RENESAS

# BCR8PM-12L

## Triac

Medium Power Use

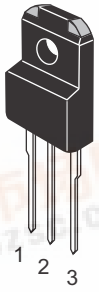
REJ03G0303-0200
Rev.2.00
Nov.08.2004

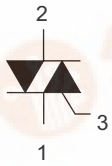
## Features

- $I_{T\,(RMS)}$ : 8 A
- $V_{DRM}$ : 600 V
- $I_{FGTI}$, $I_{RGTI}$, $I_{RGTIII}$ : 30 mA (20 mA)[Note5]
- Viso : 2000 V
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904
  File No. E80271

## Outline

TO-220F




1. $T_1$ Terminal
2. $T_2$ Terminal
3. Gate Terminal

## Applications

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

## Maximum Ratings

| Parameter | Symbol | Voltage class | Unit |
|---|---|---|---|
| | | 12 | |
| Repetitive peak off-state voltage[Note1] | $V_{DRM}$ | 600 | V |
| Non-repetitive peak off-state voltage[Note1] | $V_{DSM}$ | 720 | V |

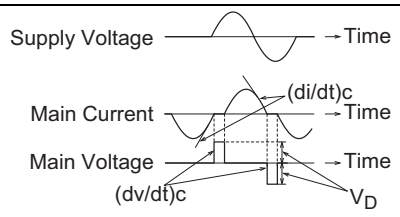
| Parameter | Symbol | Ratings | Unit | Conditions |
|---|---|---|---|---|
| RMS on-state current | $I_{T\ (RMS)}$ | 8 | A | Commercial frequency, sine full wave 360° conduction, Tc = 88°C |
| Surge on-state current | $I_{TSM}$ | 80 | A | 60Hz sinewave 1 full cycle, peak value, non-repetitive |
| $I^2t$ for fusing | $I^2t$ | 26 | $A^2s$ | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current |
| Peak gate power dissipation | $P_{GM}$ | 5 | W | |
| Average gate power dissipation | $P_{G\ (AV)}$ | 0.5 | W | |
| Peak gate voltage | $V_{GM}$ | 10 | V | |
| Peak gate current | $I_{GM}$ | 2 | A | |
| Junction temperature | Tj | – 40 to +125 | °C | |
| Storage temperature | Tstg | – 40 to +125 | °C | |
| Mass | — | 2.0 | g | Typical value |
| Isolation voltage | Viso | 2000 | V | Ta = 25°C, AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case |

Notes: 1. Gate open.

## Electrical Characteristics

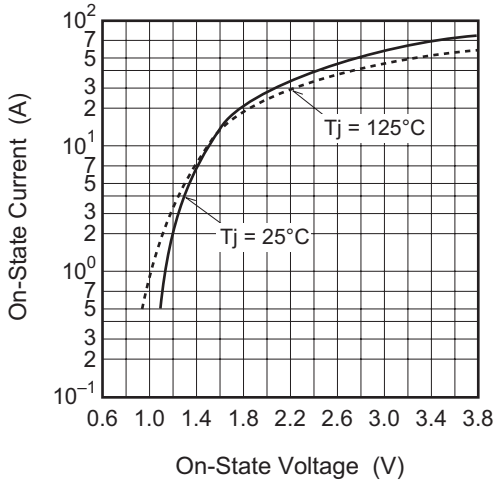
| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|---|---|---|---|---|---|---|---|
| Repetitive peak off-state current | | $I_{DRM}$ | — | — | 2.0 | mA | Tj = 125°C, $V_{DRM}$ applied |
| On-state voltage | | $V_{TM}$ | — | — | 1.6 | V | Tc = 25°C, $I_{TM}$ = 12 A, Instantaneous measurement |
| Gate trigger voltage[Note2] | I | $V_{FGTI}$ | — | — | 1.5 | V | Tj = 25°C, $V_D$ = 6 V, $R_L$ = 6 Ω, $R_G$ = 330 Ω |
| | II | $V_{RGTI}$ | — | — | 1.5 | V | |
| | III | $V_{RGTIII}$ | — | — | 1.5 | V | |
| Gate trigger current[Note2] | I | $I_{FGTI}$ | — | — | 30[Note5] | mA | Tj = 25°C, $V_D$ = 6 V, $R_L$ = 6 Ω, $R_G$ = 330 Ω |
| | II | $I_{RGTI}$ | — | — | 30[Note5] | mA | |
| | III | $I_{RGTIII}$ | — | — | 30[Note5] | mA | |
| Gate non-trigger voltage | | $V_{GD}$ | 0.2 | — | — | V | Tj = 125°C, $V_D$ = 1/2 $V_{DRM}$ |
| Thermal resistance | | $R_{th\ (j-c)}$ | — | — | 3.7 | °C/W | Junction to case[Note3] |
| Critical-rate of rise of off-state commutating voltage[Note4] | | (dv/dt)c | 10 | — | — | V/µs | Tj = 125°C |

