

# BCR12FM-12LB

600V - 12A - Triac

Medium Power Use

R07DS1104EJ0201

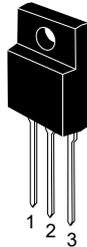
Rev.2.01

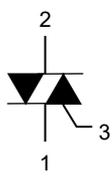
May 31, 2018

## Features

- $I_{T(RMS)}$  : 12 A
- $V_{DRM}$  : 600 V
- $T_j$ : 150 °C
- $I_{FGTI}$ ,  $I_{RGTI}$ ,  $I_{RGT III}$ : 30 mA(20mA) <sup>Note5</sup>
- Insulated Type
- Planar Passivation Type
- Viso: 2000V

## Outline

<p>RENESAS Package code: PRSS0003AG-A (Package name: TO-220FP)</p>  <p><b>Not Recommended for New Design</b></p>	<p>RENESAS Package code: PRSS0003AP-A (Package name: TO-220FPA)</p> 
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1. T<sub>1</sub> Terminal  
2. T<sub>2</sub> 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 <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	$I_{T(RMS)}$	12	A	Commercial frequency, sine full wave 360°conduction, $T_c = 102^\circ\text{C}$ (#BB0, #BH0) <sup>Note2</sup> $T_c = 93^\circ\text{C}$ (#BG0) <sup>Note2</sup>
Surge on-state current	$I_{TSM}$	120	A	50 Hz sinewave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusion	$I^2t$	60	A <sup>2</sup> s	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	$T_j$	-40 to +150	°C	
Storage temperature	$T_{stg}$	-40 to +150	°C	
Isolation voltage <sup>Note7</sup>	$V_{iso}$	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.  
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	$T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied	
On-state voltage	$V_{TM}$	—	—	1.6	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 20\text{ A}$ , instantaneous measurement	
Gate trigger voltage <sup>Note3</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>Note3</sup>	I	$I_{FGTI}$	—	—	30 <sup>Note6</sup>	mA	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$I_{RGTI}$	—	—	30 <sup>Note6</sup>	mA	
	III	$I_{RGTIII}$	—	—	30 <sup>Note6</sup>	mA	
Gate non-trigger voltage	$V_{GD}$	0.2	—	—	V	$T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$	
		0.1	—	—		$T_j = 150^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$	
Thermal resistance	$R_{th(j-c)}$	—	—	3.3	$^\circ\text{C/W}$	Junction to case <sup>Note4</sup> (#BB0, #BH0) <sup>Note2</sup>	
		—	—	4.0	$^\circ\text{C/W}$	Junction to case <sup>Note4</sup> (#BG0) <sup>Note2</sup>	
Critical-rate of rise of off-state commutation voltage <sup>Note5</sup>	$(dv/dt)_c$	10	—	—	V/ $\mu\text{s}$	$T_j = 125^\circ\text{C}$	
		1	—	—		$T_j = 150^\circ\text{C}$	

Notes: 3. Measurement using the gate trigger characteristics measurement circuit.

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

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

6. High sensitivity ( $I_{GT} \leq 20\text{ mA}$ ) is also available. ( $I_{GT}$  item:1)

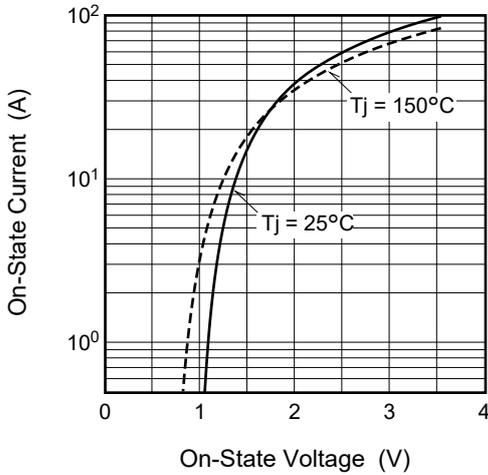
7. Make sure that your finished product containing this device meets your safe isolation requirements.

For safety, it's advisable that heatsink is electrically floating.

