

# FRED Modules

**VRRM** 1200V
**IFAV** 400 A

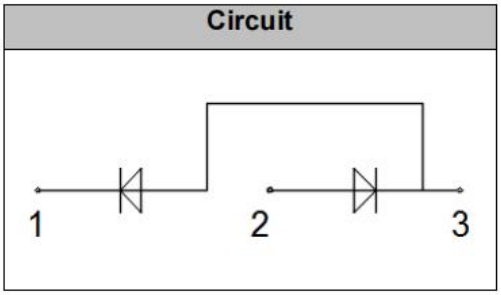
## Applications

- Inversion Welder
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Power Factor Correction (PFC) Circuit
- Converter & Chopper

## Features

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

**Circuit**




## Maximum Ratings

| Symbol | Conditions | Values | Units |
|---|---|---|---|
| $V_R$ | | 1200 | V |
| $V_{RRM}$ | | 1200 | V |
| $I_{FAV}$ | $T_C$=100°C, Per Leg | 400 | A |
| $I_{FRMS}$ | $T_C$=100°C, Per Leg | 560 | A |
| $I_{FSM}$ | t=10ms $T_J$=25℃ | 3200 | A |
| $I^2t$ | t=10ms $T_J$=25℃ | 51200 | $A^2s$ |
| $P_D$ | | 833 | W |
| $V_{ISO}$ | AC 50Hz/60Hz; R.M.S; 1min | 3000 | V |
| $T_J$ | | -40 to +150 | ℃ |
| Tstg | | -40 to +125 | ℃ |
| Mt | To Terminals(M6) | 5±15% | N·m |
| Ms | To Heatsink(M6) | 5±15% | N·m |
| Weight | | 160 | g |

## Thermal Characteristics

| Symbol | Conditions | Values | Units |
|---|---|---|---|
| Rth(j-c) | Junction to Case(Per Leg) | 0.15 | ℃/W |

## Electrical Characteristics

| Symbol | Conditions | Values | | | Units |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $I_{RM}$ | $V_R$=1200V | -- | -- | 0.5 | mA |
| | $V_R$=1200V, $T_J$=125°C | -- | -- | 5 | mA |
| $V_F$ | $I_F$=400A | -- | 1.9 | 2.2 | V |
| | $I_F$=400A, $T_J$=125°C | -- | 1.7 | 2.0 | V |
| trr | $I_F$=1A, $V_R$=30V, $di_F/dt$=-200A/μs | -- | 76 | -- | ns |
| trr | $V_R$=600V, $I_F$=400A, $di_F/dt$=-200A/μs, TJ=25°C | -- | 180 | -- | ns |
| $I_{RRM}$ | | -- | 15 | -- | A |
| trr | $V_R$=600V, $I_F$=400A, $di_F/dt$=-200A/μs, TJ=125°C | -- | 500 | -- | ns |
| $I_{RRM}$ | | -- | 35 | -- | A |

