

Standard Rectifier

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

1~ Rectifier Bridge

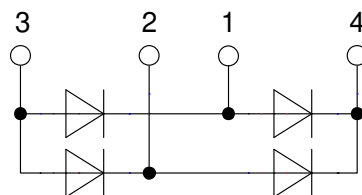
Part number

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					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				1.33	V
		$I_F = 20$ A		$T_{VJ} = 125^\circ\text{C}$		1.07	V
		$I_F = 40$ A				1.31	V
I_{DAV}	bridge output current	$T_C = 115^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		40	A
		rectangular	$d = 0.5$				
V_{FO}	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.81	V
r_F	slope resistance					12.1	m Ω
						} for power loss calculation only	
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		$V_R = 0$ V		345	A
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		270	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ 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		$V_R = 0$ 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		$V_R = 0$ V		360	A ² s
C_J	junction capacitance	$V_R = 400$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		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		3000		V	
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500		V	

Product Marking



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

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



Rectifier

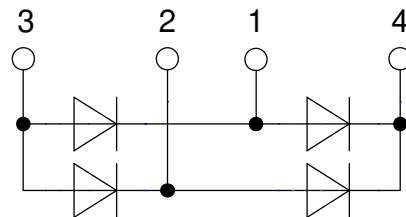
$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	10.2	mΩ



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





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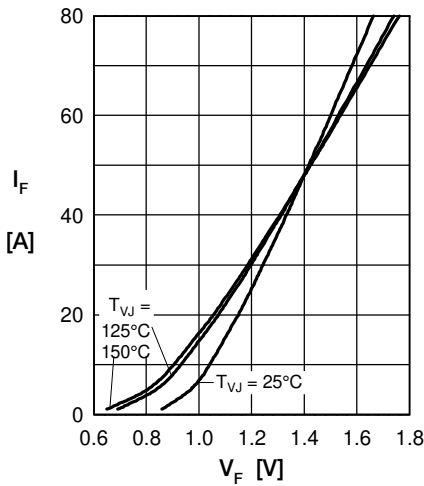


Fig. 1 Forward current vs. voltage drop per diode

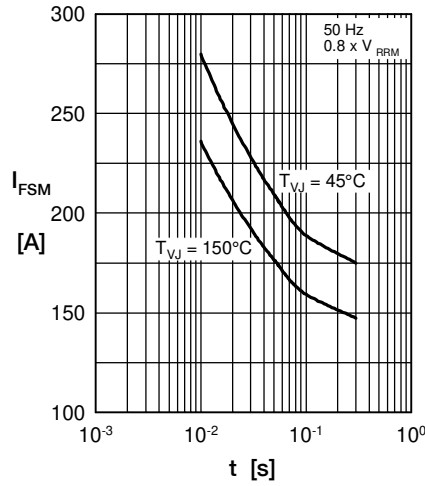


Fig. 2 Surge overload current vs. time per diode

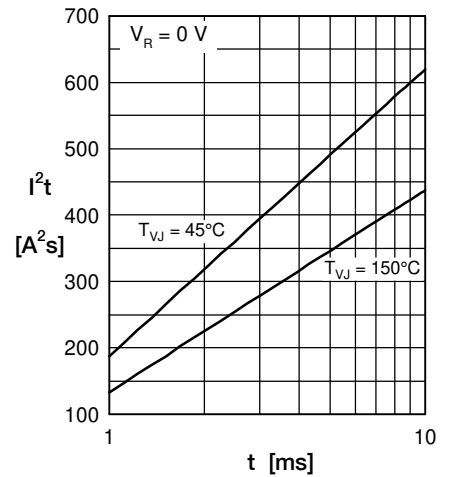


Fig. 3 I^2t vs. time per diode

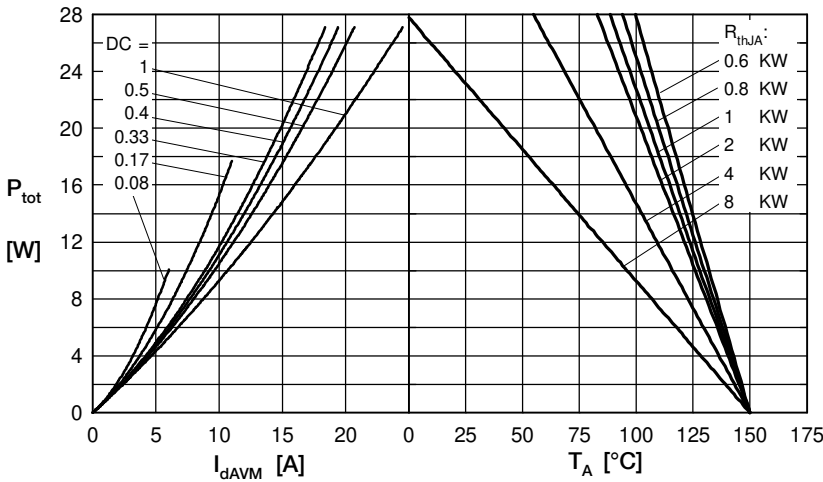


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

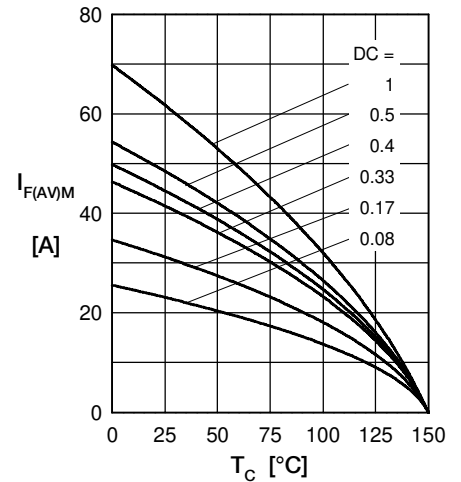


Fig. 5 Max. forward current vs. case temperature per diode

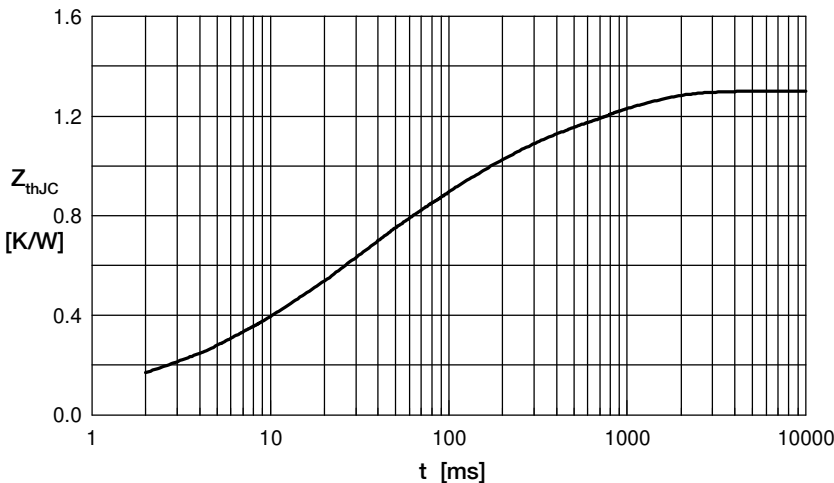


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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