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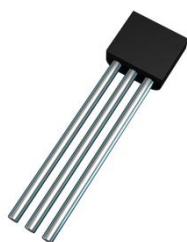


60V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOSFET
Features

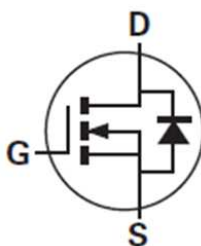
- $BV_{DSS} > 60V$
- $R_{DS(on)} \leq 5\Omega @ V_{GS} = 10V$
- $I_D = 270mA$ Maximum Continuous Drain Current
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

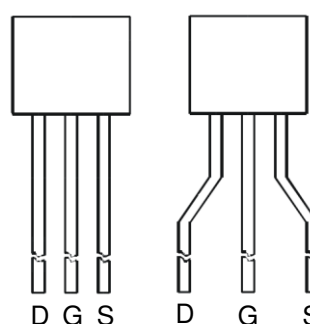
- Case: E-Line (TO-92 Compatible)
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Rating 94V-0
- Terminals: Finish - Matte Tin Plated Leads, Solderable per
MIL-STD-202, Method 208 @3
- Weight: 0.159 grams (Approximate)

 E-Line
 (TO-92 Compatible)


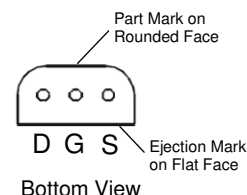
Flat Face View



Device Symbol



Rounded Face View

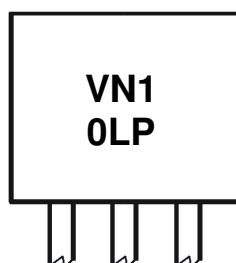


Bottom View

Ordering Information (Note 4)

| Product | Marking | Package | Leads | Quantity |
|-----------|---------|---------|----------|--------------------------|
| VN10LP | VN10LP | E-Line | Straight | 4,000 Loose in a Box |
| VN10LPSTZ | VN10LP | E-Line | Joggled | 2,000 Taped per Ammo Box |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 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


Rounded Face View

VN10LP = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|--------------------------|------------------|-------|------|
| Drain-Source Voltage | V _{DSS} | 60 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current | I _D | 270 | mA |
| Pulsed Drain Current | I _{DM} | 3 | A |

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

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 625 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 200 | °C/W |
| Thermal Resistance, Junction to Leads (Note 6) | R _{θJL} | 71 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

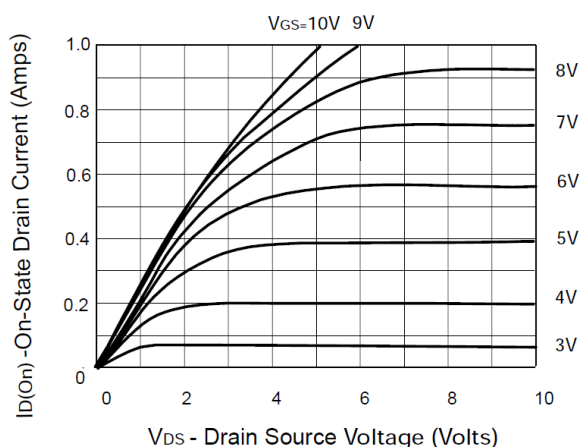
- Notes:
- For a through-hole device mounted on the minimum recommended pad layout with 12mm lead length from the bottom of package to the single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Thermal resistance from junction to solder-point at the seating plane (2.5mm from the bottom of package along the drain lead).

