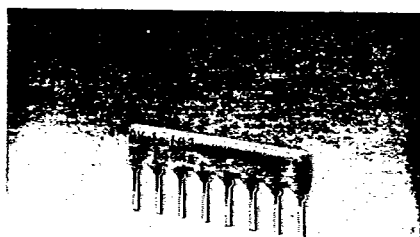


T-62-05

**BOURNS****Model 4600X****® Resistor Networks**

## CONFORMAL SIPs, LOW PROFILE 4 THROUGH 14 PIN

- Low profile is compatible with DIPs
- Wide assortment of pin packages enhances design flexibility
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

### Electrical Characteristics

#### Standard Resistance Values

.....10 ohms to 10 megohms

Maximum Operating Voltage...100V

Temperature Coefficient of Resistance (TCR)..... $\pm 100\text{ppm}/^\circ\text{C}$  $\pm 250\text{ppm}/^\circ\text{C}$  for values

less than 50 ohms and

greater than 2.2 megohms

Voltage Coefficient..... $\pm 100\text{ppm}/\text{V}$ 

typical by decade values

TCR Tracking.....50ppm/ $^\circ\text{C}$ 

maximum; equal values

Resistor Tolerance.....See circuits

Operating Temperature

..... $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ Power Rating.....Derate to zero power from  $+70^\circ\text{C}$  to  $+125^\circ\text{C}$ 

### Environmental Characteristics

Tests per MIL-R-83401.  $\Delta R$  maximumShort Time Overload..... $\pm 0.25\%$ Load Life..... $\pm 1.00\%$ Mechanical Shock..... $\pm 0.25\%$ Moisture Resistance..... $\pm 0.50\%$ 

Resistance to Soldering Heat

..... $\pm 0.25\%$ Terminal Strength..... $\pm 0.25\%$ Thermal Shock..... $\pm 0.25\%$ Vibration..... $\pm 0.25\%$ 

Insulation Resistance

.....10,000 megohms minimum

Dielectric Withstanding Voltage

.....200 VRMS

Lead Solderability &amp; Solvent Resistance

Meet requirements of MIL-R-83401

### Physical Characteristics

Flammability...Conforms to UL94V-0

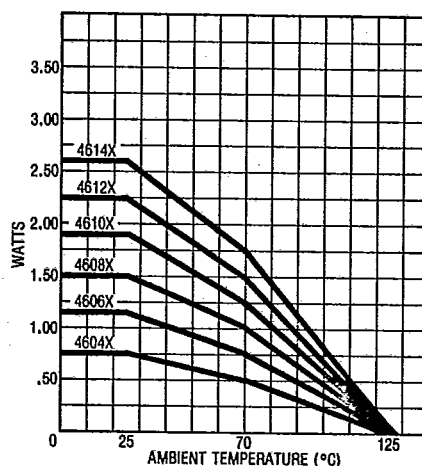
Lead Frame Material

Copper (OLIN 194) 60/40 solder dip

Body Material

Epoxy resin/anhydride diphenol A

### PACKAGE POWER TEMPERATURE DERATING CURVE



### PACKAGE POWER RATINGS (Watts)

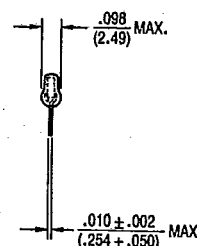
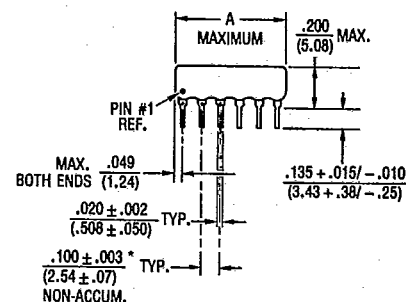
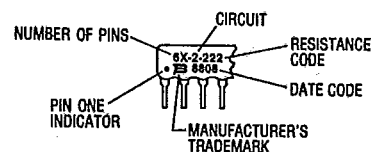
| Pkg.  | Ambient Temperature |      | Pkg.  | Ambient Temperature |      |
|-------|---------------------|------|-------|---------------------|------|
|       | 70°C                | 25°C |       | 70°C                | 25°C |
| 4604X | 0.50                | 0.75 | 4610X | 1.25                | 1.88 |
| 4605X | 0.63                | 0.94 | 4611X | 1.38                | 2.06 |
| 4606X | 0.75                | 1.13 | 4612X | 1.50                | 2.25 |
| 4607X | 0.88                | 1.31 | 4613X | 1.63                | 2.44 |
| 4608X | 1.00                | 1.50 | 4614X | 1.75                | 2.63 |
| 4609X | 1.13                | 1.69 |       |                     |      |

