



N-Channel Enhancement-Mode MOSFET Transistors

PRODUCT SUMMARY

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D Min (A)
VN10LLS	60	5 @ $V_{GS} = 10$ V	0.8 to 2.5	0.32
VN0605T		5 @ $V_{GS} = 10$ V	0.8 to 3.0	0.18
VN0610LL		5 @ $V_{GS} = 10$ V	0.8 to 2.5	0.28
VN2222LL		5 @ $V_{GS} = 10$ V	0.6 to 2.5	0.23

FEATURES

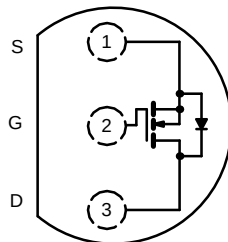
- Low On-Resistance: 2.5 Ω
- Low Threshold: <2.1 V
- Low Input Capacitance: 22 pF
- Fast Switching Speed: 7 ns
- Low Input and Output Leakage

BENEFITS

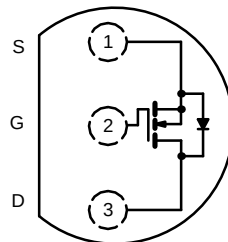
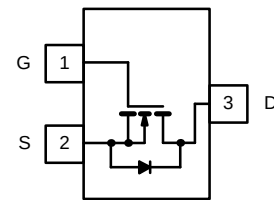
- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffering
- High-Speed Circuits
- Low Error Voltage

APPLICATIONS

- Direct Logic-Level Interface: TTL/CMOS
- Solid State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems

TO-226AA
(TO-92)Top View
VN0610LL
VN2222LL

TO-92S

Top View
VN10LLSTO-236
(SOT-23)Top View
VN0605T (V2)*
*Marking Code for TO-236ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	VN10LLS	VN0605T	VN0610LL	VN2222LL	Unit
Drain-Source Voltage	V_{DS}	60	60	60	60	V
Gate-Source Voltage—Non-Repetitive ^b	V_{GSM}	± 30	± 30	± 30	± 30	
Gate-Source Voltage—Continuous	V_{GS}	± 20	± 20	± 20	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	I_D	0.32	0.18	0.28	A
	$T_A = 100^\circ\text{C}$		0.2	0.11	0.17	
Pulsed Drain Current ^a	I_{DM}	1.4	0.72	1.3	1.0	
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	0.9	0.36	0.8	W
	$T_A = 100^\circ\text{C}$		0.4	0.14	0.32	
Maximum Junction-to-Ambient	R_{thJA}	139	350	156	156	$^\circ\text{C/W}$
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.
b. $t_p \leq 50 \mu\text{s}$.

