

# Standard Rectifier Module

<b>1~ Rectifier</b>	
$V_{RRM}$	= 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

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 9 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

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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	$V_R = 1200$ V		$T_{VJ} = 25^\circ\text{C}$		10	$\mu\text{A}$
		$V_R = 1200$ V		$T_{VJ} = 150^\circ\text{C}$		0.7	mA
$V_F$	forward voltage drop	$I_F = 10$ A		$T_{VJ} = 25^\circ\text{C}$		1.20	V
		$I_F = 20$ A				1.41	V
		$I_F = 10$ A		$T_{VJ} = 125^\circ\text{C}$		1.14	V
		$I_F = 20$ A				1.42	V
$I_{DAV}$	bridge output current	$T_C = 115^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		20	A
		rectangular	d = 0.5				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.84	V
$r_F$	slope resistance					28.8	m $\Omega$
						} for power loss calculation only	
$R_{thJC}$	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 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		120	A
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		130	A
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		100	A
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		110	A
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		72	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		70	A <sup>2</sup> s
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		50	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		50	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; f = 1 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
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		125	°C
<b>Weight</b>				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	3000			V
		t = 1 minute	2500			V



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

**Equivalent Circuits for Simulation**

\* on die level

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

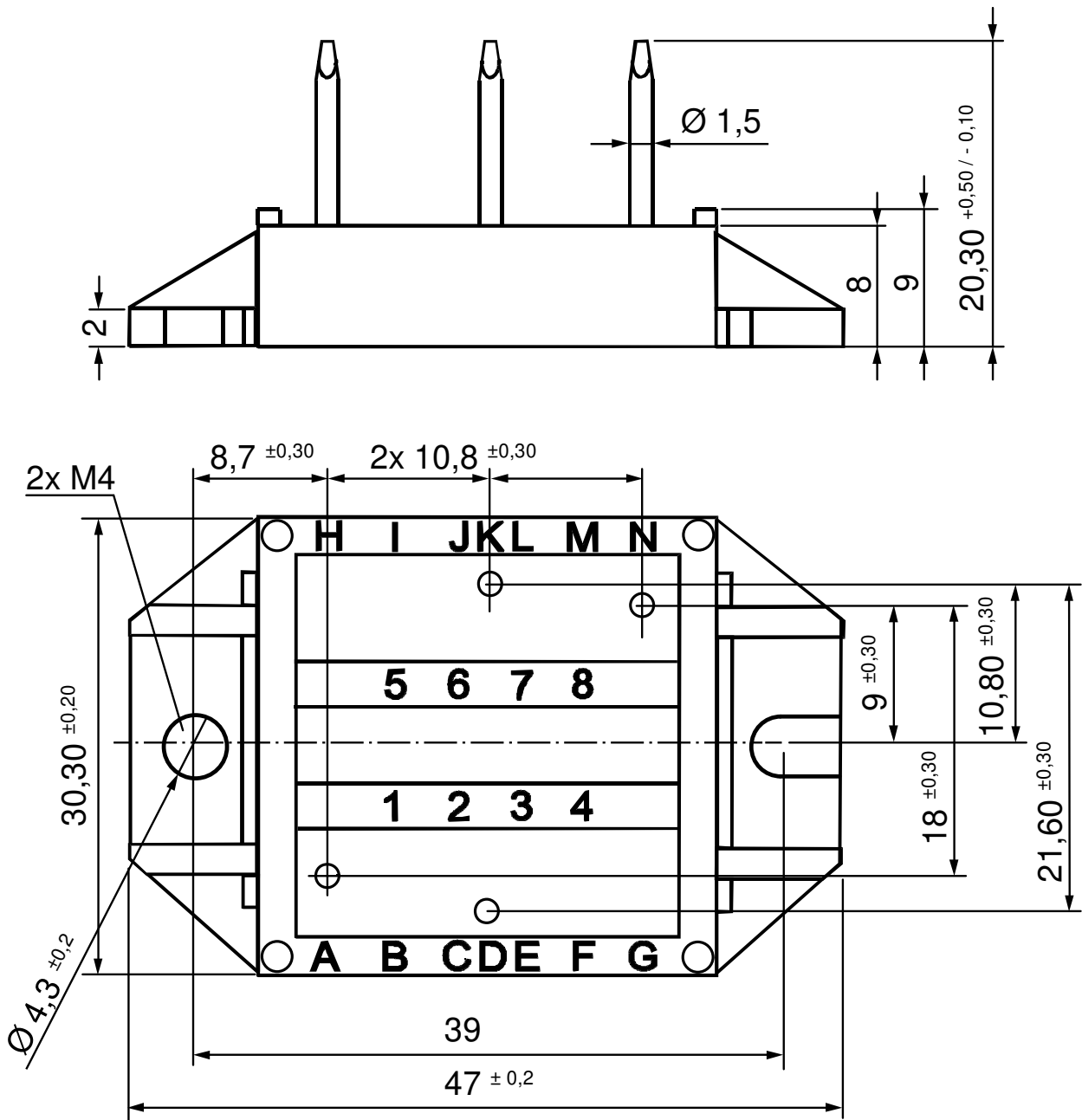


**Rectifier**

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



Outlines ECO-PAC1



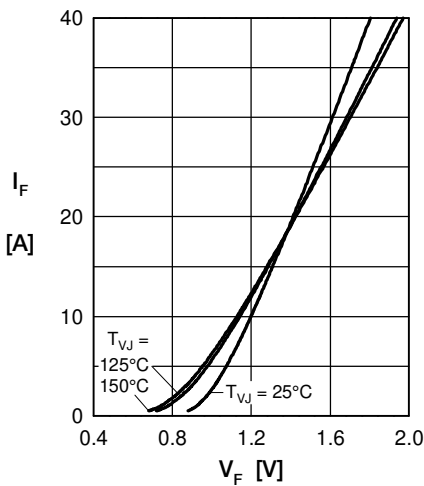
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

