



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

PRODUCT SUMMARY				
Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (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
VN66AFD		3 @ $V_{GS} = 10$ V	0.8 to 2.5	1.46

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### FEATURES

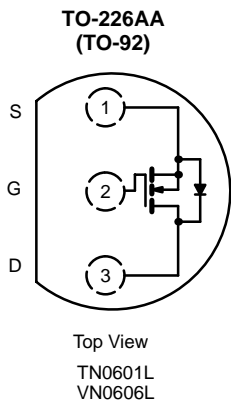
- Low On-Resistance: 1.2  $\Omega$
- Low Threshold: <1.6 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 9 ns
- Low Input and Output Leakage

### BENEFITS

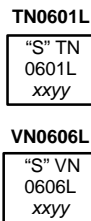
- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

### APPLICATIONS

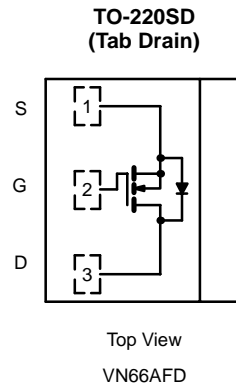
- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays



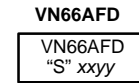
Device Marking  
Front View



"S" = Siliconix Logo  
xxyy = Date Code



Device Marking  
Front View



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ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	TN0601L	VN0606L	VN66AFD <sup>b</sup>	Unit
Drain-Source Voltage	$V_{DS}$	60	60	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 30$	$\pm 30$	
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_A = 25^\circ\text{C}$	0.47	0.33	A
		$T_A = 100^\circ\text{C}$	0.29	0.21	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	1.5	1.6	3	
Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	0.8	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	0.32	
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	156	156		$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{thJC}$			8.3	
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.  
b. Reference case for all temperature testing.



SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)										
Parameter	Symbol	Test Conditions	Typ <sup>a</sup>	Limits						Unit
				TN0601L		VN0606L		VN66AFD		
				Min	Max	Min	Max	Min	Max	
<b>Static</b>										
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA	70	60		60		60		V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 0.25 mA	1.6	0.5	2					V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA	1.7			0.8	2	0.8	2.5	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±30 V					±100		±100	nA
		T <sub>C</sub> = 125 °C							±500	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±10					μA
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V					10			
		T <sub>J</sub> = 125 °C					500			
		V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V			1				1	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V	0.5	0.25						A
		V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 10 V	2.4	1		1.5		1.5		
		T <sub>J</sub> = 125 °C								
Drain-Source On-Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 3.5 V, I <sub>D</sub> = 0.04 A	4		5					Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.25 A	2		3					
		T <sub>J</sub> = 125 °C	3.8		6					
		V <sub>GS</sub> = 5 V, I <sub>D</sub> = 0.3 A	2.3						5	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 A	1.2				3			
		T <sub>J</sub> = 125 °C	2.3				6			
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.5 A	350	200		170		170		mS
		T <sub>C</sub> = 125 °C	2.5						6	
Common Source Output Conductance <sup>b</sup>	g <sub>os</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.1 A	0.3							mS
<b>Dynamic</b>										
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	35		60		50		50	pF
Output Capacitance	C <sub>oss</sub>		25		50		40		40	
Reverse Transfer Capacitance	C <sub>rss</sub>		6		10		10		10	
<b>Switching<sup>c</sup></b>										
Turn-On Time	t <sub>ON</sub>	V <sub>DD</sub> = 25 V, R <sub>L</sub> = 23 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V R <sub>G</sub> = 25 Ω	8		15		10		15	ns
Turn-Off Time	t <sub>OFF</sub>		9		15		10		15	

