Vitreous Wirewound Resistors with Corrugated Ribbon

FEATURES

- High power rating up to 1000 W
- Excellent pulse load capability
- Low ohmic values
- Adjustable type (E) available
- Corrugated ribbon construction aids rapid cooling
- Non-flammable and enhanced humidity protection
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

HALOGEN FREE

The GBS series, with completely welded construction, is the perfect choice for high continuous power dissipation up to 1000 W and is offered with an optional adjustable type. The components of this series are well suited for harsh environments and exhibit a long lifetime. With their high pulse power capability, they are the ideal choice for inrush limiters. Typical applications include but are not limited to drive systems, power supplies, frequency inverters, AC filters, and snubber resistors. Particular requirements can be submitted to a Vishay Draloric application engineer specifying peak voltage, pulse shape, pulse time, and environmental conditions for review.

APPLICATIONS

- Inrush limiter
- Capacitor charge / discharge
- Snubber resistor
- Brake resistor
- Filter resistor

TECHNICAL SPECIFICATION

TYPE	RATED DISSIPATION P_{40} WM50 WM110	RATED DISSIPATION P_{40} WM10	RESISTANCE RANGE (1) TCR +650 ppm/K to +750 ppm/K WM10	RESISTANCE RANGE (1) TCR -10 ppm/K to -80 ppm/K WM50	RESISTANCE RANGE (1) TCR +100 ppm/K to +180 ppm/K WM110	RESISTANCE TOLERANCE
GBS 20/100 **GBS 20/100 E**	80 W 50 W	50 W	0.13 Ω to 0.51 Ω	0.56 Ω to 2.2 Ω	1.3 Ω to 6.2 Ω	± 5 %, ± 10 %
GBS 20/165 **GBS 20/165 E**	160 W 100 W	100 W	0.27 Ω to 1.0 Ω	1.1 Ω to 4.7 Ω	2.4 Ω to 12 Ω	
GBS 20/265 **GBS 20/265 E**	300 W 180 W	180 W	0.47 Ω to 1.8 Ω	2.0 Ω to 7.5 Ω	4.3 Ω to 22 Ω	
GBS 30/100 **GBS 30/100 E**	150 W 90 W	90 W	0.10 Ω to 0.43 Ω	0.47 Ω to 3.3 Ω	1.0 Ω to 8.2 Ω	
GBS 30/133 **GBS 30/133 E**	200 W 120 W	120 W	0.15 Ω to 0.62 Ω	0.68 Ω to 5.1 Ω	1.5 Ω to 12 Ω	
GBS 30/165 **GBS 30/165 E**	250 W 150 W	150 W	0.20 Ω to 0.91 Ω	1.0 Ω to 6.8 Ω	2.0 Ω to16 Ω	
GBS 30/215 **GBS 30/215 E**	300 W 200 W	200 W	0.27 Ω to 1.1 Ω	1.2 Ω to 9.1 Ω	2.7 Ω to 24 Ω	
GBS 30/265 **GBS 30/265 E**	375 W 250 W	250 W	0.30 Ω to 1.3 Ω	1.5 Ω to 11 Ω	3.9 Ω to 27 Ω	
GBS 30/330 **GBS 30/330 E**	450 W 350 W	350 W	0.39 Ω to 1.8 Ω	2.0 Ω to 15 Ω	5.1 Ω to 36 Ω	
GBS 45/370 **GBS 45/370 E**	750 W 550 W	550 W	0.75 Ω to 3.0 Ω	3.3 Ω to 24 Ω	8.2 Ω to 56 Ω	
GBS 60/370 **GBS 60/370 E**	1000 W 700 W	700 W	0.91 Ω to 3.9 Ω	4.3 Ω to 33 Ω	10 Ω to 75 Ω	

Notes

- The operating temperature range for these resistors is from -55 °C up to 350 °C.

(1) Resistance values are to be selected for ± 10 % from the E12 series, and for ± 5 % from the E24 series.

