

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^{\circ}C$
-200V	25Ω @ $V_{GS} = 10V$	200mA

## Description

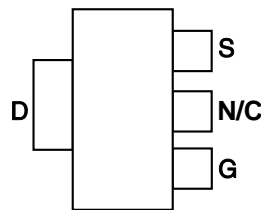
This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

## Applications

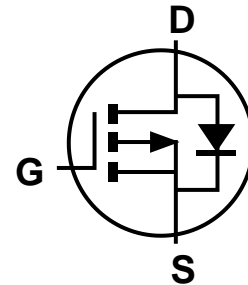
- Active clamping of primary aide MOSFETs in 48 Volt DC-DC converters



Top View



Pin Out - Top



Equivalent Circuit

## Features and Benefits

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

## Mechanical Data

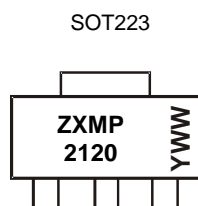
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.112 grams (Approximate)

## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP2120G4TA	ZXMP2120	7	12	1,000
ZXMP2120G4TC	ZXMP2120	13	12	4,000

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



ZXMP2120 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 5 = 2015)  
 WW or  $\bar{W}W$  = Week Code (01~53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-200	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C) (Note 5)	I <sub>D</sub>	-200	mA
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	-1	A
Pulsed Source Current (Body Diode) (Note 6)	I <sub>SM</sub>	-1	A

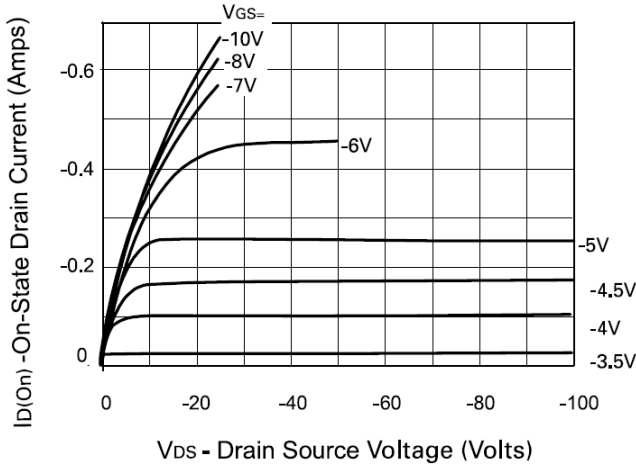
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation at T <sub>A</sub> = +25°C (Note 5)	P <sub>D</sub>	2.0	W
Linear Derating Factor		1.6	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	62.5	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

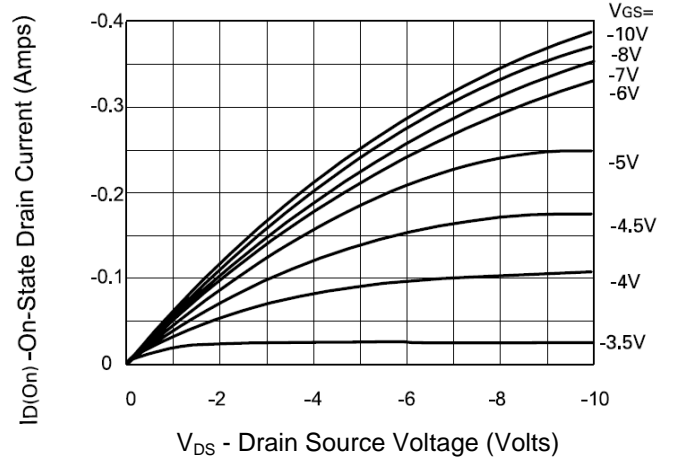
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-200	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	-10 -100	µA	V <sub>DS</sub> = -200V, V <sub>GS</sub> = 0V V <sub>DS</sub> = -160V, V <sub>GS</sub> = 0V, T = +125°C
Gate-Source Leakage	I <sub>GSS</sub>	-	-	20	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.5	-	-3.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -1mA
Static Drain-Source On-Resistance (Note 7)	R <sub>DS(ON)</sub>	-	-	25	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -150mA
Forward Transconductance (Notes 7 & 8)	g <sub>fs</sub>	50	-	-	mS	V <sub>DS</sub> = -25V, I <sub>D</sub> = -150mA
On-State Drain Current (Note 7)	I <sub>D(ON)</sub>	-300	-	-	mA	V <sub>DS</sub> = -25V, V <sub>GS</sub> = -10V
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance (Note 8)	C <sub>iss</sub>	-	-	100	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance (Note 8)	C <sub>oss</sub>	-	-	25	pF	
Reverse Transfer Capacitance (Note 8)	C <sub>rss</sub>	-	-	7	pF	V <sub>DD</sub> = -25V, I <sub>D</sub> = -150mA
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	
Turn-Off Delay Time (Notes 8 & 9)	t <sub>D(OFF)</sub>	-	-	12	ns	
Turn-Off Fall Time (Notes 8 & 9)	t <sub>F</sub>	-	-	15	ns	

