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_C = 25°C unless otherwise noted)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CES}	80	V
Collector-Base Voltage	V_{CBO}	90	V
Emitter-Base Voltage	V_{EBO}	5.0	V
Collector Current	I_C	1.0	A
Total Power Dissipation (Note 1) @ T_A = 25°C Derate above 25°C	P_D	 0.8 6.4	 W mW/°C
Total Power Dissipation (Note 2) @ T_A = 25°C Derate above 25°C	P_D	 1.25 10	 W mW/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−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	T_L	260 10	°C Sec

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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^2 pad.

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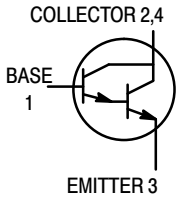
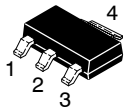
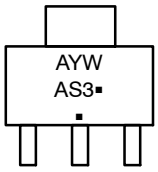
MEDIUM POWER NPN SILICON SURFACE MOUNT DARLINGTON TRANSISTOR



MARKING DIAGRAM



SOT−223
CASE 318E
STYLE 1



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†
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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage (I_C = 100 μA, I_E = 0)	$V_{(BR)CBO}$	90	–	–	V
Emitter-Base Breakdown Voltage (I_E = 10 μA, I_C = 0)	$V_{(BR)EBO}$	5.0	–	–	V
Collector-Emitter Cutoff Current (V_{CE} = 80 V, V_{BE} = 0)	I_{CES}	–	–	10	μA
Emitter-Base Cutoff Current (V_{EB} = 4.0 V, I_C = 0)	I_{EBO}	–	–	10	μA
ON CHARACTERISTICS (Note 3)					
DC Current Gain (I_C = 150 mA, V_{CE} = 10 V) (I_C = 500 mA, V_{CE} = 10 V)	h_{FE}	1000 2000	– –	– –	–
Collector-Emitter Saturation Voltage (I_C = 500 mA, I_B = 0.5 mA)	$V_{CE(sat)}$	–	–	1.3	V
Base-Emitter Saturation Voltage (I_C = 500 mA, I_B = 0.5 mA)	$V_{BE(sat)}$	–	–	1.9	V
SWITCHING CHARACTERISTICS					
Rise Time (V_{CC} = 10 V, I_C = 150 mA, I_{B1} = 0.15 mA)	t_r	–	155	–	ns
Delay Time (V_{CC} = 10 V, I_C = 150 mA, I_{B1} = 0.15 mA)	t_d	–	205	–	ns
Storage Time (V_{CC} = 10 V, I_C = 150 mA, I_{B1} = 0.15 mA, I_{B2} = 0.15 mA)	t_s	–	420	–	ns
Fall Time (V_{CC} = 10 V, I_C = 150 mA, I_{B1} = 0.15 mA, I_{B2} = 0.15 mA)	t_f	–	365	–	ns

