# ZX5T1951G

## 60V PNP MEDIUM POWER TRANSISTOR IN SOT223

## Features and Benefits

- $BV_{CEO}$ > -60V
- $I_C$ = -6A Continuous Collector Current
- Low Saturation Voltage (-95mV max @ -1A)
- $R_{SAT}$ = 40mΩ for a low equivalent On-Resistance
- $h_{FE}$ specified up to -10A for a high gain hold up
- **RoHS Compliant**
- **Halogen and Antimony Free. "Green" Device (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**

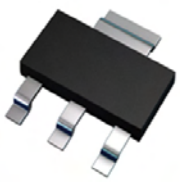
## Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper Leadframe
- Weight: 0.112 grams (Approximate)

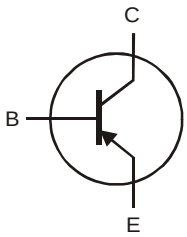
## Applications

- Motor driving
- DC-DC modules
- Backlight inverters
- Actuator, relay, and solenoid drivers

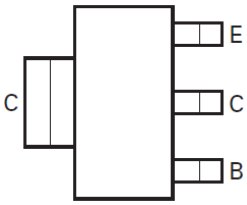
SOT223



Top View




Device Symbol



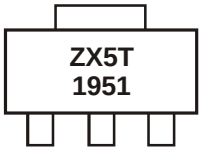

Top View
Pin-Out

## Ordering Information (Note 2)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|
| ZX5T1951GTA | ZX5T1951 | 7 | 12 | 1,000 |

Notes: 1. Diodes Inc's "Green" Policy can be found on our website at http://www.diodes.com
2. For Packaging Details, go to our website at http://www.diodes.com.

## Marking Information




ZX5T1951 = Product type Marking Code


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## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -90 | V |
| Collector-Emitter Voltage | $V_{CES}$ | -90 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -60 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -7 | V |
| Continuous Collector Current (Note 3) | $I_C$ | -6 | A |
| Peak Pulse Current | $I_{CM}$ | -15 | A |
| Base Current | $I_B$ | -1 | A |

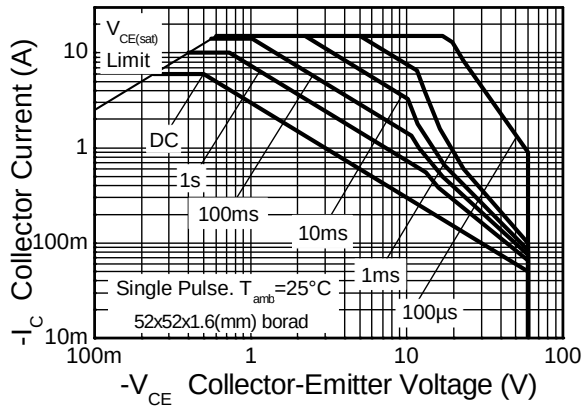
## Thermal Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation<br>Linear derating factor | (Note 3) | $P_D$ | 3.0<br>24 | W<br>mW /°C |
| | (Note 4) | | 1.6<br>12.8 | |
| Thermal Resistance, Junction to Ambient | (Note 3) | $R_{\theta JA}$ | 42 | °C/W |
| | (Note 4) | $R_{\theta JA}$ | 78 | |
| Thermal Resistance Junction to Lead | (Note 5) | $R_{\theta JL}$ | 12.3 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

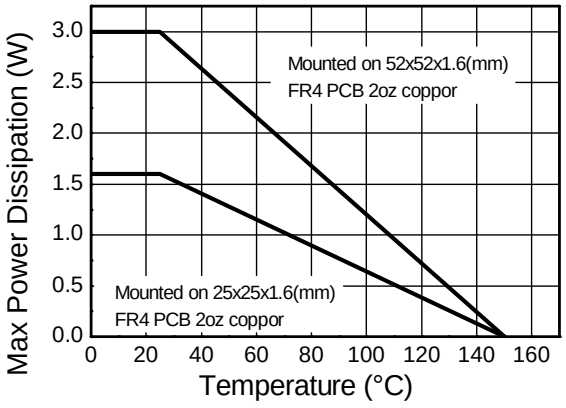
Notes:
3. For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
4. Same as note (3), except the device is surface mounted on 25mm x 25mm with 1oz copper.
5. Thermal resistance from junction to solder-point (at the end of the collector lead).


