200V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = +25°C
200V	10Ω @ V_{GS} = 10V	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

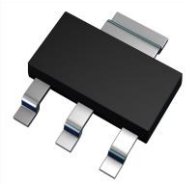
Features and Benefits

- 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 or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

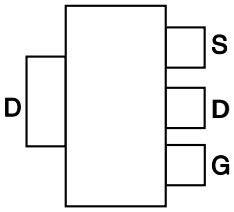
Mechanical Data

- 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 e3
- Weight: 0.112 grams (Approximate)

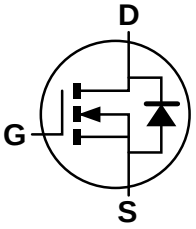
SOT223 (Type DN)



Top View



Pin Out - Top



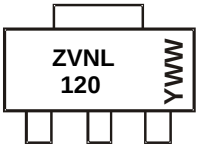
Equivalent Circuit

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:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. 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.
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



ZVNL120 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 2 = 2022)
WW or $\overline{WW}$ = Week Code (01~53)

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Maximum Ratings (@ T_A = +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_{GS} = 10V, T_A = +25°C)	I_D	320	mA
Pulsed Drain Current	I_{DM}	2	A

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

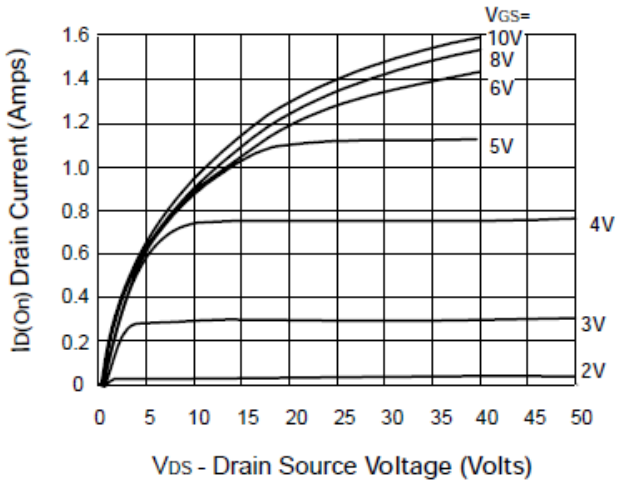
Characteristic	Symbol	Value	Unit
Power Dissipation at T_A = +25°C (Note 5)	P_D	2.0	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

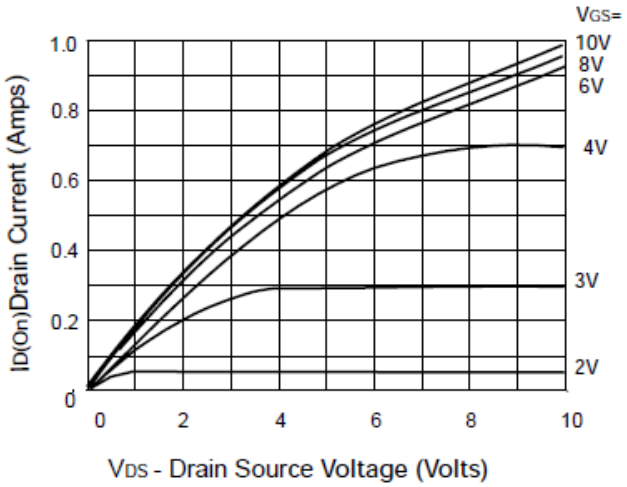
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	200	-	-	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	10 100	µA	V_{DS} = 200V, V_{GS} = 0V V_{DS} = 160V, V_{GS} = 0V, T = +125°C
Gate-Source Leakage	I_{GSS}	-	-	100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	-	1.5	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance (Note 6)	$R_{DS(on)}$	-	-	10	Ω	V_{GS} = 5V, I_D = 250mA
		-	-	10	Ω	V_{GS} = 3V, I_D = 125mA
Forward Transconductance (Notes 6, 7)	g_{fs}	200	-	-	mS	V_{DS} = 25V, I_D = 250mA
On-State Drain Current (Note 6)	$I_{D(on)}$	500	-	-	mA	V_{DS} = 25V, V_{GS} = 5V
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	-	85	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
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} = 25V, I_D = 250mA
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≦300µs. Duty cycle ≦2%.
7. Sample test.
8. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator.

