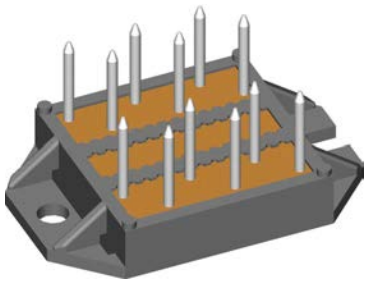
Thyristor Module

V_{RRM}	=	1200 V
I_{TAV}	=	16 A
V_T	=	1,19 V

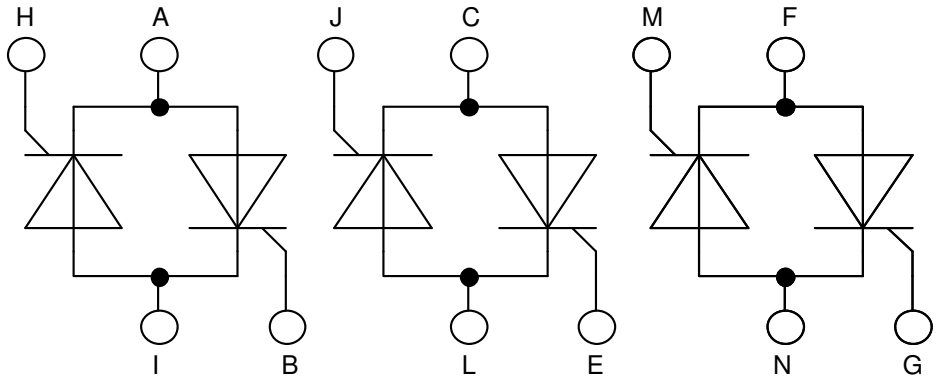
AC Controlling
3~ full-controlled

Part number

VWO35-12HO7



Backside: isolated



E72873

Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

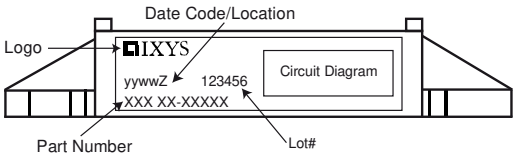
Package: ECO-PAC1

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 9 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Rectifier

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1300	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1200	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			50	µA
		$V_{R/D}$ = 1200 V	T_{VJ} = 125°C			2	mA
V_T	*forward voltage drop*	I_T = 15 A	T_{VJ} = 25°C			1,23	V
		I_T = 30 A				1,48	V
		I_T = 15 A	T_{VJ} = 125°C			1,19	V
		I_T = 30 A				1,51	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 125°C			16	A
I_{RMS}	*RMS forward current per phase*	180° sine				35	A
V_{T0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 125°C			0,88	V
r_T	*slope resistance* }					21	mΩ
R_{thJC}	*thermal resistance junction to case*					1,3	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,5		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			77	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			200	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			215	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			170	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			185	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			200	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			190	A²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			145	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			140	A²s
C_J	*junction capacitance*	V_R = 400V f = 1 MHz	T_{VJ} = 25°C		7		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 125°C			5	W
		t_P = 300 µs				2,5	W
P_{GAV}	*average gate power dissipation*					0,5	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 125°C; f = 50 Hz	repetitive, I_T = 45 A			100	A/µs
		t_P = 200 µs; di_G/dt = 0,15 A/µs;					
		I_G = 0,15A; V_D = ⅔ V_{DRM}	non-repet., I_T = 15 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			500	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25°C			1,5	V
			T_{VJ} = -40°C			2,5	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			25	mA
			T_{VJ} = -40°C			50	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			0,2	V
I_{GD}	*gate non-trigger current*					3	mA
I_L	*latching current*	t_p = 10 µs	T_{VJ} = 25°C			75	mA
		I_G = 0,1 A; di_G/dt = 0,1 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			50	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0,1 A; di_G/dt = 0,1 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 15A; V_D = ⅔ V_{DRM}	T_{VJ} =100 °C		150		µs
		di/dt = 10 A/µs; dv/dt = 20 V/µs; t_p = 200 µs					

