

NPN Silicon Epitaxial Transistor

BCP56 Series

These NPN Silicon Epitaxial transistors are designed for use in audio amplifier applications. The device is housed in the SOT-223 package, which is designed for medium power surface mount applications.

Features

- High Current: 1.0 A
- 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 BCP56T1G to Order the 7 inch/1000 Unit Reel
Use BCP56T3G to Order the 13 inch/4000 Unit Reel
- PNP Complement is BCP53T1G
- S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	80	Vdc
Collector-Base Voltage	V _{CBO}	100	Vdc
Emitter-Base Voltage	V _{EBO}	5	Vdc
Collector Current	I _C	1	Adc
Collector Current - Peak (Note 1)	I _{CM}	2	Adc
Total Power Dissipation @ T _A = 25°C (Note 2) Derate above 25°C	P _D	1.5 12	W mW/°C
Operating and Storage Temperature Range	T _J , T _{stg}	-65 to 150	°C

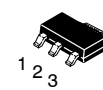
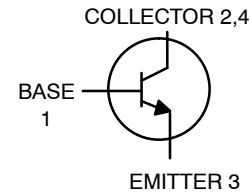
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient (surface mounted)	R _{θJA}	83.3	°C/W
Maximum Temperature for Soldering Purposes Time in Solder Bath	T _L	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.

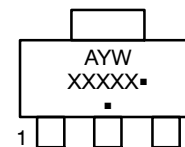
1. Reference SOA curve.
2. Device mounted on a FR-4 glass epoxy printed circuit board 1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.

MEDIUM POWER NPN SILICON HIGH CURRENT TRANSISTOR SURFACE MOUNT



SOT-223
CASE 318E
STYLE 1

MARKING DIAGRAM



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

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

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

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Base Breakdown Voltage ($I_C = 100\ \mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	100	–	–	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 1.0\ \text{mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	80	–	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\ \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	–	–	Vdc
Collector–Base Cutoff Current ($V_{CB} = 30\ \text{Vdc}$, $I_E = 0$)	I_{CBO}	–	–	100	nAdc
Emitter–Base Cutoff Current ($V_{EB} = 5.0\ \text{Vdc}$, $I_C = 0$)	I_{EBO}	–	–	10	μAdc
ON CHARACTERISTICS (Note 3)					
DC Current Gain ($I_C = 5.0\ \text{mA}$, $V_{CE} = 2.0\ \text{V}$) ($I_C = 150\ \text{mA}$, $V_{CE} = 2.0\ \text{V}$) ($I_C = 500\ \text{mA}$, $V_{CE} = 2.0\ \text{V}$)	h_{FE}	25 40 63 100 25	– – – – –	– 250 160 250 –	–
Collector–Emitter Saturation Voltage ($I_C = 500\ \text{mAdc}$, $I_B = 50\ \text{mAdc}$)	$V_{CE(sat)}$	–	–	0.5	Vdc
Base–Emitter On Voltage ($I_C = 500\ \text{mAdc}$, $V_{CE} = 2.0\ \text{Vdc}$)	$V_{BE(on)}$	–	–	1.0	Vdc
SWITCHING CHARACTERISTICS					
Rise Time ($V_{CC} = 30\ \text{Vdc}$, $I_C = 150\ \text{mA}$, $I_{B1} = 15\ \text{mA}$)	t_r	–	14	–	ns
Delay Time ($V_{CC} = 30\ \text{Vdc}$, $I_C = 150\ \text{mA}$, $I_{B1} = 15\ \text{mA}$)	t_d	–	9	–	ns
Storage Time ($V_{CC} = 30\ \text{Vdc}$, $I_C = 150\ \text{mA}$, $I_{B1} = 15\ \text{mA}$, $I_{B2} = 15\ \text{mA}$)	t_s	–	714	–	ns
Fall Time ($V_{CC} = 30\ \text{Vdc}$, $I_C = 150\ \text{mA}$, $I_{B1} = 15\ \text{mA}$, $I_{B2} = 15\ \text{mA}$)	t_f	–	58	–	ns
DYNAMIC CHARACTERISTICS					
Current–Gain – Bandwidth Product ($I_C = 10\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 35\ \text{MHz}$)	f_T	–	130	–	MHz

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.

