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SPECIFICATIONS

Low Ohm (Metal Strip) Chip Resistor

LRP Series

Version March 2022

Low Ohm (Metal Strip) Chip Resistor- LRP Series

■ Features

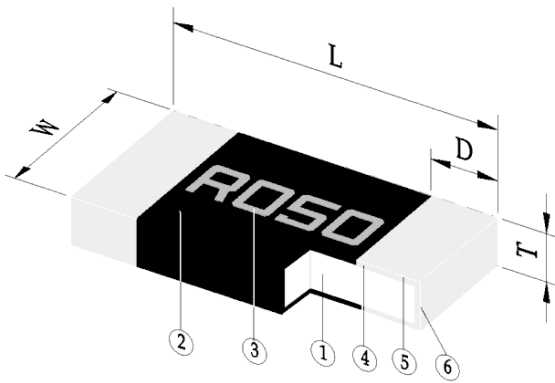
- Low TCR down to ± 25 PPM/ $^{\circ}$ C
- Customized resistance available
- Low inductance < 5nH
- AEC-Q200 Compliance
- Sulfur resistance unaffected by sulfur environments
- Lead-free and RoHS compliant



■ Applications

- NB (for Power Management)
- MB (for Power Management)
- SWPS (DC-DC Converter, Charger, Adaptor)
- Monitor (for Power Management)

■ Construction



① Alloy Plate	④ Internal Electrode
② Overcoat	⑤ Barrier Layer
③ Marking	⑥ Solder Plating

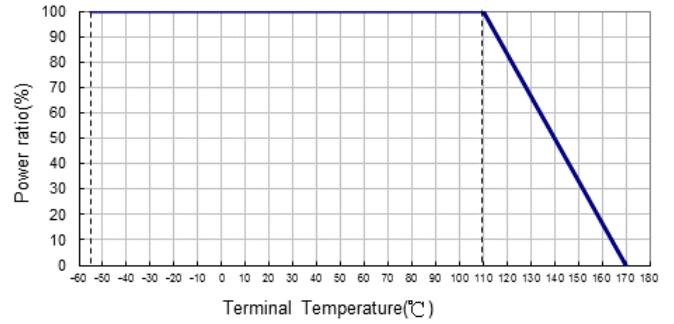
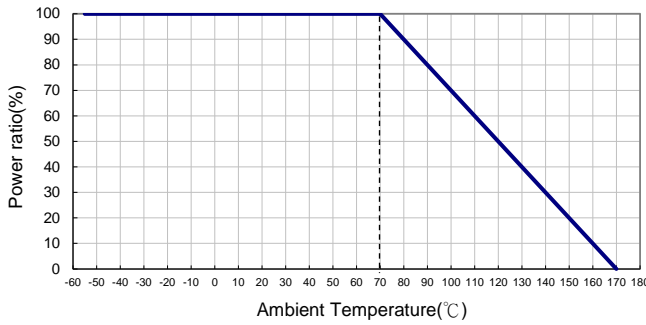
■ Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D (mm)	Weight (g) (1000pcs)
LRP06	1206	3.15 \pm 0.10	1.45 \pm 0.10	0.55 \pm 0.10	0.55 \pm 0.15	10.5
LRP10	2010	5.00 \pm 0.15	2.40 \pm 0.15	0.55 \pm 0.15	0.80 \pm 0.20	40
LRP12	2512	6.40 \pm 0.25	3.20 \pm 0.25	0.70 \pm 0.20	0.90 \pm 0.30	52.6

■ Part Numbering

LRP	12	F	T	D	S	R015
Product Type	Dimensions (LxW)	Resistance Tolerance	Packaging Code	TCR (PPM/ $^{\circ}$ C)	Power Rating	Resistance
	06: 1206 10: 2010 12: 2512	D: \pm 0.5% F: \pm 1% J: \pm 5%	T: Taping Reel	C: \pm 25 D: \pm 50 W: \pm 75 E: \pm 100	R: 3W S: 2W T: 1W	R015: 0.015 Ω R050: 0.05 Ω

