

ZXMP6A13F

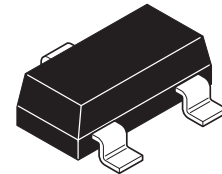
60V P-CHANNEL ENHANCEMENT MODE MOSFET

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.



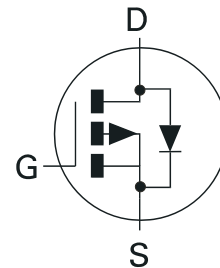
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FEATURES

- 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



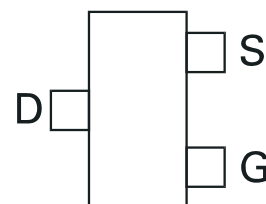
ORDERING INFORMATION

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

DEVICE MARKING

- 7P6

PINOUT



Top View

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ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	-60	V
Gate Source Voltage	V_{GS}	± 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	-1.1 -0.8 -0.9	A
Pulsed Drain Current ^(c)	I_{DM}	-4.0	A
Continuous Source Current (Body Diode) ^(b)	I_S	-1.2	A
Pulsed Source Current (Body Diode) ^(c)	I_{SM}	-4.0	A
Power Dissipation at $T_A=25^\circ C$ ^(a) Linear Derating Factor	P_D	625 5	mW mW/°C
Power Dissipation at $T_A=25^\circ C$ ^(b) Linear Derating Factor	P_D	806 6.5	mW mW/°C
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	°C

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient ^(a)	$R_{\theta JA}$	200	°C/W
Junction to Ambient ^(b)	$R_{\theta JA}$	155	°C/W

NOTES

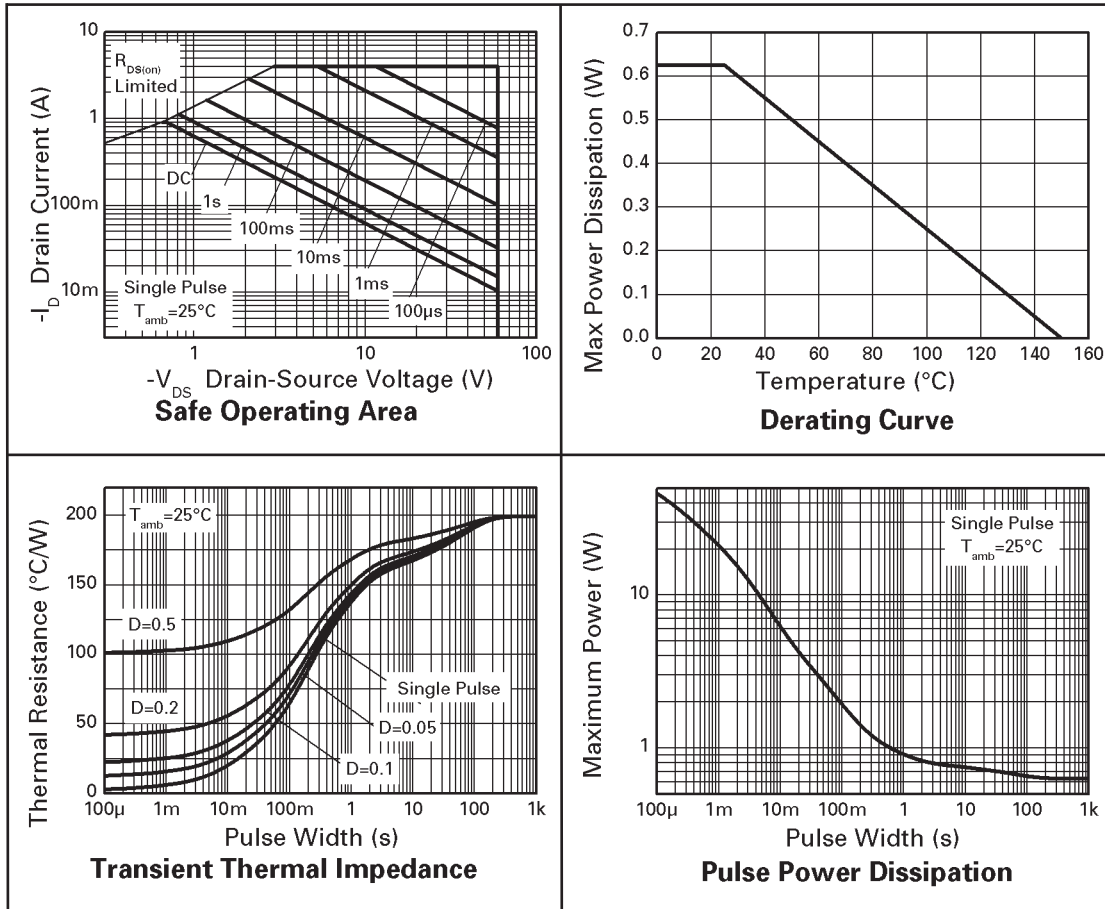
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(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 μ 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)

