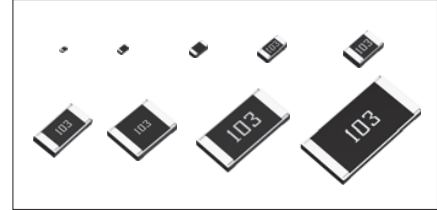


# Thick Film Chip Resistors

## MCR Series < Automotive >

### ●Features

- 1) Full line up from ultra small size (01005) to 2512 with jumper type.
- 2) High reliability metal glazed thick film.
- 3) ROHM resistors have obtained ISO9001/ISO/TS16949 certification.
- 4) "Automotive" product is AEC-Q200 compliant.



| Part No.                                                                               | Size |        | Type Code                                                                                    |                                        | Packing Specification                            | Quantity / Reel               |
|----------------------------------------------------------------------------------------|------|--------|----------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------|-------------------------------|
|                                                                                        | (mm) | (inch) | GENERAL PURPOSE                                                                              | AUTOMOTIVE<br>*Corresponds to AEC-Q200 |                                                  |                               |
| MCR004                                                                                 | 0402 | 01005  | YZP                                                                                          | —                                      | Paper tape (2mm pitch)                           | 15,000                        |
|                                                                                        |      |        | RZP                                                                                          | —                                      | Embossed tape (1mm pitch)                        | 40,000                        |
| MCR006                                                                                 | 0603 | 0201   | YRT                                                                                          | YZP                                    | Paper tape (2mm pitch)                           | 15,000                        |
| MCR01                                                                                  | 1005 | 0402   | MRT                                                                                          | MZP                                    |                                                  | 10,000                        |
| PZPI<br>(*For further information on datasheet, please refer to AUTOMOTIVE datasheet.) |      |        |                                                                                              | Bulk case                              | 50,000                                           |                               |
| MCR03                                                                                  | 1608 | 0603   | ERT                                                                                          | EZP                                    | Paper tape (4mm pitch)                           | 5,000                         |
|                                                                                        |      |        | MZP / PZPI<br>(*For further information on datasheet, please refer to AUTOMOTIVE datasheet.) |                                        | MZP : Paper tape (2mm pitch)<br>PZPI : Bulk case | MZP : 10,000<br>PZPI : 25,000 |
| MCR10                                                                                  | 2012 | 0805   | ERT                                                                                          | EZP                                    | Paper tape (4mm pitch)                           | 5,000                         |
| MCR18                                                                                  | 3216 | 1206   | ERT                                                                                          | EZP                                    |                                                  |                               |
| MCR25                                                                                  | 3225 | 1210   | JZH                                                                                          |                                        | Embossed tape (4mm pitch)                        | 4,000                         |
| MCR50                                                                                  | 5025 | 2010   | JZH                                                                                          |                                        |                                                  |                               |
| MCR100                                                                                 | 6432 | 2512   | JZH                                                                                          |                                        |                                                  |                               |

\*Please contact us for status of AEC-Q200 on "General purpose" products.

### ●Part Number Description

|                                                         |                                                                                                                                                                                                                 |                            |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M</b> <b>C</b> <b>R</b>                              | <b>0</b> <b>0</b> <b>6</b>                                                                                                                                                                                      | <b>Y</b> <b>R</b> <b>T</b> | <b>J</b>                                                                                                                           | <b>1</b> <b>0</b> <b>0</b>                                                                                                                                                                                                                                                                                                 |
| <b>Part No.</b><br><b>MCR</b><br>(Micro chip resistors) | <b>Size (mm [inch])</b><br>004 (0402 [01005])<br>006 (0603 [0201])<br>01 (1005 [0402])<br>03 (1608 [0603])<br>10 (2012 [0805])<br>18 (3216 [1206])<br>25 (3225 [1210])<br>50 (5025 [2010])<br>100 (6432 [2512]) | <b>Type Code</b>           | <b>Resistance Tolerance</b><br>D ( ±0.5% )<br>F ( ±1% )<br>FX ( ±1% ) *Only MCR03EZP/MZP/PZPI<br>J ( ±5% ) (Including jumper type) | <b>Nominal Resistance</b><br>Resistance code, 3 or 4 digits.<br>000 denotes jumper type.<br>Resistance tolerance      Resistance code<br><b>D,F</b> : 4 digits<br><b>J</b> : 3 digits<br>Ex.)<br>1Ω = 1R0 ( ±5% )<br>9.1Ω = 9R1 ( ±5% )<br>10Ω = 10R0 ( ±0.5%, ±1% )<br>100 ( ±5% )<br>2.2MΩ = 2204 ( ±1% )<br>225 ( ±5% ) |

