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NTE2986 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Logic Level Gate Drive
- R_{DS(on)} Specified at V_{GS} = 4V & 5V
- +175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

Absolute Maximum Ratings:

Drain Current, I _D	
Continuous (V _{GS} = 5V)	
T _C = +25°C	50A
T _C = +100°C	36A
Pulsed (Note 1)	200A
Total Power Dissipation (T _C = +25°C), P _D	150W
Derate Above 25°C	1.0W/°C
Gate-Source Voltage, V _{GS}	±10V
Single Pulsed Avalanche Energy (Note 2), E _{AS}	110mJ
Peak Diode Recovery dv/dt (Note 3), dv/dt	4.5V/ns
Operating Junction Temperature Range, T _J	-55° to +175°C
Storage Temperature Range, T _{stg}	-55° to +175°C
Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T _L	+300°C
Mounting Torque, 6-32 or M3 Screw	10 lbf•in (1.1 N•m)
Thermal Resistance:	
Maximum Junction-to-Case, R _{thJC}	1.0K/W
Typical Case-to-Sink (Mounting surface flat, smooth, and greased), R _{thCS}	0.5K/W
Maximum Junction-to-Ambient (Free Air Operation), R _{thJA}	62K/W

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

Note 2. L = 179µH, V_{DD} = 25V, R_G = 25Ω, I_{AS} = 51A, Starting T_J = +175°C.

Note 3. I_{SD} ≤ 51A, di/dt ≤ 250A/µs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ +175°C.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	60	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	–	0.07	–	$\text{V}/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 5\text{V}, I_D = 31\text{A}$, Note 4	–	–	0.028	Ω
		$V_{GS} = 4\text{V}, I_D = 25\text{A}$, Note 4	–	–	0.039	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	–	2.0	V
Forward Transconductance	g_{fs}	$V_{DS} \geq 25\text{V}, I_D = 31\text{A}$, Note 4	23	–	–	mhos
Drain–to–Source Leakage Current	I_{DSS}	$V_{DS} = 60\text{V}, V_{GS} = 0$	–	–	25	μA
		$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$, $T_C = +150^\circ\text{C}$	–	–	250	μA
Gate–Source Leakage Forward	I_{GSS}	$V_{GS} = 10\text{V}$	–	–	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{GS} = -10\text{V}$	–	–	-100	nA
Total Gate Charge	Q_g	$V_{GS} = 5\text{V}, I_D = 51\text{A}, V_{DS} = 48\text{V}$	–	–	66	nC
Gate–Source Charge	Q_{gs}		–	–	12	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	–	43	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{V}, I_D = 51\text{A}, R_G = 4.6\Omega,$ $R_D = 0.56\Omega$	–	17	–	ns
Rise Time	t_r		–	230	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	42	–	ns
Fall Time	t_f		–	110	–	ns
Internal Drain Inductance	L_D	Between lead, 6mm (0.25”) from package and center of die contact	–	4.5	–	nH
Internal Source Inductance	L_S		–	7.5	–	nH
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$	–	3300	–	pF
Output Capacitance	C_{oss}		–	1200	–	pF
Reverse Transfer Capacitance	C_{rss}		–	200	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	–	–	50	A
Pulse Source Current	I_{SM}	(Body Diode) Note 1	–	–	200	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 51\text{A}, V_{GS} = 0\text{V}$, Note 4	–	–	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 51\text{A}, di/dt = 100\text{A}/\mu\text{s}$, Note 4	–	130	180	ns
Reverse Recovery Charge	Q_{rr}		–	0.84	1.3	μC
Forward Turn–On Time	t_{on}	Intrinsic turn–on time is negligible (turn–on is dominated by $L_S + L_D$)				

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

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

