

## Data Sheet

Customer :

Product : Aluminum Nitride Thin Film Precision Chip Resistor – ARN Series

Size: 1206/2512

Issued Date: 8-Dec-20

Edition : REV.A2



VIKING TECH CORPORATION  
光韻科技股份有限公司

No.70, Guangfu N. Rad.,  
Hsin Chu Industrial Park,  
Hukou Hsiang, Hsin Chu Hsien,  
303, Taiwan

TEL:886-3-5972931

FAX:886-3-5972935•886-3-5973494

E-mail:sales@viking.com.tw

VIKING TECH CORPORATION KAOHSIUNG BRANCH  
光韻科技股份有限公司高雄分公司

No.248-3, Sin-Sheng Rd., Cian-Jhen Dist., Kaohsiung,  
806, Taiwan

TEL:886-7-8217999

FAX:886-7-8228229

E-mail:sales@viking.com.tw

Viking Electronics (WUXI) CO., LTD.  
光韻電子(無錫)有限公司

No.1A,(Xixia Road),Machinery & Industry Park,  
National Hi-Tech Industrial Development Zone of  
Wuxi, Wuxi, Jiangsu Province, China

Zip Code:214028

TEL:86-510-85203339

FAX:86-510-85203667•86-510-85203977

E-mail:wuxisales@tmtec.com.tw

| Produced by<br>(QC) | Checked<br>(QC)  | Approved by<br>(QC) | Prepared by<br>(Sales) | Accepted by<br>(Customer) |
|---------------------|------------------|---------------------|------------------------|---------------------------|
| 8-Dec-20            | 8-Dec-20         | 8-Dec-20            |                        |                           |
| <b>Chun</b>         | <b>Ben Chang</b> | <b>Ben Chang</b>    |                        |                           |

## Aluminum Nitride Thin Film Precision Chip Resistor (ARN Series)



### ■ Features

- High thermal conductivity aluminum nitride substrate
- Power rating up to 6.0W
- Resistance 50Ω ~ 30.1KΩ
- Resistor tolerance to ± 0.1%
- TCR to ± 25ppm/ ° C

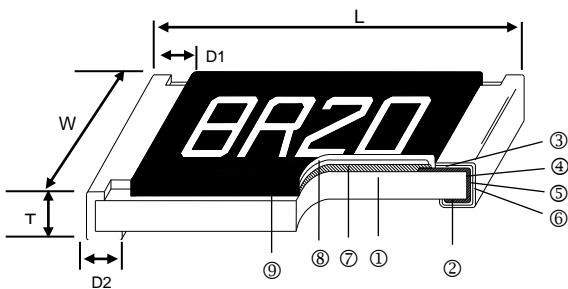
### ■ Applications

- Power Supplies
- Power Switching
- Braking System

### ■ Typical Performance

- TCR. 25 ppm/°C
- TOL. 0.1 %

### ■ Construction



|                             |                      |                  |
|-----------------------------|----------------------|------------------|
| ① Alumina Nitride Substrate | ④ Edge Electrode     | ⑦ Resistor Layer |
| ② Bottom Electrode          | ⑤ Barrier Layer      | ⑧ Overcoat       |
| ③ Top Electrode             | ⑥ External Electrode | ⑨ Marking        |

### ■ Dimensions

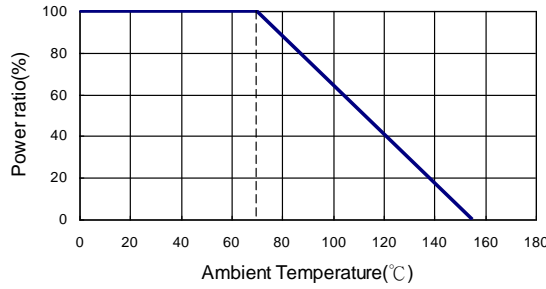
Unit: mm

| Type  | Size (Inch) | L         | W         | T         | D1        | D2        | Weight (g) (1000pcs) |
|-------|-------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| ARN06 | 1206        | 3.05±0.20 | 1.55±0.20 | 0.43±0.15 | 0.50±0.15 | 1.20±0.20 | 10.98                |
| ARN12 | 2512        | 6.30±0.20 | 3.10±0.20 | 0.43±0.15 | 0.70±0.25 | 1.60±0.25 | 42.32                |

