# BCR16FM-12LB

## 600V - 16A - Triac

Medium Power Use

R07DS1188EJ0201
Rev.2.01
Feb. 19, 2019

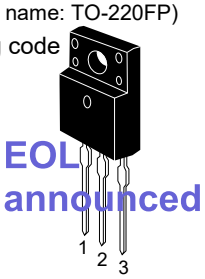
## Features

- $I_{T\,(RMS)}$ : 16 A
- $V_{DRM}$ : 600 V
- Tj: 150 °C
- $I_{FGTI}$, $I_{RGTI}$, $I_{RGT\,III}$: 30 mA(20mA) Note5
- Insulated Type
- Planar Passivation Type
- Viso: 2000V

## Outline

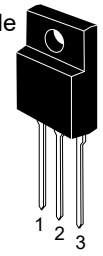
RENESAS Package code: PRSS0003AG-A
(Package name: TO-220FP)

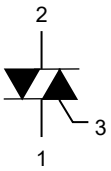
Ordering code
#BB0




RENESAS Package code: PRSS0003AP-A
(Package name: TO-220FPA)

Ordering code
#BG0
#BH0




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

## Application

Motor control, Heater control, Power supply, Solid state relay, and other general purpose AC 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 |

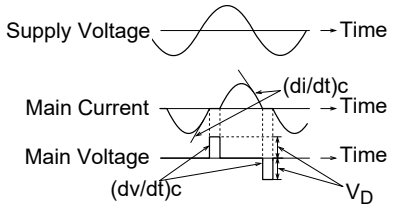
| Parameter | Symbol | Ratings | Unit | Conditions |
|---|---|---|---|---|
| RMS on-state current | $I_{T\,(RMS)}$ | 16 | A | Commercial frequency, sine full wave 360°conduction,<br>Tc = 98°C (#BB0, #BH0) Note2<br>Tc = 87°C (#BG0) Note2 |
| Surge on-state current | $I_{TSM}$ | 160 | A | 50 Hz sinewave 1 full cycle, peak value, non-repetitive |
| $I^2t$ for fusion | $I^2t$ | 106.5 | $A^2s$ | 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 | Tj | –40 to +150 | °C | |
| Storage temperature | Tstg | –40 to +150 | °C | |
| Isolation voltage Note7 | $V_{iso}$ | 2000 | V | Ta=25°C, AC 1 minute,<br>$T_1$ • $T_2$ • G terminal to case |

Notes: 1. Gate open.
2. Please refer to the Ordering Information.

## Electrical Characteristics

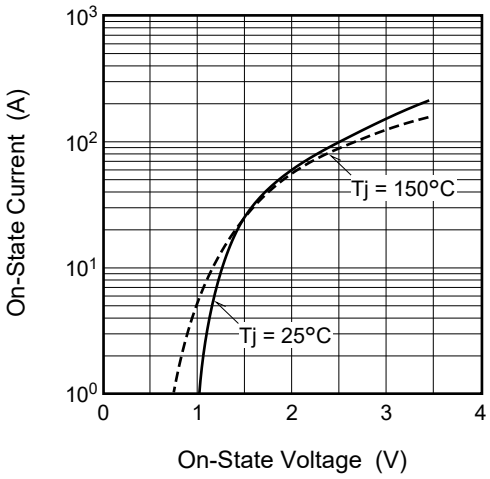
| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|---|---|---|---|---|---|---|---|
| Repetitive peak off-state current | | $I_{DRM}$ | — | — | 2.0 | mA | Tj = 150°C, $V_{DRM}$ applied |
| On-state voltage | | $V_{TM}$ | — | — | 1.5 | V | Tc = 25°C, $I_{TM}$ = 25 A, instantaneous measurement |
| Gate trigger voltage[Note3] | 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 curent[Note3] | I | $I_{FGTI}$ | — | — | 30 [Note6] | mA | Tj = 25°C, $V_D$ = 6 V, $R_L$ = 6 Ω, $R_G$ = 330 Ω |
| | II | $I_{RGTI}$ | — | — | 30 [Note6] | mA | |
| | III | $I_{RGTIII}$ | — | — | 30 [Note6] | mA | |
| Gate non-trigger voltage | | $V_{GD}$ | 0.2 | — | — | V | Tj = 125°C, $V_D$ = 1/2 $V_{DRM}$ |
| | | | 0.1 | — | — | | Tj = 150°C, $V_D$ = 1/2 $V_{DRM}$ |
| Thermal resistance | | $R_{th\ (j-c)}$ | — | — | 2.9 | °C/W | Junction to case[Note4] (#BB0, #BH0)[Note2] |
| | | | — | — | 3.5 | °C/W | Junction to case[Note4] (#BG0)[Note2] |
| Critical-rate of rise of off-state commutation voltage[Note5] | | (dv/dt)c | 10 | — | — | V/μs | Tj = 125°C |
| | | | 1 | — | — | | Tj = 150°C |

