

SOT223 N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET


Features and Benefits

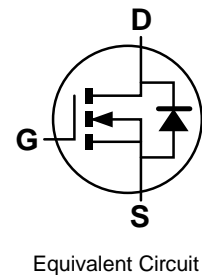
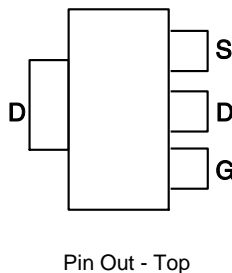
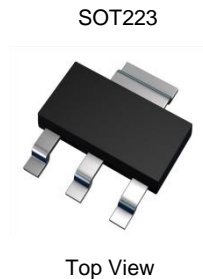
- $BV_{DS} = 60V$
- $R_{DS(ON)} = 0.33\Omega$
- Repetitive Avalanche Rating
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Applications

- DC-DC Converters
- Solenoids / Relay Driver for Automotive
- Stepper Motor Drivers

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)

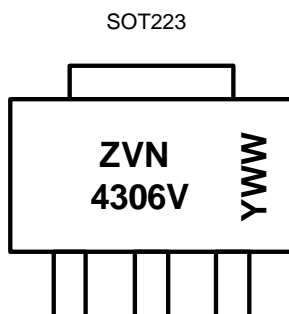


Ordering Information (Note 4)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|----------|--------------------|-----------------|-------------------|
| ZVN4306GVTA | ZVN4306V | 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



ZVN4306V = Product Type Marking Code
 YWW = Date Code Marking
 Y or \overline{Y} = Last Digit of Year (ex: 5= 2015)
 WW or \overline{WW} = Week Code (01~53)

ABSOLUTE MAXIMUM RATINGS (@T_A = +25°C, unless otherwise stated.)

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Drain-Source Voltage | V _{DS} | 60 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | 2.1 | A |
| Pulsed Drain Current | I _{DM} | 15 | A |
| Power Dissipation | P _{tot} | 3 | W |
| Avalanche Current-Repetitive | I _{AR} | 1 | A |
| Avalanche Energy-Repetitive | E _{AR} | 25 | mJ |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ELECTRICAL CHARACTERISTICS (@T_A = +25°C, unless otherwise stated.)