### ■ Part Numbering

|              |                      |   |                           |                  |                  |  |                                    |
|--------------|----------------------|---|---------------------------|------------------|------------------|--|------------------------------------|
| ARN          | 06                   | C   | T                         | C                | S                | 1000                                   | N                                  |
| Product Type | Dimensions (LxW)     | Resistance Tolerance                        | Packaging Code            | TCR (PPM/°C)     | Power Rating     | Resistance                             | Marking Code                       |
|              | 06: 1206<br>12: 2512 | B: ±0.1%<br>C: ±0.25%<br>D: ±0.5%<br>F: ±1% | T: Taping Reel<br>B: Bulk | C: ±25<br>D: ±50 | S : 2W<br>I : 6W | 1000: 100Ω<br>5000: 500Ω<br>1002: 10KΩ | :Standard Marking<br>N: No Marking |

**Derating Curve**



**Standard Electrical Specifications**

| Item<br>Type | Power Rating<br>at 70°C | Operating Temp.<br>Range | Max<br>Operating<br>Voltage | Max<br>Overload<br>Voltage | Resistance Range |        |       |     | TCR (PPM/°C) |
|--------------|-------------------------|--------------------------|-----------------------------|----------------------------|------------------|--------|-------|-----|--------------|
|              |                         |                          |                             |                            | ±0.1%            | ±0.25% | ±0.5% | ±1% |              |
| ARN06 (1206) | 2W <sup>(1)</sup>       | -55°C ~ +155°C           | 100V                        | 200V                       | 50Ω~30.1KΩ       |        |       |     | ±25<br>±50   |
| ARN12 (2512) | 6W <sup>(1)</sup>       | -55°C ~ +155°C           | 100V                        | 200V                       | 50Ω~30.1KΩ       |        |       |     | ±25<br>±50   |

<sup>(1)</sup> Dependant on component mounting by user.

Operating Voltage= $\sqrt{P \cdot R}$  or Max. operating voltage listed above, whichever is lower.

