Thin Film Resistor

Viking Tech Corporation

IATF16949
ISO9001
ISO14001
ISO13485

About Viking

Viking Tech was established in 1997, Taiwan, as the leader in the design, manufacturing and marketing of Thin-Film / Thick-Film / Multilayer / Wirewound Resistors, Capacitors, Inductors.

Your reliable partner, well-experienced in the design of innovative components, offering excellent products to the Global customers. A professional manufacturer for miniature, precision, High power, Ultra stability passive components.

1997-2011

Established & Expanded

- 1997 Established for Integrated Passive Devices. Thin Film Foundry Service OEM/ODM.
- 2002 Acquired Chip Resistor Company (TMTEC) ISO9001/14001, TS16949 Certificated, MELF Resistor

2011-2016

Go on Public

- Viking Tech go on Public in Taiwan.
- Set up Viking Tech America Corporation
- Expansion Hsin chu Factory II

2016-2019

Automotive Market

- Automotive market (IATF16949 Certificated)
- Factory in Taiwan were all processed VDA 6.3

2020-2022

Medical Market

- Medical market (ISO13485 approved)
- Aggressively Extension for Thin Film, MELF, Thick Film Resistor production.
- MES (Manufacturing Execution System)

2022-2026

Thin Film Resistor

- More solutions for environment and future
- Keep developing new products to cover more niche market

Advanced, Experienced Component Technology

Flexible Extension Sufficient Capacity

Wide Range Products. Excellent Technical Support

Well-Organized, ERP System. IATF16949, Automotive Grade

Quick Turnaround Time and Response

CP↑

On Public Company Superior Management High Yield, Cost Effective

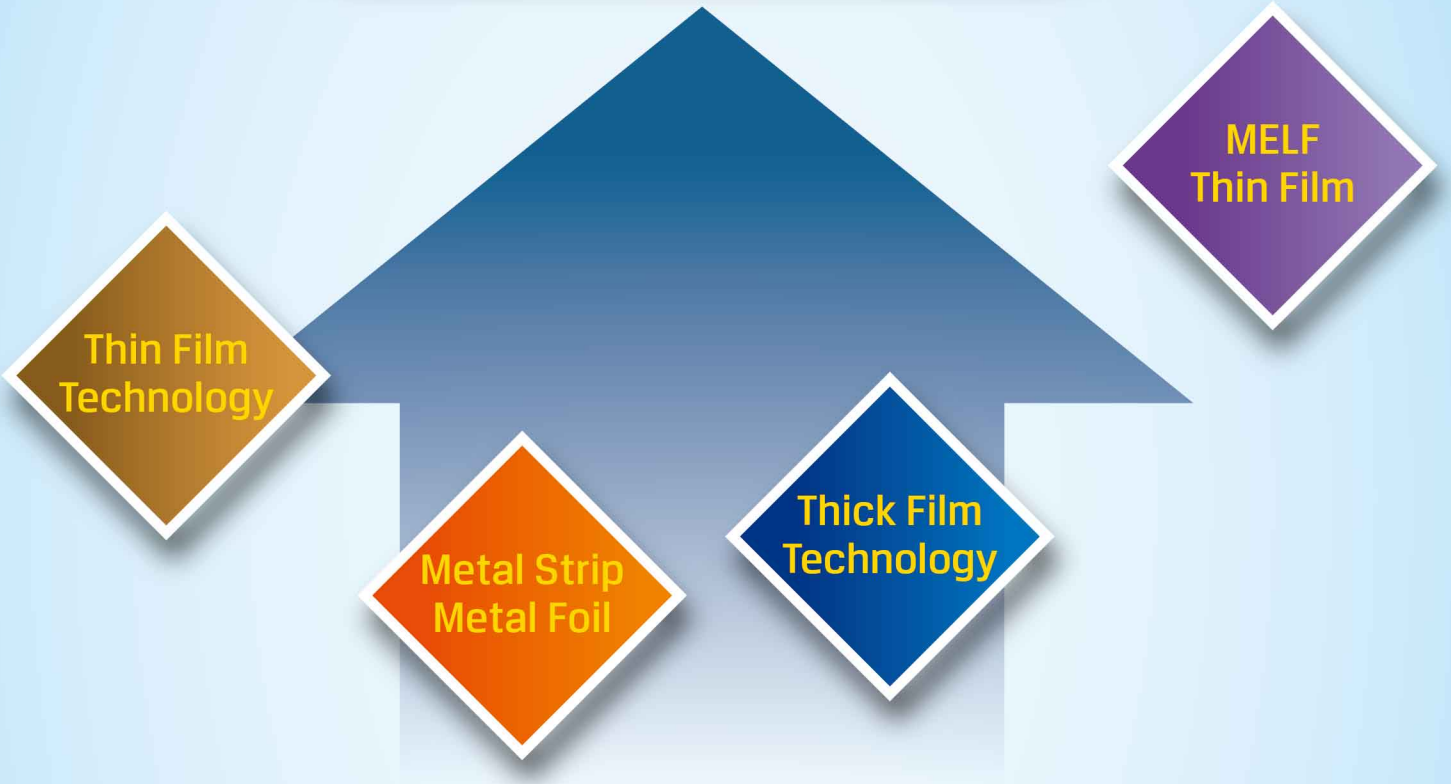
FAST

Short Lead Time and Free Sample Support

Extensive RD Team, Miniature Size, High Power, New Product Development

Viking's Resistor Core Technologies

Viking Tech Corporation



Thin Film Precision Resistor

TaN/NiCr
High Power
High Voltage
High Temp
High Frequency

Current Sensing Resistor

Metal Strip
Metal Foil
Thick Film
Thin Film

Various Functional Resistor

Pulse/Surge
High Power
High Voltge
Anti-sulfur
High Temp

MELF Thin Film Precision

High Power
High Voltge
High Frequency

Viking's Business Strategy

01 All product meet AEC-Q200 standards and factories passing automotive customers' VDA6.3 audition.

02 Focusing on customer's new design & development. Taking one manufacturer as our reference for developing new product.

03 Focusing on ISO13485, Class I & II. 5G application product. New energy, AI application.

04 Upgrade current product for well replacement of remarkable brand. Developing advanced new products to meet market trend.

