

Features

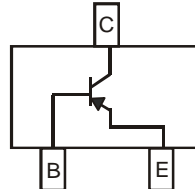
- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Voltage
- Ideal for Low Power Amplification and Switching
- Complementary NPN Type Available (2DD2652)
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**



Top View

Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Alloy42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)



Device Schematic

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -15 | V |
| Collector-Emitter Voltage | V_{CEO} | -12 | V |
| Emitter-Base Voltage | V_{EBO} | -6 | V |
| Collector Current - Continuous | I_C | -1.5 | A |
| Peak Pulse Collector Current | I_{CM} | -3 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|--------------------|
| Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ | P_D | 300 | mW |
| Thermal Resistance, Junction to Ambient (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 417 | $^\circ\text{C/W}$ |
| Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$ | P_D | 500 | mW |
| Thermal Resistance, Junction to Ambient (Note 4) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 250 | $^\circ\text{C/W}$ |
| 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 | Symbol | Min | Typ | Max | Unit | Conditions |
|--|---------------|-----|------|------|---------------|---|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -15 | — | — | V | $I_C = -10\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage (Note 5) | $V_{(BR)CEO}$ | -12 | — | — | V | $I_C = -1\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -6 | — | — | V | $I_E = -10\mu\text{A}, I_C = 0$ |
| Collector Cut-Off Current | I_{CBO} | — | — | -0.1 | μA | $V_{CB} = -15\text{V}, I_E = 0$ |
| Emitter Cut-Off Current | I_{EBO} | — | — | -0.1 | μA | $V_{EB} = -6\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | -110 | -200 | mV | $I_C = -500\text{mA}, I_B = -25\text{mA}$ |
| DC Current Gain | h_{FE} | 270 | — | 680 | — | $V_{CE} = -2\text{V}, I_C = -200\text{mA}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Output Capacitance | C_{obo} | — | 8.5 | — | pF | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$ |
| Current Gain-Bandwidth Product | f_T | — | 300 | — | MHz | $V_{CE} = -2\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$ |

- Notes:
1. No purposefully added lead.
 2. Diode's Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB with minimum recommended pad layout.
 4. Device mounted on FR-4 PCB with 1 inch² copper pad layout.
 5. Measured under pulsed conditions. Pulse width = 300 μs . Duty cycle $\leq 2\%$.

