

30V NPN MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

Features

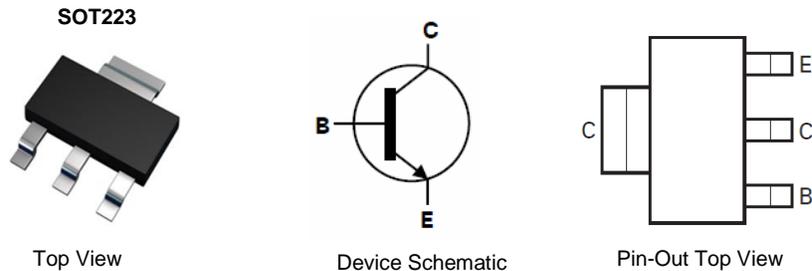
- $BV_{CEO} > 30V$
- $I_C = 7A$ Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)} < 50mV$ Max @ 1A
- $R_{SAT} = 28m\Omega$ @ 6.5A for Low Equivalent On-Resistance
- h_{FE} Specified up to 20A for High Gain Hold Up
- **Lead-Free Finish; RoHS Compliant (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
- Weight: 0.112 grams (Approximate)

Applications

- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

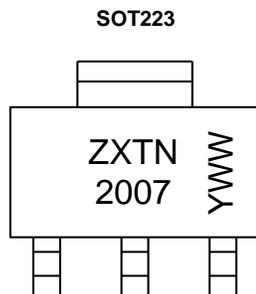


Ordering Information (Note 4)

| Part Number | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|-------------|----------|--------------------|-----------------|-------------------|
| ZXTN2007GTA | ZXTN2007 | 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



ZXTN 2007 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 5 = 2015)
 WW or \bar{WW} = Week Code (01 - 53)

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 80 | V |
| Collector-Emitter Voltage | V _{CEO} | 30 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 7 | A |
| Peak Pulse Current | I _{CM} | 20 | A |

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

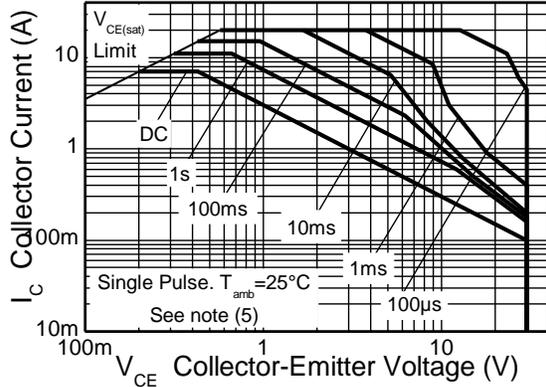
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|-------|
| Power Dissipation | P _D | 3.0 | W |
| | | 24 | |
| Linear Derating Factor | | 1.6 | mW/°C |
| | | 12.8 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 42 | °C/W |
| | R _{θJA} | 78 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 8.8 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

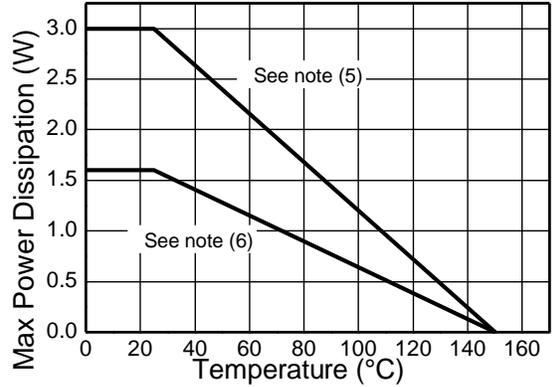
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

- Notes:
5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
 6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
 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.

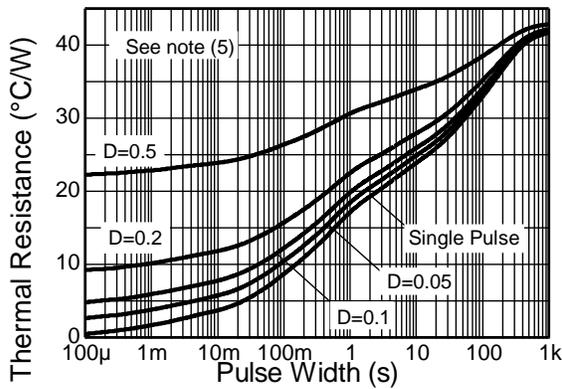
Thermal Characteristics and Derating Information