Automotive Market

High-End Market

Medical Devices Market
5G Market

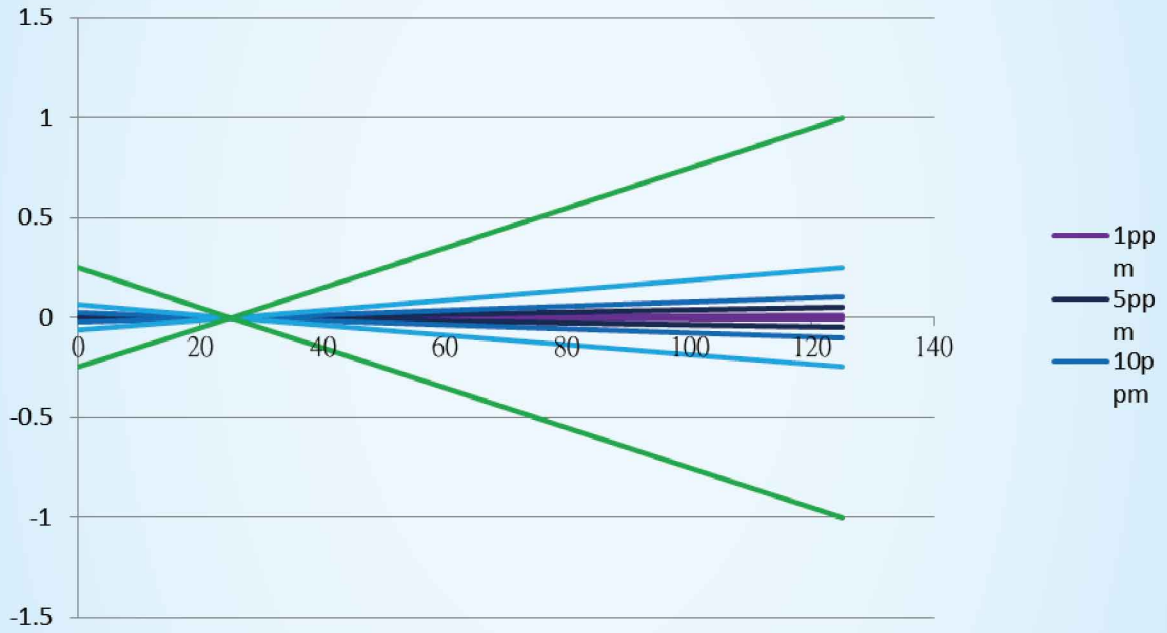
Consumer Market

5G

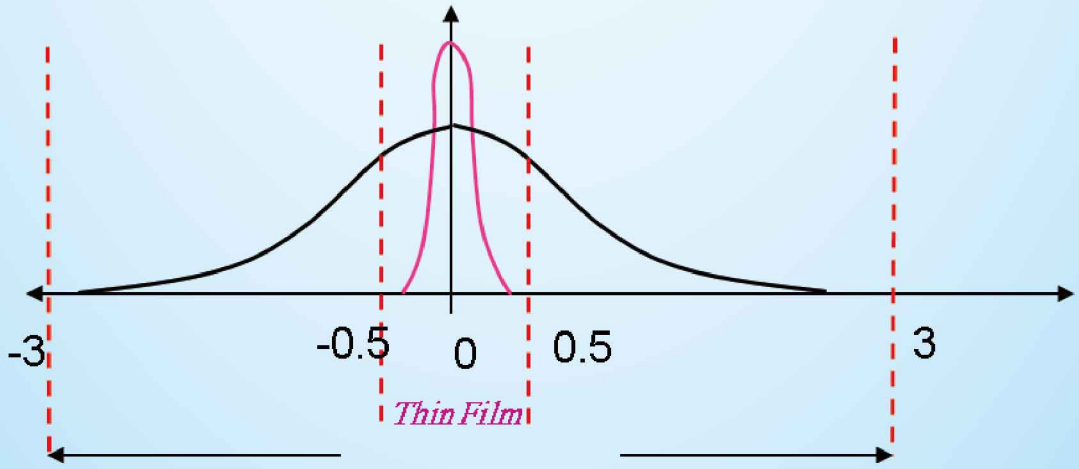
Thin Film Technology Precision Resistor

Viking is excellent with sputtering thin film technology for manufacturing accurate resistor. It offers outstanding performance characteristics, excellent stability, Applications for high reliable requirements such as industrial instrumentation, test and measurement equipment, automotive electronics, and medical. Thin Film precision resistor is the perfect choice with completed sizes from 0201 to 2512, Very tight tolerance to 0.01%. extremely low down to TCR 1ppm.

LOW TCR to 1ppm



Tight Tolerance to 0.01%



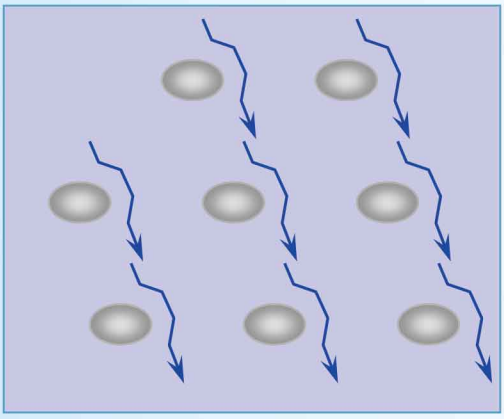
Why thin films provide better anti-Pulse / ESD ?

Resistance material of

Thin Film

Ni-Cr alloy/ TaN

Current flow is practically even

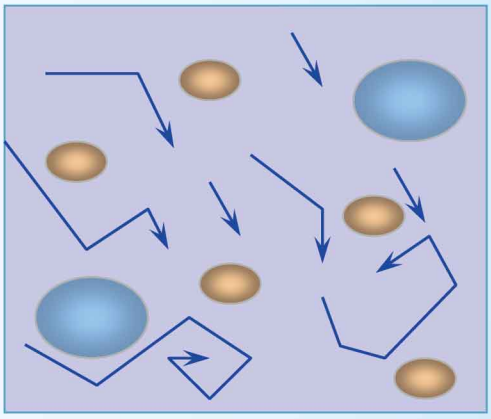


Resistance material of

Thick Film

Metal & Insulator composite

Current flow is not even



Environmental Characteristics

Technology	Short time overload	Endurance	Damp Heat with Load	Resistance to Soldering Heat	Biased Humidity 85/85 1000 hours	Rapid Change of Temp
Thin Film	ΔR±0.05%/ 0.1% ΔR±0.2% for high power rating	ΔR±0.05%/ 0.1% ΔR±0.5% for high power rating	ΔR±0.05% ΔR±0.5% for high power rating	ΔR±0.05%/ 0.1%	ΔR±0.1%	ΔR±0.05% ΔR±0.5% for high power rating
Thick Film	ΔR±1%	ΔR±1%	ΔR±1%	ΔR±0.5%	ΔR±1~2%	ΔR±0.5%

Thin Film Precision Resistor-
AR / ARG series

Series	PN	Size	Power	Tolerance	Resistance	TCR/PPM
Precision NiCr	AR01	0201	1/32W, 1/20W	±0.1%~ ±1%	22Ω~75KΩ	±25/50
	AR02	0402	1/16W, 1/10W	±0.01%~ ±1%	4Ω~511KΩ	±10/15/ 25/50
	AR03	0603	1/16W, 1/10W, 1/6W		1Ω~1MΩ	
	AR05	0805	1/10W, 1/8W, 1/4W		1Ω~2MΩ	
	AR06	1206	1/8W, 1/4W, 1/3W		1Ω~3MΩ	
	AR13	1210	1/4W, 1/3W			
	AR10	2010	1/4W, 1/3W, 1/2W			
	AR12	2512	1/2W, 3/4W, 1W		1Ω~3MΩ	
Ultra low TCR Precison NiCr	AR02	0402	1/16W, 1/10W	±0.01%~ ±1%	49.9Ω~20KΩ	±1/2/3/5
	AR03	0603	1/16W, 1/10W		24.9Ω~60KΩ	
	AR05	0805	1/10W, 1/8W		24.9Ω~150KΩ	
	AR06	1206	1/8W, 1/4W		24.9Ω~300KΩ	
	AR13	1210	1/4W, 1/3W			
	AR10	2010	1/4W, 1/3W			
	AR12	2512	1/2W			
General Purpose	ARG02	0402	1/16W	±0.1%~ ±1%	4.7Ω~255KΩ	±25/50
	ARG03	0603	1/10W		1Ω~1MΩ	
	ARG05	0805	1/8W		1Ω~2MΩ	
	ARG06	1206	1/4W		1Ω~2.49MΩ	

