



**THE DATASHEET OF  
4816P-T01-102**





## Features

- RoHS compliant\* (see How to Order "Termination" option)
- Standard EIA package compatible with automatic placement equipment
- Tape and reel packaging standard
- Custom circuits are available
- Compliant leads to reduce solder joint fatiguing
- Standard electrical schematics: isolated, bussed, dual terminator
- Now available with improved tolerance to  $\pm 0.5\%$

## 4800P Series - Thick Film Surface Mounted Medium 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/ $^{\circ}$ C  
 below 50  $\Omega$  .....  $\pm 250$  ppm/ $^{\circ}$ C  
 TCR Tracking  
 (for equal values within a package)  
 ..... 50 ppm/ $^{\circ}$ C max. for values > 50  $\Omega$ ;  
 ..... 100 ppm/ $^{\circ}$ C for values  $\leq$  50  $\Omega$   
 Operating Temperature  
 ..... -55  $^{\circ}$ C to +125  $^{\circ}$ C  
 Insulation Resistance  
 ..... 10,000 megohms min.  
 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 ..... Thermoplastic

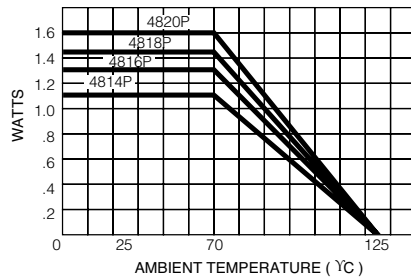
### How To Order

**48 16 P - 1 - 103**

Model \_\_\_\_\_  
 (48 = SOM Pkg.)  
 Number of Pins \_\_\_\_\_  
 Electrical Configuration \_\_\_\_\_  
 • 1 or 4 = Isolated\*  
 • 2 = Bussed\*  
 • 3 = Dual Terminator\*  
 Resistance Code \_\_\_\_\_  
 • First 2 digits are significant  
 • Third digit represents the  
 number of zeros to follow.  
 Resistance Tolerance \_\_\_\_\_  
 • 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)  
 Terminations \_\_\_\_\_  
 • All electrical configurations EXCEPT T03:  
 LF = RoHS compliant  
 • ONLY electrical configuration T03:  
 L = RoHS compliant  
 • Blank = Tin/Lead-plated

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

### Package Power Temp. Derating Curve

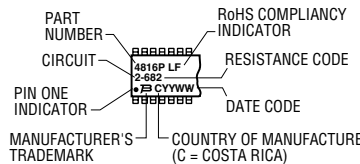


### Package Power Rating at 70 $^{\circ}$ C

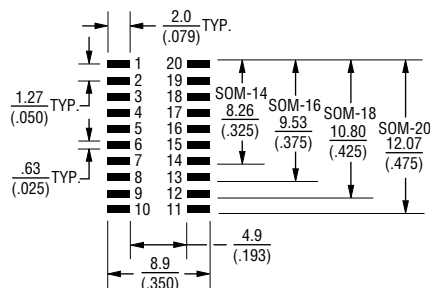
|       |            |
|-------|------------|
| 4814P | 1.12 watts |
| 4816P | 1.28 watts |
| 4818P | 1.44 watts |
| 4820P | 1.60 watts |

### Typical Part Marking

Represents total content. Layout may vary.



### Recommended Land Pattern



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

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

### Product Dimensions



Lead coplanarity .102mm (.004 inch) max. at mounting surface.

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.



**WARNING Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011. Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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

- [DRAM Applications](#)
- [Dual Terminator Resistor Networks](#)
- [R/2R Ladder Networks](#)
- [SCSI Applications](#)

## 4800P Series - Thick Film Surface Mounted Medium Body **BOURNS®**

### Isolated Resistors (1 and 4 Circuits)

**Model 4814P-1**  
**Model 4816P-1 (Shown)**  
**Model 4818P-1**  
**Model 4820P-1**



**Model 4816P-4 (Shown)**  
**Model 4820P-4**



#### Resistance Tolerance

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

#### Power Rating per Resistor

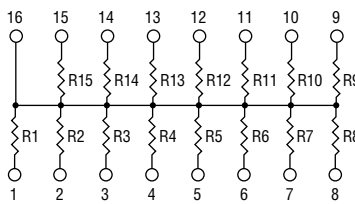
1 Circuit at 70 °C ..... 0.160 watt  
 4 Circuit at 70 °C ..... 0.160 watt

