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A Product Line of
Diodes Incorporated

ZETEX

ZXMP3F37N8 30V SO8 P-channel enhancement mode MOSFET

Summary

| $V_{(BR)DSS}$ (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|-------------------|---------------------------|-----------|
| -30 | 0.025 @ $V_{GS}=-10V$ | -10.7 |
| | 0.041 @ $V_{GS}=-4.5V$ | |



Description

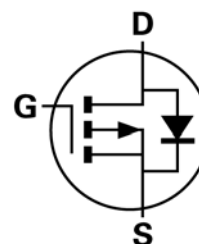
This new generation Trench MOSFET from Zetex has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance making it ideal for high efficiency power management applications.

Features

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

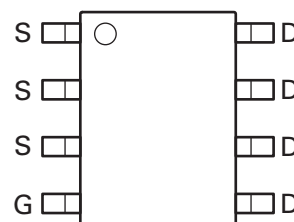
Applications

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



Ordering information

| Device | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|--------------------|-----------------|-------------------|
| ZXMP3F37N8TA | 7 | 12 | 500 |



Device marking

ZXMP 3F37

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Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|---|----------------|-------------------------------|---------------------|
| Drain-Source voltage | V_{DSS} | -30 | V |
| Gate-Source voltage | V_{GS} | ± 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) @ $V_{GS} = -10V$; $T_L = 25^\circ C$ ^(d) | I_D | -8.5 -6.8 -6.4 -10.7 | V |
| Pulsed Drain current ^(c) | I_{DM} | -39.5 | A |
| Continuous Source current (Body diode) ^(b) | I_S | -4.4 | A |
| Pulsed Source current (Body diode) ^(c) | I_{SM} | -39.5 | A |
| Power dissipation at $T_A = 25^\circ C$ ^(a) Linear derating factor | P_D | 1.56 12.5 | W mW/ $^\circ C$ |
| Power dissipation at $T_A = 25^\circ C$ ^(b) Linear derating factor | P_D | 2.8 22.2 | W mW/ $^\circ C$ |
| Power dissipation at $T_L = 25^\circ C$ ^(d) Linear derating factor | P_D | 4.4 35.4 | W mW/ $^\circ C$ |
| Operating and storage temperature range | T_j, T_{stg} | -55 to 150 | $^\circ C$ |

Thermal resistance

| Parameter | Symbol | Value | Unit |
|------------------------------------|-----------------|-------|--------------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 80 | $^\circ C/W$ |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 45 | $^\circ C/W$ |
| Junction to lead ^(d) | $R_{\theta JL}$ | 28.26 | $^\circ C/W$ |

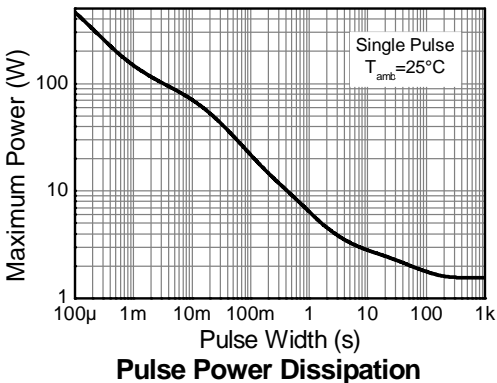
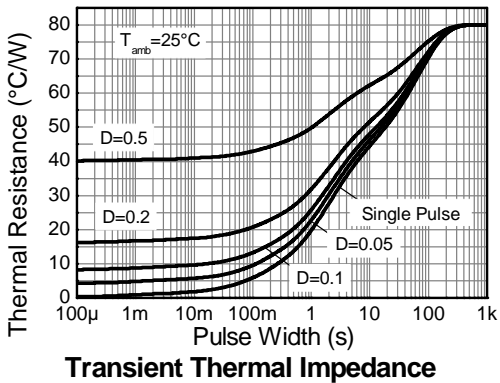
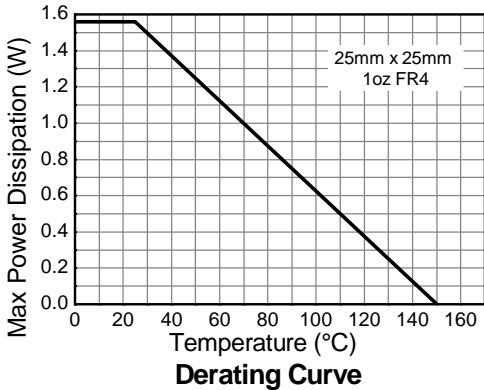
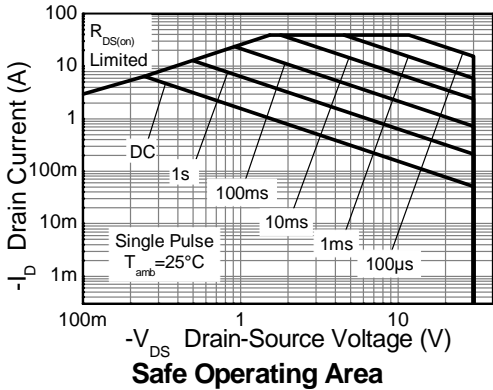
NOTES:

- (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 | $V_{(BR)DSS}$ | -30 | | | V | $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$ |
| Zero Gate voltage Drain current | I_{DSS} | | | -1.0 | μA | $V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$ |
| 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 | | -2.5 | V | $I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$ |
| Static Drain-Source on-state resistance (*) | $R_{DS(on)}$ | | | 0.025 0.041 | Ω | $V_{GS} = -10\text{V}$, $I_D = -7.1\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -5.5\text{A}$ |
| Forward Transconductance (*) (†) | g_{fs} | | 18.6 | | S | $V_{DS} = -15\text{V}$, $I_D = -7.1\text{A}$ |
| Dynamic (†) | | | | | | |
| Input capacitance | C_{iss} | | 1678 | | pF | $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$ |
| Output capacitance | C_{oss} | | 303 | | pF | |
| Reverse transfer capacitance | C_{rss} | | 178 | | pF | |
| Switching (‡) (†) | | | | | | |
| Turn-on-delay time | $t_{d(on)}$ | | 3.5 | | ns | $V_{DD} = -15\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$, |
| Rise time | t_r | | 4.9 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 44 | | ns | |
| Fall time | t_f | | 28 | | ns | |
| Gate charge | | | | | | |
| Total Gate charge | Q_g | | 31.6 | | nC | $V_{DS} = -15\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -7.1\text{A}$ |
| Gate-Source charge | Q_{gs} | | 4.3 | | nC | |
| Gate-Drain charge | Q_{gd} | | 6.2 | | nC | |
| Source-Drain diode | | | | | | |
| Diode forward voltage (*) | V_{SD} | | -0.80 | -1.2 | V | $I_S = -1.7\text{A}$, $V_{GS} = 0\text{V}$ |
| Reverse recovery time (‡) | t_{rr} | | 16.2 | | ns | $I_S = -2.2\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse recovery charge (‡) | Q_{rr} | | 10 | | nC | |

NOTES:

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

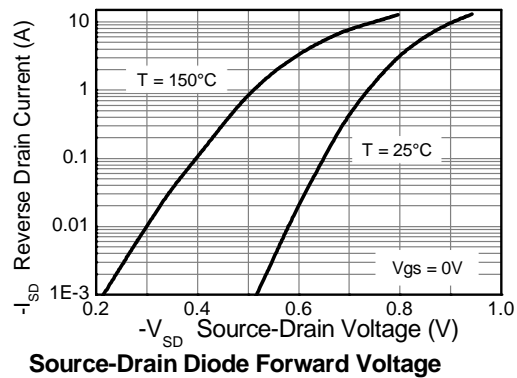
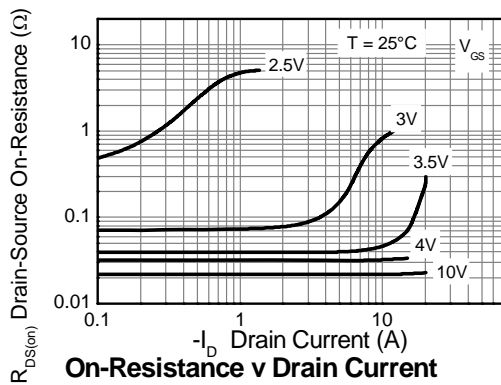
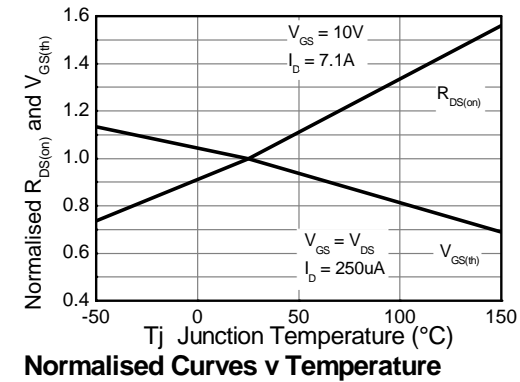
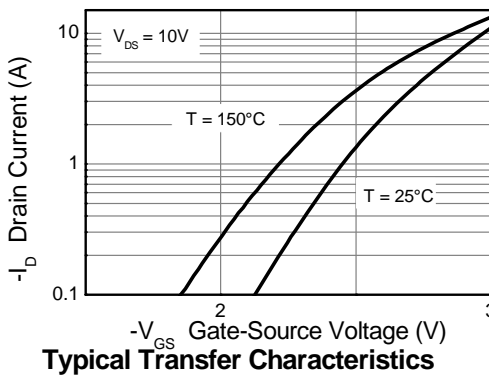
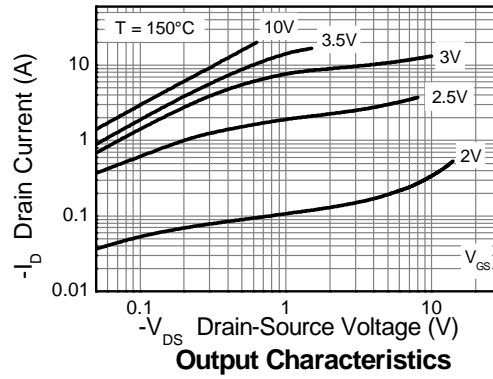
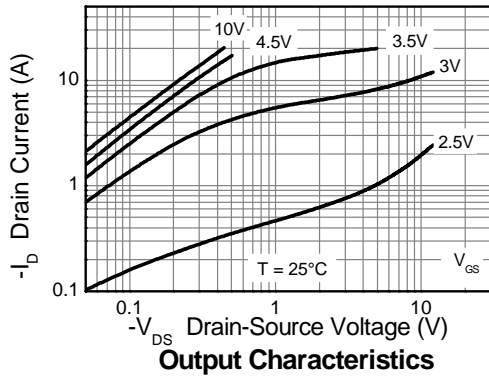
(†) Switching characteristics are independent of operating junction temperature.

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

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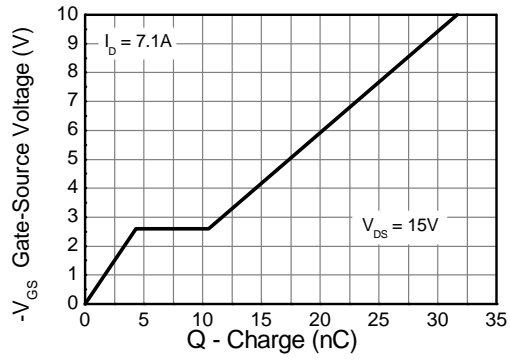
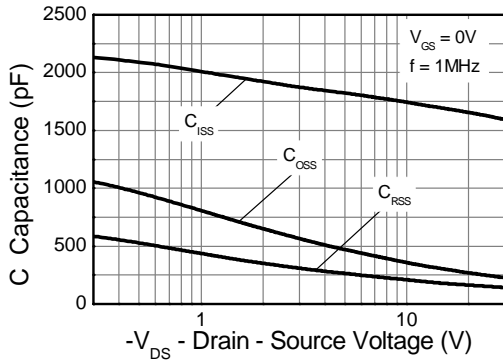
Typical characteristics