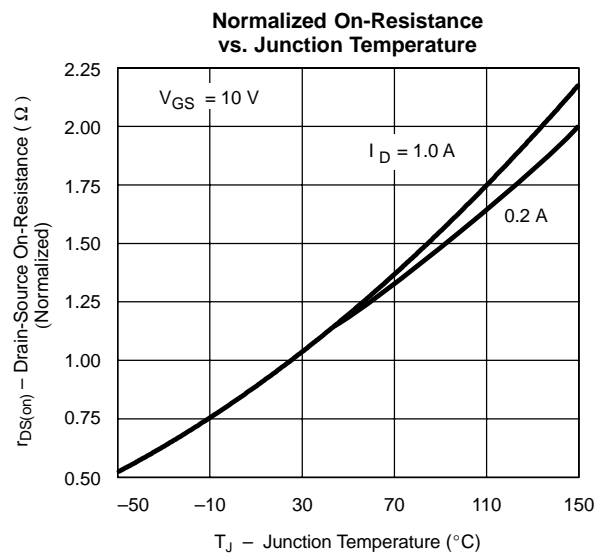
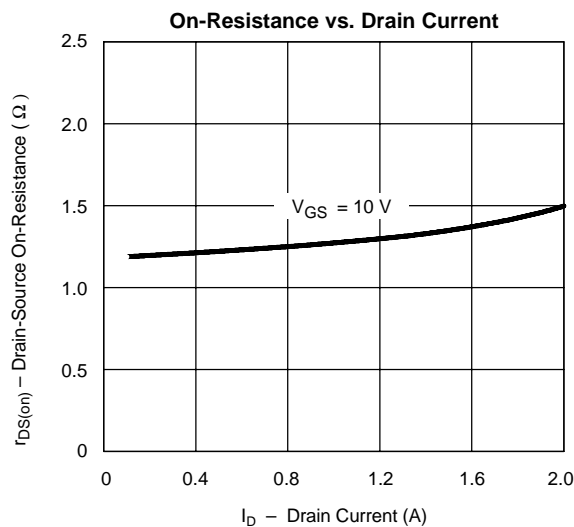
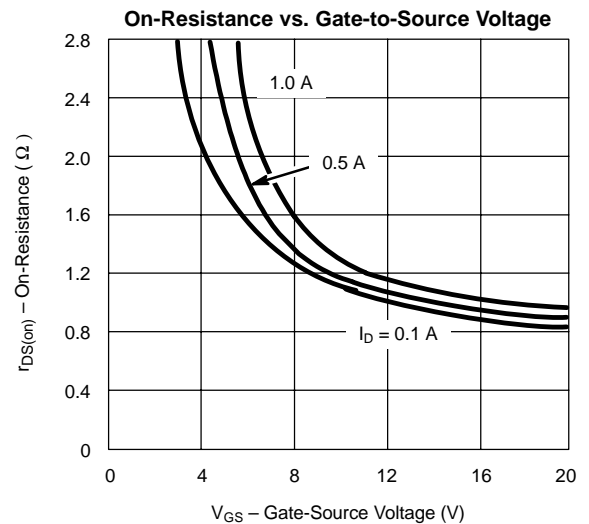
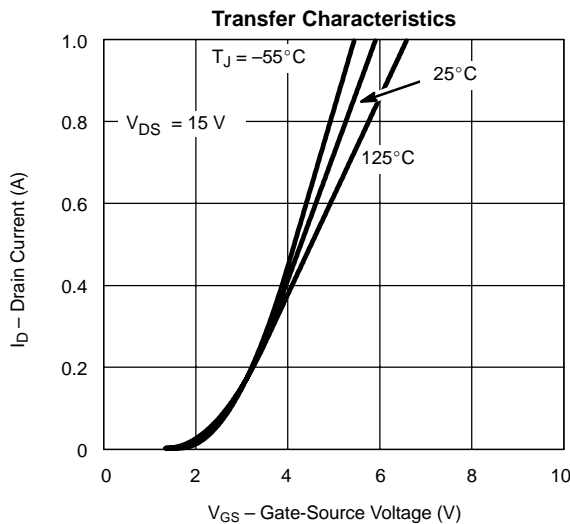
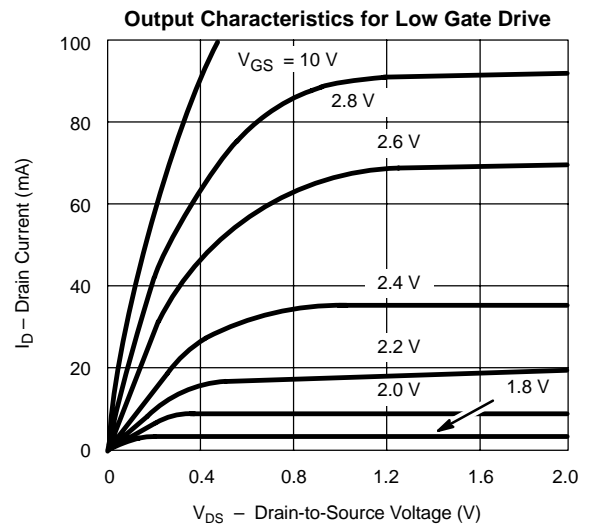
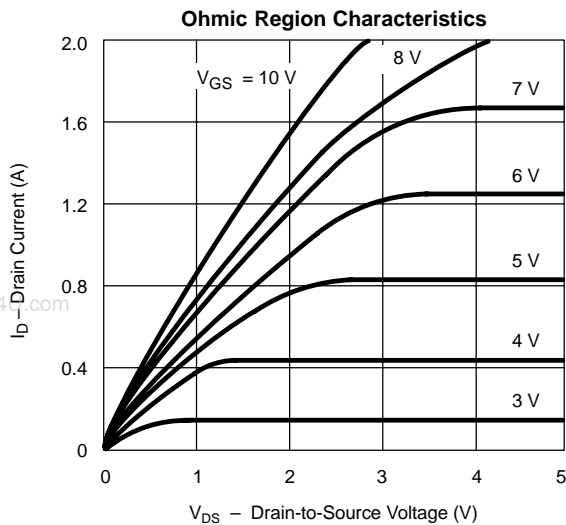
Notes

- a. For DESIGN AID ONLY, not subject to production testing..
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- c. Switching time is essentially independent of operating temperature.

VNDQ06



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



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