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# SPECIFICATIONS

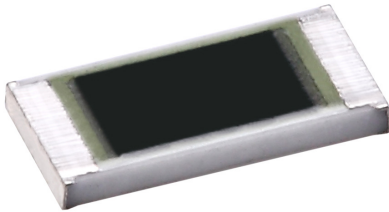
Trimmable Thick Film Chip Resistor

## RT-02-Serie

Low TCR 100ppm

Version September 2022

## Trimmable Thick Film Chip Resistor



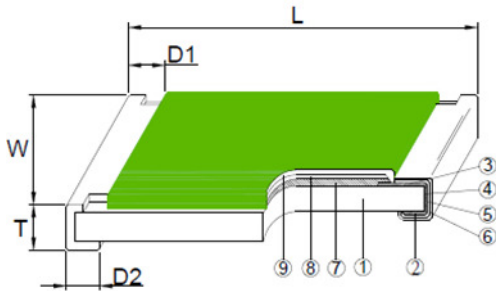
### Scope

- This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

### Features

- Suitable for laser fine tune
- Small size and light weight
- Highly reliable multilayer electrode construction
- Compatible with all soldering process

### Construction



### Applications

- Tuner
- Sensor Control Circuit
- Camcorder
- Portable Audio
- Photo Sensor
- Portable Measuring Equipment

① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Primary Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Secondary Overcoat

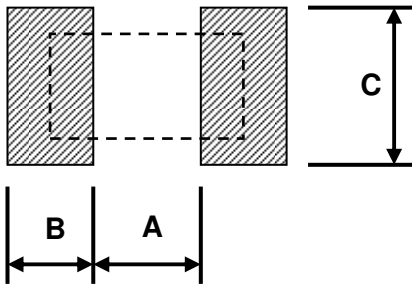
### Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
RT-02	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10	0.62

### Part Numbering

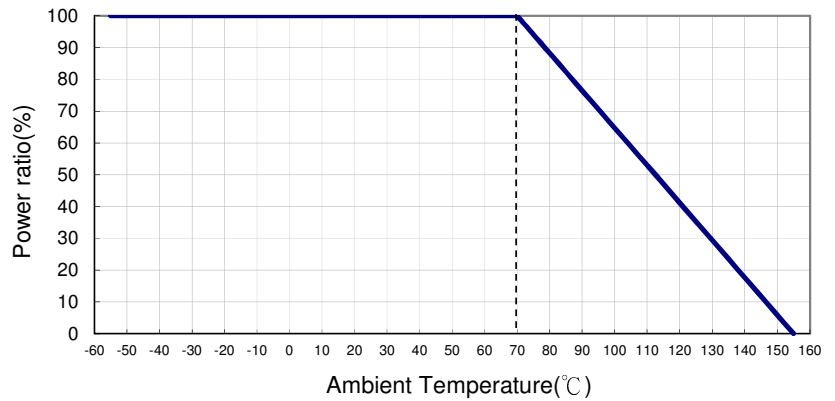
RT-	02	N	F	6	- - - 1 0 R
Product Type	Dimensions	Resistance Tolerance	Function Code	Packaging Code	Resistance
RT-	02: 0402	N: 0~-10% P: 0~-20% Q: 0~-30%	F: TCR 100ppm	6: 7" Reel 10Kpcs	--- 10R: 10Ω --- 9K1: 9.1KΩ --- -1M: 1MΩ “-“ to fill up 6 spaces

■Recommend Land Pattern

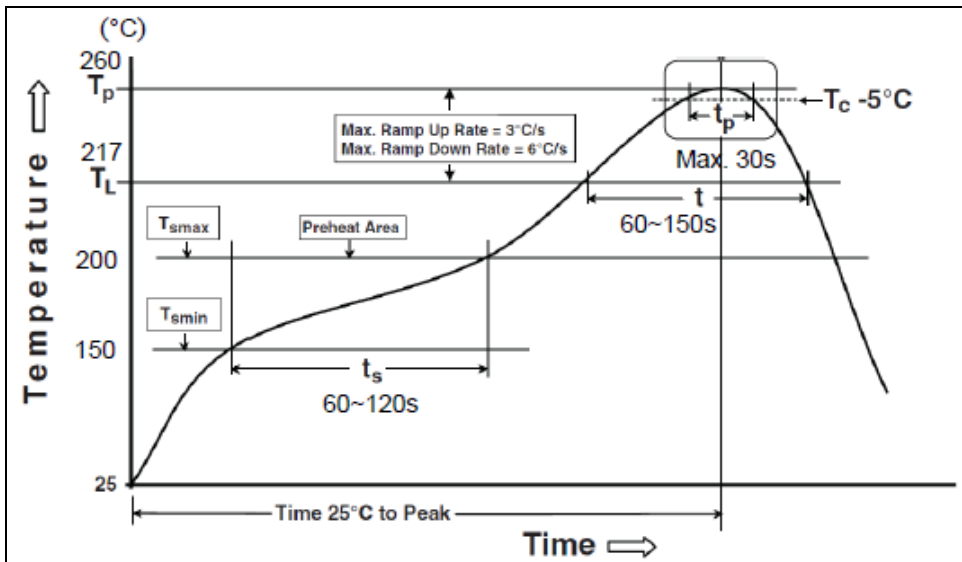


Type	A (mm)	B (mm)	C (mm)
RT-02	0.50	0.45	0.60

■Derating Curve



■Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	Profile Feature	Pb-Free Assembly
<b>Preheat</b>	Min. Temperature (T <sub>min</sub> )	150 °C
	Max Temperature (T <sub>max</sub> )	200 °C
	Preheating time (t <sub>s</sub> ) from (T <sub>min</sub> to T <sub>max</sub> )	60-120 seconds
	Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3 °C/second max.
	Liquidous temperature (T <sub>L</sub> ) Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	217 °C 60-150 seconds
	Min. Peak temperature (T <sub>p</sub> min)	235 °C
	Max. Peak temperature (T <sub>p</sub> max)	260 °C
	Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> )	30 seconds max.
	Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6 °C/second max.
	Time 25 °C to peak temperature	8 minutes max.

