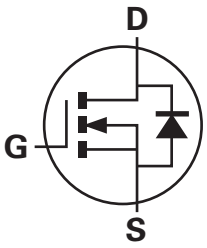
# ZXMN6A25N8
# 60V SO8 N-channel enhancement mode MOSFET

## 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.

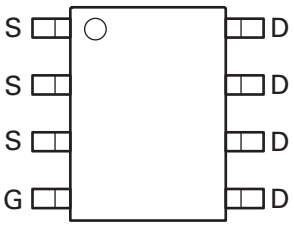



## Features

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

## Applications

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




Top view

## Ordering information

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

## Device marking

ZXMN6A25

## 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°C (b)<br>@ $V_{GS}$= 10V; $T_A$=70°C (b)<br>@ $V_{GS}$= 10V; $T_A$=25°C (a)<br>@ $V_{GS}$= 10V; $T_L$=25°C (a)(d) | $I_D$ | 5.7<br>4.5<br>4.3<br>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°C (a)<br>Linear derating factor | $P_D$ | 1.56<br>12.5 | W<br>mW/°C |
| Power dissipation at $T_A$ =25°C (b)<br>Linear derating factor | $P_D$ | 2.8<br>22.2 | W<br>mW/°C |
| Power dissipation at $T_L$ =25°C (d)<br>Linear derating factor | $P_D$ | 4.14<br>33.1 | W<br>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:**

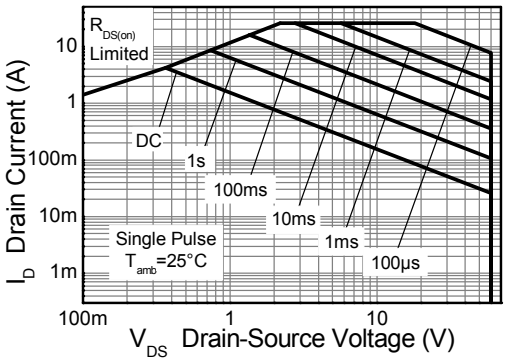
(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) Mounted on FR4 PCB measured at $t \leq 10$ sec.

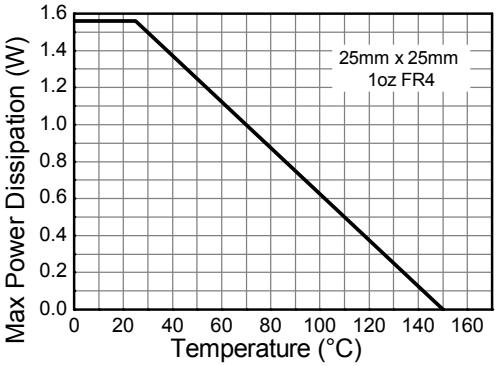
(c) Repetitive rating on 25mm x 25mm FR4 PCB, D=0.02, pulse width 300us – pulse width limited by maximum junction temperature.

(d) Thermal resistance from junction to solder-point (at the end of the drain lead).

