

BCR12CS-12LB

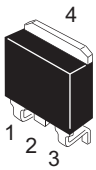

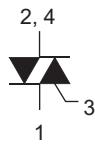

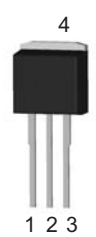
600V-12A-Triac
Medium Power Use

R07DS0225EJ0500
Rev.5.00
Oct 19, 2015

Features

- $I_T (RMS)$: 12 A
- V_{DRM} : 600 V
- $I_{FGTI}, I_{RGTI}, I_{RGT III}$: 30 mA (20 mA)^{Note6}
- The product guaranteed maximum junction temperature of 150°C
- Non-Insulated Type
- Planar Passivation Type

Outline

| | | |
|---|--|---|
| <p>RENESAS Package code: PRSS0004AE-B (Package name: LDK(S)-(1))</p>  | <p>RENESAS Package code: PRSS0004AB-A (Package name: TO-220S)</p>  |  <p>1. T₁ Terminal 2. T₂ Terminal 3. Gate Terminal 4. T₂ Terminal</p> |
| <p>RENESAS Package code: PRSS0004AS-A (Package name: TO-263)</p>  | <p>RENESAS Package code: PRSS0004AR-A (Package name: TO-262)</p>  | |

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 ^{Note1} | V_{DRM} | 600 | V |
| Non-repetitive peak off-state voltage ^{Note1} | 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, $T_c = 123^{\circ}\text{C}$ ^{Note3} |
| Surge on-state current | I_{TSM} | 120 | A | 60Hz sinewave 1 full cycle, peak value, non-repetitive |
| I^2t for fusing | I^2t | 60 | A^2s | 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 | $^{\circ}\text{C}$ | |
| Storage temperature | T_{stg} | - 40 to +150 | $^{\circ}\text{C}$ | |
| 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_{DRM} | — | — | 2.0 | mA | $T_j = 150^{\circ}\text{C}$, V_{DRM} applied | |
| On-state voltage | V_{TM} | — | — | 1.6 | V | $T_c = 25^{\circ}\text{C}$, $I_{TM} = 20\text{ A}$, Instantaneous measurement | |
| Gate trigger voltage ^{Note2} | I | V_{FGTI} | — | — | 1.5 | V | $T_j = 25^{\circ}\text{C}$, $V_D = 6\text{ V}$, $R_L = 6\ \Omega$, $R_G = 330\ \Omega$ |
| | II | V_{RGTI} | — | — | 1.5 | V | |
| | III | V_{RGTIII} | — | — | 1.5 | V | |
| Gate trigger current ^{Note2} | I | I_{FGTI} | — | — | 30 ^{Note6} | mA | $T_j = 25^{\circ}\text{C}$, $V_D = 6\text{ V}$, $R_L = 6\ \Omega$, $R_G = 330\ \Omega$ |
| | II | I_{RGTI} | — | — | 30 ^{Note6} | mA | |
| | III | I_{RGTIII} | — | — | 30 ^{Note6} | mA | |
| 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 | $R_{th(j-c)}$ | — | — | 1.8 | $^{\circ}\text{C}/\text{W}$ | Junction to case ^{Note3 Note4} | |
| Critical-rate of rise of off-state commutating voltage ^{Note5} | $(dv/dt)_c$ | 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.

