

MITSUBISHI THYRISTOR MODULES

# TM90DZ/CZ-24,-2H

HIGH VOLTAGE HIGH POWER GENERAL USE  
INSULATED TYPE

TM90DZ/CZ-24,-2H



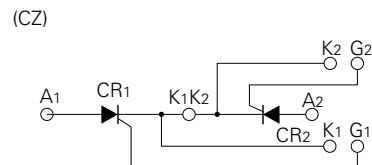
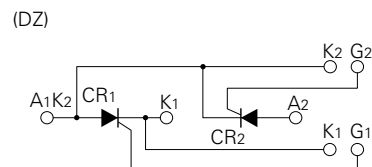
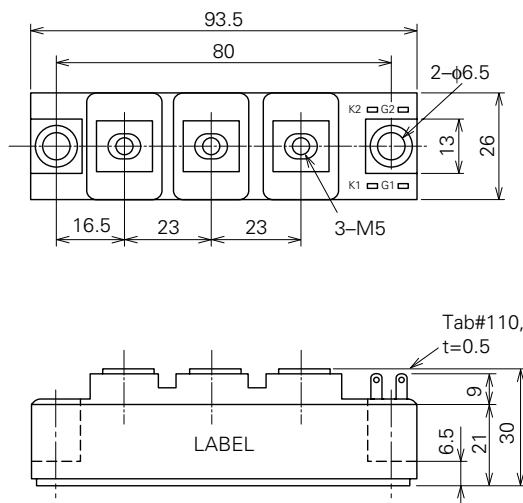
- **IT (AV)** Average on-state current ..... **90A**
- **VRRM** Repetitive peak reverse voltage  
..... **1200/1600V**
- **VDRM** Repetitive peak off-state voltage  
..... **1200/1600V**
- **DOUBLE ARMS**
- **Insulated Type**
- **UL Recognized**  
Yellow Card No. E80276 (N)  
File No. E80271

## APPLICATION

DC motor control, NC equipment, AC motor control, Contactless switches,  
Electric furnace temperature control, Light dimmers

## OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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## ABSOLUTE MAXIMUM RATINGS

| Symbol  | Parameter                             | Voltage class |      | Unit |
|---------|---------------------------------------|---------------|------|------|
|         |                                       | 24            | 2H   |      |
| VRRM    | Repetitive peak reverse voltage       | 1200          | 1600 | V    |
| VRSM    | Non-repetitive peak reverse voltage   | 1350          | 1700 | V    |
| VR (DC) | DC reverse voltage                    | 960           | 1280 | V    |
| VDRM    | Repetitive peak off-state voltage     | 1200          | 1600 | V    |
| VD SM   | Non-repetitive peak off-state voltage | 1350          | 1700 | V    |
| VD (DC) | DC off-state voltage                  | 960           | 1280 | V    |

| Symbol           | Parameter                                 | Conditions  | Ratings               | Unit             |
|------------------|---|---|-----------------------|------------------|
| IT (RMS)         | RMS on-state current                      |   | 140                   | A                |
| IT (AV)          | Average on-state current                  | Single-phase, half-wave 180° conduction, T <sub>C</sub> =82°C                     | 90                    | A                |
| ITSM             | Surge (non-repetitive) on-state current   | One half cycle at 60Hz, peak value  | 1800                  | A                |
| I <sup>2</sup> t | I <sup>2</sup> t for fusing               | Value for one cycle of surge current  | 1.4 × 10 <sup>4</sup> | A <sup>2</sup> s |
| di/dt            | Critical rate of rise of on-state current | V <sub>D</sub> =1/2V <sub>DRM</sub> , I <sub>G</sub> =1.0A, T <sub>j</sub> =125°C | 100                   | A/μs             |
| PGM              | Peak gate power dissipation               |   | 5.0                   | W                |
| PG (AV)          | Average gate power dissipation            |   | 0.5                   | W                |
| VFGM             | Peak gate forward voltage                 |   | 10                    | V                |
| VRGM             | Peak gate reverse voltage                 |   | 5.0                   | V                |
| IFGM             | Peak gate forward current                 |   | 2.0                   | A                |
| T <sub>j</sub>   | Junction temperature                      |   | −40~+125              | °C               |
| T <sub>stg</sub> | Storage temperature                       |   | −40~+125              | °C               |
| V <sub>iso</sub> | Isolation voltage                         | Charged part to case  | 2500                  | V                |
| —                | Mounting torque                           | Main terminal screw M5  | 1.47~1.96             | N·m              |
|                  |   |   | 15~20                 | kg·cm            |
|                  |   | Mounting screw M6   | 1.96~2.94             | N·m              |
|                  |   |   | 20~30                 | kg·cm            |
| —                | Weight                                    | Typical value   | 160                   | g                |