### TYPICAL PART MARKING

Represents total content. Layout may vary.

| Part Number     | Part Marking |
|-----------------|--------------|
| 4606X-101-RC    | 6X-1-RC      |
| 4608X-102-RC    | 8X-2-RC      |
| 4610X-104-RC/RC | 10X-4-RC/RC  |

RC = ohmic value, 3-digit resistance code.



| Pin Count | A Maximum inches (mm) |
|-----------|-----------------------|
| 4         | .398 (10.11)          |
| 5         | .498 (12.65)          |
| 6         | .598 (15.19)          |
| 7         | .698 (17.73)          |
| 8         | .798 (20.27)          |
| 9         | .898 (22.81)          |
| 10        | .998 (25.35)          |
| 11        | 1.098 (27.89)         |
| 12        | 1.198 (30.43)         |
| 13        | 1.298 (32.97)         |
| 14        | 1.398 (35.51)         |

Maximum package length is equal to .100" (2.54mm) times the number of pins, less .002" (.05mm).

Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

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

### HOW TO ORDER CONFORMAL SIP NETWORKS

46 06 X - 101 - 222

Model  
(46 = Conformal SIP)

Number of Pins

Physical Configuration  
(X = Low Profile)

Resistance Code

- First 2 digits are significant.
- Third digit represents the number of zeros to follow.

Electrical Configuration

- 101 = Bussed
- 102 = Isolated
- 104 = Dual Terminator

T-62-05

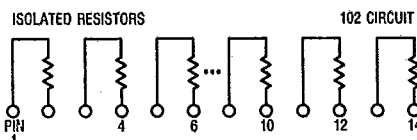
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

## Model 4600X

® Resistor Networks

### ISOLATED RESISTORS (102 CIRCUIT)

**Model 4600X-102-RC**  
4, 6, 8, 10, 12 or 14 Pin



These models incorporate 2 to 7 isolated thick-film resistors of equal value, each connected between two pins.

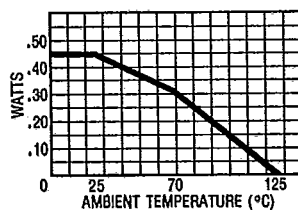
#### Resistance Tolerance

10 ohms to 49 ohms.....  $\pm 1$  ohm  
50 ohms to 5 megohms.....  $\pm 2\%$ \*  
Above 5 megohms.....  $\pm 5\%$

#### Power Rating per Resistor

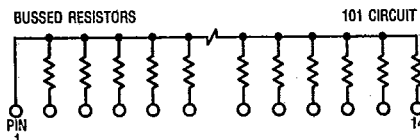
At 70°C.....0.30 watt  
At 25°C.....0.45 watt

#### POWER TEMPERATURE DERATING CURVE



### BUSSED RESISTORS (101 CIRCUIT)

**Model 4600X-101-RC**  
4 through 14 Pin



These models incorporate 3 to 13 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

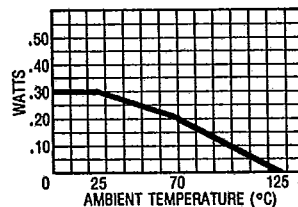
#### Resistance Tolerance

10 ohms to 49 ohms.....  $\pm 1$  ohm  
50 ohms to 5 megohms.....  $\pm 2\%$ \*  
Above 5 megohms.....  $\pm 5\%$

#### Power Rating per Resistor

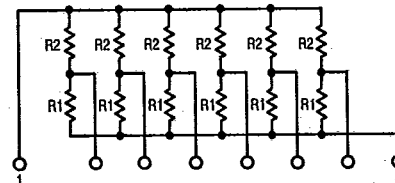
At 70°C.....0.20 watt  
At 25°C.....0.30 watt

