ZXMN3F31DN8
30V SO8 dual N-channel enhancement mode MOSFET

Summary

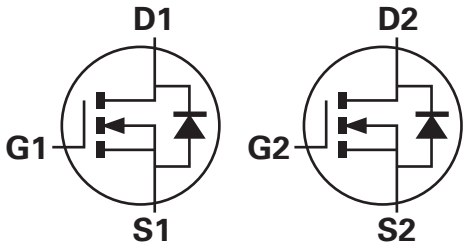
$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.024 @ V_{GS}= 10V	7.3
	0.039 @ V_{GS}= 4.5V	5.7

Description

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

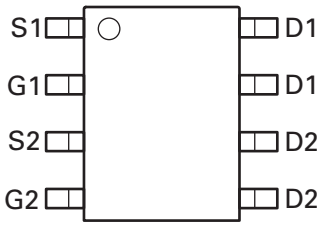
Features

- Low on-resistance
- 4.5V gate drive capability



Applications

- DC-DC Converters
- Power management functions
- Load switching
- Motor control
- Back lighting



Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN3F31DN8TA	7	12	500

Device marking

ZXMN

3F31D

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain source voltage	V_{DSS}	30	V
Gate source voltage	V_{GS}	±20	V
Continous Drain Current @ V_{GS}=10; T_A=25°C[b] @ V_{GS}=10; T_A=70°C[b] @ V_{GS}=10; T_A=25°C[a]	I_D	7.3 5.9 5.7	A A A
Pulsed drain current[c]	I_{DM}	33	A
Continuous source current (body diode)[b]	I_S	3	A
Pulsed source current (body diode)[c]	I_{SM}	33	A
Power dissipation at T_A =25°C[a][d] Linear derating factor	P_D	1.25 10	W mW/°C
Power dissipation at T_A =25°C[a][e] Linear derating factor	P_D	1.8 14	W mW/°C
Power dissipation at T_A =25°C[b][d] Linear derating factor	P_D	2.1 17	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][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]	$R_{\theta JL}$	53	°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 ≤ 10 sec.

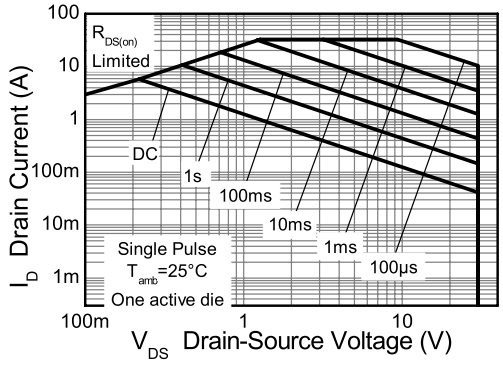
(c) Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs - pulse width limited by maximum junction temperature.

(d) For a dual device with one active die.

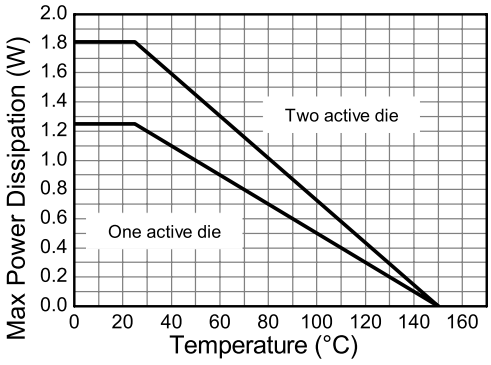
(e) For a device with two active die running at equal power.

