

Standard Rectifier

1~ Rectifier	
V_{RRM}	= 1600 V
I_{DAV}	= 40 A
I_{FSM}	= 320 A

1~ Rectifier Bridge

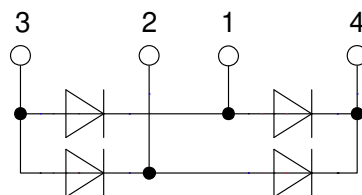
Part number

VBO40-16NO6



Backside: isolated

 E72873



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

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: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- 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	$I_F = 20\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.15	V
		$I_F = 40\text{ A}$				1.33	V
		$I_F = 20\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1.07	V
		$I_F = 40\text{ A}$				1.31	V
I_{DAV}	bridge output current	$T_C = 115^{\circ}\text{C}$ rectangular	$T_{VJ} = 150^{\circ}\text{C}$ d = 0.5			40	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.81	V
r_F	slope resistance					12.1	m Ω
R_{thJC}	thermal resistance junction to case					1.3	K/W
R_{thCH}	thermal resistance case to heatsink				0.1		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				95	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}\text{C}$			320	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			345	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}\text{C}$			270	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			295	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}\text{C}$			510	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			495	A ² s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}\text{C}$			365	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			360	A ² s
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$			11		pF

Package SOT-227B (minibloc)				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		150	°C
Weight					30		g
M_D	mounting torque			1.1		1.5	Nm
M_T	terminal torque			1.1		1.5	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	10.5	3.2			mm
$d_{Spb/Apb}$		terminal to backside	8.6	6.8			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	VBO40-16NO6	VBO40-16NO6	Tube	10	475904

Similar Part	Package	Voltage class
VBO40-12NO6	SOT-227B (minibloc)	1200
VBO40-08NO6	SOT-227B (minibloc)	800

Equivalent Circuits for Simulation

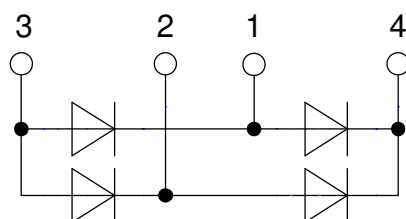
* on die level

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

$I \rightarrow$	V_0	R_0	Rectifier
$V_{0 \max}$	threshold voltage	0.81	V
$R_{0 \max}$	slope resistance *	10.2	mΩ

Outlines SOT-227B (minibloc)


Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



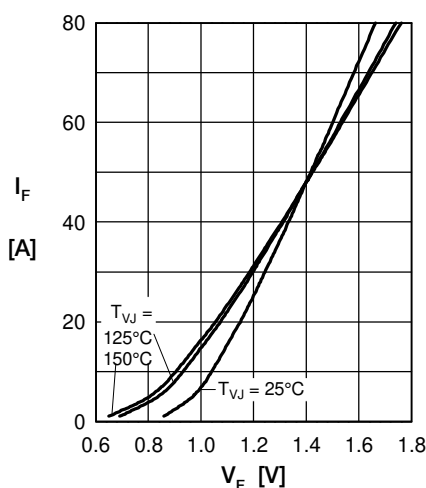
Rectifier


Fig. 1 Forward current vs. voltage drop per diode

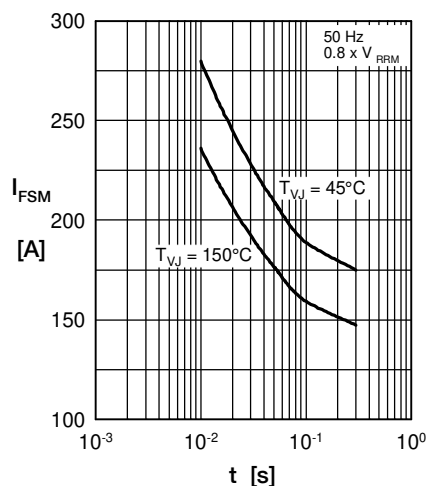


Fig. 2 Surge overload current vs. time per diode

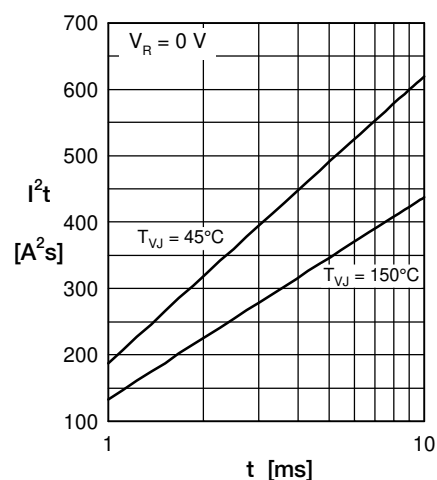


Fig. 3 I^2t vs. time per diode

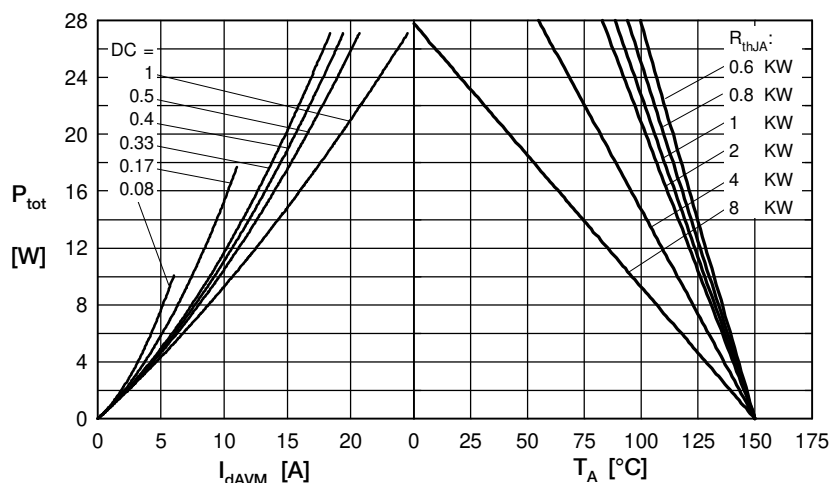


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

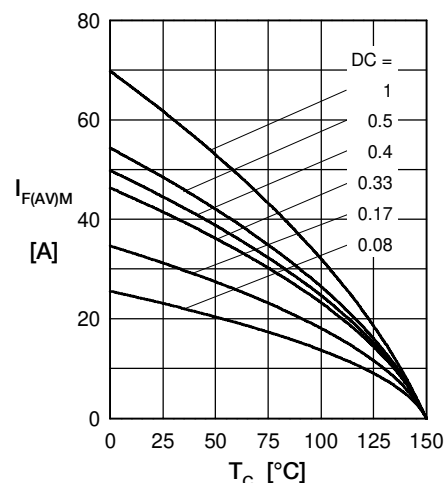


Fig. 5 Max. forward current vs. case temperature per diode

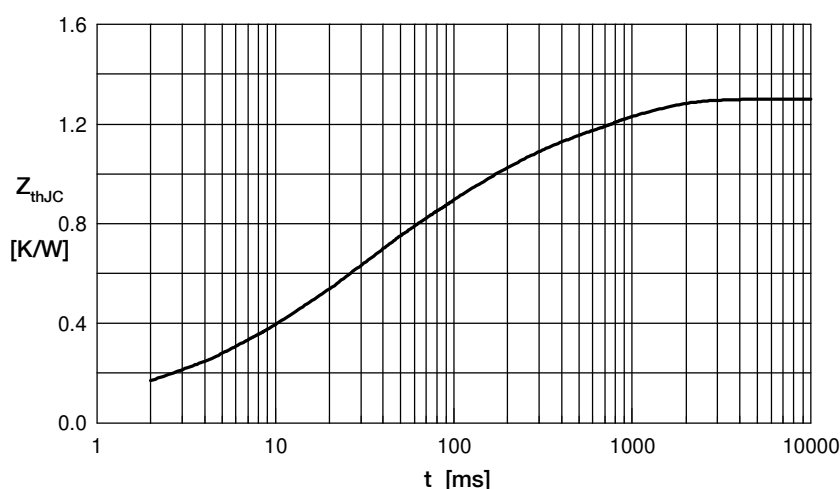


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	0.061	0.0002
2	0.145	0.0036
3	0.398	0.0200
4	0.405	0.1000
5	0.291	0.7000