



## NTE2389 MOSFET N-Ch, Enhancement Mode High Speed Switch

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|   |                                     |
|---|-------------------------------------|
| Drain–Source Voltage, $V_{DS}$ .....                                | 60V                                 |
| Drain–Gate Voltage ( $R_{GS} = 20\text{k}\Omega$ ), $V_{DGR}$ ..... | 60V                                 |
| Drain Current, $I_D$  |                                     |
| Continuous .....  | 35A                                 |
| Pulsed .....  | 152A                                |
| Gate–Source Voltage, $V_{GS}$ .....                                 | $\pm 30\text{V}$                    |
| Maximum Power Dissipation, $P_D$ .....                              | 125W                                |
| Operating Junction Temperature, $T_J$ .....                         | $+175^\circ\text{C}$                |
| Storage Temperature range, $T_{stg}$ .....                          | $-55^\circ$ to $+175^\circ\text{C}$ |
| Maximum Thermal Resistance, Junction–to–Case, $R_{thJC}$ .....      | $1.2^\circ\text{C/W}$               |
| Typical Thermal Resistance, Junction–to–Ambient, $R_{thJA}$ .....   | $60^\circ\text{C/W}$                |

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

| Parameter                        | Symbol       | Test Conditions                                    | Min                        | Typ  | Max  | Unit             |               |
|----------------------------------|--------------|--|----------------------------|------|------|------------------|---------------|
| <b>Static Ratings</b>            |              |  |                            |      |      |                  |               |
| Drain–Source Breakdown Voltage   | $BV_{DSS}$   | $I_D = 0.25\text{mA}, V_{GS} = 0$                  | 60                         | –    | –    | V                |               |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $I_D = 1\text{mA}, V_{DS} = V_{GS}$                | 2.1                        | 3.0  | 4.0  | V                |               |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS} = 60\text{V}, V_{GS} = 0$                  | $T_J = +25^\circ\text{C}$  | –    | 1    | 10               | $\mu\text{A}$ |
|                                  |              |  | $T_J = +125^\circ\text{C}$ | –    | 0.1  | 1.0              | mA            |
| Gate–Source Leakage Current      | $I_{GSS}$    | $V_{GS} = \pm 30\text{V}, V_{DS} = 0$              | –                          | 10   | 100  | nA               |               |
| Drain–Source On–State Resistance | $R_{DS(on)}$ | $I_D = 20\text{A}, V_{GS} = 10\text{V}$            | –                          | 40   | 45   | $\text{m}\Omega$ |               |
| <b>Dynamic Ratings</b>           |              |  |                            |      |      |                  |               |
| Forward Transconductance         | $g_{fs}$     | $I_D = 20\text{A}, V_{DS} = 25\text{V}$            | 8                          | 13.5 | –    | mhos             |               |
| Input Capacitance                | $C_{iss}$    | $V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$ | –                          | 1650 | 2000 | pF               |               |
| Output Capacitance               | $C_{oss}$    |  | –                          | 560  | 750  | pF               |               |
| Reverse Transfer Capacitance     | $C_{rss}$    |  | –                          | 300  | 400  | pF               |               |

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

| Parameter                        | Symbol      | Test Conditions  | Min | Typ | Max | Unit          |
|----------------------------------|-------------|--|-----|-----|-----|---------------|
| <b>Dynamic Ratings (Cont'd)</b>  |             |  |     |     |     |               |
| Turn-On Time                     | $t_{d(on)}$ | $V_{CC} = 30\text{V}, V_{GS} = 10\text{V},$<br>$I_D = 3\text{A}, R_{GS} = 50\Omega$      | –   | 25  | 40  | ns            |
|                                  | $t_r$       |  | –   | 60  | 90  | ns            |
| Turn-Off Time                    | $t_d(off)$  |  | –   | 125 | 160 | ns            |
|                                  | $t_f$       |  | –   | 100 | 130 | ns            |
| Internal Drain Inductance        | $L_d$       | Measured from contact screw on tab to center of die                                      | –   | 3.5 | –   | nH            |
|                                  |             | Measured from drain lead 6mm from package to center of die                               | –   | 4.5 | –   | nH            |
| Internal Source Inductance       | $L_s$       | Measured from source lead 6mm from package to source bond pad                            | –   | 7.5 | –   | nH            |
| <b>Reverse Diode</b>             |             |  |     |     |     |               |
| Continuous Reverse Drain Current | $I_{DR}$    |  | –   | –   | 41  | A             |
| Pulsed Reverse Drain Current     | $I_{DRM}$   |  | –   | –   | 164 | A             |
| Diode Forward On-Voltage         | $V_{SD}$    | $I_F = 41\text{A}, V_{GS} = 0$   | –   | 1.4 | 2.0 | V             |
| Reverse Recovery Time            | $t_{rr}$    | $I_F = 41\text{A}, V_{GS} = 0, V_R = 30\text{V}$<br>$-di_F/dt = 100\text{A}/\mu\text{s}$ | –   | 60  | –   | ns            |
| Reverse Recovery Charge          | $Q_{rr}$    |  | –   | 0.3 | –   | $\mu\text{C}$ |

