

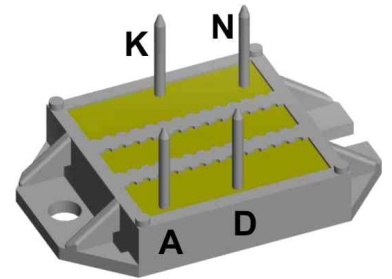
Standard Rectifier Module

1~ Rectifier	
V_{RRM}	= 1600 V
I_{DAV}	= 55 A
I_{FSM}	= 300 A

1~ Rectifier Bridge

Part number

VBO54-16NO7



 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					1700	V	
V_{RRM}	max. repetitive reverse blocking voltage					1600	V	
I_R	reverse current	$V_R = 1600$ V	$T_{VJ} = 25^\circ\text{C}$			40	μA	
		$V_R = 1600$ V	$T_{VJ} = 150^\circ\text{C}$			1.5	mA	
V_F	forward voltage drop	$I_F = 20$ A	$T_{VJ} = 25^\circ\text{C}$			1.15	V	
		$I_F = 40$ A				1.34	V	
		$I_F = 20$ A	$T_{VJ} = 125^\circ\text{C}$			1.12	V	
		$I_F = 40$ A				1.32	V	
I_{DAV}	bridge output current	$T_C = 105^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			55	A	
V_{FO}	threshold voltage	} for power loss calculation only				0.82	V	
r_F	slope resistance					12.2	m Ω	
R_{thJC}	thermal resistance junction to case					1.1	K/W	
R_{thCH}	thermal resistance case to heatsink			0.4			K/W	
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$			110	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			300	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			325	A	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			255	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			275	A	
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			450	A ² s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			440	A ² s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			325	A ² s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			315	A ² s	
C_J	junction capacitance	$V_R = 400$ V; f = 1 MHz	$T_{VJ} = 25^\circ\text{C}$		10		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
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	3000			V
		t = 1 minute	2500			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO54-16NO7	VBO54-16NO7	Box	25	479551
Alternative	VBO54-16NO7	VBO54-16NO7	Tube	13	521602

