

# BCR20FM-12LB

600V - 20A - Triac  
Medium Power Use

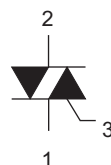
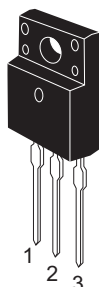
R07DS0889EJ0100  
Rev.1.00  
Oct 29, 2012

## Features

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

## Outline

RENESAS Package code: PRSS0003AG-A  
(Package name: TO-220FP)



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

## Applications

Switching mode power supply, washing machine, motor control, heater control, and other general purpose control applications.

## Maximum Ratings

Parameter	Symbol	Voltage class	
		12	Unit
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	$I_{T(RMS)}$	20	A	Commercial frequency, sine full wave 360° conduction, $T_c = 104^\circ\text{C}$
Surge on-state current	$I_{TSM}$	200	A	60 Hz sinewave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusion	$I^2t$	167	A <sup>2</sup> 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 +150	°C	
Storage temperature	$T_{stg}$	-40 to +150	°C	
Mass	—	1.9	g	Typical value
Isolation voltage <sup>Note6</sup>	Viso	2000	V	$T_a = 25^\circ\text{C}$ , AC 1 minute T <sub>1</sub> •T <sub>2</sub> •G terminal to case

## Electrical Characteristics

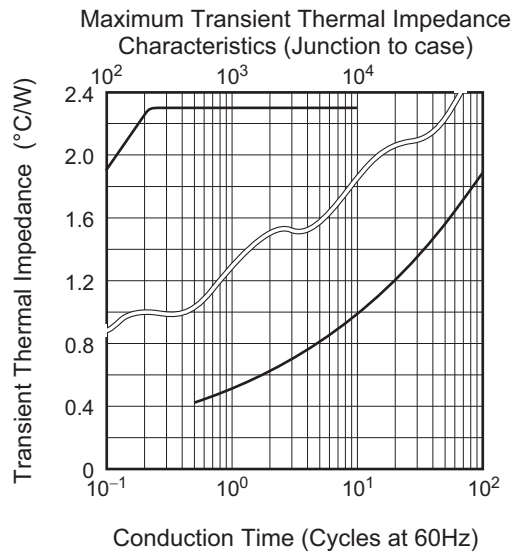
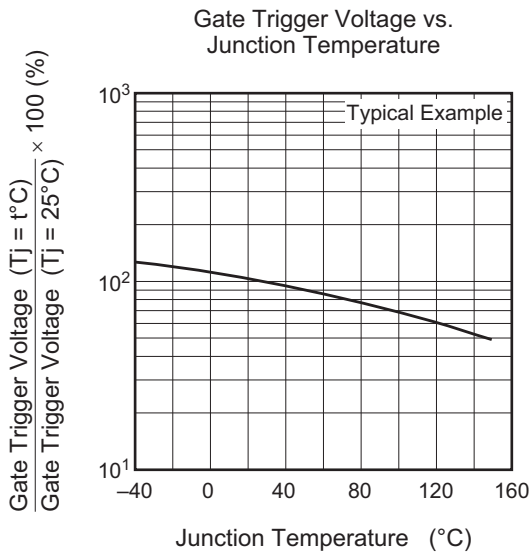
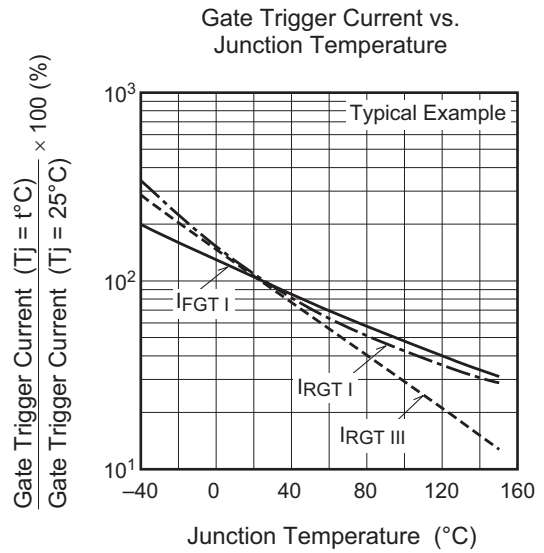
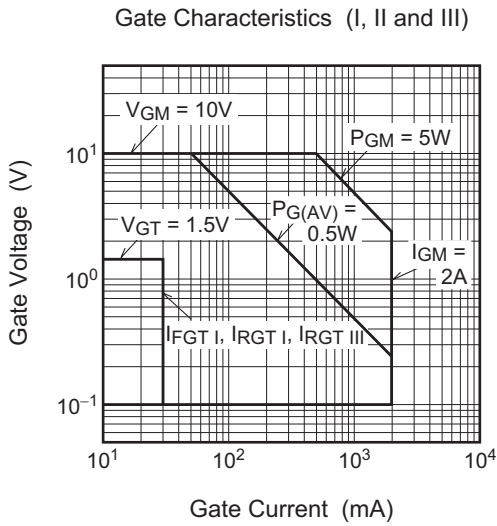
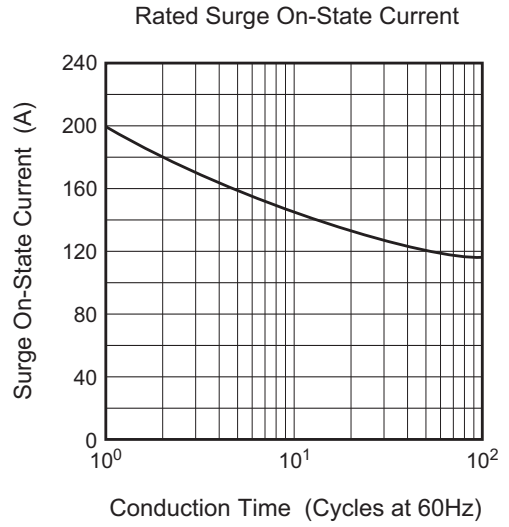
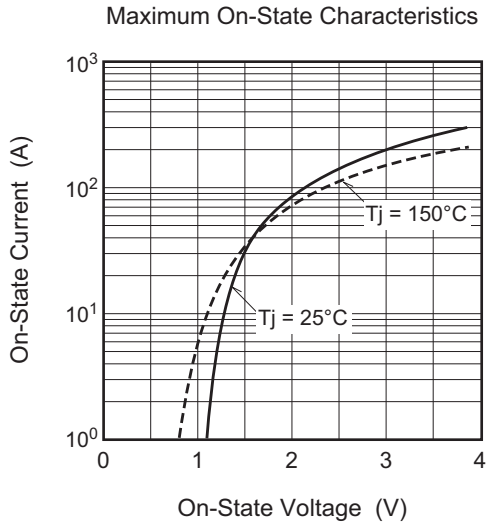
Parameter	Symbol	Rated value			Unit	Test conditions
		Min.	Typ.	Max.		
Repetitive peak off-state current	$I_{DRM}$	—	—	3.0	mA	$T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied
On-state voltage	$V_{TM}$	—	—	1.5	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 30\text{A}$ , instantaneous measurement
Gate trigger voltage <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	$I_{FGTI}$	—	—	30 <sup>Note5</sup>	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$I_{RGTI}$	—	—	30 <sup>Note5</sup>	
	III	$I_{RGTIII}$	—	—	30 <sup>Note5</sup>	
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	$R_{th(j-c)}$	—	—	2.3	$^\circ\text{C/W}$	Junction to case <sup>Note3</sup>
Critical-rate of rise of off-state commutation voltage <sup>Note4</sup>	$(dv/dt)_c$	10	—	—	$\text{V}/\mu\text{s}$	$T_j = 125^\circ\text{C}$
		1	—	—		$T_j = 150^\circ\text{C}$

