

Specification

Title: METAL-PLATE CHIP RESISTOR; LOW OHM

Style: RLP16,20,32,63, MLP20,63

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.



釜屋電機株式会社
KAMAYA ELECTRIC CO., LTD.

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

Note: Stock conditions

Temperature: +5 ℃ ~ +35 ℃

Relative humidity: 25% ~ 75%

The period of guarantee: Within 2 year from shipment by the company.

Solderability shall be satisfied.

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 1/19

1. Scope

1.1 This specification covers the detail requirements for metal-plate chip resistor ; low ohm, style of RLP16, 20, 32, 63, MLP20,63.

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

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

3 Temperature coefficient of resistance

 Style

N	$\pm 70 \times 10^{-6} / ^\circ\text{C}$
K	$\pm 100 \times 10^{-6} / ^\circ\text{C}$
-(Dash)	$\pm 150 \times 10^{-6} / ^\circ\text{C}$

4 Rated resistance

5 Tolerance on rated resistance

6 Packaging form

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	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		
MLP20	1.0	10.0	K	100	10	
			N	±70		

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
 RLP16, 20, 32, 63, MLP20,63

Page: 2/19

Table-1(2)

Style	Rated dissipation (W)	Rated current (A)	Temperature coefficient of resistance (10 ⁻⁶ /°C)		Rated resistance (mΩ)	Tolerance on rated resistance
RLP32	1.0	31.6	-(Standard)	±150	1	F(±1%) J(±5%)
			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		
		9.1	K	±100	12	
			N	±70		
		8.7	K	±100	13	
			N	±70		
		8.1	K	±100	15	
			N	±70		

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 3/19

Table-1(3)

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%)	
	1.0		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		
MLP63	2.0		K	100	0.5	J(±5%)	
			N	±70			
			36.5	K	100	1.5	F(±1%) J(±5%)
				N	±70		
			31.6	K	100	2	
				N	±70		
			28.2	K	100	2.5	
				N	±70		
			25.8	K	100	3	
				N	±70		
			22.3	K	100	4	
				N	±70		
			20	K	100	5	
				N	±70		
			18.2	K	100	6	
				N	±70		
			16.9	K	100	7	
				N	±70		
			15.8	K	100	8	
				N	±70		
			14.9	K	100	9	
				N	±70		
			14.1	K	100	10	
N	±70						

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 4/19

Table-1(4)

Style	Isolation voltage (V)	Category temperature range (°C)
RLP16	100	-55~+155
RLP20		
MLP20		
RLP32		
RLP63		
MLP63		

3.2 Climatic category

55/155/56

Lower category temperature

-55 °C

Upper category temperature

+155 °C

Duration of the damp heat, steady state test

56days

3.3 Stability class

5%

Limits for change of resistance:

-for long-term tests ±5%

-for short-term tests ±1%

3.4 Derating

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

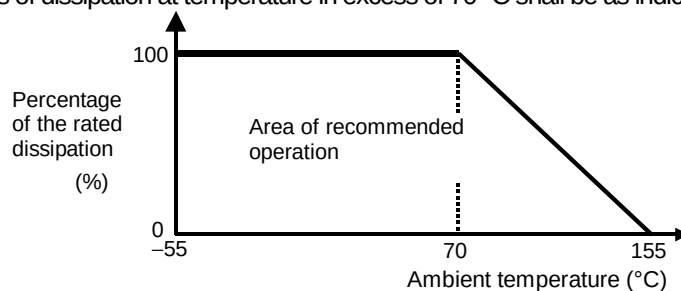


Figure-1 Derating curve

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)

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
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.	RLP16, 20, 32, MLP20
TE	Embossed taping	12mm width, 4mm pitches	4,000 pcs.	RLP63, MLP63

