DUAL P-CHANNEL 60V ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	Package	I_D T_A = +25°C (Notes 4 & 6)
-60V	85mΩ @ V_{GS} = -10V	SO-8	-3.9A
	125mΩ @ V_{GS} = -4.5V		-3.2A

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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (ZXMP6A16DN8Q)**

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.

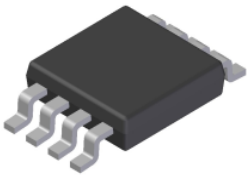
Applications

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

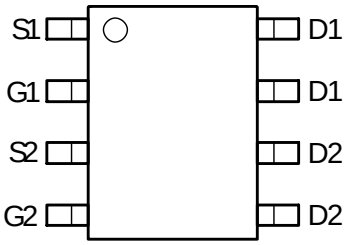
Mechanical Data

- 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: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

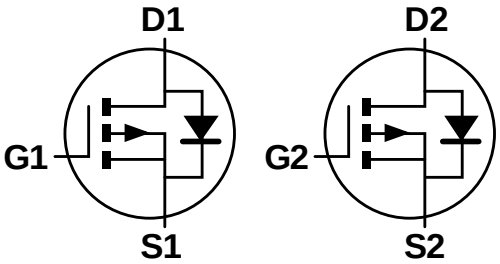
SO-8



Top View



Top View



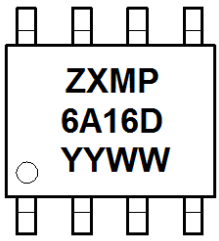
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
ZXMP6A16DN8TA	SO-8	500/Tape & Reel
ZXMP6A16DN8TC	SO-8	2,500/Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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. 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: 16 = 2016)
WW = Week (01 - 53)

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

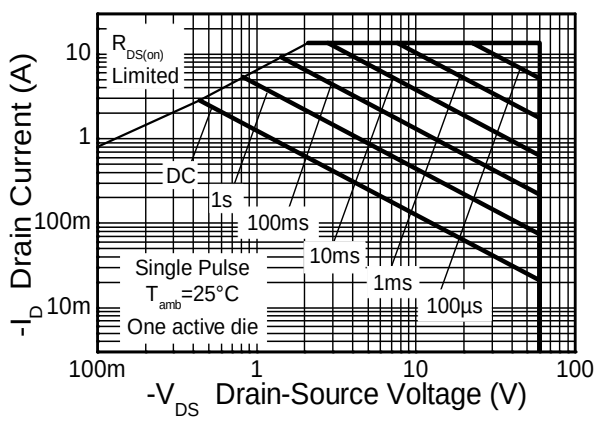
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-60	V
Gate-Source Voltage		(Note 5)	V_{GS}	±20	V
Continuous Drain Current	V_{GS} = 10V	(Notes 7 & 9)	I_D	-3.9	A
		T_A = +70°C (Notes 7 & 9)		-3.1	
		(Notes 6 & 9)		-2.9	
Pulsed Drain Current		(Notes 8 & 9)	I_{DM}	-18.3	A
Continuous Source Current (Body Diode)		(Notes 7 & 9)	I_S	-3.2	A
Pulsed Source Current (Body Diode)		(Notes 8 & 9)	I_{SM}	-18.3	A

Thermal Characteristics

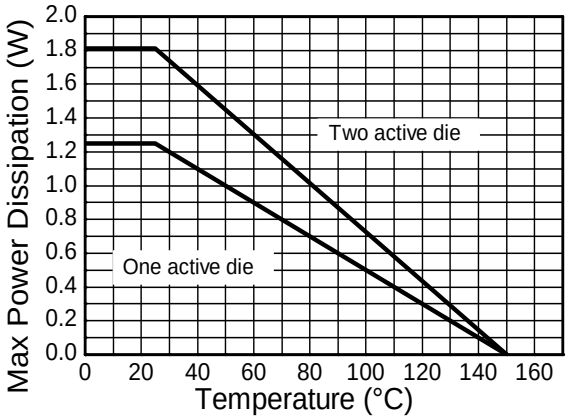
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.25 10.0	W mW/°C
	(Notes 6 & 10)		1.81 14.5	
	(Notes 7 & 9)		2.15 17	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	100	°C/W
	(Notes 6 & 10)		70	
	(Notes 7 & 9)		60	
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	$R_{\theta JL}$	48.85	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. AEC-Q101 V_{GS} maximum is ±16V.
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 (5), except the device is measured at t ≤ 10 sec.
8. Same as Note (5), except the device is pulsed with D = 0.02 and pulse width 300µs.
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.

