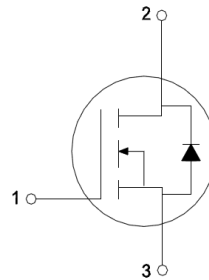


PRODUCT FEATURES

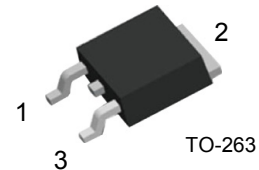
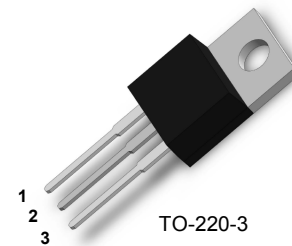
- Proprietary New Trench Technology
- $R_{DS(ON),typ}=9.3m\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery body Diode

APPLICATIONS

- High efficiency DC/DC Converters
- Synchronous Rectification
- UPS inverter



1.GATE
2.DRAIN
3.SOURCE



| Type | V _{DS} | I _D | R _{DS(ON)} .max T _J =25°C | T _{Jmax} | Marking | Package |
|---------|-----------------|----------------|---|-------------------|---------|---------|
| MM4115K | 150V | 115 | 11mΩ | 175°C | MM4115K | TO-220 |
| MM4115S | 150V | 115 | 11mΩ | 175°C | MM4115S | TO-263 |

ABSOLUTE MAXIMUM RATINGS

T_C = 25°C unless otherwise specified

| Symbol | Parameter/Test Conditions | Values | Unit |
|-------------------|---|--|------------------|
| V _{DSS} | Drain Source Voltage | T _J =25°C | 150 |
| V _{GSS} | Gate Source Voltage | | ±20 |
| I _D | Continuous Drain Current | T _C =25°C(Silicon limited) | 115 ^① |
| | | T _C =100°C(Silicon limited) | 81 ^① |
| I _{DM} | Pulsed Drain Current at V _{GS} =10V | Limited by T _{Jmax} | 511 |
| P _D | Maximum Power Dissipation | | 375 |
| E _{AS} | Single Pulse Avalanche Energy (V _{DD} =50V, L=1mH) | | 1093 |
| T _{Jmax} | Max. Junction Temperature | | 175 |
| T _{STG} | Storage Temperature Range | | -55~175 |
| Torque | Module to Sink (TO-220) | Recommended (M3) | 1.1 |
| Weight | | | 2.5 |

① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 80A.

THERMAL CHARACTERISTICS

T_C = 25°C unless otherwise specified

| Symbol | Parameter/Test Conditions | Values | Unit |
|-------------------|---|--------|------|
| R _{thJC} | Thermal resistance, junction to case | 0.4 | °C/W |
| R _{thJA} | Thermal resistance, junction to ambient | 62 | |

ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

| Symbol | Parameter/Test Conditions | | Min. | Typ. | Max. | Unit |
|---------------|--------------------------------|--|------------------------|------|------|------------|
| $V_{(BR)DSS}$ | Drain Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 150 | | | V |
| $R_{DS(ON)}$ | Drain Source ON Resistance | $V_{GS}=10V, I_D=62A$ | | 9.3 | 11 | m Ω |
| I_{DSS} | Drain Source Leakage Current | $V_{DS}=150V, V_{GS}=0V$ | | | 25 | μA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 3.0 | | 5.0 | V |
| I_{GSS} | Gate Leakage Current | $V_{DS}=0V, V_{GS}=\pm 20V$ | -100 | | 100 | nA |
| R_{gint} | Integrated Gate Resistor | | | 4.1 | | Ω |
| Q_g | Total Gate Charge | $V_{DD}=75V, I_D=62A, V_{GS}=10V$ | | 135 | | nC |
| Q_{gs} | Gate Source Charge | | | 48 | | nC |
| Q_{gd} | Gate Drain Charge | | | 43 | | nC |
| g_{fs} | Forward Transconductance | $V_{DS}=10V, I_D=62A$ | | TBD | | S |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$ | | 6.2 | | nF |
| C_{oss} | Output Capacitance | | | 700 | | pF |
| C_{rss} | Reverse Transfer Capacitance | | | 120 | | pF |
| $t_{d(on)}$ | Turn on Delay Time | $V_{DD}=98V, I_D=62A,$ $R_G=2.2\Omega,$ $V_{GS}=10V$ | $T_J=25^\circ\text{C}$ | | 48 | ns |
| t_r | Rise Time | | | | 139 | ns |
| $t_{d(off)}$ | Turn off Delay Time | | | | 150 | ns |
| t_f | Fall Time | | | | 60 | ns |

