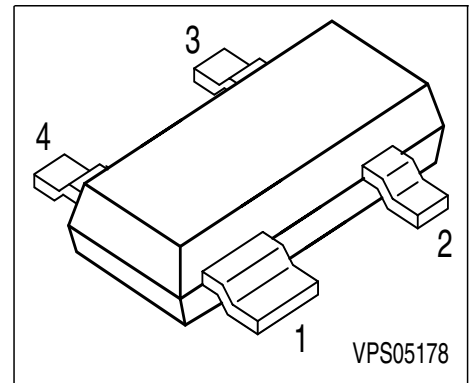


**PNP Silicon RF Transistor**

- For low distortion broadband amplifier in antenna and telecommunications systems up to 1.5 GHz at collector currents from 20 mA to 80 mA



**ESD: Electrostatic discharge sensitive device, observe handling precaution!**

Type	Marking	Pin Configuration				Package
BFP 194	RKs	1 = C	2 = E	3 = B	4 = E	SOT-143

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	15	V
Collector-emitter voltage	$V_{CES}$	20	
Collector-base voltage	$V_{CBO}$	20	
Emitter-base voltage	$V_{EBO}$	3	
Collector current	$I_C$	100	mA
Base current	$I_B$	10	
Total power dissipation, $T_S \leq 77 \text{ }^\circ\text{C}$ 1)	$P_{tot}$	700	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	$R_{thJS}$	$\leq 105$	K/W
----------------------------	------------	------------	-----

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.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	15	-	-	V
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$	$I_{EBO}$	-	-	1	$\mu\text{A}$
DC current gain $I_C = 70\text{ mA}, V_{CE} = 8\text{ V}$	$h_{FE}$	15	50	-	-

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC characteristics</b> (verified by random sampling)					
Transition frequency $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 500\text{ MHz}$	$f_T$	3.5	5	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$	$C_{cb}$	-	1.4	2	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$	$C_{ce}$	-	0.3	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$	$C_{eb}$	-	4.4	-	
Noise figure $I_C = 20\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$F$	-	2.8 4.7	-	dB
Power gain, maximum available <sup>F)</sup> $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$G_{\text{ma}}$	-	12 7	-	
Transducer gain $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	-	9 3	-	

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

**Transistor Chip Data**

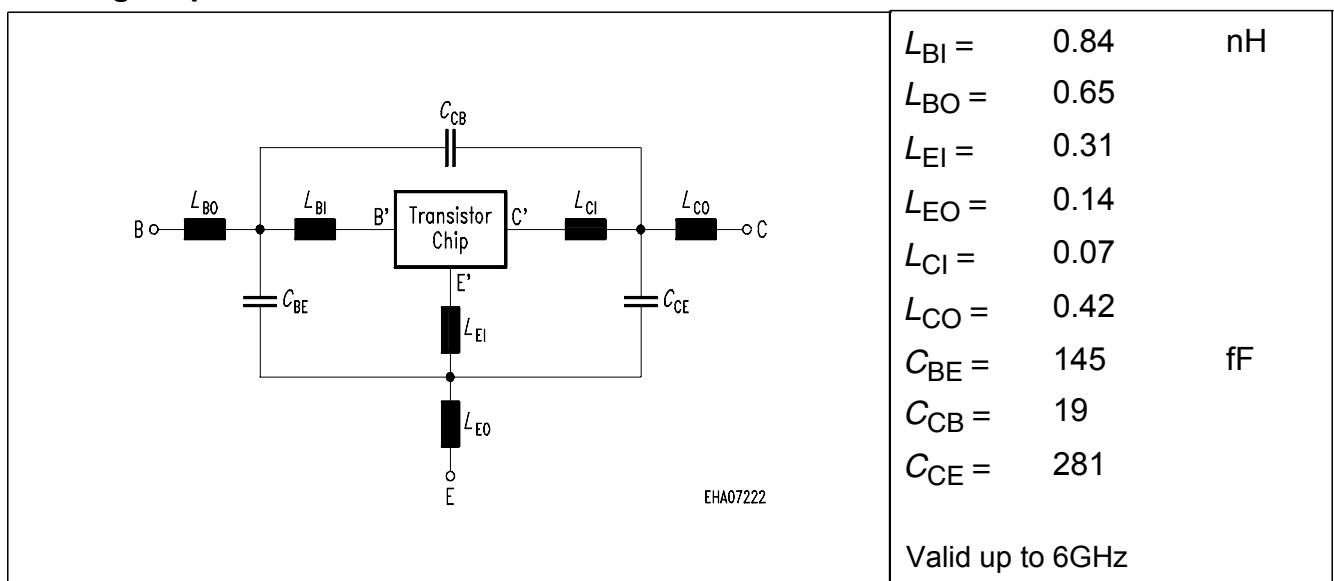
IS =	4.574	fA	BF =	111.78	-	NF =	0.66503	-
VAF =	9.1007	V	IKF =	0.84785	A	ISE =	21.629	fA
NE =	0.841	-	BR =	92.296	-	NR =	0.43618	-
VAR =	1.7871	V	IKR =	0.012843	A	ISC =	0.0078447	fA
NC =	1.6	-	RB =	0.75304	$\Omega$	IRB =	0.061674	mA
RBM =	4.1356	$\Omega$	RE =	0.15908		RC =	0.10833	$\Omega$
CJE =	17.699	fF	VJE =	0.84843	V	MJE =	0.48212	-
TF =	53.11	ps	XTF =	0.65766	-	VTF =	0.10323	V
ITF =	0.010453	mA	PTF =	0	deg	CJC =	3585.6	fF
VJC =	0.71631	V	MJC =	0.40003	-	XCJC =	0.063742	-
TR =	0.97481	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3		FC =	0.90755	-	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)