Features:

- Advanced thin film technology , special passivated film for protection
- Very tight tolerance down to ±0. 01%
- Extremely low TCR to 1ppm
- Wide resistance range 1ohm ~ 3Mega ohm
- Special materials, design, and processing for high sulfur applications

Applications:

- Medical Equipment
- Testing / Measurement Equipment
- Power supplies, Converters
- Printer Equipment, High-end NB
- Automatic Equipment Controller
- Audio, Amplifier
- Communication Device, Cell Phone, GPS, PDA

Tantalum Nitride (TaN) Thin Film Precision Chip Resistor- TAR Series

The Tantalum Nitride resistive film forms a moisture impervious tantalum pentoxide barrier layer that can withstand thousands biased humidity testing at 85 °C /85% relative humidity, This precision robust performance is an ideal choice for a wide range of applications requiring precision resistance with long term stability, reliability, and critical environmental. TaN thin film resistor is for your high –level application designs.

PN	Size	Power	Tolerance	Resistance	TCR/PPM
TAR02	0402	1/16W	±0.05%~±1%	40Ω~35KΩ	±10/15/25/50
TAR03	0603	1/6W		40Ω~130KΩ	
TAR05	0805	1/5W		10Ω~350KΩ	
TAR06	1206	1/2W		10Ω~1MΩ	

Features:

- Tantalum nitride thin film resistor
- High stability in humid environments
- Moisture resistant tantalum nitride resistive film
- AEC-Q200 Compliance
- Tight tolerance down to ±0.05% ,0.1%
- Extremely low TCR down to ±10PPM/°C
- Resistance values from 10 ohm to 1M ohm
- Test proven immunity to humidity, moisture, and sulfur

Applications:

- Automotive
- Medical Equipment
- Testing / Measurement Equipment
- Automatic Equipment Controller
- Converters
- Communication Device
- Instrumentation
- Aerospace
- Portable communications,
- Diagnostic equipment,
- Medical devices

High Reliability Thin Film Chip Resistors-ARM ..A Series

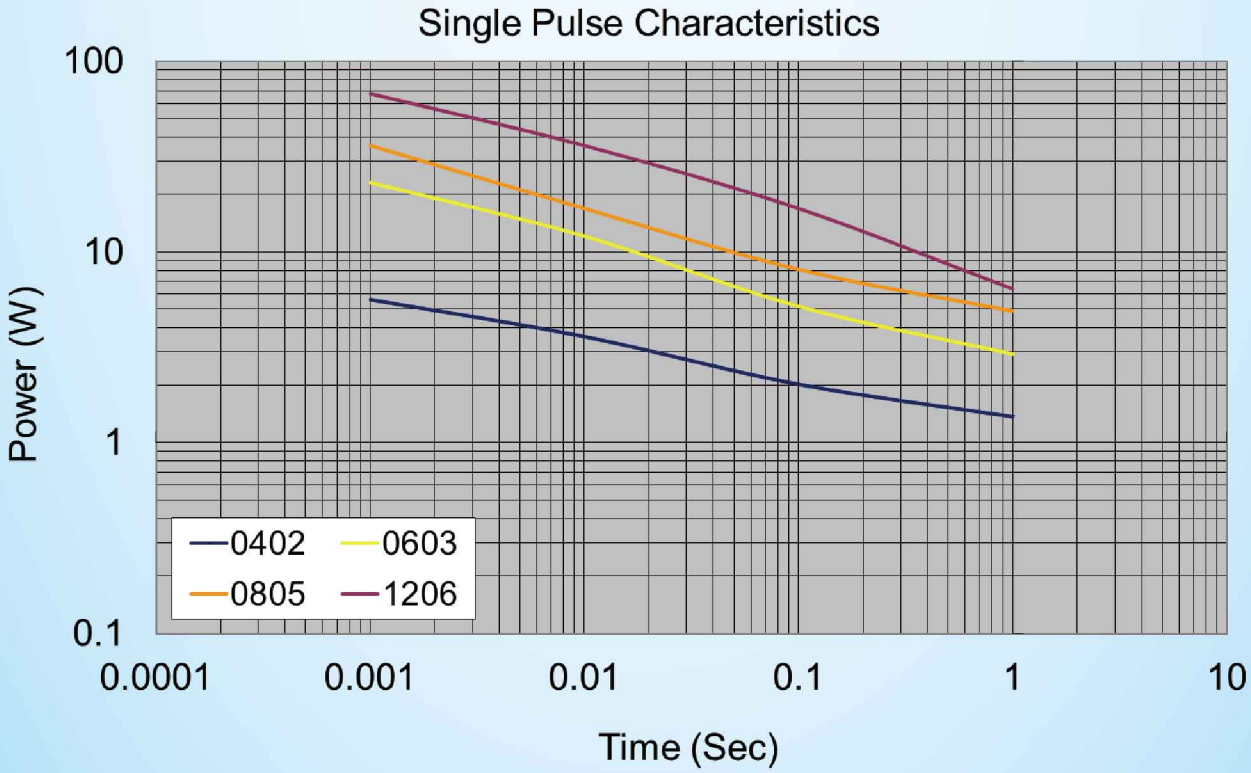
Features:

- AEC-Q200 Compliance
- High precision resistance tolerance: ±0.02%
- Low TCR down to ±5ppm/°C
- Wide Resistance range to 5.1Mohm
- High Temp derating to 85C
- High power 0805 upto 0.25W
- Advanced sulfur resistance verified according to ASTM B 809

Applications:

- Automotive
- Telecommunication
- Medical equipment
- Industrial equipment
- Industrial measurement
- Instrumentation,
- Industrial machines
- Various sensors,
- Medical electronics

PN	Size	Power	Tol	Resistance	TCR/PPM
ARM02.A	0402	1/32W,1/16W,1/8W	±0.02%~ ±0.5%	10Ω~150KΩ	±5/10/25/ 50/100
ARM03.A	0603	1/16W,1/10W,1/6W		10Ω~1MΩ	
ARM05.A	0805	1/10W,1/8W,1/4W		10Ω~2.7MΩ	
ARM06.A	1206	1/8W,1/4W		10Ω~5.1MΩ	



High Power ,High Temp Thin Film Resistors- ART.A, ARTP.A Series

Features:

