

JIS

JAPANESE INDUSTRIAL STANDARD

Fixed metal film chip resistors
rectangular type
for use in electronic equipment
(Form 72 and 73, characteristic
F, G and H, grade C)

JIS C 5222—1995

Translated and Published

by

Japanese Standards Association

Printed in Japan

**In the event of any doubt arising,
the original Standard in Japanese is to be final authority**

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association.

Errata will be provided upon request, please contact:

**Business Department,
Japanese Standards Association**
4-1-24, Akasaka, Minato-ku,
Tokyo, JAPAN 107
TEL. 03-3583-8002
FAX. 03-3583-0462

Errata are also provided to subscribers of JIS (English edition) in *Monthly Information*.

JAPANESE INDUSTRIAL STANDARD

J I S

Fixed metal film chip resistors rectangular
type for use in electronic equipment
(Form 72 and 73, characteristic F, G and H, grade C) C 5222-1995

1. Scope This Japanese Industrial Standard specifies fixed metal film chip resistors rectangular type of form 72 and 73, characteristic F, G and H, grade C (hereafter referred to as "resistors") which are mainly used in electronic equipment, based on JIS C 5201.

Remarks 1. This resistor is formed in such a manner that metal film closely fixed on the surface of rectangular ceramic body is employed as the resistance element, no lead wire is provided, and electrodes for surface mounting are provided on both ends.

2. The following standards are cited in this Standard:

JIS C 5201	General rules of fixed resistors for use in electronic equipment
JIS C 5202	Test methods of fixed resistors for electronic equipment
JIS C 5602	Glossary of passive components for electronic equipment
JIS C 5603	Terms and definitions for printed circuits
JIS C 6484	Copper-clad laminates for printed wiring boards - Glass fabric base, epoxy resin
JIS K 1501	Methanol
JIS K 5902	Colophonium
JIS Z 3282	Soft solder
JIS Z 9015	Sampling inspection procedures and tables by attributes with severity adjustment (receiving inspection where a consumer can select suppliers)

2. Definitions For the purpose of this Standard the definitions specified in JIS C 5201, JIS C 5602 and JIS C 5603 apply.

3. Type designation

3.1 Structure of type designation The type designation shall be structured by arranging the symbols as given below.

Symbol denoting kind of resistor	Symbol denoting style	Symbol denoting character- istic	Symbol denoting rated dissipa- tion	Symbol denoting nominal resistance	Symbol denoting tolerance on resist- ance
3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6
Example: RN	73	F	2B	221	F
Symbol denoting electrode construc- tion	Symbol denoting grade	Symbol denoting failure rate level	Symbol denoting taping		
3.2.7	3.2.8	3.2.9	3.2.10		
E	C	X	T		

3.2 Symbols

3.2.1 Kind of resistor The symbol denoting kind of resistor shall be RN, based on 4.2.1 of JIS C 5201.

3.2.2 Style The symbol denoting style shall be 72 and 73, as given in Table 1, based on 4.2.2 of JIS C 5201.

Table 1. Style

Symbol	Style
72	Rectangular (chip) without enclosure, surface mounting electrodes on both ends
73	Rectangular (chip), with non-metallic enclosure, surface mounting electrodes on both ends

3.2.3 Characteristic The symbol denoting characteristic shall consist of one English capital letter based on 4.2.3 of JIS C 5201, and three kinds of letters i.e., F, G and H shall be employed as shown in Table 2.

Table 2. Characteristic

Characteristic		Characteristic symbol	F	G	H
Rated dissipation and maximum working voltage (see 4.1 and 4.6)	Rated dissipation		Maximum working voltage V		
	Symbol	Dissipation W			
	1J	0.063	50		
	2A	0.1	75		
	2B	0.125	150		
	2E	0.25	200		
Rated ambient temperature (see 4.1)			70 °C		
Category temperature range (see 4.3)			- 55 to + 125 °C		
Temperature characteristic of resistance ppm/°C (see No. 2 of Table 11)			± 25	± 50	± 100
Allowable maximum variation of resistance	Short time overload (see No. 3 of Table 11)		± (0.5 % + 0.05 Ω)		
	Voltage proof (see No. 5 of Table 11)				
	Robustness of electrode (see No. 1 of Table 12)				
	Resistance to soldering heat (see No. 2 of Table 12)				
	Change of temperature (see No. 1 of Table 13)				
	Endurance (loading under damp) (see No. 2 of Table 13)		± (1 % + 0.05 Ω)		
	Endurance (rated load) (see No. 3 of Table 13)				
Tolerance on resistance (see 4.5) %			± 0.1	± 0.25	± 0.5 ± 1
Nominal resistance range (see Table 6)	Symbol denoting rated dissipation	1J	10 Ω to 47 kΩ		
		2A	10 Ω to 100 kΩ		
		2B			
		2E	10 Ω to 470 kΩ		

3.2.4 Rated dissipation The symbols denoting rated dissipation shall be as given in Table 3, based on 4.2.4 of JIS C 5201.

