passive components

SELECTION GUIDE

KOA SPEER ELECTRONICS, INC.

KOA SPEER ELECTRONICS, INC.

OF RESISTORS SHIPPED EVERY MONTH

With 99%+ On-Time Delivery...

You Can Count on KOA Speer

At KOA Speer, we ship Billions of resistors every month! And, despite that volume, our 99%+ on-time performance and service levels are off the charts. We offer a diverse and expanding family of surface mount and leaded resistors, all backed by our Quality 1st mandate to deliver unmatched service and product quality. Let KOA Speer help take your design from **Concept to Reality!**

Quality 1st

You expect product quality from any component that makes it into one of your designs. But in today's competitive global marketplace, there's more to the quality equation. At KOA Speer, our Quality 1st initiative reinforces our organization wide focus on serving you at the highest possible level.

Our commitment to quality in everything we do is paying off... as we consistently receive customer quality and service awards. We're the industry's most recognized and awarded supplier for achieving the highest product quality, on-time delivery and responsive customer service.

ISO 9001:2015

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RoHS COMPLIANT

SURFACE MOUNT RESISTORS

General Purpose

RK73B - General Purpose Chip Resistor

- Tolerance: ±2%, ±5%
- Power rating: 0.03W (01005), 0.05W (0201), 0.1W (0402), 0.125W (0603), 0.25W (0805, 1206), 0.5W (1210), 0.75W (2010), 1W -2W (2512)

RK73H - Precision Chip Resistor

- Tolerance: ±0.5%, ±1%
- Power rating: 0.03W (01005), 0.05W (0201), 0.1W (0402), 0.125W (0603), 0.25W (0805, 1206), 0.5W (1210), 0.75W (2010), 1W - 2W (2512)

RK73Z - Zero ohm Jumper Chip Resistor

- Zero ohm with max. resistance of 50mΩ

RK73-FT Lead-Free Chip Resistor

- RoHS exemption free

Precision Thick Film

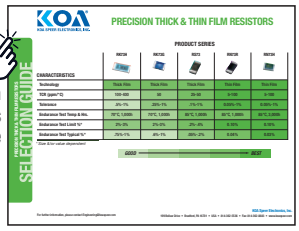
RK73G High Precision

- TCR: ±50ppm/°C
- Tolerance: ±0.25%, ±.5%, ±1%
- Power rating: 0.5W (0201), 0.1W (0402, 0603), 0.125W (0805), 0.25W (1206)

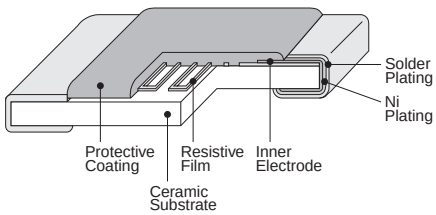
RS73 - Ultra Precision High Reliability

- Low TCR: ±25ppm/°C, ±50ppm/°C
- Tolerance: ±0.1% ~ ±1%
- Power rating: 0.125W (0402), 0.2W (0603), 0.25W (0805), 0.33W (1206)
- Excellent long-term stability with ΔR of ±0.2%

Watch Video -
"Thin Film vs Thick Film for High Reliability"



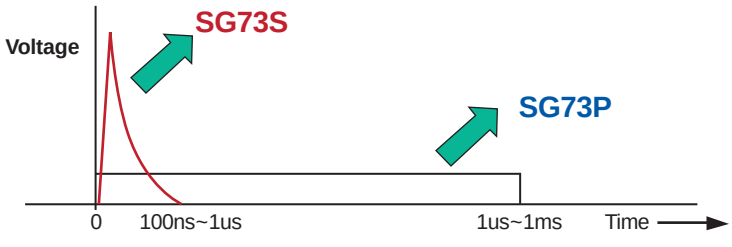
Precision Thick & Thin Film Resistors Selection Guide

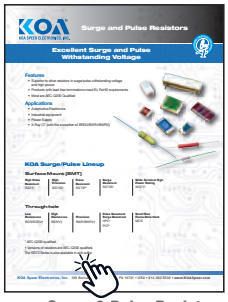


Excellent Surge & Pulse Withstanding Voltages

Surge overload
High peak voltage, short duration
Ex.: CR discharge, ESD surge

Pulse overload
Higher power than rated power, lower voltage than surge is applied for long time.
Ex.: Gate resistors of FET





Surge & Pulse Resistors Sales Guide

Precision Thin Film

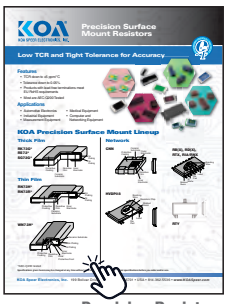
RN73R - High Reliability

- High precision tolerance: ±0.05% ~ ±1%
- High performance TCR: ±5 ~ ±100ppm/°C

RN73H - for Automotive

- High stability ΔR = 0.1% after 3,000 hrs
- High precision tolerance: ±0.05% ~ ± 1%
- High performance TCR: ±5 ~ ±100ppm/°C

Watch Video -
"Comparing RN73 to RN73R"



Precision Resistors Sales Guide

WN73H Wide Terminal (Metal)

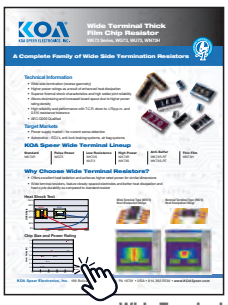
- High performance TCR: ±10ppm/°C, ±25ppm/°C, ±50ppm/°C
- High precision tolerance: ±0.1% - ±0.5%
- Improved moisture resistance by special protective coating
- High precision resistor solution for tough environments, especially in high reliable automotive, medical, and industrial environments

Wide Terminal Thick Film

WG73 Surge Current Wide Terminal

- Superior to WK73 in pulse withstanding voltage
- Power rating: 1W (0612), 1.5W (1020), 2W (1225)
- Resistance range: 560m ~ 1kΩ
- Tolerance: ±10%, ±20%

Watch Video -
"Advantages of Wide Terminal Chip Resistors"

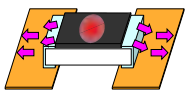


Wide Terminal Sales Guide

WK73R Wide Terminal

- Offers excellent heat dissipation & achieves high rated power
- Power rating: 0.33W (0204), 0.66W (0306), 1W (0508), 1.5W (0612), 2W (1020), 3W (1225)

Wide Terminal Type (WK73) Heat Dissipation Image



Nominal Terminal Type (RK73) Heat Dissipation Image

SURFACE MOUNT RESISTORS *(CONTINUED)*

Surge Current Thick Film

SG73 High Pulse/Surge
- Superior to RK73 series in surge/pulse withstanding voltage
- Tolerance: ±10%, ±20%
- Power rating: 0.1W (0603), 0.125W (0805), 0.33W, (1206), 0.5W (1210), 0.75W (2010), 1W (2512)

SG73G High Precision Pulse Power
- TCR: ±50ppm/°C
- Tolerance: ±0.25%, ±0.5%
- Power rating: 0.33W (0603), 0.5W (0805, 1206)
- Ultra precision grade, high power

SG73P Pulse Resistant
- Superior to RK73 series in pulse withstanding voltage and high power
- Tolerance: ±0.5% ~ ±5%
- Power rating: 0.33W (0402), 0.5W (0603), 0.75W (0805), 1W (1206), 1.5W (1210)

SG73S Surge Resistant
- Superior to RK73 series in surge withstanding voltage and high power
- Tolerance: ±0.5% ~ ±5%
- Endures high ESD limiting voltage
- Power rating: 0.33W (0402), 0.5W (0603), 0.75W (0805), 1W (1206), 1.5W (1210)

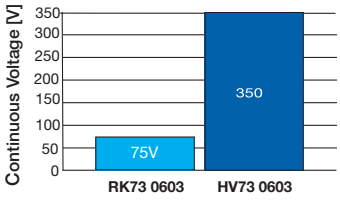
Watch Video - "Handling Pulse Power with Surface Mount Resistors"

High Voltage

HV73 - High Voltage
- Superior to RK73 in maximum working voltage
- Absolute maximum working voltage as high as 800V (1206), 3000V D.C. (2512)
- Resistance range: 10k ~ 100MΩ

HV73V - High Voltage for Automotive
- Superior to RK73 in maximum working voltage
- Maximum working voltage as high as 800V (1206)
- Resistance range: 10k ~ 51MΩ

Use Fewer Resistors for High-Voltage

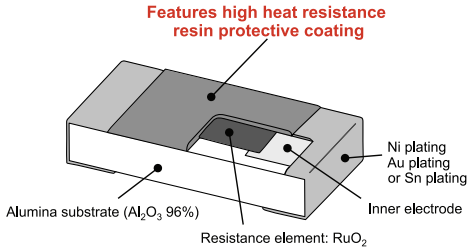


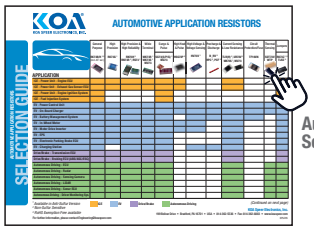
Watch Video - "HV73 & HV73V High Voltage Chip Resistors"

- Anti-Sulfuration Version - HV73RT - Only company to offer High Voltage resistor with sulfur proof terminations

High Temperature

HSG73P - High Temperature
- The maximum operating temperature of Sn plating products compatible with solder mounting is 175°C, and Au plating products compatible with conductive glue mounting is 200°C.





