

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ Max}$	I_D $T_A = +25^\circ\text{C}$ (Notes 4 & 6)
-60V	85mΩ @ $V_{GS} = -10\text{V}$	-3.9A
	125mΩ @ $V_{GS} = -4.5\text{V}$	-3.2A

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

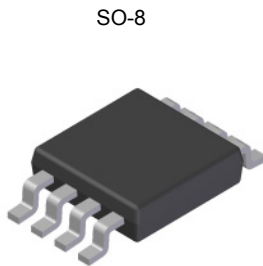
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features

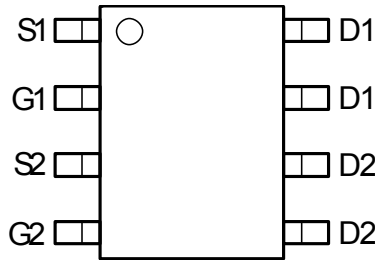
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Available**

Mechanical Data

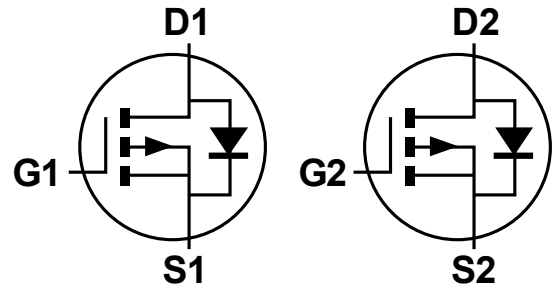
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



Top View



Top View



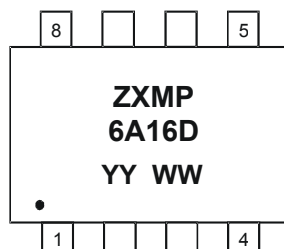
Equivalent Circuit

Ordering Information

Part Number	Qualification	Case	Packaging
ZXMP6A16DN8QTA	Automotive	SO-8	500/Tape & Reel

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

Marking Information



ZXMP6A16D = 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.)

