

# ZXMP2120E5

## 200V P-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS} = -200V$ ;  $R_{DS(ON)} = 28\Omega$ ;  $I_D = -122mA$

### DESCRIPTION

This 200V enhancement mode P-channel MOSFET provides users with a competitive specification offering efficient power handling capability, high impedance and is free from thermal runaway and thermally induced secondary breakdown. Applications benefiting from this device include a variety of Telecom and general high voltage circuits.

A 4 pin SOT223 version is also available (ZXMP2120G4).

### FEATURES

- High voltage
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- SOT23-5 package variant engineered to increase spacing between high voltage pins.

### APPLICATIONS

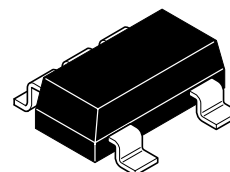
- Active clamping of primary side MOSFETs in 48 volt DC-DC converters

### ORDERING INFORMATION

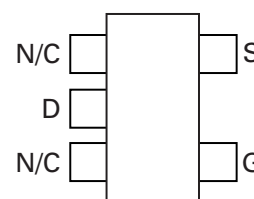
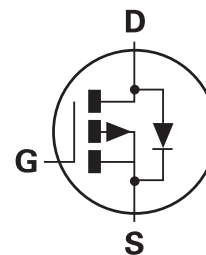
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXMP2120E5TA	7	8mm embossed	3,000 units

### DEVICE MARKING

- P120



SOT23-5



PINOUT - TOP VIEW

# ZXMP2120E5

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	-200	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS}=10V$ ; $T_{amb}=25^{\circ}C$ ) <sup>(a)</sup>	$I_D$	-122	mA
Pulsed Drain Current (c)	$I_{DM}$	-0.7	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	-0.7	A
Power Dissipation at $T_{amb}=25^{\circ}C$ <sup>(a)</sup>	$P_D$	0.75	W
Linear Derating Factor		6	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>	$R_{\theta JA}$	167	$^{\circ}C/W$

### 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 - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-200			V	$I_D = -1\text{mA}$ , $V_{GS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1.5		-3.5	V	$I_D = -1\text{mA}$ , $V_{DS} = V_{GS}$
Gate-Body Leakage	$I_{GSS}$			20	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			-10 -100	$\mu\text{A}$ $\mu\text{A}$	$V_{DS} = -200\text{V}$ , $V_{GS} = 0$ $V_{DS} = -160\text{V}$ , $V_{GS} = 0\text{V}$ , $T = 125^{\circ}\text{C}$ (2)
On-State Drain Current <sup>(1)</sup>	$I_{D(on)}$	-300			mA	$V_{DS} = -25\text{V}$ , $V_{GS} = -10\text{V}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			28	$\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -150\text{mA}$
Forward Transconductance <sup>(1)(2)</sup>	$g_{fs}$	50			mS	$V_{DS} = -25\text{V}$ , $I_D = -150\text{mA}$
<b>DYNAMIC</b>						
Input Capacitance <sup>(2)</sup>	$C_{iss}$			100	pF	$V_{DS} = -25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$
Output Capacitance <sup>(2)</sup>	$C_{oss}$			25	pF	
Reverse Transfer Capacitance <sup>(2)</sup>	$C_{rss}$			7	pF	
<b>SWITCHING</b>						
Turn-On Delay Time <sup>(2)(3)</sup>	$t_{d(on)}$			7	ns	$V_{DD} = -25\text{V}$ , $I_D = -150\text{mA}$
Rise Time <sup>(2)(3)</sup>	$t_r$			15	ns	
Turn-Off Delay Time <sup>(2)(3)</sup>	$t_{d(off)}$			12	ns	
Fall Time <sup>(2)(3)</sup>	$t_f$			15	ns	