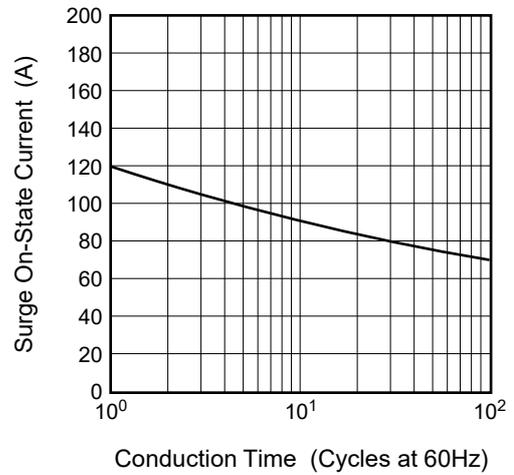
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -6.0\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

Performance Curves

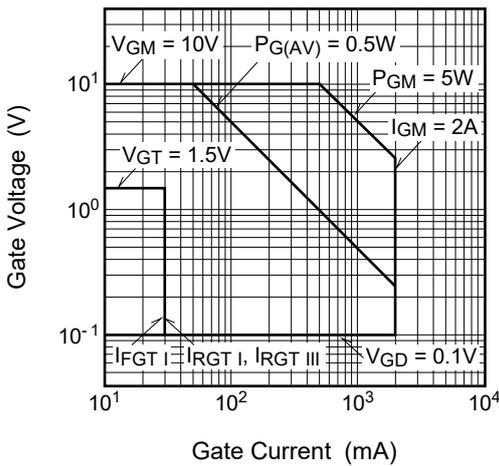
Maximum On-State Characteristics



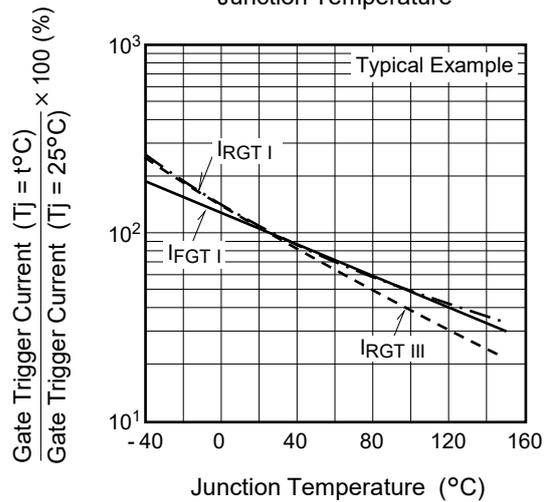
Rated Surge On-State Current



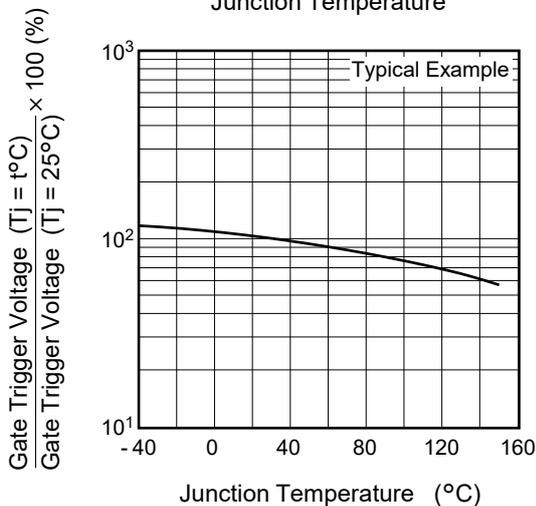
Gate Characteristics (I, II and III)



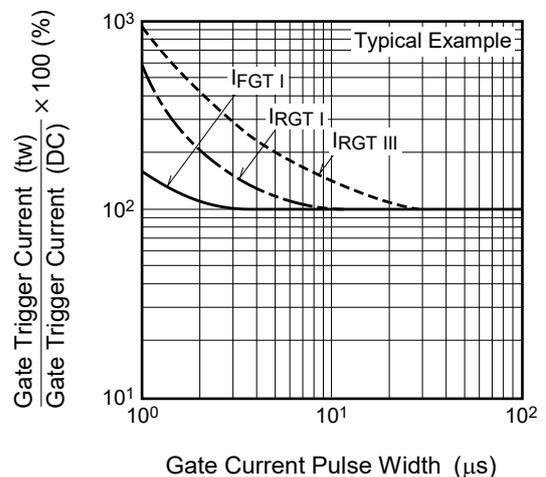
Gate Trigger Current vs. Junction Temperature

