

# Standard Rectifier Module

<b>3~ Rectifier</b>	
$V_{RRM}$	= 2000 V
$I_{DAV}$	= 60 A
$I_{FSM}$	= 350 A

## 3~ Rectifier Bridge

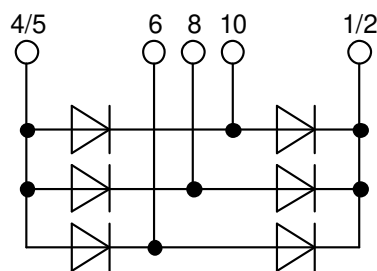
Part number

**VUO52-20NO1**



Backside: isolated

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

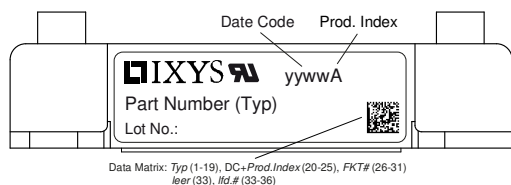
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2100	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2000	V
$I_R$	reverse current	$V_R = 2000$ V		$T_{VJ} = 25^\circ\text{C}$		40	$\mu\text{A}$
		$V_R = 2000$ V		$T_{VJ} = 150^\circ\text{C}$		1.5	mA
$V_F$	forward voltage drop	$I_F = 20$ A		$T_{VJ} = 25^\circ\text{C}$		1.13	V
		$I_F = 60$ A				1.44	V
		$I_F = 20$ A		$T_{VJ} = 125^\circ\text{C}$		1.07	V
		$I_F = 60$ A				1.50	V
$I_{DAV}$	bridge output current	$T_C = 110^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		60	A
		rectangular	$d = \frac{1}{3}$				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.83	V
$r_F$	slope resistance					11.5	m $\Omega$
		} for power loss calculation only					
$R_{thJC}$	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			$T_C = 25^\circ\text{C}$		95	W
$I_{FSM}$	max. forward surge current	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		350	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		380	A
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		300	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		320	A
$I^2t$	value for fusing	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		615	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		600	A <sup>2</sup> s
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		450	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		425	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 700$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		7	pF



Package V1-A-Pack				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	
<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 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3600			V	
		t = 1 minute	3000			V	



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VUO52-20NO1	VUO52-20NO1	Blister	24	516840

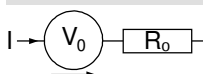
Similar Part	Package	Voltage class
VUO52-08NO1	V1-A-Pack	800
VUO52-12NO1	V1-A-Pack	1200
VUO52-14NO1	V1-A-Pack	1400
VUO52-16NO1	V1-A-Pack	1600

VUO52-18NO1	V1-A-Pack	1800
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

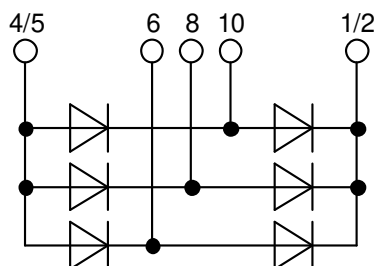


**Outlines V1-A-Pack**



**Remarks / Bemerkungen:**

1. Nominal distance mounting screws on heat sink: 52 mm / Nennabstand Befestigungsschrauben auf Kühlkörper: 52 mm
2. General tolerance / Allgemeintoleranz: DIN ISO 2768 -T1-c
3. Surface treatment of pins: tin plated (Sn) in hot dip / Oberflächenbehandlung der Pins: verzinkt (Sn) im Tauchbad
4. Detail X: EJOT PT® self-tapping screws (dimension K25) to be recommended for mounting on PCB  
selbstschneidende Schraube (Größe K25) empfohlen für die PCB-Montage  
Take care on the maximum screw length according to board thickness and the maximum hole depth of 6 mm<sup>L</sup>  
Bei der Wahl der Schraubenlänge die PCB-Dicke und die maximale Lochtiefe von 6mm beachten  
Recommended mounting torque: 1.5 Nm / Empfohlenes Drehmoment: 1.5 Nm





**Rectifier**



Fig. 1 Forward current vs. voltage drop per diode



Fig. 2 Surge overload current vs. time per diode

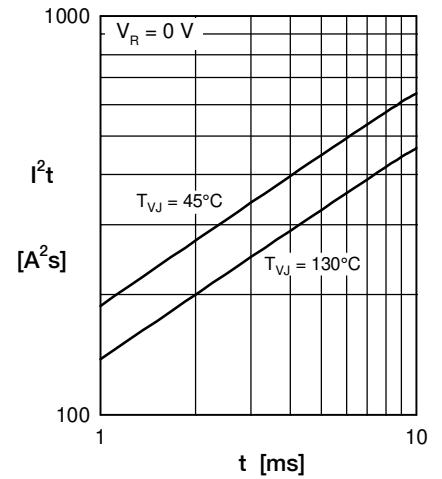


Fig. 3  $I^2t$  vs. time per diode



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	0.06070	0.008
2	0.173	0.05
3	0.3005	0.06
4	0.463	0.3
5	0.3028	0.15