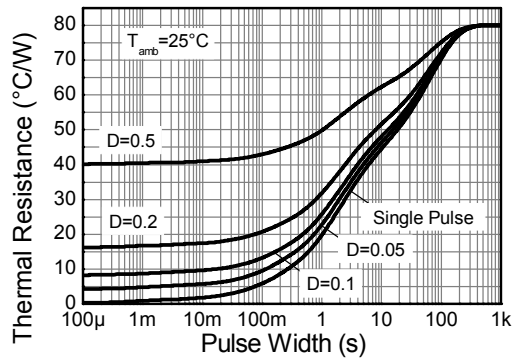
## Thermal characteristics



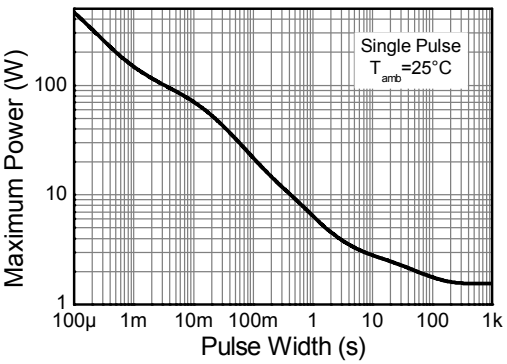

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**




**Pulse Power Dissipation**

## Electrical characteristics (at $T_{amb}$ = 25°C unless otherwise stated)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | 60 | | | V | $I_D$ =250μA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | | | 1.0 | μA | $V_{DS}$=60V, $V_{GS}$=0V |
| Gate-Body leakage | $I_{GSS}$ | | | 100 | nA | $V_{GS}$=±20V, $V_{DS}$=0V |
| Gate-Source threshold voltage | $V_{GS(th)}$ | 1 | | 3 | V | $I_D$=250μA, $V_{DS}$=$V_{GS}$ |
| Static Drain-Source on-state resistance (*) | $R_{DS(on)}$ | | | 0.050<br>0.070 | Ω | $V_{GS}$= 10V, $I_D$= 3.6A<br>$V_{GS}$= 4.5V, $I_D$= 3.0A |
| Forward Transconductance (*) (†) | $g_{fs}$ | | 10.2 | | S | $V_{DS}$= 15V, $I_D$= 4.5A |
| **Dynamic** (†) | | | | | | |
| Input capacitance | $C_{iss}$ | | 1063 | | pF | $V_{DS}$= 30V, $V_{GS}$=0V<br>f=1MHz |
| Output capacitance | $C_{oss}$ | | 104 | | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | 64 | | pF | |
| **Switching** (‡) (†) | | | | | | |
| Turn-on-delay time | $t_{d(on)}$ | | 3.8 | | ns | $V_{DD}$= 30V, $V_{GS}$= 10V<br>$I_D$= 1A<br>$R_G \cong$ 6.0Ω, |
| 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 | $V_{DS}$= 30V, $V_{GS}$= 5V<br>$I_D$= 4.5A |
| Total gate charge | $Q_g$ | | 20.4 | | nC | $V_{DS}$= 30V, $V_{GS}$= 10V<br>$I_D$= 4.5A |
| 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 | $I_S$= 5.5A,$V_{GS}$=0V |
| Reverse recovery time (‡) | $t_{rr}$ | | 22.0 | | ns | $I_S$= 2.2A,di/dt=100A/μs |
| Reverse recovery charge(‡) | $Q_{rr}$ | | 21.4 | | nC | |

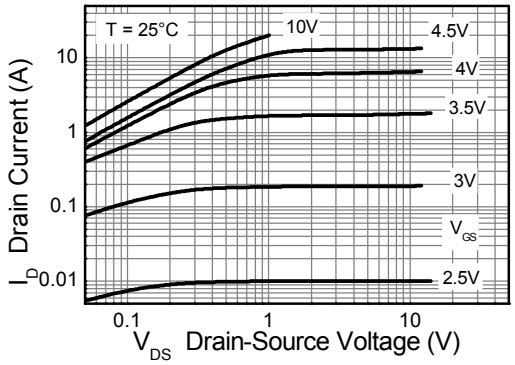
**NOTES:**

(*) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.

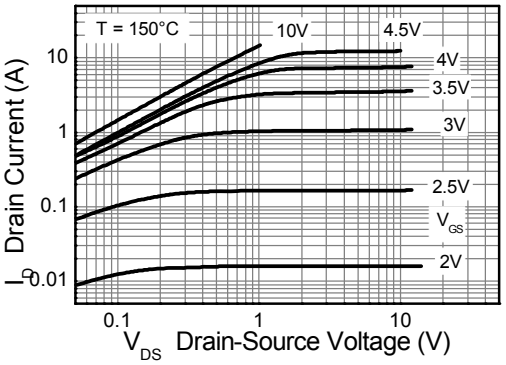
(†)Switching characteristics are independent of operating junction temperature.

