

# BCR12CS-12LB

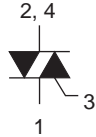
Triac  
Medium Power Use

R07DS0225EJ0400  
(Previous: REJ03G0470-0300)  
Rev.4.00  
Dec 14, 2010

## Features

- $I_{T(RMS)}$  : 12 A
- $V_{DRM}$  : 600 V
- $I_{FGT}$ ,  $I_{RGT}$ ,  $I_{RGT III}$  : 30 mA (20 mA)<sup>Note6</sup>
- The product guaranteed maximum junction temperature of 150°C
- Non-Insulated Type
- Planar Passivation Type

## Outline

RENESAS Package code: PRSS0004AE-B (Package name: LDKPAK(S)-(1) )	RENESAS Package code: PRSS0004AB-A (Package name: TO-220S)				1. T <sub>1</sub> Terminal 2. T <sub>2</sub> Terminal 3. Gate Terminal 4. T <sub>2</sub> Terminal
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## Applications

Contactless AC switch, light dimmer, electronic flasher unit, control of household equipment such as TV sets, stereo systems, refrigerator, washing machine, infrared kotatsu, carpet, electric fan, solenoid driver, small motor control, solid state relay, copying machine, electric tool, electric heater control, and other general purpose 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 <sub>c</sub> = 123°C <sup>Note3</sup>
Surge on-state current	$I_{TSM}$	120	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
I <sup>2</sup> t for fusing	I <sup>2</sup> t	60	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 <sub>j</sub>	- 40 to +150	°C	
Storage temperature	T <sub>stg</sub>	- 40 to +150	°C	
Mass	—	1.3	g	Typical value

Notes: 1. Gate open.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current	$I_{\text{DRM}}$	—	—	2.0	mA	$T_j = 150^\circ\text{C}$ , $V_{\text{DRM}}$ applied
On-state voltage	$V_{\text{TM}}$	—	—	1.6	V	$T_c = 25^\circ\text{C}$ , $I_{\text{TM}} = 20\text{ A}$ , Instantaneous measurement
Gate trigger voltage <sup>Note2</sup>	I	$V_{\text{FGTI}}$	—	—	1.5	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$V_{\text{RGTI}}$	—	—	1.5	
	III	$V_{\text{RGTIII}}$	—	—	1.5	
Gate trigger current <sup>Note2</sup>	I	$I_{\text{FGTI}}$	—	—	$30^{\text{Note6}}$	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II	$I_{\text{RGTI}}$	—	—	$30^{\text{Note6}}$	
	III	$I_{\text{RGTIII}}$	—	—	$30^{\text{Note6}}$	
Gate non-trigger voltage	$V_{\text{GD}}$	0.2/0.1	—	—	V	$T_j = 125^\circ\text{C}/150^\circ\text{C}$ , $V_D = 1/2 V_{\text{DRM}}$
Thermal resistance	$R_{\text{th (j-c)}}$	—	—	1.8	$^\circ\text{C}/\text{W}$	Junction to case <sup>Note3 Note4</sup>
Critical-rate of rise of off-state commutating voltage <sup>Note5</sup>	$(dv/dt)_c$	10/1	—	—	$\text{V}/\mu\text{s}$	$T_j = 125^\circ\text{C}/150^\circ\text{C}$

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

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

4. The contact thermal resistance  $R_{\text{th (c-f)}}$  in case of greasing is  $1.0^\circ\text{C}/\text{W}$ .

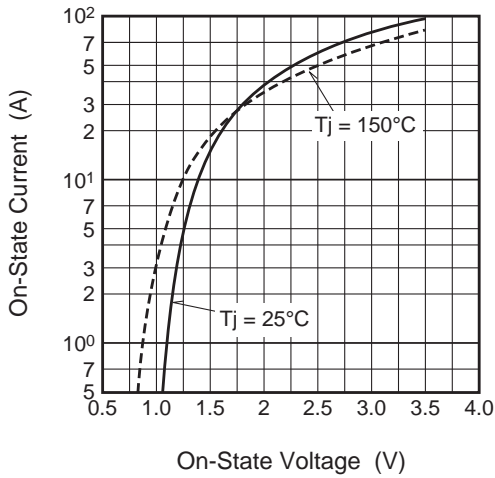
5. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