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

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TYPICAL ELECTRICAL CHARACTERISTICS

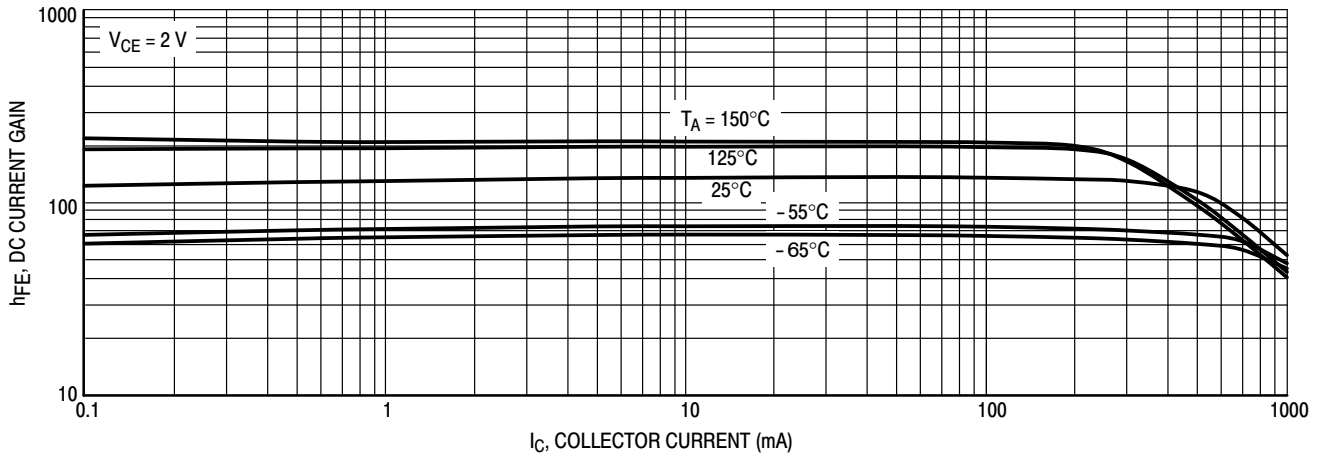


Figure 1. DC Current Gain

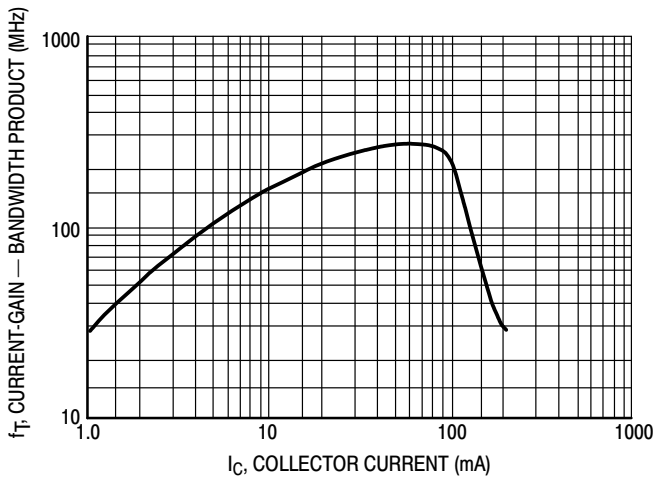


Figure 2. Current-Gain - Bandwidth Product

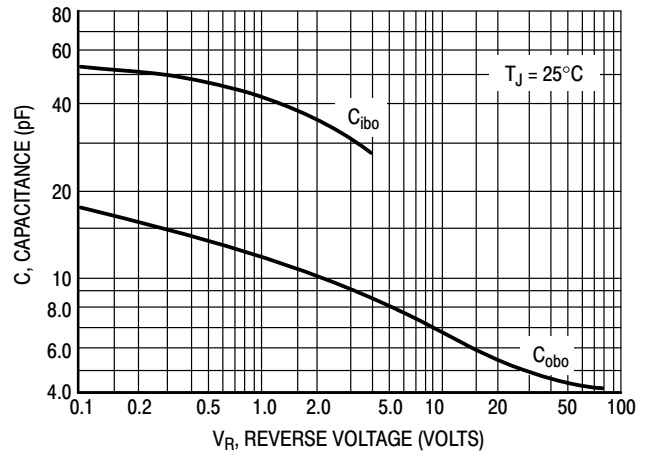


