

# CR12CM-12B

Thyristor

Medium Power Use

R07DS0232EJ0100

Rev.1.00

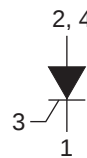
Dec 20, 2010

## Features

- $I_{T(AV)}$  : 12 A
- $V_{DRM}$  : 600 V
- $I_{GT}$  : 30 mA
- The product guaranteed maximum junction temperature of 150°C
- Non-Insulated Type
- Planar Passivation Type

## Outline

RENESAS Package code: PRSS0004AA-A  
(Package name: TO-220)



1. Cathode
2. Anode
3. Gate
4. Anode

## Applications

Switching mode power supply, regulator for autcycle, motor control, heater control, and other general purpose control applications

## Maximum Ratings

| Parameter                           | Symbol    | Voltage class | Unit |
|-------------------------------------|-----------|---------------|------|
|                                     |           | 12            |      |
| Repetitive peak reverse voltage     | $V_{RRM}$ | 600           | V    |
| Non-repetitive peak reverse voltage | $V_{RSM}$ | 720           | V    |
| DC reverse voltage                  | $V_R(DC)$ | 480           | V    |
| Repetitive peak off-state voltage   | $V_{DRM}$ | 600           | V    |
| DC off-state voltage                | $V_D(DC)$ | 480           | V    |

| Parameter                      | Symbol       | Ratings      | Unit                 | Conditions                                                                                         |
|--------------------------------|--------------|--------------|----------------------|----------------------------------------------------------------------------------------------------|
| RMS on-state current           | $I_{T(RMS)}$ | 18.8         | A                    |                                                                                                    |
| Average on-state current       | $I_{T(AV)}$  | 12           | A                    | Commercial frequency, sine half wave 180° conduction, $T_c = 116^{\circ}\text{C}$ <sup>Note2</sup> |
| Surge on-state current         | $I_{TSM}$    | 360          | A                    | 60Hz sine half wave 1 full cycle, peak value, non-repetitive                                       |
| $I^2t$ for fusing              | $I^2t$       | 544          | $\text{A}^2\text{s}$ | 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 forward voltage      | $V_{FGM}$    | 6            | V                    |                                                                                                    |
| Peak gate reverse voltage      | $V_{RGM}$    | 10           | V                    |                                                                                                    |
| Peak gate forward current      | $I_{FGM}$    | 2            | A                    |                                                                                                    |
| Junction temperature           | $T_j$        | – 40 to +150 | $^{\circ}\text{C}$   |                                                                                                    |
| Storage temperature            | $T_{stg}$    | – 40 to +150 | $^{\circ}\text{C}$   |                                                                                                    |
| Mass                           | —            | 2.0          | g                    | Typical value                                                                                      |

