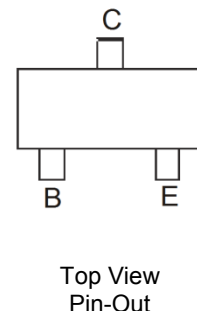
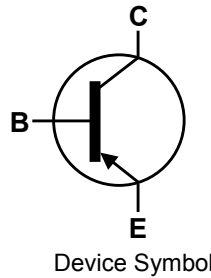


## Features

- Ideally Suited for Automatic Insertion
- Epitaxial Planar Die Construction
- Complementary NPN Types Available (BC817)
- For switching and AF Amplifier Applications
- **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: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208<sup>(3)</sup>
- Weight 0.008 grams (approximate)

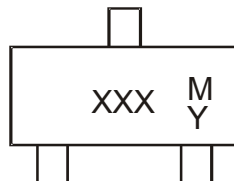


## Ordering Information (Notes 5)

| Product        | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|------------|---------|--------------------|-----------------|-------------------|
| BC807-16-7-F   | AEC-Q101   | K5A     | 7                  | 8               | 3,000             |
| BC807-25-7-F   | AEC-Q101   | K5B     | 7                  | 8               | 3,000             |
| BC807-40-7-F   | AEC-Q101   | K5C     | 7                  | 8               | 3,000             |
| BC807-40-13-F  | AEC-Q101   | K5C     | 13                 | 8               | 10,000            |
| BC807-40Q-7-F  | Automotive | K5C     | 7                  | 8               | 3,000             |
| BC807-40Q-13-F | Automotive | K5C     | 13                 | 8               | 10,000            |

- 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](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/](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



XXX = Product Type Marking Code (See table above)  
 YM = Date Code Marking  
 Y = Year ex: X = 2010  
 M = Month ex: 9 = September

### Date Code Key

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|
| Code | X    | Y    | Z    | A    | B    | C    | D    | E    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CB0</sub> | -50   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -45   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -5.0  | V    |
| Continuous Collector Current | I <sub>C</sub>   | -0.5  | A    |
| Peak Collector Current       | I <sub>CM</sub>  | -1.0  | A    |
| Peak Base Current            | I <sub>BM</sub>  | -200  | mA   |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

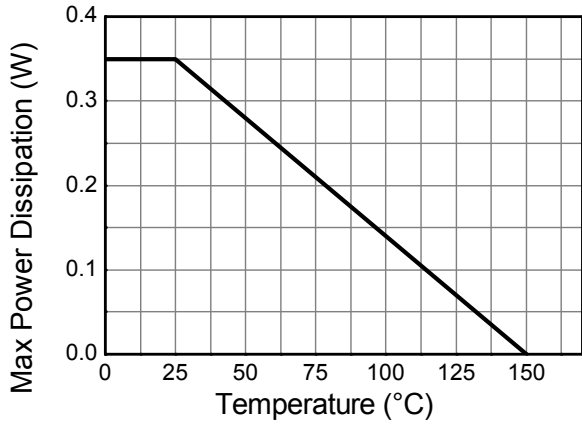
| Characteristic                          | Symbol                            | Value           | Unit |
|---|-----------------------------------|-----------------|------|
| Power Dissipation                       | P <sub>D</sub>                    | (Note 6)<br>310 | mW   |
|   |                                   | (Note 7)<br>350 |      |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | (Note 6)<br>403 | °C/W |
|   |                                   | (Note 7)<br>357 |      |
| Thermal Resistance, Junction to Leads   | R <sub>θJL</sub>                  | 350             | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150     | °C   |

**ESD Ratings** (Note 9)

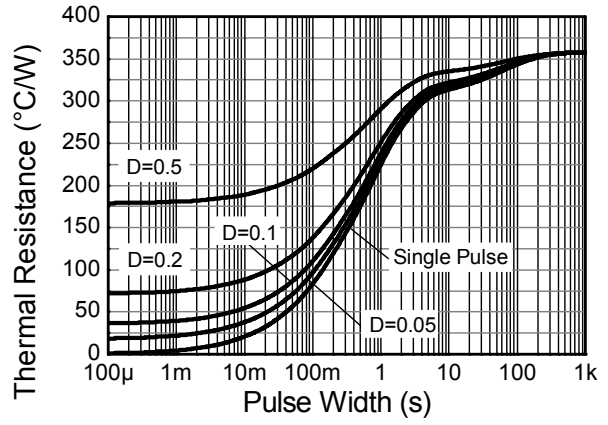
| Characteristic                             | Symbol  | Value   | Unit | JEDEC Class |
|--|---------|---------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | ≥ 8,000 | V    | 3B          |
| Electrostatic Discharge - Machine Model    | ESD MM  | ≥ 400   | V    | C           |

- Notes:
6. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air condition; device measured when operating in steady state condition.
  7. Same as Note 6, except the device is mounted on 15mm X 15mm FR4 PCB.
  8. Thermal resistance from junction to solder-point (at the end of the leads).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

