

BCP53 Series

PNP Silicon Epitaxial Transistors

This PNP Silicon Epitaxial transistor is 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.

- High Current
- NPN Complement is BCP56
- 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
- Device Marking:
BCP53T1G = AH
BCP53-10T1G = AH-10
BCP53-16T1G = AH-16
- 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 _{CB0} | -100 | Vdc |
| Emitter-Base Voltage | V _{EBO} | -5.0 | Vdc |
| Collector Current | I _C | 1.5 | Adc |
| Total Power Dissipation @ T _A = 25°C (Note 1) 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 |

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 glass epoxy printed circuit board 1.575 in. x 1.575 in. x 0.059 in.; mounting pad for the collector lead min. 0.93 sq. in.

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|------------------|-----------|---------|
| Thermal Resistance, Junction-to-Ambient (Surface Mounted) | R _{θJA} | 83.3 | °C/W |
| Lead Temperature for Soldering, 0.0625" from case Time in Solder Bath | T _L | 260 10 | °C s |

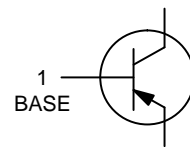


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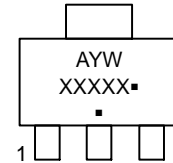
MEDIUM POWER HIGH CURRENT SURFACE MOUNT PNP TRANSISTORS

COLLECTOR 2, 4



EMITTER 3

MARKING DIAGRAM



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

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|-------------------|------------------|
| BCP53T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| SBCP53-10T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| BCP53-10T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| SBCP53-10T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| BCP53-16T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| SBCP53-16T1G | SOT-223 (Pb-Free) | 1000/Tape & Reel |
| BCP53-16T3G | SOT-223 (Pb-Free) | 4000/Tape & Reel |
| NSVBCP53-16T3G | 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 ($T_A = 25^\circ\text{C}$ 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 |
| Collector–Emitter Breakdown Voltage ($I_C = -100\ \mu\text{Adc}$, $R_{BE} = 1.0\ \text{k}\Omega$) | $V_{(BR)CER}$ | -100 | - | - | 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

| | | | | | |
|--|---------------|-----|---|------|-----|
| DC Current Gain ($I_C = -5.0\ \text{mAdc}$, $V_{CE} = -2.0\ \text{Vdc}$) All Part Types | h_{FE} | 25 | - | - | - |
| ($I_C = -150\ \text{mAdc}$, $V_{CE} = -2.0\ \text{Vdc}$) BCP53, SBCP53 | | 40 | - | 250 | |
| BCP53–10, SBCP53–10 | | 63 | - | 160 | |
| BCP53–16, SBCP53–16, NSVBCP53–16 | | 100 | - | 250 | |
| ($I_C = -500\ \text{mAdc}$, $V_{CE} = -2.0\ \text{Vdc}$) All Part Types | | 25 | - | - | |
| 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 | - | 50 | - | 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.

BCP53 Series

TYPICAL CHARACTERISTICS

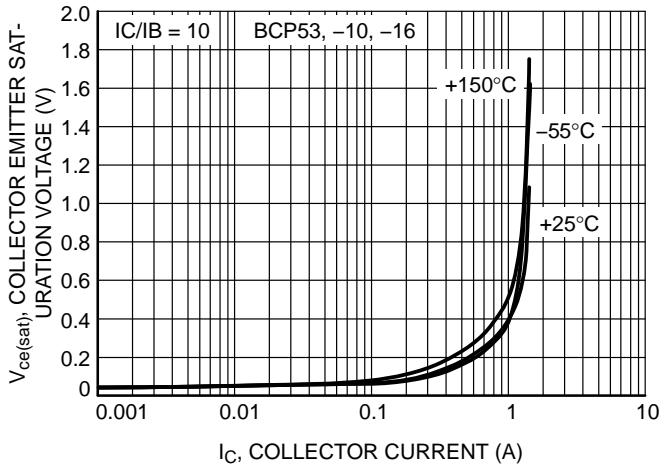


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

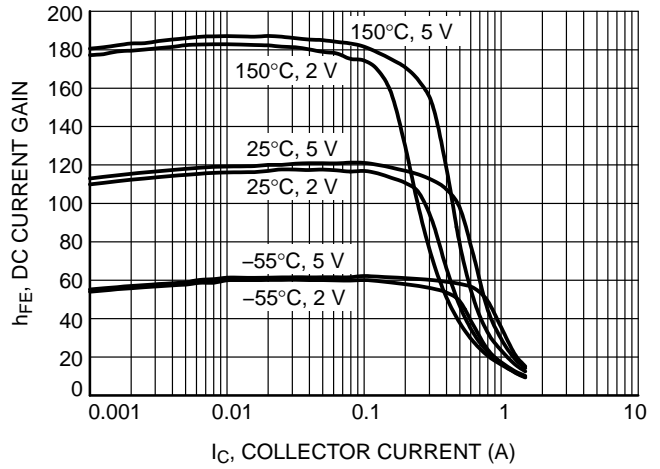


Figure 2. DC Current Gain vs. Collector Current (BCP53)

