

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ\text{C}$
60V	80m Ω @ $V_{GS}=10\text{V}$	3.5A
	150m Ω @ $V_{GS}=4.5\text{V}$	2.5A

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 and Benefits

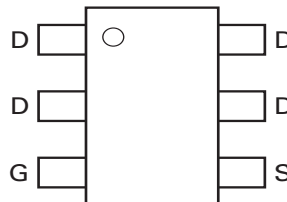
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Available**

Mechanical Data

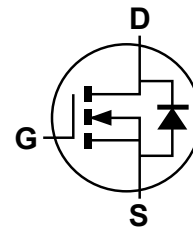
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame.
Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.018 grams (approximate)



Top View



Top view
Pin Out - Top View



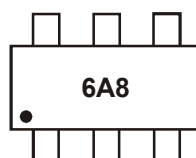
Equivalent Circuit

Ordering Information (Note 4 & 5)

Part Number	Compliance	Case	Quantity per reel
ZXMN6A08E6QTA	Automotive	SOT26	3,000

- Note:
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



6A8 = Product Type Marking Code

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

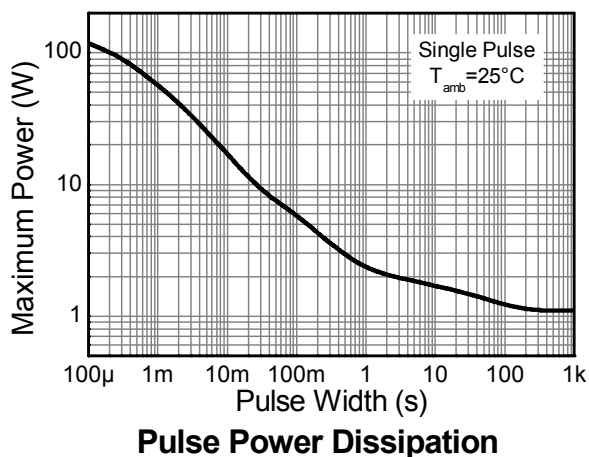
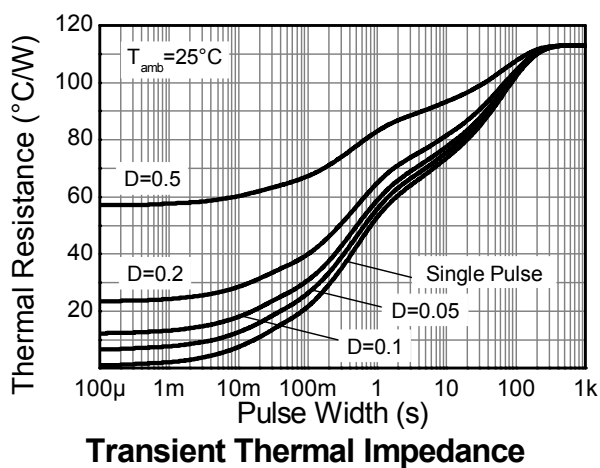
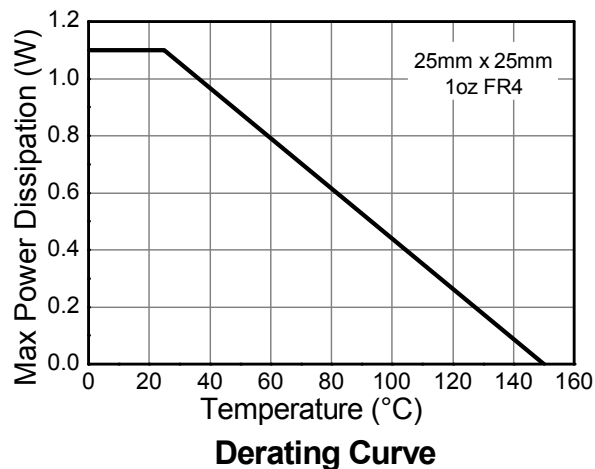
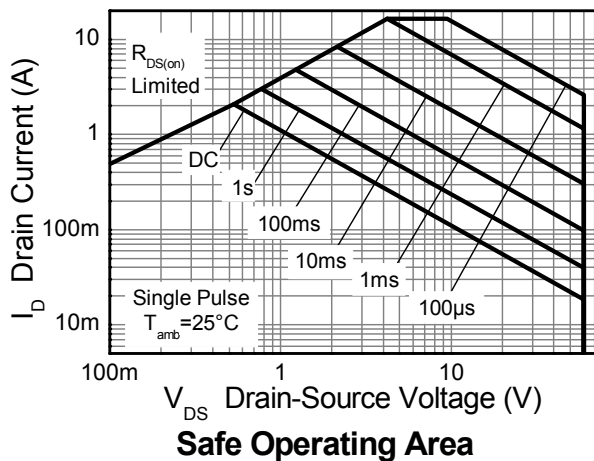
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	(Note 7)	I _D	3.5	A
		T _A = +70°C (Note 7)		2.8	
		(Note 6)		2.8	
Pulsed Drain Current	V _{GS} = 10V	(Note 8)	I _{DM}	16	A
Continuous Source Current (Body diode)		(Note 7)	I _S	2.6	A
Pulsed Source Current (Body diode)		(Note 8)	I _{SM}	16	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P _D	1.1	W
			8.8	
Linear Derating Factor	(Note 7)		1.7	mW/°C
			13.6	
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	113	°C/W
	(Note 7)		73	
Operating and Storage Temperature Range		T _J , T _{STG}	-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.

