

## Type CPF-A Series

### Key Features

AEC-Q200

Compliance

Advanced thin  
film technology

RoHS compliant

Special  
materials,  
design, and  
processing for  
high sulfur  
applications

Test proven  
immunity to  
humidity,  
moisture, and  
sulfur



TE Connectivity are pleased to introduce the sister of our CPF thin film chip resistor, the AEC-Q200 compliant CPF-A series. Supplied on tape and reel for ease of insertion, and available in 6 sizes / power ratings up to 0.5W

### Applications

Automotive

Medical

Testing /  
Measurement

Communication

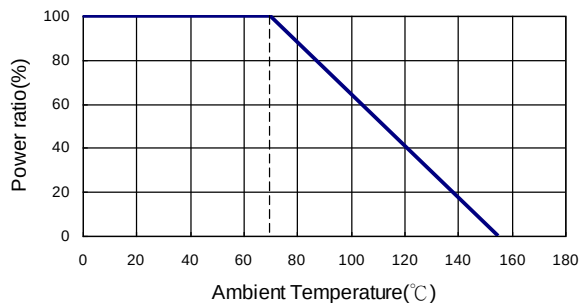
### Characteristics – Electrical

| Size | Power Rating<br>@70°C | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range |               |       |     | TCR<br>PPM/°C |
|------|-----------------------|-----------------------|------------------------|-----------------------|------------------|---------------|-------|-----|---------------|
|      |                       |                       |                        |                       | ±0.05%           | ±0.1%         | ±0.5% | ±1% |               |
| 0402 | 0.0625W               | -55 ~ +155°C          | 25V                    | 50V                   | 49.9Ω - 10KΩ     | 49.9Ω - 100KΩ |       |     | ±25<br>±50    |
| 0603 | 0.0625W               | -55 ~ +155°C          | 50V                    | 100V                  | 10Ω - 49.9KΩ     | 10Ω - 332KΩ   |       |     | ±25<br>±50    |
| 0805 | 0.1W                  | -55 ~ +155°C          | 100V                   | 200V                  | 10Ω - 100KΩ      | 10Ω - 1MΩ     |       |     | ±25<br>±50    |
| 1206 | 0.125W                | -55 ~ +155°C          | 150V                   | 300V                  | 10Ω - 200KΩ      | 10Ω - 1MΩ     |       |     | ±25<br>±50    |
| 2010 | 0.25W                 | -55 ~ +155°C          | 150V                   | 300V                  | 10Ω - 499KΩ      | 10Ω - 1MΩ     |       |     | ±25<br>±50    |
| 2512 | 0.5W                  | -55 ~ +155°C          | 150V                   | 300V                  | 10Ω - 499KΩ      | 10Ω - 1MΩ     |       |     | ±25<br>±50    |

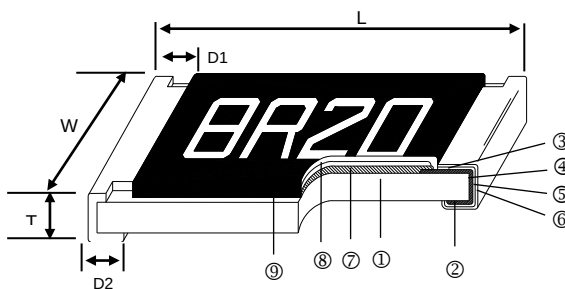
Operating Voltage= $\sqrt{P \cdot R}$  or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max. overload voltage listed above, whichever is lower

## Derating Curve



## Construction and dimensions

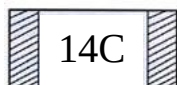


|                               |                           |                         |
|-------------------------------|---------------------------|-------------------------|
| ① Alumina Substrate           | ④ Edge Electrode (NiCr)   | ⑦ Resistor Layer (NiCr) |
| ② Bottom Electrode (Ag)       | ⑤ Barrier Layer (Ni)      | ⑧ Overcoat (Epoxy)      |
| ③ Top Electrode (Ag-Pd or Cu) | ⑥ External Electrode (Sn) | ⑨ Marking               |

| Size | L         | W         | T         | D1        | D2        | Weight<br>(g)<br>(1000pcs) |
|------|-----------|-----------|-----------|-----------|-----------|----------------------------|
| 0402 | 1.00±0.05 | 0.50±0.05 | 0.30±0.05 | 0.20±0.10 | 0.20±0.10 | 0.54                       |
| 0603 | 1.55±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 1.83                       |
| 0805 | 2.00±0.15 | 1.25±0.15 | 0.55±0.10 | 0.30±0.20 | 0.40±0.20 | 4.71                       |
| 1206 | 3.05±0.15 | 1.55±0.15 | 0.55±0.10 | 0.42±0.20 | 0.35±0.25 | 9.02                       |
| 2010 | 4.90±0.15 | 2.40±0.15 | 0.55±0.10 | 0.60±0.30 | 0.50±0.25 | 23.61                      |
| 2512 | 6.30±0.15 | 3.10±0.15 | 0.55±0.10 | 0.60±0.30 | 0.50±0.25 | 38.06                      |

