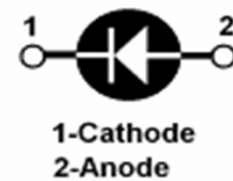
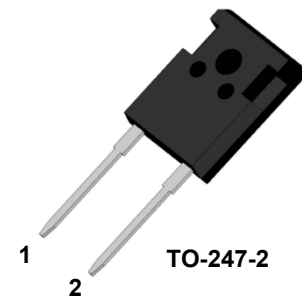


## PRODUCT FEATURES

- Ultrafast Recovery Time
- Low Recovery Loss
- Soft Reverse Recovery Characteristics
- Low Leakage Current
- Low Forward Voltage
- High Surge Current Capability

## APPLICATIONS

- Freewheeling, Snubber, Clamp
- Inversion Welder
- PFC
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Converter & Chopper
- UPS



## DESCRIPTION

FRED from MacMic utilizes advanced processing techniques to achieve ultrafast recovery times and higher forward current. Its soft recovery characteristics and high reliability suit for wide industrial applications.

## ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

| Symbol       | Parameter/Test Conditions            |   | Values      | Unit                      |
|--------------|--------------------------------------|---|-------------|---------------------------|
| $V_R$        | Maximum D.C. Reverse Voltage         |   | 1200        | V                         |
| $V_{RRM}$    | Maximum Repetitive Reverse Voltage   |   |             |                           |
| $I_{F(AV)}$  | Average Forward Current              | $T_C=110^\circ\text{C}$   | 60          | A                         |
| $I_{F(RMS)}$ | RMS Forward Current                  | $T_C=110^\circ\text{C}$   | 84          |                           |
| $I_{FSM}$    | Non Repetitive Surge Forward Current | $T_J=25^\circ\text{C}, t=10\text{ms}, 50\text{Hz}, \text{Sine}$ | 540         |                           |
| $P_D$        | Power Dissipation                    |   | 334         | W                         |
| $T_J$        | Junction Temperature                 |   | -55 to +175 | $^\circ\text{C}$          |
| $T_{STG}$    | Storage Temperature Range            |   | -55 to +150 | $^\circ\text{C}$          |
| Torque       | To Heat Sink                         | Recommended (M3)  | 1.1         | Nm                        |
| $R_{thJC}$   | Junction to Case Thermal Resistance  |   | 0.45        | $^\circ\text{C}/\text{W}$ |
| Weight       |                                      |   | 6           | g                         |

## ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

| Symbol   | Parameter/Test Conditions       |   | Min. | Typ. | Max. | Unit          |
|----------|---------------------------------|---|------|------|------|---------------|
| $I_{RM}$ | Maximum Reverse Leakage Current | $V_R = 1200\text{V}$  |      |      | 10   | $\mu\text{A}$ |
|          |                                 | $V_R = 1200\text{V}, T_J = 150^\circ\text{C}$                             |      |      | 1    | mA            |
| $V_F$    | Forward Voltage                 | $I_F=60\text{A}$  |      | 2.1  | 2.6  | V             |
|          |                                 | $I_F=60\text{A}, T_J=150^\circ\text{C}$                                   |      | 1.8  |      |               |
| trr      | Reverse Recovery Time           | $(I_F = 1\text{A}, dI_F/dt = -200\text{A}/\mu\text{s}, V_R = 30\text{V})$ |      | 32   | 35   | ns            |
| trr      | Reverse Recovery Time           | $(I_F = 0.5\text{A}, I_R=1\text{A}, I_{RR} = 0.25\text{A})$               |      | 70   | 80   | ns            |

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**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

| Symbol    | Parameter/Test Conditions        | Min. | Typ. | Max. | Unit |
|-----------|----------------------------------|------|------|------|------|
| $t_{rr}$  | Reverse Recovery Time            |      | 375  |      | ns   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |      | 6    |      | A    |
| $Q_{RR}$  | Reverse Recovery Charge          |      | 1320 |      | nC   |
| $t_{rr}$  | Reverse Recovery Time            |      | 525  |      | ns   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |      | 15   |      | A    |
| $Q_{RR}$  | Reverse Recovery Charge          |      | 4500 |      | nC   |

*Note: Test conditions for the second set of parameters are  $I_F = 60\text{A}, V_R = 600\text{V}, di_F/dt = -200\text{A}/\mu\text{s}, T_J = 150^\circ\text{C}$ .*

