

To all our customers

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## **Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.**

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The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.)

Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

# BCR5PM-14

MEDIUM POWER USE  
INSULATED TYPE, PLANAR PASSIVATION TYPE

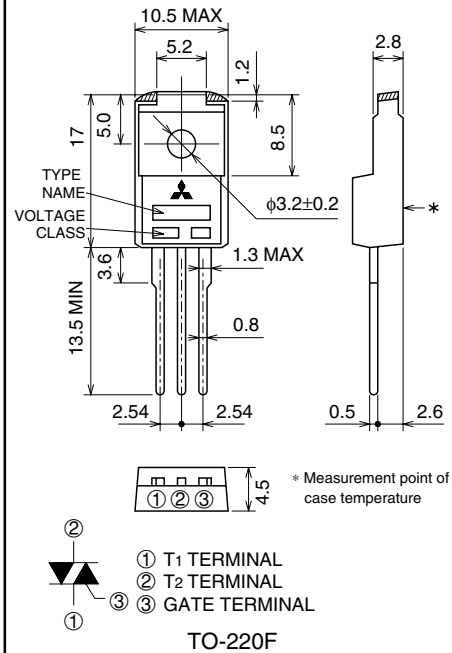
## BCR5PM-14



- **IT (RMS)** ..... **5A**
- **VDRM** ..... **700V**
- **IFGT I, IRGT I, IRGT III** ..... **30mA**
- **Viso** ..... **2000V**
- **UL Recognized: Yellow Card No.E80276(N)**  
**File No. E80271**

## OUTLINE DRAWING

Dimensions  
in mm



## APPLICATION

Switching mode power supply, washing machine, small motor control, copying machine, other general purpose control applications

## MAXIMUM RATINGS

| Symbol | Parameter                                | Voltage class | Unit |
|--------|------------------------------------------|---------------|------|
|        |                                          | 14            |      |
| VDRM   | Repetitive peak off-state voltage *1     | 700           | V    |
| VD SM  | Non-repetitive peak off-state voltage *1 | 840           | V    |

| Symbol                      | Parameter                              | Conditions                                                               | Ratings    | Unit             |
|-----------------------------|----------------------------------------|--------------------------------------------------------------------------|------------|------------------|
| IT (RMS)                    | RMS on-state current                   | Commercial frequency, sine full wave 360° conduction, Tc=95°C            | 5          | A                |
| ITSM                        | Surge on-state current                 | 60Hz sinewave 1 full cycle, peak value, non-repetitive                   | 50         | A                |
| I <sup>2</sup> <sub>t</sub> | I <sup>2</sup> <sub>t</sub> for fusing | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current | 10.4       | A <sup>2</sup> s |
| P <sub>GM</sub>             | Peak gate power dissipation            |                                                                          | 3          | W                |
| P <sub>G (AV)</sub>         | Average gate power dissipation         |                                                                          | 0.3        | W                |
| V <sub>GM</sub>             | Peak gate voltage                      |                                                                          | 10         | V                |
| I <sub>GM</sub>             | Peak gate current                      |                                                                          | 2          | A                |
| T <sub>j</sub>              | Junction temperature                   |                                                                          | -40 ~ +125 | °C               |
| T <sub>stg</sub>            | Storage temperature                    |                                                                          | -40 ~ +125 | °C               |
| —                           | Weight                                 | Typical value                                                            | 2.0        | g                |
| V <sub>iso</sub>            | Isolation voltage                      | Ta=25°C, AC 1 minute, T1 · T2 · G terminal to case                       | 2000       | V                |

\*1. Gate open.

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**ELECTRICAL CHARACTERISTICS**

