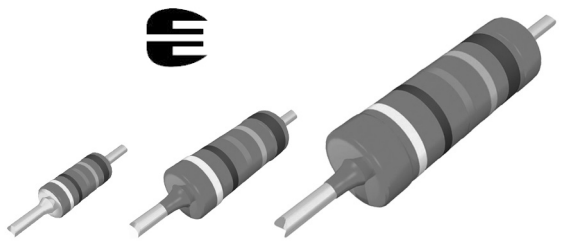
MBA 0204 VG06, MBB 0207 VG06, MBE 0414 VG06

Vishay Beyschlag

Leaded Resistors with Established Reliability



MBA 0204 VG06, MBB 0207 VG06 and MBE 0414 VG06 leaded thin film resistors with established reliability are the perfect choice for all high-reliability applications typically found in the fields of military, aircraft and spacecraft electronics. These versions supplement the families of professional and precision leaded resistors MBA 0204, MBB 0207 and MBE 0414.

FEATURES

- Approved according to CECC 40101-806, version E
- Established reliability, failure rate level E7
- Advanced thin film technology
- Excellent overall stability: Class 0.5
- Green product, supports Lead (Pb)-free soldering.

APPLICATIONS

- Military
- Avionics
- Space

METRIC SIZE			
DIN:	0204	0207	0414
CECC:	**A**	**B**	**E**

TECHNICAL SPECIFICATIONS			
DESCRIPTION	**MBA 0204**	**MBB 0207**	**MBE 0414**
CECC size, style	A	B	E
Resistance range	1 Ω to 5.11 MΩ	1 Ω to 10 MΩ	1 Ω to 21.5 MΩ
Resistance tolerance	± 1 %; ± 0.1 %		
Temperature coefficient	± 50 ppm/K; ± 15 ppm/K		
Climatic category (LCT/UCT/days)	55/155/56	55/155/56	55/155/56
Rated dissipation, P_{70}	0.4 W	0.6 W	1.0 W
Operating voltage, U_{max} AC/DC	200 V	300 V	500 V
Film temperature	155 °C	155 °C	155 °C
Max. resistance change at P_{70} for resistance range, ΔR/R after:	1 Ω to 332 kΩ	1 Ω to 1 MΩ	1 Ω to 2.43 MΩ
1000 h	= 0.5 %		= 0.4 %
8000 h	= 1.0 %		= 0.8 %
Specified lifetime	8 000 h		
Permissible voltage against ambient (insulation):			
1 minute; U_{ins}	300 V	500 V	800 V
continuous	75 V	75 V	75 V
Failure rate level	E7		
Failure rate	$= 0.7 \times 10^{-9}$/h	$= 0.3 \times 10^{-9}$/h	$= 0.1 \times 10^{-9}$/h

Note: The failure rate level E7 corresponds to MIL Level R.

PRODUCT DESCRIPTION

M	B	A	0204	-50	1 %	VG06	CT	287 K
FILM TYPE	PRODUCT CODE	SIZE CODE	METRIC DIN SIZE	TEMPERATURE COEFFICIENT	TOLERANCE	ESTABLISHED RELIABILITY	PACKING[1]	RESISTANCE VALUE
M = Metal	B = Axial leaded	A = 0204 B = 0207 E = 0414	0204 0207 0414	± 15 ppm/K ± 50 ppm/K	± 0.1 % ± 1 %	Reference to CECC 40101-806 Version E	C1 = 1 000 units CT = 5 000 units	See Temperature coefficient and resistance range table

Note: We recommend that the clear text ordering code is used to minimize the possibility of errors in order handling.

1. Availability in accordance to the table Part Numbers at the end of this datasheet.
2. Jumpers are ordered by the resistance value 0 ?, e.g. MBA 0204 VG06 CT 0R0.

