

**ZXTD09N50DE6**
**50V DUAL NPN LOW SATURATION SWITCHING TRANSISTOR IN SOT26**
**Features**

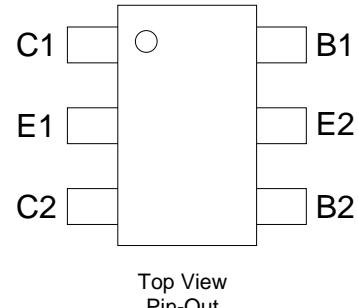
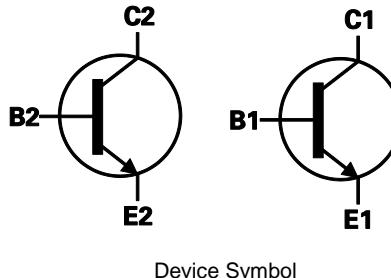
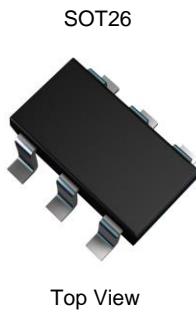
- $BV_{CEO} > 50V$
- $I_C = 1A$  High Continuous Current
- High Gain
- $R_{SAT} = 160m\Omega$  for Low Equivalent On Resistance
- Low Saturation Voltage  $V_{CE(sat)} < -270mV$  @ 1A
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

**Mechanical Data**

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.015 grams (Approximate)

**Applications**

- LCD Backlighting Inverter Circuits
- Boost Functions in DC-DC Converters


**Ordering Information** (Notes 4 & 5)

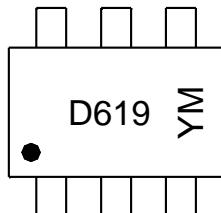
Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTD09N50DE6TA	AEC-Q101	D619	7	8	3,000
ZXTD09N50DE6QTA	Automotive	D619	7	8	3,000

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See [http://www.diodes.com/quality/lead\\_free.html](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. Automotive products are AEC-Q101 qualified and PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**

SOT26



D619 = Product Type Marking Code

YM = Date Code Marking

 Y or  $\bar{Y}$  = Year (ex: C = 2015)

 M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Code	C	D	E	F	G	H	I	J	K	L	M	
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

ZXTD09N50DE6

**Absolute Maximum Ratings – Q1 & Q2 Common** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	50	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	1	A
Peak Pulse Current	$I_{CM}$	2	A
Base Current	$I_B$	200	mA

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$	0.7	W mW/°C
		5.6	
		0.9	
		7.2	
		1.1	
		8.8	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.1	°C/W
		8.8	
		1.7	
		13.6	
		179	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	139	°C/W
		113	
		113	
		73	
		95.50	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

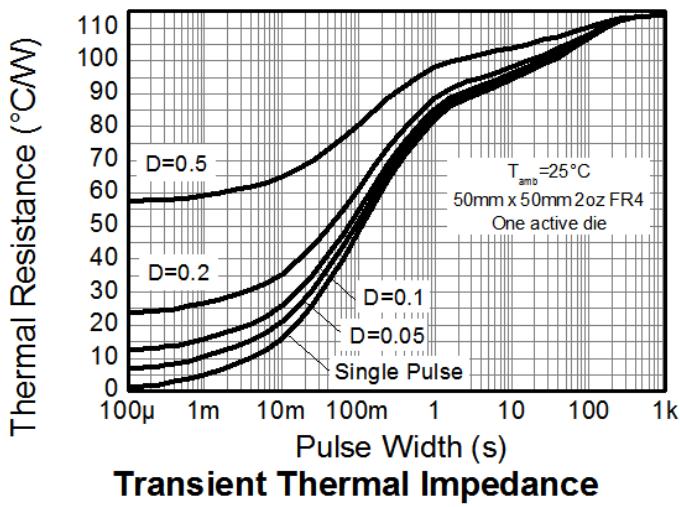
**ESD Ratings** (Note 13)