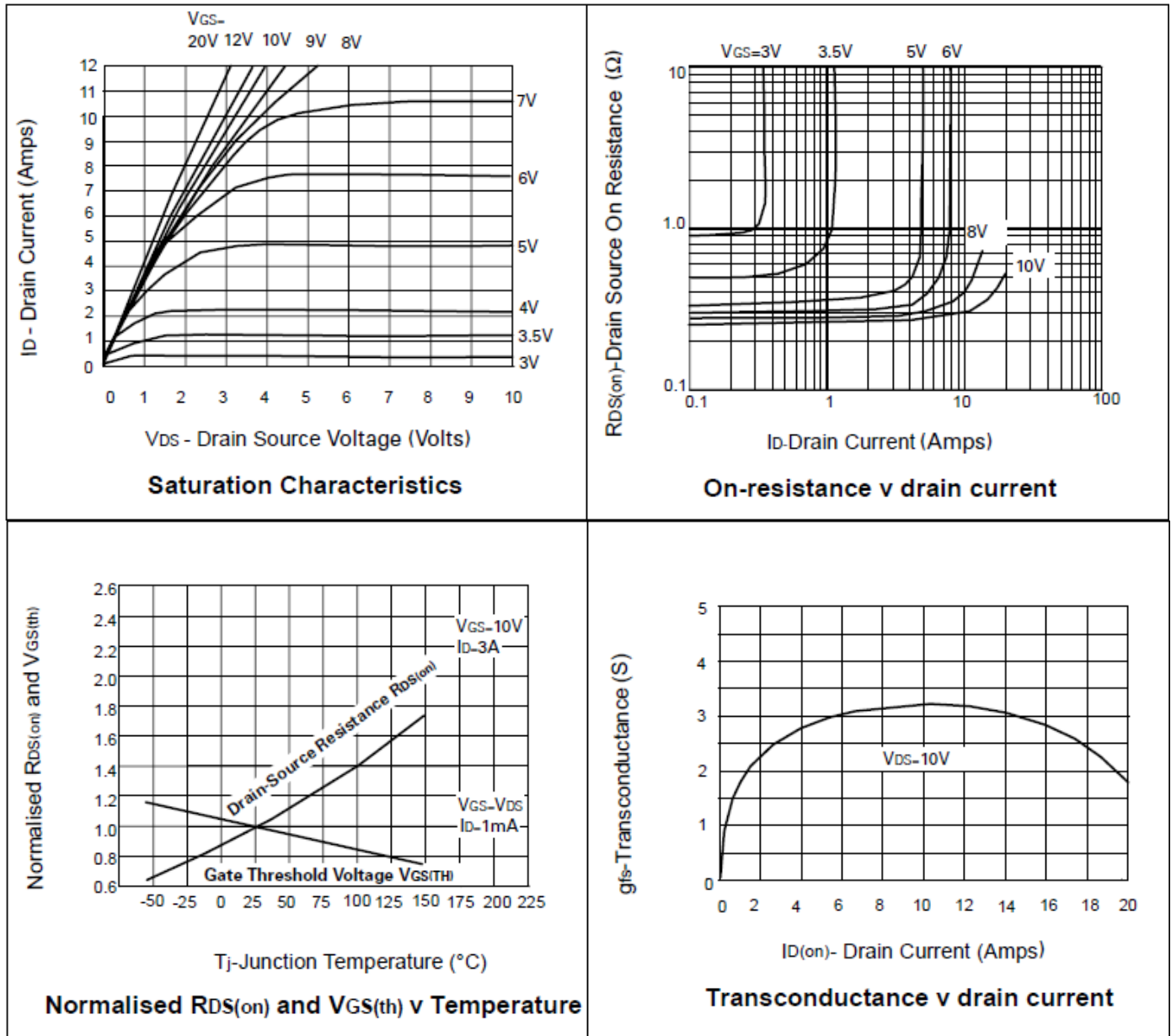
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|-----------|----------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | - | - | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | - | - | 10 100 | μA μA | V _{DS} = 60V, V _{GS} = 0V V _{DS} = 48V, V _{GS} = 0V, T = +125°C (Note 6) |
| Gate-Body Leakage | I _{GSS} | - | - | 20 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| On-State Drain Current (Note 5) | I _{D(ON)} | 12 | - | - | A | V _{GS} = 10V, V _{DS} = 10V |
| ON CHARACTERISTICS | | | | | | |
| Gate-Source Threshold Voltage | V _{GS(TH)} | 1.3 | - | 3 | V | V _{DS} = V _{GS} , I _D = 1mA |
| Static Drain-Source On-State Resistance (Note 5) | R _{DS(ON)} | - | 0.22 | 0.33 | Ω | V _{GS} = 10V, I _D = 3A |
| | | - | 0.32 | 0.45 | Ω | V _{GS} = 5V, I _D = 1.5A |
| Forward Transconductance (Notes 5 & 6) | g _{fs} | 0.7 | - | - | S | V _{DS} = 25V, I _D = 3A |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance (Note 6) | C _{iss} | - | - | 350 | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Common Source Output Capacitance (Note 6) | C _{oss} | - | - | 140 | pF | |
| Reverse Transfer Capacitance (Note 6) | C _{rss} | - | - | 30 | pF | |
| Turn-On Delay Time (Notes 6 & 7) | t _{D(ON)} | - | - | 8 | ns | V _{DD} ≈ 25V, V _{GEN} = 10V, I _D = 3A |
| Rise Time (Notes 6 & 7) | t _R | - | - | 25 | ns | |
| Turn-Off Delay Time (Notes 6 & 7) | t _{D(OFF)} | - | - | 30 | ns | |
| Fall Time (Notes 6 & 7) | t _F | - | - | 16 | ns | |

DRAIN-SOURCE DIODE CHARACTERISTICS

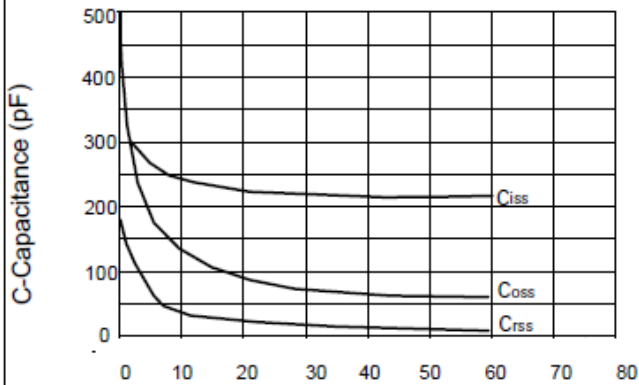
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------|-----------------|-----|------|-----|------|--|
| Diode Forward Voltage (Note 5) | V _{SD} | - | 0.82 | - | V | I _S = 0.32A, V _{GS} = 0 |
| Reverse Recovery Time | T _{RR} | - | 112 | - | ns | I _F = 0.32A, V _{GS} = 0, I _R = 0.1A |

- 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.

