

## SOT223 P-CHANNEL ENHANCEMENT MODE VERTICAL DMOSFET

### Product Summary

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

### Description

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

### Applications

- Backlighting
- AC-DC Converters

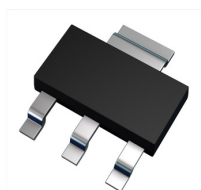
### Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Complementary Type – ZVN2120G
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

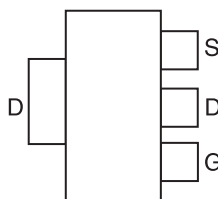
### Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.112 grams (Approximate)

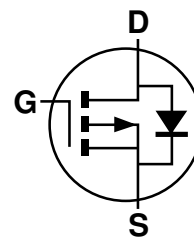
SOT223



Top View



Pin Out - Top



Equivalent Circuit

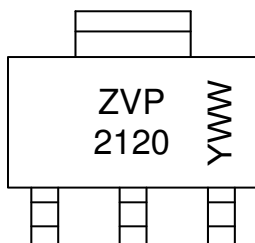
### Ordering Information (Note 4)

Product	Case	Quantity per reel
ZVP2120GTA	SOT223	1,000

- Note:
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



ZVP 2120 = 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	Units
Drain-Source Voltage	V <sub>DS</sub>	-200	V
Continuous Drain Current	I <sub>D</sub>	-200	mA
Pulsed Drain Current	I <sub>DM</sub>	-1.2	A

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

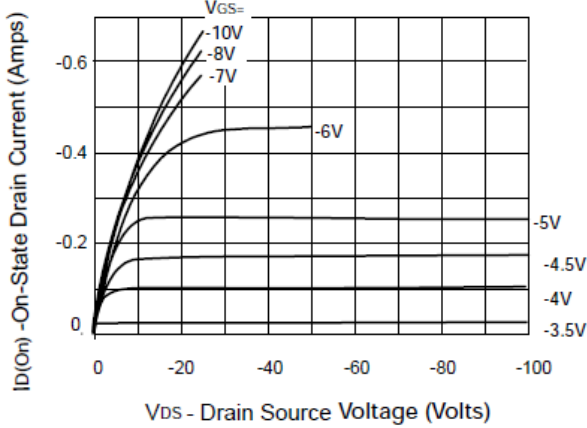
Characteristic	Symbol	Value	Units
Power Dissipation	P <sub>tot</sub>	2	W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

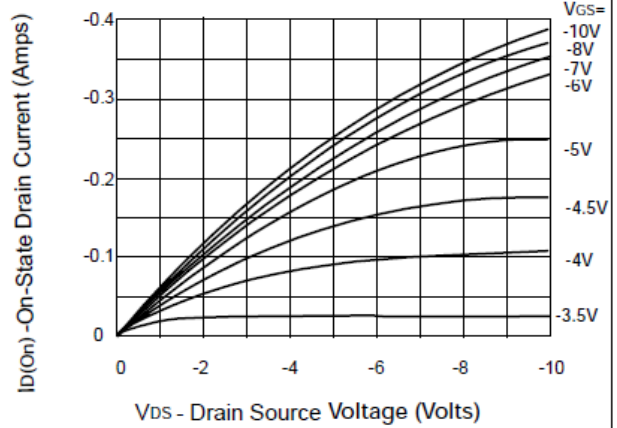
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-200	-	-	V	I <sub>D</sub> = -1mA, V <sub>GS</sub> = 0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	-1.5	-	-3.5	V	I <sub>D</sub> = -1mA, V <sub>DS</sub> = V <sub>GS</sub>
Gate-Body Leakage	I <sub>GSS</sub>	-	-	-20	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	-10	μA	V <sub>DS</sub> = -200V, V <sub>GS</sub> = 0V
				-100	μA	V <sub>DS</sub> = -160V, V <sub>GS</sub> = 0V, T = +125°C (Note 6)
On-State Drain Current (Note 5)	I <sub>D(on)</sub>	-300	-	-	mA	V <sub>DS</sub> = -25V, V <sub>GS</sub> = -10V
Static Drain-Source On-State Resistance (Note 5)	R <sub>DS(on)</sub>	-	-	25	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -150mA
Forward Transconductance (Notes 5 & 6)	g <sub>fs</sub>	50	-	-	mS	V <sub>DS</sub> = -25V, I <sub>D</sub> = -150mA
<b>Dynamic Characteristics (Note 6)</b>						
Input Capacitance	C <sub>iss</sub>	-	-	100	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1MHz
Common Source Output Capacitance	C <sub>oss</sub>	-	-	25		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	-	7		
Turn-On Delay Time (Note 7)	t <sub>d(on)</sub>	-	-	7	ns	V <sub>DD</sub> = -25V, I <sub>D</sub> = -150mA
Rise Time (Note 7)	t <sub>r</sub>	-	-	15		
Turn-Off Delay Time (Note 7)	t <sub>d(off)</sub>	-	-	12		
Fall Time (Note 7)	f <sub>f</sub>	-	-	15		

- Notes: 5. Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2%.  
6. Sample Test.  
7. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator.

