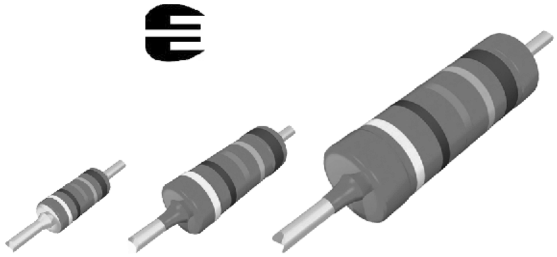
Precision Thin Film Leaded Resistors



DESCRIPTION

MBA/SMA 0204, MBB/SMA 0207 and MBE/SMA 0414 precision leaded thin film resistors combine the proven reliability of the professional products with an advanced level of precision and stability. Therefore they are perfectly suited for applications in the fields of test and measuring equipment along with industrial and medical electronics.

FEATURES

- Approved according to EN 140101-806
- Advanced thin film technology
- Low TCR: ± 15 ppm/K to ± 25 ppm/K
- Precision tolerance of value: ± 0.1 % and ± 0.25 %
- Superior overall stability: Class 0.05
- Wide precision range: 10 Ω to 1.5 MΩ
- Lead (Pb)-free solder contacts
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compliant to RoHS directive 2002/95/EC

Pb-free
RoHS
COMPLIANT

APPLICATIONS

- Test and measuring equipment
- Industrial electronics
- Medical electronics

METRIC SIZE			
DIN	0204	0207	0414
CECC	A	B	D

TECHNICAL SPECIFICATIONS						
DESCRIPTION	**MBA/SMA 0204**		**MBB/SMA 0207**		**MBE/SMA 0414**	
CECC Size	A		B		D	
Resistance Range	22 Ω to 332 kΩ		10 Ω to 1 MΩ		22 Ω to 1.5 MΩ	
Resistance Tolerance	± 0.25 %; ± 0.1 %					
Temperature Coefficient	± 25 ppm/K; ± 15 ppm/K					
Operation Mode	Precision	Standard	Precision	Standard	Precision	Standard
Climatic Category (LCT/UCT/Days)	10/85/56	55/125/56	10/85/56	55/125/56	10/85/56	55/125/56
Rated Dissipation, P_{70}	0.07 W	0.25 W	0.11 W	0.40 W	0.17 W	0.65 W
Operating Voltage, $U_{max.}$ AC/DC	200 V		350 V		500 V	
Film Temperature	85 °C	125 °C	85 °C	125 °C	85 °C	125 °C
Max. Resistance Change at P_{70} for Resistance Range, $\Delta R/R$ max., After:	100 Ω to 100 kΩ		100 Ω to 270 kΩ		100 Ω to 470 kΩ	
1000 h	≤ 0.05 %	≤ 0.25 %	≤ 0.05 %	≤ 0.15 %	≤ 0.05 %	≤ 0.25 %
8000 h	≤ 0.1 %	≤ 0.5 %	≤ 0.1 %	≤ 0.5 %	≤ 0.1 %	≤ 0.5 %
225 000 h	≤ 0.3 %	≤ 1.5 %	≤ 0.3 %	≤ 1.5 %	≤ 0.3 %	≤ 1.5 %
Permissible Voltage Against Ambient (Insulation):						
1 Minute; U_{ins}	300 V		500 V		800 V	
Continuous	75 V		75 V		75 V	
Failure Rate: $FIT_{observed}$	≤ 0.1 x 10^{-9}/h					

Notes

- MB_ series has been merged with the related SMA series to form one series “MB_/SMA__”
- These resistors do not feature 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.

