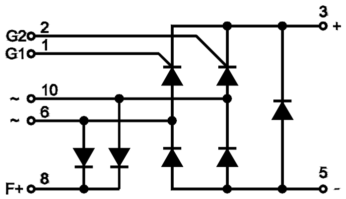
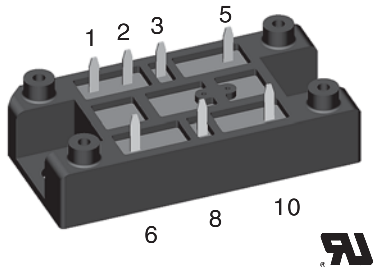
Half Controlled Single Phase Rectifier Bridge

Including Freewheeling Diode and Field Diodes

V_{RRM} = 800-1600 V
I_{dAVM} = 21 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

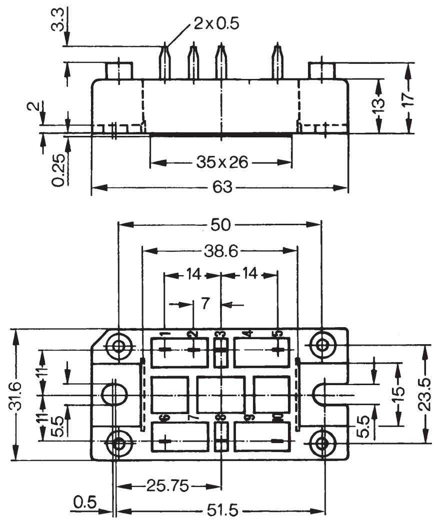
Symbol	Conditions		Maximum Ratings	
I_{dAV}	T_H = 85°C, module		16	A
I_{dAVM} ✶	module		21	A
I_{FRMS}, I_{TRMS}	per leg		15	A
I_{FSM}, I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	150	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	170	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	130	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	140	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	110	A^2s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	120	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	85	A^2s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	80	A^2s
$(di/dt)_{cr}$	T_{VJ} = 125°C	repetitive, I_T = 50 A	150	A/µs
	f = 50 Hz, t_P = 200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.3 A,	non repetitive, I_T = 0.5 I_{dAV}	500	A/µs
	di_G/dt = 0.3 A/µs			
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; V_{DR} = 2/3 V_{DRM}		1000	V/µs
	R_{GK} = ∞; method 1 (linear voltage rise)			
V_{RGM}			10	V
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	≤ 10	W
	I_T = 0.5 I_{dAVM}	t_p = 500 µs	≤ 5	W
		t_p = 10 ms	≤ 1	W
P_{GAVM}			0.5	W
T_{VJ}			-40...+125	°C
T_{VJM}			125	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 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")



IXYS reserves the right to change limits, test conditions and dimensions. 20100705a

Symbol	Conditions			Characteristic Values	
I_R, I_D	$V_R = V_{RRM}$; $V_D = V_{DRM}$	$T_{VJ} = T_{VJM}$	≤	5	mA
		$T_{VJ} = 25°C$	≤	0.3	mA
V_T, V_F	I_T, $I_F = 45$ A; $T_{VJ} = 25°C$		≤	2.55	V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125°C$)			1.0	V
r_T				40	mΩ
V_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	≤	1.0	V
		$T_{VJ} = -40°C$	≤	1.2	V
I_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	≤	65	mA
		$T_{VJ} = -40°C$	≤	80	mA
		$T_{VJ} = 125°C$	≤	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;	$T_{VJ} = 25°C$	≤	150	mA
	$di_G/dt = 0.3$ A/µs;	$T_{VJ} = -40°C$	≤	200	mA
		$T_{VJ} = 125°C$	≤	100	mA
I_H	$T_{VJ} = 25°C$; $V_D = 6$ V; $R_{GK} = \infty$		≤	100	mA
t_{gd}	$T_{VJ} = 25°C$; $V_D = 0.5V_{DRM}$		≤	2	µs
	$I_G = 0.3$ A; $di_G/dt = 0.3$ A/µs				
t_q	$T_{VJ} = 125°C$, $I_T = 15$ 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			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}	$T_H = 85°C$, per Diode		4	A
I_{FAVM}	per diode		4	A
I_{FRMS}	per diode		6	A
I_{FSM}	$T_{VJ} = 45°C$;	t = 10 ms (50 Hz), sine	100	A
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	110	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	85	A
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	94	A
I^2t	$T_{VJ} = 45°C$	t = 10 ms (50 Hz), sine	50	A^2s
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	50	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	36	A^2s
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	37	A^2s
I_R	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$	1	mA
		$T_{VJ} = 25°C$	0.15	mA
V_F	$I_F = 21$ A; $T_{VJ} = 25°C$		1.83	V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125°C$)		0.9	V
r_T			50	mΩ
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

