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# **(LRS) High Power Chip Current Sensing Resistor Shunts**

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## ► Product Introduction

**The advanced alloy shunt technology of TOKEN (LRS) spells out the high-power current sensing resistor.**

### Features :

- Resistance down to 0.1mΩ to 6mΩ.
- TCR down to ±20ppm/°C and ±50ppm/°C.
- Sustain high temperature, lead-free and RoHS compliant.
- Welded construction, air cooling, Strong stability of circuit.
- Tolerance ±1%, ±2%, and ±5%. Rated Power 3W, 5W, 6W, and 7W.

### Applications :

- Frequency converters.
- Automatic control power supply.
- Power modules. Communication system.
- Current sensor for power hybrid applications.
- High current applications for the automotive market.

Design of Bare Open Surface Mounting Chip Alloy allows air flow to achieve maximum cooling effect, so that PCB retains less heat. Welding flame protection structure feature provides 20ppm TCR temperature coefficient, low inductance. These characteristics make LRS an excellent choice for all high-power power supply and power applications that are not impacted by most environmental stresses.

For the development of high current applications for automated control and sensing power supplies, the TOKEN current sensing chip shunt (LRS) uses Manganese Copper (Manganin), Kama Alloy (KAMAR NiCr20AlSi), and Ferro Chrome Aluminum Alloy (FeCrAl) which featuring antioxidant and high temperature resistant thermal corrosion properties as alloy welding structure. Standard surface mounting spacing design is suitable for reflow welding and automatic mounting machine applications.

Designed specifically for high current applications LRS, the power can reach 3W, 5W, 6W, and 7W. The range of ultra-low resistance is from 0.1mΩ to 6mΩ. There are many options in selecting precision tolerances (±1%, ±2%, ±5%). Two types of chip dimensions are available: standard size 2512, 3920, and 5930; special size 3921, 4026, 4527, and 5931. TOKEN realizes small size, high power design, lower cost and higher performance current sensing shunts.

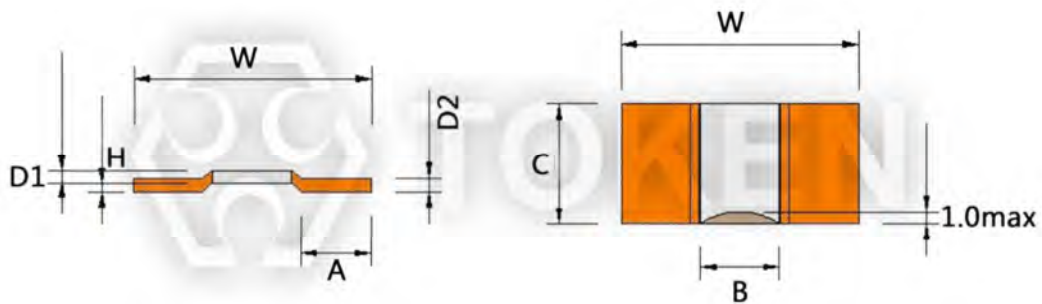
LRS provides embossed tape packaging, size 2512 1Kpcs per reel, 3920 2.5Kpcs per reel, 5930 2Kpcs per reel, products meet RoHS standards and lead-free requirements. Customers can specify resistance, size and specifications to meet the design challenges and specific technical requirements. Please contact TOKEN Business Department for the latest product information. Or link to Token official website "[Current Sense Resistors](#)". Contact us with your specific needs.



## ► LRS - M/K Dim.

### LRS - M/K Standard Size (Unit : mm)

Type	Power (W)	Material	Size	B (mm)	W (mm)	A (mm)	C (mm)	H (mm)	D1 (mm)	D2 (mm)	Resistance Value (mΩ)
LRS	3	M	2512	3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	1.5	1.5	0.3
									0.88	0.88	0.5
									0.5	0.5	1
		K							1.31	1.31	1
									0.65	0.65	2
									0.43	0.43	3
	5	M	3920	4.5±0.3	10±0.2	2.2±0.2	5.1±0.4	0.5±0.1	1.5	1.5	0.2
									1.37	1.37	0.3
									0.83	0.83	0.5
		K							0.4	0.4	1
									1.16	1.16	1
									0.37	0.37	3
	7	M	5930	5.0±0.3	15±0.3	4.2±0.3	7.6±0.4	0.5±0.1	1.5	1.5	0.2
									0.75	0.75	0.4
									0.6	0.6	0.5
		K							0.41	0.41	0.75
									0.86	0.86	1
									0.4	0.4	2
								0.29	0.29	3	



