ZXMN3B14F

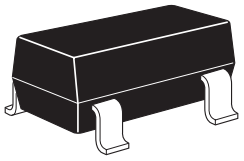
30V N-CHANNEL ENHANCEMENT MODE MOSFET 2.5V GATE DRIVE

SUMMARY

$V_{(BR)DSS}$=30V : $R_{DS(on)}$=0.08Ω; I_D=3.5A

DESCRIPTION

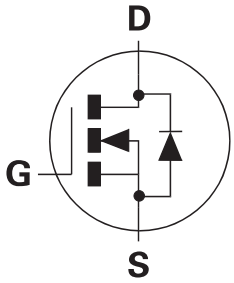
This new generation of Trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



PACKAGE

FEATURES

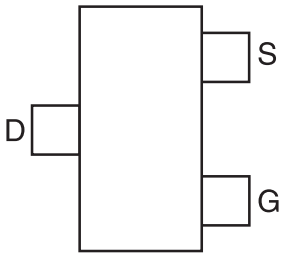
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23 package



APPLICATIONS

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control

PINOUT



ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN3B14FTA	7″	8mm	3,000 units
ZXMN3B14FTC	13″	8mm	10,000 units

DEVICE MARKING

- 3B4

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current @ V_{GS}= 4.5V; T_A=25°C (b) @ V_{GS}= 4.5V; T_A=70°C (b) @ V_{GS}= 4.5V; T_A=25°C (a)	I_D	3.5 2.9 2.9	A A A
Pulsed Drain Current (c)	I_{DM}	16	A
Continuous Source Current (Body Diode) (b)	I_S	2.4	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	16	A
Power Dissipation at T_A =25°C (a) Linear Derating Factor	P_D	1 8	W mW/°C
Power Dissipation at T_A =25°C (b) Linear Derating Factor	P_D	1.5 12	W mW/°C
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\Theta JA}$	125	°C/W
Junction to Ambient (b)	$R_{\Theta JA}$	83	°C/W

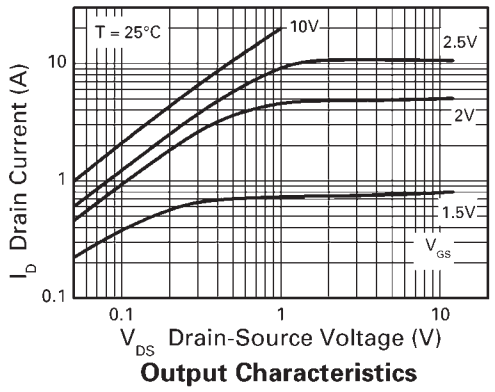
NOTES

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

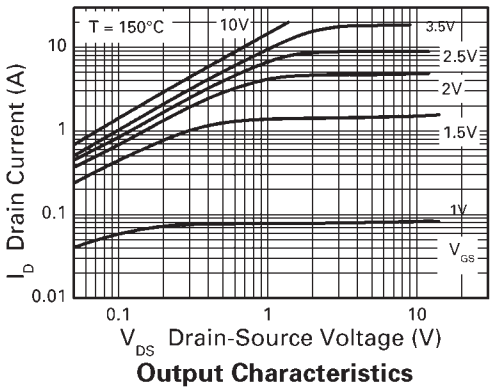
(b) For a device surface mounted on FR4 PCB measured at t ≤ 5 sec.