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

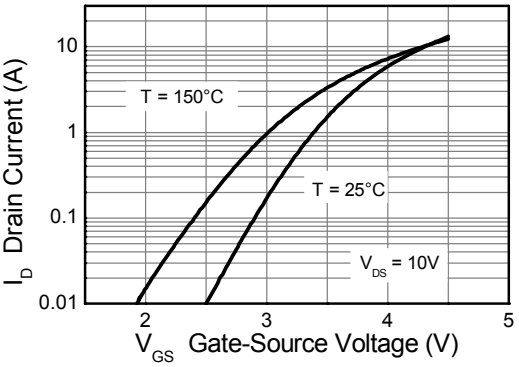
## Typical characteristics



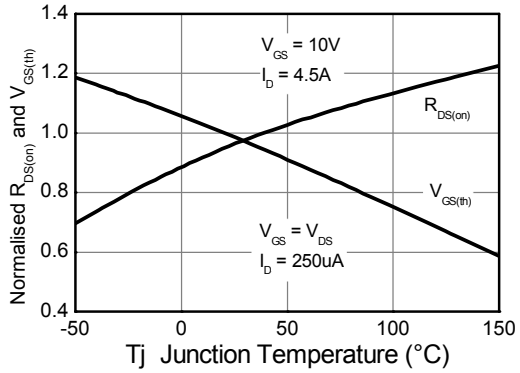

**Output Characteristics**



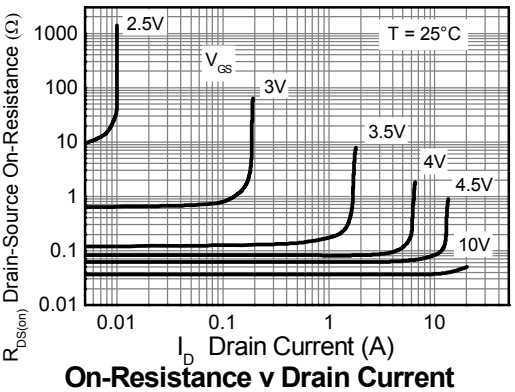

**Output Characteristics**



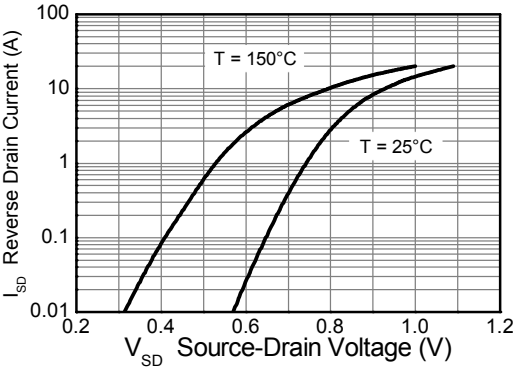

**Typical Transfer Characteristics**




**Normalised Curves v Temperature**

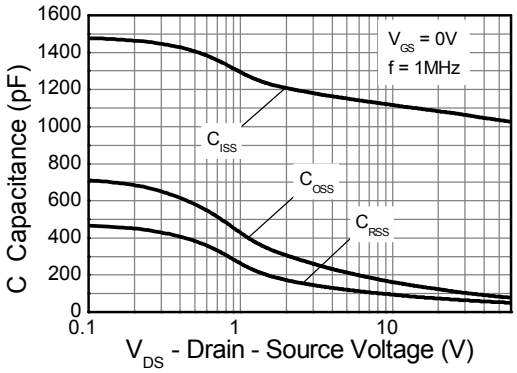



**On-Resistance v Drain Current**

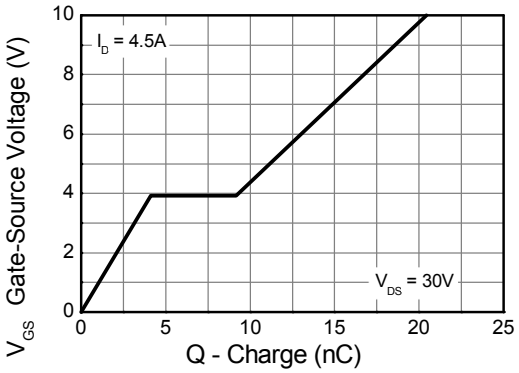



