

Data sheet

Title: METAL-PLATE CHIP RESISTOR; LOW OHM

Style: MLP20,63

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.



釜屋電機株式会社
KAMAYA ELECTRIC CO., LTD.

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

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

Page: 1/9

1. Scope

1.1 This data sheet covers the detail requirements for metal-plate chip resistor ; low ohm, style of MLP20, 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)	MLP	63	K	R010	F	TE
	1	2	3	4	5	6
	Style					

1 Metal - plate chip resistor; low ohm ☐ Style

2 Size

MLP20	2012 size
MLP63	6332 size

3 Temperature coefficient of resistance

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

4 Rated resistance

1L50	1.5m Ω
R002	2m Ω

5 Tolerance on rated resistance

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

6 Packaging form

TP	Paper taping
TE	Embossed taping

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

Page: 2/9

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 / °C)		Rated resistance (mΩ)	Tolerance on rated resistance
MLP20	1.0	10	K	100	10	F(±1%) J(±5%)
			N	±70		
MLP63	2.0	31.6	K	100	2	
			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		

Style	Insulation voltage (V)	Category temperature range (°C)
MLP20	100	-55~+155
MLP63		

3.2 Derating

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

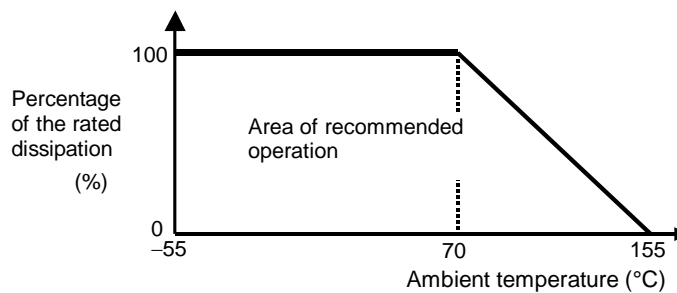


Figure-1 Derating curve

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.	MLP20
TE	Embossed taping	12mm width, 4mm pitches	4,000 pcs.	MLP63

5. Dimensions

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

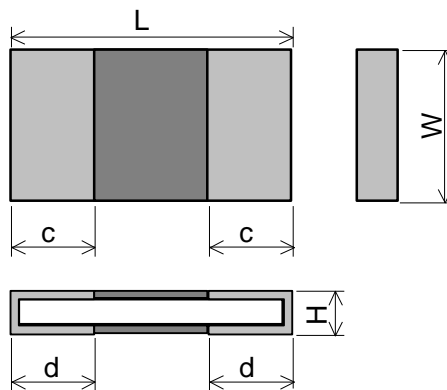


Table-3

Unit: mm

Style	Rated resistance ($m\Omega$)	L	W	H	c	d
MLP20	10	2.0±0.15	1.25±0.15	0.22±0.10	0.33±0.15	0.47±0.20
MLP63	2	6.3±0.25	3.1±0.25	0.58±0.15	2.2±0.25	2.2±0.25
	3			0.45±0.15		
	4			0.34±0.15		
	5			0.51±0.15	1.1±0.25	1.1±0.25
	6			0.5±0.15		
	7			0.35±0.15	0.6±0.25	0.6±0.25
	8				1.1±0.25	1.1±0.25
	9				0.8±0.25	0.8±0.25
	10				0.5±0.25	0.5±0.25

5.2 Net weight (Reference)

Style	Rated resistance ($m\Omega$)	Net weight (mg)
MLP20	10	3
MLP63	2 to 10	60

6. Marking**6.1 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 [$m\Omega$]

"1L50" → 0.0015 [Ω] → 1.5 [$m\Omega$]

6.2 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 [$m\Omega$]

"10" → 0.01 [Ω] → 10 [$m\Omega$]

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

Page: 5/9

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.

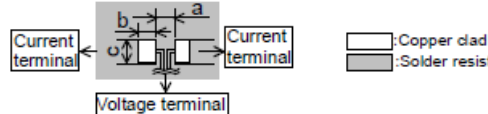
Table-4(1)

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 / 125±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±2°C 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 value 100G, Normal duration 6ms Condition: XX'YY'ZZ', 10times each	ΔR/R: Within ±1% No visible damage

