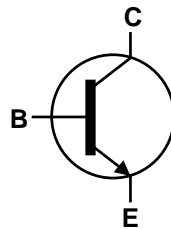


Features

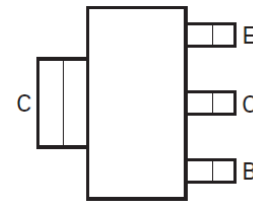
- $BV_{CE0} > 45V, 60V \& 80V$
- $I_C = 1A$ High Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage $V_{CE(sat)} < 500mV @ 0.5A$
- Gain Groups 10 and 16
- Complementary PNP Types: BCP51, 52 and 53
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**



Top View



Device Symbol


 Top View
Pin-Out

Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate) (e3)

Applications

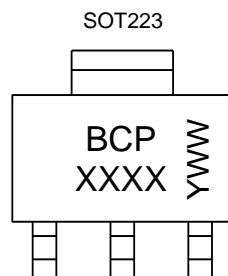
- Medium Power Switching or Amplification Applications
- AF Driver and Output Stages

Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|------------|--|--------------------|-----------------|-------------------|
| BCP54TA | AEC-Q101 | BCP 54 | 7 | 12 | 1,000 |
| BCP5410TA | AEC-Q101 | BCP 5410 | 7 | 12 | 1,000 |
| BCP5416TA | AEC-Q101 | BCP 5416 | 7 | 12 | 1,000 |
| BCP5416QTA | Automotive | BCP 5416 | 7 | 12 | 1,000 |
| BCP55TA | AEC-Q101 | BCP 55 | 7 | 12 | 1,000 |
| BCP5510TA | AEC-Q101 | BCP 5510 | 7 | 12 | 1,000 |
| BCP5516TA | AEC-Q101 | BCP 5516 | 7 | 12 | 1,000 |
| BCP56TA | AEC-Q101 | BCP 56 | 7 | 12 | 1,000 |
| BCP5610TA | AEC-Q101 | BCP 5610 | 7 | 12 | 1,000 |
| BCP5616TA | AEC-Q101 | BCP 5616 | 7 | 12 | 1,000 |
| BCP5616TC | AEC-Q101 | BCP 5616 | 13 | 12 | 4,000 |
| BCP5616QTA | Automotive | Refer to http://diodes.com/datasheets/BCP5616Q.pdf | | | |
| BCP5616QTC | Automotive | Refer to http://diodes.com/datasheets/BCP5616Q.pdf | | | |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



BCP = Product Type Marking Code, Line 1
XXXX = Product Type Marking Code, Line 2 as follows:

| | | |
|----------------|----------------|----------------|
| BCP54 = 54 | BCP55 = 55 | BCP56 = 56 |
| BCP5410 = 5410 | BCP5510 = 5510 | BCP5610 = 5610 |
| BCP5416 = 5416 | BCP5516 = 5516 | BCP5616 = 5616 |

YWW = Date Code Marking
Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
WW or $\bar{W}W$ = Week Code (01~53)

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | BCP54 | BCP55 | BCP56 | Unit |
|------------------------------|------------------|-------|-------|-------|------|
| Collector-Base Voltage | V _{CBO} | 45 | 60 | 100 | V |
| Collector-Emitter Voltage | V _{CEO} | 45 | 60 | 80 | V |
| Emitter-Base Voltage | V _{EBO} | 5 | | | V |
| Continuous Collector Current | I _C | 1 | | | A |
| Peak Pulse Collector Current | I _{CM} | 2 | | | |
| Continuous Base Current | I _B | 100 | | | mA |
| Peak Pulse Base Current | I _{BM} | 200 | | | |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

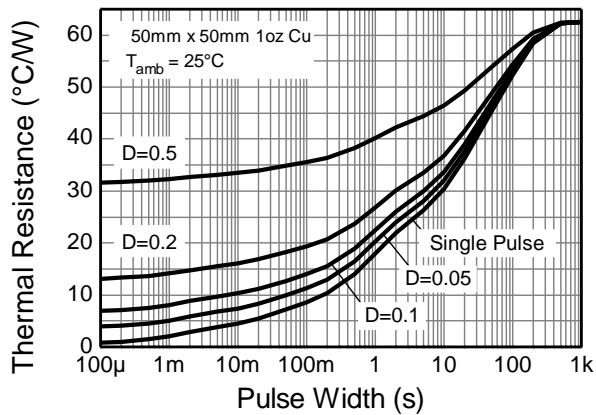
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | (Note 6) P _D | 2 | W |
| Thermal Resistance, Junction to Ambient | (Note 6) R _{θJA} | 62 | °C/W |
| Thermal Resistance, Junction to Leads | (Note 7) R _{θJL} | 19.4 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -65 to +150 | °C |

