

**60V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
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**

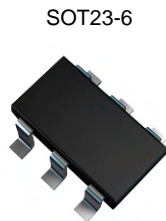
**Description and Applications**

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.

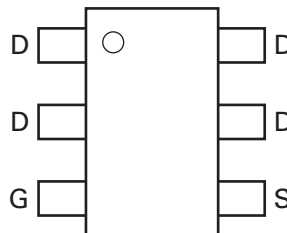
- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control

**Mechanical Data**

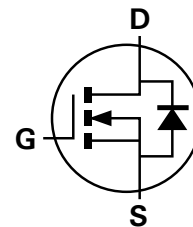
- Case: SOT23-6
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.018 grams (approximate)



Top View



Pin Out - Top View



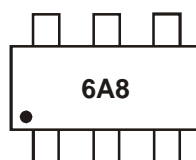
Equivalent Circuit

**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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

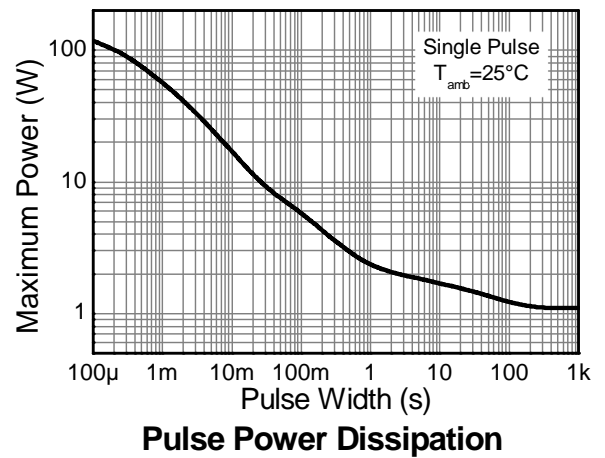
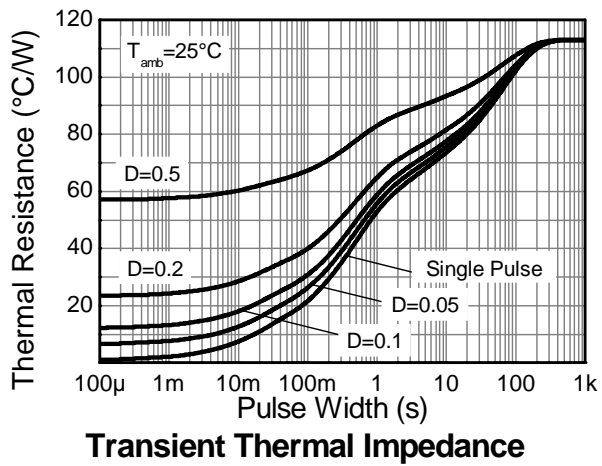
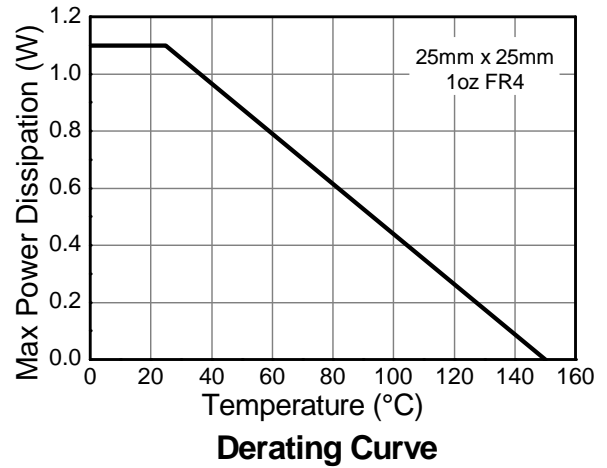
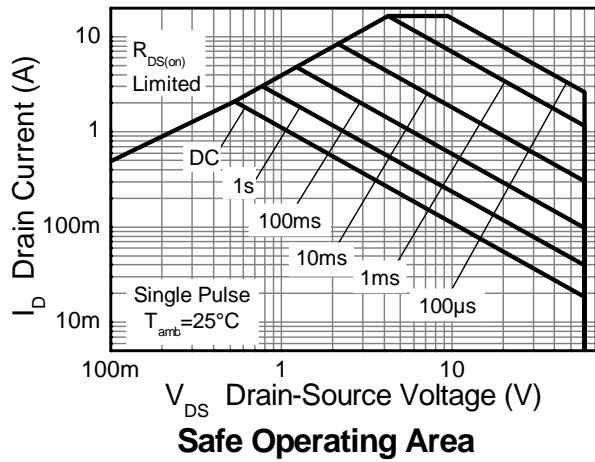
Characteristic			Symbol	Value	Unit	
Drain-Source voltage			$V_{DSS}$	60	V	
Gate-Source voltage			$V_{GS}$	$\pm 20$	V	
Continuous Drain current	$V_{GS} = 10\text{V}$	(Note 3)	$I_D$	3.5	A	
		$T_A = 70^\circ\text{C}$ (Note 3)		2.8		
		(Note 2)		2.8		
Pulsed Drain current	$V_{GS} = 10\text{V}$	(Note 4)	$I_{DM}$	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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

