

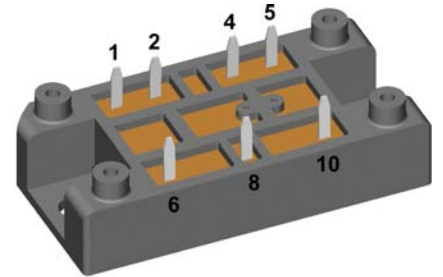
# Standard Rectifier Module

<b>3~ Rectifier</b>	
$V_{RRM}$	= 1600 V
$I_{DAV}$	= 60 A
$I_{FSM}$	= 350 A

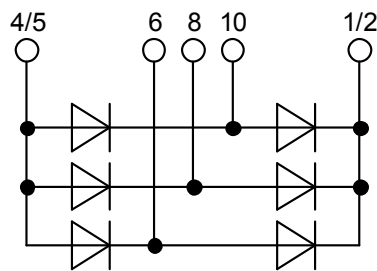
## 3~ Rectifier Bridge

Part number

**VUO52-16NO1**



E72873



### Features / Advantages:

- Package with DCB ceramic
- Reduced weight
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

### Applications:

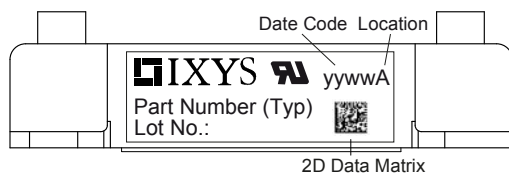
- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

### Package: V1-A-Pack

- Isolation Voltage: 3600V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Rectifier				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V
$I_R$	reverse current, drain current	$V_R = 1600 V$	$T_{VJ} = 25^{\circ}C$		40	$\mu A$
		$V_R = 1600 V$	$T_{VJ} = 150^{\circ}C$		1.5	mA
$V_F$	forward voltage drop	$I_F = 20 A$	$T_{VJ} = 25^{\circ}C$		1.13	V
		$I_F = 60 A$			1.44	V
		$I_F = 20 A$	$T_{VJ} = 125^{\circ}C$		1.07	V
		$I_F = 60 A$			1.50	V
$I_{DAV}$	bridge output current	$T_C = 110^{\circ}C$ rectangular $d = \frac{1}{3}$	$T_{VJ} = 150^{\circ}C$		60	A
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		0.83	V
$r_F$	slope resistance				11.5	m $\Omega$
$R_{thJC}$	thermal resistance junction to case				1.3	K/W
$R_{thCH}$	thermal resistance case to heatsink			0.3		K/W
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}C$		95	W
$I_{FSM}$	max. forward surge current	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		350	A
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		380	A
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		300	A
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		320	A
$I^2t$	value for fusing	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		615	A <sup>2</sup> s
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		600	A <sup>2</sup> s
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		450	A <sup>2</sup> s
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		425	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400 V; f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		10	pF

Package V1-A-Pack		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			100	A
$T_{stg}$	storage temperature		-40		125	°C
$T_{vj}$	virtual junction temperature		-40		150	°C
<b>Weight</b>				37		g
$M_D$	mounting torque		2		2.5	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	6.0			mm
$d_{Spb/Apb}$		terminal to backside	12.0			mm
$V_{ISOL}$	isolation voltage	t = 1 second	3600			V
		t = 1 minute 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V



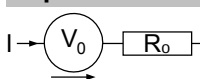
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VUO52-16NO1	VUO52-16NO1	Box	10	461180

Similar Part	Package	Voltage class
VUO52-08NO1	V1-A-Pack	800
VUO52-12NO1	V1-A-Pack	1200
VUO52-14NO1	V1-A-Pack	1400
VUO52-18NO1	V1-A-Pack	1800
VUO52-20NO1	V1-A-Pack	2000
VUO52-22NO1	V1-A-Pack	2200
VUO34-16NO1	V1-A-Pack	1600
VUO34-18NO1	V1-A-Pack	1800

### Equivalent Circuits for Simulation

\* on die level

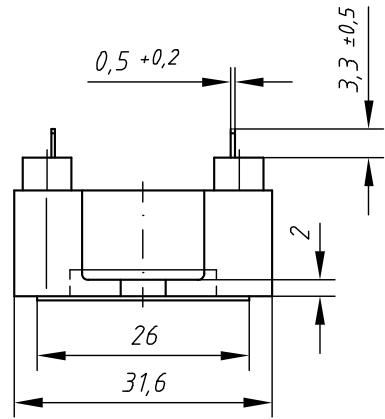
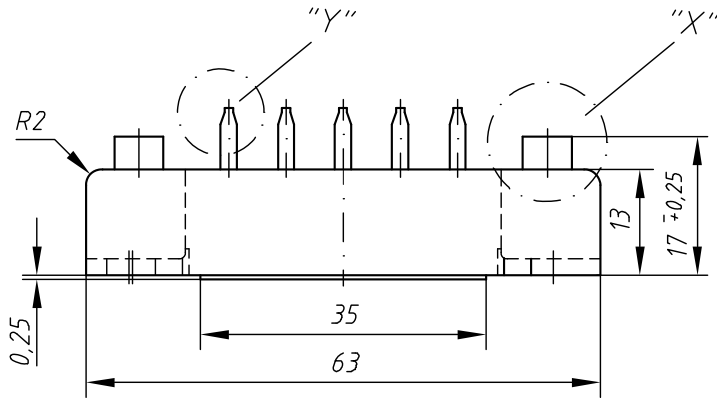
$T_{vj} = 150^\circ\text{C}$



