

**DUAL 20V N-CANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	Package	I <sub>D</sub> T <sub>A</sub> = +25°C (Notes 5 & 6)
20V	130mΩ @ V <sub>GS</sub> = 4.5V	MSOP-8	2.5A
	150mΩ @ V <sub>GS</sub> = 2.7V		2.3A

**Features**

- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- Low Gate Drive
- **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**

**Description**

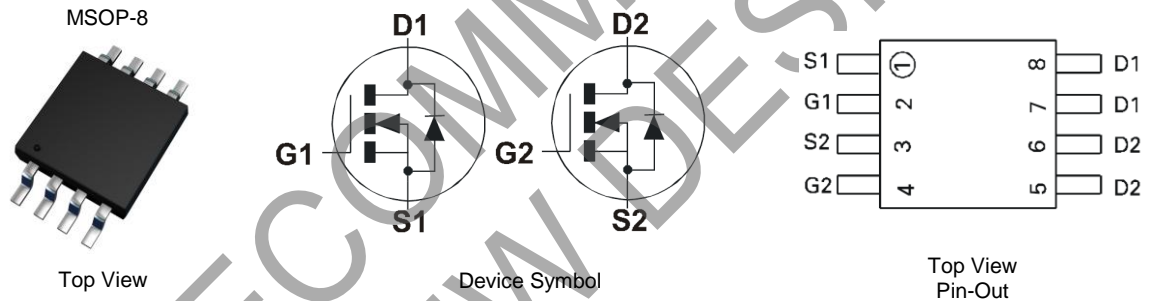
This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

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

**Mechanical Data**

- Case: MSOP-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 (E3)
- Weight: 0.0277 grams (Approximate)

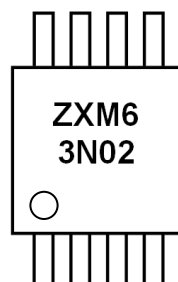


**Ordering Information** (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXMD63N02XTA	ZXM63N02	7	12	1,000
ZXMD63N02XTC	ZXM63N02	13	12	4,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**



ZXM63N02 = Product Type Marking Code

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

Characteristic			Symbol	Value	Unit	
Drain-Source Voltage			V <sub>DSS</sub>	20	V	
Gate-Source Voltage			V <sub>GSS</sub>	±12	V	
Continuous Drain Current	Steady State	@V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Notes 5 & 6)	I <sub>D</sub>	2.5	A	
		@V <sub>GS</sub> = 10V; T <sub>A</sub> = +70°C (Notes 5 & 6)		1.9		
		@V <sub>GS</sub> = 10V; T <sub>A</sub> = +100°C (Notes 5 & 6)		0.78		
Pulsed Drain Current			(Notes 6 & 7)	I <sub>DM</sub>	19	A
Continuous Source Current (Body Diode)			(Notes 5 & 6)	I <sub>S</sub>	1.5	A
Pulsed Source Current (Body Diode)			(Notes 6 & 7)	I <sub>SM</sub>	19	A

