

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**

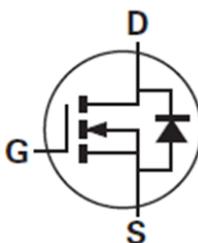
Mechanical Data

- 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 (G3)
- Weight: 0.159 grams (Approximate)

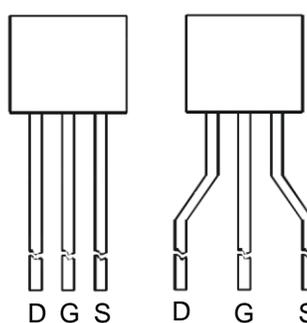
E-Line
(TO-92 Compatible)



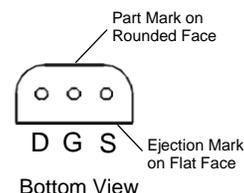
Flat Face View



Device Symbol



Rounded Face View



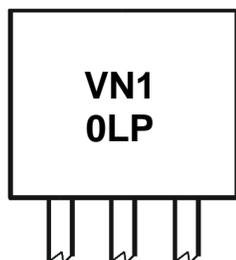
Bottom View

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

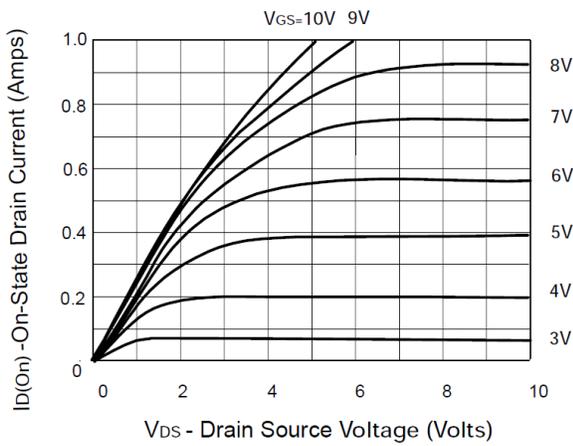
- Notes:
- For a through-hole device mounted on the minimum recommended pad layout with 12mm lead length from the bottom of package to the single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Thermal resistance from junction to solder-point at the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

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

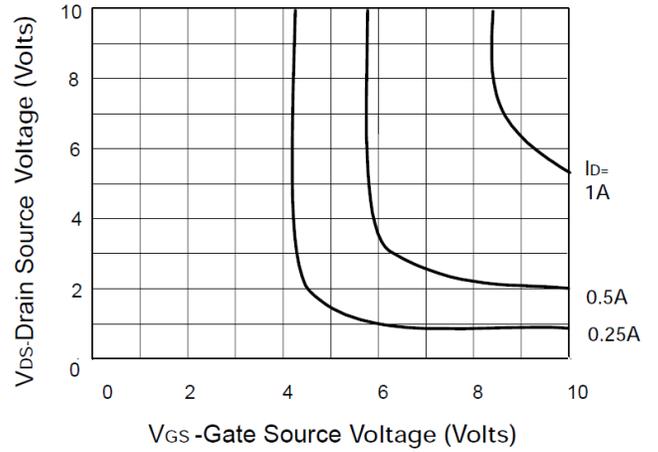
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 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.

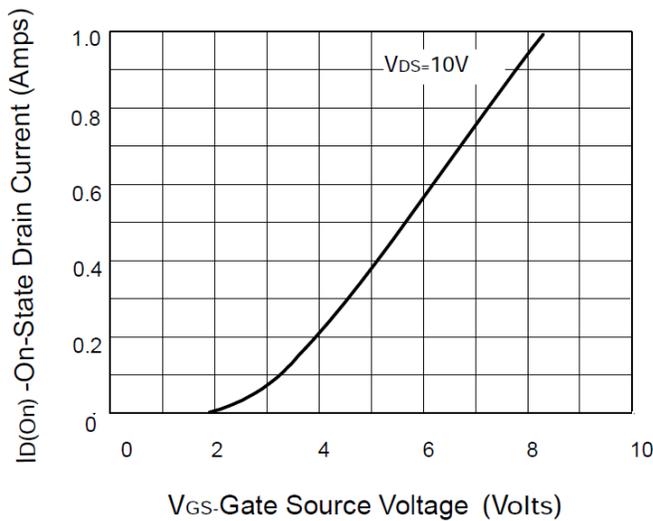
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