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

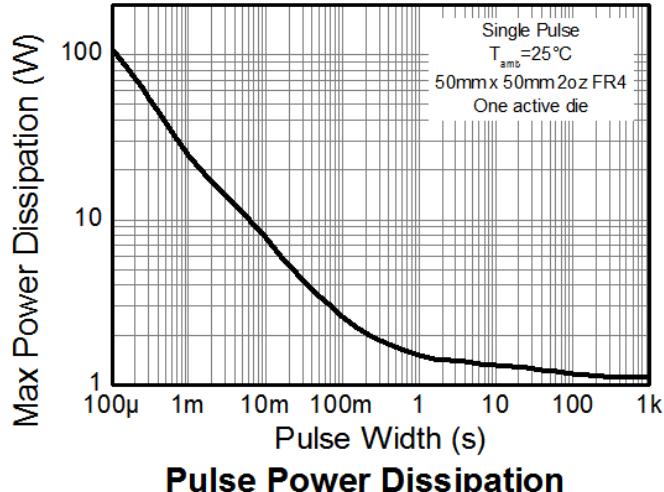
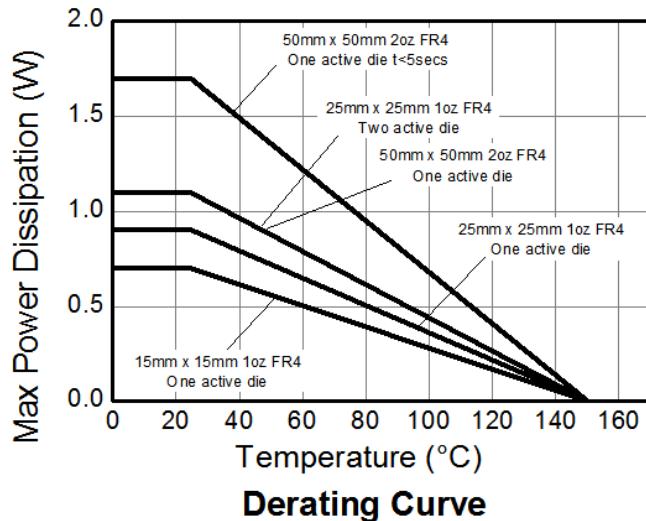
Notes:

- 6. For a device surface mounted on 15mm x 15mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
- 7. Same as Note 6, except the device is surface mounted on 25mm x 25mm 1oz copper.
- 8. Same as Note 6, except the device is surface mounted on 50mm x 50mm 2oz copper.
- 9. Same as Note 8, except the device is measured at  $t < 5$  seconds.
- 10. For device with one active die, both collectors attached to a common heatsink.
- 11. For device with two active dice running at equal power, split heatsink 50% to each collector.
- 12. Thermal resistance from junction to solder-point (at the end of the collector lead).
- 13. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

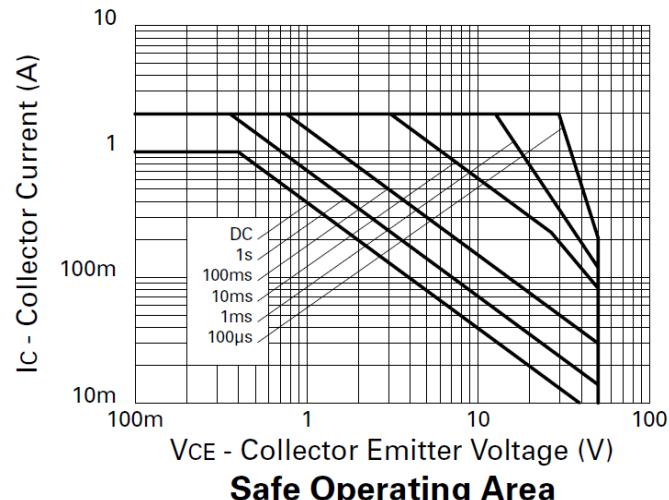
## Thermal Characteristics and Derating Information



