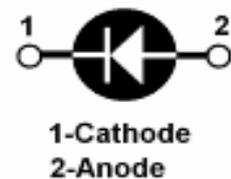
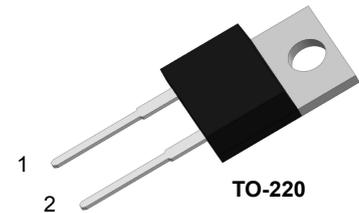


## PRODUCT FEATURES

- 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              | $T_C = 90^\circ\text{C}$  | 15          | A                         |
| $I_{F(RMS)}$  | RMS Forward Current                  | $T_C = 90^\circ\text{C}$  | 21          |                           |
| $I_{FSM}$     | Non Repetitive Surge Forward Current | $T_J = 25^\circ\text{C}, t = 10\text{ms}, 50\text{Hz}, \text{Sine}$ | 150         |                           |
| $P_D$         | Power Dissipation                    |   | 83          | W                         |
| $T_J$         | Junction Temperature                 |   | -55 to +150 | $^\circ\text{C}$          |
| $T_{STG}$     | Storage Temperature Range            |   | -55 to +125 | $^\circ\text{C}$          |
| <b>Torque</b> | To Heat Sink                         | Recommended (M3)  | 1.1         | Nm                        |
| $R_{thJC}$    | Junction to Case Thermal Resistance  |   | 1.5         | $^\circ\text{C}/\text{W}$ |
| <b>Weight</b> |                                      |   | 2.5         | 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   | $\mu\text{A}$ |
|           |   | $V_R = 1200\text{V}, T_J = 125^\circ\text{C}$                 |      |      | 1    | mA            |
| $V_F$     | Forward Voltage   | $I_F = 15\text{A}$  |      | 2.8  | 3.3  | V             |
|           |   | $I_F = 15\text{A}, T_J = 125^\circ\text{C}$                   |      | 2.3  |      |               |
| $t_{rr}$  | Reverse Recovery Time ( $I_F = 1\text{A}, dI_F/dt = -200\text{A}/\mu\text{s}, V_R = 30\text{V}$ ) |   |      | 25   | 30   | ns            |
| $t_{rr}$  | Reverse Recovery Time ( $I_F = 0.5\text{A}, I_R = 1\text{A}, I_{RR} = 0.25\text{A}$ )             |   |      | 35   | 40   | ns            |
| $t_{rr}$  | Reverse Recovery Time   | $I_F = 15\text{A}, V_R = 600\text{V},$                        |      | 72   |      | ns            |
| $I_{RRM}$ | Maximum Reverse Recovery Current  | $dI_F/dt = -200\text{A}/\mu\text{s}$                          |      | 5    |      | A             |
| $t_{rr}$  | Reverse Recovery Time   | $I_F = 15\text{A}, V_R = 600\text{V},$                        |      | 240  |      | ns            |
| $I_{RRM}$ | Maximum Reverse Recovery Current  | $dI_F/dt = -200\text{A}/\mu\text{s}, T_J = 125^\circ\text{C}$ |      | 7.5  |      | A             |

