Ultra Precision Resistor Networks

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Precision Resistors (UPSC)

Product Introduction

Direct's compact size ultra-precision resistor networks take accuracy pole position.

Features:
- Precision tolerance tight to $T(\pm0.01\%)$.
- Superior TCR narrowed to $C_{10}(\pm2\text{ ppm/}^\circ\text{C})$.
- Metal film precision networks, Lead (Pb)-free and RoHS compliant.
- Any value available within resistance range, excellent stability and reliability.

Applications:
- Precision Bypass.
- Simulation Equipment.
- Test and Measurement.
- Medical, Bridge Circuitry.
- Precision Amplifiers, Divider.
- High Precision Instrumentation.
- Audio (High End Stereo Equipment).
- Commercial Avionics, Data Convertors.

Following market demands for components to deliver ultra-precision applications in often very confined spaces, design engineers can now benefit from new technologies capable of Temperature Coefficient $C_{10}(\pm2\text{ ppm/}^\circ\text{C})$, compact body size UPSC Networks.

Constructed with Direct EE/RE 1/10 series to form a stable, high precision and low temperature coefficient network resistor, the networks are protected from moisture by a proprietary passivation material.

Customer can specify Tolerance and Temperature Coefficient range designed to satisfy challenging and specific technical requirements. The resistance and TCR range makes these (UPSC) series ideal for a number of applications, including test and measurement devices, commercial avionics and medical equipment or devices.

The thin-film (UPSC) also can be designed with custom schematics to meet individual customer specifications. The networks provide excellent resistor precision and accuracy with resistor tolerances to $\pm0.01\%$. They have TCR values to $\pm2\text{ ppm/}^\circ\text{C}$, providing superior performance over the military temperature range.

UPSC Series equate IRC, EBG Precision Devices with more competitive price and fast delivery. For non-standard technical requirements and special applications, please contact our manufacturer or sales representatives. Besides, you can link to Direct official website "Precision Resistors" to get more information.

UPR Versus UPSC Series:
- UPSC Series have the advantage of compact body size.
- The electric characteristics of UPR and UPSC are the same.
- UPR Series have the advantage of wider resistance range $10\Omega$–$5M\Omega$.
### Dimensions & Technical Characteristics

#### Dimensions & Technical Characteristics (UPSC)

<table>
<thead>
<tr>
<th>Dimensions (Unit: mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.65 ± 0.3</td>
<td>8.6 ± 0.3</td>
<td>2.6 ± 0.3</td>
<td>0.6 ± 0.05</td>
<td>3.81 ± 0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Working Temperature (°C)</th>
<th>-10 ~ +70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Wattage at 70°C (W)</td>
<td>0.2</td>
</tr>
<tr>
<td>Maximum Working Voltage (V)</td>
<td>250</td>
</tr>
<tr>
<td>Nominal Resistance Range (Ω)</td>
<td>40Ω ~ 5MΩ</td>
</tr>
<tr>
<td>Nominal Resistance Tolerance (%)</td>
<td>A2(±0.02), A5(±0.05), B(±0.1)</td>
</tr>
<tr>
<td>Temperature Coefficient (ppm/°C) [TCR: +25°C ~ +85°C]</td>
<td>C9(±3), C7(±5), C6(±10), C5(±15), C3(±25)</td>
</tr>
</tbody>
</table>

#### Remark:
- 1. Customer can specify Tolerance and Temperature Coefficient range to meet your own needs.
- 2. It can be required to Direct’s representatives if customer’s requirement beyond the range of Direct’s specifications.
## UPSC Versus UPR Series

### Nominal Resistance Range (Ω)  
<table>
<thead>
<tr>
<th>UPSC</th>
<th>UPR</th>
<th>Nominal Resistance Tolerance (%)</th>
<th>Temperature Coefficient (ppm/℃) [TCR: +25℃ ~ +85℃]</th>
</tr>
</thead>
</table>
| 40Ω ~ 5MΩ| 10Ω ~ 5MΩ| A2 ± 0.02  
A5 ±0.05  
B ± 0.1 | C9 ± 3ppm/℃  
C7 ± 5ppm/℃  
C6 ± 10ppm/℃  
C5 ± 15ppm/℃  
C3 ± 25ppm/℃ |
| 200Ω ~ 500KΩ | 100Ω ~ 500KΩ | T ± 0.01  
A2 ± 0.02  
A5 ± 0.05  
B ± 0.1 | C10 ± 2ppm/℃  
C9 ± 3ppm/℃  
C7 ± 5ppm/℃  
C6 ± 10ppm/℃  
C5 ± 15ppm/℃  
C3 ± 25ppm/℃ |

