

# ZXMP3A13F

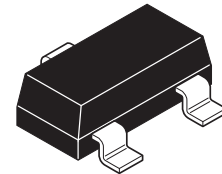
## 30V P-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS} = -30V$ ;  $R_{DS(ON)} = 0.21\Omega$ ;  $I_D = -1.6A$

### 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.



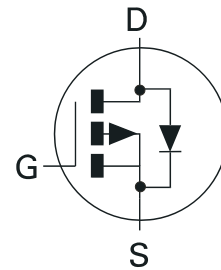
SOT23

### 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



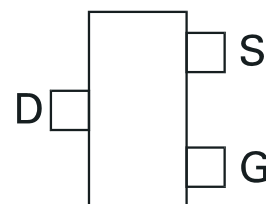
### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMP3A13FTA	7"	8mm	3000 units
ZXMP3A13FTC	13"	8mm	10000 units

### DEVICE MARKING

- 313

### PINOUT



Top View

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	-30	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current $V_{GS}=10V$ ; $T_A=25^\circ C$ (b) $V_{GS}=10V$ ; $T_A=70^\circ C$ (b) $V_{GS}=10V$ ; $T_A=25^\circ C$ (a)	$I_D$	-1.6 -1.3 -1.4	A
Pulsed Drain Current (c)	$I_{DM}$	-6	A
Continuous Source Current (Body Diode) (b)	$I_S$	-1.2	A
Pulsed Source Current (Body Diode) (c)	$I_{SM}$	-6	A
Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor	$P_D$	625 5	mW mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor	$P_D$	806 6.4	mW 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 (a)	$R_{\theta JA}$	200	$^\circ C/W$
Junction to ambient (b)	$R_{\theta JA}$	155	$^\circ C/W$

### NOTES

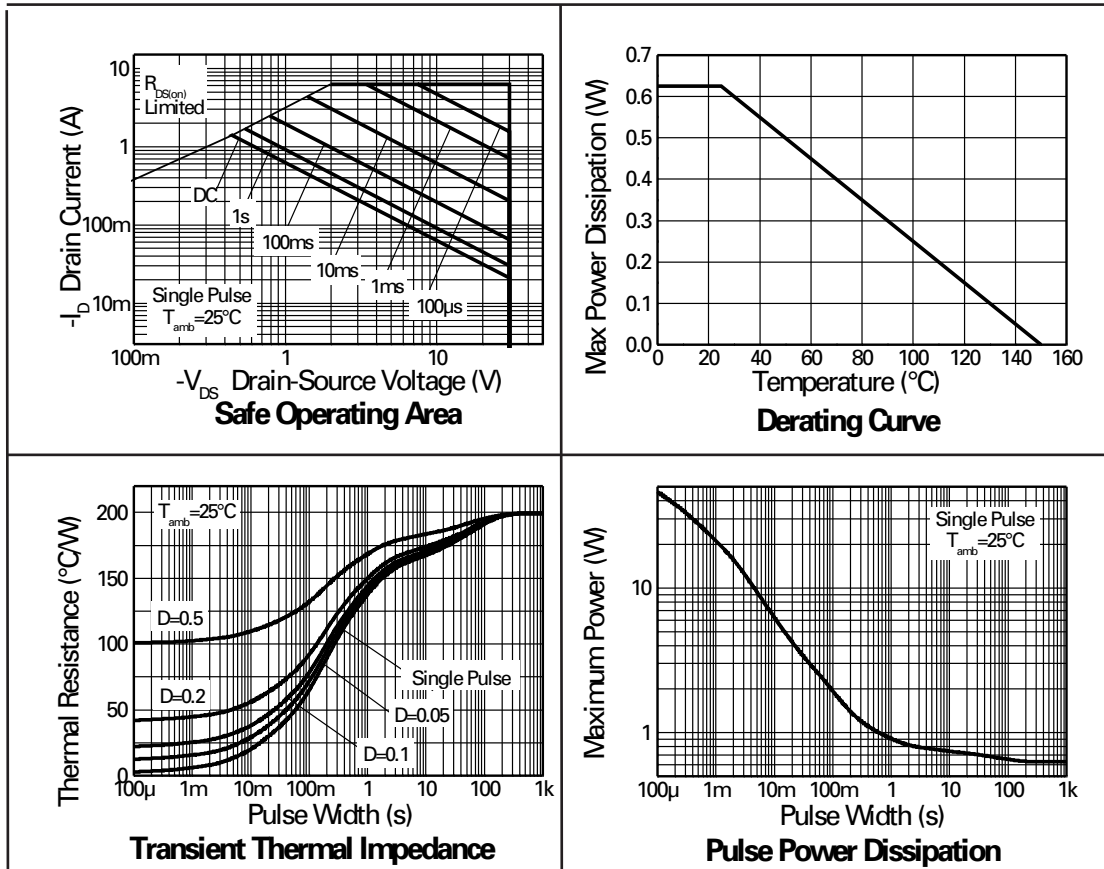
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

