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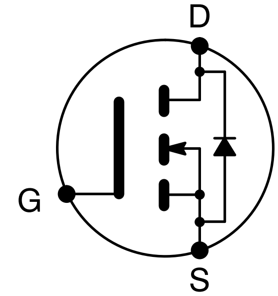
# NTE2991
# MOSFET
# N−Channel, Enhancement Mode
# High Speed Switch
# TO220 Type Package

**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°C (Note 1) . . . . . 110A
$T_C$ = +100°C . . . . . 80A
Pulsed (Note 2) . . . . . 390A
Total Power Dissipation ($T_C$ = +25°C), $P_D$ . . . . . 200W
Derate Above 25°C . . . . . 1.3W/°C
Gate−Source Voltage, $V_{GS}$ . . . . . ±20V
Single Pulsed Avalanche Energy ($I_{AS}$ = 62A, L = 138μH, 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° 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
Maximum Thermal Resistance:
Junction−to−Case, $R_{thJC}$ . . . . . 0.75°C/W
Junction−to−Ambient, $R_{thJA}$ . . . . . 62°C/W
Typical Thermal Resistance, Case−to−Sink (Flat, greased surface), $R_{thCS}$ . . . . . 0.50°C/W

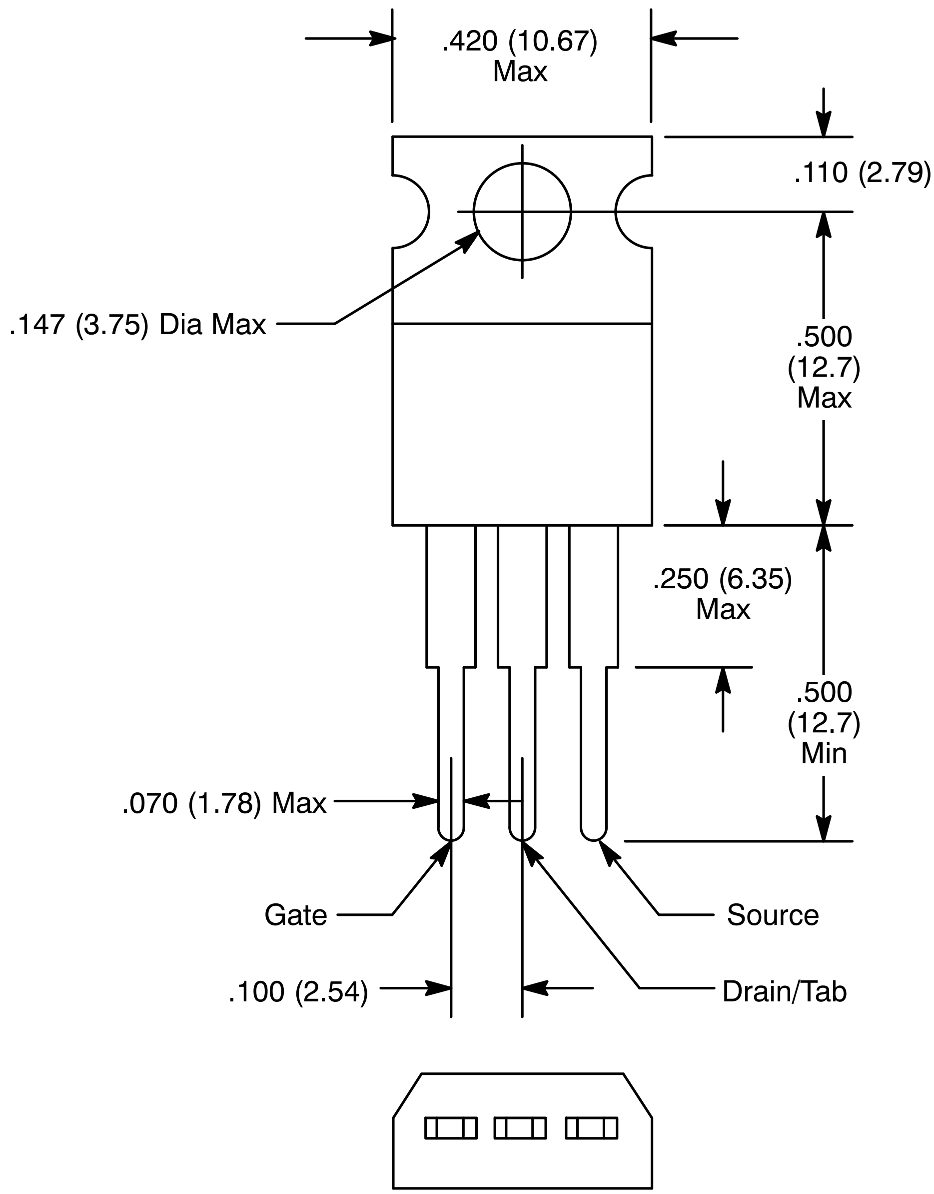
Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.
Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 3. This is a calculated value limited to $T_J$ = +175°C.
Note 4. $I_{SD} \leq 62A$, di/dt ≤ 207A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175°C$.

Rev. 5−19

**Electrical Characteristics:** ($T_J$ = +25°C unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain–Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 55 | – | – | V |
| Breakdown Voltage Temperature Coefficient | $\Delta V_{(BR)DSS}/\Delta T_J$ | Reference to +25°C, $I_D$ = 1mA | – | 0.057 | – | V/°C |
| Static Drain–Source ON Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 62A, Note 5 | – | – | 8.0 | mΩ |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 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 | μA |
| | | $V_{DS}$ = 44V, $V_{GS}$ = 0V, $T_C$ = +150°C | – | – | 250 | μA |
| 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, $R_G$ = 4.5Ω, $V_{GS}$ = 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 = 1MHz | – | 3247 | – | pF |
| Output Capacitance | $C_{oss}$ | | – | 781 | – | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | – | 211 | – | pF |
| **Source–Drain Diode Ratings and Characteristics** | | | | | | |
| 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°C, $I_S$ = 62A, $V_{GS}$ = 0V, Note 5 | – | – | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $T_J$ = +25°C, $I_F$ = 62A, di/dt = 100A/μs, Note 5 | – | 69 | 104 | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | – | 143 | 215 | μC |
| Forward Turn–On Time | $t_{on}$ | Intrinsic turn–on time is neglegible (turn–on is dominated by $L_S + L_D$) | | | | |

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 5. Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.


.420 (10.67)
Max
.110 (2.79)
.147 (3.75) Dia Max
.500
(12.7)
Max
.250 (6.35)
Max
.500
(12.7)
Min
.070 (1.78) Max
Gate
Source
.100 (2.54)
Drain/Tab