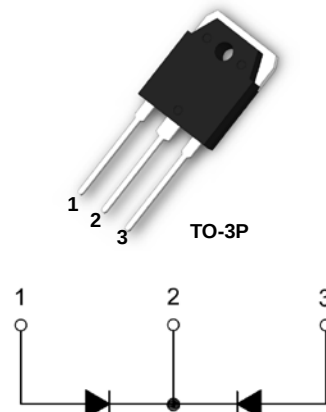


## PRODUCT FEATURES

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

## 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         |                                                         | 400         | V                           |
| $V_{RRM}$       | Maximum Repetitive Reverse Voltage   |                                                         | 400         | V                           |
| $I_{F(AV)}$     | Average Forward Current              | $T_C=110^{\circ}\text{C}$ , Per Diode                   | 10          | A                           |
|                 |                                      | $T_C=110^{\circ}\text{C}$ , Per Package                 | 20          | A                           |
| $I_{F(RMS)}$    | RMS Forward Current                  | $T_C=110^{\circ}\text{C}$ , Per Diode                   | 14          | A                           |
| $I_{FSM}$       | Non-Repetitive Surge Forward Current | $T_J=45^{\circ}\text{C}$ , $t=10\text{ms}$ , 50Hz, Sine | 100         | A                           |
| $P_D$           | Power Dissipation                    |                                                         | 83          | W                           |
| $T_J$           | Junction Temperature                 |                                                         | -40 to +150 | $^{\circ}\text{C}$          |
| $T_{STG}$       | Storage Temperature Range            |                                                         | -40 to +150 | $^{\circ}\text{C}$          |
| Torque          | Module-to-Sink                       | Recommended (M3)                                        | 1.1         | N·m                         |
| $R_{\theta JC}$ | Thermal Resistance                   | Junction-to-Case                                        | 1.5         | $^{\circ}\text{C}/\text{W}$ |
| Weight          |                                      |                                                         | 6           | g                           |

## ELECTRICAL CHARACTERISTICS

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

| Symbol    | Parameter                     | Test Conditions                                                         | Min. | Typ. | Max. | Unit          |
|-----------|-------------------------------|-------------------------------------------------------------------------|------|------|------|---------------|
| $I_{RM}$  | Reverse Leakage Current       | $V_R=400\text{V}$                                                       | --   | --   | 15   | $\mu\text{A}$ |
|           |                               | $V_R=400\text{V}$ , $T_J=125^{\circ}\text{C}$                           | --   | --   | 250  | $\mu\text{A}$ |
| $V_F$     | Forward Voltage               | $I_F=10\text{A}$                                                        | --   | 1.00 | --   | V             |
|           |                               | $I_F=10\text{A}$ , $T_J=125^{\circ}\text{C}$                            | --   | 0.87 | --   | V             |
| $t_{rr}$  | Reverse Recovery Time         | $I_F=1\text{A}$ , $V_R=30\text{V}$ , $di_F/dt=-200\text{A}/\mu\text{s}$ | --   | 20   | --   | ns            |
| $t_{rr}$  | Reverse Recovery Time         | $V_R=200\text{V}$ , $I_F=10\text{A}$                                    | --   | 25   | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt=-200\text{A}/\mu\text{s}$ , $T_J=25^{\circ}\text{C}$           | --   | 2.2  | --   | A             |
| $t_{rr}$  | Reverse Recovery Time         | $V_R=200\text{V}$ , $I_F=10\text{A}$                                    | --   | 46   | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt=-200\text{A}/\mu\text{s}$ , $T_J=125^{\circ}\text{C}$          | --   | 5.5  | --   | A             |