## ●Products List

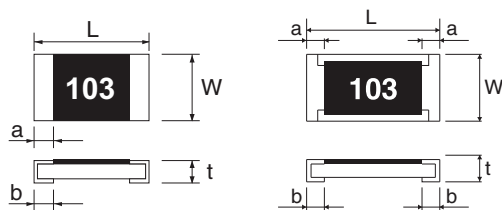
| Part No.                                  | Type Code          | Rated Power<br>(70°C)<br>(W) | Limiting Element<br>Voltage<br>(V) | Maximum<br>Overload<br>Voltage<br>(V) | Temperature<br>Coefficient<br>(ppm / °C) | Resistance<br>Tolerance<br>(%) | Resistance Range             | Series  | Operating<br>Temperature<br>Range<br>(°C) |
|-------------------------------------------|--------------------|------------------------------|------------------------------------|---------------------------------------|------------------------------------------|--------------------------------|------------------------------|---------|-------------------------------------------|
| MCR006                                    | YZP                | 0.05                         | 25                                 | —                                     | +600 / –200<br>±250                      | J(±5%)                         | 1.0Ω to 9.1Ω<br>10Ω to 10MΩ  | E24     | –55 to +125                               |
|                                           |                    |                              |                                    |                                       | ±250                                     | F(±1%)                         | 10Ω to 10MΩ                  |         |                                           |
|                                           |                    |                              |                                    |                                       | ±200                                     | D(±0.5%)                       | 10Ω to 910Ω                  |         |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     |                                | 1kΩ to 1MΩ                   |         |                                           |
| Jumper type : Rmax = 50m Ω / Imax. = 0.5A |                    |                              |                                    |                                       |                                          |                                |                              |         |                                           |
| MCR01                                     | MZP<br>PZPI        | 0.063                        | 50                                 | —                                     | +500 / –250<br>±200                      | J(±5%)                         | 1.0Ω to 9.1Ω<br>10Ω to 10MΩ  | E24     |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 2.2MΩ                 | E24,E96 |                                           |
|                                           |                    |                              |                                    |                                       | ±100<br>±50                              | D(±0.5%)                       | 10Ω to 91Ω<br>100Ω to 1MΩ    | E24     |                                           |
|                                           |                    |                              |                                    |                                       | Jumper type : Rmax = 50m Ω / Imax. = 1A  |                                |                              |         |                                           |
| MCR03                                     | EZP<br>MZP<br>PZPI | 0.1                          | 50                                 | 100                                   | ±400<br>±200                             | J(±5%)                         | 1.0Ω to 9.1Ω<br>10Ω to 10MΩ  | E24     |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | FX(±1%)                        | 10Ω to 10MΩ                  | E24,E96 |                                           |
|                                           |                    |                              |                                    |                                       | ±100<br>±50                              | D(±0.5%)                       | 10Ω to 91Ω<br>100Ω to 1MΩ    |         |                                           |
|                                           |                    |                              |                                    |                                       | Jumper type : Rmax = 50m Ω / Imax. = 1A  |                                |                              |         |                                           |
| MCR10                                     | EZP                | 0.125                        | 150                                | 200                                   | ±400<br>±200                             | J(±5%)                         | 1.0Ω to 9.1Ω<br>10Ω to 10MΩ  | E24     |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 2.2MΩ                 | E24,E96 |                                           |
|                                           |                    | 0.1                          |                                    | 300                                   | ±100<br>±50                              | D(±0.5%)                       | 10Ω to 91Ω<br>100Ω to 1MΩ    |         |                                           |
|                                           |                    |                              |                                    |                                       | Jumper type : Rmax = 50m Ω / Imax. = 2A  |                                |                              |         |                                           |
