

# BCR5KM-12LB

## Triac

Medium Power Use

REJ03G0317-0200

Rev.2.00

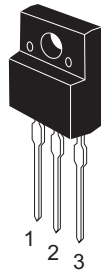
Mar 06, 2007

### Features

- $I_{T(RMS)}$  : 5 A
- $V_{DRM}$  : 600 V
- $I_{FGTI}$ ,  $I_{RGTI}$ ,  $I_{RGTIII}$  : 20 mA (10 mA)<sup>Note5</sup>
- $V_{ISO}$  : 2000 V
- The product guaranteed maximum junction temperature 150°C.
- Insulated Type
- Planar Passivation Type
- Refer to the recommended circuit values around the triac before using.

### Outline

RENESAS Package code: PRSS0003AB-A  
(Package name: TO-220FN)



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

### Applications

Switching mode power supply, small motor control, heater control, solenoid driver, 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) | 5            | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 121^\circ\text{C}$  |
| Surge on-state current         | $I_{TSM}$   | 50           | A                    | 60Hz sinewave 1 full cycle, peak value, non-repetitive                           |
| $I^2t$ for fusing              | $I^2t$      | 10.4         | $\text{A}^2\text{s}$ | 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              | $V_{GM}$    | 10           | V                    |  |
| Peak gate current              | $I_{GM}$    | 2            | A                    |  |
| Junction temperature           | $T_j$       | - 40 to +150 | $^\circ\text{C}$     |  |
| Storage temperature            | $T_{stg}$   | - 40 to +150 | $^\circ\text{C}$     |  |
| Mass                           | —           | 2.0          | g                    | Typical value  |
| Isolation voltage              | Viso        | 2000         | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1 \cdot T_2 \cdot G$ 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                        | $T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied                                |   |
| On-state voltage  | $V_{TM}$      | —            | —    | 1.8  | V                         | $T_c = 25^\circ\text{C}$ , $I_{TM} = 7\text{ A}$ , 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             | $I_{FGTI}$   | —    | —    | 20 <sup>Note5</sup>       | mA   | $T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$ |
|   | II            | $I_{RGTI}$   | —    | —    | 20 <sup>Note5</sup>       | mA   |   |
|   | III           | $I_{RGTIII}$ | —    | —    | 20 <sup>Note5</sup>       | 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  | $^\circ\text{C}/\text{W}$ | Junction to case <sup>Note3</sup>  |   |
| Critical-rate of rise of off-state commutating voltage <sup>Note4</sup> | $(dv/dt)_c$   | 5/1          | —    | —    | $\text{V}/\mu\text{s}$    | $T_j = 125^\circ\text{C}/150^\circ\text{C}$                                  |   |

