

VN10/0605/0610/2222 Series

N-Channel Enhancement-Mode MOSFET Transistors

VN10LE VN0605T VN2222LL
VN10LM VN0610LL 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

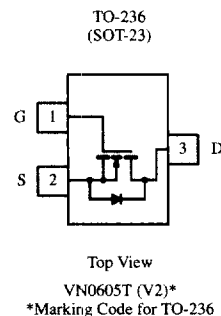
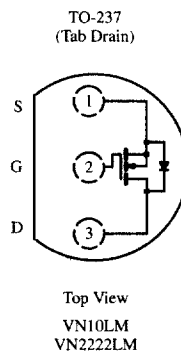
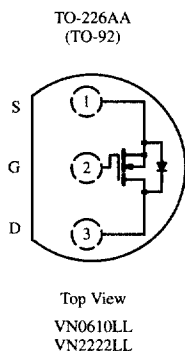
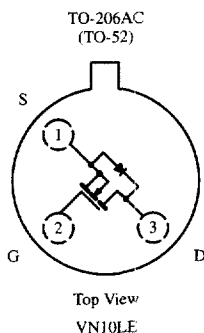
- Low On-Resistance: 2.5 Ω
- Low Threshold: <2.1 V
- Low Input Capacitance: 22 pF
- Fast Switching Speed: 7 ns
- Low Input and Output Leakage

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



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 = 25°C) (T _J = 150°C)	I _D	T _A = 25°C	0.38	0.32	0.18	0.28	0.23	0.26	A
		T _A = 100°C	0.24	0.2	0.11	0.17	0.14	0.16	
Pulsed Drain Current ^d	I _{DM}	1.0	1.4	0.72	1.3	1.0	1.0		
Power Dissipation	P _D	T _A = 25°C	1.5	1.0	0.36	0.8	0.8	1.0	W
		T _A = 100°C	0.6	0.4	0.14	0.32	0.32	0.4	
Maximum Junction-to-Ambient	R _{thJA}	400	125	350	156	156	125	°C/W	
Operating Junction and Storage Temperature Range	T _J , T _{sig}	-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 T _J = 125°C			±100 ^e			±100		±100	nA
		V _{DS} = 0 V, V _{GS} = ±30 V			±100						
Zero Gate-Voltage Drain Current	I _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V T _J = 125°C			10		1.0				μA
		V _{DS} = 48 V, V _{GS} = 0 V T _J = 125°C			500		500			10	
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	

Low Power MOSFETs

VN10/0605/0610/2222 Series

TEMIC
Semiconductors

Specifications^a

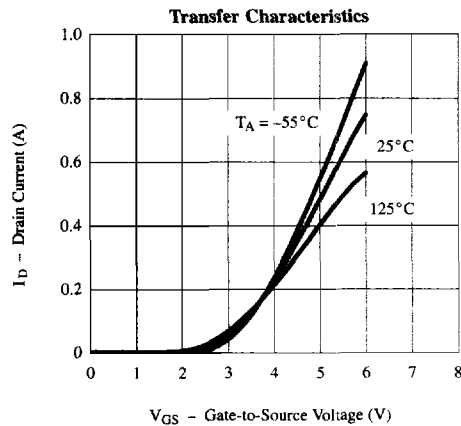
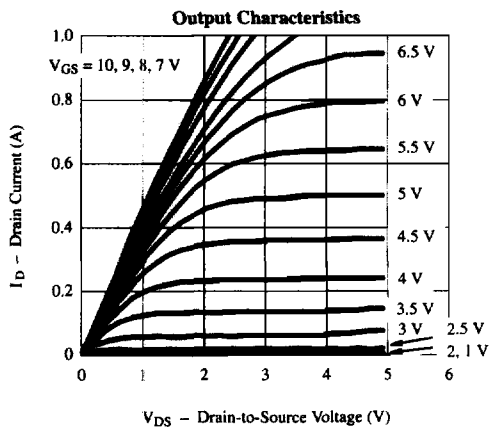
Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				VN10LE VN10LM VN0610LL		VN0605T		VN2222LL VN2222LM		
				Min	Max	Min	Max	Min	Max	
Dynamic										
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	22		60		60		60	pF
Output Capacitance	C_{oss}		11		25		25		25	
Reverse Transfer Capacitance	C_{rss}		2		5		5		5	
Switching^d										
Turn-On Time	t_{ON}	$V_{DD} = 15\text{ V}, R_L = 23\ \Omega$ $I_D \cong 0.6\text{ A}$ $V_{GEN} = 10\text{ V}, R_G = 25\ \Omega$	7		10				10	ns
Turn-Off Time	t_{OFF}		7		10				10	
Turn-On Time	t_{ON}	$V_{DD} = 30\text{ V}, R_L = 150\ \Omega$ $I_D \cong 0.2\text{ A}$ $V_{GEN} = 10\text{ V}, R_G = 25\ \Omega$	7				20			
Turn-Off Time	t_{OFF}		11				20			

