

Detail Specification: Fixed low power non wire-wound surface mount (SMD) resistors — Cylindrical — Stability classes 0,05; 0,1; 0,25; 0,5; 1; 2

The European Standard EN 140401-803:2002, with the incorporation of amendment A1:2003, has the status of a British Standard

ICS 31.040.10

National foreword

This British Standard is the official English language version of EN 140401-803:2002, including amendment A1:2003.

The UK participation in its preparation was entrusted by Technical Committee EPL/40, Capacitors and resistors for electronic equipment, to Subcommittee EPL/40/2, Resistors, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 25 and a back cover.

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This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 6 August 2002

Amendments issued since publication

Amd. No.	Date	Comments
15093	13 April 2004	Corrections to Table 7 and Annex A and incorporation of subclause 1.9.10

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ISBN 0 580 40182 0

EUROPEAN STANDARD

EN 140401-803

NORME EUROPÉENNE

May 2002

EUROPÄISCHE NORM

+A1

December 2003

ICS 31.040.10

Supersedes CECC 40 401-803:1997

English version

Detail specification:
Fixed low power non wire-wound surface mount (SMD) resistors -
Cylindrical -
Stability classes 0,05; 0,1; 0,25; 0,5; 1; 2
(including amendment A1:2003)

Spécification particulière:

Résistances fixes non bobinées
à faible dissipation pour montage
en surface (CMS) -

Cylindriques -

Catégories de stabilité 0,05; 0,1; 0,25; 0,5;
1; 2

(inclut l'amendement A1:2003)

Bauartspezifikation:

Oberflächenmontierbare nichtdracht-
gewickelte Festwiderstände (SMD)
niedriger Belastbarkeit -

Zylindrisch -

Stabilitätsklassen 0,05; 0,1; 0,25; 0,5; 1; 2
(enthält Änderung A1:2003)

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

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Ref. No. EN 140401-803:2002 + A1:2003 E



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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 2001-11-01.

This European Standard supersedes CECC 40 401-803:1997.

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) 2003-02-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-11-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A and C are normative and annex B is informative.

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 non wire-wound surface mount (SMD) resistors, cylindrical

Foreword to amendment A1

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

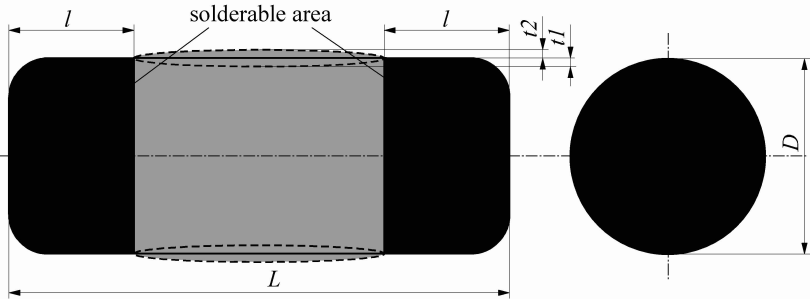
It combines the text of two draft amendments (prA1 and prAA), which were submitted to the Unique Acceptance Procedure and were approved by CENELEC as amendment A1 to EN 140401-803:2002 on 2003-09-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2004-09-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2006-09-01

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Specification available from CENELEC Central Secretariat, 35, Rue de Stassart, B-Brussels, or from the National Committees members of CENELEC	EN 140401-803	
Electronic components of assessed quality in accordance with: EN 60115-1:2001 EN 140400:200X EN 140401:2002	Issue 2 May 2002	
 Other shapes are permitted within the given dimensions. Figure 1 - Outline and dimensions (see Table 1)	Fixed low power non wire-wound surface mount resistors (SMD), cylindrical Style: RC	Ceramic body with protected, insulated, spiraled 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 L mm		Diameter D mm		Cap length l mm		t_1 mm	t_2 mm	Weight ^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

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

Information about manufacturers who have components qualified to this detail specification is available in the current CECC 00 200: Register of Approvals

Table 2b - Ratings for stability class 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

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
RC 2211M	2	20	200	75
RC 3715M	3	20	300	75
RC 6123M	5	20	500	75

