

|      |            |
|------|------------|
| 系列号  | HoRF       |
| 修订日期 | 2021-11-19 |
| 版本号  | Ho-A0      |



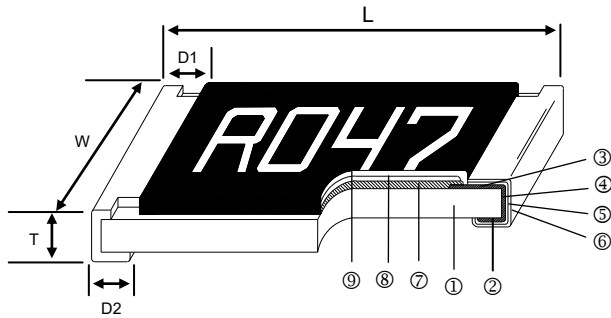
## Scope

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

## Features

- Low inductance
- Highly reliable multilayer electrode construction
- Higher component and equipment reliability
- Reduced size of final equipment reliability
- RoHS Compliance

## Construction



## Applications

- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Application
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Automotive Engine Control
- Disk Driver

|                     |                      |                      |
|---------------------|----------------------|----------------------|
| 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 |

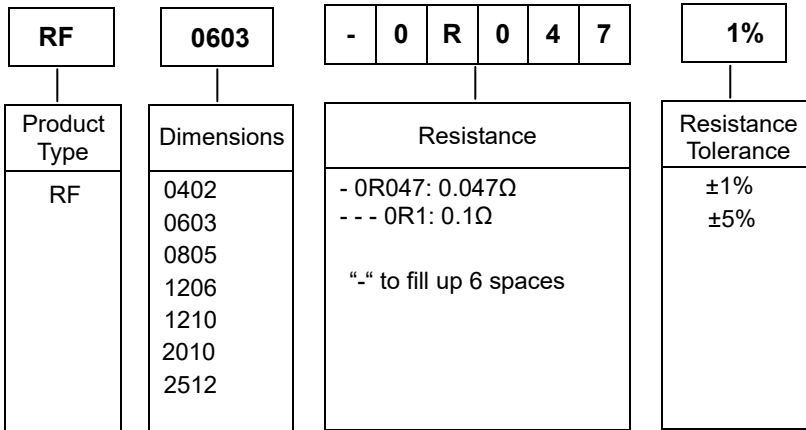
## Dimensions

| Type | Size (Inch) | L (mm)    | W (mm)    | T (mm)    | D1 (mm)   | D2 (mm)   | Weight (g) (1000pcs) |
|------|-------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| RF   | 0402        | 1.00±0.05 | 0.50±0.05 | 0.35±0.05 | 0.20±0.10 | 0.20±0.10 | 0.620                |
| RF   | 0603        | 1.60±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 2.042                |
| RF   | 0805        | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 | 4.368                |
| RF   | 1206        | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 8.947                |
| RF   | 1210        | 3.10±0.10 | 2.60±0.15 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 15.959               |
| RF   | 2010        | 5.00±0.10 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 24.241               |
| RF   | 2512        | 6.35±0.10 | 3.10±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 39.448               |

