



**THE DATASHEET OF  
BCR3FM-14LB#BB0**



# BCR3FM-14LB

700V - 3A - Triac

Medium Power Use

R07DS0963EJ0101

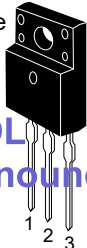
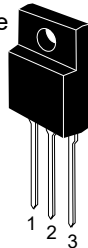
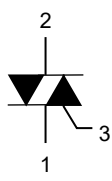
Rev.1.01

Feb. 19, 2019

## Features

- $I_{T(RMS)}$  : 3 A
- $V_{DRM}$  : 800 V ( $T_j = 125^\circ\text{C}$ )
- $T_j$ :  $150^\circ\text{C}$
- $I_{FGTI}$ ,  $I_{RGTI}$ ,  $I_{RGTIII}$ : 30 mA
- Insulated Type
- Planar Passivation Type
- Viso: 2000 V

## Outline

|   |  |   |
|---|--|---|
| RENESAS Package code: PRSS0003AG-A<br>(Package name: TO-220FP)<br>Ordering code<br>#BB0<br> | RENESAS Package code: PRSS0003AP-A<br>(Package name: TO-220FPA)<br>Ordering code<br>#BG0<br> |  |
| EOL announced   |  | 1. T <sub>1</sub> Terminal<br>2. T <sub>2</sub> Terminal<br>3. Gate Terminal        |

## Application

Power supply, motor control, heater control, solenoid control, and other general purpose AC control applications.

## Maximum Ratings

| Parameter  | Symbol    | Voltage class | Unit | Conditions                |
|--|-----------|---------------|------|---------------------------|
|  |           | 14            |      |                           |
| Repetitive peak off-state voltage <sup>Note1</sup>     | $V_{DRM}$ | 800           | V    | $T_j = 125^\circ\text{C}$ |
|  |           | 700           | V    | $T_j = 150^\circ\text{C}$ |
| Non-repetitive peak off-state voltage <sup>Note1</sup> | $V_{DSM}$ | 840           | V    |                           |

| Parameter                          | Symbol       | Ratings     | Unit             | Conditions   |
|------------------------------------|--------------|-------------|------------------|--|
| RMS on-state current               | $I_{T(RMS)}$ | 3           | A                | Commercial frequency, sine full wave 360°conduction, $T_c = 130^\circ\text{C}$             |
| Surge on-state current             | $I_{TSM}$    | 30          | A                | 60 Hz sinewave 1 full cycle, peak value, non-repetitive                                    |
| $I^2t$ for fusion                  | $I^2t$       | 3.7         | A <sup>2</sup> s | Value corresponding to 1 cycle of half wave 60 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 | °C               |  |
| Storage temperature                | $T_{stg}$    | -40 to +150 | °C               |  |
| Isolation voltage <sup>Note6</sup> | $V_{iso}$    | 2000        | V                | $T_a=25^\circ\text{C}$ , AC 1 minute, T <sub>1</sub> • T <sub>2</sub> • 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                     | $T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied  |
| On-state voltage  | $V_{TM}$      | —            | —    | 1.6  | 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                    | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ ,<br>$R_G = 330\ \Omega$ |
|   | II            | $V_{RGTI}$   | —    | —    | 1.5                    |  |
|   | III           | $V_{RGTIII}$ | —    | —    | 1.5                    |  |
| Gate trigger current <sup>Note2</sup>                                   | I             | $I_{FGTI}$   | —    | —    | 30                     | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ ,<br>$R_G = 330\ \Omega$ |
|   | II            | $I_{RGTI}$   | —    | —    | 30                     |  |
|   | III           | $I_{RGTIII}$ | —    | —    | 30                     |  |
| Gate non-trigger voltage  | $V_{GD}$      | 0.2          | —    | —    | V                      | $T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$  |
|   |               | 0.1          | —    | —    | V                      | $T_j = 150^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$  |
| Thermal resistance  | $R_{th(j-c)}$ | —            | —    | 5.2  | $^\circ\text{C/W}$     | Junction to case <sup>Note3</sup>  |
| Critical-rate of rise of off-state commutation voltage <sup>Note4</sup> | $(dv/dt)_c$   | 5            | —    | —    | $\text{V}/\mu\text{s}$ | $T_j = 125^\circ\text{C}$  |
|   |               | 1            | —    | —    | $\text{V}/\mu\text{s}$ | $T_j = 150^\circ\text{C}$  |

