

JIS

JAPANESE INDUSTRIAL STANDARD

**General rules of fixed
resistor networks for use in
electronic equipment**

JIS C 5203—1994

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

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General rules of fixed resistor networks
for use in electronic equipment

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1. **Scope** This Japanese Industrial Standard is a sectional specification for network resistors mainly used in electronic equipment (hereafter referred to as "resistors"), and specifies the bases for type designation, ratings, appearance, construction, dimensions, markings, materials and performances of resistors and the matters to be specified in detail specifications.

Remarks 1. The standards cited in this Standard are as follows:

- JIS C 3102 Annealed copper wires for electrical purposes
- JIS C 5001 General rules for electronic components
- 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 G 3141 Cold rolled carbon steel sheets and strip
- JIS H 3110 Phosphor bronze and nickel silver sheets, plates and strips
- JIS Z 9015 Sampling inspection procedures and tables by attributes with severity adjustment (receiving inspection where a consumer can select suppliers)

2. The International standards corresponding to this Standard are as follows:

- IEC 115-1 (1982) Fixed resistors for use in electronic equipment. Part 1: Generic specification
- IEC 115-6 (1983) Fixed resistors for use in electronic equipment. Part 6: Sectional specification: Fixed resistor networks with individually measurable resistors
- IEC 115-6-1 (1983) Fixed resistors for use in electronic equipment. Part 6: Blank detail specification: Fixed resistor networks with individually measurable resistors, all of equal value and equal dissipation. Assessment level E
- IEC 115-6-2 (1983) Fixed resistors for use in electronic equipment. Part 6: Blank detail specification: Fixed resistor networks with individually measurable resistors, of either different resistance values or different rated dissipations. Assessment level E

- IEC 115-6-101 (1992) Fixed resistors for use in electronic equipment. Part 6: Detail specification: Fixed thick film resistor networks with individually measurable resistors, all of equal dissipation, Class 1 (dual-in-line network)
- IEC 115-6-102 (1992) Fixed resistors for use in electronic equipment. Part 6: Detail specification: Fixed thick film resistor networks with individually measurable resistors, all of equal value and equal dissipation, Class 1 (single-in-line network)
- IEC 115-7 (1984) Fixed resistors for use in electronic equipment. Part 7: Sectional specification: Fixed resistor networks in which not all resistors are individually measurable
- IEC 115-7-1 (1984) Fixed resistors for use in electronic equipment. Part 7: Blank detail specification: Fixed resistor networks in which not all resistors are individually measurable. Assessment level E

2. **Definitions** For the purposes of this Standard, in addition to the definitions specified in JIS C 5201 and JIS C 5602, the following principal definitions apply:

- (1) **network resistor** An integrated resistor of such construction that plural resistor elements are formed on the surface of ceramic or glass base material, each resistor element is isolated or the elements are interconnected.
- (2) **nominal resistance value** The resistance value which represents the resistance value of each resistor element stated in the Standard, and it is generally the resistance value marked on the resistor.
- (3) **element rated dissipation** The maximum value of power which can be loaded to each resistor element (per element) continuously at rated ambient temperature.
- (4) **package rated dissipation** The maximum value of power which can be loaded to whole the network resistor (total power of resistor elements) continuously at rated ambient temperature.
- (5) **derating curve** A curve which shows the relation of the ambient temperature and the maximum dissipation. It is expressed by the ratio of rated dissipation to element rated dissipation or package rated dissipation (in percent).
- (6) **element rated voltage** The maximum value of d.c. voltage or a.c. voltage (r.m.s. value at power frequency) capable of being applied continuously at the rated ambient temperature. It is calculated from the element rated dissipation and the nominal resistance of each resistor element. Provided that this is a voltage not exceeding the limiting element voltage.

- (7) limiting element voltage The maximum value of d.c. voltage or a.c. voltage (r.m.s. value at power frequency) capable of being applied continuously to the resistor element.
- (8) insulation resistance between elements The insulation resistance between resistor elements adjacent each other. This is applicable only for such a circuit that the resistor elements are insulated each other.
- (9) circuit The circuit configured by the resistors in a resistor network.
- (10) resistance ratio The maximum permissible error expressed in ratio when the resistances of two resistors with the same nominal resistance are compared at a specified temperature. It is generally indicated in percent with one resistor element being the base.
- (11) temperature coefficient of resistance tracking This indicates the change in resistance caused by change in temperature and expresses the difference between temperature coefficients of resistance of two resistors. It is generally indicated in ppm/°C with one resistor being the base.

