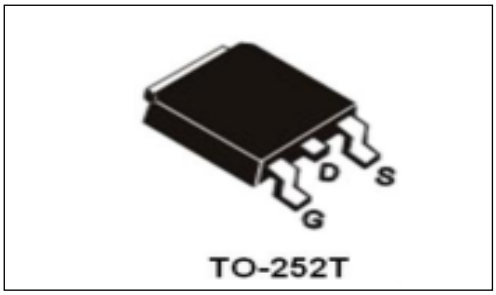
# FMD7N60E5 N-CHANNEL POWER MOSFET

## Features :

- Fast body diode eliminates the need for external diode in ZVS applications.
- Lower gate charge results in simpler drive requirements
- Higher gate voltage threshold offers improved noise immunity
- Low on-resistance
- RoHS compliant

| | | |
|---|---|---|
| $V_{DSS}$ | 600 | V |
| $I_D$ | 7 | A |
| Trr | 198 | ns |
| $R_{DS(ON)Typ}$ | 1.1 | Ω |




## Applications:

- Motor control
- Uninterruptible power supplies
- Zero voltage switching SMPS

## Absolute（Tc= 25℃）:

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 600 | V |
| $I_D$ | Continuous Drain Current | 7* | A |
| | Continuous Drain Current $T_C$ = 100 °C | 4.8* | A |
| $I_{DM}$① | Pulsed Drain Current | 28* | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±30 | V |
| $E_{AS}$② | Single Pulse Avalanche Energy | 440 | mJ |
| $E_{AR}$① | Avalanche Energy, Repetitive | 50 | mJ |
| $I_{AR}$① | Avalanche Current | 3.3 | A |
| $P_D$ | Power Dissipation | 96 | W |
| dv/dt | Peak Diode Recovery dv/dt | 5 | V/nS |
| $T_J$ | Junction Temperature | 150 | ℃ |
| $T_{stg}$ | Storage Temperature Range | –55 to 150 | ℃ |

*: Drain current is limited by maximum junction temperature

## Ordering Information

| Product number | Package | Marking | Packing | Quantity |
|---|---|---|---|---|
| FMD7N60E5 | TO252T | FMD7N60E5 | Tape & Reel | 2500 |

## Electronic Characteristics（Tc=25°C）

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Drain-source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 600 | | | V |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta Tj$ | $I_D$=250uA, Referenced to 25°C | | 0.6 | | V/°C |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 2 | | 4 | V |
| Drain-source Leakage Current | $I_{DSS}$ | $V_{DS}$ =600V,$V_{GS}$ =0V, Tj=25°C | | | 1 | μA |
| | | $V_{DS}$ =480V,$V_{GS}$ =0V, Tj=125°C | | | 100 | μA |
| Forward Transconductance | gfs | $V_{DS}$ =15V, $I_D$=3.5A ③ | | 7 | | S |
| Gate-body Leakage Current | $I_{GSS}$ | $V_{DS}$ =0V,$V_{GS}$ =±30V | | | ±100 | nA |
| Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}$ =10V, $I_D$=3.5A ③ | | 1.1 | 1.5 | Ω |
| Input Capacitance | Ciss | $V_{GS}$ = 0V, $V_{DS}$ = 25V F = 1.0MHZ | | 1050 | | pF |
| Output Capacitance | Coss | | | 84 | | |
| Reverse transfer Capacitance | Crss | | | 12 | | |
| Turn-on Delay Time | Td(on) | $V_{DD}$=300V, $I_D$ =7.0A RG=25Ω ③ | | 17 | | ns |
| Rise Time | Tr | | | 20 | | |
| Turn -Off Delay Time | Td(off) | | | 39 | | |
| Fall Time | Tf | | | 18 | | |
| Total Gate Charge | Qg | $I_D$ =7.0A, $V_{DS}$ = 480V VGS = 10V ③ | | 21 | | nC |
| Gate-to-Source Charge | Qgs | | | 4.8 | | nC |
| Gate-to-Drain Charge | Qgd | | | 6.5 | | nC |
| Continuous Diode Forward Current | $I_S$ | | | | 7 | A |
| Max Pulsed Diode Forward Current | $I_{SM}$ | | | | 28 | A |
| Diode Forward Voltage | $V_{SD}$ | Tj=25°C, Is=7.0A,$V_{GS}$ =0V ③ | | | 1.4 | V |
| Reverse Recovery Time | trr | Tj=25°C, If=7.0A di/dt=100A/μs ③ | | 198 | | ns |
| Reverse Recovery Charge | Qrr | | | 0.5 | | uC |
| Thermal Resistance Junction-case | $Rth_{JC}$ | | | 1.3 | | °C/W |
| Thermal Resistance Junction-ambient | $Rth_{JA}$ | | | 62.5 | | °C/W |

