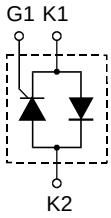
Contents

AC Controller Modules

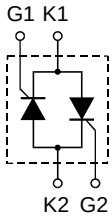
I_{RMS} = 39 A
V_{RRM} = 1200-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
1200	1200	MLO 36-12io1	MMO 36-12io1
1600	1600	MLO 36-16io1	MMO 36-16io1

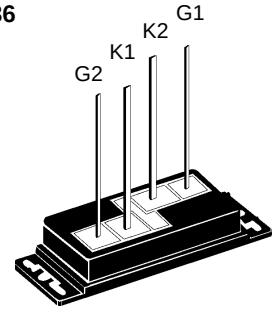
MLO



MMO



MMO 36



K1 = Cathode 1, G1 = Gate 1
K2 = Cathode 2, G2 = Gate 2
(MLO 36 has no G2 lead)

Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_K = 85°C, 50 - 400 Hz (for single controller)		39	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		28	A
I_{TAVM}	T_K = 85°C; (180° sine)		18	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	360	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	390	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	320	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	350	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	645	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	630	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	510	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	510	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs; V_D = 2/3 V_{DRM}; I_G = 0.3 A; di_G/dt = 0.3 A/µs	repetitive, I_T = 150 A	100	A/µs
		non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
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~
	$I_{ISOL} \le$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M3)	0.7 ± 0.1	Nm
		(UNF 4-32)	6 ± 0.9	lb.in.
Weight	typ.		15	g

Features
- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- Direct copper bonded Al_2O_3 -ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- UL registered, E 72873
- Long wire leads suitable for PC board soldering

Applications
- Switching and control of single and three phase AC
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions			Characteristic Values	
I_R, I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.49	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				15	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.0	V
		T_{VJ} = -40°C	≤	1.15	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	65	mA
		T_{VJ} = -40°C	≤	120	mA
I_{GM}	t_p = 50 µs, f = 60 Hz, $I_T = I_{TAVM}$			6	A
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	1	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs, V_D = 6 V I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	150	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 11 A, t_P = 200 µs; -di/dt = 10 A/µs V_R = 100 V; dv/dt = 10 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor/diode; DC current			1.3	K/W
	per module			0.65	K/W
R_{thJK}	per thyristor/diode; DC current			1.5	K/W
	per module			0.75	K/W
d_S	Creeping distance on surface			6	mm
d_A	Creepage distance in air			6	mm
a	Max. allowable acceleration			50	m/s^2

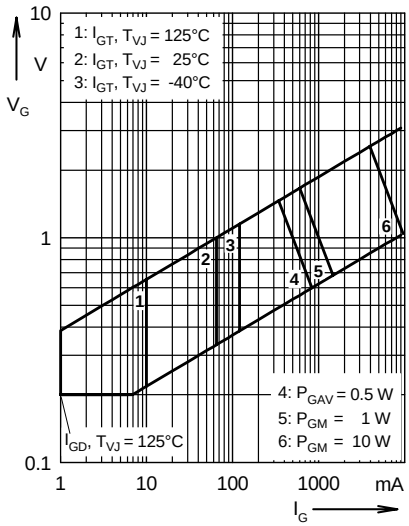


Fig. 1 Gate trigger characteristics

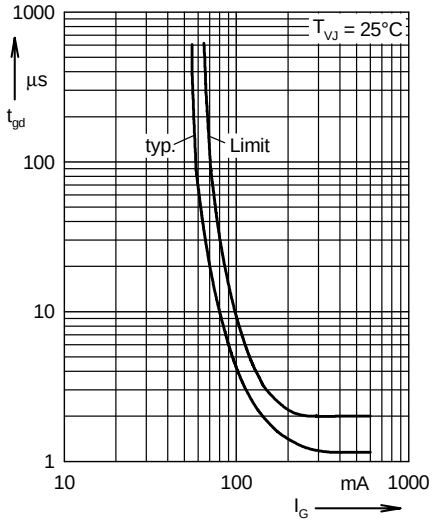


Fig. 2 Gate trigger delay time

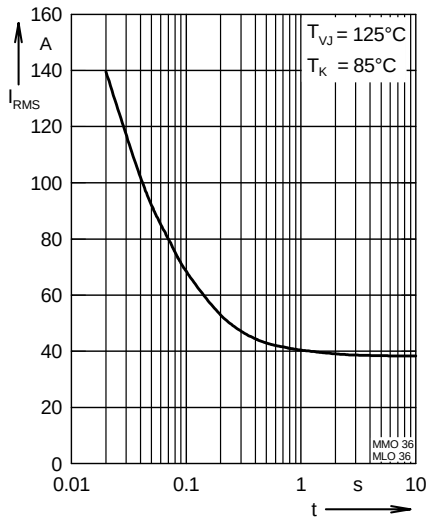
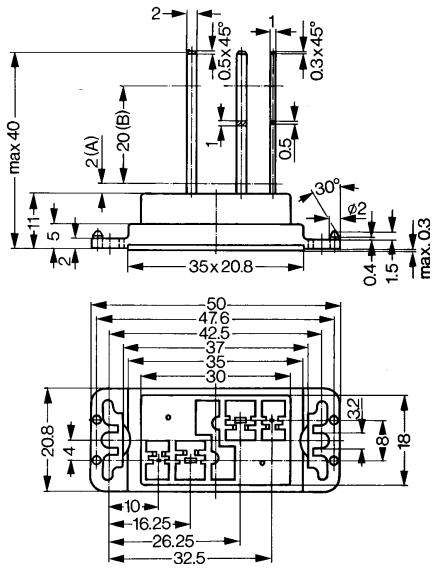


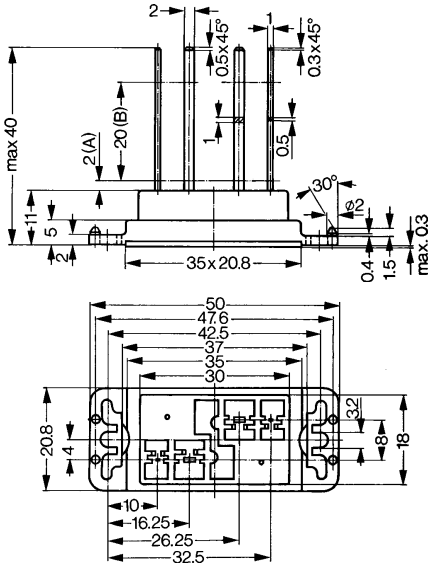
Fig. 3 Rated RMS current versus time (360° conduction)

Dimensions in mm (1 mm = 0.0394")

MLO 36



MMO 36



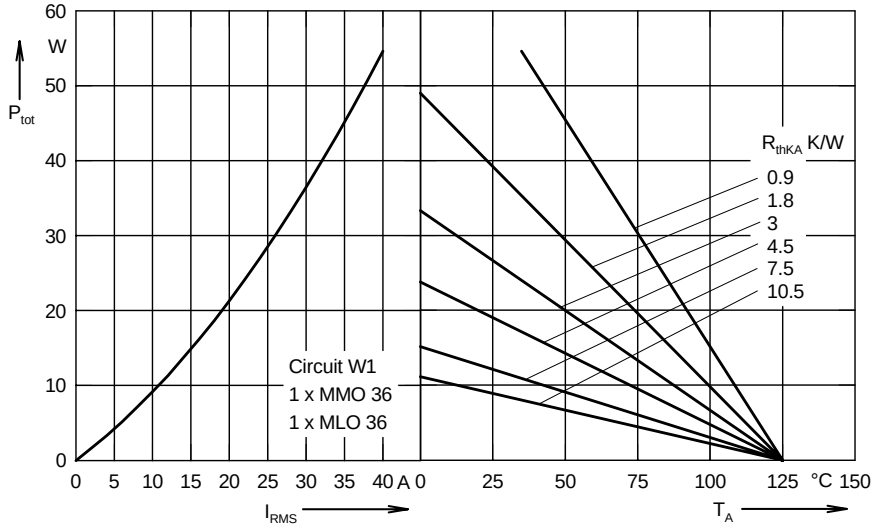


Fig. 4 Load current capability for single phase AC controller

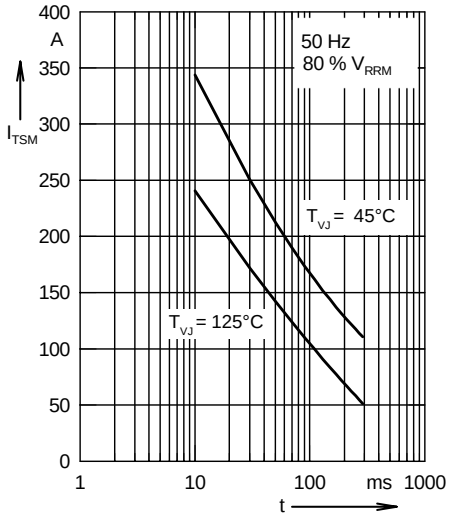


Fig. 5 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

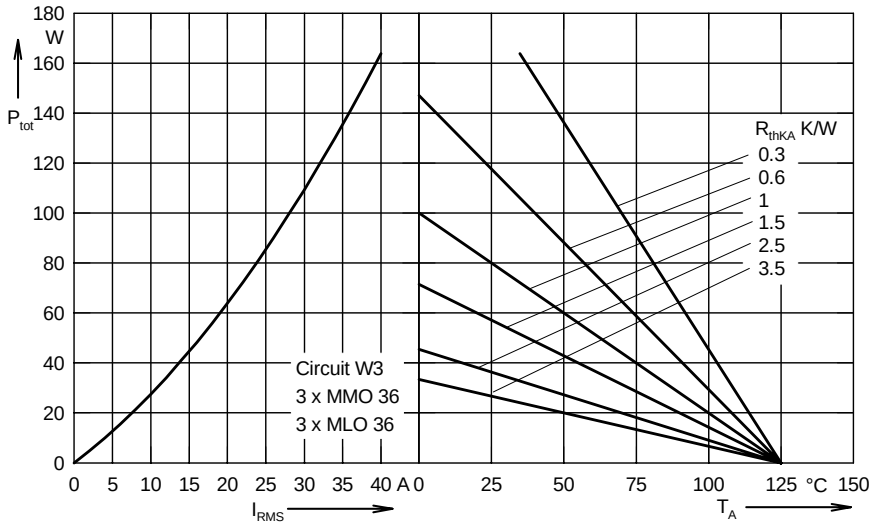


Fig. 6 Load current capability for three phase AC controller: 3xMMO 36/MLO 36

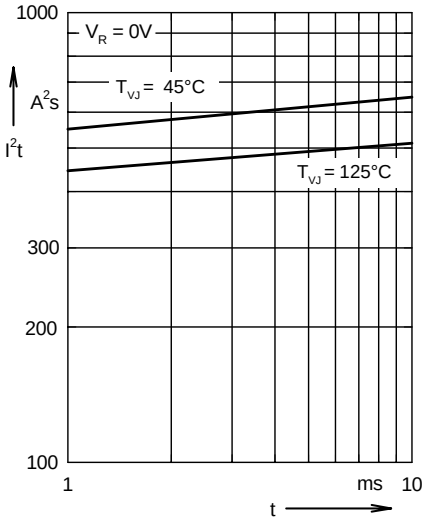


Fig. 7 I^2t versus time (1-10 ms)

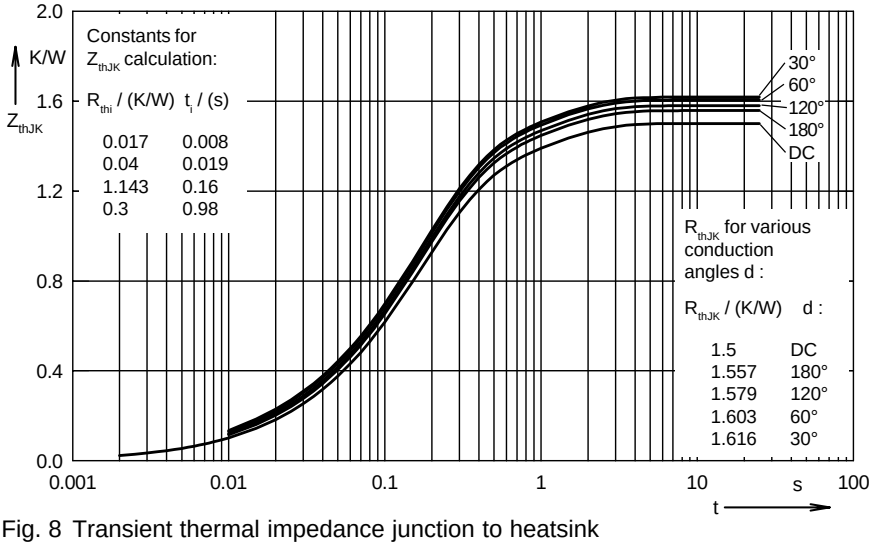


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor or diode)

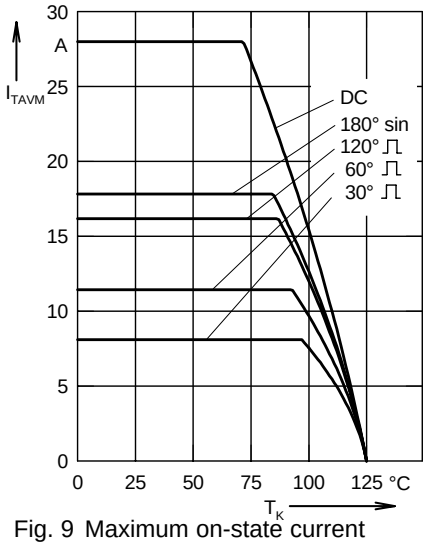
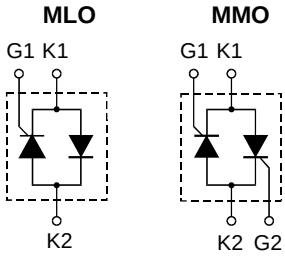


Fig. 9 Maximum on-state current versus heatsink temperature

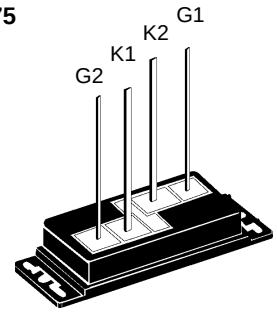
AC Controller Modules

I_{RMS} = 86 A
V_{RRM} = 1200-1600 V

V_{RSM} V	V_{RRM} V_{DSM} V_{DRM} V	Type	
1200	1200	MLO 75-12io1	MMO 75-12io1
1600	1600	MLO 75-16io1	MMO 75-16io1



MMO 75



K1 = Cathode 1, G1 = Gate 1
K2 = Cathode 2, G2 = Gate 2
(MLO 36 has no G2 lead)

Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_K = 85°C, 50 - 400 Hz (for single controller)		86	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		62	A
I_{TAVM}	T_K = 85°C; (180° sine)		39	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	1150	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1230	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1100	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	6600	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	6280	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	5000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	5020	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 150 A	100	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.45 A	non repetitive, $I_T = I_{TAVM}$	500	A/µs
	di_G/dt = 0.45 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)			
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
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~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M3)	0.7 ± 0.1	Nm
		(UNF 4-32)	6 ± 0.9	lb.in.
Weight	typ.		15	g

Features
- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- Direct copper bonded Al_2O_3 -ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- UL registered, E 72873
- Long wire leads suitable for PC board soldering

Applications
- Switching and control of single and three phase AC
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions			Characteristic Values	
I_R, I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 100 A; T_{VJ} = 25°C		≤	1.4	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				5.0	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	150	mA
		T_{VJ} = -40°C	≤	200	mA
I_{GM}	t_p = 50 µs, f = 60 Hz, $I_T = I_{TAVM}$			6	A
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.25	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs, V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	300	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	100	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 50 A, t_P = 200 µs; -di/dt = 10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor/diode; DC current			0.55	K/W
	per module			0.275	K/W
R_{thJK}	per thyristor/diode; DC current			0.75	K/W
	per module			0.375	K/W
d_S	Creeping distance on surface			4.5	mm
d_A	Creepage distance in air			4.5	mm
a	Max. allowable acceleration			50	m/s^2

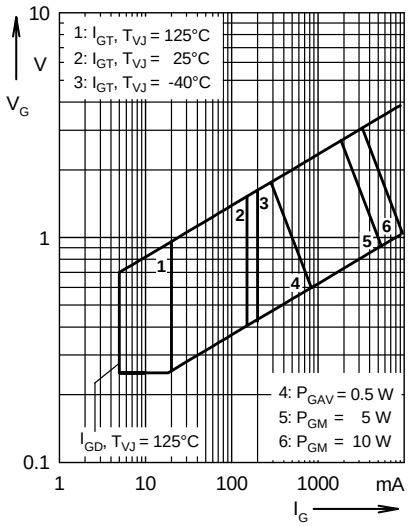


Fig. 1 Gate trigger characteristics

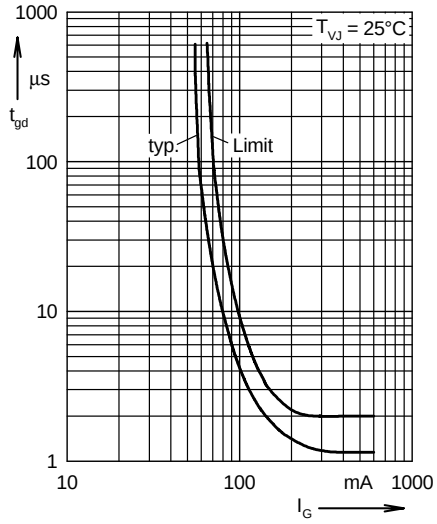


Fig. 2 Gate trigger delay time

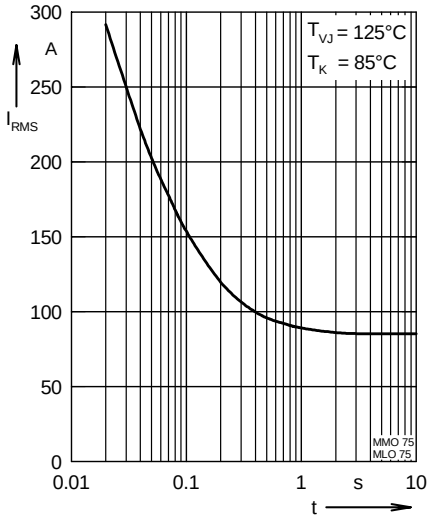
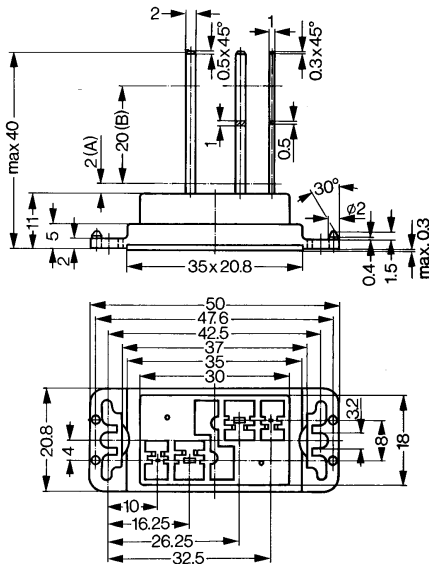


