



**THE DATASHEET OF  
ZXMN6A25DN8TA**

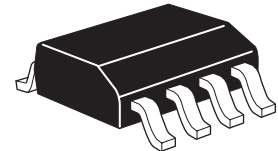


# ZXMN6A25DN8

## Dual 60V SO8 N-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.050 @ $V_{GS} = 10V$	5
	0.070 @ $V_{GS} = 4.5V$	4.2



### Description

This new generation trench MOSFET from Zetex features a unique structure combining the benefits of 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
- Low profile SO8 package

### Applications

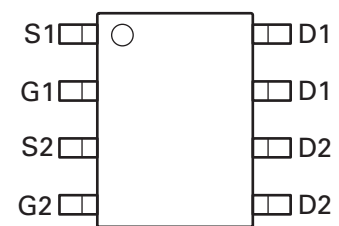
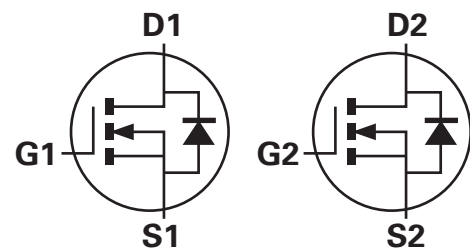
- DC - DC converters
- Power management functions
- Motor control

### Ordering information

Device	Reel (inches)	Tape width (mm)	Quantity per reel
ZXMN6A25DN8TA	7	12	500
ZXMN6A25DN8TC	13	12	2500

### Device marking

ZXMN  
6A25D



Pin out - top view

# ZXMN6A25DN8

## 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 @ $V_{GS}=10V$ ; $T_{amb}=25^{\circ}C^{(b)}$ (d) @ $V_{GS}=10V$ ; $T_{amb}=70^{\circ}C^{(b)}$ (d) @ $V_{GS}=10V$ ; $T_{amb}=25^{\circ}C^{(a)}$ (d)	$I_D$	5	A
		4	A
		3.8	A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	24	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	3.4	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	24	A
Power dissipation at $T_{amb}=25^{\circ}C^{(a)}$ (d)	$P_D$	1.25	W
Linear derating factor		10	mW/ $^{\circ}C$
Power dissipation at $T_{amb}=25^{\circ}C^{(a)}$ (e)	$P_D$	1.8	W
Linear derating factor		14	mW/ $^{\circ}C$
Power dissipation at $T_{amb}=25^{\circ}C^{(b)}$ (d)	$P_D$	2.1	W
Linear derating factor		17	mW/ $^{\circ}C$
Operating and storage temperature range	$T_j:T_{stg}$	-55 to +150	$^{\circ}C$

## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup> (d)	$R_{\theta JA}$	100	$^{\circ}C/W$
Junction to ambient <sup>(a)</sup> (e)	$R_{\theta JA}$	70	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup> (d)	$R_{\theta JA}$	60	$^{\circ}C/W$

### NOTES:

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.

