

DUAL P-CHANNEL 60V ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D $T_A = 25^\circ C$ (Notes 7 & 9)
-60V	125m Ω @ $V_{GS} = -10V$	-3.4A
	190m Ω @ $V_{GS} = -4.5V$	-2.8A

Description

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.

Applications

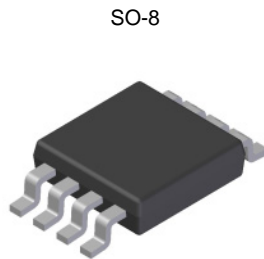
- DC-DC Converters
- Power Management functions
- Disconnect Switches
- Motor Control

Features

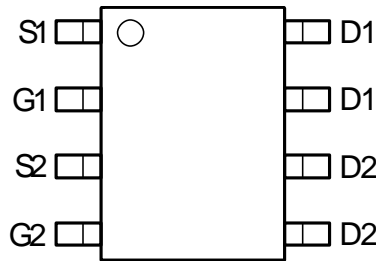
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note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

Mechanical Data

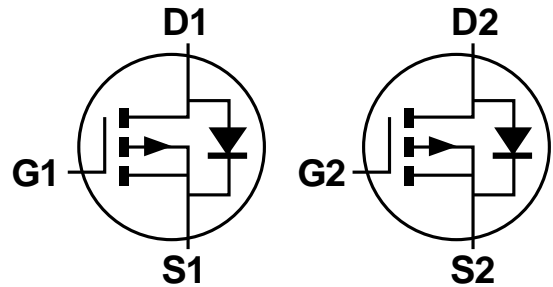
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



Top View



Top View



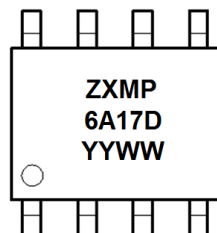
Equivalent Circuit

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A17DN8TA	AEC-Q101	ZXMP6A17D	7	12	500
ZXMP6A17DN8QTC	Automotive	ZXMP6A17D	13	12	2,500

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

Marking Information



ZXMP6A17D = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 11 = 2011)
WW = Week (01 - 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

