

CR12CM-12A

600V - 12A - Thyristor

Medium Power Use

R07DS1035EJ0400

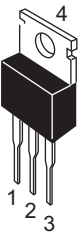

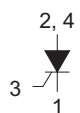
Rev.4.00

Jul 30, 2013

Features

- $I_{T(AV)}$: 12 A
- V_{DRM} : 600 V
- I_{GT} : 30 mA
- Non-Insulated Type
- Planar Passivation Type

Outline

| | |
|---|---|
| RENESAS Package code: PRSS0004AG-A (Package name: TO-220AB) | 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, $T_c = 91^{\circ}\text{C}$ ^{Note2} |
| 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 | 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 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 +125 | $^{\circ}\text{C}$ | |
| Storage temperature | T_{stg} | - 40 to +125 | $^{\circ}\text{C}$ | |
| Mass | — | 2.1 | g | Typical value |

Electrical Characteristics

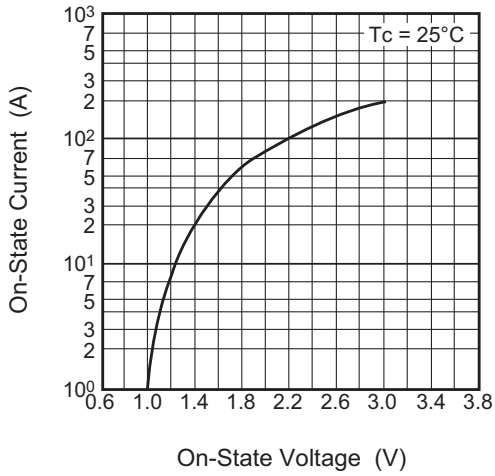
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|-----------------------------------|---------------|------|------|------|-----------------------------|---|
| Repetitive peak reverse current | I_{RRM} | — | — | 2.0 | mA | $T_j = 125^{\circ}\text{C}$, V_{RRM} applied |
| Repetitive peak off-state current | I_{DRM} | — | — | 2.0 | mA | $T_j = 125^{\circ}\text{C}$, 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 | — | — | V | $T_j = 125^{\circ}\text{C}$, $V_D = 1/2 V_{DRM}$ |
| 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 | $^{\circ}\text{C}/\text{W}$ | Junction to case ^{Note1 Note2} |

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

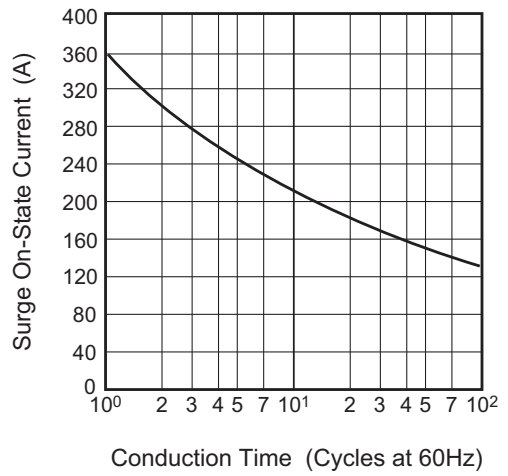
2. Case temperature is measured at anode tab 1.5 mm away from the molded case.