EN 140401-806 ORDERING INFORMATION

Example of the ordering information for a resistor: MBA 0204-50 1 % VG06 287K

CECC40401-806EZAC287KFE7

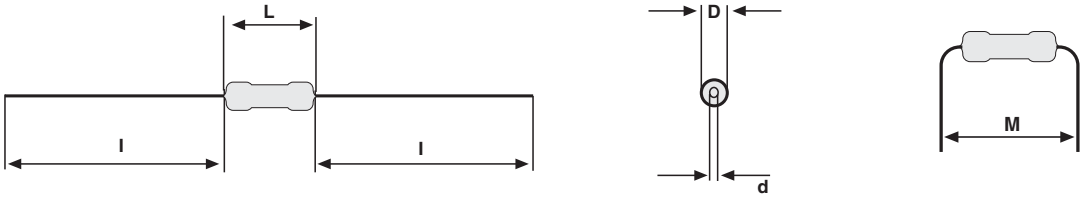
Example of the ordering information for jumpers: MBA 0204 VG06 0R0

CECC40401-806EZA-0R00-E7

The elements used in this ordering information have the following meaning:

CECC40401-806	CECC Detail specification number
EZ	Assessment level
A	Style (see table Technical Specification)
C	Temperature coefficient (C = ± 50 ppm/K; E = ± 15 ppm/K)
287K	Resistance value according to EN 60062, 4 characters
F	Tolerance on rated resistance (B = ± 0.1 %; F = ± 1 %)
E7	Failure rate level according to EN 60115-1, Table ZB.1

DIMENSIONS



DIMENSIONS - leaded resistor types, mass and relevant physical dimensions

TYPE	D_{max} (mm)	L_{max} (mm)	d_{nom} (mm)	l_{min} (mm)	M_{min} (mm)	MASS (mg)
MBA 0204	1.6	3.6	0.5	29.0	5.0	125
MBB 0207	2.5	6.3	0.6	28.0	10.0	220
MBE 0414	4.0	11.9	0.8	31.0	15.0	700

Note: Color code marking is applied according to EN 60062 in four bands (E24 series) or five bands (E96 or E192 series). Each color band appears as a single solid line, voids are permissible if at least 2/3 of the band is visible from each radial angle of view. The last color band for tolerance is approximately 50 % wider than the other bands. An interrupted violet band between the 1st and 2nd full band indicates the failure rate level E7. An interrupted orange band between the 4th and 5th full band indicates the temperature coefficient of 15 ppm/k.

DESCRIPTION

Production is strictly controlled and follows an extensive set of instructions established for reproducibility. A homogeneous film of metal alloy is deposited on a high grade ceramic body (85 % Al_2O_3) and conditioned to achieve the desired temperature coefficient. Nickel plated steel termination caps are firmly pressed on the metallised rods. A special laser is used to achieve the target value by smoothly cutting a helical groove in the resistive layer without damaging the ceramics. Connecting wires of electrolytic copper plated with 100 % pure tin are welded to the termination caps. The resistor elements are covered by a light blue protective coating designed for electrical, mechanical and climatic protection. Four or five color code rings designate the resistance value and tolerance in accordance with **EN 60062.**

The result of the determined production is verified by an extensive testing procedure performed on 100 % of the individual resistors. Only accepted products are stuck directly on the adhesive tapes in accordance with **EN 60286-1**.

ASSEMBLY

The resistors are suitable for processing on automatic insertion equipment and cutting and bending machines. Excellent solderability is proven, even after extended storage. They are suitable for automatic soldering using wave or dipping. The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions. The resistors are completely lead (Pb)-free, the pure tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes. The immunity of the plating against tin whisker growth has been proven under extensive testing.

All products comply with the CEFIC-EECA-EICTA list of legal restrictions on hazardous substances.

