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NTE2942 MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Low Static Drain-Source ON Resistance
- Improved Inductive Ruggedness
- Fast Switching Times
- Low Input Capacitance
- Extended Safe Operating Area
- TO220 Type Isolated Package

Absolute Maximum Ratings:

| | |
|---|-------------------------------|
| Drain-Source Voltage (Note 1), V_{DSS} | 100V |
| Drain-Gate Voltage ($R_{GS} = 1M\Omega$, Note 1), V_{DGR} | 100V |
| Gate-Source Voltage, V_{GS} | $\pm 20V$ |
| Drain Current, I_D | |
| Continuous | |
| $T_C = +25^\circ C$ | 9.7A |
| $T_C = +100^\circ C$ | 6.8A |
| Pulsed (Note 2) | 56A |
| Gate Current (Pulsed), I_{GM} | $\pm 1.5A$ |
| Single Pulsed Avalanche Energy (Note 3), E_{AS} | 28mJ |
| Avalanche Current, I_{AS} | 9.7A |
| Total Power Dissipation ($T_C = +25^\circ C$), P_D | 35W |
| Derate Above $25^\circ C$ | 0.28W/ $^\circ C$ |
| Operating Junction Temperature Range, T_J | -55° to $+150^\circ C$ |
| Storage Temperature Range, T_{stg} | -55° to $+150^\circ C$ |
| Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), T_L | $+300^\circ C$ |
| Thermal Resistance: | |
| Maximum Junction-to-Case, R_{thJC} | 3.57K/W |
| Typical Case-to-Sink (Mounting surface flat, smooth, and greased), R_{thCS} | 0.5K/W |
| Maximum Junction-to-Ambient (Free Air Operation), R_{thJA} | 62.5K/W |

Note 1. $T_J = +25^\circ$ to $+150^\circ C$.

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 3. $L = 0.53mH$, $V_{DD} = 25V$, $R_G = 25\Omega$, 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 |
|---|--------------|---|-----|------|------|----------|
| Drain–Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 100 | – | – | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0 | – | 4.0 | V |
| Gate–Source Leakage Forward | I_{GSS} | $V_{GS} = 20V$ | – | – | 100 | nA |
| Gate–Source Leakage Reverse | I_{GSS} | $V_{GS} = -20V$ | – | – | -100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = \text{Max. Rating}, V_{GS} = 0$ | – | – | 250 | μA |
| | | $V_{DS} = 0.8 \text{ Max. Rating}, T_C = +150^\circ\text{C}$ | – | – | 1000 | μA |
| Static Drain–Source ON Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 7A, \text{Note 4}$ | – | – | 0.16 | Ω |
| Forward Transconductance | g_{fs} | $V_{DS} \geq 50V, I_D = 7A, \text{Note 4}$ | 5.1 | 7.6 | – | mhos |
| Input Capacitance | C_{iss} | $V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$ | – | 640 | – | pF |
| Output Capacitance | C_{oss} | | – | 240 | – | pF |
| Reverse Transfer Capacitance | C_{rss} | | – | 72 | – | pF |
| Turn–On Delay Time | $t_{d(on)}$ | $V_{DD} = 0.5 BV_{DSS}, I_D = 14A, Z_O = 9.1\Omega,$ (MOSFET switching times are essentially independent of operating temperature) | – | 10 | 15 | ns |
| Rise Time | t_r | | – | 34 | 51 | ns |
| Turn–Off Delay Time | $t_{d(off)}$ | | – | 23 | 35 | ns |
| Fall Time | t_f | | – | 24 | 36 | ns |
| Total Gate Charge (Gate–Source Plus Gate–Drain) | Q_g | $V_{GS} = 10V, I_D = 14A, V_{DS} = 0.8 \text{ Max.}$ Rating, (Gate charge is essentially independent of operating temperature) | – | – | 36 | nC |
| Gate–Source Charge | Q_{gs} | | – | 7.1 | – | nC |
| Gate–Drain (“Miller”) Charge | Q_{gd} | | – | 14.6 | – | nC |
| Source–Drain Diode Ratings and Characteristics | | | | | | |
| Continuous Source Current | I_S | (Body Diode) | – | – | 14 | A |
| Pulse Source Current | I_{SM} | (Body Diode) Note 2 | – | – | 56 | A |
| Diode Forward Voltage | V_{SD} | $T_J = +25^\circ\text{C}, I_S = 14A, V_{GS} = 0V, \text{Note 4}$ | – | – | 2.5 | V |
| Reverse Recovery Time | t_{rr} | $T_J = +25^\circ\text{C}, I_F = 14A, dI_F/dt = 100A/\mu s$ | – | 125 | 250 | ns |

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