### Dimensions (Unit: mm)

**UPSC (Compact Size Networks)**
- 7.65 ± 0.3
- 2.6 ± 0.3
- 8.6 ± 0.3
- 3.81 ± 0.5
- 0.6 ± 0.05

**UPR (Wider Ohmic Range Networks)**
- 10.5 ± 0.3
- 4.0 ± 0.3
- 9.1 ± 0.3
- 7.62 ± 0.5
- 0.6 ± 0.05
### Order Codes

#### Order Codes (UPSC) Resistance Value 40Ω ~ 5MΩ

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Resistance Value (Ω)</th>
<th>Resistance Tolerance (%)</th>
<th>Temperature coefficient (PPM/°C)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPSC 530R</td>
<td>53</td>
<td>A2 ±0.02</td>
<td>C3 ±25</td>
<td>P</td>
</tr>
<tr>
<td>530R</td>
<td>530</td>
<td>A5 ±0.05</td>
<td>C5 ±15</td>
<td>P</td>
</tr>
<tr>
<td>5K3</td>
<td>5.3K</td>
<td>B ±0.10</td>
<td>C6 ±10</td>
<td>P</td>
</tr>
<tr>
<td>53K</td>
<td>53K</td>
<td></td>
<td>C7 ±5</td>
<td>P</td>
</tr>
<tr>
<td>530K</td>
<td>530K</td>
<td></td>
<td>C9 ±3</td>
<td>P</td>
</tr>
</tbody>
</table>

### Order Codes (UPSC) Resistance Value 200Ω ~ 500KΩ

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Resistance Value (Ω)</th>
<th>Resistance Tolerance (%)</th>
<th>Temperature coefficient (PPM/°C)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPSC 10K</td>
<td>200</td>
<td>T ±0.01</td>
<td>C3 ±25</td>
<td>P</td>
</tr>
<tr>
<td>10K</td>
<td>10K</td>
<td>A2 ±0.02</td>
<td>C5 ±15</td>
<td>P</td>
</tr>
<tr>
<td>100K</td>
<td>100K</td>
<td>A5 ±0.05</td>
<td>C6 ±10</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B ±0.10</td>
<td>C7 ±5</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C9 ±3</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C10 ±2</td>
<td>P</td>
</tr>
</tbody>
</table>
General Information

High Precision Devices Made in Direct
Direct is equipped to design and produce custom components to meet many design and reliability demands.

Direct's line of high-reliability and precision products reflects a long-term commitment to our industrial and military customers. In addition to standard industry-grade resistor products, we also have many resistive products designed to meet various military source-controlled drawings.

We continually strive to meet the changing application requirements of the markets by developing new products and manufacturing technologies on an on-going basis.

Enhanced Precision and Stability for Low-Cost Uses
Every component Direct provides to the commercial, industrial, and military markets for cost-efficiency uses is backed by the comprehensive testing and failure analysis capabilities of our own technical staff, whom are industrial experts in understanding and meeting the requirements of the environment.

Low TCR - Fast Approach to a Steady State
Direct Electronics provides a precision Temperature Coefficient of Resistance TCR as low as 2 ppm/°C.

If you must guarantee a smaller resistance change in your application, TCR is the best known parameter used to specify a resistor’s stability, and is used to depict the resistive element’s sensitivity to temperature change due to ambient temperature variations.

A resistor's TCR tells how much its value changes as its temperature changes. It is usually expressed in ppm/°C (parts per million per degree Centigrade) units.

Long-Term Proven Service
Our technical expertise, our knowledge of the industry, our broad product offering, and our ability to work long-term are all part of Direct’s ongoing commitment to meeting the changing requirements of our most reliability-conscious customer, today and in the future.