

# ZXMN2A14F

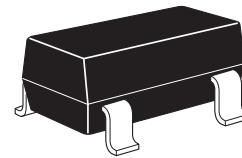
## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

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

### 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.



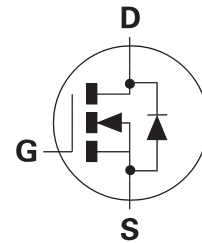
SOT23

### 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



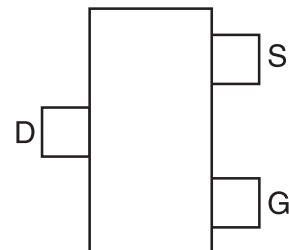
### ORDERING INFORMATION

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

### DEVICE MARKING

- 214

### PINOUT



# ZXMN2A14F

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current @ $V_{GS}=4.5V$ ; $T_A=25^\circ C$ <sup>(b)</sup>	$I_D$	4.1	A
@ $V_{GS}=4.5V$ ; $T_A=70^\circ C$ <sup>(b)</sup>		3.3	A
@ $V_{GS}=4.5V$ ; $T_A=25^\circ C$ <sup>(a)</sup>		3.4	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	19	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	1.7	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	19	A
Power Dissipation at $T_A=25^\circ C$ <sup>(a)</sup>	$P_D$	1	W
Linear Derating Factor		8	mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(b)</sup>	$P_D$	1.5	W
Linear Derating Factor		12	mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j, T_{stg}$	-55 to +150	$^\circ C$

## THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient <sup>(a)</sup>	$R_{\theta JA}$	125	$^\circ C/W$
Junction to Ambient <sup>(b)</sup>	$R_{\theta JA}$	82	$^\circ C/W$

### NOTES

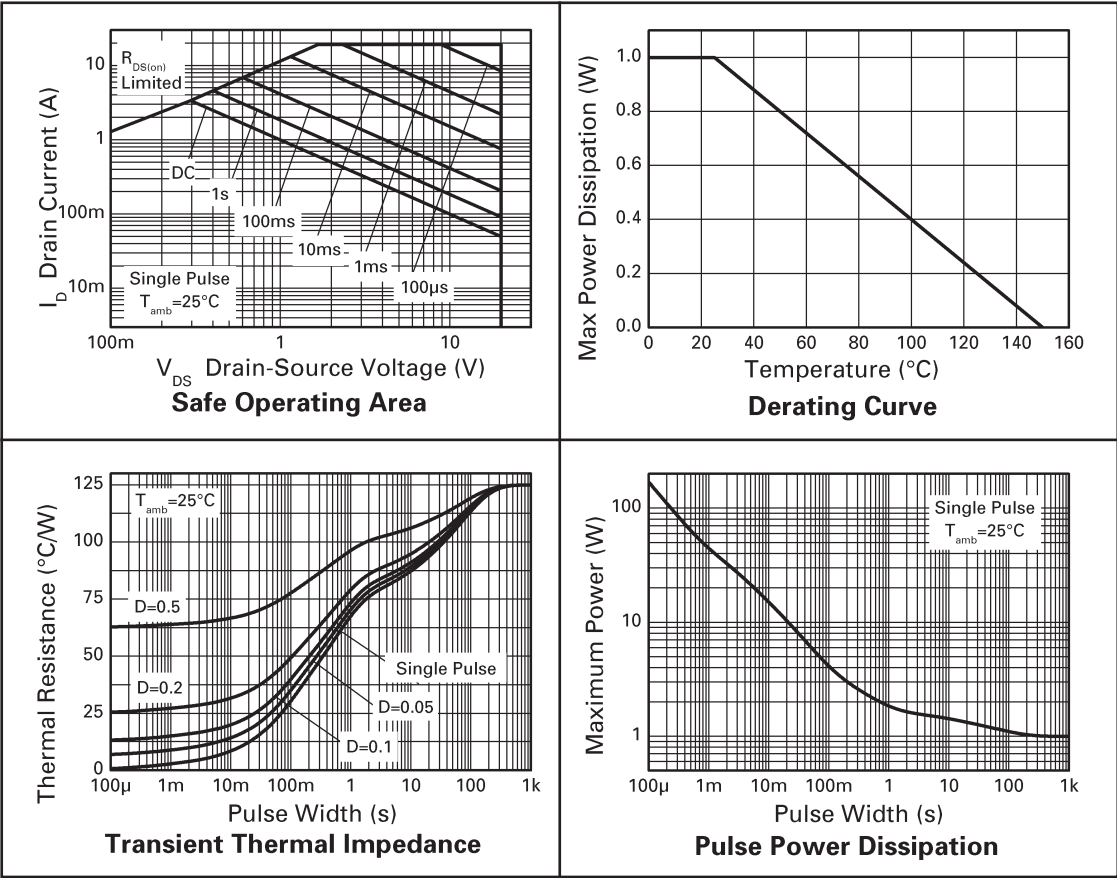
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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

