

To our customers,

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# BCR3AS-14B

Triac

Low Power Use

REJ03G1807-0100

Rev.1.00

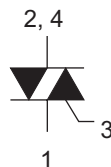
Jul 22, 2009

## Features

- $I_{T(RMS)}$  : 3 A
- $V_{DRM}$  : 800 V ( $T_j = 125^\circ\text{C}$ )
- $I_{FGT I}$ ,  $I_{RGT I}$ ,  $I_{RGT III}$  : 30 mA
- The Product guaranteed maximum junction temperature  $150^\circ\text{C}$
- Non-Insulated Type
- Planar Passivation Type

## Outline

RENESAS Package code: PRSS0004ZG-A  
(Package name: MP-3A)



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

## Applications

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

## Maximum Ratings

Parameter	Symbol	Voltage class	Unit	Conditions
		14		
Repetitive peak off-state voltage <sup>Note1</sup>	$V_{DRM}$	800	V	$T_j = 125^\circ\text{C}$
		700	V	$T_j = 150^\circ\text{C}$
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	$I_{T(RMS)}$	3.0	A	Commercial frequency, sine full wave 360°conduction, $T_c = 133^\circ\text{C}$ <sup>Note3</sup>
Surge on-state current	$I_{TSM}$	30	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusion	$I^2t$	3.7	A <sup>2</sup> 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	$V_{GM}$	6	V	
Peak gate current	$I_{GM}$	0.5	A	
Junction Temperature	$T_j$	-40 to +150	°C	
Storage temperature	$T_{stg}$	-40 to +150	°C	
Mass	—	0.32	g	Typical value

## 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	$T_c = 25^\circ\text{C}$ , $I_{TM} = 4.5\text{ A}$ , 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	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	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	$R_{th(j-c)}$	—	—	3.8	$^\circ\text{C}/\text{W}$	Junction to case <sup>Note3</sup>
Critical-rate of rise of off-state commutation voltage <sup>Note4</sup>	$(dv/dt)_c$	5/1	—	—	$\text{V}/\mu\text{s}$	$T_j = 125^\circ\text{C}/150^\circ\text{C}$

