

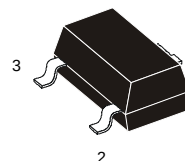
The RF Line NPN Silicon High-Frequency Transistor

DESCRIPTION

The BFR93A/BFR93AR is an NPN silicon epitaxial transistor designed for low noise amplifier at VHF, UHF and CATV band.

It has dynamic range and good current characteristic.

This small-signal transistor in 3-Pin surface-mountable plastic package SOT23 offers superior quality and performance at low cost.



BFR93A

1 – Collector
2 – Emitter
3 – Base

BFR93AR

1 – Collector
2 – Base
3 – Emitter

FEATURES

- High Gain-Bandwidth Products
 $f_T=6$ GHz (Typ) @ 30 mA
- Low Noise Figure
 $N_F=1.6$ dB (Typ) @ 800 MHz
- High Gain
 $G_{PS}=14.0$ dB (Typ) @ 800 MHz

	SOT23
JEDEC	TO-236
EIAJ	SC-59
GOST	Ё0-46
Weight:	0.01g

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CEO}	12	V
Collector – Base Voltage	V_{CBO}	20	V
Emitter – Base Voltage	V_{EBO}	2	V
Collector Current	I_C	50	mA
Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_{JMAX}	150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-45 to +70	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTIC

Thermal Resistance, Junction to Case	$R_{\theta JC}$	450	$^\circ\text{C/W}$
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ORDERING INFORMATION

Device	Marking	Package	Quantity	Packing Style
BFR93A-T1	R2	SOT-23	3 Kpcs / Reel	Embossed tape 8-mm wide 7" dia. Pin 1 (Collector) face to perforation side of the tape.
BFR93A-T3	R2	SOT-23	10 Kpcs / Reel	Embossed tape 8-mm wide 13" dia. Pin 1 (Collector) face to perforation side of the tape.
BFR93AR-T1	R5	SOT-23	3 Kpcs / Reel	Embossed tape 8-mm wide 7" dia. Pin 1 (Collector) face to perforation side of the tape.
BFR93AR-T3	R5	SOT-23	10 Kpcs / Reel	Embossed tape 8-mm wide 13" dia. Pin 1 (Collector) face to perforation side of the tape.

BFR93A/BFR93AR

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC CHARACTERISTICS					
Collector – Base Cutoff Current, $I_E = 0\text{mA}$, $V_{CB} = 10\text{V}$	I_{CBO}	–	–	100	nA
Emitter – Base Cutoff Current, $I_C = 0\text{mA}$, $V_{EB} = 2\text{V}$	I_{EBO}	–	–	10.0	μA
Collector – Emitter Breakdown Voltage, $I_C = 1\text{mA}$, $I_B = 0\text{mA}$	$V_{(BR)CEO}$	12	–	–	V
Collector – Emitter Saturation Voltage, $I_C = 50\text{mA}$, $I_B = 5\text{mA}$	$V_{CE(sat)}$	–	100	400	mV
DC Current Gain, $I_E = 30\text{mA}$, $V_{CB} = 5\text{V}$	h_{FE}	40	90	150	–

AC CHARACTERISTICS

Transition Frequency, $I_C = 30\text{mA}$, $V_{CB} = 5\text{V}$, $f = 300\text{MHz}$	f_T	4.6	6.0	–	GHz
Collector-Base Capacitance, $I_E = 0\text{mA}$, $V_{CB} = 10\text{V}$, $f = 1\text{MHz}$	C_{cb}	–	0.45	0.9	pF
Noise Figure, $I_E = 5\text{mA}$, $V_{CE} = 8\text{V}$, $f = 800\text{MHz}$, $Z_S = 50\Omega$	N_F	–	1.6	–	dB
Power Gain, $I_E = 30\text{mA}$, $V_{CE} = 8\text{V}$, $f = 800\text{MHz}$, $Z_S = 50\Omega$, $Z_L = Z_{Lopt}$	G_{PS}	12.5	14.0	–	dB

