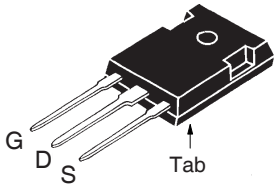
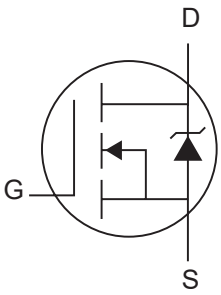
# N-Channel Enhancement Mode MOSFET

**MPR3N150PT**

**TO-247**




| | | |
|---|---|---|
| $V_{DS}$ | 1500 | V |
| $R_{DS(on),TYP}$ | 6.1 | Ω |
| $I_D$ | 3 | A |

## Features

1.Low on – resistance

2.Package TO-247

## Applications

1.High Voltage Power Supplies
2.Capacitor Discharge Applications
3.Pulse Circuits

**Maximum ratings, at $T_A$ =25°C, unless otherwise specified**

### Absolute Maximum Ratings

| PARAMETERS/TEST CONDITIONS | SYMBOL | LIMITS | UNITS |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 1500 | V |
| Drain Current –continuous @25°C | $I_D$ | 3 | A |
| Pulsed Drain Current[1] | $I_{DM}$ | 9 | A |
| Gate-Source Voltage | $V_{GS}$ | ±30 | V |
| Single Pulse Avalanche | $E_{AS}$ | 250 | mJ |
| Operating Junction & Storage Temperature | $T_j$, $T_{stg}$ | -55 to 175 | °C |
| Maximum Power Dissipation $T_C$=25°C | $P_D$ | 250 | W |
| Thermal Resistance-Junction to Case | $R_{\theta JC}$ | 2 | °C/W |
| Thermal Resistance-Junction to Ambient | $R_{\theta JA}$ | 50 | °C/W |

Note:

1. Pulse width limited by maximum junction temperature.

## Electrical Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_j$=25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 1510 | 1600 | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=1500V,$V_{GS}$=0V | -- | -- | 10 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{DS}$=0V,VGS=±30V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 3 | 3.85 | 5 | V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V, $I_D$=1A | -- | 6.1 | 7 | Ω |
| $V_{SD}$ | Forward on voltage (Note1) | $I_S$=1A,$V_{GS}$=0V | -- | -- | 1.4 | V |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | -- | 1375 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 90 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 30 | -- | pF |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 10V, $V_{DS}$ = 750V, $I_D$ = 1.5 | -- | 38.6 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 6.5 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 19 | | nC |

### Switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Td(on) | Turn-on Delay Time | $V_{GS}$ = 10V, $V_{DS}$ = 750V, $I_D$ = 1.5A , $R_G$ = 5Ω | -- | 19 | -- | ns |
| Tr | Turn-on Rise Time | | -- | 21 | -- | ns |
| Td(off) | Turn-Off Delay Time | | -- | 42 | -- | ns |
| Tf | Turn-Off Fall Time | | -- | 25 | -- | ns |

### Source- Drain Diode Characteristics@ $T_j$ = 25°C (unless otherwise stated)

| | | | | | | |
|---|---|---|---|---|---|---|
| IS | Continuous Current | $V_{GS}$ = 0V,Tj=25°C | -- | -- | 3 | A |
| Trr | Reverse Recovery Time | IF = 1.5A, -di/dt = 100A/μs, $V_R$ = 100V | -- | -- | 0.9 | us |
| Qrr | Reverse Recovery Charge | | -- | -- | 6.7 | uC |