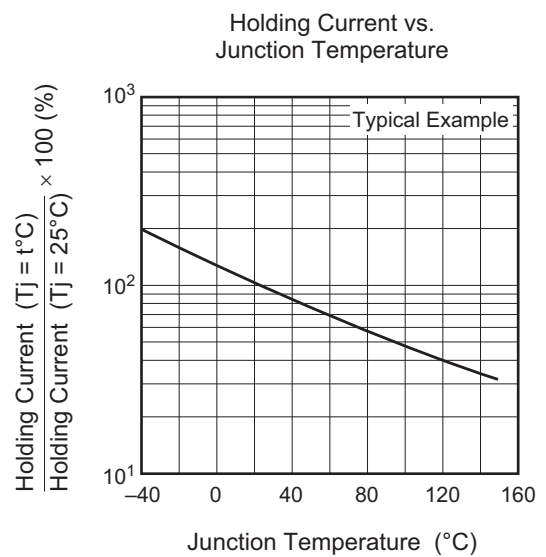
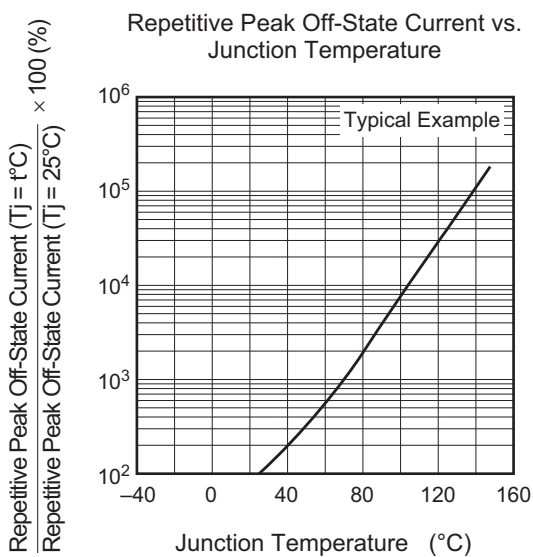
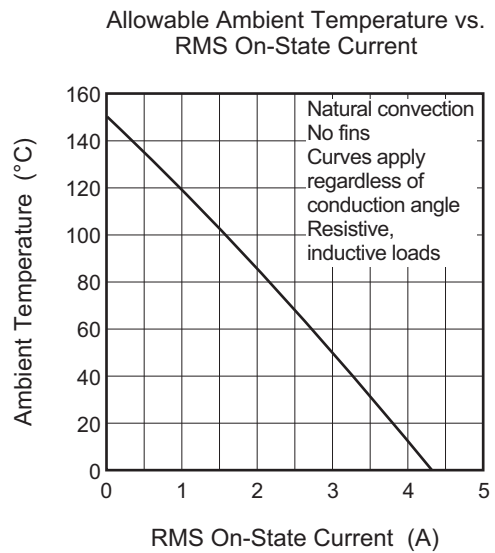
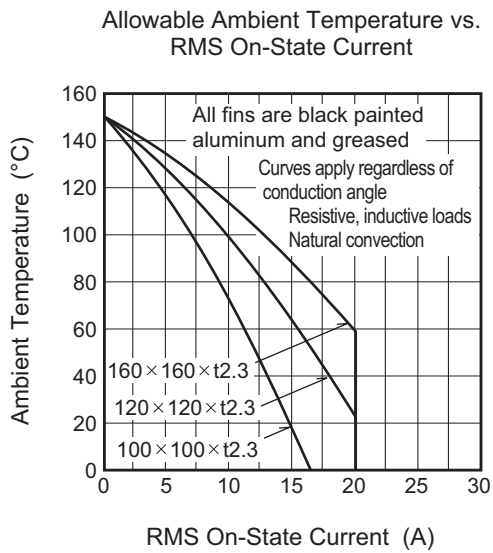
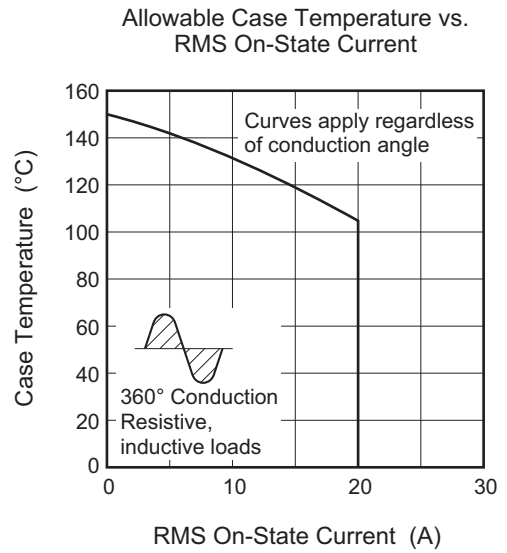
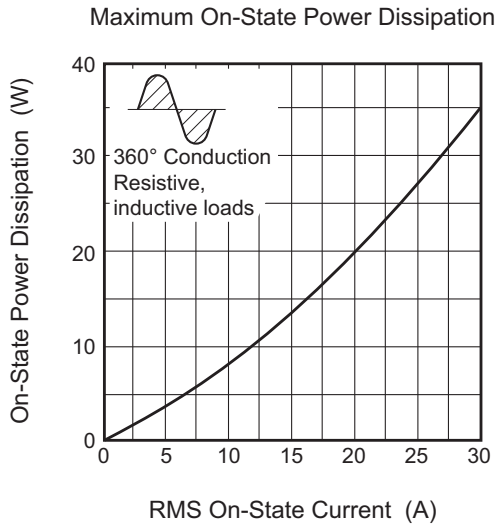
Notes: 1. Gate open.