### NOTES:

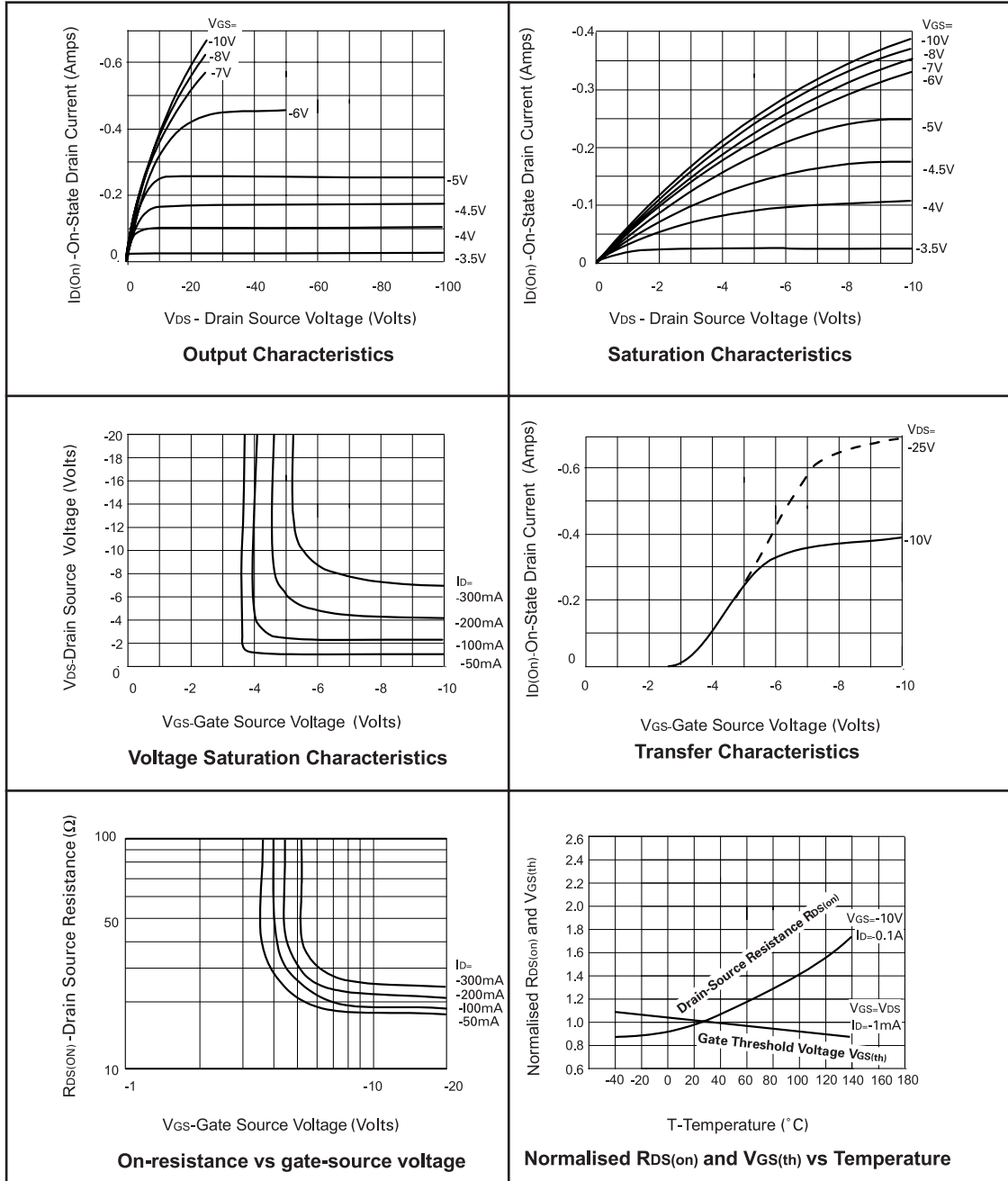
(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

(2) Sample test.

(3) Switching times measured with 50 $\Omega$  source impedance and <5ns rise time on a pulse generator.