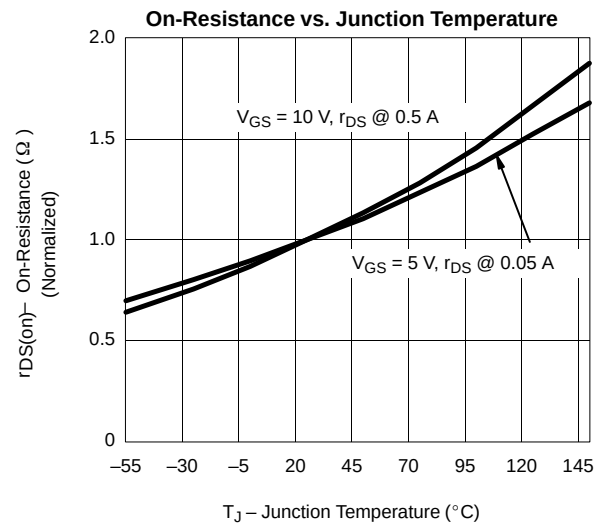
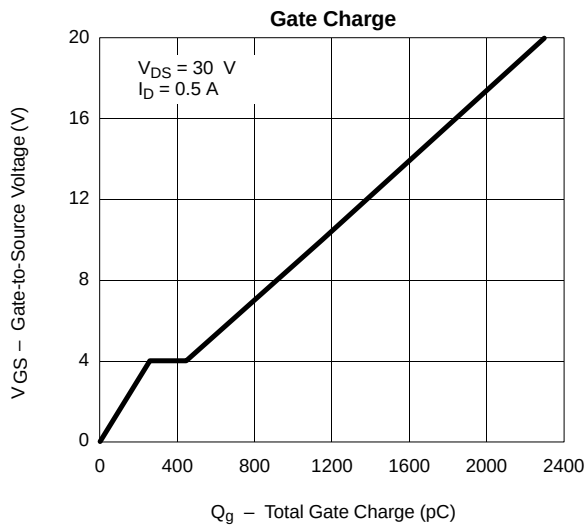
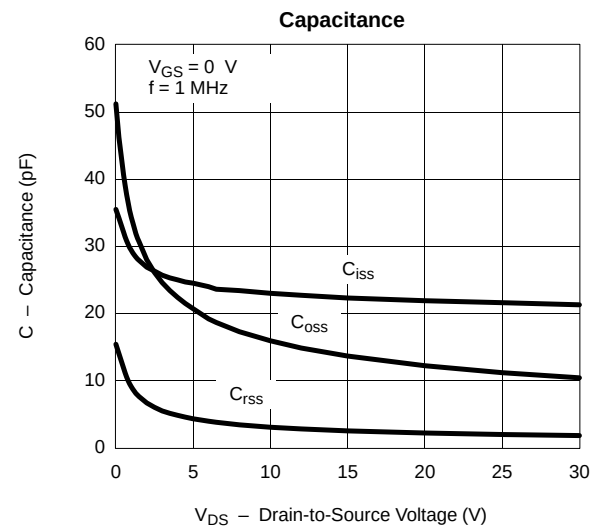
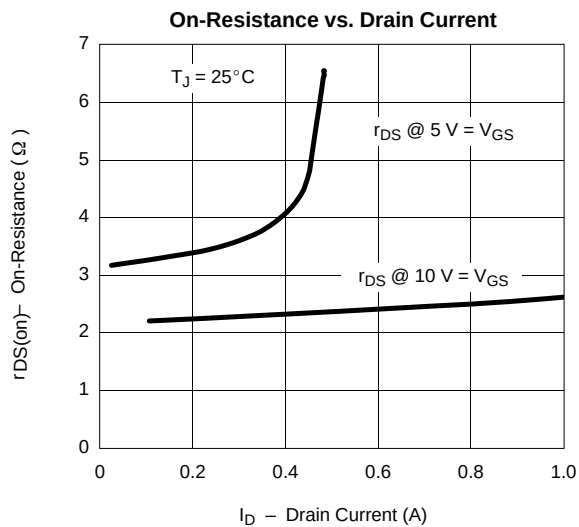
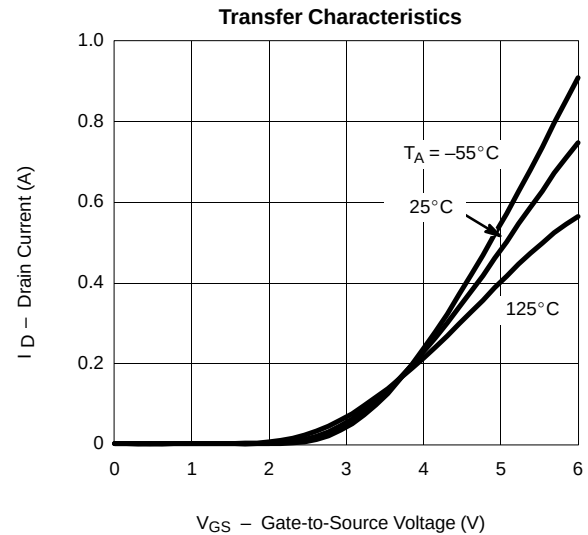
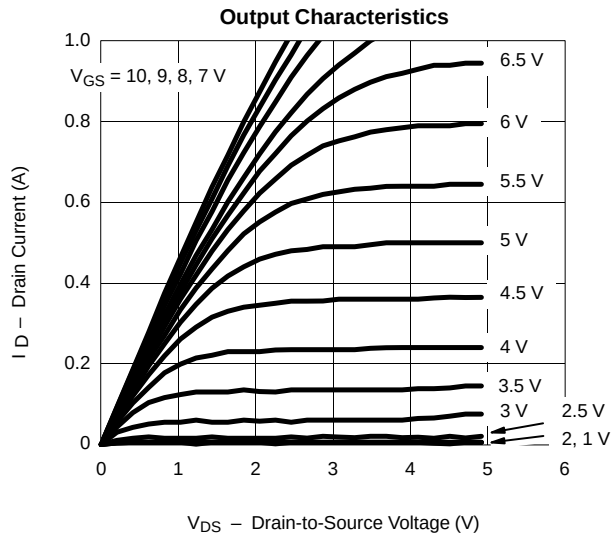
SPECIFICATIONS (T_A = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Typ ^a	Limits						Unit
				VN10LLS VN0610LL		VN0605T		VN2222LL		
				Min	Max	Min	Max	Min	Max	
Static										
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 100 μA	70	60				60		V
		V _{GS} = 0 V, I _D = 10 μA	70			60				
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 1 mA	2.1	0.8	2.5	0.8	3.0	0.6	2.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V					±100		±100	nA
		T _J =125°C					±500			
		V _{DS} = 0 V, V _{GS} = ±30 V			±100					
Zero Gate-Voltage Drain Current	I _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V			10		1.0			μA
		T _J = 125°C			500		500			
		V _{DS} = 48 V, V _{GS} = 0 V							10	
		T _J = 125°C							500	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 10 V	1000	750		500		750		mA
Drain-Source On-Resistance ^b	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 50 mA	4.5				7.5			Ω
		V _{GS} = 5 V, I _D = 0.2 A	4.5		7.5				7.5	
		V _{GS} = 10 V, I _D = 0.5 A	2.4		5		5		7.5	
		T _J = 125°C	4.4		9		10		13.5	
Forward Transconductance ^b	g _{fs}	V _{DS} = 10 V, I _D = 0.5 A	230	100				100		mS
		V _{DS} = 10 V, I _D = 0.2 A	180			80				
Common Source Output Conductance ^b	g _{os}	V _{DS} = 5 V, I _D = 50 mA	500							μS
Dynamic										
Input Capacitance	C _{iss}	V _{DS} =25 V, V _{GS} = 0 V f = 1 MHz	22		60		60		60	pF
Output Capacitance	C _{oss}		11		25		25		25	
Reverse Transfer Capacitance	C _{rss}		2		5		5		5	
Switching ^c										
Turn-On Time	t _{ON}	V _{DD} = 15 V, R _L = 23 Ω, I _D ≅ 0.6 A V _{GEN} = 10 V, R _G = 25 Ω	7		10				10	ns
Turn-Off Time	t _{OFF}		7		10				10	
Turn-On Time	t _{ON}	V _{DD} = 30 V, R _L = 150 Ω, I _D ≅ 0.2 A V _{GEN} = 10 V, R _G = 25 Ω	7				20			
Turn-Off Time	t _{OFF}		11				20			

Notes

- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.
c. Switching time is essentially independent of operating temperature.

VNBF06

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

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