



VNT008D/9D, VNS008D/9D

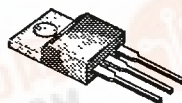
N-Channel Enhancement Mode Transistors

T-39-13

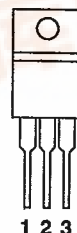
PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
VNT008D	650	1.5	5.77
VNS008D	600	1.5	5.77
VNT009D	650	2.0	5.0
VNS009D	600	2.0	5.0

TO-220AB



TOP VIEW



- 1 GATE
2 DRAIN (Connected to TAB)
3 SOURCE

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	VNT 008D	VNS 008D	VNT 009D	VNS 009D	UNITS
Drain-Source Voltage		V _{DS}	650	600	650	600	V
Gate-Source Voltage		V _{GS}	±20	±20	±20	±20	
Continuous Drain Current	T _C = 25°C	I _D	5.77	5.77	5.0	5.0	A
	T _C = 100°C		3.65	3.65	3.16	3.16	
Pulsed Drain Current ¹		I _{DM}	15	15	14	14	
Avalanche Current (See Figure 9)		I _A	5.77	5.77	5.0	5.0	
Power Dissipation	T _C = 25°C	P _D	125	125	125	125	W
	T _C = 100°C		50	50	50	50	
Operating Junction & Storage Temperature Range		T _J , T _{stg}	-55 to 150				°C
Lead Temperature (1/16" from case for 10 sec.)		T _L	300				

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THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	R_{thJC}		1.0	K/W
Junction-to-Ambient	R_{thJA}		80	
Case-to-Sink	R_{thCS}	1.0		

¹Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).

VNT008D/9D, VNS008D/9D**ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)****T-39-13**

PARAMETER		SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT
					MIN	MAX	
STATIC							
Drain-Source Breakdown Voltage	VNT008D, VNT009D VNS008D, VNS009D	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 2000\text{ }\mu\text{A}$		650 600		V
Gate Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1000\text{ }\mu\text{A}$		2.0	4.0	
Gate-Body Leakage		I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current		I_{DSS}	$V_{DS} = V_{(BR)DSS}, V_{GS} = 0\text{ V}$			2000	μA
			$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			2000	
On-State Drain Current ¹		$I_{D(ON)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$		5.7		A
Drain-Source On-State Resistance ¹	VNT008D, VNS008D VNT009D, VNS009D	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 3\text{ A}$	1.2 1.7		1.5 2.0	Ω
	VNT008D, VNS008D VNT009D, VNS009D		$V_{GS} = 10\text{ V}, I_D = 3\text{ A}, T_J = 125^\circ\text{C}$	2.4 3.4		3.75 6.0	
Forward Transconductance ¹		g_{fs}	$V_{DS} = 15\text{ V}, I_D = 3\text{ A}$	3.3	3.0		S
DYNAMIC							
Input Capacitance		C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	1200		1500	pF
Output Capacitance		C_{oss}		140		150	
Reverse Transfer Capacitance		C_{rss}		40		50	
Total Gate Charge ²		Q_g	$V_{DS} = 0.5 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 5.7\text{ A}$	53		65	nC
Gate-Source Charge ²		Q_{gs}		12.9			
Gate-Drain Charge ²		Q_{gd}		26			
Turn-On Delay Time ²		$t_{d(on)}$	$V_{DD} = 325\text{ V}, R_L = 130\text{ }\Omega$ $I_D \approx 2.5\text{ A}, V_{GEN} = 10\text{ V}, R_G = 4.7\text{ }\Omega$	15		20	ns
Rise Time ²		t_r		20		25	
Turn-Off Delay Time ²		$t_{d(off)}$		80		85	
Fall Time ²		t_f		45		50	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ\text{C}$)							
Continuous Current	VNT008D, VNS008D VNT009D, VNS009D	I_S				5.77 5.0	A
Pulsed Current ³	VNT008D, VNS008D VNT009D, VNS009D	I_{SM}				15 14	
Forward Voltage ¹	VNT008D, VNS008D VNT009D, VNS009D	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$			2.5 2.0	V
Reverse Recovery Time		t_{rr}	$I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	400			ns
Reverse Recovery Charge		Q_{rr}		2.5			μC

¹Pulse test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.²Independent of operating temperature.³Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).