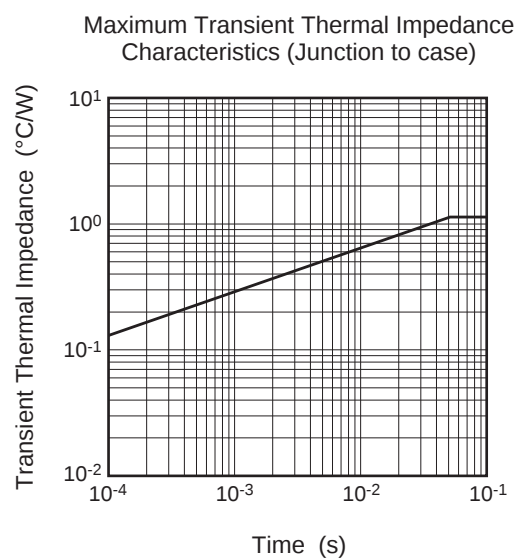
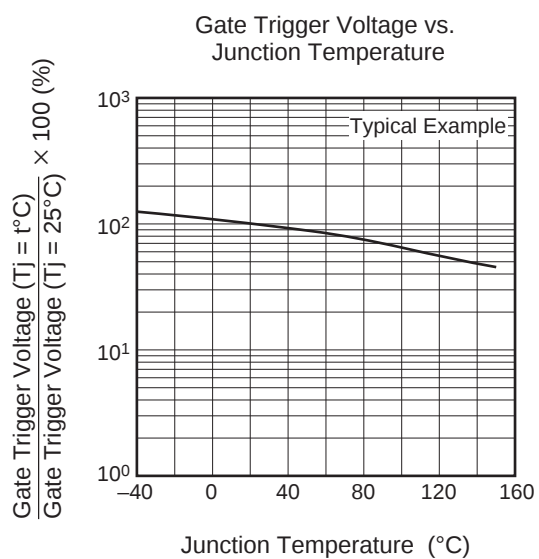
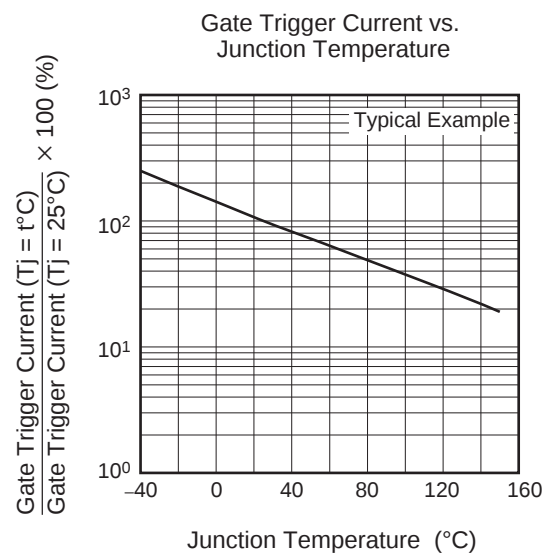
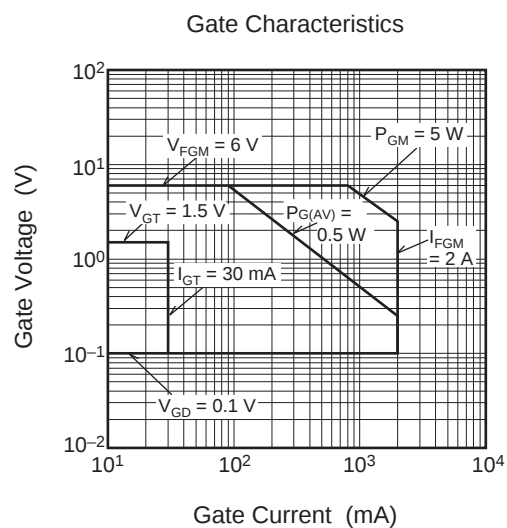
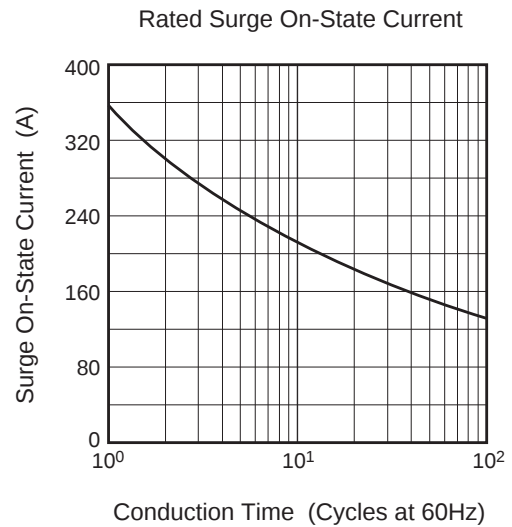
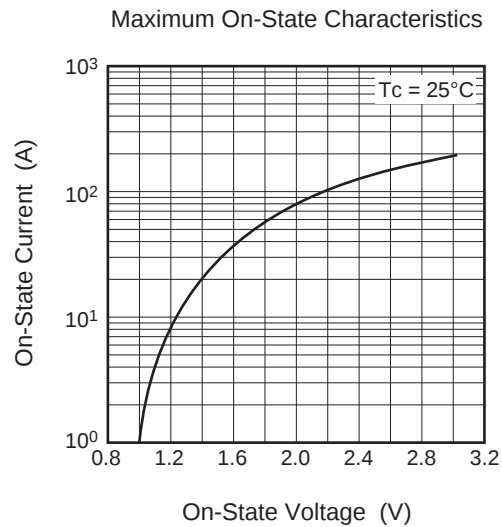
## Electrical Characteristics

