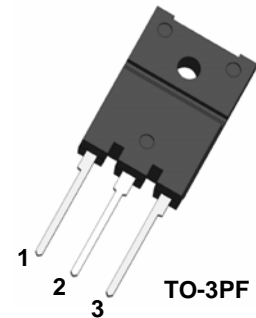


PRODUCT FEATURES

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

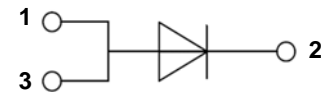
APPLICATIONS

- 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 | | 600 | V |
| V_{RRM} | Maximum Repetitive Reverse Voltage | | | |
| $I_{F(AV)}$ | Average Forward Current | $T_C=70^\circ\text{C}$ | 30 | A |
| $I_{F(RMS)}$ | RMS Forward Current | $T_C=70^\circ\text{C}$ | 42 | |
| I_{FSM} | Non Repetitive Surge Forward Current | $T_J=25^\circ\text{C}, t=10\text{ms}, 50\text{Hz}, \text{Sine}$ | 240 | |
| P_D | Power Dissipation | | 70 | 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 | | 2 | $^\circ\text{C}/\text{W}$ |
| 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 | $V_R = 600\text{V}$ | | | 10 | μA |
| | | $V_R = 600\text{V}, T_J = 150^\circ\text{C}$ | | | 200 | |
| V_F | Forward Voltage | $I_F=30\text{A}$ | | 1.65 | 2.1 | V |
| | | $I_F=30\text{A}, T_J=150^\circ\text{C}$ | | 1.35 | | |
| t_{rr} | Reverse Recovery Time ($I_F = 1\text{A}, di_F/dt = -100\text{A}/\mu\text{s}, V_R = 30\text{V}$) | | | 25 | 35 | ns |
| t_{rr} | Reverse Recovery Time ($I_F = 0.5\text{A}, I_R=1\text{A}, I_{RR} = 0.25\text{A}$) | | | 30 | 40 | 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 | | 44 | | ns |
| I_{RRM} | Maximum Reverse Recovery Current | | 4.2 | | A |
| Q_{RR} | Reverse Recovery Charge | | 135 | | nC |
| t_{rr} | Reverse Recovery Time | | 155 | | ns |
| I_{RRM} | Maximum Reverse Recovery Current | | 8.5 | | A |
| Q_{RR} | Reverse Recovery Charge | | 645 | | nC |
| t_{rr} | Reverse Recovery Time | | 101 | | ns |
| I_{RRM} | Maximum Reverse Recovery Current | | 21 | | A |
| Q_{RR} | Reverse Recovery Charge | | 1200 | | nC |
| S | Softness factor | | 2 | | |

