KAMAYA OHM

Drawing No.:	RLP–K–HTS–0002 /1
Date:	2025. 1. 7

Data sheet

Title: METAL-PLATE CHIP RESISTOR; LOW OHM

Style: RLP16,20,32,63

AEC-Q200 qualified

RoHS COMPLIANCE ITEM
Halogen and Antimony Free

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.
・Product specification contained in this data sheet 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

1. Scope

1.1 This data sheet covers the detail requirements for metal−plate chip resistor ; low ohm, style of RLP16, 20, 32, 63.

1.2 Applicable documents

JIS C 5201−1: 2011, IEC60115−1: 2008, AEC-Q200 Rev.D

2. Classification

Type designation shall be the following form.

(Example)

RLP	63	K	R010	F	TE
1	2	3	4	5	6
Style					

1 Metal - plate chip resistor; low ohm
2 Size — Style

RLP16	1608 size
RLP20	2012 size
RLP32	3216 size
RLP63	6332 size

3 Temperature coefficient of resistance

N	±70×10^{-6}/ °C
K	±100×10^{-6}/ °C
−(Dash)	Standard

4 Rated resistance

1L50	1.5mΩ
R002	2mΩ

5 Tolerance on rated resistance

F	±1%
J	±5%

6 Packaging form

TP	Paper taping
TE	Embossed taping

3. Rating

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

Table−1(1)

Style	Rated dissipation (W)	Rated current (A)	Temperature coefficient of resistance (10^{-6}/ °C)		Rated resistance (mΩ)	Tolerance on rated resistance
RLP16	0.33	8.1	K	±100	5	F(±1%) J(±5%)
			N	±70		
		5.7	K	±100	10	
			N	±70		
RLP20	0.5	15.8	K	100	2	
			N	±70		
		11.1	K	±100	4	
			N	±70		
		10.0	K	100	5	
			N	±70		
		9.1	K	±100	6	
			N	±70		
		7.9	K	100	8	
			N	±70		
		7.4	K	±100	9	
			N	±70		
		7.0	K	±100	10	
			N	±70		
RLP32	1.0	31.6	Standard	±150	1	
			K	±100		
		22.3	K	±100	2	
			N	±70		
		18.2	K	±100	3	
			N	±70		
		15.8	K	±100	4	
			N	±70		
		14.1	K	±100	5	
			N	±70		
		12.9	K	±100	6	
			N	±70		
		11.9	K	±100	7	
			N	±70		
		11.1	K	±100	8	
			N	±70		
		10.5	K	±100	9	
			N	±70		
		10	K	±100	10	
			N	±70		
		9.5	K	±100	11	
			N	±70		
		9.1	K	±100	12	
			N	±70		
		8.7	K	±100	13	
			N	±70		
		8.4	K	±100	14	
			N	±70		
		8.1	K	±100	15	
			N	±70		

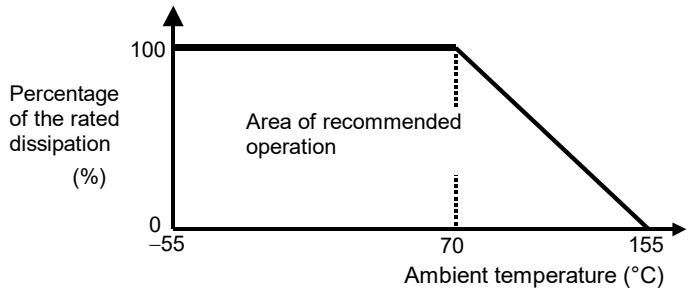
Table−1(2)

Style	Rated dissipation (W)	Rated current (A)	Temperature coefficient of resistance (10^{-6}/ °C)		Rated resistance (mΩ)	Tolerance on rated resistance
RLP63	2.0	44.7	Standard	±150	1	F(±1%) J(±5%)
			K	±100		
			N	±70		
	1.0	22.3	K	±100	2	
			N	±70		
		18.2	K	±100	3	
			N	±70		
		15.8	K	±100	4	
			N	±70		
		14.1	K	±100	5	
			N	±70		
		12.9	K	±100	6	
			N	±70		
		11.9	K	±100	7	
			N	±70		
		11.1	K	±100	8	
			N	±70		
		10.5	K	±100	9	
			N	±70		
		10	K	±100	10	
			N	±70		
		9.1	K	±100	12	
			N	±70		
		8.1	K	±100	15	
			N	±70		