| Parameter                         | Symbol        | Min.    | Typ. | Max.    | Unit                 | Test conditions                                                           |
|-----------------------------------|---------------|---------|------|---------|----------------------|---------------------------------------------------------------------------|
| Repetitive peak reverse current   | $I_{RRM}$     | —       | —    | 2.0/5.0 | mA                   | $T_j = 125^{\circ}\text{C}/150^{\circ}\text{C}$ , $V_{RRM}$ applied       |
| Repetitive peak off-state current | $I_{DRM}$     | —       | —    | 2.0/5.0 | mA                   | $T_j = 125^{\circ}\text{C}/150^{\circ}\text{C}$ , $V_{DRM}$ applied       |
| On-state voltage                  | $V_{TM}$      | —       | —    | 1.6     | V                    | $T_c = 25^{\circ}\text{C}$ , $I_{TM} = 40\text{ A}$ , instantaneous value |
| Gate trigger voltage              | $V_{GT}$      | —       | —    | 1.5     | V                    | $T_j = 25^{\circ}\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 1\text{ A}$      |
| Gate non-trigger voltage          | $V_{GD}$      | 0.2/0.1 | —    | —       | V                    | $T_j = 125^{\circ}\text{C}/150^{\circ}\text{C}$ , $V_D = 1/2 V_{DRM}$     |
| Gate trigger current              | $I_{GT}$      | —       | —    | 30      | mA                   | $T_j = 25^{\circ}\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 1\text{ A}$      |
| Holding current                   | $I_H$         | —       | 15   | —       | mA                   | $T_j = 25^{\circ}\text{C}$ , $V_D = 12\text{ V}$                          |
| Thermal resistance                | $R_{th(j-c)}$ | —       | —    | 1.2     | $^{\circ}\text{C/W}$ | Junction to case <sup>Note1 Note2</sup>                                   |

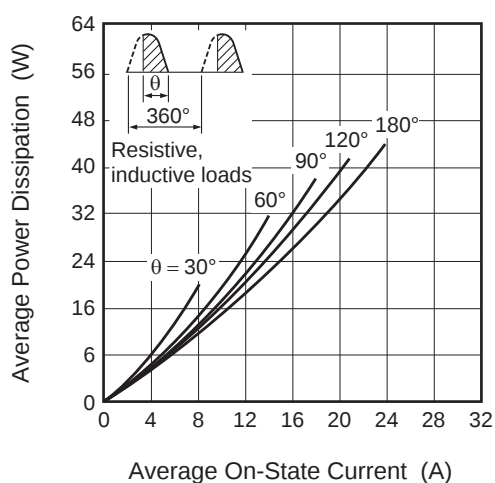
Notes: 1. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $1.0^{\circ}\text{C/W}$ .

2. Case temperature is measured at anode tab 1.5 mm away from the molded case.

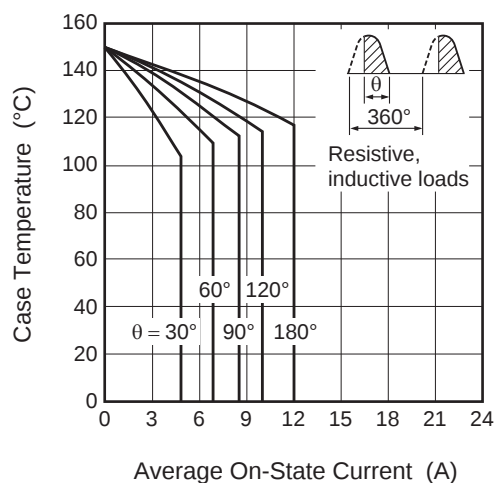
## Performance Curves



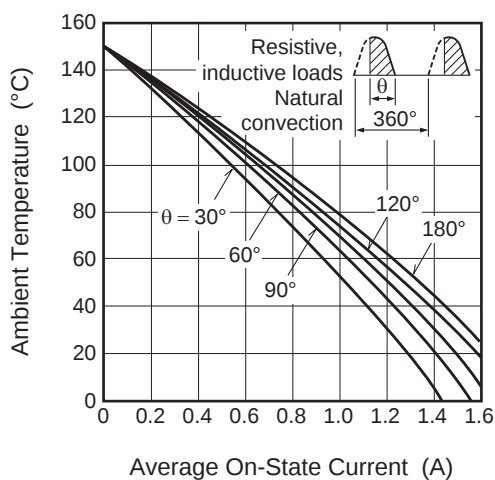
Maximum Average Power Dissipation  
(Single-Phase Half Wave)



