

Standard Rectifier Module

1~ Rectifier	
V_{RRM}	= 1200 V
I_{DAV}	= 70 A
I_{FSM}	= 750 A

1~ Rectifier Bridge

Part number

VBO72-12NO7



 E72873



Features / Advantages:

- Package with DCB ceramic
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

Applications:

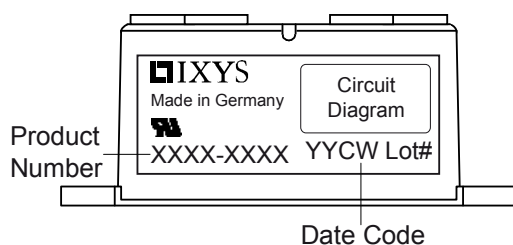
- Diode for main rectification
- For one phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package: PWS-D

- Industry standard outline
- RoHS compliant
- Easy to mount with two screws
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1300	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
I_R	reverse current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			100	μA
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			1.5	mA
V_F	forward voltage drop	$I_F = 30\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.08	V
		$I_F = 60\text{ A}$				1.22	V
		$I_F = 30\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			0.99	V
		$I_F = 60\text{ A}$				1.17	V
I_{DAV}	bridge output current	$T_C = 110^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			70	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.78	V
r_F	slope resistance					6	m Ω
R_{thJC}	thermal resistance junction to case					0.9	K/W
R_{thCH}	thermal resistance case to heatsink				0.4		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				135	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			750	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			810	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			640	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			690	A
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2.82	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			2.73	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			2.05	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			1.98	kA ² s
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$			27		pF

Package PWS-D			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			150	A
T_{stg}	storage temperature		-40		125	°C
T_{VJ}	virtual junction temperature		-40		150	°C
Weight				153		g
M_D	mounting torque		4.25		5.75	Nm
M_T	terminal torque		4.25		5.75	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	9.5			mm
$d_{Spb/Apb}$		terminal to backside	26.0			mm
V_{ISOL}	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V



Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO72-12NO7	VBO72-12NO7	Box	10	471232

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^\circ\text{C}$



Rectifier

$V_{0\max}$	threshold voltage	0.78	V
$R_{0\max}$	slope resistance *	4.8	mΩ

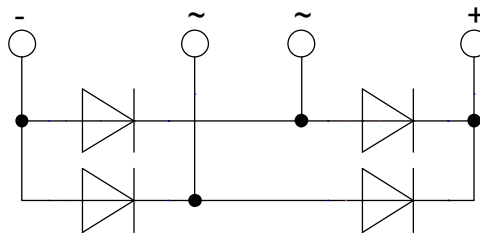
The technical drawing consists of two views of a mechanical component.

Top View:

- Overall width: 72
- Overall height: 42
- Hole diameter: 60
- Distance between hole centers (horizontal): 72 - 2 * 20 = 32
- Distance between hole centers (vertical): 42 - 2 * 5.3 = 31.4
- Distance from outer edge to hole center (horizontal): 20
- Distance from outer edge to hole center (vertical): 5.3
- Inner hole diameter: 54
- Distance between inner hole centers (horizontal): 18
- Distance between inner hole centers (vertical): 10
- Distance from inner hole center to outer edge (horizontal): 2.5
- Distance from inner hole center to outer edge (vertical): 2.5
- Central feature: Hexagonal shape with a cross symbol (+) in the center.
- Material specification: M5

Side View:

- Overall height: 30
- Distance from bottom edge to hole center: 7
- Distance from top edge to hole center: 2.5