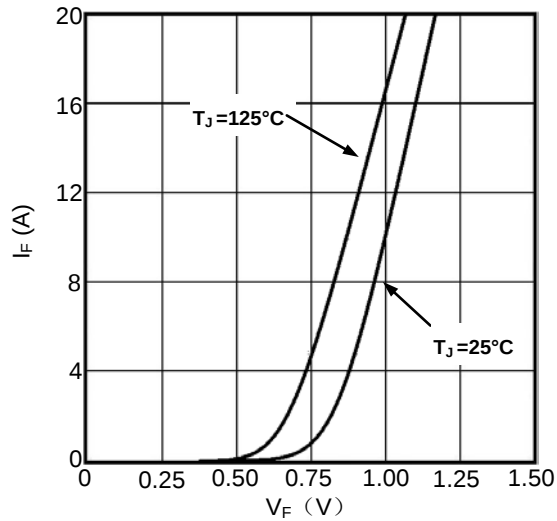


Fig1. Forward Voltage Drop vs Forward Current

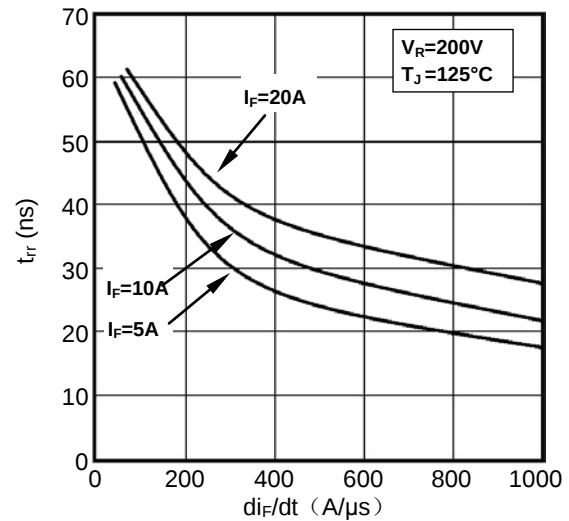
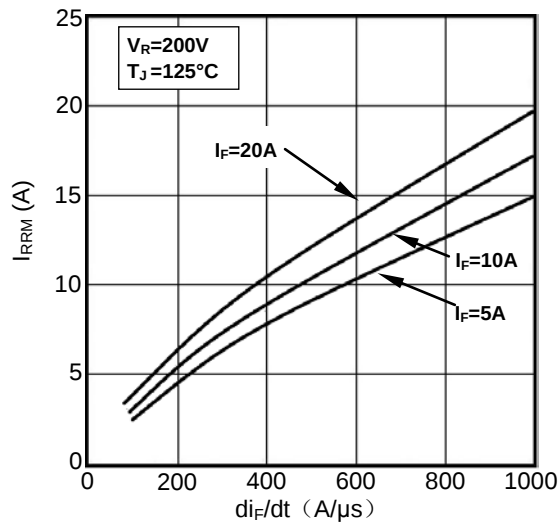
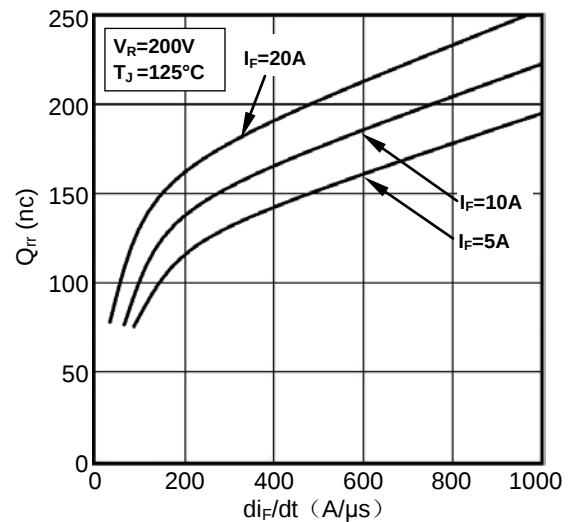
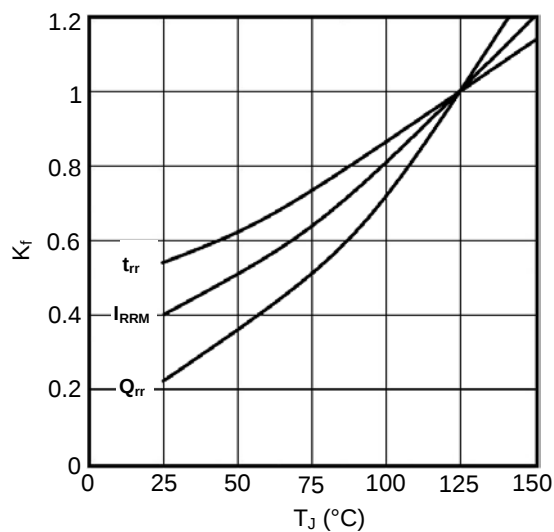
Fig2. Reverse Recovery Time vs  $di_F/dt$ Fig3. Reverse Recovery Current vs  $di_F/dt$ Fig4. Reverse Recovery Charge vs  $di_F/dt$ 