**■ Electrical Specifications**

Type	Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range (E24)			TCR (PPM/°C)
						0~ -10%	0~ -20%	0~ -30%	
RT-02 (0402)		1/16W	-55 ~ +155°C	50V	100V	10Ω – 1MΩ			±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.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

**■ Environmental Characteristics**

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	<b>JIS-C-5201-1 4.8</b> <b>IEC-60115-1 4.8</b> At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	$\pm(1.0\%+0.05\Omega)$	<b>JIS-C-5201-1 4.13</b> <b>IEC-60115-1 4.13</b> RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds.
Insulation Resistance	$\geq 10G$	<b>JIS-C-5201-1 4.6</b> <b>IEC-60115-1 4.6</b> Max. Overload Voltage for 1 minute
Endurance	$\pm(2.0\%+0.10\Omega)$	<b>JIS-C-5201-1 4.25</b> <b>IEC-60115-1 4.25.1</b> 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	$\pm(2.0\%+0.10\Omega)$	<b>JIS-C-5201-1 4.24</b> <b>IEC-60115-1 4.24</b> 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Dry Heat	$\pm(1.0\%+0.05\Omega)$	<b>JIS-C-5201-1 4.23</b> <b>IEC-60115-1 4.23.2</b> at +155°C for 1000 hrs
Bending Strength	$\pm(1.0\%+0.05\Omega)$	<b>JIS-C-5201-1 4.33</b> <b>IEC-60115-1 4.33</b> Bending once for 60 seconds 0402 sizes: 3mm
Solderability	95% min. coverage	<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds
Resistance to Soldering Heat	$\pm(0.5\%+0.05\Omega)$	<b>JIS-C-5201-1 4.18</b> <b>IEC-60115-1 4.18</b> 260±5°C for 10 seconds

Item	Requirement	Test Method
Voltage Proof	No breakdown or flashover	<b>JIS-C-5201-1 4.7</b> <b>IEC-60115-1 4.7</b> 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$	<b>JIS-C-5201-1 4.18</b> <b>IEC-60068-2-58 8.2.1</b> 260 $\pm$ 5°C for 30 seconds
Rapid Change of Temperature	$\pm(0.5\%+0.05\Omega)$	<b>JIS-C-5201-1 4.19</b> <b>IEC-60115-1 4.19</b> -55°C to +155°C, 5 cycles

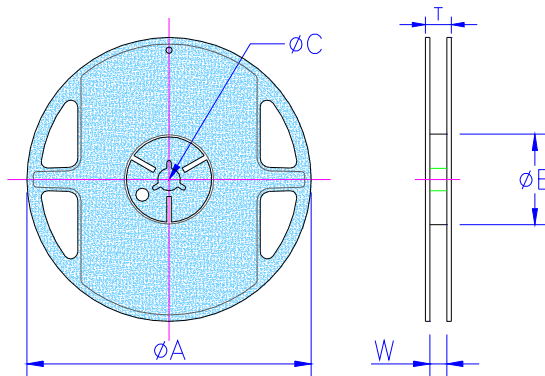
RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max. Operating Voltage whichever is lower.

■ **Storage Temperature: 15~28°C; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

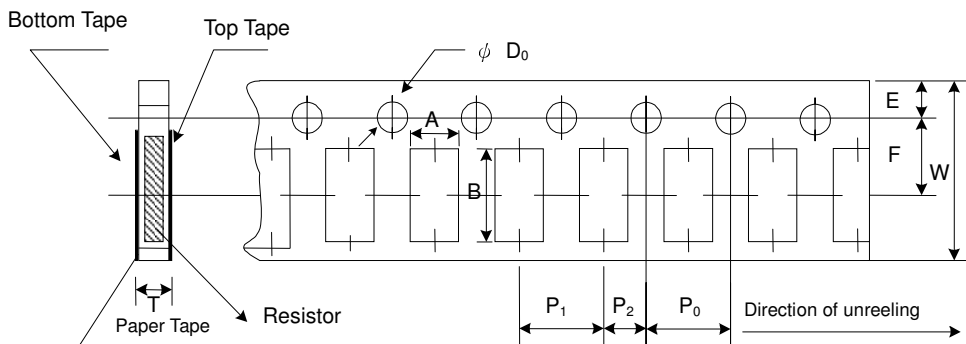
■ **Packaging**

Reel Specifications & Packaging Quantity



Type	Packaging Quantity	Tape Width	Reel Diameter	φA (mm)	φB (mm)	φC (mm)	W (mm)	T (mm)
RT-02	Paper 10K	8mm	7 inch	178.5 $\pm$ 1.5	60 <sup>+1/-0</sup>	13.0 $\pm$ 0.2	9.0 $\pm$ 0.5	12.5 $\pm$ 0.5

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	φD <sub>0</sub> (mm)	T (mm)
RT-02	0.65 $\pm$ 0.10	1.15 $\pm$ 0.10	8.0 $\pm$ 0.20	1.75 $\pm$ 0.10	3.50 $\pm$ 0.05	4.00 $\pm$ 0.10	2.00 $\pm$ 0.05	2.00 $\pm$ 0.05	1.50 $\pm$ 0.1,-0	0.45 $\pm$ 0.10