## Typical Characteristics

Fig. 1. Output Characteristics @ $T_J$ = 25ºC

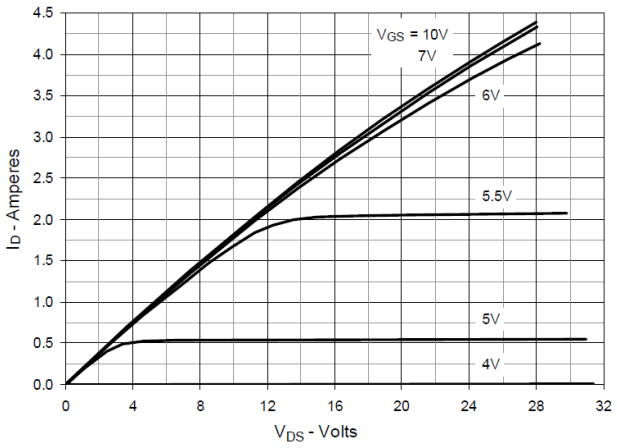



Fig. 2. Output Characteristics @ $T_J$ = 125ºC

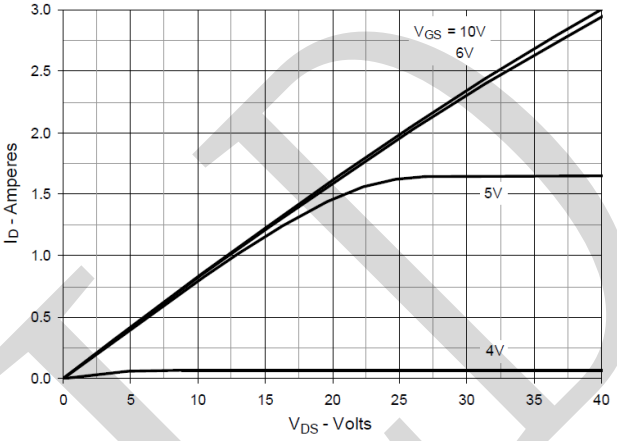



Fig. 3. $R_{DS(on)}$ Normalized to $I_D$ = 1.5A Value vs. Junction Temperature

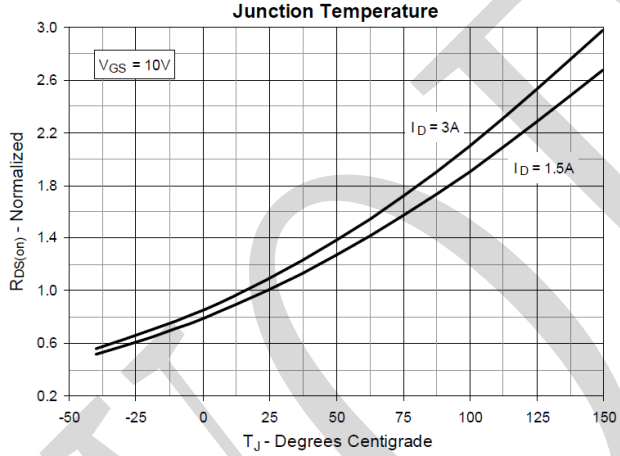



Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 1.5A Value vs. Drain Current

