

# BCR12PM-12LC

Triac

Medium Power Use

REJ03G1261-0100

Rev.1.00

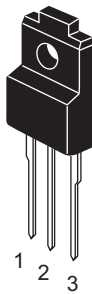
Sep.28.2005

## Features

- $I_{T(RMS)}$  : 12 A
- $V_{DRM}$  : 600 V
- $I_{FGT}$ ,  $I_{RGT}$ ,  $I_{RGTIII}$  : 50 mA
- $V_{ISO}$  : 1500 V
- The product guaranteed maximum junction temperature 150°C.
- Insulated Type
- Planar Passivation Type

## Outline

RENESAS Package code: PRSS0003AA-B  
(Package name: TO-220F(2) )



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

## Applications

Heater control, motor control

## 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> | $V_{DSM}$ | 700           | V    |

| Parameter                      | Symbol      | Ratings      | Unit                 | Conditions                                                                       |
|--------------------------------|-------------|--------------|----------------------|----------------------------------------------------------------------------------|
| RMS on-state current           | $I_T$ (RMS) | 12           | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 87^\circ\text{C}$   |
| Surge on-state current         | $I_{TSM}$   | 72           | A                    | 60Hz sinewave 1 full cycle, peak value, non-repetitive                           |
| $I^2t$ for fusing              | $I^2t$      | 21.6         | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half wave 60Hz, 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 +125 | $^\circ\text{C}$     |                                                                                  |
| Storage temperature            | $T_{stg}$   | – 40 to +125 | $^\circ\text{C}$     |                                                                                  |
| Mass                           | —           | 2.0          | g                    | Typical value                                                                    |
| Isolation voltage              | $V_{iso}$   | 1500         | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1 \cdot T_2 \cdot G$ 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                                                        | $V_{TM}$         | —    | —    | 1.8  | V                      | $T_c = 25^\circ\text{C}$ , $I_{TM} = 20\text{ A}$ , Instantaneous measurement           |
| Gate trigger voltage <sup>Note2</sup>                                   | I $V_{FGTI}$     | —    | —    | 1.5  | V                      | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|                                                                         | II $V_{RGTI}$    | —    | —    | 1.5  | V                      |                                                                                         |
|                                                                         | III $V_{RGTIII}$ | —    | —    | 1.5  | V                      |                                                                                         |
| Gate trigger current <sup>Note2</sup>                                   | I $I_{FGTI}$     | —    | —    | 50   | mA                     | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|                                                                         | II $I_{RGTI}$    | —    | —    | 50   | mA                     |                                                                                         |
|                                                                         | III $I_{RGTIII}$ | —    | —    | 50   | mA                     |                                                                                         |
| Gate non-trigger voltage                                                | $V_{GD}$         | 0.2  | —    | —    | V                      | $T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$                                         |
| Thermal resistance                                                      | $R_{th(j-c)}$    | —    | —    | 3.7  | $^\circ\text{C/W}$     | Junction to case <sup>Note3</sup>                                                       |
| Critical-rate of rise of off-state commutating voltage <sup>Note4</sup> | $(dv/dt)_c$      | 10   | —    | —    | $\text{V}/\mu\text{s}$ | $T_j = 125^\circ\text{C}$                                                               |