Automotive Resistors Selection Guide

Mold Type

SLR1 - High Temperature Resistance
- Resistance range: 301m ~ 1MΩ
- Tolerance: ±0.5%, ±1%, ±5%
- TCR: ±100ppm/°C

MWS-Power Type, Wirewound
- Power rating: 5W (package)
- Resistance range: 1 ~ 470Ω
- TCR: ±200ppm/°C

Fusing

RF73 - Fusing Resistor
- Performs like RK73 under normal conditions
- Fuses when overloaded
- Fusing time: 60 seconds, maximum
- Fuses in less than 1 minute when subjected to specified overpower condition

MELF

CC, RD41 - Fixed Carbon Film MELF Resistor
- Metal plated terminals
- Power rating: 0.25W (RD41)
- Current rating: 2A- 5A (CC)

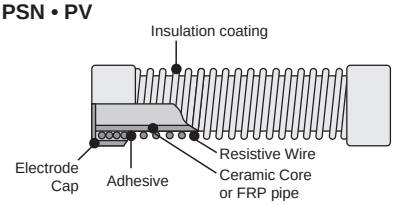
RN41 - Fixed Metal Film MELF Resistors
- Higher stability in short and long term tests
- TCR: ±25, ±50ppm/°C
- Power rating: 0.4W (2ES), 1W (3AS)

Other Surface Mount Resistors

CPCN - Fixed Ceramic Resistor
- Suitable for noise suppression of engine ignition systems
- Reliable in pulse/transient applications
- Power rating: 0.5W, 1W, 1.5W, 2W

P - High Voltage Power Resistor
- PSN is higher power (up to 250W) and for high voltage surge (up to 400kV)
- PSO is a completely moisture resistant version of PSN
- PN is non-inductive type and can be used for high frequency
- PWW are non-inductive wirewound resistors for high voltage with resistance wires wound on insulation pipes
- PAP are non-inductive wirewound resistors with inductance less than PWW, can be used for pulse wave measurement
- Wide power rating: 1.5 - 250W

PSN • PV



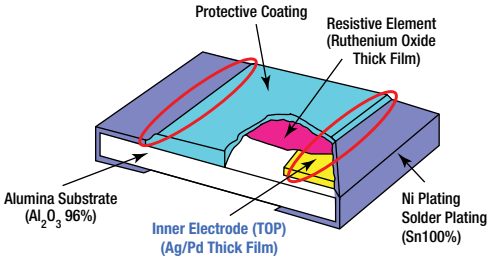
ANTI-SULFUR RESISTORS

Anti-Sulfuration Chip Resistors

Why Choose Anti-Sulfuration?

Sulfuration is a phenomenon that occurs in most thick film resistors with silver-based inner electrodes. When a resistor is used in a high-sulfur atmosphere, the sulfur molecules can migrate between the protective film and the outer electrode to the inner electrode, where they react to form silver sulfide. Silver sulfide is an insulator, and the resistance of the device increases toward an open circuit. KOA's product line includes resistors with sulfuration-resistant inner electrodes.

Structural Chart of Flat Chip Resistor (Standard)



All KOA Speer anti-sulfuration components (-RT) pass EIA-977 Anti-Sulfuration Testing

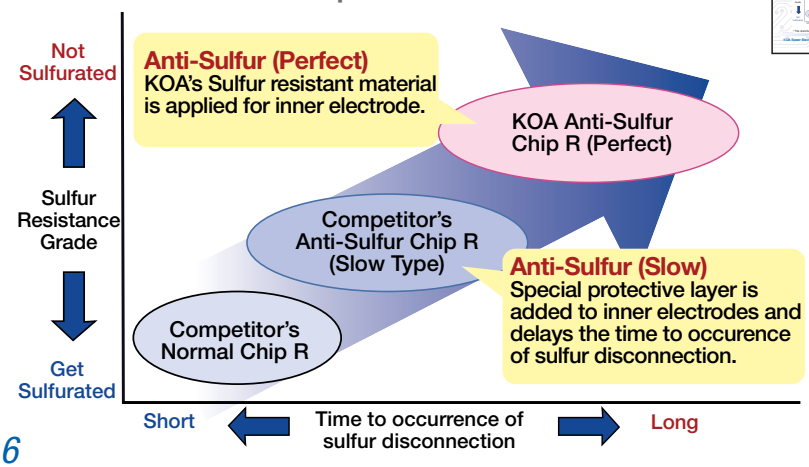
Chip Resistor Disconnected by Sulfuration

Needle Crystals of Silver Sulfide (Ag_2S)

Watch Video - "Improving Sulfur Resistance in Thick Film Resistors"

Anti-Sulfur Sales Guide

Anti-Sulfur Performance Comparison



General Purpose

RK73B-RT
- General Purpose Flat Chip Resistor
- Tolerance: ±2%, ±5%
- Power rating: 0.03W (01005), 0.05W (0201), 0.1W (0402), 0.125W (0603), 0.25W (0805, 1206), 0.5W (1210), 0.75W (2010), 1W-2W (2512)

RK73H-RT
- High Precision Flat Chip Resistor
- Tolerance: ±0.5%, ±1%
- Power rating: 0.03W (01005), 0.05W (0201), 0.1W (0402), 0.125W (0603), 0.25W (0805,1206), 0.5W (1210), 0.75W (2010), 1W-2W (2512)

RK73Z-RT
- Zero ohm with max. resistance of 50mΩ

High Precision

RS73-RT
- High reliability with ΔR of ±0.2%
- Low TCR: ±25ppm/°C, ±50ppm/°C
- Power rating: 0.125W (0402), 0.2W (0603), 0.25W (0805), 0.33W (1206)

RK73G-RT
- Ultra Precision Flat Chip Resistor
- Tolerance: ±0.25%, ±0.5%, ±1%
- TCR: ±50ppm/°C
- Power rating: 0.1W (0402, 0603), 0.125W (0805), 0.25W (1206)

Surge Current

SG73-RT
- Superior to RK73 series in surge withstanding voltage and pulse withstanding power
- Power rating: 0.1W (0603), 0.125W (0805), 0.33W (1206), 0.5W (1210), 0.75W (2010), 1W (2512)

SG73P-RT
- Pulse withstanding power
- Tolerance: ±0.5% ~ ±5%
- Power rating: 0.33W (0402), 0.5W (0603), 0.75 W (0805), 1W (1206), 1.5W (1210)

SG73S-RT
- Surge Precision
- Tolerance: ±0.5% ~ 5%
- Power rating: 0.33W (0402), 0.5W (0603), 0.75 W (0805), 1W (1206), 1.5W (1210)

Wide Terminal

WK73R-RT/WK73S-RT
- Power rating: 1W (0508 (WK73R-RT)), 1.25W (0508 (WK73S-RT)), 1.5W (0612), 2W (1020 (WK73R-RT)), 3W (1020 (WK73S-RT), 1225, (WK73R-RT)), 4W (1225 (WK73S-RT))

High Voltage

HV73-RT
- Max working voltage as high as 3000V DC (2512)
- Power rating: 0.1W (0603), 0.25W (0805, 1206), 0.5W (2010), 1W (2512)

HV73V-RT
- High Voltage Flat Chip Resistor for Automotive
- Power rating: 0.1W (0603), 0.25W (0805), 0.33W (1206)

High Temperature

HSG73P-RT
- Superior to RK73 series chip resistors pulse withstanding voltage and high power
- Power rating: 0.2W (0402), 0.33W (0603), 0.5W (0805), 0.75W (1206)

