

Features

- Standard E.I.A. package compatible with automatic placement equipment
- Tape and reel packaging standard (see page 304 for dimensions)
- For ordering guidelines, see page 304
- Marking on contrasting background for permanent identification

- Compliant leads to reduce solder joint fatiguing
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available

4800P Series - Thick Film Surface Mounted Medium Body

Product Characteristics

Resistance Range10 ohms to 2.2 megohms
 Maximum Operating Voltage50V
 Temperature Coefficient of Resistance
 50Ω and above±100ppm/°C
 below 50Ω±250ppm/°C
 TCR Tracking
50ppm/°C max.; equal values
 100ppm/°C 50W and above
 Operating Temperature
-55°C to +125°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-202ΔR MAX.
 Short Time Overload±0.25%
 Load Life±1.00%
 Moisture Resistance±0.50%
 Resistance to Soldering Heat±0.25%
 Thermal Shock±0.25%

Physical Characteristics

FlammabilityConforms to UL94V-0
 Lead Frame Material
Copper, solder coated
 Body MaterialNovolac epoxy

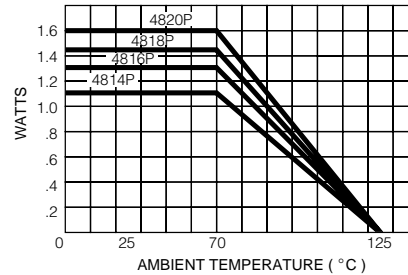
How To Order

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.

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

Package Power Temp. Derating Curve

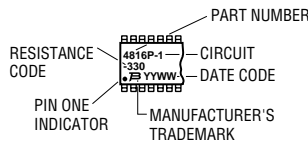


Package Power Rating at 70°C

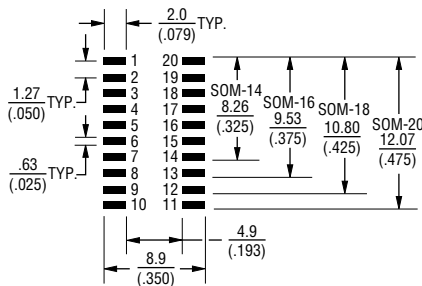
4814P1.12 watts
 4816P1.28 watts
 4818P1.44 watts
 4820P1.60 watts

Typical Part Marking

Represents total content. Layout may vary.

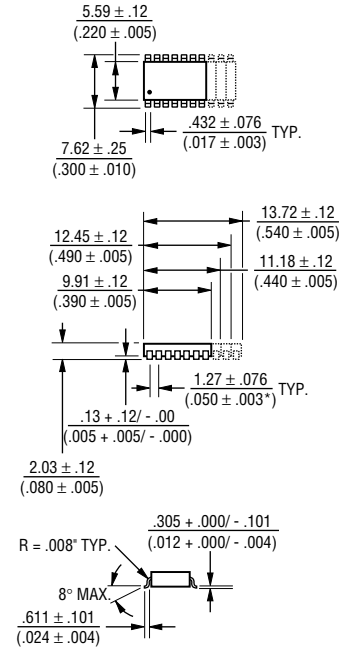


Recommended Land Pattern



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

Product Dimensions



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

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

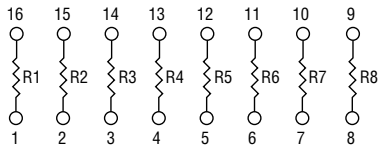
*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

4800P Series - Thick Film Surface Mounted Medium Body

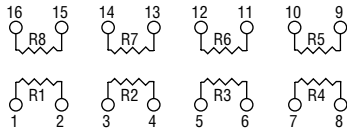


Isolated Resistors (1 And 4 Circuits)