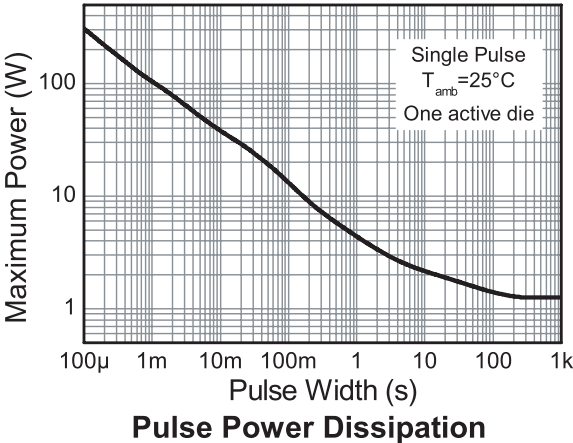
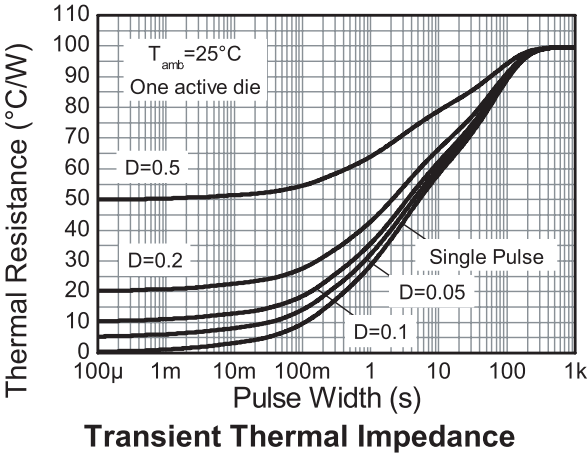
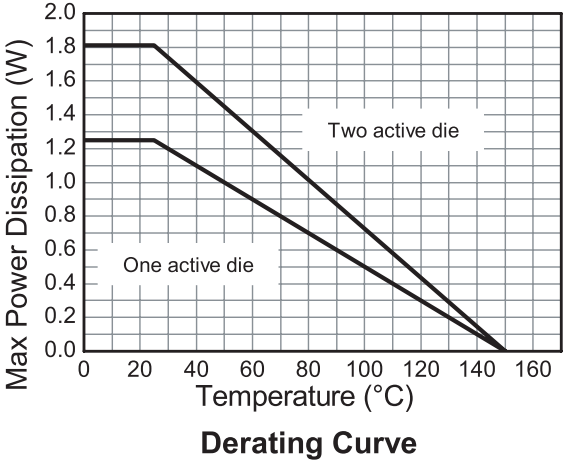
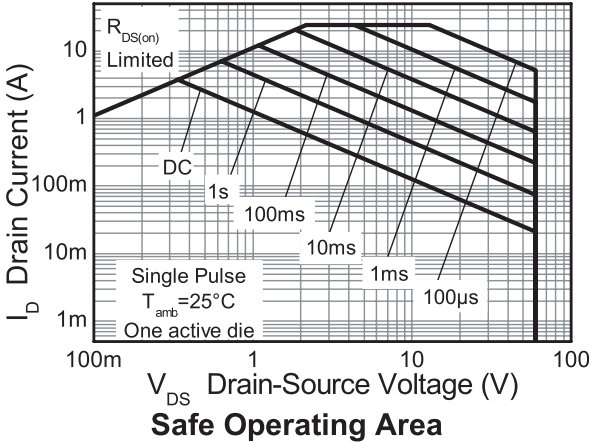
(c) Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width=300 $\mu s$  - pulse width limited by maximum junction temperature.

(d) For a dual device with one active die.

(e) For a device with two active die running at equal power.

# ZXMN6A25DN8

## Typical characteristics



# ZXMN6A25DN8

## 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	mA	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$
Gate-body leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$
Gate-source threshold voltage	$V_{GS(th)}$	1.0			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static drain-source on-state resistance <sup>(*)</sup>	$R_{DS(on)}$			0.050	$\Omega$	$V_{GS}=10\text{V}, I_D=3.6\text{A}$
				0.070	$\Omega$	$V_{GS}=4.5\text{V}, I_D=3\text{A}$
Forward transconductance <sup>(*)(‡)</sup>	$g_{fs}$		10.2		S	$V_{DS}=15\text{V}, I_D=4.5\text{A}$
<b>Dynamic<sup>(‡)</sup></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<sup>(†)(‡)</sup></b>						
Turn-on delay time	$t_{d(on)}$		3.8		ns	$V_{DD}=30\text{V}, I_D=1\text{A}$ $R_G \cong 6.0\Omega, V_{GS}=10\text{V}$
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 <sup>(*)</sup>	$V_{SD}$		0.85	0.95	V	$T_J=25^{\circ}\text{C},$ $I_S=5.5\text{A}, V_{GS}=0\text{V}$
Reverse recovery time <sup>(‡)</sup>	$t_{rr}$		22.0		ns	$T_J=25^{\circ}\text{C}, I_F=2.2\text{A},$ $di/dt= 100\text{A}/\mu\text{s}$
Reverse recovery charge <sup>(‡)</sup>	$Q_{rr}$		21.4		nC	