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

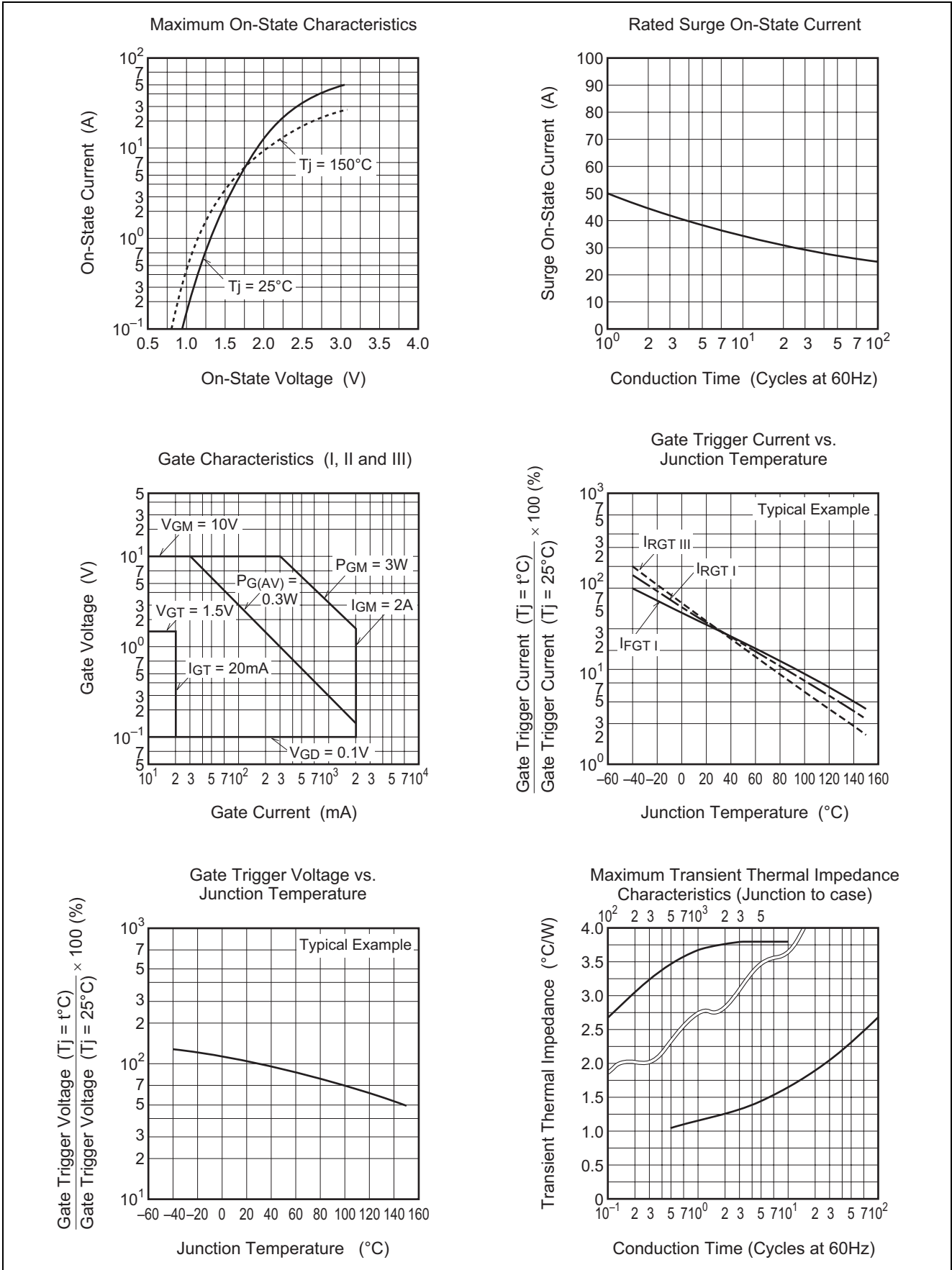
3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C}/\text{W}$ .

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

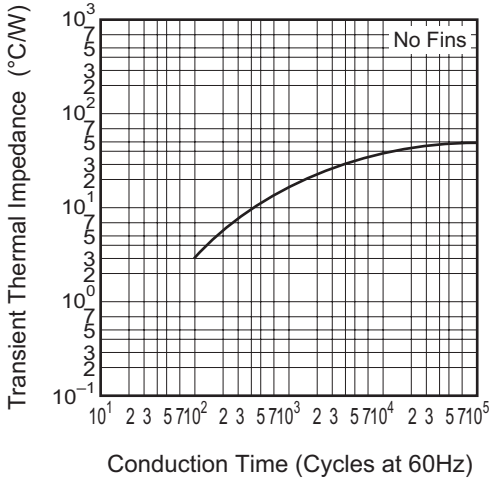
5. High sensitivity ( $I_{GT} \leq 10\text{ mA}$ ) is also available. ( $I_{GT}$  item: 1)

| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>$T_j = 125^\circ\text{C}/150^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c = -2.5\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$ |  |