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

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

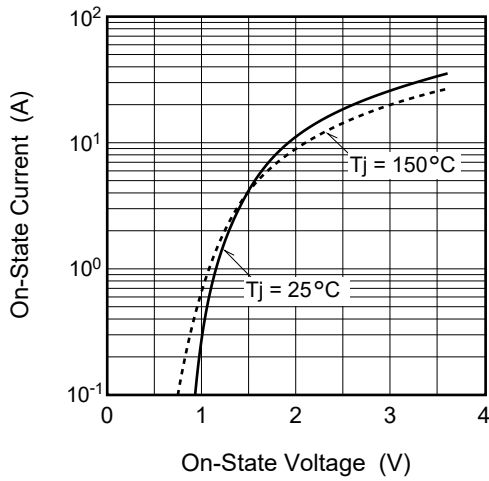
4. Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.

5. Make sure that your finished product containing this device meets your safe isolation requirements.  
For safety, it's advisable that heatsink is electrically floating.

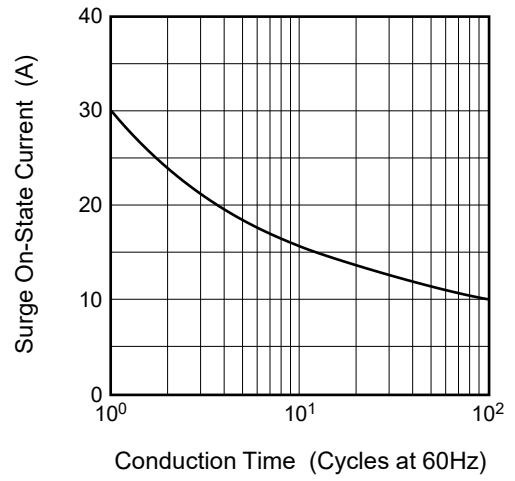
| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>$T_j = 125^\circ\text{C}/150^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c = -1.5\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$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

