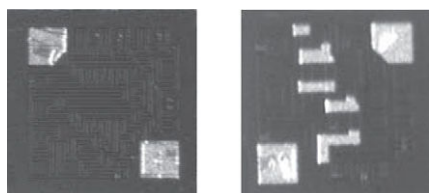


## Thin Film, Back-Contact Resistor



Product may not be to scale

### LINKS TO ADDITIONAL RESOURCES



The Back Contact Resistor (BCR) series single-value back-contact resistor chip is one of the smallest chips available.

The BCR requires only one wire bond thus saving hybrid space.

The BCRs are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology. The BCRs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032 class H or K.

### FEATURES

- Wire bondable
- Only one wire bond required
- Small size: 0.020 inches square
- Resistance range: 10  $\Omega$  to 1 M $\Omega$
- Oxidized silicon substrate for good power dissipation
- Moisture resistant
- Case size: 0202
- Resistor material: tantalum nitride, self-passivating
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

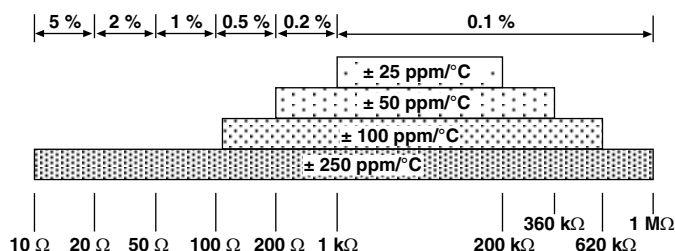
### APPLICATIONS

Vishay EFI BCR resistor chips are widely used in hybrid packages where space is limited. The bottom connection is made by attaching the back of the chip to the substrate either eutectic or with conductive epoxy. The single wire bond is made to the notched pad on the top of the chip. (The other rectangular pad on the top of the chip is a via hole, a low-ohmic contact connecting the resistor to the bottom of the chip.)

### TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES

| PARAMETER              | VALUE                                                           | UNIT              |
|------------------------|-----------------------------------------------------------------|-------------------|
| Total resistance range | 10 to 1M                                                        | $\Omega$          |
| Standard tolerances    | $\pm 0.1$ , $\pm 0.2$ , $\pm 0.5$ , $\pm 1$ , $\pm 2$ , $\pm 5$ | %                 |
| TCR                    | $\pm 25$ , $\pm 50$ , $\pm 100$ , $\pm 250$                     | ppm/ $^{\circ}$ C |

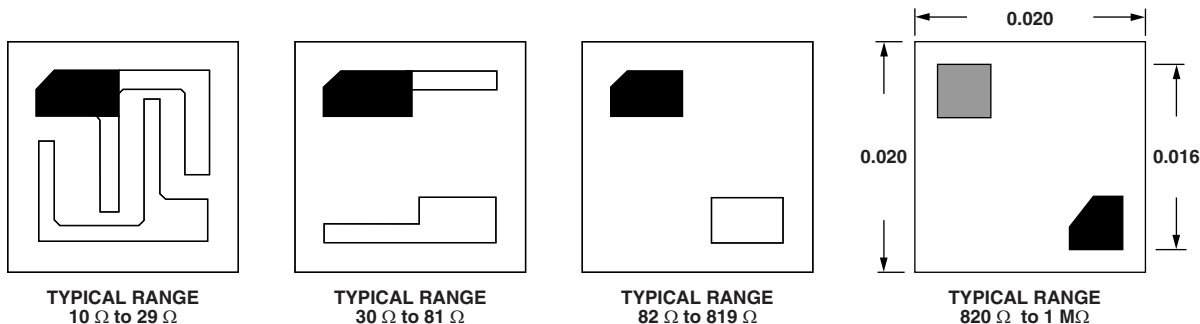
#### Tightest Standard Tolerance Available



### STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER                                                                                              | VALUE                        | UNIT         |
|--------------------------------------------------------------------------------------------------------|------------------------------|--------------|
| Noise, MIL-STD-202, method 308<br>100 $\Omega$ to 250 k $\Omega$<br>< 100 $\Omega$ or > 251 k $\Omega$ | -35 typ.<br>-20 typ.         | dB           |
| Moisture resistance, MIL-STD-202, method 106                                                           | $\pm 0.5$ max. $\Delta R/R$  | %            |
| Stability, 1000 h, +125 $^{\circ}$ C, 125 mW                                                           | $\pm 1.0$ max. $\Delta R/R$  | %            |
| Operating temperature range                                                                            | -55 to +125                  | $^{\circ}$ C |
| Thermal shock, MIL-STD-202, method 107, test condition F                                               | $\pm 0.25$ max. $\Delta R/R$ | %            |
| High temperature exposure, +150 $^{\circ}$ C, 100 h                                                    | $\pm 0.5$ max. $\Delta R/R$  | %            |
| Dielectric voltage breakdown                                                                           | 200                          | V            |
| Insulation resistance                                                                                  | $10^{12}$ min.               | $\Omega$     |
| Operating voltage                                                                                      | 75 max.                      | V            |
| DC power rating at +70 $^{\circ}$ C (derated to zero at +175 $^{\circ}$ C)                             | 0.250                        | W            |
| 5 x rated power short-time overload, +25 $^{\circ}$ C, 5 s                                             | $\pm 0.25$ max. $\Delta R/R$ | %            |

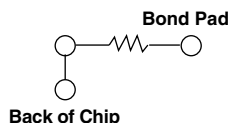
## DIMENSIONS in inches



### Note

- Notched shaded area represents top bonding pad. The backside of the chip constitutes the second resistor connection

## SCHEMATIC



| MECHANICAL SPECIFICATIONS     |                                                        |
|-------------------------------|--------------------------------------------------------|
| PARAMETER                     | VALUE                                                  |
| Chip size                     | 0.020" x 0.020" ± 0.002" (0.50 mm x 0.50 mm ± 0.05 mm) |
| Chip thickness                | 0.010" ± 0.002" (0.254 mm ± 0.05 mm)                   |
| Chip substrate material       | Oxidized silicon, 10 kÅ minimum SiO <sub>2</sub>       |
| Resistor material             | Tantalum nitride, self-passivating                     |
| Bonding pad size              | 0.004" x 0.004" (0.100 mm x 0.100 mm)                  |
| Number of pads                | 1                                                      |
| Pad material                  | 10 kÅ minimum aluminum (15 kÅ minimum gold optional)   |
| Backing                       | 3 kÅ minimum gold                                      |
| Recommended attachment method | Eutectic or conductive epoxy                           |

| GLOBAL PART NUMBER INFORMATION                                                |                                                               |                                                                                                         |                                                                                                                                          |                                                                                                    |                                        |                                             |                                           |
|-------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------|-------------------------------------------|
| Global Part Number: BCR50000FKAHWS                                            |                                                               |                                                                                                         |                                                                                                                                          |                                                                                                    |                                        |                                             |                                           |
| Global Part Number Description: BCR 5K 1 %, 100 ppm/°C, Al term., Class H, WS |                                                               |                                                                                                         |                                                                                                                                          |                                                                                                    |                                        |                                             |                                           |
| <b>B</b>                                                                      | <b>C</b>                                                      | <b>R</b>                                                                                                | <b>5</b>                                                                                                                                 | <b>0</b>                                                                                           | <b>0</b>                               | <b>0</b>                                    | <b>0</b>                                  |
| <b>F</b>                                                                      | <b>K</b>                                                      | <b>A</b>                                                                                                | <b>H</b>                                                                                                                                 | <b>W</b>                                                                                           | <b>S</b>                               |                                             |                                           |
| MODEL                                                                         | RESISTANCE                                                    | RESISTANCE MULTIPLIER CODE                                                                              | TOLERANCE CODE                                                                                                                           | TCR (ppm/°C)                                                                                       | TERMINATION                            | VISUAL CLASS (per MIL-STD-883, method 2032) | PACKAGING                                 |
| <b>BCR</b><br>20 x 20 size<br>back contact<br>resistor                        | First 4 digits<br>are significant<br>figures of<br>resistance | <b>B</b> = 0.01<br><b>A</b> = 0.1<br><b>0</b> = 1<br><b>1</b> = 10<br><b>2</b> = 100<br><b>3</b> = 1000 | <b>B</b> = 0.1 %<br><b>C</b> = 0.25 %<br><b>D</b> = 0.5 %<br><b>F</b> = 1.0 %<br><b>G</b> = 2.0 %<br><b>J</b> = 5.0 %<br><b>K</b> = 10 % | <b>E</b> = ± 25<br><b>C</b> = ± 50<br><b>K</b> = ± 100<br><b>M</b> = ± 250<br><b>R</b> = 0 / - 250 | <b>G</b> = gold<br><b>A</b> = aluminum | <b>H</b> = class H<br><b>K</b> = class K    | <b>WS</b> = waffle pack<br>100 min./mult. |



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