Current Sense

SR73-RT
- Low Resistance (0.1~10Ω)
- Power rating: 0.166W (0402), 0.2W (0603), 0.5W (0805, 1206), 0.66W (1210)

Metal Plate

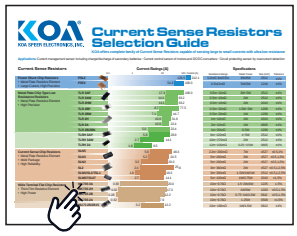
TLR-Current Sensing, Low Resistance
- Power rating: 1W (0805), 2W (2010), 3W (1206), 5W (2512)
- Resistance range: 0.5m ~ 20mΩ
- TCR: ±50, ±75, ±100ppm/°C

TLRH-Current Sensing, Extended Resistance Range, Low Resistance
- Power rating: 0.5W (0805), 5W (2512)
- Resistance range: 6m ~ 270mΩ
- TCR: ±50, ±75ppm/°C

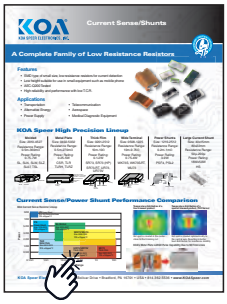
TLRZ-Current Sensing, Zero Ohm Jumper
- Current Ratings: 10A (0402), 26A (0603), 31.6A (0805), 50A (1206)
- Ultra low resistance not to exceed 0.5mΩ

Watch Video -
"Handling Pulse Power with Surface Mount Resistors"

Watch Video -
"Choosing Technologies for Current Sense Resistors"

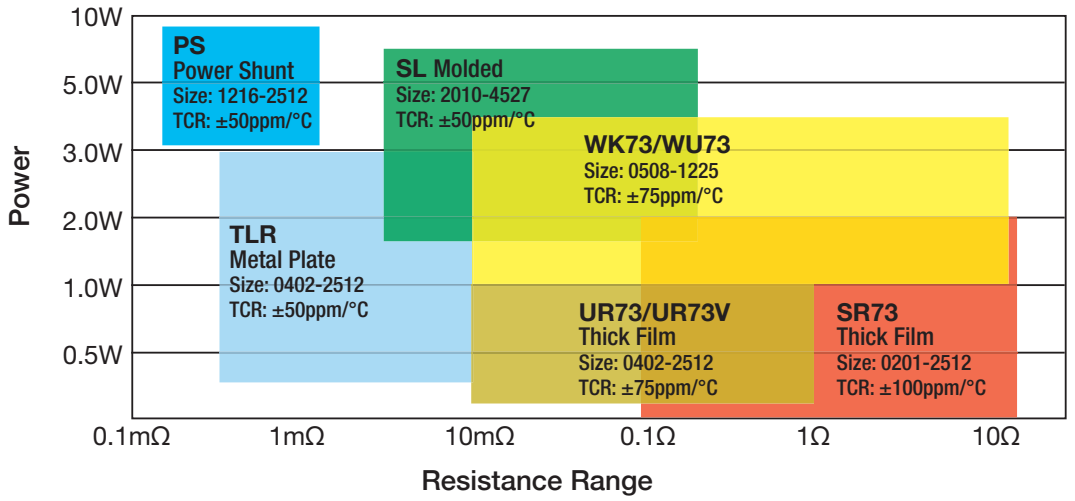


Current Sense Selection Guide

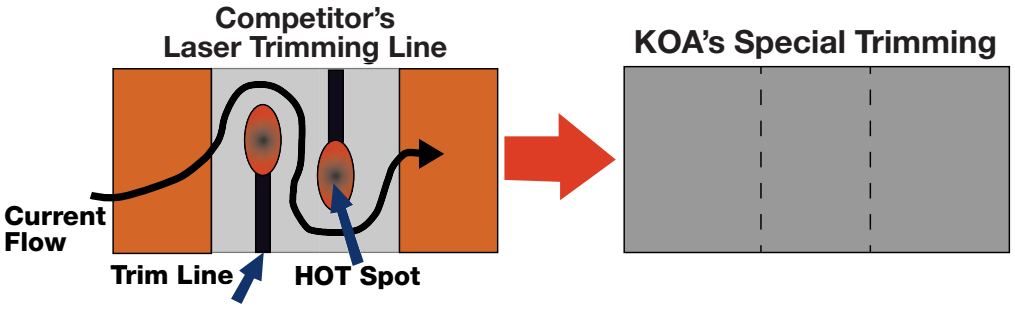


Current Sense Sales Guide

KOA Current Sense Resistor Lineup



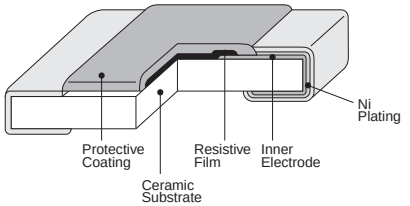
KOA's Metal Plate
LARGE Pulse Capability Due to NO Trim Lines



Thick Film

SR73-Low Resistance
- Resistance range: 24m ~ 10Ω
- TCR: Down to 100ppm/°C
- Tolerance: ±0.5% ~ ±5%

UR73-Low Resistance, Low TCR
- Resistance range: 10m ~ 100mΩ
- TCR: Down to ±100ppm/°C
- Power rating: 0.125W (0402), 0.25W (0603), 0.33W (0805), 0.5W (1206), 1W (2512)



UR73V-High Heat, Low Resistance, Low TCR
- Operating temp range: -55°C ~ +155°C
- Resistance range: 10m ~ 1Ω
- TCR: ±75ppm/°C available
- Power rating: 0.5W (0805), 1W(1206)

Wide Terminal Thick Film

WK73S-Low Resistance, Wide Terminal
- Power rating: 1.25W (0508), 1.5 W (0612), 3W (1020), 4W (1225)
- Resistance range: 10m ~ 9.76Ω
- Tolerance: ±0.5%, ±1%, ±5%

WU73-Low Resistance, Wide Terminal
- Power rating: 1W - 1.5W (0612)
- Resistance range: 10m ~ 100mΩ
- Tolerance: ±1%
- TCR: ±75, ±100ppm/°C

Power Shunts

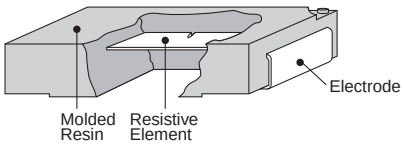
PSL2-Large Current Sensing, Ultra Low Resistance, 2-Terminal
- Resistance range: 0.2m, 0.3m, 0.5mΩ
- Power rating: 8W, 9W (2512)
- TCR: Down to ±115ppm/°C
- Tolerance: ±1%

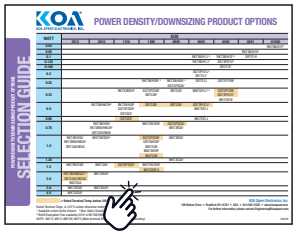
PSF4-Large Current Sensing, Ultra Low Resistance, 4-Terminal, Low TCR
- Resistance range: 0.5m, 1mΩ
- Power rating: 3W, 5W (1216)
- TCR: ±50ppm/°C

PSG4-Large Current Sensing, Ultra Low Resistance, 4-Terminal, High Power
- Resistance range: 0.5mΩ
- Power rating: 10W (2725)
- TCR: ±50ppm/°C

Molded Metal Plate

SL-Current Sensing, Low Resistance
- Power rating: 0.75W (2010), 1W (2512), 2W (SL2 4527)
- Resistance range: 3m ~ 360mΩ
- Tolerance: ±0.5% ~ ±5%
- TCR as low as: ±50ppm/°C





Power Density/Downsizing Options

SLN-SLW-Higher Power Current Sensing
- Power rating: 1W (2010), 1.5W (2512), 7W (4527)
- TCR: As low as ±50ppm/°C
- Resistance range: 3 ~ 200mΩ
- Tolerance: ±0.5%, ±1%, ±5%

TSL-Low Profile Current Sensing
- Power rating: 1W (2512)
- Resistance range: 5m ~ 100mΩ
- Tolerance: ±0.5%, ±1%, ±5%

CSR-Current Sensing, 4-Terminal, Molded
- Power rating: 1W (CSR1), 2W (CSR2)
- TCR: ±50ppm/°C
- Resistance values: 5m ~ 50mΩ
- Tolerance: ±0.5%, ±1%

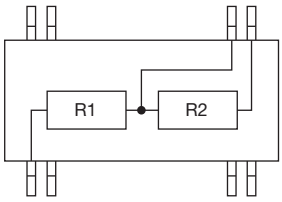
Networks

CNN-Thin Film Chip Network
- Excellent in relative TCR (±0.05%, ±0.1%)
- Pair resistors for high precision OP-amplifiers