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: MBB0207VD1001BCT00

M	B	B	0	2	0	7	V	D	1	0	0	1	B	C	T	0	0

MODEL/SIZE	VARIANT	TCR/MATERIAL	VALUE	TOLERANCE	PACKAGING (1)	SPECIAL
MBA0204 = MBA/SMA 0204 **MBB0207** = MBB/SMA 0207 **MBE0414** = MBE/SMA 0414	**V** = CECC 06	**E** = ± 15 ppm/K **D** = ± 25 ppm/K	**3 digit value** **1 digit multiplier** MULTIPLIER **8** = $*10^{-2}$ **2** = $*10^{2}$ **9** = $*10^{-1}$ **3** = $*10^{3}$ **0** = $*10^{0}$ **4** = $*10^{4}$ **1** = $*10^{1}$ **5** = $*10^{5}$	**B** = ± 0.1 % **C** = ± 0.25 %	**CT** **C1** **RP** **R2** **R4** **N4**	**00** = Standard **RB** = Radial 5 mm for MBB/SMA0207 **UB** = Radial 2.5 mm for MBB/SMA0207 **L0** = Without lacquer on termination for MBB/SMA0207

PRODUCT DESCRIPTION: MBB/SMA 0207-25 0.1 % CECC 06 CT 1K0

MBB/SMA 0207	-	25	0.1 %	CECC 06	CT	1K0
MODEL/SIZE		TCR	TOLERANCE	VARIANT	PACKAGING (1)	RESISTANCE
MBA/SMA 0204 **MBB/SMA 0207** **MBE/SMA 0414**		± **15** ppm/K ± **25** ppm/K	± **0.1** % ± **0.25** %	**CECC 06** **CECC 06 RB** **CECC 06 UB** **CECC 06 L0**	**CT** **C1** **RP** **R2** **R4** **N4**	**1K0** = 1 kΩ **51R1** = 51.1 Ω

Notes

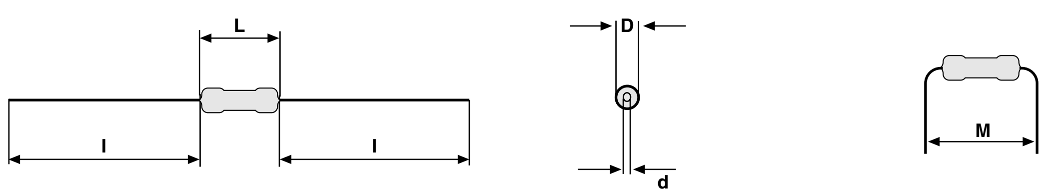
(1) Please refer to table PACKAGING for complete information

- The PART NUMBER shown above is to facilitate the unified part numbering system for ordering products

PACKAGING

MODEL	REEL		BOX	
	PIECES	CODE	PIECES	CODE
MBA/SMA 0204	5000	RP	1000 5000	C1 CT
MBB/SMA 0207	5000	RP	1000 5000	C1 CT
MBE/SMA 0207 Radial version (RB, UB)	4000	R4	4000	N4
MBE/SMA 0414	2500	R2	1000	C1

DIMENSIONS



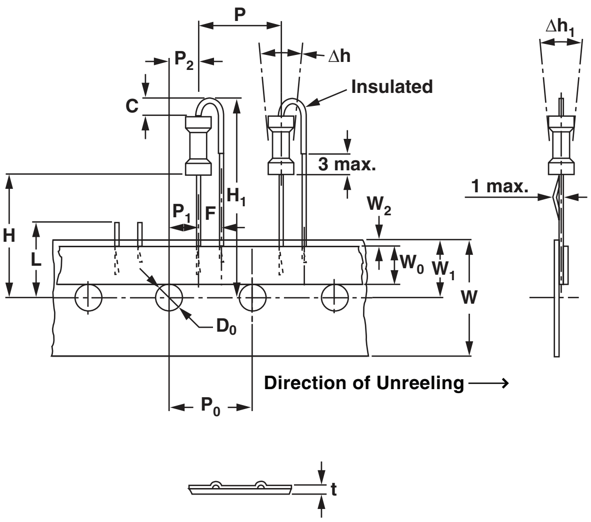
DIMENSIONS - Leaded resistor types, mass and relevant physical dimensions						
TYPE	$D_{max.}$ (mm)	$L_{max.}$ (mm)	$d_{nom.}$ (mm)	$l_{min.}$ (mm)	$M_{min.}$ (mm)	MASS (mg)
MBA/SMA 0204	1.6	3.6	0.5	29.0	5.0	125
MBB/SMA 0207	2.5	6.3	0.6	28.0	10.0 (2)	220
MBE/SMA 0414	4.0	11.9	0.8	31.0	15.0	700