Equivalent Circuits for Simulation

* on die level

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

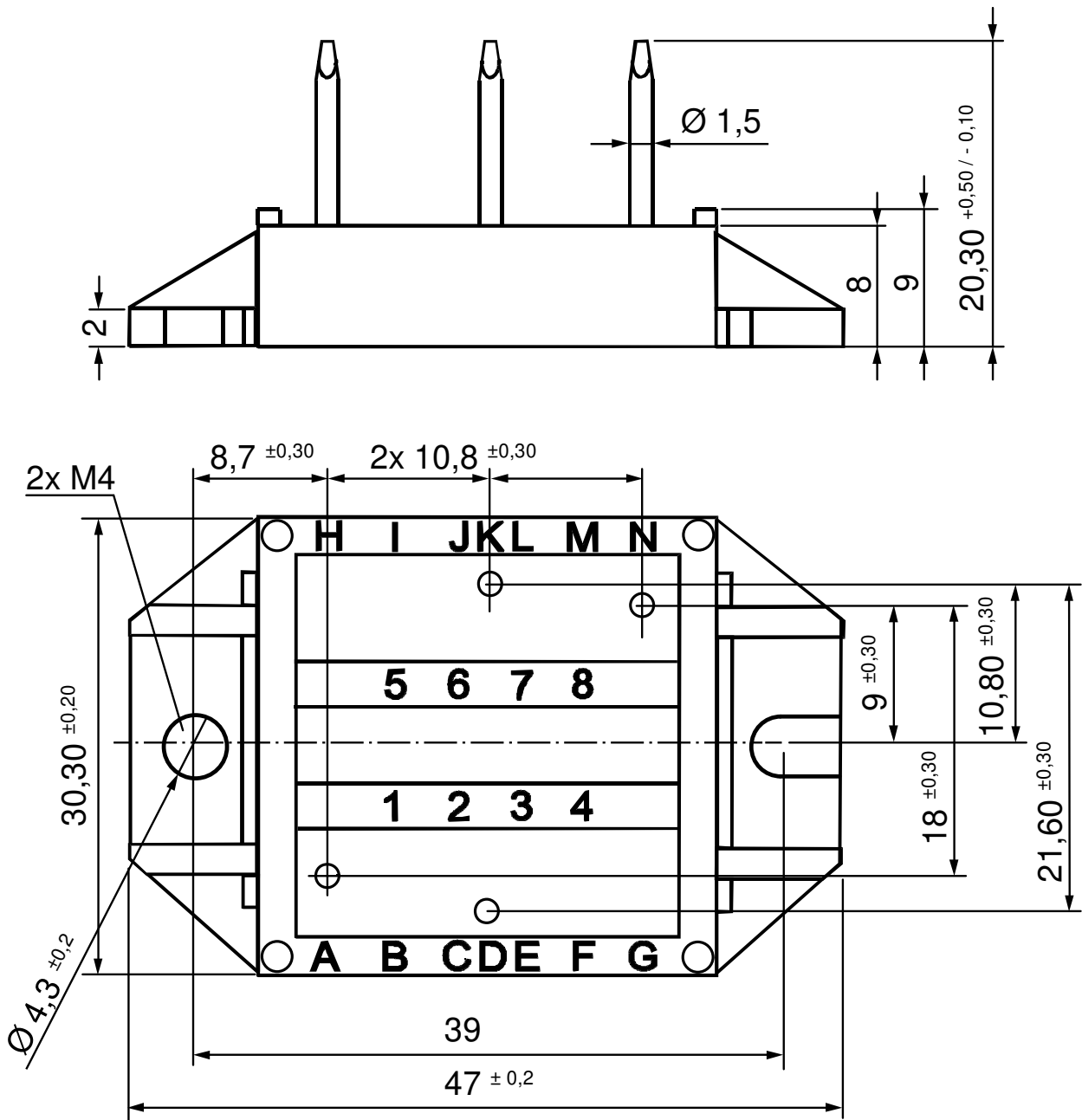


Rectifier

$V_{0\ max}$	threshold voltage	0.82	V
$R_{0\ max}$	slope resistance *	11	mΩ



Outlines ECO-PAC1





Rectifier

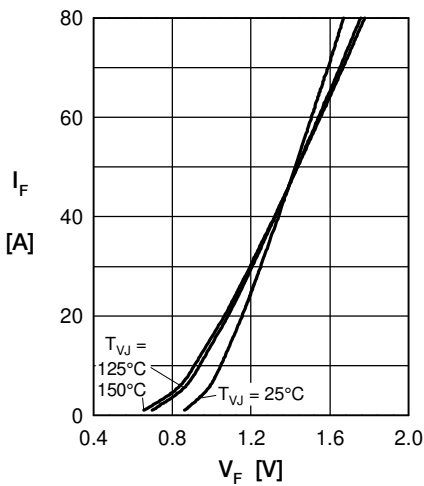


Fig. 1 Forward current versus voltage drop per diode

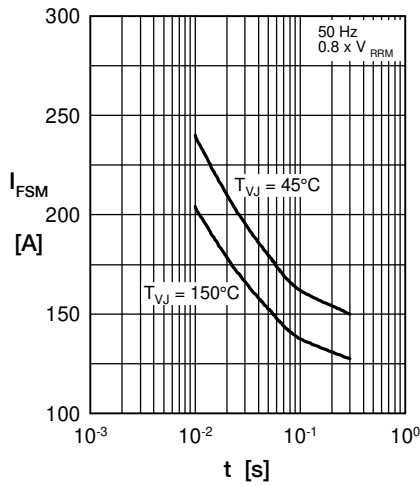


Fig. 2 Surge overload current

