Firstohm®

Quality , Reliability ,
Cost-Down via Technology

第一電阻電容器股份有限公司

FIRST RESISTOR & CONDENSER CO., LTD.

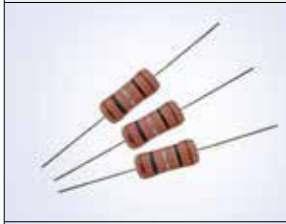
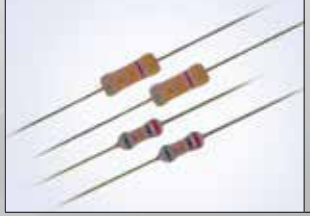
Product Summary

Quality • Reliability
Cost-Down via Technology

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**C3** **Composite Film-Type Ceramic Composition Resistor** • Innovative and cost-effective C3 technology (NOTE 1) • Conforms to ANSI/AAMI norm EC53:1995/(R)2008 5.5.3 • Suitable replacement for ceramic composition resistors, which are required in most applications. • Maximum permissible surge voltage: 15KV • Typical 1.2/50us pulse load: 90000W	2W	33R ~ 22K	±5%, ±10%, ±20%
	**CM** **Carbon Film MELF Resistor** • SMD enabled structure • Excellent solderability termination	1/6W ~ 1/2W	0R ~ 10M	± 5%
	**CSM** **Current Sense MELF Resistor** • High power handling with superior reliability and stability • Conformal multi-layer coating against humidity • SMD enabled structure with excellent solderability • HeatSinker™ technology for better heat dissipation • Typical temperature coefficient: 50ppm ~ 600ppm	1/4W ~ 3W	10mR ~ 510mR	± 1% ~ 5%

* All products are RoHS/REACH compliant unless otherwise specified. * NOTE 1: patent pending

1969
Established in Taipei, Taiwan

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**CSR** **Current Sense Resistor** • Offers better reliability than regular low-ohm resistors using our proprietary HeatSinker™ technology • Lead-free tin plated deoxygenized copper wire provides stable value of resistor during operation. • Flame-proof coating available • Typical temperature coefficient: 100ppm ~ 300ppm	1/4W ~ 5W	68mR ~ 510mR	± 1% ~ 5%
	**EFP** **Enhanced Film Power MELF Resistor** • High power handling • Superior reliability and stability • SMD enabled structure with excellent solderability • Typical temperature coefficient: 200ppm ~ 800ppm	1/2W ~ 5W	0R ~ 10M	± 0.5% ~ 5%
	**EFR** **Enhanced Film Fixed Resistor** • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • High power handling in small size • Typical temperature coefficient: 50ppm ~ 500ppm	1/2W ~ 5W	1R ~ 1M	± 1%, ± 2%, ± 5%

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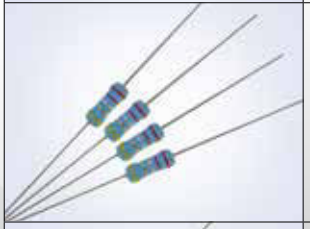
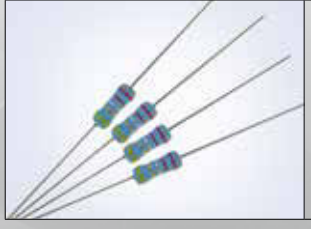
1986
Acquired precision resistor technology from Japan

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**ESM** **ESD Surge Absorber MELF** • Protects the circuit by sparking over the porous layer when surge exceeds the spark-over voltage • Patented construction with reduced costs • High insulation resistance, low capacitance, and fast response time	80A (2/10us waveform Surge Current Capacity)	1300V (DC Spark-Over Voltage)	± 30%
	**FGE** **Fusible Resistor** • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire • Typical fusing condition - (a) Standard Type: Fuses within 10 sec. at 5W ~ 6.25W (b) Power Types: Fuses within 60 sec. at 8W ~ 20W	1/4W ~ 2W	2R2 ~ 15K	± 5%
	**FGE26C** **Fusible Resistor Constant Current** • Delay fusing within 60 sec. in case of excessive current • Constant current fusing type • Fuses at low magnification of power rating (5.2 times) • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • Special tin-plated electrolytic copper lead wire • Fuses within 10 sec. at 1.6W	1/4W	0R1 ~ 0R91	±5% ~ 10%

