

# BCR16LM-14LB

Triac

R07DS0060EJ0100

Medium Power Use

Rev.1.00

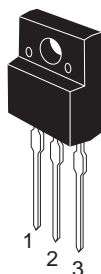
Jul 27, 2010

## Features

- $I_{T(RMS)}$  : 16 A
- $V_{DRM}$  : 800 V
- $I_{FGTI}$ ,  $I_{RGTI}$ ,  $I_{RGT III}$  : 30 mA
- $V_{iso}$  : 1800V
- The Product guaranteed maximum junction temperature 150°C
- Insulated Type
- Planar Type
- UL Recognized : File No. E223904

## Outline

RENESAS Package code: PRSS0003AF-A)  
(Package name: TO-220FL)



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

## Applications

Washing machine, inversion operation of capacitor motor, and other general controlling devices.

## Maximum Ratings

| Parameter  | Symbol    | Voltage class | Unit | Condition              |
|--|-----------|---------------|------|------------------------|
|  |           | 14            |      |                        |
| Repetitive peak off-state voltage <sup>Note1</sup>     | $V_{DRM}$ | 800           | V    | T <sub>j</sub> = 125°C |
|  |           | 700           | V    | T <sub>j</sub> = 150°C |
| Non-repetitive peak off-state voltage <sup>Note1</sup> | $V_{DSM}$ | 840           | V    |                        |

Notes: 1. Gate open.

| Parameter                      | Symbol       | Ratings     | Unit                 | Conditions  |
|--------------------------------|--------------|-------------|----------------------|---|
| RMS on-state current           | $I_{T(RMS)}$ | 16          | A                    | Commercial frequency, sine full wave<br>360° conduction, $T_c = 87^\circ\text{C}$   |
| Surge on-state current         | $I_{TSM}$    | 160         | A                    | 60 Hz sinewave 1 full cycle, peak value,<br>non-repetitive                          |
| $I^2t$ for fusion              | $I^2t$       | 106.5       | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half<br>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 | $^\circ\text{C}$     |   |
| Storage temperature            | $T_{stg}$    | -40 to +150 | $^\circ\text{C}$     |   |
| Mass                           | —            | 1.5         | g                    | Typical value   |
| Isolation voltage              | $V_{iso}$    | 1800        | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute,<br>$T_1 \cdot T_2 \cdot G$ terminal to case |

Notes: 1. Gate open.

## Electrical Characteristics

| Parameter   | Symbol        | Min.         | Typ. | Max. | Unit                      | Test conditions  |
|---|---------------|--------------|------|------|---------------------------|--|
| Repetitive peak off-state current                                       | $I_{DRM}$     | —            | —    | 5.0  | mA                        | $T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied  |
| On-state voltage  | $V_{TM}$      | —            | —    | 1.5  | V                         | $T_c = 25^\circ\text{C}$ , $I_{TM} = 25\text{ A}$ ,<br>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  | $V_{GD}$      | 0.2/0.1      | —    | —    | V                         | $T_j = 125^\circ\text{C}/150^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$                          |
| Thermal resistance  | $R_{th(j-c)}$ | —            | —    | 3.5  | $^\circ\text{C}/\text{W}$ | Junction to case <sup>Note3</sup>  |
| Critical-rate of rise of off-state commutation voltage <sup>Note4</sup> | $(dv/dt)_c$   | 10/1         | —    | —    | $\text{V}/\mu\text{s}$    | $T_j = 125^\circ\text{C}/150^\circ\text{C}$  |

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

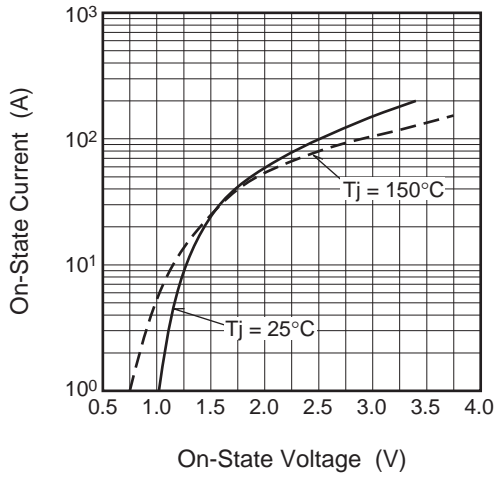
3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C}/\text{W}$ .