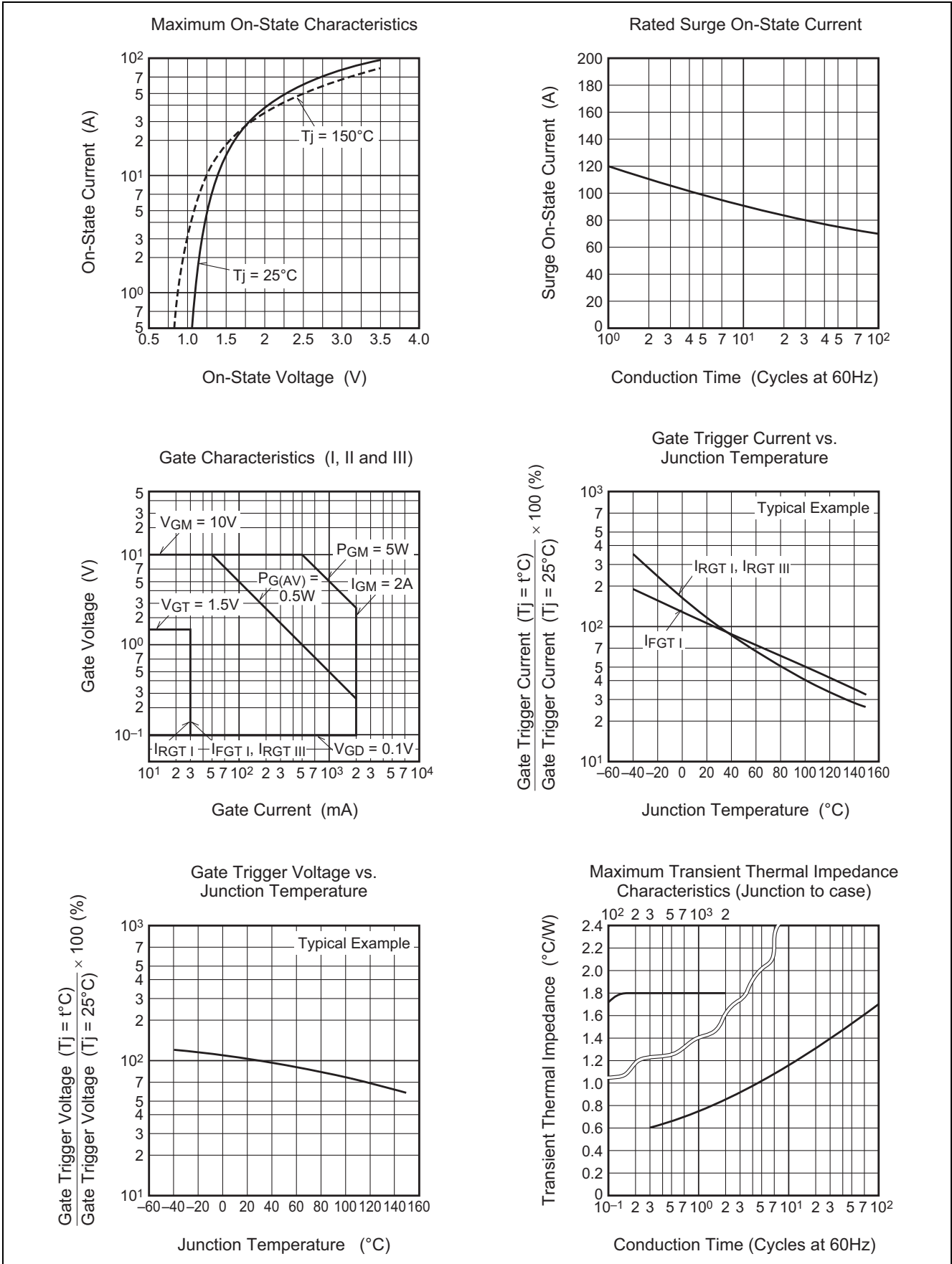
4. The contact thermal resistance $R_{th(c-f)}$ in case of greasing is $1.0^{\circ}\text{C}/\text{W}$.

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

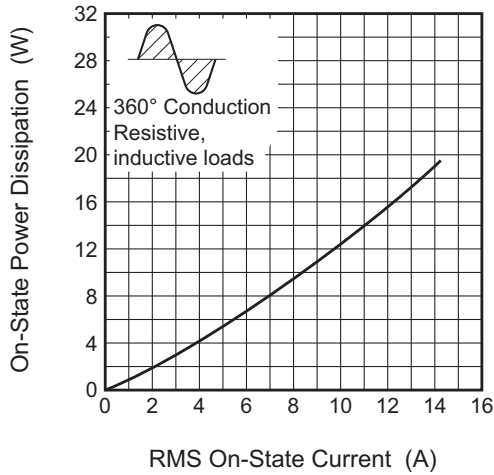
6. High sensitivity ($I_{GT} \leq 20\text{ mA}$) is also available. (I_{GT} item: 1)

| 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 $(di/dt)_c = -6.0\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$ | |