HVD-P08 - High Voltage Divider-Precision Type
- Max. working voltage 1000V
- Relative resistance tolerance: 0.1% ~ 0.5%
- Relative TCR tracking: 10ppm/°C, 25ppm/°C
- Absolute resistance tolerance: ±0.1% ~ ±1%

RBA, RBB-Bussed Resistor Network
- Resistance range: 10 ~ 100kΩ

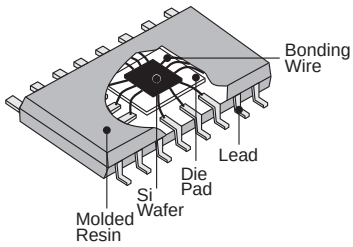
RDA, RDB-Terminator Network
- Resistance range: R1-150~10k R1:R2=1:1~1:4



RLA-R/2R- Ladder Network
- Resistance range: 1k~30k

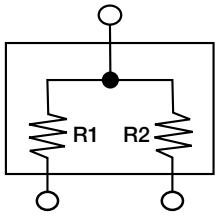
RNX-High Precision Custom Resistor Network
- Resistance range: 10 ~ 510kΩ

RIA-Isolated Resistor Network
- Absolute tolerance: ±0.1% ~ ±5%

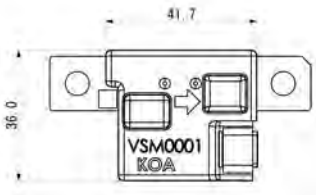


RTX-Thin Film Network
- Resistance range: 51 ~ 40kΩ
- TCR: ±25ppm/°C, ±50ppm/°C, ±100ppm/°C

RTY-Precision Voltage Divider Thin Film
- Ratio matching
- TCR: ±10, ±25, ±50, ±100ppm/°C
- TCR tracking: 5 ~ 50ppm/°C



VSM0001- Shunt Current Sensor
- Large current detection via shunt resistor
- High precision current sensing
- Low input loss
- Current rating: ±200A, ±400A



LEADED RESISTORS

General Purpose

CF-Carbon Film
- Flameproof coating available (CFP)
- Reduced body size offered (CFS, CFPS)
- Power rating: 0.25W (1/4), 0.5W (1/2)

Precision

MF-Precision Metal Film
- MFS two times the power rating of the standard body type
- Resistance range: 0.51 ~ 5.11MΩ
- Tolerance: ±0.5%, ±1%, ±2%

RNS-High Precision Metal Film
- Excellent long term stability
- Resistance range: 0.2 ~ 6.8MΩ
- Tolerance: ±0.1% ~ ±1%

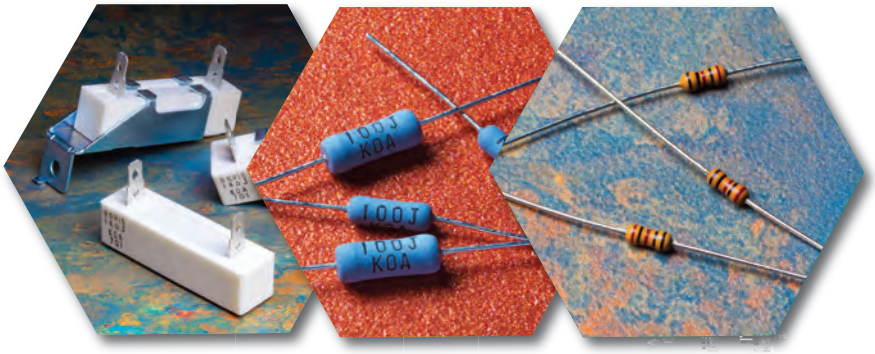
SN3A/3D- High Precision
- TCR: ±50%, ±100%, ±200ppm/°C
- Wide resistance range: 10 ~ 1.5MΩ
- Power rating: 1W (SN3A), 2W (SN3D)

SNF- Flame Retardant, Fixed Resistor
- Wide resistance range: 0.47 ~ 100Ω

RK-Metal Glaze Discharge Path Resistors
- Highly stable against environmental conditions and overload
- Power rating: 0.25W, 0.5W, 1W
- RK1/2G: Discharge path resistor
- UL1676 available

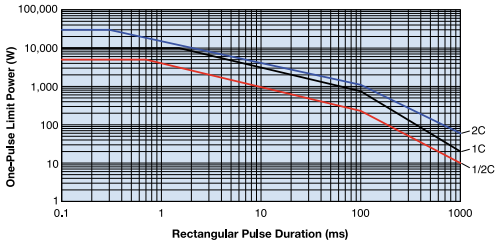
High Voltage

RCR-Anti-Surge Resistor
- Excellent anti-surge characteristics
- RCR50+ (1MΩ ~ 12MΩ), RCR50EN (1M ~ 12MΩ) and RCR60 are conductive-path and discharge path resistors recognized by UL1676 and c-UL (CSA-C22.2 No. 1-M94)
- RCR25EN, RCR50EN (100k ~ 33MΩ), RCR60 (100k ~ 56MΩ) are approved by EN6268-1 G.10 safety.



GS-High Voltage, High Resistance Thick Film
- Miniature construction can endure high continuous voltage (up to 40kV)
- High power rating up to 12W
- Excellent anti-surge characteristics
- Wide resistance range: 500k ~ 10GΩ

PCF Series One Pulse Limit Power Curve



PCF-Ceramic Resistor for Anti-Pulse Surge
- KOA original bulk ceramic resistor
- Coated with UL94 V-0 flameproof material
- Power rating: 0.5W ~ 2W

HPC-Ceramic Resistor for Anti-Pulse Surge
- KOA original bulk ceramic resistor
- Higher reliability against disconnection compared to wirewound resistors and film resistors
- Power rating: 0.5W ~ 5W

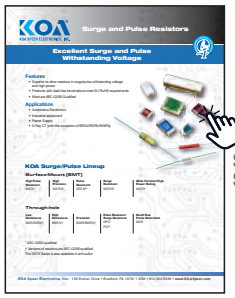
Power

BGR, BWR, BSR-High Power Resistors
- Uses flame retardant insulated ceramic case
- Power rating: BWR - 1W ~ 20W, BGR - 5W ~ 40W, BSR - 2W ~ 20W
- Various styles available

BGRV, BWRV, BSRV-High Power Resistors for Automotive
- Uses flame retardant insulated ceramic case
- Excellent in anti-pulse and in rush current
- Power rating: BGRV - 5W ~ 40W, BSRV - 3W ~ 20W, BWRV - 3W ~ 60W

MOS/MOSX-Reduced Size Metal Oxide Power Type
- MOS/MOSX Small size power type resistor
- Power rating: 0.5W - 5W
- Resistance range: MOS- 10 ~ 100kΩ, MOSX - low resistance range: 0.1 ~ 9.1Ω

SPR-Power Carbon Film
- High reliability performance
- Power rating: 0.25W - 5W



Surge & Pulse Sales Guide

LEADED RESISTORS *(CONTINUED)*

Wirewound

CWFS-Coat Insulated Wirewound Resistor with Fusing Function
- Fail-safe fusing at AC 250V
- Fusing power: 90W (CWFS23), 150W (CWFS35)
- Fusing time: 30 S. Max

CW-Coat Insulated Wirewound Resistor
- CW1SS- UL1412 approval (file No. E320246)
- CW_X - power type & CW_S - small type available
- Power rating: 0.25W - 5W
- Tolerance: ±2%, ±5%, 10%

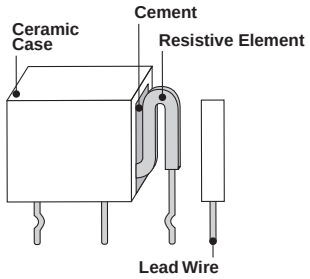
CW_H-Miniature Wirewound Leaded Resistor
- Meets MIL-PRF-26 (U characteristics)
- High precision resistor with a TCR of less than ±20ppm/°C
- Resistance range: 0.1 ~ 3kΩ
- Tolerance: ±0.5% ~ ±1%

CW_P-Precision Coat Insulated Wirewound Resistor
- Flameproof silicone coating equivalent (UL94 V-0)
- TCR: ±50, ±90ppm/°C
- Tolerance: ±0.25%, ±0.5%, ±1%

