

## Data Sheet

Customer:

Product: Automotive Grade Low Ohm (Metal Strip) Chip Resistor –  
LRP..A Series

Size: 1206/2010/2512

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**Automotive Grade Low Ohm (Metal Strip) Chip Resistor- LRP..A Series**

**■ Features**

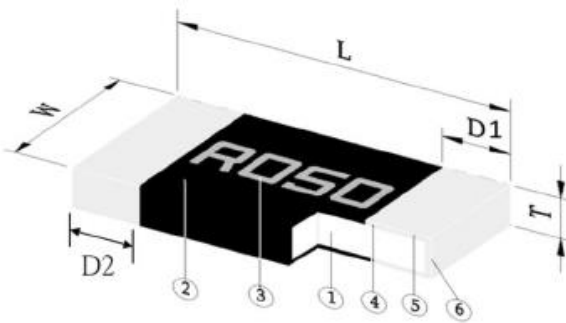
- Low TCR down to  $\pm 25$  PPM/ $^{\circ}$ C
- Customized resistance available
- Low inductance < 5nH
- AEC-Q200 Compliance
- Sulfur resistance unaffected by sulfur environments
- Lead-free and RoHS compliant
- 100% CCD inspection



**■ Applications**

- NB (for Power Management)
- MB (for Power Management)
- SWPS (DC-DC Converter, Charger, Adaptor)
- Monitor (for Power Management)
- Industrial / Power supply
- Automotive

**■ Construction**



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

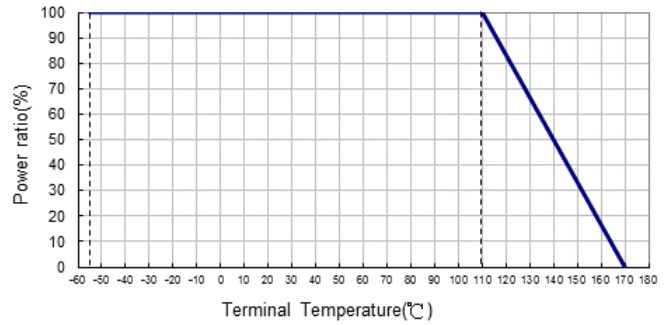
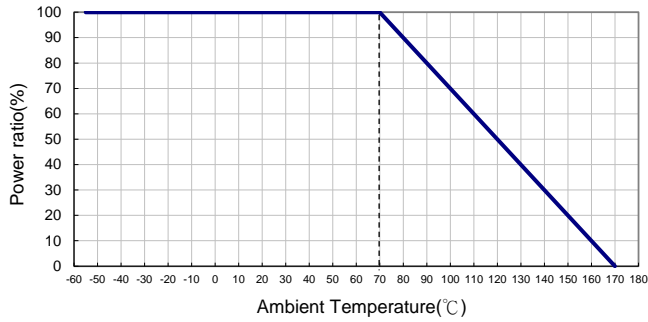
**■ Dimensions**

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D (mm)	D2 (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	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	0.80 $\pm$ 0.20	40.0
LRP12 (2~200m $\Omega$ )	2512	6.40 $\pm$ 0.25	3.20 $\pm$ 0.25	0.70 $\pm$ 0.20	0.90 $\pm$ 0.30	0.90 $\pm$ 0.30	52.6
LRP12 (1.5m $\Omega$ )	2512	6.40 $\pm$ 0.25	3.20 $\pm$ 0.25	0.70 $\pm$ 0.20	0.90 $\pm$ 0.30	1.45 $\pm$ 0.30	52.6
LRP12 (1m $\Omega$ )	2512	6.40 $\pm$ 0.25	3.20 $\pm$ 0.25	0.70 $\pm$ 0.20	0.90 $\pm$ 0.30	1.85 $\pm$ 0.30	52.6

**■ Part Numbering**

LRP	12	F	T	D	S	R015	A
Product Type	Dimensions (LxW)	Resistance Tolerance	Packaging Code	TCR (PPM/ $^{\circ}$ C)	Power Rating	Resistance	Marking
	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 $\Omega$ R050: 0.05 $\Omega$	A: Automotive Grade