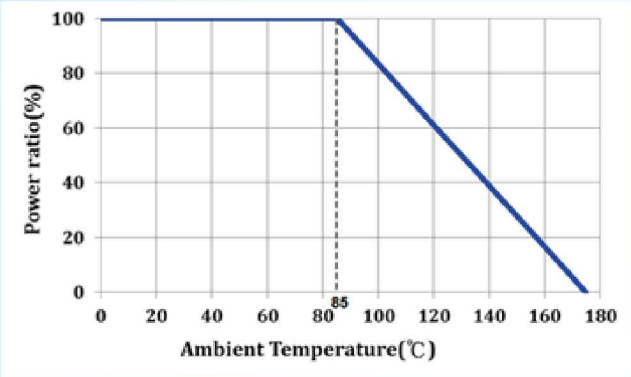
- Operating temperature up to 175°C
- Power rating up to 0.4W
- Tolerance ±0.1%, TCR ±25 ppm/°C
- Resistance values 1 Ω to 1M Ω
- Test proven immunity to humidity and sulfur
- AEC-Q200 Compliance

Applications:

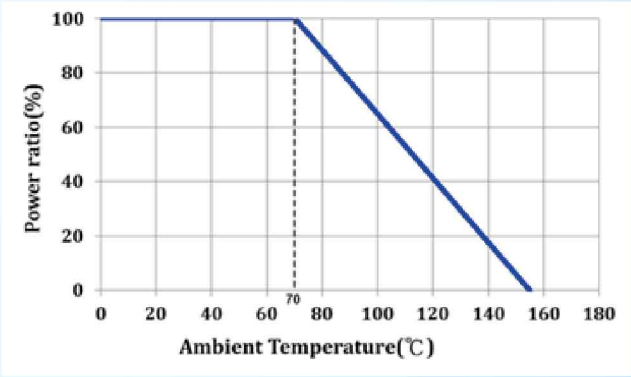
- Automotive
- Industrial
- High power and high temperature applications
- Replacement for larger case sizes

Series	PN	Size	Power	Tolerance	Resistance	TCR/PPM
Professional High Temp	ART02.A	0402	1/10W	±0.1%, ±1%	49.9Ω~221KΩ	±25/50
	ART03.A	0603	3/20W		1Ω~511KΩ	
	ART05.A	0805	1/5W		1Ω-1MΩ	
	ART06.A	1206	2/5W			
High power / Temp 170C	ARTP02.A	0402	1/5W	±0.1%, ±1%	47Ω~100KΩ	±25/50
	ARTP03.A	0603	1/4W		10Ω~100KΩ	
	ARTP05.A	0805	2/5W		10Ω~100KΩ	

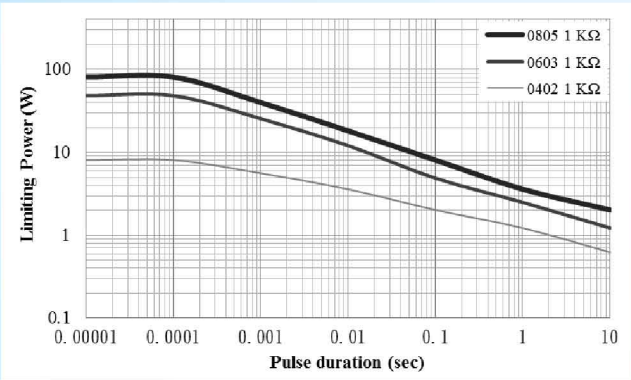
Derating- Advanced Power Operation



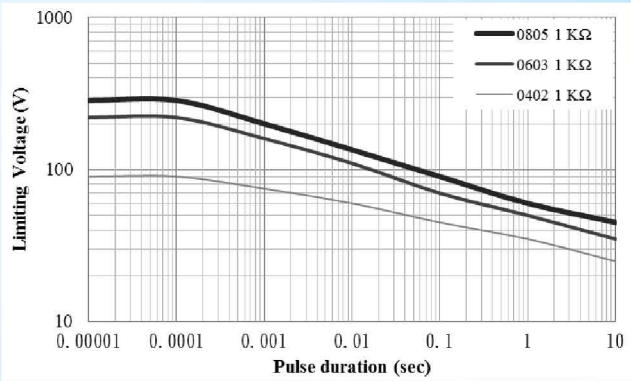
Derating- Power Operation 70



Single pulse



Pulse Voltage



High Power Thin Film Chip Resistors 1206 1W-ARP Series

Features:

- Wider bottom terminal enabling higher power capability (short side terminal)
- Significantly larger power handling capability than existing same size resistors
- Size: 1206, Power rating: 1.0W, Resistance range: 10 ~ 100KΩ
- AEC-Q200 Compliance
- Advanced sulfur resistance verified according to ASTM B 809

Applications:

- Power source related devises
- DC motors, inverters
- Robotics, Industrial control system

PN	Size	Power	Tolerance	Resistance	TCR/PPM
ARP06	1206	1W	±0.1%~±1%	47Ω~100KΩ	±25
				10Ω~100KΩ	±50

Thin Film Chip Meter Resistors-RAM Series

Features:

- AEC-Q200 Qualified
- High precision tolerance: ±0.02%
- Low TCR down to ±5ppm/°C
- Advanced sulfur resistance verified according to ASTM B 809

Applications:

- Automotive
- Telecommunication
- Medical equipment
- Industrial equipment
- Industrial measurement instrumentation
- Various sensors
- medical electronics

PN	Size	Power	Tolerance	Resistance	TCR/PPM
RAM02	0402	1/16W	± 0.1%~ ±1%	1Ω~100KΩ	±25/50
RAM03	0603	1/16W,1/10W		1Ω~332KΩ	
RAM05	0805	1/10W,1/8W		1Ω~1MΩ	
RAM06	1206	1/8W,1/4W			
RAM13	1210	1/4W			
RAM10	2010	1/4W			
RAM12	2512	1/2W			

Thin Film High Voltage-ARHV.A Series

Greatly reduce the number of thin film resistor for high Voltage , Saving PCB space or increase PCB integration density ,Higher reliability by reducing the number of solder joints
0805 200V 3pcs → 1pc of ARHV 450V
1206 200V 4pcs → 1pc of ARHV 700V
1210 200V 5pcs → 1pc of ARHV 1000V

* Offer up to 450V-1000V voltage and provide long-term stability with special passivation.
* ±25ppm/°TCR and ±0.1% resistance tolerance.
* Resistance upto 3MΩ

PN	Size	Power	Tol	Resistance	TCR/PPM	VCR (PPM/V)
ARHV05.A	0805 (450V)	1/5W	±0.1%~±1%	180KΩ~1MΩ	±25/50	<1.5
ARHV06.A	1206 (700V)	1/4W		160KΩ~2MΩ		
ARHV13.A	1210 (1000V)	1/3W		121KΩ~3.01MΩ		

Application:

Energy

Solar Inverter
Wind Energy Inverter
Power Meters

Automotive

Equipment Controller
Battery Management
Inverter for Electric and Hybrid Electric Vehicles

Industrial

DC-DC, AC-DC Converter
Test and Measurement
High-Voltage Monitoring

Medical

Power Supply
Electrocardiographs
Defibrillators

Thermal Jumper Surface Mount Chip-THJ Series

New

Key Properties:

