

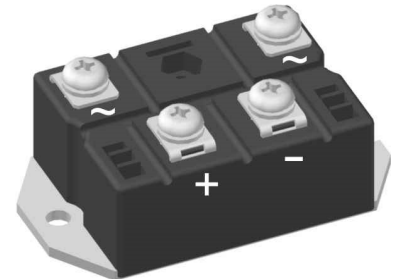
Standard Rectifier Module

1~ Rectifier
$V_{RRM} = 1800 \text{ V}$
$I_{DAV} = 160 \text{ A}$
$I_{FSM} = 2800 \text{ A}$

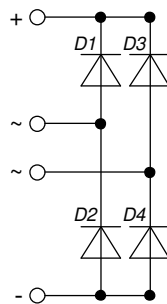
1~ Rectifier Bridge

Part number

VBO160-18NO7



 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

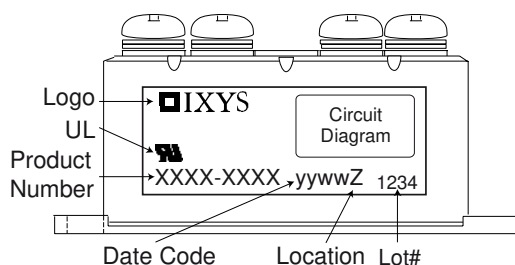
- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Easy to mount with two screws
- Base plate: Copper internally DCB isolated
- Advanced power cycling

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1900	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1800	V
I_R	reverse current	$V_R = 1800\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			200	μA
		$V_R = 1800\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			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	$T_{VJ} = 150^{\circ}\text{C}$ d = 0.5			160	A
V_{F0}	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 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}\text{C}$			2.80	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			3.03	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}\text{C}$			2.38	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			2.57	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}\text{C}$			39.2	kA ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			38.1	kA ² s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}\text{C}$			28.3	kA ² s
		t = 8,3 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_{VJ}	virtual junction temperature			-40		150	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		125	°C
Weight					273		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		12.0			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

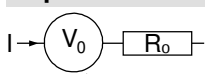


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO160-18NO7	VBO160-18NO7	Box	5	484024

