



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)
TN0201L	20	1.2 @ $V_{GS} = 10$ V	0.5 to 2	0.64
TN0401L	40	1.2 @ $V_{GS} = 10$ V	0.5 to 2	0.64
VN0300L	30	1.2 @ $V_{GS} = 10$ V	0.8 to 2.5	0.64
VN0300LS	30	1.2 @ $V_{GS} = 10$ V	0.8 to 2.5	0.67

FEATURES

- Low On-Resistance: 0.85 Ω
- Low Threshold: 1.4 V
- Low Input Capacitance: 38 pF
- Fast Switching Speed: 9 ns
- Low Input and Output Leakage

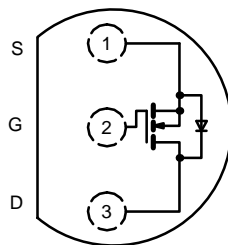
BENEFITS

- 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

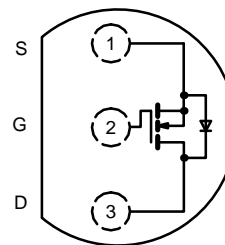
TO-226AA
(TO-92)



Top View

TN0201L
TN0401L
VN0300L

TO-92S



Top View

VN0300LS

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	TN0201L	TN0401L	VN0300L	VN0300LS	Unit
Drain-Source Voltage	V_{DS}	20	40	30	30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	± 30	± 30	V
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	I_D	0.64	0.64	0.64	A
	$T_A = 100^\circ\text{C}$		0.38	0.38	0.43	
Pulsed Drain Current ^a	I_{DM}		1.5	3	3	A
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	0.8	0.8	0.9	W
	$T_A = 100^\circ\text{C}$		0.32	0.32	0.4	
Maximum Junction-to-Ambient	R_{thJA}		156	156	156	$^\circ\text{C/W}$
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.



SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Typ ^a	Limits				Unit
				TN0201L TN0401L		VN0300L VN0300LS		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V I _D = 10 μA	TN0201L	55	20			V
			TN0401L	55	40			
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 0.25 mA	1.4	0.5	2			V
		V _{DS} = V _{GS} , I _D = 1 mA	1.5			0.8	2.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±10			nA
		V _{DS} = 0 V, V _{GS} = ±30 V					±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V					10	μA
			T _J = 125°C				500	
		V _{DS} = 0.8 × V _{(BR)DSS} , V _{GS} = 0 V			1			
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 4.5 V	0.9	0.25				A
		V _{DS} = 10 V, V _{GS} = 10 V	3.5	1		1		
Drain-Source On-Resistance ^b	r _{DS(on)}	V _{GS} = 3.5 V, I _D = 0.05 A	1.8		4			Ω
		V _{GS} = 5 V, I _D = 0.3 A	1.2				3.3	
		V _{GS} = 4.5 V, I _D = 0.25 A	1.4		2			
		T _J = 125°C	2.6		4			
		V _{GS} = 10 V, I _D = 1 A	0.85		1.2		1.2	
		T _J = 125°C	1.6				2.4	
Forward Transconductance ^b	g _{fs}	V _{DS} = 10 V, I _D = 0.5 A	500	200		200		mS
Dynamic								
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz	38		60		100	pF
Output Capacitance	C _{oss}		33		50		95	
Reverse Transfer Capacitance	C _{rss}		8		15		25	
Switching^c								
Turn-On Time	t _{ON}	V _{DD} = 15 V, R _L = 14 Ω I _D ≅ 1 A, V _{GEN} = 10 V R _G = 25 Ω	10		30		30	ns
Turn-Off Time	t _{OFF}		13		30		30	

Notes

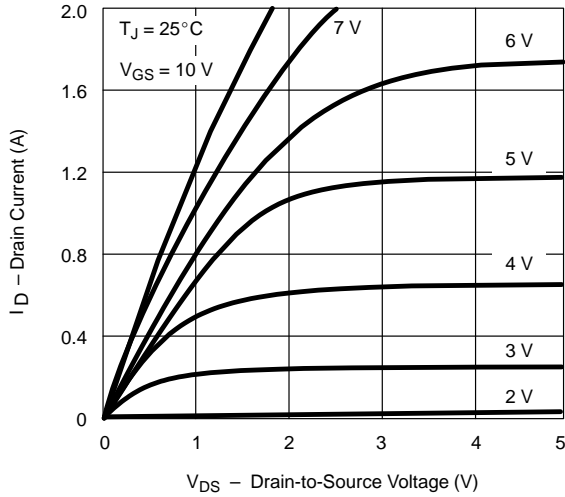
- a. For DESIGN AID ONLY, not subject to production testing.
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- c. Switching time is essentially independent of operating temperature.

