



N-Channel 60-V (D-S) MOSFETs

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

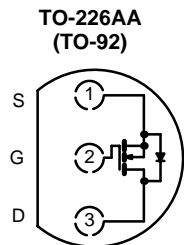
- Low On-Resistance: 2.5 Ω
- Low Threshold: <2.1 V
- Low Input Capacitance: 22 pF
- Fast Switching Speed: 7 ns
- Low Input and Output Leakage

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



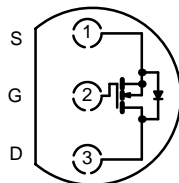
Top View
VN0610LL
VN2222LL

Front View



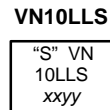
"S" = Siliconix Logo
xxyy = Date Code

TO-92S



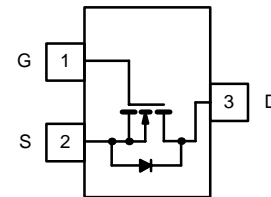
Top View
VN10LLS

Front View

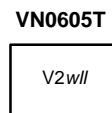


"S" = Siliconix Logo
xxyy = Date Code

TO-236 (SOT-23)



Top View
VN0605T



V2 = Part Number Code for VN0605T
w = Week Code
// = Lot Traceability

ABSOLUTE 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 ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.32	0.18	0.28	0.23	A
		$T_A = 100^\circ\text{C}$	0.2	0.11	0.17	0.14	
Pulsed Drain Current ^a	I_{DM}	1.4	0.72	1.3	1.0		
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.9	0.36	0.8	0.8	W
		$T_A = 100^\circ\text{C}$	0.4	0.14	0.32	0.32	
Thermal Resistance, 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

- Pulse width limited by maximum junction temperature.
- $t_p \leq 50 \mu\text{s}$.



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			
Zero Gate-Voltage Drain Current	I _{DSS}	V _{DS} = 0 V, V _{GS} = ±30 V			±100					μA
		V _{DS} = 50 V, V _{GS} = 0 V			10		1.0			
		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			

