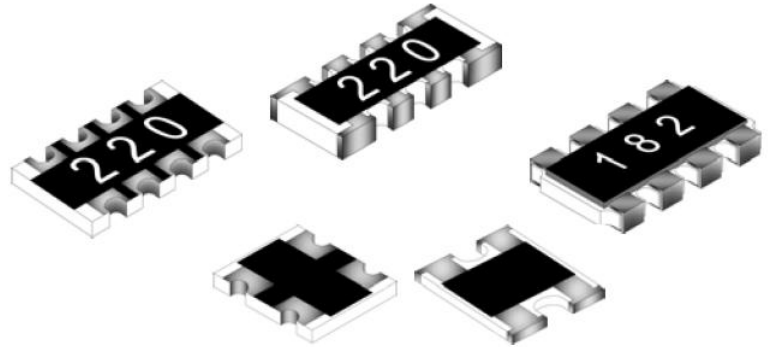


# FCN series Thick Film Chip Resistor Array

## ◆ Features

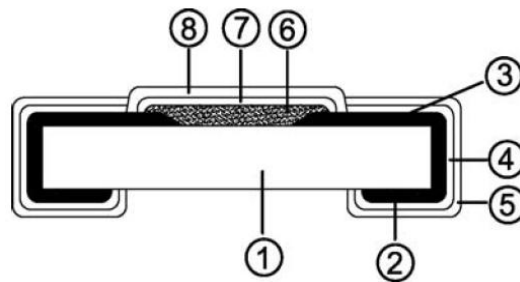
- » Small size and light weight
- » High reliability and stability
- » Comply with RoHS



## ◆ Applications

- » Computer application, NB, MB, add-on card, hard disk
- » Mobile phone, Telecom
- » Consumer electrical equipment, PDAs, Digital Camcorder

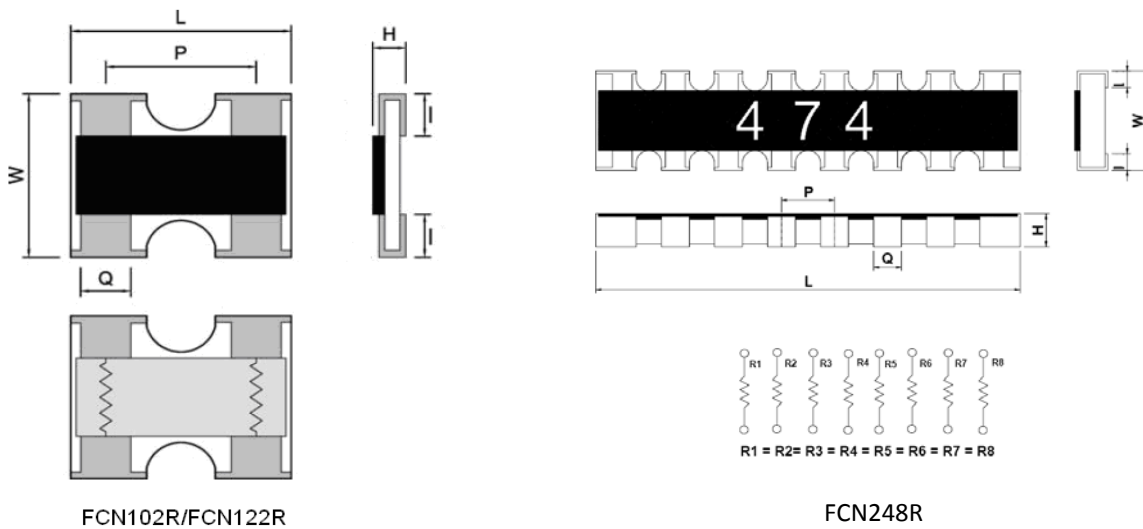
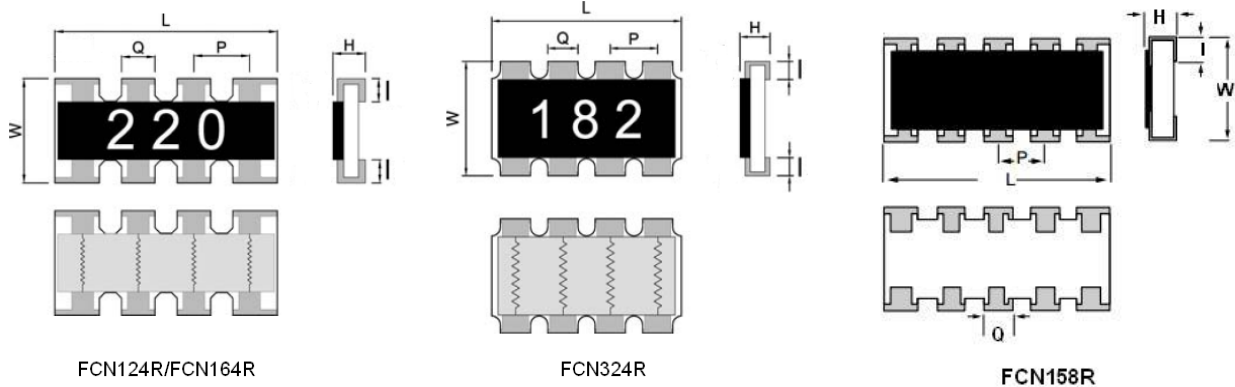
## ◆ Configuration