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

- 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  $t \leq 10$  sec.
  4. Same as note (2), except the device is pulsed with  $D = 0.02$  and pulse width 300 $\mu\text{s}$ . The pulse current is limited by the maximum junction temperature.

**Thermal Characteristics**

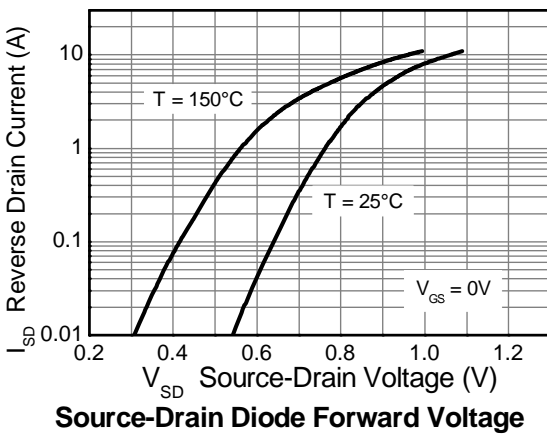
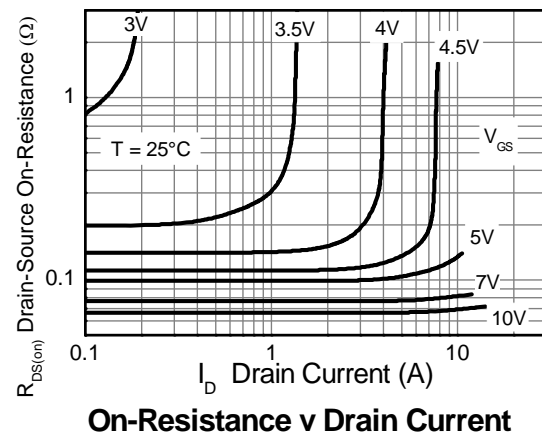
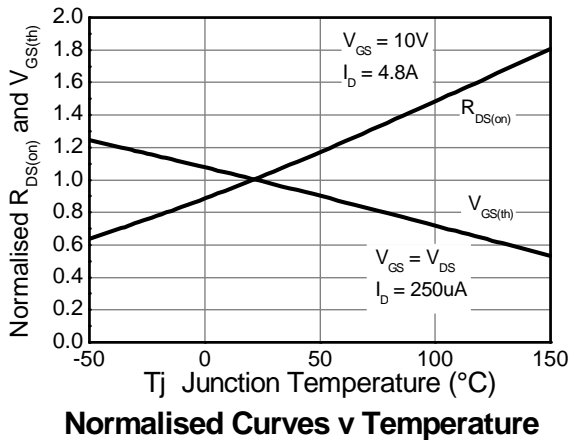
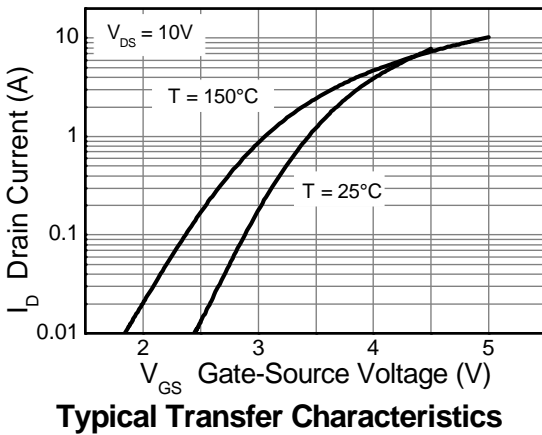
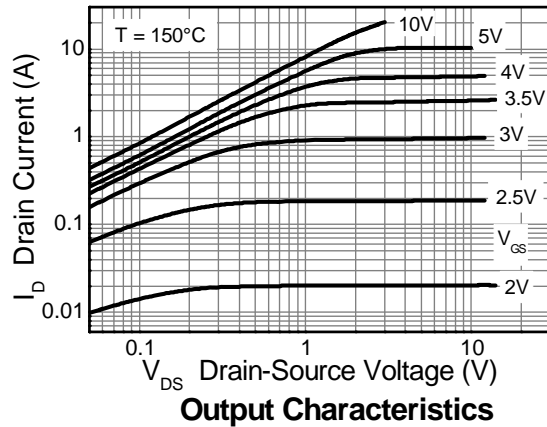
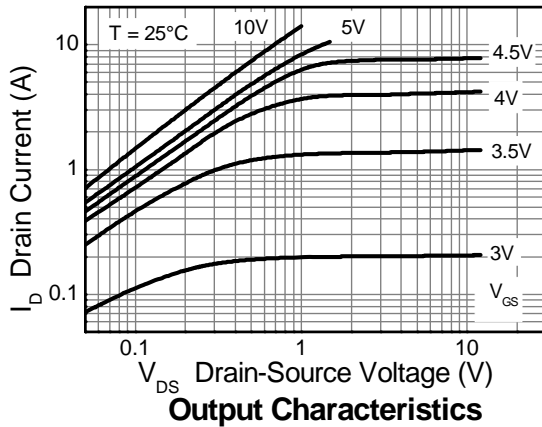


