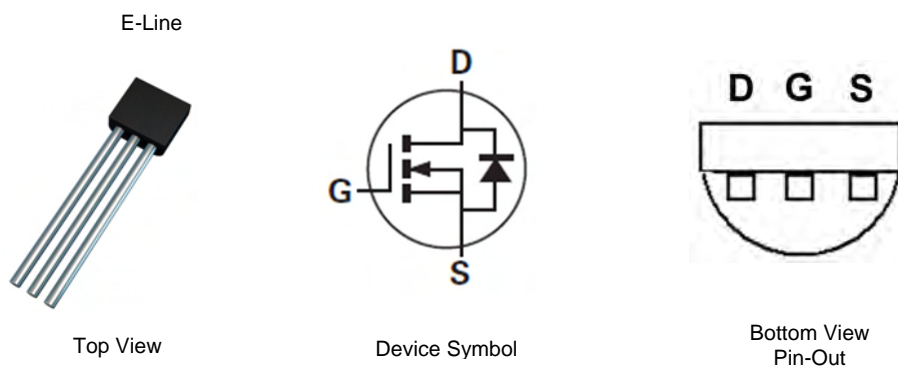


**60V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET**
**Features**

- $BV_{DSS} > 60V$
- $R_{DS(on)} \leq 5\Omega$  @  $V_{GS} = 10V$
- Maximum continuous drain current  $I_D = 270mA$
- **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)
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (E3)
- Weight: 0.159 grams (approximate)


**Ordering Information (Note 4)**

Product	Marking	Package	Quantity per box on tape
VN10LPSTZ	VN10LP	E-Line	2,000 per ammo box
VN10LP	VN10LP	E-Line	4,000 loose

- 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> 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>.

**Marking Information**

(Flat Face View)



VN10LP = Product type Marking Code

## Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	270	mA
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	3	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	625	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	71	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
- For a device mounted on 25mm X 25mm X 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air condition.
  - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
  - Thermal resistance from junction to Drain leads 2mm outside plastic compound.

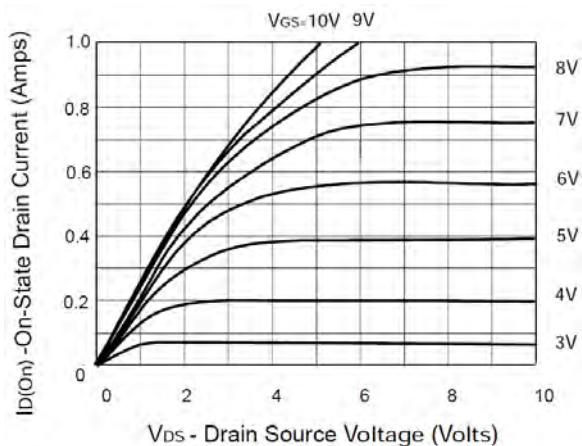
## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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

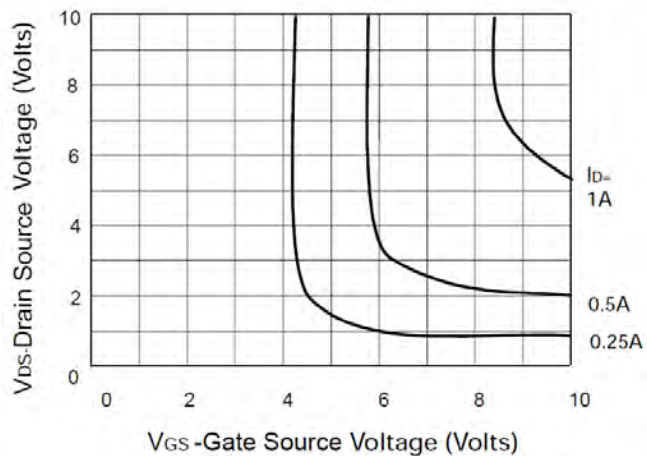
Notes:

- 8. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.
- 9. Switching characteristics are independent of operating junction temperature.
- 10. For design aid only, not subject to production testing.

