

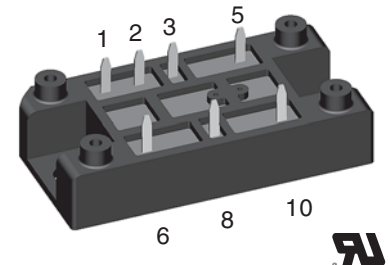
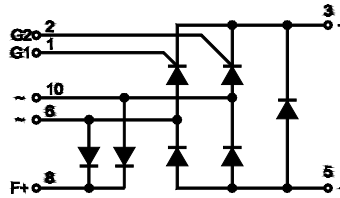
Half Controlled Single Phase Rectifier Bridge

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



Replacement: VHFD37-08/-12/-16 io1

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
	$T_{VJ} = T_{VJM}$; $V_R = 0 \text{ V}$	$t = 10 \text{ ms}$ (50 Hz), sine 130 A
		$t = 8.3 \text{ ms}$ (60 Hz), sine 140 A
I^2t	$T_{VJ} = 45^\circ\text{C}$; $V_R = 0 \text{ V}$	$t = 10 \text{ ms}$ (50 Hz), sine 110 A ² s
		$t = 8.3 \text{ ms}$ (60 Hz), sine 120 A ² s
	$T_{VJ} = T_{VJM}$; $V_R = 0 \text{ V}$	$t = 10 \text{ ms}$ (50 Hz), sine 85 A ² s
		$t = 8.3 \text{ ms}$ (60 Hz), sine 80 A ² s
$(di/dt)_{cr}$	$T_{VJ} = 125^\circ\text{C}$; $f = 50 \text{ Hz}$, $t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ $I_G = 0.3 \text{ A}$, $di_G/dt = 0.3 \text{ A}/\mu\text{s}$	repetitive, $I_T = 50 \text{ A}$ 150 A/ μs
		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}	$T_{VJ} = T_{VJM}$	$t_p = 30 \mu\text{s}$ $\leq 10 \text{ W}$
		$t_p = 500 \mu\text{s}$ $\leq 5 \text{ W}$
	$I_T = 0.5 I_{dAVM}$	$t_p = 10 \text{ ms}$ $\leq 1 \text{ W}$
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)	2-2.5 Nm
	(10-32 UNF)	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

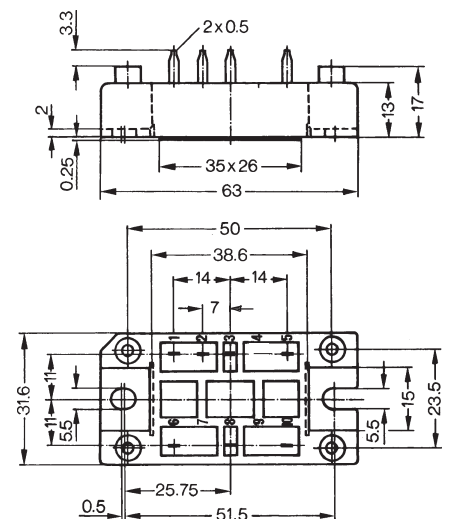
Applications

- 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	$V_R = V_{RRM}; V_D = V_{DRM}$ $T_{VJ} = T_{VJM}$ $T_{VJ} = 25^{\circ}\text{C}$	$\leq$ $\leq$	5 0.3	mA mA
V_T, V_F	$I_T, I_F = 45\text{ A}; T_{VJ} = 25^{\circ}\text{C}$	$\leq$	2.55	V
V_{T0} r_T	For power-loss calculations only ($T_{VJ} = 125^{\circ}\text{C}$)		1.0 40	V m Ω
V_{GT}	$V_D = 6\text{ V};$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$	$\leq$ $\leq$	1.0 1.2	V V
I_{GT}	$V_D = 6\text{ V};$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	$\leq$ $\leq$ $\leq$	65 80 50	mA mA mA
V_{GD} I_{GD}	$T_{VJ} = T_{VJM};$ $T_{VJ} = T_{VJM};$ $V_D = 2/3 V_{DRM}$ $V_D = 2/3 V_{DRM}$	$\leq$ $\leq$	0.2 5	V mA
I_L	$I_G = 0.3\text{ A}; t_G = 30\text{ }\mu\text{s};$ $di_G/dt = 0.3\text{ A}/\mu\text{s};$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	$\leq$ $\leq$ $\leq$	150 200 100	mA mA mA
I_H	$T_{VJ} = 25^{\circ}\text{C}; V_D = 6\text{ V}; R_{GK} = \infty$	$\leq$	100	mA
t_{gd}	$T_{VJ} = 25^{\circ}\text{C}; V_D = 0.5V_{DRM}$ $I_G = 0.3\text{ A}; di_G/dt = 0.3\text{ A}/\mu\text{s}$	$\leq$	2	μs
t_q Q_r	$T_{VJ} = 125^{\circ}\text{C}; I_T = 15\text{ A}; t_p = 300\text{ }\mu\text{s}; V_R = 100\text{ V}$ $di/dt = -10\text{ A}/\mu\text{s}; dv/dt = 20\text{ V}/\mu\text{s}; V_D = 2/3 V_{DRM}$	typ.	150 75	μs μC
R_{thJC}	per thyristor (diode); DC current per module		2.4 0.6	K/W K/W
R_{thJH}	per thyristor (diode); DC current per module		3.0 0.75	K/W 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

