

**DUAL P-CHANNEL 60V ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	$I_D$ $T_A = +25^\circ\text{C}$
-60V	55mΩ @ $V_{GS} = -10\text{V}$	-4.8A

**Description**

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

**Applications**

- Disconnect Switches
- Motor Drive

**Features**

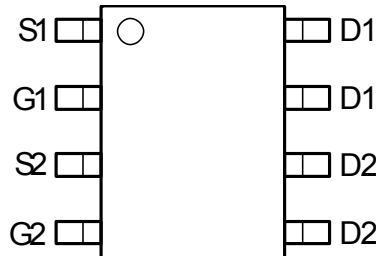
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- PPAP capable (Note 4)**

**Mechanical Data**

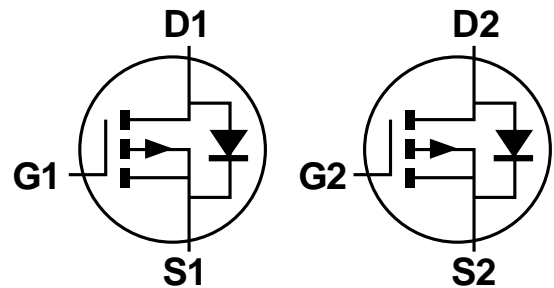
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)



Top View



Top View

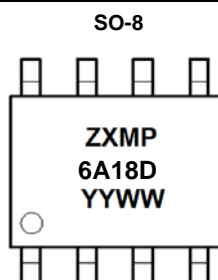


Equivalent Circuit

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

Product	Compliance	Case	Quantity per reel
ZXMP6A18DN8TA	Standard	SO-8	500
ZXMP6A18DN8TC	Standard	SO-8	2,500
ZXMP6A18DN8QTC	Automotive	SO-8	2,500

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


ZXMP6A18D = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 11 = 2011)  
 WW = Week (01 - 53)

