

Avalanche Rectifier Module

$$V_{RRM} = 1600 \text{ V}$$

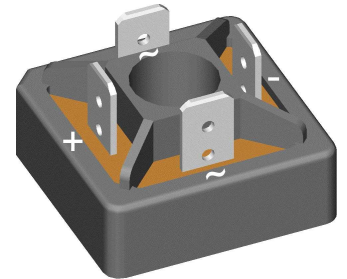
$$I_{FAV} = 25 \text{ A}$$


$$V_F = 1.13 \text{ V}$$

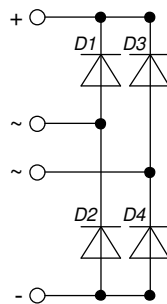
1~ Rectifier Bridge

Part number

VBO25-16AO2



 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: FO-A

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- 1/4" fast-on terminals
- Easy to mount with one screw

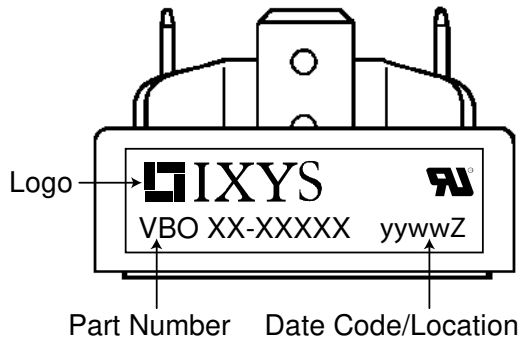
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					1700	V
V_{RRM}	max. repetitive reverse blocking voltage					1600	V
I_R	reverse current	$V_R = 1600$ V	$T_{VJ} = 25^\circ\text{C}$			100	μA
		$V_R = 1600$ V	$T_{VJ} = 150^\circ\text{C}$			1	mA
V_F	forward voltage drop	$I_F = 25$ A	$T_{VJ} = 25^\circ\text{C}$			1.18	V
		$I_F = 50$ A				1.37	V
		$I_F = 25$ A	$T_{VJ} = 125^\circ\text{C}$			1.13	V
		$I_F = 50$ A				1.37	V
I_{DAV}	bridge output current	$T_C = 125^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			25	A
V_{FO}	threshold voltage	} for power loss calculation only				0.88	V
r_F	slope resistance					9.6	m Ω
R_{thJC}	thermal resistance junction to case					2	K/W
R_{thCH}	thermal resistance case to heatsink				0.4		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		60	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			370	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			400	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			315	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			340	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			685	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			665	A ² s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			495	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			480	A ² s
C_J	junction capacitance	$V_R = 400$ V; f = 1 MHz	$T_{VJ} = 25^\circ\text{C}$		11		pF
P_{RSM}	max. surge reverse dissipation	$t_p = 10$ μs	$T_{VJ} = 150^\circ\text{C}$			3.4	kW



Package FO-A		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		125	°C
Weight				15		g
M_D	mounting torque		1.5		2	Nm
$d_{Spp/ App}$	creepage distance on surface / striking distance through air	terminal to terminal	13.0	9.5		mm
$d_{Spb/ Apb}$		terminal to backside				mm
V_{ISOL}	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBO25-16AO2	VBO25-16AO2	Box	10	424463

