IXYS

Three Phase Rectifier Bridge
with IGBT and Fast Recovery Diode
for Braking System

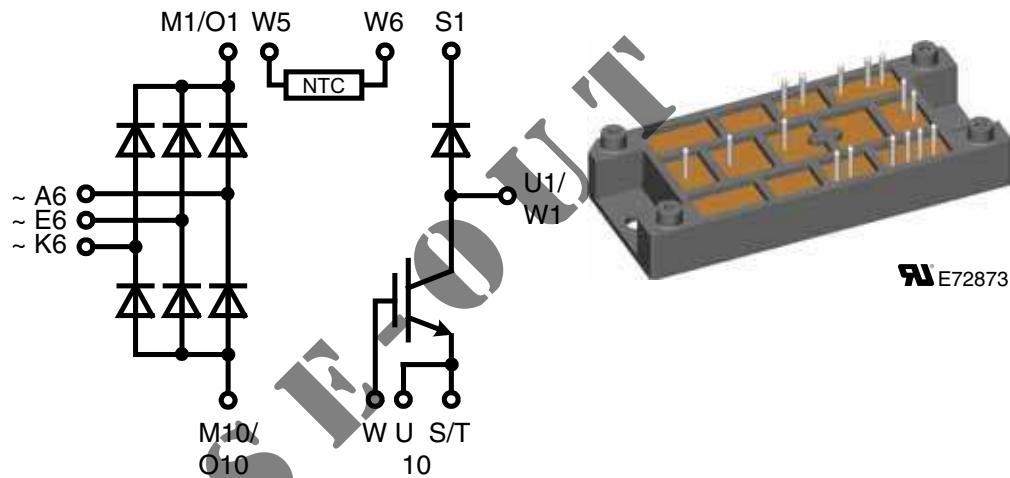| Rectifier Diode	Fast Recov. Diode	IGBT
V_{RRM} = 1200 V 1600 V	V_{CES} = 1200 V	V_{CES} = 1200 V
I_{DAVM} = 188 A	V_F = 2.7 V	I_{C80} = 100 A
I_{FSM} = 1100 A	I_{FSM} = 200 A	V_{CEsat} = 2.1 V

Preliminary data

Part name (Marking on product)

VUB120-12NO2(T)
VUB120-16NO2(T)

(T) = NTC optional

$\overline{UL}$ E72873

Features:
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Ultrafast diode
- Convenient package outline
- Optional NTC

Application:
- Drive Inverters with brake system

Package:
- Two functions in one package
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability
- UL registered, E72873

Recommended replacement: VUB120-16NOX(T)

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IGBT

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{CES}	collector emitter voltage	T_{VJ} = 25°C to 150°C				1200	V
V_{GES}	max. DC gate voltage	continuous		-20		+20	V
V_{GEM}	max. transient collector gate voltage	transient		-30		+30	V
I_{C25}	collector current	DC	T_C = 25°C			140	A
I_{C80}		DC	T_C = 80°C			100	A
P_{tot}	total power dissipation		T_C = 25°C			140	W
$V_{CE(sat)}$	collector emitter saturation voltage	I_C = 50 A; V_{GE} = 15 V	T_{VJ} = 25°C			2.1	V
$V_{GE(th)}$	gate emitter threshold voltage	I_C = 4 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	4.5		6.5	V
I_{CES}	collector emitter leakage current	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.2	mA
			T_{VJ} = 125°C			1	mA
C_{ies}	input capacitance	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			7.4		nF
$t_{d(on)}$	turn-on delay time	inductive load	T_{VJ} = 125°C		170		ns
$t_{d(off)}$	turn-off delay time	V_{CE} = 600 V; I_C = 50 A			680		ns
E_{on}	turn-on energy per pulse	V_{GE} = ±15 V; R_G = 15 Ω; L = 100 µH			11		mJ
E_{off}	turn-off energy per pulse				8		mJ
I_{CM}	reverse bias safe operating area	RBSOA; V_{GE} = ±15 V; R_G = 10 Ω; L = 100 µH			280		A
V_{CEK}		clamped inductive load;	T_{VJ} = 125°C		≤ V_{CES}-L_S·d_I/dt		V
t_{SC} (SCSOA)	short circuit safe operating area	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 15 Ω; non-repetitive	T_{VJ} = 125°C			10	µs
RBSOA	reverse bias safe operating area	V_{CE} = 1200 V; V_{GE} = ±15 V; R_G = 15 Ω; L = 100 µH; clamped inductive load	T_{VJ} = 125°C			150	A
R_{thJC}	thermal resistance junction to case					0.22	K/W
R_{thCH}	thermal resistance case to heatsink				0.1		K/W

