

Trimmable Thick Film Chip Resistor



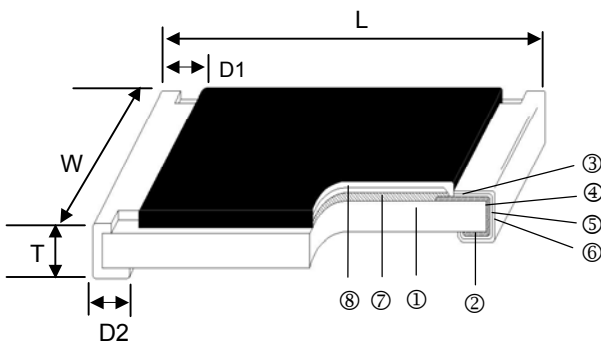
Scope

- 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 (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) | |

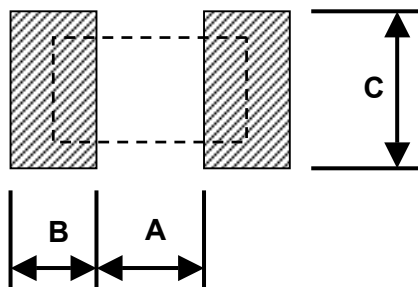
Dimensions

| 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 | 0.620 |
| RT-03 | 0603 | 1.60±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 2.042 |
| RT-05 | 0805 | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 | 4.368 |
| RT-06 | 1206 | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 8.947 |
| RT-10 | 1210 | 3.10±0.10 | 2.60±0.15 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 15.959 |
| RT-0A | 2010 | 5.00±0.10 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 24.241 |
| RT-12 | 2512 | 6.35±0.10 | 3.10±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 39.448 |

Part Numbering

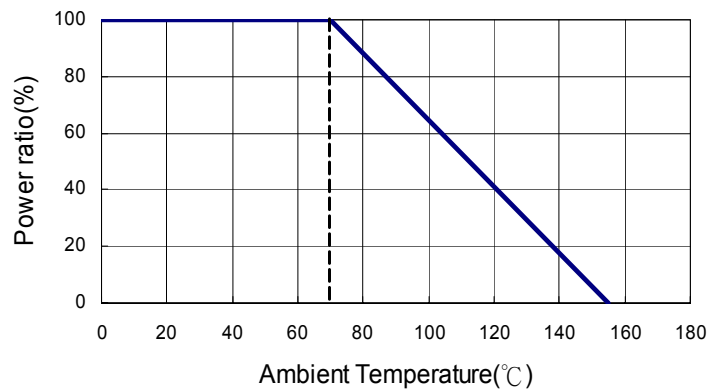
| | | | | | |
|---------------------|--|-------------------------------------|----------------------|---|---|
| RT- | 03 | N | L | 7 | - - - 1 R 2 |
| Product Type | Dimensions | Resistance Tolerance | Function Code | Packaging Code | Resistance |
| RT- | 02: 0402 03: 0603 05: 0805 06: 1206 10: 1210 0A: 2010 12: 2512 | N: 0~-10% P: 0~-20% Q: 0~-30% | L: Standard | 4: 7" Reel 4Kpcs 6: 7" Reel 10Kpcs 7: 7" Reel 5Kpcs 9: 10" Reel 8Kpcs A: 10" Reel 10Kpcs B: 10" Reel 20Kpcs C: 13" Reel 40Kpcs D: 13" Reel 20Kpcs F: Bulk | --- 1R2: 1.2Ω --- 3K3: 3.3KΩ --- 10K: 10KΩ -- 100K: 100KΩ “-” to fill up 6 spaces |

Recommend Land Pattern

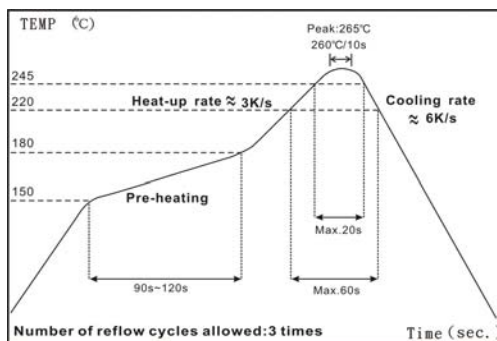


| Type | A (mm) | B (mm) | C (mm) |
|-------|--------|--------|--------|
| RT-02 | 0.50 | 0.45 | 0.60 |
| RT-03 | 0.90 | 0.60 | 0.90 |
| RT-05 | 1.20 | 0.70 | 1.30 |
| RT-06 | 2.00 | 0.90 | 1.60 |
| RT-10 | 2.00 | 0.90 | 2.80 |
| RT-0A | 3.80 | 0.90 | 2.80 |
| RT-12 | 3.80 | 1.60 | 3.50 |

