

## CR5AS-12

### Thyristor

Medium Power Use

REJ03G0346-0200

Rev.2.00

Apr.05.2005

### Features

- $I_T(AV)$  : 5 A
- $V_{DRM}$  : 600 V
- $I_{GT}$  : 100  $\mu$ A
- Lead Mounted Type
- Non-Insulated Type
- Glass Passivation Type

### Outline

RENESAS Package code: PRSS0004ZD-D  
(Package name: DPAK(L)-(3))



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

### Applications

Switching mode power supply, regulator for autcycle, protective circuit for TV sets, VCRs, and printers, igniter for autcycle, electric tool, strobe flasher, 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 <sup>Note1</sup> | $V_{DRM}$   | 600           | V    |
| DC off-state voltage <sup>Note1</sup>              | $V_{D(DC)}$ | 480           | V    |

| Parameter                      | Symbol      | Ratings      | Unit                 | Conditions                                                                     |
|--------------------------------|-------------|--------------|----------------------|--------------------------------------------------------------------------------|
| RMS on-state current           | $I_T$ (RMS) | 7.8          | A                    |                                                                                |
| Average on-state current       | $I_T$ (AV)  | 5            | A                    | Commercial frequency, sine half wave 180° conduction, $T_c = 88^\circ\text{C}$ |
| Surge on-state current         | $I_{TSM}$   | 90           | A                    | 60Hz sine half wave 1 full cycle, peak value, non-repetitive                   |
| $I^2t$ for fusing              | $I^2t$      | 33           | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current       |
| Peak gate power dissipation    | $P_{GM}$    | 0.5          | W                    |                                                                                |
| Average gate power dissipation | $P_{G(AV)}$ | 0.1          | W                    |                                                                                |
| Peak gate forward voltage      | $V_{FGM}$   | 6            | V                    |                                                                                |
| Peak gate reverse voltage      | $V_{RGM}$   | 6            | V                    |                                                                                |
| Peak gate forward current      | $I_{FGM}$   | 0.3          | A                    |                                                                                |
| Junction temperature           | $T_j$       | – 40 to +125 | $^\circ\text{C}$     |                                                                                |
| Storage temperature            | $T_{stg}$   | – 40 to +125 | $^\circ\text{C}$     |                                                                                |
| Mass                           | —           | 0.26         | g                    | Typical value                                                                  |

Notes: 1. With gate to cathode resistance  $R_{GK} = 220\ \Omega$ .

## Electrical Characteristics

| Parameter                         | Symbol        | Min. | Typ. | Max.                 | Unit               | Test conditions                                                           |
|-----------------------------------|---------------|------|------|----------------------|--------------------|---------------------------------------------------------------------------|
| Repetitive peak reverse current   | $I_{RRM}$     | —    | —    | 2.0                  | mA                 | $T_j = 125^\circ\text{C}$ , $V_{RRM}$ applied, $R_{GK} = 220\ \Omega$     |
| Repetitive peak off-state current | $I_{DRM}$     | —    | —    | 2.0                  | mA                 | $T_j = 125^\circ\text{C}$ , $V_{DRM}$ applied, $R_{GK} = 220\ \Omega$     |
| On-state voltage                  | $V_{TM}$      | —    | —    | 1.8                  | V                  | $T_c = 25^\circ\text{C}$ , $I_{TM} = 15\ \text{A}$ , instantaneous value  |
| Gate trigger voltage              | $V_{GT}$      | —    | —    | 0.8                  | V                  | $T_j = 25^\circ\text{C}$ , $V_D = 6\ \text{V}$ , $I_T = 0.1\ \text{A}$    |
| Gate non-trigger voltage          | $V_{GD}$      | 0.1  | —    | —                    | V                  | $T_j = 125^\circ\text{C}$ , $V_D = 1/2\ V_{DRM}$ , $R_{GK} = 220\ \Omega$ |
| Gate trigger current              | $I_{GT}$      | 1    | —    | 100 <sup>Note3</sup> | $\mu\text{A}$      | $T_j = 25^\circ\text{C}$ , $V_D = 6\ \text{V}$ , $I_T = 0.1\ \text{A}$    |
| Holding current                   | $I_H$         | —    | 3.5  | —                    | mA                 | $T_j = 25^\circ\text{C}$ , $V_D = 12\ \text{V}$ , $R_{GK} = 220\ \Omega$  |
| Thermal resistance                | $R_{th(j-c)}$ | —    | —    | 3.0                  | $^\circ\text{C/W}$ | Junction to case <sup>Note2</sup>                                         |

