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# SPECIFICATIONS

Thin Film Chip Inductor

**AL-Serie**

Version November 2017

## Thin Film Chip Inductor

### ■ Scope

– Viking's 0201 and 0402 series inductor is a photo lithographically etched single layer ceramic chip. Viking's design provides high SRF, excellent Q, and superior temperature stability. This highly stable inductor family is specifically designed for critical tolerance needs.

### ■ Features

- Photolithographic single layer ceramic chip
- High SRF, excellent Q, superior temperature stability
- Tight tolerance of  $\pm 1\%$  or  $\pm 0.1\text{nH}$
- Self resonant frequency controlled within 10%
- Stable inductance in high frequency circuit
- Highly stable design for critical needs

### ■ Applications

- Cellular Telephone, Pagers and GPS Products
- VCO, TCXO Circuit and RF Transceiver Module
- Wireless LAN, Bluetooth Module, Communication Appliances



### ■ Construction

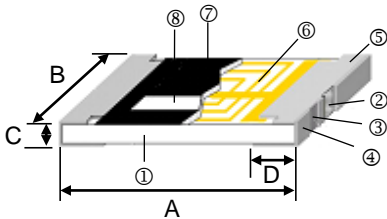


Figure1

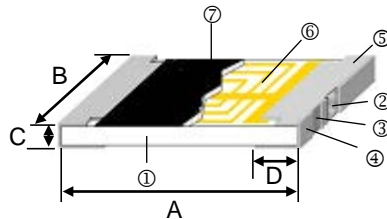
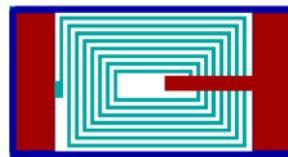


Figure2



|                     |                      |            |
|---------------------|----------------------|------------|
| ① Alumina Substrate | ④ External Electrode | ⑦ Overcoat |
| ② Inner Electrode   | ⑤ Edge Electrode     | ⑧ Marking  |
| ③ Barrier Layer     | ⑥ Cu Circuits        |            |

### ■ Dimensions

Unit: mm

| Type | Size (Inch) | Figure  | A               | B               | C               | D               | Weight (g) (1000pcs) |
|------|-------------|---------|-----------------|-----------------|-----------------|-----------------|----------------------|
| AL01 | 0201        | Figure2 | 0.60 $\pm$ 0.05 | 0.30 $\pm$ 0.05 | 0.23 $\pm$ 0.05 | 0.15 $\pm$ 0.05 | 0.23                 |
| AL02 | 0402        | Figure1 | 1.0 $\pm$ 0.05  | 0.5 $\pm$ 0.05  | 0.32 $\pm$ 0.05 | 0.2 $\pm$ 0.10  | 0.9                  |

### ■ Part Numbering

|              |                                    |   |                                  |   |   |
|--------------|------------------------------------|---|----------------------------------|---|---|
| AL           | 02                                 | G   | T                                | 10N   |   |
| Product Type | Dimensions<br>01: 0201<br>02: 0402 | Inductance Tolerance<br>B: $\pm 0.1\text{nH}$<br>C: $\pm 0.2\text{nH}$<br>S: $\pm 0.3\text{nH}$<br>F: $\pm 1\%$<br>G: $\pm 2\%$<br>H: $\pm 3\%$<br>J: $\pm 5\%$ | Packaging Code<br>T: Taping Reel | Inductance<br>1N0: 1nH<br>10N: 10nH<br>20N8: 20.8nH | :Standard<br>01: High Current<br>02: High Q |

