

To our customers,

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

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# BCR3AS-12B

## Triac

Low Power Use

(The product guaranteed maximum junction temperature of 150°C)

REJ03G0450-0400

Rev.4.00

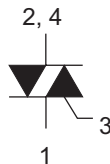
Dec 19, 2008

### Features

- $I_{T(RMS)}$  : 3 A
- $V_{DRM}$  : 600 V
- $I_{FGT I}$ ,  $I_{RGT I}$ ,  $I_{RGT III}$  : 15 mA
- Non-Insulated Type
- Planar Passivation Type

### Outline

RENESAS Package code: PRSS0004ZG-A  
(Package name: MP-3A)



1. T<sub>1</sub> Terminal
2. T<sub>2</sub> Terminal
3. Gate Terminal
4. T<sub>2</sub> Terminal

### Applications

Hybrid IC, solid state relay, switching mode power supply, light dimmer, electric fan, electric blanket, control of household equipment such as washing machine, and 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. Otherwise, general triacs with the maximum junction temperature of 125°C will be supplied.

### Maximum Ratings

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

## BCR3AS-12B (The product guaranteed maximum junction temperature of 150°C)

| Parameter                      | Symbol       | Ratings      | Unit                 | Conditions   |
|--------------------------------|--------------|--------------|----------------------|--|
| RMS on-state current           | $I_{T(RMS)}$ | 3            | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 133^\circ\text{C}$ <sup>Note3</sup> |
| Surge on-state current         | $I_{TSM}$    | 30           | A                    | 60Hz sinewave 1 full cycle, peak value, non-repetitive   |
| $I^2t$ for fusing              | $I^2t$       | 3.7          | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current                         |
| Peak gate power dissipation    | $P_{GM}$     | 3            | W                    |  |
| Average gate power dissipation | $P_{G(AV)}$  | 0.3          | W                    |  |
| Peak gate voltage              | $V_{GM}$     | 6            | V                    |  |
| Peak gate current              | $I_{GM}$     | 0.3          | A                    |  |
| Junction temperature           | $T_j$        | - 40 to +150 | °C                   |  |
| Storage temperature            | $T_{stg}$    | - 40 to +150 | °C                   |  |
| Mass                           | —            | 0.26         | g                    | Typical value  |

Notes: 1. Gate open.

## Electrical Characteristics

| Parameter   | Symbol        | Min.           | Typ. | Max. | Unit             | Test conditions  |   |
|---|---------------|----------------|------|------|------------------|--|---|
| Repetitive peak off-state current                                       | $I_{DRM}$     | —              | —    | 2.0  | mA               | $T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied                                  |   |
| On-state voltage  | $V_{TM}$      | —              | —    | 1.7  | V                | $T_c = 25^\circ\text{C}$ , $I_{TM} = 4.5\text{ A}$ , Instantaneous measurement |   |
| Gate trigger voltage <sup>Note2</sup>                                   | I             | $V_{FGT\ I}$   | —    | —    | 1.5              | V  | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|   | II            | $V_{RGT\ I}$   | —    | —    | 1.5              | V  |   |
|   | III           | $V_{RGT\ III}$ | —    | —    | 1.5              | V  |   |
| Gate trigger current <sup>Note2</sup>                                   | I             | $I_{FGT\ I}$   | —    | —    | 15               | mA   | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|   | II            | $I_{RGT\ I}$   | —    | —    | 15               | mA   |   |
|   | III           | $I_{RGT\ III}$ | —    | —    | 15               | 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  | $R_{th(j-c)}$ | —              | —    | 3.8  | °C/W             | Junction to case <sup>Note3</sup>  |   |
| Critical-rate of rise of off-state commutating voltage <sup>Note4</sup> | $(dv/dt)_c$   | 5/1            | —    | —    | V/ $\mu\text{s}$ | $T_j = 125^\circ\text{C}/150^\circ\text{C}$                                    |   |