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

**Environmental Characteristics**

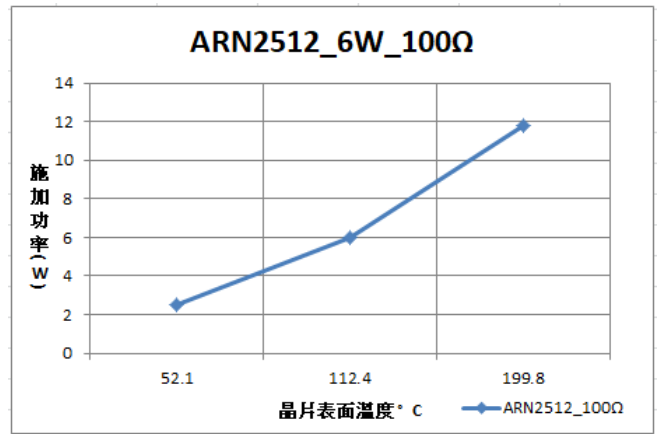
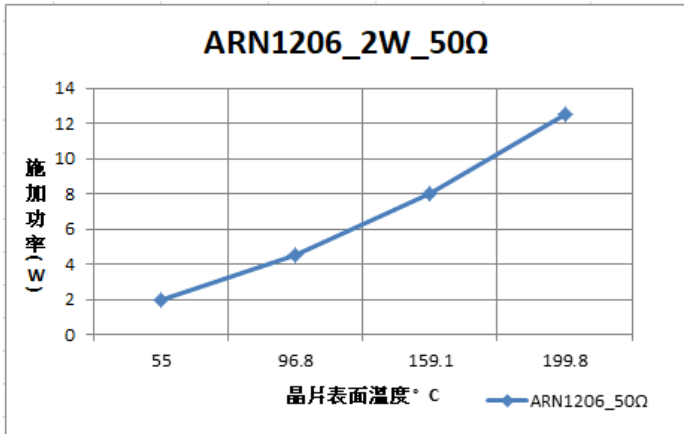
| Item   | Requirement           | Test Method   |
|--|-----------------------|---|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.              | <b>MIL-STD-202 Method 304</b><br>+25/-55/+25/+125/+25°C   |
| Short Time Overload <sup>(2)</sup>             | $\Delta R \pm 0.5 \%$ | Actual power handling capability is limited by the end user mounting process.<br>As with any high power chip resistor the ability to remove the heat is critical to the overall performance of the device |
| Insulation Resistance                          | >9999MΩ               | <b>MIL-STD-202 Method 302</b><br>Apply 100V <sub>DC</sub> for 1 minute  |
| Endurance                                      | $\Delta R \pm 1 \%$   | <b>MIL-STD-202 Method 108A</b><br>70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"   |
| Damp Heat with Load                            | $\Delta R \pm 0.4 \%$ | <b>MIL-STD-202 Method 103B</b><br>40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"   |
| Solderability                                  | 95% min. coverage     | <b>MIL-STD-202 Method 208H</b><br>245±5°C for 3 seconds   |
| Resistance to Soldering Heat                   | $\Delta R \pm 0.2 \%$ | <b>MIL-STD-202 Method 210E</b><br>260±5°C for 10 seconds  |
| Low Temperature Operation                      | $\Delta R \pm 0.2 \%$ | <b>JIS-C-5201-1 4.36</b><br>1 hour, -65°C, followed by 45 minutes of RCWV   |
| High Temperature Exposure                      | $\Delta R \pm 0.2 \%$ | <b>MIL-STD-202 Method 108</b><br>At + 155°C for 1000hrs   |
| Thermal Shock                                  | $\Delta R \pm 0.2 \%$ | <b>MIL-STD-202F Method 107G</b><br>-55°C ~155°C, 100 cycles   |

RCWV(Rated continuous working voltage)=  $\sqrt{P \cdot R}$  or Max. Operating voltage whichever is lower

■ Reference Standards: MIL-STD-202, JIS-C 5201

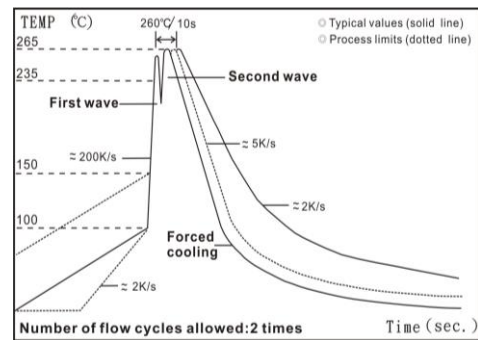
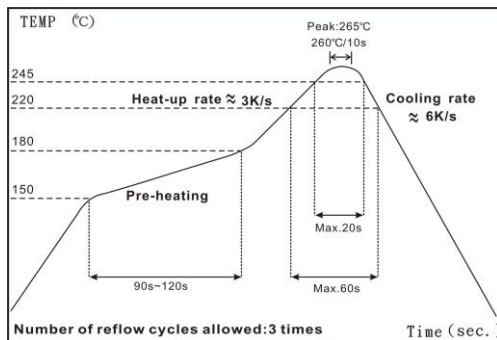
■ Storage Temperature: 15~28°C; Humidity < 80%RH

**■ Chip Temp Vs. APPLIED POWER**



(2) Chip surface temperature measured using FLIR ETS-320 thermal imaging system with an approximate test card surface temperature

