

Description

This Bipolar Junction Transistor (BJT) has been designed to meet the stringent requirements of Automotive Applications.

Features

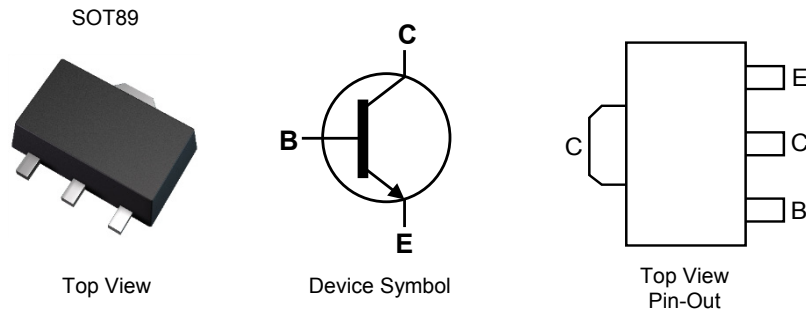
- $BV_{CEO} > 80V$
- $I_C = 1A$ High Continuous Collector Current
- $I_{CM} = 1.5A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 500mV @ 0.5A$
- Epitaxial Planar Die Construction
- Complementary PNP types: BCX5316Q
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Leads, Solderable per MIL-STD-202 Method 208 **(e3)**
- Weight: 0.055 grams (Approximate)

Applications

- Automotive
- Medium Power Switching or Amplification Applications
- AF driver and output stages

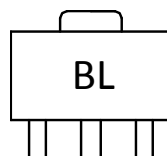


Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|------------|---------|--------------------|-----------------|-------------------|
| BCX5616QTA | Automotive | BL | 7 | 12 | 1,000 |
| BCX5616QTC | Automotive | BL | 13 | 12 | 4,000 |

- 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



BL = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 100 | V |
| Collector-Emitter Voltage | V_{CEO} | 80 | V |
| Emitter-Base Voltage | V_{EBO} | 6 | V |
| Continuous Collector Current | I_C | 1 | A |
| Peak Pulse Collector Current | I_{CM} | 1.5 | |
| Continuous Base Current | I_B | 100 | mA |
| Peak Pulse Base Current | I_{BM} | 200 | |

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

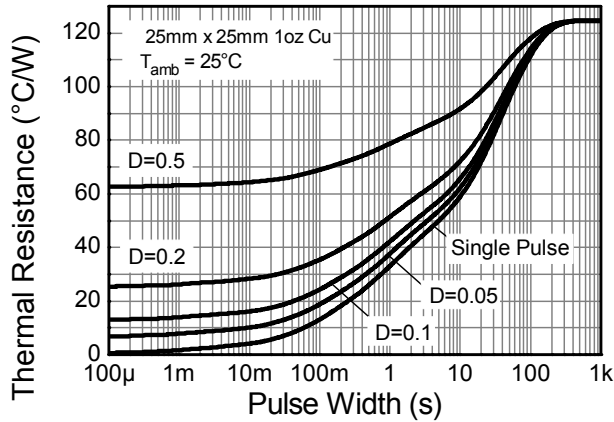
| Characteristic | | Symbol | Value | Unit |
|---|----------|-----------------|-------------|--------------------|
| Power Dissipation | (Note 6) | P_D | 1 | W |
| | (Note 7) | | 1.5 | |
| | (Note 8) | | 2.0 | |
| Thermal Resistance, Junction to Ambient Air | (Note 6) | $R_{\theta JA}$ | 125 | $^\circ\text{C/W}$ |
| | (Note 7) | | 83 | |
| | (Note 8) | | 60 | |
| Thermal Resistance, Junction to Lead | (Note 9) | $R_{\theta JL}$ | 13 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -65 to +150 | $^\circ\text{C}$ |

ESD Ratings (Note 10)

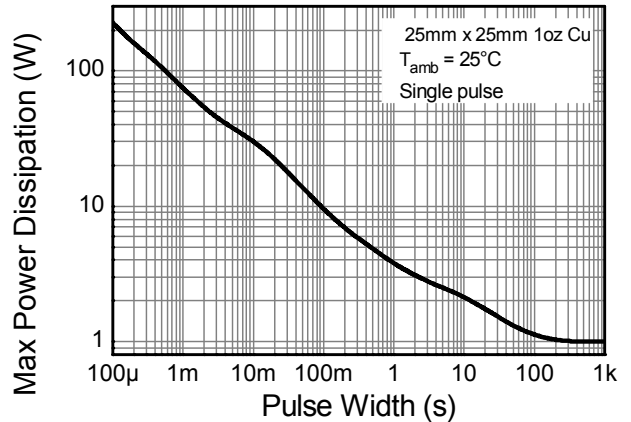
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Same as note (6), except the device is mounted on 25mm x 25mm 1oz copper.
 8. Same as note (6), except the device is mounted on 50mm x 50mm 1oz copper.
 9. Thermal resistance from junction to solder-point (on the exposed collector pad).
 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

