

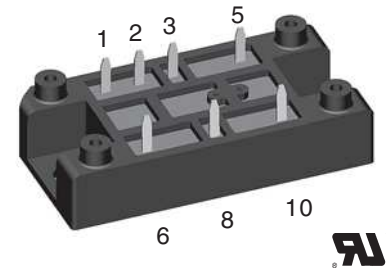
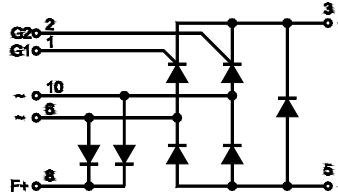
Half Controlled Single Phase Rectifier Bridge

Including Freewheeling Diode and Field Diodes

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

$$I_{dAVM} = 21 \text{ A}$$

| V_{RSM} V_{DSM} V | V_{RRM} V_{DRM} V | Type |
|-----------------------------|-----------------------------|---------------|
| 900 | 800 | VHFD 16-08io1 |
| 1300 | 1200 | VHFD 16-12io1 |
| 1700 | 1600 | VHFD 16-16io1 |



Bridge and Freewheeling Diode

| Symbol | Conditions | Maximum Ratings | |
|----------------------|---|-------------------------------------|-----------------------|
| I_{dAV} | $T_H = 85^\circ\text{C}$, module | 16 | A |
| I_{dAVM}^* | module | 21 | A |
| I_{FRMS}, I_{TRMS} | per leg | 15 | A |
| I_{FSM}, I_{TSM} | $T_{VJ} = 45^\circ\text{C}; V_R = 0 \text{ V}$ | $t = 10 \text{ ms}$ (50 Hz), sine | 150 A |
| | | $t = 8.3 \text{ ms}$ (60 Hz), sine | 170 A |
| I^2t | $T_{VJ} = T_{VJM}; V_R = 0 \text{ V}$ | $t = 10 \text{ ms}$ (50 Hz), sine | 130 A |
| | | $t = 8.3 \text{ ms}$ (60 Hz), sine | 140 A |
| $(di/dt)_{cr}$ | $T_{VJ} = 125^\circ\text{C}$ | repetitive, $I_T = 50 \text{ A}$ | 150 A/ μs |
| | $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ $I_G = 0.3 \text{ A}$, $di_G/dt = 0.3 \text{ A}/\mu\text{s}$ | non repetitive, $I_T = 0.5 I_{dAV}$ | 500 A/ μs |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise) | | 1000 V/ μs |
| V_{RGM} | | 10 | V |
| P_{GM} | $T_{VJ} = T_{VJM}$ $I_T = 0.5 I_{dAVM}$ | $t_p = 30 \mu\text{s}$ | $\leq 10 \text{ W}$ |
| | | $t_p = 500 \mu\text{s}$ | $\leq 5 \text{ W}$ |
| | | $t_p = 10 \text{ ms}$ | $\leq 1 \text{ W}$ |
| 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 | $t = 1 \text{ min}$ | 3000 V~ |
| | $I_{ISOL} \leq 1 \text{ mA}$ | $t = 1 \text{ s}$ | 3600 V~ |
| d_s | Creep distance on surface | 12.7 | mm |
| d_A | Strike distance in air | 9.4 | mm |
| a | Max. allowable acceleration | 50 | m/s^2 |
| M_d | Mounting torque (M5) (10-32 UNF) | 2-2.5 | Nm |
| | | 18-22 | lb.in. |
| Weight | | 35 | g |

Features

- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Blocking voltage up to 1600 V
- Low forward voltage drop
- Leads suitable for PC board soldering
- UL registered E 72873

