

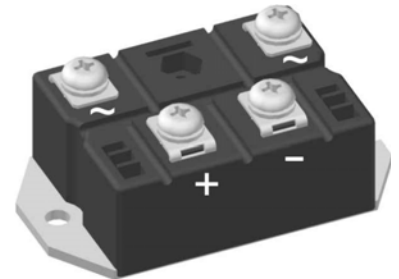
Standard Rectifier Module

1~ Rectifier
$V_{RRM} = 1600 \text{ V}$
$I_{DAV} = 160 \text{ A}$
$I_{FSM} = 2800 \text{ A}$

1~ Rectifier Bridge

Part number

VBO160-16NO7



 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-E

- 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	$T_{VJ} = 25^{\circ}\text{C}$				1700	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1600	V
I_R	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			200	μA
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			3.5	mA
V_F	forward voltage drop	$I_F = 160\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.07	V
		$I_F = 320\text{ A}$				1.22	V
		$I_F = 160\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			0.96	V
		$I_F = 320\text{ A}$				1.15	V
I_{DAV}	bridge output current	$T_C = 110^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			160	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.74	V
r_F	slope resistance					2.4	m Ω
R_{thJC}	thermal resistance junction to case					0.4	K/W
R_{thCH}	thermal resistance case to heatsink				0.15		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				310	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2.80	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			3.03	kA
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			2.38	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			2.57	kA
I^2t	value for fusing	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			39.2	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			38.1	kA ² s
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			28.3	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			27.5	kA ² s
C_J	junction capacitance	$V_R = 400\text{ V; } f = 1\text{ MHz}$			133		pF

Package PWS-E			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			250	A
T_{stg}	storage temperature		-40		125	°C
T_{VJ}	virtual junction temperature		-40		150	°C
Weight				273		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	12.0			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	VBO160-16NO7	VBO160-16NO7	Box	5	491381

