

# Thin Film Technology



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)



**2022-2025**

**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



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  
Technology

Metal Strip  
Metal Foil

Thick Film  
Technology

MELF  
Thin Film

Thin Film  
Precision  
Resistor

TaN/NiCr  
High Power  
High Voltage  
High Temp

Current  
Sensing  
Resistor

Metal Strip  
Metal Foil  
Thick Film  
Thin Film

Various  
Functional  
Resistor

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

MELF  
Thin Film  
Precision

High Power  
High Voltage

# Viking's Business Strategy



Automotive  
Market



High-End Market



Medical Devices Market  
5G Market



Consumer Market



01

All products meet AEC-Q200 and each manufacturing facility passing VDA6.3 audit.

02

Focus on new product design and development based on customer needs.

03

Focus on ISO13485, Class I & II and 5G application products.

04

Upgrade current products to meet the demands of high reliability applications.

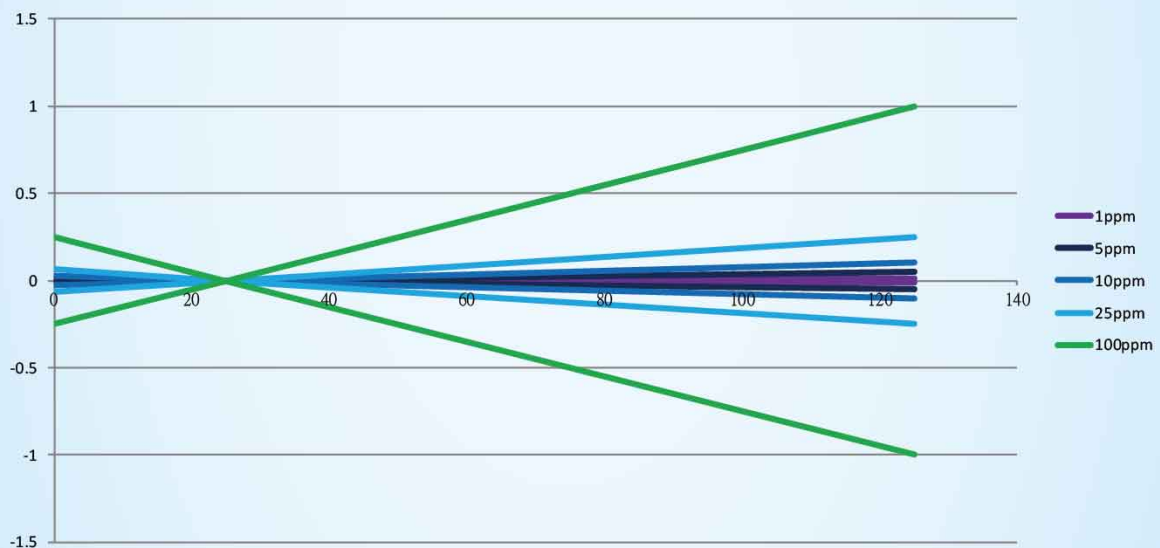
5G

# Thin Film Technology

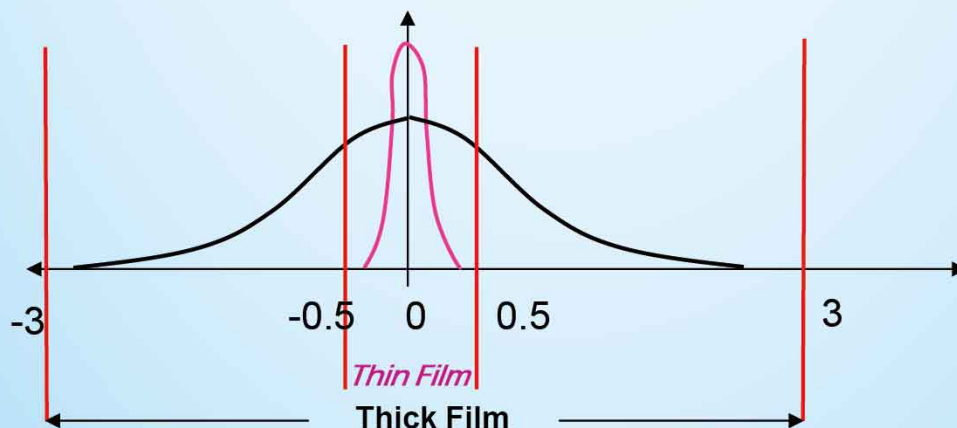