Notes: 3. Measurement using the gate trigger characteristics measurement circuit.
4. The contact thermal resistance $R_{th(c-f)}$ in case of greasing is 0.5°C/W.
5. Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.
6. High sensitivity ($I_{GT} \leq$ 20 mA) is also available. ($I_{GT}$ item:1)
7. Make sure that your finished product containing this device meets your safe isolation requirements. For safety, it's advisable that heatsink is electrically floating.

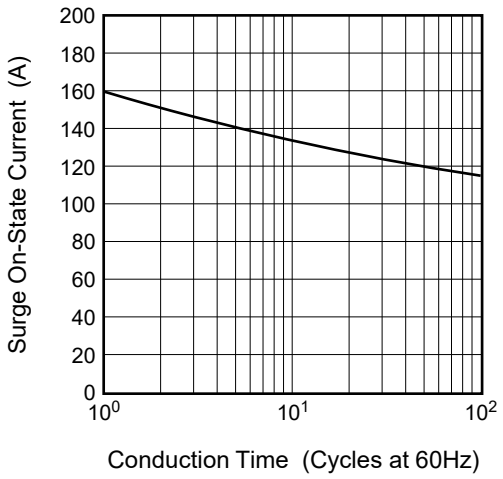
| Test conditions | Commutating voltage and current waveforms (inductive load) |
|---|---|
| 1. Junction temperature<br>Tj = 125°C/150°C<br>2. Rate of decay of on-state commutating current<br>(di/dt)c = – 8 A/ms<br>3. Peak off-state voltage<br>$V_D$ = 400 V |  |