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

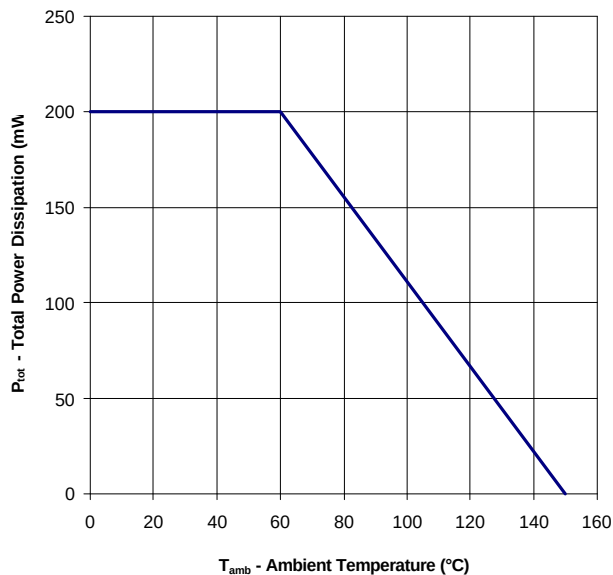


Figure 1. Total Power Dissipation vs. Ambient Temperature

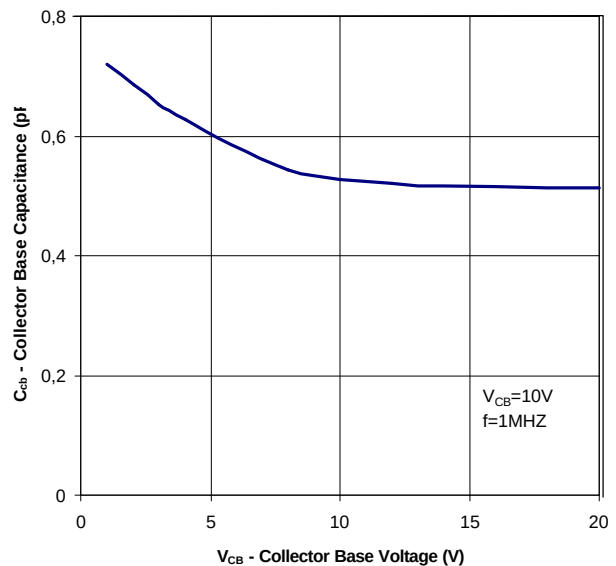


Figure 2. Collector – Base Capacitance vs. Collector – Base Voltage

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

