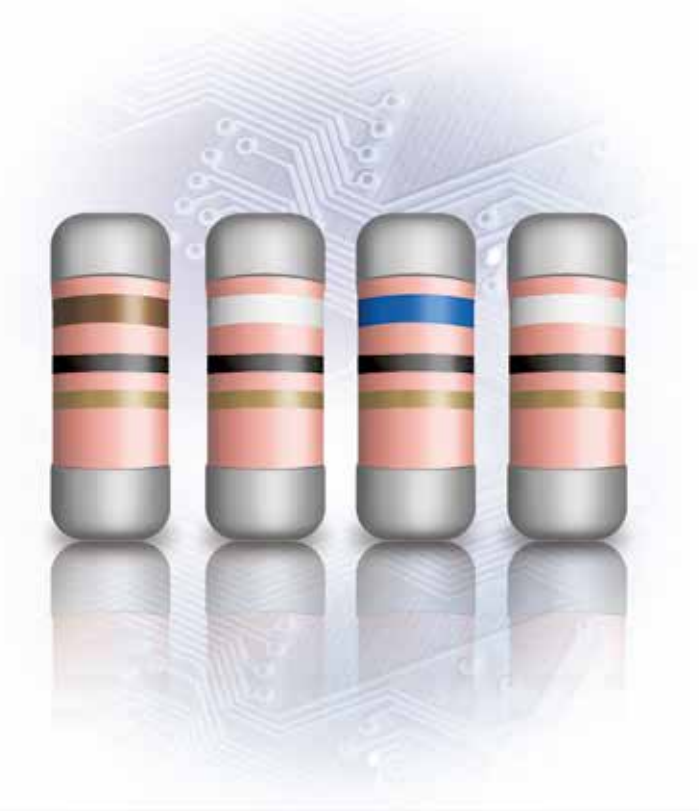
Firstohm®

Quality , Reliability ,
Cost-Down via Innovation



第一電阻電容器股份有限公司

FIRST RESISTOR & CONDENSER CO., LTD.

~ To be your valuable partner in the component industry through constant product innovation and customer satisfaction ~

~ Firstohm, where OHM comes FIRST ~

Certificate No. FM 577844

Certificate No. EMS 594693

Product Reference Table

Type	C3	C3M	CM	CSM	CSR	EFP	EFR	ESM	FGE	FGE26C	FM	HFT	HVM	HVR	HVR	IG	ISC	ISW	M-Series	MM	MM (P)	MMP
Product Name	Composite Film-type Ceramic Composition Resistor	Composite Film-Type Ceramic Composition MELF Resistor	Carbon Film MELF Resistor	Current Sense MELF Resistor	Current Sense Resistor	Enhanced Film Power MELF Resistor	Enhanced Film Fixed Resistor	ESD Surge Absorber MELF	Fusible Resistor	Fusible Resistor Constant Current	Fusible MELF Resistor	High Frequency Terminator Resistor	High Voltage MELF Resistor	High Voltage Resistor	High Voltage Resistor (High Power)	Ignition Fixed Resistor	Ignition Noise Suppression Resistor (Film/ Ceramic Composite Type)	Ignition Noise Suppression Resistor (Wirewound Type)	Metal Film Fixed Resistor	Metal Film MELF Resistor	Metal Film MELF Resistor (Pulse Withstanding)	Film MELF Precision Resistor
Circuit Types																						
Charge/Discharge/ Anti-Surge	●	●						●					●	●			●	●			●	
Current Sense				●	●																	
High Frequency												●										
High Precision																						●
High Stability						●	●															●
High Voltage								●					●	●	●							
Ignition / Lighting	●	●														●	●	●				
Power Circuit						●									●							
Safety / Protection	●	●						●	●	●	●											
Jumper																						

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Product Reference Table

MMP (V)	MO	MP	MSD	MVM	MVR	NFR	NWA	PMA	PPR	PSR	PWR	R-Series	SCP	SFP	SFP (V)	SGS	SLC	SM	SRM	SSR	SWA	SWM	WA	ZMM	ZOM
Metal Film MELF Precision Resistor(Vehicle Grade)	Metal Oxide Film Fixed Resistor	Metal Film Precision Resistor	Pulse Safety Resistor	Medium Voltage MELF Resistor	Medium Voltage Resistor	Non Flammable Carbon Film Resistor	Non-inductive Wire Wound Resistor	Professional Metal Film Axial Resistor	Pulse Protective Resistor	Power Sink Resistor	Power Metal Film Resistor	Carbon Film Power Resistor	Short Circuit Protection Resistor	Stabilized Film Power MELF Resistor	Stabilized Film Power MELF Resistor(Vehicle Grade)	Spark-Gap Surge Absorber	Slug Resistor Center Coated	Stabilized Metal Film MELF Resistor	Surge Resistant MELF Resistor	Surge Safety Resistor	Anti-Surge Wirewound Resistor	Anti-Surge Wirewound MELF Resistor	Wirewound Resistors	Zero Ohm Metal Film MELF Resistor	Zero Ohm Metal Film Resistor
			●	●	●				●				●			●			●	●	●	●			
							●																		
●		●						●										●							
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																								●	●

