

## Datasheet

### **RS Pro RS Series Thick Film Surface Mount Resistor 1206**

**Case 137 $\Omega$   $\pm$ 1% 0.25W  $\pm$ 100ppm/ $^{\circ}$ C**

**RS Stock No: 717-5350**



## Product Details

RS Pro 1206 thick film surface mount resistor with  $\pm$ 1% tolerance, provides 137  $\Omega$  resistance and is power rated at 0.25 W. The temperature coefficient of resistance is  $\pm$ 100 ppm/ $^{\circ}$ C. Applications include telecommunication equipment, radio and tape recorders, TV tuners, video cameras, watches, pocket calculators, automotive industry, computers, instruments, medical and military equipment.

## Features and Benefits

- Small size and lightweight
- Highly reliable multilayer electrode construction
- Compatible with all soldering process

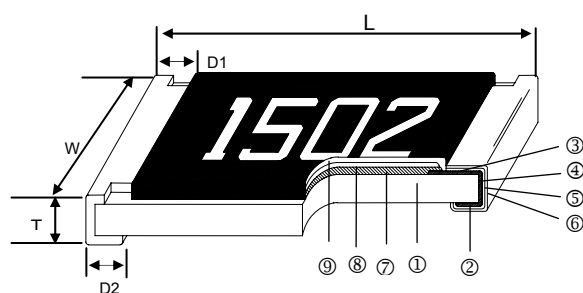
## Specifications:

|                                 |                      |
|---------------------------------|----------------------|
| Case Style                      | Ruthenium Oxide      |
| Depth                           | 1.55 mm              |
| Dimensions                      | 3.1 x 1.55 x 0.55 mm |
| Height                          | 0.55 mm              |
| Length                          | 3.1 mm               |
| Maximum Operating Temperature   | +155°C               |
| Maximum Temperature Coefficient | +100 ppm/°C          |
| Minimum Operating Temperature   | -55°C                |
| Minimum Temperature Coefficient | -100 ppm/°C          |
| Package/Case                    | 1206                 |
| Power Rating                    | 0.25 W               |
| Resistance                      | 137 Ω                |
| Technology                      | Thick Film           |
| Temperature Coefficient         | ±100 ppm/°C          |
| Termination Style               | Solder Pad           |
| Tolerance                       | ±1%                  |
| Maximum Operating Voltage       | 200 V                |
| Maximum Overload Voltage        | 400 V                |
| Tape Width                      | 8 mm                 |

# Thick Film Chip Resistor 1% - RS Series

## 0201/0402/0603/0805/1206

### Construction



|                         |                           |                                         |
|-------------------------|---------------------------|-----------------------------------------|
| ① Alumina Substrate     | ④ Edge Electrode (NiCr)   | ⑦ Resistor Layer (RuO <sub>2</sub> /Ag) |
| ② Bottom Electrode (Ag) | ⑤ Barrier Layer (Ni)      | ⑧ Primary Overcoat (Glass)              |
| ③ Top Electrode (Ag-Pd) | ⑥ External Electrode (Sn) | ⑨ Secondary Overcoat (Epoxy)            |

### Dimensions

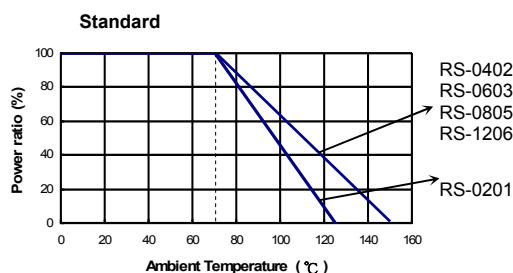
Unit: mm

| Type    | Size (Inch) | L         | W         | T         | D1        | D2        | Weight (g)<br>(1000pcs) |
|---------|-------------|-----------|-----------|-----------|-----------|-----------|-------------------------|
| RS-0201 | 0201        | 0.60±0.03 | 0.30±0.03 | 0.23±0.03 | 0.15±0.05 | 0.15±0.05 | 0.150                   |
| RS-0402 | 0402        | 1.00±0.05 | 0.50±0.05 | 0.35±0.05 | 0.20±0.10 | 0.20±0.10 | 0.620                   |
| RS-0603 | 0603        | 1.60±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 2.042                   |
| RS-0805 | 0805        | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 | 4.368                   |
| RS-1206 | 1206        | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 8.947                   |