ESD Ratings (Note 8)

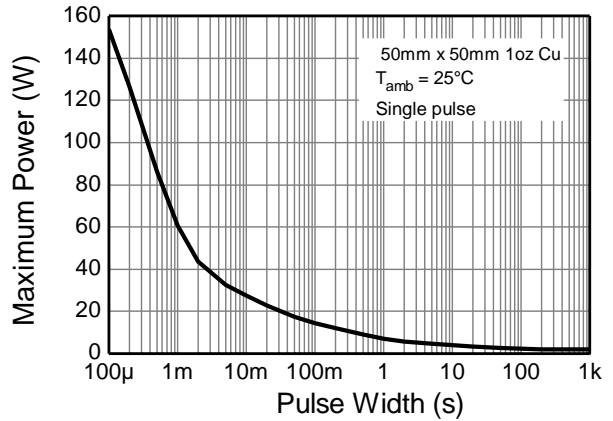
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted with the collector lead on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

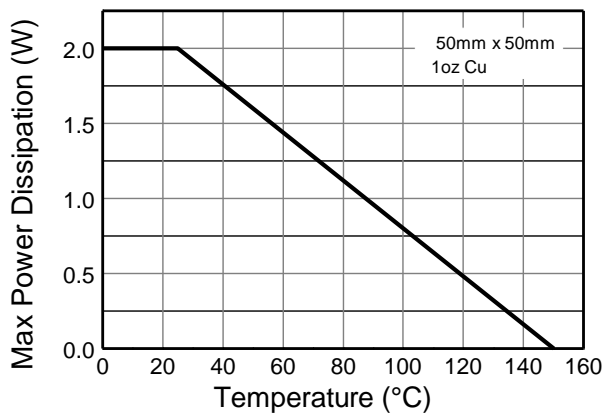
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|---------------|-----|-----|-----------|---------------|--|
| Collector-Base Breakdown Voltage | BCP54 | BV_{CBO} | 45 | - | - | V | $I_C = 100\mu\text{A}$ |
| | BCP55 | | 60 | | | | |
| | BCP56 | | 100 | | | | |
| Collector-Emitter Breakdown Voltage (Note 9) | BCP54 | BV_{CEO} | 45 | - | - | V | $I_C = 10\text{mA}$ |
| | BCP55 | | 60 | | | | |
| | BCP56 | | 80 | | | | |
| Emitter-Base Breakdown Voltage | | BV_{EBO} | 5 | - | - | V | $I_E = 10\mu\text{A}$ |
| Collector Cut-Off Current | | I_{CBO} | - | - | 0.1 20 | μA | $V_{CB} = 30\text{V}$ $V_{CB} = 30\text{V}, T_A = +150^\circ\text{C}$ |
| Emitter Cut-Off Current | | I_{EBO} | - | - | 20 | nA | $V_{EB} = 4\text{V}$ |
| Static Forward Current Transfer Ratio (Note 9) | All versions | h_{FE} | 25 | - | - | - | $I_C = 5\text{mA}, V_{CE} = 2\text{V}$ $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ $I_C = 500\text{mA}, V_{CE} = 2\text{V}$ |
| | | | 40 | - | 250 | | |
| | | | 25 | - | - | | |
| | | | 63 | - | 160 | | |
| | 10 gain grp | | 100 | - | 250 | | $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ |
| | 16 gain grp | | | | | | $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 9) | | $V_{CE(sat)}$ | - | - | 0.5 | V | $I_C = 500\text{mA}, I_B = 50\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 9) | | $V_{BE(on)}$ | - | - | 1.0 | V | $I_C = 500\text{mA}, V_{CE} = 2\text{V}$ |
| Transition Frequency | | f_T | 150 | - | - | MHz | $I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$ |
| Output Capacitance | | C_{obo} | - | - | 25 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