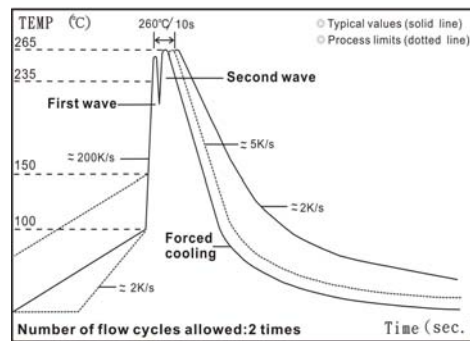
Derating Curve



Soldering Condition



IR Reflow Soldering



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

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~ -10% | 0~ -20% | 0~ -30% | |
| RT-02 (0402) | | 1/16W | -55 ~ +155°C | 50V | 100V | 1Ω - 10MΩ | | | ±200 |
| RT-03 (0603) | | 1/10W | | 50V | 100V | 1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ | | | ±200 ±100 ±200 |
| RT-05 (0805) | | 1/8W | | 150V | 300V | | | | |
| RT-06 (1206) | | 1/4W | | 200V | 400V | | | | |
| RT-10 (1210) | | 1/3W | | 200V | 400V | | | | |
| RT-0A (2010) | | 3/4W | | 200V | 400V | | | | |
| RT-12 (2512) | | 1W | | 250V | 500V | | | | |

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. | JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature |
| Short Time Overload | ±(1.0%+0.05Ω) | JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload voltage whichever is lower 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 | ±(2.0%+0.10Ω) | JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Damp Heat with Load | ±(2.0%+0.10Ω) | JIS-C-5201-1 4.24 IEC-60115-1 4.24 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Dry Heat | ±(1.0%+0.05Ω) | JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +125/+155°C for 1000 hrs |
| Bending Strength | ±(1.0%+0.05Ω) | JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm |

Trimable Thick Film Chip Resistor

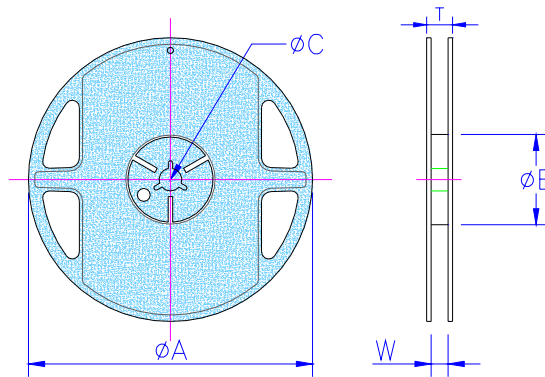
| Item | Requirement | Test Method |
|------------------------------|--|---|
| Solderability | 95% min. coverage | JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds |
| Resistance to Soldering Heat | ±(0.5%+0.05Ω) | JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds |
| Voltage Proof | No breakdown or flashover | JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage 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 | ±(0.5%+0.05Ω) | JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +125/+155°C, 5 cycles |

RCWV(Rated continuous working voltage)=√(P*R) or Max. Operating voltage whichever is lower.

