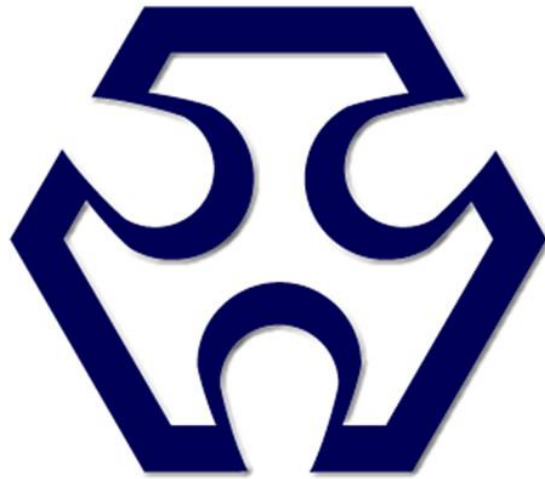


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TOKEN

(FLM) Chip Alloy Current Shunt Resistors

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▶ Product Introduction

SMD alloy shunt resistance FLM is a key current sensing technology for future vehicle construction.

Features :

- Inductance less than 10 nH, Lead-free and RoHS compliant.
- Rated Power 4W ~ 7W. Tolerance $\pm 1\%$, $\pm 2\%$ and $\pm 5\%$.
- TCR down to $\pm 20\text{ppm}/^\circ\text{C}$ and $\pm 50\text{ppm}/^\circ\text{C}$.
- Resistance values down to 0.0002Ω .

Applications :

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

Token Electronics equipped with (FLM) alloy shunt on its current sensing surface mount devices. It adopts the design of folding terminals outward and inward. Nickel-copper or manganese-copper alloy stamping is used to maintain the superior electrical characteristics of the surface mounting structure. It has the characteristics of pulse resistance and high precision.

Unlike other manufacturers of metal alloy current detection resistors, Token metal alloy power chips (FLM) have a number of advantages. Power can reach 4W, 5W, and 7W. The temperature coefficient TCR (20 - 50) ppm, tolerance accuracy 1%, 2%, and 5%, is used to improve the measurement accuracy. The resistance value is as low as 0.0002Ω , which is the first choice for high-end current sensing and sampling applications.

The (FLM) device is applicable to all types of voltage dividers, current detection and pulse applications in power management, such as sensors and transducers; VRM for notebook computers, DC/DC converters for servers, management and safety of lithium ion batteries; industrial instrumentation; and high current applications in the automotive market, such as audio, transmission, anti-lock braking, and engines.

Token Electronics adopts modern technology and production methods, constantly upgrades production equipment, provides complete low resistance current detection components, and all aspects of current sensing shunt product and application information.

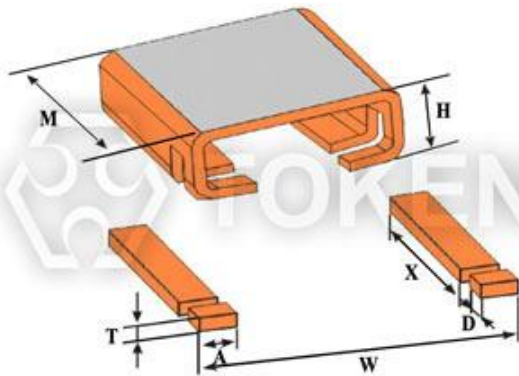
The (FLM) device is available in bulk packaging and is RoHS compliant and lead free. For non-standard technical requirements and special applications, contact us with your specific needs. Or link to Token official website "[Current Sense Resistors](http://www.token.com.tw)".



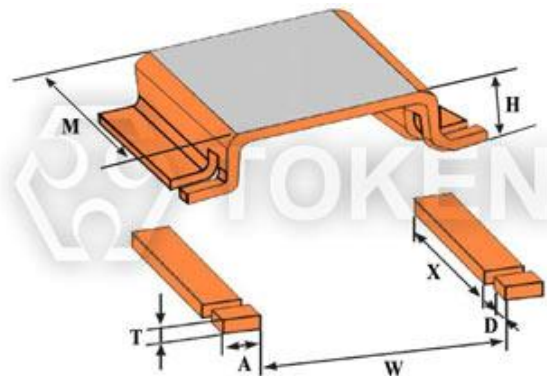
► Dimensions

Metal Alloy Power Shunts (FLM) Dimensions (Unit:mm)

