

# ZXMN2A14F

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## 20V N-CANNEL ENHANCEMENT MODE MOSFET

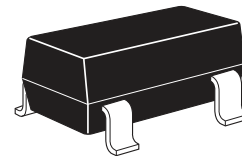
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### SUMMARY

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

### 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.



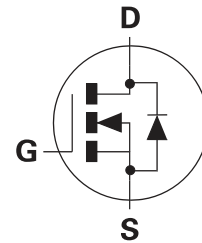
SOT23

### 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

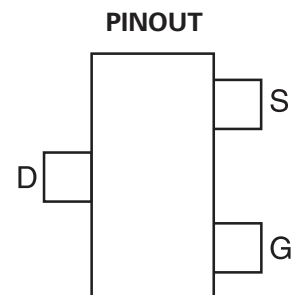


### ORDERING INFORMATION

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

### DEVICE MARKING

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# 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> @ $V_{GS}=4.5V$ ; $T_A=70^\circ C$ <sup>(b)</sup> @ $V_{GS}=4.5V$ ; $T_A=25^\circ C$ <sup>(a)</sup>	$I_D$	4.1	A
		3.3	A
		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

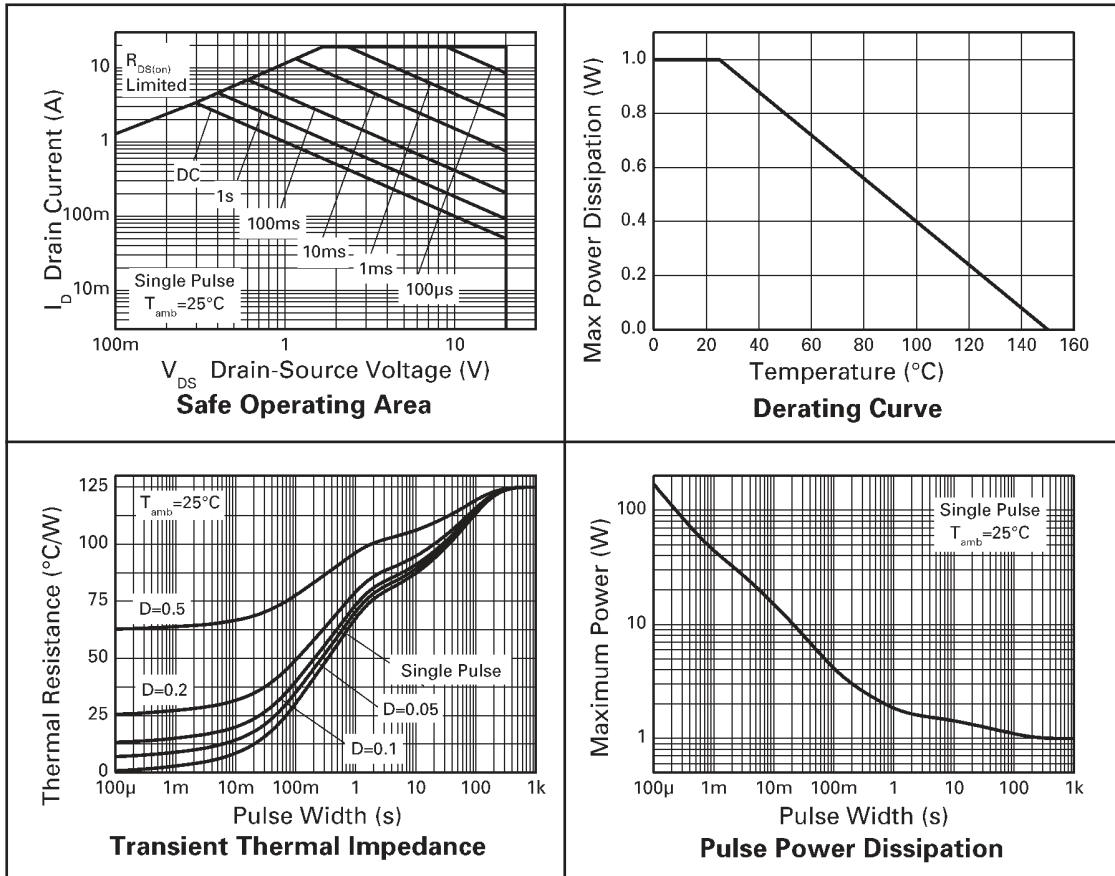
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient <sup>(a)</sup>	$R_{\theta JA}$	125	$^\circ C/W$
Junction to Ambient <sup>(b)</sup>	$R_{\theta JA}$	82	$^\circ C/W$

