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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%.