**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

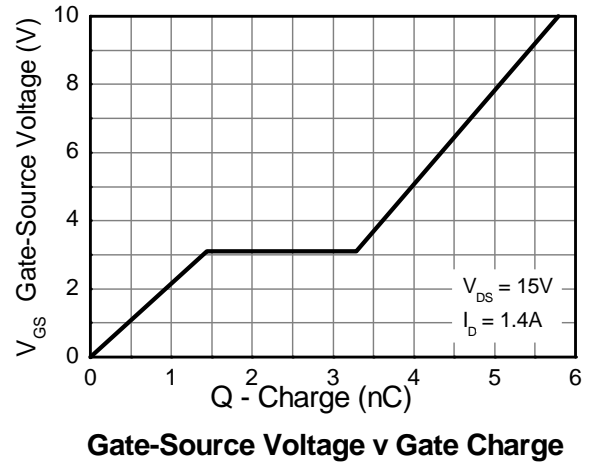
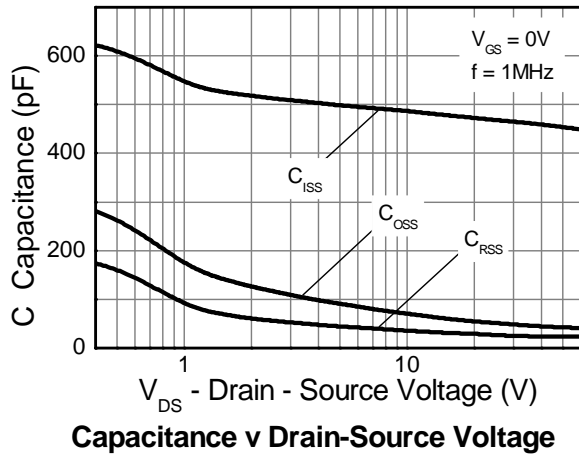
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	0.5	$\mu\text{A}$	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	—	V	$I_D = 250\mu\text{A}, V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 5)	$R_{DS(on)}$	—	0.067	0.080	$\Omega$	$V_{GS} = 10\text{V}, I_D = 4.8\text{A}$
			0.100	0.150		$V_{GS} = 4.5\text{V}, I_D = 4.2\text{A}$
Forward Transconductance (Notes 5 & 6)	$g_{fs}$	—	6.6	—	S	$V_{DS} = 15\text{V}, I_D = 4.8\text{A}$
Diode Forward Voltage (Note 5)	$V_{SD}$	—	0.88	1.2	V	$I_S = 4\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$
Reverse recovery time (Note 6)	$t_{rr}$	—	19.2	—	ns	$I_F = 1.4\text{A}, di/dt = 100\text{A}/\mu\text{s}, T_J = 25^\circ\text{C}$
Reverse recovery charge (Note 6)	$Q_{rr}$	—	30.3	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 6)</b>						
Input Capacitance	$C_{iss}$	—	459	—	pF	$V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
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	$V_{GS} = 4.5\text{V}$
Total Gate Charge (Note 7)	$Q_g$	—	5.8	—	nC	$V_{GS} = 10\text{V}$
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	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}$ $I_D = 1.5\text{A}, R_G \cong 6.0\Omega$
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  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$
  6. For design aid only, not subject to production testing.
  7. Switching characteristics are independent of operating junction temperatures.

