Features

- RoHS compliant*
- Standard E.I.A. package compatible with automatic placement equipment
- Compliant leads to reduce solder joint fatiguing
- Tape and reel packaging standard
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available
- Now available with improved tolerance to ±0.5%

**4400P Series - Thick Film Surface Mounted Wide Body**

**Product Characteristics**

Resistance Range

<table>
<thead>
<tr>
<th>Resistance Range</th>
<th>10 ohms to 2.2 megohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Operating Voltage</td>
<td>50 V</td>
</tr>
<tr>
<td>Temperature Coefficient of Resistance</td>
<td>50 °C and above: ±100 ppm/°C</td>
</tr>
<tr>
<td>below 50 °C</td>
<td>±250 ppm/°C</td>
</tr>
<tr>
<td>TCR Tracking</td>
<td>50 ppm/°C</td>
</tr>
</tbody>
</table>

**Resistance Range**

- Body Material: Novolac epoxy
- Copper, solder coated
- Lead Frame Material
- Flammability: Conforms to UL94V-0
- Physical Characteristics
- Thermal Shock: ±0.25 %
- Resistance to Soldering Heat: ±0.25 %
- Moisture Resistance: ±0.50 %
- Load Life: ±1.00 %
- Short Time Overload: ±0.25 %

**Environmental Characteristics**

- **Tests PER MIL-STD-202**
  - ΔR MAX
  - Short Time Overload: ±100 ppm/°C
  - Load Life: ±100 ppm/°C
- Moisture Resistance: ±50 %
- Resistance to Soldering Heat: ±250 ppm/°C
- Thermal Shock: ±250 ppm/°C

**Physical Characteristics**

- Flammability: Conforms to UL94V-0
- Lead Frame Material: Copper, solder coated
- Body Material: Novolac epoxy

**How To Order**

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of Pins</th>
<th>Electrical Configuration</th>
<th>Resistance Code</th>
<th>Resistance Tolerance</th>
<th>Terminations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(44 = SMD SOL Pkg.)</td>
<td>44</td>
<td>1 or 4 = Isolated*</td>
<td>2 = Bussed</td>
<td>First 2 digits are significant</td>
<td>T03: LF = Tin-plated (RoHS compliant)</td>
</tr>
<tr>
<td></td>
<td>103</td>
<td>3 = Dual Terminator*</td>
<td></td>
<td></td>
<td>L = Tin-plated (RoHS compliant)</td>
</tr>
<tr>
<td></td>
<td>LF</td>
<td>*For tube packaging, use T01, T02, T03 or T04. Consult factory for other available options.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Package Power Temp. Derating Curve**

- **Package Power Rating at 70 °C**
  - 4420P: 2.00 watts
  - 4416P: 1.60 watts

**Package Power Temp. Derating Curve**

**Recommended Land Pattern**

- **Recommended Land Pattern**
  - 2.0 TYP.
  - 1.27 TYP.
  - 0.63 TYP.

**Typical Part Marking**

- Represents total content. Layout may vary.

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Users should verify actual device performance in their specific applications.
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**Package Dimensions**

- **7.49 ± .076**
  - (295 ± .003)
- **10.34 ± .025**
  - (401 ± .001)
- **10.94 ± .05**
  - (410 ± .003)

**Governing dimensions are in metric. Dimensions in parentheses are inches and are approximate.**

- *Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

**Typical Part Marking**

- **44 20 P - 1 - 103 LF**

**For Standard Values Used in Capacitors, Inductors, and Resistors, click here.**
For information on specific applications, download Bourns’ application notes:
- DRAM Applications
- Dual Terminator Resistor Networks
- R/2R Ladder Networks
- SCSI Applications

### 4400P Series - Thick Film Surface Mounted Wide Body

#### Isolated Resistors (1 and 4 Circuits)

<table>
<thead>
<tr>
<th>Model 4416P-1</th>
<th>Model 4420P-1 (Shown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 19 18 17 16 15 14 13 12 11</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 4416P-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 19 18 17 16 15 14 13 12 11</td>
</tr>
</tbody>
</table>

