

**DUAL PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR**

**Features**

- Ideally Suited for Automated Insertion
- For Switching and AF Amplifier Applications
- Ultra-Small Surface Mount Package
- "Lead-Free", RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

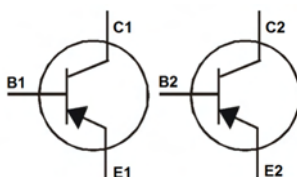
**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (approximate)

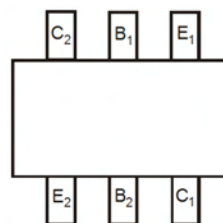
SOT363



Bottom View



Device Symbol



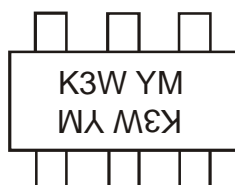
Pin-Out Top View

**Ordering Information** (Notes 3 & 4)

| Product      | Grade      | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|------------|---------|--------------------|-----------------|-------------------|
| BC857BS-7-F  | Commercial | K3W     | 7                  | 8               | 3,000             |
| BC857BS-13-F | Commercial | K3W     | 13                 | 8               | 10,000            |
| BC857BSQ-7-F | Automotive | K3W     | 7                  | 8               | 3,000             |

- Notes:
1. No purposefully added lead.
  2. Halogen and Antimony Free. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com>.
  4. Products with Q-suffix are automotive grade. All other products are commercial grade.

**Marking Information**



K3W = Product Type Marking Code  
 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>CB0</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   |
| Peak Collector Current    | I <sub>CM</sub>  | -200  | mA   |
| Peak Base Current         | I <sub>BM</sub>  | -200  | mA   |

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                           | P <sub>D</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R <sub>θJA</sub>                  | 625         | °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 (Note 6)              | Symbol               | Min  | Typ  | Max          | Unit     | Test Condition  |
|--------------------------------------|----------------------|------|------|--------------|----------|---|
| Collector-Base Breakdown Voltage     | BV <sub>CB0</sub>    | -50  | —    | —            | V        | I <sub>C</sub> = 100μA, I <sub>B</sub> = 0  |
| Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | -45  | —    | —            | V        | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0   |
| Emitter-Base Breakdown Voltage       | BV <sub>EBO</sub>    | -5   | —    | —            | V        | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0  |
| DC Current Gain                      | h <sub>FE</sub>      | 220  | —    | 475          | —        | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA  |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | —    | —    | -100<br>-400 | 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      | V <sub>BE(sat)</sub> | —    | -700 | —            | mV       | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA   |
| Base-Emitter Voltage                 | V <sub>BE(on)</sub>  | -580 | -665 | -750         | mV       | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA  |
| Collector-Cutoff Current             | I <sub>CB0</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                            |
| Emitter Cutoff Current               | I <sub>CEO</sub>     | —    | —    | -100         | nA       | V <sub>EB</sub> = -5.0V, I <sub>C</sub> = 0   |
| Gain Bandwidth Product               | f <sub>T</sub>       | 100  | —    | —            | MHz      | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA,<br>f = 100MHz                                      |
| Collector-Base Capacitance           | C <sub>CB0</sub>     | —    | —    | 3            | pF       | V <sub>CB</sub> = -10V, f = 1.0MHz  |
| Emitter-Base Capacitance             | C <sub>EBO</sub>     | —    | 11   | —            | pF       | V <sub>EB</sub> = -0.5V, f = 1.0MHz   |

Notes: 5. Device mounted on FR-4 PCB. Diodes Inc. suggested pad layout document can be found on our website at <http://www.diodes.com>  
6. Short duration pulse test used to minimize self-heating effect.