## Marking:

0603 3digit marking for E96



3digit marking for Example: 14C=13K7Ω 13C=13K3Ω

## Marking Table

| Code       | E96             |                 | Code            | E96             |                 | Code            | E96             |                 | Code             | E96              |                  |   |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|---|
| 01         | 100             |                 | 25              | 178             |                 | 49              | 316             |                 | 73               | 562              |                  |   |
| 02         | 102             |                 | 26              | 182             |                 | 50              | 324             |                 | 74               | 576              |                  |   |
| 03         | 105             |                 | 27              | 187             |                 | 51              | 332             |                 | 75               | 590              |                  |   |
| 04         | 107             |                 | 28              | 191             |                 | 52              | 340             |                 | 76               | 604              |                  |   |
| 05         | 110             |                 | 29              | 196             |                 | 53              | 348             |                 | 77               | 619              |                  |   |
| 06         | 113             |                 | 30              | 200             |                 | 54              | 357             |                 | 78               | 634              |                  |   |
| 07         | 115             |                 | 31              | 205             |                 | 55              | 365             |                 | 79               | 649              |                  |   |
| 08         | 118             |                 | 32              | 210             |                 | 56              | 374             |                 | 80               | 665              |                  |   |
| 09         | 121             |                 | 33              | 215             |                 | 57              | 383             |                 | 81               | 681              |                  |   |
| 10         | 124             |                 | 34              | 221             |                 | 58              | 392             |                 | 82               | 698              |                  |   |
| 11         | 127             |                 | 35              | 226             |                 | 59              | 402             |                 | 83               | 715              |                  |   |
| 12         | 130             |                 | 36              | 232             |                 | 60              | 412             |                 | 84               | 732              |                  |   |
| 13         | 133             |                 | 37              | 237             |                 | 61              | 422             |                 | 85               | 750              |                  |   |
| 14         | 137             |                 | 38              | 243             |                 | 62              | 432             |                 | 86               | 768              |                  |   |
| 15         | 140             |                 | 39              | 249             |                 | 63              | 442             |                 | 87               | 787              |                  |   |
| 16         | 143             |                 | 40              | 255             |                 | 64              | 453             |                 | 88               | 806              |                  |   |
| 17         | 147             |                 | 41              | 261             |                 | 65              | 464             |                 | 89               | 825              |                  |   |
| 18         | 150             |                 | 42              | 267             |                 | 66              | 475             |                 | 90               | 845              |                  |   |
| 19         | 154             |                 | 43              | 274             |                 | 67              | 487             |                 | 91               | 866              |                  |   |
| 20         | 158             |                 | 44              | 280             |                 | 68              | 499             |                 | 92               | 887              |                  |   |
| 21         | 162             |                 | 45              | 287             |                 | 69              | 511             |                 | 93               | 909              |                  |   |
| 22         | 165             |                 | 46              | 294             |                 | 70              | 523             |                 | 94               | 931              |                  |   |
| 23         | 169             |                 | 47              | 301             |                 | 71              | 536             |                 | 95               | 953              |                  |   |
| 24         | 174             |                 | 48              | 309             |                 | 72              | 549             |                 | 96               | 976              |                  |   |
| Code       | A               |                 | B               | C               | D               | E               | F               | G               | H                | X                | Y                | Z |
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>7</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> | 10 <sup>-3</sup> |   |

0603 3digit marking for E24

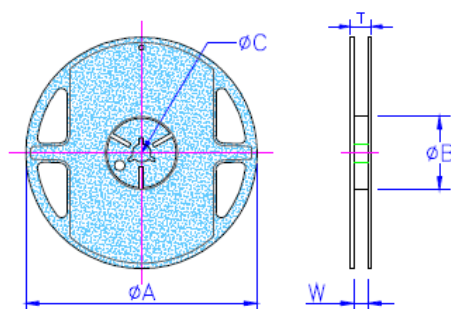
Example: 101=100Ω 102=1KΩ

|     |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| E24 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
|     | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 92 | 91 |

