


# BCR5PM

MEDIUM POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

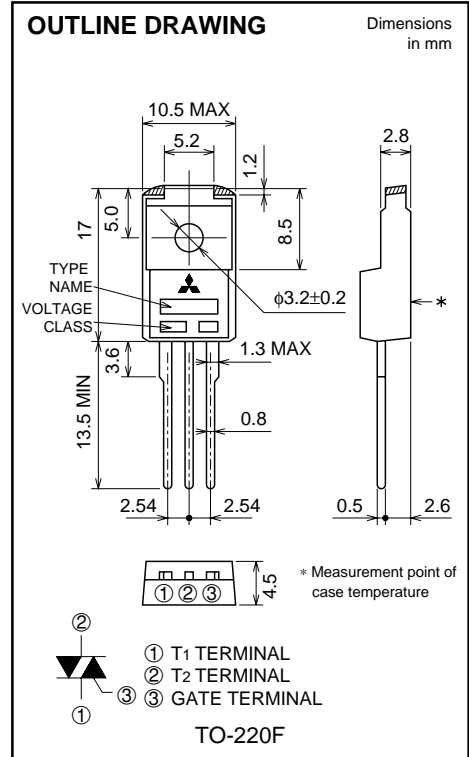
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

**BCR5PM**



- **IT (RMS)** ..... **5A**
- **VDRM** ..... **600V**
- **IFGT I, IRGT I, IRGT III** ..... **20mA (10mA) \*5**
- **Viso** ..... **2000V**
- **UL Recognized: Yellow Card No.E80276(N)**

**File No. E80271**



## APPLICATION

Switching mode power supply, light dimmer, electric flasher unit, control of household equipment such as TV sets · stereo · refrigerator · washing machine · infrared kotatsu · carpet, solenoid drivers, small motor control, copying machine, electric tool, other general purpose control applications

## MAXIMUM RATINGS

| Symbol | Parameter                                | Voltage class |  | Unit |
|--------|--|---------------|--|------|
|        |  | 12            |  |      |
| VDRM   | Repetitive peak off-state voltage *1     | 600           |  | V    |
| VDSM   | Non-repetitive peak off-state voltage *1 | 720           |  | 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 |
| PGM                         | Peak gate power dissipation            |  | 3          | W                |
| PG (AV)                     | Average gate power dissipation         |  | 0.3        | W                |
| VGM                         | Peak gate voltage                      |  | 10         | V                |
| IGM                         | 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                |
| Viso                        | Isolation voltage                      | Ta=25°C, AC 1 minute, T1 · T2 · G terminal to case                       | 2000       | V                |

\*1. Gate open.

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Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

**ELECTRICAL CHARACTERISTICS**

| Symbol                | Parameter   | Test conditions  | Limits |      |      | Unit |    |
|-----------------------|---|--|--------|------|------|------|----|
|                       |   |  | Min.   | Typ. | Max. |      |    |
| IDRM                  | Repetitive peak off-state current                         | T <sub>j</sub> =125°C, V <sub>DRM</sub> applied                                    | —      | —    | 2.0  | mA   |    |
| V <sub>TM</sub>       | On-state voltage  | T <sub>c</sub> =25°C, I <sub>TM</sub> =7A, Instantaneous measurement               | —      | —    | 1.8  | V    |    |
| V <sub>FGT I</sub>    | Gate trigger voltage *2                                   | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =6Ω, R <sub>G</sub> =330Ω | I      | —    | —    | 1.5  | V  |
| V <sub>RGT I</sub>    |   |  | II     | —    | —    | 1.5  | V  |
| V <sub>RGT III</sub>  |   |  | III    | —    | —    | 1.5  | V  |
| I <sub>FGT I</sub>    | Gate trigger current *2                                   | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =6Ω, R <sub>G</sub> =330Ω | I      | —    | —    | 20*5 | mA |
| I <sub>RGT I</sub>    |   |  | II     | —    | —    | 20*5 | mA |
| I <sub>RGT III</sub>  |   |  | III    | —    | —    | 20*5 | mA |
| V <sub>GD</sub>       | Gate non-trigger voltage                                  | T <sub>j</sub> =125°C, V <sub>D</sub> =1/2V <sub>DRM</sub>                         | 0.2    | —    | —    | V    |    |
| R <sub>th (j-c)</sub> | Thermal resistance  | Junction to case *3  | —      | —    | 4.0  | °C/W |    |
| (dv/dt) <sub>c</sub>  | Critical-rate of rise of off-state commutating voltage *4 | T <sub>j</sub> =125°C  | 5      | —    | —    | V/μs |    |

