

# BCP56T1 Series

Preferred Devices

## 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

- Pb-Free Package is Available
- High Current: 1.0 Amp
- 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

### MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ 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                           |
| Total Power Dissipation<br>@ $T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12  | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage<br>Temperature Range  | $T_J, T_{stg}$ | -65 to 150 | $^\circ\text{C}$              |

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          | Max       | Unit                      |
|--|-----------------|-----------|---------------------------|
| Thermal Resistance<br>Junction-to-Ambient<br>(surface mounted)       | $R_{\theta JA}$ | 83.3      | $^\circ\text{C}/\text{W}$ |
| Maximum Temperature for<br>Soldering Purposes<br>Time in Solder Bath | $T_L$           | 260<br>10 | $^\circ\text{C}$<br>Sec   |

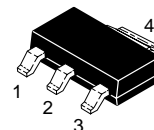
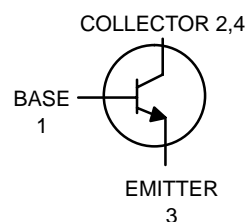
1. Device mounted on a FR-4 glass epoxy printed circuit board 1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.



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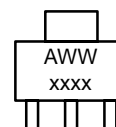
<http://onsemi.com>

## MEDIUM POWER NPN SILICON HIGH CURRENT TRANSISTOR SURFACE MOUNT



SOT-223  
CASE 318E  
STYLE 1

### MARKING DIAGRAM



xxxx = Specific Device Code  
A = Assembly Location  
WW = Work Week

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

## BCP56T1 Series

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

| Characteristics | Symbol | Min | Typ | Max | Unit |
|-----------------|--------|-----|-----|-----|------|
|-----------------|--------|-----|-----|-----|------|

#### OFF CHARACTERISTICS

|   |               |     |   |     |                 |
|---|---------------|-----|---|-----|-----------------|
| Collector–Base Breakdown Voltage<br>( $I_C = 100\ \mu\text{Adc}$ , $I_E = 0$ )  | $V_{(BR)CBO}$ | 100 | – | –   | Vdc             |
| Collector–Emitter Breakdown Voltage<br>( $I_C = 1.0\ \text{mAdc}$ , $I_B = 0$ ) | $V_{(BR)CEO}$ | 80  | – | –   | Vdc             |
| Emitter–Base Breakdown Voltage<br>( $I_E = 10\ \mu\text{Adc}$ , $I_C = 0$ )     | $V_{(BR)EBO}$ | 5.0 | – | –   | Vdc             |
| Collector–Base Cutoff Current<br>( $V_{CB} = 30\ \text{Vdc}$ , $I_E = 0$ )      | $I_{CBO}$     | –   | – | 100 | nAdc            |
| Emitter–Base Cutoff Current<br>( $V_{EB} = 5.0\ \text{Vdc}$ , $I_C = 0$ )       | $I_{EBO}$     | –   | – | 10  | $\mu\text{Adc}$ |

#### ON CHARACTERISTICS (Note 2)

|  |  |               |                             |                       |                             |     |
|--|--|---------------|-----------------------------|-----------------------|-----------------------------|-----|
| DC Current Gain<br>( $I_C = 5.0\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ )<br>( $I_C = 150\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ )<br><br>( $I_C = 500\ \text{mA}$ , $V_{CE} = 2.0\ \text{V}$ ) | All Part Types<br>BCP56T1<br>BCP56-10T1<br>BCP56-16T1<br>All Types | $h_{FE}$      | 25<br>40<br>63<br>100<br>25 | –<br>–<br>–<br>–<br>– | –<br>250<br>160<br>250<br>– | –   |
| Collector–Emitter Saturation Voltage<br>( $I_C = 500\ \text{mAdc}$ , $I_B = 50\ \text{mAdc}$ )   |  | $V_{CE(sat)}$ | –                           | –                     | 0.5                         | Vdc |
| Base–Emitter On Voltage<br>( $I_C = 500\ \text{mAdc}$ , $V_{CE} = 2.0\ \text{Vdc}$ )   |  | $V_{BE(on)}$  | –                           | –                     | 1.0                         | Vdc |

#### DYNAMIC CHARACTERISTICS

|   |       |   |     |   |     |
|---|-------|---|-----|---|-----|
| Current–Gain – Bandwidth Product<br>( $I_C = 10\ \text{mAdc}$ , $V_{CE} = 5.0\ \text{Vdc}$ , $f = 35\ \text{MHz}$ ) | $f_T$ | – | 130 | – | MHz |
|---|-------|---|-----|---|-----|

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

#### ORDERING INFORMATION

| Device      | Marking | Package              | Shipping†          |
|-------------|---------|----------------------|--------------------|
| BCP56T1     | BH      | SOT–223              | 1000 / Tape & Reel |
| BCP56T3     | BH      | SOT–223              | 4000 / Tape & Reel |
| BCP56–10T1  | BH–10   | SOT–223              | 1000 / Tape & Reel |
| BCP56–16T1  | BH–16   | SOT–223              | 1000 / Tape & Reel |
| BCP56–16T1G |         | SOT–223<br>(Pb–Free) | 1000 / Tape & Reel |
| BCP56–16T3  |         | SOT–223              | 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.

