

TN0601L, VN0606L/M, VN66AFD

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 (A)
TN0601L	60	1.8 @ $V_{GS} = 10$ V	0.5 to 2	0.47
VN0606L		3 @ $V_{GS} = 10$ V	0.8 to 2	0.33
VN0606M		3 @ $V_{GS} = 10$ V	0.8 to 2	0.39
VN66AFD		3 @ $V_{GS} = 10$ V	0.8 to 2.5	1.46

Features

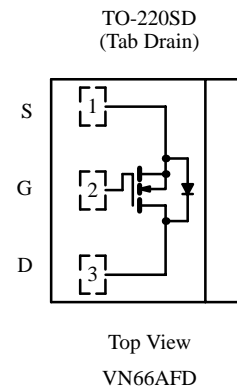
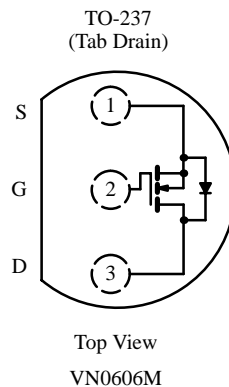
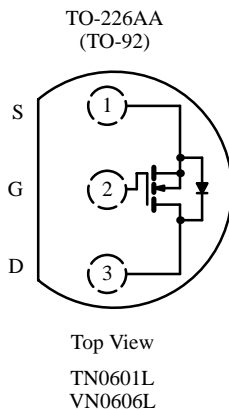
- Low On-Resistance: 1.2 Ω
- Low Threshold: <1.6 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 9 ns
- Low Input and Output Leakage

Benefits

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

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	TN0601L	VN0606L	VN0606M	VN66AFD ^b	Unit	
Drain-Source Voltage	V_{DS}	60	60	60	60	V	
Gate-Source Voltage	V_{GS}	± 20	± 30	± 30	± 30	V	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	I_D	0.47	0.33	0.39	1.46	A
	$T_A = 100^\circ\text{C}$		0.29	0.21	0.25	0.92	
Pulsed Drain Current ^a	I_{DM}		1.5	1.6	2	3	
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	0.8	0.8	1.0	15	W
	$T_A = 100^\circ\text{C}$		0.32	0.32	0.4	6	
Maximum Junction-to-Ambient	R_{thJA}		156	156	125	$^\circ\text{C/W}$	
Maximum Junction-to-Case	R_{thJC}				8.3		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150				$^\circ\text{C}$	

Notes

- Pulse width limited by maximum junction temperature.
- Reference case for all temperature testing.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70201.

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Specifications^a

Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				TN0601L		VN0606L VN0606M		VN66AFD		
				Min	Max	Min	Max	Min	Max	
Static										
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	70	60		60		60		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 0.25\text{ mA}$	1.6	0.5	2					V
		$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	1.7			0.8	2	0.8	2.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 30\text{ V}$ $T_C = 125^\circ\text{C}$					± 100		± 100	nA
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 10					
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$ $T_J = 125^\circ\text{C}$					10			μA
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$ $T_J = 125^\circ\text{C}$			1			1		
		$T_C = 125^\circ\text{C}$			100					
		$T_C = 125^\circ\text{C}$							10	
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$	0.5	0.25						A
		$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$	2.4	1		1.5		1.5		
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 3.5\text{ V}, I_D = 0.04\text{ A}$	4		5					Ω
		$V_{GS} = 4.5\text{ V}, I_D = 0.25\text{ A}$	2		3					
		$T_J = 125^\circ\text{C}$	3.8		6					
		$V_{GS} = 5\text{ V}, I_D = 0.3\text{ A}$	2.3					5		
		$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	1.2				3			
		$T_J = 125^\circ\text{C}$	2.3				6			
Forward Transconductance ^c	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$	350	200		170		170		mS
		$V_{DS} = 10\text{ V}, I_D = 0.1\text{ A}$	0.3							
Common Source Output Conductance ^c	g_{os}	$V_{DS} = 10\text{ V}, I_D = 0.1\text{ A}$	0.3							mS
Dynamic										
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	35		60		50		50	pF
Output Capacitance	C_{oss}		25		50		40		40	
Reverse Transfer Capacitance	C_{rss}		6		10		10		10	
Switching^d										
Turn-On Time	t_{ON}	$V_{DD} = 25\text{ V}, R_L = 23\ \Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}$ $R_G = 25\ \Omega$	8		15		10		15	ns
Turn-Off Time	t_{OFF}		9		15		10		15	