Performance Curves

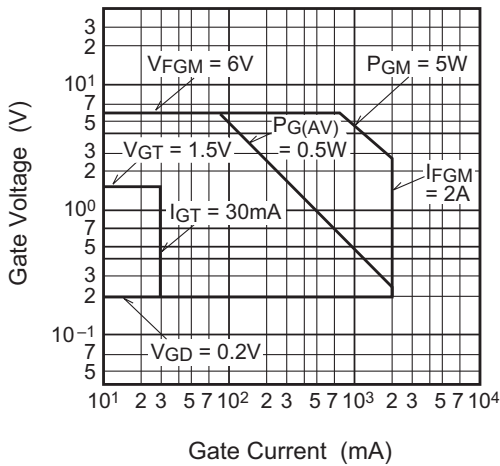
Maximum On-State Characteristics



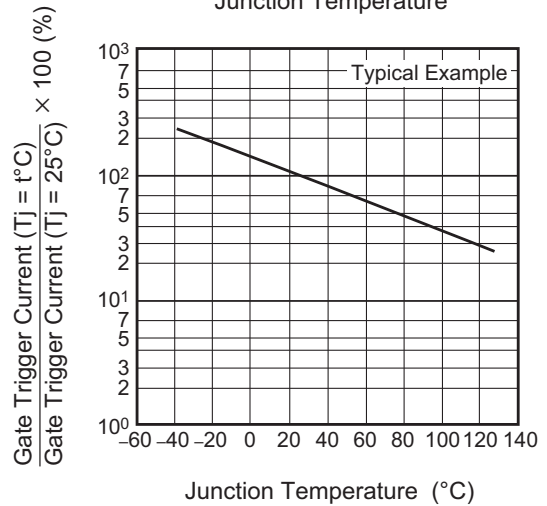
Rated Surge On-State Current



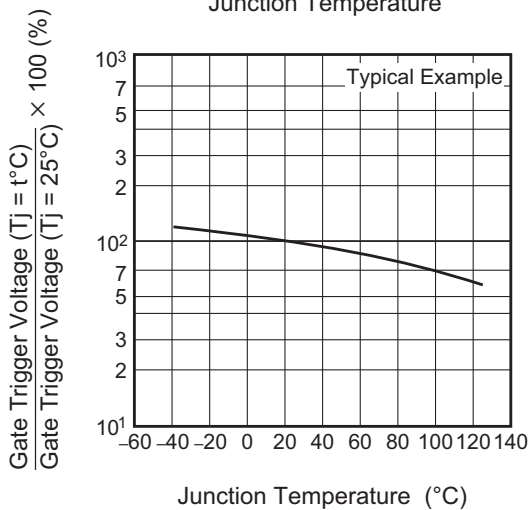
Gate Characteristics



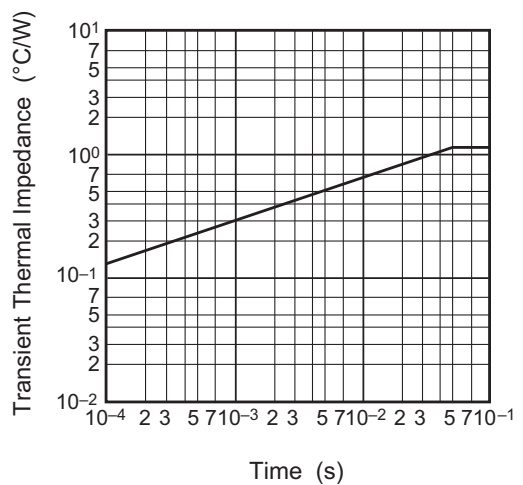
Gate Trigger Current vs. Junction Temperature



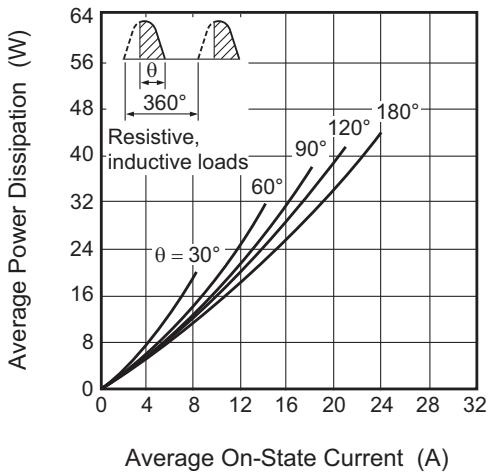
Gate Trigger Voltage vs. Junction Temperature