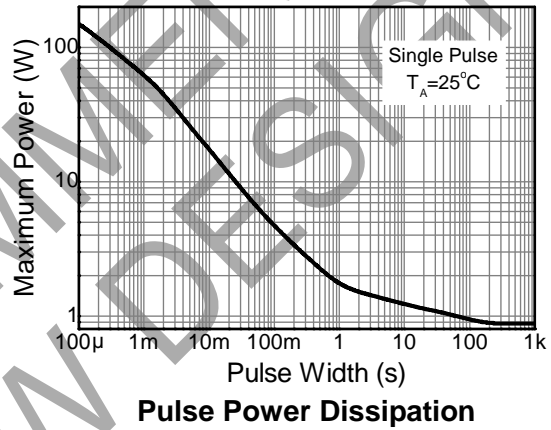
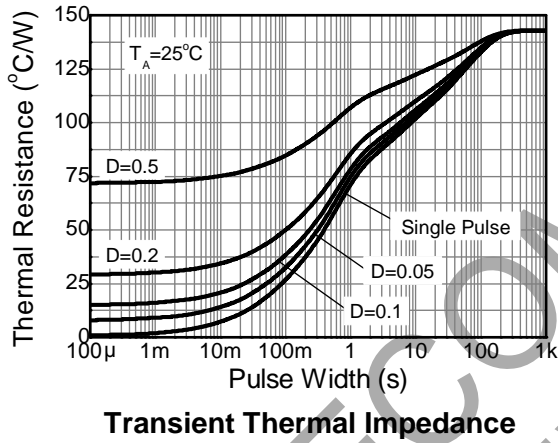
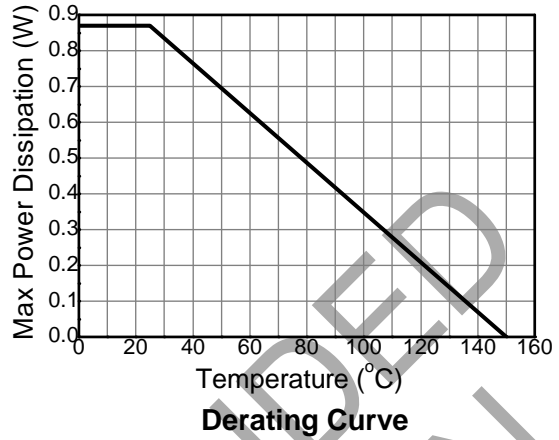
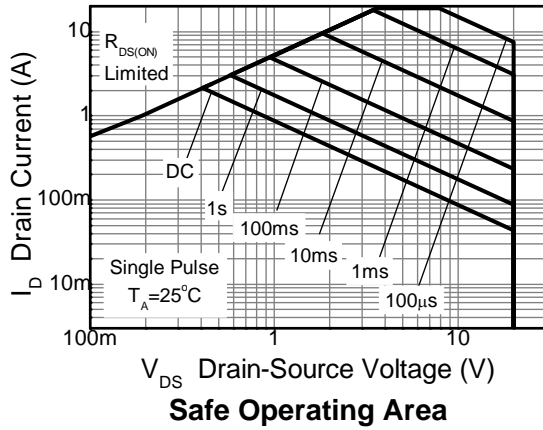
**Thermal Characteristics**

Characteristic		Symbol	Value	Unit	
Power Dissipation	(Notes 6 & 8)	P <sub>D</sub>	0.87	W	
	(Notes 5 & 6)		1.25		
	(Notes 8 & 9)		1.04		
Thermal Resistance, Junction to Ambient	(Notes 6 & 8)	R <sub>θJA</sub>	143	°C/W	
	(Notes 5 & 6)		100		
	(Notes 8 & 9)		120		
Thermal Resistance, Junction to Leads		(Note 10)	R <sub>θJL</sub>	84.9	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

- Notes:
5. For a device surface mounted on FR-4 PCB measured at t ≤ 10 sec.
  6. For device with one active die.
  7. Repetitive rating – 25mm x 25mm FR-4 PCB, D = 0.02, pulse width 300µs – pulse width limited by maximum junction temperature.
  8. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  9. For device with two active die running at equal power.
  10. Thermal resistance from junction to solder-point (at the end of the drain lead).

