

## 60V P-CHANNEL ENHANCEMENT MODE MOSFET

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
-60V	125m $\Omega$ @ $V_{GS} = -10V$	-3.4A
	190m $\Omega$ @ $V_{GS} = -4.5V$	-2.8A

### Description and Applications

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

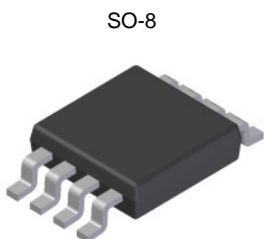
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

### Features and Benefits

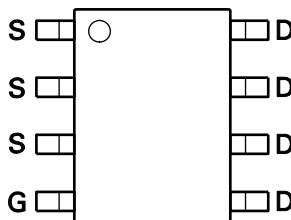
- Fast switching speed
- Low input capacitance
- “Green” component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

### Mechanical Data

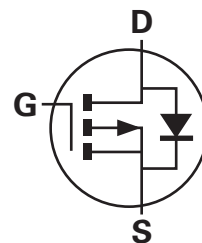
- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



Top View



Top View



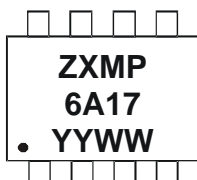
Equivalent Circuit

### Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A17N8TC	See below	13	12	2,500

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

### Marking Information



ZXMP = Product Type Marking Code, Line 1  
6A17 = Product Type Marking Code, Line 2  
YYWW = Date Code Marking  
YY = Year (ex: 09 = 2009)  
WW = Week (01 - 53)

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

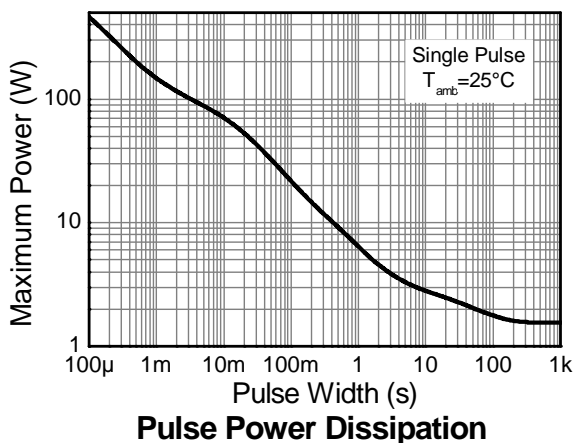
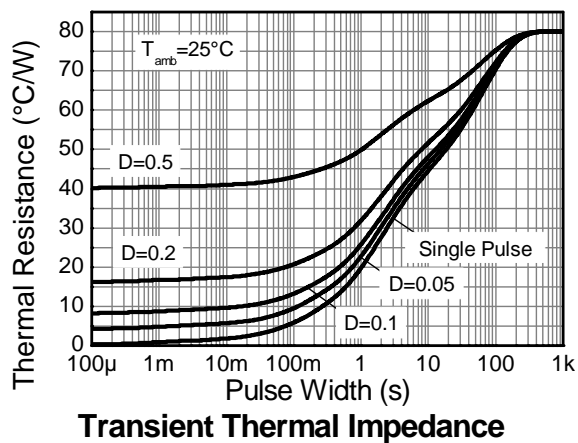
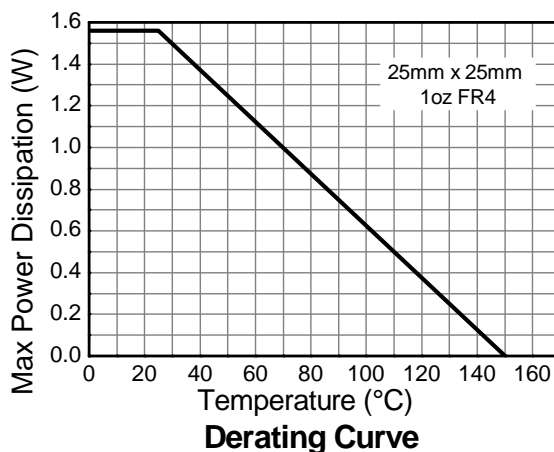
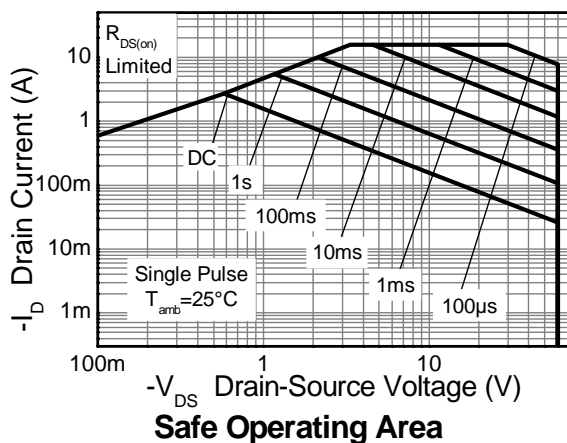
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V <sub>DSS</sub>	-60	V
Gate-Source voltage			V <sub>GS</sub>	±20	V
Continuous Drain current	V <sub>GS</sub> = 10V	(Note 3)	I <sub>D</sub>	-3.42	A
		T <sub>A</sub> = 70°C (Note 3)		-2.73	
		(Note 2)		-2.7	
Pulsed Drain current	V <sub>GS</sub> = 10V	(Note 4)	I <sub>DM</sub>	-15.6	A
Continuous Source current (Body diode)		(Note 3)	I <sub>S</sub>	-3.4	A
Pulsed Source current (Body diode)		(Note 4)	I <sub>SM</sub>	-15.6	A

## Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation	(Note 2)	P <sub>D</sub>	1.56	W
			12.5	
Linear derating factor	(Note 3)		2.5	mW/°C
			20	
Thermal Resistance, Junction to Ambient	(Note 2)	R <sub>θJA</sub>	80	°C/W
	(Note 3)		50	
Thermal Resistance, Junction to Lead	(Note 5)	R <sub>θJL</sub>	32	
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

- Notes:
2. For a device surface mounted on 25mm x 25mm x 1.6mm 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.
  3. Same as note (2), except the device is measured at t ≤ 10 sec.
  4. Same as note (2), except the device is pulsed with D= 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
  5. Thermal resistance from junction to solder-point (at the end of the drain lead).

## Thermal Characteristics

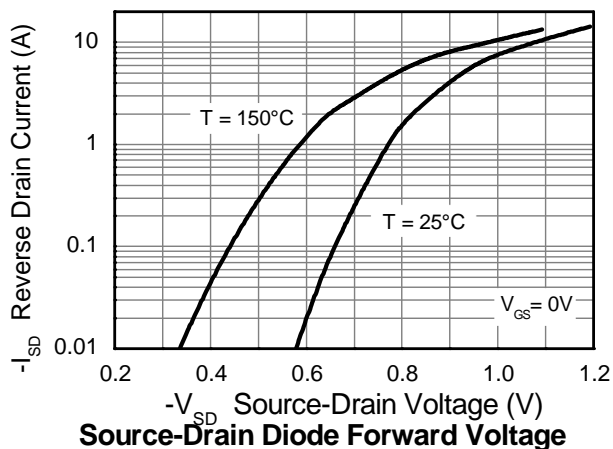
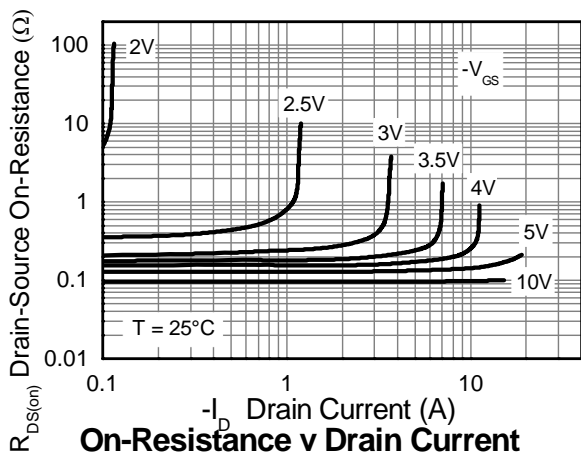
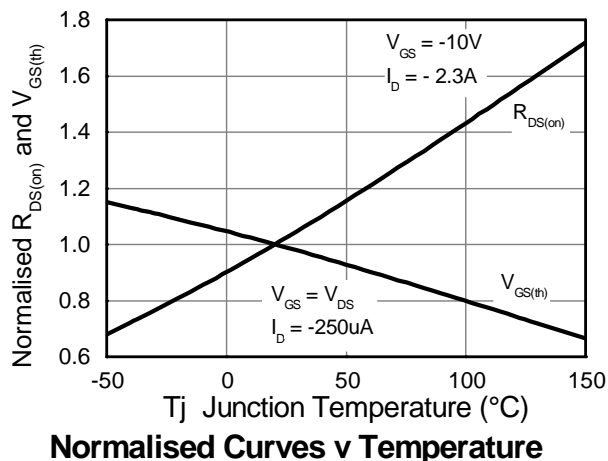
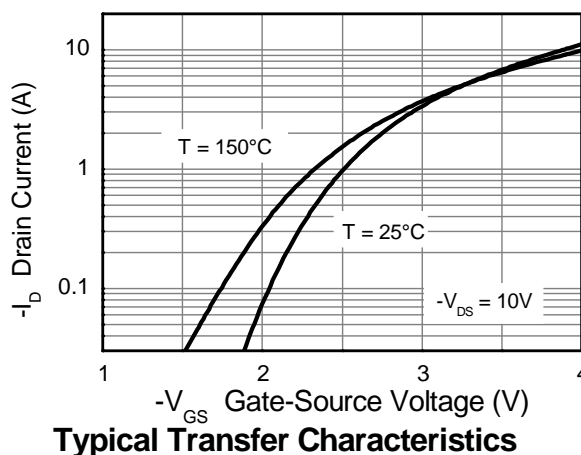
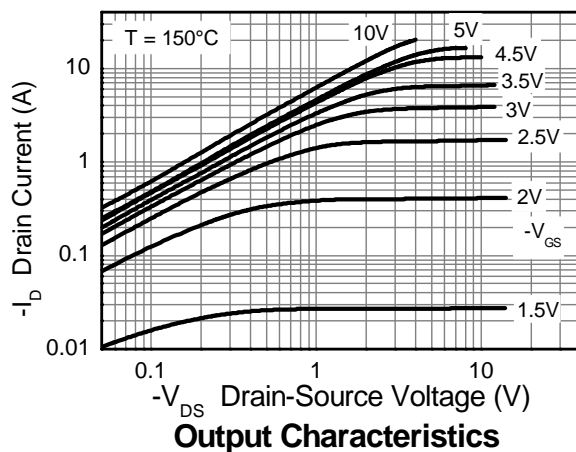
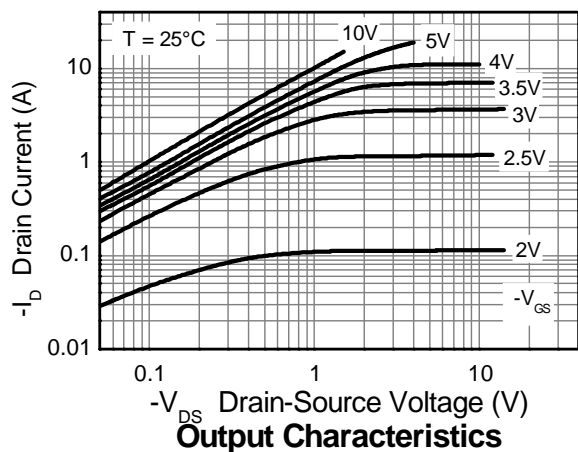


