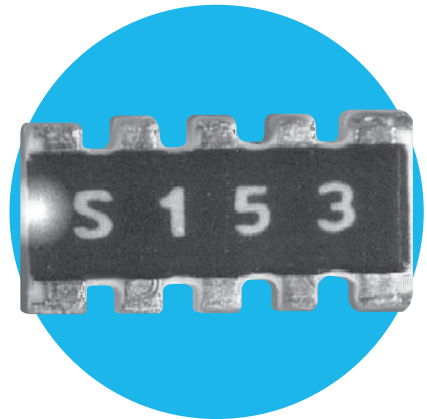


## Thick Film Chip Arrays

## BCN Series

- Sulphur resistant version available (Tested to ASTM-B809)
- AEC-Q200 (BCN10, BCN164AB and BCN4D)
- Concave and convex versions
- Isolated and bussed versions



 All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Summary of Types

| Type   | Part Number Start | Width (mm) | Resistor Elements | Circuit             | Package Size | Scalloped Convex | Square Convex | Square Concave |
|--------|-------------------|------------|-------------------|---------------------|--------------|------------------|---------------|----------------|
| BCN10  | BCN104AB          | 1.0        | 0402 x 4          | Isolated            | 0804         |                  |               |                |
| BCN164 | BCN164A           | 1.6        | 0603 x 4          |                     | 1206         |                  |               |                |
|        | BCN164AB          |            |                   |                     |              |                  |               |                |
|        | BCN164ABI         |            |                   |                     |              |                  |               |                |
| BCN168 | BCN168SB          |            | 0603 x 8          | Bussed              |              |                  |               |                |
|        | BCN168RB          |            |                   |                     |              |                  |               |                |
| BCN21  | BCN218SBI         | 2.1        | 0804 x 8          |                     | 1608         |                  |               |                |
| BCN4D  | BCN4D             | 3.1        | 1206 x 4          | Isolated            | 2112         |                  |               |                |
|        | BCN4DBI           |            |                   |                     |              |                  |               |                |
| BCN31  | BCN318SB          |            | 1206 x 8          | Bussed <sup>1</sup> | 2512         |                  |               |                |
|        | BCN318RB          |            |                   |                     |              |                  |               |                |
|        | BCN318SBI         |            |                   |                     |              |                  |               |                |
|        | BCN318RBI         |            |                   |                     |              |                  |               |                |

**Note 1** – For R/2R ladder circuit see separate BCN31L datasheet

## Electrical Data

|                             |        | BCN10                        | BCN164A<br>BCN164AB | BCN164ABI | BCN168     | BCN21      | BCN4D     | BCN31     |
|-----------------------------|--------|------------------------------|---------------------|-----------|------------|------------|-----------|-----------|
| Resistor power rating @70°C | mW     | 63                           |                     |           | 32         | 63         | 125       | 63        |
| Package power rating @70°C  | mW     | 250                          |                     |           |            | 500        |           |           |
| Limiting element voltage    | V      | 25                           | 50                  |           | 25         |            | 75        | 50        |
| Maximum overload voltage    | V      | 63                           | 125                 |           | 63         |            | 188       | 125       |
| Resistance range            | ohms   | 10R – 1M0                    |                     |           | 100R – 1M0 | 68R – 220K | 10R – 1M0 | 22R – 1M0 |
| Resistance tolerance        | %      | 1, 5                         | 1, 2, 5             |           | 5          |            | 1, 5      | 1, 2, 5   |
| TCR                         | ppm/°C | ±200                         | ±100, ±200          | ±200      |            |            |           |           |
| Standard values             |        | E24 preferred, E96 available |                     |           |            |            |           |           |
| Ambient temperature range   | °C     | -55 to +155                  |                     |           |            |            |           |           |

## General Note

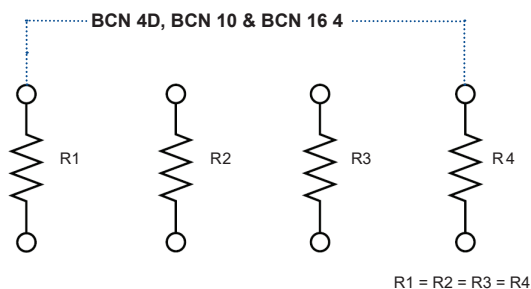
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BI Technologies IRC Welwyn

