ZXMN2A14F

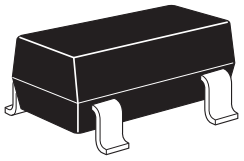
20V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS}$= 20V : $R_{DS(on)}$=0.06Ω; I_D= 4.1A

DESCRIPTION

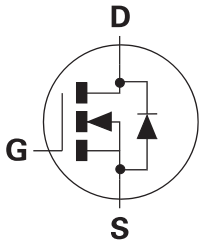
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SOT23

FEATURES

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



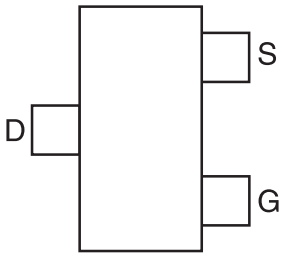
APPLICATIONS

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

ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN2A14FTA	7″	8mm	3000 units

PINOUT



DEVICE MARKING

- 214

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current @ V_{GS}=4.5V; T_A=25°C (b)	I_D	4.1	A
@ V_{GS}=4.5V; T_A=70°C (b)		3.3	A
@ V_{GS}=4.5V; T_A=25°C (a)		3.4	A
Pulsed Drain Current (c)	I_{DM}	19	A
Continuous Source Current (Body Diode) (b)	I_S	1.7	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	19	A
Power Dissipation at T_A =25°C (a)	P_D	1	W
Linear Derating Factor		8	mW/°C
Power Dissipation at T_A =25°C (b)	P_D	1.5	W
Linear Derating Factor		12	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)	$R_{\Theta JA}$	82	°C/W

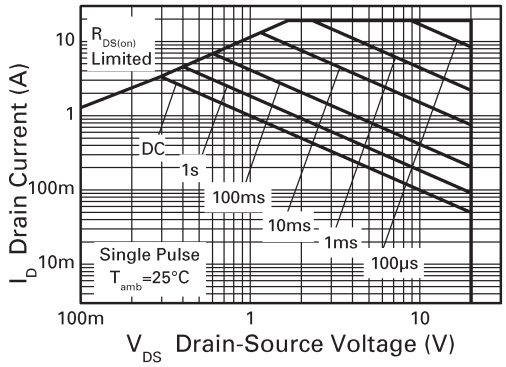
NOTES

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

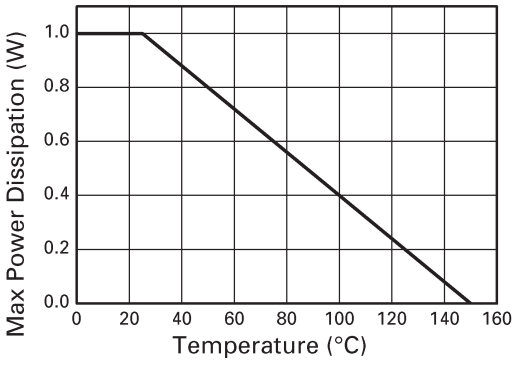
(b) For a device surface mounted on FR4 PCB measured at t ≤ 5 sec.

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

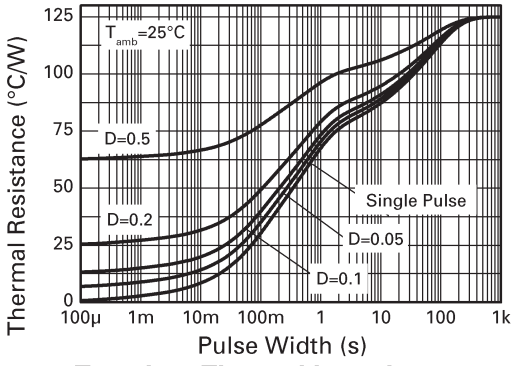
CHARACTERISTICS



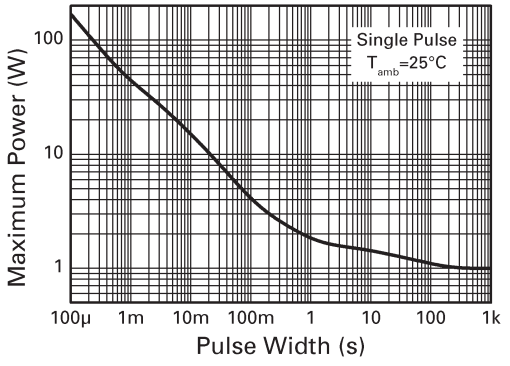
Safe Operating Area



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	$V_{GS(th)}$	0.7			V	I_D=250μA, V_{DS}= V_{GS}
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.060 0.110	Ω Ω	V_{GS}=4.5V, I_D=3.4A V_{GS}=2.5V, I_D=2.5A
Forward Transconductance (1) (3)	g_{fs}		9.4		S	V_{DS}=10V,I_D=3.4A
DYNAMIC (3)						
Input Capacitance	C_{iss}		544		pF	V_{DS}= 10V, V_{GS}=0V, f=1MHz
Output Capacitance	C_{oss}		132		pF	
Reverse Transfer Capacitance	C_{rss}		85		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		4.0		ns	V_{DD}= 10V, V_{GS}= 4.5V I_D= 1A $R_G \cong 6.0\Omega$
Rise Time	t_r		5.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		16.6		ns	
Fall Time	t_f		9.5		ns	
Total Gate Charge	Q_g		6.6		nC	V_{DS}=10V,V_{GS}= 4.5V, I_D=3.4A
Gate-Source Charge	Q_{gs}		1.2		nC	
Gate-Drain Charge	Q_{gd}		2.1		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		0.85	0.95	V	T_J=25°C, I_S=(3.3)A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		11.4		ns	T_J=25°C, I_F=(1.7)A, di/dt= 100A/μs
Reverse Recovery Charge (3)	Q_{rr}		4.6		nC	

