

# BSP52T1, BSP52T3

Preferred Devices

## NPN Small-Signal Darlington Transistor

This NPN small signal Darlington transistor is designed for use in switching applications, such as print hammer, relay, solenoid and lamp drivers. The device is housed in the SOT-223 package, which is designed for medium power surface mount applications.

### Features

- The SOT-223 Package can be soldered using wave or reflow. The formed leads absorb thermal stress during soldering, eliminating the possibility of damage to the die
- Available in 12 mm Tape and Reel  
Use BSP52T1 to order the 7 inch/1000 unit reel
- PNP Complement is BSP62T1
- Pb-Free Packages are Available

### MAXIMUM RATINGS (T<sub>C</sub> = 25°C unless otherwise noted)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V <sub>CES</sub>	80	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	90	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	Vdc
Collector Current	I <sub>C</sub>	1.0	Adc
Total Power Dissipation (Note 1) @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	0.8 6.4	W mW/°C
Total Power Dissipation (Note 2) @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.25 10	W mW/°C
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to 150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance (Note 1) Junction-to-Ambient	R <sub>θJA</sub>	156	°C/W
Thermal Resistance (Note 2) Junction-to-Ambient	R <sub>θJA</sub>	100	°C/W
Maximum Temperature for Soldering Purposes Time in Solder Bath	T <sub>L</sub>	260 10	°C Sec

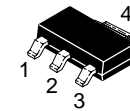
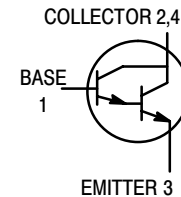
1. Device mounted on a FR-4 glass epoxy printed circuit board using minimum recommended footprint.
2. Device mounted on a FR-4 glass epoxy printed circuit board using 1 cm<sup>2</sup> pad.



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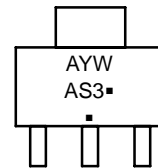
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## MEDIUM POWER NPN SILICON SURFACE MOUNT DARLINGTON TRANSISTOR



SOT-223  
CASE 318E  
STYLE 1

### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
W = Work Week  
AS3 = Specific Device Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
BSP52T1	SOT-223	1000/Tape & Reel
BSP52T1G	SOT-223 (Pb-Free)	1000/Tape & Reel
BSP52T3	SOT-223	4000/Tape & Reel
BSP52T3G	SOT-223 (Pb-Free)	4000/Tape & Reel

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

Preferred devices are recommended choices for future use and best overall value.

## BSP52T1, BSP52T3

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

Characteristics	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector-Base Breakdown Voltage ( $I_C = 100 \mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	90	–	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	–	Vdc
Collector-Emitter Cutoff Current ( $V_{CE} = 80 \text{ Vdc}$ , $V_{BE} = 0$ )	$I_{CES}$	–	10	$\mu\text{A}$
Emitter-Base Cutoff Current ( $V_{EB} = 4.0 \text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	10	$\mu\text{A}$

#### ON CHARACTERISTICS (Note 3)

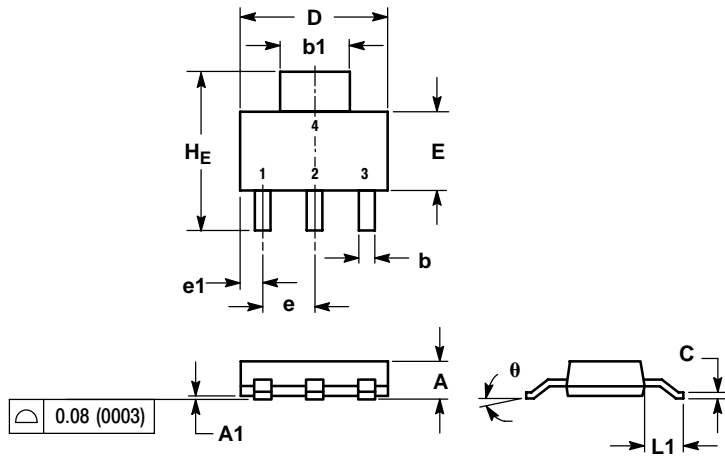
DC Current Gain ( $I_C = 150 \text{ mA}$ , $V_{CE} = 10 \text{ Vdc}$ ) ( $I_C = 500 \text{ mA}$ , $V_{CE} = 10 \text{ Vdc}$ )	$h_{FE}$	1000 2000	– –	–
Collector-Emitter Saturation Voltage ( $I_C = 500 \text{ mA}$ , $I_B = 0.5 \text{ mA}$ )	$V_{CE(sat)}$	–	1.3	Vdc
Base-Emitter Saturation Voltage ( $I_C = 500 \text{ mA}$ , $I_B = 0.5 \text{ mA}$ )	$V_{BE(sat)}$	–	1.9	Vdc

3. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

# BSP52T1, BSP52T3

## PACKAGE DIMENSIONS

SOT-223  
CASE 318E-04  
ISSUE L

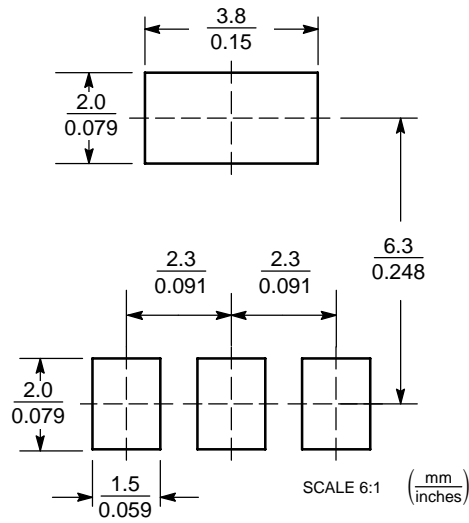


NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L1	1.50	1.75	2.00	0.060	0.069	0.078
HE	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	-	10°	0°	-	10°

STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

### SOLDERING FOOTPRINT\*



\*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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