

## N-Channel 500-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)
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

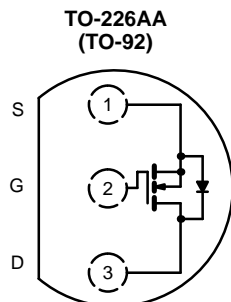
- Moderate On-Resistance: 240  $\Omega$
- Secondary Breakdown Free: 520 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

### 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

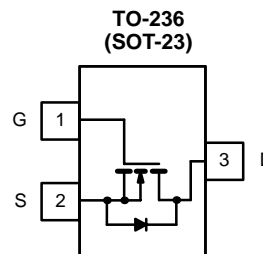


Top View  
VN50300L

Device Marking  
Front View

"S" VN5  
0300L  
xxyy

"S" = Siliconix Logo  
xxyy = Date Code



Top View  
VN50300T

Device Marking  
Top View

V1 w//

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

ABSOLUTE MAXIMUM RATINGS (TA = 25°C UNLESS OTHERWISE NOTED)				
Parameter	Symbol	VN50300L	VN50300T	Unit
Drain-Source Voltage	$V_{DS}$	500	500	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	$\pm 30$	
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_A = 25^\circ\text{C}$	0.033	A
		$T_A = 100^\circ\text{C}$	0.021	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	0.013	0.08	
Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	
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 ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ <sup>a</sup>	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	500	520		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 10\ \mu\text{A}$	1	3.5	4.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ $T_J = 125^\circ\text{C}$			$\pm 100$	nA
					$\pm 500$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$ $T_J = 125^\circ\text{C}$			0.05	$\mu\text{A}$
					5	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$	15	30		mA
Drain-Source On-Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ mA}$ $V_{GS} = 10\text{ V}, I_D = 5\text{ mA}$ $T_J = 125^\circ\text{C}$		250	300	$\Omega$
					240	
				450	700	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 10\text{ mA}$	5	14		mS
Common Source Output Conductance <sup>b</sup>	$g_{os}$			0.005		
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		5	20	$\mu\text{F}$
Output Capacitance	$C_{oss}$			1.7	10	
Reverse Transfer Capacitance	$C_{rss}$			0.5	5	
<b>Switching<sup>c</sup></b>						
Turn-On Time	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 2.5\text{ k}\Omega$ $I_D \cong 10\text{ mA}, V_{GEN} = 10\text{ V}$ $R_G = 25\ \Omega$		4.5	8	ns
	$t_r$			7	12	
Turn-Off Time	$t_{d(off)}$			8	20	
	$t_f$			60	90	

