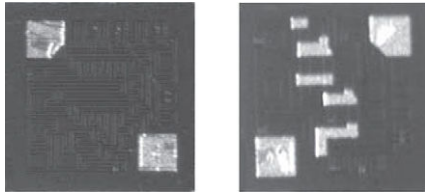


## Thin Film, Back-Contact Resistor



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)



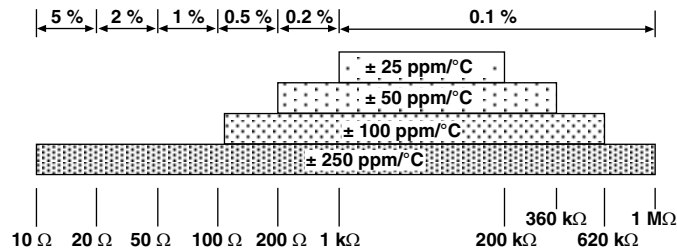
**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

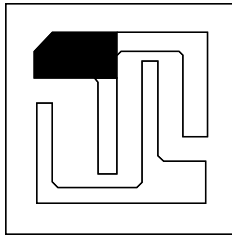
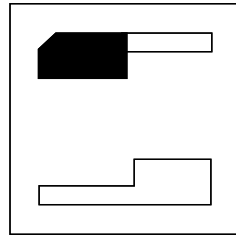
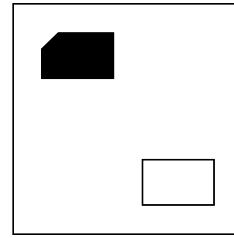
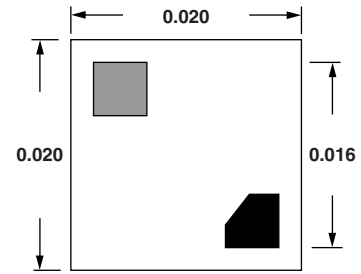
Vishay EFI BCR resistor chips are widely used in hybrid packages where space is limited. The bottom connection is made by attaching the back of the chip to the substrate either eutectic or with conductive epoxy. The single wire bond is made to the notched pad on the top of the chip. (The other rectangular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

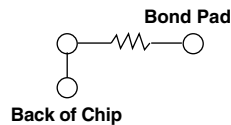


| STANDARD ELECTRICAL SPECIFICATIONS   |                              |              |
|--|------------------------------|--------------|
| PARAMETER  | VALUE                        | UNIT         |
| Noise, MIL-STD-202, method 308<br>100 $\Omega$ to 250 k $\Omega$<br>< 100 $\Omega$ or > 251 k $\Omega$ | -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

**TYPICAL RANGE**  
 10 Ω to 29 Ω

**TYPICAL RANGE**  
 30 Ω to 81 Ω

**TYPICAL RANGE**  
 82 Ω to 819 Ω

**TYPICAL RANGE**  
 820 Ω to 1 MΩ

**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   | C  | R   | 5  | 0  | 0                                      | 0   | 0                                      | F | K | A | H | W | S |
| 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 back contact resistor                              | First 4 digits are significant figures of 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 100 min./mult. |   |   |   |   |   |   |



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.