



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)
30	0.028 @ $V_{GS}= 10V$	7.1
	0.045 @ $V_{GS}= 4.5V$	5.6



Description

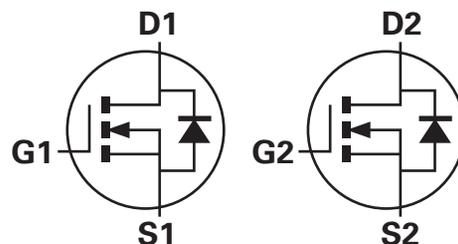
This new generation Trench MOSFET from Zetex features low on-resistance and fast switching speed.

Features

- Low on-resistance
- 4.5V gate drive capability
- Fast switching bullet

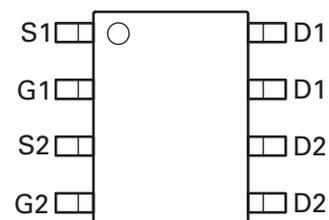
Applications

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



Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
NK-ZXMN3G32DN8TA	7	12	500



Device marking

NK-ZXMN

3G32D

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain source voltage	V_{DSS}	30	V
Gate source voltage	V_{GS}	± 20	V
Continuous Drain Current @ $V_{GS}=10$; $T_A=25^\circ\text{C}^{(b)}$ @ $V_{GS}=10$; $T_A=70^\circ\text{C}^{(b)}$ @ $V_{GS}=10$; $T_A=25^\circ\text{C}^{(a)}$	I_D	7.1	A
		5.7	A
		5.5	A
Pulsed drain current ^(c)	I_{DM}	33.6	A
Continuous source current (body diode) ^(b)	I_S	3.1	A
Pulsed source current (body diode) ^(c)	I_{SM}	33.6	A
Power dissipation at $T_A = 25^\circ\text{C}^{(a)(d)}$	P_D	1.25	W
Linear derating factor		10	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(a)(e)}$	P_D	1.8	W
Linear derating factor		14	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(b)(d)}$	P_D	2.1	W
Linear derating factor		17	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to 150	°C

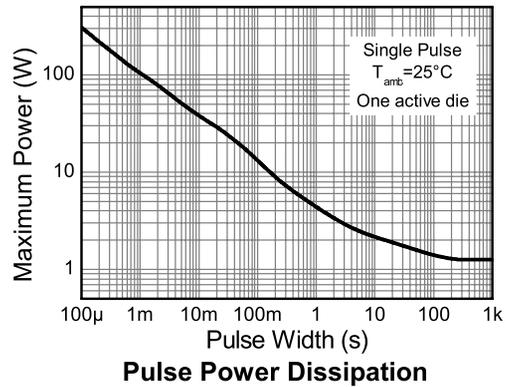
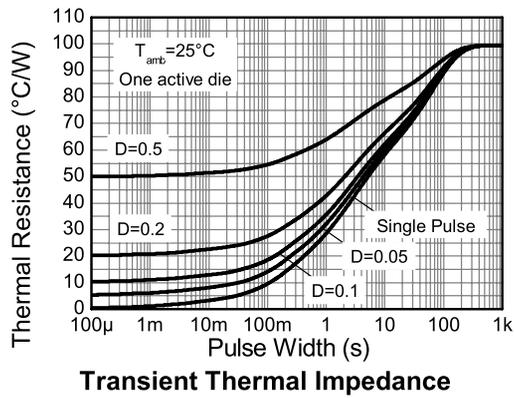
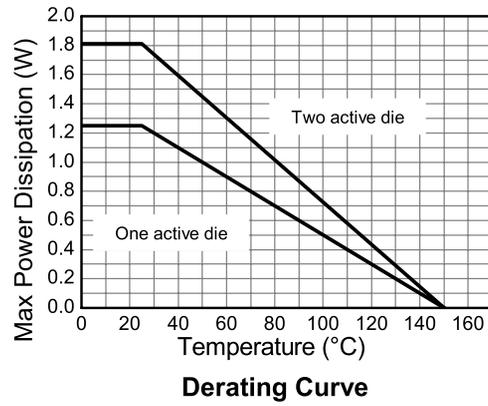
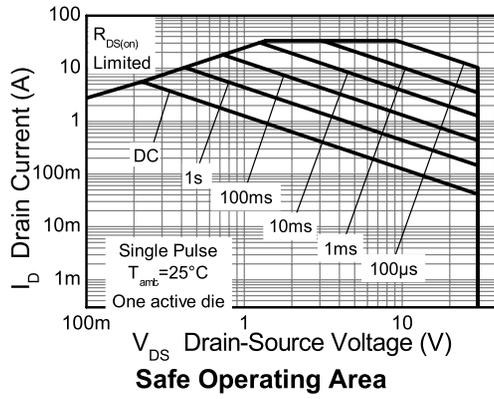
Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient ^{(a)(d)}	$R_{\theta JA}$	100	°C/W
Junction to ambient ^{(a)(e)}	$R_{\theta JA}$	70	°C/W
Junction to ambient ^{(b)(d)}	$R_{\theta JA}$	60	°C/W
Junction to lead ^(f)	$R_{\theta JL}$	51	°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 $t \leq 10$ sec.
- (c) Repetitive rating - 25mm x 25mm FR4 PCB, $D=0.02$, pulse width 300 μs - pulse width limited by maximum junction temperature.
- (d) For a dual device with one active die.
- (e) For a device with two active die running at equal power.
- (f) Thermal resistance from junction to solder-point (at end of drain lead).

