

## BCR5PM-12L

Triac

Medium Power Use

(The product guaranteed maximum junction temperature of 150°C)

REJ03G0460-0300

Rev.3.00

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### Features

- $I_{T(RMS)}$  : 5 A
- $V_{DRM}$  : 600 V
- $I_{FGTI}, I_{RGTI}, I_{RGTHI}$  : 20 mA (10 mA)<sup>Note5</sup>
- Viso : 2000 V
- Insulated Type
- Planar Passivation Type

### Outline

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



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

### Applications

Switching mode power supply, light dimmer, electronic flasher unit, control of household equipment such as TV sets, stereo systems, refrigerator, washing machine, infrared kotatsu, carpet, solenoid driver, small motor control, copying machine, electric tool, electric heater control, and other general controlling device

### Warning

1. Refer to the recommended circuit values around the triac before using.
2. Be sure to exchange the specification before using. Otherwise, general triacs with the maximum junction temperature of 125°C will be supplied.

### 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

**BCR5PM-12L (The product guaranteed maximum junction temperature of 150°C)**

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_{T(RMS)}$	5	A	Commercial frequency, sine full wave 360° conduction, $T_c = 120^\circ\text{C}$
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	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$V_{RGTI}$	—	—	1.5	
	III	$V_{RGTIII}$	—	—	1.5	
Gate trigger current <sup>Note2</sup>	I	$I_{FGTI}$	—	—	20 <sup>Note5</sup>	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$I_{RGTI}$	—	—	20 <sup>Note5</sup>	
	III	$I_{RGTIII}$	—	—	20 <sup>Note5</sup>	
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	$R_{th(j-c)}$	—	—	4.0	$^\circ\text{C}/\text{W}$	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.

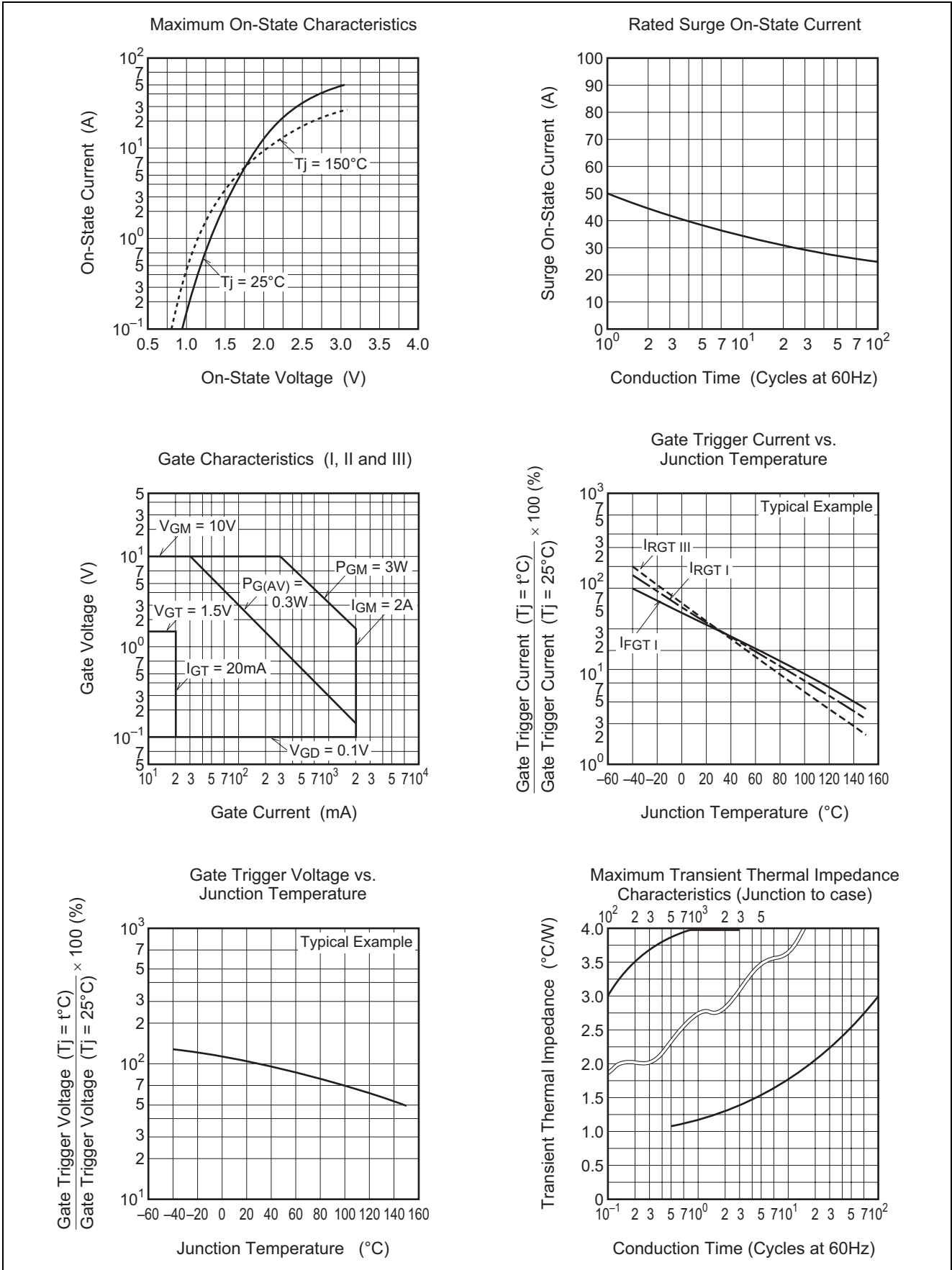
3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C}/\text{W}$ .