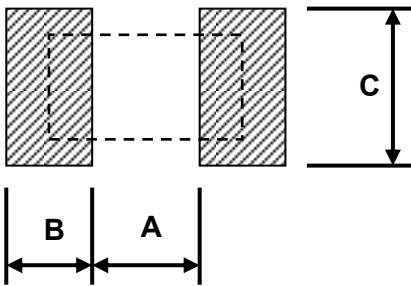


地址：深圳市龙华新区观澜大布头路南通邦高新产业园 A 栋 8 楼

### Part Numbering

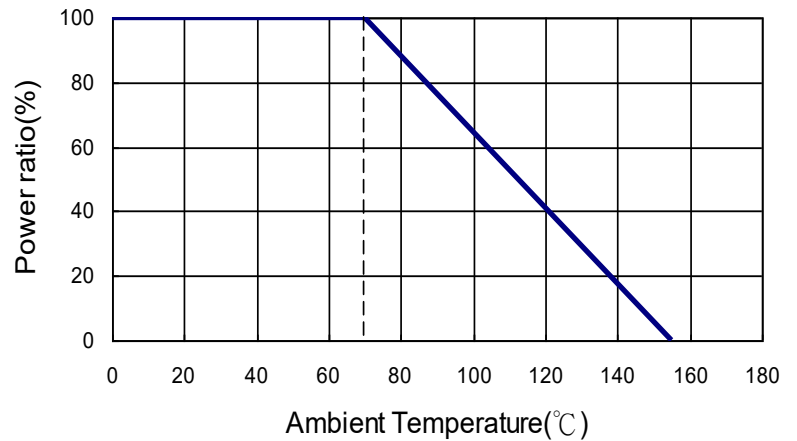


### Recommend Land Pattern

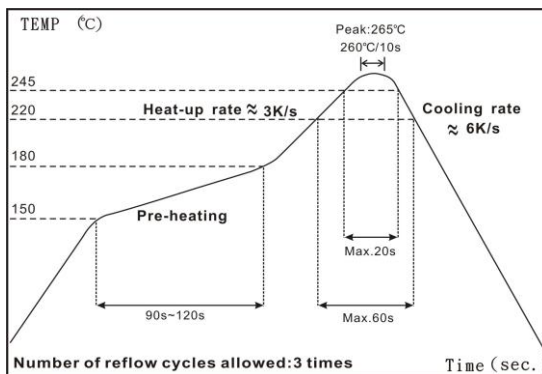


| Type   | A (mm) | B (mm) | C (mm) |
|--------|--------|--------|--------|
| RF0402 | 0.50   | 0.45   | 0.60   |
| RF0603 | 0.90   | 0.60   | 0.90   |
| RF0805 | 1.20   | 0.70   | 1.30   |
| RF1206 | 2.00   | 0.90   | 1.60   |
| RF1210 | 2.00   | 0.90   | 2.80   |
| RF2010 | 3.80   | 0.90   | 2.80   |
| RF2512 | 3.80   | 1.60   | 3.50   |

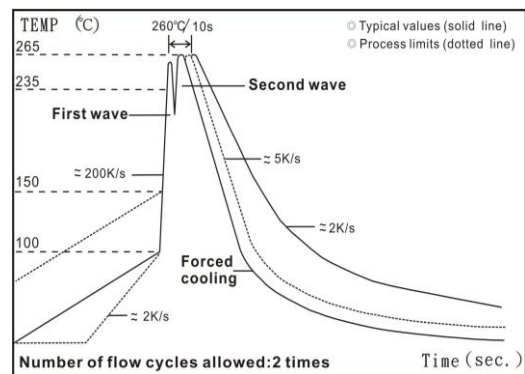
### Derating Curve



### 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

|   |                     |      |            |
|---|---------------------|------|------------|
| <br>毫欧电阻 毫欧制造 | HoRF电流感应厚膜芯片电阻系列规格书 | 系列号  | HoRF       |
|   |                     | 修订日期 | 2021-11-19 |
|   |                     | 版本号  | Ho-A0      |

## Standard Electrical Specifications

| Item<br>Type | Power Rating<br>at 70°C | Operating Temp.<br>Range | Max. Operating<br>Current | Resistance Range<br>(mΩ)                   |     | TCR<br>(PPM/°C)                |
|--------------|-------------------------|--------------------------|---------------------------|--|-----|--------------------------------|
|              |                         |                          |                           | ±1%  | ±5% |                                |
| RF0402       | 1/16W                   | -55 ~ +155°C             | 1.11A                     | 50 - 91<br>100 - 976                       |     | ±800<br>±500                   |
| RF0603       | 1/10W                   | -55 ~ +155°C             | 2.23A                     | 20 - 47<br>50 - 91<br>100 - 976            |     | ±1200<br>±800<br>±500          |
| RF0805       | 1/8W                    | -55 ~ +155°C             | 3.53A                     | 10 - 18<br>20 - 47<br>50 - 91<br>100 - 976 |     | ±1500<br>±1200<br>±800<br>±500 |
| RF1206       | 1/4W                    | -55 ~ +155°C             | 5.00A                     |  |     |                                |
| RF1210       | 1/3W                    | -55 ~ +155°C             | 5.77A                     |  |     |                                |
| RF2010       | 3/4W                    | -55 ~ +155°C             | 8.66A                     | 10 - 18<br>20 - 91<br>100 - 976            |     | ±1500<br>±800<br>±500          |
| RF2512       | 1W                      | -55 ~ +155°C             | 10.0A                     |  |     |                                |

Operating Voltage= $\sqrt{P \cdot R}$  ; Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$

