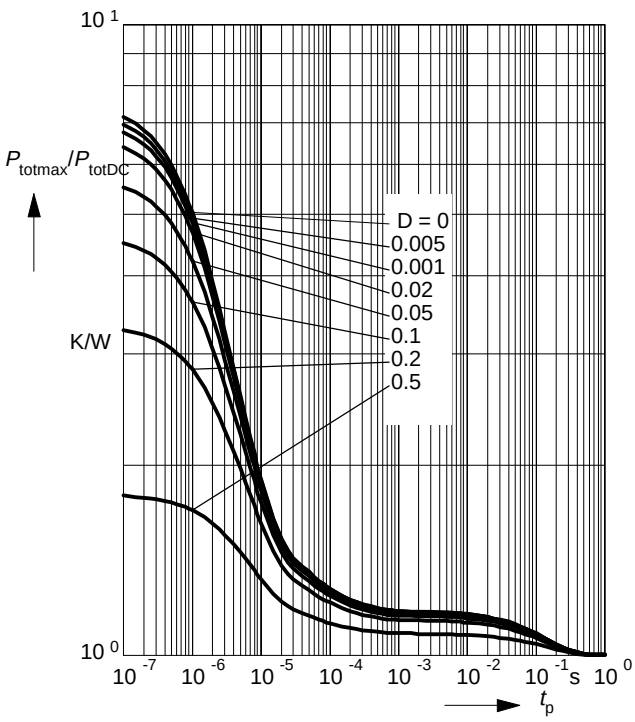
* Package mounted on epoxy



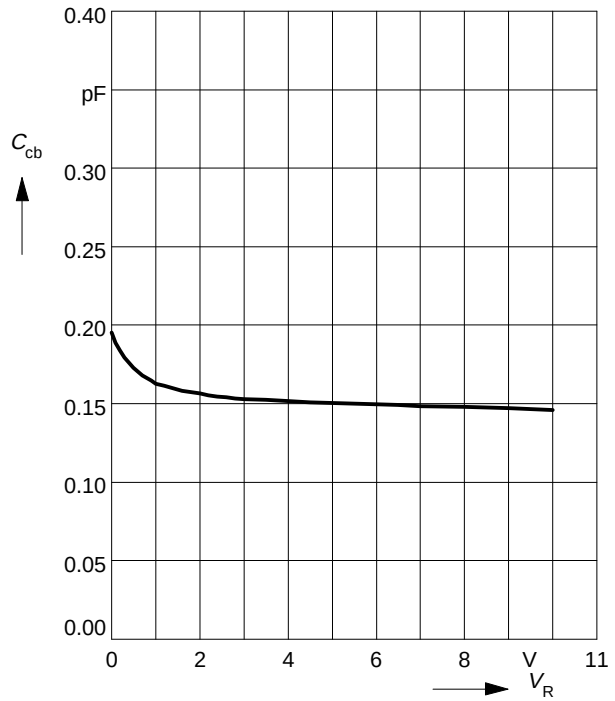
Permissible Pulse Load $R_{thJS} = f(t_p)$



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

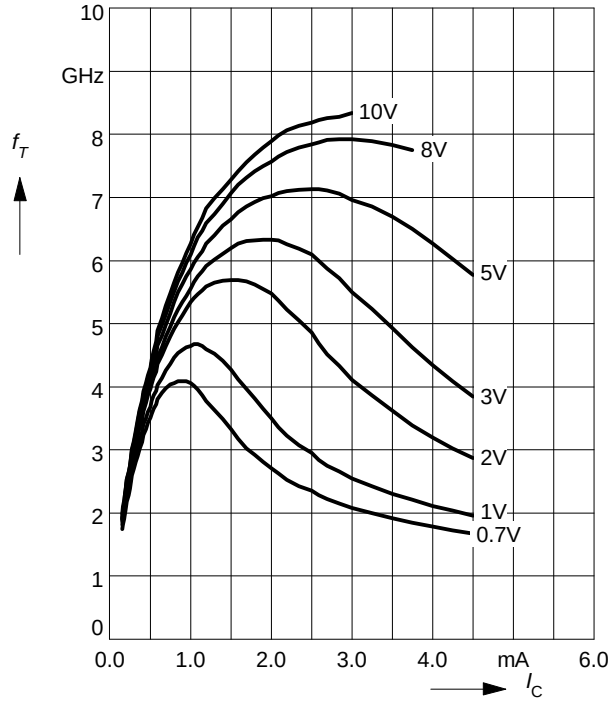


Collector-base capacitance $C_{cb} = f(V_{CB})$
$V_{BE} = v_{be} = 0$, $f = 1$MHz