VNDQ03

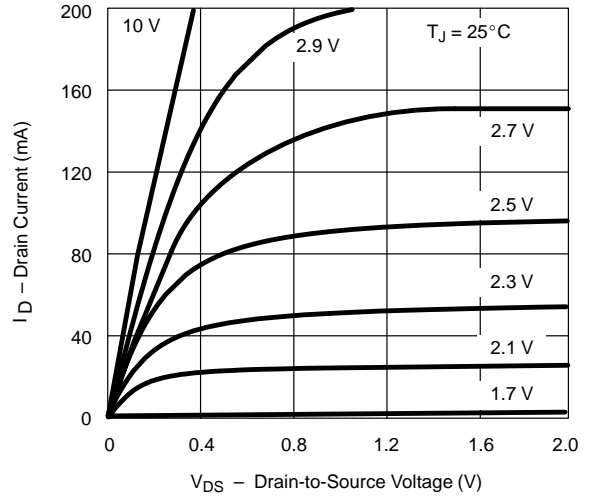


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

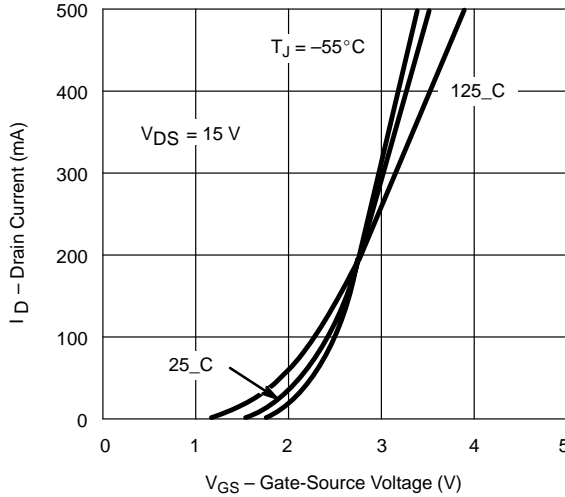
Ohmic Region Characteristics



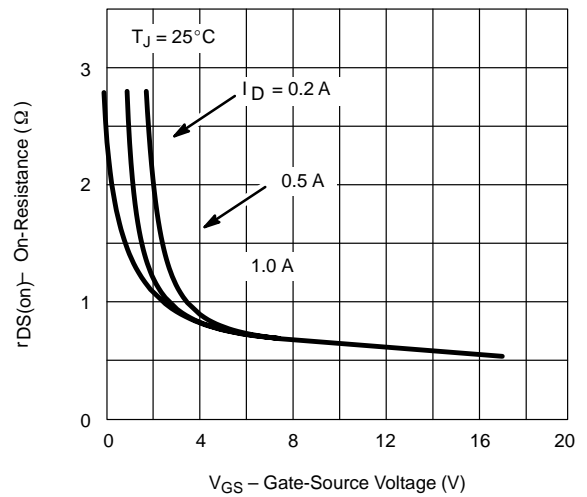
Output Characteristics for Low Gate Drive



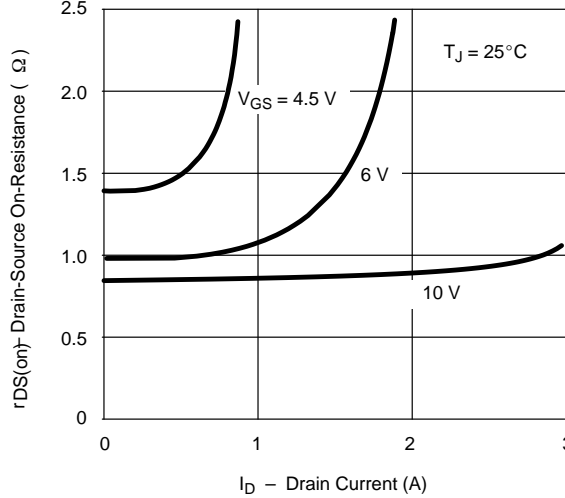
Transfer Characteristics



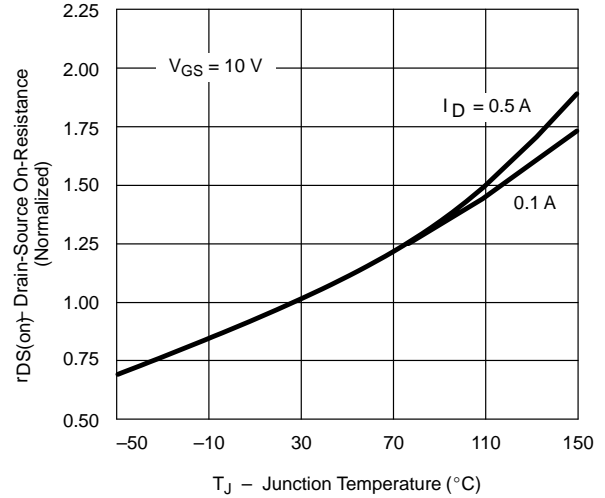
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current



Normalized On-Resistance vs. Junction Temperature





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