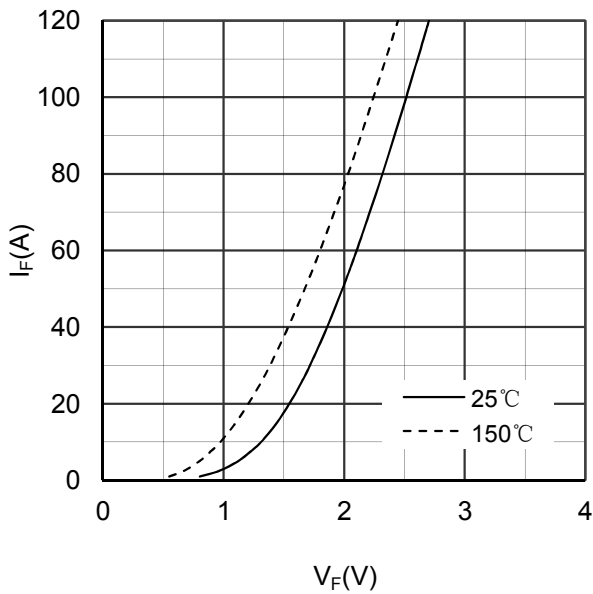


Figure 1. Forward Voltage Drop vs Forward Current

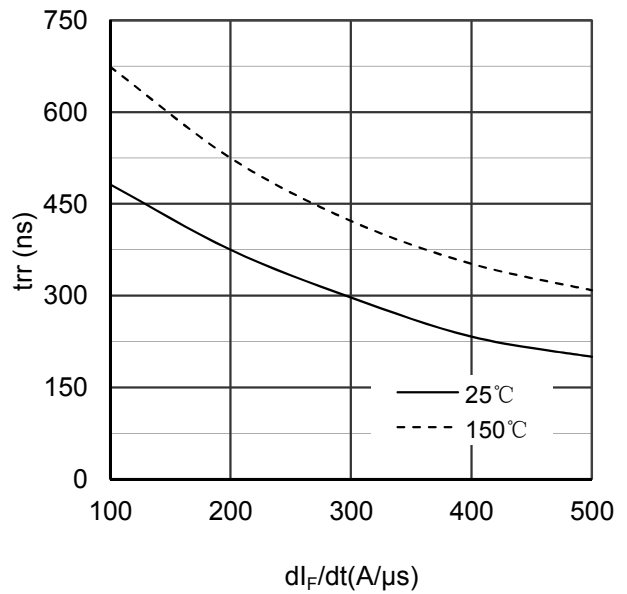


Figure 2. Reverse Recovery Time vs  $di_F/dt$

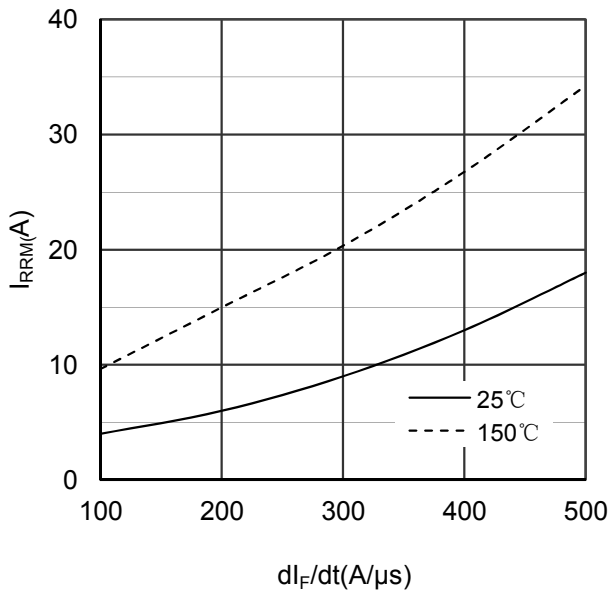


Figure 3. Reverse Recovery Current vs  $di_F/dt$

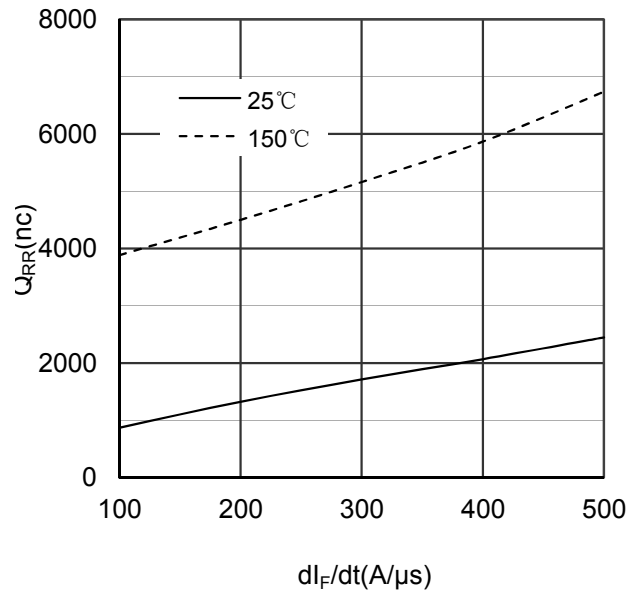


Figure 4. Reverse Recovery Charge vs  $di_F/dt$