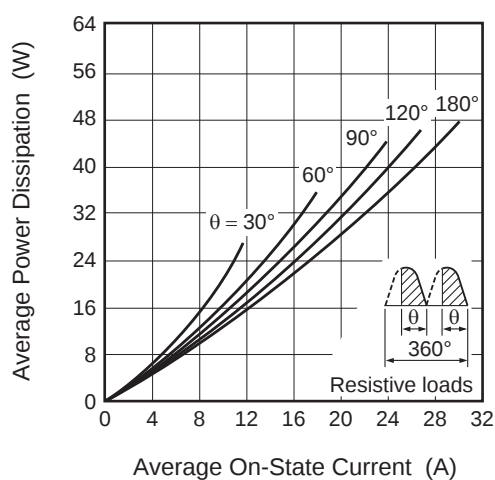
Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



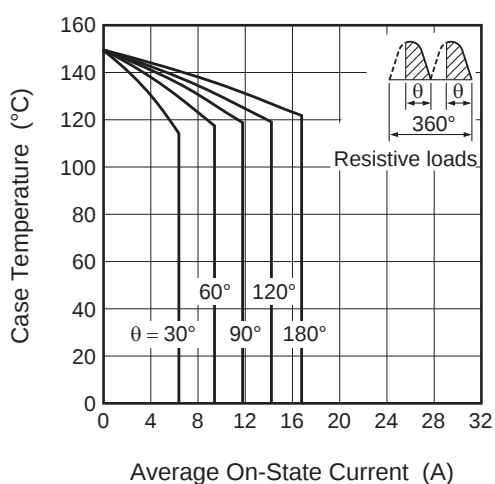
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



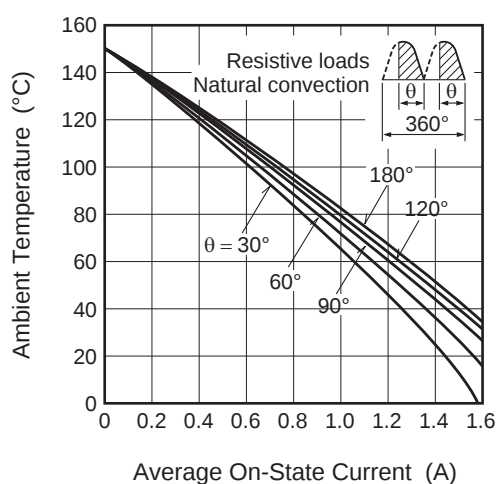
Maximum Average Power Dissipation  
(Single-Phase Full Wave)



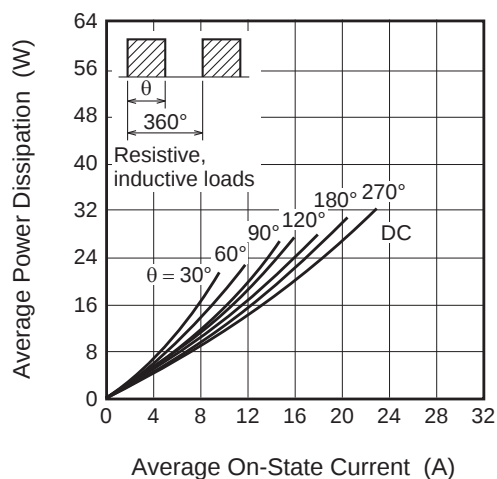
Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



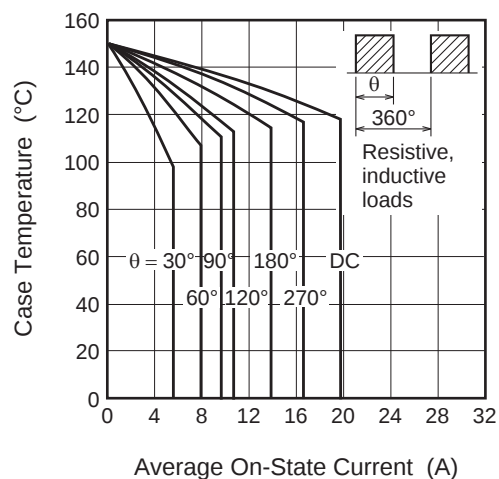
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