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

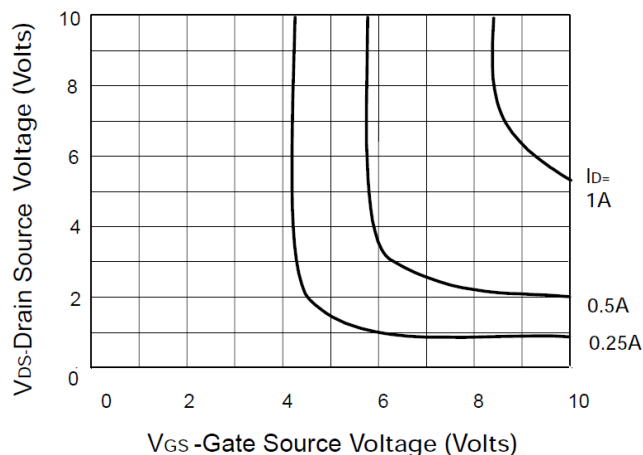
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-----|------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 10 | μA | V _{DS} = 60V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| On state Drain Current (Note 7) | I _{D(on)} | 750 | — | — | mA | V _{DS} = 15V, V _{GS} = 10V |
| Gate Threshold Voltage | V _{GS(th)} | 0.8 | — | 2.5 | V | I _D = 1mA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 7) | R _{DS(on)} | — | — | 5.0 | Ω | V _{GS} = 10V, I _D = 500mA |
| | | | | 7.5 | | V _{GS} = 5V, I _D = 200mA |
| Forward Transconductance (Notes 7 & 9) | g _{fs} | 100 | — | — | mS | V _{DS} = 15V, I _D = 500mA |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | — | 60 | pF | V _{DS} = 25V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | — | 25 | | |
| Reverse Transfer Capacitance | C _{rss} | — | — | 5 | | |
| Turn-On Time (Note 8) | t _(on) | — | — | 10 | ns | V _{DD} = 15V, I _D = 600mA |
| Turn-Off Time (Note 8) | t _(off) | — | — | 10 | | |

- Notes:
- Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
 - Switching characteristics are independent of operating junction temperature. Switching times are measured with 50ohm source impedance and <5ns rise time on a pulse generator.
 - For design aid only, not subject to production testing.

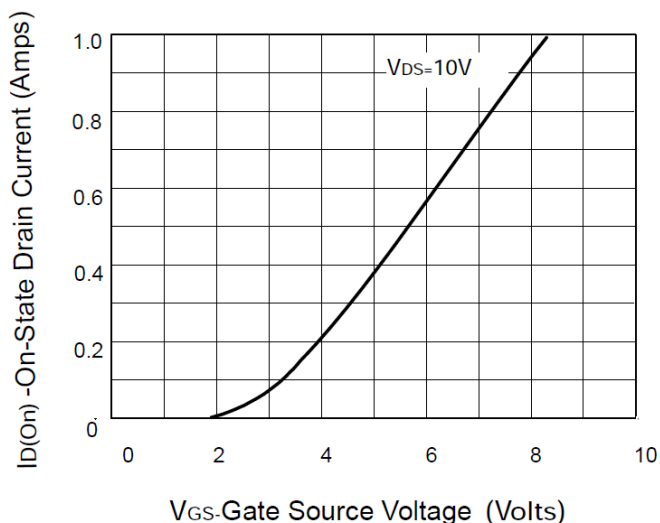
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