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

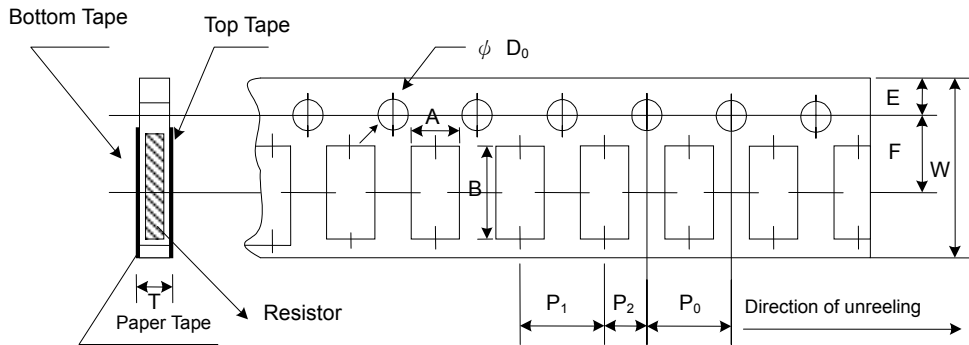
■ **Packaging**

Reel Specifications & Packaging Quantity



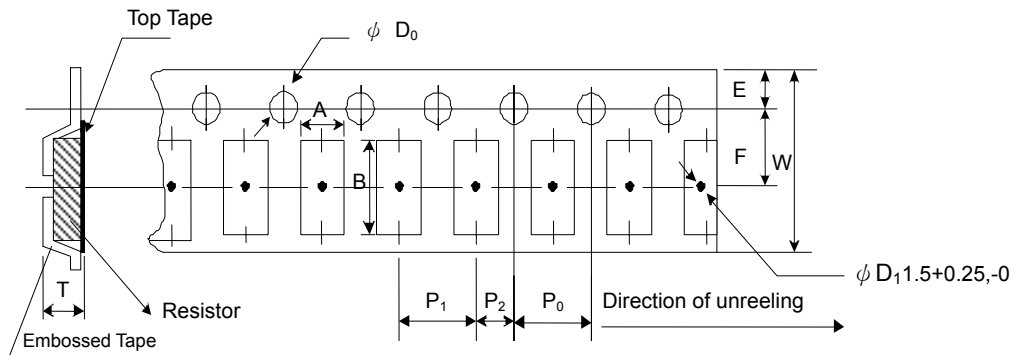
| Type | Packaging Quantity | Tape Width | Reel Diameter | ΦA (mm) | ΦB (mm) | ΦC (mm) | W (mm) | T (mm) | |
|----------------------------------|--------------------|------------|---------------|---------|-----------|---------------------|----------|----------|----------|
| RT-02 | Paper | 10K | 8mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 |
| | | 20K | 8mm | 10 inch | 254±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |
| | | 40K | 8mm | 13 inch | 330±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |
| RT-03 RT-05 RT-06 RT-10 | Paper | 5K | 8mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 |
| 10K | | 8mm | 10 inch | 254±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 | |
| 20K | | 8mm | 13 inch | 330±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 | |
| RT-0A RT-12 | Embossed | 4K | 12mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.5 | 13.0±0.5 | 15.5±0.5 |
| 8K | | 12mm | 10 inch | 250±1.0 | 62±0.5 | 13.0±0.5 | 12.5±0.5 | 16.5±0.5 | |

Paper Tape Specifications



| Type | A (mm) | B (mm) | W (mm) | E (mm) | F (mm) | P ₀ (mm) | P ₁ (mm) | P ₂ (mm) | ΦD ₀ (mm) | T (mm) |
|-------|-----------|-----------|----------|-----------|-----------|---------------------|---------------------|---------------------|----------------------|-----------|
| RT-02 | 0.65±0.10 | 1.15±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.45±0.10 |
| RT-03 | 1.10±0.10 | 1.90±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.70±0.10 |
| RT-05 | 1.60±0.10 | 2.40±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.85±0.10 |
| RT-06 | 1.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.85±0.10 |
| RT-10 | 2.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.85±0.10 |

Embossed Plastic Tape Specifications



| Type | A (mm) | B (mm) | W (mm) | E (mm) | F (mm) | P ₀ (mm) | P ₁ (mm) | P ₂ (mm) | ΦD ₀ (mm) | T (mm) |
|-------|----------|----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|-------------------|
| RT-0A | 2.8±0.10 | 5.5±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.1, -0 | 1.2 ⁺⁰ |
| RT-12 | 3.5±0.10 | 6.7±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.1, -0 | 1.2 ⁺⁰ |

REVISION HISTORY

| REVISION | DATE | CHANGE NOTIFICATION | DESCRIPTION |
|-----------------|-------------|----------------------------|---|
| Version A8 | Jun 03,2014 | - | - Environmental Characteristics updated |
