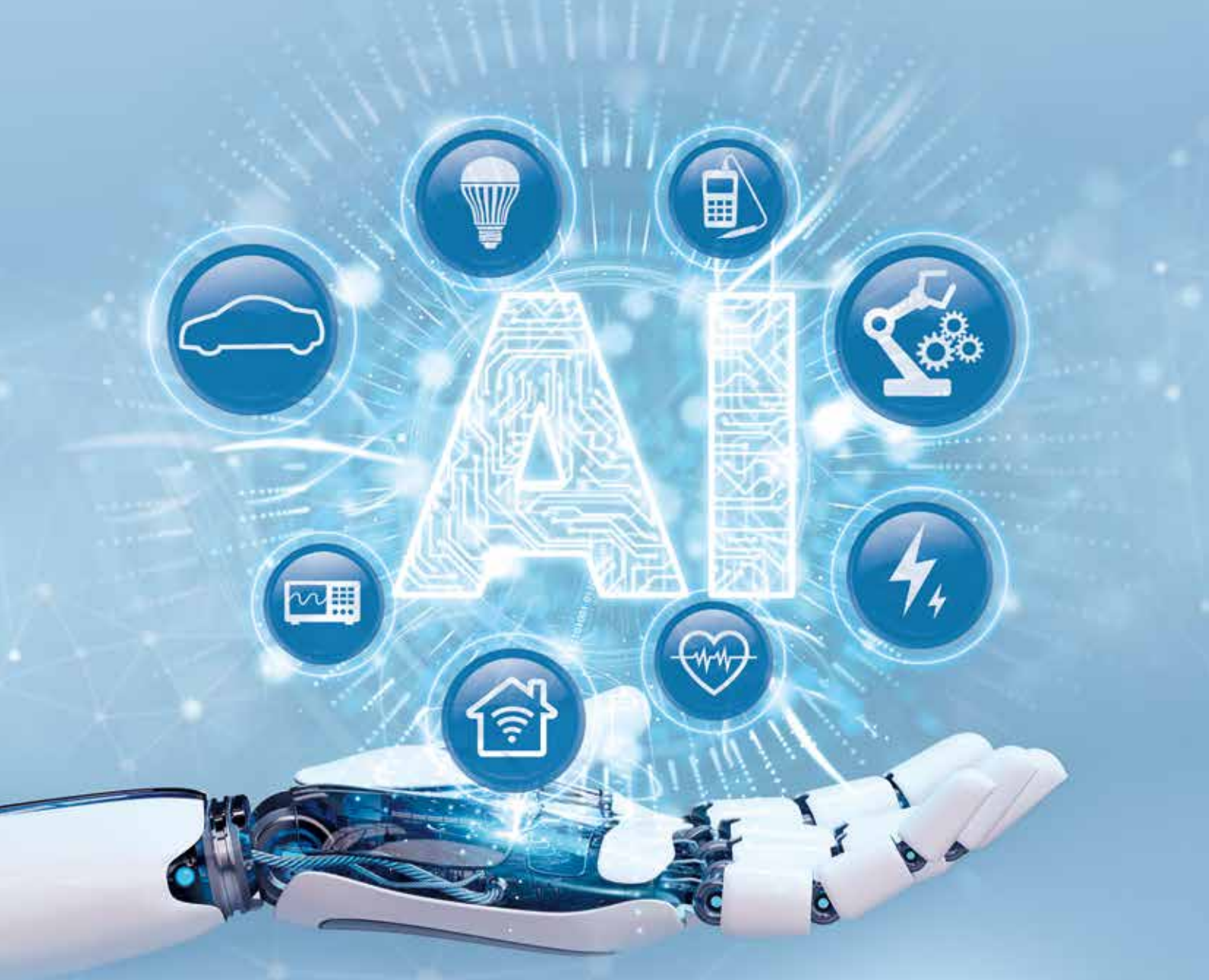


**Firstohm**<sup>®</sup>

Since 1969

# Building Life-time Partnership



*Quality, Reliability,  
Cost-Down via Innovation*

MELF Resistor



第一電阻電容器股份有限公司

FIRST RESISTOR & CONDENSER CO., LTD.

