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IXYS Corporation
VHFD16-14IO1

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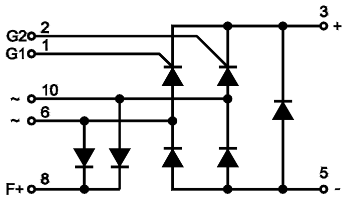
IXYS **VHFD 16**

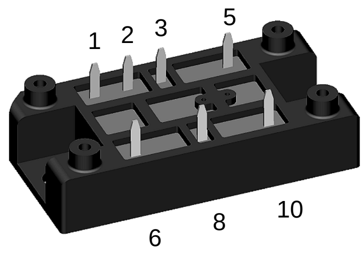
Half Controlled
Single Phase Rectifier Bridge

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
1500	1400	VHFD 16-14io1
1700	1600	VHFD 16-16io1





Bridge and Freewheeling Diode

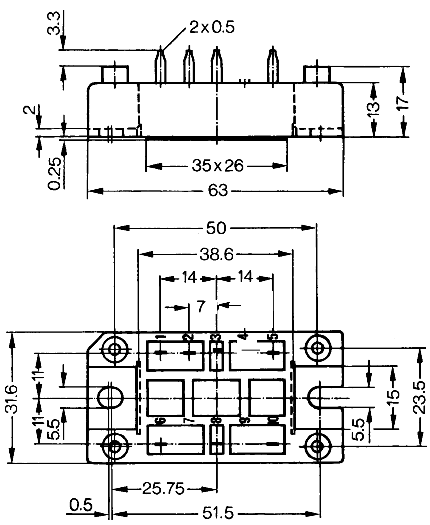
Symbol	Test Conditions		Maximum Ratings	
I_{dAV}	T_H = 85°C, module		16	A
I_{dAVM} ①	module		21	A
I_{FRMS}, I_{TRMS}	per leg		15	A
I_{FSM}, I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	150	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	170	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	130	A
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	140	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	110	A²s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	120	A²s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	85	A²s
	V_R = 0 V	t = 8.3 ms (60 Hz), sine	80	A²s
$(di/dt)_{cr}$	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/s²
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")



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VHFD 16

Symbol	Test Conditions		Characteristic Values		
I_R, I_D	$V_R = V_{RRM}$; $V_D = V_{DRM}$	$T_{VJ} = T_{VJM}$ T_{VJ} = 25°C	≤ ≤	5 0.3	mA mA
V_T, V_F	I_T, I_F = 45 A; T_{VJ} = 25°C		≤	2.55	V
V_{T0} r_T	For power-loss calculations only (T_{VJ} = 125°C)			1.0 40	V mΩ
V_{GT} I_{GT}	V_D = 6 V; V_D = 6 V;	T_{VJ} = 25°C T_{VJ} = -40°C T_{VJ} = 25°C T_{VJ} = -40°C T_{VJ} = 125°C	≤ ≤ ≤ ≤ ≤	1.0 1.2 65 80 50	V V 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}	≤ ≤	0.2 5	V mA
I_L	I_G = 0.3 A; t_G = 30 µs; di_G/dt = 0.3 A/µs;	T_{VJ} = 25°C T_{VJ} = -40°C T_{VJ} = 125°C	≤ ≤ ≤	150 200 100	mA mA 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} I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	2	µs
t_q Q_r	T_{VJ} = 125°C, I_T = 15 A, t_P = 300 µs, V_R = 100 V di/dt = -10 A/µs, dv/dt = 20 V/µs, V_D = 2/3 V_{DRM}		typ.	150 75	µs µC
R_{thJC} R_{thJH}	per thyristor (diode); DC current per module per thyristor (diode); DC current per module			2.4 0.6 3.0 0.75	K/W K/W K/W K/W

