

# ZXMP3A13F

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## 30V P-CHANNEL ENHANCEMENT MODE MOSFET

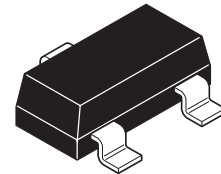
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### SUMMARY

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

### 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.



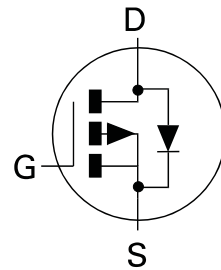
SOT23

### 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



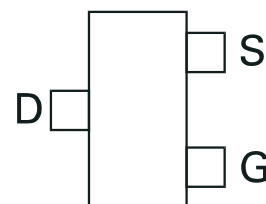
### ORDERING INFORMATION

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

### DEVICE MARKING

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### 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

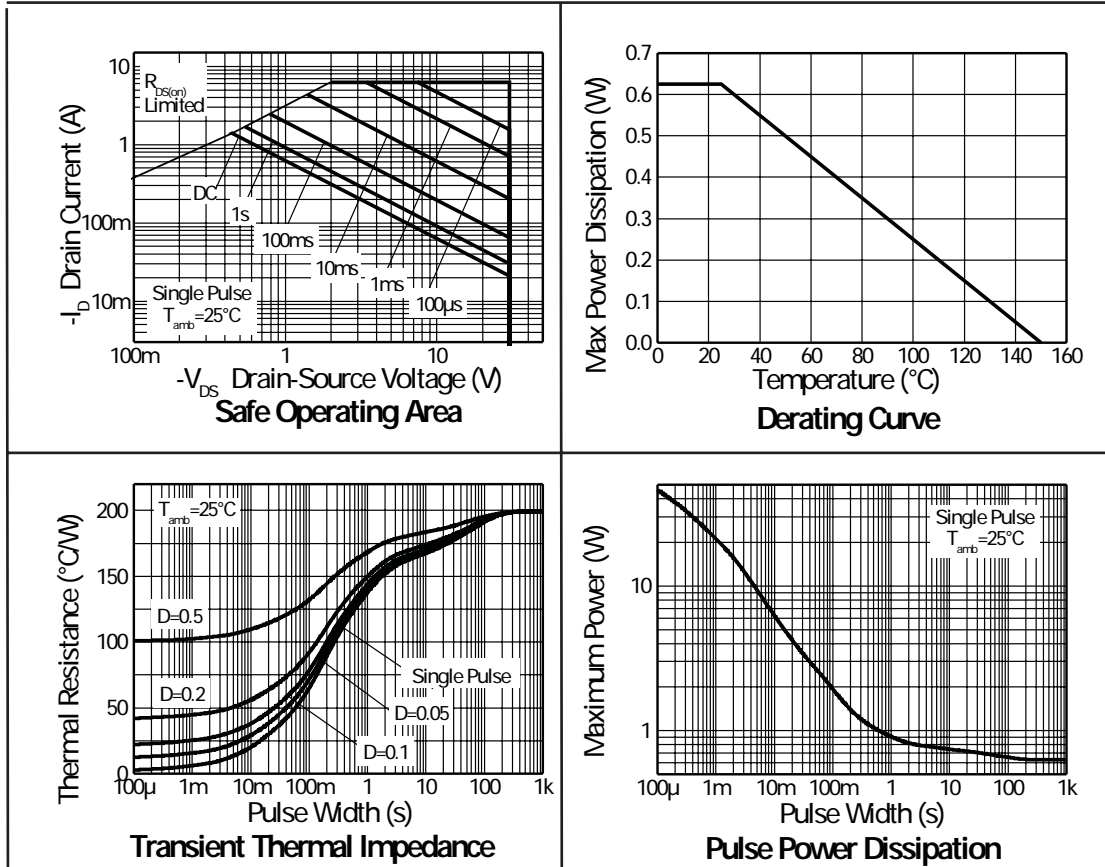
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(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)