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

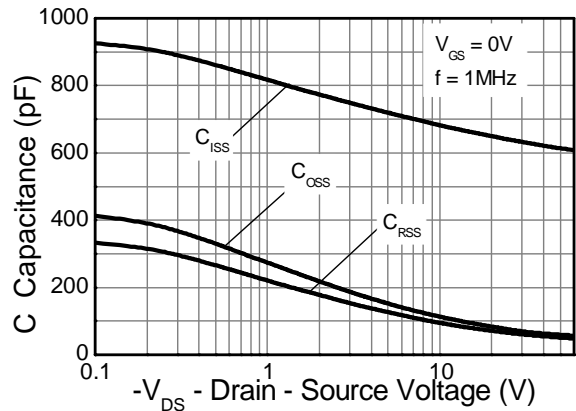
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-60	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -60V, V <sub>GS</sub> = 0V	
Gate-Source 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>	-1.0	—	—	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-Resistance (Note 6)	R <sub>DS (ON)</sub>	—	—	0.125	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.3A	
				0.190		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.9A	
Forward Transconductance (Notes 6 & 7)	g <sub>fs</sub>	—	4.7	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.3A	
Diode Forward Voltage (Note 6)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -2.0A, V <sub>GS</sub> = 0V	
Reverse recovery time (Note 7)	t <sub>rr</sub>		25.1	—	ns	I <sub>S</sub> = -1.7A, di/dt = 100A/μs	
Reverse recovery charge (Note 7)	Q <sub>rr</sub>	—	27.2	—	nC		
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C <sub>iss</sub>	—	637	—	pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V f = 1MHz	
Output Capacitance	C <sub>oss</sub>	—	70	—	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	53	—	pF		
Total Gate Charge (Note 8)	Q <sub>g</sub>	—	9.0	—	nC	V <sub>GS</sub> = -4.5V	V <sub>DS</sub> = -30V I <sub>D</sub> = -2.2A
Total Gate Charge (Note 8)	Q <sub>g</sub>	—	17.7	—	nC	V <sub>GS</sub> = -10V	
Gate-Source Charge (Note 8)	Q <sub>gs</sub>	—	1.6	—	nC		
Gate-Drain Charge (Note 8)	Q <sub>gd</sub>	—	4.4	—	nC		
Turn-On Delay Time (Note 8)	t <sub>D(on)</sub>	—	2.6	—	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 8)	t <sub>r</sub>	—	3.4	—	ns		
Turn-Off Delay Time (Note 8)	t <sub>D(off)</sub>	—	26.2	—	ns		
Turn-Off Fall Time (Note 8)	t <sub>f</sub>	—	11.3	—	ns		