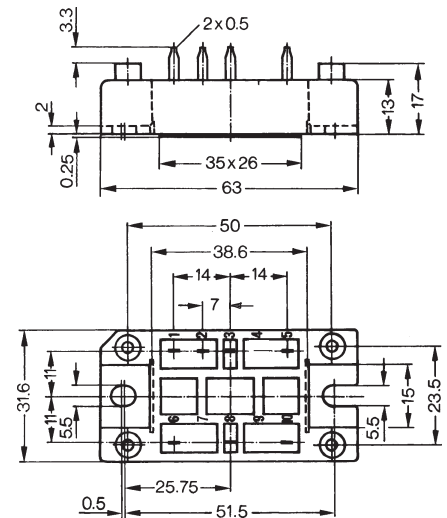
Applications

- 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")



| Symbol | Conditions | Characteristic Values |
|------------|--|---|
| I_R, I_D | $V_R = V_{RRM}; V_D = V_{DRM}$ $T_{VJ} = T_{VJM}$ $T_{VJ} = 25^\circ\text{C}$ | ≤ 5 mA ≤ 0.3 mA |
| V_T, V_F | $I_T, I_F = 45$ A; $T_{VJ} = 25^\circ\text{C}$ | ≤ 2.55 V |
| V_{T0} | For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$) | 1.0 V |
| r_T | | 40 m Ω |
| V_{GT} | $V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$ | ≤ 1.0 V ≤ 1.2 V |
| I_{GT} | $V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | ≤ 65 mA ≤ 80 mA ≤ 50 mA |
| V_{GD} | $T_{VJ} = T_{VJM};$ $V_D = 2/3 V_{DRM}$ | ≤ 0.2 V |
| I_{GD} | $T_{VJ} = T_{VJM};$ $V_D = 2/3 V_{DRM}$ | ≤ 5 mA |
| I_L | $I_G = 0.3$ A; $t_G = 30$ μs ; $di_G/dt = 0.3$ A/ μs ; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | ≤ 150 mA ≤ 200 mA ≤ 100 mA |
| I_H | $T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$ | ≤ 100 mA |
| t_{gd} | $T_{VJ} = 25^\circ\text{C}; V_D = 0.5 V_{DRM}$ $I_G = 0.3$ A; $di_G/dt = 0.3$ A/ μs | ≤ 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_f | $di/dt = -10$ A/ μs , $dv/dt = 20$ V/ μs , $V_D = 2/3 V_{DRM}$ | 75 μC |
| R_{thJC} | per thyristor (diode); DC current | 2.4 K/W |
| | per module | 0.6 K/W |
| R_{thJH} | per thyristor (diode); DC current | 3.0 K/W |
| | per module | 0.75 K/W |

Field Diodes

| Symbol | Conditions | Maximum Ratings |
|------------|--|--|
| I_{FAV} | $T_H = 85^\circ\text{C}$, per Diode | 4 A |
| I_{FAVM} | per diode | 4 A |
| I_{FRMS} | per diode | 6 A |
| I_{FSM} | $T_{VJ} = 45^\circ\text{C};$ $V_R = 0$ V $t = 10$ ms (50 Hz), sine $t = 8.3$ ms (60 Hz), sine | 100 A 110 A |
| | $T_{VJ} = T_{VJM}$ $V_R = 0$ V $t = 10$ ms (50 Hz), sine $t = 8.3$ ms (60 Hz), sine | 85 A 94 A |
| I^2t | $T_{VJ} = 45^\circ\text{C}$ $V_R = 0$ V $t = 10$ ms (50 Hz), sine $t = 8.3$ ms (60 Hz), sine | 50 A ² s 50 A ² s |
| | $T_{VJ} = T_{VJM}$ $V_R = 0$ V $t = 10$ ms (50 Hz), sine $t = 8.3$ ms (60 Hz), sine | 36 A ² s 37 A ² s |
| I_R | $V_R = V_{RRM}$ $T_{VJ} = T_{VJM}$ $T_{VJ} = 25^\circ\text{C}$ | 1 mA 0.15 mA |
| V_F | $I_F = 21$ A; $T_{VJ} = 25^\circ\text{C}$ | 1.83 V |
| V_{T0} | For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$) | 0.9 V |
| r_T | | 50 m Ω |
| R_{thJC} | per diode; DC current | 4.4 K/W |
| R_{thJH} | per diode; DC current | 5.2 K/W |