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Product Reference Table

Type		C3	C3M	CM	CSM	CSR	EFP	EFR	ESM	FGE	FGE26C	FM	HFT	HVM	HVR	HVR	IG	ISC	ISW	M-Series	MM	MM (P)	MMP
Product Name		Composite Film-type Ceramic Composition Resistor	Composite Film-Type Ceramic Composition MELF Resistor	Carbon Film MELF Resistor	Current Sense MELF Resistor	Current Sense Resistor	Enhanced Film Power MELF Resistor	Enhanced Film Fixed Resistor	ESD Surge Absorber MELF	Fusible Resistor	Fusible Resistor Constant Current	Fusible MELF Resistor	High Frequency Terminator Resistor	High Voltage MELF Resistor	High Voltage Resistor	High Voltage Resistor (High Power)	Ignition Fixed Resistor	Ignition Noise Suppression Resistor (Film/Ceramic Composite Type)	Ignition Noise Suppression Resistor (Wirewound Type)	Metal Film Fixed Resistor	Metal Film MELF Resistor	Metal Film MELF Resistor (Pulse Withstanding)	Film MELF Precision Resistor
Industries	Power Supply	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●	●	●
	Telecomm	●	●	●	●	●	●		●				●	●							●	●	●
	Meter	●	●	●	●	●	●	●	●				●	●	●	●					●	●	●
	Medical	●	●	●	●	●	●	●	●				●	●	●	●					●	●	●
	Automotive			●	●	●	●						●	●			●	●	●		●	●	●
	Lighting			●	●	●	●	●	●				●	●	●	●					●	●	●
	Surface Mount Enabled		●	●	●		●		●			●	●	●				●	●		●	●	●

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●	●	●	●	●	●	●	Metal Film MELF Precision Resistor(Vehicle Grade)	MMP (V)
						●	Metal Oxide Film Fixed Resistor	MO
			●	●			Metal Film Precision Resistor	MP
			●	●	●	●	Pulse Safety Resistor	MSD
●	●		●	●		●	Medium Voltage MELF Resistor	MVM
	●		●	●		●	Medium Voltage Resistor	MVR
						●	Non Flammable Carbon Film Resistor	NFR
					●	●	Non-inductive Wire Wound Resistor	NWA
			●	●			Professional Metal Film Axial Resistor	PMA
			●	●	●	●	Pulse Protective Resistor	PPR
						●	Power Sink Resistor	PSR
			●	●			Power Metal Film Resistor	PWR
							Carbon Film Power Resistor	R-Series
			●	●	●	●	Short Circuit Protection Resistor	SCP
●						●	Stabilized Film Power MELF Resistor	SFP
●		●				●	Stabilized Film Power MELF Resistor(Vehicle Grade)	SFP (V)
	●		●	●	●	●	Spark-Gap Surge Absorber	SGS
●	●	●					Slug Resistor Center Coated	SLC
●	●	●	●	●	●	●	Stabilized Metal Film MELF Resistor	SM
●	●	●	●	●	●	●	Surge Resistant MELF Resistor	SRM
	●	●	●	●	●	●	Surge Safety Resistor	SSR
	●		●	●	●	●	Anti-Surge Wirewound Resistor	SWA
●	●		●	●	●	●	Anti-Surge Wirewound MELF Resistor	SWM
						●	Wirewound Resistors	WA
●	●	●	●	●	●	●	Zero Ohm Metal Film MELF Resistor	ZMM
							Zero Ohm Metal Film Resistor	ZOM

