

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ\text{C}$
200V	10Ω @ $V_{GS} = 10\text{V}$	320mA

## Description and Applications

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.

- Offline 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)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

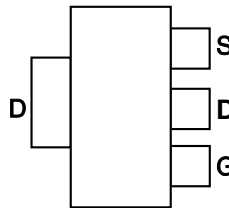
## Mechanical Data

- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

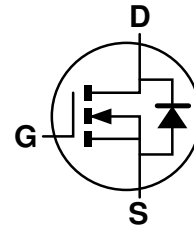
SOT223 (Type DN)



Top View



Pin Out - Top



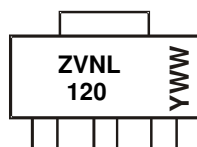
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVNL120GTA	SOT223 (Type DN)	1,000	Tape & Reel
ZVNL120GTC	SOT223 (Type DN)	4,000	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  - See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



ZVNL120 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 2 = 2022)  
 WW or  $\bar{W}$  = 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

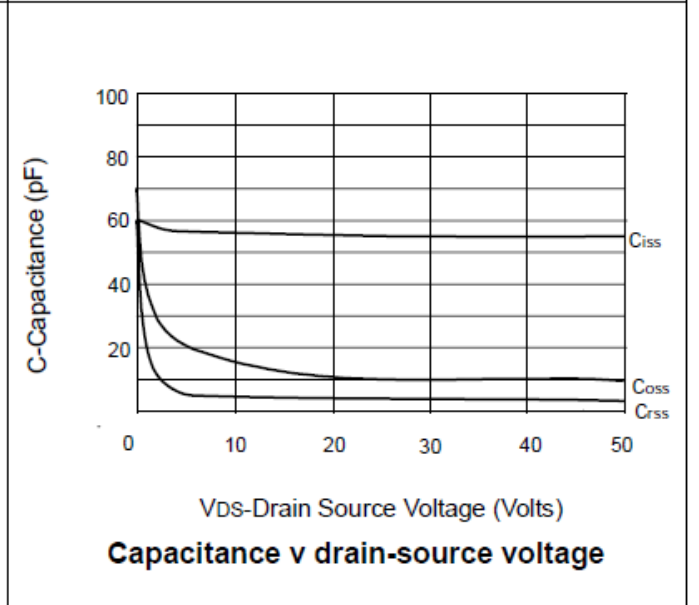
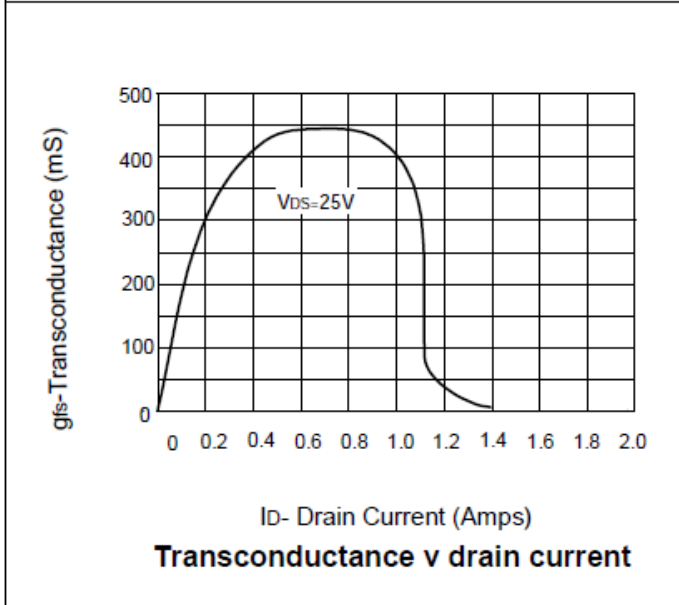
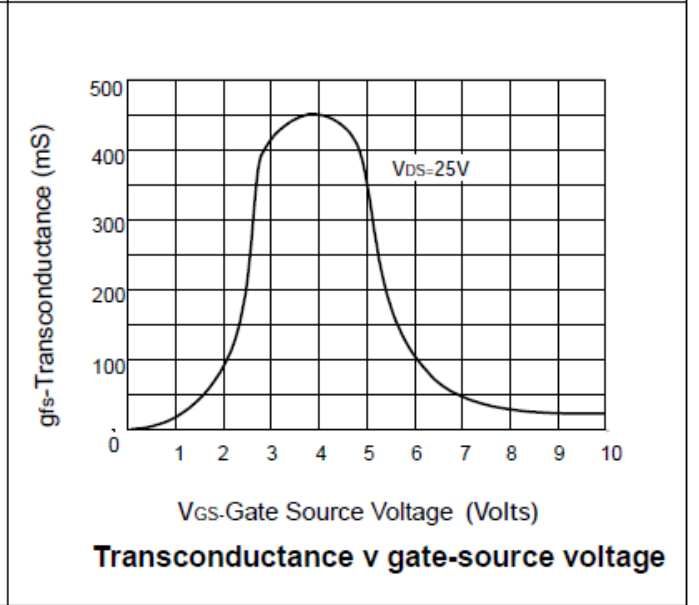
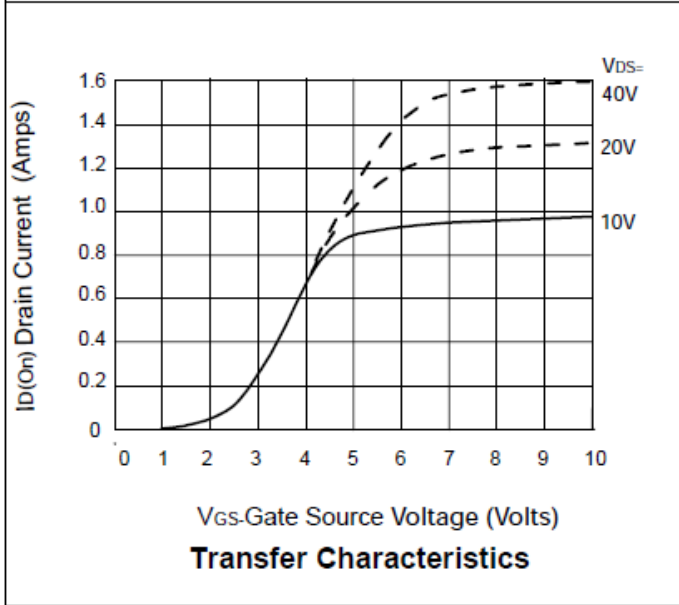
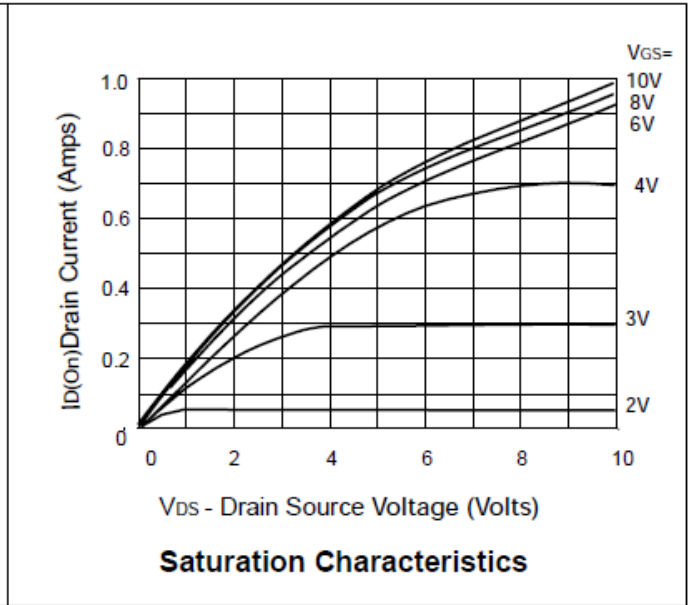
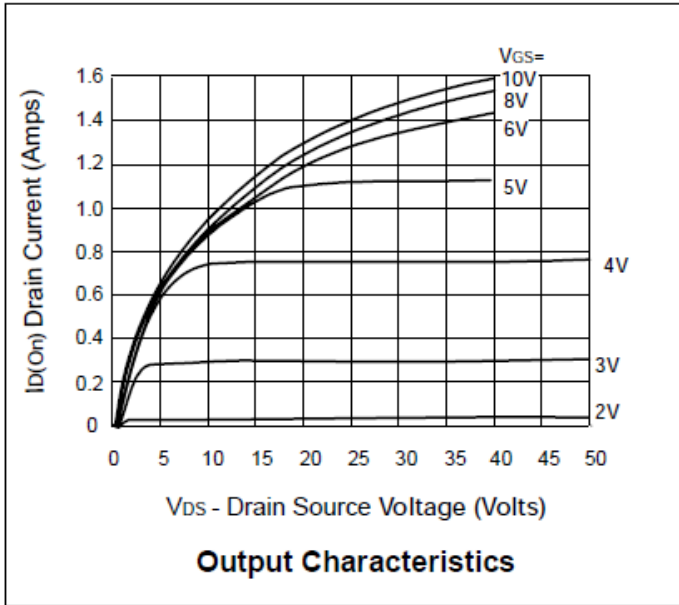
**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