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TYPICAL CHARACTERISTICS (25°C Unless Otherwise Specified)

T-39-13

Figure 1. Output Characteristics

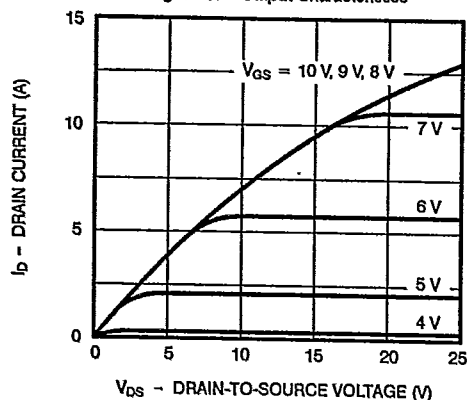


Figure 2. Transfer Characteristics

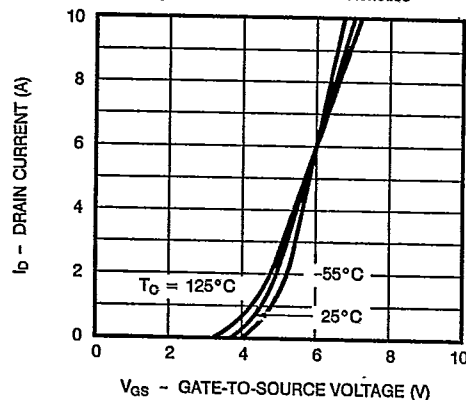


Figure 3. Transconductance

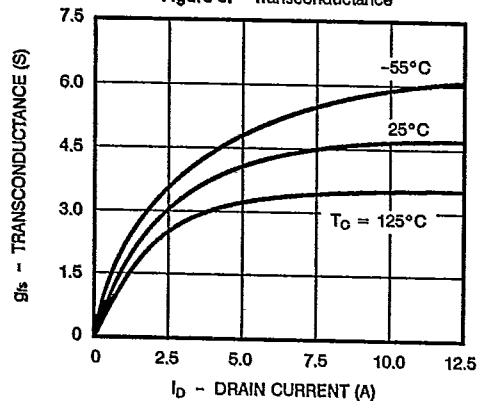
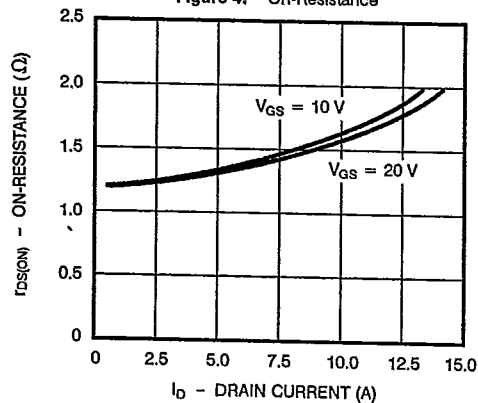


