



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)

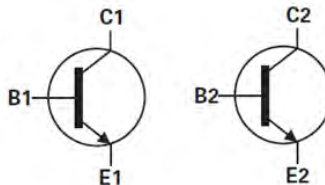
Applications

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

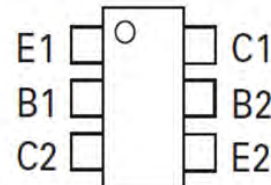
SOT-223



Top View



Device symbol



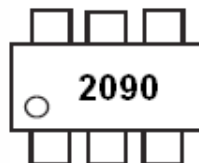
Pin Configuration

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

ZXTD2090E6

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

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

ZXTD2090E6

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

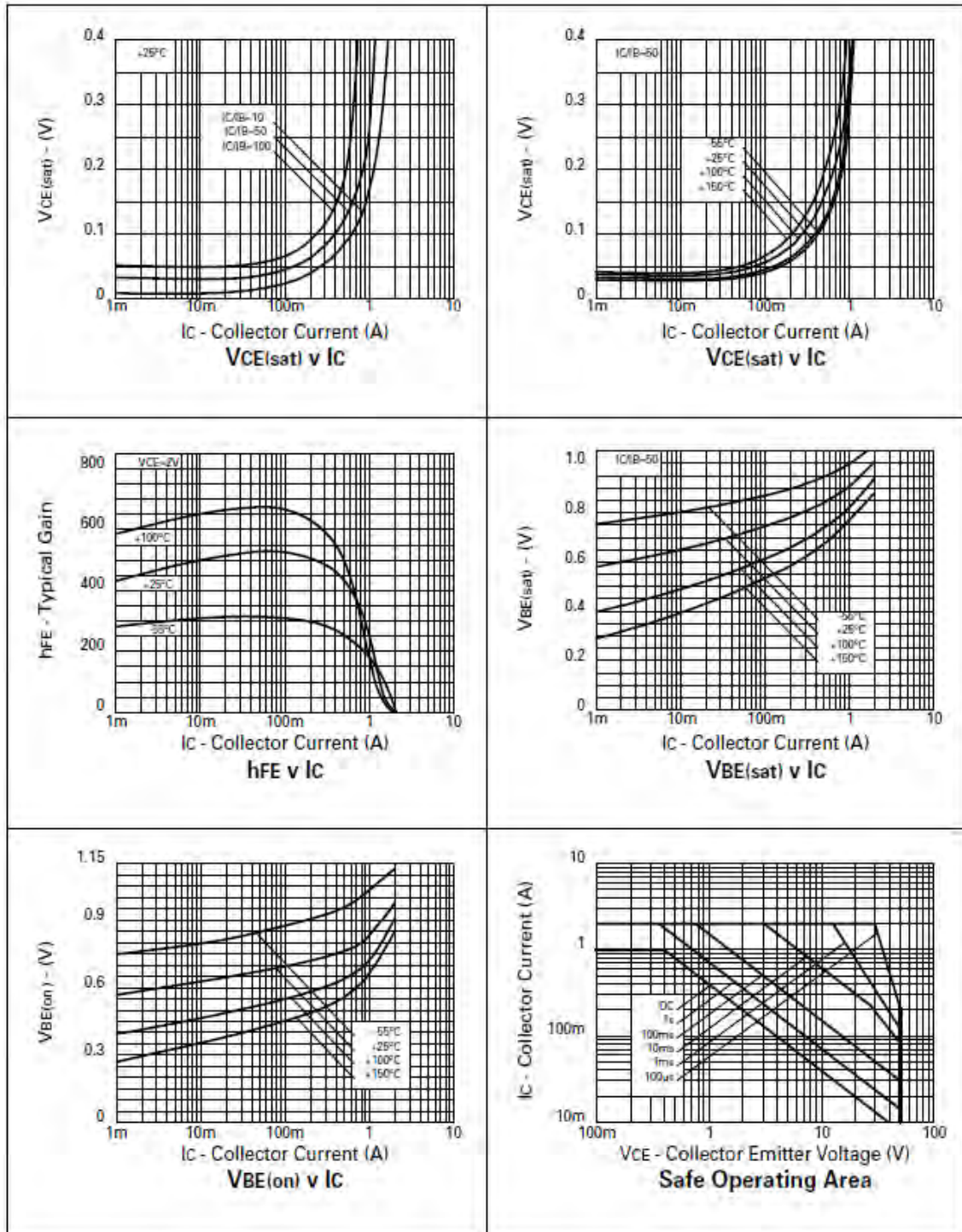
Electrical Characteristics @T_A = 25°C unless otherwise specified

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%

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

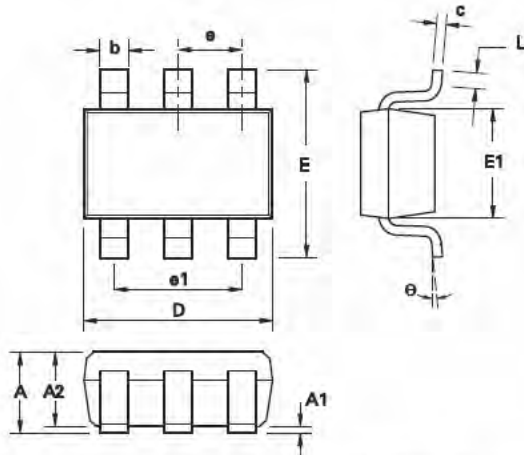
Typical Characteristics



ZXTD2090E6

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

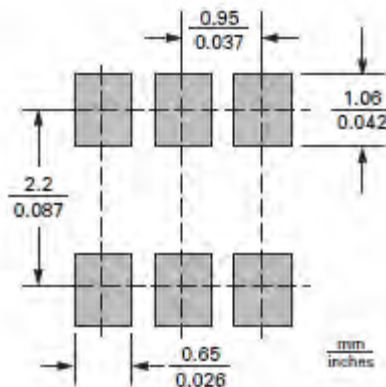
Package Outline Dimensions



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



ZXTD2090E6

DUAL 50V NPN SILICON LOW SATURATION SWITCHING TRANSISTOR

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
 - 1. are intended to implant into the body, or
 - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2009, Diodes Incorporated

www.diodes.com