**Notes:**

① Repetitive rating: Pulse width is limited by the maximum junction temperature

② Starting Tj=25°C, $V_{DD}$ =50V, L=18mH, $R_G$ =25Ω, $I_{AS}$=7.0A

③ Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

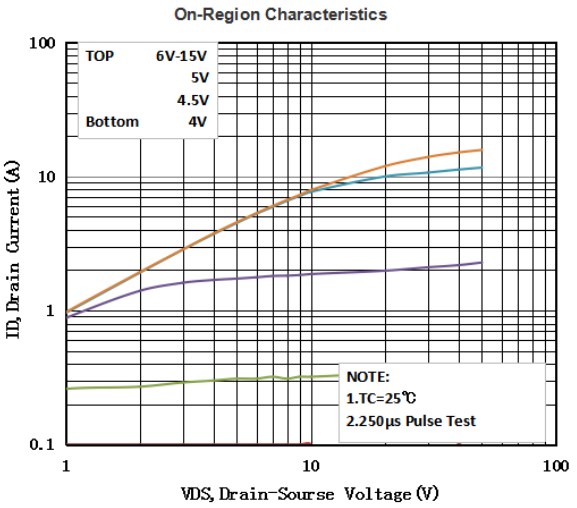



Fig.1 Typical Output Characteristics, Tc=25℃

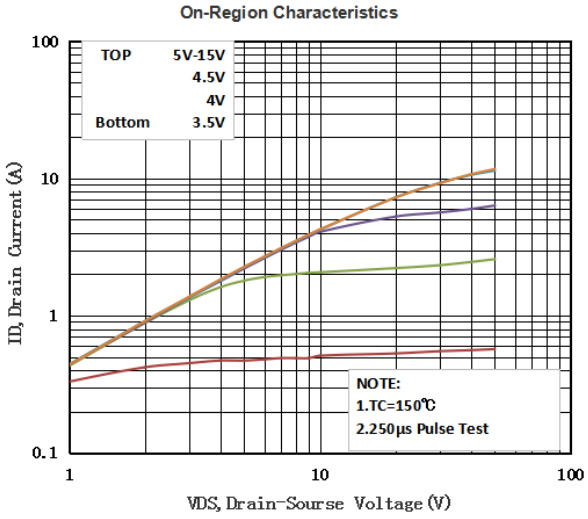



