KAMAYA OHM

Spec. No.:	RHC–K–HTS–0001 /8
Date:	2017. 1. 10

Specification

Title: FIXED THICK FILM CHIP RESISTORS; RECTANGULAR TYPE & HIGH OHM

Style: RHC16,20

RoHS COMPLIANCE ITEM
Halogen and Antimony Free

Product specification contained in this specification
are subject to change at any time without notice
If you have any questions or a Purchasing Specification for any quality
Agreement is necessary, please contact our sales staff.

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Hokkaido Research Center
Approval by: T. Sannomiya
Drawing by: M. Shibuya

Note: Stock conditions
Temperature: +5°C ~ +35°C
Relative humidity: 25% ~ 75%
The period of guarantee: Within 2 year from shipmen t by the company.
Solderability shall be satisfied.

1. Scope

1.1 This specification covers the detail requirements for fixed thick film chip resistors; rectangular type & high ohm, style of RHC16,20.

1.2 Applicable documents

JIS C 5201: 1994, JIS C 5202: 1990

2. Classification

Type designation shall be the following form.

(Example)

RHC	20	10G0	M	TP
1	2	3	4	5

Style

1 Fixed thick film chip resistors; rectangular type & high ohm — Style

2 Size

3 Rated resistance

10G0	10G0-->10GΩ

4 Tolerance on rated resistance

J	±5%
K	±10%
M	±20%
N	±30%
H	±50%

5 Packaging form

B	Bulk (loose package)
TP	Paper taping

3. Rating

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

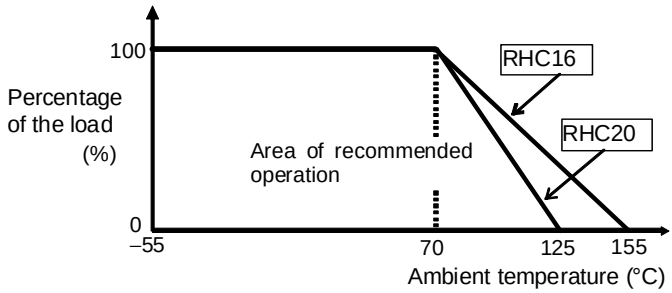
Table–1

Style	Rated voltage (V)	Temperature coefficient of resistance (10^{-6}/°C)	Rated resistance range (Ω)	Tolerance on rated resistance	Preferred number series for resistors
RHC16	15	0~–2,000	100M~270M	J(±5%)	E12
			100M~4G	K(±10%)	
			100M~150G	M(±20%), N(±30%), H(±50%)	
RHC20		±2,000	100M~1G	J(±5%), K(±10%)	
			100M~10G	M(±20%), N(±30%), H(±50%)	
		±4,000	100G~150G		

Style	Working temperature range(°C)
RHC16	–55~+155
RHC20	–55~+125

3.2 Derating

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



Figure–1 Derating curve

4. Packaging form

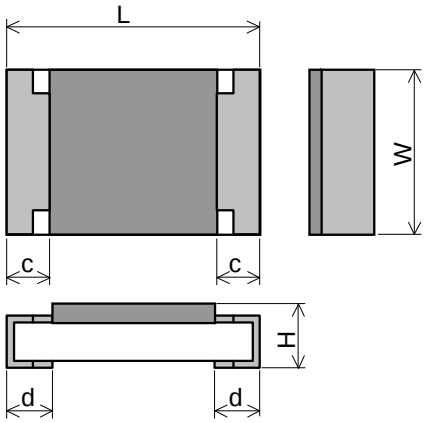
The standard packaging form shall be in accordance with Table–2.

Table–2

Symbol	Packaging form		Standard packaging quantity / units
B	Bulk (loose package)		1,000 pcs.
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.

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 Unit: mm

Style	L	W	H	c	d
RHC16	1.6±0.1	$0.8^{+0.15}_{-0.05}$	0.45±0.10	0.3±0.1	0.3±0.1
RHC20	2.0±0.1	1.25±0.10	0.55±0.10	0.4±0.2	0.4±0.2