## Precision Resistor

Viking Tech leverages advanced sputtering thin film technology to manufacture highly accurate resistors, setting a new standard in performance, stability, and reliability. Specifically designed to meet the stringent requirements of industrial instrumentation, test and measurement equipment, automotive electronics, and medical devices, our Thin Film Precision Resistors are the ideal solution for demanding applications. Comprehensive Size Range: Available in sizes from 0201 to 2512 to suit diverse application needs. Exceptional Tolerance: Features extraordinarily tight tolerances down to 0.01%, ensuring unparalleled accuracy. Ultra-Low TCR: Exhibits an extremely low temperature coefficient of resistance (TCR), down to 1 ppm, for stable performance across a wide temperature range.

### LOW TCR to 1ppm



### Tight Tolerance to 0.01%



# 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		4Ω~511KΩ	
	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~2.49MΩ	
	AR13	1210	1/4W, 1/3W			
	AR10	2010	1/4W, 1/3W, 1/2W		1Ω~3MΩ	
	AR12	2512	1/2W, 3/4W, 1W			
Ultra low TCR Precision 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:

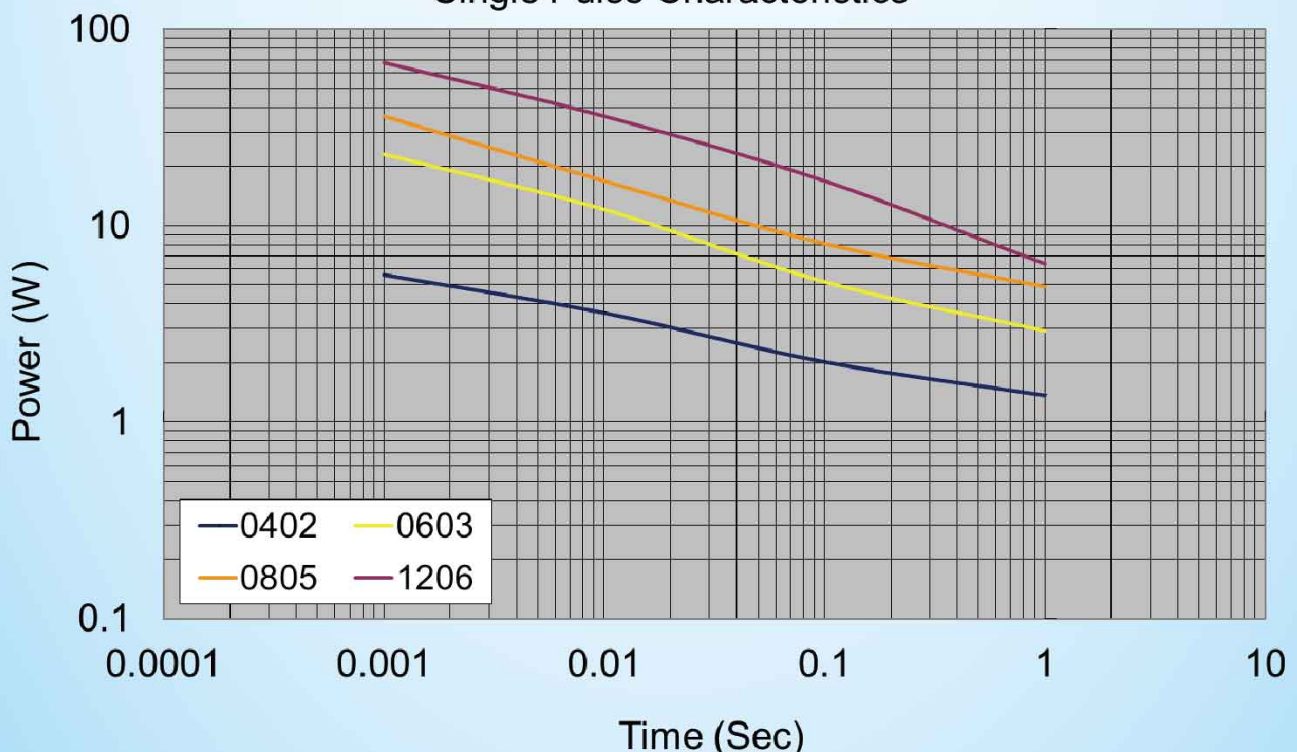
- AEC-Q200 Compliance
- High precision resistance tolerance:  $\pm 0.02\%$
- Low TCR down to  $\pm 5\text{ppm}/^\circ\text{C}$
- Wide Resistance range to 5.1Mohm
- High Temp derating to 85C
- High power 0805 upto 0.25W
- Advanced sulfur resistance verified according to ASTM B 809