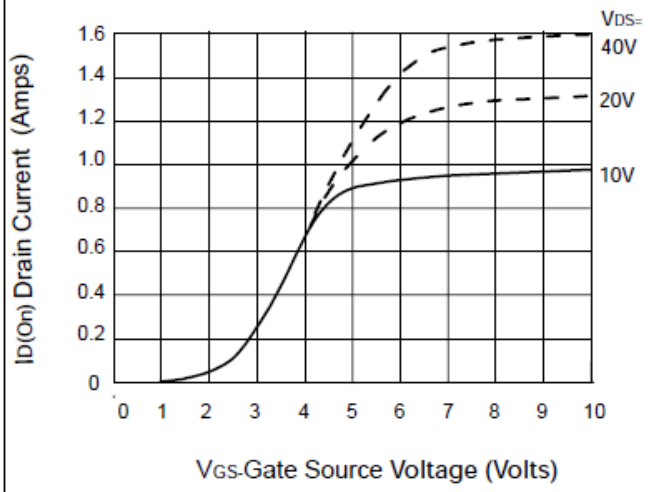
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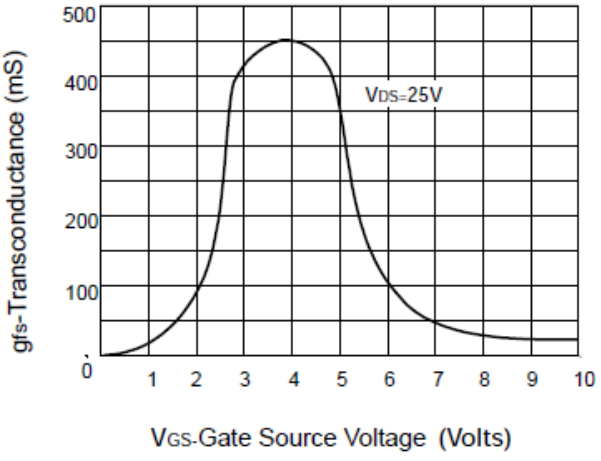
Output Characteristics