## Performance Curves

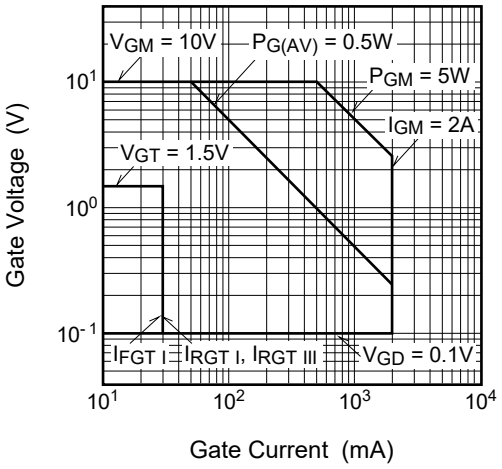
Maximum On-State Characteristics



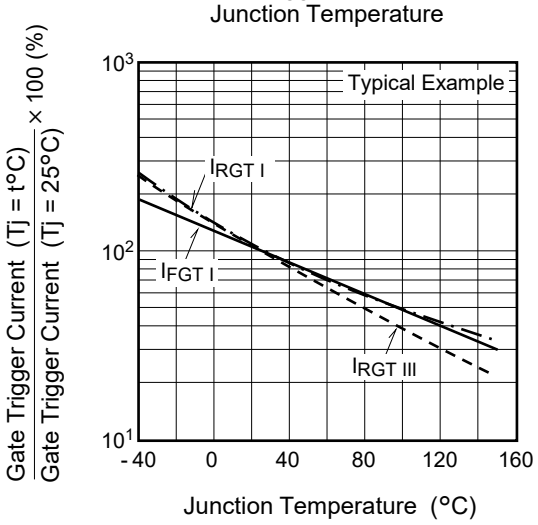

Rated Surge On-State Current



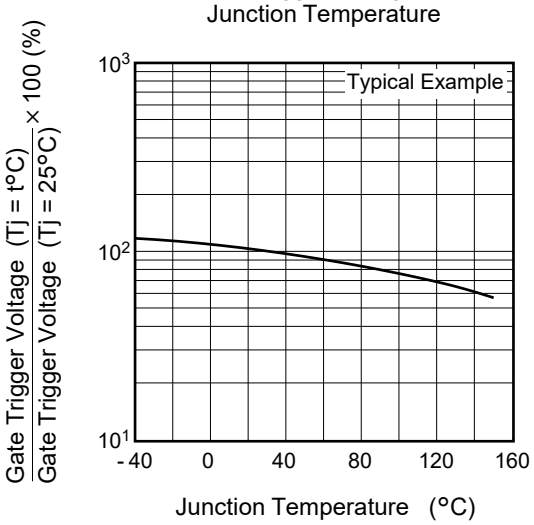

Gate Characteristics (I, II and III)