Performance Curves

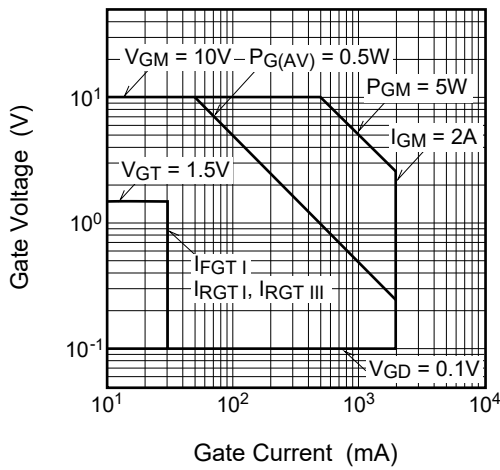
Maximum On-State Characteristics



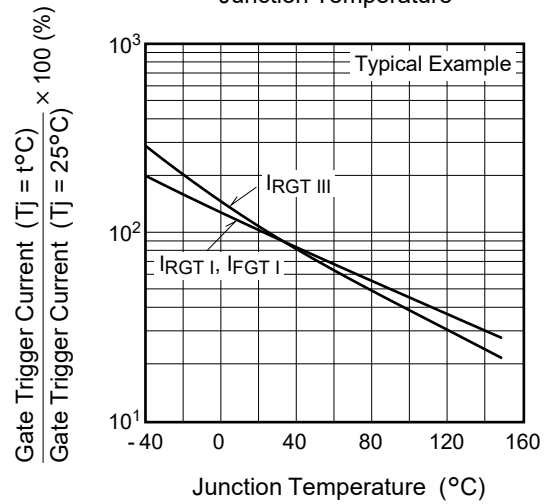
Rated Surge On-State Current



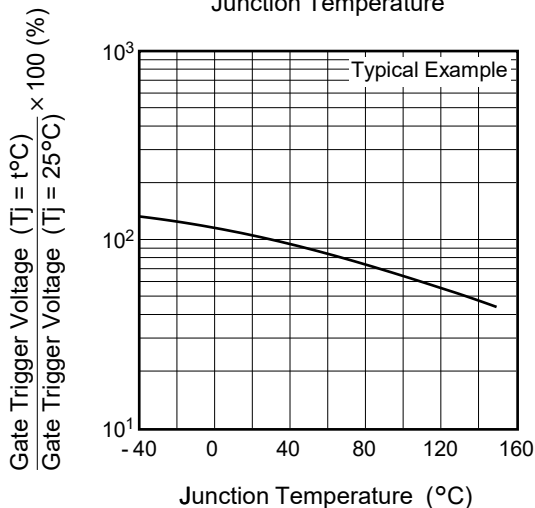
Gate Characteristics (I, II and III)



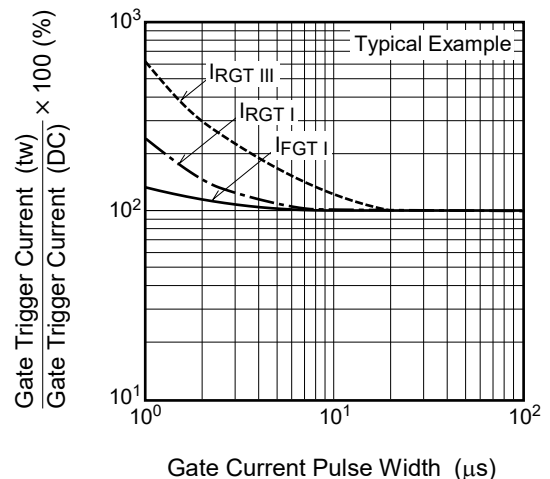
Gate Trigger Current vs. Junction Temperature