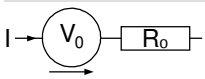
Package ECO-PAC1				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	***RMS current***	per terminal				40	A
T_{VJ}	***virtual junction temperature***			-40		125	°C
T_{op}	***operation temperature***			-40		100	°C
T_{stg}	***storage temperature***			-40		125	°C
Weight					19		g
M_D	***mounting torque***			1,4		2	Nm
$d_{Spp/App}$	***creepage distance on surface | striking distance through air***		***terminal to terminal***	6,0			mm
$d_{Spb/Apb}$			***terminal to backside***	10,0			mm
V_{ISOL}	***isolation voltage***	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VWO35-12ho7	VWO35-12ho7	Box	25	479667

Equivalent Circuits for Simulation

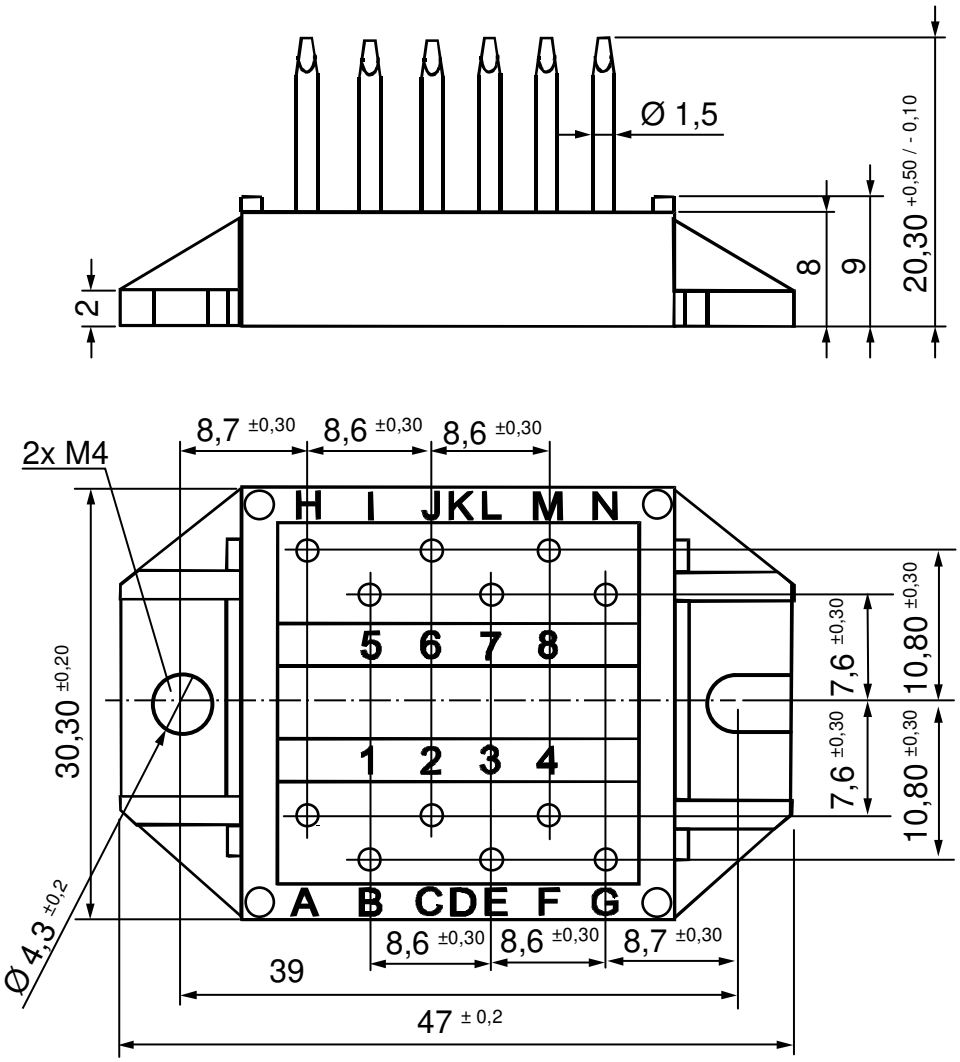
**** on die level*** T_{VJ} = 125°C

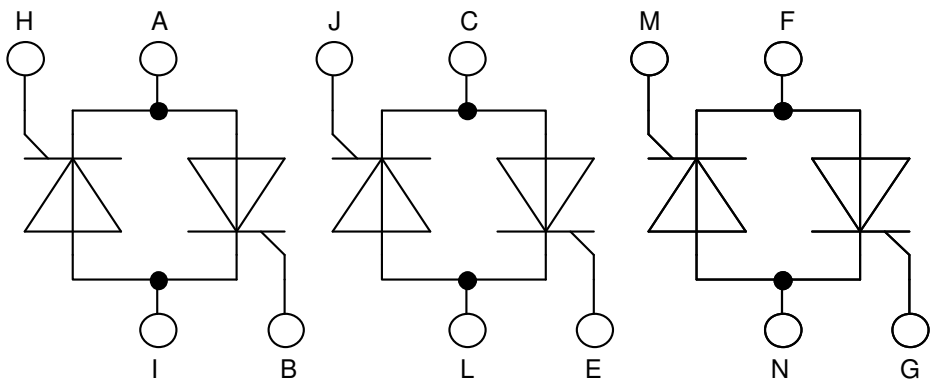


Thyristor

$V_{0\ max}$	***threshold voltage***	0,88	V
$R_{0\ max}$	***slope resistance ****	18	mΩ

