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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°C (Note 1) . . . . . 53A
  - $T_C$ = +100°C . . . . . 37A
- Pulse (Note 2) . . . . . 180A

Power Dissipation ($T_C$ = +25°C), $P_D$ . . . . . 107W
- Derate above +25°C . . . . . 0.71W/°C

Gate–Source Voltage, $V_{GS}$ . . . . . ±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°C
Storage Temperature Range, $T_{stg}$ . . . . . –55° to +175°C
Lead Temperature (During Soldering, 1.6mm from case, 10sec max), $T_L$ . . . . . +300°C
Maximum Thermal Resistance, Junction–to–Case, $R_{thJC}$ . . . . . 1.4°C/W
Typical Thermal Resistance, Case–to–Sink (Flat, greased surface), $R_{thCS}$ . . . . . 0.5°C/W
Maximum Thermal Resistance, Junction–to–Ambient, $R_{thJA}$ . . . . . 62°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°C, L = 389µH, $R_G$ = 25Ω, $I_{AS}$ = 28A.

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

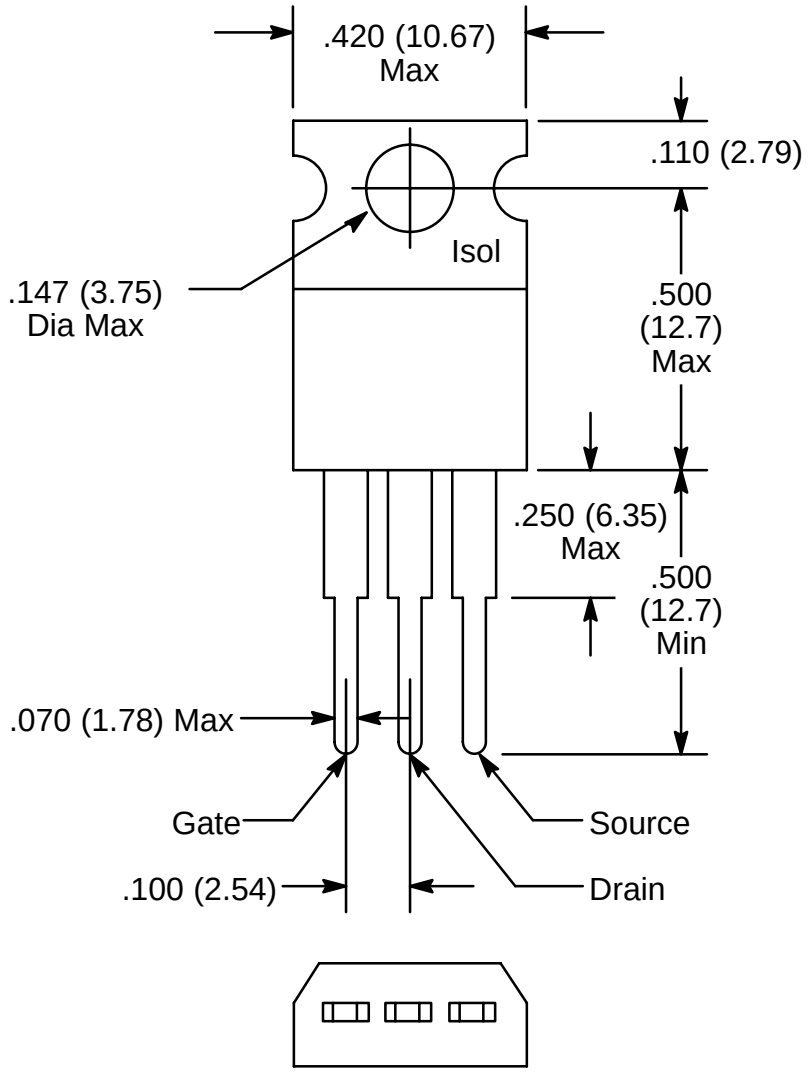
Note 5. $I_{SD} \le 28A$, di/dt ≤ 220A/µs, $V_{DD} \le V_{(BR)DSS}$, $T_J \le +175°C$

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

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain–Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 55 | – | – | V |
| Breakdown Voltage Temperature Coefficient | $\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$ | Reference to +25°C, $I_D$ = 1mA | – | 0.057 | – | V/°C |
| Static Drain–Source On–Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 28A, Note 6 | – | – | 16.5 | 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, $I_D$ = 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°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, $R_G$ = 12Ω | – | 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 = 1MHz | – | 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°C, $I_S$ = 28A, $V_{GS}$ = 0, Note 6 | – | – | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $T_J$ = +25°C, $I_F$ = 28A, di/dt = 100A/μs, Note 6 | – | 67 | 101 | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | – | 208 | 312 | nC |
| Forward Turn–On Time | $t_{on}$ | Intristic 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 ≤ 400μs, duty cycle ≤ 2%.


.420 (10.67)
Max
.110 (2.79)
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.500
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Max
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Max
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.070 (1.78) Max
Gate
Source
.100 (2.54)
Drain