|   |                       |   |                                    |
|---|-----------------------|---|------------------------------------|
| 1 | Alumina Substrate     | 5 | External Electrode (Sn)            |
| 2 | Bottom Electrode (Ag) | 6 | Resistor Layer (RuO <sub>2</sub> ) |
| 3 | Top Electrode (Ag/Pd) | 7 | Primary Overcoat (Glass)           |
| 4 | Barrier Layer (Ni)    | 8 | Secondary Overcoat (Epoxy)         |

## ◆ Dimension

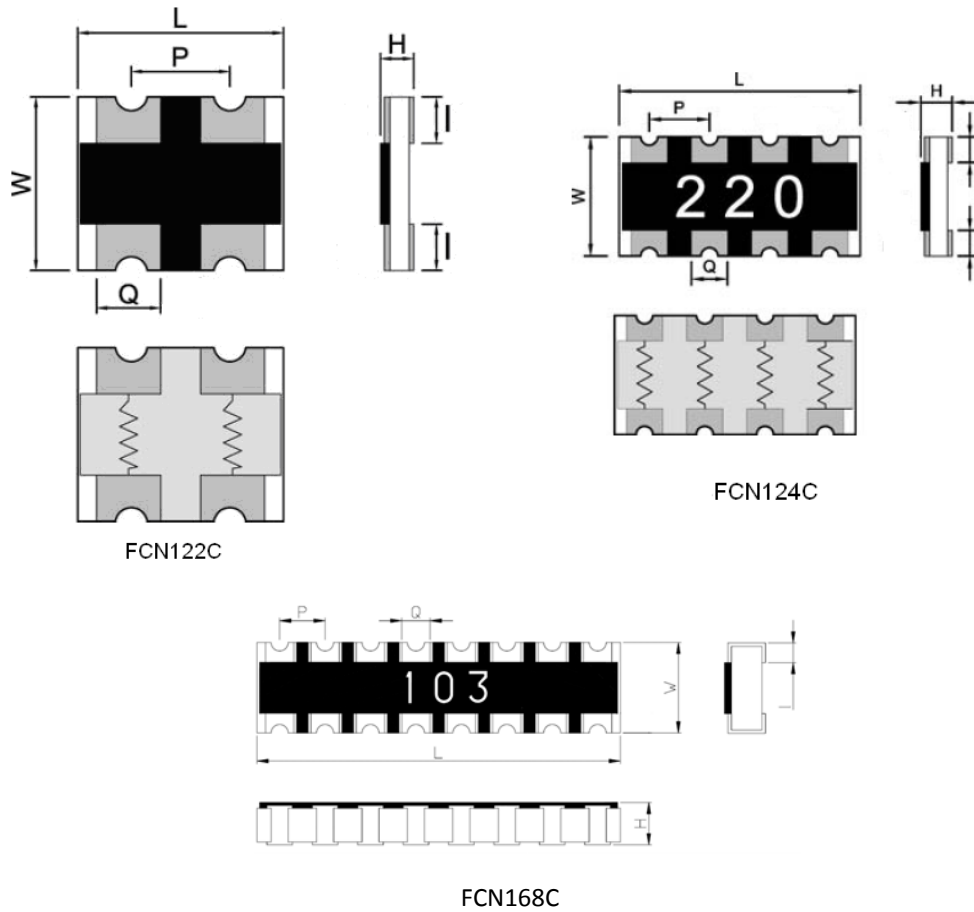
### » Convex



| TYPE    | L         | W         | H         | I         | P         | Unit: mm  |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|
|         |           |           |           |           |           | Q         |
| FCN102R | 0.80±0.10 | 0.60±0.10 | 0.30±0.05 | 0.15±0.05 | 0.50±0.10 | 0.35±0.10 |
| FCN104R | 1.40±0.10 | 0.60±0.10 | 0.35±0.10 | 0.15±0.05 | 0.40±0.10 | 0.35±0.10 |
| FCN122R | 1.00±0.10 | 1.00±0.10 | 0.32±0.10 | 0.25±0.10 | 0.67±0.10 | 0.34±0.15 |
| FCN124R | 2.00±0.10 | 1.00±0.10 | 0.40±0.10 | 0.22±0.15 | 0.50±0.10 | 0.30±0.10 |