0805~2512 4digit marking

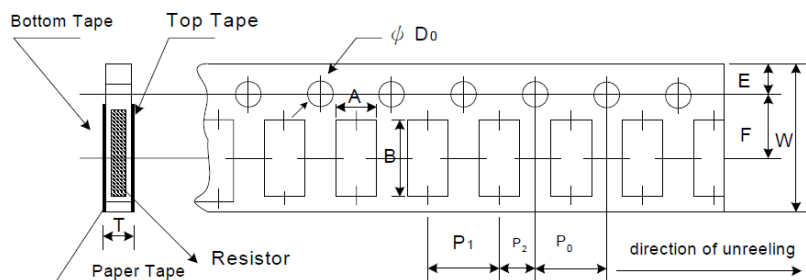
| Resistance | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
|------------|------|-------|------|--------|-------|
| marking    | 1000 | 2201  | 1002 | 4992   | 1003  |

## Packaging Quantity and reel specifications



| Type | ØA        | ØB       | ØC       | W        | T        | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|------|-----------|----------|----------|----------|----------|-----------------|--------------------------|
| 0402 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 1,000 / 5,000   | -                        |
| 0603 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 1,000 / 5,000   | -                        |
| 0805 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 1,000 / 5,000   | -                        |
| 1206 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 1,000 / 5,000   | -                        |
| 2010 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 13.5±1.0 | 15.5±1.0 | -               | 4,000                    |
| 2512 | 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

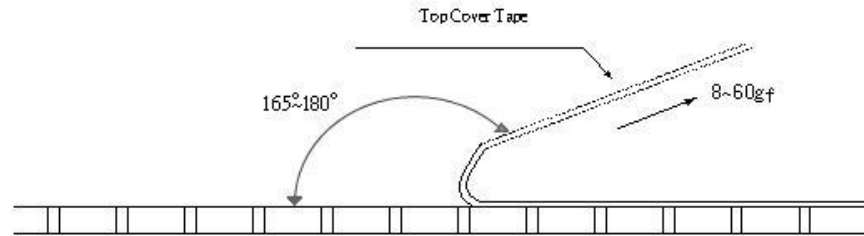


| Type | A         | B        | W         | E         | F        | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | ΦD <sub>0</sub> | T         |
|------|-----------|----------|-----------|-----------|----------|----------------|----------------|----------------|-----------------|-----------|
| 0402 | 0.70±0.05 | 1.16±0.0 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10      | 2.00±0.05      | 2.00±0.05      | 1.55±0.05       | 0.40±0.03 |
| 0603 | 1.10±0.05 | 1.90±0.0 | 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       | 0.60±0.03 |
| 0805 | 1.60±0.05 | 2.37±0.0 | 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 |
| 1206 | 2.00±0.05 | 3.55±0.0 | 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 |