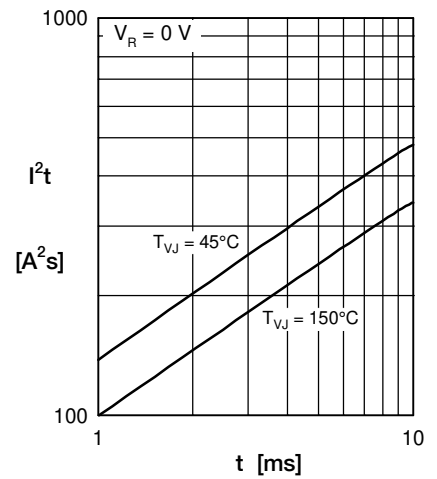


Fig. 3 I^2t versus time per diode

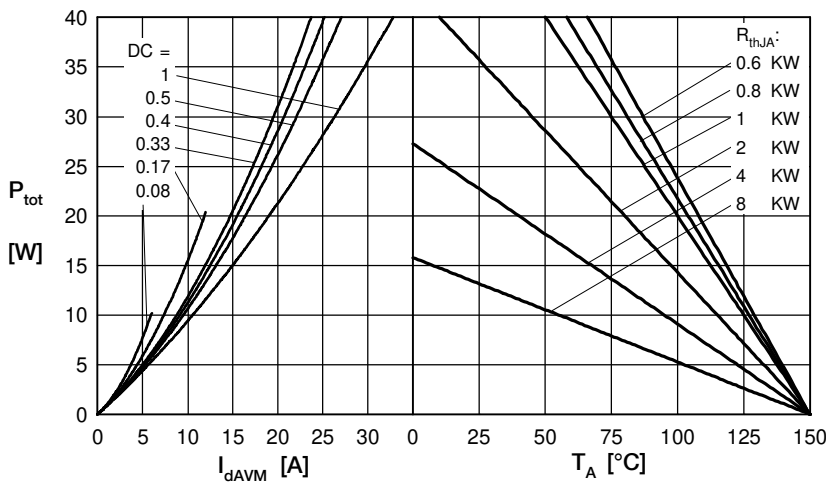


Fig. 4 Power dissipation vs. direct output current & ambient temperature

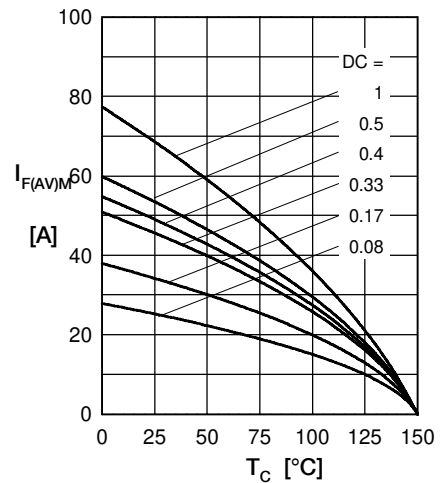


Fig. 5 Max. forward current vs. case temperature

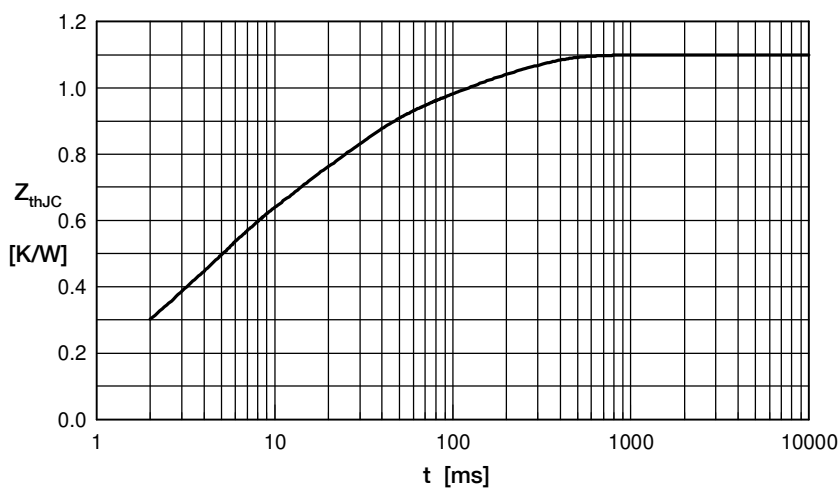


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	0.05070	0.004
2	0.163	0.0025
3	0.2805	0.0035
4	0.363	0.02
5	0.2228	0.15