

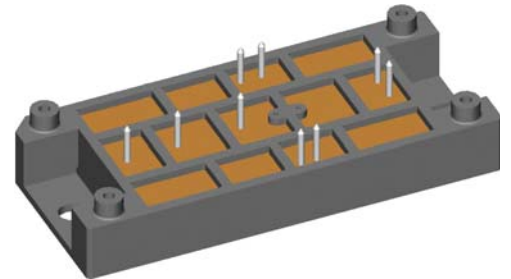
# Standard Rectifier Module

<b>3~ Rectifier</b>
$V_{RRM} = 1600\text{ V}$
$I_{DAV} = 180\text{ A}$
$I_{FSM} = 1100\text{ A}$

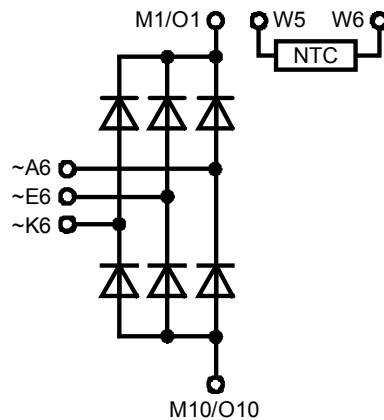
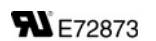
3~ Rectifier Bridge + NTC

Part number

**VUO120-16NO2T**



Backside: isolated



### 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
- NTC

### Applications:

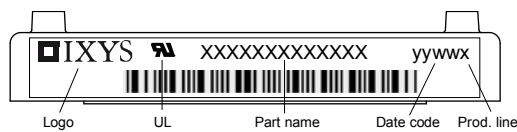
- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

### Package: V2-Pack

- Isolation Voltage: 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	$V_R = 1600 V$	$T_{VJ} = 25^{\circ}C$		100	$\mu A$	
		$V_R = 1600 V$	$T_{VJ} = 125^{\circ}C$		2	mA	
$V_F$	forward voltage drop	$I_F = 60 A$	$T_{VJ} = 25^{\circ}C$		1.16	V	
		$I_F = 180 A$			1.55	V	
		$I_F = 60 A$	$T_{VJ} = 125^{\circ}C$		1.09	V	
		$I_F = 180 A$			1.59	V	
$I_{DAV}$	bridge output current	$T_C = 90^{\circ}C$ rectangular $d = 1/3$	$T_{VJ} = 150^{\circ}C$		180	A	
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		0.81	V	
$r_F$	slope resistance				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		$T_C = 25^{\circ}C$		205	W	
$I_{FSM}$	max. forward surge current	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		1.10	kA	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		1.19	kA	
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 150^{\circ}C$		935	A	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		1.01	kA	
$I^2t$	value for fusing	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		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	
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 150^{\circ}C$		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	$V_R = 400 V; f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		37	pF	

Package V2-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>				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	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	VUO120-16NO2T	VUO120-16NO2T	Box	6	510996

Similar Part	Package	Voltage class
VUO120-12NO2T	V2-Pack	1200

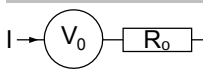
### Temperature Sensor NTC

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

### Equivalent Circuits for Simulation

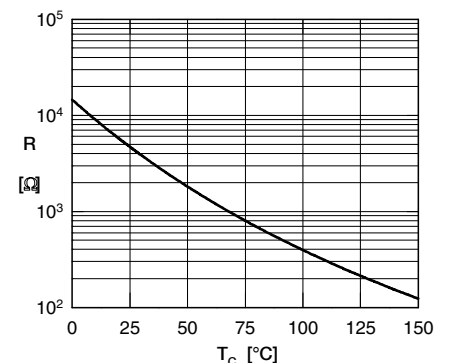
\* on die level

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



Rectifier

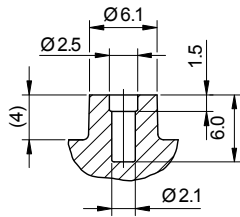
$V_{0\max}$	threshold voltage	0.81				V
$R_{0\max}$	slope resistance *	3.2				m $\Omega$