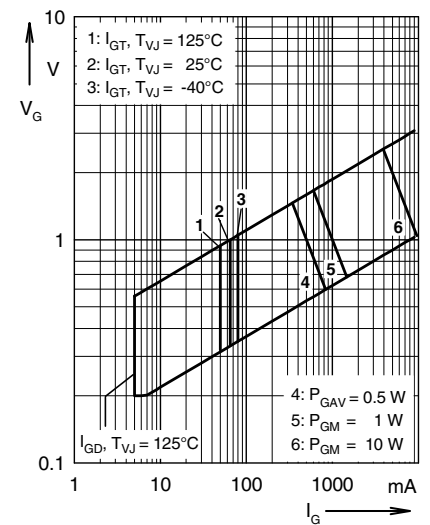


Fig. 1 Gate trigger range

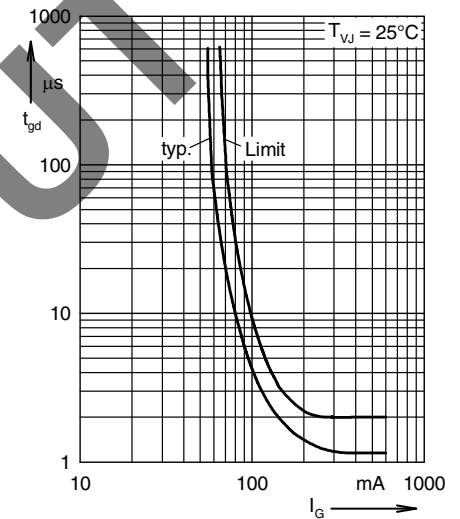


Fig. 2 Gate controlled delay time t_{gd}

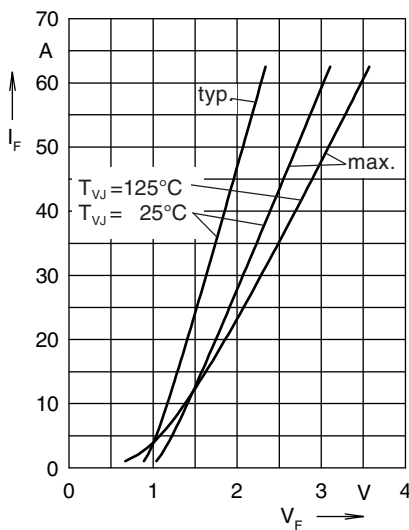


Fig. 3 Forward current vs. voltage drop per diode

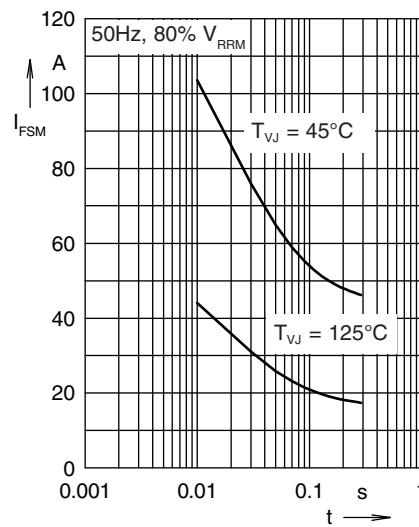


Fig. 4 Surge overload current

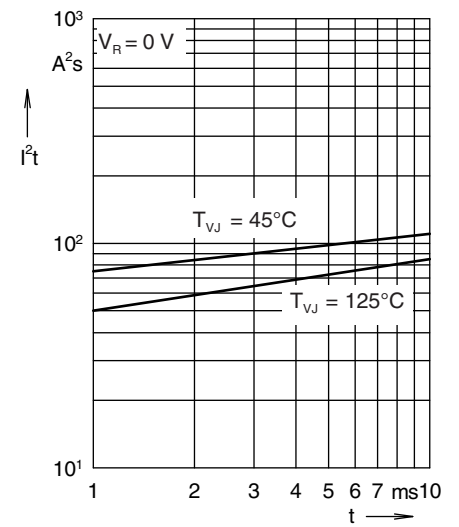


Fig. 5 I^2t versus time per diode

