BFR93A (NPN)

FEATURES

- For low-noise, high-gain broadband amplifiers at collector currents from 2 mA to 30 mA

1. BASE
2. EMITTER
3. COLLECTO

SOT-23

MAXIMUM RATINGS (TA=25℃ unless otherwise noted)

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	50	mA
Base current	I_B	6	
Total power dissipation, $T_S \leq 63$ °C [1)]	P_{tot}	300	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}	≤ 290	K/W

[1] T_S is measured on the collector lead at the soldering point to the pcb

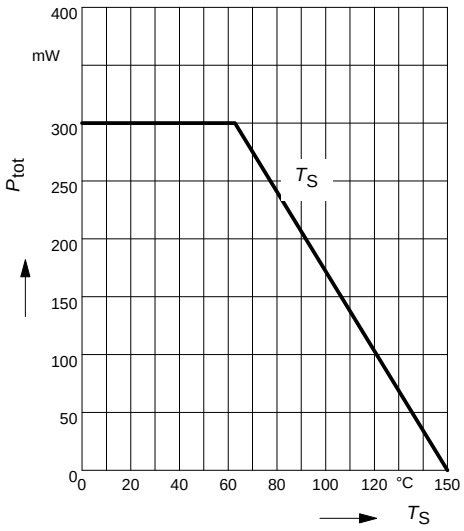
[2] For calculation of R_{thJA} please refer to Application Note Thermal Resistance

ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

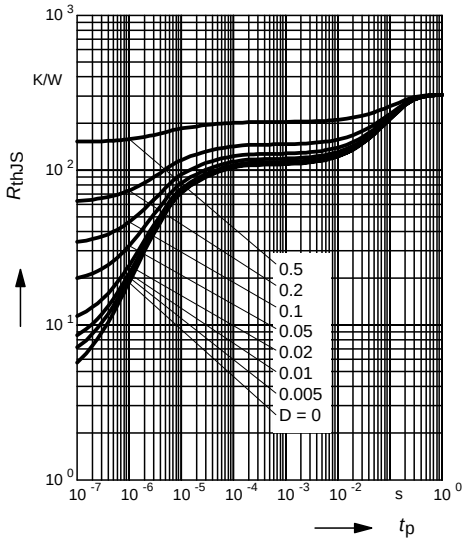
BFR93A

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} = 2 V, I_C = 0	I_{EBO}	-	-	10	μA
DC current gain I_C = 30 mA, V_{CE} = 8 V	h_{FE}	50	100	200	-
AC characteristics (verified by random sampling)					
Transition frequency I_C = 30 mA, V_{CE} = 8 V, f = 500 MHz	f_T	4.5	6	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	0.58	0.9	pF
Collector-emitter capacitance V_{CE} = 10 V, f = 1 MHz	C_{ce}	-	0.23	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	1.7	-	
Noise figure I_C = 5 mA, V_{CE} = 8 V, Z_S = Z_{Sopt} , f = 900 MHz f = 1.8 GHz	F	 - -	 2 3.3	 - -	dB
Power gain, maximum available [1)] I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 900 MHz f = 1.8 GHz	G_{ma}	 - -	 13.5 8.5	 - -	
Transducer gain I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_L = 50Ω , f = 900 MHz f = 1.8 GHz	$\lvert S_{21e}\rvert^2$	 - -	 12 6.5	 - -	

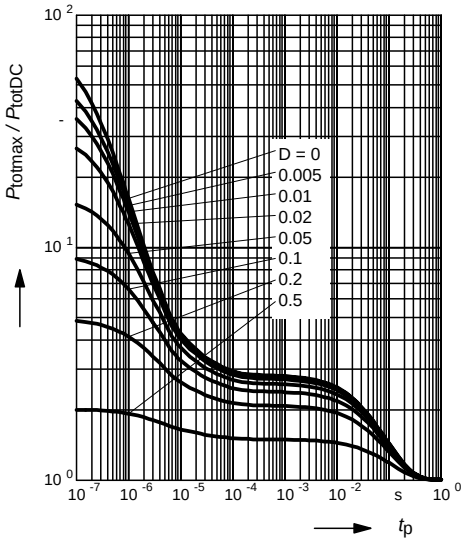
BFR93A Typical Characteristics



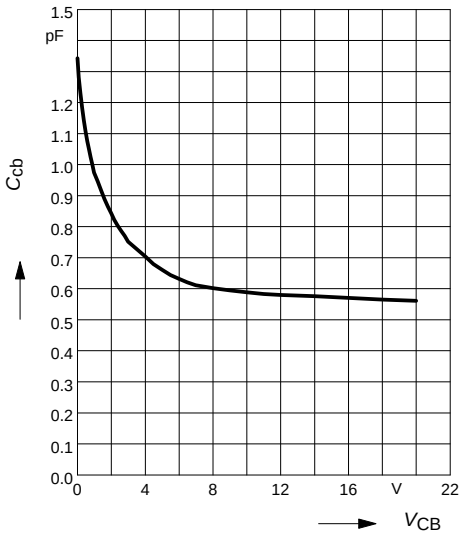
Total power dissipation $P_{tot} = f(T_S)$



