60V SOT223 N-channel enhancement mode MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)\ max}$	I_D T_A = +25°C
60V	50mΩ @ V_{GS} = 10V	6.7A
	70mΩ @ V_{GS} = 4.5V	5.7A

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Backlighting

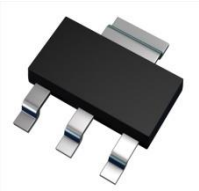
Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

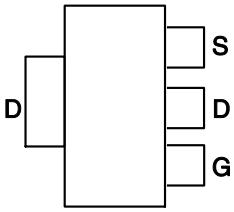
Mechanical Data

- Case: SOT223
- 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 e3
- Weight: 0.112 grams (Approximate)

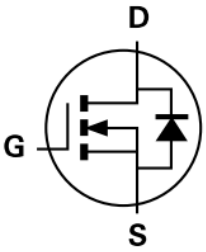
SOT223



Top View



Pin Out - Top



Equivalent Circuit

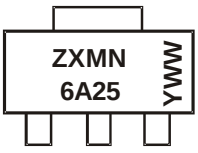
Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A25GTA	ZXMN6A25	7	12	1,000

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

SOT223



ZXMN6A25 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{WW}$ = Week Code (01~53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current, V_{GS} = 10V	Steady State	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A = +25°C (Note 5)	I_D	6.7 5.4 4.8	A
Maximum Body Diode Forward Current (Note 6)			I_S	5.7	A
Pulsed Drain Current (Note 7)			I_{DM}	28.5	A
Pulsed Source Current (Note 7)			I_{SM}	28.5	A

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

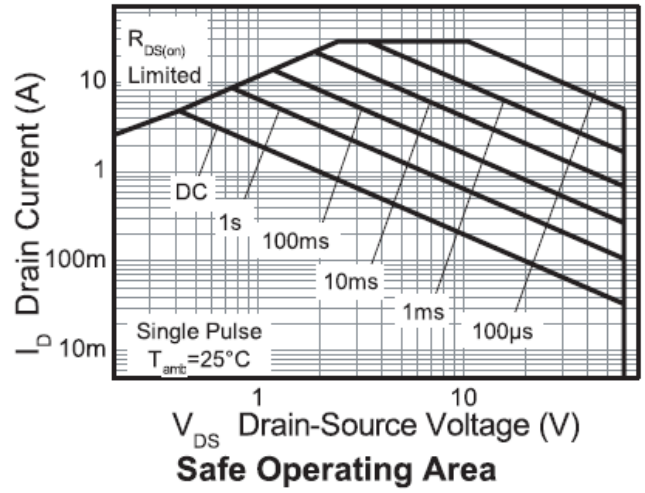
Characteristic		Symbol	Value	Units
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 5)	P_D	2 16	W mW/°C
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 6)	P_D	3.9 31	W mW/°C
Thermal Resistance, Junction to Ambient	Steady state (Note 5)	$R_{\theta JA}$	62.5	°C/W
	Steady state (Note 6)		32	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