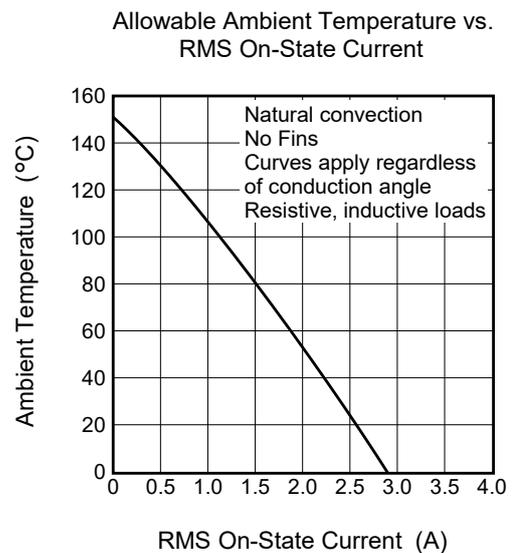
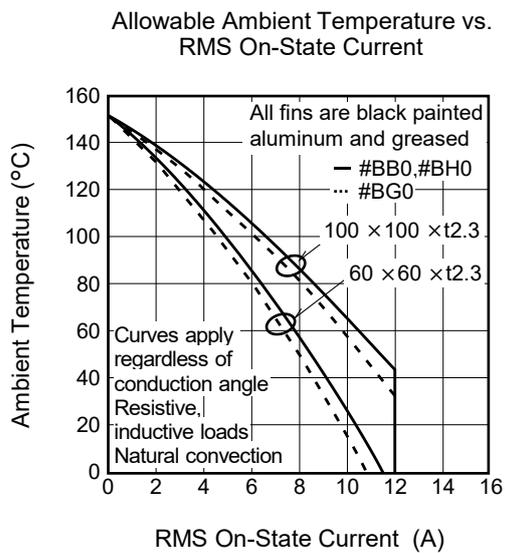
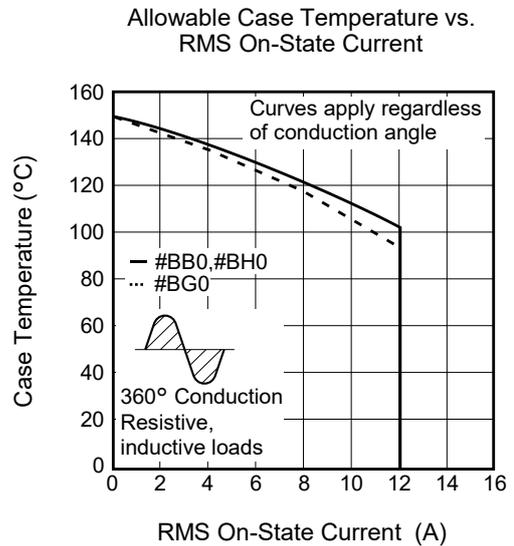
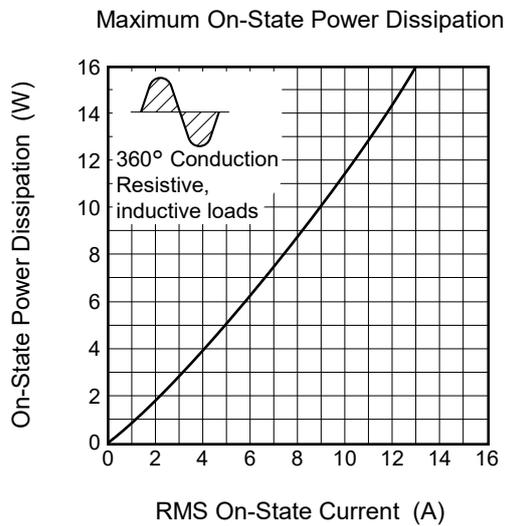
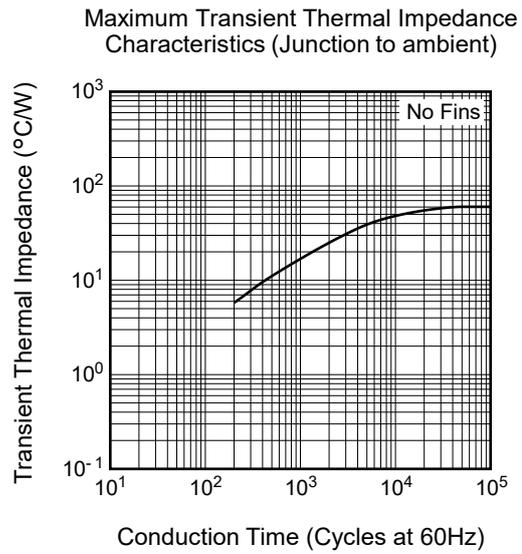
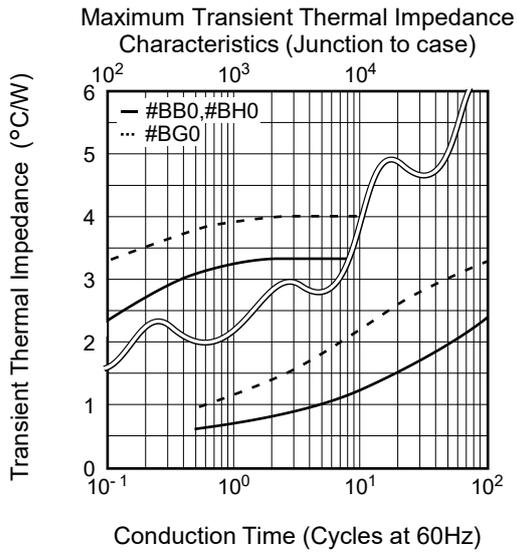