Equivalent Circuits for Simulation

* on die level

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



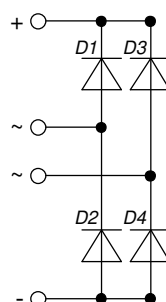
Rectifier

$V_{0\max}$ threshold voltage 0.74

V

$R_{0\max}$ slope resistance * 1.2

mΩ



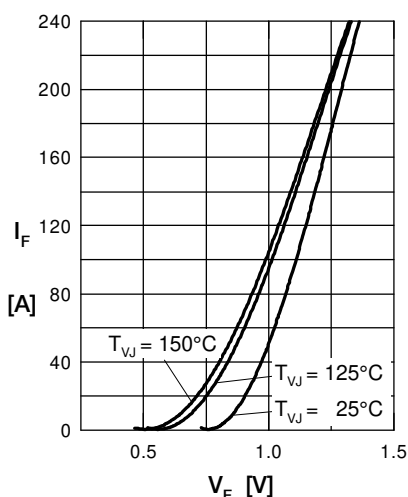
Rectifier


Fig. 1 Forward current vs. voltage drop per diode

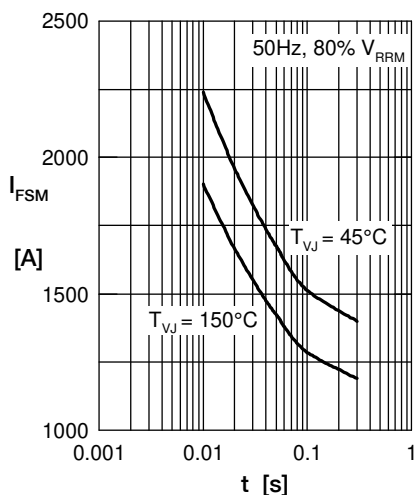


Fig. 2 Surge overload current vs. time per diode

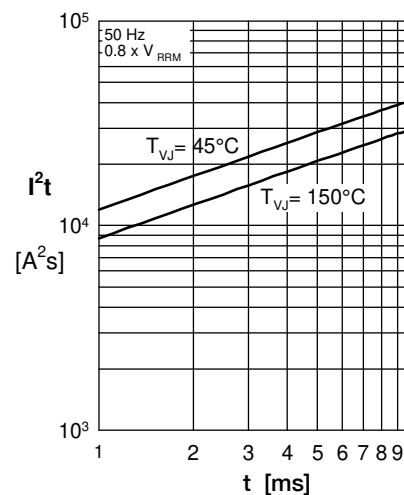
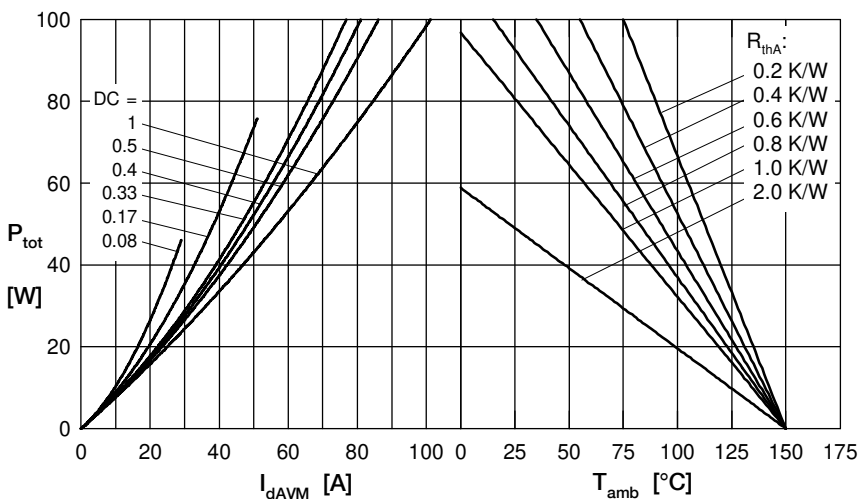

 Fig. 3 I^2t vs. time per diode


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

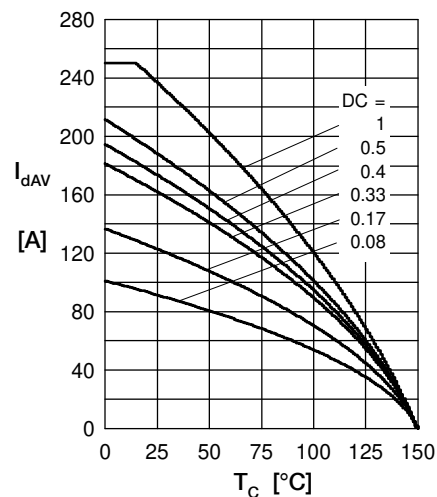


Fig. 5 Max. forward current vs. case temperature per diode

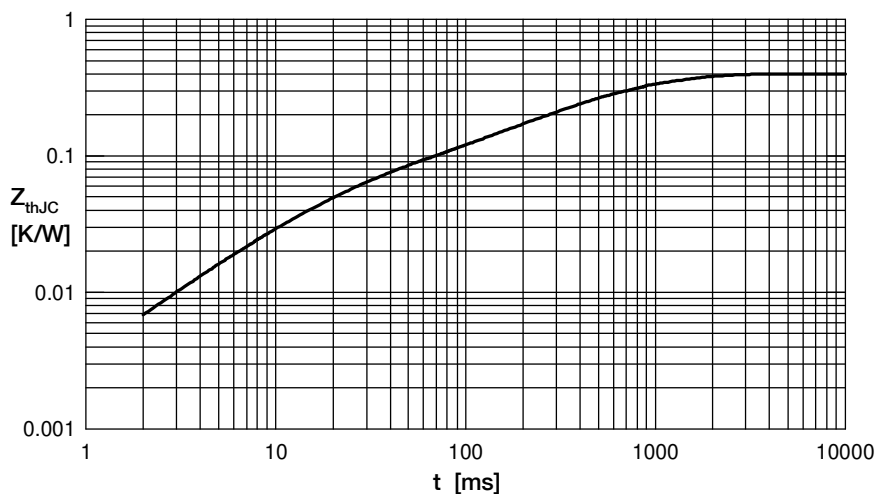


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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

