



**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)

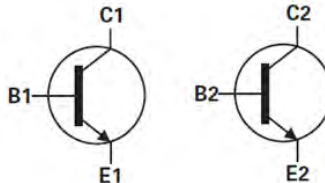
### Applications

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

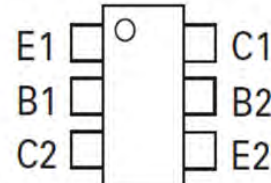
SOT-223



Top View



Device symbol



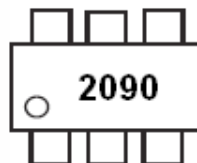
Pin Configuration

### 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	$V_{CBO}$	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)	$P_D$	0.90	W
Linear derating factor		7.2	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (Notes 3 & 7)	$P_D$	1.1	W
Linear derating factor		8.8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (Notes 4 & 6)	$P_D$	1.7	W
Linear derating factor		13.6	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Notes 3 & 6)	$R_{\theta JA}$	139	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Notes 4 & 6)	$R_{\theta JA}$	73	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Notes 3 & 7)	$R_{\theta JA}$	113	$^\circ\text{C/W}$
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<sub>A</sub> = 25°C unless otherwise specified

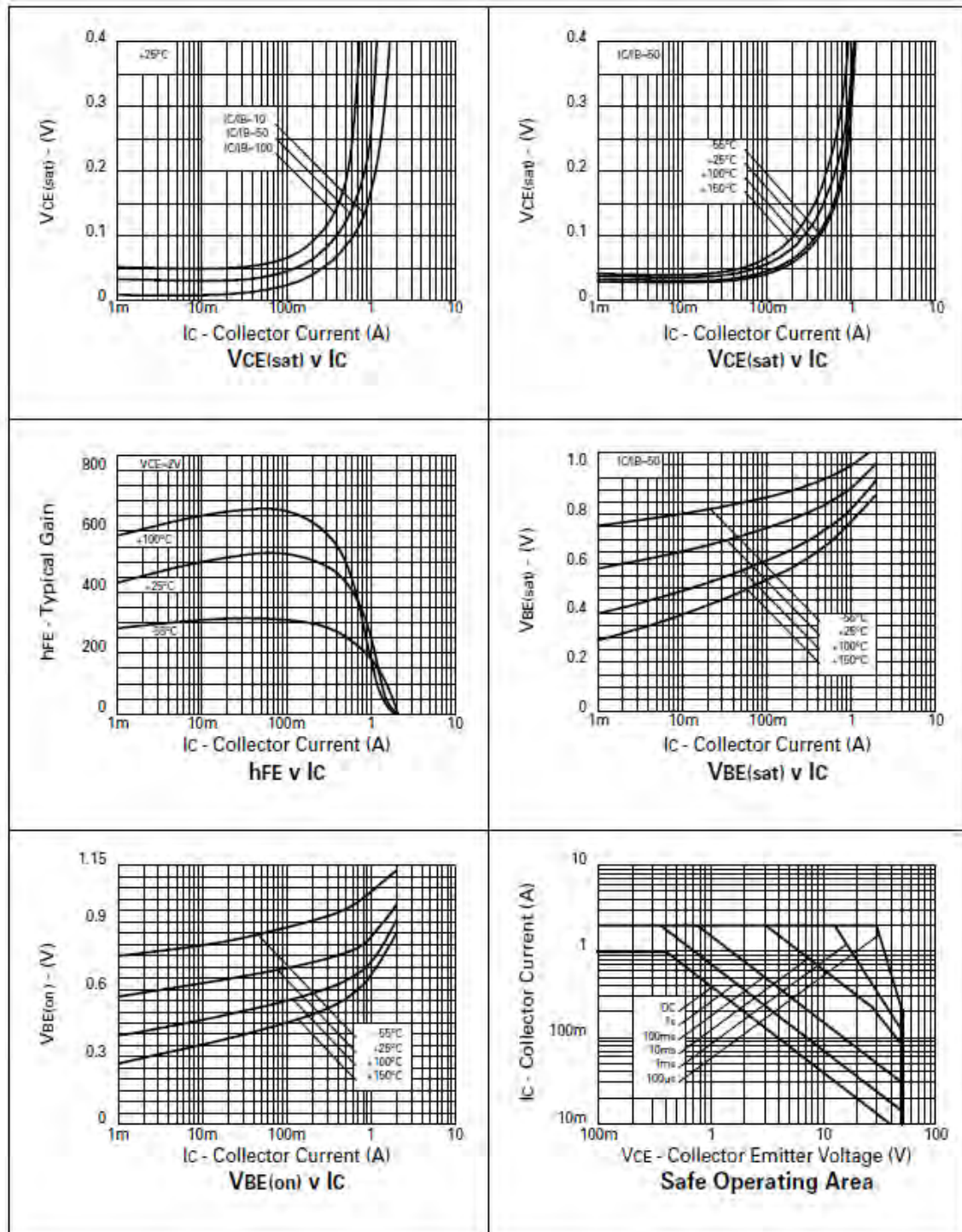
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	50			V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	V <sub>(BR)CEO</sub>	50			V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	5			V	I <sub>E</sub>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

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

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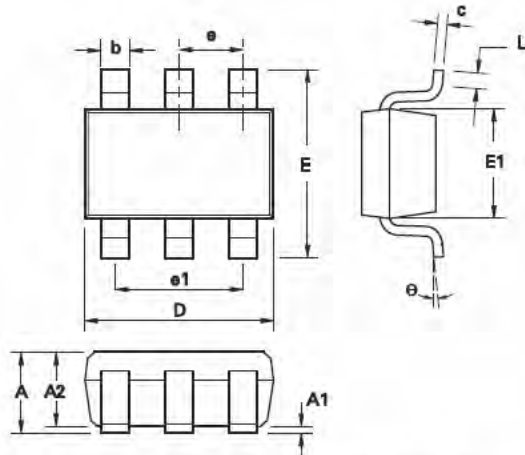
**Typical Characteristics**



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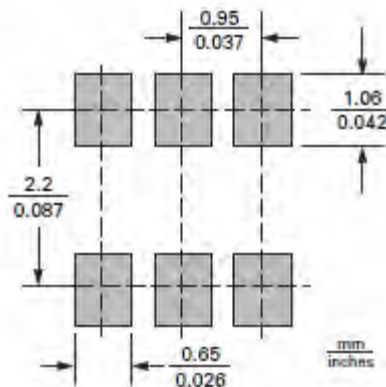
## Package Outline Dimensions



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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