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

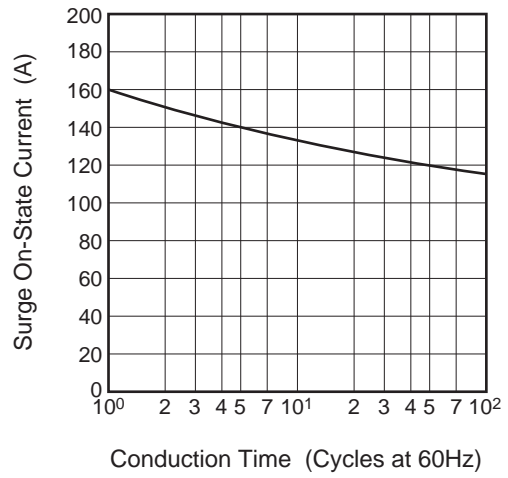
| Test conditions   | Commutating voltage and current waveforms (inductive load) |
|---|--|
| 1. Junction temperature<br>$T_j = 125^\circ\text{C}/150^\circ\text{C}$<br>2. Rate of decay of on-state commutating current<br>$(di/dt)_c = -8.0\text{ A/ms}$<br>3. Peak off-state voltage<br>$V_D = 400\text{ V}$ |  |

Performance Curves

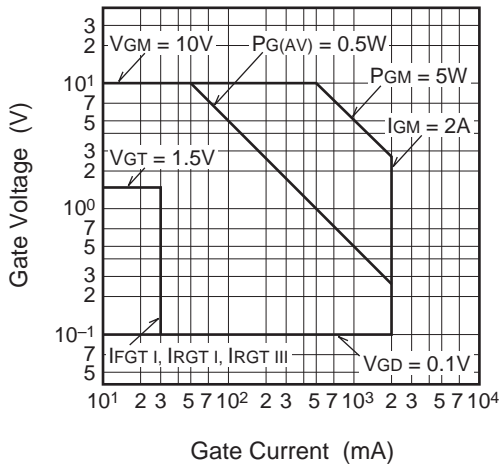
Maximum On-State Characteristics



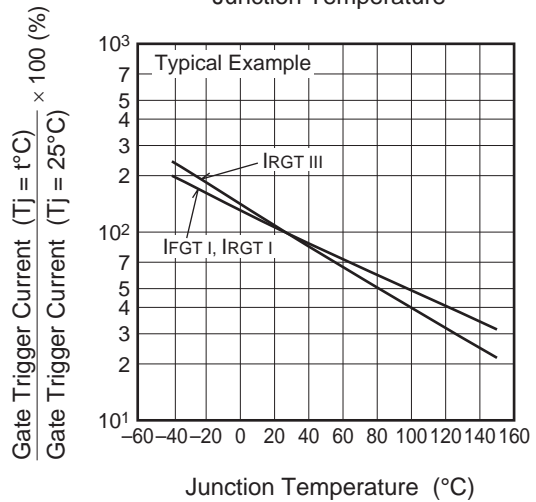
Rated Surge On-State Current



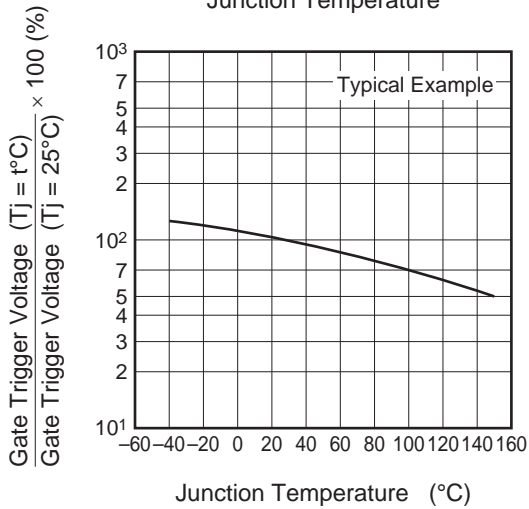
Gate Characteristics (I, II and III)



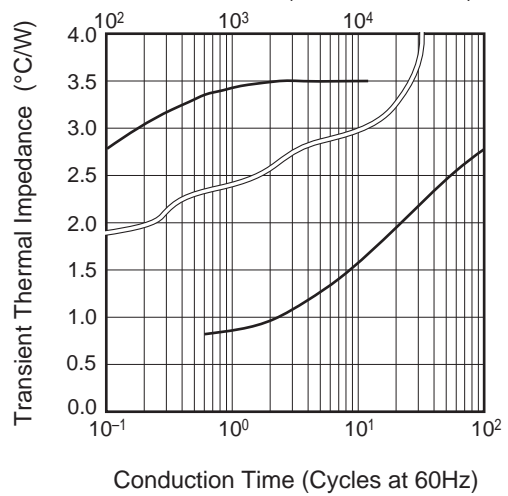
Gate Trigger Current vs. Junction Temperature