| MCR18                                     | EZP                | 0.25                         | 200                                | 400                                   | ±400<br>±200                             | J(±5%)                         | 1.0Ω to 9.1Ω<br>10Ω to 10MΩ  | E24     | –55 to +155                               |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 2.2MΩ                 | E24,E96 |                                           |
|                                           |                    | 0.125                        |                                    |                                       | ±100<br>±50                              | D(±0.5%)                       | 10Ω to 91Ω<br>100Ω to 1MΩ    |         |                                           |
|                                           |                    |                              |                                    |                                       | Jumper type : Rmax = 50m Ω / Imax. = 2A  |                                |                              |         |                                           |
| MCR25                                     | JZH                | 0.25                         | 200                                | 400                                   | 500±350<br>±500                          | J(±5%)                         | 1.0Ω to 2.0Ω<br>2.2Ω to 5.1Ω | E24     |                                           |
|                                           |                    |                              |                                    |                                       | ±200                                     |                                | 5.6Ω to 3.3MΩ                | E24,E96 |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 1MΩ                   |         |                                           |
|                                           |                    |                              |                                    |                                       | Jumper type : Rmax = 50m Ω / Imax. = 2A  |                                |                              |         |                                           |
| MCR50                                     | JZH                | 0.5                          | 200                                | 400                                   | 500±350<br>±500                          | J(±5%)                         | 1.0Ω to 2.0Ω<br>2.2Ω to 9.1Ω | E24     |                                           |
|                                           |                    |                              |                                    |                                       | ±200                                     |                                | 10Ω to 330kΩ                 | E24,E96 |                                           |
|                                           |                    |                              |                                    |                                       | ±350                                     |                                | 360kΩ to 560kΩ               |         |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 180kΩ                 |         |                                           |
| Jumper type : Rmax = 50m Ω / Imax. = 3A   |                    |                              |                                    |                                       |                                          |                                |                              |         |                                           |
| MCR100                                    | JZH                | 1                            | 200                                | 400                                   | 500±350<br>±500                          | J(±5%)                         | 1.0Ω to 2.0Ω<br>2.2Ω to 9.1Ω | E24     | –55 to +125                               |
|                                           |                    |                              |                                    |                                       | ±350                                     |                                | 10Ω to 22Ω                   | E24,E96 |                                           |
|                                           |                    |                              |                                    |                                       | ±200                                     |                                | 24Ω to 100kΩ                 |         |                                           |
|                                           |                    |                              |                                    |                                       | ±100                                     | F(±1%)                         | 10Ω to 82kΩ                  |         |                                           |
| Jumper type : Rmax = 50m Ω / Imax. = 4A   |                    |                              |                                    |                                       |                                          |                                |                              |         |                                           |

