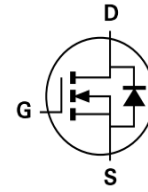


### Product Summary

- $V_{DS} (V) = 60V$
- $R_{DS(ON)} < 50m\ \Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 70m\ \Omega$  ( $V_{GS} = 4.5V$ )

### 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.



Equivalent Circuit

### Applications

- DC-DC Converters
- Power Management Functions
- Backlighting

### Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- Lead-Free Finish;
- Halogen and Antimony Free.

### Maximum Ratings (@ $T_A = +25^\circ C$ , unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} = 10V$	Steady State	$T_A = +25^\circ C$ (Note 6)	6.7	A
		$T_A = +70^\circ C$ (Note 6)	5.4	
		$T_A = +25^\circ C$ (Note 5)	4.8	
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<sub>A</sub> = +25°C, unless otherwise specified.)

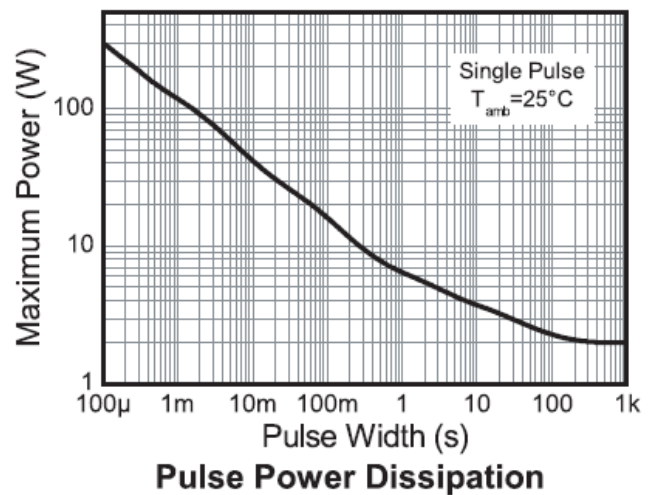
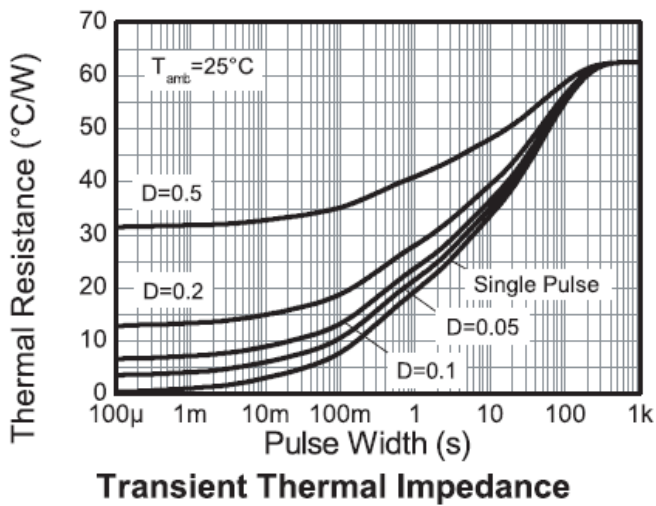
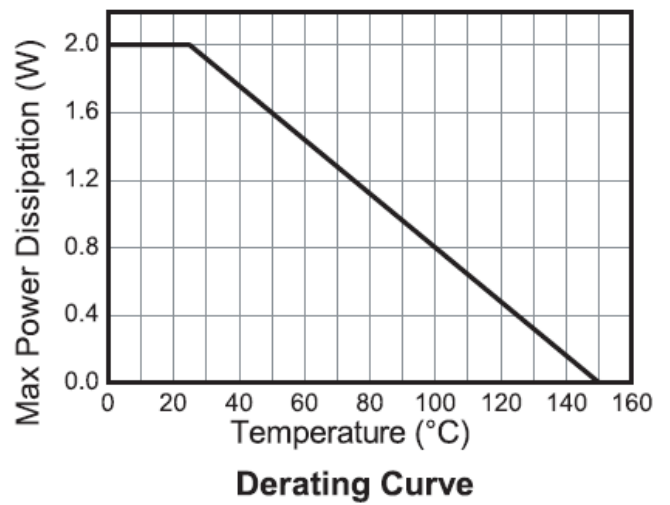
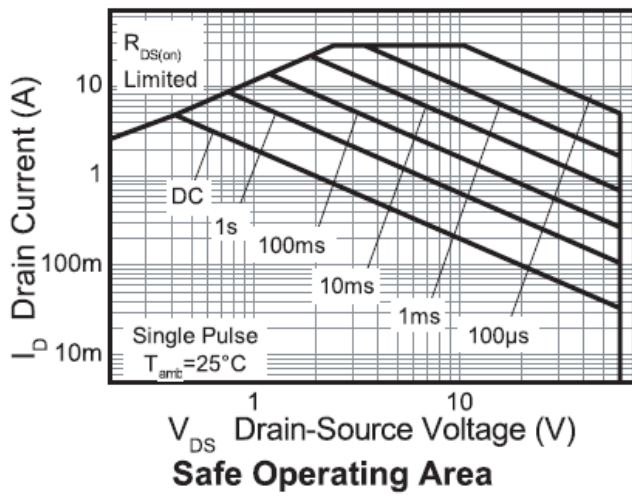
Characteristic	Symbol	Value	Units	
Total Power Dissipation	P <sub>D</sub>	2	W	
Linear Derating Factor		16	mW/°C	
Total Power Dissipation	P <sub>D</sub>	3.9	W	
Linear Derating Factor		31	mW/°C	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	Steady state (Note 5)	62.5	°C/W
		Steady state (Note 6)	32	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

