# BSP52T1G, BSP52T3G

# 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
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

### **MAXIMUM RATINGS** (T<sub>C</sub> = $25^{\circ}$ C unless otherwise noted)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V <sub>CES</sub>	80	V
Collector-Base Voltage	V <sub>CBO</sub>	90	V
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	V
Collector Current	Ι <sub>C</sub>	1.0	А
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

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit	
Thermal Resistance (Note 1) Junction-to-Ambient	$R_{\theta JA}$	156	°C/W	
Thermal Resistance (Note 2) Junction-to-Ambient	$R_{\theta JA}$	100	°C/W	
Maximum Temperature for Soldering Purposes Time in Solder Bath	Τ <sub>L</sub>	260 10	°C Sec	

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. 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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# MEDIUM POWER NPN SILICON SURFACE MOUNT DARLINGTON TRANSISTOR





### **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
BSP52T1G	SOT-223 (Pb-Free)	1000 / 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.

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## **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristics	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage $(I_{C} = 100 \ \mu\text{A}, I_{E} = 0)$	V <sub>(BR)CBO</sub>	90	_	-	V	
Emitter-Base Breakdown Voltage $(I_E = 10 \ \mu\text{A}, I_C = 0)$	V <sub>(BR)EBO</sub>	5.0	_	-	V	
Collector-Emitter Cutoff Current ( $V_{CE} = 80 \text{ V}, V_{BE} = 0$ )	I <sub>CES</sub>	_	_	10	μΑ	
Emitter-Base Cutoff Current ( $V_{EB} = 4.0 \text{ V}, I_{C} = 0$ )	I <sub>EBO</sub>	_	_	10	μA	
ON CHARACTERISTICS (Note 3)						
DC Current Gain ( $I_C = 150 \text{ mA}, V_{CE} = 10 \text{ V}$ ) ( $I_C = 500 \text{ mA}, V_{CE} = 10 \text{ V}$ )	h <sub>FE</sub>	1000 2000	-	-	-	
Collector-Emitter Saturation Voltage $(I_C = 500 \text{ mA}, I_B = 0.5 \text{ mA})$	V <sub>CE(sat)</sub>	-	-	1.3	V	
Base-Emitter Saturation Voltage $(I_C = 500 \text{ mA}, I_B = 0.5 \text{ mA})$	V <sub>BE(sat)</sub>	_	_	1.9	V	
SWITCHING CHARACTERISTICS						
Rise Time (V <sub>CC</sub> = 10 V, I <sub>C</sub> = 150 mA, I <sub>B1</sub> = 0.15 mA)	t <sub>r</sub>	_	155	-	ns	
Delay Time (V <sub>CC</sub> = 10 V, I <sub>C</sub> = 150 mA, I <sub>B1</sub> = 0.15 mA)	t <sub>d</sub>	-	205	-	ns	
Storage Time (V <sub>CC</sub> = 10 V, I <sub>C</sub> = 150 mA, I <sub>B1</sub> = 0.15 mA, I <sub>B2</sub> = 0.15 mA)	t <sub>s</sub>	-	420	_	ns	
Fall Time (V <sub>CC</sub> = 10 V, I <sub>C</sub> = 150 mA, I <sub>B1</sub> = 0.15 mA, I <sub>B2</sub> = 0.15 mA)	t <sub>f</sub>	_	365	_	ns	

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

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