Note

(2) For 7.5 ≤ M < 10.0 mm, use version MBB/SMA 0207 ... L0 without lacquer on the leads

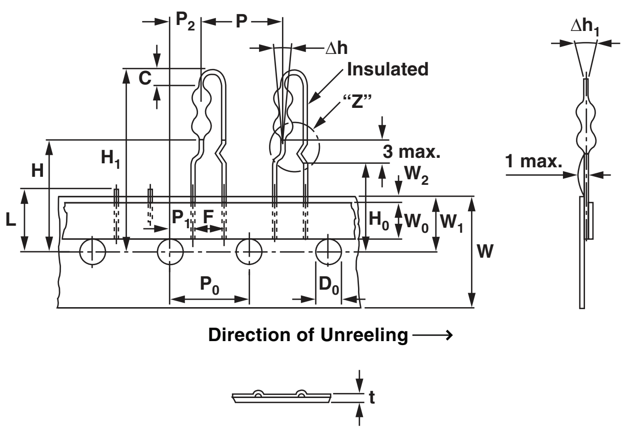
MBB/SMA 0207 WITH RADIAL TAPING

LEAD SPACING (UB = 2.5 mm), SIZE 0207

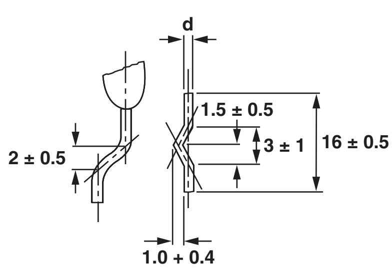


DIMENSIONS in millimeters			**TOL.**
Lead Ø	d	0.6	-
Pitch of components	P	12.7	± 1.0
Pitch of sprocket holes [1]	P_0	12.7	± 0.3
Distance between hole center and lead center	P_1	5.1	± 0.7
Distance between hole center and resistor center	P_2	5.1	± 0.7
Lead Spacing	F	2.5	+ 0.6, - 0.1
Angle of insertion	Δh	1.3 max.	-
Angle of insertion	Δh1	2 max.	-
Width of carrier tape	W	18.0	+ 1, - 0.5
Width of adhesive tape	W_0	6.0	± 0.5
Position of holes	W_1	9.0	+ 0.75, - 0.5
Position of adhesive tape	W_2	0.5	+ 0.5, - 0
Body to hole center [2]	H	18.0	± 2, - 0
Hole Ø	D_0	4.0	+ 0.2
Thickness of tape [3]	t	0.9 max.	-
Height for cutting	L	11 max.	-
Height for bending	C	2.5	+ 0, - 0.5
Height for insertion	H_1	32 max.	-

LEAD SPACING (RB = 5.0 mm), SIZE 0207



Area "Z"



DIMENSIONS in millimeters			**TOL.**
Lead Ø	d	0.6	-
Pitch of components	P	12.7	± 1.0
Tape pitch	P_0	12.7	± 0.3
Distance between hole center and lead center	P_1	3.85	± 0.7
Distance between hole center and resistor center	P_2	6.35	± 0.7
Lead spacing	F	5.0	+ 0.6, - 0.1
Angle of insertion	Δh	1.3 max.	-
Angle of insertion	Δh1	2 max.	-
Width of carrier tape	W	18.0	+ 1, - 0.5
Width of adhesive tape	W_0	6.0	± 0.5
Position of holes	W_1	9.0	+ 0.75, - 0.5
Position of adhesive tape	W_2	0.5	+ 0.5, - 0
Body to hole center [2]	H	18.0	+ 2, - 0
Lead crimp to hole center [2]	H_0	16.0	± 0.5
Hole Ø	D_0	4.0	± 0.2
Thickness of tape [3]	t	0.9 max.	-
Height for cutting	L	11 max.	-
Height for bending	C	2.5	+ 0, - 0.5
Height for insertion	H_1	32 max.	-