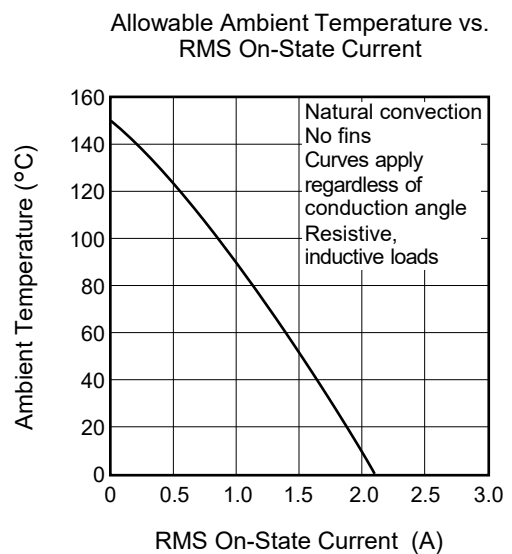
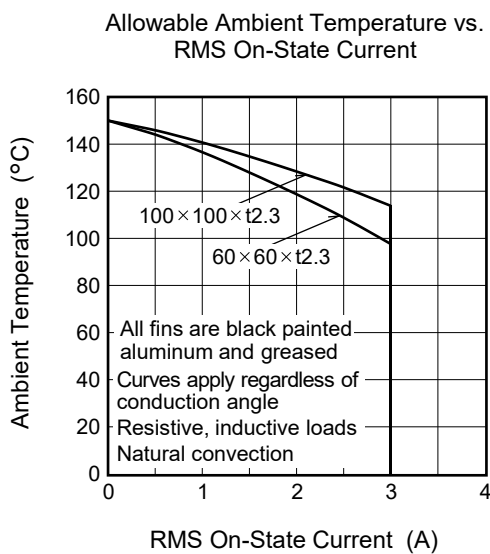
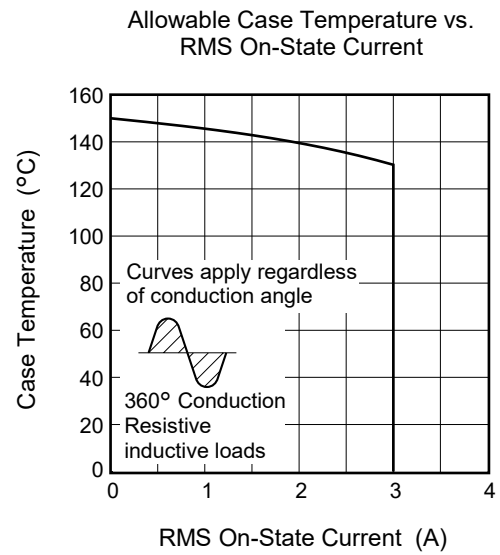
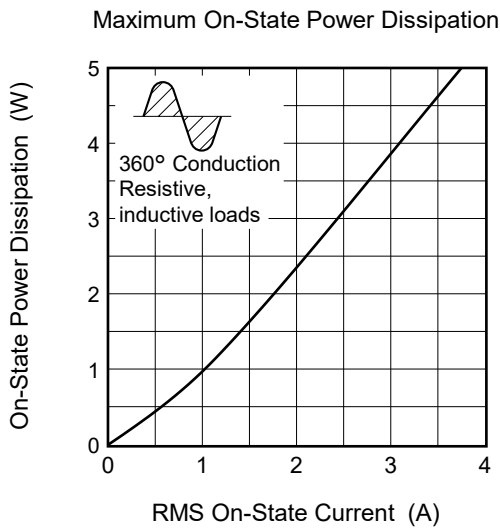
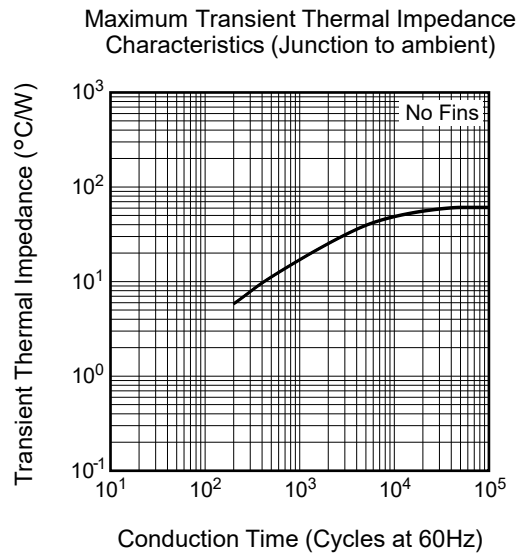
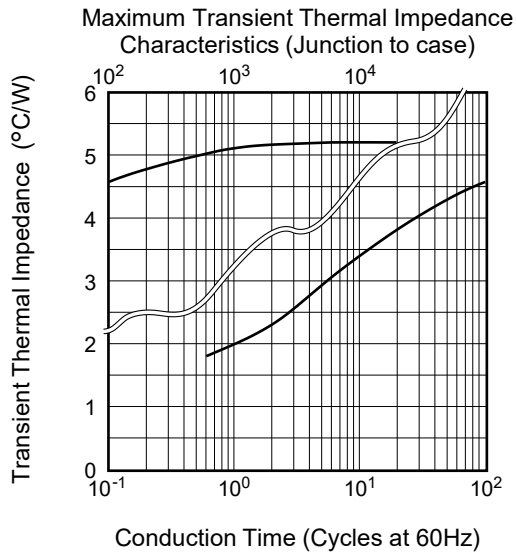