© 1996 SIEMENS AG

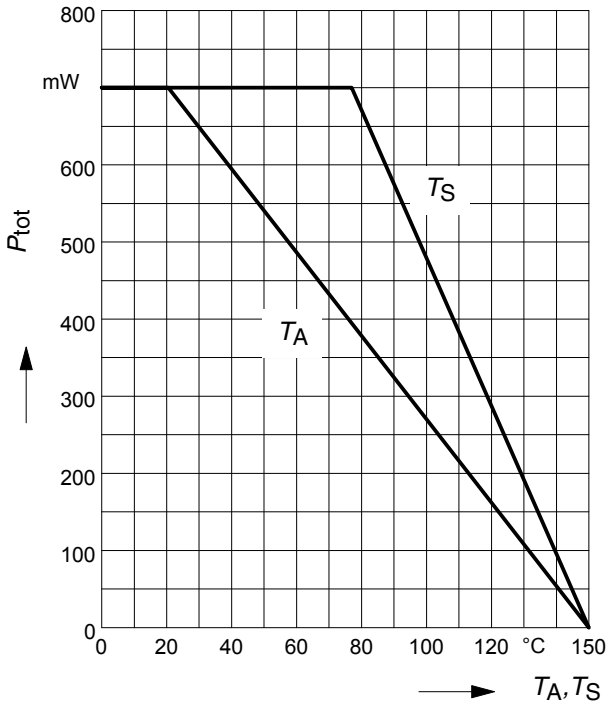
**Package Equivalent Circuit:**



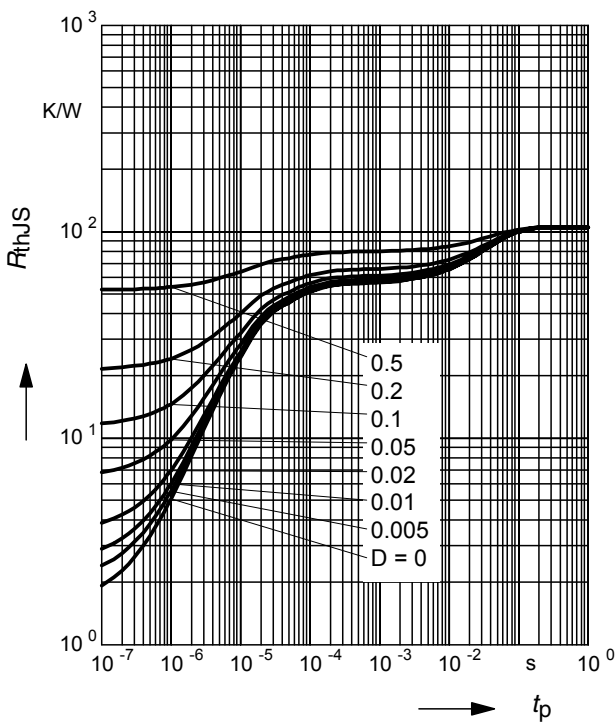
For examples and ready to use parameters please contact your local Infineon Technologies distributor or salesoffice to obtain a Infineon Technologies CD-ROM or see Internet: <http://www.infineon.com/products/discrete/index.htm>