### Part Numbering

|     |                                      |                                                    |           |                                    |
|-----|--------------------------------------|----------------------------------------------------|-----------|------------------------------------|
| RS- | 0402-                                | 10R-                                               | 1%-       | 0.0625W                            |
|     | Dimensions                           | Resistance                                         | Tolerance | Power Rating @ 70 °C               |
|     | 0201<br>0402<br>0603<br>0805<br>1206 | 10R: 10Ω<br>100R: 100Ω<br>10K: 10KΩ<br>100K: 100KΩ | 1%        | 0.0625W<br>0.1W<br>0.125W<br>0.25W |

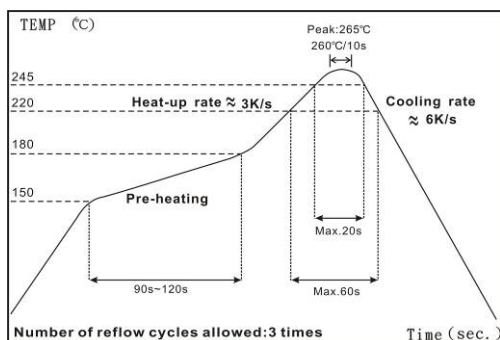
## Derating Curve



## Standard Electrical Specifications

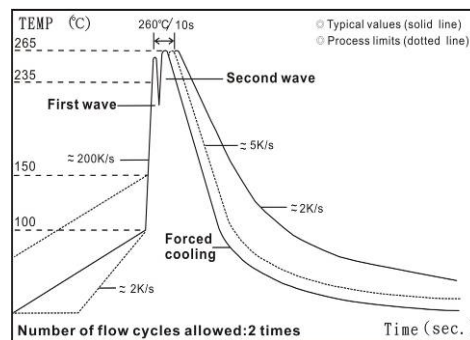
| Item<br>Type | Power Rating<br>at 70°C<br>Jumper<br>Rated Current | Operating Temp.<br>Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range | TCR<br>(PPM/°C) |
|--------------|----------------------------------------------------|--------------------------|------------------------------|-----------------------------|------------------|-----------------|
|              |                                                    |                          |                              |                             | ±1%              |                 |
| RS-0201      | 1/20W                                              | -55 ~ +155°C             | 25V                          | 50V                         | 10Ω – 910KΩ      | ±200            |
| RS-0402      | 1/16W                                              | -55 ~ +155°C             | 50V                          | 100V                        | 10Ω – 910KΩ      | ±100            |
| RS-0603      | 1/10W                                              | -55 ~ +155°C             | 75V                          | 150V                        | 10Ω – 910KΩ      | ±100            |
| RS-0805      | 1/8W                                               | -55 ~ +155°C             | 150V                         | 300V                        | 10Ω – 910KΩ      | ±100            |
| RS-1206      | 1/4W                                               | -55 ~ +155°C             | 200V                         | 400V                        | 10Ω – 910KΩ      | ±100            |

## Soldering Condition



### IR Reflow Soldering

- (1) Time of IR reflow soldering at maximum temperature point 260°C: 10s
- (2) Time of wave soldering at maximum temperature point 260°C: 10s
- (3) Time of soldering iron at maximum temperature point 410°C: 5s



### Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C: 10s
- (2) Time of wave soldering at maximum temperature point 260°C: 10s
- (3) Time of soldering iron at maximum temperature point 410°C: 5s