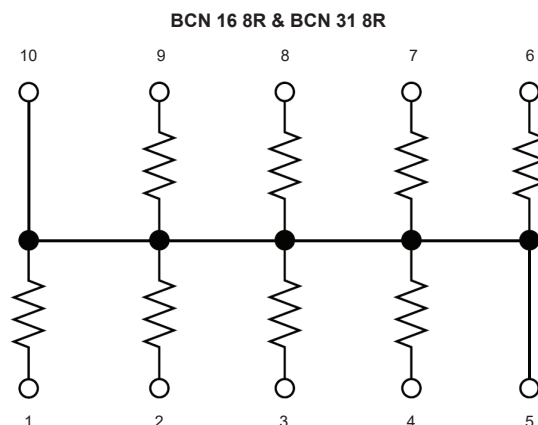
[www.ttelectronics.com/resistors](http://www.ttelectronics.com/resistors)

## Circuits

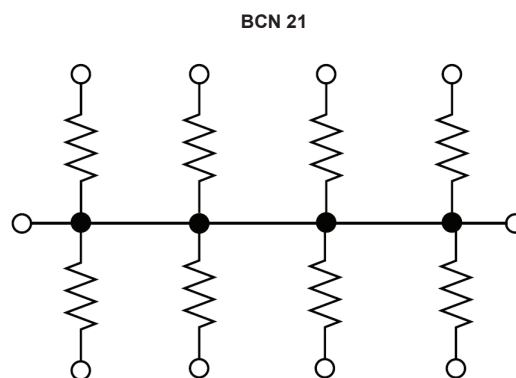
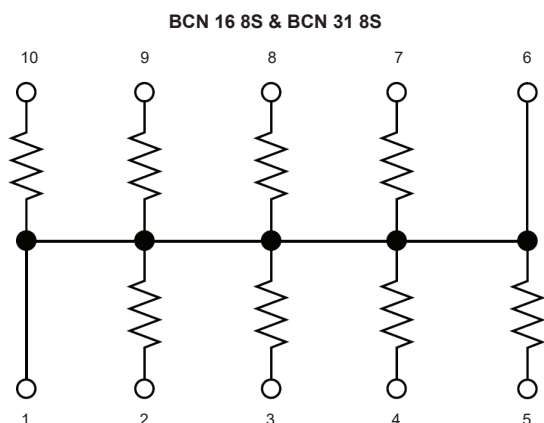
### Isolated



### Reverse Bussed



### Standard Bussed



## Environmental Data

| Test                            | Condition                                        | $\Delta R\%$ (+0.1 $\Omega$ )          |                                        |
|---------------------------------|--------------------------------------------------|----------------------------------------|----------------------------------------|
|                                 |                                                  | $\pm 200\text{ppm}/^\circ\text{C TCR}$ | $\pm 100\text{ppm}/^\circ\text{C TCR}$ |
| Load life                       | 1000 hrs cyclic load @ 70°C                      | 3                                      | 1                                      |
| Short term overload             | 2.5 x rated voltage for 5s                       | 2                                      | 0.25                                   |
| High temperature operation      | 1000 hrs @ 155°C                                 | 3                                      | 1                                      |
| Temperature cycling             | 5 cycles, -55 to +155°C                          | 1                                      | 1                                      |
| Moisture resistance             | 1000 hrs @ 40°C, 95% RH                          | 3                                      | 1                                      |
| Resistance to solder heat       | 260°C for 10s                                    | 1                                      | 0.25                                   |
| Sulphur resistance <sup>1</sup> | 1000 hrs @ 50°C, 92% RH, 3-5ppm H <sub>2</sub> S | 0.5                                    | 0.5                                    |