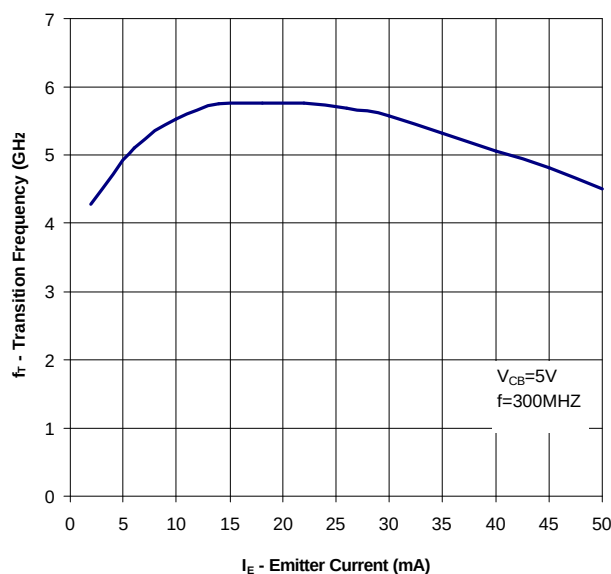


Figure 3. Transition Frequency vs. Emitter Current

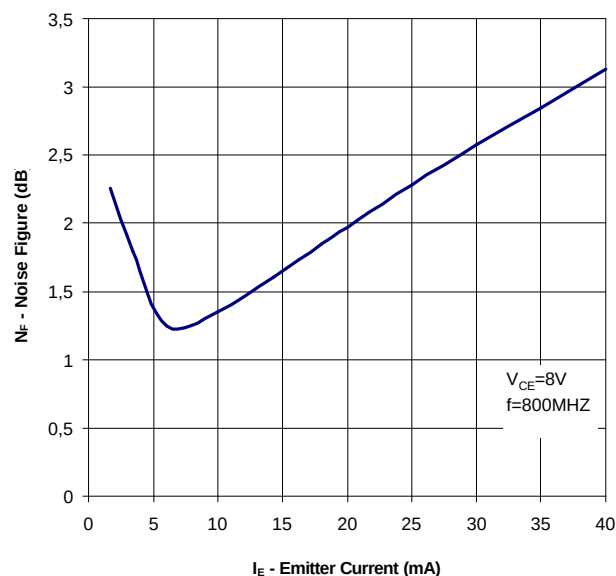


Figure 4. Noise Figure vs. Emitter Current

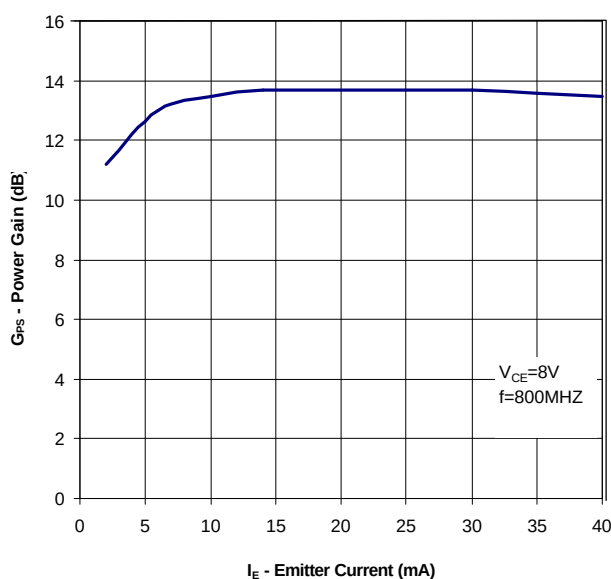


Figure 5. Power Gain vs. Emitter Current

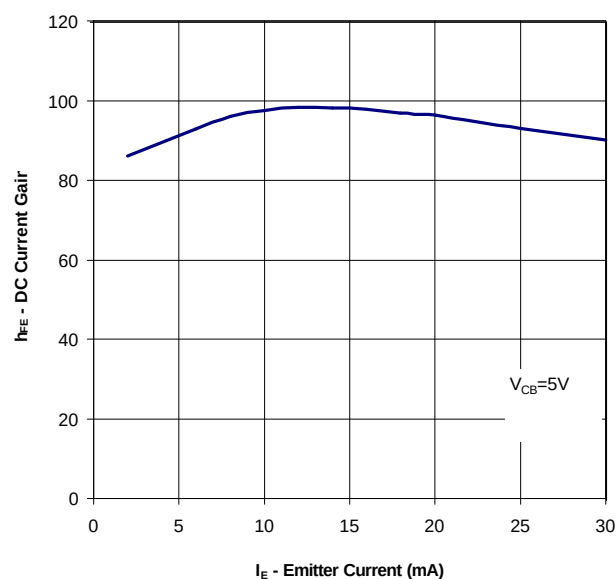
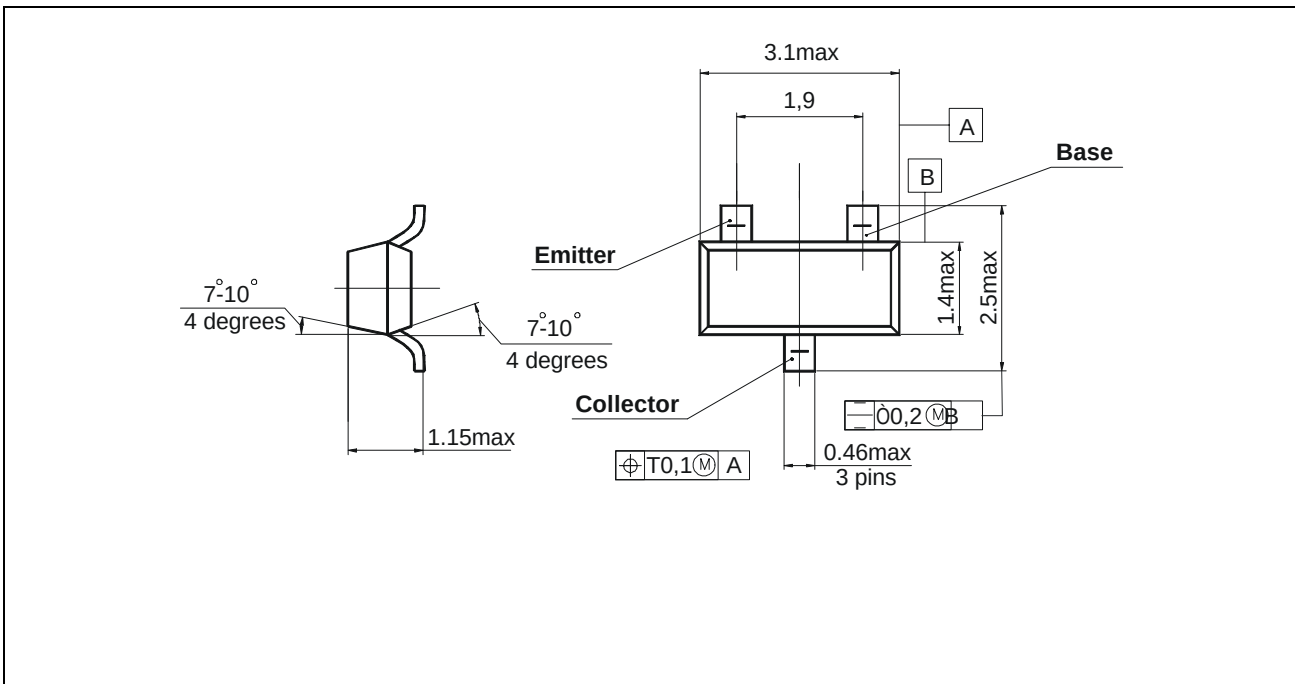