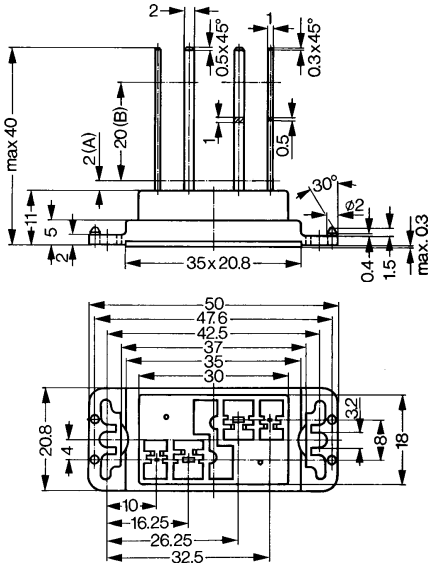
Fig. 3 Rated RMS current versus time (360° conduction)

Dimensions in mm (1 mm = 0.0394")

MLO 75



MMO 75



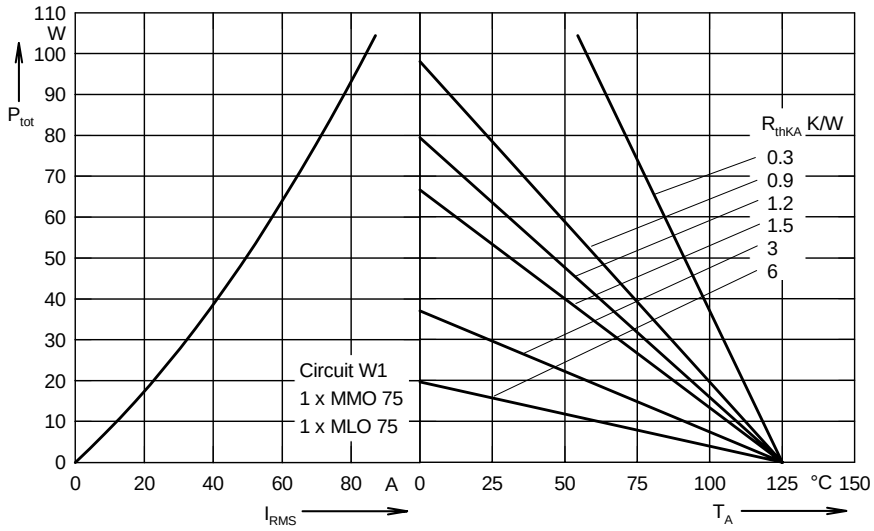


Fig. 4 Load current capability for single phase AC controller

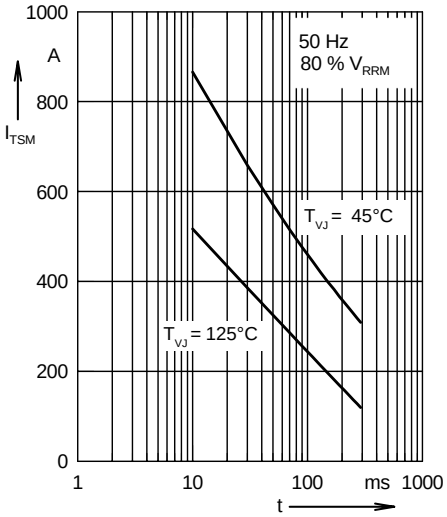


Fig. 5 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

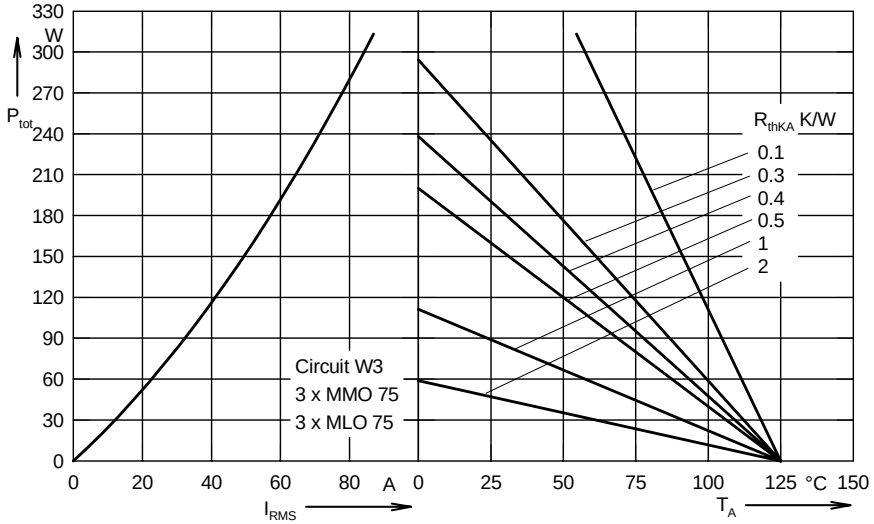


Fig. 6 Load current capability for three phase AC controller: 3xMMO 75/MLO 75

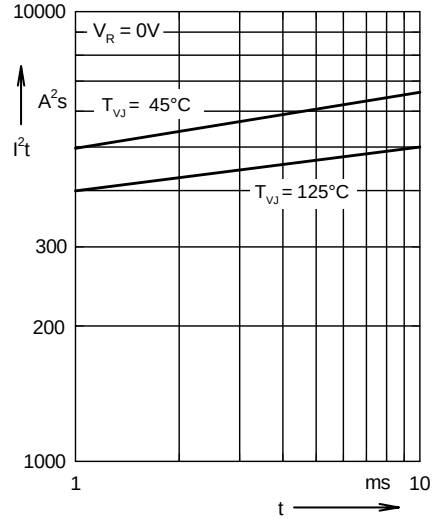


Fig. 7 I^2t versus time (1-10 ms)

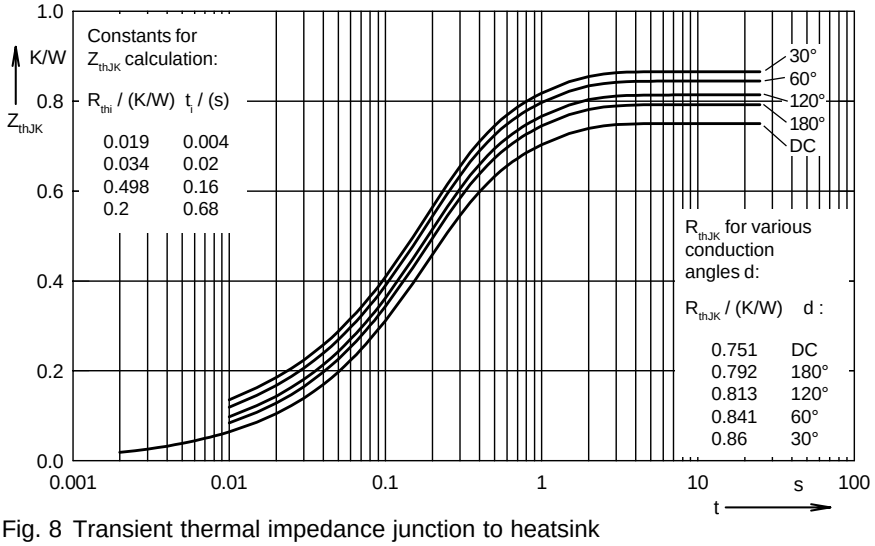


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor or diode)

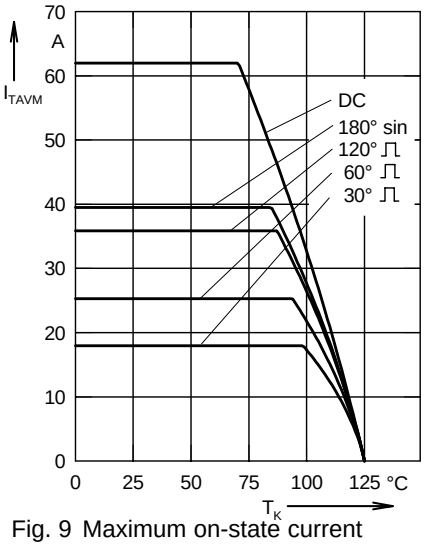


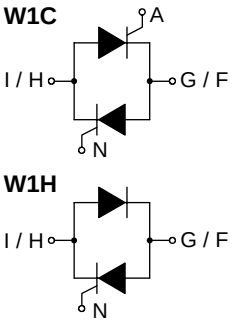
Fig. 9 Maximum on-state current versus heatsink temperature

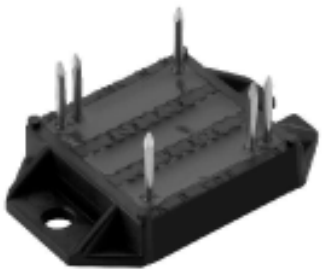
AC Controller Modules

I_{RMS} = 112 A
V_{RRM} = 800-1400 V

Preliminary Data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
800	800	MMO 110-08io7	MLO 110-08io7
1200	1200	MMO 110-12io7	MLO 110-12io7
1400	1400	MMO 110-14io7	MLO 110-14io7





Symbol	Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz, module		112	A
I_{TRMS}			81	A
I_{TAVM}	T_C = 85°C; (180° sine)		51	A
I_{TSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1070	A
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	870	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	930	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	5000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	4810	A^2s
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	3780	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	3630	A^2s
$(di/dt)_{cr}$	T_{VJ} = 125°C f = 50 Hz, t_P = 200 µs	repetitive, I_T = 50 A	100	A/µs
	V_D = $^2/_3$ V_{DRM} I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, I_T = I_{TAVM}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ} = 125°C; V_{DR} = $^2/_3$ V_{DRM} R_{GK} = ∞; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	T_{VJ} = 125°C	t_p = 30 µs	10	W
	I_T = I_{TAVM}	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M4)		1.5...2.0/14...18	Nm/lb.in.
Weight	typ.		18	g

Features

- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- Isolation voltage 3000 V~
- Planar glass passivated chips
- Low forward voltage drop
- Lead suitable for PC board solering

Applications

- Switching and control of single and three phase AC circuits
- Light and temperature control
- Softstart AC motor controller
- Solid state switches

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density
- Small and light weight

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

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Symbol	Conditions		Characteristic Values		
I_D , I_R	T_{VJ} = 125°C; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 150 A; T_{VJ} = 25°C		≤	1.57	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				5.6	mΩ
V_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.9	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	T_{VJ} = 125°C; $V_D = {}^2/_3 V_{DRM}$		≤	0.2	V
I_{GD}			≤	1	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; $R_{GK} = \infty$		≤	100	mA
t_{gd}	T_{VJ} = 25°C; $V_D = ½ V_{DRM}$ I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
R_{thJC}	per thyristor; DC			0.8	K/W
	per module			0.4	K/W
R_{thCH}	per thyristor; sine 180° el		typ.	0.12	K/W
	per module		typ.	0.06	K/W
d_S	Creeping distance on surface			11.2	mm
d_A	Creepage distance in air			17.0	mm
a	Max. allowable acceleration			50	m/s^2

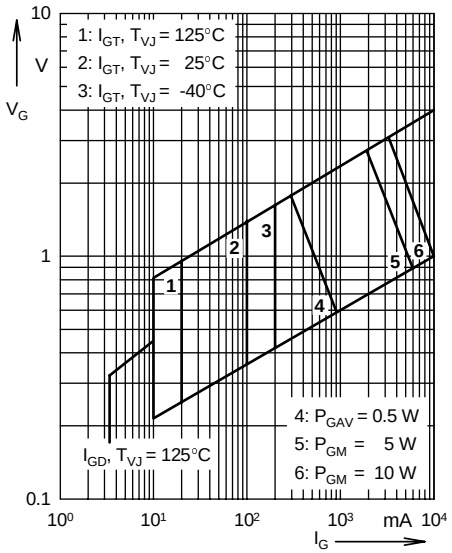


Fig. 1 Gate trigger characteristics

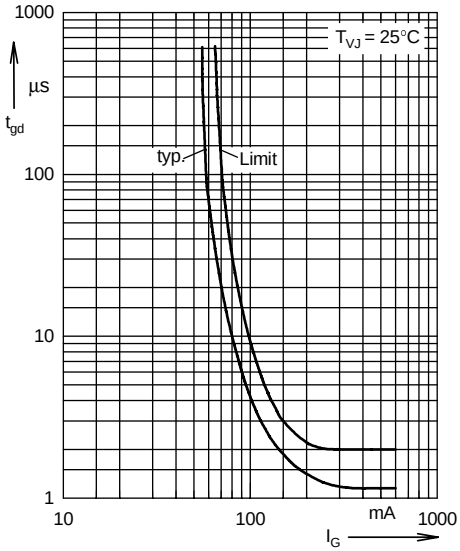
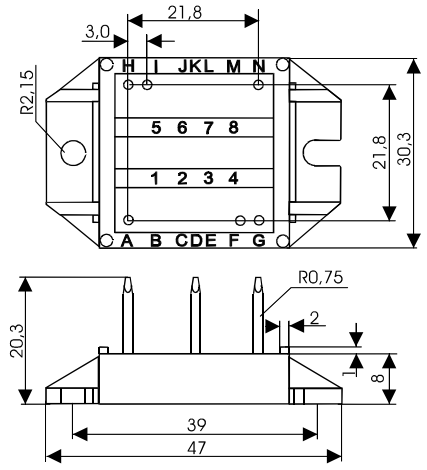


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

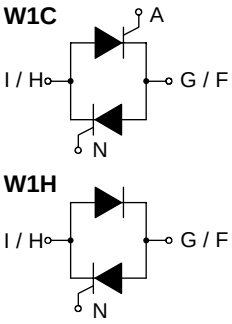


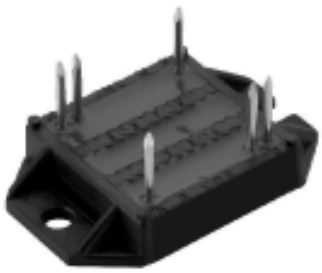
AC Controller Modules

I_{RMS} = 140 A
V_{RRM} = 800-1600 V

Preliminary Data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
800	800	MMO 140-08io7	MLO 140-08io7
1200	1200	MMO 140-12io7	MLO 140-12io7
1600	1600	MMO 140-16io7	MLO 140-16io7





Symbol	Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz, (per single controller)		130	A
I_{TRMS}			90	A
I_{TAVM}	T_C = 85°C; 180° sine, per Thyristor		58	A
I_{TSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1150	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1230	A
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	1000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1070	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	6600	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	6280	A^2s
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	5000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	4750	A^2s
$(di/dt)_{cr}$	T_{VJ} = 125°C f = 50 Hz, t_P = 200 µs	repetitive, I_T = 60 A	150	A/µs
	V_D = $^2/_3$ V_{DRM} I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, I_T = I_{TAVM}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ} = 125°C; V_{DR} = $^2/_3$ V_{DRM} R_{GK} = ∞; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	T_{VJ} = 125°C	t_p = 30 µs	10	W
	I_T = I_{TAVM}	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M4)		1.5...2.0/14...18	Nm/lb.in.
Weight	typ.		18	g

Features

- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- Isolation voltage 3000 V~
- Planar glass passivated chips
- Low forward voltage drop
- Lead suitable for PC board solering

Applications

- Switching and control of single and three phase AC circuits
- Light and temperature control
- Softstart AC motor controller
- Solid state switches

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density
- Small and light weight

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

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Symbol	Conditions		Characteristic Values		
I_D, I_R	T_{VJ} = 125°C; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 200 A; T_{VJ} = 25°C		≤	1.75	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				5.2	mΩ
V_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	T_{VJ} = 125°C; $V_D = {}^2/_3 V_{DRM}$		≤	0.2	V
I_{GD}			≤	10	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; $R_{GK} = \infty$		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = ½ V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
R_{thJC}	per thyristor; DC			0.7	K/W
	per module			0.35	K/W
R_{thCH}	per thyristor; sine 180° el		typ.	0.12	K/W
	per module		typ.	0.06	K/W
d_S	Creeping distance on surface			11.2	mm
d_A	Creepage distance in air			17.0	mm
a	Max. allowable acceleration			50	m/s^2

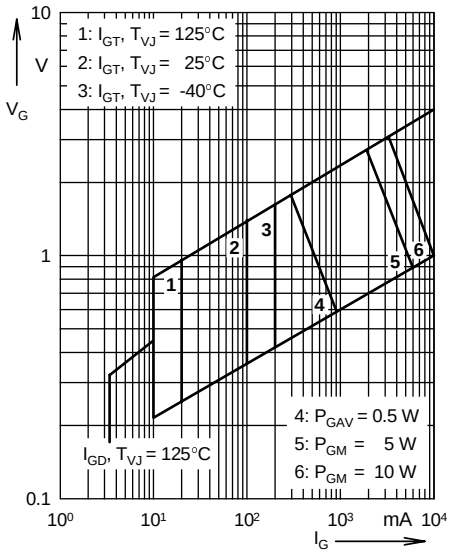


Fig. 1 Gate trigger characteristics

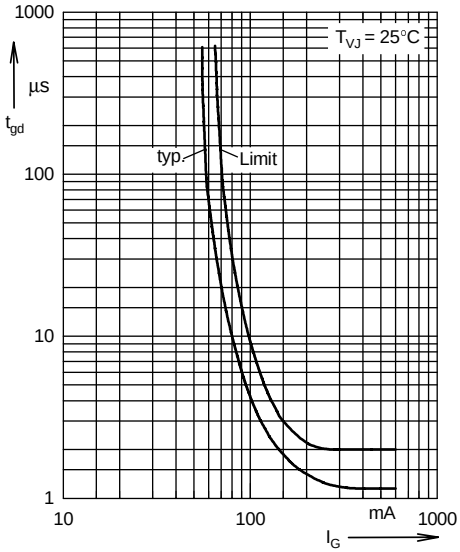
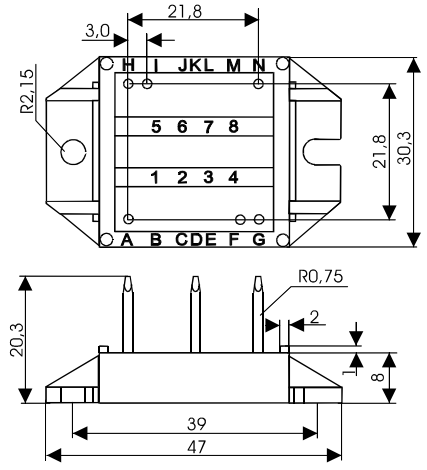


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

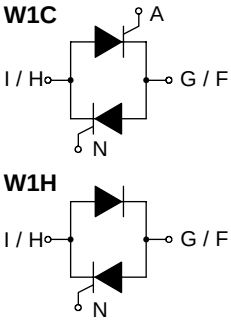


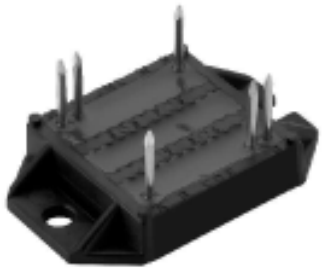
AC Controller Modules

I_{RMS} = 175 A
V_{RRM} = 800-1600 V

Preliminary Data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
800	800	MMO 175-08io7	MLO 175-08io7
1200	1200	MMO 175-12io7	MLO 175-12io7
1600	1600	MMO 175-16io7	MLO 175-16io7





Symbol	Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz, (per single controller)		175	A
I_{TRMS}			125	A
I_{TAVM}	T_C = 85°C; 180° sine		80	A
I_{TSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1500	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1600	A
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	1350	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1450	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	11200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	10750	A^2s
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	9100	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	8830	A^2s
$(di/dt)_{cr}$	T_{VJ} = 125°C f = 50 Hz, t_P = 200 µs	repetitive, I_T = 80 A	150	A/µs
	V_D = $^2/_3$ V_{DRM} I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, I_T = I_{TAVM}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ} = 125°C; V_{DR} = $^2/_3$ V_{DRM} R_{GK} = ∞; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	T_{VJ} = 125°C	t_p = 30 µs	10	W
	I_T = I_{TAVM}	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M4)		1.5...2.0/14...18	Nm/lb.in.
Weight	typ.		18	g

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.

Features

- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- Isolation voltage 3000 V~
- Planar glass passivated chips
- Low forward voltage drop
- Lead suitable for PC board solering

Applications

- Switching and control of single and three phase AC circuits
- Light and temperature control
- Softstart AC motor controller
- Solid state switches

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density
- Small and light weight

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Symbol	Conditions		Characteristic Values		
I_D , I_R	T_{VJ} = 125°C; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 200 A; T_{VJ} = 25°C		≤	1.57	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				3.7	mΩ
V_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	T_{VJ} = 125°C; $V_D = {}^2/_3 V_{DRM}$		≤	0.2	V
I_{GD}			≤	10	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; $R_{GK} = \infty$		≤	200	mA
t_{gd}	T_{VJ} = 25°C; $V_D = ½ V_{DRM}$ I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
R_{thJC}	per thyristor; DC			0.5	K/W
	per module			0.25	K/W
R_{thCH}	per thyristor; sine 180° el		typ.	0.12	K/W
	per module		typ.	0.06	K/W
d_S	Creeping distance on surface			11.2	mm
d_A	Creepage distance in air			17.0	mm
a	Max. allowable acceleration			50	m/s^2

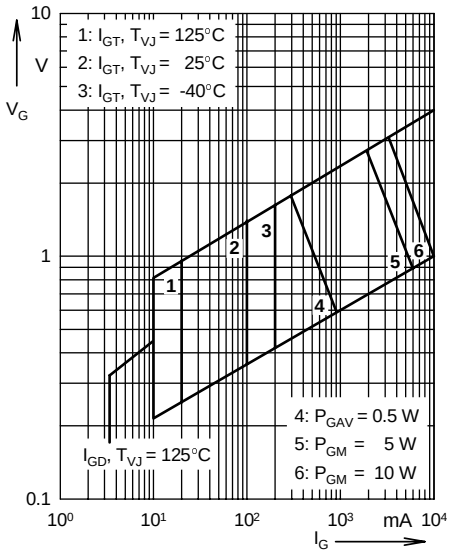


Fig. 1 Gate trigger characteristics

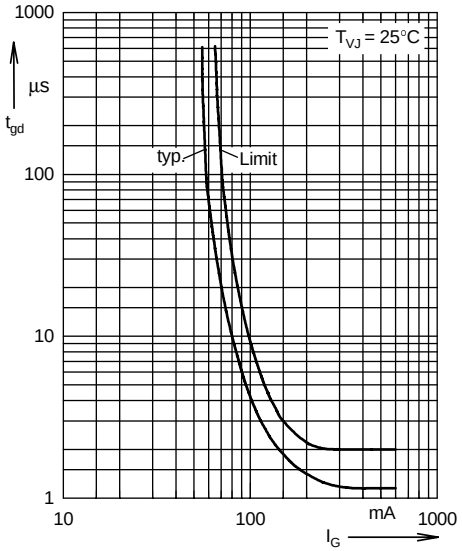
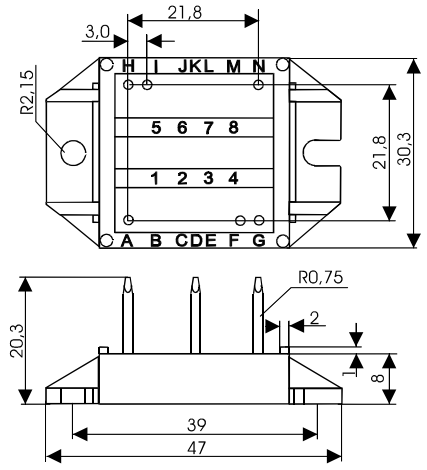


Fig. 2 Gate trigger delay time

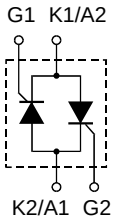
Dimensions in mm (1 mm = 0.0394")



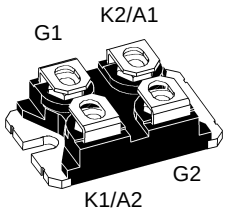
AC Controller Modules

I_{RMS} = 54 A
V_{RRM} = 1200-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1200	1200	MMO 62-12io6
1600	1600	MMO 62-16io6



miniBLOC, SOT-227 B



Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 110°C, 50 - 400 Hz, module		54	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		39	A
I_{TAVM}	T_C = 110°C; (180° sine)		25	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	400	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	430	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	350	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	370	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	800	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	780	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	610	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	570	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs; V_D = 2/3 V_{DRM}	repetitive, I_T = 150 A	100	A/µs
	I_G = 0.3 A; di_G/dt = 0.3 A/µs	non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
V_{ISOL}	50/60 Hz, RMS; $I_{ISOL} \leq$ 1 mA		2500	V~
M_d	Mounting torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
	Terminal connection torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
Weight	typ.		30	g

Features

- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- Planar passivated chips
- UL registered, E 72873

Applications

- Switching and control of single and three phase AC
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

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Symbol	Test Conditions		Characteristic Values		
I_R, I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	12	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.57	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				12	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	250	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; DC current			0.91	K/W
	per module			0.455	K/W
R_{thCH}	per thyristor; DC current		typ.	0.1	K/W
	per module		typ.	0.05	K/W
d_S	Creeping distance on surface			8	mm
d_A	Creepage distance in air			4	mm
a	Max. allowable acceleration			50	m/s^2

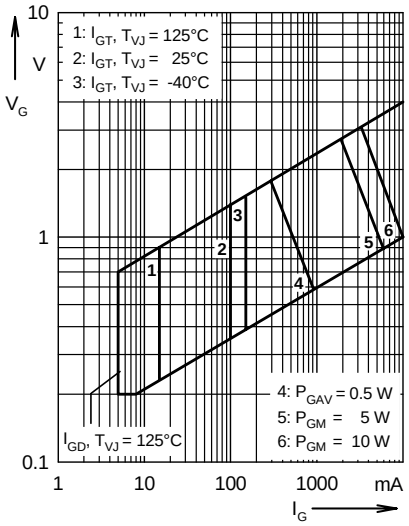


Fig. 1 Gate trigger characteristics

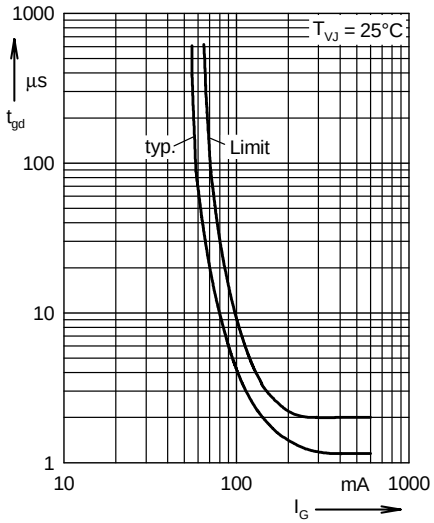
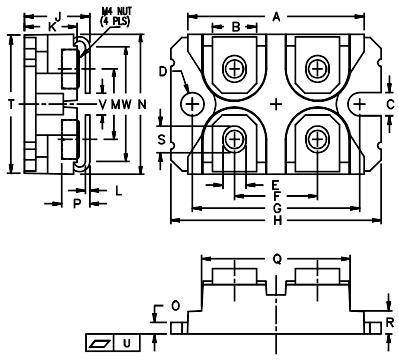


Fig. 2 Gate trigger delay time

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

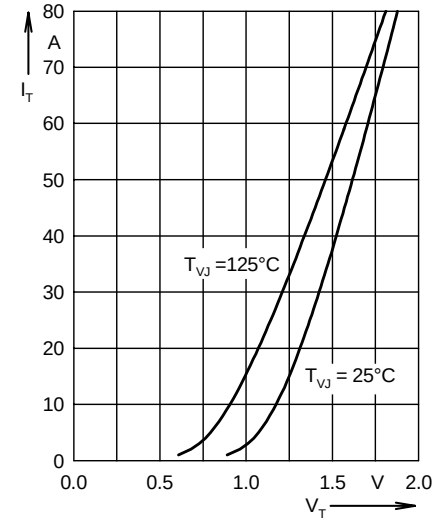


Fig. 3 Forward current versus voltage drop per leg

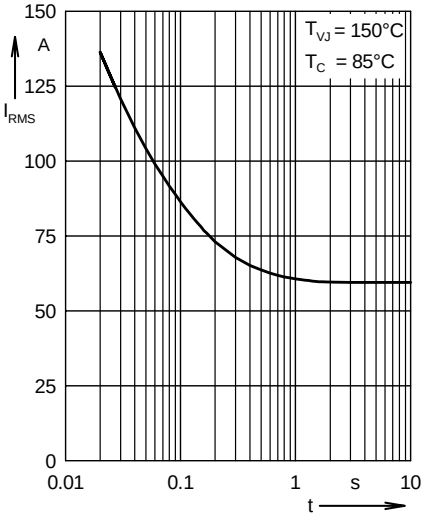


Fig. 4 Rated RMS current versus time (360° conduction)

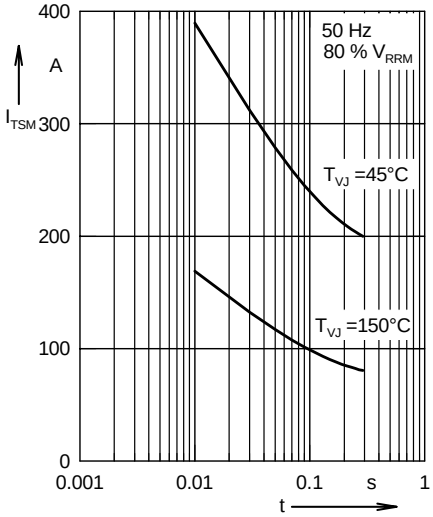


Fig. 5 Surge overload current

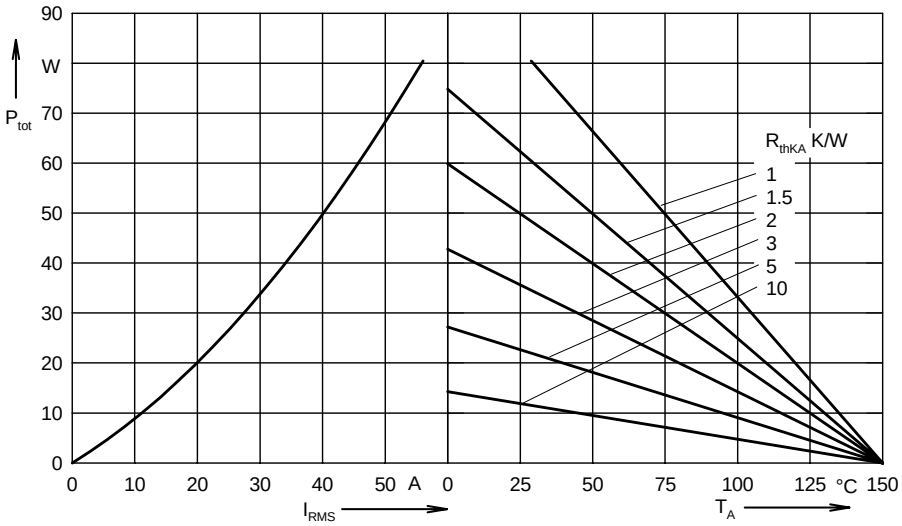


Fig. 6 Load current capability for single AC controller; 1 x MMO62

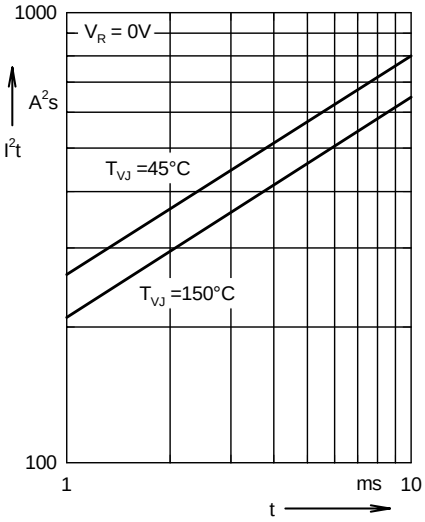


Fig. 7 I²t versus time (per thyristor)

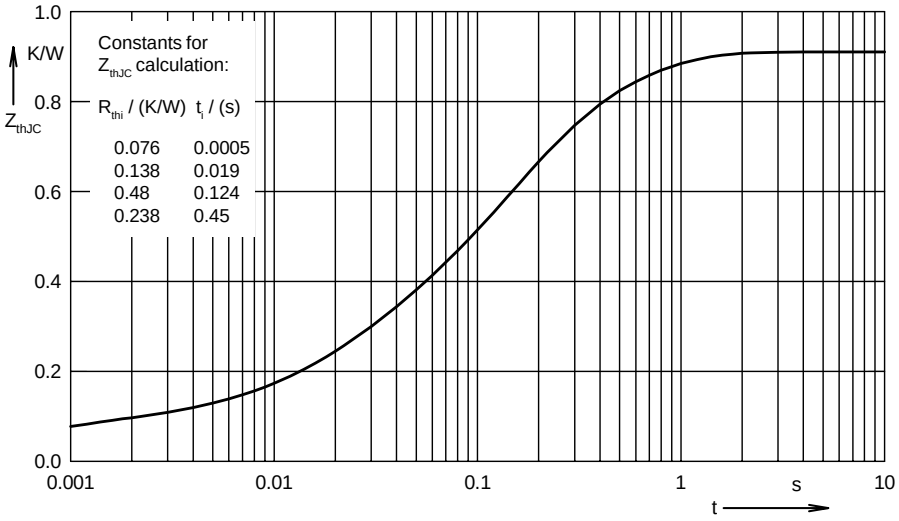


Fig. 8 Transient thermal impedance junction to case (per thyristor)

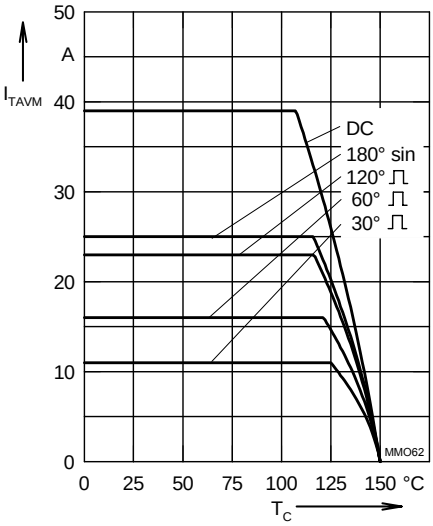
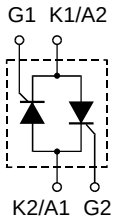


Fig. 9 Maximum forward current at case temperature

AC Controller Modules

I_{RMS} = 74 A
V_{RRM} = 1200-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1200	1200	MMO 74-12io6
1600	1600	MMO 74-16io6



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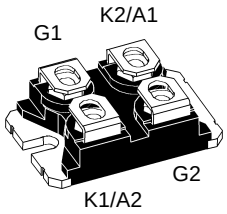

Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 110°C, 50 - 400 Hz, module		74	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		53	A
I_{TAVM}	T_C = 110°C; (180° sine)		34	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	600	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	640	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	520	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	560	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1800	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1720	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1350	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1320	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs; V_D = 2/3 V_{DRM}; I_G = 0.3 A; di_G/dt = 0.3 A/µs	repetitive, I_T = 150 A	100	A/µs
		non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
V_{ISOL}	50/60 Hz, RMS; $I_{ISOL} \leq$ 1 mA		2500	V~
M_d	Mounting torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
	Terminal connection torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
Weight	typ.		30	g

Data according to IEC 60747 and to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Features

- Thyristor controller for AC (circuit W1C acc. to IEC) for mains frequency
- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- Planar passivated chips
- UL registered, E 72873

Applications

- Switching and control of single and three phase AC
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

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Symbol	Test Conditions		Characteristic Values		
I_R, I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	12	mA
V_T	I_T = 80 A; T_{VJ} = 25°C		≤	1.64	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				8.4	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	250	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; DC current			0.71	K/W
	per module			0.355	K/W
R_{thCH}	per thyristor; DC current			0.1	K/W
	per module			0.05	K/W
d_S	Creeping distance on surface			8	mm
d_A	Creepage distance in air			4	mm
a	Max. allowable acceleration			50	m/s^2

