

VN10/0605/0610/2222 Series

N-Channel Enhancement-Mode MOSFET Transistors

VN10LE
VN10LM

VN0605T
VN0610LL

VN2222LL
VN2222LM

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D Min (A)
VN10LE	60	5 @ $V_{GS} = 10$ V	0.8 to 2.5	0.38
VN10LM		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		7.5 @ $V_{GS} = 5$ V	0.6 to 2.5	0.23
VN2222LM		7.5 @ $V_{GS} = 5$ V	0.6 to 2.5	0.26

Features

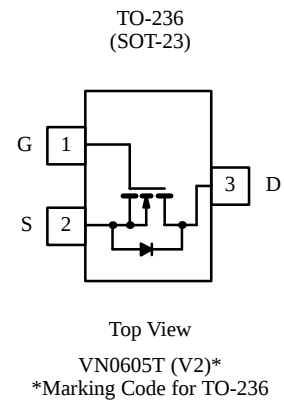
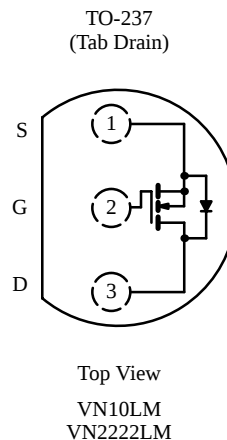
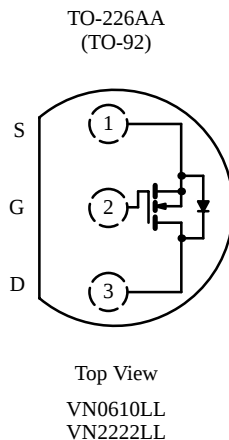
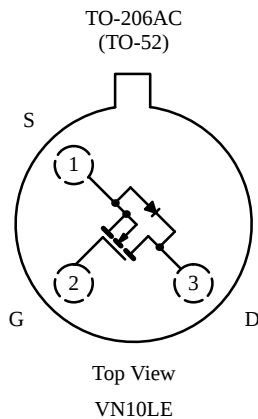
- Low On-Resistance: 2.5 Ω
- Low Threshold: <2.1 V
- Low Input Capacitance: 22 pF
- Fast Switching Speed: 7 ns
- Low Input and Output Leakage

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



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Absolute Maximum Ratings (T_A = 25 °C Unless Otherwise Noted)

Parameter	Symbol	VN10LE ^b	VN10LM	VN0605T	VN0610LL	VN2222LL	VN2222LM	Unit
Drain-Source Voltage	V _{DS}	60	60	60	60	60	60	V
Gate-Source Voltage—Non-Repetitive ^c	V _{GSM}		± 30	± 30	± 30	± 30	± 30	
Gate-Source Voltage—Continuous	V _{GS}	± 20	± 20	± 20	± 20	± 20	± 20	
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	I _D	0.38	0.32	0.18	0.28	0.23	A
	T _A = 100 °C		0.24	0.2	0.11	0.17	0.14	
Pulsed Drain Current ^a	I _{DM}		1.0	1.4	0.72	1.3	1.0	
Power Dissipation	T _A = 25 °C	P _D	1.5	1.0	0.36	0.8	0.8	W
	T _A = 100 °C		0.6	0.4	0.14	0.32	0.4	
Maximum Junction-to-Ambient	R _{thJA}		400	125	350	156	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.
b. Reference case for all temperature testing.
c. t_p ≤ 50 μs.

Specifications^a

Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				VN10LE VN10LM VN0610LL		VN0605T		VN2222LL VN2222LM		
				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 ^e		± 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 ^c	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 10 V	1000	750		500		750		mA
Drain-Source On-Resistance ^c	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 ^c	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 ^c	g _{os}	V _{DS} = 5 V, I _D = 50 mA	500							μS

