

N-Channel Enhancement-Mode MOS Transistors

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
VN3515L	350	15 @ $V_{GS} = 4.5$ V	0.6 to 1.8	0.15
VN4012L	400	12 @ $V_{GS} = 4.5$ V	0.6 to 1.8	0.16

Features

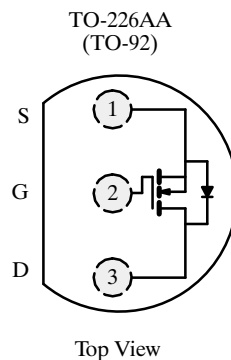
- Low On-Resistance: 8.7 Ω
- Secondary Breakdown Free: 420 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

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 ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	VN3515L	VN4012L	Unit
Drain-Source Voltage	V_{DS}	350	400	V
Gate-Source Voltage	V_{GS}	± 20	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.15	A
		$T_A = 100^\circ\text{C}$	0.09	
Pulsed Drain Current	I_{DM}	0.6	0.65	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	
Maximum Junction-to-Ambient	R_{thJA}	156		$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

Notes

- a. Pulse width limited by maximum junction temperature.

Specifications^a

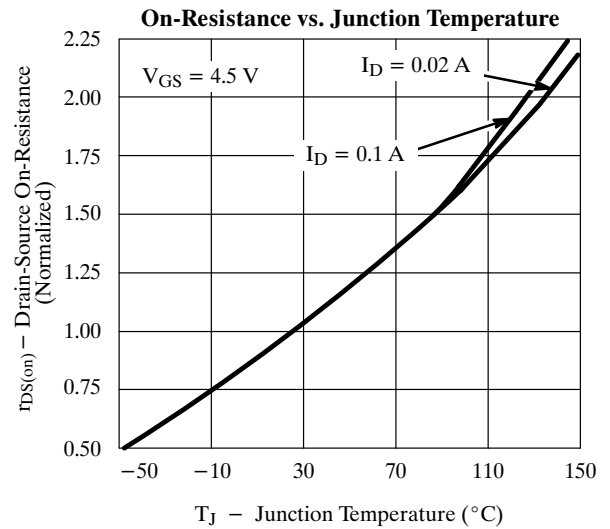
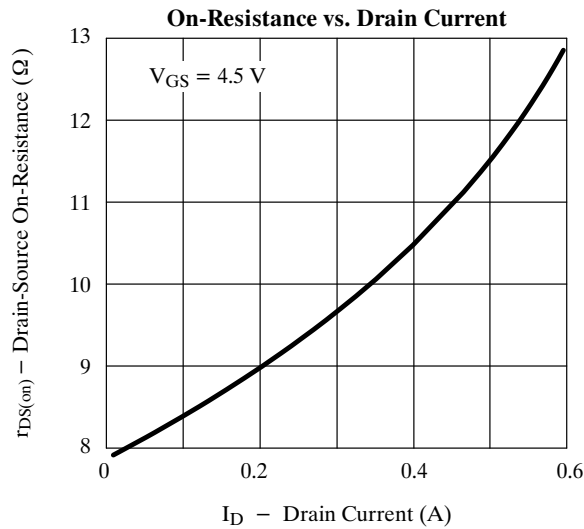