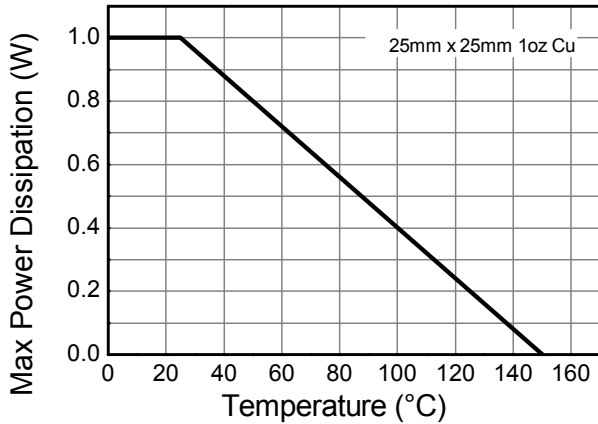
Thermal Characteristics and Derating Information



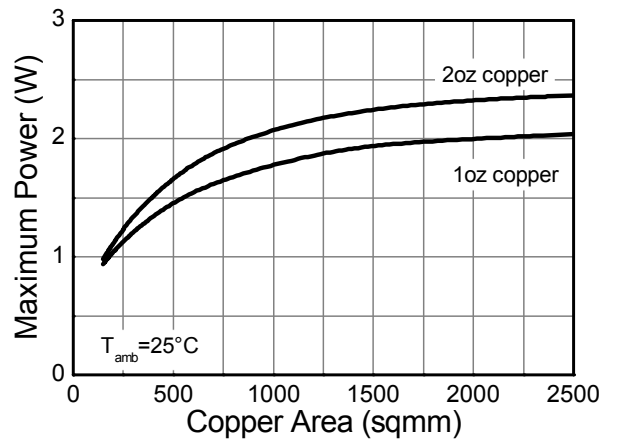
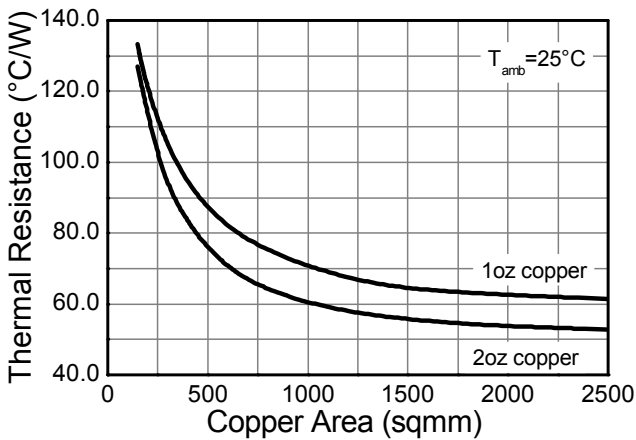
Transient Thermal Impedance



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 | BV_{CBO} | 100 | — | — | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV_{CEO} | 80 | — | — | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 6 | — | — | V | $I_E = 100\mu\text{A}$ |
| 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 | $V_{EB} = 5\text{V}$ |
| Static Forward Current Transfer Ratio (Note 9) | h_{FE} | 25 100 25 | — — — | - 250 - | — | $I_C = 5\text{mA}, V_{CE} = 2\text{V}$ $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ $I_C = 500\text{mA}, V_{CE} = 2\text{V}$ |
| 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_{ob0} | — | — | 25 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |

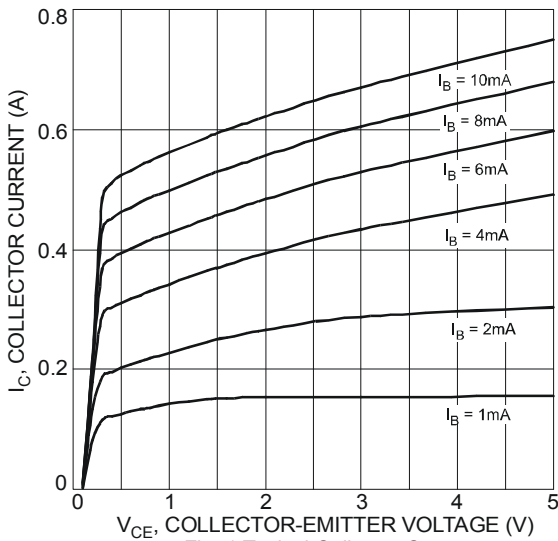
 Notes: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.


