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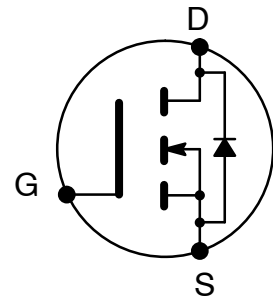
## NTE2928 MOSFET N-Channel, Enhancement Mode High Speed Switch TO-220 Type Package

**Features:**

- $R_{DS(on)} = 550m\Omega$  Max @  $V_{GS} = 10V, I_D = 6A$
- Low Gate Charge: 22nC Typ
- Low  $C_{RSS}$ : 11pF Typ
- 100% Avalanche Tested

**Applications:**

- LCD/LED/PDP TV
- Lighting
- Uninterruptible Power Supply



**Absolute Maximum Ratings:** ( $T_C = +25^\circ C$  unless otherwise specified)

|  |                               |
|--|-------------------------------|
| Drain-Source Voltage, $V_{DSS}$ .....  | 500V                          |
| Gate-Source Voltage, $V_{GSS}$ .....   | $\pm 30V$                     |
| Drain Current, $I_D$   |                               |
| Continuous   |                               |
| $T_C = +25^\circ C$ .....  | 11.5A                         |
| $T_C = +100^\circ C$ .....   | 6.9A                          |
| Pulsed (Note 1) .....  | 46A                           |
| Single Pulsed Avalanche Energy (Note 2), $E_{AS}$ .....                          | 456mJ                         |
| Avalanche Current (Note 1), $I_{AR}$ .....                                       | 11.5A                         |
| Repetitive Avalanche Energy (Note 1), $E_{AR}$ .....                             | 16.7mJ                        |
| Peak Diode Recovery $dv/dt$ (Note 3), $dv/dt$ .....                              | 4.5V/ns                       |
| Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....                           | 165W                          |
| Derate Above $+25^\circ C$ .....   | 1.33W/ $^\circ C$             |
| Operating Temperature Range, $T_J$ .....   | $-55^\circ$ to $+150^\circ C$ |
| Storage Temperature Range, $T_{stg}$ .....                                       | $-55^\circ$ to $+150^\circ C$ |
| Maximum Lead temperature (During Soldering, 1/8" from case, 5 sec ), $T_L$ ..... | $+300^\circ C$                |
| Maximum Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....                   | 0.75 $^\circ C/W$             |
| Maximum Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....                | 62.5 $^\circ C/W$             |

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

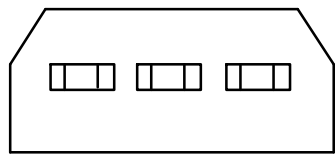
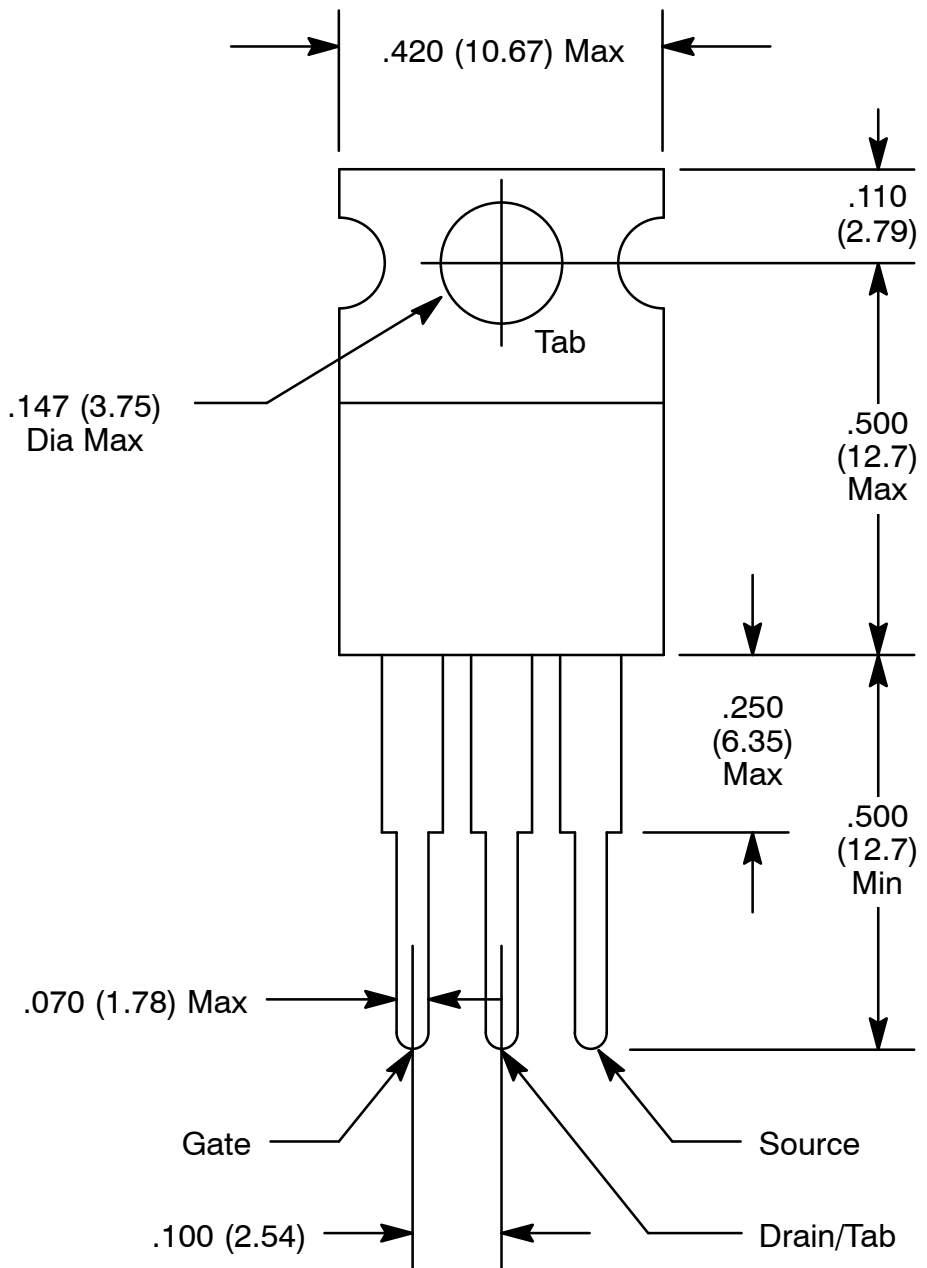
Note 2.  $L = 6.9mH, I_{AS} = 11.5A, V_{DD} = 50V, R_G = 25\Omega$ , starting  $T_J = +25^\circ C$ .