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

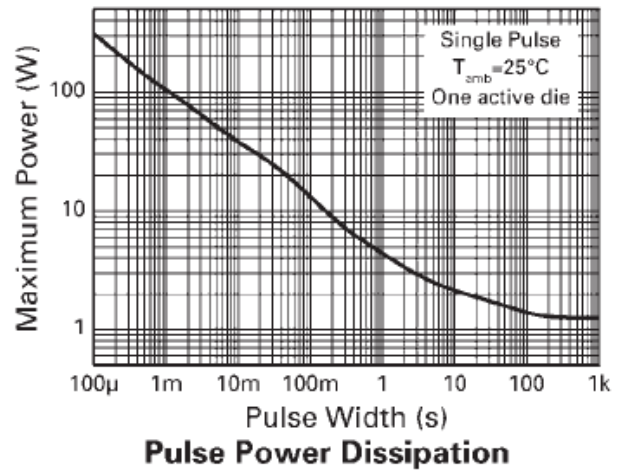
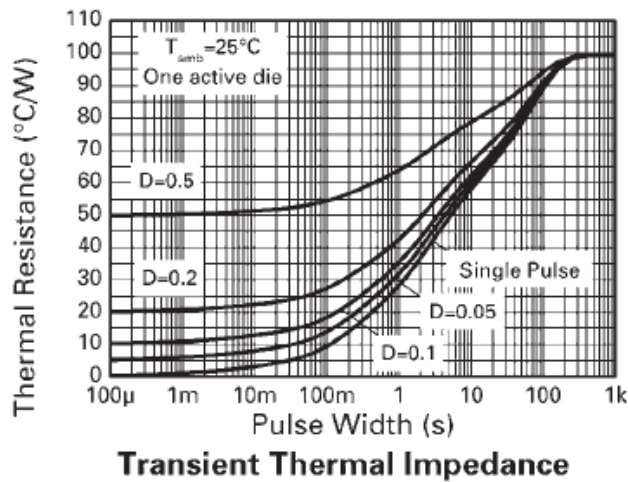
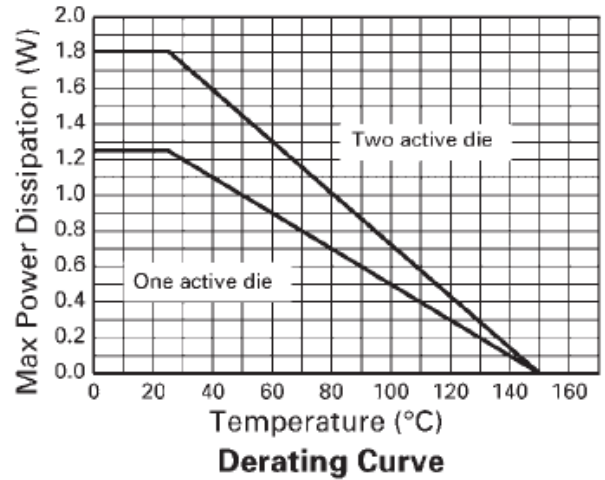
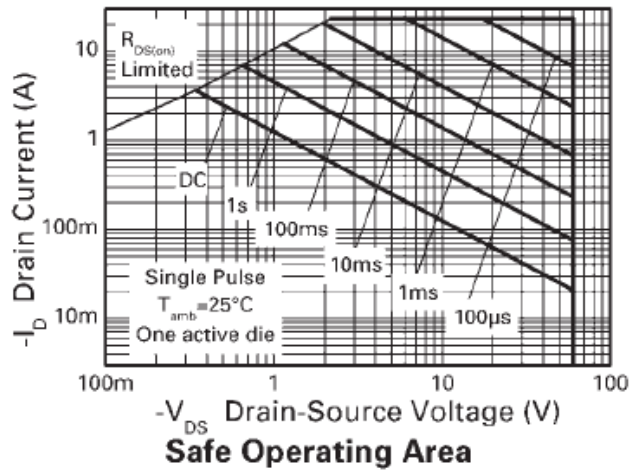
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-60	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current (V <sub>GS</sub> = 10V)	(Notes 7 & 9)	I <sub>D</sub>	-4.8	A
	T <sub>A</sub> = +70°C (Notes 7 & 9)		-3.8	
	(Notes 6 & 9)		-3.7	
Pulsed Drain Current	(Notes 8)	I <sub>DM</sub>	-23	A
Continuous Source Current (Body Diode)	(Notes 7)	I <sub>S</sub>	-3.3	A
Pulsed Source Current (Body Diode)	(Notes 8)	I <sub>SM</sub>	-23	A
Single Pulsed Avalanche Energy (L = 0.1mH)	(Note 11)	E <sub>AS</sub>	38.2	mJ
Single Pulsed Avalanche Current (L = 0.1mH)	(Note 11)	I <sub>AS</sub>	27.6	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P <sub>D</sub>	1.25 10	W mW/°C
	(Notes 6 & 10)		1.8 14	
	(Notes 7 & 9)		2.1 17	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	R <sub>θJA</sub>	+100	°C/W
	(Notes 7 & 10)		+69	
	(Notes 7 & 9)		+58	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
6. For a dual device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 1oz copper in still air conditions.
  7. For a dual device surface mounted FR4 PCB measured at t ≤ 10 sec.
  8. Repetitive rating 25mm x 25mm x 1.6mm FR4 PCB, D = 0.02, pulse width = 300μs – pulse width limited by maximum junction temperature.
  9. For a dual device with one active die.
  10. For a device with two active die running at equal power.
  11. IAR and EAR rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