### Resistor Power Temp. Derating Curve



### Bussed Resistors (2 Circuit)

**Model 4814P-2**  
**Model 4816P-2 (Shown)**  
**Model 4818P-2**  
**Model 4820P-2**



#### 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 ..... 0.080 watt

### Resistor Power Temp. Derating Curve



### Dual Terminator (3 Circuit)

**Model 4814P-3**  
**Model 4816P-3 (Shown)**  
**Model 4818P-3**  
**Model 4820P-3**



#### Resistance Tolerance

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

#### Power Rating per Resistor

3 Circuit at 70 °C ..... 0.080 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  |

### 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            |

REV. 07/19

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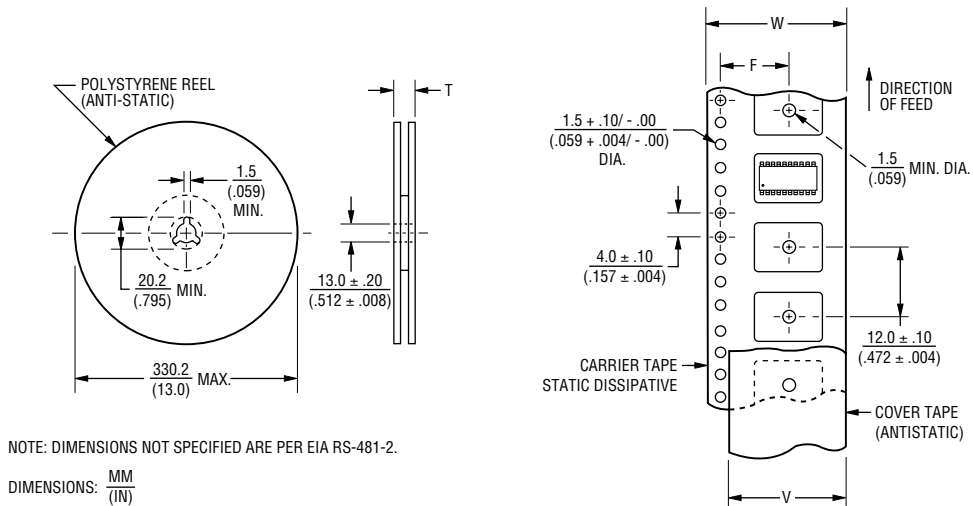
\* Add "F" after resistance code for ±1 % tolerance available from 100 Ω through 1M Ω, or add "D" after resistance code for ±0.5 % tolerance available from 100 Ω through 1M Ω.  
 Part number suffix examples: -103 = 10K Ω, ±2 %; -103F = 10K Ω, ±1 %; -103D = 10K Ω, ±0.5 %  
 \*\* Non-standard values available, within resistance range.

# Surface Mount Ordering Guide

**BOURNS®**

| Electrical Configuration | *Circuit Codes |       | Examples                                |
|--------------------------|----------------|-------|---|
|                          | Tape & Reel    | Tubes |   |
| Isolated                 | 1              | T01   | 4816P-1-101                             |
| Bussed                   | 2              | T02   | Isolated Circuit in Tape & Reel Package |
| Dual Terminated          | 3              | T03   | 4816P-T01-101                           |
| Adj. Isolated            | 4              | T04   | Isolated Circuit in Slide Tube Package  |

\*4816P-X-RC: To specify package type, replace "X" with appropriate "Circuit Code".



| Model | Standard Quantity per Reel | Carrier Tape Width (W)                 | Cover Tape Width (W)       | Reel Width (T)              | Pocket Center (F)                      |
|-------|----------------------------|--|----------------------------|-----------------------------|--|
| 4814P | 2,000                      | $\frac{24.0 \pm .30}{(.945 \pm .012)}$ | $\frac{21.0}{(.827)}$ NOM. | $\frac{30.4}{(1.197)}$ MAX. | $\frac{11.5 \pm .10}{(.453 \pm .004)}$ |
| 4816P |                            |  |                            |                             |  |
| 4818P |                            |  |                            |                             |  |
| 4820P |                            |  |                            |                             |  |

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

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