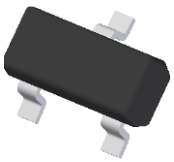
## Features

- 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)**

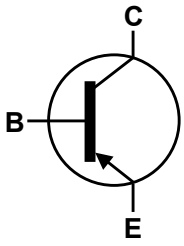
## Mechanical Data

- 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 e3
- Weight 0.008 grams (approximate)

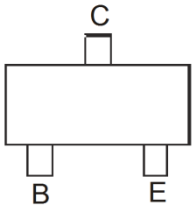
SOT23



Top View




Device Symbol



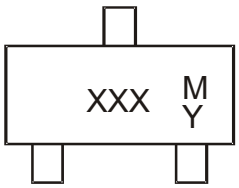

Top View
Pin-Out

## 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 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




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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -50 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -45 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -5.0 | V |
| Continuous Collector Current | $I_C$ | -0.5 | A |
| Peak Collector Current | $I_{CM}$ | -1.0 | A |
| Peak Base Current | $I_{BM}$ | -200 | mA |

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

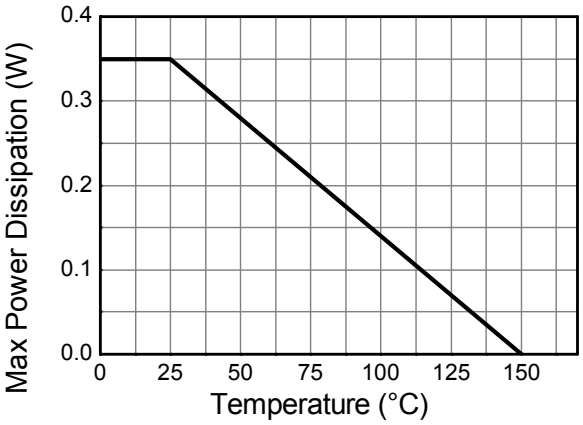
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 6) | $P_D$ | 310 | mW |
| | (Note 7) | | 350 | |
| Thermal Resistance, Junction to Ambient | (Note 6) | $R_{\theta JA}$ | 403 | °C/W |
| | (Note 7) | | 357 | |
| Thermal Resistance, Junction to Leads | (Note 8) | $R_{\theta JL}$ | 350 | °C/W |
| Operating and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 9)

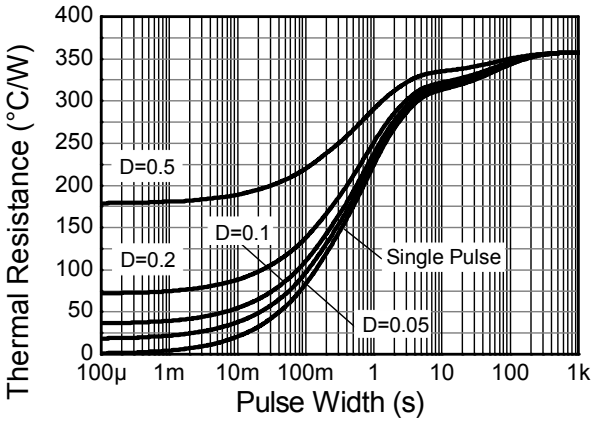
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | ≥ 8,000 | V | 3B |
| Electrostatic Discharge - Machine Model | ESD MM | ≥ 400 | V | C |

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.

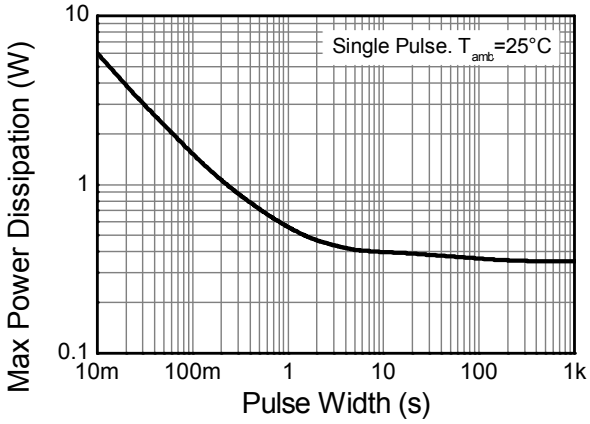
## Thermal Characteristics and Derating Information