Alloy Shunt Resistors (LRS) - M/K Series Dimensions

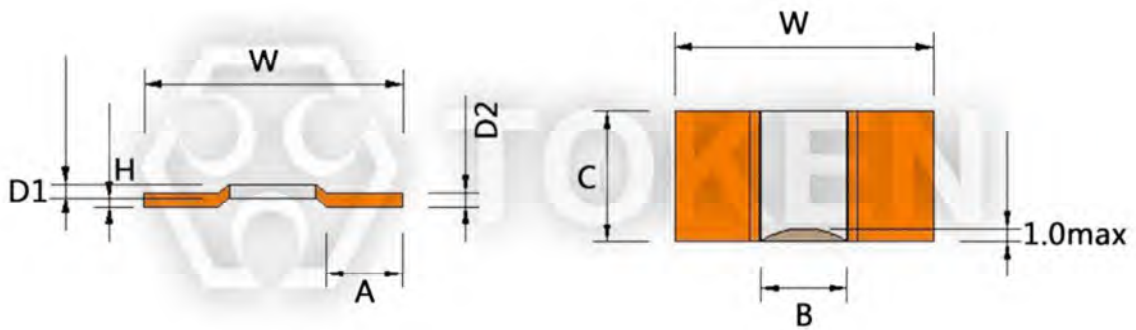
### LRS - M/K Special Size (Unit : mm)

Type	Power (W)	Material	Size	B (mm)	W (mm)	A (mm)	C (mm)	H (mm)	Resistance Value (mΩ)
LRS	5	M	3921	4.5±0.3	10±0.2	2.2±0.2	5.2±0.3	0.5±0.1	0.2 ~ 5
	5	K	3921	4.5±0.3	10±0.2	2.2±0.2	5.2±0.3	0.5±0.1	0.2 ~ 5
	6	M	4026	4.5±0.3	10±0.2	2.2±0.2	6.6±0.4	0.5±0.1	0.2 ~ 3
	6	K	4026	4.5±0.3	10±0.2	2.2±0.2	6.6±0.4	0.5±0.1	0.2 ~ 3
	6	M	4527	4.5±0.3	11.5±0.2	3.0±0.3	6.9±0.4	0.5±0.1	0.4 ~ 3
	6	K	4527	4.5±0.3	11.5±0.2	3.0±0.3	6.9±0.4	0.5±0.1	0.4 ~ 3
	7	M	5931	5.0±0.3	15±0.3	4.2±0.3	7.8±0.4	0.5±0.1	0.1 ~ 0.75
	7	K	5931	5.0±0.3	15±0.3	4.2±0.3	7.8±0.4	0.5±0.1	1 ~ 3