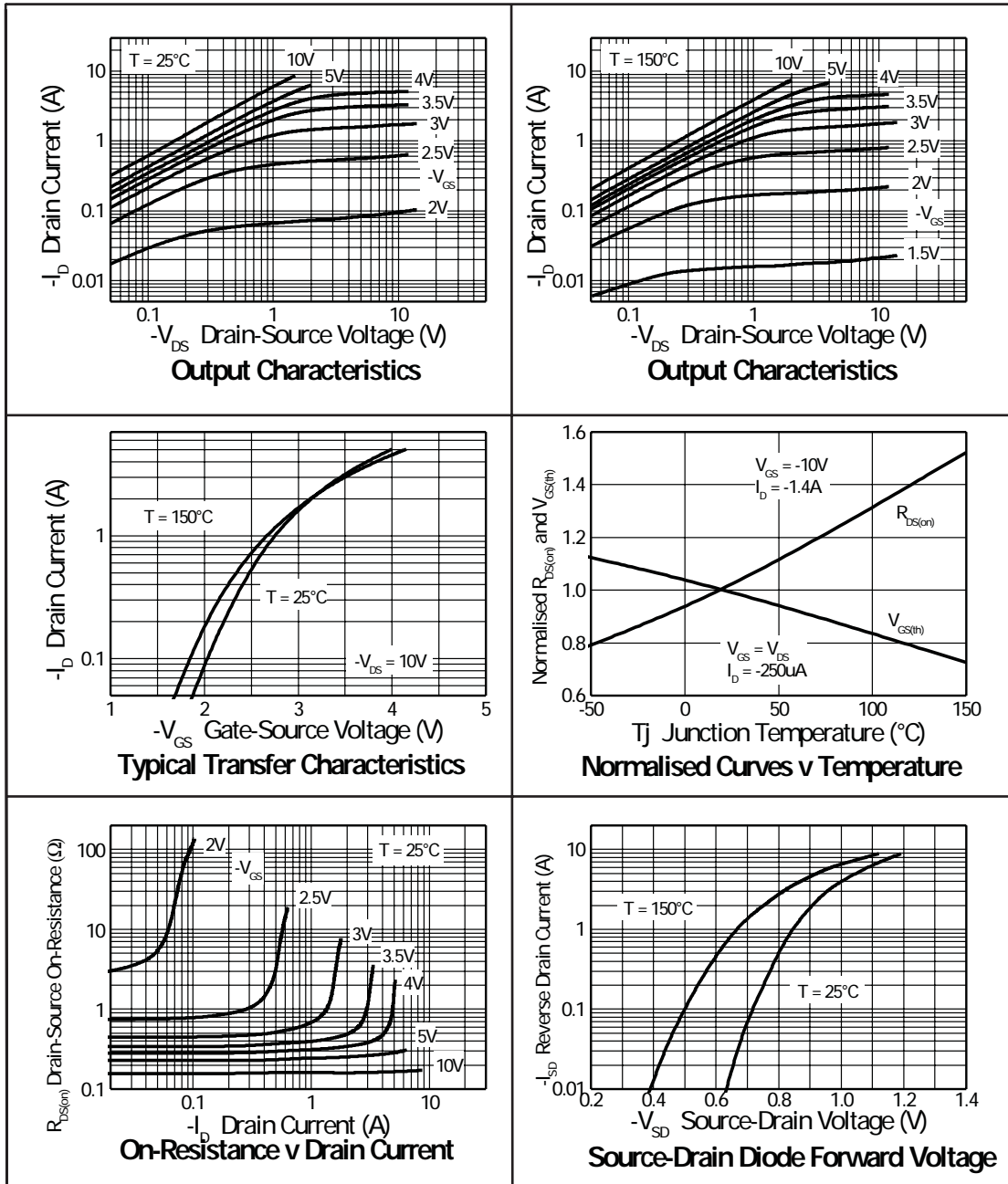
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			-0.5	$\mu\text{A}$	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1.0			V	$I_D = -250\mu\text{A}, V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.210 0.330	$\Omega$ $\Omega$	$V_{GS} = -10\text{V}, I_D = -1.4\text{A}$ $V_{GS} = -4.5\text{V}, I_D = -1.1\text{A}$
Forward Transconductance (1)(3)	$g_{fs}$		2.48		S	$V_{DS} = -15\text{V}, I_D = -1.4\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		204		pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		39.8		pF	
Reverse Transfer Capacitance	$C_{rss}$		25.8		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		1.5		ns	$V_{DD} = -15\text{V}, I_D = -1\text{A}$ $R_G = 6.0\Omega, V_{GS} = -10\text{V}$
Rise Time	$t_r$		2.8		ns	
Turn-Off Delay Time	$t_{d(off)}$		11.3		ns	
Fall Time	$t_f$		7.5		ns	
Gate Charge	$Q_g$		2.58		nC	$V_{DS} = -15\text{V}, V_{GS} = -5\text{V},$ $I_D = -1.4\text{A}$
Total Gate Charge	$Q_g$		5.15		nC	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V},$ $I_D = -1.4\text{A}$
Gate-Source Charge	$Q_{gs}$		0.65		nC	
Gate-Drain Charge	$Q_{gd}$		0.92		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$		-0.85	-0.95	V	$T_J = 25^\circ\text{C}, I_S = -1.1\text{A},$ $V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		18.6		ns	$T_J = 25^\circ\text{C}, I_F = -0.95\text{A},$ $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	$Q_{rr}$		14.8		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.