Type	Power (W)	M (mm)	W (mm)	H (mm)	X (mm)	D (mm)	A (mm)	T (mm)
FLM-M-0m20	5	6.6±0.3	6.9±0.3	3.0±0.5	4.8±0.3	0.90±0.3	2.5±0.3	0.7±0.3
FLM-M-0m30	5	6.6±0.3	6.9±0.3	3.0±0.5	4.8±0.3	0.90±0.3	2.5±0.3	1.12±0.3
FLM-M-0m50	5	6.6±0.3	6.9±0.3	3.0±0.3	4.8±0.3	0.90±0.3	2.5±0.3	0.66±0.3
FLM-M-R001	5	6.6±0.3	6.9±0.3	3.0±0.3	4.8±0.3	0.90±0.3	2.5±0.3	0.33±0.3
FLM-K-R002	5	6.6±0.3	6.9±0.3	3.0±0.3	4.8±0.3	0.90±0.3	2.5±0.3	0.50±0.3
FLM-K-R003	4	6.6±0.3	6.9±0.3	3.0±0.3	4.8±0.3	0.90±0.3	2.5±0.3	0.34±0.3
FLM-K-R005	4	3.9±0.3	6.9±0.3	3.0±0.3	2.0±0.3	0.34±0.3	2.5±0.3	0.34±0.3
FLM-K-R010	7	6.1±0.3	15.9±0.3	3.0±0.3	4.2±0.3	0.90±0.3	2.5±0.3	0.30±0.3



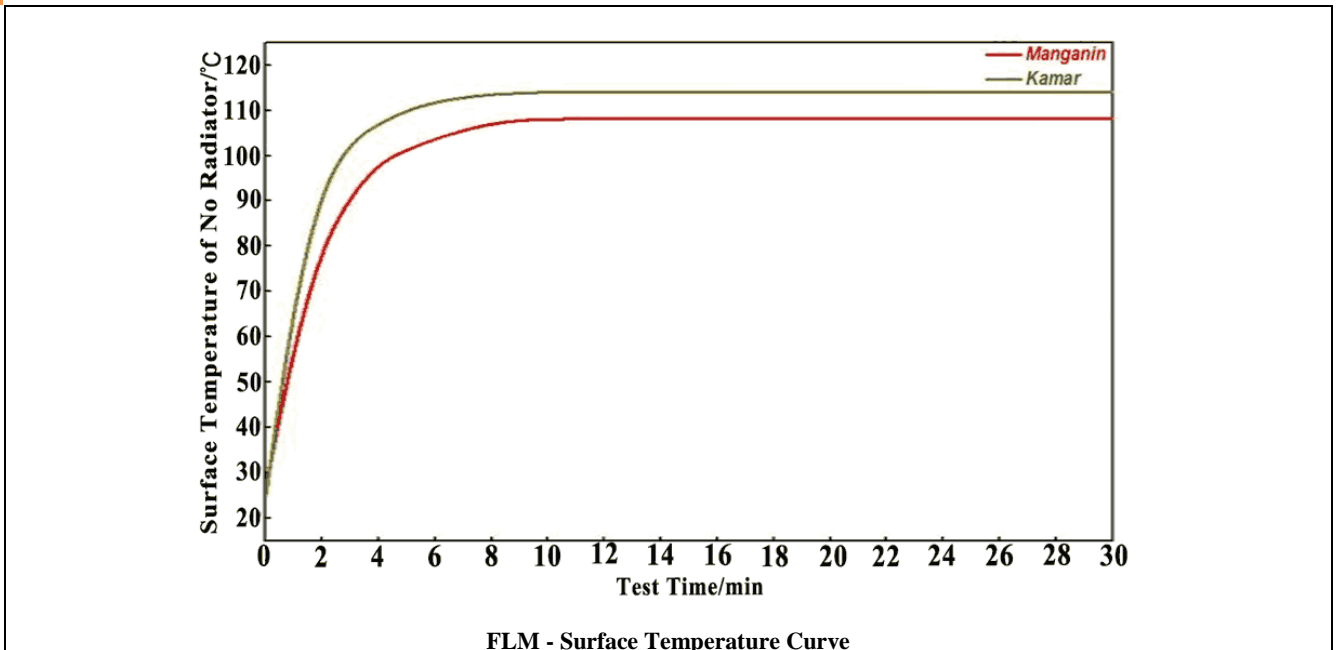
Alloy Shunt Resistors FLM - Inward Fold (n)