Notes

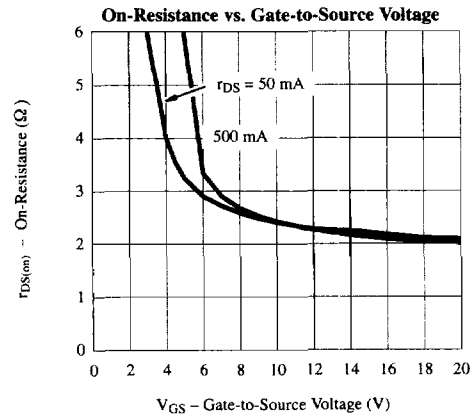
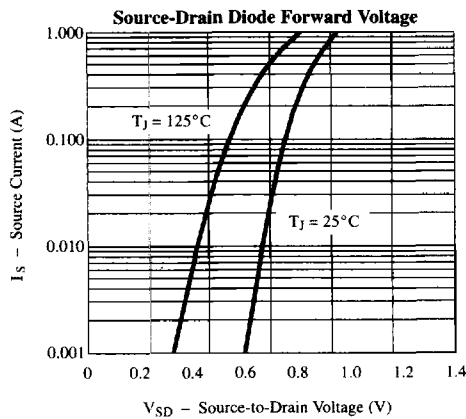
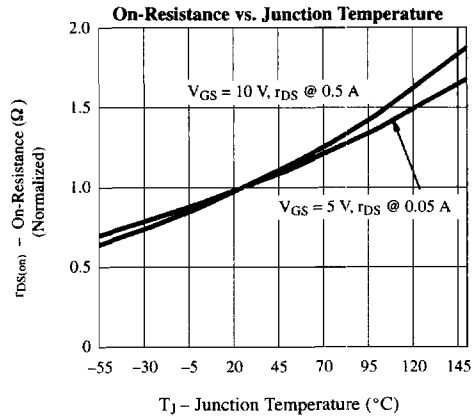
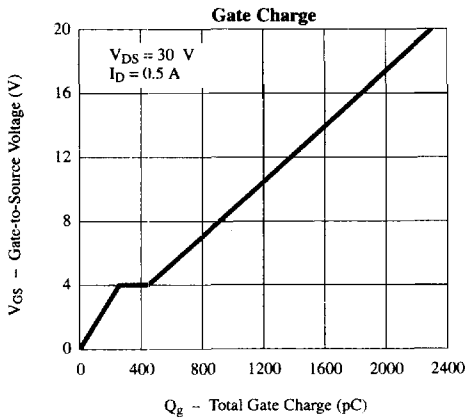
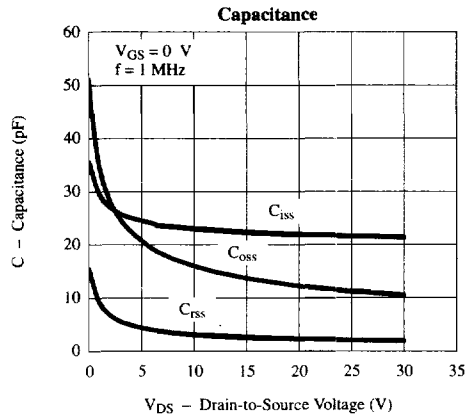
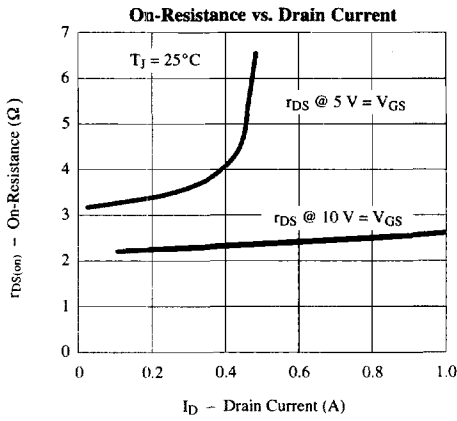
- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 3\%$.
- Switching time is essentially independent of operating temperature.
- VN10LE only.

VNBF06

Typical Characteristics (25°C Unless Otherwise Noted)



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Low Power MOSFETs

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