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

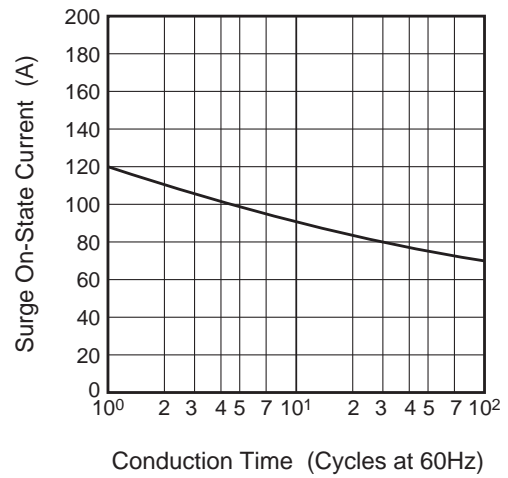
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -6.0\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

Performance Curves

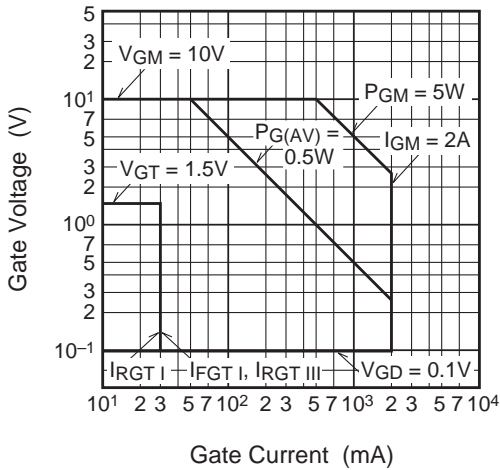
Maximum On-State Characteristics



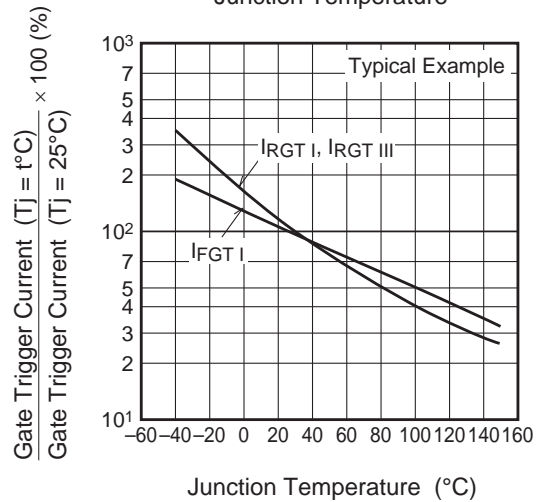
Rated Surge On-State Current



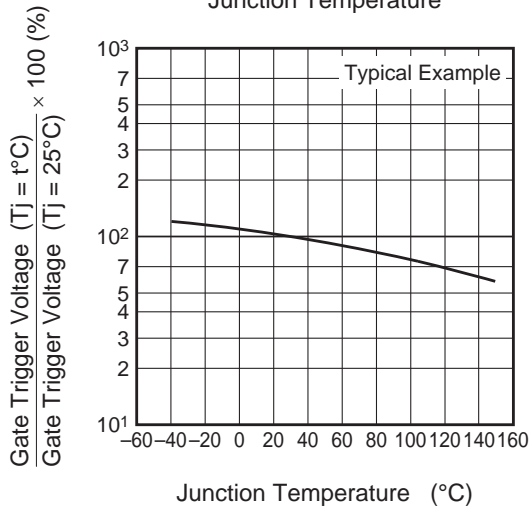
Gate Characteristics (I, II and III)



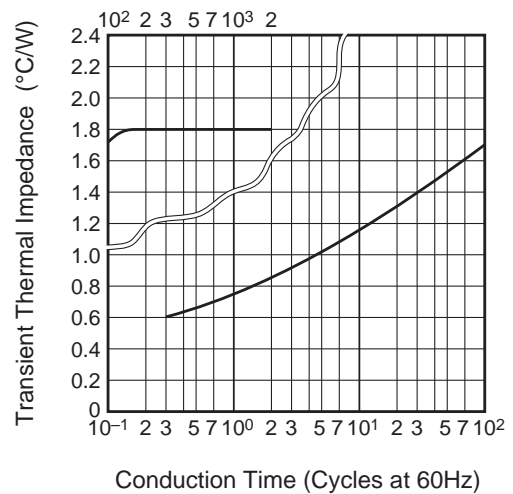
Gate Trigger Current vs. Junction Temperature