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



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



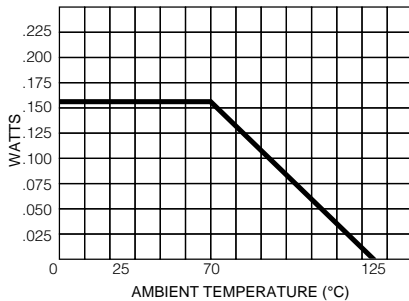
Resistance Tolerance

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

Power Rating per Resistor

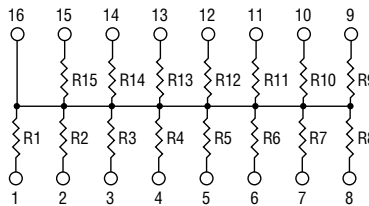
1 Circuit at 70°C0.160 watt
 4 Circuit at 70°C0.160 watt

Resistor Power Temp. Derating Curve



Bussed Resistors (2 Circuit)

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



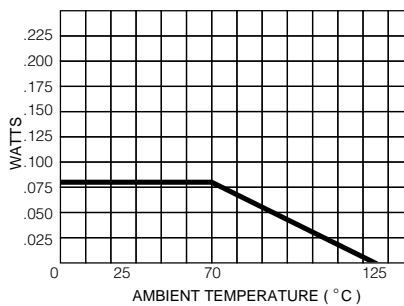
Resistance Tolerance

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

Power Rating per Resistor

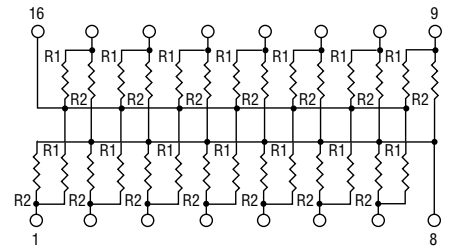
2 Circuit at 70°C0.080 watt

Resistor Power Temp. Derating Curve



Dual Terminator (3 Circuit)

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



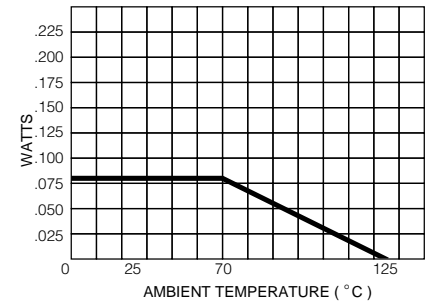
Resistance Tolerance

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

Power Rating per Resistor

3 Circuit at 70°C0.080 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 ₁ | R ₂ | R ₁ | R ₂ |
| 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 |

* ±1% TOLERANCE IS AVAILABLE BY ADDING SUFFIX CODE "F" AFTER THE RESISTANCE CODE.

**NON-STANDARD VALUES AVAILABLE, WITHIN RESISTANCE RANGE.

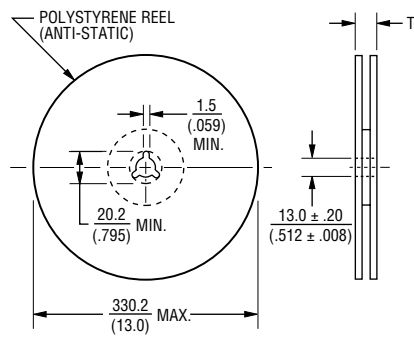
Specifications are subject to change without notice.

Surface Mounted Ordering Guide



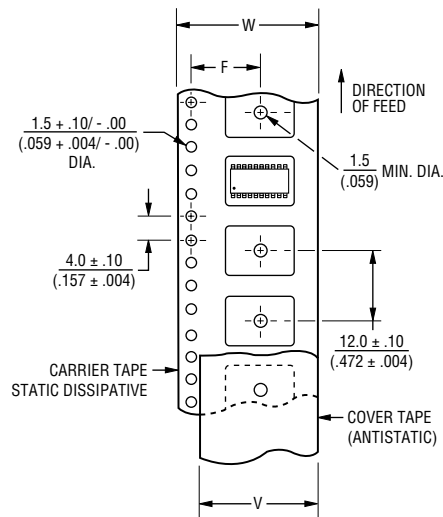
| Electrical Configuration | *Circuit Codes | | Examples |
|--------------------------|----------------|-------|---|
| | Tape & Reel | Tubes | |
| Isolated | 1 | T01 | 4816P-1-101 |
| Bussed | 2 | T02 | Isolated Circuit in Tape & Reel Package |
| Dual Terminated | 3 | T03 | |
| Adj. Isolated | 4 | T04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

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



NOTE: DIMENSIONS NOT SPECIFIED ARE PER EIA RS-481-2.

