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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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CR05AM-12

Thyristor

Low Power Use

REJ03G0353-0100

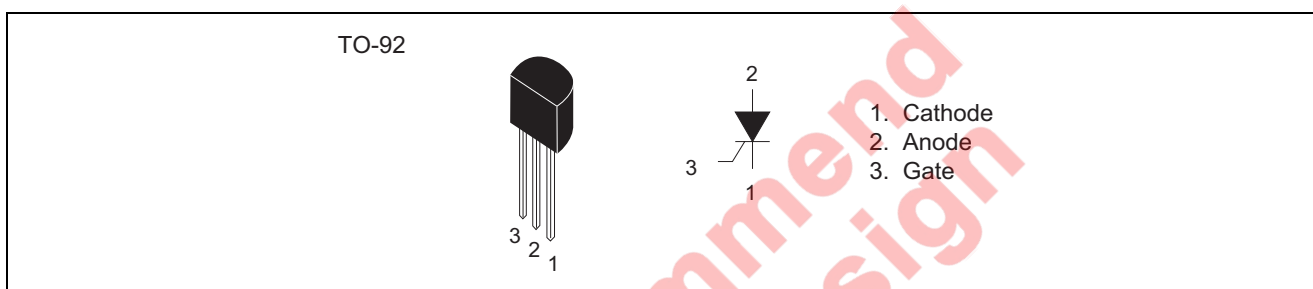
Rev.1.00

Aug.20.2004

Features

- $I_{T(AV)}$: 0.3 A
- V_{DRM} : 600 V
- I_{GT} : 100 μ A
- Non-Insulated Type
- Glass Passivation Type

Outline



Applications

Leakage protector, timer, and gas igniter

Maximum Ratings

| Parameter | Symbol | Voltage class | Unit |
|--|-------------|---------------|------|
| | | 12 | |
| Repetitive peak reverse voltage | V_{RRM} | 600 | V |
| Non-repetitive peak reverse voltage | V_{RSM} | 800 | V |
| DC reverse voltage | $V_{R(DC)}$ | 480 | V |
| Repetitive peak off-state voltage ^{Note1} | V_{DRM} | 600 | V |
| Non-repetitive peak off-state voltage ^{Note1} | V_{DSM} | 800 | V |
| DC off-state voltage ^{Note1} | $V_{D(DC)}$ | 480 | V |

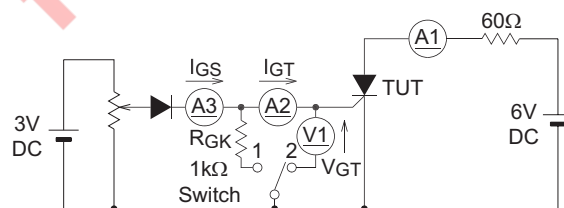
| Parameter | Symbol | Ratings | Unit | Conditions |
|--------------------------------|--------------|--------------|----------------------|--|
| RMS on-state current | $I_{T(RMS)}$ | 0.47 | A | |
| Average on-state current | $I_{T(AV)}$ | 0.3 | A | Commercial frequency, sine half wave 180° conduction, $T_a = 47^\circ\text{C}$ |
| Surge on-state current | I_{TSM} | 10 | A | 60Hz sine half wave 1 full cycle, peak value, non-repetitive |
| I^2t for fusing | I^2t | 0.4 | A^2s | 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 +110 | $^\circ\text{C}$ | |
| Storage temperature | T_{stg} | - 40 to +125 | $^\circ\text{C}$ | |
| Mass | — | 0.23 | g | Typical value |