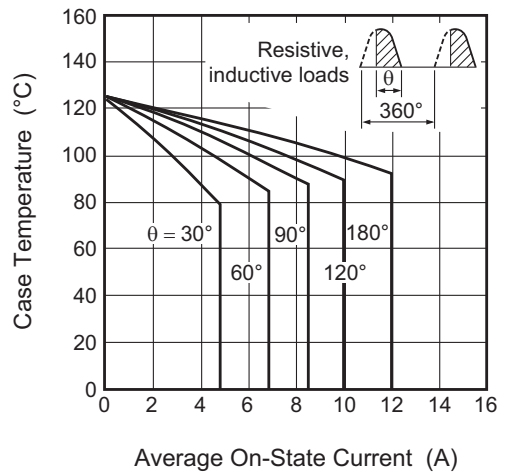
Maximum Transient Thermal Impedance Characteristics (Junction to case)



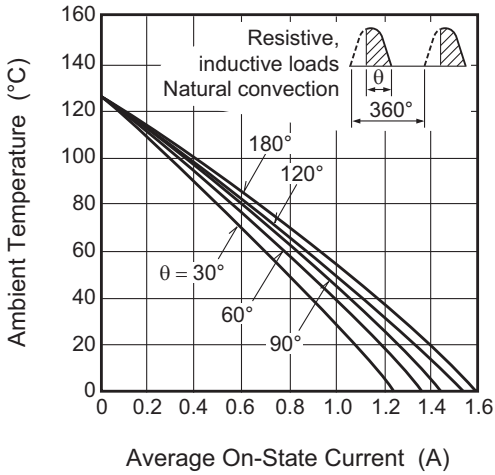
Maximum Average Power Dissipation
(Single-Phase Half Wave)



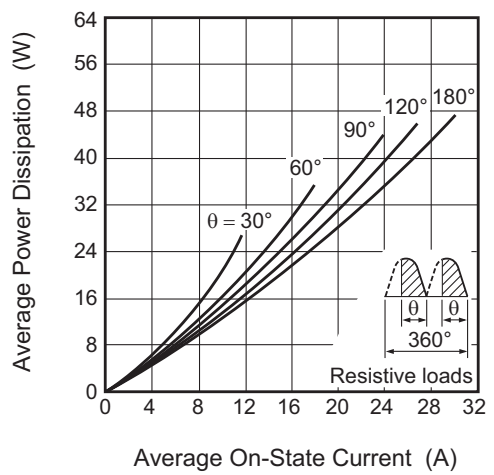
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Half Wave)



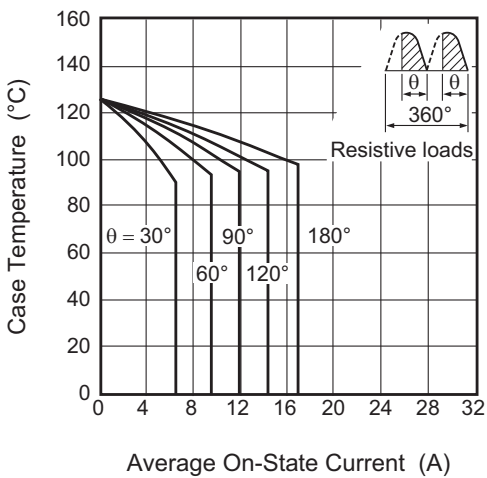
Allowable Ambient Temperature vs.
Average On-State Current
(Single-Phase Half Wave)



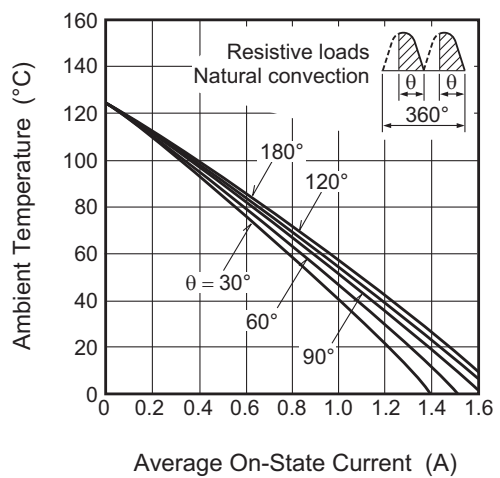
Maximum Average Power Dissipation
(Single-Phase Full Wave)



