

**PNP SURFACE MOUNT SMALL SIGNAL TRANSISTOR IN SOT323**
**Features**

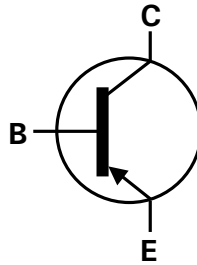
- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (BC846W – BC848W)
- For switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

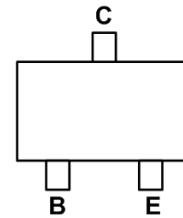
- Case: SOT323
- Case material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol

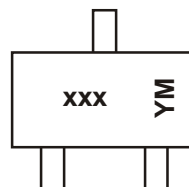

 Top View  
Pin-Out

**Ordering Information** (Note 4)

| Product      | Marking | Reel size (inches) | Quantity per reel |
|--------------|---------|--------------------|-------------------|
| BC856AW-7-F  | K3A     | 7                  | 3,000             |
| BC856BW-7-F  | K3B     | 7                  | 3,000             |
| BC856BW-13-F | K3B     | 13                 | 10,000            |
| BC857AW-7-F  | K3A     | 7                  | 3,000             |
| BC857BW-7-F  | K3B     | 7                  | 3,000             |

| Product     | Marking | Reel size (inches) | Quantity per reel |
|-------------|---------|--------------------|-------------------|
| BC857CW-7-F | K3G     | 7                  | 3,000             |
| BC858AW-7-F | K3A     | 7                  | 3,000             |
| BC858BW-7-F | K3B     | 7                  | 3,000             |
| BC858CW-7-F | K3G     | 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> 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. Tape width is 8mm. For more packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**


xxx = Product Type Marking Code  
 (Please see Ordering Information)  
 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>CBO</sub> | -80   | V    |
|                              |                  | -50   |      |
|                              |                  | -30   |      |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -65   | V    |
|                              |                  | -45   |      |
|                              |                  | -30   |      |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -5.0  | V    |
| Continuous Collector Current | I <sub>C</sub>   | -100  | mA   |
| Peak Collector Current       | I <sub>CM</sub>  | -200  | mA   |
| Peak Emitter Current         | I <sub>EM</sub>  | -200  | mA   |

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

| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                       | P <sub>D</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 625         | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C   |

**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>    | -80 | -    | -    | V    | I <sub>C</sub> = -100nA                                                                        |
|                                               |                      | -50 |      |      |      |                                                                                                |
|                                               |                      | -30 |      |      |      |                                                                                                |
| Collector-Emitter Breakdown Voltage (Note 6)  | BV <sub>CEO</sub>    | -65 | -    | -    | V    | I <sub>C</sub> = -10mA                                                                         |
|                                               |                      | -45 |      |      |      |                                                                                                |
|                                               |                      | -30 |      |      |      |                                                                                                |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | -5  | -    | -    | V    | I <sub>E</sub> = -100nA                                                                        |
| DC Current Gain (Note 6)                      | h <sub>FE</sub>      | 125 | 180  | 250  | -    | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA                                               |
|                                               |                      | 220 | 290  | 475  |      |                                                                                                |
|                                               |                      | 420 | 520  | 800  |      |                                                                                                |
| Collector Cutoff Current                      | I <sub>CBO</sub>     | -   | -    | -15  | nA   | V <sub>CB</sub> = -30V                                                                         |
|                                               |                      |     |      | -4   | μA   | V <sub>CB</sub> = -30V, T <sub>A</sub> = +150°C                                                |
| Collector-Emitter Saturation Voltage (Note 6) | V <sub>CE(sat)</sub> | -   | -75  | -300 | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA                                                |
|                                               |                      |     | -250 | -650 |      | I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA                                               |
| Base-Emitter Turn-On Voltage (Note 6)         | V <sub>BE(on)</sub>  | -   | -600 | -650 | mV   | I <sub>C</sub> = -2mA, V <sub>CE</sub> = -5V                                                   |
|                                               |                      |     | -    | -820 |      | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V                                                  |
| Base-Emitter Saturation Voltage (Note 6)      | V <sub>BE(sat)</sub> | -   | -700 | -    | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA                                                |
|                                               |                      |     | -850 | -950 |      | I <sub>C</sub> = -100mA, I <sub>B</sub> = -5mA                                                 |
| Output Capacitance                            | C <sub>obo</sub>     | -   | 3    | 4.5  | pF   | V <sub>CB</sub> = -10V, f = 1.0MHz                                                             |
| Transition Frequency                          | f <sub>T</sub>       | 100 | 200  | -    | MHz  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA, f = 100MHz                                      |
| Noise Figure                                  | NF                   | -   | -    | 10   | dB   | V <sub>CE</sub> = -5V, I <sub>C</sub> = -200μA<br>R <sub>S</sub> = 2kΩ, f = 1kHz<br>Δf = 200Hz |

Notes: 5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air condition; the device is measured when operating in a steady-state condition.  
6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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