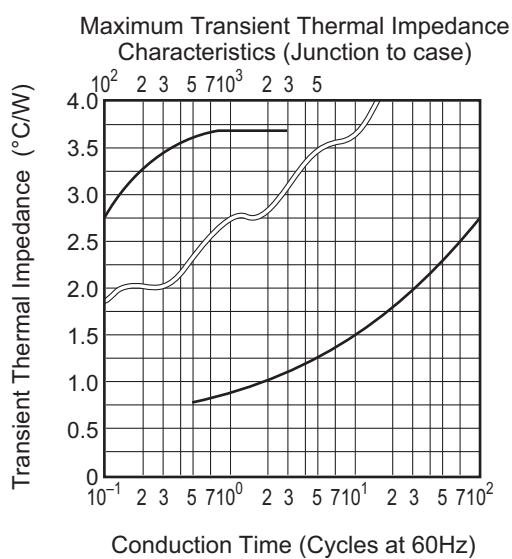
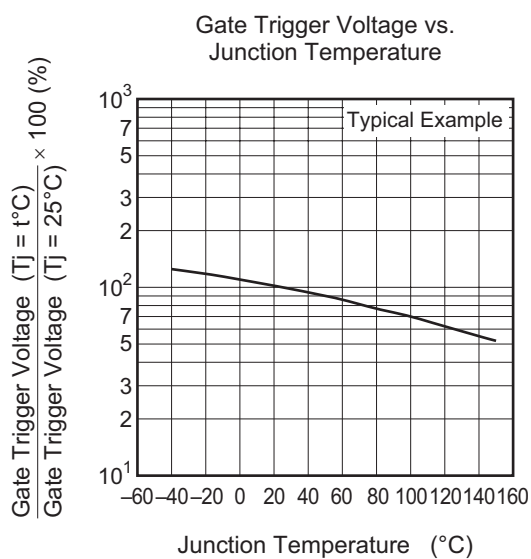
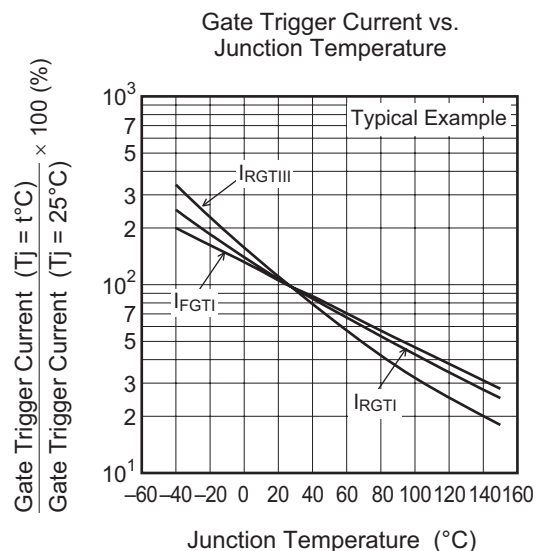
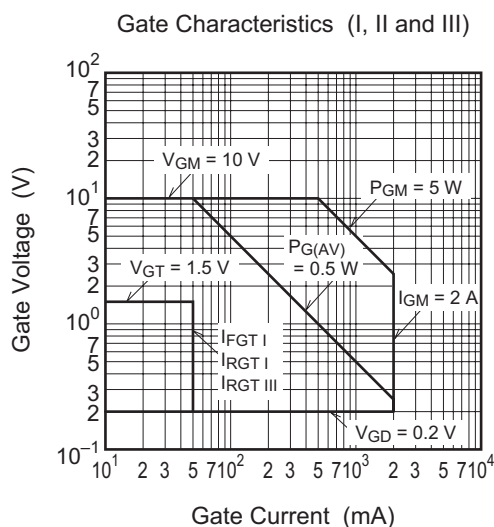
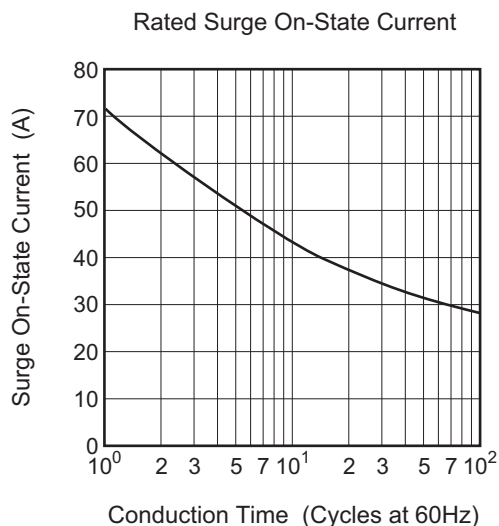
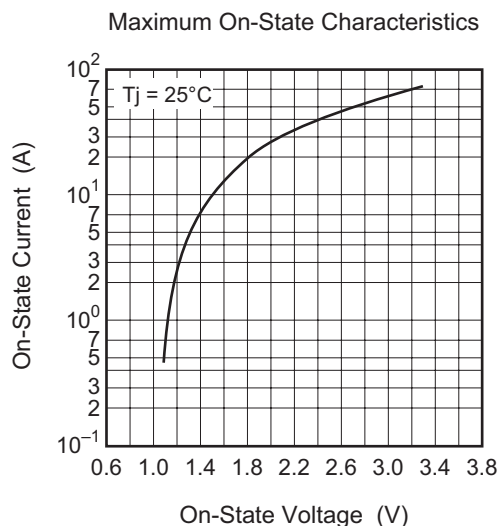
Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

