30V N-CHANNEL ENHANCEMENT MODE MOSFET 2.5V GATE DRIVE

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
30V	0.025Ω@V_{GS} = 4.5V	8.9A

Description

This new generation of Trench MOSFETs from Diodes Incorporated utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

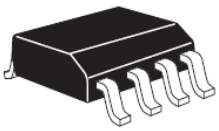
Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SO-8 Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

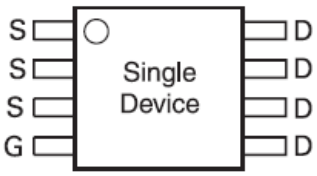
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.076 grams (Approximate)

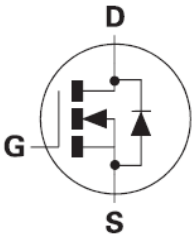
SO-8



Top View



Top View
Pin Out Configuration



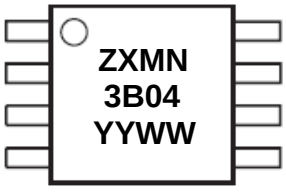
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Reel Size	Tape Width	Quantity Per Reel
ZXMN3B04N8TA	SO-8	7"	12mm	500 Units
ZXMN3B04N8TC	SO-8	13"	12mm	2500 Units

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 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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



ZXMN3B04 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 17 = 2017)
WW = Week Code (01 to 53)

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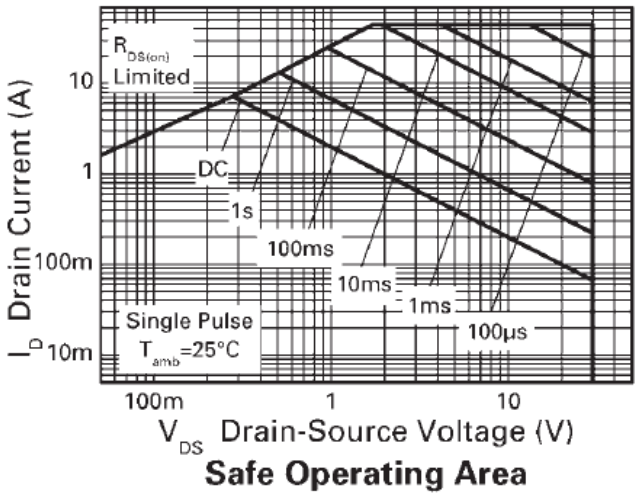
Maximum Ratings

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current @V_{GS} = 4.5V	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A= +25°C (Note 5)	I_D	8.9 7.3 7.2	A
Pulsed Drain Current (Note 7)		I_{DM}	45	A
Continuous Source Current (Body Diode) (Note 6)		I_S	4.5	A
Pulsed Source Current (Body Diode) (Note 7)		I_{SM}	45	A
Power Dissipation at T_A= +25°C (Note 5) Linear Derating Factor		P_D	2 16	W mW/°C
Power Dissipation at T_A= +25°C (Note 6) Linear Derating Factor		P_D	3 24	W mW/°C
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

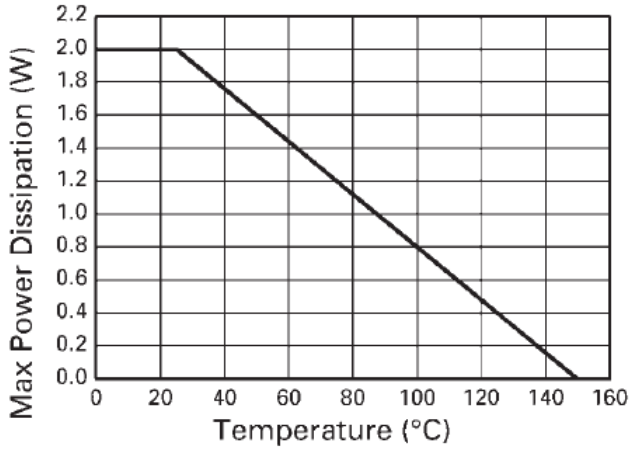
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	41.4	