# Company Profile

Quality • Reliability  
Cost-Down via Innovation

Established in 1969, First Resistor & Condenser Co., Ltd. (Firstohm) is specialized in thin-film resistors. Backed by strong in-house research and development capability and manufacturing technology acquired from major partners in Japan and the US, Firstohm has pioneered the development in various types of resistors in response to the changing environment of global industries.



## Philosophy and Mission

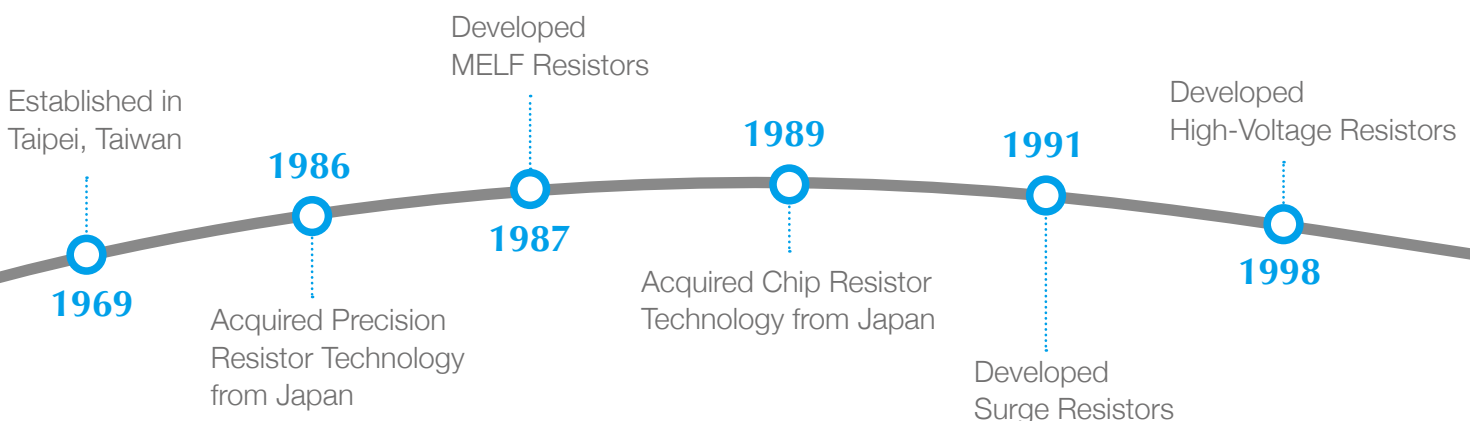
Given the fast-developing technology landscape, the ability of component manufacturers to evolve and provide quality parts in time has become increasingly crucial to introduction of new electronic products. Our goal at Firstohm is to constantly pursue innovation and to provide customers with quality products and reliable services in a cost efficient and timely manner.

## Why to stay with us

- **Extensive range of specialty resistors** – These products include MELF resistors, surge resistors, high voltage resistors, precision resistors, and current sense resistors.
- **Customer-oriented** – Firstohm is able to customize products and services according to customer's special requirement.
- **In-house research and development capability** – This enables Firstohm's swift responses to the market trend. (Quality, Reliability, Cost-Down via Innovation).
- **Solution provider** – To ensure optimal outcome, Firstohm closely collaborates with the customers from the initial technical consulting to the final resistor product selection.

## Featured Products vs. Industries

Application Product Category	Power Supply	Telecomm	Meter	Medical	Automotive	LED Lighting
MELF	★	★	★	★	★	★
Anti-Surge	★	★	★	★	★	★
High Voltage	★		★	★		★
Precision			★	★	★	
Current Sense	★	★	★	★	★	★
Fusible	★		★		★	★