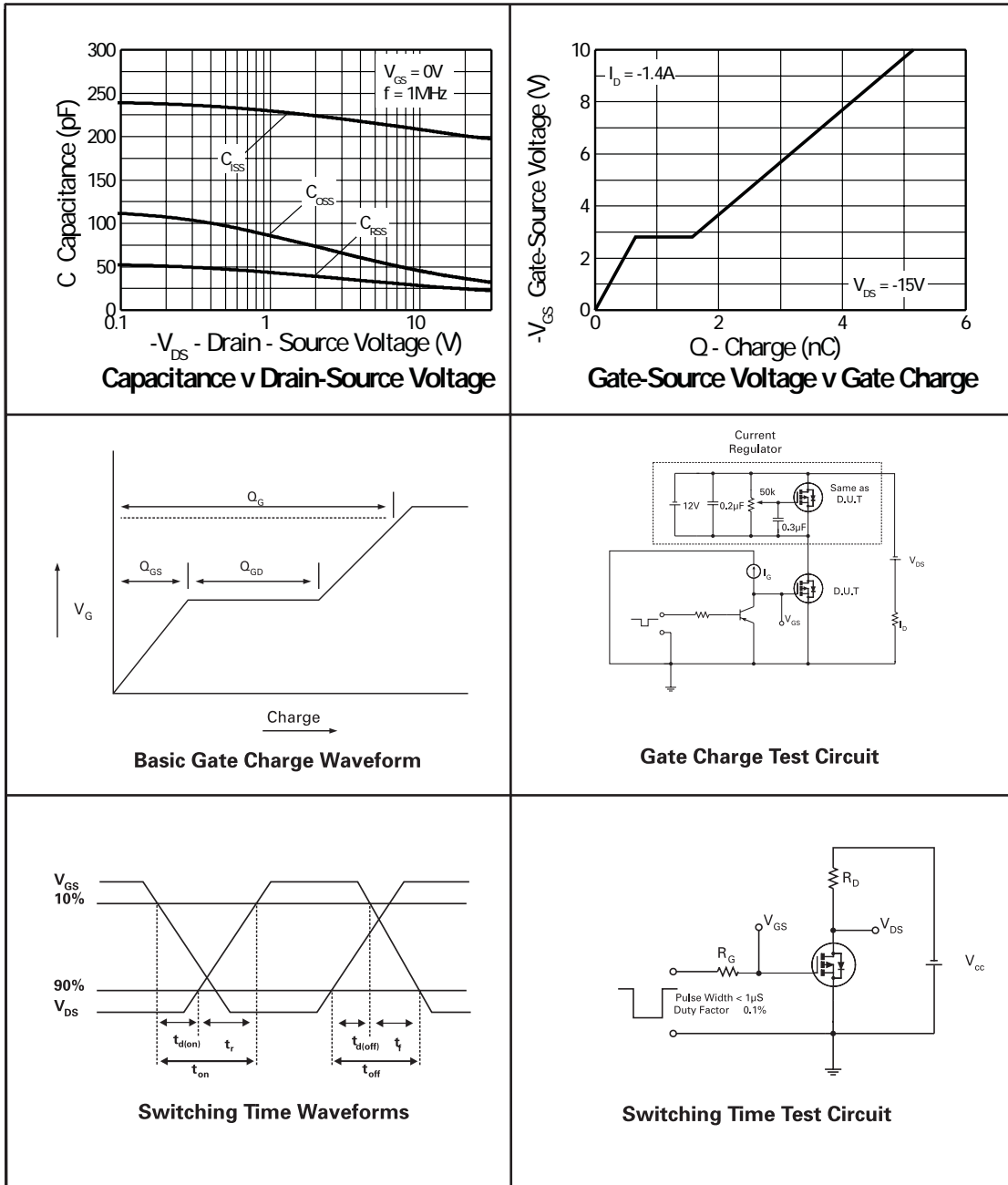
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## TYPICAL CHARACTERISTICS



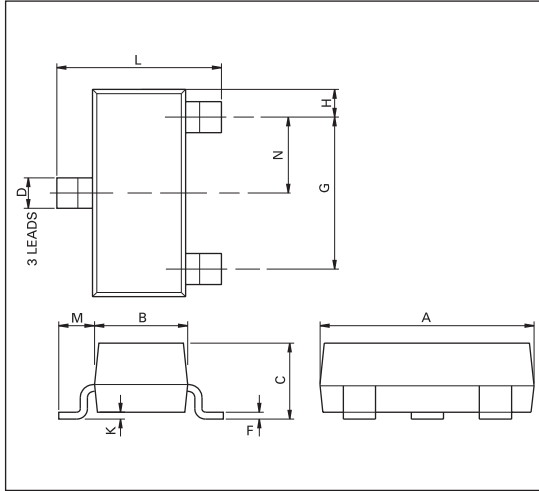
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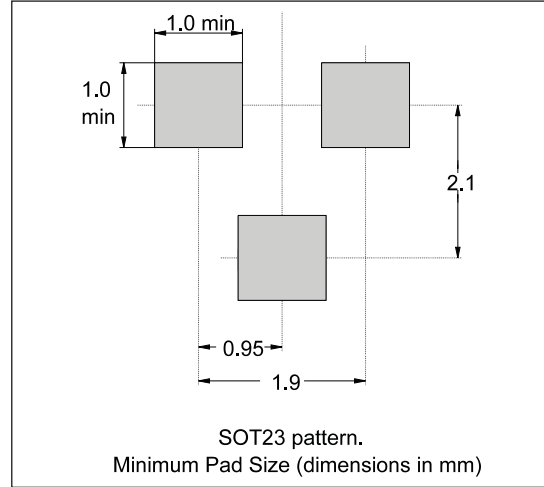


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## PACKAGE OUTLINE



## PAD LAYOUT



## PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Max	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		—	—		—	

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