Notes: 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°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 ($I_{GT} \leq 20$ mA) is also available. ($I_{GT}$ item: 1)

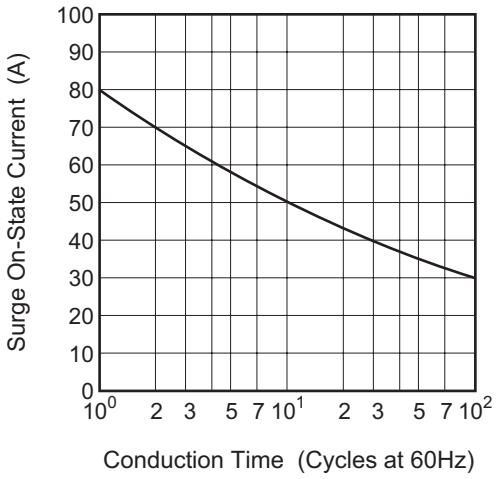
| Test conditions | Commutating voltage and current waveforms (inductive load) |
|---|---|
| 1. Junction temperature<br>Tj = 125°C<br>2. Rate of decay of on-state commutating current<br>(di/dt)c = – 4.0 A/ms<br>3. Peak off-state voltage<br>$V_D$ = 400 V |  |

## Performance Curves

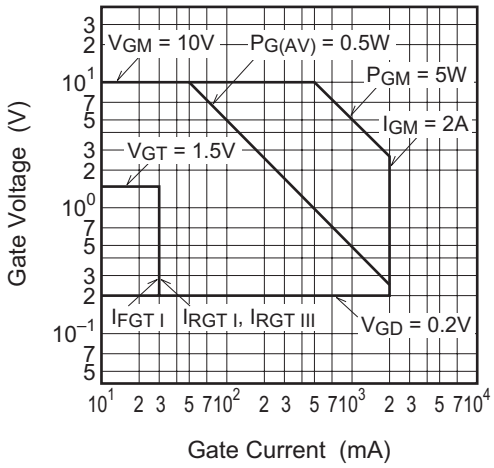
