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**(LRA)**  
**Precision**  
**Low Ohmic Resistor**

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## ▶ Product Introduction

### Open Air Low Ohmic Resistors (LRA) Feature Longer Thermal Path.

#### Features :

- Radial leads.
- Non-inductance.
- Solderable Copper Leads.
- Lead (Pb)-free and RoHS compliant.
- $\pm 1\%$ ,  $\pm 2\%$ ,  $\pm 5\%$ ,  $\pm 10\%$  standard tolerance.
- High stability bare metal element open air style.

#### Applications :

- Automotive, Feedback System.
- Residual Battery Power Detection.
- CPU Drive Control, Power Tool Motor controls.
- Power Supply Shunt, Current Detective, and Current Sensing.
- Inverter and Switching Power Supplies
- High power AC/DC detection.

Token's current sense LRA open air resistors are expected to gain wide acceptance in the worldwide market as a result of increased thermal management capabilities.

The LRA series is designed for applications requiring the transfer of heat away from circuits and solder joints. Available in 0.5W, 1W, and 1.5W rating, the resistor is being specified for current sensing, feedback, current detective, supper low inductance, as well as surge and pulse applications.

The hot spot on the LRA open-air resistor is approximately 0.2 degrees higher than on a typical metal strip chip resistor. This results in an increased thermal path for the LRA, reducing heat transfer into the solder joints and circuits.

The flameproof LRA low resistance value resistors are constructed of a wire resistive element with welded copper leads to prevent solder wicking, which can change the device's resistance value in the circuit by as much as 30%. Because of this, the device is ideal for thermally harsh environments, including automotive and aerospace applications, as well as enclosed poorly ventilated circuits in applications such as laptop computers.

The LRA Open Air Series feature a reduced pitch, or spacing between the leads on the circuit board (with a corresponding increase in the board mounted profile), when compared to the standard Token LRB Series devices.

The LRA resistors are rated for 1W or 1.5W at 70°C, with resistance values from 0.1Ω to 0.003Ω and tolerances down to  $\pm 1\%$ . Operating temperature range is -50°C to 300°C. The LRA Series is available in bulk packaging in 200 increments.

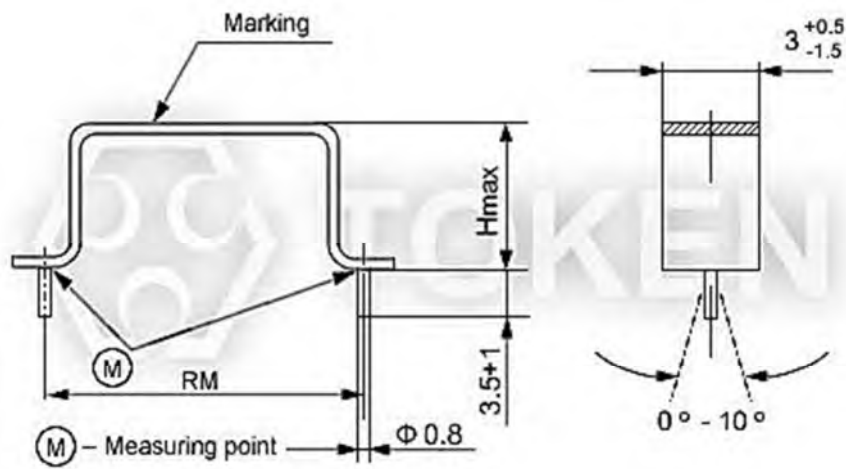
Token will also produce devices outside these specifications to meet customer requirements. A lead-free RoHS-compliant version is available, as is a non-inductive version for high frequency applications. Contact us with your specific needs, or link to Token official website "[Current Sensing Resistors](http://www.token.com.tw)" for more information.



## ► Dimensions

### Dimensions (Unit: mm) (LRA)

Type	H Max. (Unit: mm)	RM (Unit: mm)
LRA350-009	6.5	10
LRA351-009	10.5	
LRA352-009	17.0	
LRA351-010	8.0	15
LRA352-010	14.5	
LRA352-010	16.1±1.0	14.5±1.0
LRA352-010	17.1±1.0	14.5±1.0
LRA352-011	12.0	20



Low Ohmic Open Air (LRA) Dimensions

#### Construction:

- 1. The resistive elements consist of a flat metal-band.
- 2. Spot welded Cu-terminals ensure high stability of contacts.
- 3. Thus, this construction results in a non-inductive of both high stability and overload capacity.