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

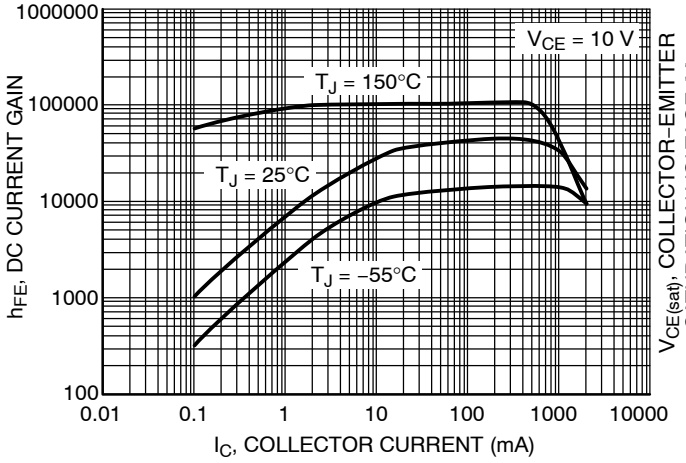


Figure 1. DC Current Gain

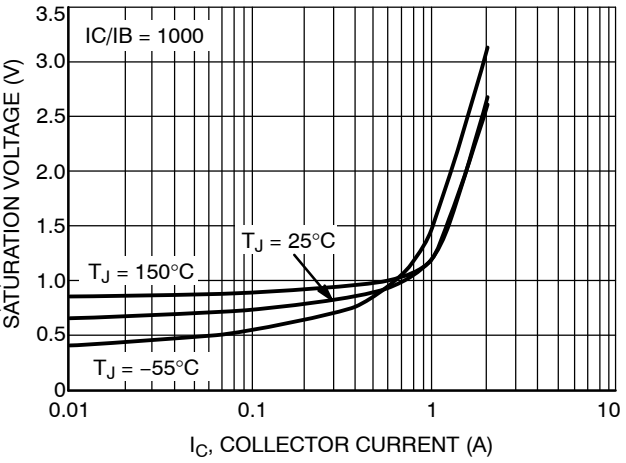


Figure 2. Collector−Emitter Saturation Voltage

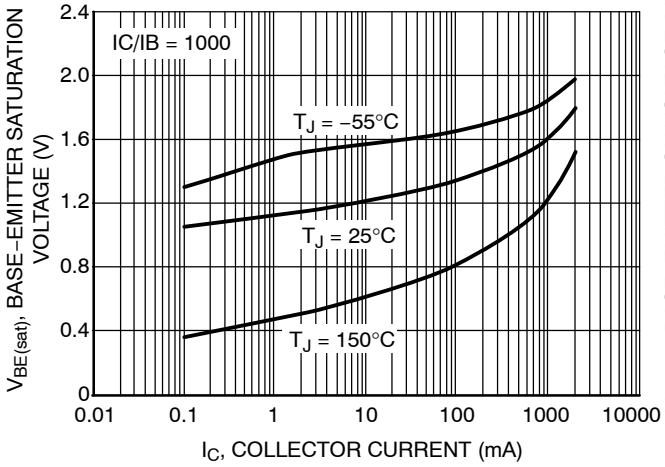


Figure 3. Base−Emitter Saturation Voltage

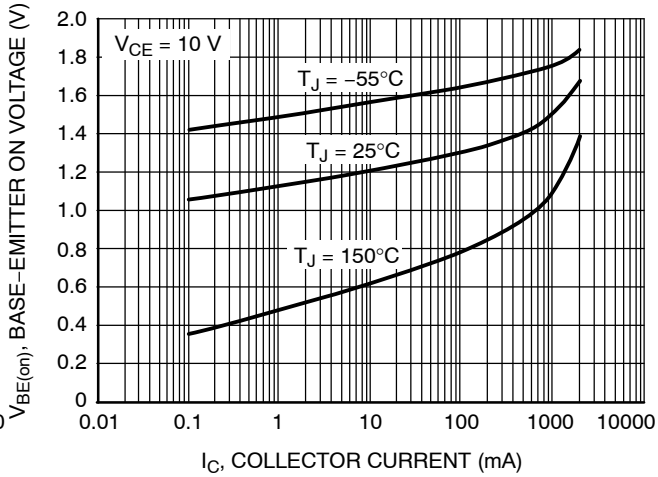


Figure 4. Base−Emitter ON Voltage

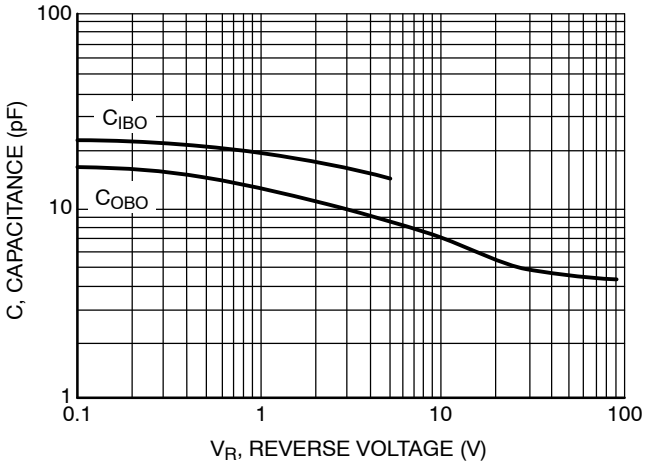


Figure 5. Capacitance

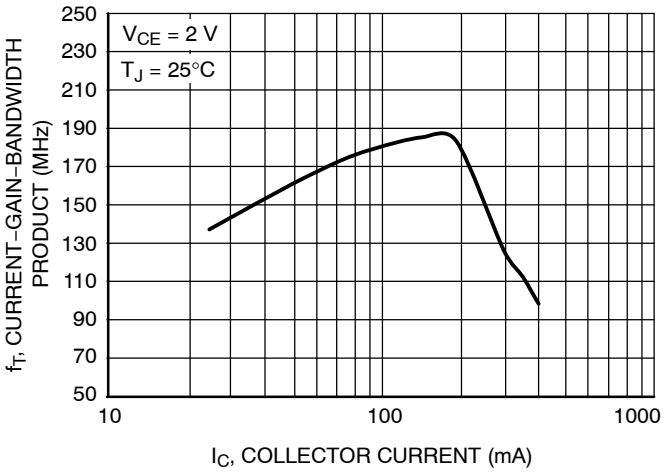
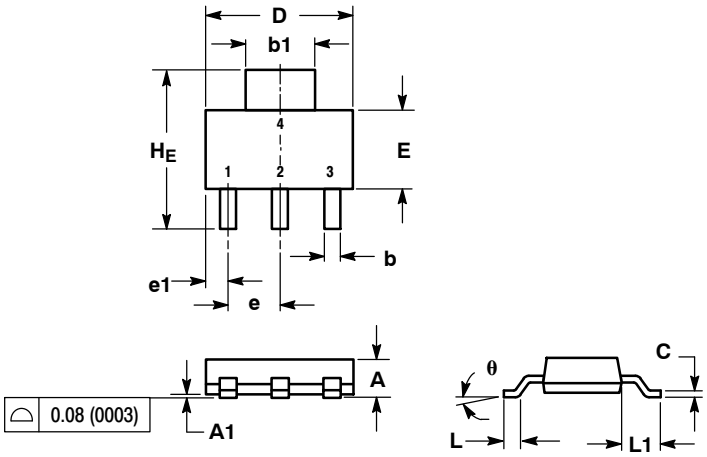


Figure 6. Current Gain Bandwidth Product vs. Collector Current

PACKAGE DIMENSIONS

SOT−223 (TO−261)
CASE 318E−04
ISSUE N

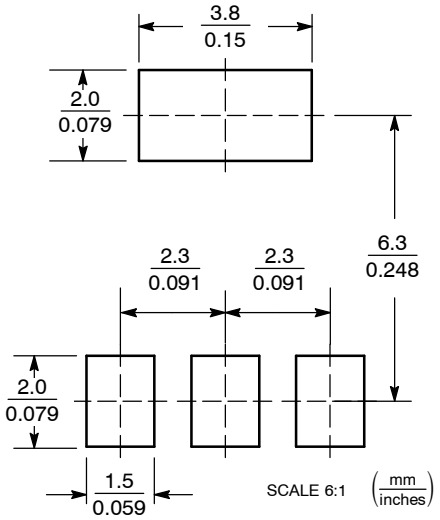


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	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
L	0.20	−−−	−−−	0.008	−−−	−−−
L1	1.50	1.75	2.00	0.060	0.069	0.078
H_E	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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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