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

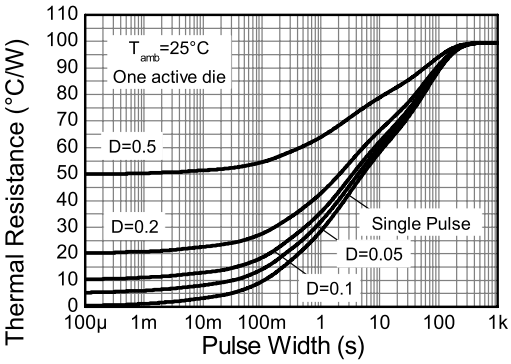
Thermal characteristics



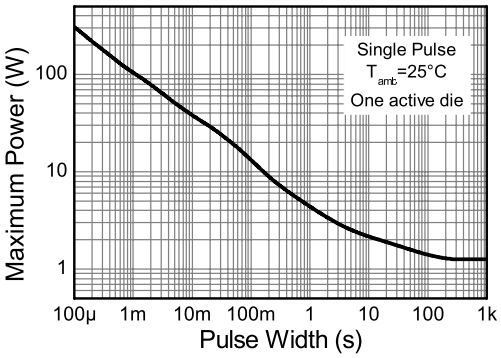
Safe Operating Area



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	$V_{(BR)DSS}$	30			V	I_D= 250μA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			0.5	μA	V_{DS}= 30V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0		3.0	V	I_D= 250μA, V_{DS}=V_{GS}
Static Drain-Source On-State Resistance (*)	$R_{DS(on)}$			0.024 0.039	Ω Ω	V_{GS}= 10V, I_D= 7.0A V_{GS}= 4.5V, I_D= 6.0A
Forward Transconductance(*)(†)	g_{fs}		16.5		S	V_{DS}= 15V, I_D= 7A
Dynamic (†)						
Input Capacitance	C_{iss}		608		pF	V_{DS}= 15V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		132		pF	
Reverse Transfer Capacitance	C_{rss}		71		pF	
Switching (‡)(†)						
Turn-On-Delay Time	$t_{d(on)}$		2.9		ns	V_{DD}= 15V, I_D= 1A $R_G \cong 6.0\Omega$, V_{GS}=10V
Rise Time	t_r		3.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		16		ns	
Fall Time	t_f		8		ns	
Total Gate Charge	Q_g		12.9		nC	V_{DS}= 15V, V_{GS}= 10V I_D= 7A
Gate-Source Charge	Q_{gs}		2.5		nC	
Gate Drain Charge	Q_{gd}		2.52		nC	
Source-drain diode						
Diode Forward Voltage(*)	V_{SD}		0.82	1.2	V	T_j=25°C, I_S= 1.7A, 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}

