

**Information**

**NEC**

# **Voltage Regulator of SMD**

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**SOT-89 (Power mini mold)**  
**MP-3Z (SC-63)**

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## 1. INTRODUCTION

In recent years electronic devices such as camcorders, notebook PCs, and cellular telephones, have been increasingly miniaturized. In response, the need for smaller and lighter semiconductor devices and electronic components employed for these systems to increase the mounting density on PC boards has intensified.

NEC offers SOT-89 and MP-3Z surface-mount packages for power supply ICs.

This document explains the characteristics and taping specifications of the SOT-89 and MP-3Z packages.

## 2. DIMENSIONS

Figure 1 shows the dimensions of the SOT-89 package, and Figure 2 shows the dimensions of the MP-3Z package.

Figure 1. SOT-89 Dimensions (unit: mm)

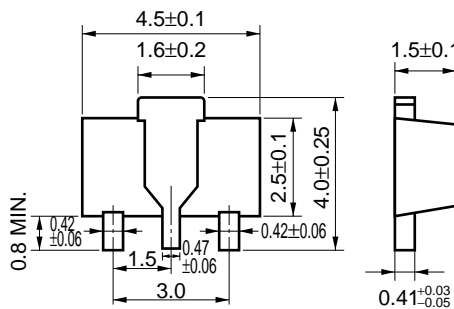
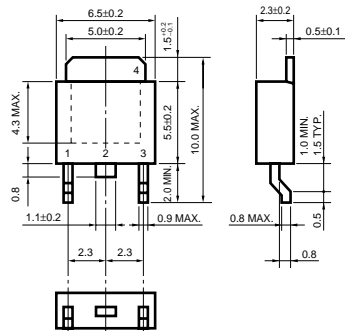


Figure 2. MP-3Z Dimensions (unit: mm)



### 3. CHARACTERISTICS

Because of the construction, the SOT-89 and MP-3Z packages change their thermal characteristics, i.e., total power dissipation, depending on the material and area of the PC board on which the packages are to be mounted.

The Data Sheet for a power IC housed in the SOT-89 package shows the total power dissipation when the package is mounted on a ceramic PC board. Figure 3 shows the total power dissipation when the package is mounted on a glass epoxy board.

Figures 4 and 5 show the typical mounting pad dimensions.

The recommended soldering conditions are described in the Data Sheet of each product. Be sure to read this description.

