



# NES

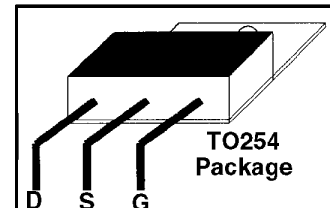
NEW ENGLAND SEMICONDUCTOR

NSFM150

## POWER MOSFET

N CHANNEL  
POWER MOSFET

- Switching Power Supplies
- Repetitive Avalanche Rating
- Isolated Hermetic Package
- Ceramic Eyelets
- High Reliability



ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

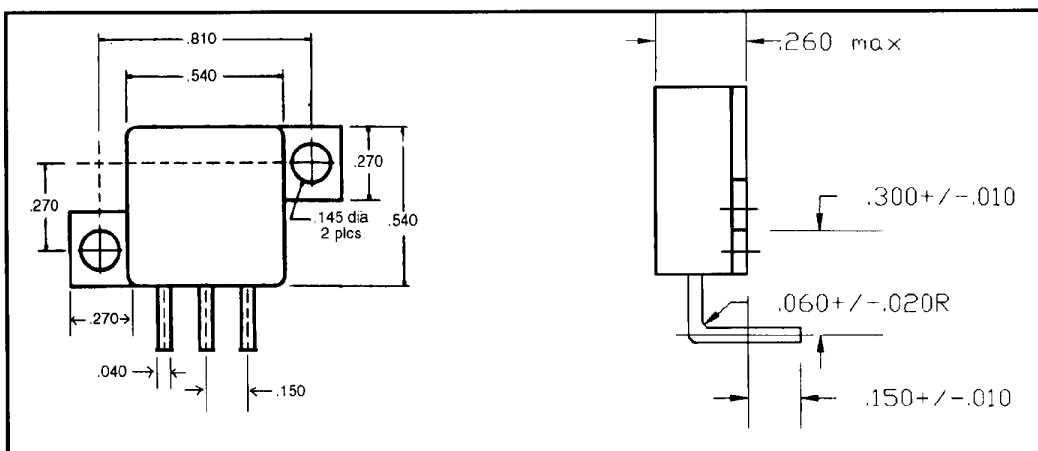
| PARAMETERS/TEST CONDITIONS                      |                           | SYMBOL         | NSFM150    | UNITS            |
|-------------------------------------------------|---------------------------|----------------|------------|------------------|
| Drain-Source Voltage                            |                           | $V_{DS}$       | 100        | V                |
| Gate-Source Voltage                             |                           | $V_{GS}$       | $\pm 20$   | V                |
| Continuous Drain Current                        | $T_C = 25^\circ\text{C}$  | $I_D$          | 34         | A                |
|                                                 | $T_C = 100^\circ\text{C}$ |                | 21         |                  |
| Pulsed Drain Current (1)                        |                           | $I_{DM}$       | 136        | A                |
| Power Dissipation                               | $T_C = 25^\circ\text{C}$  | $P_D$          | 150        | W                |
|                                                 | $T_C = 100^\circ\text{C}$ |                | 60         |                  |
| Operating Junction & Storage Temperature Range  |                           | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |
| Lead Temperature (1/16" from case for 10 secs.) |                           | $T_L$          | 300        | $^\circ\text{C}$ |

### THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE  | Symbol     | Typ. | Max. | Units |
|---------------------|------------|------|------|-------|
| Junction-to-Case    | $R_{thJC}$ | -    | 0.83 | K/W   |
| Junction-to-Ambient | $R_{thJA}$ | -    | 48   | K/W   |
| Case-to-Sink        | $R_{thCS}$ | 0.21 | -    | K/W   |

(1) Pulse width limited by maximum junction temperature.