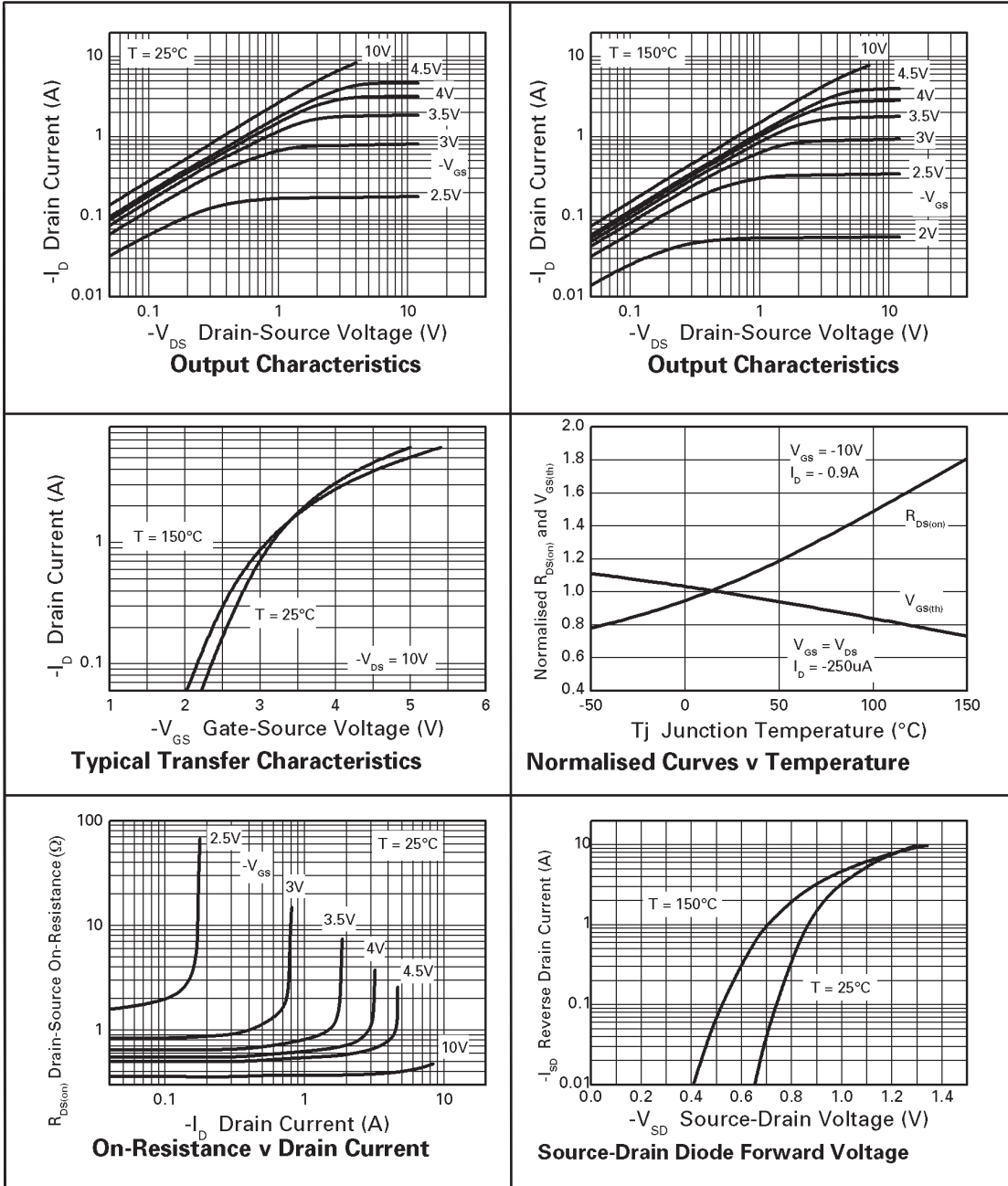
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-60			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
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 ⁽¹⁾	$R_{DS(on)}$			0.400 0.600	Ω Ω	$V_{GS} = -10\text{V}$, $I_D = -0.9\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -0.8\text{A}$
Forward Transconductance ⁽¹⁾⁽³⁾	g_{fs}		1.8		S	$V_{DS} = -15\text{V}$, $I_D = -0.9\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		219		pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{oss}		25.7		pF	
Reverse Transfer Capacitance	C_{rss}		20.5		pF	
SWITCHING ^{(2) (3)}						
Turn-On Delay Time	$t_{d(on)}$		1.6		ns	$V_{DD} = -30\text{V}$, $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = -10\text{V}$
Rise Time	t_r		2.2		ns	
Turn-Off Delay Time	$t_{d(off)}$		11.2		ns	
Fall Time	t_f		5.7		ns	
Gate Charge	Q_g		3.2		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -5\text{V}$, $I_D = -0.9\text{A}$
Total Gate Charge	Q_g		5.9		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -0.9\text{A}$
Gate-Source Charge	Q_{gs}		0.74		nC	
Gate-Drain Charge	Q_{gd}		1.5		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	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 ⁽³⁾	t_{rr}		21.1		ns	$T_J = 25^\circ\text{C}$, $I_F = -0.9\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		19.3		nC	