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

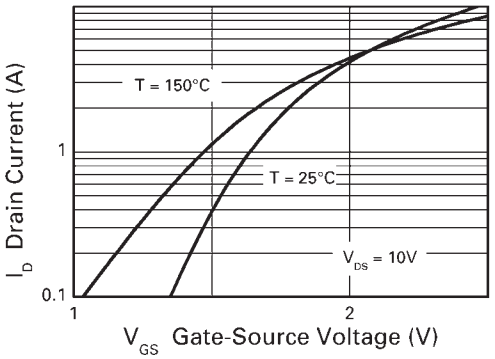
TYPICAL CHARACTERISTICS



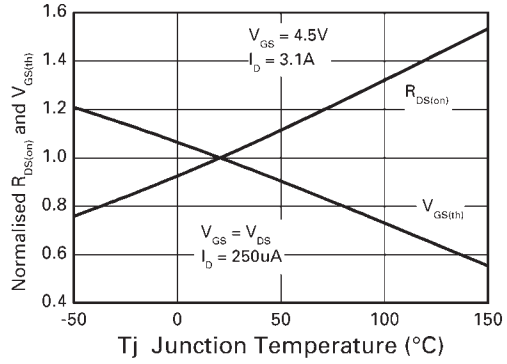
Output Characteristics



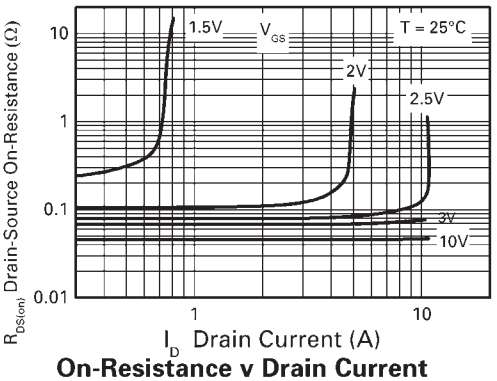
Output Characteristics



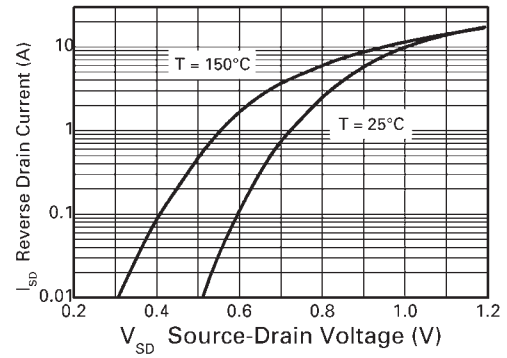
Typical Transfer Characteristics



Normalised Curves v Temperature



On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

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}			1	μA	V_{DS}= 30V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±12V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	I_D= 250μA, V_{DS}=V_{GS}
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.080 0.140	Ω Ω	V_{GS}= 4.5V, I_D= 3.1A V_{GS}= 2.5V, I_D= 2.2A
Forward Transconductance (1) (3)	g_{fs}		8.5		S	V_{DS}= 15V, I_D= 3.1A
DYNAMIC (3)						
Input Capacitance	C_{iss}		568		pF	V_{DS}= 15V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		101		pF	
Reverse Transfer Capacitance	C_{rss}		66		pF	
SWITCHING(2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		3.6		ns	V_{DD}= 15V, V_{GS}= 4.5V I_D= 1A $R_G \cong 6.0\Omega$
Rise Time	t_r		4.9		ns	
Turn-Off Delay Time	$t_{d(off)}$		17.3		ns	
Fall Time	t_f		9.8		ns	
Total Gate Charge	Q_g		6.7		nC	V_{DS}= 15V, V_{GS}= 4.5V I_D= 3.1A
Gate-Source Charge	Q_{gs}		1.4		nC	
Gate Drain Charge	Q_{gd}		1.8		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		0.82	0.95	V	T_j=25°C, I_S= 3.1A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		10.8		ns	T_j=25°C, I_F= 1.6A, di/dt=100A/μs
Reverse Recovery Charge (3)	Q_{rr}		4.54		nC	

