

**ZXTD09N50DE6**

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

**Features**

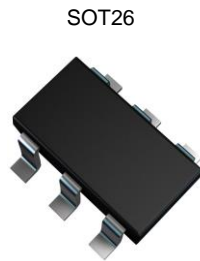
- $BV_{CEO} > 50V$
- $I_C = 1A$  High Continuous Current
- High Gain
- $R_{SAT} = 160m\Omega$  for Low Equivalent On Resistance
- Low Saturation Voltage  $V_{CE(sat)} < -270mV @ 1A$
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
-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

**Mechanical Data**

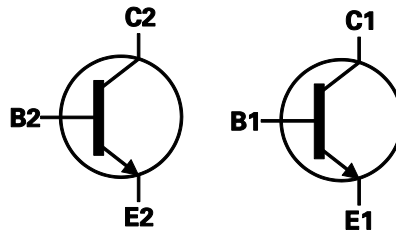
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 Ⓔ
- Weight: 0.015 grams (Approximate)

**Applications**

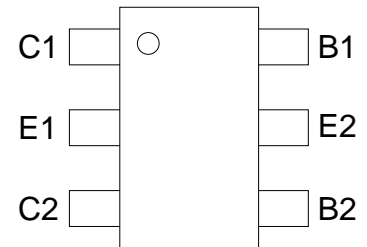
- LCD Backlighting Inverter Circuits
- Boost Functions in DC-DC Converters



Top View



Device Symbol



Top View Pin-Out

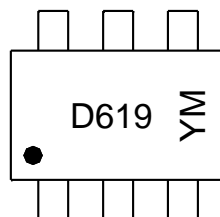
**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTD09N50DE6TA	AEC-Q101	D619	7	8	3,000
ZTD09N50DE6QTA	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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	2	A
Base Current	I <sub>B</sub>	200	mA

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

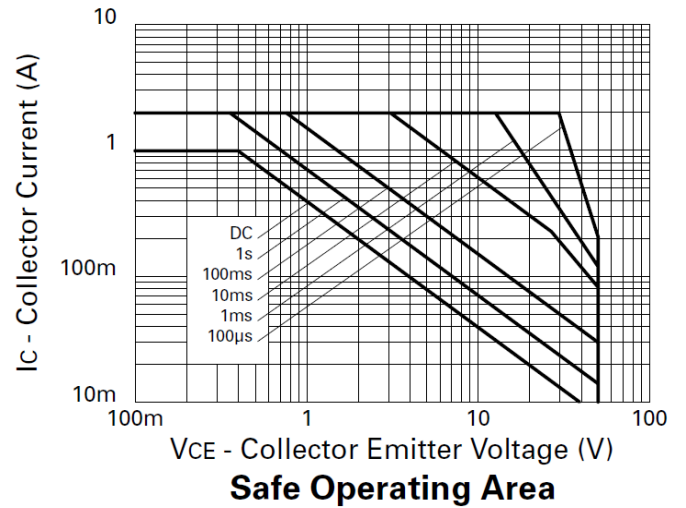
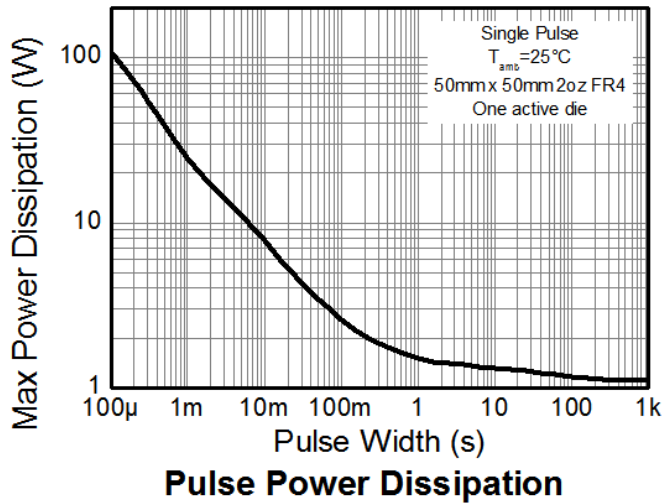
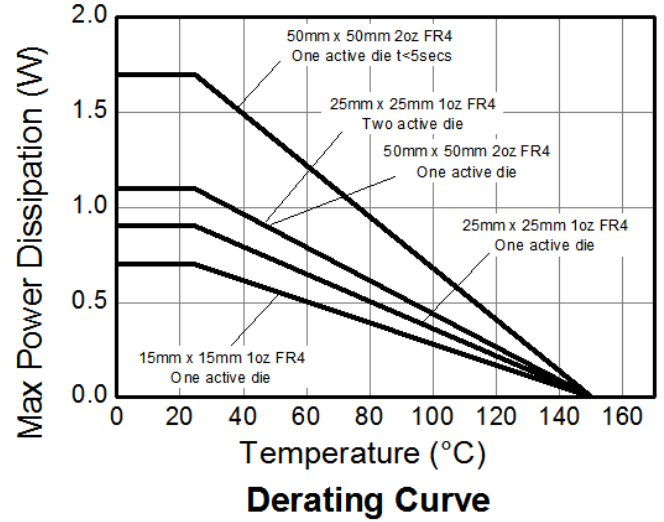
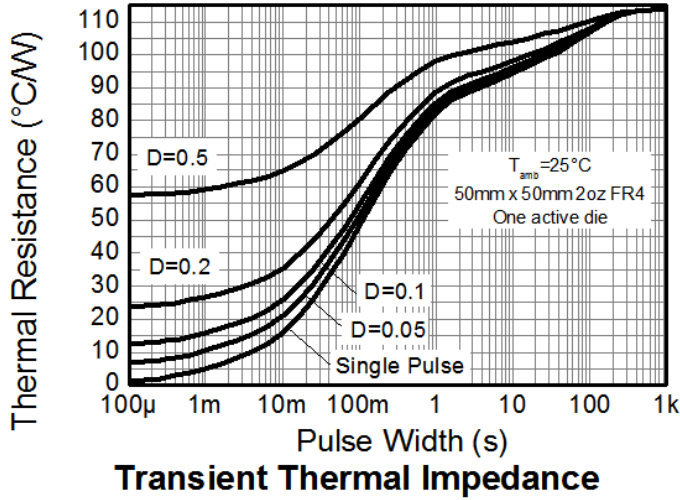
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	0.7	W mW/°C
		5.6	
		0.9	
		7.2	
		1.1	
		8.8	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	1.1	°C/W
		8.8	
		1.7	
		13.6	
		179	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	139	°C/W
		113	
		113	
		73	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	95.50	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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**

