

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## BCR25RM-12LB

## Triac

Medium Power Use

REJ03G1715-0100

Rev.1.00

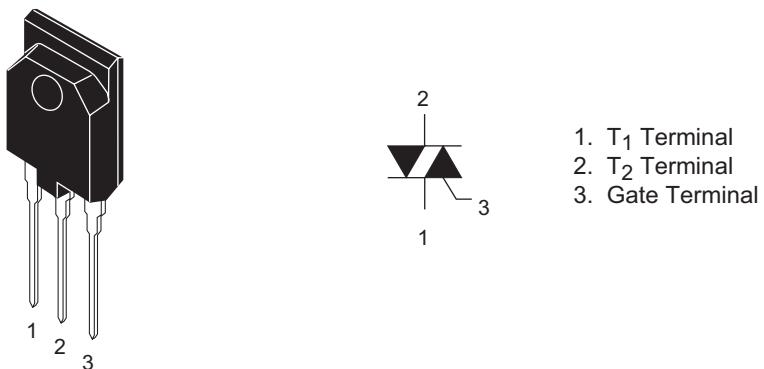
Jul 10, 2008

## Features

- $I_T(\text{RMS})$  : 25 A
- $V_{\text{DRM}}$ : 600 V
- $I_{\text{FGTI}}, I_{\text{RGTI}}, I_{\text{RGTH}}$ : 50 mA
- $V_{\text{iso}}$ : 2000 V
- The product guaranteed maximum junction temperature of 150°C
- Insulated Type
- Planar Type

## Outline

RENESAS Package code: PRSS0003ZA-A  
(Package name: TO-3PFM)



## Applications

Contactless AC switch, electric heater control, light dimmer, on/off and speed control of small induction motor, on/off control of copier lamp

## Maximum Ratings

| Parameter  | Symbol           | Voltage class |  | Unit |
|--|------------------|---------------|--|------|
|  |                  | 12            |  |      |
| Repetitive peak off-state voltage <sup>Note1</sup>     | $V_{\text{DRM}}$ | 600           |  | V    |
| Non-repetitive peak off-state voltage <sup>Note1</sup> | $V_{\text{DSM}}$ | 720           |  | V    |

Notes: 1. Gate open.

| Parameter                      | Symbol      | Ratings     | Unit                 | Conditions   |
|--------------------------------|-------------|-------------|----------------------|--|
| RMS on-state current           | $I_T$ (RMS) | 25          | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 96^\circ\text{C}$   |
| Surge on-state current         | $I_{TSM}$   | 250         | A                    | 50 Hz sinewave 1 full cycle, peak value, non-repetitive                          |
| $I^2t$ for fusion              | $I^2t$      | 313         | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half wave 50 Hz, 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           | $T_j$       | -40 to +150 | $^\circ\text{C}$     |  |
| Storage temperature            | $T_{stg}$   | -40 to +150 | $^\circ\text{C}$     |  |
| Mass                           | —           | 5.2         | g                    | Typical value  |
| Isolation voltage              | $V_{iso}$   | 2000        | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case |