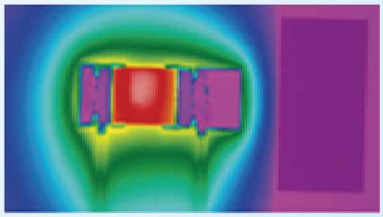
- 0603/0612/1206/2512
- High thermal conductivity ALN substrate (170W/mK)
- Low Capacitance

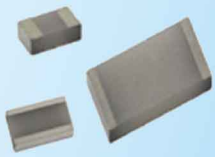
Applications:

- Power supplies and converters
- RF amplifiers
- Switch mode power supplies
- Filters

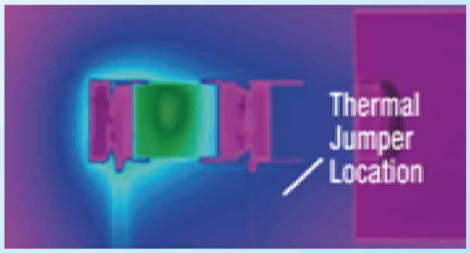
provides associated devices with an electrically isolated thermal conductive pathway to a heat sink while maintaining the electrical isolation of the device.

Ceramic Resistor Chip without thermal jumper (149.8°C)





Ceramic Resistor Chip with thermal jumper 95.5°C)



Thin Film Current Sensing-TCS Series

Features:

- Thin film process
- High power rating up to 3 Watts in 2512 size
- Tight tolerance down to ±0.5%
- Extremely low TCR down to ±50 PPM/°C
- Resistance values from 50m to 1ohm
- High purity alumina substrate for high power dissipation

Applications:

- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Applications
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Disk Driver
- Portable Devices (PDA, Smart phone)

PN	Size	Power	Tolerance	Resistance mΩ	TCR/PPM
TCS02	0402	1/16W	±0.5%~±1%	500m~1Ω	±50/100/200
TCS03	0603	1/10W		200m~1Ω	
TCS05	0805	1/8W			
TCS06	1206	1/4W		50m~1Ω	
TCS10	2010	3/4W			
TCS12	2512	1W			
TCS12	2512	3W		100m~1Ω	±100

Thin Film Array Chip Resistor - TFAN Series

Features:

- Advanced thin film technology
- Very tight tolerance down to ±0.05%
- Extremely low TCR down to ±5PPM/C
- TCR tracking down to 5ppm(±2.5ppm) and tolerance matching down to 0.1%(±0.05%)
- RoHS compliant component, compatible with lead (Pb)-free

Applications:

- Voltage divider
- Feedback circuits
- Signal conditioning

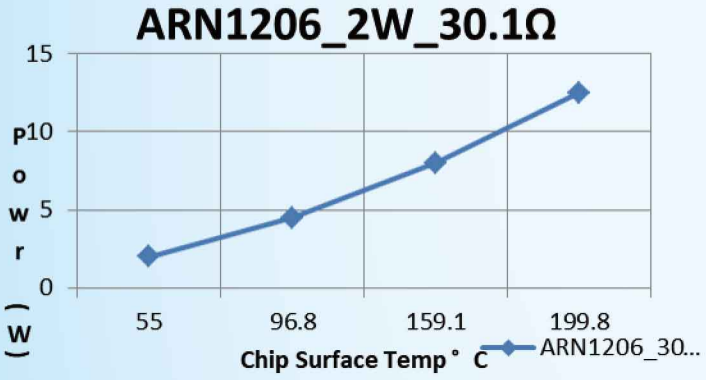
PN	Size	Power	Tolerance	Resistance	TCR/PPM
TFAN43	0603*4	1/16W, 1/10W, 1/8W	±0.05%~±1%	24.9~332K	±5/10/15/25/50

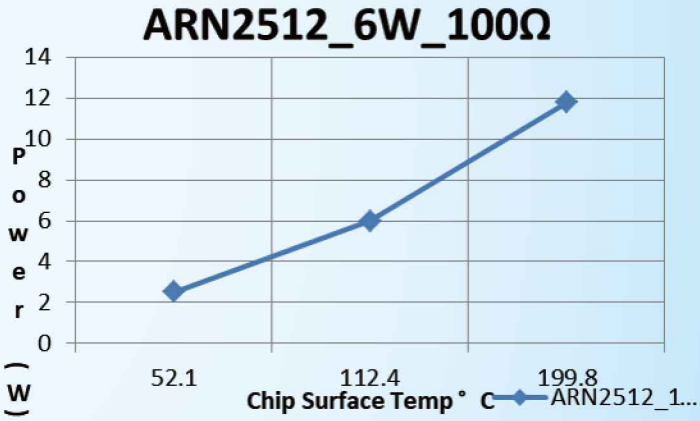
Absolute Tolerance	Tolerance Matching	Resistance Value	Absolute TCR	TCR Tracking
±0.05%~1%	0.1%~0.5%	24.9~332K	±5/10/15/25/50ppm	5/10/15/25/50ppm

Aluminum Nitride based thin film precision, high-power thin-film chip Resistors -ARN series

ARN Series Chip resistors are designed on high thermal conductivity Aluminum Nitride substrate with enlarged backside terminations to reduce the thermal resistance. As with any high power chip resistor has good ability to remove the heat to the overall performance of the devices. Thin film advanced process to ensure the tight spec and high reliability.

PN	Size	Power	Tolerance	Resistance	TCR/PPM
ARN03	0603	1/2W	±0.1%~±1%	50Ω~30.1KΩ	±25/50
ARN05	0805	1W			
ARN06	1206	2W			
ARN12	2512	6W			





Features:

- High thermal conductivity aluminum nitride substrate
- High-power resistors 1206 up to 2 watts, 2512 is upto 6W
- Offer 2x the power rating over traditional thin-film chip resistors
- Designed with enlarged backside terminations to reduce the thermal resistance
- *Low TC down to 25 ppm/C ,Tight tolerance to 0.1%

Applications:

- Industrial, telecommunications,
- Test , measurement instrumentation and equipment
- Power suppliers, Power switching,
- Military and aerospace

Long Termination Thin Film Resistor-ARW..A Series

Features:

- AEC-Q200 Compliance
- Advanced thin film technology
- RoHS compliant
- Special materials, design, and processing for high sulfur applications
- Test proven immunity to humidity, moisture, and sulfur

Applications:

- Automotive electronics
- DC motor , inverters
- Robotics , Industrial control system

PN	Size	Power	Tolerance	Resistance	TCR/PPM
ARW62	0612	1/2W	±0.1%~1%	2.5Ω~80KΩ	±25/50
ARW20	1020	1W		2.5Ω~200KΩ	
ARW25	1225	2W		2.5Ω~250KΩ	

Ultra high power long side terminal resistor technology:
High power, compare to same dimension standard short terminal, it has better heat dispassion and higher power rating.