## High Power Electrical Specifications


| Item<br>Type | Power Rating<br>at 70°C | Operating Temp.<br>Range | Max. Operating<br>Current | Resistance Range<br>(mΩ)                   |     | TCR<br>(PPM/°C)                |
|--------------|-------------------------|--------------------------|---------------------------|--|-----|--------------------------------|
|              |                         |                          |                           | ±1%  | ±5% |                                |
| RF0402       | 1/10W                   | -55 ~ +155°C             | 1.40A                     | 50 - 91<br>100 - 976                       |     | ±800<br>±500                   |
| RF0603       | 1/8W                    | -55 ~ +155°C             | 2.50A                     | 20 - 47<br>50 - 91<br>100 - 976            |     | ±1200<br>±800<br>±500          |
| RF0805       | 1/4W                    | -55 ~ +155°C             | 5.00A                     | 10 - 18<br>20 - 47<br>50 - 91<br>100 - 976 |     | ±1500<br>±1200<br>±800<br>±500 |
| RF1206       | 1/2W                    | -55 ~ +155°C             | 7.07A                     |  |     |                                |
| RF1210       | 1/2W                    | -55 ~ +155°C             | 7.07A                     |  |     |                                |
| RF2010       | 1W                      | -55 ~ +155°C             | 10.0A                     | 10 - 18<br>20 - 91<br>100 - 976            |     | ±1500<br>±800<br>±500          |
| RF2512       | 2W                      | -55 ~ +155°C             | 14.1A                     |  |     |                                |

Operating Voltage= $\sqrt{P \cdot R}$

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$

Operating Current= $\sqrt{P/R}$

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

|   |                     |      |            |
|---|---------------------|------|------------|
| <br>毫欧电阻 毫欧制造 | HoRF电流感应厚膜芯片电阻系列规格书 | 系列号  | HoRF       |
|   |                     | 修订日期 | 2021-11-19 |
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## Environmental Characteristics

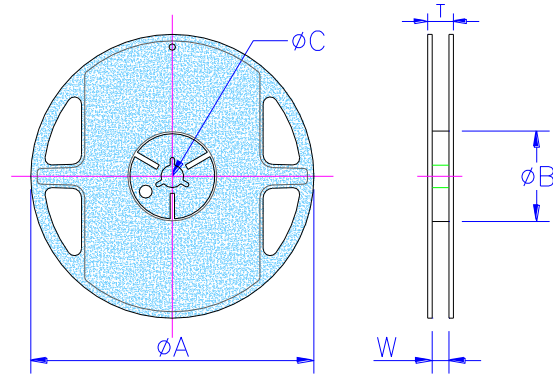
| Item   | Requirement   |               | Test Method  |
|--|---|---------------|--|
|  | ±1%   | ±5%           |  |
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.  |               | <b>JIS-C-5201-1 4.8</b><br><b>IEC-60115-1 4.8</b><br>-55°C~+125°C, 25°C is the reference temperature   |
| Short Time Overload                            | ±(1.0%+0.05Ω)   | ±(2.0%+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 whichever is lower 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                                      | ±(1.0%+0.10Ω)   | ±(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, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"                                      |
| Damp Heat with Load                            | ±(1.0%+0.10Ω)   | ±(2.0%+0.10Ω) | <b>JIS-C-5201-1 4.24</b><br><b>IEC-60115-1 4.24</b><br>40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"                           |
| Dry Heat                                       | ±(1.0%+0.05Ω)   | ±(1.5%+0.10Ω) | <b>JIS-C-5201-1 4.23</b><br><b>IEC-60115-1 4.23.2</b><br>at +155°C for 1000 hrs  |
| Bending Strength                               | ±(1.0%+0.05Ω)   | ±(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)   | ±(1.0%+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 Max. Operating Voltage 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)   | ±(1.0%+0.05Ω) | <b>JIS-C-5201-1 4.19</b><br><b>IEC-60115-1 4.19</b><br>-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

