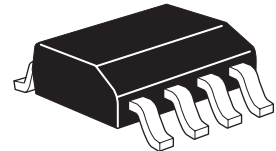


ZXMN6A25DN8

Dual 60V SO8 N-channel enhancement mode MOSFET

Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ (Ω) | 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

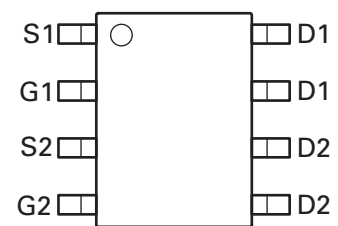
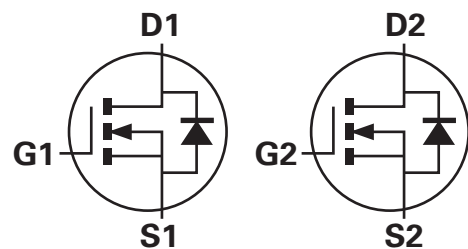
- DC - DC converters
- Power management functions
- Motor control

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} | ± 20 | V |
| Continuous drain current @ $V_{GS}=10V$; $T_{amb}=25^{\circ}C^{(b)}$ (d) | I_D | 5 | A |
| @ $V_{GS}=10V$; $T_{amb}=70^{\circ}C^{(b)}$ (d) | | 4 | A |
| @ $V_{GS}=10V$; $T_{amb}=25^{\circ}C^{(a)}$ (d) | | 3.8 | A |
| Pulsed drain current ^(c) | I_{DM} | 24 | A |
| Continuous source current (body diode) ^(b) | I_S | 3.4 | A |
| Pulsed source current (body diode) ^(c) | 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

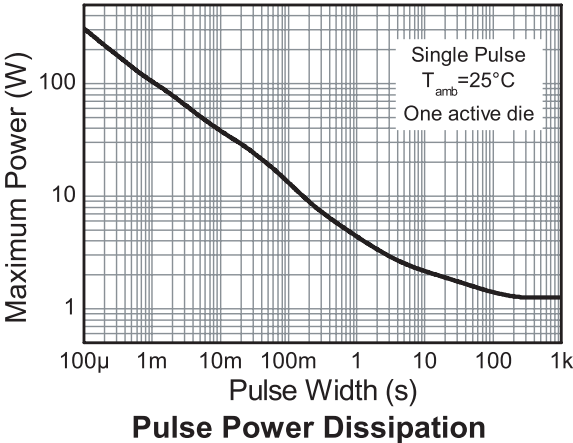
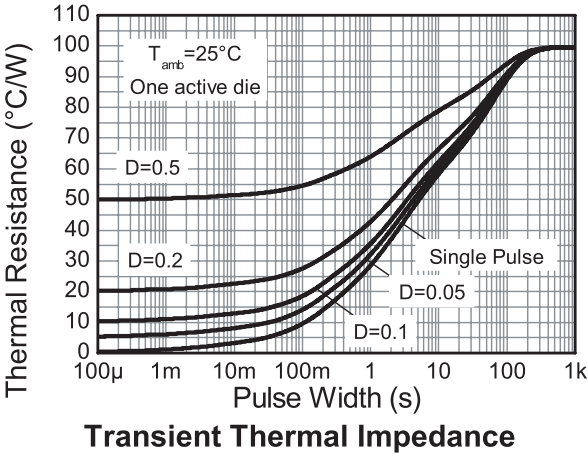
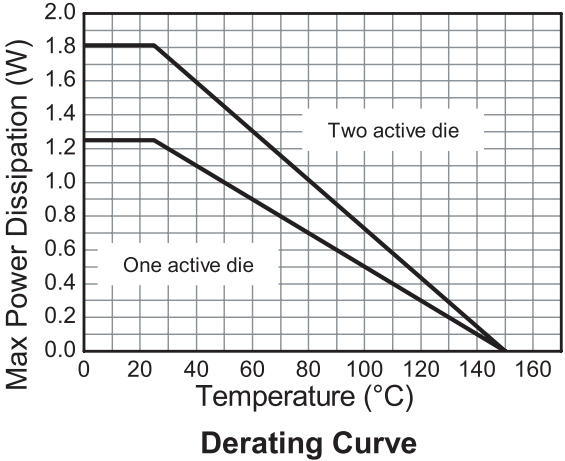
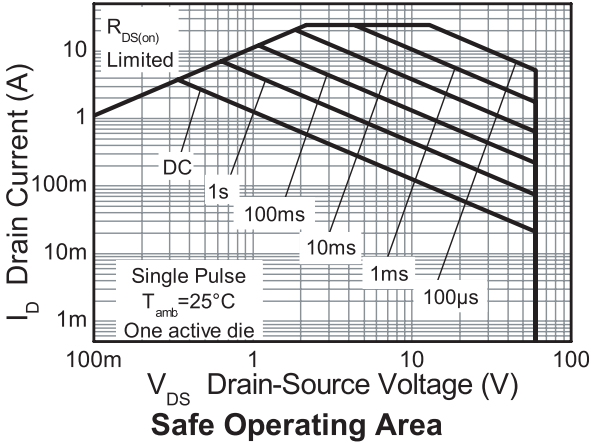
| Parameter | Symbol | Limit | Unit |
|--|-----------------|-------|---------------|
| Junction to ambient ^(a) (d) | $R_{\theta JA}$ | 100 | $^{\circ}C/W$ |
| Junction to ambient ^(a) (e) | $R_{\theta JA}$ | 70 | $^{\circ}C/W$ |
| Junction to ambient ^(b) (d) | $R_{\theta JA}$ | 60 | $^{\circ}C/W$ |