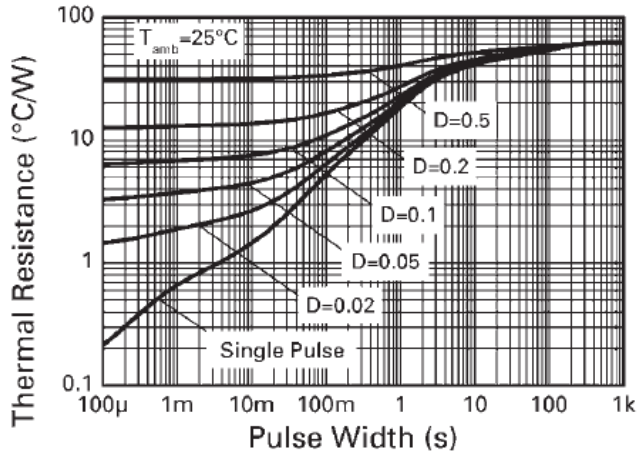
Notes: 5. For a device surface mounted on 50mm x 50mm FR-4 PCB with high coverage of single sided 2oz copper, in still air conditions.
6. For a device surface mounted on FR-4 PCB measured at t ≤10 sec.
7. Repetitive rating - 25mm x 25mm FR-4 PCB, D=0.02, pulse width 300µs - pulse width limited by maximum junction temperature.



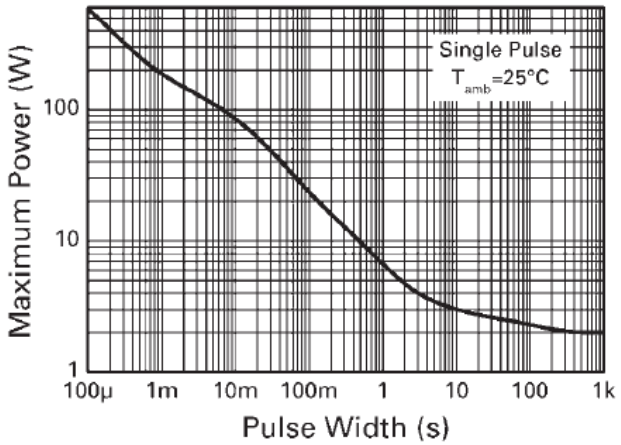
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

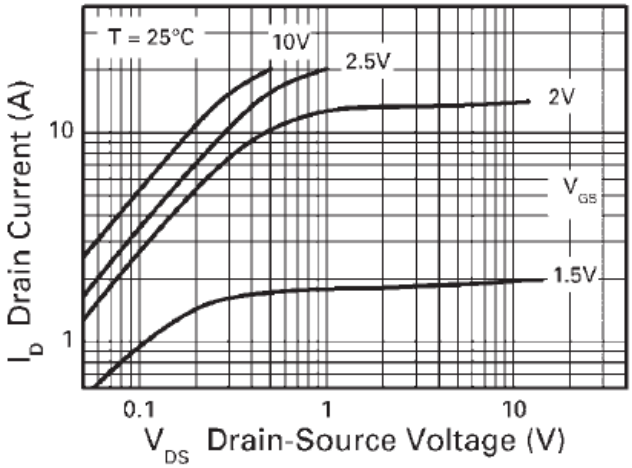
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Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