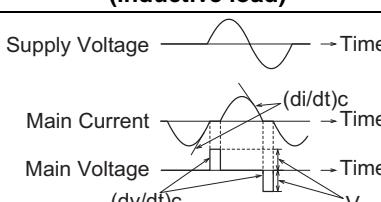
## Electrical Characteristics

| Parameter   | Symbol        | Min.                 | Typ. | Max.    | Unit                   | Test conditions   |
|---|---------------|----------------------|------|---------|------------------------|---|
| Repetitive peak off-state current                                       | $I_{DRM}$     | —                    | —    | 3.0/5.0 | mA                     | $T_j = 125^\circ\text{C} / 150^\circ\text{C}$ , $V_{DRM}$ applied             |
| On-state voltage  | $V_{TM}$      | —                    | —    | 1.5     | V                      | $T_c = 25^\circ\text{C}$ , $I_{TM} = 40$ A, instantaneous measurement         |
| Gate trigger voltage <sup>Note2</sup>                                   | I             | $V_{FGTI}$           | —    | —       | V                      | $T_j = 25^\circ\text{C}$ , $V_D = 6$ V, $R_L = 6 \Omega$ , $R_G = 330 \Omega$ |
|   | II            | $V_{RGTI}$           | —    | —       | V                      |   |
|   | III           | $V_{RGTI\text{III}}$ | —    | —       | V                      |   |
| Gate trigger current <sup>Note2</sup>                                   | I             | $I_{FGTI}$           | —    | —       | mA                     | $T_j = 25^\circ\text{C}$ , $V_D = 6$ V, $R_L = 6 \Omega$ , $R_G = 330 \Omega$ |
|   | II            | $I_{RGTI}$           | —    | —       | mA                     |   |
|   | III           | $I_{RGTI\text{III}}$ | —    | —       | mA                     |   |
| Gate non-trigger voltage  | $V_{GD}$      | 0.2/0.1              | —    | —       | V                      | $T_j = 125^\circ\text{C} / 150^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$           |
| Thermal resistance  | $R_{th(j-c)}$ | —                    | —    | 1.7     | $^\circ\text{C/W}$     | Junction to case <sup>Note3</sup>   |
| Critical-rate of rise of off-state commutation voltage <sup>Note4</sup> | $(dv/dt)c$    | 10/1                 | —    | —       | $\text{V}/\mu\text{s}$ | $T_j = 125^\circ\text{C} / 150^\circ\text{C}$                                 |

Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

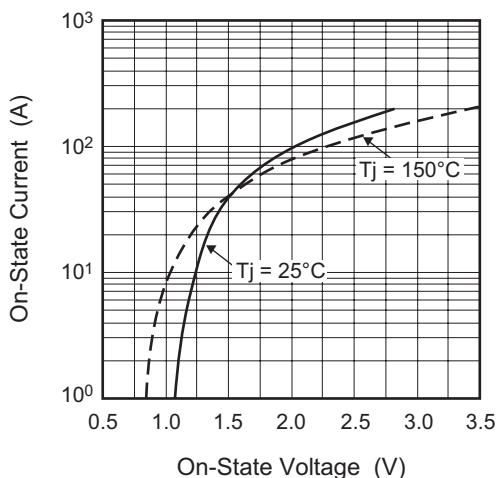
3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .

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

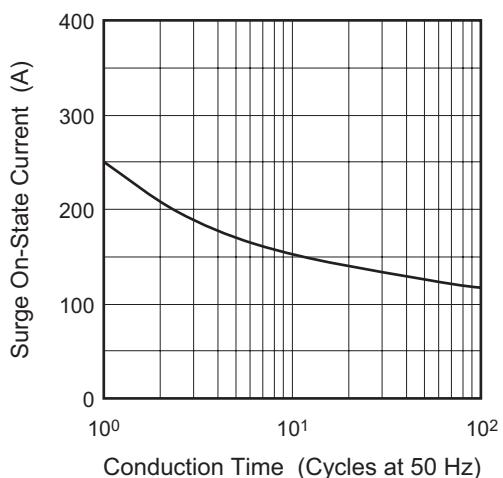
| Test conditions   | Commutating voltage and current waveforms (inductive load)                           |
|---|--|
| <ol style="list-style-type: none"> <li>1. Junction temperature <math>T_j = 125/150^\circ\text{C}</math></li> <li>2. Rate of decay of on-state commuting current <math>(di/dt)c = -13 \text{ A/ms}</math></li> <li>3. Peak off-state voltage <math>V_D = 400</math> V</li> </ol> |  |

