

# ZXMN2A14F

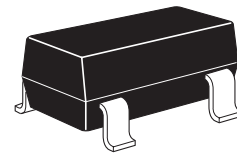
## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### 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.



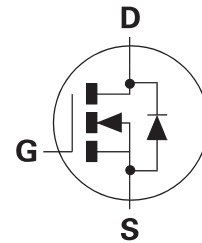
SOT23

### FEATURES

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

### APPLICATIONS

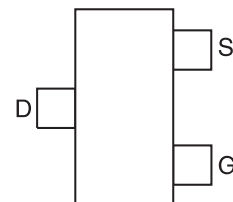
- DC-DC Converters
- Power Management functions
- Disconnect switches
- Motor control



### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN2A14FTA	7"	8mm	3000 units
ZXMN2A14FTC	13"	8mm	10000 units

### PINOUT



### 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>	$I_D$	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

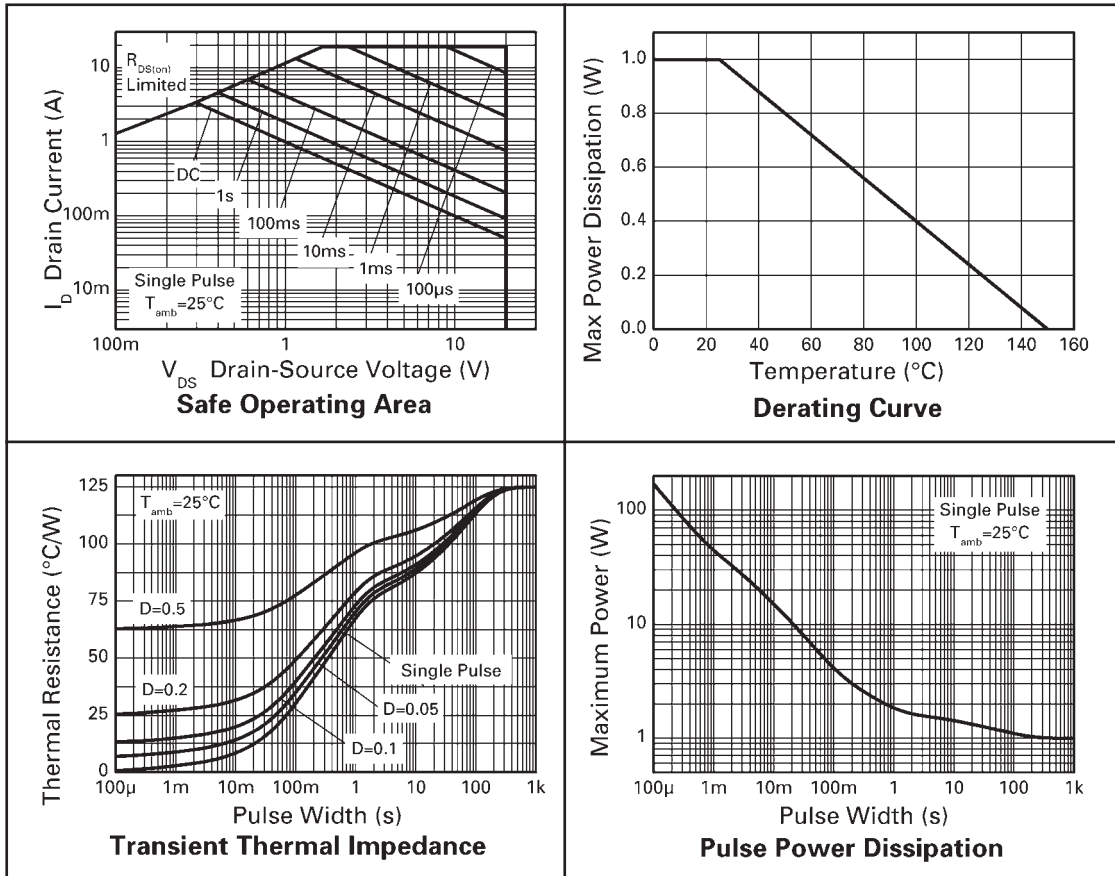
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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)

