NPN diffused silicon planar transistor

BFR 16

Low-level, low-noise high gain amplifier

The BFR 16 is an NPN silicon planar transistor designed for use in high performance, low level, low noise amplifier applications.

ELECTRICAL CHARACTERISTICS
(T_A = 25°C unless otherwise noted)

Symbol	Characteristic and test conditions	Min.	Typ.	Max.	Unit
h_{FE}	DC Current Gain (5)				
	I_C = 10 μA V_{CE} = 5V		150		
	I_C = 100 μA V_{CE} = 5V	80	220		
	I_C = 1 mA V_{CE} = 5V	150	350	490	
	I_C = 10 mA V_{CE} = 5V	150	370		
$V_{BE\ on}$	Base - Emitter On Voltage I_C = 1 mA V_{CE} = 5V	0.5	0.64	0.70	V
$V_{CE\ sat}$	Collector Saturation Voltage (5) I_C = 1 mA I_B = 0.1 mA		0.15	0.35	V
I_{CES}	Collector Reverse Current V_{CE} = 50V V_{EB} = 0		0.1	10	nA
I_{CES} (150°C)	Collector Reverse Current V_{CE} = 50V V_{EB} = 0		0.1	10	μA
I_{EBO}	Emitter Reverse Current V_{EB} = 5V I_C = 0		0.1	10	nA
BV_{CES}	Collector to Emitter Breakdown Voltage I_C = 10 μA V_{EB} = 0	60			V
BV_{EBO}	Emitter to Base Breakdown Voltage I_E = 10 μA I_C = 0	6			V
LV_{CEO}	Collector to Emitter Sustaining Voltage (4 and 5) I_C = 10 mA I_B = 0	60			V
h_{fe}	Small Signal Current Gain (f = 1 kHz) I_C = 1 mA V_{CE} = 5V		350		
h_{ie}	Input Resistance (f=1 kHz) I_C = 1 mA V_{CE} = 5V		10		KΩ
h_{oe}	Output Conductance (f=1 kHz) I_C = 1 mA V_{CE} = 5V		17		μmho
h_{re}	Voltage Feedback Ratio (f=1 kHz) I_C = 1 mA V_{CE} = 5V		4.3		$\times 10^{-4}$
h_{fe}	High Freq. Current Gain (f=20 MHz) I_C = 1 mA V_{CE} = 5V	3.5	5		
C_{TE}	Emitter Transition Capacitance I_C = 0 V_{EB} = 0.5V		3.5	6	pF
C_{obo}	Base - Collector Capacitance I_E = 0 V_{CB} = 5V		3.5	6	pF
NF	Wide Band Noise Figure (6) I_C = 10 μA V_{CE} = 5V		1.5	4	dB
NF	Narrow Band Noise Figure (7) I_C = 10 μA V_{CE} = 5V		1	4	dB

NOTES:

(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
(3) These ratings give a maximum junction temperature of 200°C and junction - to - case thermal resistance of 146°C/W (derating factor of 6.9 mW/°C); junction - to - ambient thermal resistance of 486°C/W (derating factor of 2.1 mW/°C).
(4) These ratings refer to a high - current point where collector - to - emitter voltage is lowest. For more information send for SGS - AR 5.
(5) Measured under pulse conditions: pulse length = 300 μsec; duty cycle = 1%.
(6) R_S = 10 kΩ; Power Bandwidth of 15.7 kHz with 3 dB points at 10 Hz and 10 kHz.
(7) f = 1 kHz; R_S = 10 kΩ; Power Bandwidth of 200 Hz.

ABSOLUTE MAXIMUM RATINGS (1)
(T_A = 25°C unless otherwise noted)

Voltages and Currents

Collector to Emitter (4)	V_{CEO}	60 V
Collector to Emitter	V_{CES}	60 V
Emitter to Base	V_{EBO}	8 V
DC Collector Current	I_C	50 mA

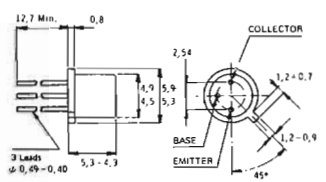
Temperatures

Storage Temperature	T_{STG}	-55°C to 200°C
Junction Temperature	T_J	200°C
Lead Temperature (Soldering 10 sec.)	T_L	260°C

Power (2 - 3)

Dissipation at 25°C Case Temperature	P_D	1.2 W
Dissipation at 25°C Ambient Temperature	P_D	0.36 W

PHYSICAL DIMENSIONS
Similar to Jedec TO-18



Note All dimensions are in mm