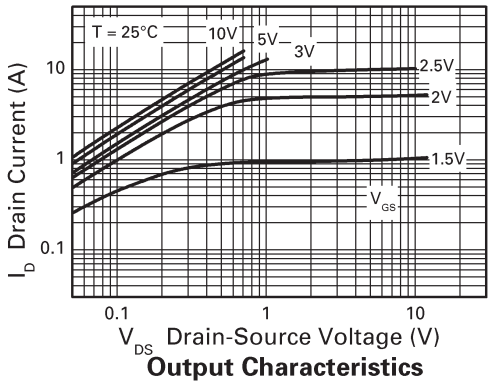
NOTES

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

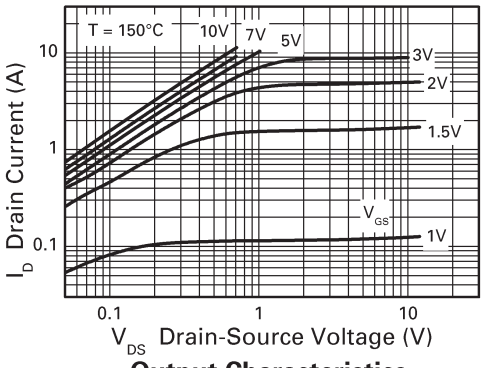
(2) Switching characteristics are independent of operating junction temperature.