RW-Coat-Insulated Miniature Precision Power Wirewound Resistor
- Meets MIL-R-26E (U and V characteristics) and surface temperature (hot spot) 350°C max.
- Wide resistance range: 0.1 ~ 62kΩ
- RW_N are non-inductive wound and can be used in high frequency applications
- Tolerance: +0.5% ~ ±5%

Current Sense

BPR-Rectangular Metal Plate Resistor
- Power type current detecting resistor with flame retardant ceramic case
- Automatic insertion for a 5mm pitch between terminals is applicable (26 type, 58 type)
- Low resistance range: 0.01 ~ 1Ω



LR-Custom Milliohm Resistor
- Pitches and heights are adjustable according to mounting conditions
- All custom made parts
- Max. current rating: 3A ~ 21A

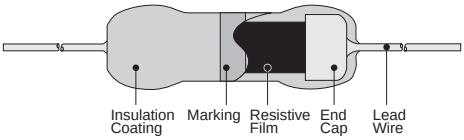
Fusing

RF-Coat Insulated Fusing Resistor
- Quick fusing protects circuit from excessive overload at an abnormal time
- Fusing time: 30s max, 60s max
- Flame-retardant coating equivalent to UL94 V-0
- Fusing power: 2.5W ~ 36W

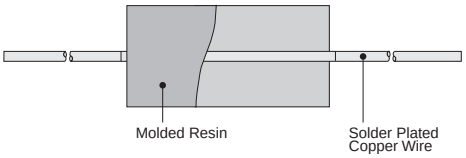
RF25CC-Coat-Insulated Fusing Resistor
- Constant current fuse type
- Fuse with 60 sec in case of over-current
- Flame retardant coating equivalent to UL94 V-0

Jumper

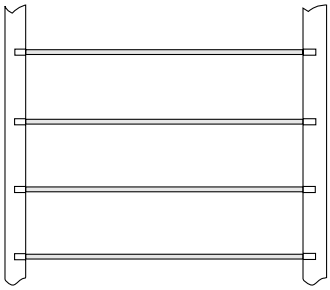
Z-Jumper (Coating Type)
- Max. Amperage: 15A
- Resistance: 20mΩ or less

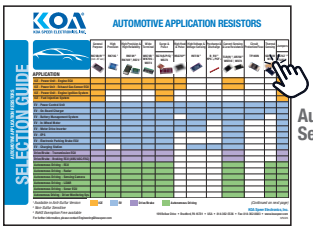


J-Molded Jumper
- Max. allowable current: 8A, 10A



JL-Jumper Wire
- Suitable for automatic machine insertion
- Max. current rating: 8A (5), 10A (6), 12A (8),
- Gauge wire: 24 (JL5), 22 (JL6), 20 (JL8)

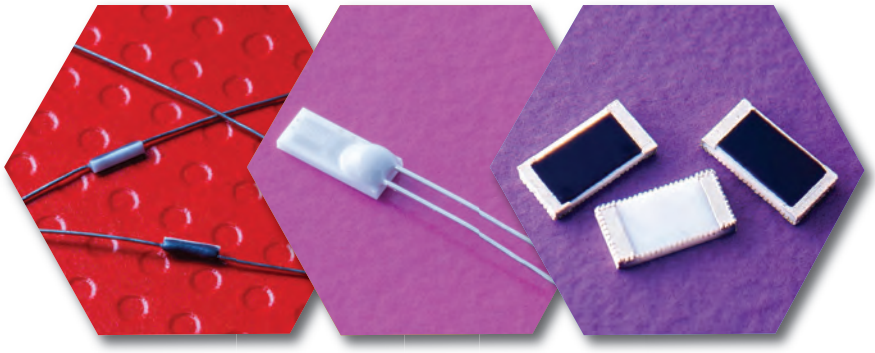




Automotive Resistors Selection Guide

THERMAL SENSORS / THERMISTORS

Platinum Thin Film Thermal Sensors (Through-Hole)

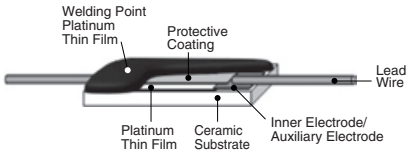


SDT310VASP2-Small Type Platinum Thin Film Thermal Sensor, Fast Response
- Achieves a thermal time constant 2.8 seconds due to volume reduction
- Excellent heat-resistance
- Applies axial lead type suitable to use as a heater element

SDT101-Axial Platinum Thin Film Thermal Series
- Stable characteristics even in use for a long time with an excellent environment resistance
- Resistance: 10Ω ~ 1kΩ

SDT310HCTP-Small Type Platinum Thin Film Thermal Sensor
- Small package of 1.2mm x 3mm with 100Ω resistance
- Operating temperature range: -55°C ~ +300°C, -55°C ~ +400°C

SDT310-Small Type Platinum Thin Film Thermal Sensor
- TCR: 3850ppm/°C
- Thermal time constant is improved with the small package
- Operating temperature range: -55°C ~ 155°C, -55°C ~ 400°C, -55°C ~ +650°C



Platinum Thin Film Thermal Sensors (Custom)

ST-Custom Thermal Sensor
- All ST-series thermal sensors are custom designed in various shapes in accordance with your application
- Resistance values at 0°C: 100, 500, 1kΩ
- Utilize SDT310 or SDT101

Platinum Thin Film Thermal Sensors (Surface Mount)

SDT73H
- Thermal time constant: 6.5 seconds
- TCR: 3850ppm/°C
- Resistance values at 0°C: 100, 500Ω

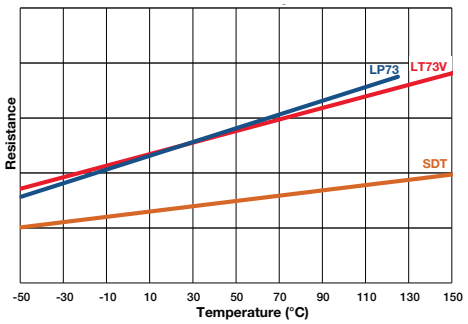
SDT73S
- TCR: 3850ppm/°C
- Operating temperature range: -55°C ~ +250°C
- Thermal time constant: 6.5 seconds

SDT73V-Automotive
- TCR: 3850ppm/°C
- Operating temperature range: -55°C ~ +155°C
- Thermal dissipation constant: 2.4mW/°C
- Resistance values at 0°C: 100Ω, 500Ω
- Thermal time constant: 6.5 seconds

NEW **WTP-For Wire Bonding**
- TCR: 3850ppm/°C in accordance with JIS-IEC standards
- Electric structure suitable for Al wire bonding of thick lines
- Thermal time constant: 8.3 seconds

Thin Film Thermistors and PTC Thermistors

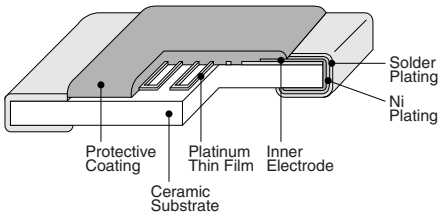
Thermistor Styles



LP73-Thin Film Thermal Sensors of SMD Type
- Suitable for control of temperatures in various industrial equipment
- Sizes: 0603, 0805, 1206
- TCR tolerance: ±5%
- Resistance: 100Ω ~ 1kΩ

LT73-Linear Positive Tempco Thermistor
- TCR: 150 ~ 4500ppm/°C
- Thermal time constant: 1 second, 1.5 seconds
- Resistance: 51Ω ~ 51kΩ

LT73V-Linear Positive Tempco Through-hole for Automotive
- Various TCR: 150 ~ 4500ppm/°C are available
- Sizes: 0805, 1206
- Resistance: 51Ω ~ 22kΩ



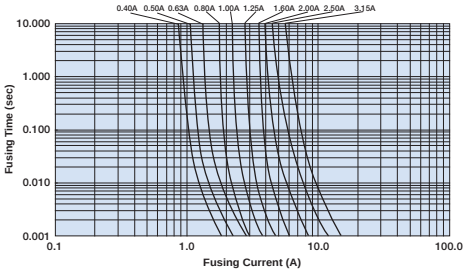
FUSES & VARISTORS

Fuses – Flat Chip

TF16VN - Chip Current Fuse for Automotive

- Small and light for the secondary circuit
- Current rating: 0.40 - 3.15A
- Anti-pulse type in 0603 size