Figure 3. Capacitance

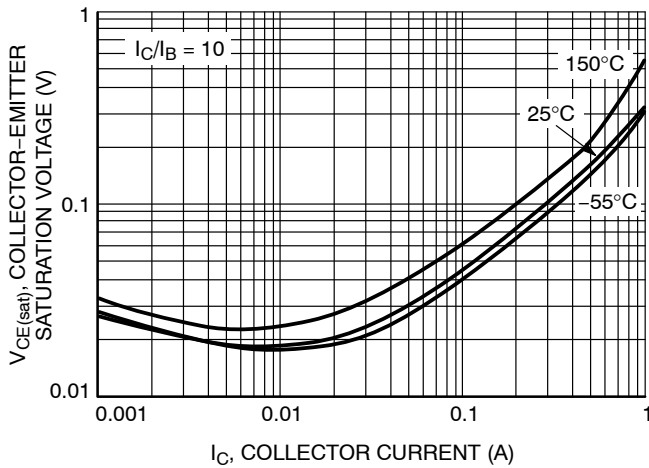


Figure 4. Collector Emitter Saturation Voltage vs. Collector Current

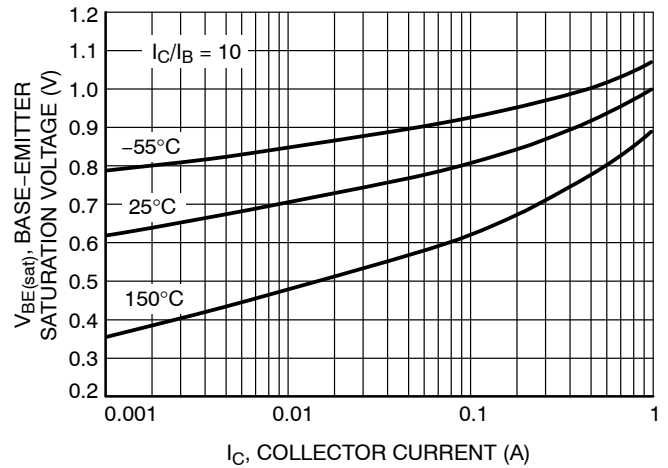


Figure 5. Base Emitter Saturation Voltage vs. Collector Current

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TYPICAL ELECTRICAL CHARACTERISTICS

