

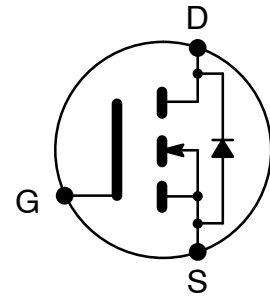


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## NTE2991 MOSFET N-Channel, Enhancement Mode High Speed Switch TO220 Type Package

**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)	110A
$T_C = +100^\circ C$	80A
Pulsed (Note 2)	390A
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$	200W
Derate Above $25^\circ C$	1.3W/ $^\circ C$
Gate-Source Voltage, $V_{GS}$	$\pm 20V$
Single Pulsed Avalanche Energy ( $I_{AS} = 62A$ , $L = 138^\circ H$ , Note 3), $E_{AS}$	264mJ
Avalanche Current (Note 2), $I_{AR}$	62A
Repetitive Avalanche Energy (Note 2), $E_{AR}$	20mJ
Peak Diode Recovery dv/dt (Note 4), dv/dt	5.0V/ns
Operating Junction Temperature Range, $T_J$	$-55^\circ$ to $+175^\circ C$
Storage Temperature Range, $T_{stg}$	$-55^\circ$ 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.  $I_{SD} \leq 62A$ ,  $di/dt \leq 207A/^\circ s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq +175^\circ C$ .

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250^\circ A$	55	–	–	V
Breakdown Voltage Temperature Coefficient	$\pm V_{(BR)DSS} / \pm T_J$	Reference to $+25^\circ\text{C}$ , $I_D = 1\text{mA}$	–	0.057	–	$V/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 62A$ , Note 5	–	–	8.0	$\leq$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250^\circ A$	2.0	–	4.0	V
Forward Transconductance	$g_{fs}$	$V_{DS} = 25V, I_D = 62A$ , Note 5	44	–	–	mhos
Drain–to–Source Leakage Current	$I_{DSS}$	$V_{DS} = 55V, V_{GS} = 0$	–	–	25	$^\circ A$
		$V_{DS} = 44V, V_{GS} = 0V, T_C = +150^\circ\text{C}$	–	–	250	$^\circ A$
Gate–Source Leakage Forward	$I_{GSS}$	$V_{GS} = 20V$	–	–	100	nA
Gate–Source Leakage Reverse	$I_{GSS}$	$V_{GS} = -20V$	–	–	-100	nA
Total Gate Charge	$Q_g$	$V_{GS} = 10V, I_D = 62A, V_{DS} = 44V$	–	–	146	nC
Gate–Source Charge	$Q_{gs}$		–	–	35	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	–	54	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 28V, I_D = 62A, R_G = 4.5\leq, V_{GS} = 10V$ , Note 5	–	14	–	ns
Rise Time	$t_r$		–	101	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	50	–	ns
Fall Time	$t_f$		–	65	–	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	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	–	3247	–	pF
Output Capacitance	$C_{oss}$		–	781	–	pF
Reverse Transfer Capacitance	$C_{rss}$		–	211	–	pF
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	(Body Diode)	–	–	110	A
Pulse Source Current	$I_{SM}$	(Body Diode) Note 2	–	–	390	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^\circ\text{C}, I_S = 62A, V_{GS} = 0V$ , Note 5	–	–	1.3	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^\circ\text{C}, I_F = 62A, di/dt = 100A/^\circ s$ , Note 5	–	69	104	ns
Reverse Recovery Charge	$Q_{rr}$		–	143	215	$^\circ C$
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  $\leq 400^\circ s$ , Duty Cycle  $\leq 2\%$ .