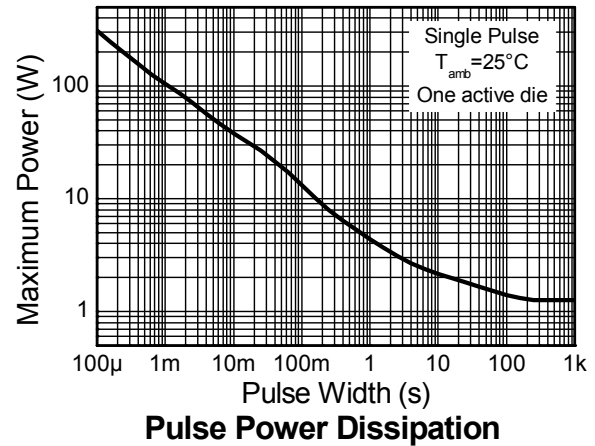
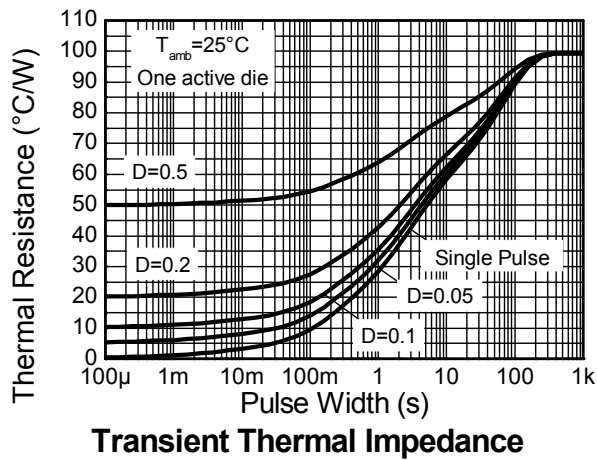
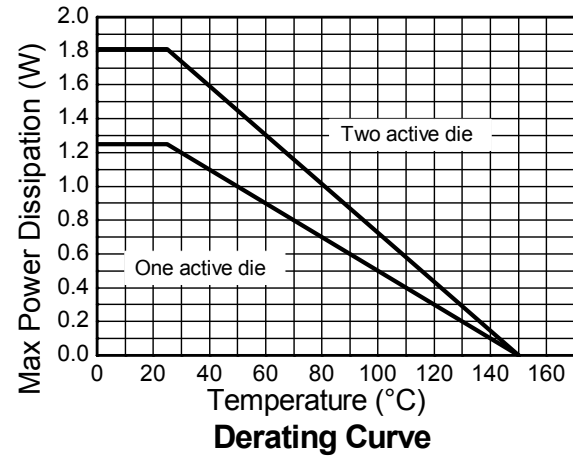
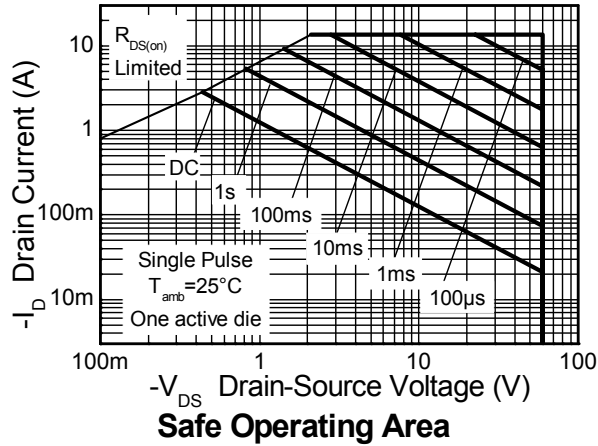
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V _{DSS}	-60	V
Gate-Source voltage		(Note 6)	V _{GS}	±20	V
Continuous Drain current	V _{GS} = 10V	(Notes 8 & 10)	I _D	-3.9	A
		T _A = +70°C (Notes 8 & 10)		-3.1	
		(Notes 7 & 10)		-2.9	
Pulsed Drain current		(Notes 9 & 10)	I _{DM}	-18.3	A
Continuous Source current (Body diode)		(Notes 8 & 10)	I _S	-3.2	A
Pulsed Source current (Body diode)		(Notes 9 & 10)	I _{SM}	-18.3	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 7 & 10)	P _D	1.25 10.0	W mW/°C
	(Notes 7 & 11)		1.81 14.5	
	(Notes 8 & 10)		2.15 17	
	(Notes 7 & 10)		100	
Thermal Resistance, Junction to Ambient	(Notes 7 & 11)	R _{θJA}	70	°C/W
	(Notes 8 & 10)		60	
	(Notes 10 & 12)		48.85	
Thermal Resistance, Junction to Lead		R _{θJL}	48.85	
Operating and storage temperature range		T _J , T _{STG}	-55 to +150	°C

- Notes:
- AEC-Q101 V_{GS} maximum is ±16V.
 - 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.
 - Same as note (7), except the device is measured at t ≤ 10 sec.
 - Same as note (7), except the device is pulsed with D = 0.02 and pulse width 300μs.
 - For a dual device with one active die.
 - For a device with two active die running at equal power.
 - Thermal resistance from junction to solder-point.