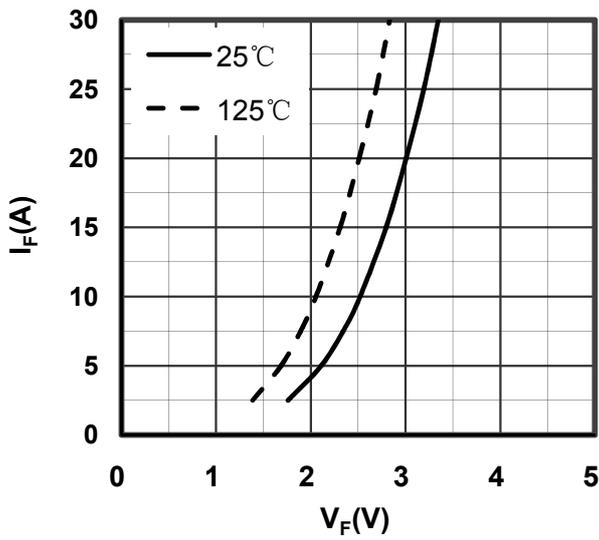


Figure 1. Forward Voltage Drop vs Forward Current

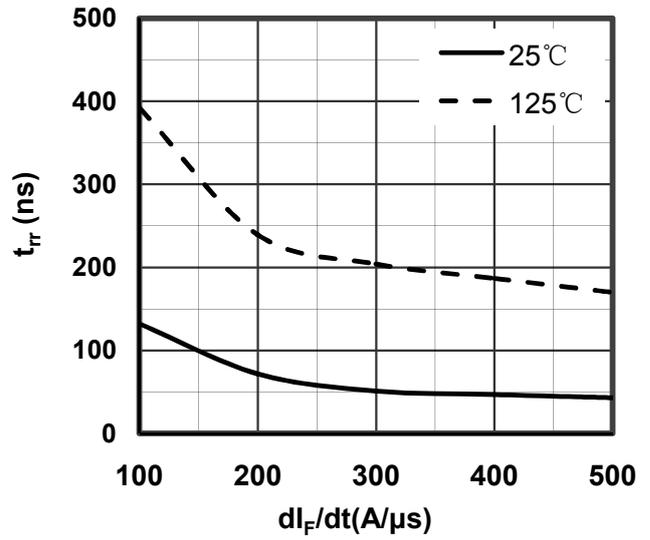


Figure 2. Reverse Recovery Time vs  $di_F/dt$

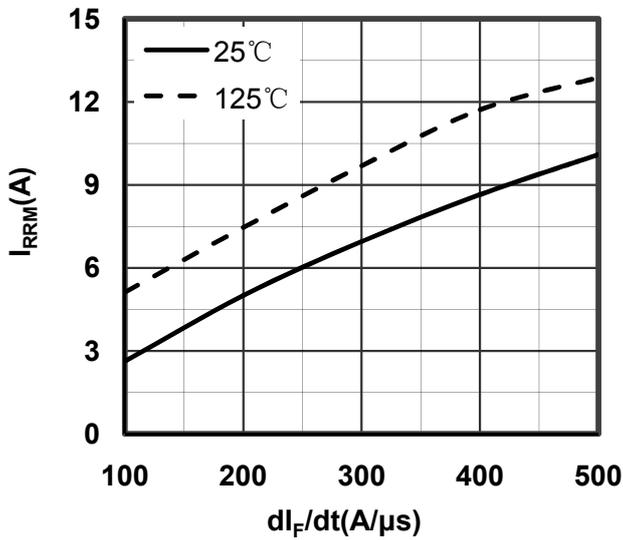


Figure 3. Reverse Recovery Current vs  $di_F/dt$

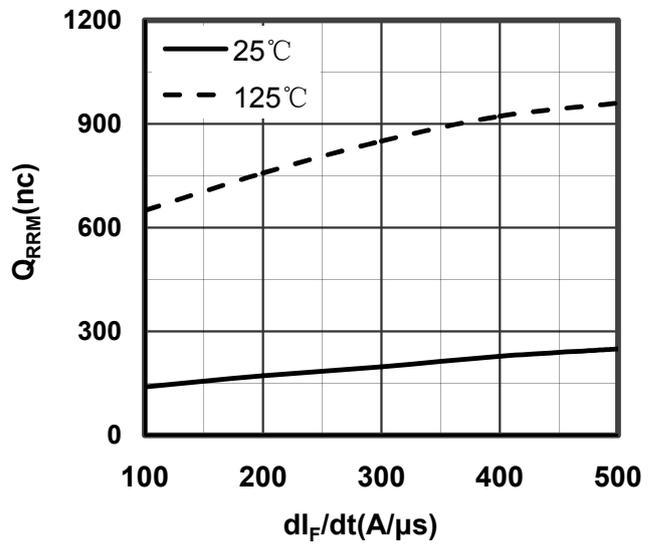


Figure 4. Reverse Recovery Charge vs  $di_F/dt$