## LRS - F Dim.

### LRS - F Dimensions (Unit : mm)

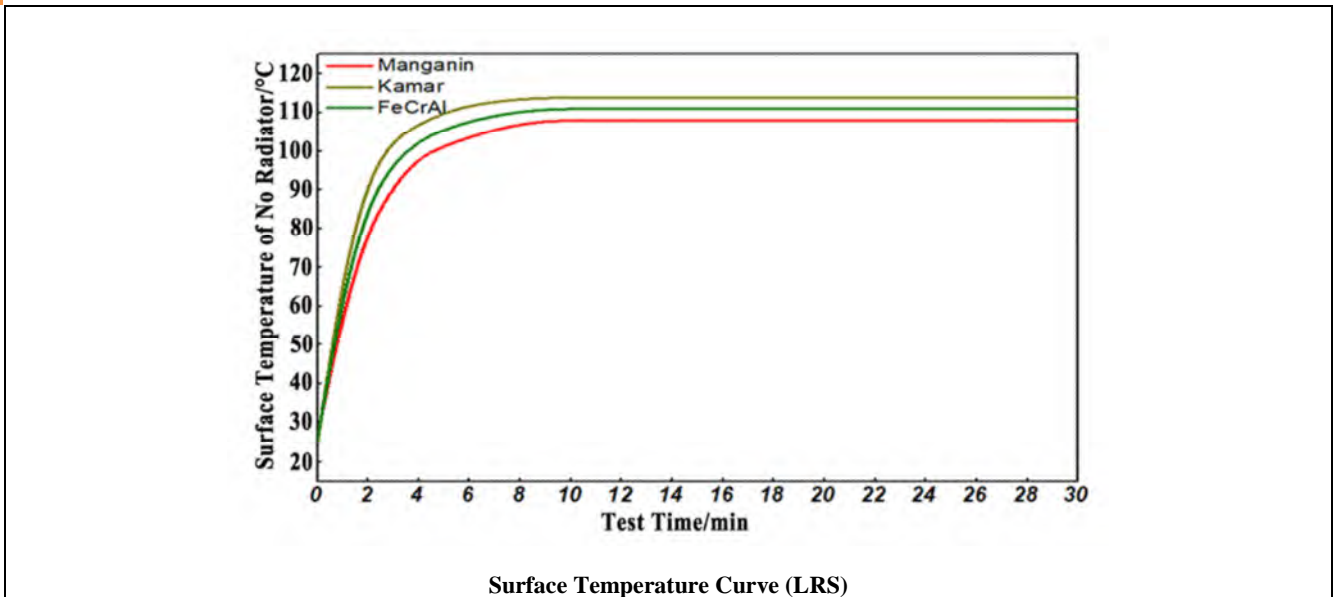
Type	Power (W)	Material	Size	B (mm)	W (mm)	A (mm)	C (mm)	H (mm)	D1 (mm)	D2 (mm)	Resistance Value (mΩ)
LRS	3	F	2512	3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	1.4	1.4	1
				3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	0.7	0.7	2
				3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	3	0.47	0.47
				3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	0.35	0.35	4
				3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	0.28	0.28	5
				3.0±0.3	6.3±0.2	1.2±0.2	3.1±0.3	0.5±0.1	0.24	0.24	6
	5	F	3920	4.5±0.3	10.0±0.2	2.2±0.2	5.1±0.4	0.5±0.1	1.28	1.28	1