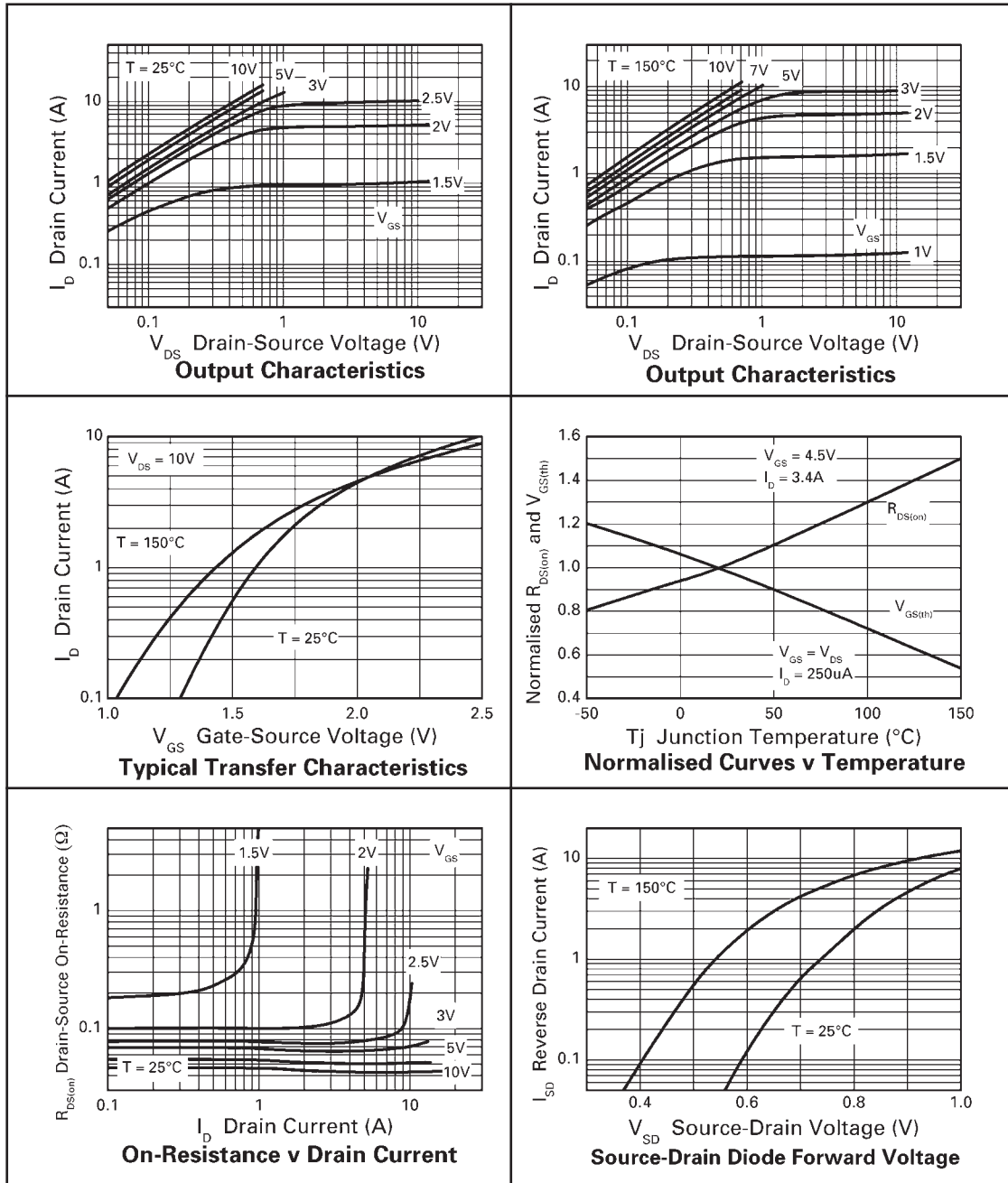
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	30			V	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	0.7			V	I <sub>D</sub> =250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-State Resistance <sup>(1)</sup>	R <sub>DS(on)</sub>			0.060	Ω	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.4A
				0.110	Ω	V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.5A
Forward Transconductance <sup>(1)</sup> <sup>(3)</sup>	g <sub>fs</sub>		9.4		S	V <sub>DS</sub> =10V, I <sub>D</sub> =3.4A
DYNAMIC <sup>(3)</sup>						
Input Capacitance	C <sub>iss</sub>		544		pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		132		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		85		pF	
SWITCHING <sup>(2)</sup> <sup>(3)</sup>						
Turn-On Delay Time	t <sub>d(on)</sub>		4.0		ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 1A R <sub>G</sub> ≡ 6.0Ω
Rise Time	t <sub>r</sub>		5.3		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		16.6		ns	
Fall Time	t <sub>f</sub>		9.5		ns	
Total Gate Charge	Q <sub>g</sub>		6.6		nC	V <sub>DS</sub> =10V,V <sub>GS</sub> = 4.5V, I <sub>D</sub> =3.4A
Gate-Source Charge	Q <sub>gs</sub>		1.2		nC	
Gate-Drain Charge	Q <sub>gd</sub>		2.1		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage <sup>(1)</sup>	V <sub>SD</sub>		0.85	0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> =(3.3)A, V <sub>GS</sub> =0V
Reverse Recovery Time <sup>(3)</sup>	t <sub>rr</sub>		11.4		ns	T <sub>J</sub> =25°C, I <sub>F</sub> =(1.7)A,
Reverse Recovery Charge <sup>(3)</sup>	Q <sub>rr</sub>		4.6		nC	di/dt= 100A/μs