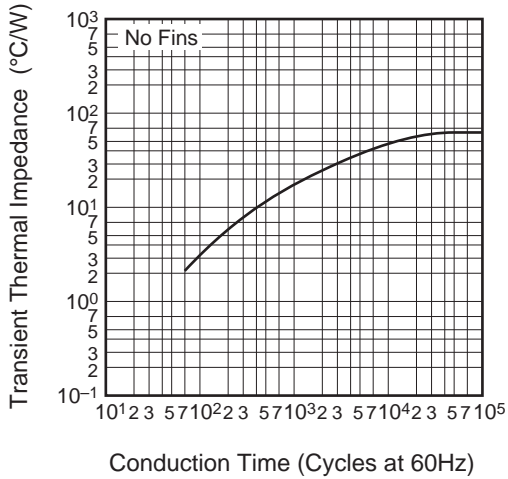
Gate Trigger Voltage vs. Junction Temperature



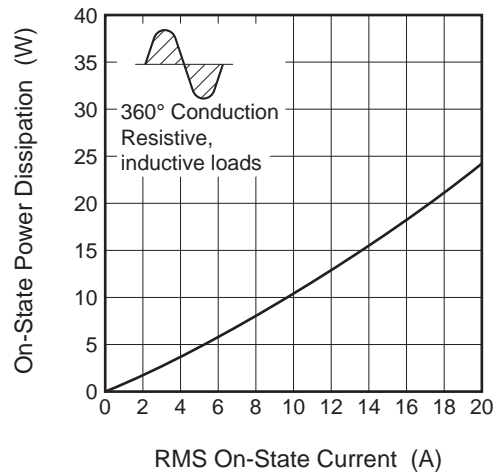
Maximum Transient Thermal Impedance Characteristics (Junction to case)



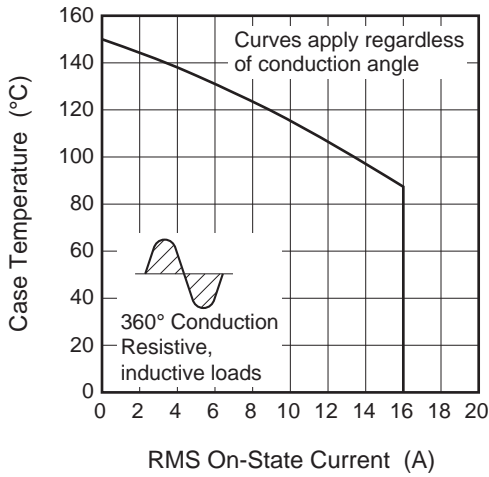
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



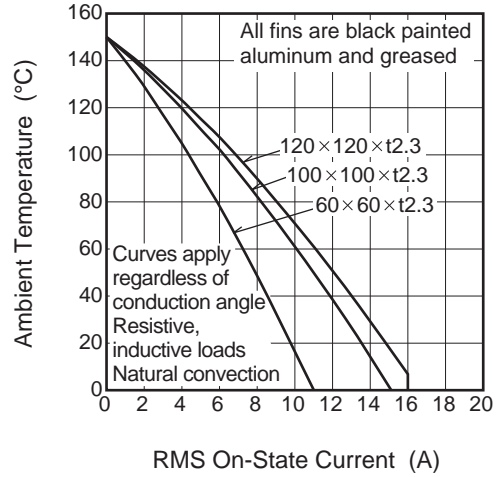
Maximum On-State Power Dissipation



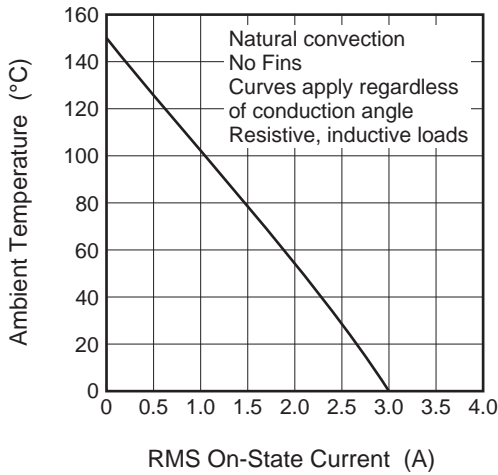
Allowable Case Temperature vs. RMS On-State Current