DIMENSIONS: $\frac{\text{MM}}{(\text{IN})}$



| Model | Standard Quantity Per Reel | Carrier Tape Width (W) | Cover Tape Width (V) | Reel Width (T) | Pocket Center (F) |
|----------------------------------|----------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|
| 4416P | 1,500 | $24.0 \pm .30$ (.945 ± .012) | 21.0 (.827) NOM. | 30.4 (1.197) MAX. | $11.5 \pm .10$ (.453 ± .004) |
| 4420P | 1,500 | | | | |
| 4814P 4816P 4818P 4820P | 2,000 | | | | |
| 4908P 4914P 4916P | 2,500 | 12mm 12mm 16mm | Contact Factory | Contact Factory | 8mm 8mm 8mm |

Leader Length = 500 min.
Trailer Length = 500mm min.



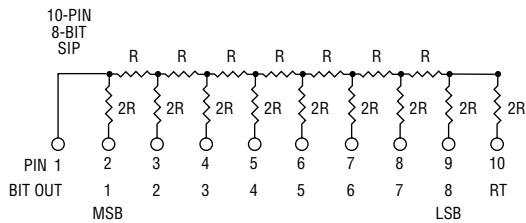
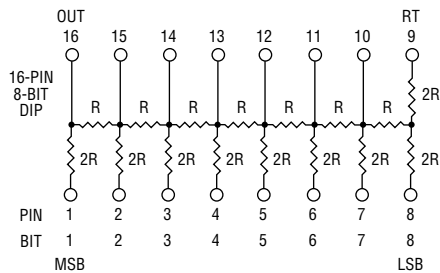
Empty Component Pockets
Sealed with Cover Tape

Specifications are subject to change without notice.

R/2R Ladder Networks



R/2R Ladder Networks are available in both DIP and SIP (Molded or Conformal) configurations.



The R/2R Ladder Network is commonly used for Digital to Analog (D/A) conversions and Analog to Digital (A/D) conversion by successive approximations. The bits of the ladder are the points at which input signals are presented to the ladder and the output terminal (OUT) is the point at which the output is

taken from the R/2R ladder. This terminal (OUT) is commonly used to drive an operational amplifier. R_T (the terminating resistor) is always connected to ground.

Standard R/2R Ladder Networks have a resistance tolerance of $\pm 2.0\%$ ($\pm 1.0\%$ available on all but low profile SIPs).

Standard R/2R Ladder Networks

Availability is as follows:

| DIP/SMD | SIP-CONFORMAL | SIP MOLDED |
|----------------|-----------------|----------------|
| 14 Pin - 7 Bit | 6 Pin - 4 Bit | 6 Pin - 4 Bit |
| 16 Pin - 8 Bit | 7 Pin - 5 Bit | 8 Pin - 6 Bit |
| | 8 Pin - 6 Bit | 10 Pin - 8 Bit |
| | 9 Pin - 7 Bit | |
| | 10 Pin - 8 Bit | |
| | 11 Pin - 9 Bit | |
| | 12 Pin - 10 Bit | |
| | 14 Pin - 12 Bit | |

Resistor Power Ratings @ 70° C

| | |
|-----------------------|-------|
| Low Profile SIP & DIP | .125W |
| Medium Profile SIP | .170W |
| High Profile SIP | .200W |

How To Order R/2R Ladder Networks

41 16 R - R2R - 503

Model

- (41 = Molded DIP)
- (43 = Molded SIP)
- (44 = Wide Body SMD)
- (46 = Conformal SIP)
- (48 = SMD)

Number of Pins

Physical Configuration

- (R = Low Profile - Molded)
- (X = Low Profile - Conformal)
- (M = Medium Profile)
- (H = High Profile)
- (P = Medium Body SOIC)

Resistance/Capacitance Code

- (For value of R). 2R is double this value.
- First 2 digits are significant.
- Third digit represents the number of zeros to follow.

Electrical Configuration

- R2R = R/2R Ladder Network