- Measurement using the gate trigger characteristics measurement circuit.
- The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .
- Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.
- High sensitivity ( $I_{GT} \leq 20\text{ mA}$ ) is also available. ( $I_{GT}$  item: 1)
- Make sure that your finished product containing this device meets your safe isolation requirements. For safety, it's advisable that heatsink is electrically floating.

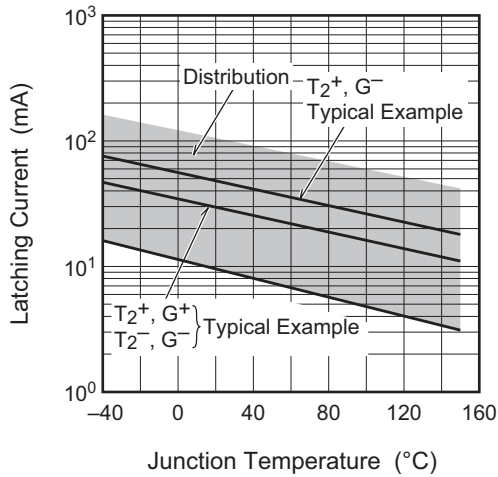
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -10\text{A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

Performance Curves

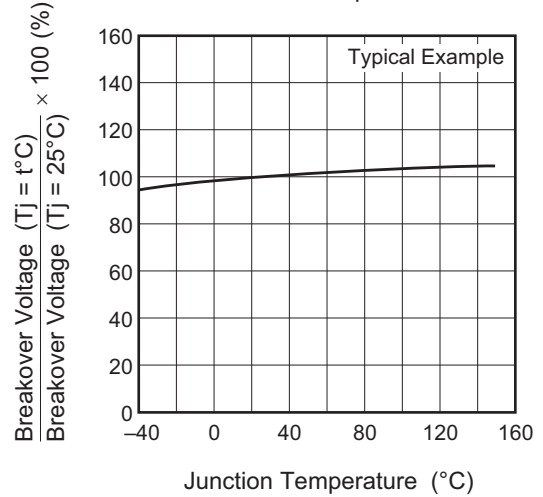




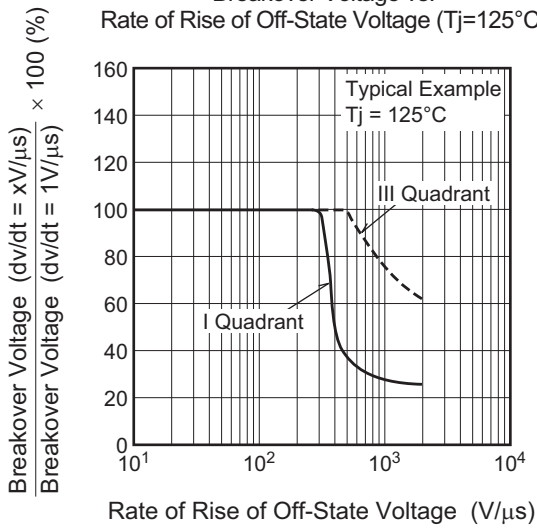
Latching Current vs. Junction Temperature



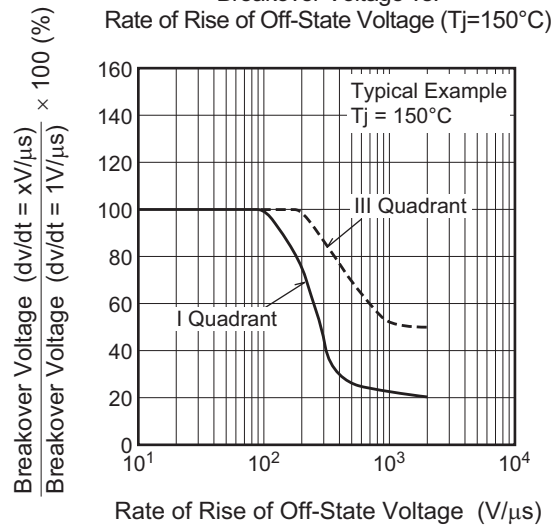
Breakover Voltage vs. Junction Temperature



