Lead-free Green

ZXMN6A08E6

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = 25°C
100V	80mΩ @ V_{GS}=10V	3.5A
	150mΩ @ V_{GS}=4.5V	2.5A

Features and Benefits

- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- **"Green" component and RoHS compliant (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

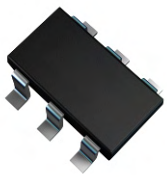
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control

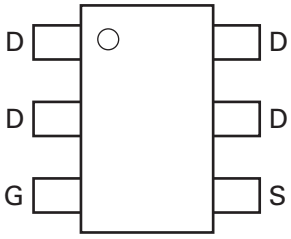
Mechanical Data

- Case: SOT23-6
- Case Material: Molded Plastic, 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
- Weight: 0.018 grams (approximate)

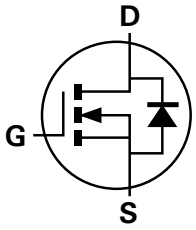
SOT23-6



Top View



Pin Out - Top View



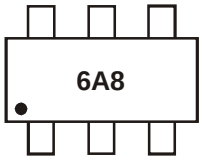
Equivalent Circuit

Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A08E6TA	See below	7	8	3,000

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



6A8 = Product Type Marking Code

Maximum Ratings @T_A = 25°C unless otherwise specified

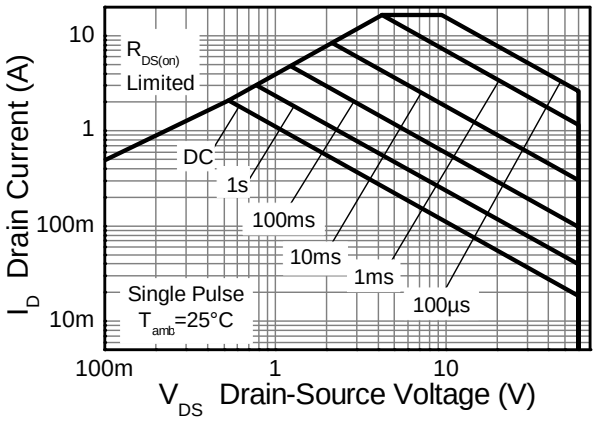
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	60	V
Gate-Source voltage			V_{GS}	±20	V
Continuous Drain current	V_{GS} = 10V	(Note 3)	I_D	3.5	A
		T_A = 70°C (Note 3)		2.8	
		(Note 2)		2.8	
Pulsed Drain current	V_{GS}= 10V	(Note 4)	I_{DM}	16	A
Continuous Source current (Body diode)		(Note 3)	I_S	2.6	A
Pulsed Source current (Body diode)		(Note 4)	I_{SM}	16	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

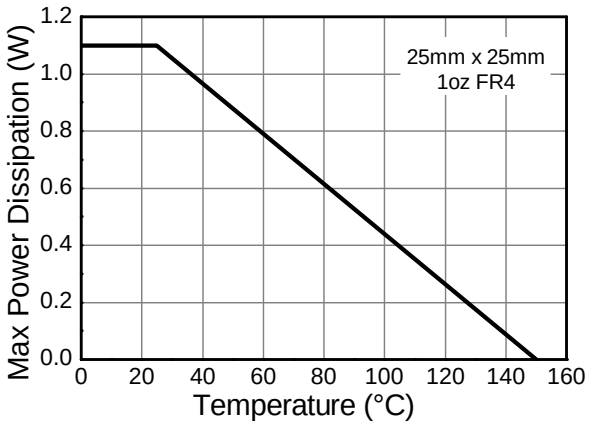
Characteristic		Symbol	Value	Unit
Power dissipation	(Note 2)	P_D	1.1	W
Linear derating factor			8.8	mW/°C
	(Note 3)		1.7	W
			13.6	mW/°C
Thermal Resistance, Junction to Ambient	(Note 1)	$R_{\theta JA}$	113	°C/W
	(Note 3)		73	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

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 300µs. The pulse current is limited by the maximum junction temperature.

