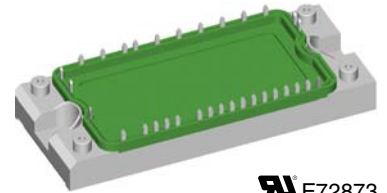
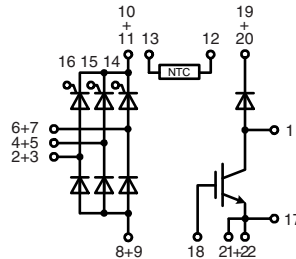


## Three Phase Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

$$V_{RRM} = 1600 \text{ V}$$

$$I_{dAVM} = 170 \text{ A}$$

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



E72873

See outline drawing for pin arrangement

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

### Features

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

### Applications

- Drive Inverters with brake system

### Advantages

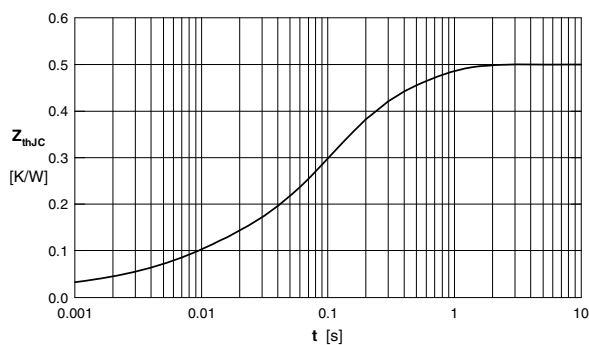
- 2 functions in one package
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

Data according to IEC 60747

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

20091110b

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_R, I_D$	$V_R = V_{RRM}; T_{VJ} = 25^{\circ}\text{C}$ $V_R = V_{RRM}; T_{VJ} = 150^{\circ}\text{C}$			0.1 mA 20 mA
$V_F, V_T$	$I_F = 150\text{ A}; T_{VJ} = 25^{\circ}\text{C}$			1.68 V
$V_{T0}$	for power-loss calculations only			0.85 V
$r_T$	$T_{VJ} = 150^{\circ}\text{C}$			5.9 mΩ
$V_{GT}$	$V_D = 6\text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			1.5 V 1.6 V
$I_{GT}$	$V_D = 6\text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			95 mA 200 mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$			0.2 V
$I_{GD}$	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$			10 mA
$I_L$	$V_D = 6\text{ V}; t_G = 10\ \mu\text{s};$ $di_G/dt = 0.45\text{ A}/\mu\text{s}; I_G = 0.45\text{ A}$			450 mA
$I_H$	$T_{VJ} = T_{VJM}; V_D = 6\text{ V}; R_{GK} = \infty$			200 mA
$t_{gd}$	$V_D = \frac{1}{2} V_{DRM};$ $di_G/dt = 0.45\text{ A}/\mu\text{s}; I_G = 0.45\text{ A}$			2 μs
$t_q$	$T_{VJ} = T_{VJM}; V_R = 100\text{ V}; V_D = \frac{2}{3} V_{DRM};$ $t_p = 200\ \mu\text{s}; dv/dt = 20\text{ V}/\mu\text{s};$ $I_T = 120\text{ A}; -di/dt = 10\text{ A}/\mu\text{s}$			150 μs
$R_{thJC}$	per rectifier			0.5 K/W
$R_{thCH}$				0.1 K/W
$V_{BR(CES)}$	$V_{GS} = 0\text{ V}; I_C = 0.1\text{ mA}$	1200		V
$V_{GE(th)}$	$I_C = 3\text{ mA}$	4.5		6.45 V
$I_{CES}$	$V_{CE} = 1200\text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $V_{CE} = 0.8 \cdot V_{CES}; T_{VJ} = 125^{\circ}\text{C}$			0.1 mA 0.5 mA
$V_{CEsat}$	$V_{GE} = 15\text{ V}; I_C = 150\text{ A}$			3.7 V
$t_{SC}(\text{SCSOA})$	$V_{GE} = 15\text{ V}; V_{CE} = 900\text{ V}; T_{VJ} = 125^{\circ}\text{C}$			10 μs
<b>RBSOA</b>	$V_{GE} = 15\text{ V}; V_{CE} = 1200\text{ V}; T_{VJ} = 125^{\circ}\text{C};$ clamped inductive load; $L = 100\ \mu\text{H};$ $R_G = 15\ \Omega$			150 A
$C_{ies}$	$V_{CE} = 25\text{ V}; f = 1\text{ MHz}; V_{GE} = 0\text{ V}$		5.7	nF
$t_{d(on)}$	$V_{CE} = 720\text{ V}; I_C = 75\text{ A};$ $V_{GE} = 15\text{ V}; R_G = 15\ \Omega;$ Inductive load; $L = 100\ \mu\text{H};$ $T_{VJ} = 125^{\circ}\text{C}$		150	ns
$t_{d(off)}$			680	ns
$E_{on}$			9	mJ
$E_{off}$			7.5	mJ
$R_{thJC}$				0.22 K/W
$R_{thJH}$		0.4		K/W



	$R_i$	$\tau_i$
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)

Symbol	Conditions	Characteristic Values			
		(T <sub>VJ</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
Fast Recovery Diode	V <sub>R</sub> = V <sub>RRM</sub> , T <sub>VJ</sub> = 25°C V <sub>R</sub> = 1200 V, T <sub>VJ</sub> = 125°C			0.25 mA	
			1	mA	
	V <sub>F</sub>	I <sub>F</sub> = 30 A, T <sub>VJ</sub> = 25°C			2.76 V
	V <sub>T0</sub>	For power-loss calculations only T <sub>VJ</sub> = 150°C			1.3 V
	r <sub>T</sub>				16 mΩ
	I <sub>RM</sub>	I <sub>F</sub> = 50 A, -di <sub>F</sub> /dt = 100 A/μs, V <sub>R</sub> = 100 V	5.5	11	A
	t <sub>rr</sub>	I <sub>F</sub> = 1 A, -di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 30 V	40		ns
R <sub>thJC</sub> R <sub>thCH</sub>				0.9 K/W 0.1 K/W	
R <sub>25</sub> B <sub>25/50</sub>	NTC $\left\{ R(T) = R_{25} \cdot e^{B_{25/100} \left( \frac{1}{T} - \frac{1}{298K} \right)} \right\}$	4.75	5.0	5.25 kΩ	
			3375	K	

Symbol	Conditions	Maximum Ratings	
T <sub>VJ</sub>		-40...+150	°C
T <sub>VJM</sub>		150	°C
T <sub>stg</sub>		-40...+125	°C
V <sub>ISOL</sub>	50/60 Hz, t = 1 min I <sub>ISOL</sub> ≤ 1 mA, t = 1 s	2500	V~
		3000	V~
M <sub>d</sub>	Mounting torque	2.7...3.3	Nm
d <sub>s</sub>	Creep distance on surface	12.7	mm
d <sub>A</sub>	Strike distance in air	9.6	mm
a	Maximum allowable acceleration	50	m/s <sup>2</sup>
Weight	typ.	180	g

Dimensions in mm (1 mm = 0.0394")

