



T2MNM9P7



100V N-Channel MOSFETs

General Description

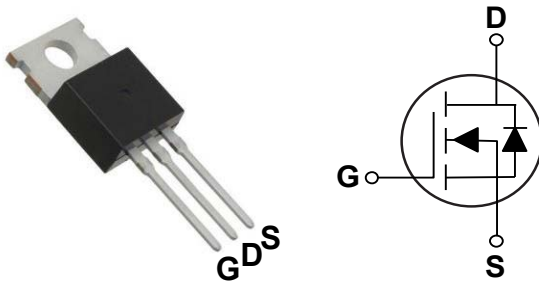
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

| BV_{DSS} | $R_{DS(ON)}$ | I_D |
|------------|----------------|-------|
| 100 V | 9.7 m Ω | 75 A |

Features

- $R_{DS(ON)} \leq 9.7\text{m}\Omega @ V_{GS}=10\text{V}$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO-220 Pin Configuration



Applications

- DC-DC Converter
- Load Switch
- Motor Drivers
- Quick Charger

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|--------------|--|------------|------------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ\text{C}$) | 75 | A |
| | Drain Current – Continuous ($T_C=100^\circ\text{C}$) | 46.4 | A |
| I_{DM} | Drain Current – Pulsed (NOTE 1) | 137 | A |
| EAS | Single Pulse Avalanche Energy (L=0.1mH) (NOTE 2) | 36 | mJ |
| IAS | Single Pulse Avalanche Current (L=0.1mH) (NOTE 2) | 27 | A |
| P_D | Power Dissipation ($T_C=25^\circ\text{C}$) | 62.5 | W |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| Marking Code | | NM9P7 | |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | --- | 50 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 2 | $^\circ\text{C/W}$ |

**Electrical Characteristics (T_J=25°C, unless otherwise noted)****Off Characteristics**

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 100 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V | --- | --- | 1 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |

On Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|--|------|------|------|------|
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =2A | --- | --- | 9.7 | mΩ |
| | | V _{GS} =4.5V, I _D =2A | --- | --- | 14.5 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.0 | 2.0 | 3.0 | V |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =10A | --- | 22.3 | --- | S |

Dynamic and switching Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|--|------|------|------|------|
| Q _g | Total Gate Charge | V _{DS} =50V, V _{GS} =10V, I _D =20A | --- | 39.9 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 8.92 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 10.4 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DS} =50V, V _{GS} =10V, R _{GEN} =6Ω, I _D =1A | --- | 9.2 | --- | nS |
| T _r | Rise Time | | --- | 17.6 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 32.2 | --- | |
| T _f | Fall Time | | --- | 69.9 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =50V, V _{GS} =0V, F=1MHz | --- | 1910 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 506 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 36 | --- | |
| R _g | Gate Resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | --- | 0.8 | --- | Ω |

Drain-Source Diode Characteristics and Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|-------------------------|---|------|------|------|------|
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =2A | --- | --- | 1.1 | V |
| t _{rr} | Reverse Recovery Time | V _R =50V, I _F =10A, | --- | 37 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | dI/dt=100A/us | --- | 35 | --- | nC |

NOTES :