Notes

[1] Test over 10 holes - 9 intervals P_0 12 x 9 = 114.3 ± 0.5

[2] Parallelism, < 0.5 mm

[3] Thickness of carrier tape: 0.55 mm ± 0.1

TEMPERATURE COEFFICIENT AND RESISTANCE RANGE				
DESCRIPTION		RESISTANCE VALUE (1)		
TCR	TOLERANCE	MBA/SMA 0204	MBB/SMA 0207	MBE/SMA 0414
± 25 ppm/K	± 0.25 %	**22 Ω to 332 kΩ**	**10 Ω to 1 MΩ**	**22 Ω to 1.5 MΩ**
	± 0.1 %	**43 Ω to 332 kΩ**	**10 Ω to 1 MΩ**	**43 Ω to 1 MΩ**
± 15 ppm/K	± 0.25 %	22 Ω to 221 kΩ	10 Ω to 1 MΩ	22 Ω to 1 MΩ
	± 0.1 %	**43 Ω to 221 kΩ**	**10 Ω to 1 MΩ**	**43 Ω to 1 MΩ**

Notes
(1) Resistance values to be selected from E96 and E192 series, for other values please contact factory
- Resistance ranges printed in bold are preferred TCR/tolerance combinations with optimized availability

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 and conditioned to achieve the desired temperature coefficient. Plated steel termination caps are firmly pressed on the metallized 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. A further conditioning is applied in order to stabilise the trimming result. Connecting wires of electrolytic copper plated with 100 pure tin are welded to the termination caps. The resistors are covered by protective coating designed for electrical, mechanical and climatic protection.The terminations receive a final pure tin on nickel plating. Four or five color code rings designate the resistance value and tolerance in accordance with **IEC 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 **IEC 60286-1**; **IEC 60286-2**.

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 suitability of conformal coatings, if applied, shall be qualified by appropriate means to ensure the long-term stability of the whole system. 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 **GADSL** (2) and the **CEFIC-EECA-EICTA** (3) list of legal restrictions on hazardous substances. This includes full compliance with the following directives:

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

APPROVALS

The resistors are approved within the IECQ-CECC Quality Assessment System for Electronic Components to the detail specification **EN 140101-806** which refers to **EN 60115-1** and **EN 140100** and the variety of environmental test procedures of the **IEC 60068** series. Conformity is attested by the use of the **CECC** logo ( ) as the Mark of Conformity on the package label for CECC version.

Vishay BEYSCHLAG has achieved **"Approval of Manufacturer"** in accordance with **IEC QC 001002-3, clause 2**. The release certificate for **"Technology Approval Schedule"** in accordance with **CECC 240001** based on **IEC QC 001002-3**, clause 6 is granted for the Vishay BEYSCHLAG manufacturing process.

RELATED PRODUCTS

This product family of leaded thin film resistors for professional applications is complemented by **Zero Ohm Jumpers**.

For a corelated range of precision TCR and tolerance specifications see the datasheet:

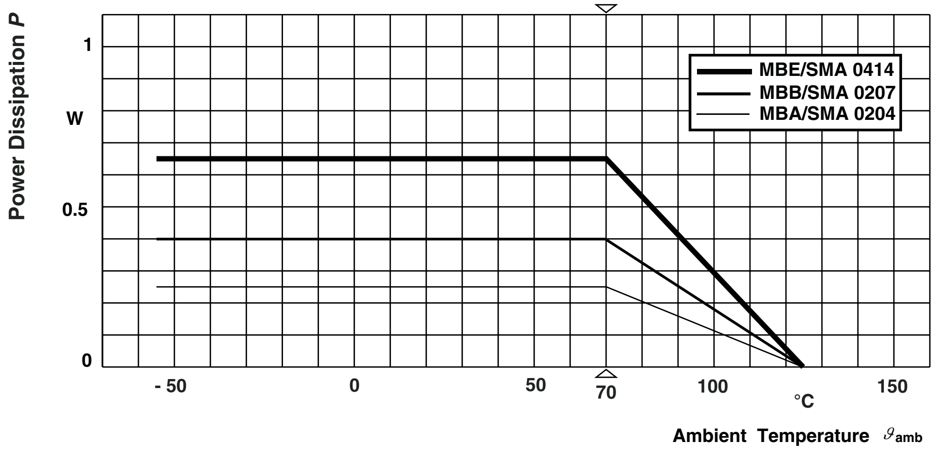
- "Professional Thin Film Leaded Resistors", document no. 28766