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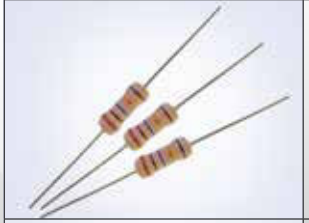
1989
Acquired chip resistor technology from Japan

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**FM** **Fusible MELF Resistor** • SMD enabled structure • Excellent solderability termination • Fuses within 10 sec. at 9.8W ~ 10.5W	1/3W ~ 1/2W	2R2 ~ 10K	± 5%
	**HDR** **High Voltage Discharge Resistor** • Excellent anti-surge characteristic • Suitable for medium to high working voltage • Flameproof coating available • Typical 1.2/50us pulse load: 100W ~ 990W	1/4W ~ 2W	100K ~ 56M	± 5%
	**HFT** **High Frequency Terminator Resistor** • SMD enabled structure • Superior frequency response • Excellent solderability termination	1/4W ~ 1/3W	25R ~ 75R	± 0.1% ~ 1%

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1991
Developed Surge/Pulse Resistant Resistors

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**HVM** **High Voltage MELF Resistor** • Handles much higher working voltage than general purpose resistors do • Pure tin-plated termination for excellent solderability • SMD enabled structure • Anti-surge feature available • Maximum working voltage: 600V DC ~ 8400V DC	1/6W ~ 3W	56K ~ 68M	± 1% ~ 5%
	**HVR** **High Voltage Resistor** • Special conductive film withstands high voltage • Maximum working voltage far over that of general-purpose resistors • Suitable for applications such as TV's, high voltage power supply, and high voltage detection. • Entire series is VDE0860 (EN60065) approved under license number 40011593 • Maximum working voltage: 1.6KV DC ~ 12KV DC • Typical temperature coefficient: 200ppm ~ 800ppm	1/4W ~ 3W	91K ~ 100M	± 1% ± 5%
	**HVR** **High Voltage Resistor (High Power)** • Special conductive film withstands voltage far over the maximum working voltage of general-purpose resistors. • Suitable for applications such as TV's, high voltage power supply, and high voltage detection. • Maximum working voltage: 35KV DC • Typical temperature coefficient: 800ppm	10W ~ 15W	100K ~ 100M	± 1%, ± 5%

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1991
Developed MELF Resistor

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**IG** **Ignition Fixed Resistor** • Special coating technique to ensure fast ignition • Color code per MIL & EIA standards • Special conductive film to fuse at high temperature • Auto cut-off after fusing/no sustainging fire hazard • Special tin-plated electrolytic copper lead wire for optimal ease of soldering and mounting	1/6W ~ 1/3W	1R ~ 150R	± 5%
	**M-Series** **Metal Film Fixed Resistor** • Conformal multi-layer coating • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire	1/6W ~ 3W	0R1 ~ 10M	± 0.1% ~ 5%
	**MM(P)** **Metal Film MELF Resistor (Pulse Withstanding)** • SMD enabled structure • Excellent solderability termination • Enhanced pulse withstanding capability • Maximum 1.2/50us pulse load: 1000W ~ 1600W • Typical temperature coefficient: 50ppm, 100ppm	1/6W ~ 1/2W	0R1 ~ 330K	± 1%, ± 2%, ± 5%

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1998
Developed High-Voltage Resistors