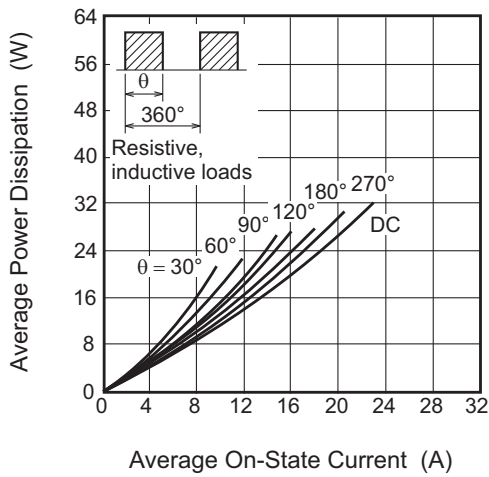
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Full Wave)



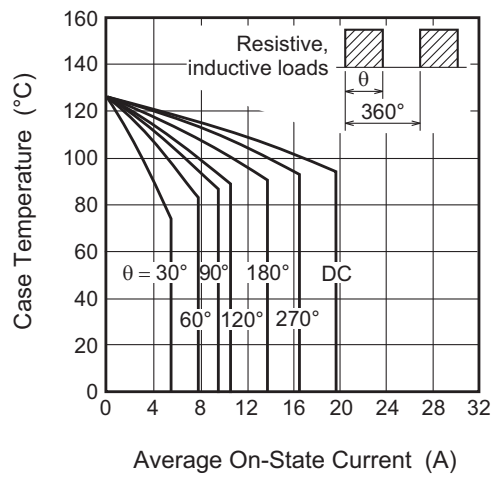
Allowable Ambient Temperature vs.
Average On-State Current
(Single-Phase Full Wave)



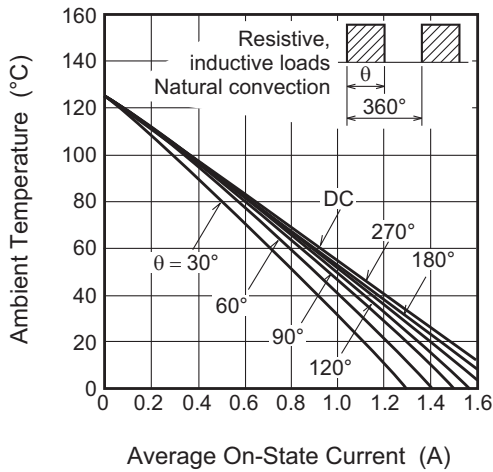
Maximum Average Power Dissipation
(Rectangular Wave)



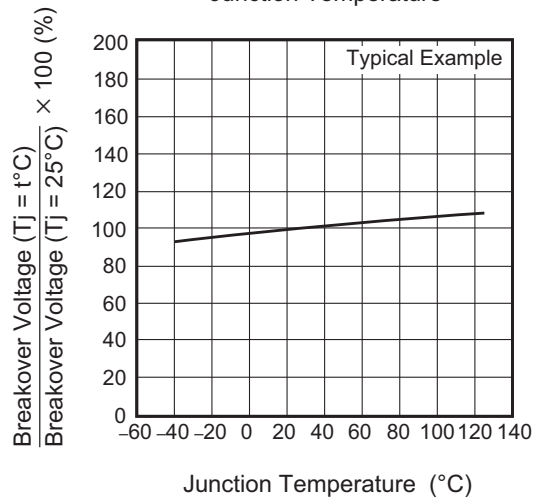
Allowable Case Temperature vs.
Average On-State Current
(Rectangular Wave)



