

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# BCR3KM-12

Triac

Low Power Use

REJ03G0312-0200

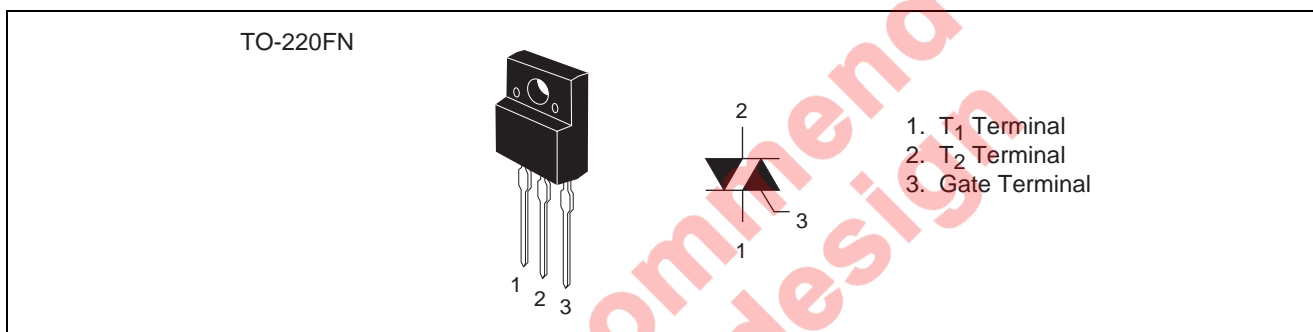
Rev.2.00

Nov.09.2004

## Features

- $I_{T(RMS)}$  : 3 A
- $V_{DRM}$  : 600 V
- $I_{FGT I}$ ,  $I_{RGT I}$ ,  $I_{RGT III}$  : 15 mA (10 mA)<sup>Note3</sup>
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904  
File No. E80271

## Outline



## Applications

Electric rice cooker, electric pot, and controller for other heater

## Maximum Ratings

| Parameter  | Symbol    | Voltage class | Unit |
|--|-----------|---------------|------|
|  |           | 12            |      |
| Repetitive peak off-state voltage <sup>Note1</sup>     | $V_{DRM}$ | 600           | V    |
| Non-repetitive peak off-state voltage <sup>Note1</sup> | $V_{DSM}$ | 720           | V    |

| Parameter                      | Symbol       | Ratings      | Unit                 | Conditions   |
|--------------------------------|--------------|--------------|----------------------|--|
| RMS on-state current           | $I_{T(RMS)}$ | 3.0          | A                    | Commercial frequency, sine full wave 360° conduction, $T_c = 111^\circ\text{C}$  |
| Surge on-state current         | $I_{TSM}$    | 30           | A                    | 60Hz sinewave 1 full cycle, peak value, non-repetitive                           |
| $I^2t$ for fusing              | $I^2t$       | 3.7          | $\text{A}^2\text{s}$ | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current         |
| Peak gate power dissipation    | $P_{GM}$     | 3            | W                    |  |
| Average gate power dissipation | $P_{G(AV)}$  | 0.3          | W                    |  |
| Peak gate voltage              | $V_{GM}$     | 6            | V                    |  |
| Peak gate current              | $I_{GM}$     | 0.5          | A                    |  |
| Junction temperature           | $T_j$        | - 40 to +125 | $^\circ\text{C}$     |  |
| Storage temperature            | $T_{stg}$    | - 40 to +125 | $^\circ\text{C}$     |  |
| Mass                           | —            | 2.0          | g                    |  |
| Isolation voltage              | $V_{iso}$    | 2000         | V                    | $T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case |

Notes: 1. Gate open.