Product Reference Table

Product Summary

Quality • Reliability
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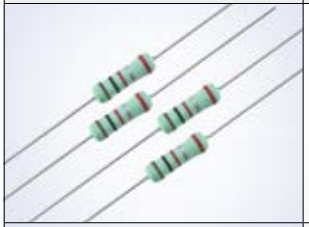
Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**C3** **Composite Film-Type Ceramic Composition Resistor** • Innovative and cost-effective C3 technology (NOTE 1) • Conforms to ANSI/AAMI norm EC53:1995/(R)2008 5.5.3 • Suitable replacement for ceramic composition resistors, which are required in most applications. • Maximum permissible surge voltage: 15KV • Typical 1.2/50us pulse load: 90000W	1W	33R ~ 22K	±5%, ±10%, ±20%
	**C3M100** **Composite Film - Type Ceramic Composition MELF Resistor** • SMD-enabled structure • Suitable replacement for ceramic composition resistors, which are requiements in most applications. • Maximum permissible surge voltage: 15KV • Typical 1.2/50μs pulse load: 20000W	1W	33R ~ 22K	±5% ~ 20%
	**CM** **Carbon Film MELF Resistor** • SMD enabled structure • Excellent solderability termination	1/6W ~ 1/2W	0.51R ~ 10M	± 5%

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

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**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%
	**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	0.51R ~ 10M	± 0.5% ~ 5%

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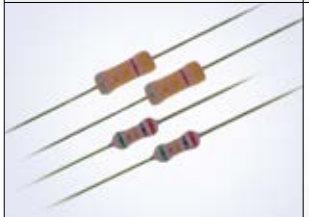
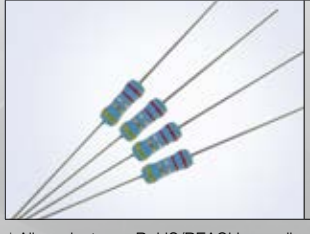
1986
Acquired precision resistor technology from Japan

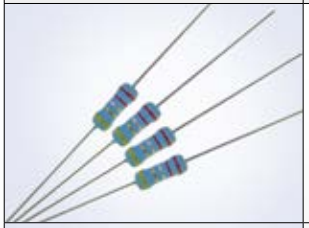
Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**EFR** **Enhanced Film Fixed Resistor** • Flameproof multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to overload test UL 1412 • High power handling in small size • Typical temperature coefficient: 50ppm ~ 500ppm	1/2W ~ 5W	1R ~ 1M	± 1%, ± 2%, ± 5%
	**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 @2/10μs 60A @8/20μs Surge Current Capacity	1300V DC Spark-Over Voltage	± 30%
	**FGE** **Fusible Resistor** • Flameproof multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to 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 ~ 24W	1/4W ~ 3W	2R2 ~ 15K	± 5%

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

1989
Acquired chip resistor technology from Japan

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**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 equivalent to UL 94 V-0 • Flameproof feature equivalent to overload test UL 1412 • Special tin-plated electrolytic copper lead wire • Fuses within 10 sec. at 1.6W	1/4W	0R1 ~ 0R91	±5% ~ 10%
	**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%
	**HFT** **High Frequency Terminator Resistor** • SMD enabled structure • Superior frequency response • Excellent solderability termination	1/4W ~ 2W	25R ~ 75R	± 0.1% ~ 1%

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

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 • 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

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	1R ~ 150R	± 5%
	**ISC** **Ignition Noise Suppression Resistor (Ceramic Film Composite Type)** • Dedicatedly designed for high-voltage spark ignition systems • Proprietary ceramic composite withstands high-voltage surge impacts with long-term stability. • One of few sources in the world capable of manufacturing such type of resistor	1/2W ~ 3W	1K ~ 10K	±5% ~ 20%
	**ISW** **Ignition Noise Suppression Resistor (Wirewound Type)** • Dedicatedly designed for high-voltage spark ignition systems • Enhanced weld spot is reliable against surge with long-term stability	2W ~ 3W	1K ~ 5K	±5% ~ 20%

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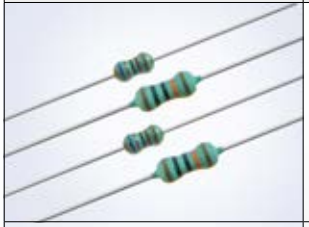
1998
Developed High-Voltage Resistors

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**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** **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%
	**MM102** **Metal Film MELF Resistor** • SMD-enabled structure • Excellent solderability termination • Typical temperature coefficient: 25ppm - 100ppm	0.2W	0.22R ~ 2.2M	±0.5% ~ 5%

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

1999
Established management system according to ISO14000 standards

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**MM(P)** **Metal Film MELF Resistor (Pulse Withstanding)** • SMD enabled structure • Excellent solderability termination • Enhanced pulse withstanding capability • Typical temperature coefficient: 50ppm, 100ppm	1/6W ~ 1/2W	0R1 ~ 330K	± 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%
	**MMP(V)** **Metal Film MELF Precision Resistor, Vehicle Grade** • AEC-Q200 Compliant • Excellent solderability termination • Typical 1.2/50μs pulse load: 35W - 80W • Typical temperature coefficient: 25ppm - 100ppm	0.25W ~ 0.5W	10R ~ 1M	±0.1% ~ 0.5%

