

# ZXMP6A13F

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## 60V P-CHANNEL ENHANCEMENT MODE MOSFET

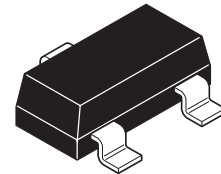
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### SUMMARY

$V_{(BR)DSS} = -60V$ ;  $R_{DS(ON)} = 0.400\Omega$   $I_D = -1.1A$

### 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.



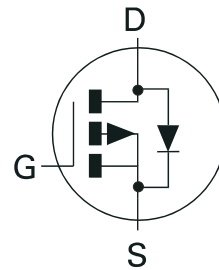
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### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

### APPLICATIONS

- DC - DC converters
- Power management functions
- Relay and solenoid driving
- Motor control

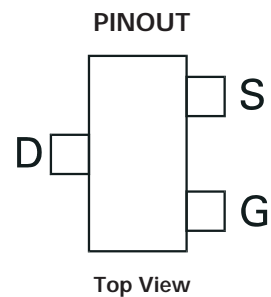


### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMP6A13FTA	7"	8mm	3000 units
ZXMP6A13FTC	13"	8mm	10000 units

### DEVICE MARKING

- 7P6



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## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	-60	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(b)</sup> $V_{GS}=10V$ ; $T_A=70^\circ C$ <sup>(b)</sup> $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(a)</sup>	$I_D$	-1.1 -0.8 -0.9	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	-4.0	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	-1.2	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	-4.0	A
Power Dissipation at $T_A=25^\circ C$ <sup>(a)</sup> Linear Derating Factor	$P_D$	625 5	mW mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(b)</sup> Linear Derating Factor	$P_D$	806 6.5	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 <sup>(a)</sup>	$R_{\theta JA}$	200	$^\circ C/W$
Junction to Ambient <sup>(b)</sup>	$R_{\theta JA}$	155	$^\circ C/W$

### NOTES

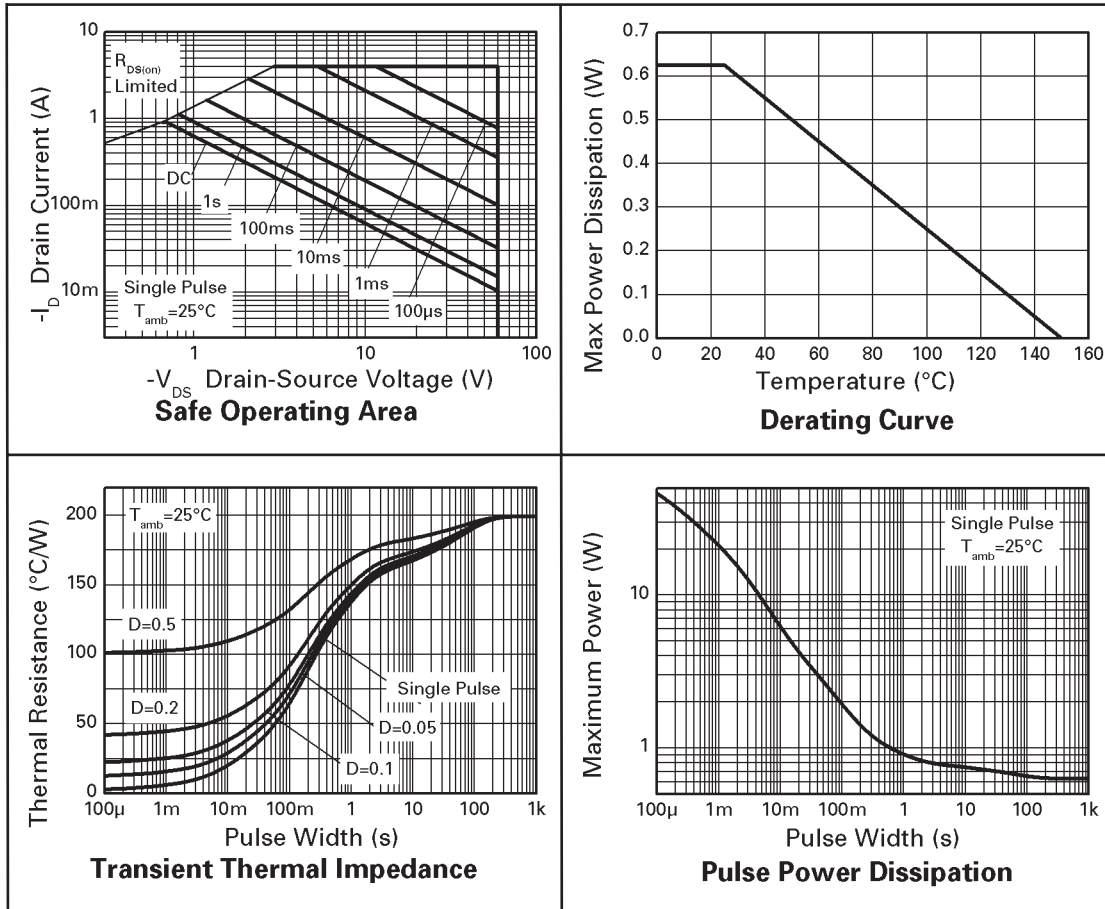
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(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.