### NOTES:

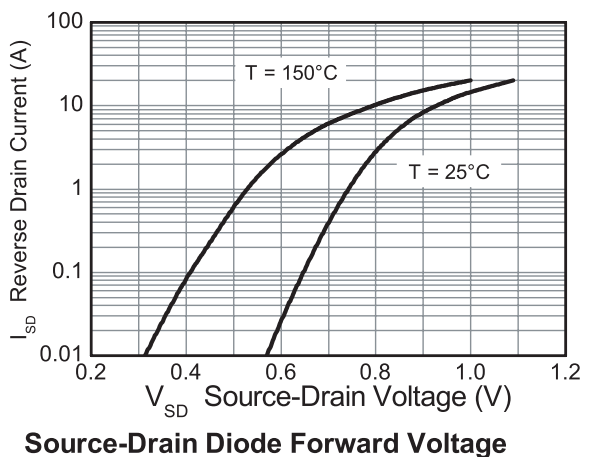
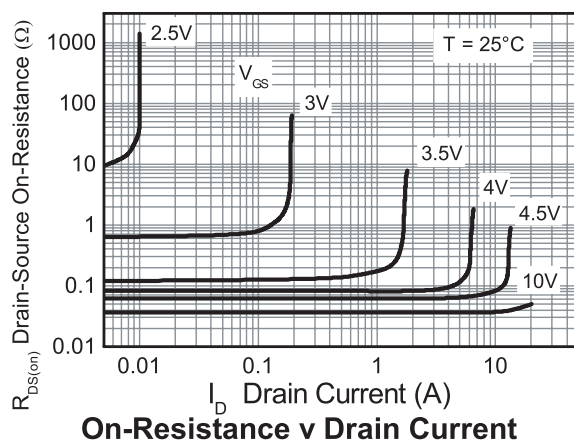
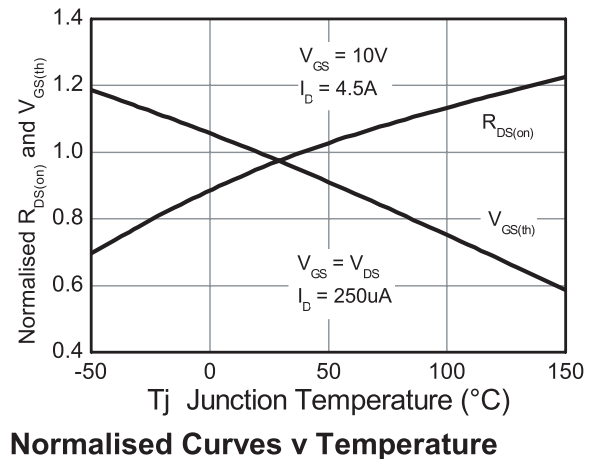
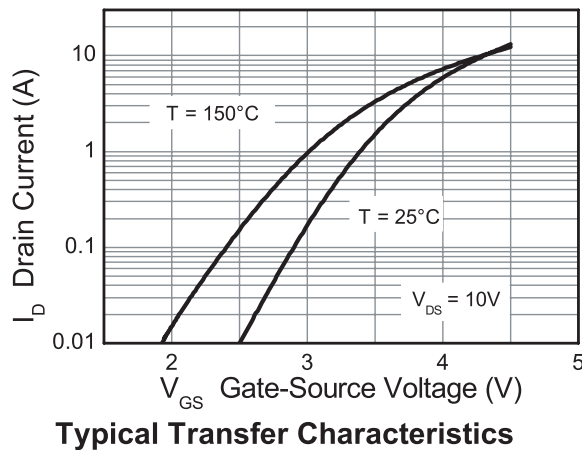
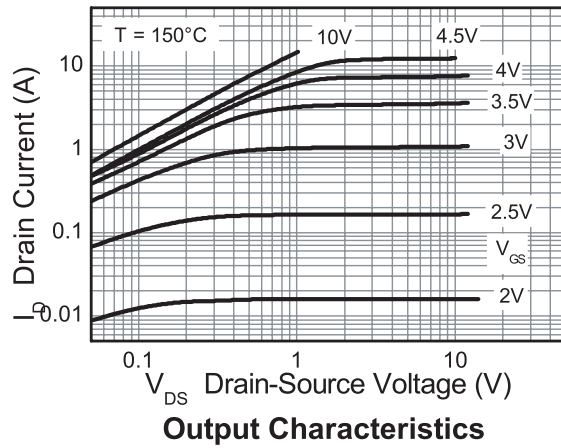
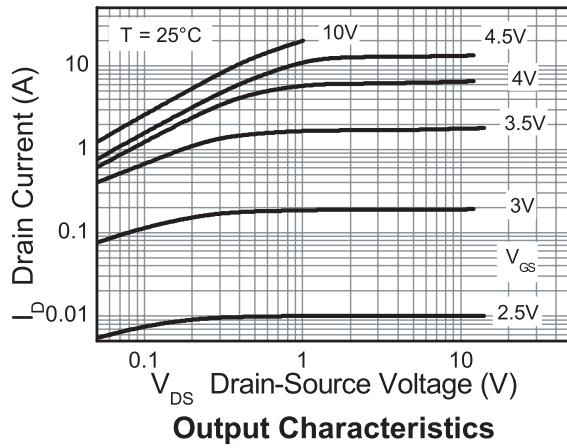
(\*) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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