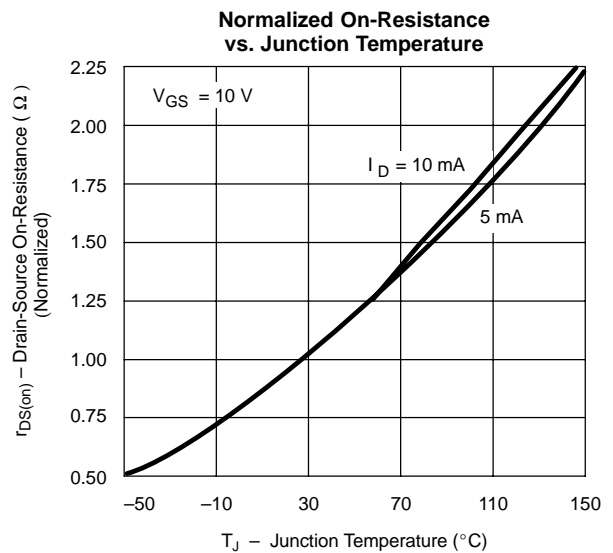
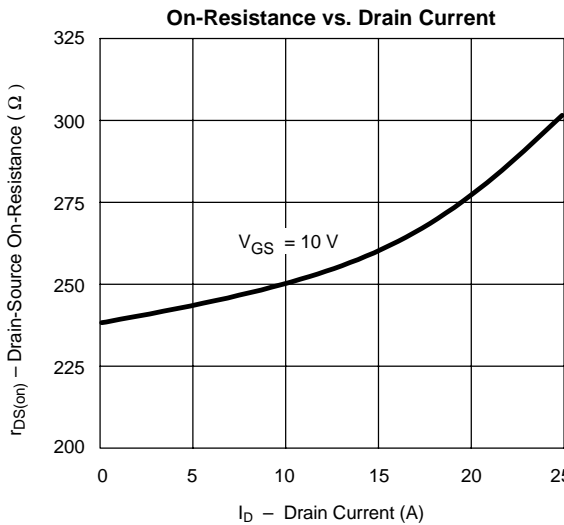
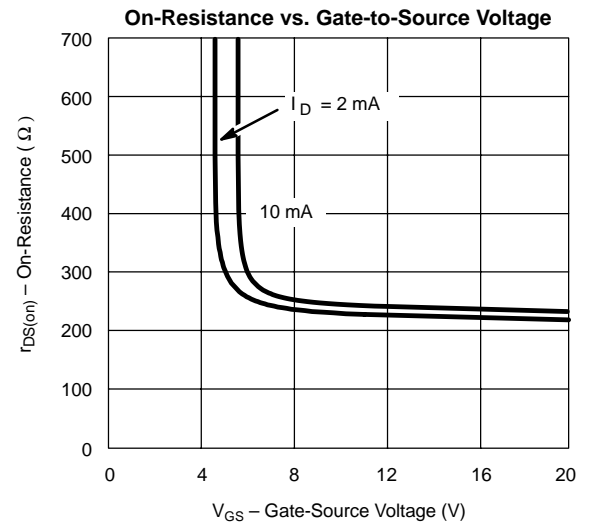
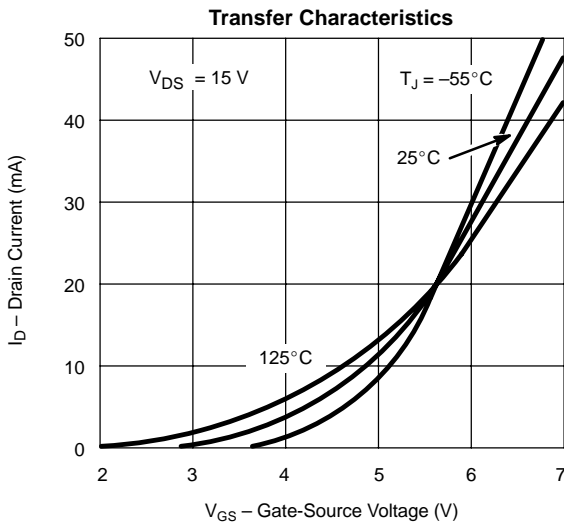
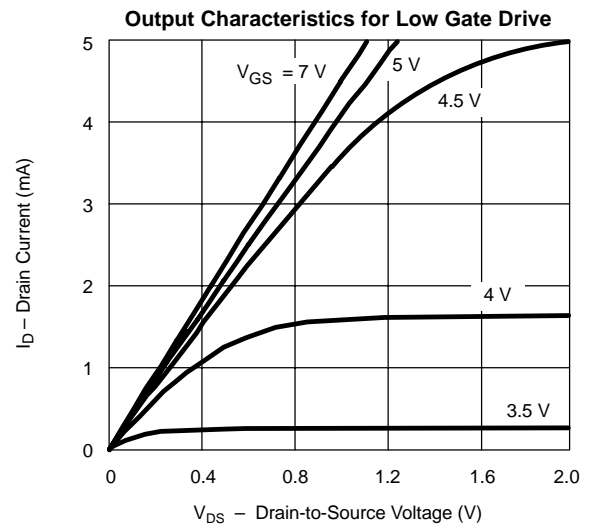
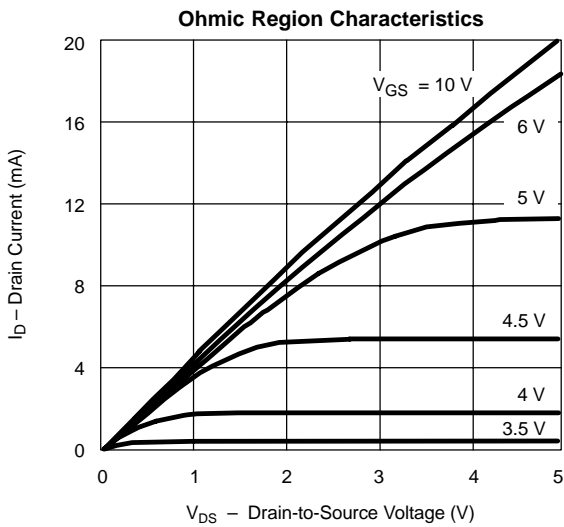
## Notes

- a. For DESIGN AID ONLY, not subject to production testing.  
 b. Pulse test:  $PW \leq 300\ \mu\text{s}$  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)**



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