## Applications:

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

Series	Size	Power	Tol	Resistance	TCR/PPM
ARM02A	0402	1/32W,1/16W,1/8W	$\pm 0.02\% \sim \pm 0.5\%$	10 $\Omega$ ~150K $\Omega$	$\pm 5/10/25/50/100$
ARM03A	0603	1/16W,1/10W,1/6W		10 $\Omega$ ~1M $\Omega$	
ARM05A	0805	1/10W,1/8W,1/4W		10 $\Omega$ ~2.7M $\Omega$	
ARM06A	1206	1/8W,1/4W		10 $\Omega$ ~5.1M $\Omega$	

Single Pulse Characteristics





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



## Features:

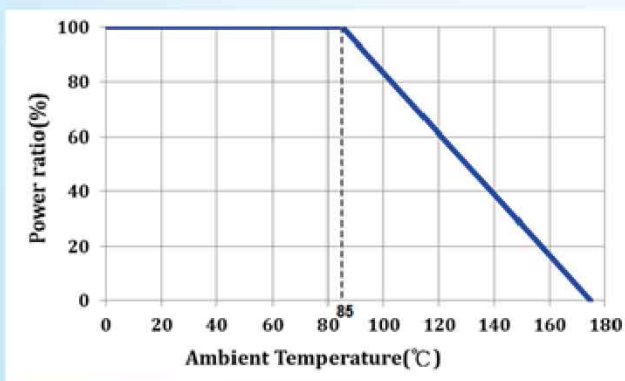
- Operating temperature up to 175°C
- Power rating up to 0.4W
- Tolerance  $\pm 0.1\%$ , TCR  $\pm 25$  ppm/°C
- Resistance values 1  $\Omega$  to 1M  $\Omega$
- Test proven immunity to humidity and sulfur
- AEC-Q200 Compliance

## Applications:

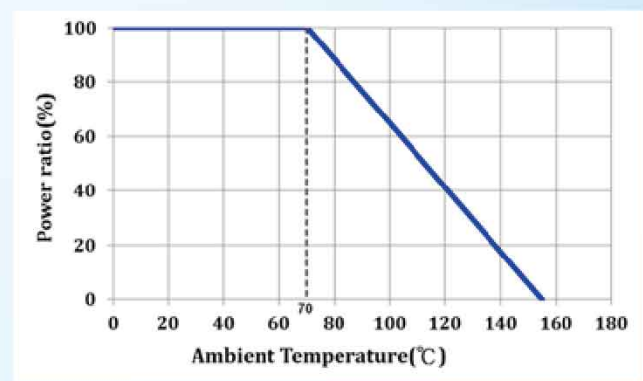
- Automotive
- Industrial
- High power and high temperature applications
- Replacement for larger case sizes

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

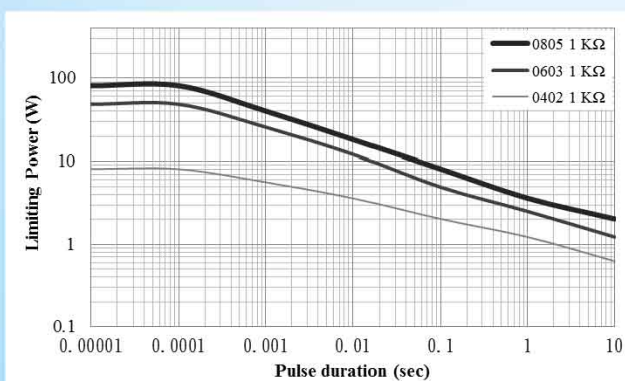
### Derating- Advanced Power Operation



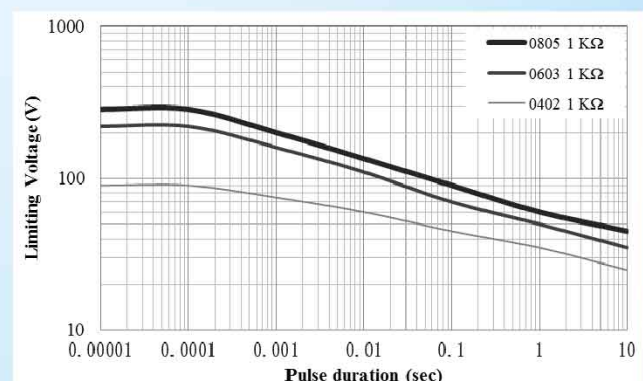
### Derating- Power Operation 70



### 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 devices
- DC motors, inverters
- Robotics, Industrial control system