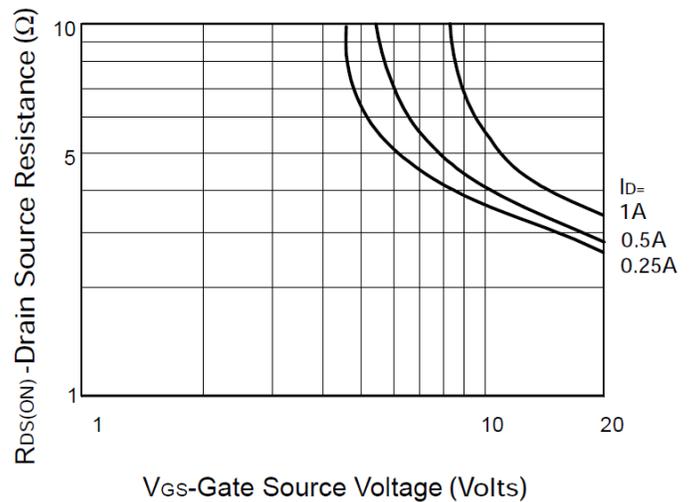
Saturation Characteristics



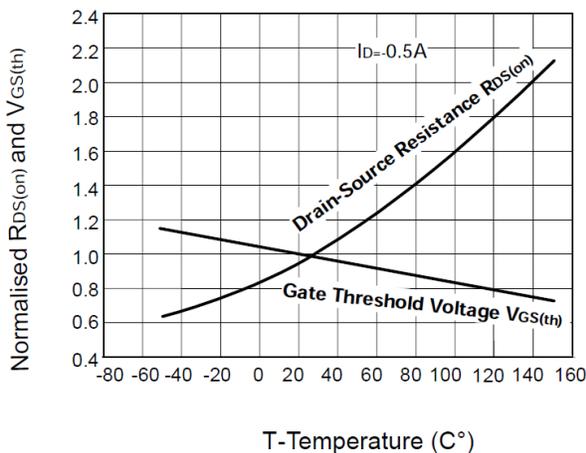
Voltage Saturation Characteristics



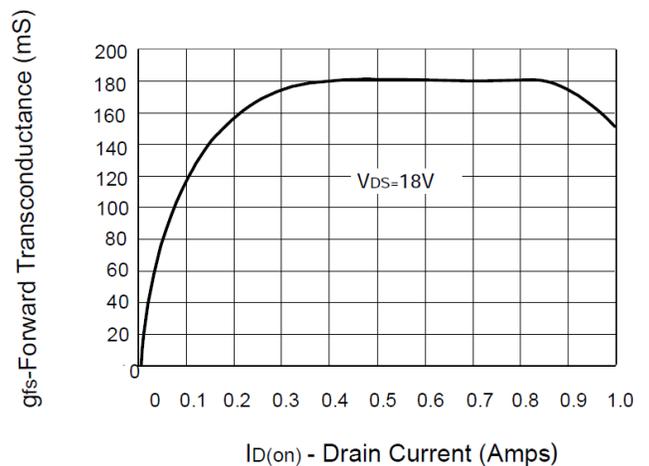
Transfer Characteristics



On-resistance vs gate-source voltage



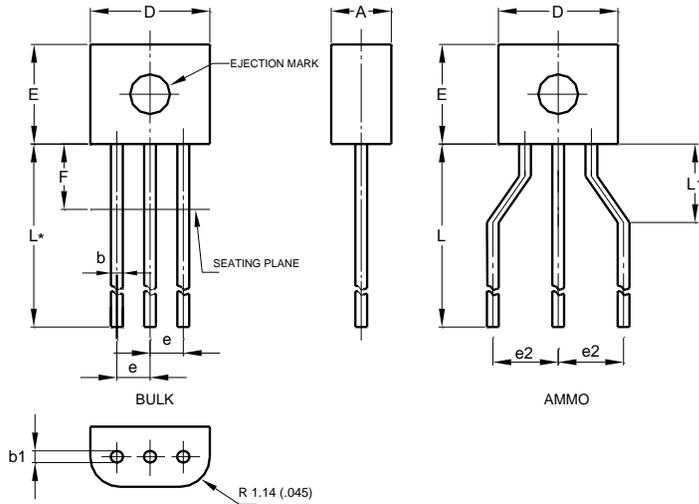
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature



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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