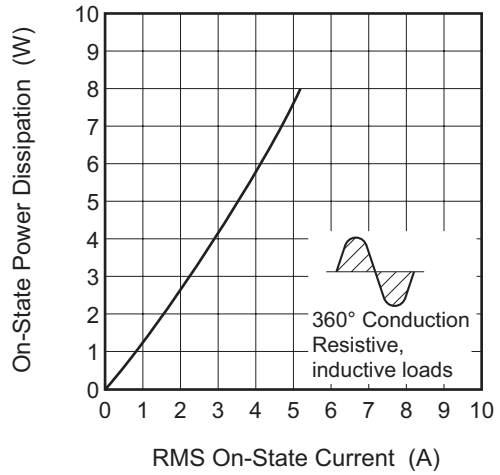
Performance Curves



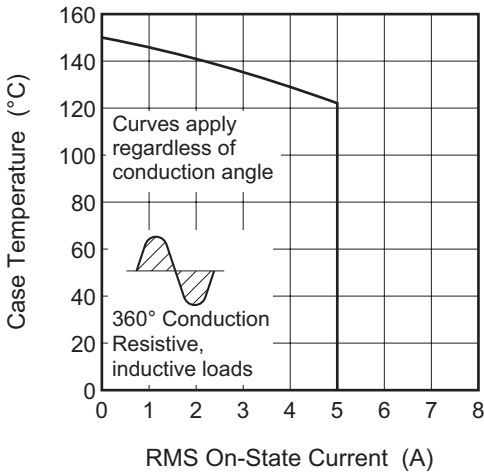
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



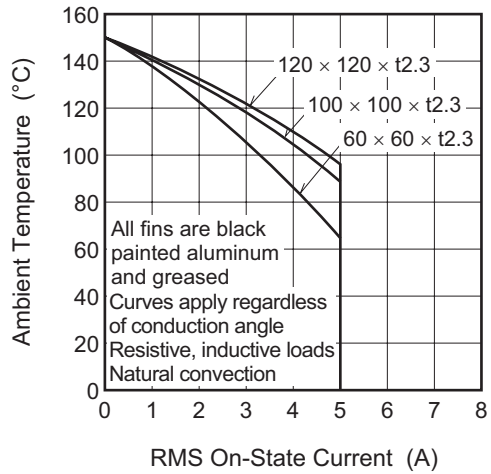
Maximum On-State Power Dissipation



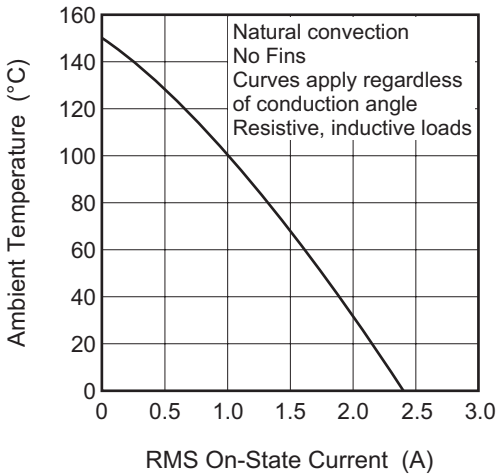
Allowable Case Temperature vs. RMS On-State Current



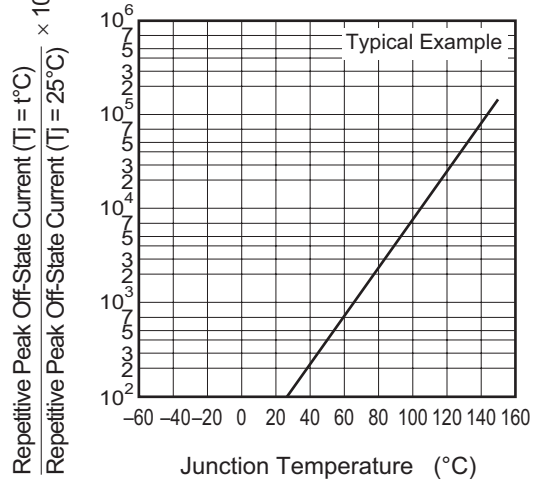
Allowable Ambient Temperature vs. RMS On-State Current



