



N-Channel 500-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)
VN50300L	500	300 @ $V_{GS} = 10$ V	1 to 4.5	0.033
VN50300T		300 @ $V_{GS} = 10$ V	1 to 4.5	0.022

FEATURES

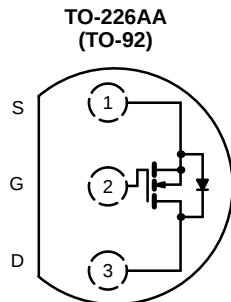
- Moderate On-Resistance: 240 Ω
- Secondary Breakdown Free: 520 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

BENEFITS

- Low Offset Voltage
- Full-Voltage Operation
- Easily Driven Without Buffer
- Low Error Voltage
- No High-Temperature "Run-Away"

APPLICATIONS

- High-Voltage Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Transistors, etc.
- Telephone Mute Switches, Ringer Circuits
- Power Supply, Converters
- Motor Control

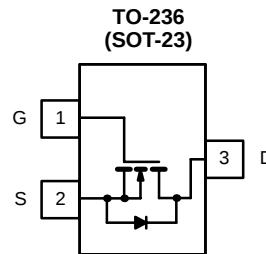


Top View
VN50300L

Device Marking
Front View

"S" VN5
0300L
xxyy

"S" = Siliconix Logo
xxyy = Date Code



Top View
VN50300T

Device Marking
Top View

V1w//

V1 = Part Number Code for VN50300T
w = Week Code
// = Lot Traceability

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	VN50300L	VN50300T	Unit
Drain-Source Voltage	V_{DS}	500	500	V
Gate-Source Voltage	V_{GS}	± 30	± 30	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	0.033	0.022	A
		0.021	0.013	
Pulsed Drain Current ^a	I_{DM}	0.013	0.08	
Power Dissipation	P_D	0.8	0.35	W
		0.32	0.14	
Thermal Resistance, Junction-to-Ambient	R_{thJA}	156	350	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

