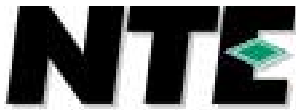

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# NTE67
# MOSFET
# N–Ch, Enhancement Mode
# High Speed Switch

**Description:**

The NTE67 is a TMOS Power FET in a TO220 type package designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

**Features:**

- Lower $R_{DS(ON)}$
- Improved Inductive Ruggedness
- Fast Switching Times
- Lower Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability

**Absolute Maximum Ratings:**

Drain–Source Voltage ($T_J$ = +25°C to +150°C), $V_{DSS}$ . . . . . 400V
Drain–Gate Voltage ($R_{GS}$ = 1MΩ, $T_J$ = +25°C to +125°C), $V_{DGR}$ . . . . . 400V
Gate–Source Voltage, $V_{GS}$ . . . . . ±20V
Continuous Drain Current, $I_D$
$T_C$ = +25°C . . . . . 4.5A
$T_C$ = +100°C . . . . . 3.0A
Pulsed Drain Current (Note 2), $I_{DM}$ . . . . . 18A
Pulsed Gate Current, $I_{GM}$ . . . . . ±1.5A
Single Pulsed Avalanche Energy (Note 3), $E_{AS}$ . . . . . 290mJ
Avalanche Current, $I_{AS}$ . . . . . 5.5A
Total Power Dissipation ($T_C$ = +25°C), $P_D$ . . . . . 75W
Derate Above 25°C . . . . . 0.6W/°C
Operating Junction Temperature Range, $T_J$ . . . . . –55° to +150°C
Storage Temperature Range, $T_{stg}$ . . . . . –55° to +150°C
Lead Temperature (During Soldering, 1/8” from case, 5sec max.), $T_L$ . . . . . +300°C
Thermal Resistance, Junction–to–Case, $R_{thJC}$ . . . . . 1.67K/W
Thermal Resistance, Junction–to–Ambient, $R_{thJA}$ . . . . . 80K/W
Thermal Resistance, Case–to–Sink (Mounting surface flat, smooth, and greased), $R_{thCS}$ 0.24K/W

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2. Repetitive rating: Pulse width limited by max, junction temperature.
Note 3. L = 17mH, $V_{dd}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = +25°C.

