

# ZXMN6A25N8

## 60V SO8 N-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.050 @ $V_{GS}=10V$	7.0
	0.070 @ $V_{GS}=4.5V$	



### Description

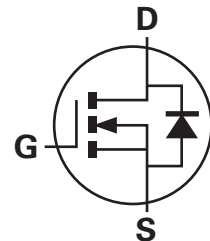
This new generation Trench MOSFET from Zetex features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

### Features

- Low on-resistance
- Fast switching speed
- Low gate drive
- SO8 package

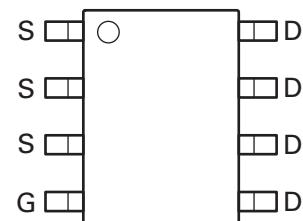
### Applications

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



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A25N8TA	7	12	500



Top view

### Device marking

ZXMN6A25

# ZXMN6A25N8

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-Source voltage	$V_{DSS}$	60	V
Gate-Source voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain current @ $V_{GS}=10V$ ; $T_A=25^\circ C$ (b) @ $V_{GS}=10V$ ; $T_A=70^\circ C$ (b) @ $V_{GS}=10V$ ; $T_A=25^\circ C$ (a) @ $V_{GS}=10V$ ; $T_L=25^\circ C$ (a)(d)	$I_D$	5.7 4.5 4.3 7.0	A
Pulsed Drain current (c)	$I_{DM}$	25.7	A
Continuous Source current (Body diode) (b)	$I_S$	4.1	A
Pulsed Source current (Body diode) (c)	$I_{SM}$	25.7	A
Power dissipation at $T_A=25^\circ C$ (a) Linear derating factor	$P_D$	1.56 12.5	W mW/°C
Power dissipation at $T_A=25^\circ C$ (b) Linear derating factor	$P_D$	2.8 22.2	W mW/°C
Power dissipation at $T_L=25^\circ C$ (d) Linear derating factor	$P_D$	4.14 33.1	W mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

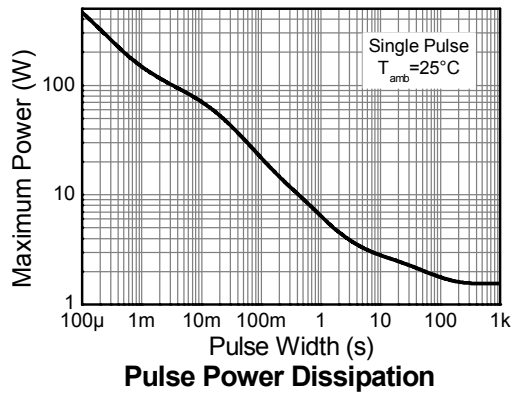
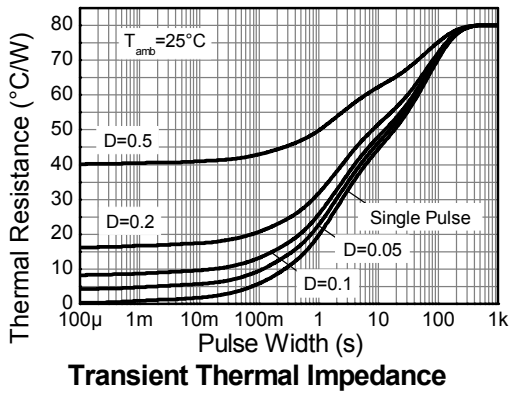
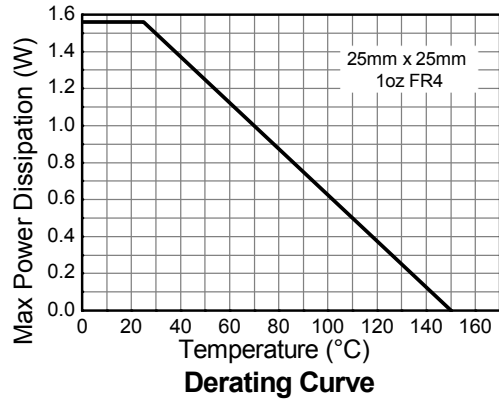
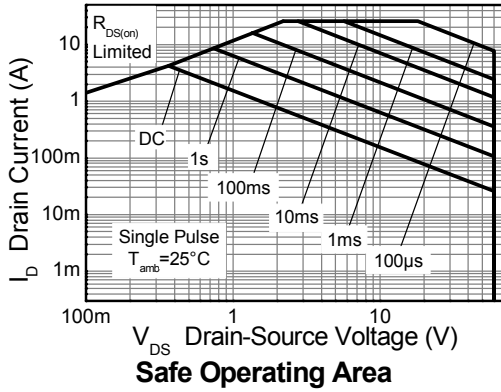
Parameter	Symbol	Value	Unit
Junction to ambient (a)	$R_{\theta JA}$	80	°C/W
Junction to ambient (b)	$R_{\theta JA}$	45	°C/W
Junction to lead (d)	$R_{\theta JL}$	30.2	°C/W