PACKAGING

TYPE	PACKAGING CODE	QUANTITY	FORMAT	DIMENSION OF PACKAGE
All	LX	Variable	Bulk, separately packed with paper	Box size selection according to quantity and product size

PART NUMBER AND PRODUCT DESCRIPTION

Part Number: GBS60AA13750KLX000

G	B	S	6	0	A	A	1	3	7	5	0	K	L	X	0	0	0

TYPE	VARIANT / TERMINAL	TCR / MATERIAL	RESISTANCE	TOLERANCE	PACKAGING	SPECIAL
GBS202S = GBS 20/100 **GBS204L** = GBS 20/165 **GBS207D** = GBS 20/265 **GBS302S** = GBS 30/100 **GBS303P** = GBS 30/133 **GBS304L** = GBS 30/165 **GBS305Z** = GBS 30/215 **GBS307D** = GBS 30/265 **GBS3096** = GBS 30/330 **GBS45AA** = GBS 45/370 **GBS60AA** = GBS 60/370	**0** = neutral **1** = E (adjustable)	**1** = WM 50 -10 ppm/K to -80 ppm/K **3** = WM 110 100 ppm/K to 180 ppm/K **4** = WM 10 650 ppm/K to 750 ppm/K	**2 digit value** **1 digit multiplier** MULTIPLIER **8** = $*10^{-2}$ **9** = $*10^{-1}$ **0** = $*10^{0}$	**J** = ± 5 % **K** = ± 10 %	**LX** = loose pack without quantity	**000** = standard **3 digit code** = customized version

Product Description: GBS60/370 E 110 75R 10 %

GBS60/370	E	110	75R	10 %
TYPE	VARIANT / TERMINAL	TCR / MATERIAL	RESISTANCE	TOLERANCE
GBS20/100 **GBS20/165** **GBS20/265** **GBS30/100** **GBS30/133** **GBS30/165** **GBS30/215** **GBS30/265** **GBS30/330** **GBS45/370** **GBS60/370**	Neutral **E** (adjustable)	**50** = WM 50 **110** = WM 110 **10** = WM 10	**R10** = 0.1 Ω **75R** = 75 Ω	± **5 %** ± **10 %**

Note

- The products can be ordered using either the PRODUCT DESCRIPTION or the PART NUMBER.

DESCRIPTION

Vitreous wirewound resistors are best suited for the use in demanding environmental conditions. Their rugged design and durable coatings enable these resistors to withstand extreme environmental stress. The vitreous coating is designed for high stability and a long lifetime in humid environments. The coating is resistant to all cleaning chemicals commonly used in the electronic industry.

Production is strictly controlled and follows an extensive set of instructions established for reproducibility. The winding is done with specific materials on a specially developed fine ceramic body (Al_2O_3). The ceramic meets the highest requirements against mechanical resistance, thermal shocks, dielectric strength, and insulation resistance at high temperatures. With different corrugated ribbons and turn spacings, low ohmic values can be offered. With this construction, rapid cooling is also possible. The glaze is fired layer by layer, several times, at a high temperature (> 600 °C). The resistors are marked with resistance, tolerance, and winding material.

The GBS series meets single lot / date code packaging requirements.

MATERIALS

Vishay acknowledges the following systems for the regulation of hazardous substances:

- IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry, with the list of declarable substances given therein (1)
- The Global Automotive Declarable Substance List (GADSL) (2)
- The REACH regulation (1907/2006/EC) and the related list of substances with very high concern (SVHC) (3) for its supply chain

The products do not contain any of the banned substances as per IEC 62474, GADSL, or the SVHC list, see www.vishay.com/how/leadfree.

Hence the products fully comply with the following directives:

- 2000/53/EC End-of-Life Vehicle Directive (ELV) and Annex II (ELV II)
- 2011/65/EU Restriction of the Use of Hazardous Substances Directive (RoHS) with amendment 2015/863/EU
- 2012/19/EU Waste Electrical and Electronic Equipment Directive (WEEE)

Vishay pursues the elimination of conflict minerals from its supply chain, see the Conflict Minerals Policy at www.vishay.com/doc?49037.

ASSEMBLY

The resistors are fitted with lugs for soldering. The terminals of the resistors are completely lead (Pb)-free. The special tin plating used provides compatibility with lead (Pb)-free and lead-containing soldering processes.

Special lugs may be available on request, please inquire at ww1resistors@vishay.com.

3D-Models are available on request, please inquire at ww1resistors@vishay.com.

Different mounting accessories are available for fixing, see the datasheet: www.vishay.com/doc?21015.

The slider of the adjustable type should be only moved after removal of voltage and sufficient loosening of the screw.

APPLICATION INFORMATION

The power dissipation of the resistor generates a temperature rise with respect to the ambient. The permissible dissipation is derated for temperatures above 40°C, as shown in the derating diagram, in order to avoid overheating of the resistor. The heat dissipated from the resistor may affect adjacent components, hence proper clearance will be required in order to avoid overheating.

