Overview of Vishay Beyschlag IECQ-CECC Approved Products

This document serves as a supplement to several datasheets for resistors with IECQ-CECC approval. It provides the exact listing of all approved products, with given conditions and affected resistance ranges, as confirmed by the respective marks' licenses. For a start, below are a few basics to this quality assessment system:

QUALITY ASSESSMENT SYSTEM

The INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) supports the QUALITY ASSESSMENT SYSTEM FOR ELECTRONIC COMPONENTS (IECQ system) by means of a dedicated sub-organization, the IECQ.

The IECQ provides a set of rules and procedures, which are available on their website at https://www.iecq.org. While the actual work related to the quality assessment of electronic components, including the auditing of the applicants, is executed by designated IECQ Certification Bodies (IECQ CB), the IECQ operates a database for publication of the approval certificates at https://certificates.iecq.org.

Whereas the IECQ has established other quality assessment systems before, the Quality Assessment System for Electronic Components has been adopted from the HARMONIZED SYSTEM OF QUALITY ASSESSMENT FOR ELECTRONIC COMPONENTS established by the CENELEC ELECTRONIC COMPONENTS COMMITTEE (CECC), then a part of the COMITÉ EUROPÉEN DE NORMALISATION ELECTROTECHNIQUE (CENELEC, European Committee for Electrotechnical Standardization). In the CECC system, the certification body has been addressed as NATIONAL SUPERVISING INSPECTORATE (NSI, or ONS). Reference to the origin of this Quality Assessment System is maintained by our continued use of the designation IECQ-CECC.

CECC ceased its operations in 2003, after which CENELEC leased the renowned CECC MARK OF APPROVAL to the IECQ.

APPROVAL OF MANUFACTURER

Prerequisites to the manufacturer's quality management system apply for obtaining any certification within the IECQ Quality Assessment System for Electronic Components (IECQ System), as detailed in IECQ 03-1, Clauses 8 and 9, with detailed references to IEC 9001 and to ISO/IEC 17025.

Note

- Prior to the release of IECQ 03-1, these prerequisites were covered by a separate approval of an organization, e.g. approval of a manufacturer, with the requirements given in IEC QC 001002-3, Clause 2, and before in EN 100114-1 or its predecessor CECC 00 114/I

The Approval of Manufacturer has been achieved by Beyschlag, Heide continuously since 1974 (online certificate IECQ-P VDE 18.0011), followed by respective approvals for the production in Dolní Rychnov (CZ) (IECQ-P VDE 18.0010), Be'er Sheva (IL) (IECQ-P VDE 18.0003), and Dimona (IL) (IECQ-P VDE 18.0002). These approvals are granted by the VDE Testing and Certification Institute and registered as No. 7933/10.74.

QUALIFICATION APPROVALS

IECQ offers as part of its IECQ APPROVED COMPONENT PRODUCTS, RELATED MATERIALS & ASSEMBLIES SCHEME for qualification of electronic components the IECQ APPROVED COMPONENT CERTIFICATION. While the procedural requirements are detailed in IECQ 03-3, the technical requirements, including test schedules, severities, and performance requirements, are applied from the respective specification documents.

For resistors, the CENELEC detail specifications, e.g. EN 140101-8xx, or EN 140401-8xx, which relate to subordinate sectional and generic specifications from the EN 60115-x series, provide the required details.

Note

- Prior to the release of the IECQ 03-3-1, the Qualification Approval was covered by IEC QC 001002-3, Clause 3, and before by EN 100114-2 and its predecessor CECC 00 114/II

Qualification approvals have been achieved by Beyschlag since 1974 for its variety of leaded film resistors, since the mid 1980s for its thin film SMD MELF resistors, and since the 1990s for its range of thin film SMD chip resistors.

TECHNOLOGY APPROVAL

Superior to the assessment of a finished product is the management of its production flow by means of suitable intermediate supervision aiming to ensure that only acceptable products will be produced. The basic concept for this comprehensive approach has been set up as Technology Approval and now is offered by IECQ 03-3-1 as IECQ APPROVED COMPONENT – TECHNOLOGY CERTIFICATION.

Note

- Prior to the release of the IECQ 03-3, the Technology Approval has been covered by IEC QC 001002-3, Clause 6, and before by EN 100114-6

Key to a Technology Approval is a Technology Approval Schedule on the respective range of components, which in this case is the CECC 240 001 on fixed low power film resistors. The Technology Approval has been achieved by Beyschlag since 1996 for its range of leaded metal film resistors, thin film SMD MELF resistors, and thin film SMD chip resistors.

The comprehensive nature of the Technology Approval gives reason to anticipate a similar level of quality assessment even for those products that are not specifically covered by a qualification approval.

1. LOW POWER METAL FILM RESISTORS WITH LEADS

The European Standard

EN 140101-806, Detail Specification: Fixed low power film resistors - Metal film resistors on high grade ceramic, conformal coated or molded, axial or preformed leads

provides a suitable basis for the qualification of low power metal film resistors with leads, hence for our family of MB_/SMA metal film leaded resistors.