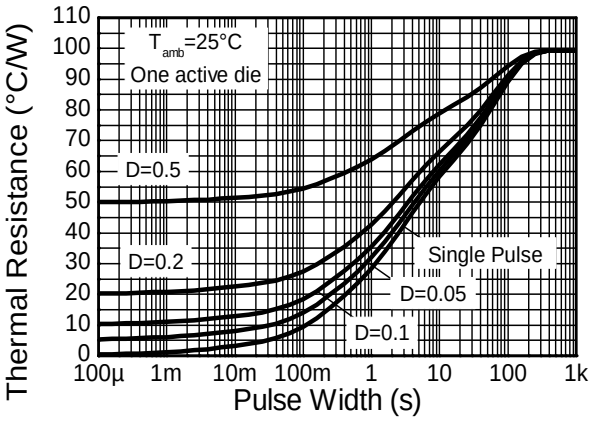
Thermal Characteristics (Continued)



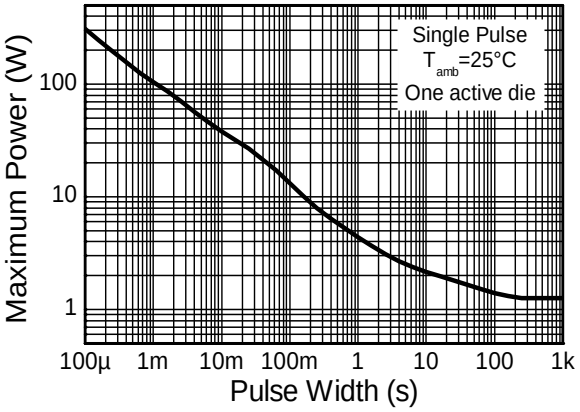
Safe Operating Area



Derating Curve



Transient Thermal Impedance



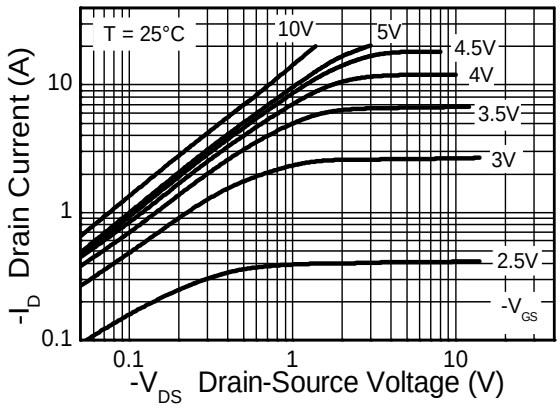
Pulse Power Dissipation

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

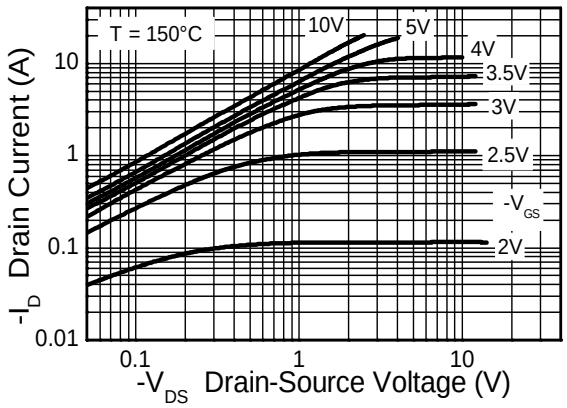
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
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)	$R_{DS(ON)}$	—	—	85	mΩ	V_{GS} = -10V, I_D = -2.9A
			—	125		V_{GS} = -4.5V, I_D = -2.4A
Forward Transconductance (Notes 12 & 13)	g_{FS}	—	7.2	—	S	V_{DS} = -15V, I_D = -2.9A
Diode Forward Voltage (Note 12)	V_{SD}	—	-0.85	-0.95	V	I_S = -3.4A, V_{GS} = 0V, T_J = +25°C
Reverse Recovery Time (Note 13)	t_{RR}	—	29.2	—	ns	I_S = -2A, di/dt = 100A/µs,
Reverse Recovery Charge (Note 13)	Q_{RR}	—	39.6	—	nC	T_J = +25°C
DYNAMIC CHARACTERISTICS (Note 14)						
Input Capacitance	C_{ISS}	—	1,021	—	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	Q_G	—	12.1	—	nC	V_{GS} = -5V; V_{DS} = -30V, I_D = -2.9A
Total Gate Charge	Q_G	—	24.2	—	nC	V_{GS} = -10V; V_{DS} = -30V, I_D = -2.9A
Gate-Source Charge	Q_{GS}	—	2.5	—	nC	V_{GS} = -10V; V_{DS} = -30V, I_D = -2.9A
Gate-Drain Charge	Q_{GD}	—	3.7	—	nC	V_{GS} = -10V; V_{DS} = -30V, I_D = -2.9A
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DD} = -30V, V_{GS} = -10V, I_D = -1A, $R_G \cong$ 6.0Ω
Turn-On Rise Time	t_R	—	4.1	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	35	—	ns	
Turn-Off Fall Time	t_F	—	10	—	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.