| FCN248R | 4.00±0.20 | 1.60±0.10 | 0.40±0.10 | 0.30±0.10 | 0.50±0.10 | 0.25±0.10 |
| FCN158R | 3.20±0.20 | 1.60±0.15 | 0.60±0.10 | 0.35±0.15 | 0.64±0.05 | 0.35±0.05 |
| FCN162R | 1.60±0.15 | 1.60±0.15 | 0.45±0.10 | 0.30±0.15 | 0.80±0.20 | 0.60±0.10 |
| FCN164R | 3.20±0.20 | 1.60±0.15 | 0.50±0.10 | 0.30±0.20 | 0.80±0.20 | 0.50±0.15 |
| FCN324R | 5.10±0.20 | 3.10±0.20 | 0.55±0.15 | 0.55±0.15 | 1.30±0.20 | 0.90±0.10 |

## ◆ Dimension

### » Concave



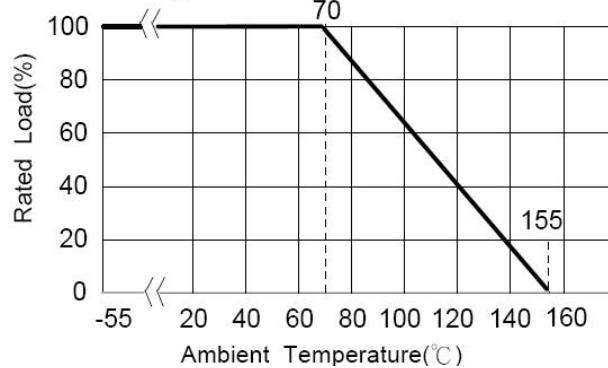
Unit:mm

| TYPE    | L         | W         | H         | I         | P         | Q         |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| FCN122C | 1.00±0.10 | 1.00±0.10 | 0.30±0.10 | 0.25±0.15 | 0.50±0.10 | 0.30±0.15 |
| FCN124C | 2.00±0.10 | 1.00±0.10 | 0.40±0.10 | 0.22±0.15 | 0.50±0.10 | 0.34±0.15 |
| FCN162C | 1.60±0.15 | 1.60±0.15 | 0.55±0.10 | 0.40±0.15 | 0.80±0.10 | 0.50±0.10 |
| FCN164C | 3.20±0.15 | 1.60±0.15 | 0.55±0.10 | 0.45±0.15 | 0.80±0.10 | 0.50±0.10 |
| FCN168C | 6.40±0.20 | 1.60±0.20 | 0.55±0.10 | 0.40±0.15 | 0.80±0.10 | 0.50±0.10 |