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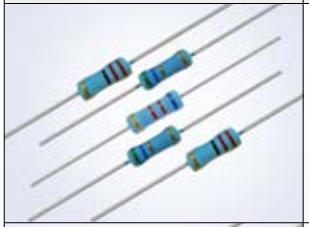
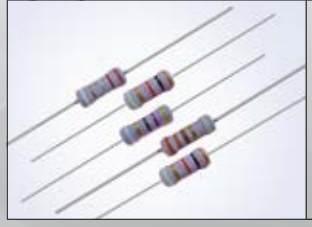
2001
ISO 9001 certified

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**MO** **Metal Oxide Film Fixed Resistor** • Flameproof multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to overload test UL 1412 • Solvent resistant • Special tin-plated electrolytic copper lead wire	1/2W ~ 10W	0R1 ~ 330K	± 5%
	**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 multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to 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%

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

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

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**MVM** **Medium Voltage MELF Resistor** • SMD enabled structure • Anti-surge feature available • Pure tin-plated termination for excellent solderability • Handles much higher working voltage than general purpose resistors • Maximum working voltage: 750V DC - 1,000V DC	1/6W ~ 1/4W	56K ~ 40M	±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%
	**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%

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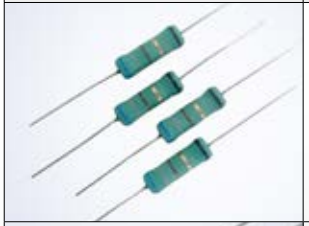
2008
Developed Current Sense MELF Resistor

Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**NWA** **Non-inductive Wire Wound Resistor** • Flameproof multi-layer coating equivalent to UL 94- V-0 • Flameproof feature equivalent to overload test UL 1412 • Special wire winging technique • Special tin-plated electrolytic cooper lead wire	6W ~ 10W	0.1R ~ 1K1	±5%
	**PMA** **Professional Metal Film Axial Resistor** • Conformal multi-layer coating • Excellent stability and better power handling • Typical temperature coefficient: 5ppm ~ 100pm	2/5W ~ 1.2W	1R ~ 4M7	± 0.1% ~ 5%
	**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	1/4W ~ 2W	2R2 ~ 4M7	± 5%

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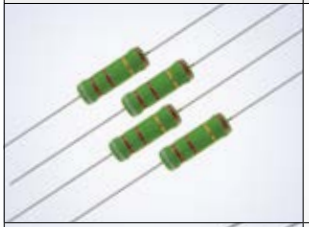
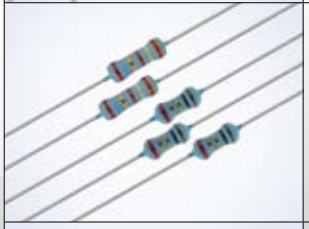
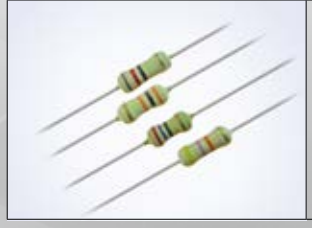
First non-resistor product officially launched - Spark-Gap Surge Absorber (SGS) **2010**

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**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 equivalent to UL 94 V-0 • Flameproof feature equivalent to 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%
	**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%

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Product Summary

Quality • Reliability
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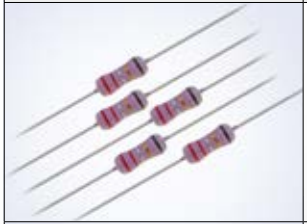
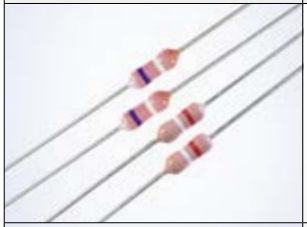
Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SCP** **Short Circuit Protection Resistor** • Advanced multi-functional design • Cut-off on overload or accidental short circuit • Transient withstanding for power-line coupling • Flameproof multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to overload test UL 1412 • Possible 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%
	**SFP(V)** **Stabilized Film Power MELF Resistor, Vehicle Grade** • AEC-Q200 Complicant • Low temperature coefficient and terance • Superior power handing • Typical temperature coefficient: 25ppm - 50ppm	1/2W ~ 3W	1K ~ 5K	±1% ~ 5 %