Notes: 2. The measurement point for case temperature is at anode tab.

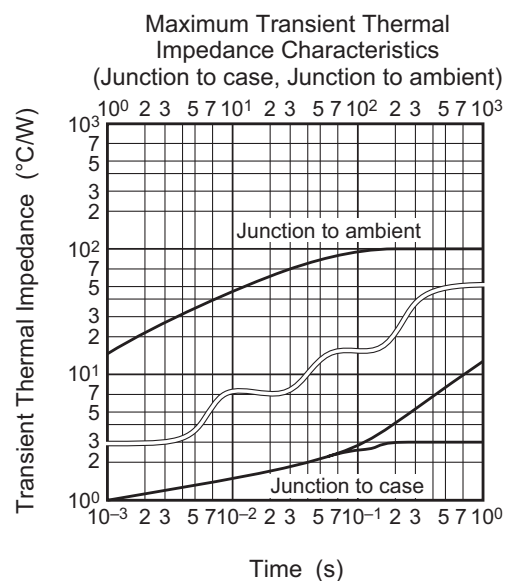
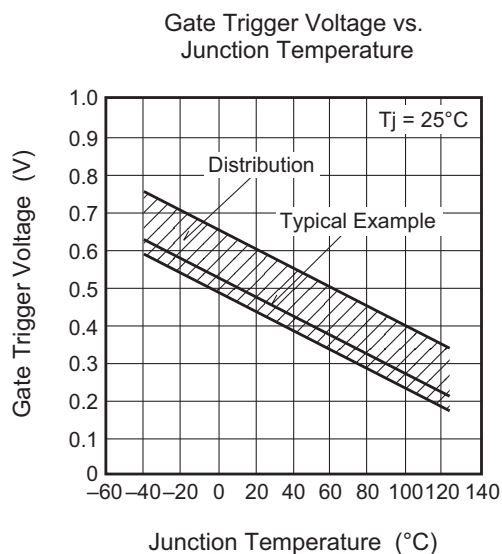
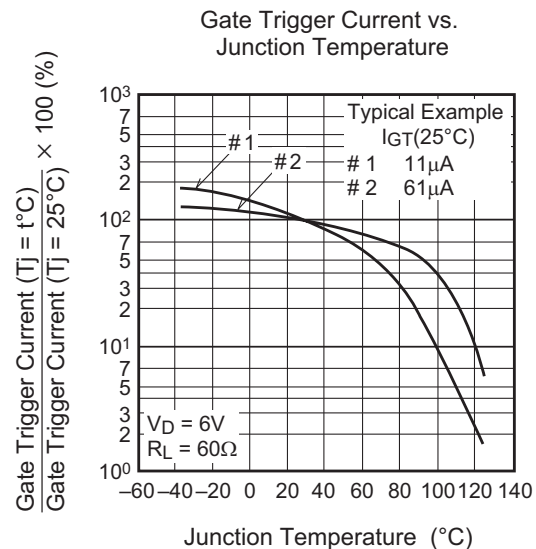
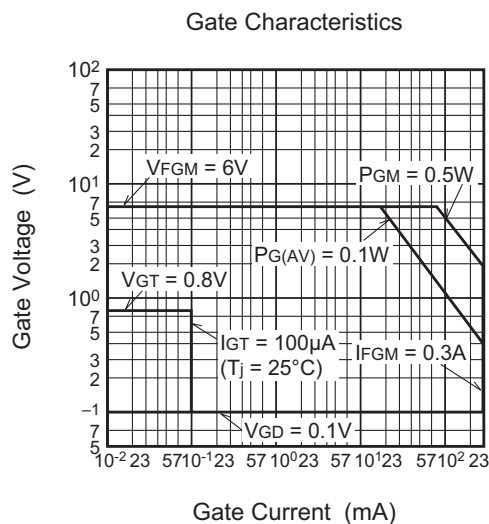
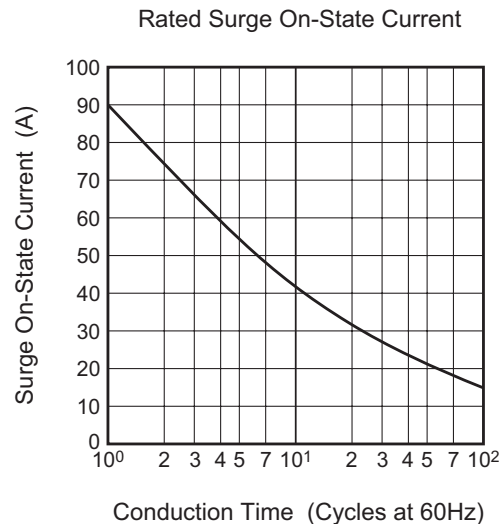
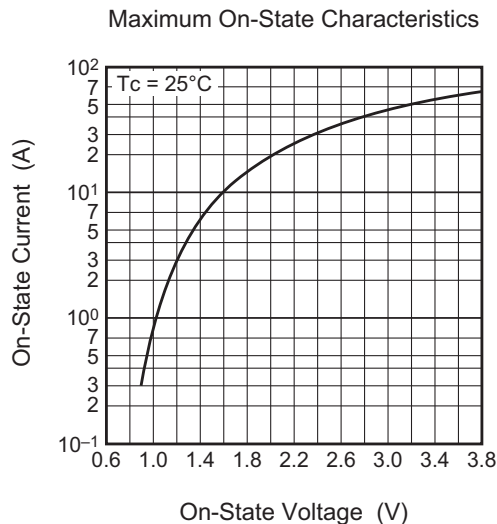
3. If special values of  $I_{GT}$  are required, choose item D or E from those listed in the table below if possible.