## ◆ Power Derating Curve

Operating Temperature Range : - 55~155 °C

For resistors operated in ambient temperatures above 70 °C , power rating shall be derated in accordance with figure below.



## ◆ Rating

### » Convex

| TYPE    | Power Rating At 70°C (W) | Max Working Voltage | Max Overload Voltage | TCR (ppm/°C)<br>Lower available | Resistance Range |                 |                 |
|---------|--------------------------|---------------------|----------------------|---------------------------------|------------------|-----------------|-----------------|
|         |                          |                     |                      |                                 | 0.5%             | 1%              | 5%              |
| FCN102R | 1/32W<br>(0.031W)        | 12.5V               | 25V                  | ±500                            | ---              | ---             | 3Ω ≤ R < 10Ω    |
|         |                          |                     |                      | ±300                            | ---              | ---             | 10Ω ≤ R < 1K Ω  |
|         |                          |                     |                      | ±200                            | ---              | ---             | 1K Ω ≤ R ≤ 1M Ω |
| FCN104R | 1/32W<br>(0.031W)        | 12.5V               | 25V                  | ±200                            | ---              | 10R ≤ R ≤ 1MΩ   | 10R ≤ R ≤ 1MΩ   |
| FCN158R | 1/16W<br>(0.063W)        |                     |                      | ±200                            | ---              | ---             | 10Ω ≤ R < 100KΩ |
| FCN122R | 1/16 W<br>(0.063W)       |                     |                      | ±400                            | ---              | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω    |
|         |                          |                     |                      | ±200                            | ---              | 10Ω ≤ R ≤ 1M Ω  | 10Ω ≤ R ≤ 1M Ω  |
| FCN124R | 1/16 W<br>(0.063W)       | 25V                 | 50V                  | ±400                            | ---              | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω    |
|         |                          |                     |                      | ±200                            | ---              | 10Ω ≤ R ≤ 1M Ω  | 10Ω ≤ R ≤ 1M Ω  |
| FCN248R | 1/16 W<br>(0.063W)       | 25V                 | 50V                  | ±250                            | ---              | 10Ω ≤ R ≤ 1M Ω  | 1Ω ≤ R ≤ 1M Ω   |
| FCN162R | 1/16 W<br>(0.063W)       | 50V                 | 100V                 | ±200                            | ---              | 10Ω ≤ R ≤ 1M Ω  | 1Ω ≤ R ≤ 10M Ω  |
| FCN164R | 1/16 W<br>(0.063W)       | 50V                 | 100V                 | 0~+400                          | ---              | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω    |
|         |                          |                     |                      | ±200                            | 22Ω ≤ R < 470K Ω | 10Ω ≤ R < 10M Ω | 10Ω ≤ R < 10M Ω |
| FCN324R | 1/4 W<br>(0.25W)         | 200V                | 400V                 | 0~+400                          | ---              | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω    |
|         |                          |                     |                      | ±200                            | ---              | 10Ω ≤ R < 1M Ω  | 10Ω ≤ R < 1M Ω  |

| TYPE                 | FCN102R | FCN104R | FCN122R | FCN124R | FCN128R | FCN162R | FCN164R | FCN248R | FCN324R |
|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Jumper Rated Current | 0.5A    |         |         | 1A      |         |         |         |         | 2A      |

