UMW ZXMN6A25GTA

60V N-Channel MOSFET

1.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.

2.Features

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

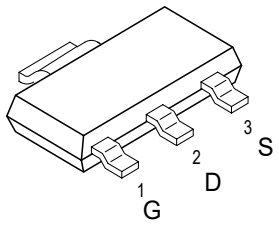
3.Benefits

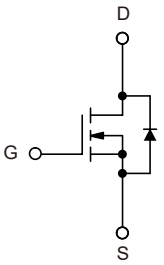
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- Lead-Free Finish
- Halogen and Antimony Free

4.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

SOT-223





5.Maximum ratings (T_A=25°C unless otherwise noted)

Parameter			Symbol	Maximum	Units
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current V_{GS}=10V	(SteadyState)	T_A=+25°C (Note 6)	I_D	6.7	A
		T_A=+70°C (Note 6)		5.4	A
		T_A=+25°C (Note 5)		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

6.Thermal Characteristics

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

7.T_J=25°C unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Source Leakage	I_{GSS}	V_{DS}=±20V, V_{GS}=0V			±100	nA
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1			V
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.6A			50	mΩ
		V_{GS}=4.5V, I_D=3A			70	mΩ
Diode Forward Voltage (Note 8)	V_{SD}	V_{GS}=0V, I_S=5.5A		0.85	0.95	V
Forward Transconductance (Note 8 & 10)	g_{FS}	V_{DS}=15V, I_D=4.5A		10.2		S
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	V_{DS}=30V, V_{GS}=0V, f=1MHz		1.063		pF
Output Capacitance	C_{oss}			104		pF
Reverse Transfer Capacitance	C_{rss}			64		pF
Total Gate Charge (V_{GS}=5V)	Q_g	V_{DS}=30V, I_D=1.4A		11		nC
Total Gate Charge (V_{GS}=10V)	Q_g			20.4		nC
Gate-Source Charge	Q_{gs}			4.1		nC
Gate-Drain Charge	Q_{gd}			5.1		nC
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=30V R_G=6Ω, I_D=1A		3.8		ns
Turn-On Rise Time	t_r			4		ns
Turn-Off Delay Time	$t_{D(off)}$			26.2		ns
Turn-Off Fall Time	t_f			10.6		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=2.2A, dI/dt=100A/μs		22		ns
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

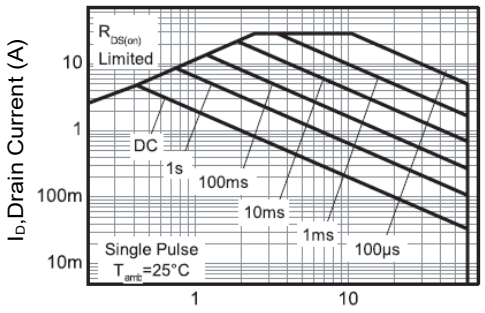
6. For a device surface mounted on FR4 PCB measured at t ≤10 secs.

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%.

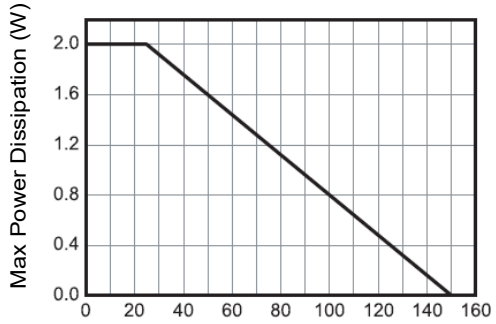
9. Short duration pulse test used to minimize self-heating effect.

