# Three Phase Diode Bridge & Thyristor Module

| $V_{DRM}$ / $V_{RRM}$ | 800 to 1600V |
|---|---|
| $I_{FAV}$/ $I_{TAV}$ | 200 Amp |

## Features

- Aluminum oxide DBC
- Glass passivated chip

## Applications

- Inverter for AC or DC motor control
- Current stabilized power supply
- Switching power supply



## Circuit



## Module Type

| Type | $V_{RRM}$ / $V_{DRM}$ | $V_{RSM}$ |
|---|---|---|
| MDST200-08 | 800V | 900V |
| MDST200-12 | 1200V | 1300V |
| MDST200-16 | 1600V | 1700V |

## Diode

### ■ Maximum Ratings

| Symbol | Item | Conditions | Values | Unit |
|---|---|---|---|---|
| $I_D$ | Output Current | Three Phase, Full Wave $T_c$ = 90℃ | 200 | A |
| $I_{FSM}$ | Surge Forward Current | $T_j$ = 25℃, t = 50Hz(10ms), $V_R$ = 0V | 2240 | A |
| $I^2t$ | Circuit Fusing Consideration | t = 10ms $T_j$ =25℃ | 25088 | $A^2s$ |
| $V_{ISO}$ | Isolation Breakdown Voltage | AC 50Hz/60Hz; R.M.S; 1min | 3000 | V |
| $T_j$ | Operating Junction Temperature |  | -40 to +150 | ℃ |
| $T_{stg}$ | Storage Temperature |  | -40 to +125 | ℃ |
| $M_t$ | Mounting Torque | To Terminals(M4) | 2±15% | N·m |
|  |  | To Terminals(M6) | 5±15% |  |
| $M_s$ |  | To Heatsink(M6) | 5±15% |  |
| Weight | Module (Approximately) |  | 360 | g |

### ■ Thermal Characteristics

| Symbol | Item | Conditions | Values | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | Thermal Impedance, Max | Junction to Case(Per Module) | 0.12 | ℃/W |
| $R_{th(c-s)}$ | Thermal Impedance, Max | Case to Heat Sink | 0.05 | ℃/W |

### ■ Electrical Characteristics

| Symbol | Item | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{FM}$ | Forward Voltage Drop, Max | $T_j$ = 25℃   $I_F$ = 200A | — | — | 1.35 | V |
| $I_{RRM}$ | Repetitive Peak Reverse Current, Max | $T_j$ = 25℃   $V_R$ = $V_{RRM}$ | — | — | 0.5 | mA |
| | | $T_j$ = 150℃ $V_R$ = $V_{RRM}$ | — | — | 10 | |
| $V_{T0}$ | Threshold Voltage, for power loss calculation only | $T_j$ = 125℃ | | 0.80 | | V |
| $r_T$ | Slope Resistance, for power loss calculation only | $T_j$ = 125℃ | | 2.25 | | mΩ |
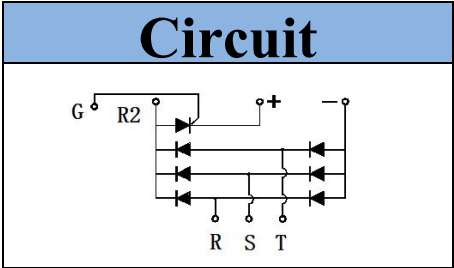
## Thyristor

■ Maximum Ratings

| Symbol | Item | Conditions | Values | Unit |
|---|---|---|---|---|
| $I_{TAV}$ | Average On-state Current | $T_c$ = 90℃, Three Phase Full Wave Rectified | 200 | A |
| $I_{TSM}$ | Surge On-state Current | $T_j$ = 25℃, t = 50Hz(10ms), $V_R$ = 0V | 2400 | A |
| $I^2t$ | Circuit Fusing Consideration | | 28800 | $A^2s$ |
| $V_{ISO}$ | Isolation Breakdown Voltage | AC 50Hz; R.M.S;1min | 3000 | V |
| $T_j$ | Operating Junction Temperature | | -40 to + 125 | ℃ |
| $T_{stg}$ | Storage Temperature | | -40 to + 125 | ℃ |
| di/dt | Critical Rate of Rise of On-state Current, Max | $T_j$= 125℃, $V_D$ = 1/2$V_{DRM}$, $I_G$ = 150mA, $di_G$/dt = 0.1A/µs | 150 | A/µs |

■ Thermal Characteristics

| Symbol | Item | Conditions | Values | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | Thermal Impedance, Max | Junction to Case | 0.14 | ℃/W |
| $R_{th(c-s)}$ | Thermal Impedance, Max | Case to Heat Sink | 0.05 | ℃/W |