\*Design and specifications are subject to change without notice. Carefully check the specification sheet supplied with the product before using or ordering it.

## ●Chip Resistor Dimensions and Markings

■ MCR004 / 006 / 01 / 03

■ MCR10 / 18 / 25 / 50 / 100



&lt;Marking method&gt;

There are three or four digits used for the calculation number according to IEC code and "R" is used for the decimal point.

| (Unit : mm)   |                    |      |        |          |          |           |          |                                       |                   |
|---------------|--------------------|------|--------|----------|----------|-----------|----------|---------------------------------------|-------------------|
| Part No.      | Type Code          | (mm) | (inch) | L        | W        | t         | a        | b                                     | Marking existence |
| <b>MCR006</b> | YZP                | 0603 | 0201   | 0.6±0.03 | 0.3±0.03 | 0.23±0.03 | 0.1±0.05 | 0.15±0.05                             | No                |
| <b>MCR01</b>  | MZP<br>PZPI        | 1005 | 0402   | 1.0±0.05 | 0.5±0.05 | 0.35±0.05 | 0.2±0.1  | 0.25 <sup>+0.05</sup> <sub>-0.1</sub> | No                |
| <b>MCR03</b>  | EZP<br>MZP<br>PZPI | 1608 | 0603   | 1.6±0.1  | 0.8±0.1  | 0.45±0.1  | 0.3±0.2  | 0.3±0.2                               | Yes *             |
| <b>MCR10</b>  | EZP                | 2012 | 0805   | 2.0±0.1  | 1.25±0.1 | 0.55±0.1  | 0.4±0.2  | 0.4±0.2                               | Yes               |
| <b>MCR18</b>  | EZP                | 3216 | 1206   | 3.2±0.15 | 1.6±0.15 | 0.55±0.1  | 0.5±0.25 | 0.5±0.25                              | Yes               |
| <b>MCR25</b>  | JZH                | 3225 | 1210   | 3.2±0.15 | 2.5±0.15 | 0.55±0.15 | 0.5±0.25 | 0.5±0.25                              | Yes               |
| <b>MCR50</b>  | JZH                | 5025 | 2010   | 5.0±0.15 | 2.5±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                              | Yes               |
| <b>MCR100</b> | JZH                | 6432 | 2512   | 6.3±0.15 | 3.2±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                              | Yes               |

Marking method of jumper type

| Jumper type                 | Marking existence |
|-----------------------------|-------------------|
| MCR006 / 01 / 25 / 50 / 100 | No                |
| MCR03 / 10 / 18             | Yes               |

\*Marking method of MCR03

For MCR03 series resistors, the printing process restricts the marking to three digits/characters.

Consequently, 1% tolerance resistors with values from the E24 series will be marked the same as

5% resistors with the same value, but 1% tolerance resistors with values from the E96 series will not be marked.

Examples:

MCR03EZPJ243 (5% tolerance, E24 / 24 k Ω ) Marking = 243

MCR03EZPF2402 (1% tolerance, E24 / 24 k Ω ) Marking = 243

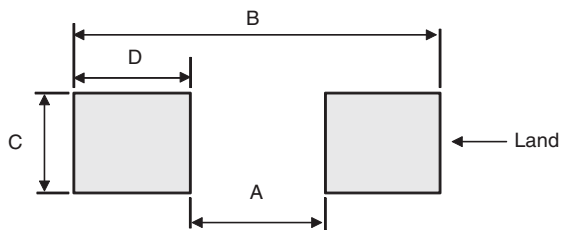
MCR03EZPF2432 (1% tolerance, E96 / 24.3 k Ω ) No Marking

MCR18EZPJ243 (5% tolerance, E24 / 24 k Ω ) Marking = 243

MCR18EZPF2402 (1% tolerance, E24 / 24 k Ω ) Marking = 2402

MCR18EZPF2432 (1% tolerance, E96 / 24.3 k Ω ) Marking = 2432

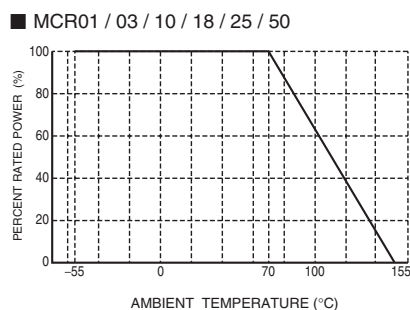
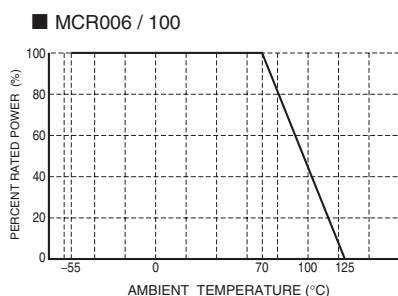
## ●Land pattern Example



