



**THE DATASHEET OF
BC857BW-7-F**

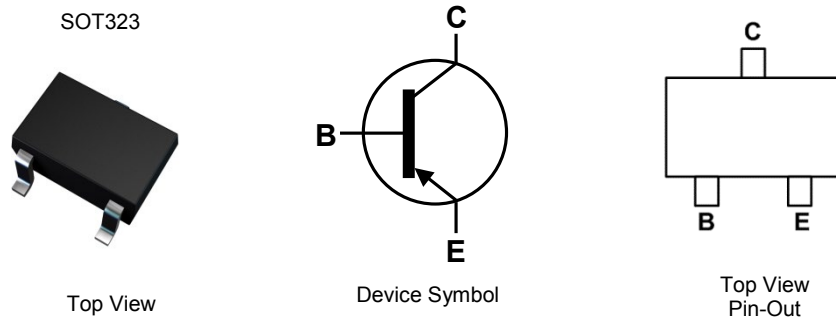


Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (BC846AW - BC848CW)
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

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 ③
- Weight: 0.006 grams (Approximate)



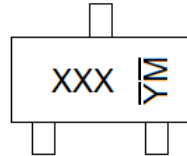
Ordering Information (Note 4)

| Product | Compliance | Marking | Reel Size (Inches) | Quantity per Reel |
|---------------|------------|---------|--------------------|-------------------|
| BC856AW-7-F | Standard | K3A | 7 | 3000 |
| BC856BW-7-F | Standard | K3B | 7 | 3000 |
| BC856BW-13-F | Standard | K3B | 13 | 10,000 |
| BC857AW-7-F | Standard | K3A | 7 | 3000 |
| BC857BW-7-F | Standard | K3B | 7 | 3000 |
| BC857BWQ-13-F | Automotive | K3B | 13 | 10,000 |
| BC857CW-7-F | Standard | K3G | 7 | 3000 |
| BC858AW-7-F | Standard | K3A | 7 | 3000 |
| BC858BW-7-F | Standard | K3B | 7 | 3000 |
| BC858CW-7-F | Standard | K3G | 7 | 3000 |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT323



XXX = Product Type Marking Code (See Ordering Information)
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: H = 2020)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

| Year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | H | I | J | K | L | M | N | O | P | R | S | T |
| 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | BC856 | -80 |
| | | BC857 | -50 |
| | | BC858 | -30 |
| Collector-Emitter Voltage | V_{CEO} | BC856 | -65 |
| | | BC857 | -45 |
| | | BC858 | -30 |
| Emitter-Base Voltage | V_{EBO} | -5.0 | V |
| Continuous Collector Current | I_C | -100 | mA |
| Peak Pulse Collector Current (single pulse) | I_{CM} | -200 | mA |
| Peak Pulse Emitter Current (single pulse) | I_{EM} | -200 | mA |

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

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Power Dissipation | P_D | 200 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 625 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

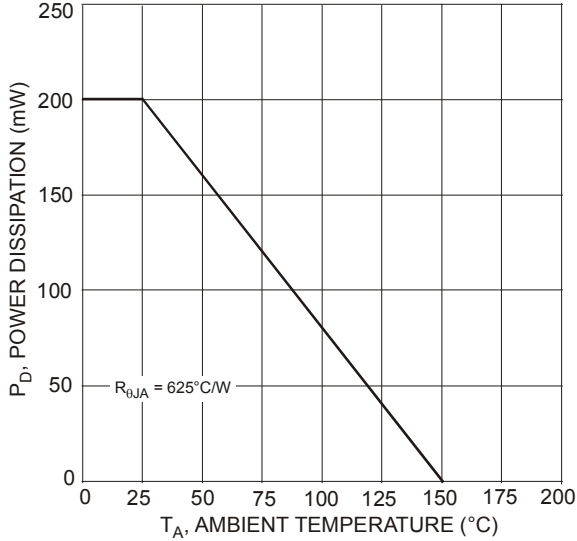
Note: 5. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.