## Electrical Characteristics

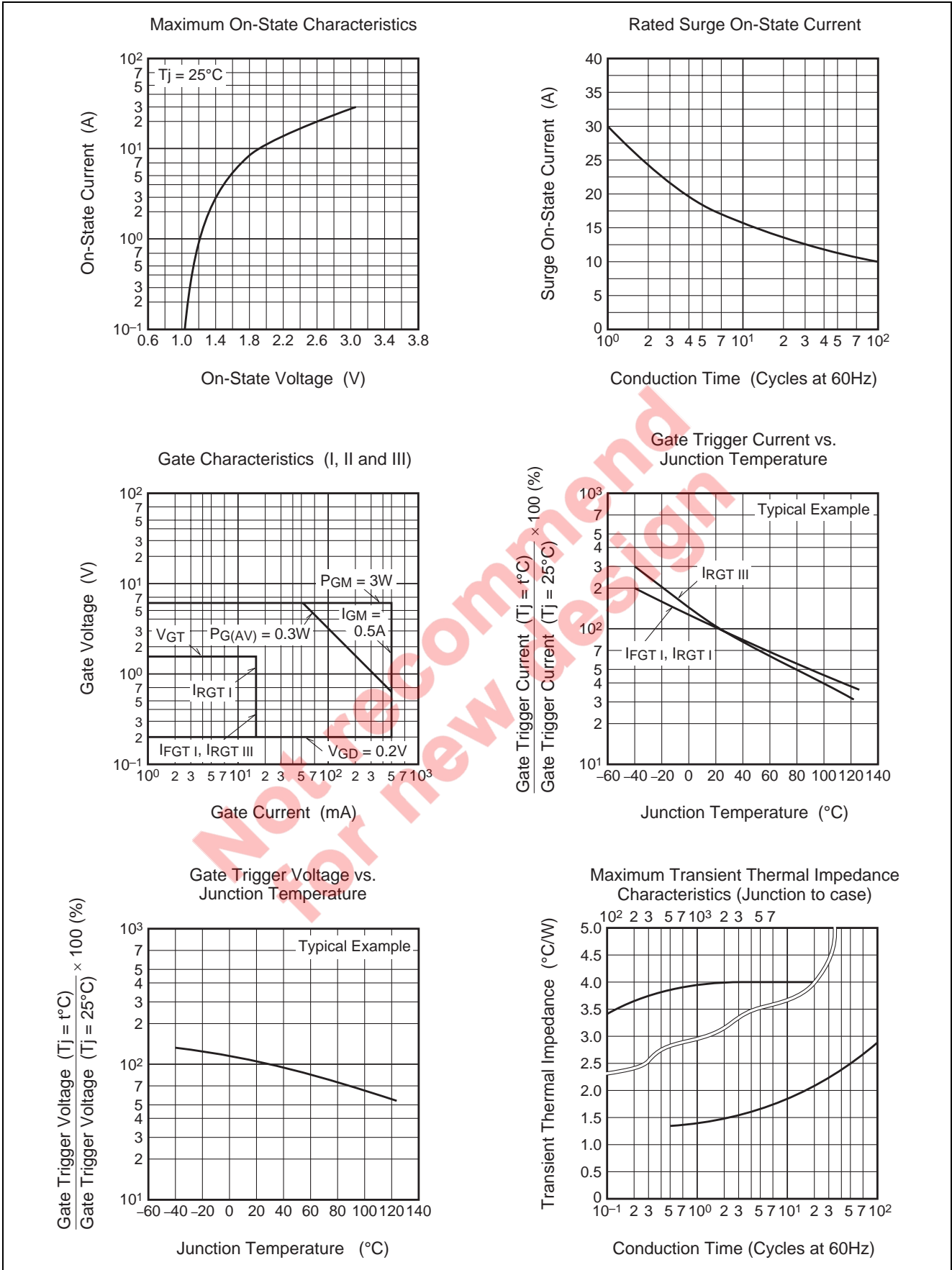
| Parameter                             | Symbol        | Min.                  | Typ. | Max. | Unit                | Test conditions   |  |
|---------------------------------------|---------------|-----------------------|------|------|---------------------|---|--|
| Repetitive peak off-state current     | $I_{DRM}$     | —                     | —    | 2.0  | mA                  | $T_j = 125^\circ\text{C}$ , $V_{DRM}$ applied                                   |  |
| On-state voltage                      | $V_{TM}$      | —                     | —    | 1.5  | V                   | $T_c = 25^\circ\text{C}$ , $I_{TM} = 4.5 \text{ A}$ , Instantaneous measurement |  |
| Gate trigger voltage <sup>Note2</sup> | I             | $V_{FGT \text{ I}}$   | —    | —    | 1.5                 | V   | $T_j = 25^\circ\text{C}$ , $V_D = 6 \text{ V}$ , $R_L = 6 \Omega$ , $R_G = 330 \Omega$ |
|                                       | II            | $V_{RGT \text{ I}}$   | —    | —    | 1.5                 | V   |  |
|                                       | III           | $V_{RGT \text{ III}}$ | —    | —    | 1.5                 | V   |  |
| Gate trigger current <sup>Note2</sup> | I             | $I_{FGT \text{ I}}$   | —    | —    | 15 <sup>Note3</sup> | mA  | $T_j = 25^\circ\text{C}$ , $V_D = 6 \text{ V}$ , $R_L = 6 \Omega$ , $R_G = 330 \Omega$ |
|                                       | II            | $I_{RGT \text{ I}}$   | —    | —    | 15 <sup>Note3</sup> | mA  |  |
|                                       | III           | $I_{RGT \text{ III}}$ | —    | —    | 15 <sup>Note3</sup> | mA  |  |
| Gate non-trigger voltage              | $V_{GD}$      | 0.2                   | —    | —    | V                   | $T_j = 125^\circ\text{C}$ , $V_D = 1/2V_{DRM}$                                  |  |
| Thermal resistance                    | $R_{th(j-c)}$ | —                     | —    | 4.0  | $^\circ\text{C/W}$  | Junction to case <sup>Note4</sup>   |  |
| Thermal resistance                    | $R_{th(j-a)}$ | —                     | —    | 50   | $^\circ\text{C/W}$  | Junction to ambient   |  |

Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

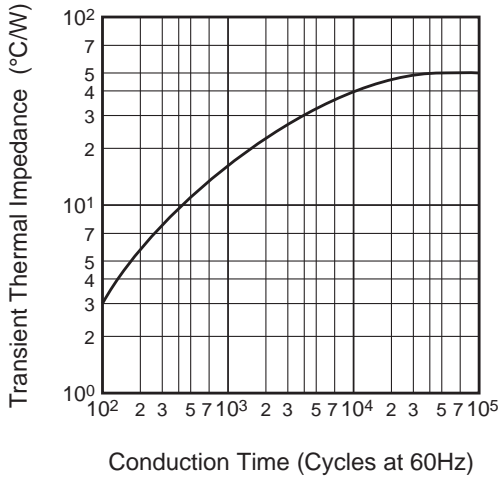
3. High sensitivity ( $I_{GT} \leq 10 \text{ mA}$ ) is also available. ( $I_{GT}$  item: 1)

4. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .

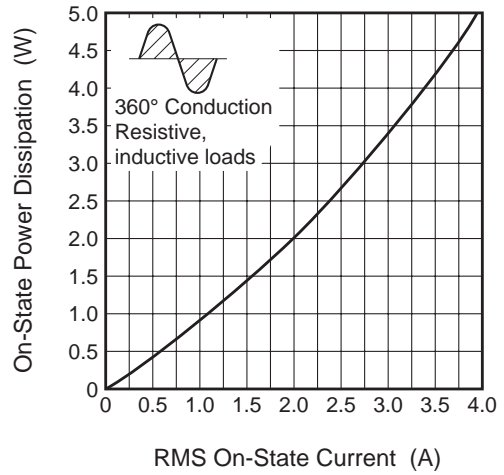
Performance Curves



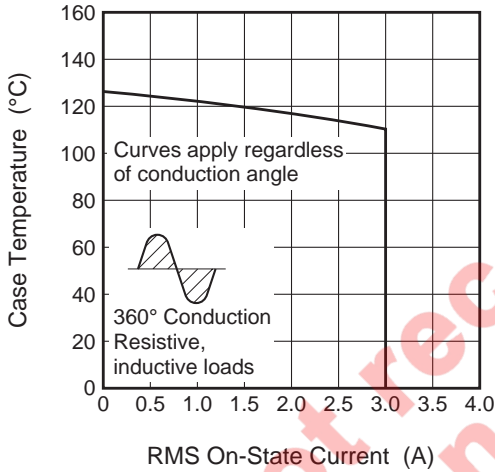
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