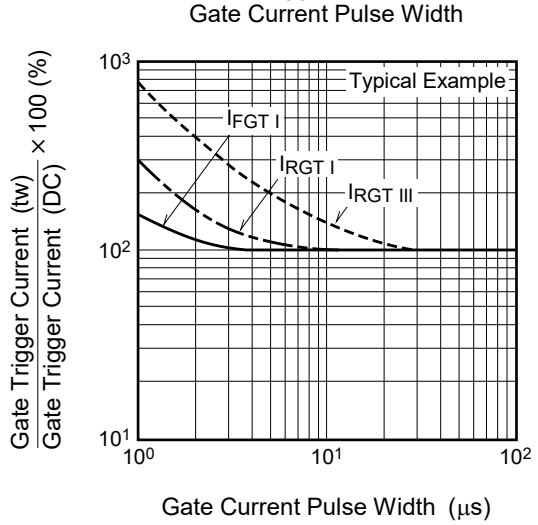

Gate Trigger Current vs. Junction Temperature



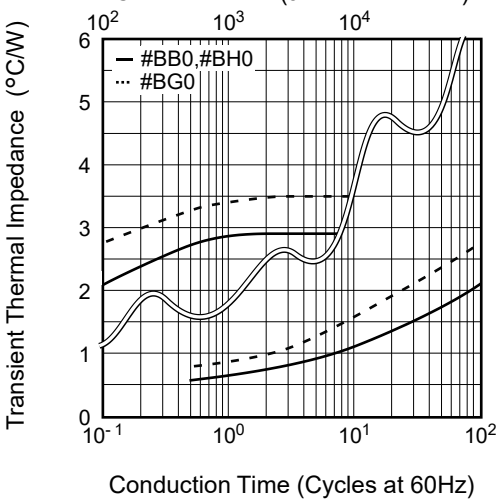

Gate Trigger Voltage vs. Junction Temperature



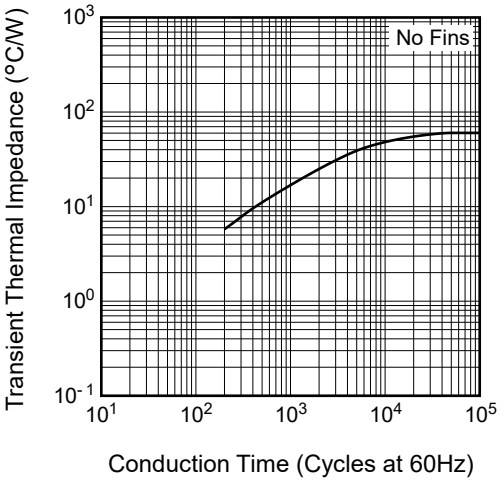

Gate Trigger Current vs. Gate Current Pulse Width



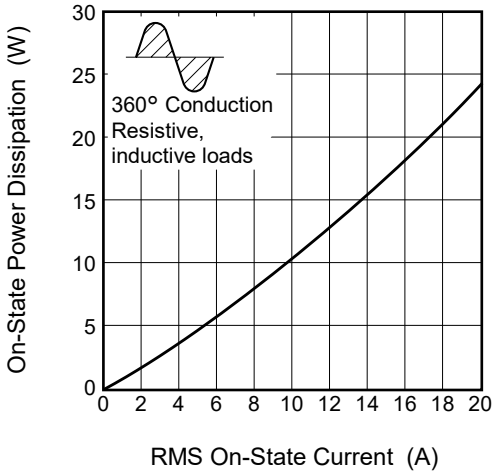
Maximum Transient Thermal Impedance Characteristics (Junction to case)



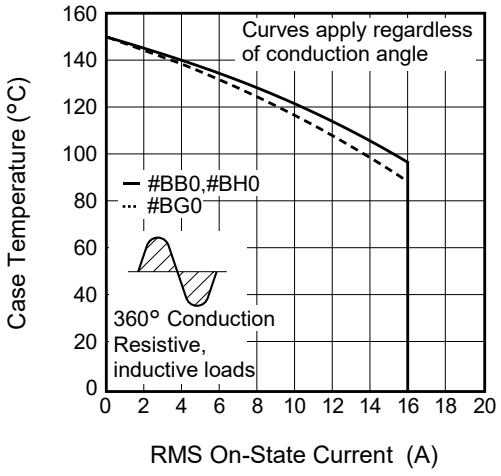

Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



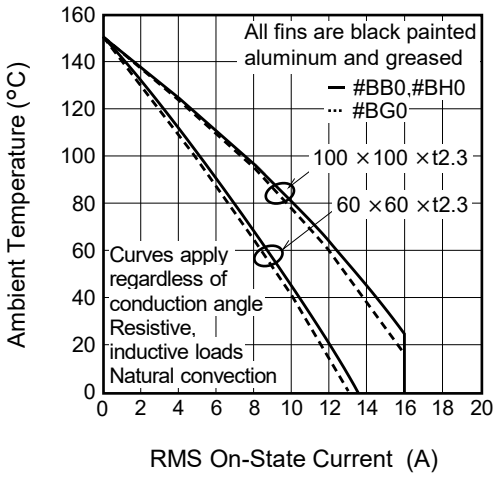

Maximum On-State Power Dissipation



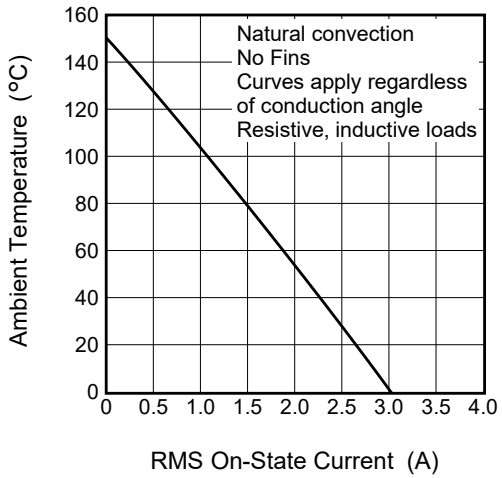

Allowable Case Temperature vs. RMS On-State Current



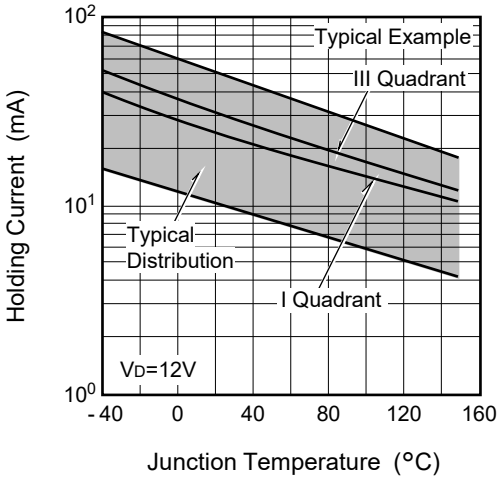

Allowable Ambient Temperature vs. RMS On-State Current



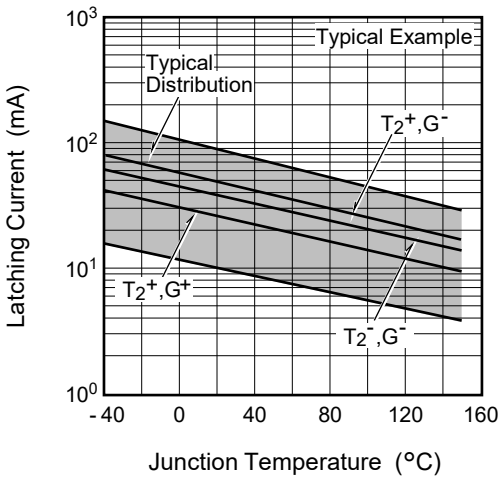

Allowable Ambient Temperature vs. RMS On-State Current



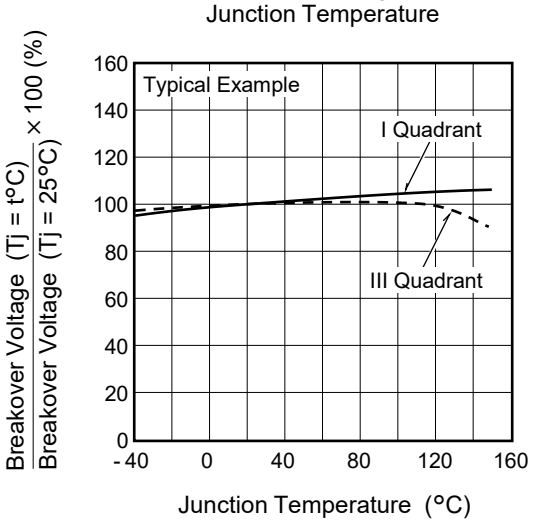
Holding Current vs.
Junction Temperature