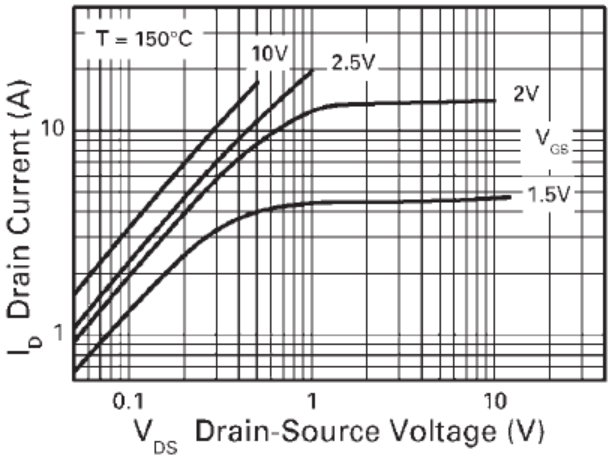
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
STATIC						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	µA	V_{DS} = 30V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±12V, V_{DS} = 0V
Gate-Source Threshold Voltage	$V_{GS(TH)}$	0.7	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	0.021	0.025	Ω	V_{GS} = 4.5V, I_D = 7.2A
		—	0.028	0.040		V_{GS} = 2.5V, I_D = 5.7A
Forward Transconductance (Notes 8 and 10)	g_{fs}	—	24	—	S	V_{DS} = 15V, I_D = 7.2A
DYNAMIC (Note 10)						
Input Capacitance	C_{iss}	—	2480	—	pF	V_{DS} = 15V, f = 1.0MHz, V_{GS} = 0V
Output Capacitance	C_{oss}	—	318	—		
Reverse Transfer Capacitance	C_{rss}	—	184	—		
SWITCHING (Notes 9 and 10)						
Turn-On Delay Time	$t_{D(ON)}$	—	9	—	ns	V_{DD} = 15V, R_G = 6.0Ω, I_D =1A, V_{GS} = 4.5V
Rise Time	t_R	—	11.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	40	—		
Fall Time	t_F	—	16.6	—		
Total Gate Charge	Q_g	—	23.1	—	nC	V_{DS} = 15V, V_{GS} = 4.5V, I_D = 7.2A
Gate-Source Charge	Q_{gs}	—	4.9	—		
Gate-Drain Charge	Q_{gd}	—	6.2	—		
SOURCE-DRAIN DIODE						
Diode Forward Voltage (Note 8)	V_{SD}	—	0.85	0.95	V	T_J = +25°C, I_S = 8A, V_{GS} = 0V
Reverse Recovery Time (Note 10)	t_{RR}	—	17.9	—	ns	di/dt = 100A/µs, I_F = 3.2A, T_J = +25°C
Reverse Recovery Charge (Note 10)	Q_{RR}	—	10	—	nC	

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
9. Switching characteristics are independent of operating junction temperature.
10. For design aid only, not subject to production testing.

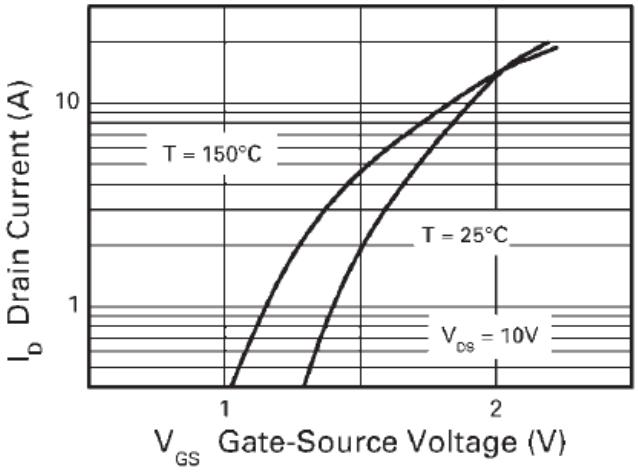
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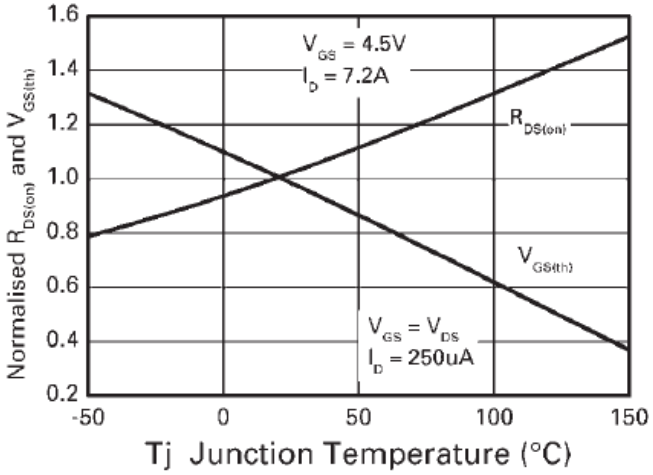
Output Characteristics