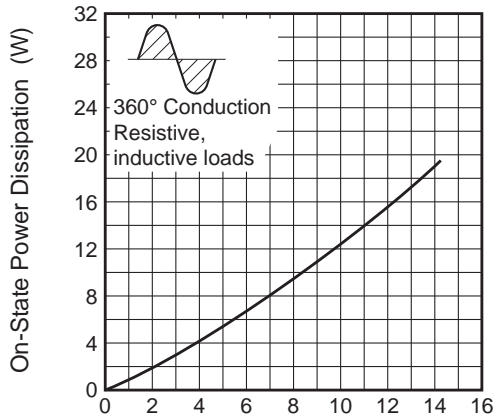
Gate Trigger Voltage vs. Junction Temperature



Maximum Transient Thermal Impedance Characteristics (Junction to case)

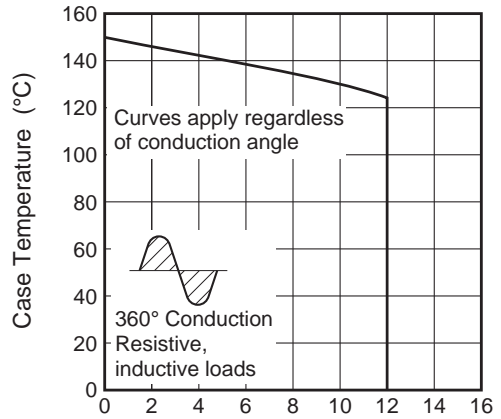


Maximum On-State Power Dissipation



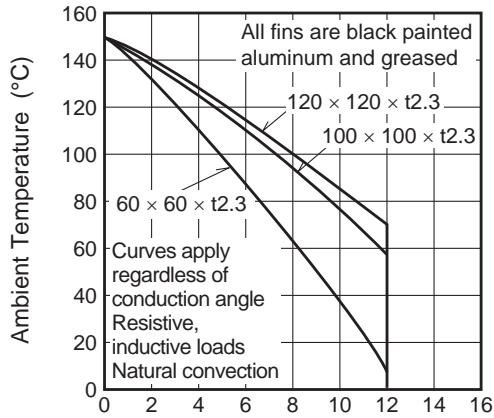
RMS On-State Current (A)

Allowable Case Temperature vs. RMS On-State Current



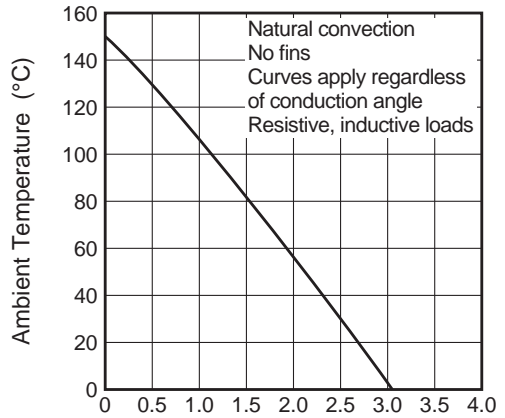
RMS On-State Current (A)

Allowable Ambient Temperature vs. RMS On-State Current



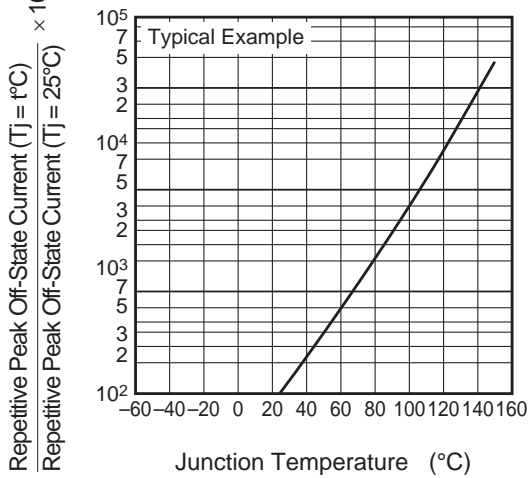
RMS On-State Current (A)