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 5/19

5. Dimensions

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

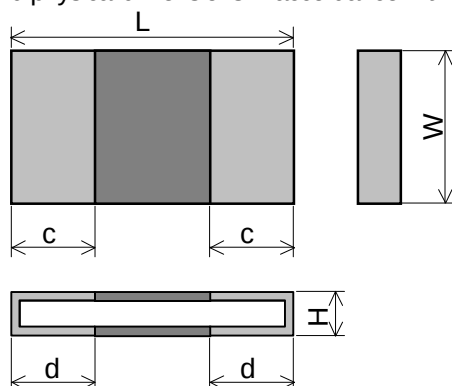


Figure-2

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	4	2.0±0.15	1.25±0.15	0.35±0.10	0.3±0.1	0.7±0.2
	5			0.35±0.10	0.3±0.1	0.6±0.2
	6			0.35±0.10	0.3±0.1	0.47±0.20
	8			0.22±0.10	0.3±0.1	0.6±0.2
	9			0.22±0.10	0.3±0.1	0.52±0.20
	10			0.22±0.10	0.3±0.1	0.47±0.20
MLP20	10			0.22±0.10	0.3±0.1	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
	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
	15			0.22±0.10	0.5±0.25	0.5±0.25
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

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
 RLP16, 20, 32, 63, MLP20,63

Page: 6/19

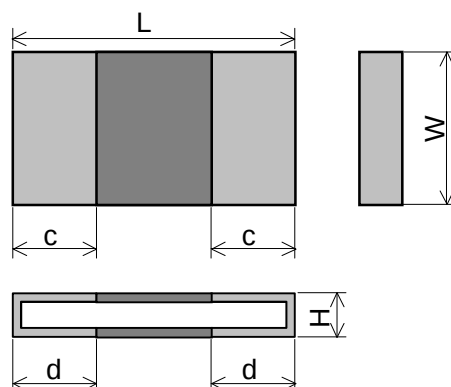


Table-3(2)

Unit: mm

Style	Rated resistance (mΩ)	L	W	H	c	d
MLP63	0.5	6.3±0.25	3.1±0.25	0.58±0.15	2.2±0.25	2.2±0.25
	1.5			0.38±0.15	1.5±0.25	1.5±0.25
	2			0.58±0.15	2.2±0.25	2.2±0.25
	2.5			0.45±0.15	2.4±0.25	2.4±0.25
	3			0.45±0.15	2.2±0.25	2.2±0.25
	4			0.34±0.15	2.2±0.25	2.2±0.25
	5			0.51±0.15	1.1±0.25	1.1±0.25
	6			0.5±0.15	1.1±0.25	1.1±0.25
	7			0.5±0.15	0.6±0.25	0.6±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			0.35±0.15	0.5±0.25	0.5±0.25

5.2 Net weight (Reference)

Style	Rated resistance (mΩ)	Net weight (mg)
RLP16	5	2
	10	
RLP20	4 to 10	3
MLP20	10	3
RLP32	1	12
	2	11
	3	11
	4	12
	5	11
	6	11
	7	11
	8	10
	9	9
	10	9
	12	8
	13	7
	15	6

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 7/19

5.2 Net weight (Reference)

Style	Rated resistance (mΩ)	Net weight (mg)
RLP63	1	50
	2	42
	3	57
	4	43
	5	43
	6	41
	7	42
	8	41
	9	40
	10	30
	12	26
	15	26
MLP63	0.5	90
	1.5	47
	2	77
	2.5	63
	3	63
	4	48
	5	64
	6	55
	7	55
	8	43
	9	40
	10	41

6. Marking

The Rated resistance of RLP16 should not be marked standard.

6.1 RLP63, MLP63

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, MLP20

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]

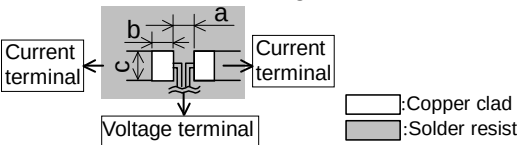
"10" → 0.01 [Ω] → 10 [mΩ]