**Derating Curve**




**Transient Thermal Impedance**




**Pulse Power Dissipation**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | | $BV_{CBO}$ | -50 | — | — | V | $I_C$ = -100μA |
| Collector-Emitter Breakdown Voltage | | $BV_{CEO}$ | -45 | — | — | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | | $BV_{EBO}$ | -5 | — | — | V | $I_C$ = -100μA |
| Collector-Emitter Cutoff Current | | $I_{CES}$ | — | — | -100<br>-5.0 | nA<br>μA | $V_{CE}$ = -45V<br>$V_{CE}$ = -25V, $T_J$ = +150°C |
| Emitter-Base Cutoff Current | | $I_{EBO}$ | — | — | -100 | nA | $V_{EB}$ = -5.0V |
| DC Current Gain (Note 10) | BC807-16<br>BC807-25<br>BC807-40 | $h_{FE}$ | 100<br>160<br>250 | — | 250<br>400<br>600 | — | $V_{CE}$ = -1.0V, $I_C$ = -100mA |
| | BC807-16<br>BC807-25<br>BC807-40 | | 60<br>100<br>170 | | — | | $V_{CE}$ = -1.0V, $I_C$ = -300mA |
| Collector-Emitter Saturation Voltage (Note 10) | | $V_{CE(SAT)}$ | — | — | -0.7 | V | $I_C$ = -500mA, $I_B$ = -50mA |
| Base-Emitter Voltage (Note 10) | | $V_{BE}$ | — | — | -1.2 | V | $V_{CE}$ = -1.0V, $I_C$ = -300mA |
| Gain Bandwidth Product | | $f_T$ | 100 | — | — | MHz | $V_{CE}$ = -5.0V, $I_C$ = -10mA, f = 50MHz |
| Collector-Base Capacitance | | $C_{CBO}$ | — | — | 12 | pF | $V_{CB}$ = -10V, f = 1.0MHz |