# BCP56T1 Series

## TYPICAL ELECTRICAL CHARACTERISTICS

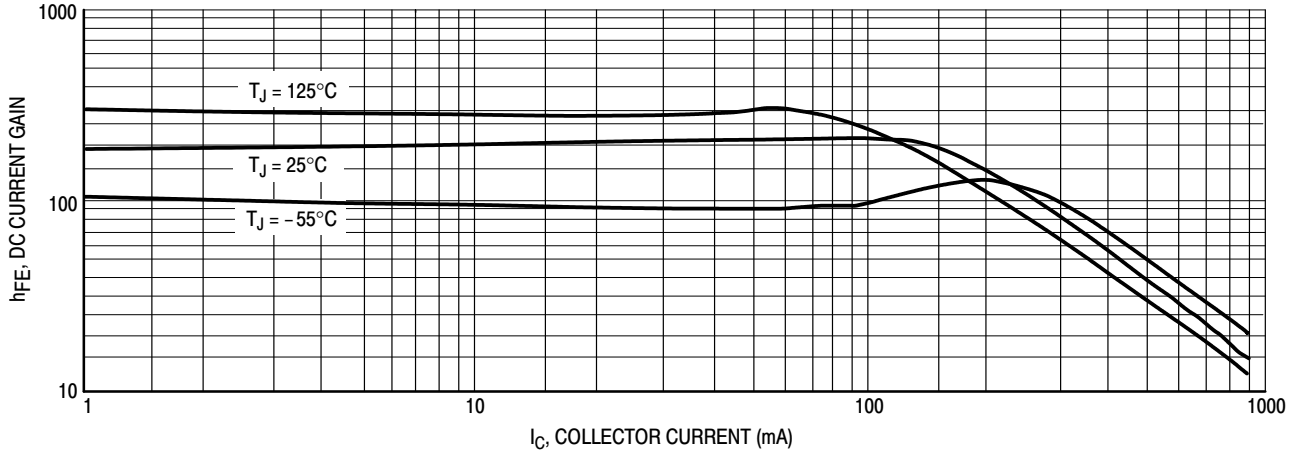


Figure 1. DC Current Gain

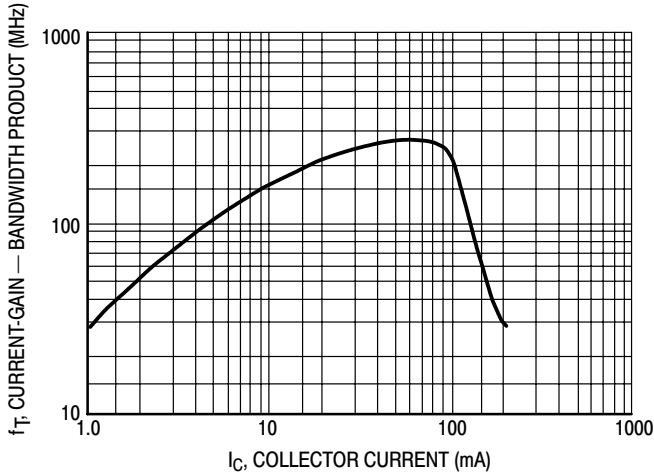


Figure 2. Current-Gain - Bandwidth Product

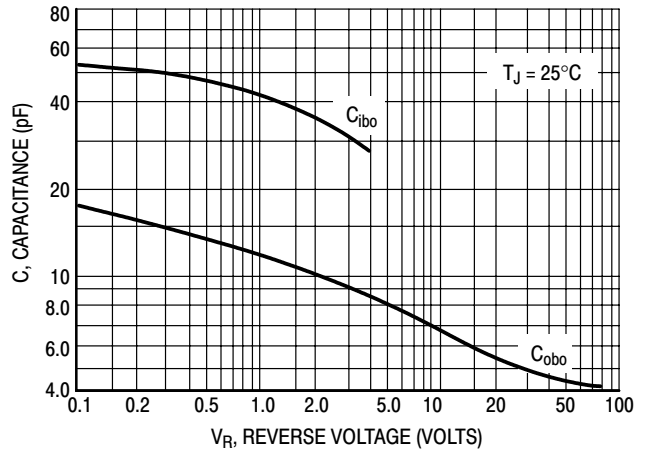


Figure 3. Capacitance

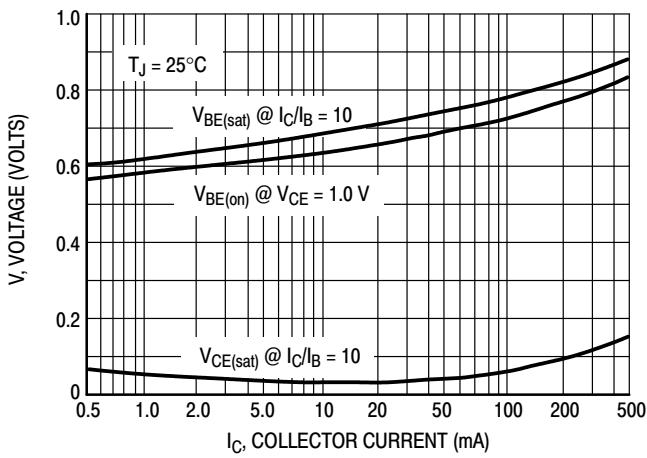


Figure 4. "On" Voltages

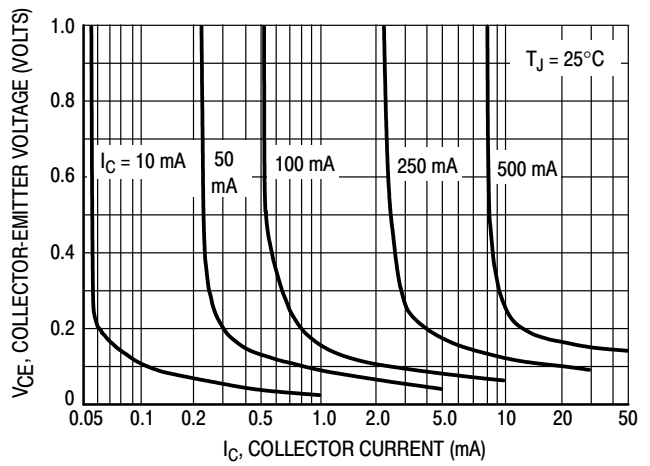
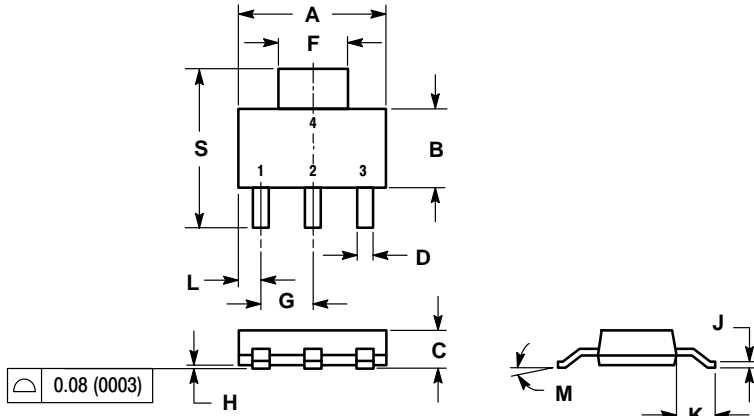


Figure 5. Collector Saturation Region

# BCP56T1 Series

## PACKAGE DIMENSIONS

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



NOTES:

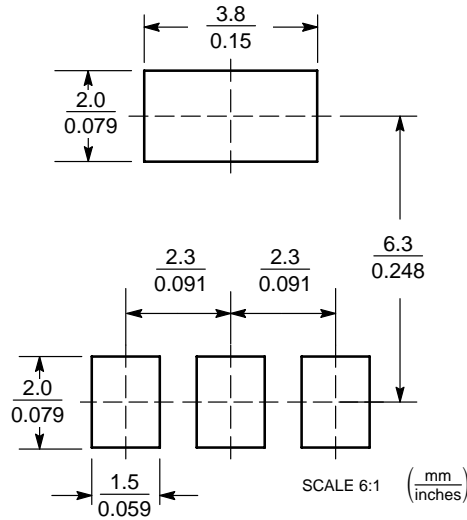
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES |        | MILLIMETERS |       |
|-----|--------|--------|-------------|-------|
|     | MIN    | MAX    | MIN         | MAX   |
| A   | 0.249  | 0.263  | 6.30        | 6.70  |
| B   | 0.130  | 0.145  | 3.30        | 3.70  |
| C   | 0.060  | 0.068  | 1.50        | 1.75  |
| D   | 0.024  | 0.035  | 0.60        | 0.89  |
| F   | 0.115  | 0.126  | 2.90        | 3.20  |
| G   | 0.087  | 0.094  | 2.20        | 2.40  |
| H   | 0.0008 | 0.0040 | 0.020       | 0.100 |
| J   | 0.009  | 0.014  | 0.24        | 0.35  |
| K   | 0.060  | 0.078  | 1.50        | 2.00  |
| L   | 0.033  | 0.041  | 0.85        | 1.05  |
| M   | 0°     | 10°    | 0°          | 10°   |
| S   | 0.264  | 0.287  | 6.70        | 7.30  |

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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