Fig.2 Typical Output Characteristics, Tc=150℃

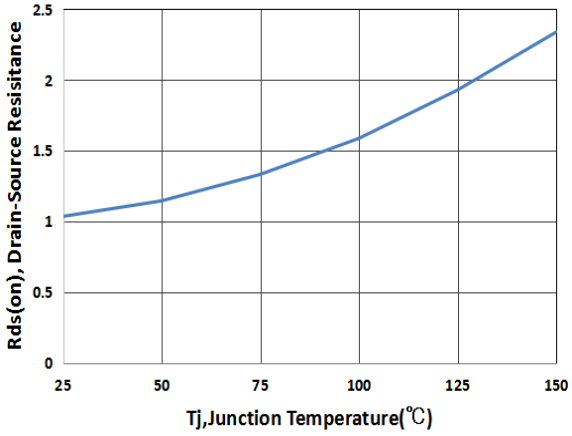



Fig.3 On-Resistance Vs. Temperature

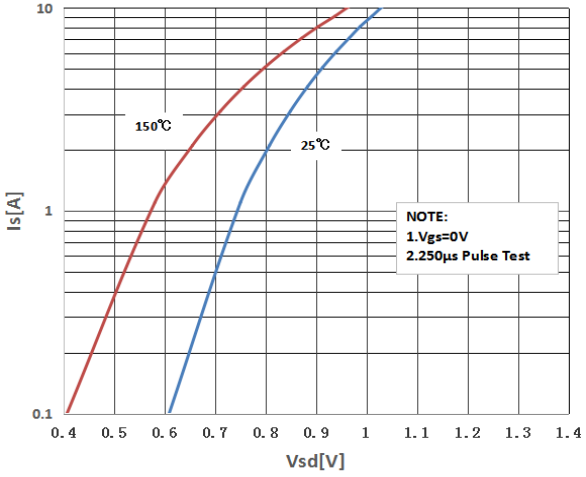



Fig.4 Typical Source-Drain Diode Forward Voltage

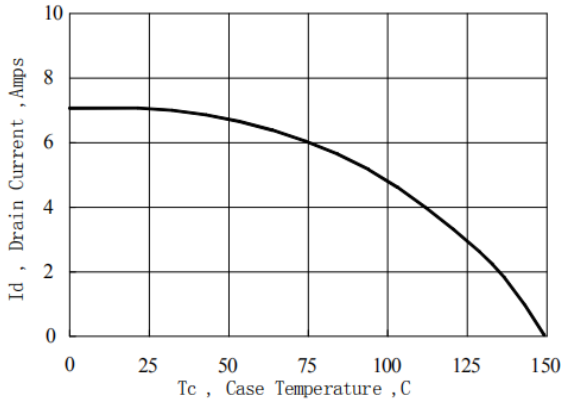



Fig.5 Maximum Drain Current Vs. Case Temperature

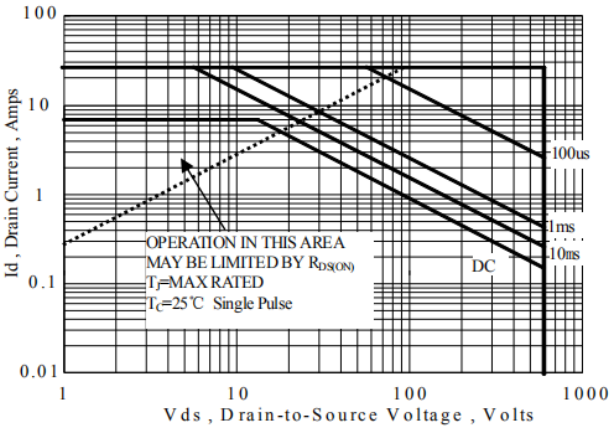



