

## 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  $\pm 0.5\%$

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

### Product Characteristics

|                                       |  |
|---------------------------------------|--|
| Resistance Range                      | 10 ohms to 2.2 megohms   |
| Maximum Operating Voltage             | 50 V   |
| Temperature Coefficient of Resistance | 50 $\Omega$ and above $\pm 100$ ppm/ $^{\circ}\text{C}$<br>below 50 $\Omega$ $\pm 250$ ppm/ $^{\circ}\text{C}$ |
| TCR Tracking                          | 50 ppm/ $^{\circ}\text{C}$ maximum; equal values   |
| Operating Temperature                 | -55 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$  |
| Insulation Resistance                 | 10,000 megohms minimum   |
| Dielectric Withstanding Voltage       | 200 VRMS   |
| Lead Solderability                    | Meet requirements of MIL-STD-202 Method 208  |

### Environmental Characteristics

|                              |                 |
|------------------------------|-----------------|
| TESTS PER MIL-STD-202        | $\Delta R$ MAX. |
| Short Time Overload          | $\pm 0.25\%$    |
| Load Life                    | $\pm 1.00\%$    |
| Moisture Resistance          | $\pm 0.50\%$    |
| Resistance to Soldering Heat | $\pm 0.25\%$    |
| Thermal Shock                | $\pm 0.25\%$    |

### Physical Characteristics

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

### How To Order

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

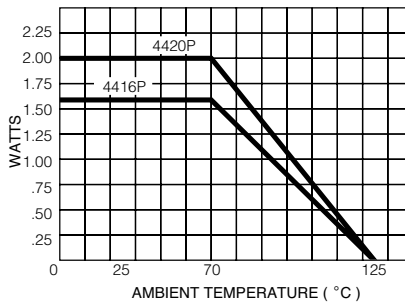
|                              |     |
|------------------------------|-----|
| Model<br>(44 = SMD SOL Pkg.) | 44  |
| Number of Pins               | 20  |
| Electrical Configuration     | P   |
| Resistance Code              | 103 |
| Resistance Tolerance         | F   |
| Terminations                 | LF  |

• 1 or 4 = Isolated\*  
 • 2 = Bussed\*  
 • 3 = Dual Terminator\*  
 • First 2 digits are significant  
 • Third digit represents the number of zeros to follow.  
 • Blank =  $\pm 2\%$  (see "Resistance Tolerance" on next page for resistance range)  
 • F =  $\pm 1\%$  (100 ohms - 1 megohm)  
 • D =  $\pm 0.5\%$  (100 ohms - 1 megohm)

• All electrical configurations EXCEPT T03:  
 LF = Tin-plated (RoHS compliant)  
 • ONLY electrical configuration T03:  
 L = Tin-plated (RoHS compliant)

\*For tube packaging, use T01, T02, T03 or T04. Consult factory for other available options.

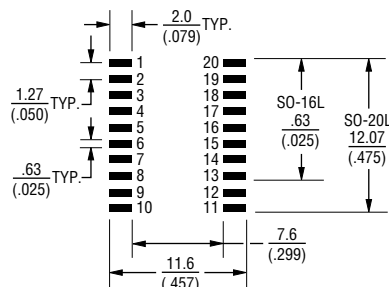
### Package Power Temp. Derating Curve



### Package Power Rating at 70 $^{\circ}\text{C}$

|       |            |
|-------|------------|
| 4420P | 2.00 watts |
| 4416P | 1.60 watts |

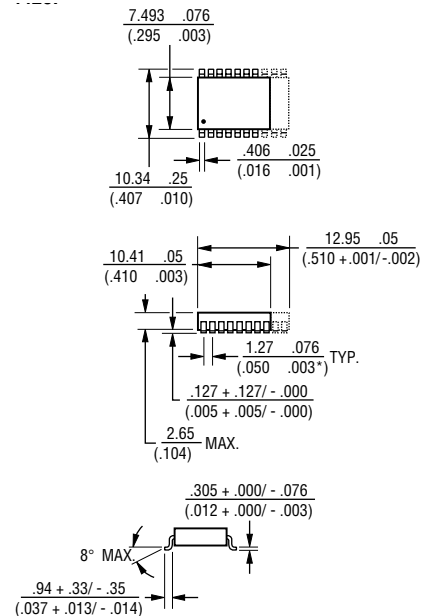
### Recommended Land Pattern



NOTE: Land pattern dimensions are based on design rules established by the Institute for Interconnecting and Packaging Electronic Circuits in IPC-SM-782.

For Standard Values Used in Capacitors, Inductors, and Resistors, [click here](#).

### Product Dimensions

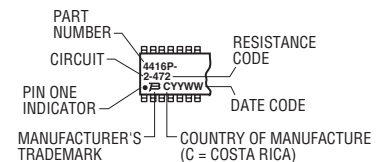


Governing dimensions are in metric. Dimensions in parentheses are inches and are approximate.

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

### Typical Part Marking

Represents total content. Layout may vary.



