N-Channel 350- and 400-V (D-S) MOSFETs

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

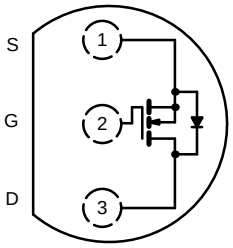
BENEFITS

- 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

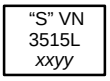
TO-226AA
(TO-92)



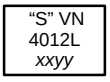
Top View

Device Marking
Front View

VN3515L



VN3515L



"S" = Siliconix Logo
xxyy = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C)	T_A= 25°C	I_D	0.15	0.16	A
	T_A= 100°C		0.09	0.1	
Pulsed Drain Current[a]		I_{DM}	0.6	0.65	
Power Dissipation	T_A= 25°C	P_D	0.8	0.8	W
	T_A= 100°C		0.32	0.32	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	156		°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

Notes
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

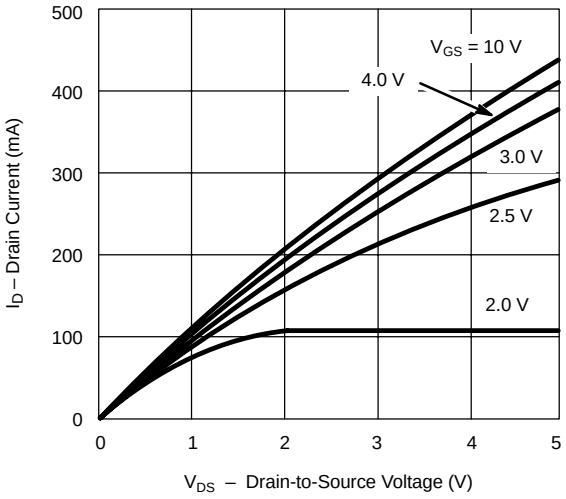
Parameter	Symbol	Test Conditions	Typ[a]	Limits VN3515L Min	Limits VN3515L Max	Limits VN4012L Min	Limits VN4012L Max	Unit
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 100 μA	420	350		400		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA	1.3	0.6	1.8	0.6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

Notes
a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: PW ≤300 μs duty cycle ≤2%.
c. Switching time is essentially independent of operating temperature.

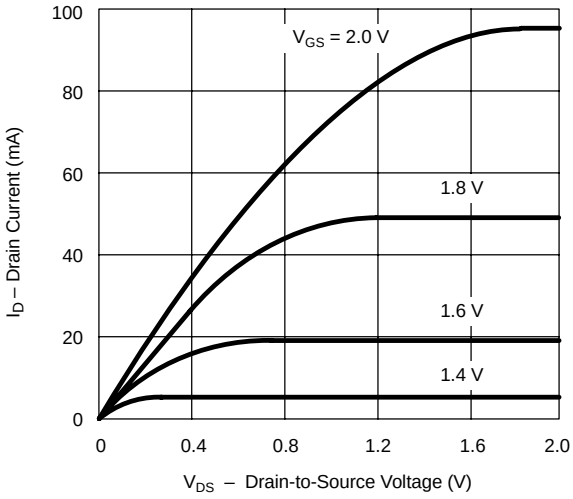
VNDV40

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

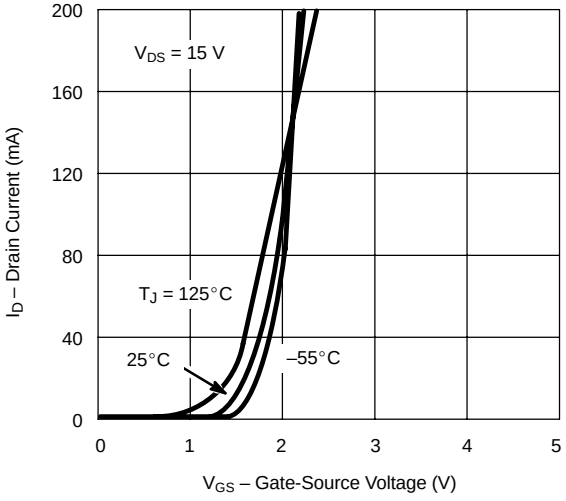
Ohmic Region Characteristics



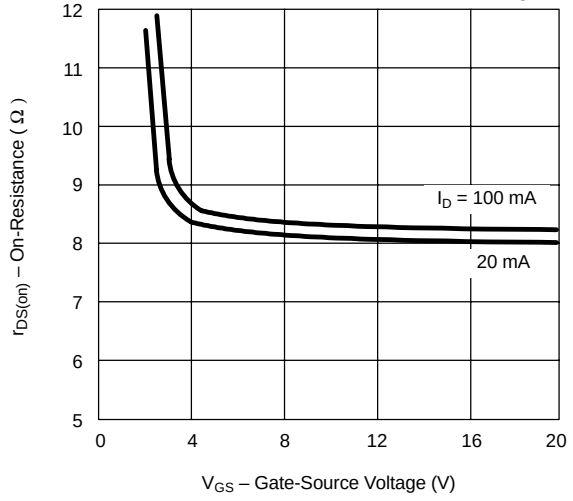
Output Characteristics for Low Gate Drive