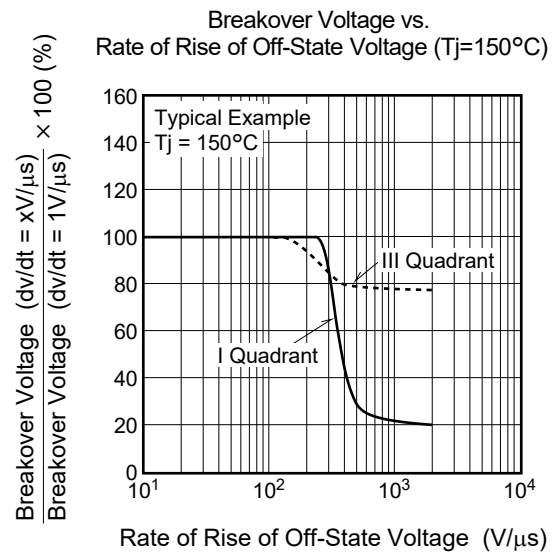
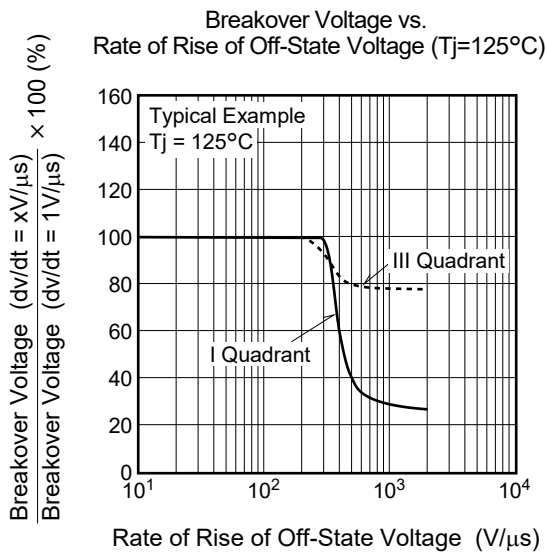
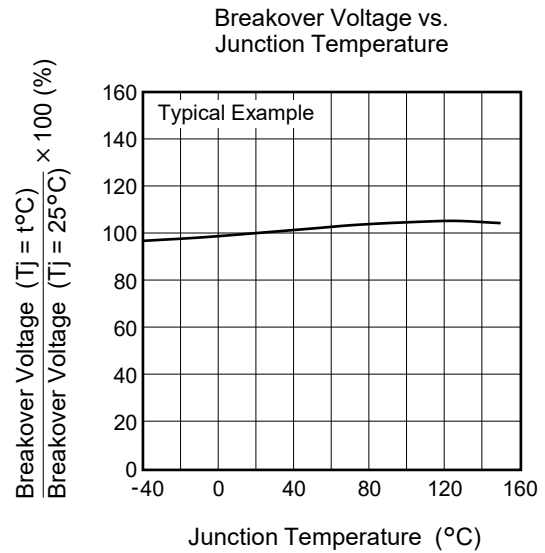
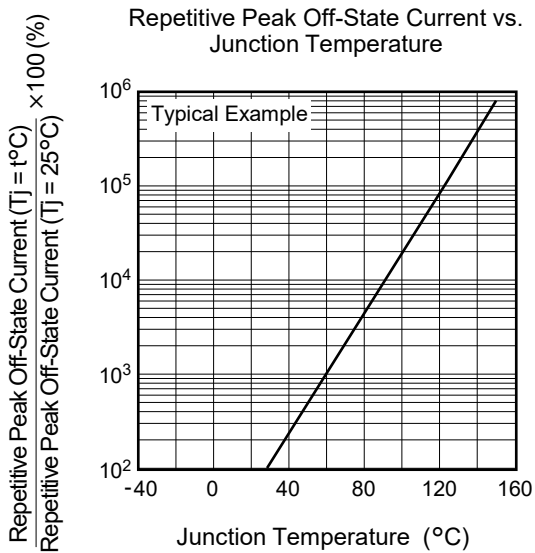
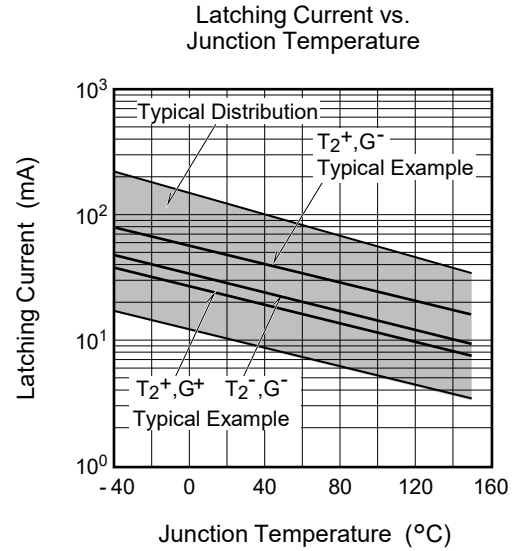
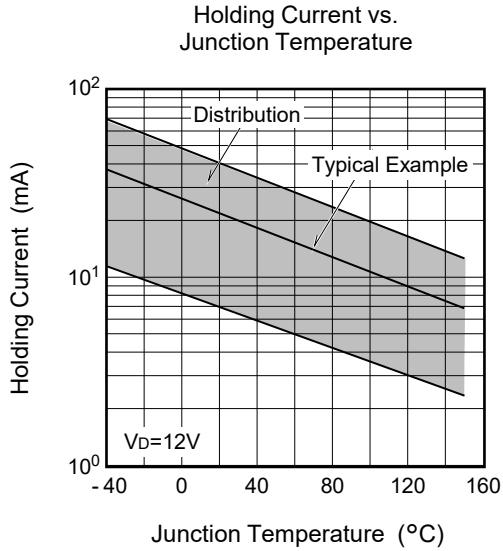
Gate Trigger Voltage vs. Junction Temperature