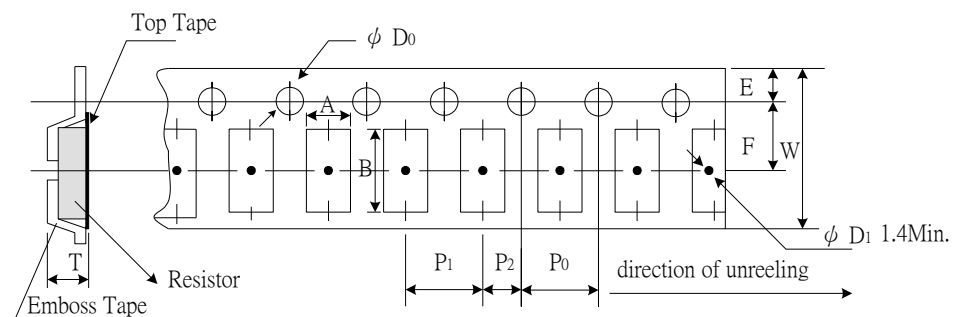
## Peel force of top cover tape

The peel speed shall be about 300mm/min $\pm$ 5%

The peel force of top cover tape shall be between 8gf to 60gf



## Embossed Plastic Tape Specifications

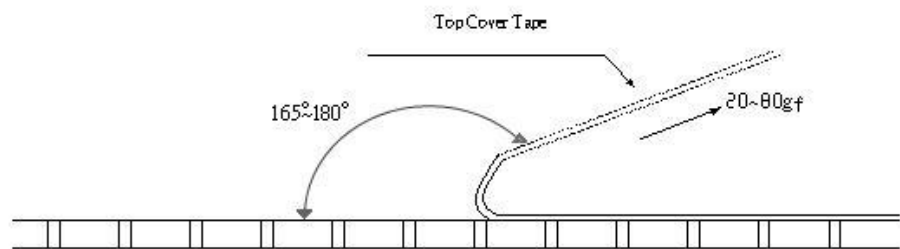


| Type | A               | B               | W               | E               | F              | P <sub>0</sub>  | P <sub>1</sub>  | P <sub>2</sub>  | ØD <sub>0</sub> | T               |
|------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 2010 | 2.85 $\pm$ 0.10 | 5.45 $\pm$ 0.10 | 12.0 $\pm$ 0.10 | 1.75 $\pm$ 0.10 | 5.5 $\pm$ 0.05 | 4.00 $\pm$ 0.05 | 4.00 $\pm$ 0.10 | 2.00 $\pm$ 0.05 | 1.50 $\pm$ 0.10 | 1.00 $\pm$ 0.20 |
| 2512 | 3.40 $\pm$ 0.10 | 6.65 $\pm$ 0.10 | 12.0 $\pm$ 0.10 | 1.75 $\pm$ 0.10 | 5.5 $\pm$ 0.05 | 4.00 $\pm$ 0.05 | 4.00 $\pm$ 0.10 | 2.00 $\pm$ 0.05 | 1.50 $\pm$ 0.10 | 1.00 $\pm$ 0.20 |

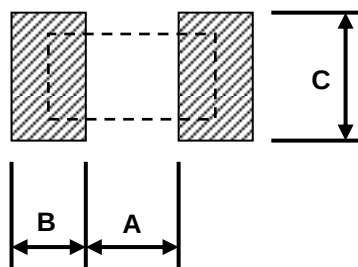
## Peel force of top cover tape

The peel speed shall be about 300mm/min $\pm$ 5%

The peel force of top cover tape shall be between 20gf to 80g

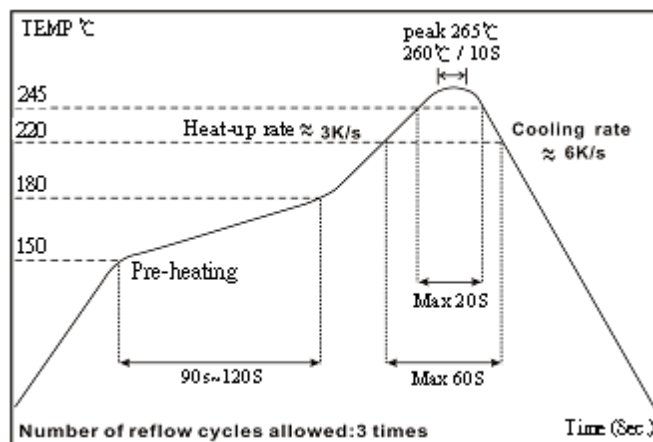


### Recommended Land Pattern



| Type | A    | B    | C        |
|------|------|------|----------|
| 0402 | 0.50 | 0.50 | 0.60±0.2 |
| 0603 | 0.80 | 1.00 | 0.90±0.2 |
| AR05 | 1.00 | 1.00 | 1.35±0.2 |
| AR06 | 2.00 | 1.15 | 1.70±0.2 |
| AR13 | 2.00 | 1.15 | 2.50±0.2 |
| AR10 | 3.60 | 1.40 | 2.50±0.2 |
| AR12 | 4.90 | 1.60 | 3.10±0.2 |

### Reflow Solder Profile



| CPF-A                                                      | 0805                                | B                                 | 1K0                                         | E                      | 1                                 |
|------------------------------------------------------------|-------------------------------------|-----------------------------------|---------------------------------------------|------------------------|-----------------------------------|
| Common Part                                                | Package Size                        | Tolerance                         | Value                                       | TCR                    | Packaging                         |
| CPF-A<br>Automotive<br>Grade<br>precision<br>chip resistor | 0402 1206<br>0603 2010<br>0805 2512 | B - ±0.1%<br>D - ±0.5%<br>F - ±1% | 100R - 100Ω<br>1K0 - 1000Ω<br>10K - 10,000Ω | E - 25PPM<br>C - 50PPM | 1 - 1K<br>REEL<br>Blank - 5K REEL |

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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