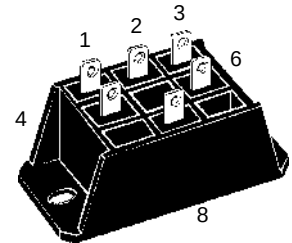
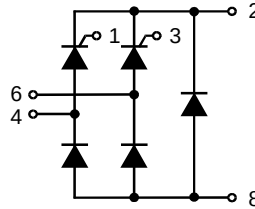


# Half Controlled Single Phase Rectifier Bridge with Freewheeling Diode

$$I_{dAVM} = 40 \text{ A}$$

$$V_{RRM} = 800-1600 \text{ V}$$

| $V_{RSM}$<br>$V_{DSM}$<br>V | $V_{RRM}$<br>$V_{DRM}$<br>V | Type         |
|-----------------------------|-----------------------------|--------------|
| 900                         | 800                         | VHF 36-08io5 |
| 1300                        | 1200                        | VHF 36-12io5 |
| 1500                        | 1400                        | VHF 36-14io5 |
| 1700                        | 1600                        | VHF 36-16io5 |



| Symbol                                          | Test Conditions                                                                                                                                                          | Maximum Ratings                                                                                                         |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| $I_{dAV}$<br>$I_{dAVM}$<br>$I_{FRMS}, I_{TRMS}$ | $T_K = 85^\circ\text{C}$ , module<br>module<br>per leg                                                                                                                   | 36 A<br>40 A<br>28 A                                                                                                    |
| $I_{FSM}, I_{TSM}$                              | $T_{VJ} = 45^\circ\text{C}$ ;<br>$V_R = 0 \text{ V}$<br>$t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                          | 320 A<br>350 A                                                                                                          |
| $I^2t$                                          | $T_{VJ} = T_{VJM}$<br>$V_R = 0 \text{ V}$<br>$t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                                     | 280 A<br>310 A                                                                                                          |
| $(di/dt)_{cr}$                                  | $T_{VJ} = 125^\circ\text{C}$<br>$f = 50 \text{ Hz}$ , $t_p = 200 \mu\text{s}$<br>$V_D = 2/3 V_{DRM}$<br>$I_G = 0.3 \text{ A}$ ,<br>$di_G/dt = 0.3 \text{ A}/\mu\text{s}$ | repetitive, $I_T = 50 \text{ A}$ 150 A/ $\mu\text{s}$<br>non repetitive, $I_T = 1/2 \cdot I_{dAV}$ 500 A/ $\mu\text{s}$ |
| $(dv/dt)_{cr}$                                  | $T_{VJ} = T_{VJM}$ ; $V_{DR} = 2/3 V_{DRM}$<br>$R_{GK} = \infty$ ; method 1 (linear voltage rise)                                                                        | 1000 V/ $\mu\text{s}$                                                                                                   |
| $V_{RGM}$                                       |                                                                                                                                                                          | 10 V                                                                                                                    |
| $P_{GM}$                                        | $T_{VJ} = T_{VJM}$<br>$I_T = I_{TAVM}$<br>$t_p = 30 \mu\text{s}$<br>$t_p = 500 \mu\text{s}$<br>$t_p = 10 \text{ ms}$                                                     | $\leq 10 \text{ W}$<br>$\leq 5 \text{ W}$<br>$\leq 1 \text{ W}$                                                         |
| $P_{GAVM}$                                      |                                                                                                                                                                          | 0.5 W                                                                                                                   |
| $T_{VJ}$                                        |                                                                                                                                                                          | -40...+125 $^\circ\text{C}$                                                                                             |
| $T_{VJM}$                                       |                                                                                                                                                                          | 125 $^\circ\text{C}$                                                                                                    |
| $T_{stg}$                                       |                                                                                                                                                                          | -40...+125 $^\circ\text{C}$                                                                                             |
| $V_{ISOL}$                                      | 50/60 Hz, RMS<br>$I_{ISOL} \leq 1 \text{ mA}$<br>$t = 1 \text{ min}$<br>$t = 1 \text{ s}$                                                                                | 3000 V~<br>3600 V~                                                                                                      |
| $M_d$                                           | Mounting torque<br>(M5)<br>(10-32 UNF)                                                                                                                                   | 2-2.5 Nm<br>18-22 lb.in.                                                                                                |
| Weight                                          |                                                                                                                                                                          | 50 g                                                                                                                    |

