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NTE2996 MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Ultra Low On-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)	84A
$T_C = +100^\circ C$	59A
Pulsed (Note 2)	330A
Total Power Dissipation ($T_C = +25^\circ C$), P_D	200W
Derate Above $25^\circ C$	1.4W/ $^\circ C$
Gate-Source Voltage, V_{GS}	$\pm 20V$
Single Pulsed Avalanche Energy ($I_{AS} = 50A$, $L = 260\mu H$, Note 3), E_{AS}	320mJ
Avalanche Current (Note 2), I_{AR}	50A
Repetitive Avalanche Energy (Note 2), E_{AR}	17mJ
Peak Diode Recovery dv/dt (Note 4), dv/dt	4.0V/ns
Operating Junction Temperature Range, T_J	-55° to $+175^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+175^\circ C$
Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L	$+300^\circ C$
Maximum Thermal Resistance:	
Junction-to-Case, R_{thJC}	0.75 $^\circ C/W$
Junction-to-Ambient, R_{thJA}	62 $^\circ C/W$
Typical Thermal Resistance, Case-to-Sink (Flat, greased surface), R_{thCS}	0.50 $^\circ C/W$

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 3. This is a calculated value limited to $T_J = +175^\circ C$.

Note 4. $I_{SD} \leq 50A$, $di/dt \leq 230A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175^\circ C$.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to $+25^\circ\text{C}$, $I_D = 1mA$	–	0.064	–	$V/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 50A$, Note 5	–	–	12	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}	$V_{DS} = 25V, I_D = 50A$, Note 5	69	–	–	mhos
Drain–to–Source Leakage Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0$	–	–	25	μA
		$V_{DS} = 48V, V_{GS} = 0V, T_C = +150^\circ\text{C}$	–	–	250	μA
Gate–Source Leakage, Forward	I_{GSS}	$V_{GS} = 20V$	–	–	100	nA
Gate–Source Leakage, Reverse		$V_{GS} = -20V$	–	–	-100	nA
Total Gate Charge	Q_g	$V_{GS} = 10V, I_D = 50A, V_{DS} = 48V$	–	–	130	nC
Gate–Source Charge	Q_{gs}		–	–	28	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	–	44	nC
Turn–On Delay Time	$t_{d(on)}$		$V_{DD} = 30V, I_D = 50A, R_G = 3.6\Omega, V_{GS} = 10V$, Note 5	–	12	–
Rise Time	t_r	–		78	–	ns
Turn–Off Delay Time	$t_{d(off)}$	–		48	–	ns
Fall Time	t_f	–		53	–	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}	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$	–	3210	–	pF
Output Capacitance	C_{oss}		–	690	–	pF
Reverse Transfer Capacitance	C_{rss}		–	140	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode) Note 6	–	–	84	A
Pulse Source Current	I_{SM}	(Body Diode) Note 2	–	–	330	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 50A, V_{GS} = 0V$, Note 5	–	–	1.3	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 50A, di/dt = 100A/\mu s$, Note 5	–	73	110	ns
Reverse Recovery Charge	Q_{rr}		–	220	330	μC
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 5. Pulse Width $\leq 400\mu s$, Duty Cycle $\leq 2\%$.

Note 6. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