**Figure 3. Size of Glass Epoxy Board and Total Power Dissipation of SOT-89**

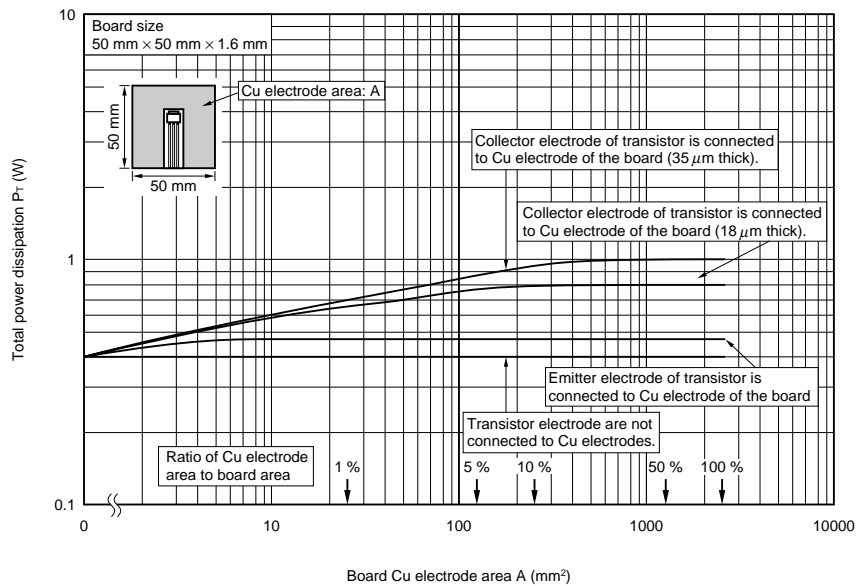
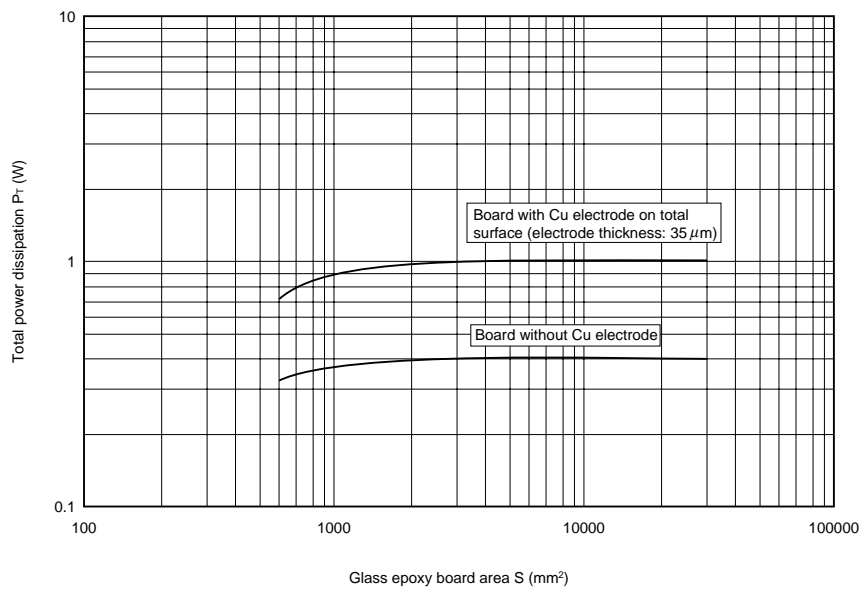


Figure 4. SOT-89 Typical Mounting Pad Dimensions (unit: mm)

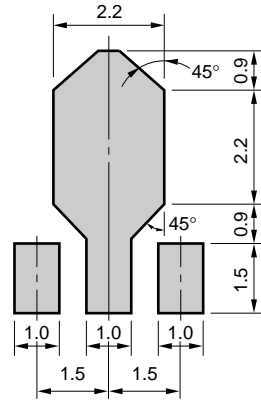
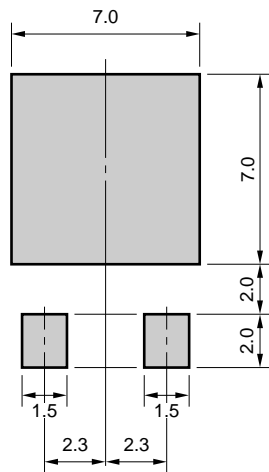


Figure 5. MP-3Z Typical Mounting Pad Dimensions (unit: mm)

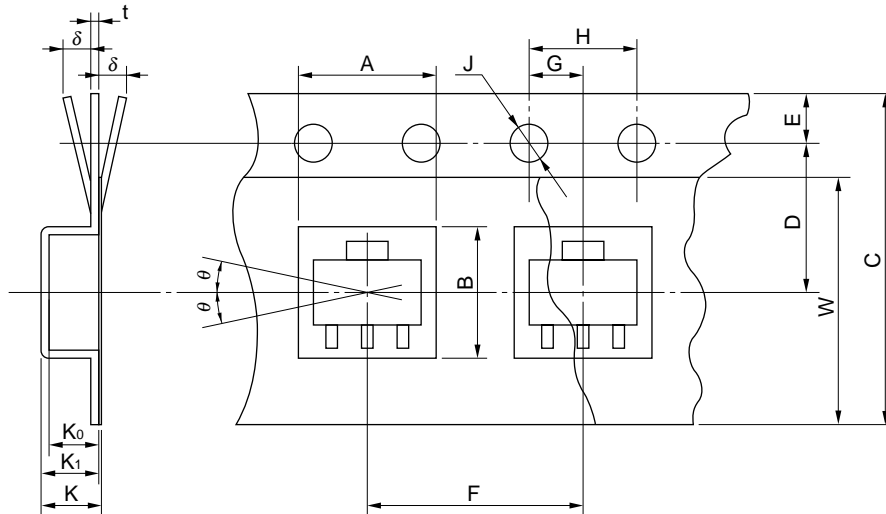


#### 4. TAPING SPECIFICATIONS

The SOT-89 and MP-3Z packages can be delivered on a tape like other ICs.