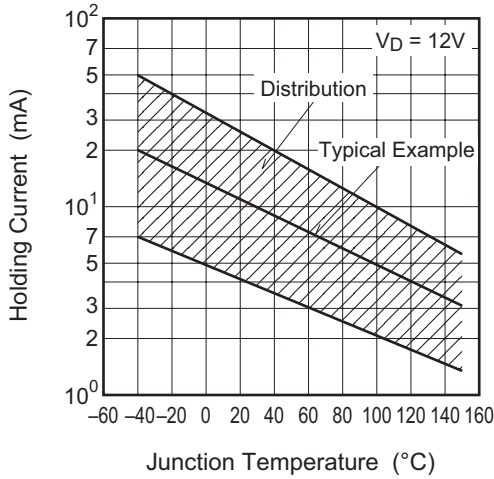
Allowable Ambient Temperature vs. RMS On-State Current



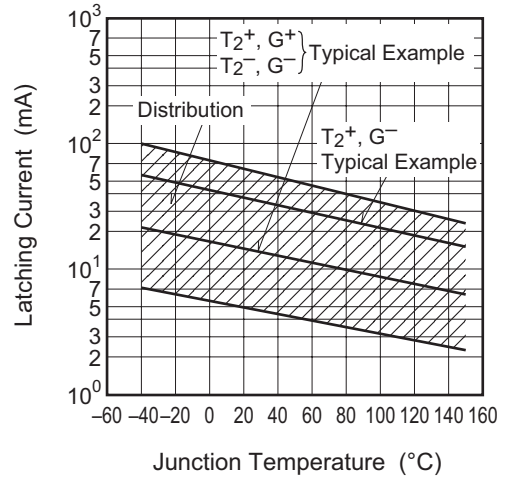
Repetitive Peak Off-State Current vs. Junction Temperature



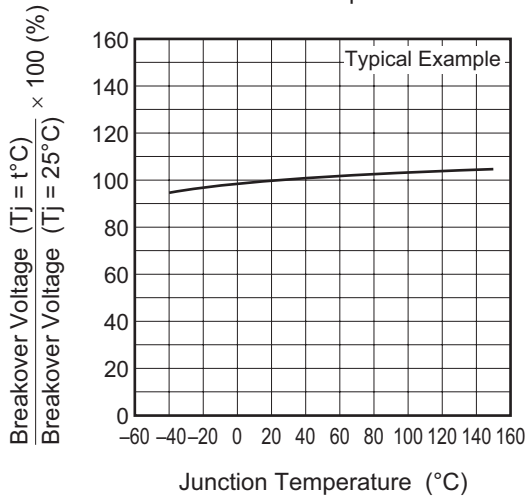
Holding Current vs. Junction Temperature



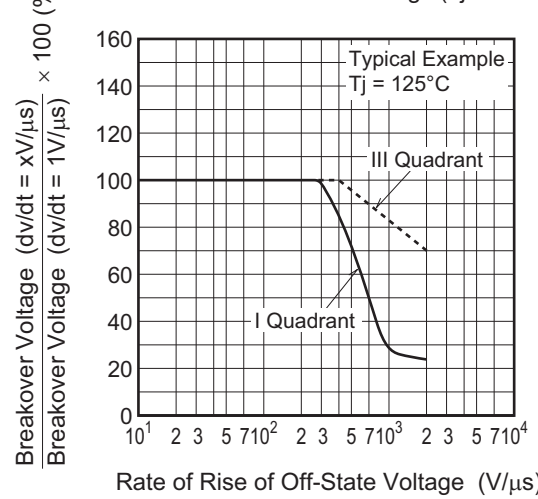
Latching Current vs. Junction Temperature



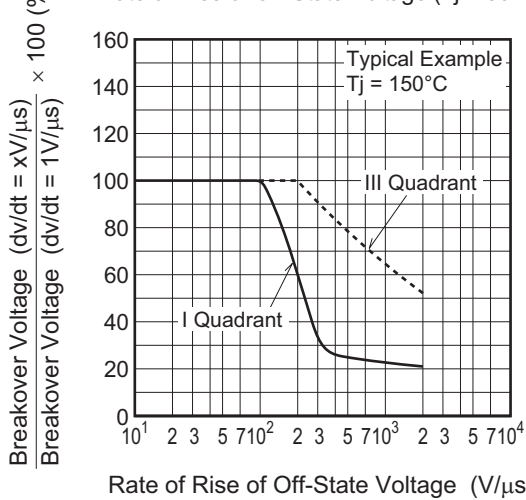
Breakover Voltage vs. Junction Temperature