Maximum On-State Characteristics



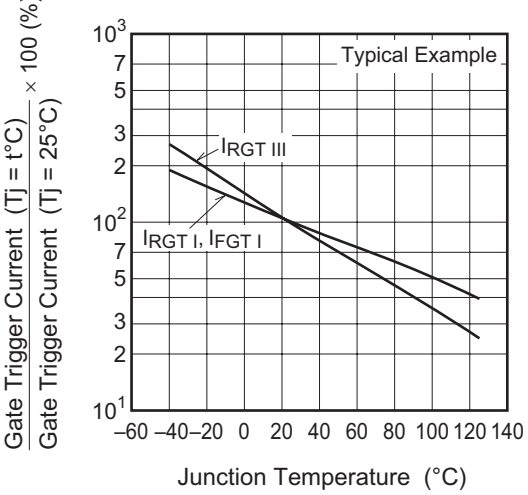

Rated Surge On-State Current



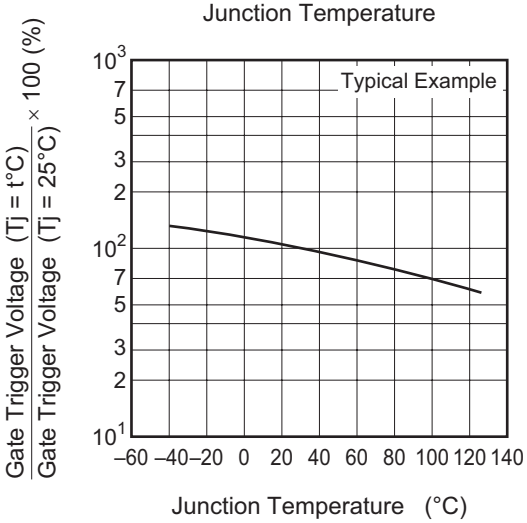

Gate Characteristics (I, II and III)



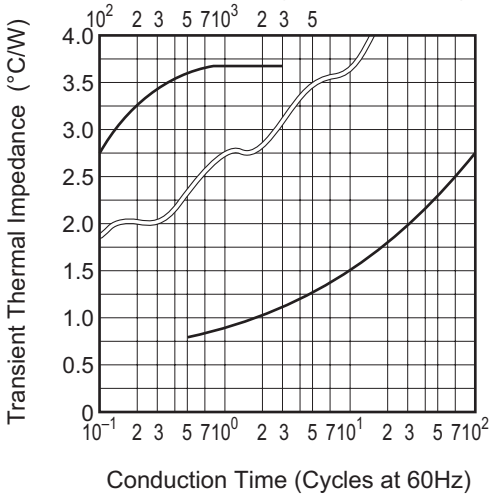

Gate Trigger Current vs. Junction Temperature



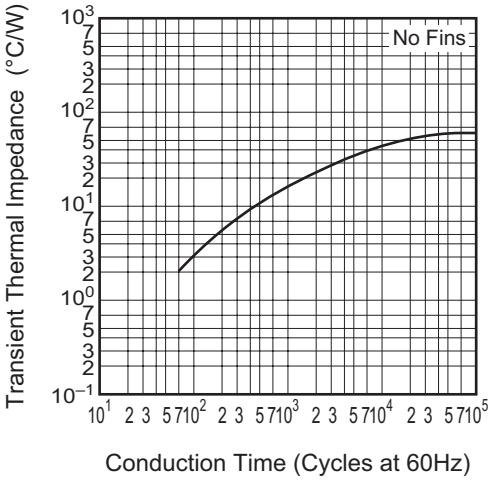

Gate Trigger Voltage vs. Junction Temperature



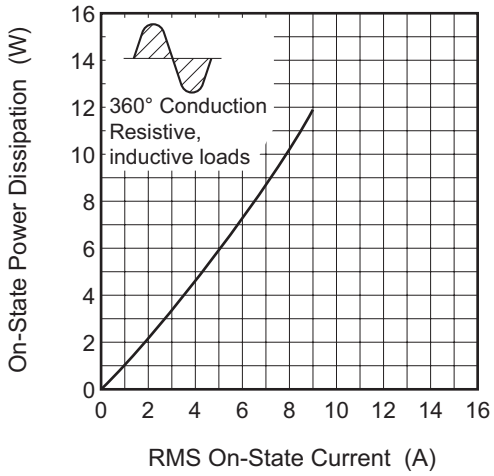

Maximum Transient Thermal Impedance Characteristics (Junction to case)



