

75V DUAL NPN HIGH GAIN MEDIUM POWER TRANSISTOR IN SM-8

Features

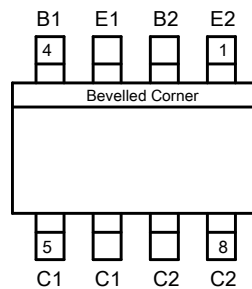
- $BV_{CEO} > 75V$
- $I_C = 5A$ High Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- High Gain $h_{FE} > 300 @ 1A$
- Low Saturation Voltage $V_{CE(SAT)} < 150mV @ 1A$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

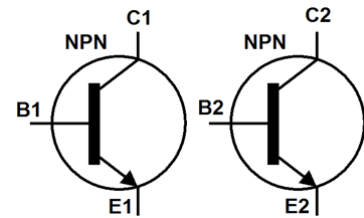
- Case: SM-8 (8 LEAD SOT223)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.117 grams (Approximate)



Top View



Top View
Pin Out



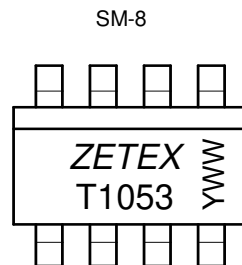
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| ZDT1053TA | AEC-Q101 | T1053 | 7 | 12 | 1,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



T1053 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
 WW or $\bar{W}W$ = Week Code (01 to 53)

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | NPN | Unit |
|------------------------------|------------------|-----|------|
| Collector-Base Voltage | V _{CBO} | 150 | V |
| Collector-Emitter Voltage | V _{CEO} | 75 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 5 | A |
| Peak Pulse Current | I _{CM} | 20 | A |
| Base Current | I _B | 500 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

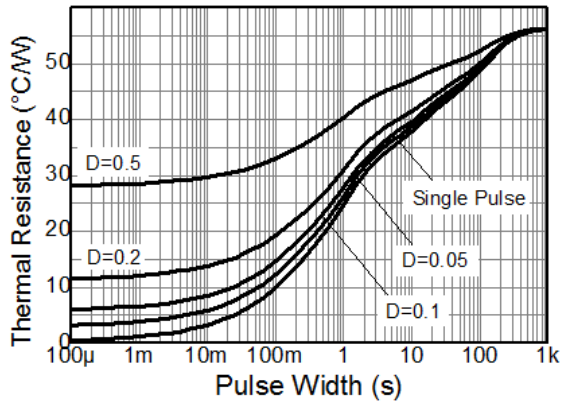
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Collector Power Dissipation | P _D | (Note 5) | 2.25 |
| | | (Note 6) | 2.75 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 55.6 |
| | | (Note 6) | 45.5 |
| Thermal Resistance, Junction to Leads | R _{θJL} | 30.7 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

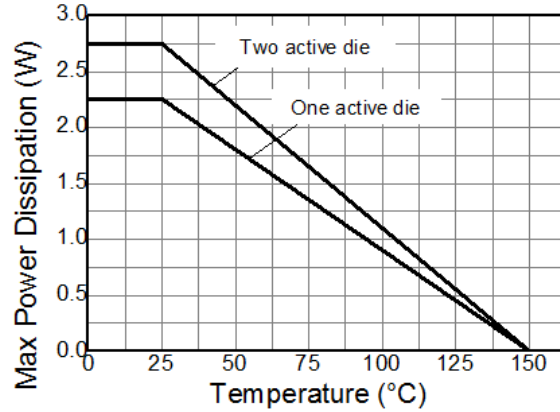
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
5. For a device with any single die active and mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
 6. Same as Note 5, except both die are active and equally sharing power.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

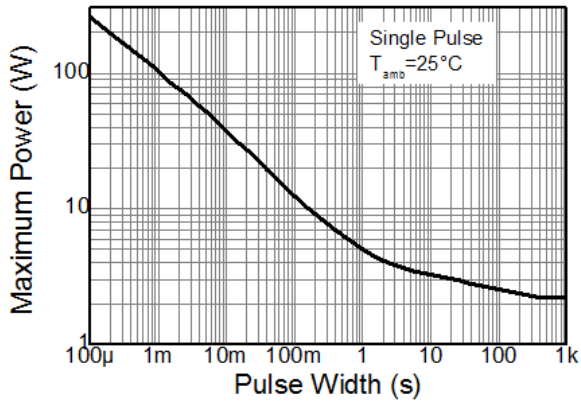
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