**Transient Thermal Impedance**



**Pulse Power Dissipation**



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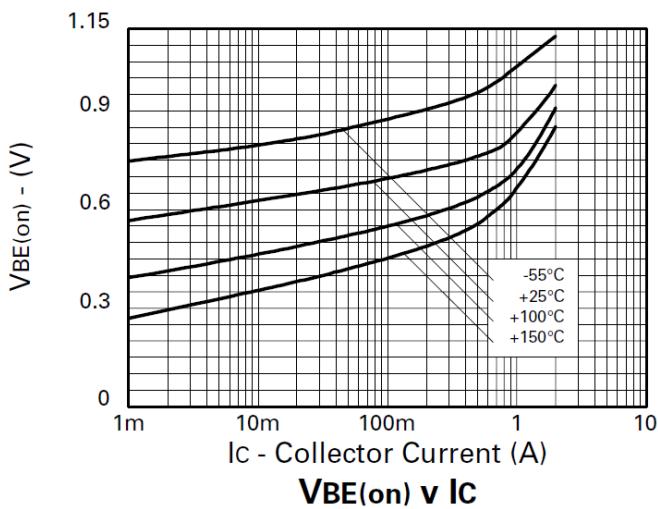
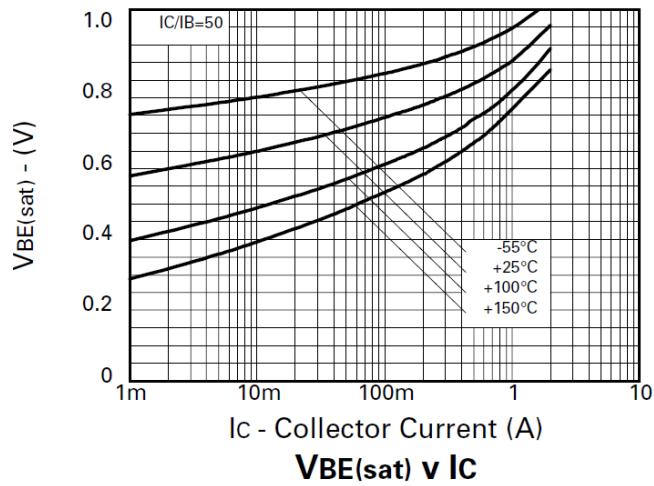
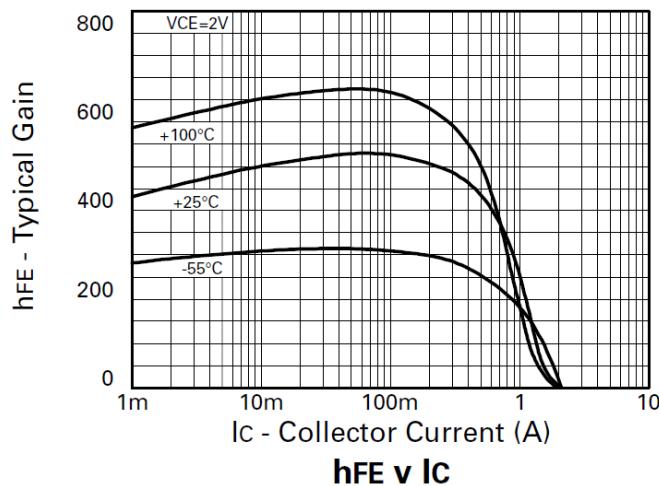
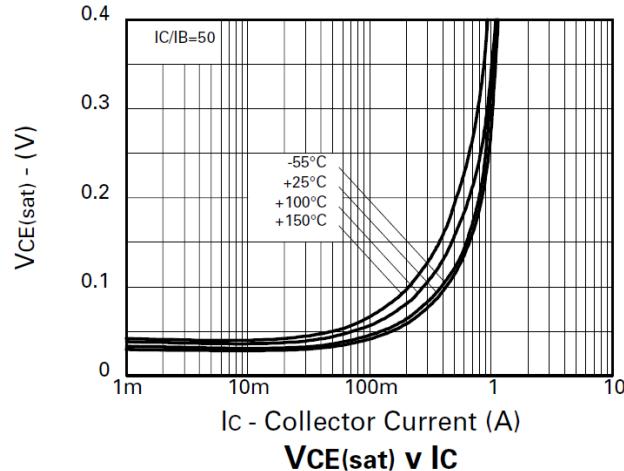
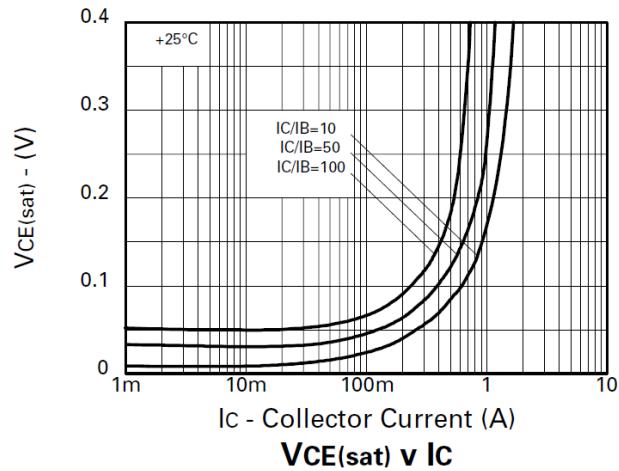
**Electrical Characteristics - Q1 & Q2 common** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	50	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 13)	$\text{BV}_{\text{CEO}}$	50	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cut-Off Current	$I_{\text{CBO}}$	—	—	10	nA	$V_{\text{CB}} = 40\text{V}$
Collector-Emitter Cut-Off Current	$I_{\text{CES}}$	—	—	10	nA	$V_{\text{CES}} = 40\text{V}$
Emitter Cutoff Current	$I_{\text{EBO}}$	—	—	10	nA	$V_{\text{EB}} = 5.6\text{V}$
DC Current Gain (Note 13)	$h_{\text{FE}}$	200	420	—	—	$I_C = 10\text{mA}, V_{\text{CE}} = 2\text{V}$
		300	450	—	—	$I_C = 100\text{mA}, V_{\text{CE}} = 2\text{V}$
		200	350	—	—	$I_C = 500\text{mA}, V_{\text{CE}} = 2\text{V}$
		75	130	—	—	$I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$
		20	60	—	—	$I_C = 1.5\text{A}, V_{\text{CE}} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 13)	$V_{\text{CE}(\text{sat})}$	—	24	35	mV	$I_C = 100\text{mA}, I_B = 10\text{mA}$
		—	60	80		$I_C = 250\text{mA}, I_B = 10\text{mA}$
		—	120	200		$I_C = 500\text{mA}, I_B = 10\text{mA}$
		—	160	270		$I_C = 1\text{A}, I_B = 50\text{mA}$
		—	940	1100		$I_C = 1\text{A}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage (Note 13)	$V_{\text{BE}(\text{sat})}$	—	850	1100	mV	$I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$
Base-Emitter Turn-On Voltage (Note 13)	$V_{\text{BE}(\text{on})}$	—	—	—	—	—
Output Capacitance	$C_{\text{obo}}$	—	10	—	pF	$V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	—	215	—	MHz	$V_{\text{CE}} = 10\text{V}, I_C = 50\text{mA}$ $f = 100\text{MHz}$
Turn-On Time	$t_{\text{on}}$	—	150	—	ns	$V_{\text{CC}} = 10\text{V}, I_C = 1\text{A}$
Turn-Off Time	$t_{\text{off}}$	—	425	—	ns	$I_{B1} = I_{B2} = 100\text{mA}$