## Features

- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- 1/4" fast-on terminals
- UL registered E 72873

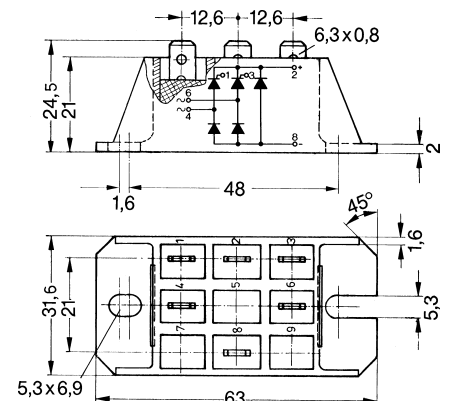
## Applications

- Supply for DC power equipment
- DC motor control

## Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

## Dimensions in mm (1 mm = 0.0394")



Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated.

① for resistive load

IXYS reserves the right to change limits, test conditions and dimensions.

| Symbol     | Test Conditions                                                                                                                                       | Characteristic Values                           |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| $I_R, I_D$ | $V_R = V_{RRM}; V_D = V_{DRM}$<br>$T_{VJ} = T_{VJM}$<br>$T_{VJ} = 25^\circ\text{C}$                                                                   | $\leq 5$ mA<br>$\leq 0.3$ mA                    |
| $V_T, V_F$ | $I_T, I_F = 45$ A; $T_{VJ} = 25^\circ\text{C}$                                                                                                        | $\leq 1.45$ V                                   |
| $V_{T0}$   | For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )                                                                                     | 0.85 V                                          |
| $r_T$      |                                                                                                                                                       | 13 mΩ                                           |
| $V_{GT}$   | $V_D = 6$ V;<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = -40^\circ\text{C}$                                                                           | $\leq 1.0$ V<br>$\leq 1.2$ V                    |
| $I_{GT}$   | $V_D = 6$ V;<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = -40^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$                                           | $\leq 65$ mA<br>$\leq 80$ mA<br>$\leq 50$ mA    |
| $V_{GD}$   | $T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$                                                                                                                 | $\leq 0.2$ V                                    |
| $I_{GD}$   | $T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$                                                                                                                 | $\leq 5$ mA                                     |
| $I_L$      | $I_G = 0.3$ A; $t_G = 30$ μs;<br>$di_G/dt = 0.3$ A/μs;<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = -40^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$ | $\leq 150$ mA<br>$\leq 200$ mA<br>$\leq 100$ mA |
| $I_H$      | $T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$                                                                                             | $\leq 100$ mA                                   |
| $t_{gd}$   | $T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$<br>$I_G = 0.3$ A; $di_G/dt = 0.3$ A/μs                                                                 | $\leq 2$ μs                                     |
| $t_q$      | $T_{VJ} = 125^\circ\text{C}; I_T = 15$ A; $t_p = 300$ μs; $V_R = 100$ V                                                                               | typ. 150 μs                                     |
| $Q_r$      | $di/dt = -10$ A/μs; $dv/dt = 20$ V/μs; $V_D = 2/3 V_{DRM}$                                                                                            | 75 μC                                           |
| $R_{thJC}$ | per thyristor (diode); DC current                                                                                                                     | 1.15 K/W                                        |
|            | per module                                                                                                                                            | 0.29 K/W                                        |
| $R_{thJK}$ | per thyristor (diode); DC current                                                                                                                     | 1.55 K/W                                        |
|            | per module                                                                                                                                            | 0.39 K/W                                        |
| $d_s$      | Creeping distance on surface                                                                                                                          | 12.6 mm                                         |
| $d_A$      | Creepage distance in air                                                                                                                              | 6.3 mm                                          |
| $a$        | Max. allowable acceleration                                                                                                                           | 50 m/s <sup>2</sup>                             |

