

BIPOLARICS, INC.**Part Number BRF504****NPN LOW NOISE SILICON MICROWAVE TRANSISTOR****PRODUCT DATA SHEET****FEATURES:**

- High Gain Bandwidth Product

$$f_t = 10 \text{ GHz typ @ } I_C = 4\text{mA}$$

- Low Noise Figure

$$1.6 \text{ dB typ at } 1 \text{ GHz}$$

$$2.0 \text{ dB typ at } 2 \text{ GHz}$$

- High Gain

$$|S_{21}|^2 = 18.1 \text{ dB @ } 1 \text{ GHz}$$

$$12.8 \text{ dB @ } 2 \text{ GHz}$$

- Dice, Plastic, Hermetic and Surface Mount packages available

PERFORMANCE DATA:

- Electrical Characteristics ($T_A = 25^\circ\text{C}$)

DESCRIPTION AND APPLICATIONS:

Bipolarics' BRF504 is a high performance silicon bipolar transistor intended for use in low noise application at VHF, UHF and microwave frequencies. High performance low noise performance can be realized at 2 mA or less making the BRF504 an excellent choice for battery application. From 4 mA to over 8mA, f_t is nominally 10 GHz. Maximum recommended continuous current is 16 mA. A broad range of packages are offered including SOT-23, SOT-143, plastic and ceramic 0.085" Micro-X, 0.070" Stripline and unencapsulated dice.

Absolute Maximum Ratings:

SYMBOL	PARAMETERS	RATING	UNITS
V_{CBO}	Collector-Base Voltage	10	V
V_{CEO}	Collector-Emitter Voltage	10	V
V_{EBO}	Emitter-Base Voltage	1.5	V
$I_{C \text{ CONT}}$	Collector Current	8	mA
T_J	Junction Temperature	200	$^\circ\text{C}$
T_{STG}	Storage Temperature	-65 to 150	$^\circ\text{C}$

SYMBOL	PARAMETERS & CONDITIONS $V_{CE} = 8\text{V}, I_C = 4 \text{ mA}$ unless stated	UNIT	MIN.	TYP.	MAX.
f_t	Gain Bandwidth Product	GHz		10	
$ S_{21} ^2$	Insertion Power Gain: $f = 1.0 \text{ GHz}, I_C = 4 \text{ mA}$ $I_C = 8 \text{ mA}$ $f = 2.0 \text{ GHz}, I_C = 4 \text{ mA}$ $I_C = 8 \text{ mA}$			17.5 18.1 12.8 12.6	
$P_{1\text{dB}}$	Power output at 1dB compression: $f = 1.0 \text{ GHz}$	dBm		10	
$G_{1\text{dB}}$	Gain at 1dB compression: $f = 1.0 \text{ GHz}$	dBm		15	
NF	Noise Figure: $V_{CE} = 8\text{V}, I_C = 0.8\text{mA}$ $f = 1.0 \text{ GHz}$ $Z_S = 50\Omega$	dB		1.6	
h_{FE}	Forward Current Transfer Ratio: $V_{CE} = 8\text{V}, I_C = 4 \text{ mA}$ $f = 1\text{MHz}$		50	100	250
I_{CBO}	Collector Cutoff Current : $V_{CB} = 8\text{V}$	μA			0.2
I_{EBO}	Emitter Cutoff Current : $V_{EB} = 1\text{V}$	μA			1.0
C_{CB}	Collector Base Capacitance: $V_{CB} = 8\text{V}$ $f = 1\text{MHz}$	pF		0.07	