# SOT223 N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET

## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | $I_D$ $T_A$ = +25°C |
|---|---|---|
| 100V | 1.5Ω @ $V_{GS}$= 10V | 800mA |

## Features and Benefits

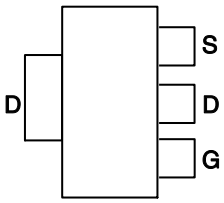
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

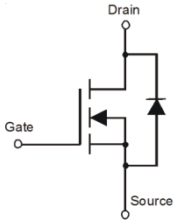
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View




Pin Out - Top View



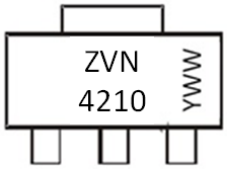

Equivalent Circuit

## Ordering Information (Note 4)

| Part Number | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---|---|---|---|---|
| ZVN4210GTA | ZVN4210 | 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 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




ZVN4210 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$= Year (ex: 5 = 2015)
WW or $\overline{WW}$ = Week (01 to 53)

## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current $V_{GS}$ = 10V | $T_A$ = +25°C | $I_D$ | 800 | mA |
| Pulsed Drain Current | | $I_{DM}$ | 6 | A |

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

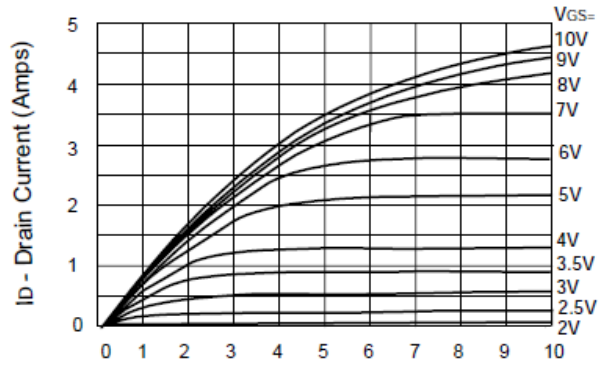
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation | $T_A$ = +25°C | $P_D$ | 2 | W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

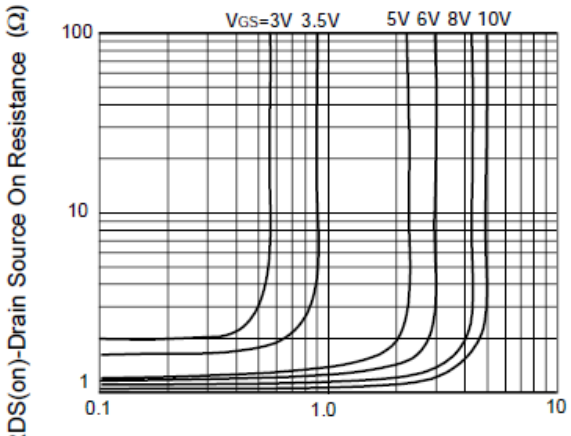
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 100 | – | – | V | $V_{GS}$ = 0V, $I_D$ =1mA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | –<br>– | –<br>– | 10<br>100 | µA<br>µA | $V_{DS}$ = 100V, $V_{GS}$ = 0V<br>$V_{DS}$=80V, $V_{GS}$=0V, T=125°C (Note 6) |
| Gate-Source Leakage | $I_{GSS}$ | – | – | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 0.8 | – | 2.4 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 1mA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | – | – | 1.5 | Ω | $V_{GS}$ = 10V, $I_D$ = 1.5A |
| | | – | – | 1.8 | Ω | $V_{GS}$ = 5V, $I_D$ = 0.5A |
| Diode Forward Voltage (Note 5) | $V_{SD}$ | –<br>– | 0.79<br>0.89 | –<br>– | V | $I_S$ =0.32A, $V_{GS}$ =0V<br>$I_S$ =1.0A, $V_{GS}$ =0V |
| On-State Drain Current (Note 5) | $I_{D(ON)}$ | 2.5 | – | – | A | $V_{DS}$ =25V, $V_{GS}$ =10V |
| Forward Transconductance (Notes 5 and 6) | $g_{fs}$ | 250 | – | – | mS | $V_{DS}$ =25V,$I_D$ =1.5A |
| Reverse Recovery Time (to $I_R$ =10%) | $t_{RR}$ | – | 135 | – | ns | $I_F$ =0.45A, $V_{GS}$ =0V, $I_R$ =100mA, $V_R$ =10V |
| **DYNAMIC CHARACTERISTICS** (Note 6) | | | | | | |
| Input Capacitance | $C_{iss}$ | – | – | 100 | pF | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1MHz |
| Output Capacitance | $C_{oss}$ | – | – | 40 | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | – | – | 12 | pF | |
| Turn-On Delay Time (Note 7) | $t_{D(ON)}$ | – | – | 4 | ns | $V_{DD}$ = 25V, $I_D$=1.5A |
| Turn-On Rise Time (Note 7) | $t_R$ | – | – | 8 | ns | |
| Turn-Off Delay Time (Note 7) | $t_{D(OFF)}$ | – | – | 20 | ns | |
| Turn-Off Fall Time (Note 7) | $t_F$ | – | – | 30 | ns | |

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. Spice parameter data is available upon request for this device