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

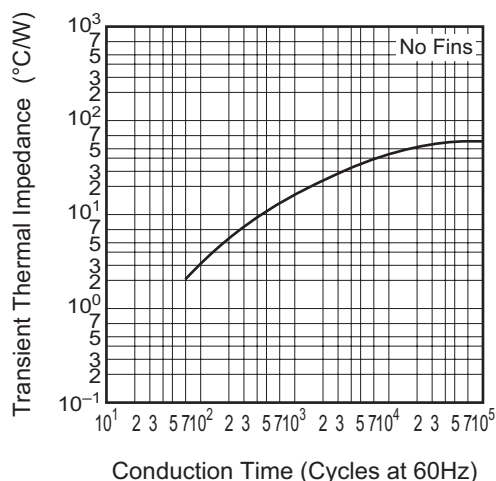
4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

| 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>$(di/dt)_c = -6\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$ |                                                            |

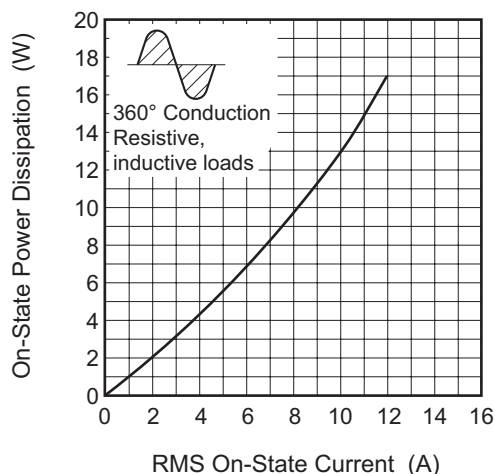
## Performance Curves



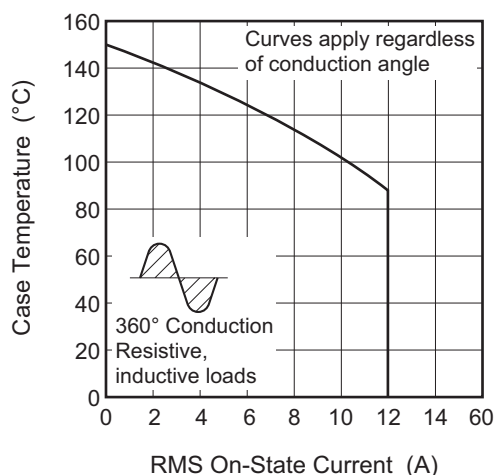
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