Short Terminal resistor

Long Terminal resistor

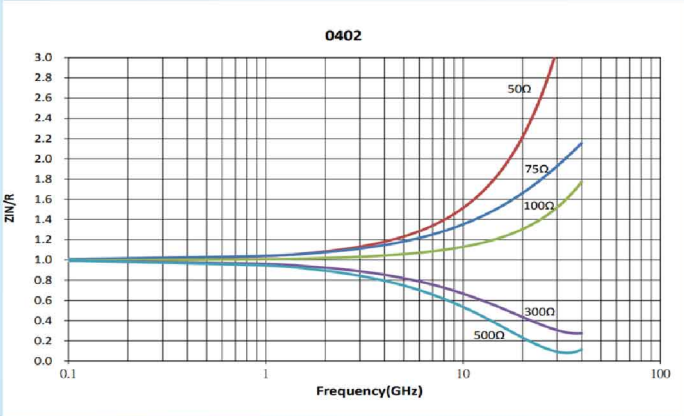
Size	Short Terminal	Size	Wide Terminal
1206	0.125W	**0612**	1W
2010	0.25W	**1020**	1.5W/2W
2512	0.5W	**1225**	2W/3W

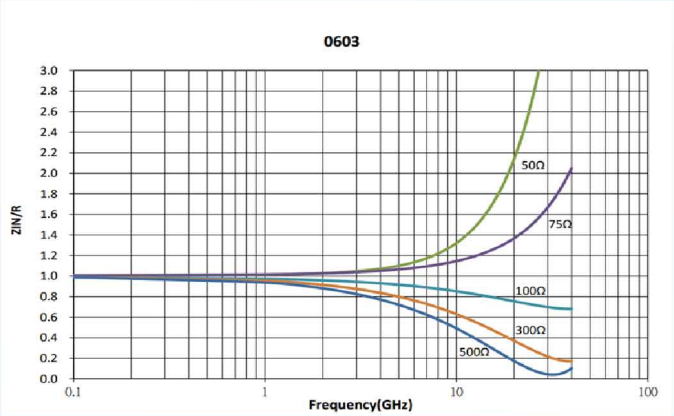
High resistance of welding crack, the construction design of electrode distance is short and it can enhance the resistance of welding crack.

Thin Film High Frequency Resistor –ARF series

ARF series chip resistors are designed with low internal reactance. The thin film technology applied to resistors is appropriated to reduce the parasitic inductance and capacitance. Low internal reactance allows these devices to keep a very good resistor behavior in high frequencies. High Purity alumina substrate.

PN	Size	Power	Tolerance	Resistance	TCR/PPM
ARF01	0201	1/32W	±0.1%~±1%	25Ω~500Ω	±25/50
ARF02	0402	1/20W		10Ω~1KΩ	
ARF03	0603	1/8W			
ARF05	0805	1/5W			
ARF06	1206	1/3W			





Features:

- High Frequency (Up to 50GHz, 0201-70GHz)
- 0201、0402、0603、0805、1206 case sizes
- Ohmic range (50Ω~150Ω)
- Resistor tolerance to ±0.1%
- TCR to ±25 ppm/°C

Applications:

ARF Series Applications

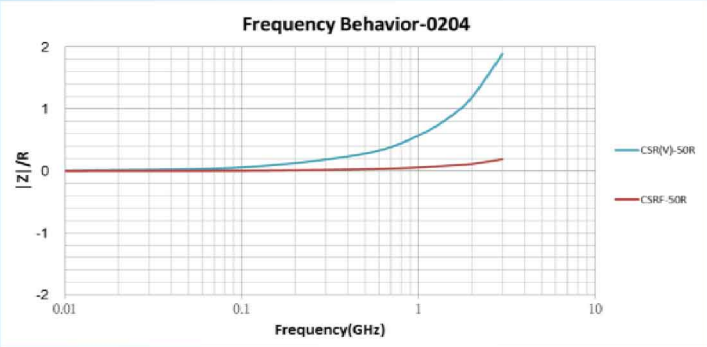
- Low Noise Amplifiers (LNAs)
  - LNAs for GPS
  - LNAs for LTE
  - LNAs for WLAN
  - LNAs for Wireless Infrastructure
  - LNAs for Set-Top Boxes
  - LNAs for Car Radio
- High-speed routers
- Attenuation circuitry
- High-frequency line termination

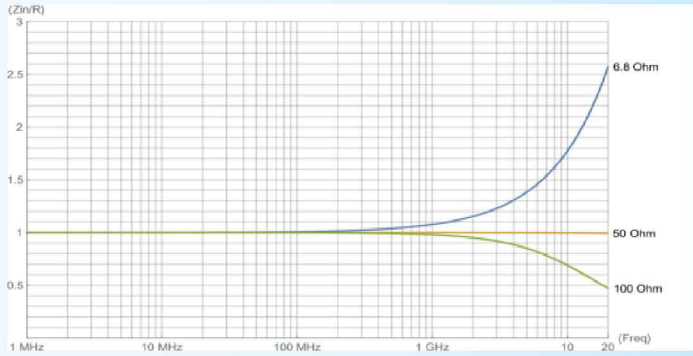
CSRF Series- MELF High Frequency Resistor

Specially designed for high frequency applications. The general type MELF resistor uses a spiral trimming method to increase the internal inductance, CSRF uses a special non-spiral trimmed method reduced the internal reactance which caused the Impedance change when the resistor used in high frequency applications, so it is very suitable for high frequency circuit design.

PN	Size	Power	Tolerance	Resistance	TCR/PPM
CSRF0102	0102	1/5W, 3/10W	±1%	50Ω, 6.8Ω~100Ω	±50
CSRF0204	0204	1/4W, 2/5W		50Ω, 1.5Ω~ 220Ω	
CSRF0207	0207	1/2W, 1W		50Ω, 6.8Ω~220Ω	

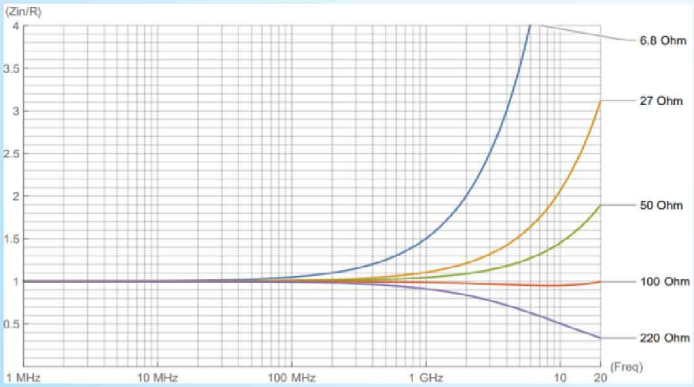
Frequency behavior comparison of General type MELF Resistor(CSRV) and High Frequency MELF Resistor(CSRF)：