For products approved to EN 140101-806, version E, with established reliability and failure rate level E7 (Quality factor π_Q = 0.1), see the datasheet:

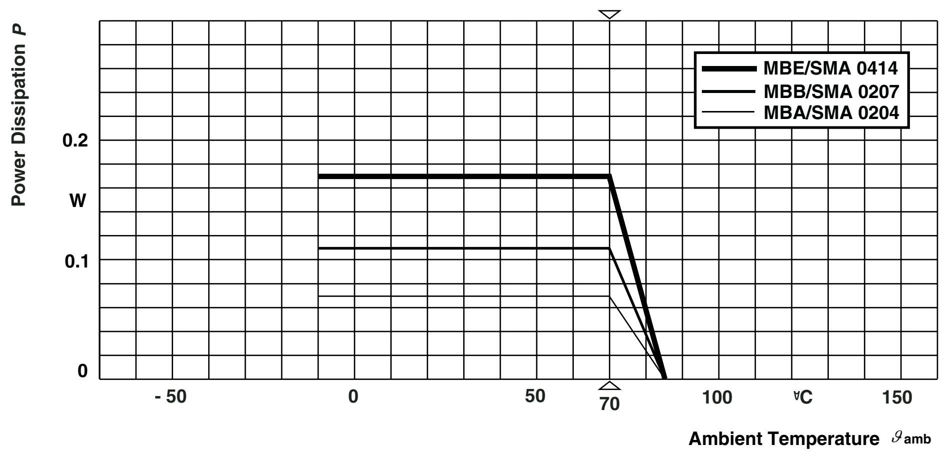
- "Established Reliability Thin Film Leaded Resistors", document no. 28768

Notes
(2) Global Automotive Declarable Substance List, see www.gadsl.org
(3) CEFIC (European Chemical Industry Council), EECA (European Electronic Component Manufacturers Association), EICTA (European trade organisation representing the information and communications technology and consumer electronics), see www.eicta.org/index.php?id=1053&id_article=340