Further to an elaborate test schedule for the initial qualification of the concerned resistors, the detail specification EN 140101-806 prescribes an extensive schedule for quality conformance inspections, consisting of lot-by-lot tests and of periodic tests scheduled for a frequency of 3 months, 12 months, or 36 months, as appropriate. An additional requirement of EN 140101-806 is the application of a suitable screening method for the reduction of an early failure rate.

1.1 APPROVAL TO VERSION A REQUIREMENTS

EN 140101-806 defines version A for the approval of products that are 100 % tested for their resistance value.

Product approval to version A is established in order to support the characteristic functional, performance, and reliability requirements of high performance electronic equipment, where one or more of the following criteria apply: uninterrupted performance is desired or mandatory, operation in harsh environmental conditions, and / or extended lifetime.

Applications demanding such criteria are typically found in the fields of industrial electronics, telecommunication infrastructure, and in all kinds of mobility.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

1.1.1 PRODUCTION IN HEIDE (DE) AND IN DOLNÍ RYCHNOV (CZ)

PRODUCTS APPROVED TO EN 140101-806, VERSION A APPLYING CLIMATIC CATEGORY 55 / 155 / 56 AND STABILITY CLASSES 0.5; 1; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
A	A	n/a	MBA/SMA 0204 CECC 06	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
						± 1	F	1 Ω to 332 kΩ	0.5	
								> 332 kΩ to 10 MΩ	2	
						± 0.5	D	10 Ω to 475 kΩ	0.5	
				± 25	Q	± 1	F	10 Ω to 332 kΩ		
								> 332 kΩ to 475 kΩ	2	
						± 0.5	D	10 Ω to 475 kΩ	0.5	
				n/a		n/a		0 Ω	n/a	-
B			MBB/SMA 0207 CECC 06	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
								> 10 MΩ to 22 MΩ	2	
						± 1	F	1 Ω to 1 MΩ	0.5	
								> 1 MΩ to 10 MΩ	2	
						± 0.5	D	10 Ω to 1 MΩ	0.5	
				± 25	Q	± 1	F			
						± 0.5	D			
				n/a		n/a		0 Ω	n/a	-
D			MBE/SMA 0414 CECC 06	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
						± 1	F	1 Ω to 2.43 MΩ	0.5	
								> 2.43 MΩ to 22 MΩ	2	
						± 0.5	D	10 Ω to 2.43 MΩ	0.5	
				± 25	Q	± 1	F			
						± 0.5	D			

Notes

- Related datasheet:
  MBA/SMA 0204, MBB/SMA 0207, MBE/SMA 0414 - Professional, Professional Metal Film Leaded Resistors
  Document 28766, see www.vishay.com/doc?28766

[1] TCR code as per IEC 60062, applied in EN 140101-806, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140101-806, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASS 0.25										
STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
A	A	n/a	MBA/SMA 0204 CECC 06	± 25	Q	± 0.25	C	22 Ω to 332 kΩ	0.25	No prescription of E series
						± 0.1	B	43 Ω to 332 kΩ		
				± 15	P	± 0.25	C	22 Ω to 221 kΩ		
						± 0.1	B	43 Ω to 221 kΩ		
B			MBB/SMA 0207 CECC 06	± 50	R	± 0.5	D	10 Ω to 1 MΩ		
				± 25	Q					
						± 0.25	C			
						± 0.1	B			
				± 15	P	± 0.25	C			
						± 0.1	B			
D			MBE/SMA 0414 CECC 06	± 25	Q	± 0.25	C	22 Ω to 1.5 MΩ		
						± 0.1	B	43 Ω to 1 MΩ		
				± 15	P	± 0.25	C	22 Ω to 1 MΩ		
						± 0.1	B	43 Ω to 1 MΩ		

Notes

- Related datasheet:
  MBA/SMA 0204, MBB/SMA 0207, MBE/SMA 0414 - Precision, Precision Metal Film Leaded Resistors
  Document 28767, see www.vishay.com/doc?28767

[1] TCR code as per IEC 60062, applied in EN 140101-806, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0017 for the Heide (DE) site, and IECQ-C VDE 18.0017-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 113459 for both sites.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site, and IECQ-C VDE 18.0022-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632 for both sites.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the manufacturer code **DE BEH** within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved low power metal film resistors with leads (Version A) produced in Heide (DE) and its dependent production site Dolní Rychnov (CZ).

Note

- This manufacturer code should not be confused with the beginning of the lot number shown on the label, which usually starts with (H)BEH for products made in Heide (DE) and with (H)VEM for products made in Dolní Rychnov (CZ)

1.2 APPROVAL TO VERSION E REQUIREMENTS

EN 140101-806 defines version E for the approval of products that are 100 % tested for their resistance value, in addition to the assessment of a failure rate level (FRL) based on accumulated true long term endurance test performance of an extended sample size.

Product approval to version E is established in order to support the characteristic functional, performance, and reliability requirements of high performance and high reliability electronic equipment, where the requirement for established reliability and an assessed failure rate level applies in addition to the criteria stated above for version A.