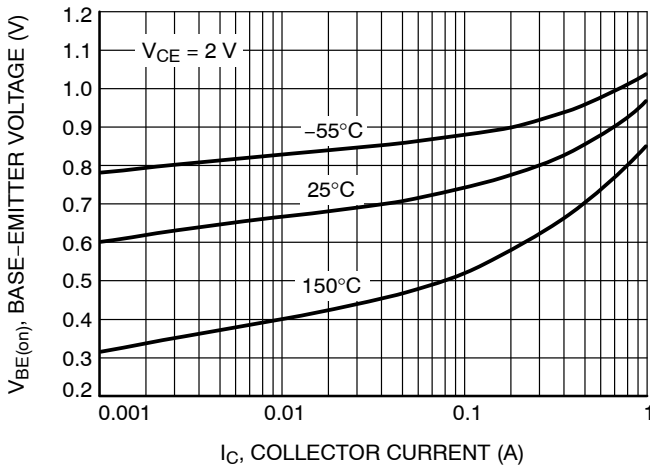


Figure 6. Base Emitter Voltage vs. Collector Current

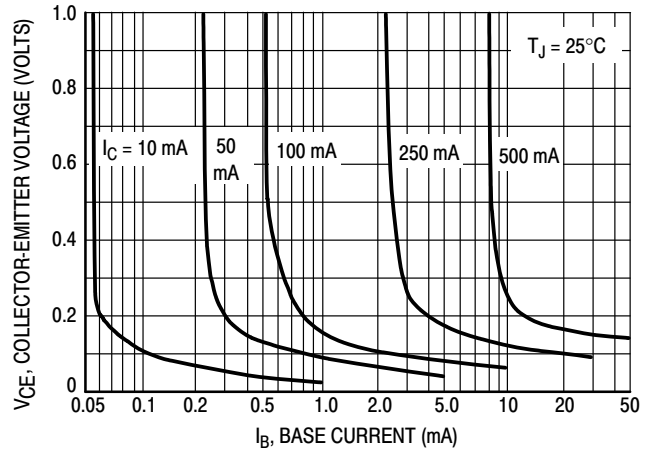


Figure 7. Collector Saturation Region

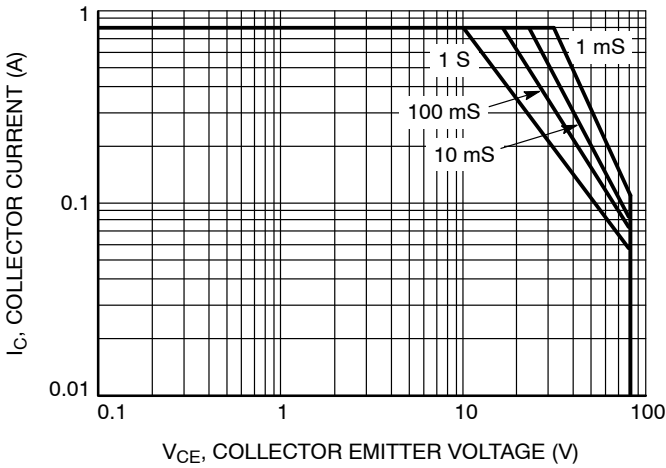


Figure 8. Safe Operating Area

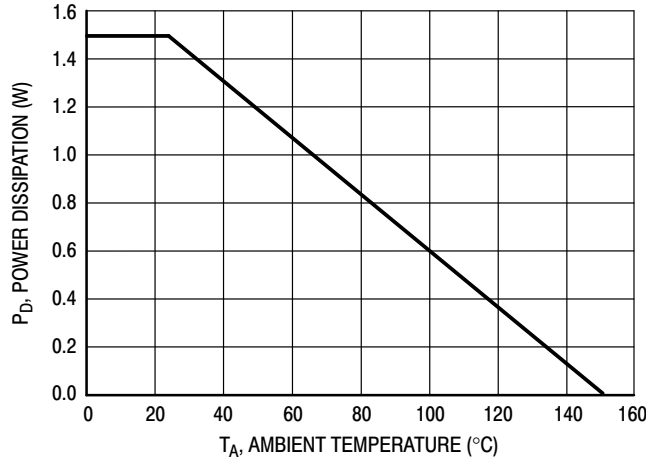


Figure 9. Power Derating Curve

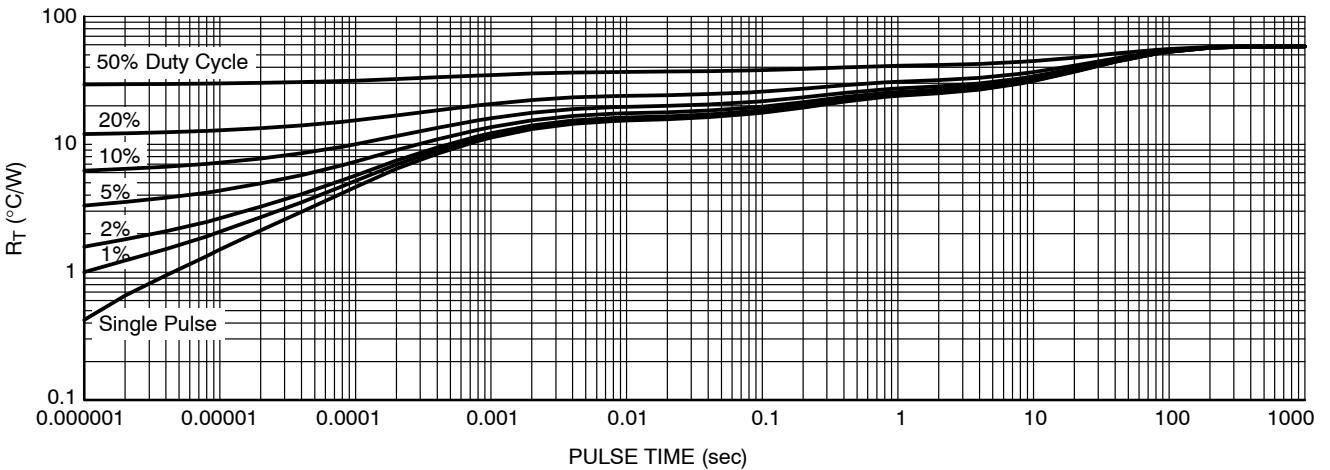


Figure 10. Thermal Response

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ORDERING INFORMATION

Device	Marking	Package	Shipping†
BCP56T1G	BH	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBCP56T1G*			
BCP56T3G	BH	SOT-223 (Pb-Free)	4000 / Tape & Reel
SBCP56T3G*			
BCP56-10T1G	BH-10	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBCP56-10T1G*			
BCP56-10T3G	BH-10	SOT-223 (Pb-Free)	4000 / Tape & Reel
NSVBCP56-10T3G*			
BCP56-16T1G	BH-16	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBCP56-16T1G*			