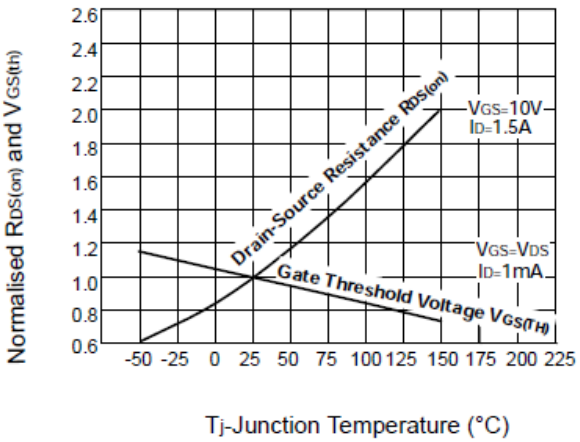
## Electrical Characteristics



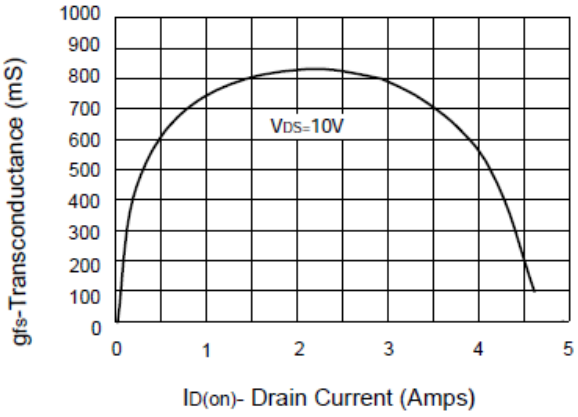

**Saturation Characteristics**



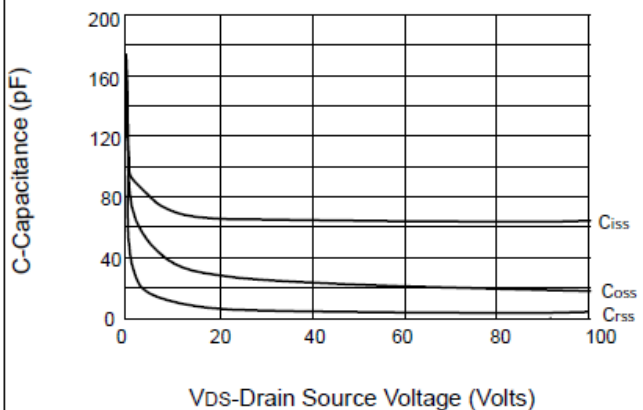

**On-resistance v drain current**



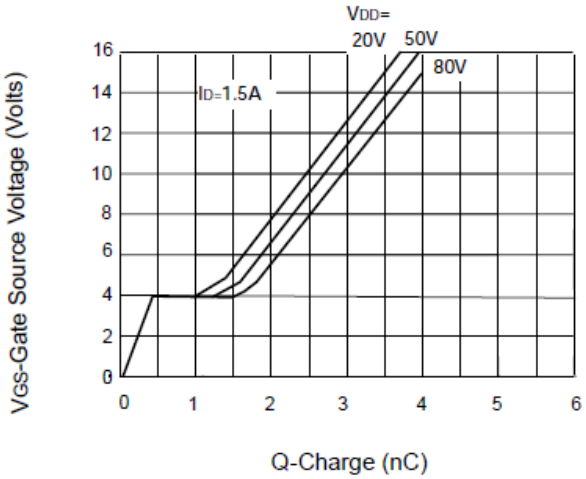

**Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature**




**Transconductance v drain current**



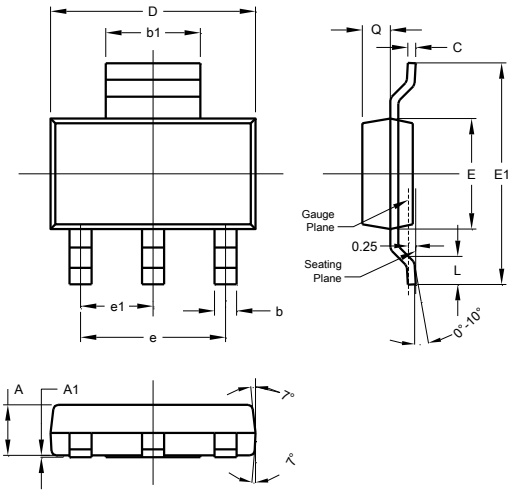

**Capacitance v drain-source voltage**




**Gate charge v gate-source voltage**

## Package Outline Dimensions

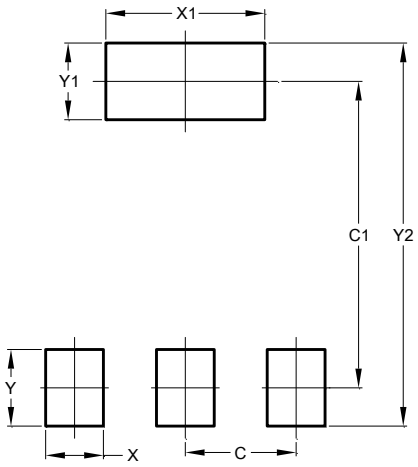
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| 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 |
| **Y2** | 8.00 |

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