
Podrobna specifikacija: upori, nespremenljivi, za male moči, žični, za površinsko montažo (SMD) – Pravokotne oblike – Razredi stabilnosti 0,5; 1; 2

Detail specification: Fixed low power wire-wound surface mount (SMD) resistors – Rectangular – Stability classes 0,5; 1; 2

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EUROPEAN STANDARD

EN 14042-801

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2005

ICS 31.040.10

Supersedes CECC 40 402-801:2000

English version

**Detail specification: Fixed low power wire-wound
surface mount (SMD) resistors –
Rectangular –
Stability classes 0,5; 1; 2**

Spécification particulière: Résistances
fixes bobinées à faible dissipation
pour montage en surface (CMS) -
Rectangulaire –
Catégories de stabilité 0,5; 1; 2

Bauartspezifikation:
Oberflächenmontierbare drahtgewickelte
Festwiderstände (SMD) niedriger
Belastbarkeit –
Rechteckig –
Stabilitätsklassen 0,5; 1; 2

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This European Standard was approved by CENELEC on 2004-12-01. 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 140402-801 on 2004-12-01.

This European Standard supersedes CECC 40 402-801:2000.

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) 2005-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-12-01

This specification is part of 4 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 140402	Blank Detail Specification: Fixed low power wire wound surface mounting (SMD) resistors
EN 140402-801	Detail specification: Fixed low power wire-wound surface mount (SMD) resistors – Rectangular – Stability classes 0,5; 1; 2

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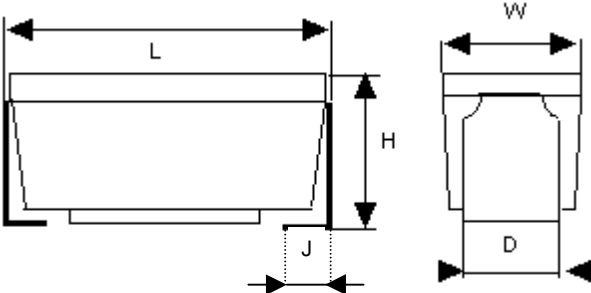
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Specification available from the National Committees members of CENELEC	EN 140402-801	
Electronic components of assessed quality in accordance with: EN 60115-1:2001 EN 140400:2003 EN 140402:1998	Issue 1	
 <p>Other shapes are permitted within the given dimensions.</p> <p>Figure 1 – Outline and dimensions (see Table 1)</p>	<p>Fixed low power wire wound surface mounting resistors (SMD) with rectangular base Style: RW</p> <p>Wire wound, insulated resistor with end terminations for application on rigid or flexible printed board</p> <p>Assessment level EZ^{*)} Version A: with 100 % test Version E: with failure rate level and 100 % test Stability classes 0,5 ; 1 and 2</p>	
*) 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

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Table 1 – Style and dimensions

Style		Length <i>L</i> mm		Width <i>W</i> mm		Height <i>H</i> mm		Termination Width <i>D</i> mm		Termination breadth <i>J</i> mm		Weight ^a mg
metric	inch	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max.
RW 0503M	RW 2012	4,6	5,6	3,1	3,3	2,0	2,8	1,0	1,5	0,7	1,3	200
RW 0704M	RW 2515	5,8	8,0	3,4	4,8	1,7	4,5	2,0	2,8	0,8	1,8	400
RW 1107M	RW 4527	10,5	12,5	5,0	8,4	3,5	5,5	3,0	5,6	1,0	2,8	1 000
RW 1607M	RW 6927	14,3	18,3	6,6	7,5	6,4	7,6	3,0	5,8	2,0	2,8	1 700

^a For information only.

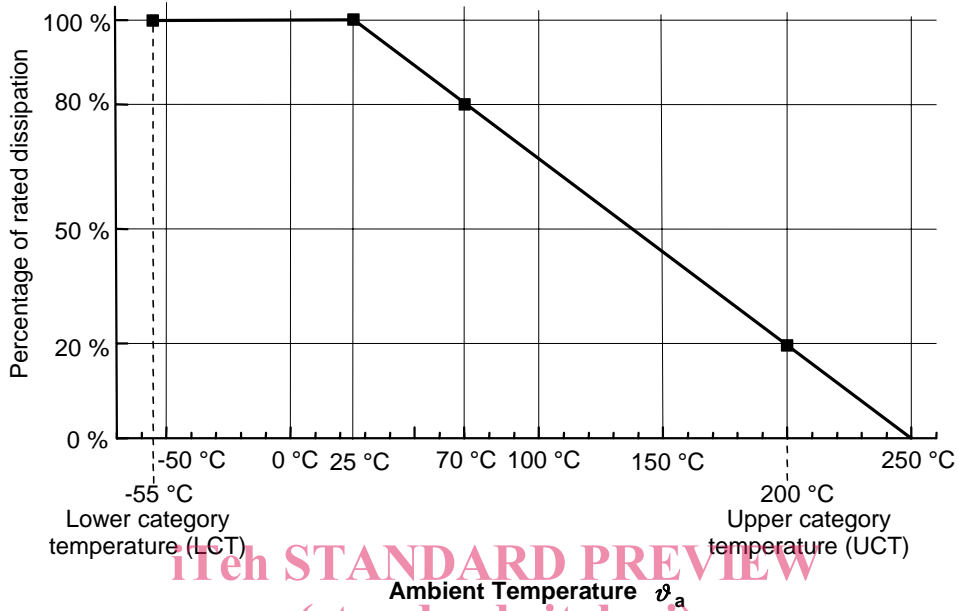
Table 2 – Ratings for stability class 2; 1 and 0,5 on printed board