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

\* Package mounted on epoxy

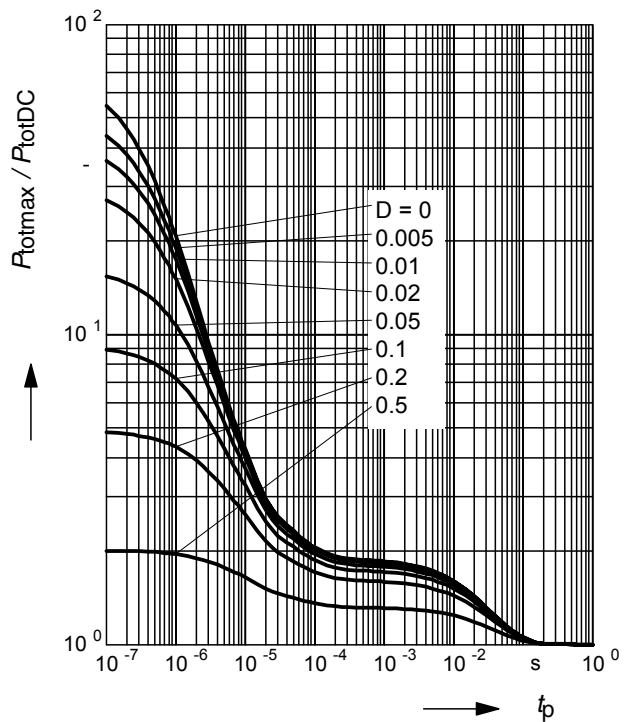


**Permissible Pulse Load  $R_{thJS} = f(t_p)$**



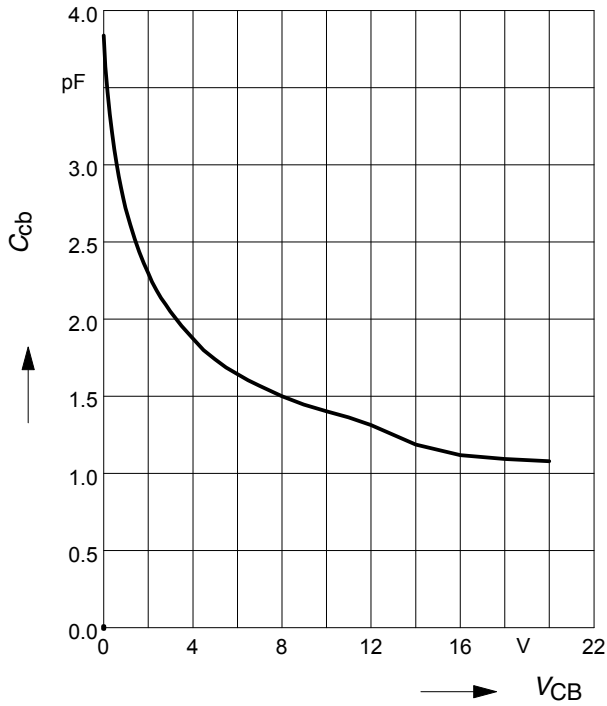
**Permissible Pulse Load**

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



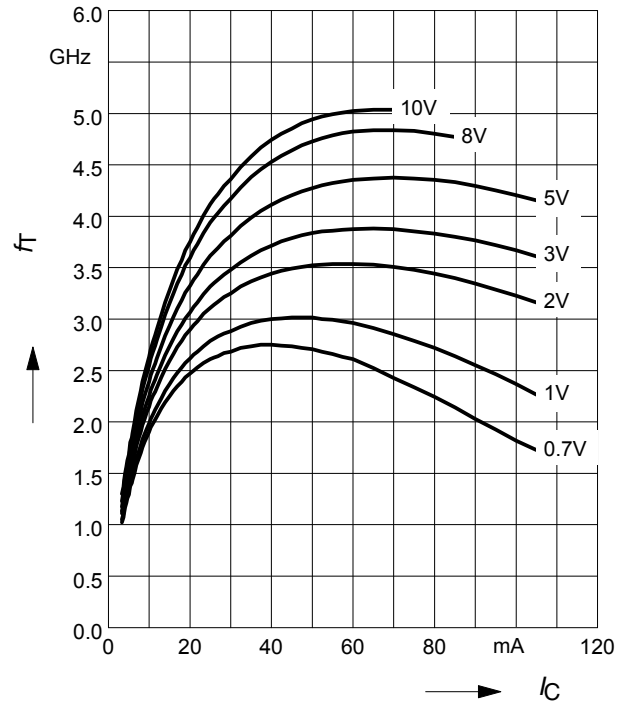
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