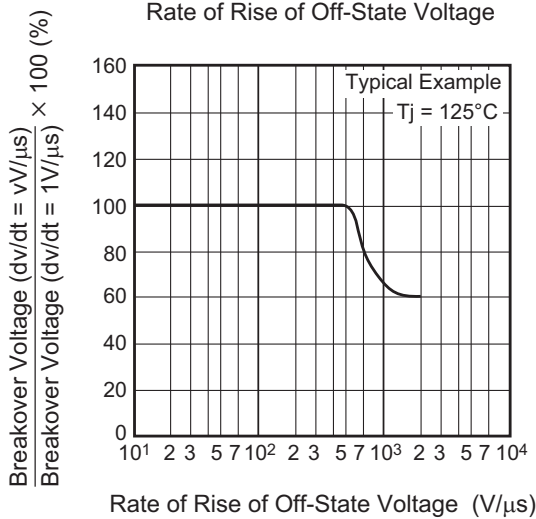
Allowable Ambient Temperature vs.
Average On-State Current
(Rectangular Wave)



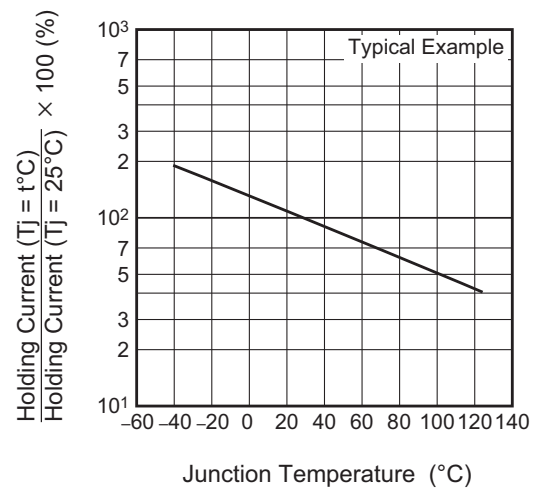
Breakover Voltage vs.
Junction Temperature