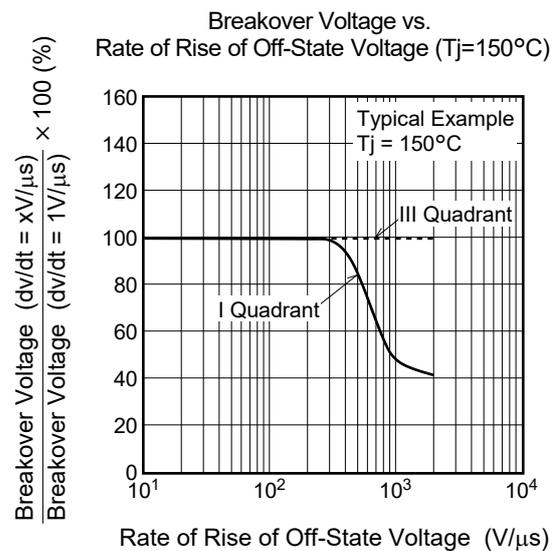
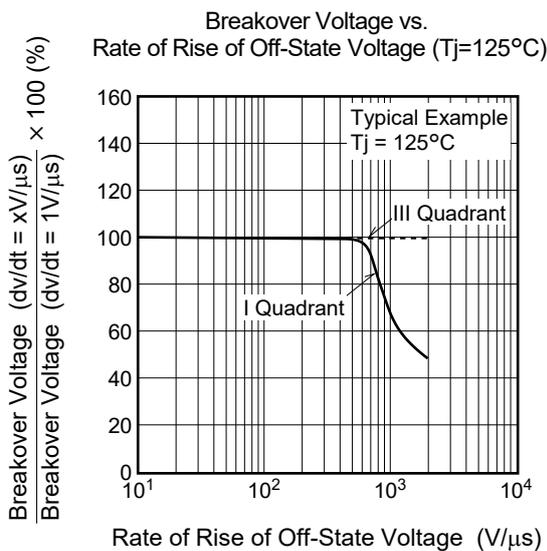
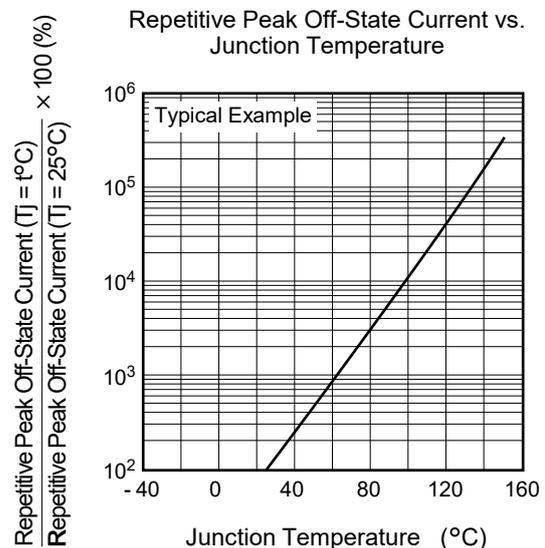
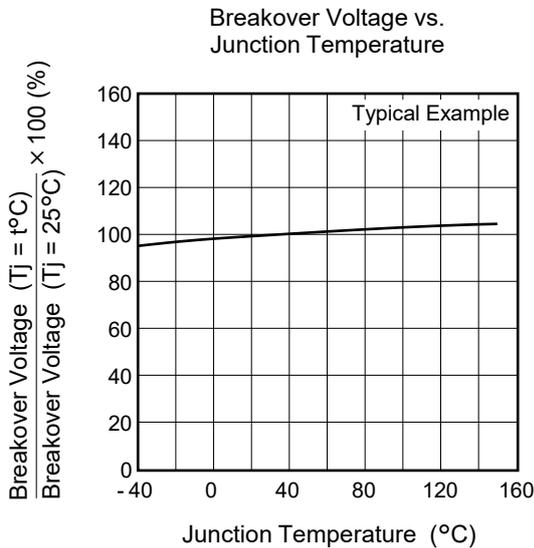
