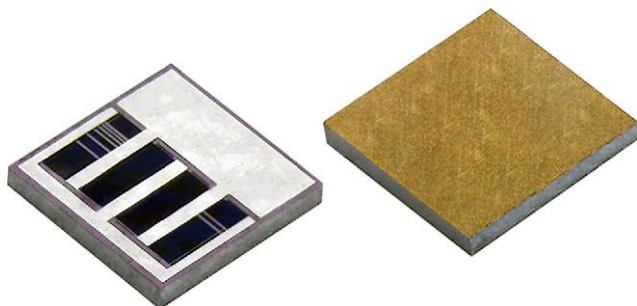


# Thin Film, High Power Back-Contact Resistor



## LINKS TO ADDITIONAL RESOURCES



3D Models



Videos



Infographics



Did You Know?



Capabilities and Custom Options

The high power back-contact resistor (IGBR) series thin film chip resistor utilizes the excellent thermal properties of silicon to allow ultra high power rating with miniature case size for hybrid (chip and wire) assemblies.

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

The IGBRs are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology.

The IGBRs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032 class H, class K, or commercial inspection per internal standards.

## FEATURES

- Noise reduction or elimination when used in SiC power modules
- Sintering, soldering, and epoxy attachment options
- Wire bondable
- Small size, high power density
- High power rating
- Single wire bond assembly
- Moisture resistant
- Case size: 0202 to 0808
- 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)

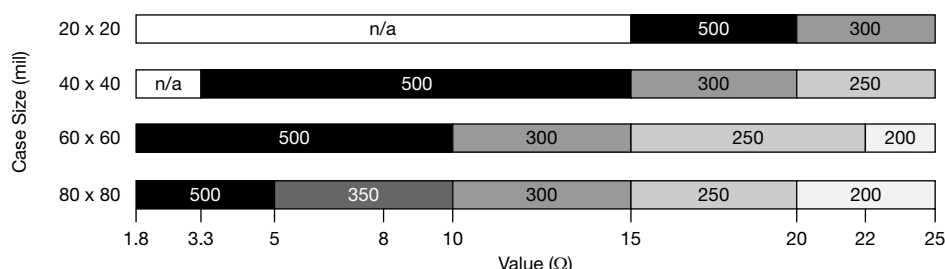
## APPLICATIONS

- Gate resistor for SiC based power modules
- Gate resistor for IGBT based power converters
- Current limiting for LED lighting applications
- High power applications
- Alternative energy
- Hybrid assemblies

## TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES

PARAMETER	VALUE	UNIT
Total Resistance Range	1.8 to 25	$\Omega$
Standard Tolerances	5, 10, 25	%
TCR	$\pm 500$	ppm/ $^{\circ}\text{C}$

## TCR (ppm/ $^{\circ}\text{C}$ ) BY CASE SIZE AND VALUE



STANDARD ELECTRICAL SPECIFICATIONS		
PARAMETER	VALUE	UNIT
Operating Film Temperature Range	200 max.	°C
Operating Temperature Range	-55 to +125	°C
Working Voltage	75 max.	V
Breakdown Voltage	400 max.	V
Thermal Resistivity <sup>(1)</sup>	Down to 2	K/W
DC Power Rating <sup>(1)(2)</sup>	Up to 4	W
Load Life Stability, 1000 h, Film Temperature 200 °C	± 1 $\Delta R/R$	%
Short Time Overload, 5 x Rated Power, 25 °C, 5 s	± 0.25 $\Delta R/R$	%
Thermal Shock, MIL-STD-202, Method 107 F	± 1 $\Delta R/R$	%
Moisture Resistance, MIL-STD-202, Method 106 <sup>(3)</sup>	± 0.25 $\Delta R/R$	%
High Temperature Exposure, 100 h, +150 °C	± 0.5 $\Delta R/R$	%
Low Temperature Operation, -65 °C, 45 min	± 0.5 $\Delta R/R$	%