Equivalent Circuits for Simulation

* on die level

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

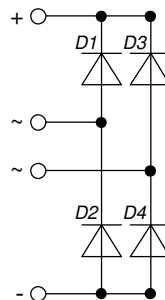
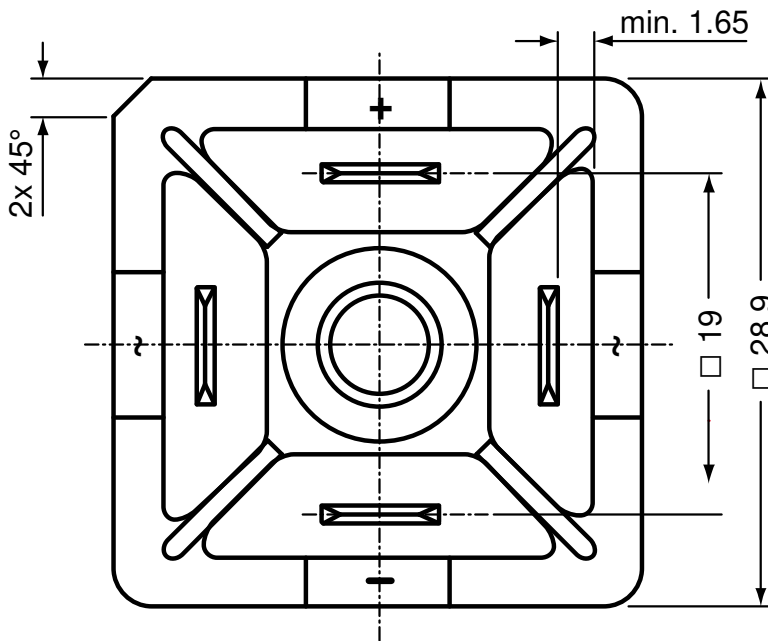
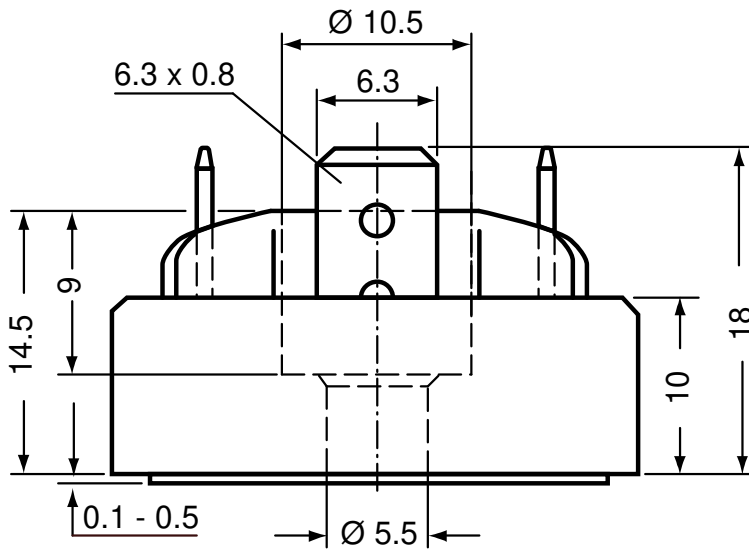