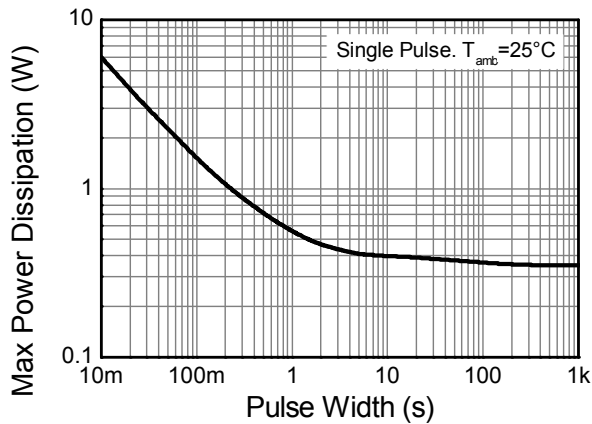
**Thermal Characteristics and Derating Information**



**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                 |                                  | Symbol               | Min               | Typ | Max               | Unit     | Test Condition  |
|--|----------------------------------|----------------------|-------------------|-----|-------------------|----------|---|
| Collector-Base Breakdown Voltage               |                                  | BV <sub>CBO</sub>    | -50               | —   | —                 | V        | I <sub>C</sub> = -100μA   |
| Collector-Emitter Breakdown Voltage            |                                  | BV <sub>CEO</sub>    | -45               | —   | —                 | V        | I <sub>C</sub> = -10mA  |
| Emitter-Base Breakdown Voltage                 |                                  | BV <sub>EBO</sub>    | -5                | —   | —                 | V        | I <sub>C</sub> = -100μA   |
| Collector-Emitter Cutoff Current               |                                  | I <sub>CES</sub>     | —                 | —   | -100<br>-5.0      | nA<br>μA | V <sub>CE</sub> = -45V<br>V <sub>CE</sub> = -25V, T <sub>J</sub> = +150°C |
| Emitter-Base Cutoff Current                    |                                  | I <sub>EBO</sub>     | —                 | —   | -100              | nA       | V <sub>EB</sub> = -5.0V   |
| DC Current Gain (Note 10)                      | BC807-16<br>BC807-25<br>BC807-40 | h <sub>FE</sub>      | 100<br>160<br>250 | —   | 250<br>400<br>600 | —        | V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -100mA                          |
|  | BC807-16<br>BC807-25<br>BC807-40 |                      | 60<br>100<br>170  |     | —                 |          |   |
| Collector-Emitter Saturation Voltage (Note 10) |                                  | V <sub>CE(SAT)</sub> | —                 | —   | -0.7              | V        | I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA                           |
| Base-Emitter Voltage (Note 10)                 |                                  | V <sub>BE</sub>      | —                 | —   | -1.2              | V        | V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -300mA                          |
| Gain Bandwidth Product                         |                                  | f <sub>T</sub>       | 100               | —   | —                 | MHz      | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA,<br>f = 50MHz             |
| Collector-Base Capacitance                     |                                  | C <sub>CBO</sub>     | —                 | —   | 12                | pF       | V <sub>CB</sub> = -10V, f = 1.0MHz  |

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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