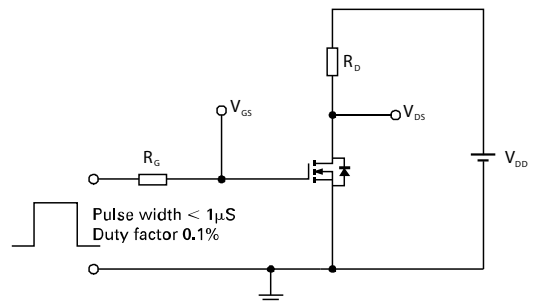
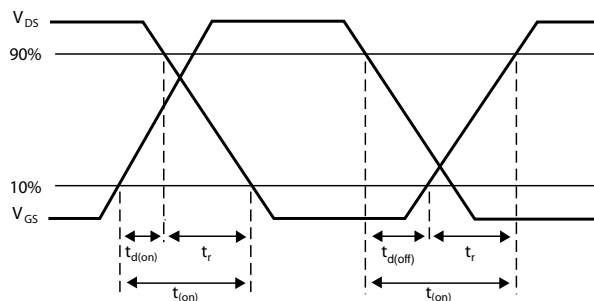
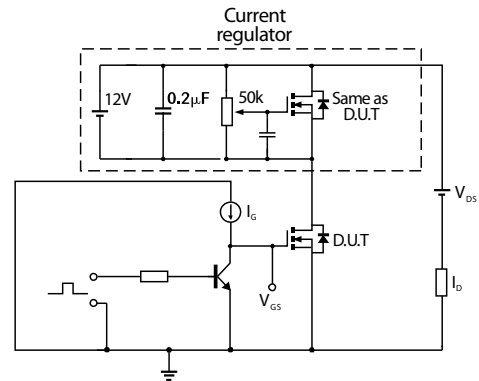
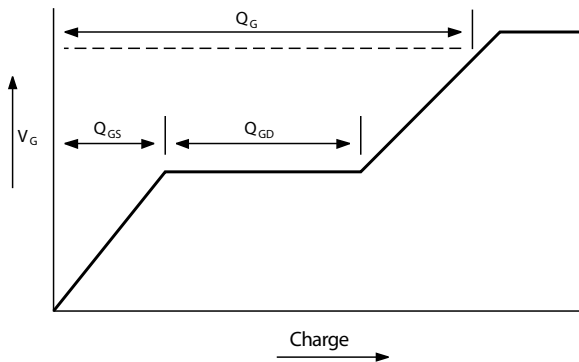
**Typical Characteristics**



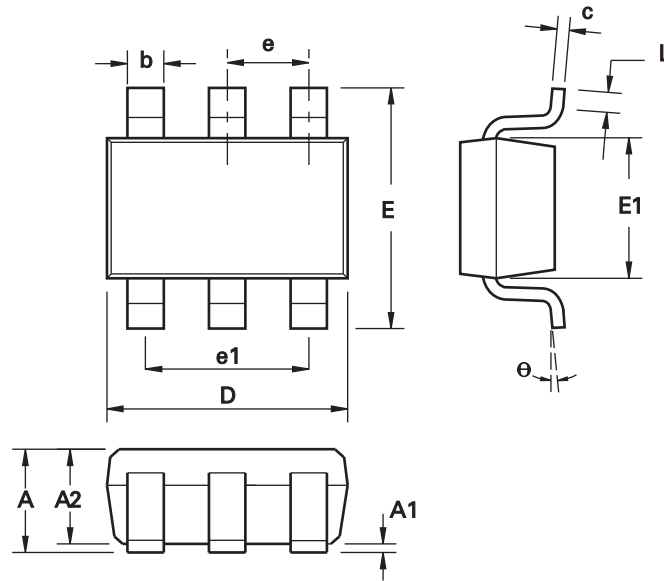
**Typical Characteristics – continued**



**Test Circuits**

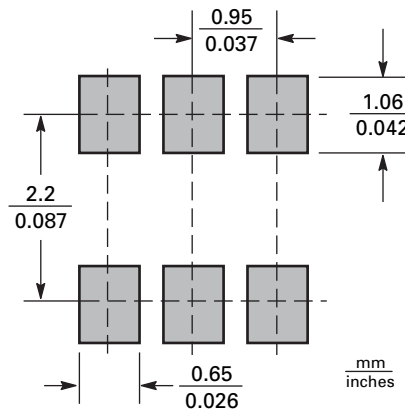


**Package Outline Dimensions**



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**



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