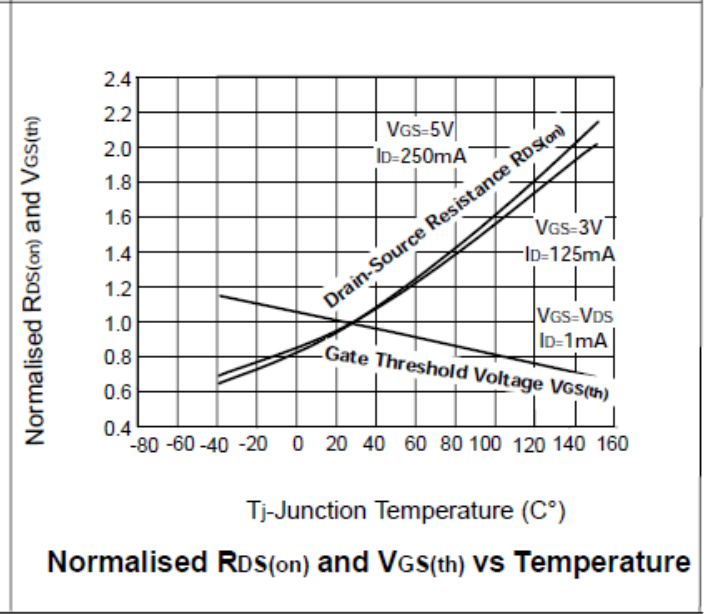
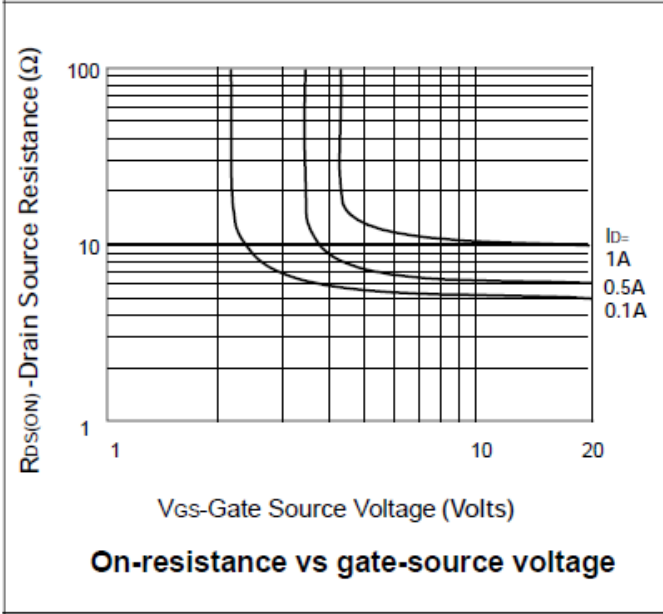
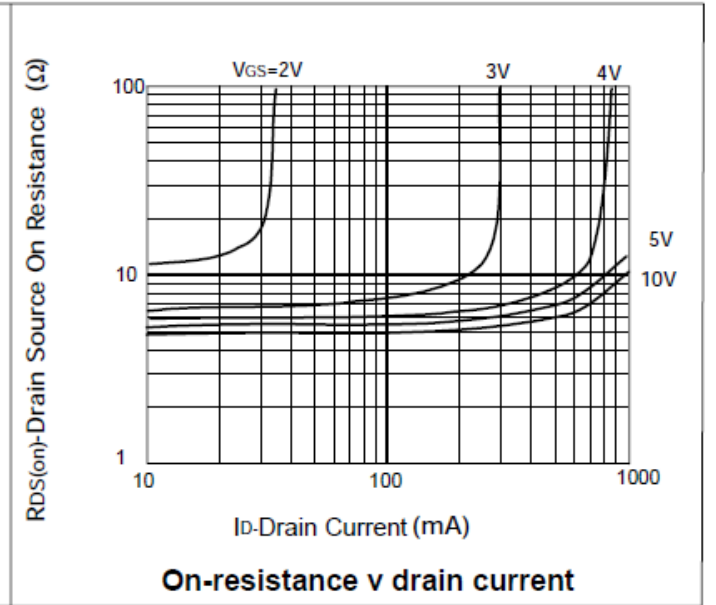
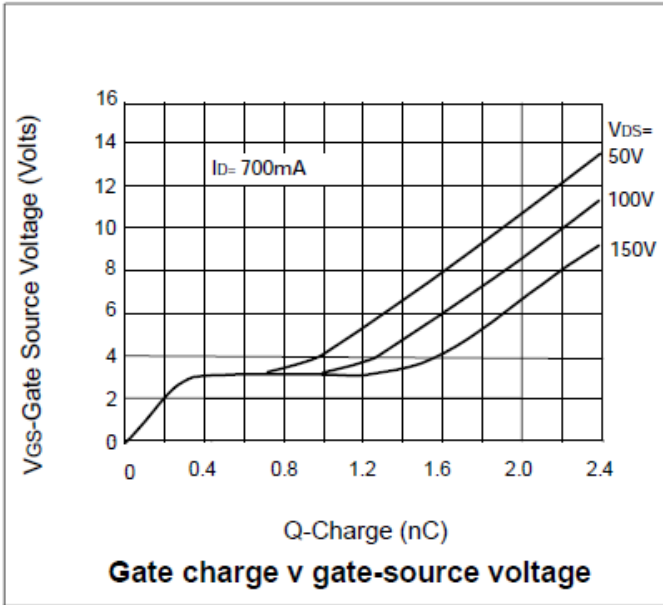
Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2.0	W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**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	-	-	mS	$V_{DS} = 25\text{V}$ , $I_D = 250\text{mA}$
On-State Drain Current (Note 6)	$I_{D(on)}$	500	-	-	mA	$V_{DS} = 25\text{V}$ , $V_{GS} = 5\text{V}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	-	-	85	pF	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	-	20	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	-	7	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 <5ns rise time on a pulse generator.