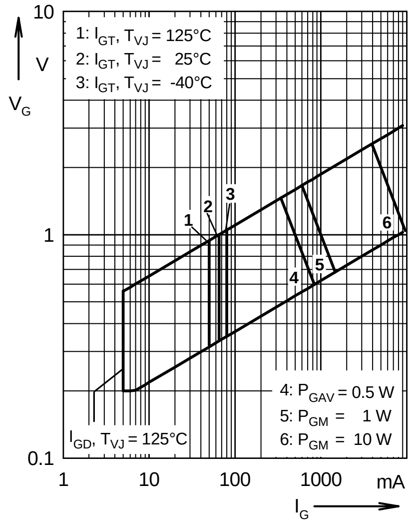

Fig. 1 Gate trigger range

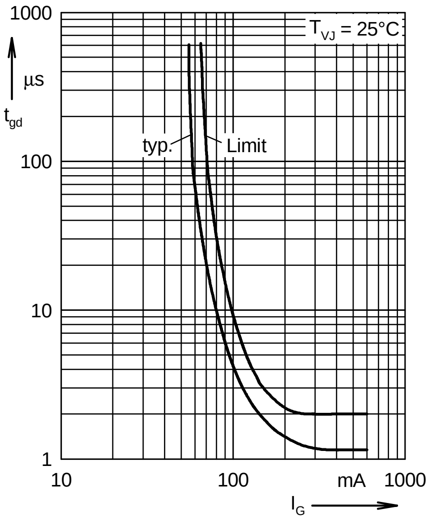

Fig. 2 Gate controlled delay time t_{gd}

Field Diodes

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

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.