Notes

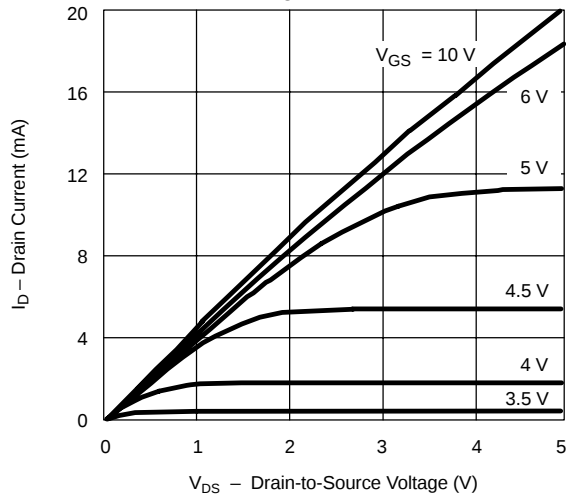
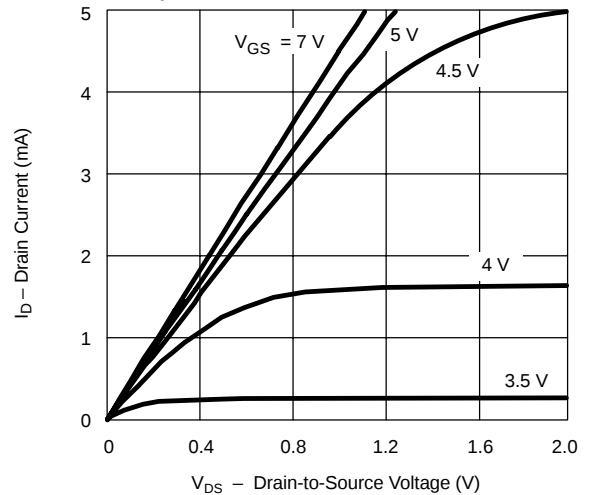
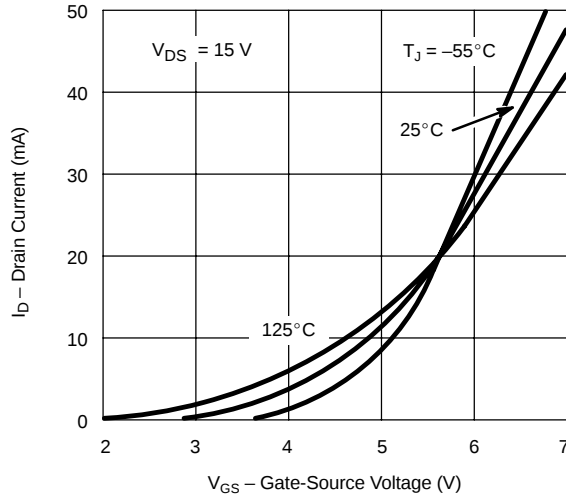
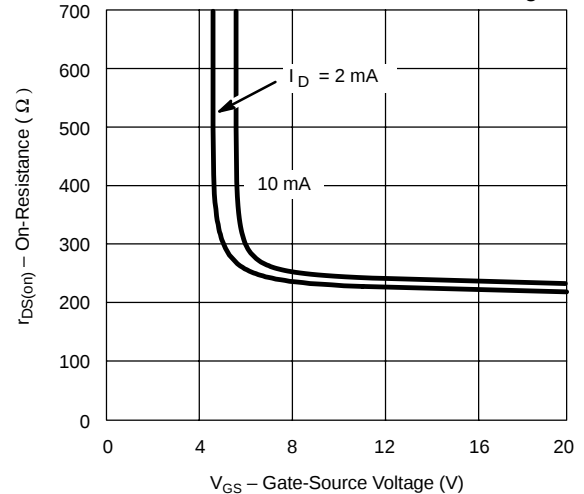
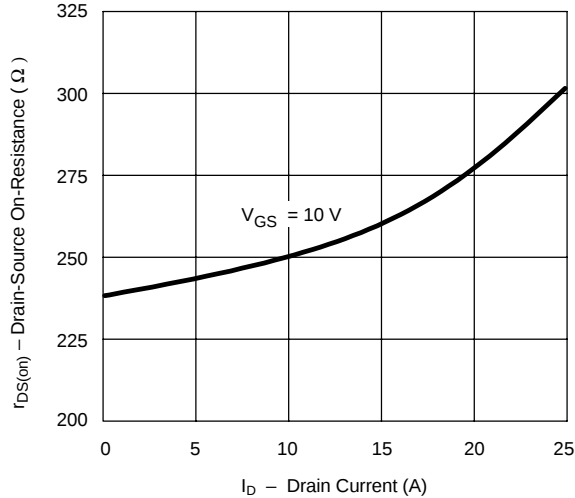
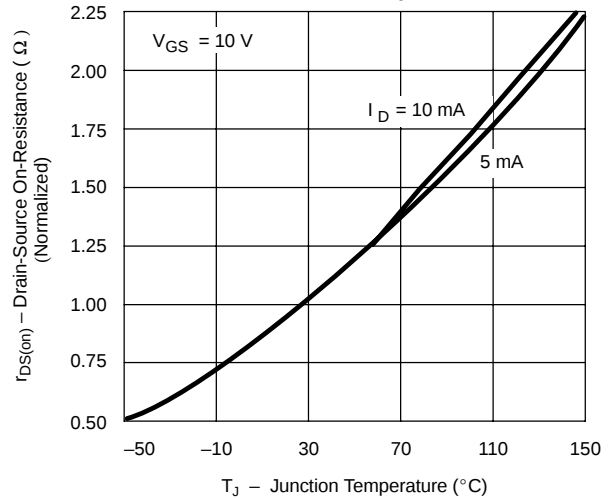
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T _A = 25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ ^a	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	500	520		V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 10 μA	1	3.5	4.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
		T _J = 125°C			± 500	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 250 V, V _{GS} = 0 V			0.05	μA
		T _J = 125°C			5	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 10 V	15	30		mA
Drain-Source On-Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 10 mA		250	300	Ω
		V _{GS} = 10 V, I _D = 5 mA		240		
		T _J = 125°C		450	700	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 10 mA	5	14		mS
Common Source Output Conductance ^b	g _{os}			0.005		
Dynamic						
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V f = 1 MHz		5	20	pF
Output Capacitance	C _{oss}			1.7	10	
Reverse Transfer Capacitance	C _{rss}			0.5	5	
Switching ^c						
Turn-On Time	t _{d(on)}	V _{DD} = 25 V, R _L = 2.5 kΩ I _D ≅ 10 mA, V _{GEN} = 10 V R _G = 25 Ω		4.5	8	ns
	t _r			7	12	
Turn-Off Time	t _{d(off)}			8	20	
	t _f			60	90	

Notes

- a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
c. Switching time is essentially independent of operating temperature.

VNDO50

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