Equivalent Circuits for Simulation

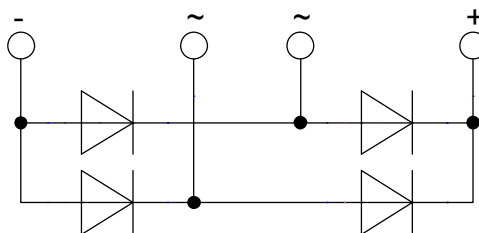
* on die level

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



Rectifier

$V_{0\max}$	threshold voltage	0.74	V
$R_{0\max}$	slope resistance *	1.2	mΩ



Rectifier

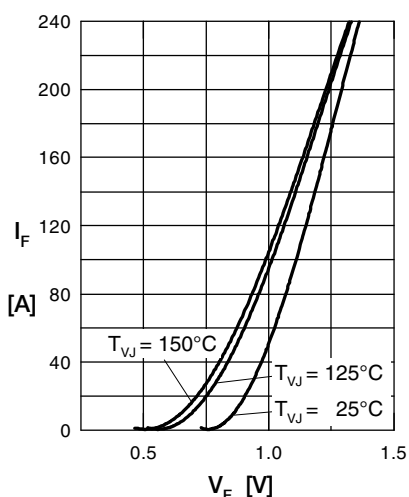


Fig. 1 Forward current vs. voltage drop per diode

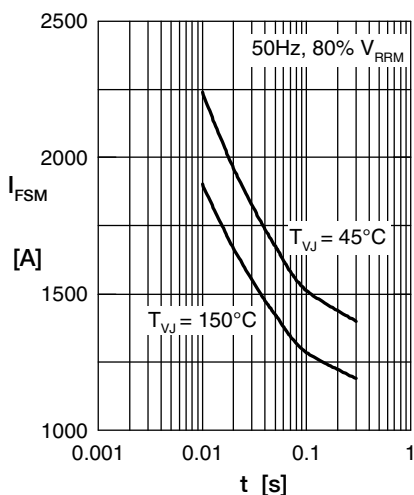


Fig. 2 Surge overload current vs. time per diode

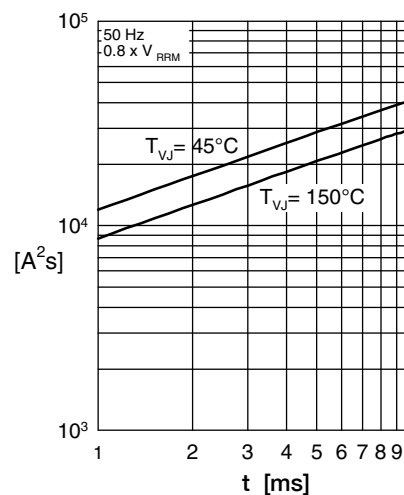


Fig. 3 I^2t vs. time per diode

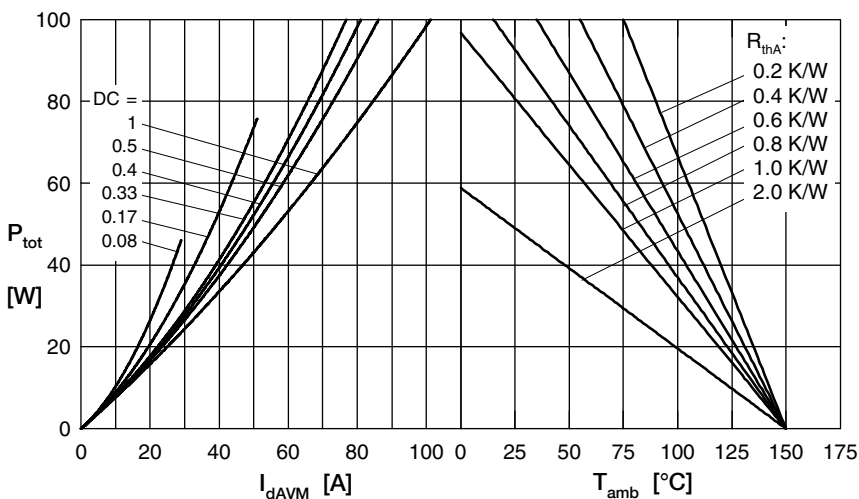


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

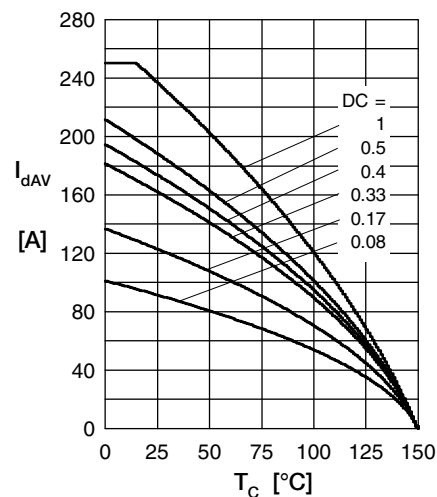


Fig. 5 Max. forward current vs. case temperature per diode

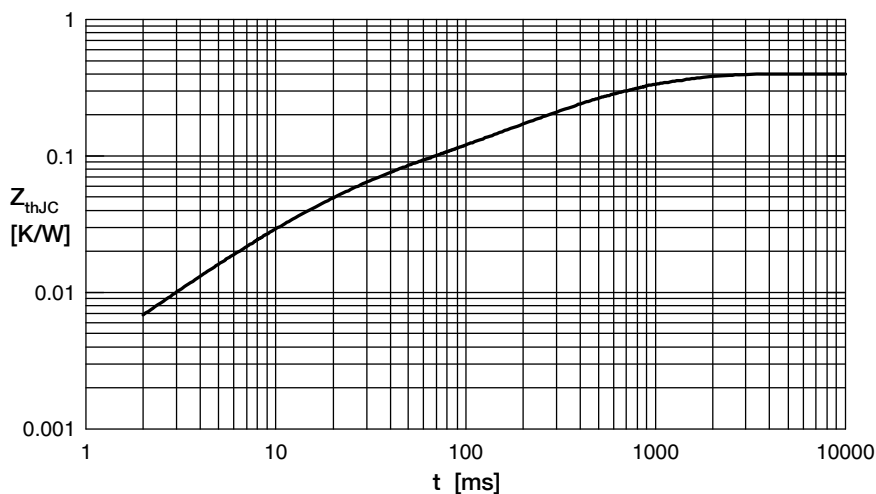


Fig. 6 Transient thermal impedance junction to case vs. time per diode

R_i	t_i
0.050	0.02
0.003	0.01
0.100	0.225
0.177	0.8
0.070	0.58

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