KMY

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Specification

(Reference)

Title: FIXED THICK FILM CHIP RESISTORS;

RECTANGULAR TYPE AND ULTRAHIGH VOLTAGE

Style: RZC50, 63

RoHS COMPLIANCE ITEM

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Issue Dept.: Research & Development Department Hokkaido Research Center

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1. Scope

1.1 This specification covers the detail requirements for fixed thick film chip resistors; rectangular type and ultrahigh voltage, style of RZC50, 63.

1.2 Applicable documents

JIS C 5201-1: 1998, JIS C 5201-8: 1998, JIS C 5201-8-1: 1998

IEC60115-1: 1999, IEC60115-8: 1989 Amendment 1: 1992, IEC60115-8-1: 1989

EIAJ RC-2134B-2002

2. Classification

Type designation shall be the following form.

(Example)

RZC	63	_	475	J	TE
1	2	3	4	5	6
Stv	le				

- 1 Fixed thick film chip resistors; rectangular type & precision Style
- 2 Rated dissipation and / or dimension
- 3 Temperature coefficient of resistance
- 4 Rated resistance Example: $475 \rightarrow 4.7 M\Omega$
- 5 Tolerance on rated resistance
- 6 Packaging form

3. Rating

3.1 The ratings shall be in accordance with Table-1.

Table-1

Style	Rated dissipation (W)	Temperature or resistance (•	Rated resistance range (Ω)	Preferred number Series for resistors	Tolerance on rated resistance
RZC50	0.5	Standard	+200	11/1 161/1	E24	I(+E0/) I/(+400/) I/(+200/)
RZC63	1.0	Statituatu	±200	1M~16M	C2 4	J(±5%), K(±10%), M(±20%)

Style	Limiting element voltage (V)	Isolation voltage (V)	Category temperature range (°C)
RZC50	1500	500	<i>–</i> 55∼+125
RZC63	2000	300	=55~+125

3.2 Climatic category

55/125/56 Lower category temperature - 55 °C Upper category temperature +125 °C

Duration of the damp heat, steady state test 56days

3.3 Stability class

5% Limits for change of resistance:

-for long-term tests $\pm (5\% + 0.1\Omega)$

-for short–term tests $\pm (1\% + 0.05\Omega)$

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3.4 Derating

The derated values of dissipation at temperature in excess of 70 °C shall be as indicated by the following curve.

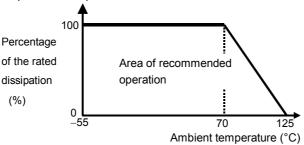


Figure-1 Derating curve

3.5 Rated voltage

d. c. or a. c. r. m. s. voltage calculated from the square root of the product of the rated resistance and the rated dissipation.

$$E = \sqrt{P \cdot R}$$

E: Rated voltage (V)

P: Rated dissipation (W)

R: Rated resistance (Ω)

Limiting element voltage can only be applied to resistors when the resistance value is equal to or higher than the critical resistance value.

At high value of resistance, the rated voltage may not be applicable.

4. Packaging form

The standard packaging form shall be in accordance with Table-2.

Table-2

Symbol	Packaging form		Standard packaging quantity / units
В	Bulk (loose package)		1,000 pcs.
TE	Embossed taping	12mm width, 4mm pitches	4,000 pcs.



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5. Dimensions

5.1 The resistor shall be of the design and physical dimensions in accordance with Figure–2 and Table–3.

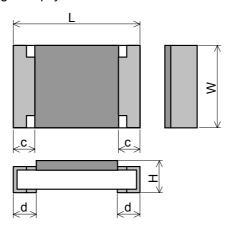


Figure-2

		Table	- 3	Ur	nit : mm
Style	L	W	Н	С	d
RZC50	5.0 ± 0.15	2.5 ± 0.15	0.55 ± 0.15	0.6 ± 0.2	0.6 ± 0.2
R7C63	63+015	32+015	0.55 + 0.15	06+02	06+02

5.2 Net weight (Reference)

Style	Net weight(mg)
RZC50	25
RZC63	40

6. Marking

The Rated resistance shall be marked in 3 digits (E24) and marked on over coat side. (Example) "475" \rightarrow 47 ×10 $^{5}[\Omega] \rightarrow$ 4.7 [M Ω]