5.2 Net weight (Reference)

Style	Net weight(mg)
RHC16	2
RHC20	5

6. Performance

6.1 The standard condition for tests shall be in accordance with Sub–clause 3, JIS C 5202: 1990.

6.2 The performance shall be satisfied in Table–4.

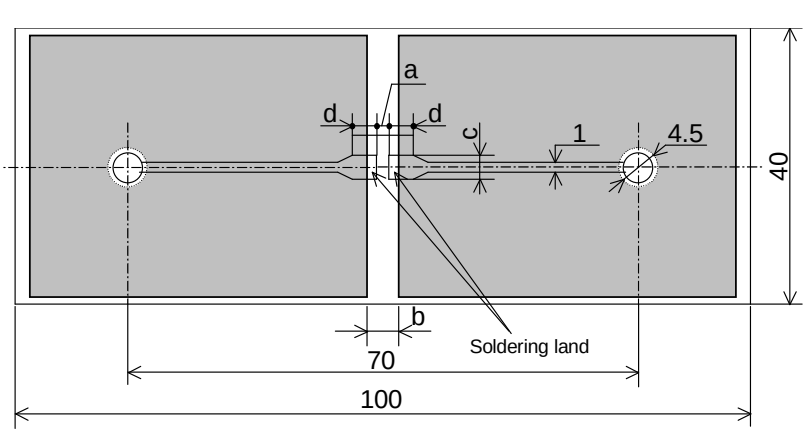
Table–4(1)

No.	Test items	Condition of test (JIS C 5202)	Performance requirements
1	DC resistance	Sub–clause 5.1 Measuring voltage: 15 V	Within the specified tolerance of rated resistance.
2	Temperature characteristics of resistance	Sub–clause 5.2 Test condition: 5 °C / 35 °C	See table–1.
3	Voltage coefficient	Sub–clause 5.3 Measuring voltage: 5 V / 15 V	RHC16 100MΩ≤R<100GΩ: Within ±1 %/V 100GΩ≤R≤150GΩ: Within ±2 %/V RHC20 100MΩ≤R≤10GΩ: Within 0~–2 %/V 100GΩ≤R≤150GΩ: Within ±10 %/V
4	Insulation resistance	Sub–clause 5.6 The resistor shall be fixed on the test fixture as shown in Figure–4. Test potential: 100 Vdc Test period: 1 min.	10 TΩ min.
5	Capacitance	Measuring voltage: 1 V Measuring frequency: 10 kHz, 100kHz, 1MHz	1 pF max.
6	Terminal strength (Pulling test)	Lead wire (RHC16: ϕ0.4 mm, RHC20: ϕ0.47 mm) shall be soldered to the center of terminal. One side is fixed and the specified load shall be applied to the other side in the direction of axial. Duration: 10 s ± 1 s	Not be peeled off by the pulling force under 5 N. RHC16: 3 N
7	Substrate bending test	Sub–clause 6.1.4 (1) The resistor shall be mounted on the test substrate as shown in Figure–3. Bending value: 5 mm (Among the fulcrums: 90 mm) Duration: 10 s ± 1 s	No evidence of mechanical damage.
8	Resistance to soldering heat	Sub–clause 6.10 Test by a piece. Temp. of solder bath: 260 °C ± 5 °C Immersion time: 10 s ± 1 s After immersion into solder, leaving at the room temp. for 1h or more and then measure the resistance.	RHC16 100MΩ≤R≤10GΩ: Within ±1 % 10GΩ<R≤150GΩ: Within ±2 % RHC20 100MΩ≤R≤10GΩ: Within ±1 % 100GΩ≤R≤150GΩ: Within ±5 % No evidence of appearance damage
9	Solderability	Sub–clause 6.11 Test by a piece. Flux: Rosin–Methanol Temp. of solder bath: 235 °C ± 5 °C Immersion time: 2 s ± 0.5 s	The surface of terminal immersed shall be min. of 95% covered with a new coating of solder.

Table–4(2)

<table>
<tr><th>No.</th><th>Test items</th><th colspan="3">Condition of test (JIS C 5202)</th><th>Performance requirements</th></tr>
<tr><td rowspan="6">10</td><td rowspan="6">Temperature cycling</td><td colspan="3">Sub–clause 7.4
Test cycle: 5 cycles for duty cycle as specified below.</td><td rowspan="6">RHC16
100MΩ≤R≤10GΩ: Within ±1 %
10GΩ<R≤150GΩ: Within ±2 %
RHC20
100MΩ≤R≤10GΩ: Within ±1 %
100GΩ≤R≤150GΩ: Within ±5 %
No evidence of appearance damage</td></tr>
<tr><td>Step</td><td>Temperature (°C)</td><td>Time (min)</td></tr>
<tr><td>1</td><td>Room temp.</td><td>2~3</td></tr>
<tr><td>2</td><td>–55±3</td><td>30</td></tr>
<tr><td>3</td><td>Room temp.</td><td>2~3</td></tr>
<tr><td>4</td><td>RHC16: 155±2
RHC20: 125±2</td><td>30</td></tr>
<tr><td>11</td><td>Humidity</td><td colspan="3">Sub–clause 7.5
Test temp. & relative humidity:
40 °C ± 2 °C & 90~95 %
Test period: 1,000 $^{+48}_{0}$ h</td><td>RHC16
100MΩ≤R≤10GΩ: Within ±2 %
10GΩ<R≤150GΩ: Within ±5 %
RHC20
100MΩ≤R≤10GΩ: Within ±2 %
100GΩ≤R≤150GΩ: Within ±5 %
No evidence of appearance damage</td></tr>
<tr><td>12</td><td>Load life</td><td colspan="3">Sub–clause 7.10
Test temp. & relative humidity:
70 °C ± 2 °C
Test voltage: Cycle of 1 h 30 min. ″ON″ and 30 min. ″OFF″ at dc rated voltage.
Test period: 1,000 $^{+48}_{0}$ h</td><td>RHC16
100MΩ≤R≤10GΩ: Within ±3 %
10GΩ<R≤150GΩ: Within ±5 %
RHC20
100MΩ≤R≤10GΩ: Within ±3 %
100GΩ≤R≤150GΩ: Within ±20 %
No evidence of appearance damage</td></tr>
</table>