Outlines ECO-PAC1





Thyristor

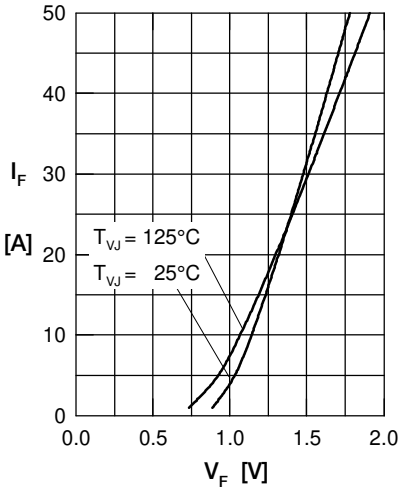


Fig. 1 Forward current vs. voltage drop per thyristor

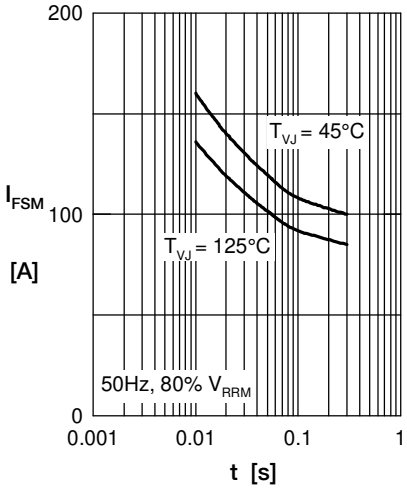


Fig. 2 Surge overload current vs. time per thyristor

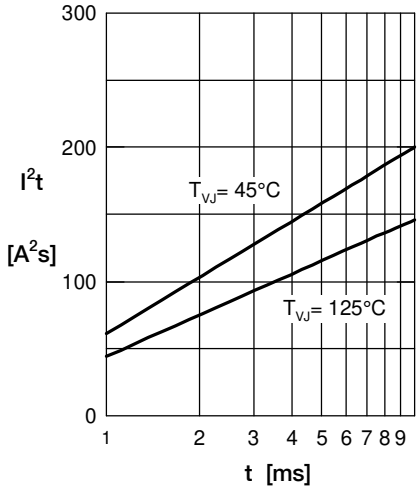


Fig. 3 I^2t vs. time per thyristor

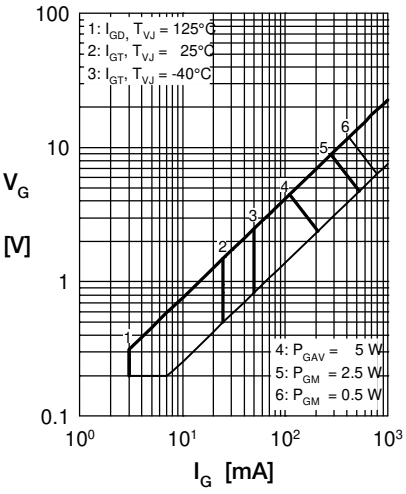


Fig. 4 Gate trigger characteristics

