

## 600V FRD Full Bridge Module

### Description

The Fast Recovery Diode module devices used Full Bridge Structure, and optimized to reduce losses and EMI/RFI in high frequency power conditioning electrical systems.

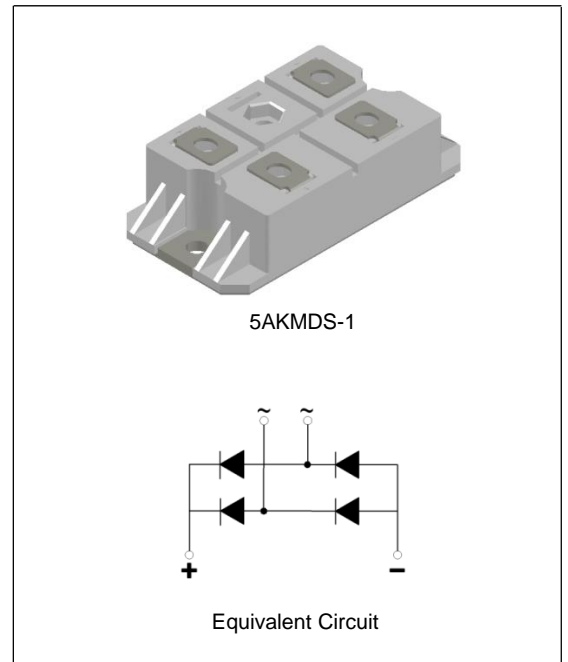
The Fast Recovery Diode module is ideally suited for power converters, inverter welders, motor drives and other applications where switching losses are significant portion of the total losses.

### Features

- Repetitive Reverse Voltage:  $V_{RRM} = 600V$
- Low Forward Voltage:  $V_F(\text{typ.}) = 1.6V @ I_F=100A$
- Average Forward Current:  $I_{F(AV)} = 100A @ T_C=100^\circ C$
- Reverse Recovery Time:  $t_{rr}(\text{typ.}) = 85ns$
- Extensive Characterization of Recovery Parameters
- Reduced EMI and RFI
- Isolation Type Package
- 150°C Operating Junction Temperature
- Built-in Full Bridge FRD Construction

### Applications

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



### Absolute Maximum Ratings (Per diode at $T_C=25^\circ C$ 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                               | $T_C = 25^\circ C$  | 200        |
|             |   | $T_C = 100^\circ C$ | 100        |
| $I_{FSM}$   | Non-repetitive Peak Surge Current<br>60Hz Single Half-sine Wave | 1150                | A          |
| $I^2t$      | $I^2t$ For Fusing<br>60Hz Sine Wave                             | $5.5 * 10^3$        | $A^2s$     |
| $P_D$       | Maximum Power Dissipation                                       | 270                 | W          |
| $V_{iso}$   | Isolation Voltage @AC 1 Minutes                                 | 2500                | V          |
| $T_J$       | Junction Temperature  | -55 ~ +150          | $^\circ C$ |
| $T_{STG}$   | Storage Temperature   | -55 ~ +150          | $^\circ C$ |
|             | Mounting Torque (M5)  | 4.0                 | N.m        |
|             | Terminal Torque (M5)  | 2.0                 | N.m        |
|             | Weight  | 137                 | 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     | $I_F=100\text{A}$   | -    | 1.6  | 1.9  | V    |
|          |                          | $I_F=100\text{A}, T_C=100^\circ\text{C}$                        | -    | 1.4  | -    | V    |
| $I_{RM}$ | Reverse Leakage Current  | $V_R=600\text{V}$   | -    | -    | 0.5  | mA   |
|          |                          | $V_R=600\text{V}, T_C=100^\circ\text{C}$                        | -    | -    | 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    | $I_F=100\text{A}, di/dt=-200\text{A/us}$                        | -    | 85   | 110  | ns   |
| $I_{rr}$ | Reverse Recovery Current |   | -    | 12.5 | -    | A    |
| $t_{rr}$ | Reverse Recovery Time    | $I_F=100\text{A}, di/dt=-200\text{A/us}, T_C=100^\circ\text{C}$ | -    | 200  | -    | ns   |
| $I_{rr}$ | Reverse Recovery Current |   | -    | 24.2 | -    | A    |