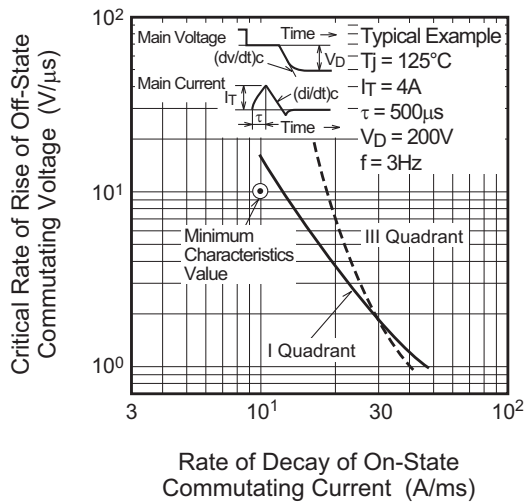
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=125°C)



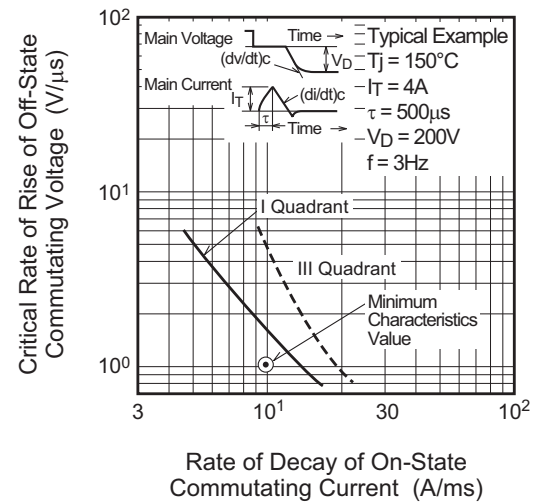
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)



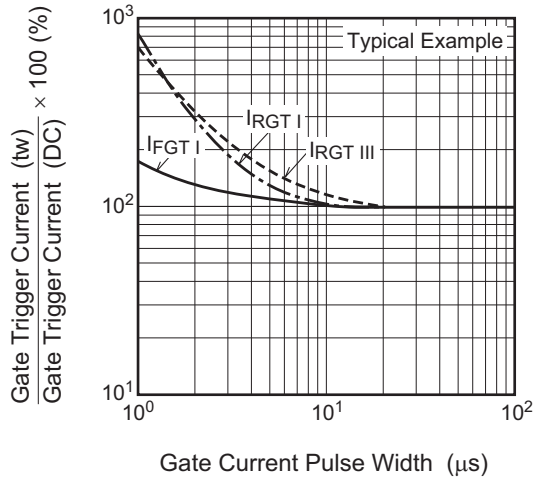
Commutation Characteristics (Tj=125°C)



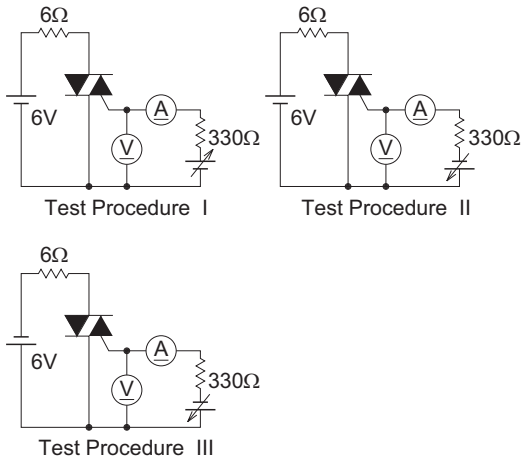
Commutation Characteristics (Tj=150°C)



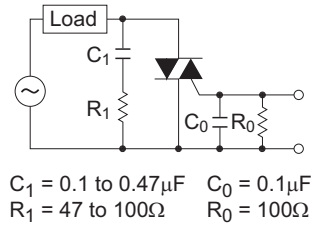
Gate Trigger Current vs. Gate Current Pulse Width