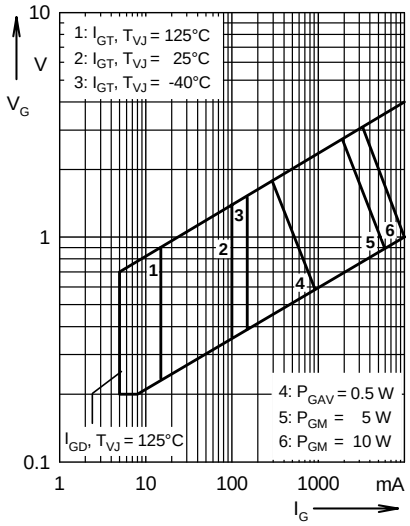


Fig. 1 Gate trigger characteristics

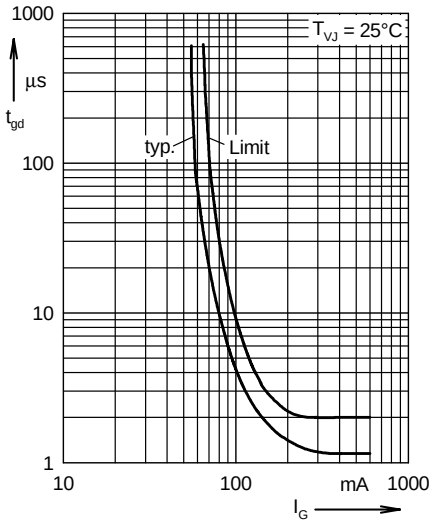
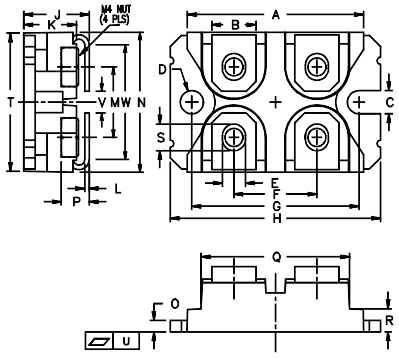


Fig. 2 Gate trigger delay time

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

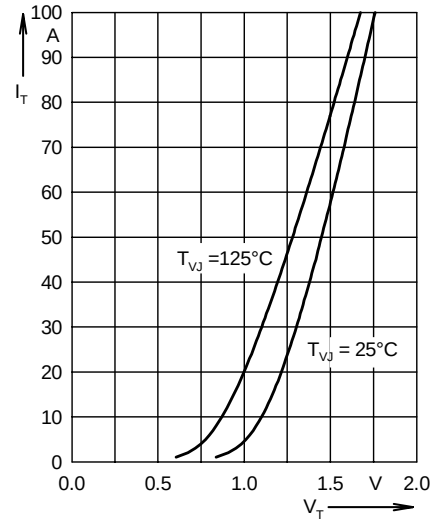


Fig. 3 Forward current versus voltage drop per leg

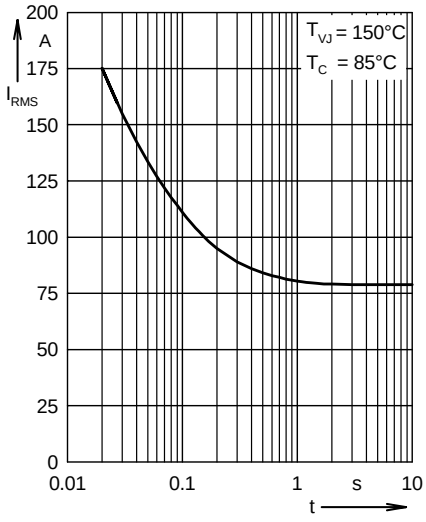


Fig. 4 Rated RMS current versus time (360° conduction)

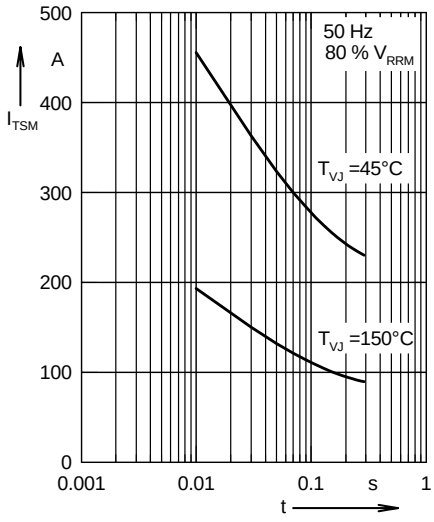


Fig. 5 Surge overload current

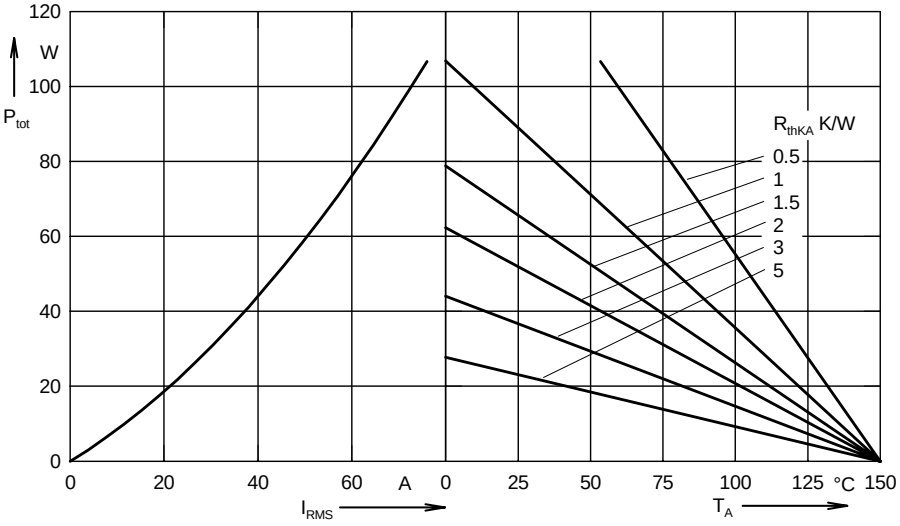


Fig. 6 Load current capability for single AC controller; 1 x MMO74

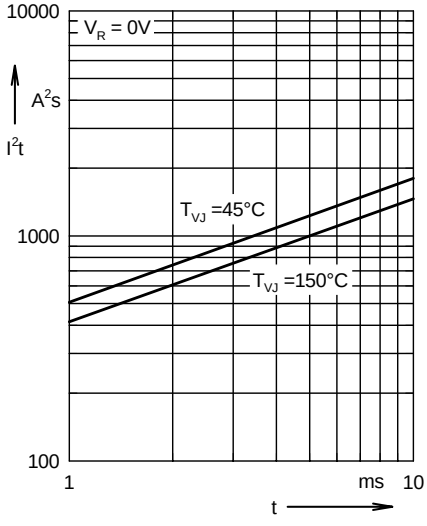


Fig. 7 I²t versus time (per thyristor)

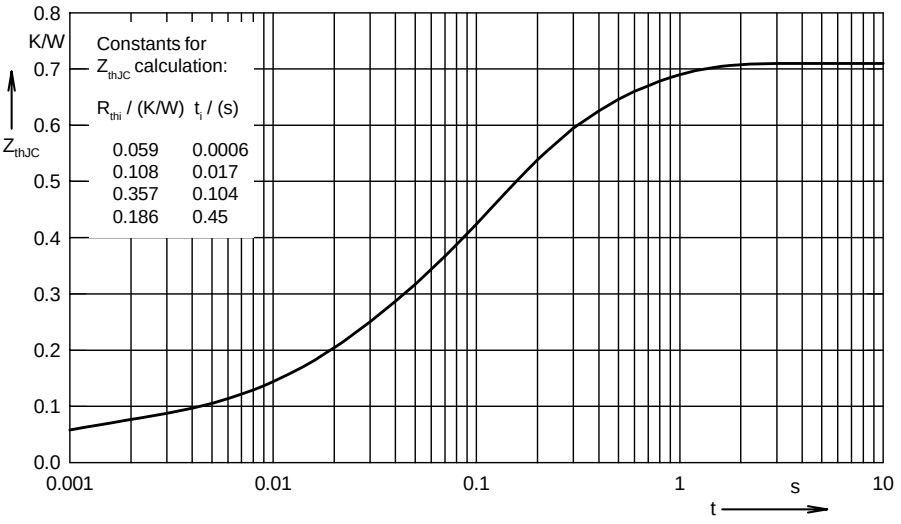


Fig. 8 Transient thermal impedance junction to case (per thyristor)

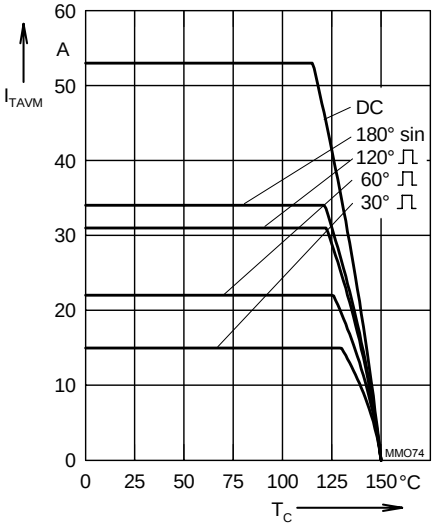
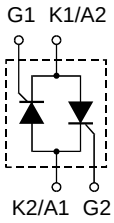


Fig. 9 Maximum forward current at case temperature

AC Controller Modules

I_{RMS} = 90 A
V_{RRM} = 1200-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1200	1200	MMO 90-12io6
1600	1600	MMO 90-16io6



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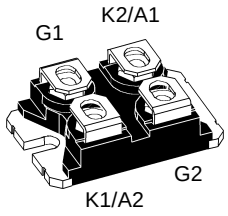

Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 110°C, 50 - 400 Hz, module		90	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		65	A
I_{TAVM}	T_C = 110°C; (180° sine)		41	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	800	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	860	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	700	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	750	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	3200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	3110	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	2450	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	2360	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs	repetitive, I_T = 150 A	100	A/µs
	$V_D = {}^2/_3 V_{DRM}$; I_G = 0.3 A; di_G/dt = 0.3 A/µs	non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	$V_{DR} = {}^2/_3 V_{DRM}$	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
V_{ISOL}	50/60 Hz, RMS;	$I_{ISOL} \leq$ 1 mA	2500	V~
M_d	Mounting torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
	Terminal connection torque (M4)		1.1 - 1.5 / 9 - 13	Nm/lb.in.
Weight	typ.		30	g

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

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Symbol	Test Conditions		Characteristic Values		
I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	20	mA
V_T	I_T = 80; T_{VJ} = 25°C		≤	1.43	V
V_{T0}	For power-loss calculations only			0.9	V
r_T				5.8	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	$V_D = {}^2/_3\ V_{DRM}$	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	250	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; $V_D = {}^2/_3\ V_{DRM}$		typ.	150	µs
R_{thJC}	per thyristor; DC current			0.6	K/W
	per module			0.3	K/W
R_{thCH}	per thyristor; DC current			0.1	K/W
	per module			0.05	K/W
d_S	Creeping distance on surface			8	mm
d_A	Creepage distance in air			4	mm
a	Max. allowable acceleration			50	m/s^2

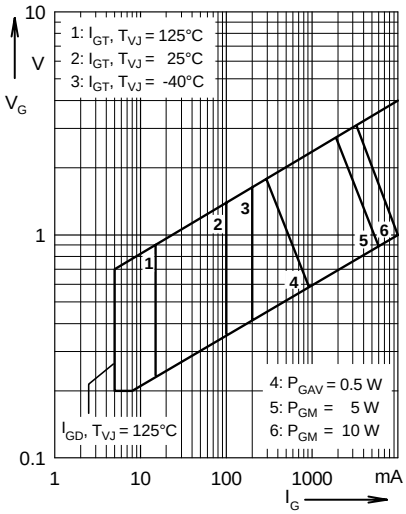


Fig. 1 Gate trigger characteristics

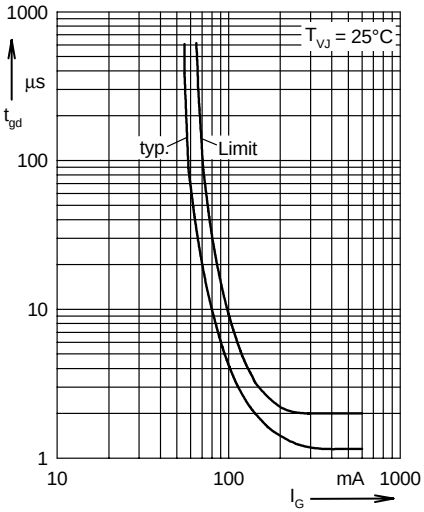
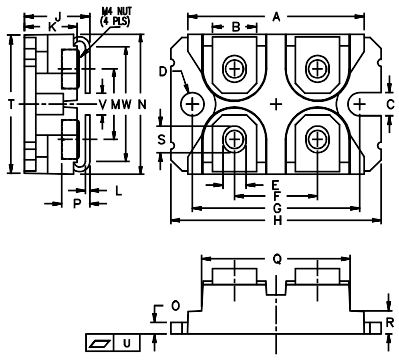


Fig. 2 Gate trigger delay time

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
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G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

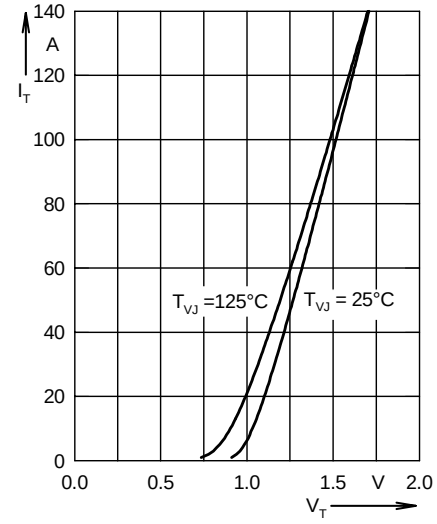


Fig. 3 Forward current versus voltage drop per leg

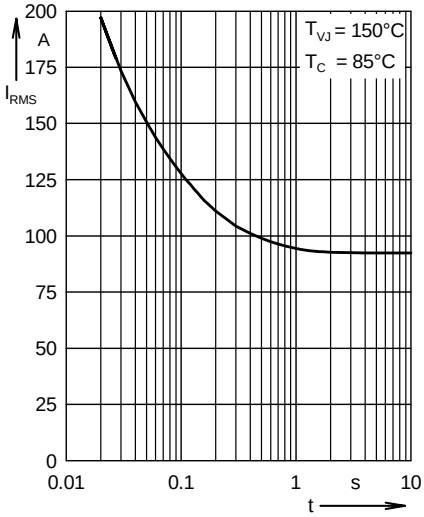


Fig. 4 Rated RMS current versus time (360° conduction)

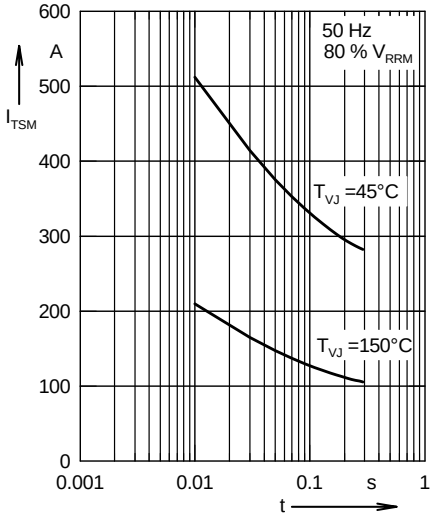


Fig. 5 Surge overload current

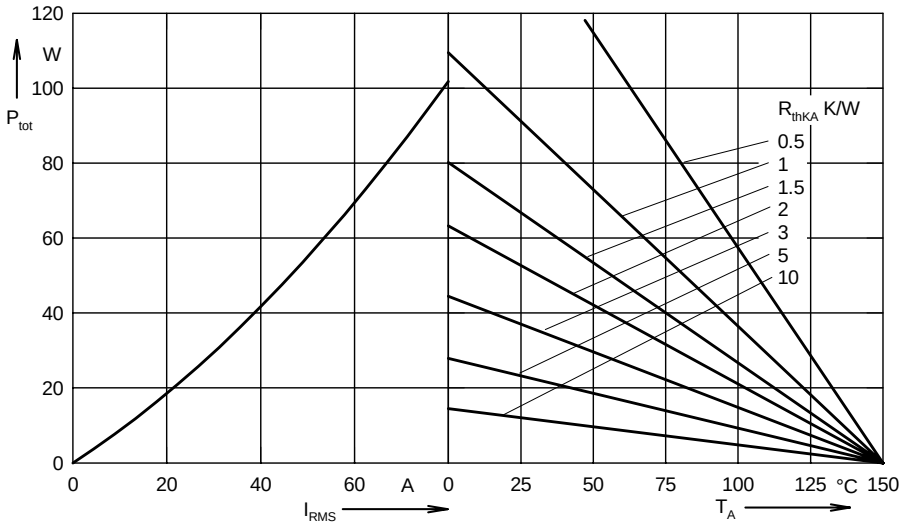


Fig. 6 Load current capability for single AC controller; 1 x MMO 90

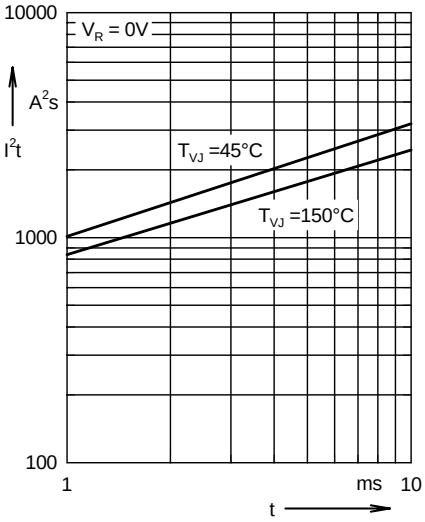


Fig. 7 I^2t versus time (per thyristor)

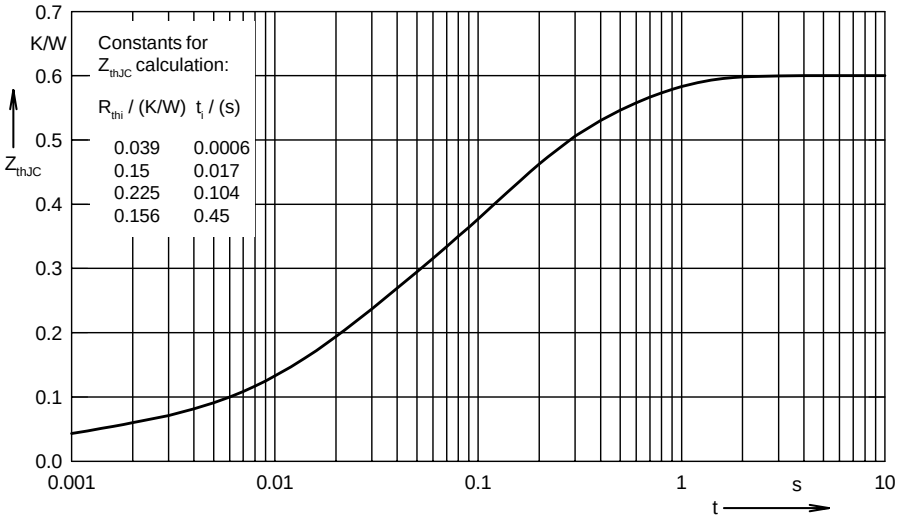


Fig. 8 Transient thermal impedance junction to case (per thyristor)

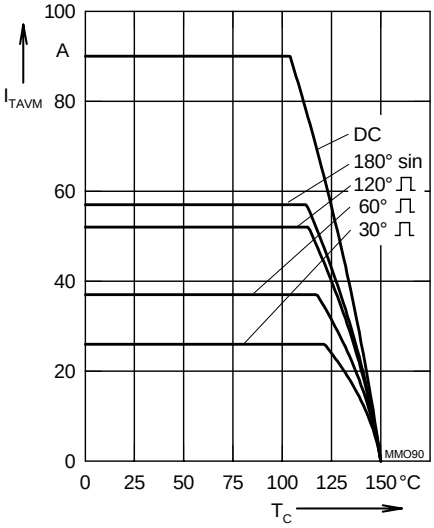
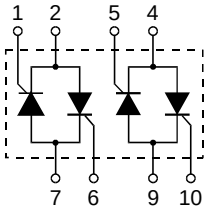


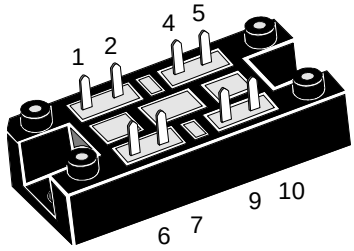
Fig. 9 Maximum forward current at case temperature

AC Controller Modules

I_{RMS} = 2x 30 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VW2x30-08io1
1200	1200	VW2x30-12io1
1400	1400	VW2x30-14io1
1600	1600	VW2x30-16io1





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, (per phase)		30	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		22	A
I_{TAVM}	T_C = 85°C; (180° sine ; per thyristor)		14	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	200	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	210	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	180	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	190	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	190	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	160	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	150	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 45 A	100	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.45 A	non repetitive, $I_T = I_{TAVM}$	500	A/µs
	di_G/dt = 0.45 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)			
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
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~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M5)		2-2.5/18-22	Nm/lb.in.
Weight	typ.		35	g

Features

- Thyristor controller for AC (circuit W2C acc. to IEC) for mains frequency
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Planar passivated chips
- UL applied

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

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Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.81	V
V_{T0}	For power-loss calculations only			0.8	V
r_T				25	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; DC			1.7	K/W
	per module			0.43	K/W
R_{thJK}	per thyristor; DC			2.0	K/W
	per module			0.5	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

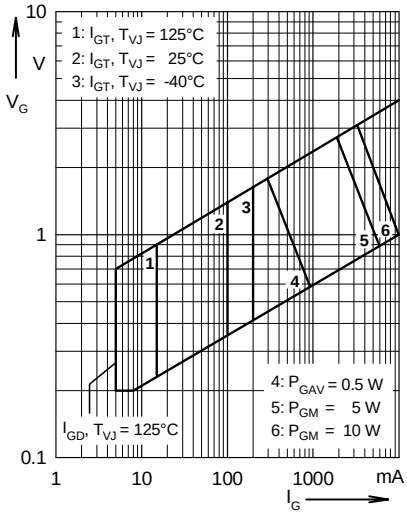


Fig. 1 Gate trigger characteristics

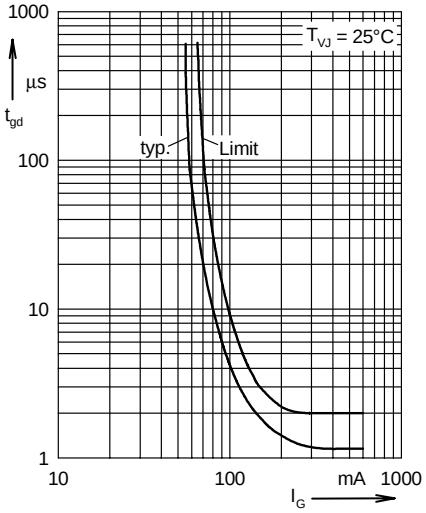
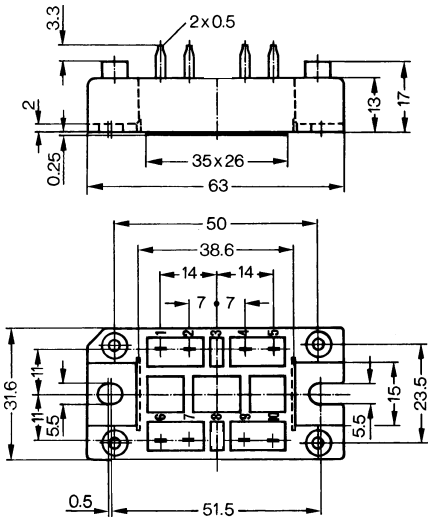


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



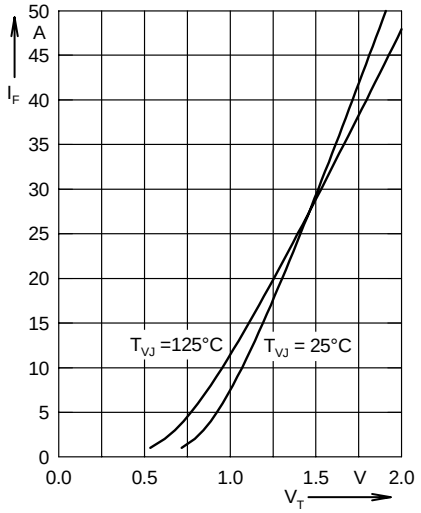


Fig. 3 Forward current versus voltage drop per leg

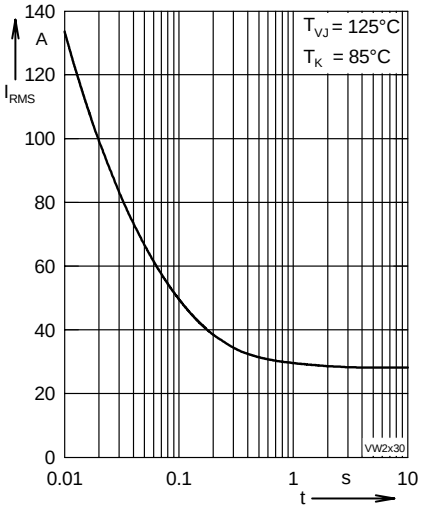


Fig. 4 Rated RMS current versus time (360° conduction)

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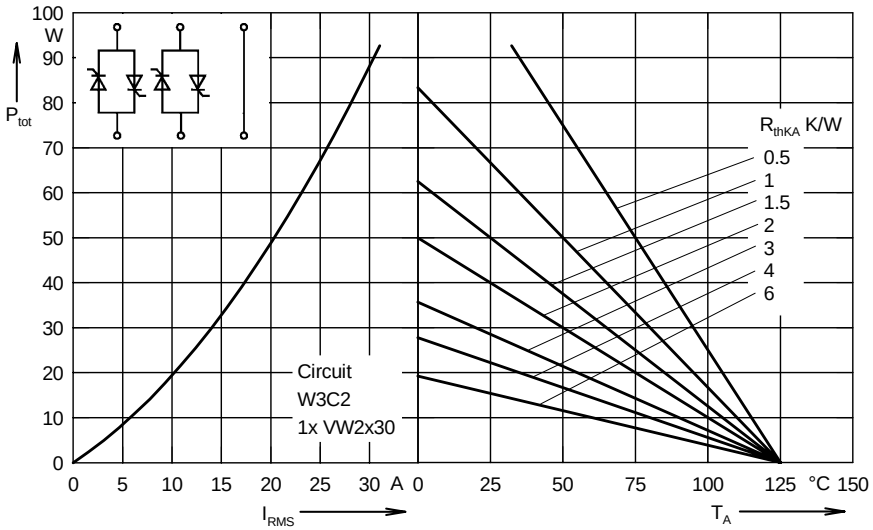

Fig. 5 Load current capability for two phase AC controller

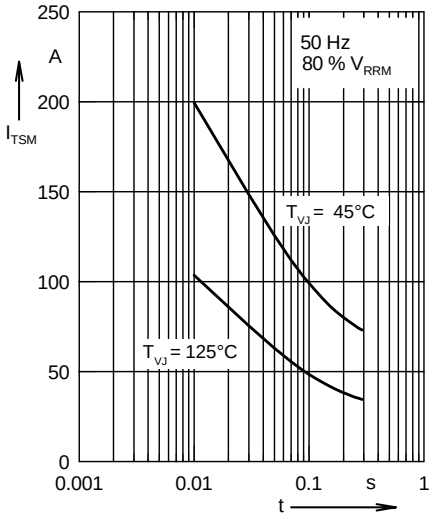

Fig. 6 Surge overload current

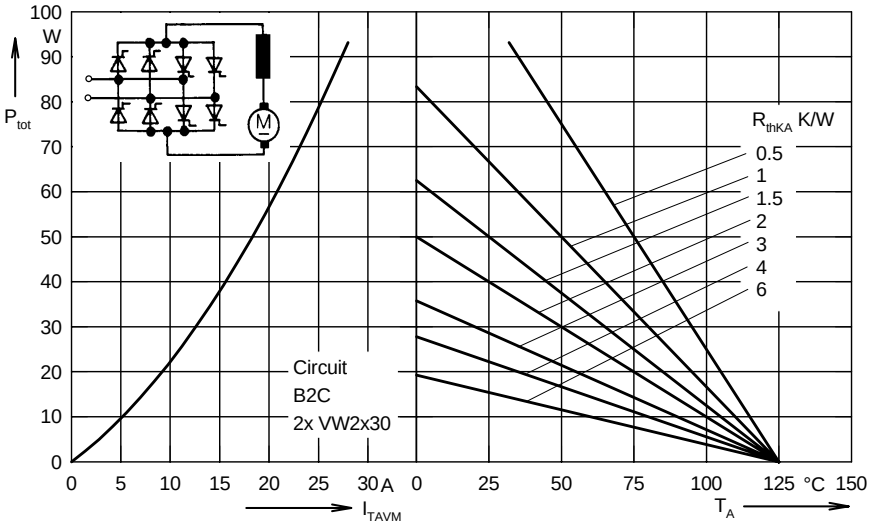

Fig. 7 Power dissipation versus direct output current and ambient temperature cyclo converter, four quadrant operation

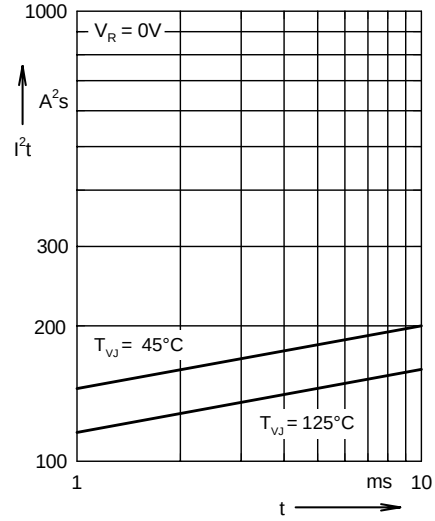

Fig. 8 I²t versus time (per thyristor)

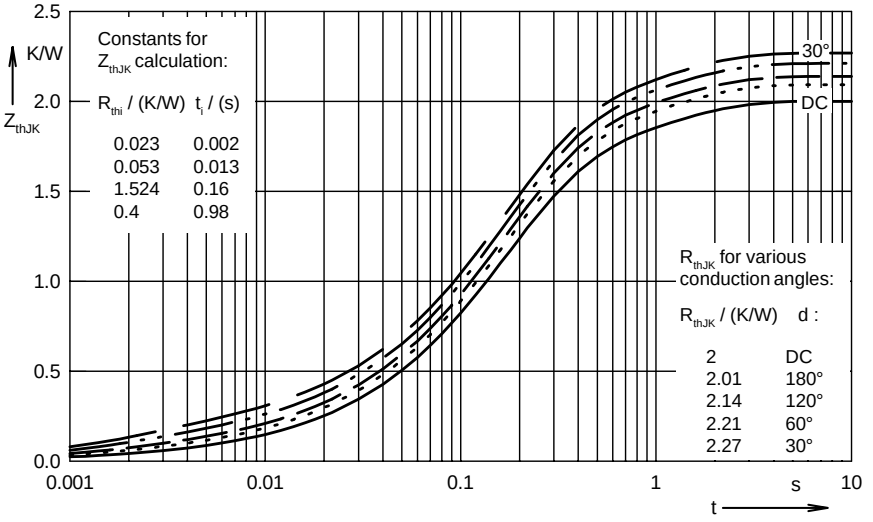

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor)

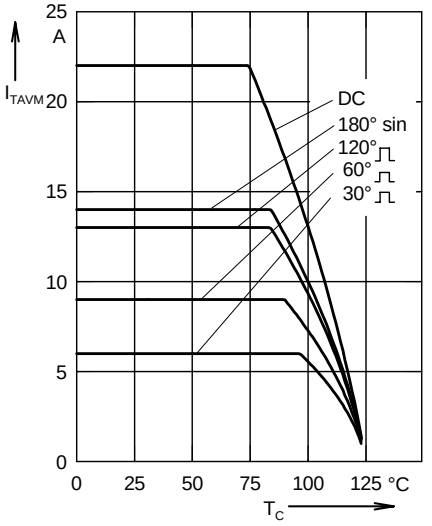

Fig. 10 Maximum forward current at case temperature

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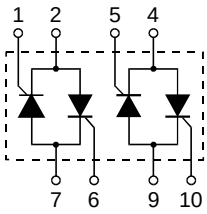
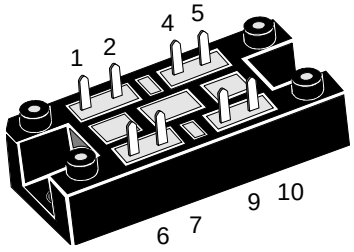
AC Controller Modules

I_{RMS} = 2x 45 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VW2x45-08io1
1200	1200	VW2x45-12io1
1400	1400	VW2x45-14io1
1600	1600	VW2x45-16io1





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, (per phase)		45	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		32	A
I_{TAVM}	T_C = 85°C; (180° sine ; per thyristor)		20	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	300	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	320	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	270	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	290	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	450	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	430	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	360	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	350	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs V_D = 2/3 V_{DRM}	repetitive, I_T = 45 A	100	A/µs
	I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
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~
	$I_{ISOL} \le$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M5)		2-2.5/18-22	Nm/lb.in.
Weight	typ.		35	g

Features

- Thyristor controller for AC (circuit W2C acc. to IEC) for mains frequency
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
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- Switching and control of three phase AC circuits
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Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.52	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				15	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; DC			1.25	K/W
	per module			0.31	K/W
R_{thJK}	per thyristor; DC			1.55	K/W
	per module			0.39	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

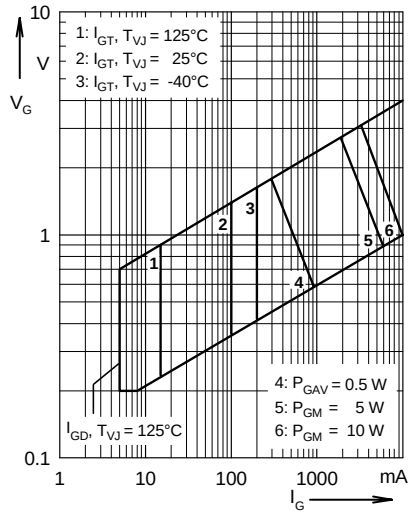


Fig. 1 Gate trigger characteristics

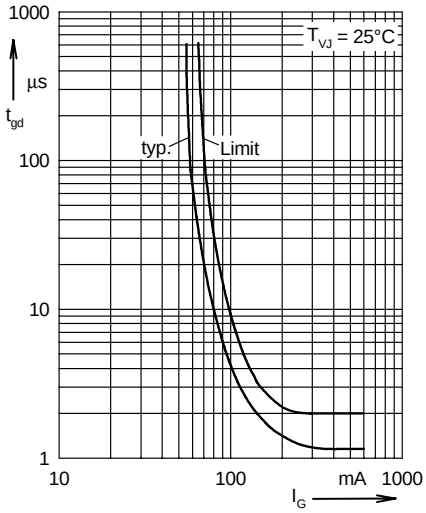
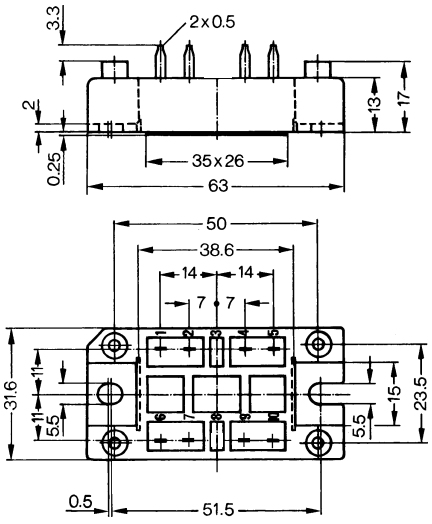


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



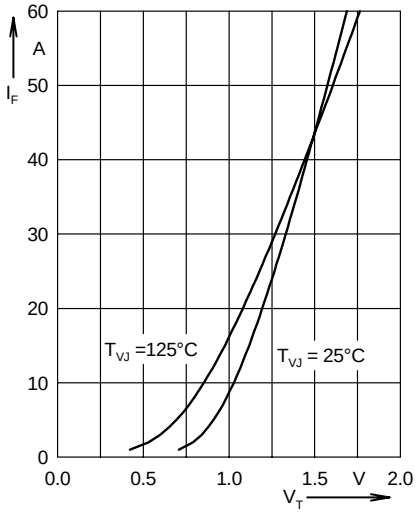


Fig. 3 Forward current versus voltage drop per leg

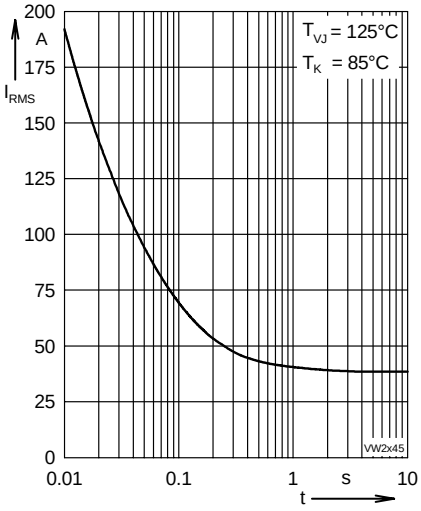


Fig. 4 Rated RMS current versus time (360° conduction)