Fig.6 Maximum Safe Operating Area

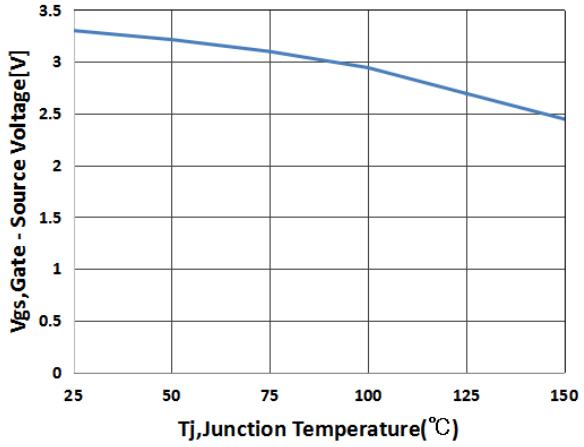



Fig.7 Gate Threshold Voltage Variation vs. Temperature

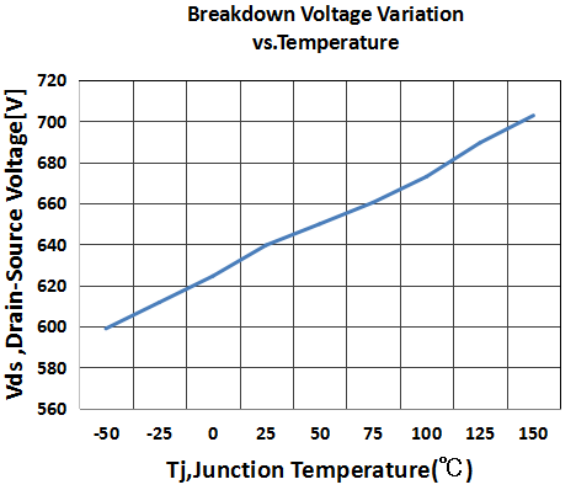



Fig.8 Breakdown Voltage Variation vs. Temperature

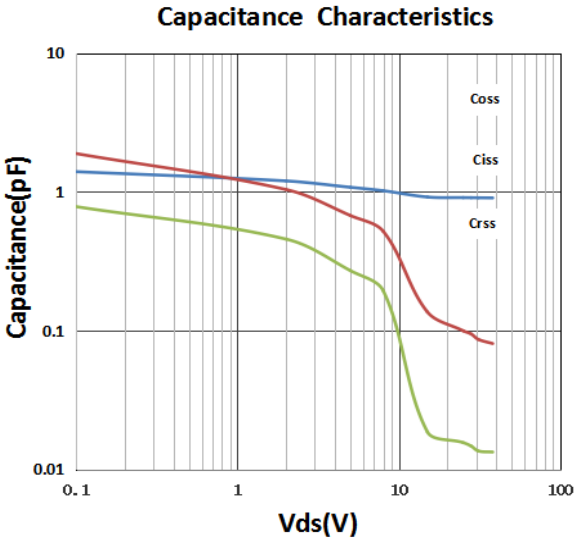



Fig.9 Capacitance Characteristics