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

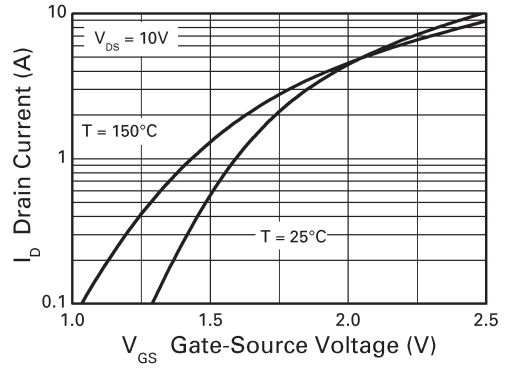
TYPICAL CHARACTERISTICS



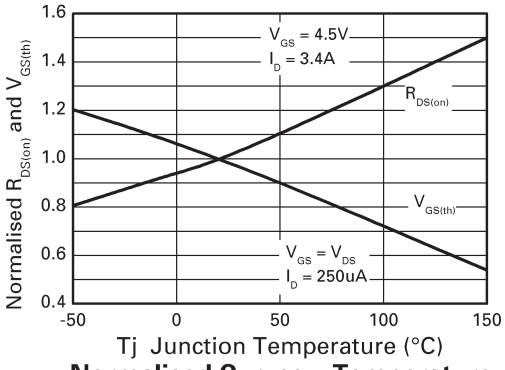
Output Characteristics



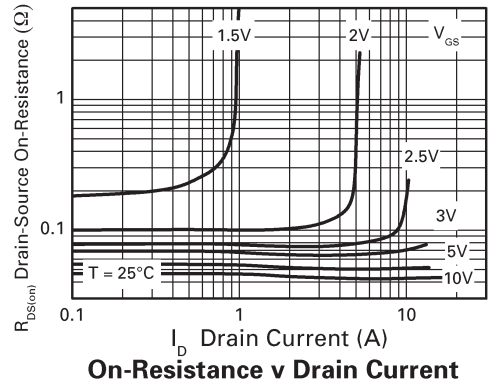
Output Characteristics



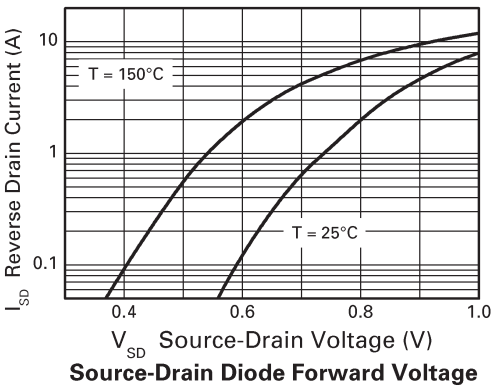
Typical Transfer Characteristics



Normalised Curves v Temperature

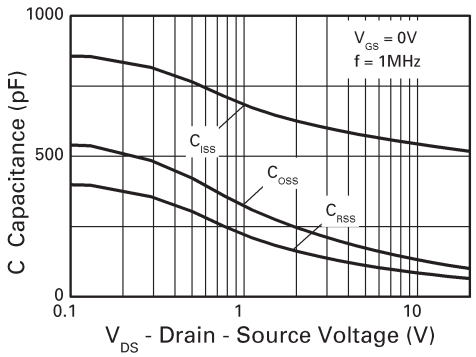


On-Resistance v Drain Current

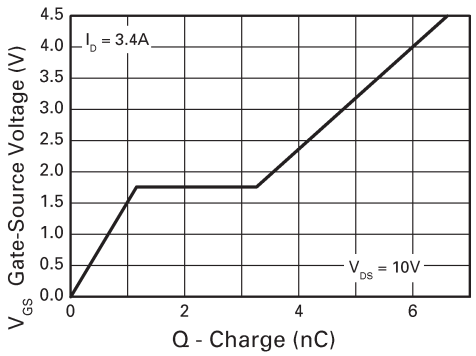


Source-Drain Diode Forward Voltage

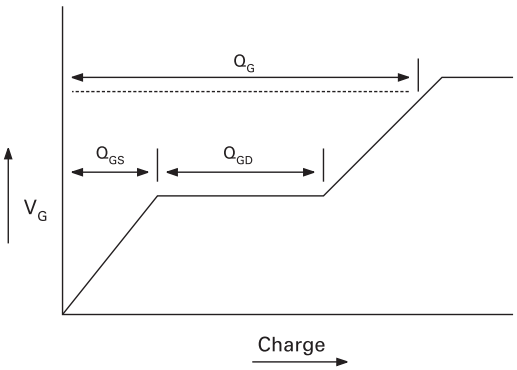
TYPICAL CHARACTERISTICS



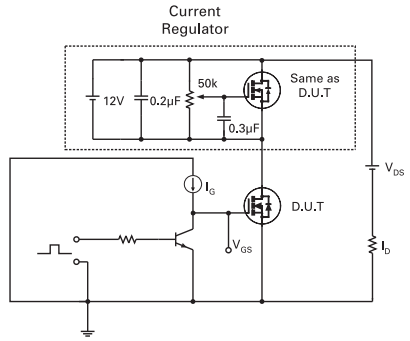
Capacitance v Drain-Source Voltage



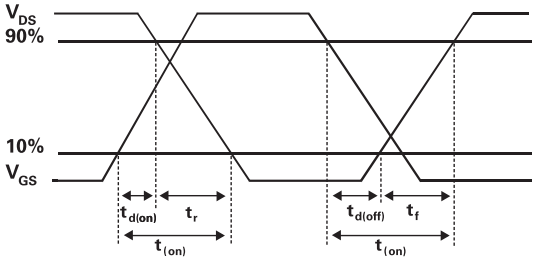
Gate-Source Voltage v Gate Charge



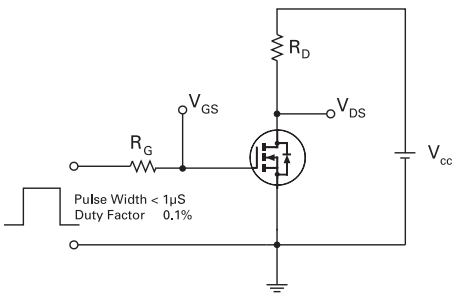
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



Switching Time Test Circuit

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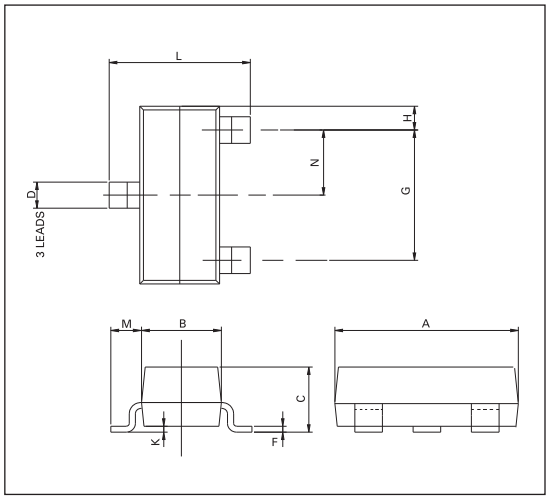
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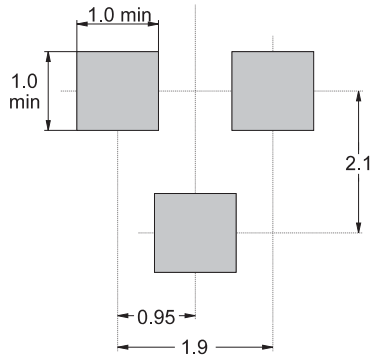
"Preview"Future device intended for production at some point. Samples may be available
"Active"Product status recommended for new designs
"Last time buy (LTB)"Device will be discontinued and last time buy period and delivery is in effect
"Not recommended for new designs"Device is still in production to support existing designs and production
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"Issue"This term denotes an issued datasheet containing finalized specifications. However, changes to specifications may occur, at any time and without notice.

ZXMN2A14F

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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