

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.



釜屋電機株式會社
KAMAYA ELECTRIC CO., LTD.

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 shipment 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%) | |
| | | | 100G~150G | | |
| | ±4,000 | | | | |

| 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.

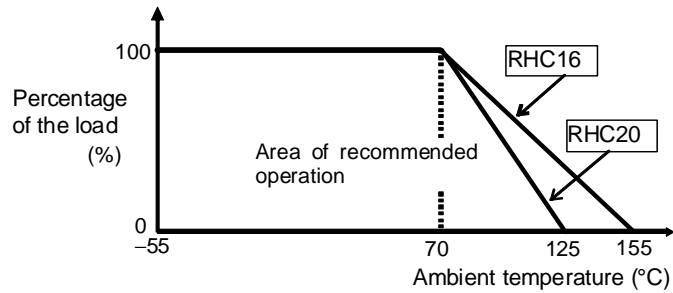


Figure-1 Derating curve

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.

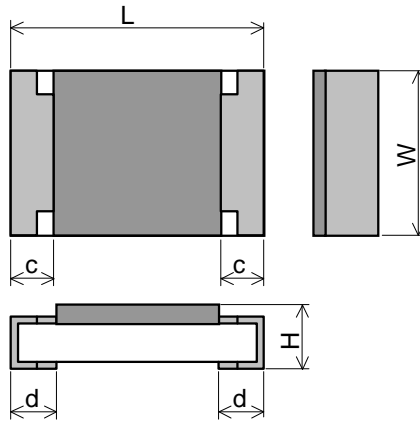


Figure-2

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)

| No. | Test items | Condition of test (JIS C 5202) | | | Performance requirements |
|-----|------------------------------|--|------------------|------------|--|
| 10 | Temperature cycling | Sub-clause 7.4 Test cycle: 5 cycles for duty cycle as specified below. | | | 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 |
| | | Step | Temperature (°C) | Time (min) | |
| | | 1 | Room temp. | 2-3 | |
| | | 2 | -55±3 | 30 | |
| | | 3 | Room temp. | 2-3 | |
| 4 | RHC16: 155±2 RHC20: 125±2 | 30 | | | |
| 11 | Humidity | Sub-clause 7.5 Test temp. & relative humidity: 40 °C ± 2 °C & 90-95 % Test period: 1,000 ⁺⁴⁸ ₀ h | | | 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 |
| 12 | Load life | 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 | | | 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 |

7. Test substrate

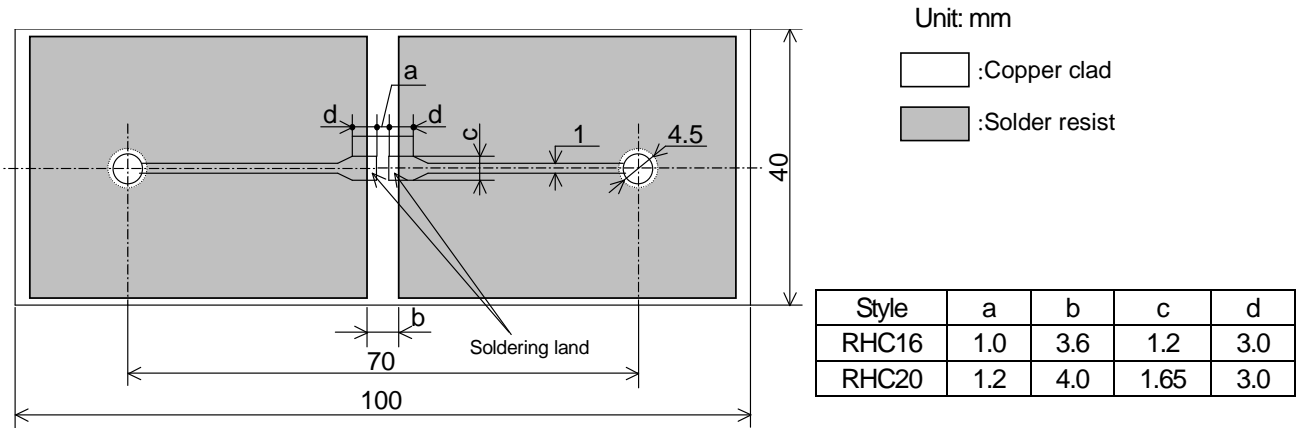


Figure-3 RHC BOUND STRENGTH OF THE END FACE PLATING TEST SUBSTRATE

Remark 1). Material: Epoxide woven glass
Thickness: 1.6mm Thickness of copper clad: 0.035mm

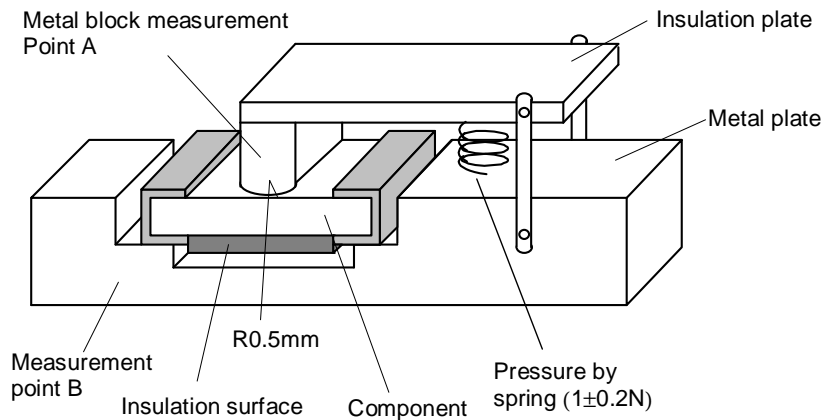


Figure-4

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.

