

ZXMN6A25N8

60V SO8 N-channel enhancement mode MOSFET

Summary

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



Description

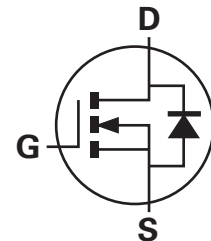
This new generation Trench MOSFET from Zetex features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Features

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

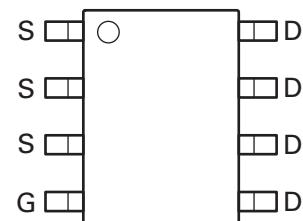
Applications

- 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

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Absolute maximum ratings

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

Thermal resistance

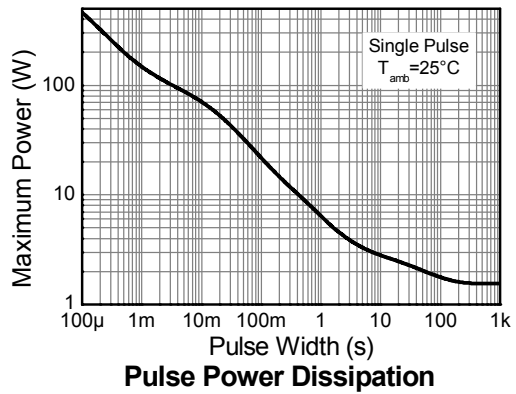
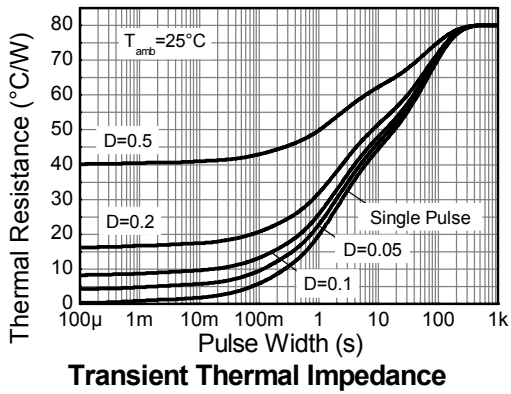
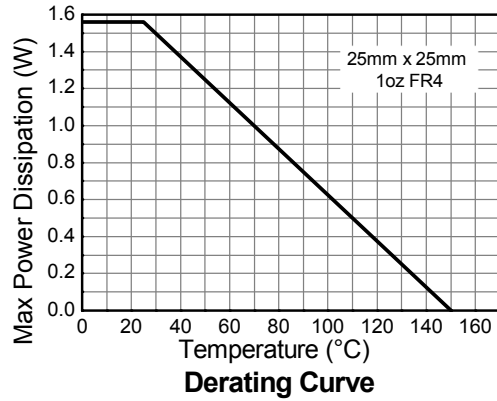
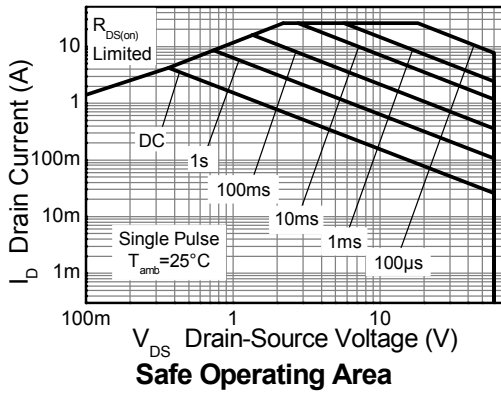
Parameter	Symbol	Value	Unit
Junction to ambient ^(a)	$R_{\theta JA}$	80	°C/W
Junction to ambient ^(b)	$R_{\theta JA}$	45	°C/W
Junction to lead ^(d)	$R_{\theta JL}$	30.2	°C/W

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
Static						
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	μA	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$
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	Ω	$V_{GS}=10\text{V}$, $I_D=3.6\text{A}$ $V_{GS}=4.5\text{V}$, $I_D=3.0\text{A}$
Forward Transconductance (*) (†)	g_{fs}		10.2		S	$V_{DS}=15\text{V}$, $I_D=4.5\text{A}$
Dynamic (†)						
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	
Switching (‡) (†)						
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	
Source-Drain diode						
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	