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

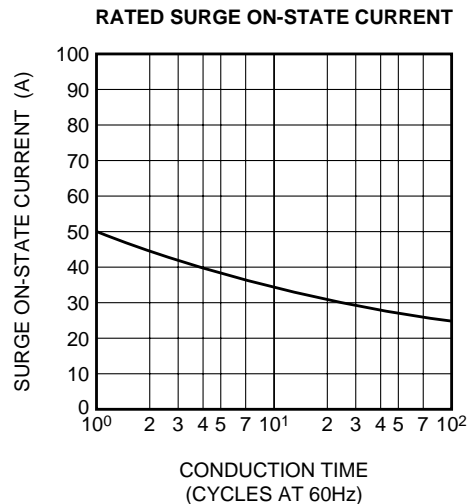
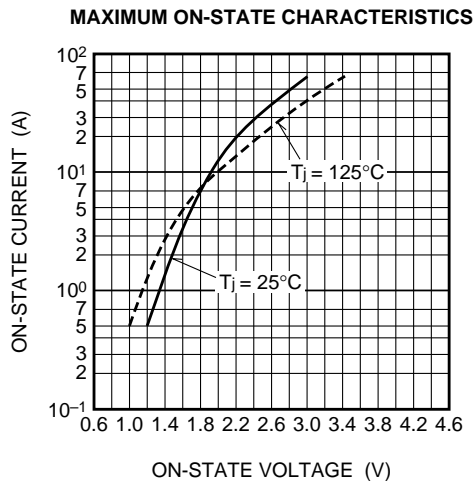
\*3. The contact thermal resistance R<sub>th (c-f)</sub> in case of greasing is 0.5°C/W.

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

\*5. High sensitivity (I<sub>GT</sub>≤10mA) is also available. (IGT item ①)

| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>T <sub>j</sub> =125°C<br><br>2. Rate of decay of on-state commutating current<br>(di/dt) <sub>c</sub> =-2.5A/ms<br><br>3. Peak off-state voltage<br>V <sub>D</sub> =400V |  |

**PERFORMANCE CURVES**

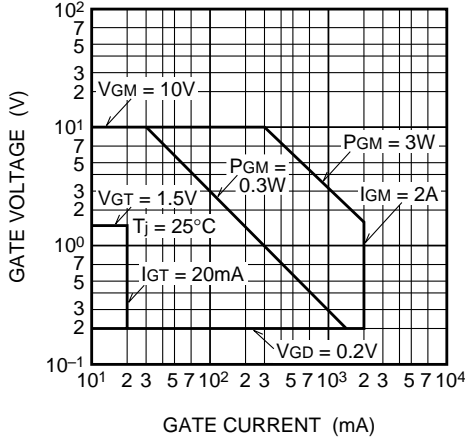


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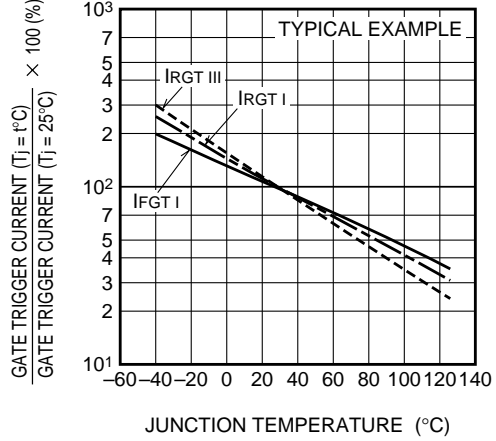
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

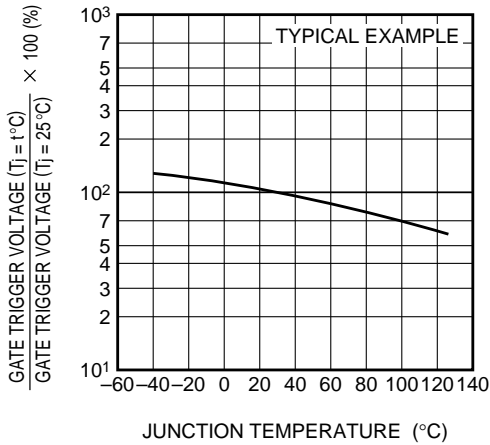
**GATE CHARACTERISTICS**  
(I, II AND III)



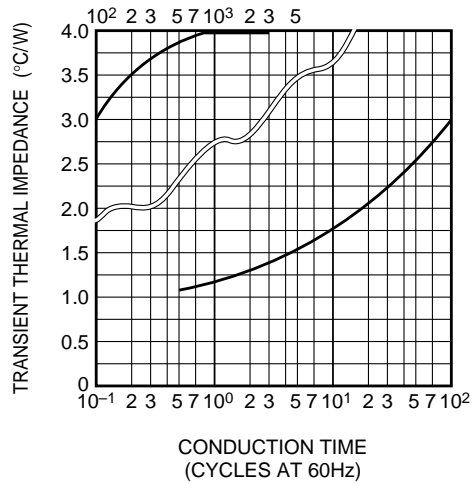
**GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE**



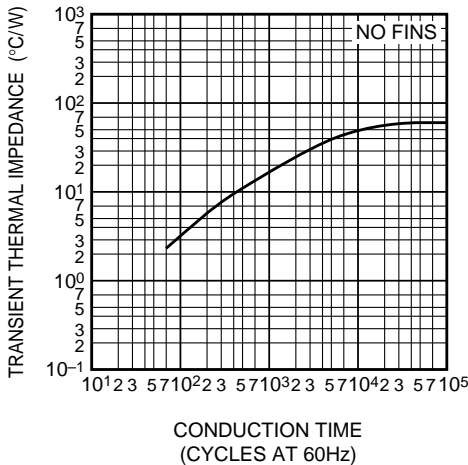
**GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE**