### MECHANICAL OUTLINE



NEW ENGLAND SEMICONDUCTOR

6 Lake Street Lawrence, MA 01841  
1-800-446-1158 / (978) 794-1666 / FAX: (978) 689-0803

T4-4.8-860-939 REV: --



# NEC

## NEW ENGLAND SEMICONDUCTOR

### NSFM150

#### ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

| PARAMETERS/TEST CONDITIONS                                                                                  |                                                                      | Symbol       | Min | Typ. | Max.  | Units         |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------|-----|------|-------|---------------|
| Drain-Source Breakdown Voltage<br>$V_{GS} = 0, I_D = 1000 \mu\text{A}$                                      |                                                                      | $V_{(BR)DS}$ | 100 | -    | -     | V             |
| Gate Threshold Voltage<br>$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$                                          |                                                                      | $V_{GS(th)}$ | 2.0 | -    | 4.0   | V             |
| Gate-Body Leakage<br>$V_{DS} = 0, V_{GS} = \pm 20 \text{ V}$                                                |                                                                      | $I_{GSS}$    | -   | -    | 100   | nA            |
| Zero Gate Voltage Drain Current<br>$V_{DS} = V_{(BR)DS}, V_{GS} = 0$                                        |                                                                      | $I_{DSS}$    | -   | -    |       | $\mu\text{A}$ |
| Zero Gate Voltage Drain Current<br>$V_{DS} = 0.8 \times V_{(BR)DS}, V_{GS} = 0, T_J = 125^\circ\text{C}$    |                                                                      | $I_{DSS}$    | -   | -    | 250   | $\mu\text{A}$ |
| Drain-Source On-State Resistance (2)<br>$V_{GS} = 10 \text{ V}, I_D = 21 \text{ A}$                         |                                                                      | $r_{DS(on)}$ | -   |      | 0.07  | $\Omega$      |
| Drain-Source On-State Resistance (2)<br>$V_{GS} = 10 \text{ V}, I_D = 34 \text{ A}$                         |                                                                      | $r_{DS(on)}$ | -   |      | 0.081 | $\Omega$      |
| Forward Transconductance (2)<br>$V_{DS} = 15 \text{ V}, I_D = 21 \text{ A}$                                 |                                                                      | $g_{fs}$     | 9.0 |      |       | S(V)          |
| Input Capacitance<br>$V_{GS} = 0$                                                                           |                                                                      | $C_{iss}$    |     | 3700 |       | pF            |
| Output Capacitance<br>$V_{DS} = 25 \text{ V}$                                                               |                                                                      | $C_{oss}$    |     | 1100 |       |               |
| Reverse Transfer Capacitance<br>$f = 1 \text{ MHz}$                                                         |                                                                      | $C_{rss}$    |     | 200  |       |               |
| Total Gate Charge<br>$V_{DS} = 0.5 \times V_{(BR)DS}, V_{GS} = 10 \text{ V}, I_D = 34 \text{ A}$            | (Gate charge is essentially independent of operating temperature)    | $Q_g$        | 50  |      | 125   | nC            |
| Gate-Source Charge                                                                                          |                                                                      | $Q_{gs}$     | 8   |      | 22    |               |
| Gate-Drain Charge                                                                                           |                                                                      | $Q_{gd}$     | 15  |      | 65    |               |
| Turn-On Delay Time<br>$V_{DD} = 50 \text{ V}, I_D = 34 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 2.4 \Omega$ | (Switching time is essentially independent of operating temperature) | $t_{d(on)}$  | -   |      | 35    | ns            |
| Rise time                                                                                                   |                                                                      | $t_r$        | -   |      | 190   |               |
| Turn-Off Delay Time                                                                                         |                                                                      | $t_{d(off)}$ | -   |      | 170   |               |
| Fall Time                                                                                                   |                                                                      | $t_f$        | -   |      | 130   |               |

#### SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

| PARAMETERS/TEST CONDITIONS                                                   | Symbol   | Min. | Typ. | Max. | Units         |
|------------------------------------------------------------------------------|----------|------|------|------|---------------|
| Continuous Current                                                           | $I_S$    | -    | -    | 34   | A             |
| Pulsed Current (1)                                                           | $I_{SM}$ | -    | -    | 136  | A             |
| Forward Voltage (2)<br>$I_F = I_S, V_{GS} = 0$                               | $V_{SD}$ |      | -    | 1.8  | V             |
| Reverse Recovery Time<br>$I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{S}$    | $t_{rr}$ | -    |      | 500  | ns            |
| Reverse Recovered Charge<br>$I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{S}$ | $Q_{rr}$ | -    |      | 2.9  | $\mu\text{C}$ |

(1) Pulse width limited by maximum junction temperature.

(2) Pulse test: Pulse width < 300  $\mu\text{sec}$ . Duty Cycle  $\leq 2\%$ .

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