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

## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

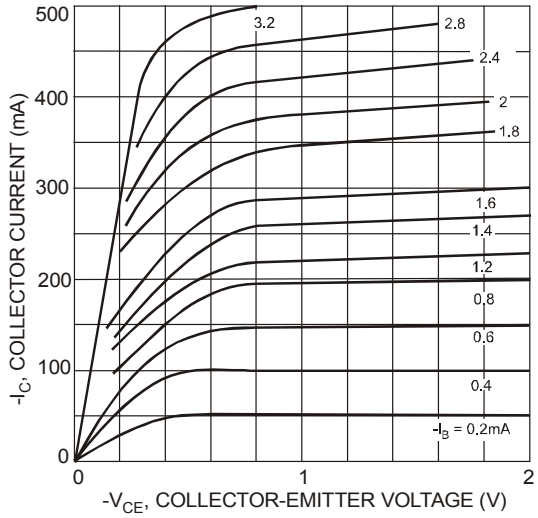



Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

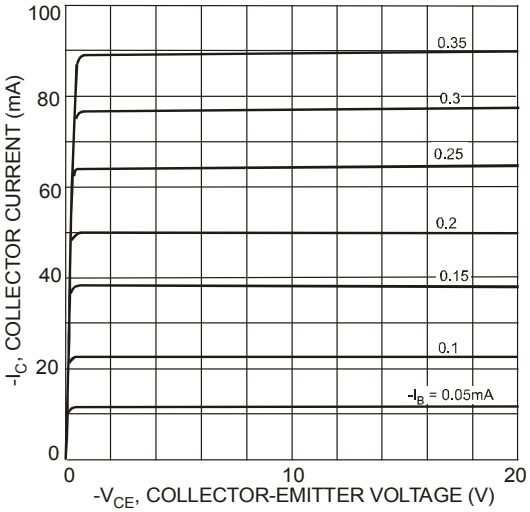



Figure 2 Typical Collector Current vs. Collector-Emitter Voltage

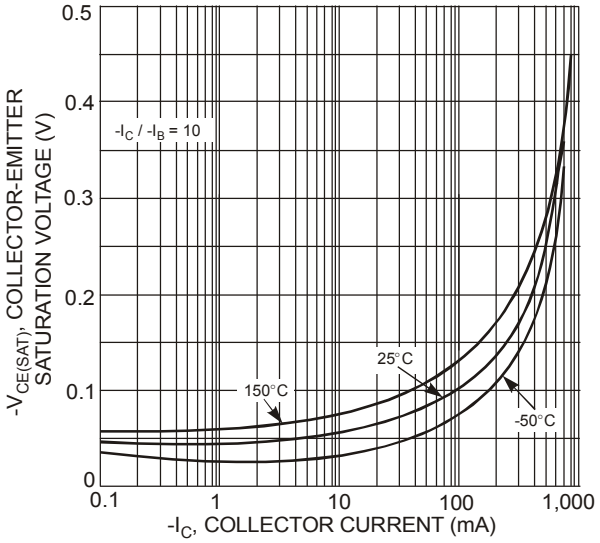



Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

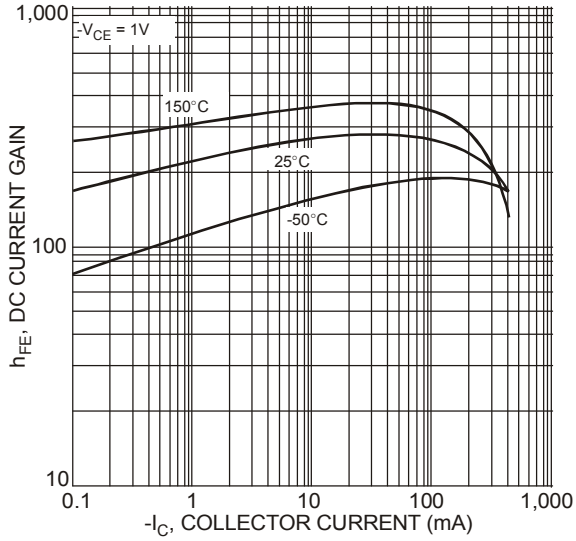



Figure 4 Typical DC Current Gain vs. Collector Current

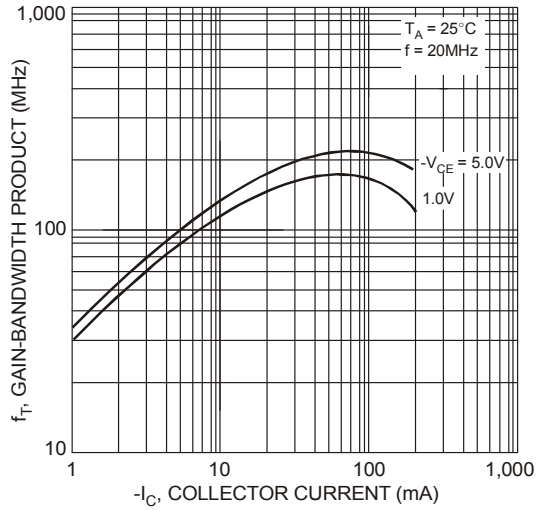
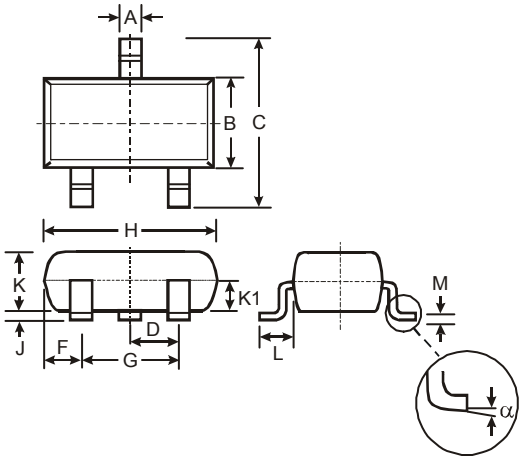



Figure 5 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

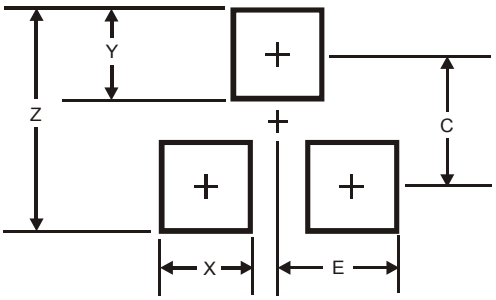
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| 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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