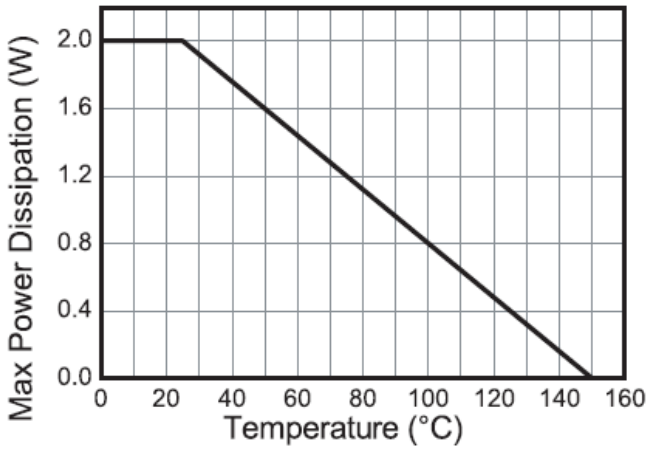
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	—	50	mΩ	V_{GS} = 10V, I_D = 3.6A
		—	—	70		V_{GS} = 4.5V, I_D = 3.0A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.85	0.95	V	V_{GS} = 0V, I_S = 5.5A
Forward Transconductance (Note 8 & 10)	g_{fs}	—	10.2	—	S	V_{DS} = 15V, I_D = 4.5A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	1,063	—	pF	V_{DS} = 30V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	104	—		
Reverse Transfer Capacitance	C_{rss}	—	64	—		
Total Gate Charge (V_{GS} = 5.0V)	Q_g	—	11	—	nC	V_{DS} = 30V, I_D = 1.4A,
Total Gate Charge (V_{GS} = 10V)	Q_g	—	20.4	—		
Gate-Source Charge	Q_{gs}	—	4.1	—		
Gate-Drain Charge	Q_{gd}	—	5.1	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.8	—	nS	V_{GS} = 10V, V_{DD} = 30V, R_G = 6.0Ω, I_D= 1.0A
Turn-On Rise Time	t_r	—	4.0	—		
Turn-Off Delay Time	$t_{D(off)}$	—	26.2	—		
Turn-Off Fall Time	t_f	—	10.6	—		
Body Diode Reverse Recovery Time	t_{rr}	—	22	—	nS	I_F = 2.2A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	21.4	—	nC	

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
6. For a device surface mounted on FR4 PCB measured at t ≤10 secs.
7. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300µs - pulse width limited by maximum junction temperature.
8. Measured under pulsed conditions. Width=300µs. Duty cycle ≤ 2%.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