7. Performance

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

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.  Unit:mm <table><thead><tr><th>Style</th><th>Resistance value(mΩ)</th><th>a</th><th>b</th><th>c</th></tr></thead><tbody><tr><td rowspan="2">RLP16</td><td>5</td><td>0.6</td><td>0.8</td><td rowspan="2">0.8</td></tr><tr><td>10</td><td>1.0</td><td>0.6</td></tr><tr><td>RLP20</td><td>4 to 10</td><td>0.8</td><td>0.95</td><td>1.35</td></tr><tr><td>MLP20</td><td>10</td><td>0.8</td><td>0.95</td><td>1.35</td></tr><tr><td rowspan="6">RLP32</td><td>1</td><td>1.0</td><td>1.45</td><td rowspan="6">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 and 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="5">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="4">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 15</td><td>4.0</td><td>1.8</td></tr><tr><td rowspan="2">MLP63</td><td>0.5,2 to 4</td><td>1.8</td><td>2.9</td><td rowspan="2">3.5</td></tr><tr><td>1.5, 5 to 10</td><td>4.0</td><td>1.8</td></tr></tbody></table> 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. <td>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.</td>	Style	Resistance value(mΩ)	a	b	c	RLP16	5	0.6	0.8	0.8	10	1.0	0.6	RLP20	4 to 10	0.8	0.95	1.35	MLP20	10	0.8	0.95	1.35	RLP32	1	1.0	1.45	1.7	2	2.1	0.9	3	0.8	1.55	4	1.0	1.45	5 and 6	1.4	1.25	7 to 15	2.1	0.9	RLP63	1	1.5	3.0	4.0	2	4.0	1.8	3.5	3, 4	1.8	2.9	5	2.4	2.6	6 to 15	4.0	1.8	MLP63	0.5,2 to 4	1.8	2.9	3.5	1.5, 5 to 10	4.0	1.8	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																																																																				
RLP16	5	0.6	0.8	0.8																																																																				
	10	1.0	0.6																																																																					
RLP20	4 to 10	0.8	0.95	1.35																																																																				
MLP20	10	0.8	0.95	1.35																																																																				
RLP32	1	1.0	1.45	1.7																																																																				
	2	2.1	0.9																																																																					
	3	0.8	1.55																																																																					
	4	1.0	1.45																																																																					
	5 and 6	1.4	1.25																																																																					
	7 to 15	2.1	0.9																																																																					
RLP63	1	1.5	3.0	4.0																																																																				
	2	4.0	1.8	3.5																																																																				
	3, 4	1.8	2.9																																																																					
	5	2.4	2.6																																																																					
	6 to 15	4.0	1.8																																																																					
MLP63	0.5,2 to 4	1.8	2.9	3.5																																																																				
	1.5, 5 to 10	4.0	1.8																																																																					
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≥ 1 GΩ																																																																					

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
 RLP16, 20, 32, 63, MLP20,63

Page: 9/19

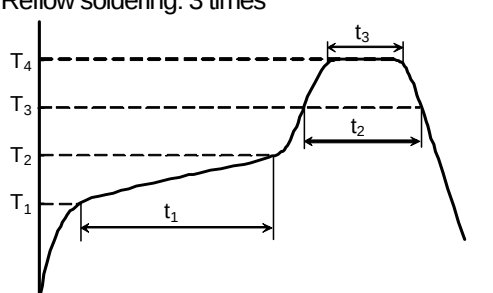
Table-4(2)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
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: 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: RLP16: Figure-3-1 RLP20, MLP20 Figure-3-2 RLP32 Figure-3-3 RLP63, MLP63 Figure-3-4 Sub-clause 4.13 The applied voltage shall be 2.5 times the rated voltage 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 $\Delta R \leq \pm 1\%$ Legible marking
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: 3mm(RLP16, 20, 32, MLP20) 1 mm(RLP63, MLP63) Resistance Sub-clause 4.33.6 Visual examination	$\Delta R \leq \pm 1\%$ No visible damage

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 10/19

Table-4(3)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
7	Resistance to soldering heat Component resistance solvent	Sub-clause 4.18 (JEITA RC-2144 2.3.2) Substrate material: Epoxide woven glass Test substrate: Figure-3-1 T₁:Pre-heat minimum temp.:150±5 °C T₂:Pre-heat maximum temp.:180±5 °C T₃:Soldering temp.:220 °C T₄:Peak temp.:250 °C t₁:Pre-heat duration:120±5 s t₂:Soldering duration:60 to 90 s t₃:Peak duration(T₄-5°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 $\Delta R \leq \pm 1\%$
8	Mounting Adhesion Rapid change temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-3-1 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 $\Delta R \leq \pm 1\%$

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 11/19

Table 4(4)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
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 Test substrate: RLP16: Figure-3-1 RLP20, MLP20 Figure-3-2 RLP32 Figure-3-3 RLP63, MLP63 Figure-3-4 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 Test substrate: Figure-3-1 Sub-clause 4.8 +20 °C / +155 °C	As in Table-1