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**Thermal Characteristics**



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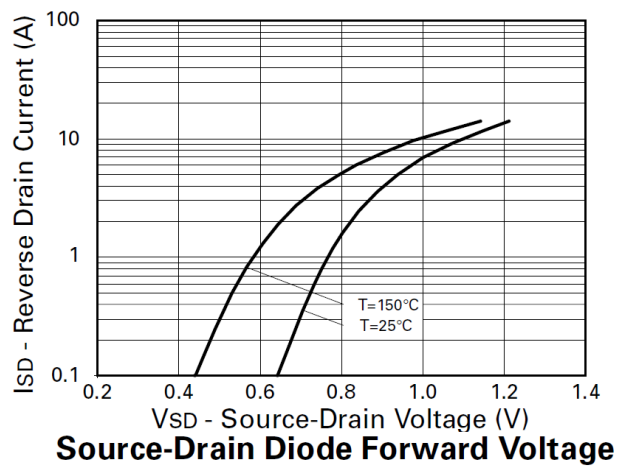
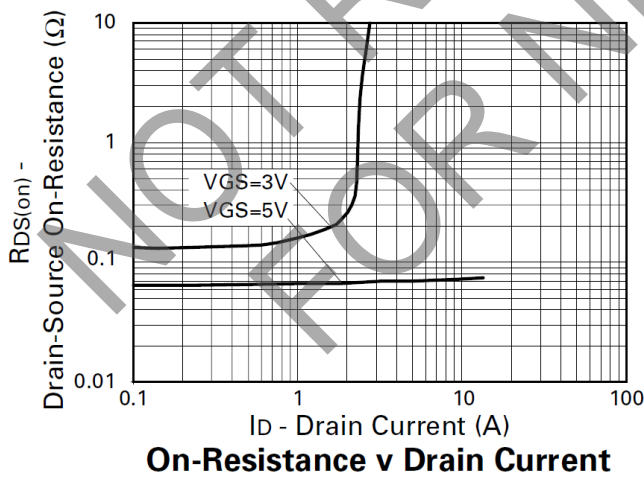
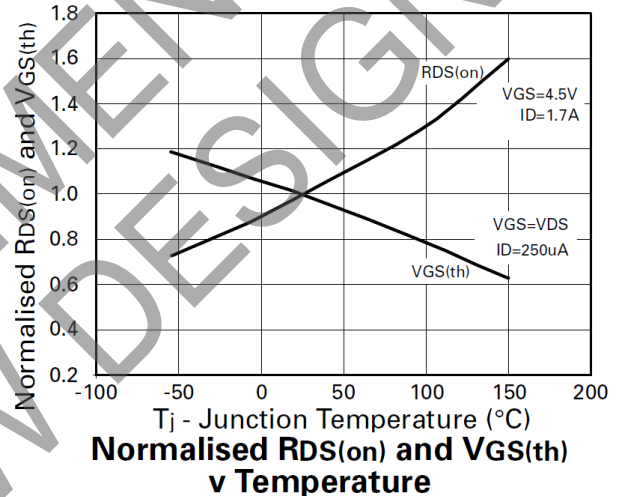
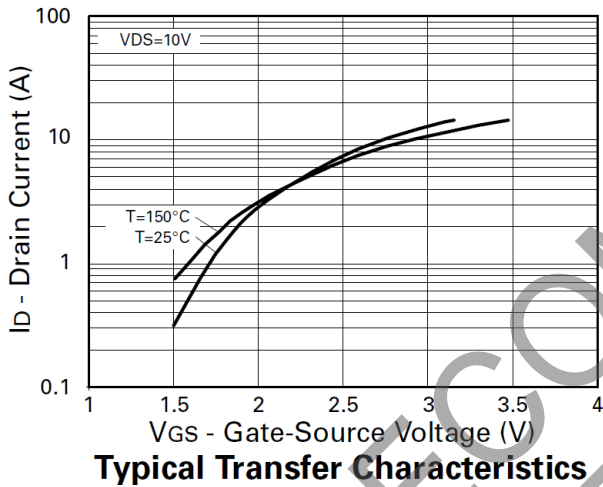
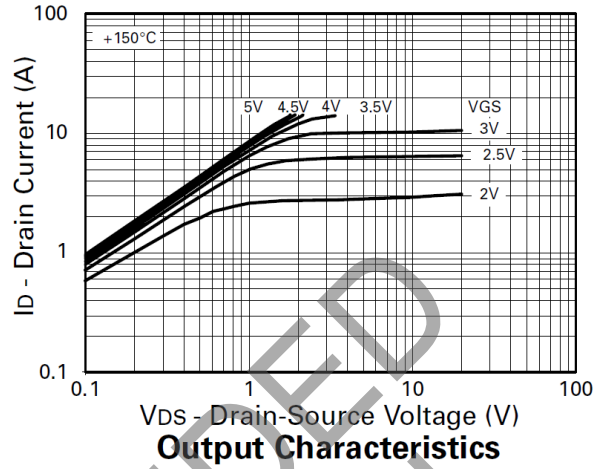
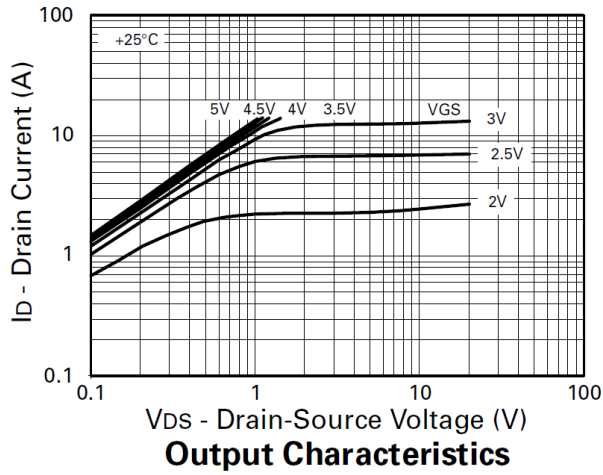
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.7	—	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance (Note 11)	R <sub>DS(ON)</sub>	—	65	130	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.7A
			90	150		V <sub>GS</sub> = 2.7V, I <sub>D</sub> = 0.85A
Forward Transconductance (Notes 11 & 13)	g <sub>fs</sub>	2.6	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.85A
Diodes Forward Voltage (Note 11)	V <sub>SD</sub>	—	0.85	0.95	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance (Notes 12 & 13)	C <sub>iss</sub>	—	350	700	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance (Notes 12 & 13)	C <sub>oss</sub>	—	120	250		
Reverse Transfer Capacitance (Notes 12 & 13)	C <sub>rss</sub>	—	50	100		
Gate Resistance (Notes 12 & 13)	R <sub>g</sub>	—	3.8	7.6	Ω	f = 1MHz, V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V
Total Gate Charge (Notes 12 & 13)	Q <sub>g</sub>	—	4.5	6	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 16V, I <sub>D</sub> = 1.7A
Gate-Source Charge (Notes 12 & 13)	Q <sub>gs</sub>	—	0.5	0.65		
Gate-Drain Charge (Notes 12 & 13)	Q <sub>gd</sub>	—	2	2.5		
Reverse Recovery Time (Note 13)	t <sub>RR</sub>	—	15	30	ns	T <sub>J</sub> = +25°C, I <sub>F</sub> = 1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 13)	Q <sub>RR</sub>	—	5.9	—	nC	
Turn-On Delay Time (Notes 12 & 13)	t <sub>D(ON)</sub>	—	3.4	—	ns	V <sub>DD</sub> = 10V, I <sub>D</sub> = 1.7A, R <sub>G</sub> = 6Ω, R <sub>D</sub> = 5.7Ω
Turn-On Rise Time (Notes 12 & 13)	t <sub>r</sub>	—	8.1	—		
Turn-Off Delay Time (Notes 12 & 13)	t <sub>D(OFF)</sub>	—	13.5	—		
Turn-Off Fall Time (Notes 12 & 13)	t <sub>f</sub>	—	9.1	—		

