

# BCR40RM-12LB

Triac  
Medium Power Use

R07DS0516EJ0100  
Rev.1.00  
Oct 14, 2011

## Features

- $I_{T(RMS)}$  : 40A
- $V_{DRM}$  : 600 V
- $T_j$ : 150 °C
- $I_{FGT}$ ,  $I_{RGT}$ ,  $I_{RGT}$  :50 mA
- Viso:2000V
- Insulated Type
- Planar Passivation Type

## Outline

RENESAS Package code: PRSS0003ZA-A  
(Package name: TO-3PFM)



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

## Applications

Contactless AC switch, electric heater control, light dimmer, on/off and speed control of small induction motor, on/off control of copier lamp

## 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

Notes: 1. Gate open.

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_{T(RMS)}$	40	A	Commercial frequency, sine full wave 360° conduction, $T_c = 61^\circ\text{C}$ <sup>Note3</sup>
Surge on-state current	$I_{TSM}$	400	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusion	$I^2t$	667	$\text{A}^2\text{s}$	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 +150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-40 +150	$^\circ\text{C}$	
Mass	—	5.2	g	Typical value
Isolation voltage	Viso	2000	V	$T_a=25^\circ\text{C}$ , AC 1 minute $T_1$ $T_2$ G terminal to case

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current	$I_{DRM}$	—	—	10.0	mA	$T_j = 150^\circ\text{C}$ , $V_{DRM}$ applied
On-state voltage	$V_{TM}$	—	—	1.55	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 60\text{A}$ , instantaneous measurement
Gate trigger voltage <sup>Note2</sup>	I $V_{FGTI}$	—	—	2.5	V	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II $V_{RGTI}$	—	—	2.5	V	
	III $V_{RGTIII}$	—	—	2.5	V	
Gate trigger current <sup>Note2</sup>	I $I_{FGTI}$	—	—	50	mA	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II $I_{RGTI}$	—	—	50	mA	
	III $I_{RGTIII}$	—	—	50	mA	
Gate non-trigger voltage	$V_{GD}$	0.2	—	—	V	$T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$
		0.1	—	—	V	$T_j = 150^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$
Thermal resistance	$R_{th(j-c)}$	—	—	1.8	$^\circ\text{C}/\text{W}$	Junction to case <sup>Note3</sup>
Critical-rate of rise of off-state commutation voltage <sup>Note4</sup>	$(dv/dt)_c$	20	—	—	$\text{V}/\mu\text{s}$	$T_j = 125^\circ\text{C}$
		2	—	—	$\text{V}/\mu\text{s}$	$T_j = 150^\circ\text{C}$