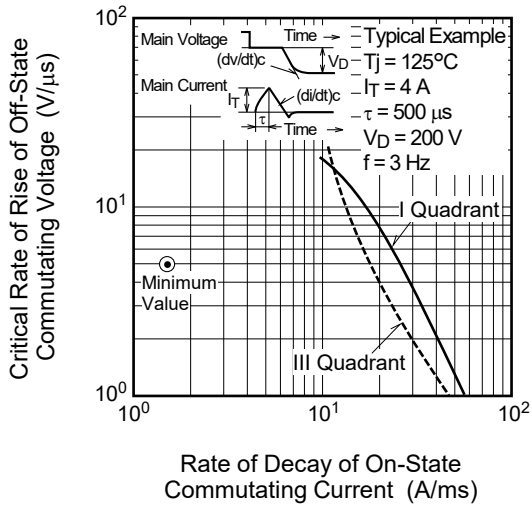
Gate Trigger Current vs. Gate Current Pulse Width



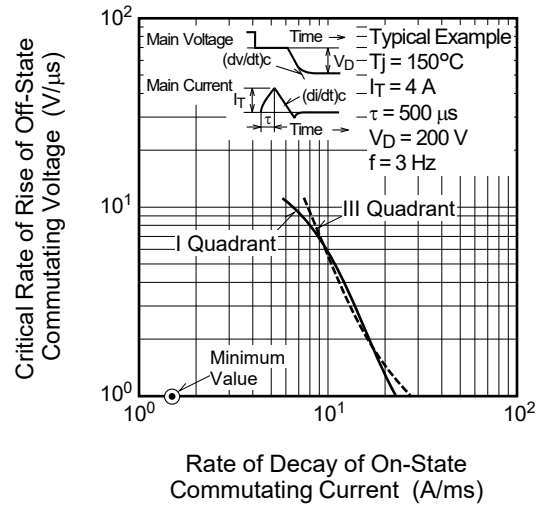




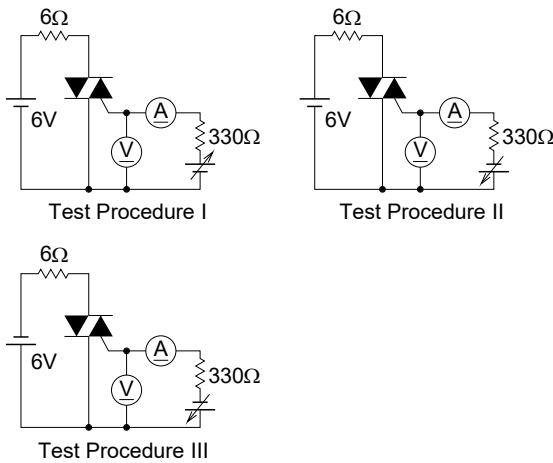
Commutation Characteristics (Tj=125°C)



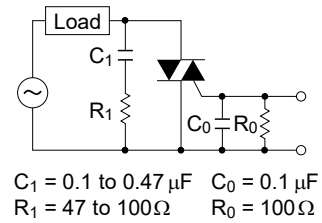
Commutation Characteristics (Tj=150°C)



