

**N-Channel Enhancement-Mode MOSFET Transistors**

**Product Summary**

Part Number	V <sub>(BR)DSS</sub> Min (V)	r <sub>DS(on)</sub> Max (Ω)	V <sub>GS(th)</sub> (V)	I <sub>D</sub> (A)
VN3515L	350	15 @ V <sub>GS</sub> = 4.5 V	0.6 to 1.8	0.15
VN4012L	400	12 @ V <sub>GS</sub> = 4.5 V	0.6 to 1.8	0.16

**Features**

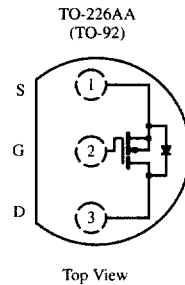
- Low On-Resistance: 8.7 Ω
- Secondary Breakdown Free: 420 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

**Benefits**

- Low Offset Voltage
- Full-Voltage Operation
- Easily Driven Without Buffer
- Low Error Voltage
- No High-Temperature "Run-Away"

**Applications**

- High-Voltage Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Transistors, etc.
- Telephone Mute Switches, Ringer Circuits
- Power Supply, Converters
- Motor Control



**Absolute Maximum Ratings (T<sub>A</sub> = 25°C Unless Otherwise Noted)**

Parameter	Symbol	VN3515L	VN4012L	Unit
Drain-Source Voltage	V <sub>DS</sub>	350	400	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	
Continuous Drain Current (T <sub>J</sub> = 150°C)	T <sub>A</sub> = 25°C	0.15	0.16	A
	T <sub>A</sub> = 100°C	0.09	0.1	
Pulsed Drain Current <sup>a</sup>	I <sub>DM</sub>	0.6	0.65	
Power Dissipation	T <sub>A</sub> = 25°C	0.8	0.8	W
	T <sub>A</sub> = 100°C	0.32	0.32	
Maximum Junction-to-Ambient	R <sub>thJA</sub>	156		°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°C

Notes

a. Pulse width limited by maximum junction temperature.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70207.