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

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## CHARACTERISTICS



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## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

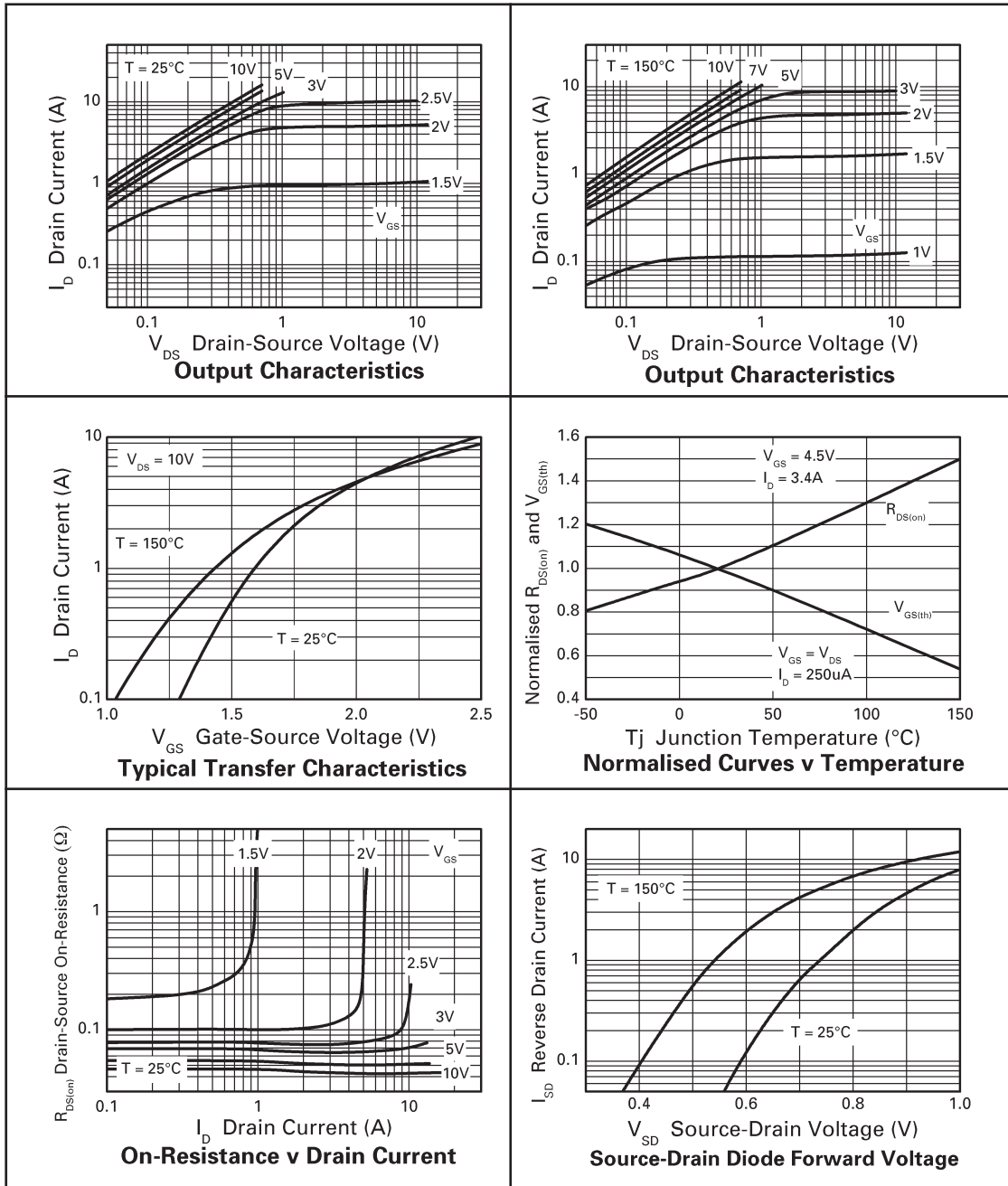
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu A$ , $V_{GS}=0V$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu A$	$V_{DS}=20V$ , $V_{GS}=0V$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 12V$ , $V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	$I_D=250\mu A$ , $V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			0.060	$\Omega$	$V_{GS}=4.5V$ , $I_D=3.4A$
				0.110	$\Omega$	$V_{GS}=2.5V$ , $I_D=2.5A$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		9.4		S	$V_{DS}=10V, I_D=3.4A$
DYNAMIC <sup>(3)</sup>						
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 <sup>(2) (3)</sup>						
Turn-On Delay Time	$t_{d(on)}$		4.0		ns	$V_{DD}=10V$ , $V_{GS}=4.5V$ $I_D=1A$ $R_G \equiv 6.0\Omega$
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 <sup>(1)</sup>	$V_{SD}$		0.85	0.95	V	$T_J=25^{\circ}C$ , $I_S=(3.3)A$ , $V_{GS}=0V$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		11.4		ns	$T_J=25^{\circ}C$ , $I_F=(1.7)A$ ,
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		4.6		nC	$di/dt=100A/\mu s$

