

Detail specification: Fixed low power film SMD resistors — Cylindrical — Stability classes 0,05; 0,1; 0,25; 0,5; 1; 2

ICS 31.040.10

National foreword

This British Standard is the UK implementation of EN 140401-803:2007+A3:2017. It supersedes BS EN 140401-803:2007+A2:2013 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CENELEC text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee EPL/40X, Capacitors and resistors for electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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31 July 2017	Implementation of CENELEC amendment A3:2017

**Detail specification:
Fixed low power film SMD resistors -
Cylindrical -
Stability classes 0,05; 0,1; 0,25; 0,5; 1; 2**

Spécification particulière:
Résistances couche fixes
à faible dissipation CMS -
Cylindriques -
Catégories de stabilité
0,05; 0,1; 0,25; 0,5; 1; 2

Bauartspezifikation:
SMD Schicht-Festwiderstände
niedriger Belastbarkeit -
Zylindrisch -
Stabilitätsklassen 0,05; 0,1; 0,25; 0,5; 1; 2

This European Standard was approved by CENELEC on 2007-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 40XB, Resistors.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 140401-803 on 2007-05-01.

This European Standard supersedes EN 140401-803:2002 + A1:2003.

Preceding documents on the subject covered by this specification have been

- CECC 40 401-803:1997,
only on resistors without established reliability, now version A:
- CECC 40 401-005:1990; 1991; 1992,
only on resistors with established reliability, now version E:
- CECC 40 401-001:1988; 1990.

Compared to the superseded standard, the following changes have been implemented:

- modification of the title;
- introduction of a test on the resistance to electrostatic discharge in 1.6 and Annex A;
- introduction of description and test methods for lead-free soldering in 1.8, 1.10.3 and Annex A;
- introduction of the code letters for temperature coefficient as given in EN 60062;
- revision of the ordering information in 1.9.4;
- revised information on pulse load capability in 1.10.6;
- revised information on resistance value drift in 1.10.7;
- revised information on current noise in 1.10.9;
- adoption of the IECQ rules of procedure, QC 001002-3;
- revision of the sample quantities and the sequence of tests in Annex A;
- editorial revision.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-05-01

This specification is part of four documents describing fixed resistors for surface mount technology as follows:

EN 60115-1	Fixed resistors for use in electronic equipment - Part 1: Generic specification (IEC 60115-1, mod.)
EN 140400	Sectional specification: Fixed low power surface mount (SMD) resistors
EN 140401	Blank Detail Specification: Fixed low power non wire-wound surface mount (SMD) resistors
EN 140401-803	Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes 0,05; 0,1; 0,25; 0,5; 1; 2

Foreword to amendment A1

This amendment was prepared by the Technical Committee CENELEC TC 40XB, Resistors.

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Foreword to amendment A2

This document (EN 140401-803:2007/A2:2013) has been prepared by CLC/TC 40XB "Resistors".

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or by endorsement
- latest date by which the national standards conflicting with this (dow) 2015-12-24
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Foreword to amendment A3

This document (EN 140401-803:2007/A3:2017) has been prepared by CLC/TC/40XB "Resistors".

The following dates are fixed:

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to be implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-01-23
standards conflicting with this
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This amendment facilitates the following changes of the standard:

- clarification of the standard products covered by this detail specification to be manufactured with lead-free plated terminations, and identification of the option of special products under this detail specification with lead-bearing termination plating in 1.1, Table 1 and 1.9.4;
- Introduction of a new suffix for the ordering information of special products with lead-bearing termination plating, while maintaining the established ordering information for standard products in 1.9.4;
- Revision of the test conditions and schedule for standard products versus special products in 1.8.1 and Annex A, Table A.1.;
- Revision of the application information on soldering for standard products versus special products in 1.10.3.

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Specification available from the National Committees members of CENELEC	EN 140401-803 
Electronic components of assessed quality in accordance with: EN 60115-1:2001 + A1:2001 EN 140400:2003 EN 140401:2002	
Other shapes are permitted within the given dimensions. Figure 1 – Outline and dimensions (see Table 1)	Fixed low power film surface mount resistors (SMD), cylindrical Style: RC Ceramic body with protected, insulated, spiralled resistance film and solder terminations, thin film, for application on rigid or flexible printed board. Assessment level EZ ^a Version A: with 100- %-test Version E: with failure rate level and 100- %-test Stability classes 0,05; 0,1; 0,25; 0,5; 1 and 2
^a For explanations on assessment level EZ see 2.1.1.	