Fast Recovery Diode

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{RRM}	max. repetitive reverse voltage	T_{VJ} = 150°C				1200	V
I_{FAV}	average forward current	rect.; d = 0.5	T_C = 80°C			34	A
I_{FRMS}	rms forward current	rect.; d = 0.5	T_C = 80°C			48	A
I_{FSM}	max. surge forward current	t = 10 ms	T_{VJ} = 45°C			200	A
		t = 10 ms	T_{VJ} = 150°C			180	A
P_{tot}	total power dissipation		T_C = 25°C			140	W
V_{F0}	threshold voltage	T_{VJ} = 150°C				1.3	V
r_F	slope resistance	for power loss calculation only				15	mΩ
V_F	forward voltage	I_F = 30 A	T_{VJ} = 25°C			2.7	V
I_R	reverse current	V_R = V_{RRM}	T_{VJ} = 25°C			0.5	mA
			T_{VJ} = 125°C			1	mA
I_{RM}	reverse recovery current	I_F = 50 A; V_R = 100 V; di_F/dt = -100 A/µs			8	12	A
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; di_F/dt = -100 A/µs			40	60	ns
R_{thJC}	thermal resistance junction to case					0.9	K/W
R_{thCH}	thermal resistance case to heatsink				0.3		K/W

T_C = 25°C unless otherwise stated

IXYS reserves the right to change limits, test conditions and dimensions.

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Rectifier Diode

Symbol	Conditions				min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage			$T_{VJ} = 25°C$			1200	V
							1600	V
I_R	reverse current	$V_R = V_{RRM}$		$T_{VJ} = 25°C$			0.3	mA
				$T_{VJ} = 150°C$			5	mA
V_F	forward voltage	$I_F = 150 A$		$T_{VJ} = 25°C$			1.46	V
$I_{D(AV)M}$	max. average DC output current	rectangular; d = $^1/_3$; bridge		$T_C = 80°C$			188	A
V_{F0}	threshold voltage			$T_{VJ} = 150°C$			0.87	V
r_F	slope resistance	for power loss calculation only					4	mΩ
R_{thJC}	thermal resistance junction to case	per diode		$T_{VJ} = 25°C$			0.6	K/W
R_{thCH}	thermal resistance case to heatsink			$T_{VJ} = 25°C$		0.2		K/W
P_{tot}	total power dissipation			$T_{VJ} = 25°C$			160	W
I_{FSM}	max. forward surge current	t = 10 ms (50Hz)		$T_{VJ} = 45°C$			1100	A
		$V_R = 0 V$		$T_{VJ} = 150°C$			960	A
I^2t	value for fusing	t = 10 ms (50Hz)		$T_{VJ} = 45°C$			6050	A²s
		$V_R = 0 V$		$T_{VJ} = 150°C$			4610	A²s

Temperature Sensor NTC

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_C = 25°C$	4.75	5.0	5.25	kΩ
$B_{25/85}$				3375		K

Module

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
T_{VJ}	operating temperature			-40		150	°C
T_{VJM}	max. virtual junction temperature					150	°C
T_{stg}	storage temperature			-40		125	°C
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1$ mA; 50/60 Hz;	t = 1 min.			3000	V~
			t = 1 s			3600	V~
M_d	mounting torque	(M5)		2.0		2.5	Nm
d_S	creep distance on surface			12.7			mm
d_A	strike distance through air			9.4			mm
a	maximum allowable acceleration			50			m/s²
Weight					80		g

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Outline Drawing

Detail Y   M 5:1

Φ1.5 (DIN 46 431)