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7. Performance

7.1 The standard condition for tests shall be in accordance with Sub-clause 4.2, JIS C 5201–1: 1998.

7.2 The performance shall be satisfied in Table-4.

Table-4(1)

		Table 4(1)	
No.	Test items	Condition of test (JIS C 5201–1)	Performance requirements
1	Visual examination	Sub-clause 4.4.1 Checked by visual examination.	As in 4.4.1 The marking shall be legible, as checked by visual examination.
2	Dimension Resistance	Sub-clause 4.4.2 Sub-clause 4.5	As specified in Table–3 of this specification. As in 4.5.2 The resistance value shall correspond with the rated resistance taking into account the specified tolerance.
3	Voltage proof	Sub-clause 4.7 Method: 4.6.1.4(See Figure-5) Test voltage: Alternating voltage with a peak value of 1.42 times the insulation voltage. Duration: 60 s ± 5 s Insulation resistance Test voltage: Insulation voltage Duration: 1 min.	No breakdown or flash over $R \ge 1 \ G \Omega$
4	Solderability	Sub-clause 4.17 Without ageing Flux: The resistors shall be immersed in a non-activated soldering flux for 2s. Bath temperature: 235 °C ± 5 °C Immersion time: 2 s ± 0.5 s	As in 4.17.4.5 The terminations shall be covered with a smooth and bright solder coating.
5	Mounting Overload (in the mounted state) Solvent resistance of the marking	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure–3 Sub-clause 4.13 The applied voltage shall be 2.5 times the rated voltage or twice the limiting element voltage which ever is less severe. Duration: 2 s Visual examination Resistance Sub-clause 4.30 Solvent: 2-propanol Solvent temperature: 23 °C ± 5 °C Method 1 Rubbing material: cotton wool Without recovery	No visible damage $\DeltaR \leq \pm(1\% + 0.05\Omega)$ Legible marking



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Table-4(2)

No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
6	Mounting	Sub-clause 4.31	
	_	Substrate material: Epoxide woven glass	
		Test substrate: Figure-4	
	Bound strength of the end	Sub-clause 4.33	
	face plating	Bent value: 1 mm	
		Resistance	$\Delta R \leq \pm (1\% + 0.05\Omega)$
	Final measurements	Sub-clause 4.33.6	
		Visual examination	No visible damage
7	Resistance to soldering heat	Sub-clause 4.18	
		Solvent temperature: 260 °C ± 5 °C	
		Immersion time: 5 s ± 0.5 s	
		Visual examination	As in 4.18.3.4
			No sign of damage such as cracks.
		Resistance	$\Delta R \leq \pm (1\% + 0.05\Omega)$
	Component solvent	Sub-clause 4.29	
	resistance	Solvent: 2-propanol	
		Solvent temperature: 23 °C ± 5 °C	
		Method 2	
		Recovery: 48 h	N. I. a visibile alexander
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (1\% + 0.05\Omega)$
8	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Adhesion	Test substrate: Figure–3	
	Adriesion	Sub-clause 4.32	
		Force: 5 N	
		Duration: 10 s ± 1 s	No visible damage
	Rapid change temperature	Visual examination	NO VISIBle darriage
	Rapid Change temperature	Sub-clause 4.19	
		Lower category temperature:	
		_55 °C	
		Upper category temperature:	
		+125 °C	
		Duration of exposure at each temperature: 30	
		min.	
		Number of cycles: 5 cycles.	No visible damage
		Visual examination	ΔR ≤ ±(1%+0.05Ω)
L		Resistance	<u></u>



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Table-4(3)