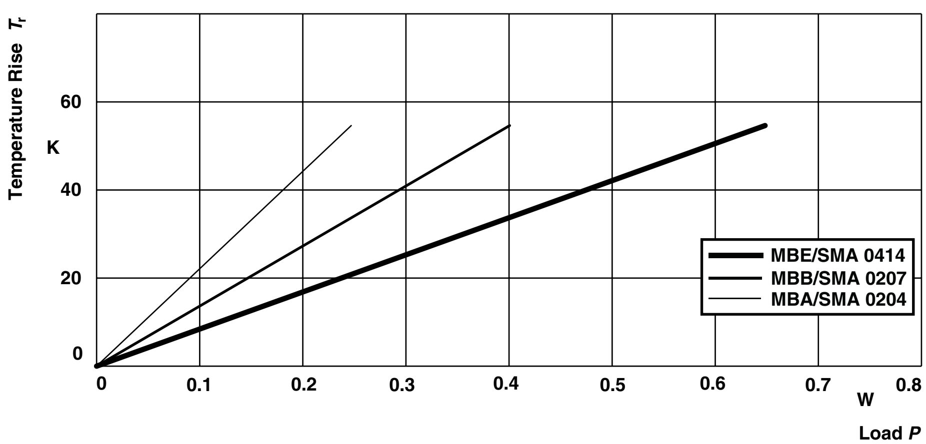
FUNCTIONAL PERFORMANCE



Derating - Long Term Operation

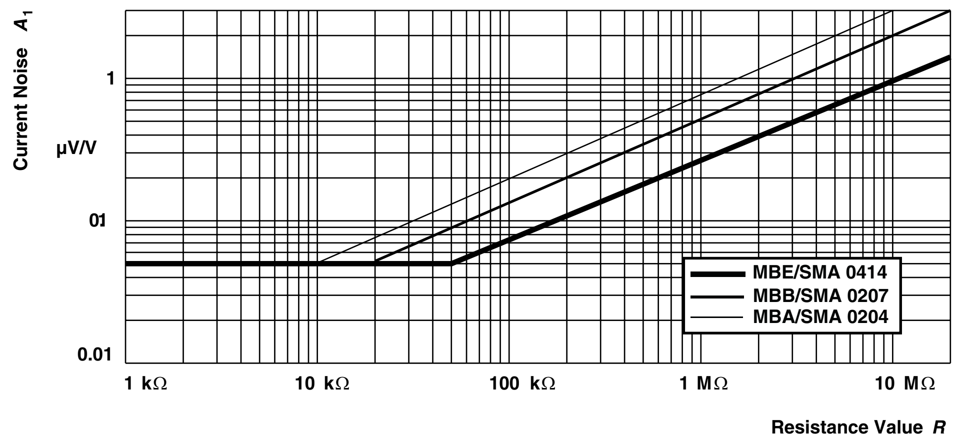


Derating - Precision Operation



Rise of the surface temperature.

Temperature Rise



Current Noise A_1 in accordance with IEC 60195

TESTS AND REQUIREMENTS

Essentially all tests are carried out in accordance with the following specifications:

EN 60115-1, Generic specification (includes tests)

EN 140100, Sectional specification (includes schedule for qualification approval)

EN 140101-806 (successor of CECC 40101-806), Detail specification (includes schedule for conformance inspection)

Most of the components are approved in accordance with the European CECC-system, where applicable. The Test Procedures and Requirements table contains only the most important tests. For the full test schedule refer to the documents listed above. The testing also covers most of the requirements specified by EIA/IS-703 and JIS-C-5202.

The tests are carried out in accordance with IEC 60068-2-xx test method and under standard atmospheric conditions in accordance with IEC 60068-1, 5.3. Climatic category LCT/UCT/56 (rated temperature range: Lower Category Temperature, Upper Category Temperature; damp heat, long term, 56 days) is valid.

Unless otherwise specified the following values apply:

Temperature: 15 °C to 35 °C

Relative humidity: 45 % to 75 %

Air pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar).

For testing the components are mounted on a test board in accordance with IEC 60115-1, 4.31 unless otherwise specified.

In the Test Procedures and Requirements table, only the tests and requirements are listed with reference to the relevant clauses of IEC 60115-1 and IEC 60068-2-xx test methods. A short description of the test procedure is also given.

TEST PROCEDURES AND REQUIREMENTS

IEC 60115-1 CLAUSE	IEC 60068-2- TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR max.)		
			Stability for product types:	**STABILITY CLASS 0.05**	**STABILITY CLASS 0.1**	**STABILITY CLASS 0.25**
			MBA/SMA 0204	100 Ω to 100 kΩ	43 Ω to < 100 Ω; > 100 Ω to 221 kΩ	22 Ω to 332 kΩ
			MBB/SMA 0207	100 Ω to 270 kΩ	43 Ω to < 100 Ω; > 270 kΩ to 510 kΩ	22 Ω to 1 MΩ
			MBE/SMA 0414	100 Ω to 470 kΩ	43 Ω to <100 Ω; > 470 kΩ to 1 MΩ	22 Ω to 1.5 MΩ
4.5	-	Resistance	-	± 0.25 %; ± 0.1 %		
4.8	-	Temperature coefficient	At 20/LCT/20 °C and 20/UCT/20 °C	± 25 ppm/K; ± 15 ppm/K		