This includes full compliance with the following European RoHS directives:

- 2000/53/EC End of Vehicle life Directive (ELV)
- 2000/53/EC Annex II to End of Vehicle Life Directive (ELV II)
- 2002/95/EC Restriction of the use of Hazardous Substances Directive (RoHS)
- 2002/96/EC Waste Electrical and Electronic Equipment Directive (WEEE)

Solderability is specified for 2 years after production or re-qualification. The permitted storage time is 20 years.

APPROVALS

The resistors are tested in accordance with **CECC 40401-806** which refers to **EN 60115-1** and **EN 140400** and the variety of environmental test procedures of the **IEC/EN 60068** series. Approval of conformity is indicated by the **CECC** logo on the package label.

Vishay BEYSCHLAG has achieved **"Approval of Manufacturer"** in accordance with **EN 100114-1**. The release certificate for **"Technology Approval Schedule"** in accordance with **CECC 240 001** based on **EN 100114-6** is granted for the Vishay BEYSCHLAG manufacturing process.

SPECIALS

This product family of thin film leaded resistors with established reliability is complemented by **Zero Ohm Jumpers**.

FUNCTIONAL PERFORMANCE

Further information on the performance of these products may be found in the following Data Sheets:

- “Professional Leaded Resistors”
  Document No. 28723
- “Precision Leaded Resistors”
  Document No. 28725

TEMPERATURE COEFFICIENT AND RESISTANCE RANGE				
DESCRIPTION		RESISTANCE VALUE(1)		
T.C.	TOLERANCE	MBA 0204	MBB 0207	MBE 0414
± 50 ppm/K	± 1 %	1 Ω to 5.11 MΩ	1 Ω to 10 MΩ	1 Ω to 21.5 MΩ
± 15 ppm/K	± 0.1 %	100 Ω to 221 kΩ	100 Ω to 499 kΩ	100 Ω to 470 kΩ
Jumper	-	= 10 mΩ; I_{max} = 3 A	= 10 mΩ; I_{max} = 5 A	-

Note: Resistance values to be selected for ± 1 % tolerance from E24/E96 only and for ± 0.1 % tolerance from E24/E192 only.

ORDERING INFORMATION

Components may be ordered by using either the Product Description, the CECC 40101-806 Ordering Information or the Part Number.

Part Number

- The resistors have a 12-digit Part Number starting with 2312.
- The subsequent 4 digits indicate the resistor type, specification and packaging; see the Part Number table.
- The remaining 4 digits indicate the resistance value:
  - The first 3 digits indicate the resistance value.
  - The last digit indicates the resistance decade in accordance with the Resistance Decade table.

Resistance Decade

RESISTANCE DECADE	LAST DIGIT
1 Ω to 9.99 Ω	8
10 Ω to 99.9 Ω	9
100 Ω to 999 Ω	1
1 kΩ to 9.99 kΩ	2
10 kΩ to 99.9 kΩ	3
100 kΩ to 999 kΩ	4
1 MΩ to 9.99 MΩ	5
10 MΩ to 99.9 MΩ	6

Ordering example

The Part Number of a MBA 0204 VG06 resistor, value 287 k and TC 50 with ± 1 % tolerance, supplied on bandolier in a box of 5 000 units per reel is: 2312 905 02874.

PART NUMBER - resistor type and packing				
DESCRIPTION			PART NUMBER 2312	
			BANDOLIER IN BOX	
TYPE	T.C.	TOL.	C1 1 000 UNITS	CT 5 000 UNITS
MBA 0204 VG06	± 50 ppm/K	± 1 %	900 0....	905 0....
	± 15 ppm/K	± 0.1 %	902 0....	907 0....
	jumper	–	902 90001	907 90001
MBB 0207 VG06	± 50 ppm/K	± 1 %	910 0....	915 0....
	± 15 ppm/K	± 0.1 %	912 0....	917 0....
	jumper	–	912 90001	917 90001
MBE 0414 VG06	± 50 ppm/K	± 1 %	920 0....	
	± 15 ppm/K	± 0.1 %	922 0....	

Notice

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