Detail X   M 2:1

Aufdruck der
Typenbezeichnung
(Klebeetikett)
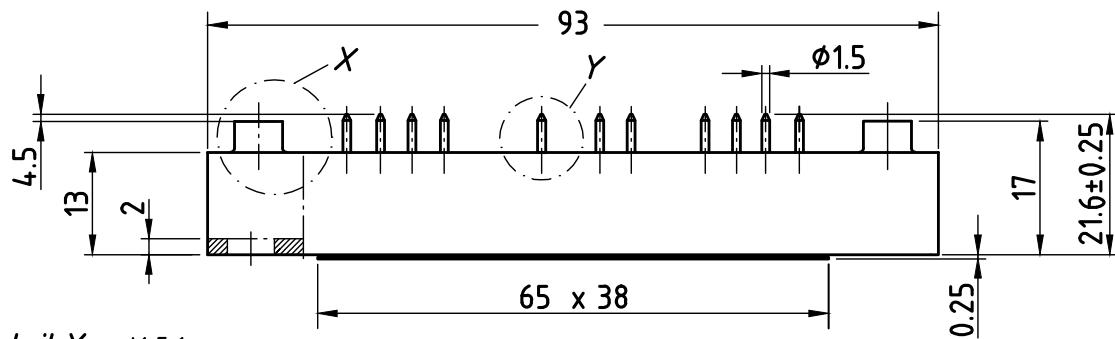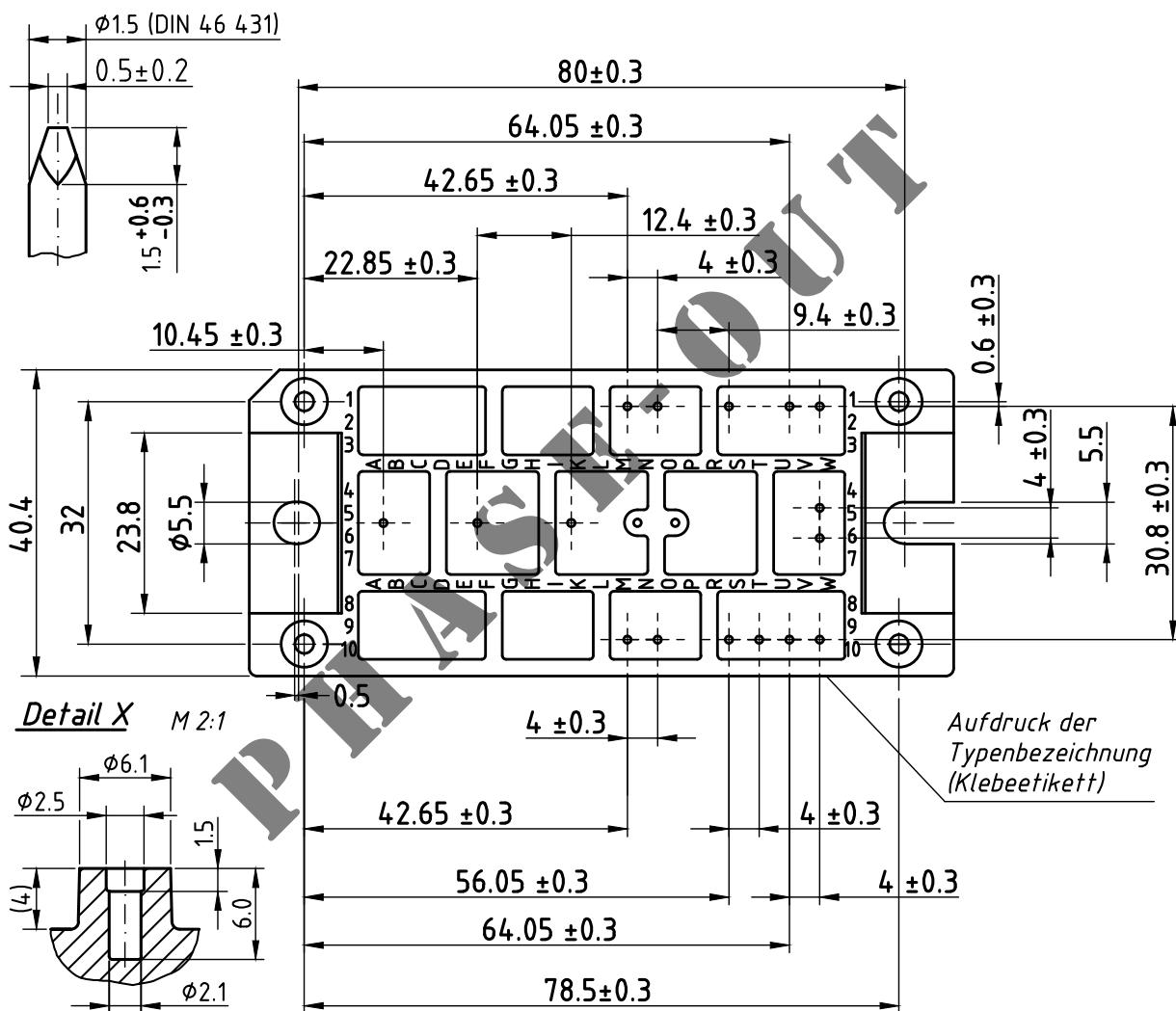
Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	VUB 120-12NO2	VUB120-12NO2	Box	6	495956
Standard	VUB 120-16NO2	VUB120-16NO2	Box	6	495964
+NTC	VUB 120-12NO2T	VUB120-12NO2	Box	6	499592
+NTC	VUB 120-16NO2T	VUB120-16NO2	Box	6	499714

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