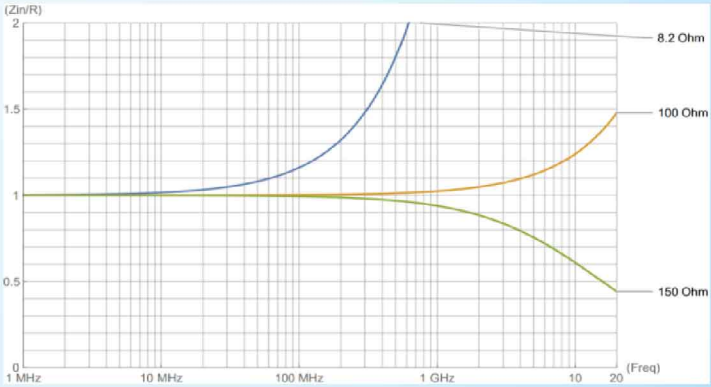


CSRF0102

Frequency Behavior



CSRF0204



CSRF0207

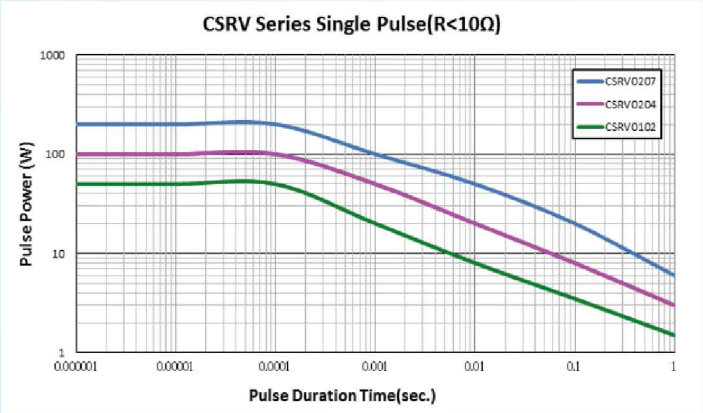
High Frequency MELF Resistor application：

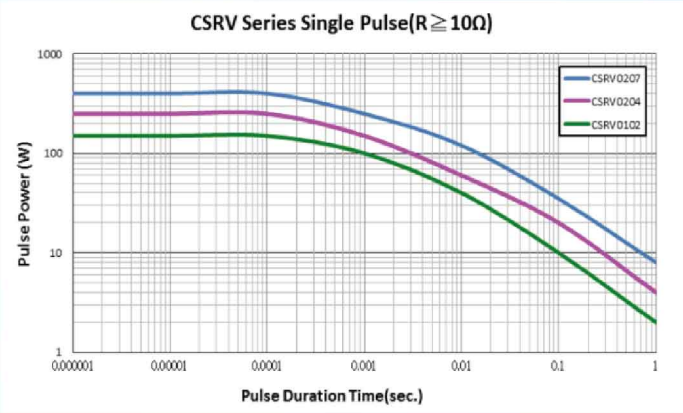
Typical applications are in the fields of telecommunication equipment and industrial electronics.

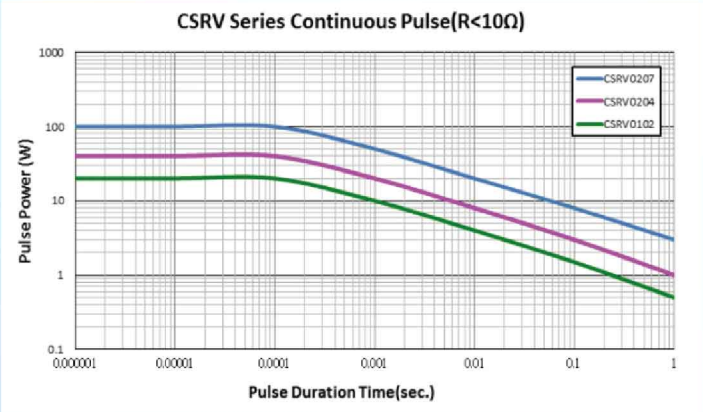
Metal Film MELF Precision Resistor – CSRV series High Voltage MELF–CSRP Series , Resistance to 10Mohm

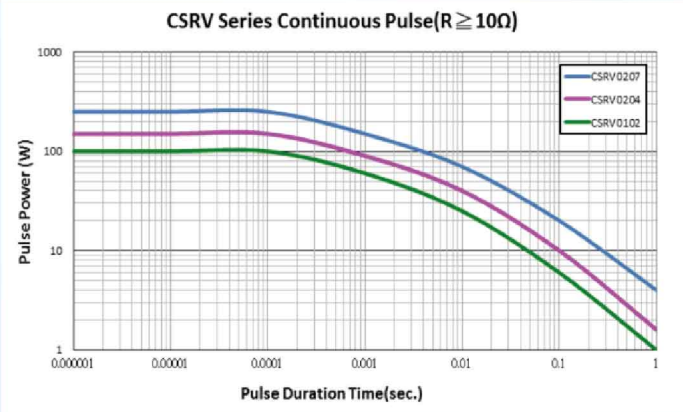
The MELF is cylindrical in shape and with metal electrode Leadless face resistor.
Land pattern sizes are the same as SMD chip resistors.
It is manufactured by depositing a homogeneous film of NiCr onto a high-grade ceramic body.
High quality of MELF resistors offers excellent electrical and Environmental Stability,
exceptional stability demonstrated over life, biased humidity, and short time overload testing.
Short lead time, Effective cost control, price competitiveness

PN	Size	Power	Tolerance	Resistance	TCR/PPM
CSRV0102	0102	1/8, 1/5W, 0.3W	±0.1%~ ±5%	1Ω~1MΩ 0Ω 2A	±15/25/50/100
CSRV0204	0204	1/4W, 2/5W		0.1Ω~3.4MΩ 0Ω 3A,5A	±5/10/15/25/ 50/100
CSRV0207	0207	1/2W, 1W			
CSRP0204	0204	2/5W, 700V	±0.1%~ ±1%	100KΩ~10MΩ	±25/50
CSRP0207	0207	1W, 1200V			









Metal Film Precision MELF Resistor

Feature	PN	Size	Power	Tolerance	Resistance	TCR/PPM
Standard	CSRV0102	0102	1/8, 1/5W, 0.3W	±0.1%~ ±5%	1Ω~1MΩ 0Ω 2A	±10/15/25/ 50/100
	CSRV0204	0204	1/4W, 2/5W		0.1Ω~3.4MΩ 0Ω 3A, 5A	±5/10/15/25/ 50/100
	CSRV0207	0207	1/2W, 1W			
High Frequency	CSRF0102	0102	1/5W, 3/10W	±1%	50Ω, 6.8Ω~100Ω	±50
	CSRF0204	0204	1/4W, 2/5W		50Ω, 1.5Ω~ 220Ω	
	CSRF0207	0207	1/2W, 1W		50Ω, 6.8Ω~220Ω	
Automotive	CSRA0102	0102	1/5W, 3/10W	±0.1%~ ±5%	0Ω, 1Ω~1MΩ	±5/±10/±15/ ±25/±50/ ±100
	CSRA0204	0204	1/4W, 2/5W		0Ω, 0.1Ω~10MΩ	
	CSRA0207	0207	1/2W, 1W			
High Voltage Automotive	CSRP0204	0204	2/5W, 700V	±0.1%~ ±1%	340KΩ~10MΩ	±25/50
	CSRP0207	0207	1W, 1200V			

Features:

- AEC-Q200 Compliance
- Size: 0102/0204/0207 , Resistance range: 1ohm~10Mohm
- Excellent overall stability
- Tight tolerance down to ±0.1% ,
- Extremely low TCR down to 5ppm, 10ppm, 15ppm, 25ppm,50ppm
- High power rating up to 1 Watts
- SMD enabled structure
- Lead-free and RoHS compliant