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

Electrical Characteristics

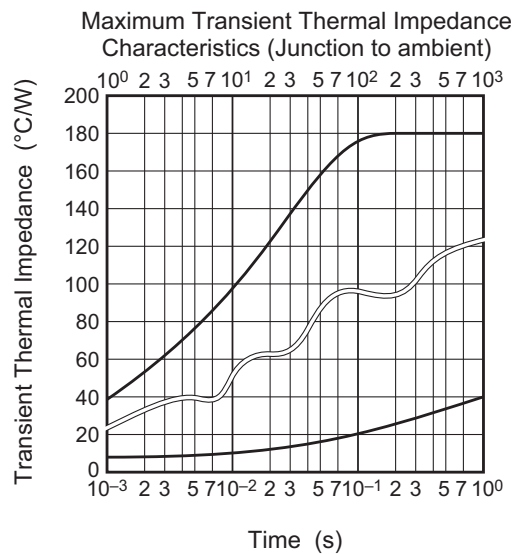
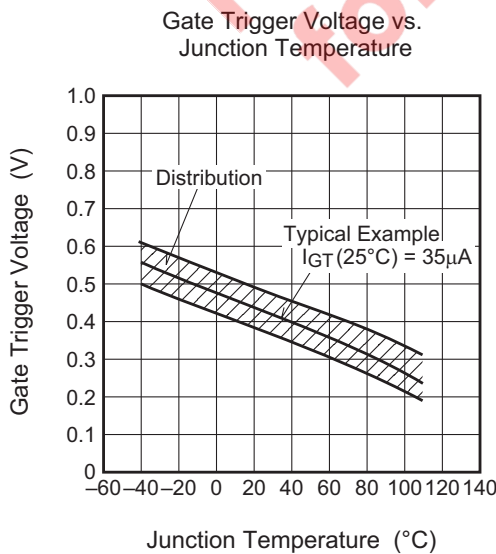
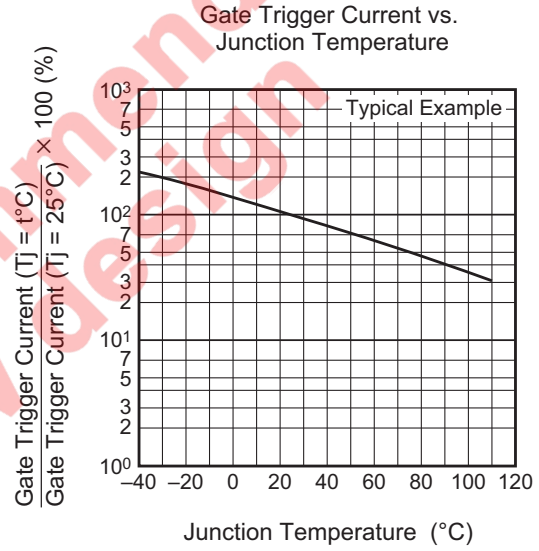
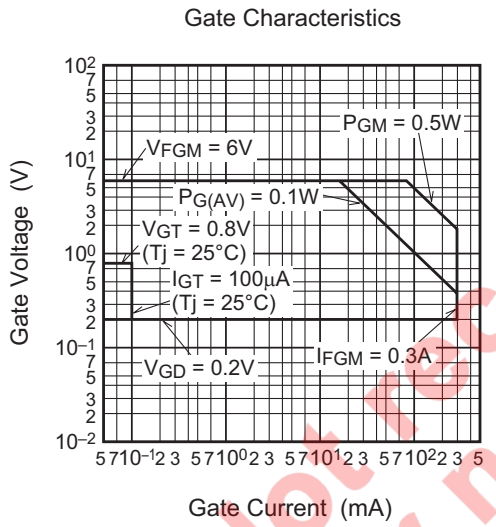
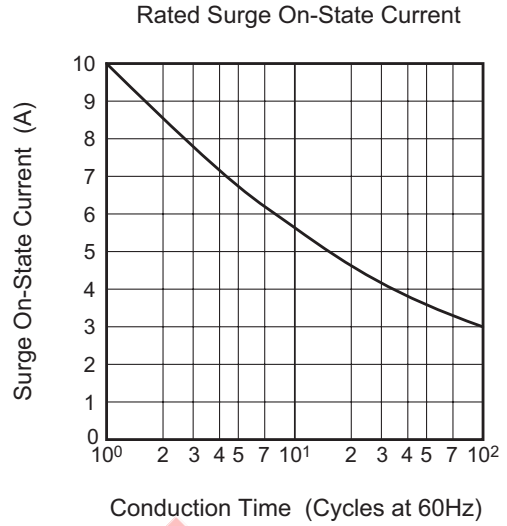
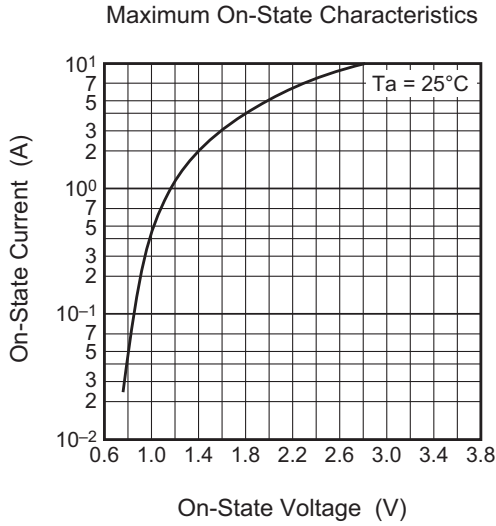
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|-----------------------------------|---------------|------|------|------|--------------------|---|
| Repetitive peak reverse current | I_{RRM} | — | — | 0.1 | mA | $T_j = 110^\circ\text{C}$, V_{RRM} applied |
| Repetitive peak off-state current | I_{DRM} | — | — | 0.1 | mA | $T_j = 110^\circ\text{C}$, V_{DRM} applied, $R_{GK} = 1 \text{ k}\Omega$ |
| On-state voltage | V_{TM} | — | — | 1.8 | V | $T_a = 25^\circ\text{C}$, $I_{TM} = 4 \text{ A}$, instantaneous value |
| Gate trigger voltage | V_{GT} | — | — | 0.8 | V | $T_j = 25^\circ\text{C}$, $V_D = 6 \text{ V}$, $I_T = 0.1 \text{ A}$ ^{Note2} |
| Gate non-trigger voltage | V_{GD} | 0.2 | — | — | V | $T_j = 110^\circ\text{C}$, $V_D = 1/2 V_{DRM}$, $R_{GK} = 1 \text{ k}\Omega$ |
| Gate trigger current | I_{GT} | 1 | — | 100 | μA | $T_j = 25^\circ\text{C}$, $V_D = 6 \text{ V}$, $I_T = 0.1 \text{ A}$ ^{Note2} |
| Holding current | I_H | — | 1.5 | 3 | mA | $T_j = 25^\circ\text{C}$, $V_D = 12 \text{ V}$, $R_{GK} = 1 \text{ k}\Omega$ |
| Thermal resistance | $R_{th(j-a)}$ | — | — | 180 | $^\circ\text{C/W}$ | Junction to ambient |