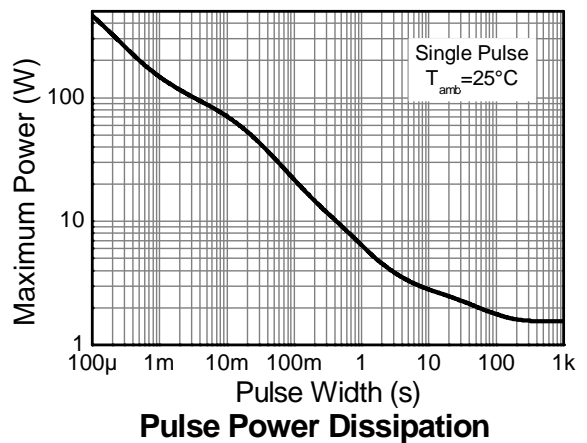
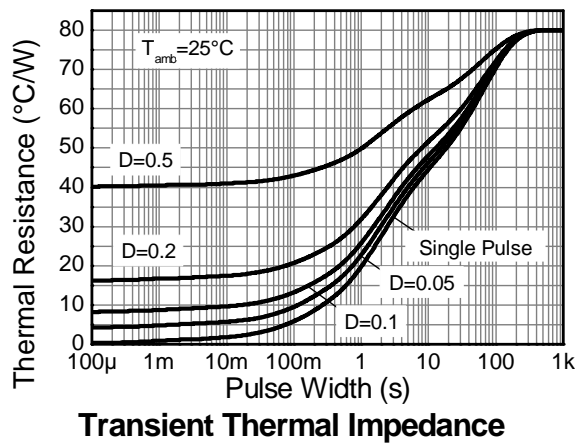
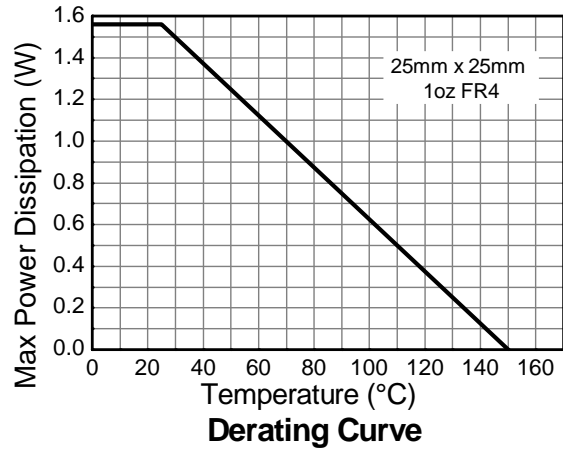
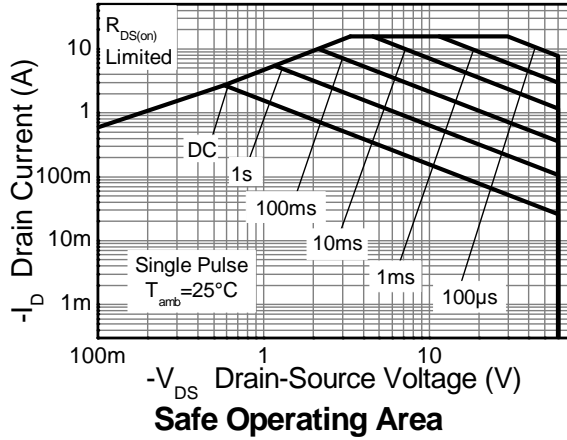
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		V _{DSS}	-60	V	
Gate-Source voltage		V _{GS}	±20	V	
Continuous Drain current	V _{GS} = 10V	I _D	(Notes 7 & 9)	-3.42	A
			T _A = +70°C (Notes 7 & 9)	-2.73	
			(Notes 6 & 9)	-2.7	
Pulsed Drain current		I _{DM}	-15.6	A	
Continuous Source current (Body diode)		I _S	-3.4	A	
Pulsed Source current (Body diode)		I _{SM}	-15.6	A	

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

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 6 & 9)	P _D	1.25	W mW/°C
	(Notes 6 & 10)		10.0	
	(Notes 7 & 9)		1.81 14.5	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	R _{θJA}	2.15	°C/W
	(Notes 6 & 10)		17	
	(Notes 7 & 9)		100	
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	R _{θJL}	70	°C/W
Operating and storage temperature range	(Notes 9 & 11)	T _J , T _{STG}	51.68	
			-55 to 150	°C

- Notes:
6. 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.
 7. Same as note (6), except the device is measured at t ≤ 10 sec.
 8. Same as note (6), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the 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. Thermal resistance from junction to solder-point.