Applications demanding such criteria are typically found in the fields of military and aeronautic electronics.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

1.2.1 PRODUCTION IN HEIDE (DE) AND IN DOLNÍ RYCHNOV (CZ)

PRODUCTS APPROVED TO EN 140101-806, VERSION E APPLYING CLIMATIC CATEGORY 55 / 155 / 56 AND STABILITY CLASSES 0.5; 1; 2										
STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
A	E	E7	MBA/SMA 0204 VG06	± 50	R	± 1	F	1.00 Ω to 332 kΩ	0.5	E96
								340 kΩ to 5.11 MΩ	2	
				n/a		n/a		0 Ω	n/a	-
B			MBB/SMA 0207 VG06	± 50	R	± 1	F	1.00 Ω to 1.00 MΩ	0.5	E96
								1.02 MΩ to 5.11 MΩ	1	
								5.23 MΩ to 10.0 MΩ	2	
				n/a		n/a		0 Ω	n/a	-
D			MBE/SMA 0414 VG06	± 50	R	± 1	F	1.00 Ω to 2.43 MΩ	0.5	E96
								2.49 MΩ to 5.11 MΩ	1	
								5.23 MΩ to 21.5 MΩ	2	

Notes

- Related datasheet:
  MBA/SMA 0204 VG06, MBB/SMA 0207 VG06, MBE/SMA 0414 VG06, Leaded Metal Film Resistors With Established Reliability
  Document 28768, see www.vishay.com/doc?28768

(1) TCR code as per IEC 60062, applied in EN 140101-806, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140101-806, VERSION E APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASS 0.25										
STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
A	E	E7	MBA/SMA 0204 VG06	± 15	P	± 0.1	B	100 Ω to 221 kΩ	0.25	E192
B			MBB/SMA 0207 VG06					100 Ω to 499 kΩ		
D			MBE/SMA 0414 VG06					100 Ω to 470 kΩ		

Notes

- Related datasheet:
  MBA/SMA 0204 VG06, MBB/SMA 0207 VG06, MBE/SMA 0414 VG06 - Leaded Metal Film Resistors With Established Reliability
  Document 28768, see www.vishay.com/doc?28768

(1) TCR code as per IEC 60062, applied in EN 140101-806, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0017 for the Heide (DE) site, and IECQ-C VDE 18.0017-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 113459 for both sites.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site, and IECQ-C VDE 18.0022-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632 for both sites.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the Commercial and Government Entity (CAGE) code **D9539** on account of the approval of their products by the German Federal Office for Defense Technology and Procurement (BWB). This CAGE code is used on the labels of the IECQ-CECC approved low power metal film resistors with leads (Version E) produced in Heide (DE) and its dependent production site Dolní Rychnov (CZ).

2. LOW POWER THIN FILM CHIP RESISTORS FOR SMD ASSEMBLY

The European Standard

EN 140401-801, Detail specification: Fixed low power film SMD resistors - Rectangular - Stability classes 0.1; 0.25; 0.5; 1

provides a suitable basis for the qualification of low power thin film chip resistors for SMD assembly, hence for our families of MC_ and MC_ AT thin film chip resistors.

Further to an elaborate test schedule for the initial qualification of the concerned resistors, the detail specification EN 140401-801 prescribes an extensive schedule for quality conformance inspections, consisting of lot by lot tests and of periodic tests scheduled for a frequency of 3 months, 12 months, or 36 months, as appropriate. An additional requirement of EN 140401-801 is the application of a suitable screening method for the reduction of an early failure rate.

2.1 APPROVAL TO VERSION A REQUIREMENTS

EN 140401-801 defines version A for the approval of products that are 100 % tested for their resistance value.

Product approval to version A is established in order to support the characteristic functional, performance, and reliability requirements of high performance electronic equipment, where one or more of the following criteria apply: uninterrupted performance is desired or mandatory, operation in harsh environmental conditions, and / or extended lifetime.

Applications demanding such criteria are typically found in the fields of industrial electronics, telecommunication infrastructure, and in all kinds of mobility.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test) and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

2.1.1 PRODUCTION IN HEIDE (DE)

PRODUCTS APPROVED TO EN 140401-801, VERSION A
APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RR1005M	A	n/a	**MCS 0402**	± 50	R	± 1	F	10 Ω to 33.2 kΩ	0.5	No prescription of E series
								> 33.2 kΩ to 1 MΩ	1	
						± 0.5	D	10 Ω to 33.2 kΩ	0.5	
								> 33.2 kΩ to 1 MΩ	1	
				± 25	Q	± 1	F	10 Ω to 33.2 kΩ	0.5	
								> 33.2 kΩ to 1 MΩ	1	
						± 0.5	D	10 Ω to 33.2 kΩ	0.5	
								> 33.2 kΩ to 1 MΩ	1	
						± 0.25	C	43 Ω to < 100 Ω	0.25	
								> 10 kΩ to 33.2 kΩ		
						± 0.1	B			
				± 15	P	± 0.25	C	43 Ω to < 100 Ω		
								> 10 kΩ to 33.2 kΩ		
						± 0.1	B			
				± 10	N	± 0.25	C	43 Ω to < 100 Ω		
				n/a		n/a		0 Ω	n/a	-

