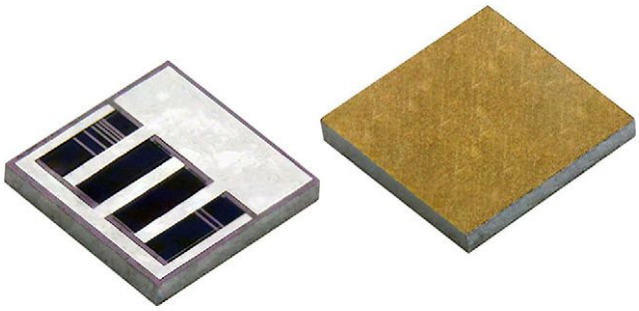
Thin Film, High Power Back-Contact Resistor



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

Pb-free

RoHS COMPLIANT

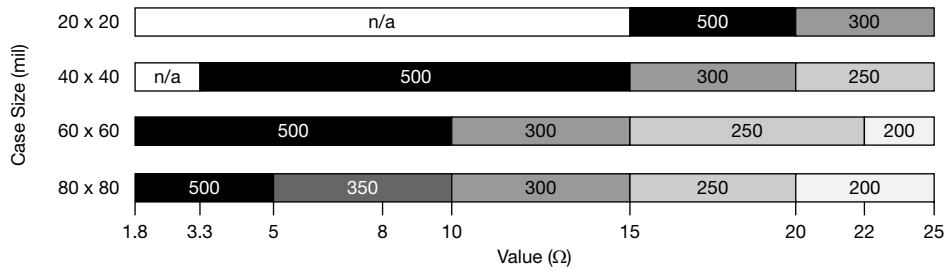
HALOGEN FREE GREEN (5-2008)

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	Ω
Standard Tolerances	5, 10, 25	%
TCR	± 500	ppm/°C

TCR (ppm/°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 (1)	Down to 2	K/W
DC Power Rating (1)(2)	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 (3)	± 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

(1) See table “Power Rating by Case Size”

(2) 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

(3) 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

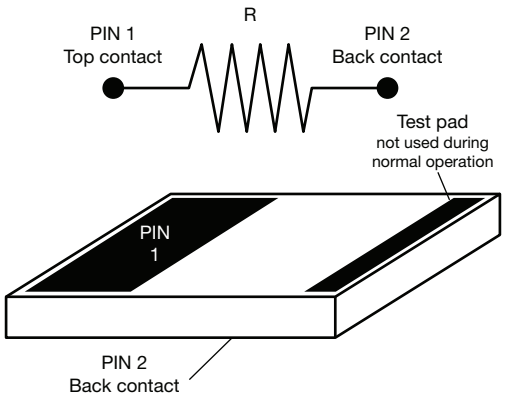
POWER RATING BY CASE SIZE						
CASE SIZE	**CHIP SIZE mil (mm) (2)**	**BOND PAD SIZE mil (mm)**	**DIE THICKNESS mil (mm) (2)**	**TYPICAL *R* THERMAL (1) K/W**	***R* MIN. Ω**	***R* MAX. Ω**
0202	20 x 20 (0.5 x 0.5)	10 x 16 (0.25 x 0.41)	10 (0.25)	10	15	25
0404	40 x 40 (1 x 1)	15 x 36 (0.38 x 0.91)	10 (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

(1) Typical *R* thermal between film and back contact. Does not include die attach joint (epoxy or solder)

(2) Dimension tolerances are ± 0.05 mm (± 2 mil)

SCHEMATIC

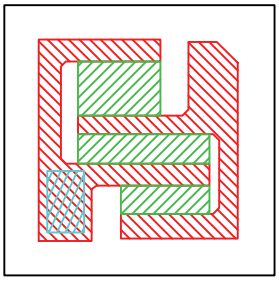


MATERIAL SPECIFICATIONS	
PARAMETER	
Chip Substrate Material	Oxidized silicon, 10 kÅ minimum SiO_2
Film Material	Tantalum Nitride
Case Size	See table “Power Rating by Case Size”
Passivation	None
Number of Pads	1
Top Terminations Suitable for Heavy Gage Aluminum Wire-Bonding	Al (2.5 µm min.)
Back Termination (for epoxy, lead (Pb)-free solder or silver compression 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)

