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NTE2981 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Repetitive Avalanche rated
- Logic Level Gate Drive
- $R_{DS(on)}$ Specified at $V_{GS} = 4V$ & $5V$

Absolute Maximum Ratings:

Drain Current, I_D	
Continuous ($V_{GS} = 5V$)	
$T_C = +25^\circ C$	7.7A
$T_C = +100^\circ C$	4.9A
Pulsed (Note 1)	31A
Total Power Dissipation ($T_C = +25^\circ C$), P_D	42W
Derate Above $25^\circ C$	0.33W/ $^\circ C$
Total Power Dissipation (PC Board Mount, $T_C = +25^\circ C$, Note 2), P_D	2.5W
Derate Above $25^\circ C$	0.02W/ $^\circ C$
Gate-Source Voltage, V_{GS}	$\pm 10V$
Single Pulsed Avalanche Energy (Note 3), E_{AS}	210mJ
Avalanche Current (Note 1), I_{AR}	7.7A
Repetitive Avalanche Energy (Note 1), E_{AR}	4.2mJ
Peak Diode Recovery dv/dt (Note 4), dv/dt	5.5V/ns
Operating Junction Temperature Range, T_J	-55° to $+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L	$+260^\circ C$
Maximum Thermal Resistance:	
Junction-to-Case, R_{thJC}	3.0 $^\circ C/W$
Junction-to-Ambient (PCB Mount, Note 2), R_{thJA}	50 $^\circ C/W$
Junction-to-Ambient, R_{thJA}	110 $^\circ C/W$

- Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
 Note 2. When mounted on a 1" square PCB (FR-4 or G-10 material).
 Note 3. $L = 5.3mH$, $V_{DD} = 25V$, $R_G = 25\Omega$, Starting $T_J = +25^\circ C$, $I_{AS} = 7.7A$.
 Note 4. $I_{SD} \leq 9.2A$, $di/dt \leq 110A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +150^\circ C$.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	100	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	–	0.13	–	$V/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 5V, I_D = 4.6A$, Note 5	–	–	0.27	Ω
		$V_{GS} = 4V, I_D = 3.9A$, Note 4	–	–	0.38	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	–	2.0	V
Forward Transconductance	g_{fs}	$V_{DS} = 50V, I_D = 4.6A$, Note 5	4.4	–	–	mhos
Drain–to–Source Leakage Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0$	–	–	25	μA
		$V_{DS} = 80V, V_{GS} = 0V, T_C = +125^\circ\text{C}$	–	–	250	μA
Gate–Source Leakage Forward	I_{GSS}	$V_{GS} = 10V$	–	–	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{GS} = -10V$	–	–	-100	nA
Total Gate Charge	Q_g	$V_{GS} = 5V, I_D = 9.2A, V_{DS} = 80V$, Note 5	–	–	12	nC
Gate–Source Charge	Q_{gs}		–	–	3.0	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	–	7.1	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 9.2A, R_G = 9.0\Omega, R_D = 5.2\Omega$, Note 5	–	9.8	–	ns
Rise Time	t_r		–	64	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	21	–	ns
Fall Time	t_f		–	27	–	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}	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	–	490	–	pF
Output Capacitance	C_{oss}		–	150	–	pF
Reverse Transfer Capacitance	C_{rss}		–	30	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	–	–	7.7	A
Pulse Source Current	I_{SM}	(Body Diode) Note 1	–	–	31	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 7.7A, V_{GS} = 0V$, Note 5	–	–	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 9.2A, di/dt = 100A/\mu s$, Note 5	–	110	140	ns
Reverse Recovery Charge	Q_{rr}		–	0.8	1.0	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 5. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