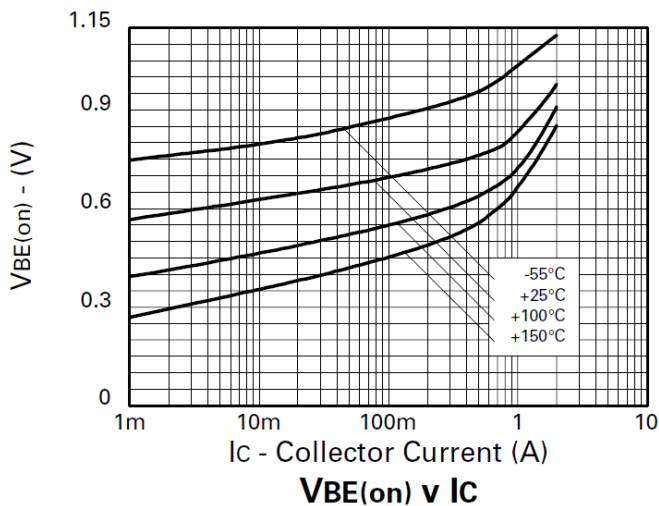
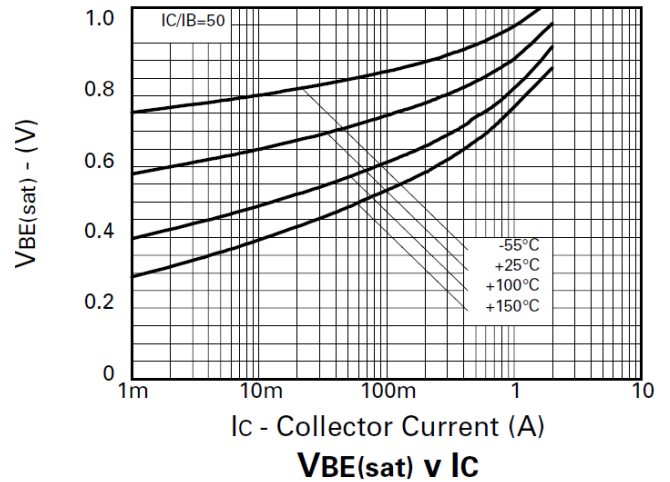
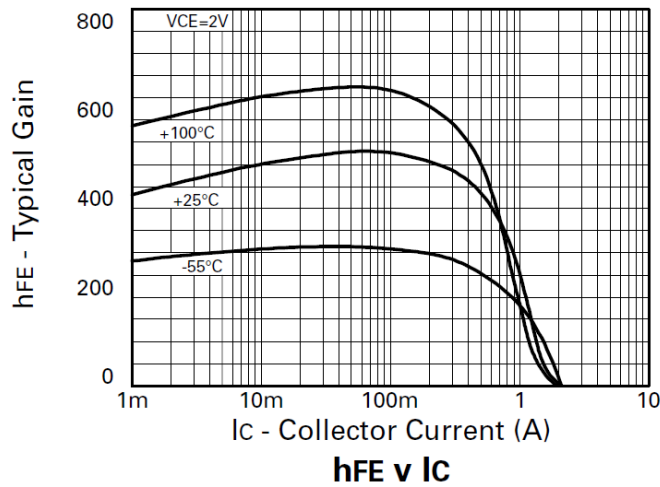
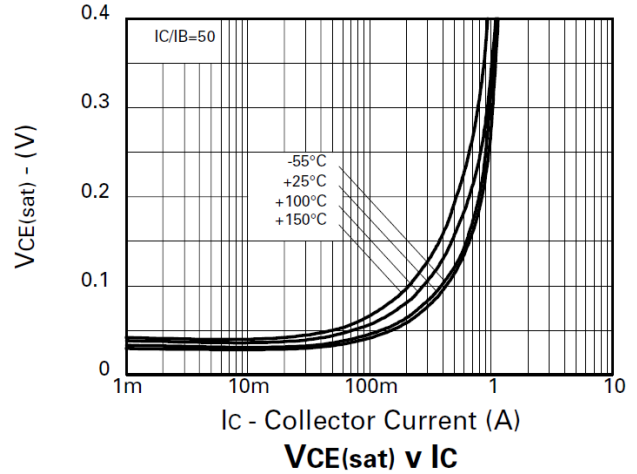
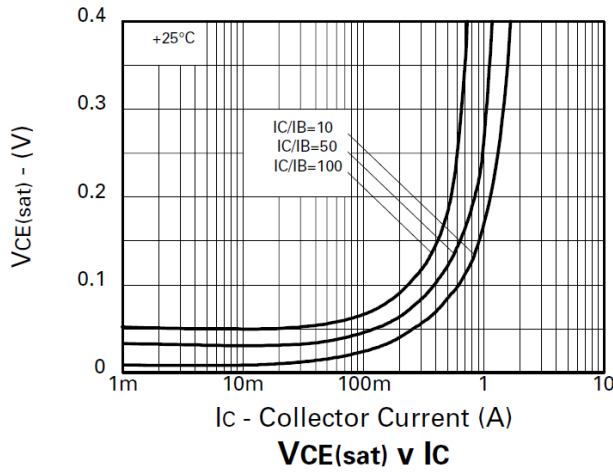