				4.5±0.3	10.0±0.2	2.2±0.2	5.1±0.4	0.5±0.1	0.64	0.64	2
				4.5±0.3	10.0±0.2	2.2±0.2	5.1±0.4	0.5±0.1	0.43	0.43	3
				4.5±0.3	10.0±0.2	2.2±0.2	5.1±0.4	0.5±0.1	0.32	0.32	4
				4.5±0.3	10.0±0.2	2.2±0.2	5.1±0.4	0.5±0.1	0.26	0.26	5
	7	F	5930	5.0±0.3	15±0.3	4.2±0.3	7.6±0.4	0.5±0.1	0.96	0.96	1
				5.0±0.3	15±0.3	4.2±0.3	7.6±0.4	0.5±0.1	0.48	0.48	2
				5.0±0.3	15±0.3	4.2±0.3	7.6±0.4	0.5±0.1	0.32	0.32	3
				5.0±0.3	15±0.3	4.2±0.3	7.6±0.4	0.5±0.1	0.24	0.24	4



Current Sensing Power Shunts (LRS) - F Series Dimensions

## Technical Specifications

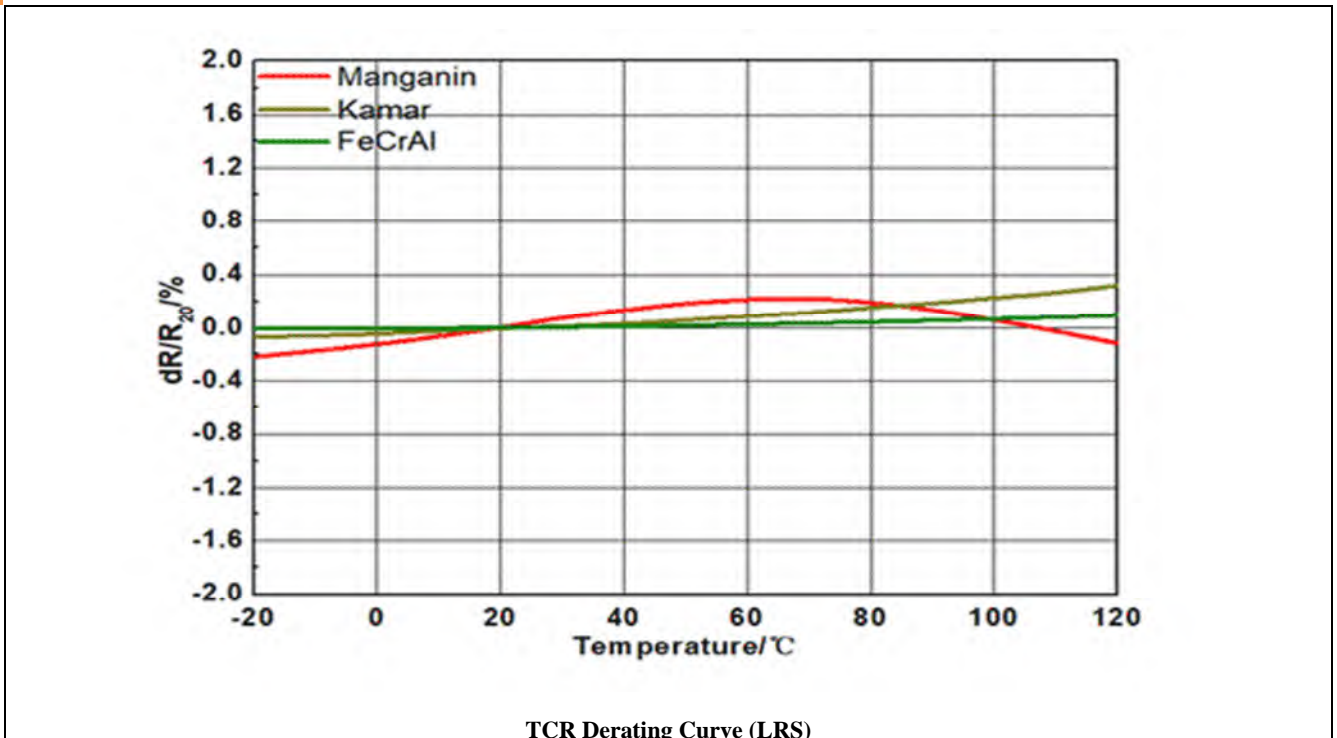
### Surface Temperature Curve LRS - Technical Specifications