Derating Curve



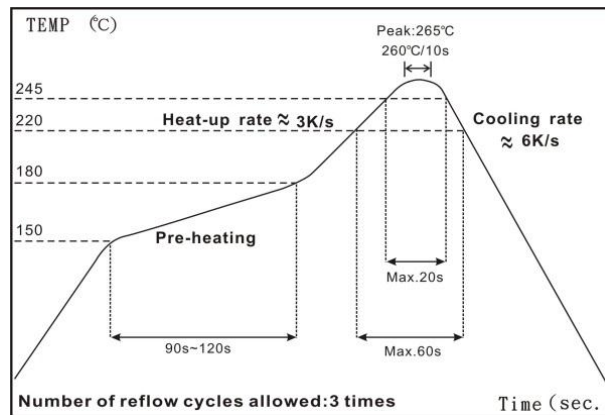
Electrical Specifications

Type	Item	Power Rating at 70°C	Rated Terminal Temperature	Operating Temp. Range	Resistance Range (mΩ)			TCR (PPM/°C)
					±0.5%	±1%	±5%	
LRP06 (1206)	1W	110°C	110°C	-55 ~ +170°C	8, 10, 12, 15, 20, 25, 30, 33, 40			±50
					3, 4, 5, 7, 8, 10, 12, 15, 20, 25, 30, 33, 40			±75 ±100
LRP10 (2010)	1W	110°C	110°C	-55 ~ +170°C	10, 15, 20, 30, 50, 68, 75, 100			±75
	2W				10, 15, 20, 30, 50, 68, 75			
LRP12 (2512)	2W, 3W	110°C	110°C	-55 ~ +170°C	3, 4, 5, 6, 7, 18, 20, 22, 25, 30, 33, 35, 39, 40, 47, 50, 60, 68, 70, 75, 80, 82, 90, 91, 100, 120, 150, 180, 200			±25
		110°C			3, 4, 5, 6, 7, 8, 8.5, 9, 10, 12, 15, 18, 20, 22, 25, 30, 33, 35, 39, 40, 47, 50, 60, 68, 70, 75, 80, 82, 90, 91, 100, 120, 150, 180, 200			±50 ±75

Operating Current = $\sqrt{P/R}$, Operating Voltage = $\sqrt{P \cdot R}$

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

Soldering Condition



IR Reflow Soldering

(1) Time of IR reflow soldering at maximum temperature point 260°C : 10s

Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	IEC60115-1 4.8 JIS-C-5201-1 4.8 +25°C ~125°C, 25°C is the reference temperature
Short Time Overload	±1.0%	IEC60115-1 4.13 JIS-C-5201-1 4.13 5*rated power for 5 seconds
Insulation Resistance	≥10G	IEC60115-1 4.6 JIS-C-5201-1 4.13 100V DC for 1 minute
Endurance	±1.0%	IEC60115-1 4.25 JIS-C-5201-1 4.25.1 70±2°C, rated power for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Biased Humidity	±1.0%	MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power
Dry Heat	±1.0%	IEC60115-1 4.23.2 JIS-C-5201-1 4.23.2 at +170°C for 1000 hrs
Bending Strength	±1.0%	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending width 2mm once for 60 seconds
Solderability	95% min. coverage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	±0.5%	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds
Rapid Change of Temperature	±1.0%	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles
Low Temperature Storage	±1.0%	IEC60115-1 4.23.4 JIS-C-5201-1 4.23.4 at -55°C for 2 hrs

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower.

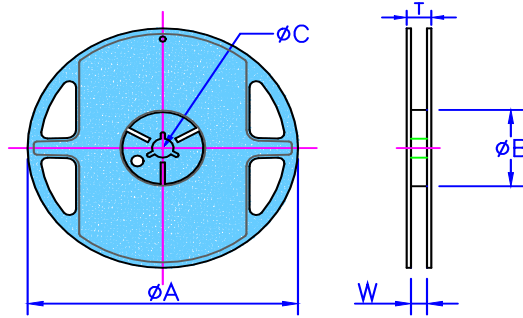
Storage Temperature: 15~28°C; Humidity < 80%RH

Shelf Life: 2 years from production date.