## ◆ Rating

### » Concave

| TYPE    | Power Rating At 70°C(W) | Max Working Voltage | Max Overload Voltage | TCR (ppm/°C)<br>Lower available | Resistance Range                |                                 |
|---------|-------------------------|---------------------|----------------------|---------------------------------|---------------------------------|---------------------------------|
|         |                         |                     |                      |                                 | 1%                              | 5%                              |
| FCN122C | 1/16 W<br>(0.063W)      | 25V                 | 50V                  | ±650                            | $3\Omega \leq R < 10\Omega$     | $3\Omega \leq R < 10\Omega$     |
|         |                         |                     |                      | ±250                            | $10\Omega \leq R \leq 1M\Omega$ | $10\Omega \leq R \leq 1M\Omega$ |
| FCN124C | 1/16 W<br>(0.063W)      | 25V                 | 50V                  | ±400                            | $1\Omega \leq R < 10\Omega$     | $1\Omega \leq R < 10\Omega$     |
|         |                         |                     |                      | ±200                            | $10\Omega \leq R \leq 1M\Omega$ | $10\Omega \leq R \leq 1M\Omega$ |
| FCN162C | 1/16 W<br>(0.063W)      | 50V                 | 100V                 | ±200                            | $1\Omega \leq R \leq 1M\Omega$  | $1\Omega \leq R \leq 10M\Omega$ |
| FCN164C | 1/16 W<br>(0.063W)      | 50V                 | 100V                 | ±200                            | $1\Omega \leq R \leq 1M\Omega$  | $1\Omega \leq R \leq 10M\Omega$ |
| FCN168C | 1/16 W<br>(0.063W)      | 50V                 | 100V                 | ±200                            | $1\Omega \leq R \leq 1M\Omega$  | $1\Omega \leq R \leq 10M\Omega$ |

| TYPE                 | FCN122C | FCN124C | FCN162C | FCN164C | FCN168C |
|----------------------|---------|---------|---------|---------|---------|
| Jumper Rated Current | 1A      |         |         |         |         |

**Note:** Lower TCR value and higher Power Rating are available for customer's requirement.

**Rated Voltage:** The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

$$E = \sqrt{R \times P}$$

E = Rated voltage (v)

P = power rating (w)

R = Nominal resistance(Ω)

◆ **Part Number**

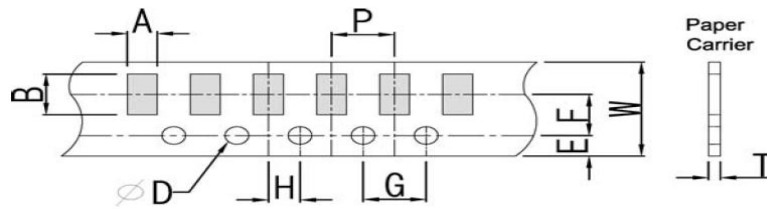
| FCN  | 164                   | R             | J         | 470R      | □         | □□                           |
|------|-----------------------|---------------|-----------|-----------|-----------|------------------------------|
| Type | Size                  | Terminal Type | Tolerance | R VALUE   | Reel Size | Package quantity             |
| FCN  | 102=0201x2<br>(4P2R)  | R=convex      | J=5%      | 10Ω =10R  | Blank =   | Standard Package<br>As below |
|      | 104=0201x4<br>(8P4R)  | C=concave     | F=1%      | 4.7Ω =4R7 | B= 13"    | 10 = 10K per reel            |
|      | 122=0402x2<br>(4P2R)  |               | D=0.5%    |           | C= 10"    | 20 = 20K per reel            |
|      | 124=0402x4<br>(8P4R)  |               |           |           |           | 08= 8K per reel              |
|      | 158=0612<br>(10P8R)   |               |           |           |           | 16= 16K per reel             |
|      | 248=0616<br>(16P8R)   |               |           |           |           |                              |
|      | 162=0603x2<br>(4P2R)  |               |           |           |           |                              |
|      | 164=0603x4<br>(8P4R)  |               |           |           |           |                              |
|      | 168=0603x8<br>(16P8R) |               |           |           |           |                              |
|      | 324=1206x4<br>(8P4R)  |               |           |           |           |                              |

