



SLOVENSKI STANDARD

SIST EN 140401-803:2008

01-januar-2008

BUXca Yý U.

SIST EN 140401-803:2003

SIST EN 140401-803:2003/A1:2004

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Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes
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

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

Ta slovenski standard je istoveten z: EN 140401-803:2007

ICS:

31.040.10 Fiksni upor Fixed resistors

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English version

**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

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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:


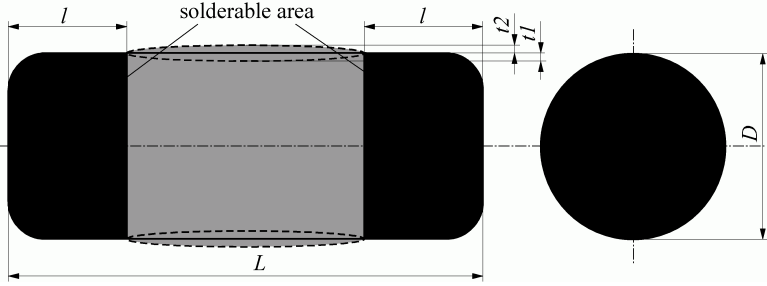
- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-05-01

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

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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		
 <p>Other shapes are permitted within the given dimensions.</p> <p>Figure 1 – Outline and dimensions (see Table 1)</p>	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> mm		Diameter <i>D</i> mm		Cap length <i>l</i> mm		<i>t</i> ₁ mm	<i>t</i> ₂ mm	Mass ^a mg
metric	DIN	min.	max.	min.	max.	min.	max.	max.	max.	max.
RC 2211M	0102	1,9	2,2	1,0	1,1	0,35	0,45	0,05	0,05	7,8
RC 3715M	0204	3,3	3,7	1,2	1,6	0,50	0,90	0,10	0,05	18
RC 6123M	0207	5,5	6,1	2,0	2,5	0,80	1,40	0,20	0,05	78

^a For information only.

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
RC 2211M	2; 1; 0,5; 0,25	200	150	200	75
RC 3715M	2; 1; 0,5; 0,25	250	200	300	75
RC 6123M	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
RC 2211M	0,1; 0,05	63	150	200	75
RC 3715M	0,1; 0,05	75	200	300	75
RC 6123M	0,1; 0,05	100	300	500	75

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Table 2c – Ratings for 0 Ω resistors

Style	Maximum current I_{max} A	Maximum resistance value R_{max} mΩ	Insulation voltage d.c. or a.c. (peak) U_{ins} V	
			1 min	continuous
RC 2211M	2,0	20	200	75
RC 3715M	3,0	20	300	75
RC 6123M	5,0	20	500	75

