

**45V DUAL PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Description**

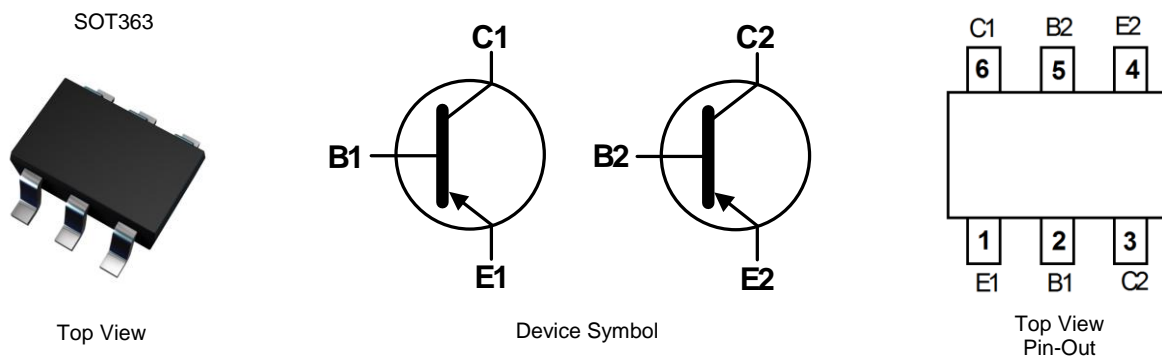
This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

**Features**

- Ultra-Small Surface Mount Package
- Ideally Suited for Automated Insertion
- For Switching and AF Amplifier Application
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

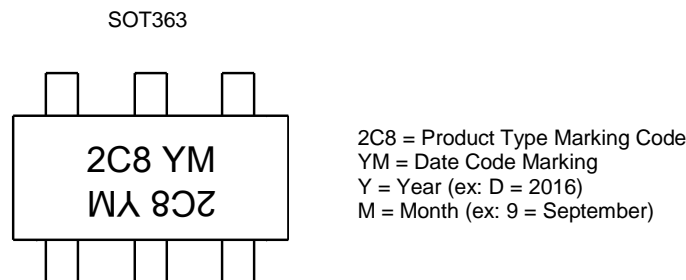
**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 <sup>e3</sup>
- Weight: 0.006 grams (Approximate)


**Ordering Information** (Notes 4 & 5)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| AC857BSQ-7  | Automotive | 2C8     | 7                  | 8               | 3,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**

**Date Code Key**

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|------|------|------|------|------|------|------|------|------|
| Code | D    | E    | F    | G    | H    | I    | J    | K    |

| 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    | $V_{CB0}$ | -50   | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | -45   | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | -5.0  | V    |
| Collector Current         | $I_C$     | -100  | mA   |
| Peak Collector Current    | $I_{CM}$  | -200  | mA   |
| Peak Base Current         | $I_{BM}$  | -200  | mA   |

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

| Characteristic                                       | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 6)                           | $P_D$           | 200         | mW                        |
| Thermal Resistance, Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 625         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range              | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

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

| Characteristic (Note 7)              | Symbol        | Min  | Typ  | Max          | Unit                | Test Condition  |
|--------------------------------------|---------------|------|------|--------------|---------------------|---|
| Collector-Base Breakdown Voltage     | $BV_{CB0}$    | -50  | —    | —            | V                   | $I_C = -100\mu\text{A}, I_B = 0$  |
| Collector-Emitter Breakdown Voltage  | $BV_{CEO}$    | -45  | —    | —            | V                   | $I_C = -10\text{mA}, I_B = 0$   |
| Emitter-Base Breakdown Voltage       | $BV_{EBO}$    | -5   | —    | —            | V                   | $I_E = -100\mu\text{A}, I_C = 0$  |
| DC Current Gain                      | $h_{FE}$      | 220  | —    | 475          | —                   | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$  |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —    | —    | -100<br>-400 | 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      | $V_{BE(SAT)}$ | —    | -700 | —            | mV                  | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$   |
| Base-Emitter Voltage                 | $V_{BE(ON)}$  | -580 | -665 | -750         | mV                  | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$  |
| Collector-Cutoff Current             | $I_{CBO}$     | —    | —    | -15<br>-4.0  | nA<br>$\mu\text{A}$ | $V_{CB} = -30\text{V}$<br>$V_{CB} = -30\text{V}, T_A = +150^\circ\text{C}$              |
| Emitter Cutoff Current               | $I_{EBO}$     | —    | —    | -100         | nA                  | $V_{EB} = -5.0\text{V}, I_C = 0$  |
| Gain Bandwidth Product               | $f_T$         | 100  | —    | —            | MHz                 | $V_{CE} = -5.0\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$                          |
| Collector-Base Capacitance           | $C_{CB0}$     | —    | 2    | 3            | pF                  | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$   |
| Emitter-Base Capacitance             | $C_{EBO}$     | —    | 11   | —            | pF                  | $V_{EB} = -0.5\text{V}, f = 1.0\text{MHz}$  |