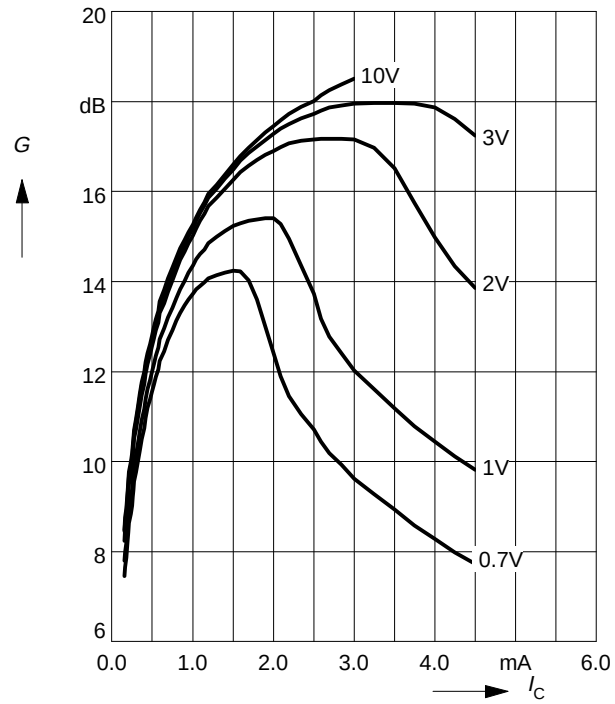


Transition frequency $f_T = f(I_C)$

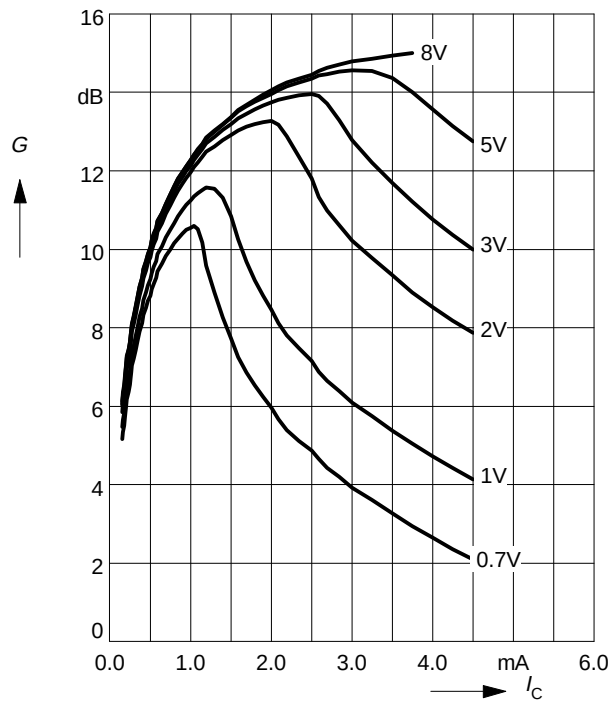
V_{CE} = Parameter



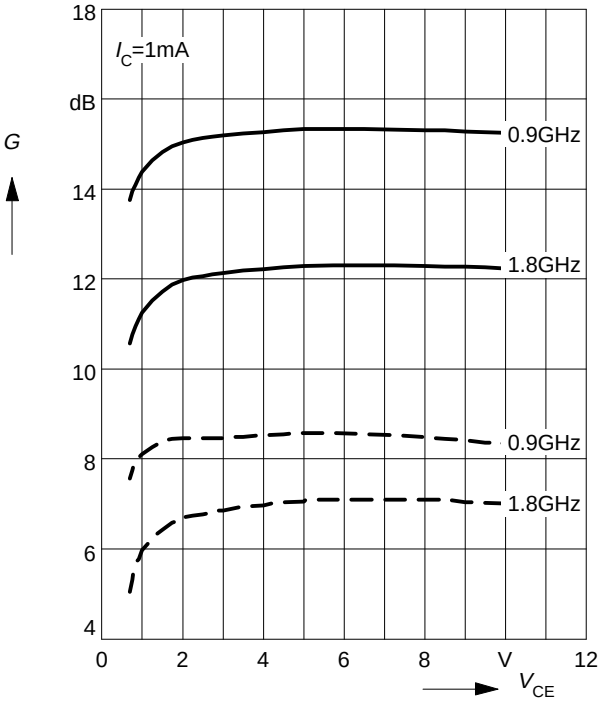
Power Gain G_{ma}, $G_{ms} = f(I_C)$
$f = 0.9$GHz
V_{CE} = Parameter



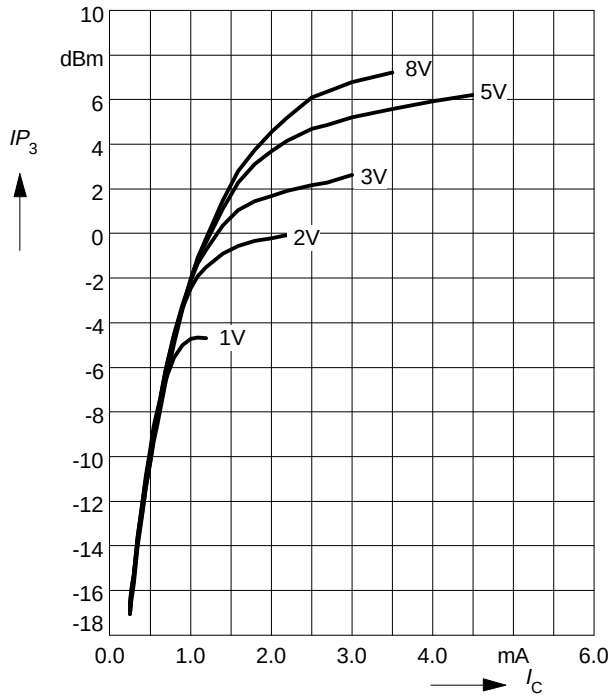
Power Gain G_{ma}, $G_{ms} = f(I_C)$
$f = 1.8$GHz
V_{CE} = Parameter



