



January 2011

PRELIMINARY

# MM30F120B

1200V 30A FRED

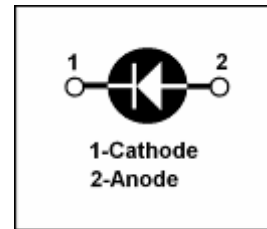
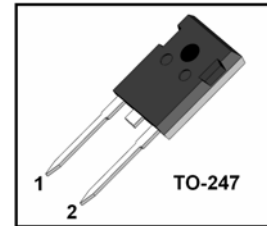
RoHS Compliant

## 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         |   | 1200        | V                           |
| $V_{RRM}$       | Maximum Repetitive Reverse Voltage   |   | 1200        | V                           |
| $I_{F(AV)}$     | Average Forward Current              | $T_C=110^{\circ}\text{C}$                               | 30          | A                           |
| $I_{F(RMS)}$    | RMS Forward Current                  | $T_C=110^{\circ}\text{C}$                               | 42          | A                           |
| $I_{FSM}$       | Non-Repetitive Surge Forward Current | $T_J=45^{\circ}\text{C}$ , $t=10\text{ms}$ , 50Hz, Sine | 300         | A                           |
| $P_D$           | Power Dissipation                    |   | 115         | 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  | 1.1         | $^{\circ}\text{C}/\text{W}$ |
| Weight          |                                      |   | 7.0         | 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       | $V_R=1200\text{V}$  | --   | --   | 100  | $\mu\text{A}$ |
|           |                               | $V_R=1200\text{V}$ , $T_J=125^{\circ}\text{C}$                          | --   | --   | 1    | mA            |
| $V_F$     | Forward Voltage               | $I_F=30\text{A}$  | --   | 2.15 | --   | V             |
|           |                               | $I_F=30\text{A}$ , $T_J=125^{\circ}\text{C}$                            | --   | 1.75 | --   | V             |
| $t_{rr}$  | Reverse Recovery Time         | $I_F=1\text{A}$ , $V_R=30\text{V}$ , $di_F/dt=-200\text{A}/\mu\text{s}$ | --   | 30   | --   | ns            |
| $t_{rr}$  | Reverse Recovery Time         | $V_R=600\text{V}$ , $I_F=30\text{A}$                                    | --   | 160  | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt=-200\text{A}/\mu\text{s}$ , $T_J=25^{\circ}\text{C}$           | --   | 5    | --   | A             |
| $t_{rr}$  | Reverse Recovery Time         | $V_R=600\text{V}$ , $I_F=30\text{A}$                                    | --   | 300  | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt=-200\text{A}/\mu\text{s}$ , $T_J=125^{\circ}\text{C}$          | --   | 11   | --   | A             |

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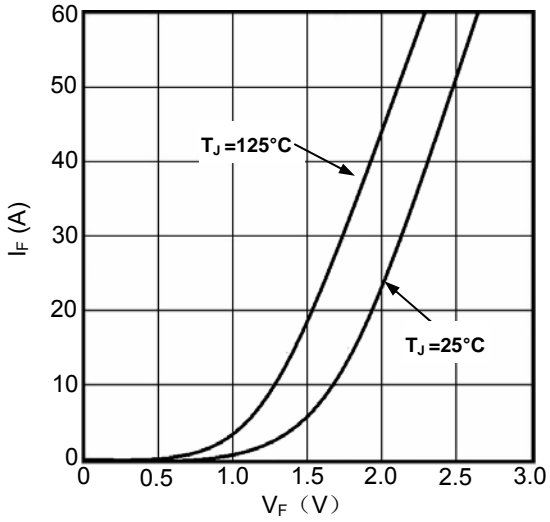