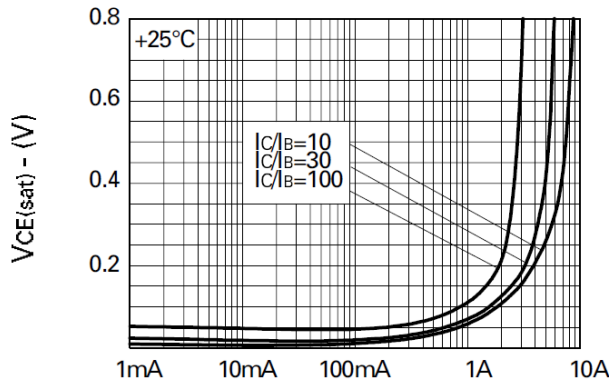
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-----|------|------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 150 | 245 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 75 | 100 | — | V | I _C = 10mA |
| Collector-Emitter Breakdown Voltage | BV _{CES} | 150 | 245 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage | BV _{CEV} | 150 | 245 | — | V | I _C = 100μA, V _{EB} = 1V |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.8 | — | V | I _E = 100μA |
| Collector Cut-Off Current | I _{CBO} | — | <1 | 10 | nA | V _{CB} = 120V |
| Emitter Cut-Off Current | I _{EBO} | — | <1 | 10 | nA | V _{EB} = 5.6V |
| Collector Emitter Cut-Off Current | I _{CES} | — | <1 | 10 | nA | V _{CES} = 120V |
| DC Current Transfer Static Ratio (Note 9) | h _{FE} | 260 | 420 | — | — | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | 1200 | | |
| | | 150 | 220 | — | | |
| | | 30 | 50 | — | | |
| | | — | 15 | — | | |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | — | 17 | 25 | mV | I _C = 0.2A, I _B = 20mA |
| | | — | 70 | 100 | | |
| | | — | 120 | 150 | | |
| | | — | 150 | 200 | | |
| | | — | 300 | 440 | | |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(SAT)} | — | 1100 | 1200 | mV | I _C = 5A, I _B = 250mA |
| Base-Emitter Turn-On Voltage (Note 9) | V _{BE(ON)} | — | 1000 | 1100 | mV | I _C = 5A, V _{CE} = 2V |
| Transitional Frequency | f _T | — | 140 | — | MHz | I _C = 50mA, V _{CE} = 10V, f = 100MHz |
| Output Capacitance | C _{OBO} | — | 21 | 30 | pF | V _{EB} = 10V, f = 1MHz |
| Switching Time | t _{ON} | — | 90 | — | ns | V _{CC} = 50V, I _C = 2A, I _{B1} = -I _{B2} = 20mA |
| | t _{OFF} | — | 750 | — | ns | |

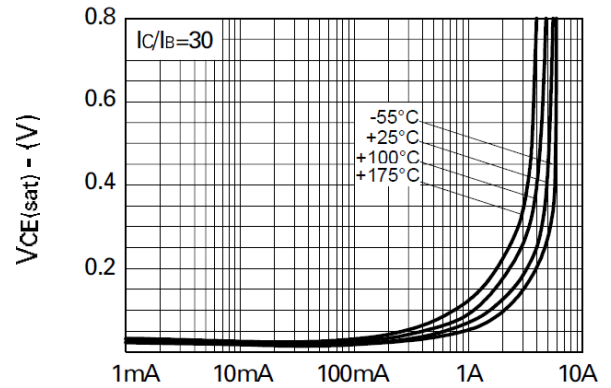
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