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

Page: 6/9

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 Temperature: 250±5 °C Time: 30sec Temperature ramp: 1°C/s-4°C/s immersion and emersion rate : Time above 183°C, 90 s - 120 s The assembly shall be exposed to three heat cycles.	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 °C dwell time 4h / solder dipping 235°C/ 5s. Solder: Sn96.5-Ag3-Cu0.5 B1) Bake the sample for 155 °C dwell time 4h / solder dipping 245°C/ 5s. Solder: Sn96.5-Ag3-Cu0.5 D) Category 3, Solder dipping 260°C/ 30s.	The surface of terminal immersed shall be min. of 95% covered with a new coating of solder.																		
13	Electrical Characterization AEC Q200 - No.19	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.  <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>MLP20</td><td>10</td><td>0.8</td><td>0.95</td><td>1.36</td></tr><tr><td rowspan="2">MLP63</td><td>2 to 4</td><td>1.8</td><td>2.9</td><td rowspan="2">3.5</td></tr><tr><td>5 to 10</td><td>4.0</td><td>1.8</td></tr></tbody></table> 2. Temperature Coefficient of Resistance -55 °C / +20°C +20 °C / +155°C	Style	Resistance value(mΩ)	a	b	c	MLP20	10	0.8	0.95	1.36	MLP63	2 to 4	1.8	2.9	3.5	5 to 10	4.0	1.8	1. The resistance value shall correspond with the rated resistance taking into account the specified tolerance. 2. As in Table-1
Style	Resistance value(mΩ)	a	b	c																	
MLP20	10	0.8	0.95	1.36																	
MLP63	2 to 4	1.8	2.9	3.5																	
	5 to 10	4.0	1.8																		
14	Flammability AEC Q200 – No.20	UL-94	V-1 is acceptable																		
15	Bending strength AEC Q200 – No.21	AEC-Q200-005 Bending value2mm Holding time: 60sec.	ΔR/R: Within ±1% No visible damage																		
16	Adhesion AEC Q200 – No.22	AEC-Q200-006 Pressurizing force:17.7N Test time: 60±1s.	ΔR/R: Within ±1% No visible damage																		

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.

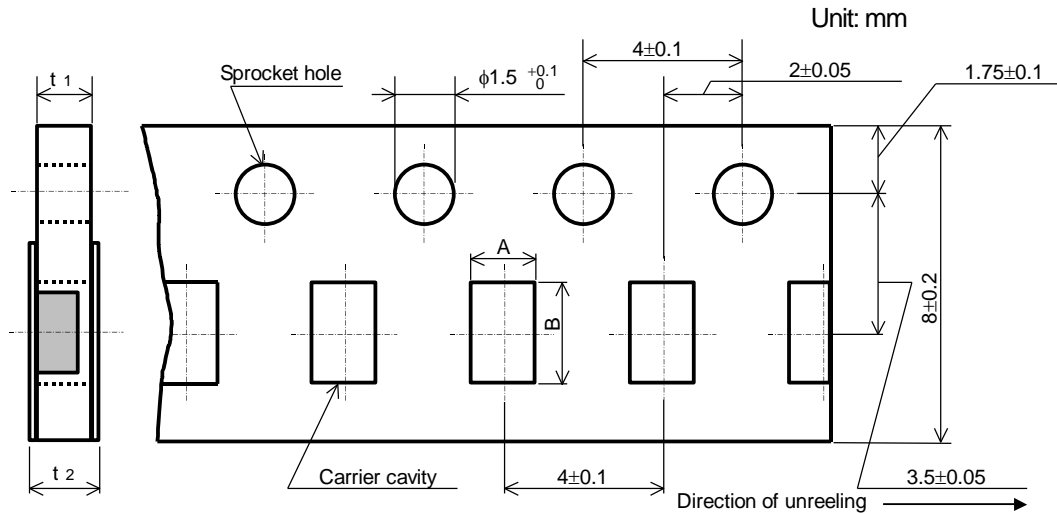


Figure-3

Table-5

Unit: mm

Style	A	B	t ₁	t ₂
MLP20	1.65±0.15	2.5±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.

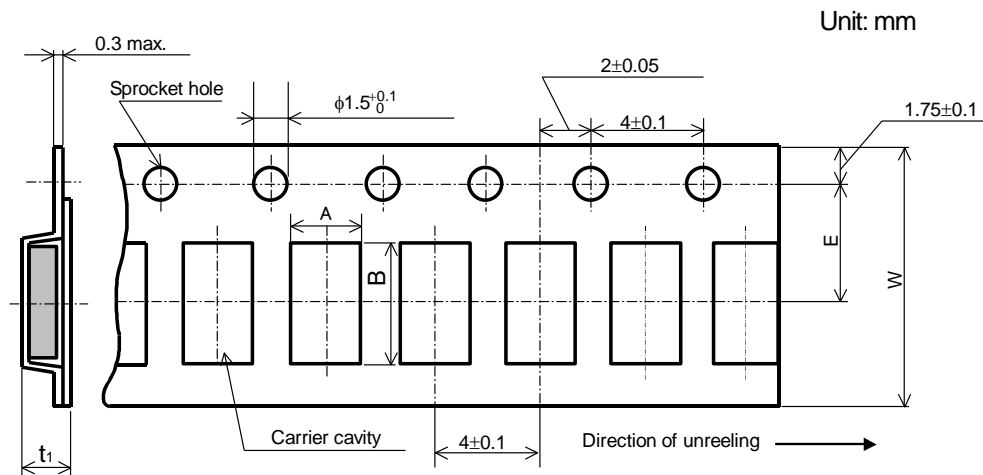


Figure-4

Table-6

Unit: mm

Style	A	B	W	E	t ₁
MLP63	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 $\pm 0.2\text{mm}$.
- 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 MLP20: Figure-5, MLP63: Figure-6.
- 6). When the tape is bent with the minimum radius for (MLP20: 25mm, 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.

