

# ZXMN2F30FH

## 20V SOT23 N-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
20	0.045 @ $V_{GS} = 4.5V$	4.9
	0.065 @ $V_{GS} = 2.5V$	4.1



### Description

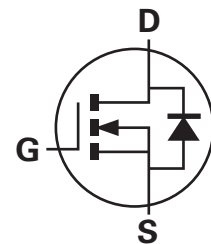
This new generation Trench MOSFET from Zetex features low on-resistance achievable with low (2.5V) gate drive.

### Features

- Low on-resistance
- 2.5V gate drive capability
- SOT23 package

### Applications

- Buck/Boost DC-DC Converters
- Load switching and SMPS
- Charging applications in portable equipment
- Motor Control
- LED Lighting

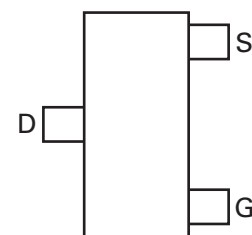


### Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2F30FHTA	7	8	3000

### Device marking

KNC



Top view

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## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain source voltage	$V_{DSS}$	20	V
Gate source voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current @ $V_{GS}=4.5$ ; $T_A=25^\circ\text{C}^{(b)}$ @ $V_{GS}=4.5$ ; $T_A=70^\circ\text{C}^{(b)}$ @ $V_{GS}=4.5$ ; $T_A=25^\circ\text{C}^{(a)}$	$I_D$	4.9 4.0 4.1	A A A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	22.6	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	1.6	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	22.6	A
Power dissipation at $T_A=25^\circ\text{C}^{(a)}$ Linear derating factor	$P_D$	0.96 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.

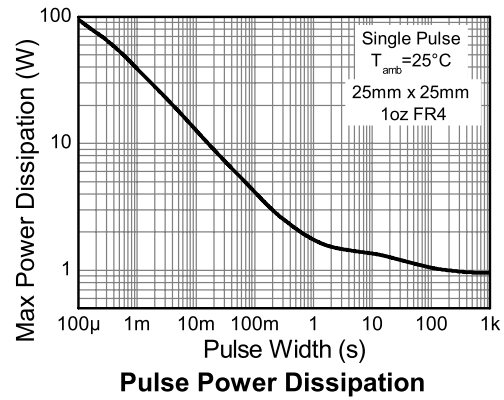
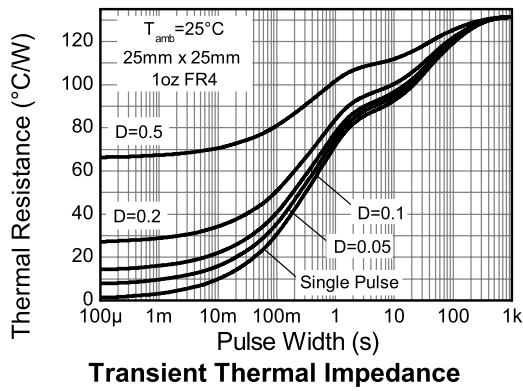
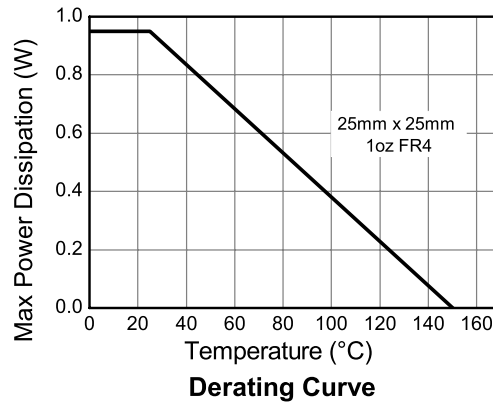
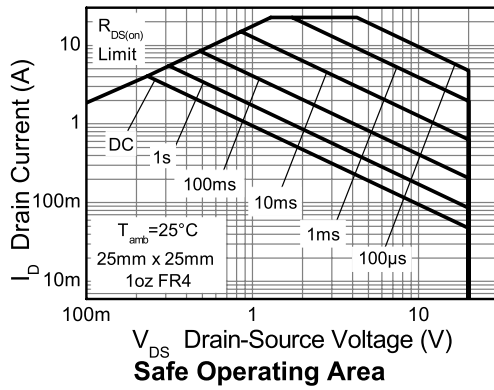
(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  sec.