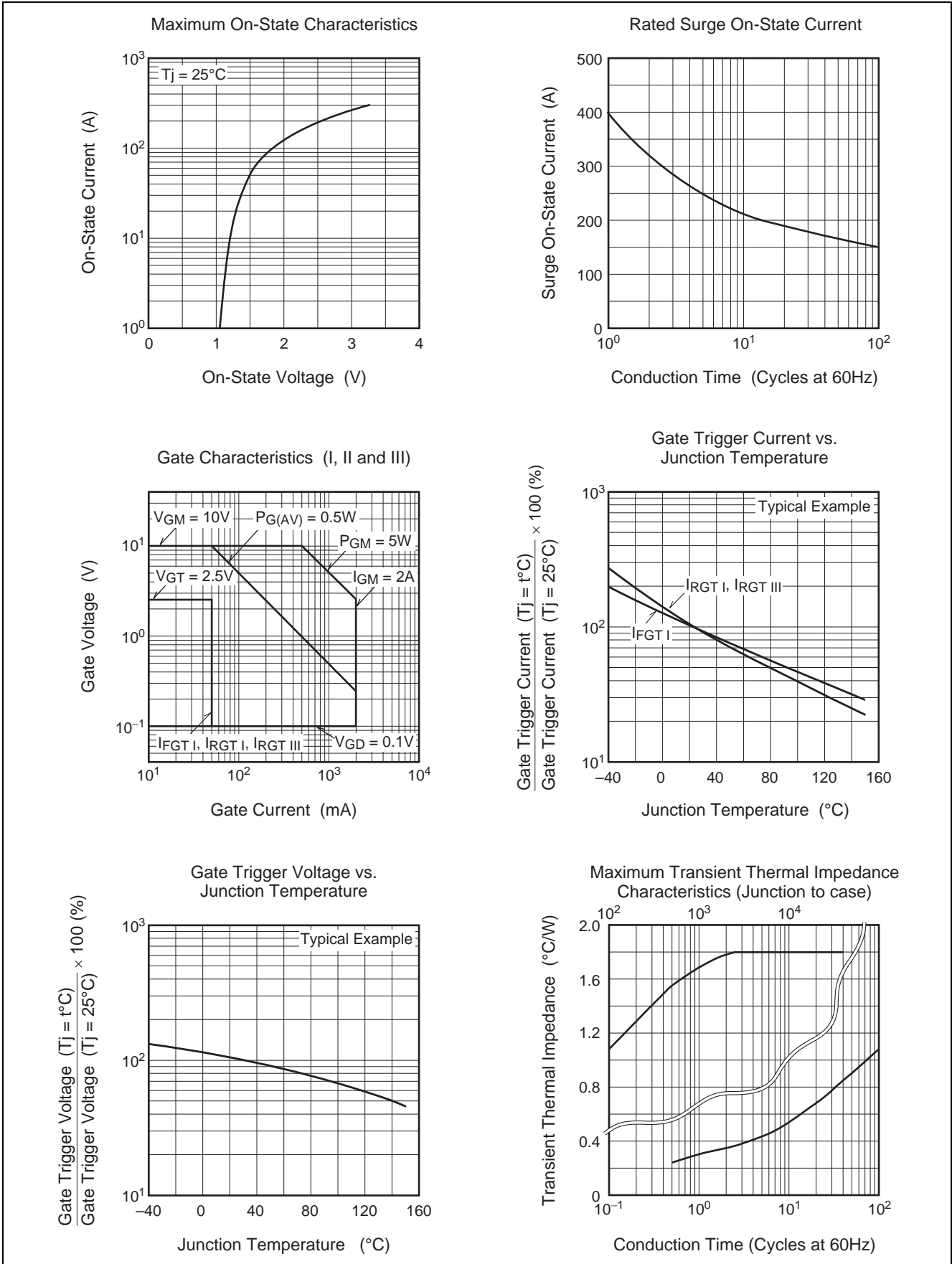
Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

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

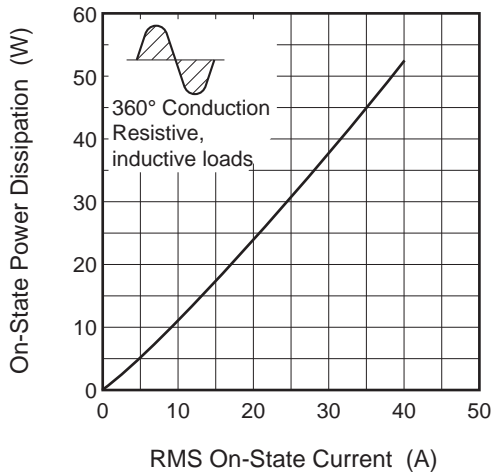
4. Test conditions of the critical-rate of rise of off-state commutating voltage shown in the table below.

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 $(di/dt)_c = -20\ \text{A}/\text{ms}$ 3. Peak off-state voltage $V_D = 400\ \text{V}$	