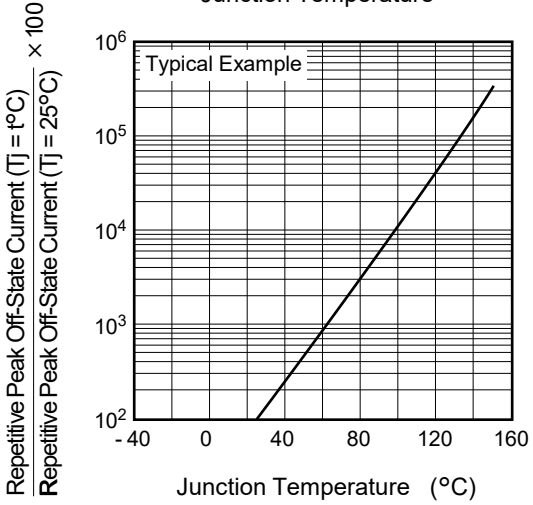

Latching Current vs.
Junction Temperature



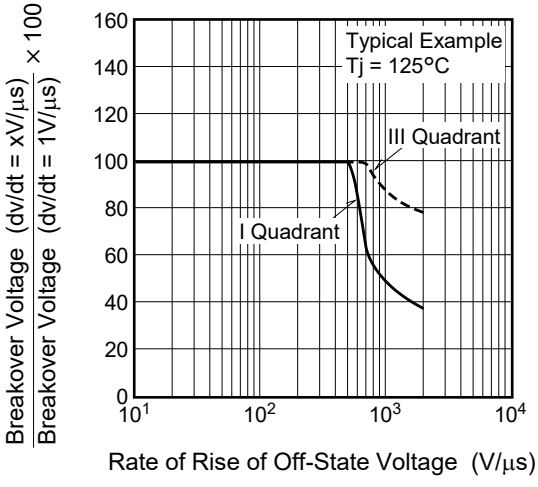

Breakover Voltage vs.
Junction Temperature



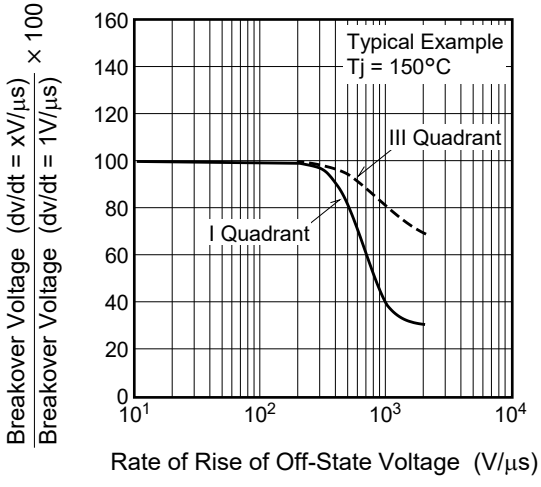

Repetitive Peak Off-State Current vs.
Junction Temperature



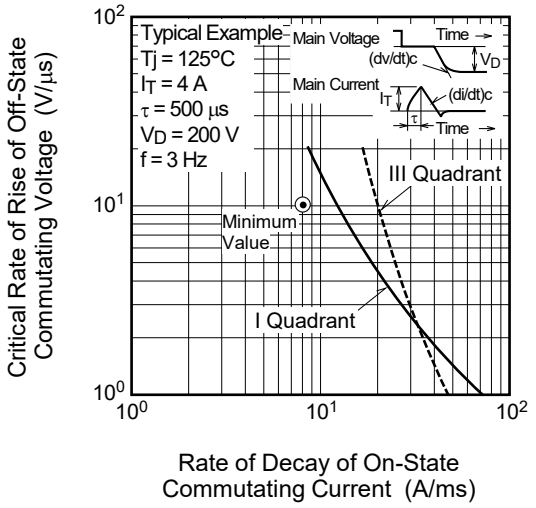

Breakover Voltage vs.
Rate of Rise of Off-State Voltage (Tj=125°C)



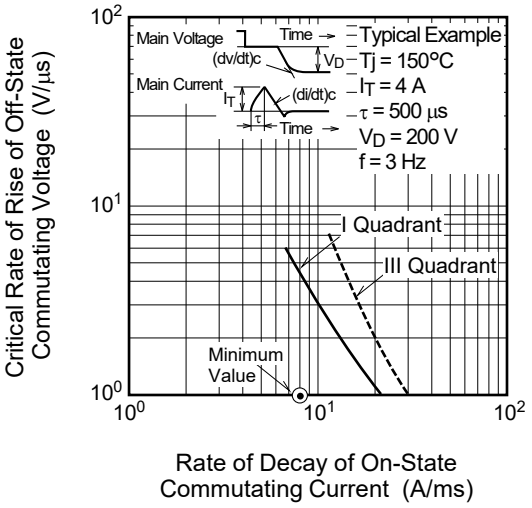

Breakover Voltage vs.
Rate of Rise of Off-State Voltage (Tj=150°C)



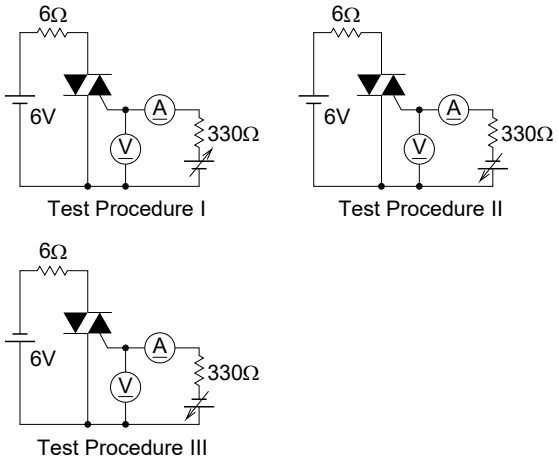
Commutation Characteristics (Tj=125°C)