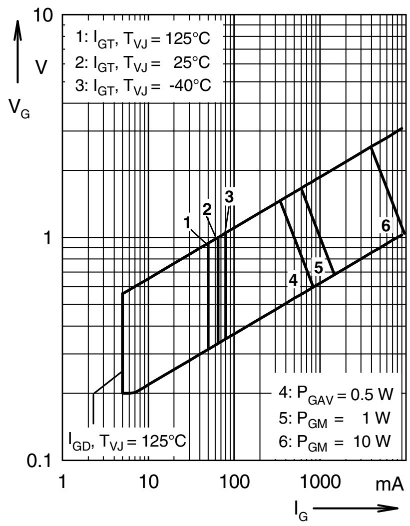


Fig. 1 Gate trigger range

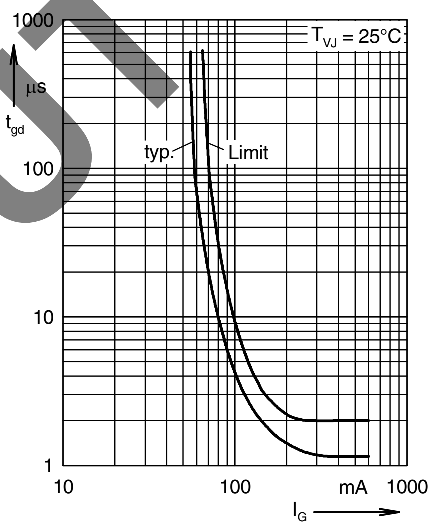


Fig. 2 Gate controlled delay time t_{gd}

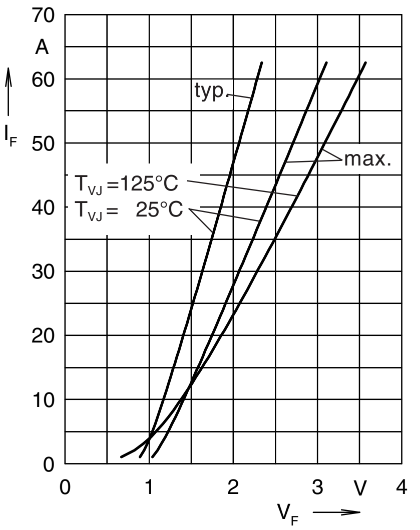


Fig. 3 Forward current vs. voltage drop per diode

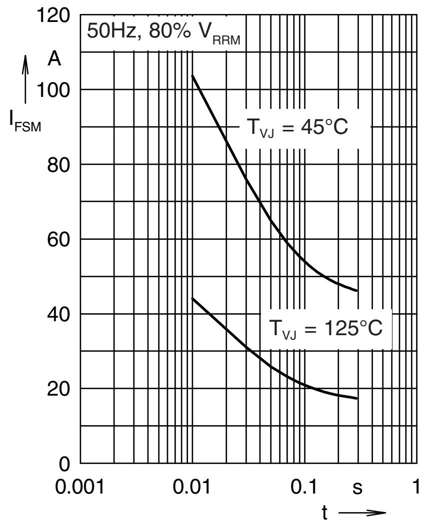


Fig. 4 Surge overload current

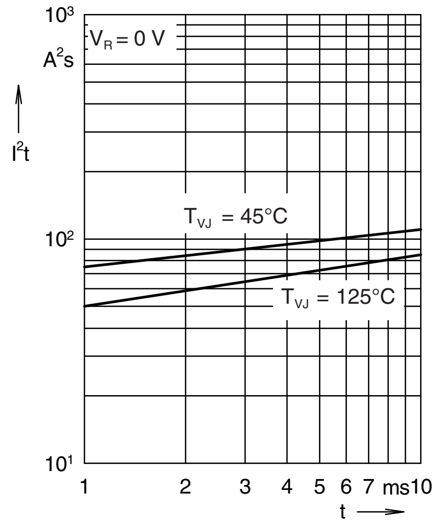


Fig. 5 I^2t versus time per diode

