VN50300L/VN50300T

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)
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

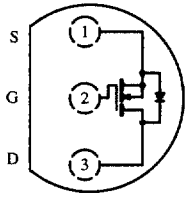
Benefits

- 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

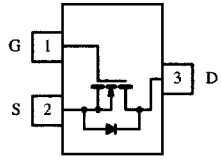
TO-226AA
(TO-92)



Top View

VN50300L

TO-236
(SOT-23)



Top View

VN50300T (V1)*

*Marking Code for TO-236

Absolute Maximum Ratings (T_A = 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	
Maximum 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.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70216.

Specifications[a]

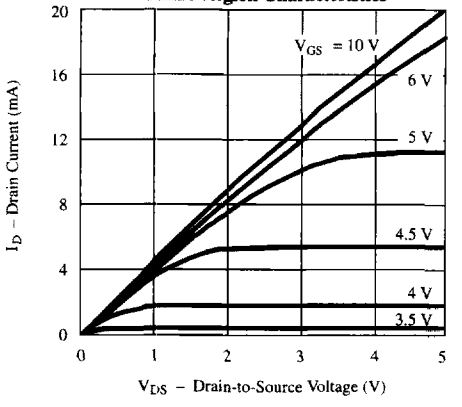
Parameter	Symbol	Test Conditions	Limits Min	Limits Typ[b]	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 µA	500	520		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 10 µA	1	3.5	4.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 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[c]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 10 V	15	30		mA
Drain-Source On-Resistance[c]	$r_{DS(on)}$	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[c]	g_{fs}	V_{DS} = 15 V, I_D = 10 mA	5	14		mS
Common Source Output Conductance[c]	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[d]						
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. T_A = 25°C unless otherwise noted.
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: PW ≤ 300 µs duty cycle ≤ 2%.
d. Switching time is essentially independent of operating temperature.

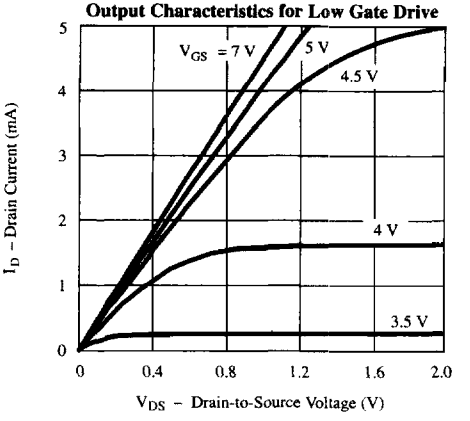
VNDO50

Typical Characteristics (25°C Unless Otherwise Noted)

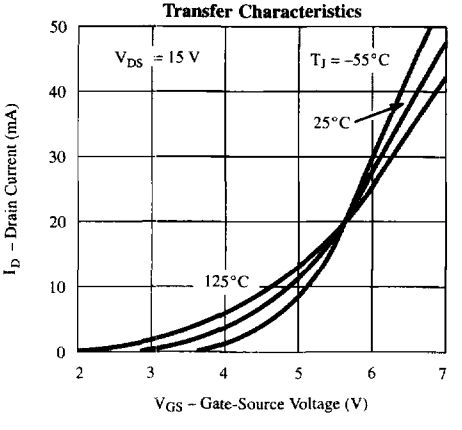
Ohmic Region Characteristics



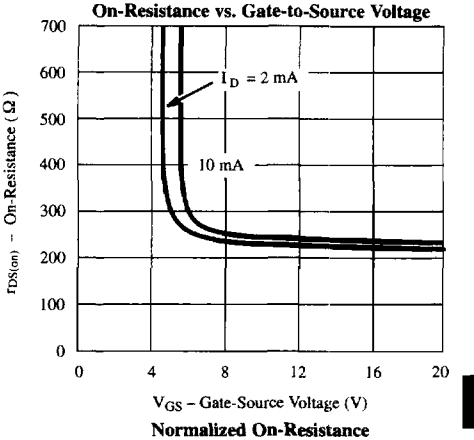
Output Characteristics for Low Gate Drive