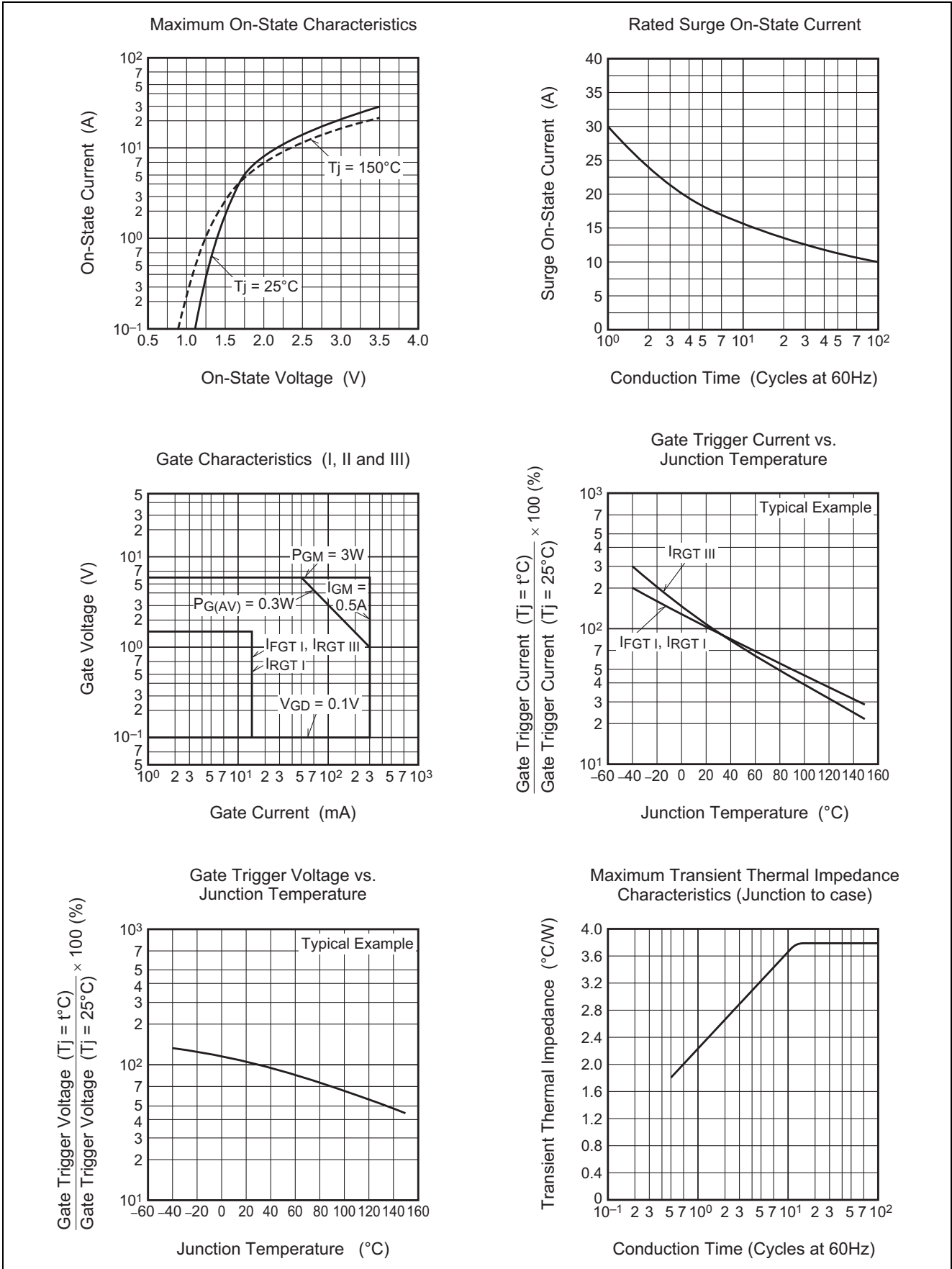
Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