## Performance Curves

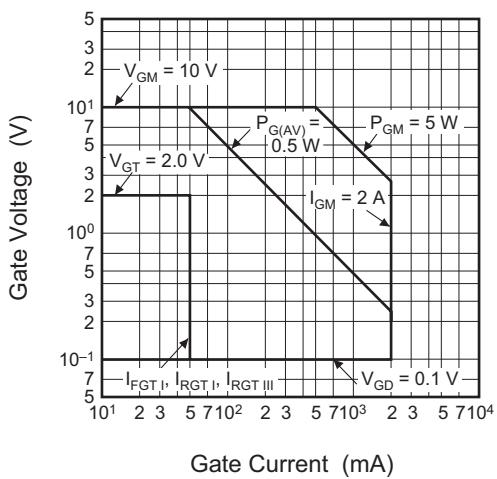
Maximum On-State Characteristics



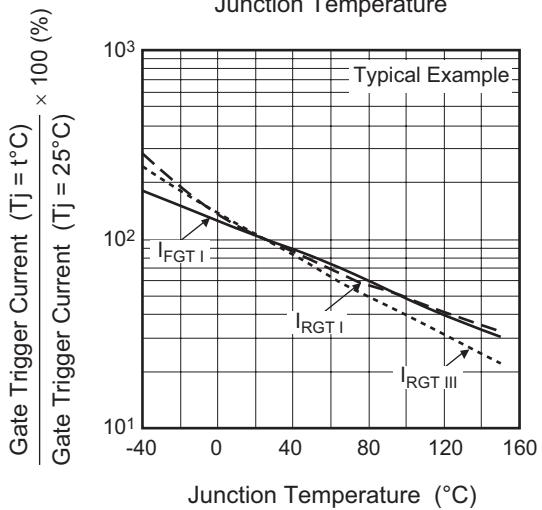
Rated Surge On-State Current



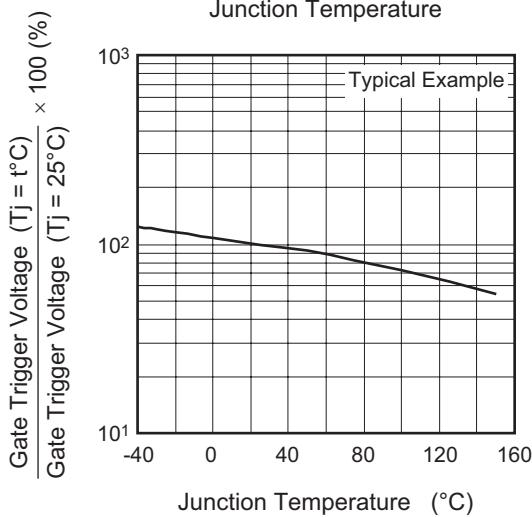
Gate Characteristics (I, II and III)



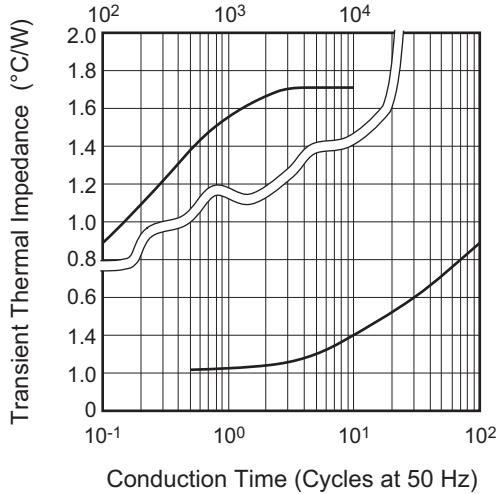
Gate Trigger Current vs. Junction Temperature



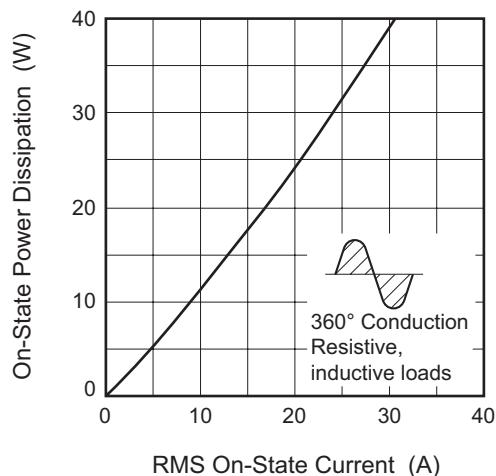
Gate Trigger Voltage vs. Junction Temperature



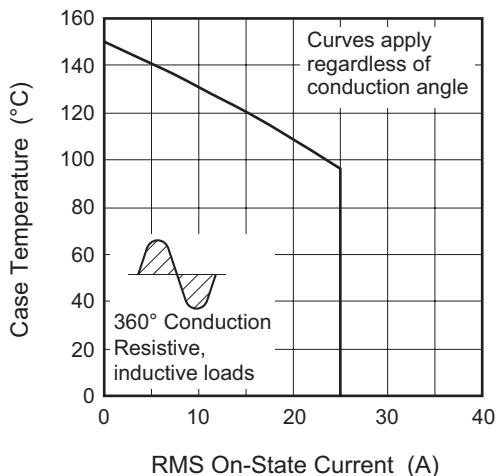
Maximum Transient Thermal Impedance Characteristics (Junction to case)