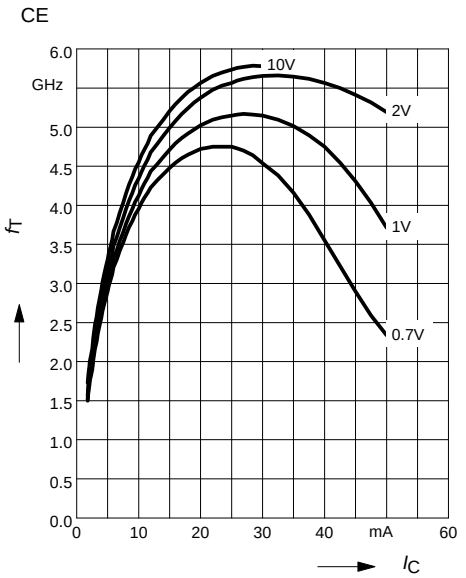
Permissible Pulse Load $R_{thJS} = f(t_p)$



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

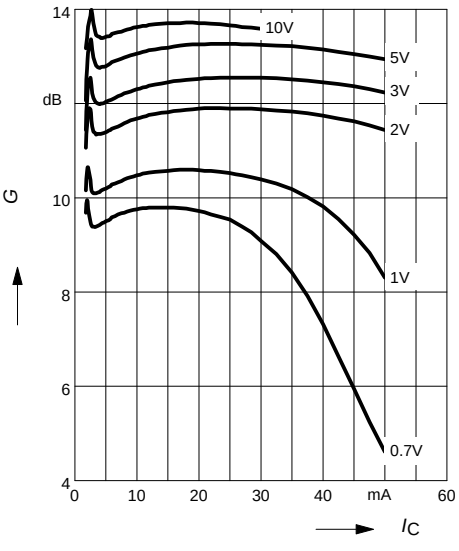


Collector-base capacitance $C_{cb} = f(V_{CB})$
f = 1MHz



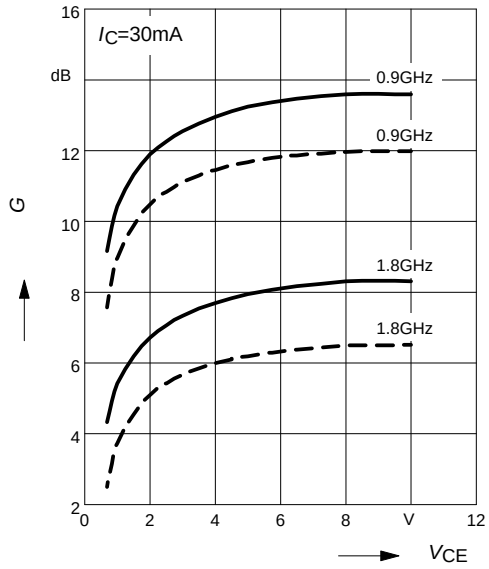
Transition frequency $f_T = f(I_C)$

V = Parameter



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

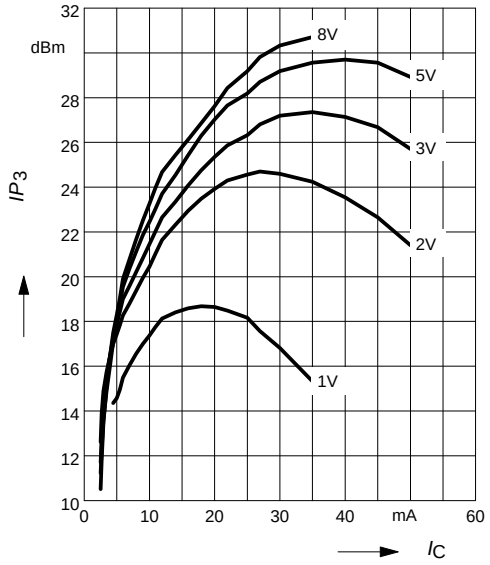
BFR93A Typical Characteristics



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

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

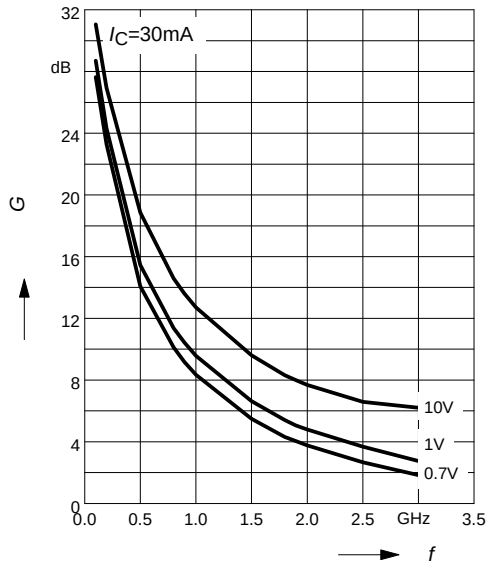
f = Parameter



Intermodulation Intercept Point IP_3=$f(I_C)$

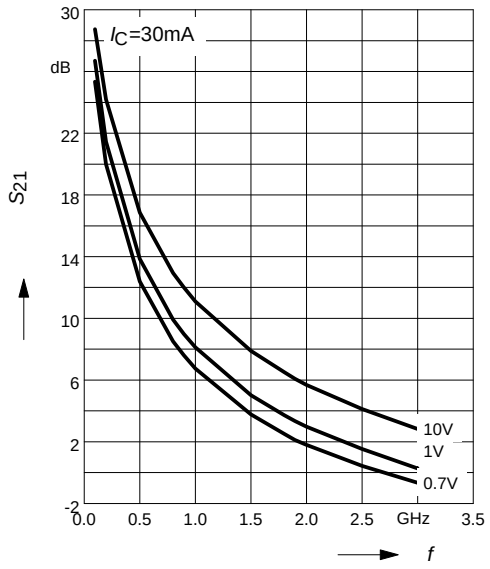
(3rd order, Output, Z_S=Z_L=50Ω)

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