## Thermal Characteristics

| Symbol        | Parameter                            | Ratings | Unit               |
|---------------|--------------------------------------|---------|--------------------|
| $R_{th(J-C)}$ | Thermal Resistance, Junction to case | 0.46    | $^\circ\text{C/W}$ |

**Typical Performance Characteristics**

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

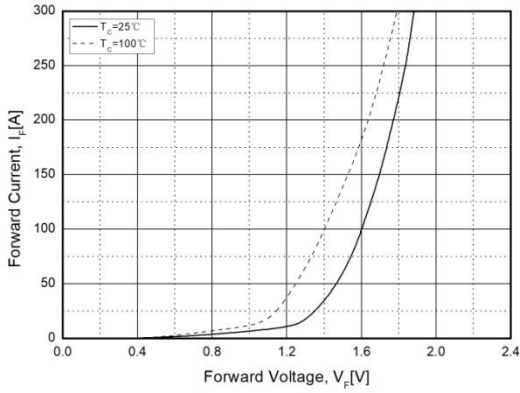


Fig. 2. Typical Reverse Recovery Time vs.  $di/dt$

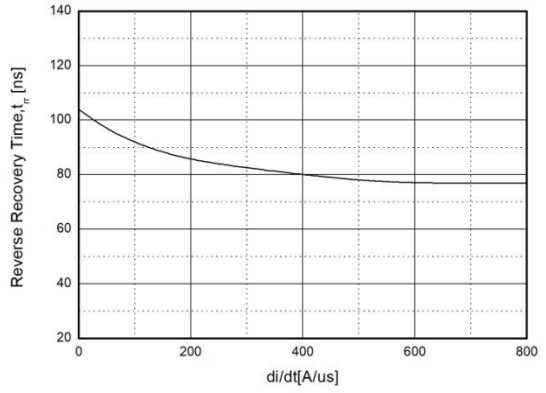


Fig. 3. Transient Thermal Impedance Characteristics ( $R_{th(J-C)}$ )

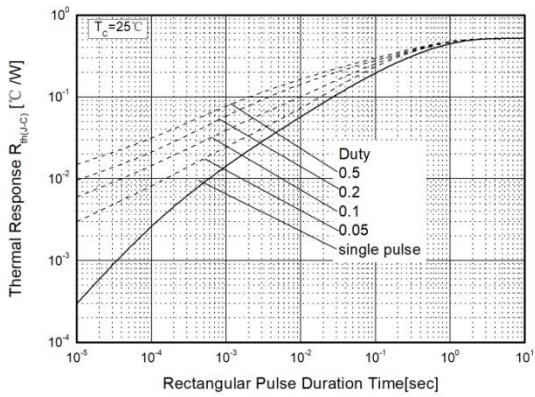
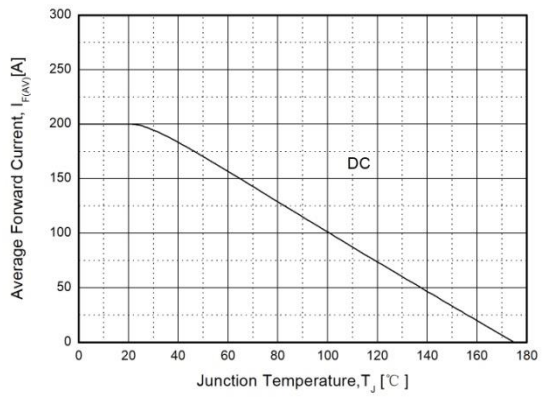
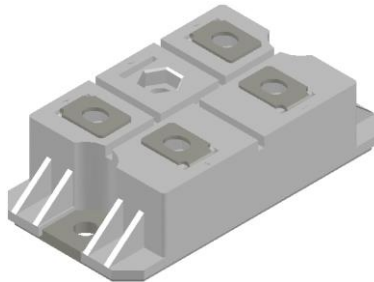


Fig. 4. Forward Current Derating Curve



**Package Dimensions**

**5AKMDS-1**



(Dimensions in Millimeters)