■ Electrical Characteristics

| Symbol | Item | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{TM}$ | Peak On-State Voltage, Max | $T_j$ = 25℃, $I_T$ = 200A | - | - | 1.30 | V |
| $I_{DRM}$ /$I_{RRM}$ | Repetitive Peak Reverse Current, Max /Repetitive Peak Off-state Current, Max | $T_j$ = 125℃, $V_R$ = $V_{RRM}$, $V_D$ = $V_{DRM}$ | - | - | 30 | mA |
| $V_{GT}$ | Gate Trigger Voltage, Max | $T_j$ = 25℃, $V_D$ = 6V | - | - | 3.0 | V |
| $I_{GT}$ | Gate Trigger Current, Max | $T_j$ = 25℃, $V_D$ = 6V | - | - | 150 | mA |
| $V_{GD}$ | Gate Non-Trigger Voltage, Max | $T_j$ = 125℃, $V_D$ = 2/3$V_{DRM}$ | - | - | 0.25 | V |
| $I_L$ | Latching Current | $T_j$ = 25℃ | - | 200 | - | mA |
| $I_H$ | Holding Current | $T_j$ = 25℃ | - | 150 | - | mA |
| $t_{gt}$ | Turn On Time | $T_j$ = 25℃ | - | 3 | - | µs |
| dv/dt | Critical Rate of Rise of Off-state Voltage, Min | $T_j$ = 125℃, $V_D$ = 2/3$V_{DRM}$ Linear Voltage Rise | | 500 | | V/µs |
| $V_{T0}$ | Threshold Voltage, for power loss calculation only | $T_j$ = 125℃ | | 0.89 | | V |
| $r_T$ | Slope Resistance, for power loss calculation only | $T_j$ = 125℃ | | 1.8 | | mΩ |

## Performance Curves


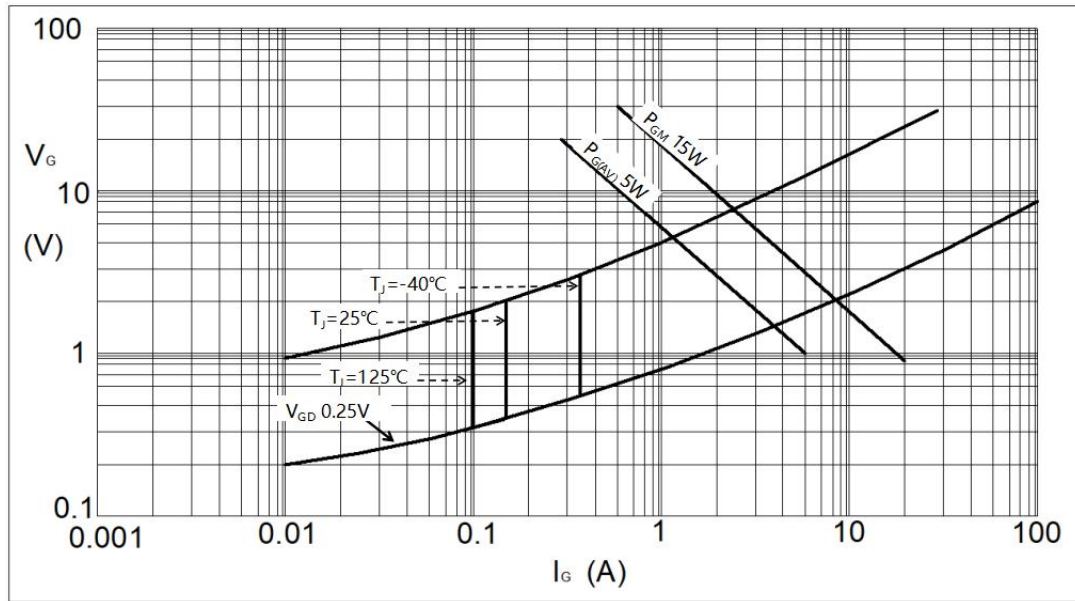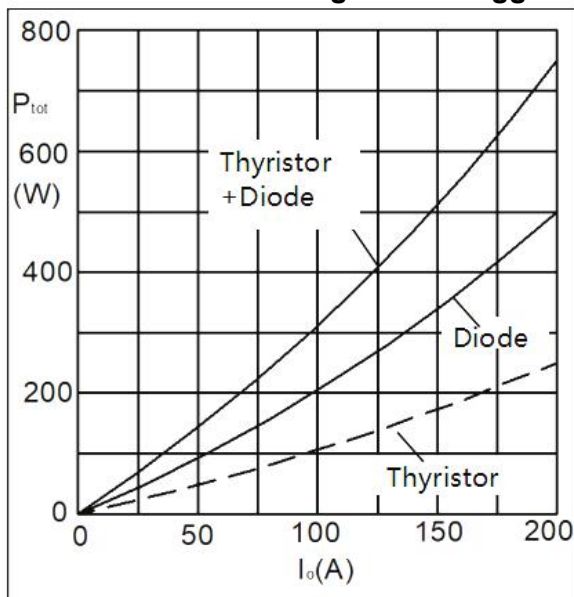
Fig1. Gate Trigger Characteristics
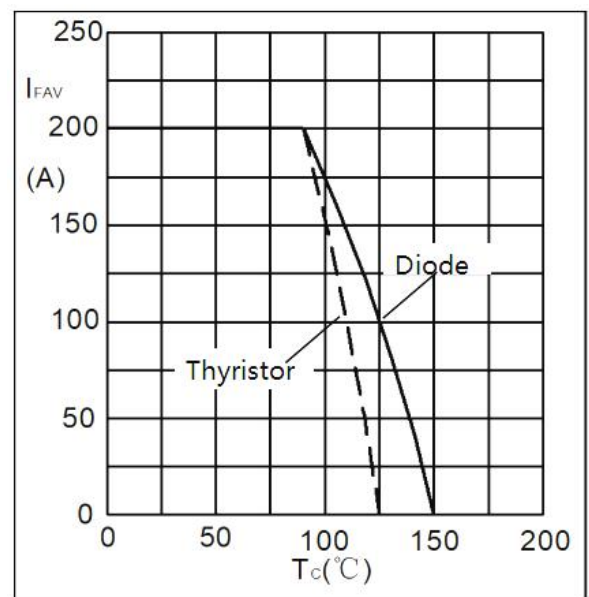


