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

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
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

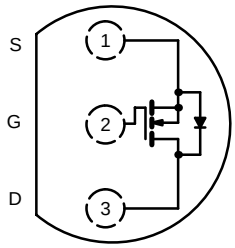
BENEFITS

- 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

TO-226AA
(TO-92)



Top View

TN0601L
VN0606L

Device Marking
Front View

TN0601L

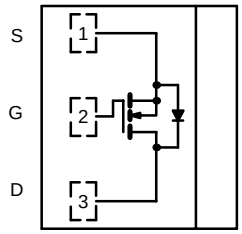
"S" TN
0601L
xxyy

VN0606L

"S" VN
0606L
xxyy

"S" = Siliconix Logo
xxyy = Date Code

TO-220SD
(Tab Drain)



Top View

VN66AFD

Device Marking
Front View

VN66AFD

VN66AFD
"S" *xxyy*

"S" = Siliconix Logo
xxyy = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)						
Parameter		**Symbol**	**TN0601L**	**VN0606L**	**VN66AFD[b]**	**Unit**
Drain-Source Voltage		V_{DS}	60	60	60	V
Gate-Source Voltage		V_{GS}	±20	±30	±30	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.47	0.33	1.46	A
	T_A= 100°C		0.29	0.21	0.92	
Pulsed Drain Current[a]		I_{DM}	1.5	1.6	3	
Power Dissipation	T_A= 25°C	P_D	0.8	0.8	15	W
	T_A= 100°C		0.32	0.32	6	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	156	156		°C/W
Thermal Resistance, Junction-to-Case		R_{thJC}			8.3	
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.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

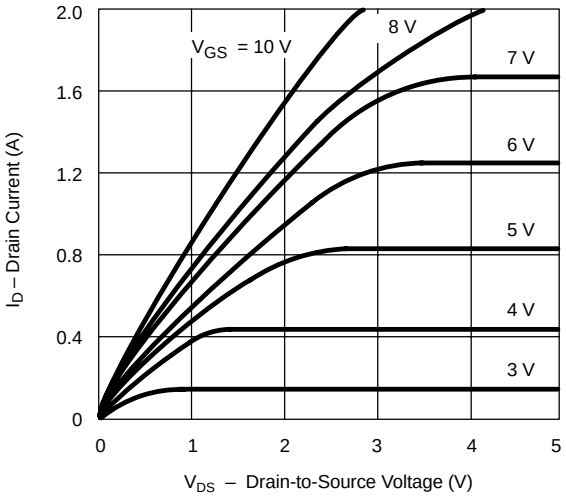
Parameter	Symbol	Test Conditions	Typ[a]	Limits TN0601L Min	TN0601L Max	VN0606L Min	VN0606L Max	VN66AFD Min	VN66AFD Max	Unit
Static										
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 μA	70	60		60		60		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 0.25 mA	1.6	0.5	2					
		V_{DS} = V_{GS}, I_D = 1 mA	1.7			0.8	2	0.8	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±30 V					±100		±100	nA
		T_C = 125°C							±500	
		V_{DS} = 0 V, V_{GS} = ±20 V			±10					
Zero Gate VoltageDrain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V					10			μA
		T_J = 125°C					500			
		V_{DS} = 48 V, V_{GS} = 0 V			1				1	
		T_J = 125°C			100					
		T_C = 125°C							10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 4.5 V	0.5	0.25						A
		V_{DS} = 10 V, V_{GS} = 10 V	2.4	1		1.5		1.5		
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = 3.5 V, I_D = 0.04 A	4		5					Ω
		V_{GS} = 4.5 V, I_D = 0.25 A	2		3					
		T_J = 125°C	3.8		6					
		V_{GS} = 5 V, I_D = 0.3 A	2.3						5	
		V_{GS} = 10 V, I_D = 0.5 A	1.2				3			
		T_J = 125°C	2.3				6			
		V_{GS} = 10 V, I_D = 1 A	1.3		1.8				3	
		T_C = 125°C	2.5						6	
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 0.5 A	350	200		170		170		mS
Common Source Output Conductance[b]	g_{os}	V_{DS} = 10 V, I_D = 0.1 A	0.3							
Dynamic										
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	35		60		50		50	pF
Output Capacitance	C_{oss}		25		50		40		40	
Reverse Transfer Capacitance	C_{rss}		6		10		10		10	
Switching[c]										
Turn-On Time	t_{ON}	V_{DD} = 25 V, R_L = 23 Ω, I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 25 Ω	8		15		10		15	ns
Turn-Off Time	t_{OFF}		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.