Figure 6. DC Current Gain vs. Emitter Current

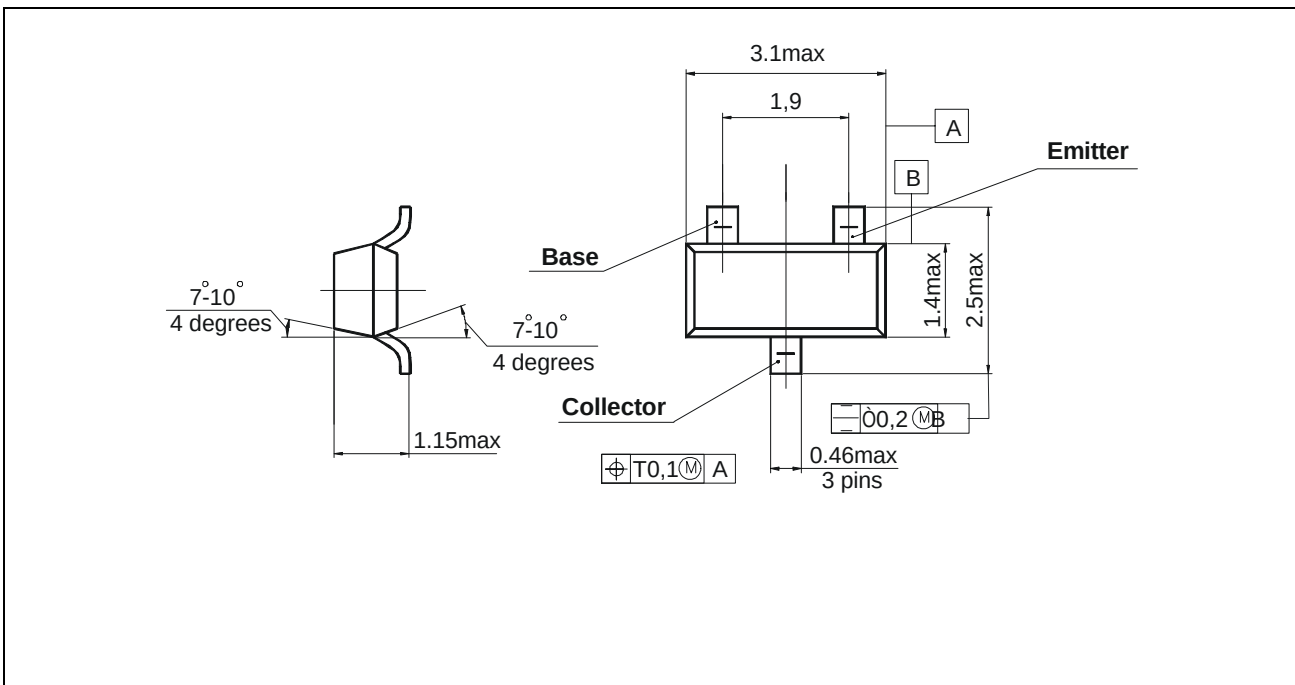
BFR93A/BFR93AR

PACKAGE DIMENSIONS of BFR93A in mm



PLASTIC CASE KT-46

PACKAGE DIMENSIONS of BFR93AR in mm



PLASTIC CASE KT-46