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 μ 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 |
|--|---------------|------|------|-------|----------|--|
| 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 | 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 ^(*) | $R_{DS(on)}$ | | | 0.050 | Ω | $V_{GS}=10\text{V}, I_D=3.6\text{A}$ |
| | | | | 0.070 | Ω | $V_{GS}=4.5\text{V}, I_D=3\text{A}$ |
| 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 | $V_{DD}=30\text{V}, I_D=1\text{A}$ $R_G \cong 6.0\Omega, V_{GS}=10\text{V}$ |
| 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 | |
| Source-drain diode | | | | | | |
| Diode Forward Voltage ^(*) | 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 ^(‡) | 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 ^(‡) | Q_{rr} | | 21.4 | | nC | |

NOTES:

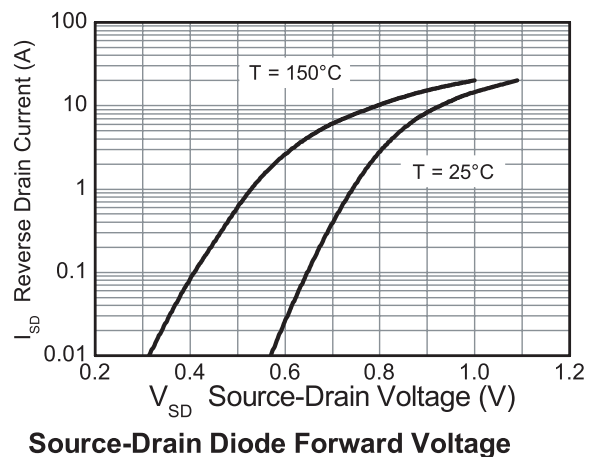
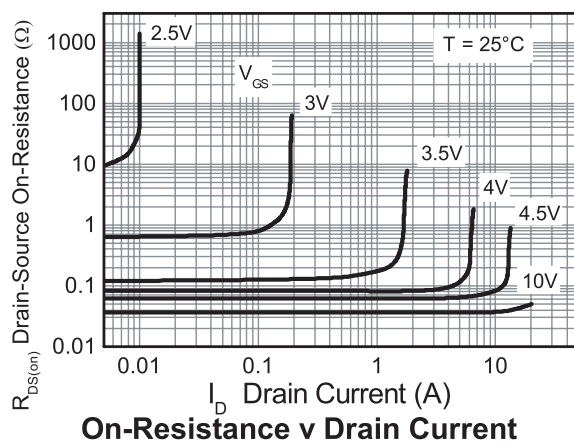
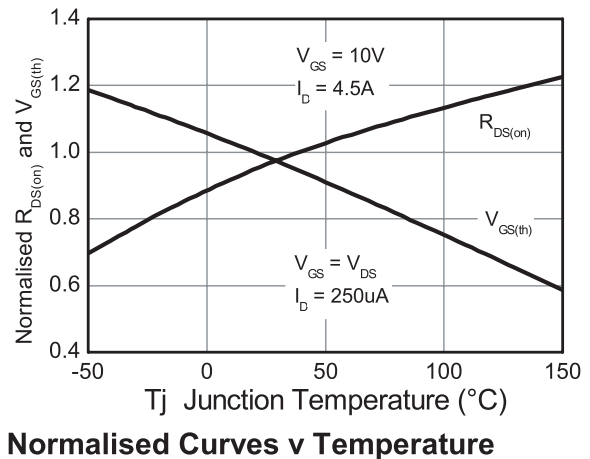
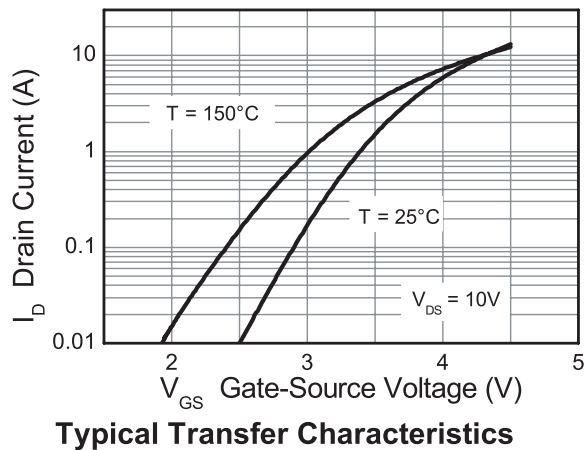
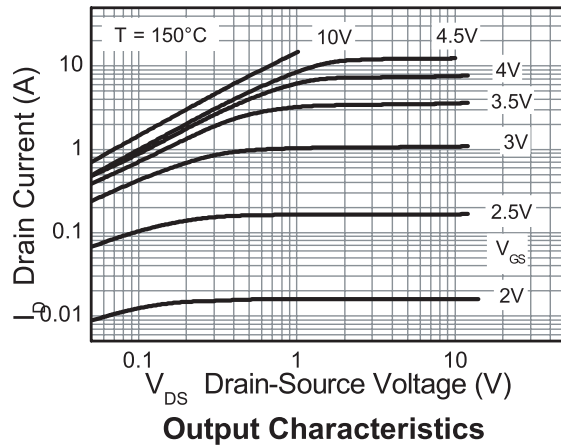
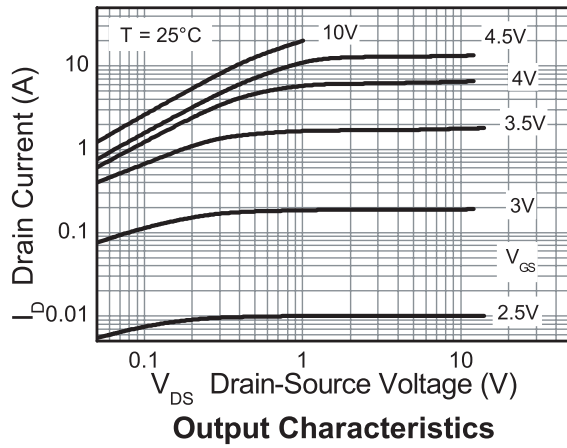
(*) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.