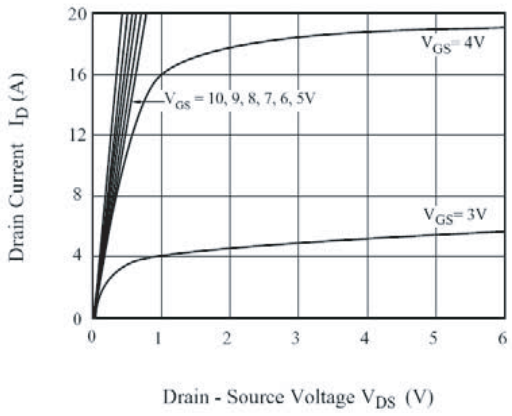


Fig2. I_D - V_{GS}

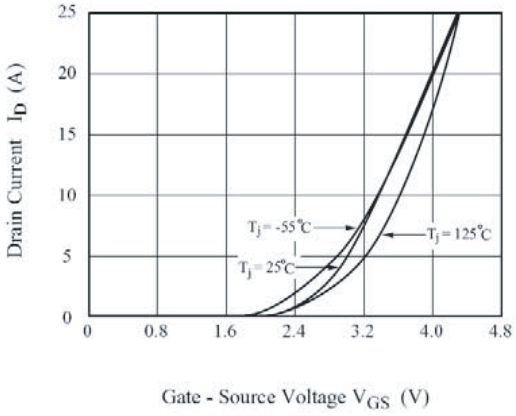


Fig3. V_{th} - T_j

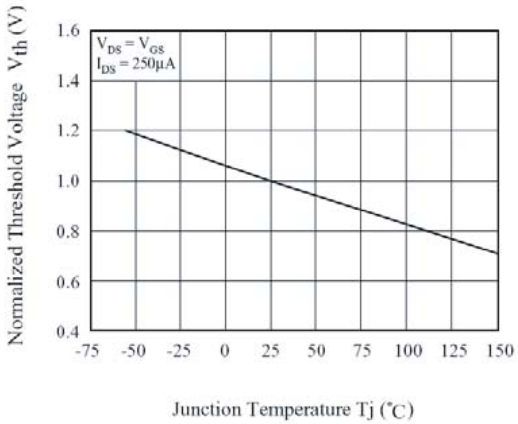


Fig4. I_{DR} - V_{SD}

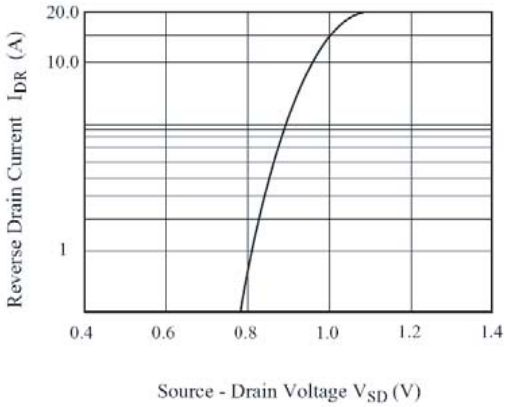
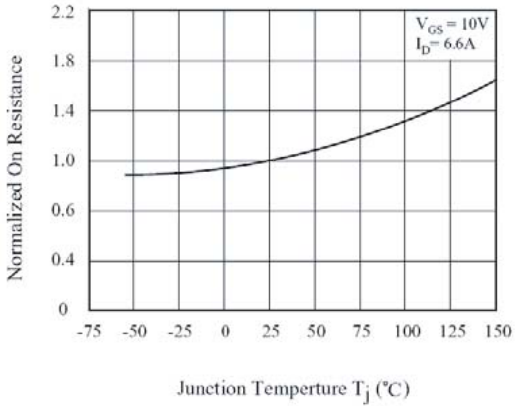
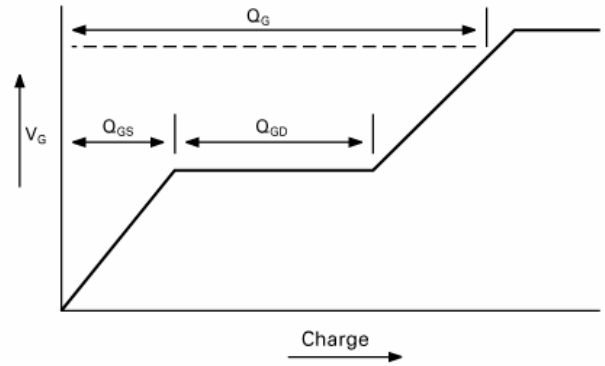


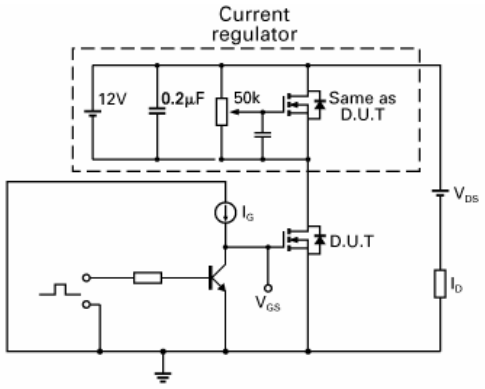
Fig5. $R_{DS(ON)}$ - T_j



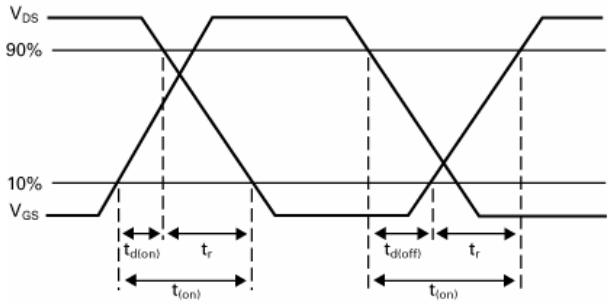
Test circuits



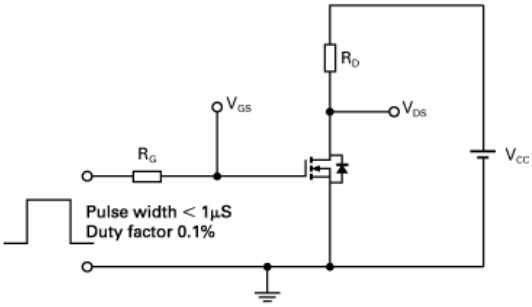
Basic gate charge waveform



Gate charge test circuit

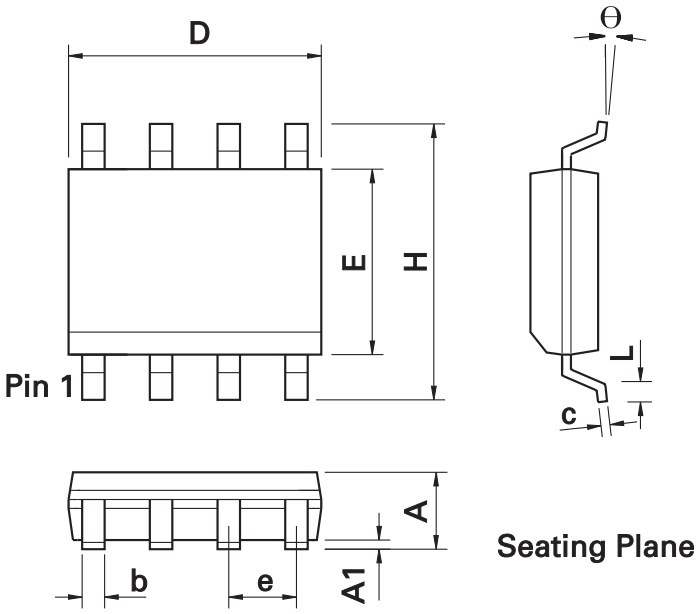


Switching time waveforms



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

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