**■ 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

**■ Marking**

1206~2512 4digit marking

Example

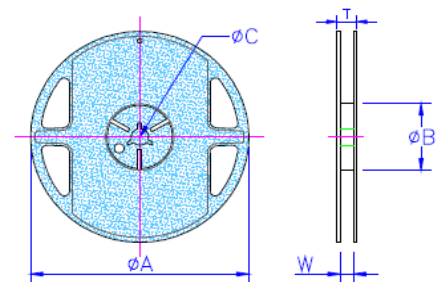
|            |      |       |      |        |
|------------|------|-------|------|--------|
| Resistance | 500Ω | 2.2KΩ | 10KΩ | 12.5KΩ |
| marking    | 5000 | 2201  | 1002 | 1252   |

**■ Packaging**

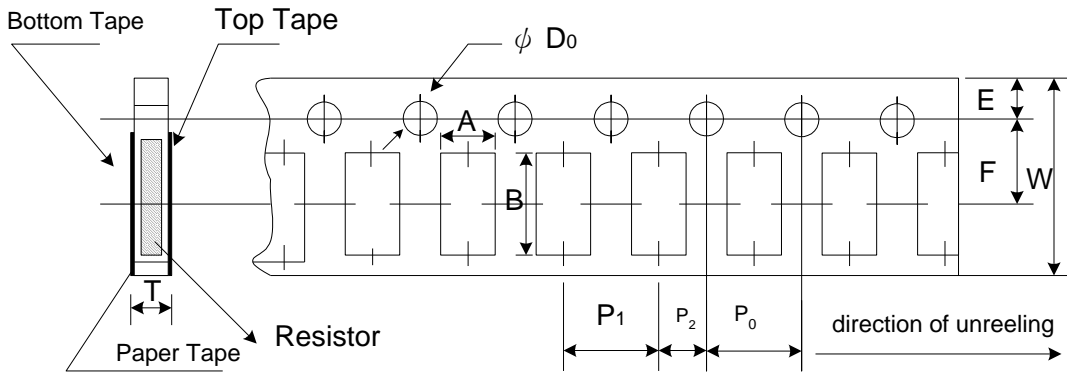
Packing Quantity & Reel Specifications

Unit :mm

| Type  | ØA        | ØB       | ØC       | W        | T        | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|-------|-----------|----------|----------|----------|----------|-----------------|--------------------------|
| ARN06 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 5,000           | -                        |
| ARN12 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 13.5±1.0 | 15.5±1.0 |                 | 4,000                    |



