



ZXTD2090E6

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

Features

- $BV_{CEO} = 50V$
- $R_{SAT} = 160mV$
- $I_C = 1A$ Continuous Collector Current
- Low Equivalent On Resistance
- Low Saturation Voltage
- SOT23-6 package
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **“Green” Devices (Note 2)**

Mechanical Data

- Case: SOT23-6
- Case material: Molded Plastic. “Green” Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.018 grams (approximate)

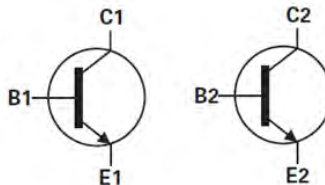
Applications

- LCD Backlighting inverter circuits
- Boost functions in DC-DC converters

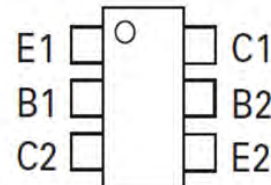
SOT-223



Top View



Device symbol



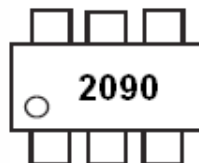
Pin Configuration

Ordering Information

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|---------|--------------------|-----------------|-------------------|
| ZXTD2090E6TA | 2090 | 7 | 8 | 3000 |

Notes: 1. No purposefully added lead. Halogen and Antimony Free.
2. Diodes Inc.'s “Green” Policy can be found on our website at <http://www.diodes.com>.

Marking Information



2090 = Product type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|---------------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CB0} | 50 | V |
| Collector-Emitter Voltage | V_{CEO} | 50 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Continuous Collector Current (Note 5) | I_C | 1 | A |
| Base current | I_B | 200 | mA |
| Peak Pulse Current | I_{CM} | 2 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Notes 3 & 6) Linear derating factor | P_D | 0.90 7.2 | W mW/ $^\circ\text{C}$ |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Notes 3 & 7) Linear derating factor | P_D | 1.1 8.8 | W mW/ $^\circ\text{C}$ |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Notes 4 & 6) Linear derating factor | P_D | 1.7 13.6 | W mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction to Ambient (Notes 3 & 6) | $R_{\theta JA}$ | 139 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient (Notes 4 & 6) | $R_{\theta JA}$ | 73 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient (Notes 3 & 7) | $R_{\theta JA}$ | 113 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
3. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions
 4. For a device surface mounted on FR4 PCB measured at < 5sec
 5. Repetitive rating – pulse width limited by maximum junction temperature. Refer to transient thermal impedance graph
 6. For a device with one active die
 7. For a device with two die running at equal power