**Derating Curve**



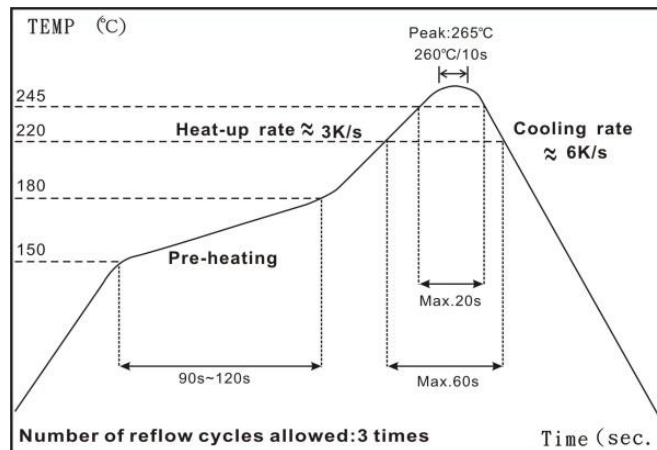
**Electrical Specifications**

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	4, 5, 10, 15, 20, 30, 50, 68, 75, 100			±75
	2W	110°C			4, 5, 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
					1, 1.5, 2, 2.5, 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.	<b>IEC60115-1 4.8</b> <b>JIS-C-5201-1 4.8</b> +25°C ~125°C, 25°C is the reference temperature
Short Time Overload	±1.0%	<b>IEC60115-1 4.13</b> <b>JIS-C-5201-1 4.13</b> 5*rated power for 5 seconds
Insulation Resistance	≥10G	<b>IEC60115-1 4.6</b> <b>JIS-C-5201-1 4.13</b> 100V DC for 1 minute
Endurance	±1.0%	<b>IEC60115-1 4.25</b> <b>JIS-C-5201-1 4.25.1</b> 70±2°C, rated power for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Biased Humidity	±1.0%	<b>MIL-STD-202 Method 103</b> 1000 hrs 85°C/85%RH 10% of operating power
High Temperature Exposure	±1.0%	<b>MIL-STD-202 Method 108</b> at +170°C for 1000 hrs
Board Flex	±1.0%	<b>AEC-Q200-005</b> Bending once for 60 seconds 3mm
Solderability	95% min. coverage	<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds
Resistance to Soldering Heat	±0.5%	<b>JIS-C-5201-1 4.18</b> <b>IEC-60115-1 4.18</b> 260±5°C for 10 seconds
Temperature Cycling	±1.0%	<b>JESD22 Method JA-104</b> -55°C to +125°C, 1000 cycles
Low Temperature Storage	±1.0%	<b>IEC60115-1 4.23.4</b> <b>JIS-C-5201-1 4.23.4</b> at -55°C for 2 hrs
Mechanical Shock	±(0.25%+0.05Ω)	<b>MIL-STD-202 Method 213</b> Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	±(0.5%+0.05Ω)	<b>MIL-STD-202 Method 204</b> 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(3%+0.05Ω)	<b>AEC-Q200-002</b> Human body model: 2KV
Resistance to Solvents	No visible damage on appearance and marking.	<b>MIL-STD-202 Method 215</b> Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken	<b>AEC-Q200-006</b> Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	<b>UL-94</b> V-0 or V-1 are acceptable. Electrical test not required.