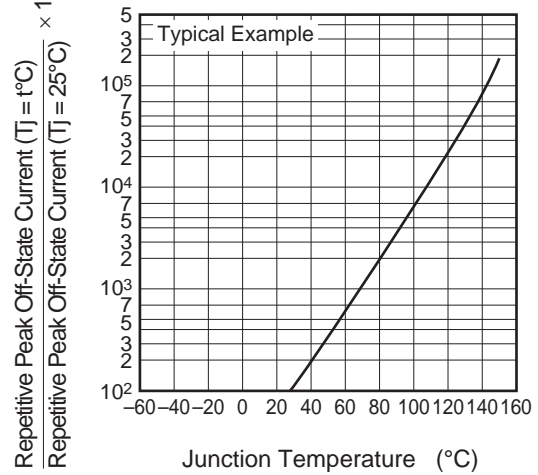
Allowable Ambient Temperature vs. RMS On-State Current



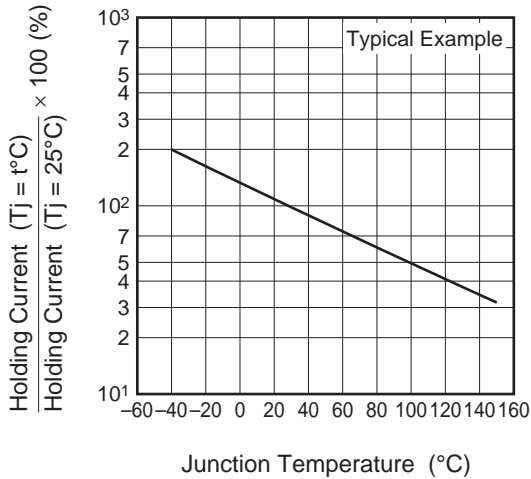
Allowable Ambient Temperature vs. RMS On-State Current



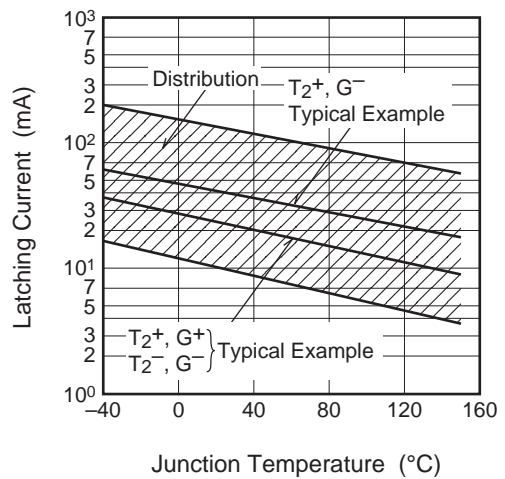
Repetitive Peak Off-State Current vs. Junction Temperature



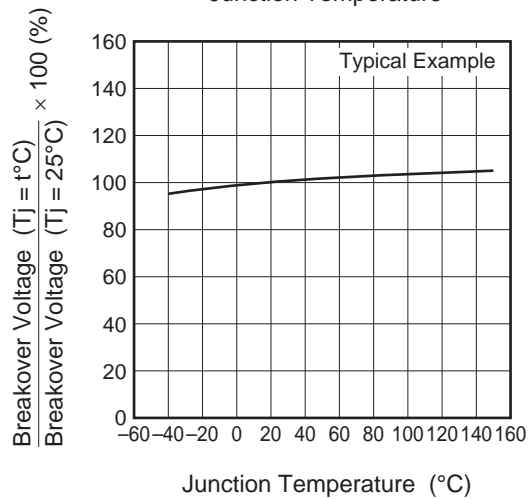
Holding Current vs. Junction Temperature



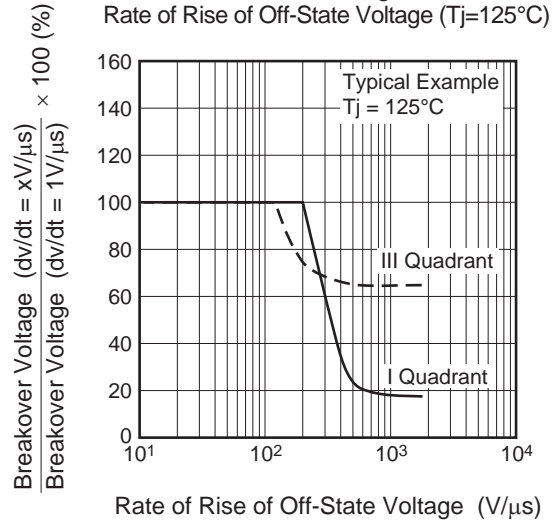
Latching Current vs. Junction Temperature



