

# BFR93,S

CASE 318-02/03, STYLE 6  
SOT-23 (TO-236AA/AB)

RF TRANSISTOR

NPN SILICON

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	12	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	15	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	2.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	25	mAdc

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
*Total Device Dissipation, T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	350 2.8	mW mW/°C
Storage Temperature	T <sub>stg</sub>	150	°C
*Thermal Resistance Junction to Ambient	R <sub>θJA</sub>	357	°C/W

\*Package mounted on 99.5% alumina 10 x 8 x 0.6 mm.

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA)	V <sub>(BR)CEO</sub>	12	—	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μA)	V <sub>(BR)CBO</sub>	15	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μA)	V <sub>(BR)EBO</sub>	2.0	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 10 V)	I <sub>CBO</sub>	—	50	nA
Collector Cutoff Current (V <sub>CB</sub> = 10 V)	I <sub>CBO</sub>	—	50	nA
Emitter Cutoff Current (V <sub>EB</sub> = 1.0 V)	I <sub>EBO</sub>	—	10	nA

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 1.0 mA, V <sub>CE</sub> = 5.0 V) (I <sub>C</sub> = 20 mA, V <sub>CE</sub> = 4.0 V) (I <sub>C</sub> = 30 mA, V <sub>CE</sub> = 5.0 V)	h <sub>FE</sub> BFR93S	25 30 25	— 100 —	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 35 mA, I <sub>B</sub> = 7.0 mA)	V <sub>CE(sat)</sub>	—	0.5	Vdc
Base-Emitter Saturation Voltage (I <sub>C</sub> = 35 mA, I <sub>B</sub> = 7.0 mA)	V <sub>BE(sat)</sub>	—	1.2	Vdc

### SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product (I <sub>C</sub> = 30 mA, V <sub>CE</sub> = 5.0 V, f = 500 MHz)	f <sub>T</sub>	4.5	—	GHz
Noise Figure (V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 2.0 mA, R <sub>S</sub> = 50 Ω, f = 30 MHz)	NF	—	3.0	dB