

# BCP56 Series, SBCP56 Series

## NPN Silicon Epitaxial Transistor

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 BCP56T1 to Order the 7 inch/1000 Unit Reel  
Use BCP56T3 to Order the 13 inch/4000 Unit Reel
- PNP Complement is BCP53T1
- AEC-Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	80	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	100	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	5	Vdc
Collector Current	I <sub>C</sub>	1	Adc
Total Power Dissipation @ T <sub>A</sub> = 25°C (Note 1) Derate above 25°C	P <sub>D</sub>	1.5 12	W mW/°C
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to 150	°C

### THERMAL CHARACTERISTICS

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

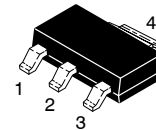
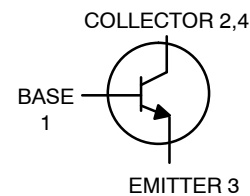
1. Device mounted on a FR-4 glass epoxy printed circuit board 1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.



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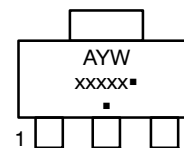
<http://onsemi.com>

## MEDIUM POWER NPN SILICON HIGH CURRENT TRANSISTOR SURFACE MOUNT



SOT-223  
CASE 318E  
STYLE 1

### MARKING DIAGRAM



- xx = 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 and shipping information in the package dimensions section on page 2 of this data sheet.

## BCP56 Series, SBP56 Series

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

Characteristics	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
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	$\mu\text{Adc}$

### ON CHARACTERISTICS (Note 2)

DC Current Gain ( $I_C = 5.0\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ ) All Part Types ( $I_C = 150\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ ) BCP56T1, SBP56T1, SBP56T3 BCP56-10T1, SBP56-10T1 BCP56-16T1, SBP56-16T1, SBP56-16T3 ( $I_C = 500\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ ) All Types	$h_{FE}$	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

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

### ORDERING INFORMATION

Device	Marking	Package	Shipping <sup>†</sup>
BCP56T1G	BH	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBP56T1G			
BCP56T3G	BH	SOT-223 (Pb-Free)	4000 / Tape & Reel
SBP56T3G			
BCP56-10T1G	BH-10	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBP56-10T1G			
BCP56-16T1G	BH-16	SOT-223 (Pb-Free)	1000 / Tape & Reel
SBP56-16T1G			
BCP56-16T3G	BH-16	SOT-223 (Pb-Free)	4000 / Tape & Reel
SBP56-16T3G			

<sup>†</sup>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.

