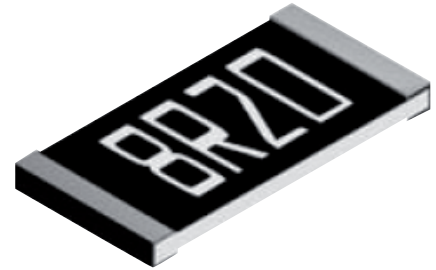


## Precision Thin Film Nichrome Chip Resistors

### PCF Series

- Precision thin film technology
- Extended ohmic range 1R - 3M
- Precision to  $\pm 0.01\%$  and 1ppm/ $^{\circ}\text{C}$
- Passivated range for superior humidity performance
- Load life stability and humidity to 0.05%
- Pb-free standard with SnPb option
- AEC-Q200 grade available



 All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Electrical Data - Standard Range

| Type    | TCR (ppm/ $^{\circ}\text{C}$ ) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range <sup>1</sup> |          |          |           |       |
|---------|--------------------------------|-----------|------------------------------|--------------------------------|----------|----------|-----------|-------|
|         |                                |           |                              | 1% & 0.5%                      | 0.25%    | 0.1%     | 0.05%     | 0.01% |
| PCF0201 | 50                             | 0.031     | 15                           | 49R9-33K                       |          |          |           |       |
|         | 25                             |           |                              | 49R9-5K                        |          |          |           |       |
| PCF0402 | 50                             | 0.063     | 25                           | 10R-205K                       |          |          |           |       |
|         | 25                             |           |                              |                                | 49R9-70K | 49R9-12K |           |       |
|         | 15                             |           |                              |                                | 49R9-12K | 49R9-3K  |           |       |
|         | 10                             |           |                              |                                |          | 49R9-5K  |           |       |
|         | 5                              |           |                              |                                |          |          | 49R9-4K99 |       |
|         | 3                              |           |                              |                                |          |          | 49R9-20K  |       |
| PCF0603 | 50                             | 0.063     | 50                           | 2R-1M                          |          | 4R7-1M   | 4R7-332K  |       |
|         | 25                             |           |                              |                                | 4R7-332K |          |           |       |
|         | 15                             |           |                              |                                |          | 24R9-15K | 24R9-100K |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          |           |       |
|         | 3                              |           |                              |                                |          |          | 24R9-15K  |       |
| PCF0805 | 50                             | 0.1       | 100                          | 1R-2M                          |          | 4R7-2M5  | 4R7-1M    |       |
|         | 25                             |           |                              |                                | 4R7-1M   |          | 24R9-500K |       |
|         | 15                             |           |                              |                                |          |          |           |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          | 24R9-49K9 |       |
|         | 3                              |           |                              |                                |          |          | 24R9-30K  |       |
| PCF1206 | 50                             | 0.125     | 150                          | 1R-2M5                         |          | 4R7-2M5  | 4R7-1M    |       |
|         | 25                             |           |                              |                                | 4R7-1M   |          | 24R9-500K |       |
|         | 15                             |           |                              |                                |          |          |           |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          | 24R9-49K9 |       |
|         | 3                              |           |                              |                                |          |          |           |       |
| PCF1210 | 50                             | 0.2       | 150                          | 1R-2M5                         |          | 4R7-2M5  |           |       |
|         | 25                             |           |                              |                                | 4R7-1M   |          |           |       |
|         | 15                             |           |                              |                                |          |          |           |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          | 24R9-49K9 |       |
|         | 3                              |           |                              |                                |          |          |           |       |
| PCF2010 | 50                             | 0.25      | 150                          | 1R-3M                          |          | 4R7-3M   | 4R7-1M    |       |
|         | 25                             |           |                              |                                | 4R7-1M   |          | 24R9-500K |       |
|         | 15                             |           |                              |                                |          |          |           |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          | 24R9-100K |       |
|         | 3                              |           |                              |                                |          |          | 24R9-300K |       |
| PCF2512 | 50                             | 0.5       | 150                          | 1R-3M                          |          | 4R7-3M   | 4R7-1M    |       |
|         | 25                             |           |                              |                                | 4R7-1M   |          | 24R9-500K |       |
|         | 15                             |           |                              |                                |          |          |           |       |
|         | 10                             |           |                              |                                |          |          |           |       |
|         | 5                              |           |                              |                                |          |          | 24R9-100K |       |
|         | 3                              |           |                              |                                |          |          |           |       |

Note 1: Standard values E24 or E96. Other values may be available by request.