(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	$V_{(BR)DSS}$	20			V	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS} = 20\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 12\text{V}$ , $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.6	0.9	1.5	V	$I_D = 250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (*)	$R_{DS(on)}$			0.045 0.065	$\Omega$ $\Omega$	$V_{GS} = 4.5\text{V}$ , $I_D = 2.5\text{A}$ $V_{GS} = 2.5\text{V}$ , $I_D = 2.0\text{A}$
Forward Transconductance <sup>(*)(†)</sup>	$g_{fs}$		8.6		S	$V_{DS} = 10\text{V}$ , $I_D = 3\text{A}$
<b>Dynamic (†)</b>						
Input Capacitance	$C_{iss}$		452		pF	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		102		pF	
Reverse Transfer Capacitance	$C_{rss}$		58		pF	
<b>Switching (‡)(†)</b>						
Turn-On-Delay Time	$t_{d(on)}$		2.9		ns	$V_{DD} = 10\text{V}$ , $V_{GS} = 4.5\text{V}$ $I_D = 1\text{A}$ $R_G \approx 6.0\Omega$
Rise Time	$t_r$		5.6		ns	
Turn-Off Delay Time	$t_{d(off)}$		19.4		ns	
Fall Time	$t_f$		10.2		ns	
Total Gate Charge	$Q_g$		4.8		nC	$V_{DS} = 10\text{V}$ , $V_{GS} = 4.5\text{V}$ $I_D = 3.5\text{A}$
Gate-Source Charge	$Q_{gs}$		1		nC	
Gate Drain Charge	$Q_{gd}$		1.2		nC	
<b>Source-drain diode</b>						
Diode Forward Voltage <sup>(*)</sup>	$V_{SD}$		0.75	1.2	V	$I_S = 1.25\text{A}$ , $V_{GS} = 0\text{V}$