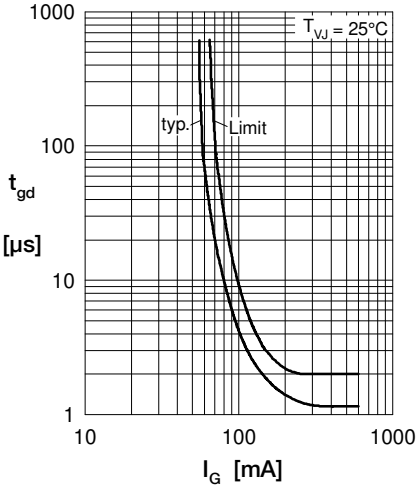


Fig. 5 Gate trigger delay time

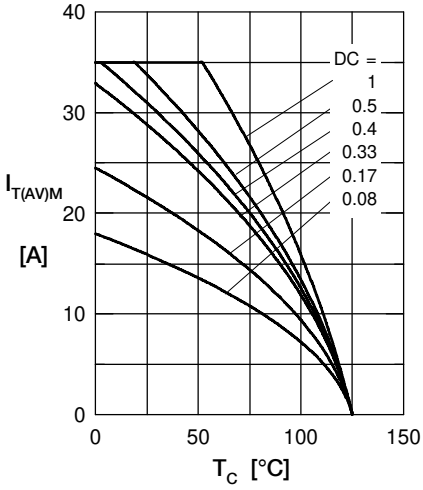


Fig. 5 Max. forward current vs. case temperature per thyristor

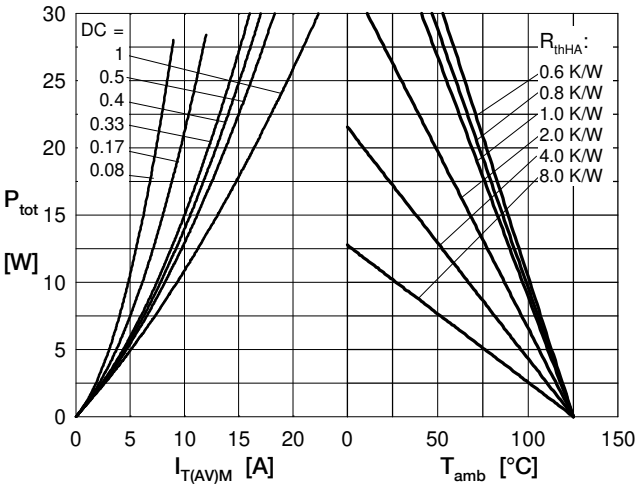


Fig. 4 Power dissipation vs. forward current and ambient temperature per thyristor

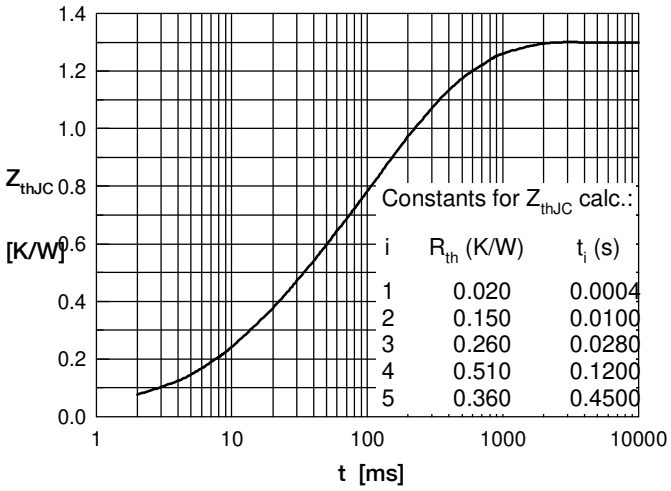


Fig. 6 Transient thermal impedance junction to case vs. time per thyristor