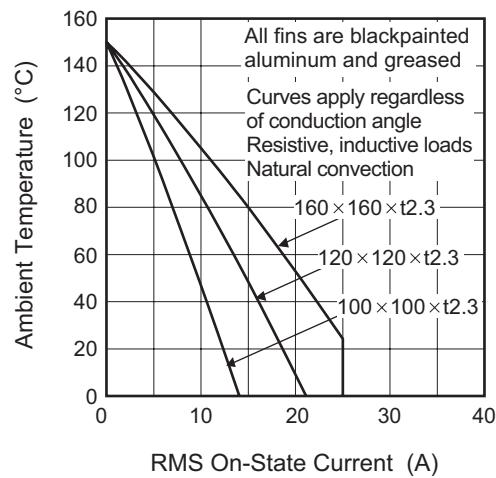
Maximum On-State Power Dissipation



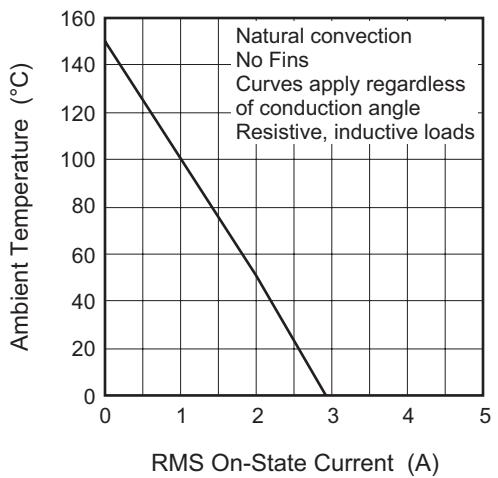
Allowable Case Temperature vs. RMS On-State Current



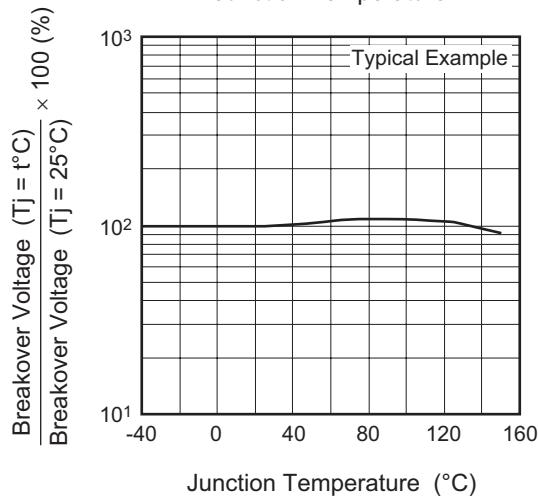
Allowable Ambient Temperature vs. RMS On-State Current



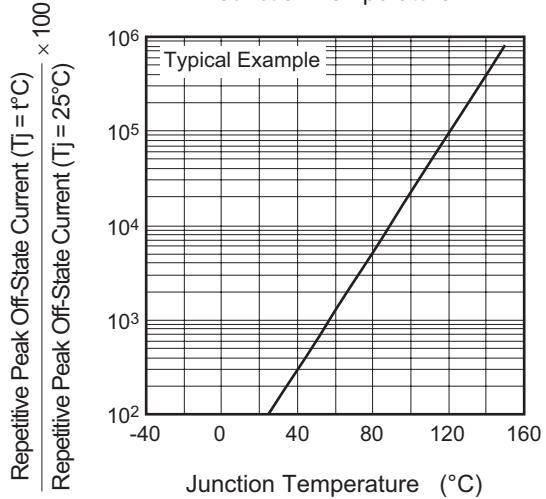
Allowable Ambient Temperature vs. RMS On-State Current