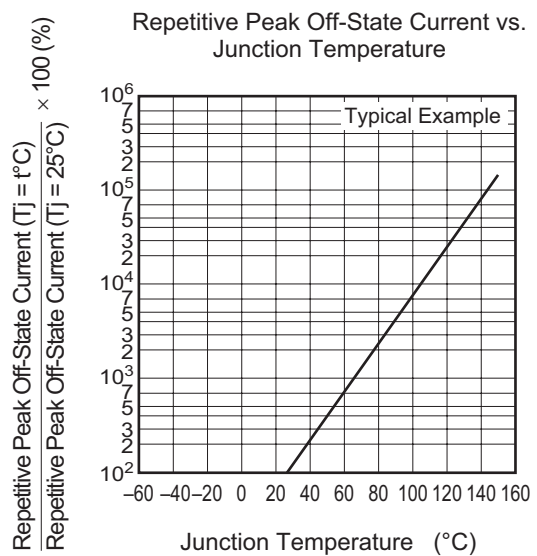
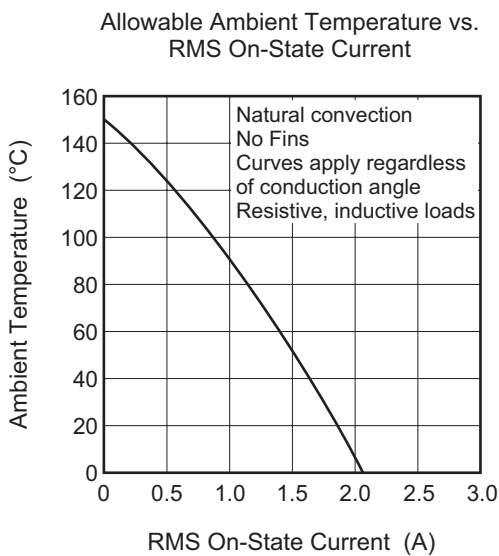
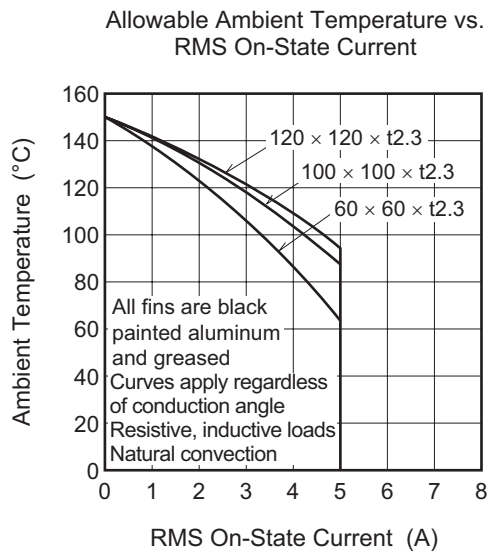
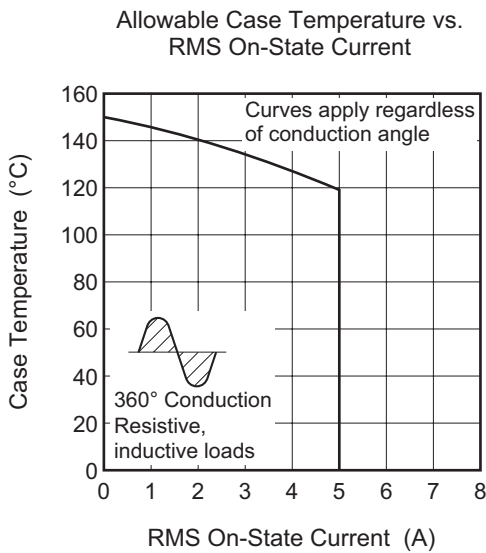
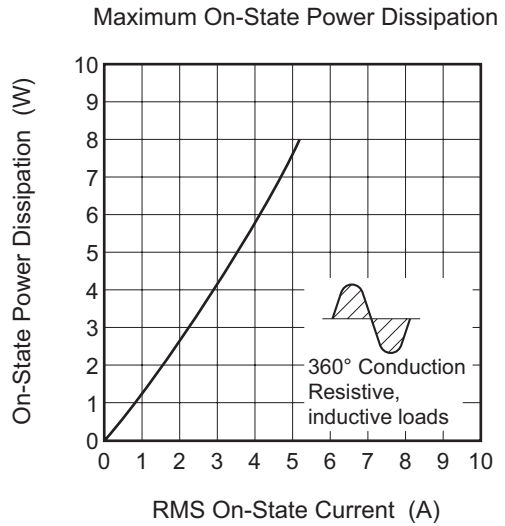
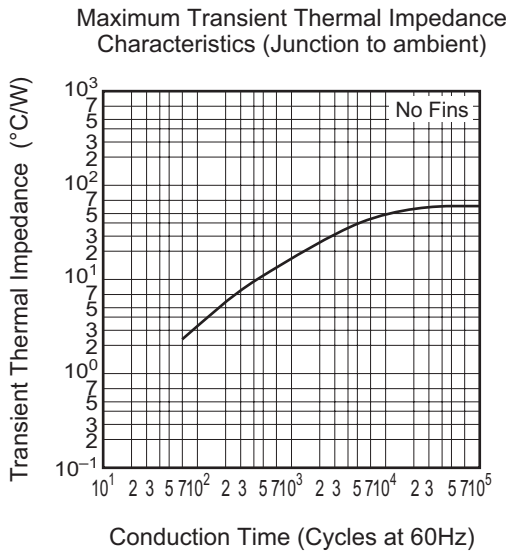
4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