# Product Classification by Application

Quality • Reliability  
Cost-Down via Innovation

## ■ Surge / Safety / Protection Circuit

- Anti-Surge Wire Wound Fast-Fuse Resistor—SWAT
- Anti-Surge Wirewound Fast-Fuse MELF Resistor—SWMT
- Composite Film-Type Ceramic Composition Resistor—C3
- Fusible Resistor—FGE
- Fusible MELF Resistor—FM
- Pulse Safety Resistor-MSD
- Pulse Protective Resistor—PPR
- Short Circuit Protection Resistor—SCP
- Surge Resistant MELF Resistor—SRM
- Surge Safety Resistor—SSR
- Superior Anti-Surge Wire Wound Axial Resistor—SSWA

## ■ AEC-Q200 (Vehicle Grade)

- Metal Film MELF Resistor—MM(V)
- Metal Film MELF Precision Resistor—MMP(V)
- Stabilized Film Power MELF Resistor—SFP(V)
- Surge Resistant MELF Resistor—SRM
- Anti-Surge Wirewound MELF Resistor—SWM

## ■ Current Sense Circuit

- Current Sense MELF Resistor—CSM

## ■ Ignition / Lighting Circuit

- Ignition Fixed Resistor—IG
- Ignition Noise Suppression Resistor (Wirewound Type)—ISW
- Ignition Noise Suppression Resistor—ISC (Film/Ceramic Composite Type)
- Medium Voltage Resistor—MVR
- Slug Resistor Center Coated—SLC

## ■ Precision/High Stability Circuit

- Enhanced Film Fixed Resistor—EFR
- Enhanced Film Power MELF Resistor—EFP
- Metal Film MELF Precision Resistor—MMP
- Metal Film Precision Resistor—MP
- Stabilized Film Power MELF High Power—SFP
- Stabilized Metal Film MELF Resistor—SM
- Professional Metal Film Axial Resistor—PMA
- Metal Film Fixed Resistor—M-Series
- Metal Film MELF Resistor—MM

## ■ Power Circuit (>3W)

- Enhanced Film Power MELF Resistor—EFP
- Enhanced Film Fixed Resistor—EFR
- Metal Oxide Film Fixed Resistor—MO
- Wirewound Resistors—WA
- Anti-Surge Wirewound MELF Resistor—SWM
- Anti-Surge Wirewound Resistor—SWA

## ■ High Voltage Circuit

- High Voltage MELF Resistor—HVM
- High Voltage Resistor—HVR
- Medium Voltage Resistor—MVR
- Pulse Load High Voltage MELF Resistor—PVM

## ■ High Frequency Circuit

- High Frequency Terminator Resistor—HFT

Established management system according to ISO14001 standards

Developed Current Sense MELF Resistor

Developed Anti-Surge Wirewound Fast-Fuse Resistor

ISO 9001 certificated

Developed Anti-Surge Wirewound Resistor

2015

2018

1999

2001

2008

2014

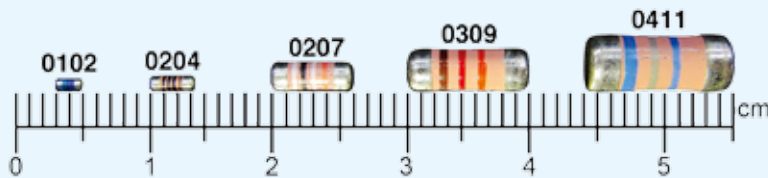
Developed 0102 Metal Film MELF Resistor



# Specialist MELF Resistors

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Cost-Down via Innovation

Over 30 years' experience in MELF resistors with high quality.



## Advantages of MELF Resistor:

- Stronger mechanical structure to endure vibration and thermal shock.
- Excellent in heat dissipation. (Especially suitable for air cooling).
- Superior surge protection than chip resistors (Surge Proof).
- Highly stable, suitable for long period usage. (Excellent Stability).
- Low TCR, high precision.