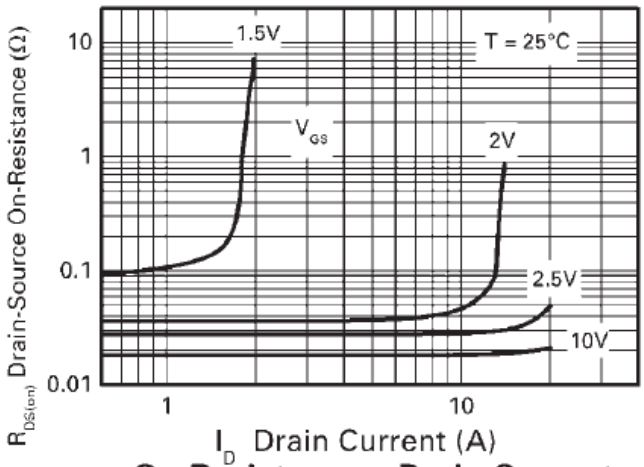
Output Characteristics



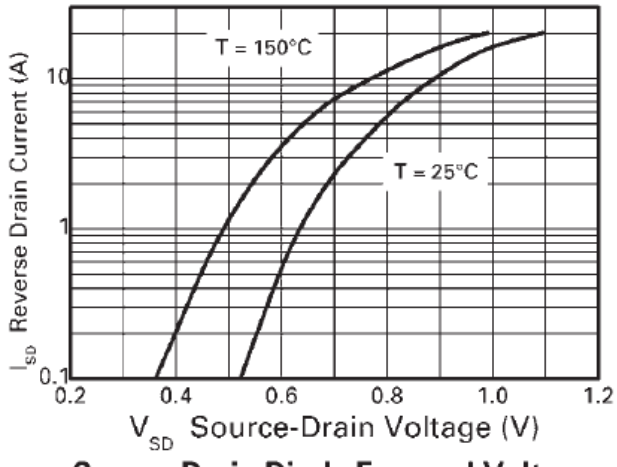
Typical Transfer Characteristics



Normalised Curves v Temperature

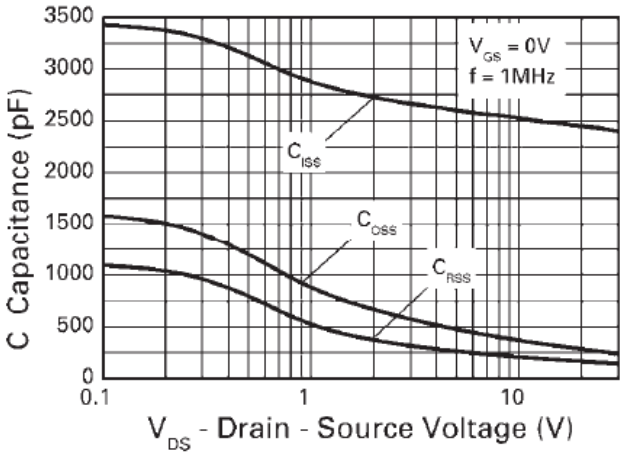


On-Resistance v Drain Current