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RR1608M	A	n/a	MCT 0603	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 1 MΩ	1	
						± 0.5	D	10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 221 kΩ	1	
				± 25	Q	± 1	F	10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 221 kΩ	1	
						± 0.5	D	10 Ω to 100 kΩ	0.5	
						± 0.25	C	39 Ω to < 100 Ω	0.25	
								> 10 kΩ to 100 kΩ		
						± 0.1	B			
				± 15	P	± 0.25	C	39 Ω to < 100 Ω		
								> 10 kΩ to 100 kΩ		
						± 0.1	B			
				± 10	N	± 0.25	C	39 Ω to < 100 Ω		
								> 10 kΩ to < 20 kΩ		
						± 0.1	B			
				n/a		n/a		0 Ω	n/a	-
RR2012M			MCU 0805	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 221 kΩ	0.5	
								> 221 kΩ to 1 MΩ	1	
				± 25	Q	± 0.5	D	10 Ω to 221 kΩ	0.5	
								> 221 kΩ to 1 MΩ	1	
						± 0.25	C	39 Ω to < 100 Ω	0.25	
								> 47.5 kΩ to 221 kΩ		
						± 0.1	B	> 47.5 kΩ to 100 kΩ		
				± 15	P	± 0.25	C	39 Ω to < 100 Ω		
								> 47.5 kΩ to 221 kΩ		
						± 0.1	B	> 47.5 kΩ to 100 kΩ		
				± 10	N	± 0.25	C	39 Ω to < 100 Ω		
						± 0.1	B	> 47.5 kΩ to 100 kΩ		
				n/a		n/a		0 Ω	n/a	-
RR3216M			MCA 1206	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 332 kΩ	0.5	
								> 332 kΩ to 1 MΩ	1	
				± 25	Q	± 0.5	D	1 Ω to < 10 Ω	1	
								10 Ω to 332 kΩ	0.5	
								> 332 kΩ to 1 MΩ	1	
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheets:
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Professional, Professional Thin Film Chip Resistors
  Document 28705, see www.vishay.com/doc?28705
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Precision, Precision Thin Film Chip Resistors
  Document 28700, see www.vishay.com/doc?28700

[1] TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-801, VERSION A
APPLYING CLIMATIC CATEGORY 10 / 085 / 56 AND STABILITY CLASS 0.1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	**MCS 0402**	± 25	Q	± 0.25	C	100 Ω to 10 kΩ	0.1	No prescription of E series
						± 0.1	B			
				± 15	P	± 0.25	C			
						± 0.1	B			
				± 10	N	± 0.25	C	100 Ω to 7.5 kΩ		
						± 0.1	B			
RR1608M			**MCT 0603**	± 25	Q	± 0.25	C	100 Ω to 10 kΩ		
						± 0.1	B	39 Ω to 10 kΩ		
				± 15	P	± 0.25	C	100 Ω to 10 kΩ		
						± 0.1	B	39 Ω to 10 kΩ		
				± 10	N	± 0.25	C	100 Ω to 10 kΩ		
						± 0.1	B	39 Ω to 10 kΩ		
RR2012M			**MCU 0805**	± 25	Q	± 0.25	C	100 Ω to 47.5 kΩ		
						± 0.1	B	39 Ω to 47.5 kΩ		
				± 15	P	± 0.25	C	100 Ω to 47.5 kΩ		
						± 0.1	B	39 Ω to 47.5 kΩ		
				± 10	N	± 0.25	C	100 Ω to < 36 kΩ		
						± 0.1	B	39 Ω to 47.5 kΩ		
RR3216M			**MCA 1206**	± 25	Q	± 0.25	C	39 Ω to 332 kΩ		
						± 0.1	B			
				± 15	P	± 0.25	C			
						± 0.1	B			
				± 10	N	± 0.25	C	39 Ω to < 46 kΩ		
						± 0.1	B			

Notes

- Related datasheet:
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Precision, Precision Thin Film Chip Resistors
  Document 28700, see www.vishay.com/doc?28700

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0012 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 116273.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632.