| (Unit : mm)   |                    |     |      |      |      |
|---------------|--------------------|-----|------|------|------|
| Part No.      | Type Code          | A   | B    | C    | D    |
| <b>MCR006</b> | YZP                | 0.3 | 0.84 | 0.3  | 0.27 |
| <b>MCR01</b>  | MZP<br>PZPI        | 0.5 | 1.3  | 0.5  | 0.4  |
| <b>MCR03</b>  | EZP<br>MZP<br>PZPI | 1.0 | 2.0  | 0.8  | 0.5  |
| <b>MCR10</b>  | EZP                | 1.2 | 2.6  | 1.15 | 0.7  |
| <b>MCR18</b>  | EZP                | 2.2 | 4.0  | 1.5  | 0.9  |
| <b>MCR25</b>  | JZH                | 2.2 | 4.0  | 2.3  | 0.9  |
| <b>MCR50</b>  | JZH                | 3.8 | 6.0  | 2.3  | 1.1  |
| <b>MCR100</b> | JZH                | 5.1 | 8.1  | 3.0  | 1.5  |

## ●Derating Curve

When the ambient temperature exceeds 70°C, power dissipation must be adjusted according to the derating curves below.



## ●Characteristics

| Test Items                               | Guaranteed Value                                                                               |             | Test Conditions                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------|
|                                          | Resistor Type                                                                                  | Jumper Type |                                                                                                                  |
| Resistance                               | See "Products List"                                                                            |             | 20°C                                                                                                             |
| Variation of resistance with temperature | See "Products List"                                                                            |             | Measurement : +20 / -55 / +20 / +125°C                                                                           |
| Overload                                 | ± (2.0%+0.1Ω)                                                                                  | Max. 50mΩ   | Rated voltage (current) ×2.5, 2s.<br>Maximum overload voltage                                                    |
| Solderability                            | A new uniform coating of minimum of 95% of the surface being immersed and no soldering damage. |             | Rosin-Ethanol : 25% (Weight)<br>Soldering condition : 235±5°C<br>Duration of immersion : 2.0±0.5s                |
| Resistance to soldering heat             | ± (1.0%+0.05Ω)<br>No remarkable abnormality on the appearance.                                 | Max. 50mΩ   | Soldering condition : 260±5°C<br>Duration of immersion : 10±1s                                                   |
| Rapid change of temperature              | ± (1.0%+0.05Ω)                                                                                 | Max. 50mΩ   | Test temp.<br>-55°C to +125°C 100cycle (MCR006 / 01 / 03)<br>-55°C to +125°C 5cycle (MCR10 / 18 / 25 / 50 / 100) |
| Damp heat, steady state                  | ± (3.0%+0.1Ω)                                                                                  | Max. 100mΩ  | 40°C, 93%RH (Relative Humidity)<br>Test time : 1,000h to 1,048h                                                  |
| Endurance at 70°C                        | ± (3.0%+0.1Ω)                                                                                  | Max. 100mΩ  | 70°C<br>Rated voltage (current)<br>1.5h : ON – 0.5h : OFF<br>Test time : 1,000h to 1,048h                        |
| Endurance                                | ± (3.0%+0.1Ω)                                                                                  | Max. 100mΩ  | 125°C (MCR006 / 25 / 50 / 100)<br>155°C (MCR01 / 03 / 10 / 18)<br>Test time : 1,000h to 1,048h                   |
| Resistance to solvent                    | ± (1.0%+0.05Ω)                                                                                 | Max. 50mΩ   | 23±5°C, Immersion cleaning, 5±0.5min<br>Solvent : 2-propanol                                                     |
| Bend strength of the end face plating    | ± (1.0%+0.05Ω)<br>Without mechanical damage such as breaks.                                    | Max. 50mΩ   | —                                                                                                                |

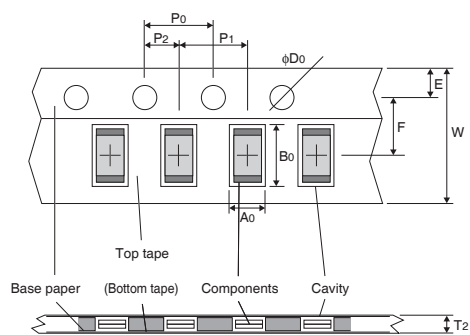
Compliance Standard(s) : IEC60115-8  
JISC 5201-8