Thermal Characteristics

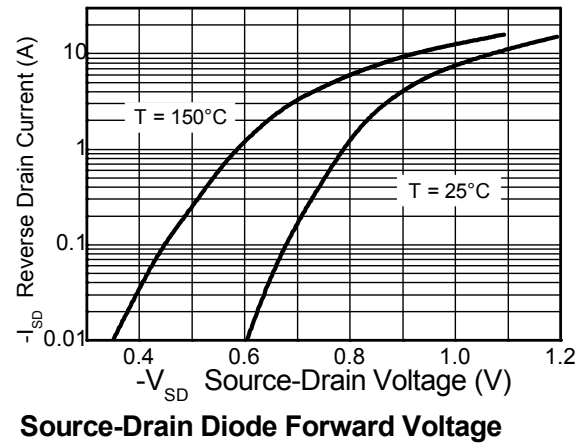
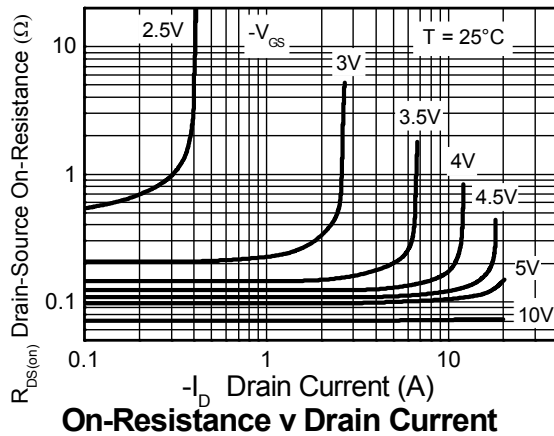
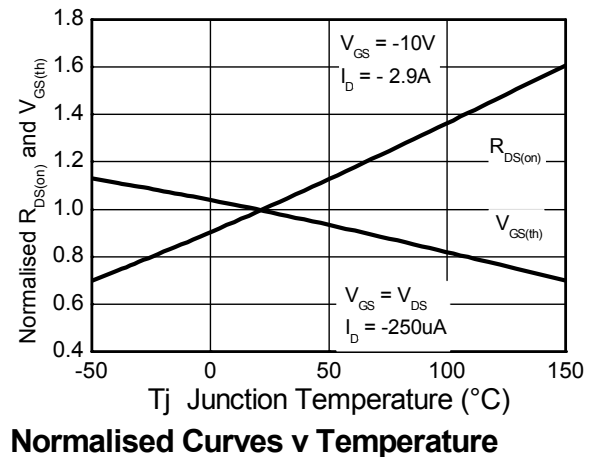
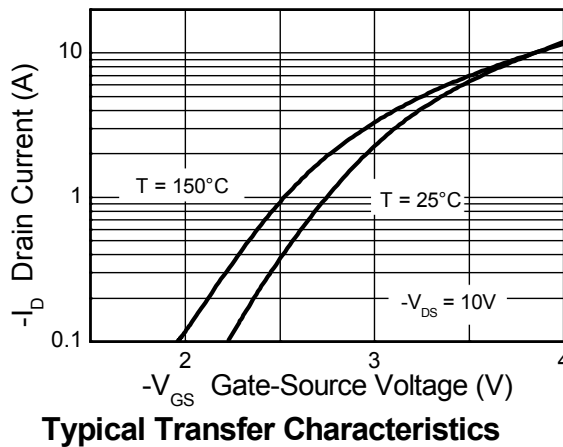
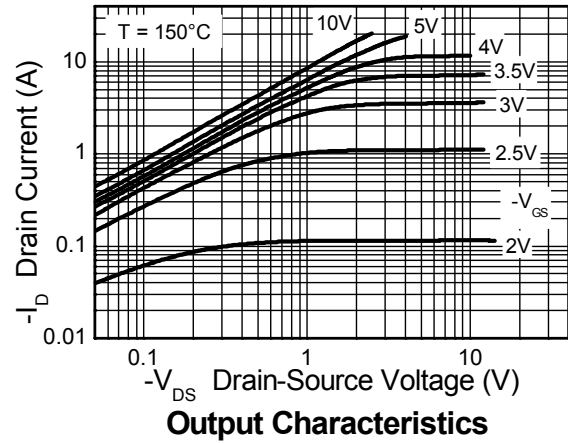
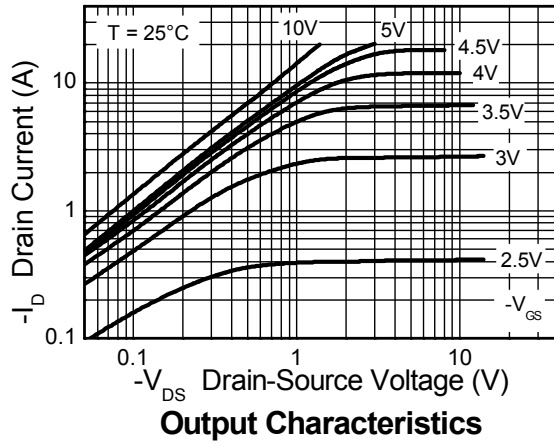