Note 1 – Anti-sulphur construction only

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## Physical Data (Inch /mm)

| <div> <div> Scalloped Edge: Models BCN 4D, 16 4A </div> <div> Exterior Termination (Convex)<br/> Square Edge: Models BCN 16 4AB, 31 </div> </div> |                       |                 |            |             |            |            |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|------------|-------------|------------|------------|--------------|
|                                                                                                                                                   | L (BCN 4D, BCN 16 4A) | W               | H          | P           | B          | B1         | C            |
| BCN 4D                                                                                                                                            | .210 ±.008            | .122 ±.008      | .022 ±.004 | .050 ±.008  | .030 ±.008 | -          | .012 ±.008   |
|                                                                                                                                                   | 5.34 ±0.20            | 3.10 ±0.20      | 0.55±0.10  | 1.27±0.20   | 0.80 ±0.20 | -          | 0.30 ±0.20   |
| BCN 10                                                                                                                                            | .079 ±.004            | .039 ±.004      | .018 ±.004 | .020 ±.002  | .012 ±.002 | .016±.002  | .012±.006    |
|                                                                                                                                                   | 2.00 ±0.10            | 1.00 ±0.10      | 0.45 ±0.10 | 0.50 ±0.05  | 0.30 ±0.05 | 0.40 ±0.05 | 0.3 ±0.15    |
| BCN 16 4A/ AB                                                                                                                                     | .126 ±.004            | .063 ±.004      | .020 ±.004 | .031 ±.002  | .020 ±.004 | -          | .009 ±.005   |
|                                                                                                                                                   | 3.20 ±0.10            | 1.60 ±0.10      | 0.50 ±0.10 | 0.80 ±0.05  | 0.50 ±0.10 | -          | 0.229 ±0.125 |
| BCN 31                                                                                                                                            | .252 ±.008            | .122±.012,-.008 | .022 ±.004 | .050 ±.002  | .032 ±.004 | .041±.004  | .012 ±.004   |
|                                                                                                                                                   | 6.40 ±0.20            | 3.1 ±0.3, -0.2  | 0.55 ±0.10 | 1.27 ±0.051 | 0.80 ±0.10 | 1.05±0.10  | 0.30 ±0.10   |