Fig1. Forward Voltage Drop vs Forward Current

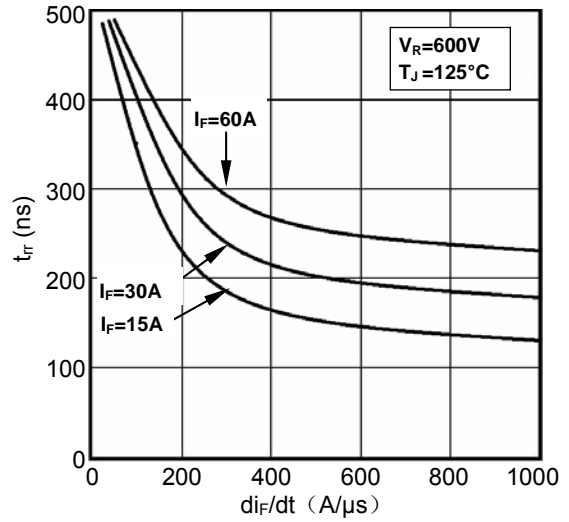


Fig2. Reverse Recovery Time vs  $di_F/dt$

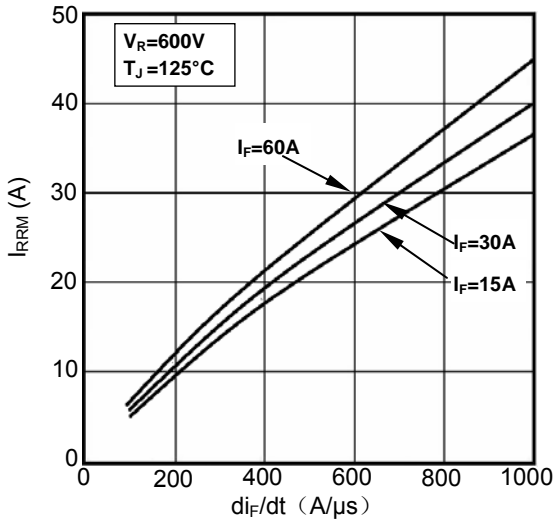


Fig3. Reverse Recovery Current vs  $di_F/dt$

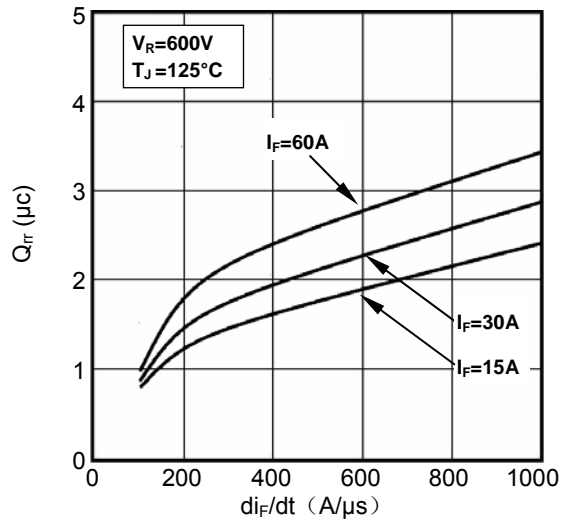


Fig4. Reverse Recovery Charge vs  $di_F/dt$

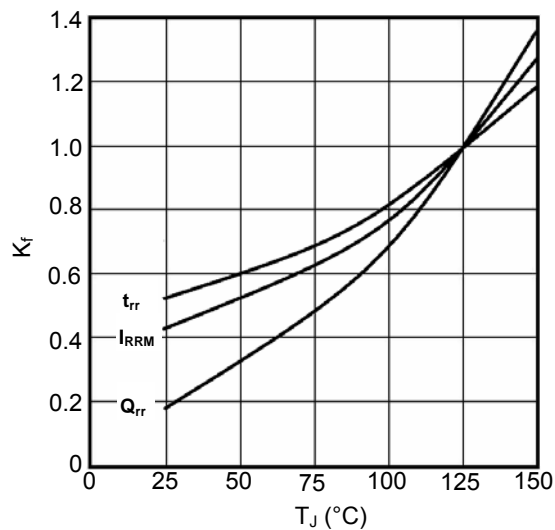


