

N-Channel Enhancement-Mode MOS Transistors

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
VN1206L	120	6 @ $V_{GS} = 10$ V	0.8 to 2	0.23
VN1206M		6 @ $V_{GS} = 10$ V	0.8 to 2	0.26
VN1210M		10 @ $V_{GS} = 2.5$ V	0.8 to 2	0.2

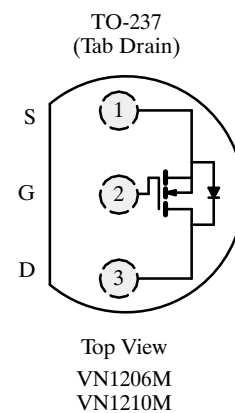
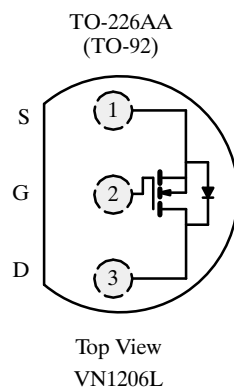
Features

- Low On-Resistance: 3.8 Ω
- Low Threshold: 1.4 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 10 ns
- Low Input and Output Leakage
- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

Benefits

Applications

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



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	VN1206L	VN1206M	VN1210M	Unit
Drain-Source Voltage	V_{DS}	120	120	120	V
Gate-Source Voltage	V_{GS}	± 30	± 30	± 30	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.23	0.26	A
		$T_A = 100^\circ\text{C}$	0.15	0.16	
Pulsed Drain Current ^a	I_{DM}	2	2	2	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8	1	W
		$T_A = 100^\circ\text{C}$	0.32	0.4	
Maximum Junction-to-Ambient	R_{thJA}	156	125	125	$^\circ\text{C}/\text{W}$
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.