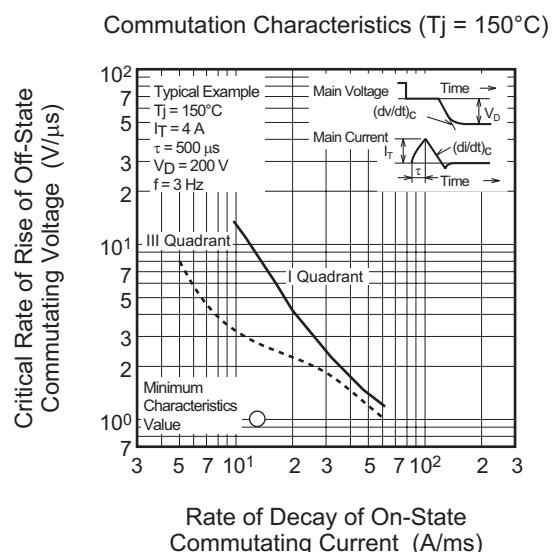
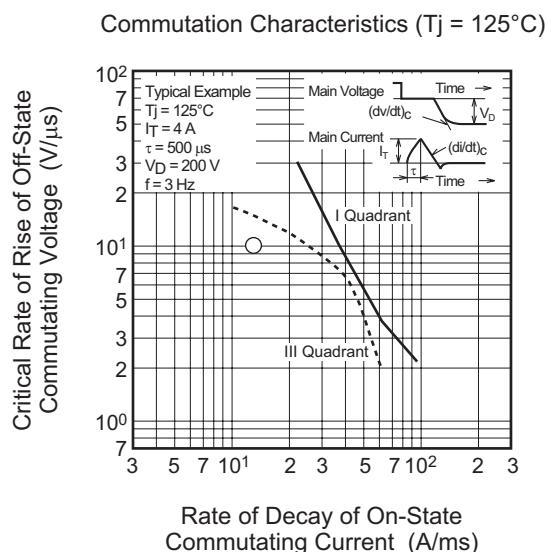
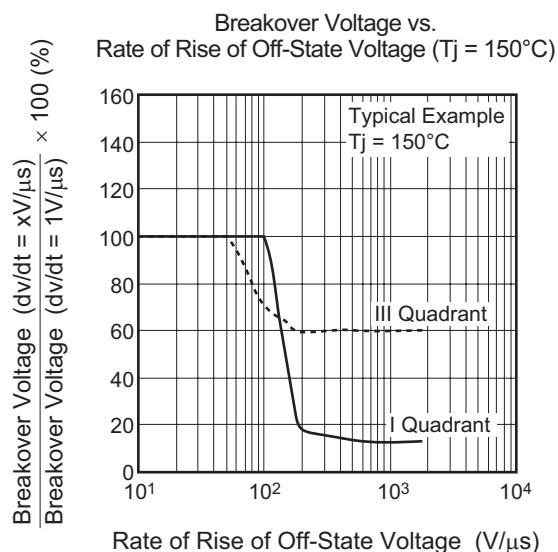
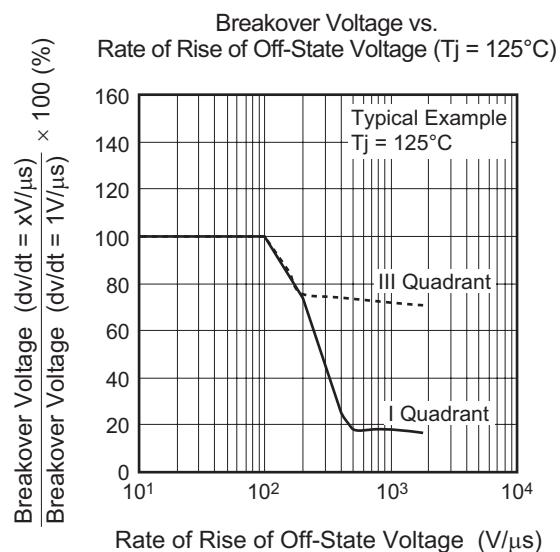
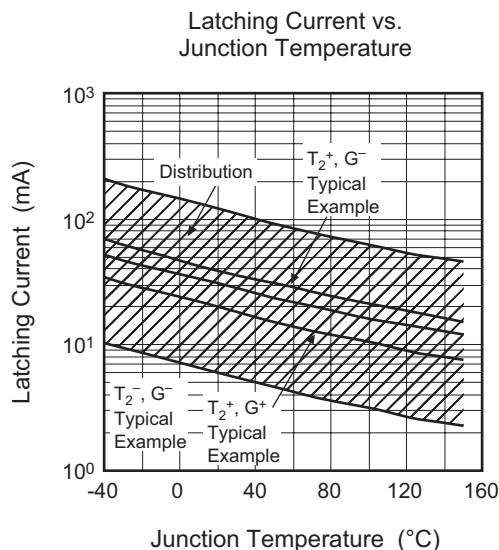
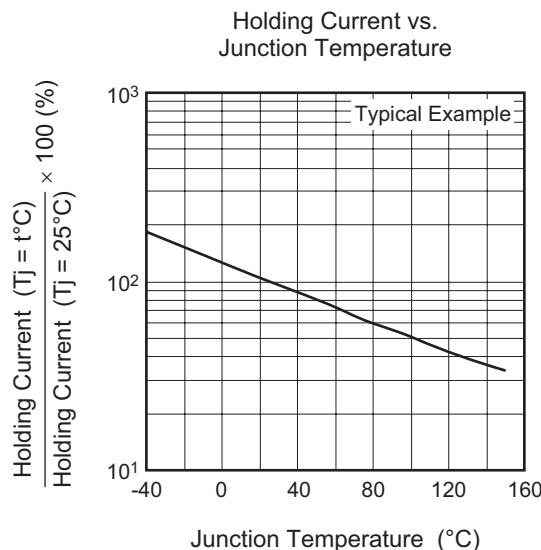