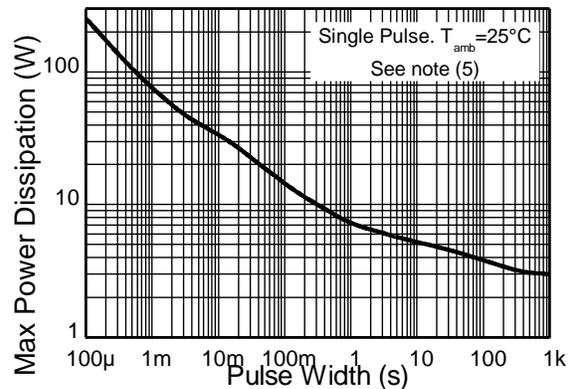
Safe Operating Area



Derating Curve



Transient Thermal Impedance



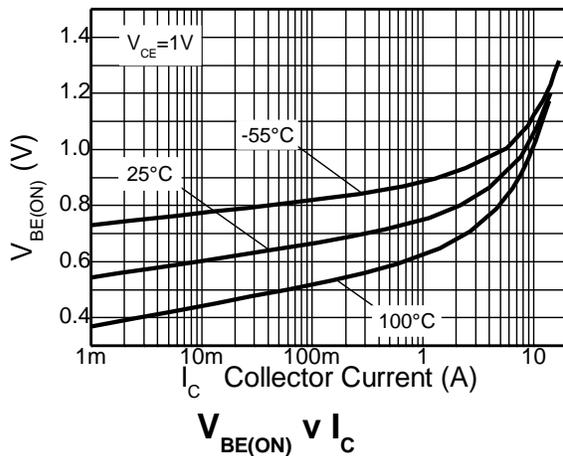
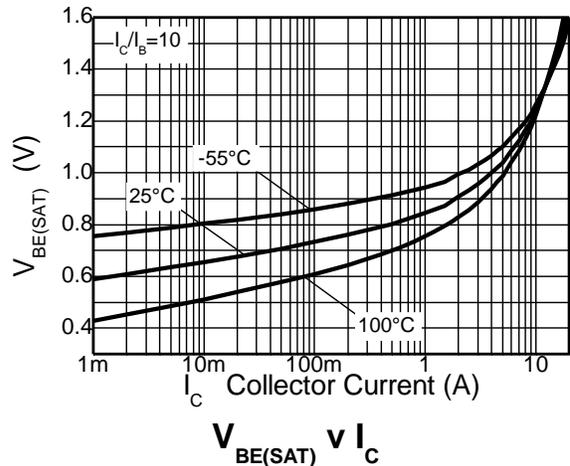
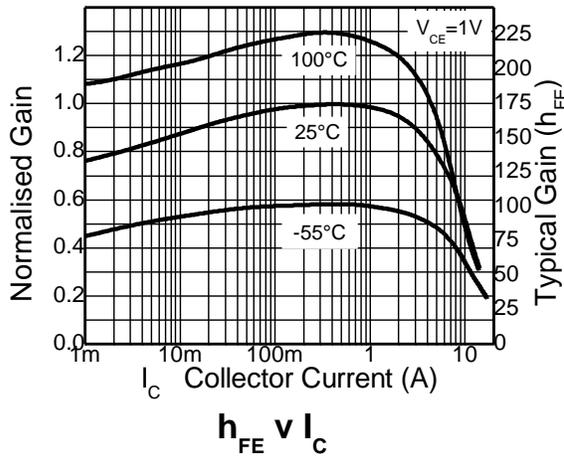
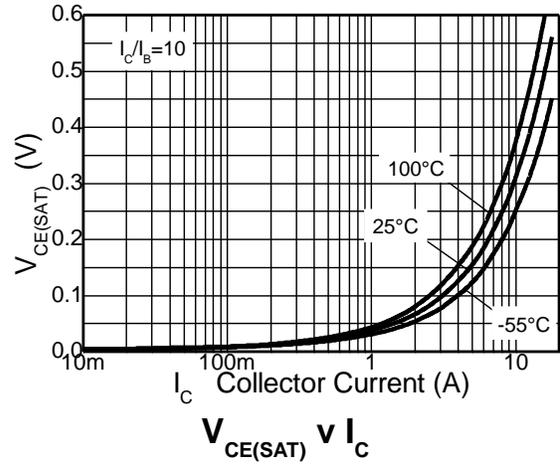
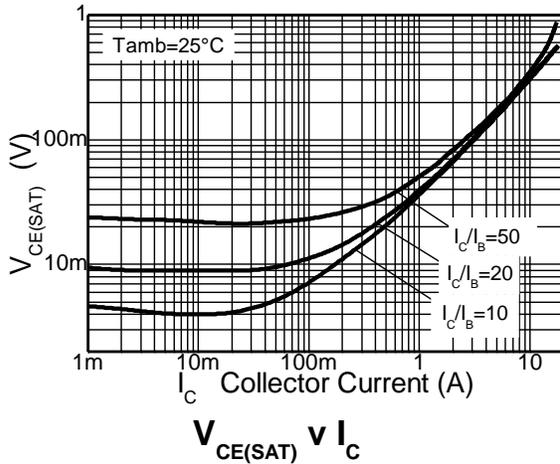
Pulse Power Dissipation