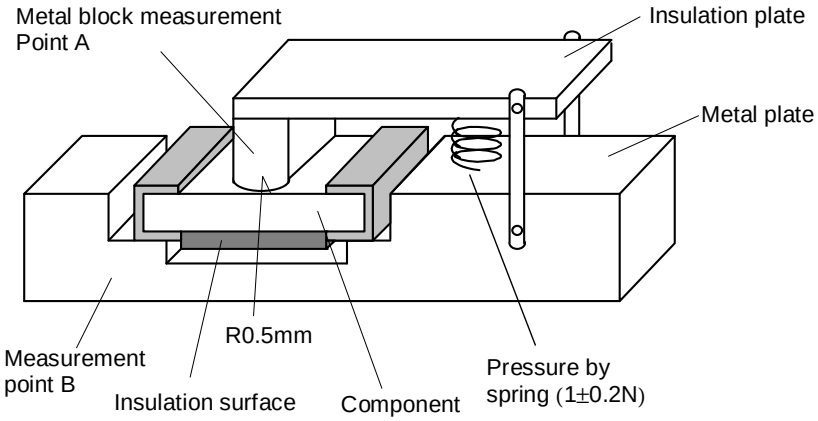
7. Test substrate



Style	a	b	c	d
RHC16	1.0	3.6	1.2	3.0
RHC20	1.2	4.0	1.65	3.0

Figure–3 RHC 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–4

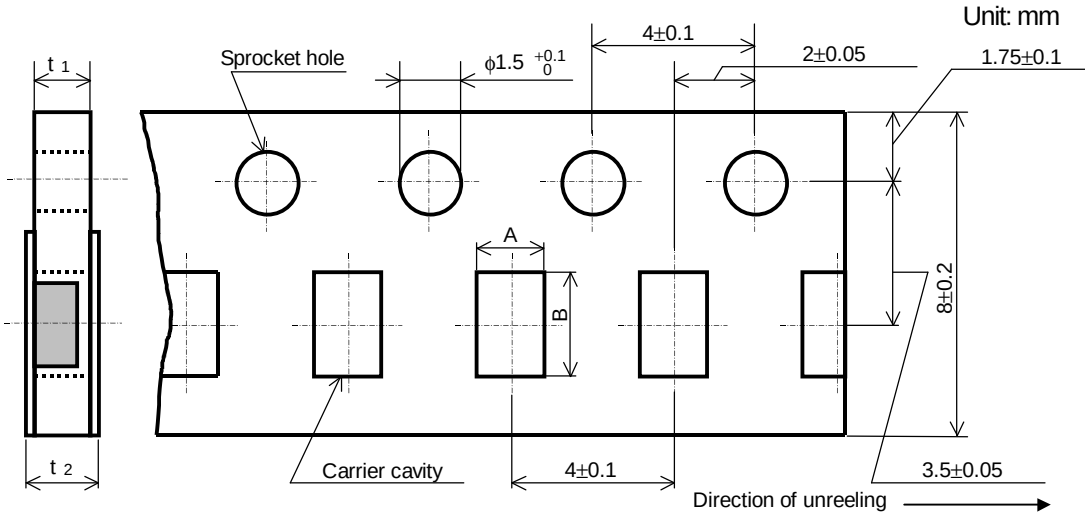
8. Taping

8.1 Applicable documents JIS C 0806–3: 2014, EIAJ ET–7200C: 2010

8.2 Taping dimensions

Paper taping (8mm width, 4mm pitches)

Taping dimensions shall be in accordance with Figure–5 and Table–5.