Note 3.  $I_{SD} \leq 11.5A, di/dt \leq 200A/\mu s, V_{DD} \leq V_{(BR)DSS}$ , starting  $T_J = +25^\circ C$ .

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

| Parameter   | Symbol                          | Test Conditions  | Min | Typ  | Max       | Unit               |
|---|---------------------------------|--|-----|------|-----------|--------------------|
| <b>OFF Characteristics</b>                                    |                                 |  |     |      |           |                    |
| Drain–Source Breakdown Voltage                                | $V_{(BR)DSS}$                   | $V_{GS} = 0V, I_D = 250\mu A, T_J = +25^\circ\text{C}$                   | 500 | –    | –         | V                  |
| Breakdown Voltage Temperature Coefficient                     | $\Delta V_{(BR)DSS}/\Delta T_J$ | $I_D = 250\mu A$ , Referenced to $+25^\circ\text{C}$                     | –   | 0.5  | –         | $V/^\circ\text{C}$ |
| Zero Gate Voltage Drain Current                               | $I_{DSS}$                       | $V_{DS} = 500V, V_{GS} = 0$  | –   | –    | 1.0       | $\mu A$            |
|   |                                 | $V_{DS} = 400V, T_C = +125^\circ\text{C}$                                | –   | –    | 10        | $\mu A$            |
| Gate–Body Leakage Current                                     | $I_{GSS}$                       | $V_{GS} = \pm 30V, V_{DS} = 0V$  | –   | –    | $\pm 100$ | nA                 |
| <b>ON Characteristics</b>                                     |                                 |  |     |      |           |                    |
| Gate Threshold Voltage  | $V_{GS(th)}$                    | $V_{GS} = V_{DS}, I_D = 250\mu A$  | 3.0 | –    | 5.0       | V                  |
| Static Drain–Source ON Resistance                             | $R_{DS(on)}$                    | $V_{GS} = 10V, I_D = 6A$   | –   | 0.55 | 0.65      | $\Omega$           |
| Forward Transconductance                                      | $g_{FS}$                        | $V_{DS} = 40V, I_D = 6A$   | –   | 11.5 | –         | S                  |
| <b>Dynamic Characteristics</b>                                |                                 |  |     |      |           |                    |
| Input Capacitance   | $C_{iss}$                       | $V_{GS} = 0V, V_{DS} = 25V,$<br>$f = 1\text{MHz}$                        | –   | 985  | 1315      | pF                 |
| Output Capacitance  | $C_{oss}$                       |  | –   | 140  | 190       | pF                 |
| Reverse Transfer Capacitance                                  | $C_{rss}$                       |  | –   | 11   | 17        | pF                 |
| Total Gate Charge   | $Q_g$                           | $V_{DD} = 400V, I_D = 11.5A,$<br>$V_{GS} = 10V$ , Note 4                 | –   | 22   | 30        | nC                 |
| Gate–Source Charge  | $Q_{gs}$                        |  | –   | 6    | –         | nC                 |
| Gate–Drain Charge   | $Q_{gd}$                        |  | –   | 9    | –         | nC                 |
| <b>Switching Characteristics</b>                              |                                 |  |     |      |           |                    |
| Turn–On Delay Time  | $t_{d(on)}$                     | $V_{DD} = 250V, I_D = 11.5A,$<br>$V_{GS} = 10V, R_G = 25\Omega$ , Note 4 | –   | 24   | 60        | ns                 |
| Rise Time   | $t_r$                           |  | –   | 50   | 110       | ns                 |
| Turn–Off Delay Time   | $t_{d(off)}$                    |  | –   | 45   | 100       | ns                 |
| Fall Time   | $t_f$                           |  | –   | 30   | 70        | ns                 |
| <b>Drain–Source Diode Characteristics and Maximum Ratings</b> |                                 |  |     |      |           |                    |
| Maximum Continuous Drain–Source Diode Forward Current         | $I_S$                           |  | –   | –    | 11.5      | A                  |
| Maximum Pulsed Drain–Source Diode Forward Current             | $I_{SM}$                        |  | –   | –    | 46        | A                  |
| Drain–Source Diode Forward Voltage                            | $V_{SD}$                        | $V_{GS} = 0V, I_S = 11.5A$   | –   | –    | 1.4       | V                  |
| Reverse Recovery Time   | $t_{rr}$                        | $V_{GS} = 0V, I_{SD} = 11.5A,$<br>$di_F/dt = 100A/\mu s$                 | –   | 375  | –         | ns                 |
| Reverse Recovery Charge                                       | $Q_{rr}$                        |  | –   | 3.5  | –         | $\mu C$            |

Note 4. Essentially independent of operating temperature typical characteristics.



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