#### POWER TEMPERATURE DERATING CURVE



### DUAL TERMINATORS (104 CIRCUIT)

**Model 4600X-104-R1/R2**  
4 through 14 Pin



The 4608X-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

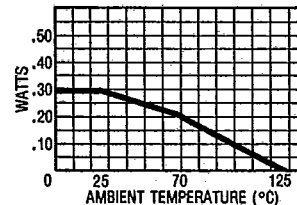
#### Resistance Tolerance

Below 100 ohms.....  $\pm 2$  ohms  
100 ohms to 5 megohms.....  $\pm 2\%$ \*  
Above 5 megohms.....  $\pm 5\%$

#### Power Rating per Resistor

At 70°C.....0.20 watt  
At 25°C.....0.30 watt

#### POWER TEMPERATURE DERATING CURVE



### STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

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

### STANDARD RESISTANCE VALUES (104 CIRCUITS)

| 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            |

Specifications are subject to change without notice.

\*  $\pm 1\%$  tolerance is available by adding suffix code "F" after the resistance code.

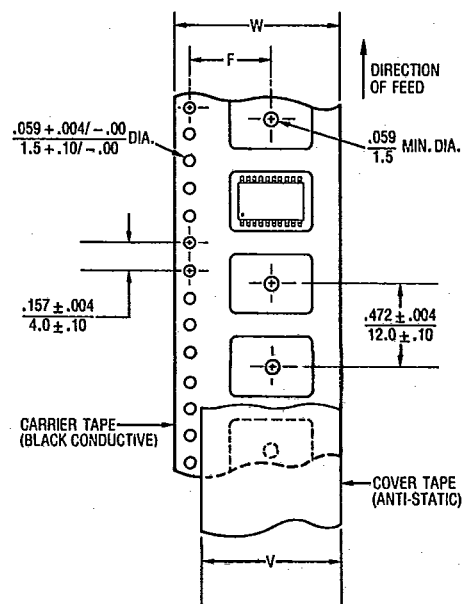
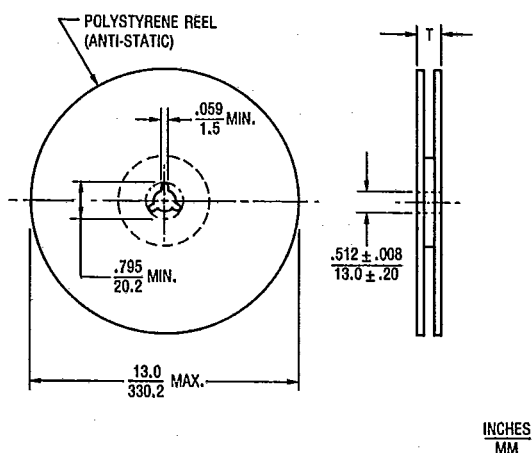
**BOURNS**

T-90-20

# RESISTOR NETWORKS SURFACE MOUNT TAPE AND REEL SPECIFICATIONS

| Model          | Standard Quantity Per Reel | Carrier Tape Width (W)               | Cover Tape Width (V)     | Reel Width (T)           | Pocket Center (F)                    |
|----------------|----------------------------|--------------------------------------|--------------------------|--------------------------|--------------------------------------|
| 4210P<br>4220P | 1,000                      | $\frac{.630 \pm .012}{16.0 \pm .30}$ | $\frac{.524}{13.3}$ NOM. | $\frac{.882}{22.4}$ MAX. | $\frac{.295 \pm .004}{7.5 \pm .10}$  |
| 4416P<br>4416J | 1,500                      |                                      |                          |                          |                                      |
| 4814P          | 2,000                      |                                      |                          |                          |                                      |
| 4420P<br>4420J | 1,500                      | $\frac{.945 \pm .012}{24.0 \pm .30}$ | $\frac{.827}{21.0}$ NOM. | $\frac{1.43}{36.4}$ MAX. | $\frac{.453 \pm .004}{11.5 \pm .10}$ |
| 4816P          | 2,000                      |                                      |                          |                          |                                      |

Leader Length =  $530 \pm 30$ mm } Empty Component Pockets  
 Trailer Length = 500mm Min. } Sealed With Cover Tape



NOTE: Dimensions not specified are per EIA RS-481.  
 Governing dimensions are in millimeters.