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

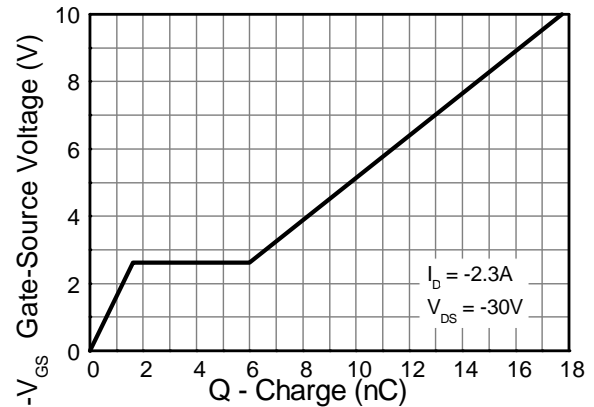
## Typical Characteristics



## Typical Characteristics - continued

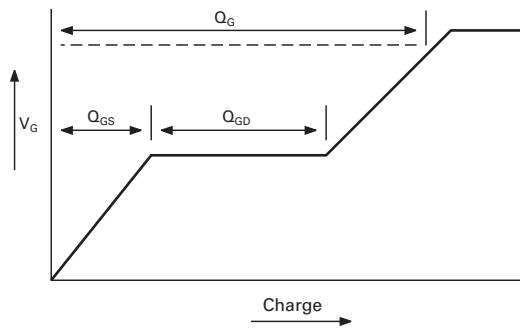


Capacitance v Drain-Source Voltage

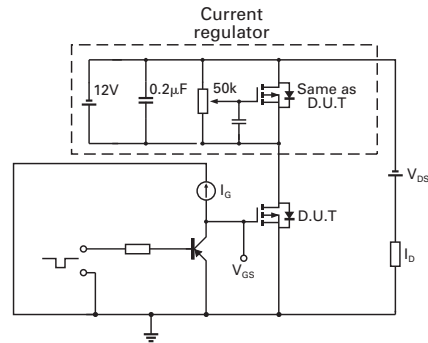


Gate-Source Voltage v Gate Charge

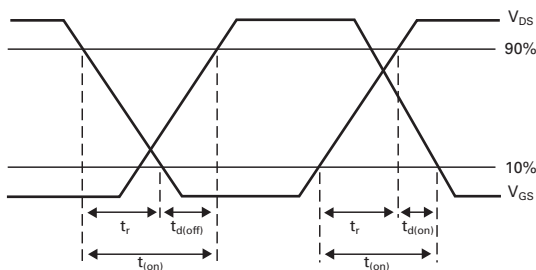
## Test Circuits



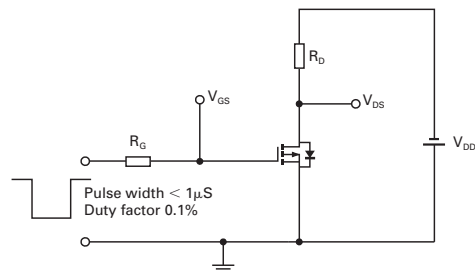
Basic gate charge waveform



Gate charge test circuit

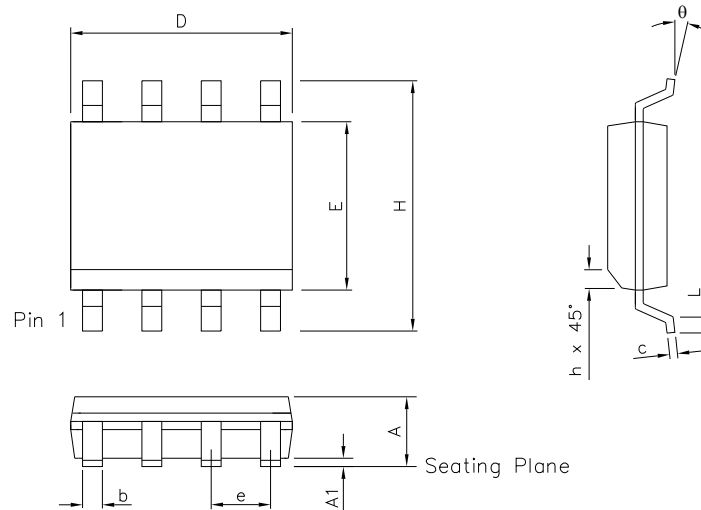


Switching time waveforms



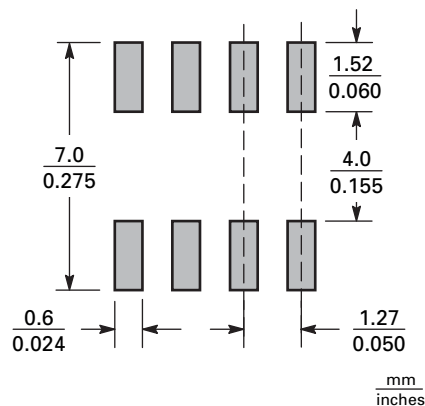
Switching time test circuit

## Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

## Suggested Pad Layout



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