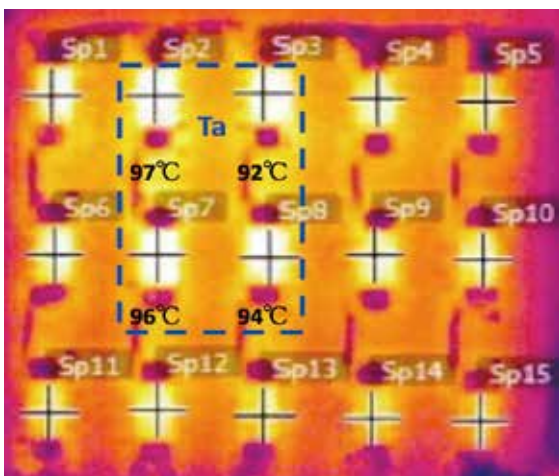
## Superior surge protection than chip resistors

Firstohm SRM204T and anti-surge 1206 CHIP resistor of Company V1 connected in series  
AC 12.25W applied individually:

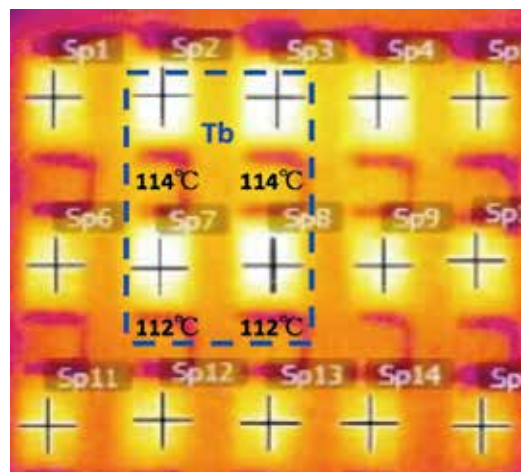
Firstohm SRM204T (100Ω, 5%)	V1 company Anti-Surge 1206 CHIP resistor (100Ω, 5%)
Average change in resistance value: < 0.1%	Open in approximately 0.1s ~ 0.2s

## Comparison of the internal heat resistance (Rthi):

Advantage Firstohm: (Better heat dissipation) ;  $\Delta T = T_b - T_a : 17^{\circ}\text{C} \sim 20^{\circ}\text{C}$



• FIRSTOHM SFP101V (MELF RESISTOR)



• Competitor V1 (Chip resistor)

# What's New

Quality • Reliability  
Cost-Down via Innovation



## What's New

### Anti-Surge Wirewound Fast-Fuse Resistor (SWAT/SWMT)

- Patented enhancement to the wire welded spot  
Taiwan patent number: I637420 United States patent number: US10170266B2  
Japan patent number: 6836669 China patent number: 4743603
- Multi-Purpose Resistors (include Fast Fusing & Anti-Surge functions) to reduce total BOM cost
- Applications now include lighting circuits, motor energizing, ignition system, rush current protection for power capacitors, mobile phone charger, etc.

### Superior Anti-Surge Wirewound Axial Resistor (SSWA)

- Special composite wirewound structure enhances anti-surge capability. "Patent pending"
- Rated to withstand the defibrillation pulse tests described in ANSI/AAMI/IEC 60601-2-27
- Rated to withstand the ESD pulse tests described in IEC 61000-4-2 (including both the 8KV contact discharge and the 15KV air discharge)

## International Certifications



REG E932/F252

### Certificate No: 40054118 & 40043961

Surge Resistant MELF Resistor (SRM Series) tested and certified according to DIN EN IEC 62368-1 (VDE 0868-1): 2021-05 Anhang/Annex G.10



Intertek

No. 0116319



UKAS MANAGEMENT SYSTEMS

014

### Certificate No: 0116319

Firstohm commits to processes that engage Various teams in providing better customer service effectively and efficiently.



Intertek

No. 0116023



UKAS MANAGEMENT SYSTEMS

014

### Certificate No: 0116023

Minimizing environmental impact while growing the business is of utmost importance to us.

