

Features

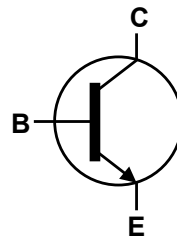
- Ideally Suited for Automatic Insertion
- Complementary PNP Types: BC856W – BC858W
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

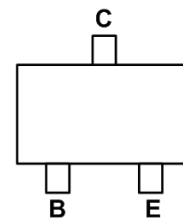
- Case: SOT323
- Case material: molded plastic, "Green" molding compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 $\text{\textcircled{e}}$
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol


 Top View
Pin-Out

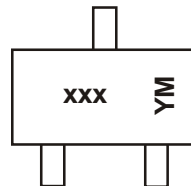
Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel Size (inches) | Quantity per Reel |
|--------------|------------|---------|--------------------|-------------------|
| BC846AW-7-F | AEC-Q101 | K1Q | 7 | 3,000 |
| BC846BW-7-F | AEC-Q101 | K1R | 7 | 3,000 |
| BC846BWQ-7-F | Automotive | K1R | 7 | 3,000 |
| BC846BW-13-F | AEC-Q101 | K1R | 13 | 10,000 |
| BC847AW-7-F | AEC-Q101 | K1Q | 7 | 3,000 |
| BC847BW-7-F | AEC-Q101 | K1R | 7 | 3,000 |
| BC847BW-13-F | AEC-Q101 | K1R | 13 | 10,000 |

| Product | Compliance | Marking | Reel Size (inches) | Quantity per Reel |
|---------------|------------|---------|--------------------|-------------------|
| BC847BWQ-13-F | Automotive | K1R | 13 | 10,000 |
| BC847CW-7-F | AEC-Q101 | K1M | 7 | 3,000 |
| BC847CW-13-F | AEC-Q101 | K1M | 13 | 10,000 |
| BC847CWQ-7-F | Automotive | K1M | 7 | 3,000 |
| BC848AW-7-F | AEC-Q101 | K1Q | 7 | 3,000 |
| BC848BW-7-F | AEC-Q101 | K1R | 7 | 3,000 |
| BC848CW-7-F | AEC-Q101 | K1M | 7 | 3,000 |

- 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. Tape width is 8mm. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



xxx = Product Type Marking Code
(Please see Ordering Information)
YM = Date Code Marking
Y or \bar{Y} = Year (ex: A = 2013)
M or \bar{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 |

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

| Characteristic | | Symbol | Value | Unit |
|------------------------------|--------------|------------------|-------|------|
| Collector-Base Voltage | BC846 | V _{CBO} | 80 | V |
| | BC847 | | 50 | |
| | BC848 | | 30 | |
| Collector-Emitter Voltage | BC846 | V _{CEO} | 65 | V |
| | BC847 | | 45 | |
| | BC848 | | 30 | |
| Emitter-Base Voltage | BC846, BC847 | V _{EBO} | 6 | V |
| | BC848 | | 5 | |
| Continuous Collector Current | | I _C | 100 | mA |
| Peak Collector Current | | I _{CM} | 200 | mA |
| 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 | 200 | mW |
| Thermal Resistance, Junction to Ambient | (Note 6) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -65 to +150 | °C |

ESD Ratings (Note 7)

| 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 on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------------|---------------|-----|-----|-----|---------------|---|
| Collector-Base Breakdown Voltage | BC846 | BV_{CBO} | 80 | — | — | V | $I_C = 100\mu\text{A}$ |
| | BC847 | | 50 | | | | |
| | BC848 | | 30 | | | | |
| Collector-Emitter Breakdown Voltage (Note 8) | BC846 | BV_{CEO} | 65 | — | — | V | $I_C = 10\text{mA}$ |
| | BC847 | | 45 | | | | |
| | BC848 | | 30 | | | | |
| Emitter-Base Breakdown Voltage | BC846, BC847 | BV_{EBO} | 6 | — | — | V | $I_E = 100\mu\text{A}$ |
| | BC848 | | 5 | | | | |
| DC Current Gain (Note 8) | Current Gain Group | A | 110 | 180 | 220 | — | $V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$ |
| | | B | 200 | 290 | 450 | | |
| | | C | 420 | 520 | 800 | | |
| Collector Cutoff Current | | I_{CBO} | — | — | 20 | nA | $V_{CB} = 30\text{V}$ |
| | | | | | 5 | μA | $V_{CB} = 30\text{V}, T_A = +150^\circ\text{C}$ |
| Collector-Emitter Saturation Voltage (Note 8) | | $V_{CE(sat)}$ | — | 90 | 250 | mV | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ |
| | | | | 200 | 600 | | $I_C = 100\text{mA}, I_B = 5.0\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 8) | | $V_{BE(on)}$ | 580 | 660 | 700 | mV | $I_C = 2\text{mA}, V_{CE} = 5\text{V}$ |
| | | | — | — | 770 | | $I_C = 10\text{mA}, V_{CE} = 5\text{V}$ |
| Base-Emitter Saturation Voltage (Note 8) | | $V_{BE(sat)}$ | — | 700 | — | mV | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ |
| | | | | 900 | | | $I_C = 100\text{mA}, I_B = 5\text{mA}$ |
| Output Capacitance | | C_{obo} | — | 3 | 4.5 | pF | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}$ |
| Transition Frequency | | f_T | 100 | 300 | — | MHz | $V_{CE} = 5\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$ |
| Noise Figure | | NF | — | — | 10 | dB | $V_{CE} = 5\text{V}, I_C = 200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$ |

Notes: 8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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