Thermal Characteristics

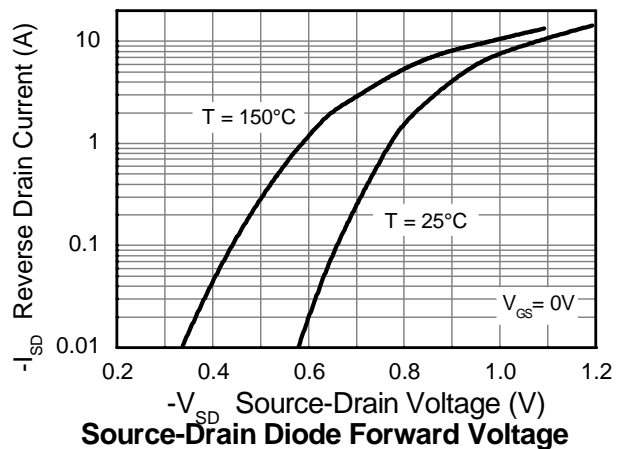
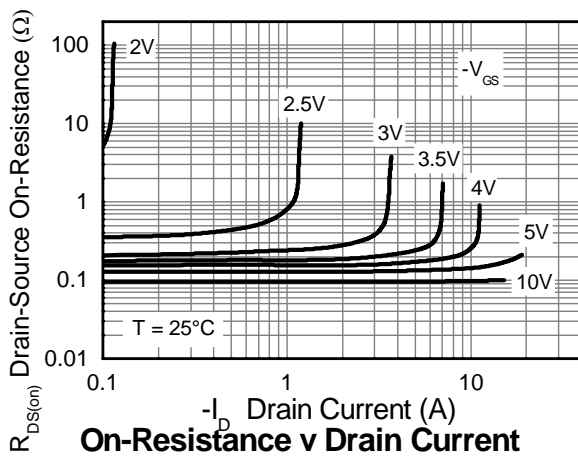
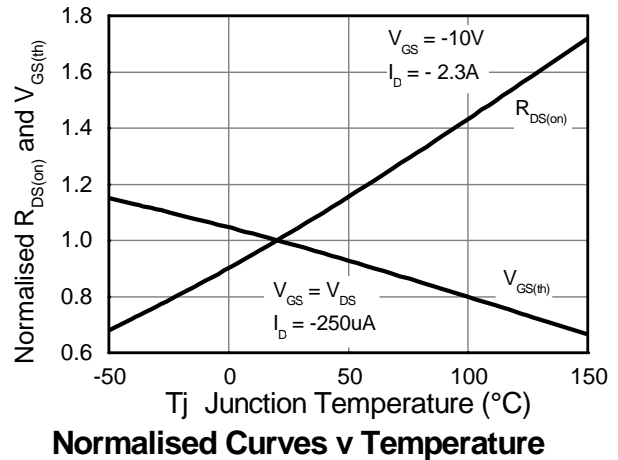
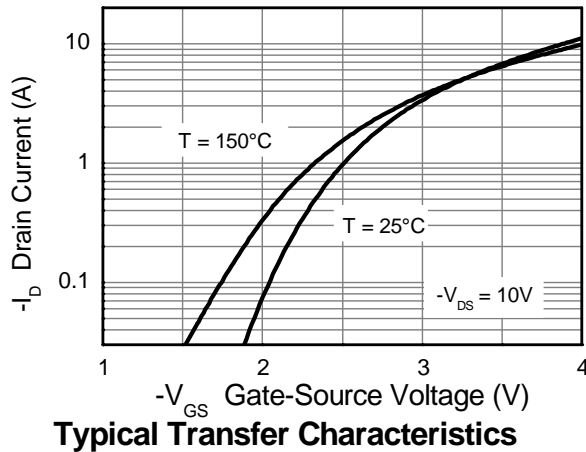
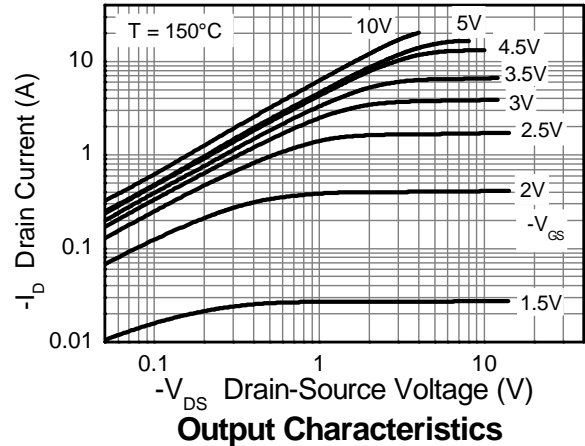
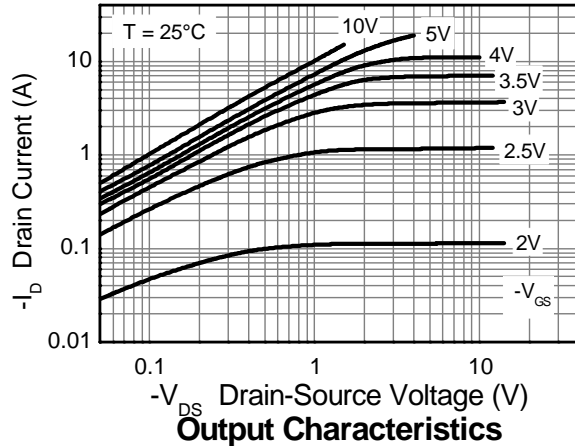