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

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

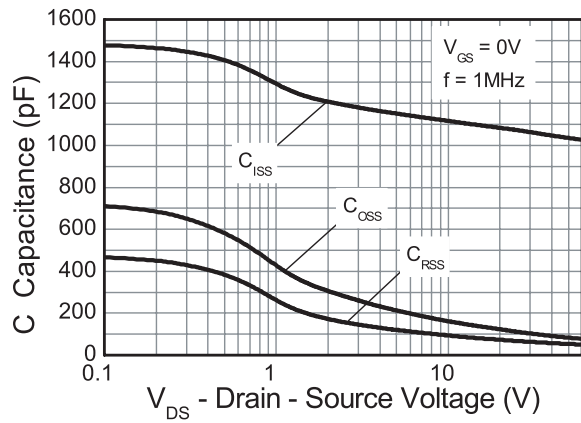
ZXMN6A25DN8

Typical characteristics

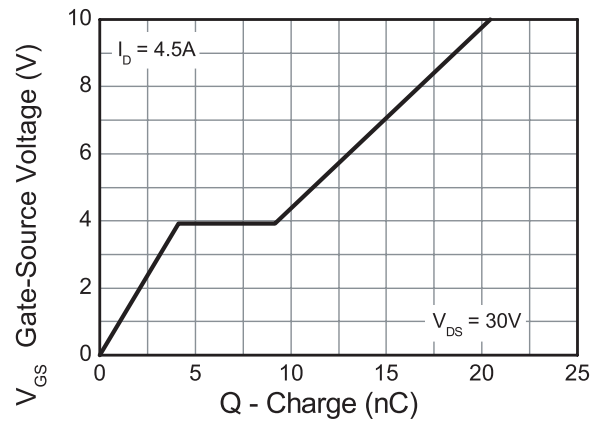


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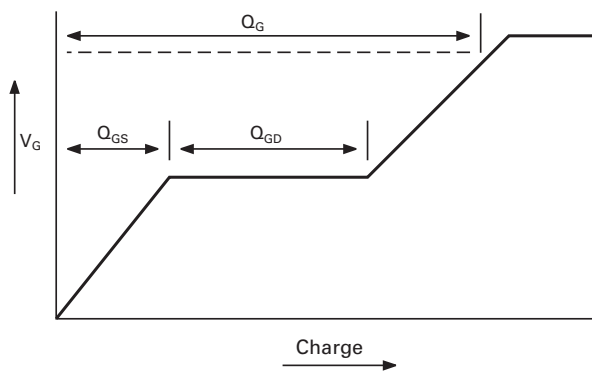
Typical characteristics



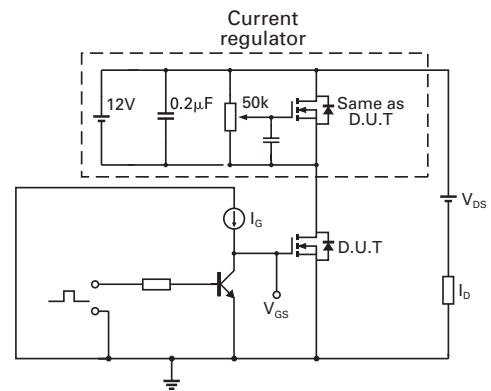
Capacitance v Drain-Source Voltage



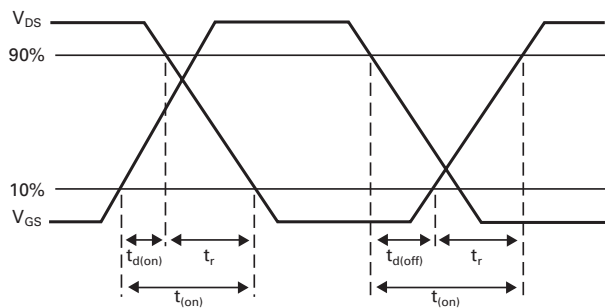
Gate-Source Voltage v Gate Charge



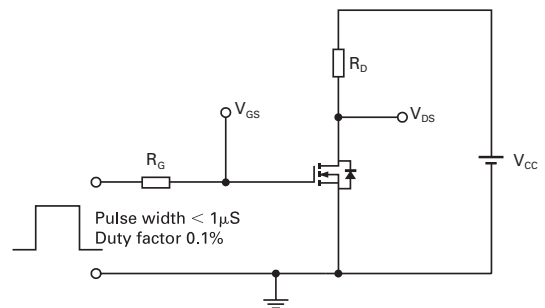
Basic gate charge waveform



Gate charge test circuit



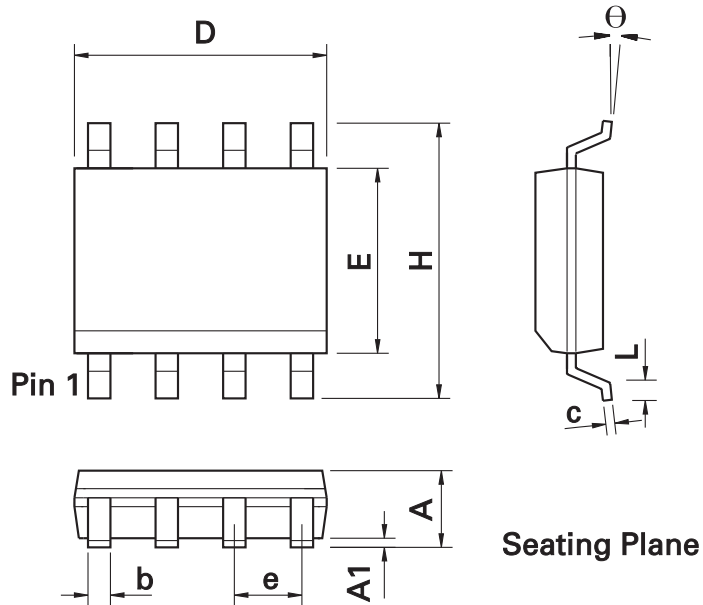
Switching time waveforms



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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| | |
|-----------------------------------|--|
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|-----------------------|---|
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