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 12/19

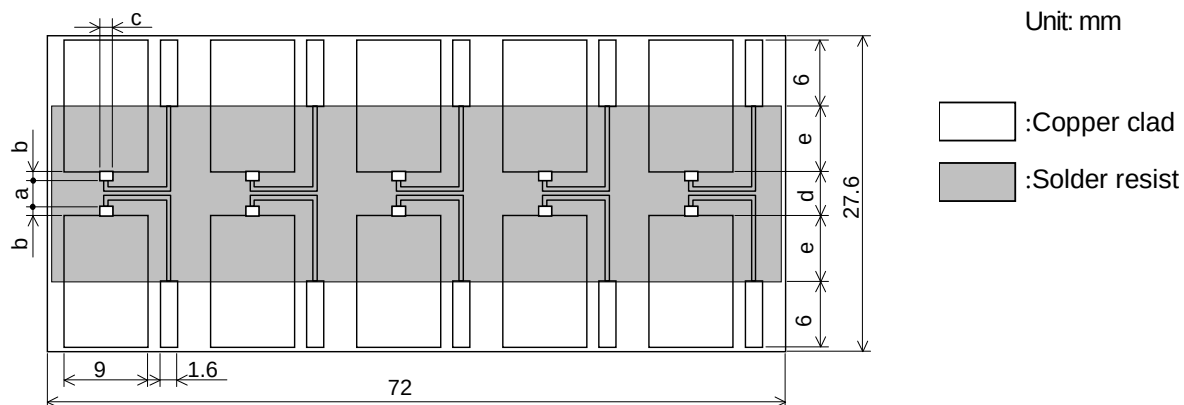
Table-4(5)

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 Test substrate: Figure-3-1 Sub-clause 4.24 Ambient temperature: 40 °C±2 °C Relative humidity: $93 \pm \frac{2}{3}$ % 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 Test substrate: Figure-3-1 Sub-clause 4.25.3 Ambient temperature: 155 °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 $\Delta R \leq \pm 5\%$

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 13/19

8. Test substrate



Style	Rated resistance (mΩ)	a	b	c	d	e
RLP16	5	0.6	0.8	0.8	2.2	6.2
	10	1.0	0.6			
RLP20	4 to 10	0.8	0.95	1.35	2.7	5.95
MLP20	10					
RLP32	1	1.0	1.45	1.7	3.9	5.35
	2	2.1	0.9			
	3	0.8	1.55			
	4	1.0	1.45			
	5 and 6	1.4	1.25			
	7 to 15	2.1	0.9			
RLP63	1	1.5	3.05	3.5	7.6	3.5
	2	4.0	1.8			
	3, 4	1.8	2.9			
	5	2.4	2.6			
	6 to 15	4.0	1.8			
MLP63	0.5, 2 to 4	1.8	2.9	3.5	7.6	3.5
	1.5, 5 to 10	4.0	1.8			

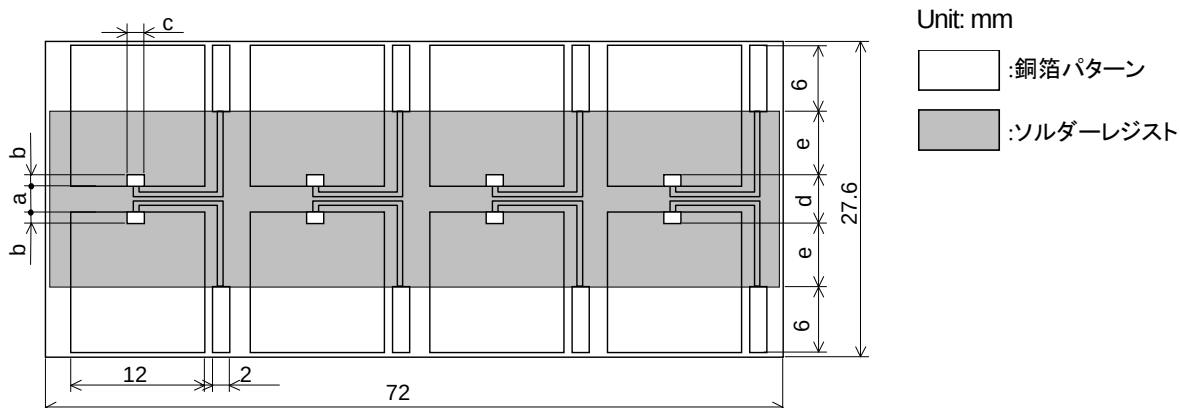
Figure-3-1 RLP16, 20, 32, 63, MLP20, 63TEST SUBSTRATE

Remark: Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).