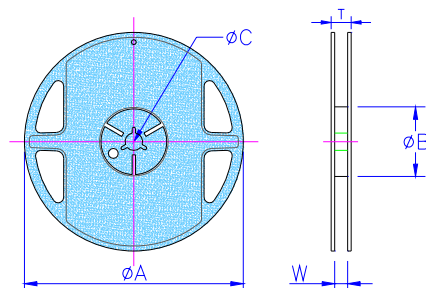
## ■ Environmental Characteristics

| Item                                           | Requirement                                                | Test Method                                                                                                                             |
|------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                                                | ±1%                                                        |                                                                                                                                         |
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.                                                   | <b>JIS-C-5201-1 4.8</b><br><b>IEC-60115-1 4.8</b><br>-55°C~+125/+155°C, 25°C is the reference temperature                               |
| Short Time Overload                            | ±(1.0%+0.05Ω)                                              | <b>JIS-C-5201-1 4.13</b><br><b>IEC-60115-1 4.13</b><br>RCWV*2.5 or Max. overload voltage for 5 seconds, 2 seconds for high power series |
| Insulation Resistance                          | ≥10G                                                       | <b>JIS-C-5201-1 4.6</b><br><b>IEC-60115-1 4.6</b><br>Max. overload voltage for 1 minute                                                 |
| Endurance                                      | ±(2.0%+0.10Ω)                                              | <b>JIS-C-5201-1 4.25</b><br><b>IEC-60115-1 4.25.1</b><br>70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"  |
| Damp Heat with Load                            | ±(2.0%+0.10Ω)                                              | <b>JIS-C-5201-1 4.24</b><br>40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"                   |
| Dry Heat                                       | ±(1.0%+0.05Ω)                                              | <b>JIS-C-5201-1 4.23</b><br><b>IEC-60115-1 2.23.2</b><br>at +125/+155°C for 1000 hrs                                                    |
| Bending Strength                               | ±(1.0%+0.05Ω)                                              | <b>JIS-C-5201-1 4.33</b><br><b>IEC-60115-1 4.33</b><br>Bending once for 5 seconds<br>2010, 2512 sizes: 2mm Other sizes: 3mm             |
| Solderability                                  | 95% min. coverage                                          | <b>JIS-C-5201-1 4.17</b><br><b>IEC-60115-1 4.17</b><br>245±5°C for 3 seconds                                                            |
| Resistance to Soldering Heat                   | ±(0.5%+0.05Ω)                                              | <b>JIS-C-5201-1 4.18</b><br><b>IEC-60115-1 4.18</b><br>260±5°C for 10 seconds                                                           |
| Voltage Proof                                  | No breakdown or flashover                                  | <b>JIS-C-5201-1 4.7</b><br><b>IEC-60115-1 4.7</b><br>1.42 times RCWV (RMS) for 1 minute                                                 |
| Leaching                                       | Individual leaching area □ 5%<br>Total leaching area □ 10% | <b>JIS-C-5201-1 4.18</b><br><b>IEC-60068-2-58 8.2.1</b><br>260±5°C for 30 seconds                                                       |
| Rapid Change of Temperature                    | ±(0.5%+0.05Ω)                                              | <b>JIS-C-5201-1 4.18</b><br><b>IEC-60115-1 4.18</b><br>-55°C to +125/+155°C, 5 cycles                                                   |

■ Storage Temperature: 25±3°C; Humidity < 80%RH

## ■Packaging

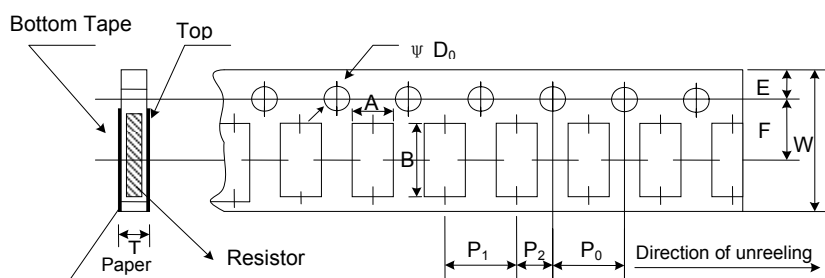
### Reel Specifications & Packaging Quantity



Unit: mm

| Type                          | Packaging Quantity | Tape Width | Reel Diameter | ΦA        | ΦB                  | ΦC       | W       | T        |
|-------------------------------|--------------------|------------|---------------|-----------|---------------------|----------|---------|----------|
| RS-0201<br>RS-0402            | Paper              | 8mm        | 7 inch        | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 |
|                               |                    |            | 10 inch       | 254±1     | 100±0.5             | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |
| RS-0603<br>RS-0805<br>RS-1206 |                    |            | 13 inch       | 330±1     | 100±0.5             | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |

### Paper Tape Specifications



Unit: mm

| Type    | A         | B         | W       | E        | F         | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | ΦD <sub>0</sub> | T        |
|---------|-----------|-----------|---------|----------|-----------|----------------|----------------|----------------|-----------------|----------|
| RS-0201 | 0.38±0.05 | 0.68±0.05 | 8.0±0.2 | 1.75±0.1 | 3.50±0.05 | 4.00±0.10      | 2.00±0.05      | 2.00±0.05      | 1.50+0.1,-0     | 0.42±0.1 |
| RS-0402 | 0.65±0.10 | 1.15±0.1  | 8.0±0.2 | 1.75±0.1 | 3.50±0.05 | 4.00±0.10      | 2.00±0.05      | 2.00±0.05      | 1.50+0.1,-0     | 0.45±0.1 |
| RS-0603 | 1.10±0.10 | 1.90±0.1  | 8.0±0.2 | 1.75±0.1 | 3.50±0.05 | 4.00±0.10      | 4.00±0.05      | 2.00±0.05      | 1.50+0.1,-0     | 0.70±0.1 |
| RS-0805 | 1.60±0.10 | 2.40±0.2  | 8.0±0.2 | 1.75±0.1 | 3.50±0.05 | 4.00±0.10      | 4.00±0.05      | 2.00±0.05      | 1.50+0.1,-0     | 0.85±0.1 |
| RS-1206 | 1.90±0.10 | 3.50±0.2  | 8.0±0.2 | 1.75±0.1 | 3.50±0.05 | 4.00±0.10      | 4.00±0.05      | 2.00±0.05      | 1.50+0.1,-0     | 0.85±0.1 |

