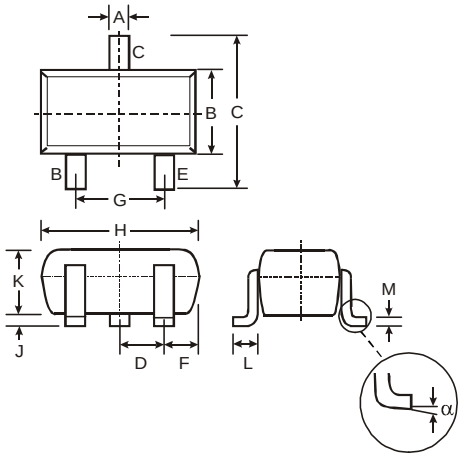
# BC856AW - BC858CW

**PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR**

## Features

- Ideally Suited for Automated Insertion
- Complementary NPN Types Available (BC846W-BC848W)
- For Switching and AF Amplifier Applications
- **Lead Free/RoHS Compliant (Note 3)**
- **"Green" Device (Note 4 and 5)**




| 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** | | |

## Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 5. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Pin Connections: See Diagram
- Marking Code: See Table Below & Diagram on Page 3
- Ordering & Date Code Information: See Page 3
- Weight: 0.006 grams (approximate)

| Marking Code (Note 2) | | | |
|---|---|---|---|
| **Type** | **Marking** | **Type** | **Marking** |
| BC856AW | K3A | BC857CW | K3G |
| BC856BW | K3B | BC858AW | K3J, K3A, K3V |
| BC857AW | K3V, K3A | BC858BW | K3K, K3B, K3W |
| BC857BW | K3W, K3B | BC858CW | K3L, K3G |

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Collector-Base Voltage | BC856<br>BC857<br>BC858 | $V_{CBO}$ | -80<br>-50<br>-30 | V |
| Collector-Emitter Voltage | BC856<br>BC857<br>BC858 | $V_{CEO}$ | -65<br>-45<br>-30 | V |
| Emitter-Base Voltage | | $V_{EBO}$ | -5.0 | V |
| Collector Current | | $I_C$ | -100 | mA |
| Peak Collector Current | | $I_{CM}$ | -200 | mA |
| Peak Emitter Current | | $I_{EM}$ | -200 | mA |
| Power Dissipation (Note 1) | | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | | $T_j$, $T_{STG}$ | -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 BC856W.
3. No purposefully added lead.
4. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
5. Product manufactured with Date Code 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage (Note 6) | BC856 | $V_{(BR)CBO}$ | -80 | — | — | V | $I_C$ = 10μA, $I_B$ = 0 |
| | BC857 | | -50 | — | — | | |
| | BC858 | | -30 | — | — | | |
| Collector-Emitter Breakdown Voltage (Note 6) | BC856 | $V_{(BR)CEO}$ | -65 | — | — | V | $I_C$ = 10mA, $I_B$ = 0 |
| | BC857 | | -45 | — | — | | |
| | BC858 | | -30 | — | — | | |
| Emitter-Base Breakdown Voltage (Note 6) | | $V_{(BR)EBO}$ | -5 | — | — | V | $I_E$ = 1μA, $I_C$ = 0 |
| DC Current Gain (Note 6) Current Gain Group | A | $h_{FE}$ | 125 | 180 | 250 | — | $V_{CE}$ = -5.0V, $I_C$ = -2.0mA |
| | B | | 220 | 290 | 475 | | |
| | C | | 420 | 520 | 800 | | |
| Collector-Emitter Saturation Voltage (Note 6) | | $V_{CE(SAT)}$ | — | -75 | -300 | mV | $I_C$ = -10mA, $I_B$ = -0.5mA |
| | | | | -250 | -650 | | $I_C$ = -100mA, $I_B$ = -5.0mA |
| Base-Emitter Saturation Voltage (Note 6) | | $V_{BE(SAT)}$ | — | -700 | — | mV | $I_C$ = -10mA, $I_B$ = -0.5mA |
| | | | — | -850 | -950 | | $I_C$ = -100mA, $I_B$ = -5.0mA |
| Base-Emitter Voltage (Note 6) | | $V_{BE(ON)}$ | -600 | -650 | -750 | mV | $V_{CE}$ = -5.0V, $I_C$ = -2.0mA |
| | | | — | — | -820 | | $V_{CE}$ = -5.0V, $I_C$ = -10mA |
| Collector-Cutoff Current (Note 6) | | $I_{CBO}$ | — | — | -15 | nA | $V_{CB}$ = -30V |
| | | $I_{CBO}$ | — | — | -4.0 | μA | $V_{CB}$ = -30V, $T_A$ = 150°C |
| Gain Bandwidth Product | | $f_T$ | 100 | 200 | — | MHz | $V_{CE}$ = -5.0V, $I_C$ = -10mA, f = 100MHz |
| Collector-Base Capacitance | | $C_{CBO}$ | — | 3 | 4.5 | pF | $V_{CB}$ = -10V, f = 1.0MHz |
| Noise Figure | | NF | — | — | 10 | dB | $V_{CE}$ = -5.0V, $I_C$ = 200μA, $R_S$ = 2kΩ, f = 1kHz, Δf = 200Hz |

Notes: 6. Short duration pulse test used to minimize self-heating effect.

