

# BCR3PM-12LA

Triac

Low Power Use

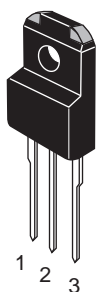
R07DS0097EJ0300  
 (Previous: REJ03G0301-0200)  
 Rev.3.00  
 Sep 13, 2010

## Features

- $I_{T(RMS)}$  : 3 A
- $V_{DRM}$  : 600 V
- $I_{FGT}$ ,  $I_{RGT}$ ,  $I_{RGT III}$  : 20 mA (10 mA)<sup>Note5</sup>
- $V_{ISO}$  : 2000 V
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904

## Outline

RENESAS Package code: PRSS0003AA-A  
 (Package name: TO-220F)



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

## Applications

Contactless AC switch, light dimmer, electric blanket, control of household equipment such as electric fan, solenoid driver, small motor control, and other general purpose control applications

## 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    |

| Parameter                      | Symbol      | Ratings      | Unit                 | Conditions   |
|--------------------------------|-------------|--------------|----------------------|--|
| RMS on-state current           | $I_T (RMS)$ | 3.0          | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 107^\circ\text{C}$    |
| 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              | $I_{GM}$    | 0.5          | A                    |  |
| Junction temperature           | $T_j$       | - 40 to +125 | $^\circ\text{C}$     |  |
| Storage temperature            | $T_{stg}$   | - 40 to +125 | $^\circ\text{C}$     |  |
| Mass                           | —           | 2.0          | g                    | Typical value  |
| Isolation voltage              | Viso        | 2000         | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1\text{-}T_2\text{-}G$ 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                     | $T_j = 125^\circ\text{C}$ , $V_{DRM}$ applied   |
| On-state voltage  | $V_{TM}$      | —            | —    | 1.5  | V                      | $T_c = 25^\circ\text{C}$ , $I_{TM} = 4.5\text{ A}$ , Instantaneous measurement          |
| Gate trigger voltage <sup>Note2</sup>                                   | I             | $V_{FGTI}$   | —    | —    | 1.5                    | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|   | II            | $V_{RGTI}$   | —    | —    | 1.5                    |   |
|   | III           | $V_{RGTIII}$ | —    | —    | 1.5                    |   |
| Gate trigger current <sup>Note2</sup>                                   | I             | $I_{FGTI}$   | —    | —    | 20 <sup>Note5</sup>    | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|   | II            | $I_{RGTI}$   | —    | —    | 20 <sup>Note5</sup>    |   |
|   | III           | $I_{RGTIII}$ | —    | —    | 20 <sup>Note5</sup>    |   |
| Gate non-trigger voltage  | $V_{GD}$      | 0.2          | —    | —    | V                      | $T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$   |
| Thermal resistance  | $R_{th(j-c)}$ | —            | —    | 4.5  | $^\circ\text{C/W}$     | Junction to case <sup>Note3</sup>   |
| Critical-rate of rise of off-state commutating voltage <sup>Note4</sup> | $(dv/dt)_c$   | 5            | —    | —    | $\text{V}/\mu\text{s}$ | $T_j = 125^\circ\text{C}$   |