Source-Drain BODY-DIODE CHARACTERISTICS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

| Symbol | Parameter/Test Conditions | | Min. | Typ. | Max. | Unit |
|-----------|---------------------------------|-----------------------|------|------|------|------|
| I_{SD} | Continuous Source Drain Current | | | | 115 | A |
| I_{SDM} | Pulse Source Drain Current | Limited by T_{Jmax} | | | 511 | A |
| V_{SD} | Forward Voltage | $I_S=62A, V_{GS}=0V$ | | | 1.2 | V |
| t_{rr} | Reverse Recovery time | $I_F=62A, V_{GS}=0V$ | | 60 | | ns |
| Q_{RR} | Reverse Recovery Charge | $di_F/dt=-100A/\mu s$ | | 100 | | nC |

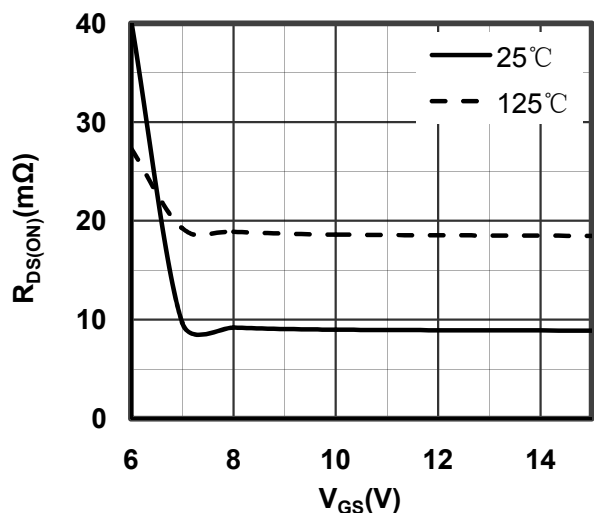


Figure 1. Typical $R_{DS(ON)}$ vs Gate Voltage

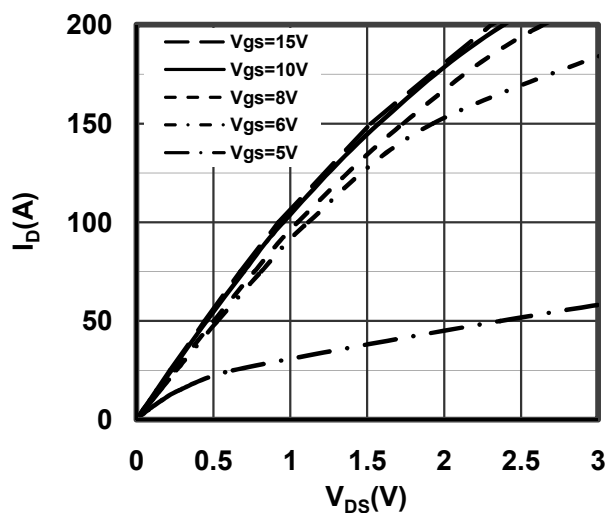


Figure 2. Typical Output Characteristics