Product Summary

Quality • Reliability
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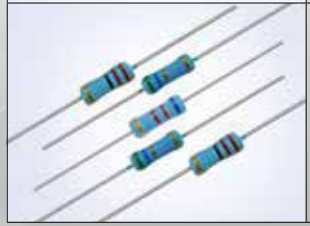
Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**MM** **Metal Film MELF Resistor** • SMD enabled structure • Excellent solderability termination • Typical 1.2/50us pulse load: 32W ~ 70W • Typical temperature coefficient: 25ppm ~ 100ppm	1/6W ~ 1/2W	0R51 ~ 10M	± 1%, ± 2%, ± 5%
	**MMP** **Metal Film MELF Precision Resistor** • SMD enabled structure • Excellent solderability termination • Typical 1.2/50us pulse load: 32W ~ 70W • Typical temperature coefficient: 5ppm ~ 50ppm	1/6W ~ 1/2W	10R ~ 1M	± 0.1%, ± 0.25%, ± 0.5%
	**MO** **Metal Oxide Film Fixed Resistor** • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • Solvent resistant • Special tin-plated electrolytic copper lead wire	1/2W ~ 10W	0R1 ~ 330K	± 5%

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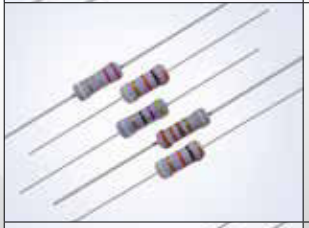
1999
Established management system according to ISO14000 standards

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**MP** **Metal Film Precision Resistor** • Conformal multi-layer coating • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire • Typical temperature coefficient: 10ppm ~ 50ppm	1/6W ~ 1/2W	10R ~ 1M	± 0.05% ~ 0.5%
	**MSD** **Pulse Safety Resistor** • Special composite film on high grade ceramic substrate • Flameproof coating meets UL 94 V-0 and overload test UL 1412 • Excellent anti-surge capability. Typical 1.2/50us pulse load: 140W ~ 4500W • Absorbs pulse from city power line, direct crossing or inductive coupling and protects electric equipment or parts from accidental shock • Low-cost alternative to wire-wound resistors	1/4W ~ 6W	0R1 ~ 1M	± 0.1% ~ 5%
	**MVR** **Medium Voltage Resistor** • Higher working voltage with improved reliability • Proprietary conductive film • Especially suitable for SMPS & lighting devices • Low-cost alternative to metal-glazed resistors • Maximum working voltage: 550V DC ~ 7KV DC • Typical temperature coefficient: 100ppm ~ 800ppm	1/4W ~ 2W	47K ~ 100M	± 0.1% ~ ± 5%

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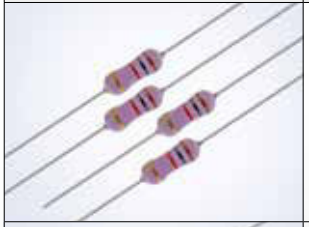
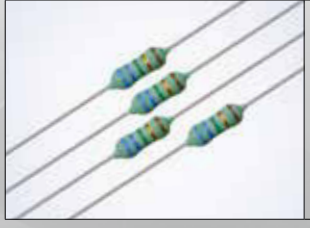
Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**NFR** **Non Flammable Carbon Film Resistor** • Conformal multi-layer non-flammable coating • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire	1/6W ~ 2W	1R ~ 10M	± 5%
	**NL** **Non-inductive Resistor** • Proprietary conductive film • Required by operating environment that demands consistent performance • Performs with virtually no inductance • Typical temperature coefficient: 100ppm ~ 300ppm	1/2W ~ 20W	0R1 ~ 47K	± 1% ± 5%
	**PMA** **Professional Metal Film Axial Resistor** • Conformal multi-layer coating • Excellent stability and better power handling • Typical temperature coefficient: 5ppm ~ 100pm	1/4W ~ 1.2W	1R ~ 4M7	± 0.1% ~ 5%

