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A Product Line of  
Diodes Incorporated



## ZXMP3F36N8 30V SO8 P-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-30	0.020 @ $V_{GS}=-10V$	-12.6
	0.028 @ $V_{GS}=-4.5V$	



### Description

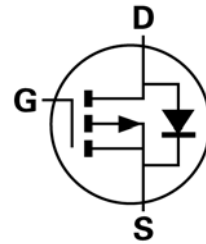
This new generation Trench MOSFET from Zetex has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance.

### Features

- Low on-resistance
- SO8 package

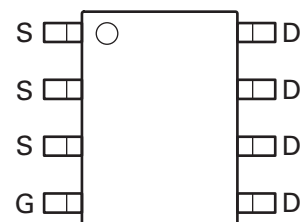
### Applications

- Battery Protection
- Battery disconnect
- Power management functions



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP3F36N8TA	7	12	500



Top view

### Device marking

ZXMP 3F36

# DISCONTINUED

## ZXMP3F36N8

### Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-Source voltage	$V_{DSS}$	-30	V
Gate-Source voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain current @ $V_{GS} = -10V$ ; $T_A = 25^\circ C$ <sup>(b)</sup> @ $V_{GS} = -10V$ ; $T_A = 70^\circ C$ <sup>(b)</sup> @ $V_{GS} = -10V$ ; $T_A = 25^\circ C$ <sup>(a)</sup> @ $V_{GS} = -10V$ ; $T_L = 25^\circ C$ <sup>(d)</sup>	$I_D$	-9.6 -7.7 -7.2 -12.6	V
Pulsed Drain current <sup>(c)</sup>	$I_{DM}$	-45	A
Continuous Source current (Body diode) <sup>(b)</sup>	$I_S$	-4.7	A
Pulsed Source current (Body diode) <sup>(c)</sup>	$I_{SM}$	-45	A
Power dissipation at $T_A = 25^\circ C$ <sup>(a)</sup> Linear derating factor	$P_D$	1.56 12.5	W mW/ $^\circ C$
Power dissipation at $T_A = 25^\circ C$ <sup>(b)</sup> Linear derating factor	$P_D$	2.8 22.2	W mW/ $^\circ C$
Power dissipation at $T_L = 25^\circ C$ <sup>(d)</sup> Linear derating factor	$P_D$	4.7 37.9	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 <sup>(a)</sup>	$R_{\theta JA}$	80	$^\circ C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	45	$^\circ C/W$
Junction to lead <sup>(d)</sup>	$R_{\theta JL}$	26.4	$^\circ C/W$

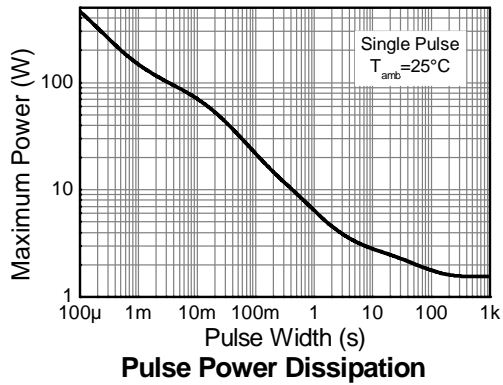
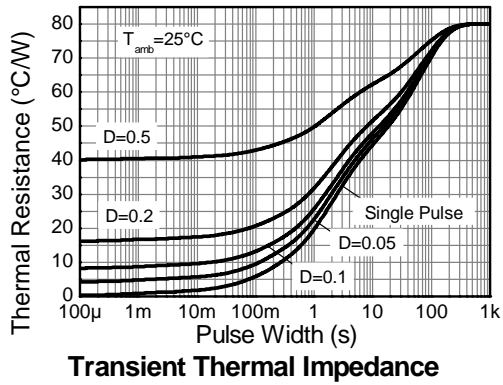
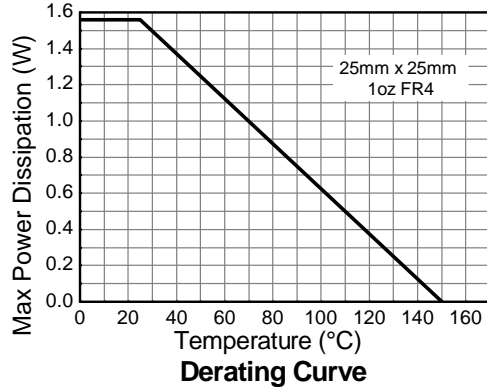
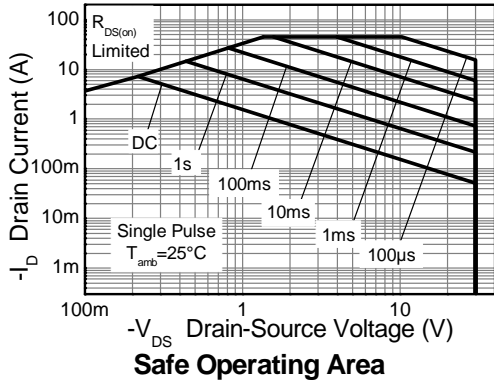
#### NOTES:

- (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).

# DISCONTINUED

## ZXMP3F36N8

### Thermal characteristics



# DISCONTINUED

## ZXMP3F36N8

### 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	$V_{(BR)DSS}$	-30			V	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate voltage Drain current	$I_{DSS}$			-1.0	$\mu\text{A}$	$V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$
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 (*)	$R_{DS(on)}$			0.020 0.028	$\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -10\text{A}$ $V_{GS} = -4.5\text{V}$ , $I_D = -8.0\text{A}$
Forward Transconductance (*) (†)	$g_{fs}$		29		S	$V_{DS} = -15\text{V}$ , $I_D = -10\text{A}$
<b>Dynamic</b> (†)						
Input capacitance	$C_{iss}$		2265		pF	$V_{DS} = -15\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	$C_{oss}$		424		pF	
Reverse transfer capacitance	$C_{rss}$		266		pF	
<b>Switching</b> (‡) (†)						
Turn-on-delay time	$t_{d(on)}$		3.1		ns	$V_{DD} = -15\text{V}$ , $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$ ,
Rise time	$t_r$		5		ns	
Turn-off delay time	$t_{d(off)}$		75		ns	
Fall time	$t_f$		40		ns	
<b>Gate charge</b>						
Total Gate charge	$Q_g$		43.9		nC	$V_{DS} = -15\text{V}$ , $V_{GS} = -10\text{V}$ $I_D = -10\text{A}$
Gate-Source charge	$Q_{gs}$		6		nC	
Gate-Drain charge	$Q_{gd}$		9.8		nC	
<b>Source-Drain diode</b>						
Diode forward voltage (*)	$V_{SD}$		-0.73	-1.2	V	$I_S = -1.7\text{A}$ , $V_{GS} = 0\text{V}$
Reverse recovery time (‡)	$t_{rr}$		17.7		ns	$I_S = -2.9\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (‡)	$Q_{rr}$		11.7		nC	