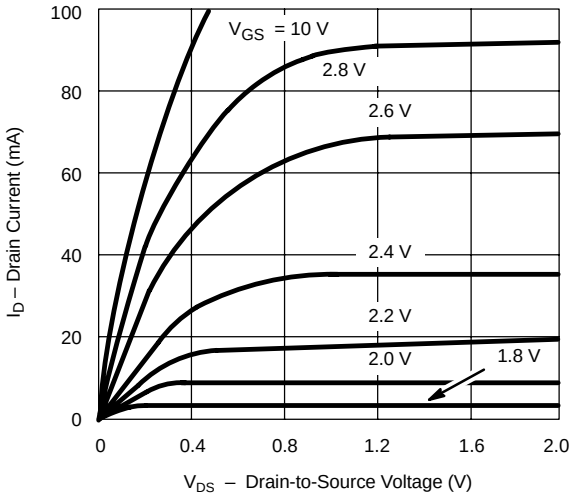
VNDQ06

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

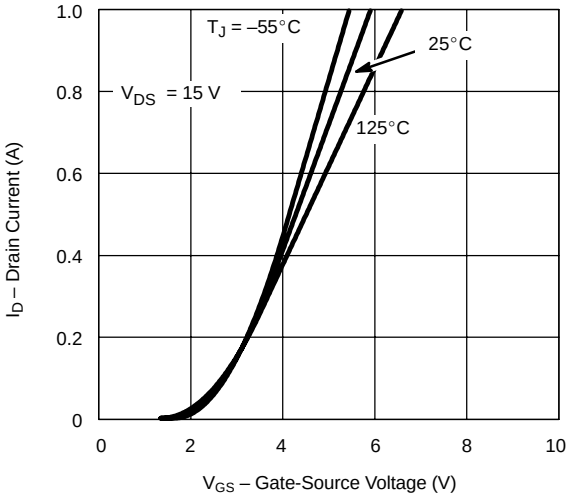
Ohmic Region Characteristics



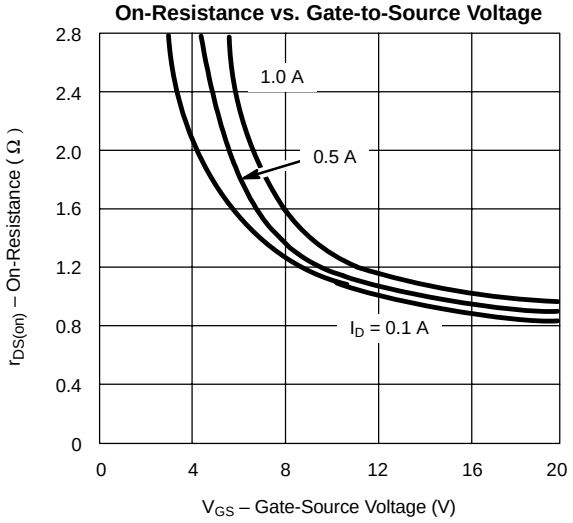
Output Characteristics for Low Gate Drive



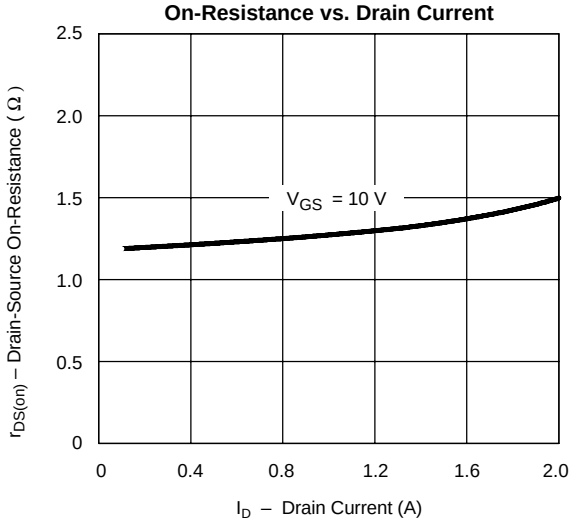
Transfer Characteristics



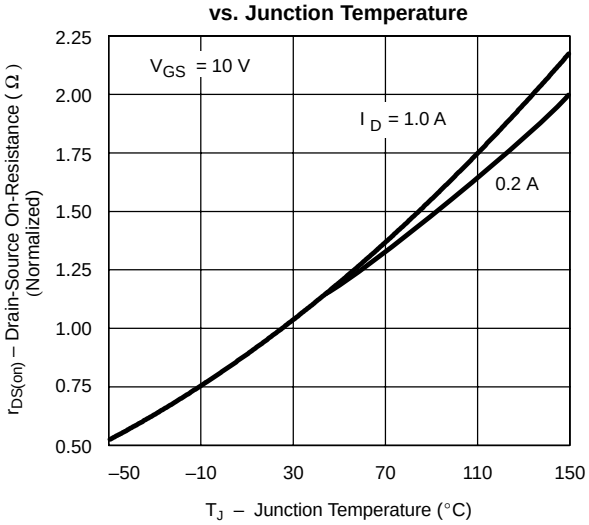
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