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Specifications^a

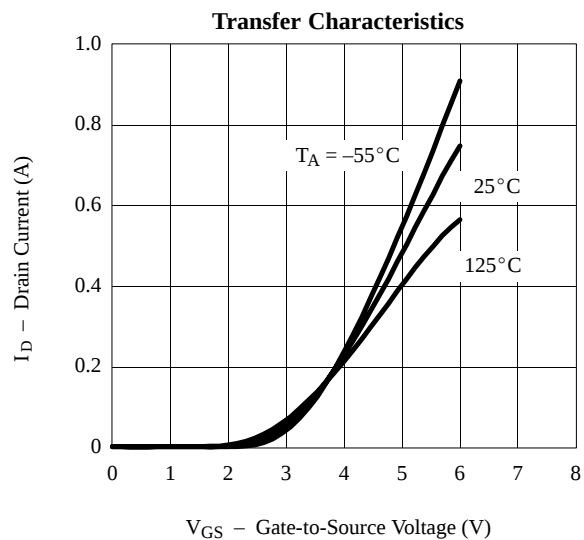
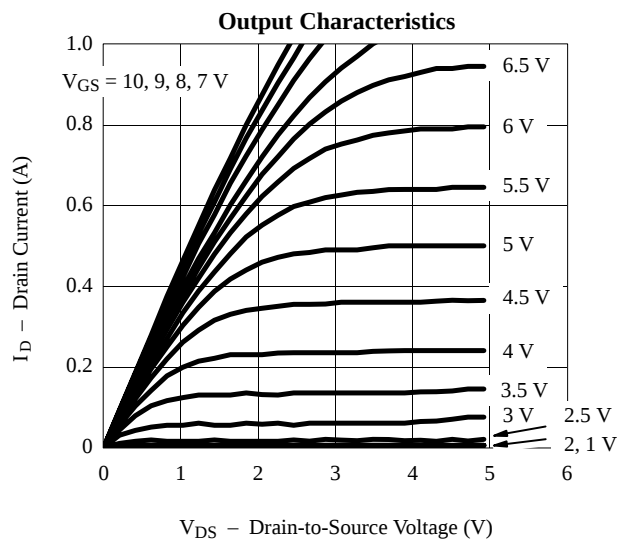
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				VN10LE VN10LM VN0610LL		VN0605T		VN2222LL VN2222LM			
				Min	Max	Min	Max	Min	Max		
Dynamic											
Input Capacitance	C _{iss}	V _{DS} =25 V, V _{GS} = 0 V f = 1 MHz	22		60		60		60	pF	
Output Capacitance	C _{oss}		11		25		25		25		
Reverse Transfer Capacitance	C _{rss}		2		5		5		5		
Switching ^d											
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	7				20				
Turn-Off Time	t _{OFF}	V _{GEN} = 10 V, R _G = 25 Ω	11				20				

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 3\%$.
- Switching time is essentially independent of operating temperature.
- VN10LE only.