#### NOTES:

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

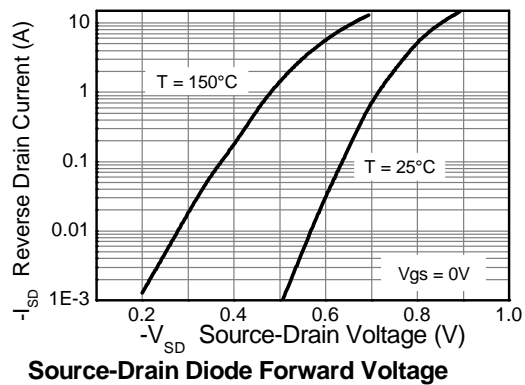
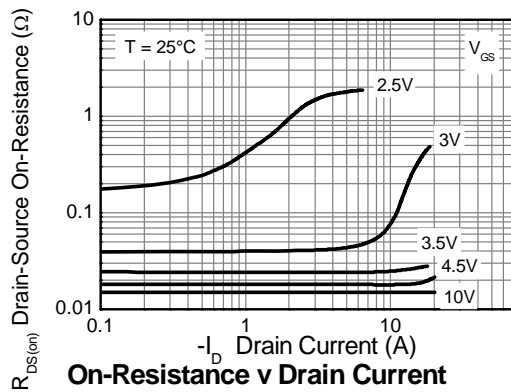
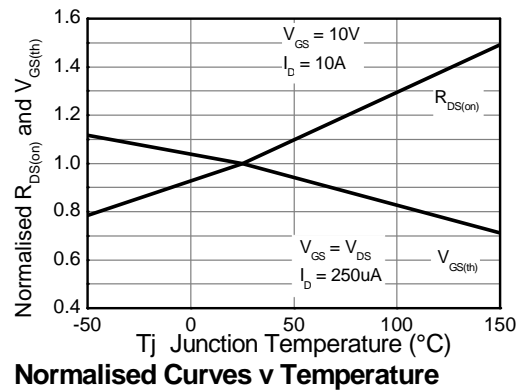
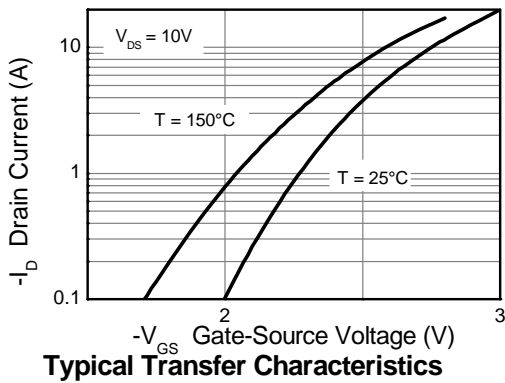
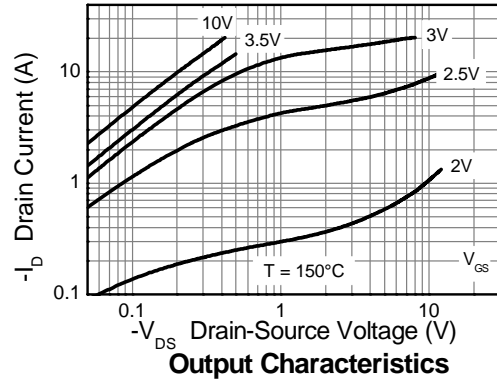
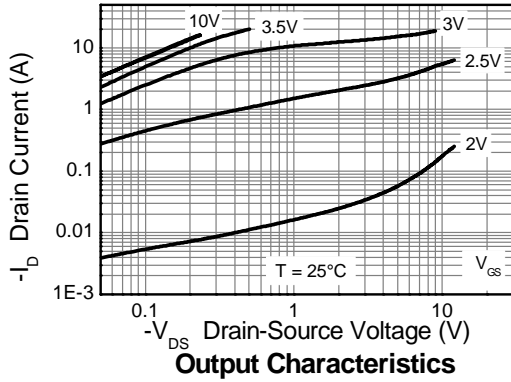
(†) Switching characteristics are independent of operating junction temperature.

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

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## ZXMP3F36N8

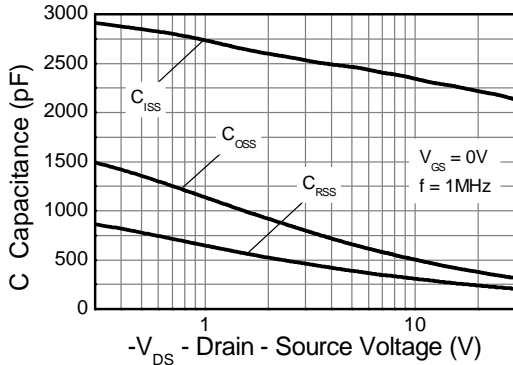
### Typical characteristics



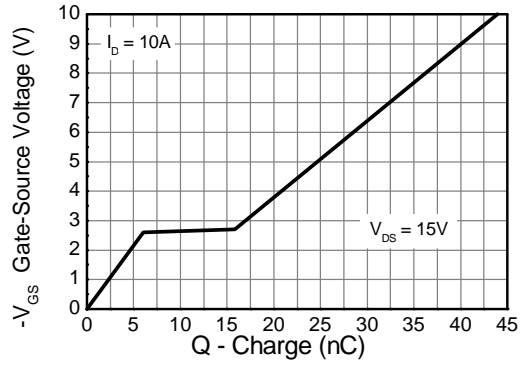
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## ZXMP3F36N8

