

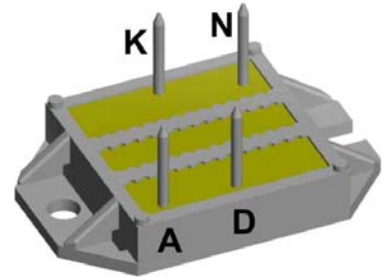
Standard Rectifier Module

1~ Rectifier	
V_{RRM}	= 1200 V
I_{DAV}	= 20 A
I_{FSM}	= 120 A

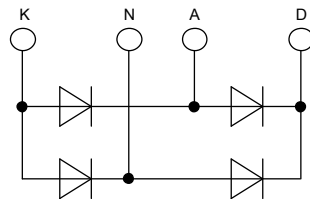
1~ Rectifier Bridge

Part number

VBO21-12N07



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:

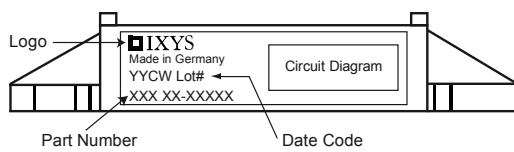
- Diode for main rectification
- For one phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package: ECO-PAC1

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

Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					1300	V
V_{RRM}	max. repetitive reverse blocking voltage					1200	V
I_R	reverse current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			10	μA
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			0.7	mA
V_F	forward voltage drop	$I_F = 10\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			1.20	V
		$I_F = 20\text{ A}$				1.41	V
		$I_F = 10\text{ A}$	$T_{VJ} = 125^\circ\text{C}$			1.14	V
		$I_F = 20\text{ A}$				1.42	V
I_{DAV}	bridge output current	$T_C = 115^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$			20	A
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^\circ\text{C}$			0.84	V
r_F	slope resistance					28.8	m Ω
R_{thJC}	thermal resistance junction to case					2.5	K/W
R_{thCH}	thermal resistance case to heatsink				0.4		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		50	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$			120	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			130	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$			100	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			110	A
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$			72	A ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			70	A ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$			50	A ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			50	A ² s
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		4		pF

Package ECO-PAC1		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{stg}	storage temperature		-40		125	°C
T_{VJ}	virtual junction temperature		-40		150	°C
Weight				19		g
M_D	mounting torque		1.5		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	3000			V
		t = 1 minute 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500			V

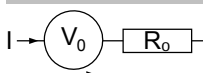


Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO21-12NO7	VBO21-12NO7	Box	25	479527