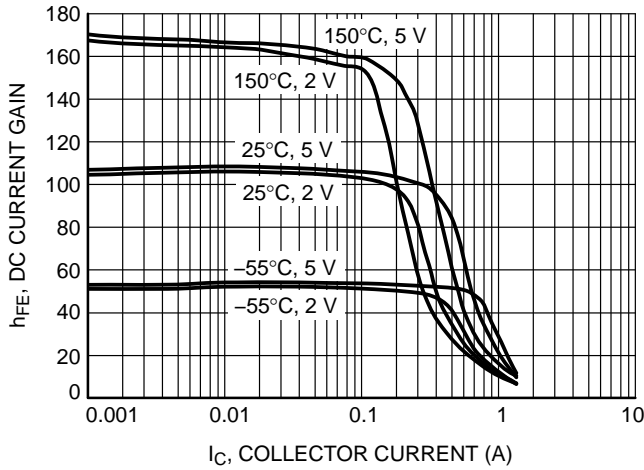


Figure 3. DC Current Gain vs. Collector Current (BCP53-10)

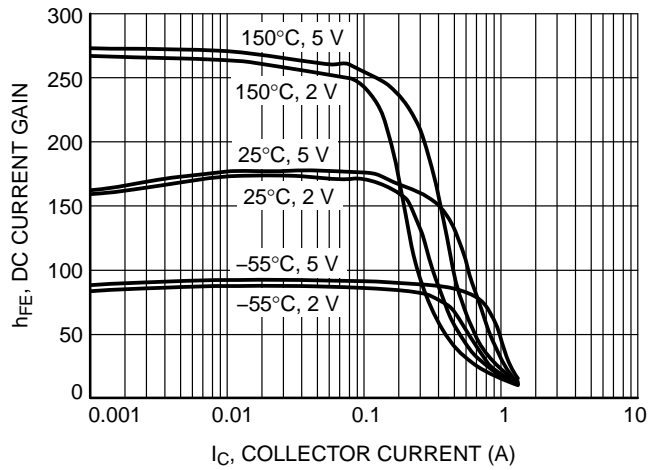


Figure 4. DC Current Gain vs. Collector Current (BCP53-16)