1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



Characteristics Curves

FIG. 1- On-Resistance vs. I_D

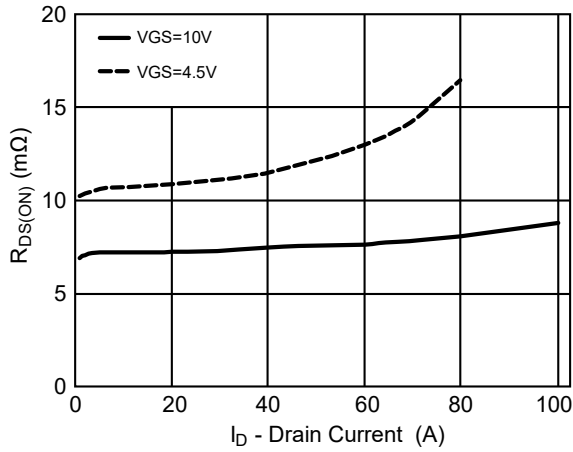


FIG. 2- Gate Threshold Voltage

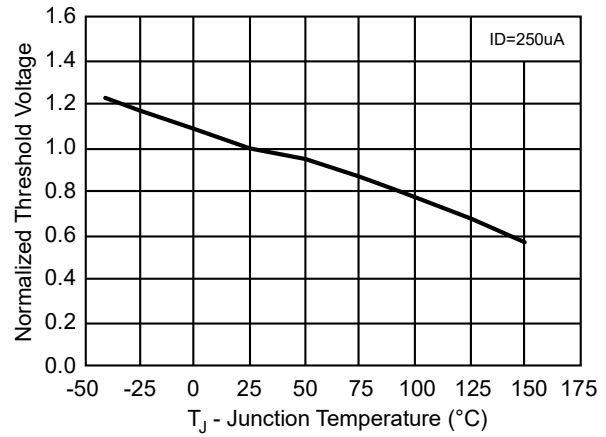


FIG. 3- Gate Charge Characteristics

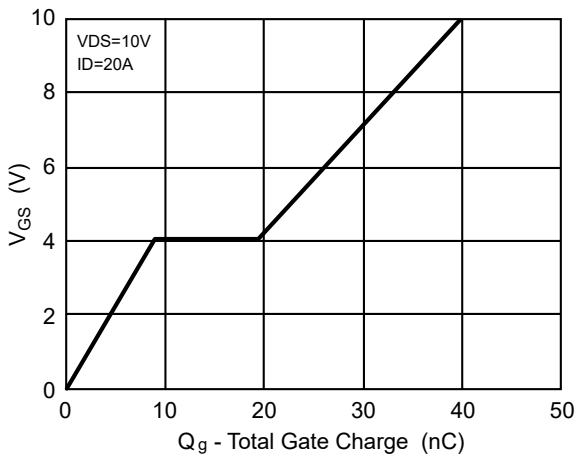


FIG. 4- Drain Current