### 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

Fig1.  $I_D - V_{DS}$

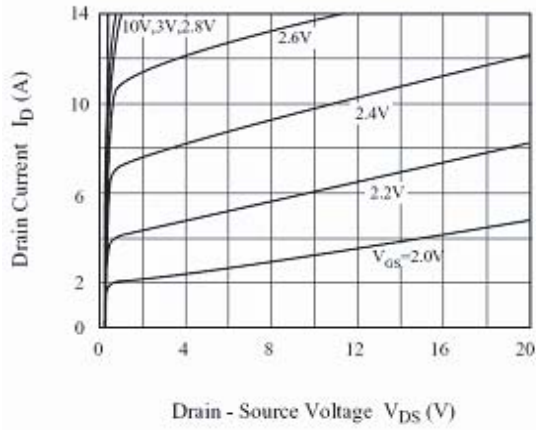


Fig2.  $R_{DS(on)} - I_D$

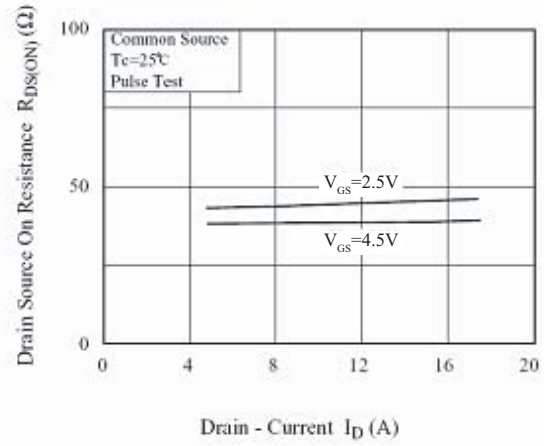


Fig3.  $I_D - V_{GS}$

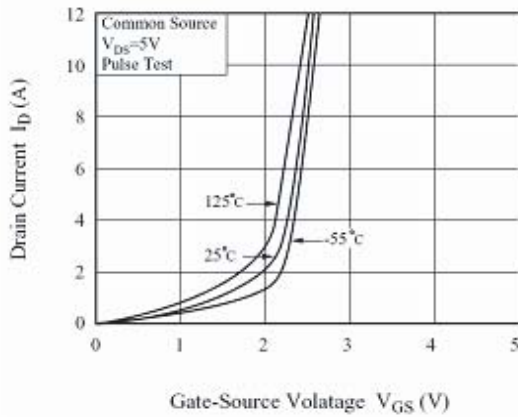


Fig4.  $R_{DS(on)} - T_J$

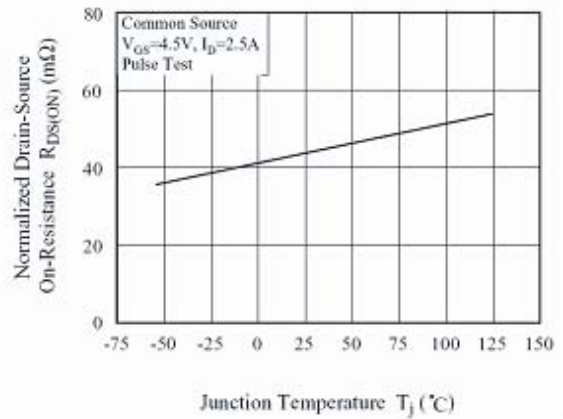


Fig5.  $V_{th} - T_J$

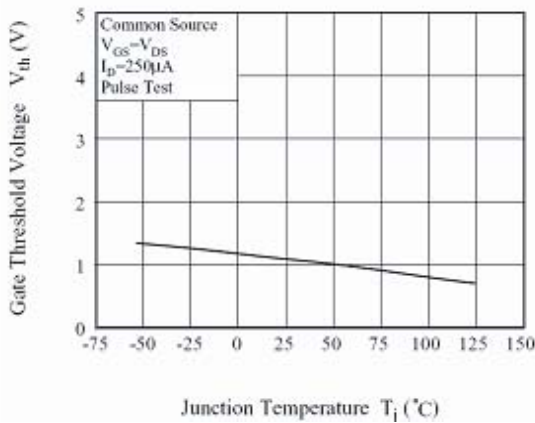
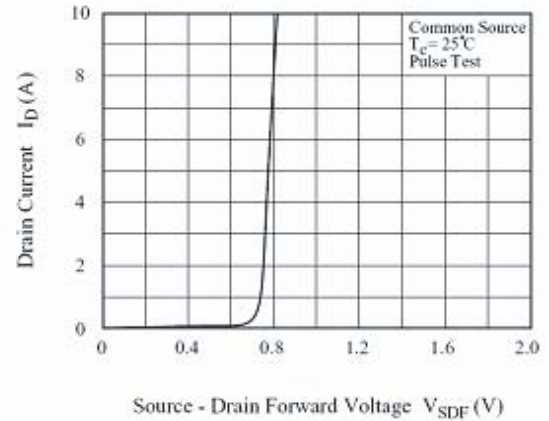
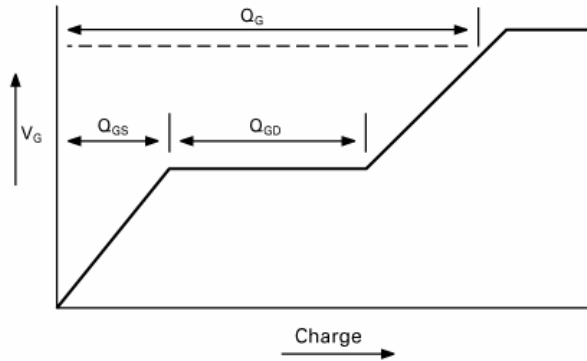