Fusing Characteristics

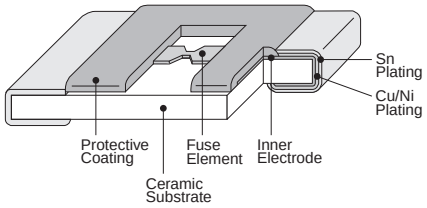


RF73-Fusing Flat Chip Resistor

- Resistance range: 0.2 ~ 510Ω
- Sizes available: 0603, 2512
- UL1412 Approved (0805 ~ 2512 sizes)

TF-Thin Film Chip Fuse

- Rated current from 0.20 ~ 5A
- Sizes available: 0402, 0603
- TF16AT is anti-pulse

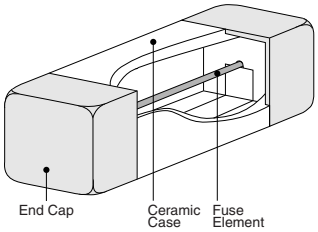


CCF1N-Anti-Surge Chip Fuse

- Current rating: 400mA ~ 30A
- UL248, 14, c-UL(CAS)C22.2 approved
- Up to 125V AC and 160V DC
- Standard size: 2410

CCF1F-Anti Surge, Anti-Sulfuration Chip Fuse

- Meets IEC60127-4 specifications (7A or less)
- Stable fusing characteristics due to proprietary technology
- Current rating: 0.4 ~ 15A
- Standard size: 2410



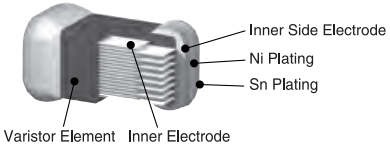
Varistors

NV73-Metal Oxide Varistor

- Protects against static electricity, switching and incoming surges
- Clamping voltage: 18V ~ 100V
- Max. peak current Ip (2 times): up to 70A

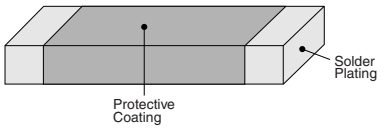
NV73DL-Metal Oxide Varistor for Automotive

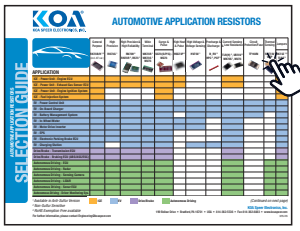
- Ideal for countermeasures against ESD (conforming to IEC61000-4-2)
- Max. energy type up to 1.5J
- Clamping voltage: 24V ~ 135V



NV73S - Multilayer Type Metal Oxide Varistor

- Multilayer construction allows its small size to absorb a large surge
- Clamping voltage: 27V ~ 248V
- Max. current: 6,000A
- Max. peak current Ip (1 time): up to 6,000A





Automotive Resistors Selection Guide

LTCC SUBSTRATES & OTHER PRODUCTS

LTCC Substrates

KLC-LTCC Multilayer Substrates

- Line width as low as 60µm
- Special shapes of substrates and cavity (circle, polygonal, concave or convex shape available)
- Line-to-line spacing as low as 60µm
- Cavity flatness: <25µm
- Flexural/bending strength: 250MPa
- (TCE): 5.5x10^{-6}/K
- Thermal conductivity: 3W/m.K
- Fired layer thickness: 80µm, 100µm, 125µm
- Via diameter: 100µm, 150µm, 200µm

Hybrid IC

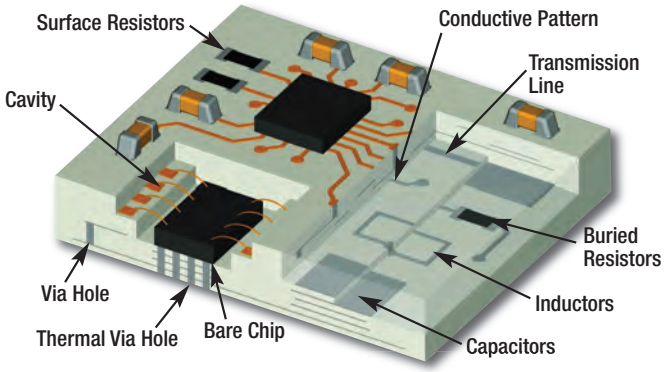
KA-Hybrid IC

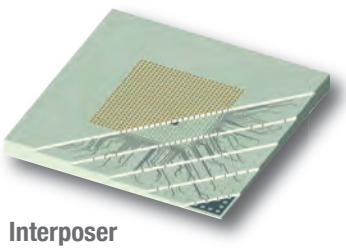
- High density mounting by bonding (COB)
- Adjustment processes are decreased by function and ratio trimmings
- Conductor: Ag-Pd, Ag-Pt
- Printed resistor: 5Ω ~ 10MΩ ±100x10^{-6}/K

Other Products

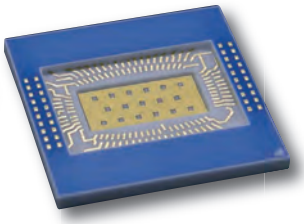
RC-Test Point Chip

- Surface-mountable chip type test terminal
- Standard resistance: 50mΩ or less
- Sizes available: 0603, 0805, 1206
- AEC-Q200 Qualified (RCU only)

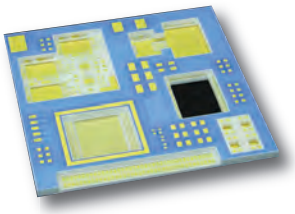




Interposer



Semiconductor Package



Multi-Cavity

LTCC Sales Guide

LAB KITS

Surface Mount Resistors

Anti-Sulfur Precision Flat Chip Resistors

RK73H1ERT-Kit1 (0402 chip size)
122 values, 100 pcs each

RK73H1JRT-Kit1 (0402 chip size)
122 values, 100 pcs each

Precision Flat Chip Resistors

RK73H1FTK001Kit (01005 chip size)
38 values, Lead-free, 25 pcs each (10R0 ~ 620K = ±1%)

RK73H1HTK001Kit (0201 chip size)
217 values, Lead-free, 50 pcs each (0, 10R0 ~ 1M00 = ±1%)

RK73H1ETK001 (0402 chip size)
122 values, Lead-free, 100 pcs each (0, 10R0 ~ 1M00 = ±1%) E-24

RK73H1JTK001 (0603 chip size)
122 values, Lead-free, 100 pcs each (0, 10R0 ~ 1M00 = ±1%) E-24

RK73H2ATK001 (0805 chip size)
122 values, Lead-free, 100 pcs each (0, 10R0 ~ 1M00 = ±1%)

RK73H2BTK001 (1206 chip size)
122 values, Lead-free, 100 pcs each (0, 10R0 ~ 1M00 = ±1%)

General Purpose Flat Chip Resistors

RK73B1FTK001Kit (01005 chip size)
51 values, Lead-free, 25 pcs each (0, 10 ~ 1M = ±5%)

RK73B1HTK001Kit (0201 chip size)
139 values, Lead-free, 50 pcs each (0, 2R2 ~ 2M2 = ±5%)

High Voltage Flat Chip Resistors

HV73TK001Kit (0603, 0805, 1206, 2010 chip sizes)
156 values, Lead-free, 25 pcs each (10k ~ 10M = +1%)

Surge Current Flat Chip Resistors

SG73TK001Kit (0603, 0805, 1206, 1210, 2010, 2512 chip sizes)
204 values, ±10%, Lead-free, 25 pcs each

SG73STK001Kit (0603, 0805, 1206, 1210 chip sizes)
101 values, ±1%, Lead-free, 25 pcs each

SG73PTK001Kit (0603, 0805, 1206, 1210 chip sizes)
97 values, ±1%, Lead-free, 25 pcs each

Wide Terminal Flat Chip Resistors

WK731JT-Kit1 (0306 chip size) (WK73R Series)
73 values, Lead-free, 100 pcs each (±1%)

WK732AT-Kit1 (0508 chip size)
138 values, Lead-free, 100 pcs each (±1%)

WK73TK001Kit (0612,1020,1225 chip sizes)
64 values, Lead-free, 25 pcs each (±1%, ±5%)

WK732BT-Kit1 (0612 chip size)
145 values, Lead-free, 100 pcs each (±5%)

NEW **WK732HT-Kit1 (1020 chip size)**
145 values, Lead-free, 100 pcs each (±1%, ±5%)

NEW **WK733AT-Kit1 (2512 chip size)**
145 values, Lead-free, 200 pcs each +/-1%, +/-5%)

NEW **WN73H1JT-Kit1 (0306 chip size)**
32 values, Lead-free, 100 pcs each (±0.1%)

NEW **WN73H2BT-Kit1 (0612 chip size)**
37 values, Lead-free, 100 pcs each (±0.1%)