# Resistors-SMD

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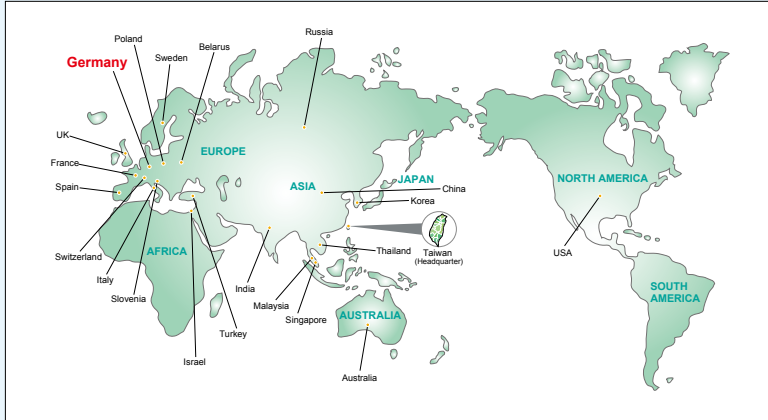
Series	Description	Power (W)	Resistance	Tolerance	T.C.R	Feature
 C3M100	Composite Film - Type Ceramic Composition MELF Resistor	1W	33R~22K	±10%, ±20%	-3000	<ul style="list-style-type: none"> <li>SMD-enabled structure</li> <li>Suitable replacement for ceramic composition resistors, which are requirements in most applications.</li> <li>Maximum permissible surge voltage: 15KV</li> <li>Typical 10µs maximum pulse load: 40000W</li> </ul>
 CM	Carbon Film MELF Resistor	0.25W~0.5W	0, 0.51R~10M	±5%	±300 -500 -700 -1000 -1500	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Excellent solderability termination</li> </ul>
 CSM	Current Sense MELF Resistor	0.5W~3W	10mR~510mR	±1%~±5%	±50 ±100 ±200 ±300 ±600	<ul style="list-style-type: none"> <li>High power handling with superior reliability and stability</li> <li>Conformal multi-layer coating against humidity</li> <li>SMD enabled structure with excellent solderability</li> <li>HeatSinker™ technology for better heat dissipation</li> <li>Typical temperature coefficient: 50ppm ~ 600ppm</li> </ul>
 EFP	Enhanced Film Power MELF Resistor	0.5W~5W	0, 0.51R~10M	±0.5%~±5%	±200 ±400 ±600 ±800	<ul style="list-style-type: none"> <li>High power handling</li> <li>Superior reliability and stability</li> <li>SMD enabled structure with excellent solderability</li> <li>Typical temperature coefficient: 200ppm ~ 800ppm</li> </ul>
 ESM	ESD Surge Absorber MELF	$\left\{ \begin{array}{l} 80A @2/10\mu s \\ 60A @8/20\mu s \\ \text{Surge Current Capacity} \end{array} \right\}$	$\left\{ \begin{array}{l} 1300V \\ DC \\ \text{Spark-Over Voltage} \end{array} \right\}$	±30%	--	<ul style="list-style-type: none"> <li>Protects the circuit by sparking over the porous layer when surge exceeds the spark-over voltage</li> <li>Patented construction with reduced costs</li> <li>High insulation resistance, low capacitance, and fast response time</li> </ul>
 FM	Fusible MELF Resistor	0.33W~0.5W	2R2~10K	±5%	±200	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Excellent solderability termination</li> <li>Fuses within 10 sec. at 9.8W ~ 10.5W</li> </ul>
 HFT	High Frequency Terminator Resistor	0.2W~2W	24R9~75R	±0.1%~±5%	±50 ±100	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Superior frequency response</li> <li>Excellent solderability termination</li> </ul>