Low Ohm (Metal Strip) Chip Resistor

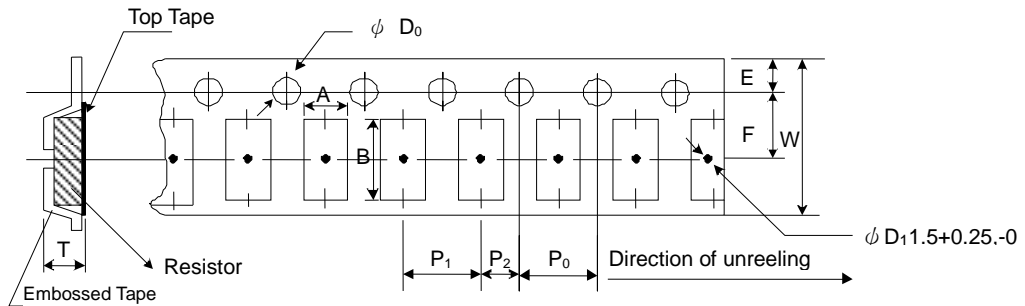
■ Packaging

Reel Specifications & Packaging Quantity



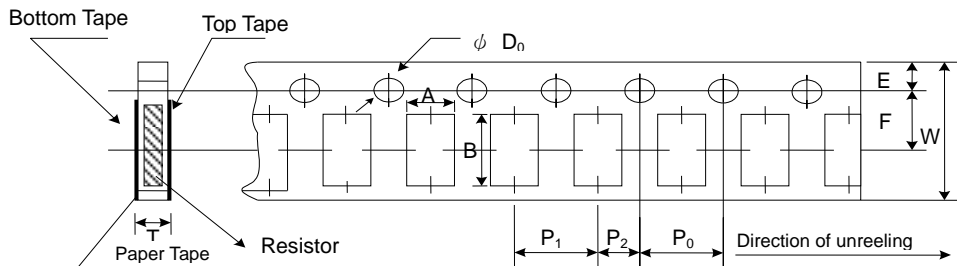
Type	Resistance (mΩ)	Packaging Quantity	Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	
LRP06	3~40	Paper	5K	8mm	7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.2	9.0±0.5	12.5±0.5
LRP10	10 - 100	Embossed	4K	12mm	7 inch	178.5+/-1.5	60±1.0	13.0±0.5	13.0±1.0	15.5±0.5
LRP12	4~200	Embossed	4K	12mm	7 inch	178.5+/-1.5	60±1.0	13.0±0.5	13.0±1.0	15.5±0.5
LRP12	3	Embossed	2K	12mm	7 inch	178.5+/-1.5	60±1.0	13.0±0.5	13.0±1.0	15.5±0.5

Embossed Plastic Tape Specifications



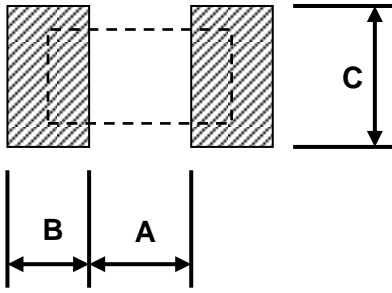
Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
LRP10	2.80±0.10	5.40±0.20	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.20+0
LRP12	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.20+0
LRP12 (3mΩ)	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.45±0.2

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
LRP06	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10

■ Recommend Land Pattern



Type	A (mm)	B (mm)	C (mm)
LRP06	1.50	1.40	1.70
LRP10	3.60	1.40	2.50
LRP12	4.00	2.00	3.50

* FR4 copper board, 100 μ m of copper pad thickness

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Apr 30, 2015	-	- First issue of this specification
Version A1	Jul 30, 2015	-	- Add 0.5% Resistance Range
Version A2	Nov 27, 2015	-	- Change TCR75 ppm Resistance Range 10mR~100mR →7mR~100mR
Version A3	Jul 15, 2016	-	- Remove Material Description - Modify Storage Temperature
Version A4	Jun 01, 2017	-	- Add 1206 Size Resistance Range - Add 2512 Size R003~R006 TCR75ppm
Version A5	Nov 02, 2017	-	- Features Item Add AEC-Q200 Compliance (LRP12 7mΩ to 100mΩ)
Version A6	Jan 12, 2018	-	- Environmental Characteristics update - Electrical Specifications update
Version A7	Aug 03, 2018	-	- Electrical Specifications update
Version A8	Oct 21, 2019	-	- Features: Add sulfur resistance instructions
Version A9	Mar 23, 2020	-	- Increase product weight
Version B	Jul 06, 2020	-	- Features Increase Low inductance < 5nH
Version B1	Nov 30, 2020	-	- Increase the resistance range of LRP06 - LRP12 add TCR: 25ppm & 50ppm specification
Version B2	Mar 10, 2021	-	- Features: Add Lead-free and RoHS compliant
Version B3	Jun 09, 2021	-	- Modify LRP06 Dimensions
Version B4	Jul 20, 2021	-	- Increase the resistance range of LRP10
Version B5	Nov 15, 2021	-	- Increase the shelf life description
Version B6	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version B7	Mar 18, 2022	-	- Add Terminal Temperature Derating Curve - Add 2512 8.5mΩ