1.2 Derating curve

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

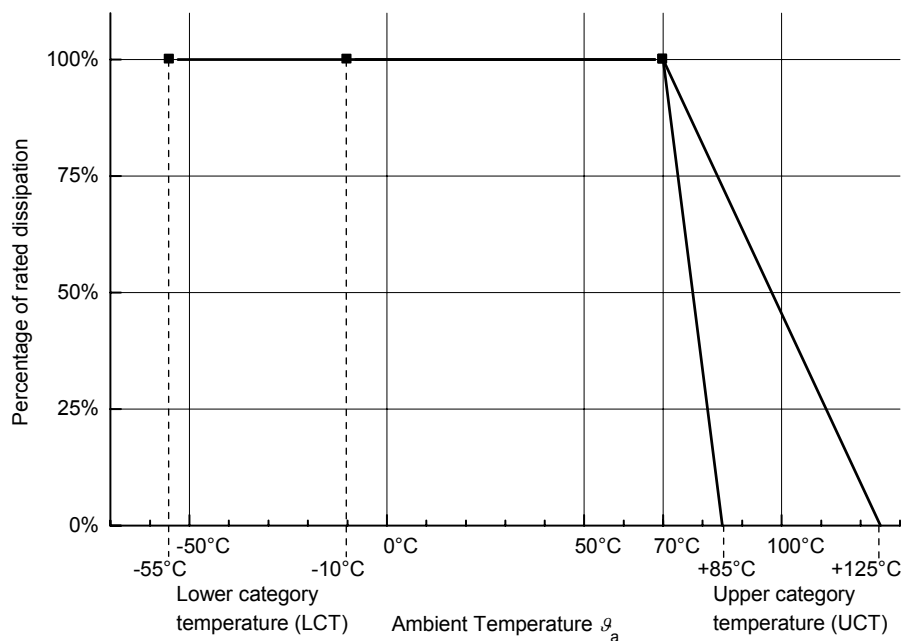


Figure 2 - Derating curve

For the category temperatures of stability classes refer to Table 6.

1.3 Resistance range and tolerance on rated resistance

Version A:

The following combinations of temperature coefficient, tolerance on rated resistance shall be used for qualification approval according to 2.2.1 and quality conformance inspection according to 2.3. Resistance values of 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	± 50; ± 25	10 Ω to 221 kΩ	0,25
	± 0,25	C	± 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
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	22 Ω to 332 kΩ	0,25
			± 25; ± 15; ± 10; ± 5	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	43 Ω to 332 kΩ	0,25
			± 25; ± 15; ± 10; ± 5	43 Ω to < 100 Ω	0,1
				100 Ω to 100 kΩ	0,05
				> 100 kΩ to 221 kΩ	0,1
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					

Version E:

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

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
				> 221 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 < 10 Ω	0,5	E96
				10 Ω to 332 kΩ	0,25	
				> 332 kΩ to 5,11 MΩ	2	
	± 0,25	C	± 10	22 Ω to < 43 Ω	0,25	E192
				43 Ω to 221 kΩ	0,1	
			± 5	100 Ω to 100 kΩ	0,05	
	± 0,1	B	± 15	75 Ω to 100 kΩ	0,25	
			± 10	43 Ω to 221 kΩ	0,1	
			± 5	100 Ω to 100 kΩ	0,05	
RC 6123M	± 1	F	± 50	1 Ω to < 10 Ω	0,5	E96
				10 Ω to 1 MΩ	0,25	
				> 1 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 percentage change of resistance (acc. to EN 140400, Table 2)**

Temperature coefficient		Limit of resistance change $\Delta R/R$				
		%				
ppm/K	Code ^a	Stability classes 2; 1; 0,5; 0,25			Stability classes 0,1; 0,05	
		Temp. charact. 20 °C / 70 °C	LCT / Ref. temp. -55 °C / 20 °C	Ref. temp. / UCT 20 °C / 125 °C	LCT / Ref. temp. -10 °C / 20 °C	Ref. temp. / UCT 20 °C / 85 °C
± 50	C	± 0,250	± 0,375	± 0,525	—	—
± 25	D	± 0,125	± 0,188	± 0,263	± 0,075	± 0,163
± 15	E	± 0,075	± 0,113	± 0,158	± 0,045	± 0,098
± 10	F	± 0,050	± 0,075	± 0,105	± 0,030	± 0,065
± 5	G	± 0,025	± 0,038	± 0,053	± 0,015	± 0,033
^a Code letter according to EN 140400, Table 2						