All materials used are non-flammable and inorganic.

These resistors do not features a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

RELATED PRODUCTS

In lower continuous power applications and less demanding environmental conditions the cement coated alternative, like the ZBS series might be suitable, see the datasheet:

“Cemented Wirewound Resistors with Corrugated Ribbon”
www.vishay.com/doc?21011

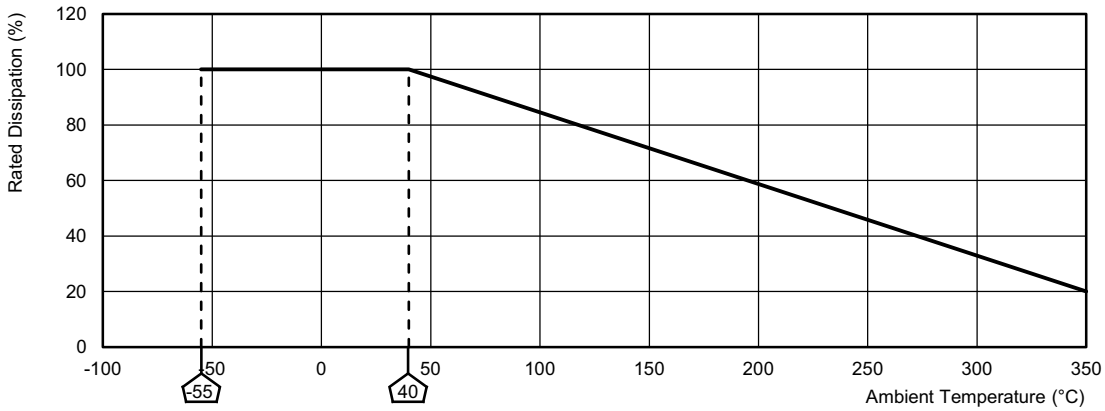
For high ohmic values, there is the vitreous coated GWS series, see the datasheet:

“Vitreous Wirewound Resistors with Lugs”
www.vishay.com/doc?21003

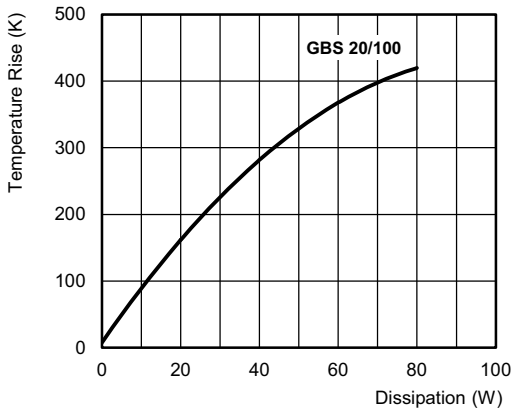
Notes

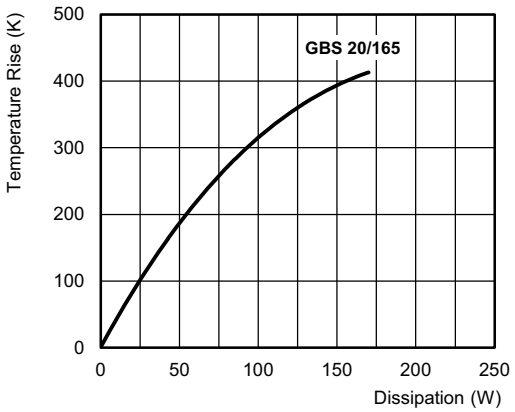
(1) The IEC 62474 list of declarable substances is maintained in a dedicated database, which is available at http://std.iec.ch/iec62474.
(2) The Global Automotive Declarable Substance List (GADSL) is maintained by the American Chemistry Council, and available at www.gadsl.org.
(3) The SVHC list is maintained by the European Chemical Agency (ECHA) and available at http://echa.europa.eu/candidate-list-table.

