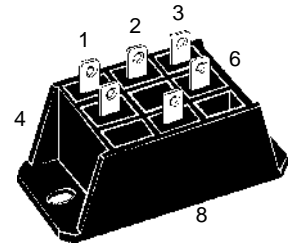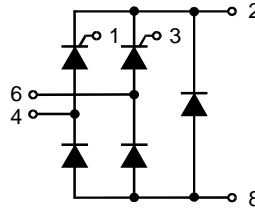# Half Controlled
Single Phase Rectifier Bridge
with Freewheeling Diode

I_{dAVM} = 40 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type
V	V	
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}	T_K = 85°C, module		36	A
I_{dAVM} ①	module		40	A
I_{FRMS}, I_{TRMS}	per leg		28	A
I_{FSM}, I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	320	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	350	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	280	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	310	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	500	A^2s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	520	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	390	A^2s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	400	A^2s
$(di/dt)_{cr}$	T_{VJ} = 125°C f =50 Hz, t_P =200 µs V_D = 2/3 V_{DRM}	repetitive, I_T = 50 A	150	A/µs
	I_G = 0.3 A, di_G/dt = 0.3 A/µs	non repetitive, I_T = 1/2 • I_{dAV}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM} R_{GK} = ∞; method 1 (linear voltage rise)		1000	V/µs
V_{RGM}			10	V
P_{GM}	T_{VJ} = T_{VJM}	t_p = 30 µs	≤ 10	W
	I_T = I_{TAVM}	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~
M_d	Mounting torque	(M5)	2-2.5	Nm
		(10-32 UNF)	18-22	lb.in.
Weight			50	g

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.

Features
• Package with DCB ceramic base plate
• Isolation voltage 3600 V~
• Planar passivated chips
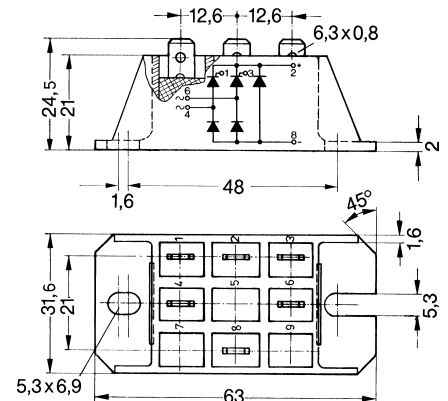• ¼" fast-on terminals
• UL registered E 72873

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")

Symbol	Test Conditions		Characteristic Values		
I_R, I_D	$V_R = V_{RRM}$; $V_D = V_{DRM}$	$T_{VJ} = T_{VJM}$	$\leq$	5	mA
		$T_{VJ} = 25°C$	$\leq$	0.3	mA
V_T, V_F	I_T, $I_F = 45$ A; $T_{VJ} = 25°C$		$\leq$	1.45	V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125°C$)			0.85	V
r_T				13	mΩ
V_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	$\leq$	1.0	V
		$T_{VJ} = -40°C$	$\leq$	1.2	V
I_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	$\leq$	65	mA
		$T_{VJ} = -40°C$	$\leq$	80	mA
		$T_{VJ} = 125°C$	$\leq$	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;	$T_{VJ} = 25°C$	$\leq$	150	mA
	$di_G/dt = 0.3$ A/μs;	$T_{VJ} = -40°C$	$\leq$	200	mA
		$T_{VJ} = 125°C$	$\leq$	100	mA
I_H	$T_{VJ} = 25°C$; $V_D = 6$ V; $R_{GK} = \infty$		$\leq$	100	mA
t_{gd}	$T_{VJ} = 25°C$; $V_D = 1/2\ V_{DRM}$ $I_G = 0.3$ A; $di_G/dt = 0.3$ A/μs		$\leq$	2	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			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^2

