

Spec. No.: TWP-K-HTS-001 /1

Date: 2017. 1. 10

Preliminary Specification

Title: METAL-PLATE CHIP RESISTOR; LOW OHM &
WIDE TERMINATION

Style: TWP63,110

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 metal-plate chip resistor ; low ohm & wide termination, style of TWP63,110.

1.2 Applicable documents

JIS C 5201-1: 2011, JIS C 5201-8: 2014, JIS C 5201-8-1: 2014
IEC60115-1: 2008, IEC60115-8: 2009, IEC60115-8-1: 2014


2. Classification

Type designation shall be the following form.

(Example)

TWP	110	K	R005	F	TE
1	2	3	4	5	6

Style

1 Metal - plate chip resistor; low ohm & wide termination  Style

2 Size

3 Temperature coefficient of resistance

K	$\pm 100 \times 10^{-6} / ^\circ\text{C}$
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4 Rated resistance

R005	R005-->5m Ω
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5 Tolerance on rated resistance

F	$\pm 1\%$
J	$\pm 5\%$

6 Packaging form

TE	Embossed taping
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3. Rating

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

Table-1

Style	Rated dissipation (W)	Rated current (A)	Temperature coefficient of resistance ($10^{-6}/^{\circ}\text{C}$)		Rated resistance (m Ω)	Tolerance on rated resistance
TWP63	3.0	54.7	K	100	1	F($\pm 1\%$) J($\pm 5\%$)
		38.7			2	
		31.6			3	
		27.3			4	
		24.4			5	
TWP110	6.0	77.4	K	100	1	F($\pm 1\%$) J($\pm 5\%$)
		54.7			2	
		44.7			3	
		38.7			4	
		34.6			5	

Style	Isolation voltage (V)	Category temperature range ($^{\circ}\text{C}$)
TWP63	100	-55~+170
TWP110		

3.2 Climatic category

55/155/56

Lower category temperature -55 $^{\circ}\text{C}$
 Upper category temperature +170 $^{\circ}\text{C}$
 Duration of the damp heat, steady state test 56days

3.3 Stability class

5%

Limits for change of resistance:
 -for long-term tests $\pm 5\%$
 -for short-term tests $\pm 1\%$

3.4 Derating

The derated values of dissipation at temperature in excess of 70 $^{\circ}\text{C}$ shall be as indicated by the following curve.

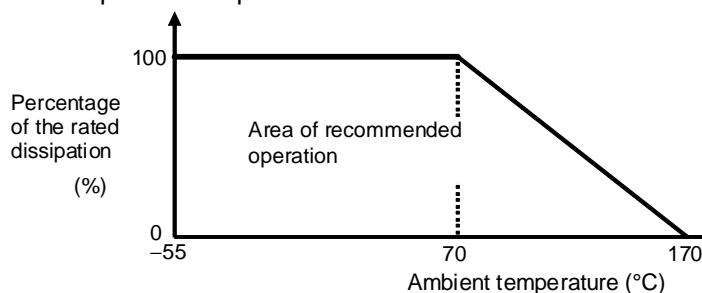


Figure-1 Derating curve

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)

3.6 Rated current

The rated current calculated from the square root of the quotient of the rated resistance and the rated dissipation.

$$I = \sqrt{P / R}$$

I: Rated current (A)
 P: Rated dissipation (W)
 R: Rated resistance (Ω)

The rated current shall be corresponding to rated voltage.