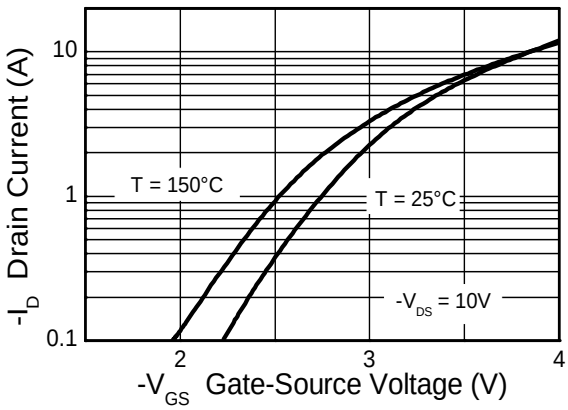
Typical Characteristics



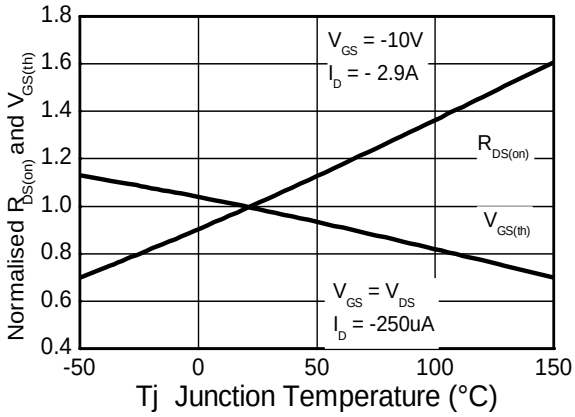
Output Characteristics



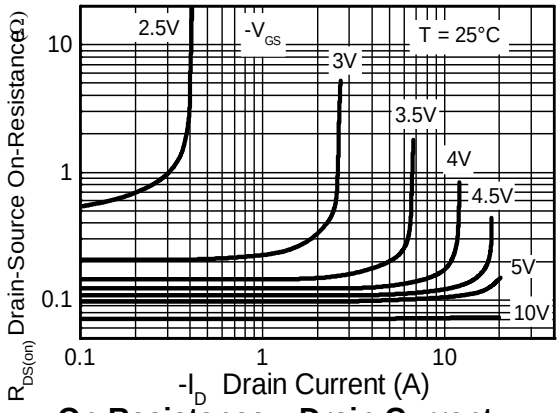
Output Characteristics



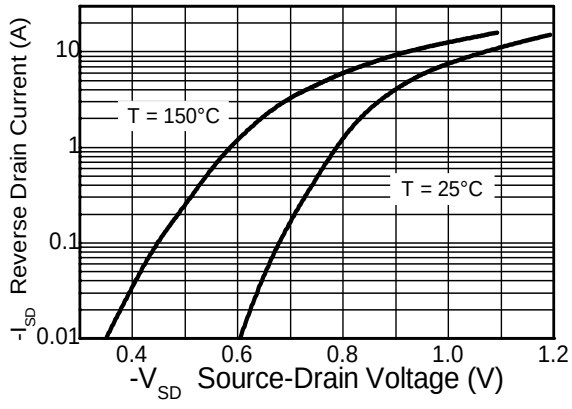
Typical Transfer Characteristics



Normalised Curves v Temperature

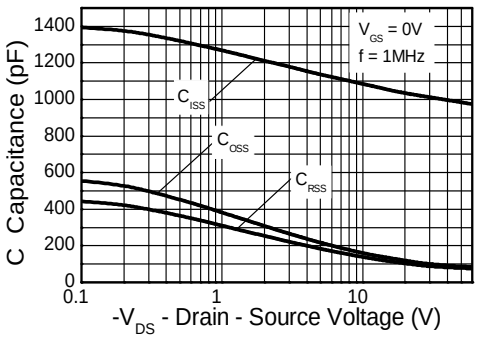


On-Resistance v Drain Current

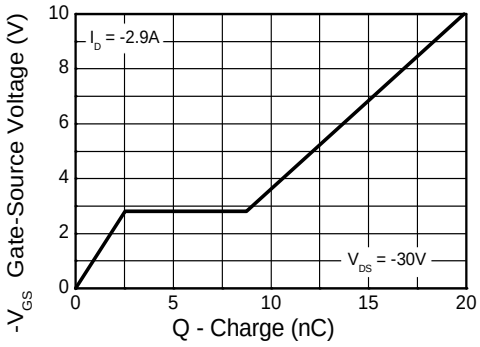


Source-Drain Diode Forward Voltage

Typical Characteristics (Continued)