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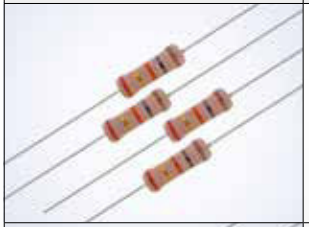
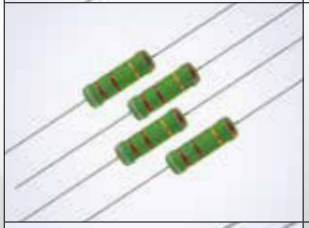
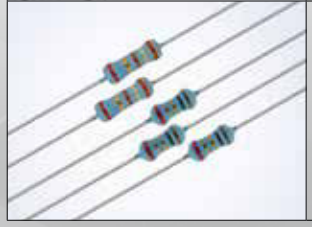
2004
High-Voltage Resistor (HVR series) passed VDE0860 (EN60065)

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**PPR** **Pulse Protective Resistor** • Application: high-frequency, sharp-impulse circuits. • Protects active components in missile detonators, triac switching circuits, etc. • Offers better performance than carbon composition resistor. • No "sintering effect" caused by high surge that greatly decreases resistance value. • Conformal multi-layer non-flammable coating • Maximum permissible surge voltage: 5KV ~ 20KV • Typical 1.2/50us pulse load: 75W ~ 1300W	1/6W ~ 2W	2R2 ~ 4M7	± 5%
	**PSR** **Power Sink Resistor** • Designed to replace cement resistors • Auto insertion feasible • Enhanced conductive film absorbs pulse noise • Superior-grade ceramic core dissipates heat efficiently • Flameproof multi-layer coating meets UL 94 V-0 & overload test UL 1412 • Maximum permissible surge voltage: 20KV • Typical 1.2/50us pulse load: 1700W	6W	1R ~ 4M7	± 5%
	**PWR** **Power Metal Film Resistor** • Conformal multi-layer coating • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire • Typical temperature coefficient: 250ppm	0.6W ~ 2W	0R22 ~ 1M	± 5%

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2008
Developed Current Sense MELF Resistor

Product Summary

Quality • Reliability
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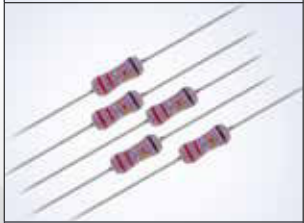
Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**R-Series** **Carbon Film Power Resistor** • Conformal multi-layer coating • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire • Non-flammable coating option available	1/6W ~ 3W	1R ~ 10M	± 5%
	**SCP** **Short Circuit Protection Resistor** • Advanced multi-functional design • Cut-off on overload or accidental short circuit • Transient withstanding for power-line coupling • Flameproof multi-layer coating meets UL 94 V-0 and overload test UL 1412 • Better alternative to wire-wound resistors • Maximum overload voltage: 600V ~ 700V • Fuses within 60 sec. at 12W ~ 30W	1/2W ~ 3W	2R2 ~ 10K	± 5%
	**SFP** **Stabilized Film Power MELF Resistor** • Low temperature coefficient and tolerances • Excellent stability • Superior power handling • Typical temperature coefficient: 50ppm ~ 200ppm	1/2W ~ 3W	0R5 ~ 10M	± 0.5% ~ 5%

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First non-resistor product officially launched - Spark-Gap Surge Absorber (SGS) 2010

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SGS** **Spark-Gap Surge Absorber** • Low-cost patented construction (EP 09000962.2) • No light-dark effect • Low capacitance / short response time / fast ignition • Response time: ≤1ns	80A (2/10us waveform Surge Current Capacity)	1550V ~ 3300V (DC Spark-Over Voltage)	± 30%
	**SLC** **Slug Resistor Center Coated** • 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.	1/6W ~ 1/2W	1R ~ 9M1	± 5% ~ 10%
	**SM** **Stabilized Metal Film MELF Resistor** • Conformal coating against humidity • Excellent solderability termination • Typical 1.2/50us pulse load: 32W ~ 70W • Typical temperature coefficient: 25ppm ~ 100ppm	1/6W ~ 1/2W	0R51 ~ 10M	± 1% ~ 5%

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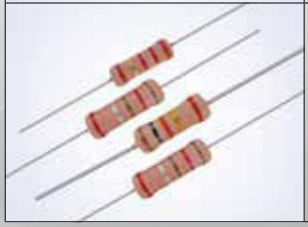
2011 SGS patent granted by European Patent Office