| Item                       | A       | B        | C         | D       | E         |
|----------------------------|---------|----------|-----------|---------|-----------|
| $I_{GT}$ ( $\mu\text{A}$ ) | 1 to 30 | 20 to 50 | 40 to 100 | 1 to 50 | 20 to 100 |

The above values do not include the current flowing through the  $220\ \Omega$  resistance between the gate and cathode.

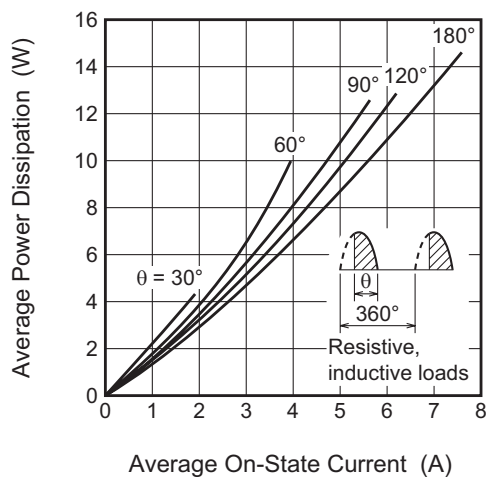
# Performance Curves

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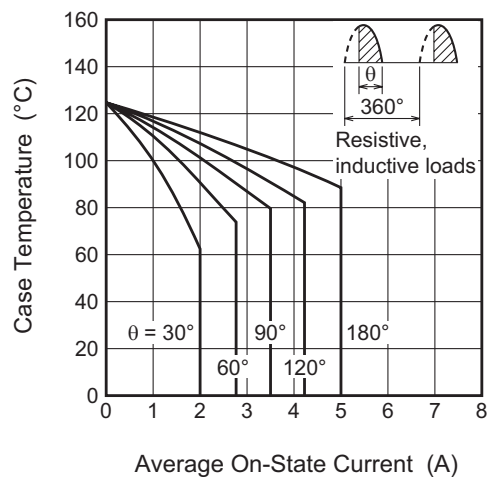