## ●Technical data

| Parameter             | Unit  | MCR006<br>YZP | MCR01<br>MZP / PZPI | MCR03<br>EZP / MZP / PZPI | MCR10<br>EZP | MCR18<br>EZP | MCR25<br>JZH | MCR50<br>JZH | MCR100<br>JZH |
|-----------------------|-------|---------------|---------------------|---------------------------|--------------|--------------|--------------|--------------|---------------|
| Insulation resistance | MΩ    | 1000          | 1000                | 1000                      | 1000         | 1000         | 1000         | 1000         | 1000          |
| Failure rate          | Fit   | 0.0016        | 0.0002              | 0.0009                    | 0.0015       | 0.0018       | 0.0203       | 0.0201       | 0.0586        |
| Weight                | mg/pc | 0.157         | 0.70                | 2.12                      | 5.03         | 9.46         | 16.5         | 25.8         | 42.0          |

## ●Tape Dimensions

## ■ Paper Tape

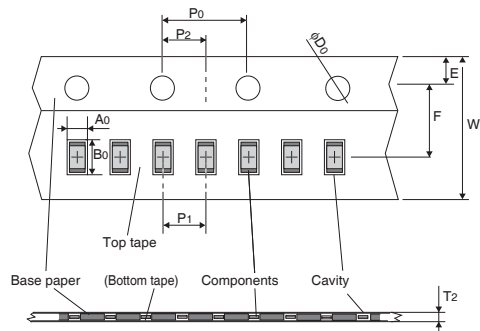


(Unit : mm)

| Part No.      | Type Code | W       | F        | E        | A0                                    | B0                                    |
|---------------|-----------|---------|----------|----------|---------------------------------------|---------------------------------------|
| <b>MCR006</b> | YZP       | 8.0±0.2 | 3.5±0.05 | 1.75±0.1 | 0.38±0.03                             | 0.68±0.03                             |
| <b>MCR01</b>  | MZP       | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 0.7±0.1                               | 1.2±0.1                               |
| <b>MCR03</b>  | EZP       | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 1.1±0.1                               | 1.9±0.1                               |
| <b>MCR10</b>  | EZP       | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 1.65 <sup>+0.2</sup> <sub>-0.1</sub>  | 2.4 <sup>+0.2</sup> <sub>-0.1</sub>   |
| <b>MCR18</b>  | EZP       | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 1.95 <sup>+0.1</sup> <sub>-0.05</sub> | 3.5 <sup>+0.15</sup> <sub>-0.05</sub> |

| Part No.      | Type Code | D0                                | P0      | P1       | P2       | T2      |
|---------------|-----------|-----------------------------------|---------|----------|----------|---------|
| <b>MCR006</b> | YZP       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 2.0±0.05 | 2.0±0.05 | Max 0.5 |
| <b>MCR01</b>  | MZP       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 2.0±0.05 | 2.0±0.05 | Max 1.1 |
| <b>MCR03</b>  | EZP       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1  | 2.0±0.05 | Max 1.1 |
| <b>MCR10</b>  | EZP       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1  | 2.0±0.05 | Max 1.1 |
| <b>MCR18</b>  | EZP       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1  | 2.0±0.05 | Max 1.1 |

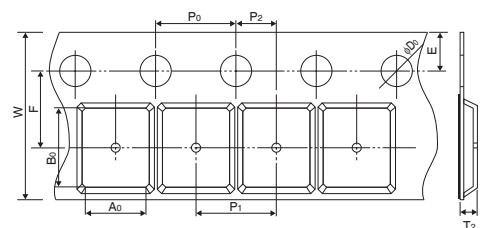
## ■ Paper Tape (Narrow pitch taping)



(Unit : mm)

| Part No.     | Type Code | W                                 | F        | E        | A0       | B0      |
|--------------|-----------|-----------------------------------|----------|----------|----------|---------|
| <b>MCR03</b> | MZP       | 8.0±0.3                           | 3.5±0.05 | 1.75±0.1 | 1.1±0.1  | 1.9±0.1 |
|              |           | D0                                | P0       | P1       | P2       | T2      |
|              |           | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1  | 2.0±0.5  | 2.0±0.05 | Max 1.1 |