Figure 4. On-Resistance



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Figure 5. Capacitance

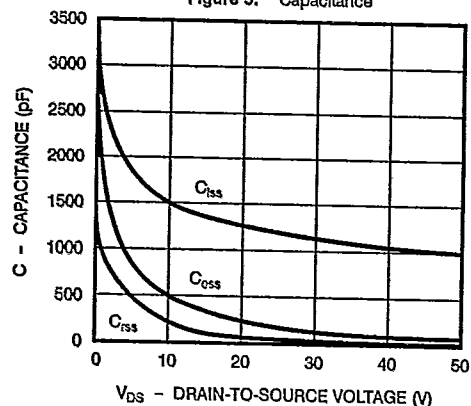
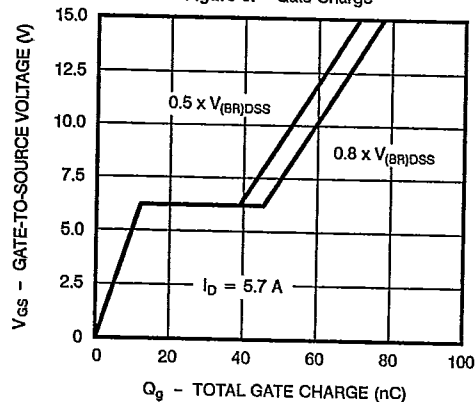
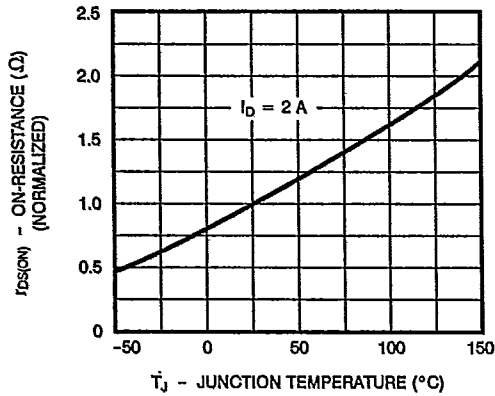
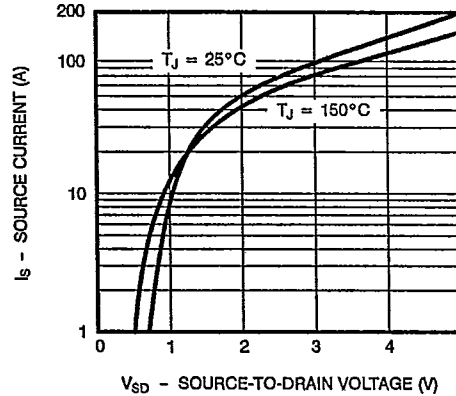
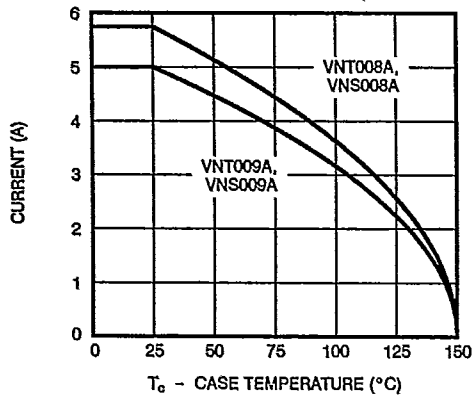
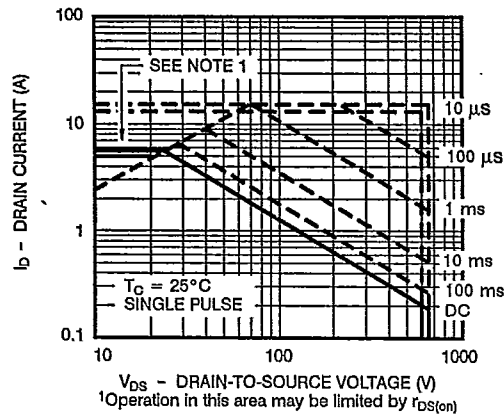


Figure 6. Gate Charge



VNT008D/9D, VNS008D/9D**TYPICAL CHARACTERISTICS (Cont'd)****T-39-13****Figure 7. On-Resistance vs. Junction Temperature****Figure 8. Source-Drain Diode Forward Voltage****THERMAL RATINGS****Figure 9. Maximum Avalanche and Drain Current vs. Case Temperature****Figure 10. Safe Operating Area****Figure 11. Normalized Effective Transient Thermal Impedance, Junction-to-Case**