Thermal characteristics



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}			0.5	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	$V_{GS(th)}$	1.0		3.0	V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (*)	$R_{DS(on)}$			0.028 0.045	Ω Ω	$V_{GS} = 10\text{V}$, $I_D = 6.0\text{A}$ $V_{GS} = 4.5\text{V}$, $I_D = 4.9\text{A}$
Forward Transconductance(*) (†)	g_{fs}		12		S	$V_{DS} = 15\text{V}$, $I_D = 6.0\text{A}$
Dynamic (†)						
Input Capacitance	C_{iss}		472		pF	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}		178		pF	
Reverse Transfer Capacitance	C_{rss}		65		pF	
Switching (‡)(†)						
Turn-On-Delay Time	$t_{d(on)}$		2.5		ns	$V_{DD} = 15\text{V}$, $I_D = 1\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = 10\text{V}$
Rise Time	t_r		3.1		ns	
Turn-Off Delay Time	$t_{d(off)}$		14		ns	
Fall Time	t_f		9.7		ns	
Total Gate Charge	Q_g		10.5		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 6\text{A}$
Gate-Source Charge	Q_{gs}		1.86		nC	
Gate Drain Charge	Q_{gd}		2.3		nC	
Source-drain diode						
Diode Forward Voltage(*)	V_{SD}		0.68	1.2	V	$T_j = 25^{\circ}\text{C}$, $I_S = 1.7\text{A}$, $V_{GS} = 0\text{V}$