WU73TK001Kit (0612 chip sizes)
27 values, Lead-free, 20 pcs each (±1%)

Circuit Protection - Fuses

CCFTK001Kit (2410 chip size)
18 values, Lead-free, 20 pcs each

FuseKit-TF10BN (0402 chip size)
12 values, Lead-free, 100 pcs each

FuseKit-TF16SN (0603 chip size)
14 values, Lead-free, 100 pcs each

FuseKit-TF16AT (0603 chip size)
13 values, Lead-free, 100 pcs each

Ultra Precision Flat Chip Resistor

RN73H1ET-Kit (0402 chip size)
49 values, Lead-free, 50 pcs each (±0.1%, 25ppm°C)

RN73H1JT-Kit (0603 chip size)
67 values, Lead-free, 50 pcs each (±0.1%, 25ppm°C)

RN73H2AT-Kit (0805 chip size)
73 values, Lead-free, 50 pcs each (±0.1%, 25ppm°C)

RN73R1ET-Kit1 (0402 chip size)
49 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RN73R1JT-Kit1 (0603 chip size)
67 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RN73R2AT-Kit1 (0805 chip size)
73 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RN73R2BT-Kit1 (1206 chip size)
74 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RS73F1ET-Kit1 (0402 chip size)
86 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RS73F1JT-Kit1 (0603 chip size)
121 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RS73F2AT-Kit1 (0805 chip size)
132 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

RS73F2BT-Kit1 (1206 chip size)
138 values, Lead-free, 100 pcs each (±0.1%, 25ppm°C)

NOTE: Reference product data pages for available values.

LAB KITS *(CONTINUED)*

Current Sense Resistors

Surface Mount Molded

SLW07TK001Kit (2010, 1W size)
27 values, 20 pcs each (±1%)

SLW1TK001Kit (2512, 1.5W size)
25 values, 20 pcs each (±0.5%)

SL1TK001Kit (2512, 1W size)
33 values, 20 pcs each (±1%)

SL2TK001Kit (4528, 2W size)
45 values, 20 pcs each (±1%)

SLN3TK001Kit (4528, 3W size)
32 values, 20 pcs each (±0.5%)

SLN5TK001Kit (4528, 5W size)
21 values, 10 pcs each (±0.5%)

TSL1TK001Kit (2512, 1W size)
33 values, Lead-free, 20 pcs each (±1%)

SLRTK001Kit (2513, 1W size)
40 values, 15 pcs each (±1%)

Metal Plate

TLR2ATK001Kit (0805 chip size)
6 values, 20 pcs each (±1%)

TLR2BWD-Kit (1206 chip size)
17 values, 15 pcs each (±1%)

TLR2HW-Kit (2010 chip size)
10 values, 15 pcs each (±1%)

TLR3APD-Kit (2512 chip size)
10 values, 20 pcs each (±1%)

TLRDK001Kit (1206, 2010, 2512 chip sizes)
36 values, Lead-free, complete range, 20 pcs each (±1%)

TLR2BP-Kit (1206 chip size)
17 values, 15 pcs each (±1%)

Chip Resistors

UR73TK001Kit (0402, 0603, 0805, 1206, 2010, 2512 chip sizes)
144 values, Lead-free, 20 pcs each (±1%)

UR73VTK001Kit (1206 chip sizes)
8 values, 20 pcs each (±1%)

NOTE: Reference product data pages for available values.

Thick Film

SR731HTK001Kit (0201 chip size)
29 values, Lead-free, 50 pcs each (R47 ~ 10R0, ±1%, ±5%)

SR731ETK001Kit (0402 chip size)
25 values, Lead-free, 50 pcs each (R100 ~ 1R00, ±1%)

SR731JK001Kit (0603 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

SR732AK001Kit (0805 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

SR732BK001Kit (1206 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

SR732EK001Kit (1210 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

SR732HK001Kit (2010 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

SR733AK001Kit (2512 chip size)
49 values, Lead-free, 50 pcs each (R100 ~ 10R0, ±1%)

STANDARD VALUES

Significant Figures of Nominal Resistance

E-12 Decade Values					
10	12	15	18	22	27
33	39	47	56	68	82

E-24 Decade Values					
10	11	12	13	15	16
18	20	22	24	27	30
33	36	39	43	47	51
56	62	68	75	82	91

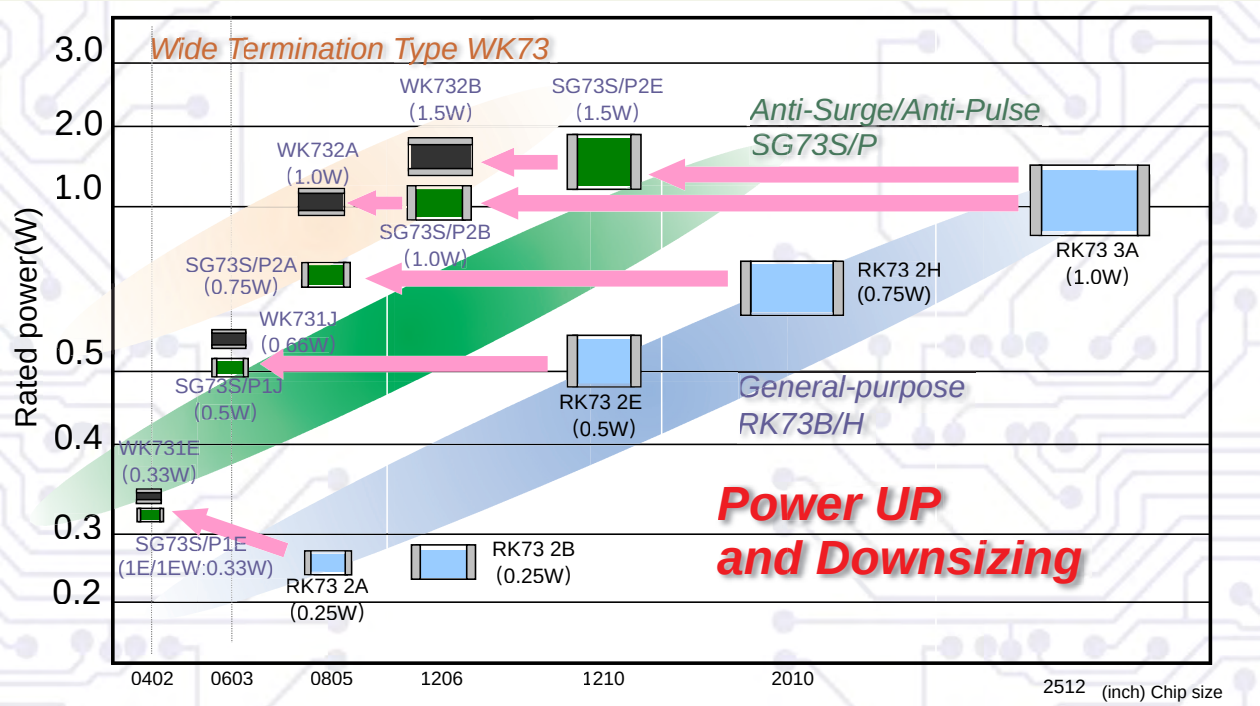
E-96 Decade Values					
100	102	105	107	110	113
115	118	121	124	127	130
133	137	140	143	147	150
154	158	162	165	169	174
178	182	187	191	196	200
205	210	215	221	226	232
237	243	249	255	261	267
274	280	287	294	301	309
316	324	332	340	348	357
365	374	383	392	402	412
422	432	442	453	464	475
487	499	511	523	536	549
562	576	590	604	619	634
649	665	681	698	715	732
750	768	787	806	825	845
866	887	909	931	953	976

E-192 Decade Values					
100	101	102	104	105	106
107	109	110	111	113	114
115	117	118	120	121	123
124	126	127	129	130	132
133	135	137	138	140	142
143	145	147	149	150	152
154	156	158	160	162	164
165	167	169	172	174	176
178	180	182	184	187	189
191	193	196	198	200	203
205	208	210	213	215	218
221	223	226	229	232	234
237	240	243	246	249	252
255	258	261	264	267	271
274	277	280	284	287	291
294	298	301	305	309	312
316	320	324	328	332	336
340	344	348	352	357	361
365	370	374	379	383	388
392	397	402	407	412	417
422	427	432	437	442	448
453	459	464	470	475	481
487	493	499	505	511	517
523	530	536	542	549	556
562	569	576	583	590	597
604	612	619	626	634	642
649	657	665	673	681	690
698	706	715	723	732	741
750	759	768	777	787	796
806	816	825	835	845	856
866	876	887	898	909	920
931	942	953	965	976	988