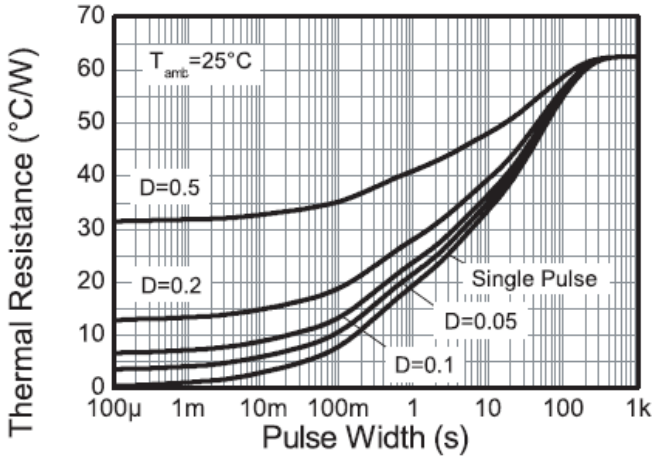
Typical Characteristics



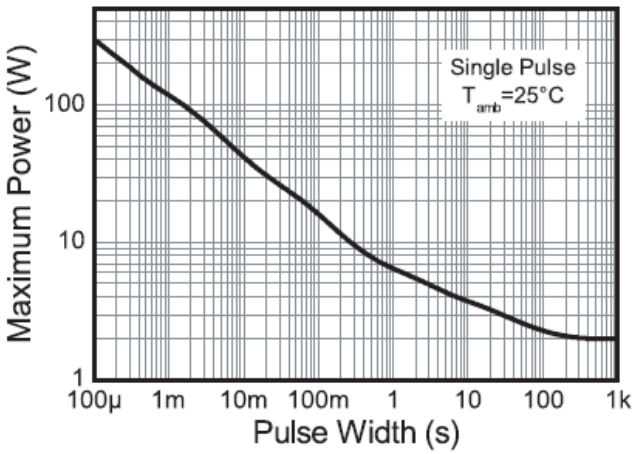
Safe Operating Area



Derating Curve

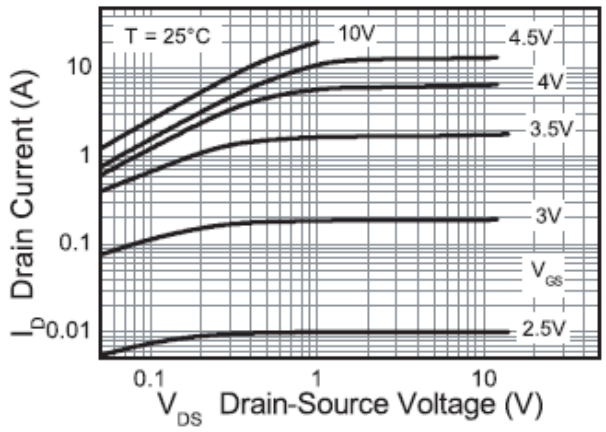


Transient Thermal Impedance

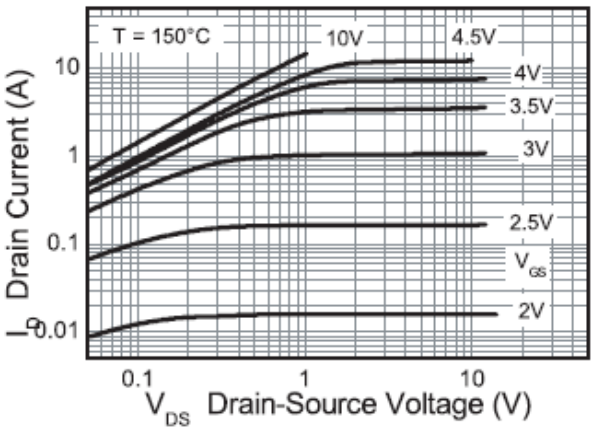


Pulse Power Dissipation

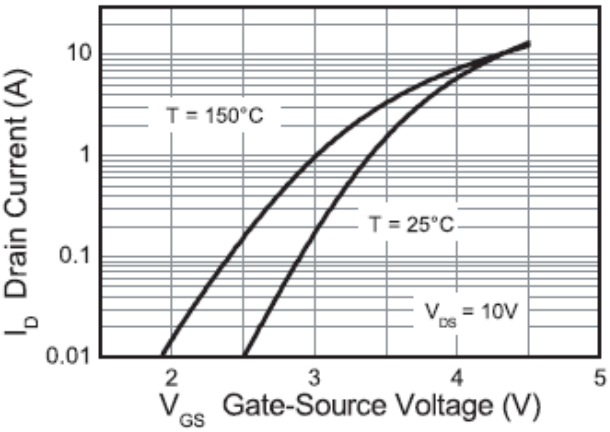
Typical Characteristics (continued)