## ELECTRICAL CHARACTERISTICS

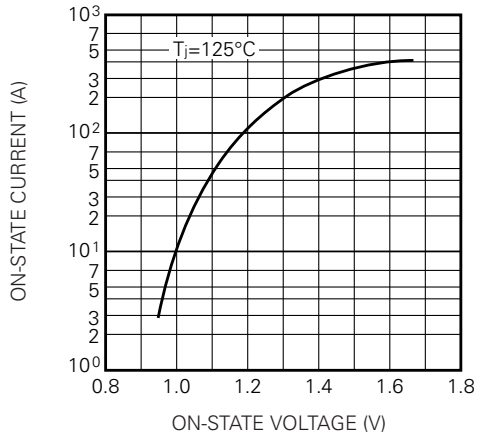
| Symbol                | Parameter                                  | Test conditions   | Limits |      |      | Unit |
|-----------------------|--|---|--------|------|------|------|
|                       |  |   | Min.   | Typ. | Max. |      |
| IRRM                  | Repetitive peak reverse current            | T <sub>j</sub> =125°C, VRRM applied                               | —      | —    | 15   | mA   |
| IDRM                  | Repetitive peak off-state current          | T <sub>j</sub> =125°C, VDRM applied                               | —      | —    | 15   | mA   |
| VTM                   | On-state voltage                           | T <sub>j</sub> =125°C, I <sub>TM</sub> =270A, instantaneous meas. | —      | —    | 1.4  | V    |
| dv/dt                 | Critical rate of rise of off-state voltage | T <sub>j</sub> =125°C, V <sub>D</sub> =2/3V <sub>DRM</sub>        | 500    | —    | —    | V/μs |
| VGT                   | Gate trigger voltage                       | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =2Ω      | —      | —    | 2.0  | V    |
| VGD                   | Gate non-trigger voltage                   | T <sub>j</sub> =125°C, V <sub>D</sub> =1/2V <sub>DRM</sub>        | 0.25   | —    | —    | V    |
| IGT                   | Gate trigger current                       | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =2Ω      | 15     | —    | 100  | mA   |
| R <sub>th</sub> (j-c) | Thermal resistance                         | Junction to case (per 1/2 module)                                 | —      | —    | 0.3  | °C/W |
| R <sub>th</sub> (c-f) | Contact thermal resistance                 | Case to fin, conductive grease applied (per 1/2 module)           | —      | —    | 0.2  | °C/W |
| —                     | Insulation resistance                      | Measured with a 500V megohmmeter between main terminal and case   | 10     | —    | —    | MΩ   |

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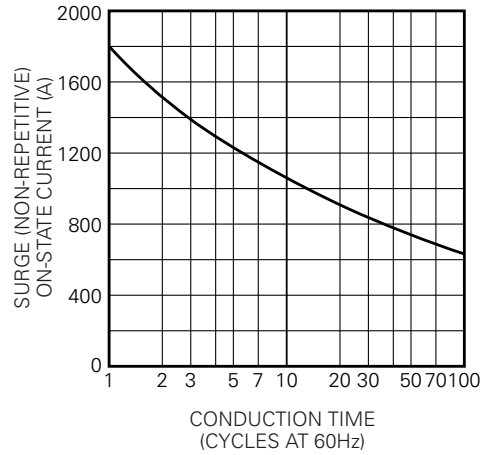
HIGH VOLTAGE HIGH POWER GENERAL USE  
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## PERFORMANCE CURVES