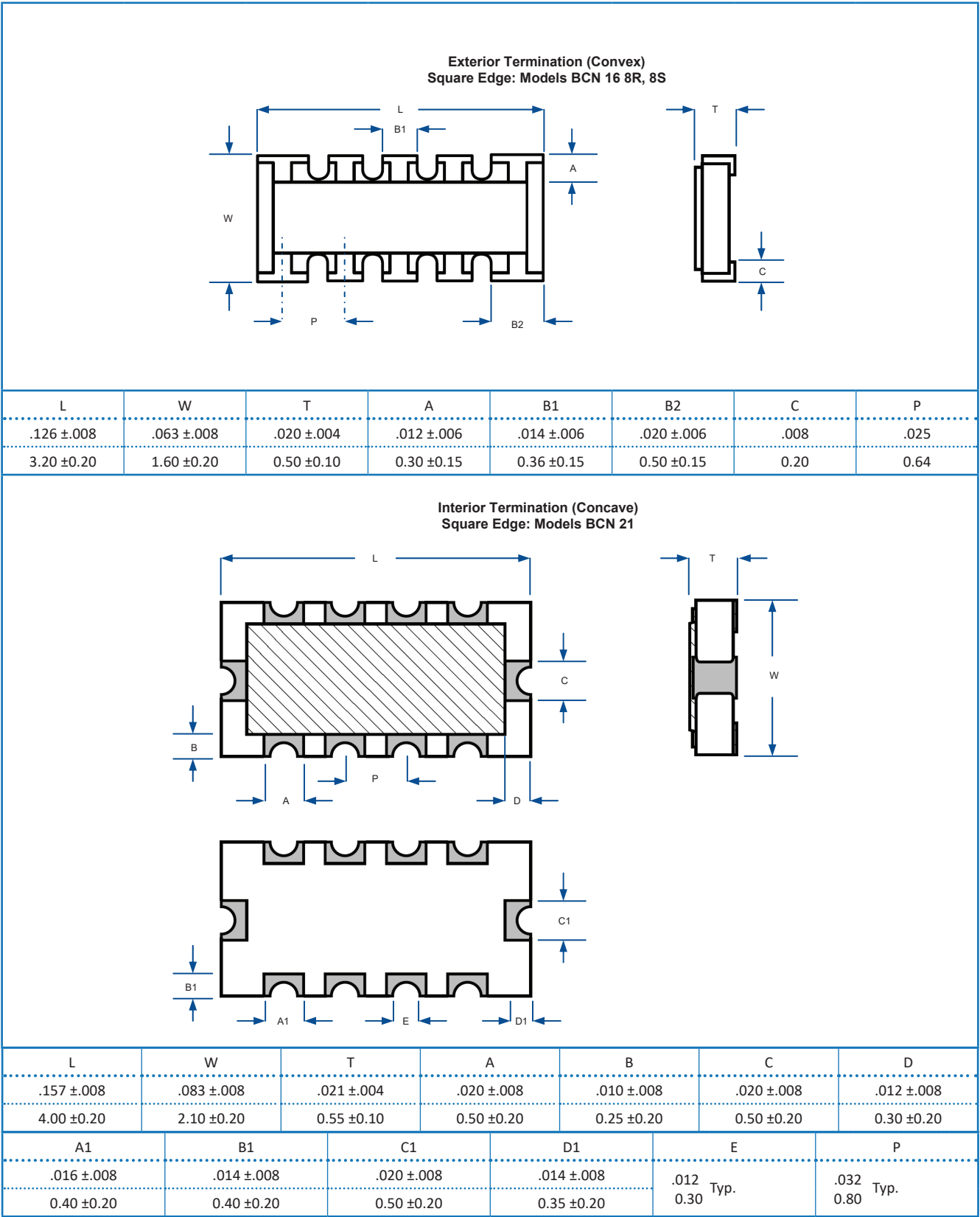
| <div> <div> Interior Termination (Concave)<br/> Square Edge: Models BCN 4 DBI, 16 4ABI, 31 </div> </div> |            |            |            |            |            |            |                                        |
|----------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|----------------------------------------|
|                                                                                                          | L          | W          | H          | P          | B          | C          | C1                                     |
| BCN 4 DBI                                                                                                | .210 ±.008 | .122 ±.008 | .022 ±.004 | .050 ±.008 | .030 ±.008 | .012 ±.008 | -                                      |
|                                                                                                          | 5.34 ±0.20 | 3.10 ±0.20 | 0.55 ±0.10 | 1.27 ±0.20 | 0.80 ±0.20 | 0.30 ±0.20 | -                                      |
| BCN 16 4ABI                                                                                              | .126 ±.008 | .063 ±.006 | .024 ±.004 | .031 ±.004 | .016 ±.006 | .012 ±.008 | .012 ±.008                             |
|                                                                                                          | 3.20 ±0.20 | 1.60 ±0.15 | 0.60 ±0.10 | 0.80 ±0.10 | 0.40 ±0.15 | 0.30 ±0.20 | 0.30 ±0.20                             |
| BCN 31                                                                                                   | .252 ±.008 | .122 ±.008 | .024 ±.004 | .050       | .028 ±.008 | .012       | .012 <sup>+.008</sup> <sub>-.004</sub> |
|                                                                                                          | 6.40 ±0.20 | 3.10 ±0.20 | 0.60 ±0.10 | 1.27       | 0.70 ±0.20 | 0.30       | 0.30 <sup>+.02</sup> <sub>-.01</sub>   |

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Physical Data (Inch /mm)



General Note

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BCN Series

Solder pad layout (Inch / mm)

|                                                              |                     |      |      |      |      |      |                        |      |      |      |      |
|--------------------------------------------------------------|---------------------|------|------|------|------|------|------------------------|------|------|------|------|
| <div><div>BCN 31 Only</div><div>BCN 16 4AB, 4ABI</div></div> |                     |      |      |      |      |      |                        |      |      |      |      |
| BCN 4D/4DBI                                                  | Wave Solder Process |      |      |      |      |      | Re-flow Solder Process |      |      |      |      |
|                                                              | P                   | A    | B    | C    | X    | Y    | A                      | B    | C    | X    | Y    |
|                                                              | .050                | .087 | .169 | .022 | .028 | .041 | .087                   | .154 | .022 | .028 | .034 |
|                                                              | 1.27                | 2.20 | 4.30 | 0.57 | 0.70 | 1.05 | 2.20                   | 3.90 | 0.57 | 0.70 | 0.85 |
|                                                              | BCN 16 4A, AB, ABI  |      |      |      |      |      |                        |      |      |      |      |
|                                                              | .032                | .039 | .118 | .014 | .018 | .039 | .039                   | .118 | .014 | .018 | .039 |
| BCN 31 8R, 8S                                                |                     |      |      |      |      |      |                        |      |      |      |      |
|                                                              | .050                | .084 | .148 | .014 | .036 | .032 | .084                   | .148 | .014 | .036 | .032 |
|                                                              | 1.27                | 2.10 | 3.70 | 0.35 | 0.90 | 0.80 | 2.10                   | 3.70 | 0.35 | 0.90 | 0.80 |

|                             |
|-----------------------------|
| <div>BCN 16 8RB / 8SB</div> |
|-----------------------------|