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

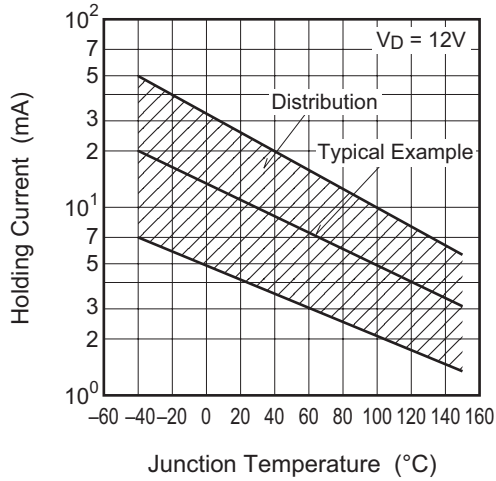
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -2.5\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

Performance Curves

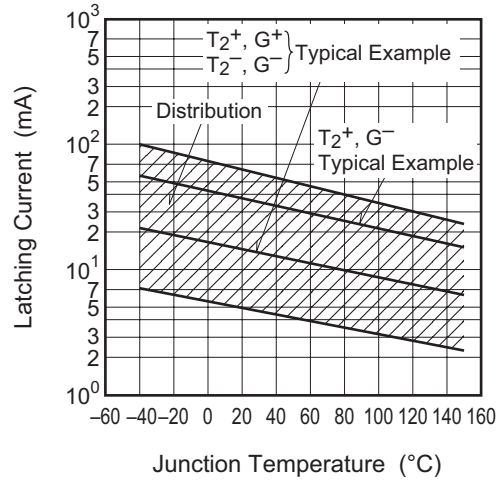




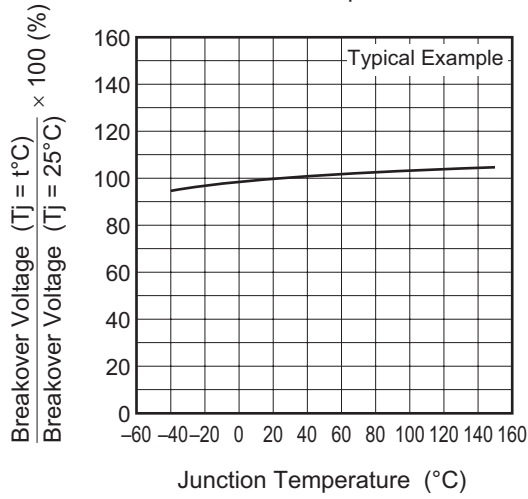
Holding Current vs. Junction Temperature



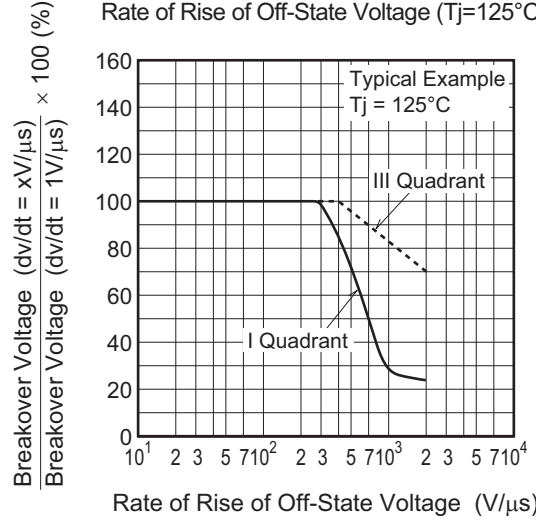
Latching Current vs. Junction Temperature



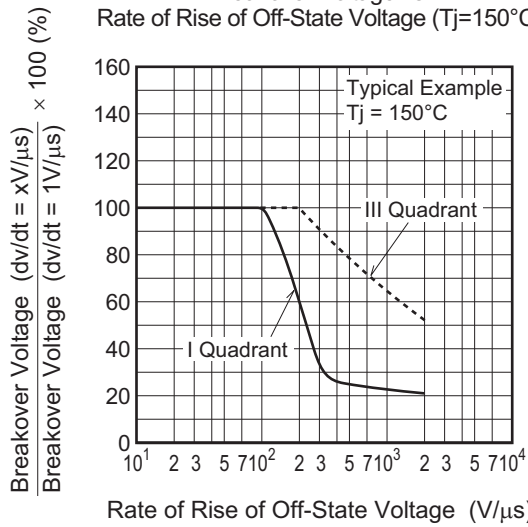
Breakover Voltage vs. Junction Temperature



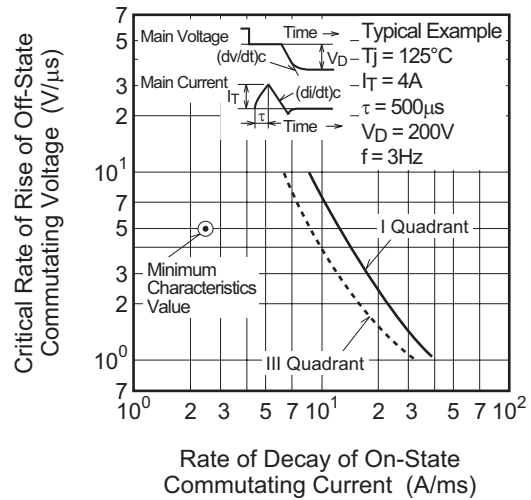
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=125°C)