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

SGS patent granted in Japan, China, and Korea 2012

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 60A @8/20us Surge Current Capacity	1550V ~ 3300V DC Spark-Over Voltage	± 30%
	**SL** **Slug Resistor** • 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. • Protective coating is optional	1/6W ~ 1/2W	1R ~ 9M1	± 5% ~ 10%
	**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%

* All products are RoHS/REACH compliant unless otherwise specified.
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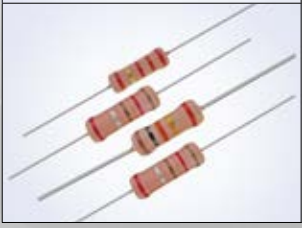
Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SM** **Stabilized Metal Film MELF Resistor** • Conformal coating against humidity • Excellent solderability termination • Typical 1.2/50us pulse load: 32W ~ 70W • Typical temperature coefficient: 25ppm ~ 100ppm	1/6W ~ 1/2W	0R51 ~ 10M	± 1% ~ 5%
	**SRM** **Surge Resistant MELF Resistor** • IEC60065 & UL1676 Compliant • 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 • Approved to the safety requirement of VDE0860 under license number 40043961	1/4W ~ 3W	0R1 ~ 1M	± 1% ~ 5%
	**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	1/4W ~ 5W	10R ~ 330K	± 5%

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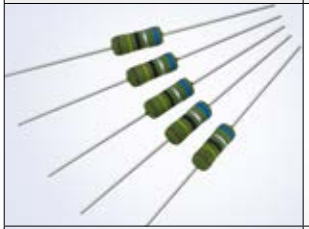
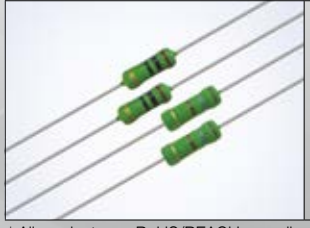
Product Summary

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	**SWA** **Anti-Surge Wirewound Resistor** • Flameproof multi-layer coating equivalent to UL 94 V-0 • Flameproof feature equivalent to overload test UL 1412 • 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 equivalent to UL 94 V-0 • Flameproof feature equivalent to 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 mequivalent to UL 94 V-0 • Flameproof feature equivalent to 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

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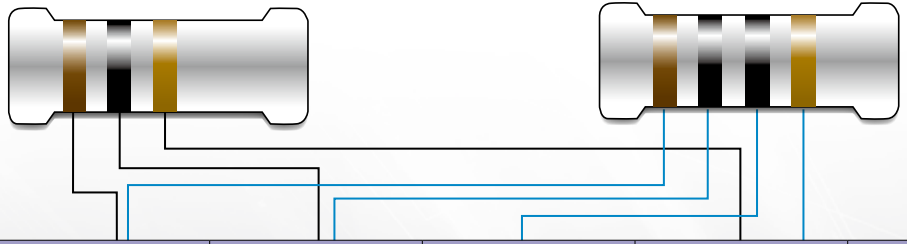
Color Code for Discrete Resistors

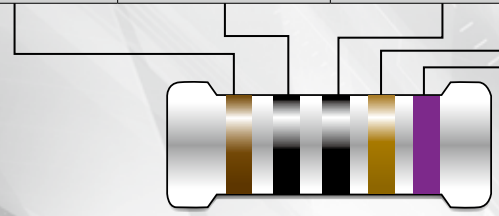
3-BAND-CODE
(Tolerance ±2%, ±5%, ±10%)

4-BAND-CODE
(Tolerance ±0.25%, ±0.5%, ±1%)



COLOUR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1	
Brown	1	1	1	10^1	± 1%
Red	2	2	2	10^2	± 2%
Orange	3	3	3	10^3	
Yellow	4	4	4	10^4	
Green	5	5	5	10^5	± 0.5%
Blue	6	6	6	10^6	± 0.25%
Violet	7	7	7	10^7	± 0.1%
Grey	8	8	8	10^6	± 0.05%
White					
Gold				10^{-1}	± 5%
Silver				10^{-2}	± 10%

COLOUR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1	
Brown	1	1	1	10^1	± 1%
Red	2	2	2	10^2	± 2%
Orange	3	3	3	10^3	
Yellow	4	4	4	10^4	
Green	5	5	5	10^5	± 0.5%
Blue	6	6	6	10^6	± 0.25%
Violet	7	7	7	10^7	± 0.1%
Grey	8	8	8	10^6	± 0.05%
White					
Gold				10^{-1}	± 5%
Silver				10^{-2}	± 10%



5-BAND-CODE
(Tolerance ±0.1%)

Firstohm®

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