DOWNSIZING

Increasing Power Ratings

Downsizing Through Greater Stability & Temperature Management



Power Density/Downsizing Product Options

POWER DENSITY/DOWN SIZING PRODUCT OPTIONS
SELECTION GUIDE

WATT	SIZE								
	2512	2010	1210	1206	0805	0603	0402	0201	01005
0.03									RK73B/H1F[1]
0.05								RK73B/H1H[1]	
0.1						RK73B/H1J[1,3]	RK73B/H1E[1,3]	SR731H	
0.125						RK73B/H1J[1]	SG73P/S1E[1]		
0.166							SR731E[1]		
0.2						SG73P/S1J[1] SR731J[1]			
0.25				RK73B/H2B[1,3]	RK73B/H2A[1,3] SG73P/S2A[1]	SR731J	SG73P1EW		
0.33			RK732EB/H[3]	SG73P/S2B[1] SR732B[1]	SR732A[1]	WN73H1J[2,4]	SG73P1EW SG73P/S1E[1] WK73R1E		
0.5		RK73B/HW2H[3]	RK73B/H2E[1] SG73P/S2E[1] SR732E[1]	SR732B[1]	SR732A[1]	SG73P/S1J[1] WK73R1J			
0.66			SR732E[1]			WK73R1J			
0.75		RK73B/H2H[1] RK73BW/HW2H[1] SR732H/W2H		WK73R/S2B[1]	SG73P/S2A[1] WK73R2A[1]				
1.0	RK73B/H3A[1] RK73BW/HW3A[1] SR733A/W3A	WK73R/S2H[1]		SG73P/S2B[1] UR73VH2B[2] WG732B WN73H2B[2] WU732B	WK73R2A[1]				
1.25					WK73S2A[1]				
1.5	WK73R/S3A[1]	WG732H	SG73P/S2E[1]	WK73R/S2B[1] WU732B15					
2.0	RK73B/HW3A2[1,3] SR733A2/W3A2 WG733A	WK73R2H[1]							
3.0	WK73R3A[1]	WK73S2H[1]							
4.0	WK73S3A[1]								

= Rated Terminal Temp. below 125°C

Rated Terminal Temp. is 125°C unless otherwise noted
[1] Available in Anti-Sulfur Version [2] Non-Sulfur Sensitive
[3] RoHS Exemption Free available (2512 is RK73B/HW3A series) [4] = 0.3 Watt
NOTE: WG73, WK73, WN73H, WU73 (Wide terminal film resistors are reverse geometry)

KOA Speer Electronics, Inc.
199 Bolivar Drive • Bradford, PA 16701 • USA • 814-362-5536 • www.koaspeer.com
For further information, please contact Engineering@koaspeer.com

3/5/26

SHORT FORM SELECTION GUIDE

General Purpose & Precision Resistors

General Purpose - Chips

RK73B/H/Z - 5% & 1% Tol.
- 01005 - 2512 sizes
- 1r - 22M
- .03W - 2W

Precision - Thick Film

RK73G - 50 ppm TCR
RS73 - Low Tol. & TCR
- Down to 25 ppm TCR
- Down to .1% Tol.
- 0201 - 1206 sizes

Precision - Thin Film

RN73R - High Reliability
RN73H - Automotive
WN73H - Wide Terminal
- Tolerance down to .05%
- TCR down to 5 ppm
- 0402 - 1210 sizes
- 10r - 1.5M
- .063W - 1 W

Applications: A, I, M, T

Common Applications:

- A Automotive
- B Battery Management
- C Converters
- E Engine Control Units
- I Industrial
- M Medical
- P Power Supply
- S Surge
- T Test & Measurement

Specialty Resistors

Wide Terminal - Chip

WK73R/S - Higher Power
WG73 - Anti-Surge
WN73H - Low Tol. & TCR
WU73 - Low TCR
- Higher power than standard termination
- 0204 - 1225
- .33W - 3W
- 10m - 1M

Applications: A, I, M, T, P

Anti Surge/Pulse - Chip

SG73 - Untrimmed
SG73P - Pulse
SG73S - Surge
SG73G - 50 ppm
- Superior surge & pulse withstanding voltage vs. standard resistor

Applications: I, E, P, S

High Voltage - Chip

HV73 - High Voltage
HV73V - Automotive
- Maximum working voltage higher than standard resistors

Applications: B, C

High Temperature - Chip

HSG73P - High Temp
- Can be used at temps. 155°C & higher

Molded Packaging

SLR1 - High Temp
MWS - Wirewound
- Operates to 180°C

Melf

CC - Cross Conductor
RD41 - Carbon Film
RN41 - Metal Film

Other Surface Mount Res.

CPCN - Noise Suppresor
P- High Voltage

Anti-Sulfur - Chip

HSG73P - High Temp.
HV73/V - High Voltage
RK73B/H/Z - 5% & 1% Tol.
RK73G - 50 ppm TCR
RS73 - Low Tol. & TCR
SG73/P/S - Pulse/Surge
SR73 - Current Sense
WK73S - High Power
- Even more sulfur resistant than our standard product

Applications: A, I, P

Current Sense Resistors

Chip

SR73 - .024m - 10R
UR73 - Low TCR
UR73V - Automotive

Molded

CSR - 5m - 50m, 50 ppm
SL/N/Z - .5m - 360m
SLR - .33R - 9.1R, 1W
TSL - 5m - 100m, 1W

Plate

PSF/G/L - .2m-1m, 3W-10W
TLR/H/Z - .25W-5W
- Down to 50 micro ohm
- Starting at 0201 size
- .1W - 50W

Applications: A, I

Shunt Current Sensors

VSM0001 - Large Current Detection Via Shunt Resistor

Applications: A, C, B, I, P

SHORT FORM SELECTION GUIDE *(CONTINUED)*

Resistor Networks

Chip

CNN - Thin Film

Molded - High Voltage

HVD - High Voltage Divider

Applications: B, C

Molded - Various

RBA - Bussed
RBB - Bussed - High Speed
RDA - Dual Terminator
RDB - Differential Term.
RLA - R/2R Ladder Network
RIA - Isolated
RNX - Custom
RTX - SOT 23
RTY - Precision Voltage Divider

Common Applications:

- A Automotive
- B Battery Management
- C Converters
- E Engine Control Units
- I Industrial
- M Medical
- P Power Supply
- S Surge
- T Test & Measurement

Leaded Resistors

General Purpose

CFS/CFPS - Carbon Film Reduced Size
CFP - Carbon Film - Flameproof

Precision

MF - Metal Film - Standard
RNS - Metal Film - MIL - High Precision
SN - Metal Film - High Precision
SNF - Metal Film - Flameproof
RK - Metal Film - High Ohmic Value

High Voltage

RCR - Pulse/Surge
GS - High Voltage
PCF - Ceramic - Pulse/Surge
HPC - Ceramic - Pulse/Surge

Power

BGR/V - Ceramic - Glass Core
BWR/V - Ceramic Wirewound
BSR/V - Ceramic - Metal Oxide
MOS - Metal Oxide - Power
SPR - Metal Film - Power

Applications: A, B, P

Wirewound

CW - Wirewound - Various
RW - Wirewound - Precision

Current Sense

BPR - Ceramic - Current Sense
LR - Current Sense - Wire

Zero Ohm Jumpers

Z - Zero Ohm Jumper - w/ Body
J - Zero Ohm Jumper - Molded
JL - Zero Ohm Jumper - Wire Only

Sensors, Fuses & Varistors

Thermal Sensors

SDT73 - Platinum (SMD)
SDT101 & 310 - Platinum (thru hole)
WTP - For Wire Bonding
LT73/V - Linear Positive (SMD)
LP73 - Thin Film (SMD)

Applications: M, T

Fuses

RF73 - Fusing Chip
TF/16VN - Thin Film Fuse
CCF - Ceramic

Varistors

NV73 - Metal Oxide Varistor
NV73DL - MOV for Automotive
NV73S - Multilayer MOV

Applications: S

Other

LTCC Substrates

KLC-LTCC - Multilayer

Hybrid IC

KA-Hybrid IC

Test Point Chips

RCx - 0603,0805 & 1206

Lab Kits

Various

KOA SPEER ELECTRONICS, INC.

199 Bolivar Drive
Bradford, PA 16701
Phone: 814-362-5536
www.koaspeer.com

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