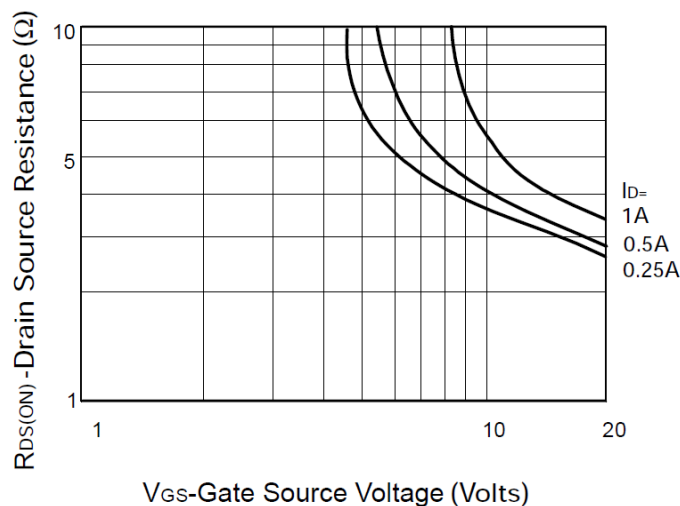
Saturation Characteristics



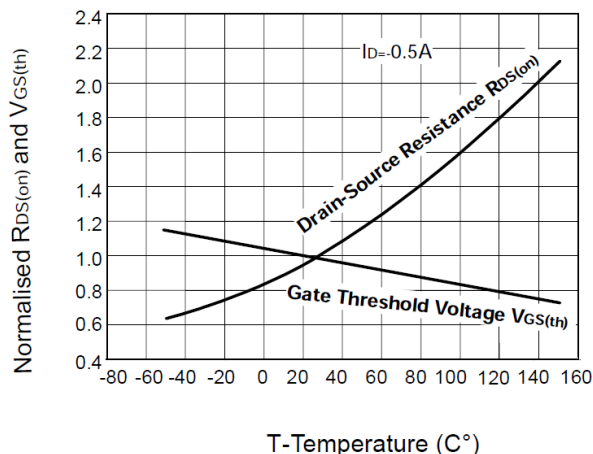
Voltage Saturation Characteristics



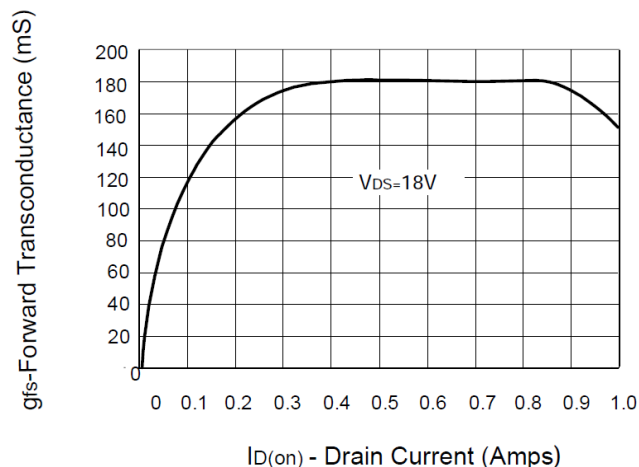
Transfer Characteristics



On-resistance vs gate-source voltage



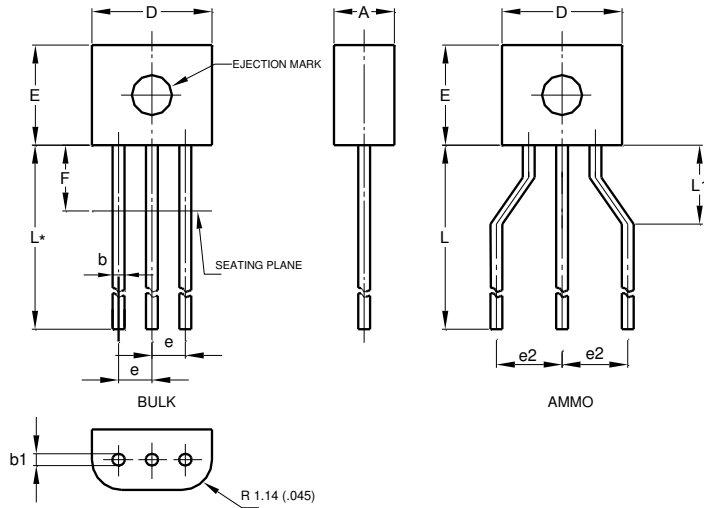
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature



Transconductance v drain current

Package Outline Dimensions

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



| E-Line | | | |
|----------------------|-------|-------|------|
| Dim | Min | Max | Typ |
| A | 2.16 | 2.41 | — |
| b | 0.41 | 0.495 | — |
| b1 | 0.41 | 0.495 | — |
| D | 4.37 | 4.77 | — |
| E | 3.61 | 4.01 | — |
| e | — | — | 1.27 |
| e2 | — | — | 2.54 |
| F | — | 2.50 | — |
| L | 13.00 | 13.97 | — |
| L1 | 2.50 | 3.50 | — |
| All Dimensions in mm | | | |

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