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

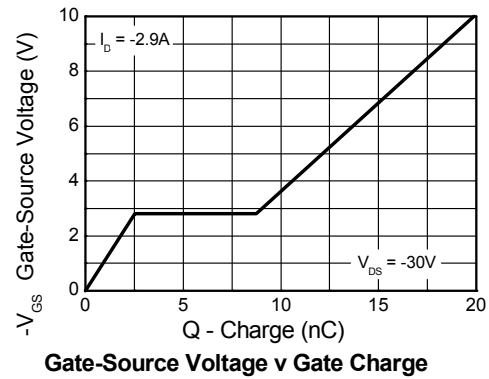
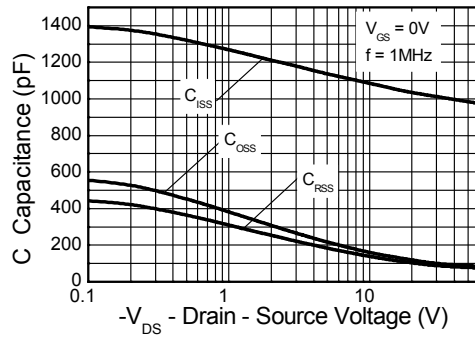
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	$I_D = -250\mu A, V_{GS} = 0V$	
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	μA	$V_{DS} = -60V, V_{GS} = 0V$	
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	—	V	$I_D = -250\mu A, V_{DS} = V_{GS}$	
Static Drain-Source On-Resistance (Note 13)	$R_{DS(on)}$	—	—	85	m Ω	$V_{GS} = -10V, I_D = -2.9A$	
			—	125		$V_{GS} = -4.5V, I_D = -2.4A$	
Forward Transconductance (Notes 13 & 14)	g_{fs}	—	7.2	—	S	$V_{DS} = -15V, I_D = -2.9A$	
Diode Forward Voltage (Note 13)	V_{SD}	—	-0.85	-0.95	V	$I_S = -3.4A, V_{GS} = 0V, T_J = +25^\circ C$	
Reverse recovery time (Note 14)	t_{rr}	—	29.2	—	ns	$I_S = -2A, di/dt = 100A/\mu s, T_J = +25^\circ C$	
Reverse recovery charge (Note 14)	Q_{rr}	—	39.6	—	nC		
DYNAMIC CHARACTERISTICS (Note 14)							
Input Capacitance	C_{iss}	—	1021	—	pF	$V_{DS} = -30V, V_{GS} = 0V, f = 1MHz$	
Output Capacitance	C_{oss}	—	83.1	—	pF		
Reverse Transfer Capacitance	C_{rss}	—	56.4	—	pF		
Total Gate Charge (Note 15)	Q_g	—	12.1	—	nC	$V_{GS} = -5V$	$V_{DS} = -30V, I_D = -2.9A$
Total Gate Charge (Note 15)	Q_g	—	24.2	—	nC	$V_{GS} = -10V$	
Gate-Source Charge (Note 15)	Q_{gs}	—	2.5	—	nC		
Gate-Drain Charge (Note 15)	Q_{gd}	—	3.7	—	nC		
Turn-On Delay Time (Note 15)	$t_{D(on)}$	—	3.5	—	ns	$V_{DD} = -30V, V_{GS} = -10V, I_D = -1A, R_G \cong 6\Omega$	
Turn-On Rise Time (Note 15)	t_r	—	4.1	—	ns		
Turn-Off Delay Time (Note 15)	$t_{D(off)}$	—	35	—	ns		
Turn-Off Fall Time (Note 15)	t_f	—	10	—	ns		