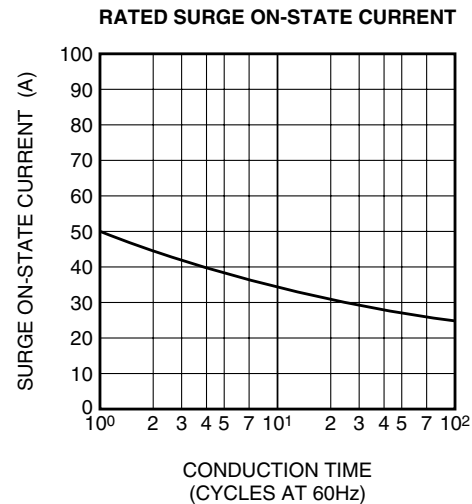
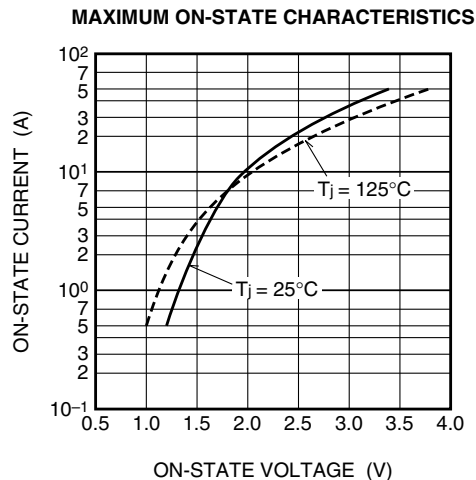
| Symbol               | Parameter                                                 | Test conditions                                                            | Limits |      |      | Unit                   |
|----------------------|-----------------------------------------------------------|----------------------------------------------------------------------------|--------|------|------|------------------------|
|                      |                                                           |                                                                            | Min.   | Typ. | Max. |                        |
| $I_{DRM}$            | Repetitive peak off-state current                         | $T_j=125^\circ\text{C}$ , $V_{DRM}$ applied                                | —      | —    | 2.0  | mA                     |
| $V_{TM}$             | On-state voltage                                          | $T_c=25^\circ\text{C}$ , $I_{TM}=7\text{A}$ , Instantaneous measurement    | —      | —    | 1.8  | V                      |
| $V_{FGT\text{ I}}$   | Gate trigger voltage *2                                   | $T_j=25^\circ\text{C}$ , $V_D=6\text{V}$ , $R_L=6\Omega$ , $R_G=330\Omega$ | —      | —    | 1.5  | V                      |
| $V_{RGT\text{ I}}$   |                                                           |                                                                            | —      | —    | 1.5  | V                      |
| $V_{RGT\text{ III}}$ |                                                           |                                                                            | —      | —    | 1.5  | V                      |
| $I_{FGT\text{ I}}$   | Gate trigger current *2                                   | $T_j=25^\circ\text{C}$ , $V_D=6\text{V}$ , $R_L=6\Omega$ , $R_G=330\Omega$ | —      | —    | 30   | mA                     |
| $I_{RGT\text{ I}}$   |                                                           |                                                                            | —      | —    | 30   | mA                     |
| $I_{RGT\text{ III}}$ |                                                           |                                                                            | —      | —    | 30   | mA                     |
| $V_{GD}$             | Gate non-trigger voltage                                  | $T_j=125^\circ\text{C}$ , $V_D=1/2V_{DRM}$                                 | 0.2    | —    | —    | V                      |
| $R_{th(j-c)}$        | Thermal resistance                                        | Junction to case *3                                                        | —      | —    | 4.0  | $^\circ\text{C/W}$     |
| $(dv/dt)_c$          | Critical-rate of rise of off-state commutating voltage *4 | $T_j=125^\circ\text{C}$                                                    | 5      | —    | —    | $\text{V}/\mu\text{s}$ |

\*2. Measurement using the gate trigger characteristics measurement circuit.

\*3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .

\*4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

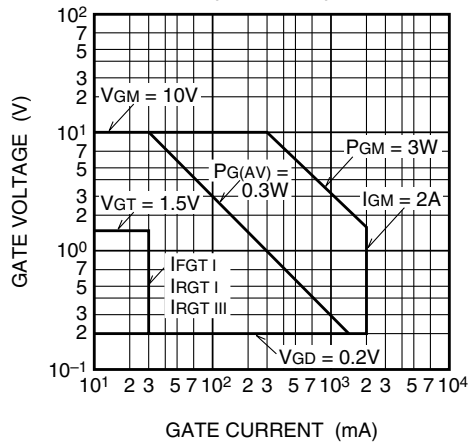
| Test conditions                                                                                                                                                                         | Commutating voltage and current waveforms (inductive load) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 1. Junction temperature<br>$T_j=125^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c=-2.5\text{A/ms}$<br>3. Peak off-state voltage<br>$V_D=400\text{V}$ |                                                            |

