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

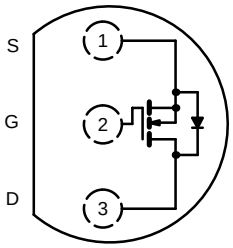
BENEFITS

- 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

TO-226AA
(TO-92)



Top View

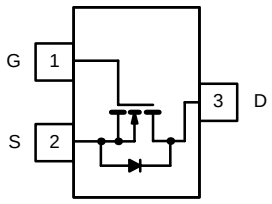
VN50300L

Device Marking
Front View

"S" VN5
0300L
xxyy

"S" = Siliconix Logo
xxyy = Date Code

TO-236
(SOT-23)



Top View

VN50300T

Device Marking
Top View

V1*wll*

V1 = Part Number Code for VN50300T
w = Week Code
ll = 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}	±30	±30	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.033	0.022	A
	T_A= 100°C		0.021	0.013	
Pulsed Drain Current[a]		I_{DM}	0.013	0.08	
Power Dissipation	T_A= 25°C	P_D	0.8	0.35	W
	T_A= 100°C		0.32	0.14	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	156	350	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

Notes
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ[a]	Limits Max	Unit
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	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
		T_J = 125°C			±500	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 250 V, V_{GS} = 0 V			0.05	μA
		T_J = 125°C			5	μA
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		Ω
		T_J = 125°C		450	700	Ω
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		mS
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	pF
Reverse Transfer Capacitance	C_{rss}			0.5	5	pF
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	ns
Turn-Off Time	$t_{d(off)}$			8	20	ns
	t_f			60	90	ns

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.

VNDO50

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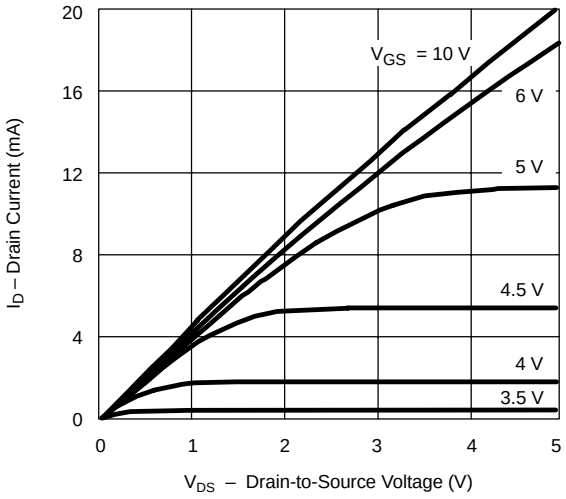
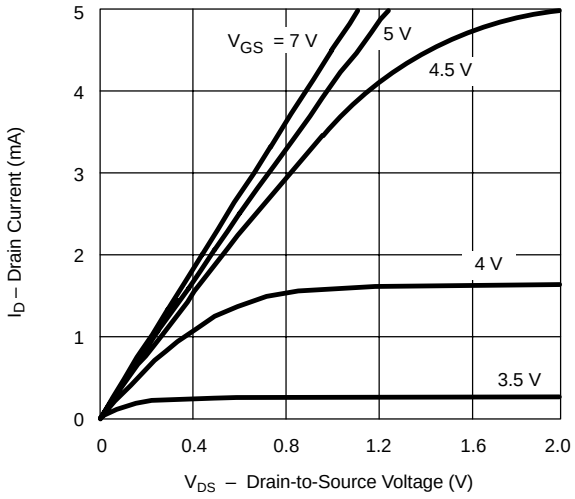
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