Fig2. Power Dissipation
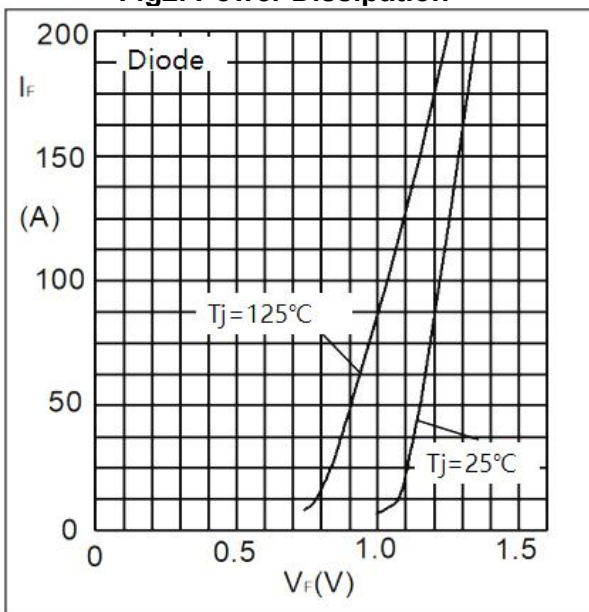
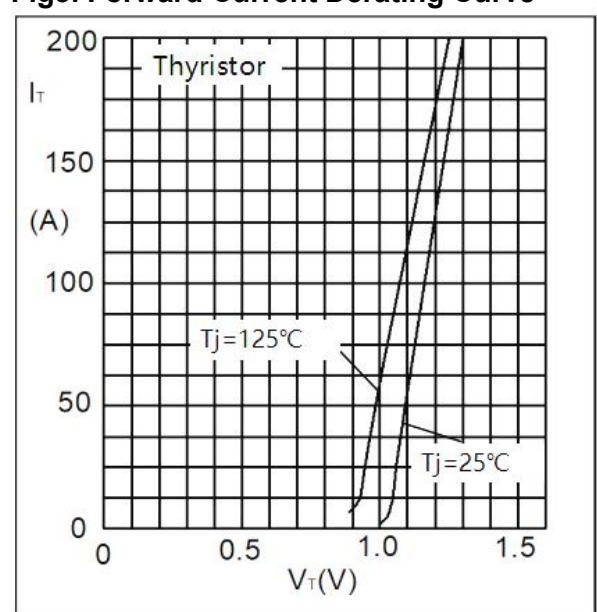