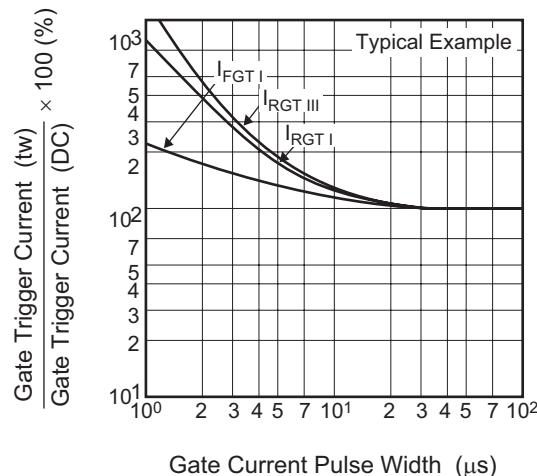
Breakover Voltage vs. Junction Temperature



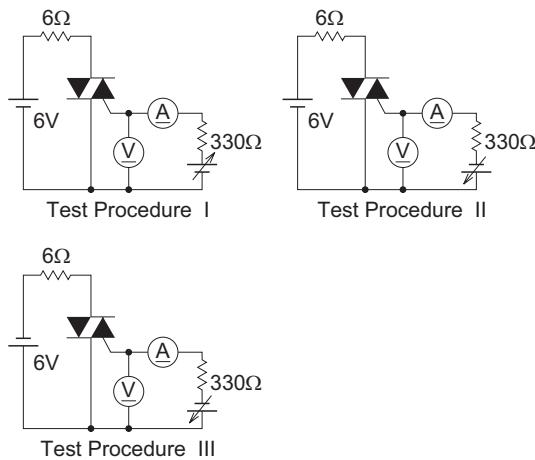
Repetitive Peak Off-State Current vs. Junction Temperature



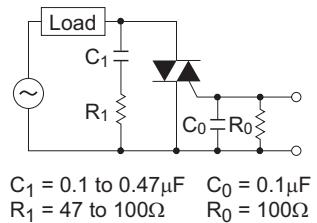


Gate Trigger Current vs.  
Gate Current Pulse Width

Gate Trigger Characteristics Test Circuits



Recommended Circuit Values Around The Triac



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code      | MASS[Typ.] | Unit: mm |
|--------------|--------------------|--------------|--------------------|------------|----------|
| TO-3PBM      | SC-93              | PRSS0003ZA-A | TO-3PBM / TO-3PBMV | 5.2g       |          |
|              |                    |              |                    |            |          |

## Order Code

| Lead form     | Standard packing | Quantity | Standard order code | Standard order code example |
|---------------|------------------|----------|---------------------|-----------------------------|
| Straight type | Magazine (Tube)  | 30       | Type name           | BCR25RM-12LB                |

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

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