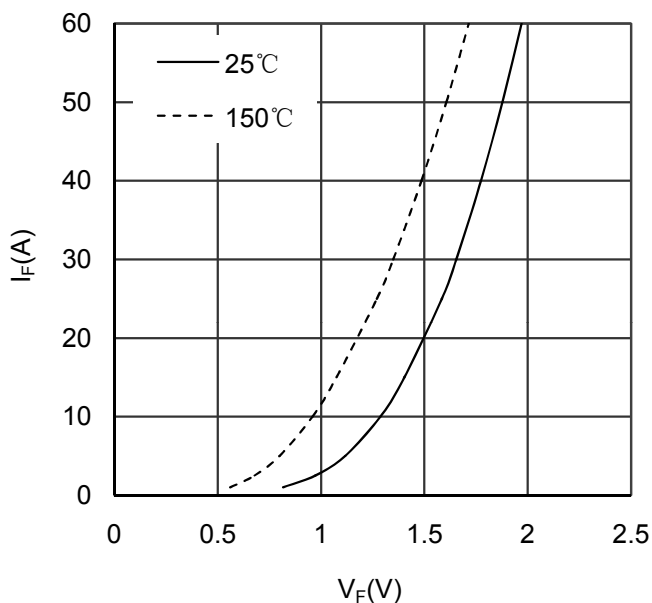


Figure 1. Forward Voltage Drop vs Forward Current

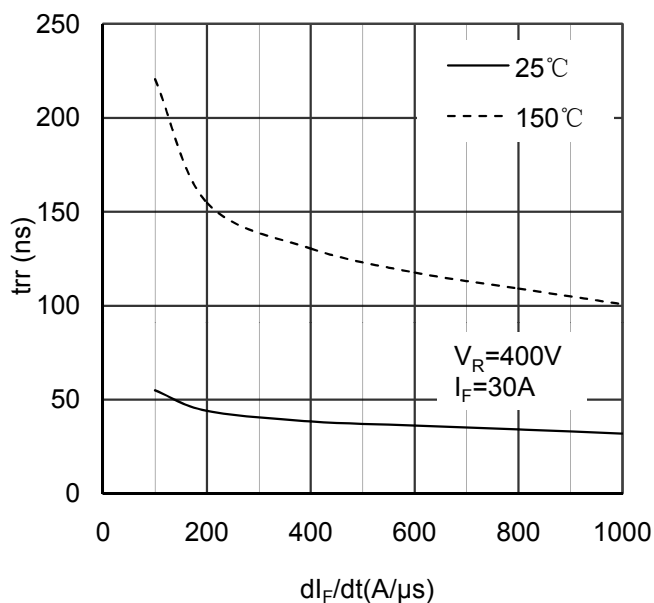


Figure 2. Reverse Recovery Time vs dI_F/dt

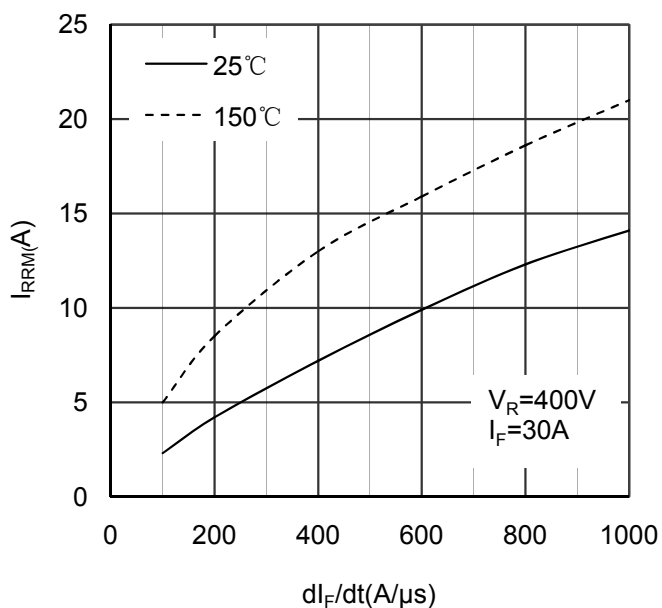


Figure 3. Reverse Recovery Current vs dI_F/dt

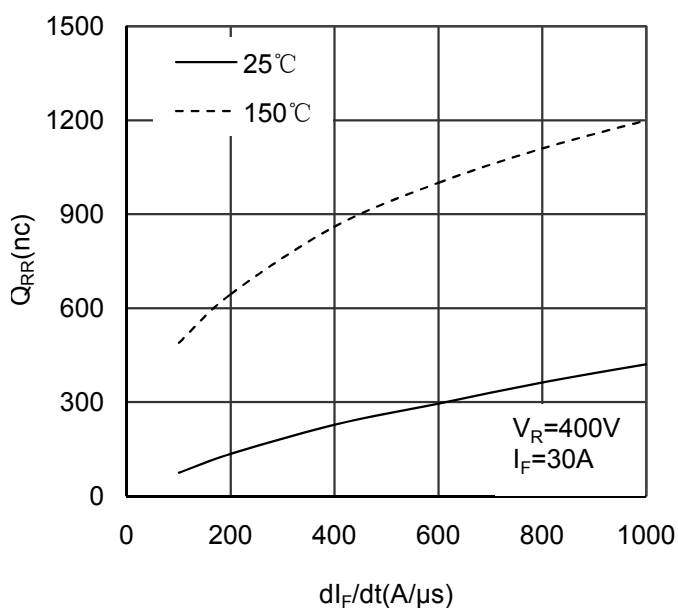


Figure 4. Reverse Recovery Charge vs dI_F/dt