8.1Typical Characterisitics



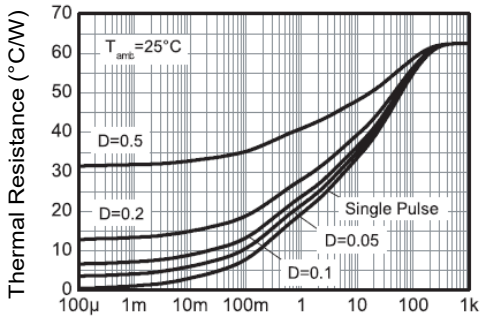
V_{DS},Drain-to-Source Voltage (V)

Figure 1: Safe Operating Area



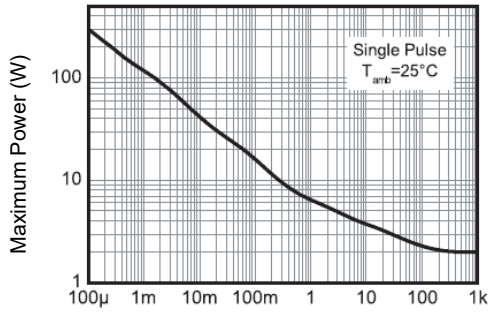
V_{GS},Gate-to-Source Voltage (V)

Figure 2: Transfer Characteristics



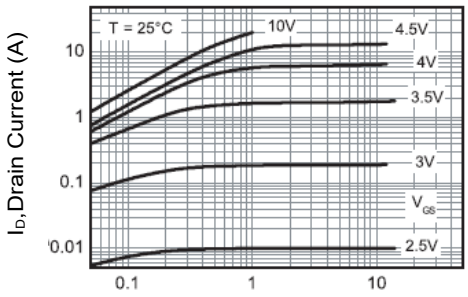
Pulse Width (s)

Figure 3: Transient Thermal Impedance



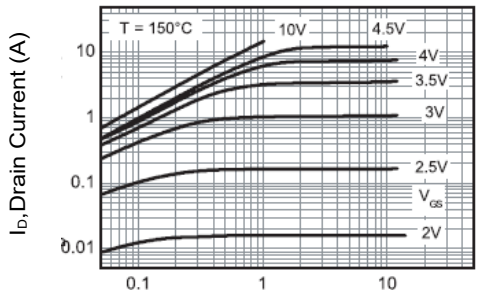
Pulse Width (s)

Figure 4: Pulse Power Dissipation



V_{DS},Drain Source Voltage (V)

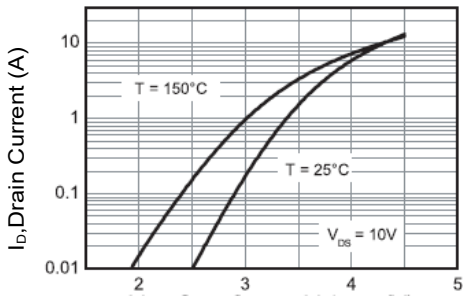
Figure 5: Output Characteristics



V_{DS},Drain Source Voltage (V)

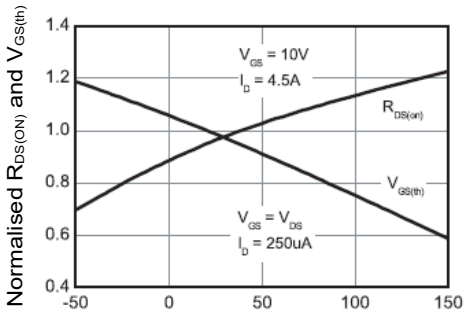
Figure 6: Output Characteristics

8.2Typical Characterisitics



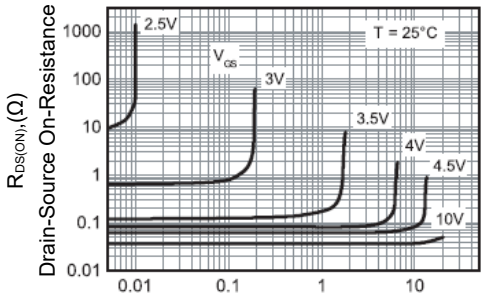
V_{GS},Gate Source Voltage (V)