### General Note

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## PCF Series

### Electrical Data - AEC-Q200 Grade - Standard Range

| Type        | TCR (ppm/°C) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range * |      |       |            |       |
|-------------|--------------|-----------|------------------------------|---------------------|------|-------|------------|-------|
|             |              |           |                              | 1%                  | 0.5% | 0.25% | 0.1%       | 0.05% |
| PCF0402...A | 50           | 0.063     | 25                           | 49R9 – 100K         |      |       | 49R9-10K   |       |
|             | 25           |           |                              | 49R9-69K8           |      |       | 49R9-10K   |       |
|             | 15           |           |                              | 49R9-69K8           |      |       | 49R9-10K   |       |
|             | 10           |           |                              | 49R9-69K8           |      |       | 49R9-10K   |       |
| PCF0603...A | 50           | 0.063     | 50                           | 10R-332K            |      |       | 10R – 49K9 |       |
|             | 25           |           |                              | 10R-332K            |      |       | 10R – 49K9 |       |
|             | 15           |           |                              | 10R-332K            |      |       | 10R – 49K9 |       |
|             | 10           |           |                              | 10R-332K            |      |       | 10R – 49K9 |       |
| PCF0805...A | 50           | 0.1       | 100                          | 10R-1M0             |      |       | 10R – 100K |       |
|             | 25           |           |                              | 10R-1M0             |      |       | 10R – 100K |       |
|             | 15           |           |                              | 10R-511K            |      |       | 10R – 100K |       |
|             | 10           |           |                              | 10R-511K            |      |       | 10R – 100K |       |
| PCF1206...A | 50           | 0.125     | 150                          | 10R-1M0             |      |       | 10R – 200K |       |
|             | 25           |           |                              | 10R-1M0             |      |       | 10R – 200K |       |
|             | 15           |           |                              | 10R-1M0             |      |       | 10R – 200K |       |
|             | 10           |           |                              | 10R-1M0             |      |       | 10R – 200K |       |
| PCF1210...A | 50           | 0.25      | 150                          | 10R-1M0             |      |       | 10R – 499K |       |
|             | 25           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 15           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 10           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
| PCF2010...A | 50           | 0.25      | 150                          | 10R-1M0             |      |       | 10R – 499K |       |
|             | 25           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 15           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 10           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
| PCF2512...A | 50           | 0.5       | 150                          | 10R-1M0             |      |       | 10R – 499K |       |
|             | 25           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 15           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |
|             | 10           |           |                              | 10R-1M0             |      |       | 10R – 499K |       |

\* Standard values E24 or E96.

### Electrical Data – High Power Range

| Type     | TCR (ppm/°C) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range * |       |          |       |           |
|----------|--------------|-----------|------------------------------|---------------------|-------|----------|-------|-----------|
|          |              |           |                              | 0.5%                | 0.25% | 0.1%     | 0.05% | 0.01%     |
| PCF0603H | 50           | 0.1       | 75                           | 4R7-1M              |       | 4R7-332K |       | 24R9-100K |
|          | 25           |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
|          | 15           |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
|          | 10           |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
|          | 5            |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
|          | 3            |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
|          | 2            |           |                              | 4R7-332K            |       | 4R7-332K |       | 24R9-100K |
| PCF0805H | 50           | 0.125     | 150                          | 1R-1M               |       | 4R7-1M   |       | 24R9-200K |
|          | 25           |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
|          | 15           |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
|          | 10           |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
|          | 5            |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
|          | 3            |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
|          | 2            |           |                              | 4R7-332K            |       | 4R7-511K |       | 24R9-200K |
| PCF1206H | 50           | 0.25      | 200                          | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 25           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 15           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 10           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 5            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 3            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 2            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
| PCF1210H | 50           | 0.33      | 200                          | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 25           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 15           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 10           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 5            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 3            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 2            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
| PCF2010H | 50           | 0.33      | 200                          | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 25           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 15           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 10           |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 5            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 3            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
|          | 2            |           |                              | 4R7-1M              |       | 4R7-1M   |       | 24R9-500K |
| PCF2512H | 50           | 0.75      | 200                          | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 25           |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 15           |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 10           |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 5            |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 3            |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |
|          | 2            |           |                              | 1R-2K               |       | 4R7-2K   |       | 24R9-2K   |

\* Standard values E24 or E96. Other values may be available by request.