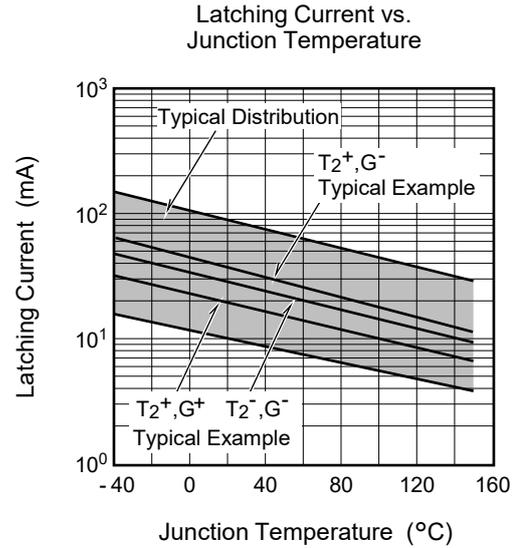
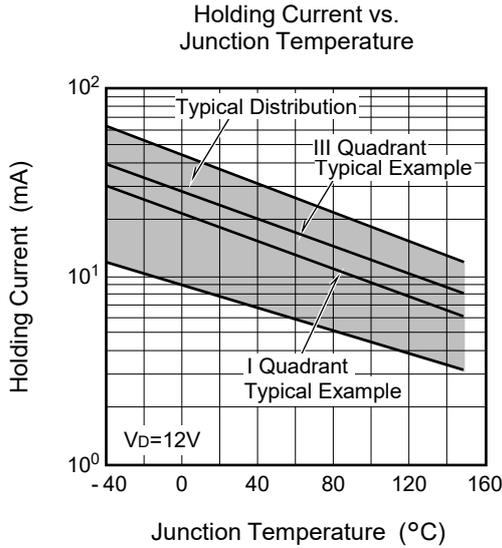
Gate Trigger Voltage vs. Junction Temperature