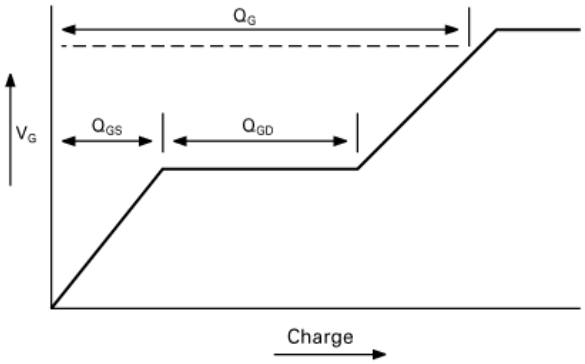


Capacitance v Drain-Source Voltage

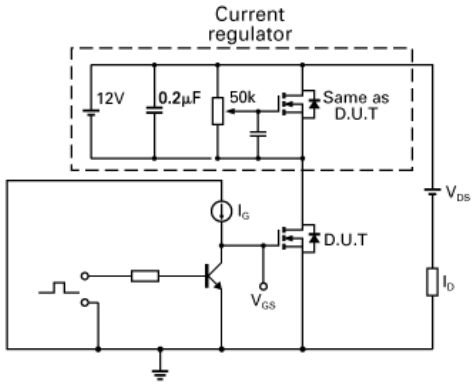


Gate-Source Voltage v Gate Charge

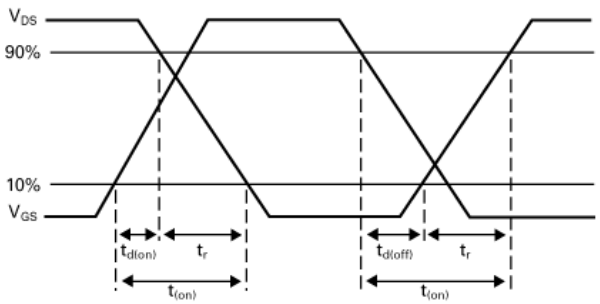
Test Circuits



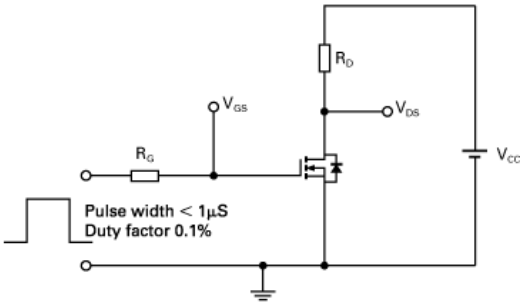
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

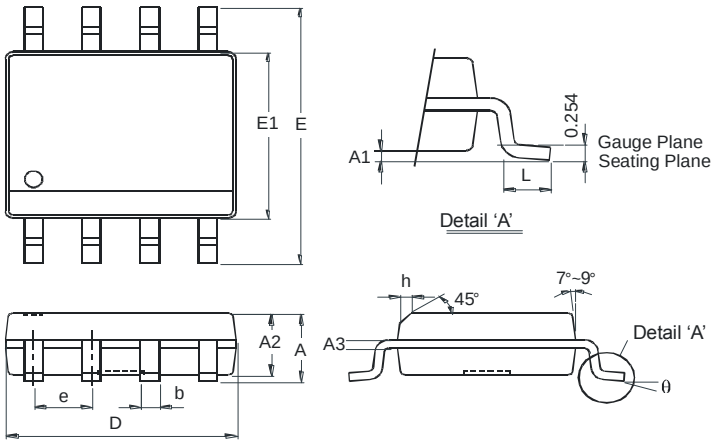


Switching time test circuit

Package Outline Dimensions

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

SO-8

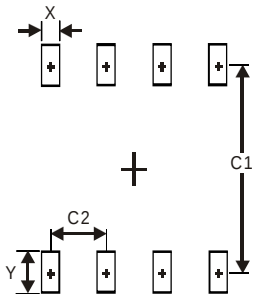


SO-8		
Dim	**Min**	**Max**
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

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

SO-8



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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