# 100V NPN DARLINGTON TRANSISTOR IN SOT223

## Features

- $BV_{CEO}$ > 100V
- $BV_{CBO}$ > 100V
- $I_C$ = 1.5A high Continuous current
- hFE > 10k for very high gain @ 100mA
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

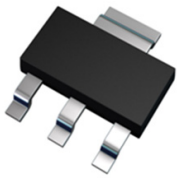
## Mechanical Data

- Case: SOT223
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (approximate)

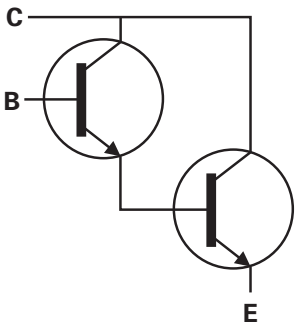
## Applications

- Lamp
- Relay
- Solenoid driving

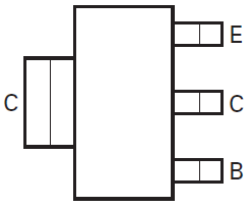
SOT223



Top View




Device Symbol



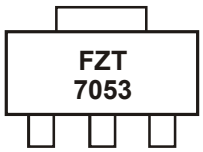

Top View
Pin-Out

## Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|
| FZT7053TA | FZT7053 | 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 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.

## Marking Information




FZT7053 = Product Type Marking Code

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

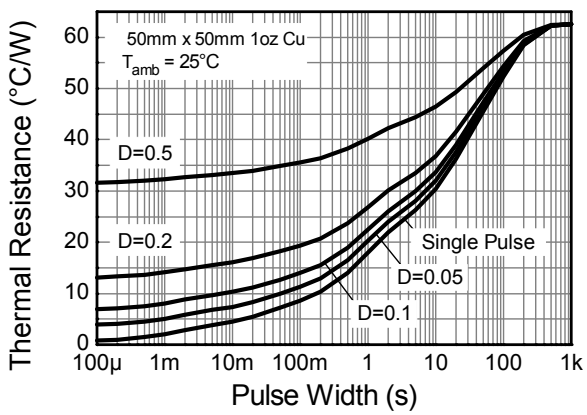
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 100 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 12 | V |
| Continuous Collector Current | $I_C$ | 1.5 | A |
| Peak Pulse Current | $I_{CM}$ | 2 | A |

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

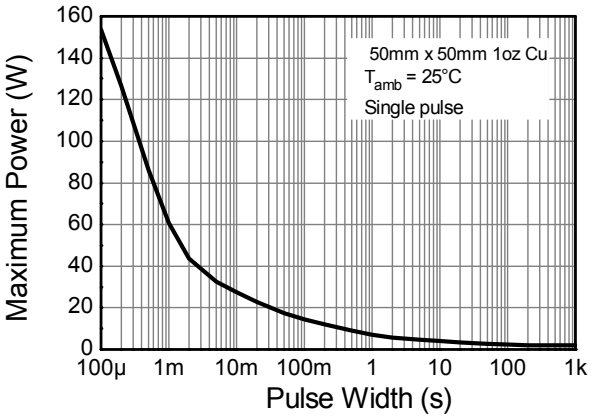
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 5) | $P_D$ | 1 | W |
| Power Dissipation (Note 6) | $P_D$ | 1.25 | W |
| Power Dissipation (Note 7) | $P_D$ | 2 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 125 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 100 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 7) | $R_{\theta JA}$ | 62 | °C/W |
| Thermal Resistance, Junction to Lead (Note 8) | $R_{\theta JL}$ | 19.4 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes:
5. For a device surface mounted on 15mm x 14mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Same as note (5), except the device is surface mounted on 25mm x 25mm with 1oz copper.
7. Same as note (5), except the device is surface mounted on 50mm x 50mm with 1oz copper.
8. Thermal resistance from junction to solder-point (at the end of the collector lead).

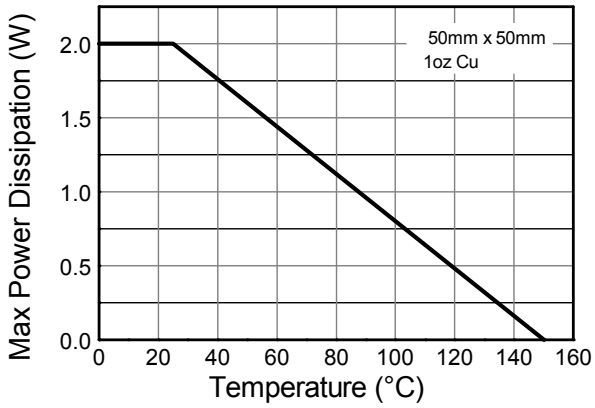
## Thermal Characteristics and Derating Information




