



## SMD - Resistors

Product : Wire Bondable Chip Resistors – SMDW Series

---

Size : 0201/0402/0603

---



## SMD - Resistors

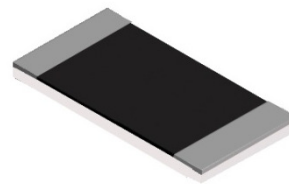
### Wire Bondable Chip Resistor (SMDW Series)

#### ► 1. Features

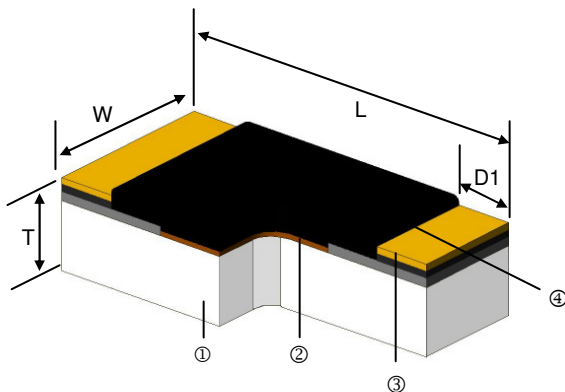
- Thin film passivated NiCr resistive element
- Tolerance of  $\pm 0.1\%$
- Extremely low TCR down to  $\pm 25\text{PPM}/^\circ\text{C}$
- Wide resistance range
- Customized bonding pattern design

#### ► 2. Applications

- LED Constant Current Application
- Medical Equipment
- Testing / Measurement Equipment
- Hybrid Chip on Board Circuits
- Multi Chip Module(MCM) Package
- Integrated MMIC



#### ► 3. Construction



|                                     |                               |
|-------------------------------------|-------------------------------|
| ① Alumina Substrate                 | ③ Ni/Au Plating (Bonding Pad) |
| ② Passivated NiCr Resistive Element | ④ Overcoat                    |

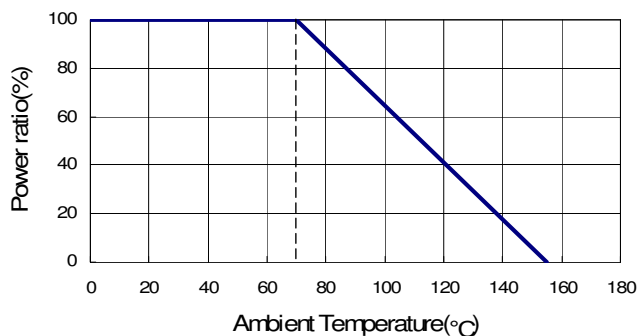
#### ► 4. Dimensions

Unit : mm

| Type     | Size (Inch) | L               | W               | T               | D1              | Weight (g) (1000pcs) |
|----------|-------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| SMDW0201 | 0201        | 0.58 $\pm$ 0.05 | 0.29 $\pm$ 0.05 | 0.23 $\pm$ 0.05 | 0.12 $\pm$ 0.05 | 1                    |
| SMDW0402 | 0402        | 1.00 $\pm$ 0.05 | 0.50 $\pm$ 0.05 | 0.30 $\pm$ 0.05 | 0.20 $\pm$ 0.10 | 1.8                  |
| SMDW0603 | 0603        | 1.55 $\pm$ 0.10 | 0.80 $\pm$ 0.10 | 0.45 $\pm$ 0.10 | 0.30 $\pm$ 0.20 | 2.7                  |

## SMD - Resistors

### 5. Derating Curve



### 6. Part Numbering

| SMDW         | 0402                 | D   | T                         | E                           | 1000   |                     | N          |
|--------------|----------------------|---|---------------------------|-----------------------------|--|---------------------|------------|
| Product Type | Dimensions (LxW)     | Resistance Tolerance                                | Packaging Code            | TCR (PPM/°C)                | Resistance   | Construction        | Electrode  |
|              | 0201<br>0402<br>0603 | B: ±0.1%<br>D: ±0.5%<br>F: ±1%<br>J: ±5%<br>K: ±10% | T: Taping Reel<br>B: Bulk | C: ±25<br>D: ±50<br>E: ±100 | 0100: 10Ω<br>1000: 100Ω<br>2201: 2200Ω<br>1002: 10000Ω | A: Two Bonding Pads | N: Ni / Au |