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

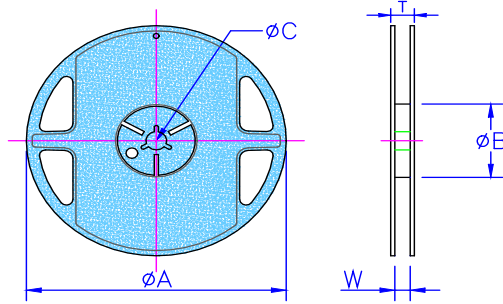
**■ Storage Temperature: 15~28°C; Humidity < 80%RH**

**■ Shelf Life: 2 years from production date.**

**Automotive Grade Low Ohm (Metal Strip) Chip Resistor**

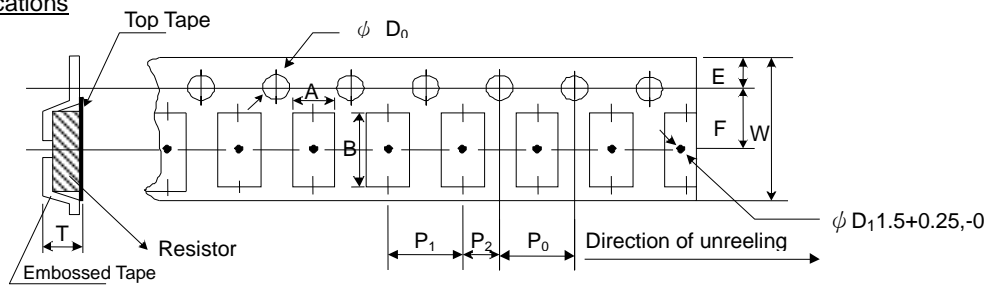
**■ Packaging**

Reel Specifications & Packaging Quantity



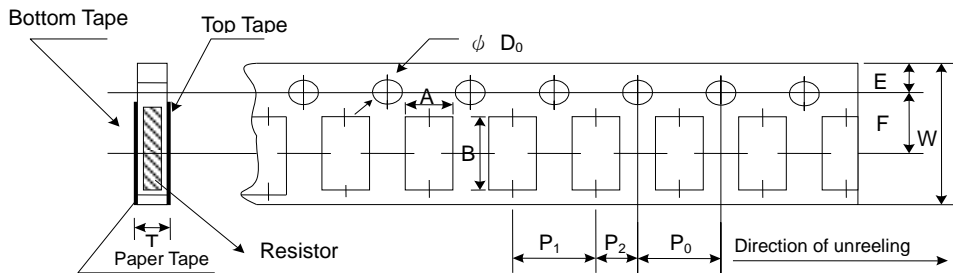
Type	Resistance (mΩ)	Packaging Quantity	Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	
LRP06	3~40	Paper	5K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
LRP10	4~100	Embossed	4K	12mm	7 inch	178.5+/-1.5	60±1.0	13.0±0.5	13.0±1.0	15.5±0.5
LRP12	1~200	Embossed	4K	12mm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

Embossed Plastic Tape Specifications



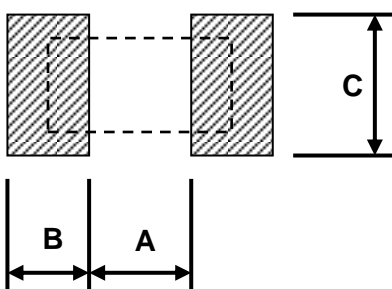
Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	ΦD <sub>0</sub> (mm)	T (mm)
LRP10	2.80±0.10	5.40±0.20	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.20+0
LRP12	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10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

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	ΦD <sub>0</sub> (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 (2~200mΩ)	4.00	2.00	3.50
LRP12 (1~1.5mΩ)	2.30	2.65	3.50

\* FR4 copper board, 100μm of copper pad thickness

**REVISION HISTORY**

<b>REVISION</b>	<b>DATE</b>	<b>CHANGE NOTIFICATION</b>	<b>DESCRIPTION</b>
Version A	Jul 20, 2021	-	- First issue of this specification
Version A1	Nov 15, 2021	-	- Increase the shelf life description
Version A2	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version A3	Mar 18, 2022	-	- Add Terminal Temperature Derating Curve - Add 2512 8.5m $\Omega$ - Add 2010 Size Resistance Range
Version A4	Jan 06, 2023		- Modify 2512 3m $\Omega$ Packaging Quantity - Add 2010 Size Resistance Range
Version A5	Sep 01, 2023		- Add 2512 Size Resistance Range