**Transient Thermal Impedance**




**Pulse Power Dissipation**



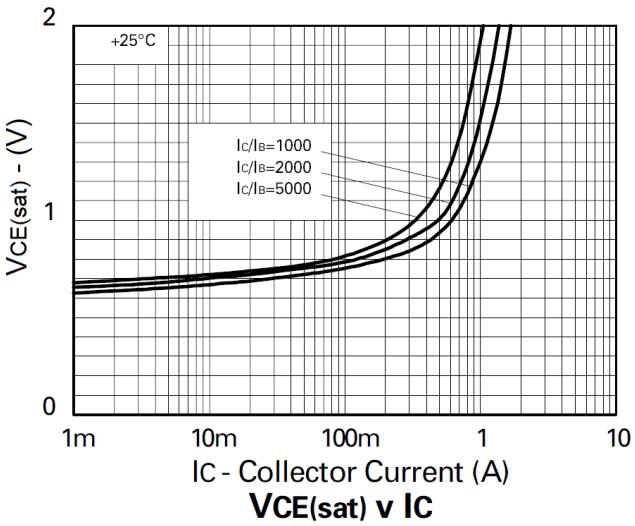

**Derating Curve**

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

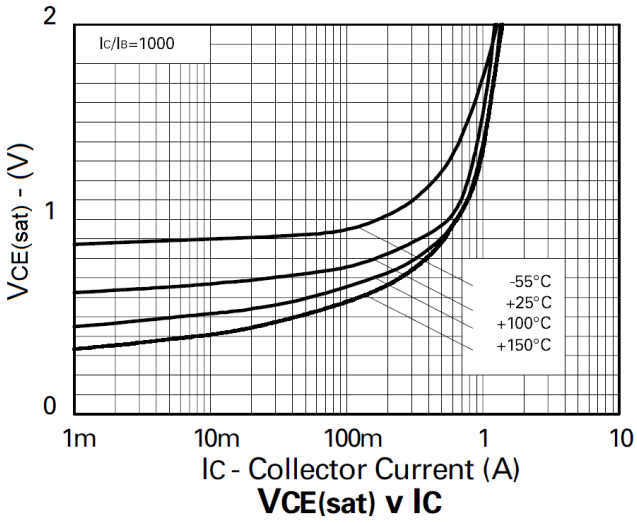
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 100 | 300 | - | V | $I_C$ = 100µA |
| Collector-Emitter Breakdown Voltage (Note 9) | $BV_{CEO}$ | 100 | 130 | - | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 12 | 14 | - | V | $I_E$ = 100µA |
| Collector-Base Cutoff Current | $I_{CBO}$ | - | <10 | 100 | nA | $V_{CB}$ = 80V |
| Collector-Emitter Cutoff Current | $I_{CES}$ | - | <10 | 200 | nA | $V_{CE}$ = 80V |
| Emitter Cutoff Current | $I_{EBO}$ | - | <10 | 100 | nA | $V_{EB}$ = 7V |
| DC Current Gain (Note 9) | $h_{FE}$ | 10,000<br>1,000 | - | - | - | $I_C$ = 100mA, $V_{CE}$ = 5V<br>$I_C$ = 1A, $V_{CE}$ = 5V |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(sat)}$ | - | - | 1.5 | V | $I_C$ = 100mA, $I_B$ = 0.1mA |
| Base-Emitter Turn-On Voltage (Note 9) | $V_{BE(on)}$ | - | - | 2.0 | V | $I_C$ = 100mA, $V_{CE}$ = 5V |
| Output Capacitance (Note 9) | $C_{obo}$ | - | 6.0 | 8.0 | pF | $V_{CB}$ = 10V. f = 1MHz |
| Current Gain-Bandwidth Product (Note 9) | $f_T$ | 200 | - | - | MHz | $V_{CE}$ = 5V, $I_C$ = 100mA |
| Turn-On Time | $t_{on}$ | - | 0.7 | - | µs | $V_{CC}$ = 10V, $I_C$ = 100µA |
| Turn-Off Time | $t_{off}$ | - | 2.5 | - | µs | $I_{B1}$ = -$I_{B2}$ = 0.1mA |

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

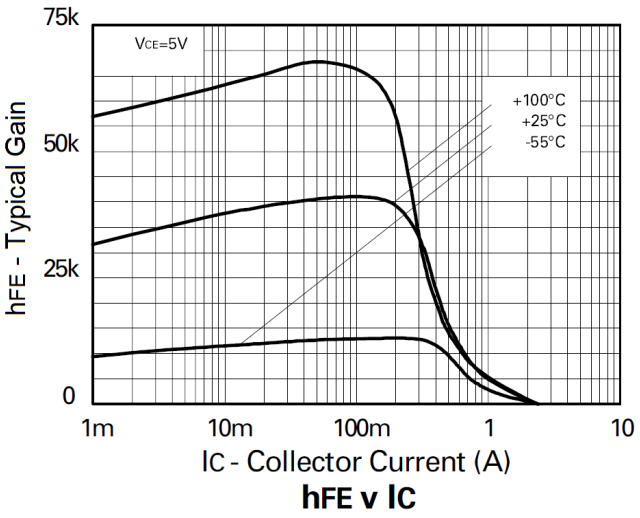
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