# BCP56 Series, SBCP56 Series

## TYPICAL ELECTRICAL CHARACTERISTICS

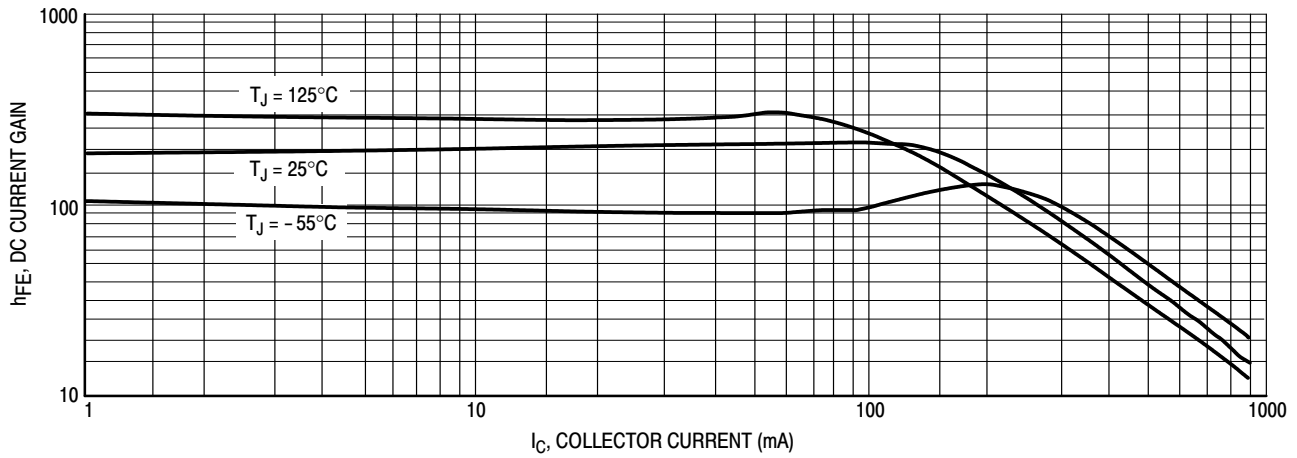


Figure 1. DC Current Gain

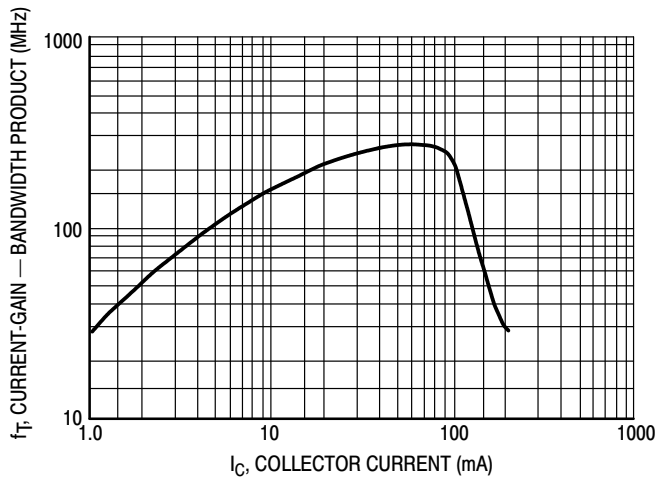


Figure 2. Current-Gain - Bandwidth Product

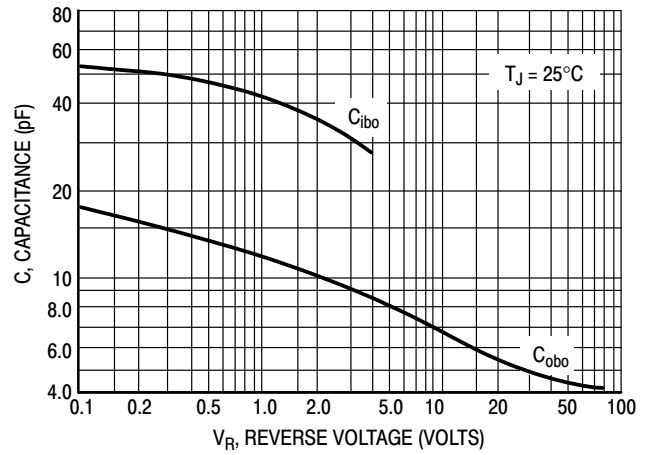


Figure 3. Capacitance

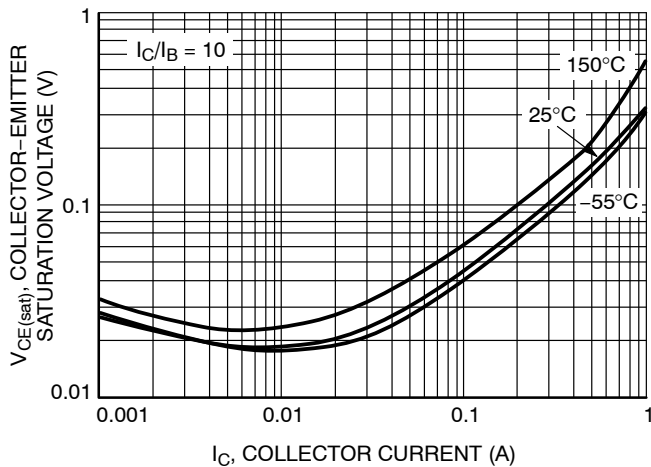


Figure 4. Collector Emitter Saturation Voltage vs. Collector Current

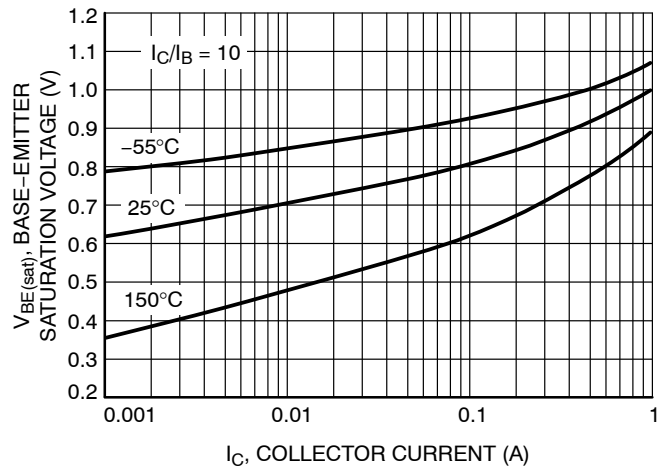
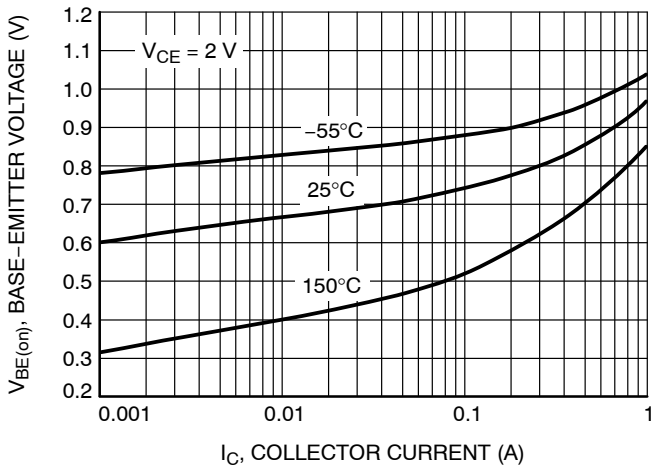