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1.2 Derating curve

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

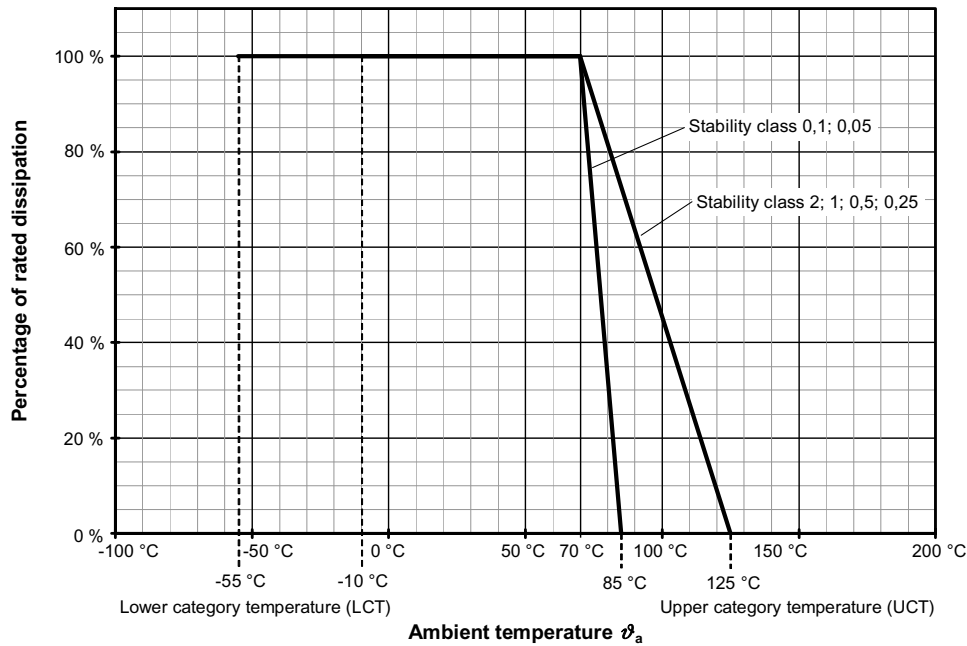


Figure 2 – Derating curve
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Refer to Table 6 for the category temperatures of stability classes.

1.3 Resistance range and tolerance on rated resistance

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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. RC 3715M 1 % > 10 M Ω 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 ppm/K	Resistance range	Stability class
	%	Code ^a			
RC 2211M	± 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		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
	± 0,1	B	± 25; ± 15; ± 10 ± 25; ± 15; ± 10; ± 5	> 100 kΩ to 221 kΩ	0,1
				43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 147 kΩ	0,1
RC 3715M	± 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 ppm/K	Resistance range	Stability class
	%	Code ^a			
RC 6123M	± 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	43 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 Ω-resistors according to Table 2c for all styles.
^a Code letters according to EN 60062

1.3.2 Version E

The following combinations of temperature coefficient, tolerance on rated resistance, resistance range and E-series according to IEC 60063 are permitted only. Products from this extent shall be used for the qualification approval according to 2.2.2 and for the quality conformance inspection according to 2.3.

Table 3b – Resistance range, tolerance on rated resistance for version E

Style	Tolerance on rated resistance		Temperature coefficient ppm/K	Resistance range	Stability class	E series
	%	Code ^a				
RC 2211M	± 2	G	± 50	1 Ω to 9,1 Ω	0,5	E24
	± 1	F	± 50	10 Ω to 221 kΩ	0,25	E96
				226 kΩ to 2,21 MΩ	2	
± 0,1	B	± 15	75 Ω to 100 kΩ	0,25	E192	
RC 3715M	± 1	F	± 50	1 Ω to 9,76 Ω	0,5	E96
				10 Ω to 332 kΩ	0,25	
				340 kΩ to 5,11 MΩ	2	
± 0,1	B	± 15	75 Ω to 100 kΩ	0,25	E192	
RC 6123M	± 1	F	± 50	1 Ω to 9,76 Ω	0,5	E96
				10 Ω to 1 MΩ	0,25	
				1,02 MΩ to 10 MΩ	2	
± 0,1	B	± 15	75 Ω to 499 kΩ	0,25	E192	

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

^a Code letters according to EN 60062.

1.4 Variation of resistance with temperature and temperature rise

Table 4 – Temperature coefficients and limits of resistance change

Temperature coefficient			Limit of resistance change $\Delta R/R$			
ppm/K	Code ^a	Code ^b	%			
			LCT / Reference temp.		Reference temp. / UCT	
			°C		°C	
			-55 / 20	-10 / 20	20 / 85	20 / 125
± 50	R	C	± 0,375	± 0,150	± 0,325	± 0,525
± 25	Q	D	± 0,188	± 0,075	± 0,163	± 0,262
± 15	P	E	± 0,113	± 0,045	± 0,098	± 0,158
± 10	N	F	± 0,075	± 0,030	± 0,065	± 0,105
± 5	M	G	± 0,038	± 0,0015	± 0,033	± 0,053

^a Code letters according to EN 60062.

^b Historical code letters according to EN 140400, for information only.

Table 5 – Limit of temperature rise

Stability class	Limit of temperature rise at rated dissipation
2; 1; 0,5; 0,25	$T_r \leq 55$ K
0,1; 0,05	$T_r \leq 15$ K

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1.5 Climatic categories

Table 6 – Climatic categories

Stability class	Climatic category LCT / UCT / Duration
2; 1; 0,5; 0,25	55 / 125 / 56
0,1; 0,05	10 / 085 / 56