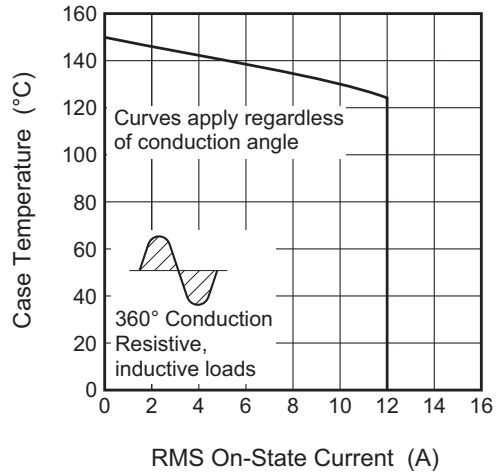
Performance Curves



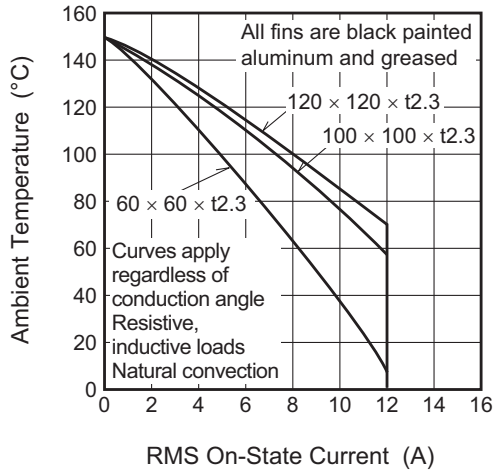
Maximum On-State Power Dissipation



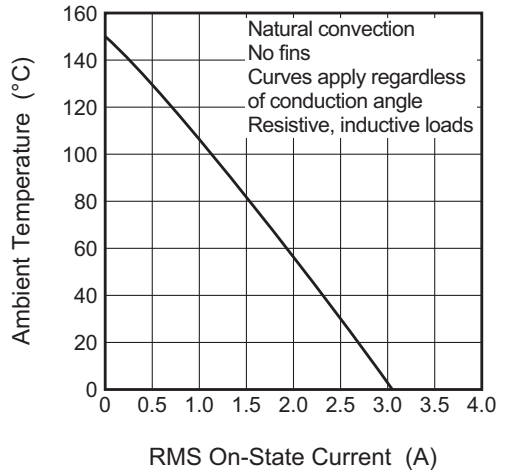
Allowable Case Temperature vs. RMS On-State Current



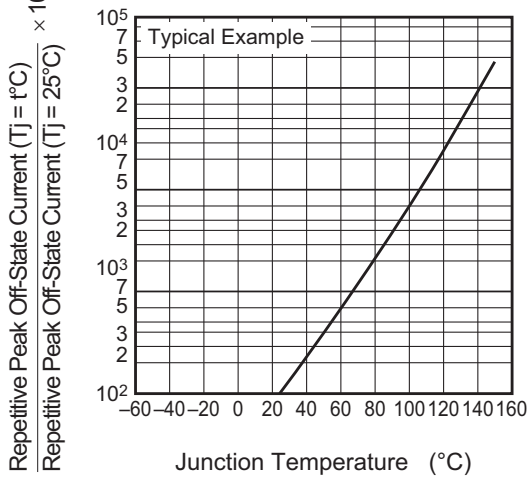
Allowable Ambient Temperature vs. RMS On-State Current