Fig5. Dynamic Parameters vs Junction Temperature

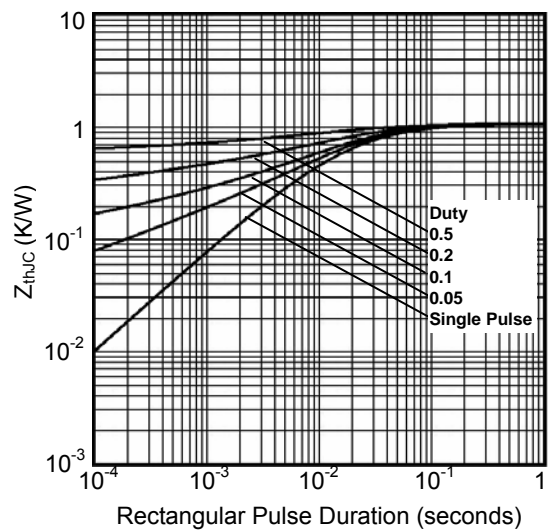


Fig6. Transient Thermal Impedance

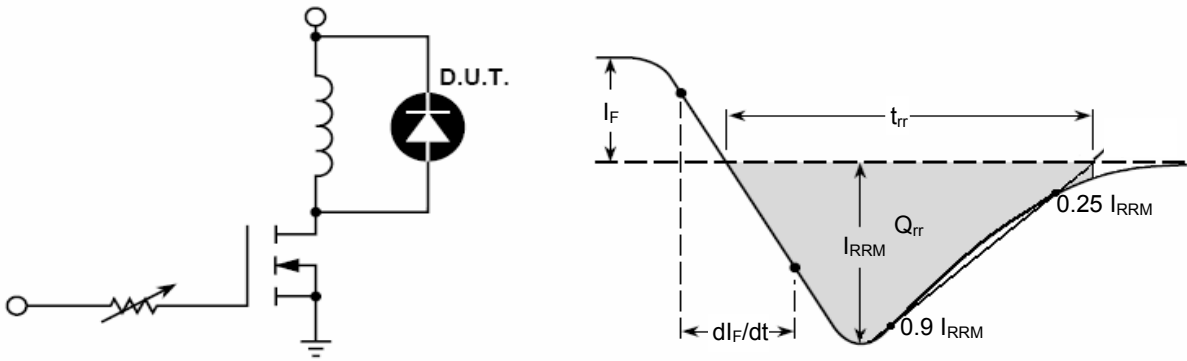
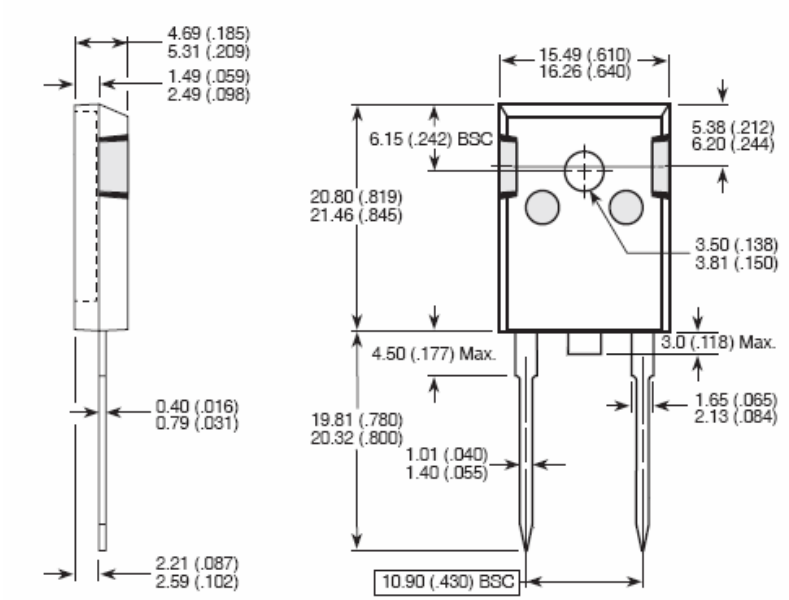


Fig7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in Millimeters and (Inchs)  
Fig8. Package Outline