Fig6.  $I_S - V_{SDF}$

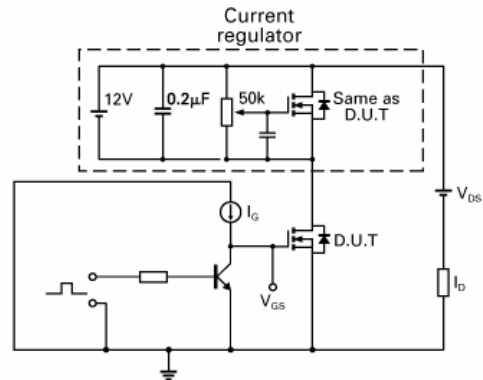


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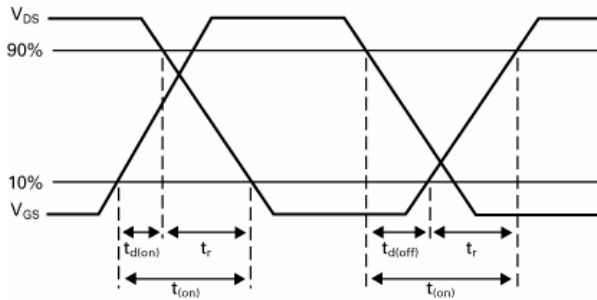
## Test circuits



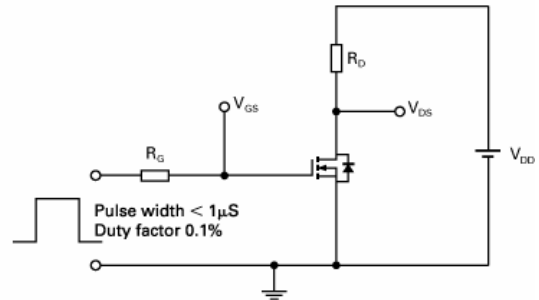
**Basic gate charge waveform**



**Gate charge test circuit**



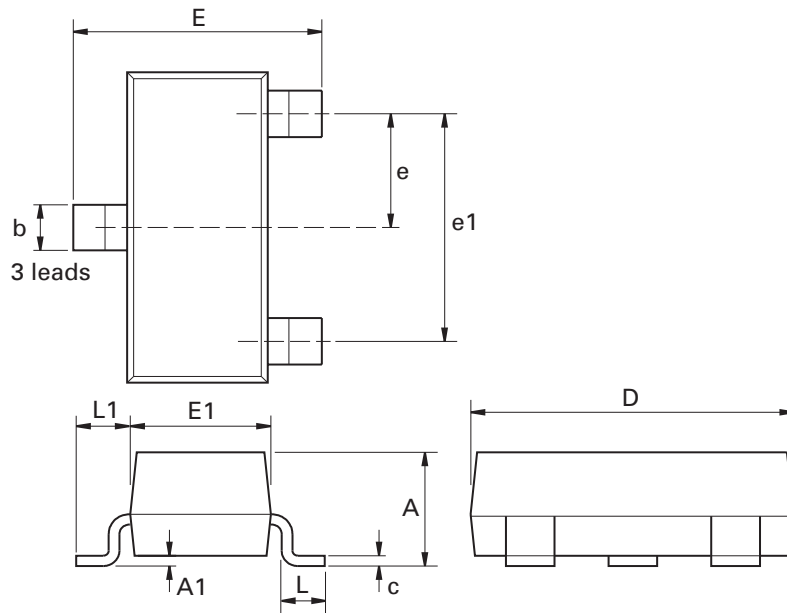
**Switching time waveforms**



**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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