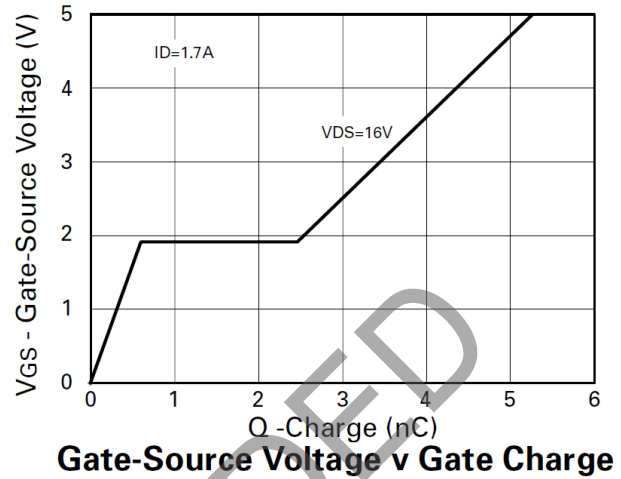
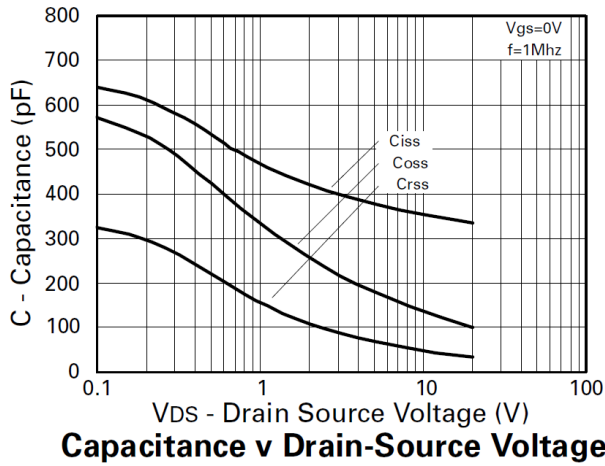
Notes: 11. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.  
 12. Switching characteristics are independent of operating junction temperature.  
 13. For design aid only, not subject to production testing.