» Standard Package Q'ty for each size is as following.

| TYPE   | Standard Package Q'ty |
|--------|-----------------------|
| FCN102 | 10K per reel (7")     |
| FCN104 | 10K per reel (7")     |
| FCN122 | 10K per reel (7")     |
| FCN158 | 5K per reel (7")      |
| FCN124 | 10K per reel (7")     |
| FCN248 | 5K per reel (7")      |
| FCN162 | 5K per reel (7")      |
| FCN164 | 5K per reel (7")      |
| FCN168 | 5K per reel (7")      |
| FCN324 | 5K per reel (11")     |

## ◆ Packing

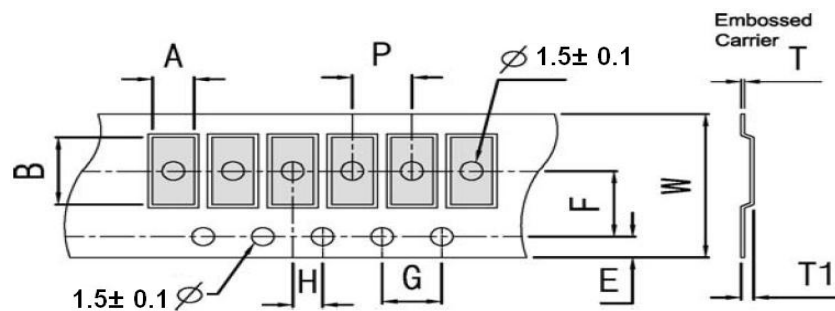
### Tape Dimension » Paper Carrier



Unit: mm

| TYPE    | A          | B          | W         | E         | F         | G         | H         | T         | $\phi D$ | P        |
|---------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|
| FCN102R | 0.70± 0.1  | 0.90± 0.1  | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.05 | 2.0± 0.05 | 0.45± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN104R | 0.70± 0.1  | 1.57± 0.05 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.05 | 2.0± 0.05 | 0.45± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN122R | 1.20± 0.15 | 1.20± 0.15 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.45± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN124R | 1.20± 0.10 | 2.20± 0.10 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.60± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN248R | 1.90± 0.20 | 4.30± 0.20 | 12.0± 0.2 | 1.75± 0.1 | 5.5± 0.05 | 4.0± 0.05 | 2.0± 0.05 | 0.60± 0.2 | 1.5± 0.1 | 4.0± 0.1 |
| FCN162R | 1.90± 0.10 | 1.90± 0.10 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.60± 0.2 | 1.5± 0.1 | 4.0± 0.1 |
| FCN164R | 1.90± 0.20 | 3.50± 0.20 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.75± 0.2 | 1.5± 0.1 | 4.0± 0.1 |
| FCN122C | 1.20± 0.15 | 1.20± 0.15 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.45± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN124C | 1.20± 0.10 | 2.20± 0.10 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.60± 0.2 | 1.5± 0.1 | 2.0± 0.1 |
| FCN162C | 1.90± 0.10 | 1.90± 0.10 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.75± 0.2 | 1.5± 0.1 | 4.0± 0.1 |
| FCN164C | 1.90± 0.20 | 3.50± 0.20 | 8.0± 0.2  | 1.75± 0.1 | 3.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.75± 0.2 | 1.5± 0.1 | 4.0± 0.1 |
| FCN168C | 2.00± 0.20 | 6.90± 0.20 | 12.0± 0.2 | 1.75± 0.1 | 5.5± 0.05 | 4.0± 0.10 | 2.0± 0.05 | 0.75± 0.2 | 1.5± 0.1 | 4.0± 0.1 |