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RR1005M	A	n/a	**MCS 0402 AT**	± 50	R	± 1	F	10 Ω to 33.2 kΩ	0.5	No prescription of E series
								> 33.2 kΩ to 221 kΩ	1	
						± 0.5	D	10 Ω to 33.2 kΩ	0.5	
								> 33.2 kΩ to 221 kΩ	1	
				± 25	Q			10 Ω to 33.2 kΩ	0.5	
								> 33.2 kΩ to 221 kΩ	1	
				± 15	P	± 0.1	B	> 10 kΩ to 33.2 kΩ	0.25	
				n/a		n/a		0 Ω	n/a	-
RR1608M			**MCT 0603 AT**	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 511 kΩ	1	
						± 0.5	D	10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 511 kΩ	1	
				± 25	Q			10 Ω to 100 kΩ	0.5	
								> 100 kΩ to 511 kΩ	1	
				± 15	P	± 0.1	B	> 10 kΩ to 100 kΩ	0.25	
				± 10	N			> 10 kΩ to 22.1 kΩ		
				n/a		n/a		0 Ω	n/a	-
RR2012M			**MCU 0805 AT**	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 221 kΩ	0.5	
								> 221 kΩ to 1 MΩ	1	
						± 0.5	D	10 Ω to 221 kΩ	0.5	
								> 221 kΩ to 1 MΩ	1	
				± 25	Q			10 Ω to 221 kΩ	0.5	
								> 221 kΩ to 1 MΩ	1	
				± 15	P	± 0.1	B	> 47.5 kΩ to 100 kΩ	0.25	
				n/a		n/a		0 Ω	n/a	-
RR3216M			**MCA 1206 AT**	± 50	R	± 1	F	1 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to 332 kΩ	0.5	
								> 332 kΩ to 1 MΩ	1	
						± 0.5	D	10 Ω to 332 kΩ	0.5	
								> 332 kΩ to 1 MΩ	1	
				± 25	Q			10 Ω to 332 kΩ	0.5	
								> 332 kΩ to 1 MΩ	1	
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheets:
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT - Professional, Professional Thin Film Chip Resistors
  Document 28760, see www.vishay.com/doc?28760
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT – Precision, Precision Thin Film Chip Resistors
  Document 28785, see www.vishay.com/doc?28785

[1] TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 10 / 085 / 56 AND STABILITY CLASS 0.1										
STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	MCS 0402 AT	± 25	Q	± 0.1	B	47 Ω to 10 kΩ	0.1	No prescription of E series
				± 15	P					
				± 10	N					
RR1608M			MCT 0603 AT	± 25	Q					
				± 15	P					
				± 10	N					
RR2012M			MCU 0805 AT	± 25	Q			47 Ω to 47.5 kΩ		
				± 15	P					
				± 10	N			47 Ω to 33.2 kΩ		
RR3216M			MCA 1206 AT	± 25	Q			47 Ω to 332 kΩ		
				± 15	P					
				± 10	N			47 Ω to 43.2 kΩ		

Notes

- Related datasheet:
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT – Precision, Precision Thin Film Chip Resistors
  Document 28785, see www.vishay.com/doc?28785

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0001, for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 40024341.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the manufacturer code **DE BEH** within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved low power thin film chip resistors for SMD assembly (Version A) produced in Heide (DE).

2.1.2 PRODUCTION IN BE'ER SHEVA (IL) AND IN DIMONA (IL)

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1										
STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	MCS 0402	± 50	R	± 1	F	10 Ω to < 20 kΩ	0.5	No prescription of E series
						± 0.5	D			
				± 25	Q	± 1	F			
						± 0.5	D			
						± 0.25	C	> 10 kΩ to < 20 kΩ	0.25	
						± 0.1	B			

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1608M	A	n/a	**MCT 0603**	± 50	R	± 1	F	3.31 Ω to < 10 Ω	1	No prescription of E series
								10 Ω to < 32 kΩ	0.5	
								221 kΩ to 1 MΩ	1	
						± 0.5	D	3.31 Ω to < 10 Ω		
								10 Ω to < 32 kΩ	0.5	
								221 kΩ to 1 MΩ	1	
				± 25	Q	± 1	F	10 Ω to < 32 kΩ	0.5	
						± 0.5	D			
						± 0.25	B	39 Ω to < 100 Ω	0.25	
								> 10 kΩ to < 32 kΩ		
						± 0.1				
RR2012M			**MCU 0805**	± 50	R	± 1	F	3.31 Ω to < 10 Ω	1	
								10 Ω to < 50 kΩ	0.5	
								480 kΩ to 1 MΩ	1	
						± 0.5	D	3.31 Ω to < 10 Ω		
								10 Ω to < 50 kΩ	0.5	
								480 kΩ to 1 MΩ	1	
				± 25	Q	± 1	F	10 Ω to < 50 kΩ	0.5	
						± 0.5	D			
						± 0.25	B	39 Ω to < 100 Ω	0.25	
								> 47.5 kΩ to < 50 kΩ		
						± 0.1				

Notes

- Related datasheets:
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Professional, Professional Thin Film Chip Resistors
  Document 28705, see www.vishay.com/doc?28705
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Precision, Precision Thin Film Chip Resistors
  Document 28700, see www.vishay.com/doc?28700

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 10 / 085 / 56 AND STABILITY CLASS 0.1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	**MCS 0402**	± 25	Q	± 0.25	C	100 Ω to 10 kΩ	0.1	No prescription of E series
						± 0.1	B			
RR1608M			**MCT 0603**	± 25	Q	± 0.25	C			
						± 0.1	B	39 Ω to 10 kΩ		
RR2012M			**MCU 0805**	± 25	Q	± 0.25	C	100 Ω to 47.5 kΩ		
						± 0.1	B	39 Ω to 47.5 kΩ		

Notes

- Related datasheet:
  MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Precision, Precision Thin Film Chip Resistors
  Document 28700, see www.vishay.com/doc?28700