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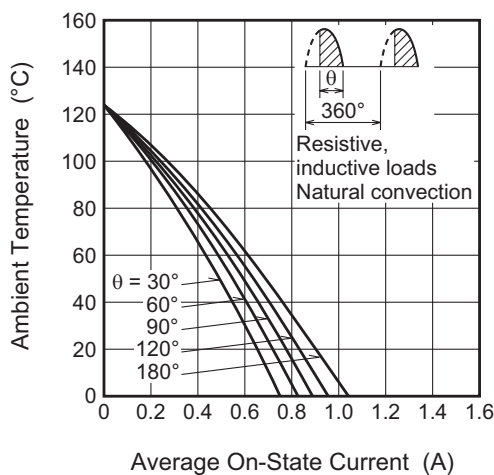
Maximum Average Power Dissipation  
(Single-Phase Half Wave)



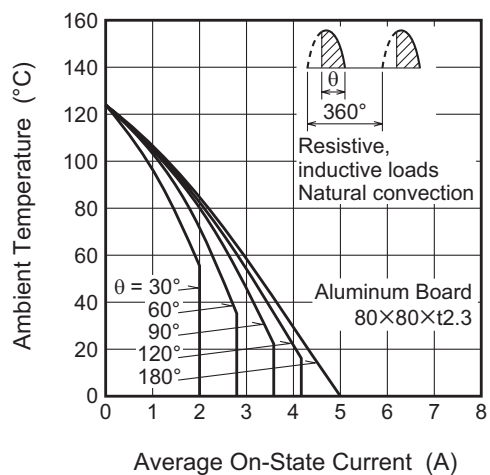
Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



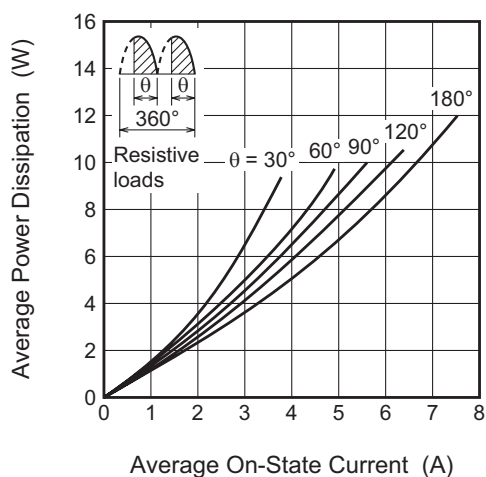
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



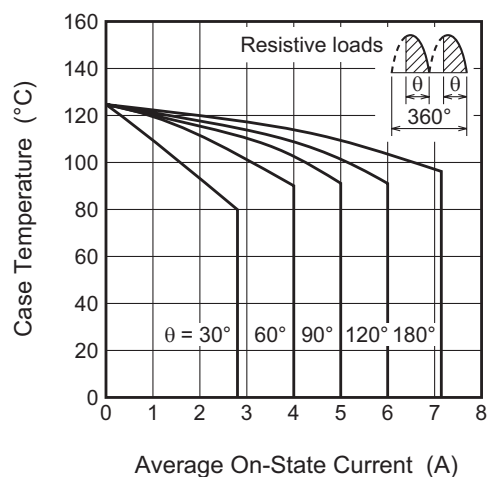
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



Maximum Average Power Dissipation  
(Single-Phase Full Wave)