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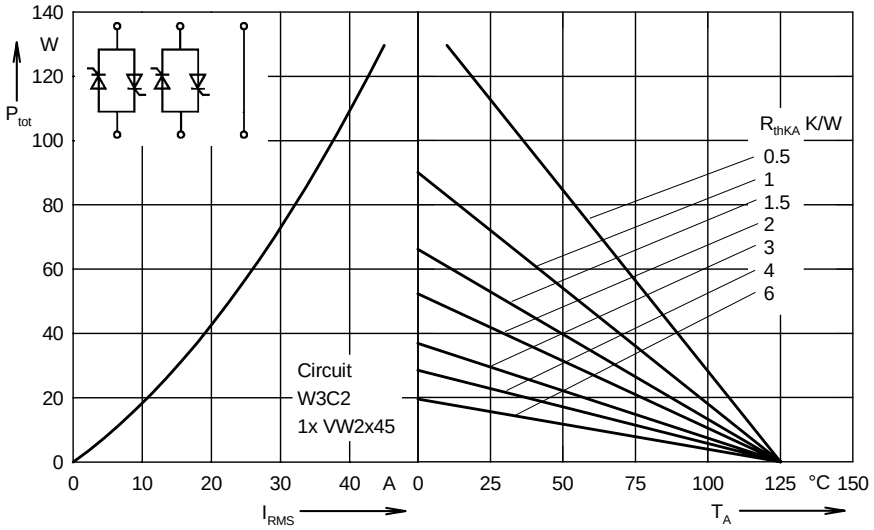

Fig. 5 Load current capability for two phase AC controller

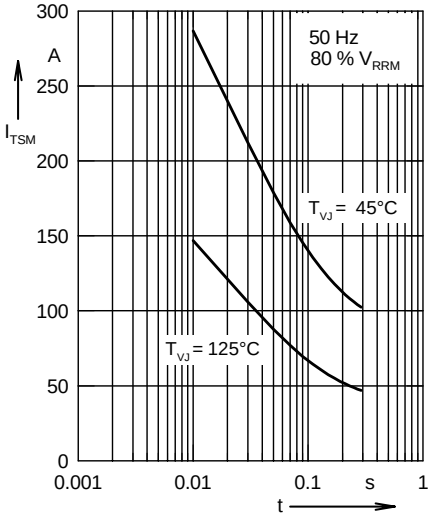

Fig. 6 Surge overload current

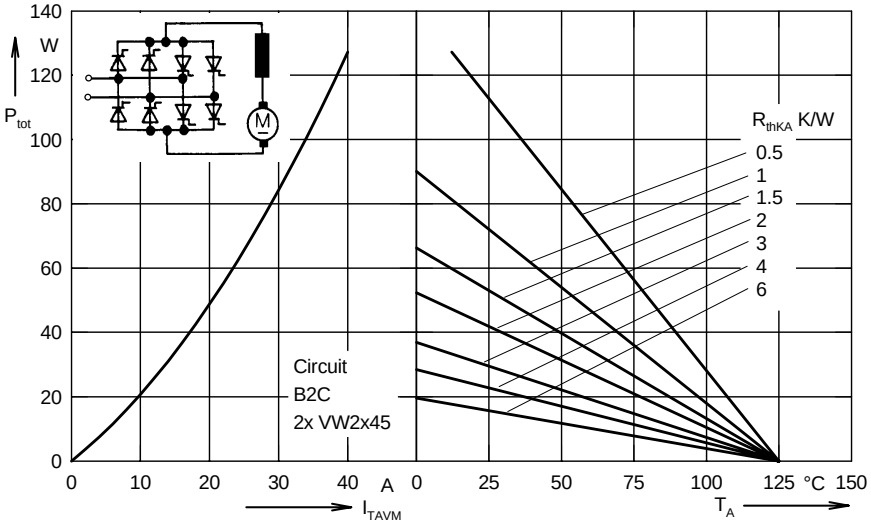

Fig. 7 Power dissipation versus direct output current and ambient temperature cyclo converter, four quadrant operation

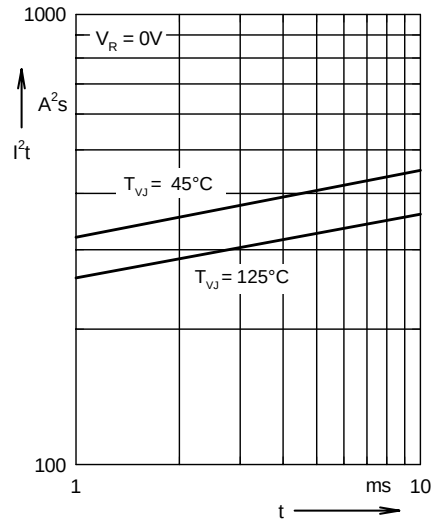

Fig. 8 I²t versus time (per thyristor)

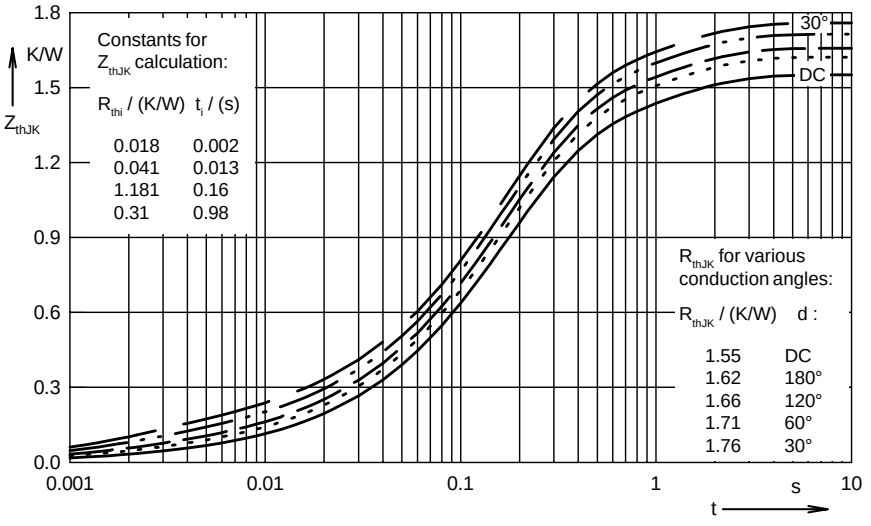

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor)

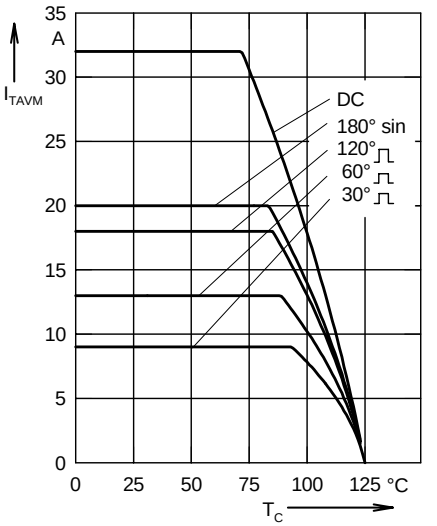

Fig. 10 Maximum forward current at case temperature

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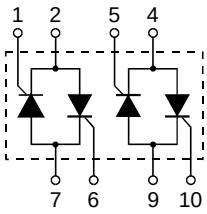
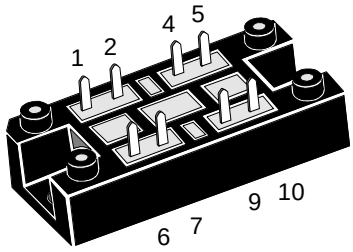
AC Controller Modules

I_{RMS} = 2x 60 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM} V V	V_{RRM} V_{DRM}	Type
800	800	VW2x60-08io1
1200	1200	VW2x60-12io1
1400	1400	VW2x60-14io1
1600	1600	VW2x60-16io1





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		60	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		43	A
I_{TAVM}	T_C = 85°C; (180° sine)		27	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	520	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	560	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	470	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	510	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1350	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1320	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1100	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1090	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f =50 Hz, t_P =200 µs V_D = 2/3 V_{DRM}	repetitive, I_T = 45 A	100	A/µs
	I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, $I_T = I_{TAVM}$	500	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)			
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
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~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M5)		2-2.5/18-22	Nm/lb.in.
Weight	typ.		35	g

Features

- Thyristor controller for AC (circuit W2C acc. to IEC) for mains frequency
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Planar passivated chips
- UL applied

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

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Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 80 A; T_{VJ} = 25°C		≤	1.65	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				11	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; DC			0.92	K/W
	per module			0.23	K/W
R_{thJK}	per thyristor; DC			1.22	K/W
	per module			0.31	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

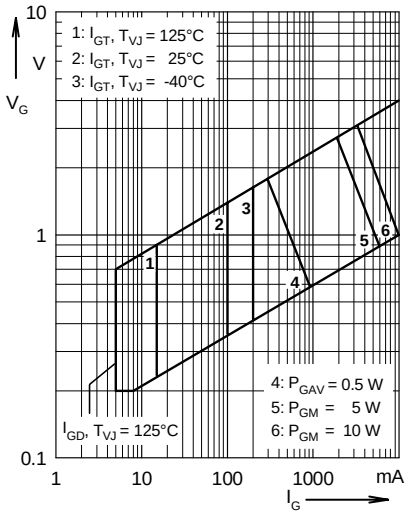


Fig. 1 Gate trigger characteristics

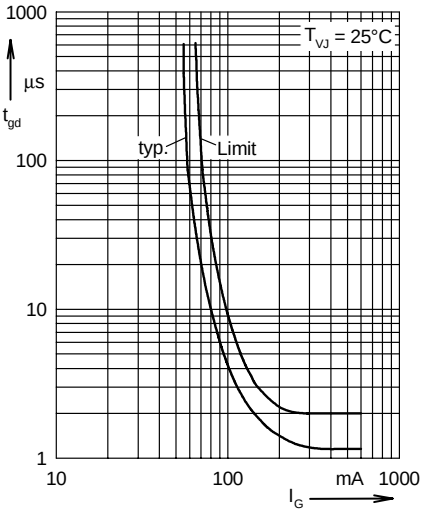
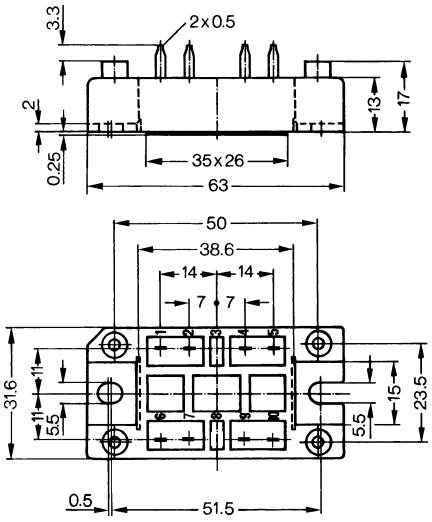


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



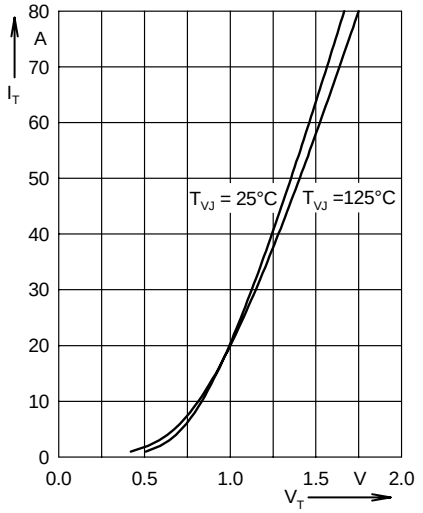


Fig. 3 Forward current versus voltage drop per leg

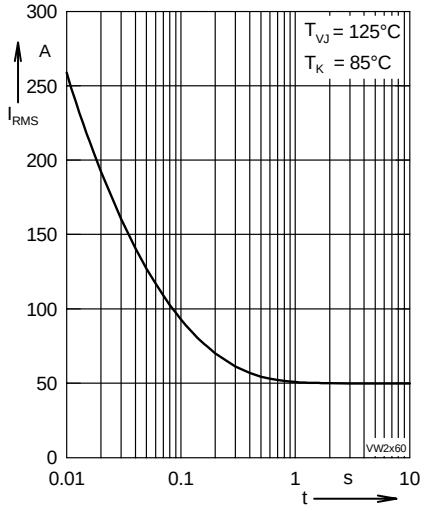


Fig. 4 Rated RMS current versus time (360° conduction)

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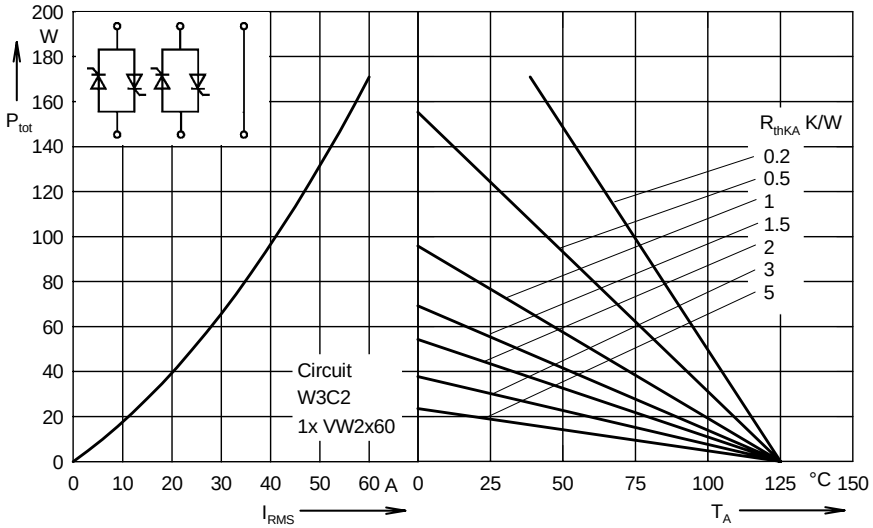

Fig. 5 Load current capability for two phase AC controller

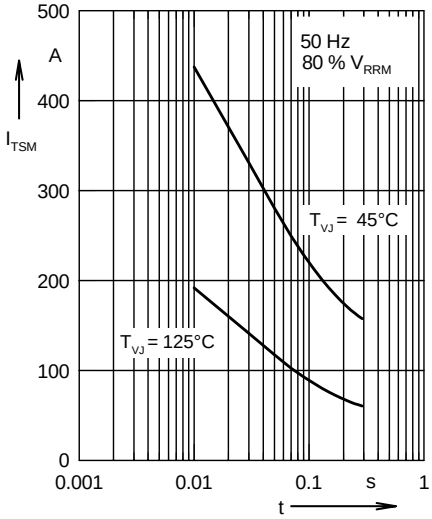

Fig. 6 Surge overload current

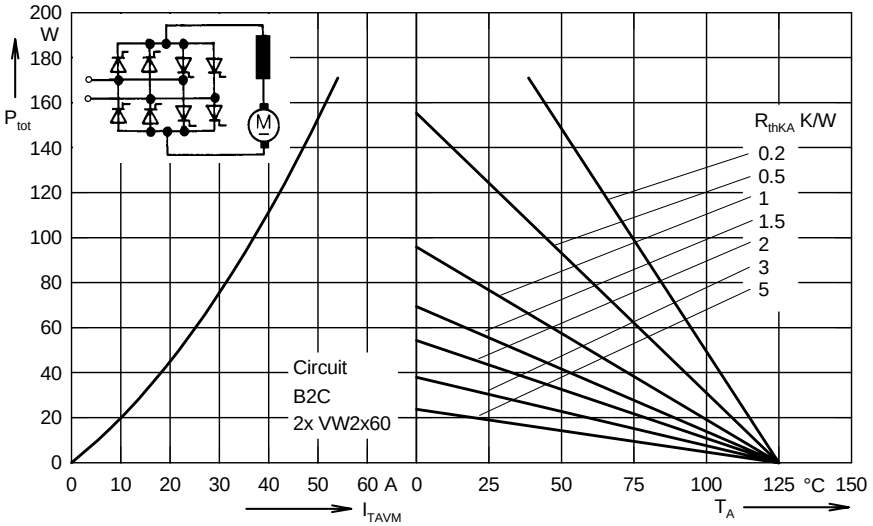

Fig. 7 Power dissipation versus direct output current and ambient temperature cyclo converter, four quadrant operation

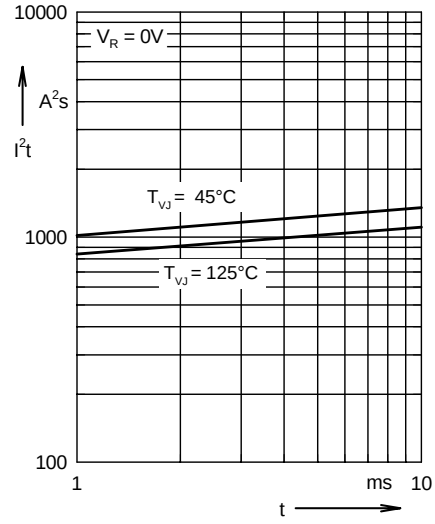

Fig. 8 I²t versus time (per thyristor)

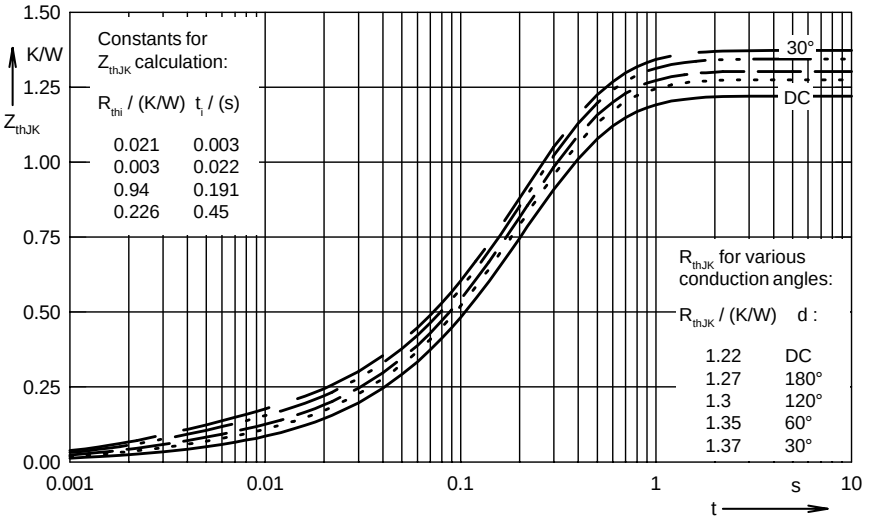

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor)