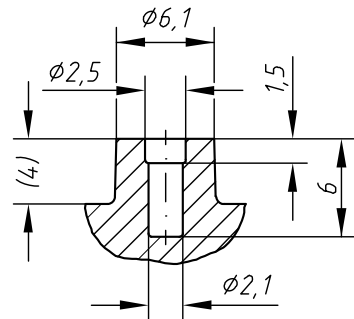
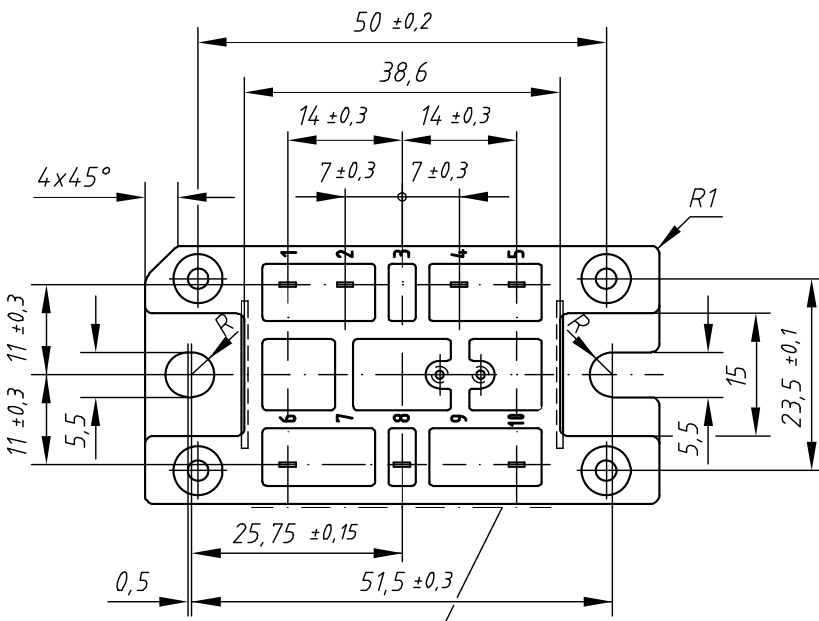
Rectifier

$V_{0\ max}$	threshold voltage	0.83	V
$R_{0\ max}$	slope resistance *	10.2	mΩ

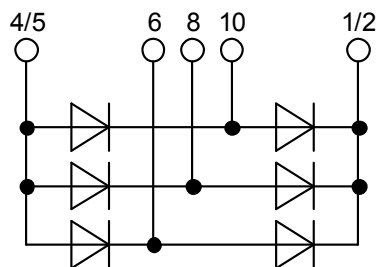
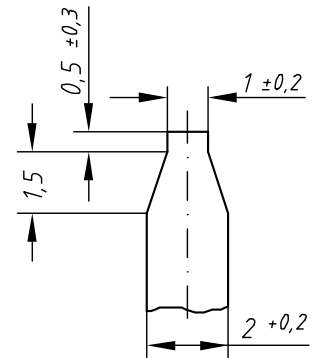
**Outlines V1-A-Pack**