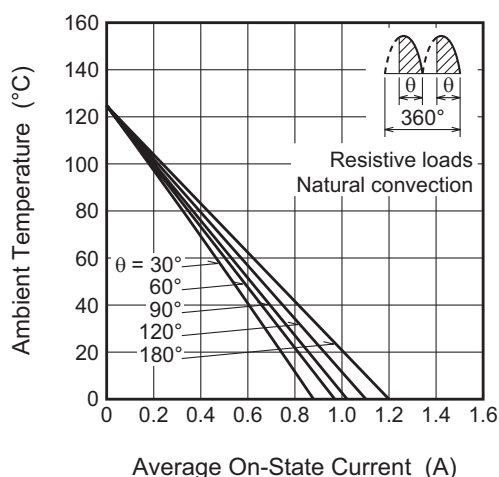


Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)

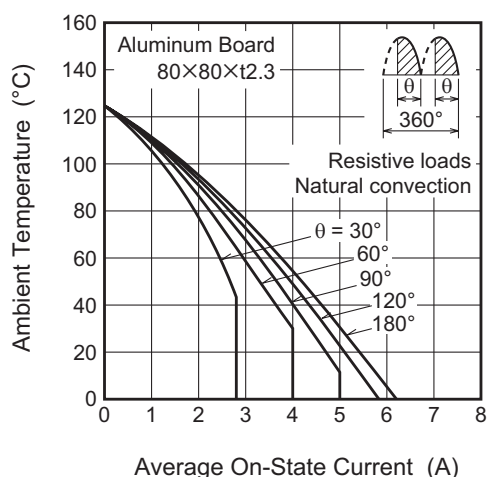


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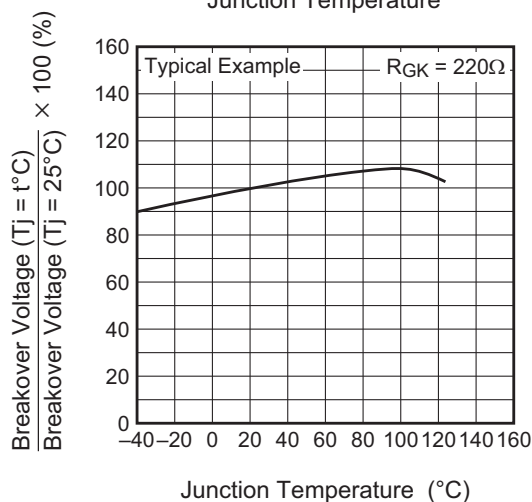
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



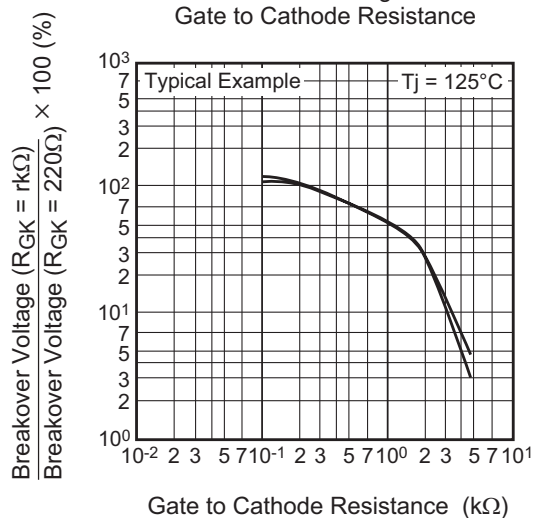
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



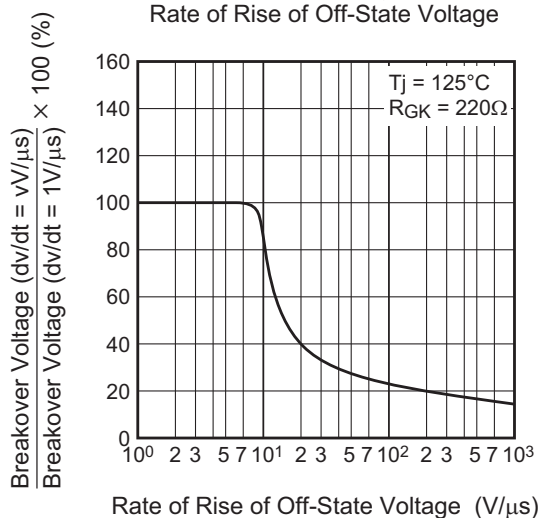
Breakover Voltage vs.  
Junction Temperature