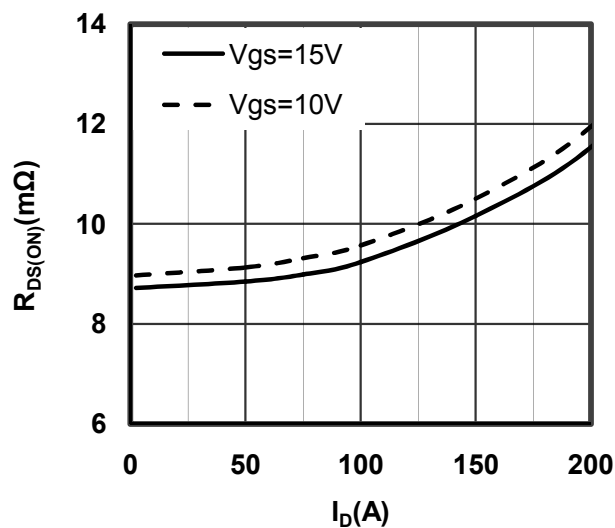


Figure 3. Drain-Source ON Resistance vs I_D

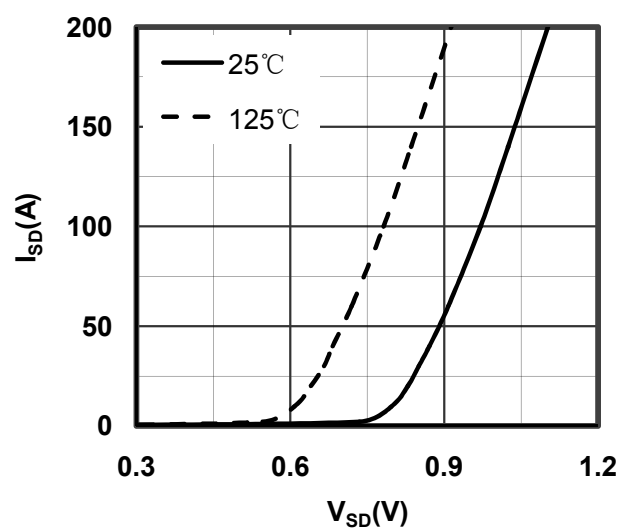


Figure 4. Source-Drain Voltage

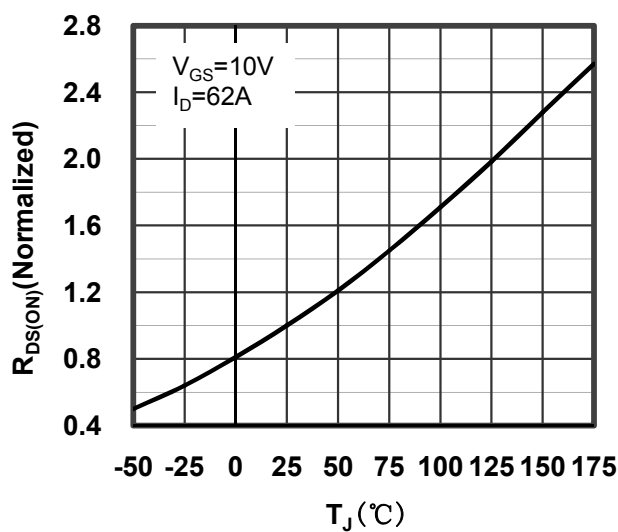


Figure 5. Drain-Source ON Resistance vs Junction Temperature

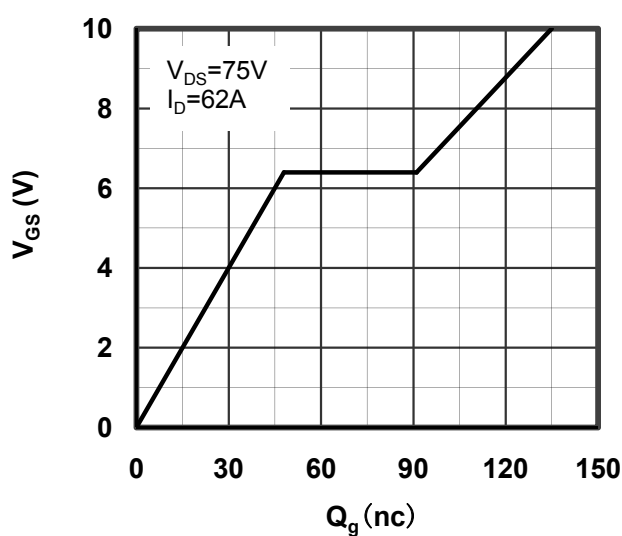


Figure 6. Gate Charge characteristics

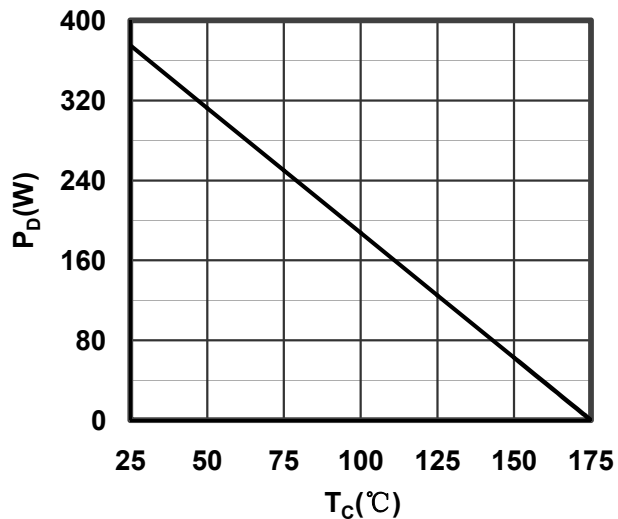


