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DIRECT

Electronics Tech.

(LSQ) 4-Terminal Current Sensing Resistor

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▶ Product Introduction

Direct's Kelvin style (LSQ) family current sensing 4-terminal resistors handle high-wattage applications.

Features :

- Welded & fireproof construction.
- Superior anti-surge capability & Low TCR.
- Special inorganic potting construction provides high moisture resistance and thermal conductivity.
- 4 leads for Kelvin connection with extremely low resistance values.

Applications :

- Automatic Test Equipment.
- Current Sensing Application.
- High Precision Instrumentation.
- Industrial, Medical and Military.
- Measurement Instrumentation.

Providing ultralow resistance values (to 0.01 ohm) for relatively high current requirements, new four-terminal cement filling resistor from Direct combine the advantages of a Kelvin configuration with PC board mounting capability.

The Kelvin (or 4-terminal) configuration enables current to be applied through two opposite terminals and a sensing voltage to be measured across the other two terminals, eliminating the resistance and temperature coefficient of the terminals for a more accurate current measurement.

The 4 lead resistors are a new version of Direct's (LSQ) Precision Current Sensing Family Resistors which was specially designed for use in a Kelvin method where a current is applied through two opposing leads and sensing voltage is measured across the other two leads. Direct LSQ series is specifically designed for low resistance applications requiring the highest accuracy and temperature stability.

The advantages of Kelvin connection enable the resistance and temperature coefficient of the leads to be effectively eliminated. The need to connect to the leads at precise test points is eliminated, allowing for tighter tolerance on the end application. Also results in a lower temperature coefficient of resistance and lower self-heating drift which may be experienced on two-terminal resistor.

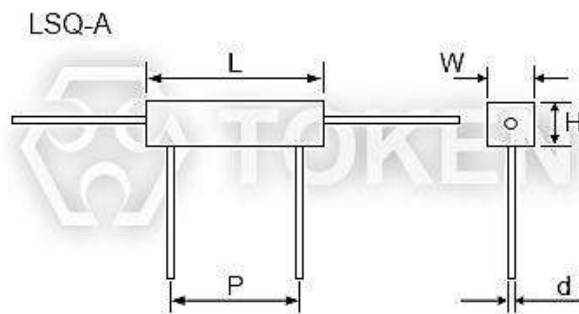
Direct will also produce low ohmic resistor LSQ series outside these specifications to meet customer requirements. Contact us with your specific needs, or link to Direct official website "[Current Sensing Resistors](#)" for more information.



▶ **LSQ-A Spec. & Dim**

Specification & Dimensions (Unit: mm) (LSQ-A) for Kelvin Connection

Type	Power (Watts)	Resistance Range (Ω)	Dimensions (Unit: mm)				
			L	W±1	H±1	P±1	d±0.5
LSQ-A-3	3	R01~R1	22±1.0	8	8	14	0.8
LSQ-A-5	5	R01~R1	22±1.5	9.5	9.5	14	0.8
LSQ-A-7	7	R01~R1	35±2.0	9.5	9.5	25	0.8
LSQ-A-10	10	R01~R1	48±2.0	9.5	9.5	36	0.8
LSQ-A-15	15	R01~R1	48±2.0	12.5	12.5	36	0.8

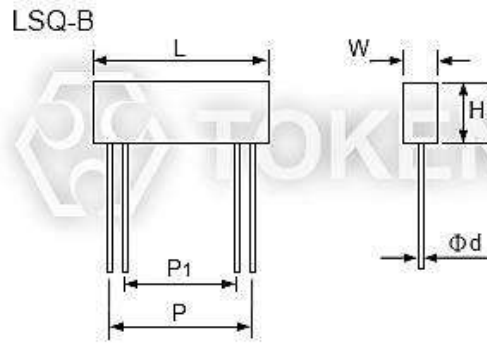


4-T Kelvin Sensing (LSQ-A) Dimensions

▶ **LSQ-B Spec. & Dim**

Specification & Dimensions (Unit: mm) (LSQ-B) for Kelvin Connection

Type	Power (Watts)	Resistance Range (Ω)	Dimensions (Unit: mm)					
			L±2	W±1	H±1	P±1	P1±1	d±0.5
LSQ-B-5	5	R01~R1	26	5	10	20	12	0.8

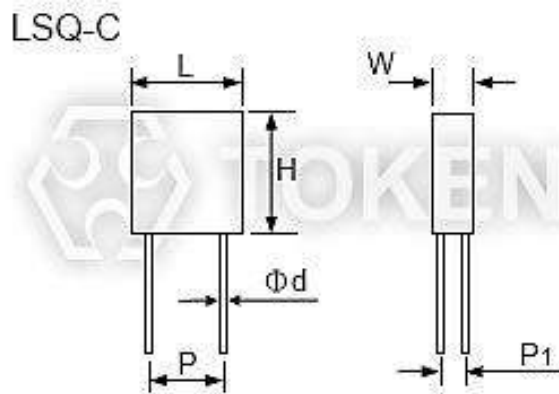


4 Terminal Sensing (LSQ-B) Dimensions

▶ **LSQ-C Spec. & Dim**

Specification & Dimensions (Unit: mm) (LSQ-C) for Kelvin Connection

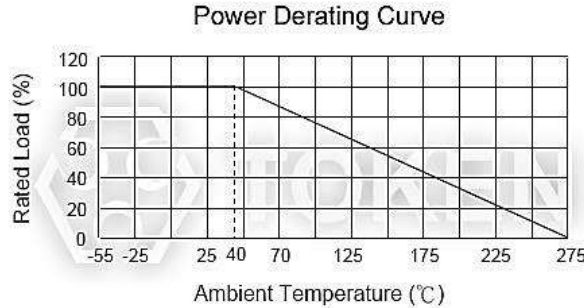
Type	Power (Watts)	Resistance Range (Ω)	Dimensions (Unit: mm)					
			L±2	W±1	H±1	P±1	P1±1	d±0.5
LSQ-C-10	10	R01~R1	18	10.5	20	12	5	1.0



4-wire Sensing (LSQ-C) Dimensions

► **Derating Curve**

Power Derating Curve (LSQ)



Power Derating Curve (LSQ)

► **Characteristics**

Characteristic Specification (LSQ)

Test Items	Test Method	Specification
Resistance Tolerances		D(±0.5%), F(±1%), G(±2%), J(±5%)
Temperature Coefficients		±10 ppm/°C, ±20 ppm/°C, ±25 ppm/°C, ±50 ppm/°C
Operating Temperature Range		-55°C ~275°C
Maximum Working Voltage		(P40°C x R)1/2
Terminal Tensile Strength	50N, 10s	ΔR≤±1.0%R
Withstand Voltage	1000V, 1 Min.	No damage on the appearance.
Short Time Overload	5 times rated power, 5s	ΔR≤±4.0%R
Thermal Shock	-55°C ~+275°C, 5 cycles, 30 min.	ΔR≤±5.0%R
Load Life	40°C, 1000h 1.5 hours on, 0.5 hours off.	ΔR≤±5.0%R

► **Order Codes**

Order Codes (LSQ)

LSQ-A	-	15	R01	J	P
Part Number		Rated Power	Resistance Value (Ω)	Tolerance	Package-Code
LSQ-A		3 3 Watt	R01 0.01Ω	J ±5%	P Bulk
LSQ-B		5 5 Watt	R05 0.05Ω		
LSQ-C		7 7 Watt	R1 0.1Ω		
		10 10 Watt			
		15 15 Watt			



► 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.