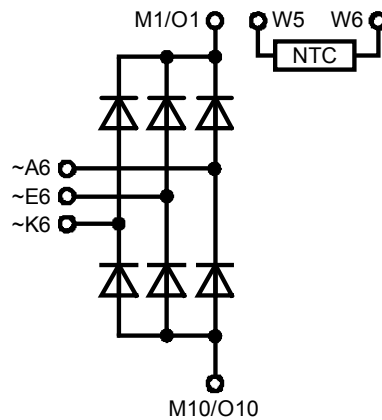
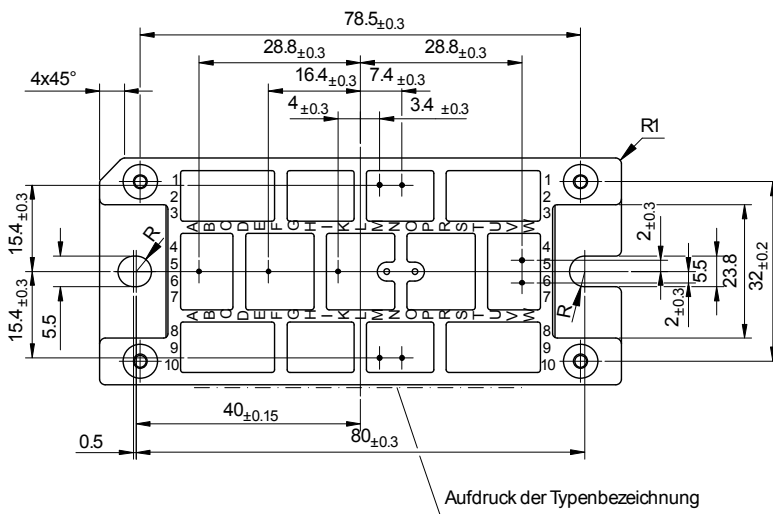
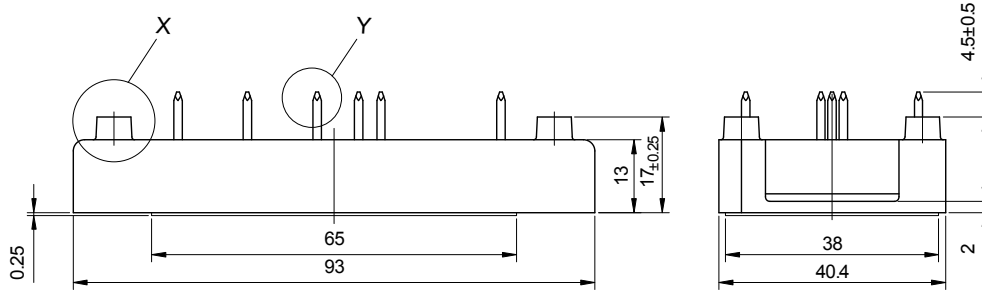
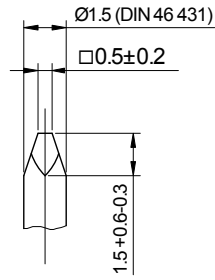
Typ. NTC resistance vs. temperature