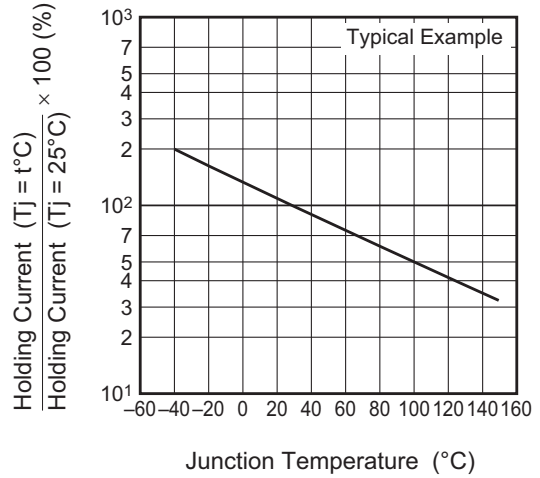
Allowable Ambient Temperature vs. RMS On-State Current



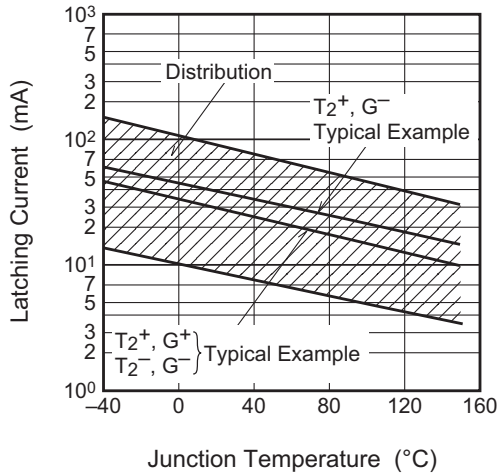
Repetitive Peak Off-State Current vs. Junction Temperature



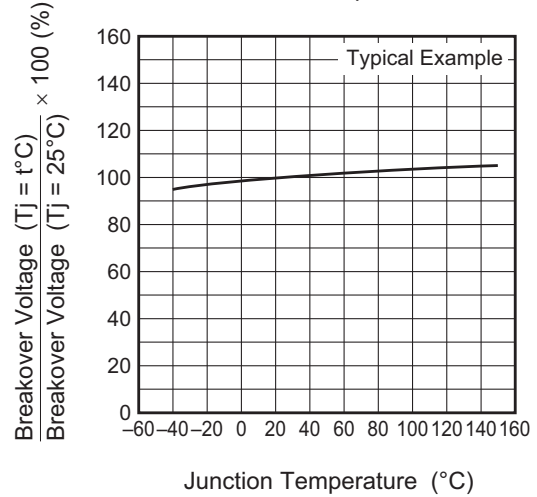
Holding Current vs. Junction Temperature



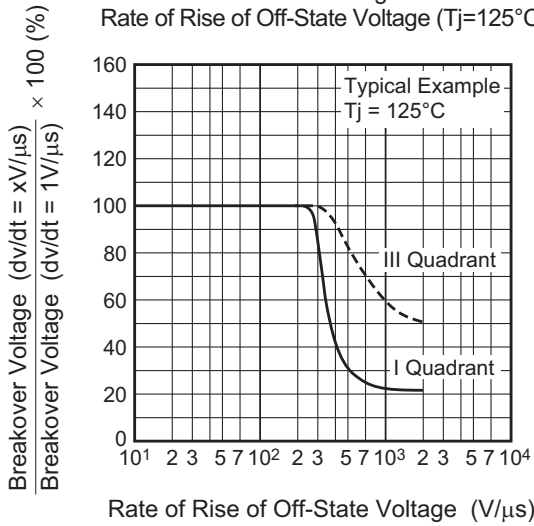
Latching Current vs. Junction Temperature



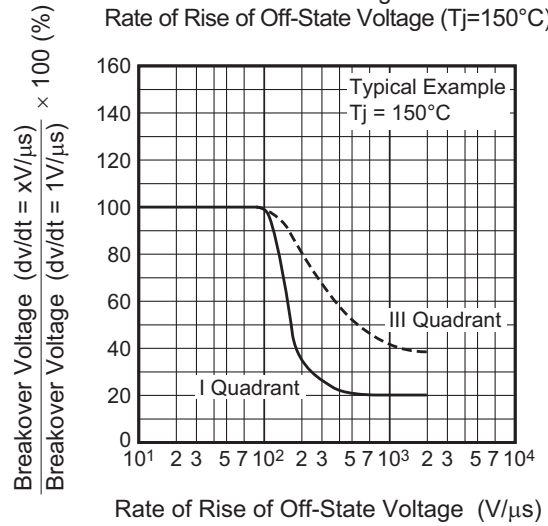
Breakover Voltage vs. Junction Temperature