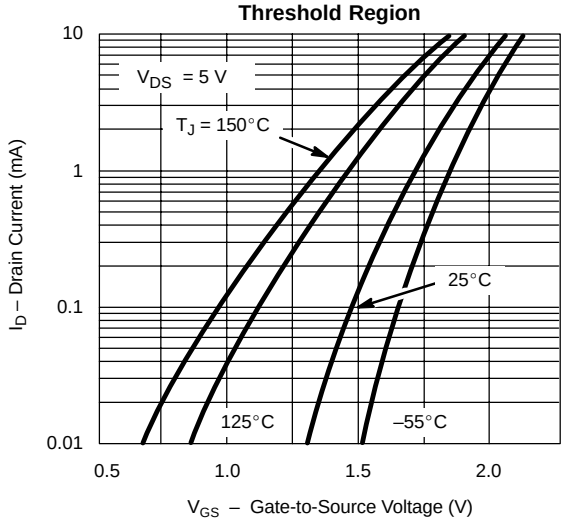


Normalized On-Resistance vs. Junction Temperature

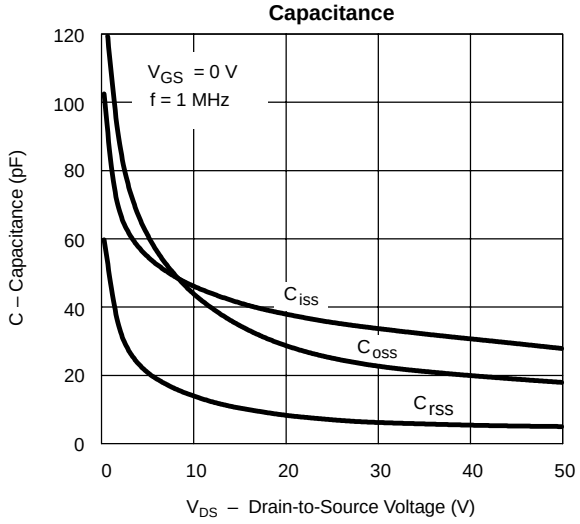


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

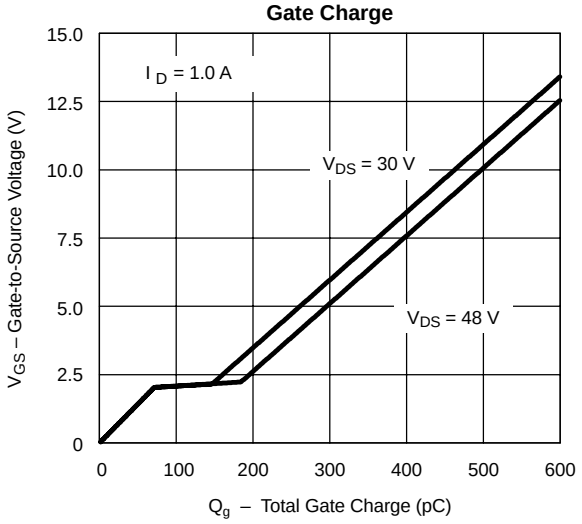
Threshold Region



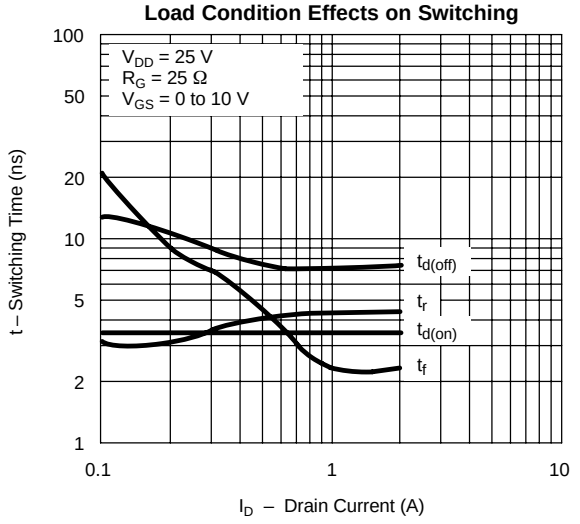
Capacitance



Gate Charge



Load Condition Effects on Switching



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient (TO-226AA)