



ZXMP2120E5

### 200V P-CHANNEL ENHANCEMENT MODE MOSFET

### **Product Summary**

BV <sub>DSS</sub>	Rds(on) max	I <sub>D MAX</sub> T <sub>A</sub> = +25°C	
-200V	28Ω @ V <sub>GS</sub> = -10V	-122mA	

### **Description**

This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

### **Applications**

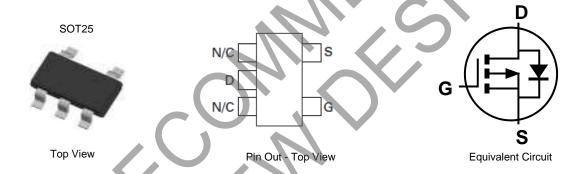
 Active Clamping of Primary Side MOSFETs in 48V DC-DC Converters

### **Features and Benefits**

- High Voltage
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

### **Mechanical Data**

- Case: SOT25
- Case Material: Molded Plastic, "Green" Molding Compound.
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish @3
- Weight: 0.016 grams (Approximate)



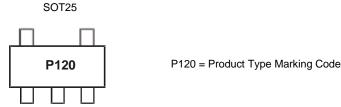
### Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXMP2120E5TA	P120	7	8	3,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- See http://www.diodes.com/quality/lead\_free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

### **Marking Information**





**ZXMP2120E5** 

## **Maximum Ratings** (@ $T_A = +25^{\circ}C$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	-200	V
Gate-Source Voltage	$V_{GSS}$	±20	V
Continuous Drain Current (V <sub>GS</sub> = -10V; T <sub>A</sub> = +25°C) (Note 5)	I <sub>D</sub>	-122	mA
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	-0.7	A
Pulsed Source Current (Body Diode) (Note 6)	I <sub>SM</sub>	-0.7	A

### Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation at T <sub>A</sub> = +25°C (Note 5) Linear Derating Factor	P <sub>D</sub>	0.75 6	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>0JA</sub>	167	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

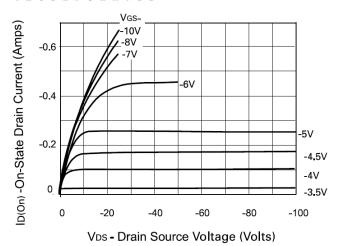
### Electrical Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-200	-	-	٧	$V_{GS} = 0V$ , $I_D = -1mA$
Zero Gate Voltage Drain Current	IDSS	-	).	-10 -100	μA	$V_{DS} = -200V, V_{GS} = 0V$ $V_{DS} = -160V, V_{GS} = 0V, T_A = +125^{\circ}0$
Gate-Source Leakage	Igss	-	-	20	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.5	-	-3.5	V	$V_{DS} = V_{GS}$ , $I_D = -1mA$
Static Drain-Source On-Resistance (Note 7)	R <sub>DS(ON)</sub>		-	28	Ω	$V_{GS} = -10V, I_D = -150mA$
Forward Transconductance (Notes 7 & 8)	9 <sub>fs</sub>	50	-	-	ms	$V_{DS} = -25V, I_{D} = -150mA$
On-State Drain Current (Note 7)	I <sub>D</sub> (ON)	-300	-	-	mA	V <sub>DS</sub> = -25V, V <sub>GS</sub> = -10V
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 8)	Ciss	_	-	100	pF	V 05V V 0V
Output Capacitance (Note 8)		-	-	25	pF	$V_{DS} = -25V, V_{GS} = 0V,$ f = 1.0MHz
Reverse Transfer Capacitance (Note 8)	C <sub>rss</sub>	-	-	7	pF	1 = 1.0IVII IZ
Turn-On Delay Time (Notes 8 & 9)	t <sub>D(ON)</sub>	-	-	7	ns	
Turn-On Rise Time (Notes 8 & 9)	t <sub>R</sub>	-	-	15	ns	V 25V I 450mA
Turn-Off Delay Time (Notes 8 & 9)	t <sub>D(OFF)</sub>	-	-	12	ns	$V_{DD} = -25V, I_{D} = -150mA$
Turn-Off Fall Time (Notes 8 & 9)	t <sub>F</sub>	-	-	15	ns	
Notes: 5. For a device surface mounted on 25mm x 25mm FR-6. Repetitive rating - pulse width limited by maximum juing 7. Measured under pulsed conditions. Pulse width ≤ 300 8. Sample test.	nction temperate Oµs. Duty cycle	ure. Refer to ≤ 2%.				

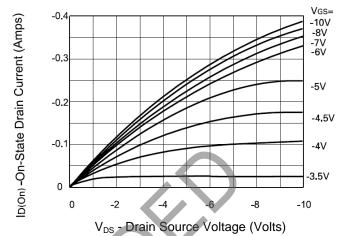
- Switching characteristics are independent of operating junction temperature.