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

**■ Standard Electrical Specifications**

AL01 Chip Inductors / Standard Type

| Inductance (nH) | Inductance Tolerance (nH or %) | Quality Factor min. | SRF (GHz) min. | DCR (Ω) max. | IDC (mA) max. |
|-----------------|--------------------------------|---------------------|----------------|--------------|---------------|
| 0.1             | ±0.1nH                         | 8 / 500MHz          | 9              | 0.20         | 400           |
| 0.2             | ±0.1, 0.2nH                    | 8 / 500MHz          | 9              | 0.20         | 400           |
| 0.3             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.20         | 400           |
| 0.4             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.25         | 350           |
| 0.5             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.25         | 350           |
| 0.6             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.25         | 350           |
| 0.7             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.30         | 300           |
| 0.8             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.30         | 300           |
| 0.9             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.30         | 300           |
| 1.0             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.30         | 300           |
| 1.1             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.35         | 300           |
| 1.2             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.35         | 300           |
| 1.3             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.45         | 250           |
| 1.4             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.45         | 250           |
| 1.5             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.45         | 250           |
| 1.6             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.55         | 200           |
| 1.7             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.55         | 200           |
| 1.8             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.55         | 200           |
| 1.9             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 9              | 0.55         | 200           |
| 2.0             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.70         | 200           |
| 2.1             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.70         | 200           |
| 2.2             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.70         | 200           |
| 2.3             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.80         | 150           |
| 2.4             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.80         | 150           |
| 2.5             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.80         | 150           |
| 2.6             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.80         | 150           |
| 2.7             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 8              | 0.80         | 150           |
| 2.8             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 2.9             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 3.0             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 3.1             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 3.2             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 3.3             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.00         | 150           |
| 3.4             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 3.5             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 3.6             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 3.7             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 3.8             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 3.9             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 4.0             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.20         | 150           |
| 4.4             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.30         | 140           |
| 4.7             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.40         | 130           |
| 4.9             | ±0.1, 0.2, 0.3nH               | 8 / 500MHz          | 6              | 1.60         | 130           |
| 5.6             | ±2, ±3, ±5%                    | 8 / 500MHz          | 4              | 1.80         | 130           |
| 6.1             | ±2, ±3, ±5%                    | 8 / 500MHz          | 4              | 2.00         | 120           |
| 6.8             | ±2, ±3, ±5%                    | 8 / 500MHz          | 4              | 2.30         | 110           |
| 7.4             | ±2, ±3, ±5%                    | 8 / 500MHz          | 4              | 2.80         | 110           |
| 8.2             | ±2, ±3, ±5%                    | 8 / 500MHz          | 3              | 3.00         | 110           |
| 9.1             | ±2, ±3, ±5%                    | 8 / 500MHz          | 3              | 3.25         | 100           |
| 9.2             | ±2, ±3, ±5%                    | 8 / 500MHz          | 3              | 3.25         | 100           |
| 10              | ±2, ±3, ±5%                    | 8 / 500MHz          | 2              | 3.50         | 80            |

Operating Temperature Range: -40°C to +85°C

Test Equipment: HP4287A+Agilent 16196C

AL01-01 Chip Inductors / High Current Type

| Inductance (nH) | Inductance Tolerance (nH or %) | Quality Factor min. | SRF (GHz) min. | DCR (Ω) max. | IDC (mA) max. |
|-----------------|--------------------------------|---------------------|----------------|--------------|---------------|
| 0.1             | ±0.1nH                         | 10 / 500MHz         | 6              | 0.05         | 600           |
| 0.2             | ±0.1, 0.2nH                    | 10 / 500MHz         | 6              | 0.05         | 600           |
| 0.3             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.05         | 600           |
| 0.4             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.05         | 600           |
| 0.5             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.10         | 600           |
| 0.6             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.10         | 600           |
| 0.7             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.10         | 600           |
| 0.8             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.10         | 600           |
| 0.9             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.10         | 600           |
| 1.0             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.15         | 600           |
| 1.1             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.15         | 600           |
| 1.2             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.15         | 600           |
| 1.3             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.20         | 600           |
| 1.4             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.20         | 600           |
| 1.5             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.25         | 600           |
| 1.6             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.25         | 600           |
| 1.7             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.30         | 500           |
| 1.8             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.30         | 500           |
| 1.9             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.30         | 500           |
| 2.0             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.30         | 500           |
| 2.1             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.30         | 500           |
| 2.2             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 500           |
| 2.3             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 500           |
| 2.4             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 450           |
| 2.5             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 450           |
| 2.6             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 450           |
| 2.7             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.35         | 450           |
| 2.8             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 450           |
| 2.9             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 450           |
| 3.0             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 400           |
| 3.1             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 400           |
| 3.2             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 400           |
| 3.3             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.50         | 400           |
| 3.4             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.80         | 350           |
| 3.5             | ±0.1, 0.2, 0.3nH               | 10 / 500MHz         | 6              | 0.80         | 350           |
| 3.6             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.80         | 350           |
| 3.7             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.80         | 350           |
| 3.8             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.80         | 350           |
| 3.9             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.80         | 350           |
| 4.0             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.80         | 350           |
| 4.4             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.50         | 300           |
| 4.7             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.50         | 300           |
| 4.9             | ±0.1, 0.2, 0.3nH/±3, ±5%       | 10 / 500MHz         | 6              | 0.60         | 300           |
| 5.6             | ±2, ±3,±5%                     | 10 / 500MHz         | 6              | 0.60         | 250           |
| 6.1             | ±2, ±3,±5%                     | 10 / 500MHz         | 5.5            | 0.70         | 250           |
| 6.8             | ±2, ±3,±5%                     | 10 / 500MHz         | 5              | 0.75         | 250           |
| 7.4             | ±2, ±3,±5%                     | 10 / 500MHz         | 5              | 0.80         | 200           |
| 8.2             | ±2, ±3,±5%                     | 10 / 500MHz         | 4.5            | 0.90         | 200           |
| 9.1             | ±2, ±3,±5%                     | 10 / 500MHz         | 4              | 1.05         | 175           |
| 9.2             | ±2, ±3,±5%                     | 10 / 500MHz         | 4              | 1.15         | 150           |
| 10              | ±2, ±3,±5%                     | 10 / 500MHz         | 3.5            | 1.30         | 150           |

