优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Summary

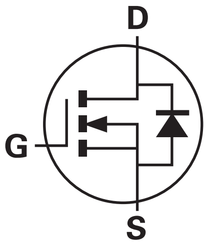
$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.045 @ V_{GS}= 4.5V	4.9
	0.065 @ V_{GS}= 2.5V	4.1

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

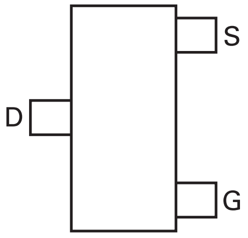


Applications

- 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
NK-ZXMN2F30FHTA	7	8	3000



Top view

Device marking

KNC

Absolute maximum ratings

Parameter	**Symbol**	**Limit**	**Unit**
Drain source voltage	V_{DSS}	20	V
Gate source voltage	V_{GS}	±12	V
Continous Drain Current @ V_{GS}=4.5; T_A=25°C$^{(b)}$ @ V_{GS}=4.5; T_A=70°C$^{(b)}$ @ V_{GS}=4.5; T_A=25°C$^{(a)}$	I_D	4.9 4.0 4.1	A A A
Pulsed drain current$^{(c)}$	I_{DM}	22.6	A
Continuous source current (body diode)$^{(b)}$	I_S	1.6	A
Pulsed source current (body diode)$^{(c)}$	I_{SM}	22.6	A
Power dissipation at T_A =25°C$^{(a)}$ Linear derating factor	P_D	0.96 7.6	W mW/°C
Power dissipation at T_A =25°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$^{(a)}$	$R_{\Theta JA}$	131	°C/W
Junction to ambient$^{(b)}$	$R_{\Theta JA}$	89	°C/W
Junction to Lead$^{(d)}$	$R_{\Theta JL}$	68	°C/W

NOTES:

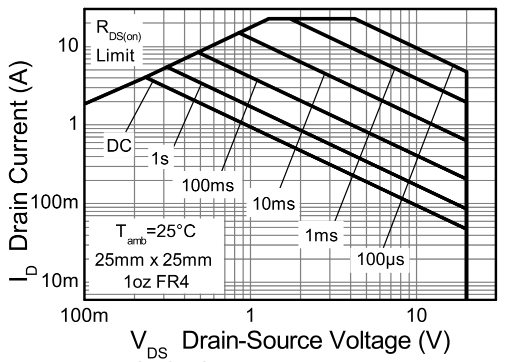
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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

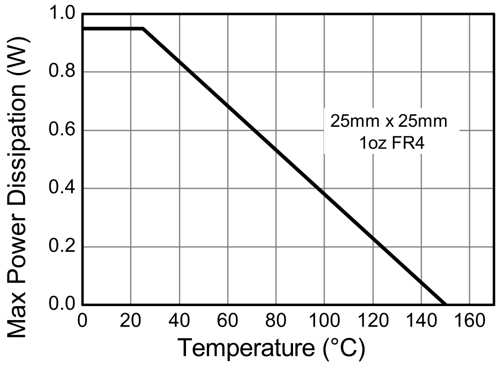
(c) Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300µs - pulse width limited by maximum junction temperature.

(d) Thermal resistance from junction to solder-point (at the end of the drain lead).

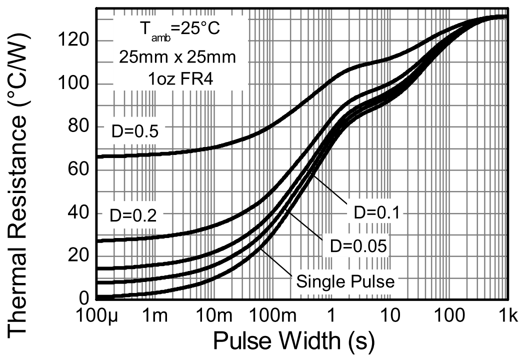
Thermal characteristics



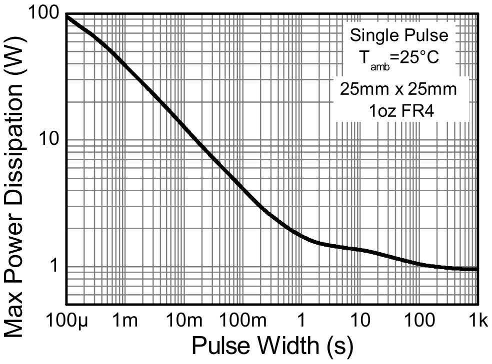
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	I_D= 250μA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	V_{DS}= 20V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±12V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.6	0.9	1.5	V	I_D= 250μA, V_{DS}=V_{GS}
Static Drain-Source On-State Resistance (*)	$R_{DS(on)}$			0.045 0.065	Ω Ω	V_{GS}= 4.5V, I_D= 2.5A V_{GS}= 2.5V, I_D= 2.0A
Forward Transconductance(*)(†)	g_{fs}		8.6		S	V_{DS}= 10V, I_D= 3A
Dynamic (†)						
Input Capacitance	C_{iss}		452		pF	V_{DS}= 10V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		102		pF	
Reverse Transfer Capacitance	C_{rss}		58		pF	
Switching (‡)(†)						
Turn-On-Delay Time	$t_{d(on)}$		2.9		ns	V_{DD}= 10V, V_{GS}= 4.5V I_D= 1A R_G ≈ 6.0Ω
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}= 10V, V_{GS}= 4.5V I_D= 3.5A
Gate-Source Charge	Q_{gs}		1		nC	
Gate Drain Charge	Q_{gd}		1.2		nC	
Source-drain diode						
Diode Forward Voltage(*)	V_{SD}		0.75	1.2	V	I_S= 1.25A, V_{GS}=0V