1 Characteristics and ratings

Various parameters of this component are precisely specified in this specification. Unspecified parameters may vary from one component to another.

1.1 Dimensions and ratings



Table 1 – Style and dimensions

Style		Length <i>L</i>		Diameter <i>D</i>		Cap length <i>l</i>		<i>t</i> ₁	<i>t</i> ₂	Mass ^b
		mm		mm		mm		mm	mm	mg
metric	DIN ^a	min.	max.	min.	max.	min.	max.	max.	max.	max.
RC2211M	0102	2,0	2,2	1,0	1,1	0,35	0,45	0,05	0,05	8
RC3715M	0204	3,4	3,7	1,3	1,5	0,50	0,90	0,10	0,05	22
RC6123M	0207	5,5	6,1	2,0	2,3	0,80	1,40	0,20	0,05	80

^a Historical style codes, for information only.

^b For information only.

 NOTE This specification supports the qualification of resistors with different types of plating on the solder terminations,

- a standard product with a lead-free termination plating, which typically is pure tin, and
- a special product with a lead-bearing termination plating, which is SnPb with the relative mass fraction of lead being not less than 3 %. 



Information about manufacturers who have components qualified to this detail specification is available in the approvals section of the website <http://www.iecq.org>.

Table 2a – Ratings for stability classes 2; 1; 0,5; 0,25

Style	Stability class	Rated dissipation P_{70} mW	Limiting element voltage d.c. or a.c. (r.m.s.) $U_{\max}$ V	Insulation voltage d.c. or a.c. (peak) U_{ins} V	
				1 min	continuous
A ₂ RC2211M A ₂	2; 1; 0,5; 0,25	200	150	200	75
A ₂ RC3715M A ₂	2; 1; 0,5; 0,25	250	200	300	75
A ₂ RC6123M A ₂	2; 1; 0,5; 0,25	400	300	500	75

Table 2b – Ratings for stability classes 0,05; 0,1

Style	Stability class	Rated dissipation P_{70} mW	Limiting element voltage d.c. or a.c. (r.m.s.) $U_{\max}$ V	Insulation voltage d.c. or a.c. (peak) U_{ins} V	
				1 min	continuous
A ₂ RC2211M A ₂	0,1; 0,05	63	150	200	75
A ₂ RC3715M A ₂	0,1; 0,05	75	200	300	75
A ₂ RC6123M A ₂	0,1; 0,05	100	300	500	75

Table 2c – Ratings for 0 Ω resistors

Style	Maximum current $I_{\max}$ A	Maximum resistance value $R_{\max}$ m Ω	Insulation voltage d.c. or a.c. (peak) U_{ins} V	
			1 min	continuous
A ₂ RC2211M A ₂	2,0	20	200	75
A ₂ RC3715M A ₂	3,0	20	300	75
A ₂ RC6123M A ₂	5,0	20	500	75

1.2 Derating curve

Resistors covered by this specification are derated according to the following diagram:

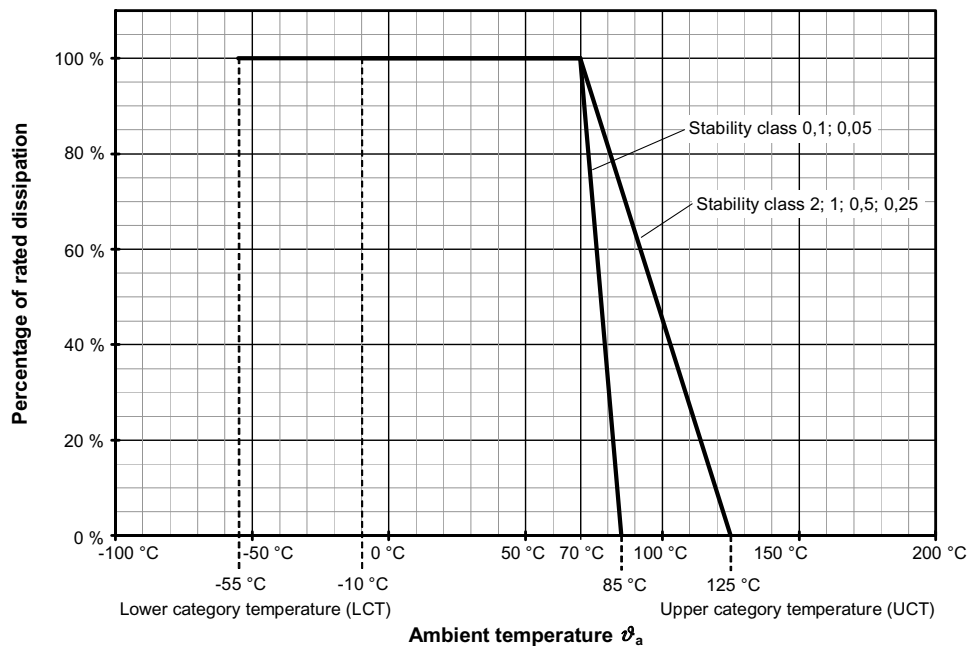


Figure 2 – Derating curve

Refer to Table 6 for the category temperatures of stability classes.

1.3 Resistance range and tolerance on rated resistance

1.3.1 Version A

The following combinations of temperature coefficient and tolerance on rated resistance may be approved only. Products from this extent shall be used for the qualification approval according to 2.2.1 and for the quality conformance inspection according to 2.3. Resistance values of an E-series according to IEC 60063 shall be used.

The qualification of resistance values below or beyond the specified resistance values is permitted, if they fulfil the requirements of the closest stability class (e.g. $\text{RC3715M } 1\% > 10 \text{ M}\Omega$ shall fulfil the requirements of stability class 2).

Table 3a – Resistance range, tolerance on rated resistance for version A

Style	Tolerance on rated resistance		Temperature coefficient	Resistance range	Stability class
	%	Code ^a			
A ₂ RC2211M A ₂	± 5	J	± 50	0,22 Ω to < 1 Ω	1
	± 2	G	± 50	1 Ω to < 10 Ω	0,5
	± 1	F	± 50; ± 25	10 Ω to 221 kΩ	0,25
				> 221 kΩ to 2,21 MΩ	2
	± 0,5	D	A ₁ ± 50; ± 25 A ₁	10 Ω to 221 kΩ	0,25
	± 0,25	C	± 25; ± 15; ± 10; ± 25; ± 15; ± 10; ± 5	22 Ω to 221 kΩ	0,25
				43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 221 kΩ	0,1
	± 0,1	B	± 25; ± 15; ± 10; ± 25; ± 15; ± 10; ± 5	43 Ω to 221 kΩ	0,25
				43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 147 kΩ	0,1
A ₂ RC3715M A ₂	± 5	J	± 50	0,22 Ω to < 1 Ω	1
	± 1	F	± 50	1 Ω to < 10 Ω	0,5
			± 50; ± 25	10 Ω to 332 kΩ	0,25
				> 332 kΩ to 10 MΩ	2
	± 0,5	D	± 50; ± 25	10 Ω to 332 kΩ	0,25
	± 0,25	C	± 25; ± 15; ± 10; ± 25; ± 15; ± 10; ± 5	22 Ω to 332 kΩ	0,25
				43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 221 kΩ	0,1
	± 0,1	B	± 25; ± 15; ± 10; ± 25; ± 15; ± 10; ± 5	43 Ω to 332 kΩ	0,25
				43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 221 kΩ	0,1

Table 3a – Resistance range, tolerance on rated resistance for version A (continued)

Style	Tolerance on rated resistance		Temperature coefficient	Resistance range	Stability class
	%	Code ^a			
A ₂ RC6123M A ₂	± 5	J	± 50	0,22 Ω to < 1 Ω	1
	± 1	F	± 50	1 Ω to < 10 Ω	0,5
			± 50; ± 25	10 Ω to 1 MΩ	0,25
				> 1 MΩ to 10 MΩ	2
	± 0,5	D	± 50; ± 25	10 Ω to 1 MΩ	0,25
	± 0,25	C	± 25; ± 15; ± 10	22 Ω to 1 MΩ	0,25
			± 25; ± 15; ± 10; ± 5	43 Ω to < 100 Ω	0,1
				100 Ω to 270 kΩ	0,05
				> 270 kΩ to 510 kΩ	0,1
			± 0,1	B	± 25; ±15; ± 10
	± 25; ± 15; ± 10; ± 5	43 Ω to < 100 Ω			0,1
		100 Ω to 270 kΩ			0,05
		> 270 kΩ to 510 kΩ			0,1

0 Ω-resistors according to Table 2c for all styles.

^a Code letters according to EN 60062.