Rectifier

$V_{0\ max}$	threshold voltage	0.88	V
$R_{0\ max}$	slope resistance *	8.4	mΩ



Outlines FO-A





Rectifier

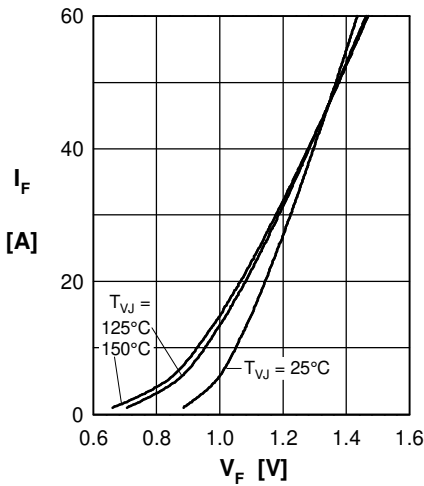


Fig. 1 Forward current vs. voltage drop per diode

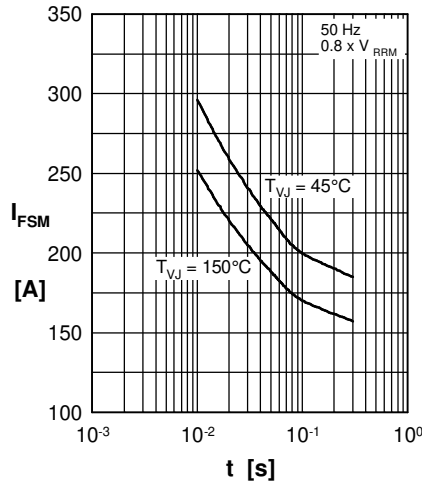


Fig. 2 Surge overload current vs. time per diode

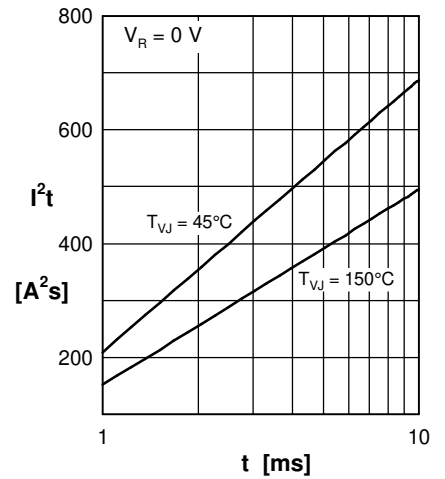


Fig. 3 I^2t vs. time per diode

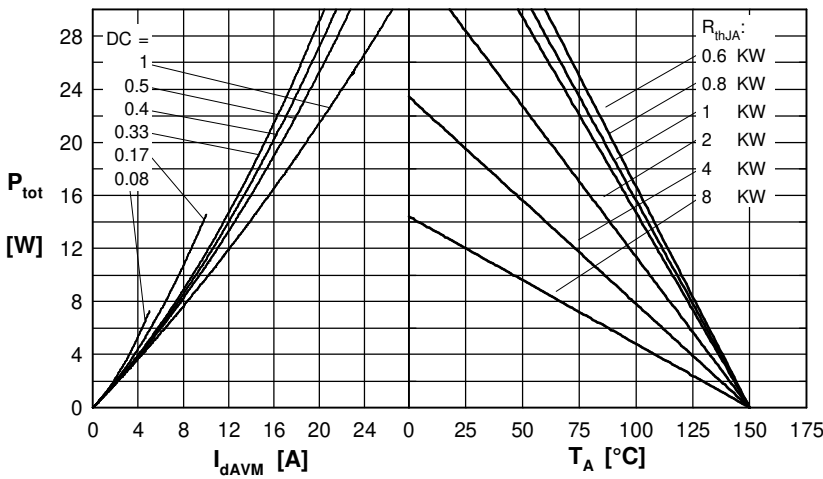


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

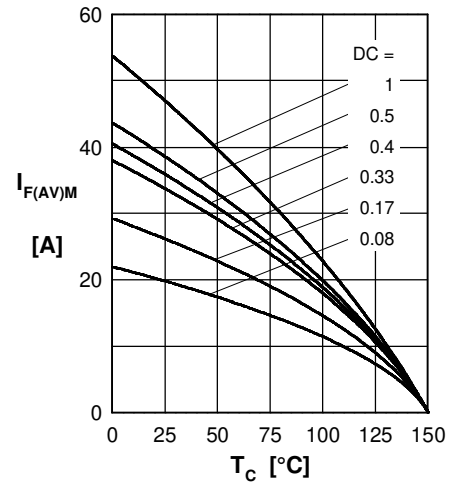


Fig. 5 Max. forward current vs. case temperature per diode

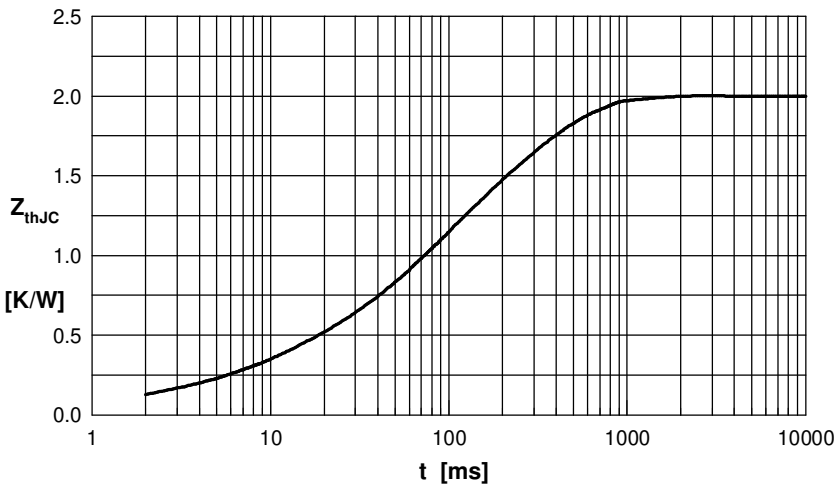


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	0.061	0.001
2	0.203	0.008
3	0.500	0.250
4	0.703	0.060
5	0.533	0.300