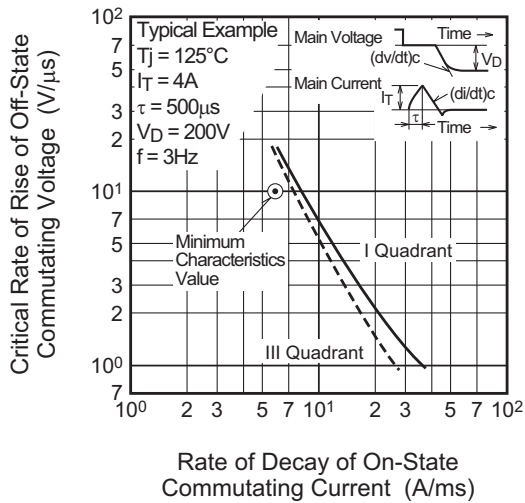
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=125°C)



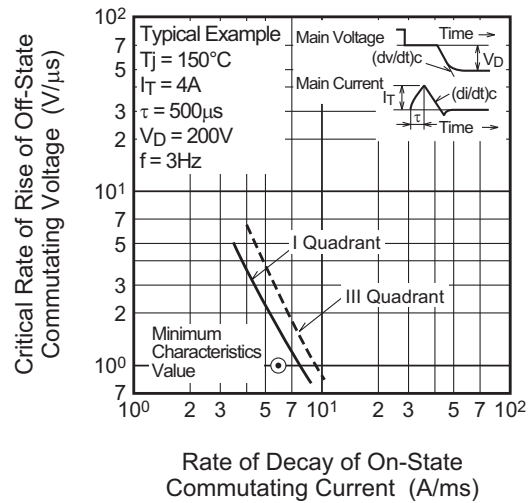
Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)

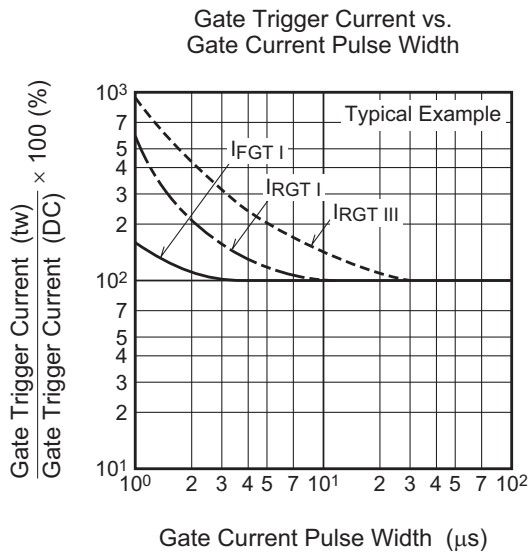


Commutation Characteristics (Tj=125°C)

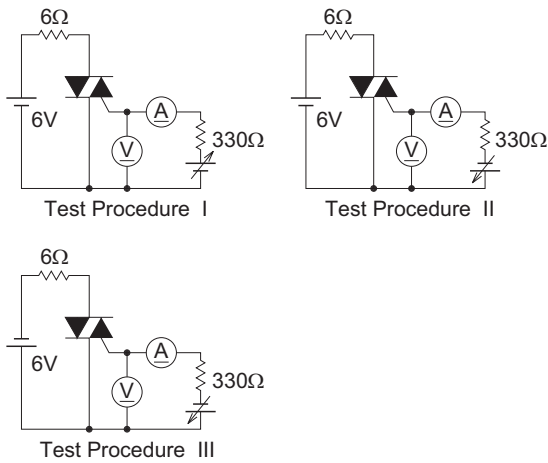


Commutation Characteristics (Tj=150°C)