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	MCS 0402 AT	± 50	R	± 1	F	10 Ω to < 20 kΩ	0.5	No prescription of E series
						± 0.5	D			
				± 25	Q					
						± 0.1	B	> 10 kΩ to < 20 kΩ	0.25	
RR1608M			MCT 0603 AT	± 50	R	± 1	F	10 Ω to < 32 kΩ	0.5	
						± 0.5	D			
				± 25	Q					
						± 0.1	B	> 10 kΩ to < 32 kΩ	0.25	

Notes

- Related datasheets:
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT - Professional, Professional Thin Film Chip Resistors
  Document 28760, see www.vishay.com/doc?28760
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT – Precision, Precision Thin Film Chip Resistors
  Document 28785, see www.vishay.com/doc?28785

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-801, VERSION A APPLYING CLIMATIC CATEGORY 10 / 085 / 56 AND STABILITY CLASS 0.1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR1005M	A	n/a	MCS 0402 AT	± 25	Q	± 0.1	B	47 Ω to 10 kΩ	0.1	No prescription of E series
RR1608M			MCT 0603 AT							

Notes

- Related datasheet:
  MCS 0402 AT, MCT 0603 AT, MCU 0805 AT, MCA 1206 AT – Precision, Precision Thin Film Chip Resistors
  Document 28785, see www.vishay.com/doc?28785

(1) TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0002, for the Be'er Sheva (IL) site and IECQ-C VDE 18.0003 for the Dimona (IL) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 40013252 for both sites.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the manufacturer code **DE BEH** within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved low power thin film chip resistors for SMD assembly (Version A) produced in Heide (DE) and its dependent production sites Be'er Sheva (IL) and in Dimona (IL).

Note

- This manufacturer code should not be confused with the beginning of the lot number shown on the label, which usually starts with (H)BEH for products made in Heide (DE) and with (H)DES for products made in Be'er Sheva (IL) and in Dimona (IL)

2.2 APPROVAL TO VERSION E REQUIREMENTS

EN 140401-801 defines version E for the approval of products that are 100 % tested for their resistance value, in addition to the assessment of a failure rate level (FRL) based on accumulated true long term endurance test performance of an extended sample size.

Product approval to version E is established in order to support the characteristic functional, performance, and reliability requirements of high performance and high reliability electronic equipment, where the requirement for established reliability and an assessed failure rate level applies, in addition to the criteria stated above for version A.

Applications demanding such criteria are typically found in the fields of military and aeronautic electronics.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

2.2.1 PRODUCTION IN HEIDE (DE)

PRODUCTS APPROVED TO EN 140401-801, VERSION E APPLYING CLIMATIC CATEGORY 55/125/56 AND STABILITY CLASSES 0.25; 0.5; 1

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RR1005M	E	E6	**MCS 0402 VG01**	± 50	R	± 1	F	10 Ω to 33.2 kΩ	0.5	E96
								34.0 kΩ to 1.00 MΩ	1	
				± 15	P	± 0.1	B	100 Ω to 33.2 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-
RR1608M			**MCT 0603 VG01**	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	1	E96
								10 Ω to 100 kΩ	0.5	
								102 kΩ to 1.00 MΩ	1	
				± 15	P	± 0.1	B	100 Ω to 47.5 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-
RR2012M			**MCU 0805 VG01**	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	1	E96
								10 Ω to 221 kΩ	0.5	
								226 kΩ to 1.00 MΩ	1	
				± 15	P	± 0.1	B	100 Ω to 100 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-
RR3216M			**MCA 1206 VG01**	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	1	E96
								10 Ω to 332 kΩ	0.5	
								340 kΩ to 1.00 MΩ	1	
				± 15	P	± 0.1	B	43.0 Ω to 332 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheet:
  MCS 0402 VG01, MCT 0603 VG01, MCU 0805 VG01, MCA 1206 VG01 - Thin Film Chip Resistors With Established Reliability
  Document 28744, see www.vishay.com/doc?28744

[1] TCR code as per IEC 60062, applied in EN 140401-801, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0012, for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 116273.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the Commercial and Government Entity (CAGE) code **D9539** on account of the approval of their products by the German Federal Office for Defense Technology and Procurement (BWB). This CAGE code is used on the labels of the IECQ-CECC approved low power thin film chip resistors for SMD assembly (Version E) produced in Heide (DE).

3. LOW POWER THIN FILM MELF RESISTORS FOR SMD ASSEMBLY

The European Standard

EN 140401-803, Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes 0.05; 0.1; 0.25; 0.5; 1; 2

provides a suitable basis for the qualification of low power thin film MELF resistors for SMD assembly, hence for our family of MM_ , MM_ HT, and UMA thin film MELF resistors.

Further to an elaborate test schedule for the initial qualification of the concerned resistors, the detail specification EN 140401-803 prescribes an extensive schedule for quality conformance inspections, consisting of lot by lot tests and of periodic tests scheduled for a frequency of 3 months, 12 months, or 36 months, as appropriate. An additional requirement of EN 140401-803 is the application of a suitable screening method for the reduction of an early failure rate.