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

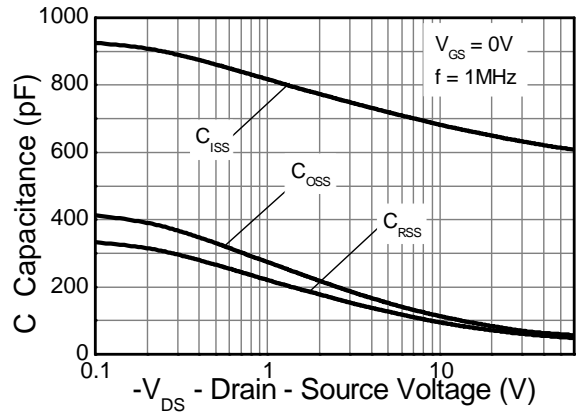
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-0.5	μA	V _{DS} = -60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	-1.0	—	—	V	I _D = -250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 12)	R _{DS(ON)}	—	—	0.125	Ω	V _{GS} = -10V, I _D = -2.3A
				0.190		V _{GS} = -4.5V, I _D = -1.9A
Forward Transconductance (Notes 12 & 13)	g _{fs}	—	4.7	—	S	V _{DS} = -15V, I _D = -2.3A
Diode Forward Voltage (Note 12)	V _{SD}	—	-0.85	-0.95	V	I _S = -2.0A, V _{GS} = 0V
Reverse recovery time (Note 13)	t _{rr}	—	25.1	—	ns	I _S = -1.7A, di/dt = 100A/μs
Reverse recovery charge (Note 13)	Q _{rr}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C _{iss}	—	637	—	pF	V _{DS} = -30V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	53	—	pF	
Total Gate Charge (Note 14)	Q _g	—	9.0	—	nC	V _{GS} = -4.5V
Total Gate Charge (Note 14)	Q _g	—	17.7	—	nC	V _{GS} = -10V
Gate-Source Charge (Note 14)	Q _{gs}	—	1.6	—	nC	
Gate-Drain Charge (Note 14)	Q _{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 14)	t _{D(on)}	—	2.6	—	ns	V _{DD} = -30V, V _{GS} = -10V I _D = -1A, R _G ≅ 6.0Ω
Turn-On Rise Time (Note 14)	t _r	—	3.4	—	ns	
Turn-Off Delay Time (Note 14)	t _{D(off)}	—	26.2	—	ns	
Turn-Off Fall Time (Note 14)	t _f	—	11.3	—	ns	

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

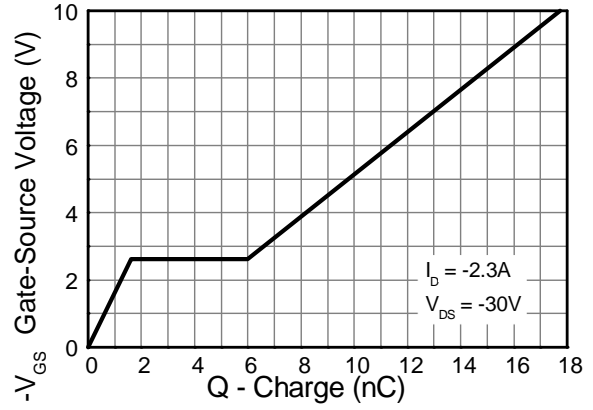
Typical Characteristics



Typical Characteristics – (cont.)