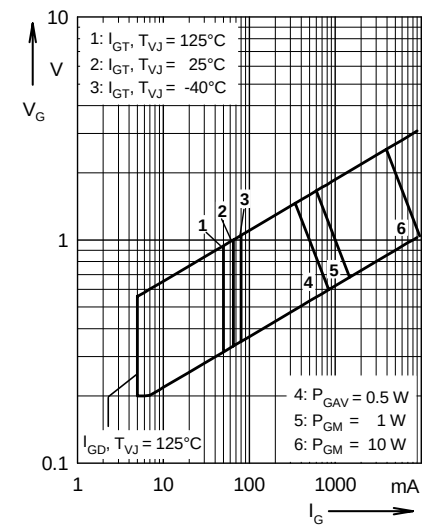


Fig. 1 Gate trigger range

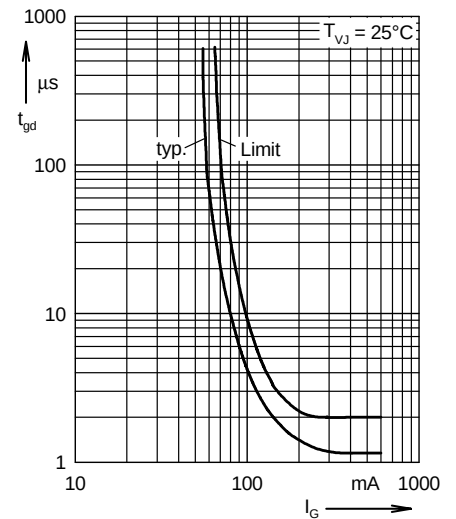


Fig. 2 Gate controlled delay time  $t_{gd}$

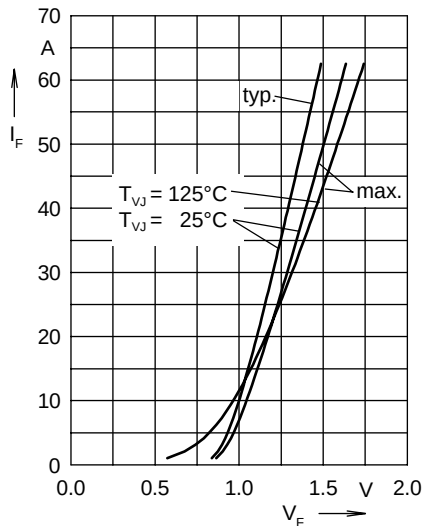


Fig. 3 Forward current versus voltage drop per diode

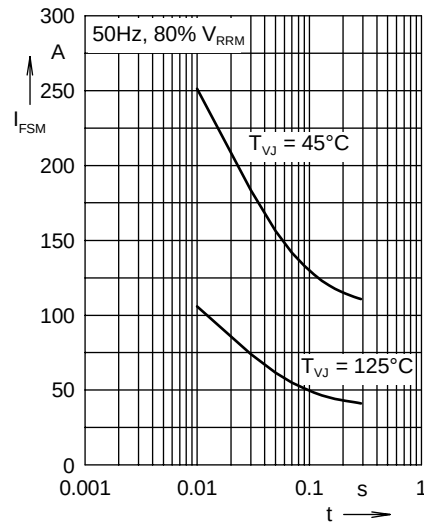


Fig. 4 Surge overload current

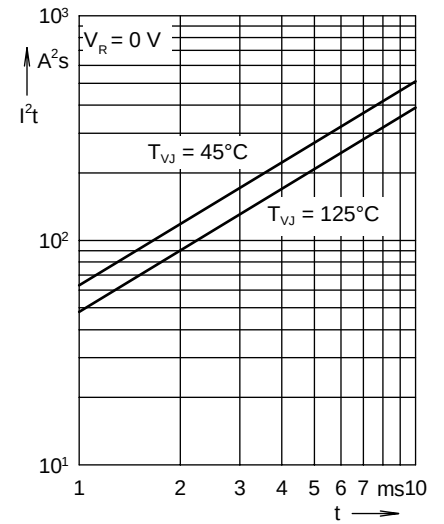


Fig. 5  $I^2t$  versus time per diode

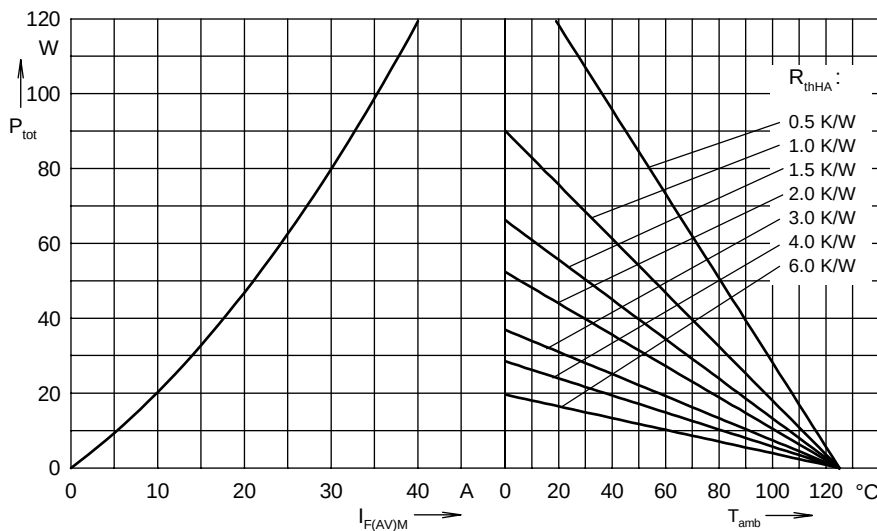