Rectifier

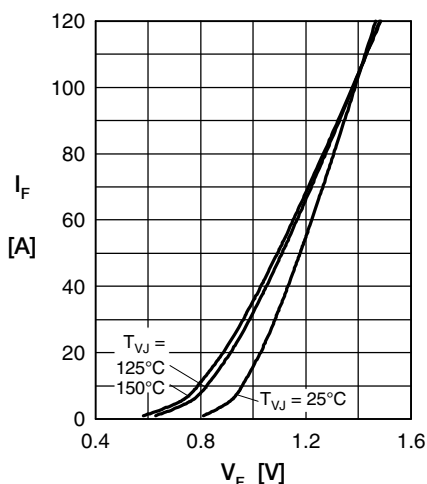


Fig. 1 Forward current versus voltage drop per diode

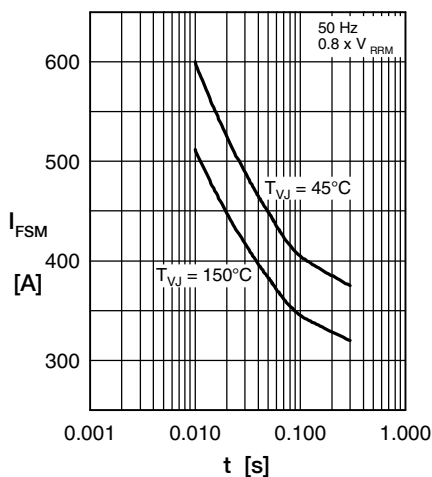


Fig. 2 Surge overload current

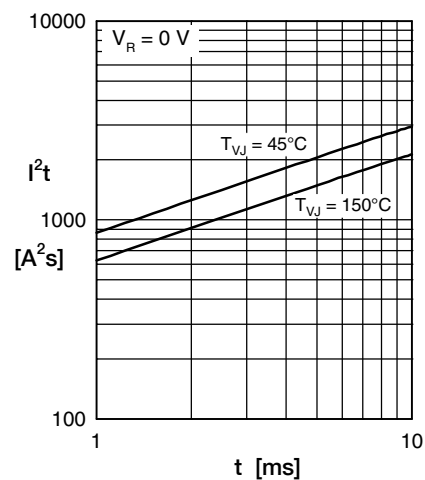


Fig. 3 I^2t versus time per diode

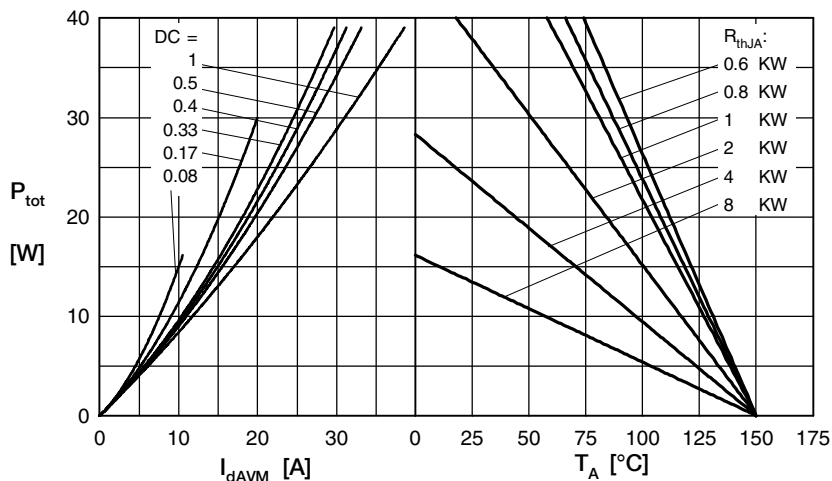


Fig. 4 Power dissipation vs. direct output current & ambient temperature

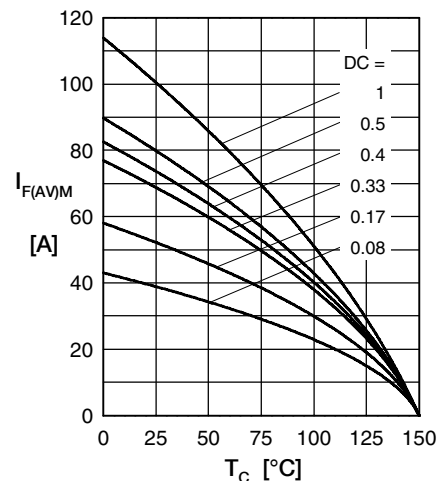


Fig. 5 Max. forward current vs. case temperature

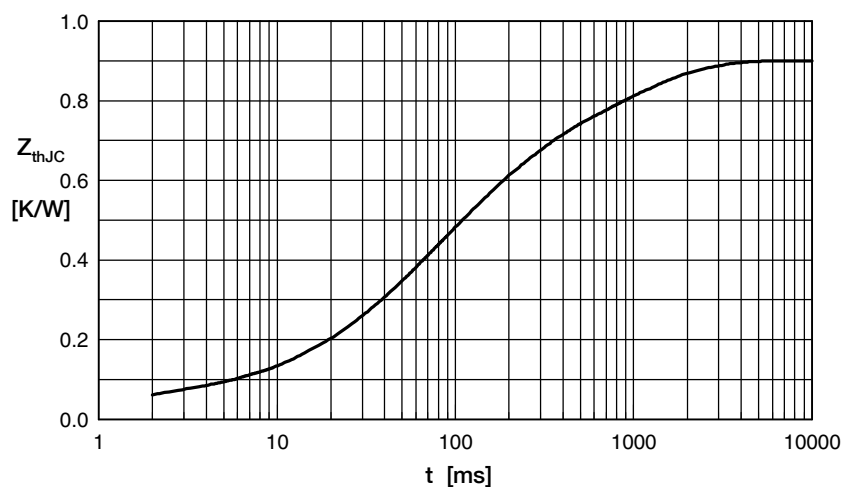


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	0.05	0.001
2	0.14	0.030
3	0.18	0.070
4	0.28	0.150
5	0.25	0.950