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SRM** **Surge Resistant MELF Resistor** • Miniaturized MELF design handles high power • Special conductive film enhances anti-surge capability • Absorbs harmful surge which damages precious devices or components • SMD-enabled alternative to carbon composition resistors • Maximum permissible surge voltage: 2KV ~ 10KV • Typical 1.2/50us pulse load: 60W ~ 6000W	1/4W ~ 3W	0R1 ~ 1M	± 1% ~ 5%
	**SRS** **Spark Noise Suppression Slug Resistor** Dedicatedly designed for high-voltage spark ignition systems. Proprietary conductive film withstands high-voltage surge impacts with long-term stability. One of few sources in the world capable of manufacturing such type of resistor. Maximum surge load: 20KV/10ns, 35KV/20ns, 50KV/20ns, 50KV/30ns Note: to be replaced by ISC/ISW series effectively March 2015.	1/2W ~ 4W	10R ~ 33K	± 5% ~ 20%
	**SSR** **Surge Safety Resistor** • Designed to replace carbon or ceramic composition resistor • Absorbs harmful surge energy, so to prevent hazard of fire and circuit damage caused by surge energy with a flame proof coating • High-surge applications: fuel ignition systems, power charging/discharging circuits, TV sets, etc. • Maximum permissible surge voltage: 7.5KV ~ 35KV • Typical 1.2/50us pulse load: 450W ~ 17000W	1/6W ~ 5W	10R ~ 330K	± 5%

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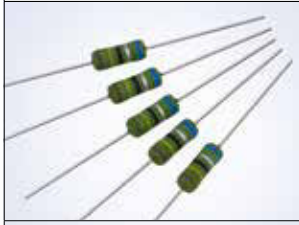
SGS patent granted in Japan, China, and Korea 2012

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SWA** **Anti-Surge Wirewound Resistor** • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL1412 • SWA series can be adopted for high surge applications such as high rush current protection for power capacitor, motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge energy and prevent hazard of circuit damage caused by surge impact. • Enhanced weld spot is reliable against surge impact • Special tin-plated electrolytic copper lead wire • Typical 1.2/50us pulse load: 12000W ~ 36000W**	1W ~3W	0R1 ~ 1K5	± 5%
	**SWM** **Anti-Surge Wirewound MELF Resistor** • SMD enabled structure • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • SWM series can be adopted for high surge applications such as high rush current protection for power capacitor, motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge energy and prevent hazard of circuit damage caused by surge impact. • Enhanced weld spot is reliable against surge impact • Typical 1.2/50us pulse load: 8000W ~ 32000W**	1W ~4W	0R1 ~ 1K5	± 5%
	**WA** **Wirewound Resistors** • Flameproof multi-layer coating meets UL 94 V-0 • Flameproof feature meets overload test UL 1412 • Color code per MIL & EIA standards • Special tin-plated electrolytic copper lead wire	1/2W ~ 8W	0R1 ~ 3K3	± 2% ± 5%

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Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**ZMM** **Zero Ohm Metal Film MELF Resistor** • SMD enable structure • Excellent solderability termination • Stable metal film construction	2A ~ 4A [Maximum Current]	< 20mR	N/A
	**ZOM** **Zero Ohm Metal Film Resistor** • Conformal multi-layer coating against humidity • Very low resistance • Stable metal film construction • Special tin-plated deoxygenized copper wire for resistance stabilization during operation	3A ~ 5A [Maximum Current]	< 10mR	N/A

* All products are RoHS/REACH compliant unless otherwise specified.

Detail information of following products can be expected in late 2014/early 2015. Please contact us for more information.

- Size 0102 Metal Film MELF Resistor
- ISC - Ignition Noise Suppression Resistor (Film/Ceramic Composite Type): designed for high-voltage spark ignition systems
- ISW - Ignition Noise Suppression Resistor (Wirewound Type): designed for high-voltage spark ignition systems
- MVM - Medium Voltage MELF Resistor