Operating Temperature Range: -40°C to +85°C

Test Equipment: HP4287A+Agilent 16196C

AL01-02 Chip Inductors / High Q Type

| Inductance (nH) | Inductance Tolerance (nH or %) | Quality Factor min. | SRF (GHz) min. | DCR ( $\Omega$ ) max. | IDC (mA) max. |
|-----------------|--------------------------------|---------------------|----------------|-----------------------|---------------|
| 0.1             | $\pm 0.1$ nH                   | 14 / 500MHz         | 10             | 0.05                  | 850           |
| 0.2             | $\pm 0.1, 0.2$ nH              | 14 / 500MHz         | 10             | 0.05                  | 800           |
| 0.3             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 10             | 0.05                  | 800           |
| 0.4             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 10             | 0.05                  | 750           |
| 0.5             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 10             | 0.10                  | 750           |
| 0.6             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 9              | 0.10                  | 750           |
| 0.7             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 9              | 0.10                  | 600           |
| 0.8             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 9              | 0.10                  | 600           |
| 0.9             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 9              | 0.10                  | 600           |
| 1.0             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 9              | 0.15                  | 600           |
| 1.1             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.2             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.3             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.4             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.5             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.6             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.15                  | 600           |
| 1.7             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.2                   | 500           |
| 1.8             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.2                   | 500           |
| 1.9             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.2                   | 500           |
| 2.0             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 8              | 0.2                   | 500           |
| 2.1             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.2                   | 500           |
| 2.2             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.2                   | 500           |
| 2.3             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.2                   | 500           |
| 2.4             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 2.5             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 2.6             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 2.7             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 2.8             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 2.9             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.25                  | 450           |
| 3.0             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7.5            | 0.3                   | 400           |
| 3.1             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.3                   | 400           |
| 3.2             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.3                   | 400           |
| 3.3             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.3                   | 400           |
| 3.4             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.4                   | 350           |
| 3.5             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.4                   | 350           |
| 3.6             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.4                   | 350           |
| 3.7             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 7              | 0.4                   | 350           |
| 3.8             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6.5            | 0.4                   | 350           |
| 3.9             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6.5            | 0.4                   | 350           |
| 4.0             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6.5            | 0.4                   | 350           |
| 4.4             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6.5            | 0.5                   | 300           |
| 4.7             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6              | 0.5                   | 300           |
| 4.9             | $\pm 0.1, 0.2, 0.3$ nH         | 14 / 500MHz         | 6              | 0.6                   | 300           |
| 5.6             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 6              | 0.6                   | 250           |
| 6.1             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 5.5            | 0.7                   | 250           |
| 6.8             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 5              | 0.75                  | 250           |
| 7.4             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 5              | 0.8                   | 200           |
| 8.2             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 4.5            | 0.9                   | 200           |
| 9.1             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 4              | 1.05                  | 175           |
| 9.2             | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 4              | 1.15                  | 150           |
| 10              | $\pm 2, \pm 5\%$               | 14 / 500MHz         | 3.5            | 1.3                   | 150           |