Style	Insulation voltage (V)	Category temperature range (°C)
RLP16	100	−55~+155
RLP20		
RLP32		
RLP63		

3.2 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

3.3 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)

3.4 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

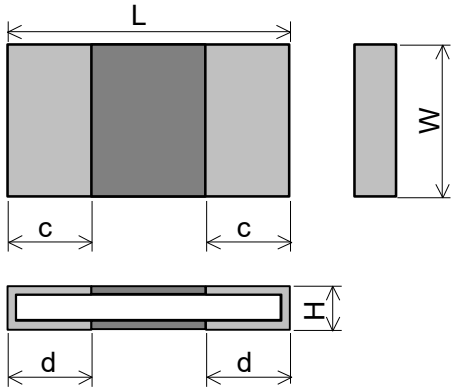
The standard packaging form shall be in accordance with Table−2.

Table−2

Symbol	Packaging form		Standard packaging quantity / units	Application
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.	RLP16, 20, 32
TE	Embossed taping	12mm width, 4mm pitches	4,000 pcs.	RLP63

5. Dimensions

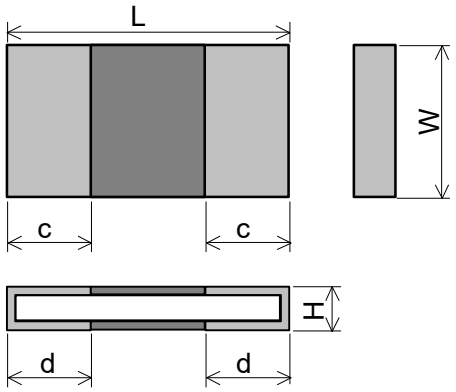
5.1 The resistor shall be of the design and physical dimensions in accordance with Figure−2 and Table−3.



Figure−2

Table−3(1) Unit: mm

Style	Rated resistance (mΩ)	L	W	H	c	d
RLP16	5	1.6±0.1	0.8±0.1	0.35±0.10	0.2±0.1	0.6±0.1
	10			0.3±0.1	0.2±0.1	0.3±0.1
RLP20	2	2.0±0.15	1.25±0.15	0.22±0.10	0.35±0.10	0.55±0.20
	4			0.35±0.10	0.35±0.10	0.75±0.20
	5			0.35±0.10	0.35±0.10	0.6±0.2
	6			0.35±0.10	0.35±0.10	0.47±0.20
	8			0.22±0.10	0.35±0.10	0.6±0.2
	9			0.22±0.10	0.35±0.10	0.52±0.20
	10			0.22±0.10	0.35±0.10	0.47±0.20
RLP32	1	3.2±0.15	1.6±0.15	0.32±0.15	1.1±0.25	1.1±0.25
	2			0.32±0.15	0.5±0.25	0.5±0.25
	3			0.35±0.10	0.7±0.25	1.3±0.25
	4			0.35±0.10	1.1±0.25	1.1±0.25
	5			0.35±0.10	1.0±0.25	1.0±0.25
	6			0.35±0.10	0.85±0.25	0.85±0.25
	7			0.35±0.10	0.7±0.25	0.7±0.25
	8			0.35±0.10	0.6±0.25	0.6±0.25
	9			0.3±0.1	0.75±0.25	0.75±0.25
	10			0.28±0.10	0.5±0.25	0.5±0.25
	11			0.28±0.10	0.5±0.25	0.5±0.25
	12			0.22±0.10	0.65±0.25	0.65±0.25
	13			0.22±0.10	0.65±0.25	0.65±0.25
	14			0.22±0.10	0.55±0.25	0.55±0.25
	15			0.22±0.10	0.5±0.25	0.5±0.25