NOTES:

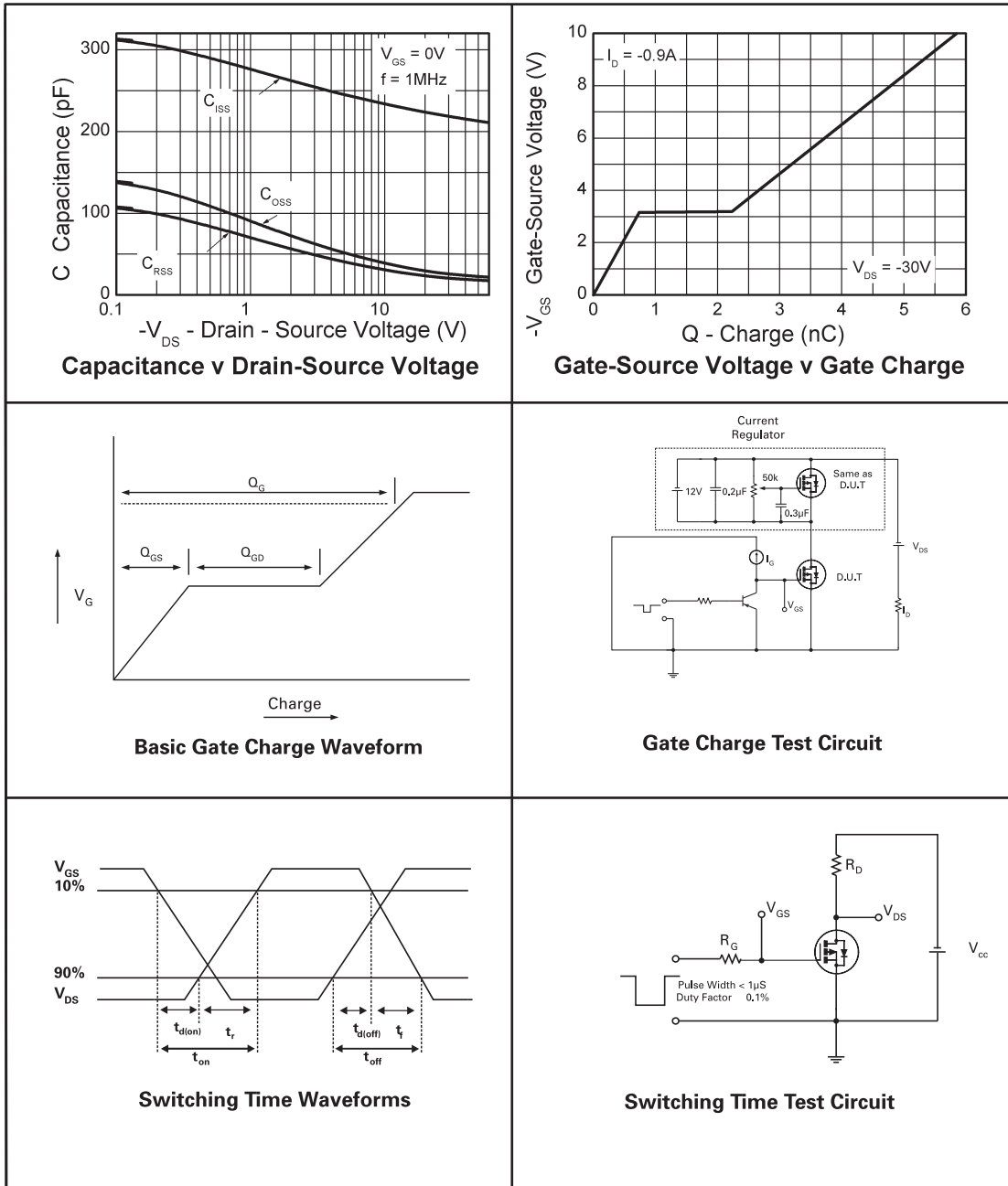
- (1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.
(2) Switching characteristics are independent of operating junction temperature.
(3) For design aid only, not subject to production testing.

