

# ZXMN3F30FH

## 30V SOT23 N-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.047 @ $V_{GS} = 10V$	4.6
	0.065 @ $V_{GS} = 4.5V$	4.0



### Description

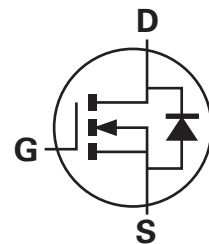
This new generation Trench MOSFET from Zetex features low on-resistance achievable with 4.5V gate drive.

### Features

- Low on-resistance
- 4.5V gate drive capability
- SOT23

### Applications

- DC-DC Converters
- Power management functions
- Motor Control

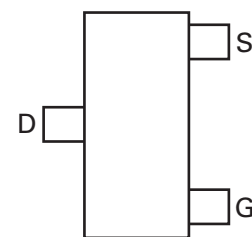


### Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN3F30FHTA	7	8	3000

### Device marking

KNA



Top view

# ZXMN3F30FH

## 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 @ $V_{GS}=4.5$ ; $T_A=25^\circ\text{C}^{(b)}$ @ $V_{GS}=4.5$ ; $T_A=70^\circ\text{C}^{(b)}$ @ $V_{GS}=4.5$ ; $T_A=25^\circ\text{C}^{(a)}$	$I_D$	4.6 3.7 3.8	A A A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	21	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	2.2	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	21	A
Power dissipation at $T_A=25^\circ\text{C}^{(a)}$ Linear derating factor	$P_D$	0.95 7.6	W mW/°C
Power dissipation at $T_A=25^\circ\text{C}^{(b)}$ Linear derating factor	$P_D$	1.4 11.2	W mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	131	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	89	°C/W
Junction to lead <sup>(d)</sup>	$R_{\theta JL}$	68	°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.

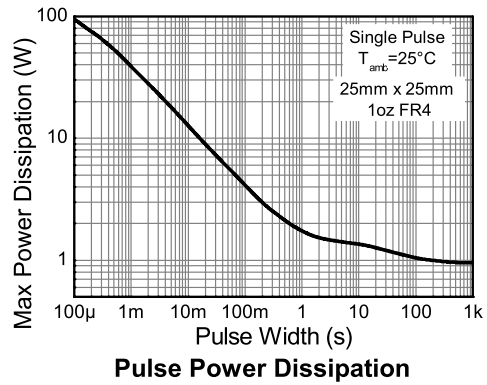
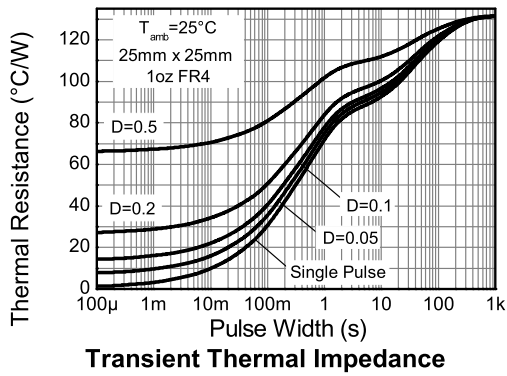
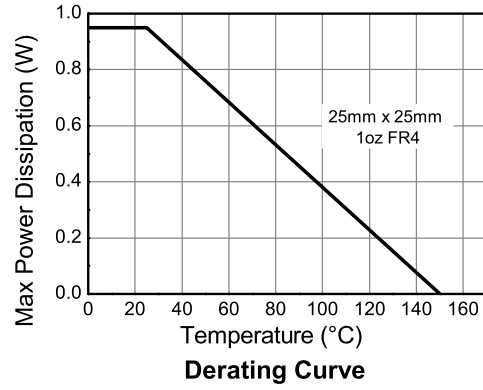
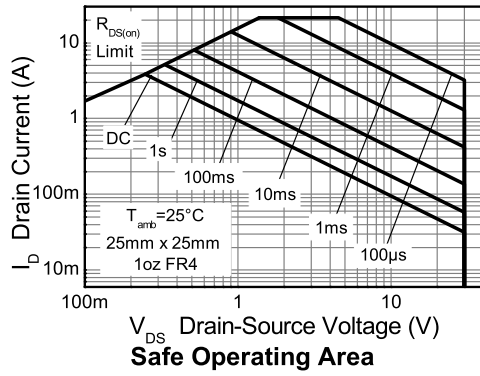
(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  sec.