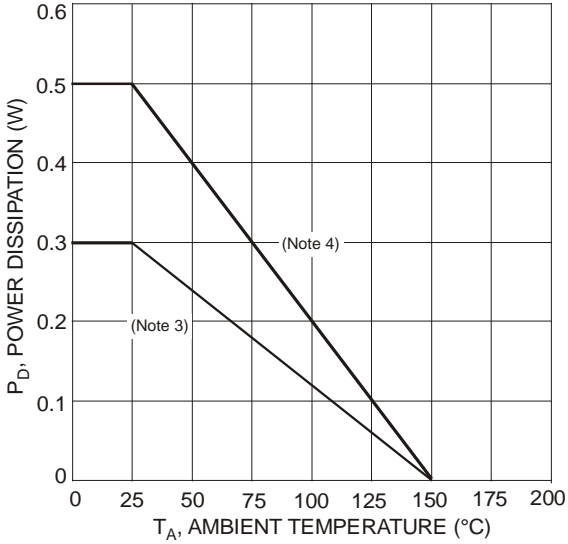


Fig. 1 Power Dissipation vs. Ambient Temperature

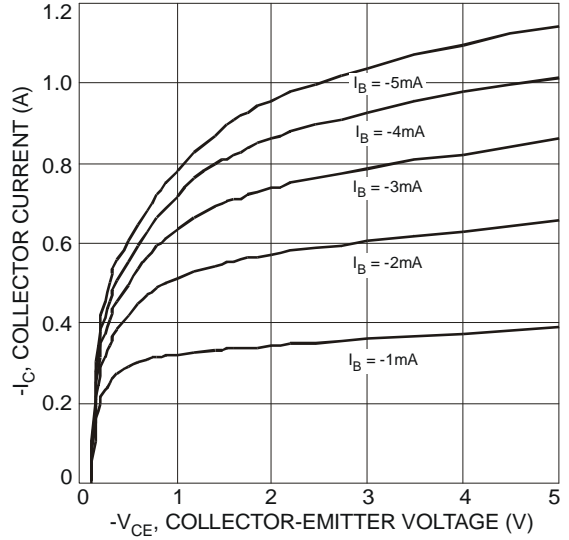


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

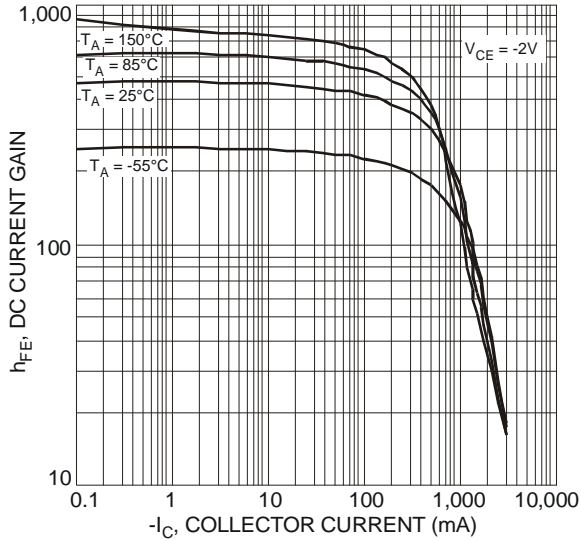


Fig. 3 Typical DC Current Gain vs. Collector Current

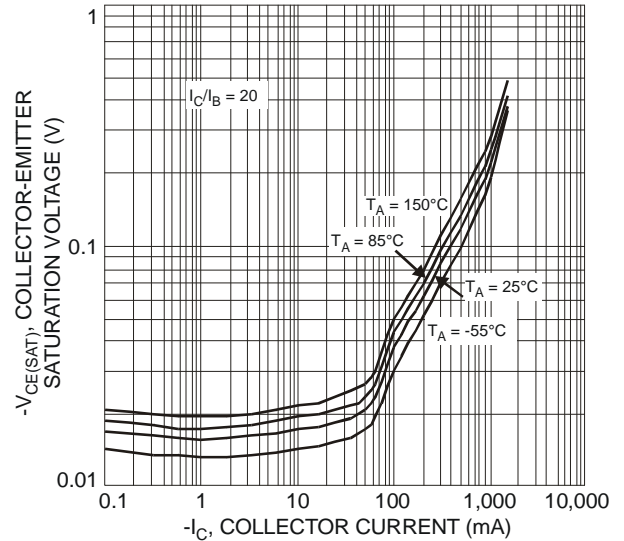


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

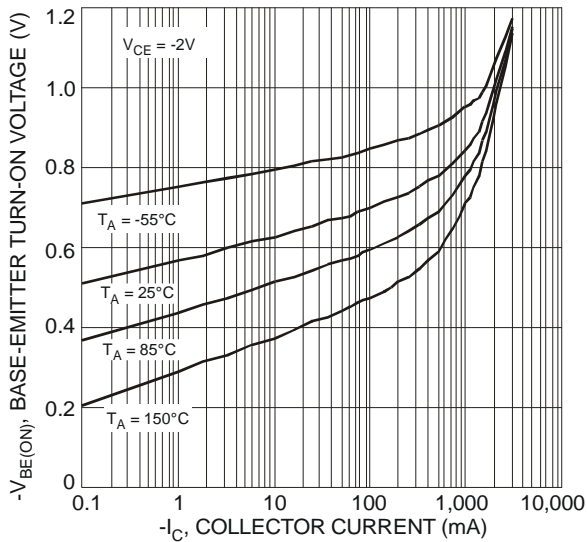


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

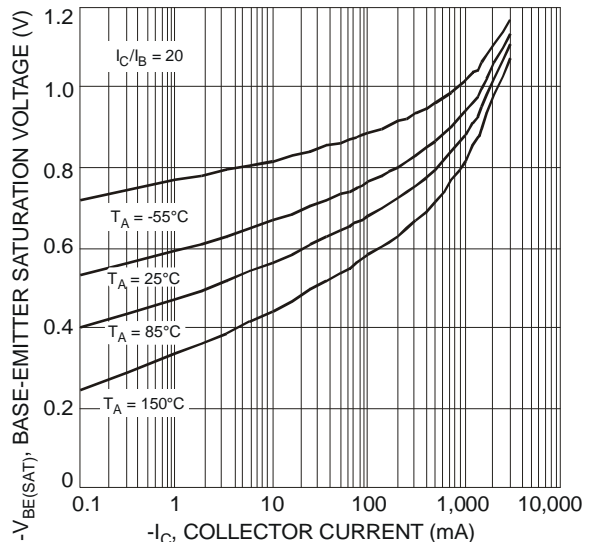


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

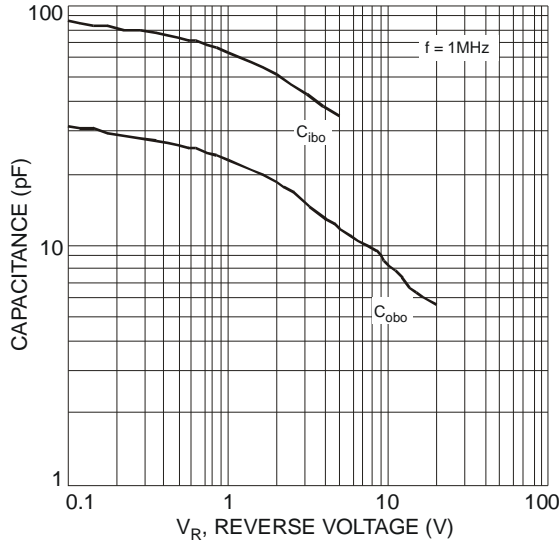


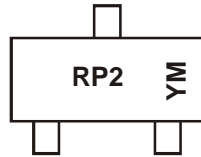
Fig. 7 Typical Capacitance Characteristics