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TYPICAL CHARACTERISTICS



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"Not recommended for new designs"Device is still in production to support existing designs and production

"Obsolete"Production has been discontinued

Datasheet status key:

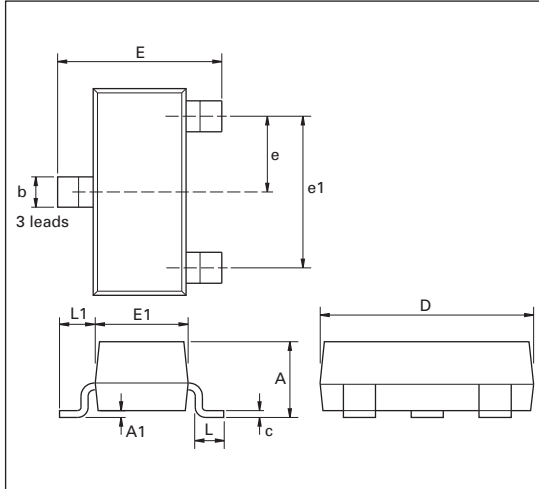
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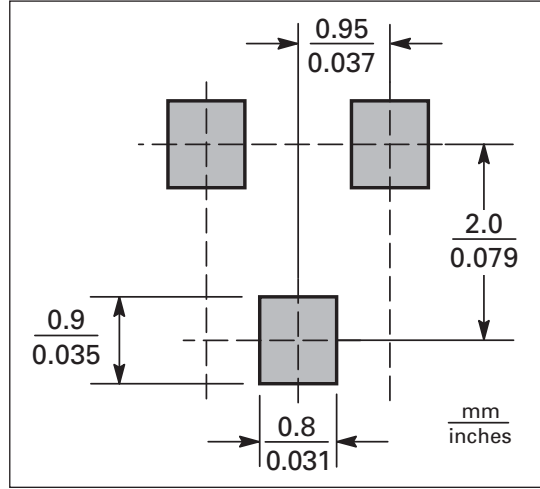
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PACKAGE OUTLINE



PAD LAYOUT



PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Max	Max
A	-	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	0.20	0.003	0.008	L	0.25	0.60	0.018	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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