

## 600V FRD Module

### Description

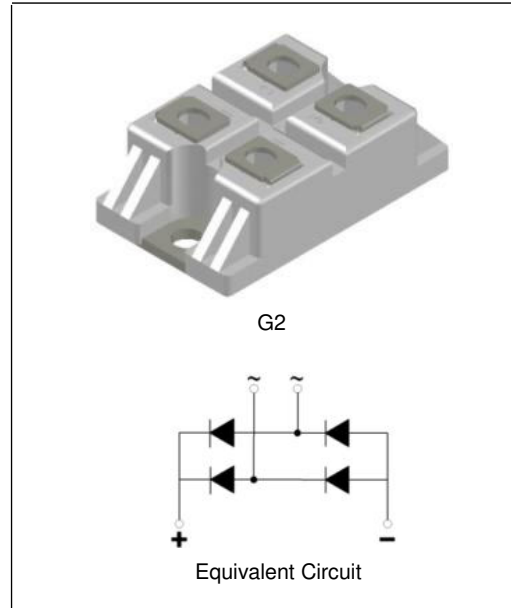
The Fast Recovery Diode module devices are optimized to reduce losses and EMI/RFI in high frequency power conditioning electrical systems. The Fast Recovery Diode module is ideally suited for power converters, inverter welders, motor drives and other applications where switching losses are significant portion of the total losses.

### Features

- Repetitive Reverse Voltage:  $V_{RRM} = 600V$
- Low Forward Voltage:  $V_F(\text{typ.}) = 1.4V @ I_F=60A$
- Average Forward Current:  $I_{F(AV)}=60A @ T_C=100^\circ C$
- Ultrafast Reverse Recovery Time:  $t_{rr}(\text{typ.}) = 100ns$
- Extensive Characterization of Recovery Parameters
- Reduced EMI and RFI
- Isolation Type Package
- $150^\circ C$  Operating Junction Temperature
- Built-in Dual FRD Construction

### Applications

- High Speed & High Power Converters, Inverter Welders
- Various Switching and Telecommunication Power Supply
- Cutting Machine



### Absolute Maximum Ratings ( $T_C=25^\circ C$ , unless otherwise noted)

| Symbol      | Parameter   |             | Ratings             | Unit             |   |
|-------------|---|-------------|---------------------|------------------|---|
| $V_{RRM}$   | Repetitive Peak Reverse Voltage   |             | 600                 | V                |   |
| $V_R$       | DC Blocking Voltage   |             | 480                 | V                |   |
| $I_{F(AV)}$ | Average Rectified Forward Current   | Per Diode   | $T_C = 25^\circ C$  | 120              | A |
|             |   |             | $T_C = 100^\circ C$ | 60               |   |
|             |   | Per Package | $T_C = 25^\circ C$  | 480              |   |
|             |   |             | $T_C = 100^\circ C$ | 240              |   |
| $I_{FSM}$   | Non-repetitive Peak Surge Current (Per Diode)<br>60Hz Single Half-sine Wave |             | 1080                | A                |   |
| $I^2t$      | $I^2t$ For Fusing<br>60Hz Sine Wave   |             | $4.8 * 10^3$        | A <sup>2</sup> S |   |
| $P_D$       | Maximum Power Dissipation   |             | 340                 | W                |   |
| $V_{iso}$   | Isolation Voltage @AC 1 Minutes   |             | 2500                | V                |   |
| $T_J$       | Junction Temperature  |             | -55 ~ +150          | $^\circ C$       |   |
| $T_{STG}$   | Storage Temperature Range   |             | -55 ~ +150          | $^\circ C$       |   |
|             | Mounting Torque (M6)  |             | 1.45                | N.m              |   |
|             | Terminal Torque (M6)  |             | 1.45                | N.m              |   |
|             | Weight  |             | 45                  | g                |   |

**Electrical Characteristics** (Per Diode,  $T_C=25\text{ }^\circ\text{C}$ , unless otherwise noted)

| Symbol   | Parameter                | Conditions   | Min. | Typ. | Max. | Unit |
|----------|--------------------------|--|------|------|------|------|
| $V_F$    | Forward Voltage Drop     | $I_F=60\text{A}$   | -    | 1.4  | 1.7  | V    |
|          |                          | $I_F=60\text{A}$ , $T_C=100\text{ }^\circ\text{C}$                           | -    | 1.25 | -    | V    |
| $I_{RM}$ | Reverse Leakage Current  | $V_R=600\text{V}$  | -    | -    | 0.5  | mA   |
|          |                          | $V_R=600\text{V}$ , $T_C=60\text{ }^\circ\text{C}$                           | -    | -    | 1    | mA   |
| $t_{rr}$ | Reverse Recovery Time    | $I_F=1\text{A}$ , $di/dt=-200\text{A/us}$                                    | -    | 35   | -    | ns   |
| $t_{rr}$ | Reverse Recovery Time    | $I_F=60\text{A}$ , $di/dt=-200\text{A/us}$                                   | -    | 100  | 120  | ns   |
| $I_{rr}$ | Reverse Recovery Current |  | -    | 10.0 | -    | A    |
| $t_{rr}$ | Reverse Recovery Time    | $I_F=60\text{A}$ , $di/dt=-200\text{A/us}$ , $T_C=100\text{ }^\circ\text{C}$ | -    | 270  | -    | ns   |
| $I_{rr}$ | Reverse Recovery Current |  | -    | 20.8 | -    | A    |