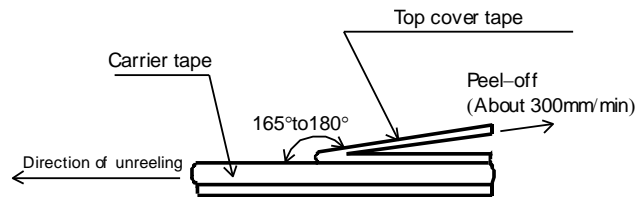


Figure-5

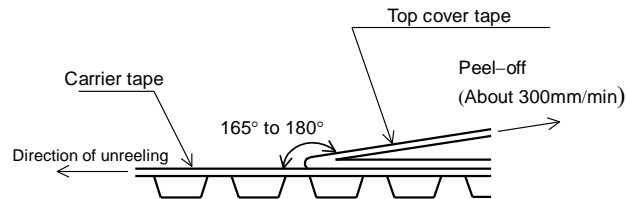


Figure-6

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)

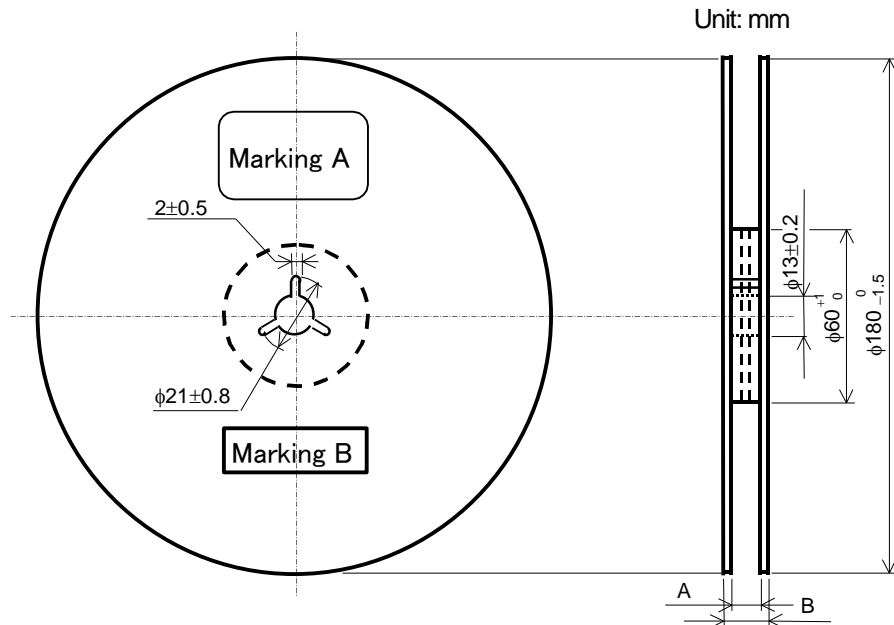


Figure-7

Table-7

Unit: mm

Style	A	B	Note
MLP20	9 ^{+1.0} ₀	11.4±1.0	Injection molding
		13±1.0	Vacuum forming
MLP63	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.

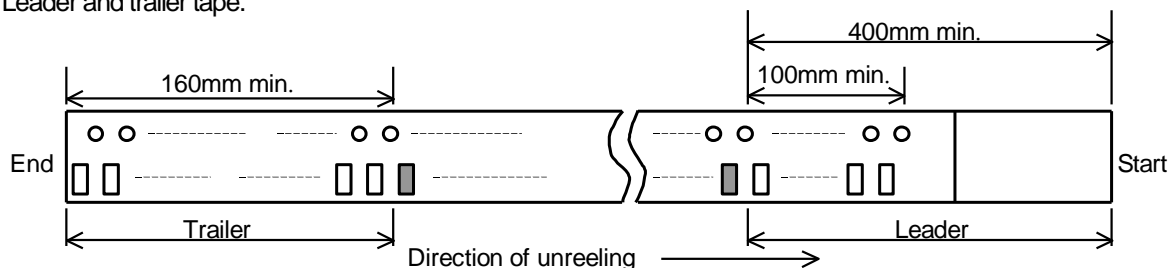


Figure-8

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)