 HVM	High Voltage MELF Resistor	0.16W~3W	56K~68M	±1%~±5%	±200 ±400 ±800 ±1200	<ul style="list-style-type: none"> <li>Handles much higher working voltage than general purpose resistors</li> <li>Pure tin-plated termination for excellent solderability</li> <li>SMD enabled structure</li> <li>Anti-surge feature available</li> <li>Maximum working voltage: 600V DC ~ 8400V DC</li> </ul>
 ISC	Ignition Noise Suppression Resistor (Ceramic Film Composite Type)	0.5W~3W	1K~10K	±5%~±20%	±3300	<ul style="list-style-type: none"> <li>Dedicatedly designed for high-voltage spark ignition systems</li> <li>Proprietary ceramic composite withstands high-voltage surge impacts with long-term stability.</li> <li>One of few sources in the world capable of manufacturing such type of resistor</li> </ul>
 ISW	Ignition Noise Suppression Resistor (Wirewound Type)	2W~3W	1K~5K	±5%~±20%	±300	<ul style="list-style-type: none"> <li>Dedicatedly designed for high-voltage spark ignition systems</li> <li>Enhanced weld spot is reliable against surge with long-term stability</li> </ul>
 MM	Metal Film MELF Resistor	0.16W~0.5W	0, 0R51~10M	±1% ±2% ±5%	±25 ±50 ±100	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Excellent solderability termination</li> <li>Typical 10µs maximum pulse load: 32W ~ 70W</li> <li>Typical temperature coefficient: 25ppm ~ 100ppm</li> </ul>
 MM(V)	Metal Film MELF Resistor, Vehicle Grade	0.25W~0.5W	0R47~10M	±1% ±2% ±5%	±25 ±50 ±100	<ul style="list-style-type: none"> <li>AEC-Q200 compliant</li> <li>Excellent solderability termination</li> <li>Typical 10µs maximum pulse load: 35W ~ 80W</li> <li>Typical temperature coefficient: 25ppm ~ 100ppm</li> </ul>
 MM102	Metal Film MELF Resistor	0.2W	0, 0.22R~2.2M	±0.5%~±5%	±25 ±50 ±100	<ul style="list-style-type: none"> <li>AEC-Q200 compliant</li> <li>SMD-enabled structure</li> <li>Excellent solderability termination</li> <li>Typical temperature coefficient: 25ppm ~ 100ppm</li> </ul>
 MM(P)	Metal Film MELF Resistor (Pulse Withstanding)	0.16W~0.5W	0R1~330K	±1% ±2% ±5%	±50 ±100	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Excellent solderability termination</li> <li>Enhanced pulse withstanding capability</li> <li>Typical temperature coefficient: 50ppm, 100ppm</li> <li>Typical 1.2/50µs maximum pulse voltage: 4000V</li> </ul>