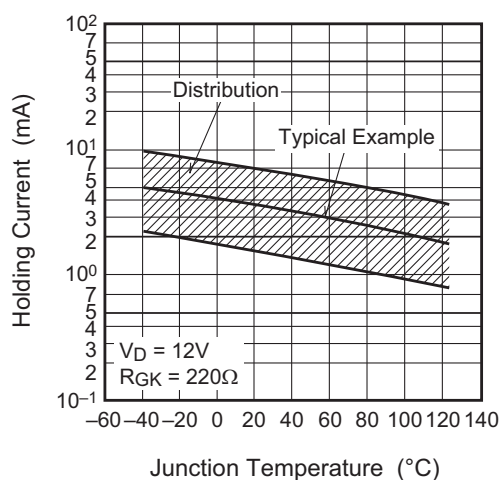
Breakover Voltage vs.  
Gate to Cathode Resistance



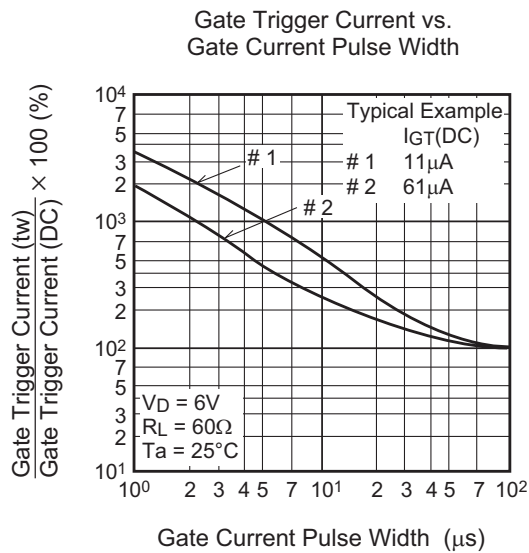
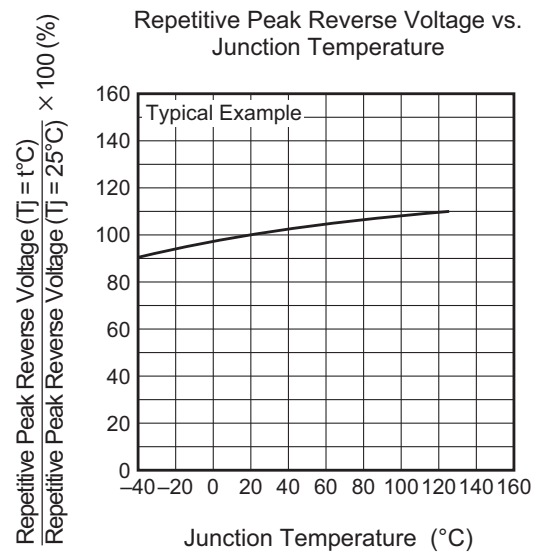
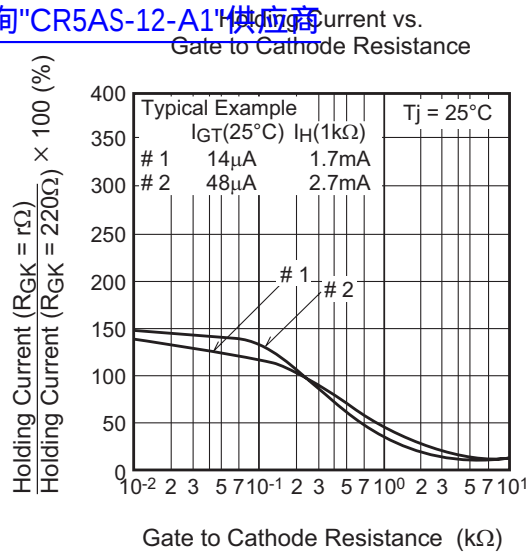
Breakover Voltage vs.  
Rate of Rise of Off-State Voltage