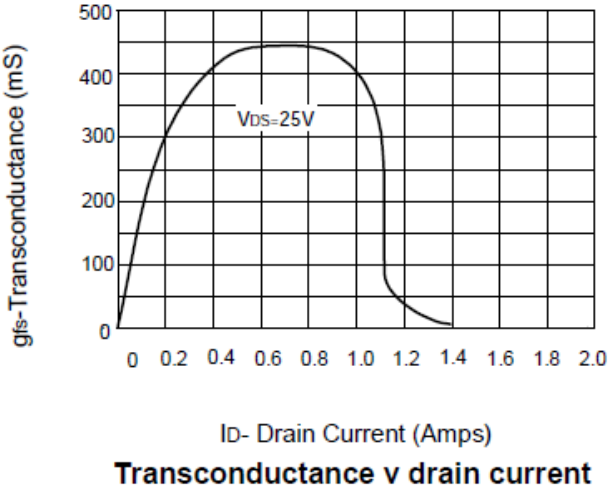
Saturation Characteristics



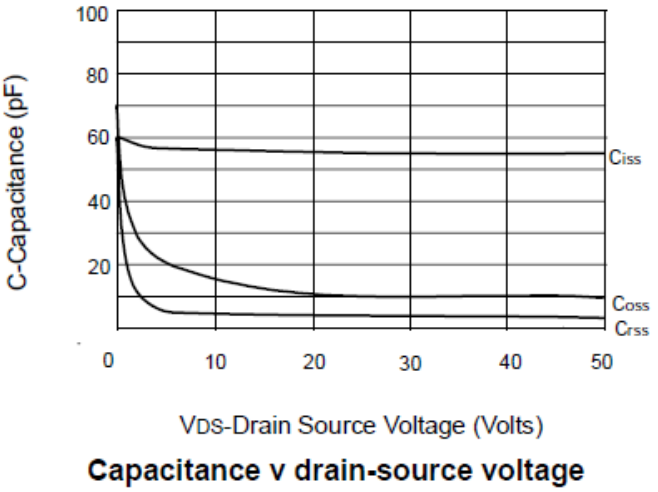
Transfer Characteristics



Transconductance v gate-source voltage

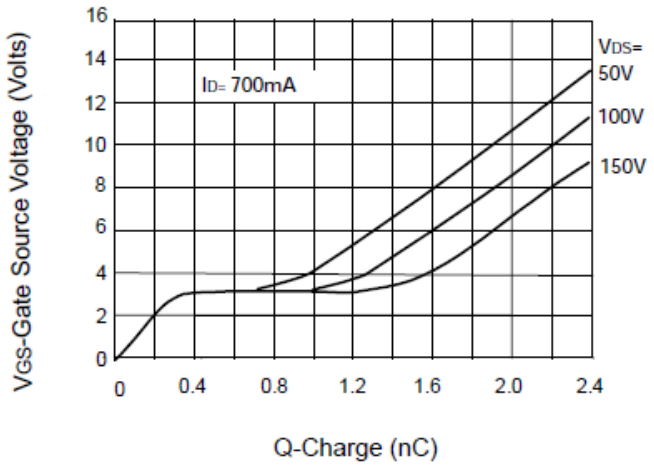


Transconductance v drain current

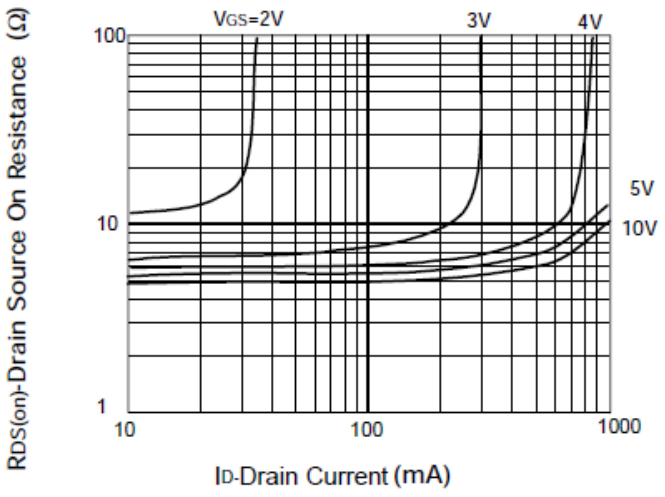


Capacitance v drain-source voltage

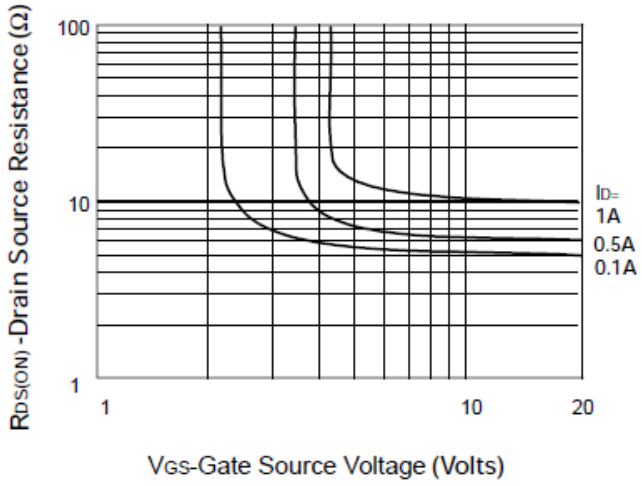
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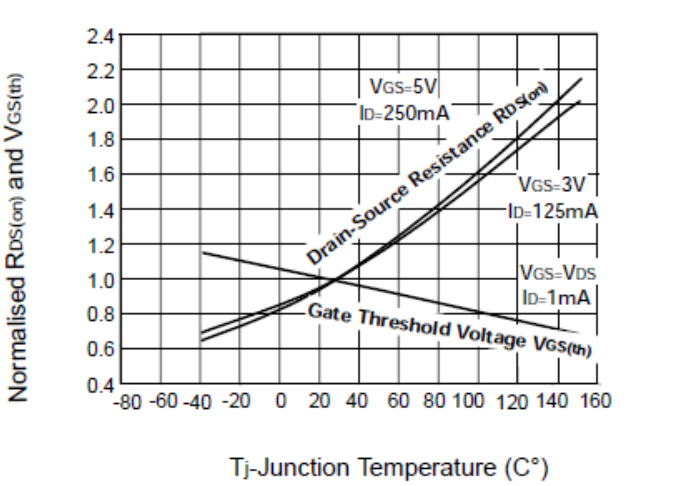
Gate charge v gate-source voltage



On-resistance v drain current



On-resistance vs gate-source voltage



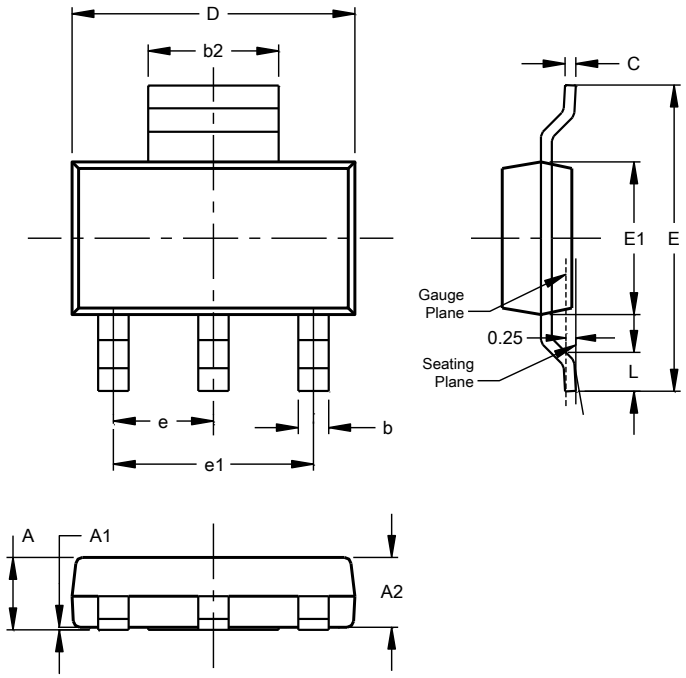
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature

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Package Outline Dimensions

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

SOT223 (Type DN)

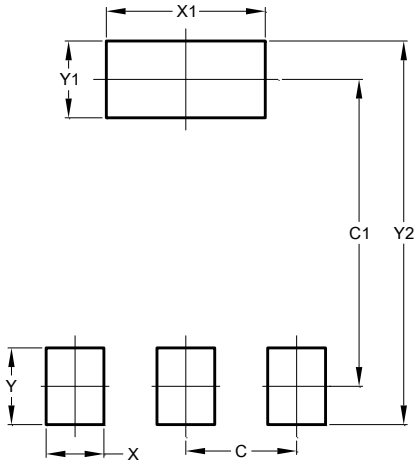


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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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