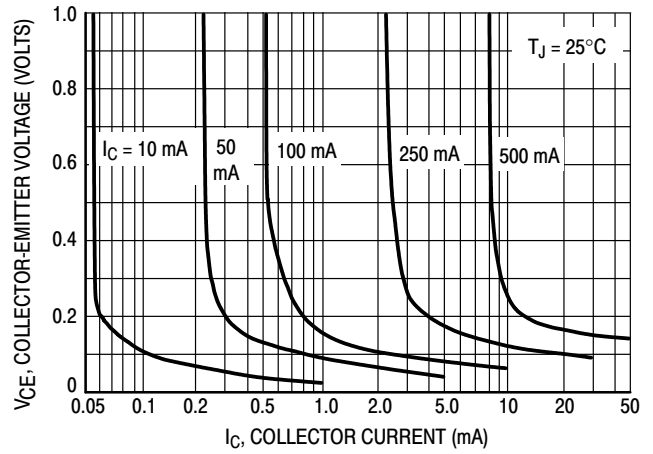
Figure 5. Base Emitter Saturation Voltage vs. Collector Current

# BCP56 Series, SBCP56 Series

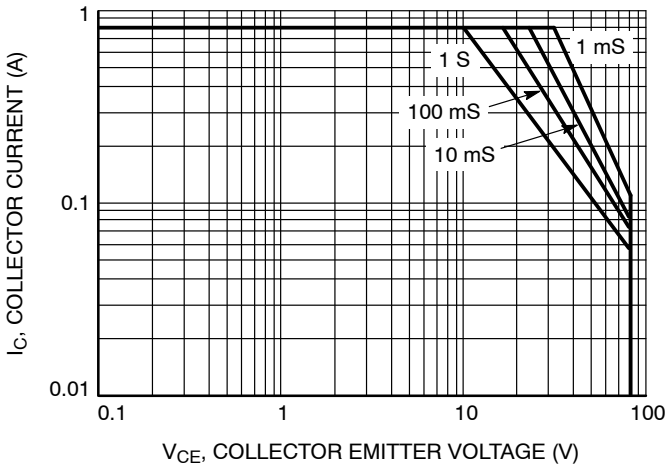
## TYPICAL ELECTRICAL CHARACTERISTICS



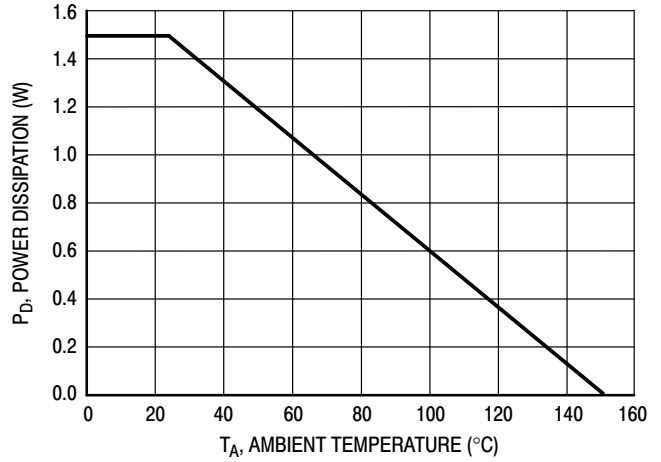
**Figure 6. Base Emitter Voltage vs. Collector Current**



**Figure 7. Collector Saturation Region**



**Figure 8. Safe Operating Area**

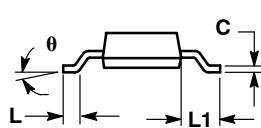
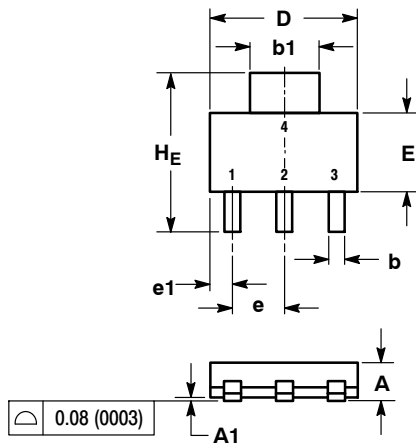


**Figure 9. Power Derating Curve**

# BCP56 Series, SBCP56 Series

## PACKAGE DIMENSIONS

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

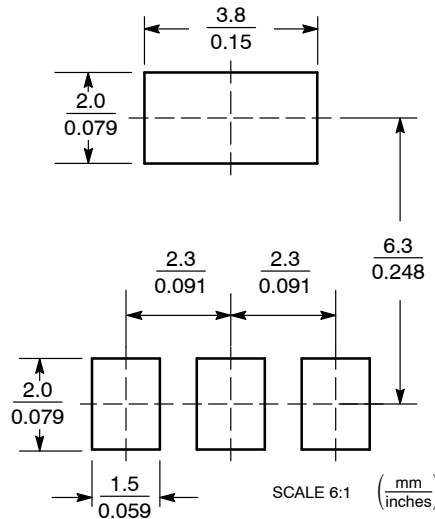


NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.  
2. CONTROLLING DIMENSION: INCH.

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
L	0.20	---	---	0.008	---	---
L1	1.50	1.75	2.00	0.060	0.069	0.078
H <sub>E</sub>	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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