Fig5. Dynamic Parameters vs Junction Temperature

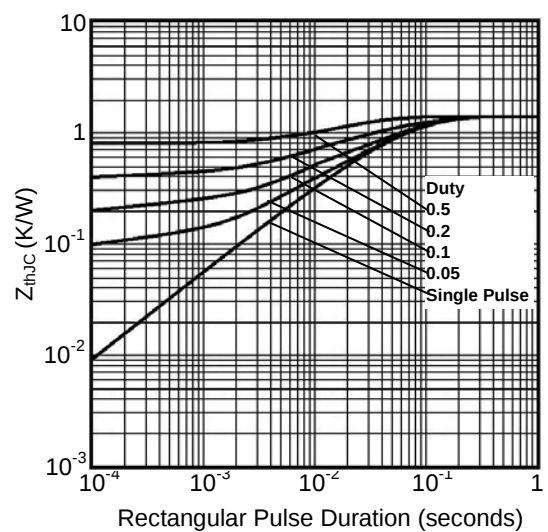


Fig6. Transient Thermal Impedance

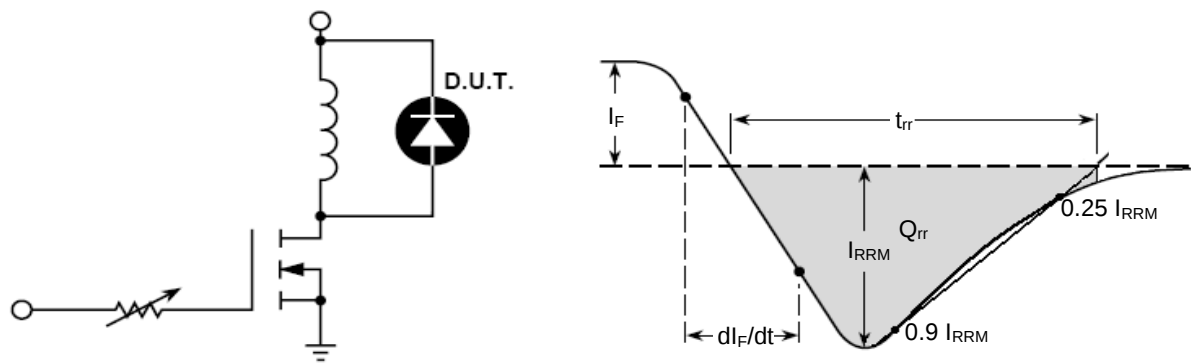
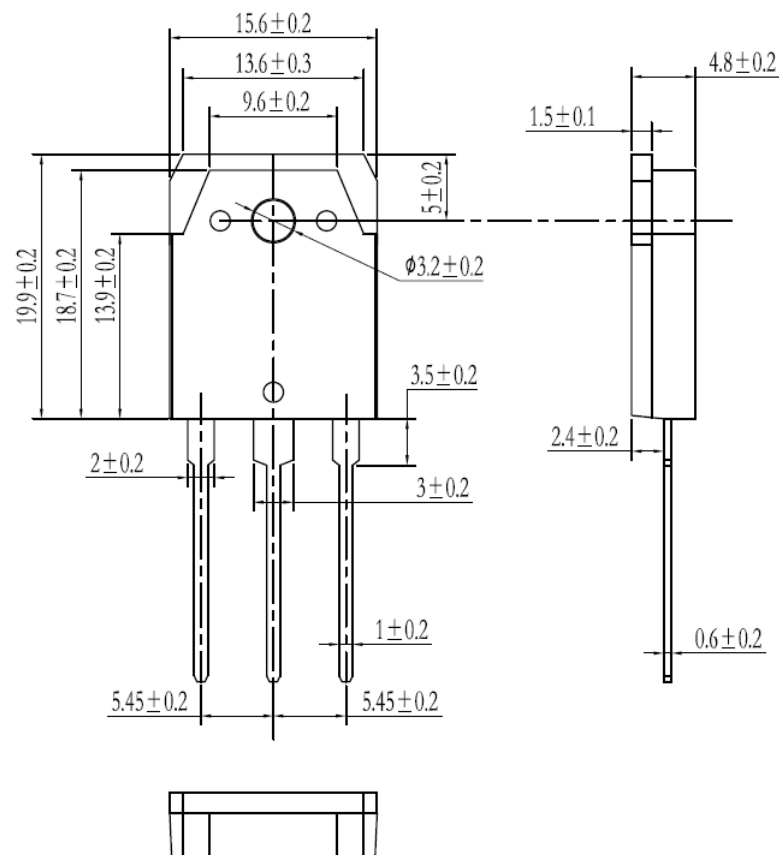


Fig7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in Millimeters  
Fig8. Package Outline