

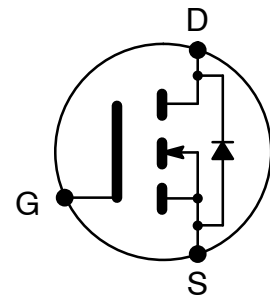


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NTE2987 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch TO220 Type Package

Features:

- Avalanche Rugged Technology
- Logic Level Gate Drive
- $R_{DS(on)} = 0.09\Omega$ Typ. at $V_{GS} = 5V$
- +175°C Operating Temperature
- Fast Switching
- Low Gate Charge
- High Current Capability



Absolute Maximum Ratings:

| | |
|---|----------------|
| Drain Current, I_D | |
| Continuous | |
| $T_C = +25^\circ C$ | 20A |
| $T_C = +100^\circ C$ | 14A |
| Pulsed (Note 1) | 80A |
| Total Power Dissipation ($T_C = +25^\circ C$), P_D | 105W |
| Derate Above 25°C | 0.7W/°C |
| Gate-Source Voltage, V_{GS} | ±15V |
| Avalanche Current, Repetitive or Non-Repetitive (Note 2), I_{AR} | 20A |
| Single Pulsed Avalanche Energy (Note 3), E_{AS} | 120mJ |
| Repetitive Avalanche Energy (Note 2), E_{AR} | 30mJ |
| Avalanche Current, Repetitive or Non-Repetitive (Note 4), I_{AR} | 14A |
| Drain-Source Voltage ($V_{GS} = 0$), V_{DS} | 100V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$), V_{DGR} | 100V |
| Operating Junction Temperature, T_J | +175°C |
| Storage Temperature Range, T_{stg} | -65° to +175°C |
| Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L | +300°C |
| Thermal Resistance: | |
| Maximum Junction-to-Case, R_{thJC} | 1.43°C/W |
| Typical Case-to-Sink (Mounting surface flat, smooth, and greased), R_{thCS} | 0.5°C/W |
| Maximum Junction-to-Ambient (Free Air Operation), R_{thJA} | 62.5°C/W |

Note 1. Pulse width limited by safe operating area.

Note 2. Pulse width limited by T_J max, Duty Cycle < 1%.

Note 3. $V_{DD} = 25V$, $I_D = I_{AR}$, Starting $T_J = +175^\circ C$.

Note 4. $T_C = +100^\circ C$, Pulse width limited by T_J max, Duty Cycle < 1%.

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

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|--------------|--|-----|------|------|---------------|
| OFF | | | | | | |
| Drain–Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ | 100 | – | – | V |
| Drain–to–Source Leakage Current | I_{DSS} | $V_{DS} = 100\text{V}, V_{GS} = 0$ | – | – | 1 | μA |
| | | $V_{DS} = 80\text{V}, V_{GS} = 0\text{V}, T_C = +150^\circ\text{C}$ | – | – | 10 | μA |
| Gate–Source Leakage Forward | I_{GSS} | $V_{GS} = 15\text{V}$ | – | – | 100 | nA |
| Gate–Source Leakage Reverse | I_{GSS} | $V_{GS} = -15\text{V}$ | – | – | -100 | nA |
| ON (Note 5) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 1.0 | 1.6 | 2.5 | V |
| Static Drain–Source ON Resistance | $R_{DS(on)}$ | $V_{GS} = 5\text{V}, I_D = 10\text{A}$ | – | 0.09 | 0.12 | Ω |
| On–State Drain Current | $I_{D(on)}$ | $V_{DS} > I_{D(on)} \times R_{DS(on)}\text{max}, V_{GS} = 10\text{V}$ | 20 | – | – | A |
| Dynamic | | | | | | |
| Forward Transconductance | g_{fs} | $V_{DS} > I_{D(on)} \times R_{DS(on)}\text{max}, I_D = 10\text{A},$ Note 5 | 10 | 16 | – | mhos |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$ | – | 1200 | 1500 | pF |
| Output Capacitance | C_{oss} | | – | 250 | 350 | pF |
| Reverse Transfer Capacitance | C_{rss} | | – | 60 | 90 | pF |
| Switching | | | | | | |
| Total Gate Charge | Q_g | $V_{GS} = 5\text{V}, I_D = 20\text{A}, V_{DD} = 80\text{V}$ | – | 22 | 30 | nC |
| Gate–Source Charge | Q_{gs} | | – | 6 | – | nC |
| Gate–Drain (“Miller”) Charge | Q_{gd} | | – | 12 | – | nC |
| Turn–On Delay Time | $t_{d(on)}$ | $V_{DD} = 30\text{V}, I_D = 10\text{A}, R_G = 50\Omega,$ $V_{GS} = 5\text{V}$ | – | 50 | 70 | ns |
| Rise Time | t_r | | – | 140 | 200 | ns |
| Turn–Off Delay Time | $t_{d(off)}$ | $V_{DD} = 80\text{V}, I_D = 20\text{A}, R_G = 50\Omega,$ $V_{GS} = 5\text{V}$ | – | 80 | 110 | ns |
| Fall Time | t_f | | – | 80 | 110 | ns |
| Source–Drain Diode Ratings and Characteristics | | | | | | |
| Continuous Source Current | I_S | (Body Diode) | – | – | 20 | A |
| Pulse Source Current | I_{SM} | (Body Diode) Note 1 | – | – | 80 | A |
| Diode Forward Voltage | V_{SD} | $I_{SD} = 20\text{A}, V_{GS} = 0\text{V},$ Note 5 | – | – | 1.5 | V |
| Reverse Recovery Time | t_{rr} | $T_J = +150^\circ\text{C}, V_{DD} = 50\text{V}, I_{SD} = 20\text{A},$ $di/dt = 100\text{A}/\mu\text{s}$ | – | 130 | – | ns |
| Reverse Recovery Charge | Q_{rr} | | – | 0.4 | – | μC |
| Reverse Recovery Current | I_{RRM} | | – | 6 | – | A |

Note 1. Pulse width limited by safe operating area.

Note 5. Pulse Test: Pulse Width = $300\mu\text{s}$, Duty Cycle = 1.5%.