$f = 1\text{MHz}$



**Transition frequency  $f_T = f(I_C)$**

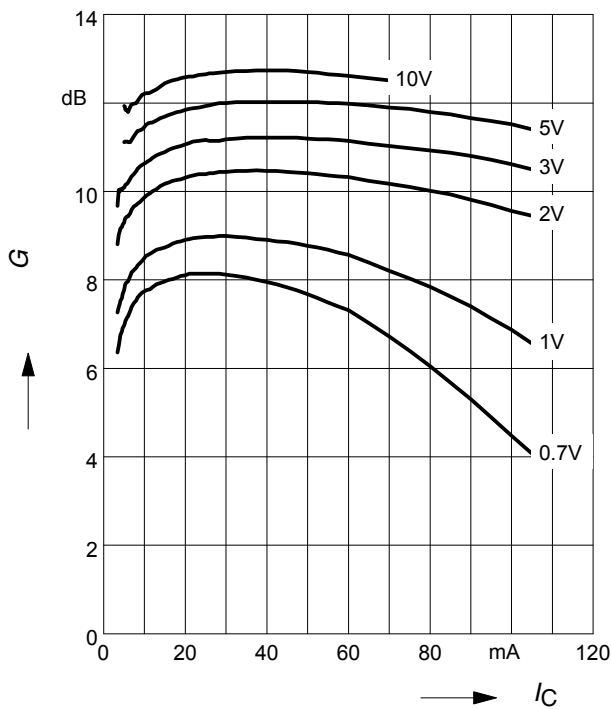
$V_{CE} = \text{Parameter}$



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

$f = 0.9\text{GHz}$

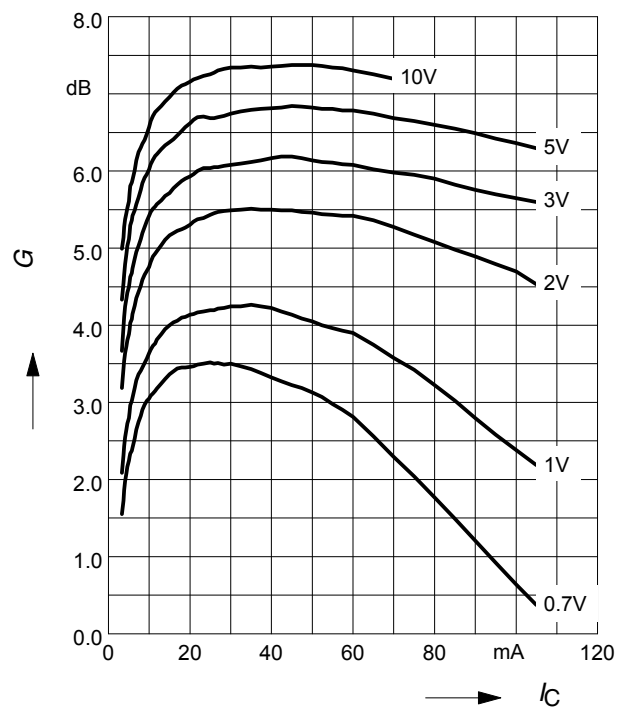
$V_{CE} = \text{Parameter}$



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

$f = 1.8\text{GHz}$

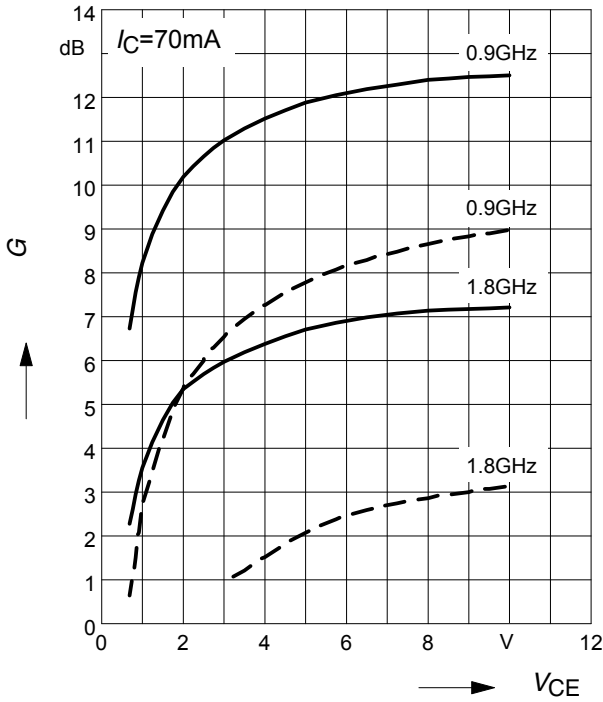
