# TMH3025DF

## N+N-Channel Enhancement Mosfet

### General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

### Applications

- Load switch
- PWM

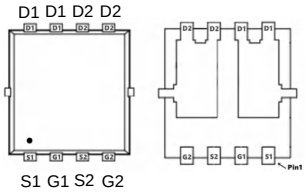
### Product Summary

$V_{DS}$ = 30V $I_D$ =25A

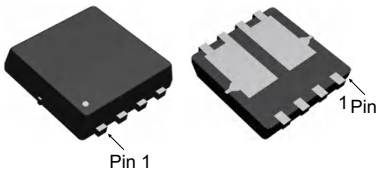
$R_{DS(ON)}$ = 14 mΩ (Typ.) @ $V_{GS}$=10V

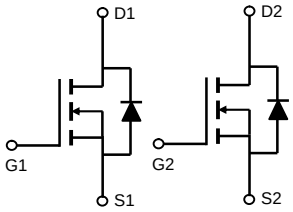
100% UIS Tested
100% $R_g$ Tested

Green Product




DF:DFN3x3-8L




Marking:304

### Absolute Maximum Ratings ($T_A$=25°C Unless Otherwise Noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 25 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 10 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 56 | A |
| EAS | Single Pulse Avalanche Energy[3] | 12.1 | mJ |
| $I_{AS}$ | Avalanche Current | 48 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation[4] | 6.0 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |

### Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient [1] | --- | 75 | °C/W |

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## Electrical Characteristics ($T_J$=25℃ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V | - | - | 1 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$=0V, $V_{GS}$=±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note2 | $V_{GS}$=10V, $I_D$=5A | - | 14 | 20 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=3A | - | 18 | 29 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1.0MHz | - | 490 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 79 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 61 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=15V, $I_D$=5.8A, $V_{GS}$=10V | - | 5.2 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 0.9 | - | nC |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 1.3 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}$=15V, $I_D$=3A, $V_{GS}$=10V, $R_{REN}$ =3Ω | - | 4.5 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 2.5 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 14.5 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 3.5 | - | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 12 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 48 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$=0V, $I_S$= 12A | - | - | 1.2 | V |

### Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 25 | A |
| $I_{SM}$ | Pulsed Source Current[2,5] | | --- | --- | 56 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |

Note :
1. The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=21A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

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## Typical Performance Characteristics