Thermal Characteristics

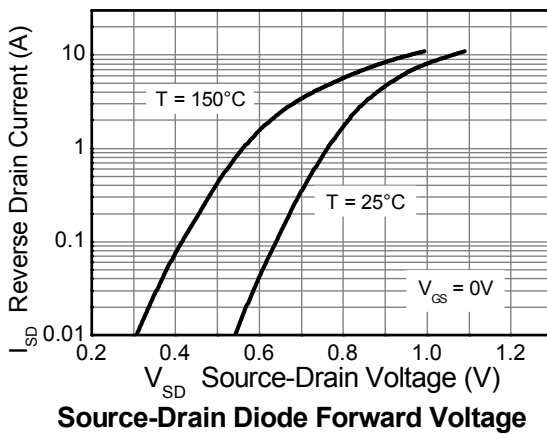
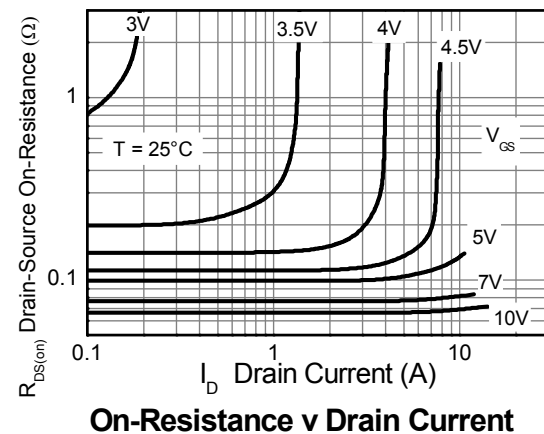
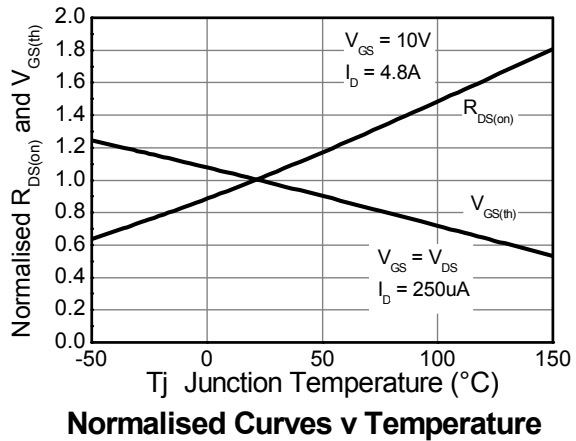
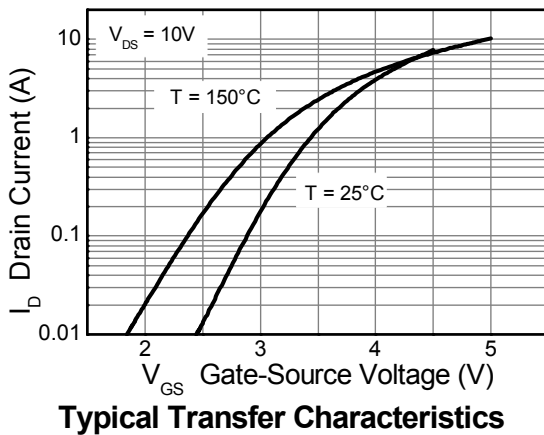
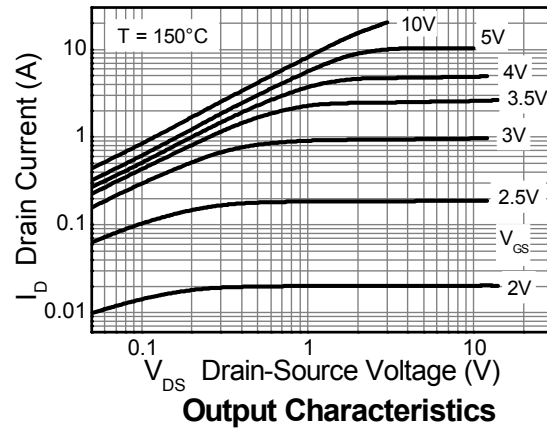
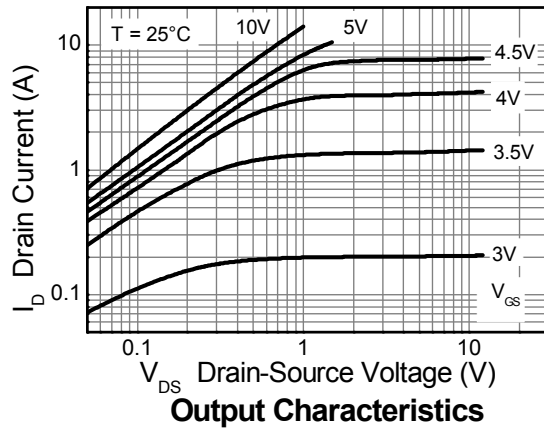