## Performance Curves

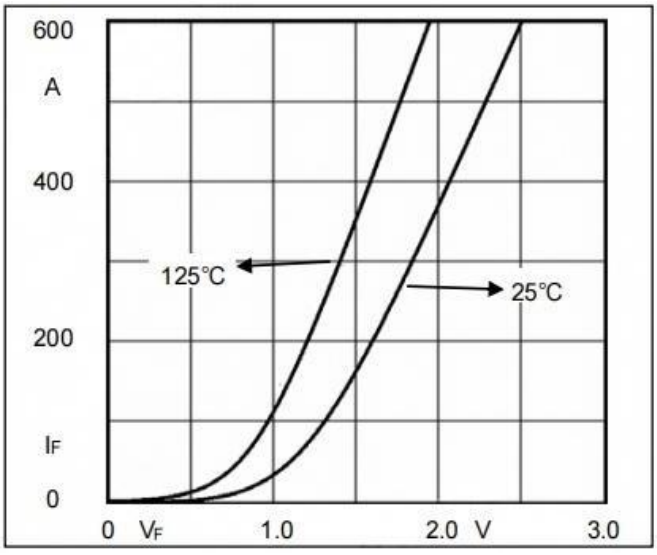



Fig1. Forward Characteristics

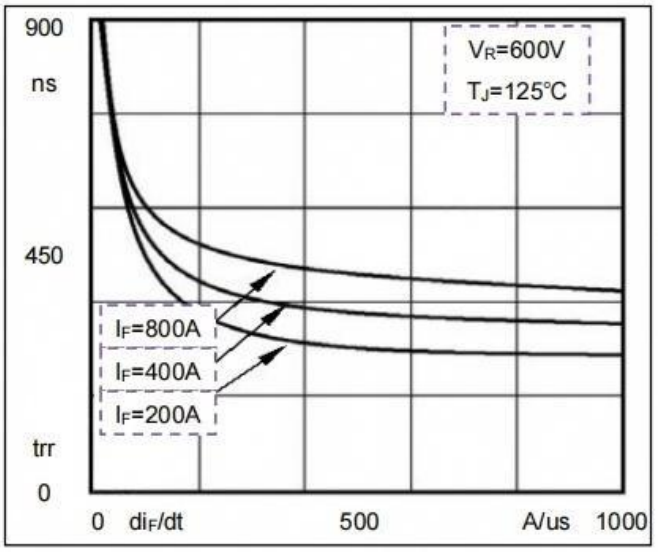



Fig2.Reverse Recovery Time vs $di_F/dt$

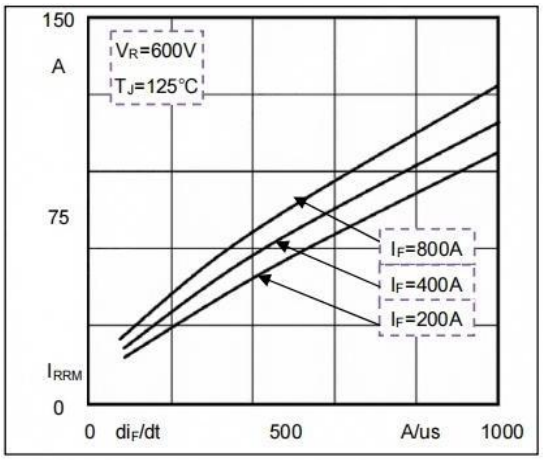



Fig3. Reverse Recovery Current vs $di_F/dt$

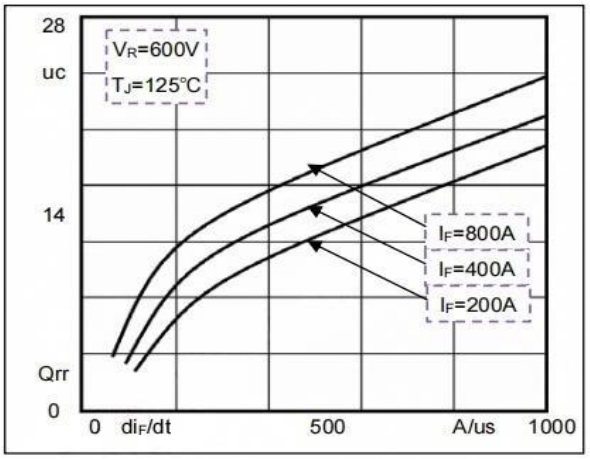
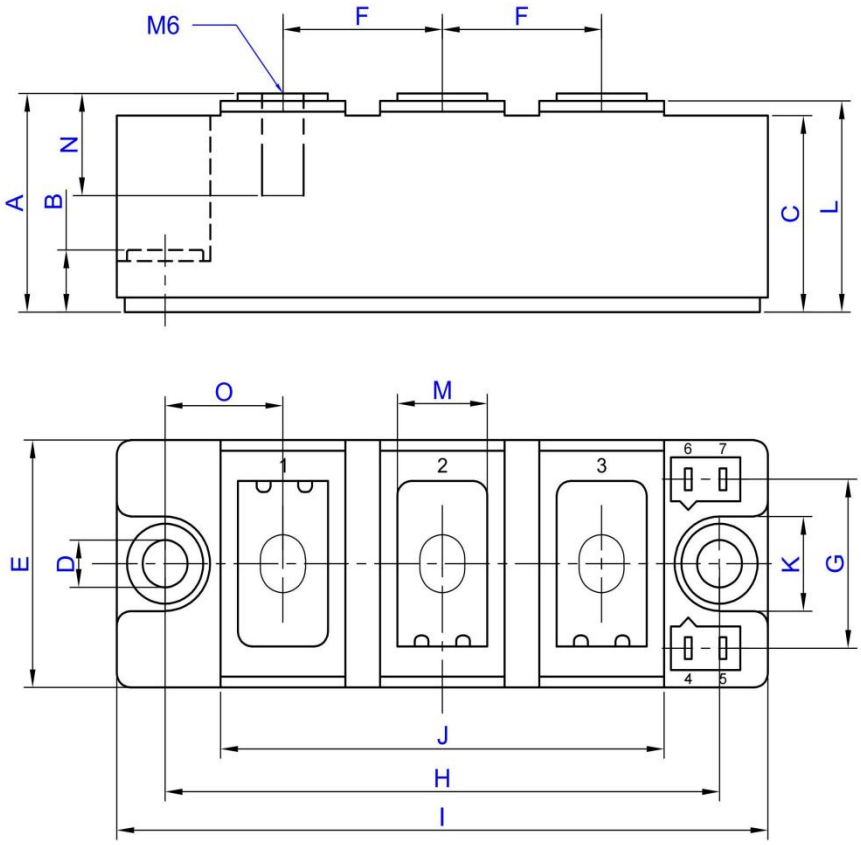



Fig4. Reverse Recovery Charge vs diF/dt

## Package Outline Information

**CASE: F2**




| DIM | Min (mm) | Max (mm) | Note |
|---|---|---|---|
| A | 29.5 | 30.5 | |
| B | 8.0 | 9.0 | |
| C | 26.5 | 27.5 | |
| D | 6.3 | 6.7 | Ø |
| E | 33.5 | 34.5 | |
| F | 22.8 | 23.2 | |
| G | 22.7 | 23.7 | |
| H | 79.5 | 80.5 | |
| I | 93.5 | 94.5 | |
| J | 63.5 | 64.5 | |
| K | 12.5 | 13.5 | |
| L | 28.5 | 29.5 | |
| M | 12.9 | 13.1 | |
| N | 13.5 | 14.5 | |
| O | 16.5 | 17.5 | |

## Packing Standard

| Item | Length: A(mm) | Width: B(mm) | Height: C (mm) | Quantity (PCS) |
|---|---|---|---|---|
| Inner Box | 276 | 258 | 48 | 8 |
| Outer Carton | 545 | 295 | 240 | 80 |

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