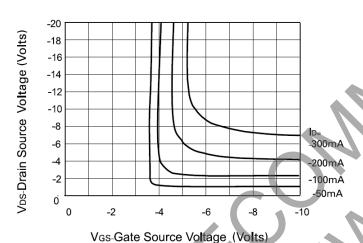
### **ZXMP2120E5**



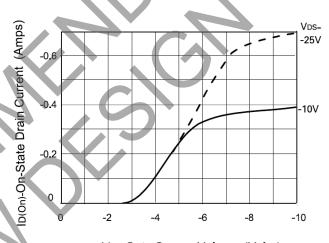
### **Output Characteristics**



**Saturation Characteristics** 



**Voltage Saturation Characteristics** 

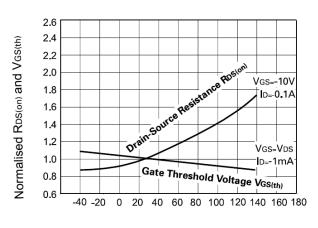


Vgs-Gate Source Voltage (Volts)

# Ci and a source Voltage (Volts)

On-resistance vs gate-source voltage

# Transfer Characteristics



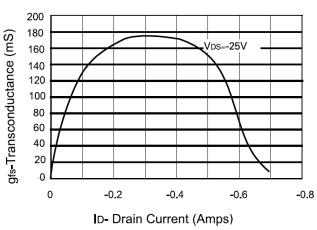
T-Temperature (°C)

Normalised RDS(on) and VGS(th) vs Temperature

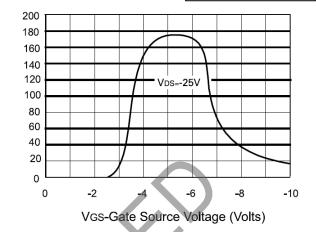


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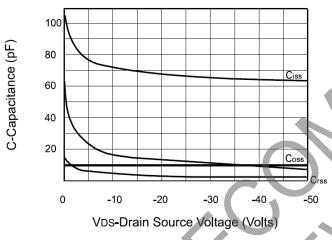


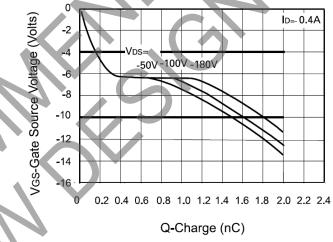
gfs-Transconductance (mS)



### Transconductance v drain current

Transconductance v gate-source voltage



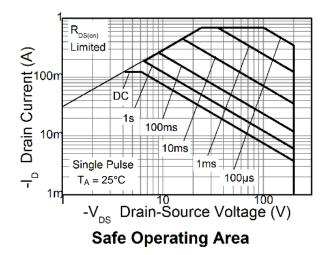


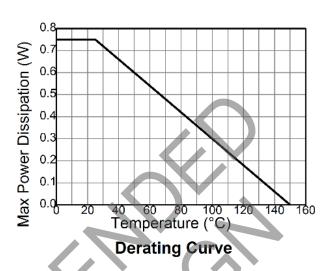
Capacitance v drain-source voltage

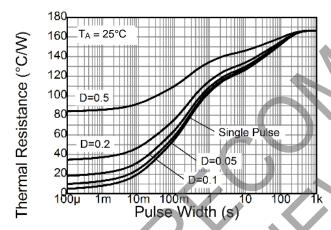
Gate charge v gate-source voltage

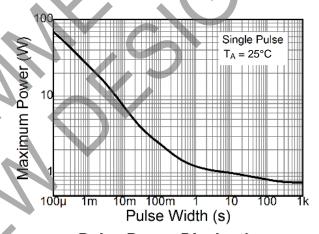


### **Thermal Characteristics**









**Transient Thermal Impedance** 

**Pulse Power Dissipation** 

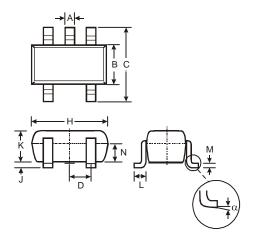


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### **Package Outline Dimensions**

Please see http://www.diodes.com/package-outlines.html for the latest version.

### SOT25

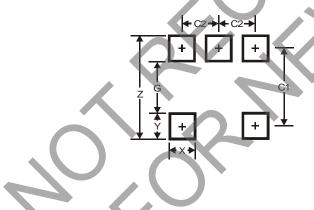


SOT25					
Dim	Min	Max	Тур		
Α	0.35	0.50	0.38		
В	1.50	1.70	1.60		
C	2.70	3.00	2.80		
ם	1	j	0.95		
Н	2.90	3.10	3.00		
7	0.013	0.10	0.05		
K	1.00	1.30	1.10		
1	0.35	0.55	0.40		
M	0.10	0.20	0.15		
2	0.70	0.80	0.75		
α	0°	8°	-		
All Dimensions in mm					

### **Suggested Pad Layout**

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT25



Dimensions	SOT25
Z	3.20
G	1.60
Х	0.55
Υ	0.80
C1	2.40
C2	0.95



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