$V_{CE} = \text{Parameter}$



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

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

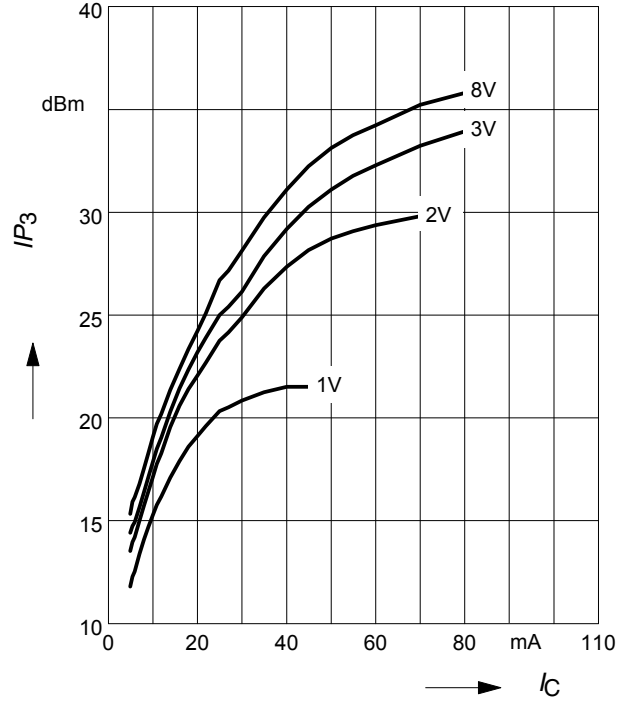
$f =$  Parameter



**Intermodulation Intercept Point**  $IP_3 = f(I_C)$

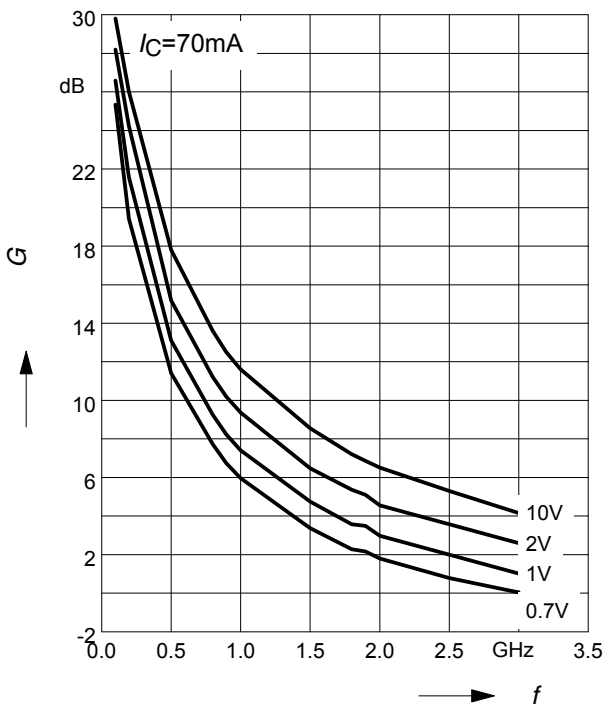
(3rd order, Output,  $Z_S = Z_L = 50\Omega$ )

$V_{CE} =$  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