**PERFORMANCE CURVES**

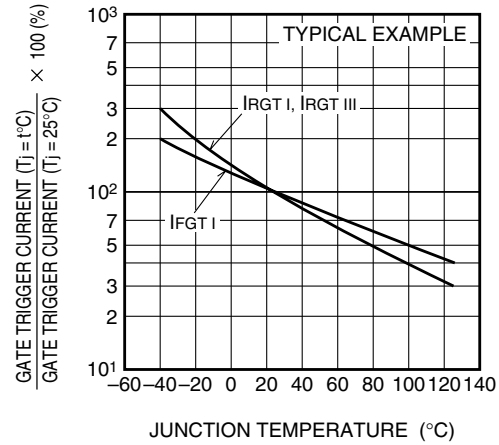
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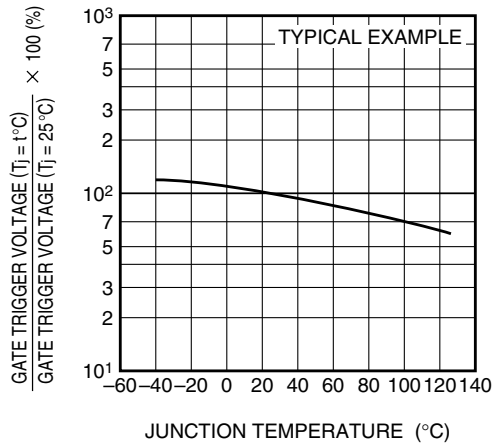
**GATE CHARACTERISTICS  
(I, II AND III)**



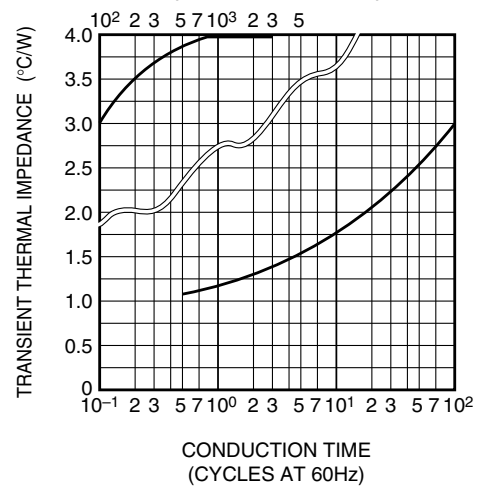
**GATE TRIGGER CURRENT VS.  
JUNCTION TEMPERATURE**



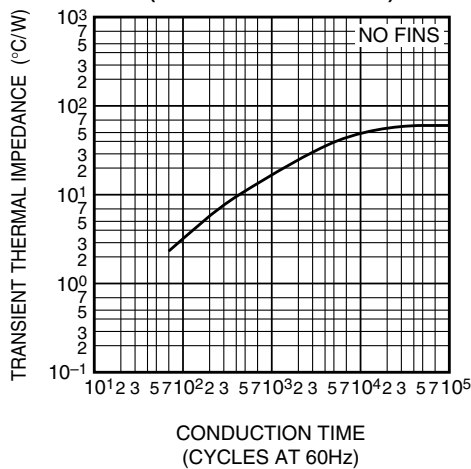
**GATE TRIGGER VOLTAGE VS.  
JUNCTION TEMPERATURE**



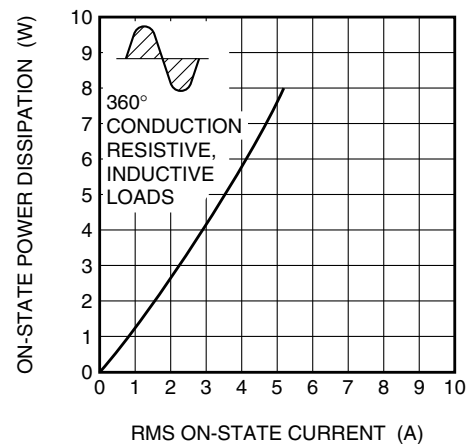
**MAXIMUM TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(JUNCTION TO CASE)**