750

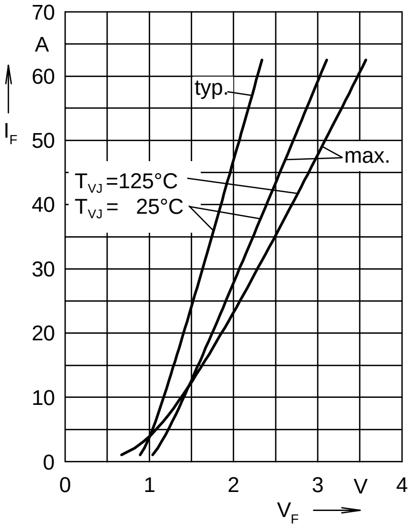

Fig. 3 Forward current versus voltage drop per diode

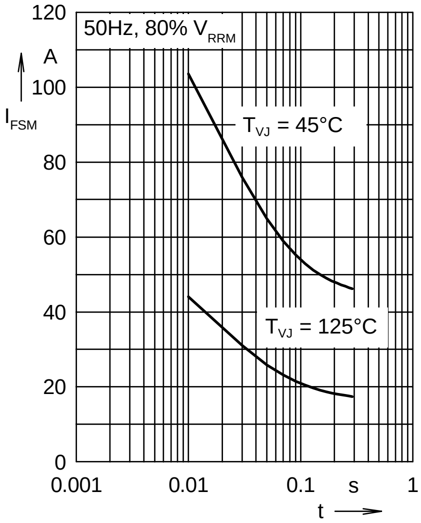

Fig. 4 Surge overload current

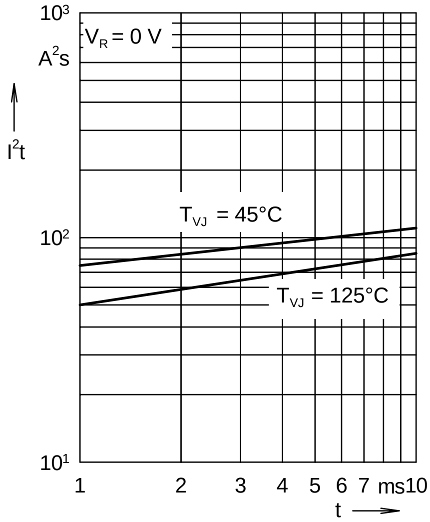

Fig. 5 I^2t versus time per diode

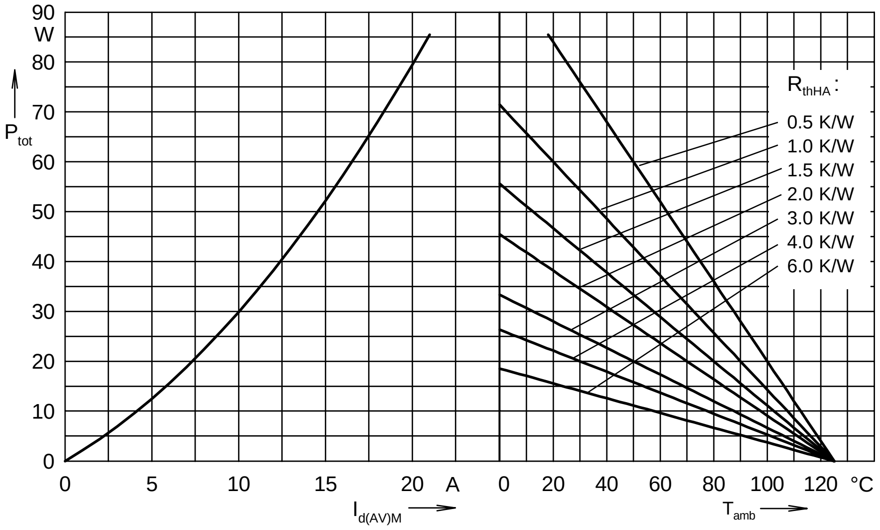

Fig. 6 Power dissipation versus direct output current and ambient temperature

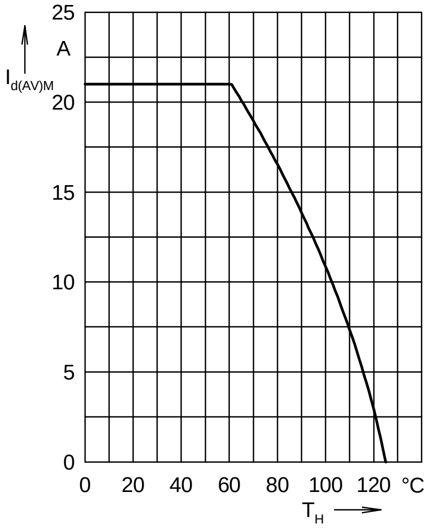

Fig. 7 Max. forward current versus heatsink temperature

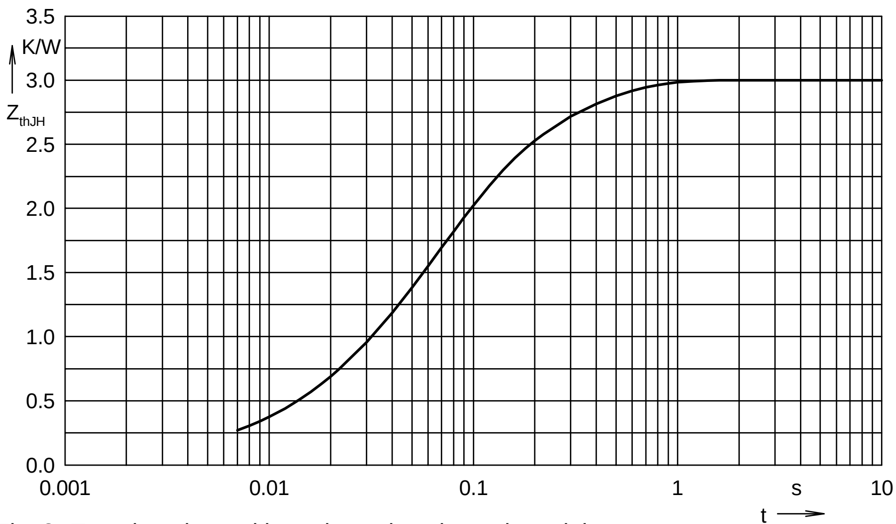

Fig. 8 Transient thermal impedance junction to heatsink

Constants for Z_{thJH} calculation:

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