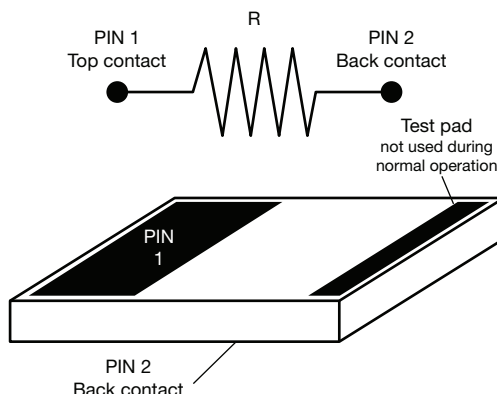
**Notes**

- <sup>(1)</sup> See table “Power Rating by Case Size”
- <sup>(2)</sup> Power rating determined by application specific heat sink properties. Film temperature should not exceed 200 °C. See table “Power Rating by Case Size” for more details
- <sup>(3)</sup> Aluminum pads and aluminum wire bonds are sensitive to high moisture environments. Adequate application level packaging is required to protect the components and wire bonds from moisture related damage

POWER RATING BY CASE SIZE						
CASE SIZE	CHIP SIZE mil (mm) <sup>(2)</sup>	BOND PAD SIZE mil (mm)	DIE THICKNESS mil (mm) <sup>(2)</sup>	TYPICAL <i>R</i> THERMAL <sup>(1)</sup> K/W	<i>R</i> MIN. Ω	<i>R</i> MAX. Ω
0202	20 x 20 (0.5 x 0.5)	10 x 16 (0.25 x 0.41)	10 (0.25)	10	15	25
0404	40 x 40 (1 x 1)	15 x 36 (0.38 x 0.91)	10 (0.25)	7	3.3	25
0606	60 x 60 (1.5 x 1.5)	20 x 56 (0.51 x 1.42)	10 (0.25)	5	1.8	25
0808	80 x 80 (2 x 2)	27 x 76 (0.69 x 1.93)	10 (0.25)	2	1.8	25

**Notes**




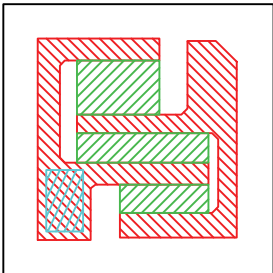
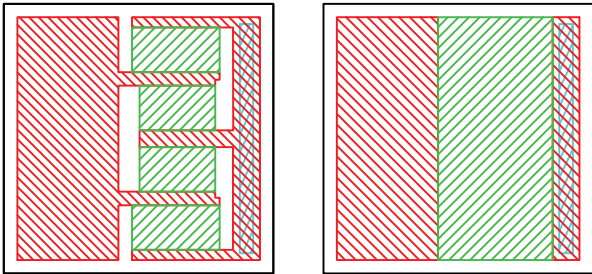
- <sup>(1)</sup> Typical *R* thermal between film and back contact. Does not include die attach joint (epoxy or solder)
- <sup>(2)</sup> Dimension tolerances are ± 0.05 mm (± 2 mil)

**SCHEMATIC**


MATERIAL SPECIFICATIONS	
PARAMETER	
Chip Substrate Material	Oxidized silicon, 10 kÅ minimum SiO <sub>2</sub>
Film Material	Tantalum Nitride
Case Size	See table "Power Rating by Case Size"
Passivation	None
Number of Pads	1
Top Terminations Suitable for Aluminum Wire-Bonding	Al (2.5 µm min.)
Back Termination (for epoxy, lead (Pb)-free solder, or sintering assembly)	P = TiW (500 Å to 1000 Å) Pd (2000 Å to 3000 Å) Au (3000 Å to 5000 Å)
	N = TiW (500 Å to 1000 Å) Ni (6000 Å to 7000 Å) Au (3000 Å to 5000 Å)
	T = TiW (500 Å to 1000 Å) Au (1000 Å to 3000 Å) Ni (40 µ" minimum) Au (40 µ" minimum)