Operating Temperature Range: -40°C to +85°C

Test Equipment: HP4287A+Agilent 16196B

## AL02 Chip Inductors / Standard Type

| Inductance (nH) | Inductance Tolerance (nH or %) | Quality Factor min. | SRF (GHz) min. | DCR ( $\Omega$ ) max. | IDC (mA) max. |
|-----------------|--------------------------------|---------------------|----------------|-----------------------|---------------|
| 0.2             | $\pm 0.1, 0.2\text{nH}$        | 13 / 500MHz         | 14             | 0.10                  | 800           |
| 0.3             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.10                  | 800           |
| 0.4             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.10                  | 800           |
| 0.5             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.15                  | 700           |
| 0.6             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.15                  | 700           |
| 0.8             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.15                  | 700           |
| 0.9             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 14             | 0.15                  | 700           |
| 1.0             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 12             | 0.15                  | 700           |
| 1.1             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 12             | 0.15                  | 700           |
| 1.2             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 12             | 0.15                  | 700           |
| 1.3             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 700           |
| 1.4             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 700           |
| 1.5             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 700           |
| 1.6             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 560           |
| 1.7             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 560           |
| 1.8             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 10             | 0.25                  | 560           |
| 1.9             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 560           |
| 2.0             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 560           |
| 2.1             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.2             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.3             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.4             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.5             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.6             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.7             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 8              | 0.35                  | 440           |
| 2.8             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 2.9             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 3.0             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 3.1             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 3.2             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 3.3             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.45                  | 380           |
| 3.4             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 380           |
| 3.5             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 380           |
| 3.6             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 380           |
| 3.7             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 340           |
| 3.8             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 340           |
| 3.9             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.55                  | 340           |
| 4.3             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.65                  | 320           |
| 4.7             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.65                  | 320           |
| 5.4             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.85                  | 280           |
| 5.6             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.85                  | 280           |
| 5.9             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 0.85                  | 280           |
| 6.5             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 1.05                  | 260           |
| 6.8             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 1.05                  | 260           |
| 7.2             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 6              | 1.05                  | 260           |
| 8.0             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 5.5            | 1.25                  | 220           |
| 8.1             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 5.5            | 1.25                  | 220           |
| 8.2             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 5.5            | 1.25                  | 220           |
| 9.1             | $\pm 0.1, 0.2, 0.3\text{nH}$   | 13 / 500MHz         | 5.5            | 1.25                  | 220           |
| 10.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 4.5            | 1.35                  | 200           |
| 10.8            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 4.5            | 1.35                  | 200           |
| 12.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 3.7            | 1.55                  | 180           |
| 13.8            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 3.7            | 1.75                  | 180           |
| 15.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 3.3            | 1.75                  | 130           |
| 17.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 3.1            | 1.95                  | 100           |
| 18.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 3.1            | 2.15                  | 100           |
| 20.8            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 2.8            | 2.55                  | 90            |
| 22.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 2.8            | 2.65                  | 90            |
| 27.0            | $\pm 1, 2, 3, 5\%$             | 13 / 500MHz         | 2.5            | 3.25                  | 75            |
| 33.0            | $\pm 5\%$                      | 13 / 500MHz         | 2.5            | 4.50                  | 75            |

Operating Temperature Range: -40°C to +85°C

Test Equipment: HP4287A+Agilent 16196B

AL02-02 Chip Inductors / High Q Type

| Inductance (nH) | Inductance Tolerance (nH or %) | Quality Factor min. | SRF (GHz) min. | DCR (Ω) max. | IDC (mA) max. |
|-----------------|--------------------------------|---------------------|----------------|--------------|---------------|
| 0.2             | ±0.1, 0.2nH                    | 16 / 500MHz         | 14             | 0.1          | 1000          |
| 0.3             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.1          | 1000          |
| 0.4             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.1          | 1000          |
| 0.5             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.12         | 850           |
| 0.6             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.12         | 850           |
| 0.7             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.12         | 850           |
| 0.8             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.12         | 850           |
| 0.9             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 14             | 0.12         | 850           |
| 1.0             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 12             | 0.12         | 850           |
| 1.1             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 12             | 0.12         | 850           |
| 1.2             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 12             | 0.12         | 850           |
| 1.3             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 850           |
| 1.4             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 850           |
| 1.5             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 850           |
| 1.6             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 675           |
| 1.7             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 675           |
| 1.8             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 10             | 0.2          | 675           |
| 1.9             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 675           |
| 2.0             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 675           |
| 2.1             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.2             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.3             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.4             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.5             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.6             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.7             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 8              | 0.28         | 530           |
| 2.8             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 2.9             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 3.0             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 3.1             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 3.2             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 3.3             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.35         | 460           |
| 3.4             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 460           |
| 3.5             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 460           |
| 3.6             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 460           |
| 3.7             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 410           |
| 3.8             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 410           |
| 3.9             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.45         | 410           |
| 4.3             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.55         | 350           |
| 4.7             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.55         | 350           |
| 5.4             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.7          | 310           |
| 5.6             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.7          | 310           |
| 5.9             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.7          | 310           |
| 6.5             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.9          | 290           |
| 6.8             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.9          | 290           |
| 7.2             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 6              | 0.9          | 290           |
| 8.0             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 5.5            | 1.0          | 245           |
| 8.1             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 5.5            | 1.0          | 245           |
| 8.2             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 5.5            | 1.0          | 245           |
| 9.1             | ±0.1, 0.2, 0.3nH               | 16 / 500MHz         | 5.5            | 1.0          | 245           |
| 10              | ±1, 2, 3, 5%                   | 16 / 500MHz         | 4.5            | 1.1          | 220           |