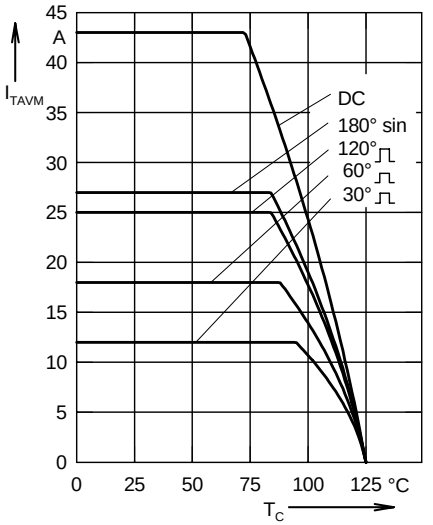

Fig. 10 Maximum forward current at case temperature

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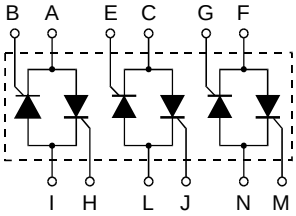
AC Controller Modules

I_{RMS} = 3x 35 A
V_{RRM} = 600-1200 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
700	600	VWO 35-06ho7
900	800	VWO 35-08ho7
1300	1200	VWO 35-12ho7



Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, (per phase)		35	A
I_{TAVM}	T_C = 85°C; (180° sine ; per thyristor)		16	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	200	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	210	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	180	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	190	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	150	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	160	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	150	A^2s
$(di/dt)_{cr}$	T_{VJ} = T_{VJM} f =50 Hz, t_p =200 µs V_D = 2/3 V_{DRM}	repetitive, I_T = 20 A	100	A/µs
	I_G = 0.15 A di_G/dt = 0.15 A/µs	non repetitive, I_T = I_{TAVM}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ} = T_{VJM}; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	500	V/µs
V_{RGM}			10	V
P_{GM}	T_{VJ} = T_{VJM}	t_p = 30 µs	≤ 5	W
	I_T = I_{TAVM}	t_p = 300 µs	≤ 2.5	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	2500	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M4)		1.5 - 2	Nm
			14 - 18	lb.in.
Weight	typ.		18	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Soldering connections for PCB mounting
- Isolation voltage 3000 V~
- Planar passivated chips

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

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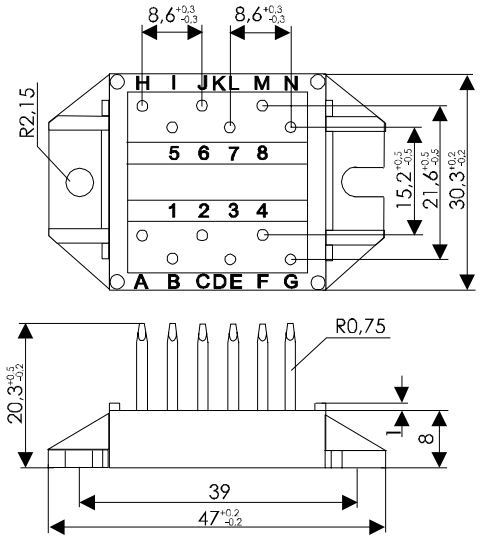
Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 20 A; T_{VJ} = 25°C		≤	1.6	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				27	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	2.5	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	25	mA
		T_{VJ} = -40°C	≤	50	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	3	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.1 A; di_G/dt = 0.1 A/µs		≤	75	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	50	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.1 A; di_G/dt = 0.1 A/µs		≤	2	µs
R_{thJC}	per thyristor; DC			1.3	K/W
	per module			0.22	K/W
R_{thJK}	per thyristor; DC			1.8	K/W
	per module			0.3	K/W
d_S	Creeping distance on surface			11.2	mm
d_A	Creepage distance in air			5.0	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

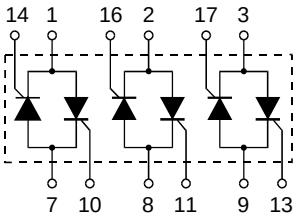


Three Phase AC Controller Modules

I_{RMS} = 3x 39 A
V_{RRM} = 800-1600 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 36-08io7
1200	1200	VWO 36-12io7
1400	1400	VWO 36-14io7
1600	1600	VWO 36-16io7



Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_K = 85°C, 50 - 400 Hz (per phase)		39	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		28	A
I_{TAVM}	T_K = 85°C; (180° sine)		18	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	320	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	350	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	280	A
	V_R = 0	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	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	t = 8.3 ms (60 Hz), sine	400	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs V_D = 2/3 V_{DRM} I_G = 0.3 A di_G/dt = 0.3 A/µs	repetitive, I_T = 20 A	150	A/µs
		non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}			125	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M5)		5 ± 15 %	Nm
		(10-32 UNF)	44 ± 15 %	lb.in.
Weight	typ.		110	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains requency
- Package with metal base plate
- Isolation voltage 3000 V~
- Planar passivated chips
- UL applied
- ¼" fast-on power terminals

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

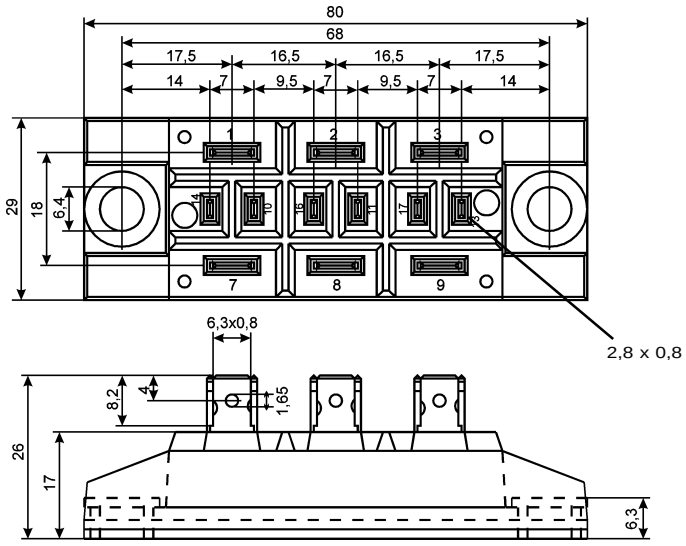
Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling capability
- High power density
- Light weight and compact

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions			Characteristic Values	
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.45	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				13	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
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	150	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; sine 180°el			1.3	K/W
	per module			0.216	K/W
R_{thJK}	per thyristor; sine 180°el			1.5	K/W
	per module			0.25	K/W
d_S	Creeping distance on surface			16.1	mm
d_A	Creepage distance in air			6.0	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

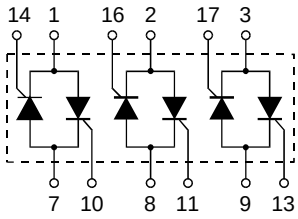


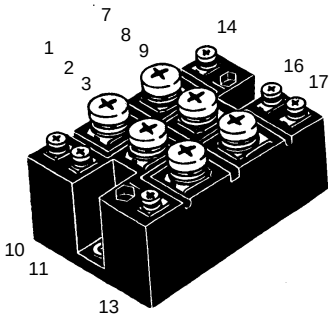
Three Phase AC Controller Modules

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

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 40-08io7
1200	1200	VWO 40-12io7
1400	1400	VWO 40-14io7
1600	1600	VWO 40-16io7





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		40	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		29	A
I_{TAVM}	T_C = 85°C; (180° sine)		18	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	400	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	450	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	360	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	390	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	800	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	850	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	650	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	640	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs; V_D = 2/3 V_{DRM}; I_G = 0.3 A; di_G/dt = 0.3 A/µs	repetitive, I_T = 150 A	100	A/µs
		non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}			125	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \le$ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M5)		5/44±15 %	Nm/lb.in.
	Terminal connection torque (M3; M5)		1.5/13±15 %	Nm/lb.in.
Weight	typ.		180	g

Features
- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Package with metal base plate
- Isolation voltage 3000 V~
- Planar passivated chips
- UL applied

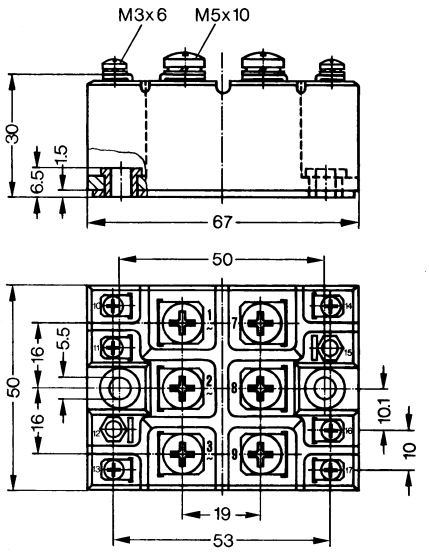
Applications
- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 80 A; T_{VJ} = 25°C		≤	1.65	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				15	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.0	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	150	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; sine 180°el			1.43	K/W
	per module			0.238	K/W
R_{thJK}	per thyristor; sine 180°el			1.53	K/W
	per module			0.255	K/W
d_S	Creeping distance on surface			8.0	mm
d_A	Creepage distance in air			4.5	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

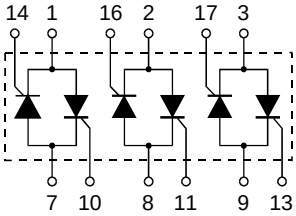


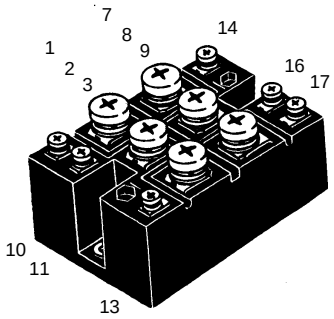
Three Phase AC Controller Modules

I_{RMS} = 50 A
V_{RRM} = 800-1600 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 50-08io7
1200	1200	VWO 50-12io7
1400	1400	VWO 50-14io7
1600	1600	VWO 50-16io7





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		50	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		36	A
I_{TAVM}	T_C = 85°C; (180° sine)		23	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	520	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	560	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	460	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	500	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1350	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1320	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1060	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1050	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs; V_D = 2/3 V_{DRM}; I_G = 0.3 A; di_G/dt = 0.3 A/µs	repetitive, I_T = 150 A	100	A/µs
		non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}			125	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \le$ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M5)		5/44±15 %	Nm/lb.in.
	Terminal connection torque (M3; M5)		1.5/13±15 %	Nm/lb.in.
Weight	typ.		180	g

Features
- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Package with metal base plate
- Isolation voltage 3000 V~
- Planar passivated chips
- UL applied

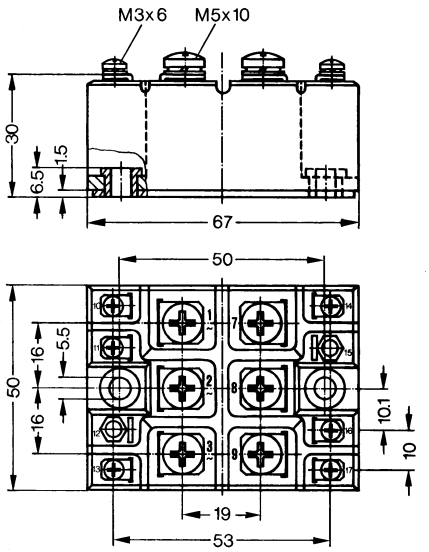
Applications
- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

Advantages
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 80 A; T_{VJ} = 25°C		≤	1.65	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				11	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.0	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	150	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		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; sine 180°el			1.20	K/W
	per module			0.20	K/W
R_{thJK}	per thyristor; sine 180°el			1.31	K/W
	per module			0.218	K/W
d_S	Creeping distance on surface			8.0	mm
d_A	Creepage distance in air			4.5	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

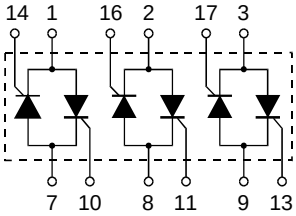


Three Phase AC Controller Modules

I_{RMS} = 3x 60 A
V_{RRM} = 800-1600 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 60-08io7
1200	1200	VWO 60-12io7
1400	1400	VWO 60-14io7
1600	1600	VWO 60-16io7



Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_K = 85°C, 50 - 400 Hz (per phase)		60	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		43	A
I_{TAVM}	T_K = 85°C; (180° sine)		27	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	550	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	600	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	500	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	550	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1520	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1520	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1250	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1250	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 25 A	150	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.45 A	non repetitive, $I_T = I_{TAVM}$	500	A/µs
	di_G/dt = 0.45 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)			
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs	10	W
	$I_T = I_{TAVM}$	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}			125	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque (M5)		5 ± 15 %	Nm
		(10-32 UNF)	44 ± 15 %	lb.in.
Weight	typ.		110	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains requency
- Package with metal base plate
- Isolation voltage 3000 V~
- Planar passivated chips
- UL applied
- 1/4" fast-on power terminals

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

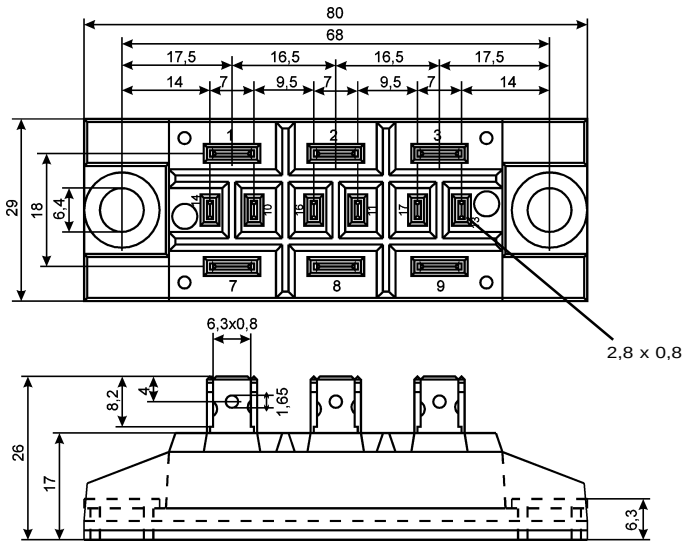
Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling capability
- High power density
- Light weight and compact

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions		Characteristic Values		
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 45 A; T_{VJ} = 25°C		≤	1.45	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				11	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; sine 180°el			0.9	K/W
	per module			0.15	K/W
R_{thJK}	per thyristor; sine 180°el			1.1	K/W
	per module			0.183	K/W
d_S	Creeping distance on surface			16.1	mm
d_A	Creepage distance in air			6.0	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

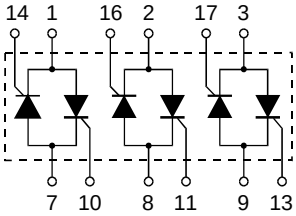


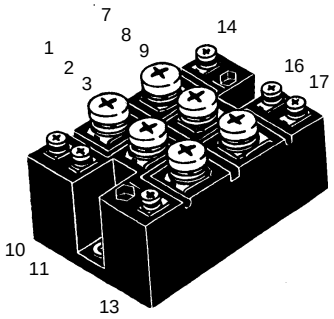
Three Phase AC Controller Modules

I_{RMS} = 80/95 A
V_{RRM} = 800-1400 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
800	800	VWO 80-08io7	VWO 95-08io7
1200	1200	VWO 80-12io7	VWO 95-12io7
1400	1400	VWO 80-14io7	VWO 95-14io7





Symbol	Test Conditions		Maximum Ratings VWO 80	VWO 95	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		82	96	A
I_{TRMS}	$T_{VJ} = T_{VJM}$		59	69	A
I_{TAVM}	T_C = 85°C; (180° sine)		37	44	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	1000	1150	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1100	1230	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	900	1000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1000	1100	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	5000	6600	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	5080	6280	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	4050	5000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	4200	5080	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f =50 Hz, t_P =200 µs V_D = 2/3 V_{DRM}	repetitive, I_T = 150 A		100	A/µs
	I_G = 0.3 A di_G/dt = 0.3 A/µs	non repetitive, $I_T = I_{TAVM}$		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
P_{GM}	$T_{VJ} = T_{VJM}$	t_p = 30 µs		10	W
	$I_T = I_{TAVM}$	t_p = 300 µs		5	W
P_{GAVM}				0.5	W
V_{RGM}				10	V
T_{VJ}				-40...+125	°C
T_{VJM}				125	°C
T_{stg}				-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min		2500	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s		3000	V~
M_d	Mounting torque (M5)			5/44±15 %	Nm/lb.in.
	Terminal connection torque (M3; M5)			1.5/13±15 %	Nm/lb.in.
Weight	typ.			180	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Package with metal base plate
- Isolation voltage 3000 V~
- Planar passivated chips
- UL applied

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

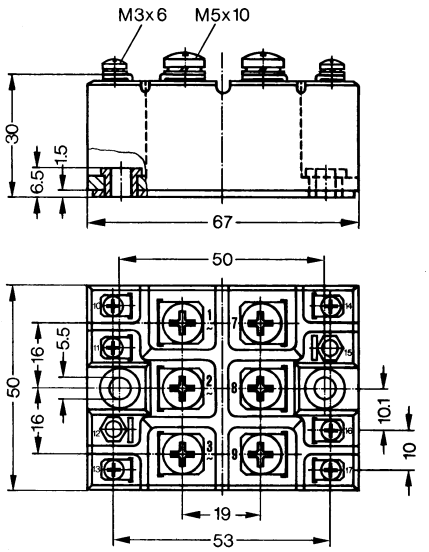
Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions			Characteristic Values VWO 80	VWO 95	
I_D, I_R	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	5	mA
V_T	I_T = 150 A; T_{VJ} = 25°C		≤	1.65	1.57	V
V_{T0}	For power-loss calculations only			0.85	0.85	V
r_T				5.2	4.8	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.0	1.0	V
		T_{VJ} = -40°C	≤	1.6	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	100	mA
		T_{VJ} = -40°C	≤	150	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	0.2	V
I_{GD}			≤	5	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.3 A; di_G/dt = 0.3 A/µs		≤	200	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	150	150	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		≤	2	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	150	µs
R_{thJC}	per thyristor; sine 180°el			0.81	0.66	K/W
	per module			0.135	0.11	K/W
R_{thJK}	per thyristor; sine 180°el			1.0	0.93	K/W
	per module			0.167	0.155	K/W
d_S	Creeping distance on surface			8.0		mm
d_A	Creepage distance in air			4.5		mm
a	Max. allowable acceleration			50		m/s^2

Dimensions in mm (1 mm = 0.0394")