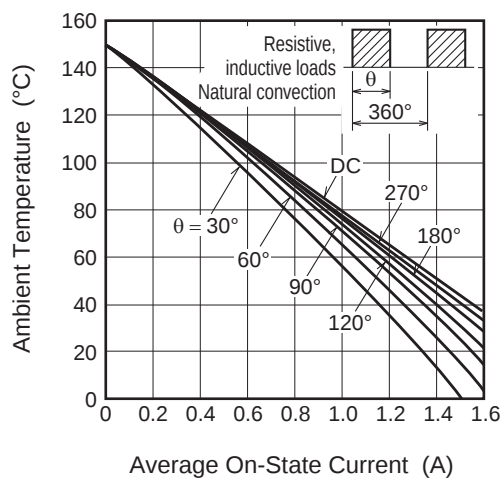
Maximum Average Power Dissipation  
(Rectangular Wave)



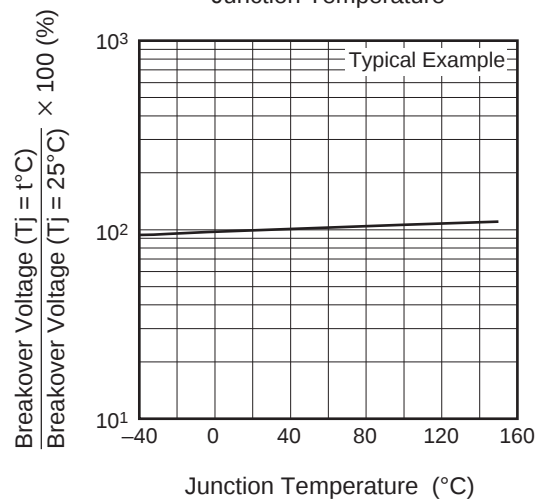
Allowable Case Temperature vs.  
Average On-State Current  
(Rectangular Wave)



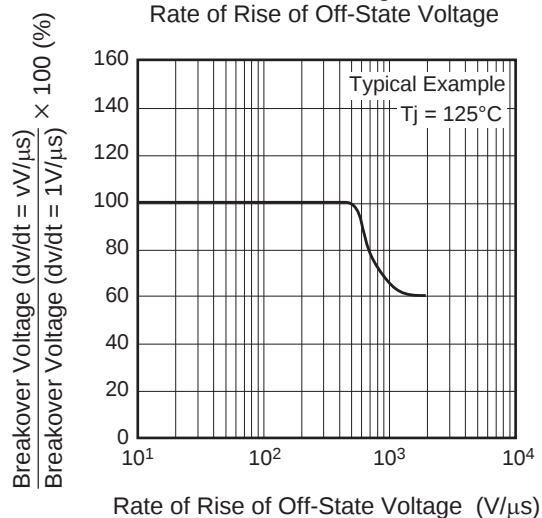
Allowable Ambient Temperature vs.  
Average On-State Current  
(Rectangular Wave)



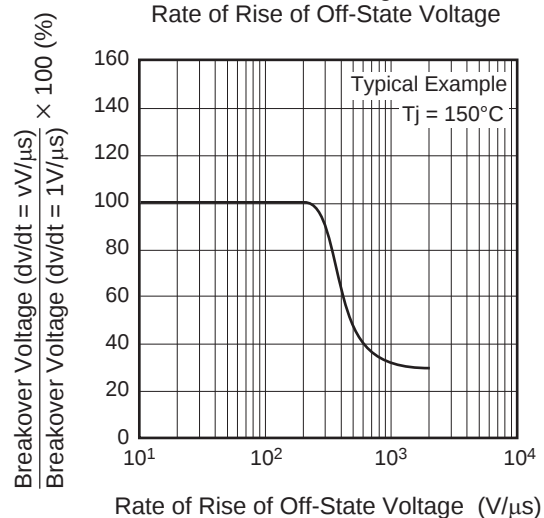
Breakover Voltage vs.  
Junction Temperature