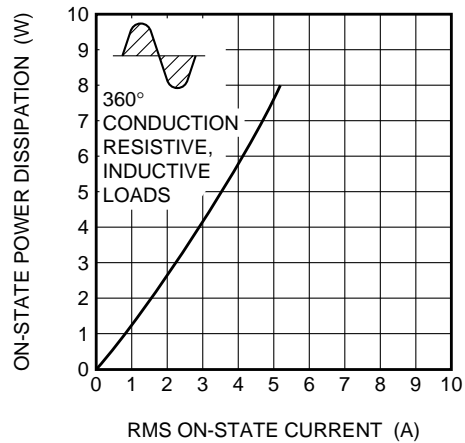
**MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



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



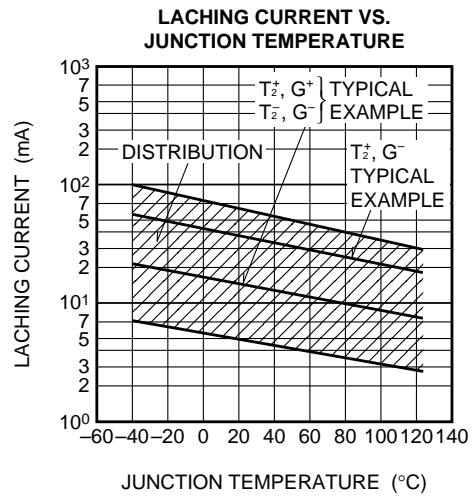
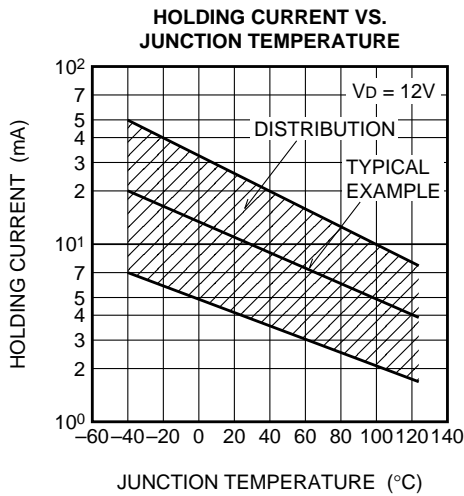
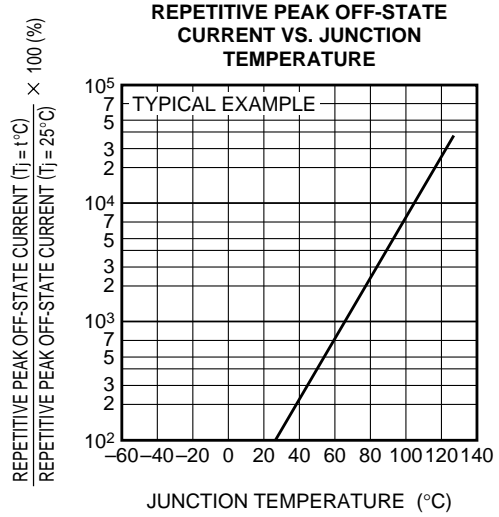
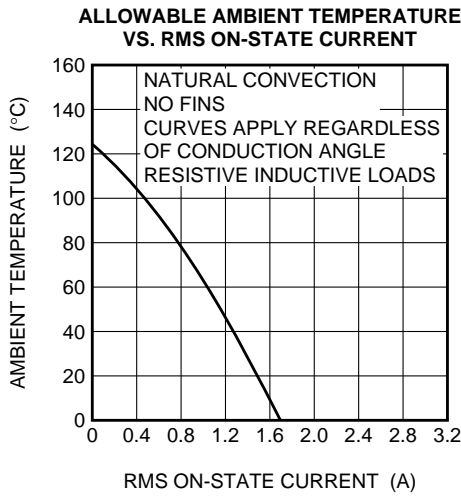
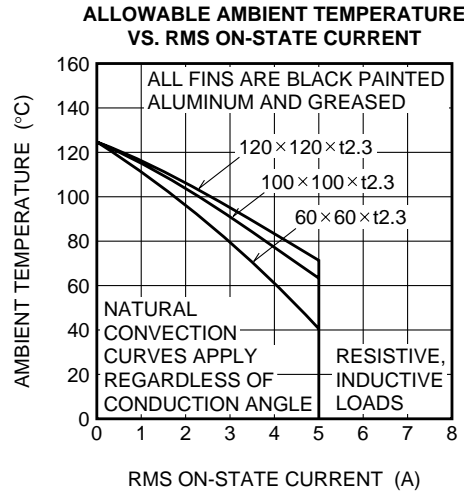
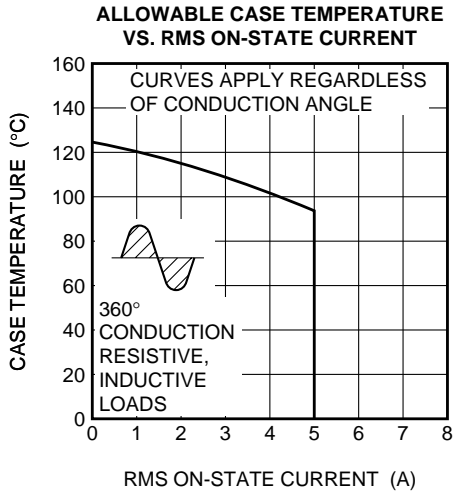
**MAXIMUM ON-STATE POWER DISSIPATION**



