

Datasheet

RS Pro RS Series Thick Film Surface Mount Resistor 0603

Case $470\Omega \pm 5\%$ $0.1W \pm 200\text{ppm}/^\circ\text{C}$

RS Stock No: 713-4131



Product Details

RS Pro 0603 thick film surface mount resistor with $\pm 5\%$ tolerance, provides 470Ω resistance and is power rated at 0.1 W . The temperature coefficient of resistance is $\pm 200\text{ ppm}/^\circ\text{C}$. 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

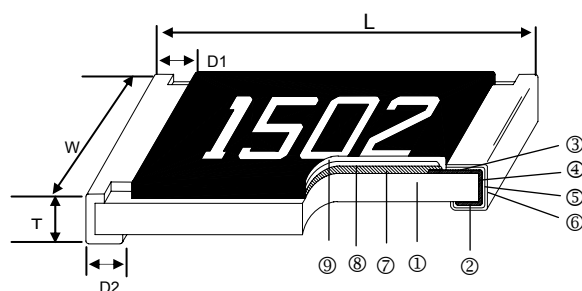
Specifications:

Case Style	Ruthenium Oxide
Depth	0.8 mm
Dimensions	1.6 x 0.8 x 0.45 mm
Height	0.45 mm
Length	1.6 mm
Maximum Operating Temperature	+155°C
Maximum Temperature Coefficient	+200 ppm/°C
Minimum Operating Temperature	-55°C
Minimum Temperature Coefficient	-200 ppm/°C
Package/Case	0603
Power Rating	0.1 W
Resistance	470 Ω
Technology	Thick Film
Temperature Coefficient	±200 ppm/°C
Termination Style	Solder Pad
Tolerance	±5%
Maximum Overload Voltage	150 V
Maximum Operating Voltage	75 V
Tape Width	8 mm

Thick Film Chip Resistor 5% - RS Series

0201/0402/0603/0805/1206

Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (RuO ₂ /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) (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



Derating Curve



Standard Electrical Specifications

Item Type	Power Rating at 70°C Jumper Rated Current	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range	TCR (PPM/°C)
					±5%	
RS-0201	1/20W	-55 ~ +155°C	25V	50V	1Ω – 9.76MΩ	±200
Jumper	1A				0Ω (<50mΩ)	-
RS-0402	1/16W	-55 ~ +155°C	50V	100V	1Ω – 9.76MΩ	±200
Jumper	1A				0Ω (<50mΩ)	-
RS-0603	1/10W	-55 ~ +155°C	75V	150V	1Ω – 9.76MΩ	±200
Jumper	1A				0Ω (<50mΩ)	-
RS-0805	1/8W	-55 ~ +155°C	150V	300V	1Ω – 9.76MΩ	±200
Jumper	2A				0Ω (<50mΩ)	-
RS-1206	1/4W	-55 ~ +155°C	200V	400V	1Ω – 9.76MΩ	±200
Jumper	2A				0Ω (<50mΩ)	-

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)



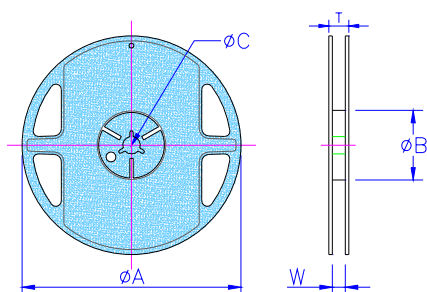
■ Environmental Characteristics

Item	Requirement		Test Method
	±5%	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125/+155°C, 25°C is the reference temperature
Short Time Overload	±(2.0%+0.05Ω)	<50mΩ	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. overload voltage for 5 seconds, 2 seconds for high power series
Insulation Resistance	≥10G		JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. overload voltage for 1 minute
Endurance	±(3.0%+0.10Ω)	<100mΩ	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±(3.0%+0.10Ω)	<100mΩ	JIS-C-5201-1 4.24 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	±(1.5%+0.10Ω)	<50mΩ	JIS-C-5201-1 4.23 IEC-60115-1 2.23.2 at +125/+155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	<50mΩ	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	±(1.0%+0.05Ω)	<50mΩ	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area □ 5% Total leaching area □ 10%		JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Rapid Change of Temperature	±(1.0%+0.05Ω)	<50mΩ	JIS-C-5201-1 4.18 IEC-60115-1 4.18 -55°C to +125/+155°C, 5 cycles

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

Packaging

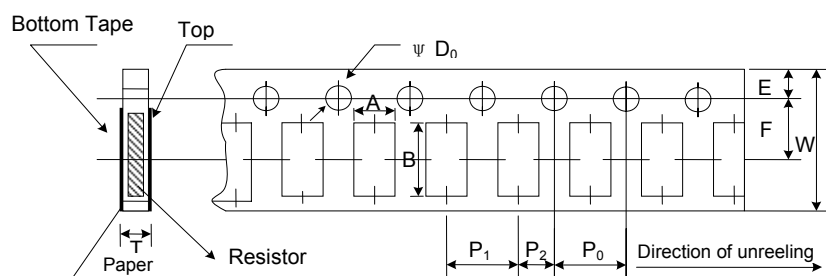
Reel Specifications & Packaging Quantity



Unit: mm

Type	Packaging Quantity	Tape Width	Reel Diameter	ΦA	ΦB	ΦC	W	T
RS-0201 RS-0402	Paper	8mm	7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.2	9.0±0.5	12.5±0.5
RS-0603 RS-0805 RS-1206			10 inch	254±1	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
			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 ₀	P ₁	P ₂	ΦD_0	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

Jumper for all: Letter "0"

5% for 0603/0805/1206: 3 digits marking in E24

Example: 101=100Ω 102=1KΩ (1st and 2nd are E24 code and 3rd code is multiplier)

E24 code	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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■ **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