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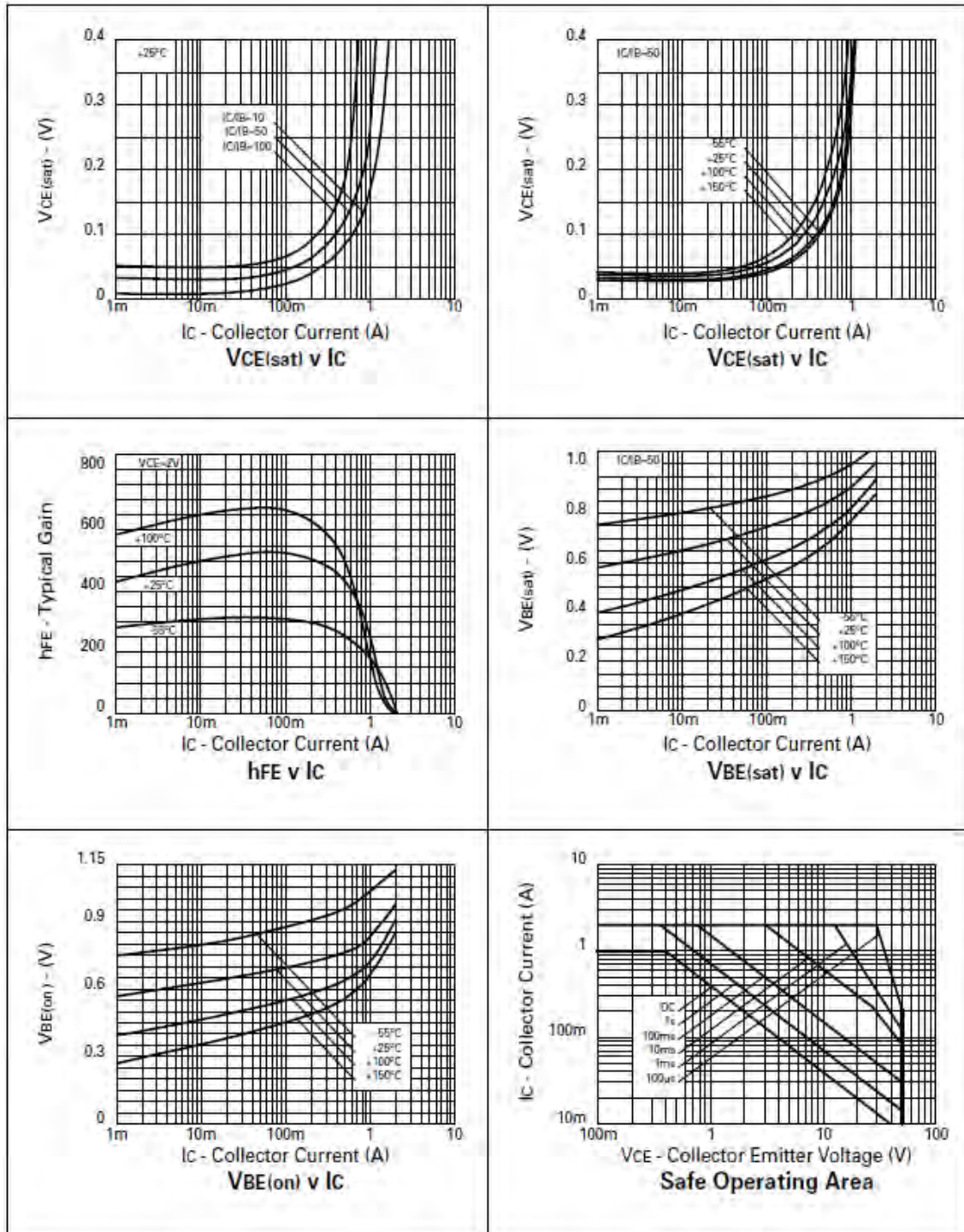
Electrical Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-------------------------------|--------------------------------|------------------------|------|---|
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | 50 | | | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 8) | V _{(BR)CEO} | 50 | | | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | 5 | | | V | I _E = 100μA |
| Collector-Base Cutoff Current | I _{CBO} | | | 10 | nA | V _{CB} = 40V |
| Collector-Emitter Cutoff Current | I _{CES} | | | 10 | nA | V _{CE} = 40V |
| Emitter Cutoff Current | I _{EBO} | | | 10 | nA | V _{EB} = 4V |
| DC Current Gain (Note 8) | h _{FE} | 200 300 200 75 20 | 420 450 350 130 60 | | | I _C = 10mA, V _{CE} = 2V I _C = 100mA, V _{CE} = 2V I _C = 500mA, V _{CE} = 2V I _C = 1A, V _{CE} = 2V I _C = 1.5A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 8) | V _{CE(SAT)} | | 24 60 120 160 | 35 80 200 270 | mV | I _C = 100mA, I _B = 10mA I _C = 250mA, I _B = 10mA I _C = 500mA, I _B = 10mA I _C = 1A, I _B = 50mA |
| Base-Emitter Saturation Voltage (Note 8) | V _{BE(sat)} | | 940 | 1100 | mV | I _C = 1A, I _B = 50mA |
| Base-Emitter Turn-On Voltage (Note 8) | V _{BE(ON)} | | 850 | 1100 | mV | I _C = 1A, V _{CE} = 2V |
| Output Capacitance | C _{obo} | | 10 | | pF | V _{CB} = 10V, f = 1MHz |
| Current Gain-Bandwidth Product | f _T | | 215 | | MHz | V _{CE} = 10V, I _C = 50mA f = 100MHz |
| Turn-On Time | t _{on} | | 150 | | ns | V _{CC} = 10V, I _C = 1A |
| Turn-Off Time | t _{off} | | 425 | | ns | I _{B1} = -I _{B2} = 100mA |

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

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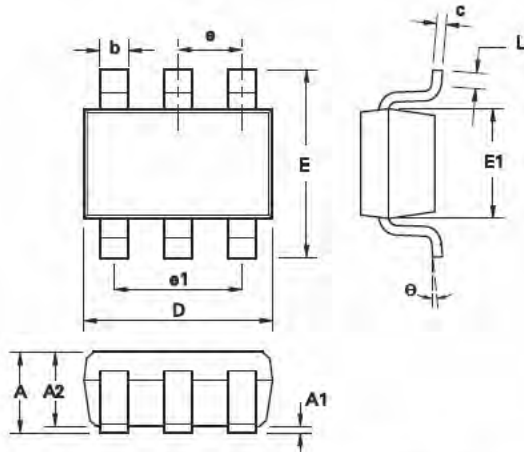
Typical Characteristics



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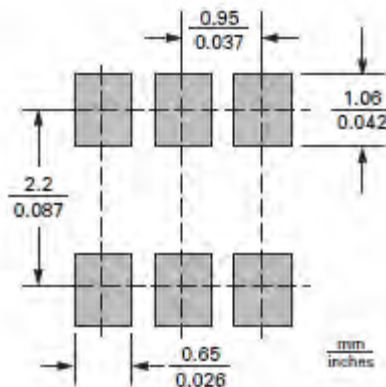
Package Outline Dimensions



| DIM | Millimeters | | Inches | |
|-----|-------------|------|------------|--------|
| | Min. | Max. | Min. | Max. |
| A | 0.90 | 1.45 | 0.0354 | 0.0570 |
| A1 | 0.00 | 0.15 | 0.00 | 0.0059 |
| A2 | 0.90 | 1.30 | 0.0354 | 0.0511 |
| b | 0.35 | 0.50 | 0.0078 | 0.0196 |
| C | 0.09 | 0.26 | 0.0035 | 0.0102 |
| D | 2.70 | 3.10 | 0.1062 | 0.1220 |
| E | 2.20 | 3.20 | 0.0866 | 0.1181 |
| E1 | 1.30 | 1.80 | 0.0511 | 0.0708 |
| L | 0.10 | 0.60 | 0.0039 | 0.0236 |
| e | 0.95 REF | | 0.0374 REF | |
| e1 | 1.90 REF | | 0.0748 REF | |
| L | 0° | 30° | 0° | 30° |

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

Suggested Pad Layout



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