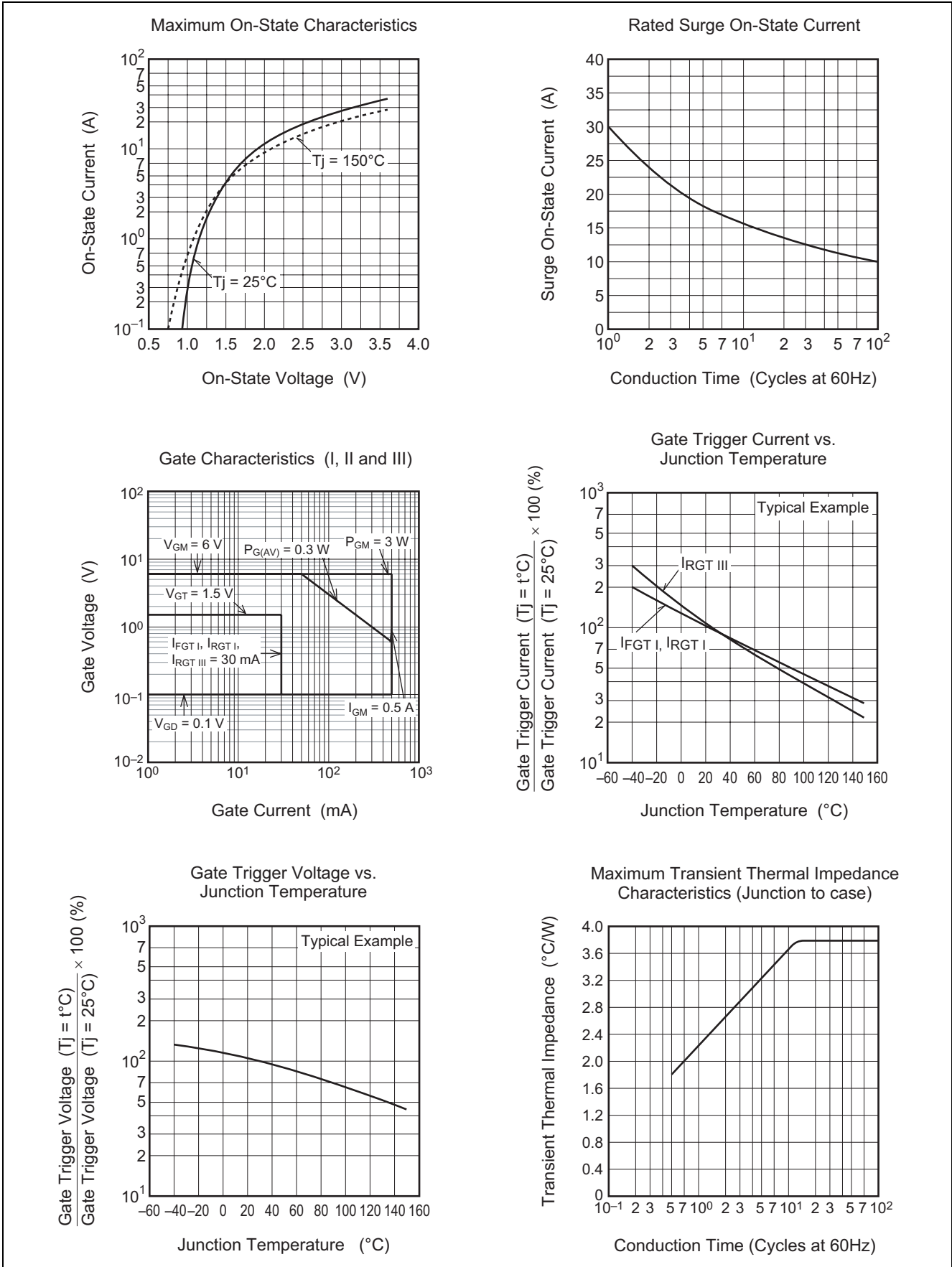
Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

3. Case temperature is measured on the  $T_2$  tab.

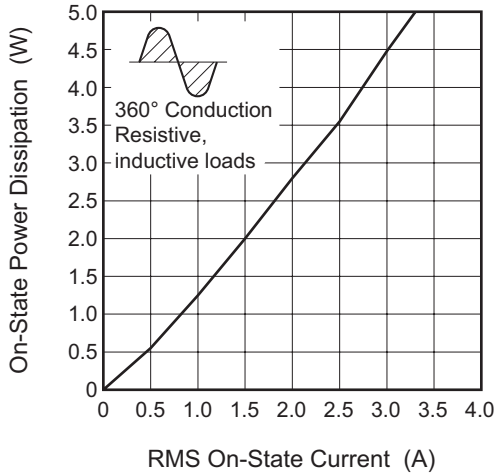
4. Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.

Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -1.5\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