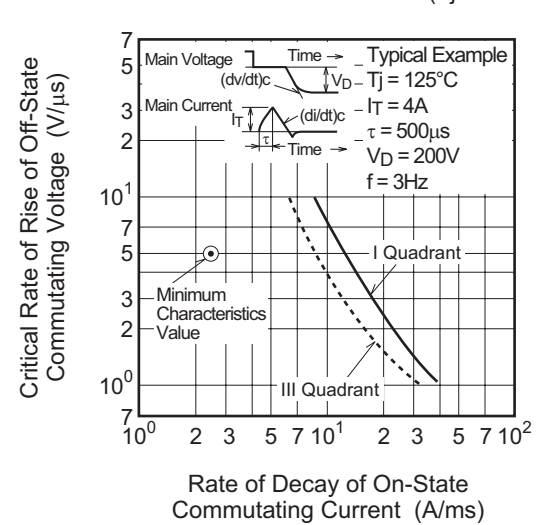
Breakover Voltage vs. Rate of Rise of Off-State Voltage (T\_j=125°C)



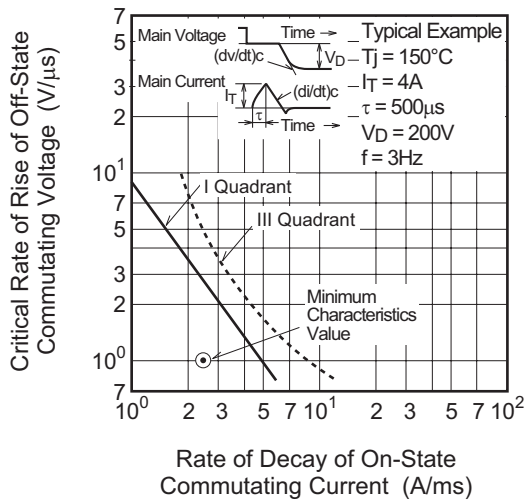
Breakover Voltage vs. Rate of Rise of Off-State Voltage (T\_j=150°C)



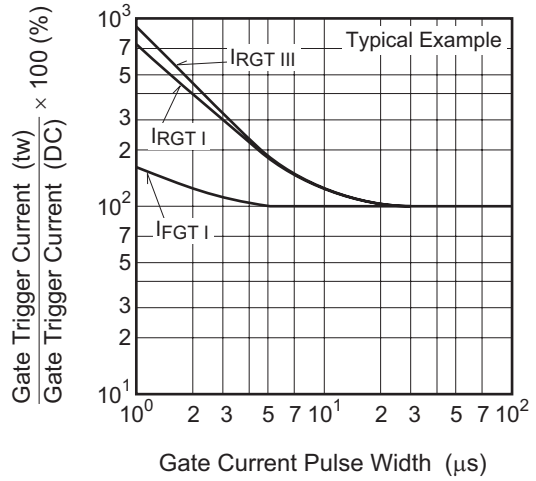
Commutation Characteristics (T\_j=125°C)



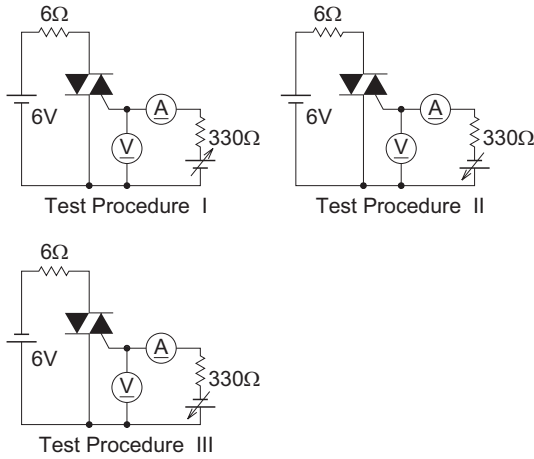
Commutation Characteristics (Tj=150°C)



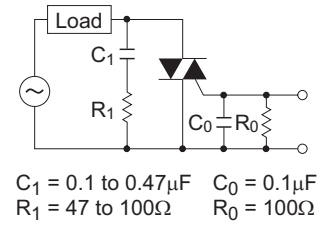
Gate Trigger Current vs. Gate Current Pulse Width