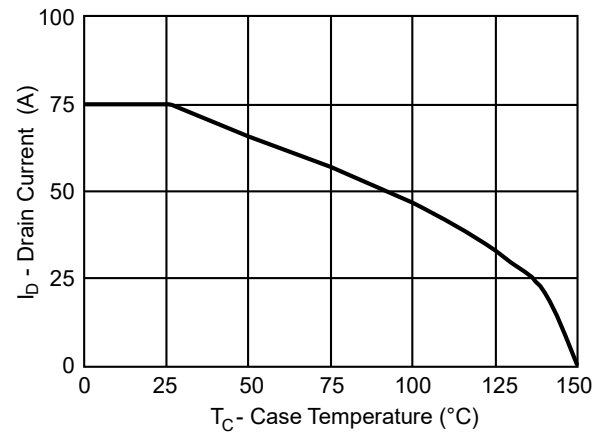


FIG. 5- Power Dissipation

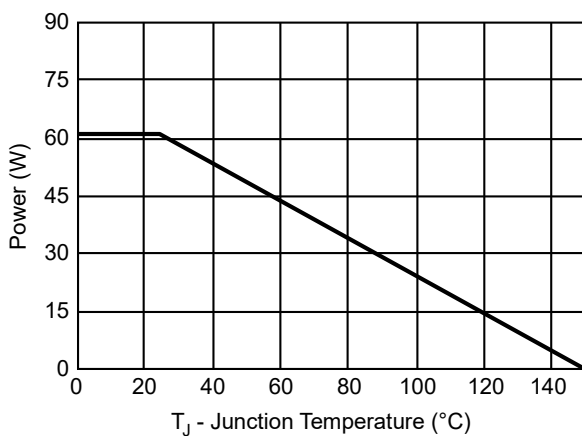
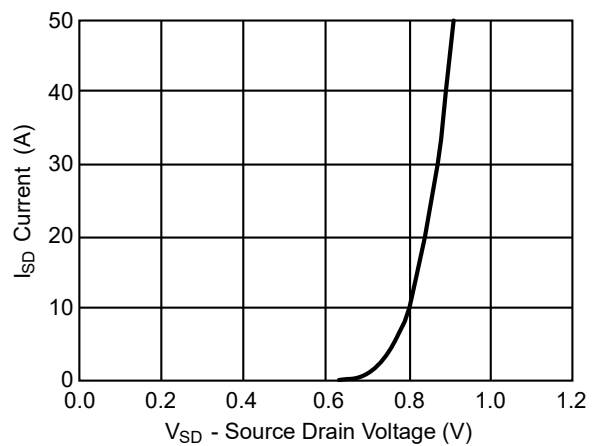
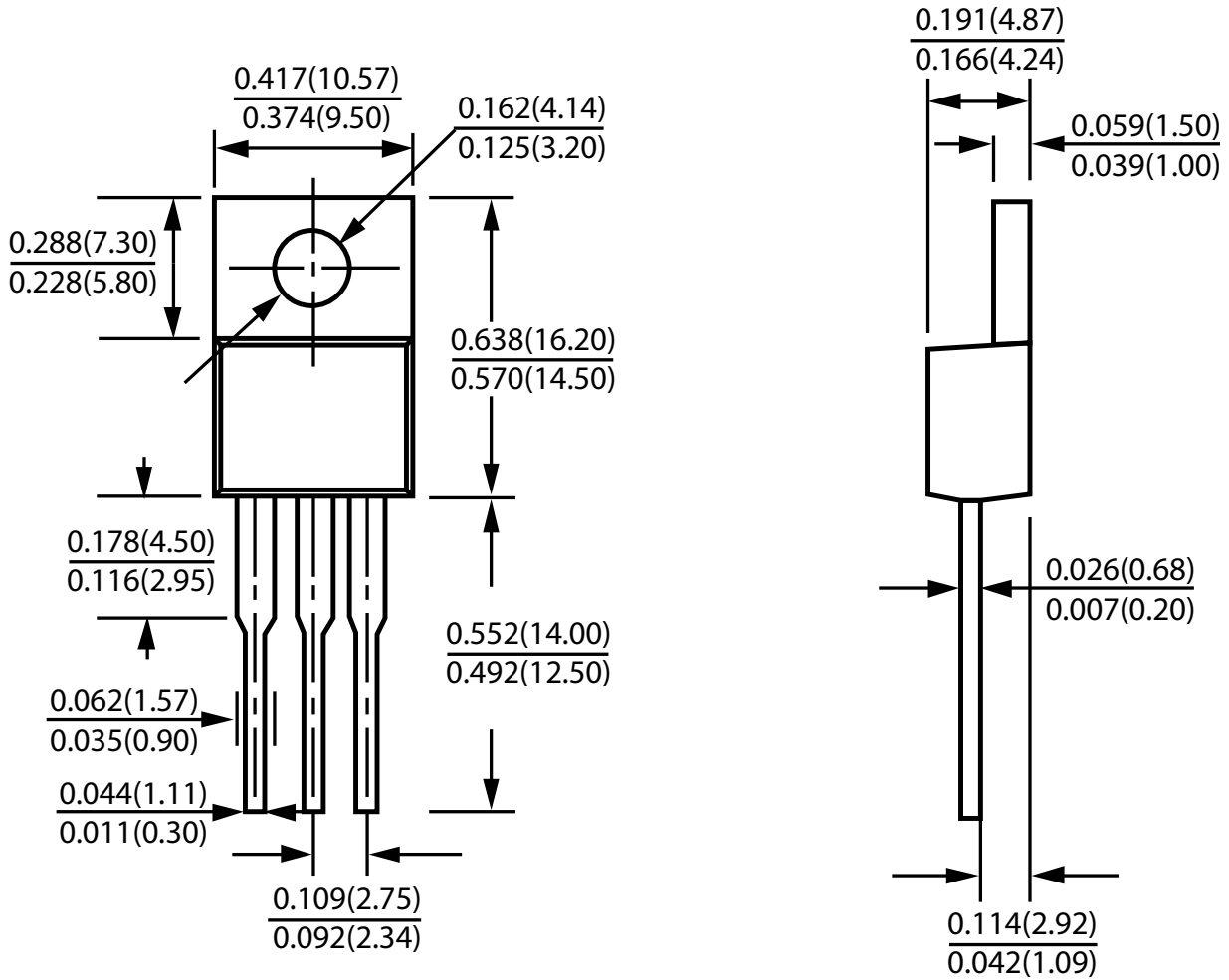


FIG. 6- Source-Drain Diode Forward





Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)



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