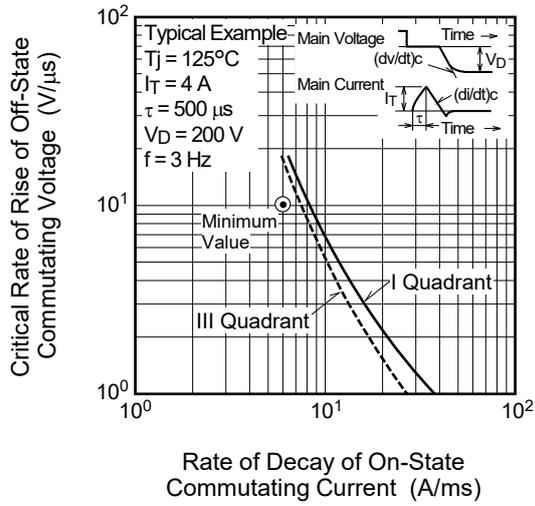
Gate Trigger Current vs. Gate Current Pulse Width



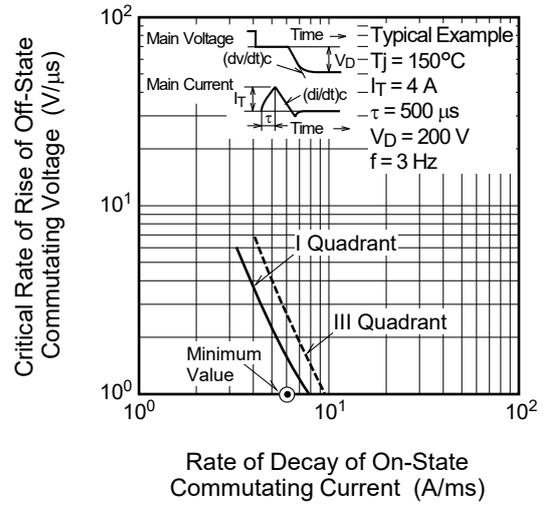




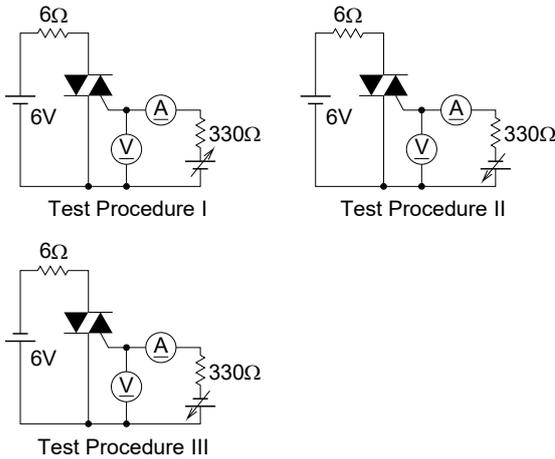
Commutation Characteristics (Tj=125°C)



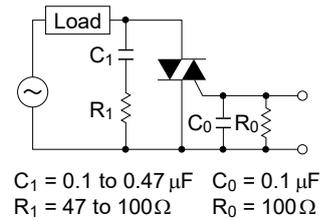
Commutation Characteristics (Tj=150°C)