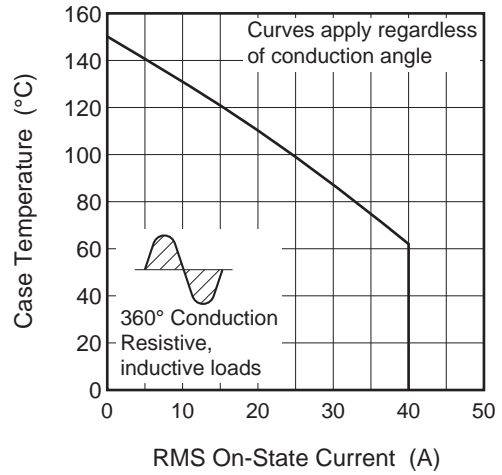
Performance Curves



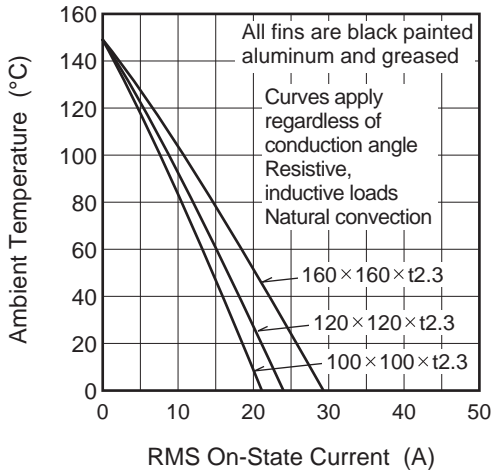
Maximum On-State Power Dissipation



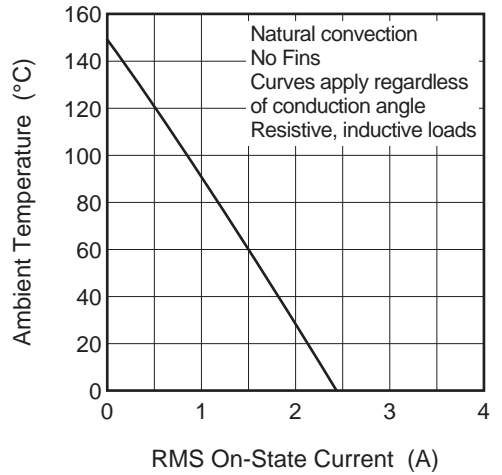
Allowable Case Temperature vs. RMS On-State Current



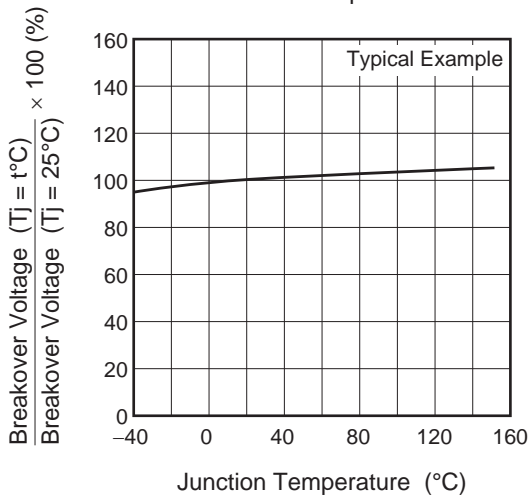
Allowable Ambient Temperature vs. RMS On-State Current



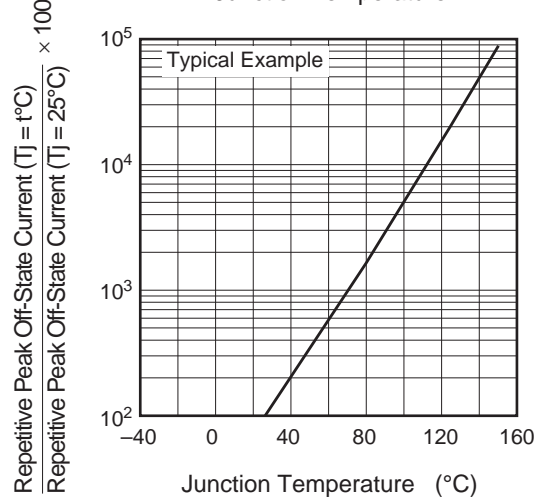
Allowable Ambient Temperature vs. RMS On-State Current



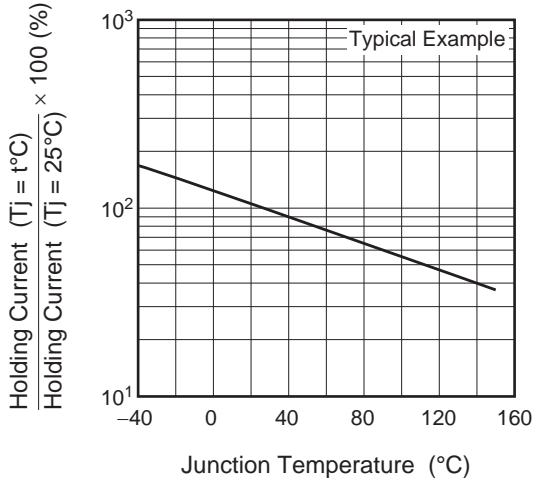
Breakover Voltage vs. Junction Temperature



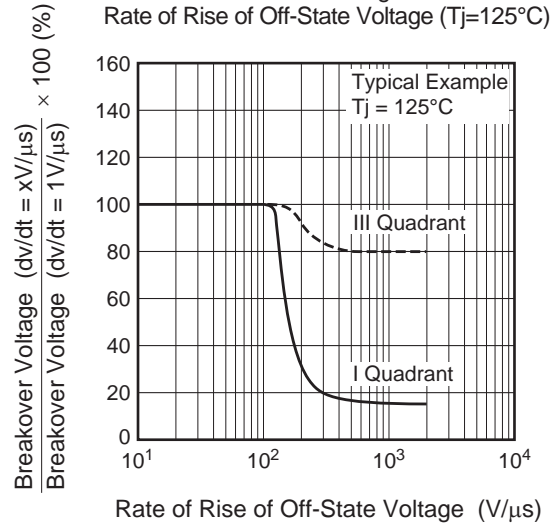
Repetitive Peak Off-State Current vs. Junction Temperature