**BCR5PM**

Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

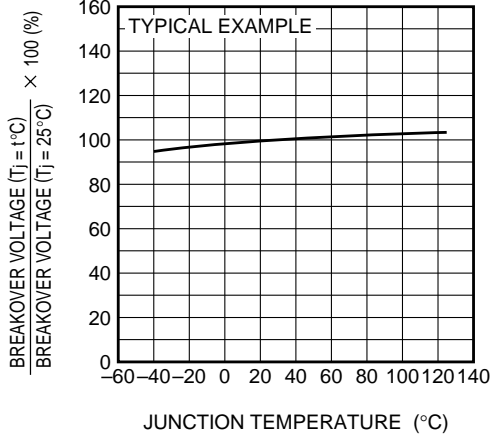


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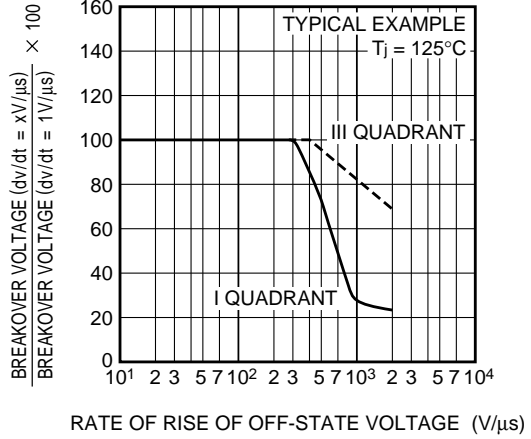
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MEDIUM POWER USE  
INSULATED TYPE, PLANAR PASSIVATION TYPE

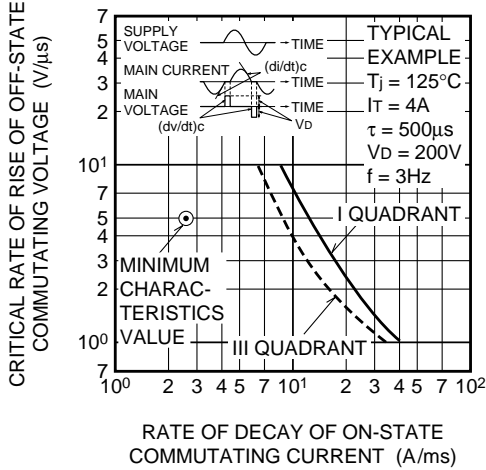
**BREAKEOVER VOLTAGE VS. JUNCTION TEMPERATURE**



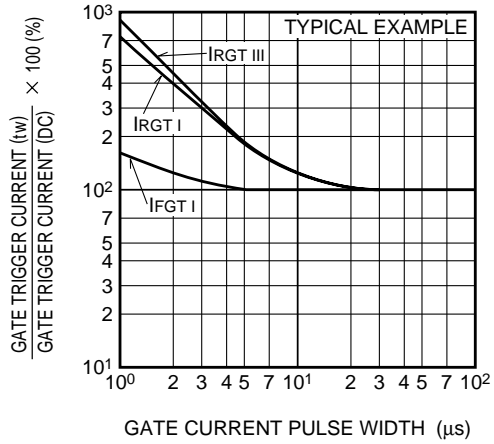
**BREAKEOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE**



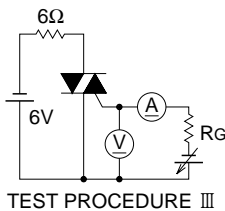
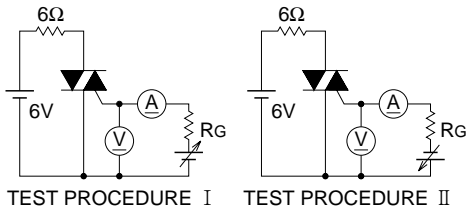
**COMMUTATION CHARACTERISTICS**



**GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH**



**GATE TRIGGER CHARACTERISTICS TEST CIRCUITS**




# BCR5PM

MEDIUM POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

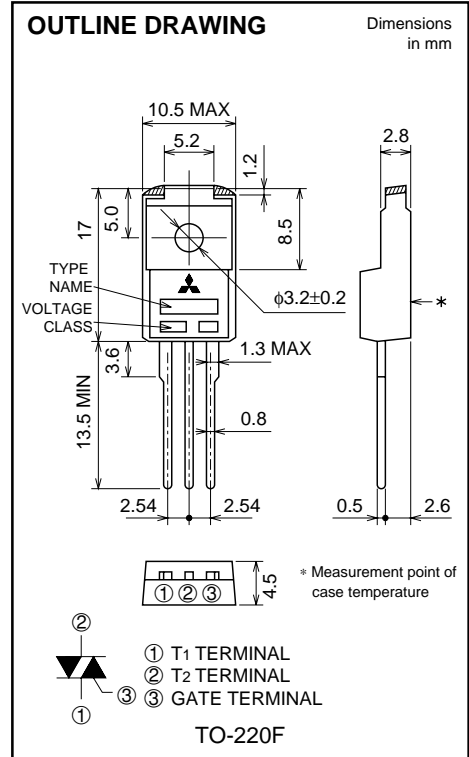
The product guaranteed maximum junction temperature 150°C (See warning.)