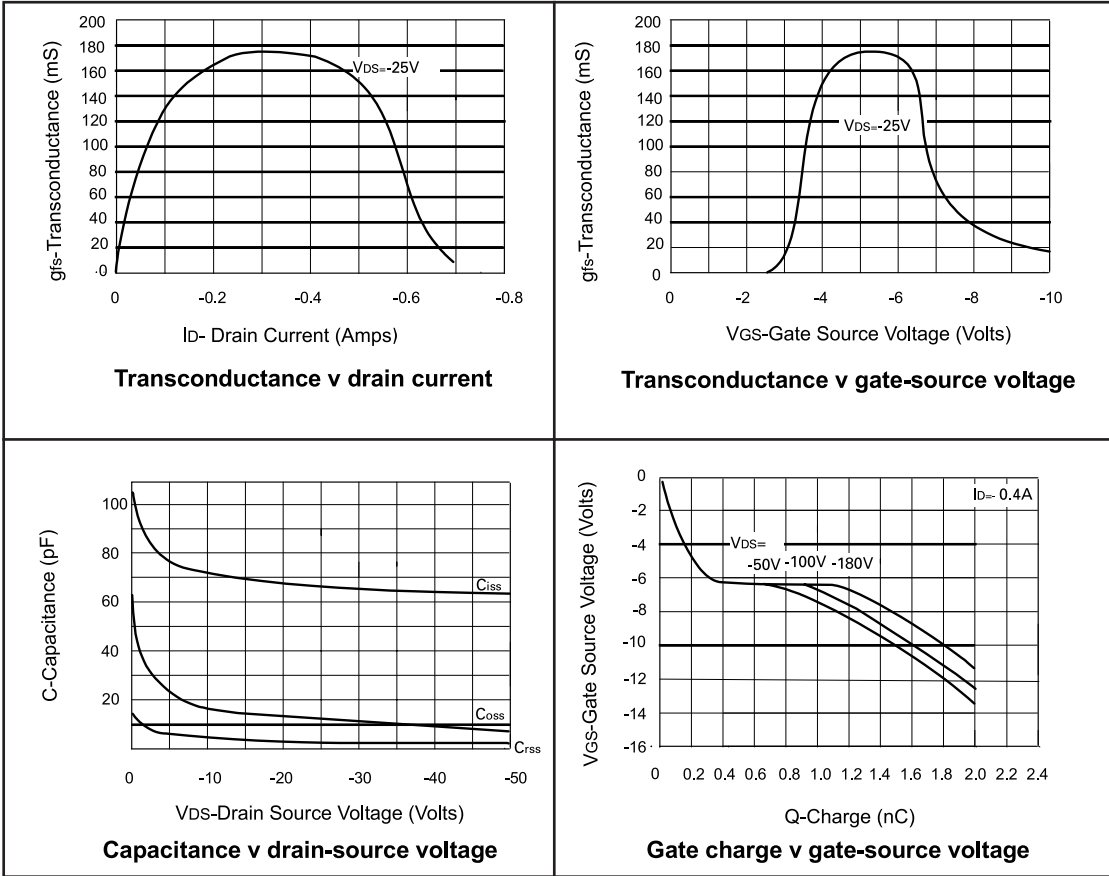
# ZXMP2120E5

## TYPICAL CHARACTERISTICS



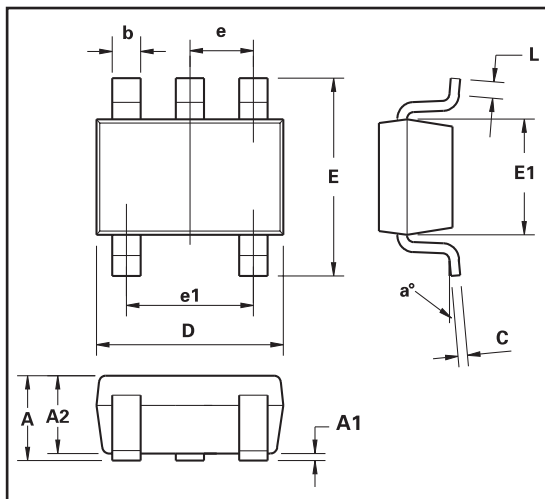
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## CHARACTERISTICS

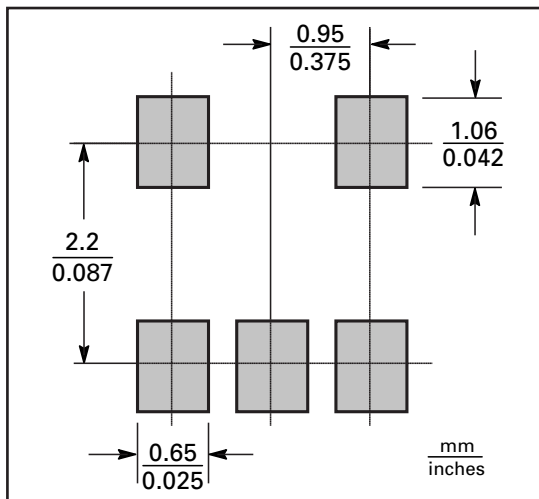


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## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



Controlling dimensions are in millimeters. Approximate conversions are given in inches

## PACKAGE DIMENSIONS

DIM	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.45	0.0354	0.0570
A1	-	0.15	-	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.20	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220

DIM	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0.10	0.60	0.0039	0.0236
a	0°	30°	0°	30°

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Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 <a href="mailto:europe.sales@zetex.com">europe.sales@zetex.com</a>	Zetex Inc 700 Veterans Memorial Hwy Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 <a href="mailto:usa.sales@zetex.com">usa.sales@zetex.com</a>	Zetex (Asia) Ltd 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 <a href="mailto:asia.sales@zetex.com">asia.sales@zetex.com</a>	Zetex Semiconductors plc Zetex Technology Park Chadderton, Oldham, OL9 9LL United Kingdom Telephone (44) 161 622 4444 Fax: (44) 161 622 4446 <a href="mailto:hq@zetex.com">hq@zetex.com</a>

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ISSUE 2 - SEPTEMBER 2006