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

(c) Repetitive rating 25mm x 25mm FR4 PCB,  $D = 0.05$ , pulse width 10  $\mu s$  - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

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## CHARACTERISTICS



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

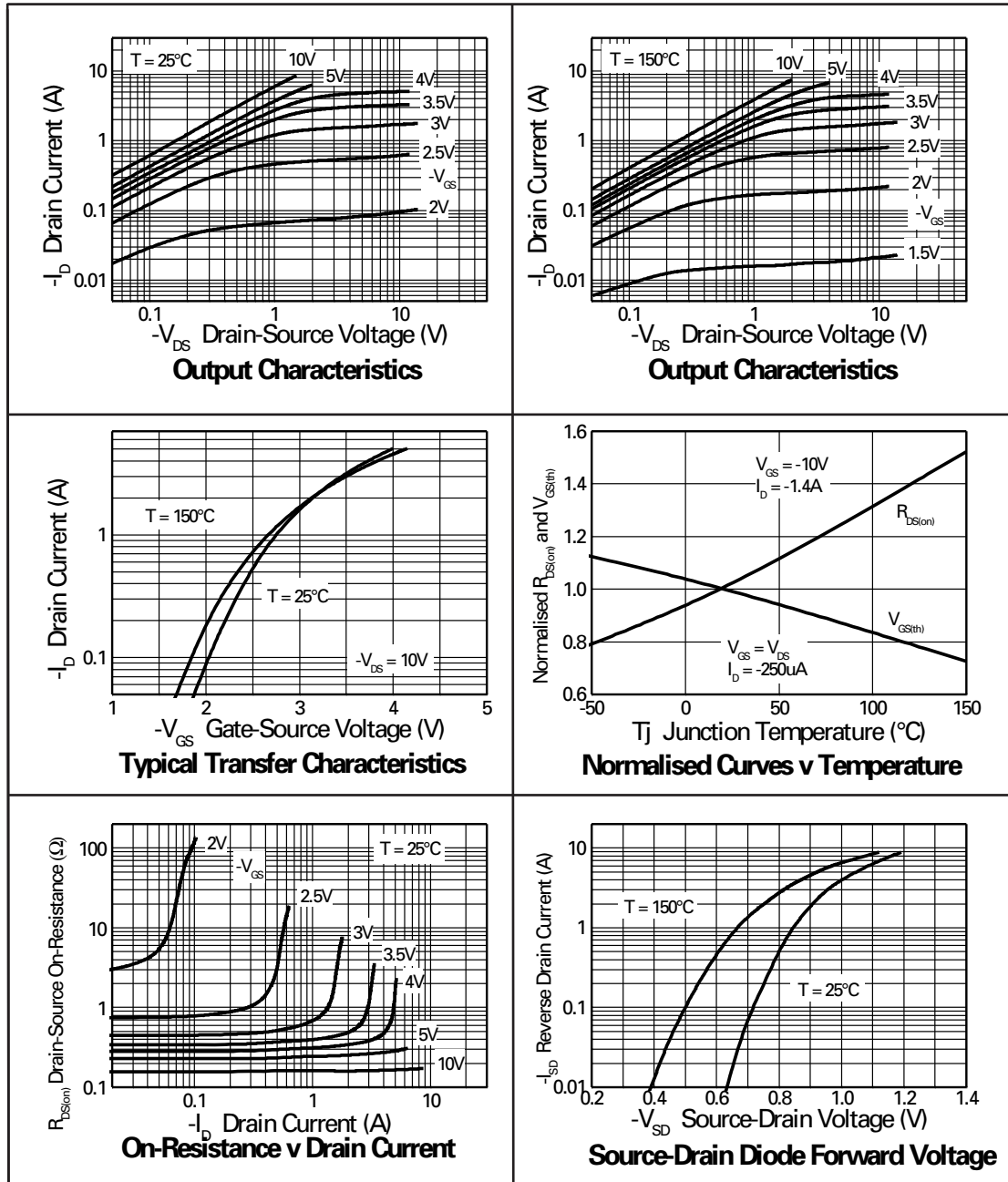
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	-30			V	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			-0.5	μA	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	-1.0			V	I <sub>D</sub> =-250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-State Resistance (1)	R <sub>DS(on)</sub>			0.210 0.330	Ω Ω	V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.4A V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.1A
Forward Transconductance (1)(3)	g <sub>fs</sub>		2.4		S	V <sub>DS</sub> =-15V, I <sub>D</sub> =-1.4A
DYNAMIC (3)						
Input Capacitance	C <sub>iss</sub>		206		pF	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		59.3		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		49.2		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	t <sub>d(on)</sub>		1.5		ns	V <sub>DD</sub> =-15V, I <sub>D</sub> =-1A R <sub>G</sub> =6.0Ω, V <sub>GS</sub> =-10V
Rise Time	t <sub>r</sub>		3.0		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		11.1		ns	
Fall Time	t <sub>f</sub>		7.6		ns	
Gate Charge	Q <sub>g</sub>		3.8		nC	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-5V, I <sub>D</sub> =-1.4A
Total Gate Charge	Q <sub>g</sub>		6.4		nC	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.4A
Gate-Source Charge	Q <sub>gs</sub>		0.69		nC	
Gate-Drain Charge	Q <sub>gd</sub>		2.0		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V <sub>SD</sub>		-0.85	-0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> =-1.1A, V <sub>GS</sub> =0V
Reverse Recovery Time (3)	t <sub>rr</sub>		15.6		ns	T <sub>J</sub> =25°C, I <sub>F</sub> =-0.95A, di/dt= 100A/μs
Reverse Recovery Charge (3)	Q <sub>rr</sub>		9.6		nC	

### NOTES:

- (1) Measured under pulsed conditions. Width=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.

