

# The RF Line

## NPN Silicon

### High-Frequency Transistors

... designed primarily for use in high-gain, low-noise, small-signal UHF and microwave amplifiers constructed with thick and thin-film circuits using surface mount components.

# BFR93ALT1

RF TRANSISTORS  
NPN SILICON

#### MAXIMUM RATINGS

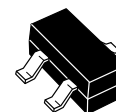
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	12	Vdc
Collector-Base Voltage	$V_{CBO}$	15	Vdc
Emitter-Base Voltage	$V_{EBO}$	2.0	Vdc
Collector Current — Continuous	$I_C$	35	mA
Maximum Junction Temperature	$T_{Jmax}$	150	°C
Power Dissipation, $T_{case} = 75^\circ\text{C}$ Derate linearly above $T_{case} = 75^\circ\text{C}$ @	$PD(max)$	0.306 4.08	W mW/°C

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Storage Temperature	$T_{stg}$	-55 to +150	°C
Thermal Resistance Junction to Case	$R_{\theta JC}$	245	°C/W

#### DEVICE MARKING

BFR93ALT1 = R2



CASE 318-07, STYLE 6  
SOT-23  
LOW PROFILE

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

Characteristic	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (1) ( $I_C = 10\text{ mA}$ )	$V_{(BR)CEO}$	12	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10\text{ }\mu\text{A}$ )	$V_{(BR)CBO}$	15	—	Vdc
Emitter-Base Breakdown Voltage ( $I_C = 100\text{ }\mu\text{A}$ )	$V_{(BR)EBO}$	2.0	—	Vdc
Collector Cutoff Current ( $V_{CE} = 10\text{ V}$ )	$I_{CEO}$	—	50	nA
Collector Cutoff Current ( $V_{CB} = 10\text{ V}$ )	$I_{CBO}$	—	50	nA

#### ON CHARACTERISTICS

DC Current Gain (1) ( $I_C = 30\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )	$h_{FE}$	40	—	—
Collector-Emitter Saturation Voltage (1) ( $I_C = 35\text{ mA}$ , $I_B = 7.0\text{ mA}$ )	$V_{CE(sat)}$	—	0.5	Vdc
Base-Emitter Saturation Voltage (1) ( $I_C = 35\text{ mA}$ , $I_B = 7.0\text{ mA}$ )	$V_{BE(sat)}$	—	1.2	Vdc

NOTE:

1. Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .


(continued)

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

Characteristic	Symbol	Min	Max	Unit
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain — Bandwidth Product ( $I_C = 30\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 500\text{ MHz}$ )	$f_T$	3.0	—	GHz
Noise Figure ( $V_{CE} = 5.0\text{ V}$ , $I_C = 2.0\text{ mA}$ , $R_S = 50\ \Omega$ , $f = 30\text{ MHz}$ )	NF	—	3.0	dB

## PACKAGE DIMENSIONS

F SUFFIX  
SOG  
CASE 751J-01

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