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

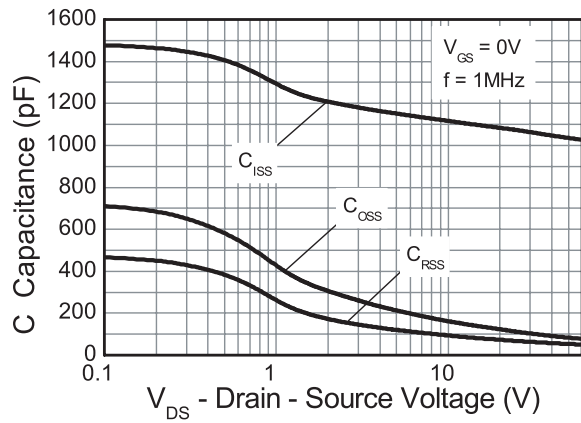
# ZXMN6A25DN8

## Typical characteristics

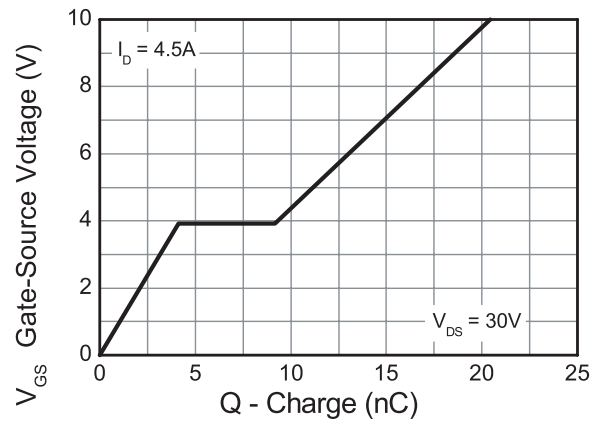


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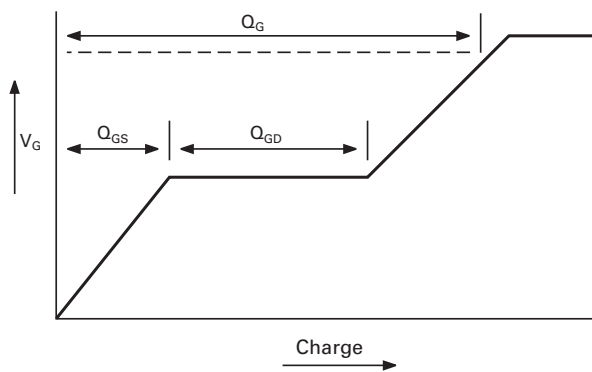
## Typical characteristics