**Electrical Characteristics - Q1 & Q2 common** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 13)	BV <sub>CEO</sub>	50	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector-Base Cut-Off Current	I <sub>CBO</sub>	—	—	10	nA	V <sub>CB</sub> = 40V
Collector-Emitter Cut-Off 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> = 5.6V
DC Current Gain (Note 13)	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 13)	V <sub>CE(sat)</sub>	—	24 60 120 160	35 80 200 270	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 13)	V <sub>BE(sat)</sub>	—	940	1100	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA
Base-Emitter Turn-On Voltage (Note 13)	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

Note: 13. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

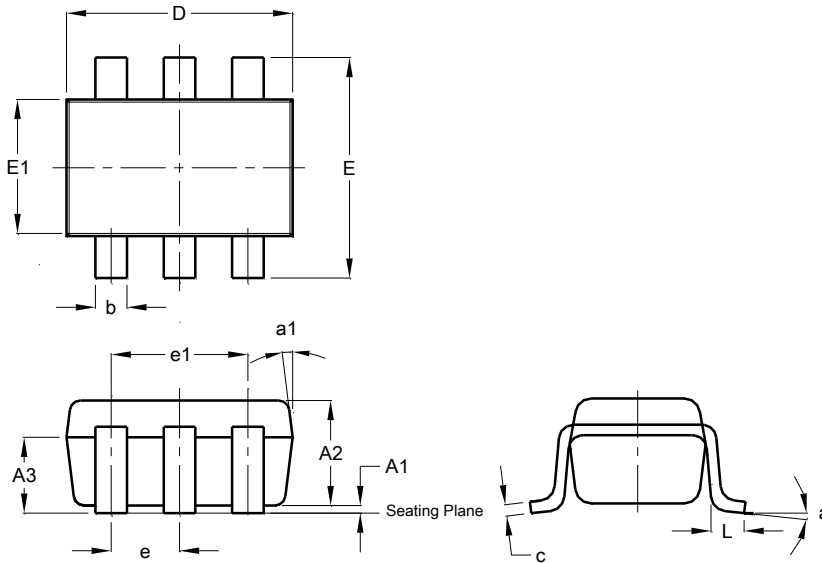
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**ZXTD09N50DE6**

### Package Outline Dimensions

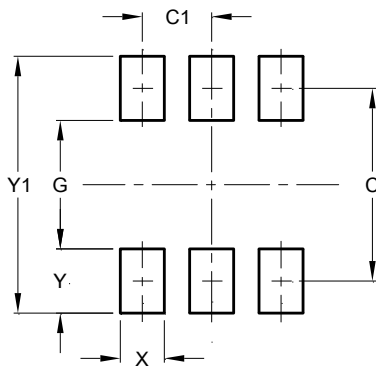
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	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)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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