Style	Stability class	Rated dissipation P_{25}^a W	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
RW 0503M	2; 1; 0,5	0,75	33	500	75
RW 0704M	2; 1; 0,5	1,0	50	500	75
RW 1107M	2; 1; 0,5	2,0	150	500	75
RW 1607M	2; 1; 0,5	2,5	200	500	75

^a Power dissipation at 70°C is 80 % of rated dissipation (see derating curve).

1.2 Derating curve

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



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Figure 2 – Derating curve

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See 1.8.6 regarding special care on derating information.
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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. RW 0704M 1 % > 2,21 k Ω shall fulfil the requirements of stability class 1).

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

Style	Tolerance on rated resistance		Resistance range	Stability class
	(%)	Code ^{*)}		
RW 0503M	± 5	J	0,047 Ω to 1 k Ω	2
	± 1	F	0,1 Ω to 1 k Ω	1
	± 0,5	E	0,1 Ω to 1 k Ω	0,5
RW 0704M	± 5	J	0,047 Ω to 2,2 k Ω	2
	± 1	F	0,1 Ω to 2,21 k Ω	1
	± 0,5	E	0,1 Ω to 2,21 k Ω	0,5
RW 1107M	± 5	J	0,047 Ω to 4,7 k Ω	2
	± 1	F	0,1 Ω to 4,75 k Ω	1
	± 0,5	E	0,1 Ω to 4,75 k Ω	0,5
RW 1607M	± 5	J	0,047 Ω to 13 k Ω	2
	± 1	F	0,1 Ω to 13 k Ω	1
	± 0,5	E	0,1 Ω to 13 k Ω	0,5

^{*)}Code letters according to EN 60062.

Version E: Version E will be specified further according to specific requirements (proposal is as follows)

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		Resistance range	Stability class	E series
	(%)	Code ^{*)}			
RW 0503M	± 5 %	J	0,47 Ω to 1 k Ω	2	E24
	± 0,5 %	E	0,464 Ω to 1 k Ω	0,5	E96
RW 0704M	± 5 %	J	0,47 Ω to 1 k Ω	2	E24
	± 0,5 %	E	0,464 Ω to 1 k Ω	0,5	E96
RW 1107M	± 5 %	J	0,47 Ω to 2,2 k Ω	2	E24
	± 0,5 %	E	0,464 Ω to 2,21 k Ω	0,5	E96
RW 1607M	± 5 %	J	0,47 Ω to 4,3 k Ω	2	E24
	± 0,5 %	E	0,464 Ω to 4,32 k Ω	0,5	E96

^{*)}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)

Resistance range (Ω)	Temperature coefficient (ppm/K)	Limit of resistance change $\Delta R/R$ (%)		
		Temp. charact. 20 °C / 70 °C	LCT / Ref. temp. -55 °C / 20 °C	Ref. temp. / UCT 20 °C / 200 °C
$R < 0,47$	± 250	$\pm 1,25 \%$	$\pm 1,875 \%$	$\pm 4,5 \%$
$0,47 \leq R < 1$	± 100	$\pm 0,5 \%$	$\pm 0,75 \%$	$\pm 1,8 \%$
$1 \leq R \leq 10$	± 50	$\pm 0,25 \%$	$\pm 0,375 \%$	$\pm 0,9 \%$
$R > 10$	± 25	$\pm 0,125 \%$	$\pm 0,188 \%$	$\pm 0,45 \%$

Table 5 – Limit of temperature rise

Stability class	Limit of temperature rise at rated dissipation
0,5; 1; 2	$T_r \leq 225 \text{ °C}$