## ■Marking

No Marking for 0201 and 0402

1% for 0805/1206: 4 digits marking

Example:

|            |      |       |      |        |       |
|------------|------|-------|------|--------|-------|
| Resistance | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
| Marking    | 1000 | 2201  | 1002 | 4992   | 1003  |

1% for 0603: 3 digits marking in E96

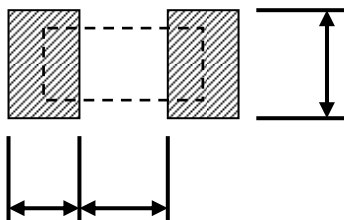


3 digits marking for Example: 14C=13K7Ω 13C=13K3Ω  
68B=4K99Ω 68X=49.9Ω

## Marking Table

| Code       | E96             | Code            | E96             | Code            | E96             | Code            | E96             |                  |                  |  |  |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|--|--|
| 01         | 100             | 25              | 178             | 49              | 316             | 73              | 562             |                  |                  |  |  |
| 02         | 102             | 26              | 182             | 50              | 324             | 74              | 576             |                  |                  |  |  |
| 03         | 105             | 27              | 187             | 51              | 332             | 75              | 590             |                  |                  |  |  |
| 04         | 107             | 28              | 191             | 52              | 340             | 76              | 604             |                  |                  |  |  |
| 05         | 110             | 29              | 196             | 53              | 348             | 77              | 619             |                  |                  |  |  |
| 06         | 113             | 30              | 200             | 54              | 357             | 78              | 634             |                  |                  |  |  |
| 07         | 115             | 31              | 205             | 55              | 365             | 79              | 649             |                  |                  |  |  |
| 08         | 118             | 32              | 210             | 56              | 374             | 80              | 665             |                  |                  |  |  |
| 09         | 121             | 33              | 215             | 57              | 383             | 81              | 681             |                  |                  |  |  |
| 10         | 124             | 34              | 221             | 58              | 392             | 82              | 698             |                  |                  |  |  |
| 11         | 127             | 35              | 226             | 59              | 402             | 83              | 715             |                  |                  |  |  |
| 12         | 130             | 36              | 232             | 60              | 412             | 84              | 732             |                  |                  |  |  |
| 13         | 133             | 37              | 237             | 61              | 422             | 85              | 750             |                  |                  |  |  |
| 14         | 137             | 38              | 243             | 62              | 432             | 86              | 768             |                  |                  |  |  |
| 15         | 140             | 39              | 249             | 63              | 442             | 87              | 787             |                  |                  |  |  |
| 16         | 143             | 40              | 255             | 64              | 453             | 88              | 806             |                  |                  |  |  |
| 17         | 147             | 41              | 261             | 65              | 464             | 89              | 825             |                  |                  |  |  |
| 18         | 150             | 42              | 267             | 66              | 475             | 90              | 845             |                  |                  |  |  |
| 19         | 154             | 43              | 274             | 67              | 487             | 91              | 866             |                  |                  |  |  |
| 20         | 158             | 44              | 280             | 68              | 499             | 92              | 887             |                  |                  |  |  |
| 21         | 162             | 45              | 287             | 69              | 511             | 93              | 909             |                  |                  |  |  |
| 22         | 165             | 46              | 294             | 70              | 523             | 94              | 931             |                  |                  |  |  |
| 23         | 169             | 47              | 301             | 71              | 536             | 95              | 953             |                  |                  |  |  |
| 24         | 174             | 48              | 309             | 72              | 549             | 96              | 976             |                  |                  |  |  |
| Code       | A               | B               | C               | D               | E               | F               | G               | X                | Y                |  |  |
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> |  |  |

## ■Recommend Land Pattern



Unit: mm

| Type    | A    | B    | C    |
|---------|------|------|------|
| RS-0201 | 0.30 | 0.25 | 0.30 |
| RS-0402 | 0.50 | 0.45 | 0.60 |
| RS-0603 | 0.90 | 0.60 | 0.90 |
| RS-0805 | 1.20 | 0.70 | 1.30 |
| RS-1206 | 2.00 | 0.90 | 1.60 |