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

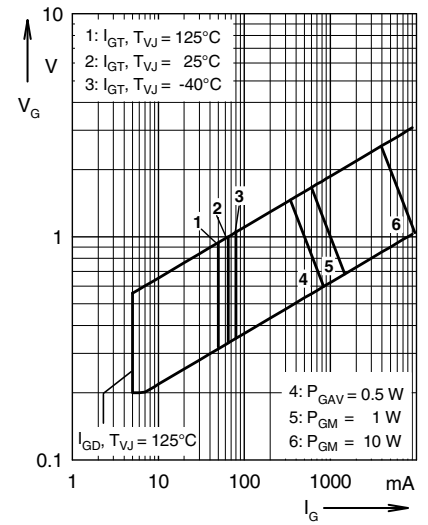


Fig. 1 Gate trigger range

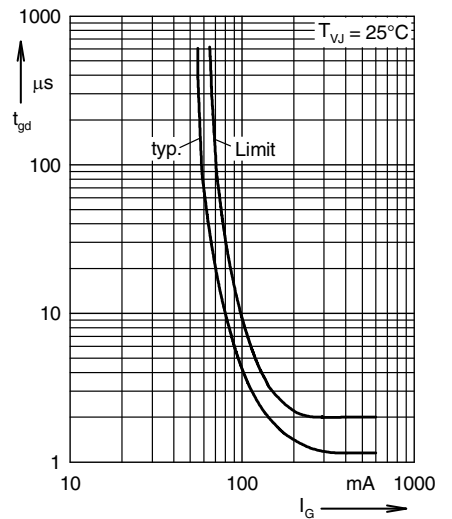


Fig. 2 Gate controlled delay time t_{gd}

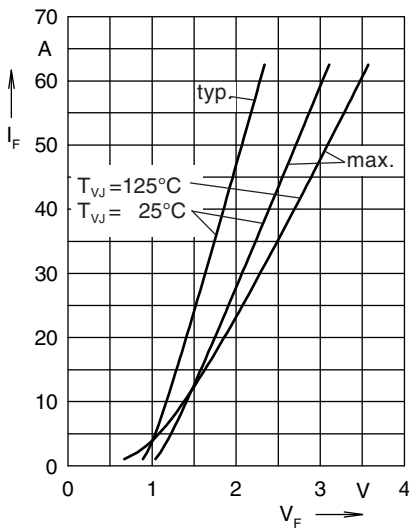


Fig. 3 Forward current vs. voltage drop per diode

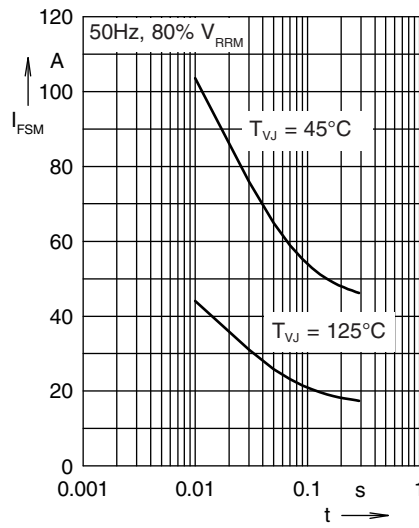


Fig. 4 Surge overload current

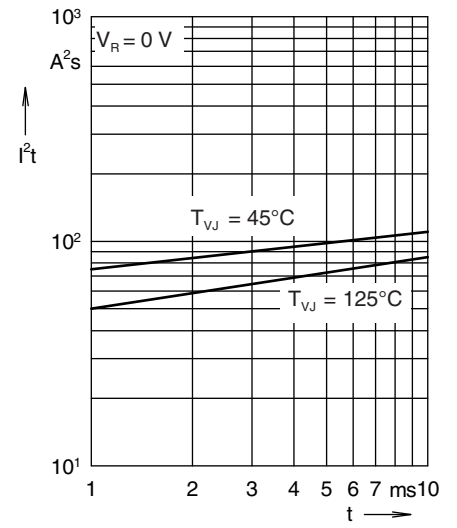


Fig. 5 I^2t versus time per diode