### » Embossed Carrier

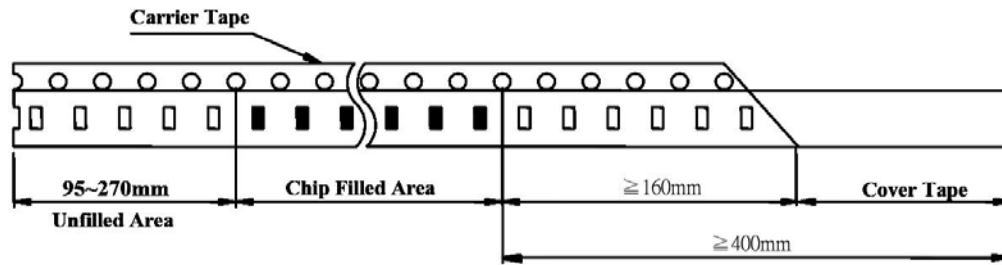


Unit: mm

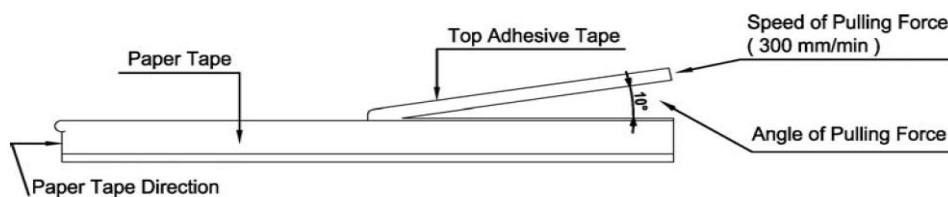
| TYPE    | A         | B         | W       | E         | F         | G        | H         | T         | T1         | P        |
|---------|-----------|-----------|---------|-----------|-----------|----------|-----------|-----------|------------|----------|
| FCN324R | 3.55± 0.2 | 5.55± 0.2 | 12± 0.1 | 1.75± 0.1 | 5.5± 0.05 | 4.0± 0.1 | 2.0± 0.05 | 0.25± 0.1 | 0.85± 0.15 | 8.0± 0.2 |

## ◆ Packing

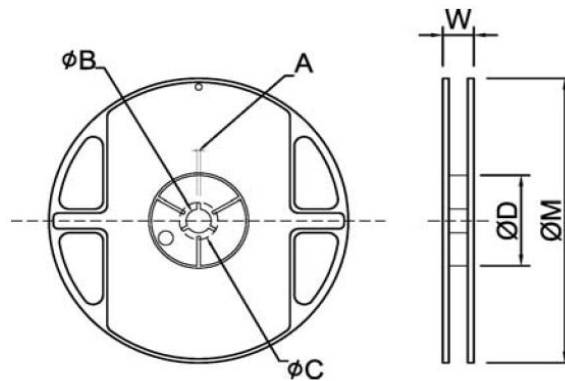
### Lead Dimensions



Top Adhesive Peel Off Strength : 10~70g



### Reel Dimensions



Unit: mm

| TYPE             | SIZE           | A       | φ B      | φ C    | φ D     | W        | φ M     |
|------------------|----------------|---------|----------|--------|---------|----------|---------|
| FCN102<br>FCN104 | 10K/Reel (7")  | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0  | 11.5±2.0 | 178±2.0 |
| FCN122<br>FCN124 | 10K/Reel (7")  | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0  | 11.5±2.0 | 178±2.0 |
| FCN248           | 5K/Reel (7")   | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0  | 11.5±2.0 | 178±2.0 |
| FCN162<br>FCN164 | 5K/Reel (7")   | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0  | 11.5±2.0 | 178±2.0 |
|                  | 10K/Reel (10") | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 100±1.0 | 11.5±2.0 | 254±2.0 |
|                  | 20K/Reel (13") | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 100±1.0 | 11.5±2.0 | 330±2.0 |
| FCN168           | 5K/Reel (7")   | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 80±1.0  | 13.8±0.5 | 178±2.0 |
| FCN324           | 5K/Reel (11")  | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0  | 16.0±2.0 | 278±2.0 |