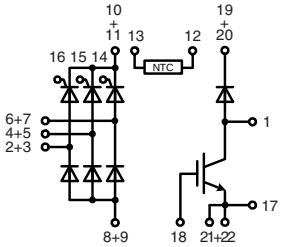
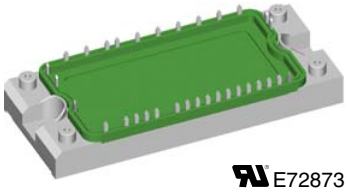
Three Phase Rectifier Bridge
with IGBT and Fast Recovery Diode for Braking System

V_{RRM} = 1600 V
I_{dAVM} = 170 A

V_{RRM} V	Type
1600	VVZB 170-16 NO1





See outline drawing for pin arrangement

Symbol		Conditions		Maximum Ratings	
V_{RRM}	Rectifier Bridge			1600	V
I_{dAVM}		T_C = 85°C; sinusoidal 120°		170	A
I_{FSM}		T_{VJ} = 45°C; t = 10 ms; V_R = 0 V		900	A
		T_{VJ} = 150°C; t = 10 ms; V_R = 0 V		780	A
I^2t		T_{VJ} = 45°C; t = 10 ms; V_R = 0 V		4050	A
		T_{VJ} = 150°C; t = 10 ms; V_R = 0 V		3040	A
P_{tot}		T_C = 25°C per diode		250	W
$(di/dt)_{cr}$		$T_{VJ} = T_{VJM}$; f = 50 Hz; t_P = 200 µs;	repetitive; I_T = 150 A	150	A/µs
		$V_D = {}^2/_3\ V_{DRM}$; I_G = 0.45 A; di_G/dt = 0.45 A/µs	non repetitive; $I_T = I_{d(AV)}/3$	500	A/µs
$(dv/dt)_{cr}$		$T_{VJ} = T_{VJM}$; $V_{DR} = {}^2/_3\ V_{DRM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)		1000	V/µs
P_{GM}		$T_{VJ} = T_{VJM}$;	t_P = 30 µs	10	W
		$I_T = I_{d(AV)}/3$;	t_P = 300 µs	5	W
P_{GAVM}				0.5	W
V_{CES}	IGBT	T_{VJ} = 25°C to 150°C		1200	V
V_{GE}		Continuous		± 20	V
I_{C25}		T_C = 25°C; DC		141	A
I_{C80}		T_C = 80°C; DC		100	A
I_{CM}		t_p = Pulse width limited by T_{VJM}		150	A
P_{tot}		T_C = 25°C		570	W
V_{RRM}	Fast Recovery Diode			1200	V
I_{FAV}		T_C = 80°C; rectangular d = 0.5		27	A
I_{FRMS}		T_C = 80°C; rectangular d = 0.5		38	A
I_{FRM}		T_C = 80°C; t_P = 10 µs; f = 5 kHz		tbd	A
I_{FSM}		T_{VJ} = 45°C; t = 10 ms		200	A
P_{tot}		T_C = 25°C		130	W

Features
- Soldering connections for PCB mounting
- Convenient package outline
- Thermistor

Applications
- Drive Inverters with brake system

Advantages
- 2 functions in one package
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

Data according to IEC 60747

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

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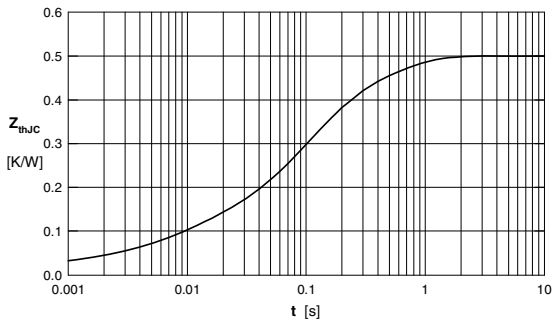
Symbol		Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R, I_D	Rectifier Bridge	$V_R = V_{RRM}$; T_{VJ} = 25°C $V_R = V_{RRM}$; T_{VJ} = 150°C			0.1 20	mA mA
V_F, V_T		I_F = 150 A; T_{VJ} = 25°C			1.68	V
V_{T0} r_T		for power-loss calculations only T_{VJ} = 150°C			0.85 5.9	V mΩ
V_{GT} I_{GT}		V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C			1.5 1.6 95 200	V V mA mA
V_{GD} I_{GD}		$T_{VJ} = T_{VJM}$; $V_D = {}^2/_3 V_{DRM}$ $T_{VJ} = T_{VJM}$; $V_D = {}^2/_3 V_{DRM}$			0.2 10	V mA
I_L		V_D = 6 V; t_G = 10 µs; di_G/dt = 0.45 A/µs; I_G = 0.45 A			450	mA
I_H		$T_{VJ} = T_{VJM}$; V_D = 6 V; $R_{GK} = \infty$			200	mA
t_{gd}		$V_D = ½ V_{DRM}$; di_G/dt = 0.45 A/µs; I_G = 0.45 A			2	µs
t_q		$T_{VJ} = T_{VJM}$; V_R = 100 V; $V_D = {}^2/_3 V_{DRM}$; t_P = 200 µs; dv/dt = 20 V/µs; I_T = 120 A; -di/dt = 10 A/µs			150	µs
R_{thJC} R_{thCH}		per rectifier			0.5 0.1	K/W K/W
$V_{BR(CES)}$ $V_{GE(th)}$	IGBT	V_{GS} = 0 V; I_C = 0.1 mA I_C = 3 mA	1200 4.5		 6.45	V V
I_{CES}		V_{CE} = 1200 V; T_{VJ} = 25°C V_{CE} = 0,8•V_{CES}; T_{VJ} = 125°C			0.1 0.5	mA mA
V_{CEsat}		V_{GE} = 15 V; I_C = 150 A			3.7	V
t_{SC} (SCSOA)		V_{GE} = 15 V; V_{CE} = 900 V; T_{VJ} = 125°C			10	µs
RBSOA		V_{GE} = 15 V; V_{CE} = 1200 V; T_{VJ} = 125°C; clamped inductive load; L = 100 µH; R_G = 15 Ω			150	A
C_{ies}		V_{CE} = 25 V; f = 1 MHz; V_{GE} = 0 V		5.7		nF
$t_{d(on)}$ $t_{d(off)}$ E_{on} E_{off}		V_{CE} = 720 V; I_C = 75 A; V_{GE} = 15 V; R_G = 15 Ω; Inductive load; L = 100 µH; T_{VJ} = 125°C		150 680 9 7.5		ns ns mJ mJ
R_{thJC} R_{thJH}				 0.4	0.22	K/W K/W