## Thermal Characteristics

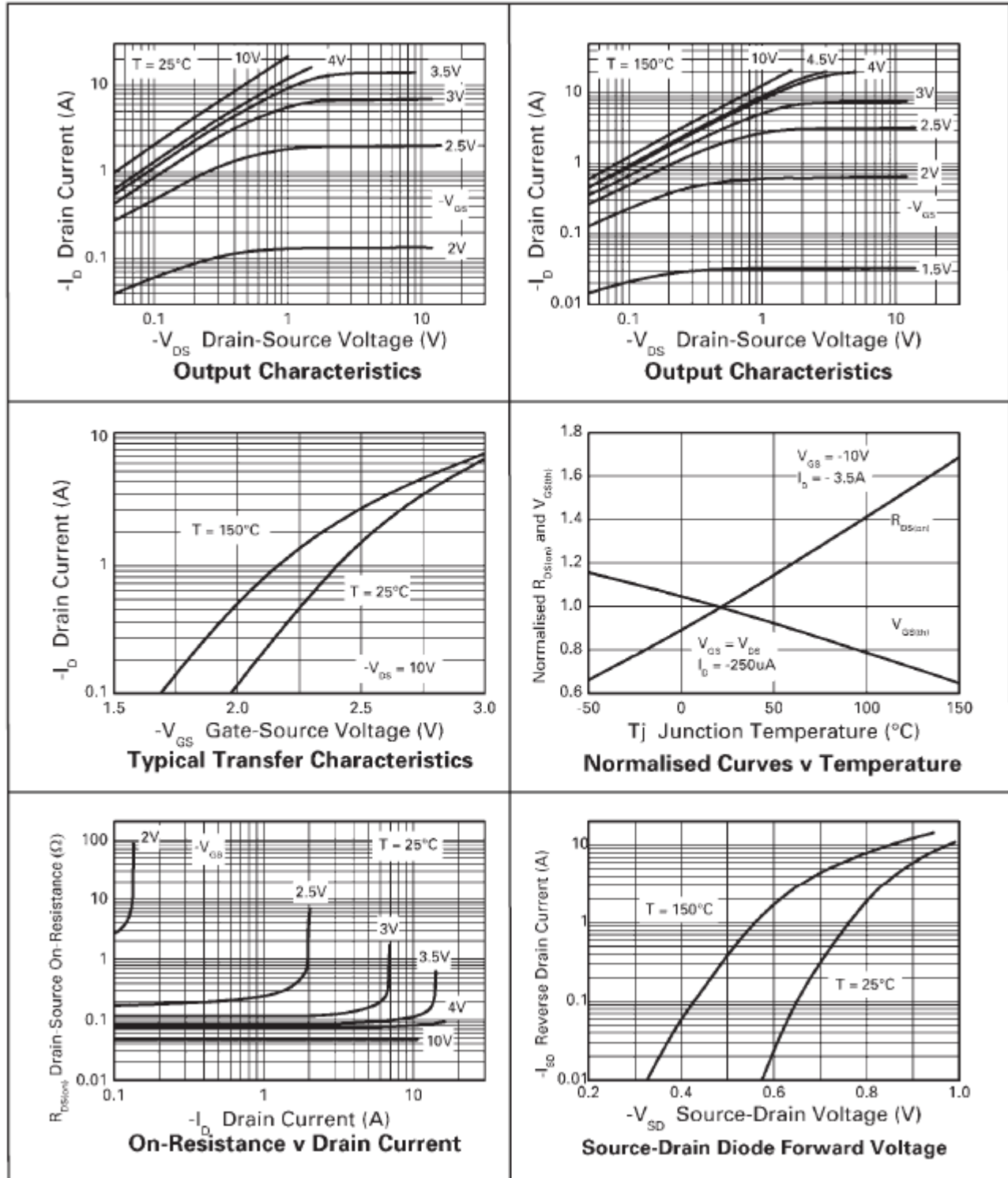


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

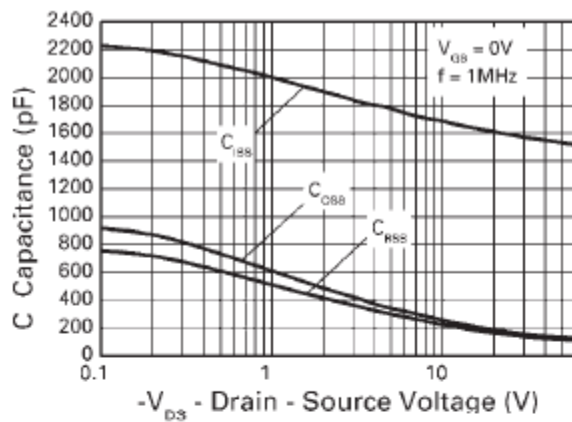
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-60	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -60V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1	—	—	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-Resistance (Note 12)	R <sub>DS(ON)</sub>	—	—	0.055	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3.5A	
				0.08		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.9A	
Forward Transconductance (Notes 12 & 14)	g <sub>fs</sub>	—	8.7	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -3.5A	
Diode Forward Voltage (Note 12)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -4.2A, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C	
Reverse Recovery Time (Note 14)	t <sub>rr</sub>		37	—	ns	I <sub>F</sub> = -2.1A, di/dt = 100A/μs, T <sub>J</sub> = +25°C	
Reverse Recovery Charge (Note 14)	Q <sub>rr</sub>	—	56	—	nC		
DYNAMIC CHARACTERISTICS (Note 14)							