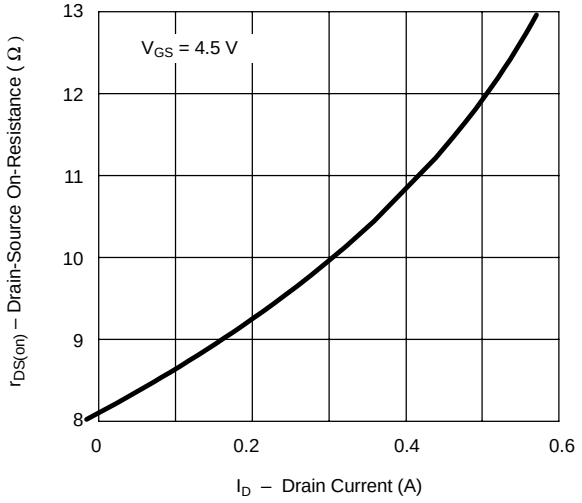
Transfer Characteristics



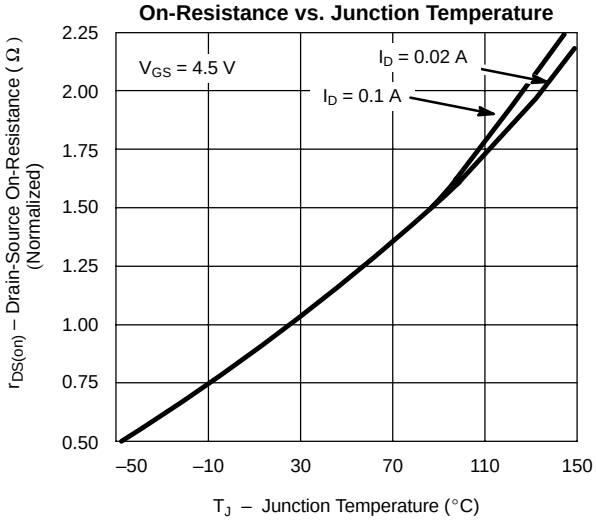
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

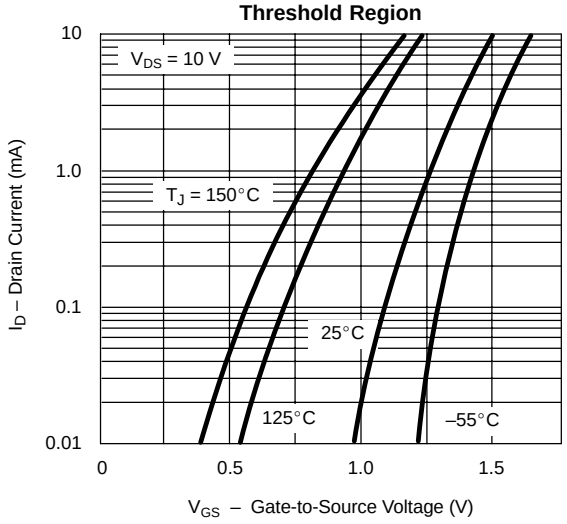


On-Resistance vs. Junction Temperature

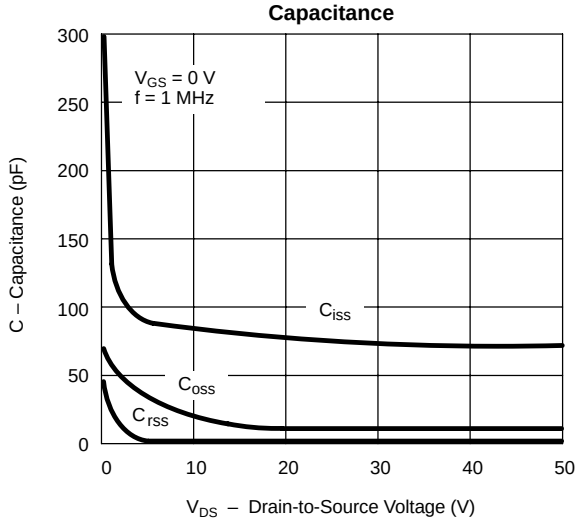


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

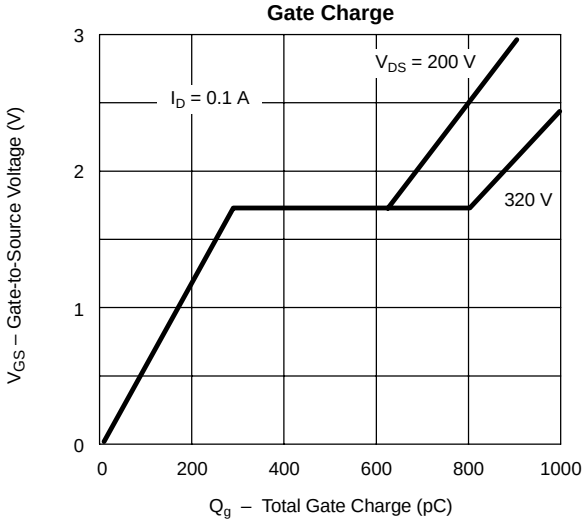
Threshold Region



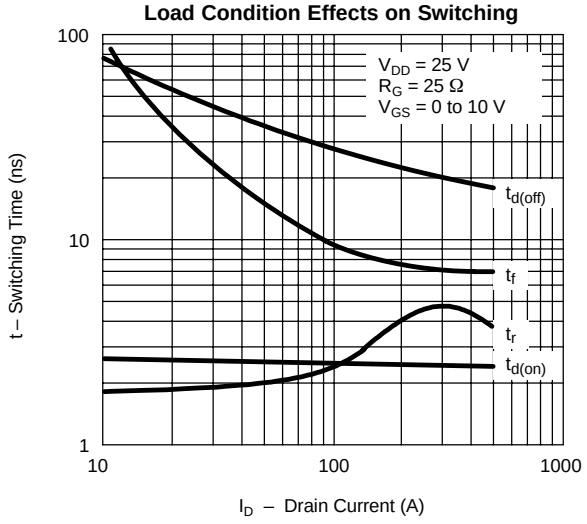
Capacitance



Gate Charge



Load Condition Effects on Switching



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient