

## Standard Rectifier Module

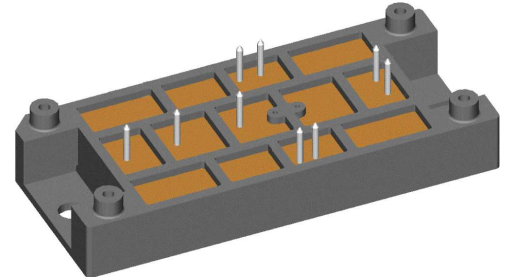
# PHASE OUT

3~ Rectifier Bridge + NTC


<b>3~ Rectifier</b>
$V_{RRM} = 1200\text{ V}$
$I_{DAV} = 180\text{ A}$
$I_{FSM} = 1100\text{ A}$

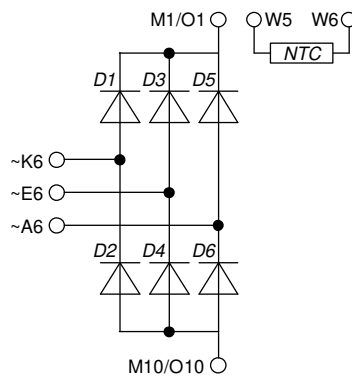
Part number

**VUO120-12NO2T**



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
- NTC

### 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: V2-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

**Recommended replacement: VUO121-16NO1; MDMA120U1600VA**

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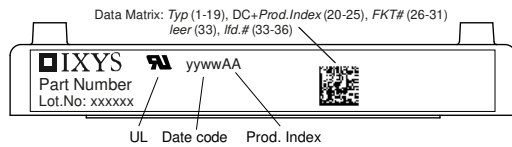


Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1200	V
$I_R$	reverse current	$V_R = 1200$ V		$T_{VJ} = 25^\circ\text{C}$		100	$\mu\text{A}$
		$V_R = 1200$ V		$T_{VJ} = 125^\circ\text{C}$		2	mA
$V_F$	forward voltage drop	$I_F = 60$ A		$T_{VJ} = 25^\circ\text{C}$		1.16	V
		$I_F = 180$ A				1.55	V
		$I_F = 60$ A		$T_{VJ} = 125^\circ\text{C}$		1.09	V
		$I_F = 180$ A				1.59	V
$I_{DAV}$	bridge output current	$T_C = 90^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		180	A
		rectangular	$d = \frac{1}{3}$				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.81	V
$r_F$	slope resistance	} for power loss calculation only				4.4	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.6	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.2		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		205	W
$I_{FSM}$	max. forward surge current	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		1.10	kA
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		1.19	kA
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		935	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		1.01	kA
$I^2t$	value for fusing	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		6.05	kA <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		5.89	kA <sup>2</sup> s
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		4.37	kA <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		4.25	kA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		37	pF

# PHASE OUT



Package V2-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>				76		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	VUO120-12NO2T	VUO120-12NO2T	Box	6	510989

Similar Part	Package	Voltage class
VUO120-16NO2T	V2-Pack	1600

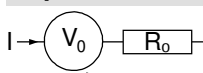
**Temperature Sensor NTC**

Symbol	Definition	Conditions	min.	typ.	max.	Unit
$R_{25}$	resistance	$T_{VJ} = 25^\circ$	4.75	5	5.25	kΩ
$B_{25/50}$	temperature coefficient			3375		K

**Equivalent Circuits for Simulation**

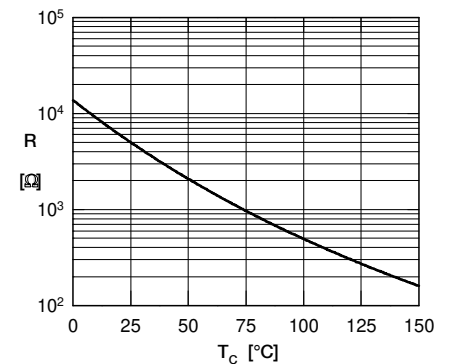
\* on die level

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



Rectifier

$V_{0\ max}$	threshold voltage	0.81				V
$R_{0\ max}$	slope resistance *	3.2				mΩ



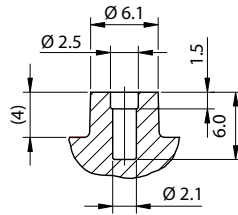
Typ. NTC resistance vs. temperature



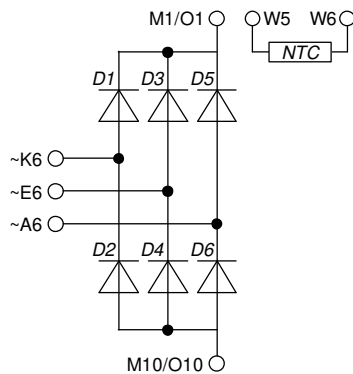
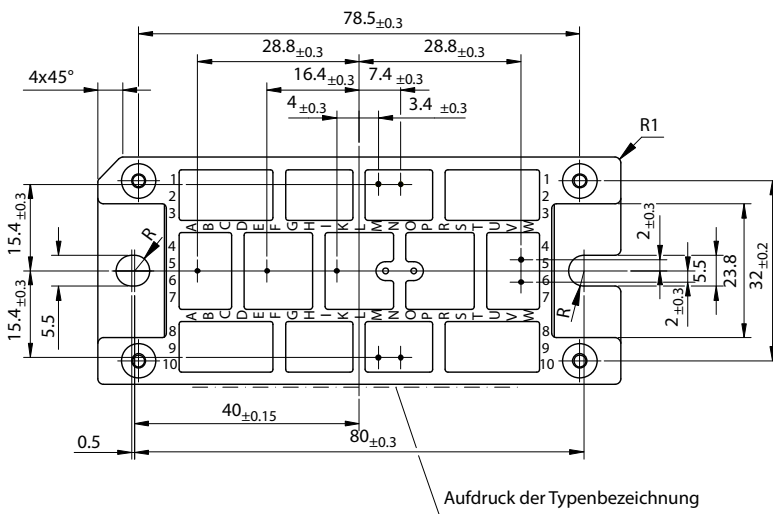
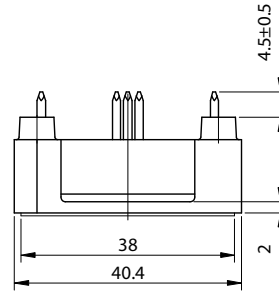
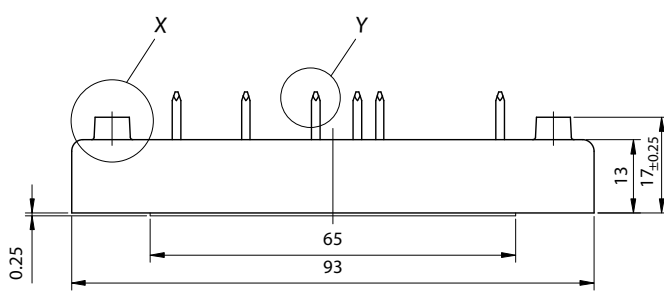
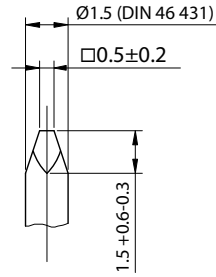
**Outlines V2-Pack**

**Remarks:**  
EJOT PT® self-tapping screws of the dimension K25 are recommended for the mechanical connection between module and PCB. Choose the right length according to your board thickness at a maximum depth of 6 mm of the module holes.<sup>1</sup> The recommended mounting torque is 1.5 Nm.

Detail X M2:1



Detail Y M5:1



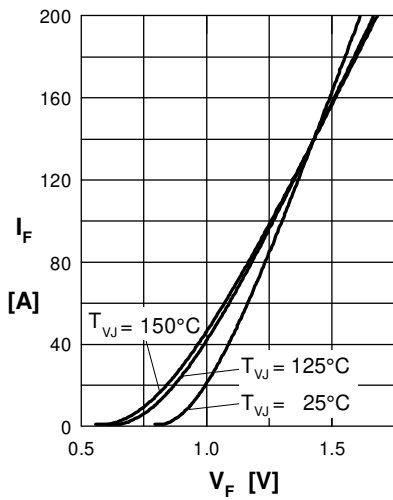
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