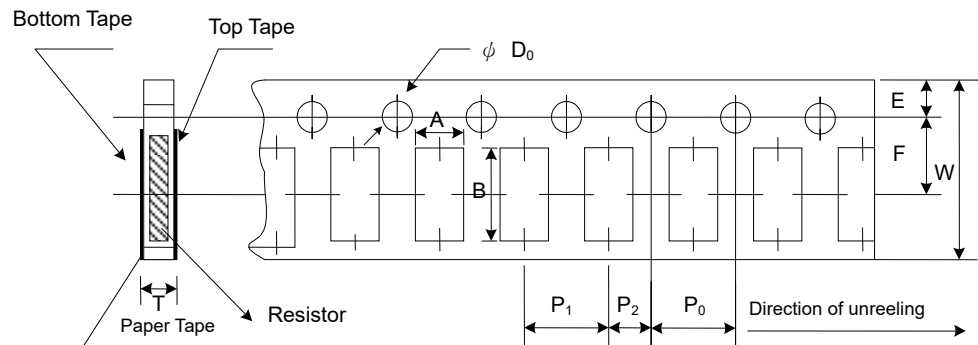
## ■ Packaging

### Reel Specifications & Packaging Quantity

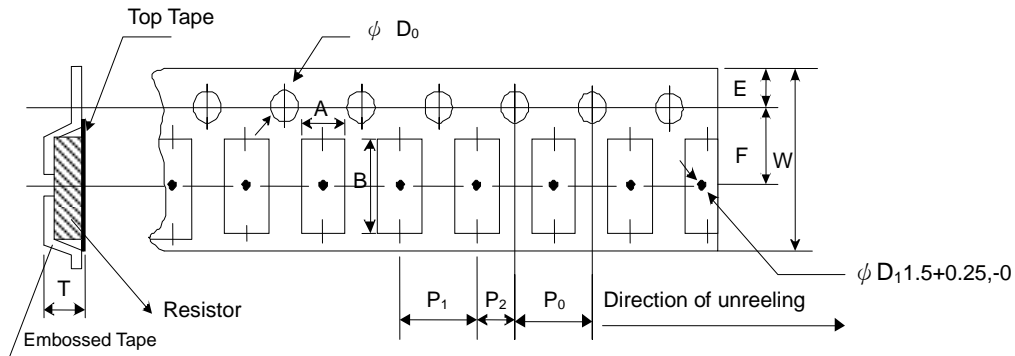


| Type   | Packaging Quantity | Tape Width | Reel Diameter | $\phi A$ (mm) | $\phi B$ (mm) | $\phi C$ (mm)       | W (mm)   | T (mm)   |          |
|--------|--------------------|------------|---------------|---------------|---------------|---------------------|----------|----------|----------|
| RF0402 | Paper              | 10K        | 8mm           | 7 inch        | 178.5±1.5     | 60 <sup>+1/-0</sup> | 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 |
| RF0603 | Paper              | 5K         | 8mm           | 7 inch        | 178.5±1.5     | 60 <sup>+1/-0</sup> | 13.0±0.2 | 9.0±0.5  | 12.5±0.5 |
| RF0805 |                    | 10K        | 8mm           | 10 inch       | 254±1.0       | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 13.5±0.5 |
| RF1206 |                    | 20K        | 8mm           | 13 inch       | 330±1.0       | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 13.5±0.5 |
| RF1210 |                    |            |               |               |               |                     |          |          |          |
| RF2010 | Embossed           | 4K         | 12mm          | 7 inch        | 178.5±1.5     | 60 <sup>+1/-0</sup> | 13.0±0.5 | 13.0±0.5 | 15.5±0.5 |
| RF2512 |                    | 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 <sub>0</sub> (mm) | P <sub>1</sub> (mm) | P <sub>2</sub> (mm) | $\phi D_0$ (mm) | T (mm)    |
|--------|-----------|-----------|----------|-----------|-----------|---------------------|---------------------|---------------------|-----------------|-----------|
| RF0402 | 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 |
| RF0603 | 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 |
| RF0805 | 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 |
| RF1206 | 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 |
| RF1210 | 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 <sub>0</sub> (mm) | P <sub>1</sub> (mm) | P <sub>2</sub> (mm) | ΦD <sub>0</sub> (mm) | T (mm)            |
|--------|----------|----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|-------------------|
| RF2010 | 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 <sup>+0</sup> |
| RF2512 | 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 <sup>+0</sup> |

**Marking**

No Marking for 0402

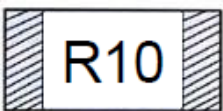
1%, 5% for 0805/1206/1210/2010/2512: 4 digits marking

Example:

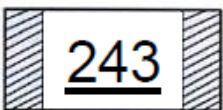
|            |      |      |      |       |       |
|------------|------|------|------|-------|-------|
| Resistance | 47mΩ | 75mΩ | 15mΩ | 750mΩ | 820mΩ |
| Marking    | R047 | R075 | R015 | R750  | R820  |

5% for 0603: 3 digits marking in E24

1% for 0603: 3 digits marking with under-line in E96 (non-including E24 series)



3 digits marking for E24 or R value suffix is zero in E96: R10=100mΩ; R28=280mΩ


 3 digits marking for E96: 243=243mΩ; 511=511mΩ

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[M55342K06B1E78RS3](#) [M55342K06B6E19RWL](#) [M55342K06B6E81RS3](#) [M55342M05B200DRWB](#) [M55342M06B4K70MS3](#) [MC0603-511-](#)  
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