Operating Temperature Range: -40°C to +85°C

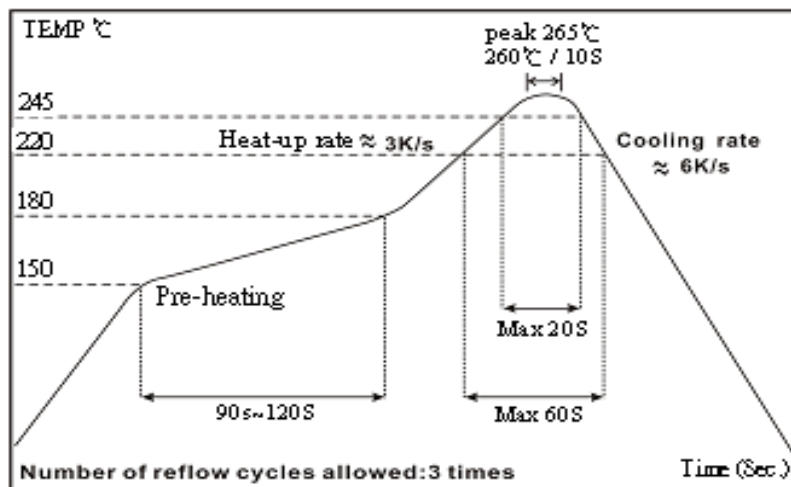
Test Equipment: HP4287A+Agilent 16196B

**■ Environmental Characteristics**

| Item                         | Requirement          | Test Method   |
|------------------------------|----------------------|---|
| Inductance                   | As Spec.             | Measuring equipment and fixture:<br>0201: HP4287+Agilent 16196C<br>0402: HP4287+Agilent 16196B                              |
| Insulation Resistance        | >1000MΩ              | <b>MIL-STD-202 Method 302</b><br>Apply 100V <sub>DC</sub> for 1minute   |
| Damp Heat with Load          | $\Delta L \leq 10\%$ | <b>MIL-STD-202 Method 103B</b><br>40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Bending Strength             | As Spec.             | <b>JIS-C-5201-1 4.33</b><br>Bending Amplitude 3mm for 10 seconds  |
| Solderability                | 95% min. coverage    | <b>MIL-STD-202 Method 208H</b><br>245±5°C for 3 seconds   |
| Resistance to Soldering Heat | $\Delta L \leq 10\%$ | <b>MIL-STD-202 Method 210E</b><br>260±5°C for 10 seconds  |
| Dielectric Withstand Voltage | >100V                | <b>MIL-STD-202 Method 301</b><br>Apply 100VA (rms) for 1minute  |
| High Temperature Exposure    | $\Delta L \leq 10\%$ | <b>JIS-C-5201-1 7.2</b><br>85±2°C, 1000 +48/-0 hours  |
| Low Temperature Storage      | $\Delta L \leq 10\%$ | <b>JIS-C-5201-1 7.1</b><br>-40±3°C, 1000 +48/-0 hours   |
| Temperature Cycle            | $\Delta L \leq 10\%$ | <b>JIS-C-5201-1 7.4</b><br>-40/RT/85/RT, 10 cycles  |