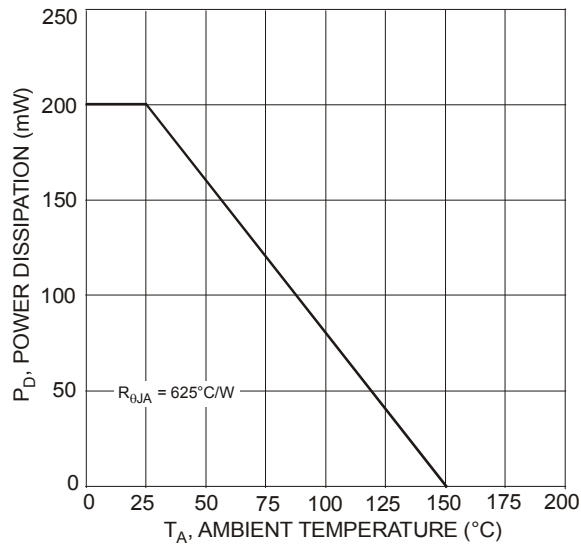


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 5)

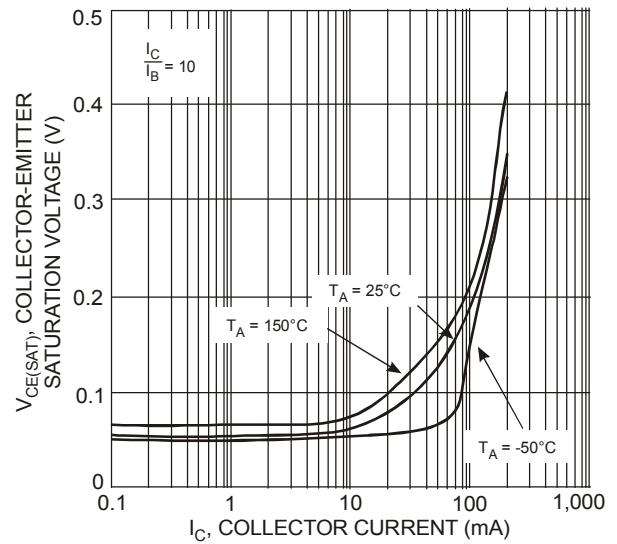


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

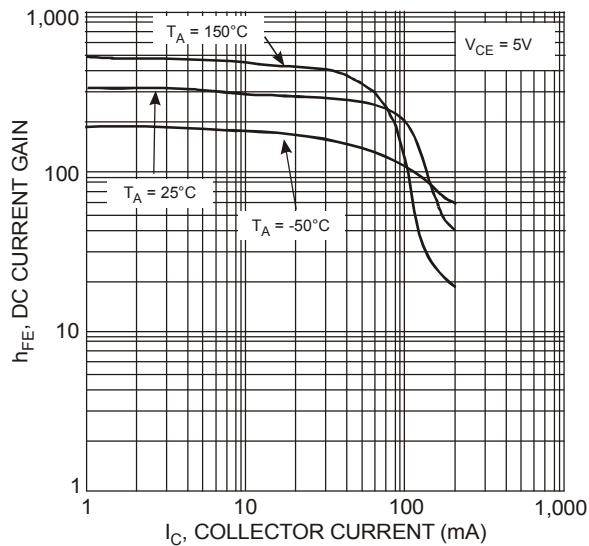


Fig. 3 Typical DC Current Gain (Group B) vs. Collector Current

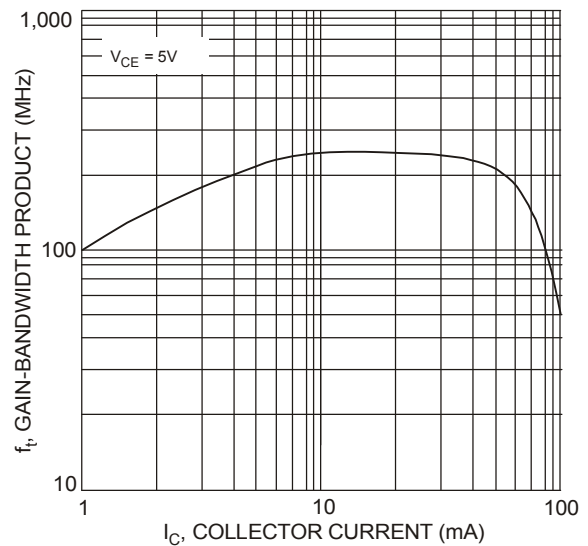
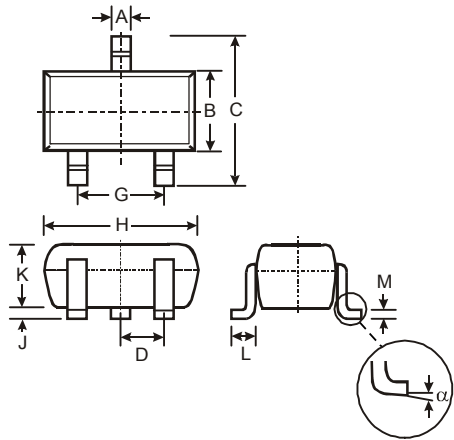


Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

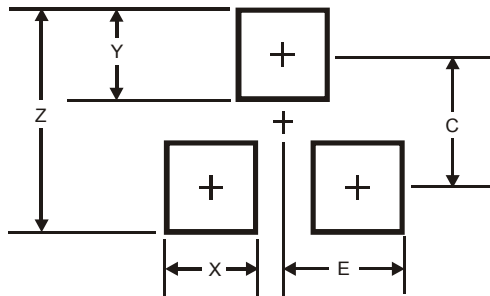
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 |
| $\alpha$             | 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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