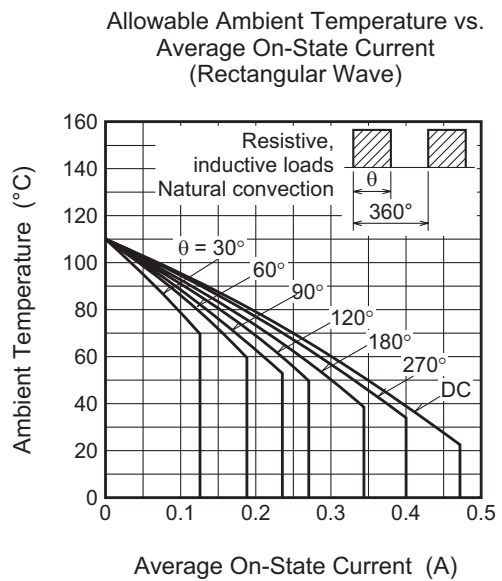
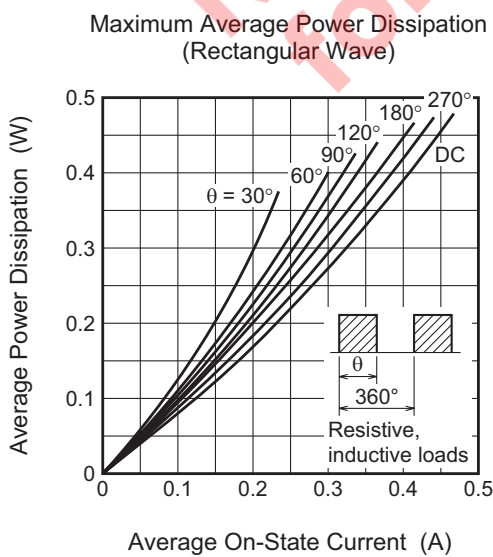
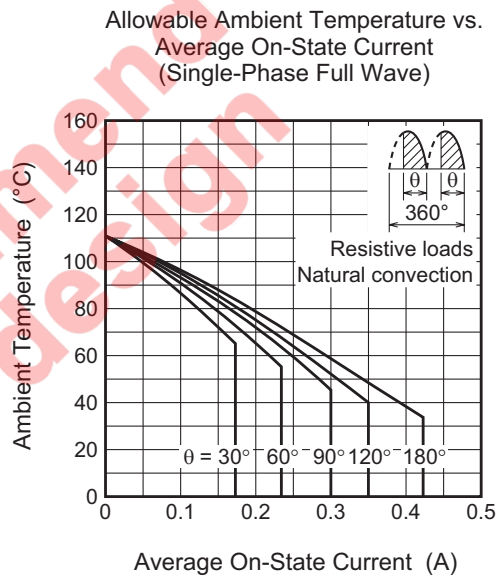
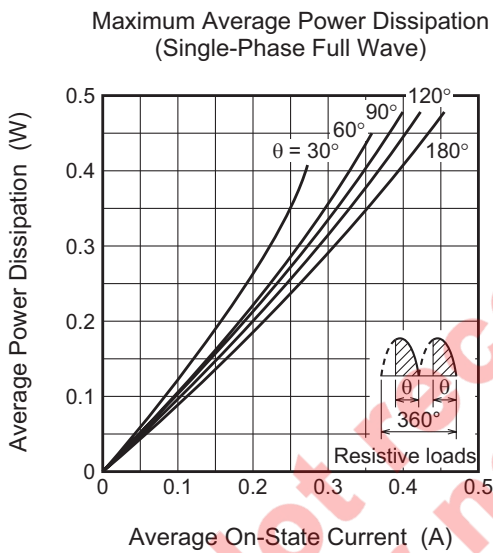
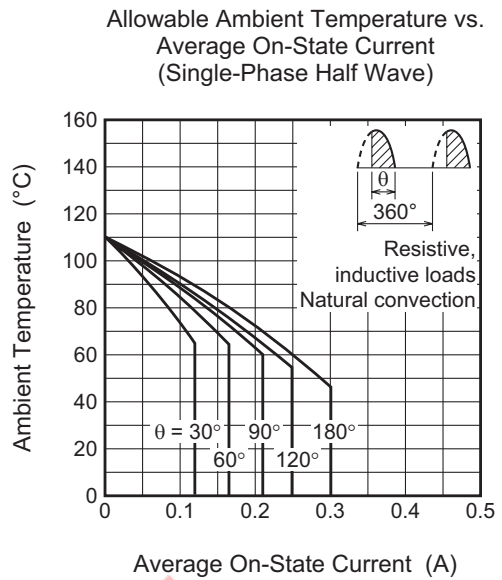
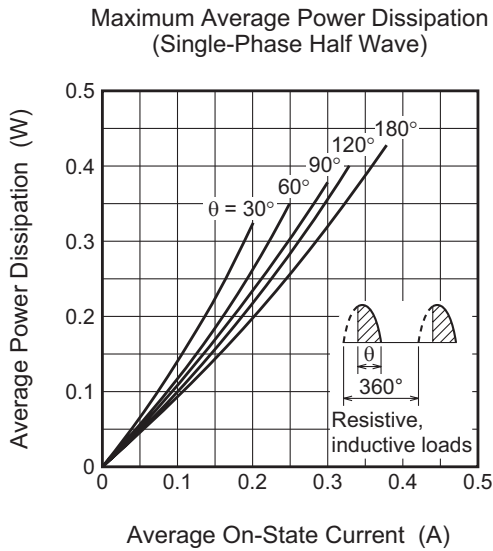
Notes: 2. I_{GT} , V_{GT} measurement circuit.