### NOTES:

- (a) 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.
- (b) Mounted on FR4 PCB measured at  $t \leq 10$  sec.
- (c) Repetitive rating on 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300us – pulse width limited by maximum junction temperature.
- (d) Thermal resistance from junction to solder-point (at the end of the drain lead).

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## Thermal characteristics



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## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
<b>Static</b>						
Drain-Source breakdown voltage	$V_{(BR)DSS}$	60			V	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero gate voltage drain current	$I_{DSS}$			1.0	$\mu\text{A}$	$V_{DS} = 60\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
Gate-Source threshold voltage	$V_{GS(th)}$	1		3	V	$I_D = 250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source on-state resistance (*)	$R_{DS(on)}$			0.050 0.070	$\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 3.6\text{A}$ $V_{GS} = 4.5\text{V}$ , $I_D = 3.0\text{A}$
Forward Transconductance (*) (†)	$g_{fs}$		10.2		S	$V_{DS} = 15\text{V}$ , $I_D = 4.5\text{A}$
<b>Dynamic</b> (†)						
Input capacitance	$C_{iss}$		1063		pF	$V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	$C_{oss}$		104		pF	
Reverse transfer capacitance	$C_{rss}$		64		pF	
<b>Switching</b> (‡) (†)						
Turn-on-delay time	$t_{d(on)}$		3.8		ns	$V_{DD} = 30\text{V}$ , $V_{GS} = 10\text{V}$ $I_D = 1\text{A}$ $R_G \cong 6.0\Omega$ ,
Rise time	$t_r$		4.0		ns	
Turn-off delay time	$t_{d(off)}$		26.2		ns	
Fall time	$t_f$		10.6		ns	
Gate charge	$Q_g$		11.0		nC	$V_{DS} = 30\text{V}$ , $V_{GS} = 5\text{V}$ $I_D = 4.5\text{A}$
Total gate charge	$Q_g$		20.4		nC	$V_{DS} = 30\text{V}$ , $V_{GS} = 10\text{V}$ $I_D = 4.5\text{A}$
Gate-Source charge	$Q_{gs}$		4.1		nC	
Gate-Drain charge	$Q_{gd}$		5.1		nC	
<b>Source-Drain diode</b>						
Diode forward voltage (*)	$V_{SD}$		0.85	0.95	V	$I_S = 5.5\text{A}$ , $V_{GS} = 0\text{V}$
Reverse recovery time (‡)	$t_{rr}$		22.0		ns	$I_S = 2.2\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (‡)	$Q_{rr}$		21.4		nC	