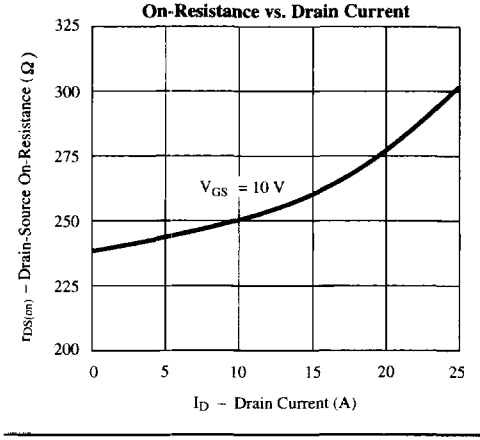
Transfer Characteristics



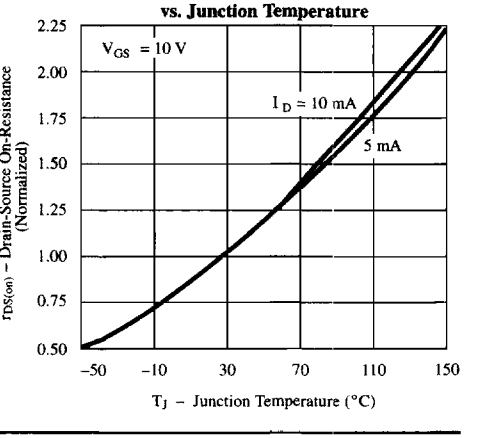
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

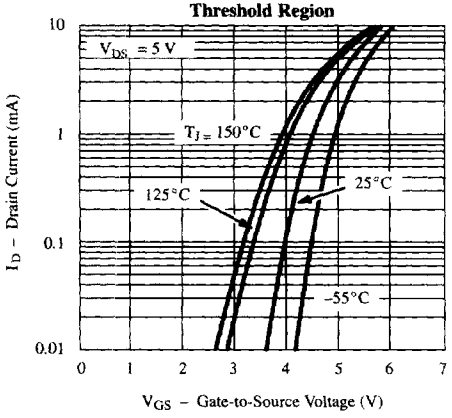


Normalized On-Resistance vs. Junction Temperature

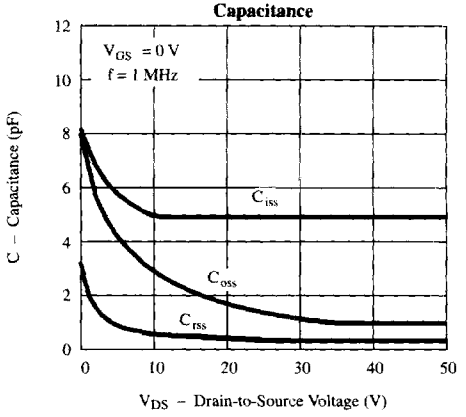


Typical Characteristics (25°C Unless Otherwise Noted) (Cont'd)

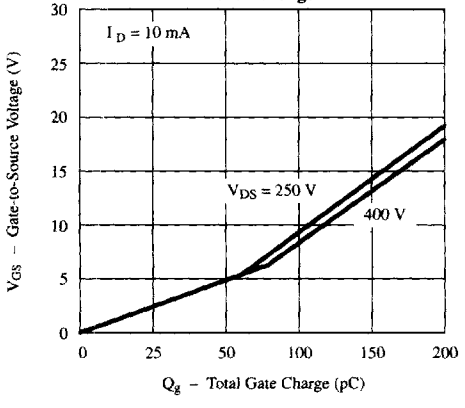
Threshold Region



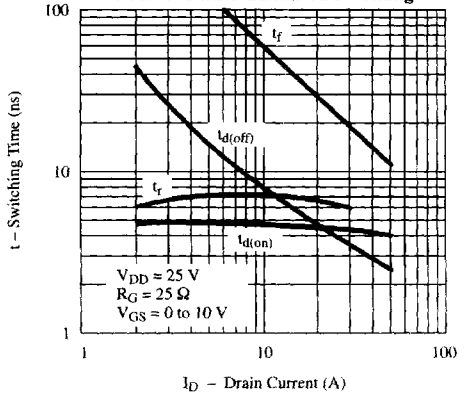
Capacitance



Gate Charge



Load Condition Effects on Switching



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