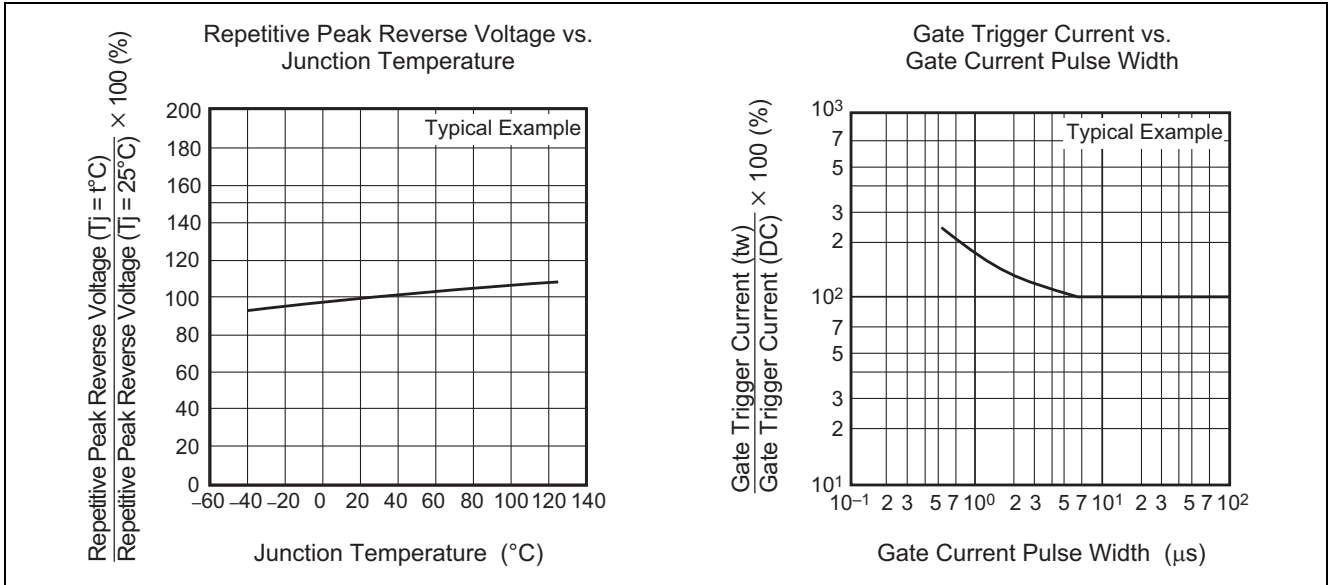


Breakover Voltage vs.
Rate of Rise of Off-State Voltage

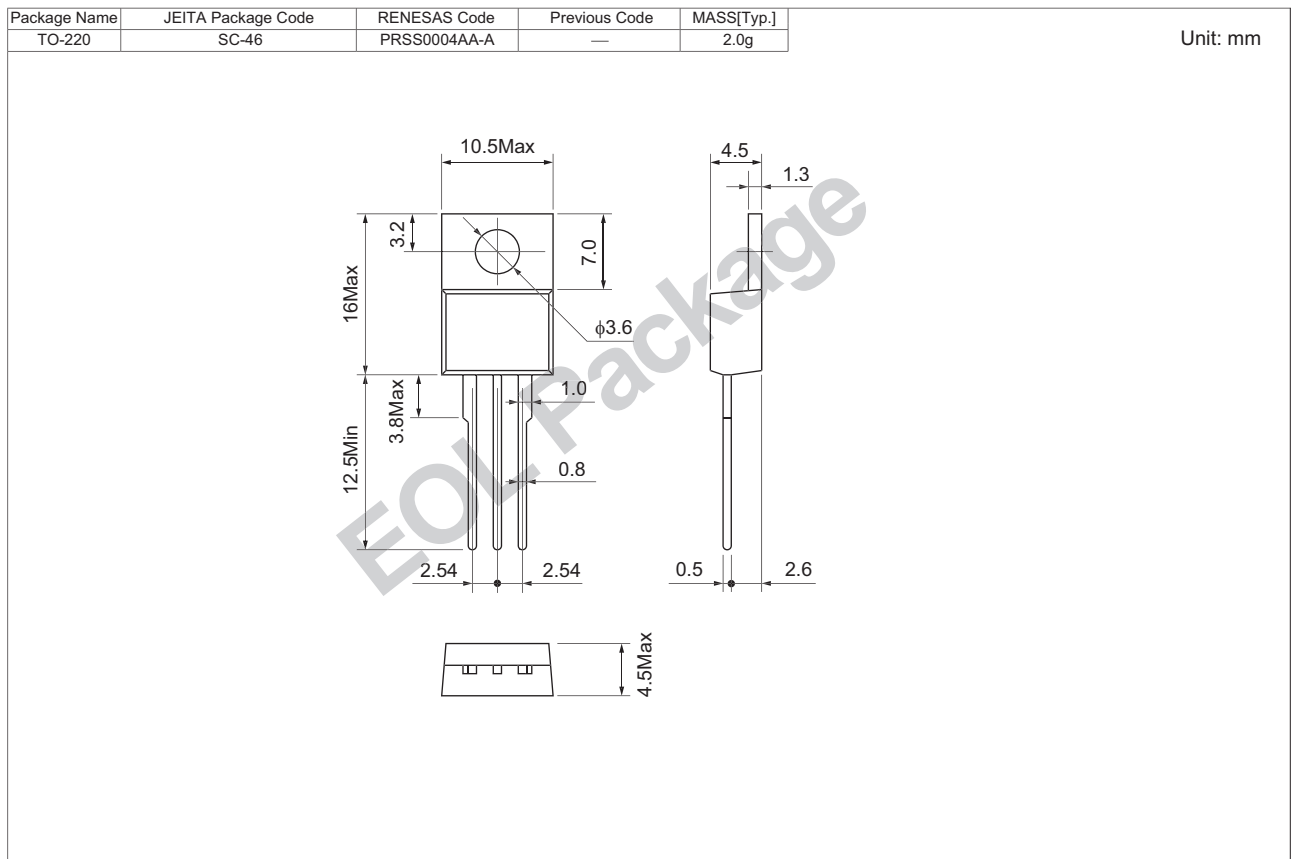
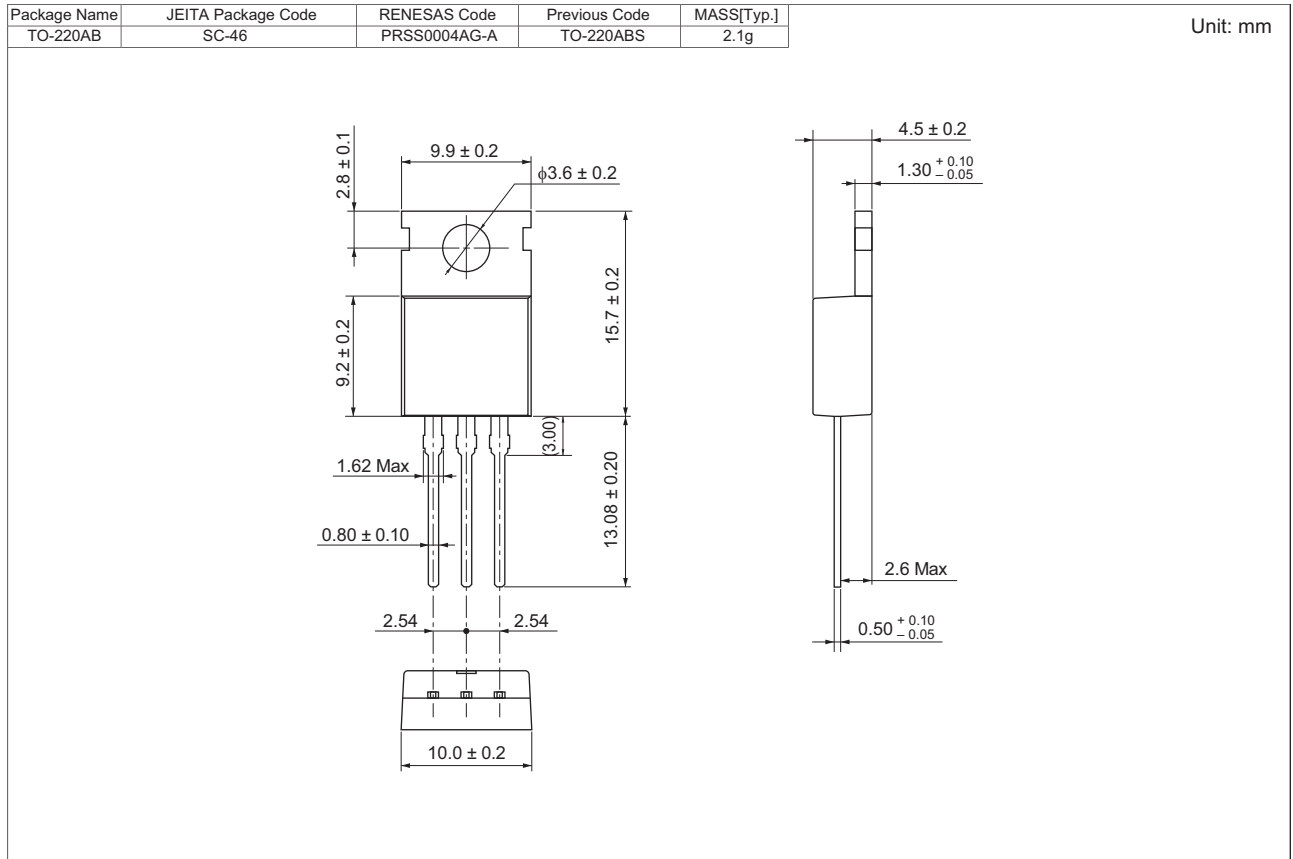


Holding Current vs.
Junction Temperature





Package Dimensions



Ordering Information

| Orderable Part Number | Packing | Quantity | Remark |
|-----------------------|---------|----------|---------------|
| CR12CM-12A#BB0 | Tube | 50 pcs. | Straight type |
| CR12CM-12A-A8#BB0 | Tube | 50 pcs. | A8 Lead form |

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

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