Equivalent Circuits for Simulation

* on die level

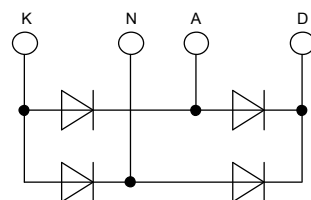
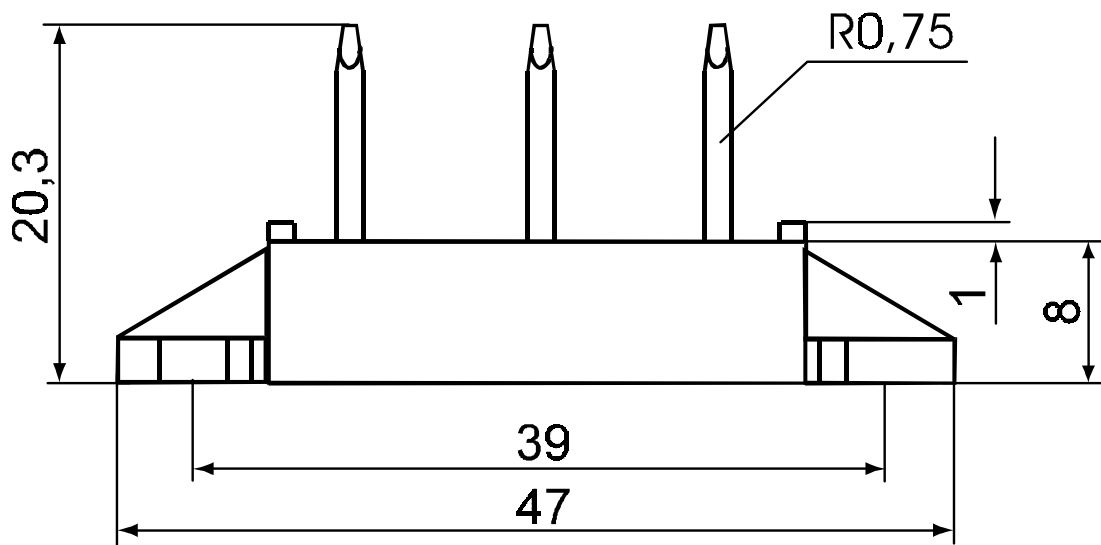
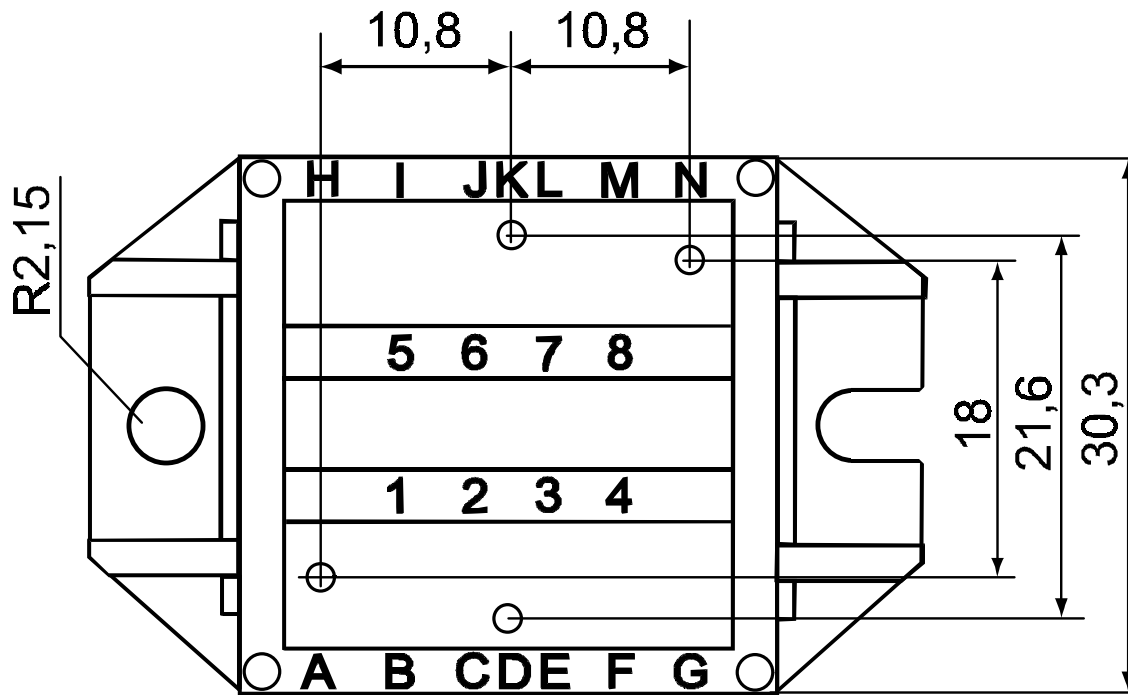
$T_{VJ} = 150^\circ\text{C}$



