

General purpose

The BFR 20 is an NPN silicon planar epitaxial transistor designed primarily for amplifier and switching applications over a wide range of voltage and current. This device features a useful beta range from 100 μ A to 500 mA and low saturation voltage permitting switching operation at 1 ampere.

ELECTRICAL CHARACTERISTICS

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

Symbol	Characteristic and test conditions	Min.	Typ.	Max.	Unit
h_{FE}	DC Current Gain (5)				
	$I_C = 100 \mu\text{A}$ $V_{CE} = 1\text{V}$	40			
	$I_C = 5 \text{ mA}$ $V_{CE} = 1\text{V}$	100	250	500	
	$I_C = 150 \text{ mA}$ $V_{CE} = 1\text{V}$	90		450	
$V_{BE \text{ sat}}$	Base Saturation Voltage (5)				
	$I_C = 150 \text{ mA}$ $I_B = 15 \text{ mA}$	0.9	1		V
$V_{BE \text{ on}}$	Base Emitter On Voltage				
	$I_C = 150 \text{ mA}$ $V_{CE} = 15 \text{ V}$	0.13	0.25		V
$V_{CE \text{ sat}}$	Collector Saturation Voltage (5)				
	$I_C = 1 \text{ A}$ $I_B = 0.1 \text{ A}$	0.65	1		V
I_{CES}	Collector Reverse Current				
	$V_{CE} = 50\text{V}$ $V_{EB} = 0$	0.1	10		nA
$I_{CES} (150^\circ\text{C})$	Collector Reverse Current				
	$V_{CE} = 50\text{V}$ $V_{EB} = 0$	0.1	10		μA
I_{EBO}	Emitter Reverse Current				
	$V_{EB} = 5\text{V}$ $I_C = 0$	0.1	10		nA
BV_{CES}	Collector to Emitter Breakdown Voltage	75			V
	$I_C = 0$ $V_{EB} = 0$				
BV_{EBO}	Emitter to Base Breakdown Voltage	7			V
	$I_E = 0$ $I_C = 0$				
LV_{CEO}	Collector to Emitter Sustaining Voltage (4 and 5)	35			V
	$I_C = 0$ $I_B = 0$				
h_{fc}	High Freq. Current Gain ($f = 20 \text{ MHz}$)	3	4.5		
	$I_C = 50 \text{ mA}$ $V_{CE} = 10\text{V}$				
C_{TE}	Emitter Transition Capacitance				
	$I_C = 0$ $V_{EB} = 0.5\text{V}$	50	80		pF
C_{ob0}	Base Collector Capacitance				
	$I_E = 0$ $V_{CB} = 10\text{V}$	13	20		pF
t_{on}	Turn On Time				
	$I_C = 150 \text{ mA}$ $I_{B1} = 7.5 \text{ mA}$	130	200		ns
t_{off}	Turn Off Time				
	$I_C = 150 \text{ mA}$ $I_{B1} = 7.5 \text{ mA}$ $I_{B2} = 7.5 \text{ mA}$	450	800		ns

ABSOLUTE MAXIMUM RATINGS (1)

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

Voltages

Collector to Emitter (4)	V_{CEO}	35 V
Collector to Emitter	V_{CES}	75 V
Emitter to Base	V_{EBO}	7 V

Temperatures

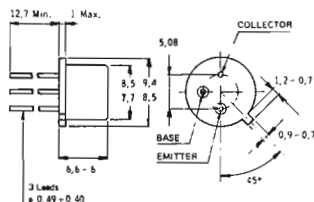
Storage Temperature	T_{STG}	-55°C to 200°C
Junction Temperature	T_J	200°C
Lead Temperature (Soldering 10 sec.)	T_L	260°C

Power (2 - 3)

Dissipation at 25°C		
Case Temperature	P_D	5 W
Dissipation at 25°C		
Ambient Temperature	P_D	0.8 W

PHYSICAL DIMENSIONS

Similar to JEDC T0-5



Note: All dimensions are in mm

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 35°C/W (derating factor of $28.6 \text{ mW}/^\circ\text{C}$); junction-to-ambient thermal resistance of 219°C/W (derating factor of $4.57 \text{ mW}/^\circ\text{C}$).
- (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%.