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## CHARACTERISTICS



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

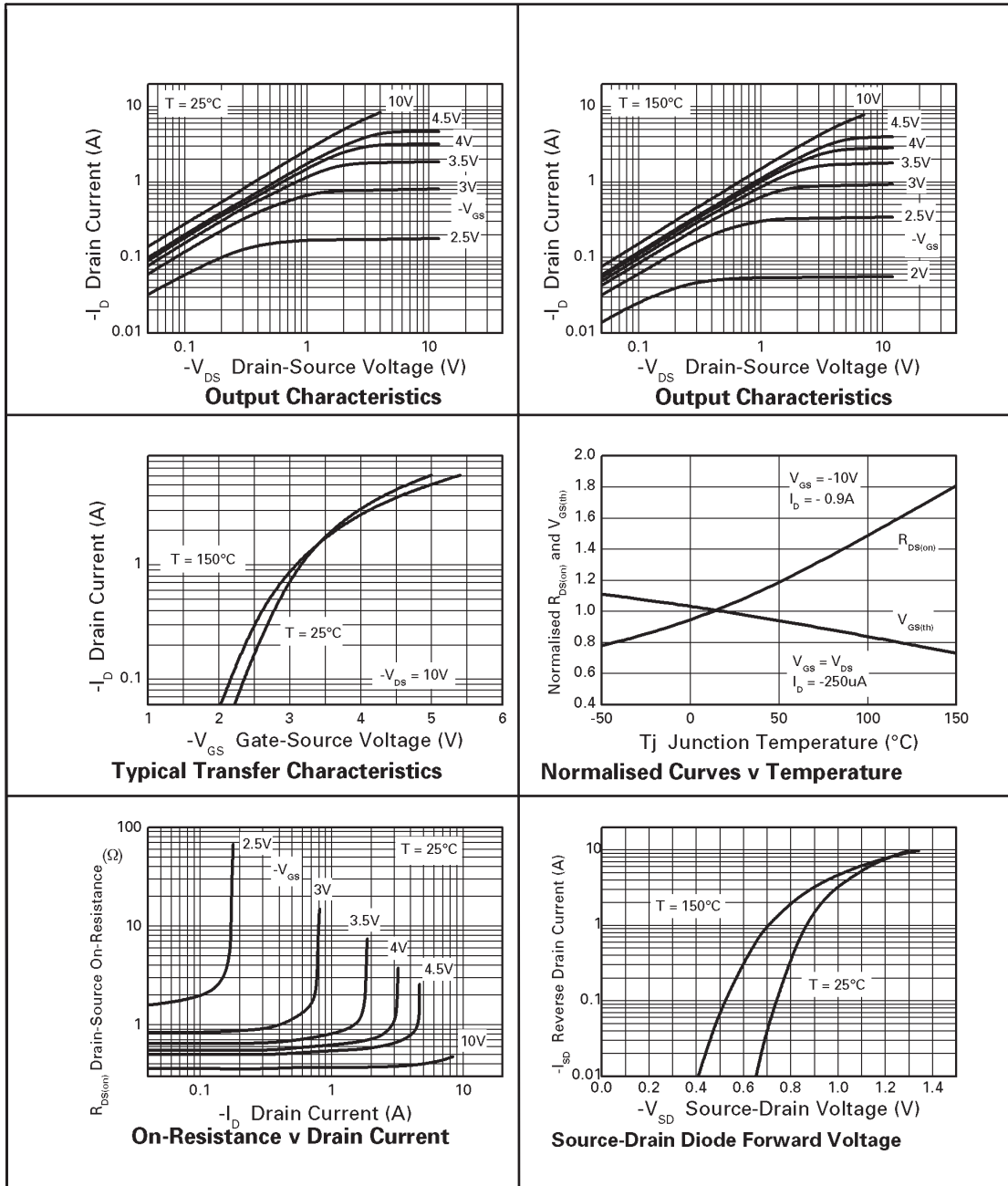
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-60			V	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			-1	$\mu\text{A}$	$V_{DS} = -60\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			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 <sup>(1)</sup>	$R_{DS(on)}$			0.400 0.600	$\Omega$ $\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -0.9\text{A}$ $V_{GS} = -4.5\text{V}$ , $I_D = -0.8\text{A}$
Forward Transconductance <sup>(1)(3)</sup>	$g_{fs}$		1.8		S	$V_{DS} = -15\text{V}$ , $I_D = -0.9\text{A}$
<b>DYNAMIC</b> <sup>(3)</sup>						
Input Capacitance	$C_{iss}$		233		pF	$V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		17.4		pF	
Reverse Transfer Capacitance	$C_{rss}$		9.6		pF	
<b>SWITCHING</b> <sup>(2) (3)</sup>						
Turn-On Delay Time	$t_{d(on)}$		1.6		ns	$V_{DD} = -30\text{V}$ , $I_D = -1\text{A}$ $R_G = 6.0\Omega$ , $V_{GS} = -10\text{V}$
Rise Time	$t_r$		2.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		13		ns	
Fall Time	$t_f$		5.8		ns	
Gate Charge	$Q_g$		2.4		nC	$V_{DS} = -30\text{V}$ , $V_{GS} = -5\text{V}$ , $I_D = -0.9\text{A}$
Total Gate Charge	$Q_g$		5.1		nC	$V_{DS} = -30\text{V}$ , $V_{GS} = -10\text{V}$ , $I_D = -0.9\text{A}$
Gate-Source Charge	$Q_{gs}$		0.7		nC	
Gate-Drain Charge	$Q_{gd}$		0.7		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		-0.85	-0.95	V	$T_J = 25^\circ\text{C}$ , $I_S = -0.8\text{A}$ , $V_{GS} = 0\text{V}$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		22.6		ns	$T_J = 25^\circ\text{C}$ , $I_F = -0.9\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		23.2		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.