Ordering Information (Note 6)

| Part Number | Case | Packaging |
|-------------|---------|------------------|
| 2DB1689-7 | SOT-323 | 3000/Tape & Reel |

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

Marking Information



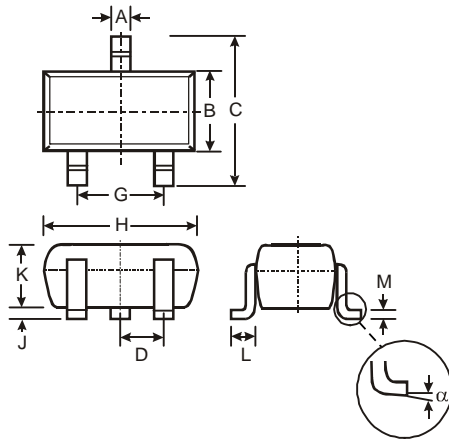
RP2 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: V = 2008)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V | W | X | Y | Z | A | B | C |

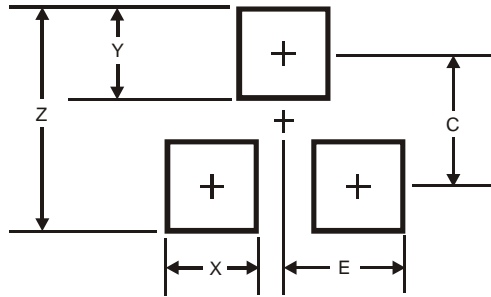
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Package Outline Dimensions



| SOT-323 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | - | - | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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