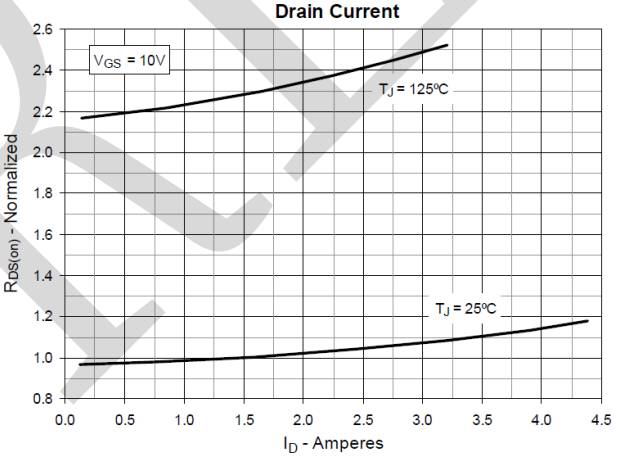



Fig. 5. Maximum Drain Current vs. Case Temperature

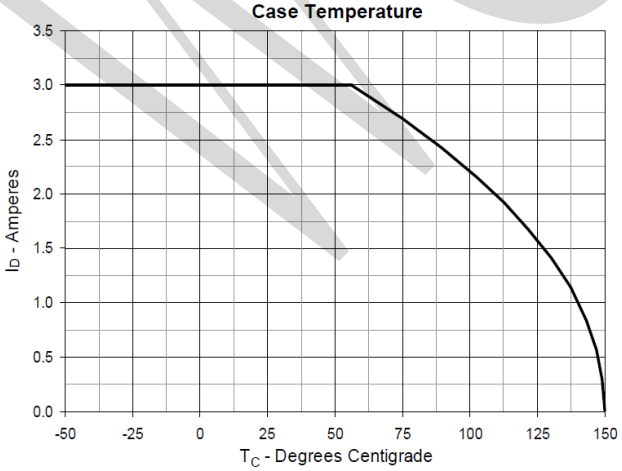
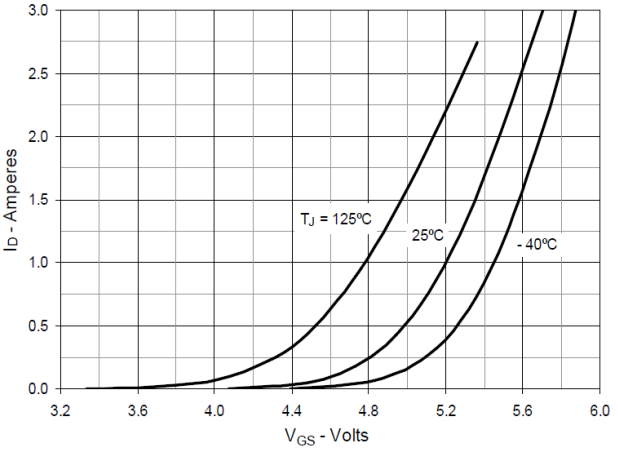