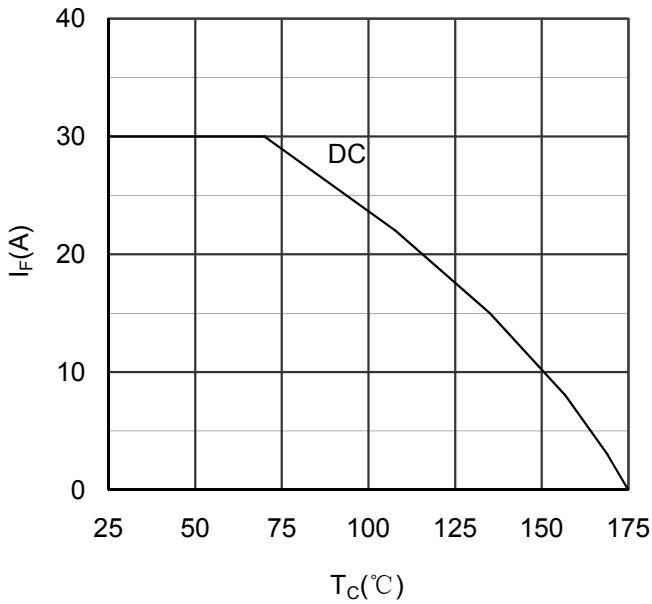


Figure 5. Forward current vs Case temperature

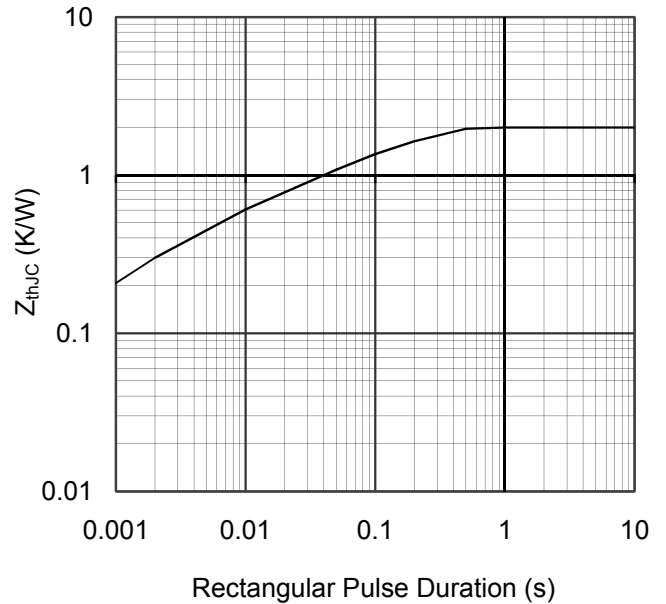


Figure 6. Transient Thermal Impedance

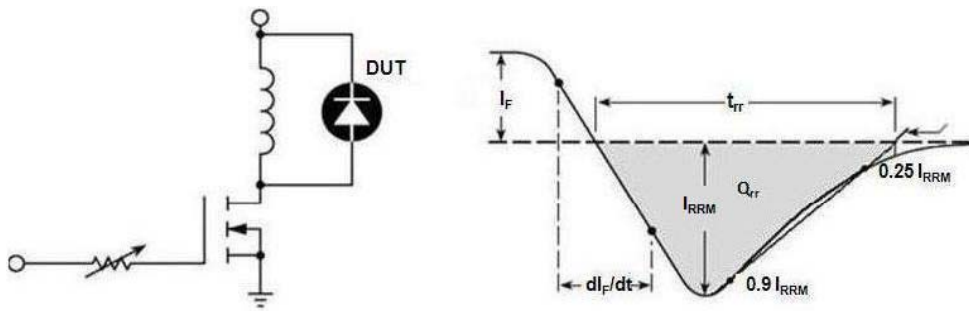
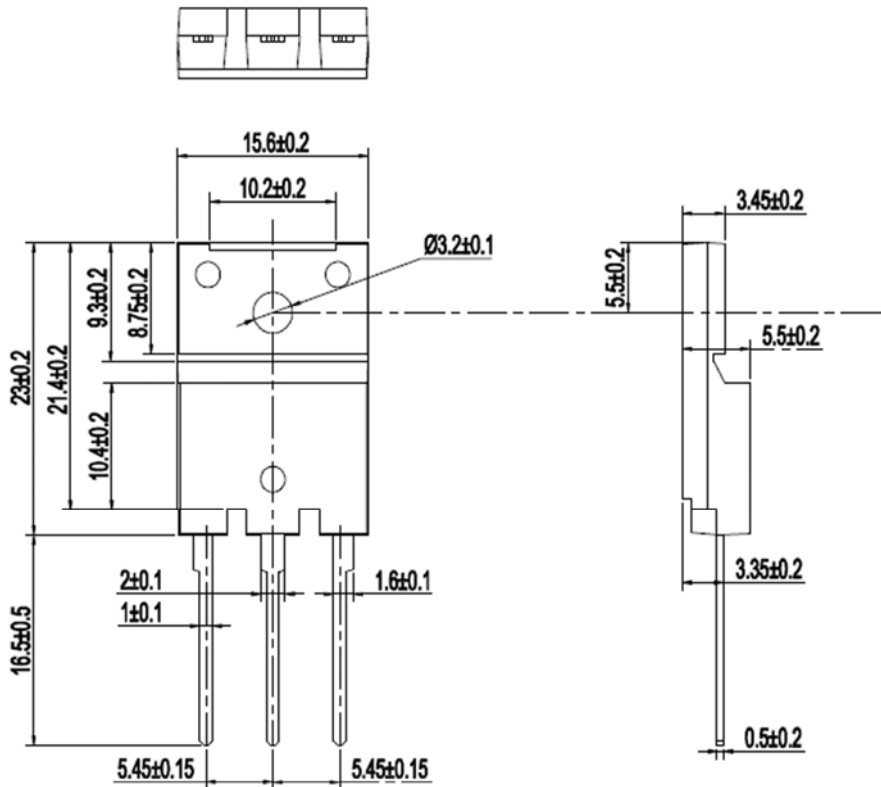


Figure 7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in (mm)

Figure 8. Package Outline