TEST PROCEDURES AND REQUIREMENTS

IEC 60115-1 CLAUSE	IEC 60068-2- TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR max.)		
			Stability for product types:	**STABILITY CLASS 0.05**	**STABILITY CLASS 0.1**	**STABILITY CLASS 0.25**
			MBA/SMA 0204	100 Ω to 100 kΩ	43 Ω to < 100 Ω; > 100 Ω to 221 kΩ	22 Ω to 332 kΩ
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			MBE/SMA 0414	100 Ω to 470 kΩ	43 Ω to <100 Ω; > 470 kΩ to 1 MΩ	22 Ω to 1.5 MΩ
4.25.1	-	Endurance at 70 °C: Precision operation mode	$U = \sqrt{P_{70} \times R}$ or $U = U_{max.}$; 1.5 h ON; 0.5 h OFF			
			70 °C; 1000 h	± (0.05 % R + 0.01 Ω) [1]	± (0.1 % R + 0.01 Ω)	± (0.25 % R + 0.05 Ω) [2]
			70 °C; 8000 h	± (0.1 % R + 0.01 Ω)	± (0.2 % R + 0.01 Ω)	± (0.5 % R + 0.05 Ω)
	-	Endurance at 70 °C: Standard operation mode	$U = \sqrt{P_{70} \times R}$ or $U = U_{max.}$; 1.5 h ON; 0.5 h OFF			
			70 °C; 1000 h	± (0.25 % R + 0.05 Ω) [2]	-	-
			70 °C; 8000 h	± (0.5 % R + 0.05 Ω)	-	-
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; 56 days; (93 ± 3) % RH	± (0.05 % R +0.01 Ω)	± (0.1 % R + 0.01 Ω)	± (0.25 % R + 0.05 Ω)
4.23		Climatic sequence:				
4.23.2	2 (Ba)	Dry heat	125 °C; 16 h			
4.23.3	30 (Db)	Damp heat, cyclic	55 °C; 24 h; 90 % to 100 % RH; 1 cycle			
4.23.4	1 (Aa)	Cold	- 55 °C; 2 h			
4.23.5	13 (M)	Low air pressure	8.5 kPa; 2 h; 15 °C to 35 °C			
4.23.6	30 (Db)	Damp heat, cyclic	55 °C; 5 days; 95 % to 100 % RH; 5 cycles	± (0.05 % R + 0.01 Ω) no visible damage	± (0.1 % R + 0.01 Ω) no visible damage	± (0.25 % R + 0.05 Ω) no visible damage
4.13	–	Short time overload	Room temperature; $U = 2.5 \times \sqrt{P_{70} \times R}$ or $U = 2 \times U_{max.}$; 5 s	± (0.01 % R + 0.01 Ω) no visible damage	± (0.02 % R + 0.01 Ω) no visible damage	± (0.05 % R + 0.01 Ω) no visible damage
4.19	14 (Na)	Rapid change of temperature	30 min at LCT = - 55 °C 30 min at UCT = 125 °C			
			5 cycles	± (0.01 % R + 0.01 Ω) no visible damage	± (0.02 % R + 0.01 Ω) no visible damage	± (0.05 % R + 0.01 Ω) no visible damage
			MBA/SMA 0204: 500 cycles MBB/SMA 0207: 200 cycles MBE/SMA 0414: 100 cycles	± (0.25 % R + 0.05 Ω) no visible damage	± (0.25 % R + 0.05 Ω) no visible damage	± (0.25 % R + 0.05 Ω) no visible damage