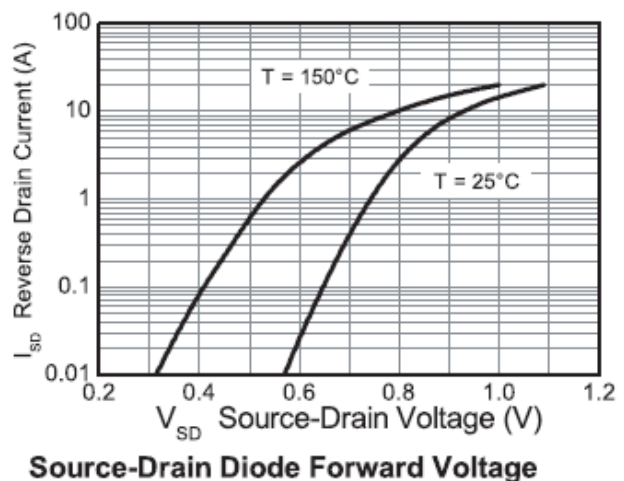
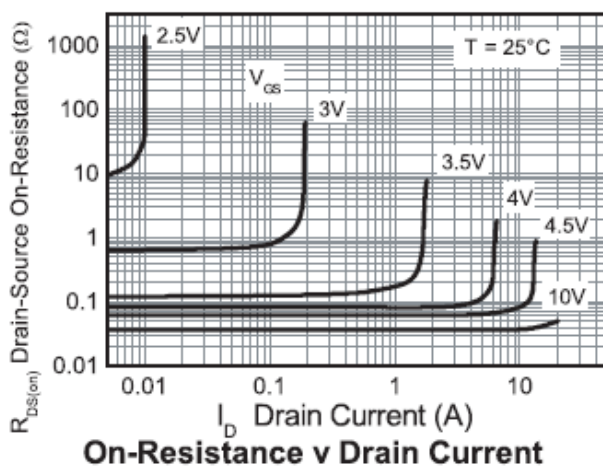
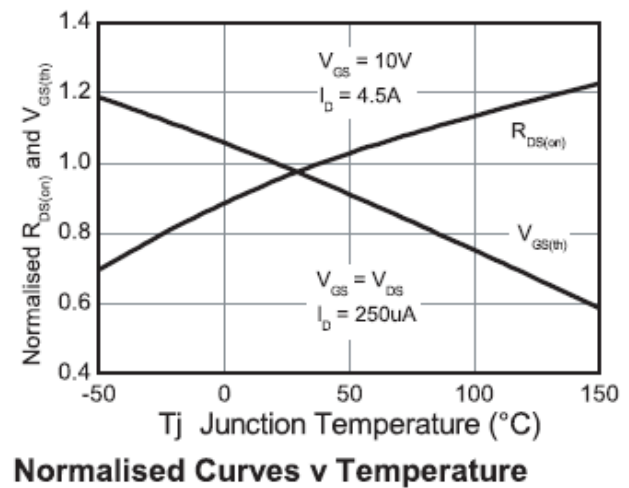
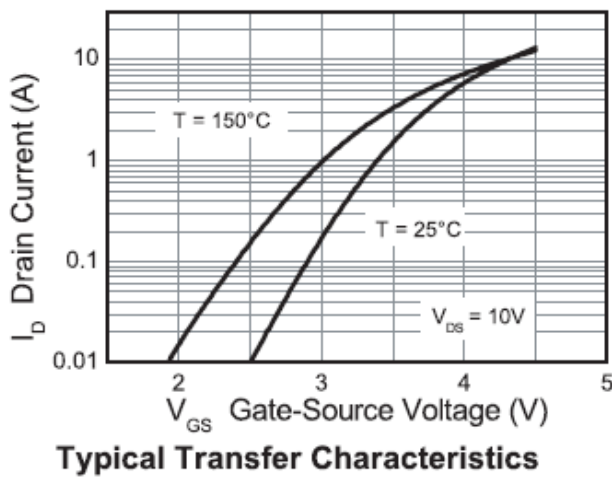
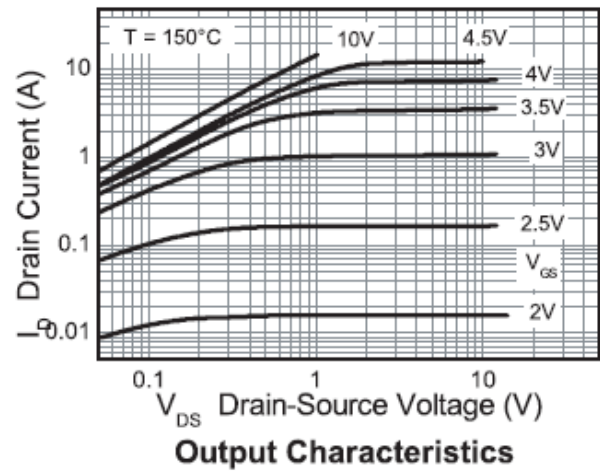
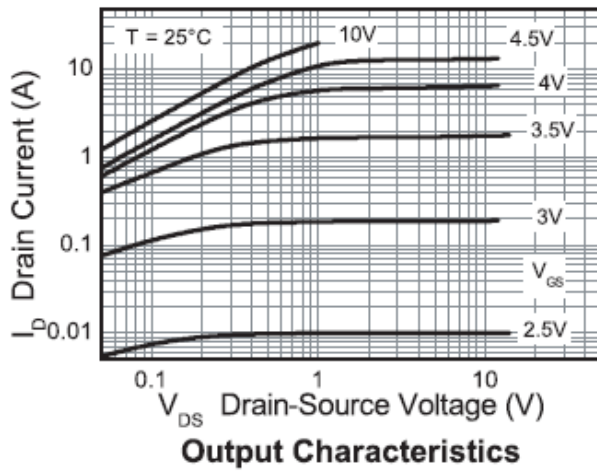
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60			V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1.0	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0			V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>			50	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.6A
				70		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.0A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>		0.85	0.95	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5.5A
Forward Transconductance (Note 8 & 10)	g <sub>fs</sub>		10.2		S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.5A
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>		1,063		pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>		104			
Reverse Transfer Capacitance	C <sub>rss</sub>		64			
Total Gate Charge (V <sub>GS</sub> = 5.0V)	Q <sub>g</sub>		11		nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 1.4A,
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>		20.4			
Gate-Source Charge	Q <sub>gs</sub>		4.1			
Gate-Drain Charge	Q <sub>gd</sub>		5.1			
Turn-On Delay Time	t <sub>D(on)</sub>		3.8		nS	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 30V, R <sub>G</sub> = 6.0Ω, I <sub>D</sub> = 1.0A
Turn-On Rise Time	t <sub>r</sub>		4.0			
Turn-Off Delay Time	t <sub>D(off)</sub>		26.2			
Turn-Off Fall Time	t <sub>f</sub>		10.6			
Body Diode Reverse Recovery Time	t <sub>rr</sub>		22		nS	I <sub>F</sub> = 2.2A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		21.4		nC	

- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
  - For a device surface mounted on FR4 PCB measured at t ≤ 10 secs.
  - Repetitive rating 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300μs - pulse width limited by maximum junction temperature.
  - Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2%.
  - Short duration pulse test used to minimize self-heating effect.

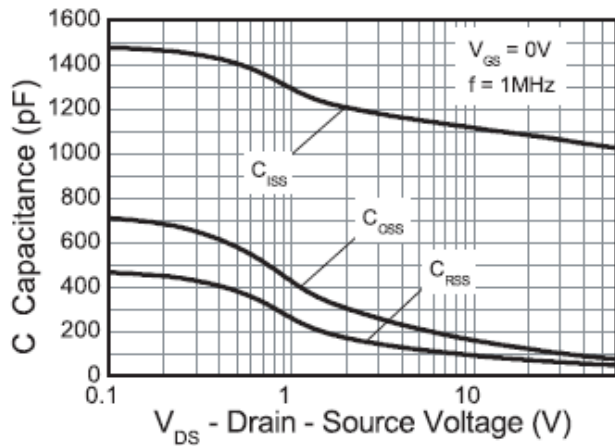
Typical Characteristics



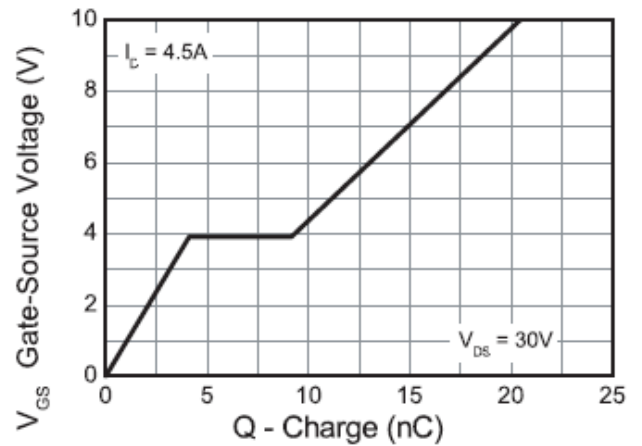
Typical Characteristics (continued)



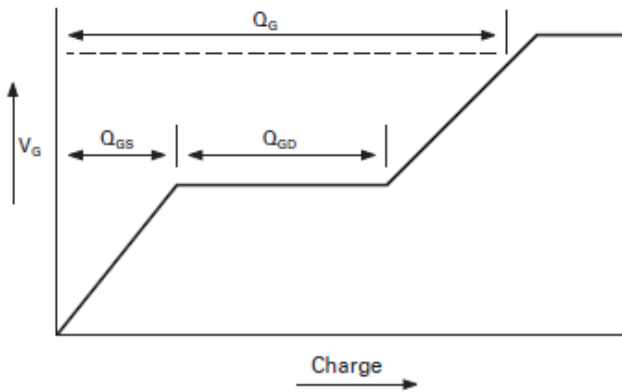
Typical Characteristics (cont.)



