

#### 200V N-CHANNEL ENHANCEMENT MODE MOSFET

### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C		
200V	10Ω @ V <sub>GS</sub> = 10V	320mA		

### **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**

Off-line Power Supply Start-up Circuitry

### **Features and Benefits**

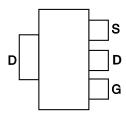
- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

### **Mechanical Data**

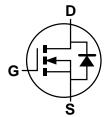
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (§3)
- Weight: 0.112 grams (Approximate)







Pin Out - Top



**Equivalent Circuit** 

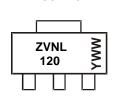
### **Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZVNL120GTA	ZVNL120	7	12	1,000
ZVNL120GTC	ZVNL120	13	12	4,000

Notes:

- 1. 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 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 http://www.diodes.com/products/packages.html.

### **Marking Information**



SOT223

ZVNL120 = Product Type Marking Code YWW = Date Code Marking Y or Y = Last Digit of Year (ex: 5 = 2015) WW or WW = Week Code (01~53)



# **Maximum Ratings** (@T<sub>A</sub> = +25°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)	I <sub>D</sub>	320	mA
Pulsed Drain Current	I <sub>DM</sub>	2	Α

## 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)	$P_{D}$	2.0	W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

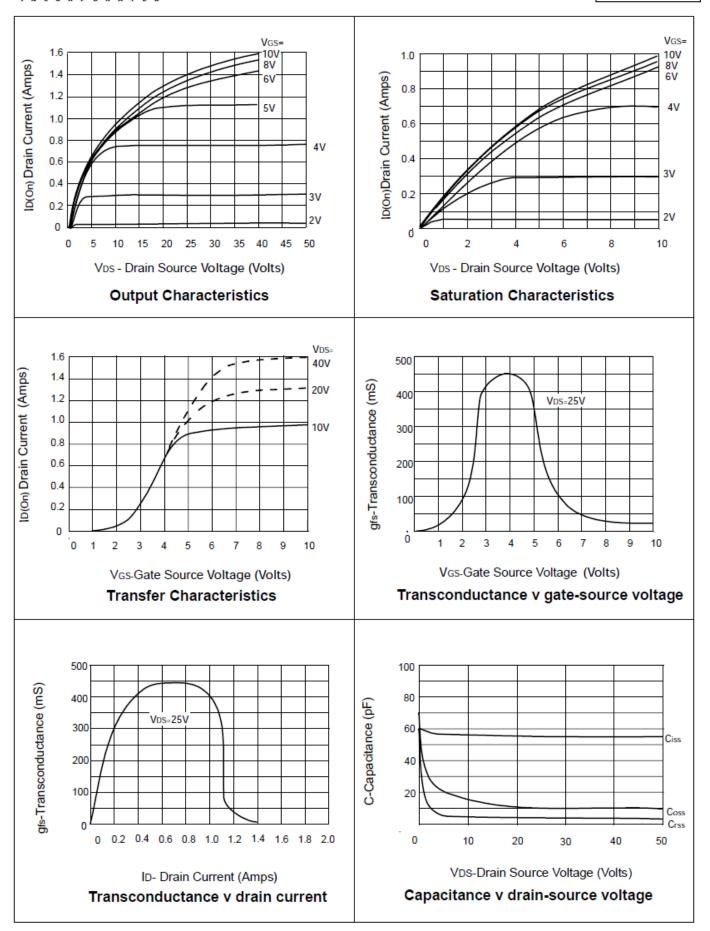
### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	200	-	-	V	$V_{GS} = 0V$ , $I_D = 1mA$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	10 100	μA	V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	-	-	100	nA	$V_{DS} = 160V, V_{GS} = 0V, T = +125^{\circ}C$ $V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS		•	•		•		
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	-	1.5	V	$V_{DS} = V_{GS}$ , $I_D = 1mA$	
Static Drain Source On Decistance (Note 6)		-	-	10	Ω	$V_{GS} = 5V, I_D = 250mA$	
Static Drain-Source On-Resistance (Note 6)	R <sub>DS(ON)</sub>	-	-	10	Ω	$V_{GS} = 3V, I_D = 125mA$	
Forward Transconductance (Notes 6 & 7)	<b>g</b> fs	200	-	-	mS	$V_{DS} = 25V, I_D = 250mA$	
On-State Drain Current (Note 6)	I <sub>D(ON)</sub>	500	-	-	mA	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 5V	
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C <sub>iss</sub>	-	-	85	рF		
Output Capacitance	Coss	-	-	20	pF	$V_{DS} = 25V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	Crss	-	-	7	pF		
Turn-On Delay Time (Note 8)	t <sub>D(ON)</sub>	-	-	8	ns	V <sub>DD</sub> = 25V, I <sub>D</sub> = 250mA	
Turn-On Rise Time (Note 8)	t <sub>R</sub>	-	-	8	ns		
Turn-Off Delay Time (Note 8)	t <sub>D(OFF)</sub>	-	-	20	ns		
Turn-Off Fall Time (Note 8)	t <sub>F</sub>	-	-	12	ns		

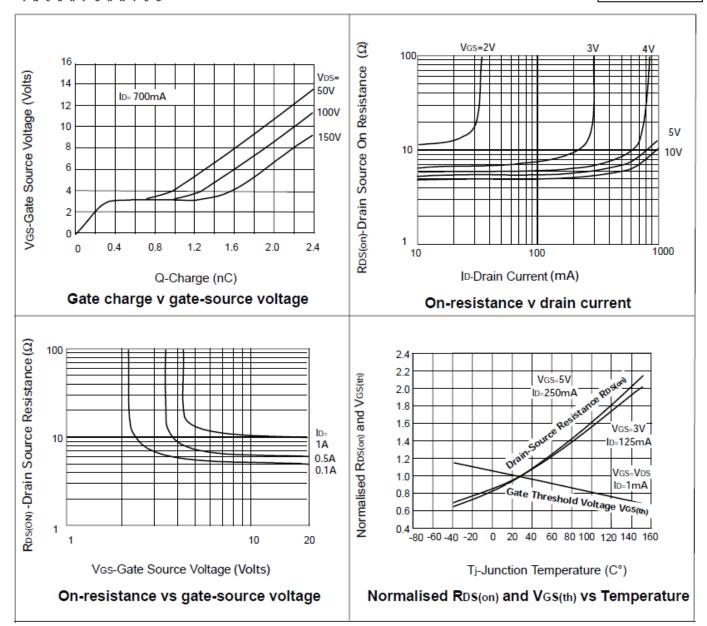
Notes:

- 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. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%.
- 7 Sample test
- 8. Switching times measured with  $50\Omega$  source impedance and <5ns rise time on a pulse generator.





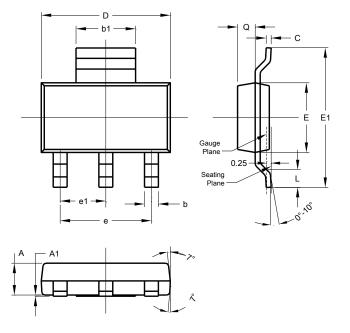






## **Package Outline Dimensions**

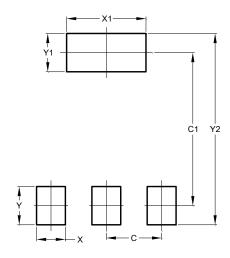
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223				
Dim	Min	Max	Тур	
Α	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	
С	0.20	0.30	0.25	
D	6.45	6.55	6.50	
Е	3.45	3.55	3.50	
E1	6.90	7.10	7.00	
е	-	-	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)		
С	2.30		
C1	6.40		
Х	1.20		
X1	3.30		
Y	1.60		
Y1	1.60		
Y2	8.00		



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