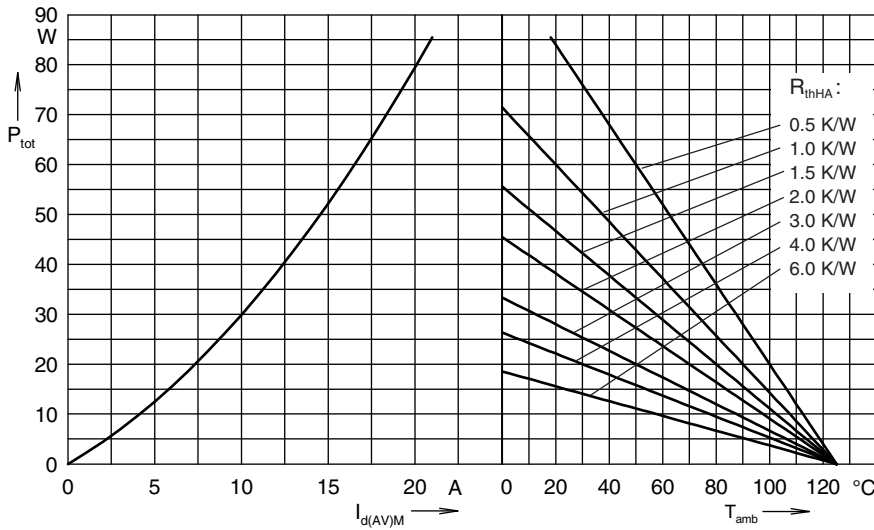


Fig. 6 Power dissipation vs. direct output current and ambient temperature

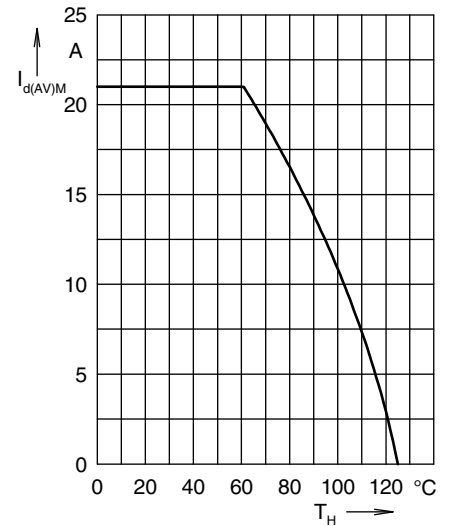


Fig. 7 Max. forward current vs. heatsink temperature

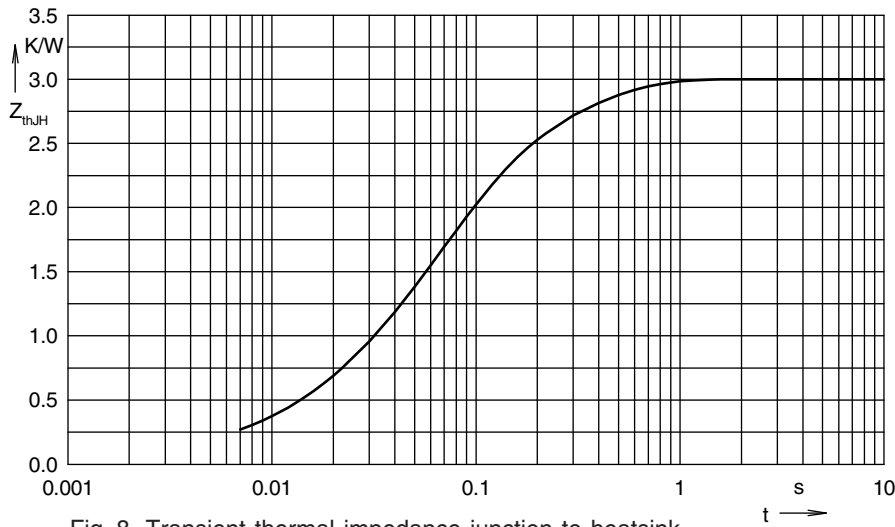


Fig. 8 Transient thermal impedance junction to heatsink

Constants for Z_{thJH} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.01 | 0.008 |
| 2 | 0.4 | 0.05 |
| 3 | 1.69 | 0.06 |
| 4 | 0.9 | 0.25 |