Gate Trigger Characteristics Test Circuits



Recommended peripheral components for Triac

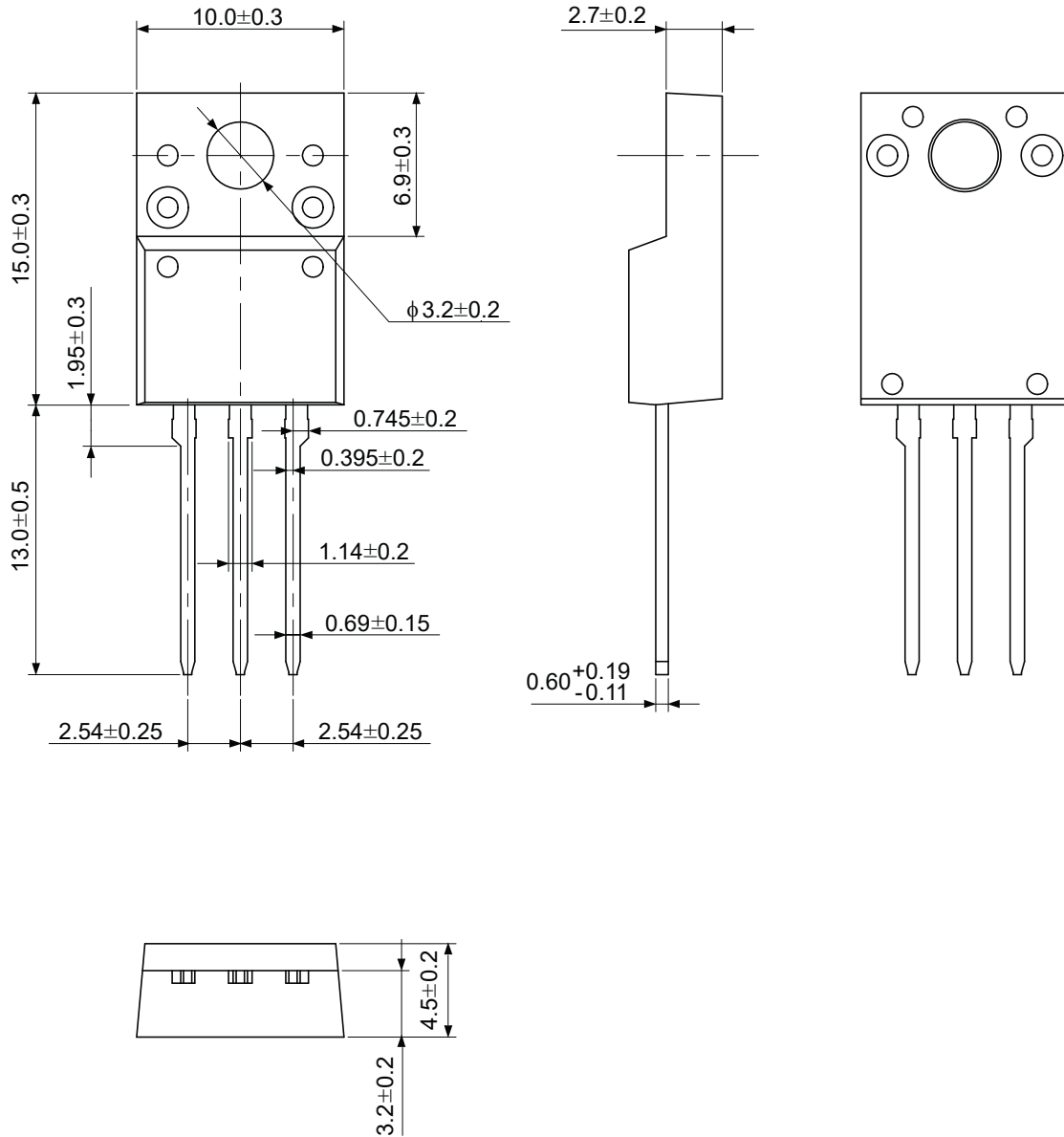


### Package Dimensions

Ordering code: #BG0

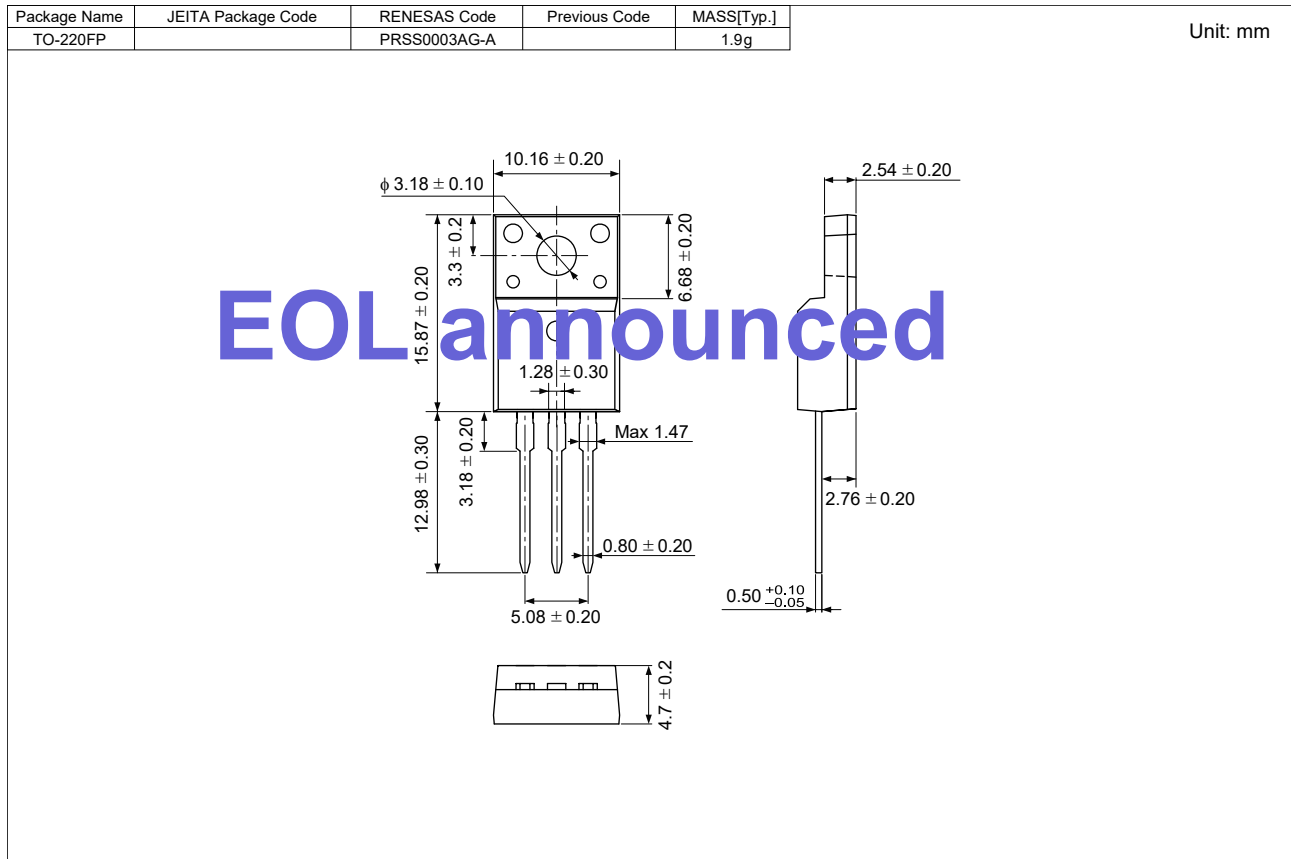
| JEITA Package Code | RENESAS Code | Previous Code | MASS (Typ) [g] |
|--------------------|--------------|---------------|----------------|
| -                  | PRSS0003AP-A | TO-220FPA     | 1.65           |

Unit: mm



## Package Dimensions

Ordering code: #BB0 <EOL announced>



## Ordering Information

| Orderable Part Number | Package   | Quantity <sup>Note6</sup> | Remark            | Status          |
|-----------------------|-----------|---------------------------|-------------------|-----------------|
| BCR3FM-14LB#BG0       | TO-220FPA | 50 pcs./ tube             | Straight type     | Mass Production |
| BCR3FM-14LB-□□#BG0    | TO-220FPA | 50 pcs./ tube             | □□:Lead form type |                 |
| BCR3FM-14LB#BB0       | TO-220FP  | 50 pcs./ tube             | Straight type     | EOL announced   |

Notes: 6. Please confirm the specification about the shipping in detail.

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