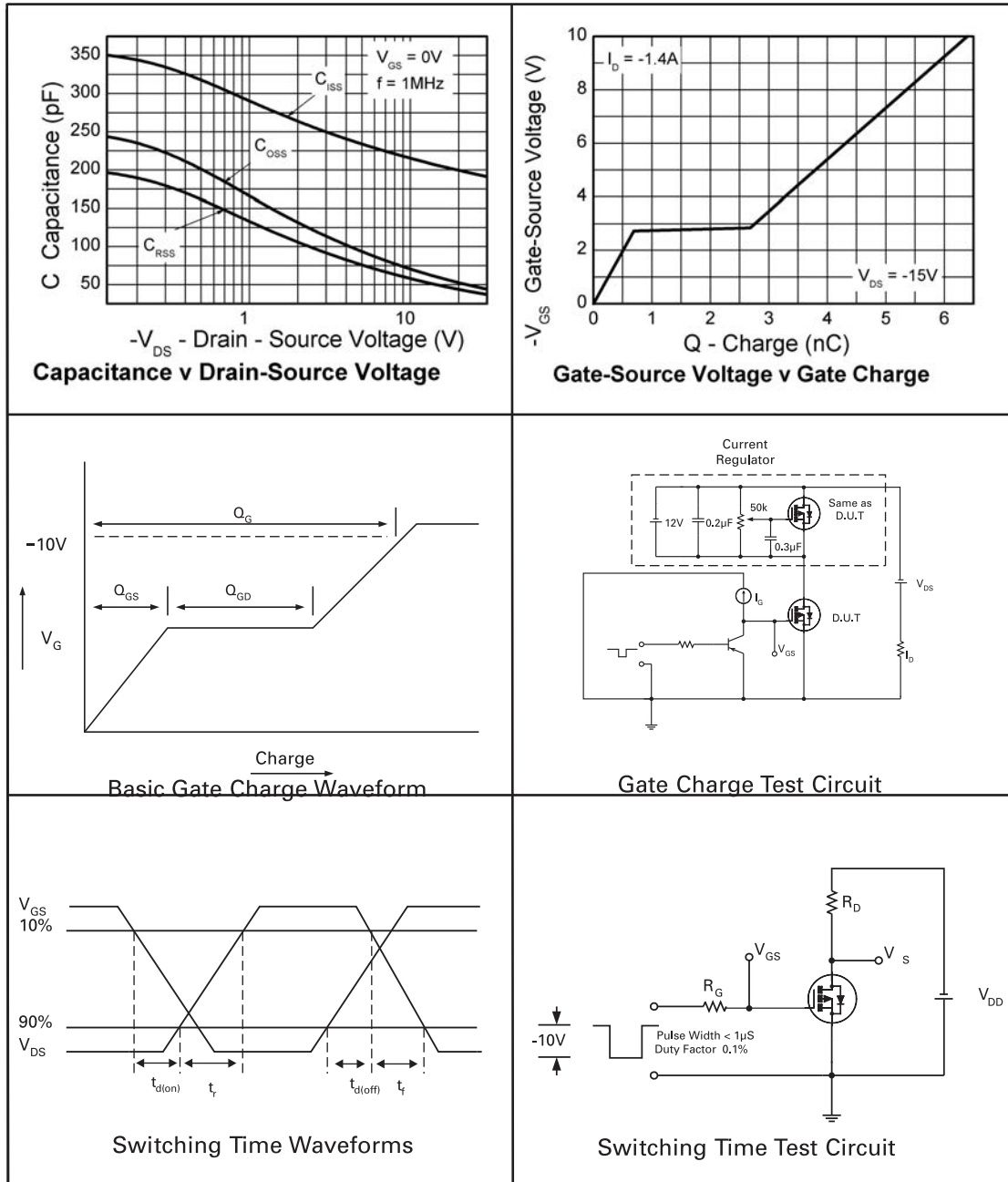
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## TYPICAL CHARACTERISTICS



# ZXMP3A13F

## TYPICAL CHARACTERISTICS



# ZXMP3A13F

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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:

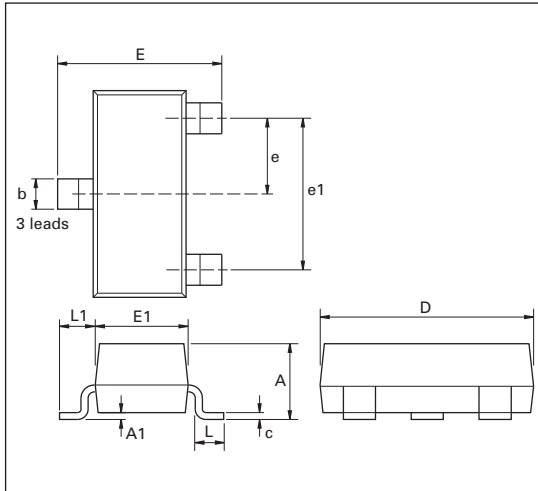
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## PACKAGE OUTLINE



## PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
C	0.085	0.020	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		—	—	—	—	—

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