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

# 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
ARHV05.A	0805 (450V)	1/5W	±0.1%~±1%	180KΩ~1MΩ	±25/50
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

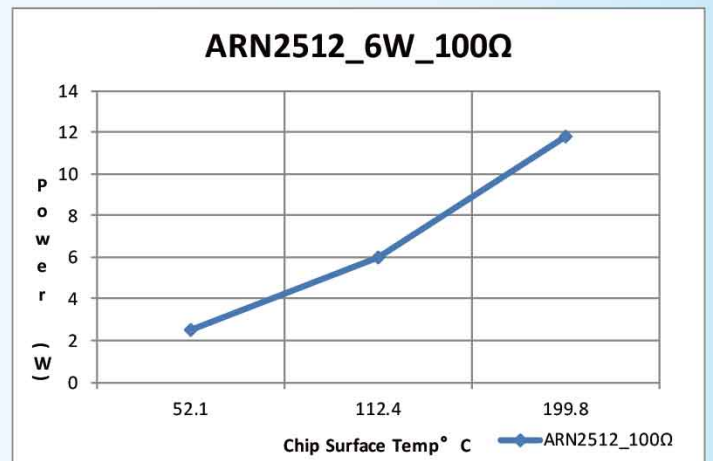
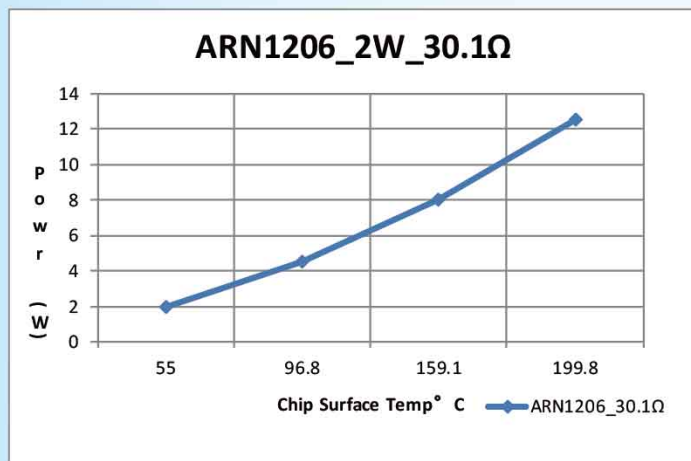
Power Supply  
Electrocardiographs  
Defibrillators

# 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:

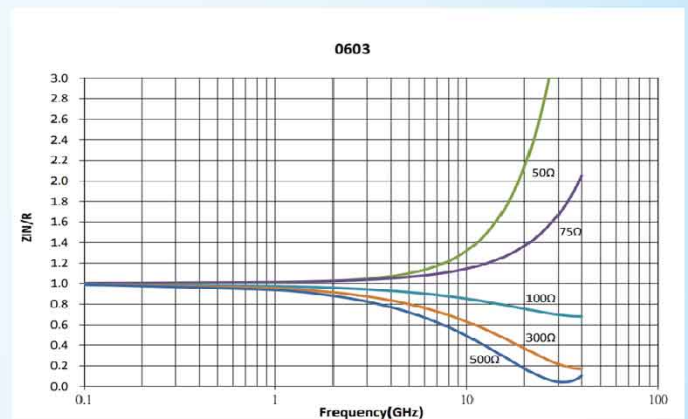
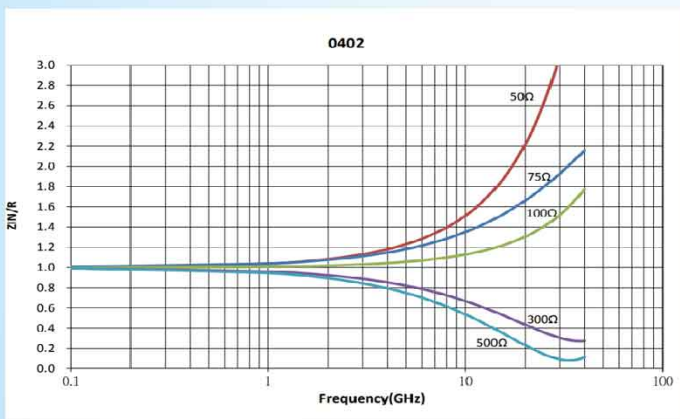
- Industrial, telecommunications,
- Test, measurement instrumentation and equipment
- Power suppliers, Power switching,
- Military and aerospace