### 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.

# ZXMN2A14F

## CHARACTERISTICS



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

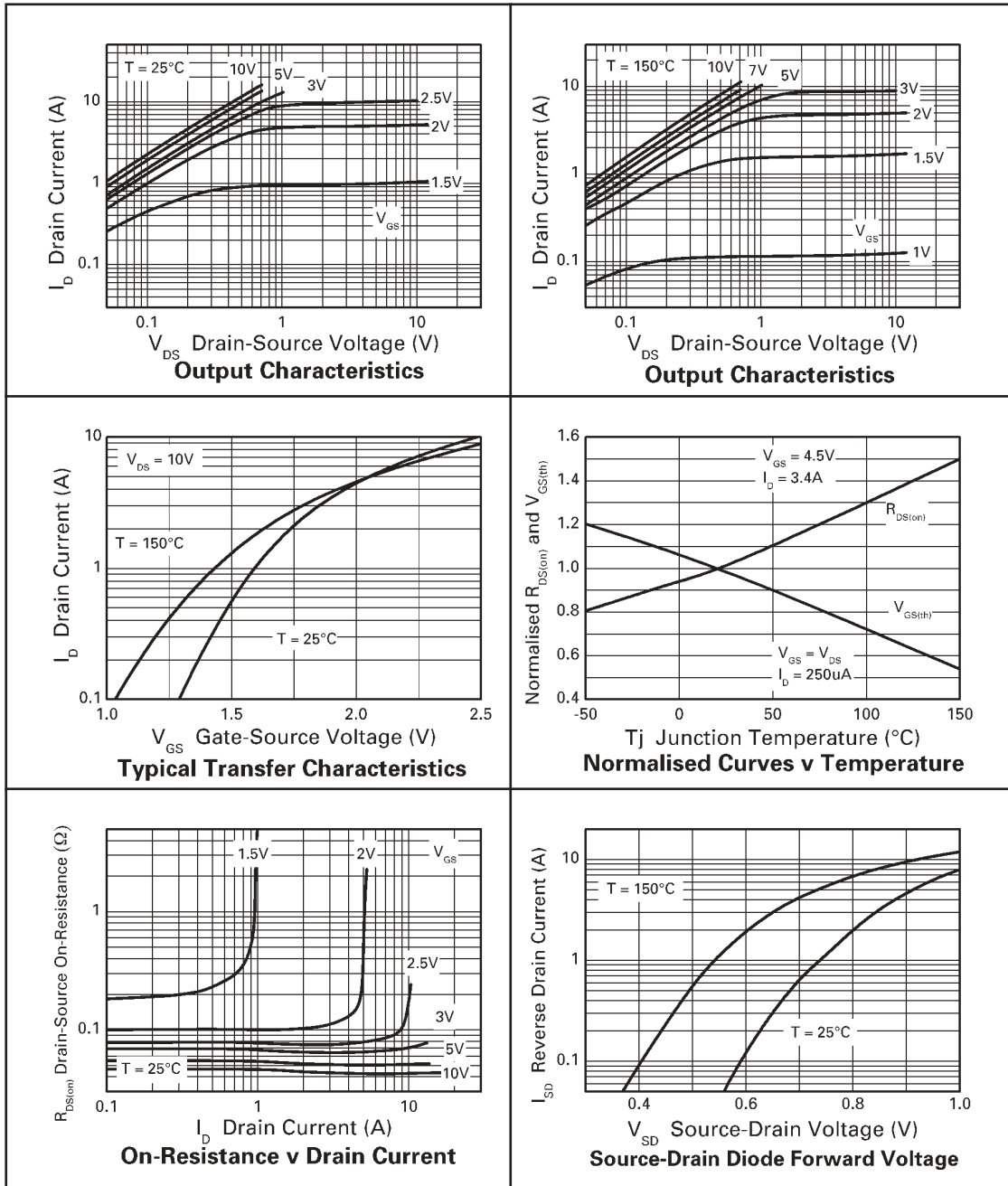
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			0.060	$\Omega$	$V_{GS}=4.5\text{V}, I_D=3.4\text{A}$
				0.110	$\Omega$	$V_{GS}=2.5\text{V}, I_D=2.5\text{A}$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		9.4		S	$V_{DS}=10\text{V}, I_D=3.4\text{A}$
<b>DYNAMIC</b> <sup>(3)</sup>						
Input Capacitance	$C_{iss}$		544		pF	$V_{DS}=10\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$		132		pF	
Reverse Transfer Capacitance	$C_{rss}$		85		pF	
<b>SWITCHING</b> <sup>(2) (3)</sup>						
Turn-On Delay Time	$t_{d(on)}$		4.0		ns	$V_{DD}=10\text{V}, V_{GS}=4.5\text{V}$ $I_D=1\text{A}$ $R_G \cong 6.0\Omega$
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	
Gate-Source Charge	$Q_{gs}$		1.2		nC	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V},$ $I_D=3.4\text{A}$
Gate-Drain Charge	$Q_{gd}$		2.1		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		0.85	0.95	V	$T_J=25^{\circ}\text{C}, I_S=(3.3)\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		11.4		ns	$T_J=25^{\circ}\text{C}, I_F=(1.7)\text{A},$
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		4.6		nC	$di/dt=100\text{A}/\mu\text{s}$