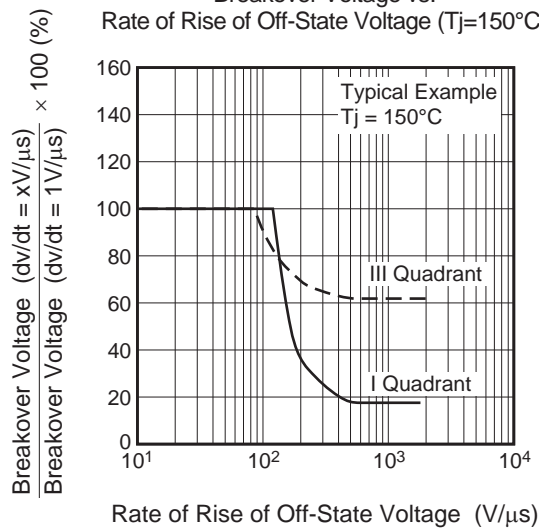
Breakover Voltage vs. Junction Temperature



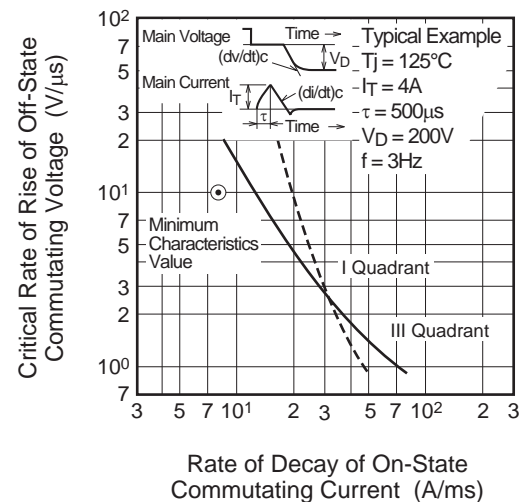
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=125°C)



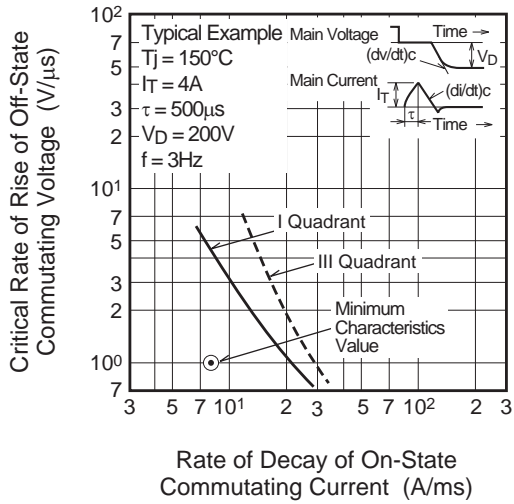
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)



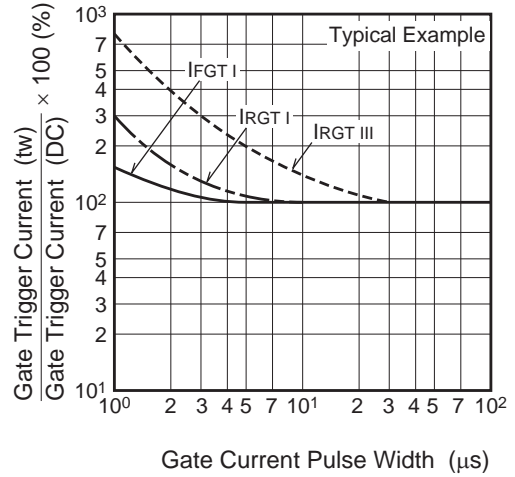
Commutation Characteristics (Tj=125°C)



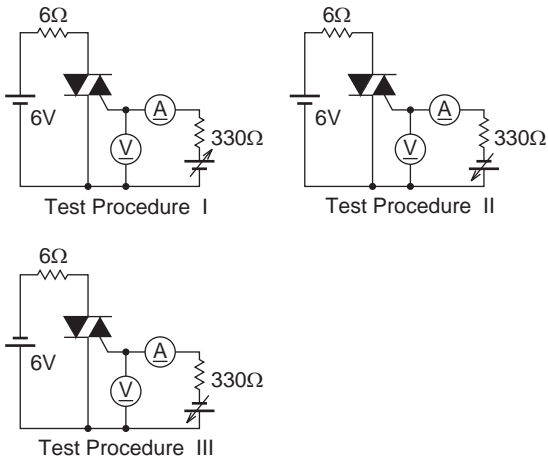
Commutation Characteristics ( $T_j=150^{\circ}\text{C}$ )