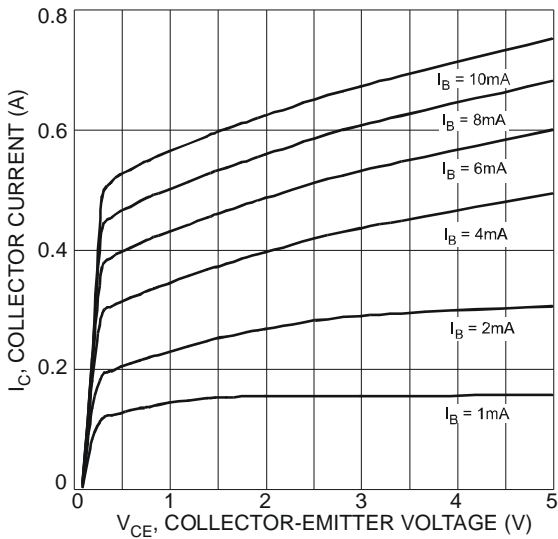


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

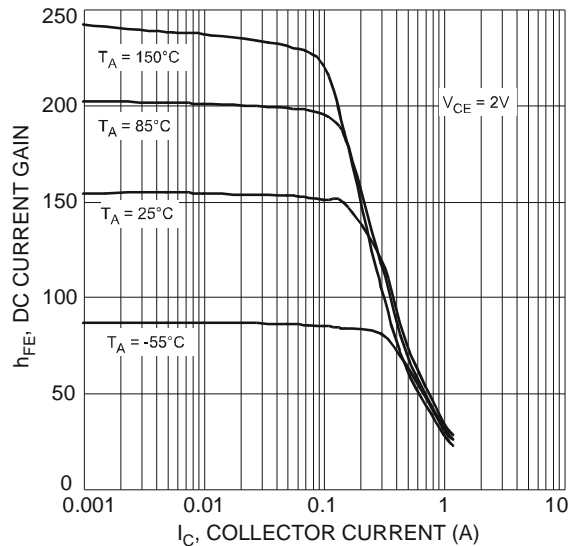


Fig. 2 Typical DC Current Gain vs. Collector Current

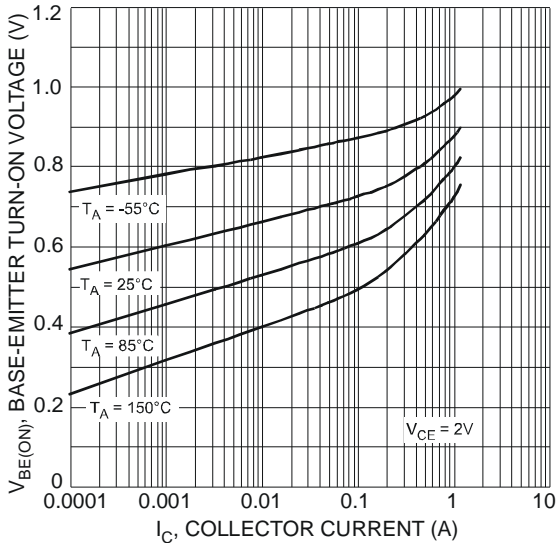


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

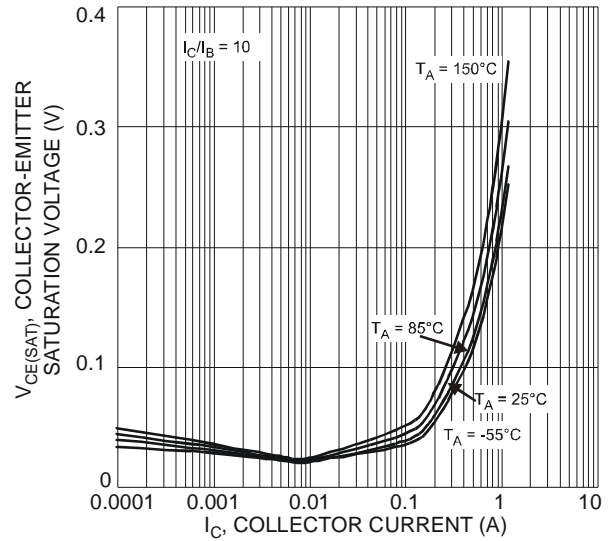


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

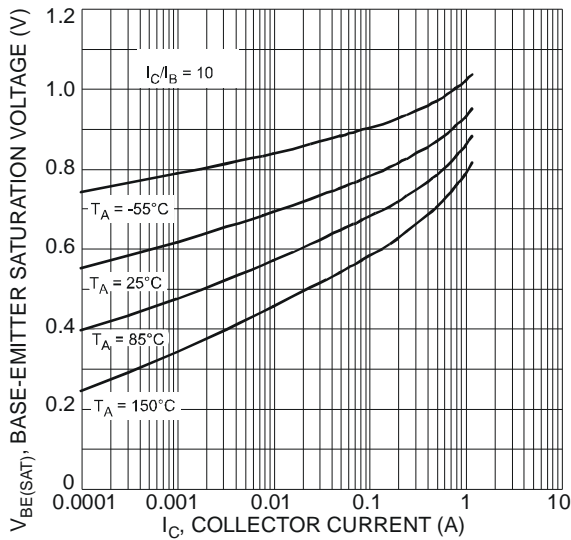


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

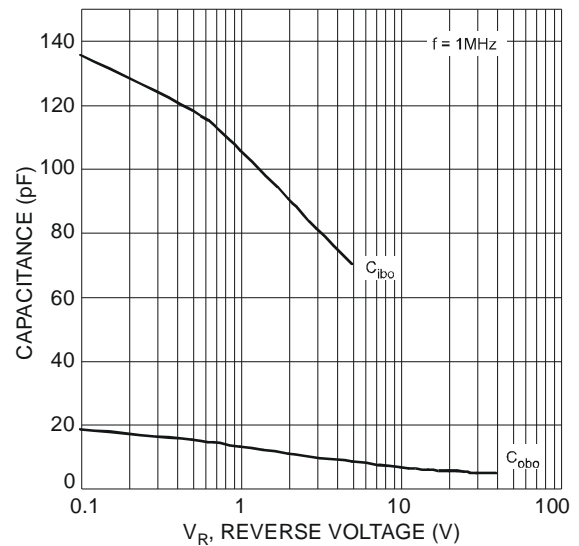


Fig. 6 Typical Capacitance Characteristics

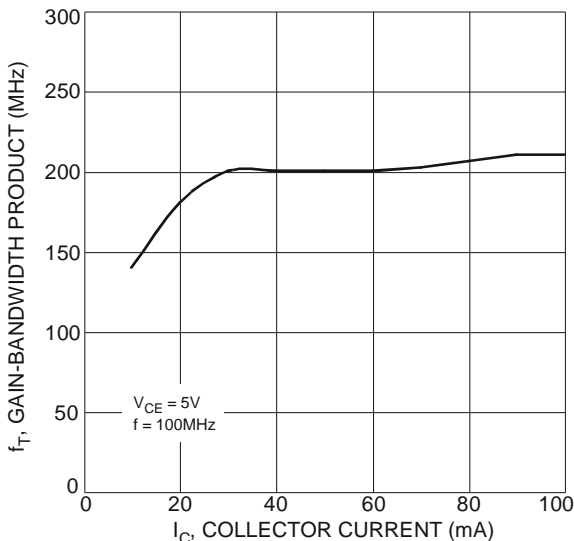
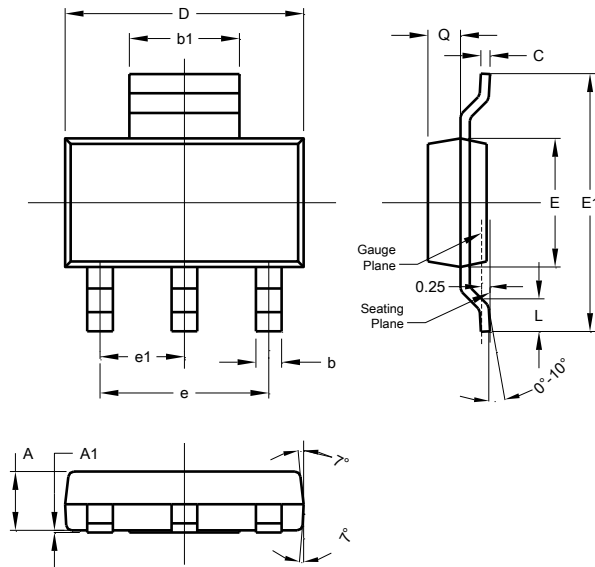


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

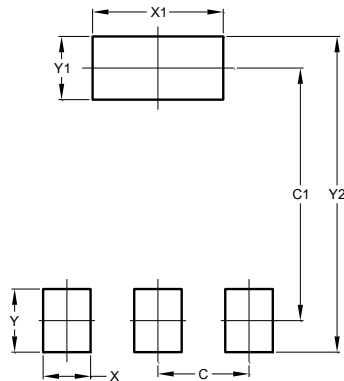
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT223 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b | 0.60 | 0.80 | 0.70 |
| b1 | 2.90 | 3.10 | 3.00 |
| C | 0.20 | 0.30 | 0.25 |
| D | 6.45 | 6.55 | 6.50 |
| E | 3.45 | 3.55 | 3.50 |
| E1 | 6.90 | 7.10 | 7.00 |
| e | - | - | 4.60 |
| e1 | - | - | 2.30 |
| L | 0.85 | 1.05 | 0.95 |
| Q | 0.84 | 0.94 | 0.89 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.30 |
| C1 | 6.40 |
| X | 1.20 |
| X1 | 3.30 |
| Y | 1.60 |
| Y1 | 1.60 |
| Y2 | 8.00 |

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