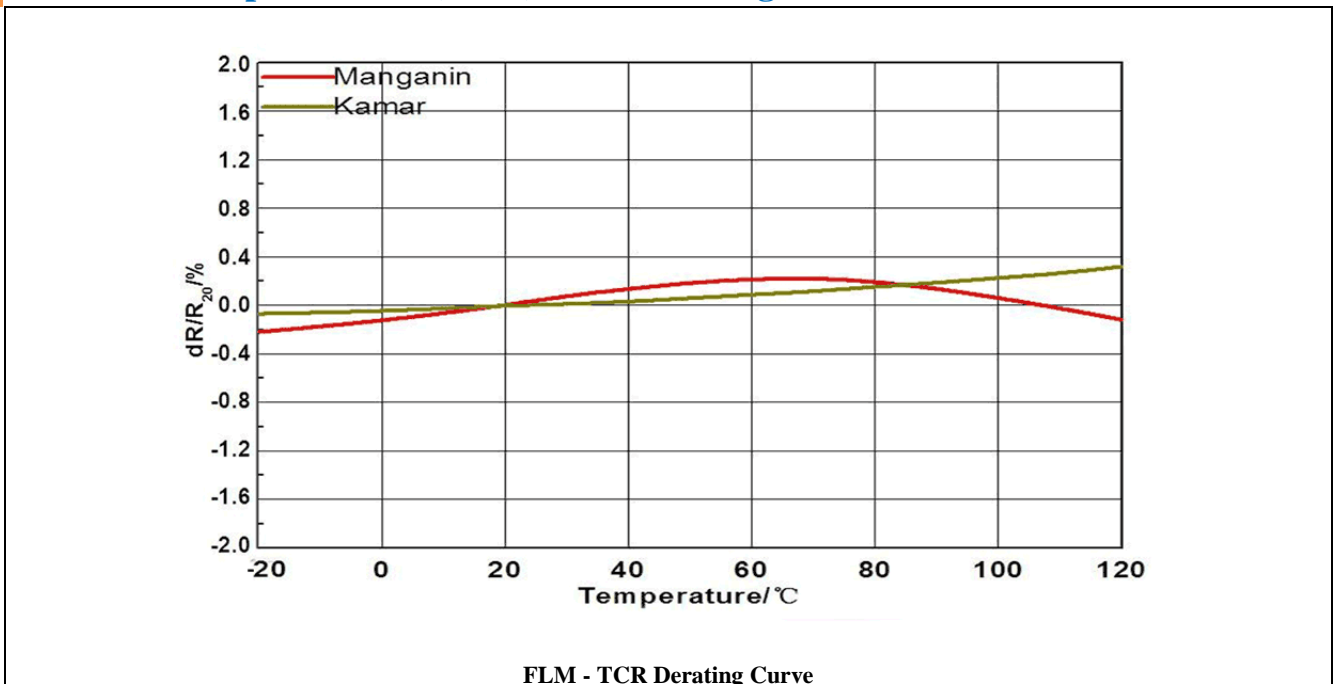
Alloy Shunt Resistors FLM - Outward Fold (y)

