

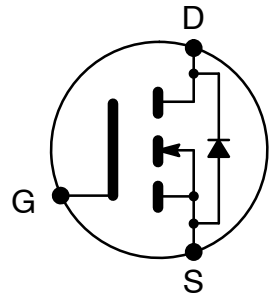


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## NTE2900 MOSFET N-Ch, Enhancement Mode High Speed Switch TO220 Type Package

**Features:**

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



**Absolute Maximum Ratings:**

|                                                                                    |                               |
|------------------------------------------------------------------------------------|-------------------------------|
| Continuous Drain Current ( $V_{GS} = 10V$ ), $I_D$                                 |                               |
| $T_C = +25^\circ C$ .....                                                          | 14A                           |
| $T_C = +100^\circ C$ .....                                                         | 8.5A                          |
| Pulsed Drain Current (Note 1), $I_{DM}$ .....                                      | 56A                           |
| Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....                             | 125W                          |
| Derate Linearly Above $25^\circ C$ .....                                           | 1.0W/ $^\circ C$              |
| Gate-to-Source Voltage, $V_{GS}$ .....                                             | $\pm 20$                      |
| Single Pulse Avalanche Energy (Note 2), $E_{AS}$ .....                             | 550mJ                         |
| Avalanche Current (Note 1), $I_{AR}$ .....                                         | 14A                           |
| Repetitive Avalanche Energy (Note 1), $E_{AR}$ .....                               | 13mJ                          |
| Peak Diode Recovery dv/dt (Note 3), dv/dt .....                                    | 4.8V/ns                       |
| Operating Junction Temperature Range, $T_J$ .....                                  | $-55^\circ$ to $+175^\circ C$ |
| Storage Temperature Range, $T_{stg}$ .....                                         | $-55^\circ$ to $+175^\circ C$ |
| Lead Temperature (During Soldering, 1.6mm from case for 10sec), $T_L$ .....        | $+300^\circ C$                |
| Mounting Torque (6-32 or M3 Screw) .....                                           | 10 lbf•in (1.1N•m)            |
| Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....                             | 1.0 $^\circ C/W$              |
| Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....                          | 62 $^\circ C/W$               |
| Typical Thermal Resistance, Case-to-Sink (Flat, Greased Surface), $R_{thCS}$ ..... | 0.5 $^\circ C/W$              |

Note 1. Repetitive rating; pulse width limited by maximum junction temperature.

Note 2.  $V_{DD} = 25V$ , starting  $T_J = +25^\circ C$ ,  $L = 4.5mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 14A$

Note 3.  $I_{SD} \leq 14A$ , di/dt  $\leq 150A/\mu s$ ,  $V_{DD} \leq 250V$ ,  $T_J \leq +175^\circ C$

Note 4. Pules Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

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

| Parameter                            | Symbol                                  | Test Conditions                                                              | Min | Typ  | Max  | Unit               |
|--------------------------------------|-----------------------------------------|------------------------------------------------------------------------------|-----|------|------|--------------------|
| Drain-to-Source Breakdown Voltage    | $V_{(BR)DSS}$                           | $V_{GS} = 0V, I_D = 250\mu A$                                                | 250 | -    | -    | V                  |
| Breakdown Voltage Temp. Coefficient  | $\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$ | Reference to $+25^\circ\text{C}$ , $I_D = 1\text{mA}$                        | -   | 0.34 | -    | $V/^\circ\text{C}$ |
| Static Drain-to-Source On-Resistance | $R_{DS(on)}$                            | $V_{GS} = 10V, I_D = 8.4A$ , Note 4                                          | -   | -    | 0.28 | $\Omega$           |
| Gate Threshold Voltage               | $V_{GS(th)}$                            | $V_{DS} = V_{GS}, I_D = 250\mu A$                                            | 2.0 | -    | 4.0  | V                  |
| Forward Transconductance             | $g_{fs}$                                | $V_{DS} = 50V, I_D = 8.4A$ , Note 4                                          | 6.7 | -    | -    | mhos               |
| Drain-to-Source Leakage Current      | $I_{DSS}$                               | $V_{DS} = 250V, V_{GS} = 0V$                                                 | -   | -    | 25   | $\mu A$            |
|                                      |                                         | $V_{DS} = 200V, V_{GS} = 0V, T_J = +125^\circ\text{C}$                       | -   | -    | 250  | $\mu A$            |
| Gate-to-Source Forward Leakage       | $I_{GSS}$                               | $V_{GS} = 20V$                                                               | -   | -    | 100  | nA                 |
| Gate-to-Source Reverse Leakage       | $I_{GSS}$                               | $V_{GS} = -20V$                                                              | -   | -    | -100 | nA                 |
| Total Gate Charge                    | $Q_g$                                   | $I_D = 7.9A, V_{DS} = 200V, V_{GS} = 10V$ ,<br>Note 4                        | -   | -    | 68   | nC                 |
| Gate-to-Source Charge                | $Q_{gs}$                                |                                                                              | -   | -    | 11   | nC                 |
| Gate-to-Drain ("Miller") Charge      | $Q_{gd}$                                |                                                                              | -   | -    | 35   | nC                 |
| Turn-On Delay Time                   | $t_{d(on)}$                             | $V_{DD} = 125V, I_D = 7.9A, R_G = 9.1\Omega$ ,<br>$R_D = 8.7\Omega$ , Note 4 | -   | 11   | -    | ns                 |
| Rise Time                            | $t_r$                                   |                                                                              | -   | 24   | -    | ns                 |
| Turn-Off Delay Time                  | $t_{d(off)}$                            |                                                                              | -   | 53   | -    | ns                 |
| Fall Time                            | $t_f$                                   |                                                                              | -   | 49   | -    | ns                 |
| Internal Drain Inductance            | $L_D$                                   | Between lead, .250in. (6.0) mm from<br>package and center of die contact     | -   | 4.5  | -    | nH                 |
| Internal Source Inductance           | $L_S$                                   |                                                                              | -   | 7.5  | -    | nH                 |
| Input Capacitance                    | $C_{iss}$                               | $V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$                                 | -   | 1300 | -    | pF                 |
| Output Capacitance                   | $C_{oss}$                               |                                                                              | -   | 330  | -    | pF                 |
| Reverse Transfer Capacitance         | $C_{riss}$                              |                                                                              | -   | 85   | -    | pF                 |

**Source-Drain Ratings and Characteristics:**

| Parameter                              | Symbol   | Test Conditions                                                           | Min | Typ | Max | Unit    |
|----------------------------------------|----------|---------------------------------------------------------------------------|-----|-----|-----|---------|
| Continuous Source Current (Body Diode) | $I_S$    |                                                                           | -   | -   | 14  | A       |
| Pulsed Source Current (Body Diode)     | $I_{SM}$ | Note 1                                                                    | -   | -   | 56  | A       |
| Diode Forward Voltage                  | $V_{SD}$ | $T_J = +25^\circ\text{C}, I_S = 14A, V_{GS} = 0V$ ,<br>Note 4             | -   | -   | 1.8 | V       |
| Reverse Recovery Time                  | $t_{rr}$ | $T_J = +25^\circ\text{C}, I_F = 7.9A$ ,<br>$di/dt = 100A/\mu s$ , Note 4  | -   | 250 | 500 | ns      |
| Reverse Recovery Charge                | $Q_{rr}$ |                                                                           | -   | 2.3 | 4.6 | $\mu C$ |
| Forward Turn-On Time                   | $t_{on}$ | Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ ) |     |     |     |         |

Note 1. Repetitive rating; pulse width limited by maximum junction temperature.

Note 4. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