		1able=4(3)	
No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
9	Climatic sequence	Sub-clause 4.23	
	–Dry heat	Sub-clause 4.23.2	
		Test temperature: +125 °C	
		Duration: 16 h	
	–Damp heat, cycle	Sub-clause 4.23.3	
	(12+12hour cycle)	Test method: 2	
	First cycle	Test temperature: 55 °C	
	-	[Severity(2)]	
	-Cold	Sub-clause 4.23.4	
		Test temperature –55 °C	
		Duration: 2h	
	–Damp heat, cycle	Sub-clause 4.23.6	
	(12+12hour cycle)	Test method: 2	
	Remaining cycle	Test temperature: 55 °C	
	<u>-</u>	[Severity (2)]	
		Number of cycles: 5 cycles	
	–D.C. load	Sub-clause 4.23.7	
		The applied voltage shall be the rated voltage	
		or the limiting element voltage which ever is	
		the smaller.	
		Duration: 1 min.	No visible demons
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$
10	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
		(RZC63 may use Alumina substrate.)	
		Test substrate: Figure-3	
	Endurance at 70 °C	Sub-clause 4.25.1	
		Ambient temperature: 70 °C ± 2 °C	
		Duration: 1000 h	
		The voltage shall be applied in cycles of 1.5 h	
		on and 0.5 h.	
		The applied voltage shall be the rated voltage	
		or the limiting element voltage which ever is	
		the smaller.	
		Examination at 48 h, 500 h and	
		1000 h:	No visible damage
		Visual examination	No visible damage
44	NA <i>C</i>	Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$
11	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Madatan of malatana (iii	Test substrate: Figure–3	
	Variation of resistance with	Sub-clause 4.8	As in Table–1
	temperature	–55 °C / +20 °C	
		+20 °C / +125°C	



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Table-4(4)

No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
12	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
		Test substrate: Figure–3	
	Damp heat, steady state	Sub-clause 4.24	
		Ambient temperature: 40 °C ± 2 °C	
		Relative humidity: 93^{+2}_{-3} %	
		a) 1st group: without voltage applied.	
		b) 2nd group: The d. c. voltage shall be	
		applied continuously.	
		The voltage shall be accordance with	
		Sub-clause 4.24.2.1 b). without polarizing	
		voltage [4.24.2.1, c)]	No visible damage
		Visual examination	Legible marking
		Resistance	$\Delta R \leq \pm (5\% + 0.1\Omega)$
13	Dimensions (detail)	Sub-clause 4.4.3	As in Table–3
10	Diricisions (detail)	Sub-clause 4.4.5	AS III Iable—3
	Mounting	Sub-clause 4.31	
	<u> </u>	Substrate material: Epoxide woven glass	
		Test substrate: Figure–3	
	Endurance at upper category	Sub-clause 4.25.3	
	temperature	Ambient temperature:125 °C ± 2 °C	
		Duration: 1000 h	
		Examination at 48 h, 500 h and	
		1000 h:	Nie della de mana
		Visual examination	No visible damage
4.4		Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$
14	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Anti-rush voltage test	Test substrate: Figure–3	
	Ailii-iusii vollage lest	Ambient temperature:25°C ± 2 °C	
		The voltage shall be applied in cycles of 1 s "ON", 9 s "OFF".	
		Test voltage: 3000V	
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (1\% + 0.05\Omega)$

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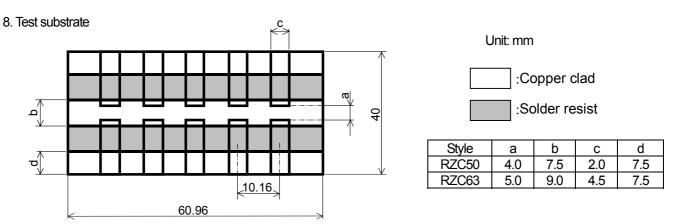


Figure-3 RZC50, 63 TEST SUBSTRATE

Remark 1). Material: Epoxide woven glass

Thickness: 1.6mm Thickness of copper clad: 0.035mm

2). In the case of connection by connector, the connecting terminals are gold plated. However, the plating is not necessary when the connection is made by soldering.