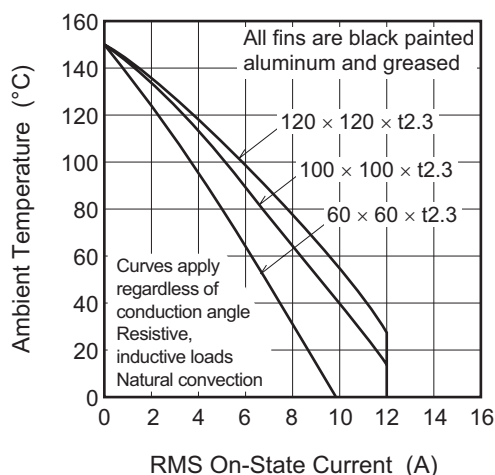
Maximum On-State Power Dissipation



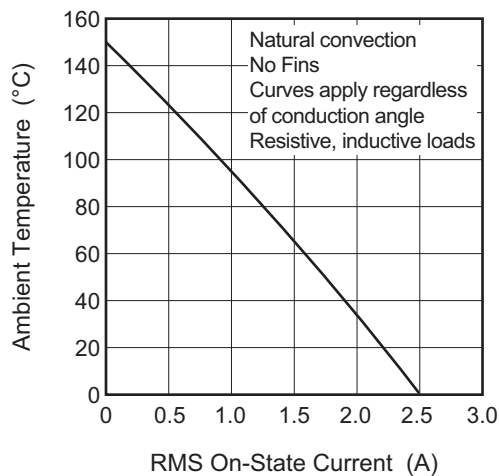
Allowable Case Temperature vs. RMS On-State Current



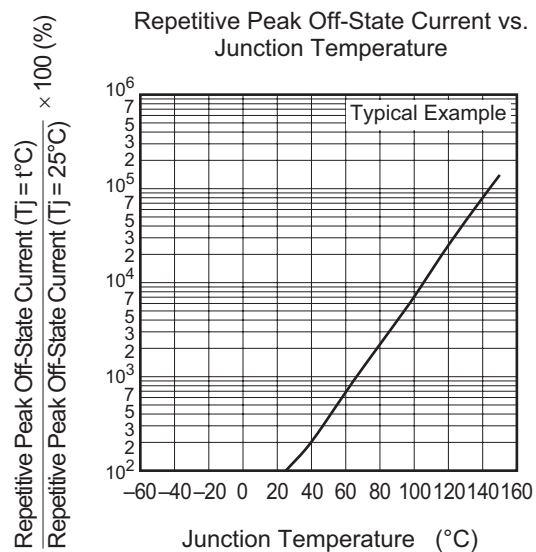
Allowable Ambient Temperature vs. RMS On-State Current