#### General Note

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## PCF Series

### Electrical Data - AEC-Q200 Grade – High Power Range

| Type         | TCR (ppm/°C) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range * |      |       |      |       |
|--------------|--------------|-----------|------------------------------|---------------------|------|-------|------|-------|
|              |              |           |                              | 1%                  | 0.5% | 0.25% | 0.1% | 0.05% |
| PCF0603H...A | 50           | 0.063     | 75                           | 10R-332K            |      |       |      |       |
|              | 25           |           |                              |                     |      |       |      |       |
|              | 15           |           |                              |                     |      |       |      |       |
|              | 10           |           |                              |                     |      |       |      |       |
| PCF0805H...A | 50           | 0.1       | 150                          | 10R-1M0             |      |       |      |       |
|              | 25           |           |                              |                     |      |       |      |       |
|              | 15           |           |                              |                     |      |       |      |       |
|              | 10           |           |                              |                     |      |       |      |       |
| PCF1206H...A | 50           | 0.125     | 200                          | 10R-511K            |      |       |      |       |
|              | 25           |           |                              |                     |      |       |      |       |
|              | 15           |           |                              |                     |      |       |      |       |
|              | 10           |           |                              |                     |      |       |      |       |
| PCF1210H...A | 50           | 0.25      | 200                          | 10R-1M0             |      |       |      |       |
|              | 25           |           |                              |                     |      |       |      |       |
|              | 15           |           |                              |                     |      |       |      |       |
|              | 10           |           |                              |                     |      |       |      |       |
| PCF2010H...A | 50           | 0.25      | 200                          | 10R-499K            |      |       |      |       |
|              | 25           |           |                              |                     |      |       |      |       |
|              | 15           |           |                              |                     |      |       |      |       |
|              | 10           |           |                              |                     |      |       |      |       |

\* Standard values E24 or E96.

### Electrical Data - Passivated Range

| Type     | TCR (ppm/°C) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range * |       |      |
|----------|--------------|-----------|------------------------------|---------------------|-------|------|
|          |              |           |                              | 0.5%                | 0.25% | 0.1% |
| PCF0402P | 50           | 0.063     | 25                           | 25R-25K             |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |
| PCF0603P | 50           | 0.063     | 50                           | 49R9-12K            |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |
| PCF0805P | 50           | 0.1       | 100                          | 25R-332K            |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |
| PCF1206P | 50           | 0.125     | 150                          | 10R - 1M            |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |
| PCF2010P | 50           | 0.25      | 150                          | 10R - 1M5           |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |
| PCF2512P | 50           | 0.5       | 150                          | 25R - 1M            |       |      |
|          | 25           |           |                              |                     |       |      |
|          | 15           |           |                              |                     |       |      |

\* Standard values E24 or E96.

