NPN Silicon RF Transistor
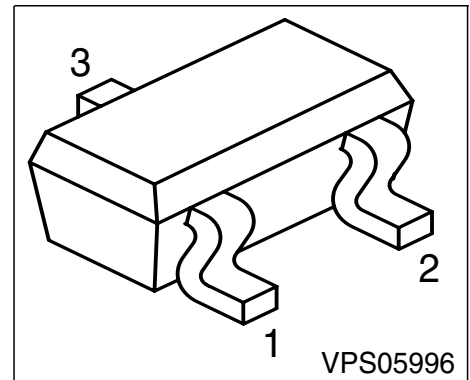
Preliminary data

- For low noise, high-gain broadband amplifiers at collector currents from 1 mA to 20 mA

- f_T = 8 GHz
  F = 1.2 dB at 900 MHz

VPS05996

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

Type	Marking	Pin Configuration			Package
BFR 182T	RGs	1 = B	2 = E	3 = C	SC-75

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	35	mA
Base current	I_B	4	
Total power dissipation, T_S = 75 °C[F)]	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point	R_{thJS}	≤ 300	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	$V_{(BR)CEO}$	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}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	1	μA
DC current gain I_C = 10 mA, V_{CE} = 8 V	h_{FE}	50	100	200	-

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

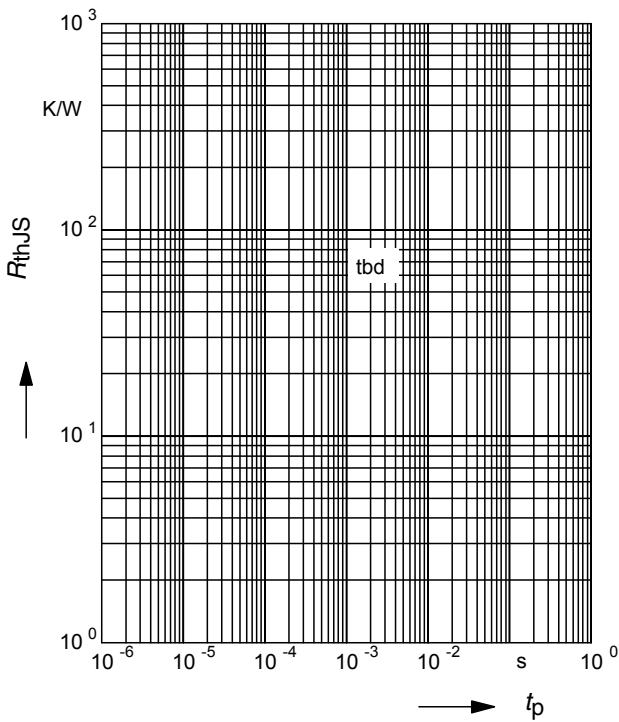| Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics (verified by random sampling)					
Transition frequency I_C = 15 mA, V_{CE} = 8 V, f = 500 MHz	f_T	6	8	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	0.33	0.5	pF
Collector-emitter capacitance V_{CE} = 10 V, f = 1 MHz	C_{ce}	-	0.18	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	0.6	-	
Noise figure I_C = 3 mA, V_{CE} = 8 V, Z_S = Z_{Sopt} , f = 900 MHz f = 1.8 GHz	F	- -	1.2 1.9	- -	dB
Power gain, maximum stable [1] I_C = 10 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 900 MHz	G_{ms}	-	20	-	
Power gain, maximum available [2] I_C = 10 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 1.8 GHz	G_{ma}	-	13	-	
Transducer gain I_C = 10 mA, V_{CE} = 8 V, Z_S = Z_L = 50Ω , f = 900 MHz f = 1.8 GHz	$|S_{21e}|^2$	- -	16 10	- -	