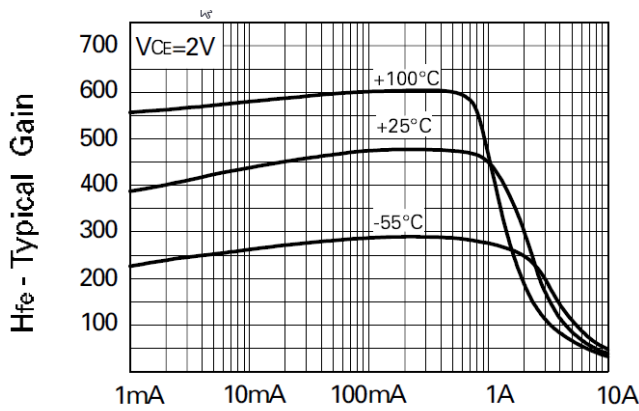
I_C -Collector Current

$V_{CE(sat)}$ v I_C



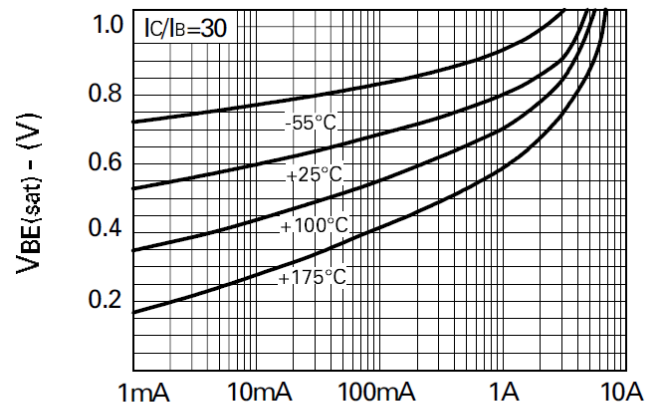
I_C -Collector Current

$V_{CE(sat)}$ v I_C



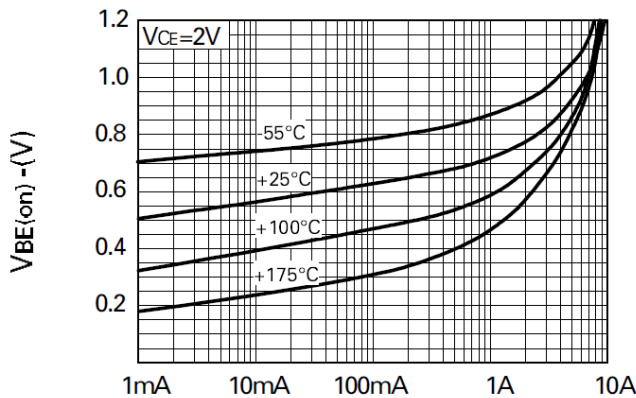
I_C -Collector Current

h_{FE} v I_C



I_C -Collector Current

$V_{BE(sat)}$ v I_C

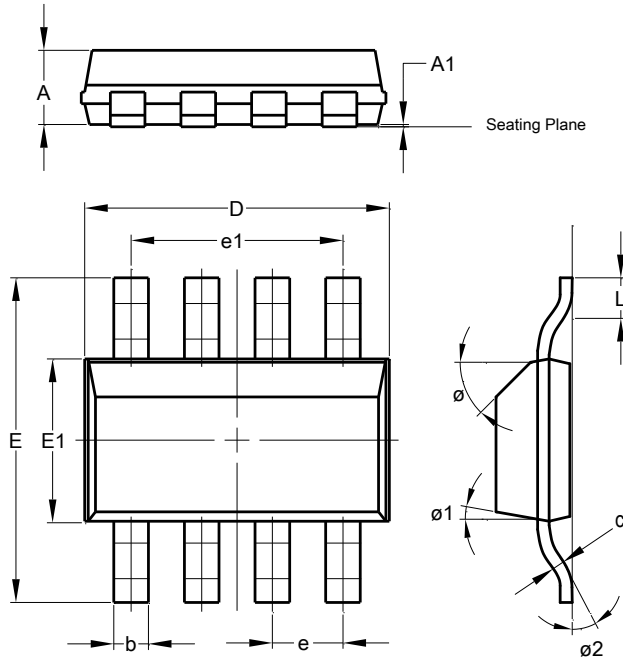


I_C -Collector Current

$V_{BE(on)}$ v I_C

Package Outline Dimensions

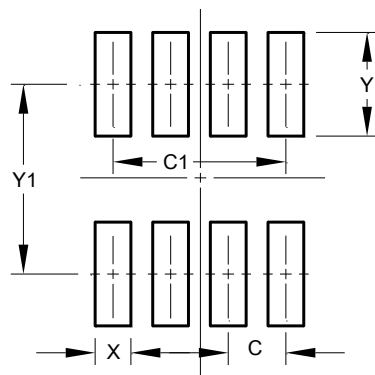
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SM-8 | | | |
|----------------------|----------|------|------|
| Dim | Min | Max | Typ |
| A | -- | 1.70 | 1.60 |
| A1 | 0.02 | 0.10 | 0.04 |
| b | 0.70 | 0.90 | 0.80 |
| c | 0.24 | 0.32 | 0.28 |
| D | 6.30 | 6.70 | 6.60 |
| e | 1.53 REF | | |
| e1 | 4.59 REF | | |
| E | 6.70 | 7.30 | 7.00 |
| E1 | 3.30 | 3.70 | 3.50 |
| L | 0.75 | 1.00 | 0.90 |
| Ø | -- | -- | 45° |
| Ø1 | -- | 15° | -- |
| Ø2 | -- | -- | 10° |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.52 |
| C1 | 4.60 |
| X | 0.95 |
| Y | 2.80 |
| Y1 | 6.80 |

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