# Resistors-SMD

Series	Description	Power (W)	Resistance	Tolerance	T.C.R	Feature
 MMP	Metal Film MELF Precision Resistor	0.16W~1W	10R~1M	±0.1% ±0.25% ±0.5%	±5 ±10 ±15 ±25 ±50	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Excellent solderability termination</li> <li>Typical 10µs maximum pulse load: 32W ~ 70W</li> <li>Typical temperature coefficient: 5ppm ~ 50ppm</li> </ul>
 MMP(V)	Metal Film MELF Precision Resistor, Vehicle Grade	0.25W~0.5W	10R~1M	±0.1%~±0.5%	±15 ±25 ±50	<ul style="list-style-type: none"> <li>AEC-Q200 Compliant</li> <li>Excellent solderability termination</li> <li>Typical 10µs maximum pulse load: 35W ~ 80W</li> <li>Typical temperature coefficient: 15ppm ~ 50ppm</li> </ul>
 PVM	Pulse Load High Voltage MELF Resistor	0.4W~1W	300K ~39M	±1% ±5%	±50 ±100	<ul style="list-style-type: none"> <li>SMD enabled structure</li> <li>Anti-surge feature available</li> <li>Pure tin-plated termination for excellent solderability</li> <li>Proprietary thin film handles much higher working voltage than general purpose resistors</li> </ul>
 SFP	Stabilized Film Power MELF Resistor	0.4W~3W	0R5~10M	±0.5%~±5%	±50 ±100 ±200	<ul style="list-style-type: none"> <li>Low temperature coefficient and tolerances</li> <li>Excellent stability</li> <li>Superior power handling</li> <li>Typical temperature coefficient: 50ppm ~ 200ppm</li> </ul>
 SFP(V)	Stabilized Film Power MELF Resistor, Vehicle Grade	0.4W~3W	0R22~1M	±1%~±5%	±25 ±50	<ul style="list-style-type: none"> <li>AEC-Q200 Compliant</li> <li>Low temperature coefficient and tolerance</li> <li>Superior power handling</li> <li>Typical temperature coefficient: 25ppm ~ 50ppm</li> </ul>
 SLC	Slug Resistor Center Coated	0.16W~0.5W	1R~9M1	±5%~±10%	±200 ~ -800	<ul style="list-style-type: none"> <li>Specially treated metal caps withstand abrasions, impacts, and corrosions, so as to reduce contact resistance during operation. conductive film is enhanced to withstand abrasions, impacts, and corrosions as well. Suitable for clip-in (embedded) application like switches with neon indicators, neon/LED modules, LED display array, etc.</li> </ul>
 SM	Stabilized Metal Film MELF Resistor	0.16W~0.5W	0R51~10M	±1%~±5%	±25 ±50 ±100	<ul style="list-style-type: none"> <li>Conformal coating against humidity</li> <li>Excellent solderability termination</li> <li>Typical 10µs maximum pulse load: 32W ~ 70W</li> <li>Typical temperature coefficient: 25ppm ~ 100ppm</li> </ul>
 SRM 	Surge Resistant MELF Resistor	0.25W~3W	0R1~10M	±1%~5%	±100 ±200 ±400	<ul style="list-style-type: none"> <li>AEC-Q200 compliant</li> <li>IEC60065 &amp; UL1676 Compliant</li> <li>Miniaturized MELF design handles high power</li> <li>Special conductive film enhances anti-surge capability</li> <li>Absorbs harmful surge which damages precious devices or components</li> <li>SMD-enabled alternative to carbon composition resistors</li> <li>Maximum permissible surge voltage: 2KV ~ 10KV</li> <li>Typical 10µs maximum pulse load: 70W ~ 8000W</li> <li>Approved to the safety requirement of VDE0860 under license number 40054118 &amp; 40043961</li> </ul>
 SWM	Anti-Surge Wirewound MELF Resistor	1W~4W	0R1~1K2	±5%	±100 ±200	<ul style="list-style-type: none"> <li>AEC-Q200 compliant</li> <li>SMD enabled structure</li> <li>Flameproof multi-layer coating equivalent to UL 94 V-0</li> <li>Flameproof feature equivalent to overload test UL 1412</li> <li>SWM series can be adopted for high surge applications such as high rush current protection for power capacitor, motor start-up protection, car &amp; motorcycle engine ignition, etc. to absorb harmful surge energy and prevent hazard of circuit damage caused by surge impact.</li> <li>Enhanced weld spot is reliable against surge impact</li> <li>Maximum permissible surge voltage: 11KV</li> </ul>
 SWMT	Anti-Surge Wire Wound Fast-Fuse MELF Resistors	1W~4W	1R~470R	±5%	±100 ±200	<ul style="list-style-type: none"> <li>Fast-acting fuse device for high-power applications</li> <li>Advanced combined anti-surge &amp; fast-fuse structure</li> <li>Thermal fuse to protect against over-heating in electronic products</li> <li>Flameproof multi-layer coating equivalent to UL 94 V-0</li> </ul>
 ZMM	Zero Ohm Metal Film MELF Resistor	2A ~ 4A { Maximum Current }	< 20mR	N/A	--	<ul style="list-style-type: none"> <li>SMD enable structure</li> <li>Excellent solderability termination</li> <li>Stable metal film construction</li> </ul>

# Global Reach

Quality • Reliability  
Cost-Down via Innovation



## Global Reach (The biggest market: Germany)

China	France
Hong Kong	Germany
India	Italy
Korea	Spain
Russia	Sweden
Singapore	Switzerland
Slovenija	Poland
United States	United Kingdom

*With operating culture built on its belief in sustaining growth, pursuit of excellence, and most importantly, customer satisfaction, Firstohm will continue to be a prestigious player and a valuable partner in the electronic component industry.*

### At a Glance

- Services Available:
  - ▶ Resistor Manufacturing
  - ▶ Resistor Research and Development
  - ▶ Technical Consulting
- Registered Total Capital: USD16.70million
- Factory Locations: Hualien, Taiwan
- Main customer locations: Europe, China, Taiwan, Southeast Asia, America
- Proprietary Manufacturing Equipments and In-house R&D Capability
- Specialty Item: MELF Resistors

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*Firstohm group commits to make the earth a better place*