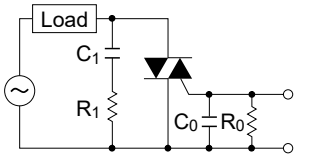

Commutation Characteristics (Tj=150°C)




Gate Trigger Characteristics Test Circuits




Recommended peripheral components for Triac



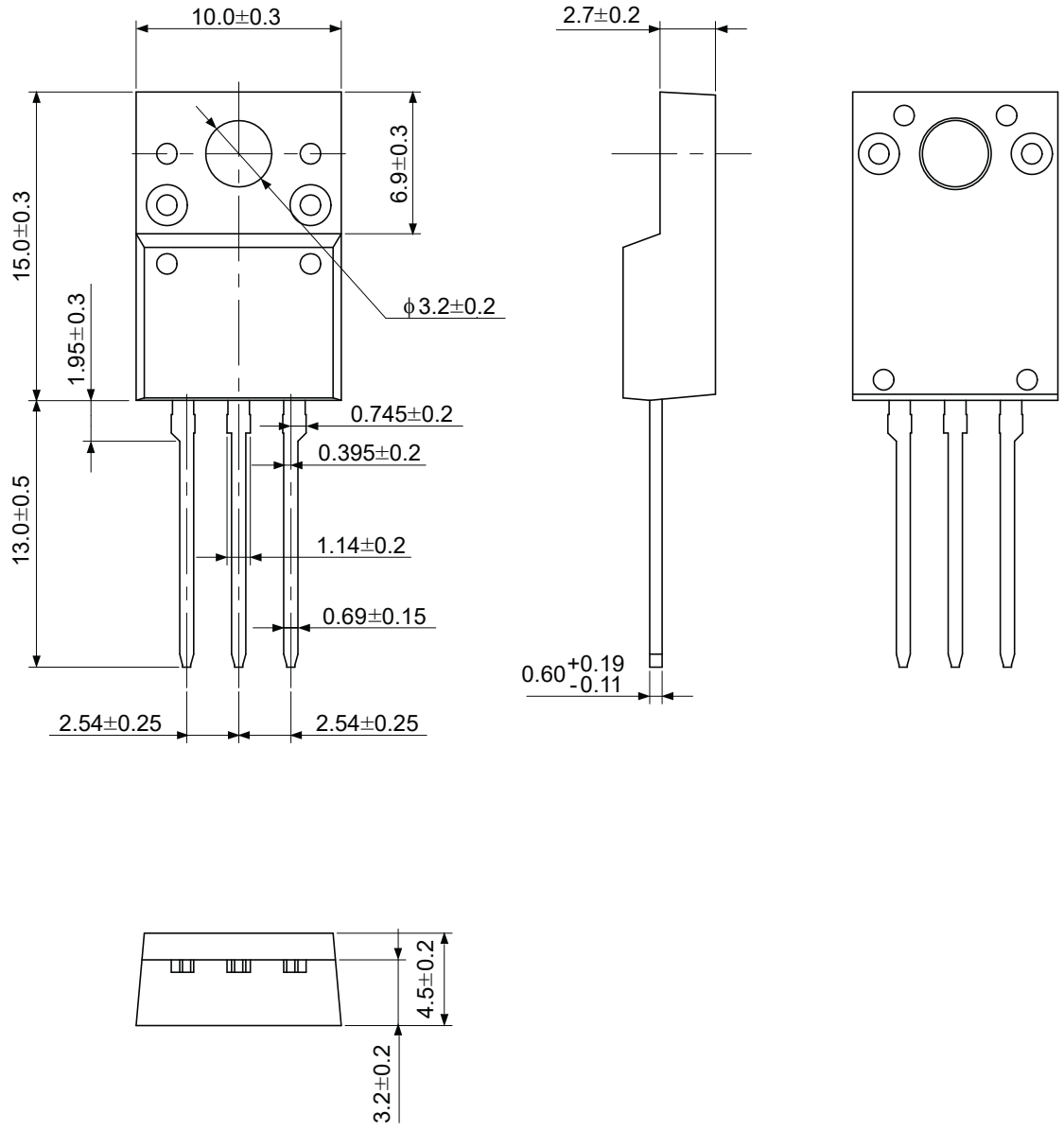

$C_1$ = 0.1 to 0.47 µF $C_0$ = 0.1 µF
$R_1$ = 47 to 100Ω $R_0$ = 100Ω

## Package Dimensions

**Ordering code: #BG0, #BH0**

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

Unit: mm

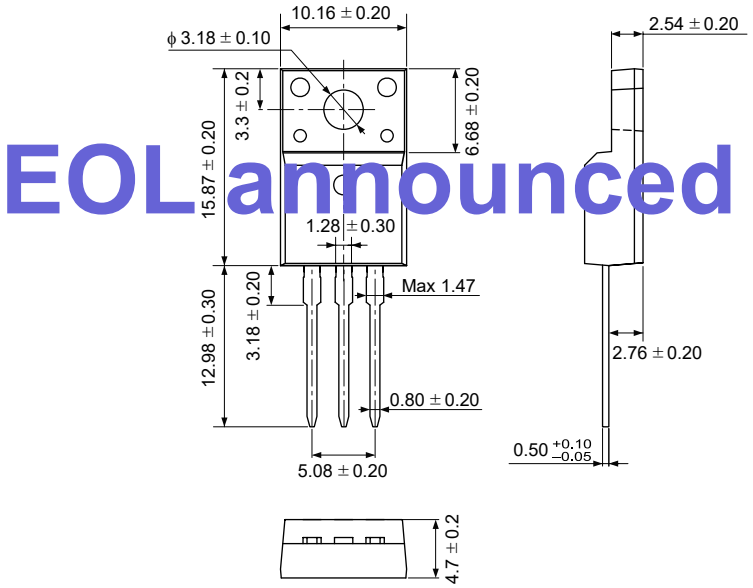


## Package Dimensions

### Ordering code: #BB0 <EOL announced>

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
|---|---|---|---|---|
| TO-220FP | | PRSS0003AG-A | | 1.9g |

Unit: mm






## Ordering Information

| Orderable Part Number | Package | Quantity Note8 | Remark | Status |
|---|---|---|---|---|
| BCR16FM-12LB#BG0 | TO-220FPA | 50 pcs./ tube | Straight type | Mass Production |
| BCR16FM-12LB-1#BG0 | TO-220FPA | 50 pcs./ tube | Straight type, $I_{GT}$ item:1 | |
| BCR16FM-12LB□□#BG0 | TO-220FPA | 50 pcs./ tube | □□:Lead form type | |
| BCR16FM12LB1□□#BG0 | TO-220FPA | 50 pcs./ tube | □□:Lead form type, $I_{GT}$ item:1 | |
| BCR16FM-12LB#BH0 | TO-220FPA | 50 pcs./ tube | Straight type | |
| BCR16FM-12LB-1#BH0 | TO-220FPA | 50 pcs./ tube | Straight type, $I_{GT}$ item:1 | |
| BCR16FM-12LB□□#BH0 | TO-220FPA | 50 pcs./ tube | □□:Lead form type | |
| BCR16FM12LB1□□#BH0 | TO-220FPA | 50 pcs./ tube | □□:Lead form type, $I_{GT}$ item:1 | |
| BCR16FM-12LB#BB0 | TO-220FP | 50 pcs./ tube | Straight type | EOL announced |
| BCR16FM-12LB-1#BB0 | TO-220FP | 50 pcs./ tube | Straight type, $I_{GT}$ item:1 | |
| BCR16FM12LB1□□#BB0 | TO-220FP | 50 pcs./ tube | □□:Lead form type, $I_{GT}$ item:1 | |

Notes: 8. Please confirm the specification about the shipping in detail.

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RENESAS

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Colophon 7.2