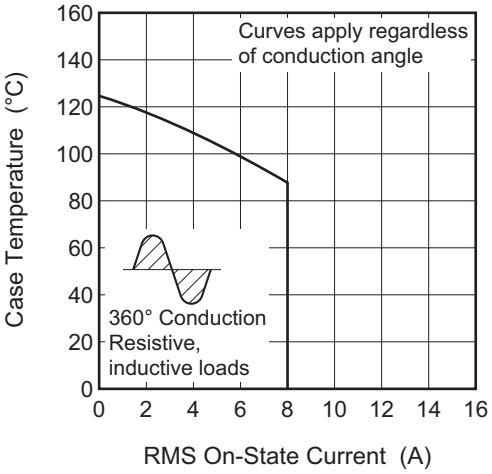
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



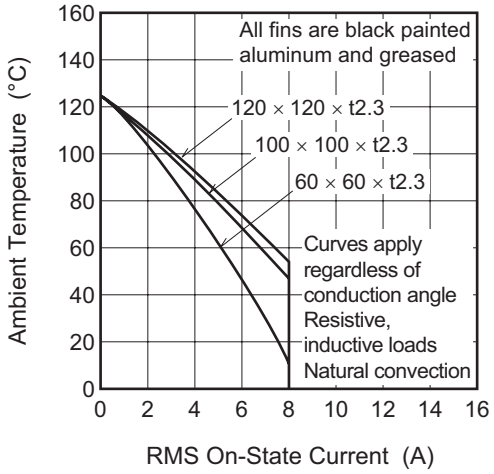

Maximum On-State Power Dissipation



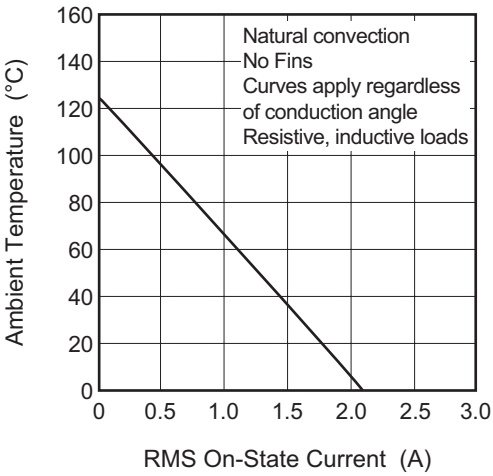

Allowable Case Temperature vs. RMS On-State Current



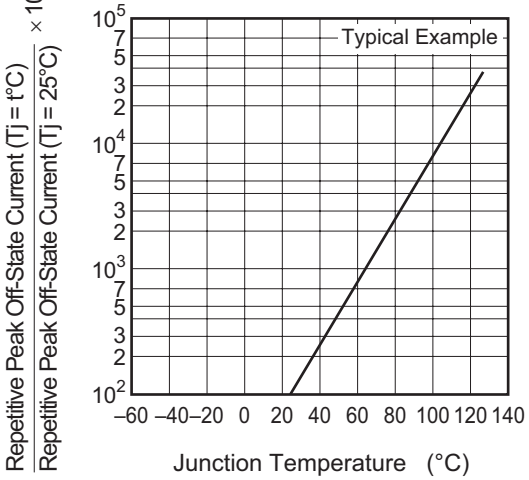

Allowable Ambient Temperature vs. RMS On-State Current



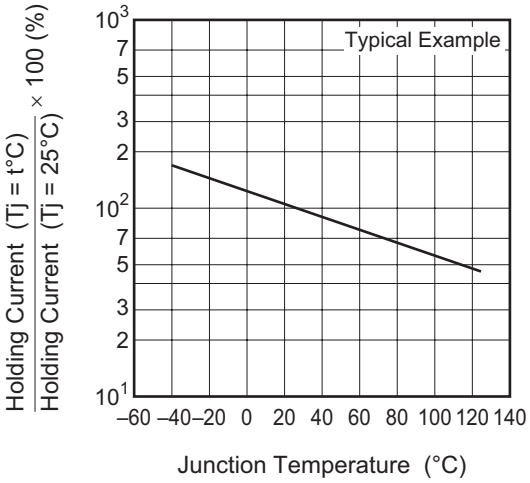

Allowable Ambient Temperature vs. RMS On-State Current



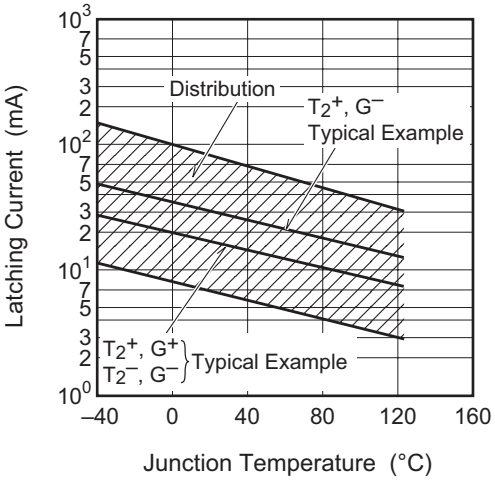

Repetitive Peak Off-State Current vs. Junction Temperature



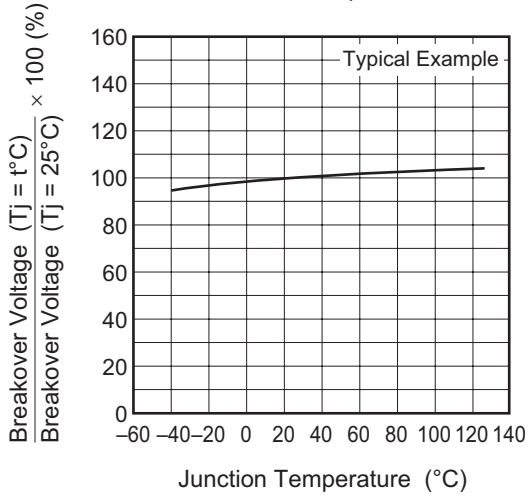
Holding Current vs.
Junction Temperature



