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NTE2993 MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Repetitive Avalanche Ratings
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling

Absolute Maximum Ratings:

Drain-Source Voltage ($V_{GS} = 0V, I_D = 1mA$), V_{DSS}	400V
Gate-Source Voltage, V_{GS}	$\pm 20V$
Continuous Drain Current ($V_{GS} = 10V$), I_D	
$T_C = +25^\circ C$	14A
$T_C = +100^\circ C$	9A
Pulsed Drain Current (Note 1), I_{DM}	56A
Maximum Power Dissipation ($T_C = +25^\circ C$), P_D	150W
Linear Derating Factor	1.2W/ $^\circ C$
Single Pulse Avalanche Energy (Note 2), E_{AS}	11.3mJ
Avalanche Current (Note 1), I_{AR}	14A
Repetitive Avalanche Energy (Note 1), E_{AR}	15mJ
Peak Diode Recovery (Note 3), dv/dt	4.0V/ns
Operating Junction Temperature Range, T_J	-55° to $+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
Lead temperature (During Soldering, .063" (1.6mm) from case, 10sec max), T_L	$+300^\circ C$
Thermal Resistance, Junction-to-Ambient (Typical Socket Mount), R_{thJA}	30K/W
Thermal Resistance, Junction-to-Case, R_{thJC}	0.83K/W

Note 1. Repetitive Rating; Pulse width limited by maximum junction temperature.

Note 2. $V_{DD} = 50V$, Starting $T_J = +150^\circ C$, Peak $I_L = 14A$.

Note 3. $I_{SD} \leq 14A$, di/dt $\leq 145A/\mu s$, $V_{DD} \leq 400V$, $T_J \leq +150^\circ C$.

Electrical Characteristics: ($T_J = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 1\text{mA}, V_{GS} = 0\text{V}$	400	-	-	V
Temperature Coefficient of Breakdown Voltage	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	-	0.46	-	$\text{V}/^\circ\text{C}$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.0	-	4.0	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 320$	-	-	25	μA
		$V_{GS} = 0\text{V}, T_J = 125^\circ\text{C}$	-	-	250	μA
On-State Drain Current	$I_{D(on)}$	$V_{DS} > I_{D(on)} \times R_{DS(on)}$ max, $V_{GS} = 10\text{V}$	15	-	-	A
Gate-Source Leakage Forward	I_{GSS}	$V_{GS} = 20\text{V}$	-	-	100	nA
Gate-Source Leakage Reverse	I_{GSS}	$V_{GS} = -20\text{V}$	-	-	-100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 9\text{A}$, Note 4	-	-	0.3	Ω
		$V_{GS} = 10\text{V}, I_D = 14\text{A}$, Note 4	-	-	0.4	Ω
Forward Transconductance	g_{fs}	$I_D = 3\text{A}, V_{DS} = 10\text{V}$, Note 4	6.0	-	-	S
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1.0\text{MHz}$	-	2600	-	pF
Output Capacitance	C_{oss}		-	680	-	pF
Reverse Transfer Capacitance	C_{rss}		-	250	-	pF
Turn-On Time	$t_{d(on)}$	$V_{DD} = 200\text{V}, I_D = 14\text{A}, R_G = 2.35\Omega$	-	-	35	ns
Rise Time	t_r		-	-	190	ns
Turn-Off Time	$t_{d(off)}$		-	-	170	ns
Fall Time	t_f		-	-	130	ns
Total Gate Charge	Q_g	$V_{GS} = 10\text{V}, I_D = 14\text{A}, V_{DS} = 200\text{V}$	52	-	110	nC
Gate-Source Charge	Q_{gs}		5.0	-	18	nC
Gate-Drain ("Miller") Charge	Q_{gd}		25	-	65	nC
Internal Drain Inductance	$L_S + L_D$	Measured between the contact screw on header that is closer to source and gate pins and center of die.	-	6.1	-	nH
Source-Drain Diode Ratings and Characteristics:						
Continuous Source Current	I_S		-	-	14	A
Pulse Source Current	I_{SM}	Note 1	-	-	56	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 14\text{A}, V_{GS} = 0\text{V}$, Note 4	-	-	1.7	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 14\text{A}, di/dt \leq 100\text{A}/\mu\text{s}, V_{DD} \leq 50\text{V}$, Note 4	-	-	1200	ns
Reverse Recovered Charge	Q_{RR}		-	-	250	μC
Forward Turn-on Time	t_{on}	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by $L_S + L_D$.				

Note 1. Repetitive Rating; Pulse width limited by maximum junction temperature.

Note 4. Pulse width $\leq 300\mu\text{s}$, Duty Cycle 2%.