# 5G

## 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.

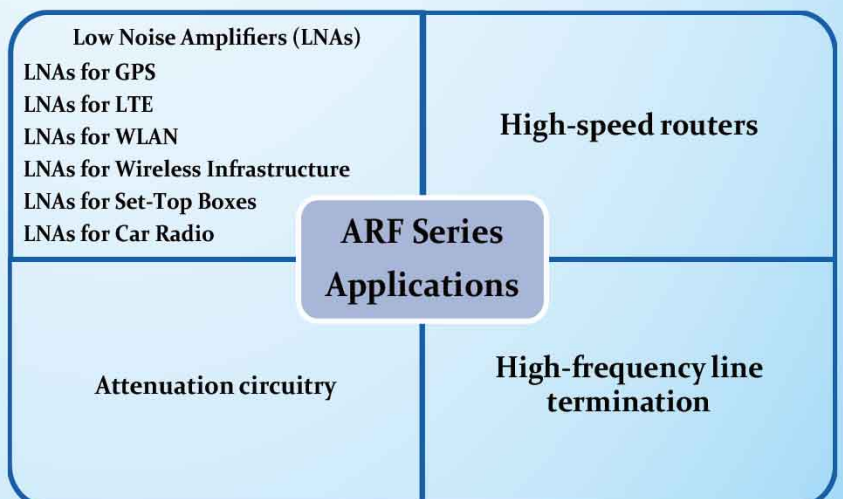
PN	Size	Power	Tolerance	Resistance	TCR/PPM
ARF01	0201	1/32W	±0.1%~±1%	25Ω~500Ω	±25/50
ARF02	0402	1/20W			
ARF03	0603	1/8W		10Ω~1KΩ	
ARF05	0805	1/5W			
ARF06	1206	1/3W			



### 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:

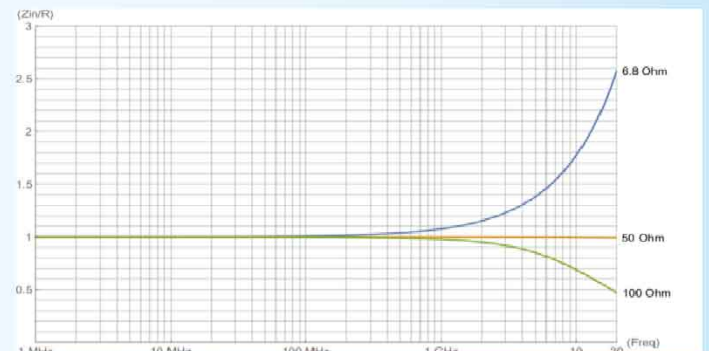


# CSRF Series- MELF High Frequency Resistor

High-Frequency Optimization: Unlike general MELF resistors that employ a spiral trimming method, which increases internal inductance, our CSRF series utilizes a specialized non-spiral trimming technique. This effectively reduces internal reactance, minimizing impedance changes during high-frequency applications—making it exceptionally well-suited for high-frequency circuit design. Choose Viking Tech's Thin Film Precision Resistors for next-level performance and reliability in your most critical applications.

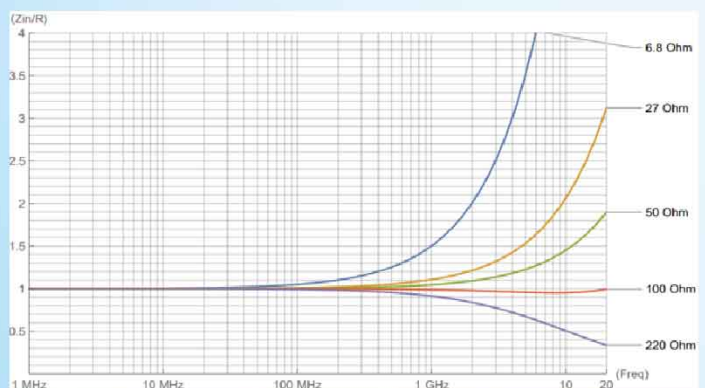
PN	Size	Power	Tolerance	Resistance	TCR/PPM
<b>CSRF0102</b>	0102	1/5W, 3/10W	±1%	50Ω, 6.8Ω~100Ω	±50
<b>CSRF0204</b>	0204	1/4W, 2/5W		50Ω, 1.5Ω~ 220Ω	
<b>CSRF0207</b>	0207	1/2W, 1W		50Ω, 6.8Ω~220Ω	