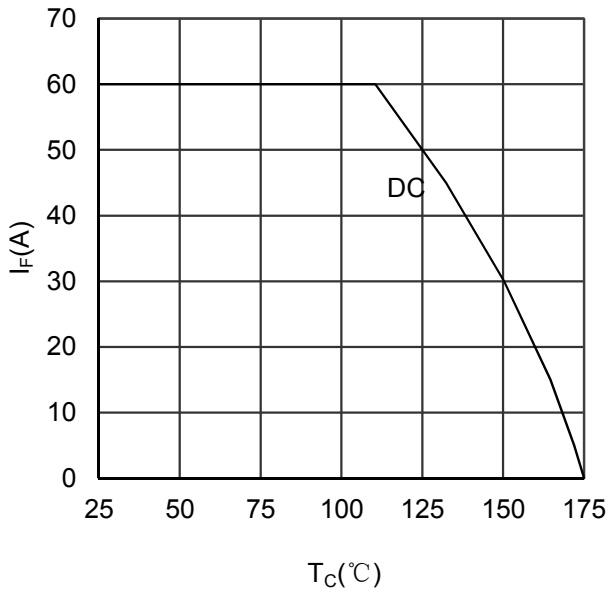


Figure 5. Forward current vs Case temperature

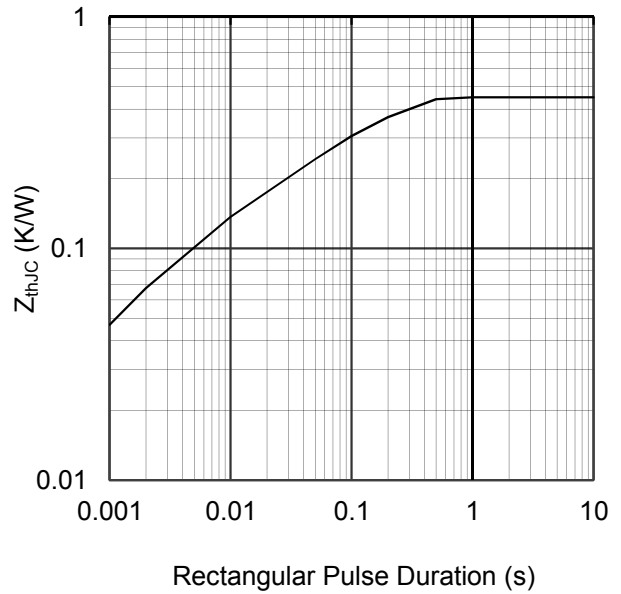


Figure 6. Transient Thermal Impedance

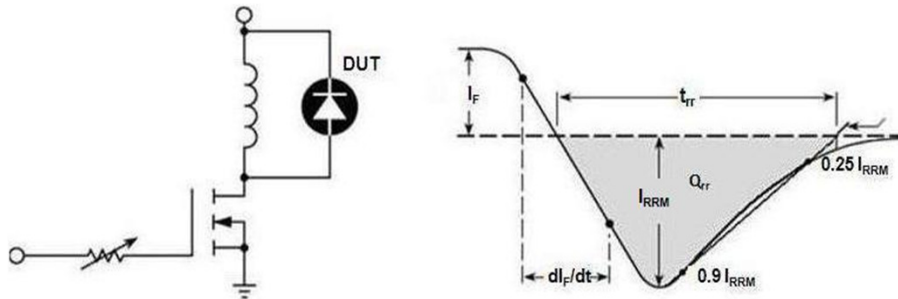
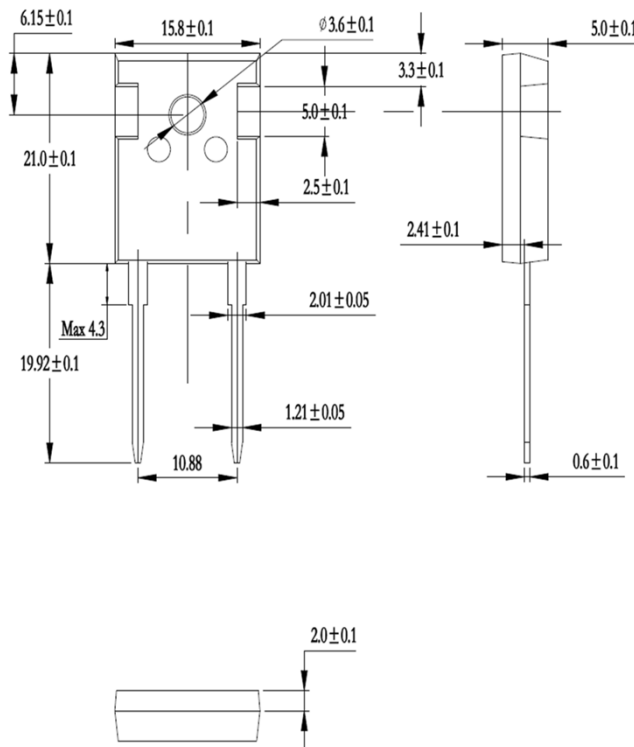


Figure 7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in (mm)  
Figure 8. Package Outline