Table−3(2) Unit: mm

Style	Rated resistance (mΩ)	L	W	H	c	d
RLP63	1	6.3±0.25	3.2±0.25	0.38±0.15	2.2±0.25	2.2±0.25
	2		3.1±0.25	0.38±0.15	1.1±0.25	1.1±0.25
	3			0.45±0.15	2.2±0.25	2.2±0.25
	4			0.35±0.15	2.2±0.25	2.2±0.25
	5			0.34±0.15	1.95±0.25	1.95±0.25
	6			0.34±0.15	1.75±0.25	1.75±0.25
	7			0.35±0.15	1.4±0.25	1.4±0.25
	8			0.35±0.15	1.1±0.25	1.1±0.25
	9			0.35±0.15	0.8±0.25	0.8±0.25
	10			0.23±0.15	1.75±0.25	1.75±0.25
	12			0.23±0.15	1.4±0.25	1.4±0.25
	15			0.23±0.15	0.95±0.25	0.95±0.25

5.2 Net weight (Reference)

Style	Rated resistance (mΩ)	Net weight (mg)
RLP16	5,10	2
RLP20	2, 4 to 6 , 8 to 10	3
RLP32	1 to 3	12
	4 to 15	11
RLP63	1,2	47
	3 to 10,12 15	43

6. Marking

The Rated resistance of RLP16 should not be marked standard.

6.1 RLP63

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

(Example) "R010" → 0.01 [Ω] → 10 [mΩ]
"1L50" → 0.0015 [Ω] → 1.5 [mΩ]

6.2 RLP20, 32

The rated resistance shall be marked in combination of two figures and underlines and marked on over coat side.

(Example) "05" → 0.005 [Ω] → 5 [mΩ]
"10" → 0.01 [Ω] → 10 [mΩ]

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.

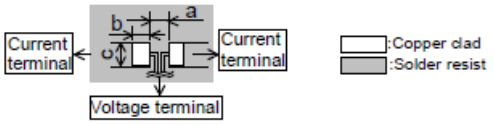
Table−4(1)

No.	Test items	Condition of test	Performance requirements
1	High temperature exposure AEC Q200 - No.3	MIL-STD-202 Method 108 Ambient temperature:155±2°C, Condition: Without load, Duration: 1,000 $^{+48}_{0}$ h Interval measurements: 250 h and 500 h	ΔR/R: Within ±3% No visible damage
2	Temperature cycling AEC Q200 - No.4	JESD22 Method JA-104 Temperature: -55±3°C / 155±2°C, Dwell time: 30min maximum at each temp. Transition time: 1 min. max. Number of cycles: 1,000 cycles. Interval measurements: 250 cy and 500 cy	ΔR/R: Within ±3% No visible damage
3	Bias humidity AEC Q200 – No.7	MIL-STD-202 Method 103 Condition: 85°C & 85% R.H. Test power: 10% of rated power shall be applied for continuously. Duration: 1,000 $^{+48}_{0}$ h Interval measurements: 250 h and 500 h	ΔR/R: Within ±3% No visible damage
4	Operational life AEC Q200 – No.8	MIL-STD-202 Method 108 Ambient temperature: 125±2ºC The applied voltage shall be the voltage to be calculated at 35% of rated dissipation or the limiting element voltage whichever is the smaller. Condition: The voltage shall be applied for continuously. Duration: 1,000 $^{+48}_{0}$ h Interval measurements: 250 h and 500 h	ΔR/R: Within ±3% No visible damage
5	External Visual AEC Q200 – No.9	MIL-STD-883 Method 2009	Inspect device construction, marking and workmanship.
6	Dimensions AEC Q200 – No.10	JESD22 Method JB-100	As in Table−3
7	Resistance to Solvents AEC Q200 – No.12	MIL-STD-202 Method 215 Solvent: 2−propanol at 25°C Immersion time: 3 min Brush: 10 times brushing Immersion and brush cycle: 3cycle	ΔR/R: Within ±1% No visible damage
8	Mechanical Shock AEC Q200 – No.13	MIL-STD-202 Method 213 Waveform: half sine, Peak value100G, Normal duration 6ms Condition: XX'YY'ZZ', 18times total	ΔR/R: Within ±1% No visible damage

Table−4(2)