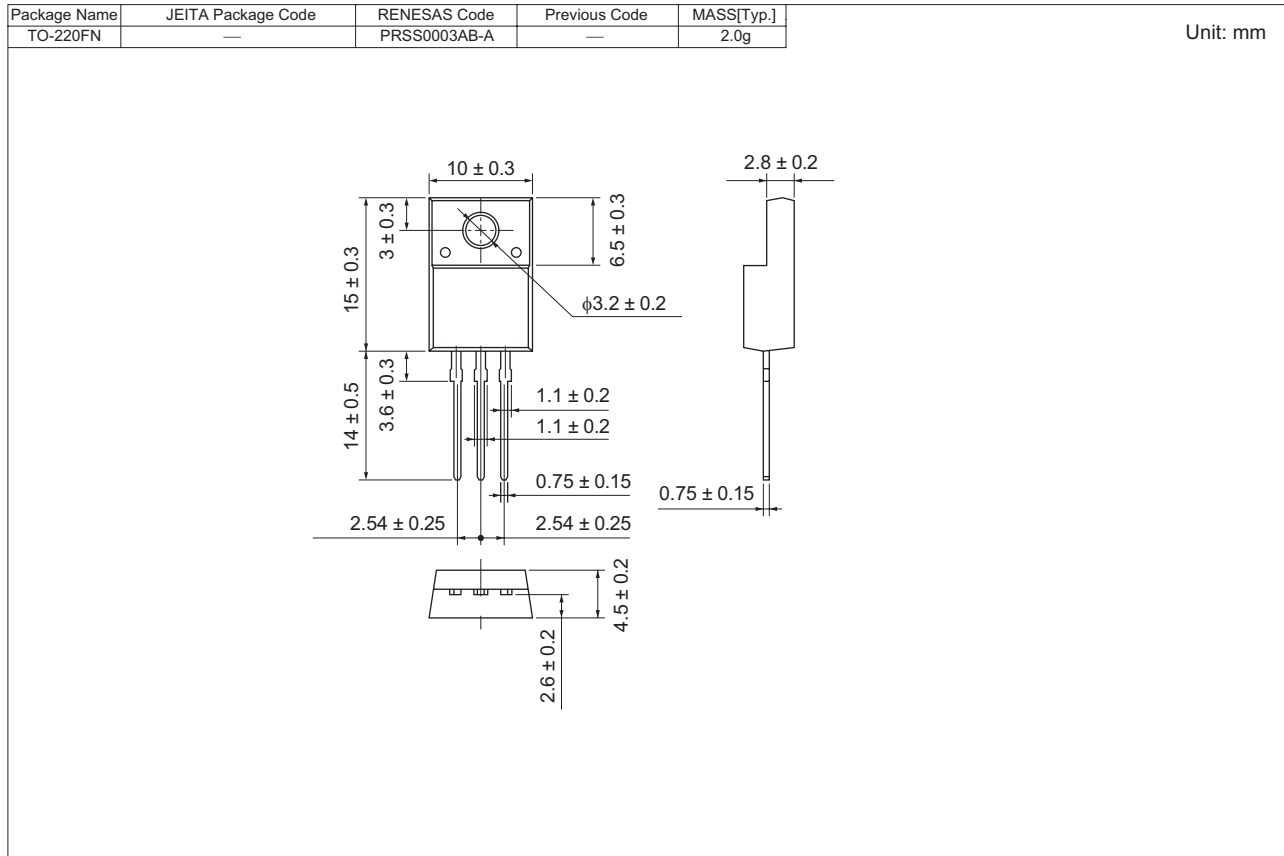
Gate Trigger Characteristics Test Circuits



Recommended Circuit Values Around The Triac



### Package Dimensions



### Order Code

| Lead form     | Standard packing        | Quantity | Standard order code           | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Plastic Magazine (Tube) | 50       | Type name                     | BCR5KM-12LB                 |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name – Lead forming code | BCR5KM-12LB-A8              |

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

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