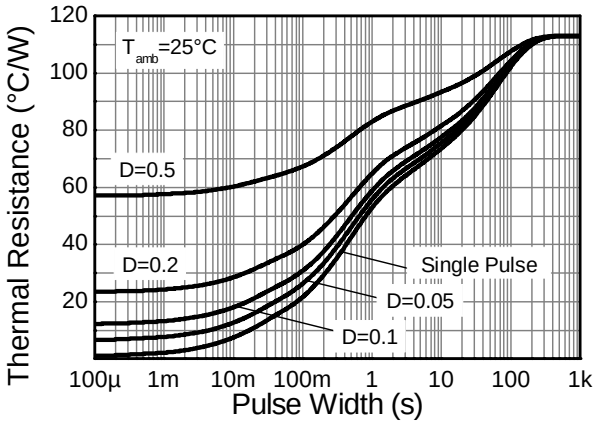
Thermal Characteristics



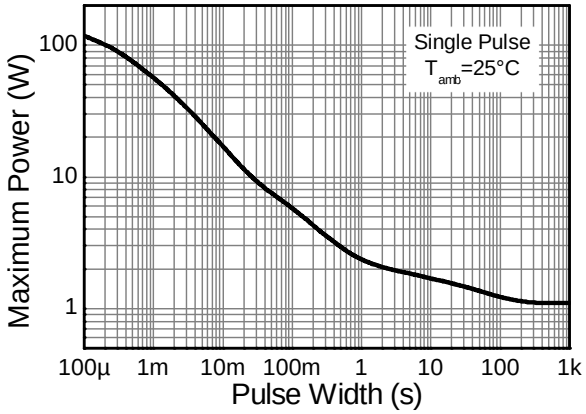
Safe Operating Area



Derating Curve



Transient Thermal Impedance



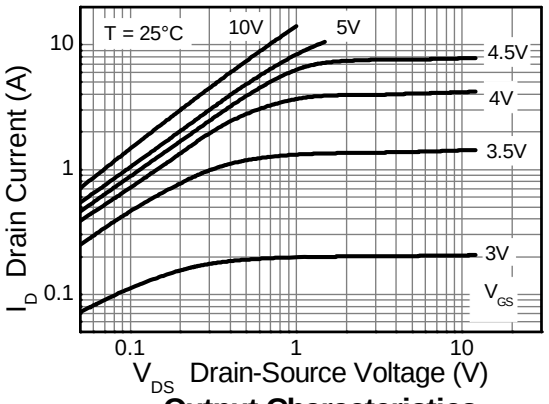
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

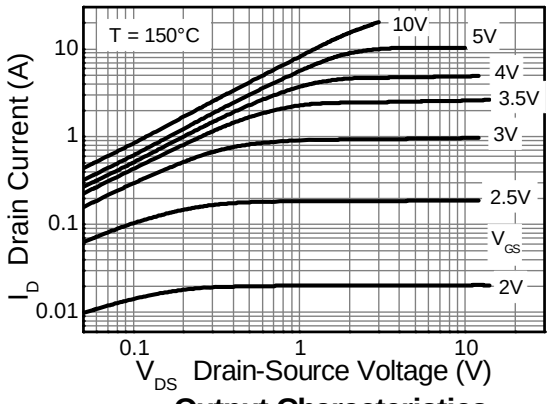
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	I_D = 250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	—	V	I_D = 250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 5)	$R_{DS\ (ON)}$	—	0.067	0.080	Ω	V_{GS} = 10V, I_D = 4.8A
			0.100	0.150		V_{GS} = 4.5V, I_D = 4.2A
Forward Transconductance (Notes 5 & 6)	g_{fs}	—	6.6	—	S	V_{DS} = 15V, I_D = 4.8A
Diode Forward Voltage (Note 5)	V_{SD}	—	0.88	1.2	V	I_S = 4A, V_{GS} = 0V, T_J = 25°C
Reverse recovery time (Note 6)	t_{rr}	—	19.2	—	ns	I_F = 1.4A, di/dt = 100A/μs,
Reverse recovery charge (Note 6)	Q_{rr}	—	30.3	—	nC	T_J = 25°C
DYNAMIC CHARACTERISTICS (Note 6)						
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 7)	Q_g	—	3.7	—	nC	V_{GS} = 4.5V; V_{DS} = 30V, I_D = 1.4A
Total Gate Charge (Note 7)	Q_g	—	5.8	—	nC	V_{GS} = 10V; V_{DS} = 30V, I_D = 1.4A
Gate-Source Charge (Note 7)	Q_{gs}	—	1.4	—	nC	
Gate-Drain Charge (Note 7)	Q_{gd}	—	1.9	—	nC	
Turn-On Delay Time (Note 7)	$t_{D(on)}$	—	2.6	—	ns	V_{DD} = 30V, V_{GS} = 10V I_D = 1.5A, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 7)	t_r	—	2.1	—	ns	
Turn-Off Delay Time (Note 7)	$t_{D(off)}$	—	12.3	—	ns	
Turn-Off Fall Time (Note 7)	t_f	—	4.6	—	ns	