Input Capacitance	C <sub>iss</sub>	—	1580	—	pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V f = 1MHz	
Output Capacitance	C <sub>oss</sub>	—	160	—	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	140	—	pF		
Total Gate Charge (Note 13)	Q <sub>g</sub>	—	23	—	nC	V <sub>GS</sub> = -5V	V <sub>DS</sub> = -30V I <sub>D</sub> = -3.5A
Total Gate Charge (Note 13)	Q <sub>g</sub>	—	44	—	nC	V <sub>GS</sub> = -10V	
Gate-Source Charge (Note 13)	Q <sub>gs</sub>	—	3.9	—	nC		
Gate-Drain Charge (Note 13)	Q <sub>gd</sub>	—	9.8	—	nC		
Turn-On Delay Time (Note 13)	t <sub>D(on)</sub>	—	4.6	—	ns	V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A, R <sub>G</sub> ≅ 6.0Ω	
Turn-On Rise Time (Note 13)	t <sub>r</sub>	—	5.8	—	ns		
Turn-Off Delay Time (Note 13)	t <sub>D(off)</sub>	—	55	—	ns		
Turn-Off Fall Time (Note 13)	t <sub>f</sub>	—	23	—	ns		

- Notes:
- 12. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  - 13. Switching characteristics are independent of operating junction temperatures.
  - 14. For design aid only, not subject to production testing.