Allowable Ambient Temperature vs. RMS On-State Current

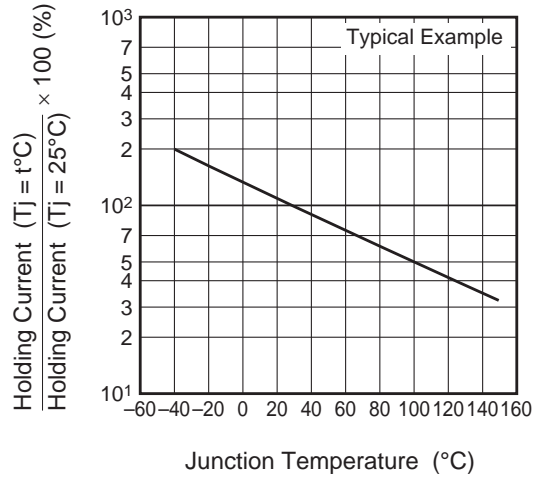


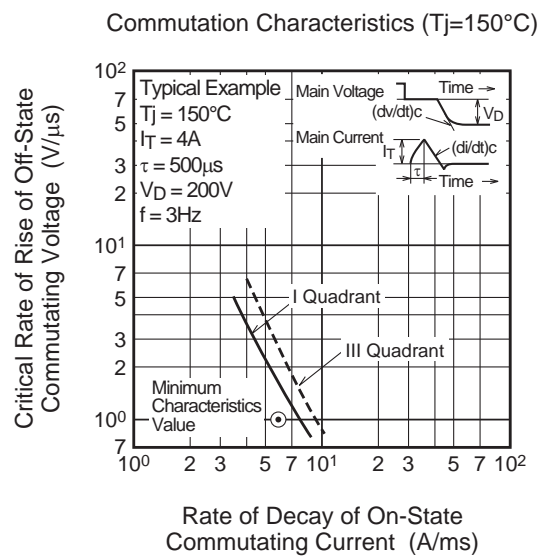
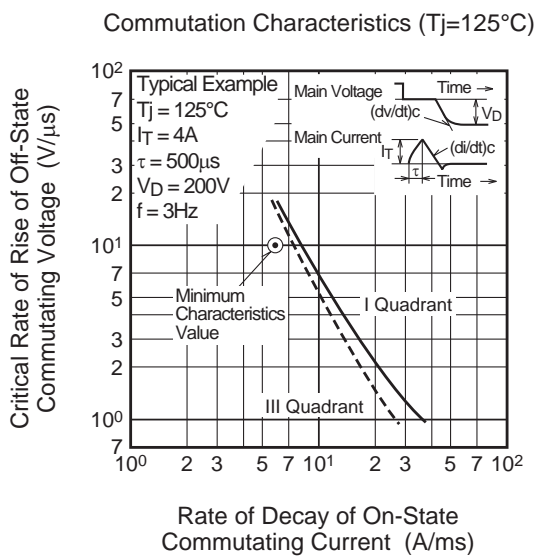
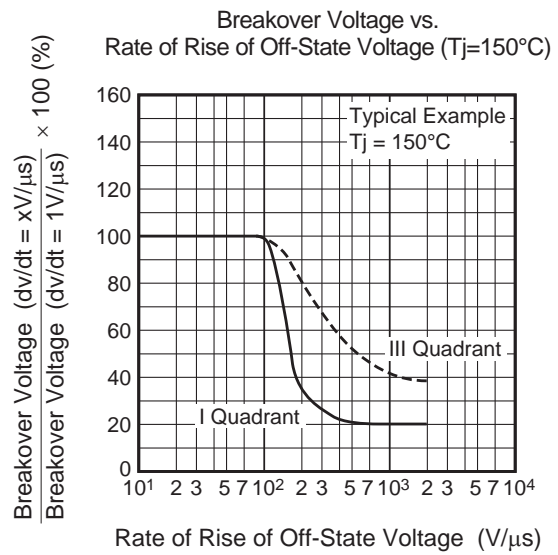
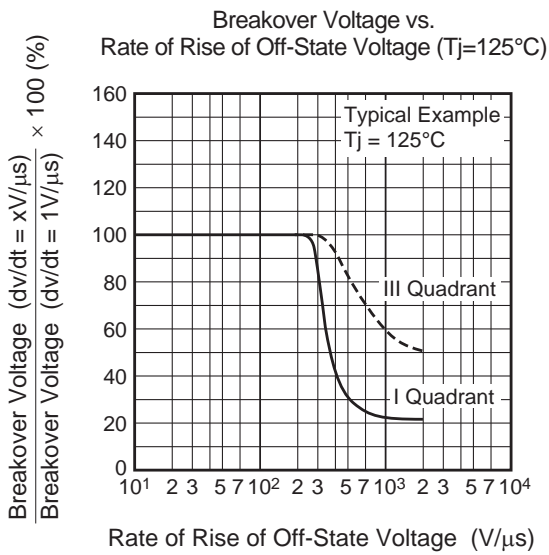
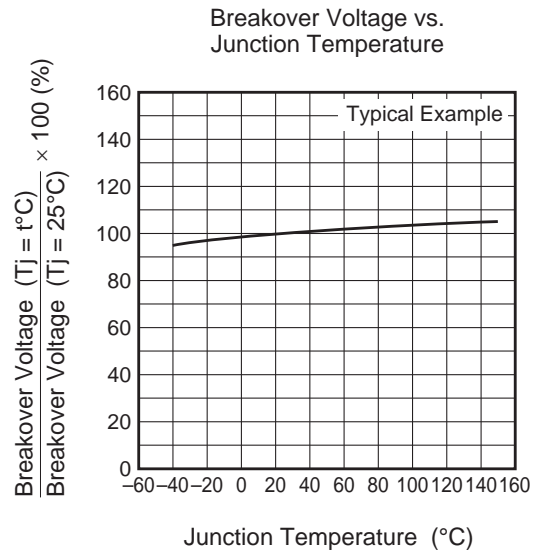
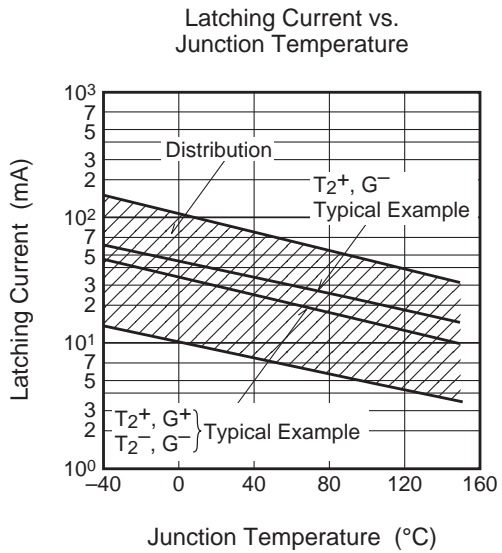
RMS On-State Current (A)