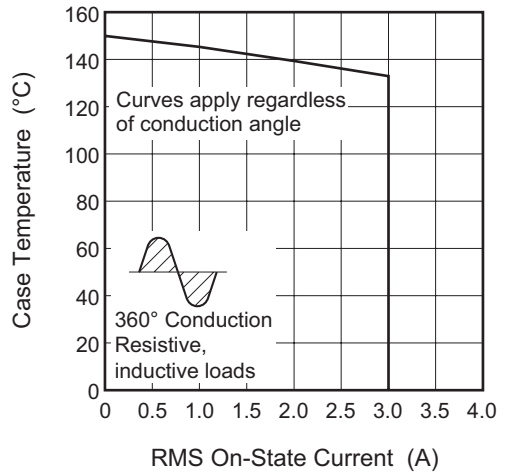
Performance Curves



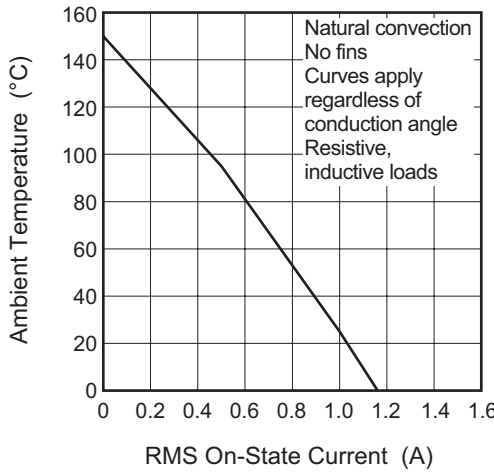
Maximum On-State Power Dissipation



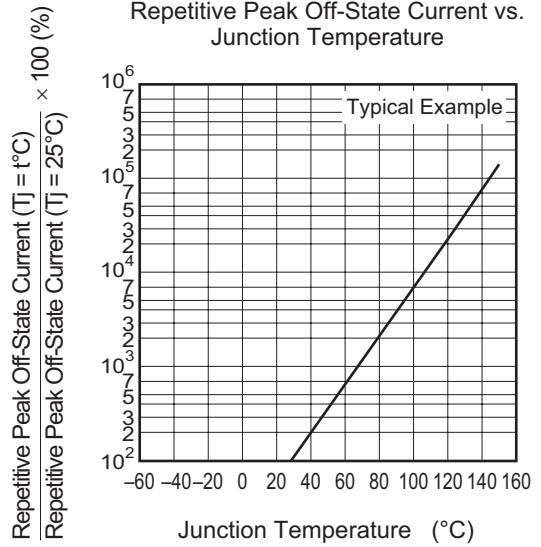
Allowable Case Temperature vs. RMS On-State Current



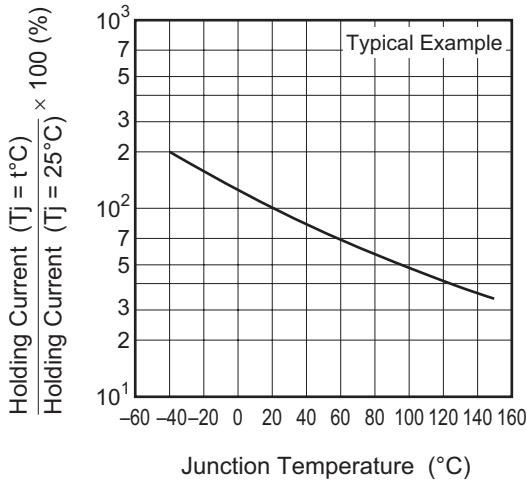
Allowable Ambient Temperature vs. RMS On-State Current



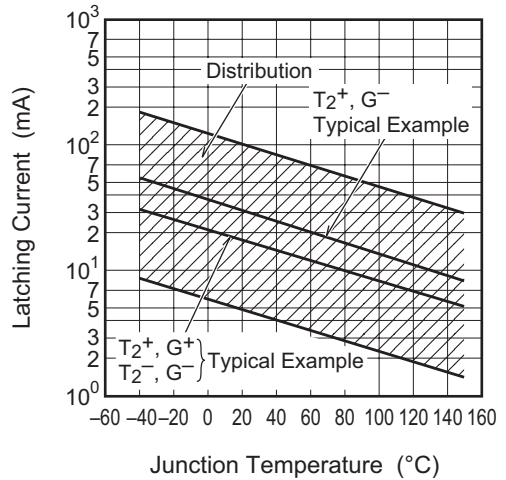
Repetitive Peak Off-State Current vs. Junction Temperature