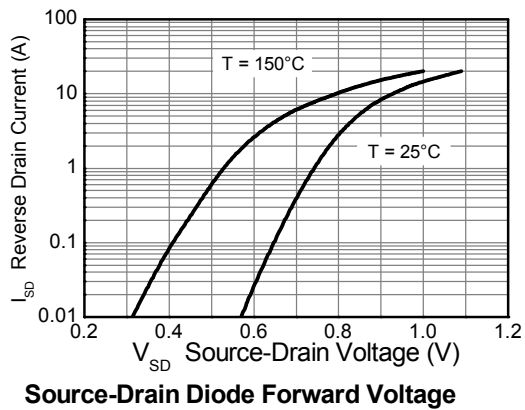
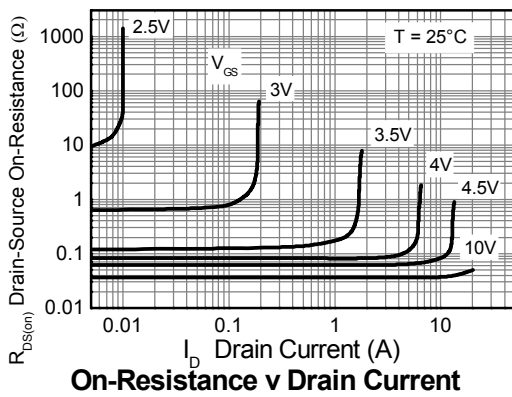
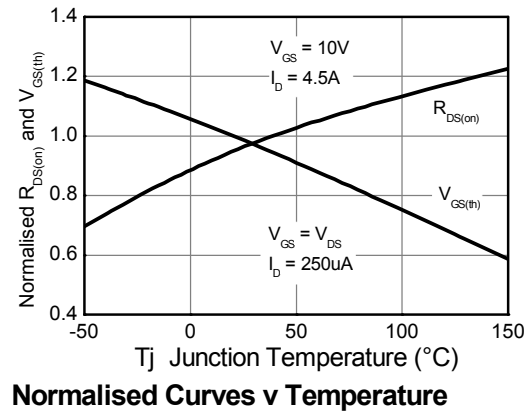
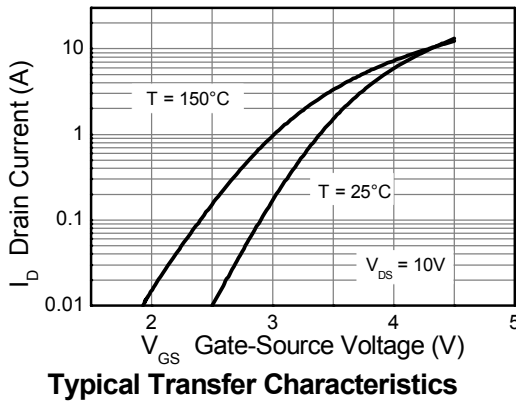
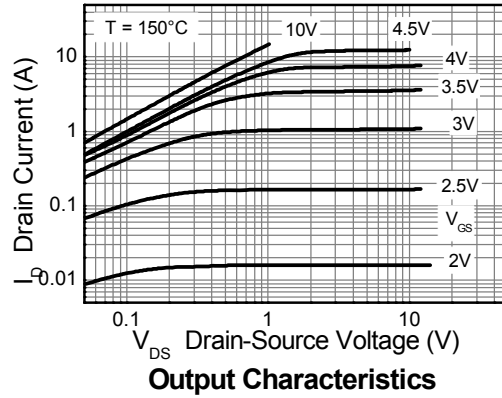
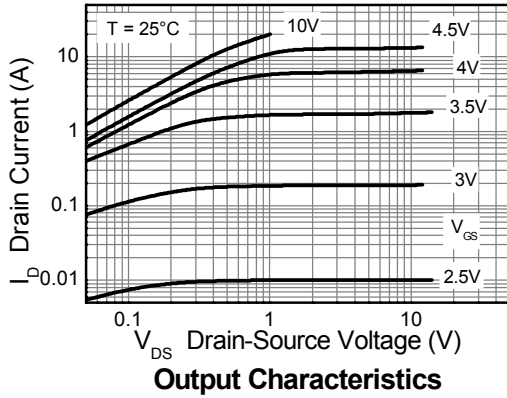
### NOTES:

(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

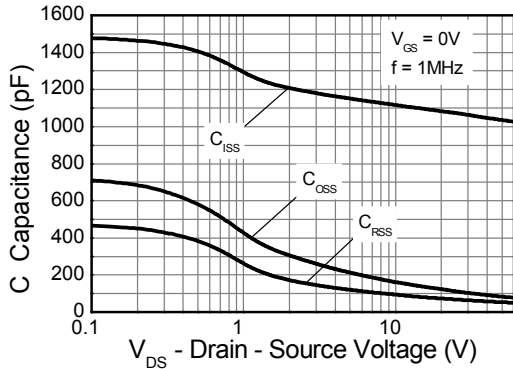
(†) Switching characteristics are independent of operating junction temperature.

(‡) For design aid only, not subject to production testing

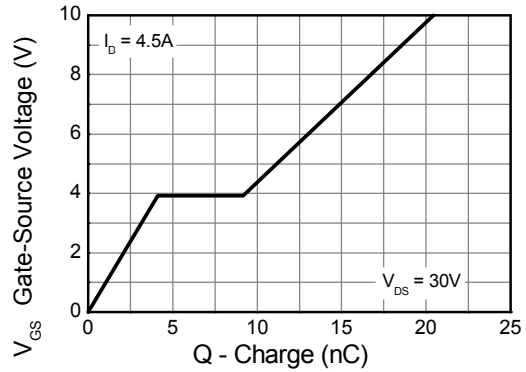
## Typical characteristics



## Typical characteristics

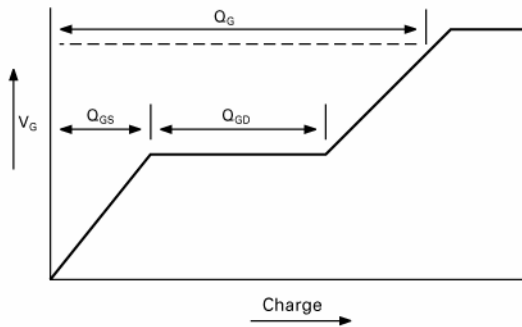


Capacitance v Drain-Source Voltage

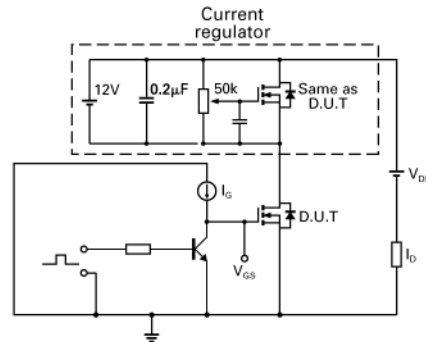


Gate-Source Voltage v Gate Charge

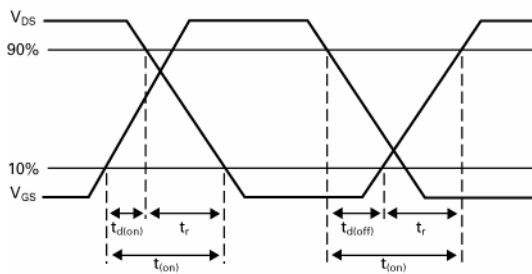
## Test circuits



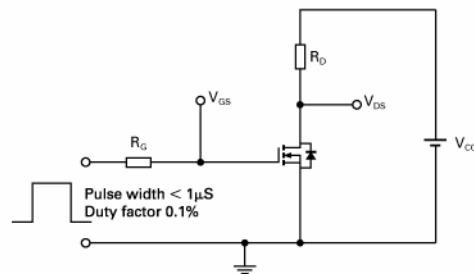
Basic gate charge waveform



Gate charge test circuit



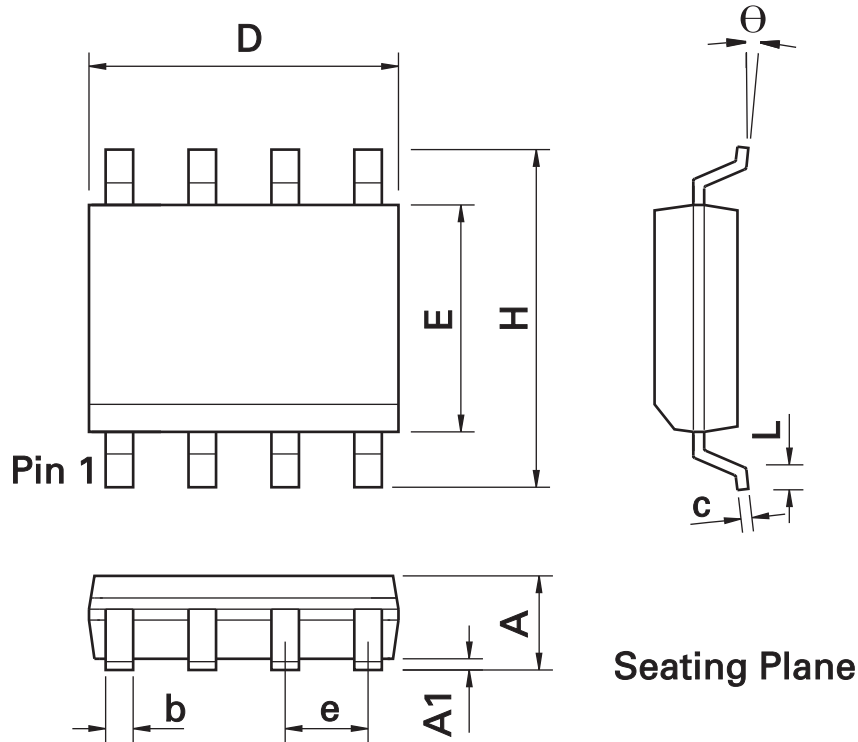
Switching time waveforms



Switching time test circuit

# ZXMN6A25N8

## Package outline SO8



## SO8 Package Information

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	U	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

**Note:** Controlling dimensions are in inches. Approximate dimensions are provided in millimeters

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