

# 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	$V_{CEO}$	15	Vdc
Collector-Base Voltage	$V_{CBO}$	20	Vdc
Emitter-Base Voltage	$V_{EBO}$	2.0	Vdc
Collector Current — Continuous	$I_C$	25	mAdc
Maximum Junction Temperature	$T_{Jmax}$	150	°C
Power Dissipation, $T_{case} = 75^\circ\text{C}$ Derate linearly above $T_{case} = 75^\circ\text{C}$ @	$P_{D(max)}$	0.273 3.64	W mW/°C

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Storage Temperature	$T_{stg}$	-55 to +150	°C
Thermal Resistance Junction to Case	$R_{\theta JC}$	275	°C/W

## DEVICE MARKING

BFR92ALT1 = P2
----------------

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

## OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (1) ( $I_C = 10\text{ mA}$ )	$V_{(BR)CEO}$	15	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 100\ \mu\text{A}$ )	$V_{(BR)CBO}$	20	—	Vdc
Emitter-Base Breakdown Voltage ( $I_C = 100\ \mu\text{A}$ )	$V_{(BR)EBO}$	2.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = 10\text{ V}$ )	$I_{CBO}$	—	50	nA

## ON CHARACTERISTICS

DC Current Gain ( $I_C = 14\text{ mA}$ , $V_{CE} = 10\text{ V}$ )	$h_{FE}$	40	—	—
Collector-Emitter Saturation Voltage (1) ( $I_C = 25\text{ mA}$ , $I_B = 5.0\text{ mA}$ )	$V_{CE(sat)}$	—	0.5	Vdc
Base-Emitter Saturation Voltage (1) ( $I_C = 25\text{ mA}$ , $I_B = 5.0\text{ mA}$ )	$V_{BE(sat)}$	—	1.2	Vdc

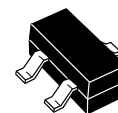
NOTE:

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

(continued)

# BFR92ALT1

RF TRANSISTORS  
NPN SILICON



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

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

Characteristic	Symbol	Typ	Unit
<b>SMALL-SIGNAL CHARACTERISTICS</b>			
Current-Gain — Bandwidth Product ( $I_C = 14\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 500\text{ MHz}$ )	$f_T$	4.5	GHz
Noise Figure ( $V_{CE} = 1.5\text{ V}$ , $I_C = 3.0\text{ mA}$ , $R_S = 50\ \Omega$ , $f = 500\text{ MHz}$ )	NF	3.0	dB
Capacitance-Collector to Base ( $V_{CB} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )	$C_{cb}$	0.7	pF

**PACKAGE DIMENSIONS**

NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

STYLE 6:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

**CASE 318-08  
ISSUE AE**

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**How to reach us:**

**USA/EUROPE:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

**MFAX:** RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244-6609  
**INTERNET:** http://Design-NET.com

**HONG KONG:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298





LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

[LittleDiode.com](http://LittleDiode.com)

Looking forward to providing you with the best possible service.