Fig. 1 Gate trigger range

1: I_{GT}, $T_{VJ} = 125°C$
2: I_{GT}, $T_{VJ} = 25°C$
3: I_{GT}, $T_{VJ} = -40°C$
4: $P_{GAV} = 0.5$ W
5: $P_{GM} = 1$ W
6: $P_{GM} = 10$ W
I_{GD}, $T_{VJ} = 125°C$
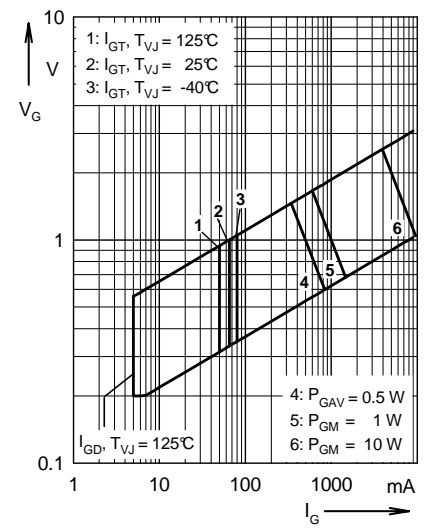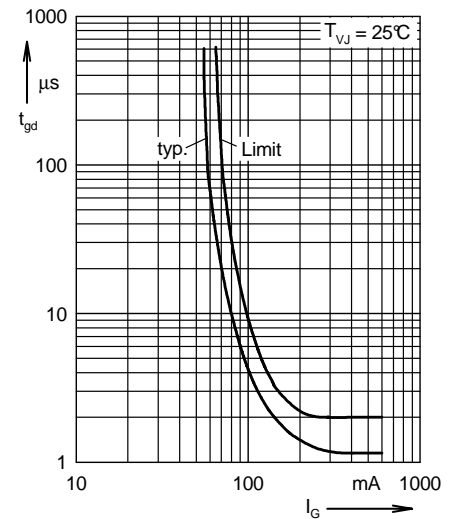
Fig. 2 Gate controlled delay time t_{gd}
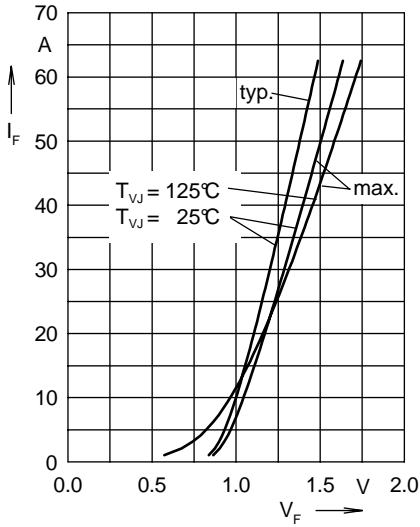
$T_{VJ} = 25°C$
typ. — Limit

750

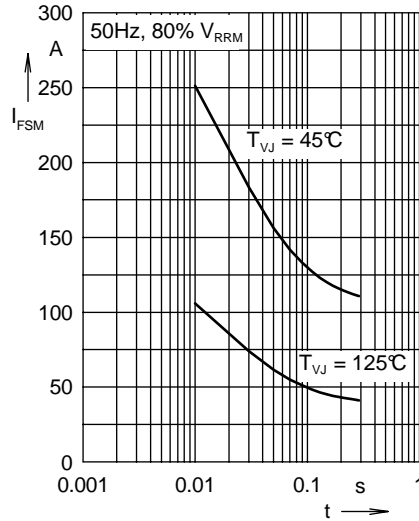Fig. 3 Forward current versus voltage drop per diode
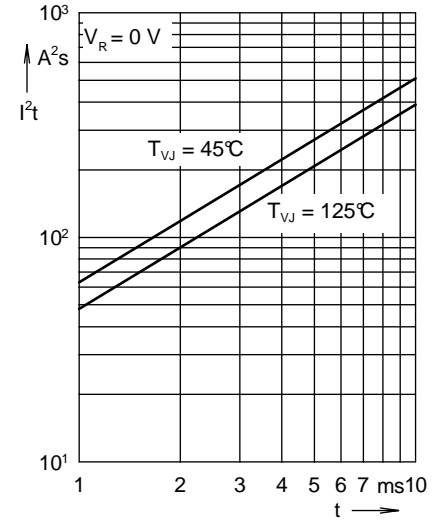