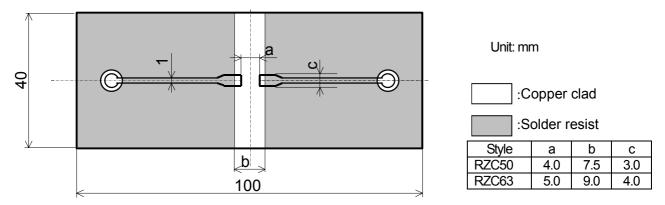


Figure-4 RZC50, 63 BOUND STRENGTH OF THE END FACE PLATING TEST SUBSTRATE

Remark 1). Material: Epoxide woven glass

Thickness: 1.6mm Thickness of copper clad: 0.035mm

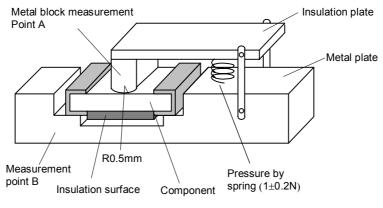


Figure-5

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9. Taping

- 9.1 Applicable documents JIS C 0806-3: 1999, EIAJ ET-7200B: 2003
- 9.2 Taping dimensions

Embossed taping dimensions shall be in accordance with Figure-6 and Table-5.

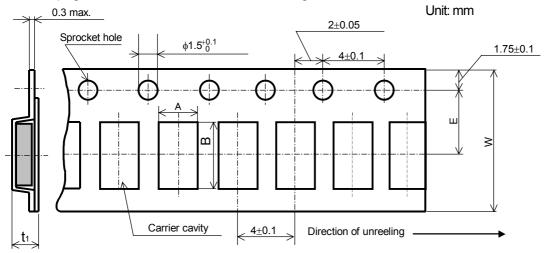


Figure-6
Table-5
Unit: mm

B W E t

5.5±0.2
6.9±0.2
Unit: mm

12.0±0.3
5.5±0.05
1.1±0.15

- 1). The cover tapes shall not cover the sprocket holes.
- Tapes in adjacent layers shall not stick together in the packing.

Style

RZC50

RZC63

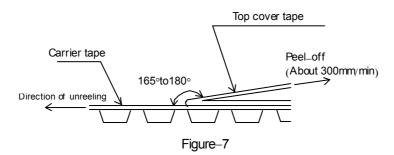
- 3). Components shall not stick to the carrier tape or to the cover tape.
- 4). Pitch tolerance over any 10 pitches ±0.2mm.
- 5). The peel strength of the top cover tape shall be with in 0.1N to 0.5N on the test method as shown in the following Figure–7.
- 6). When the tape is bent with the minimum radius for 30 mm, the tape shall not be damaged and the components shall maintain their position and orientation in the tape.
- 7). In no case shall there be two or more consecutive components missing.

 The maximum number of missing components shall be one or 0.1%, whichever is greater.
- 8). The resistors shall be faced to upward at the over coating side in the carrier cavity.

Α

3.1±0.2

3.6±0.2



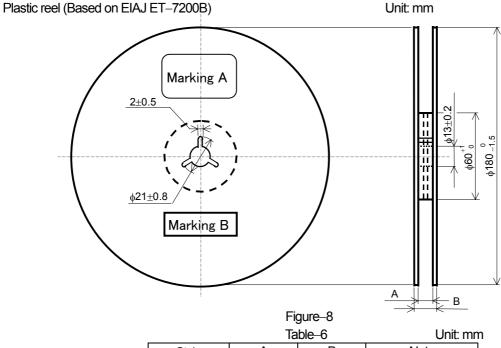
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9.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-8 and Table-6.



 Style
 A
 B
 Note

 RZC50,63
 13 **1.0 0
 17±1.0 Vacuum forming

Note: Marking label shall be marked on a place of Marking A or two place of marking A and B.

9.4 Leader and trailer tape.

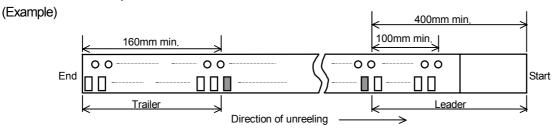


Figure-9

10. Marking on package

The label of a minimum package shall be legibly marked with follows.

10.1 Marking A

- (1) Classification (Style, Rated resistance, Tolerance on rated resistance, Packaging form)
- (2) Quantity (3) Lot number (4) Manufacturer's name or trade mark (5) Others
- 10.2 Marking B (KAMAYA Control label)