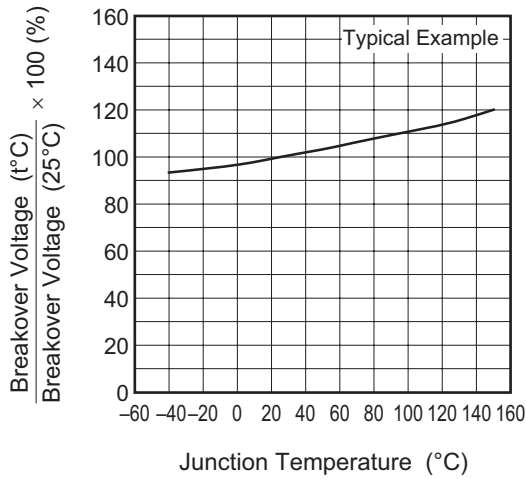
Holding Current vs. Junction Temperature



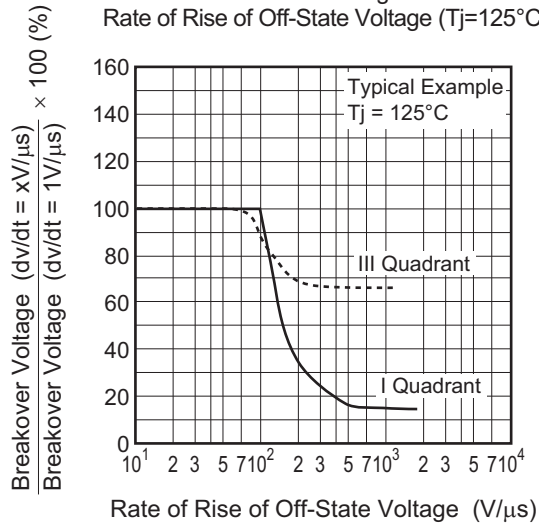
Latching Current vs. Junction Temperature



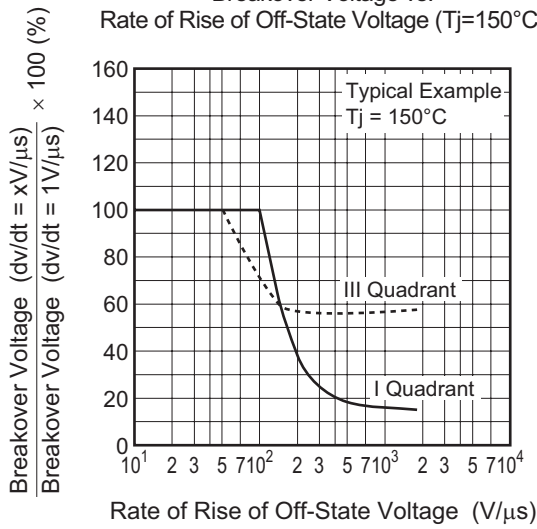
Breakover Voltage vs. Junction Temperature



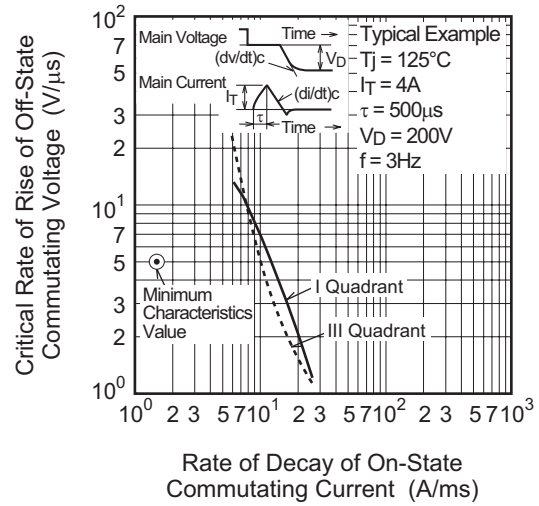
Breakover Voltage vs. Rate of Rise of Off-State Voltage (T<sub>J</sub>=125°C)