Thickness: 1.6mm Thickness of copper clad: 0.035mm

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 14/19

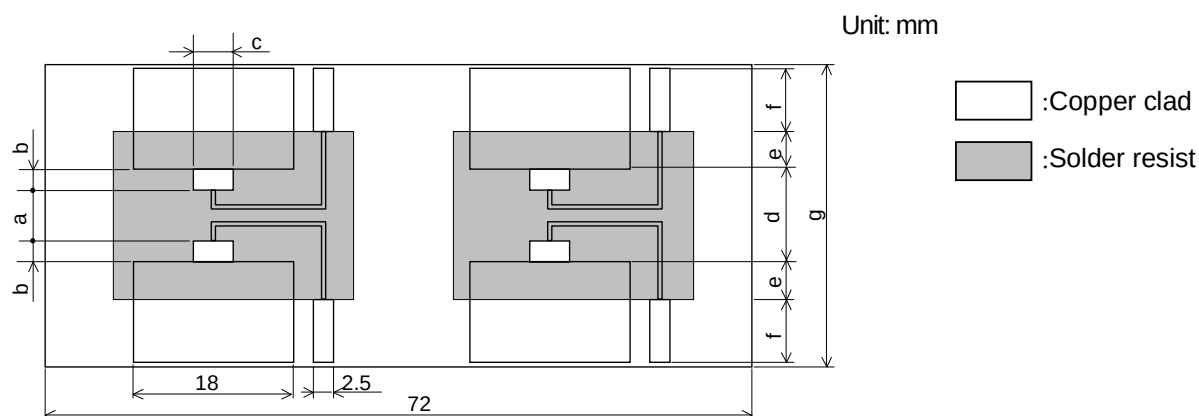


Style	Rated resistance (mΩ)	a	b	c	d	e
RLP20	4 to 10	0.8	0.95	1.35	2.7	5.95
MLP20	10					

Figure-3-2 RLP20, MLP20 TEST SUBSTRATE

Remark: Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).

Thickness: 1.6mm Thickness of copper clad: 0.035mm

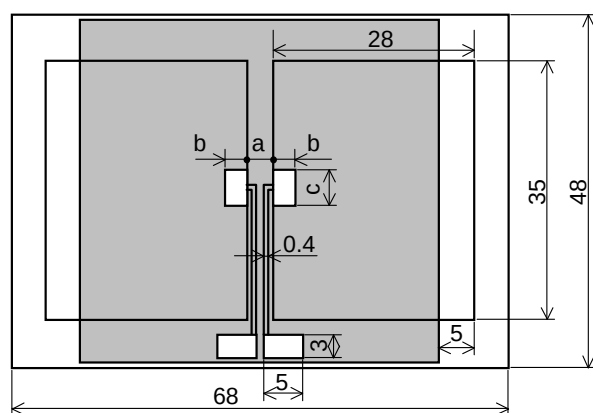


Style	Rated resistance (mΩ)	a	b	c	d	e	f	g
RLP32	1	1.0	1.45	1.7	3.9	5.35	11.68	39
	2	2.1	0.9				6.0	27.6
	3	0.8	1.55				11.68	39
	4	1.0	1.45				6.0	27.6
	5 and 6	1.4	1.25					
	7 to 15	2.1	0.9					

Figure-3-3 RLP32 TEST SUBSTRATE

Remark: Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).

Thickness: 1.6mm Thickness of copper clad: 0.07mm



Unit: mm

☐ :Copper clad

 :Solder resist

Style	Rated resistance (mΩ)	a	b	c
RLP63	1	2.0	3.0	4.0
	2	4.0	1.8	3.5
	3, 4	1.8	2.9	
	5	2.4	2.6	
	6 to 15	4.0	1.8	
MLP63	0.5, 2 to 4	1.8	2.9	3.5
	1.5, 5 to 10	4.0	1.8	

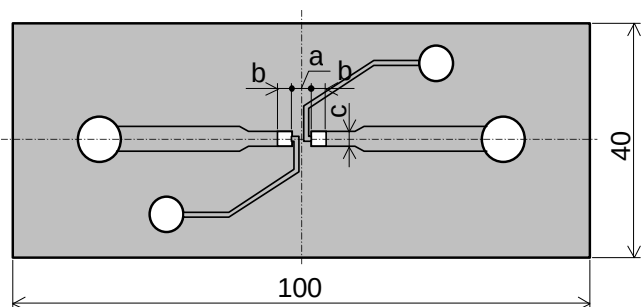
Figure-3-4 RLP63, MLP63 TEST SUBSTRATE

Remark: Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).