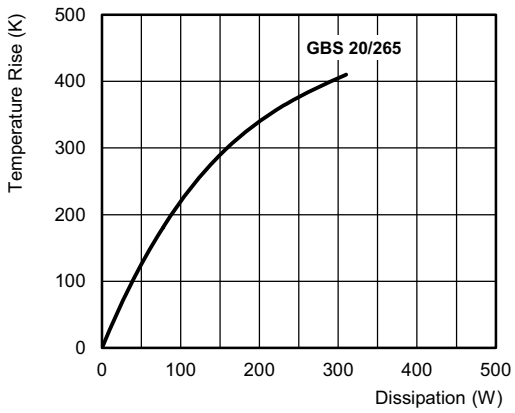
DERATING

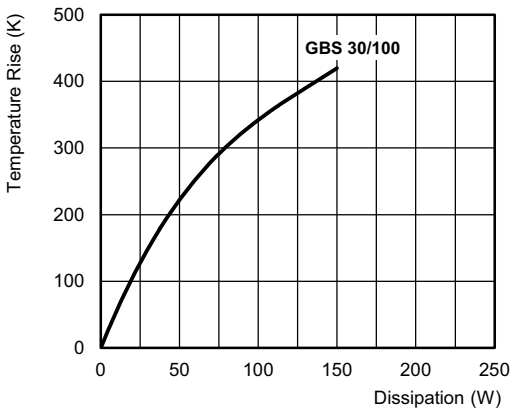


TEMPERATURE RISE









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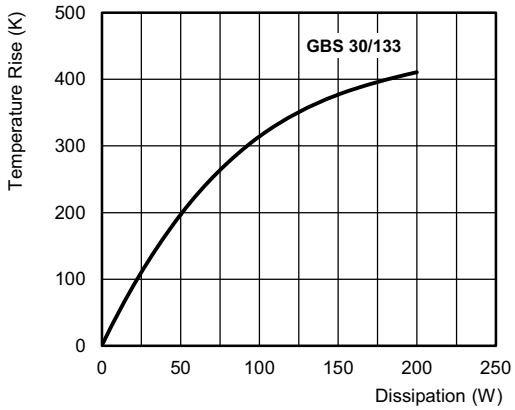