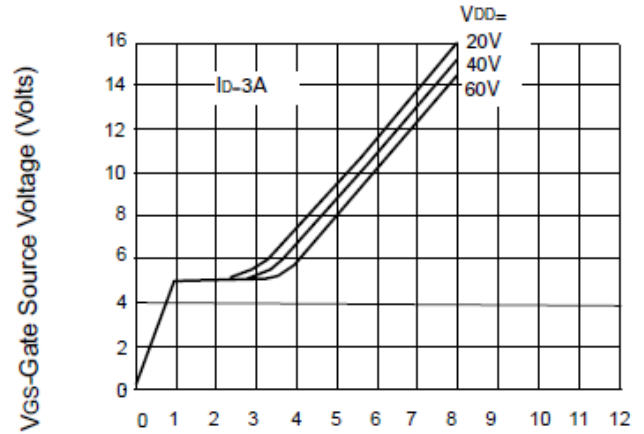
TYPICAL CHARACTERISTICS



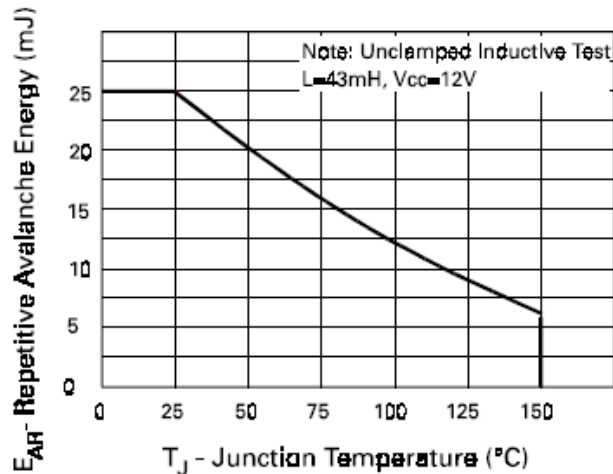
TYPICAL CHARACTERISTICS



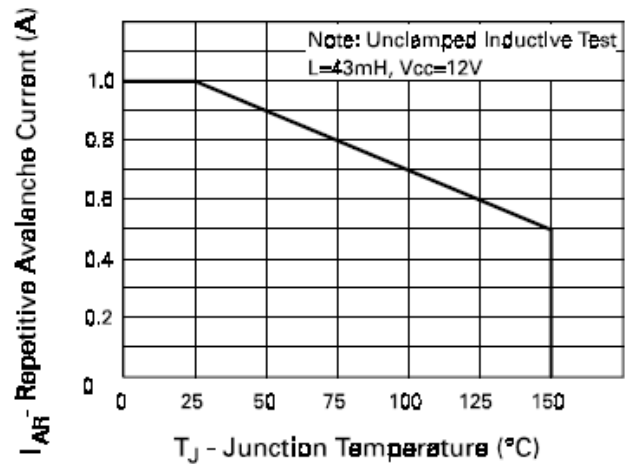
Capacitance v drain-source voltage



Gate charge v gate-source voltage



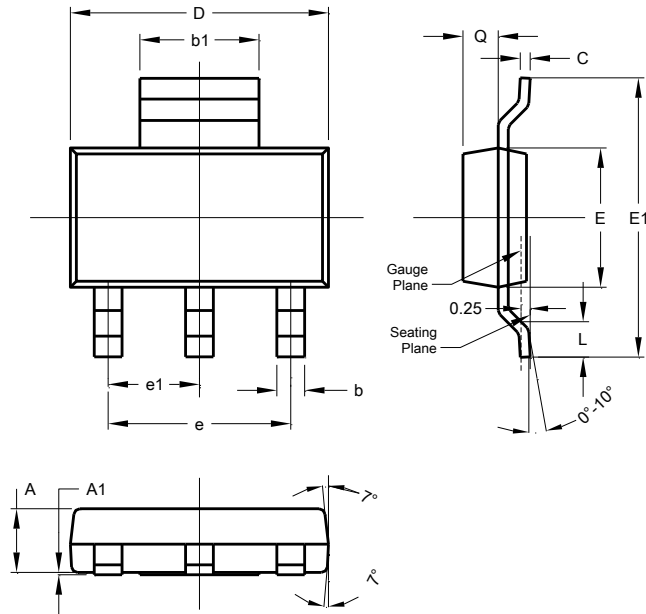
Maximum Repetitive Avalanche Energy v Junction Temperature.



Maximum Repetitive Avalanche Current v Junction Temperature

Package Outline Dimensions

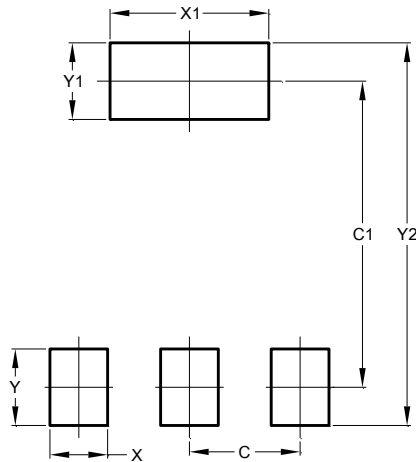
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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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