No.	Test items	Condition of test	Performance requirements
9	Vibration AEC Q200 – No.14	MIL-STD-202 Method 204 Peak acceleration and Sweep time: 5 g's for 20 min , Frequency 10Hz to 2000Hz, Condition: 12 cycles each of 3 orientations	ΔR/R: Within ±1% No visible damage
10	Resistance to soldering heat AEC Q200 - No.15	MIL-STD-202 Method 210 Test conditions:K Peak temperature: 250±5 ºC, 30sec Soldering time above 183 ºC: 90 - 120sec Temperature ramp: 1°C/s-4°C/s Test times:3 times	ΔR/R: Within ±3% No visible damage
11	ESD test AEC Q200 – No.17	AEC-Q200-002 Human body model, 2 Kohm, 150 pF, Test voltage: 12kV	ΔR/R: Within ±5% No visible damage
12	Solderability AEC Q200 – No.18	J-STD-002 B) Bake the sample for 155 ºC dwell time 4h / solder dipping 235ºC/ 5s. Solder: Sn96.5-Ag3-Cu0.5 B1) Bake the sample for 155 ºC dwell time 4h / solder dipping 245ºC/ 5s. Solder: Sn96.5-Ag3-Cu0.5 D) Category 3, Solder dipping 260ºC/ 30s.	The surface of terminal immersed shall be min. of 95% covered with a new coating of solder.

Table−4(3)

<table>
<tr><th>No.</th><th>Test items</th><th>Condition of test</th><th>Performance requirements</th></tr>
<tr><td>13</td><td>Electrical Characterization
AEC Q200 - No.19</td><td>1. D.C. Resistance
Conform to JIS C 5201-1 4.5
Mount it on our recommended 4-terminal test board and measure the resistance using the 4-terminal measurement method.
 

Unit:mm
<table>
<tr><th>Style</th><th>Resistance value(mΩ)</th><th>a</th><th>b</th><th>c</th></tr>
<tr><td rowspan="2">RLP16</td><td>5</td><td>0.6</td><td>0.8</td><td rowspan="2">0.9</td></tr>
<tr><td>10</td><td>1.0</td><td>0.6</td></tr>
<tr><td>RLP20</td><td>2 to 10</td><td>0.8</td><td>0.95</td><td>1.36</td></tr>
<tr><td rowspan="7">RLP32</td><td>1</td><td>1.0</td><td>1.45</td><td rowspan="7">1.7</td></tr>
<tr><td>2</td><td>2.1</td><td>0.9</td></tr>
<tr><td>3</td><td>0.8</td><td>1.55</td></tr>
<tr><td>4</td><td>1.0</td><td>1.45</td></tr>
<tr><td>5, 6</td><td>1.4</td><td>1.25</td></tr>
<tr><td>7 to 15</td><td>2.1</td><td>0.9</td></tr>
<tr><td rowspan="6">RLP63</td><td>1</td><td>1.5</td><td>3.0</td><td>4.0</td></tr>
<tr><td>2</td><td>4.0</td><td>1.8</td><td rowspan="5">3.5</td></tr>
<tr><td>3, 4</td><td>1.8</td><td>2.9</td></tr>
<tr><td>5</td><td>2.4</td><td>2.6</td></tr>
<tr><td>6 to 10,12,15</td><td>4.0</td><td>1.8</td></tr>
</table>
2. Temperature Coefficient of Resistance
-55 °C / +20°C
+20 °C / +155°C</td><td>1. The resistance value shall correspond with the rated resistance taking into account the specified tolerance.
2. As in Table−1</td></tr>
<tr><td>14</td><td>Flammability
AEC Q200 – No.20</td><td>UL-94</td><td>V-1 is acceptable</td></tr>
<tr><td>15</td><td>Bending strength
AEC Q200 – No.21</td><td>AEC-Q200-005
Bending value: 2mm
Holding time: 60sec.</td><td>ΔR/R: Within ±1%
No visible damage</td></tr>
<tr><td>16</td><td>Adhesion
AEC Q200 – No.22</td><td>AEC-Q200-006
Pressurizing force:
RLP20,32,63: 17.7N
RLP16: 10N
Test time: 60±1s.</td><td>ΔR/R: Within ±1%
No visible damage</td></tr>
</table>