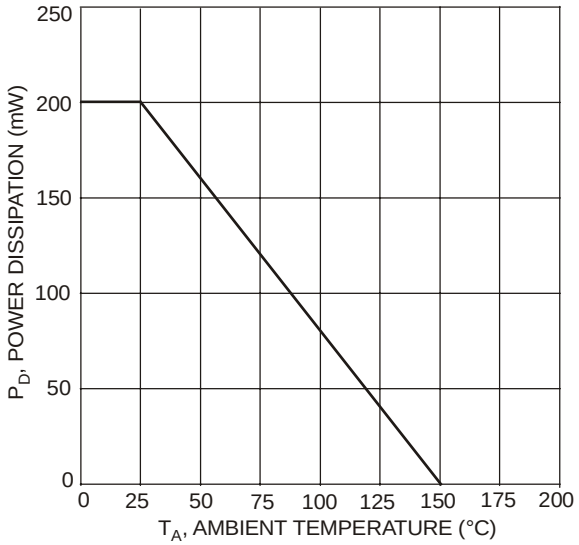



Fig. 1, Max Power Dissipation vs. Ambient Temperature

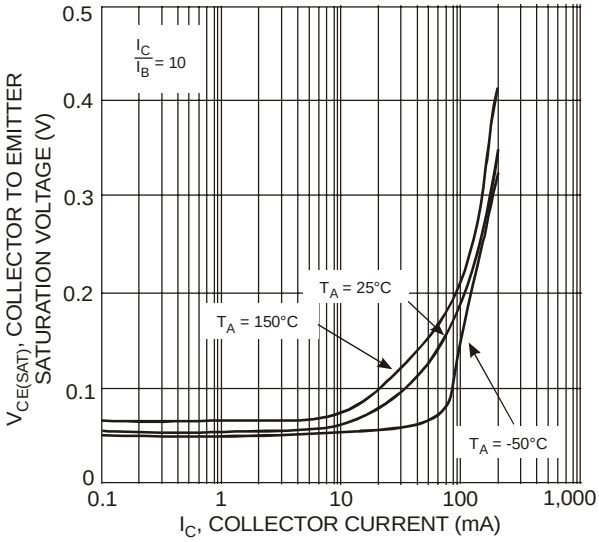



Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

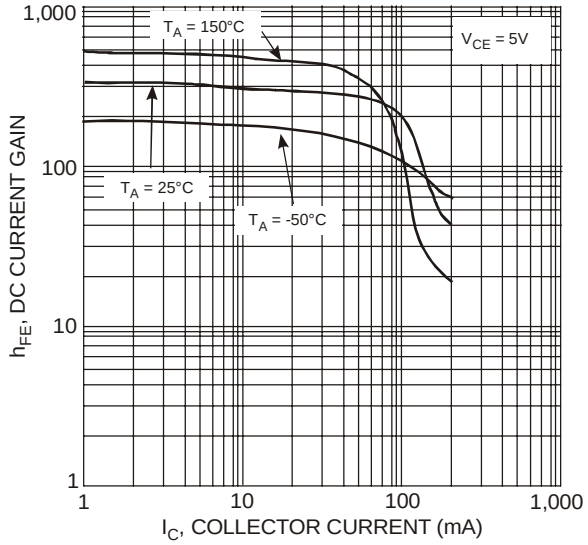


Fig. 3, DC Current Gain (Group B) vs. Collector Current

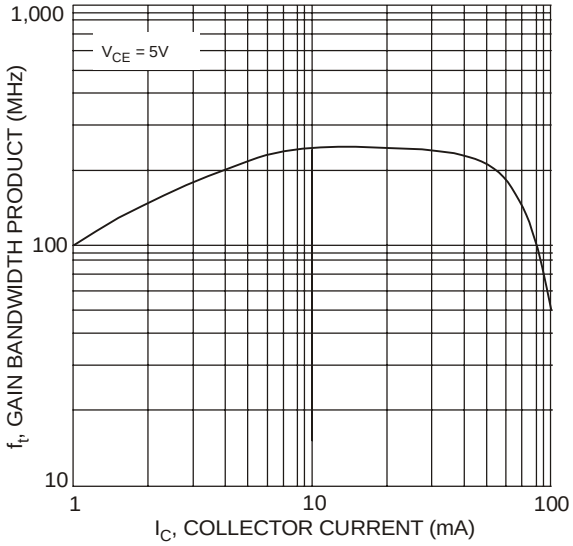


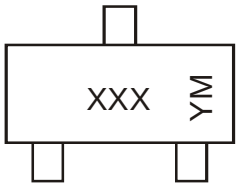
Fig. 4, Gain Bandwidth Product vs. Collector Current

## Ordering Information (Note 5 & 7)

| Device | Packaging | Shipping |
|---|---|---|
| BC85xxW-7-F | SOT-323 | 3000/Tape & Reel |

Notes: 7. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




XXX = Product Type Marking Code (See Page 1), e.g. K3A = BC856AW
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 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | J | K | L | M | N | P | R | S | T | U | V | W | X | Y | Z |

| 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 |