4. Packaging form

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

Table-2

Symbol	Packaging form		Standard packaging quantity / units	Application
TE	Embossed taping	12mm width, 4mm pitches	4,000 pcs.	TWP63
		24mm width, 8mm pitches		TWP110

5. Dimensions

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

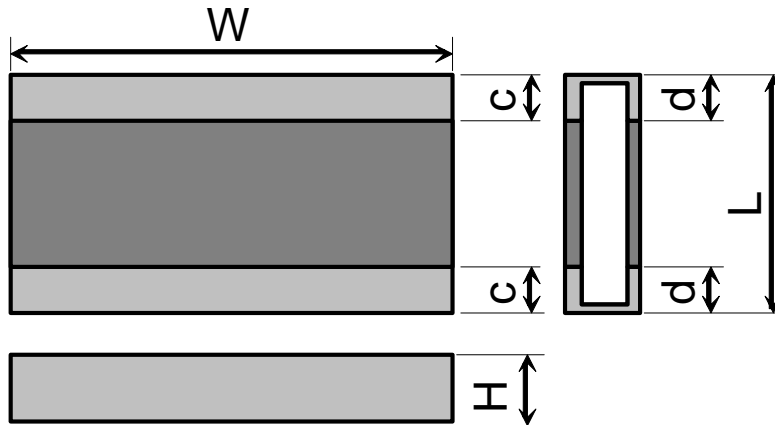


Figure-2

Table-3

Unit: mm

Style	Rated resistance (m Ω)	L	W	H	c	d
TWP63	1 to 5	3.2 \pm 0.25	6.3 \pm 0.5	0.2 \pm 0.15	0.5 \pm 0.25	0.5 \pm 0.25
TWP110	1 to 5	5.0 \pm 0.25	11.0 \pm 1.0	0.2 \pm 0.15	0.55 \pm 0.25	0.55 \pm 0.25

5.2 Net weight (Reference)

Style	Rated resistance (m Ω)	Net weight (mg)
TWP63	1 to 5	23
TWP110	1 to 5	56

6. Marking

The rated resistance shall be marked in 4 characters consisting of 3 figures and a letter and marked on over coat side.

(Example) "R005" \rightarrow 0.005 [Ω] \rightarrow 5 [m Ω]

7. Performance

7.1 The standard condition for tests shall be in accordance with Sub-clause 4.2, JIS C 5201-1: 2011.

7.2 The performance shall be satisfied in Table-4.

Table- 4(1)

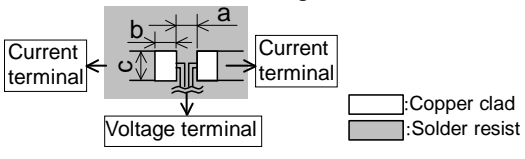
No.	Test items	Condition of test (JIS C 5201-1)	Performance requirements															
1	Visual examination	Sub-clause 4.4.1 Checked by visual examination.	As in 4.4.1 The marking shall be legible, as checked by visual examination.															
2	Dimension Resistance	Sub-clause 4.4.2 Resistance value shall be measured by mounting the substrate of the following condition.  <p style="text-align: right;">Unit:mm</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Style</th> <th>Resistance value(mΩ)</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>TWP63</td> <td>1 to 5</td> <td>0.7</td> <td>1.6</td> <td>6.8</td> </tr> <tr> <td>TWP110</td> <td>1 to 5</td> <td>1.6</td> <td>2.2</td> <td>11.5</td> </tr> </tbody> </table> <p>Thickness of copper clad: 0.035mm 4-Terminal method Measurement current: 1(A) Note: The measuring apparatus corresponding to DC Low-ohm Mater (1A) of AX-1152D for ADEX CORPORATION.</p>	Style	Resistance value(mΩ)	a	b	c	TWP63	1 to 5	0.7	1.6	6.8	TWP110	1 to 5	1.6	2.2	11.5	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.
Style	Resistance value(mΩ)	a	b	c														
TWP63	1 to 5	0.7	1.6	6.8														
TWP110	1 to 5	1.6	2.2	11.5														
3	Voltage proof	Sub-clause 4.7 Method: 4.6.1.4 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 ≥ 1 GΩ															
4	Solderability	Sub-clause 4.17 Without aging Flux: The resistors shall be immersed in a non-activated soldering flux for 2 s. Bath temperature: 245 °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 Sub-clause 4.13 The applied voltage shall be 2.5 times the rated power or the current corresponding to. 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 ΔR ≤ ±1% Legible marking															

Table-4(2)