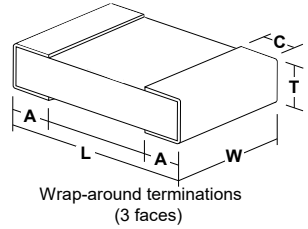
#### General Note

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## PCF Series

### Physical Data

|      | Dimensions (mm) and Weight (mg) |             |       |             |             |      |
|------|---------------------------------|-------------|-------|-------------|-------------|------|
|      | L                               | W           | T max | A           | C           | Wt   |
| 0201 | 0.58 ± 0.05                     | 0.29 ± 0.05 | 0.26  | 0.15 ± 0.05 | 0.12 ± 0.05 | 0.14 |
| 0402 | 1.0 ± 0.1                       | 0.5 ± 0.05  | 0.55  | 0.25 ± 0.15 | 0.2 ± 0.15  | 0.54 |
| 0603 | 1.6 ± 0.2                       | 0.8 ± 0.2   | 0.65  | 0.35 ± 0.25 | 0.3 ± 0.2   | 1.8  |
| 0805 | 2.0 ± 0.2                       | 1.25 ± 0.2  | 0.65  | 0.4 ± 0.25  | 0.3 ± 0.2   | 4.7  |
| 1206 | 3.05 ± 0.15                     | 1.55 ± 0.15 | 0.65  | 0.35 ± 0.25 | 0.42 ± 0.2  | 9.0  |
| 1210 | 3.10 ± 0.15                     | 2.5 ± 0.25  | 0.65  | 0.55 ± 0.25 | 0.4 ± 0.3   | 10   |
| 2010 | 4.9 ± 0.2                       | 2.4 ± 0.25  | 0.65  | 0.55 ± 0.3  | 0.6 ± 0.3   | 24   |
| 2512 | 6.3 ± 0.2                       | 3.1 ± 0.25  | 0.65  | 0.7 ± 0.45  | 0.6 ± 0.3   | 38   |



#### Construction

A thin-film material is selectively deposited on a 96% alumina substrate together with metallic contacts at each end of the resistor. The unadjusted resistors are heat treated to give the required TCR and stability, then a precisely controlled laser trim process adjusts the resistance value. Epoxy protection is applied and wrap-around terminations are added and plated with Nickel then Tin. Each resistor is measured immediately before packing into tape.

#### Terminations

The standard termination is 100% Sn matte plated wrap-around suitable for soldering. SnPb plated option is available for standard range PCF over the restricted range below.

### SnPb Termination Option Range

| Type    | TCR (ppm/°C) | Power (W) | Limiting Element Voltage (V) | Ohmic Value Range |      |       |      |
|---------|--------------|-----------|------------------------------|-------------------|------|-------|------|
|         |              |           |                              | 1%                | 0.5% | 0.25% | 0.1% |
| PCF0805 | 50           | 0.1       | 100                          | 10R – 250K        |      |       |      |
|         | 25           |           |                              | 10R – 100K        |      |       |      |
|         | 15           |           |                              | 10R – 100K        |      |       |      |
| PCF1206 | 50           | 0.125     | 150                          | 10R – 500K        |      |       |      |
|         | 25           |           |                              | 10R – 200K        |      |       |      |
|         | 15           |           |                              | 10R – 200K        |      |       |      |

### Performance Data - Standard Range

| Test Parameters            | Conditions                                | Maximum change (+0.05R)          |                         |                                  |
|----------------------------|---|----------------------------------|-------------------------|----------------------------------|
|                            |   | >0.05% tolerance<br>0603 to 2512 | Chip size<br>0201, 0402 | ≤0.05% tolerance<br>0603 to 2512 |
| Load life                  | 1000 hours rated load @ 70°C              | 0.25%                            | 0.5%                    | 0.05%                            |
| Humidity                   | 1000 hours @ 40°C, 90 - 95%RH             | 0.3%                             | 0.3%                    | 0.05%                            |
| Short term overload        | 6.25 x rated Power, or 2 x LEV, for 5 sec | 0.5%                             | 0.5%                    | 0.05%                            |
| High temperature operation | 1000 hours at 125°C                       | 0.25%                            | 0.25%                   | 0.25%                            |
| Temperature cycle          | 5 cycles -55 C, 125°C                     | 0.1%                             | 0.1%                    | 0.05%                            |
| Resistance to solder heat  | 270°C, 10 sec                             | 0.2%                             | 0.2%                    | 0.05%                            |
| Solderability              | 235°C, 2 sec                              | 95% minimum coverage             |                         |                                  |

### Performance Data - High Power Range

| Test Parameters            | Conditions                                | Maximum change (+0.05R)          |                         |
|----------------------------|---|----------------------------------|-------------------------|
|                            |   | >0.05% tolerance<br>0603 to 2512 | Chip size<br>0201, 0402 |
| Load life                  | 1000 hours rated load @ 70°C              | 0.25%                            | 0.5%                    |
| Humidity                   | 1000hrs @ 40°C, 90 - 95%RH                | 0.3%                             | 0.3%                    |
| Short term overload        | 6.25 x rated Power, or 2 x LEV, for 5 sec | 0.5%                             | 0.5%                    |
| High temperature operation | 1000 hours at 155°C                       | 0.25%                            | 0.25%                   |
| Temperature cycle          | 5 cycles -55°C, 150°C                     | 0.1%                             | 0.1%                    |
| Resistance to solder heat  | 270°C, 10 sec                             | 0.2%                             | 0.2%                    |
| Solderability              | 235°C, 2 sec                              | 95% minimum coverage             |                         |