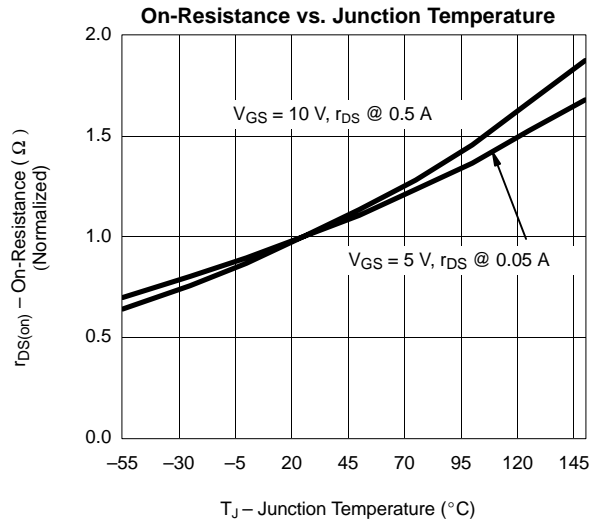
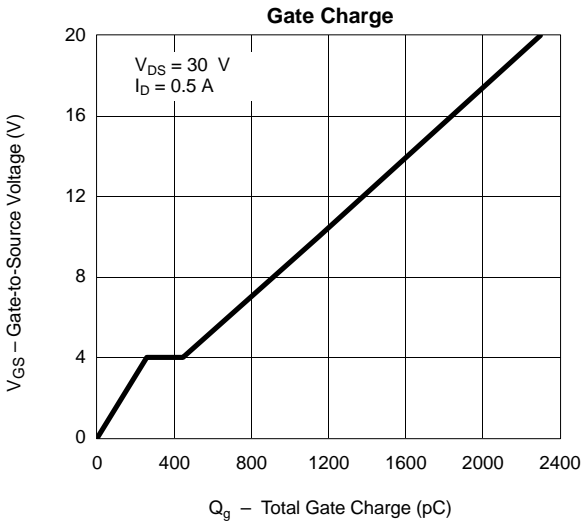
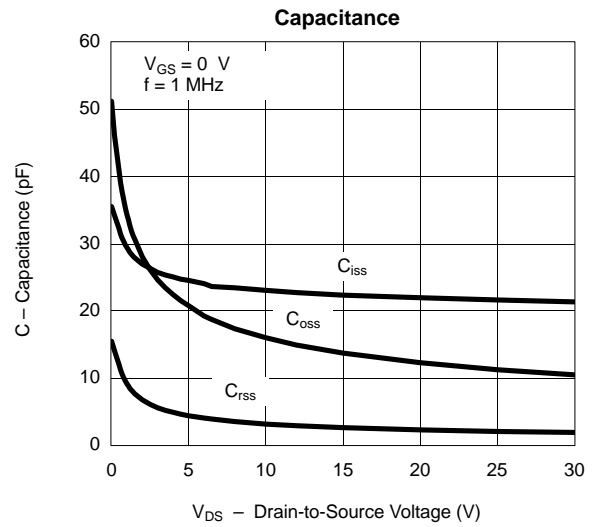
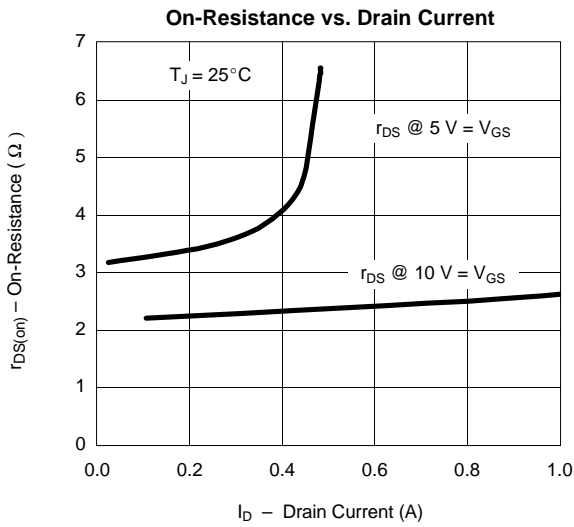
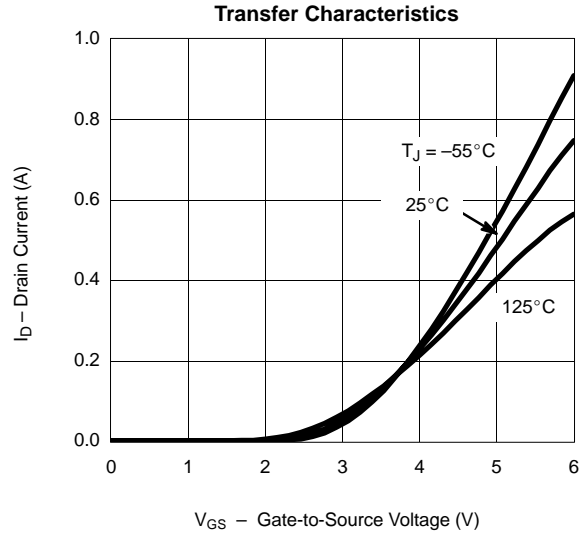
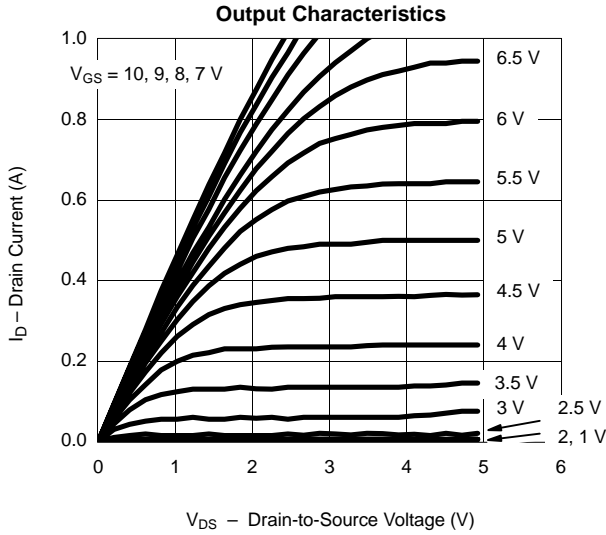
Notes

- 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.