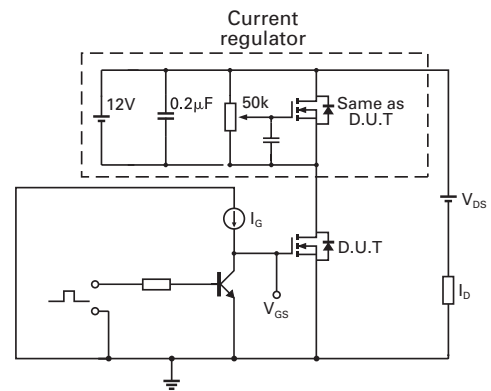
Capacitance v Drain-Source Voltage



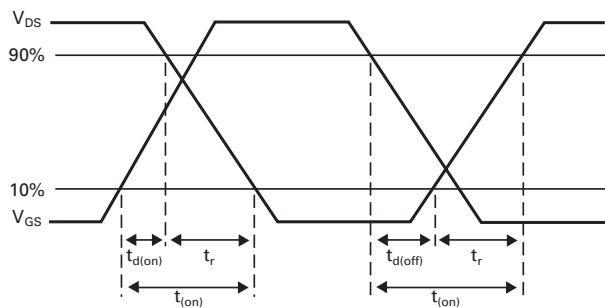
Gate-Source Voltage v Gate Charge



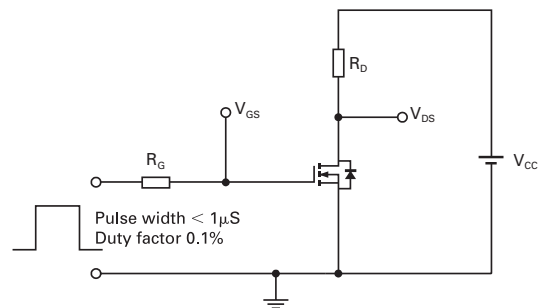
Basic gate charge waveform



Gate charge test circuit



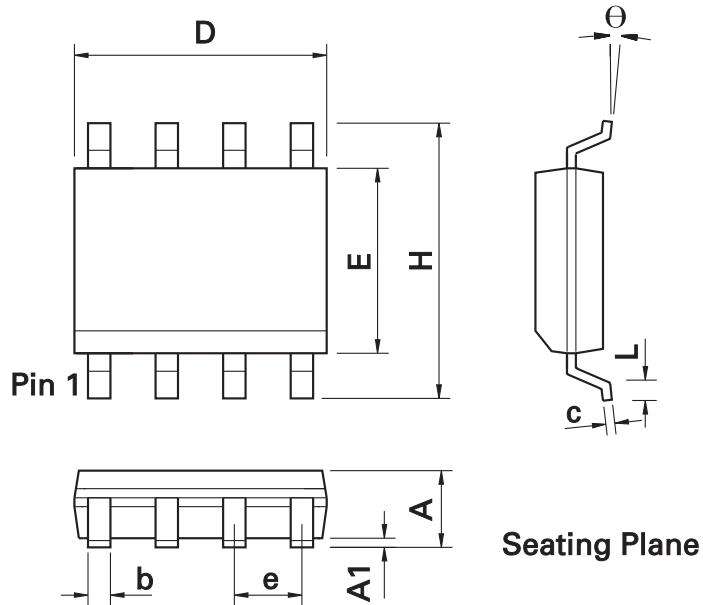
Switching time waveforms



Switching time test circuit

# ZXMN6A25DN8

## Package outline - SO8



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	Θ	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

# ZXMN6A25DN8

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