## ■ Embossed Tape

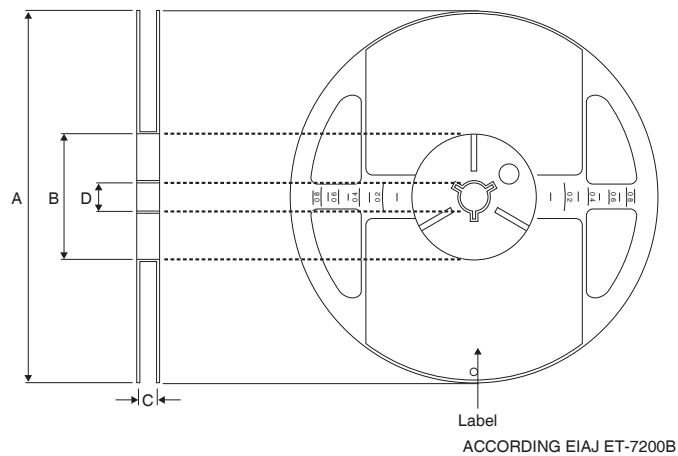


(Unit : mm)

| Part No.      | Type Code | W       | F        | E        | A0      | B0      |
|---------------|-----------|---------|----------|----------|---------|---------|
| <b>MCR25</b>  | JZH       | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 3.0±0.1 | 3.5±0.1 |
| <b>MCR50</b>  | JZH       | 12±0.3  | 5.5±0.05 | 1.75±0.1 | 3.4±0.2 | 5.6±0.2 |
| <b>MCR100</b> | JZH       | 12±0.3  | 5.5±0.05 | 1.75±0.1 | 3.5±0.2 | 6.7±0.2 |

| Part No.      | Type Code | D0                                | P0      | P1      | P2       | T2      |
|---------------|-----------|-----------------------------------|---------|---------|----------|---------|
| <b>MCR25</b>  | JZH       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | Max 1.1 |
| <b>MCR50</b>  | JZH       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | Max 1.1 |
| <b>MCR100</b> | JZH       | φ1.5 <sup>+0.1</sup> <sub>0</sub> | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | Max 1.1 |

## ●Reel Dimensions

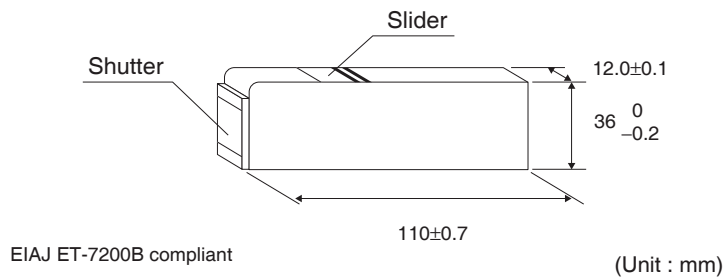


(Unit : mm)

| Part No. | Type Code | A                                                          | B                                                         | C                                                    | D                 |
|----------|-----------|------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------|-------------------|
| MCR006   | YZP       | $\phi 180 \begin{smallmatrix} 0 \\ -1.5 \end{smallmatrix}$ | $\phi 60 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$ | $9 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$  | $\phi 13 \pm 0.2$ |
| MCR01    | MZP       |                                                            |                                                           |                                                      |                   |
| MCR03    | EZP       |                                                            |                                                           |                                                      |                   |
|          | MZP       |                                                            |                                                           |                                                      |                   |
| MCR10    | EZP       |                                                            |                                                           |                                                      |                   |
| MCR18    | EZP       |                                                            |                                                           |                                                      |                   |
| MCR25    | JZH       |                                                            |                                                           | $13 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$ |                   |
| MCR50    | JZH       |                                                            |                                                           |                                                      |                   |
| MCR100   | JZH       |                                                            |                                                           |                                                      |                   |

## ●Bulk case Dimensions

- MCR01PZPI
- MCR03PZPI



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