**Electrical Characteristics:** ($T_C$ = +25°C unless otherwise specified)

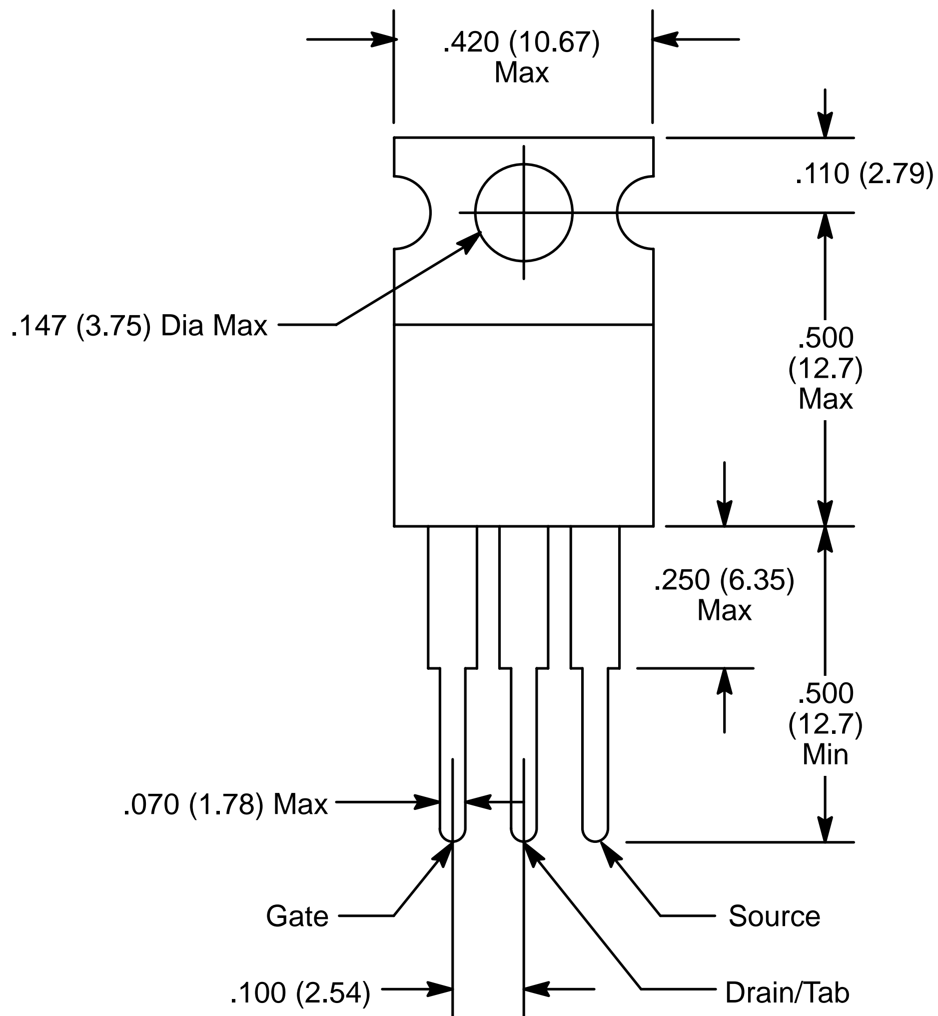
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain–Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 400 | – | – | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | – | 4.0 | V |
| Gate–Source 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 | $I_{DSS}$ | $V_{DS}$ = Max. Rating, $V_{GS}$ = 0V | – | – | 250 | μA |
| | | $V_{DS}$ = Max. Rating x 0.8, $V_{GS}$ = 0V, $T_C$ = +125°C | – | – | 1000 | μA |
| On–State Drain–Source Current | $I_{D(on)}$ | $V_{DS}$ > $I_{D(on)}$ x $R_{DS(on)}$max, $V_{GS}$ = 10V, Note 1 | 4.5 | – | – | A |
| Static Drain–Source On–State Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 3A, Note 1 | – | 1.0 | 1.5 | Ω |
| Forward Transconductance | $g_{fs}$ | $V_{DS}$ ≥ 50V, $I_D$ = 3A, Note 1 | 2.9 | 4.4 | – | mhos |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | – | 780 | – | pF |
| Output Capacitance | $C_{oss}$ | | – | 99 | – | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | – | 43 | – | pF |
| Turn–On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 0.5$BV_{DSS}$, $I_D$ = 5.5A, $Z_O$ = 12Ω (MOSFET switching times are essentially independent of operating temperature) | – | 11 | 17 | ns |
| Rise Time | $t_r$ | | – | 19 | 29 | ns |
| Turn–Off Delay Time | $t_{d(off)}$ | | – | 37 | 56 | ns |
| Fall Time | $t_f$ | | – | 16 | 24 | ns |
| Total Gate Charge (Gate–Source Plus Gate–Drain) | $Q_g$ | $V_{GS}$ = 10V, $I_D$ = 5.5A, $V_{DS}$ = 0.8 Max. Rating (Gate charge is essentially independent of operating temperature) | – | 18 | 30 | nC |
| Gate–Source Charge | $Q_{gs}$ | | – | 40 | – | nC |
| Gate–Drain (“Miller”) Charge | $Q_{gd}$ | | – | 14 | – | nC |

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

**Source–Drain Diode Ratings and Characteristics:**

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Continuous Source Current (Body Diode) | $I_S$ | | – | – | 4.5 | A |
| Pulse Source Current (Body Diode) | $I_{SM}$ | Note 2 | – | – | 18 | A |
| Diode Forward Voltage | $V_{SD}$ | $T_C$ = +25°C, $I_S$ = 4.5A, $V_{GS}$ = 0V | – | – | 1.6 | V |
| Reverse Recovery Time | $t_{rr}$ | $T_J$ = +25°C, $I_F$ = 5.5A, $dI_F/dt$ = 100A/μs | – | 310 | 660 | ns |

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2. Repetitive rating: Pulse width limited by max, junction temperature.


.420 (10.67)
Max
.110 (2.79)
.147 (3.75) Dia Max
.500
(12.7)
Max
.250 (6.35)
Max
.500
(12.7)
Min
.070 (1.78) Max
Gate
Source
.100 (2.54)
Drain/Tab