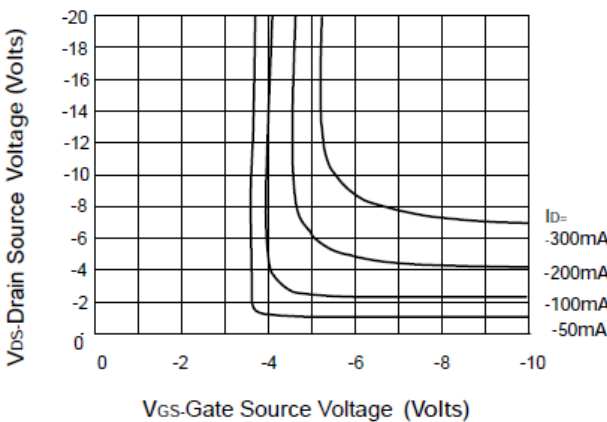
# Typical Characteristics



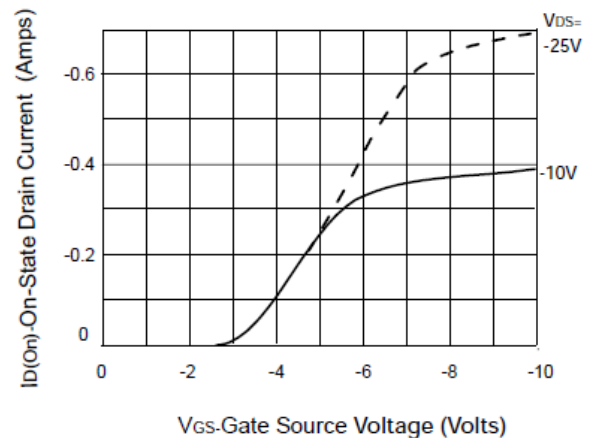
**Output Characteristics**



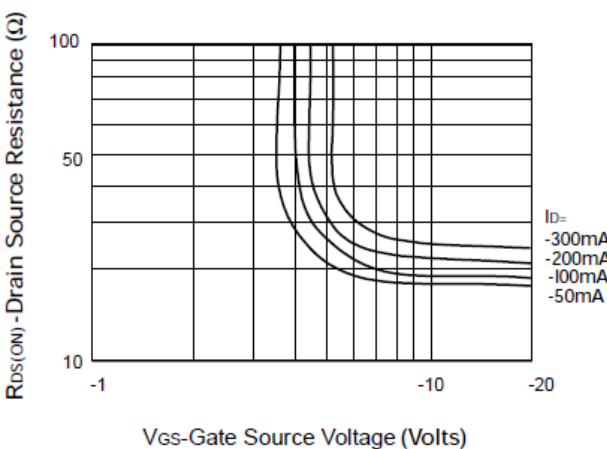
**Saturation Characteristics**



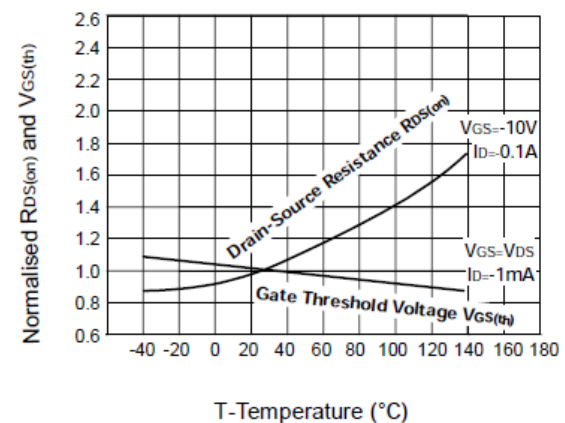
**Voltage Saturation Characteristics**



**Transfer Characteristics**

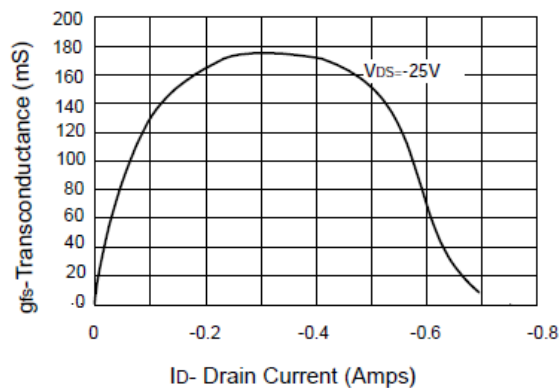


**On-resistance vs gate-source voltage**

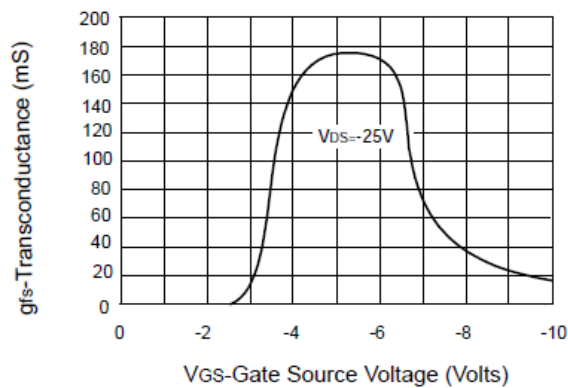


**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  vs Temperature**

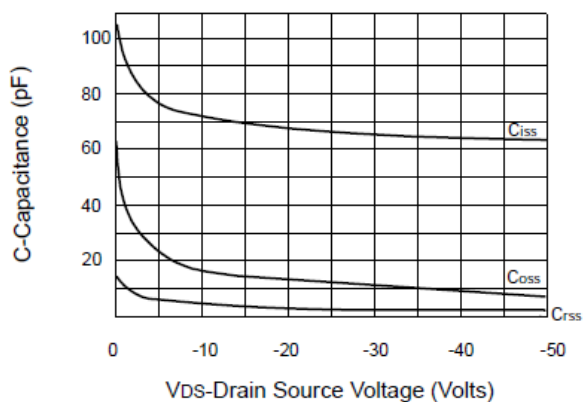