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-------------------------|------------------------------|------------------------------|------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | 80 | 125 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage | BV _{CER} | 80 | 125 | — | V | I _C = 1μA, R _B ≤ 1kΩ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 30 | 40 | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.1 | — | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | — | < 1 | 50 | nA | V _{CB} = 70V |
| | | — | — | 0.5 | μA | V _{CB} = 70V, T _A = +100°C |
| Collector Cutoff Current | I _{CER} | — | < 1 | 100 | nA | V _{CB} = 70V |
| | R _S ≤ 1kΩ | — | — | 0.5 | μA | V _{CB} = 70V, T _A = +100°C |
| Emitter Cutoff Current | I _{EBO} | — | < 1 | 10 | nA | V _{EB} = 6V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(SAT)} | — | 25 35 50 100 185 | 35 50 65 125 220 | mV | I _C = 500mA, I _B = 20mA I _C = 1A, I _B = 100mA I _C = 1A, I _B = 20mA I _C = 2A, I _B = 20mA I _C = 6.5A, I _B = 300mA |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(SAT)} | — | 1.03 | 1.13 | V | I _C = 6.5A, I _B = 150mA |
| Base-Emitter Turn-On Voltage (Note 9) | V _{BE(ON)} | — | 0.92 | 1 | V | I _C = 6.5A, V _{CE} = 1V |
| DC Current Gain (Note 9) | h _{FE} | 100 100 100 20 | 175 200 150 30 | 300 | — | I _C = 10mA, V _{CE} = 1V I _C = 1A, V _{CE} = 1V I _C = 7A, V _{CE} = 1V I _C = 20A, V _{CE} = 1V |
| Transition Frequency | f _T | — | 140 | — | MHz | V _{CE} = 10V, I _C = 100mA, f = 50MHz |
| Output Capacitance (Note 9) | C _{OBO} | — | 48 | — | pF | V _{CB} = 10V, f = 1MHz |
| Switching Times | t _{ON} | — | 37 | — | ns | V _{CC} = 10V, I _C = 1A, I _{B1} = -I _{B2} = 100mA |
| | t _{OFF} | — | 425 | — | | |

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

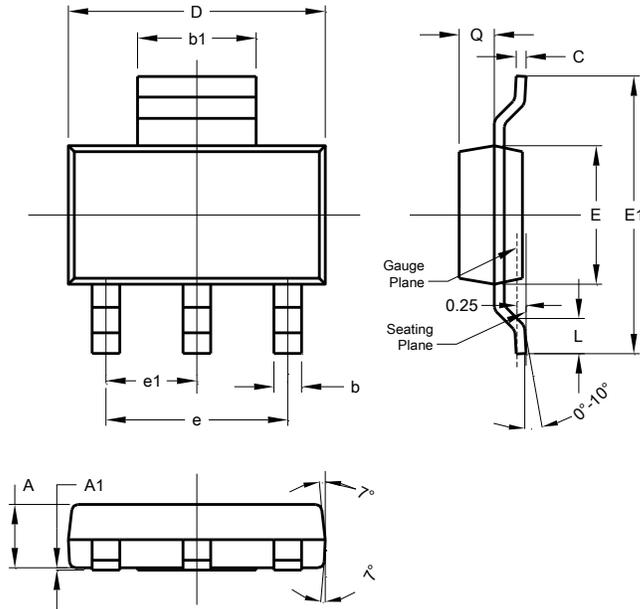
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

SOT223

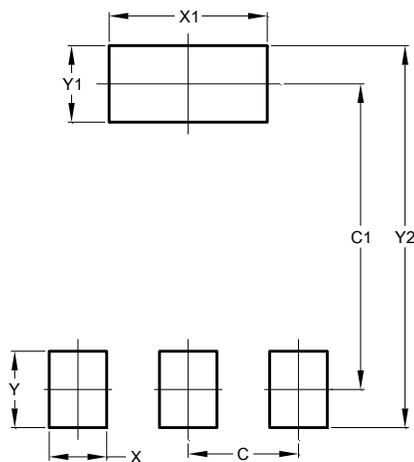


| SOT223 | | | |
|-----------------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b | 0.60 | 0.80 | 0.70 |
| b1 | 2.90 | 3.10 | 3.00 |
| C | 0.20 | 0.30 | 0.25 |
| D | 6.45 | 6.55 | 6.50 |
| E | 3.45 | 3.55 | 3.50 |
| E1 | 6.90 | 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.

SOT223



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.30 |
| C1 | 6.40 |
| X | 1.20 |
| X1 | 3.30 |
| Y | 1.60 |
| Y1 | 1.60 |
| C2 | 8.00 |

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