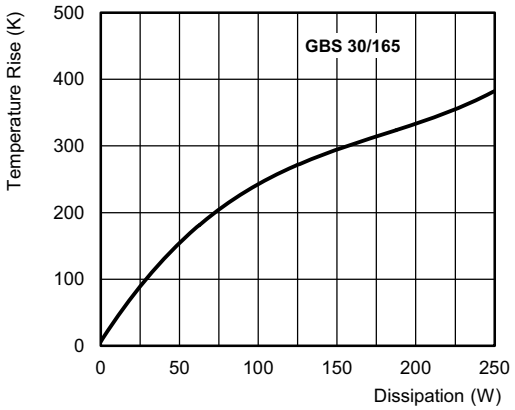

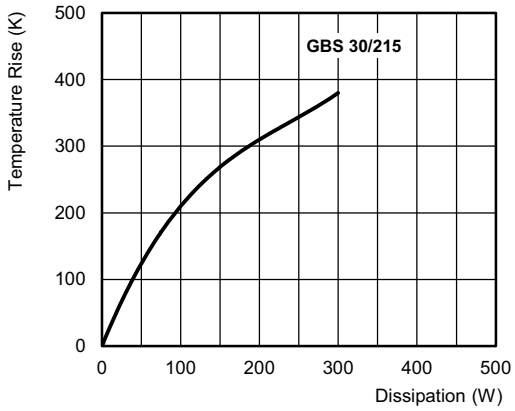

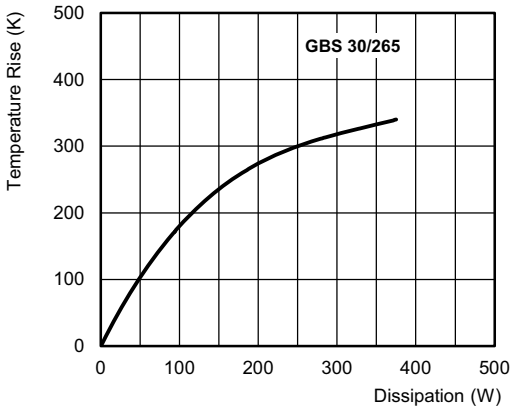

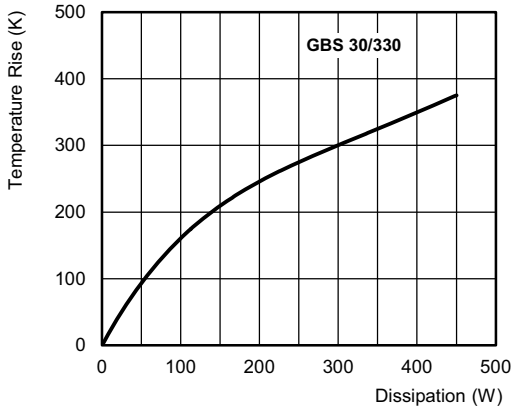

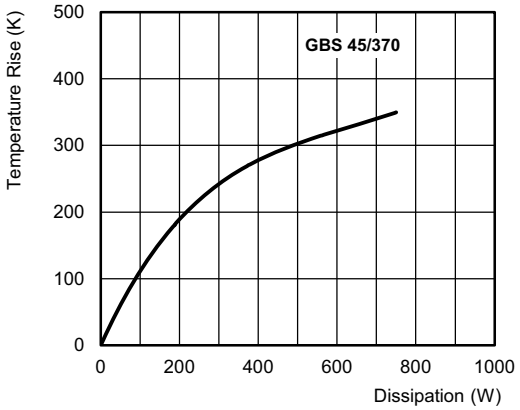

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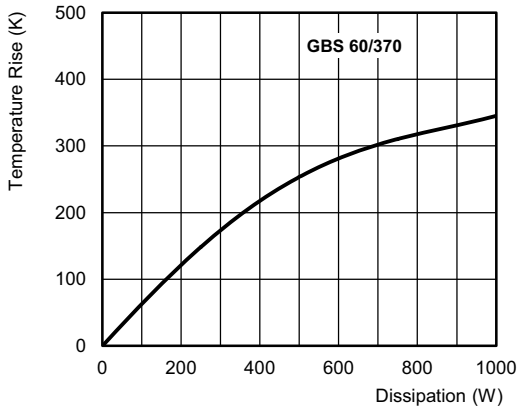
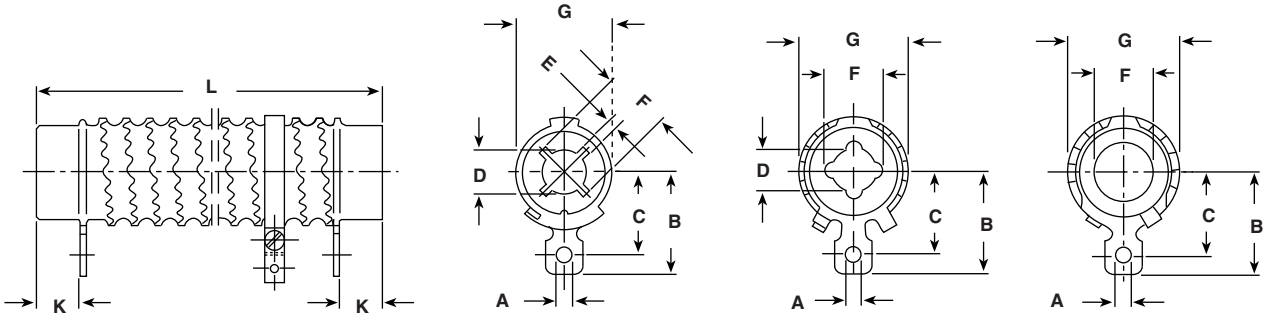


DIMENSIONS AND MASS



TYPE / VARIANT	L (mm)	K (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	MASS (g)
GBS 20/100 GBS 20/100 E	100.0 ± 2.5	15.0	4.2	26.5	22.0	10.0	1.5	14.0	24.0	100
GBS 20/165 GBS 20/165 E	165.0 ± 4.0	15.0	4.2	26.5	22.0	10.0	1.5	14.0	24.0	150
GBS 20/265 GBS 20/265 E	265.0 ± 6.6	15.0	4.2	26.5	22.0	10.0	1.5	14.0	24.0	250
GBS 30/100 GBS 30/100 E	100.0 ± 2.5	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	200
GBS 30/133 GBS 30/133 E	133.0 ± 3.3	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	250
GBS 30/165 GBS 30/165 E	165.0 ± 4.0	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	300
GBS 30/215 GBS 30/215 E	215.0 ± 5.4	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	400
GBS 30/265 GBS 30/265 E	265.0 ± 6.6	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	500
GBS 30/330 GBS 30/330 E	330.0 ± 8.0	15.0	5.2	34.0	28.0	14.0	-	18.5	37.0 ± 1.0	600
GBS 45/370 GBS 45/370 E	370.0 ± 9.0	15.0	5.2	42.5	37.0	-	-	30.0	52.0 ± 1.0	1000
GBS 60/370 GBS 60/370 E	370.0 ± 9.0	15.0	5.2	51.5	45.5	-	-	45.0	67.0 ± 1.0	1200

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