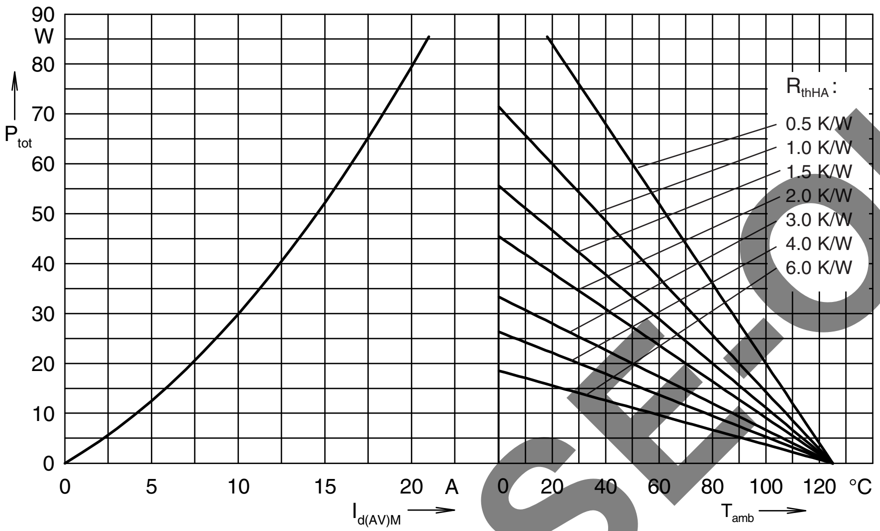


Fig. 6 Power dissipation vs. direct output current and ambient temperature

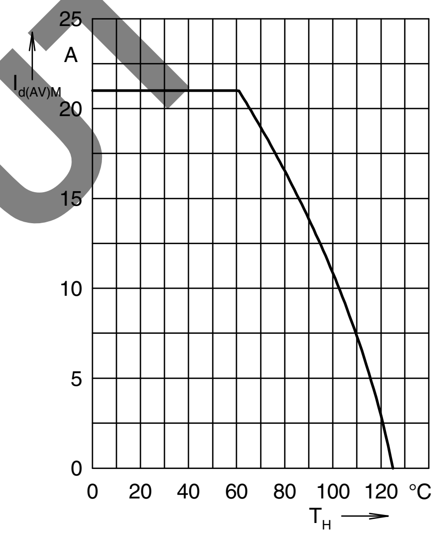


Fig. 7 Max. forward current vs. heatsink temperature

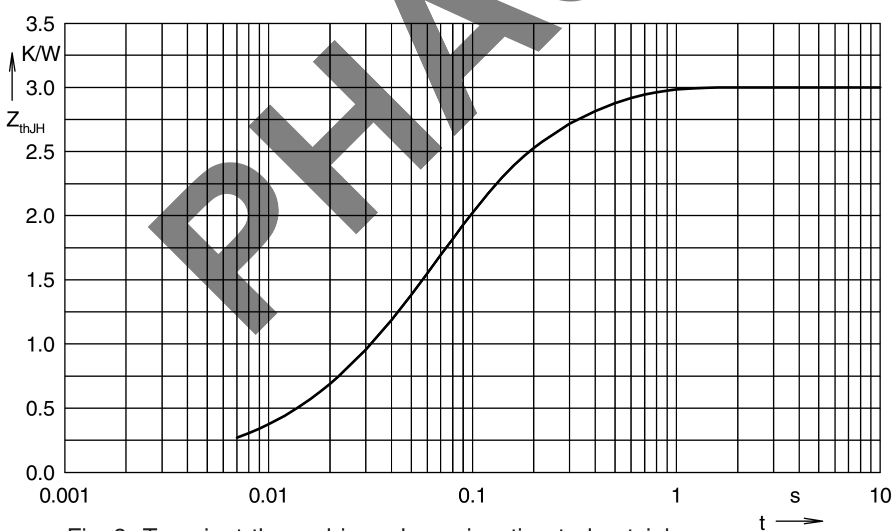


Fig. 8 Transient thermal impedance junction to heatsink

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

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