Figure 7: Typical Transfer Characteristics



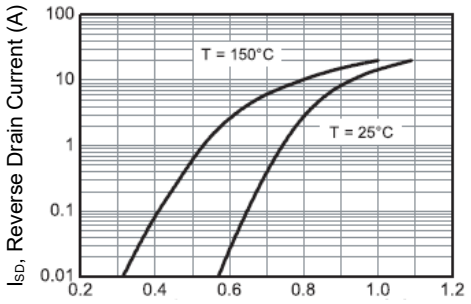
T_J,Junction Temperature (°C)

Figure 8: Normalised Curves v Temperature



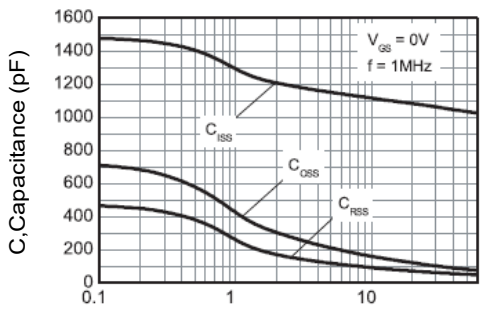
I_D,Drain Current (A)

Figure 9: On-Resistance v Drain Current



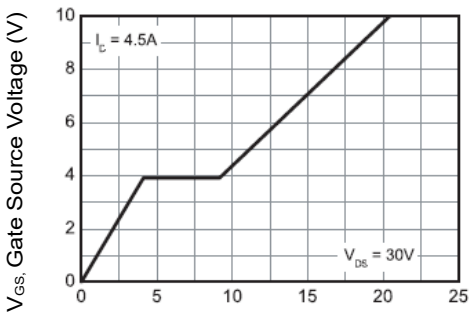
V_{SD},Source to Drain Voltage (V)

Figure 10: Source-Drain Diode Forward Voltage



V_{DS},Drain Source Voltage (V)

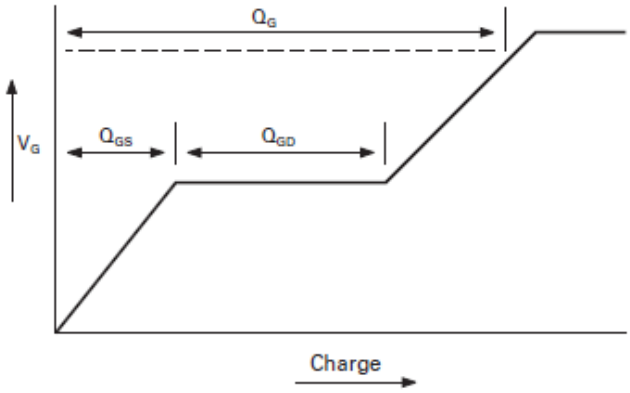
Figure 11: Capacitance v Drain-Source Voltage



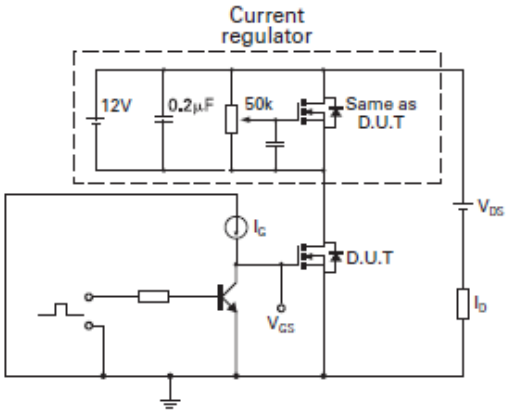
Q_G, Charge (nC)