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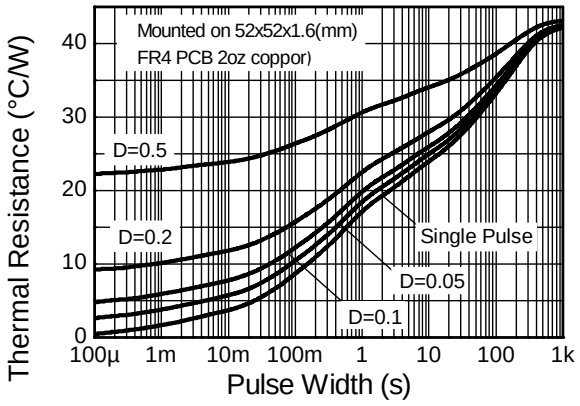
## Thermal Characteristics



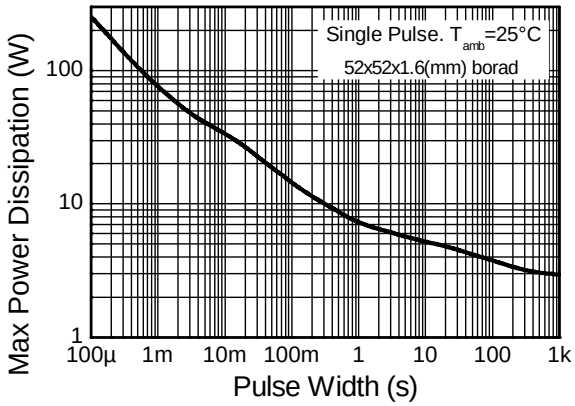

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**




**Pulse Power Dissipation**


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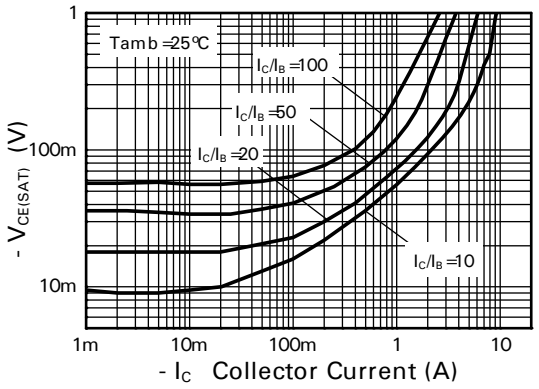
## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -90 | -120 | - | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage | $BV_{CES}$ | -90 | -120 | - | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage (Note 6) | $BV_{CEO}$ | -60 | -80 | - | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -7 | -8 | - | V | $I_E$ = -100µA |
| Collector-Base Cutoff Current | $I_{CBO}$ | - | <1 | -50 | nA | $V_{CB}$ = -72V |
| Collector-Emitter Cutoff Current | $I_{CES}$ | - | <1 | -50 | nA | $V_{CB}$ = -72V |
| Emitter Cutoff Current | $I_{EBO}$ | - | <1 | -10 | nA | $V_{EB}$ = -6V |
| Static Forward Current Transfer Ratio (Note 6) | $h_{FE}$ | 100 | 240 | - | - | $I_C$ = -10mA, $V_{CE}$ = -2V |
| | | 100 | 180 | 300 | | $I_C$ = -2A, $V_{CE}$ = -2V |
| | | 40 | 70 | - | | $I_C$ = -5A, $V_{CE}$ = -2V |
| | | 5 | 14 | - | | $I_C$ = -10A, $V_{CE}$ = -2V |
| Collector-Emitter Saturation Voltage (Note 6) | $V_{CE(sat)}$ | - | -16 | -30 | mV | $I_C$ = -100mA, $I_B$ = -10mA |
| | | - | -55 | -95 | | $I_C$ = -1A, $I_B$ = -100mA |
| | | - | -85 | -130 | | $I_C$ = -2A, $I_B$ = -200mA |
| | | - | -200 | -260 | | $I_C$ = -5A, $I_B$ = -500mA |
| Base-Emitter Saturation Voltage (Note 6) | $V_{BE(sat)}$ | - | -1 | -1.15 | V | $I_C$ = -5A, $I_B$ = -500mV |
| Base-Emitter Turn-On Voltage (Note 6) | $V_{BE(on)}$ | - | -0.89 | -1.0 | V | $I_C$ = -5A, $V_{CE}$ = -2V |
| Output Capacitance (Note 6) | $C_{obo}$ | - | 33 | 70 | pF | $V_{CB}$ = -10V. f = 1MHz |
| Transition Frequency | $f_T$ | - | 120 | - | MHz | $V_{CE}$ = -10V, $I_C$ = -100mA f = 50MHz |
| Switching Time | $t_{on}$ | - | 33 | 80 | ns | $V_{CC}$ = -10V, $I_C$ = -2A |
| | $t_{off}$ | - | 215 | 300 | | $I_{B1}$ = -$I_{B2}$ = -200mA |