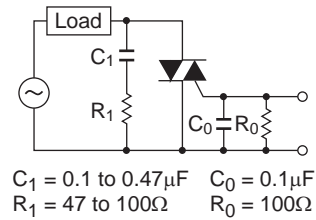
Gate Trigger Current vs. Gate Current Pulse Width



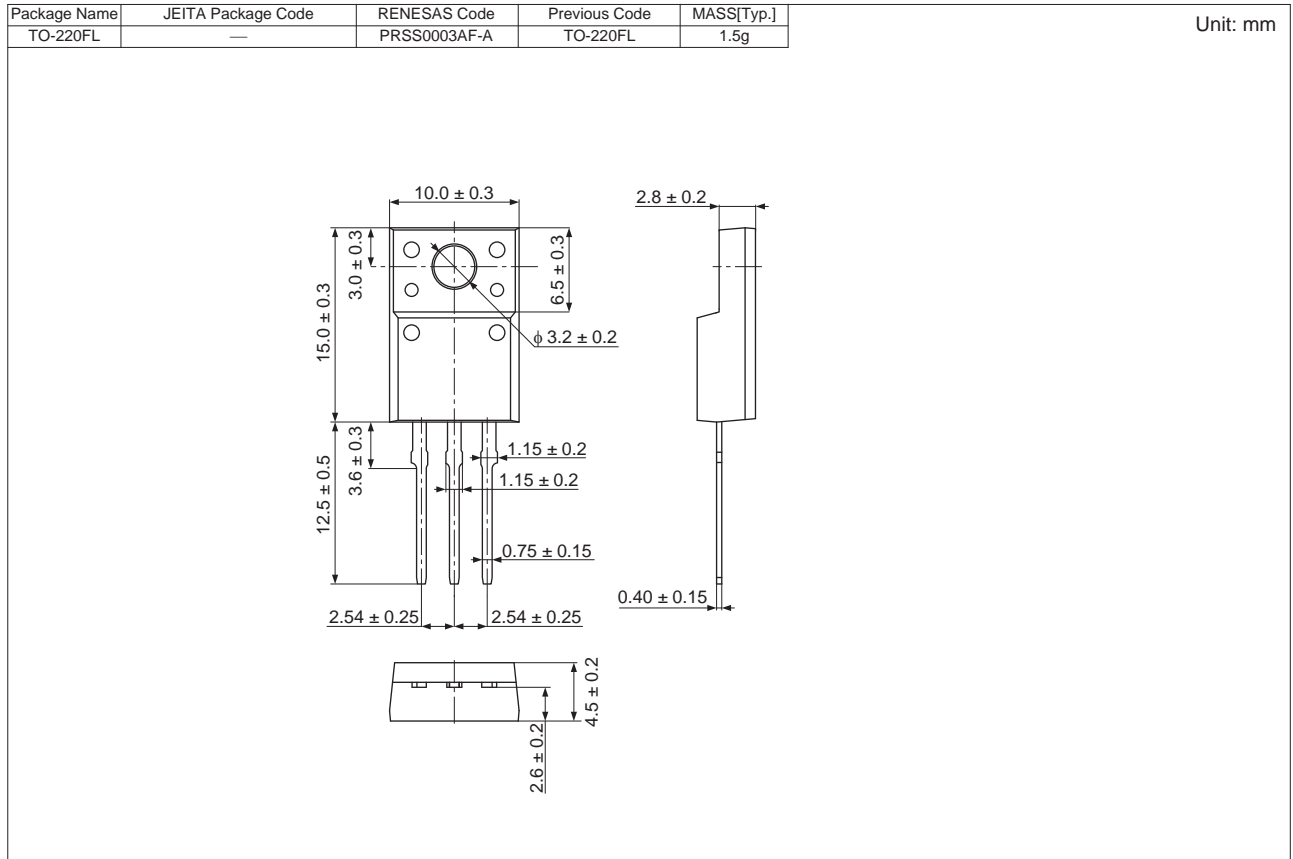
Gate Trigger Characteristics Test Circuits



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                     | BCR16LM-14LB                |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name – Lead forming code | BCR16LM-14LB-A8             |

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

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