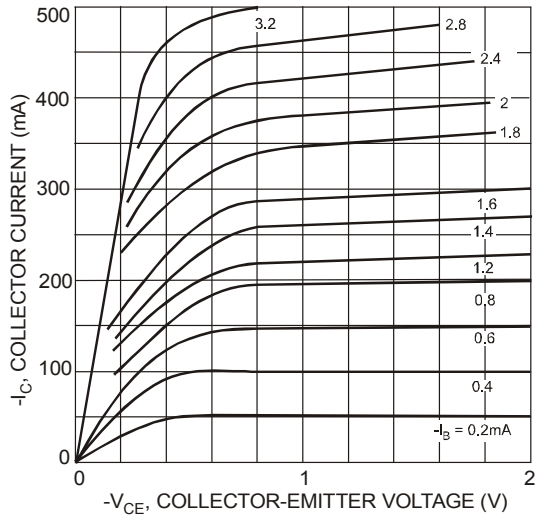


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

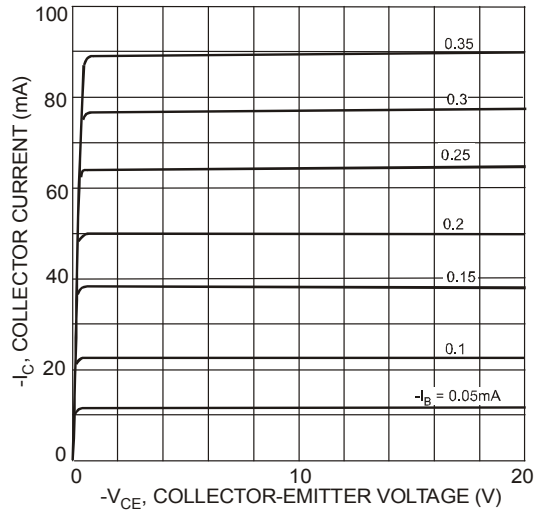


Figure 2 Typical Collector Current vs. Collector-Emitter Voltage

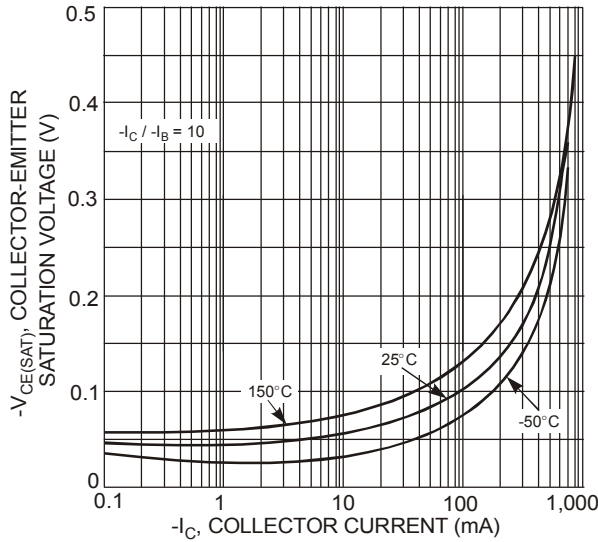


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

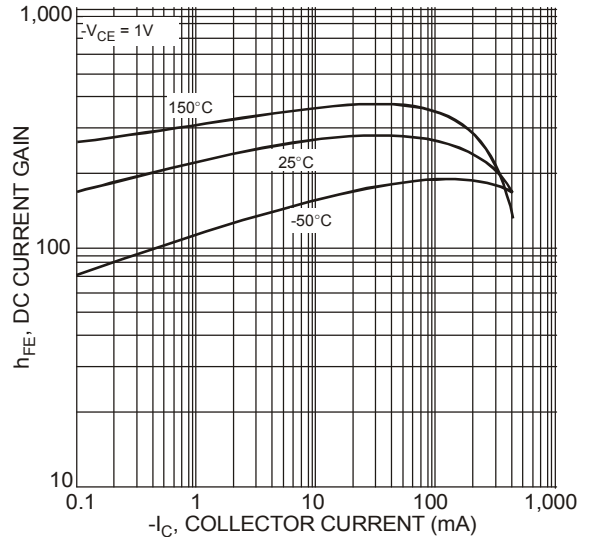


Figure 4 Typical DC Current Gain vs. Collector Current

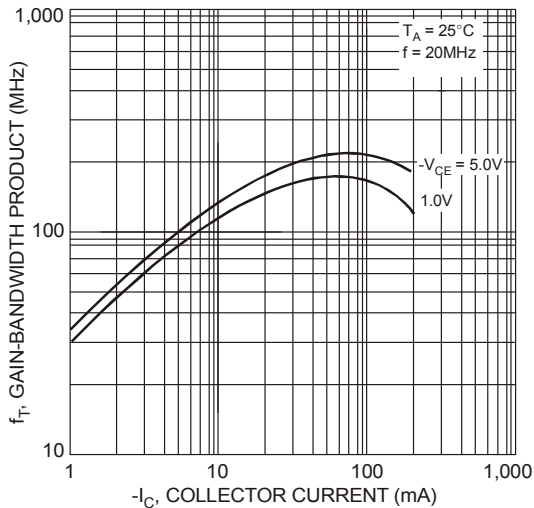
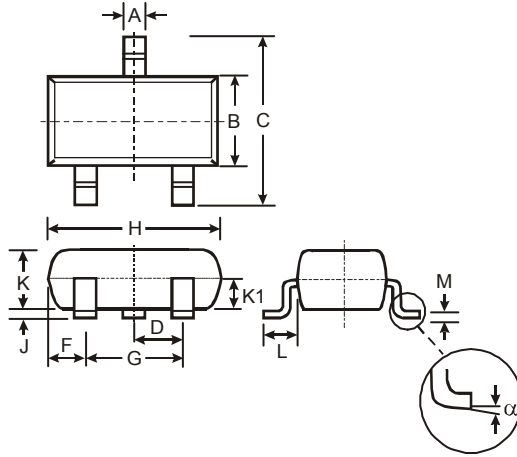


Figure 5 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

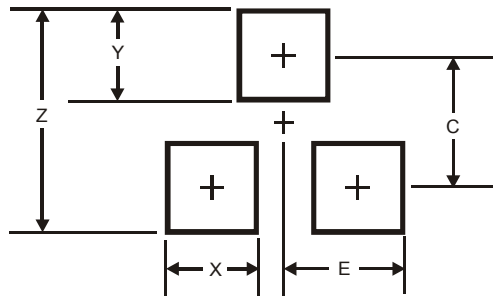
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| 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) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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