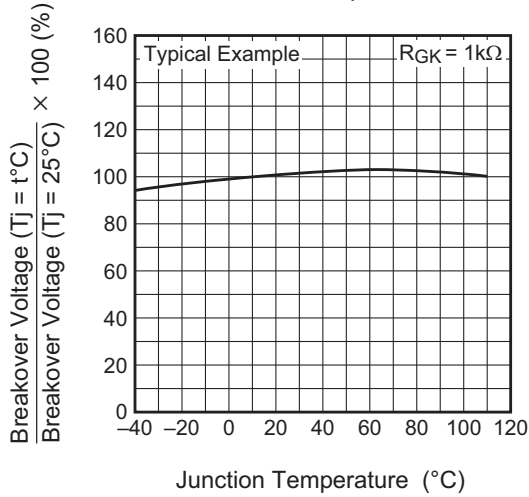
Switch 1 : I_{GT} measurement
 Switch 2 : V_{GT} measurement
 (Inner resistance of voltage meter is about $1 \text{ k}\Omega$)

Performance Curves

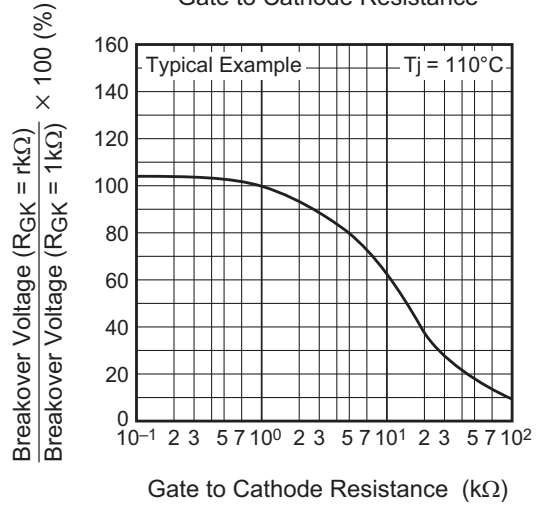




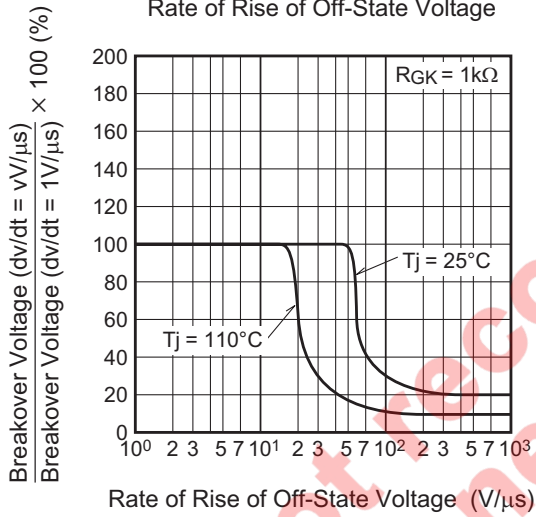
Breakover Voltage vs. Junction Temperature



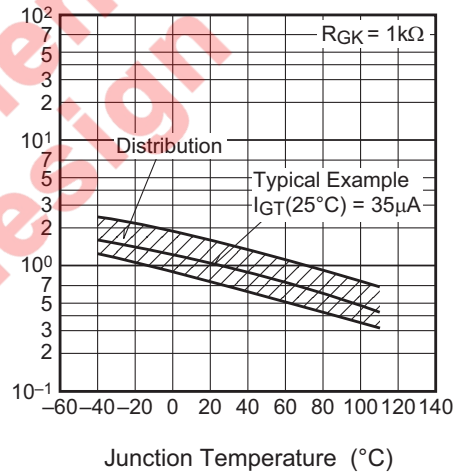
Breakover Voltage vs. Gate to Cathode Resistance