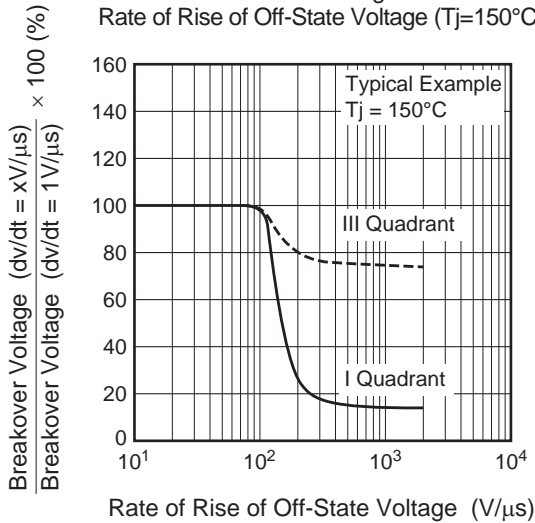
Holding Current vs. Junction Temperature



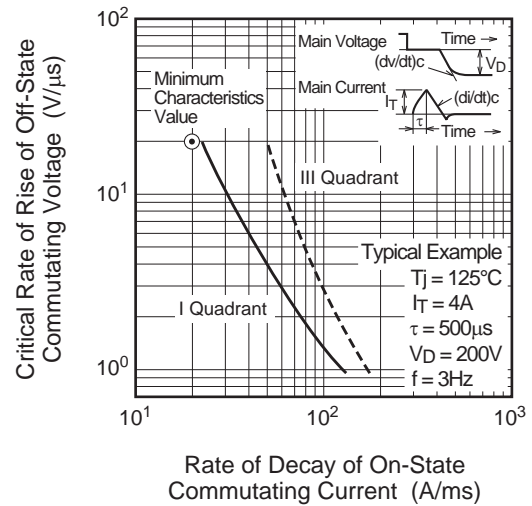
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=125°C)



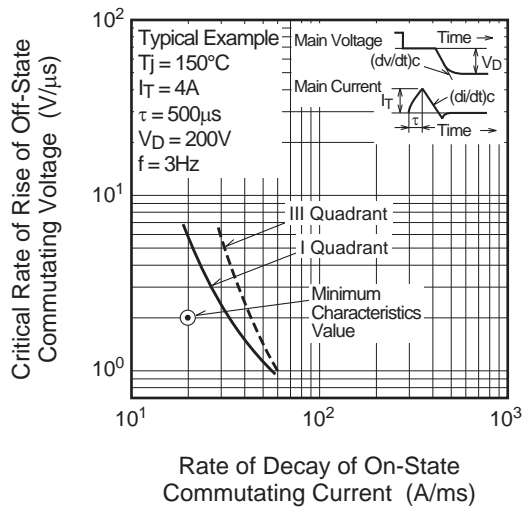
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)



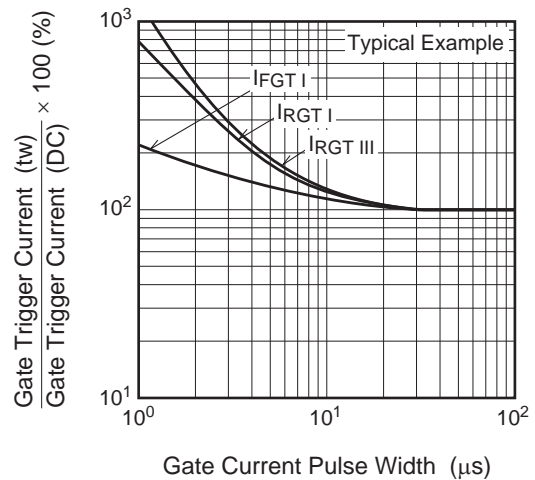
Commutation Characteristics (Tj=125°C)



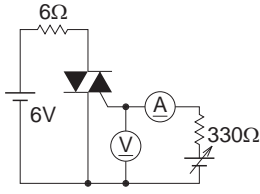
Commutation Characteristics (Tj=150°C)



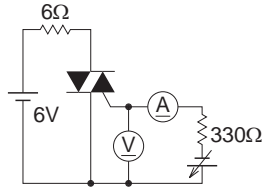
Gate Trigger Current vs. Gate Current Pulse Width