Repetitive Peak Off-State Current vs. Junction Temperature

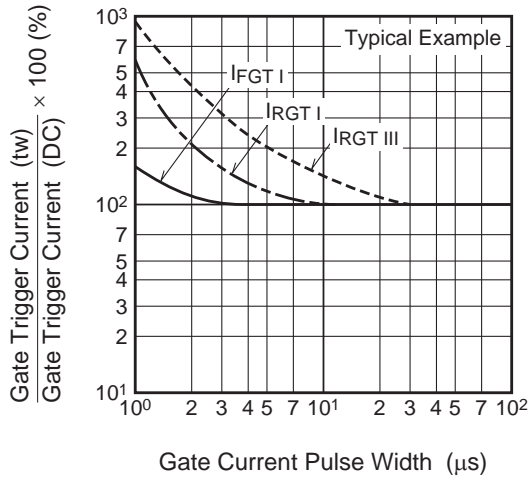


Holding Current vs. Junction Temperature

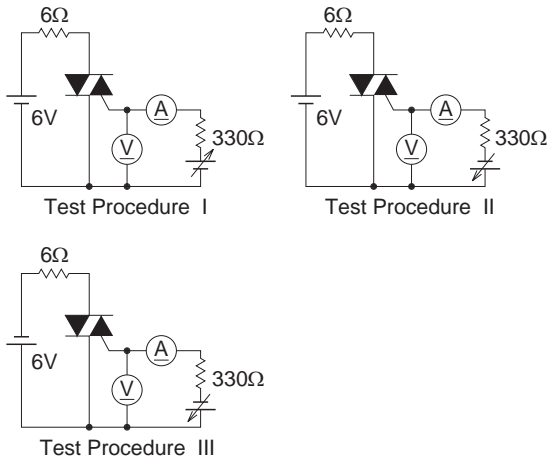




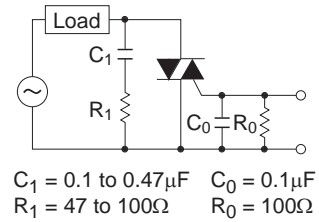
Gate Trigger Current vs. Gate Current Pulse Width