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

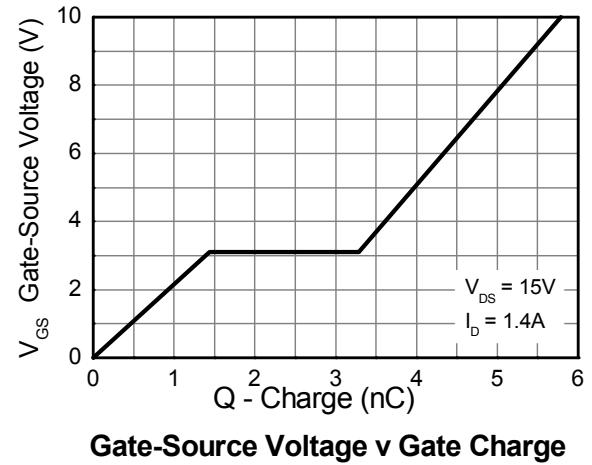
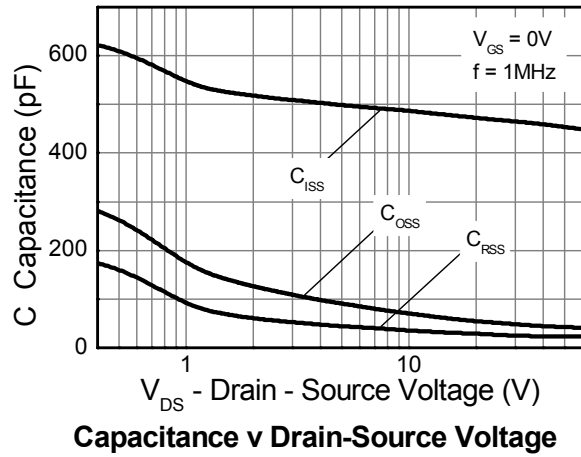
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0V	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 60V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(th)}	1	—	—	V	I _D = 250μA, V _{DS} = V _{GS}	
Static Drain-Source On-Resistance (Note 9)	R _{DS(ON)}	—	0.067	0.08	Ω	V _{GS} = 10V, I _D = 4.8A	
			0.1	0.15		V _{GS} = 4.5V, I _D = 4.2A	
Forward Transconductance (Notes 9 & 10)	g _{fs}	—	6.6	—	S	V _{DS} = 15V, I _D = 4.8A	
Diode Forward Voltage (Note 9)	V _{SD}	—	0.88	1.2	V	I _S = 4A, V _{GS} = 0V, T _J = +25°C	
Reverse recovery time (Note 10)	t _{rr}	—	19.2	—	ns	I _F = 1.4A, di/dt = 100A/μs, T _J = +25°C	
Reverse recovery charge (Note 10)	Q _{rr}	—	30.3	—	nC		
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C _{iss}	—	459	—	pF	V _{DS} = 40V, V _{GS} = 0V f = 1MHz	
Output Capacitance	C _{oss}	—	44.2	—	pF		
Reverse Transfer Capacitance	C _{rss}	—	24.1	—	pF		
Total Gate Charge (Note 11)	Q _g	—	3.7	—	nC	V _{GS} = 4.5V	V _{DS} = 30V I _D = 1.4A
Total Gate Charge (Note 11)	Q _g	—	5.8	—	nC	V _{GS} = 10V	
Gate-Source Charge (Note 11)	Q _{gs}	—	1.4	—	nC		
Gate-Drain Charge (Note 11)	Q _{gd}	—	1.9	—	nC		
Turn-On Delay Time (Note 11)	t _{D(on)}	—	2.6	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 1.5A, R _G ≡ 6Ω	
Turn-On Rise Time (Note 11)	t _r	—	2.1	—	ns		
Turn-Off Delay Time (Note 11)	t _{D(off)}	—	12.3	—	ns		
Turn-Off Fall Time (Note 11)	t _f	—	4.6	—	ns		