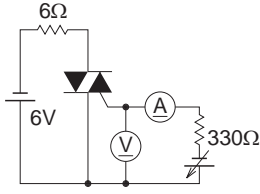
Gate Trigger Characteristics Test Circuits



Test Procedure I

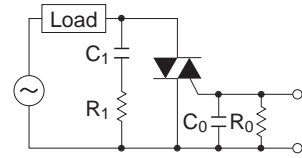


Test Procedure II



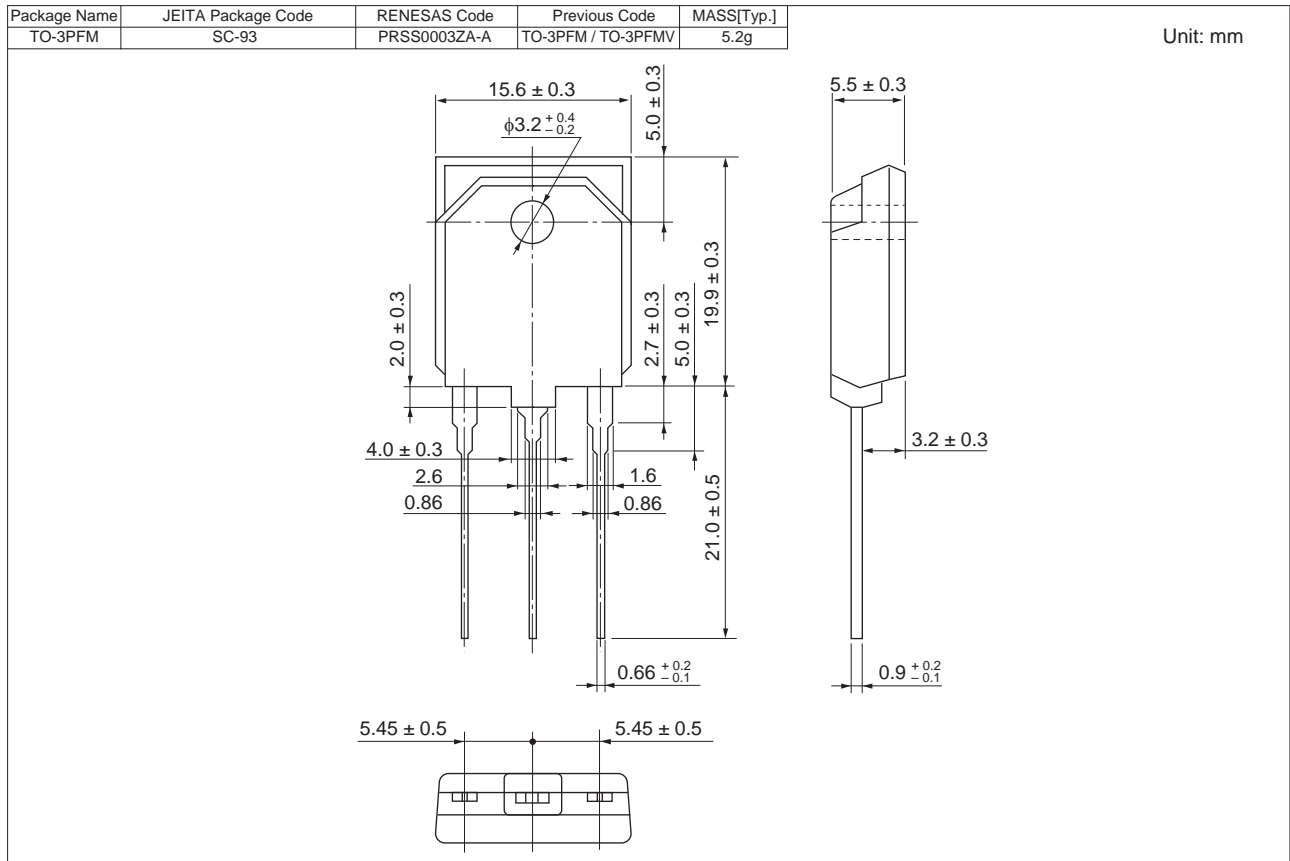
Test Procedure III

Recommended Circuit Values Around The Triac



$C_1 = 0.1 \text{ to } 0.47\mu\text{F}$      $C_0 = 0.1\mu\text{F}$   
 $R_1 = 47 \text{ to } 100\Omega$      $R_0 = 100\Omega$

Package Dimensions



Ordering Information

Orderable Part Number	Packing	Quantity	Remark
BCR40RM-12LB#B00	Tube	30 pcs.	Straight type

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

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