### NOTES

- (1) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .  
 (2) Switching characteristics are independent of operating junction temperature.  
 (3) For design aid only, not subject to production testing.

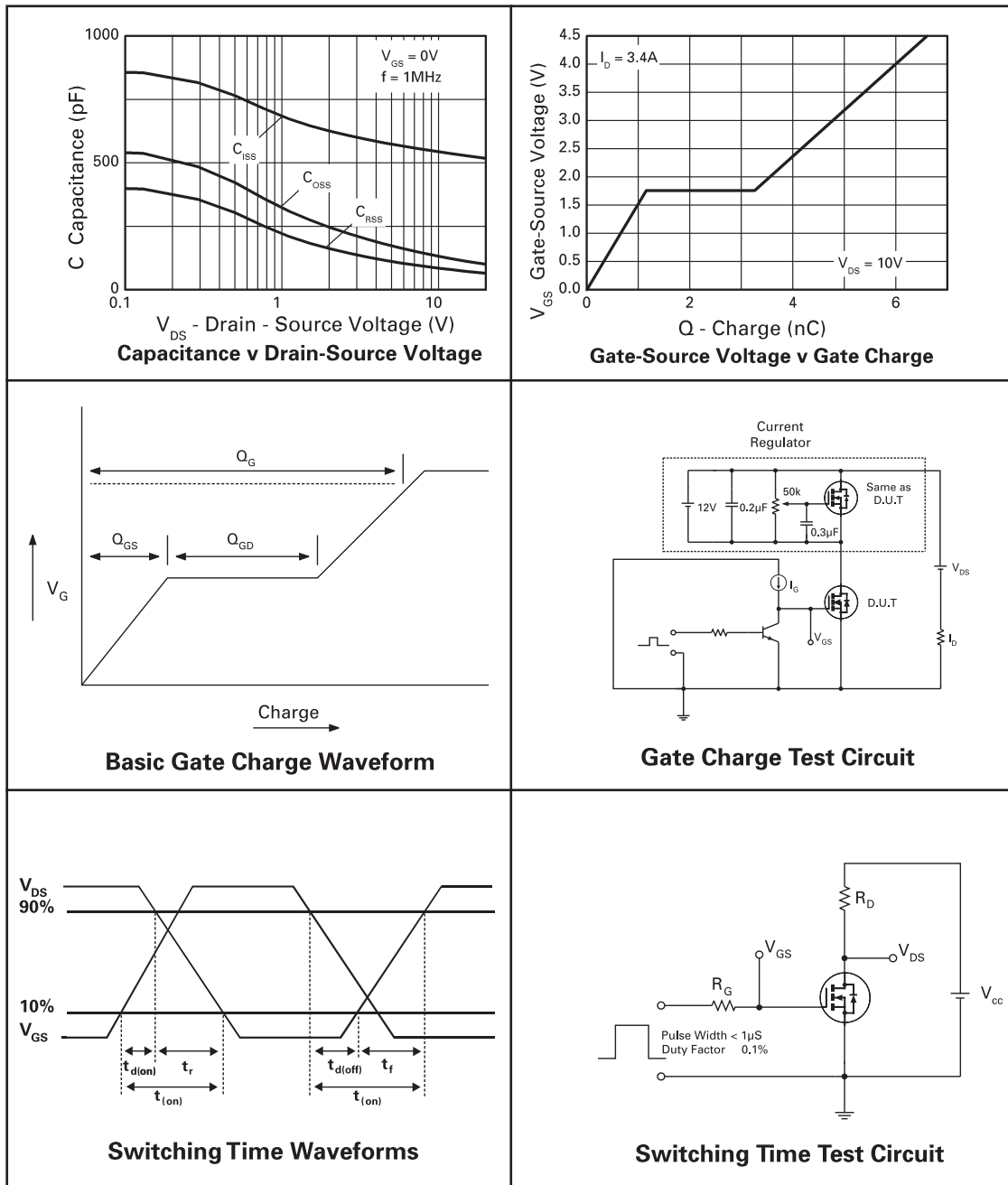
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## TYPICAL CHARACTERISTICS