**MAXIMUM TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(JUNCTION TO AMBIENT)**



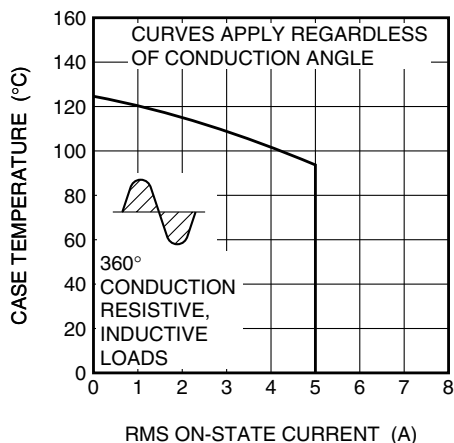
**MAXIMUM ON-STATE POWER  
DISSIPATION**



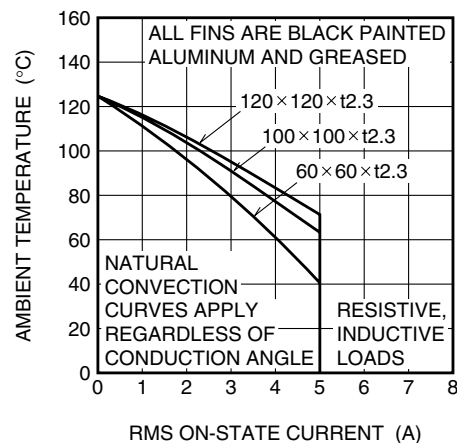
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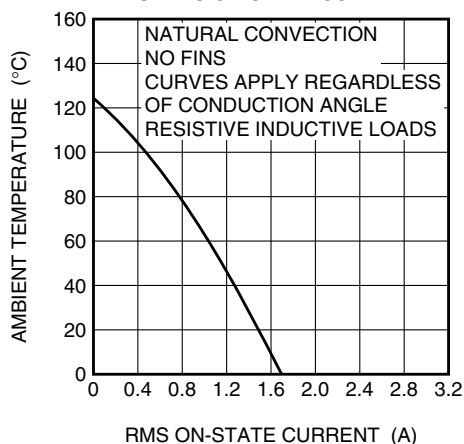
ALLOWABLE CASE TEMPERATURE  
VS. RMS ON-STATE CURRENT



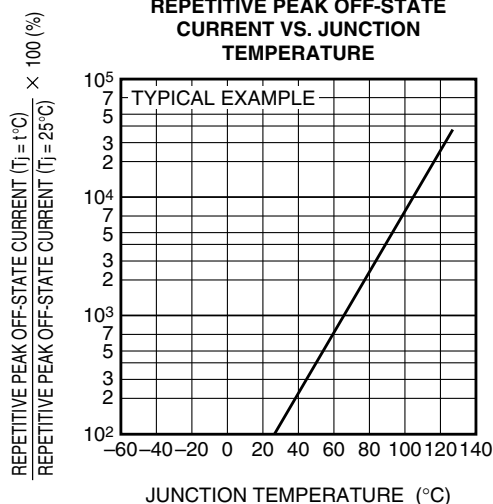
ALLOWABLE AMBIENT TEMPERATURE  
VS. RMS ON-STATE CURRENT



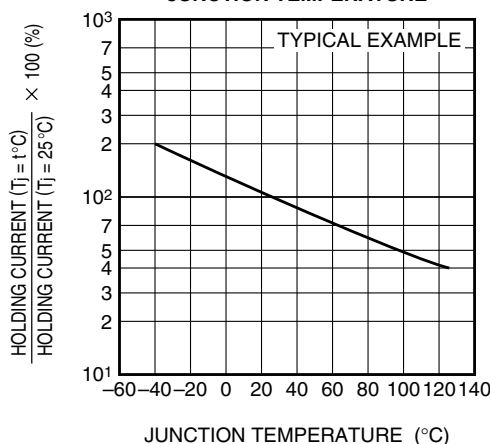
ALLOWABLE AMBIENT TEMPERATURE  
VS. RMS ON-STATE CURRENT



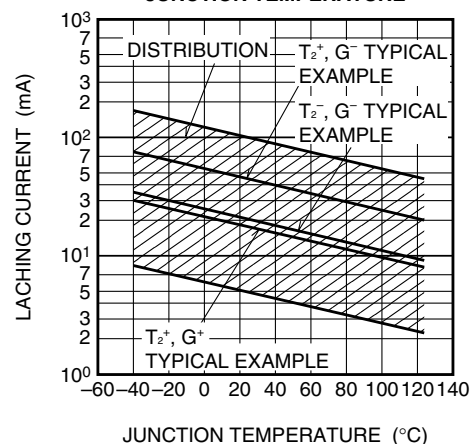
REPETITIVE PEAK OFF-STATE  
CURRENT VS. JUNCTION  
TEMPERATURE



