

# PNP Epitaxial Silicon Transistor

## BSR16

### PNP General Purpose Amplifier

- This Device Designed for Use as General Purpose Amplifier and Switches Requiring Collector Currents to 500 mA
- Sourced from Process 63
- See BCW68G for Characteristics

### ABSOLUTE MAXIMUM RATINGS

( $T_A = 25^\circ\text{C}$ , unless otherwise specified.)

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector–Emitter Voltage	–60	V
$V_{CBO}$	Collector–Base Voltage	–60	V
$V_{EBO}$	Emitter–Base Voltage	–5.0	V
$I_C$	Collector Current – Continuous	–800	mA
$T_J, T_{ST}$	Operating and Storage Junction Temperature Range	–55 ~ +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### THERMAL CHARACTERISTICS

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

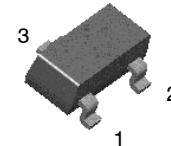
Symbol	Parameter	Max.	Unit
$P_D$	Total Device Dissipation Derate above $25^\circ\text{C}$	350 2.8	mW mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C}/\text{W}$

3. Device mounted on FR–4 PCB  $40\text{ mm} \times 40\text{ mm} \times 1.5\text{ mm}$ .



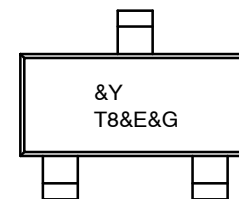
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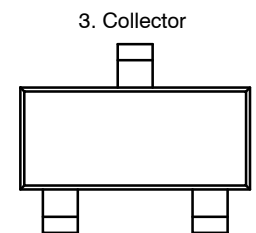
SOT–23  
CASE 318BM

### MARKING DIAGRAM



&Y ON Semiconductor Logo  
T8 Specific Device Code  
&E Designates Space  
&G Date Code (Week)

### PIN ASSIGNMENT



### ORDERING INFORMATION

Device	Package	Shipping†
BSR16	SOT–23 (Pb–Free)	3,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# BSR16

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
$BV_{(BR)CEO}$	Collector–Emitter Breakdown Voltage	$I_C = -10\text{ mA}, I_B = 0$	-60			V
$BV_{(BR)CBO}$	Collector–Base Breakdown Voltage	$I_C = -100\ \mu\text{A}, I_E = 0$	-60			V
$BV_{(BR)EBO}$	Emitter–Base Breakdown Voltage	$I_E = -10\ \mu\text{A}, I_C = 0$	-5.0			V
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = -50\text{ V}$ $V_{CB} = -50\text{ V}, T_A = 150^\circ\text{C}$			-10 -10	nA $\mu\text{A}$
$I_{CEX}$	Collector Cut-off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$			-50	nA
$I_{BEX}$	Reverse Base Current	$V_{CE} = -30\text{ V}, V_{EB} = -3.0\text{ V}$			-50	nA

## ON CHARACTERISTICS

$h_{FE}$	DC Current Gain	$I_C = -0.1\text{ mA}, V_{CE} = -10\text{ V}$ $I_C = -1.0\text{ mA}, V_{CE} = -10\text{ V}$ $I_C = -10\text{ mA}, V_{CE} = -10\text{ V}$ $I_C = -150\text{ mA}, V_{CE} = -10\text{ V}$ $I_C = -500\text{ mA}, V_{CE} = -10\text{ V}$	75 100 100 100 50	300		
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$ $I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-0.4 -1.6	V
$V_{BE(sat)}$	Base–Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$ $I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-1.3 -2.6	V

## SMALL SIGNAL CHARACTERISTICS

$f_T$	Current Gain Bandwidth Product	$I_C = -50\text{ mA}, V_{CE} = -20\text{ V},$ $f = 100\text{ MHz}, T_A = 25^\circ\text{C}$	200			MHz
$C_{cb}$	Output Capacitance	$V_{CB} = -10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$			8.0	pF
$C_{eb}$	Emitter–Base Capacitance	$V_{CB} = -2.0\text{ V}, I_E = 0, f = 1.0\text{ MHz}$			30	pF

## SWITCHING CHARACTERISTICS

$t_{on}$	Turn–On Time	$V_{CC} = -30\text{ V}, I_C = -150\text{ mA},$ $I_{B1} = -15\text{ mA}$			45	ns
$t_d$	Delay Time				10	ns
$t_r$	Rise Time				40	ns
$t_{off}$	Turn–Off Time	$V_{CC} = -6\text{ V}, I_C = -150\text{ mA},$ $I_{B1} = I_{B2} = -15\text{ mA}$			100	ns
$t_s$	Storage Time				80	ns
$t_f$	Fall Time				30	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

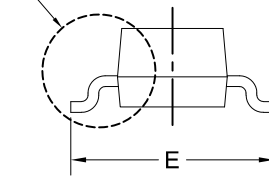
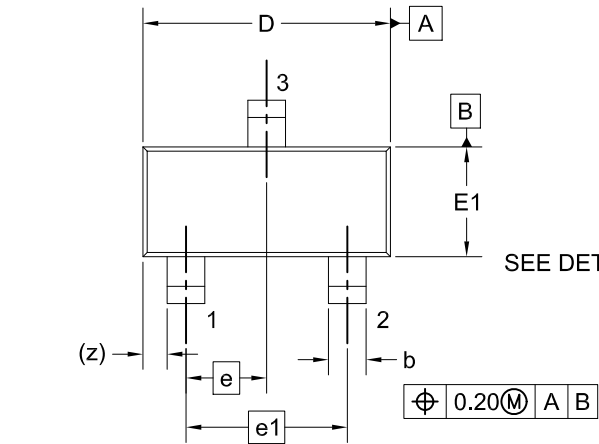


**SOT-23**  
**CASE 318BM**  
**ISSUE A**

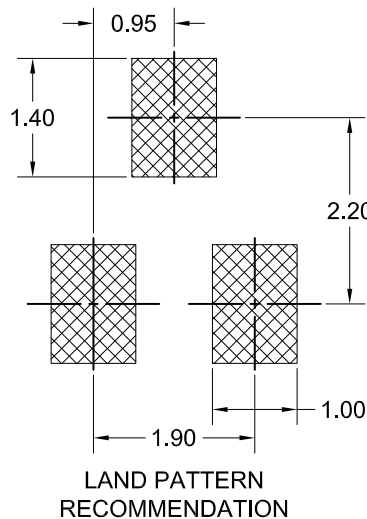
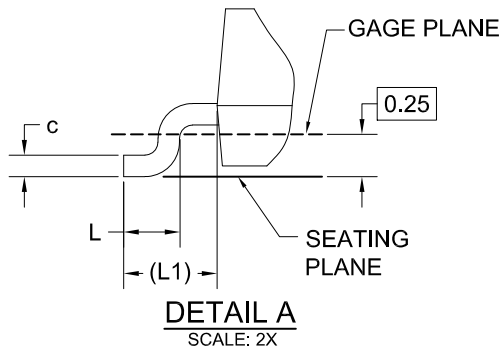
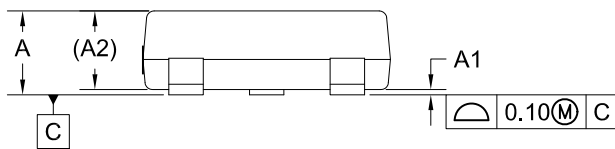
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NOTES: UNLESS OTHERWISE SPECIFIED

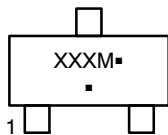
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- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.20
A1	0.00	0.05	0.10
A2	0.93 REF		
b	0.37	0.44	0.60
c	0.08	0.15	0.23
D	2.72	2.92	3.12
E	2.10	2.40	2.70
E1	1.15	1.30	1.50
e	0.95 BSC		
e1	1.90 BSC		
L	0.20	---	---
L1	0.55 REF		
z	0.29 REF		



### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

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