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
10. For design aid only, not subject to production testing.
11. Switching characteristics are independent of operating junction temperatures.

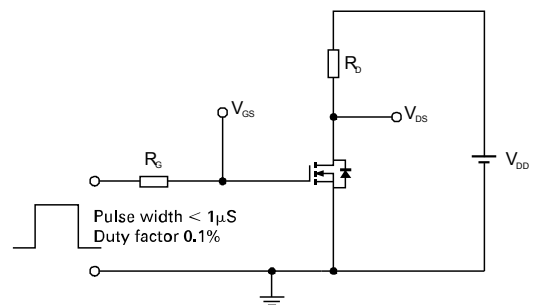
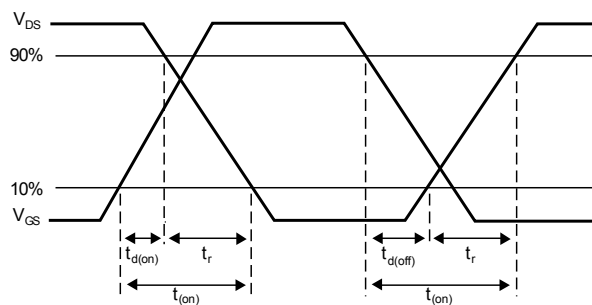
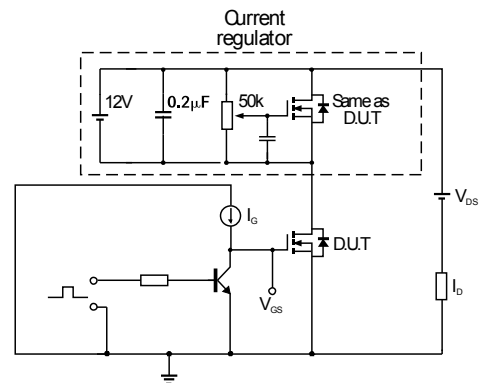
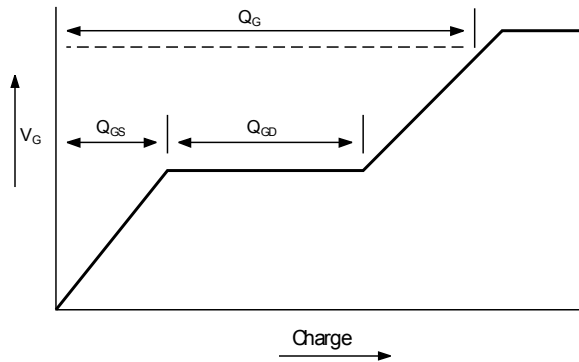
Typical Characteristics



Typical Characteristics (cont.)

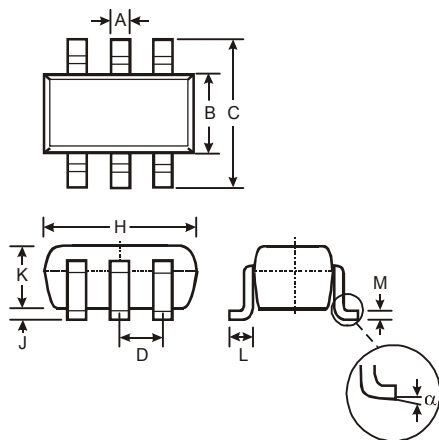


Test Circuits



Package Outline Dimensions

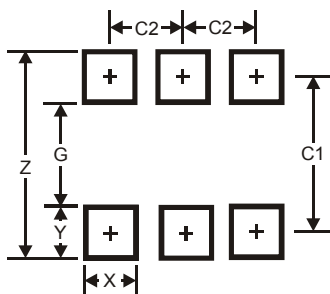
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	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)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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