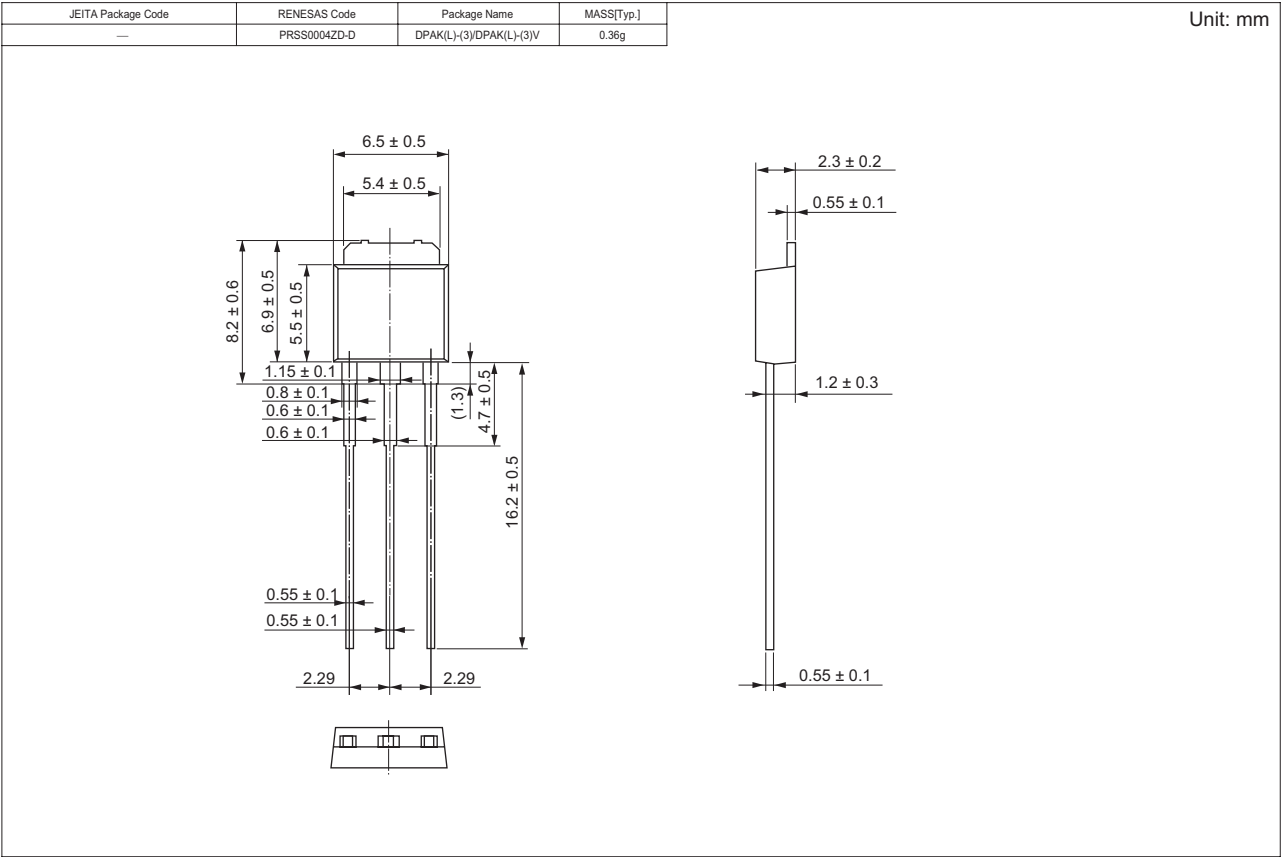
Holding Current vs.  
Junction Temperature



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Order Code

| Lead form     | Standard packing | Quantity | Standard order code | Standard order code example |
|---------------|------------------|----------|---------------------|-----------------------------|
| Straight type | Vinyl sack       | 100      | Type name – A1      | CR5AS-12-A1                 |

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

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