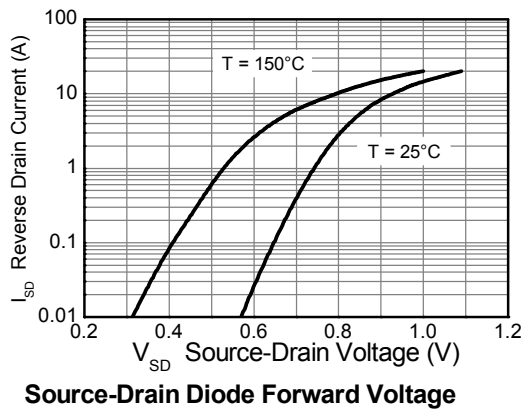
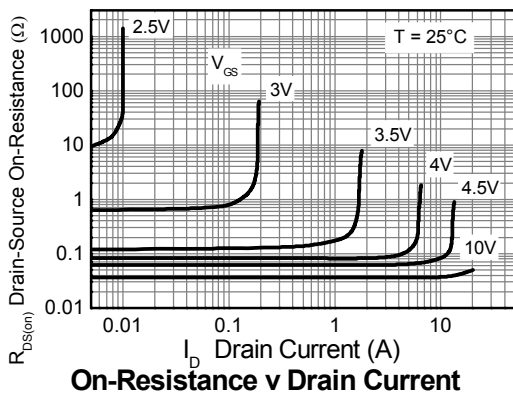
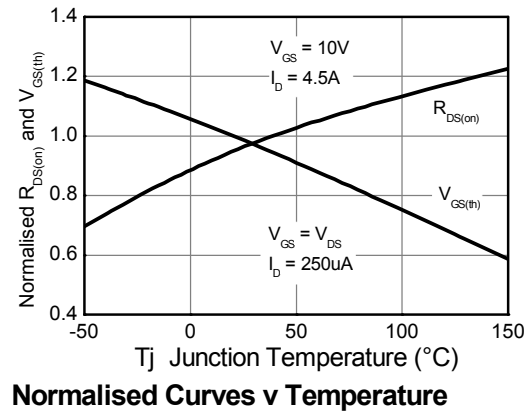
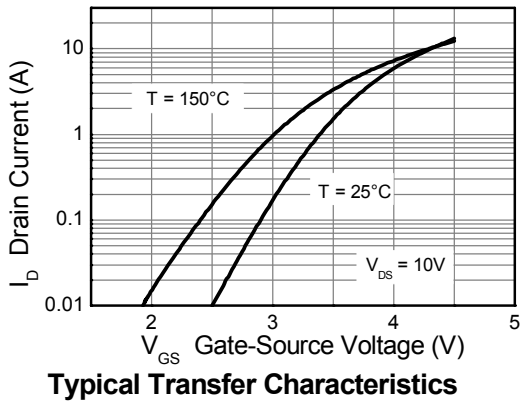
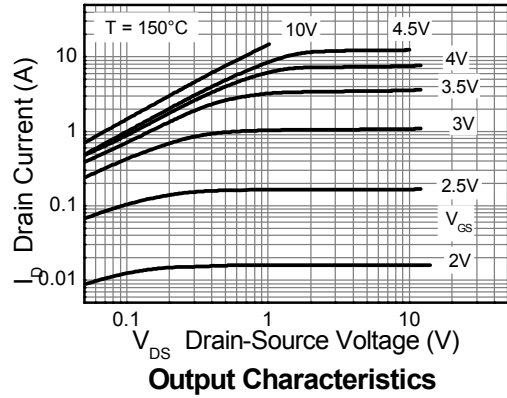
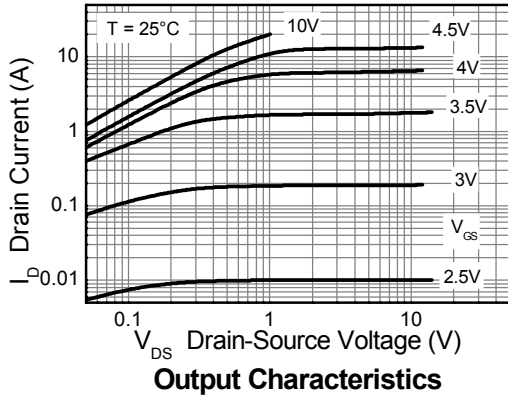
NOTES:

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

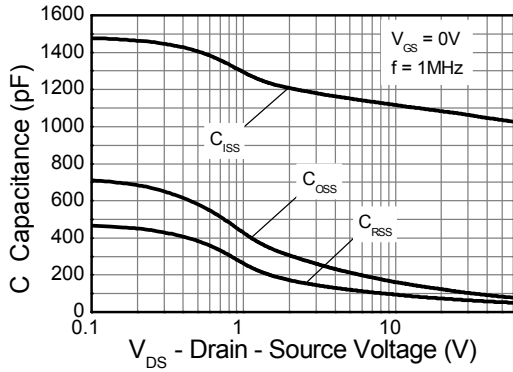
(†) Switching characteristics are independent of operating junction temperature.