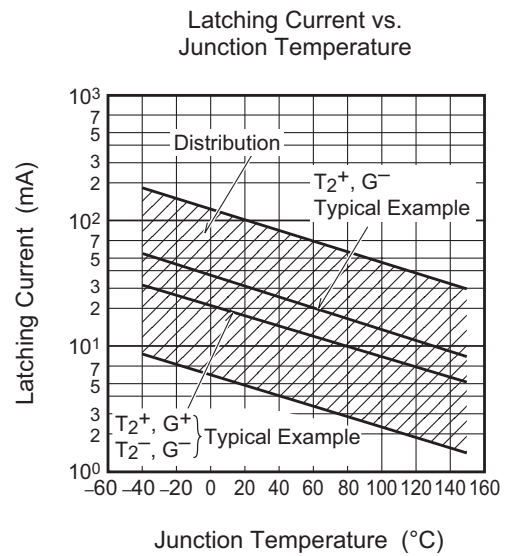
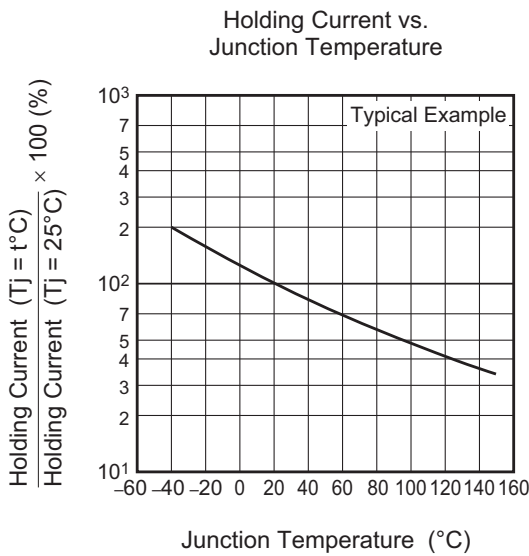
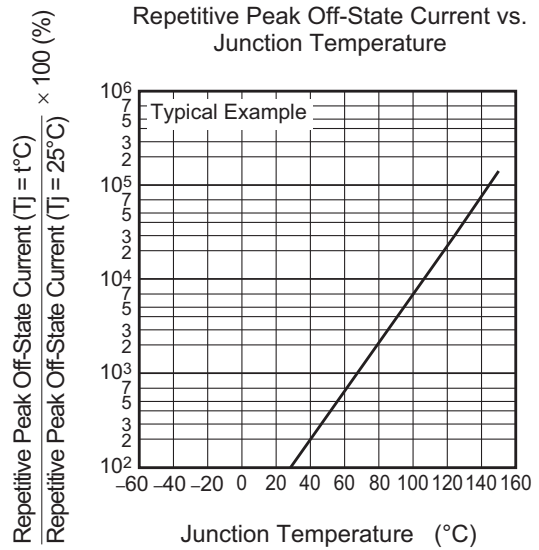
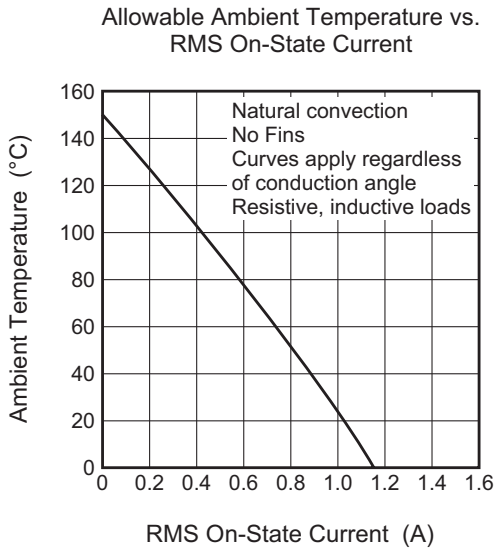
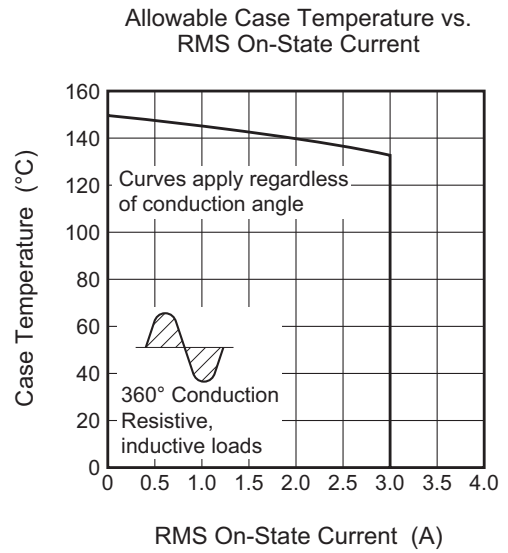
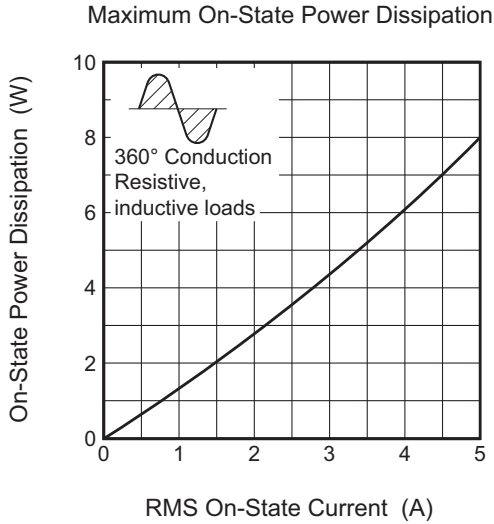
3. Case temperature is measured on the  $T_2$  tab.