Thickness: 1.6mm Thickness of copper clad: 0.07mm

Remark: 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.



Unit: mm

☐ :Copper clad

 :Solder resist

Style	Rated resistance (mΩ)	a	b	c
RLP16	5	0.6	0.8	0.9
	10	1.0	0.6	
RLP20	4 to 10	0.8	0.95	1.35
MLP20	10			
RLP32	1	1.0	1.45	1.7
	2	2.1	0.9	
	3	0.8	1.55	
	4	1.0	1.45	
	5 and 6	1.4	1.25	
	7 to 15	2.1	0.9	

RLP16, 20, 32, MLP20 BOUND STRENGTH OF THE END FACE PLATING TEST SUBSTRATE

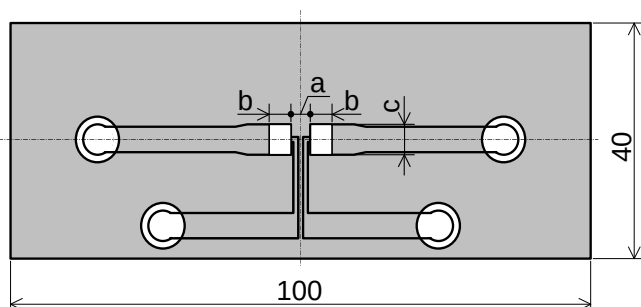
Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 16/19

Unit: mm

 :Copper clad

 :Solder resist



Style	Rated resistance (mΩ)	a	b	c
RLP63	1	1.5	3.05	4.0
	2	4.0	1.8	
	3, 4	1.8	2.9	3.5
	5	2.4	2.6	
	6 to 15	4.0	1.8	
MLP63	0.5, 2 to 4	1.8	2.9	3.5
	1.5, 5 to 10	4.0	1.8	

RLP 63, MLP63 BOUND STRENGTH OF THE END FACE PLATING TEST SUBSTRATE

Figure-4

Remark. Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).

Thickness: 1.6mm Thickness of copper clad: 0.035mm

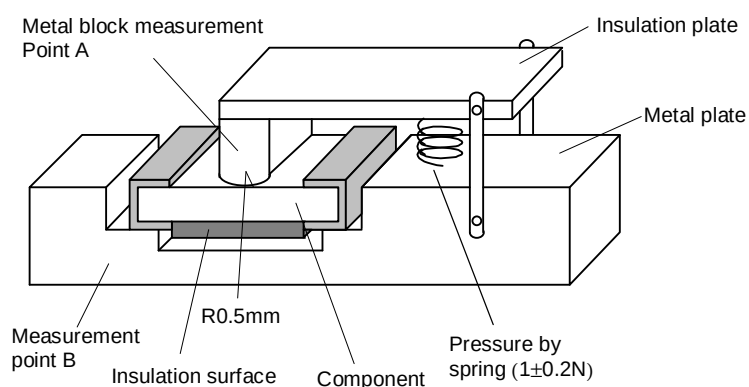


Figure-5

9. Taping

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

9.2 Taping dimensions

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

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

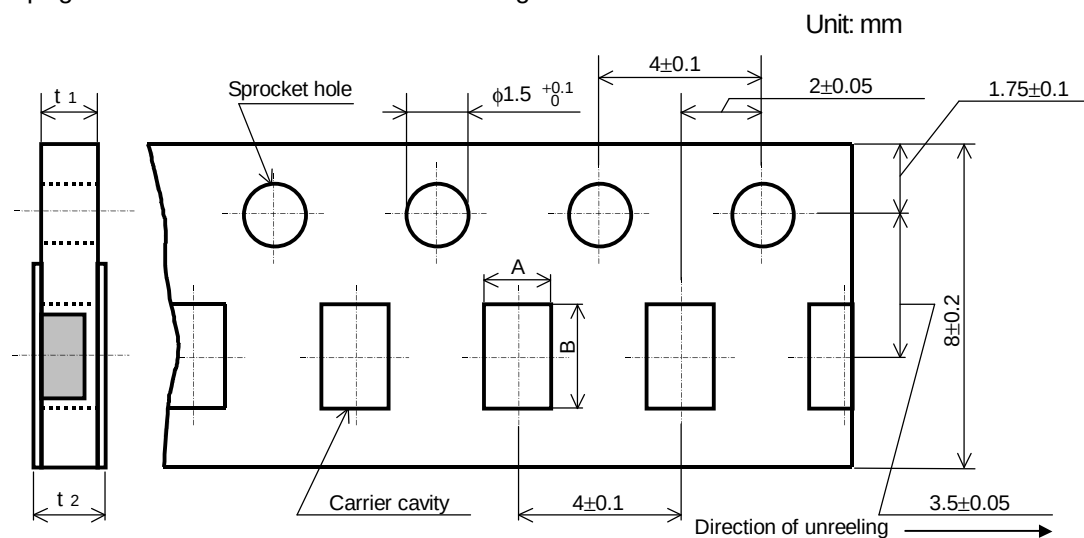


Figure-6

Table-5

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.
MLP20				
RLP32	2.00±0.15	3.6±0.2	0.6±0.1	0.8max.

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

Taping dimensions shall be in accordance with Figure-7 and Table-6.

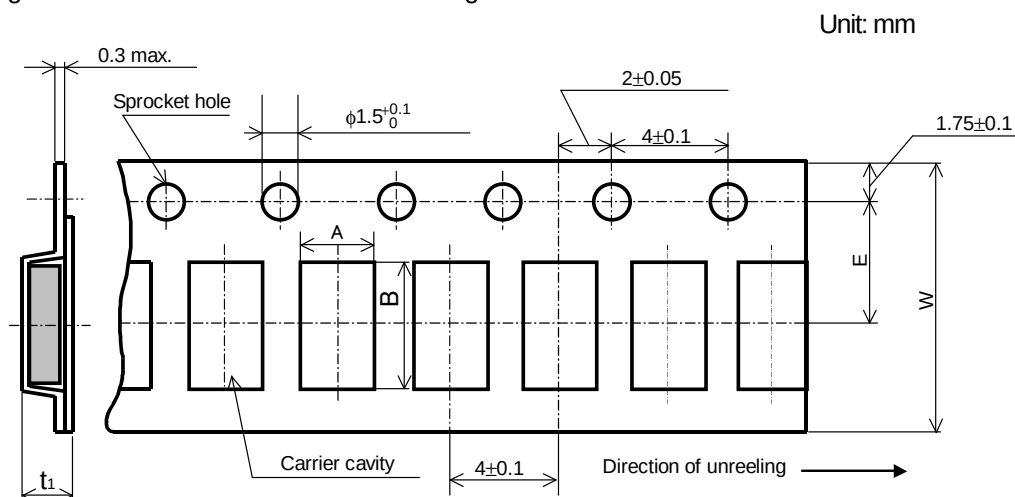


Figure-7

Table-6

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
MLP63					

- 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 $\pm 0.2\text{mm}$.
- 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, MLP20: Figure-8, RLP63, MLP63: Figure-9.
- 6). When the tape is bent with the minimum radius for (RLP16, 20, 32, MLP20: 25mm, RLP63, MLP63: 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.

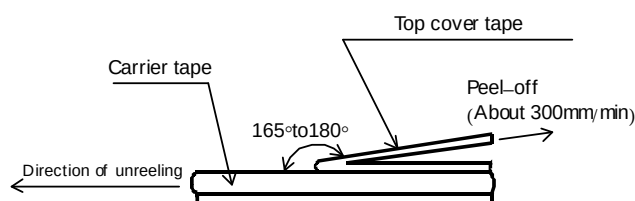


Figure-8

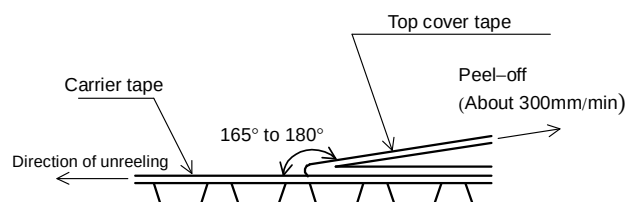


Figure-9

Title: METAL-PLATE CHIP RESISTOR; LOW OHM
RLP16, 20, 32, 63, MLP20,63

Page: 19/19

9.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-10 and Table-7.

