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NTE2975 MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Advanced Process Technology
- Ultra Low On-State Resistance
- Dynamic dv/dt Rating
- +175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated

Absolute Maximum Ratings:

Drain Current, I_D	
Continuous ($V_{GS} = 10V$)	
$T_C = +25^\circ C$ (Note 1)	53A
$T_C = +100^\circ C$	37A
Pulse (Note 2)	180A
Power Dissipation ($T_C = +25^\circ C$), P_D	107W
Derate above $+25^\circ C$	0.71W/ $^\circ C$
Gate-Source Voltage, V_{GS}	$\pm 20V$
Avalanche Current (Note 2), I_{AR}	28A
Repetitive Avalanche Energy (Note 2), E_{AR}	11mJ
Single Pulse Avalanche Energy (Note 3, Note 4), E_{AS}	152mJ
Peak Diode Recovery (Note 5), dv/dt	5.0V/ns
Operating Junction Temperature Range, T_J	-55° to $+175^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+175^\circ C$
Lead Temperature (During Soldering, 1.6mm from case, 10sec max), T_L	$+300^\circ C$
Maximum Thermal Resistance, Junction-to-Case, R_{thJC}	1.4 $^\circ C/W$
Typical Thermal Resistance, Case-to-Sink (Flat, greased surface), R_{thCS}	0.5 $^\circ C/W$
Maximum Thermal Resistance, Junction-to-Ambient, R_{thJA}	62 $^\circ C/W$

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 39A.

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 3. Starting $T_J = +25^\circ C$, $L = 389\mu H$, $R_G = 25\Omega$, $I_{AS} = 28A$.

Note 4. This is a calculated value limited to $T_J = +175^\circ C$.

Note 5. $I_{SD} \leq 28A$, $di/dt \leq 220A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	55	–	–	V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	–	0.057	–	V/ $^\circ\text{C}$
Static Drain–Source On–Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 28A$, Note 6	–	–	16.5	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	–	4.0	V
Forward Transconductance	g_{fs}	$V_{DS} = 25V, I_D = 28A$, Note 6	19	–	–	S
Drain–Source Leakage Current	I_{DSS}	$V_{DS} = 55V, V_{GS} = 0$	–	–	25	μA
		$V_{DS} = 44V, V_{GS} = 0, T_J = +150^\circ\text{C}$	–	–	250	μA
Gate–Source Forward Leakage Current	I_{GSS}	$V_{GS} = 20V$	–	–	100	nA
		$V_{GS} = -20V$	–	–	-100	nA
Total Gate Charge	Q_G	$V_{GS} = 10V, I_D = 28A, V_{DS} = 44V$	–	–	72	nC
Gate–Source Charge	Q_{GS}		–	–	11	nC
Gate–Drain (“Miller”) Charge	Q_{GD}		–	–	26	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 28V, I_D = 28A, R_G = 12\Omega$	–	14	–	ns
Rise Time	t_r		–	76	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	52	–	ns
Fall Time	t_f		–	57	–	ns
Internal Drain Inductance	L_D	Between lead, .250 (6mm) from package and center of die contact	–	4.5	–	nH
Internal Source Inductance	L_S		–	7.5	–	nH
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0, f = 1\text{MHz}$	–	1696	–	pF
Output Capacitance	C_{oss}		–	407	–	pF
Reverse Transfer Capacitance	C_{rss}		–	110	–	pF
Source–Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S		–	–	53	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 2	–	–	180	A
Diode Forward Voltage	$V_{F(S-D)}$	$T_J = +25^\circ\text{C}, I_S = 28A, V_{GS} = 0$, Note 6	–	–	1.3	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 28A, di/dt = 100A/\mu s$, Note 6	–	67	101	ns
Reverse Recovery Charge	Q_{rr}		–	208	312	nC
Forward Turn–On Time	t_{on}	Intrinsic turn–on time is negligible (turn–on is dominated by $L_S + L_D$)				

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 6. Pulse width $\leq 400\mu s$, duty cycle $\leq 2\%$.