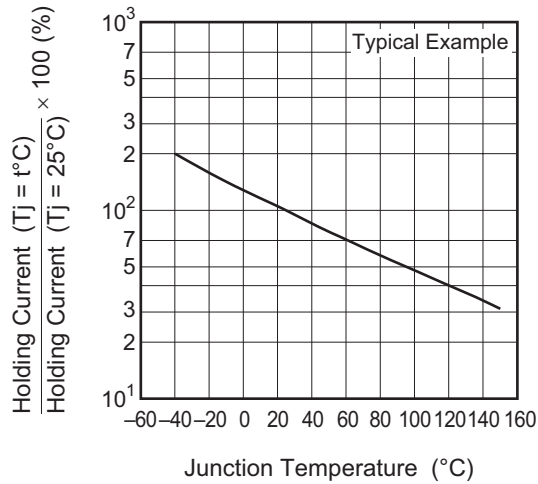
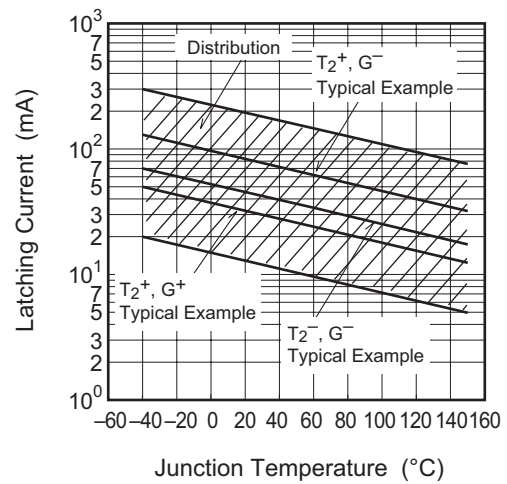
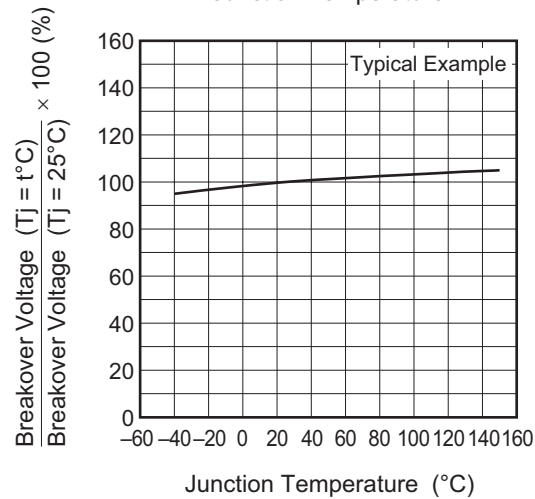
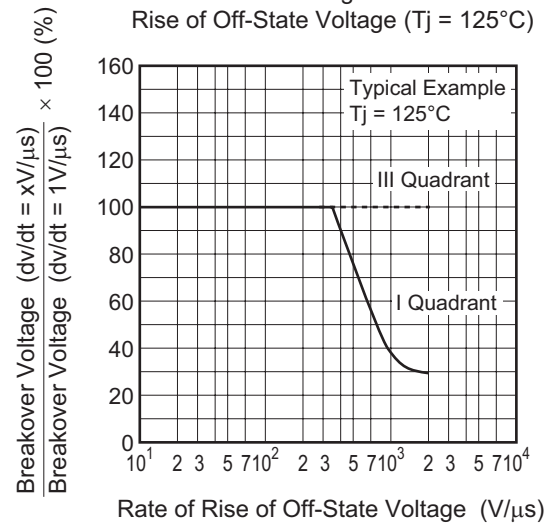
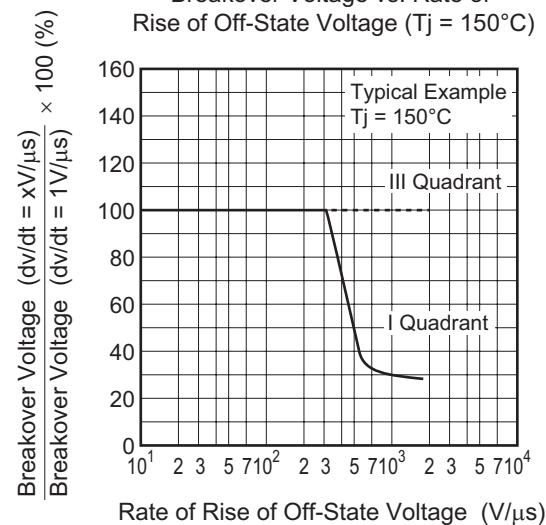
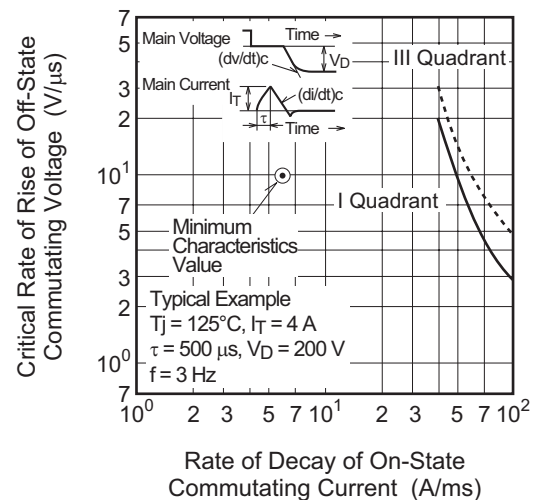


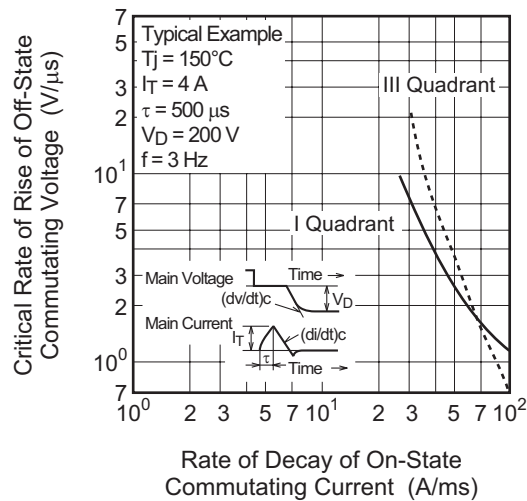
Allowable Ambient Temperature vs. RMS On-State Current