HOLDING CURRENT VS.  
JUNCTION TEMPERATURE

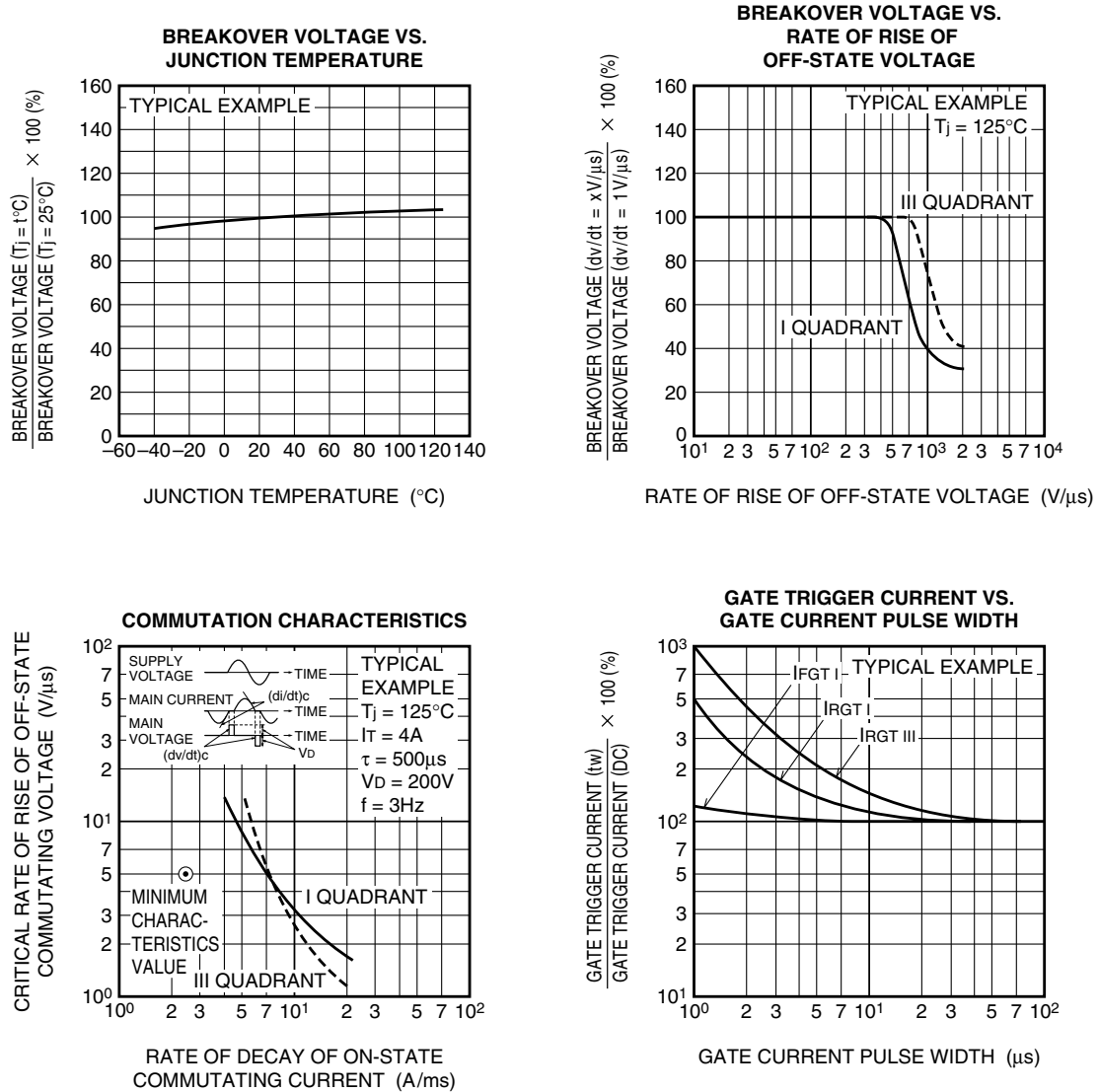


LACHING CURRENT VS.  
JUNCTION TEMPERATURE



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## GATE TRIGGER CHARACTERISTICS TEST CIRCUITS