Fig. 6. Input Admittance



## Typical Characteristics

Fig. 7. Transconductance

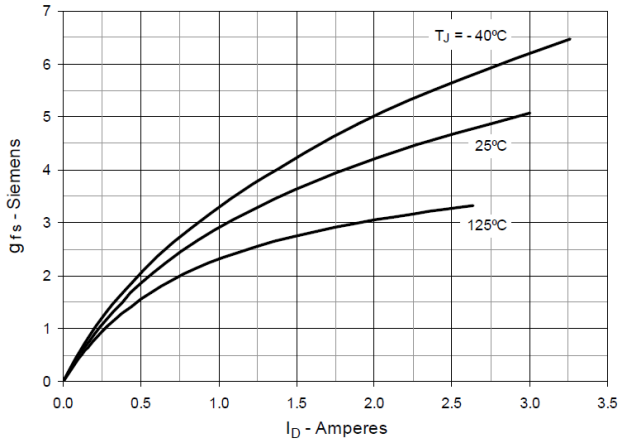



Fig. 8. Forward Voltage Drop of Intrintsic Diode

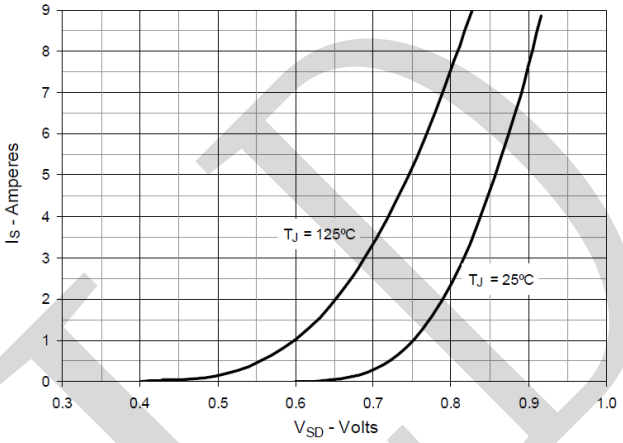



Fig. 9. Gate Charge

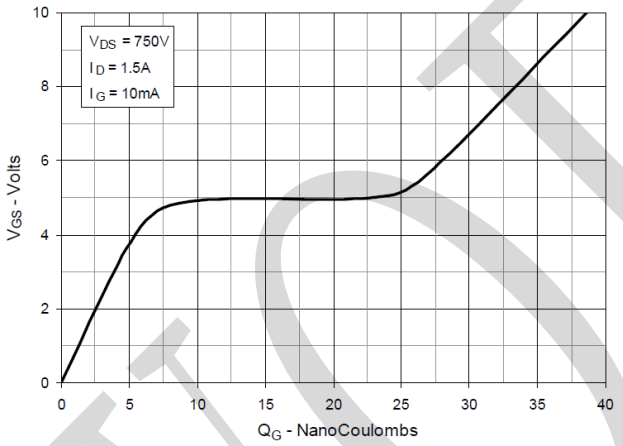



Fig. 10. Capacitance

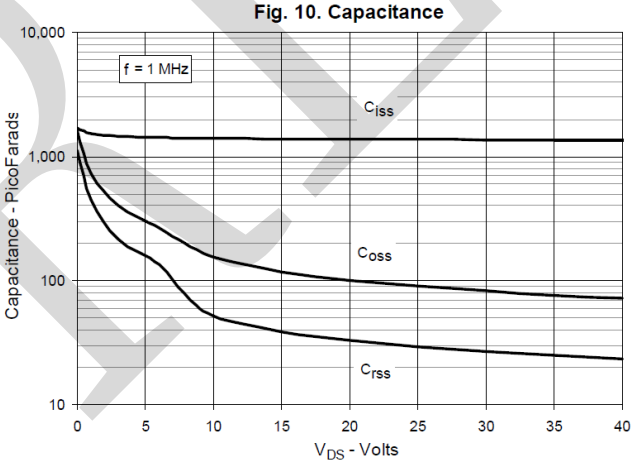



Fig. 11. Maximum Transient Thermal Impedance

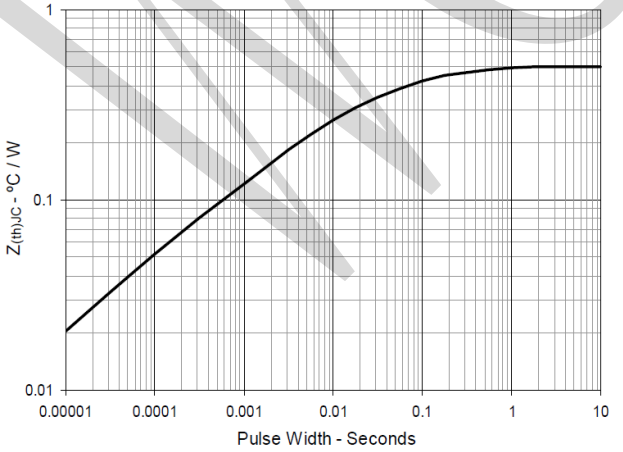
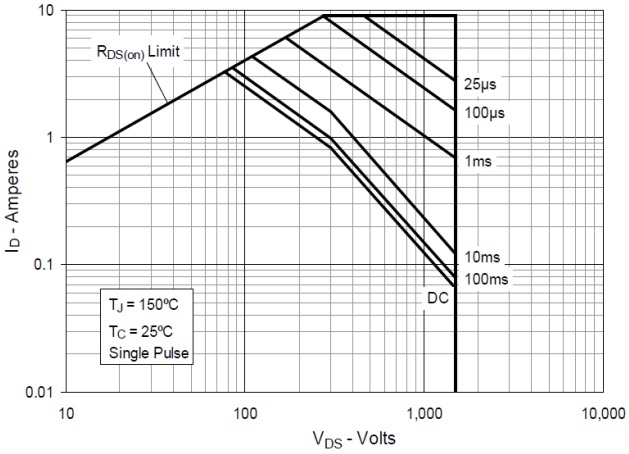



Fig. 12. Forward-Bias Safe Operating Area



## PACKAGE OUTLINE DIMENSIONS

### TO-247