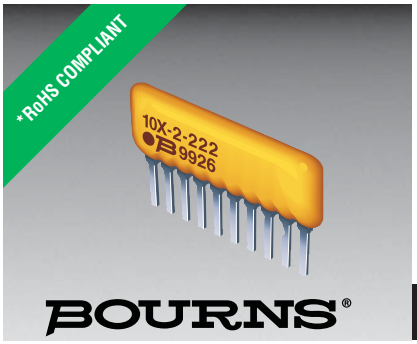


Features

- RoHS compliant*
- Low profile is compatible with DIPs
- Wide assortment of pin packages enhances design flexibility
- Ammo-pak packaging available
- Recommended for rosin flux and solvent clean or no clean flux processes
- Marking on contrasting background for permanent identification

4600X Series - Thick Film Conformal SIPs

Product Characteristics

Resistance Range
.....10 ohms to 10 megohms
Maximum Operating Voltage.....100 V
Temperature Coefficient of Resistance
50 Ω to 2.2 megohms ... ±100 ppm/°C
below 50 Ω..... ±250 ppm/°C
above 2.2 megohms ..... ±250 ppm/°C
TCR Tracking..... 50 ppm/°C maximum; equal values
Resistor Tolerance..... See circuits
Insulation Resistance
..... 10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Operating Temperature
..... -55 °C to +125 °C

Environmental Characteristics

TESTS PER MIL-STD-202.....ΔR MAX.
Short Time Overload ..... ±0.25 %
Load Life..... ±1.00 %
Moisture Resistance..... ±0.50 %
Resistance to Soldering Heat
..... ±0.50 %
Terminal Strength ..... ±0.25 %
Thermal Shock ..... ±0.25 %

Physical Characteristics

Flammability .....Conforms to UL94V-0
Body Material ..... Epoxy resin
Standard Packaging
.....Bulk, Ammo-pak available

How To Order

46 06 X - 101 - 222 __ LF

Model
(46 = Conformal SIP)

Number of Pins

Physical Configuration
(X = Thick Film Low Profile)

Electrical Configuration
- 101 = Bussed
- 102 = Isolated
- 104 = Dual Terminator
- AP1 = Bussed Ammo**
- AP2 = Isolated Ammo**
- AP4 = Dual Ammo**

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

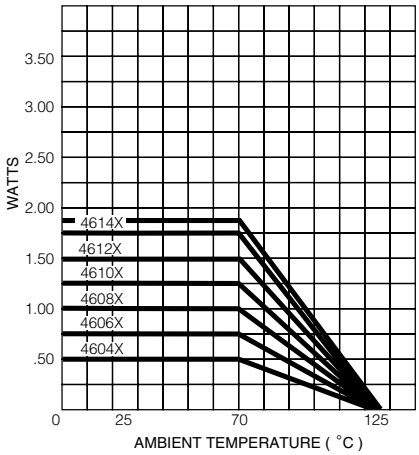
Resistance Tolerance
- Blank = ±2 % (see "Resistance Tolerance" on next page for resistance range)
- F = ±1 % (100 ohms - 5 megohms)

Terminations
- All electrical configurations EXCEPT 104 & AP4: LF = Sn/Ag/Cu-plated (RoHS compliant)
- ONLY electrical configurations 104 & AP4: L = Sn/Ag/Cu-plated (RoHS compliant)

Consult factory for other available options.

**Available for packages with 10 pins or less.

Package Power Temp. Derating Curve



Package Power Ratings (Watts)

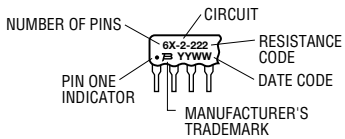
Pkg.	Ambient Temp. 70 °C	Pkg.	Ambient Temp. 70 °C
4604X	0.50	4610X	1.25
4605X	0.63	4611X	1.38
4606X	0.75	4612X	1.50
4607X	0.88	4613X	1.63
4608X	1.00	4614X	1.75
4609X	1.13		

Typical Part Marking

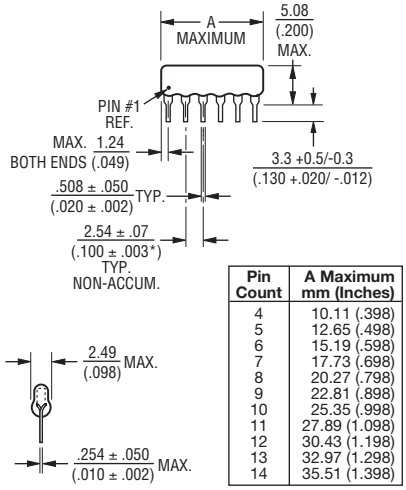
Represents total content. Layout may vary.

Part Number	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.



Product Dimensions



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

Maximum package length is equal to 2.54mm (.100") times the number of pins, less .005mm (.002").

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.

For Standard Values Used in Capacitors, Inductors, and Resistors, click here.

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex.
Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.