TEST PROCEDURES AND REQUIREMENTS

IEC 60115-1 CLAUSE	IEC 60068-2-TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR max.)		
			Stability for product types:	STABILITY CLASS 0.05	STABILITY CLASS 0.1	STABILITY CLASS 0.25
			MBA/SMA 0204	100 Ω to 100 kΩ	43 Ω to < 100 Ω; > 100 Ω to 221 kΩ	22 Ω to 332 kΩ
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			MBE/SMA 0414	100 Ω to 470 kΩ	43 Ω to <100 Ω; > 470 kΩ to 1 MΩ	22 Ω to 1.5 MΩ
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol + 23 °C; toothbrush method	Marking legible; No visible damage		
4.18.2	20 (Tb)	Resistance to soldering heat	Unmounted components; (260 ± 3) °C; (10 ± 1) s	± (0.01 % R + 0.01 Ω) no visible damage	± (0.02 % R + 0.01 Ω) no visible damage	± (0.05 % R + 0.01 Ω) no visible damage
4.17	20 (Ta)	Solderability	+ 235 °C; 2 s solder bath method; SnPb40	Good tinning (≥ 95 % covered, no visible damage)		
			+ 245 °C; 3 s solder bath method; SnAg3Cu0.5			
4.22	6 (B4)	Vibration	6 h; 10 Hz to 2000 Hz 1.5 mm or 196 m/s^2	± (0.01 % R + 0.01 Ω)	± (0.02 % R + 0.01 Ω)	± (0.05 % R + 0.01 Ω)
4.16	21 (Ua_1) 21 (Ub) 21 (Uc)	Robustness of terminations	Tensile, bending and torsion	± (0.01 % R + 0.01 Ω)	± (0.02 % R + 0.01 Ω)	± (0.05 % R + 0.01 Ω)
4.7	-	Voltage proof	$U_{RMS} = U_{ins}$; 60 s	No flashover or breakdown		
4.25.3	-	Endurance at upper category temperature	85 °C; 1000 h 125 °C; 1000 h	- ± (0.05 % R + 0.01 Ω)	- ± (0.1 % R + 0.01 Ω)	- ± (0.25 % R + 0.05 Ω)
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1; 3 pos. + 3 neg. MBA/SMA 0204: 2 kV MBB/SMA 0207: 4 kV MBE/SMA 0414: 6 kV	± (0.5 % R + 0.05 Ω)		

Notes

(1) ± (0.03 % R + 0.01 Ω) for MBB/SMA 0207

(2) ± (0.15 % R + 0.05 Ω) for MBB/SMA 0207

12NC INFORMATION FOR HISTORICAL CODING REFERENCE

- The resistors have a 12-digit numeric code starting with 2312
- The subsequent 4 digits indicate the resistor type, specification and packaging; see the 12NC 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 resistance decade table shown below

Last Digit of 12NC Indicating Resistance Decade

RESISTANCE DECADE	LAST DIGIT
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

12NC Example (For Historical coding reference of MBA 0204/MBB 0207/MBE 0414)

The 12NC code of a MBA 0204 resistor, value 47 kΩ and TCR 25 with ± 0.1 % tolerance, supplied on bandolier in a box of 5000 units is: 2312 906 74703.

12NC CODE FOR HISTORICAL CODING REFERENCE OF MBA 0204/MBB 0207/MBE 0414

DESCRIPTION			2312 ... . (BANDOLIER)				
			AMMOPACK		REEL		
TYPE	TCR	TOL.	C1 1000 units	CT 5000 units	R1 1000 units	R2 2500 units	RP 5000 units
MBA 0204	± 25 ppm/K	± 0.25 %	901 6....	906 6....	701 6....	-	806 6....
		± 0.1 %	901 7....	906 7....	701 7....	-	806 7....
	± 15 ppm/K	± 0.25 %	902 6....	907 6....	702 6....	-	807 6....
		± 0.1 %	902 7....	907 7....	702 7....	-	807 7....
MBB 0207	± 25 ppm/K	± 0.25 %	911 6....	916 6....	711 6....	-	816 6....
		± 0.1 %	911 7....	916 7....	711 7....	-	816 7....
	± 15 ppm/K	± 0.25 %	912 6....	917 6....	712 6....	-	817 6....
		± 0.1 %	912 7....	917 7....	712 7....	-	817 7....
MBE 0414	± 25 ppm/K	± 0.25 %	921 6....	-	-	826 6....	-
		± 0.1 %	921 7....	-	-	826 7....	-
	± 15 ppm/K	± 0.25 %	922 6....	-	-	827 6....	-
		± 0.1 %	922 7....	-	-	827 7....	-

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