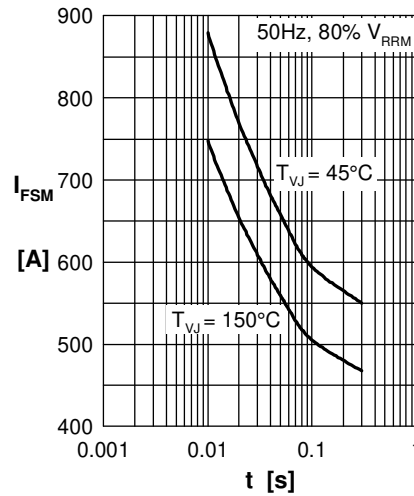


Fig. 2 Surge overload current vs. time per diode

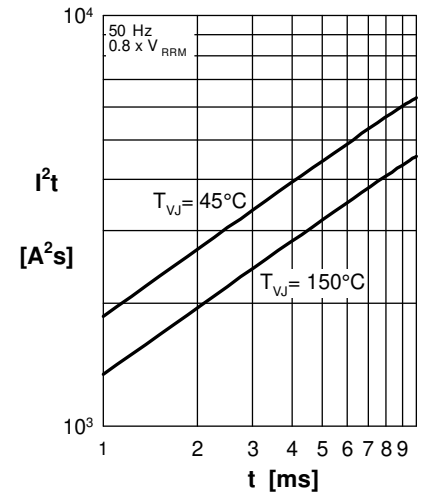
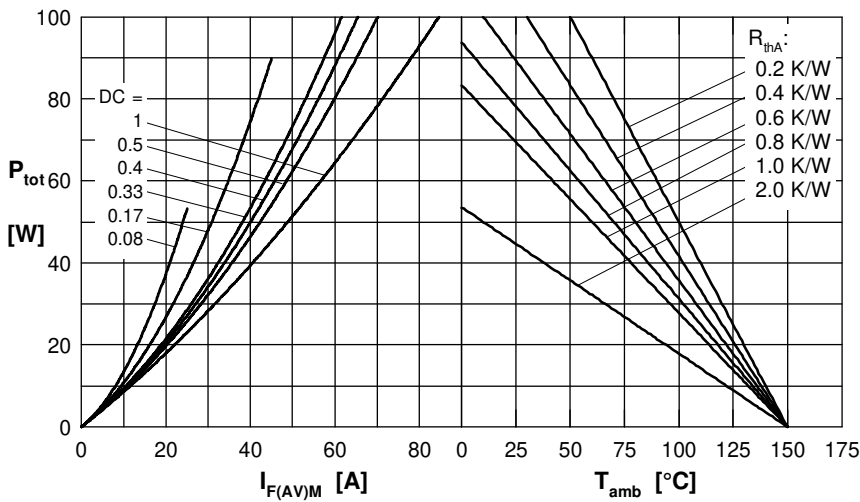

 Fig. 3  $I^2t$  vs. time per diode


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

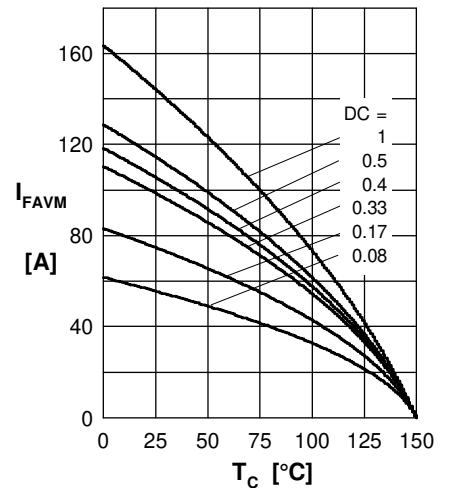


Fig. 5 Max. forward current vs. case temperature per diode

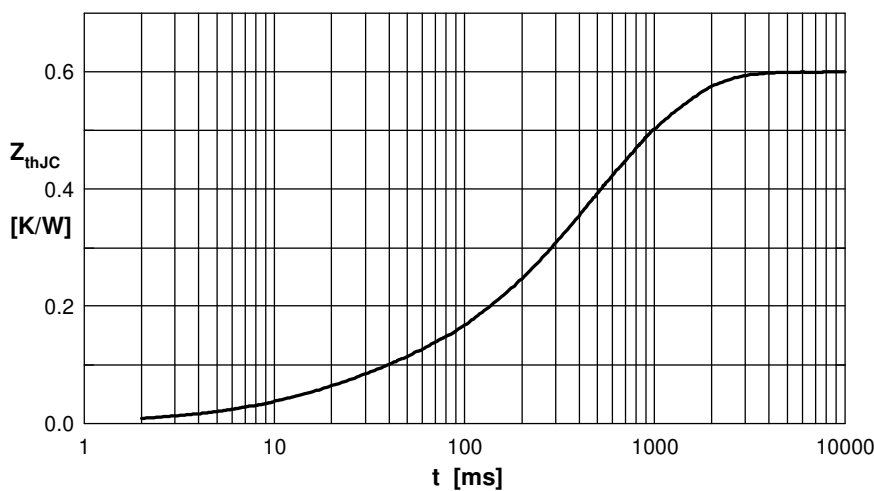


Fig. 6 Transient thermal impedance junction to case vs. time per diode

$R_i$	$t_i$
0.060	0.020
0.003	0.010
0.150	0.225
0.243	0.800
0.144	0.580

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