Rectifier

$V_{0\max}$	threshold voltage	0.84	V
$R_{0\max}$	slope resistance *	27.6	mΩ

Outlines ECO-PAC1



Rectifier

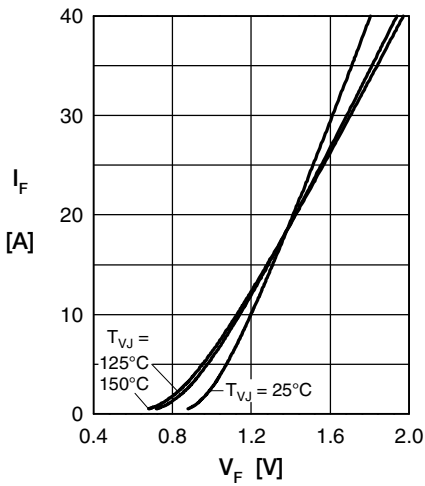


Fig. 1 Forward current vs. voltage drop per diode

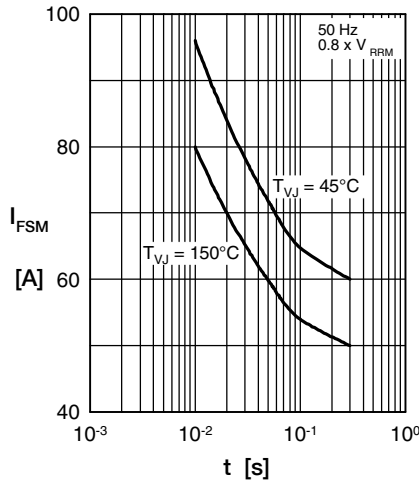


Fig. 2 Surge overload current vs. time per diode

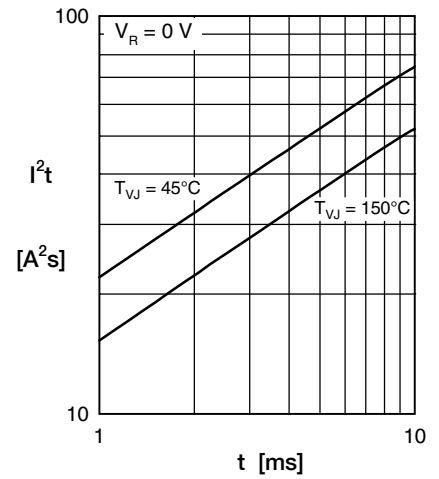


Fig. 3 I^2t vs. time per diode

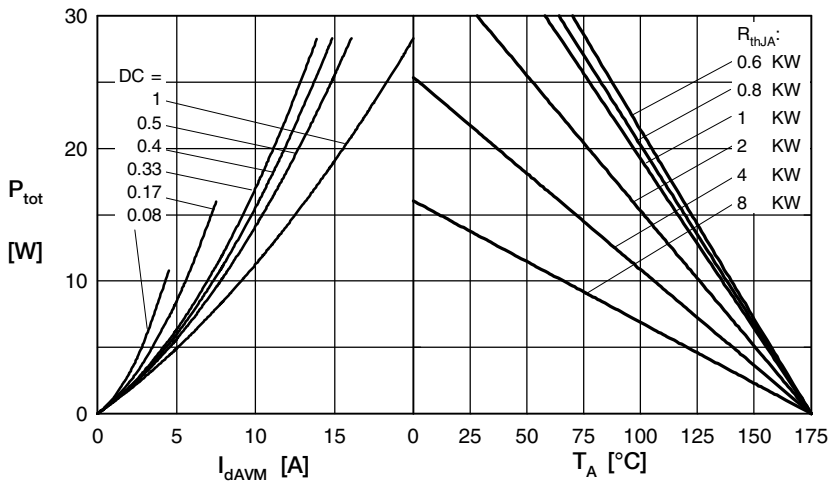


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

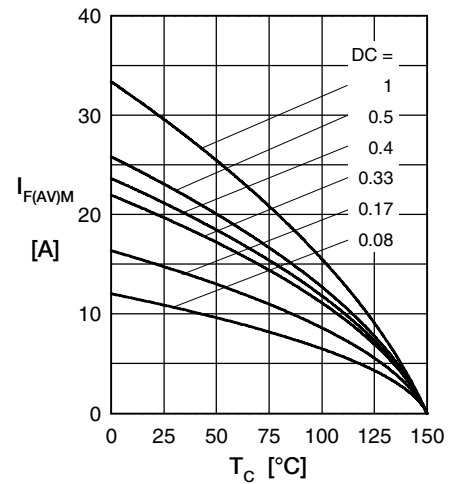


Fig. 5 Max. forward current vs. case temperature per diode

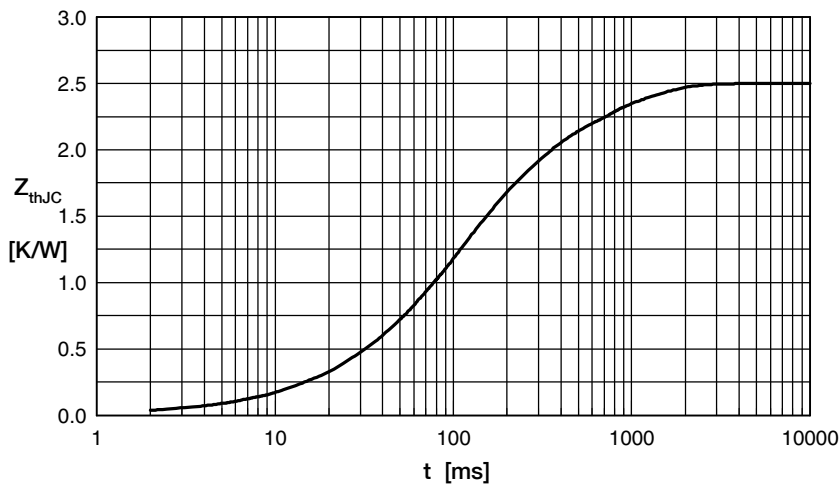


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	1.359	0.1015
2	0.3286	0.1026
3	0.1651	0.4919
4	0.6473	0.62