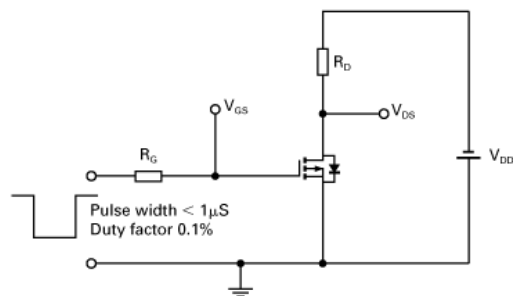
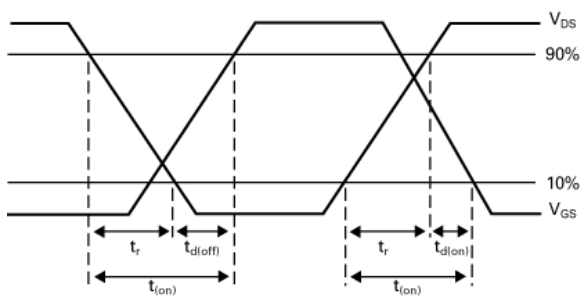
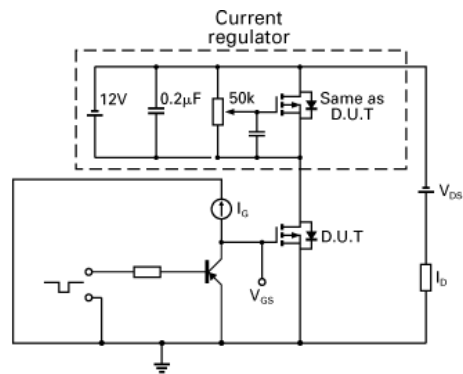
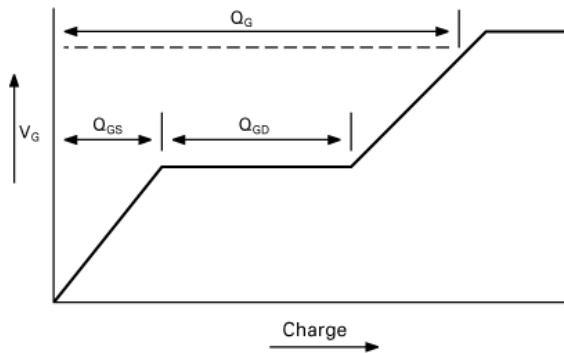
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Typical characteristics



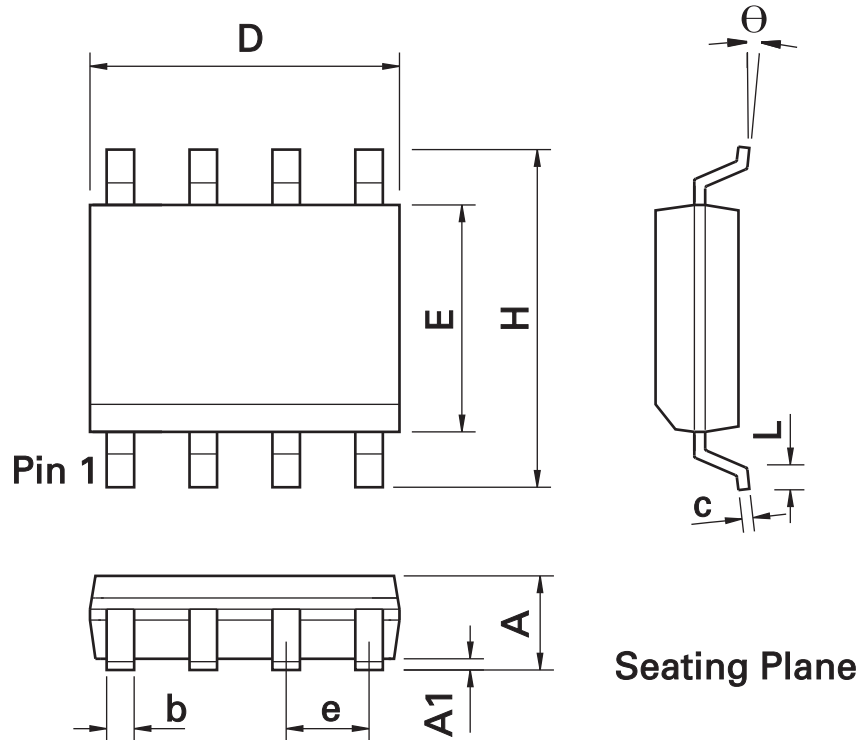
Test circuits



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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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Product status key:

| | |
|-----------------------------------|--|
| "Preview" | Future device intended for production at some point. Samples may be available |
| "Active" | Product status recommended for new designs |
| "Last time buy (LTB)" | Device will be discontinued and last time buy period and delivery is in effect |
| "Not recommended for new designs" | Device is still in production to support existing designs and production |
| "Obsolete" | Production has been discontinued |

Datasheet status key:

| | |
|-----------------------|---|
| "Draft version" | This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice. |
| "Provisional version" | This term denotes a pre-release datasheet. It provides a clear indication of anticipated performance. However, changes to the test conditions and specifications may occur, at any time and without notice. |
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