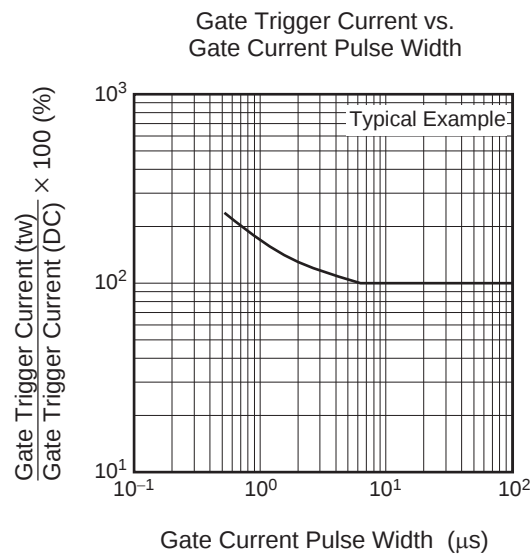
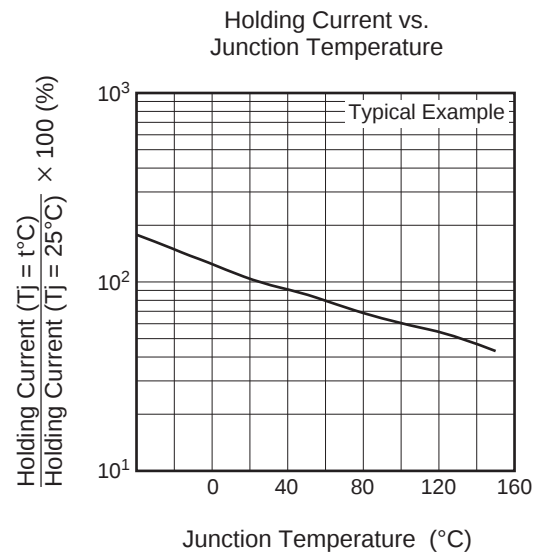
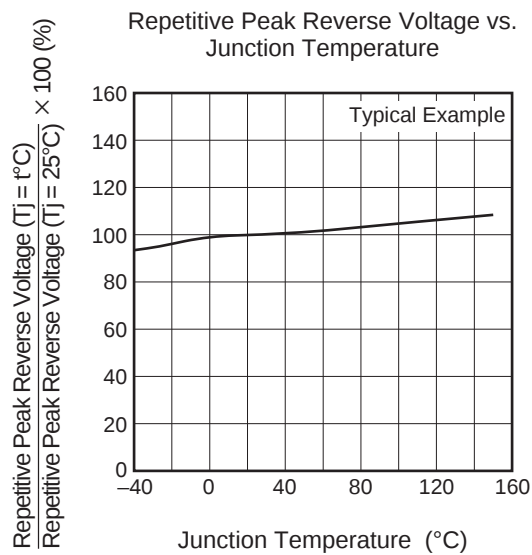


Breakover Voltage vs.  
Rate of Rise of Off-State Voltage



Breakover Voltage vs.  
Rate of Rise of Off-State Voltage

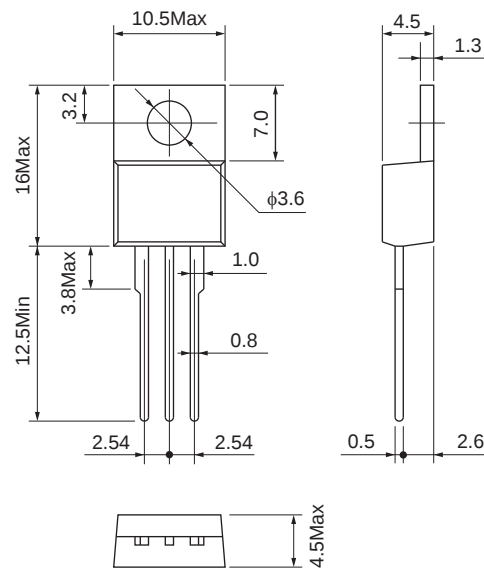




## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
|--------------|--------------------|--------------|---------------|------------|
| TO-220       | SC-46              | PRSS0004AA-A | T220AB        | 2.0g       |

Unit: mm



## Ordering Information

| Orderable Part Number | Packing | Quantity | Remark        |
|-----------------------|---------|----------|---------------|
| CR12CM-12B#B00        | Bag     | 100 pcs. | Straight type |
| CR12CM-12B-A8#B00     | Tube    | 50 pcs.  | A8 Lead form  |

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

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