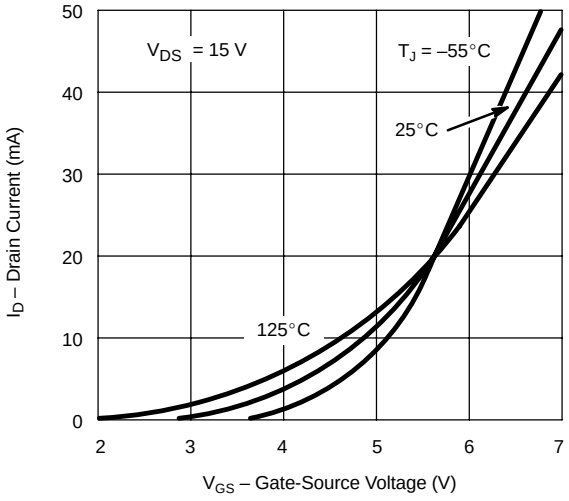
Ohmic Region Characteristics



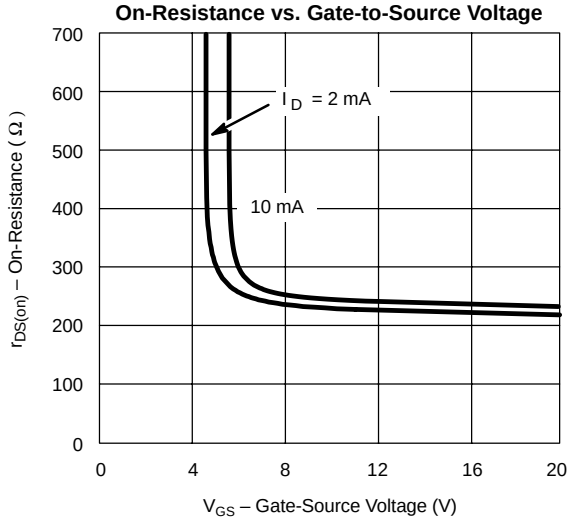
Output Characteristics for Low Gate Drive



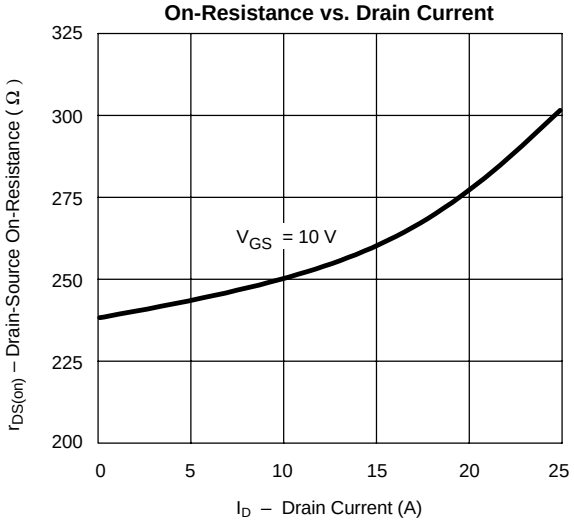
Transfer Characteristics



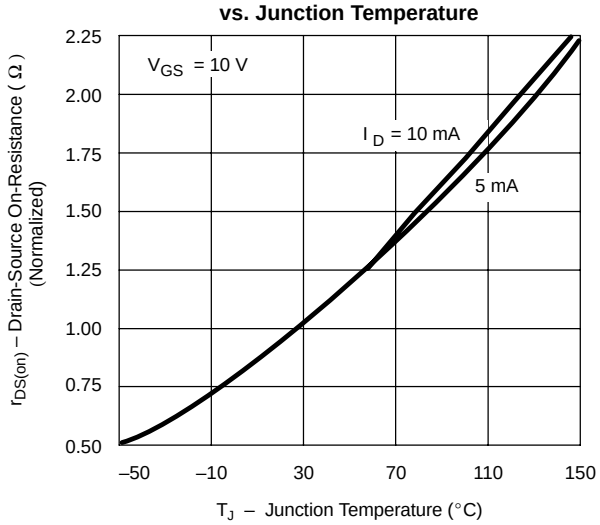
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