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

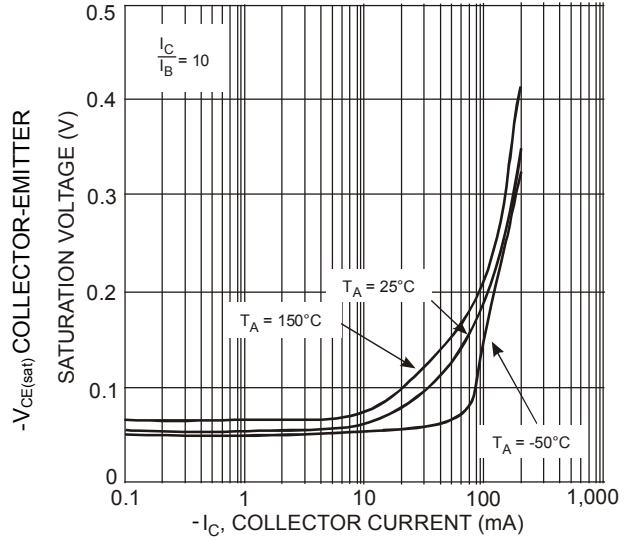
| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition | |
|---|--------------------|---------------|------|------|------|---------------|---|--|
| Collector-Base Breakdown Voltage | BC856 | BV_{CBO} | -80 | — | — | V | $I_C = -100\mu\text{A}$ | |
| | BC857 | | -50 | | | | | |
| | BC858 | | -30 | | | | | |
| Collector-Emitter Breakdown Voltage (Note 6) | BC856 | BV_{CEO} | -65 | — | — | V | $I_C = -10\text{mA}$ | |
| | BC857 | | -45 | | | | | |
| | BC858 | | -30 | | | | | |
| Emitter-Base Breakdown Voltage | | BV_{EBO} | -5 | — | — | V | $I_E = -100\mu\text{A}$ | |
| DC Current Gain (Note 6) | Current Gain Group | h_{FE} | A | 125 | 180 | 250 | — | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$ |
| | | | B | 220 | 290 | 475 | | |
| | | | C | 420 | 520 | 800 | | |
| Collector Cutoff Current | | I_{CBO} | — | — | -15 | nA | $V_{CB} = -30\text{V}$ | |
| | | | | | -4 | μA | $V_{CB} = -30\text{V}, T_A = +150^\circ\text{C}$ | |
| Collector-Emitter Saturation Voltage (Note 6) | | $V_{CE(sat)}$ | — | -75 | -300 | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ | |
| | | | | -250 | -650 | | $I_C = -100\text{mA}, I_B = -5.0\text{mA}$ | |
| Base-Emitter Turn-On Voltage (Note 6) | | $V_{BE(on)}$ | -600 | -650 | -750 | mV | $I_C = -2\text{mA}, V_{CE} = -5\text{V}$ | |
| | | | — | — | -820 | | $I_C = -10\text{mA}, V_{CE} = -5\text{V}$ | |
| Base-Emitter Saturation Voltage (Note 6) | | $V_{BE(sat)}$ | — | -700 | — | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ | |
| | | | | -850 | -950 | | $I_C = -100\text{mA}, I_B = -5\text{mA}$ | |
| Output Capacitance | | C_{obo} | — | 3 | 4.5 | pF | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$ | |
| Transition Frequency | | f_T | 100 | 200 | — | MHz | $V_{CE} = -5\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$ | |
| Noise Figure | | NF | — | — | 10 | dB | $V_{CE} = -5\text{V}, I_C = -200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$ | |

Note: 6. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

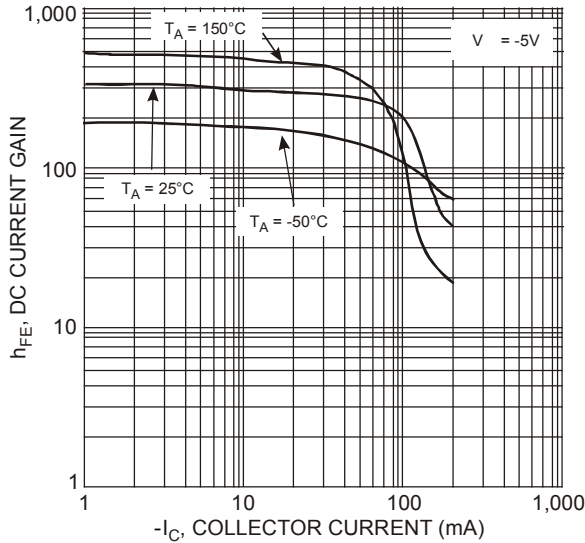
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