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

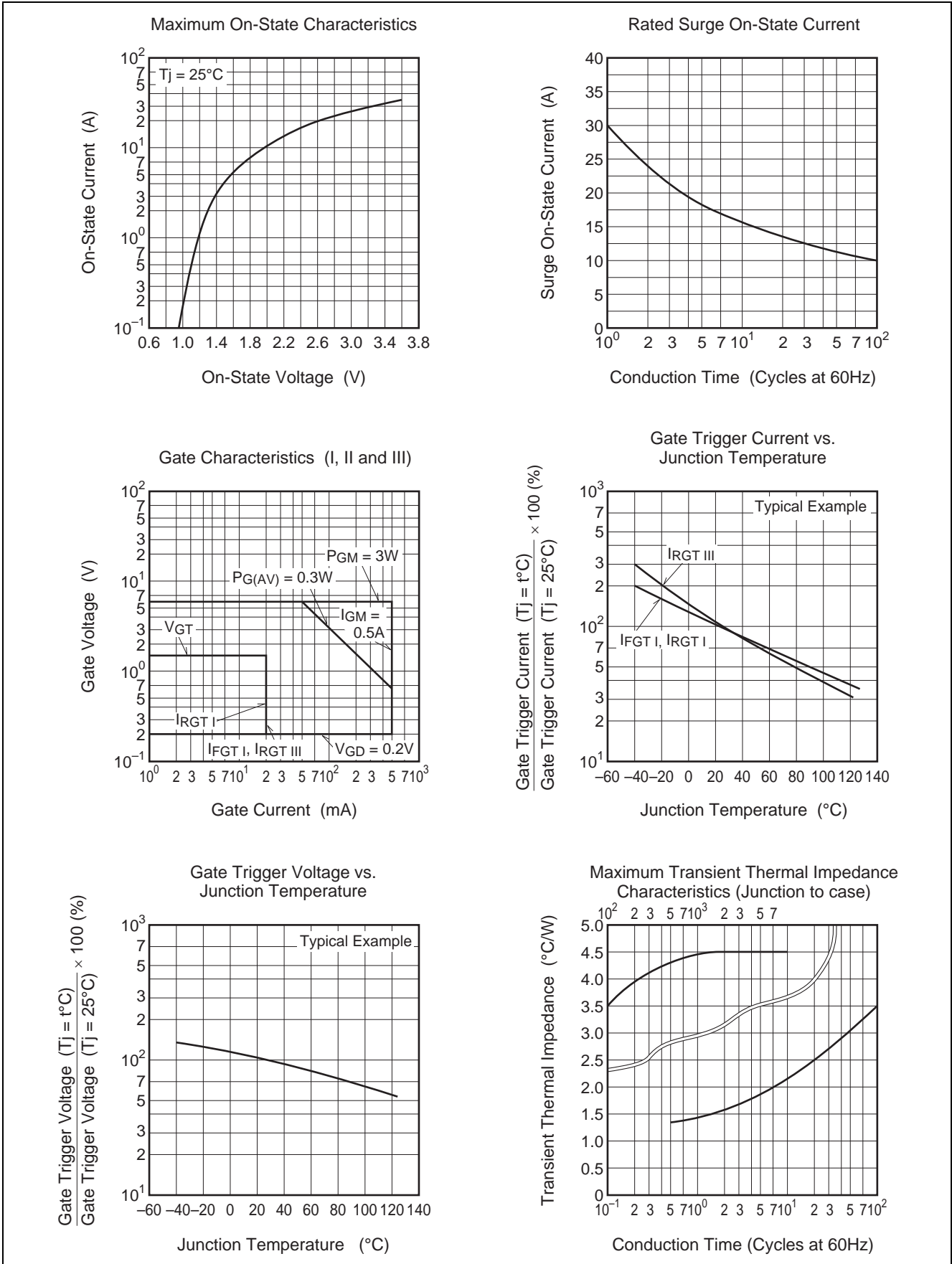
3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .

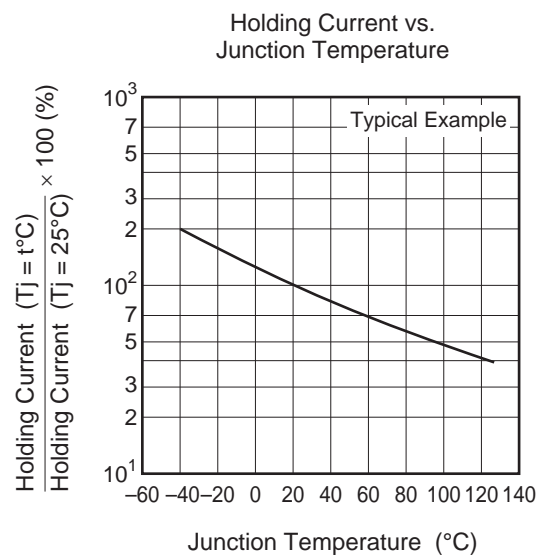
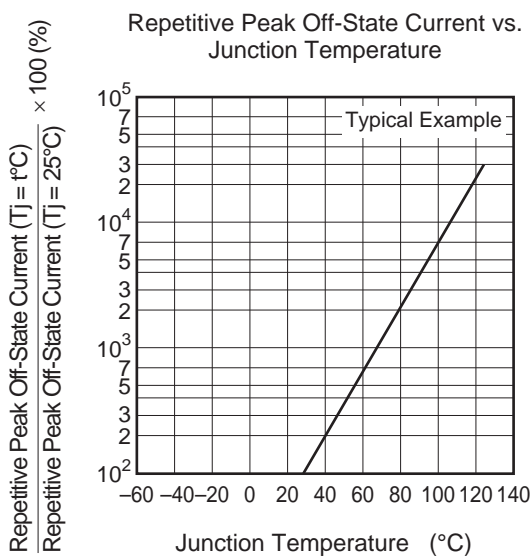
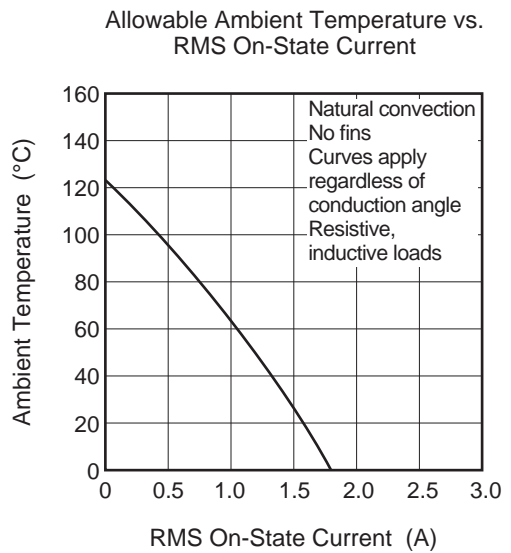
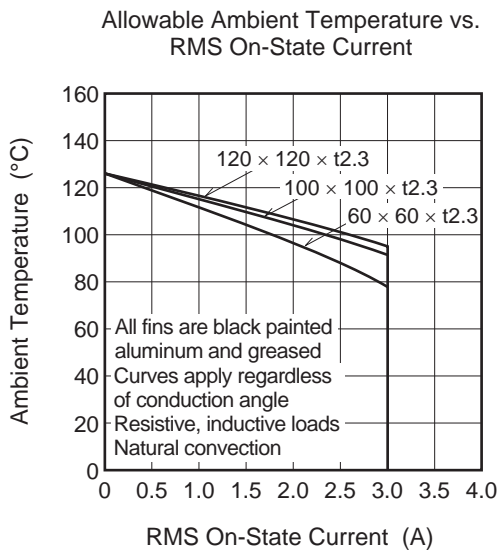
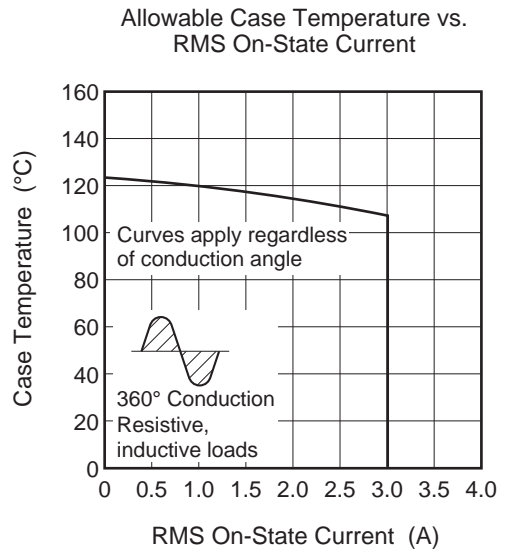
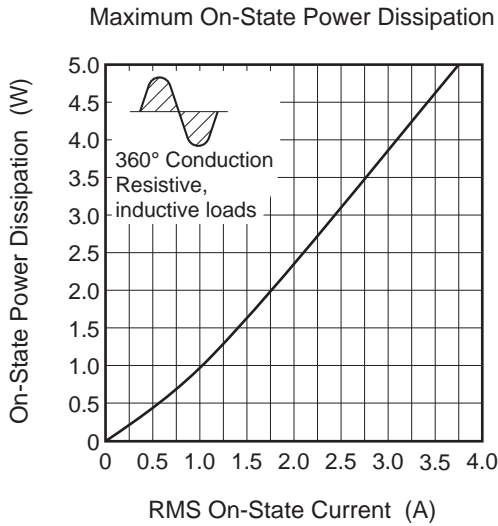
4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