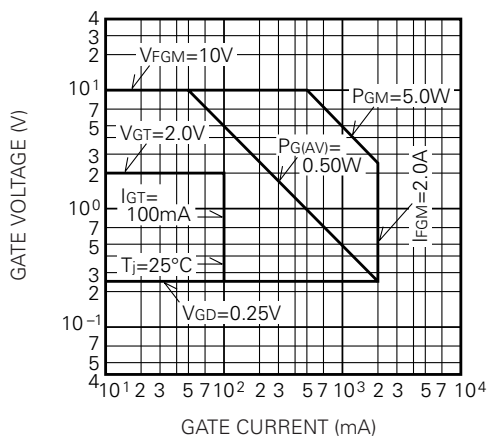
MAXIMUM ON-STATE CHARACTERISTIC



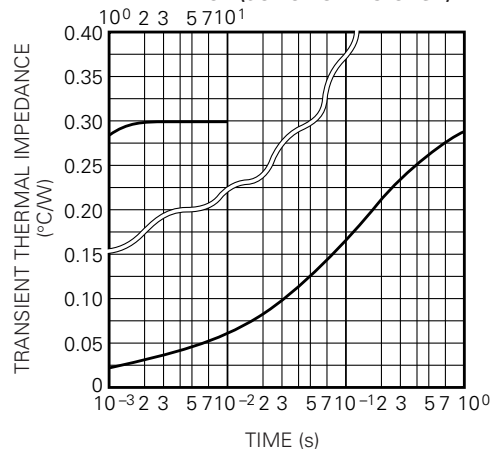
RATED SURGE (NON-REPETITIVE)  
ON-STATE CURRENT



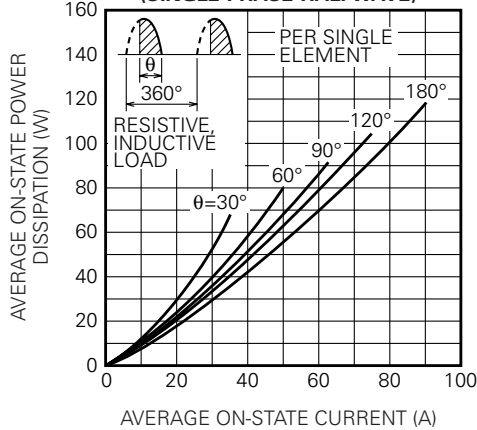
GATE CHARACTERISTICS



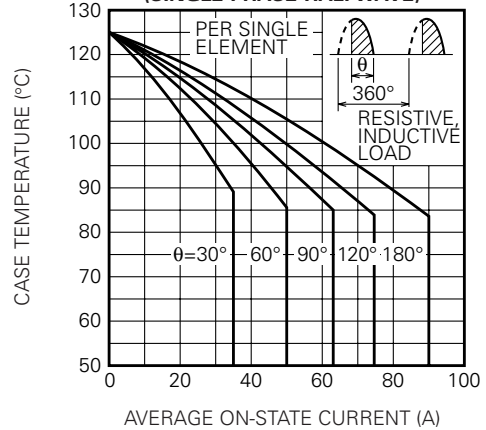
MAXIMUM TRANSIENT THERMAL  
IMPEDANCE (JUNCTION TO CASE)



MAXIMUM AVERAGE ON-STATE  
POWER DISSIPATION  
(SINGLE PHASE HALF-WAVE)