### 7. Standard Electrical Specifications

| Type     | Item | Power Rating at 70°C | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range |            |     |     |      | TCR (PPM/°C)       |             |
|----------|------|----------------------|-----------------------|------------------------|-----------------------|------------------|------------|-----|-----|------|--------------------|-------------|
|          |      |                      |                       |                        |                       | ±0.1%            | ±0.5%      | ±1% | ±5% | ±10% |                    |             |
| SMDW0201 |      | 1/32W                | -55 ~ +155°C          | 15V                    | 30V                   | -                | 50Ω - 33KΩ |     |     |      |                    | ±50<br>±100 |
| SMDW0402 |      | 1/16W                |                       | 25V                    | 50V                   | 10Ω - 100KΩ      |            |     |     |      | ±25<br>±50<br>±100 |             |
| SMDW0603 |      | 1/16W                |                       | 50V                    | 100V                  | 10Ω - 332KΩ      |            |     |     |      | ±25<br>±50<br>±100 |             |

Operating Voltage= $\sqrt{P \cdot R}$  or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max. overload voltage listed above, whichever is lower.

## SMD - Resistors

### ► 8. Environmental Characteristics

| Item   | Requirement                       | Test Method   |
|--|-----------------------------------|---|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.                          | <b>MIL-STD-202F Method 304</b><br>+25/-55/+25/+125/+25°C  |
| Short Time Overload                            | $\Delta R \pm 0.5\%$              | <b>JIS-C-5201-1 5.5</b><br>RCWV*2.5 or Max. overload voltage for 5 seconds  |
| Insulation Resistance                          | >1000M $\Omega$                   | <b>MIL-STD-202F Method 302</b><br>Apply 100V <sub>DC</sub> for 1 minute   |
| Endurance                                      | $\Delta R \pm 0.2\%$              | <b>MIL-STD-202F Method 108A</b><br>70 $\pm 2^\circ\text{C}$ , Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"             |
|  | >7k $\Omega$ $\Delta R \pm 0.5\%$ |   |
| Damp Heat with Load                            | $\Delta R \pm 0.3\%$              | <b>MIL-STD-202F Method 103B</b><br>40 $\pm 2^\circ\text{C}$ , 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Dry Heat                                       | $\Delta R \pm 0.2\%$              | <b>JIS-C-5201-1 7.2</b><br>at +155°C for 1000 hrs   |
| Bending Strength                               | $\Delta R \pm 0.2\%$              | <b>JIS-C-5201-1 6.1.4</b><br>Bending amplitude 3 mm for 10 seconds  |
| Solderability                                  | 95% min. coverage                 | <b>MIL-STD-202F Method 208H</b><br>245 $\pm 5^\circ\text{C}$ for 3 seconds  |
| Resistance to Soldering Heat                   | $\Delta R \pm 0.2\%$              | <b>MIL-STD-202F Method 210E</b><br>260 $\pm 5^\circ\text{C}$ for 10 seconds   |
| Dielectric Withstand Voltage                   | By Type                           | <b>MIL-STD-202F Method 301</b><br>Apply Max. overload voltage for 1 minute  |
| Thermal Shock                                  | $\Delta R \pm 0.25\%$             | <b>MIL-STD-202F Method 107G</b><br>-55°C ~150°C, 100 cycles   |
| Low Temperature Operation                      | $\Delta R \pm 0.2\%$              | <b>JIS-C-5201-1 7.1</b><br>1 hour, -65°C, followed by 45 minutes of RCWV  |

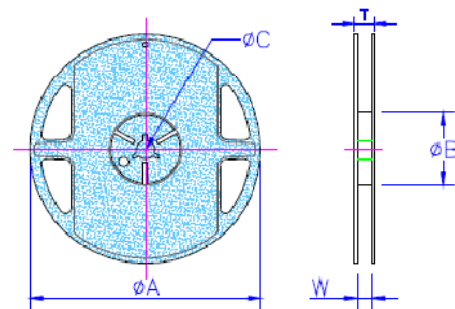
■ Storage Temperature: 25 $\pm 3^\circ\text{C}$ ; Humidity < 80%RH