(c) Repetitive rating - 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300 $\mu\text{s}$  - 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
<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	$I_{DSS}$			0.5	$\mu\text{A}$	$V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$
Gate-body leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
Gate-Source threshold voltage	$V_{GS(th)}$	1.0		3.0	V	$I_D = 250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source on-state resistance (*)	$R_{DS(on)}$			0.047 0.065	$\Omega$ $\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 3.2\text{A}$ $V_{GS} = 4.5\text{V}$ , $I_D = 2.8\text{A}$
Forward transconductance(*) (†)	$g_{fs}$		5.2		S	$V_{DS} = 15\text{V}$ , $I_D = 2.5\text{A}$
<b>Dynamic (†)</b>						
Input capacitance	$C_{iss}$		318		pF	$V_{DS} = 15\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	$C_{oss}$		75		pF	
Reverse transfer capacitance	$C_{rss}$		45		pF	
<b>Switching (†) (‡)</b>						
Turn-on-delay time	$t_{d(on)}$		1.6		ns	$V_{DD} = 15\text{V}$ , $V_{GS} = 10\text{V}$ $I_D = 1\text{A}$ $R_G \approx 6.0\Omega$
Rise time	$t_r$		2.6		ns	
Turn-off delay time	$t_{d(off)}$		17		ns	
Fall time	$t_f$		9.3		ns	
Total gatecharge	$Q_g$		7.7		nC	$V_{DS} = 15\text{V}$ , $V_{GS} = 10\text{V}$ $I_D = 2.5\text{A}$
Gate-Source charge	$Q_{gs}$		1		nC	
Gate-Drain charge	$Q_{gd}$		1.8		nC	
<b>Source-drain diode</b>						
Diode forward voltage(*)	$V_{SD}$		0.73	1.2	V	$I_S = 1.25\text{A}$ , $V_{GS} = 0\text{V}$
Reverse recovery time (†)	$t_{rr}$		12		ns	$T_j = 25^{\circ}\text{C}$ , $I_F = 1.6\text{A}$ $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (†)	$Q_{rr}$		4.8		nC	

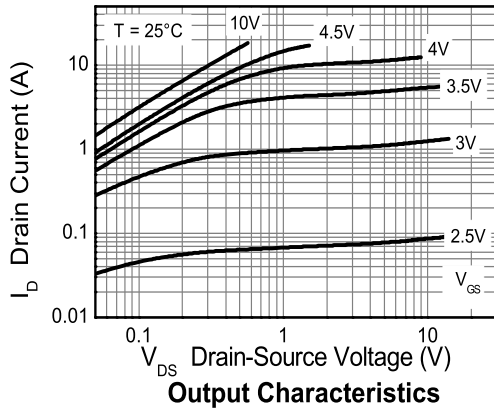
### NOTES:

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

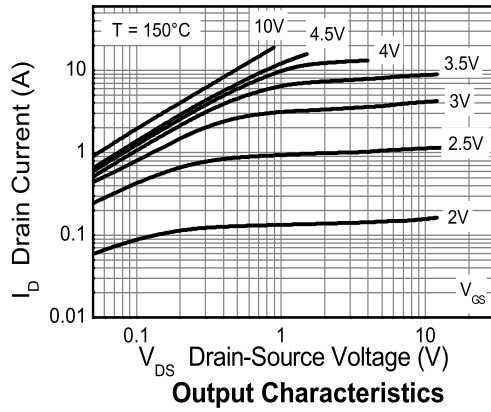
(†) For design aid only, not subject to production testing.