Surface Temperature Curve (LRS)

- Note : The surface temperature test board is made of aluminium substrate.

### TCR Derating Curve LRS - Technical Specifications



TCR Derating Curve (LRS)

- Note : The surface temperature test board is made of aluminium substrate.

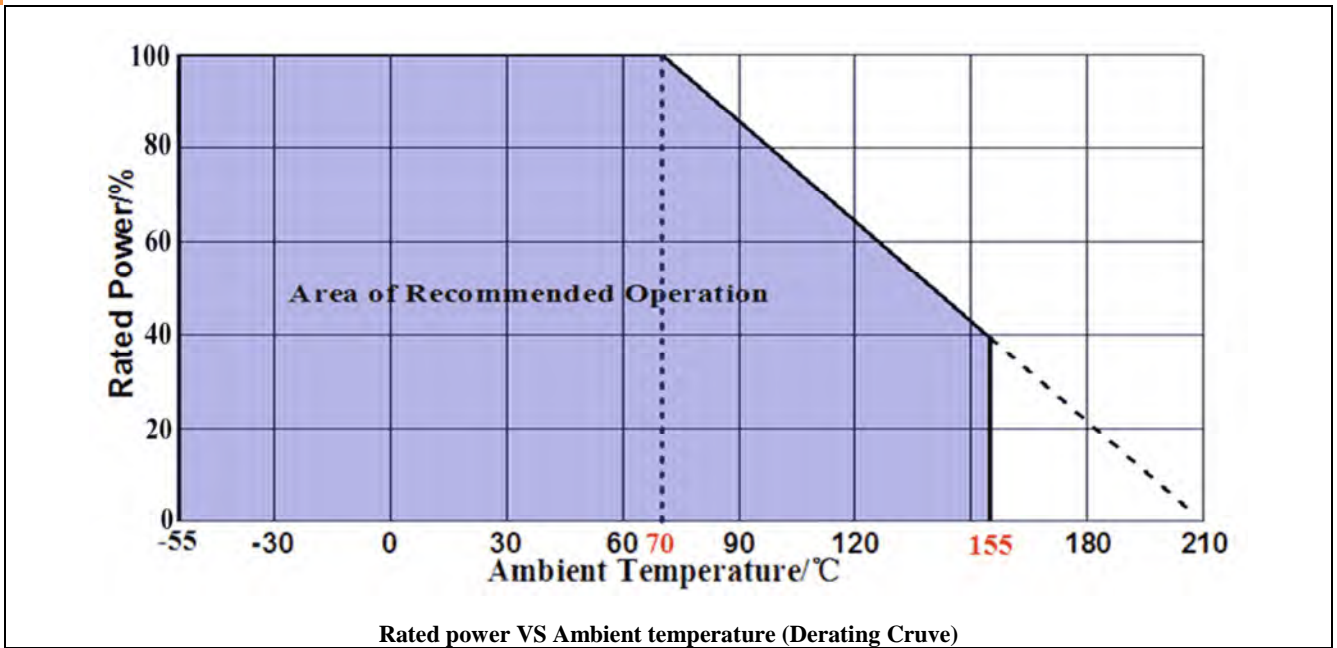
## ► Environmental Characteristics

### LRS - Environmental Characteristics

Items	Requirement	Test Methods
Temperature Cycling	±0.5%	JESD22 1000 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion.
High Temperature Exposure	±0.5%	MIL-STD-202 1000hrs. @T=125°C. Unpowered. Measurement at 24±2 hours after test conclusion.
Moisture Resistance	±0.5%	MIL-STD-202 t=24 hrs/cycle. Measurement at 24±2 hours after test conclusion. Note: Steps 7a & 7b not required. Unpowered.
Biased Humidity	±0.5%	MIL-STD-202 1000hrs 85°C/85% RH. Measurement at 24±2 hours after test conclusion. Note: Specified conditions: 10% of operating power.
Operational Life	±0.5%	MIL-STD-202 Condition D Steady State TA=125°C at rated power. Measurement at 24±2 hours after test conclusion.
Solderability	95% Coverage Minimum.	J-STD-002C 245°C±5°C, 5s+0.5s/-0.
Resistance to Soldering Heat	±0.5%	MIL-STD-202 260°C±5°C, 10s±1s. Measurement at 24±2 hours after test conclusion.
Short Time Overload	±0.5%	MIL-STD-202 5 × Rated power for 5s. Measurement at 24±2 hours after test conclusion.
Thermal Shock	±1%	MIL-STD-202 -55°C/+125°C, 300 Cycles. Maximum transfer time 20s, Dwell time 15min.
Vibration	±0.5%	MIL-STD-202 5g's for 20 min, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB .031" thick 7" secure points on one long side and secure points at corners of opposite sides which parts mounted with in 2 from any secure point. Test from 10-2000 Hz. Measurement at 24±2 hours after test conclusion.

## ▶ Derating Curve

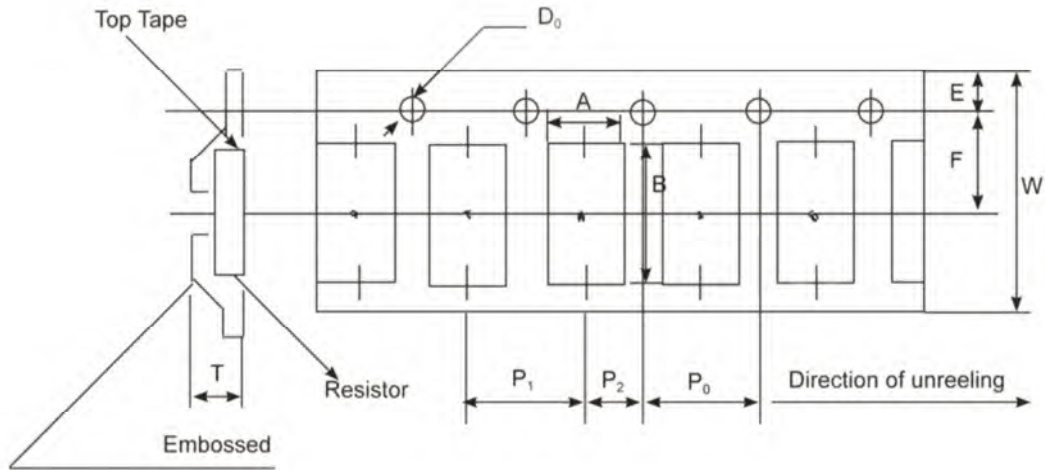
### Power Derating Curve (LRS)



## ► Packaging

### LRS - Packaging

Size	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)	D <sub>0</sub> (mm)	T (mm)	Quantity (EA)/ Pieces
2512	4.3	7.6	16	1.55	7.5	3.85	7.7	7.7	1.5	1.7	1000
3920	6.0	11	24	1.55	11.2	6	12	12	1.5	2.0	2500
5930	8.6	16	24	1.55	10.8	6	12	12	1.5	2.4	2000



LRS - Embossed Plastic Tape Specifications



## Order Codes

### Large Current Sensing Chip Resistor Shunts LRS - Order Code

LRS	3		M		0m30		J	
Part Number	Power (W)		Material		Resistance ( $\Omega$ )		Tolerance (%)	
LRS	3	3W	F	FeCrAl	0m10	0.0001 $\Omega$	J	$\pm 5$
	5	5W	M	Manganin	0m30	0.0003 $\Omega$	G	$\pm 2$
	7	7W	K	Kamar	R001	0.001 $\Omega$	F	$\pm 1$
					R004	0.004 $\Omega$		
					R005	0.005 $\Omega$		

## ► 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.