Applications:

- Automotive , Car Lighting
- Industrial
- Tele-communication
- Measurement/Testing Equipment
- Industrial & Medical Equipment
- Outdoor controls
- Fuel powered engine controls

Automotive Thin Film Resistors

Features:

- IATF-16949 Certified Production Sites
- AEC-Q200 Compliance
- High Reliability with VDA6.3
- Certified with Equipment and Employees to Manufacture Automotive Products.
- Commitment to Provide Zero-Defect
- TASK Products
- PPAP Available.
- Insurance Available

Series	PN	Size	Power	Tolerance	Resistance	TCR/PPM
Thin Film Precision NiCr	AR02.A	0402	1/16W	±0.05%~ 0.1%~ ±1%	10Ω~221KΩ	±5/10/15/ 25/50
	AR03.A	0603	1/16W, 1/10W		4.7Ω~680KΩ	
	AR05.A	0805	1/10W, 1/8W		4.7Ω~1MΩ	
	AR06.A	1206	1/8W, 1/5W			
	AR13.A	1210	1/4W, 2/5W			
	AR10.A	2010	1/4W, 1/3W, 1/2W			
	AR12.A	2512	1/2W			
Thin Film Precision TaN	TAR02	0402	1/16W	±0.05%~ 0.1%~ ±1%	40Ω~35KΩ	±10/15/ 25/50
	TAR03	0603	1/6W		40Ω~130KΩ	
	TAR05	0805	1/5W		10Ω~350KΩ	
	TAR06	1206	1/2W		10Ω~1MΩ	
Metal Thin Film Precision	ARM02.A	0402	1/32W, 1/16W, 1/8W	±0.02%~ 0.1%~ ±0.5%	10Ω~150KΩ	±5/10/ 25/50
	ARM03.A	0603	1/16W, 1/10W, 1/6W		10Ω~1MΩ	
	ARM05.A	0805	1/10W, 1/8W, 1/4W		10Ω~2.7MΩ	
	ARM06.A	1206	1/8W, 1/4W		10Ω~5.1MΩ	
Professional High Temp 175C	ART02.A	0402	1/10W	±0.1%~ ±1%	10Ω – 221KΩ	±25/50
	ART03.A	0603	3/20W		4.7Ω – 511KΩ	
	ART05.A	0805	1/5W		4.7Ω-1MΩ	
	ART06.A	1206	2/5W			
High power / Temp 175C	ARTP02.A	0402	1/5W	±0.1%~ ±1%	47Ω~100KΩ	±25/50
	ARTP03.A	0603	1/4W		10Ω~100KΩ	
	ARTP05.A	0805	2/5W		10Ω~100KΩ	
High Voltage	ARHV05.A	0805(900V)	1/5W	±0.1%~ ±1%	180KΩ~1MΩ	±25/50
	ARHV06.A	1206(1400V)	1/4W		160KΩ~2MΩ	
	ARHV13.A	1210(2000V)	1/3W		121K~3.01MΩ	
MELF Metal Film Precision	CSRA0102	0102	1/5W, 0.3W	±0.1%~ ±5%	0Ω, 1Ω~1MΩ	±5/±10/ ±15/±25/ ±50/±100
	CSRA0204	0204	1/4W, 2/5W		0Ω, 0.1Ω~10MΩ	
	CSRA0207	0207	1/2W, 1W			
High Voltage	CSRP0204	0204	2/5W, 700V	±0.1%~ ±1%	340KΩ~10MΩ	±25/50
	CSRP0207	0207	1W, 1200V			

AR Thin Film Family

AR/ARG
High Precision
Tol 0.01%,
TCR 1,2,3,5ppm
0201-2512

AR..A
High Precision
Automotive
0402-2512

TAR
TaN Precision
Automotive
0402~1206

ARN
Aluminum Nitride
Ultra High Power
0603-2512

ARP
1206 High
power 1W
AEC-Q200

TFAN
Thin Film Array
0603*4

ARM..A
Automotive
High reliability
0402-1206

ARW
Long Terminal
0612,1020,1225

RAM
Specially for
Meters
0402-2512

TCS
Current Sensing
0402-2512

ART/ARTP.A
Temp Upto 175C,
High power
0402-0805

ARHV..A
High Voltage
1206/1210

ARF
High Frequency
utp 50G,
0201 to 70G
0201-1206

Automotive Applications

Auto Parts
Comfort & Positioning

- Control Entry
- Wireless Charger
- PEPS (Keyless System)
- TPMS Module
- Window Lift, Mirror control
- Auto-control door
- Air Conditioning, HVAC
- Seat Heating, positioning
- Remote Start, window, mirror
- Temperature Sensor

ADAS
Advanced Driver Assistance Systems

- View Camera ECU
- Laser Sensor
- Front Sensing Camera
- Ultrasonic Sensor
- mmWave Radar
- Parking Assistant

Power management
Electric Vehicle / Hybrid Vehicle

- Inverter & Boost Converter
- Plug-In Batter charger
- DC DC Converter
- BMS (Battery Management System)
- Battery cell Temp Monitoring

Car information/ Entertainment
Infotainment / Entertainment Telematics

- Cluster
- Navigator
- Gateway ECU
- Telematics Control Unit (TCU)
- Entertainment-Audio, TV, LCD…
- Satellite Radio
- Internet

Safety Control System

- BMS (Battery Management System ABS /Air Bag)
- ECAT/TEMS / ASR.TRC/
- CCS/ EPS / ECU / MCU/
- IBS/ SRS/ PDU/ BCM
- Tire Monitor/
- Lane-Change Monitor/
- Distance Radar
- Engine control system
- Ignition control,
- Fuel injection control,
- Idle speed control,
- Intake control,
- Emission control,
- Fault self-diagnosis
- ICS (Intelligent Clearance Sonar)

Lighting/ HID/LED
Vehicle Lighting

- Interior Lighting
- Rear & Signal lighting
- HID Lighting
- LED/ Lamp Driver
- Light sensor

Thin Film Resistor Application Notes

Medical

Ultrasonography, Heart monitors, diagnostic equipment, medicine dispensing equipment, scales, monitors, scopes, Blood pressure and glucose machine, AED,

Power supplies

Voltage division, step up or step down converters, input or output current and voltage set.

RF

Wireless routers, Bluetooth modules, cell phone receivers, display drivers.

Thin Film Applications

Instrumentation

Aircraft instruments, altimeters, gages, flight control systems.

Computer

Voltage regulators, voltage dividers, network communications, process controllers.

Audio

Radio receivers, DVD, VCR players, amplifiers, tuners, equalizers, crossovers.

Telecom

Voice / picture communications, routers, bridges, multiplexers, fiber / wire converters.

Automotive

BMS, Airbags, ABS, dash instruments, engine monitor, GPS navigation, Entertainment, DVD, VCR, driver information center, tire pressure monitor, rear view sensor, satellite radio, Lighting

HVAC

AC, ventilation, and heating control.

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