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Solder pad layout (Inch / mm)

BCN 10

The diagram illustrates the BCN 10 layout, which consists of two rows of four rectangular components each. The top row is labeled 'A' on the left and 'B' on the right. The bottom row is labeled 'X' and 'X1' on the right. The overall length is labeled 'L'. The pitch between the centers of the components in each row is labeled 'P'. The pitch between the rows is labeled 'P1'. The width of a component in the top row is labeled 'A', and the width of a component in the bottom row is labeled 'X'. The width of the gap between components in the top row is labeled 'B'. The width of the gap between components in the bottom row is labeled 'X1'. The width of the gap between the two rows is labeled 'Y'.

BCN 10

| P    | P1   | A          | B          | X          | X1         | Y          | L          |
|------|------|------------|------------|------------|------------|------------|------------|
| .024 | .020 | .020 ±.004 | .060 ±.004 | .010 ±.004 | .018 ±.004 | .020 ±.004 | .085 ±.004 |
| 0.60 | 0.50 | 0.50 ±0.10 | 1.50 ±0.10 | 0.25 ±0.15 | 0.45 ±0.10 | 0.50 ±0.10 | 2.15 ±0.10 |

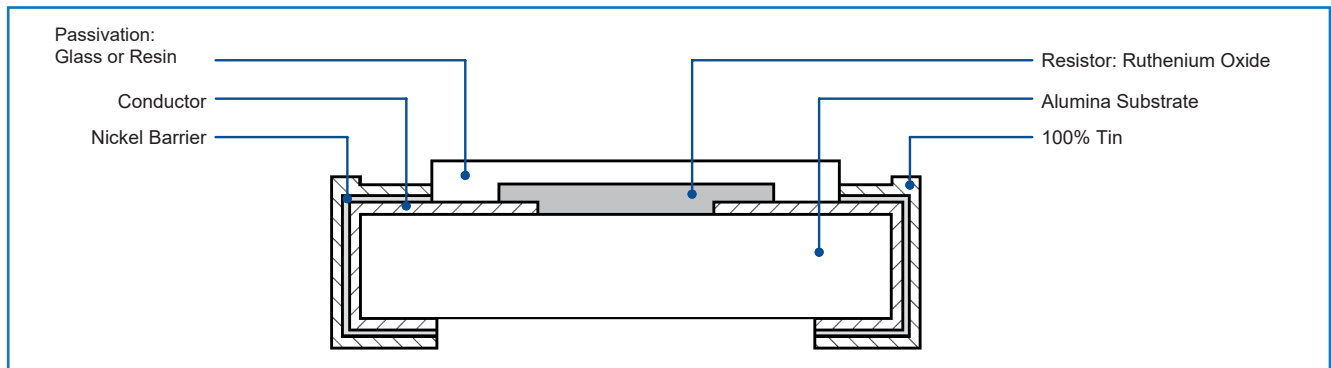
BCN 21

The diagram illustrates the BCN 21 layout, which consists of two rows of four rectangular components each. The top row is labeled 'A' on the right and 'B' on the right. The bottom row is labeled 'X' on the right. The overall length is labeled 'L'. The pitch between the centers of the components in each row is labeled 'P'. The pitch between the rows is labeled 'P1'. The width of a component in the top row is labeled 'A', and the width of a component in the bottom row is labeled 'X'. The width of the gap between components in the top row is labeled 'B'. The width of the gap between components in the bottom row is labeled 'X1'. The width of the gap between the two rows is labeled 'Y'. The width of the gap between the components and the edges of the layout is labeled 'W'. The width of the gap between the components and the edges of the layout is labeled 'W1'. The width of the gap between the components and the edges of the layout is labeled 'W2'. The width of the gap between the components and the edges of the layout is labeled 'W3'.