## Characteristics

### Characteristic Specification (LRA)

Type	LRA	350-009	351-009 351-010	352-009 352-010 352-011
Power rating P70	W	0.5	1.0	1.5
Resistance range	Ω	R003~R051	R004~R068	R006~R10
E-series		E24≥R010		
Tolerances	%	±1, ±2, ±5, ±10		
Temperature coefficient	PPM	±25~±100		
Max. Cont. working voltage	VRMS	$\sqrt{P70 * R}$ For all styles		
Insulation voltage (1min.)	VRMS	Non insulated		
Insulation resistance	Ω	Non insulated		
Derating, linear	°C	70~300(0W)		
Climatic category		55/200/56		
Temperature range	°C	-50~300		
Thermal resistance	KW-1	200	100	70
Failure rate (Total, V <sub>0max</sub> , 60% conf. lev.)	10 <sup>-9</sup> * h <sup>-1</sup>	Ca.10, Depends on value		
Endurance (P70, 70,1000h)	$[\frac{\Delta R}{R}]%$	±3.0		
Damp heat, steady state(40°C,93% r.h.,56d)	$[\frac{\Delta R}{R}]%$	±0.5		
Climatic sequence	$[\frac{\Delta R}{R}]%$	±0.5		
Terminal strength	$[\frac{\Delta R}{R}]%$	±0.5		
Terminal tensile strength	N	30		
Resistance to soldering heat ( 260°C,10s )	$[\frac{\Delta R}{R}]%$	±0.2 typ.		
Solder ability	s	2.5 Flow time, solder globule test IEC 60068-2-20-T		
Making		Value imprinted		

## ► Packing Specification

### Packing Specification (LRA)

Type	Package	Pieces	Pack.-Code
LRA350-009	Bulk	200pcs	Bulk
LRA351-009 LRA351-010	Bulk	200pcs	Bulk
LRA352-010 LRA352-011	Bulk	200pcs	Bulk

## ► Order Codes

### Order Codes (LRA)

LRA351-009	R024		J		P	
Part Number	Resistance Value ( $\Omega$ )		Tolerance (%)		Pack. -Code	
R020	0.020 $\Omega$	F	$\pm 1\%$	P	Bulk	
R022	0.022 $\Omega$	G	$\pm 2\%$			
R024	0.024 $\Omega$	J	$\pm 5\%$			
R100	0.100 $\Omega$	K	$\pm 10\%$			

### ► General Information

#### Your Current Options - Token Current Sense

As the world becomes more and more technology-driven, the uses for current sensing components will continue to increase. The need for even lower resistance value ranges is already becoming evident, as is the need for these resistors to handle more power. The industry-wide trend is the emergence of smaller and smaller products.

Token Electronics offers a wide variety of current sensing products from the industry to military standards, such as current sense in Thin-Film / Thick-Film Technology, Bare Element Resistors, and Open Air Shunts. This enables Token to present an astounding number of possible solutions for any circuit design needs.

#### Applications of Current Detecting Components

Token's TCS and CS Series unique form factor provides automotive designers with several advantages. Both TCS and CS Series are ideal for applications involving window lift motors, fuel pump systems, seat belt pretensioners, and pulse width modulator feedback.

The wider resistive element and lower resistance enables higher current to pass through the device. Token's LRC ultra low Ohmic metal strip chip series provides the inherent ability to flex slightly and offers stress relief during extreme temperature cycling on typical or metal substrates. This LRC series is suitable for switch power supply applications (DC-DC Converter, Charger, and Adaptor) and power management of monitor.

The open air design of bare element resistor LRA and LRB Series provide a far cooler operation by allowing more air flow under the resistive element to keep excess heat from being transmitted to the PC board. They are suitable for high power AC/DC detection of power supply circuit.

Token axial moulded BWL series provides power rating up to 10 watts and lower resistance  $0.005\Omega$ , is ideal for all types of current sensing applications including switching and linear power supplies, instruments and power amplifiers.

Token standard current sensing components can be replacement for Vishay, IRC, Ohmite, KOA, Yageo devices with fast delivery and more competitive price. Contact us with your specific needs.