8. Taping

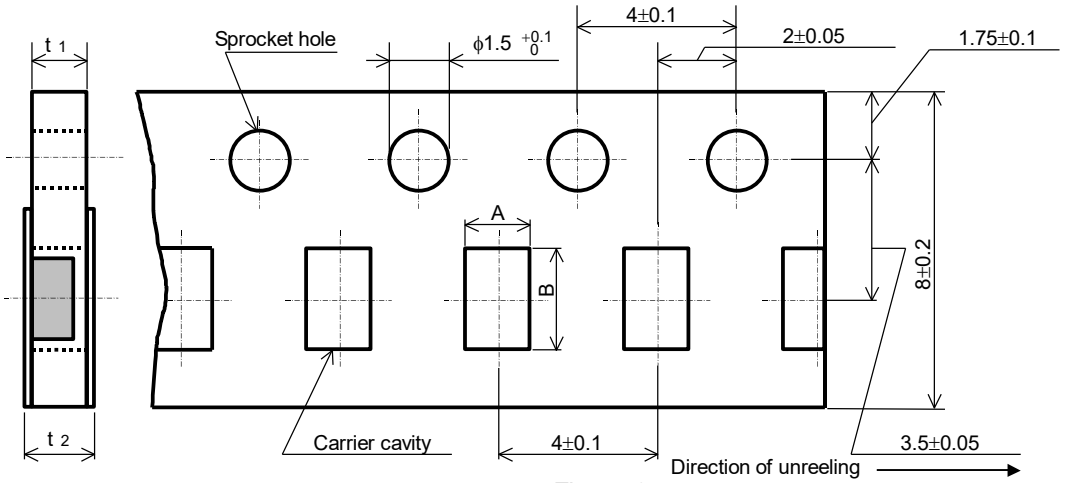
8.1 Applicable documents JIS C 0806−3: 2014, EIAJ ET−7200C: 2010

8.2 Taping dimensions

8.2.1 Paper taping (8mm width, 4mm pitches)

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

Unit: mm



Figure−3

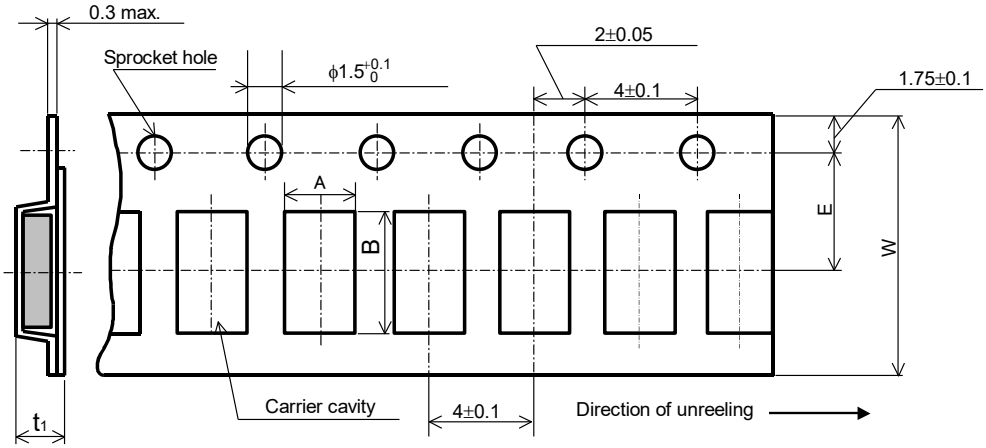
Table−5 Unit: mm

Style	A	B	t 1	t 2
RLP16	1.15±0.15	1.9±0.2	0.6±0.1	0.8max.
RLP20	1.65±0.15	2.5±0.2	0.6±0.1	0.8max.
RLP32	2.00±0.15	3.6±0.2	0.6±0.1	0.8max.

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

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

Unit: mm

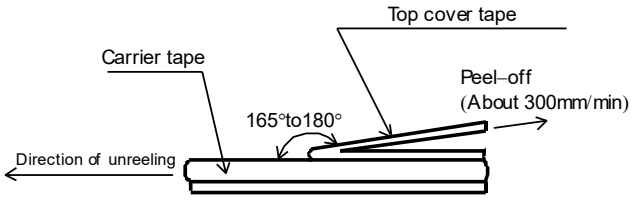


Figure−4

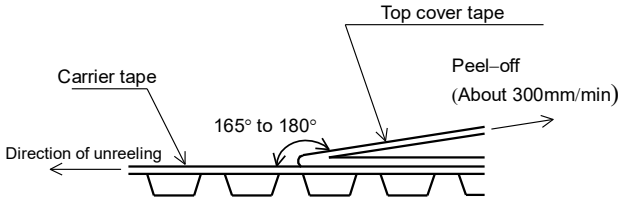
Table−6 Unit: mm

Style	A	B	W	E	t 1
RLP63	3.6±0.2	6.9±0.2	12.0±0.3	5.5±0.05	1.1±0.15

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 RLP16, 20, 32: Figure−5, RLP63: Figure−6.
6). When the tape is bent with the minimum radius for (RLP16,20,32: 25mm, RLP63: 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