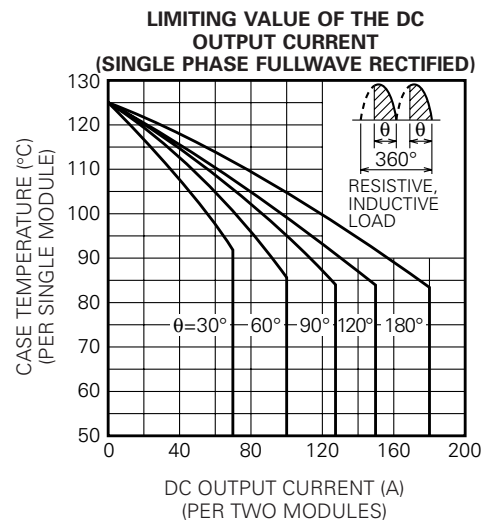
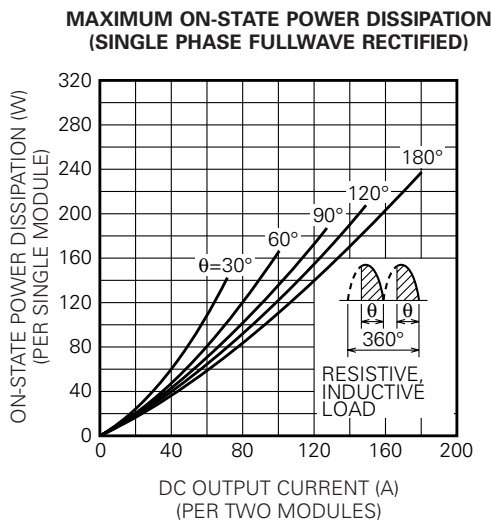
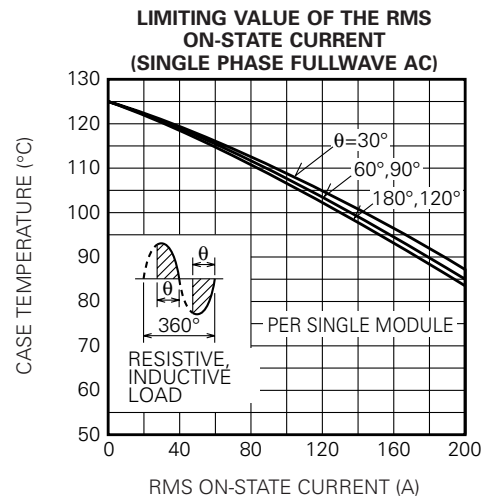
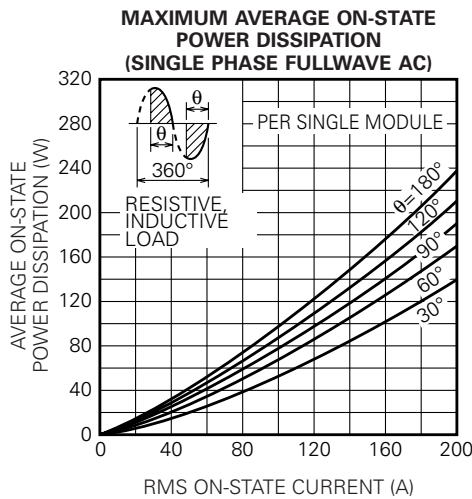
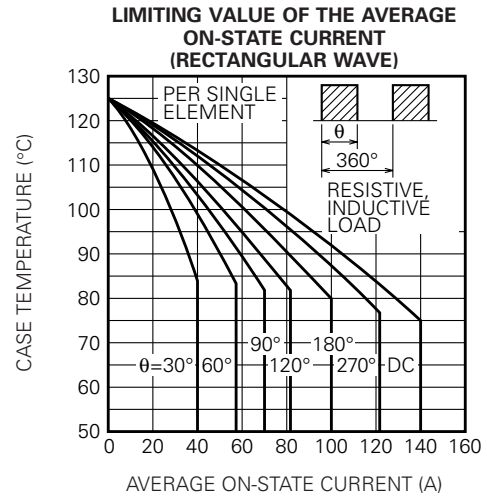
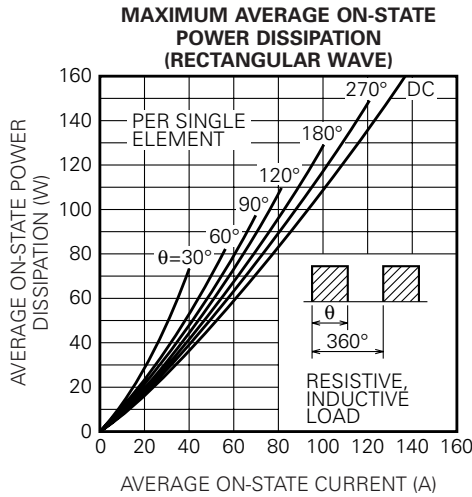
LIMITING VALUE OF THE AVERAGE  
ON-STATE CURRENT  
(SINGLE PHASE HALF-WAVE)



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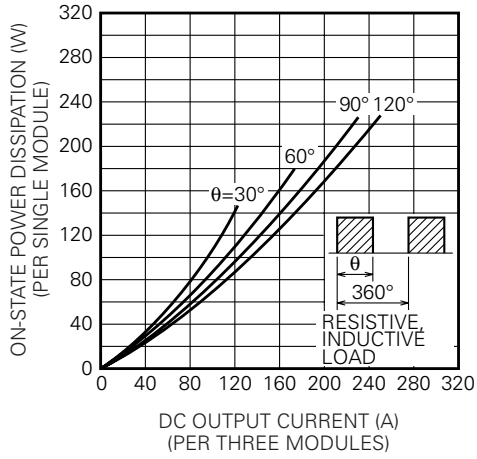
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**MAXIMUM ON-STATE POWER DISSIPATION  
(THREE PHASE FULLWAVE RECTIFIED)**



**LIMITING VALUE OF THE DC  
OUTPUT CURRENT  
(THREE PHASE FULLWAVE RECTIFIED)**