Gate Trigger Characteristics Test Circuits



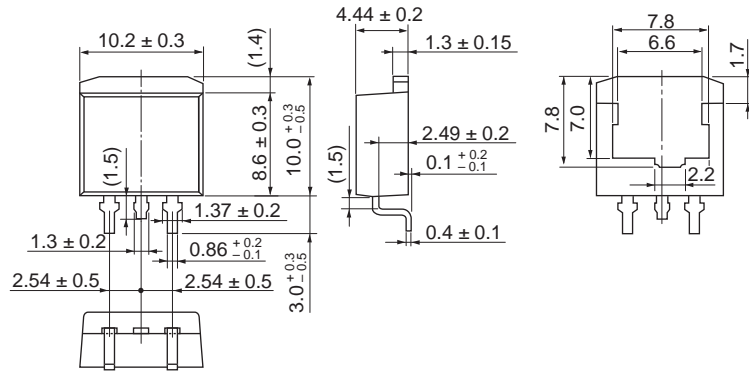
Recommended Circuit Values Around The Triac



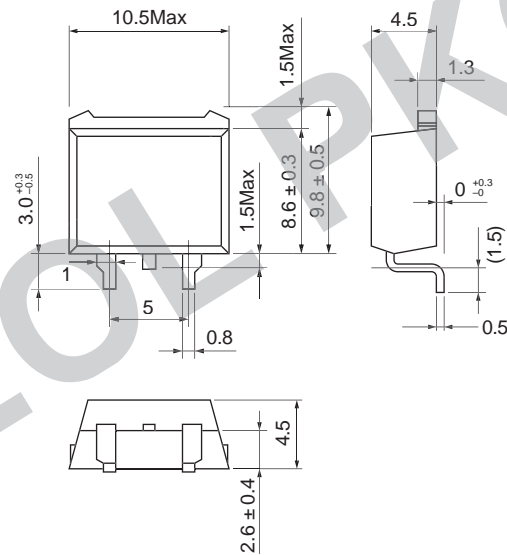
$C_1 = 0.1 \text{ to } 0.47 \mu\text{F}$      $C_0 = 0.1 \mu\text{F}$   
 $R_1 = 47 \text{ to } 100 \Omega$      $R_0 = 100 \Omega$

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
LDBPAK(S)-(1)	SC-83	PRSS0004AE-B	LDBPAK(S)-(1) / LDBPAK(S)-(1)V	1.30g	



Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-220S	SC-83	PRSS0004AB-A	TO-220S	1.2g	



**Ordering Information**

<b>Orderable Part Number</b>	<b>Packing</b>	<b>Quantity</b>	<b>Remark</b>
BCR12CS-12LB#B00	Tube	50 pcs.	—
BCR12CS-12LB-T11#B00	Embossed Tape	1000 pcs.	Taping direction "T1"
BCR12CS-12LB-T21#B00	Embossed Tape	1000 pcs.	Taping direction "T2"



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2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.  
Tel: +1-408-588-6000, Fax: +1-408-588-6130

**Renesas Electronics Canada Limited**  
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada  
Tel: +1-905-898-5441, Fax: +1-905-898-3220

**Renesas Electronics Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K  
Tel: +44-1628-585-100, Fax: +44-1628-585-900

**Renesas Electronics Europe GmbH**  
Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-65030, Fax: +49-211-6503-1327

**Renesas Electronics (China) Co., Ltd.**  
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Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

**Renesas Electronics (Shanghai) Co., Ltd.**  
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

**Renesas Electronics Hong Kong Limited**  
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852-2886-9022/9044

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Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

**Renesas Electronics Korea Co., Ltd.**  
11F., Samik Laviel' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea  
Tel: +82-2-558-3737, Fax: +82-2-558-5141