Table 3. Rated dissipation

Symbol	Dis- sipation W
1J	0.063
2A	0.1
2B	0.125
2E	0.25

3.2.5 Nominal resistance The symbol denoting nominal resistance shall consist of three numerals (for E24 series) or four numerals (for E96 or E192 series), based on 4.2.5 of JIS C 5201. In the case of three numerals, the first and second numerals shall represent the significant figures of nominal resistance in the unit of ohm (Ω) and the third numeral shall represent the number of zeros following the significant figures.

In the case of four numerals, the first, second and third numerals shall represent the significant figures in the unit of ohm (Ω) and the fourth numeral shall represent the number of zeros following the significant figures. If there is a decimal point, it shall be expressed by an English capital letter R, and in this expression all the numerals shall be significant figures.

Table 4. Examples of symbols denoting nominal resistance

The case of three numerals (E24 series)	The case of four numerals (E96, E192 series)
100.....10 Ω	10R0... ..10 Ω
122.....1.2 k Ω	5112.....51.1 k Ω
103.....10 k Ω	1003.....100 k Ω

3.2.6 Tolerance on resistance The symbol denoting tolerance on resistance shall be as given in Table 5, based on 4.2.6 of JIS C 5201.

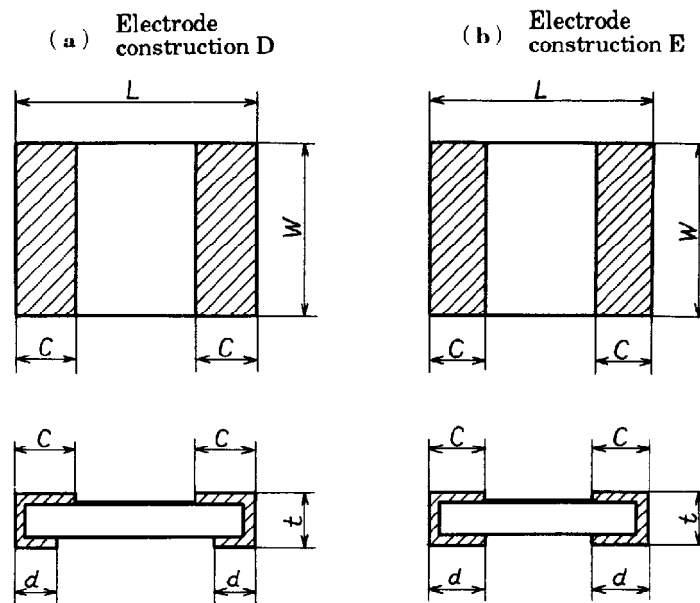
Table 5. Tolerance on resistance

Unit: %				
Symbol	B	C	D	F
Tolerance on resistance	± 0.1	± 0.25	± 0.5	± 1

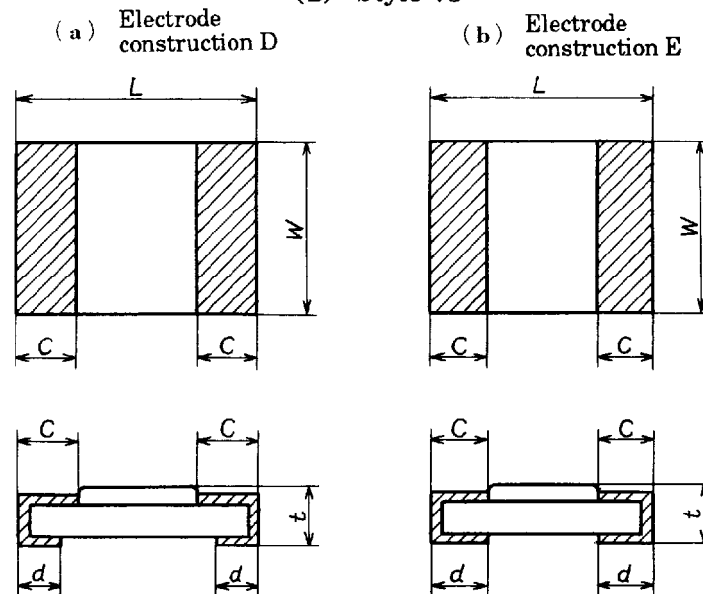
3.2.7 Electrode construction The symbol denoting electrode construction shall consist of an English capital letter D or E as illustrated in Fig. 1.

Fig. 1. Dimensions

(1) Style 72



(2) Style 73



Remarks: The hatched portion indicates the electrode.

