Thin Film Technology - Precision Resistor Networks

**Wraparound Electrodes**
- SR01/S1 Series
- SR02/S2 Series
- SR03/S3 Series
- SR04/S4 Series
- SR06/S6 Series

**BGA Style Electrodes**
- BR01/B1 Series
- BR02/B2 Series
- BR03/B3 Series
- BR04/B4 Series
- Miniature BGA

Click on pictures in PDF file for links to product datasheets

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Thin film based resistors are well known for their stability. Our proprietary nichrome based film provides for very stable resistors over a wide range of operating conditions as well as a wide range of environmental conditions.

**Absolute Tolerance**
Absolute tolerance refers to the deviation of the individual resistors from their nominal, or targeted resistance value. TFT resistor networks offer a wide range of resistance tolerances which range from ±0.02% to as loose as ±5%.

**Ratio Tracking**
Ratio Tracking refers to the difference in resistance values from one resistor to the other resistors in the same network. Ratio tracking ensures that matched resistors are not at opposite ends of the tolerance spectrum. TFT resistor networks offer ratio tracking between ±0.02% and ±1.0%.

**TCR**
TCR, or Temperature Coefficient of Resistance refers to the measure of resistance change as a function of the ambient temperature. TFT resistor networks offer TCR’s which range from 5 ppm/°C to 100 ppm/°C.

**TCR Tracking**
TCR Tracking refers to the difference in TCR’s of a set of resistors over a given temperature interval. TCR tracking ensures that matched resistors are not at opposite ends of the TCR spectrum. TFT resistor networks offer TCR tracking between ±1ppm/°C to ±5ppm/°C.

**Stability**

Thin Film Precision:
Our thin film based resistors and our integrated construction allows for extremely tight precision and stability over time. Our nichrome film is deposited through vacuum deposition, or sputtering. With our stable resistive film and the fact that the resistors in a given network are processed under identical processing conditions during the manufacturing process, our networks can provide much more closely matched resistors as compared to using discrete resistors or alternative manufacturing materials and techniques.
## Resistors Networks

Thin Film Technology offers several families of high precision chip resistor networks. They offer excellent performance and high reliability and a competitive price. All networks shown offer resistance ratio tracking and TCR tracking.

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<th>Specifications</th>
<th>RA1632</th>
<th>SR01 / BR01</th>
<th>SR02 / BR02</th>
<th>SR03 / BR03</th>
<th>SR04 / BR04</th>
<th>SR06</th>
<th>Miniature BGA</th>
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<tr>
<td>Sizes Available (English)</td>
<td>1206 0.126 x 0.063&quot;</td>
<td>2512 0.250 x 0.126&quot;</td>
<td>4022 0.400 x 0.220&quot;</td>
<td>2220 0.220 x 0.200&quot;</td>
<td>1210 0.126 x 0.098&quot;</td>
<td>1210 0.126 x 0.098&quot;</td>
<td>1205 0.126 x 0.047&quot;</td>
</tr>
<tr>
<td>Electrode Style</td>
<td>Wraparound</td>
<td>BGA or Wraparound</td>
<td>BGA or Wraparound</td>
<td>BGA or Wraparound</td>
<td>BGA or Wraparound</td>
<td>Wraparound</td>
<td>BGA</td>
</tr>
<tr>
<td>Number of Resistors</td>
<td>4 resistors 8 electrodes</td>
<td>2 resistors 6 electrodes</td>
<td>8 resistors 16 electrodes</td>
<td>4 resistors 8 electrodes</td>
<td>2 resistors 4 electrodes</td>
<td>2 resistors 3 electrodes</td>
<td>5 resistors 10 electrodes</td>
</tr>
<tr>
<td>Resistance Range (max. Ω / element)</td>
<td>50Ω ~ 100KΩ</td>
<td>10Ω ~ 40KΩ</td>
<td>10Ω ~ 30KΩ</td>
<td>10Ω ~ 30KΩ</td>
<td>10Ω ~ 10KΩ</td>
<td>10Ω ~ 10KΩ</td>
<td>10Ω ~ 4.7KΩ</td>
</tr>
<tr>
<td>Resistance Tolerances (± %)</td>
<td>0.1, 0.5</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5</td>
<td>0.25, 0.5, 1.0, 2.0, 5.0</td>
</tr>
<tr>
<td>Resistance Tracking (± %)</td>
<td>0.1, 0.2</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5, None</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5, None</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5, None</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5, None</td>
<td>0.02, 0.05, 0.1, 0.25, 0.5, None</td>
<td>0.25, 0.5, 1.0, None</td>
</tr>
<tr>
<td>Absolute TCR (ppm/°C)</td>
<td>25</td>
<td>5, 10, 25</td>
<td>5, 10, 25</td>
<td>5, 10, 25</td>
<td>5, 10, 25</td>
<td>5, 10, 25</td>
<td>10, 25, 50, 100</td>
</tr>
<tr>
<td>TCR Tracking (ppm/°C)</td>
<td>5, 10</td>
<td>1, 2, 5, None</td>
<td>1, 2, 5, None</td>
<td>1, 2, 5, None</td>
<td>1, 2, 5, None</td>
<td>1, 2, 5, None</td>
<td>2, 5, None</td>
</tr>
</tbody>
</table>

Note: Schematics can be configured based on customer need by consulting the factory.

### Typical Applications:

Precision thin film resistor networks have many applications in today’s electronic circuits. The small, high-density, multi-element networks and extremely tight matching of all elements within the network make these networks an ideal choice not only due to the excellent performance characteristics they provide, but also to save space on the circuit board, reduce component counts and improve overall reliability. Some typical applications are shown below.

- DDR, SDRAM memory applications
- FPGA applications
- Buss terminations
- Automotive applications
- Digital data termination circuits
- Amplifier circuits
- Process control and monitoring
- High speed digital circuits
- Industrial instrumentation applications
- Medical instrumentation
- Many other applications