**Figure1:** Output Characteristics

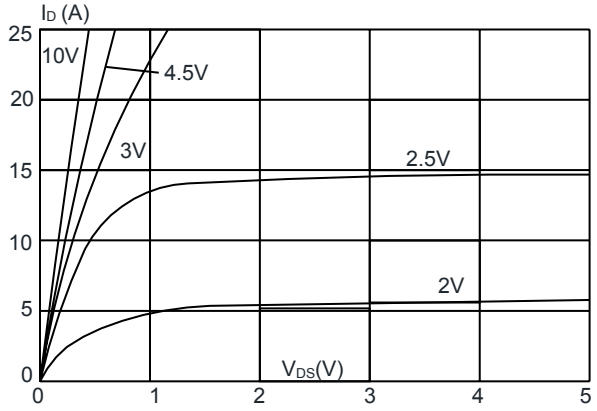



**Figure 2:** Typical Transfer Characteristics

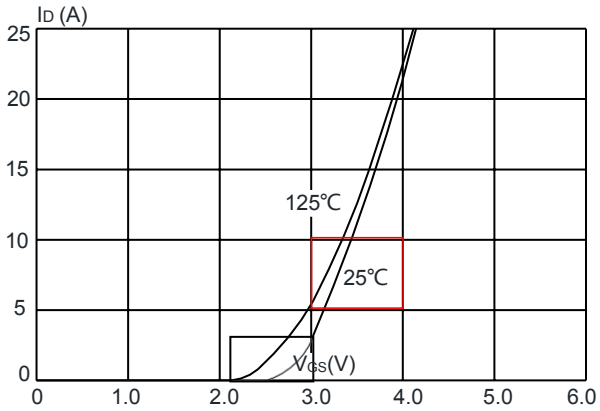



**Figure 3:**On-resistance vs. Drain Current

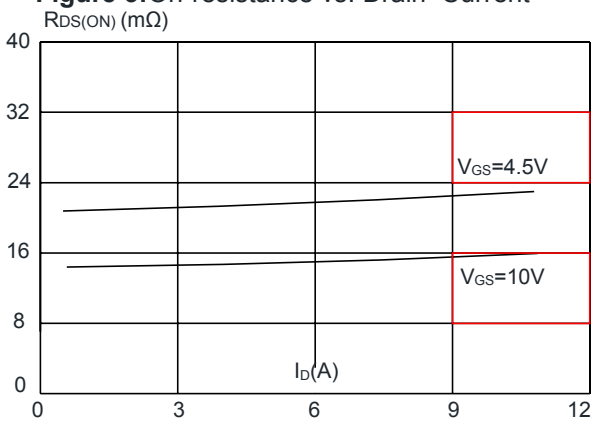



**Figure 4**: Body Diode Characteristics

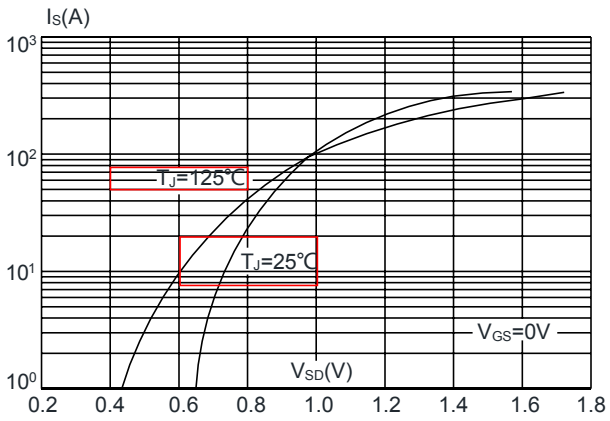



**Figure 5:** Gate Charge Characteristics

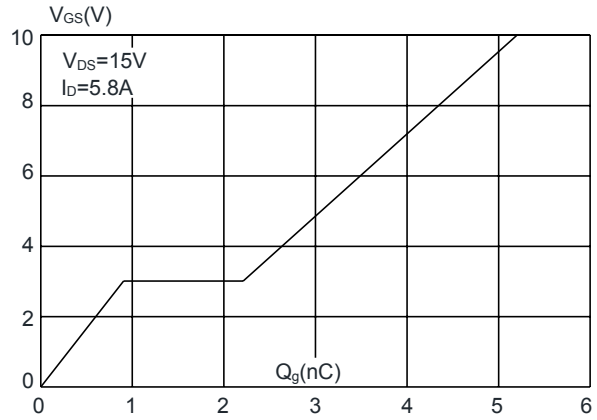
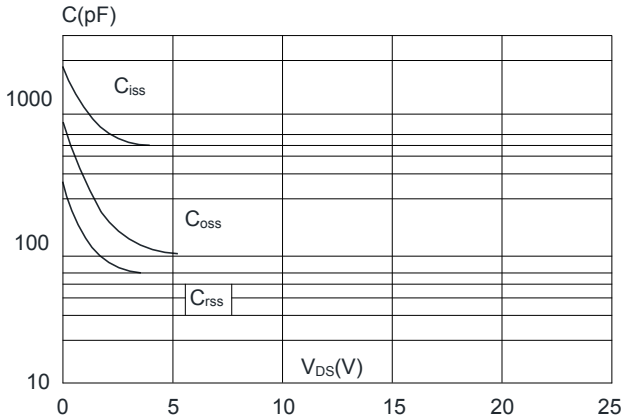



**Figure 6:** Capacitance Characteristics




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**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