The thermal resistance is calculated to $R_{th} = T_r / P_{25}$

1.5 Climatic categories

Table 6 – Climatic categories

Stability class	Climatic category LCT / UCT / Duration
0,5; 1; 2	55 / 200 / 56

1.6 Limits for change of resistance at tests

Table 7 – Limits for change of resistance at tests

Stability Class	Limit of resistance change $\Delta R/R$			
	EN 60115-1, 4.23 Climatic sequence 4.24 Damp heat, steady state 4.25.3 Endurance at upper category temperature	EN 60115-1, 4.25.1 Endurance at 25 °C		
		1 000 h	Extended, 8 000 h	EN 60115-1, 4.13 Overload 4.18 Resistance to soldering heat 4.19 Rapid change of temperature 4.21 Shock 4.22 Vibration 4.33 Substrate bending test
2	$\pm (2 \% R + 0,1 \Omega)$	$\pm (2 \% R + 0,1 \Omega)$	$\pm (5 \% R + 0,1 \Omega)$	$\pm (0,5 \% R + 0,05 \Omega)$
1	$\pm (1 \% R + 0,05 \Omega)$	$\pm (1 \% R + 0,05 \Omega)$	$\pm (2 \% R + 0,05 \Omega)$	$\pm (0,25 \% R + 0,05 \Omega)$
0,5	$\pm (0,5 \% R + 0,05 \Omega)$	$\pm (0,5 \% R + 0,05 \Omega)$	$\pm (1 \% R + 0,05 \Omega)$	$\pm (0,1 \% R + 0,01 \Omega)$

1.7 Marking, packaging and ordering designation

1.7.1 Component

Surface mount resistors are generally not marked on the body. However, if some marking is applied to the body, the resistor shall be marked with the rated resistance according to EN 60062, Clause 3 and as many of the remaining items listed in 2.4.1 of EN 60115-1 (only version A).

For version E the component shall be marked according to EN 60062, Clause 3.

1.7.2 Package

The package of the component shall be marked with ordering information in accordance to 1.7.4 with additionally:

- CECC sign of conformity,
- CECC manufacturer code,
- NATO manufacturer code (only version E, if required),
- date code of manufacture according to EN 60062, additional information is allowed.

1.7.3 Packaging/Taping

If taped, taping shall be in accordance with EN 60286-3, (only blister tape).

1.7.4 Ordering information

Orders for resistors covered by this specification shall contain the following information:

- detail specification number,
- assessment level,
- style,
- rated resistance,
- tolerance on rated resistance,
- failure rate level (only version E),
- form of delivery, packing method (in addition to the ordering information given in the examples below).

Example of the ordering information for a 150 Ω-resistor:

Version A:	CECC 40402-801	EZ	RW0704M	150R	E	E0
Version E (with failure rate level):	CECC 40402-801	EZ	RW0704M	150R	E	E5
Detail specification number	_____					
Assessment level	_____					
Style (see Table 1)	_____					
Rated resistance (coded acc. to EN 60062, 4 characters)	_____					
Tolerance on rated resistance (see Table 3a, Table 3b)	_____					
Failure rate level (coded acc. to EN 60115-1, Table F.1)	_____					

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1.8 Additional information (not for inspection purpose)

1.8.1 Storage

The solderability and the change of resistance – particularly for precision resistors – may be affected by storage. The conditions of storage are given in EN 60115-1, 2.7. The permitted storage time is 20 years.

Solderability testing and measurement of the resistance value before delivery is recommended if storage time exceeds two years.

1.8.2 Mounting

The resistors are suitable for mounting on all common printed boards, ceramics and flexible foils.

1.8.3 Soldering process

The resistors are suitable for all soldering methods according to EN 61760-1. The immersion time shall not be longer than 10 s when immersed in a soldering bath of 260 °C.

1.8.4 Conductive gluing

The resistors can be mounted with adhesive suitable for SMD mounting. The required adhesive, the adhesive curing temperature and the curing time has to be agreed between customer and manufacturer.

1.8.5 Use of cleaning solvents

It is recommended to use flux, which does not need cleaning solvents.

Otherwise the insulation resistance can be influenced by the remainders of soldering flux and cleaning solvents, because it is difficult to remove them from the space between resistor and printed board.

If solvent is used for the removal of flux residues the following solvents may be used:

- Alcohol, such as ethanol, methanol, propanol, isopropanol, butanol
- Aqueous solution

Reaction time of the solvent shall not exceed 5 min.

If using other cleaning solvents, consultation with the resistor manufacturer is necessary.

1.8.6 Dissipation

Hot temperature may exceed the rating of the PCB. Therefore the user must assure that the soldering pads are big enough to dissipate the induced over heat due to high temperature use. Furthermore, the used solder alloy must be suitable with the reached temperature during functioning.