### 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.

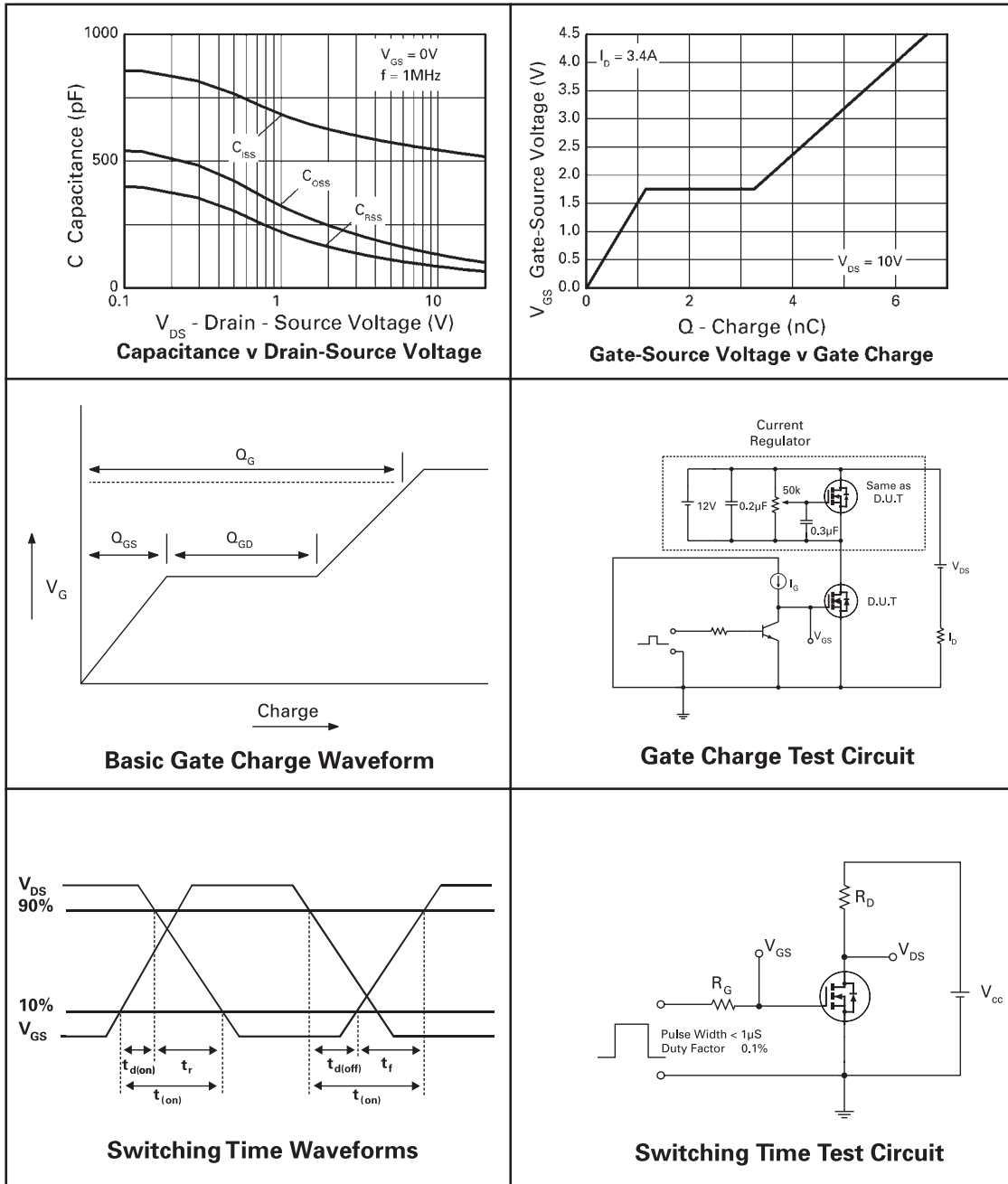
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## TYPICAL CHARACTERISTICS