Plastic reel (Based on EIAJ ET-7200B)

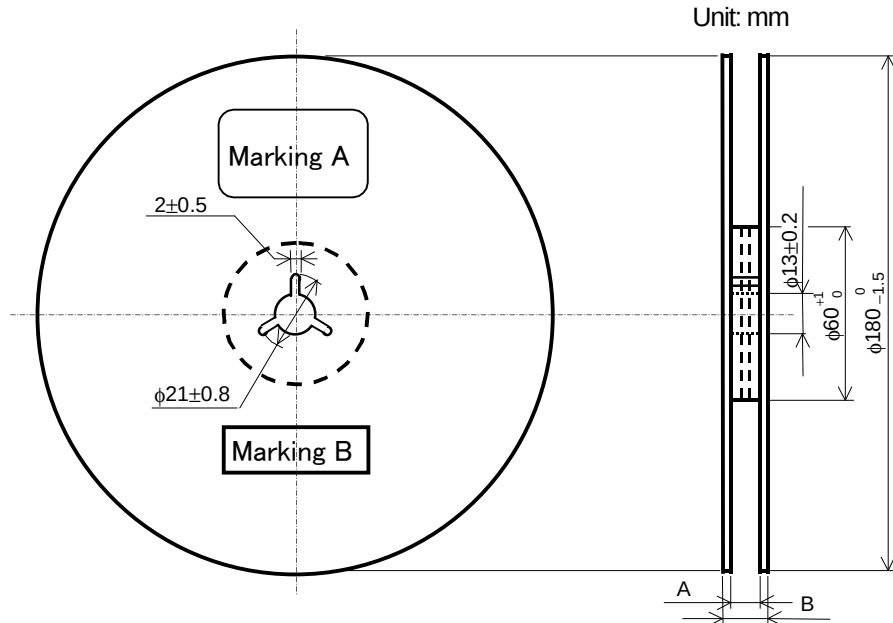


Figure-10

Table-7

Style	A	B	Note
RLP16, 20, 32, MLP20	9 $\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$	11.4±1.0	Injection molding
		13±1.0	Vacuum forming
RLP63, MLP63	13 $\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$	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.

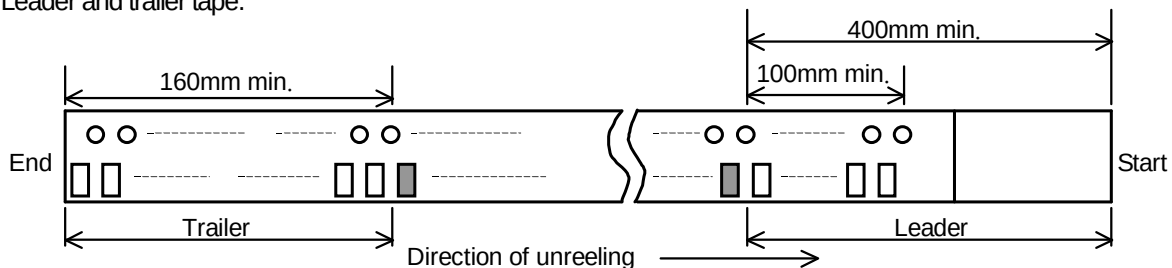


Figure-11

10. Marking on package

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

10.1 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

10.2 Marking B (KAMAYA Control label)

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Walsin:

[RLP63KR010FTE](#) [RLP32KR005JTP](#) [RLP32KR015FTP](#) [RLP32KR002FTP](#) [RLP20KR010FTP](#) [RLP32KR003FTP](#)
[RLP32KR005FTP](#) [RLP32KR010JTP](#) [RLP63KR002FTE](#) [RLP32KR004FTP](#) [RLP32KR010FTP](#) [RLP32KR008FTP](#)
[RLP63KR005FTE](#) [RLP16KR010FTP](#) [RLP32KR007FTP](#) [RLP32KR015JTP](#)