**Typical Characteristics (cont.)**



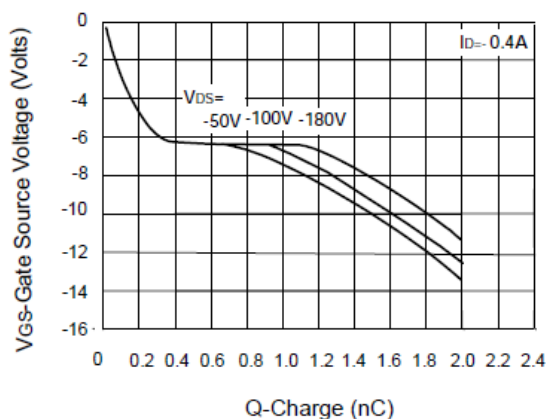
**Transconductance v drain current**



**Transconductance v gate-source voltage**



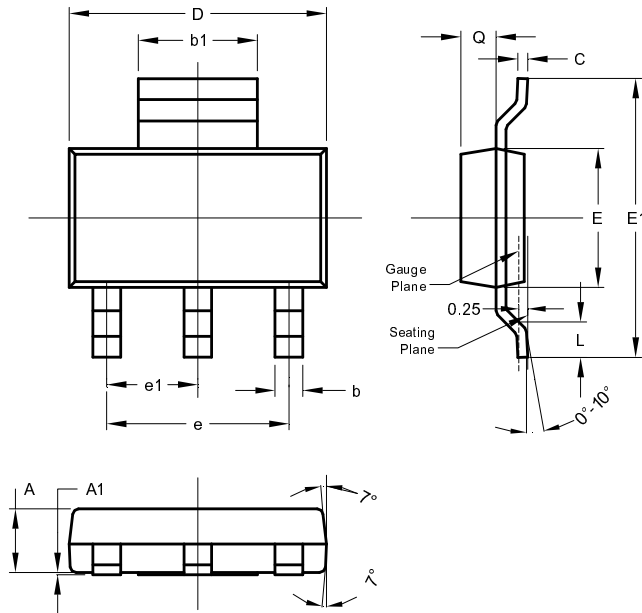
**Capacitance v drain-source voltage**



**Gate charge v gate-source voltage**

## Package Outline Dimensions

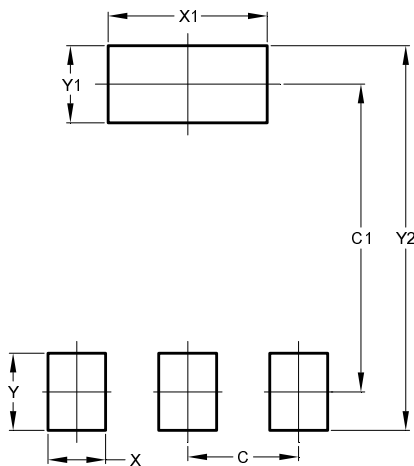
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
C2	8.00

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