#### General Note

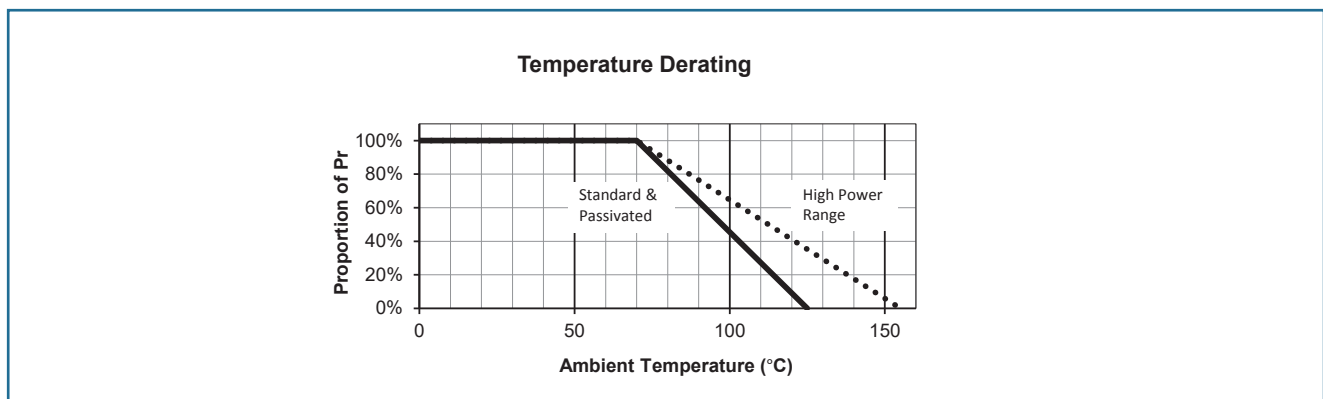
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## PCF Series

### Performance Data - Passivated Range

| Test Parameters            | Conditions                                | Maximum change (+0.05R) |       |
|----------------------------|---|-------------------------|-------|
|                            |   | 0603 to 2512            | 0402  |
| Load life                  | 1000 hours rated load @ 70°C              | 0.05%                   | 0.25% |
| Humidity                   | 1000hrs @ 40°C, 90 - 95%RH                | 0.05%                   | 0.5%  |
| Short term overload        | 6.25 x rated Power, or 2 x LEV, for 5 sec | 0.02%                   | 0.1%  |
| High temperature operation | 1000 hours at 125°C                       | 0.05%                   | 0.5%  |
| Temperature cycle          | 5 cycles -55 C, 125°C                     | 0.02%                   | 0.1%  |
| Resistance to solder heat  | 270°C, 10 sec                             | 0.02%                   | 0.1%  |
| Solderability              | 235°C, 2 sec                              | 95% minimum coverage    |       |

### Derating Curve



### Solderability

The terminations have an electroplated nickel barrier and tin coating. This ensures excellent 'leach' resistance properties and solderability.

### Packaging

PCF Resistors are supplied taped and reeled as per IEC 286-3. Sizes 2010 and 2512 are in embossed plastic tape. Smaller sizes are in paper tape.

### Application Notes

PCF resistors are ideally suited for handling by automatic methods due to their rectangular shape and the small dimensional tolerances. Electrical connection to a ceramic substrate or to a printed circuit board can be made by reflow or wave soldering of wrap-around terminations.

Wrap-around terminations provide good leach properties and ensure reliable contact. Due to the robust construction, the PCF can be immersed in the solder bath for 30 seconds at 260°C. This enables the resistor to be mounted on one side of a printed circuit board and wire-leaded components applied on the other side.

PCF resistors themselves can operate at a maximum temperature of 125°C (see performance above) (155°C for High Power grades). For soldered resistors, the joint temperature should not exceed 110°C. This condition is met when the stated power levels at 70°C are used.