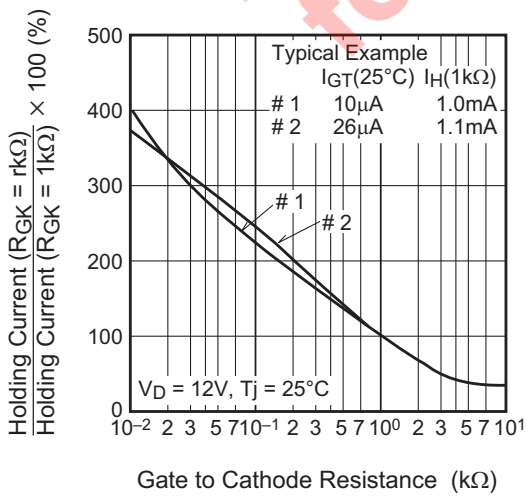
Breakover Voltage vs. Rate of Rise of Off-State Voltage



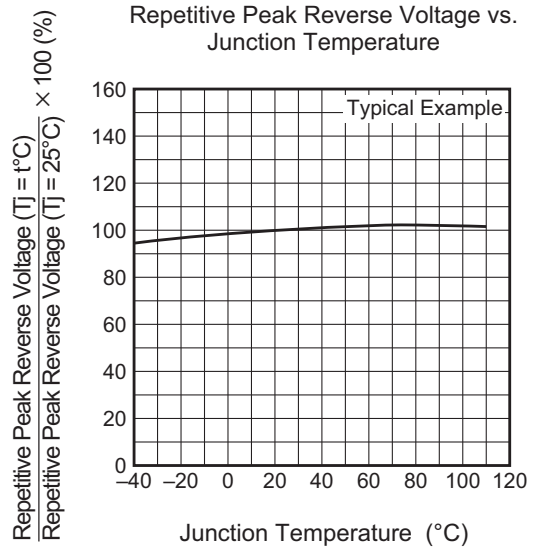
Holding Current vs. Junction Temperature



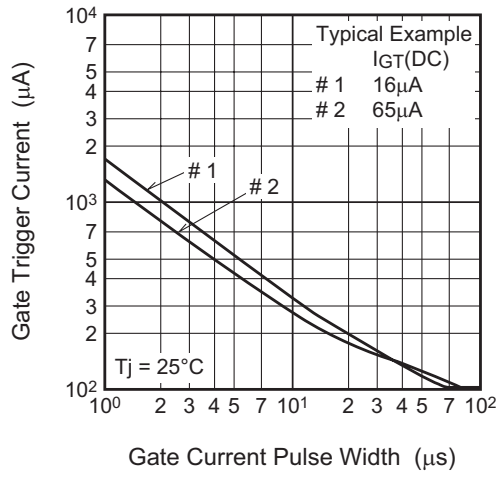
Holding Current vs. Gate to Cathode Resistance



Repetitive Peak Reverse Voltage vs. Junction Temperature



Gate Trigger Current vs.
Gate Current Pulse Width



Not recommend
for new design

Package Dimensions

TO-92

| | | | |
|-------------------|------------|----------------------------|---------------|
| EIAJ Package Code | JEDEC Code | Mass (g) (reference value) | Lead Material |
| Conforms | Conforms | 0.23 | Cu alloy |

Technical drawing showing dimensions for the TO-92 package:

- Top view: Diameter $\phi 5.0$ max, width 4.4
- Side view: Height 5.0 max, lead length 1.15 min
- Lead view: Lead spacing 1.25, lead diameter circumscribed circle $\phi 0.7$

| Symbol | Dimension in Millimeters | | |
|----------------|--------------------------|-----|-----|
| | Min | Typ | Max |
| A | — | — | — |
| A ₁ | — | — | — |
| A ₂ | — | — | — |
| b | — | — | — |
| D | — | — | — |
| E | — | — | — |
| e | — | — | — |
| x | — | — | — |
| y | — | — | — |
| y ₁ | — | — | — |
| ZD | — | — | — |
| ZE | — | — | — |

Note 1) The dimensional figures indicate representative values unless otherwise the tolerance is specified.

Order Code

| Lead form | Standard packing | Quantity | Standard order code | Standard order code example |
|---------------|------------------|----------|-------------------------------|-----------------------------|
| Straight type | Vinyl sack | 500 | Type name | CR05AM-12 |
| Lead form | Vinyl sack | 500 | Type name – Lead forming code | CR05AM-12-A6 |
| Form A8 | Taping | 2000 | Type name – TB | CR05AM-12-TB |

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

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