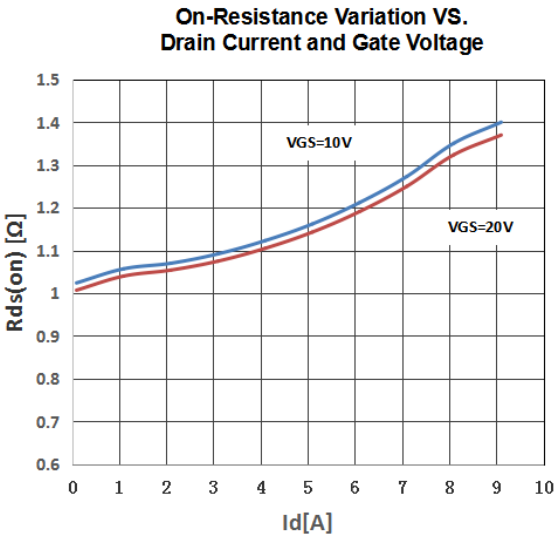



Fig.10 On-Resistance Variation VS. Drain Current and Gate Voltage

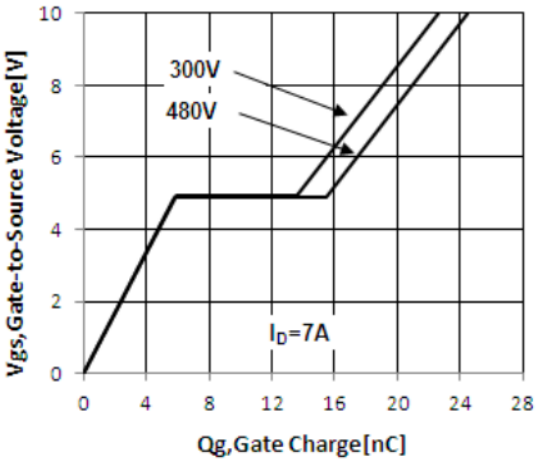



Fig.11 Gate Charge VS Gate to Source Voltage

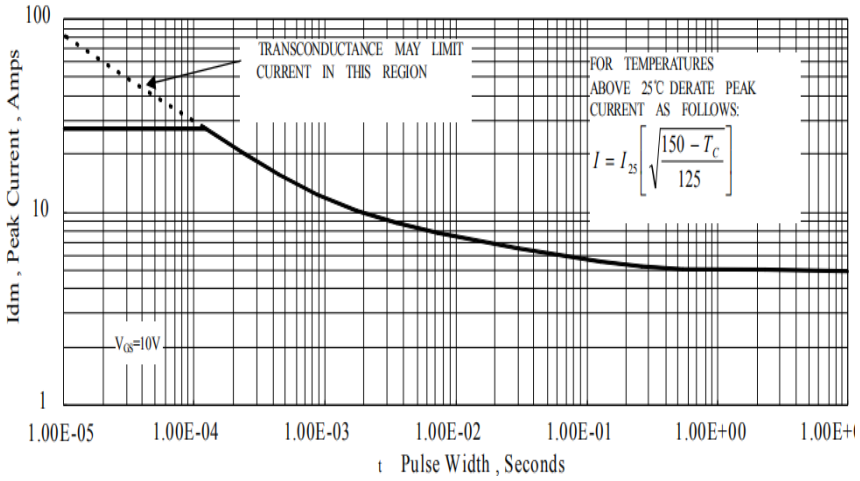



Fig.12 $I_{DM}$ VS Pulse Width

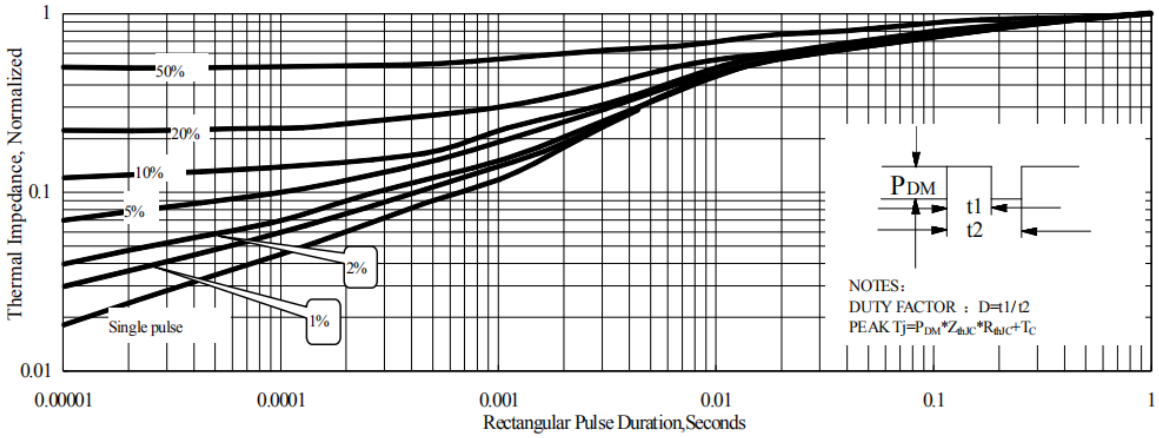
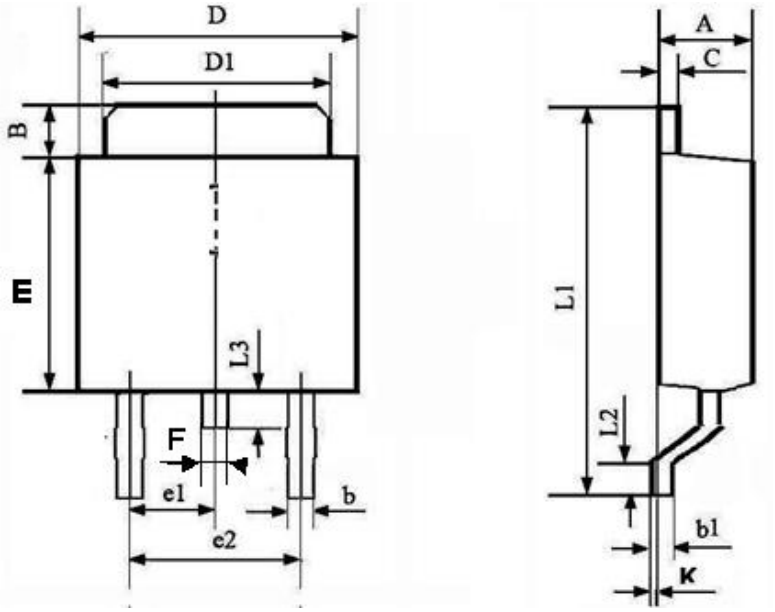