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

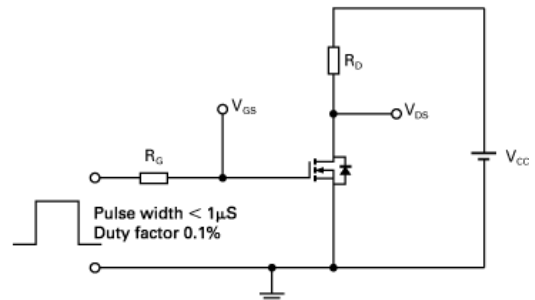
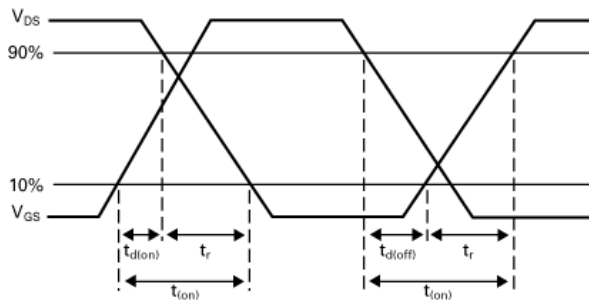
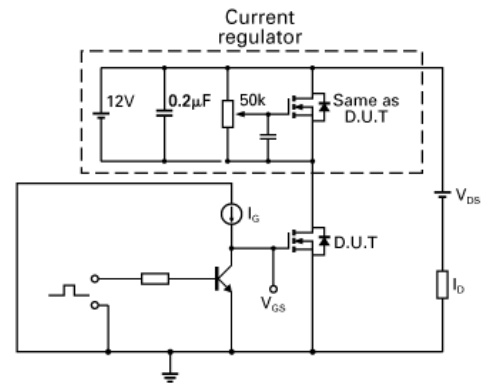
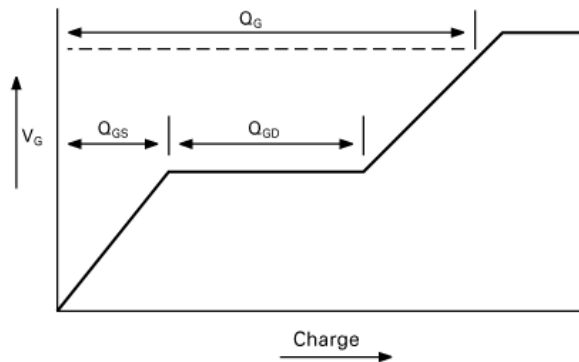
Typical Characteristics



Typical Characteristics (cont.)

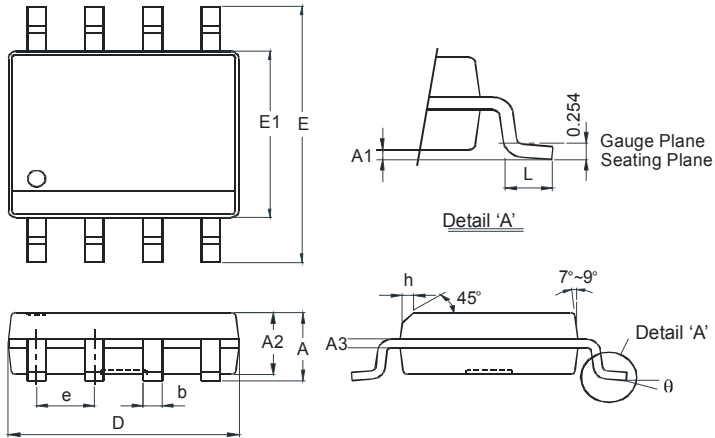


Test Circuits



Package Outline Dimensions

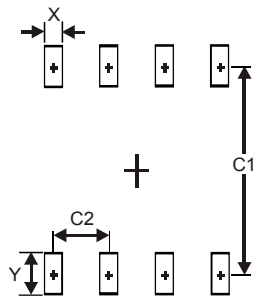
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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