#### Bussed Resistors (2 Circuit)

<table>
<thead>
<tr>
<th>Model 4416P-2</th>
<th>Model 4420P-2 (Shown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 19 18 17 16 15 14 13 12 11</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

#### Dual Terminator (3 Circuit)

<table>
<thead>
<tr>
<th>Model 4416P-3</th>
<th>Model 4420P-3 (Shown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

4420P-3 terminates 16 lines, convenient for a 16-bit computer bus.

#### Resistance Tolerance

- **10 ohms to 49 ohms**: ±1 ohm
- **50 ohms to 2.2 megohms**: ±2 %*

#### Power Rating per Resistor

- **1 Circuit at 70 °C**: 0.160 watt
- **4 Circuit at 70 °C**: 0.160 watt

#### Popular Resistance Values (1, 4 and 2 Circuits)**

<table>
<thead>
<tr>
<th>Ohms</th>
<th>Code</th>
<th>Ohms</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
<td>181</td>
<td>1,800</td>
</tr>
<tr>
<td>22</td>
<td>220</td>
<td>221</td>
<td>2,000</td>
</tr>
<tr>
<td>33</td>
<td>330</td>
<td>331</td>
<td>3,300</td>
</tr>
<tr>
<td>47</td>
<td>470</td>
<td>471</td>
<td>4,700</td>
</tr>
<tr>
<td>68</td>
<td>680</td>
<td>681</td>
<td>6,600</td>
</tr>
<tr>
<td>82</td>
<td>820</td>
<td>821</td>
<td>8,200</td>
</tr>
<tr>
<td>100</td>
<td>101</td>
<td>102</td>
<td>10,000</td>
</tr>
<tr>
<td>120</td>
<td>121</td>
<td>122</td>
<td>12,000</td>
</tr>
<tr>
<td>150</td>
<td>151</td>
<td>152</td>
<td>15,000</td>
</tr>
</tbody>
</table>

* Add “F” after resistance code for ±1 % tolerance available from 100 Ω through 1M Ω, or add “D” after resistance code for ±0.5 % tolerance available from 100 Ω through 1M Ω.

** Non-standard values available, within resistance range.

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## Surface Mounted Ordering Guide

### Electrical Configuration

<table>
<thead>
<tr>
<th>Electrical Configuration</th>
<th><em>Circuit Codes</em></th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape &amp; Reel</td>
<td>Tubes</td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>1</td>
<td>T01</td>
</tr>
<tr>
<td>Bussed</td>
<td>2</td>
<td>T02</td>
</tr>
<tr>
<td>Dual Terminated</td>
<td>3</td>
<td>T03</td>
</tr>
<tr>
<td>Adj. Isolated</td>
<td>4</td>
<td>T04</td>
</tr>
</tbody>
</table>

*4416P-X-RC: To specify package type, replace "X" with appropriate “Circuit Code”.

### Dimensions

- **POLYSTYRENE REEL (ANTI-STATIC)**
- **DIMENSIONS NOT SPECIFIED ARE PER EIA RS-481-2.**
- **DIMENSIONS: MM (IN)**

### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard Quantity per Reel</th>
<th>Carrier Tape Width (W)</th>
<th>Cover Tape Width (W)</th>
<th>Reel Width (T)</th>
<th>Pocket Center (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4416P</td>
<td>1,500</td>
<td>24.0 ± .30 (.945 ± .012)</td>
<td>21.0 NOM.</td>
<td>30.4 (1.197)</td>
<td>11.5 ± .10 (.453 ± .004)</td>
</tr>
<tr>
<td>4420P</td>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Leader Length = 500 mm min.  
Trailer Length = 500 mm min.  
Empty Component Pockets  
Sealed with Cover Tape

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