**Thermal Characteristics**

| Symbol        | Parameter                            | Ratings | Unit               |
|---------------|--------------------------------------|---------|--------------------|
| $R_{th(J-C)}$ | Thermal Resistance, Junction to case | 0.36    | $^\circ\text{C/W}$ |

**Typical Performance Characteristics**

Fig. 1. Typical Characteristics:  $V_F$  vs.  $I_F$

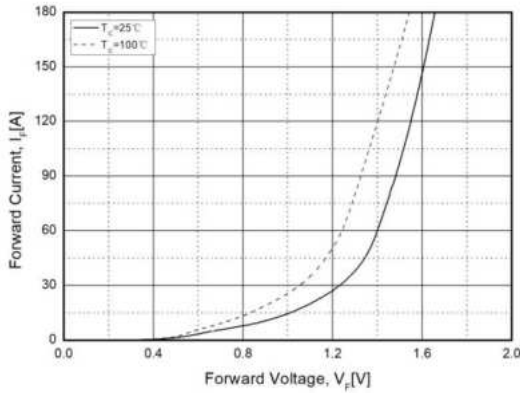


Fig. 2. Typical Reverse Recovery Time vs.  $di/dt$

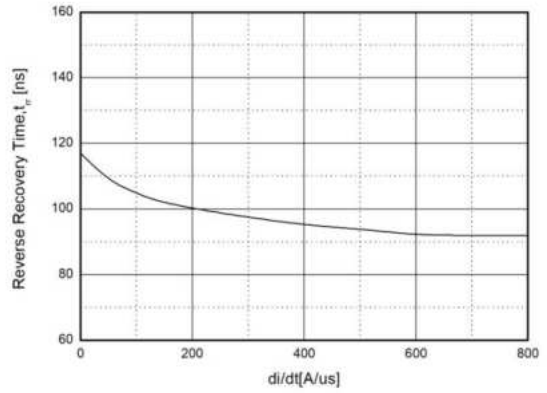


Fig. 3. Transient Thermal Impedance Characteristics ( $R_{th(J-C)}$ )

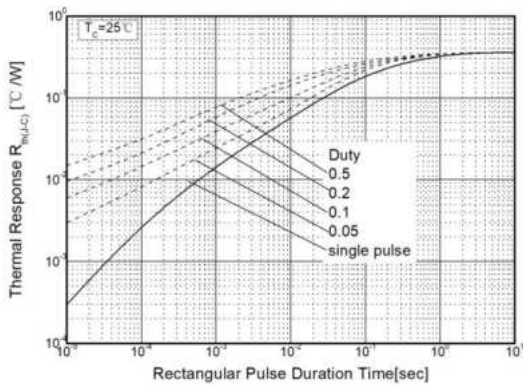


Fig. 4. Forward Current Derating Curve

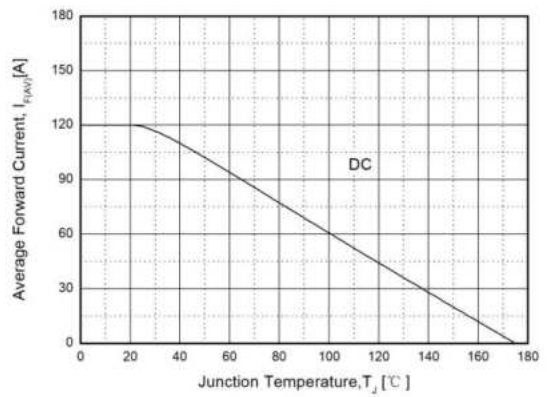
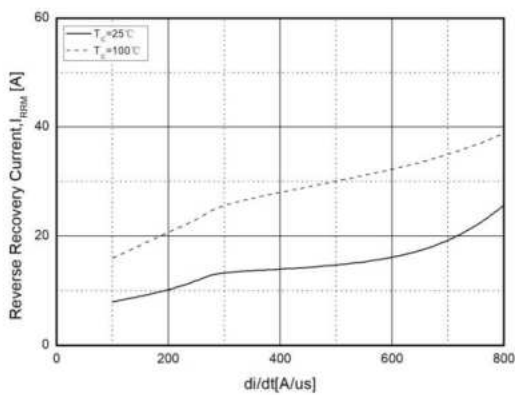
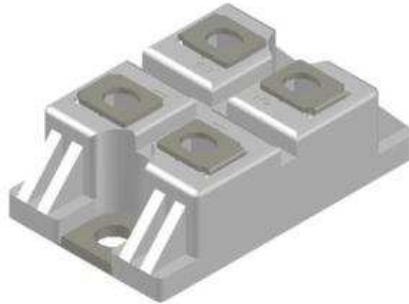


Fig. 5. Reverse Recovery Current vs.  $di/dt$



**Package Dimensions**

G2



(Dimensions in Millimeters)