BCP56-16T3G	BH-16	SOT-223 (Pb-Free)	4000 / Tape & Reel
SBCP56-16T3G*			

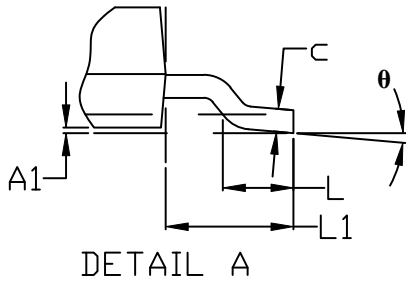
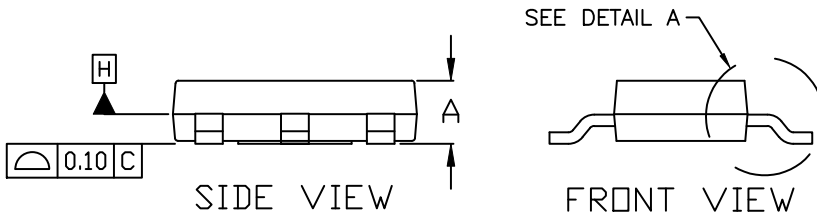
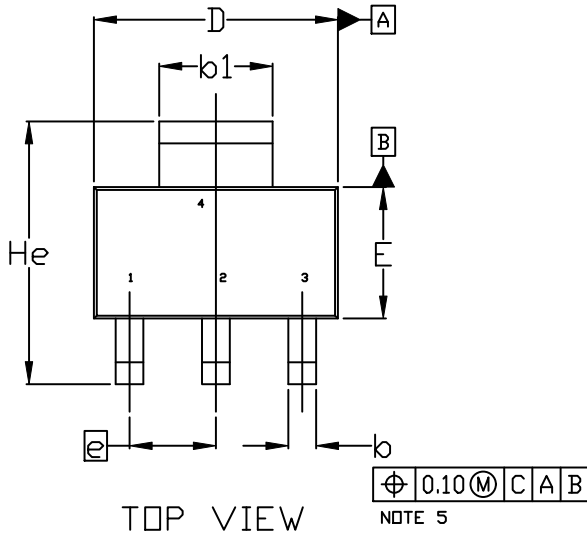
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

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PACKAGE DIMENSIONS

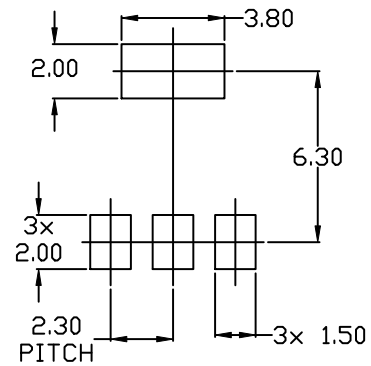
SOT-223 (TO-261)
CASE 318E-04
ISSUE R



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.200MM PER SIDE.
4. DATUMS A AND B ARE DETERMINED AT DATUM H.
5. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
6. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.50	1.63	1.75
A1	0.02	0.06	0.10
b	0.60	0.75	0.89
b1	2.90	3.06	3.20
c	0.24	0.29	0.35
D	6.30	6.50	6.70
E	3.30	3.50	3.70
e	2.30 BSC		
L	0.20	---	---
L1	1.50	1.75	2.00
He	6.70	7.00	7.30
θ	0°	---	10°



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