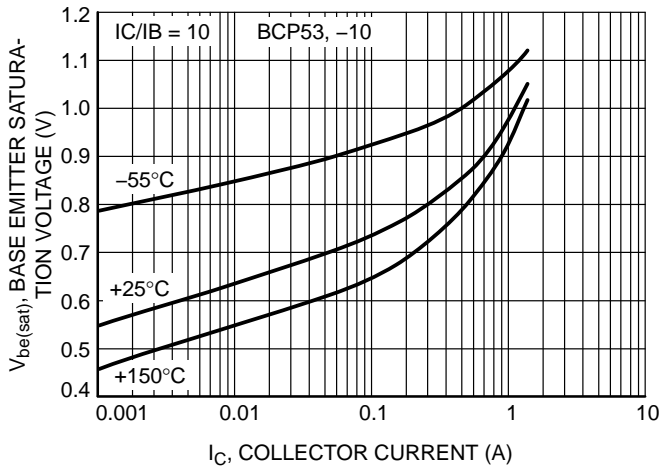


Figure 5. BCP53, -10 Base Emitter Saturation Voltage vs. Collector Current

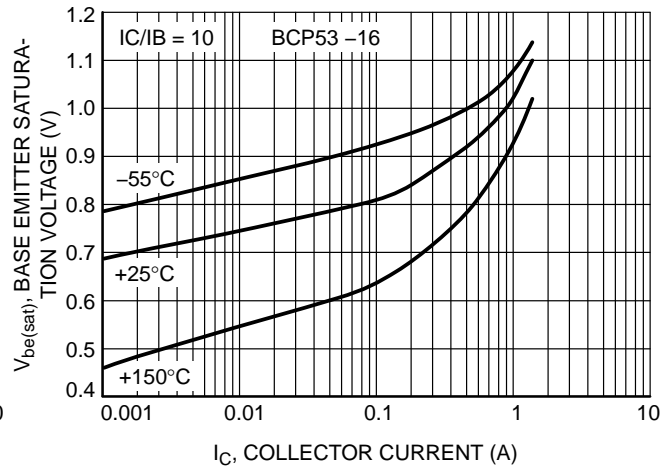


Figure 6. BCP53-16 Base Emitter Saturation Voltage vs. Collector Current

BCP53 Series

TYPICAL CHARACTERISTICS

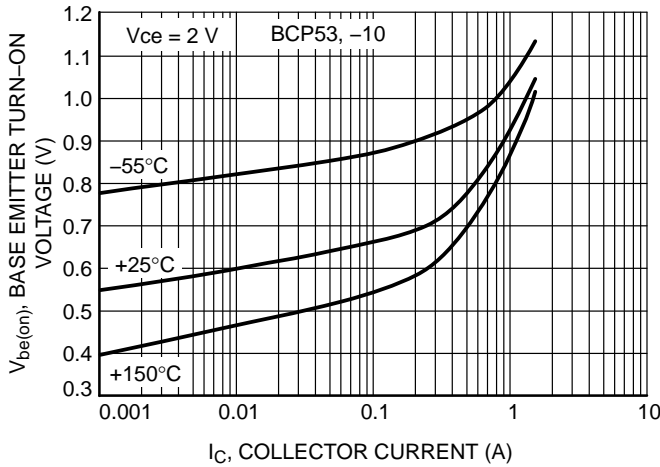


Figure 7. BCP53, -10 Base Emitter Turn-On Voltage vs. Collector Current $V_{BE(on)}$