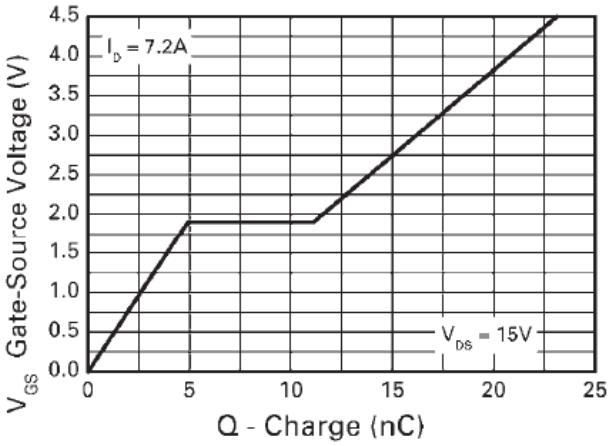


Source-Drain Diode Forward Voltage

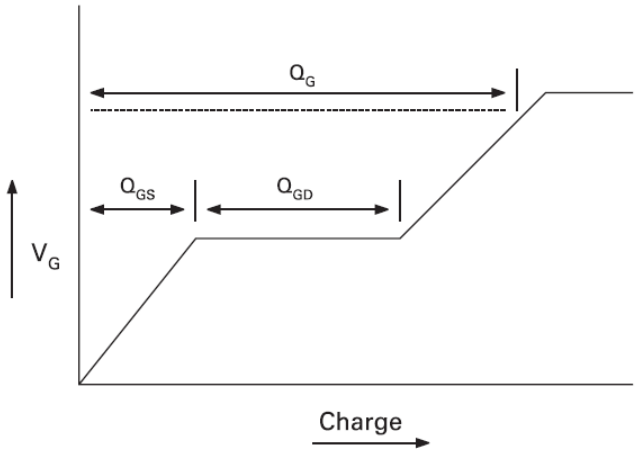
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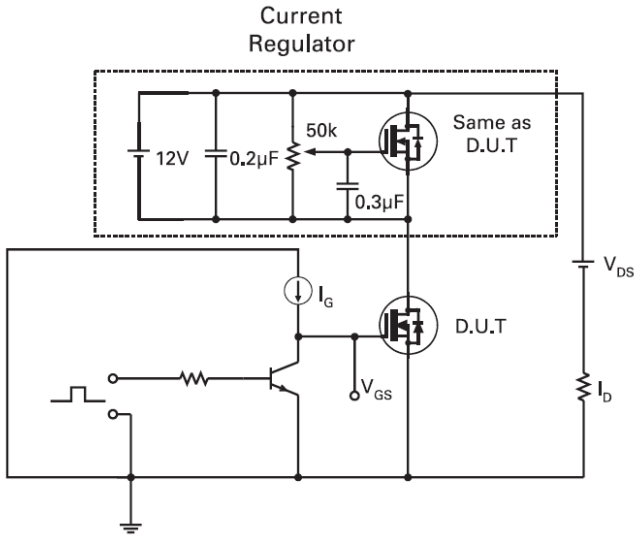
Capacitance v Drain-Source Voltage