Figures 6 and 7 show the tape shape and dimensions. Figures 8 and 9 show the reel shape.

**Figure 6. SOT-89 Tape Dimensions (12 mm embossed-type carrier tape)**

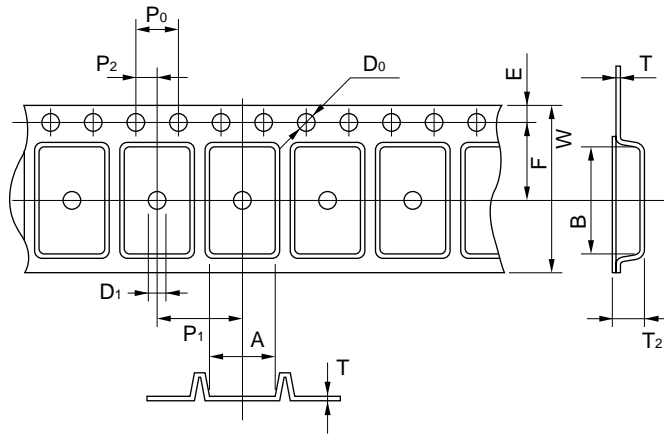


Unit: mm

| Item                                  | Symbol      | Dimensions, Angle | Remark                    |   |
|---------------------------------------|-------------|-------------------|---------------------------|---|
| Recessed hole for component insertion | Height      | A                 | $5.0^{+0.1}_{-0.1}$       | Inner side of edge on surface 0.5 mm above inner bottom |
|                                       | Width       | B                 | $4.6^{+0.1}_{-0.1}$       | Inner side of edge on surface 0.5 mm above inner bottom |
|                                       | Depth       | K <sub>0</sub>    | 1.8±0.1                   | Internal space  |
|                                       | Pitch       | F                 | 8.0±0.1                   | Total error: $^{+0.1}_{-0.3}$ MAX./10 pitch             |
| Feeding hole                          | Diameter    | J                 | $\phi 1.5^{+0.1}_{-0.05}$ |   |
|                                       | Pitch       | H                 | 4.0±0.1                   | Total error: $^{+0.1}_{-0.3}$ MAX./10 pitch             |
|                                       | Position    | E                 | 1.5±0.1                   | Distance between edge of tape and center of hole        |
| Distance between center lines         | Vertical    | G                 | 2.0±0.05                  | Center line of recessed hole and feeding hole           |
|                                       | Horizontal  | D                 | 5.65±0.05                 | Center line of recessed hole and feeding hole           |
| Cover tape                            | Width       | W                 | $9.5^{+0.3}_{-0}$         | Thickness: 0.1 MAX.                                     |
| Carrier tape                          | Width       | C                 | 12±0.2                    | Warp $\delta$ 0.3 MAX.                                  |
|                                       | Thickness   | t                 | 0.3±0.05                  |   |
|                                       | Hole depth  | K <sub>1</sub>    | 2.1±0.1                   |   |
| Device                                | Inclination | $\theta$          | 30° MAX.                  |   |
| Total thickness                       |             | K                 | 2.15±0.1                  | Total of cover tape and carrier tape                    |



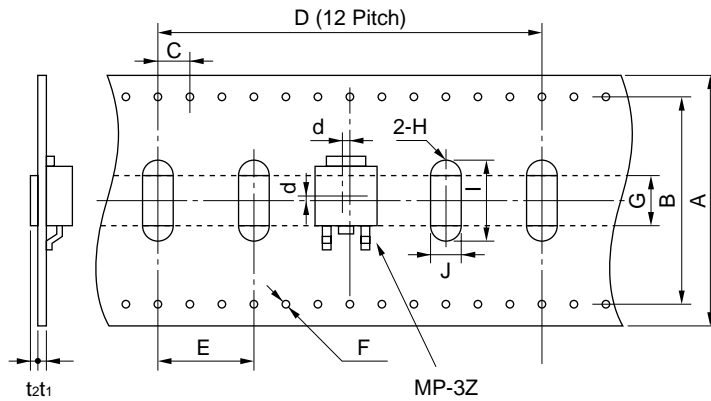
Figure 7 (A). MP-3Z Tape Dimensions (16 mm embossed-type taping)