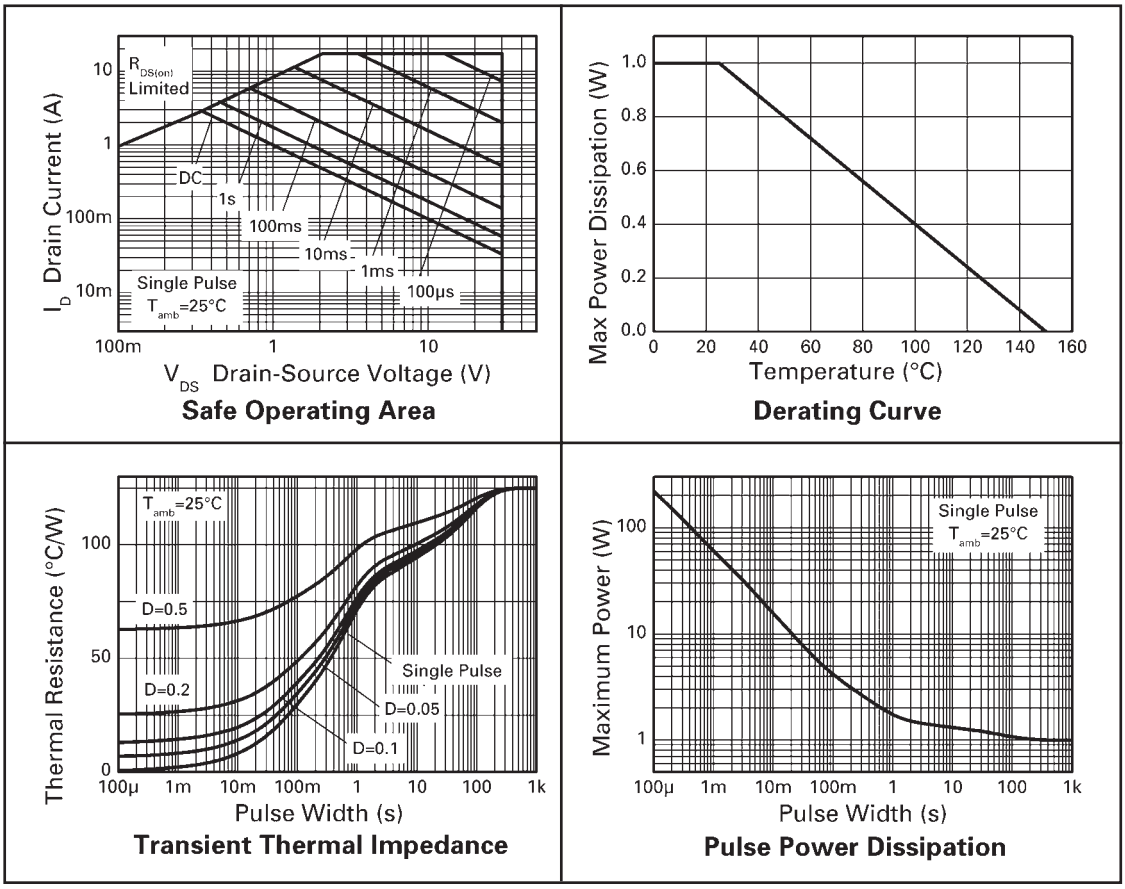
NOTES

(1) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤2%.

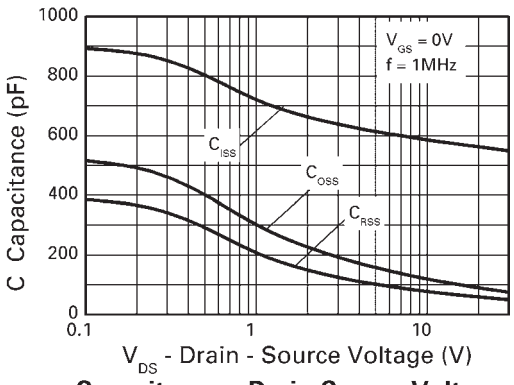
(2) Switching characteristics are independent of operating junction temperature.