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

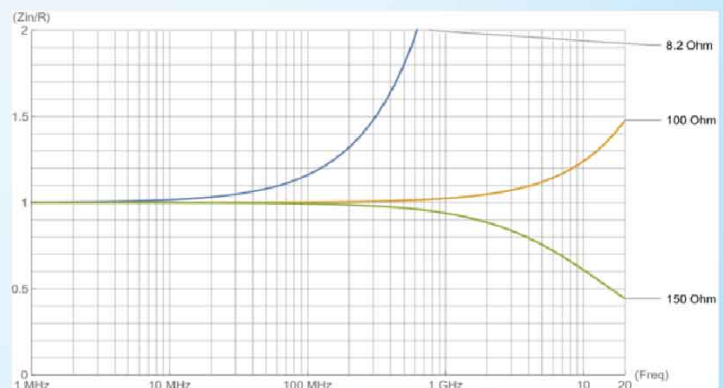


CSRF0102

## 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 – CSR series

## Advanced Metal Film MELF Precision Resistor – CSRV series

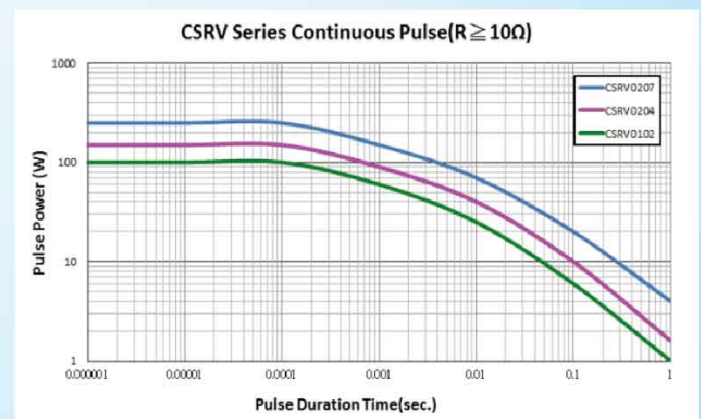
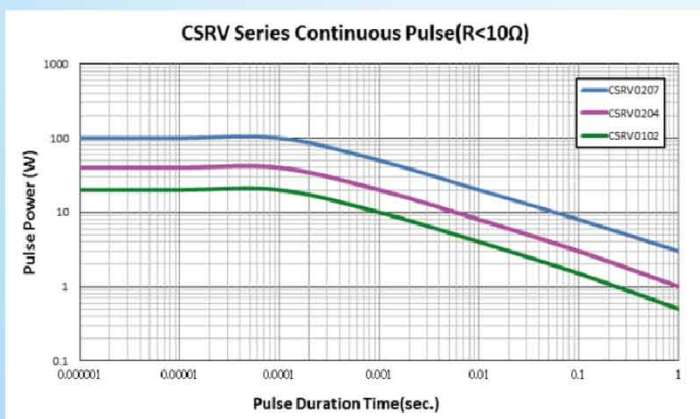
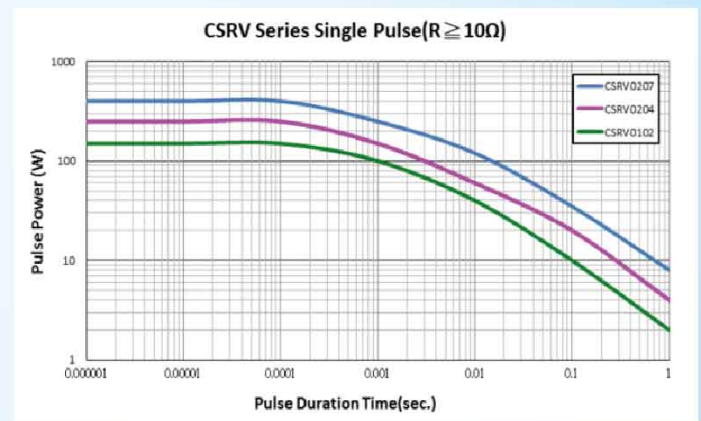
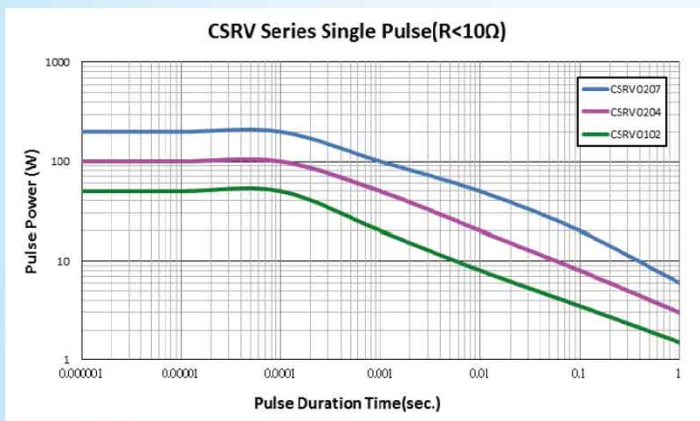
### High Voltage MELF–CSRP Series, Resistance to 10Mohm