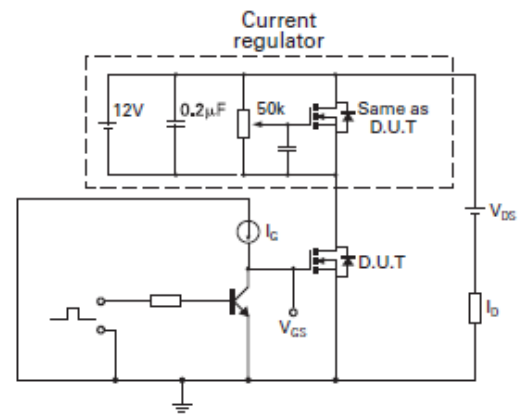
Capacitance v Drain-Source Voltage



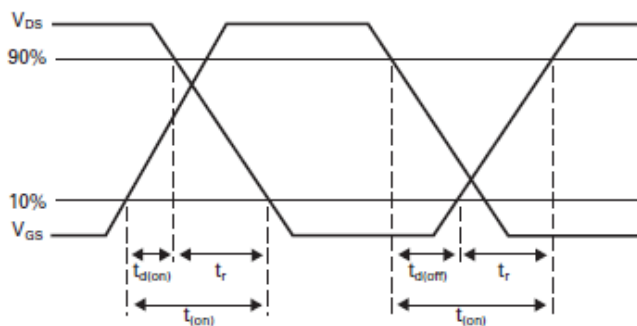
Gate-Source Voltage v Gate Charge



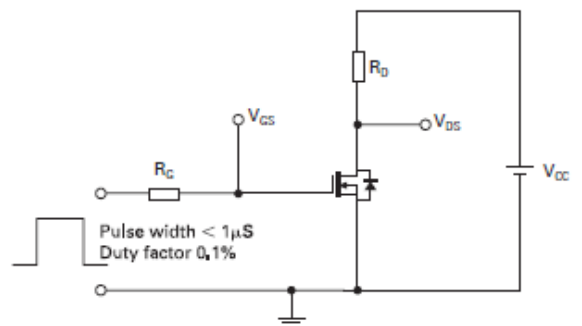
Basic gate charge waveform



Gate charge test circuit

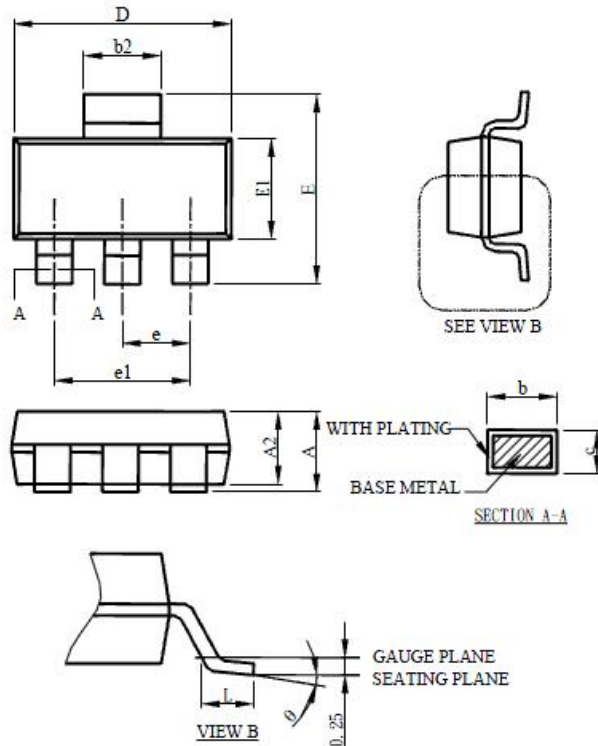


Switching time waveforms



Switching time test circuit

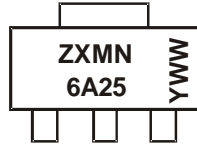
### SOT-223



SOT-223		
MILLIMETERS		
SYMBOL	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.68	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
θ	0°	8°

- Note:
1. Refer to JEDEC TO-261AA.
  2. Dimension D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs, and interlead flash, but including any mismatch between the top and bottom of the plastic body.
  3. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

**Marking**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW ZXMN6A25GTA	SOT-223	2500	Tape and reel

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