### General Note

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## PCF Series

### Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number\*\*:** PCF0603-11-1K54BI (0603, standard, 15ppm/°C, 1.54 kilohm ±0.1%, Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | C | F | 0 | 6 | 0 | 3 | - | 1 | 1 | - | 1 | K | 5 | 4 | B | I |
| 1 | 2 |   | 3 | 4 |   | 5 |   |   | 6 | 7 |   |   |   |   |   |   |

| 1    | 2    | 3                 | 4               | 5  | 6  | 7  |           |
|------|------|-------------------|-----------------|--|--|--|-----------|
| Type | Size | Range             | TCR             | Value  | Tolerance  | Grade, Packing & Termination               |           |
| PCF  | 0201 | Omit for Standard | -21 = ±1ppm/°C  | E24 = 3/4 characters<br>E96 = 3/4 characters<br>R = ohms<br>K = kilohms<br>M = megohms | L = ±0.01%   | A = AEC-Q200 grade, Standard pack, Pb-free |           |
|      | 0402 |                   | -20 = ±2ppm/°C  |  | W = ±0.05%   | I = Standard grade, Standard pack, Pb-free |           |
|      | 0603 | H = High Power    | -19 = ±3ppm/°C  | B = ±0.1%  | 0201, 0402   | 10,000/reel                                |           |
|      | 0805 | P = Passivated    | -13 = ±5ppm/°C  | C = ±0.25%   | 0603 to 1210   | 5000/reel                                  |           |
|      | 1206 |                   | -12 = ±10ppm/°C | D = ±0.5%  | 2010, 2512   | 4000/reel                                  |           |
|      | 1210 |                   | -11 = ±15ppm/°C | F = ±1%  | A1 = AEC-Q200 grade, 1K reel, Pb-free<br>T1 = Standard grade, 1K reel, Pb-free |  |           |
|      | 2010 |                   | R = ±25ppm/°C   | 0201 to 1206,<br>2010, 2512  |  | 1000/reel*                                 |           |
|      | 2512 |                   | -02 = ±50ppm/°C | PB = Standard grade, 1K reel, SnPb   |  |  |           |
|      |      |                   |                 |  |  | 0805, 1206                                 | 1000/reel |

\* Non-standard; enquire to confirm availability

\*\* Applies to all Ranges, Termination and Packing options.

**USA (IRC) Part Number\*:** PCF-W0603LF-11-1541-B-P-LT (0603, standard, 15ppm/°C, 1.54 kilohm ±0.1%, Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | C | F | - | W | 0 | 6 | 0 | 3 | L | F | - | 1 | 1 | - | 1 | 5 | 4 | 1 | - | B | - | P | - | L | T |
| 1 | 2 |   |   |   | 3 | 4 |   | 5 |   |   | 6 | 7 | 8 |   |   |   |   |   |   |   |   |   |   |   |   |

| 1    | 2     | 3                        | 4              | 5   | 6                            | 7                           | 8                |             |
|------|-------|--------------------------|----------------|---|------------------------------|-----------------------------|------------------|-------------|
| Type | Model | Termination              | TCR            | Value   | Tolerance                    | Tape                        | Packing          |             |
| PCF  | W0201 | LF = Pb-free<br>(100%Sn) | 13 = ±5ppm/°C  | 3 digits + multiplier<br>R = ohms for<br>values <100 ohms | T = ±0.01%                   | P = Paper<br>(0201 to 1210) | LT = Tape & Reel |             |
|      | W0402 |                          | 12 = ±10ppm/°C |   | A = ±0.05%                   |                             | 0201, 0402       | 10,000/reel |
|      | W0603 |                          | 11 = ±15ppm/°C | B = ±0.1%   | E = Embossed<br>(2010, 2512) | 0603 to 1210                | 5000/reel        |             |
|      | W0805 |                          | 03 = ±25ppm/°C | C = ±0.25%  |                              | 2010, 2512                  | 4000/reel        |             |
|      | W1206 |                          | 02 = ±50ppm/°C | D = ±0.5%   |                              |                             |                  |             |
|      | W1210 |                          |                | F = ±1%   |                              |                             |                  |             |
|      | W2010 |                          |                |   |                              |                             |                  |             |
|      | W2512 |                          |                |   |                              |                             |                  |             |

\* Applies only to Standard Range, Pb-Free parts

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