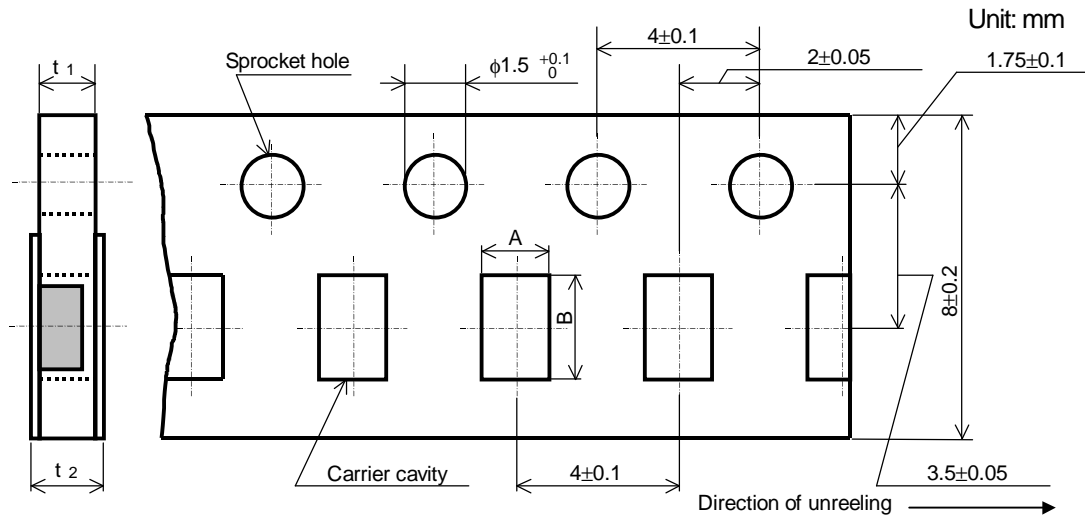


Figure-5

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 ± 0.2 mm.
- 5). The peel strength of the top cover tape shall be within 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.

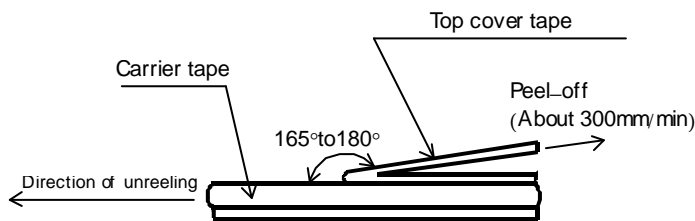


Figure-6

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)

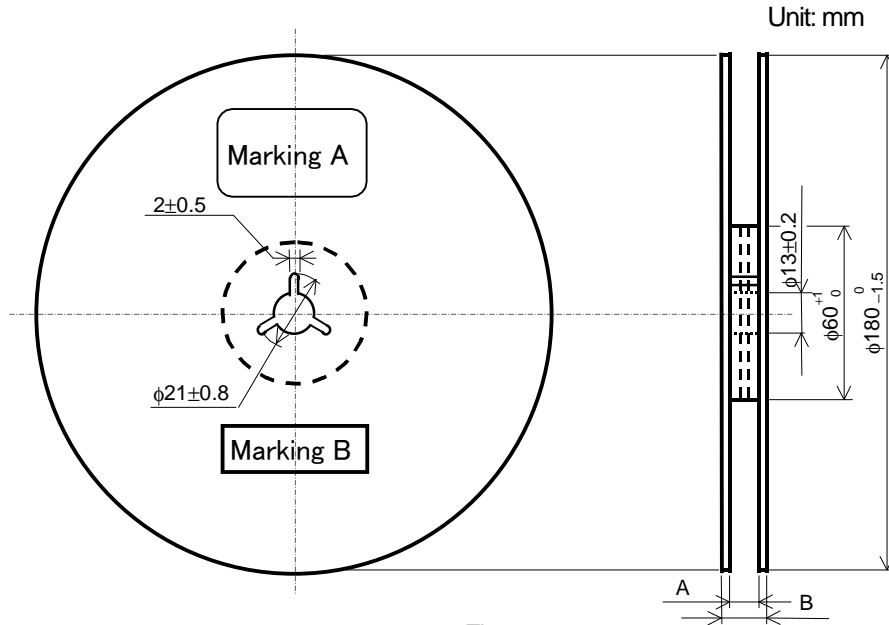


Figure-7

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.

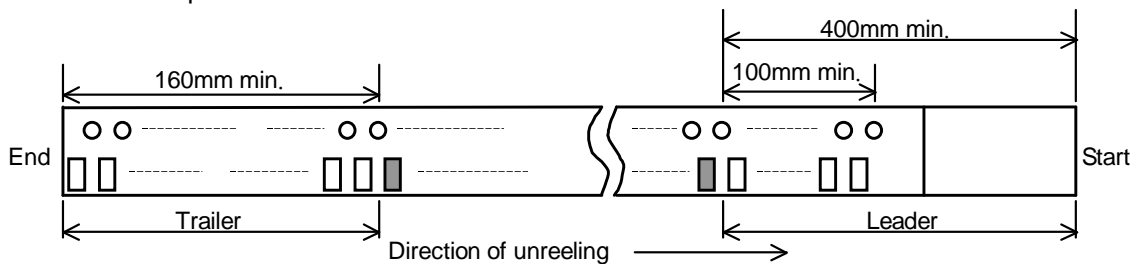


Figure-8

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)