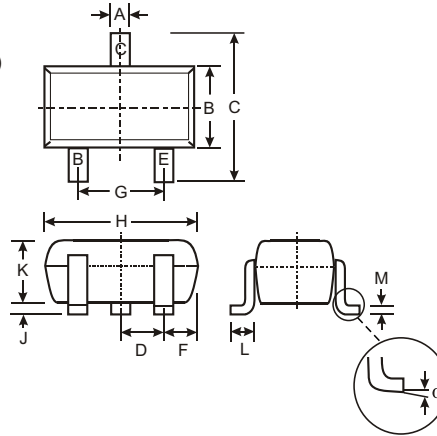


### Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856W-BC858W)
- For Switching and AF Amplifier Applications
- Available in Lead Free/RoHS Compliant Version (Note 3)

### Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Also Available in Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe ). Please see Ordering Information, Note 6, on Page 2
- Pin Connections: See Diagram
- Marking Codes (See Table Below & Diagram on Page 2)
- Ordering & Date Code Information: See Page 2
- Weight: 0.006 grams (approximate)



| SOT-323              |              |      |
|----------------------|--------------|------|
| Dim                  | Min          | Max  |
| A                    | 0.25         | 0.40 |
| B                    | 1.15         | 1.35 |
| C                    | 2.00         | 2.20 |
| D                    | 0.65 Nominal |      |
| E                    | 0.30         | 0.40 |
| G                    | 1.20         | 1.40 |
| H                    | 1.80         | 2.20 |
| J                    | 0.0          | 0.10 |
| K                    | 0.90         | 1.00 |
| L                    | 0.25         | 0.40 |
| M                    | 0.10         | 0.18 |
| α                    | 0°           | 8°   |
| All Dimensions in mm |              |      |

Marking Code (Note 2)

| Type    | Marking  | Type    | Marking       |
|---------|----------|---------|---------------|
| BC846AW | K1Q      | BC847CW | K1M           |
| BC846BW | K1R      | BC848AW | K1J, K1E, K1Q |
| BC847AW | K1E, K1Q | BC848BW | K1K, K1F, K1R |
| BC847BW | K1F, K1R | BC848CW | K1L, K1M      |

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                   | Symbol                                      | Value          | Unit |
|--------------------------------------------------|---------------------------------------------|----------------|------|
| Collector-Base Voltage                           | BC846<br>BC847<br>BC848<br>V <sub>CBO</sub> | 80<br>50<br>30 | V    |
| Collector-Emitter Voltage                        | BC846<br>BC847<br>BC848<br>V <sub>CEO</sub> | 65<br>45<br>30 | V    |
| Emitter-Base Voltage                             | BC846, BC847<br>BC848<br>V <sub>EBO</sub>   | 6.0<br>5.0     | V    |
| 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   |
| Power Dissipation (Note 1)                       | P <sub>d</sub>                              | 200            | mW   |
| Thermal Resistance, Junction to Ambient (Note 1) | R <sub>θJA</sub>                            | 625            | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub>           | -65 to +150    | °C   |

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. Current gain subgroup "C" is not available for BC846W.
  3. No purposefully added lead.