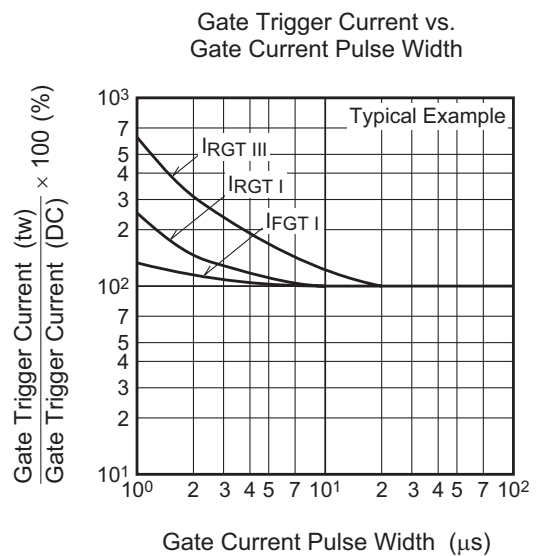
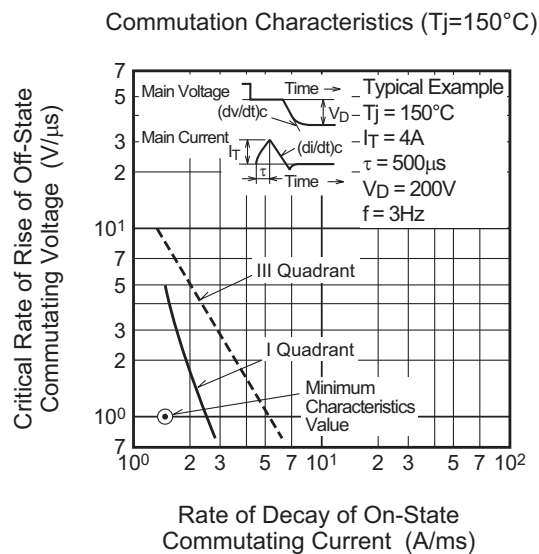
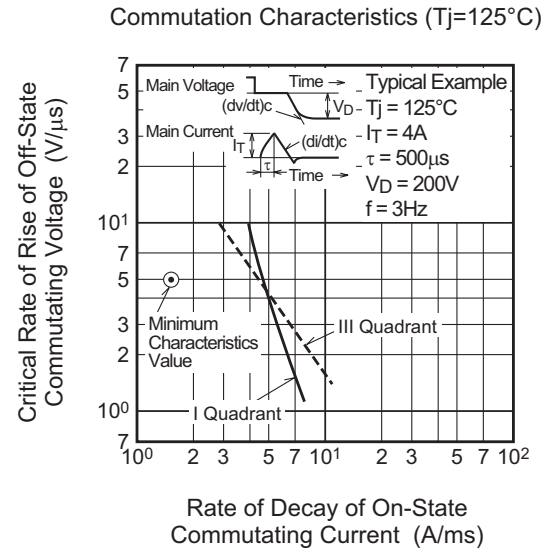
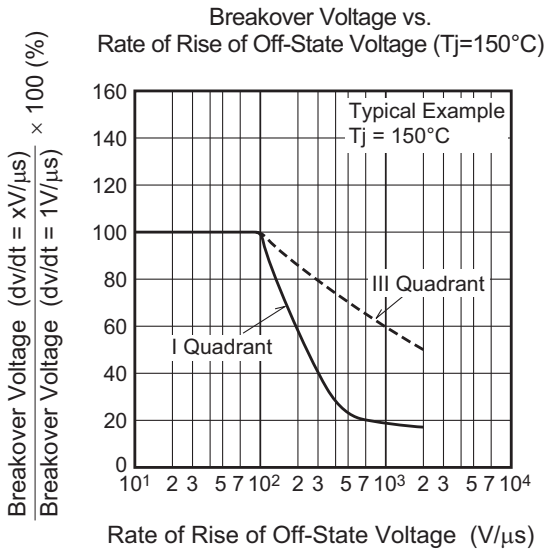
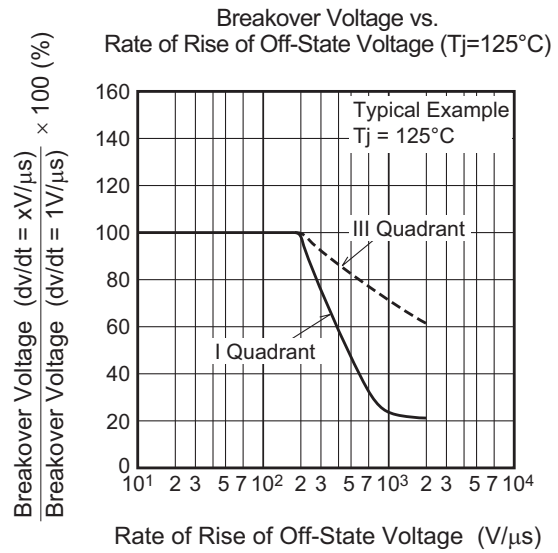
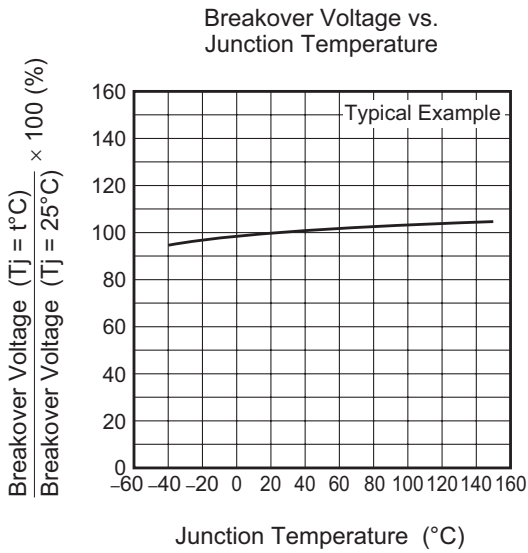
4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>$T_j = 125^\circ\text{C}/150^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c = -1.5\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$ |  |