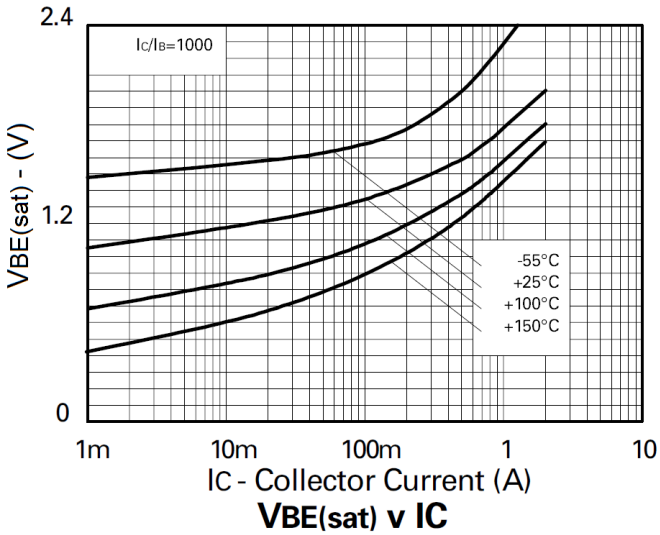

**VCE(sat) v IC**



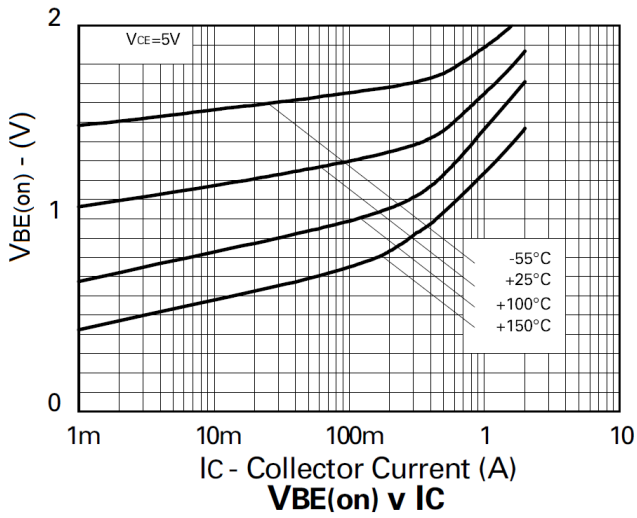

**VCE(sat) v IC**




**hFE v IC**



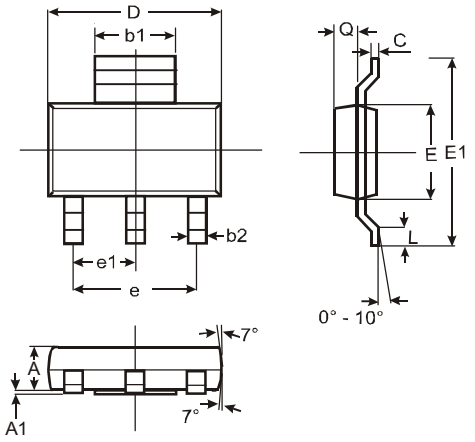

**VBE(sat) v IC**




**VBE(on) v IC**

## Package Outline Dimensions

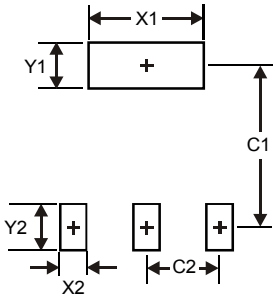
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| SOT223 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.55 | 1.65 | 1.60 |
| **A1** | 0.010 | 0.15 | 0.05 |
| **b1** | 2.90 | 3.10 | 3.00 |
| **b2** | 0.60 | 0.80 | 0.70 |
| **C** | 0.20 | 0.30 | 0.25 |
| **D** | 6.45 | 6.55 | 6.50 |
| **E** | 3.45 | 3.55 | 3.50 |
| **E1** | 6.90 | 7.10 | 7.00 |
| **e** | — | — | 4.60 |
| **e1** | — | — | 2.30 |
| **L** | 0.85 | 1.05 | 0.95 |
| **Q** | 0.84 | 0.94 | 0.89 |
| **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) |
|---|---|
| **X1** | 3.3 |
| **X2** | 1.2 |
| **Y1** | 1.6 |
| **Y2** | 1.6 |
| **C1** | 6.4 |
| **C2** | 2.3 |

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