

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.

- T1 Suffix Indicates Tape and Reel Packaging of 3,000 Units per Reel.

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, $T_{case} = 75^\circ\text{C}$ (2) Derate linearly above $T_{case} = 75^\circ\text{C}$ @	$P_{D(max)}$	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

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

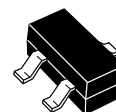
NOTES:

- Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.
- Case temperature measured on collector lead immediately adjacent to body of package.

REV 7

BFR93ALT1

RF TRANSISTORS
NPN SILICON



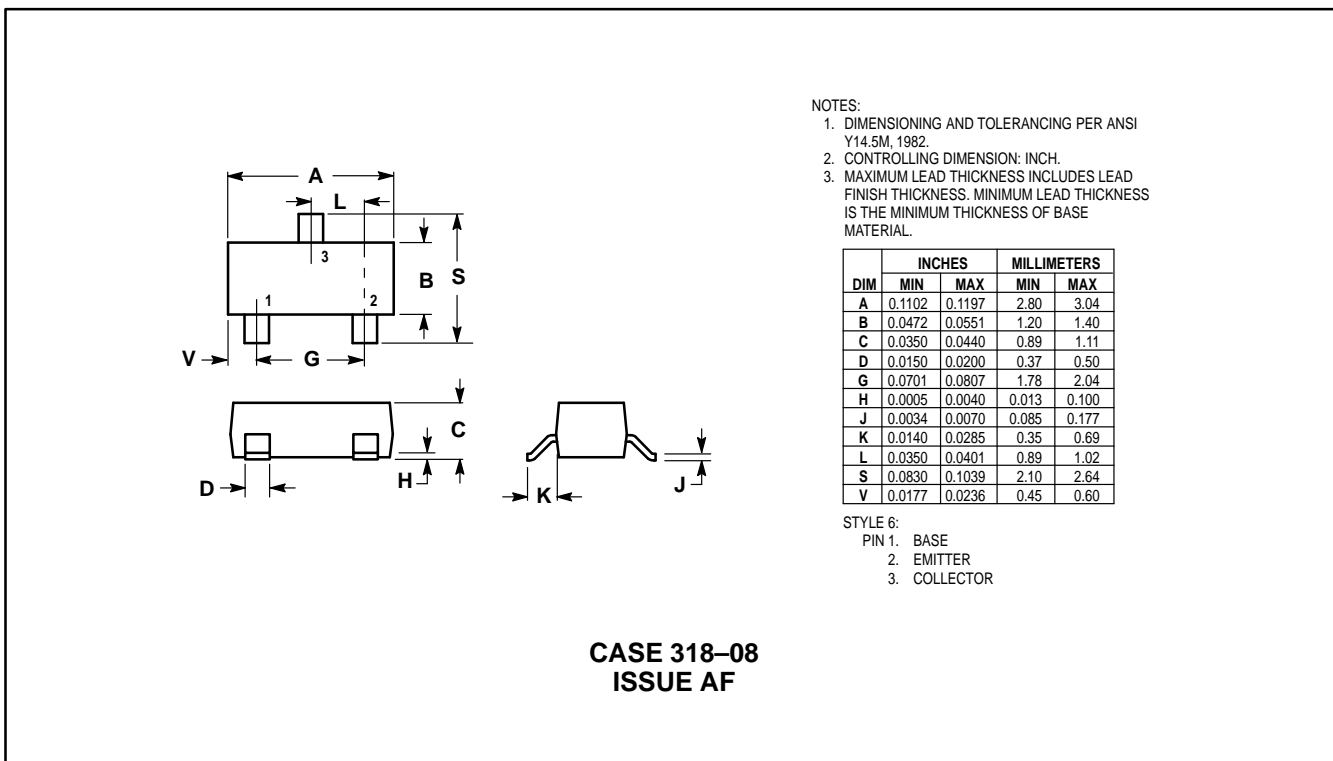
CASE 318-08, STYLE 6
SOT-23
LOW PROFILE




MOTOROLA

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

Characteristic	Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS				
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

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