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤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}

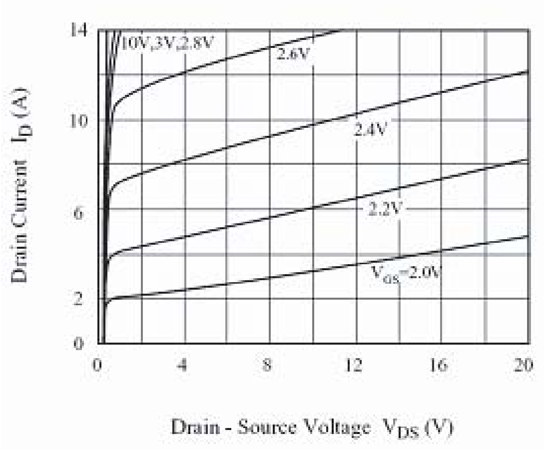


Fig2. $R_{DS(on)}$ - I_D

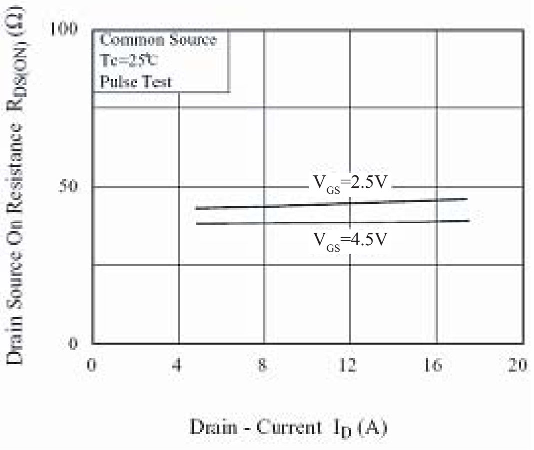


Fig3. I_D - V_{GS}

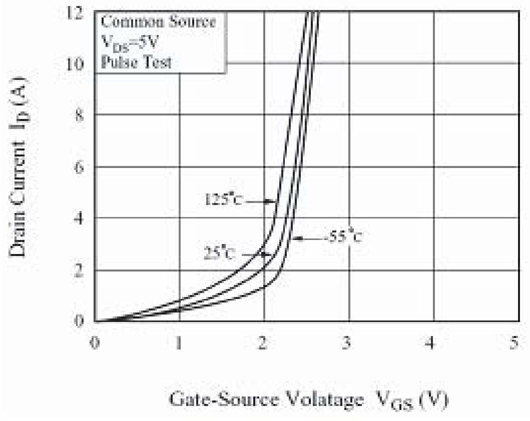


Fig4. $R_{DS(on)}$-T_j

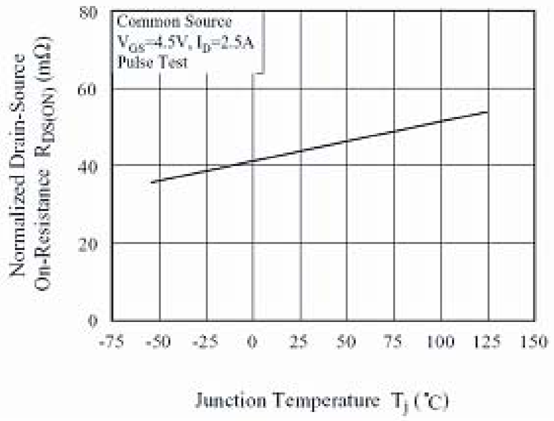


Fig5. V_{th}-T_j

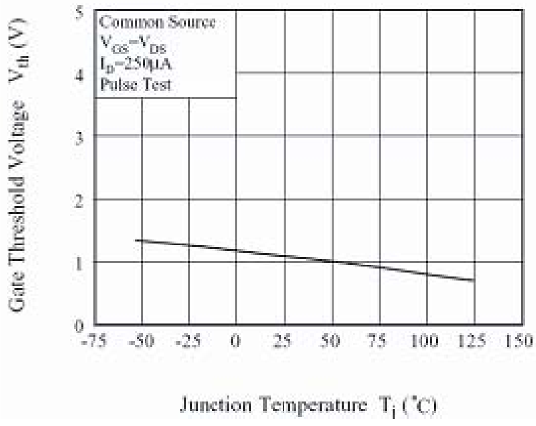
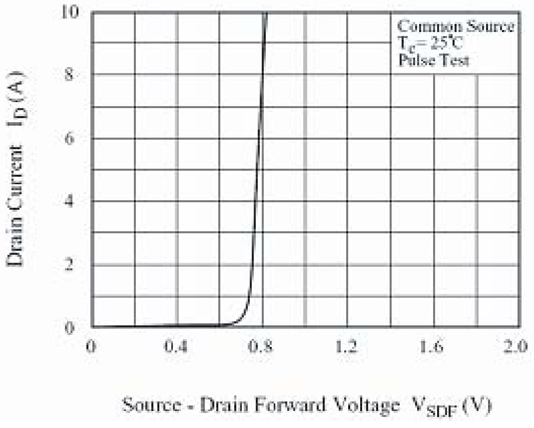