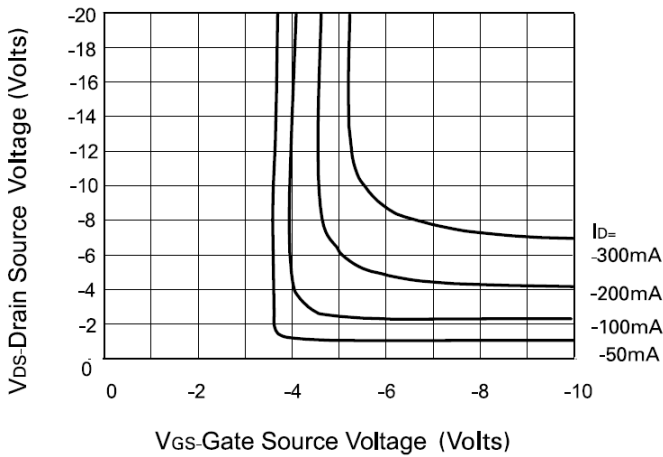
- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  6. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
  7. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.
  8. Sample test.
  9. Switching characteristics are independent of operating junction temperature.



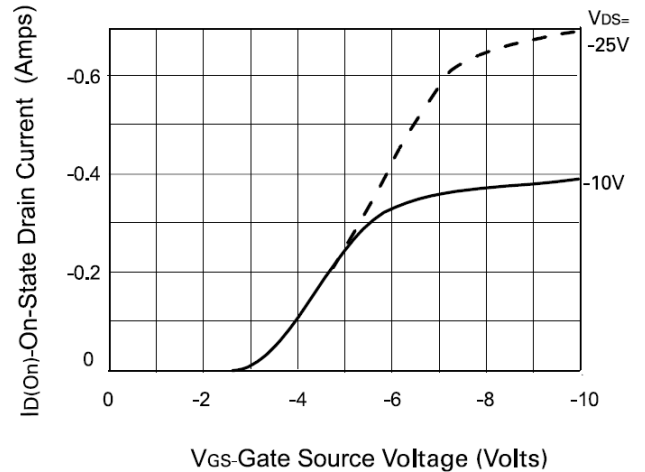
**Output Characteristics**



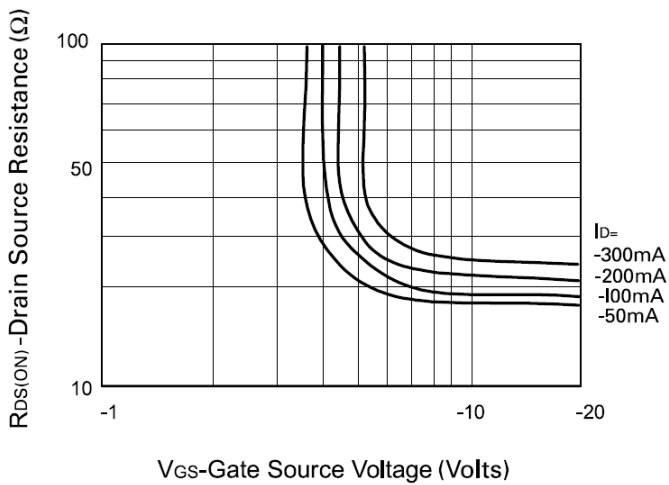
**Saturation Characteristics**



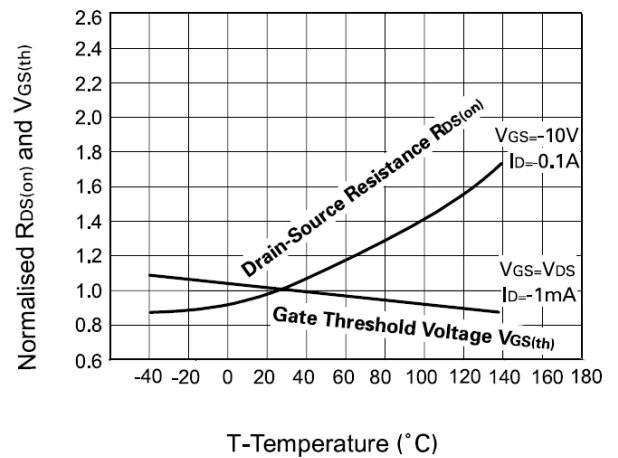
**Voltage Saturation Characteristics**



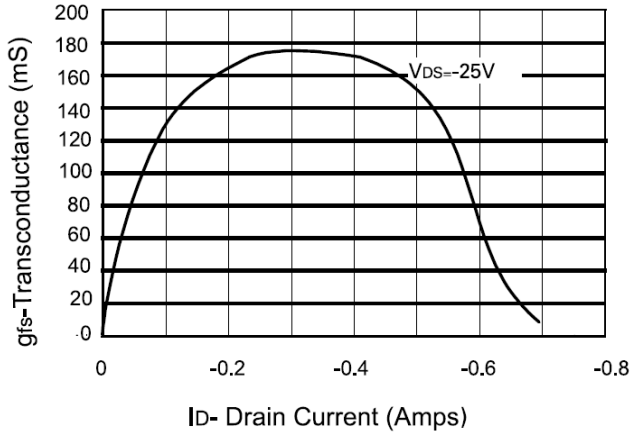
**Transfer Characteristics**



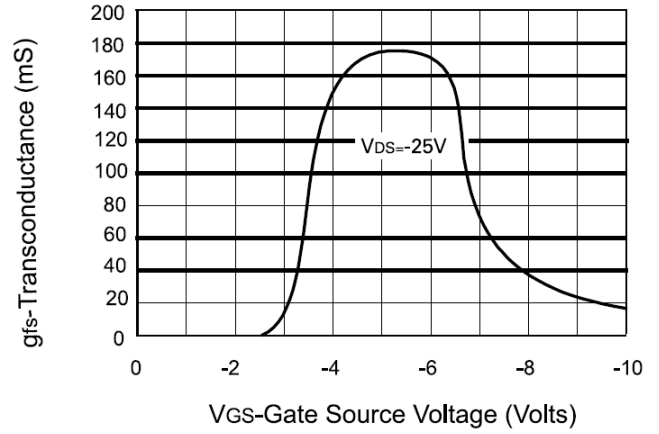
**On-resistance vs gate-source voltage**



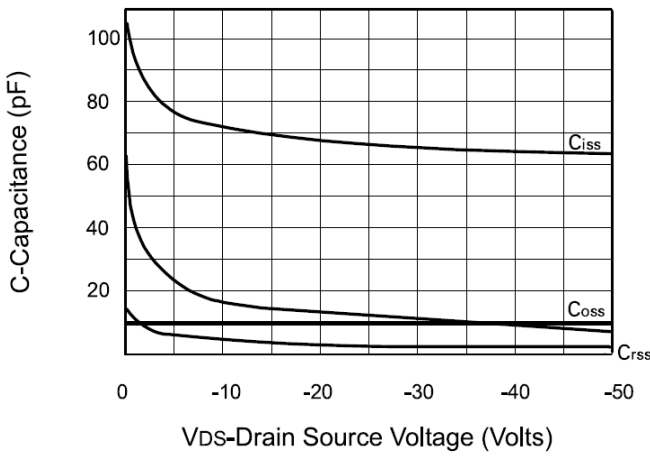
**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  vs Temperature**



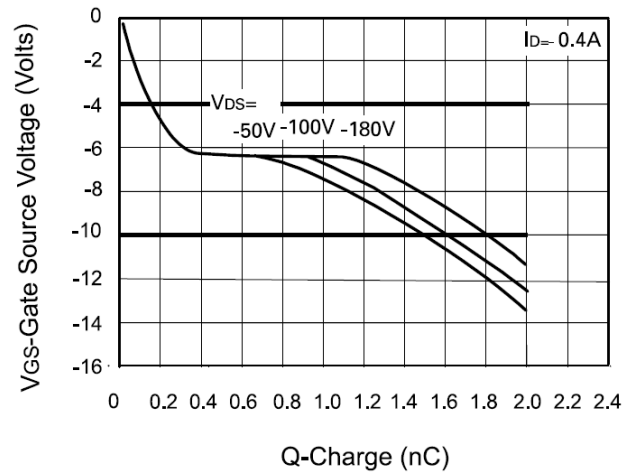
**Transconductance v drain current**



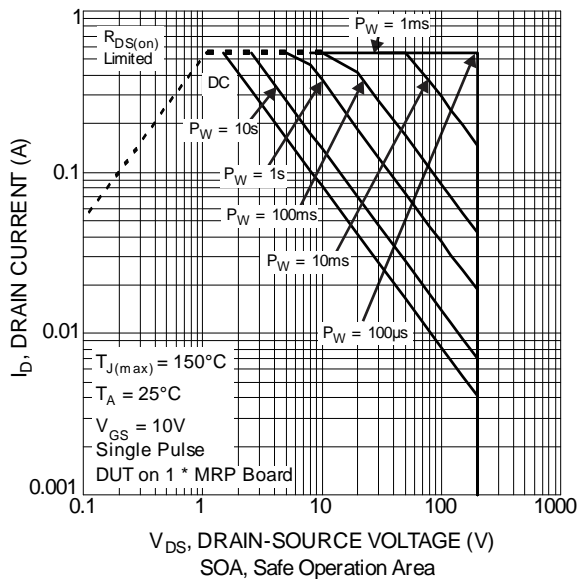
**Transconductance v gate-source voltage**