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- **IT (RMS)** ..... **5A**
- **VDRM** ..... **600V**
- **IFGT I, IRGT I, IRGT III** ..... **20mA (10mA) \*5**
- **Viso** ..... **2000V**
- **UL Recognized: Yellow Card No.E80276(N)**

**File No. E80271**



## APPLICATION

Switching mode power supply, light dimmer, electric flasher unit, control of household equipment such as TV sets · stereo · refrigerator · washing machine · infrared kotatsu · carpet, solenoid drivers, small motor control, copying machine, electric tool, other general purpose control applications

(Warning)

1. Refer to the recommended circuit values around the triac before using.
2. Be sure to exchange the specification before using. If not exchanged, general triacs will be supplied.

## MAXIMUM RATINGS

| Symbol | Parameter                                | Voltage class |  | Unit |
|--------|--|---------------|--|------|
|        |  | 12            |  |      |
| VDRM   | Repetitive peak off-state voltage *1     | 600           |  | V    |
| VDSM   | Non-repetitive peak off-state voltage *1 | 720           |  | V    |

| Symbol                      | Parameter                              | Conditions   | Ratings    | Unit             |
|-----------------------------|--|--|------------|------------------|
| IT (RMS)                    | RMS on-state current                   | Commercial frequency, sine full wave 360° conduction, Tc=120°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 |
| PGM                         | Peak gate power dissipation            |  | 3          | W                |
| PG (AV)                     | Average gate power dissipation         |  | 0.3        | W                |
| VGM                         | Peak gate voltage                      |  | 10         | V                |
| IGM                         | Peak gate current                      |  | 2          | A                |
| T <sub>j</sub>              | Junction temperature                   |  | -40 ~ +150 | °C               |
| T <sub>stg</sub>            | Storage temperature                    |  | -40 ~ +150 | °C               |
| —                           | Weight                                 | Typical value  | 2.0        | g                |
| Viso                        | Isolation voltage                      | Ta=25°C, AC 1 minute, T1 · T2 · G terminal to case                       | 2000       | V                |

\*1. Gate open.

**BCR5PM**

The product guaranteed maximum junction temperature 150°C (See warning.)

**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

**ELECTRICAL CHARACTERISTICS**

| Symbol                | Parameter   | Test conditions  | Limits  |      |      | Unit |    |
|-----------------------|---|--|---------|------|------|------|----|
|                       |   |  | Min.    | Typ. | Max. |      |    |
| IDRM                  | Repetitive peak off-state current                         | T <sub>j</sub> =150°C, V <sub>DRM</sub> applied                                    | —       | —    | 2.0  | mA   |    |
| V <sub>TM</sub>       | On-state voltage  | T <sub>c</sub> =25°C, I <sub>TM</sub> =7A, Instantaneous measurement               | —       | —    | 1.8  | V    |    |
| V <sub>FGT I</sub>    | Gate trigger voltage *2                                   | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =6Ω, R <sub>G</sub> =330Ω | I       | —    | —    | 1.5  | V  |
| V <sub>RGT I</sub>    |   |  | II      | —    | —    | 1.5  | V  |
| V <sub>RGT III</sub>  |   |  | III     | —    | —    | 1.5  | V  |
| I <sub>FGT I</sub>    | Gate trigger current *2                                   | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =6Ω, R <sub>G</sub> =330Ω | I       | —    | —    | 20*5 | mA |
| I <sub>RGT I</sub>    |   |  | II      | —    | —    | 20*5 | mA |
| I <sub>RGT III</sub>  |   |  | III     | —    | —    | 20*5 | mA |
| V <sub>GD</sub>       | Gate non-trigger voltage                                  | T <sub>j</sub> =125°C/150°C, V <sub>D</sub> =1/2V <sub>DRM</sub>                   | 0.2/0.1 | —    | —    | V    |    |
| R <sub>th (j-c)</sub> | Thermal resistance  | Junction to case *3  | —       | —    | 4.0  | °C/W |    |
| (dv/dt) <sub>c</sub>  | Critical-rate of rise of off-state commutating voltage *4 | T <sub>j</sub> =125°C/150°C  | 5/1     | —    | —    | V/μs |    |

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

\*3. The contact thermal resistance R<sub>th (c-f)</sub> in case of greasing is 0.5°C/W.

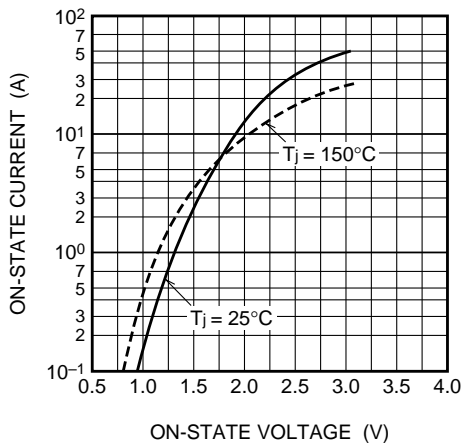
\*4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

\*5. High sensitivity (I<sub>GT</sub>≤10mA) is also available. (IGT item ①)