## Outlines V2-Pack

Detail X M2:1



Detail Y M5:1



**Rectifier**

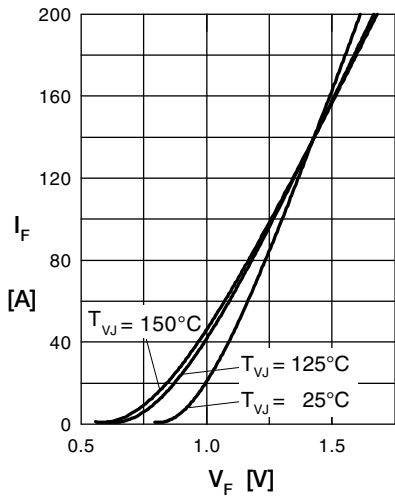


Fig. 1 Forward current vs. voltage drop per diode

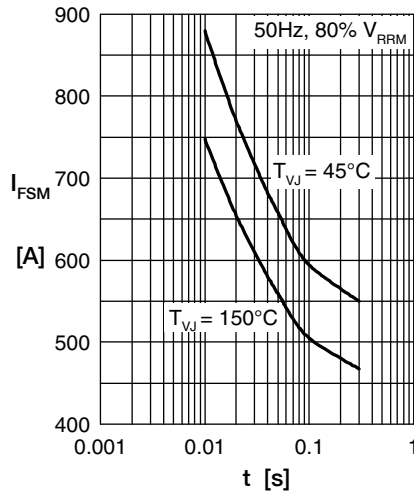


Fig. 2 Surge overload current vs. time per diode

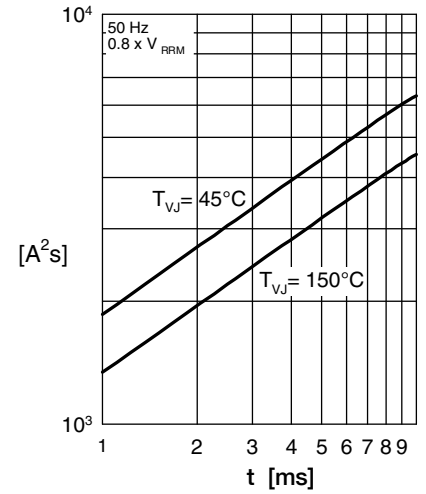


Fig. 3  $I^2t$  vs. time per diode

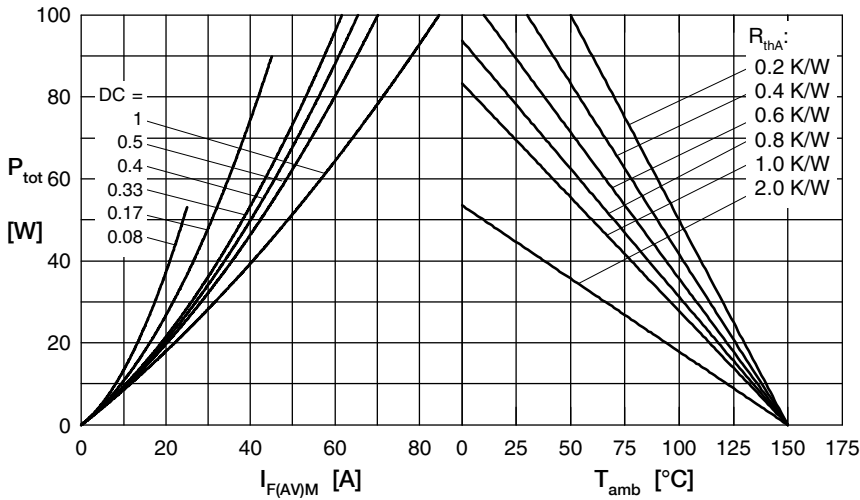


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

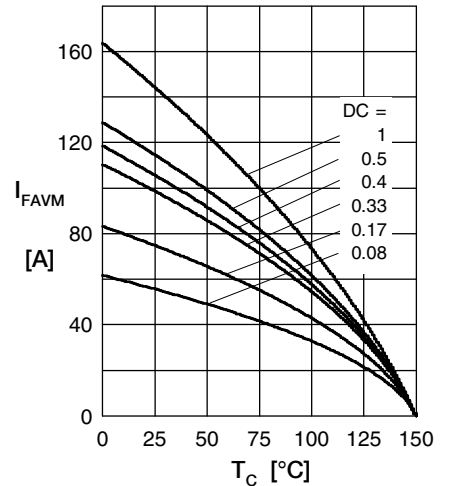


Fig. 5 Max. forward current vs. case temperature per diode

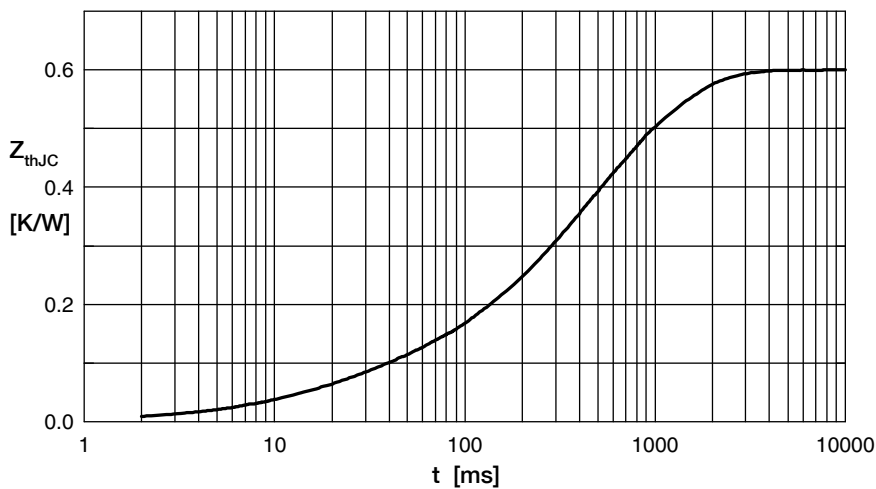


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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

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