► Technical Specifications

Current Shunts (FLM) Surface Temperature Curve



Low Ohm Chip Resistors (FLM) TCR Derating Curve



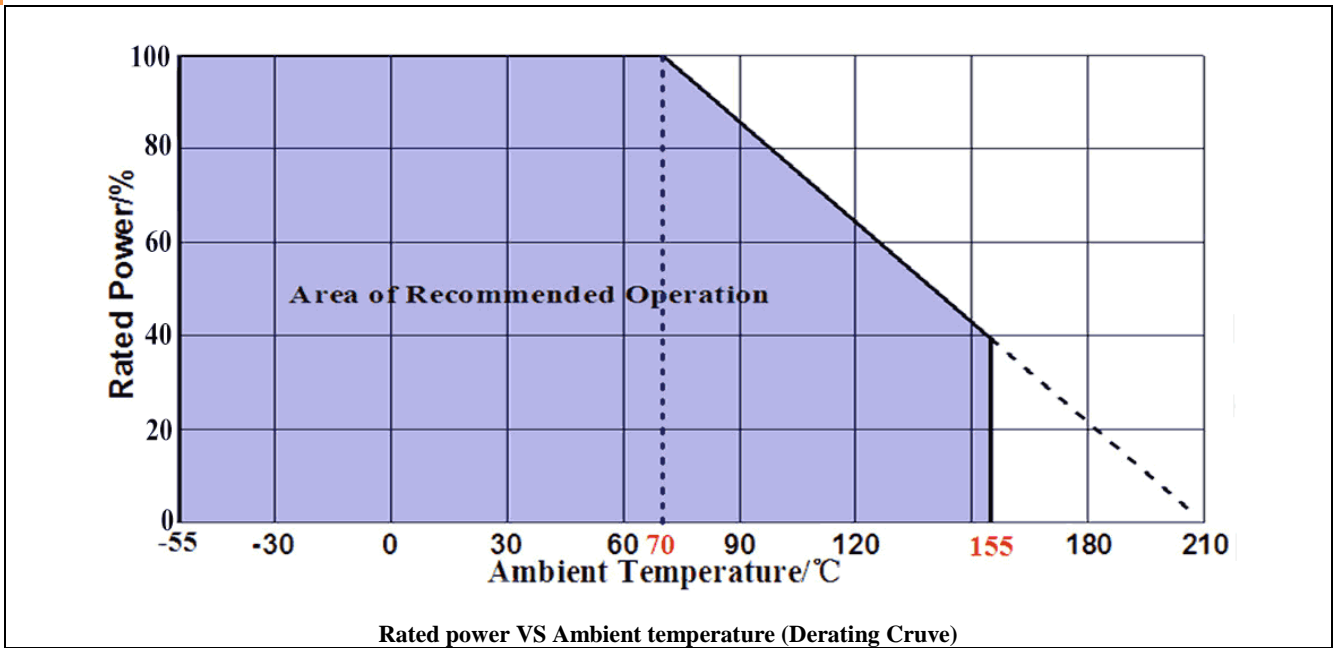
► Environmental Characteristics

Alloy Shunt Resistors (FLM) 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=24hrs/cycle. Note: Steps 7a & 7b not required. Unpowered. Measurement at 24±2 hours after test conclusion.
Biased Humidity	±0.5%	MIL-STD-202 1000hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24±2 hours after test conclusion.
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 within 2 from any secure point. Test from 10-2000 Hz. Measurement at 24±2 hours after test conclusion.

▶ Derating Curve

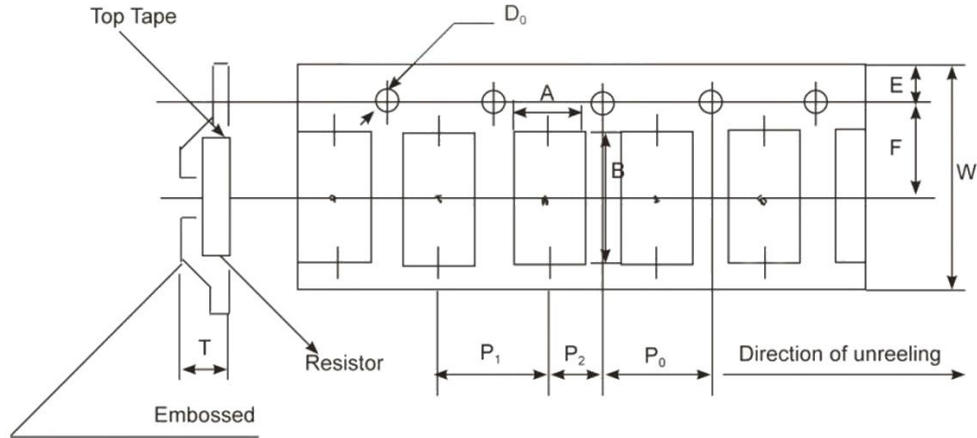
Current Shunts (FLM) Derating Curve



► Packaging

Alloy Shunt Resistors (FLM) Packaging

Type	A/mm	B/mm	W/mm	E/mm	F/mm	P ₀ /mm	P ₁ /mm	P ₂ /mm	D ₀ /mm	T/mm	Quantity(EA)/pieces
In	7.5	8	16	1.75	7.35	6	12	12	1.5	3.8	3000
Out	7.3	12.1	24	1.75	12.2	6	12	12	1.5	3.5	1000



FLM - Embossed Plastic Tape Specifications

Order Codes

SMD Alloy Current Shunt Resistors (FLM) Order Code

FLM	5		M		0m20		F		y	
Part Number	Power (W)		Material		Resistance (Ω)		Tolerance (%)		Shape	
FLM	4	4W	M	Manganin	0m20	0.0002 Ω	J	± 5	y	outward Fold
	5	5W	K	Kamar	0m50	0.0005 Ω	G	± 2	n	Intward Fold
	7	7W			R001	0.001 Ω	F	± 1		
					R002	0.002 Ω				
					R010	0.01 Ω				

► 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 0.005Ω , 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.