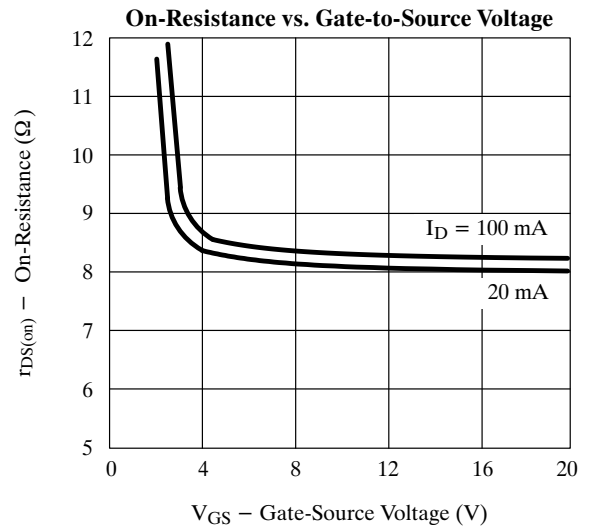
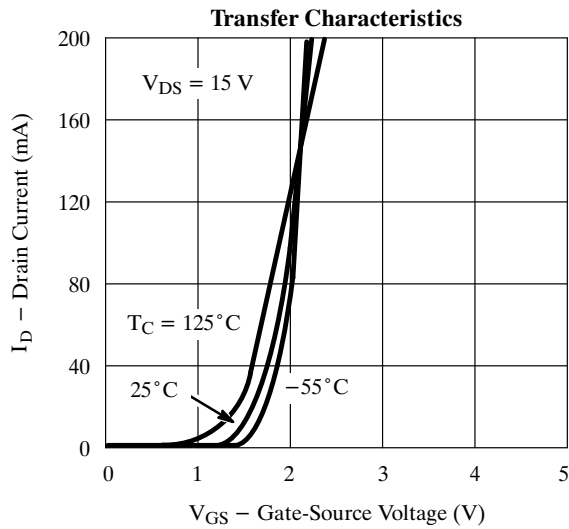
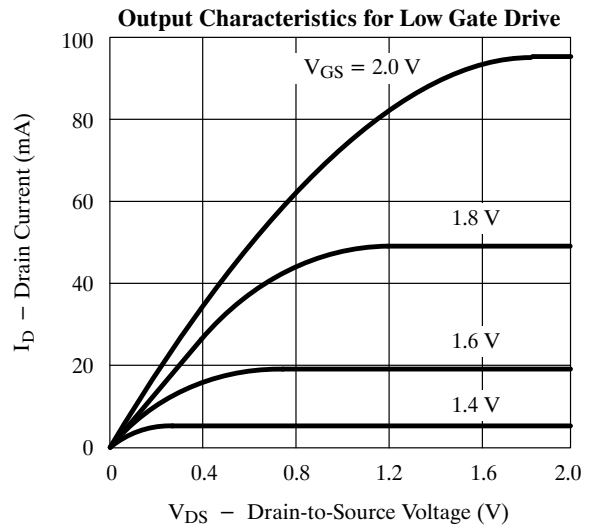
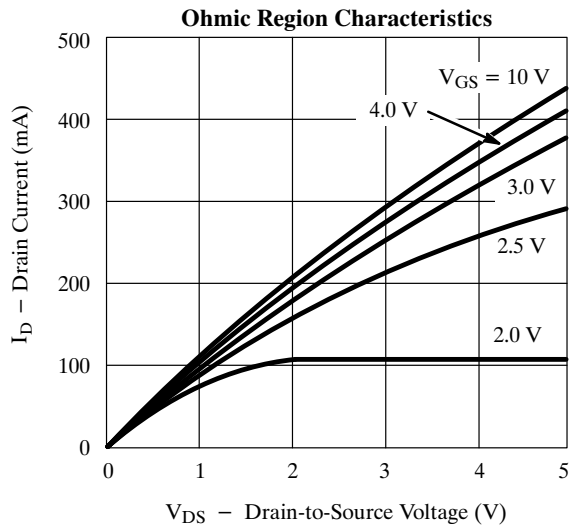
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VN3515L		VN4012L		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	420	350		400		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	1.3	0.6	1.8	0.6	1.8	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	± 1		± 10		± 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	μA
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$	800	150		150		mA
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 3.5\text{ V}, I_D = 0.05\text{ A}$	8.7					Ω
		$V_{GS} = 4.5\text{ V}, I_D = 0.1\text{ A}$	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 ^c	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
Dynamic								
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	
Switching^d								
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)



VN3515L/VN4012L

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