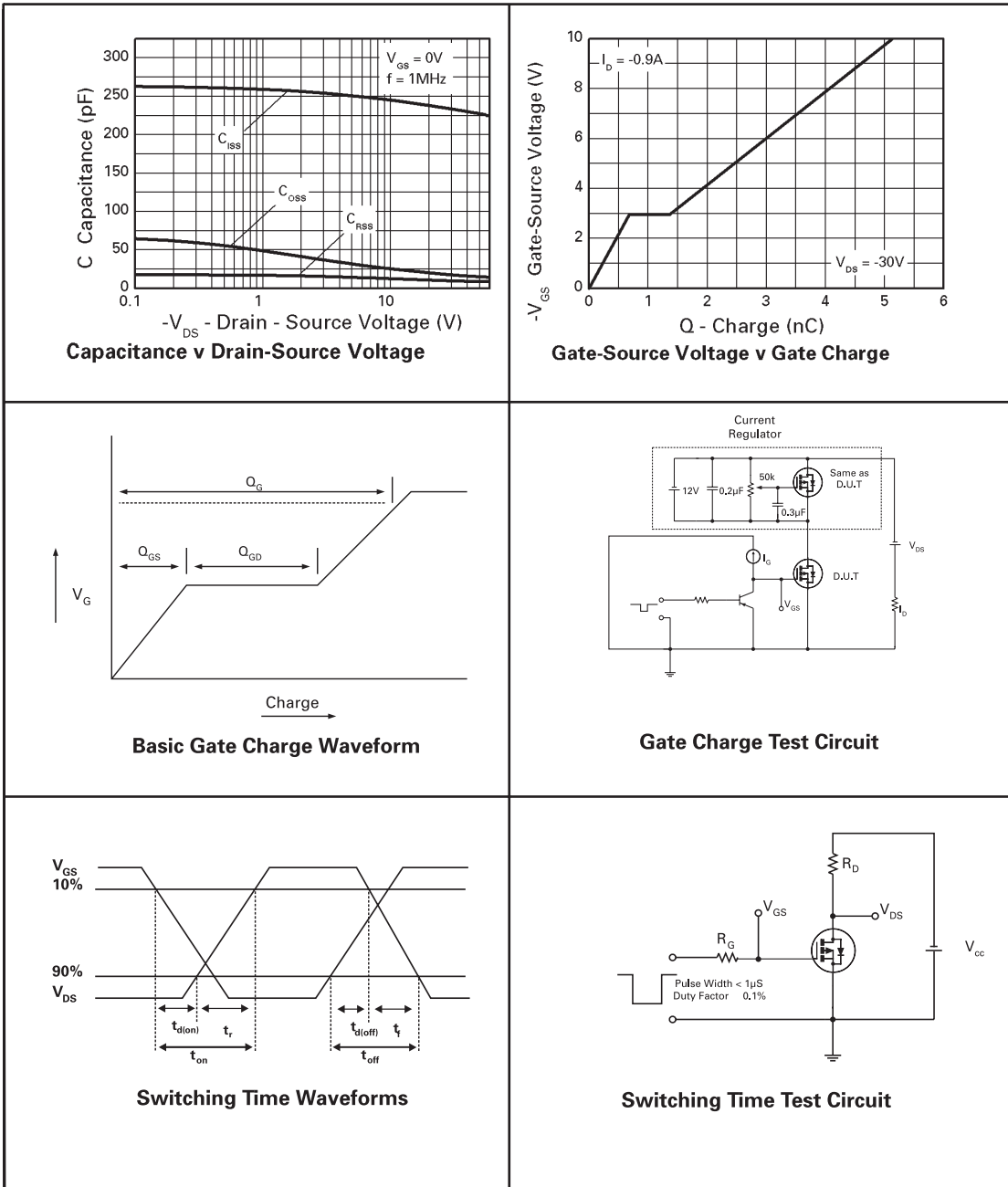
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## TYPICAL CHARACTERISTICS