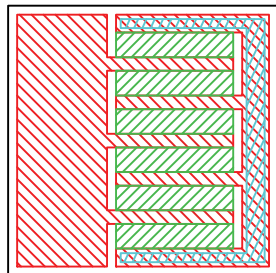
**Note**

- This product was qualified using 1 mil Al wire at 3 g min pull force

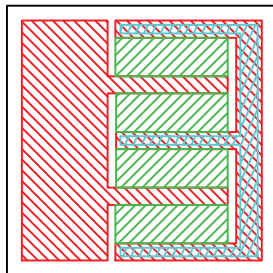
MATERIAL SPECIFICATIONS	
 Conductor material	 Resistor material  Backside connection
<b>VERSION A (0202)</b>	
	
IGBRA - 15 Ω to 25 Ω	
<b>VERSION B (0404)</b>	
	
IGBRB - 3.3 Ω to 12.9 Ω      IGBRB - 13 Ω to 25 Ω	

**MATERIAL SPECIFICATIONS**

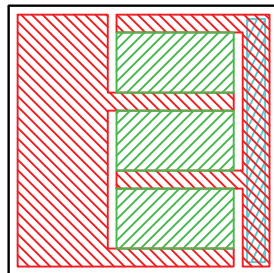
 Conductor material
  Resistor material
  Backside connection

**VERSION C (0606)**


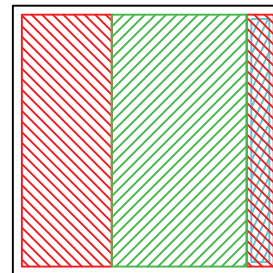
IGBRC - 1.8 Ω to 2.9 Ω



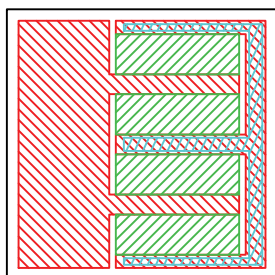
IGBRC - 3 Ω to 5.5 Ω



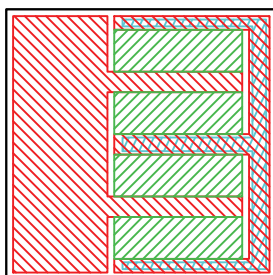
IGBRC - 5.6 Ω to 15.90 Ω



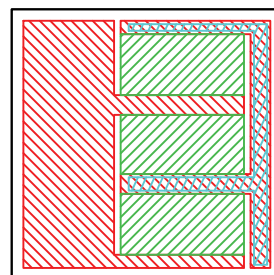
IGBRC - 16 Ω to 25 Ω

**VERSION D (0808)**


IGBRD - 1.8 Ω to 5.5 Ω



IGBRD - 5.6 Ω to 14.9 Ω



IGBRD - 15 Ω to 24.9 Ω

**GLOBAL PART NUMBER INFORMATION**

Global Part Number: IGBRB3000CJOPCST

Global Part Number Description: IGBR 1 mm 3 Ω 5 % 300 ppm/°C PD Commercial Tape

**I** **G** **B** **R** **B** **3** **0** **0** **0** **C** **J** **O** **P** **C** **S** **T**

MODEL	SIZE	RESISTANCE (Ω)	RESISTANCE MULTIPLIER CODE	TOL. CODE (%)	TCR (ppm/°C)	BACKSIDE TERMINATION	VISUAL CLASS	PACKAGING CODE
<b>IGBR</b> High power back-contact resistor	<b>A</b> = 20 x 20 <b>B</b> = 40 x 40 <b>C</b> = 60 x 60 <b>D</b> = 80 x 80	First 4 digits are significant figures of resistance	<b>C</b> = 0.001 <b>B</b> = 0.01 <b>A</b> = 0.1	<b>J</b> = 5 <b>K</b> = 10 <b>M</b> = 20 <b>L</b> = 25	<b>J</b> = ± 500 <b>W</b> = ± 350 <b>O</b> = ± 300 <b>M</b> = ± 250	<b>P</b> = TiW / Pd / Au <b>N</b> = TiW / Ni / Au <b>T</b> = TiW / Au / Ni / Au <sup>(1)</sup>	<b>C</b> = commercial <b>H</b> = class H <b>K</b> = class K	<b>WS</b> = waffle pack 100 min., 1 mult. <b>ST</b> = diced on tape

**Note**
<sup>(1)</sup> See "Material Specifications" table for metal thickness



## 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.