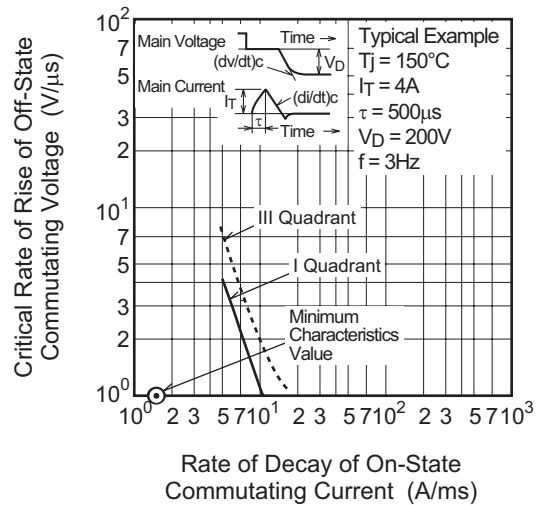
Breakover Voltage vs. Rate of Rise of Off-State Voltage (T<sub>J</sub>=150°C)



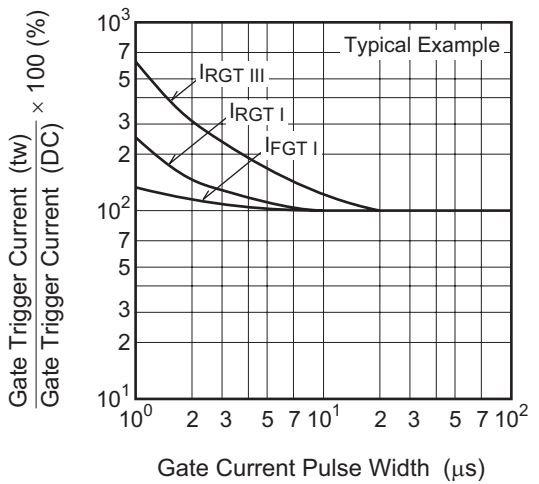
Commutation Characteristics (T<sub>J</sub>=125°C)



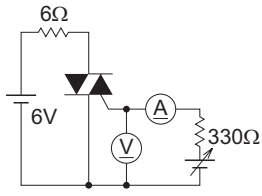
Commutation Characteristics (T<sub>J</sub>=150°C)



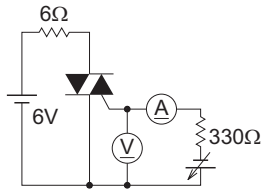
Gate Trigger Current vs. Gate Current Pulse Width



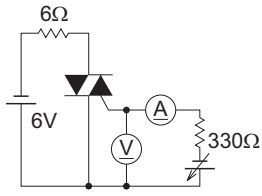
Gate Trigger Characteristics Test Circuits



Test Procedure I

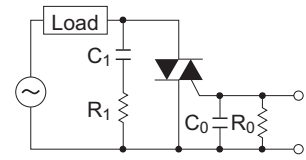


Test Procedure II



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

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
MP-3A	SC-63	PRSS0004ZG-A	—	0.32g	

The technical drawing shows three views of the BCR3AS-14B package:

- Top View:** Shows a rectangular package with a width of 6.6 mm and a length of 2.3 ± 0.2 mm. The distance between the two leads is 2.3 ± 0.2 mm. The lead width is 0.76 ± 0.2 mm. The lead height is 1 mm. The package height is 6.1 ± 0.2 mm. The lead length is 2.5 mm (Min) to 10.4 mm (Max).
- Side View:** Shows the package height of 6.1 ± 0.2 mm. The lead height is 1 ± 0.2 mm. The lead length is 2.5 mm (Min) to 10.4 mm (Max).
- Bottom View:** Shows the package width of 6.6 mm and the lead width of 0.76 ± 0.2 mm.

## Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Surface-mounted type	Taping	3000	Type name – T+Direction(1 or 2)+3	BCR3AS-14B-T13
Surface-mounted type	Plastic Magazine(Tube)	75	Type name	BCR3AS-14B

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

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