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

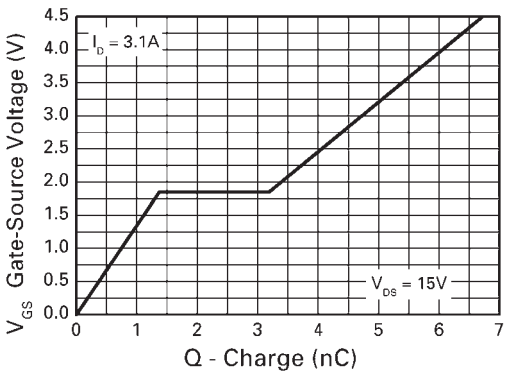
N-CHANNEL TYPICAL CHARACTERISTICS



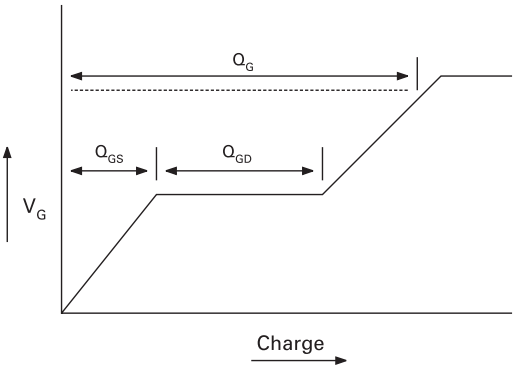
N-CHANNEL TYPICAL CHARACTERISTICS



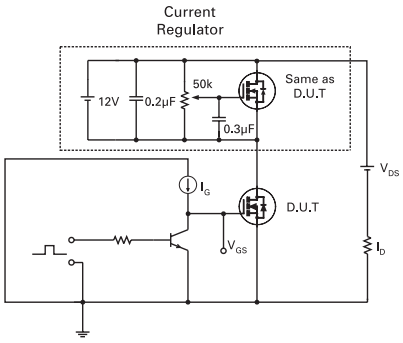
Capacitance v Drain-Source Voltage



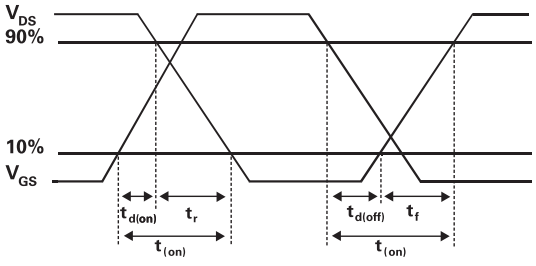
Gate-Source Voltage v Gate Charge



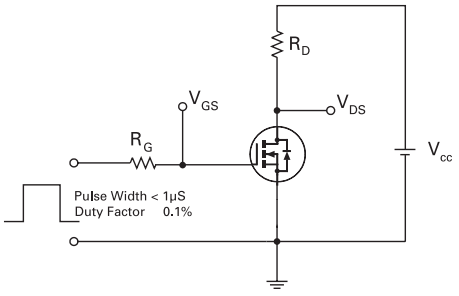
Basic Gate Charge Waveform



Gate Charge Test Circuit

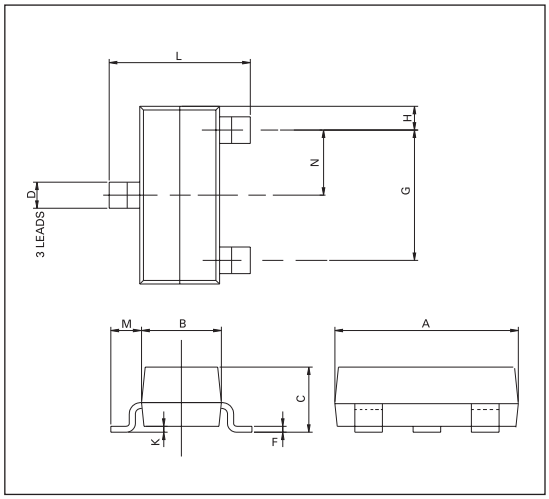


Switching Time Waveforms

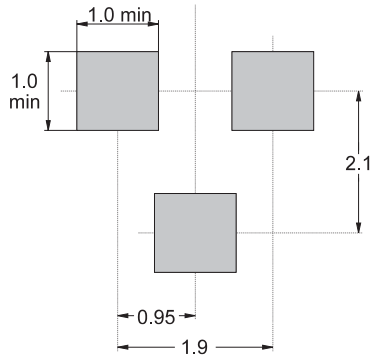


Switching Time Test Circuit

PACKAGE OUTLINE



PAD LAYOUT



SOT23 pattern.
Minimum Pad Size (dimensions in mm)

Controlling dimensions are in millimetres. Approximate conversions are given in inches

PACKAGE DIMENSIONS

DIM	MILLIMETRES		INCHES		DIM	MILLIMETRES		INCHES	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	—	1.10	—	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		θ	10° TYP		10° TYP	

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Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Hwy Hauppauge, NY 11788 USA	Zetex (Asia) Ltd 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park Chadderton, Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

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