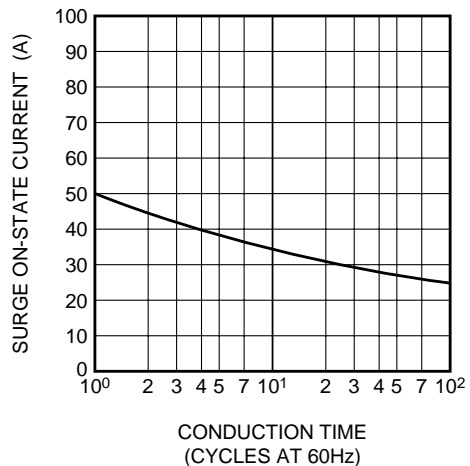
| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>T <sub>j</sub> =125°C/150°C<br><br>2. Rate of decay of on-state commutating current<br>(di/dt) <sub>c</sub> =-2.5A/ms<br><br>3. Peak off-state voltage<br>V <sub>D</sub> =400V |  |

**PERFORMANCE CURVES**

**MAXIMUM ON-STATE CHARACTERISTICS**



**RATED SURGE ON-STATE CURRENT**



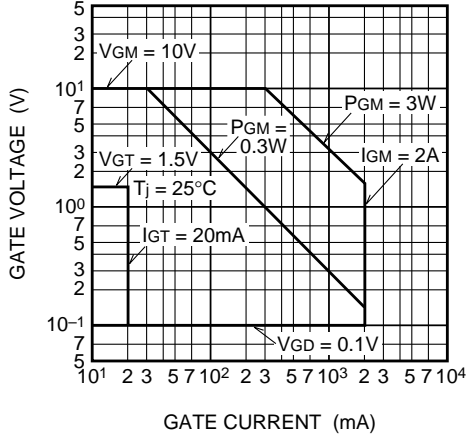
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MEDIUM POWER USE

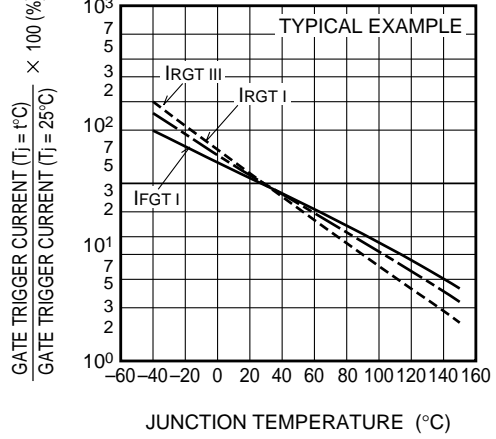
INSULATED TYPE, PLANAR PASSIVATION TYPE

The product guaranteed maximum junction temperature 150°C (See warning.)

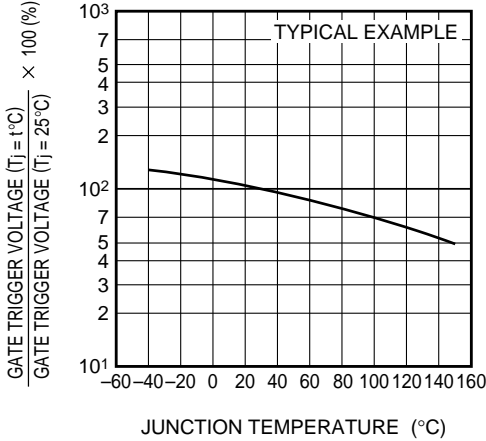
**GATE CHARACTERISTICS (I, II AND III)**



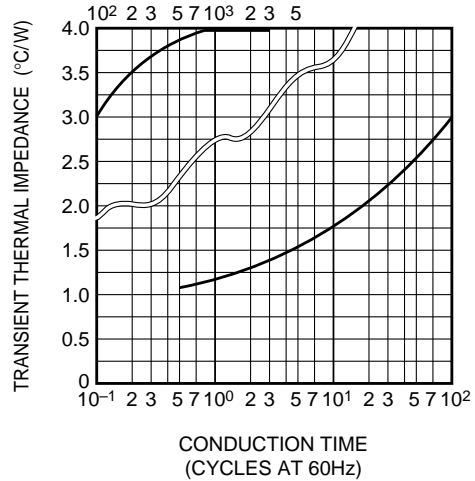
**GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE**



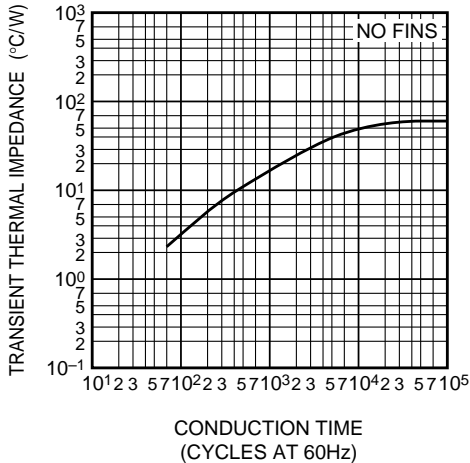
**GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE**



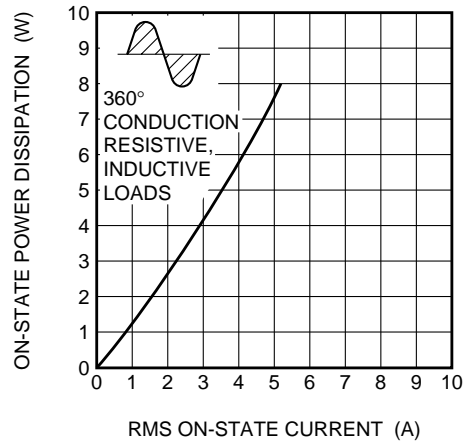
**MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