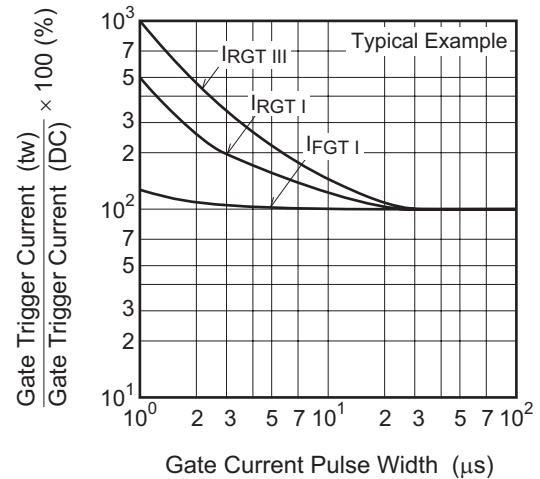
Repetitive Peak Off-State Current vs. Junction Temperature



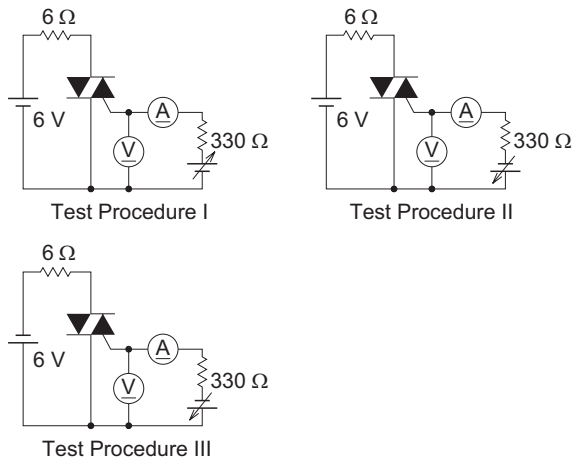
Holding Current vs.  
Junction TemperatureLatching Current vs.  
Junction TemperatureBreakover Voltage vs.  
Junction TemperatureBreakover Voltage vs. Rate of  
Rise of Off-State Voltage ( $T_j = 125^\circ\text{C}$ )Breakover Voltage vs. Rate of  
Rise of Off-State Voltage ( $T_j = 150^\circ\text{C}$ )Commutation Characteristics ( $T_j = 125^\circ\text{C}$ )

Commutation Characteristics ( $T_j = 150^\circ\text{C}$ )

Gate Trigger Current vs. Gate Current Pulse Width



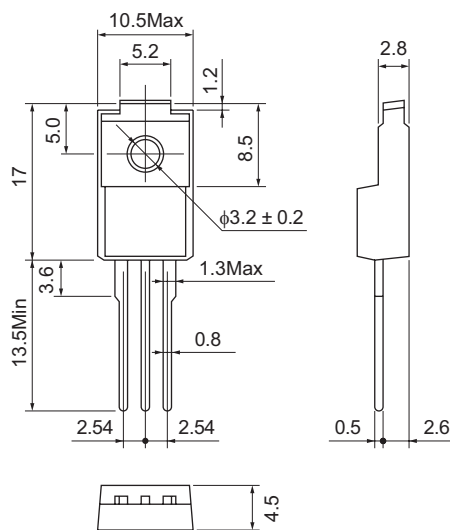
Gate Trigger Characteristics Test Circuits



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
|--------------|--------------------|--------------|---------------|------------|
| TO-220F(2)   | SC-67              | PRSS0003AA-B | —             | 2.0g       |

Unit: mm



## Order Code

| Lead form     | Standard packing        | Quantity | Standard order code           | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Vinyl sack              | 100      | Type name                     | BCR12PM-12LC                |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name – Lead forming code | BCR12PM-12LC-A8             |

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

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