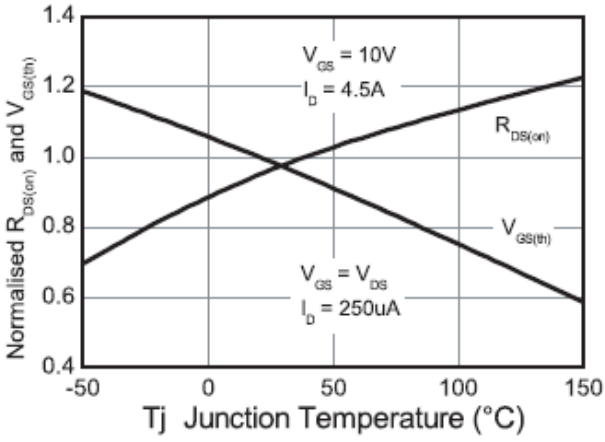
Output Characteristics



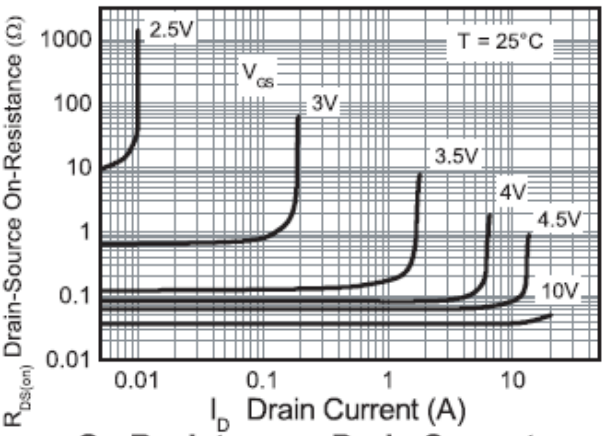
Output Characteristics



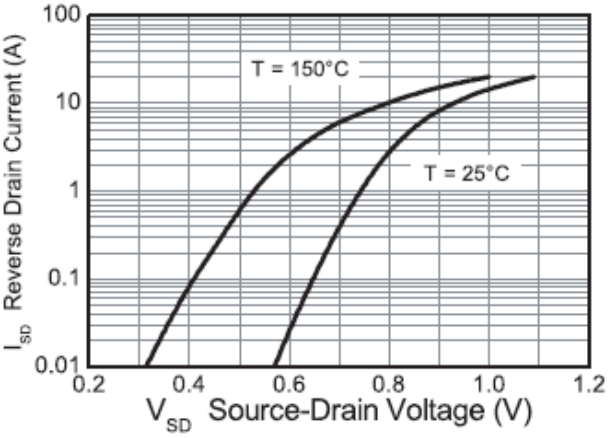
Typical Transfer Characteristics



Normalised Curves v Temperature

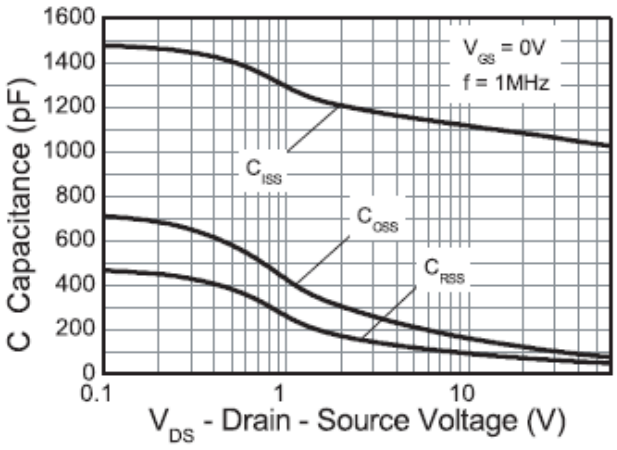


On-Resistance v Drain Current

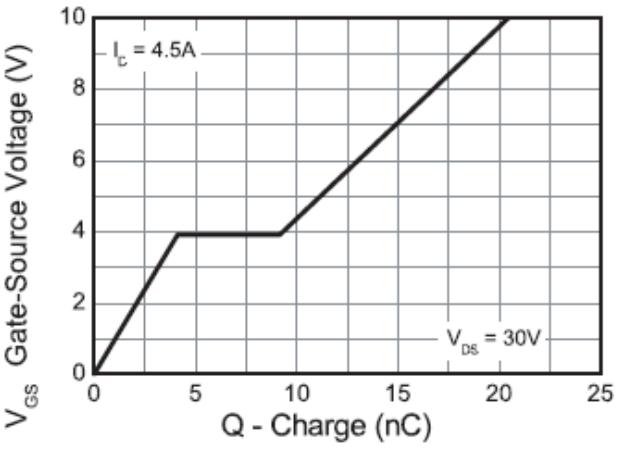


Source-Drain Diode Forward Voltage

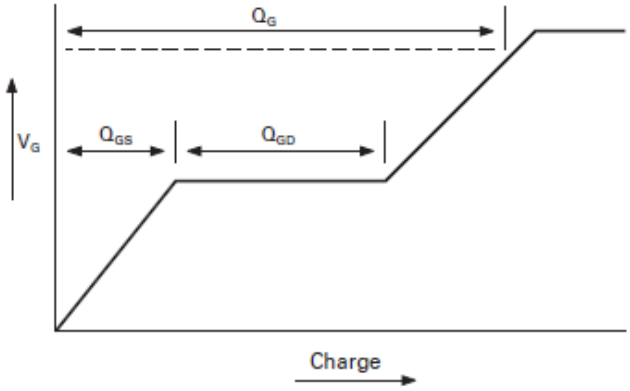
Typical Characteristics (cont.)