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



**MAXIMUM ON-STATE POWER DISSIPATION**



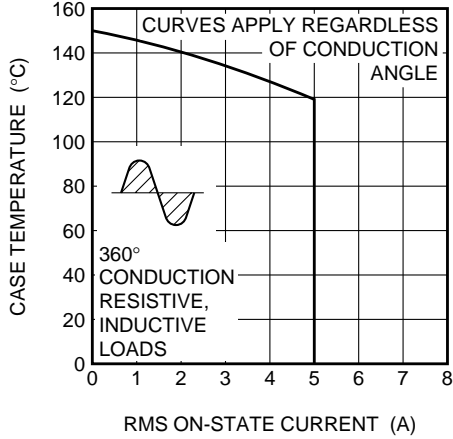


**BCR5PM**

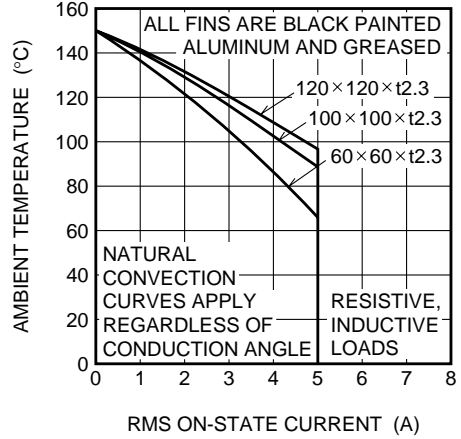
The product guaranteed maximum junction temperature 150°C (See warning.)

**MEDIUM POWER USE**  
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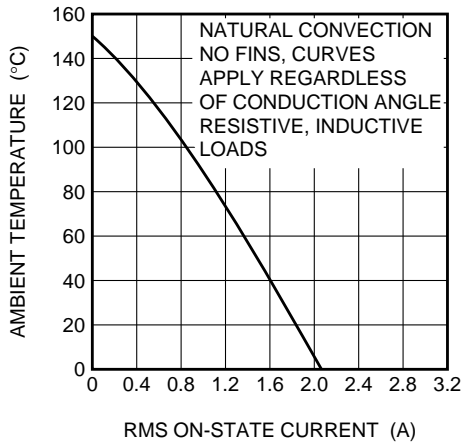
**ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT**



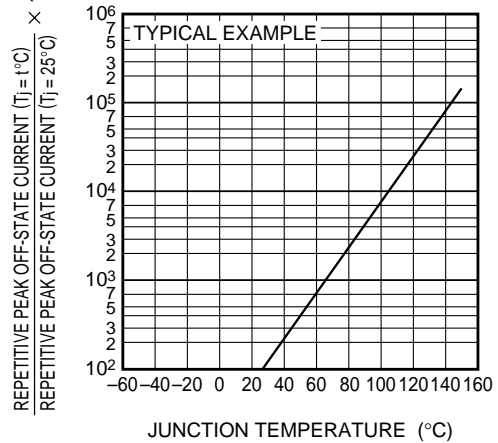
**ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT**



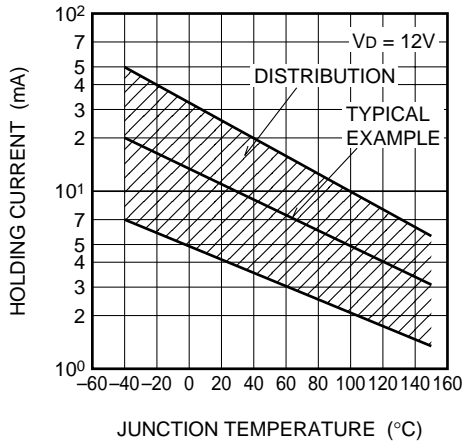
**ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT**



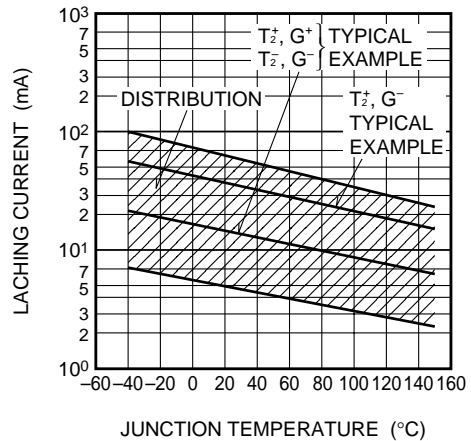
**REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE**