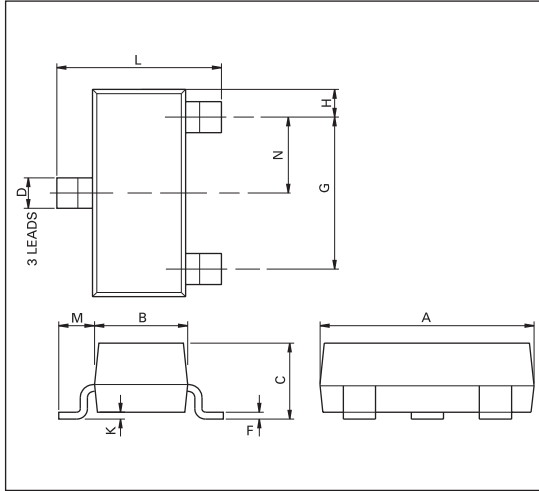
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## TYPICAL CHARACTERISTICS

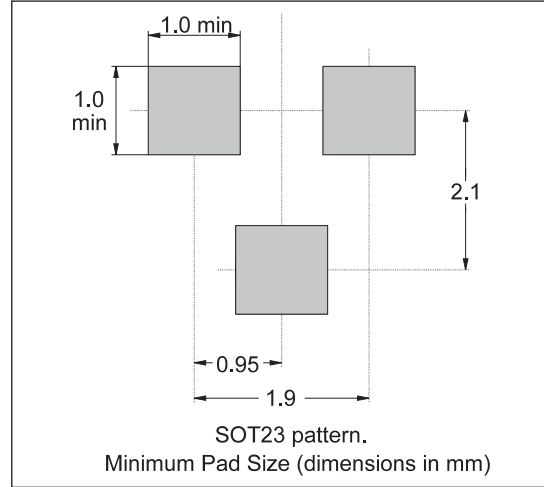


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## PACKAGE OUTLINE



## 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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