Unit: mm

| Symbol         | Standard               |
|----------------|------------------------|
| A              | 7.1 MAX.               |
| B              | 10.7 MAX.              |
| D <sub>0</sub> | $\phi 1.5^{+0.1}_{-0}$ |
| D <sub>1</sub> | $\phi 1.5$ MIN.        |
| E              | $1.75 \pm 0.1$         |
| F              | $7.5 \pm 0.1$          |
| P <sub>0</sub> | $4.0 \pm 0.1$          |
| P <sub>1</sub> | $8.0 \pm 0.1$          |
| P <sub>2</sub> | $2.0 \pm 0.1$          |
| T              | 0.2                    |
| T <sub>2</sub> | $2.7 \pm 0.1$          |
| W              | $16.0 \pm 0.3$         |

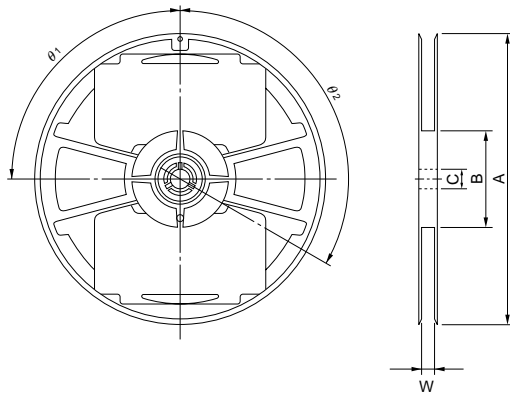
Figure 7 (B). MP-3Z Tape Dimensions (32 mm adhesive-type taping)



Unit: mm

| Symbol         | Standard               |
|----------------|------------------------|
| A              | $32^{+0}_{-0.4}$       |
| B              | $26 \pm 0.1$           |
| C              | $4.0 \pm 0.1$          |
| D              | $48 \pm 0.3$           |
| E              | $12 \pm 0.1$           |
| F              | $\phi 1.0^{+0.1}_{-0}$ |
| G              | $6.0 \pm 0.2$          |
| H              | R2.0                   |
| I              | 8.0                    |
| J              | 4.0                    |
| t <sub>2</sub> | 0.15                   |
| t <sub>1</sub> | 0.18                   |
| d              | $0 \pm 0.5$            |

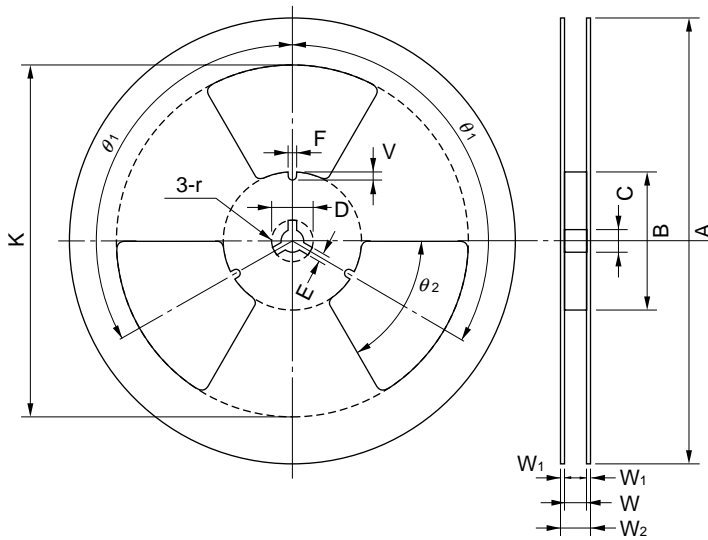
Figure 8. SOT-89 Reel Dimensions



Unit: mm

| Symbol     | Dimensions, Angle |
|------------|-------------------|
| A          | $\phi 178 \pm 2$  |
| W          | $13 \pm 0.5$      |
| B          | $\phi 60 \pm 1$   |
| $\theta_1$ | $90^\circ$        |
| C          | $\phi 13 \pm 0.5$ |
| $\theta_2$ | $120^\circ$       |