### ► 9. Packaging

Reel Specifications & Package Quantity

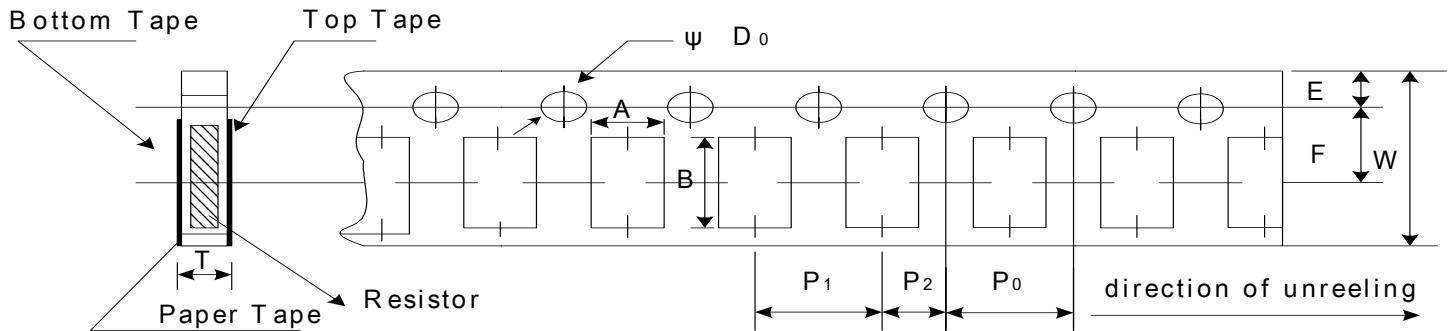
Unit:mm

| Type     | $\Phi A$    | $\Phi B$       | $\Phi C$       | W             | T              | Paper Tape (EA) |
|----------|-------------|----------------|----------------|---------------|----------------|-----------------|
| SMDW0201 | 178 $\pm 1$ | 60.0 $\pm 1.0$ | 13.5 $\pm 0.7$ | 9.5 $\pm 1.0$ | 11.5 $\pm 1.0$ | 10,000          |
| SMDW0402 | 178 $\pm 1$ | 60.0 $\pm 1.0$ | 13.5 $\pm 0.7$ | 9.5 $\pm 1.0$ | 11.5 $\pm 1.0$ | 10,000          |
| SMDW0603 | 178 $\pm 1$ | 60.0 $\pm 1.0$ | 13.5 $\pm 0.7$ | 9.5 $\pm 1.0$ | 11.5 $\pm 1.0$ | 5,000           |



# SMD - Resistors

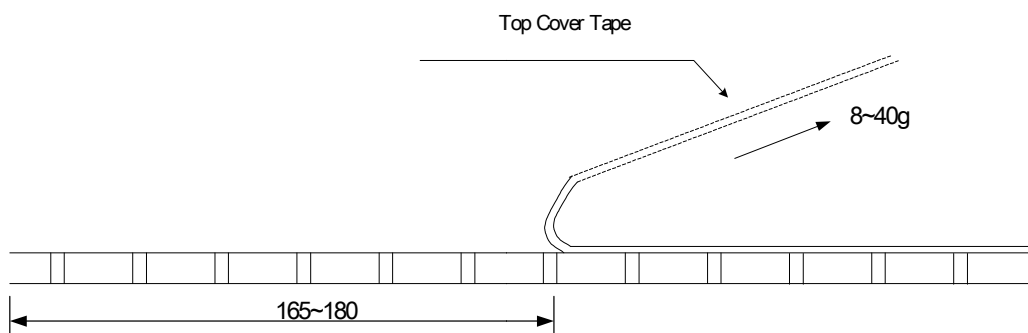
## Paper Tape Specifications



Unit :mm

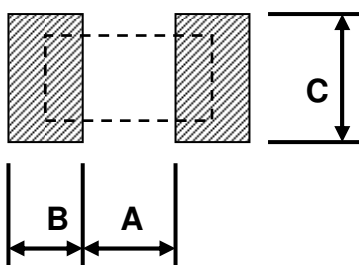
| Type     | A         | B         | W         | E         | F         | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | $\psi D_0$ | T          |
|----------|-----------|-----------|-----------|-----------|-----------|----------------|----------------|----------------|------------|------------|
| SMDW0201 | 0.40±0.05 | 0.70±0.05 | 8.00±0.10 | 3.50±0.05 | 1.75±0.05 | 2.00±0.05      | 2.00±0.05      | 4.00±0.10      | 1.55±0.05  | 0.265±0.05 |
| SMDW0402 | 0.70±0.05 | 1.16±0.05 | 8.0±0.10  | 3.50±0.05 | 1.75±0.05 | 2.00±0.05      | 2.00±0.05      | 4.00±0.10      | 1.55±0.03  | 0.40±0.03  |
| SMDW0603 | 1.10±0.05 | 1.90±0.05 | 8.0±0.10  | 3.50±0.05 | 1.75±0.05 | 4.00±0.10      | 2.00±0.05      | 4.00±0.10      | 1.55±0.03  | 0.40±0.03  |

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 8 to 40g



## ▶ 10. Recommended Land Pattern

Unit:mm



| Type     | A    | B    | C        |
|----------|------|------|----------|
| SMDW0201 | 0.25 | 0.30 | 0.40±0.2 |
| SMDW0402 | 0.50 | 0.50 | 0.60±0.2 |
| SMDW0603 | 0.80 | 1.00 | 0.90±0.2 |

## SMD - Resistors

### ► 11. Reflow