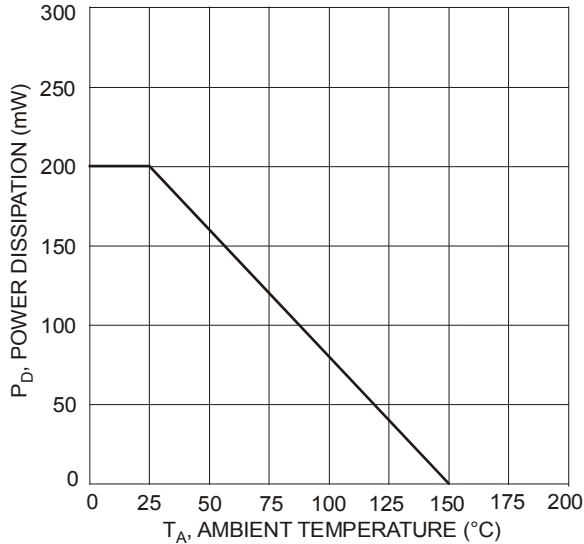


Figure 1 Power Dissipation vs. Ambient Temperature

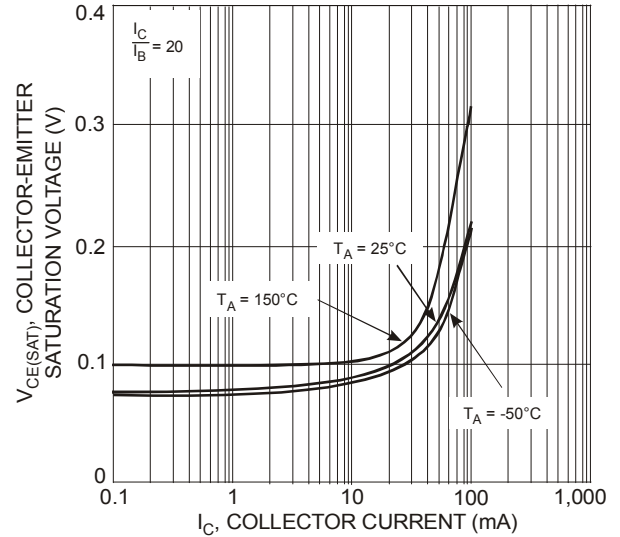


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

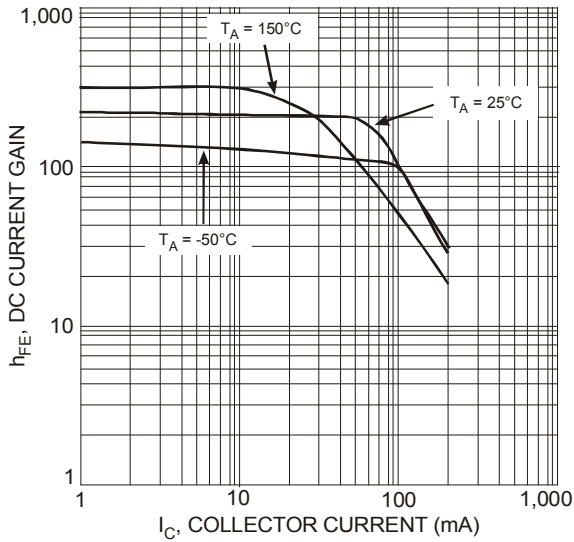


Figure 3 Typical DC Current Gain vs. Collector Current

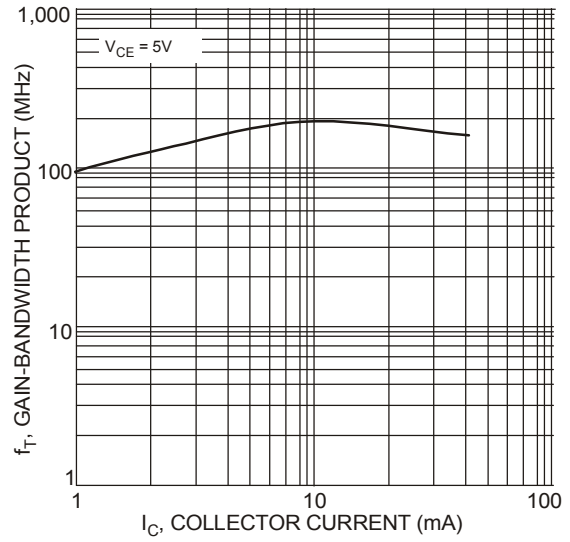
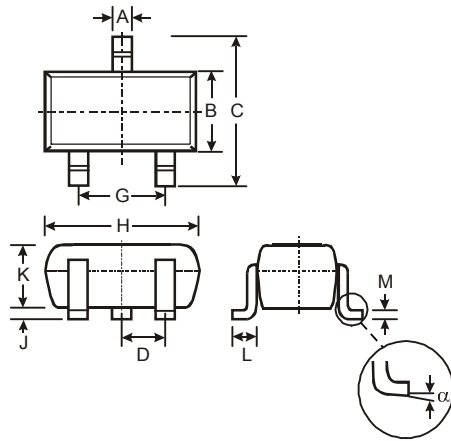


Figure 4 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

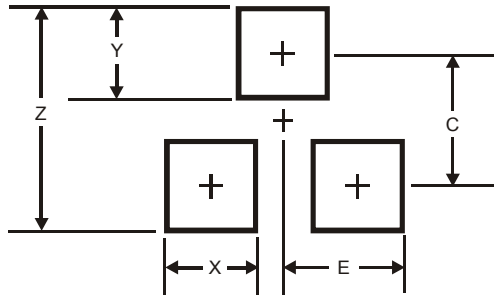
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT323 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | — | — | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 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 | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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