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

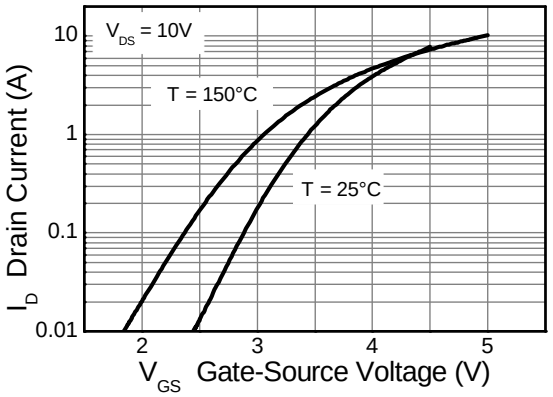
Typical Characteristics



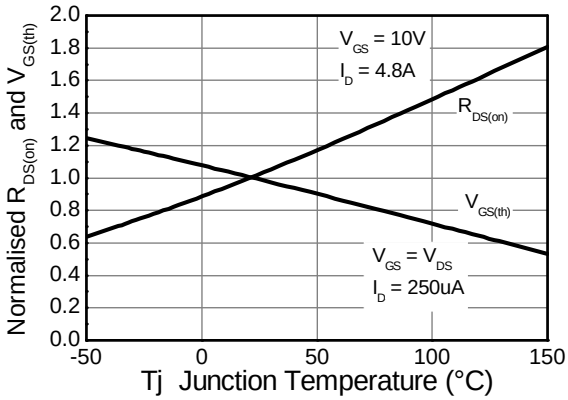
Output Characteristics



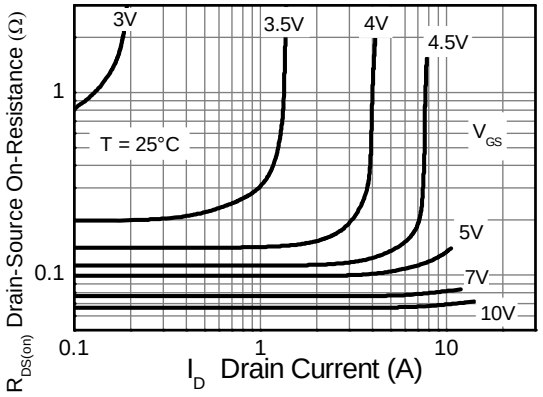
Output Characteristics



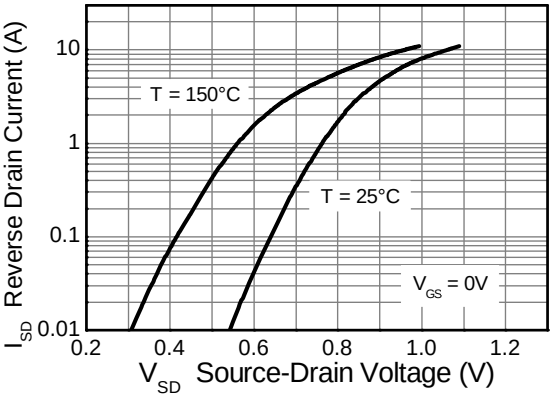
Typical Transfer Characteristics



Normalised Curves v Temperature

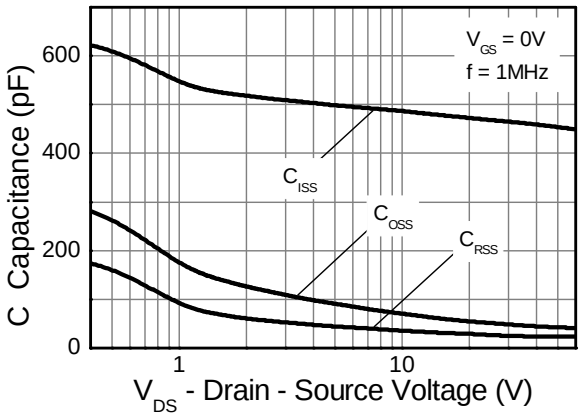


On-Resistance v Drain Current

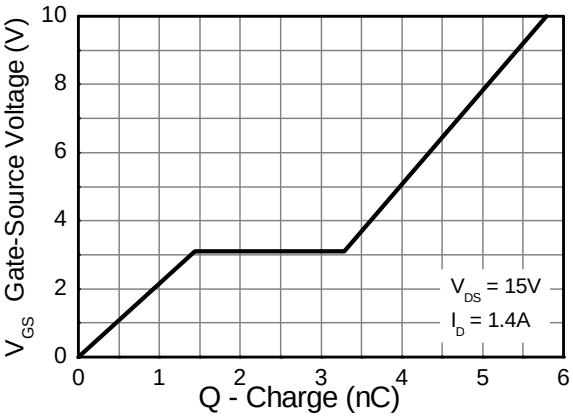


Source-Drain Diode Forward Voltage

Typical Characteristics – continued

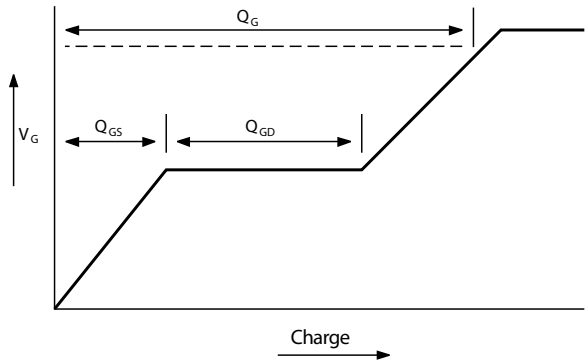