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                                                          | Symbol                 | Min               | Typ               | Max               | Unit                | Test Condition                                                                                                                    |
|-------------------------------------------------------------------------|------------------------|-------------------|-------------------|-------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage (Note 4)<br>BC846<br>BC847<br>BC848    | $V_{(BR)CBO}$          | 80<br>50<br>30    | —<br>—<br>—       | —<br>—<br>—       | V                   | $I_C = 10\mu\text{A}$ , $I_B = 0$                                                                                                 |
| Collector-Emitter Breakdown Voltage (Note 4)<br>BC846<br>BC847<br>BC848 | $V_{(BR)CEO}$          | 65<br>45<br>30    | —<br>—<br>—       | —<br>—<br>—       | V                   | $I_C = 10\text{mA}$ , $I_B = 0$                                                                                                   |
| Emitter-Base Breakdown Voltage (Note 4)<br>BC846, BC847<br>BC848        | $V_{(BR)EBO}$          | 6<br>5            | —                 | —                 | V                   | $I_E = 1\mu\text{A}$ , $I_C = 0$                                                                                                  |
| DC Current Gain<br>Current Gain Group A<br>B<br>C<br>(Note 4)           | $h_{FE}$               | 110<br>200<br>420 | 180<br>290<br>520 | 220<br>450<br>800 | —                   | $V_{CE} = 5.0\text{V}$ , $I_C = 2.0\text{mA}$                                                                                     |
| Collector-Emitter Saturation Voltage (Note 4)                           | $V_{CE(SAT)}$          | —                 | 90<br>200         | 250<br>600        | mV                  | $I_C = 10\text{mA}$ , $I_B = 0.5\text{mA}$<br>$I_C = 100\text{mA}$ , $I_B = 5.0\text{mA}$                                         |
| Base-Emitter Saturation Voltage (Note 4)                                | $V_{BE(SAT)}$          | —                 | 700<br>900        | —                 | mV                  | $I_C = 10\text{mA}$ , $I_B = 0.5\text{mA}$<br>$I_C = 100\text{mA}$ , $I_B = 5.0\text{mA}$                                         |
| Base-Emitter Voltage (Note 4)                                           | $V_{BE(ON)}$           | 580<br>—          | 660<br>—          | 700<br>770        | mV                  | $V_{CE} = 5.0\text{V}$ , $I_C = 2.0\text{mA}$<br>$V_{CE} = 5.0\text{V}$ , $I_C = 10\text{mA}$                                     |
| Collector-Cutoff Current (Note 4)                                       | $I_{CBO}$<br>$I_{CBO}$ | —<br>—            | —<br>—            | 15<br>5.0         | nA<br>$\mu\text{A}$ | $V_{CB} = 30\text{V}$<br>$V_{CB} = 30\text{V}$ , $T_A = 150^\circ\text{C}$                                                        |
| Gain Bandwidth Product                                                  | $f_T$                  | 100               | 300               | —                 | MHz                 | $V_{CE} = 5.0\text{V}$ , $I_C = 10\text{mA}$ ,<br>$f = 100\text{MHz}$                                                             |
| Collector-Base Capacitance                                              | $C_{CBO}$              | —                 | 3.0               | 4.5               | pF                  | $V_{CB} = 10\text{V}$ , $f = 1.0\text{MHz}$                                                                                       |
| Noise Figure                                                            | NF                     | —                 | —                 | 10                | dB                  | $V_{CE} = 5\text{V}$ , $I_C = 200\mu\text{A}$ ,<br>$R_S = 2.0\text{k}\Omega$ ,<br>$f = 1.0\text{kHz}$ , $\Delta f = 200\text{Hz}$ |

Notes: 4. Short duration pulse test to minimize self-heating effect.

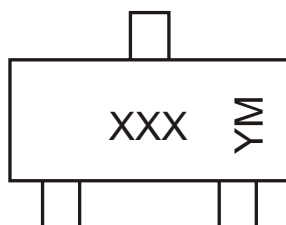
**Ordering Information** (Note 5)

| Device     | Packaging | Shipping         |
|------------|-----------|------------------|
| BC84xxW-7* | SOT-323   | 3000/Tape & Reel |

 Notes: 5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

\*xx = device type, e.g. BC846AW-7.

6. For Lead Free/RoHS Compliant version part number, please add "-F" suffix to the part number above. Example: BC846AW-7-F.

**Marking Information**


XXX = Product Type Marking Code (See Page 1), e.g. K1Q = BC846AW  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

**Date Code Key**

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J    | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    |