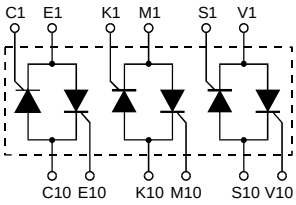


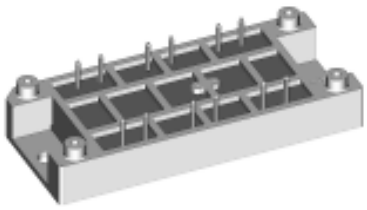
Three Phase AC Controller Modules

I_{RMS} = 3x 83 A
V_{RRM} = 800-1600 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 85-08io1
1200	1200	VWO 85-12io1
1400	1400	VWO 85-14io1
1600	1600	VWO 85-16io1





Symbol	Test Conditions		Max. Ratings per phase	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		59	A
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase) for 10 sec.		83	A
I_{TAVM}	T_C = 85°C; (180° sine)		27	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	520	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	560	A
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	470	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	510	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1350	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1320	A^2s
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	1100	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	1090	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 = 45 A	150	A/µs
	I_G = 0.45 A di_G/dt = 0.45 A/µs	non repetitive, I_T = I_{TAVM}	500	A/µs
$(dv/dt)_{cr}$	T_{VJ}=125°C; R_{GK} = ∞; method 1 (linear voltage rise)	V_{DR} = 2/3 V_{DRM}	1000	V/µs
P_{GM}	T_{VJ}=125°C	t_p = 30 µs	10	W
	I_T = I_{TAVM}	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}	for 10 sec.		150	°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 18-22	Nm. lb.in.
Weight	typ.		80	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Package with DCB base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- UL applied

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

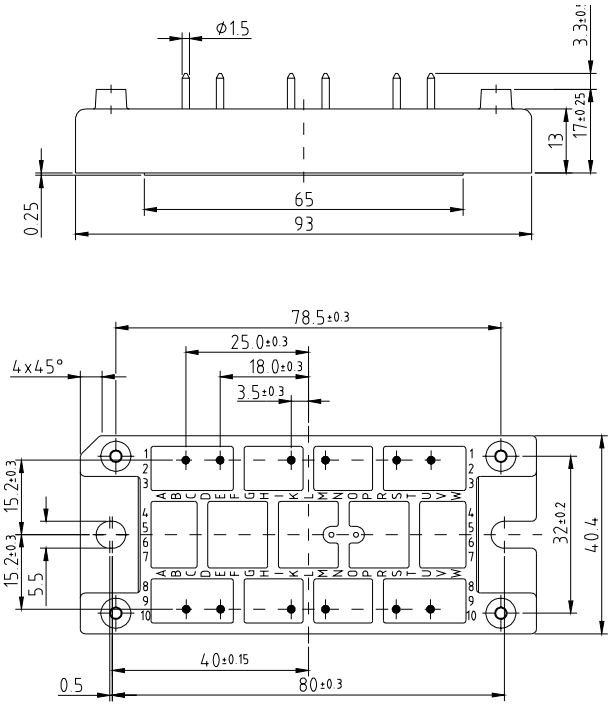
Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 refer to a single thyristor unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions		Characteristic Values		
I_D, I_R	T_{VJ} = 125°C; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 85 A; T_{VJ} = 25°C		≤	1.67	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				11	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	T_{VJ}=125°C;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	T_{VJ}=125°C; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor			0.92	K/W
	per module			0.154	K/W
R_{thJK}	per thyristor			1.22	K/W
	per module			0.204	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")

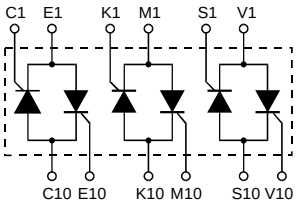


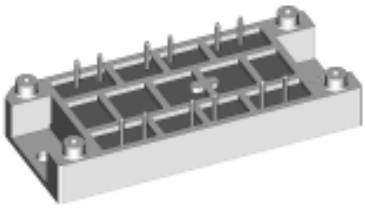
Three Phase AC Controller Modules

I_{RMS} = 3x 143 A
V_{RRM} = 800-1600 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
800	800	VWO 140-08io1
1200	1200	VWO 140-12io1
1400	1400	VWO 140-14io1
1600	1600	VWO 140-16io1





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase)		101	A
I_{RMS}	T_C = 85°C, 50 - 400 Hz (per phase) for 10 sec.		143	A
I_{TAVM}	T_C = 85°C; (180° sine)		46	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	1150	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1240	A
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	1040	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1120	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	6610	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	6460	A^2s
	T_{VJ} = 125°C	t = 10 ms (50 Hz), sine	5410	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	5270	A^2s
$(di/dt)_{cr}$	T_{VJ}=125°C	repetitive, I_T = 45 A	150	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.45 A	non repetitive, I_T = I_{TAVM}	500	A/µs
	di_G/dt = 0.45 A/µs			
$(dv/dt)_{cr}$	T_{VJ}=125°C;	V_{DR} = 2/3 V_{DRM}	1000	V/µs
	R_{GK} = ∞; method 1 (linear voltage rise)			
P_{GM}	T_{VJ}=125°C	t_p = 30 µs	10	W
	I_T = I_{TAVM}	t_p = 300 µs	5	W
P_{GAVM}			0.5	W
V_{RGM}			10	V
T_{VJ}			-40...+125	°C
T_{VJM}	for 10 sec.		150	°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.
			18-22	lb.in.
Weight	typ.		80	g

Features

- Thyristor controller for AC (circuit W3C acc. to IEC) for mains frequency
- Package with DCB base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- UL applied

Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

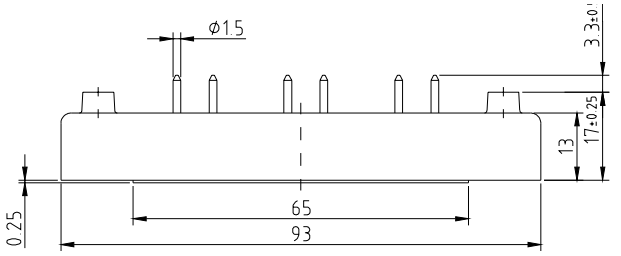
Advantages

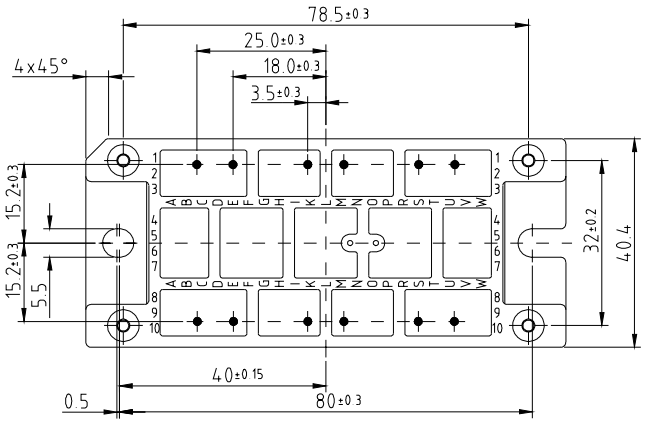
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling
- High power density

Data according to IEC 60747 refer to a single thyristor unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions		Characteristic Values		
I_D, I_R	T_{VJ} = 125°C; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	5	mA
V_T	I_T = 140 A; T_{VJ} = 25°C		≤	1.5	V
V_{T0}	For power-loss calculations only			0.85	V
r_T				5.2	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	1.5	V
		T_{VJ} = -40°C	≤	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	100	mA
		T_{VJ} = -40°C	≤	200	mA
V_{GD}	T_{VJ}=125°C;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	5	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		≤	200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		≤	2	µs
t_q	T_{VJ}=125°C; I_T = 20 A, t_P = 200 µs; di/dt = -10 A/µs V_R = 100 V; dv/dt = 15 V/µs; V_D = 2/3 V_{DRM}		typ.	150	µs
R_{thJC}	per thyristor; sine 180°el			0.6	K/W
	per module			0.1	K/W
R_{thJK}	per thyristor; sine 180°el			0.7	K/W
	per module			0.117	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

Dimensions in mm (1 mm = 0.0394")



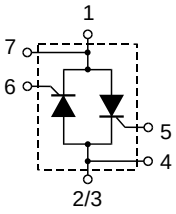


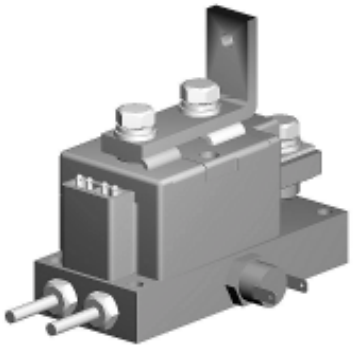
AC Controller with Isolated Water Flow

I_{RMS} = 900 A
V_{RRM} = 1200-1800 V

Preliminary data

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1300	**1200**	**HVL 900 - 12io1**
1500	**1400**	**HVL 900 - 14io1**
1700	**1600**	**HVL 900 - 16io1**
1900	**1800**	**HVL 900 - 18io1**





Symbol	Test Conditions		Maximum Ratings	
I_{RMS}	T_{Water} = 17°C; watervolume = 4 l/min		900	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz)	9200	A
	V_R = 0	t = 8.3 ms (60 Hz)	10100	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz)	8000	A
	V_R = 0	t = 8.3 ms (60 Hz)	8800	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz)	423 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	423 000	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz)	320 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	321 000	A^2s
$(di/dt)_{cr}$	T_{VJ} = T_{VJM} f =50 Hz, t_P = 200 µs V_D = 2/3 V_{DRM} I_G = 1 A, di_G/dt = 1 A/µs	repetitive, I_T = 960 A	100	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
P_{GM}	T_{VJ} = T_{VJM}	t_P = 30 µs	120	W
	I_T = I_{TAVM}	t_P = 500 µs	60	W
P_{GAV}			20	W
V_{RGM}			10	V
T_{VJ}			-40...+140	°C
T_{VJM}			140	°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~
Weight	Typical including screws		1300	g

Features

- Isolation between water and electrical connections with Direct copper bonded Al_2O_3-ceramic
- Planar passivated chips
- Isolation voltage 3600 V~
- Keyed gate/cathode twin pins

Applications

- Large resistance welding equipment
- Large electroplating equipment

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

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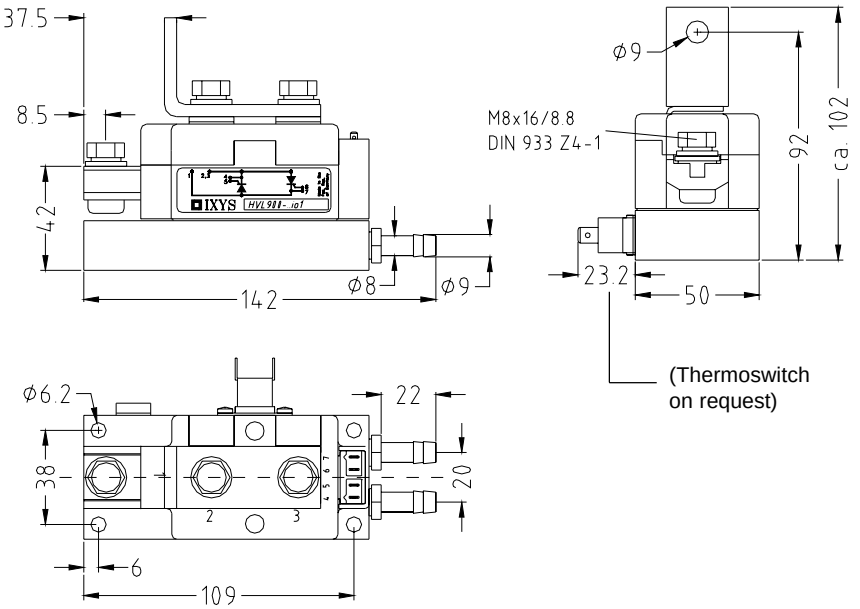
Symbol	Test Conditions		Characteristic Values	
I_{RRM}, I_{DRM}	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		40	mA
V_T, V_F	I_T, I_F = 600 A; T_{VJ} = 25°C		1.32	V
V_{T0}	For power-loss calculations only		0.8	V
r_T			0.68	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	2	V
		T_{VJ} = -40°C	3	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	150	mA
		T_{VJ} = -40°C	220	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	0.25	V
I_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	10	mA
I_L	T_{VJ} = 25°C; t_P = 30 µs; V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs		200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		150	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 1 A; di_G/dt = 1 A/µs		2	µs
Q_S	T_{VJ} = 125°C; I_T, I_F = 300 A; -di/dt = 50 A/µs		760	µC
I_{RM}			275	A
R_{thJW}	per thyristor ; 180° el; watervolume = 4 l/min		0.203	K/W
d_S	Creeping distance on surface		12.7	mm
d_A	Creepage distance in air		9.6	mm
a	Maximum allowable acceleration		50	m/s^2

Optional accessories for modules
Keyed Gate/Cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 180 L** (L = Left for pin pair 4/5) } UL 758, style 1385,
Type **ZY 180 R** (R = Right for pin pair 6/7) } CSA class 5851, guide 460-1-1



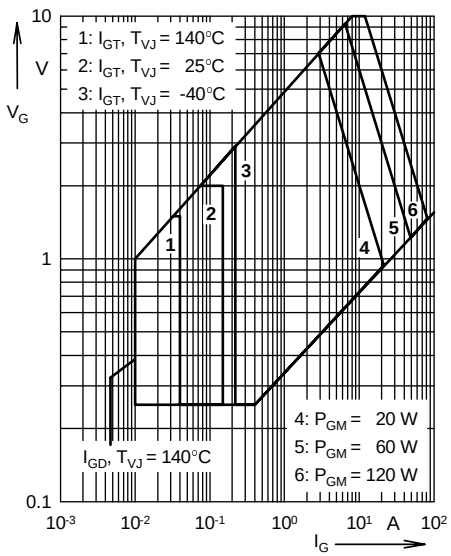


Fig. 1 Gate trigger characteristics

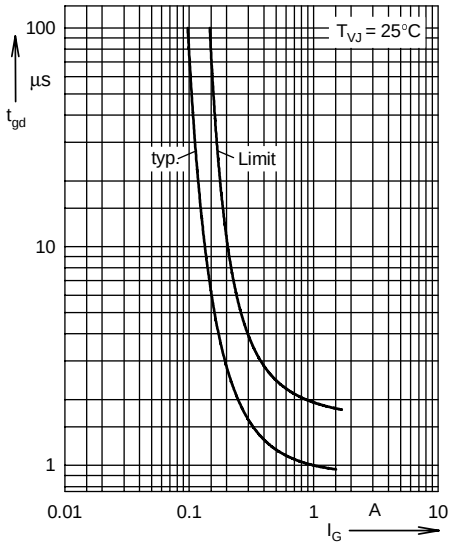


Fig. 2 Gate trigger delay time

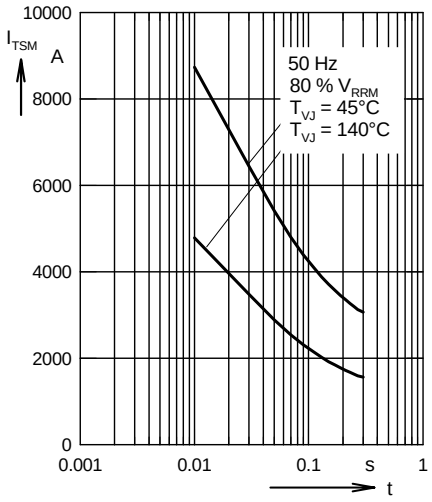


Fig. 3 Surge overload current
I_{TSM}: Crest value, t: duration

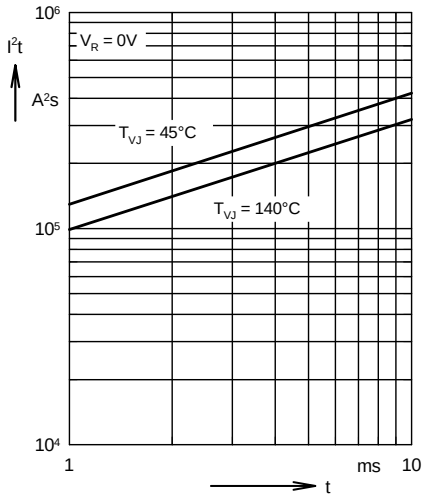


Fig. 4 I^2t versus time (1-10 ms)

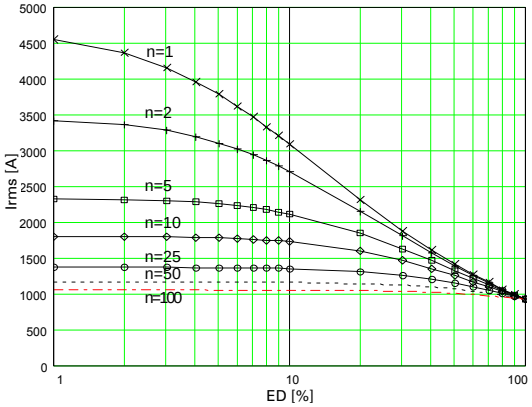


Fig. 5 Rated rms current vs. duty cycle

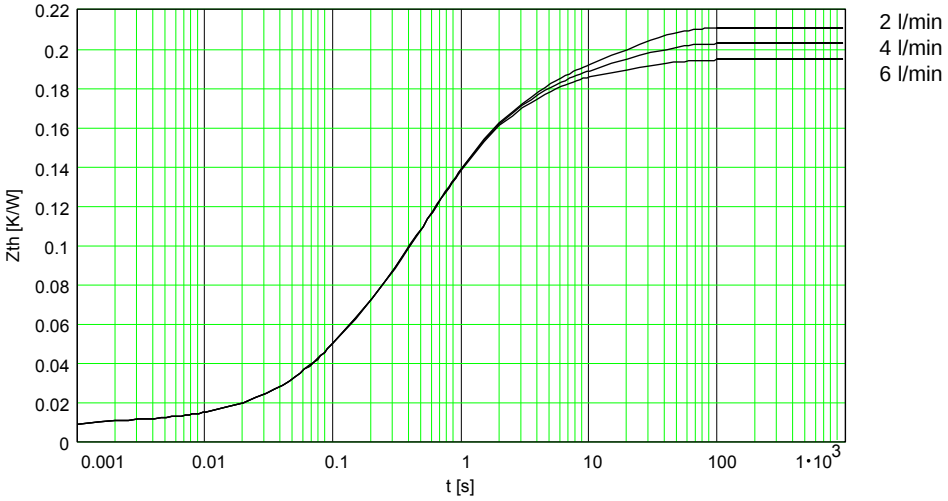


Fig. 6 Transient thermal impedance vs. time