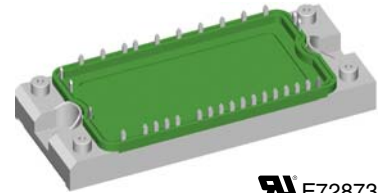
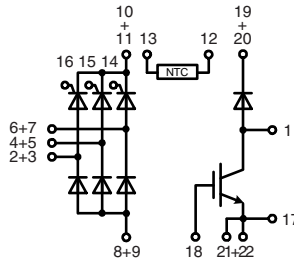


Three Phase Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

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

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

| 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 |
| $(di/dt)_{cr}$ | $T_{VJ} = T_{VJM}$; $f = 50 \text{ Hz}$; $t_p = 200 \mu\text{s}$; $V_D = \frac{2}{3} V_{DRM}$; $I_G = 0.45 \text{ A}$; $di_G/dt = 0.45 \text{ A}/\mu\text{s}$ | repetitive; $I_T = 150 \text{ A}$ | 150 A/ μs |
| | | non repetitive; $I_T = I_{d(AV)}/3$ | 500 A/ μs |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}$; $V_{DR} = \frac{2}{3} V_{DRM}$; $R_{GK} = \infty$; method 1 (linear voltage rise) | 1000 | V/ μs |
| 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°C | 1200 | V |
| V_{GE} | Continuous | ± 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

Recommended replacement:

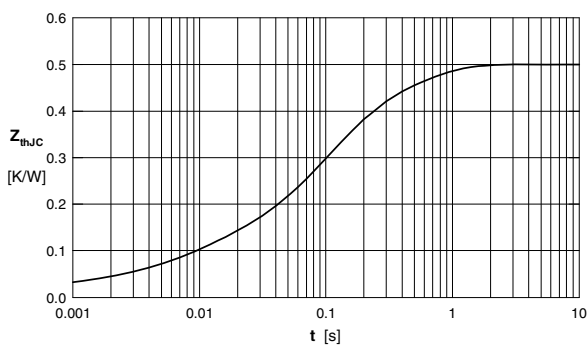
VVZB 170-16ioXT

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 | $V_R = V_{RRM}; T_{VJ} = 25^{\circ}\text{C}$ | | | 0.1 mA |
| | $V_R = V_{RRM}; T_{VJ} = 150^{\circ}\text{C}$ | | | 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} | $V_D = 6 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ | | | 1.5 V |
| | $T_{VJ} = -40^{\circ}\text{C}$ | | | 1.6 V |
| I_{GT} | $V_D = 6 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ | | | 95 mA |
| | $T_{VJ} = -40^{\circ}\text{C}$ | | | 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 | | V |
| I_{CES} | $V_{CE} = 1200 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ | | | 0.1 mA |
| | $V_{CE} = 0.8 \cdot V_{CES}; T_{VJ} = 125^{\circ}\text{C}$ | | | 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 |
| RBSOA | $V_{GE} = 15 \text{ V}; V_{CE} = 1200 \text{ V}; T_{VJ} = 125^{\circ}\text{C};$ 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 | 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)

| Symbol | Conditions | Characteristic Values | | |
|--------------------|--|--|------|---------|
| | | (T _{VJ} = 25°C, unless otherwise specified) | | |
| | | min. | typ. | max. |
| I _R | 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} | 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 { R(T) = R ₂₅ • e ^{B_{25/100}(1/T - 1/298K)} } | 4.75 | 5.0 | 5.25 kΩ |
| B _{25/50} | | | | 3375 K |

| Symbol | Conditions | Maximum Ratings | |
|-------------------|-----------------------------------|-----------------|------------------|
| T _{VJ} | | -40...+150 | °C |
| T _{VJM} | | 150 | °C |
| T _{stg} | | -40...+125 | °C |
| V _{ISOL} | 50/60 Hz, t = 1 min | 2500 | V~ |
| | I _{ISOL} ≤ 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")