Note: 13. Measured under pulsed conditions. Pulse width  $\leq 300\ \mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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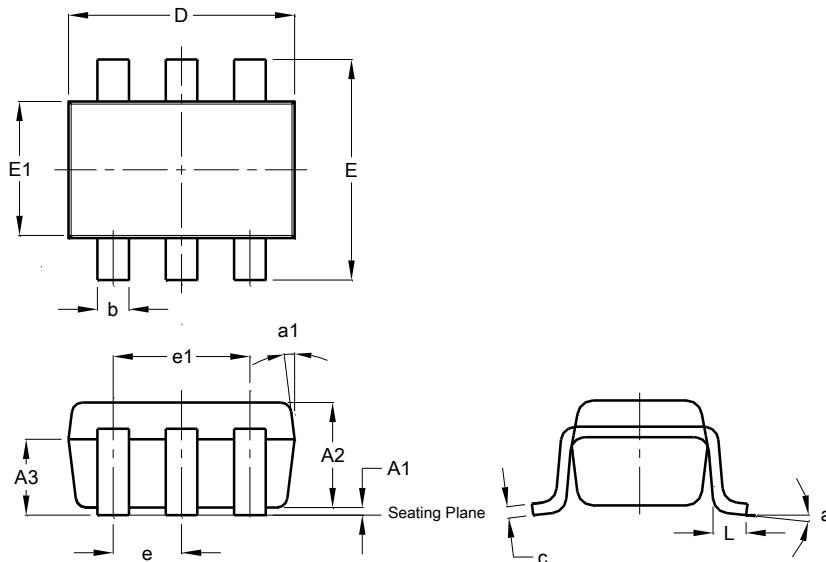
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**ZXTD09N50DE6**

## Package Outline Dimensions

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

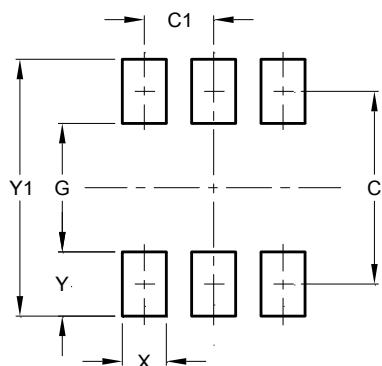


SOT26			
Dim	Min	Max	Typ
<b>A1</b>	0.013	0.10	0.05
<b>A2</b>	1.00	1.30	1.10
<b>A3</b>	0.70	0.80	0.75
<b>b</b>	0.35	0.50	0.38
<b>c</b>	0.10	0.20	0.15
<b>D</b>	2.90	3.10	3.00
<b>e</b>	-	-	0.95
<b>e1</b>	-	-	1.90
<b>E</b>	2.70	3.00	2.80
<b>E1</b>	1.50	1.70	1.60
<b>L</b>	0.35	0.55	0.40
<b>a</b>	-	-	8°
<b>a1</b>	-	-	7°

All Dimensions in mm

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
<b>C</b>	2.40
<b>C1</b>	0.95
<b>G</b>	1.60
<b>X</b>	0.55
<b>Y</b>	0.80
<b>Y1</b>	3.20

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