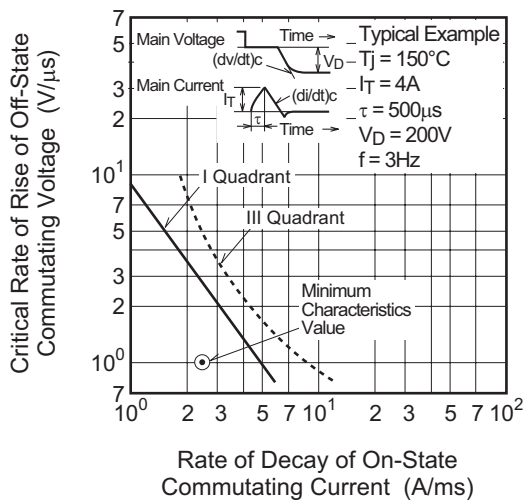
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)



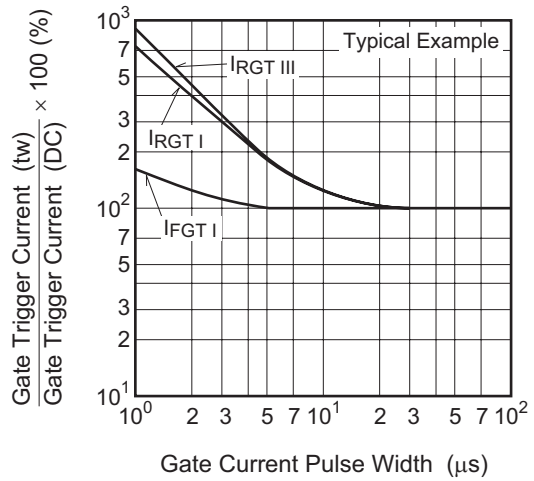
Commutation Characteristics (Tj=125°C)



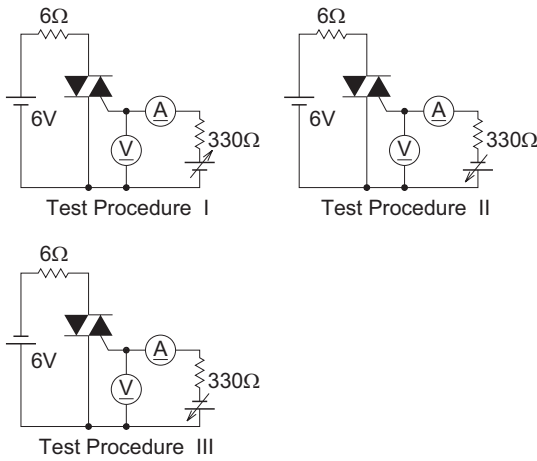
Commutation Characteristics (Tj=150°C)



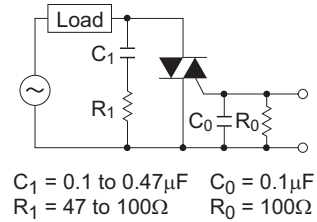
Gate Trigger Current vs. Gate Current Pulse Width



Gate Trigger Characteristics Test Circuits



Recommended Circuit Values Around The Triac



## Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220F	SC-67	PRSS0003AA-A	—	2.0g

Unit: mm

The technical drawing shows the following dimensions for the BCR5PM-12L package:

- Top View:** Total width is 10.5Max. The distance between the two leads is 5.2. The lead width is 1.2. The distance from the lead center to the mounting hole center is 2.54.
- Side View:** Total height is 17. The mounting hole diameter is  $\phi 3.2 \pm 0.2$ . The distance from the top of the package to the mounting hole center is 5.0. The distance from the mounting hole center to the lead start is 8.5. The lead length is 13.5Min. The lead thickness is 0.8. The lead tip width is 1.3Max.
- Detail View:** Shows a lead width of 2.8 and a lead thickness of 0.5.
- Bottom View:** Shows a package width of 4.5.

## Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Vinyl sack	100	Type name +B	BCR5PM-12LB
Lead form	Plastic Magazine (Tube)	50	Type name +B – Lead forming code	BCR5PM-12LB-A8

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

Notes:

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