3.1 APPROVAL TO VERSION A REQUIREMENTS

EN 140401-803 defines version A for the approval of products that are tested 100 % for their resistance value.

Product approval to version A is established in order to support the characteristic functional, performance, and reliability requirements of high-performance electronic equipment, where one or more of the following criteria apply: uninterrupted performance is desired or mandatory, operation in harsh environmental conditions, and / or extended lifetime.

Applications demanding such criteria are typically found in the fields of industrial electronics, telecommunication infrastructure, and in all kinds of mobility.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

3.1.1 PRODUCTION IN HEIDE (DE)

PRODUCTS APPROVED TO EN 140401-803, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RC2211M	A	n/a	**MMU 0102**	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
						± 2	G	1 Ω to < 10 Ω	0.5	
						± 1	F	10 Ω to 221 kΩ	0.25	
								> 221 kΩ to 2.21 MΩ	2	
						± 0.5	D	10 Ω to 221 kΩ	0.25	
				± 25	Q	± 1	F			
						± 0.5	D			
						± 0.25	C	47 Ω to 332 kΩ		
						± 0.1	B	100 Ω to 221 kΩ		
				± 15	P	± 0.25	C	47 Ω to 100 kΩ		
						± 0.1	B	100 Ω to 100 kΩ		
				n/a		n/a		0 Ω	n/a	-
RC3715M			**MMA 0204**	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
						± 1	F	1 Ω to < 10 Ω	0.5	
								10 Ω to 332 kΩ	0.25	
								> 332 kΩ to 10 MΩ	2	
						± 0.5	D	10 Ω to 332 kΩ	0.25	
				± 25	Q	± 1	F			
						± 0.5	D			
						± 0.25	C	20 Ω to 511 kΩ		
						± 0.1	B			
				± 15	P	± 0.25	C	20 Ω to 332 kΩ		
						± 0.1	B			
				n/a		n/a		0 Ω	n/a	-

PRODUCTS APPROVED TO EN 140401-803, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RR6123M	A	n/a	**MMB 0207**	± 50	R	± 5	J	0.22 Ω to < 1 Ω	1	No prescription of E series
						± 1	F	1 Ω to < 10 Ω	0.5	
								10 Ω to 1 MΩ	0.25	
								> 1 MΩ to 15 MΩ	2	
				± 25	Q	± 0.5	D	10 Ω to 1 MΩ	0.25	
						± 0.25	C	20 Ω to 1 MΩ		
						± 0.1	B			
				± 15	P				0.25	
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheets:
  MMU 0102, MMA 0204, MMB 0207 – Professional, Professional Thin Film MELF Resistors
  Document 28713, see www.vishay.com/doc?28713
  MMU 0102, MMA 0204, MMB 0207 - Precision, Precision Thin Film MELF Resistors
  Document 28714, see www.vishay.com/doc?28714

(1) TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-803, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RC3715M	A	n/a	**MMA 0204 HT**	± 50	R	± 1	F	1 Ω to < 10 Ω	0.5	No prescription of E series
								10 Ω to 332 kΩ	0.25	
								> 332 kΩ to 1 MΩ	2	
						± 0.5	D	10 Ω to 332 kΩ	0.25	
				± 25	Q	± 1	F		0.25	
						± 0.5	D			
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheet:
  MMA 0204 HT Professional, Professional High Temperature Thin Film MELF Resistors
  Document 28780, see www.vishay.com/doc?28780

(1) TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

PRODUCTS APPROVED TO EN 140401-803, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 1; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RC3715M	A	n/a	**UMA 0204**	± 10	N	± 0.25	C	22 Ω to 332 kΩ	0.25	No prescription of E series
						± 0.1	B	43 Ω to 332 kΩ	0.25	

Notes

- Related datasheet:
  UMA 0204, UMB 0207, Ultra Precision Thin Film MELF Resistors
  Document 28715, see www.vishay.com/doc?28715

(1) TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0016 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 113412.

The Technology Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the manufacturer code **DE BEH** within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved low power thin film MELF resistors SMD assembly (Version A) produced in Heide (DE).

3.2 APPROVAL TO VERSION E REQUIREMENTS

EN 140401-803 defines version E for the approval of products that are 100 % tested for their resistance value, in addition to the assessment of a failure rate level (FRL) based on accumulated true long term endurance test performance of an extended sample size.

Product approval to version E is established in order to support the characteristic functional, performance, and reliability requirements of high performance and high reliability electronic equipment, where the requirement for established reliability and an assessed failure rate level applies in addition to the criteria stated above for version A.