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

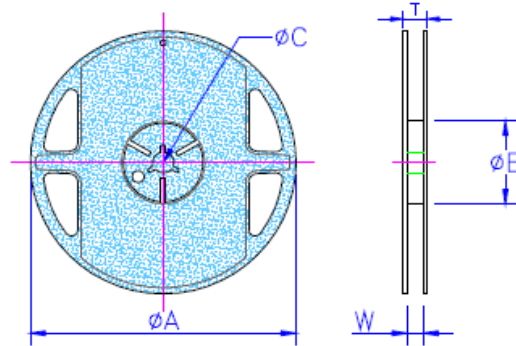
**■ Reflow**





**■ Packaging**

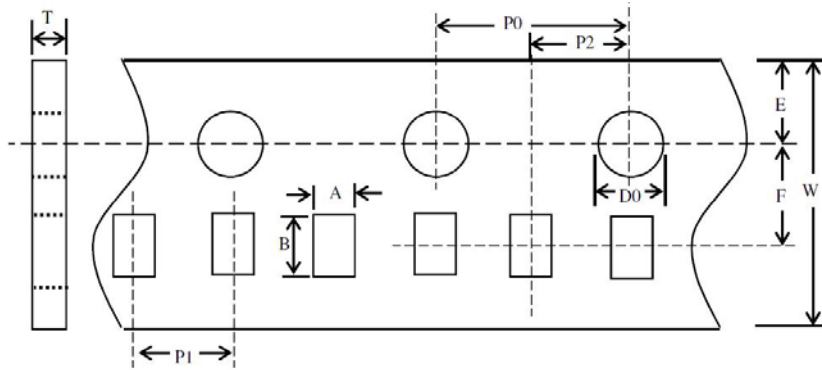
Reel Specifications & Packaging Quantity



Unit: mm

| Type | $\psi A$ | $\psi B$ | $\psi C$  | W       | T        | Quantity (EA) |
|------|----------|----------|-----------|---------|----------|---------------|
| AL01 | 178±1.0  | 60.0±1.0 | 13.5±0.70 | 9.5±1.0 | 11.5±1.0 | 10,000        |
| AL02 | 178±1.0  | 60.0±1.0 | 13.5±0.70 | 9.5±1.0 | 11.5±1.0 | 10,000        |

Paper Tape Specifications



Unit: mm

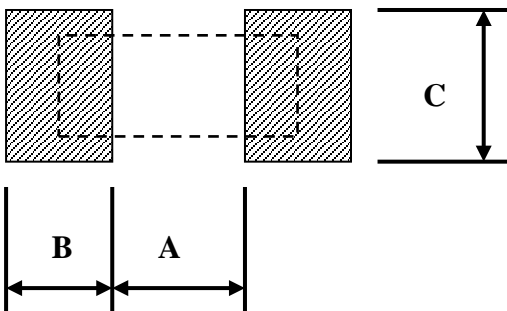
| Type | A         | B         | W         | E         | F         | P0        | P1        | P2        | $\psi D0$ | T         |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| AL01 | 0.40±0.05 | 0.70±0.05 | 8.00±0.10 | 1.75±0.05 | 3.50±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.55±0.03 | 0.42±0.02 |
| AL02 | 0.70±0.05 | 1.16±0.05 | 8.00±0.10 | 1.75±0.05 | 3.50±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.55±0.05 | 0.43±0.03 |

Remark : Test Method

Test direction : bar mark faces left

**■ Recommend Land Pattern**

Unit: mm



| Type | A    | B    | C        |
|------|------|------|----------|
| AL01 | 0.30 | 0.25 | 0.30±0.2 |
| AL02 | 0.50 | 0.45 | 0.60±0.2 |

**REVISION HISTORY**

| <b>REVISION</b> | <b>DATE</b>   | <b>CHANGE NOTIFICATION</b> | <b>DESCRIPTION</b>   |
|-----------------|---------------|----------------------------|--|
| Version C2      | Feb. 27,2013  | -                          | - Add AL01-02 (High Q) specification<br>- Delete AL0603 series specification   |
| Version C3      | May 07,2015   | -                          | - Modify SRF specifications of AL01-02 Type<br>(from 6.0 to 6.5~10).<br>- Add 4.4~10nH specifications of AL01-01<br>and AL01-02 Types. |
| Version C4      | Jun. 02,2015  | -                          | - Add AL02-02 Chip Inductors / High Q Type<br>specification.   |
| Version C5      | Aug. 20,2015  | -                          | - Note Operating Temperature Range and<br>Test Equipment.<br>- Correct the Inductance Tolerance for<br>AL01-02 5.6~10 nH.              |
| Version C6      | May. 02, 2016 | -                          | - Modify Storage Temperature.<br>- Remove Material Description.  |
| Version C7      | Apr.05, 2017  | -                          | - Modify Inductance Tolerance(nH or %).<br>- Modify Paper Tape Specifications.   |
| Version C8      | Nov.11, 2017  | -                          | - Correct the reference standard in<br>Environmental Characteristics.  |