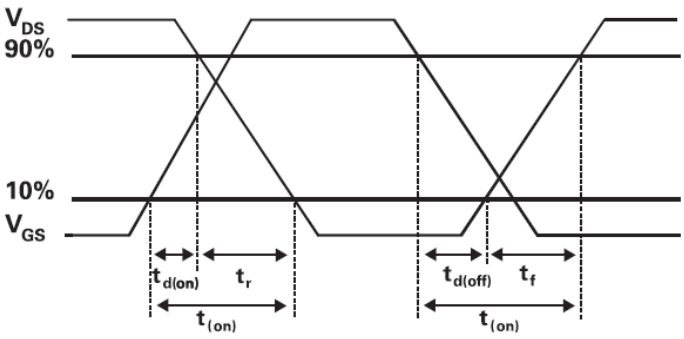
Gate-Source Voltage v Gate Charge



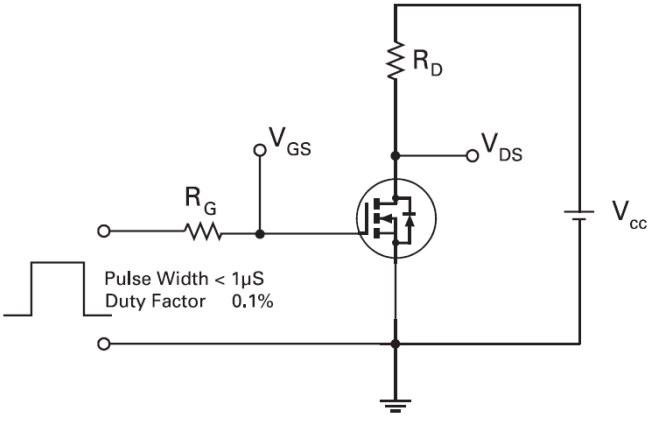
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



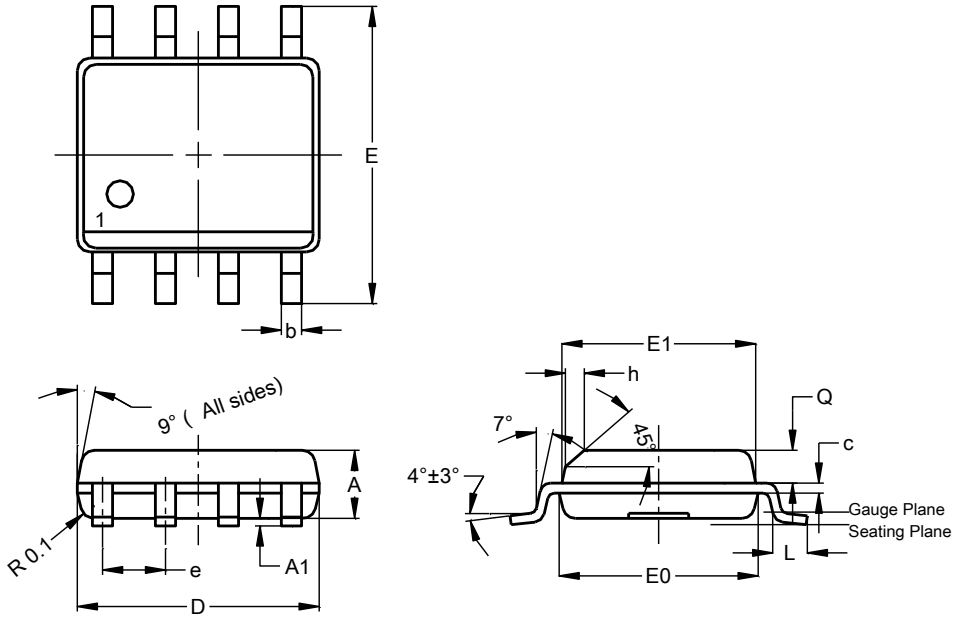
Switching Time Test Circuit

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8

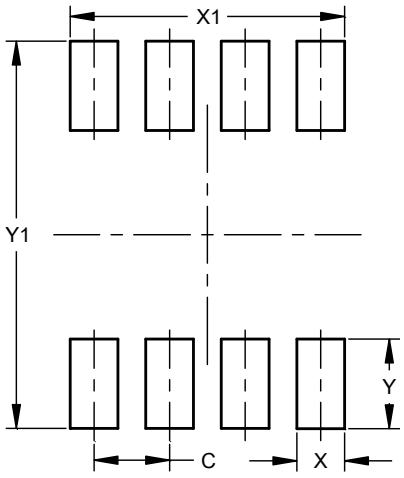


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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