Applications demanding such criteria are typically found in the fields of military and aeronautic electronics.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

3.2.1 PRODUCTION IN HEIDE (DE)

PRODUCTS APPROVED TO EN 140401-803, VERSION E APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RC2211M	E	E6	MMU 0102 VG03	± 50	R	± 1	F	100 Ω to 221 kΩ	0.25	E96
								226 kΩ to 2.21 MΩ	2	
				± 15	P	± 0.1	B	100 Ω to 100 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-
RC3715M			MMA 0204 VG03	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	0.5	E96
								10.0 Ω to 332 kΩ	0.25	
								340 kΩ to 5.11 MΩ	2	
				± 15	P	± 0.1	B	75.0 Ω to 100 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-
RC6123M			MMB 0207 VG03	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	0.5	E96
								10.0 Ω to 1.00 MΩ	0.25	
								1.02 MΩ to 10.0 MΩ	2	
				± 15	P	± 0.1	B	75.0 Ω to 499 kΩ	0.25	E192
				n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheet:
  MMU 0102 VG03, MMA 0204 VG03, MMB 0207 VG03, MELF Resistors With Established Reliability
  Document 28707, see www.vishay.com/doc?28707

[1] TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0016 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 113412.

The Technology Approval achieved within the IECQ Approved component scheme is presented as online certificate IECQ-C VDE 18.0022 for the Heide (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115632.

Beyschlag GmbH, now a part of the global Vishay organization, has been assigned the Commercial and Government Entity (CAGE) code **D9539** on account of the approval of their products by the German Federal Office for Defense Technology and Procurement (BWB). This CAGE code is used on the labels of the IECQ-CECC approved low power thin film MELF resistors SMD assembly (Version E) produced in Heide (DE).

ANNEX 1

TCR CODES				
TCR value	± 50 ppm/K	± 25 ppm/K	± 15 ppm/K	± 10 ppm/K
TCR coding as per IEC 60062	R	Q	P	N
TCR coding in Vishay Beyschlag part numbers	C	D	E	F

ANNEX 2
RELEVANT NORMATIVE DOCUMENTS

a) RULES OF PROCEDURE

IEC CA 01, *IEC Conformity Assessment Systems - Basic Rules*

IECQ 01-S, *IEC Quality Assessment System for Electronic Components (IECQ System) - IECQ Supplement to Harmonized Basic Rules IEC CA 01*

IECQ 03-1 (1), *IEC Quality Assessment System for Electronic Components (IECQ System) - Rules of procedure - Part 1: General Requirements for all IECQ Schemes*

IECQ 03-3 (1), *IEC Quality Assessment System for Electronic Components (IECQ System) - Rules of Procedure - Part 3: IECQ Approved Component Products, Related Materials & Assemblies Scheme*

IECQ 03-3-1 (1), *IEC Quality Assessment System for Electronic Components (IECQ System) - Rules of Procedure - Part 3-1: IECQ Approved Component Products, Related Materials & Assemblies Scheme, IECQ Approved Component - Technology Certification (IECQ AC-TC)*

CECC 240 001, *Technology Approval Schedule: Fixed low power film resistors (leaded / unleaded)*

Note

(1) The rules of procedure IECQ 03-x are successors of the prior IECQ documents IEC QC 001002-x, which have adopted the prior EN 100114-x and thereby the essence of the original CECC 00 114-x rules of procedure

b) RESISTOR SPECIFICATIONS

IEC 60115-1, *Fixed resistors for use in electronic equipment - Part 1: Generic specification*

EN 60115-1 (1), *Fixed resistors for use in electronic equipment - Part 1: Generic specification* (IEC 60115-1, modified)

IEC 60115-2, *Fixed resistors for use in electronic equipment - Part 2: Sectional specification – Leaded fixed low-power film resistors*

EN 60115-2 (2), *Fixed resistors for use in electronic equipment - Part 2: Sectional specification – Leaded fixed low-power film resistors* (IEC 60115-2, modified)

IEC 60115-8, *Fixed resistors for use in electronic equipment - Part 8: Sectional specification – Fixed surface mount resistors*

EN 60115-8 (3), *Fixed resistors for use in electronic equipment - Part 8: Sectional specification – Fixed surface mount resistors* (IEC 60115-8, modified)

EN 140101-806 (4), *Detail Specification: Fixed low power film resistors - Metal film resistors on high grade ceramic, conformal coated or molded, axial or preformed leads*

EN 140401-801 (5), *Detail specification: Fixed low power film SMD resistors - Rectangular - Stability classes 0.1; 0.25; 0.5; 1*

EN 140401-803 (6), *Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes 0.05; 0.1; 0.25; 0.5; 1; 2*

Notes

(1) EN 60115-1 has succeeded the prior generic specification EN 140000, which has been the successor of CECC 40 000
(2) EN 60115-2 has succeeded the prior sectional specification EN 140100, which has been the successor of CECC 40 100
(3) EN 60115-8 has succeeded the prior sectional specification EN 140400, which has been the successor of CECC 40 400
(4) EN 140101-806 has succeeded the prior detail specification CECC 40 101-806, which has been the harmonized successor of many prior national detail specifications CECC 40 101-0xx, e.g. CECC 40 101-039, merged for Version A, and CECC 40 101-047, merged for Version E
(5) EN 140401-801 has succeeded the prior detail specification CECC 40 401-801
(6) EN 140401-803 has succeeded the prior detail specification CECC 40 401-803, which has been the harmonized successor of the prior national detail specifications CECC 40 401-005, merged for Version A, and CECC 40 401-001, merged for Version E