

## Product Summary

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

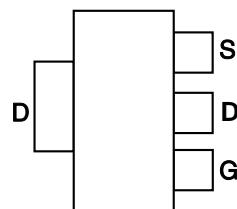
- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

## Mechanical Data

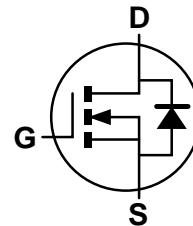
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (e3)
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top



Equivalent Circuit

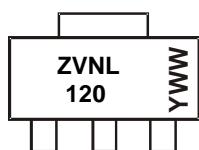
## Ordering Information (Note 4)

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.
  2. 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.
  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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	200	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS} = 10\text{V}$ , $T_A = +25^\circ\text{C}$ )	$I_D$	320	mA
Pulsed Drain Current	$I_{DM}$	2	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2.0	W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

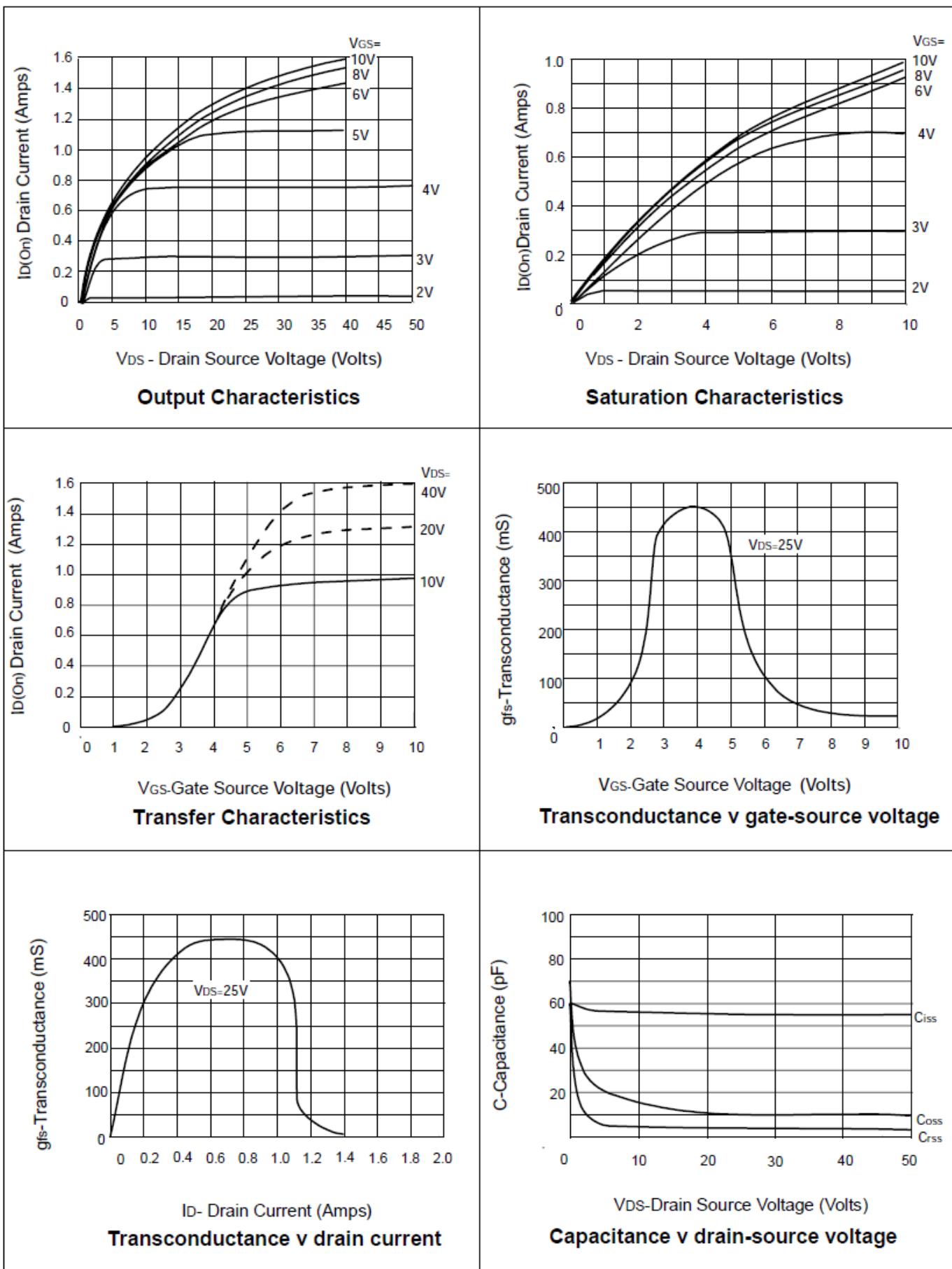
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	200	-	-	V	$V_{GS} = 0\text{V}$ , $I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	10 100	$\mu\text{A}$	$V_{DS} = 200\text{V}$ , $V_{GS} = 0\text{V}$ $V_{DS} = 160\text{V}$ , $V_{GS} = 0\text{V}$ , $T = +125^\circ\text{C}$
Gate-Source Leakage	$I_{GSS}$	-	-	100	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	-	1.5	V	$V_{DS} = V_{GS}$ , $I_D = 1\text{mA}$
Static Drain-Source On-Resistance (Note 6)	$R_{DS(ON)}$	-	-	10	$\Omega$	$V_{GS} = 5\text{V}$ , $I_D = 250\text{mA}$
		-	-	10	$\Omega$	$V_{GS} = 3\text{V}$ , $I_D = 125\text{mA}$
Forward Transconductance (Notes 6 & 7)	$g_{fs}$	200	-	-	$\text{mS}$	$V_{DS} = 25\text{V}$ , $I_D = 250\text{mA}$
On-State Drain Current (Note 6)	$I_{D(ON)}$	500	-	-	$\text{mA}$	$V_{DS} = 25\text{V}$ , $V_{GS} = 5\text{V}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	-	-	85	$\text{pF}$	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	-	20	$\text{pF}$	
Reverse Transfer Capacitance	$C_{rss}$	-	-	7	$\text{pF}$	
Turn-On Delay Time (Note 8)	$t_{D(ON)}$	-	-	8	ns	$V_{DD} = 25\text{V}$ , $I_D = 250\text{mA}$
Turn-On Rise Time (Note 8)	$t_R$	-	-	8	ns	
Turn-Off Delay Time (Note 8)	$t_{D(OFF)}$	-	-	20	ns	
Turn-Off Fall Time (Note 8)	$t_F$	-	-	12	ns	