5. High sensitivity ( $I_{GT} \leq 10\text{ mA}$ ) is also available. ( $I_{GT}$  item: 1)

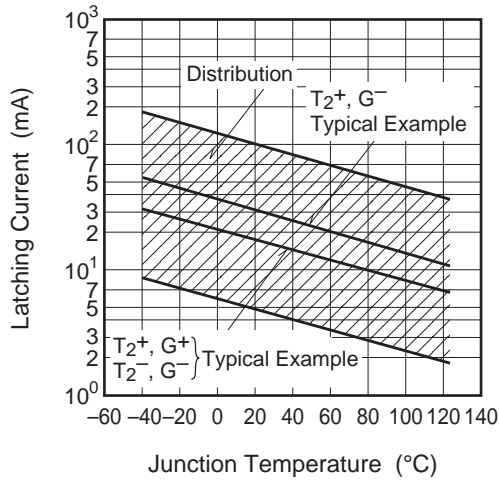
| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>$T_j = 125^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c = -1.5\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$ |  |

Performance Curves

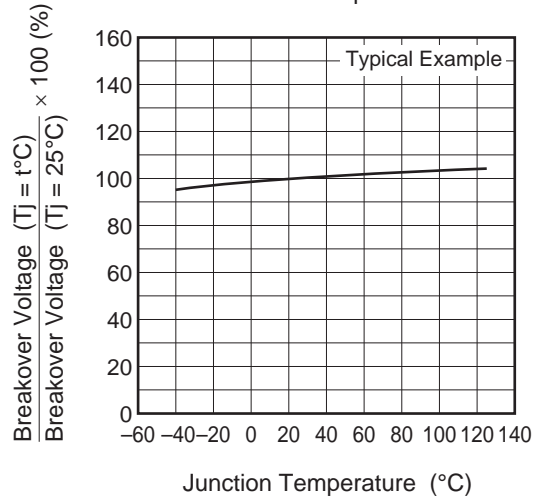




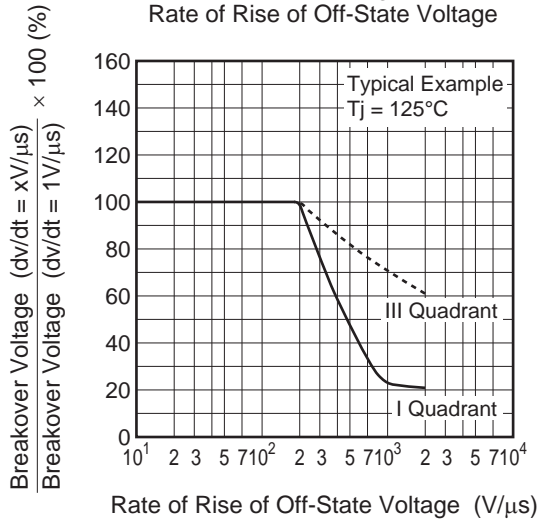
Latching Current vs. Junction Temperature