VN1206L/M, VN1210M

Specifications^a

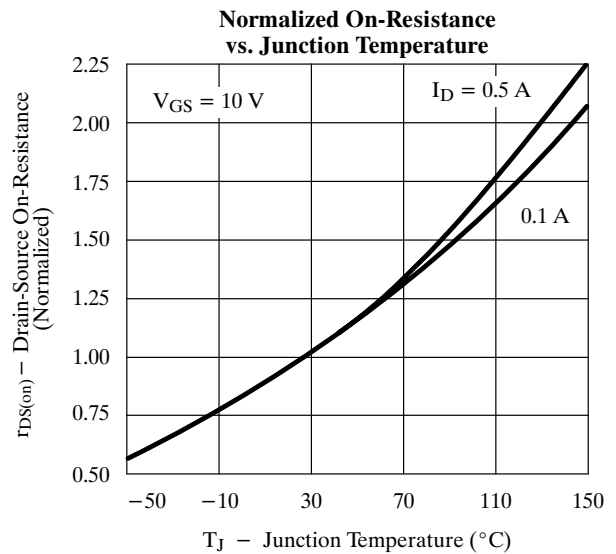
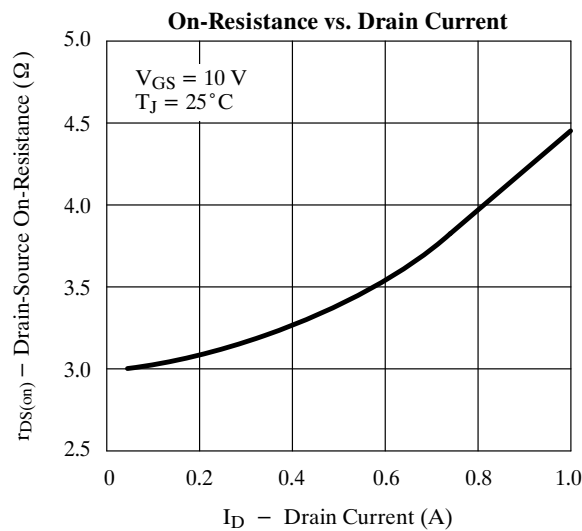
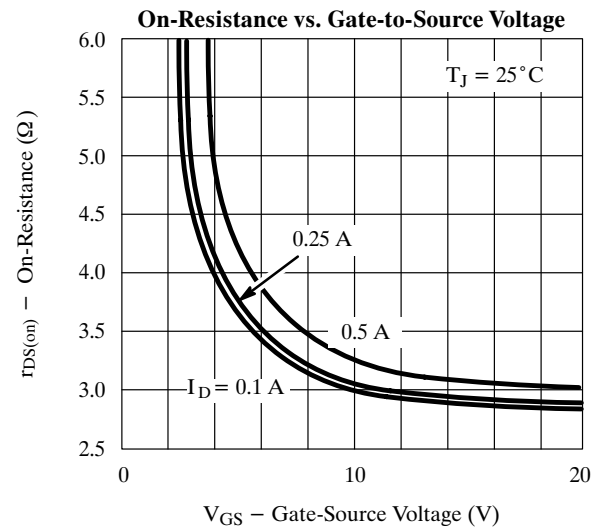
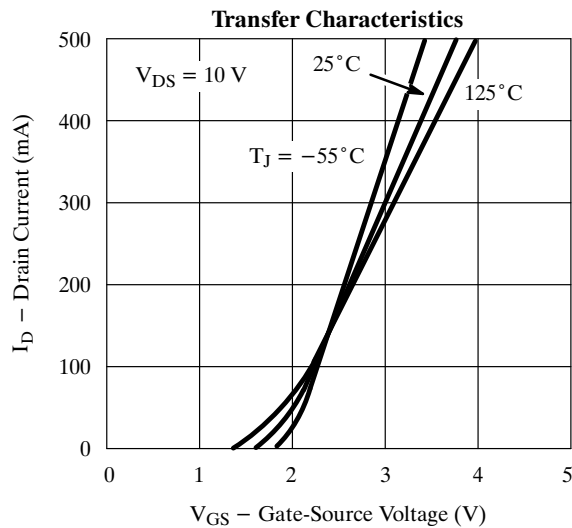
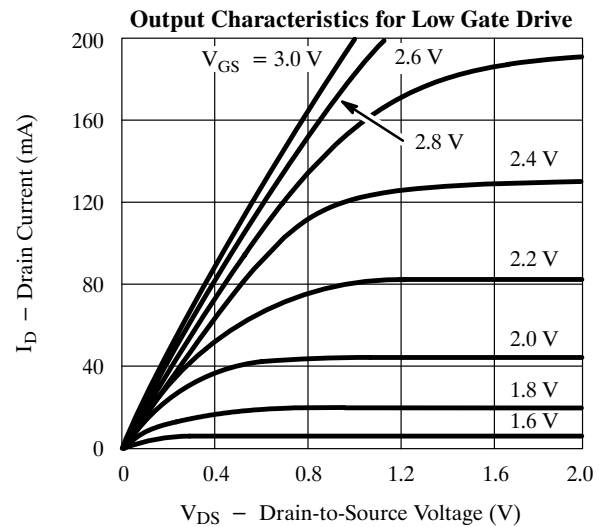
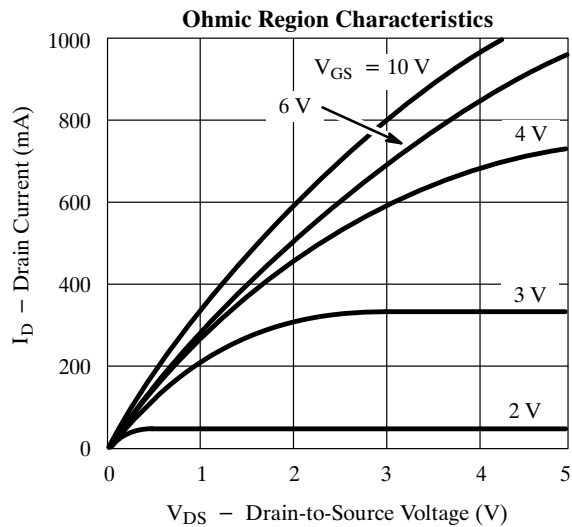
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VN1206L VN1206M		VN1210M		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	145	120		120		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.4					
		$V_{DS} = V_{GS}, I_D = 1\ \text{mA}$	1.5	0.8	2	0.8	2	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 15\ \text{V}$ $T_J = 125^\circ\text{C}$			± 100		± 100	nA
		$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$						
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 96\ \text{V}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$						μA
		$V_{DS} = 120\ \text{V}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$			10		10	
					500		500	
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = 10\ \text{V}, V_{GS} = 4.5\ \text{V}$	0.6					A
		$V_{DS} = 10\ \text{V}, V_{GS} = 10\ \text{V}$	1.6	1		1		
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 2.5\ \text{V}, I_D = 0.1\ \text{A}$	6		10		10	Ω
		$V_{GS} = 3.5\ \text{V}, I_D = 0.1\ \text{A}$	4.5					
		$V_{GS} = 10\ \text{V}, I_D = 0.3\ \text{A}$	3.3					
		$V_{GS} = 4.5\ \text{V}, I_D = 0.2\ \text{A}$	3.8					
		$T_J = 125^\circ\text{C}$	7.6					
		$V_{GS} = 10\ \text{V}, I_D = 0.5\ \text{A}$ $T_J = 125^\circ\text{C}$	3.3		6		10	
Forward Transconductance ^c	g_{fs}	$V_{DS} = 10\ \text{V}, I_D = 0.2\ \text{A}$	400					mS
		$V_{DS} = 10\ \text{V}, I_D = 0.5\ \text{A}$	425	300		300		
Common Source Output Conductance ^c	g_{os}	$V_{DS} = 7.5\ \text{V}, I_D = 0.1\ \text{A}$	0.4					
Dynamic								
Input Capacitance	C_{iss}	$V_{DS} = 25\ \text{V}, V_{GS} = 0\ \text{V}$ $f = 1\ \text{MHz}$	35		125		125	pF
Output Capacitance	C_{oss}		15		50		50	
Reverse Transfer Capacitance	C_{rss}		2		20		20	
Switching^d								
Turn-On Time	t_{ON}	$V_{DD} = 60\ \text{V}, R_L = 150\ \Omega$ $I_D \approx 0.4\ \text{A}, V_{GEN} = 10\ \text{V}$ $R_G = 25\ \Omega$	6					ns
	$t_{d(on)}$		3		8		8	
	t_r		3		8		8	
Turn-Off Time	t_{OFF}		10					
	$t_{d(off)}$		7		18		18	
	t_f		2.5		12		12	

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VNDQ12

Typical Characteristics (25°C Unless Otherwise Noted)



VN1206L/M, VN1210M

Typical Characteristics (25°C Unless Otherwise Noted) (Cont'd)