Gate Trigger Characteristics Test Circuits



Recommended peripheral components for Triac

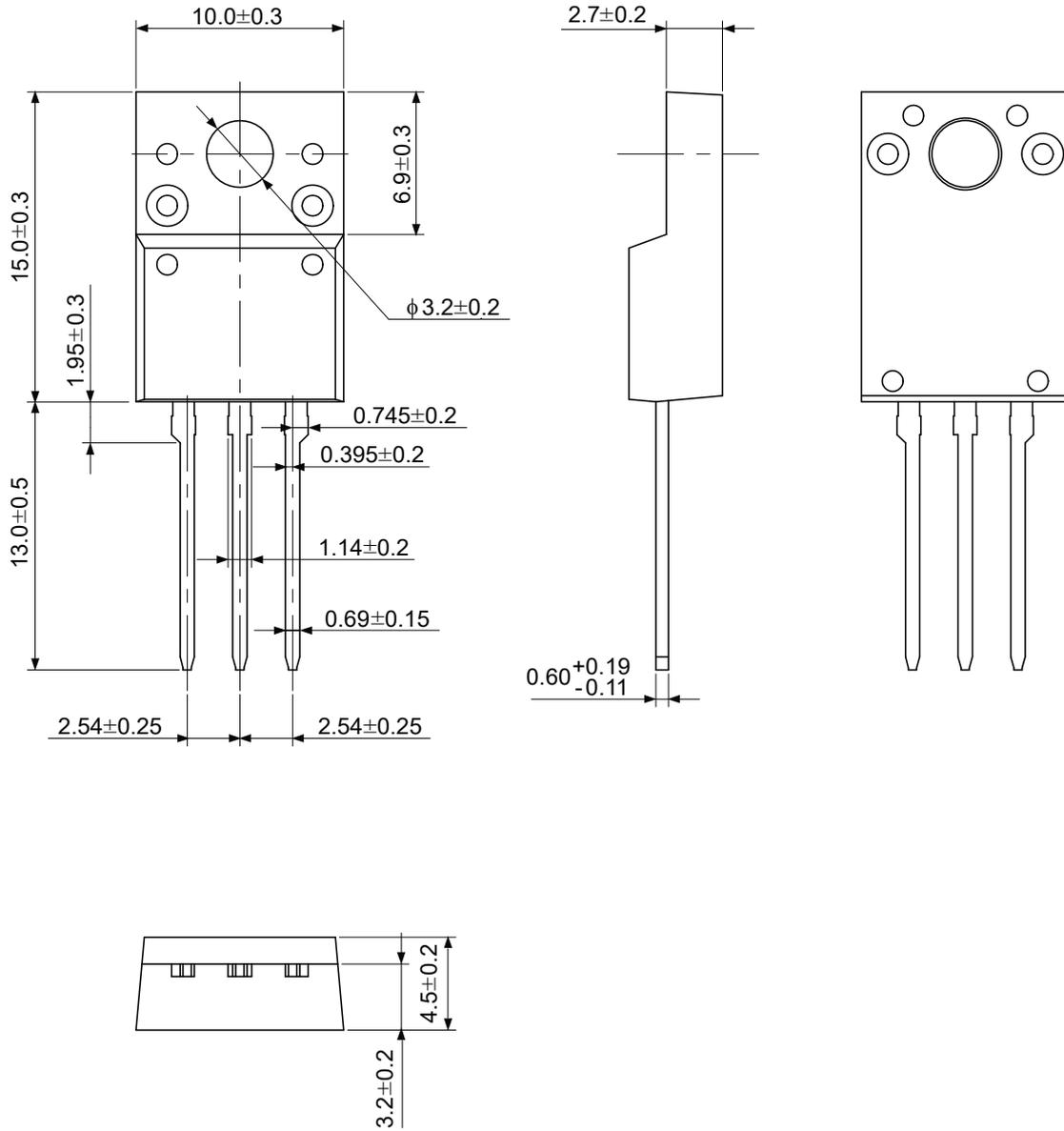


**Package Dimensions**

Ordering code: #BG0, #BH0

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

Unit: mm



## Package Dimensions

Ordering code: #BB0 <To be EOLed>

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

## Ordering Information

Orderable Part Number	Package	Quantity <sup>Note8</sup>	Remark	Status
BCR12FM-12LB#BG0	TO-220FPA	50 pcs./ tube	Straight type	Mass Production
BCR12FM-12LB-1#BG0	TO-220FPA	50 pcs./ tube	Straight type, I <sub>GT</sub> item:1	
BCR12FM-12LB□□#BG0	TO-220FPA	50 pcs./ tube	□□:Lead form type	
BCR12FM12LB1□□#BG0	TO-220FPA	50 pcs./ tube	□□:Lead form type, I <sub>GT</sub> item:1	Under Development
BCR12FM-12LB#BH0	TO-220FPA	50 pcs./ tube	Straight type	
BCR12FM-12LB-1#BH0	TO-220FPA	50 pcs./ tube	Straight type, I <sub>GT</sub> item:1	
BCR12FM-12LB□□#BH0	TO-220FPA	50 pcs./ tube	□□:Lead form type	
BCR12FM12LB1□□#BH0	TO-220FPA	50 pcs./ tube	□□:Lead form type, I <sub>GT</sub> item:1	Not Recommended for New Design
BCR12FM-12LB#BB0	TO-220FP	50 pcs./ tube	Straight type	
BCR12FM-12LB□□#BB0	TO-220FP	50 pcs./ tube	□□:Lead form type	

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

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