**HOLDING CURRENT VS. JUNCTION TEMPERATURE**



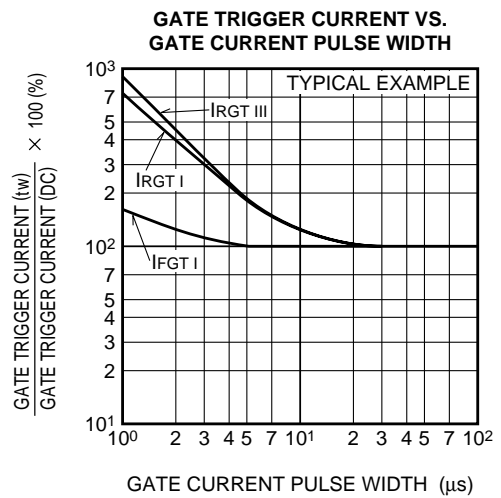
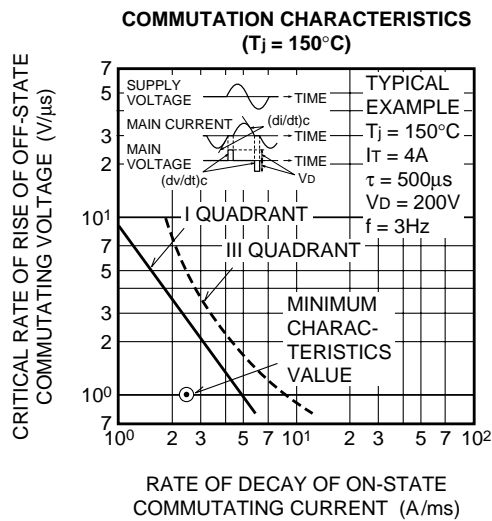
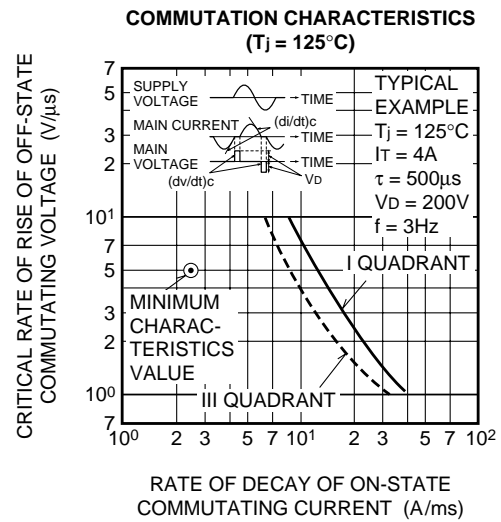
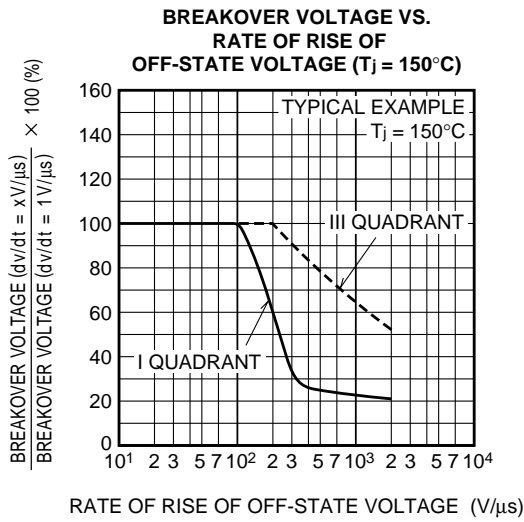
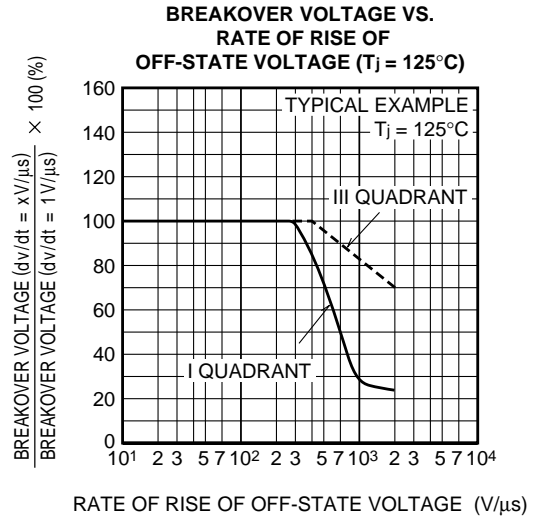
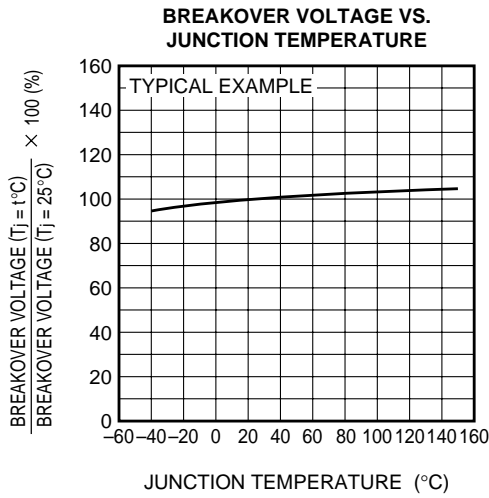
**LATCHING CURRENT VS. JUNCTION TEMPERATURE**



**BCR5PM**

The product guaranteed maximum junction temperature 150°C (See warning.)

**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

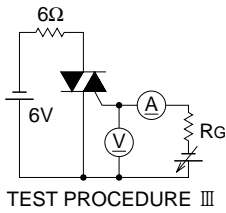
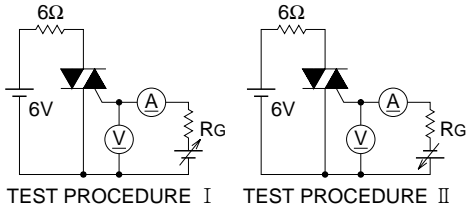


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**MEDIUM POWER USE**  
**INSULATED TYPE, PLANAR PASSIVATION TYPE**

### GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



### RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC

