

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.

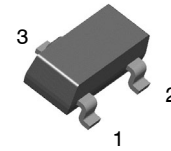
1. These ratings are based on a maximum junction temperature of 150°C .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

THERMAL CHARACTERISTICS

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

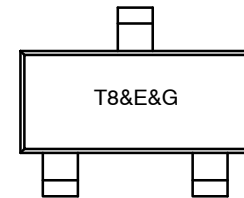
Symbol	Parameter	Max.	Unit
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C}/\text{W}$

3. Device mounted on FR-4 PCB 40 mm $\times$ 40 mm $\times$ 1.5 mm.



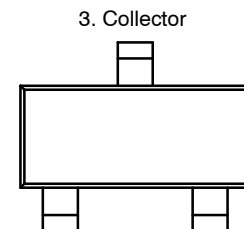
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MARKING DIAGRAM



T8 Specific Device Code
&E Designates Space
&G Date Code (Week)

PIN ASSIGNMENT



1. Base 2. Emitter

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
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OFF CHARACTERISTICS

$BV_{(BR)CEO}$	Collector–Emitter Breakdown Voltage	$I_C = -10\text{ mA}$, $I_B = 0$	-60			V
$BV_{(BR)CBO}$	Collector–Base Breakdown Voltage	$I_C = -100\text{ }\mu\text{A}$, $I_E = 0$	-60			V
$BV_{(BR)EBO}$	Emitter–Base Breakdown Voltage	$I_E = -10\text{ }\mu\text{A}$, $I_C = 0$	-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 μA
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

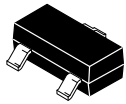
SMALL SIGNAL CHARACTERISTICS

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

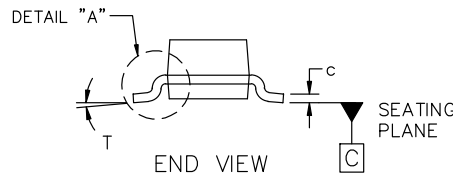
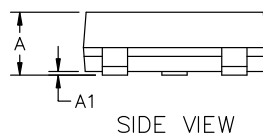
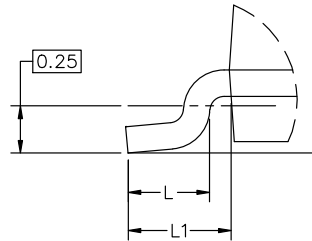
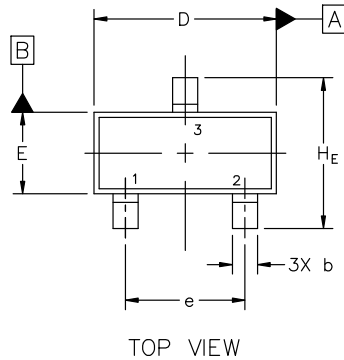
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P
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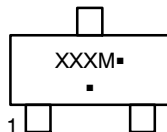


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

NOTES:

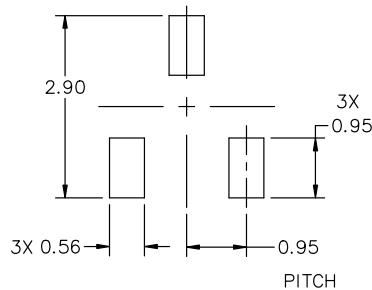
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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.



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

STYLES ON PAGE 2

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STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE	STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE	STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE	STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE	STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE	STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE	STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE
STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE	STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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