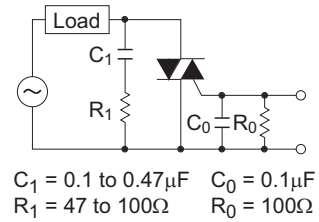




Gate Trigger Characteristics Test Circuits

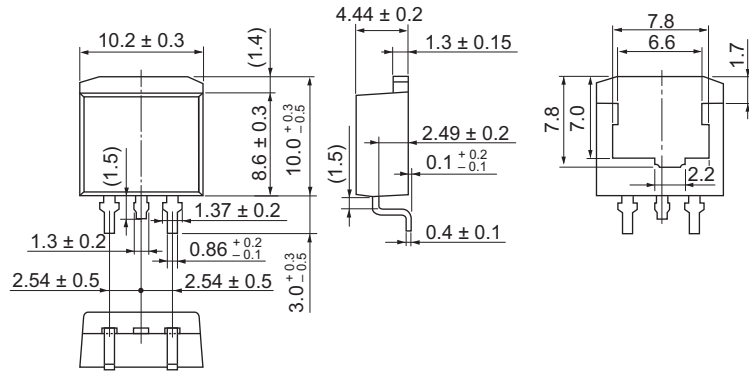


Recommended Circuit Values Around The Triac

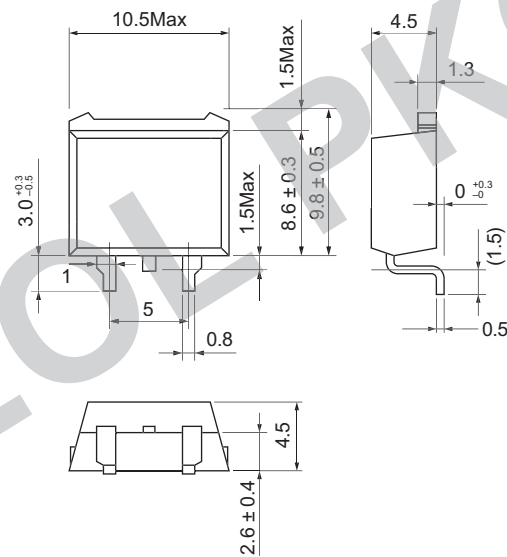


Package Dimensions

| 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 | |

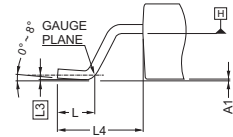
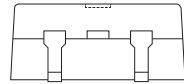
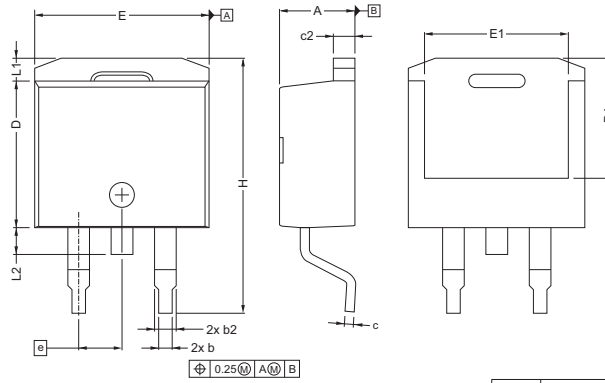


| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] | Unit: mm |
|--------------|--------------------|--------------|---------------|------------|----------|
| TO-220S | SC-83 | PRSS0004AB-A | TO-220S | 1.2g | |



| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS (Typ) [g] |
|--------------|--------------------|--------------|---------------|----------------|
| TO-263 | — | PRSS0004AS-A | TO-263A | 1.4 |