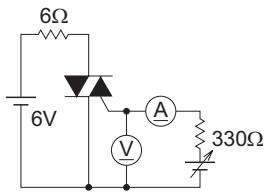
Performance Curves



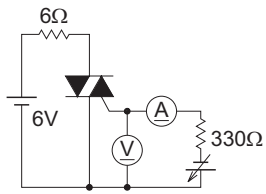




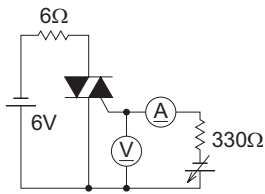
Gate Trigger Characteristics Test Circuits



Test Procedure I

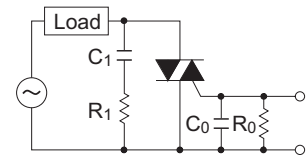


Test Procedure II



Test Procedure III

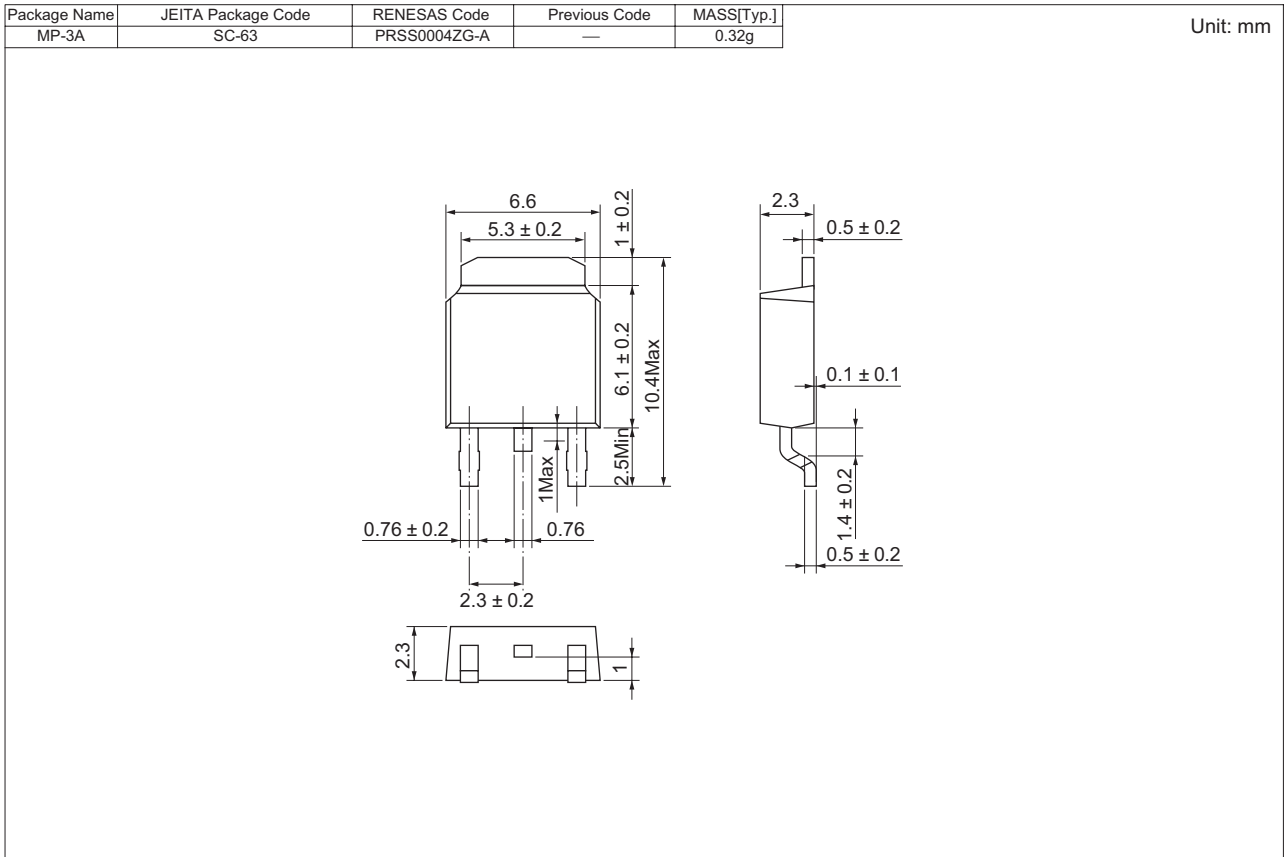
Recommended Circuit Values Around The Triac



$C_1 = 0.1 \text{ to } 0.47 \mu\text{F}$      $C_0 = 0.1 \mu\text{F}$   
 $R_1 = 47 \text{ to } 100 \Omega$      $R_0 = 100 \Omega$



### Package Dimensions



### Order Code

| Lead form            | Standard packing        | Quantity | Standard order code                  | Standard order code example |
|----------------------|-------------------------|----------|--------------------------------------|-----------------------------|
| Surface-mounted type | Taping                  | 3000     | Type name – T +Direction (1 or 2) +3 | BCR3AS-12B-T13              |
| Surface-mounted type | Plastic Magazine (Tube) | 75       | Type name                            | BCR3AS-12B                  |

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

Notes:

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