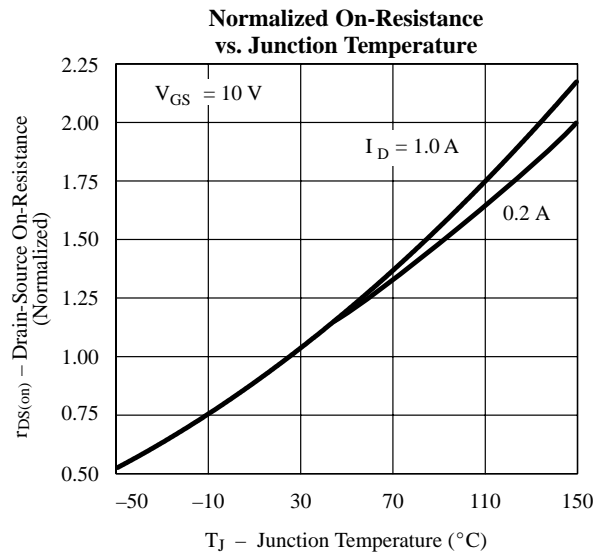
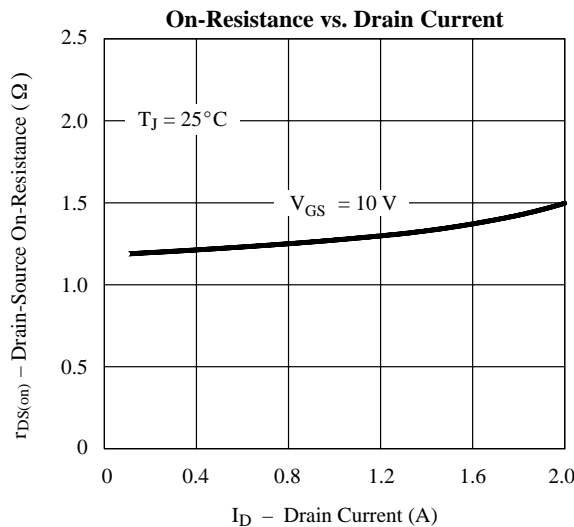
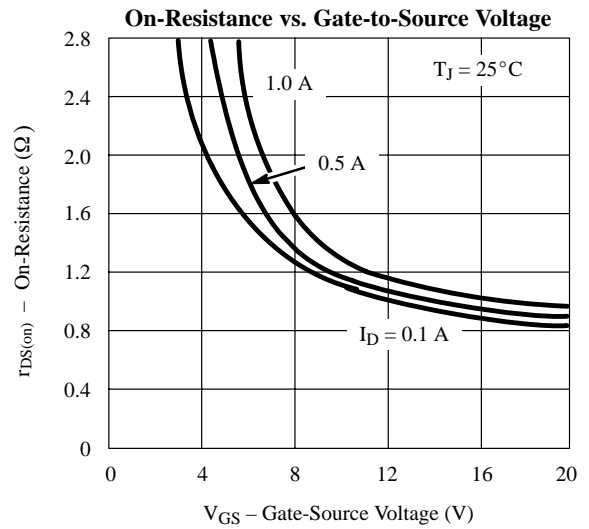
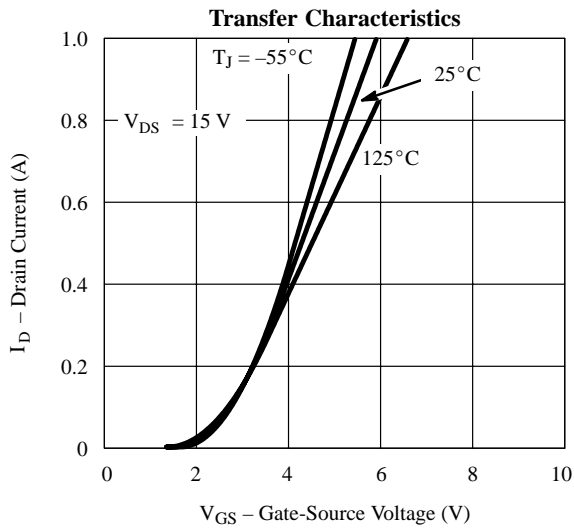
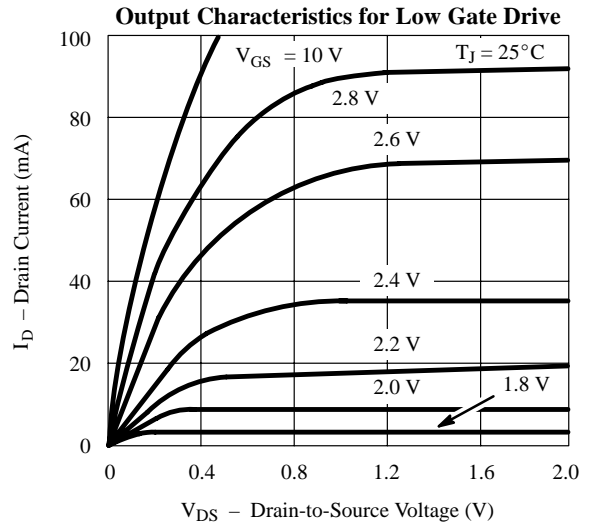
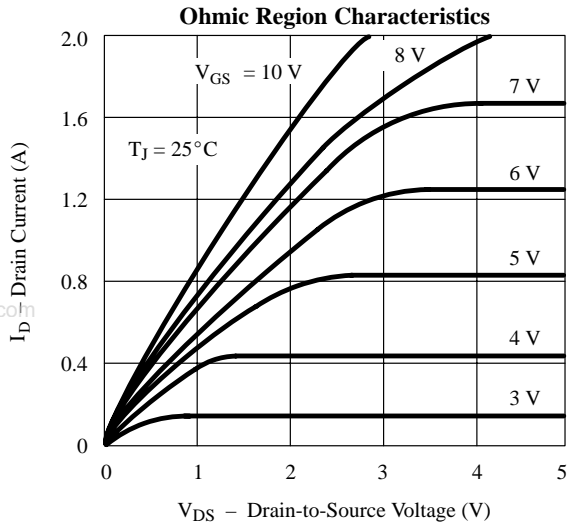
Notes

- $T_A = 25^\circ\text{C}$ 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.

VNDQ06

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Typical Characteristics (25°C Unless Otherwise Noted)



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