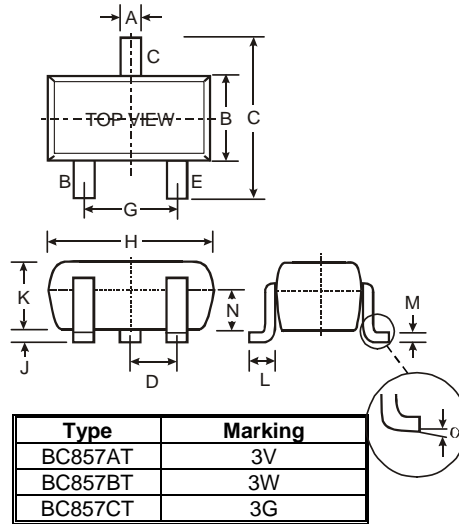


## Features

- Epitaxial Die Construction
- Complementary NPN Types Available (BC847AT,BT,CT)
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Note 4 and 5)**

## Mechanical Data

- Case: SOT-523
- 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
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Code: See Table Below & Diagram on Page 2
- Ordering & Date Code Information: See Page 2
- Weight: 0.002 grams (approximate)



| SOT-523              |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.22 |
| B                    | 0.75 | 0.85 | 0.80 |
| C                    | 1.45 | 1.75 | 1.60 |
| D                    | —    | —    | 0.50 |
| G                    | 0.90 | 1.10 | 1.00 |
| H                    | 1.50 | 1.70 | 1.60 |
| J                    | 0.00 | 0.10 | 0.05 |
| K                    | 0.60 | 0.80 | 0.75 |
| L                    | 0.10 | 0.30 | 0.22 |
| M                    | 0.10 | 0.20 | 0.12 |
| N                    | 0.45 | 0.65 | 0.50 |
| α                    | 0°   | 8°   | —    |
| All Dimensions in mm |      |      |      |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Collector-Base Voltage                           | V <sub>CBO</sub>                  | -50         | V    |
| Collector-Emitter Voltage                        | V <sub>CEO</sub>                  | -45         | V    |
| Emitter-Base Voltage                             | V <sub>EBO</sub>                  | -5.0        | V    |
| Collector Current                                | I <sub>C</sub>                    | -100        | mA   |
| Power Dissipation (Note 1)                       | P <sub>d</sub>                    | 150         | mW   |
| Thermal Resistance, Junction to Ambient (Note 1) | R <sub>θJA</sub>                  | 833         | °C/W |
| Operating and Storage Temperature Range          | T <sub>j</sub> , T <sub>STG</sub> | -55 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 (Note 3)     | V <sub>(BR)CBO</sub> | -50       | —            | —            | V        | I <sub>C</sub> = 10μA, I <sub>B</sub> = 0  |
| Collector-Emitter Breakdown Voltage (Note 3)  | V <sub>(BR)CEO</sub> | -45       | —            | —            | V        | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0  |
| Emitter-Base Breakdown Voltage (Note 3)       | V <sub>(BR)EBO</sub> | -5        | —            | —            | V        | I <sub>E</sub> = 1μA, I <sub>C</sub> = 0   |
| DC Current Gain (Note 3) Current Gain A       | h <sub>FE</sub>      | 125       | —            | 250          | —        | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA   |
| Current Gain B                                |                      | 220       | 290          | 475          |          |  |
| Current Gain C                                |                      | 420       | 520          | 800          |          |  |
| Collector-Emitter Saturation Voltage (Note 3) | V <sub>CE(SAT)</sub> | —         | —            | -300<br>-650 | mV       | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA<br>I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA      |
| Base-Emitter Saturation Voltage (Note 3)      | V <sub>BE(SAT)</sub> | —         | -700<br>-900 | —            | mV       | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA<br>I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA      |
| Base-Emitter Voltage (Note 3)                 | V <sub>BE(ON)</sub>  | -600<br>— | —            | -750<br>-820 | mV       | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA<br>V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA      |
| Collector-Cutoff Current (Note 3)             | I <sub>CBO</sub>     | —         | —            | -15<br>-4.0  | NA<br>μA | V <sub>CB</sub> = -30V<br>V <sub>CB</sub> = -30V, T <sub>A</sub> = 150°C                                 |
| Gain Bandwidth Product                        | f <sub>T</sub>       | 100       | —            | —            | MHz      | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA, f = 100MHz  |
| Output Capacitance                            | C <sub>OB</sub>      | —         | —            | 4.5          | pF       | V <sub>CB</sub> = -10V, f = 1.0MHz   |
| Noise Figure                                  | NF                   | —         | —            | 10           | dB       | I <sub>C</sub> = -0.2mA, V <sub>CE</sub> = -5.0Vdc,<br>R <sub>S</sub> = 2.0KΩ, f = 1.0KHz,<br>BW = 200Hz |

- 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. No purposefully added lead
  3. Short duration pulse test used to minimize self-heating effect.
  4. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  5. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