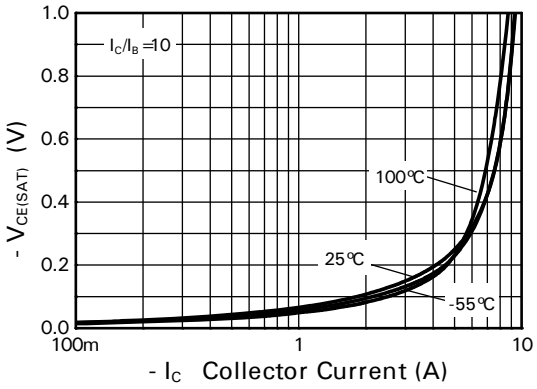
Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%


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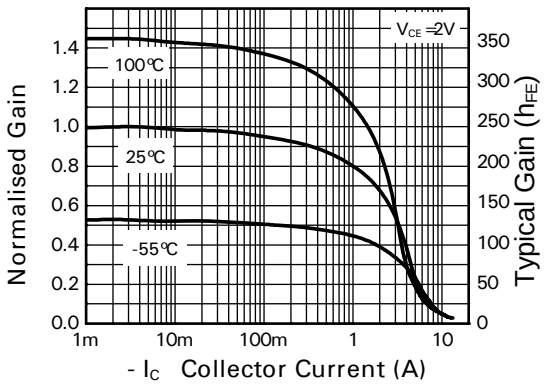
## Typical Electrical Characteristics



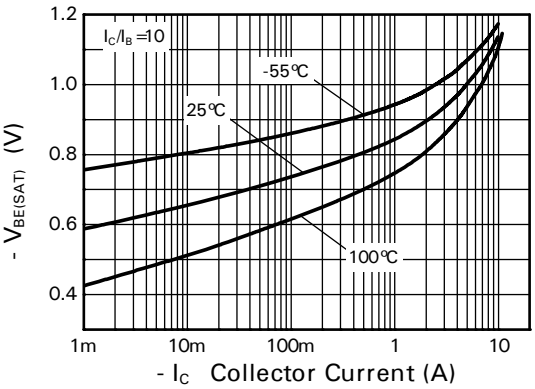

$V_{CE(SAT)}$ v $I_C$



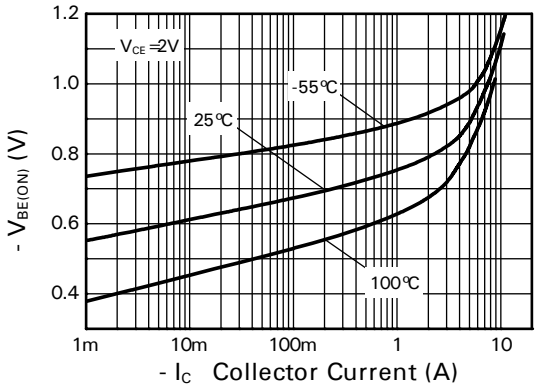

$V_{CE(SAT)}$ v $I_C$




$h_{FE}$ v $I_C$



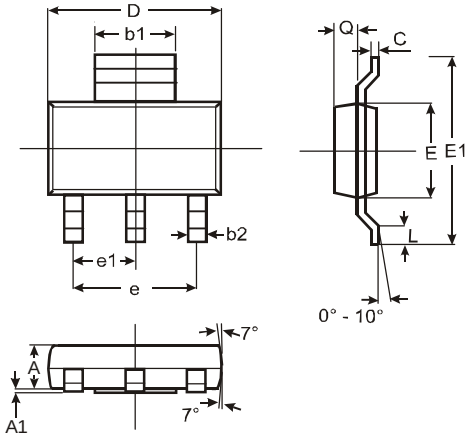

$V_{BE(SAT)}$ v $I_C$




$V_{BE(ON)}$ v $I_C$

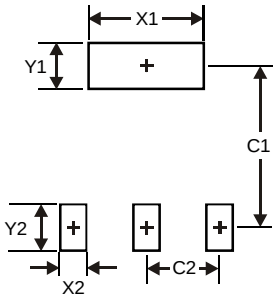

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## Package Outline Dimensions




| 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




| 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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