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

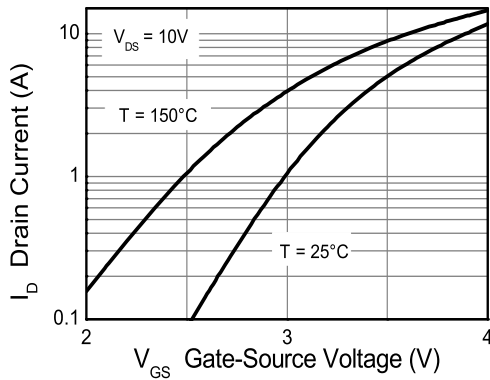
## Typical characteristics



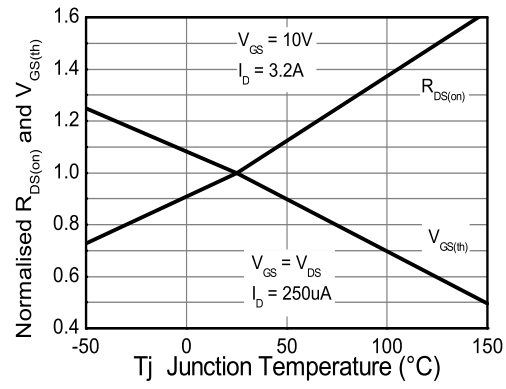
Output Characteristics



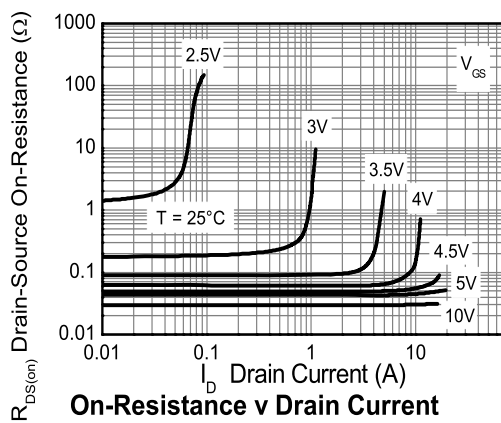
Output Characteristics



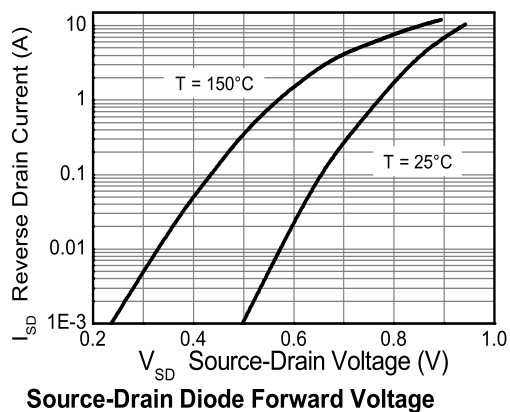
Typical Transfer Characteristics



Normalised Curves v Temperature



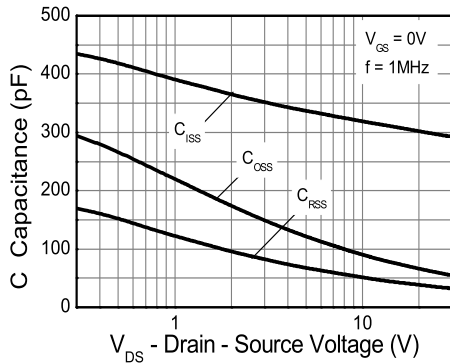
On-Resistance v Drain Current



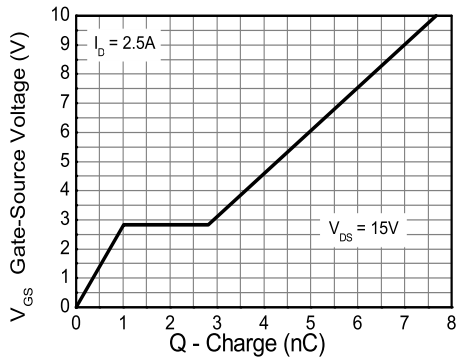
Source-Drain Diode Forward Voltage

# ZXMN3F30FH

## Typical characteristics

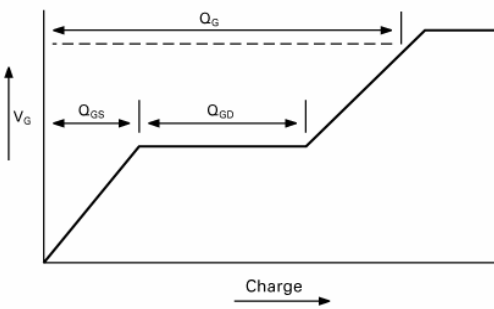