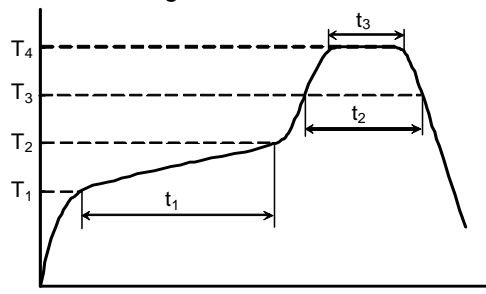
No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
6	Mounting Bound strength of the end face plating Final measurements	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-4 Sub-clause 4.33 Bent value:1 mm Resistance Sub-clause 4.33.6 Visual examination	$\Delta R \leq \pm 1\%$ No visible damage
7	Resistance to soldering heat Component resistance solvent	Sub-clause 4.18 (JEITA RC-2144 2.3.2) Substrate material: Epoxide woven glass T ₁ :Pre-heat minimum temp.:150±5 °C T ₂ :Pre-heat maximum temp.:180±5 °C T ₃ :Soldering temp.:220 °C T ₄ :Peak temp.:250 °C t ₁ :Pre-heat duration:120±5 s t ₂ :Soldering duration:60 to 90 s t ₃ :Peak duration(T ₄ -5°C):20 to 40 s Pre-reflow soldering: 1 time (Initial measurements) Reflow soldering: 3 times  Visual examination Resistance Sub-clause 4.29 Solvent: 2-propanol Solvent temperature: 23 °C±5 °C Method 2 Recovery: 48 h Visual examination Resistance	No visible damage $\Delta R \leq \pm 1\%$ No visible damage $\Delta R \leq \pm 1\%$

Table-4(3)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
8	Mounting Adhesion Rapid change temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.32 Force: 5 N Duration: 10 s±1 s Visual examination Sub-clause 4.19 Lower category temperature:-55 °C Upper category temperature:+155 °C Duration of exposure at each temperature: 30 min. Number of cycles: 5 cycles. Visual examination Resistance	No visible damage No visible damage $\Delta R \leq \pm 1\%$
9	Climatic sequence -Dry heat -Damp heat, cycle (12+12hour cycle) First cycle -Cold -Damp heat, cycle (12+12hour cycle) Remaining cycle -D.C. load	Sub-clause 4.23 Sub-clause 4.23.2 Test temperature: +155 °C Duration: 16 h Sub-clause 4.23.3 Test method: 2 Test temperature: 55 °C [Severity(2)] Sub-clause 4.23.4 Test temperature -55 °C Duration: 2h Sub-clause 4.23.6 Test method: 2 Test temperature: 55 °C [Severity (2)] Number of cycles: 5 cycles Sub-clause 4.23.7 The applied current shall be the rated current. Duration: 1 min. Visual examination Resistance	No visible damage $\Delta R \leq \pm 5 \%$
10	Mounting Endurance at 70 °C	Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.25.1 Ambient temperature: 70 °C±2 °C Duration: 1000 h The current shall be applied in cycles of 1.5 h on and 0.5 h. The applied current shall be the rated current Examination at 48 h, 500 h and 1000 h: Visual examination Resistance	No visible damage $\Delta R \leq \pm 5 \%$
11	Mounting Variation of resistance with temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.8 +20 °C / +155 °C	As in Table-1

Table-4(4)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
12	Mounting Damp heat, steady state	Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.24 Ambient temperature: 40 °C±2 °C Relative humidity: 93 ⁺² / ₋₃ % Without current applied. Visual examination Resistance	No visible damage Legible marking $\Delta R \leq \pm 5\%$
13	Dimensions (detail) Mounting Endurance at upper category temperature	Sub-clause 4.4.3 Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.25.3 Ambient temperature: 170 °C±2 °C Duration: 1000 h Examination at 48 h, 500 h and 1000 h: Visual examination Resistance	As in Table-4 No visible damage $\Delta R \leq \pm 5\%$