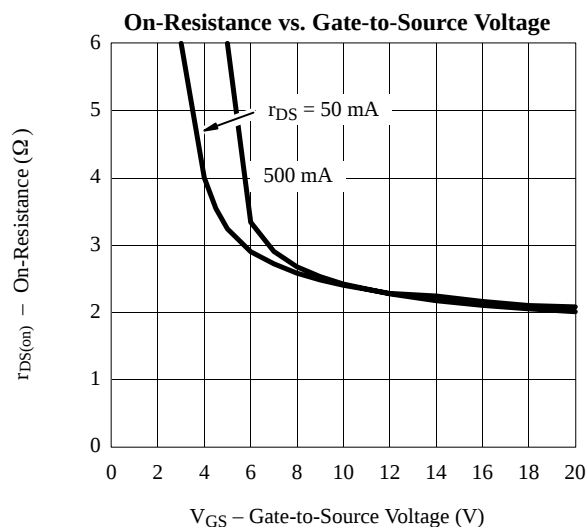
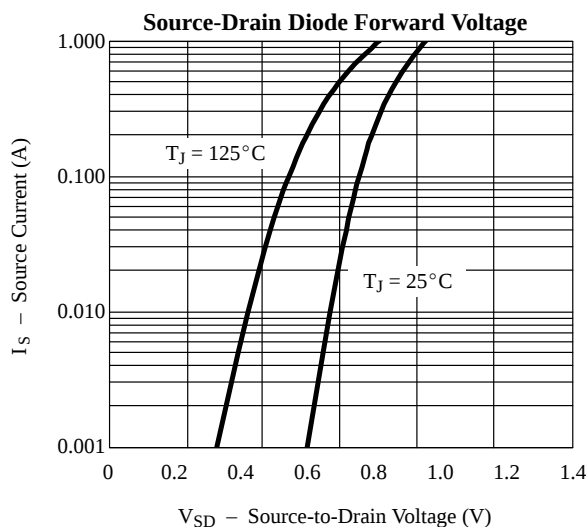
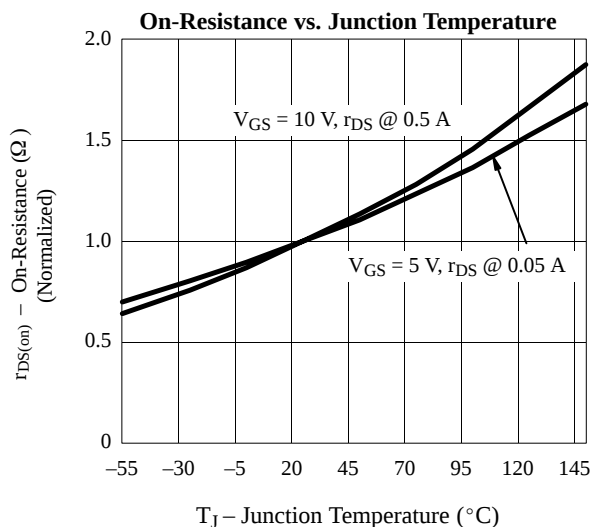
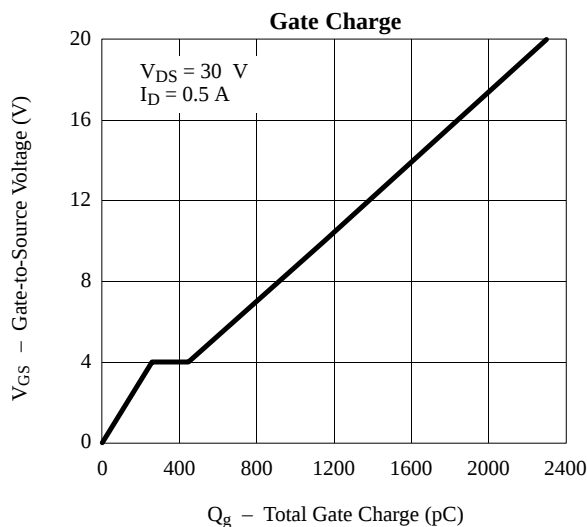
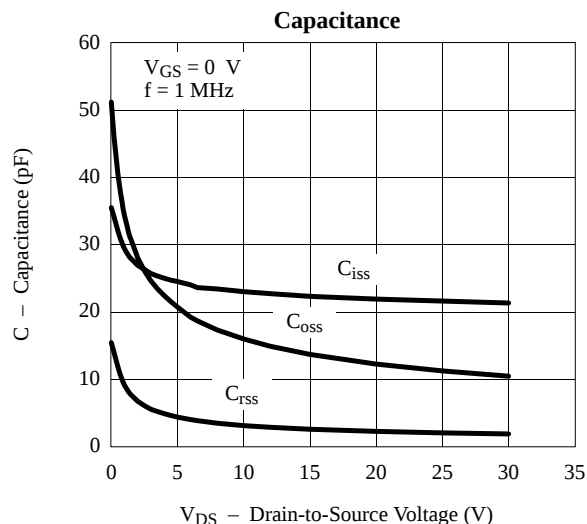
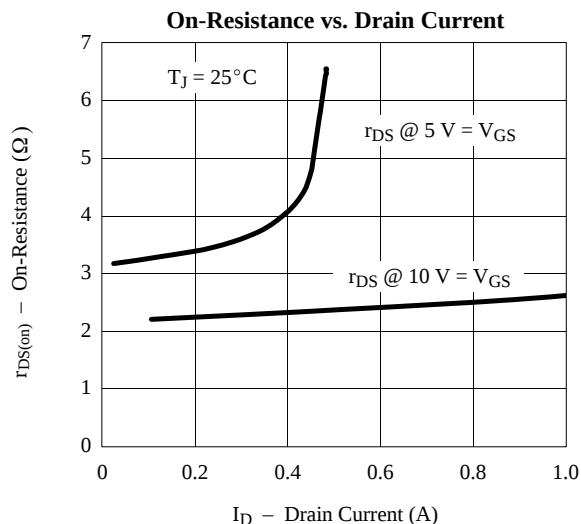
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Typical Characteristics (25°C Unless Otherwise Noted)



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