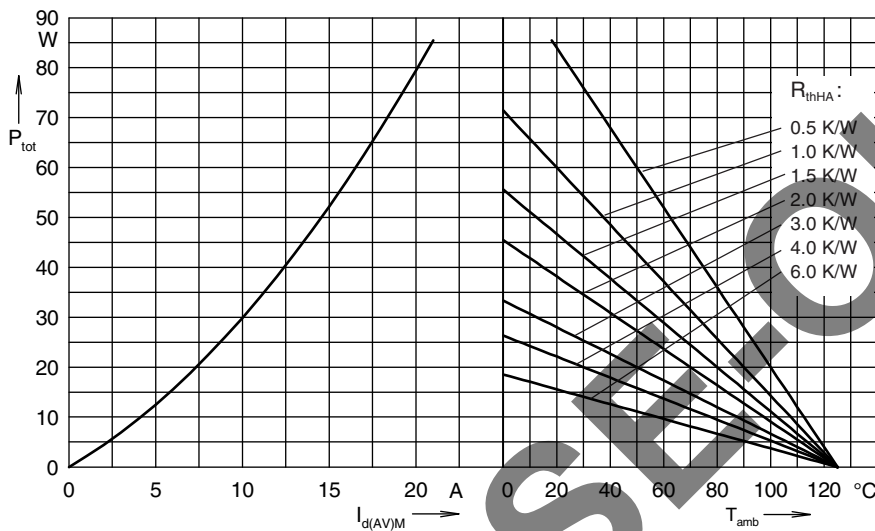


Fig. 6 Power dissipation vs. direct output current and ambient temperature

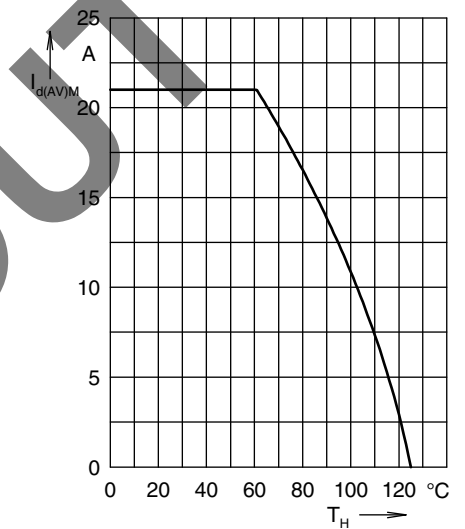


Fig. 7 Max. forward current vs. heatsink temperature

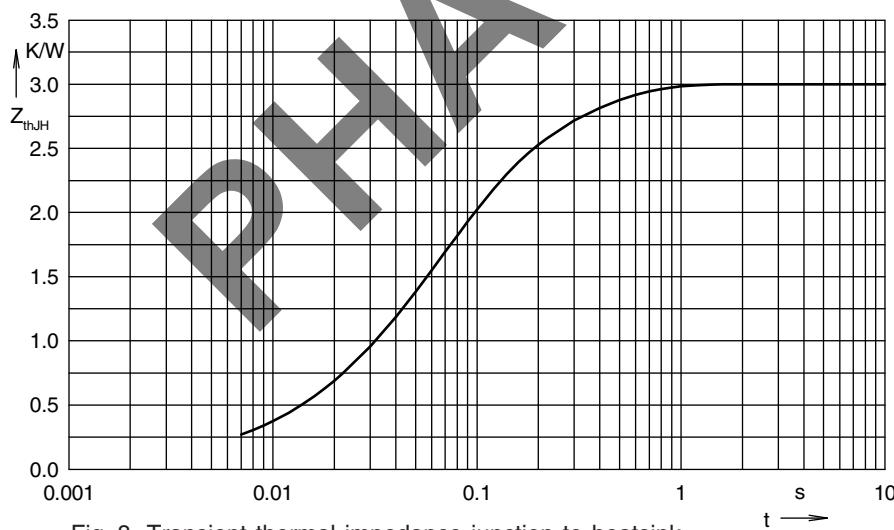


Fig. 8 Transient thermal impedance junction to heatsink

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