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DIRECT

Electronics Tech.

(OAR)

Open Air Current Sensing Resistors

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▶ Product Introduction

Direct's "tight pitch" version of its open air metal element current sense resistor (OAR) need less PCB space.

Features :

- High stability open-air style.
- Precision alloys resistive element.
- Lead (Pb)-free and RoHS compliant.
- Standard tolerance $\pm 1\%$, $\pm 2\%$, $\pm 5\%$.
- Low inductance. Solderable copper leads (60/40).
- Radial leads, low resistance value $0.05\Omega \sim 0.005\Omega$.

Applications :

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

In response to requests from power electronics design engineers with the means to squeeze more current-sensing capability into crowded power supply designs, Direct Electronics has developed a "tight pitch" version of its open air metal element current sensing resistor with ratings as high as 5W in a reduced PC board footprint and longer thermal path.

Designated the OAR Series, these through-hole devices offer a high current, flameproof alternative to conventional axial devices and flat chips for current-sense circuits where PC board space is at a premium. The open air resistor's footprint is reduced by extending the height of the device above the board, thus keeping the resistor element's "hot spot" safely off the PC board and providing for increased air circulation under it, which in turn provides increased heat dissipation and cooler operation.

The OAR devices with increased height improve cooling efficiency, and because many power supply designs are already tightly-packed at the PC board level, the additional height does not create any profile issues. The OAR series feature a reduced pitch, or spacing between the leads on the circuit board with a corresponding increase in the board mounted profile.

The OAR low resistance value resistors are power rated for 1W, 2W, 3W, or 5W at 85°C , with resistance values from 0.05Ω to 0.005Ω , with tolerances down to $\pm 1\%$. They feature TCRs as low as $\pm 50\text{ppm}/^{\circ}\text{C}$ and inductance values in the single-digit nano henry range (10 nH Max.). Operating temperature range is -40°C to $+125^{\circ}\text{C}$. The flameproof OAR 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%.

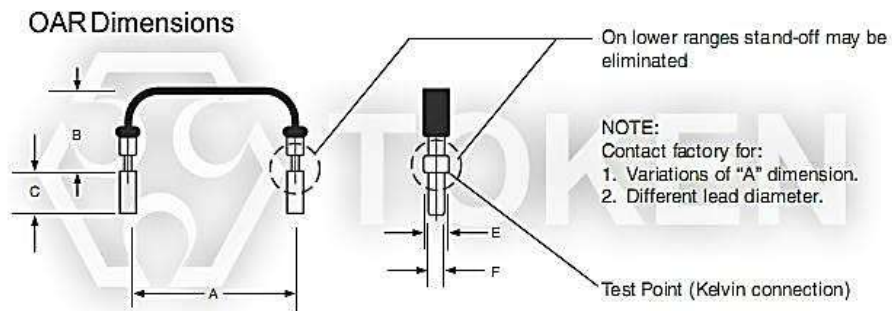
The Low Ohmic Value Current Sense (OAR) Resistor is available in bulk packaging and is RoHS compliant and lead free. For non-standard technical requirements and special applications, please contact us with your specific needs, or link to Direct official website "[Current Sensing Resistors](#)" for more information.



OAR Dimensions

Dimensions (Unit: mm) (OAR)

Type	Dimensions (Unit: mm)				
	A±1	B±3	C±0.8	E±0.3	F±0.1
OAR-1	10	10	3.5	1.6	1.0
OAR-2	15	15	3.5	1.6	1.0
OAR-3	20	20	3.5	1.6	1.0
OAR-5	20	20 </td <td>3.5</td> <td>1.6</td> <td>1.0</td>	3.5	1.6	1.0



Open Air Current Sensing (OAR) Resistor Dimensions

Specification

Specification (OAR)

Type	Power Rating @ 85°C (W)	Resistance Range (mΩ)	Tolerance (±%)	Temperature Coefficient TCR (ppm/°C)	Inductance (nH)
OAR-1	1	R005~R05	±1% ±2% ±5%	±50	10 Max.
OAR-2	2	R005~R05			
OAR-3	3	R005~R05			
OAR-5	5	R005~R01			

▶ **Characteristics**

Characteristic Specification (OAR)

Test Items	Test Method	Specification
Load Life	1000 hours @ 25°C	$\Delta R/R < 1\%$
Moisture Test	no load for 1000 hours	$\Delta R/R < 1\%$
Temperature Cycling	-40°C to +125°C for 1000 cycles	$\Delta R/R < 1\%$
Operating Temperature		-40°C to +125°C

▶ **Order Codes**

Order Codes (OAR)

OAR	-	1	R01	J	P
Part Number		Rated power (W)	Resistance Value (Ω)	Tolerance (%)	Package-Code
OAR		1 1 W	R005 0.005Ω	F ±1%	P Bulk
		2 2 W	R01 0.01Ω	G ±2%	
		3 3 W	R05 0.05Ω	J ±5%	
		5 5 W			



► General Information

Your Current Options - Direct 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.

Direct 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 Direct to present an astounding number of possible solutions for any circuit design needs.

Applications of Current Detecting Components

Direct'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. Direct'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.

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

Direct 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.