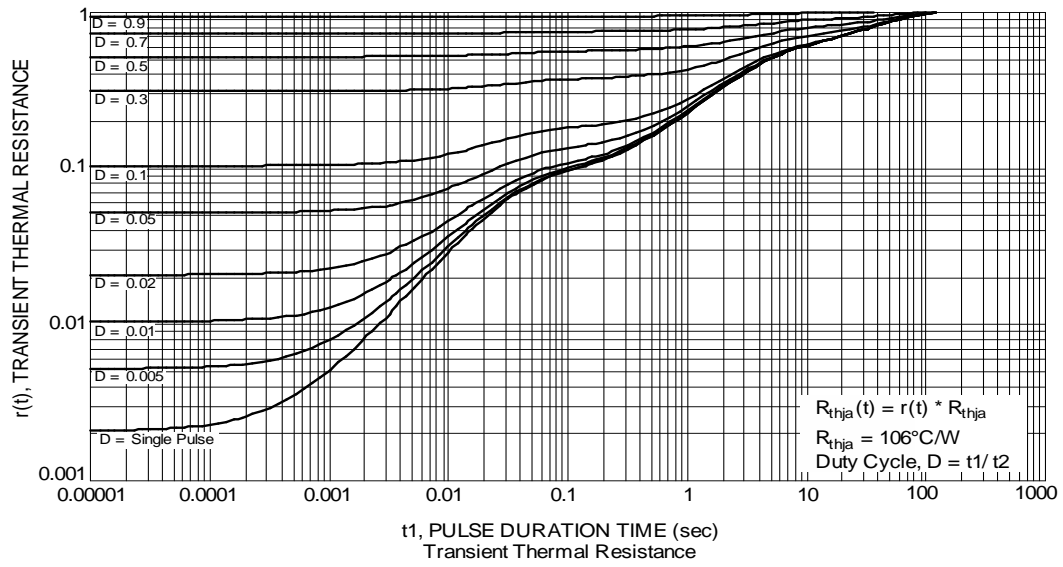


**Capacitance v drain-source voltage**



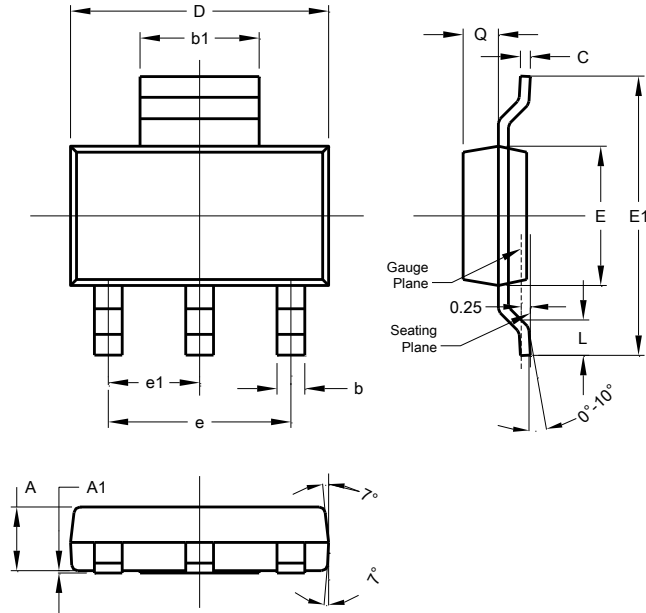
**Gate charge v gate-source voltage**





**Package Outline Dimensions**

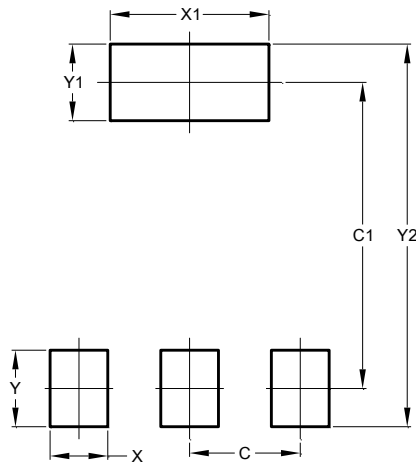
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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