

**100V N-CHANNEL ENHANCEMENT MODE VERTICAL MOSFET IN SOT223**
**Features and Benefits**

- $V_{(BR)DSS} > 100V$
- $R_{DS(ON)} \leq 0.54\Omega$  @  $V_{GS} = 10V$
- Maximum Continuous Drain Current  $I_D = 1.67A$
- **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
- Weight: 0.112 grams (Approximate)

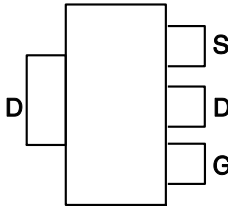
**Applications**

- DC-DC Converters
- Solenoids / Relay Driver for Automotive

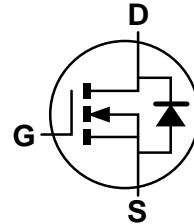
SOT223



Top View



Pin Out - Top



Equivalent Circuit

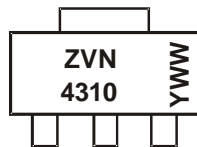
**Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZVN4310GTA	ZVN4310	7	8	1,000

- 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



ZVN4310 = 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	Unit
Drain-Source Voltage	V <sub>DSS</sub>	100	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	1.67	A
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	12	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	3	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	41.7	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	8.84	°C/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>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	-	-	10 100	μA μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V, T <sub>A</sub> = +125°C
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±20	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
On-State Drain Current	I <sub>D(ON)</sub>	9	-	-	A	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 10V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	-	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	0.4 0.5	0.54 0.75	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.3A V <sub>GS</sub> = 5V, I <sub>D</sub> = 1.5A
Forward Transconductance	g <sub>fs</sub>	0.6	-	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.3A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iSS</sub>	-	-	350	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oSS</sub>	-	-	140	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	-	-	20	pF	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	-	8	ns	V <sub>DD</sub> = 25V, I <sub>D</sub> = 3A, V <sub>GEN</sub> = 10V, R <sub>GS</sub> = 50Ω
Turn-On Rise Time	t <sub>R</sub>	-	-	25	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	-	30	ns	
Turn-Off Fall Time	t <sub>F</sub>	-	-	16	ns	

- Notes:
- For a device mounted on 50mm X 50mm X 1.6mm FR-4 PCB with high coverage of single sided 2oz copper, in still air condition.
  - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).
  - Short duration pulse test used to minimize self-heating effect.