## Specifications<sup>a</sup>

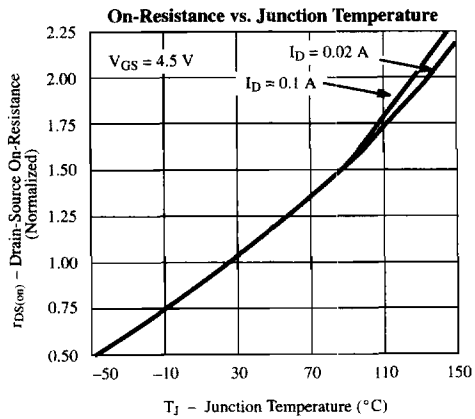
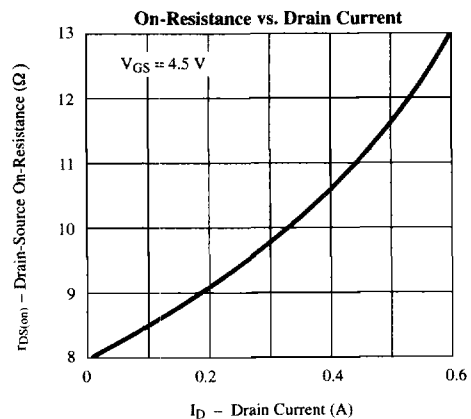
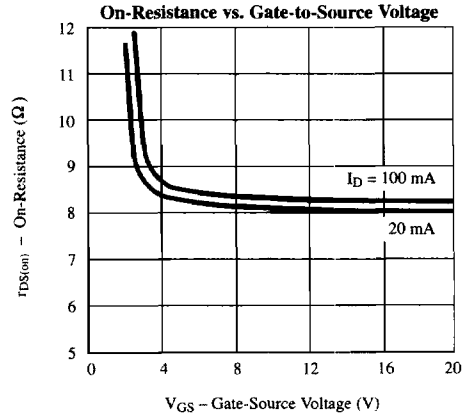
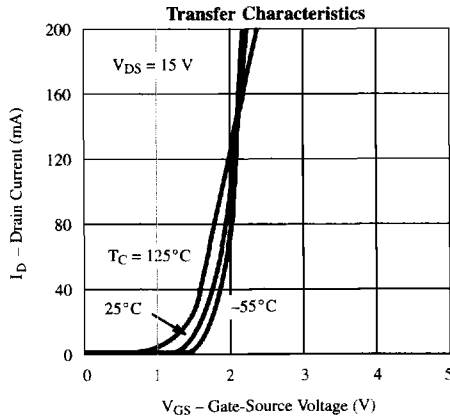
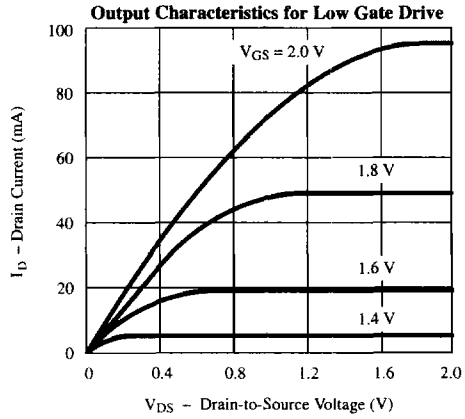
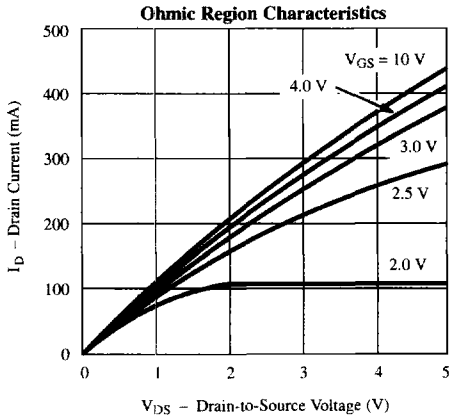
Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits				Unit
				VN3515L		VN4012L		
				Min	Max	Min	Max	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0 \text{ V}, I_D = 100 \mu\text{A}$	420	350		400		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1 \text{ mA}$	1.3	0.6	1.8	0.6	1.8	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$	$\pm 1$		$\pm 10$		$\pm 10$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0 \text{ V}$ $T_J = 125 \text{ }^\circ\text{C}$			1		1	$\mu\text{A}$
On-State Drain Current <sup>c</sup>	$I_{D(on)}$	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}$	800	150		150		mA
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(on)}$	$V_{GS} = 3.5 \text{ V}, I_D = 0.05 \text{ A}$	8.7					$\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 0.1 \text{ A}$	8.7		15		12	
		$T_J = 125 \text{ }^\circ\text{C}$	15.5		35		30	
		$V_{GS} = 4.5 \text{ V}, I_D = 0.15 \text{ A}$	8.7					
		$T_J = 125 \text{ }^\circ\text{C}$	15.5					
Forward Transconductance <sup>c</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 0.1 \text{ A}$	350	125		125		mS
Diode Forward Voltage	$V_{SD}$	$I_S = 0.1 \text{ A}, V_{GS} = 0 \text{ V}$	0.8					V
<b>Dynamic</b>								
Input Capacitance	$C_{iss}$	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	85		110		110	pF
Output Capacitance	$C_{oss}$		20		30		30	
Reverse Transfer Capacitance	$C_{rss}$		5		10		10	
<b>Switching<sup>d</sup></b>								
Turn-On Time	$t_{ON}$	$V_{DD} = 25 \text{ V}, R_L = 250 \Omega$ $I_D \cong 0.1 \text{ A}, V_{GEN} = 10 \text{ V}$ $R_G = 25 \Omega$	4.5					ns
	$t_{d(on)}$		2.5		20		20	
	$t_r$		2		20		20	
Turn-Off Time	$t_{OFF}$		36					
	$t_{d(off)}$		27		65		65	
	$t_f$		9		65		65	

Notes

- $T_A = 25^\circ\text{C}$  unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test:  $PW \leq 300 \mu\text{s}$  duty cycle  $\leq 2\%$ .
- Switching time is essentially independent of operating temperature.

VNDV40

**Typical Characteristics (25°C Unless Otherwise Noted)**



Low Power MOSFETs

## Typical Characteristics (25°C Unless Otherwise Noted) (Cont'd)