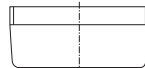
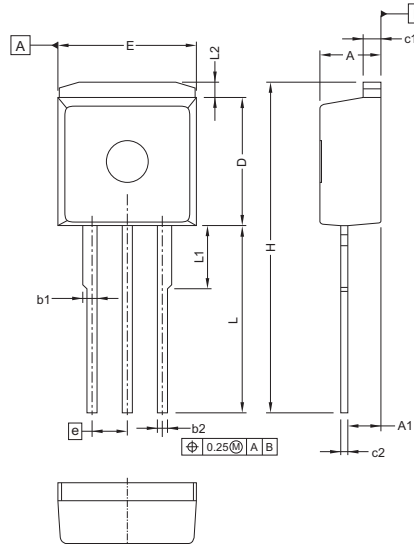
Unit: mm



| Reference Symbol | Dimensions in millimeters | | |
|------------------|---------------------------|-----|-------|
| | Min | Nom | Max |
| A | 4.20 | — | 4.60 |
| A ₁ | 0.00 | — | 0.255 |
| b | 0.65 | — | 0.95 |
| b ₂ | 1.12 | — | 1.42 |
| c | 0.381 | — | 0.737 |
| c ₂ | 1.15 | — | 1.40 |
| D | 8.50 | — | 9.10 |
| D ₁ | 6.90 | — | 7.50 |
| E | 10.05 | — | 10.65 |
| E ₁ | 8.00 | — | 8.80 |
| e | 2.54 BSC | | |
| H | 15.00 | — | 15.60 |
| L | 1.90 | — | 2.50 |
| L ₁ | — | — | 1.70 |
| L ₂ | — | — | 1.78 |
| L ₃ | 0.25 BSC | | |
| L ₄ | 4.78 | — | 5.28 |

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS (Typ) [g] |
|--------------|--------------------|--------------|---------------|----------------|
| TO-262 | — | PRSS0004AR-A | TO-262A | 1.4 |

Unit: mm



| Reference Symbol | Dimensions in millimeters | | |
|------------------|---------------------------|--------|--------|
| | Min | Nom | Max |
| A | 4.200 | 4.400 | 4.600 |
| A ₁ | 2.050 | 2.400 | 2.750 |
| b ₁ | 0.635 | 1.050 | 1.400 |
| b ₂ | 0.640 | 0.750 | 0.880 |
| c ₁ | 1.140 | 1.300 | 1.400 |
| c ₂ | 0.330 | 0.500 | 0.600 |
| D | 8.500 | 9.250 | 9.650 |
| E | 9.650 | 10.000 | 10.370 |
| e | 2.54 BSC | | |
| H | — | 23.850 | — |
| L | 12.900 | 13.500 | 14.100 |
| L ₁ | — | 4.550 | 4.800 |
| L ₂ | — | 1.100 | 1.727 |

Ordering Information

| Orderable Part Number | Package | Packing | Quantity | Remark |
|-----------------------|--------------|---------------|-----------|------------------------------|
| BCR12CS-12LB#BH0 | TO-263 | Tube | 50 pcs. | |
| BCR12CS-12LBT1#BH0 | TO-263 | Embossed Tape | 800 pcs. | Taping direction "T1" |
| BCR12CS-12LBT2#BH0 | TO-263 | Embossed Tape | 800 pcs. | Taping direction "T2" |
| BCR12CS-12LBA1#BH0 | TO-262 | Tube | 50 pcs. | |
| BCR12CS-12LB#B00 | LDBAK(S)-(1) | Tube | 50 pcs. | Not Recommend for New Design |
| BCR12CS12LBT11#B00 | LDBAK(S)-(1) | Embossed Tape | 1000 pcs. | Not Recommend for New Design |
| BCR12CS12LBT21#B00 | LDBAK(S)-(1) | Embossed Tape | 1000 pcs. | Not Recommend for New Design |
| BCR12CS-12LB#B01 | TO-220S | Tube | 50 pcs. | EOL |

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

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Renesas Electronics America Inc.
2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

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: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709, Quantum Plaza, No.27 ZhichunLu Haidian District, Beijing 100191, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, P. R. China 200333
Tel: +86-21-2226-0888, Fax: +86-21-2226-0899

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-8688, Fax: +852-2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jin Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL II Stage, Indiranagar, Bangalore, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.
12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141