

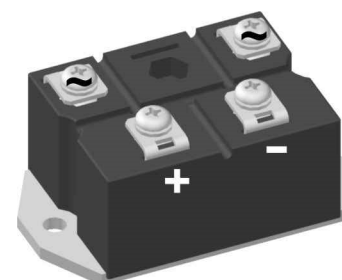
Standard Rectifier Module

1~ Rectifier	
V_{RRM}	= 1600 V
I_{DAV}	= 60 A
I_{FSM}	= 550 A

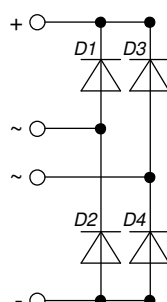
1~ Rectifier Bridge

Part number

VBO52-16NO7



 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: PWS-D

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Easy to mount with two screws
- Base plate: Copper internally DCB isolated
- Advanced power cycling

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1700	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1600	V
I_R	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			40	μA
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			1.5	mA
V_F	forward voltage drop	$I_F = 20\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.07	V
		$I_F = 40\text{ A}$				1.19	V
		$I_F = 20\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			0.96	V
		$I_F = 40\text{ A}$				1.13	V
I_{DAV}	bridge output current	$T_C = 115^{\circ}\text{C}$ rectangular	$T_{VJ} = 150^{\circ}\text{C}$ $d = 0.5$			60	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.78	V
r_F	slope resistance					8.1	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	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			550	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			595	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			470	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			505	A
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			1.52	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			1.48	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			1.11	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			1.06	kA ² s
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$			19		pF

Package PWS-D				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				150	A
T_{VJ}	virtual junction temperature			-40		150	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		125	°C
Weight					153		g
M_D	mounting torque			4.25		5.75	Nm
M_T	terminal torque			4.25		5.75	Nm
$d_{Spp/Apb}$	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	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V
		t = 1 minute		2500			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO52-16NO7	VBO52-16NO7	Box	10	472352

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 *	6.9	mΩ

Technical drawing of a mechanical part, showing top and side views with dimensions.

Top View Dimensions:

- Overall width: 72
- Overall height: 42
- Top section width (left to right): 60, 54
- Top section height (left to right): 20, 20
- Top section width (left to right): 2,5, 18, 2,5
- Bottom section width (left to right): 23, 10
- Bottom section height (left to right): 2,5, 5,3, 13,3
- Bottom section width (left to right): 48
- Bottom section height (left to right): 21,6, 5,3
- Bottom section width (left to right): 2,5, 10, 2,5
- Bottom section height (left to right): 2,5, 5,3, 13,3
- Bottom section width (left to right): 48
- Bottom section height (left to right): 21,6, 5,3
- Bottom section width (left to right): 2,5, 10, 2,5
- Bottom section height (left to right): 2,5, 5,3, 13,3

Side View Dimensions:

- Overall width: 30
- Overall height: 7
- Top section width (left to right): 2,5, 5,3, 13,3
- Top section height (left to right): 2,5, 5,3, 13,3
- Bottom section width (left to right): 2,5, 5,3, 13,3
- Bottom section height (left to right): 2,5, 5,3, 13,3

Other Features:

- Top view shows a central hexagonal feature and two circular features on the left and right sides.
- Side view shows a rectangular block with a central slot and a small circular feature on the right side.
- Material: M5



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	0.05	0.001
2	0.14	0.030
3	0.25	0.060
4	0.35	0.130
5	0.31	0.920