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

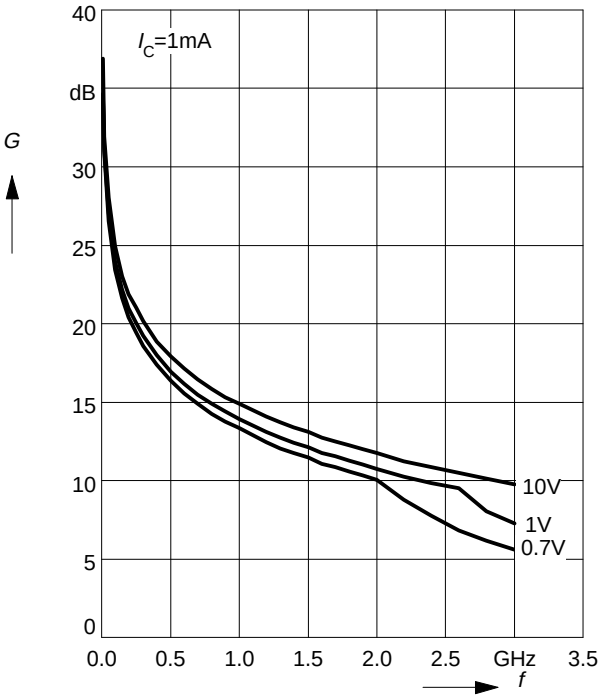


Intermodulation Intercept Point IP_3=$f(I_C)$
(3rd order, Output, Z_S=Z_L=50Ω)
V_{CE} = Parameter, f = 900MHz



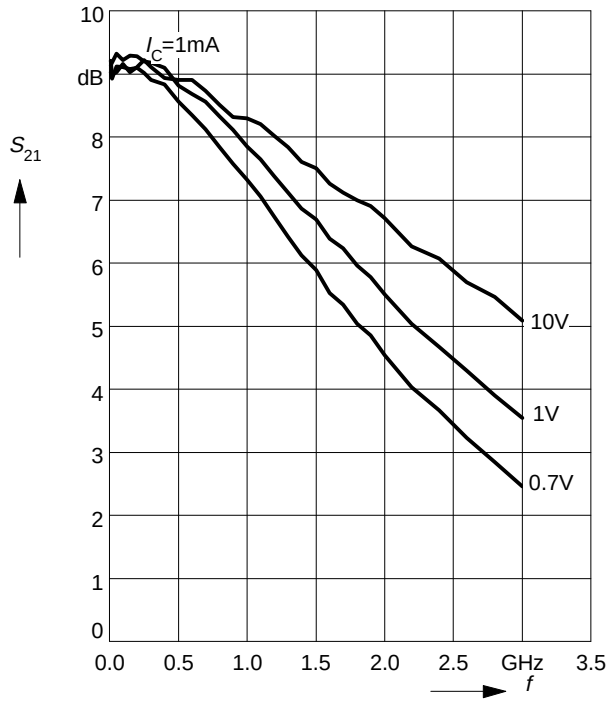
Power Gain G_{ma}, G_{ms} = $f(f)$

V_{CE} = Parameter

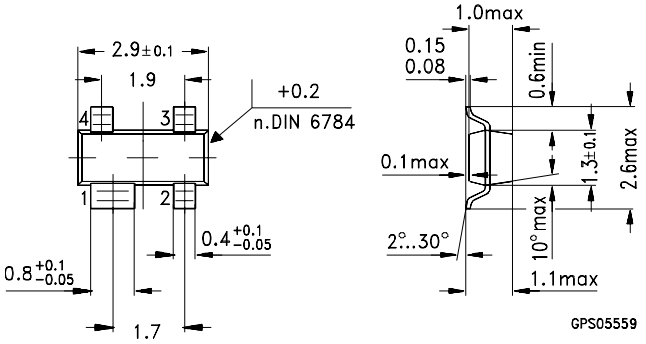


Power Gain $|S_{21}|^2$= $f(f)$

V_{CE} = Parameter



Package


2.9±0.1
1.9
+0.2
n.DIN 6784
4
3
1
2
0.4 +0.1 −0.05
0.8 +0.1 −0.05
1.7
1.0max
0.15
0.08
0.6min
0.1max
1.3±0.1
2.6max
2°...30°
10° max
1.1max
GPS05559