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
<b>CSR0204</b>	0204	1/4W, 2/5W	±0.1%~ ±5%	0.1Ω~10MΩ	±5/10/15/25/ 50/100
<b>CSR0207</b>	0207	1/2W, 1W			
<b>CSRV0102</b>	0102	1/8, 1/5W, 0.3W	±0.1%~ ±5%	1Ω~1MΩ	±15/25/50/100
<b>CSRV0204</b>	0204	1/4W, 2/5W		0.1Ω~3.4MΩ	±5/10/15/25/ 50/100
<b>CSRV0207</b>	0207	1/2W, 1W			
<b>CSRP0204</b>	0204	2/5W, 500V	±0.1%~ ±1%	340KΩ~10MΩ	±25/50
<b>CSRP0207</b>	0207	1W, 1000V			



# Metal Film Precision MELF Resistor



Feature	PN	Size	Power	Tolerance	Resistance	TCR/PPM
Metal Film Precision	CSR0204	0204	1/4W, 2/5W	±0.1%~ ±5%	0.1Ω~10MΩ	±5/10/15/25/ 50/100
	CSR0207	0207	1/2W, 1W			
Advanced	CSRV0102	0102	1/8, 1/5W, 0.3W	±0.1%~ ±5%	1Ω~1MΩ	±10/15/25/ 50/100
	CSRV0204	0204	1/4W, 2/5W		0.1Ω~3.4MΩ	±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, 500V	±0.1%~ ±1%	340KΩ~ 10MΩ	±25/50
	CSRP0207	0207	1W, 1000V			

## 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	49.9Ω~100KΩ	±5/10/15/ 25/50
	AR03.A	0603	1/16W, 1/10W		10Ω~332KΩ	
	AR05.A	0805	1/10W, 1/8W		10Ω~1MΩ	
	AR06.A	1206	1/8W, 1/4W			
	AR13.A	1210	1/4W, 1/3W			
	AR10.A	2010	1/4W, 1/3W			
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%	49.9Ω~221KΩ	±25/50
	ART03.A	0603	3/20W		10Ω~511KΩ	
	ART05.A	0805	1/5W		1Ω~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, 500V	±0.1%~ ±1%	340KΩ~10M Ω	±25/50
	CSRP0207	0207	1W, 1000V			



## 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

# Automotive Applications

## 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



**AR**  
**Thin Film**  
**Family**

**AR**

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

**AR..A**

High Precision  
Automotive  
0402-2512

**ARF**

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

**ARHV..A**

High Voltage  
0805/1206/1210

**TAR**

TaN Precision  
*Automotive*  
0402~1206

**ARTP..A**

Temp Upto 175C,  
High power  
0402-0805

**ARN**

Aluminum Nitride  
Ultra High Power  
0603-2512

**ART..A**

Temp Upto 175C  
0402-1206

**ARP**

1206 High  
power 1W  
*AEC-Q200*

**RAM**

Specially for  
Meters  
0402-2512

**ARM..A**

Automotive  
High reliability  
0402-1206

**ARG**

General  
0402-1206



# 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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