Fig. 1 (continued)

Rated dissipation		Symbol of electrode construction	Dimension mm					Remarks
Symbol	Dissipation W		<i>W</i>	<i>L</i>	<i>C</i>	<i>d</i>	<i>t</i>	
1J	0.063	D	0.8±0.2	1.6±0.2	0.3±0.2	0.3 max.	0.6 max.	Fig. 1 (a)
		E				0.3±0.2		Fig. 1 (b)
2A	0.1	D	1.25±0.2	2.0±0.2	0.4±0.2	0.4 max.	1.0 max.	Fig. 1 (a)
		E				0.4±0.2		Fig. 1 (b)
2B	0.125	D	1.6±0.2	3.2±0.2	0.5±0.3	0.5 max.		Fig. 1 (a)
		E				0.5±0.3		Fig. 1 (b)
2E	0.25	D	2.5±0.2			0.5 max.		Fig. 1 (a)
		E				0.5±0.3		Fig. 1 (b)

3.2.8 Grade The symbol denoting grade shall consist of one English capital letter based on 4.2.7 of JIS C 5201, and the letter shall be C.

3.2.9 Failure rate level The symbol denoting failure rate level shall consist of one English capital letter based on 4.2.8 of JIS C 5201, and the letter shall be X (no failure rate level is specified).

3.2.10 Taping If taping is carried out, the symbol shall consist of one English capital letter based on 4.2.9 of JIS C 5201, and the letter shall be T.

4. Ratings

4.1 Rated dissipation The rated dissipation shall be as given in Table 6.

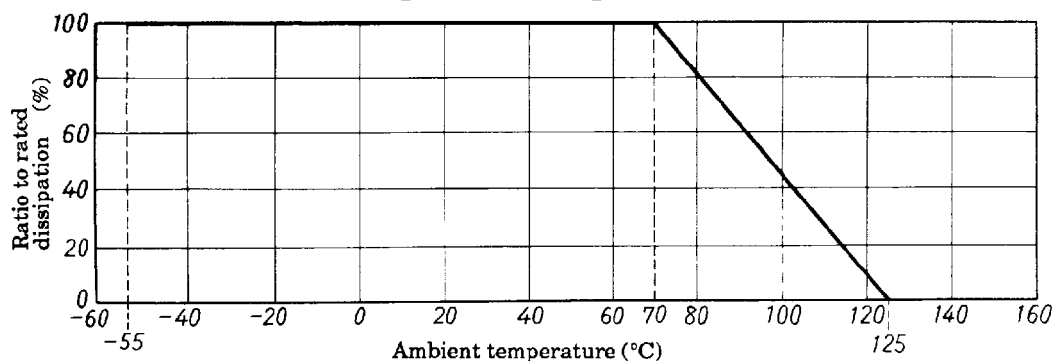
The rated ambient temperature is 70°C. However, for resistors with a resistance exceeding the critical resistance, it means the dissipation corresponding to the maximum working voltage.

Table 6. Rating

Rated dissipation		Maximum working voltage V	Maximum overload voltage V	Voltage proof V	Nominal resistance range
Symbol	Dissipation				
1J	0.063	50	100	100	10 Ω to 47 kΩ
2A	0.1	75	150	150	10 Ω to 100 kΩ
2B	0.125	150	300	300	
2E	0.25	200	400	400	10 Ω to 470 kΩ

4.2 Maximum dissipation The maximum dissipation at a temperature not exceeding the rated ambient temperature shall be equal to the rated dissipation. The maximum dissipation at a temperature exceeding the rated ambient temperature shall have a value obtained by reducing the rated dissipation by means of the derating curve shown in Fig. 2.

Fig. 2. Derating curve



4.3 Category temperature range The category temperature range shall be -55°C to $+125^{\circ}\text{C}$.

4.4 Nominal resistance value The resistance shall be expressed in the unit of ohm (Ω), and the values shall be 10^n (n is an integer) times the numerical values given in Table 7 (E24 series), and Table 8 (E96 series) and Table 9 (E192 series).

The correlation between the rated dissipation and the nominal resistance range shall be as given in Table 6.

Table 7. Standard values of nominal resistance (E24 series)

1.0	1.5	2.2	3.3	4.7	6.8
1.1	1.6	2.4	3.6	5.1	7.5
1.2	1.8	2.7	3.9	5.6	8.2
1.3	2.0	3.0	4.3	6.2	9.1

Table 8. Standard values of nominal resistance (E96 series)

1.00	1.33	1.78	2.37	3.16	4.22	5.62	7.50
1.02	1.37	1.82	2.43	3.24	4.32	5.76	7.68
1.05	1.40	1.87	2.49	3.32	4.42	5.90	7.78
1.07	1.43	1.91	2.55	3.40	4.53	6.04	8.06
1.10	1.47	1.96	2.61	3.48	4.64	6.19	8.25
1.13	1.50	2.00	2.67	3.57	4.75	6.34	8.45
1.15	1.54	2.05	2.74	3.65	4.87	6.49	8.66
1.18	1.58	2.10	2.80	3.74	4.99	6.65	8.87
1.21	1.62	2.15	2.87	3.83	5.11	6.81	9.09
1.24	1.65	2.21	2.94	3.92	5.23	6.98	9.31
1.27	1.69	2.26	3.01	4.02	5.36	7.15	9.53
1.30	1.74	2.32	3.09	4.12	5.49	7.32	9.76