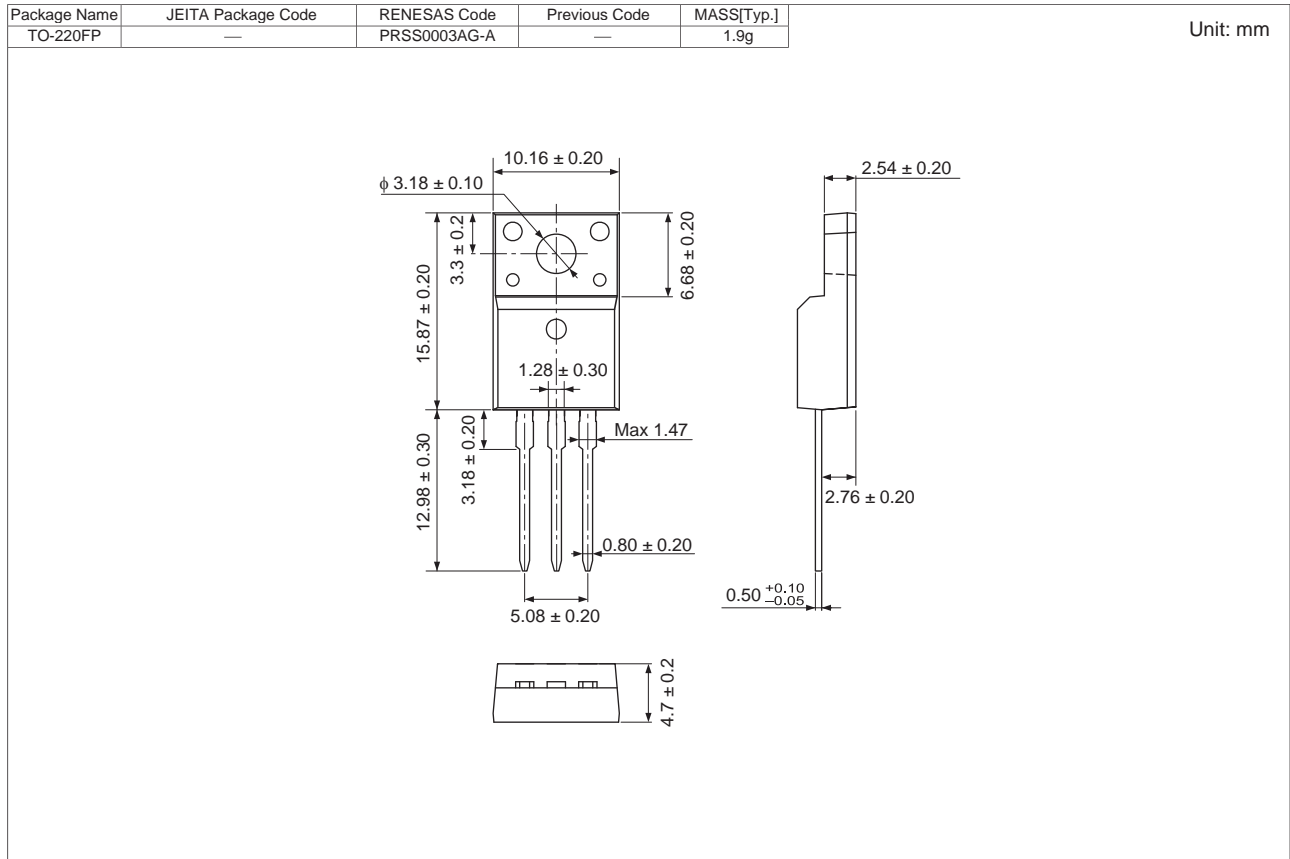
Gate Trigger Characteristics Test Circuits



Recommended Circuit Values Around The Triac



## Package Dimensions



## Ordering Information

Orderable Part Number	Packing	Quantity	Remark
BCR20FM-12LB#BB0	Tube	50 pcs.	Straight type
BCR20FM-12LB-1#BB0	Tube	50 pcs.	Straight type, IGT item:1
BCR20FM-12LBA8#BB0	Tube	50 pcs.	A8 Lead form
BCR20FM12LB1A8#BB0	Tube	50 pcs.	A8 Lead form, IGT item:1

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

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