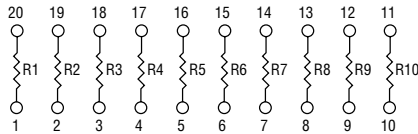
For information on specific applications, download Bourns' application notes:

- DRAM Applications
- Dual Terminator Resistor Networks
- R/2R Ladder Networks
- SCSI Applications

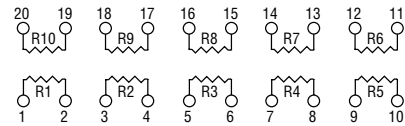
# 4400P Series - Thick Film Surface Mounted Wide Body **BOURNS®**

### Isolated Resistors (1 and 4 Circuits)

**Model 4416P-1**  
**Model 4420P-1 (Shown)**



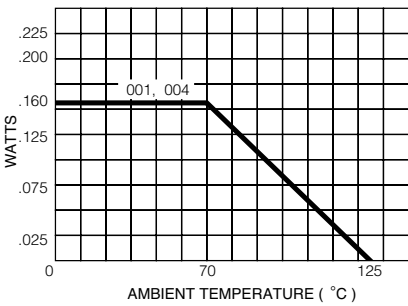
**Model 4416P-4**  
**Model 4420P-4 (Shown)**



**Resistance Tolerance**  
10 ohms to 49 ohms ..... ±1 ohm  
50 ohms to 2.2 megohms ..... ±2 %\*

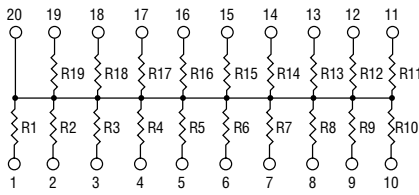
**Power Rating per Resistor**  
1 Circuit at 70 °C ..... 0.160 watt  
4 Circuit at 70 °C ..... 0.160 watt

### Resistor Power Temp. Derating Curve



### Bussed Resistors (2 Circuit)

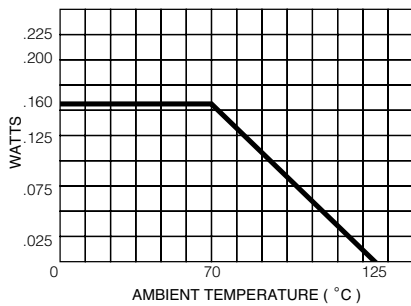
**Model 4416P-2**  
**Model 4420P-2 (Shown)**



**Resistance Tolerance**  
10 ohms to 49 ohms ..... ±1 ohm  
50 ohms to 2.2 megohms ..... ±2 %\*

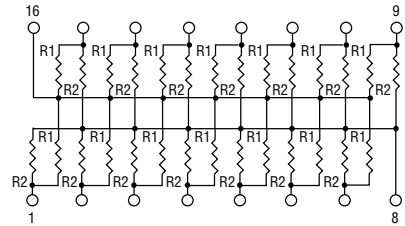
**Power Rating per Resistor**  
2 Circuit at 70 °C ..... 0.160 watt

### Resistor Power Temp. Derating Curve



### Dual Terminator (3 Circuit)

**Model 4416P-3**  
**Model 4420P-3 (Shown)**

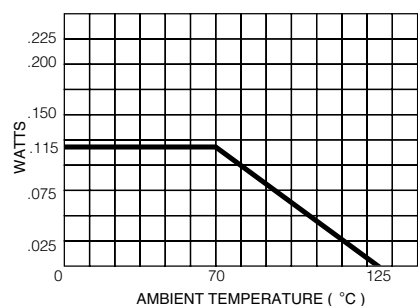


4420P-3 terminates 16 lines, convenient for a 16-bit computer bus.

**Resistance Tolerance**  
Below 100 ohms ..... ±2 ohms  
100 ohms to 2.2 megohms ..... ±2 %\*

**Power Rating per Resistor**  
3 Circuit at 70 °C ..... 0.115 watt

### Resistor Power Temp. Derating Curve



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

| Ohms | Code | Ohms  | Code | Ohms   | Code | Ohms    | Code | Ohms      | Code |
|------|------|-------|------|--------|------|---------|------|-----------|------|
| 10   | 100  | 180   | 181  | 1,800  | 182  | 15,000  | 153  | 120,000   | 124  |
| 22   | 220  | 220   | 221  | 2,000  | 202  | 18,000  | 183  | 150,000   | 154  |
| 27   | 270  | 270   | 271  | 2,200  | 222  | 20,000  | 203  | 180,000   | 184  |
| 33   | 330  | 330   | 331  | 2,700  | 272  | 22,000  | 223  | 220,000   | 224  |
| 39   | 390  | 390   | 391  | 3,300  | 332  | 27,000  | 273  | 270,000   | 274  |
| 47   | 470  | 470   | 471  | 3,900  | 392  | 33,000  | 333  | 330,000   | 334  |
| 56   | 560  | 560   | 561  | 4,700  | 472  | 39,000  | 393  | 390,000   | 394  |
| 68   | 680  | 680   | 681  | 5,600  | 562  | 47,000  | 473  | 470,000   | 474  |
| 82   | 820  | 820   | 821  | 6,800  | 682  | 56,000  | 563  | 560,000   | 564  |
| 100  | 101  | 1,000 | 102  | 8,200  | 822  | 68,000  | 683  | 680,000   | 684  |
| 120  | 121  | 1,200 | 122  | 10,000 | 103  | 82,000  | 823  | 820,000   | 824  |
| 150  | 151  | 1,500 | 152  | 12,000 | 123  | 100,000 | 104  | 1,000,000 | 105  |

\* 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.  
Part number suffix examples: -103 = 10K Ω, ±2 %; -103F = 10K Ω, ±1 %; -103D = 10K Ω, ±0.5 %

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

### Popular Resistance Values (3 Circuit)\*\*

| Resistance     |                |                |                |
|----------------|----------------|----------------|----------------|
| Ohms           |                | Code           |                |
| R <sub>1</sub> | R <sub>2</sub> | R <sub>1</sub> | R <sub>2</sub> |
| 160            | 240            | 161            | 241            |
| 180            | 390            | 181            | 391            |
| 220            | 270            | 221            | 271            |
| 220            | 330            | 221            | 331            |
| 330            | 390            | 331            | 391            |
| 330            | 470            | 331            | 471            |
| 3,000          | 6,200          | 302            | 622            |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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