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

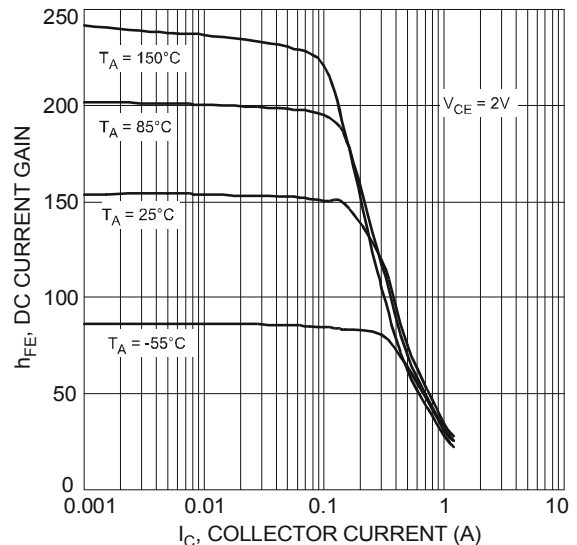


Fig. 2 Typical DC Current Gain vs. Collector Current

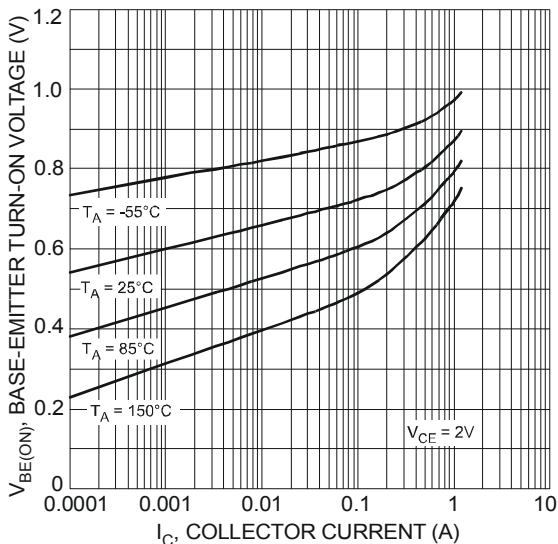


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

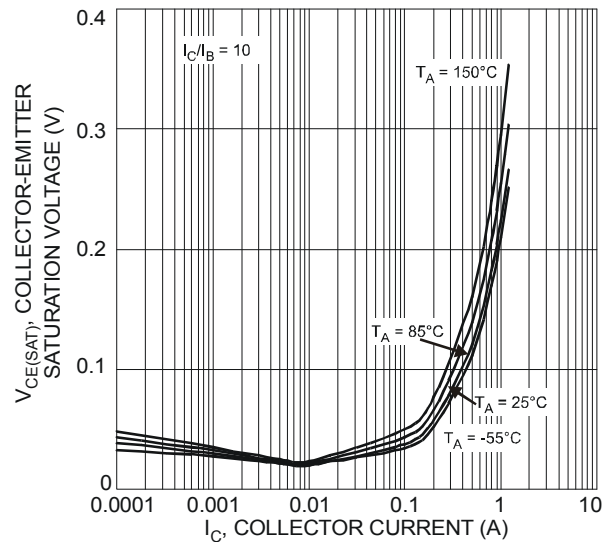


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

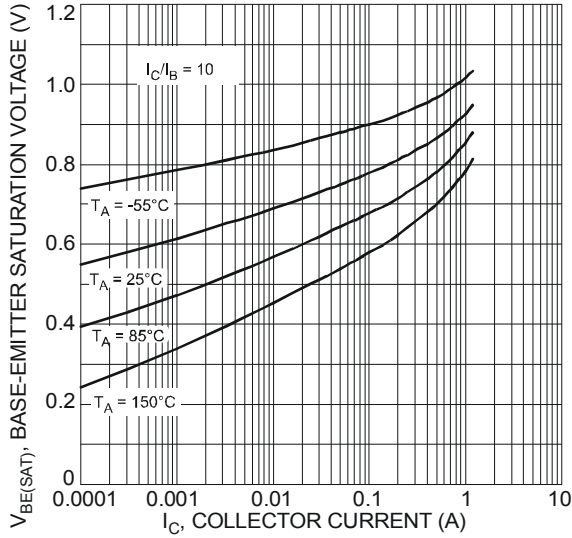


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

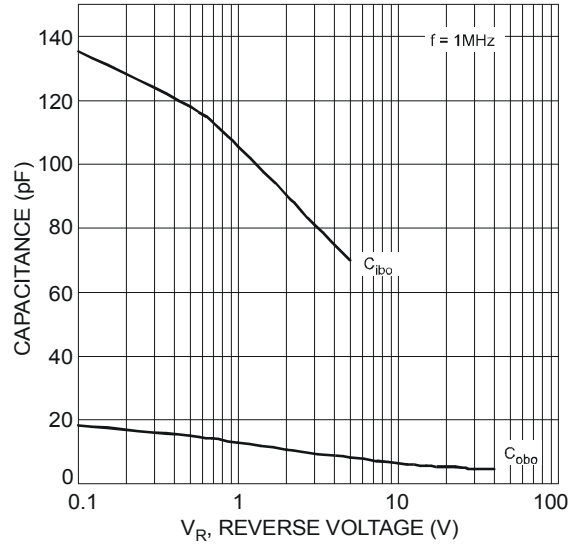


Fig. 6 Typical Capacitance Characteristics

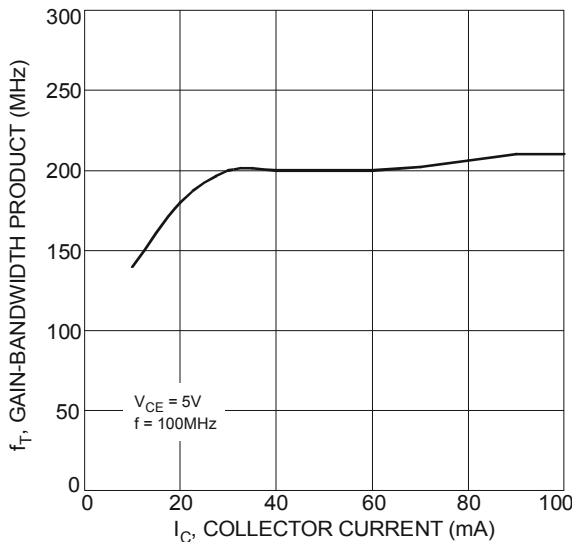
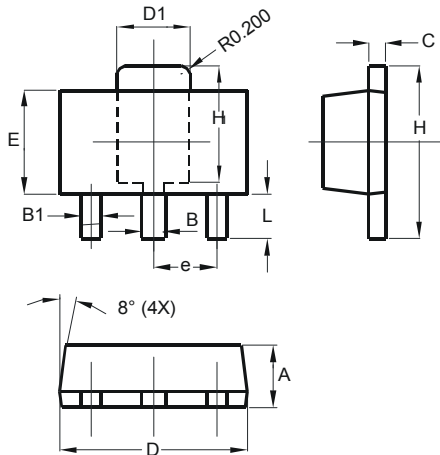


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

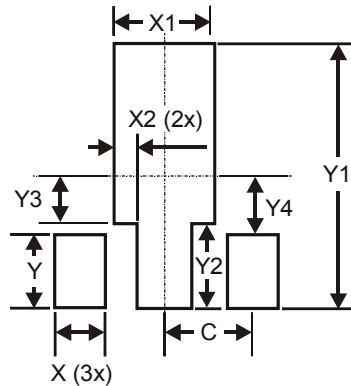
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT89 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 1.40 | 1.60 |
| B | 0.44 | 0.62 |
| B1 | 0.35 | 0.54 |
| C | 0.35 | 0.44 |
| D | 4.40 | 4.60 |
| D1 | 1.62 | 1.83 |
| E | 2.29 | 2.60 |
| e | 1.50 Typ | |
| H | 3.94 | 4.25 |
| H1 | 2.63 | 2.93 |
| L | 0.89 | 1.20 |
| 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) |
|------------|---------------|
| X | 0.900 |
| X1 | 1.733 |
| X2 | 0.416 |
| Y | 1.300 |
| Y1 | 4.600 |
| Y2 | 1.475 |
| Y3 | 0.950 |
| Y4 | 1.125 |
| C | 1.500 |

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