Capacitance v Drain-Source Voltage

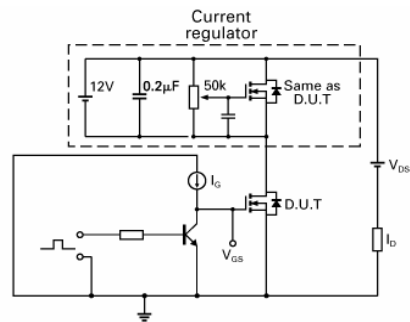


Gate-Source Voltage v Gate Charge

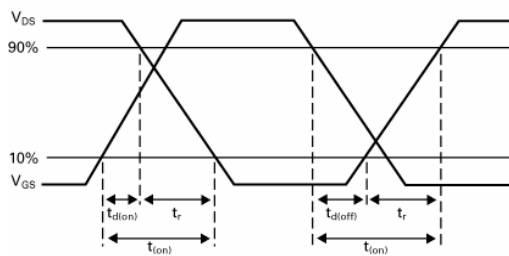
## Test circuits



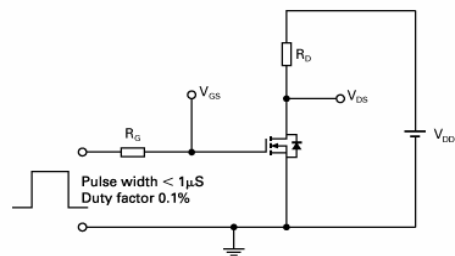
Basic gate charge waveform



Gate charge test circuit



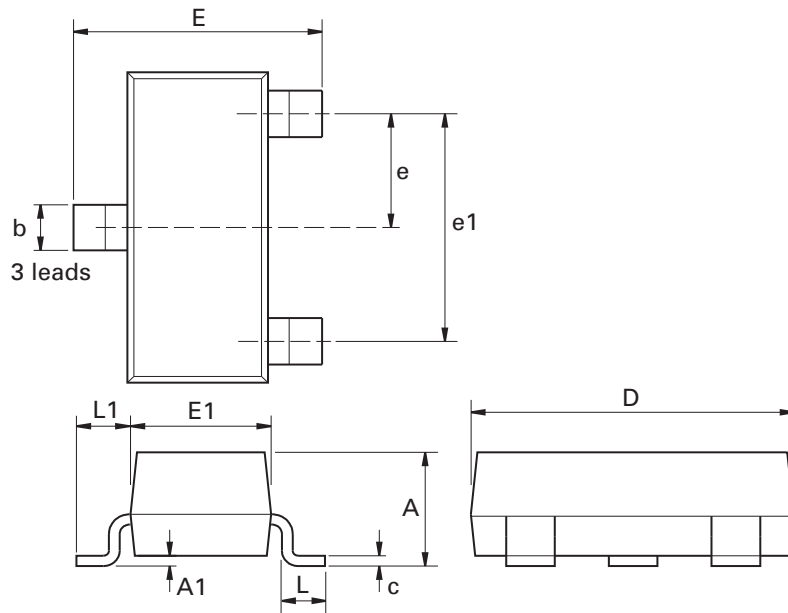
Switching time waveforms



Switching time test circuit

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## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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