Detail "X" M 2:1



Detail "Y" M 5:1



## Rectifier

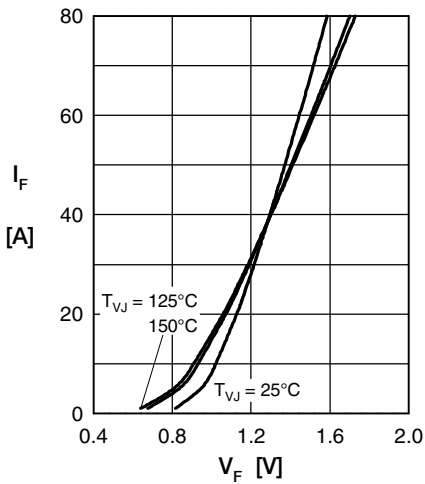


Fig. 1 Forward current versus voltage drop per diode

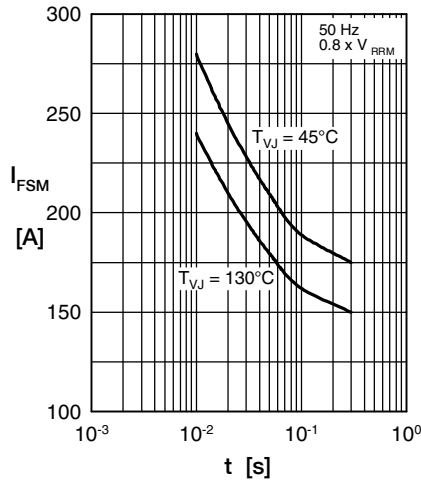


Fig. 2 Surge overload current

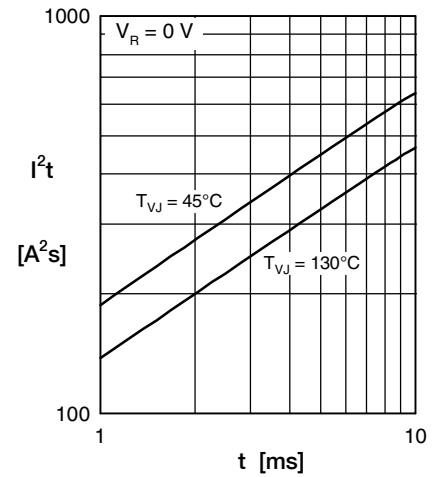


Fig. 3  $I^2t$  versus time per diode

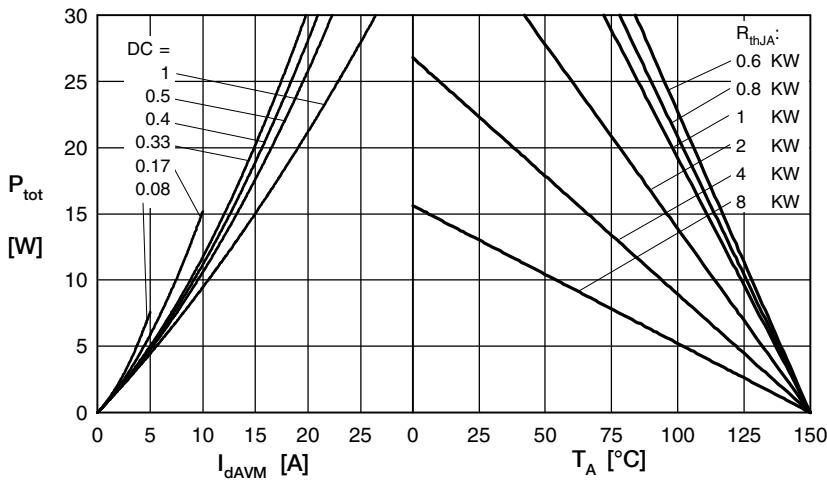


Fig. 4 Power dissipation vs. direct output current & ambient temperature

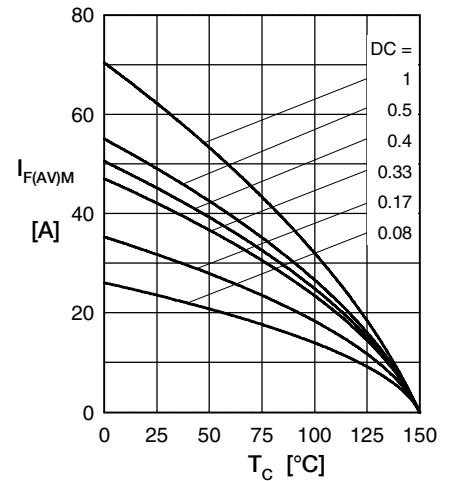


Fig. 5 Max. forward current vs. case temperature

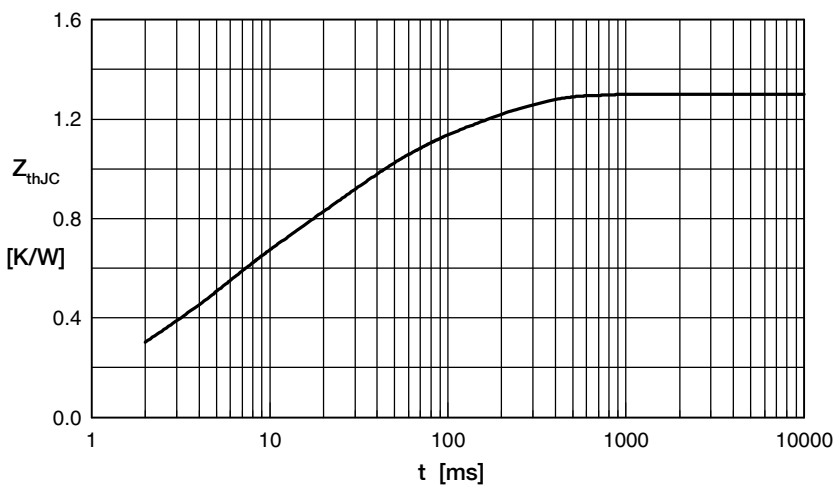


Fig. 6 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{th}$ (K/W)	$t_i$ (s)
1	0.06070	0.008
2	0.173	0.05
3	0.3005	0.06
4	0.463	0.3
5	0.3028	0.15