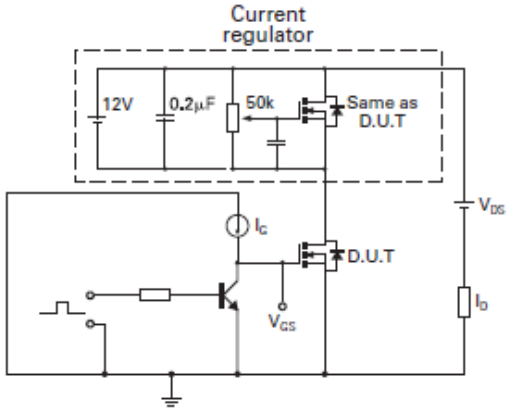
Capacitance v Drain-Source Voltage



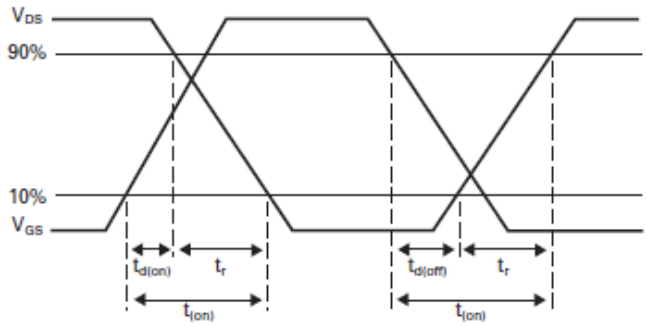
Gate-Source Voltage v Gate Charge



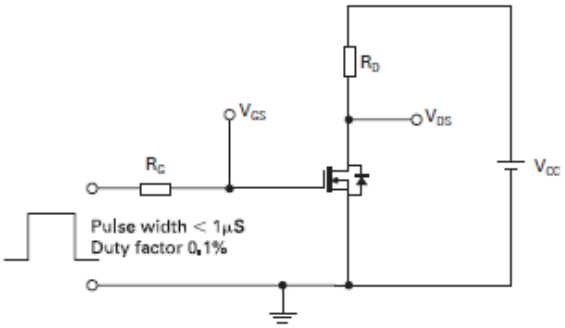
Basic gate charge waveform



Gate charge test circuit



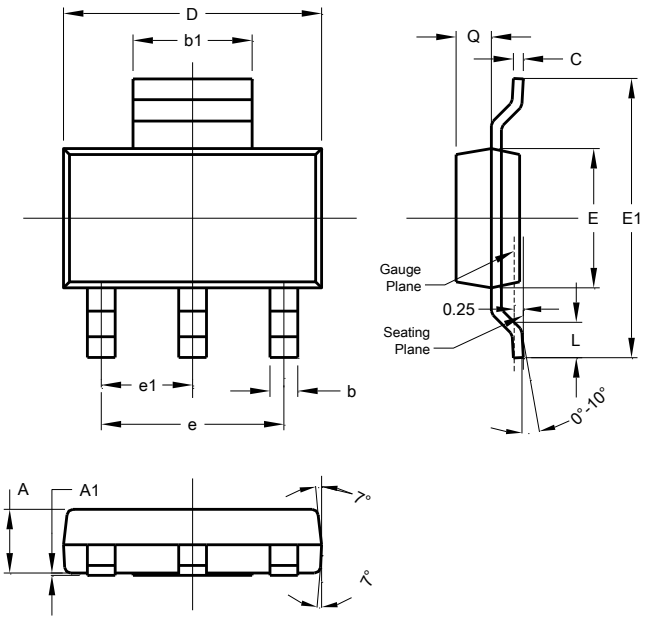
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

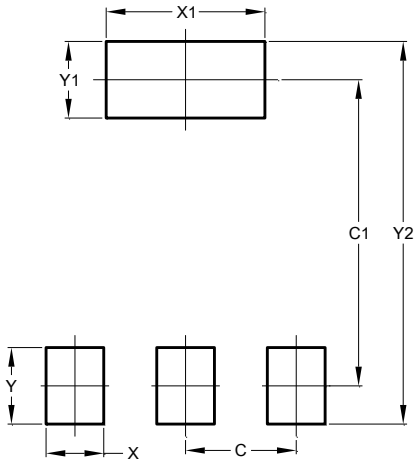
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
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)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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