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. $I_D - V_{DS}$

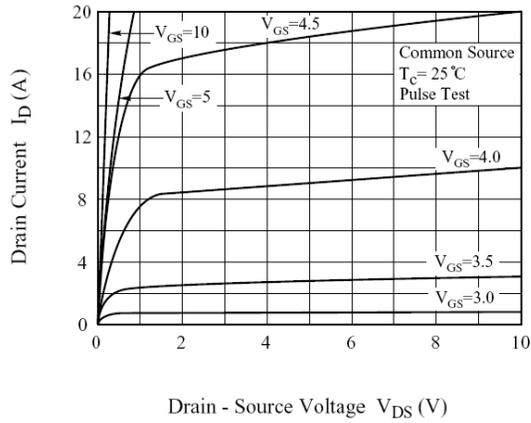


Fig3. $I_D - V_{GS}$

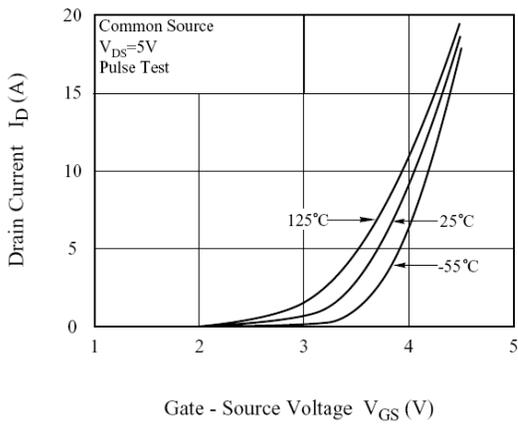


Fig5. $V_{th} - T_j$

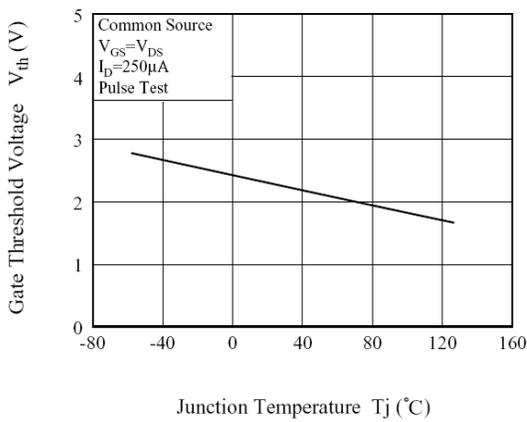


Fig2. $R_{DS(on)} - I_D$

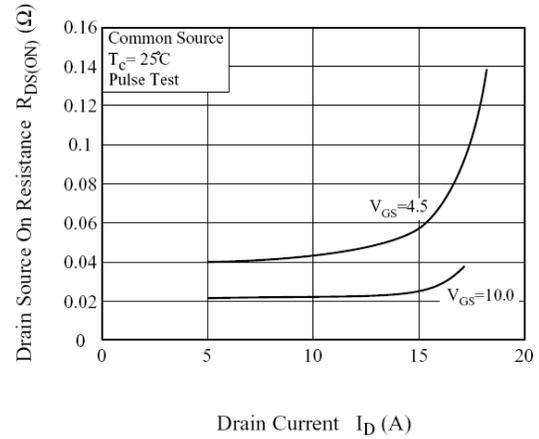


Fig4. $R_{DS(on)} - T_j$

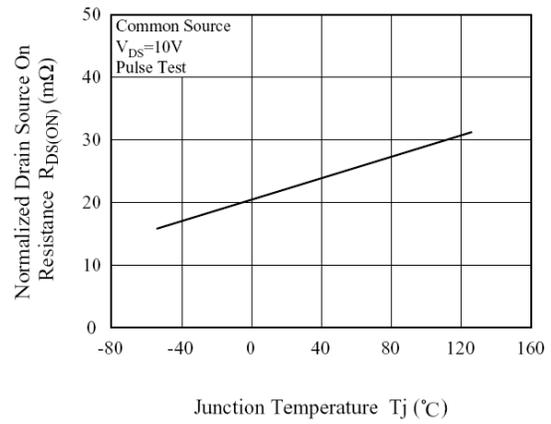
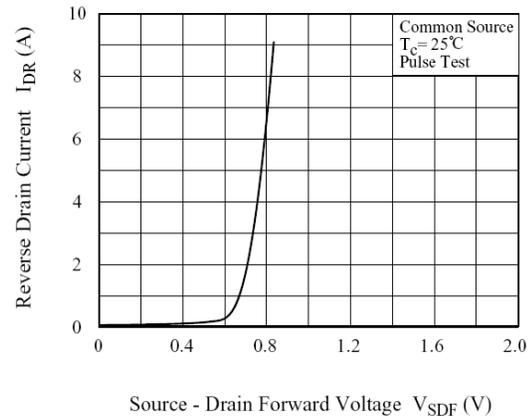
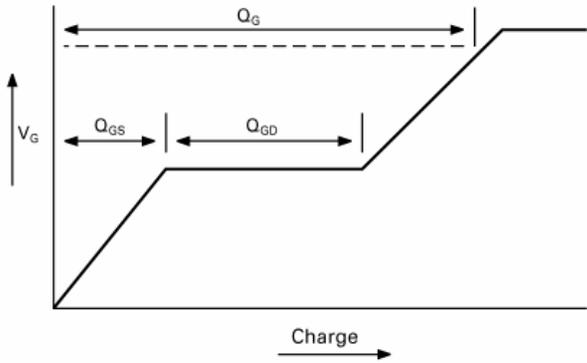