Figure–5

Table–5 Unit: mm

Style	A	B	t_1	t_2
RHC16	1.15±0.15	1.9±0.2	0.6±0.1	0.8max.
RHC20	1.65±0.15	2.5±0.2	0.8±0.1	1.0max.

1). The cover tapes shall not cover the sprocket holes.

2). Tapes in adjacent layers shall not stick together in the packing.

3). Components shall not stick to the carrier tape or to the cover tape.

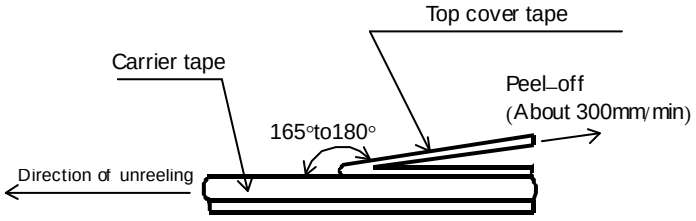
4). Pitch tolerance over any 10 pitches ±0.2mm.

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–6.

6). When the tape is bent with the minimum radius for 25 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.



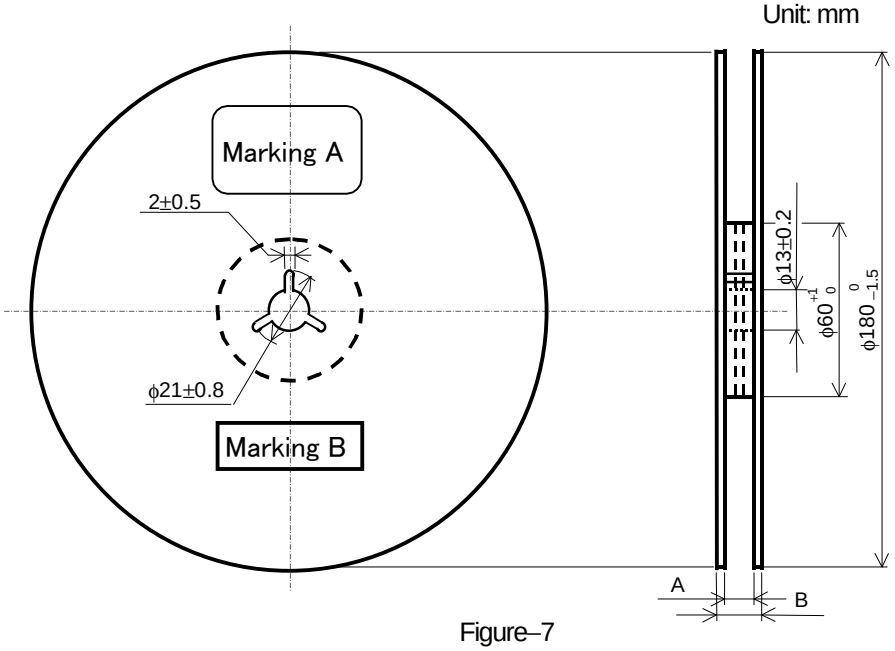
Figure–6

8.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure–7 and Table–6.

Plastic reel (Based on EIAJ ET–7200C)

Unit: mm



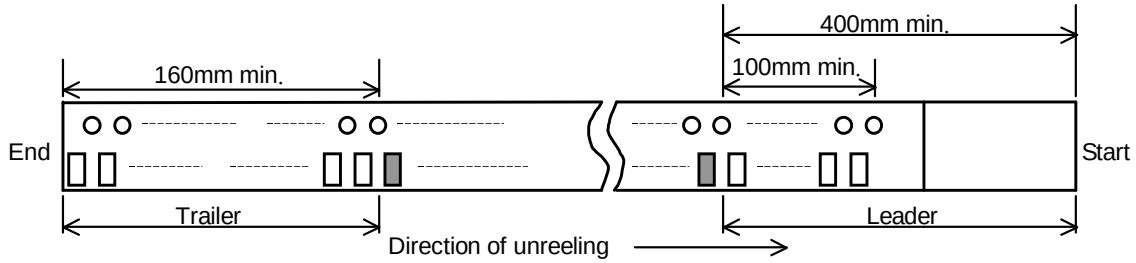
Figure–7

Table–6 Unit: mm

Style	A	B	Note
RHC16, 20	9 $^{+1.0}_{0}$	11.4±1.0	Injection molding
		13±1.0	Vacuum forming

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

8.4 Leader and trailer tape.



Figure–8

9. Marking on package

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

9.1 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

9.2 Marking B (KAMAYA Control label)