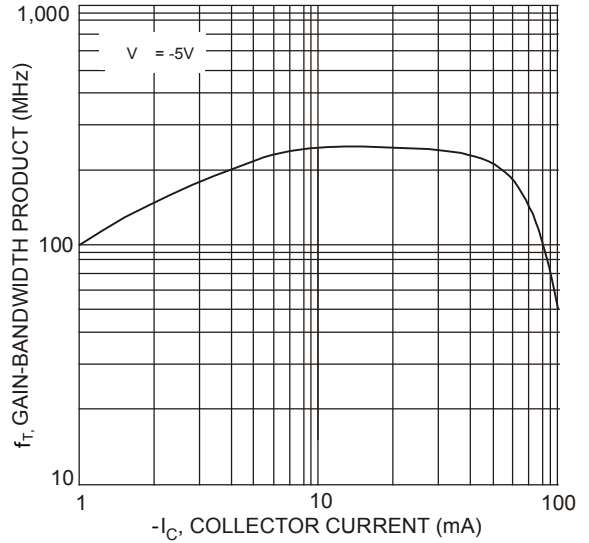
Power Dissipation vs. $P_D \text{ v } T_A$



$V_{CE(sat)} \text{ v } I_C$



$h_{FE} \text{ v } I_C$

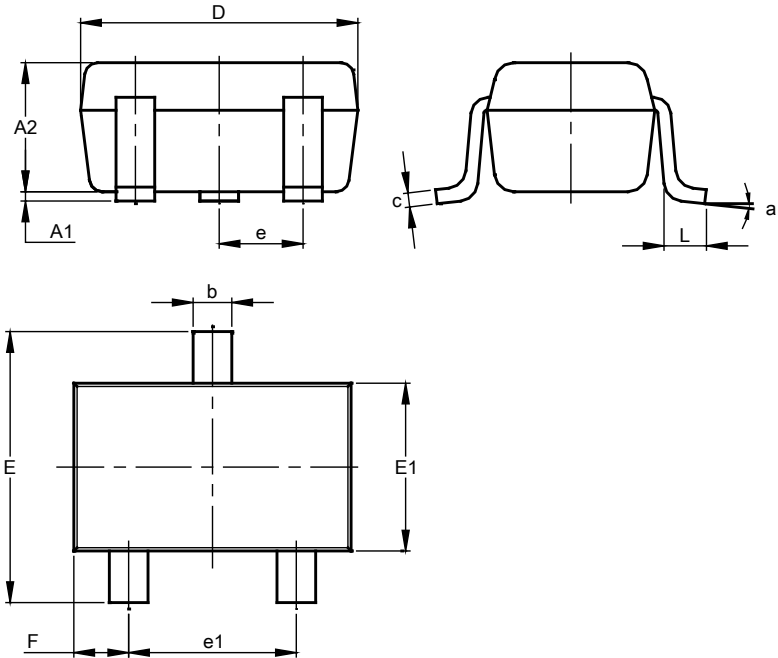


$f_T \text{ v } I_C$

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323

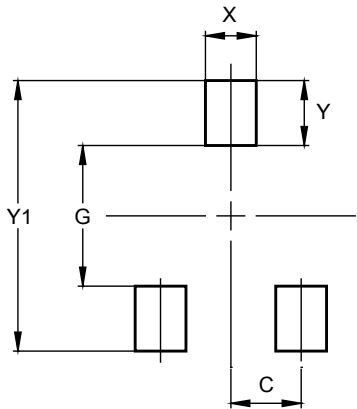


| SOT323 | | | |
|----------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.25 | 0.40 | 0.30 |
| c | 0.10 | 0.18 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| e1 | 1.20 | 1.40 | 1.30 |
| F | 0.375 | 0.475 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.470 |
| Y | 0.600 |
| Y1 | 2.500 |

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