8. Taping

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

8.2 Taping dimensions

8.2.1 Embossed taping (12mm width, 4mm pitches)

Taping dimensions shall be in accordance with Figure-3 and Table-5

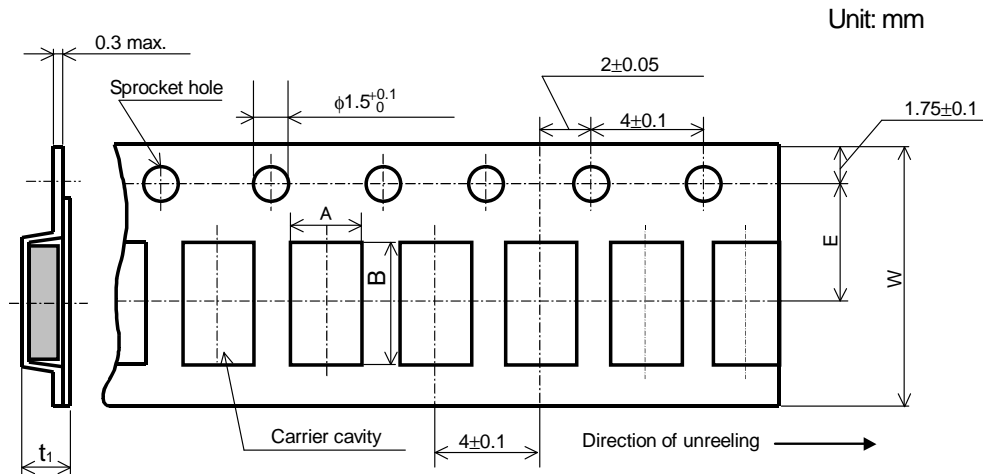


Table-5

Unit: mm

Style	A	B	W	E	t ₁
TWP63	3.6±0.2	6.9±0.2	12.0±0.3	5.5±0.05	1.1±0.15

8.2.2 Paper taping (24mm width, 8mm pitches)

Taping dimensions shall be in accordance with Figure-4 and Table-6.

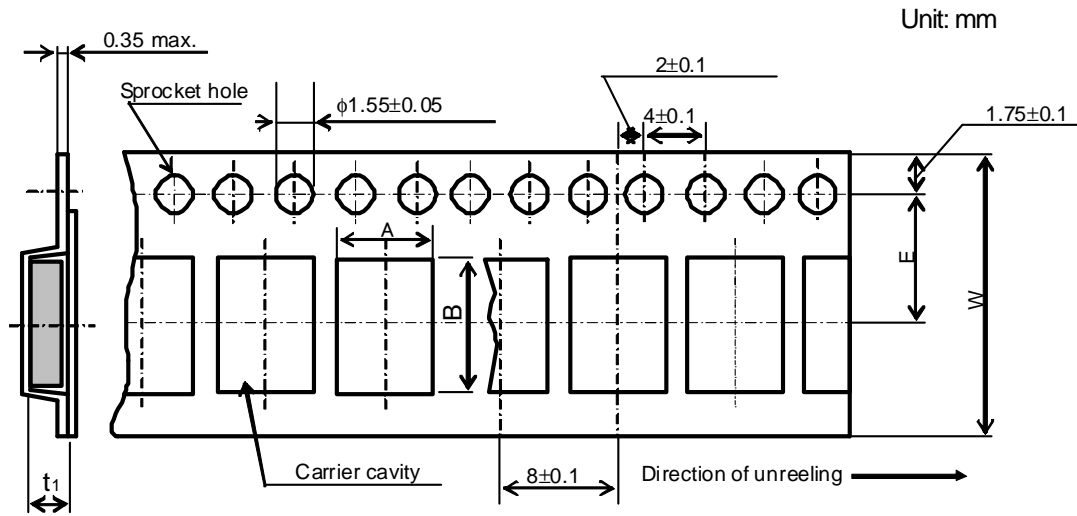


Figure-4

Table-6

Style	A	B	W	E	t_1
TWP110	5.7 ± 0.2	11.9 ± 0.2	24.0 ± 0.3	11.5 ± 0.1	0.95 ± 0.2

- 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-5.
- 6). When the tape is bent with the minimum radius for 30mm 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.