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

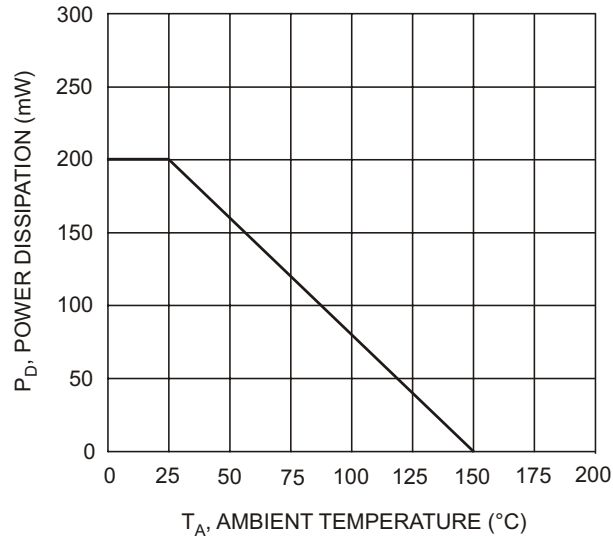


Fig. 1, Max Power Dissipation vs Ambient Temperature

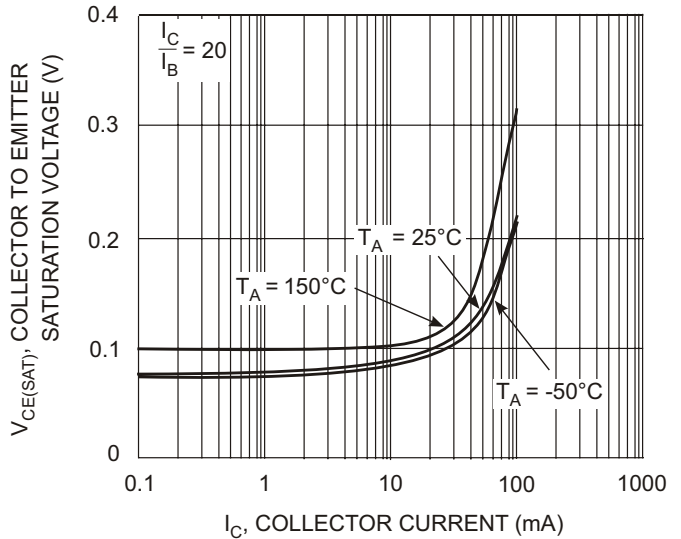


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

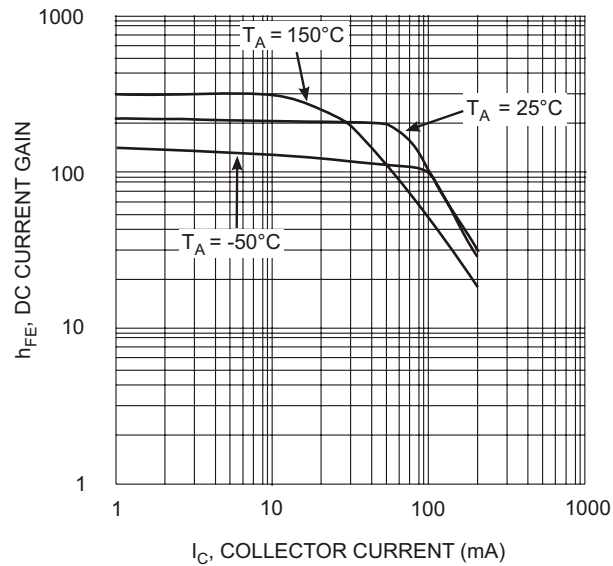


Fig. 3, DC Current Gain vs. Collector Current

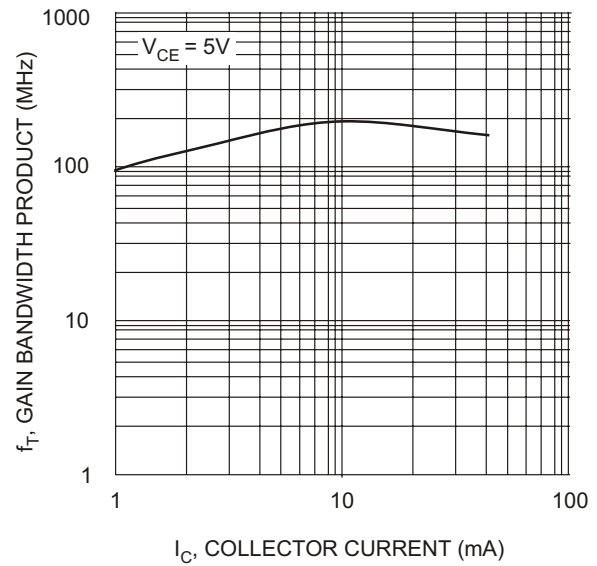


Fig. 4, Gain Bandwidth Product vs Collector Current