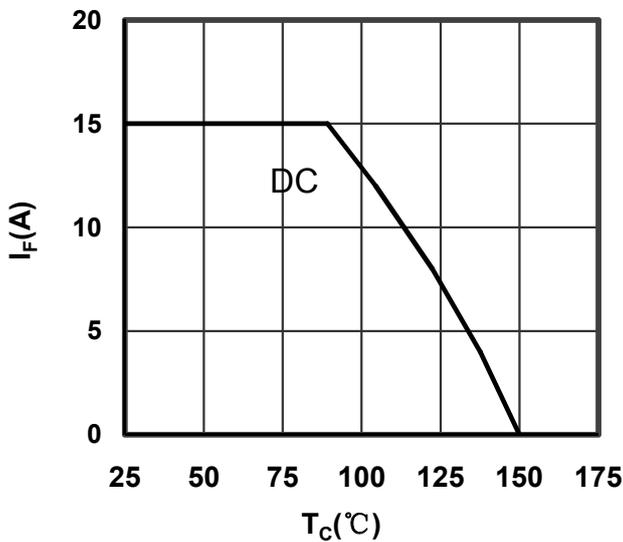


Figure 5. Forward current vs Case temperature

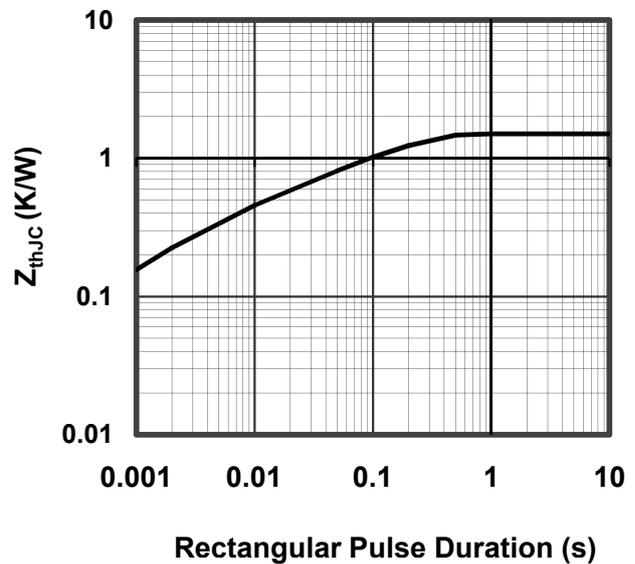


Figure 6. Transient Thermal Impedance

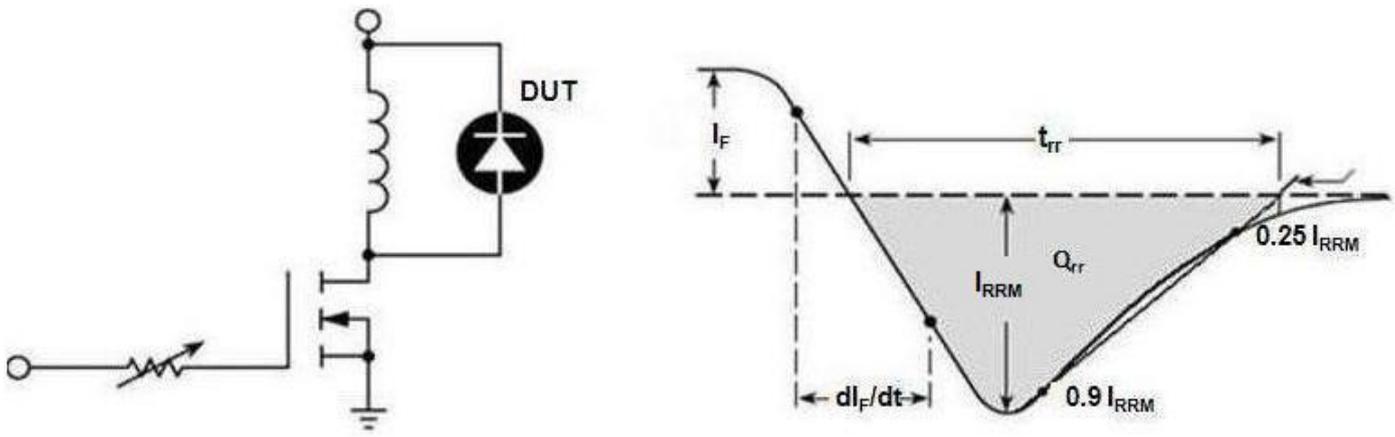
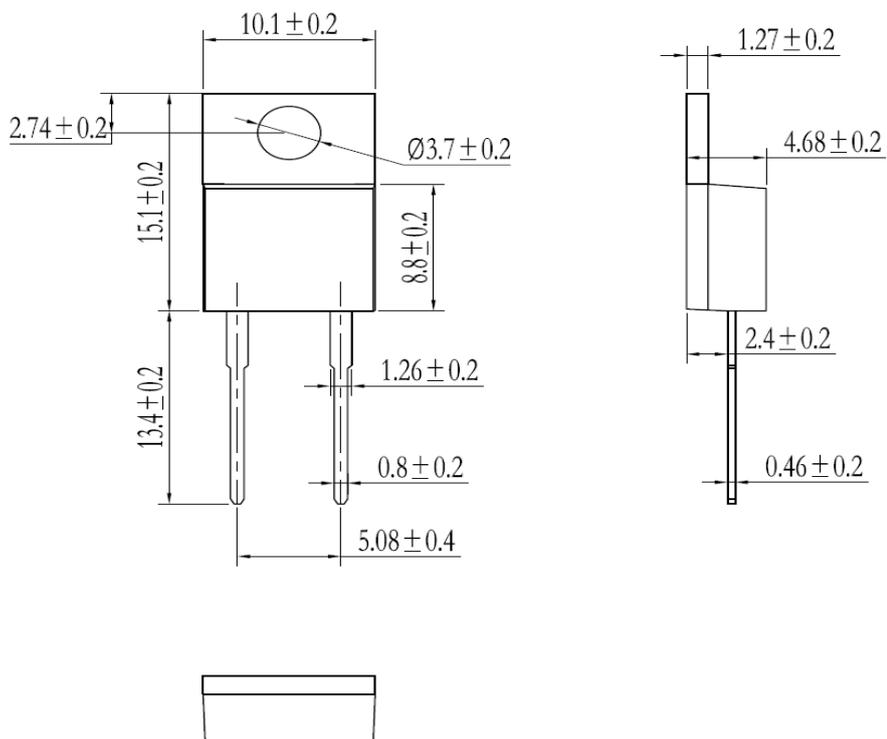


Figure 7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in (mm)  
Figure 8. Package Outline