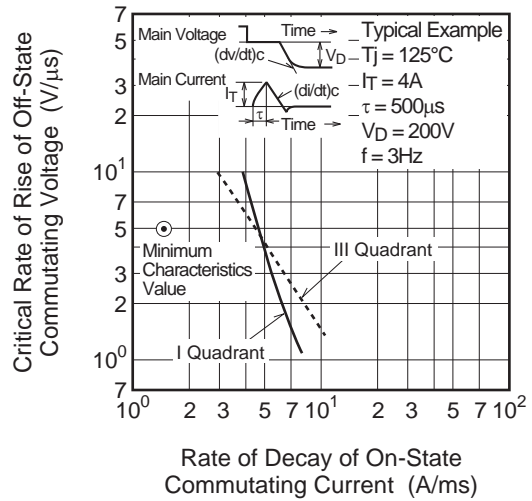
Breakover Voltage vs. Junction Temperature



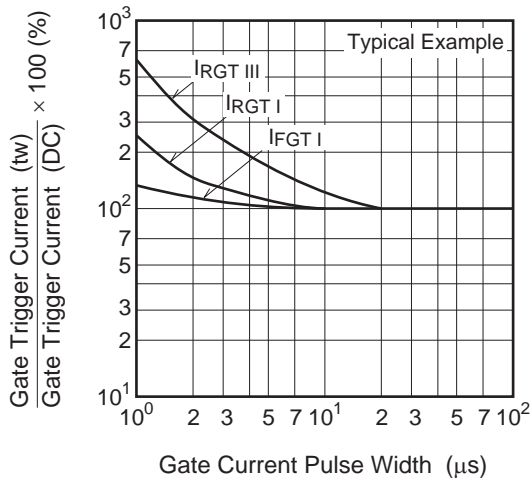
Breakover Voltage vs. Rate of Rise of Off-State Voltage



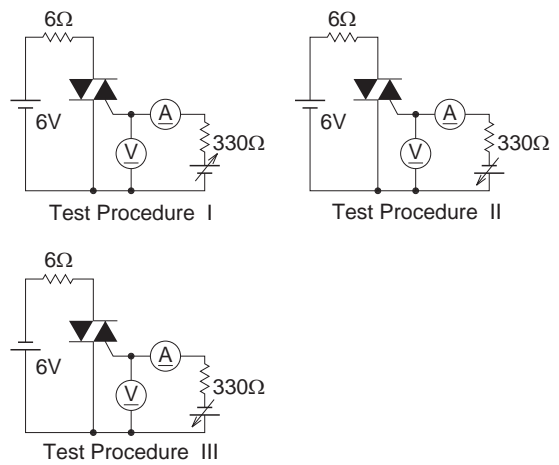
Commutation Characteristics



Gate Trigger Current vs. Gate Current Pulse Width



Gate Trigger Characteristics Test Circuits



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
|--------------|--------------------|--------------|---------------|------------|
| TO-220F      | SC-67              | PRSS0003AA-A | —             | 2.0g       |

Unit: mm

The technical drawing illustrates the dimensions of the BCR3PM-12LA package. The top view shows a square body with a width of 10.5Max and a height of 17. The body has a diameter of 5.2 and a thickness of 1.2. The distance from the top edge to the center of the mounting hole is 5.0. The mounting hole has a diameter of  $\phi 3.2 \pm 0.2$ . The distance from the center of the mounting hole to the bottom edge of the body is 8.5. The bottom view shows a square body with a width of 4.5 and a height of 13.5Min. The distance from the bottom edge to the center of the mounting hole is 3.6. The distance from the center of the mounting hole to the bottom edge of the body is 1.3Max. The distance from the center of the mounting hole to the bottom edge of the body is 0.8. The distance from the center of the mounting hole to the bottom edge of the body is 2.54. The distance from the center of the mounting hole to the bottom edge of the body is 2.54. The side view shows a package with a total height of 2.8 and a width of 0.5. The distance from the bottom edge to the top edge of the body is 2.6.

## Order Code

| Lead form     | Standard packing        | Quantity | Standard order code           | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Vinyl sack              | 100      | Type name                     | BCR3PM-12LA                 |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name – Lead forming code | BCR3PM-12LA-A8              |

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

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