**Source-Drain Diode Forward Voltage**

## Typical characteristics

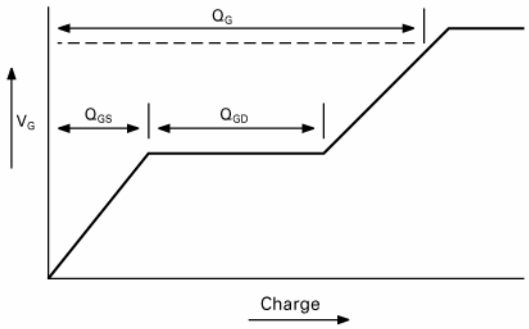



**Capacitance v Drain-Source Voltage**

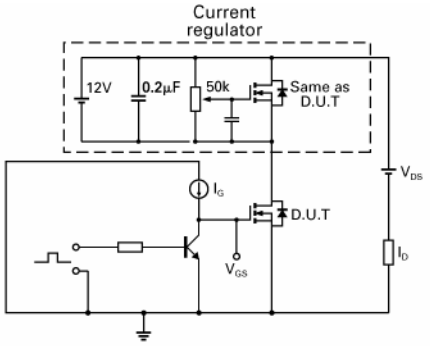



**Gate-Source Voltage v Gate Charge**

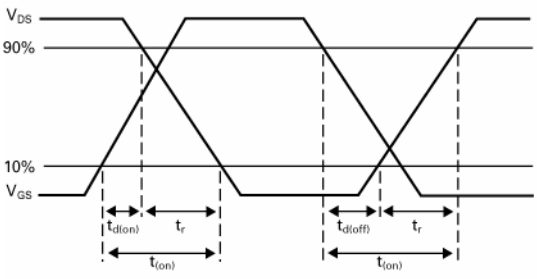
## Test circuits



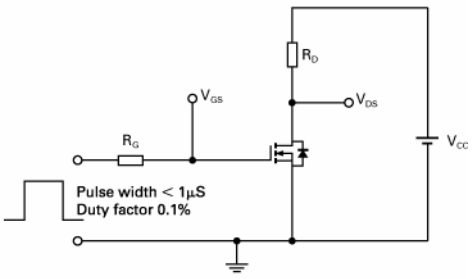

**Basic gate charge waveform**




**Gate charge test circuit**

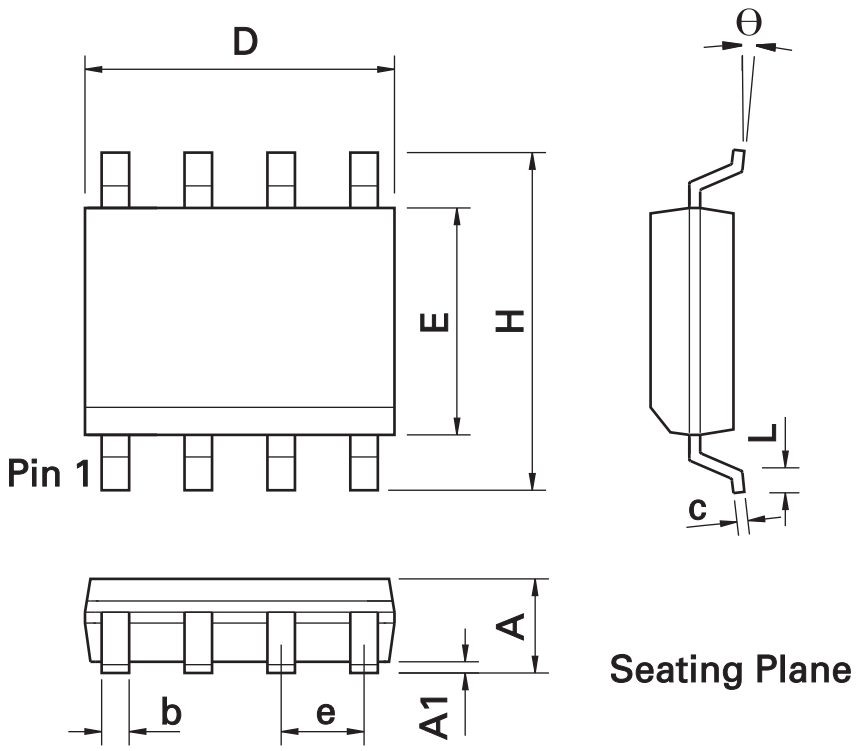



**Switching time waveforms**




**Switching time test circuit**

**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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