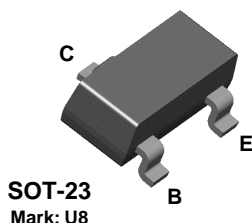


# BSR14



## NPN General Purpose Amplifier

This device is for use as a medium power amplifier and switch requiring collector currents up to 500 mA. Sourced from Process 19. See BCW65C for characteristics.

### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	40	V
$V_{CBO}$	Collector-Base Voltage	75	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector Current - Continuous	800	mA
$T_J, T_{stg}$	Operating and Storage Junction Temperature Range	-55 to +150	°C

\*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BSR14	
$P_D$	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

\*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

**NPN General Purpose Amplifier**

(continued)

**Electrical Characteristics**

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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**OFF CHARACTERISTICS**

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\ \mu A, I_B = 0$	75		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\ \mu A, I_E = 0$	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu A, I_C = 0$	6.0		V
$I_{CBO}$	Collector-Cutoff Current	$V_{CB} = 60\ V$ $V_{CB} = 60\ V, T_A = 150^\circ C$		10 10	nA $\mu A$
$I_{CEX}$	Collector-Cutoff Current	$V_{CE} = 60\ V, V_{EB} = 3.0\ V$		10	nA
$I_{BEX}$	Reverse Base Current	$V_{CE} = 60\ V, V_{EB} = 3.0\ V$		20	nA
$I_{EBO}$	Emitter-Cutoff Current	$V_{EB} = 3.0\ V, I_C = 0$		15	nA

**ON CHARACTERISTICS**

$h_{FE}$	DC Current Gain	$I_C = 0.1\ mA, V_{CE} = 10\ V$ $I_C = 1.0\ mA, V_{CE} = 10\ V$ $I_C = 10\ mA, V_{CE} = 10\ V$ $I_C = 150\ mA, V_{CE} = 10\ V$ $I_C = 150\ mA, V_{CE} = 1.0\ V$ $I_C = 500\ mA, V_{CE} = 10\ V$	35 50 75 100 50 40	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150\ mA, I_B = 15\ mA$ $I_C = 500\ mA, I_B = 50\ mA$		0.3 1.0	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 150\ mA, I_B = 15\ mA$ $I_C = 500\ mA, I_B = 50\ mA$	0.6	1.2 2.0	V V

**SMALL SIGNAL CHARACTERISTICS**

$f_T$	Current Gain - Bandwidth Product	$I_C = 20\ mA, V_{CE} = 20,$ $f = 100\ MHz$	300		MHz
$C_{CB}$	Collector-Base Capacitance	$V_{CB} = 10V, I_E = 0, f = 1.0\ MHz$		8.0	pF
$h_{ie}$	Input Impedance	$V_{CE} = 10V, I_C = 1.0\ mA, f = 1.0\ kHz$	2.0	8.0	k $\Omega$
$h_{fe}$	Small-Signal Current Gain	$V_{CE} = 10V, I_C = 1.0\ mA, f = 1.0\ kHz$	50	300	
$h_{oe}$	Output Admittance	$V_{CE} = 10V, I_C = 1.0\ mA, f = 1.0\ kHz$	5	35	$\mu S$

**SWITCHING CHARACTERISTICS**

$t_d$	Delay Time	$V_{CC} = 30\ V, V_{BE(OFF)} = 0.5\ V,$		10	ns
$t_r$	Rise Time	$I_C = 150\ mA, I_{B1} = 15\ mA$		25	ns
$t_s$	Storage Time	$V_{CC} = 30\ V, I_C = 150\ mA,$		225	ns
$t_f$	Fall Time	$I_{B1} = I_{B2} = 15\ mA$		60	ns

**Spice Model**

NPN (Is=14.34f Xti=3 Eg=1.11 Vaf=74.03 Bf=255.9 Ne=1.307 Ise=14.34f Ikf=.2847 Xtb=1.5 Br=6.092 Nc=2 Isc=0  
Ikr=0 Rc=1 Cjc=7.306p Mjc=.3416 Vjc=.75 Fc=.5 Cje=22.01p Mje=.377 Vje=.75 Tr=46.91n Tf=411.1p Itf=.6  
Vtf=1.7 Xtf=3 Rb=10)

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