Figure 12: Gate-Source Voltage v Gate Charge

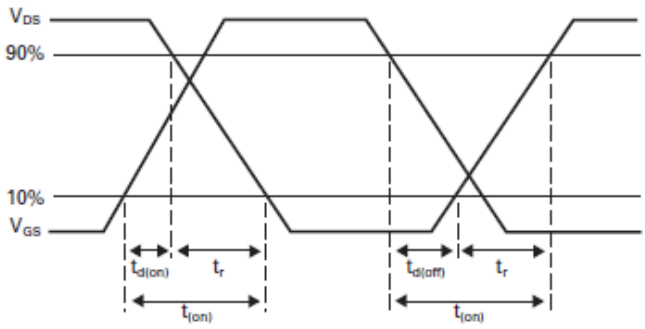
8.3Typical Characterisitics



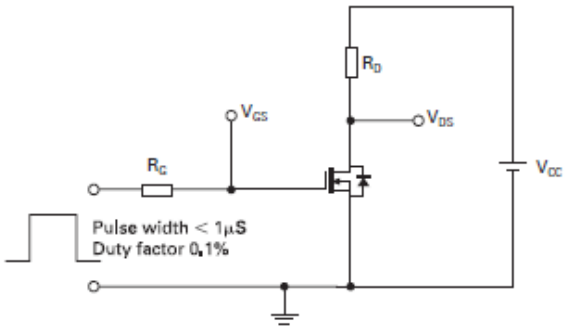
Basic gate charge waveform



Gate charge test circuit

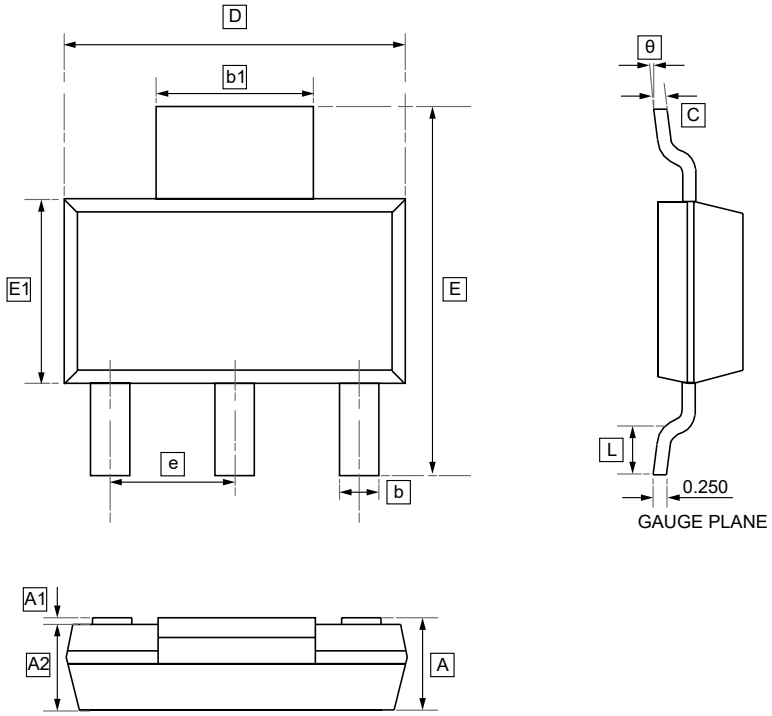


Switching time waveforms



Switching time test circuit

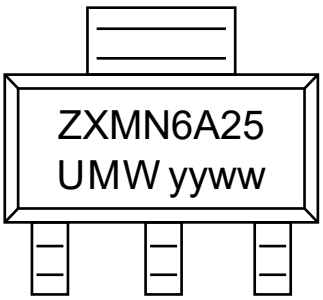
9.SOT-223 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	D	E	E1	e	L	θ
Min	-	0.020	1.500	0.660	2.900	0.230	6.300	6.700	3.300	2.300	0.750	0°
Max	1.800	0.100	1.700	0.840	3.100	0.350	6.700	7.300	3.700	BSC	-	10°

10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW ZXMN6A25GTA	SOT-223	2500	Tape and reel

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