Fig. 6 Power dissipation versus direct output current and ambient temperature

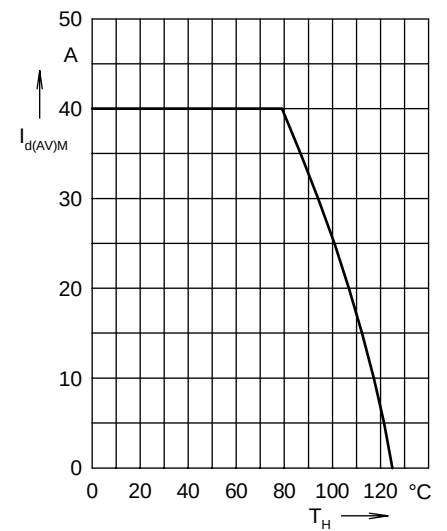


Fig. 7 Max. forward current versus heatsink temperature

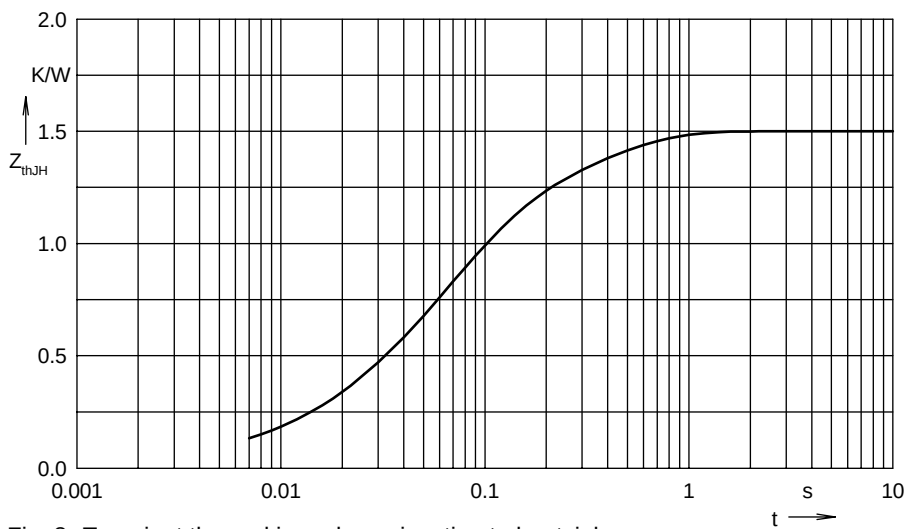


Fig. 8 Transient thermal impedance junction to heatsink

Constants for  $Z_{thJH}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.005           | 0.008     |
| 2 | 0.2             | 0.05      |
| 3 | 0.875           | 0.06      |
| 4 | 0.47            | 0.25      |