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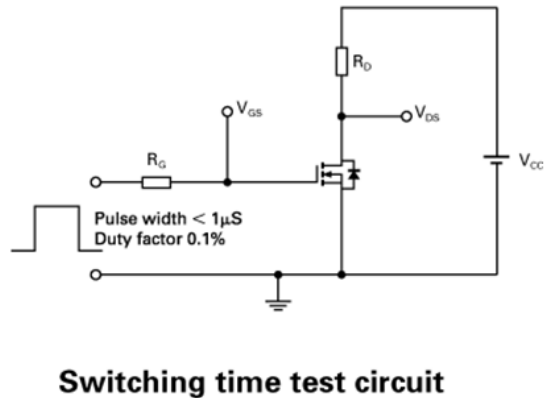
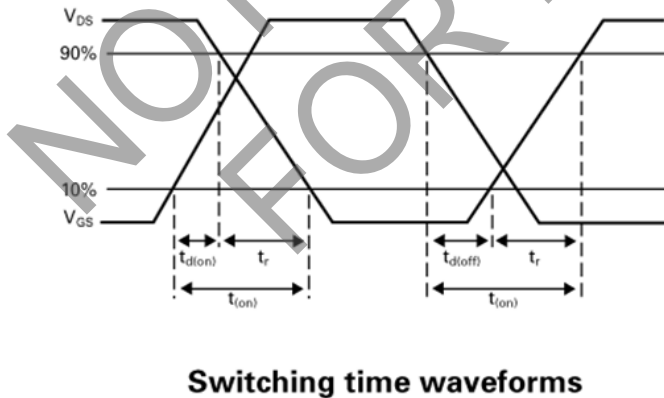
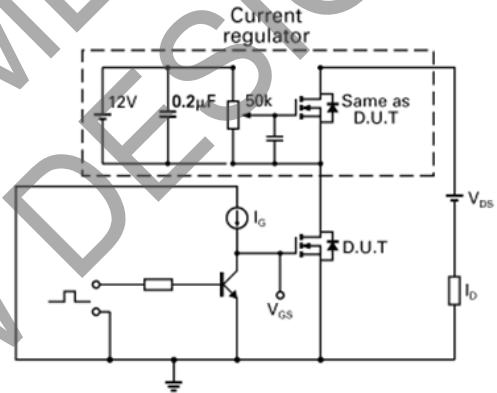
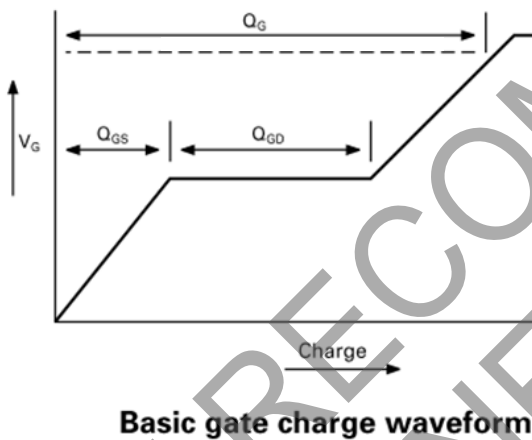
**Typical Characteristics**



**Typical Characteristics (Cont.)**



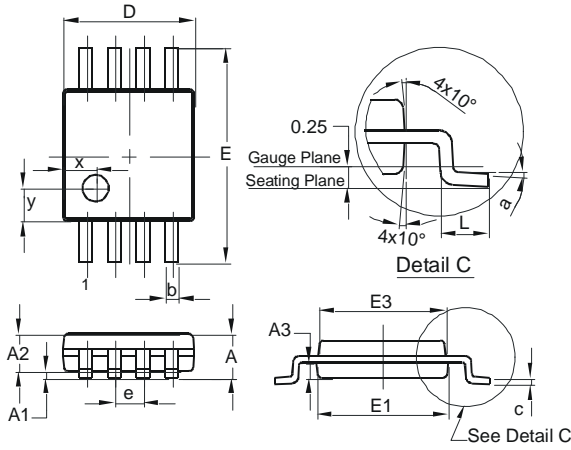
**Test Circuits**



**Package Outline Dimensions**

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

**MSOP-8**

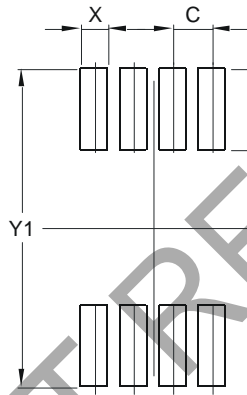


MSOP-8			
Dim	Min	Max	Typ
A	—	1.10	—
A1	0.05	0.15	0.10
A2	0.75	0.95	0.86
A3	0.29	0.49	0.39
b	0.22	0.38	0.30
c	0.08	0.23	0.15
D	2.90	3.10	3.00
E	4.70	5.10	4.90
E1	2.90	3.10	3.00
E3	2.85	3.05	2.95
e	—	—	0.65
L	0.40	0.80	0.60
a	0°	8°	4°
x	—	—	0.750
y	—	—	0.750
All Dimensions in mm			

**Suggested Pad Layout**

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

**MSOP-8**



Dimensions	Value (in mm)
C	0.650
X	0.450
Y	1.350
Y1	5.300

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