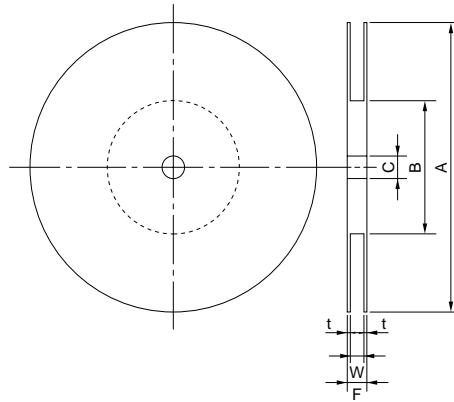
Figure 9 (A). MP-3Z Reel Dimensions (embossed-type taping)



Unit: mm

| Symbol         | Standard           |
|----------------|--------------------|
| A              | 329                |
| B              | 100                |
| C              | $13 \pm 0.5$       |
| D              | $21 \pm 0.8$       |
| E              | $2.0 \pm 0.5$      |
| F              | 2                  |
| V              | 8                  |
| W              | $16.4^{+2.0}_{-0}$ |
| W <sub>1</sub> | (2.5)              |
| W <sub>2</sub> | 22.4 MAX.          |
| K              | 260                |
| r              | 1.0                |
| $\theta_1$     | 120                |
| $\theta_2$     | 60                 |

**Figure 9 (B). MP-3Z Reel Dimensions (adhesive-type taping)**



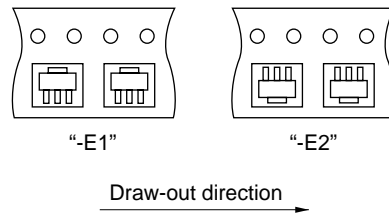
Unit: mm

| Symbol | Dimensions, Angle |
|--------|-------------------|
| A      | $\phi 300$        |
| B      | $\phi 80$         |
| C      | $\phi 15.5$       |
| W      | 34                |
| t      | 2                 |
| F      | $38 \pm 1$        |

The direction of a taped product is as shown in Figures 10 and 11. The part number of a taped product, including the symbol indicating the direction, is as follows:

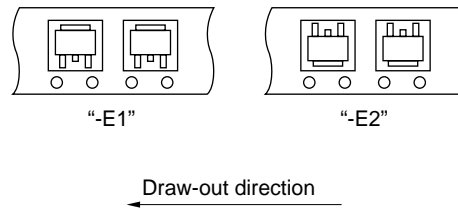
**Note** The part number of the taped product of the SOT-89 package differs from those of discrete devices such as transistors and diodes.

**Figure 10. SOT-89 Taping Direction**



**Figure 11. MP-3Z Taping Direction**

**(A) Embossed-type taping**



**(B) Adhesive-type taping**

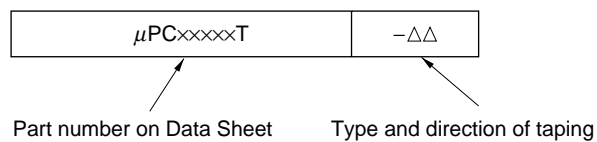
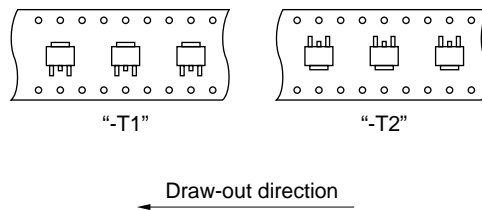


Table 1 shows the number of packages on a tape.

**Table 1. Number of Packages per Tape**

| Package                 | Quantity (units/reel) |
|-------------------------|-----------------------|
| SOT-89                  | 1000                  |
| MP-3Z (embossed taping) | 2000                  |
| MP-3Z (adhesive taping) | 1500                  |

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