### Typical characteristics

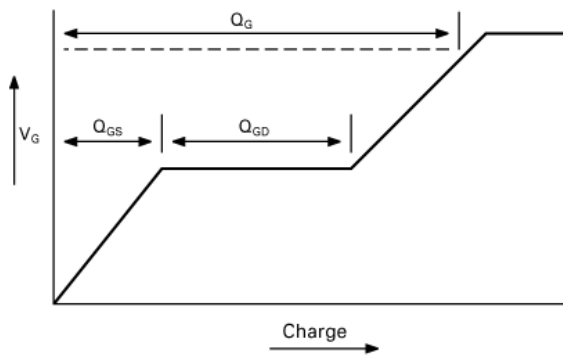


Capacitance v Drain-Source Voltage

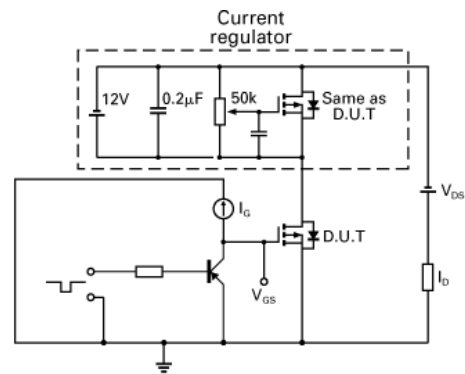


Gate-Source Voltage v Gate Charge

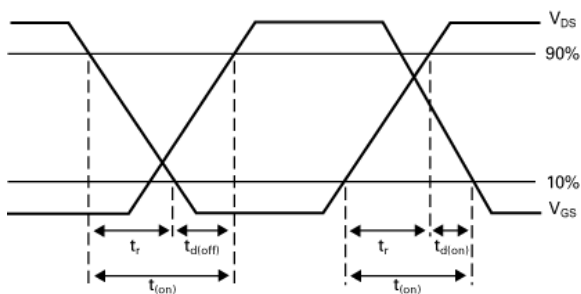
### Test circuits



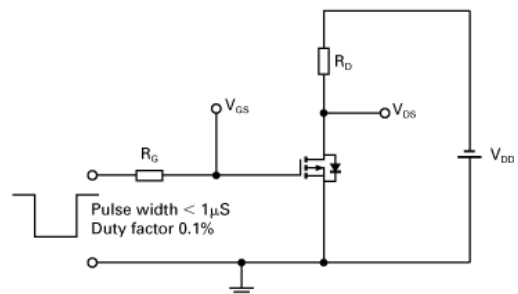
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

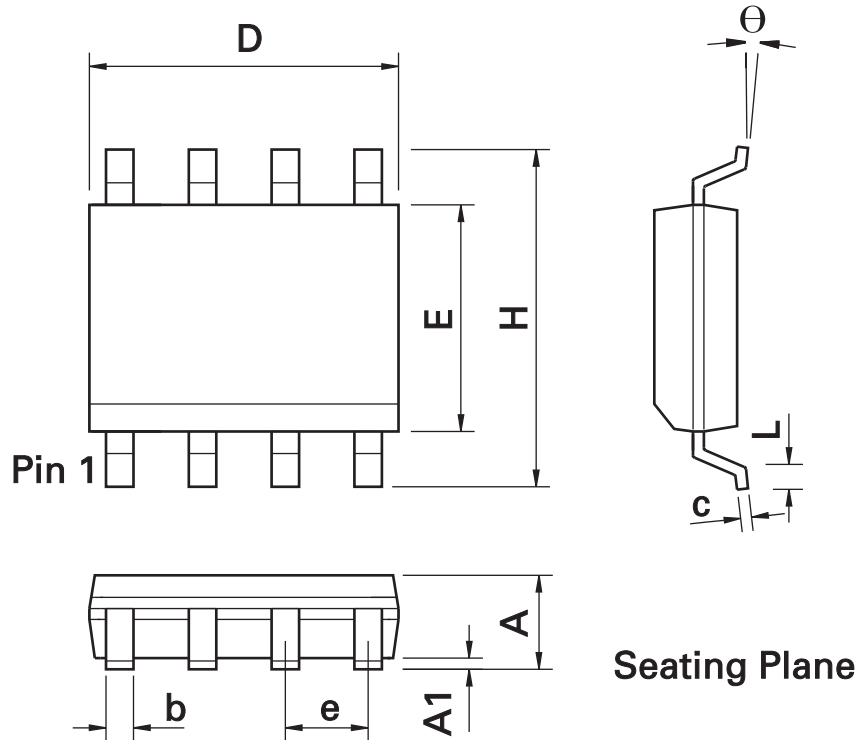


Switching time test circuit

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## ZXMP3F36N8

### 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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## ZXMP3F36N8

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