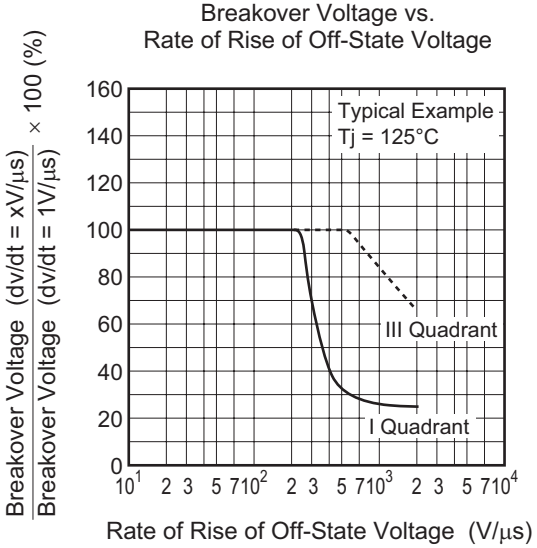

Latching Current vs.
Junction Temperature



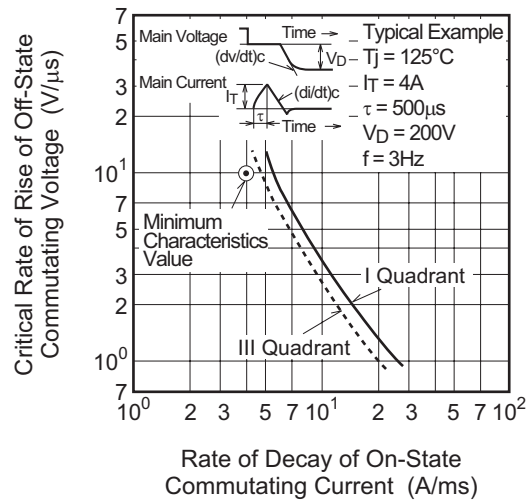

Breakover Voltage vs.
Junction Temperature



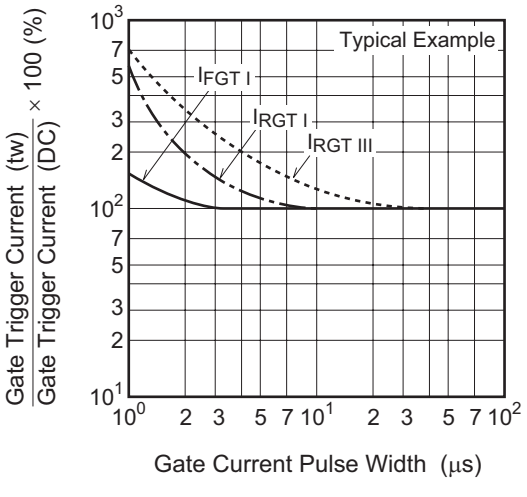

Breakover Voltage vs.
Rate of Rise of Off-State Voltage



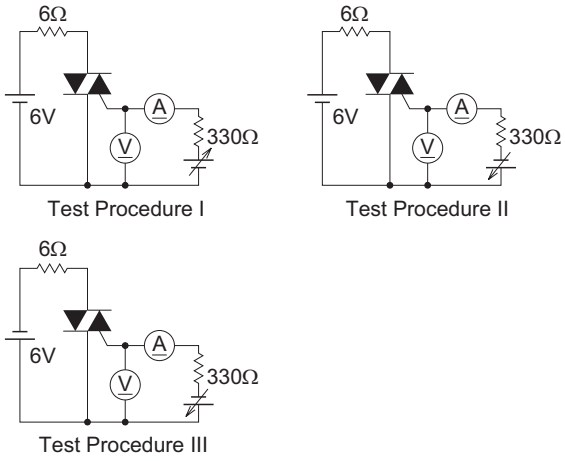

Commutation Characteristics




Gate Trigger Current vs.
Gate Current Pulse Width



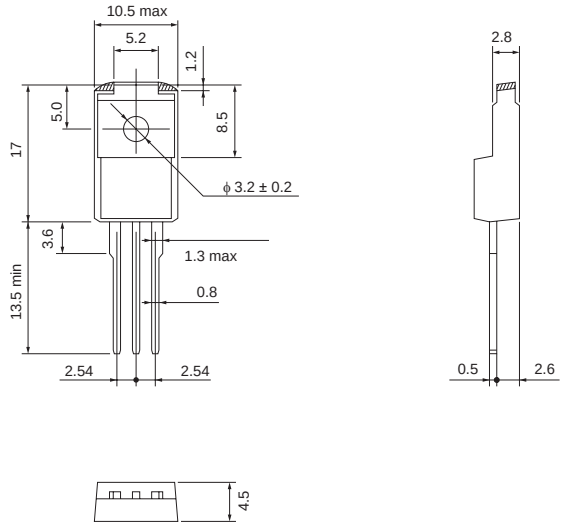
Gate Trigger Characteristics Test Circuits

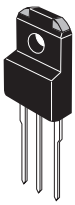


## Package Dimensions

**TO-220F**

| EIAJ Package Code | JEDEC Code | Mass (g) (reference value) | Lead Material |
|---|---|---|---|
| Conforms | — | 2.0 | Cu alloy |



| Symbol | Dimension in Millimeters | | |
|---|---|---|---|
| | Min | Typ | Max |
| A | | | |
| $A_1$ | | | |
| $A_2$ | | | |
| b | | | |
| D | | | |
| E | | | |
| e | | | |
| x | | | |
| y | | | |
| $y_1$ | | | |
| ZD | | | |
| ZE | | | |

Note 1) The dimensional figures indicate representative values unless otherwise the tolerance is specified.

## Order Code

| Lead form | Standard packing | Quantity | Standard order code | Standard order code example |
|---|---|---|---|---|
| Straight type | Vinyl sack | 100 | Type name +A | BCR8PM-12LA |
| Lead form | Plastic Magazine (Tube) | 50 | Type name +A – Lead forming code | BCR8PM-12LA-A8 |

Note : Please confirm the specification about the shipping in detail.

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