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

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

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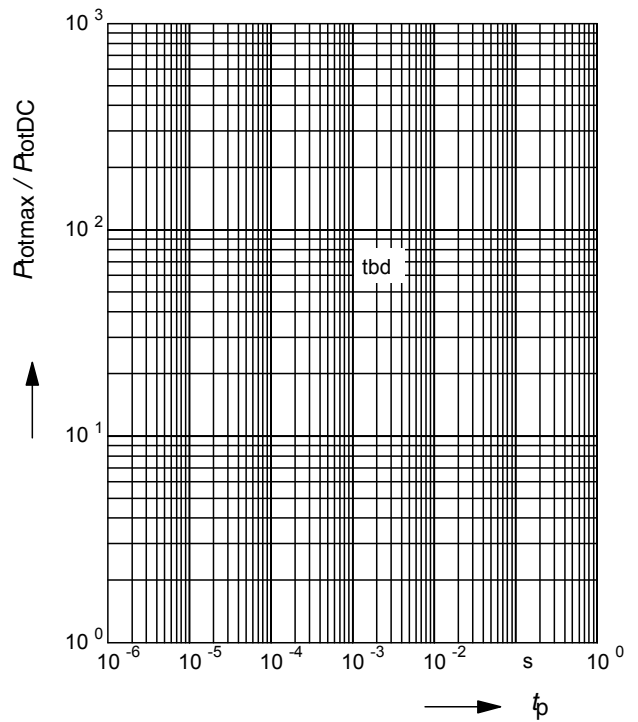
* Package mounted on epoxy

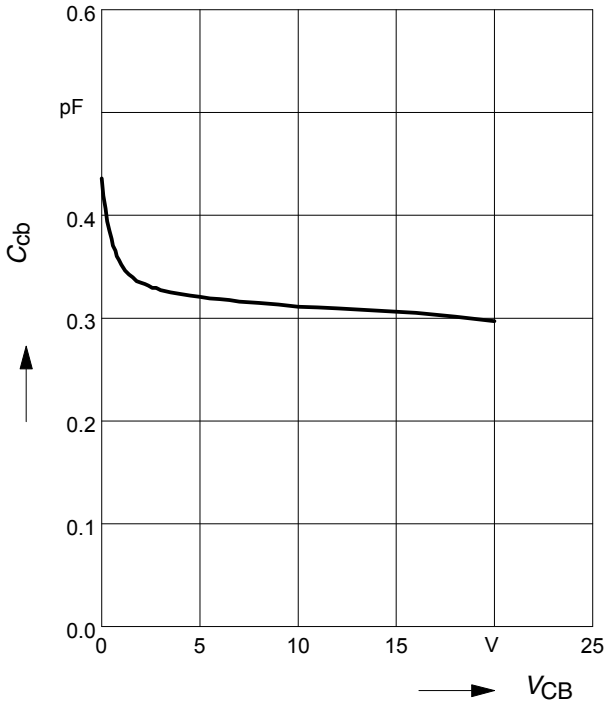## Permissible Pulse Load $R_{thJS} = f(t_p)$
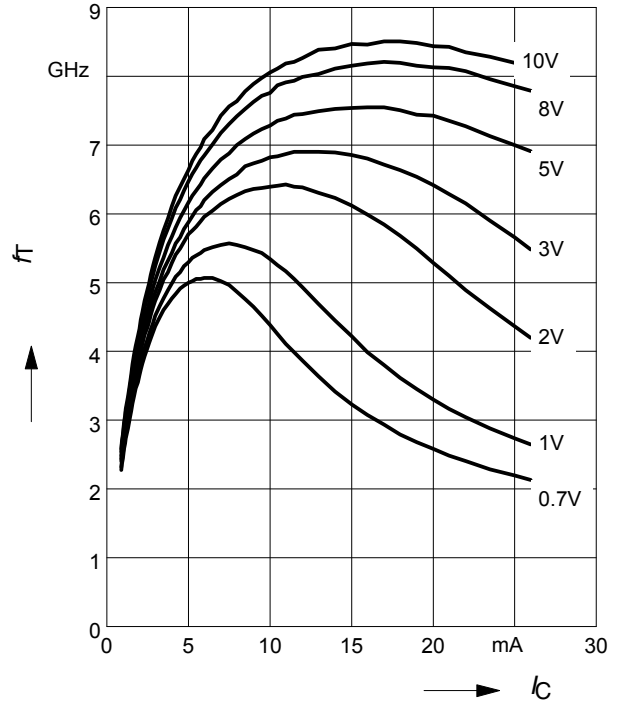

Permissible Pulse Load

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

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

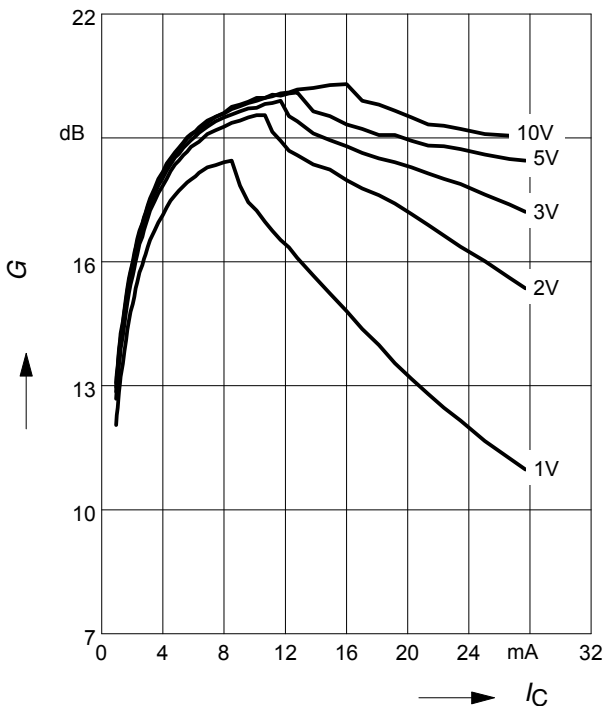$f = 1\text{MHz}$

Transition frequency $f_T = f(I_C)$

V_{CE} = Parameter

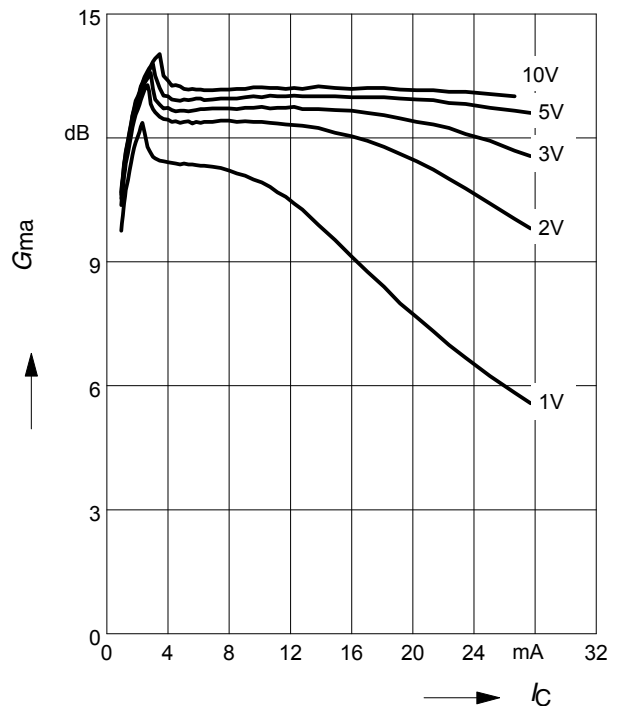**Power Gain** G_{ma}, $G_{ms} = f(I_C)$

$f = 0.9\text{GHz}$

V_{CE} = Parameter

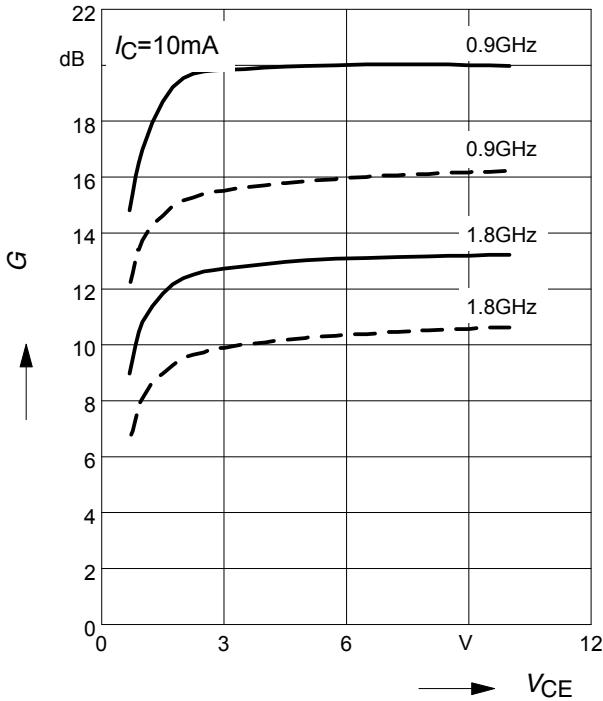**Power Gain** G_{ma}, $G_{ms} = f(I_C)$

$f = 1.8\text{GHz}$

V_{CE} = Parameter

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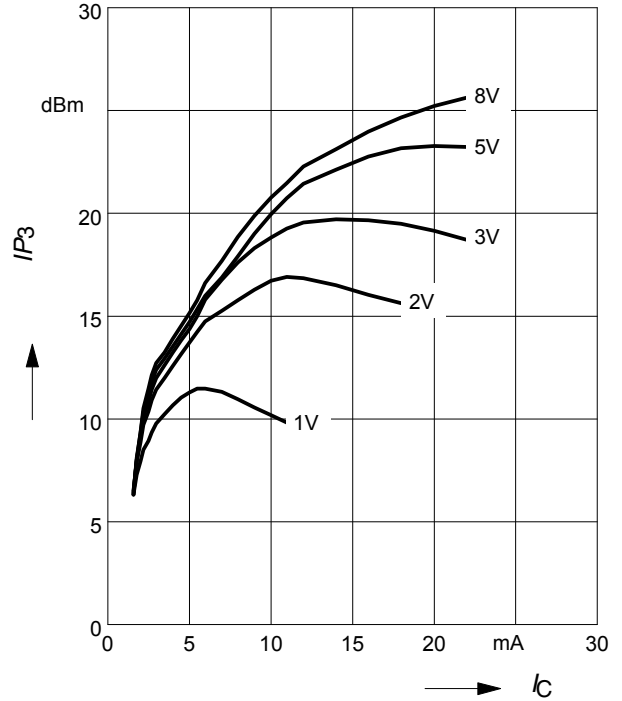
$|S_{21}|^2 = f(V_{CE})$: - - - - - - - - -

f = Parameter

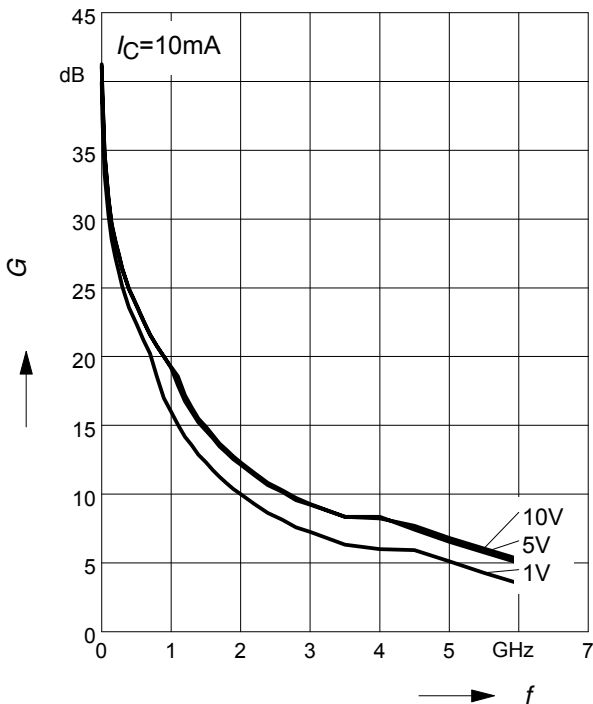**Intermodulation Intercept Point** $IP_3 = f(I_C)$

(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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