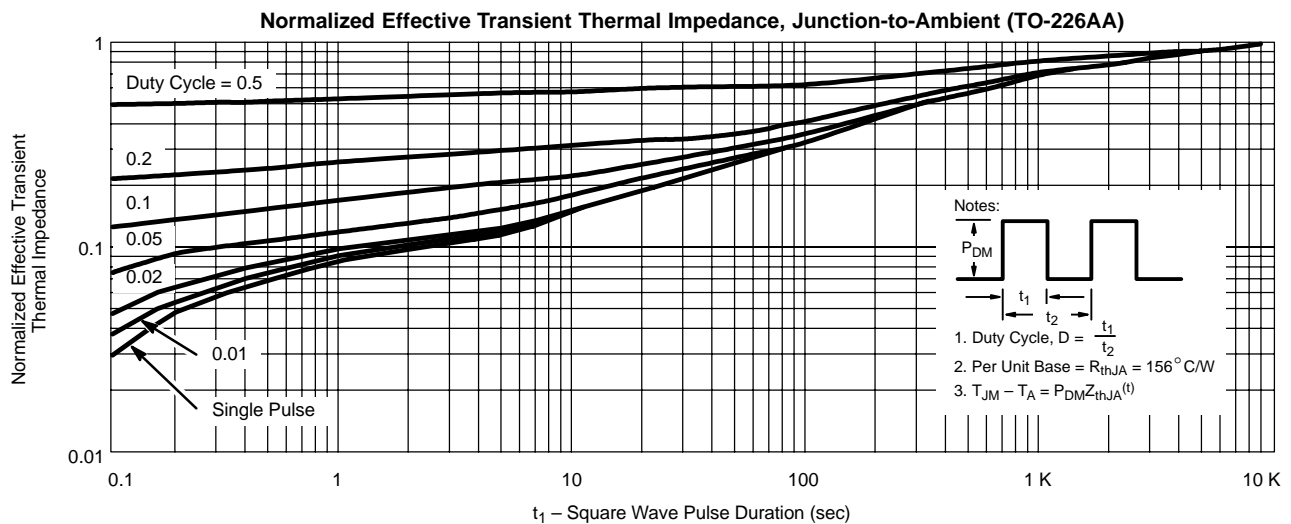
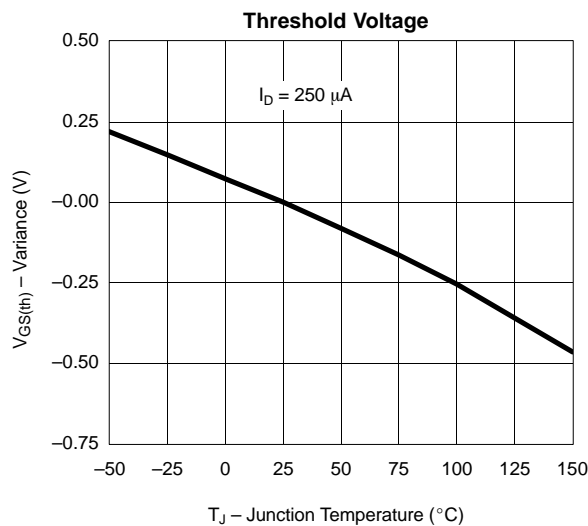
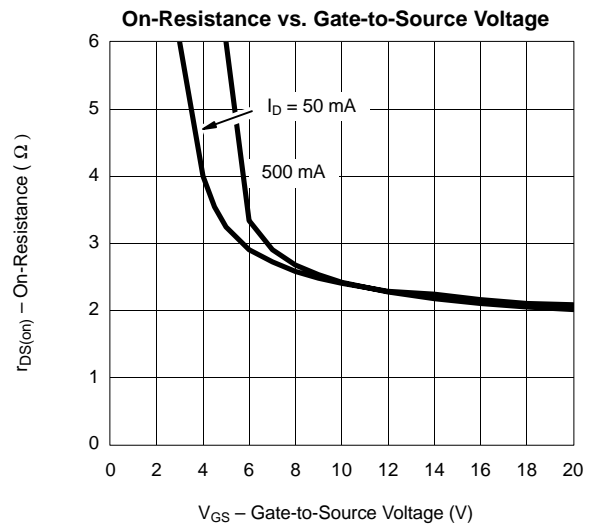
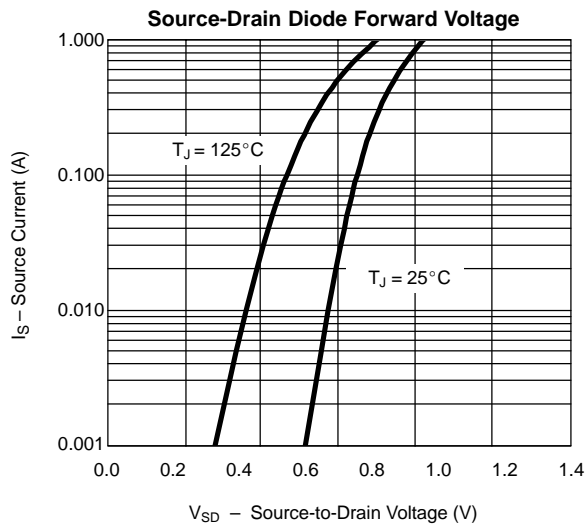
VNBF06



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



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)





Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.