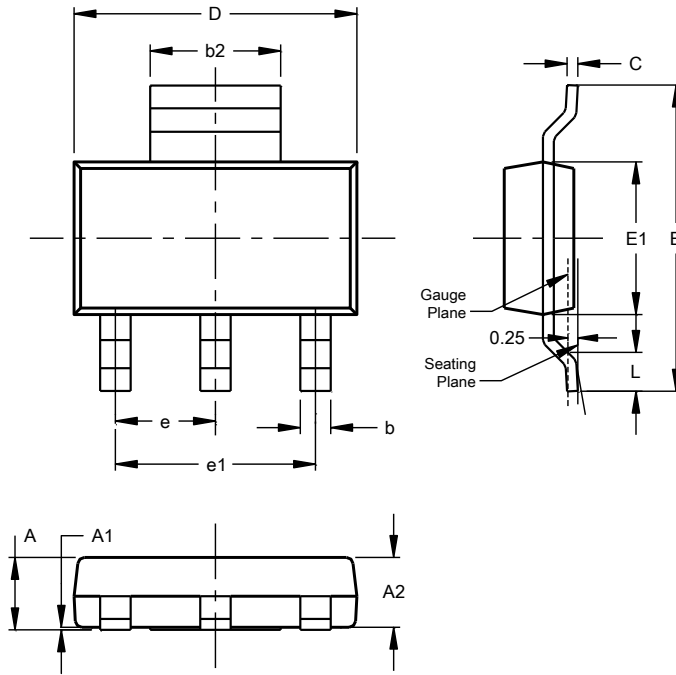




**Package Outline Dimensions**

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

**SOT223 (Type DN)**

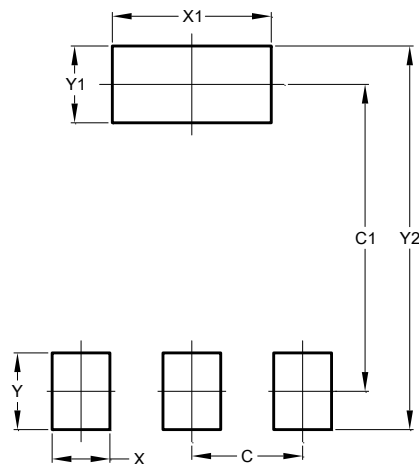


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT223 (Type DN)**



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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