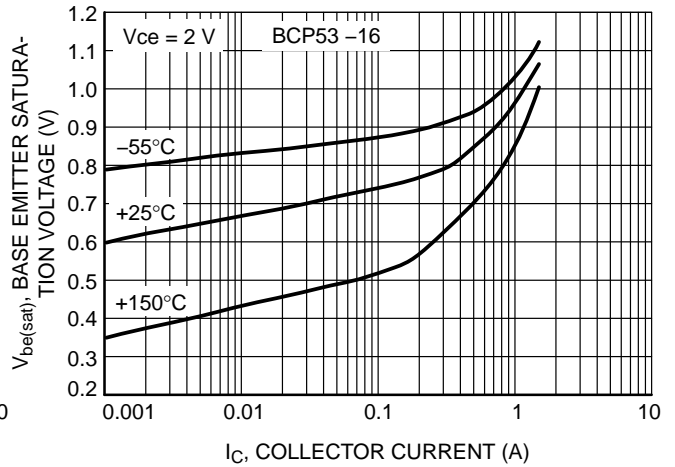


Figure 8. BCP53-16 Base Emitter Turn-On Voltage vs. Collector Current

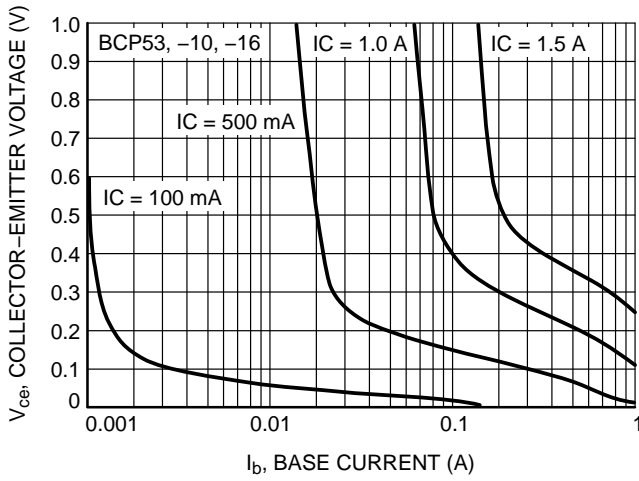


Figure 9. BCP53, -10, -16 Saturation Region

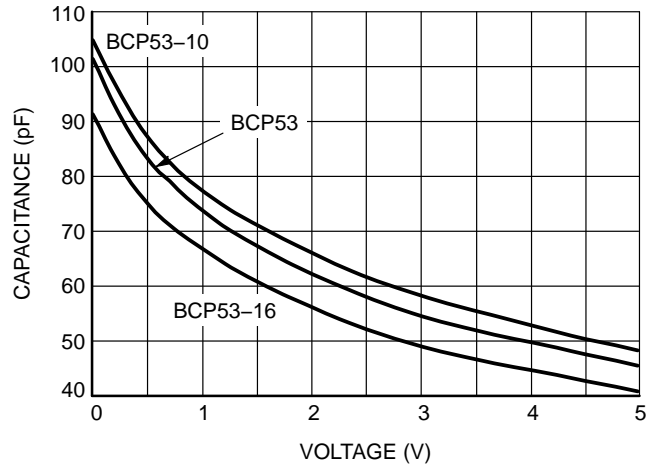


Figure 10. Input Capacitance

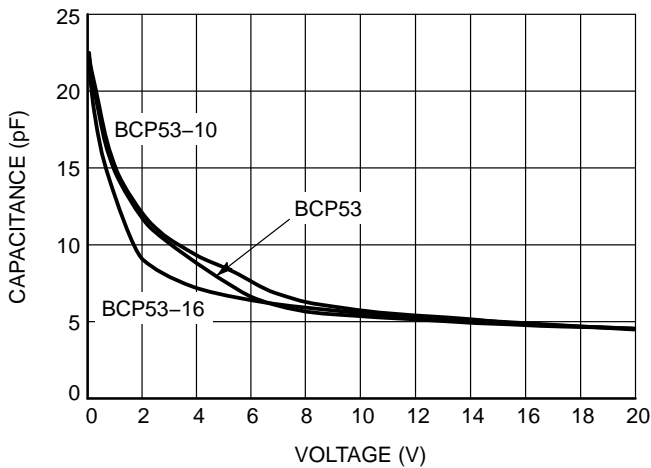


Figure 11. Output Capacitance

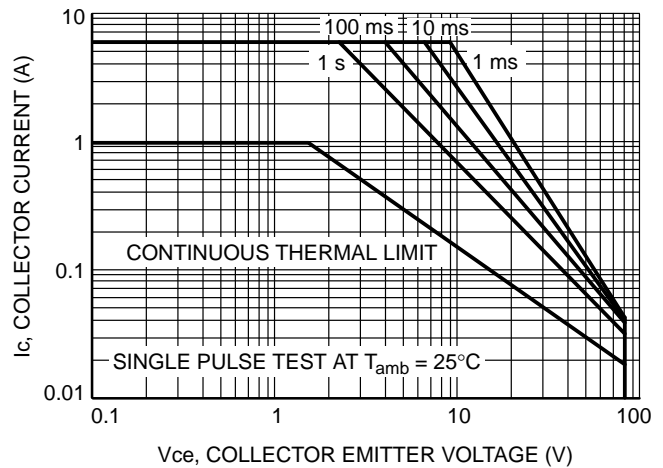
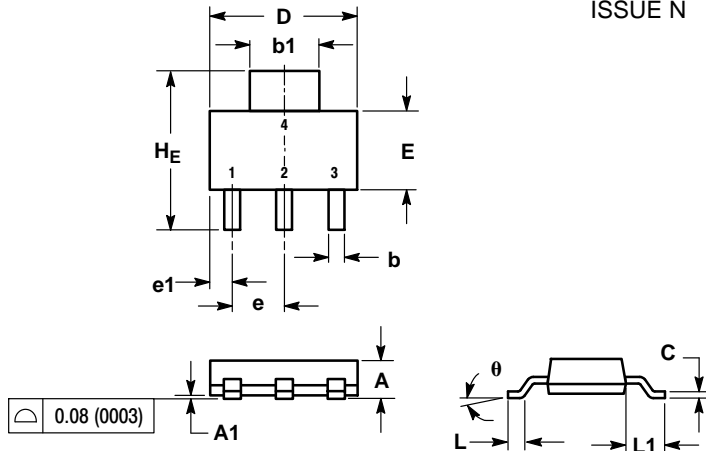


Figure 12. Standard Operating Area

BCP53 Series

PACKAGE DIMENSIONS

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

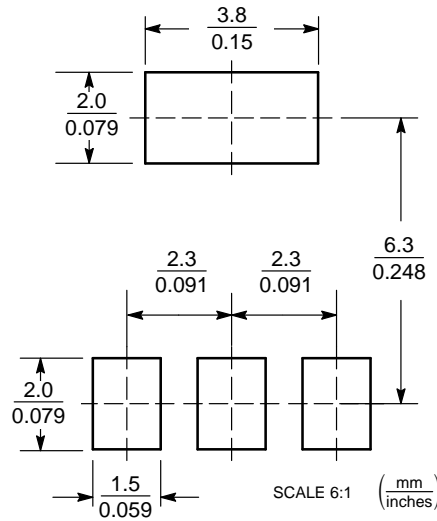


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: INCH.

| 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 |
| HE | 6.70 | 7.00 | 7.30 | 0.264 | 0.276 | 0.287 |
| θ | 0° | - | 10° | 0° | - | 10° |

- STYLE 1:
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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