### 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.

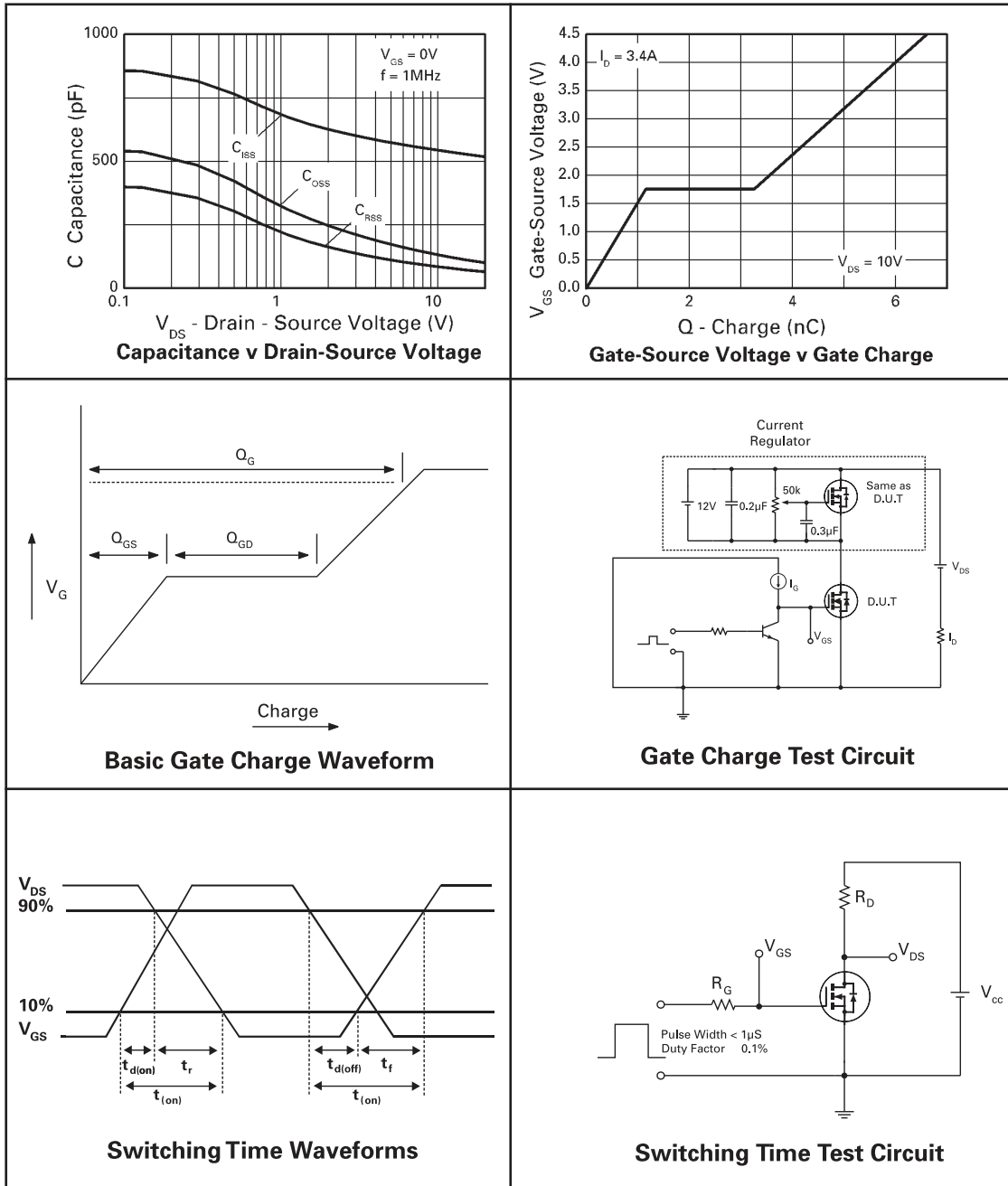
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## TYPICAL CHARACTERISTICS



# 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:

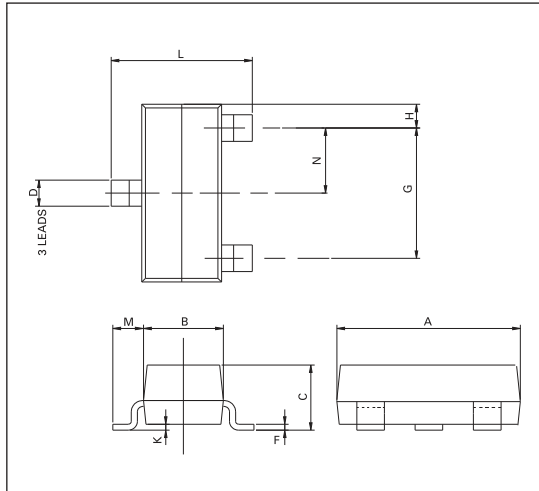
"Draft version" This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.

"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.

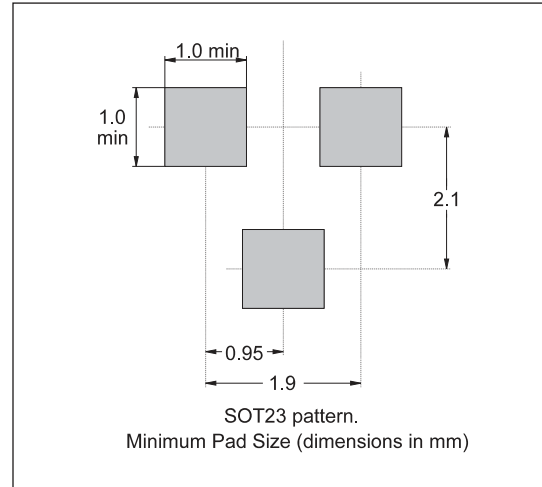
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## PACKAGE OUTLINE



## 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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ISSUE 3 - SEPTEMBER 2007