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

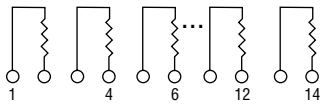
- DRAM Applications
- Dual Terminator Resistor Networks
- R/2R Ladder Networks
- SCSI Applications

4600X Series - Thick Film Conformal SIPs

BOURNS®

Isolated Resistors (102 Circuit)

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



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

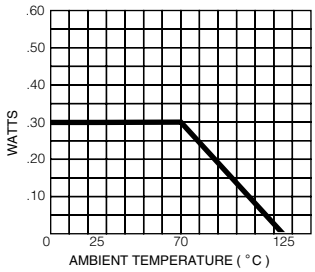
Resistance Tolerance

10 ohms to 49 ohms .....±1 ohm
50 ohms to 5 megohms .....±2 %*
Above 5 megohms ..... ±5 %

Power Rating per Resistor

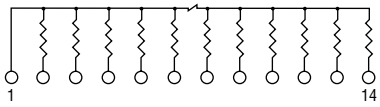
At 70 °C .....0.30 watt

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.

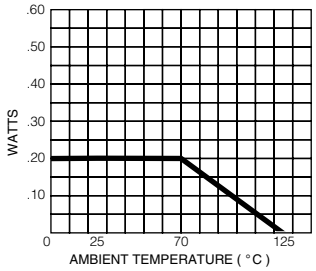
Resistance Tolerance

10 ohms to 49 ohms .....±1 ohm
50 ohms to 5 megohms .....±2 %*
Above 5 megohms ..... ±5 %

Power Rating per Resistor

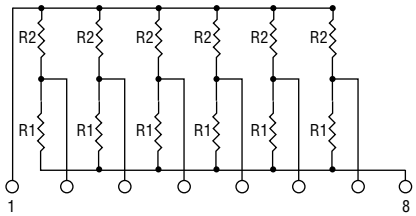
At 70 °C .....0.20 watt

Power Temperature Derating Curve



Dual Terminator (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).

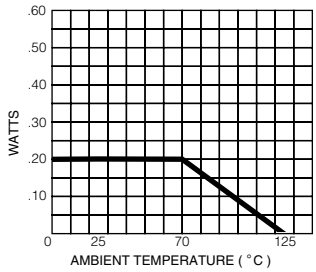
Resistance Tolerance

Below 100 ohms.....±2 ohms
100 ohms to 5 megohms .....±2 %*
Above 5 megohms ..... ±5 %

Power Rating per Resistor

At 70 °C .....0.20 watt

Power Temperature Derating Curve



Popular Resistance Values (101, 102 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

* ±1 % tolerance is available by adding suffix code "F" after the resistance code.
**Non-standard values available, within resistance range.

Popular Resistance Values (104 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

Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Bourns:

4608X-101-153 4606X-101-561 4605X-101-124 4608X-102-304F 4606X-101-514 4608X-102-304 4610X-101-111F 4610X-101-271 4608X-102-303F 4610X-102-563F 4610X-102-564 4606X-102-101F 4605X-101-272 4610X-R2R-471 4605X-101-225 4606X-102-821 4606X-102-104 4608X-1T1-102 4610X-102-151 4607X-101-104 4614X-101-681 4610X-102-111 4608X-101-103F 4606X-AP1-333 4614X-102-823 4604X-102-561F 4610X-102-121 4606X-102-103F 4606X-1T1-101 4610X-101-513 4608X-1T1-202 4610X-102-101 4610X-102-181 4610X-101-563 4610X-102-161 4608X-101-104F 4610X-101-123 4610X-101-183 4606X-102-104F 4610X-101-153 4609X-1T1-102 4608X-104-302/622 4609X-1T1-105 4610X-AP1-473 4606X-102-471 4609X-101-821 4610X-AP1-681 4606X-101-823 4614X-102-473 4610X-101-103 4604X-101-822 4605X-101-751 4606X-AP1-561 4610X-AP1-201 4610X-AP1-202 4610X-101-251F 4606X-1T1-102 4610X-AP1-273 4606X-101-473 4604X-102-562 4610X-102-565 4610X-AP1-562 4610X-101-224F 4606X-102-184 4610X-102-562 4610X-102-512 4610X-AP1-512 4612X-102-272 4609X-101-471 4612X-102-242 4612X-102-222 4604X-102-515 4607X-101-123 4606X-102-204 4608X-101-322 4612X-101-151 4607X-101-153 4608X-1T2-220 4608X-1T2-151 4612X-101-563 4608X-1T2-330 4605X-101-684 4608X-1T2-121 4610X-102-824 4610X-102-823F 4608X-1T2-470 4610X-104-181/391 4608X-102-144 4608X-1T2-150 4612X-101-103 4608X-1T2-101 4608X-1T2-560 4608X-104-221/331 4604X-102-363 4605X-101-112 4609X-101-184 4612X-102-681 4610X-AP2-391 4610X-102-560 4610X-102-390