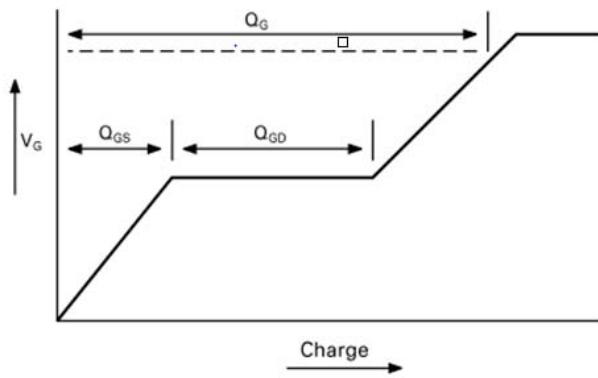


Capacitance v Drain-Source Voltage

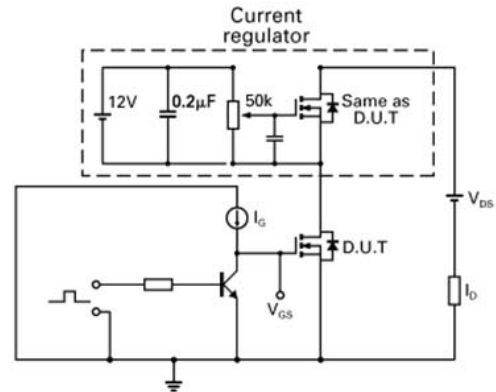


Gate-Source Voltage v Gate Charge

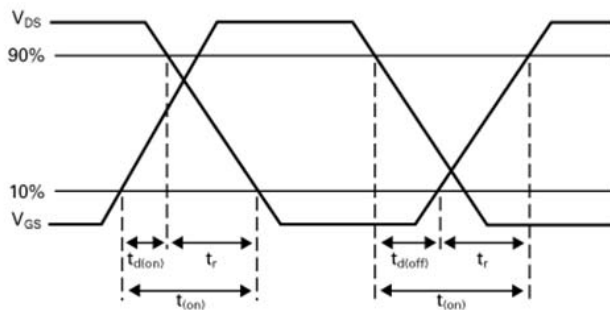
Test Circuits



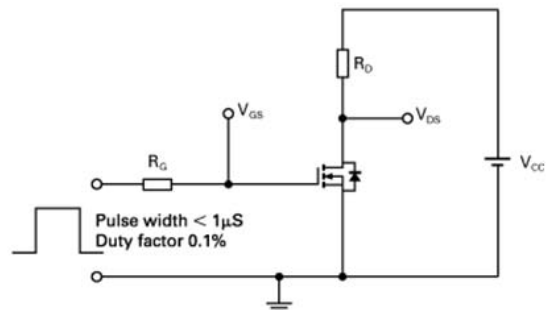
Basic gate charge waveform



Gate charge test circuit



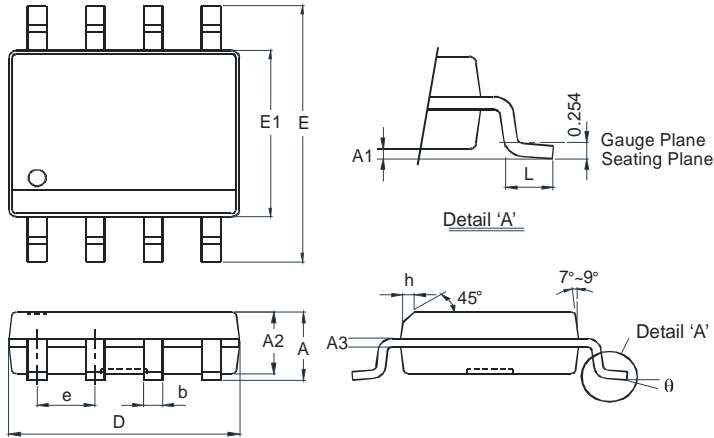
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

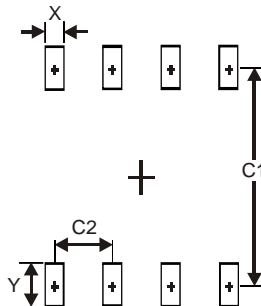
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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