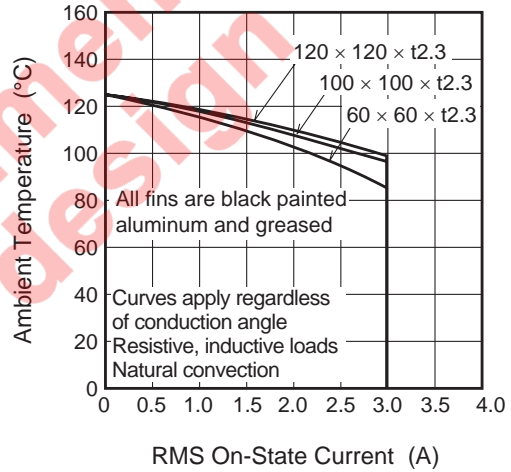
Maximum On-State Power Dissipation



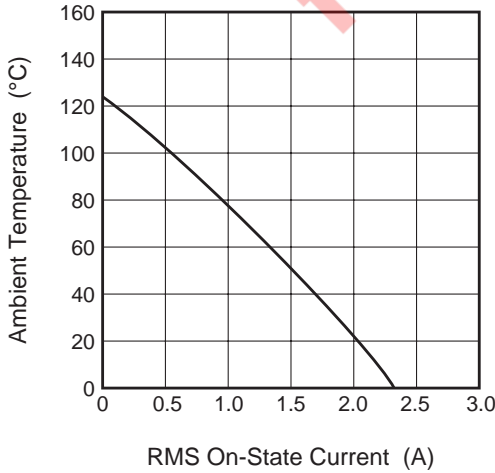
Allowable Case Temperature vs. RMS On-State Current



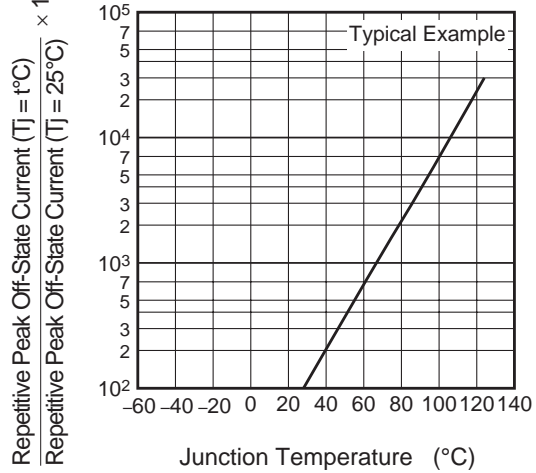
Allowable Ambient Temperature vs. RMS On-State Current



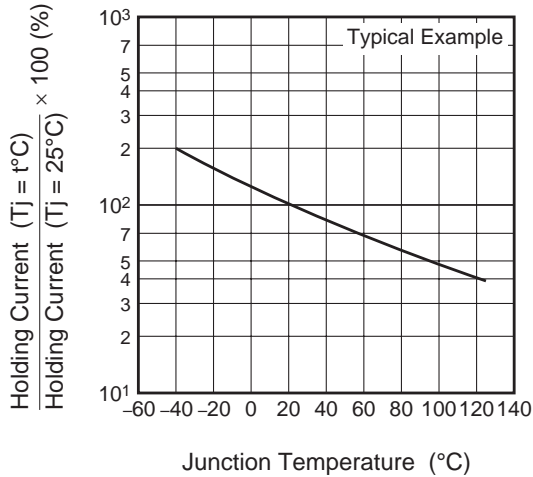
Allowable Ambient Temperature vs. RMS On-State Current



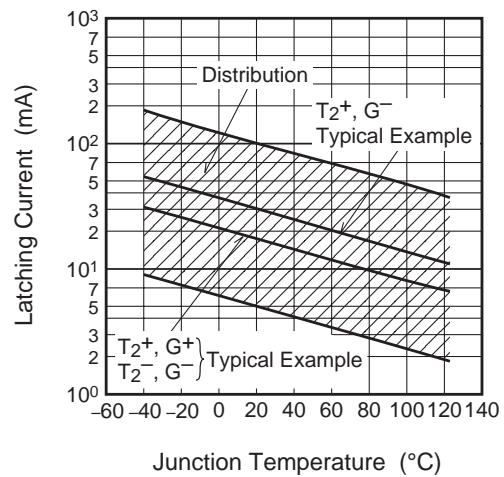
Repetitive Peak Off-State Current vs. Junction Temperature



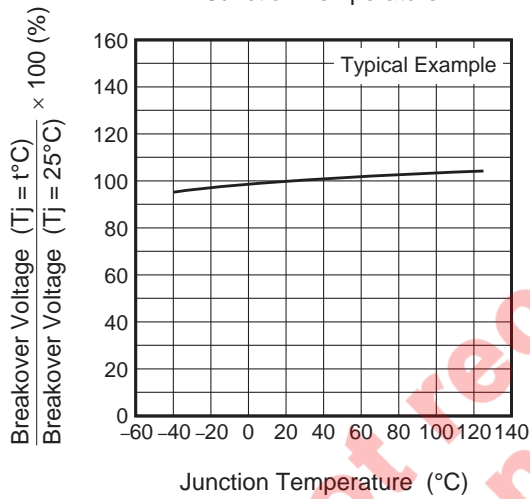
Holding Current vs. Junction Temperature