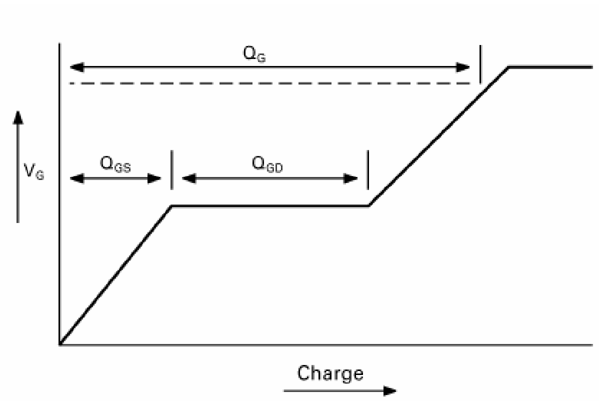


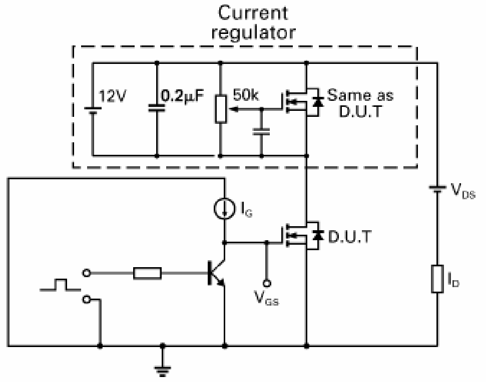
Fig6. I_S-V_{SDF}



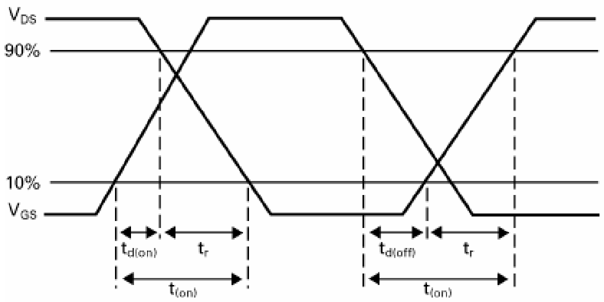
Test circuits



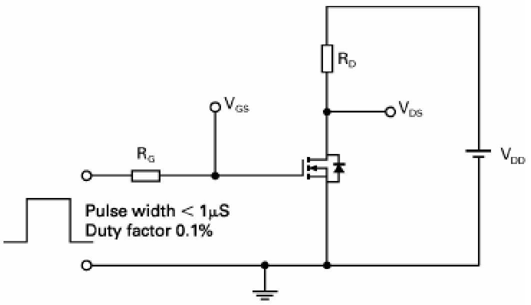
Basic gate charge waveform



Gate charge test circuit

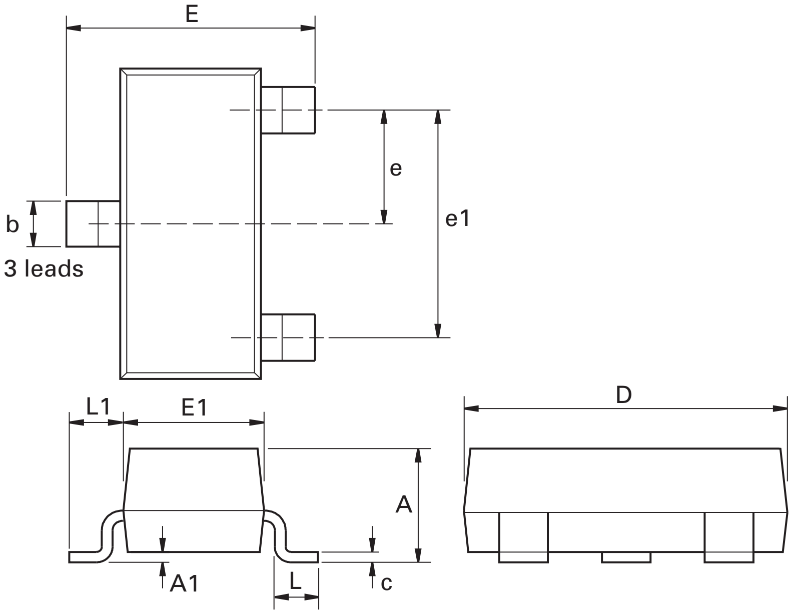


Switching time waveforms



Switching time test circuit

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