Capacitance v Drain-Source Voltage

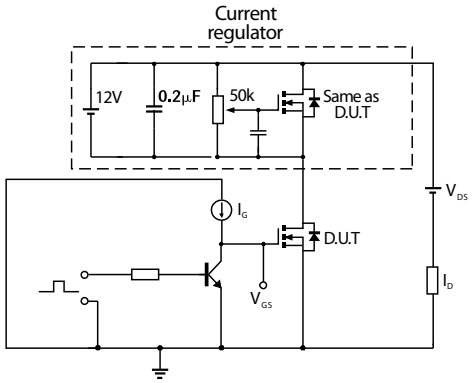


Gate-Source Voltage v Gate Charge

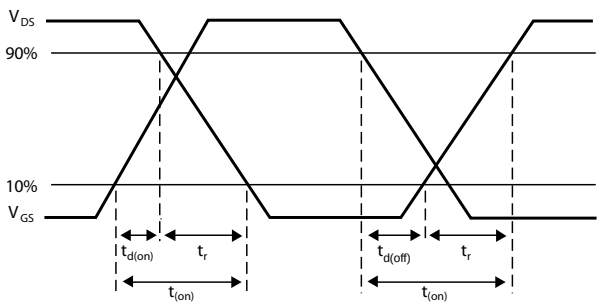
Test Circuits



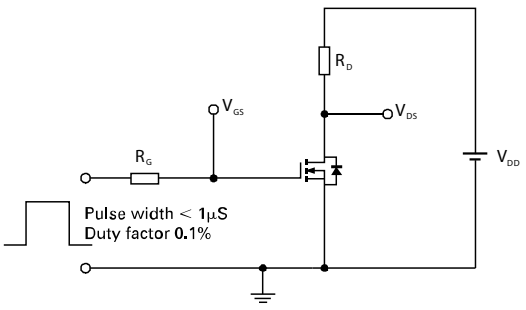
Basic gate charge waveform



Gate charge test circuit

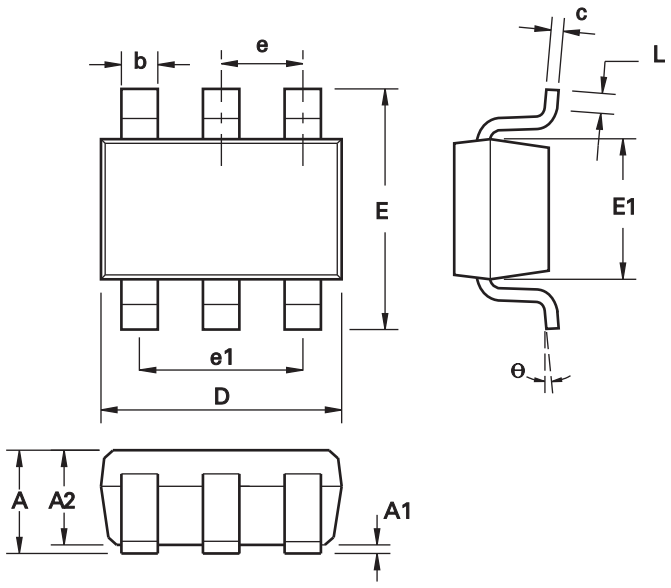


Switching time waveforms



Switching time test circuit

Package Outline Dimensions



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.20	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
L	0.10	0.60	0.0039	0.0236
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
θ	0°	30°	0°	30°

Suggested Pad Layout