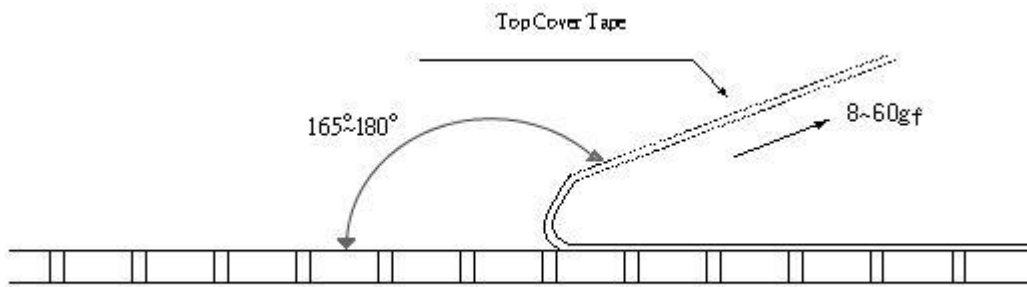
Paper Tape Specifications



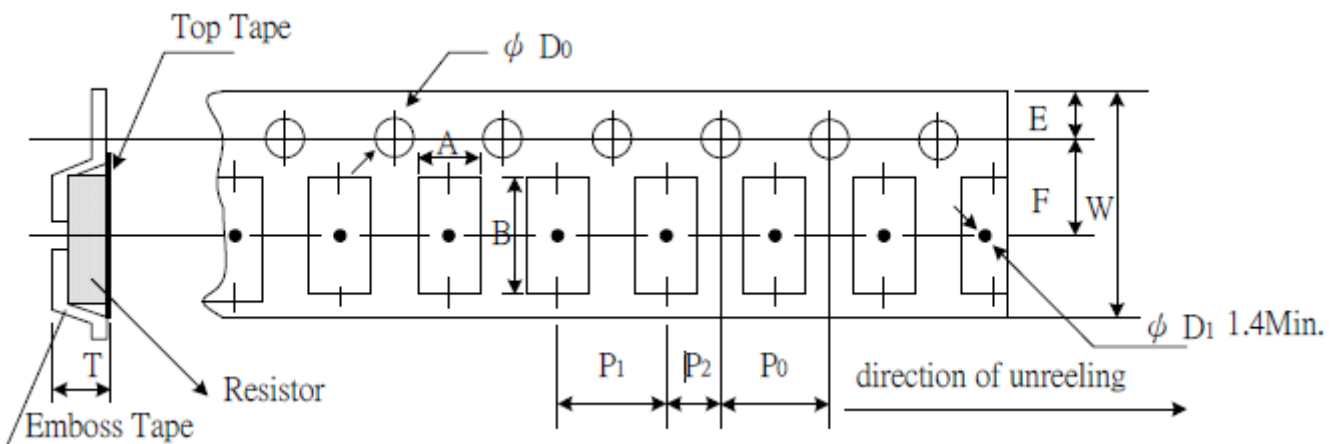
Unit: mm

| Type  | A         | B         | W         | E         | F        | $P_0$     | $P_1$     | $P_2$     | $\Phi D_0$ | T         |
|-------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|-----------|
| ARN06 | 2.00±0.05 | 3.55±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.55±0.05  | 0.75±0.05 |

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 8gf to 60gf

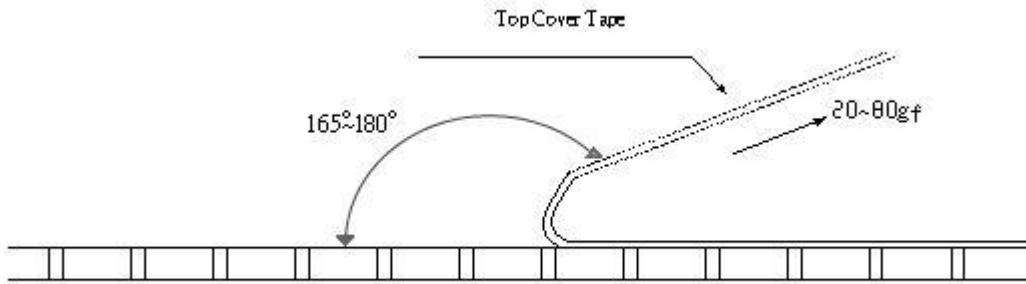


Emboss Plastic Tape Specifications



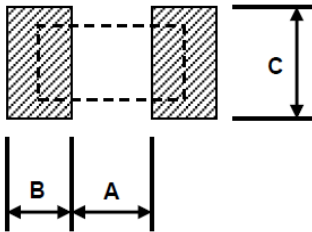
| Type  | A         | B         | W         | E         | F        | $P_0$     | $P_1$     | $P_2$     | $\Phi D_0$ | T         |
|-------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|-----------|
| ARN12 | 3.40±0.10 | 6.65±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50±0.10  | 1.00±0.20 |

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 20gf to 80gf



**Recommend Land Pattern**

Unit: mm



| Type  | A    | B    | C        |
|-------|------|------|----------|
| ARN06 | 0.60 | 1.90 | 1.80±0.1 |
| ARN12 | 2.77 | 2.31 | 3.20±0.2 |