Fig.13 Normalized Thermal Impendence VS Rectangular Pulse Duration

# TO-252T MECHANICAL DATA

UNIT：mm

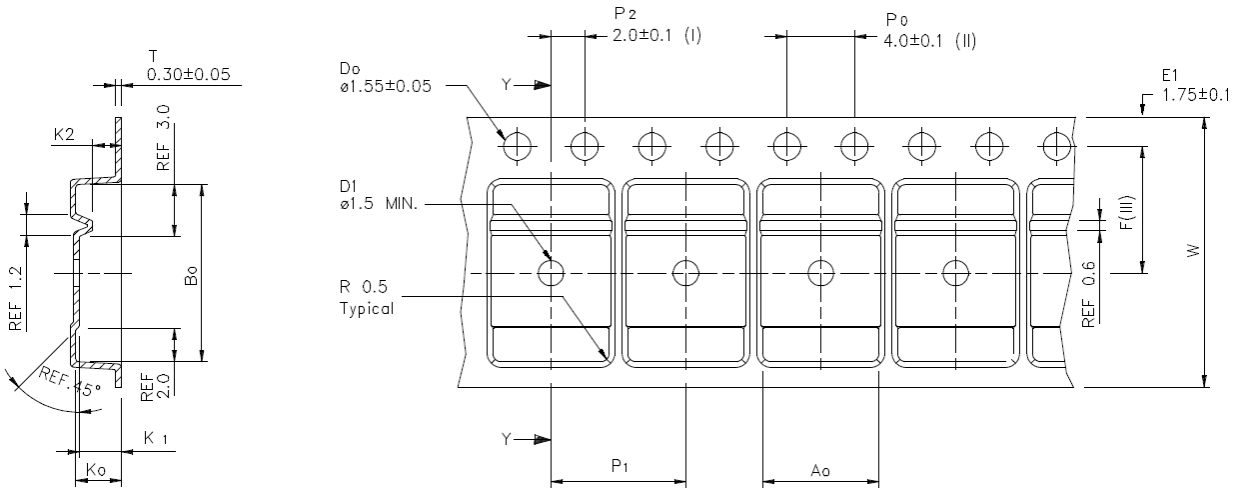
| SYMBOL | min | max | SYMBOL | min | max |
|---|---|---|---|---|---|
| A | 2.20 | 2.40 | B | 0.85 | 1.25 |
| b | 0.50 | 0.80 | C | 0.45 | 0.70 |
| b1 | 0.45 | 0.70 | D | 6.30 | 6.70 |
| D1 | 5.10 | 5.50 | E | 5.30 | 6.20 |
| L1 | 9.20 | 10.60 | F | 0.50 | 0.90 |
| L2 | 0.90 | 1.50 | e1 | 2.25 | 2.35 |
| L3 | 0.60 | 1.10 | e2 | 4.50 | 4.70 |
| | | | K | 0.00 | 0.18 |



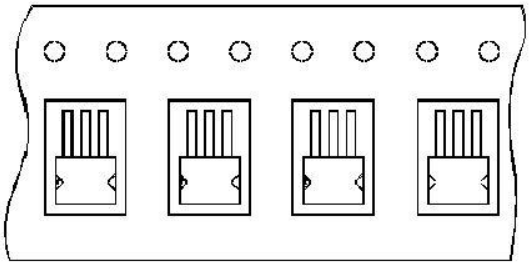
# TO-252T TAPE AND REEL DATA

**UNIT：mm**

| SYMBOL | min | nom | max | SYMBOL | min | nom | max |
|---|---|---|---|---|---|---|---|
| A0 | 6.80 | 6.90 | 7.00 | B0 | 10.40 | 10.50 | 10.60 |
| K0 | 2.60 | 2.70 | 2.90 | K1 | 2.40 | 2.50 | 2.60 |
| F | 7.40 | 7.50 | 7.60 | K2 | 1.60 | 1.70 | 1.80 |
| W | 15.90 | 16.00 | 16.10 | P1 | 7.90 | 8.00 | 8.10 |




USER DIRECTION OF FEED



UNIT ORIENTATION

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