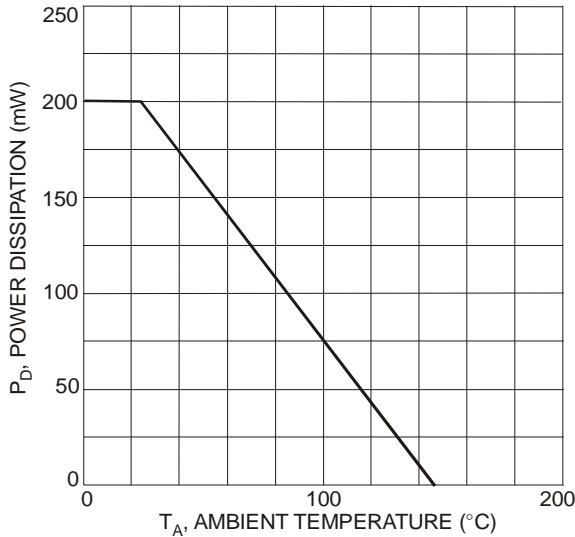


Fig. 1 Power Dissipation vs. Ambient Temperature

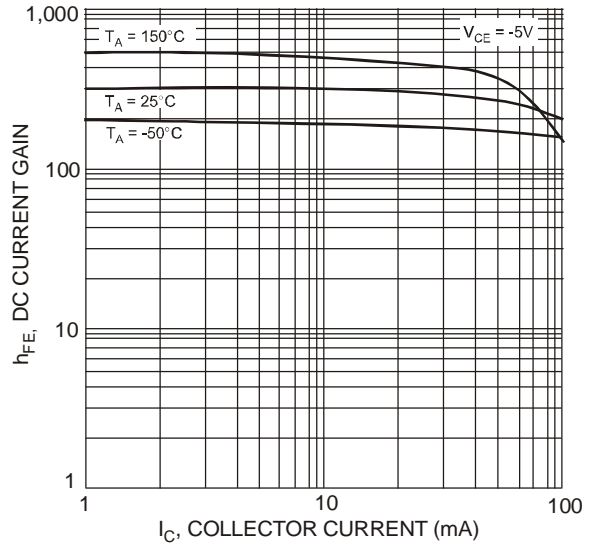


Fig. 2 Typical DC Current Gain vs. Collector Current

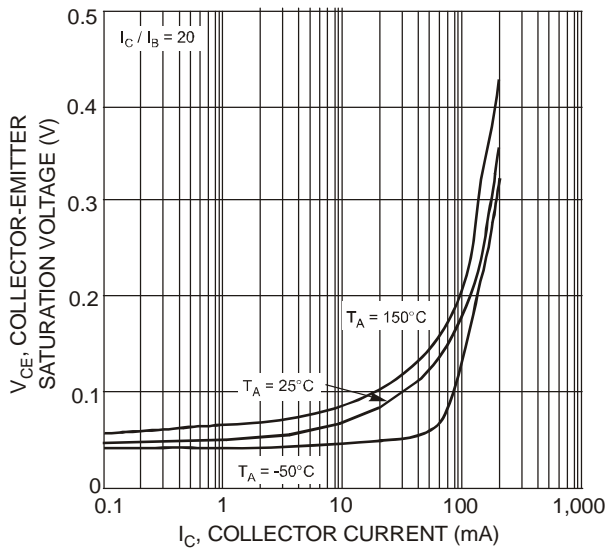


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

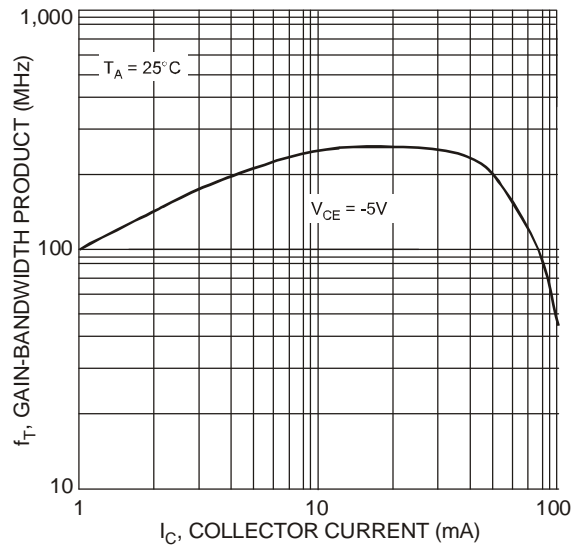
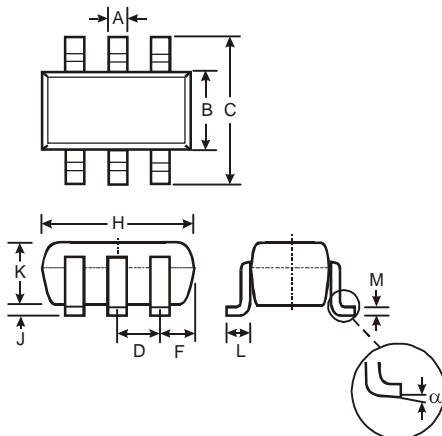


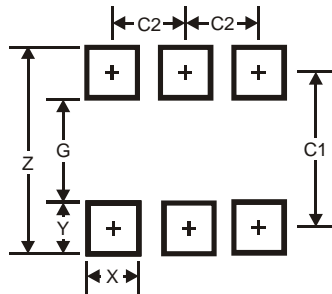
Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**



| SOT363               |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 0.10     | 0.30 |
| B                    | 1.15     | 1.35 |
| C                    | 2.00     | 2.20 |
| D                    | 0.65 Typ |      |
| F                    | 0.40     | 0.45 |
| H                    | 1.80     | 2.20 |
| J                    | 0        | 0.10 |
| K                    | 0.90     | 1.00 |
| L                    | 0.25     | 0.40 |
| M                    | 0.10     | 0.22 |
| $\alpha$             | 0°       | 8°   |
| All Dimensions in mm |          |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

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