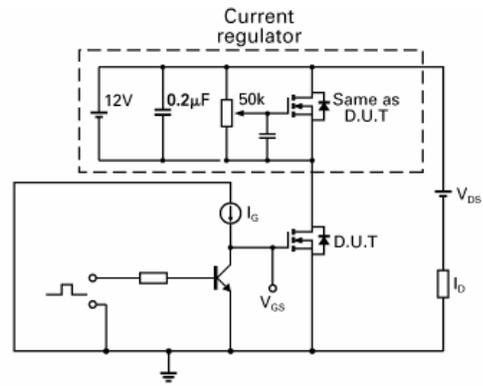
Fig6. $I_{DR} - V_{SDF}$



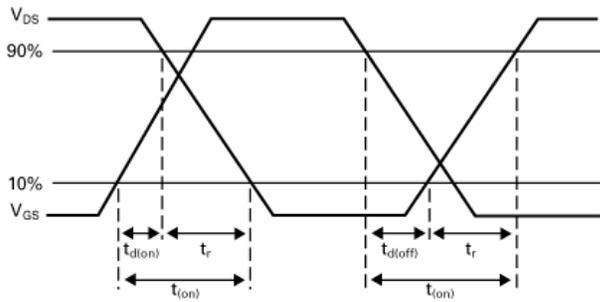
Test circuits



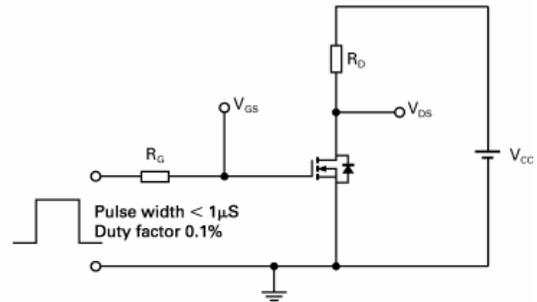
Basic gate charge waveform



Gate charge test circuit

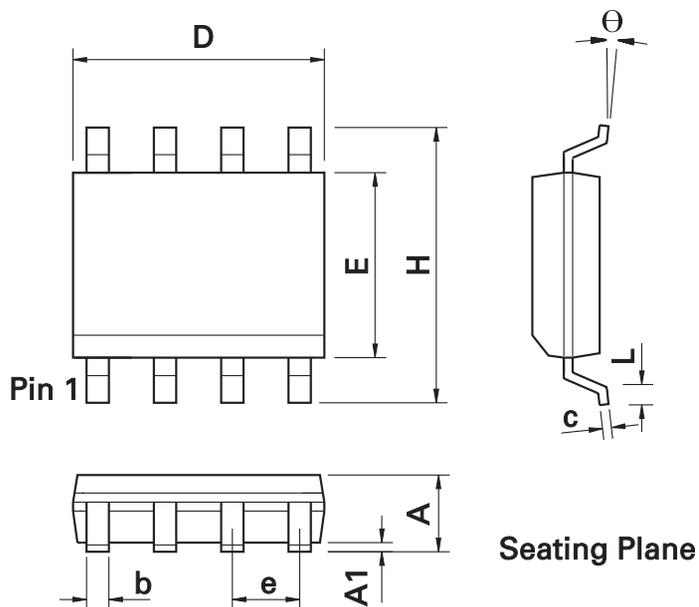


Switching time waveforms



Switching time test circuit

Package outline - SO8



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	Θ	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