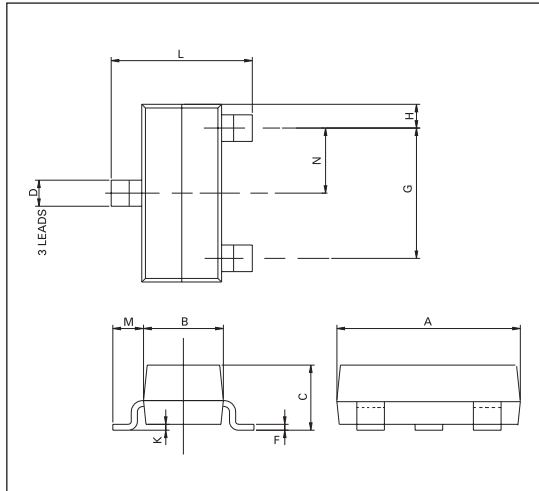
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## TYPICAL CHARACTERISTICS

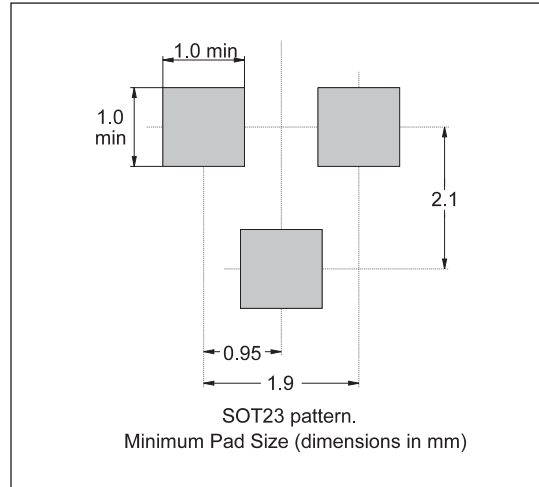


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## PACKAGE OUTLINE



## 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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### Europe

Zetex plc  
Fields New Road  
Chadderton  
Oldham, OL9 8NP  
United Kingdom  
Telephone (44) 161 622 4444  
Fax: (44) 161 622 4446  
hq@zetex.com

Zetex GmbH  
Streitfeldstraße 19  
D-81673 München  
Germany  
Telefon: (49) 89 45 49 49 0  
Fax: (49) 89 45 49 49 49  
europe.sales@zetex.com

### Americas

Zetex Inc  
700 Veterans Memorial Hwy  
Hauppauge, NY 11788  
USA  
Telephone: (1) 631 360 2222  
Fax: (1) 631 360 8222  
usa.sales@zetex.com

### Asia Pacific

Zetex (Asia) Ltd  
3701-04 Metroplaza Tower 1  
Hing Fong Road  
Kwai Fong  
Hong Kong  
Telephone: (852) 26100 611  
Fax: (852) 24250 494  
asia.sales@zetex.com

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