**Electrical Characteristics**

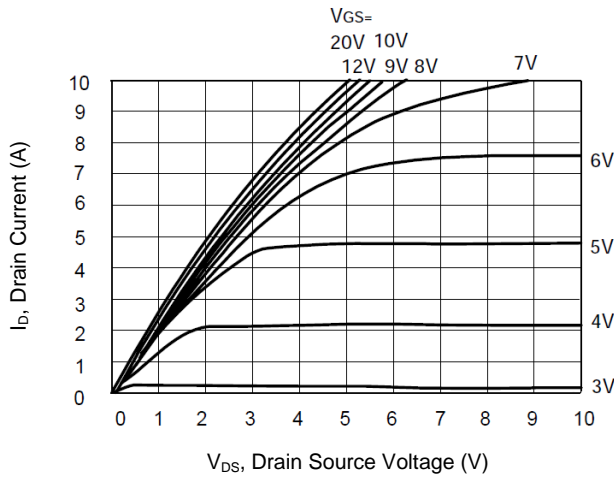


Figure 1. Saturation Characteristics

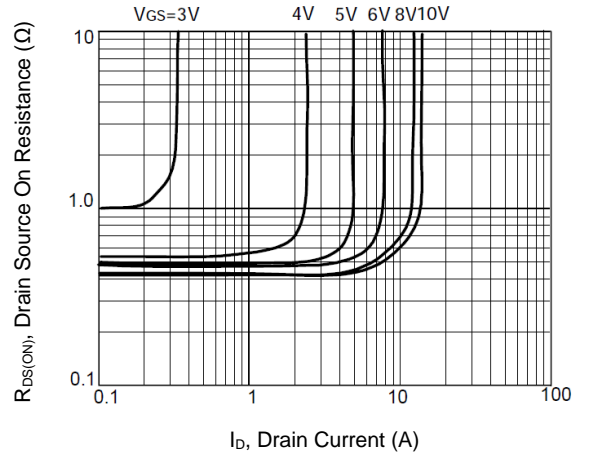


Figure 2. On-resistance vs. Drain Current

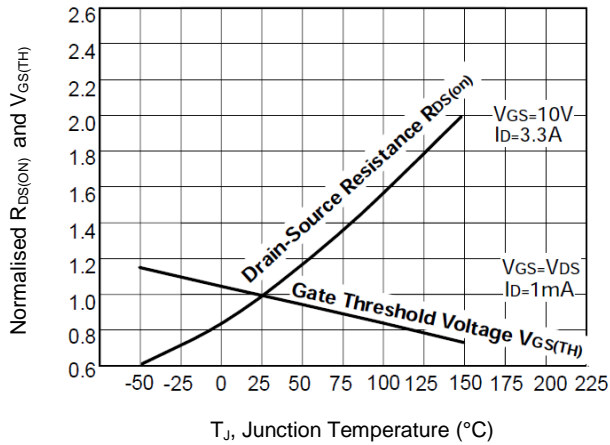


Figure 3. Normalised  $R_{DS(ON)}$  and  $V_{GS(TH)}$  vs. Temperature

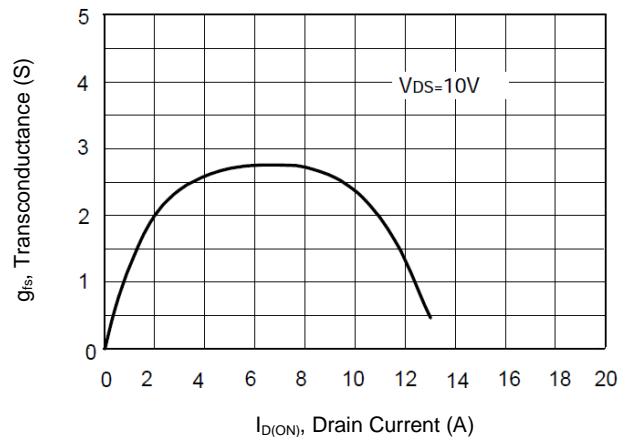


Figure 4. Transconductance vs. Drain Current

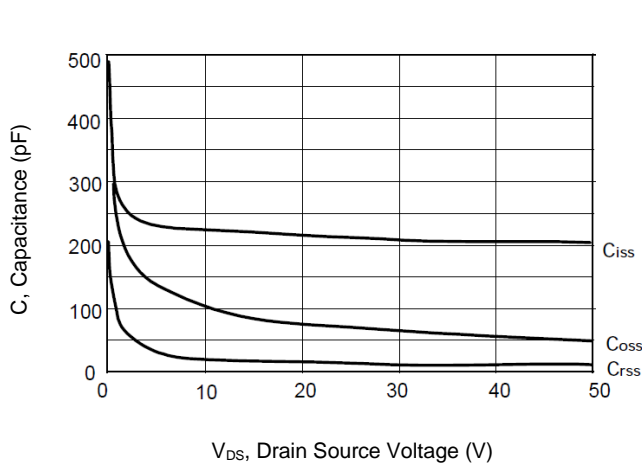


Figure 5. Capacitance vs. Drain-source Voltage

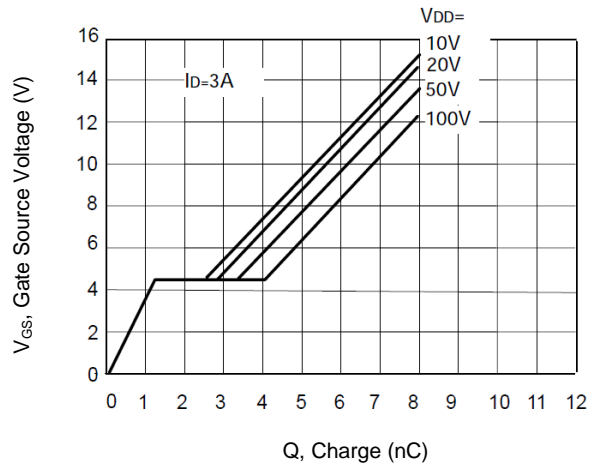
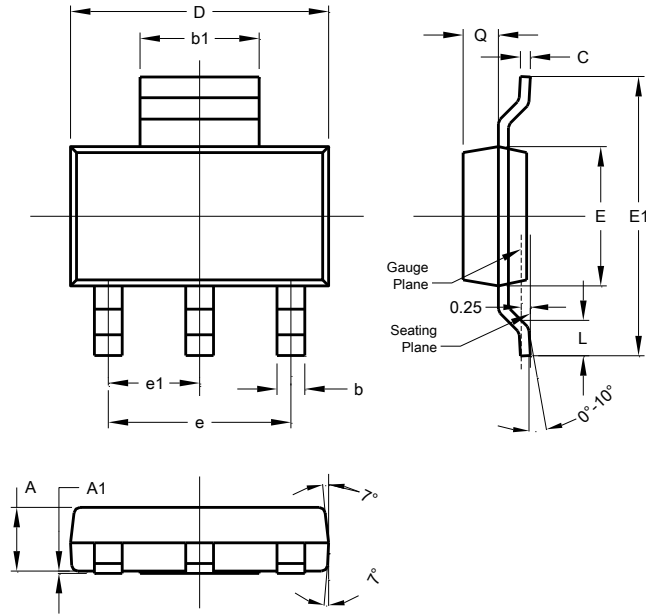


Figure 6. Gate Charge vs. Gate-source Voltage

**Package Outline Dimensions**

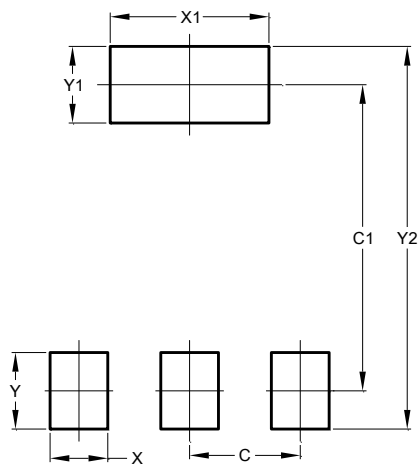
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
Y2	8.00

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