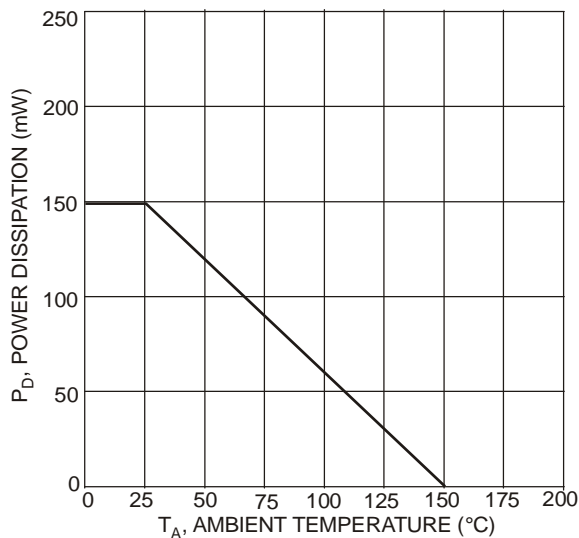


Fig. 1, Max Power Dissipation vs. Ambient Temperature

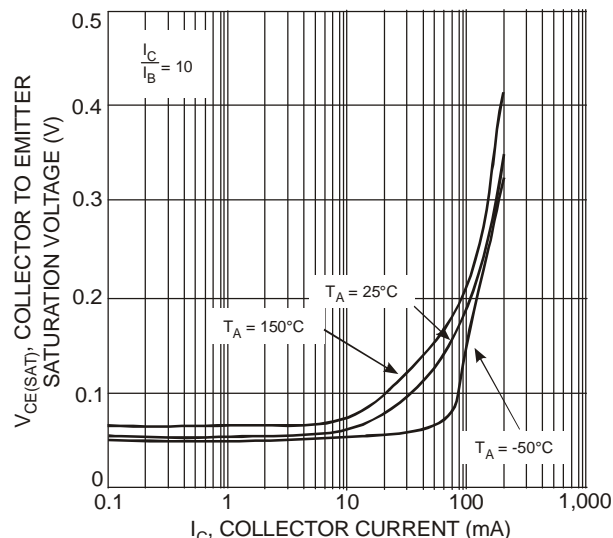


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

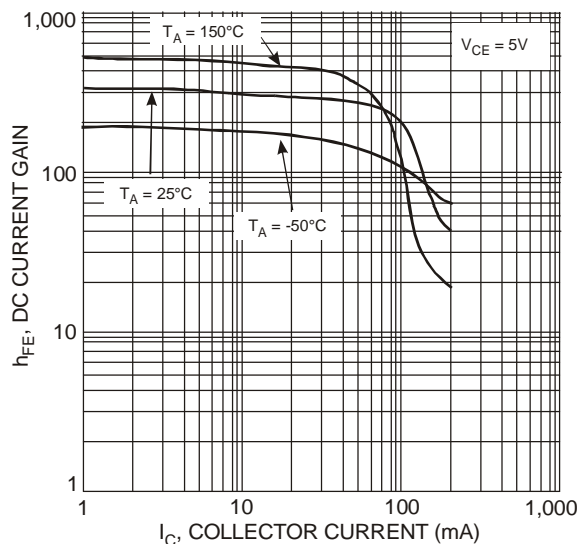


Fig. 3, DC Current Gain vs. Collector Current

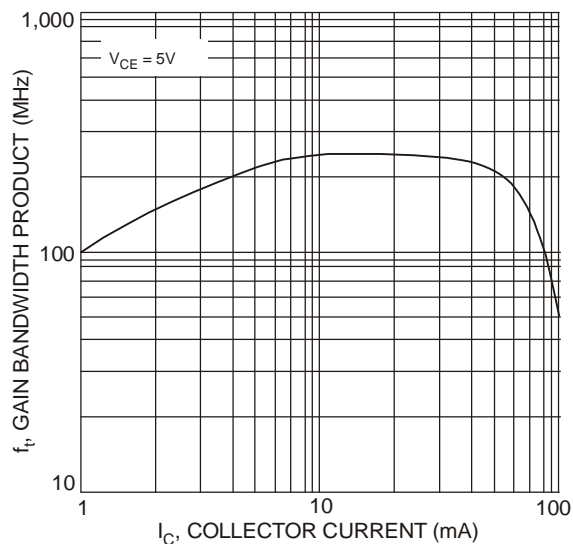


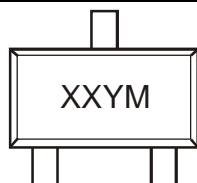
Fig. 4, Gain Bandwidth Product vs. Collector Current

## Ordering Information (Note 6)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| BC857AT-7-F | SOT-523   | 3000/Tape & Reel |
| BC857BT-7-F | SOT-523   | 3000/Tape & Reel |
| BC857CT-7-F | SOT-523   | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



XX = Product Type Marking Code (See Page 1), e.g. 3V = BC857AT  
 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   |

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