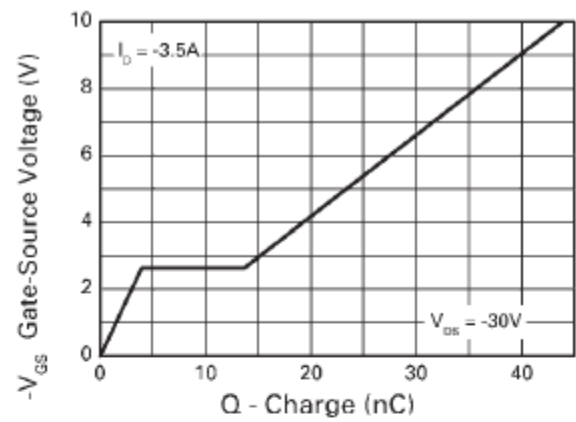
## Typical Characteristics



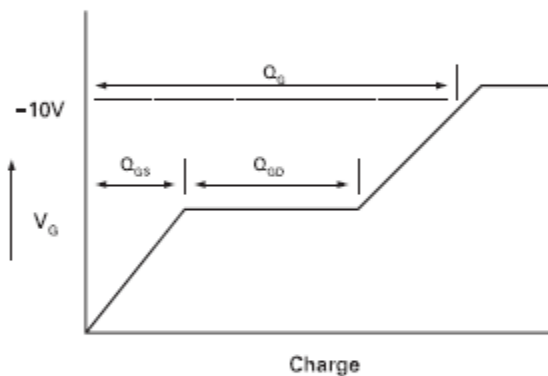
**Typical Characteristics (cont.)**



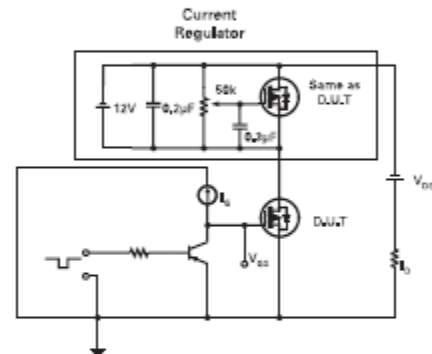
**Capacitance v Drain-Source Voltage**



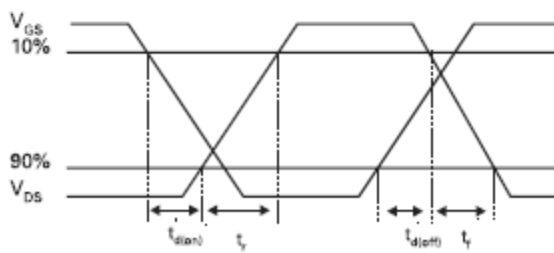
**Gate-Source Voltage v Gate Charge**



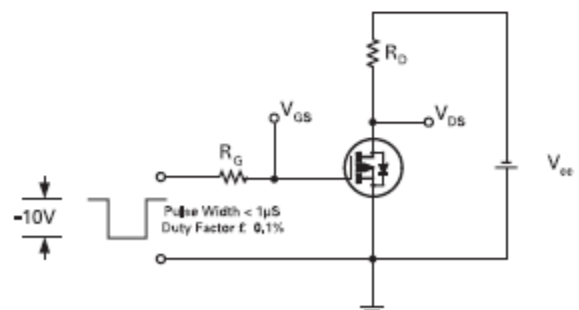
**Basic Gate Charge Waveform**



**Gate Charge Test Circuit**



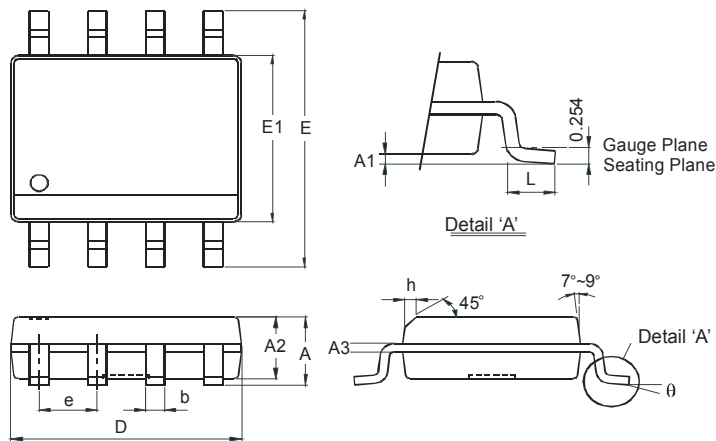
**Switching Time Waveforms**



**Switching Time Test Circuit**

## Package Outline Dimensions

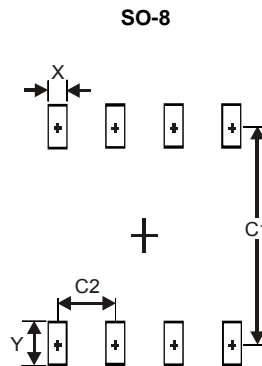
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
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)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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