3. Priority of standards If there is any conflict among the following specifications, the priority is given in the stated order:

- (1) Detail specification
- (2) Sectional specification JIS C 5203
- (3) Generic specification JIS C 5201
- (4) Basic specification JIS C 5001

4. Type designation

4.1 Structure of type designation The type designation shall be formed as shown in the following arrangement:

Symbol denoting kind of resistor	Symbol denoting style	Symbol denoting characteristic	Symbol denoting number of terminations	Symbol denoting circuit
4.2.1	4.2.2	4.2.3	4.2.4	4.2.5

Example 1.

RN	92A	F	10	C
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Example 2.

RK	92A	K	10	H
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Symbol denoting nominal resistance value	Symbol denoting tolerance on resistance value	Symbol denoting grade	Symbol denoting stability class	Symbol denoting other necessary item
4.2.6	4.2.7	4.2.8	4.2.9	4.2.10

Example 1.

1002	F	E	D
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Example 2.

331/471	J	X	J	T
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Remarks: The nominal resistance values in Example 2 indicate that the resistance values are R1 and R2.

4.2 Symbols

4.2.1 Kind of resistor The symbol denoting kind of resistor shall consist of two English capital letters based on 4.2.1 (Kind of resistor) of JIS C 5201. The first letter shall be an English capital letter R denoting resistor and the second letter shall be classified according to the principal resistor element. The combination of the first letter and the second letter shall be as specified in Table 1.

Table 1. Symbols denoting kind of resistor

Symbol	Principal resistor element
RC	Carbon mixture
RD	Carbon film
RK	Metal mixture film
RN	Metal film

4.2.2 Style The symbol denoting style shall be presented by three letters consisting of two numerals followed by an English capital letter as given in Table 2, based on 4.2.2 (Style) of JIS C 5201.

Table 2. Symbols denoting style

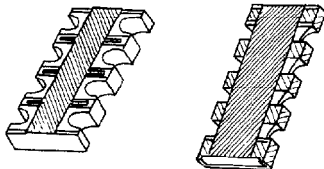
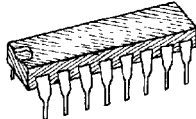
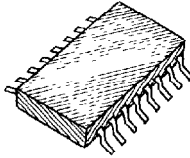
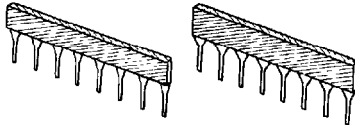
Symbol	Style	Informative reference figure
73A	Chip network	
78A	Dual inline package (DIP)	

Table 2. (continued)

Symbol	Style	Informative reference figure
78B	Small outline package (SOP)	
92A	Single inline package (SIP)	

4.2.3 Characteristic The symbol denoting characteristic shall consist of an English capital letter other than I and O based on 4.2.3 (Characteristic) of JIS C 5201, and shall express the temperature coefficient of resistance as given in Table 3.

Table 3. Temperature coefficient of resistance

Symbol	B	C	D	E	F	G	H	K	L	M
Temperature coefficient of resistance ppm/°C	± 5	± 10	± 15	± 20	± 25	± 50	± 100	± 250	± 300	± 500

4.2.4 Number of terminations The symbol denoting number of terminations shall consist of two numerals.

When the number of terminations is 9 or less, the first numeral shall be 0.

Examples: 4 terminations 04 9 terminations 09

4.2.5 Circuit The circuits are classified according to the resistor network and arrangement of termination as shown in Table 4, and the symbol shall consist of an English capital letter.

Table 4. Symbol denoting circuit

Symbol	Circuit	Symbol	Circuit
A		K	
B		L	
E		U	
J		V	
C		W	

Table 4. (continued)

Symbol	Circuit	Symbol	Circuit
D		X	
F		Y	
G		Z	
H			

Remarks: N means the maximum number of terminations.

4.2.6 Nominal resistance value The symbol denoting nominal resistance value of each resistor element shall consist of 3 numerals (E12 and E24 series numbers) or 4 numerals (E48, E96 and E192 series numbers) based on 4.2.5 (Nominal resistance value) of JIS C 5201.

When the symbol is represented by three numerals, the first and the second numerals shall represent the significant figures of nominal resistance value in ohms (Ω), and the third numeral shall represent the number of zeros following the significant figures.