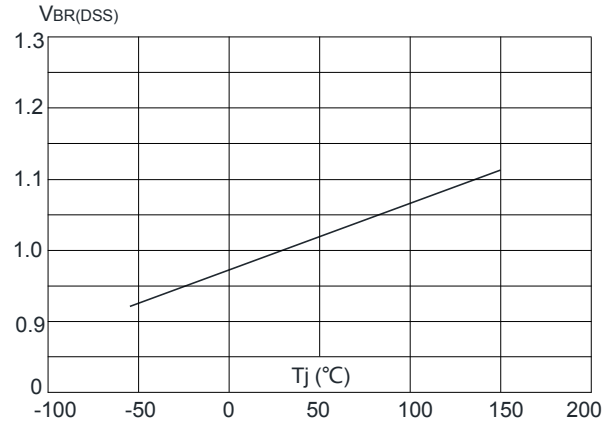



**Figure 8:** Normalized on Resistance vs. Junction Temperature

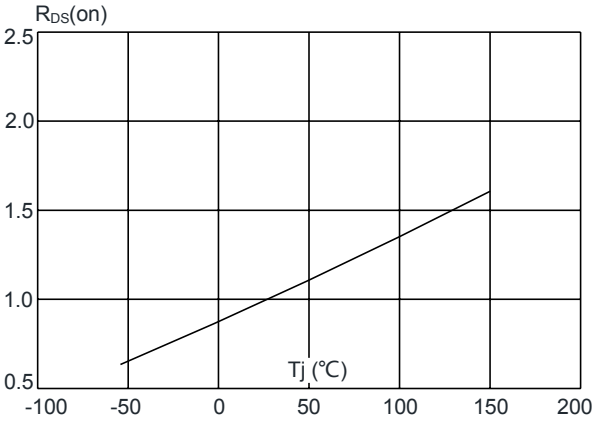



**Figure 9:** Maximum Safe Operating Area

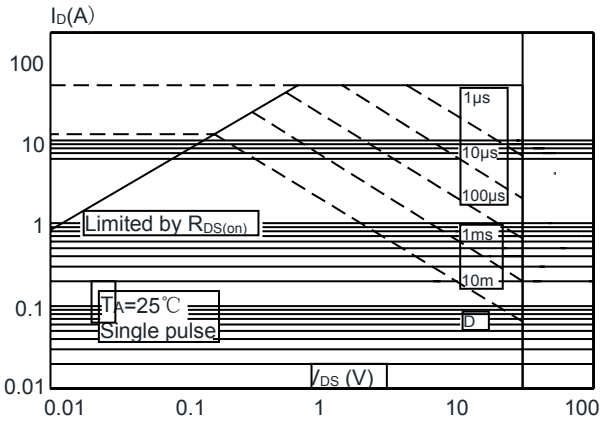



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

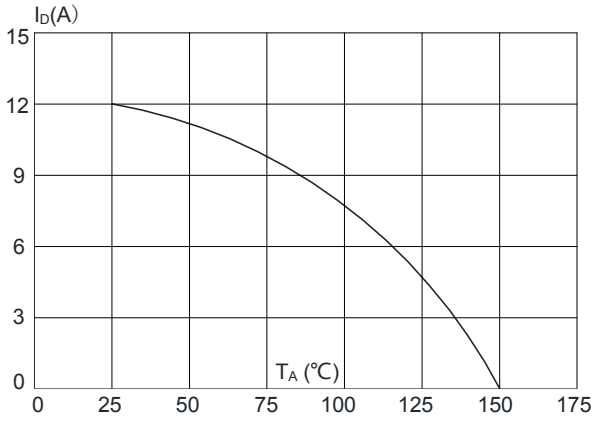
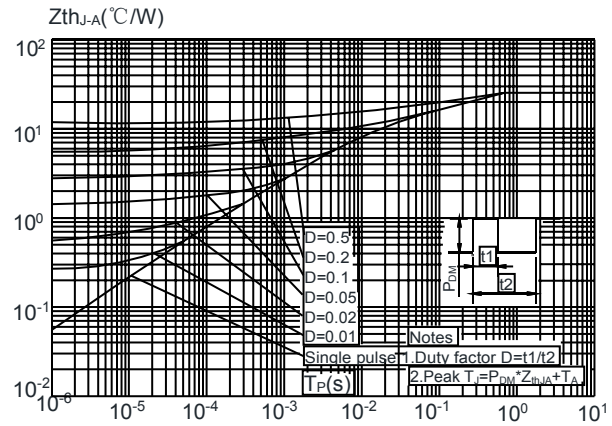
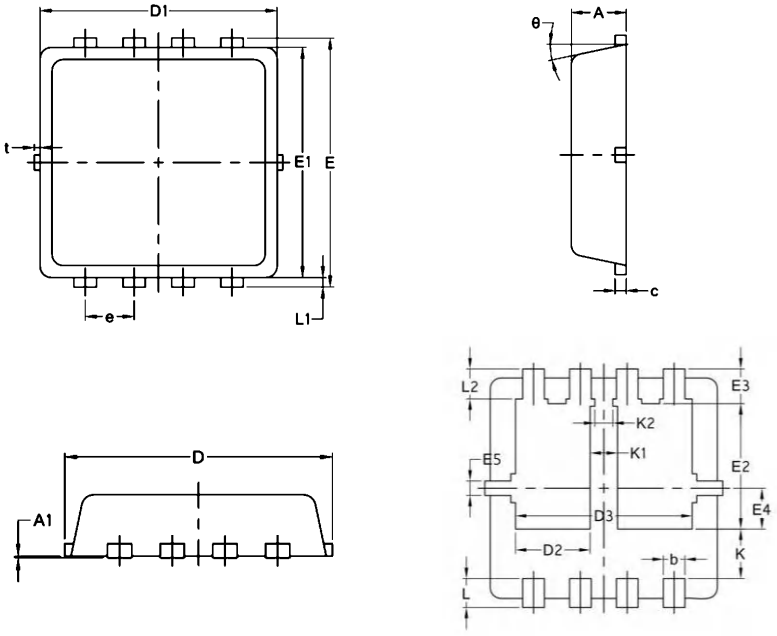



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient




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## Package Mechanical Data:DFN3x3-8L




| Symbol | Common | | |
|---|---|---|---|
| | Mm | | |
| | Min | Nom | Max |
| A | 0.70 | 0.75 | 0.85 |
| A1 | / | / | 0.05 |
| b | 0.25 | 0.30 | 0.39 |
| c | 0.14 | 0.152 | 0.20 |
| D | 3.20 | 3.30 | 3.45 |
| D1 | 3.05 | 3.15 | 3.25 |
| D2 | 0.84 | 1.04 | 1.24 |
| D3 | 2.30 | 2.45 | 2.60 |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 2.95 | 3.05 | 3.15 |
| E2 | 1.60 | 1.74 | 1.90 |
| E3 | 0.28 | 0.48 | 0.65 |
| E4 | 0.37 | 0.57 | 0.77 |
| E5 | 0.10 | 0.20 | 0.30 |
| e | 0.60 | 0.65 | 0.70 |
| K | 0.50 | 0.69 | 0.80 |
| K1 | 0.30 | 0.38 | 0.53 |
| K2 | 0.15 | 0.25 | 0.35 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | 0.06 | 0.125 | 0.20 |
| L2 | 0.27 | 0.42 | 0.57 |
| t | 0 | 0.075 | 0.13 |
| Φ | 10° | 12° | 14° |

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