BCN 21

| P    | A          | B          | C          | X          | Y          | W          | W1         | W2         | W3         | L          |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| .032 | .060 ±.008 | .120 ±.008 | .016 ±.004 | .016 ±.004 | .030 ±.004 | .012 ±.001 | .015 ±.004 | .030 ±.004 | .030 ±.004 | .196 ±.008 |
| 0.80 | 1.20 ±0.20 | 3.00 ±0.20 | 0.40 ±0.10 | 0.40 ±0.10 | 0.75 ±0.10 | 0.31 ±0.02 | 0.38 ±0.10 | 0.75 ±0.10 | 0.75 ±0.10 | 4.98 ±0.20 |

## Construction



## Ordering Procedure

**Example: BCN164ABZ102J7S** (BCN 1.6mm wide, 4 resistors, isolated circuit, square edge, convex terminations with TCR  $\pm 100\text{ppm}/^\circ\text{C}$  at 1 kilohm  $\pm 5\%$ , on a 7" reel, anti-sulphur construction, Pb-free).

|   |   |   |   |   |   |   |   |   |    |    |   |   |   |   |
|---|---|---|---|---|---|---|---|---|----|----|---|---|---|---|
| B | C | N | 1 | 6 | 4 | A | B | Z | 1  | 0  | 2 | J | 7 | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |   |   |   |   |

| 1<br>Series | 2<br>Width  | 3<br>Number of Resistors | 4<br>Circuit      | 5<br>Edge       | 6<br>Termination        | 7<br>TCR (ppm/ $^\circ\text{C}$ ) | 8<br>Value                                         | 9<br>Tolerance                     | 10<br>Packaging          | 11<br>Construction |
|-------------|-------------|--------------------------|-------------------|-----------------|-------------------------|-----------------------------------|----------------------------------------------------|------------------------------------|--------------------------|--------------------|
| BCN         | Blank=3.1mm | 4                        | A=Isolated        | Blank=Scalloped | Blank=External (convex) | Blank= $\pm 200$                  | 3 digits for E24 at 2% or 5%                       | F= $\pm 1\%$<br>G= $\pm 2\%$       | 7=7" reel<br>13=13" reel | Blank=Standard     |
|             | 10=1.0mm    |                          | S=Standard bussed | B=Square        | I=Internal (concave)    | Z= $\pm 100$                      | 4 digits for uniquely E96 and for all values at 1% | J= $\pm 5\%$<br>(Blank for jumper) |                          | S=Anti-sulphur     |
|             | 16=1.6mm    |                          | R=Reverse bussed  |                 |                         |                                   |                                                    |                                    |                          |                    |
|             | 21=2.1mm    |                          |                   |                 |                         |                                   |                                                    |                                    |                          |                    |
|             | 31=3.1mm    |                          |                   |                 |                         |                                   |                                                    |                                    |                          |                    |
|             |             |                          |                   |                 |                         |                                   | JP=Jumper                                          |                                    |                          |                    |

| Valid Combinations (1 – 6) | Valid Options (7, 8 & 11)                                         | Packaging Quantity & Tape (10)            |
|----------------------------|-------------------------------------------------------------------|-------------------------------------------|
| B C N 1 0 4 A B            | JP=Jumper, S=Anti-sulphur                                         | 7=10,000/reel, 13=40,000/reel, Paper tape |
| B C N 1 6 4 A              | Z= $\pm 100\text{ppm}/^\circ\text{C}$ , JP=Jumper, S=Anti-sulphur | 7=5000/reel, 13=20,000/reel, Paper tape   |
| B C N 1 6 4 A B            | Z= $\pm 100\text{ppm}/^\circ\text{C}$ , JP=Jumper, S=Anti-sulphur |                                           |
| B C N 1 6 4 A B I          | JP=Jumper                                                         |                                           |
| B C N 1 6 8 S B            |                                                                   |                                           |
| B C N 1 6 8 R B            | S=Anti-sulphur                                                    |                                           |
| B C N 2 1 8 S B I          |                                                                   | 7=4000/reel, 13=16,000/reel, Plastic tape |
| B C N 4 D                  | JP=Jumper, S=Anti-sulphur                                         |                                           |
| B C N 4 D B I              | JP=Jumper                                                         |                                           |
| B C N 3 1 8 S B            |                                                                   |                                           |
| B C N 3 1 8 R B            |                                                                   |                                           |
| B C N 3 1 8 S B I          |                                                                   |                                           |
| B C N 3 1 8 R B I          |                                                                   |                                           |

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