MATERIAL SPECIFICATIONS

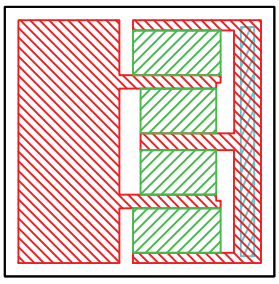
Conductor material Resistor material Backside connection

VERSION A (0202)

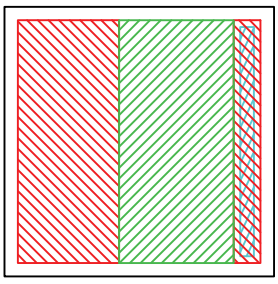


IGBRA - 15 Ω to 25 Ω

VERSION B (0404)



IGBRB - 3.3 Ω to 12.9 Ω

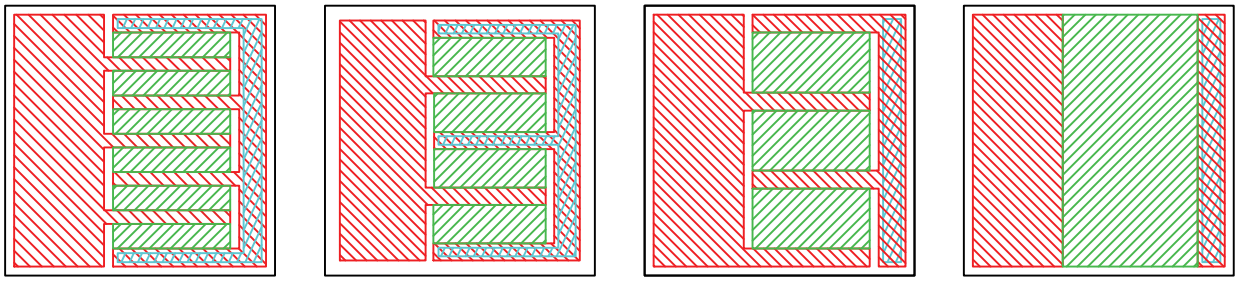


IGBRB - 13 Ω to 25 Ω

MATERIAL SPECIFICATIONS

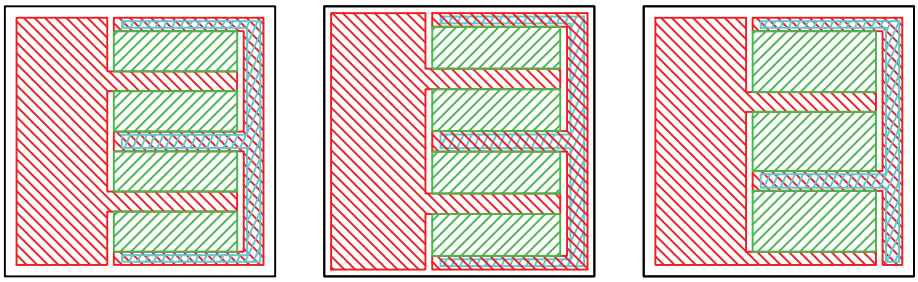
Conductor material Resistor material Backside connection

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
IGBR High power back-contact resistor	**A** = 20 x 20 **B** = 40 x 40 **C** = 60 x 60 **D** = 80 x 80	First 4 digits are significant figures of resistance	**C** = 0.001 **B** = 0.01 **A** = 0.1	**J** = 5 **K** = 10 **M** = 20 **L** = 25	**J** = ± 500 **W** = ± 350 **O** = ± 300 **M** = ± 250	**P** = TiW / Pd / Au **N** = TiW / Ni / Au **T** = TiW / Au/ Ni/Au [1]	**C** = commercial **H** = class H **K** = class K	**WS** = waffle pack 100 min., 1 mult. **ST** = diced on tape

Note

[1] See “Material Specifications” table for metal thickness

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