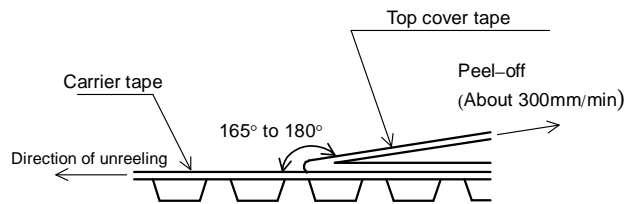


Figure-5

8.3 Reel dimension

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

Plastic reel (Based on EIAJ ET-7200C)

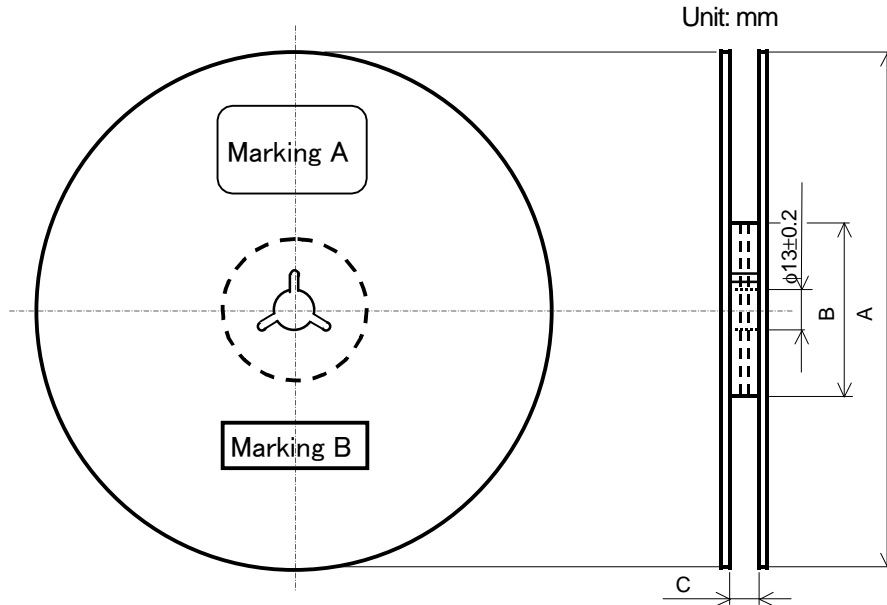


Figure-6

Table-7

Style	Unit: mm			Note
	A	B	C	
TWP63	180 ⁰ _{-1.5}	60 ^{+1.0} ₀	13.0 ^{+1.0} ₀	Injection molding
TWP110	330±2.0	80±1.0	25.4±1.0	Injection molding

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.

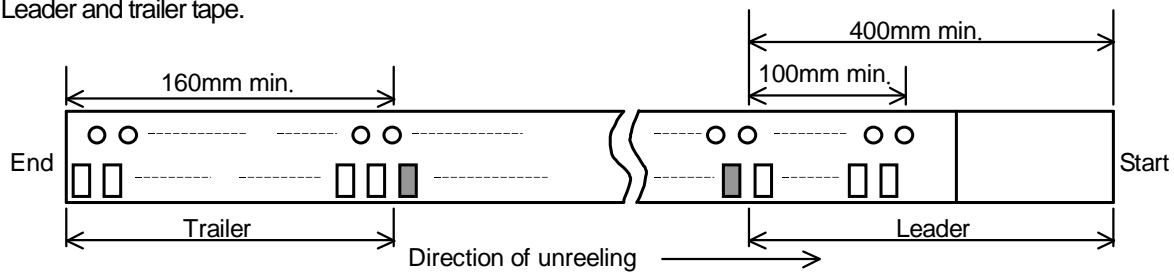


Figure-7

9. Marking on package

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

9.1 Marking A

(1) Classification

(Style, Temperature coefficient of resistance, 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)