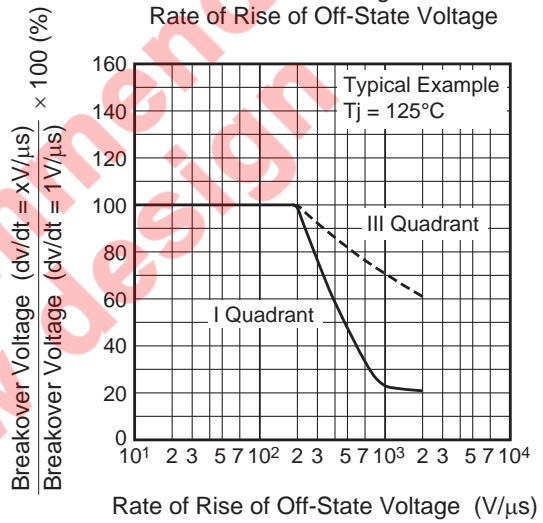
Latching Current vs. Junction Temperature



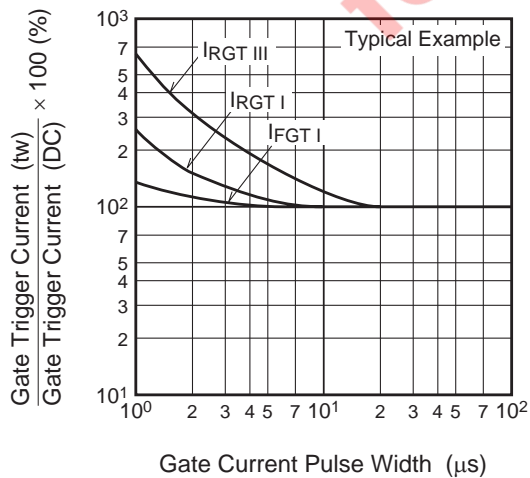
Breakover Voltage vs. Junction Temperature



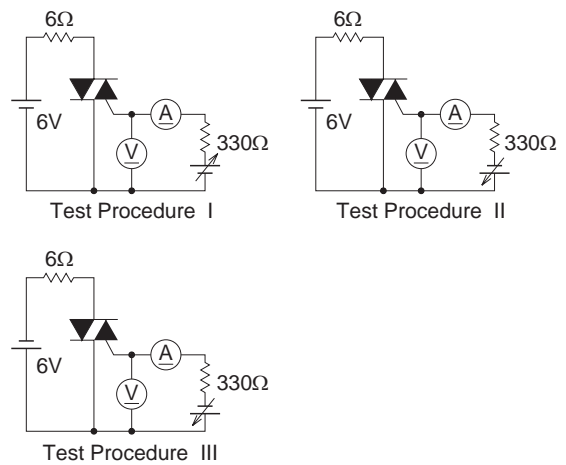
Breakover Voltage vs. Rate of Rise of Off-State Voltage



Gate Trigger Current vs. Gate Current Pulse Width



Gate Trigger Characteristics Test Circuits



### Package Dimensions

**TO-220FN**

|                   |            |                            |               |
|-------------------|------------|----------------------------|---------------|
| EIAJ Package Code | JEDEC Code | Mass (g) (reference value) | Lead Material |
| —                 | —          | 2.0                        | Cu alloy      |

Technical drawings showing dimensions for the TO-220FN package. Dimensions include: 10 ± 0.3, 3 ± 0.3, 15 ± 0.3, 6.5 ± 0.3, φ 3.2 ± 0.2, 14 ± 0.5, 3.6 ± 0.3, 1.1 ± 0.2, 0.75 ± 0.15, 2.54 ± 0.25, 2.8 ± 0.2, 0.75 ± 0.15, 4.5 ± 0.2, and 2.6 ± 0.2.

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

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

### Order Code

| Lead form     | Standard packing        | Quantity | Standard order code               | Standard order code example |
|---------------|-------------------------|----------|-----------------------------------|-----------------------------|
| Straight type | Plastic Magazine (Tube) | 50       | Type name +RA                     | BCR3KM-12RA                 |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name +RA – Lead forming code | BCR3KM-12RA-A8              |

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



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