Fig3. Forward Current Derating Curve
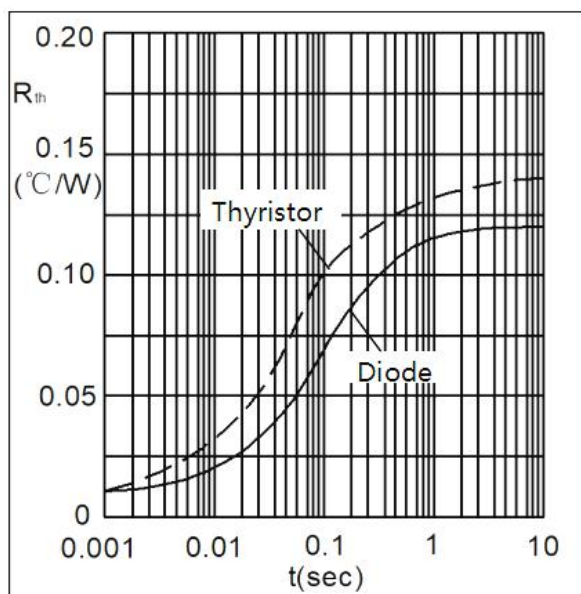


Fig4. Forward Characteristics
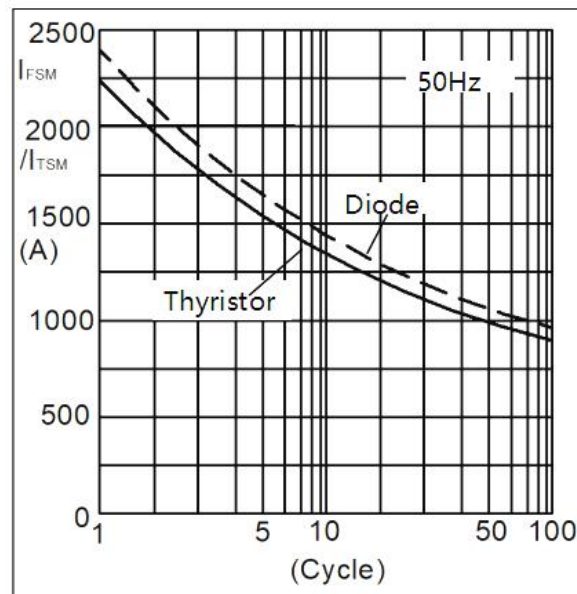
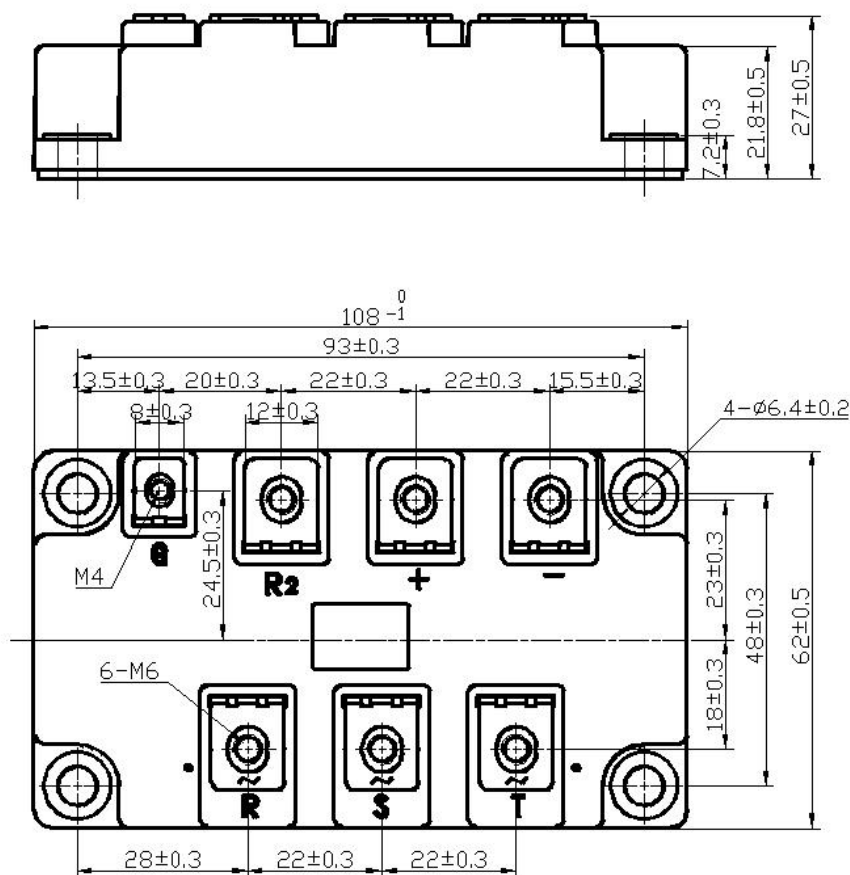**Fig5. Transient Thermal impedance**



**Fig6. Max Non-Repetitive Forward Surge Current**

## Package Outline Information

**CASE: M51B**



**Dimensions in mm**

## *IMPORTANT INFORMATION AND WARNINGS

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