Fig. 4 Surge overload current

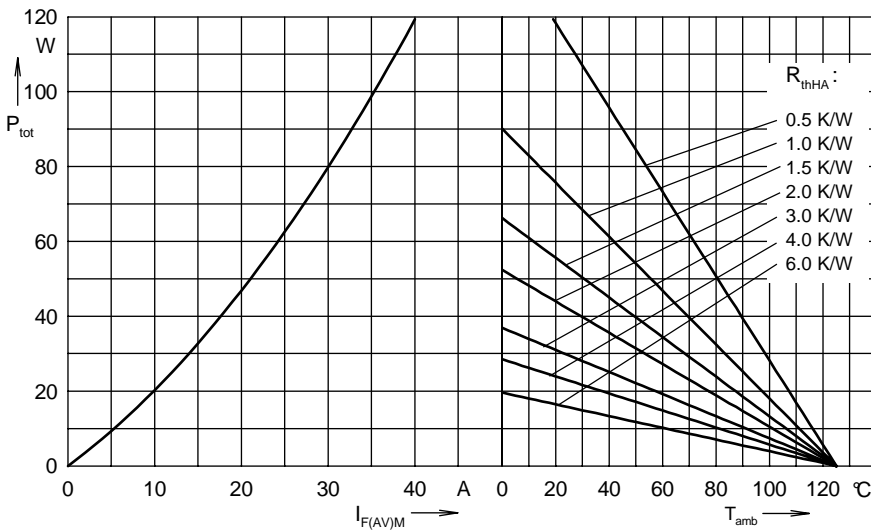Fig. 5 I²t versus time per diode

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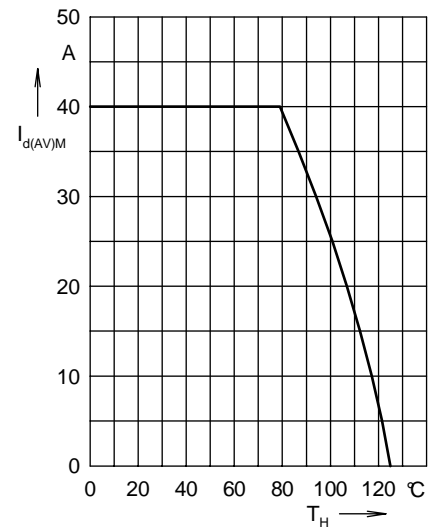

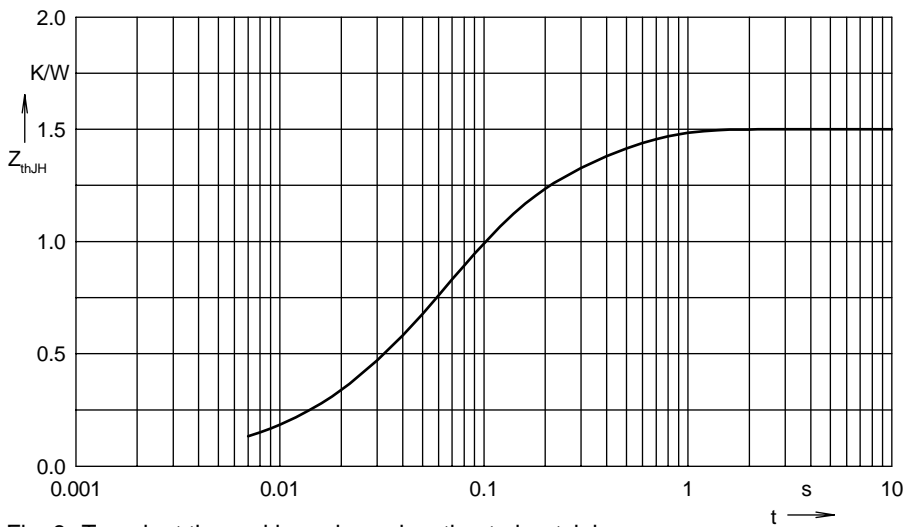Fig. 7 Max. forward current versus heatsink temperature

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