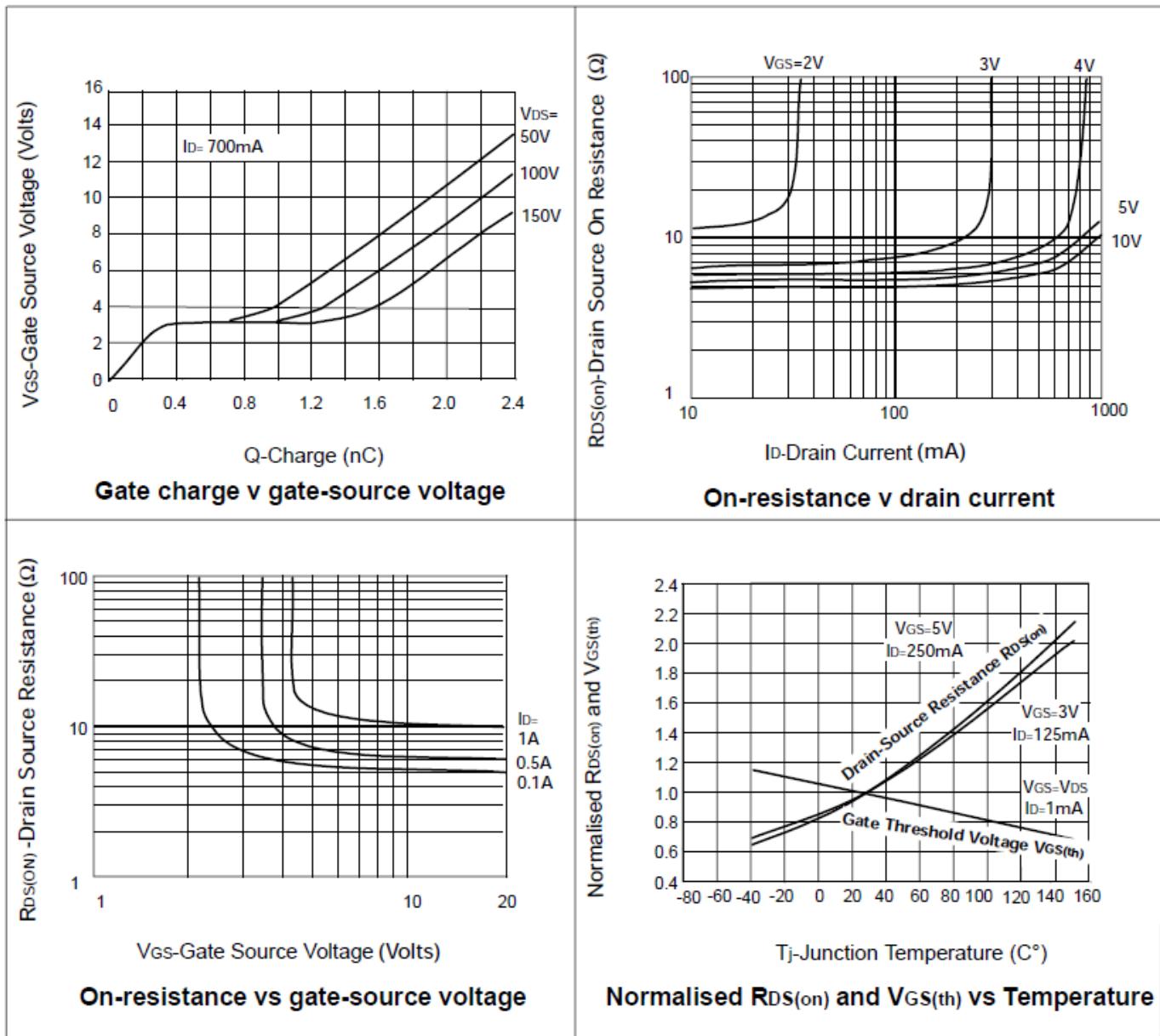
Notes: 5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

6. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

7. Sample test.

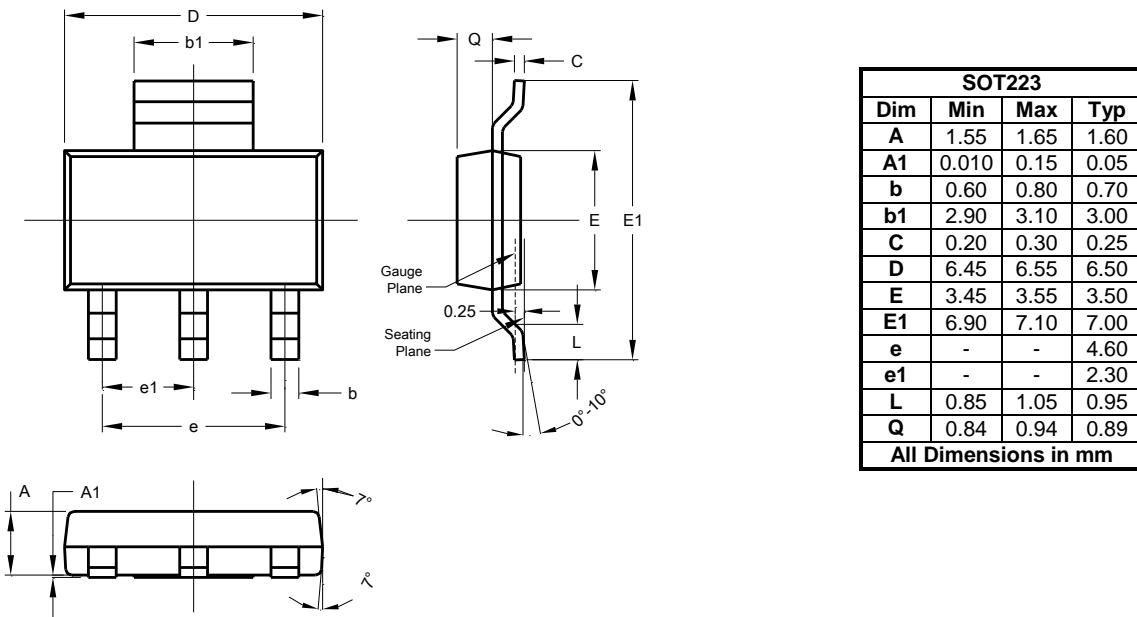
8. Switching times measured with  $50\Omega$  source impedance and  $<5\text{ns}$  rise time on a pulse generator.





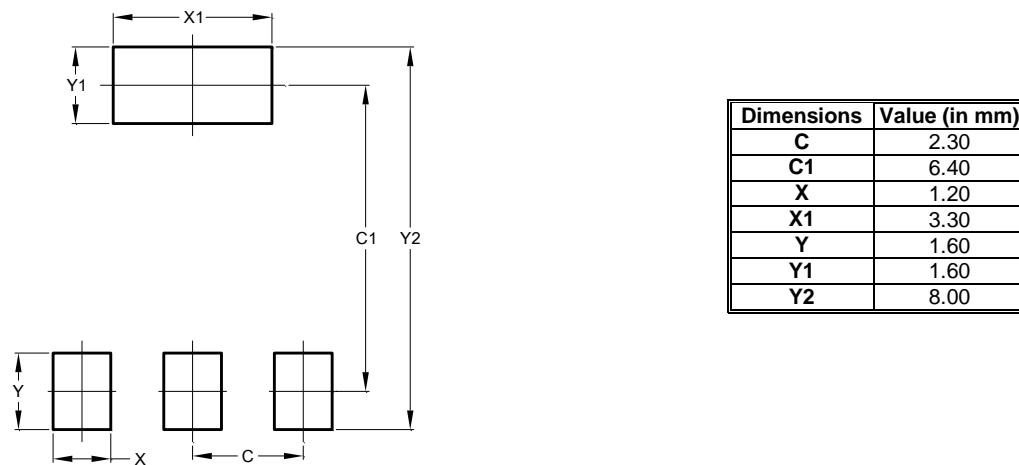
## Package Outline Dimensions

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



## Suggested Pad Layout

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



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