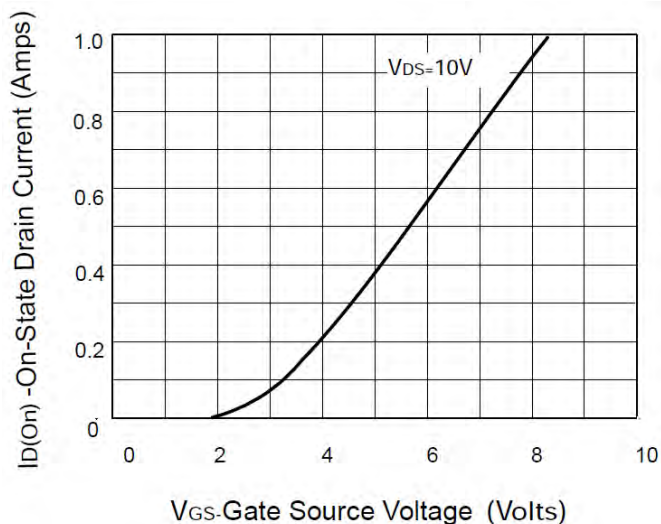
## Typical Characteristics



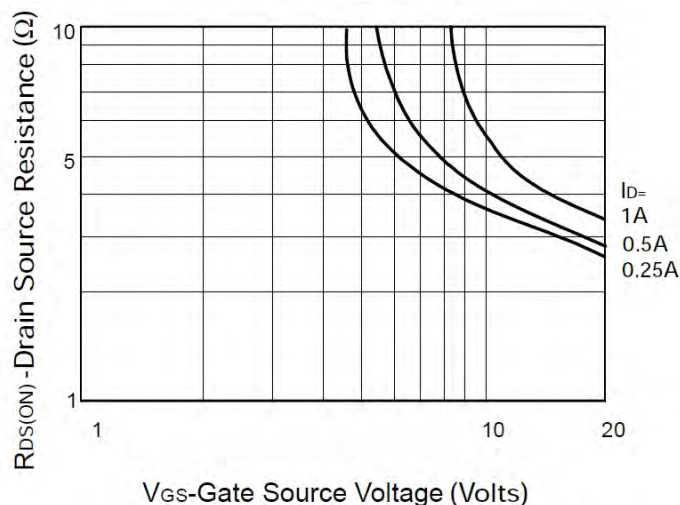
**Saturation Characteristics**



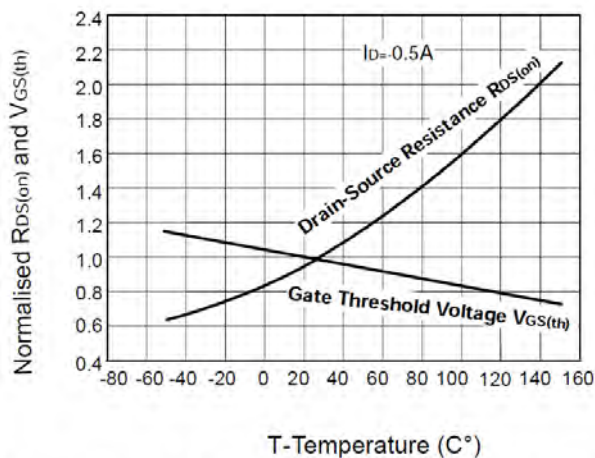
**Voltage Saturation Characteristics**



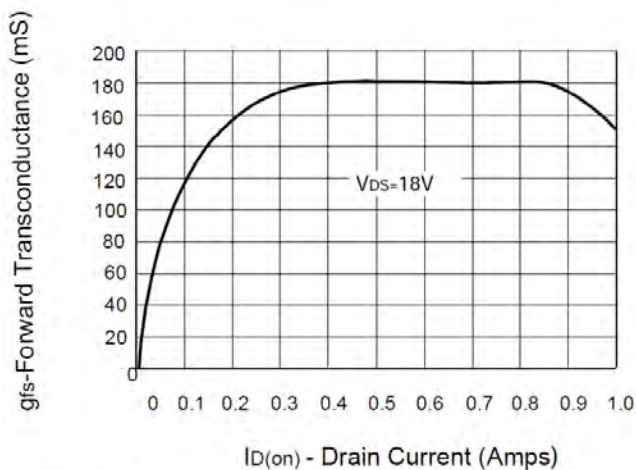
**Transfer Characteristics**



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



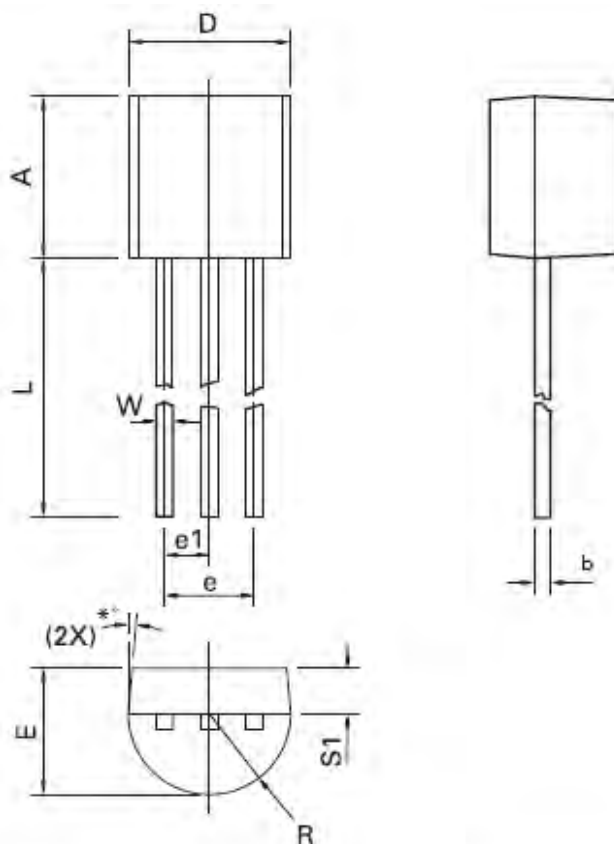
**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  vs Temperature**



**Transconductance v drain current**

## Package Outline Dimensions

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



Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.95	0.170	0.195
b	0.36	0.51	0.014	0.020
E	3.30	3.94	0.130	0.155
e	2.41	2.67	0.095	0.105
e1	1.14	1.40	0.045	0.055
L	12.70	15.49	0.500	0.610
R	2.16	2.41	0.085	0.095
S1	1.14	1.52	0.045	0.060
W	0.41	0.56	0.016	0.022
D	4.45	4.95	0.175	0.195
*°	4°	6°	4°	6°

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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