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

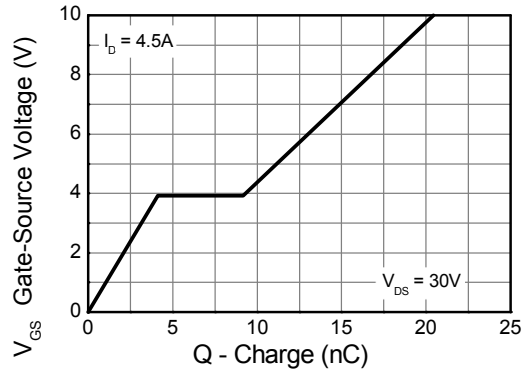
Typical characteristics



Typical characteristics

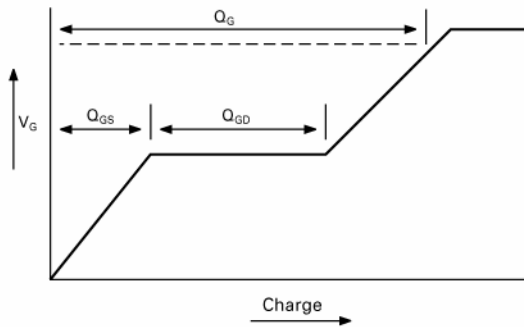


Capacitance v Drain-Source Voltage

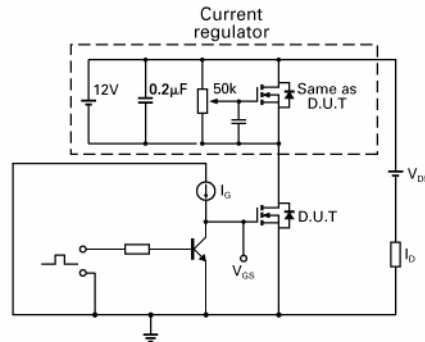


Gate-Source Voltage v Gate Charge

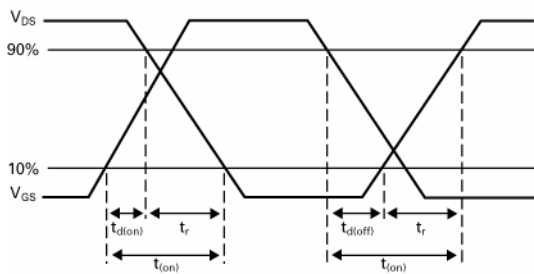
Test circuits



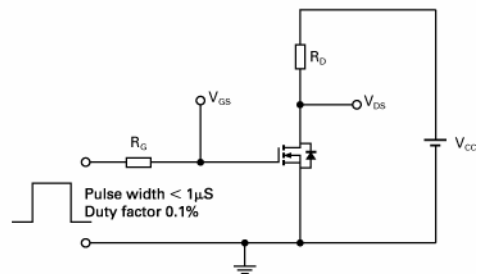
Basic gate charge waveform



Gate charge test circuit



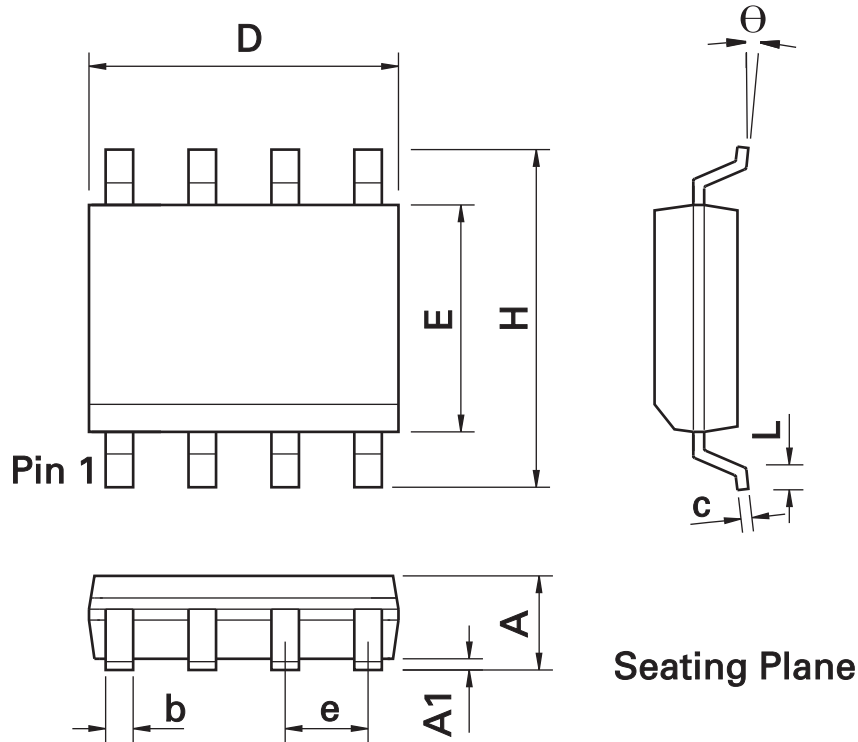
Switching time waveforms



Switching time test circuit

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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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