	R_i	τ_i
1	0.02308	0.0004
2	0.06385	0.007
3	0.2777	0.092
4	0.1354	0.44

Fig. 1 Transient thermal impedance junction to case (per thyristor/diode)

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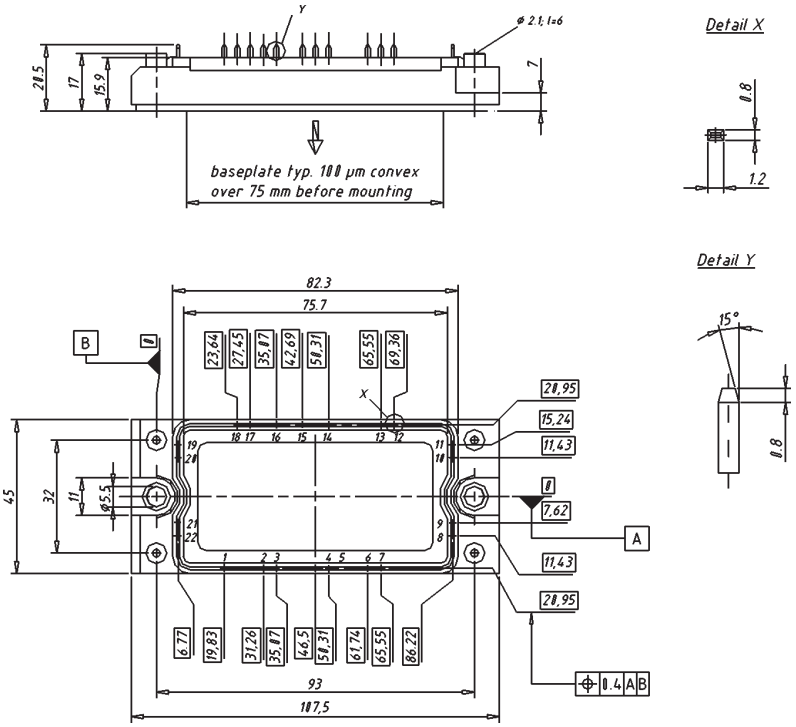
Symbol		Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R	Diode	$V_R = V_{RRM}$, T_{VJ} = 25°C			0.25	mA
		V_R = 1200 V, T_{VJ} = 125°C		1		mA
V_F		I_F = 30 A, T_{VJ} = 25°C			2.76	V
V_{T0}		For power-loss calculations only			1.3	V
r_T		T_{VJ} = 150°C			16	mΩ
I_{RM}	Fast Recovery	I_F = 50 A, $-di_F/dt$ = 100 A/µs, V_R = 100 V		5.5	11	A
t_{rr}		I_F = 1 A, $-di_F/dt$ = 200 A/µs, V_R = 30 V		40		ns
R_{thJC}					0.9	K/W
R_{thCH}					0.1	K/W
R_{25}	NTC	$\left\{ R(T) = R_{25} \bullet e^{B_{25/100}\left(\frac{1}{T} - \frac{1}{298K}\right)} \right\}$	4.75	5.0	5.25	kΩ
$B_{25/50}$				3375		K

Symbol		Conditions	Maximum Ratings	
T_{VJ}	Module		-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}		50/60 Hz, t = 1 min	2500	V~
		$I_{ISOL} \leq$ 1 mA, t = 1 s	3000	V~
M_d		Mounting torque	2.7...3.3	Nm
d_S		Creep distance on surface	12.7	mm
d_A		Strike distance in air	9.6	mm
a		Maximum allowable acceleration	50	m/s^2
Weight		typ.	180	g

Dimensions in mm (1 mm = 0.0394")



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