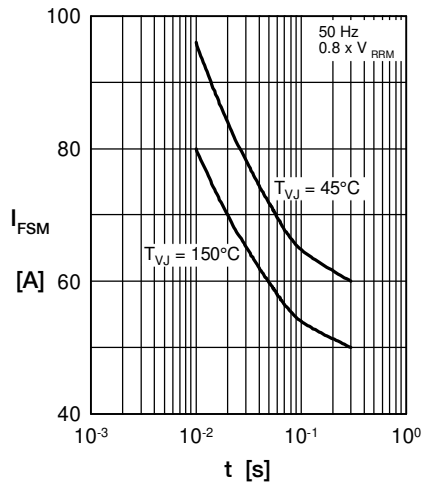


Fig. 2 Surge overload current vs. time per diode

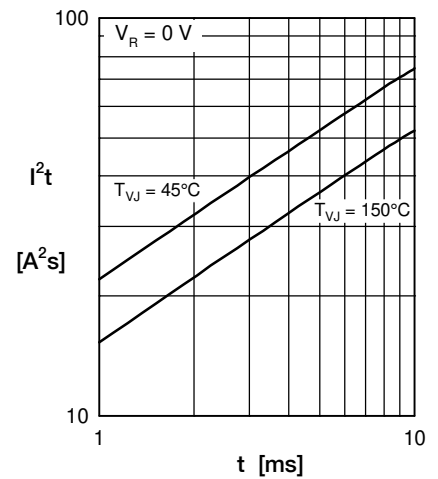
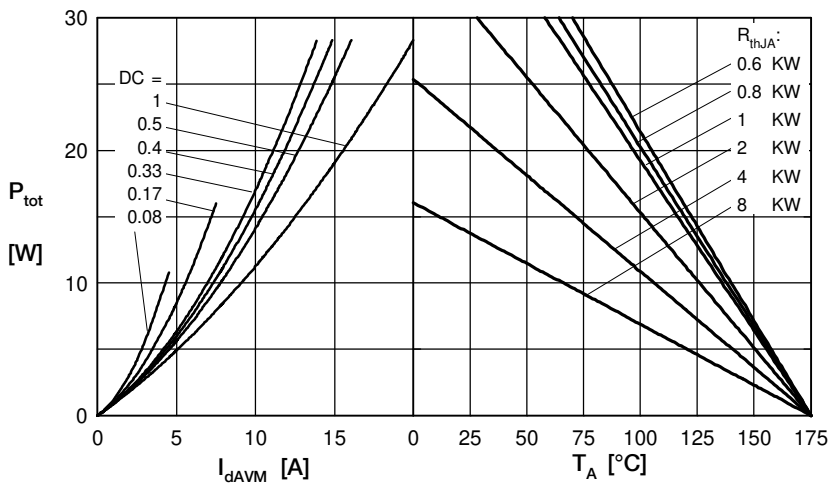

 Fig. 3  $I^2t$  vs. time per diode


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

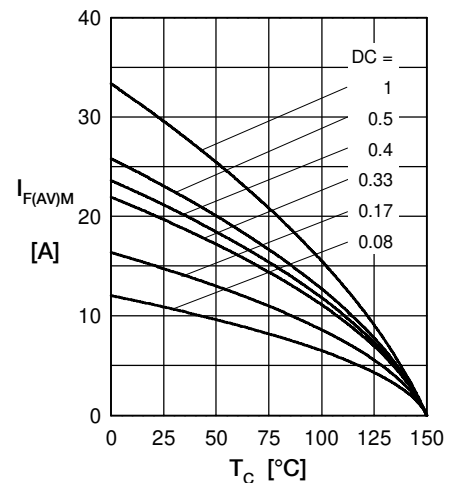


Fig. 5 Max. forward current vs. case temperature per diode

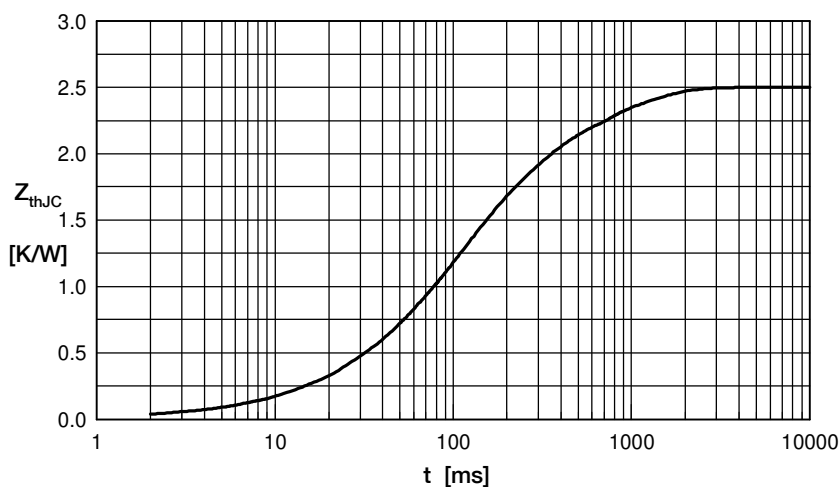


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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