Figure 7. Maximum Power Dissipation vs Case Temperature

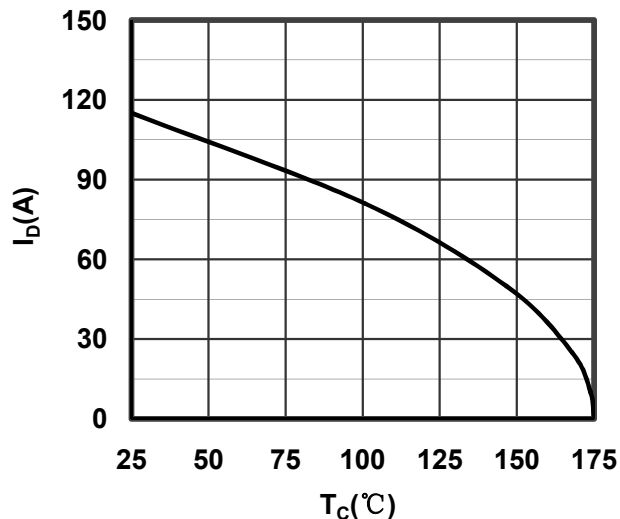


Figure 8. Maximum Continuous Drain Current vs Case Temperature

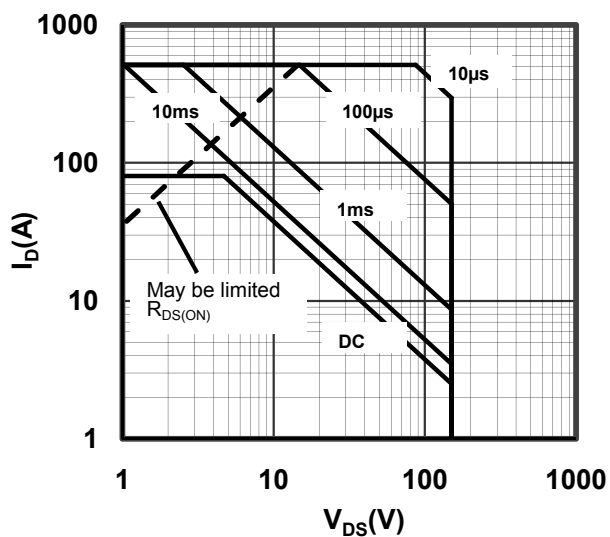


Figure 9. Maximum Forward Safe Operation Area

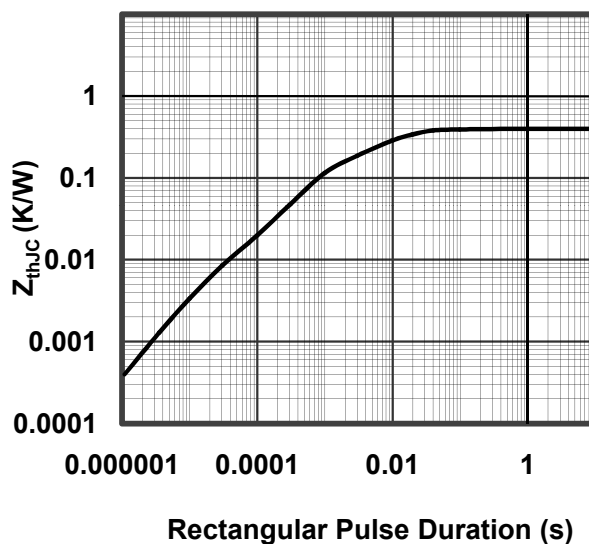
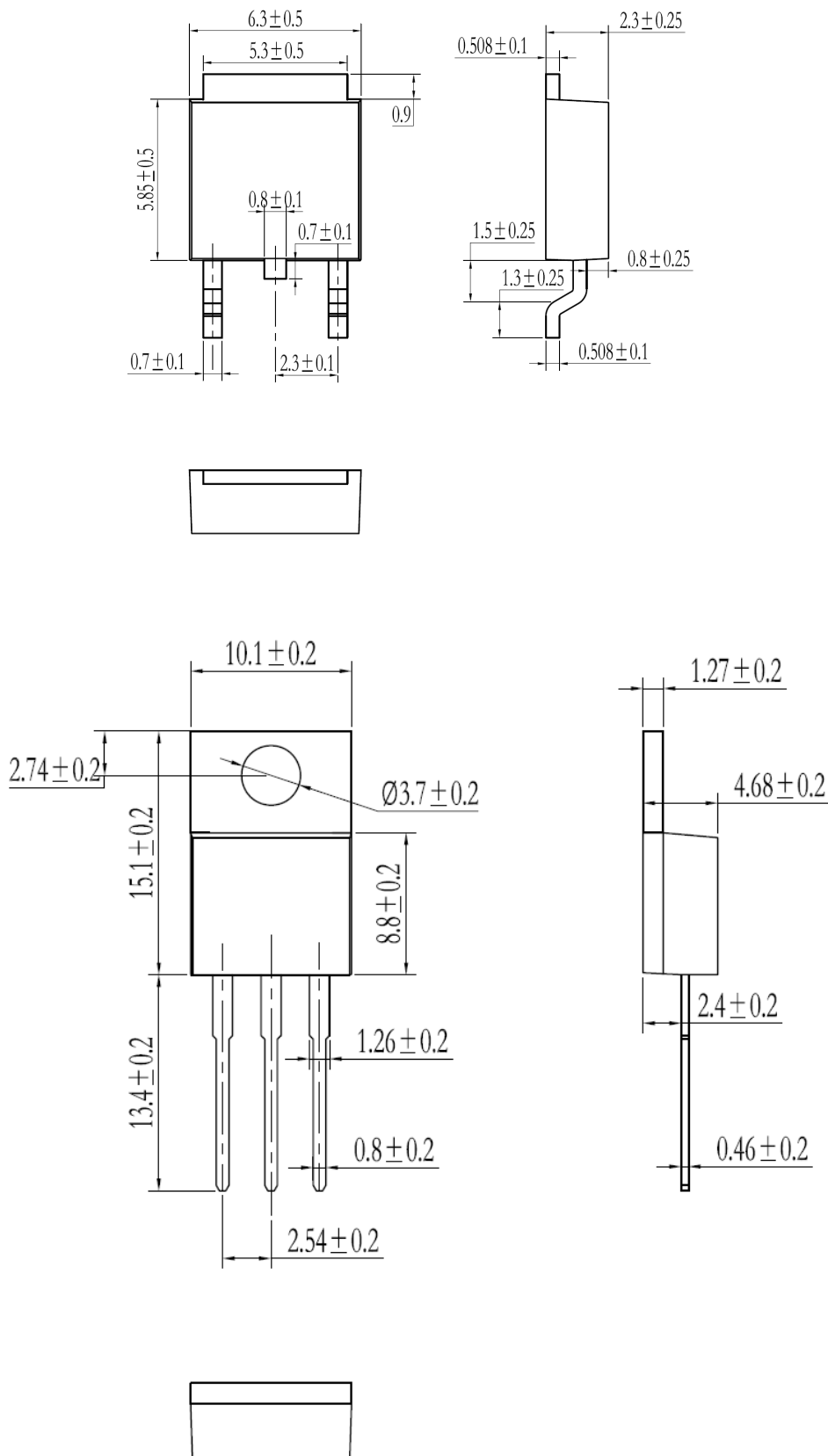


Figure 10. Transient Thermal Impedance



Dimensions in (mm)
Figure 11. Package Outline