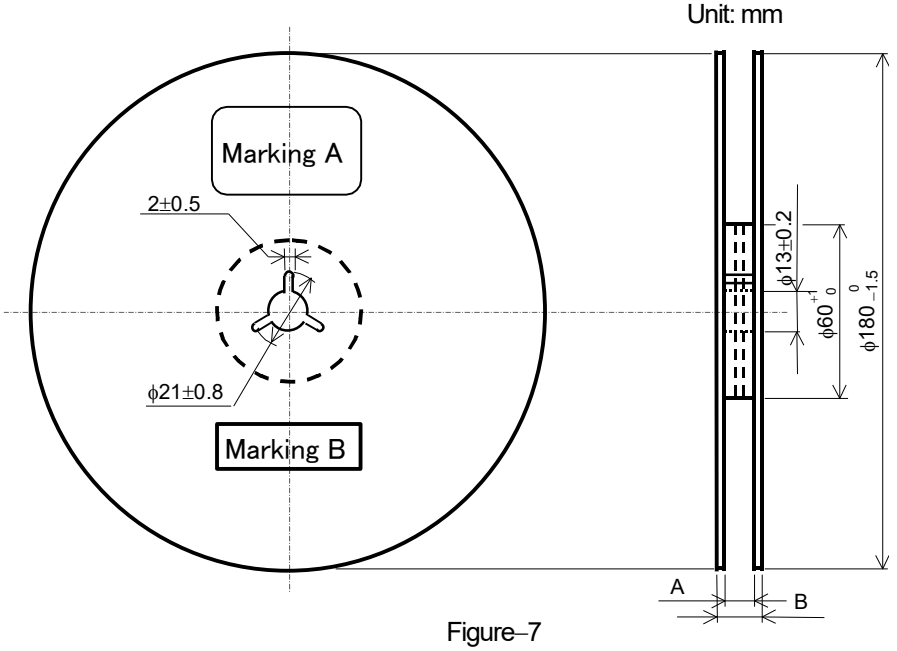
Figure−6

8.3 Reel dimension

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

Plastic reel (Based on EIAJ ET–7200C)

Unit: mm



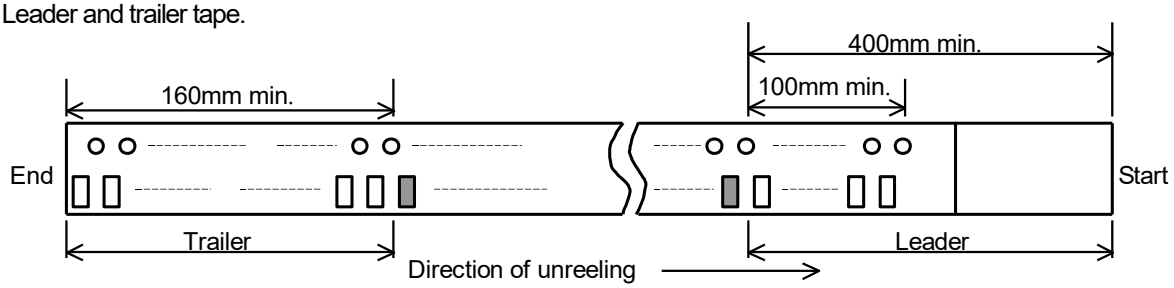
Figure–7

Table–7 Unit: mm

Style	A	B	Note
RLP16, 20, 32	9 +1.0 0	11.4±1.0	Injection molding
		13±1.0	Vacuum forming
RLP63	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.

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, Temperature coefficient of resistance, Rated resistance, Tolerance on rated resistance, Packaging form)

(2) Lot number (3) Quantity (4) Manufacturer's name or trade mark (5) Others

9.2 Marking B (KAMAYA Control label)