# ZXMN2A14F

## TYPICAL CHARACTERISTICS



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"Preview"Future device intended for production at some point. Samples may be available

"Active"Product status recommended for new designs

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"Not recommended for new designs"Device is still in production to support existing designs and production

"Obsolete"Production has been discontinued

Datasheet status key:

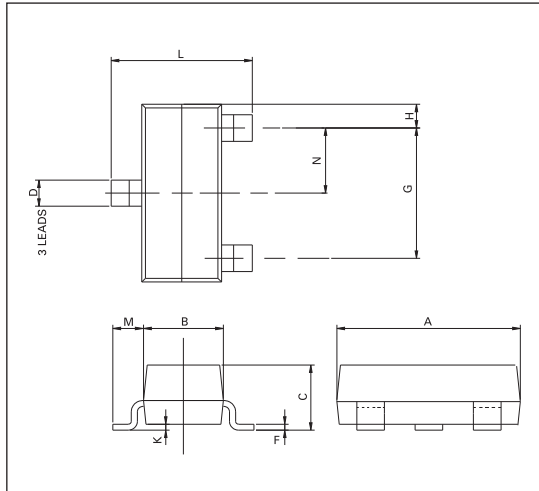
"Draft version" This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.

"Provisional version" This term denotes a pre-release datasheet. It provides a clear indication of anticipated performance. However, changes to the test conditions and specifications may occur, at any time and without notice.

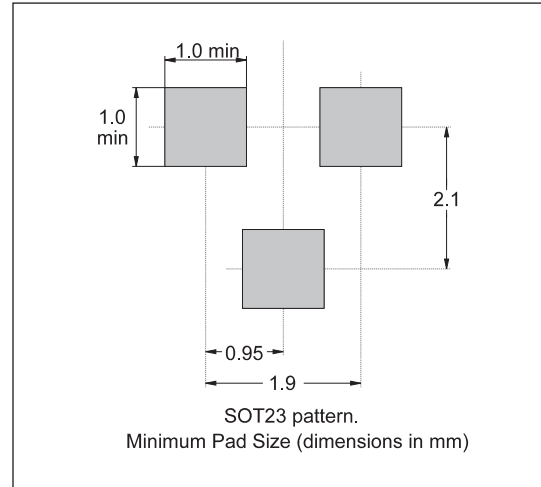
"Issue" This term denotes an issued datasheet containing finalized specifications. However, changes to specifications may occur, at any time and without notice.

# ZXMN2A14F

## PACKAGE OUTLINE



## PAD LAYOUT



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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