- Notes:
6. For the device mounted on minimum recommended pad layout FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  7. Short duration pulse test used to minimize self-heating effect.

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

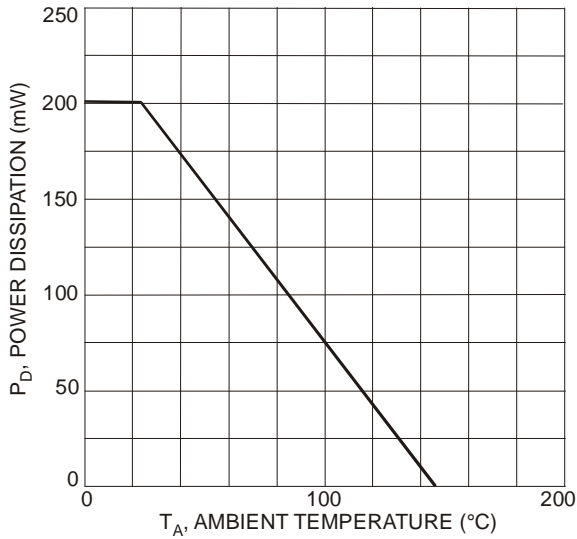


Fig. 1 Power Dissipation vs. Ambient Temperature

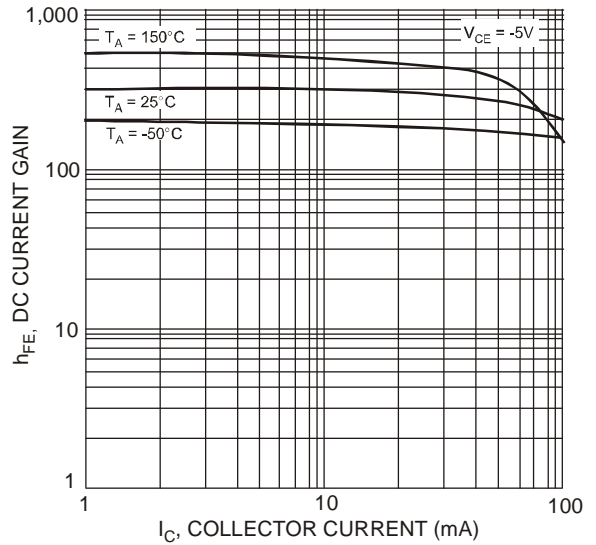


Fig. 2 Typical DC Current Gain vs. Collector Current

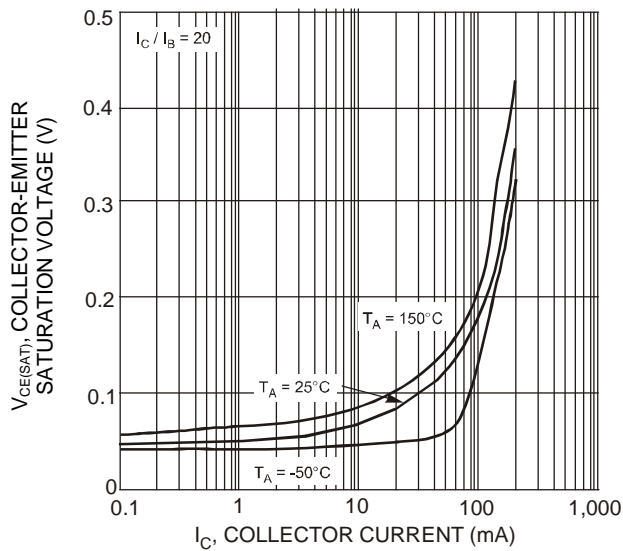


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

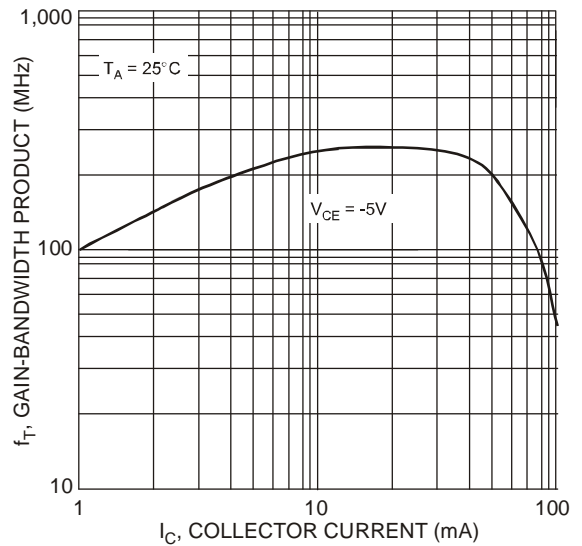
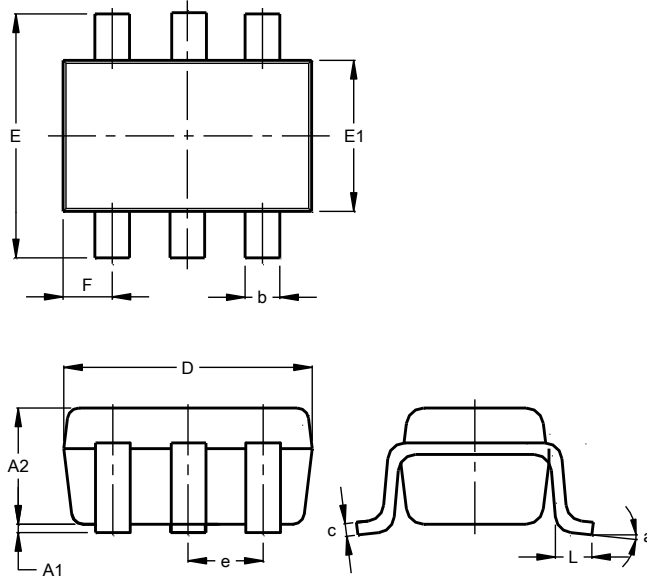


Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

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

**SOT363**

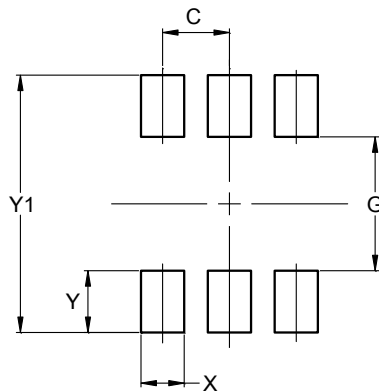


| SOT363                      |           |      |       |
|-----------------------------|-----------|------|-------|
| Dim                         | Min       | Max  | Typ   |
| A1                          | 0.00      | 0.10 | 0.05  |
| A2                          | 0.90      | 1.00 | 1.00  |
| b                           | 0.10      | 0.30 | 0.25  |
| c                           | 0.10      | 0.22 | 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 |      |       |
| F                           | 0.40      | 0.45 | 0.425 |
| L                           | 0.25      | 0.40 | 0.30  |
| a                           | 0°        | 8°   | --    |
| <b>All Dimensions in mm</b> |           |      |       |

**Suggested Pad Layout**

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

**SOT363**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 1.300         |
| X          | 0.420         |
| Y          | 0.600         |
| Y1         | 2.500         |

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