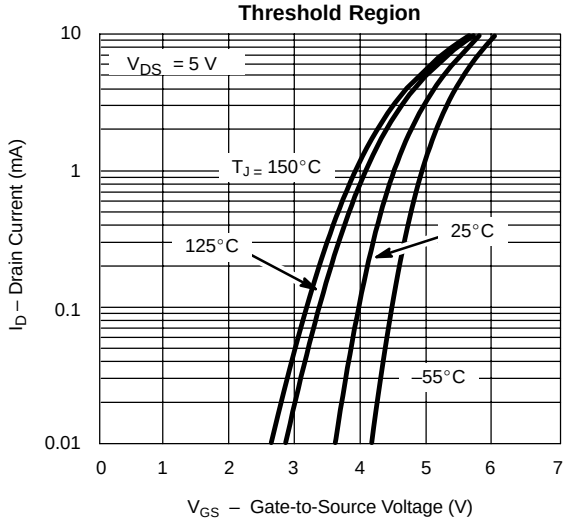


Normalized On-Resistance vs. Junction Temperature

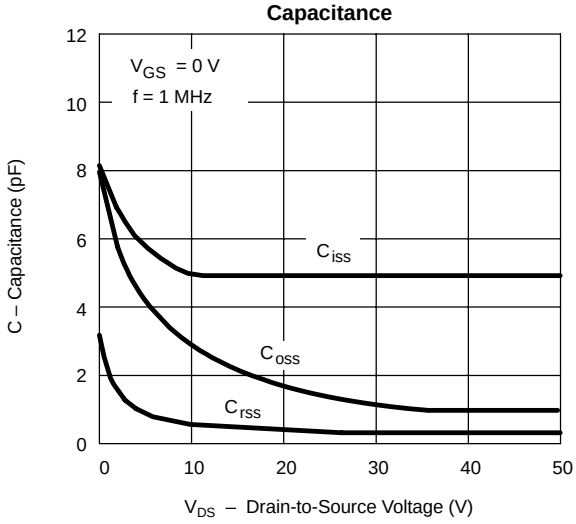


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

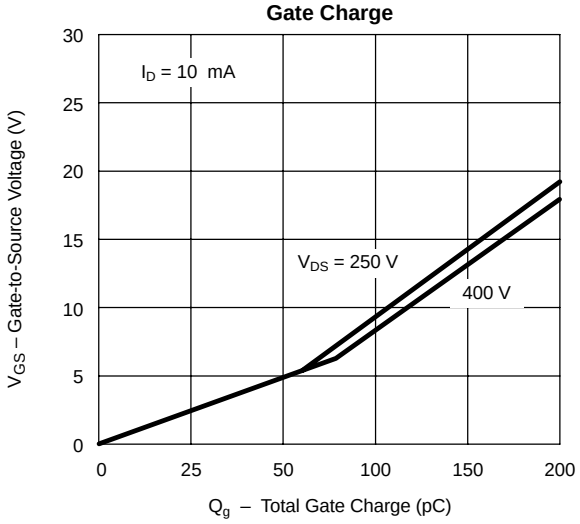
Threshold Region



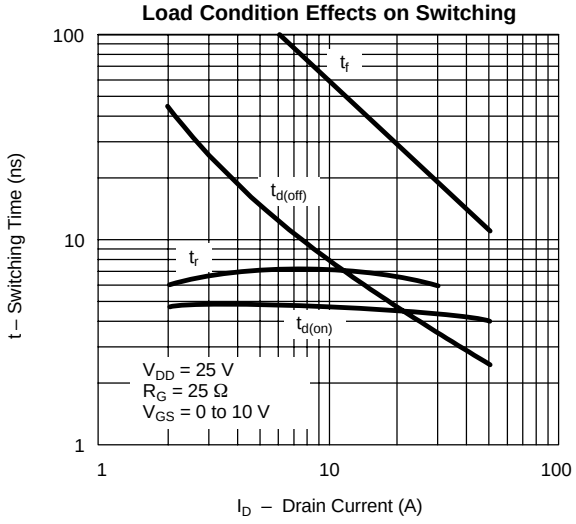
Capacitance



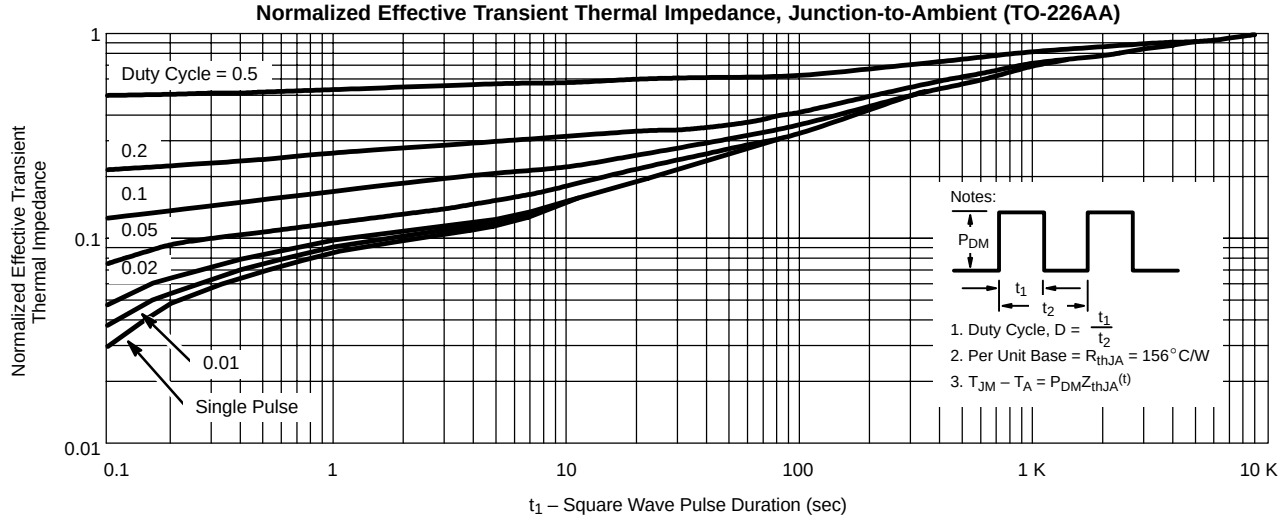
Gate Charge



Load Condition Effects on Switching



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



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