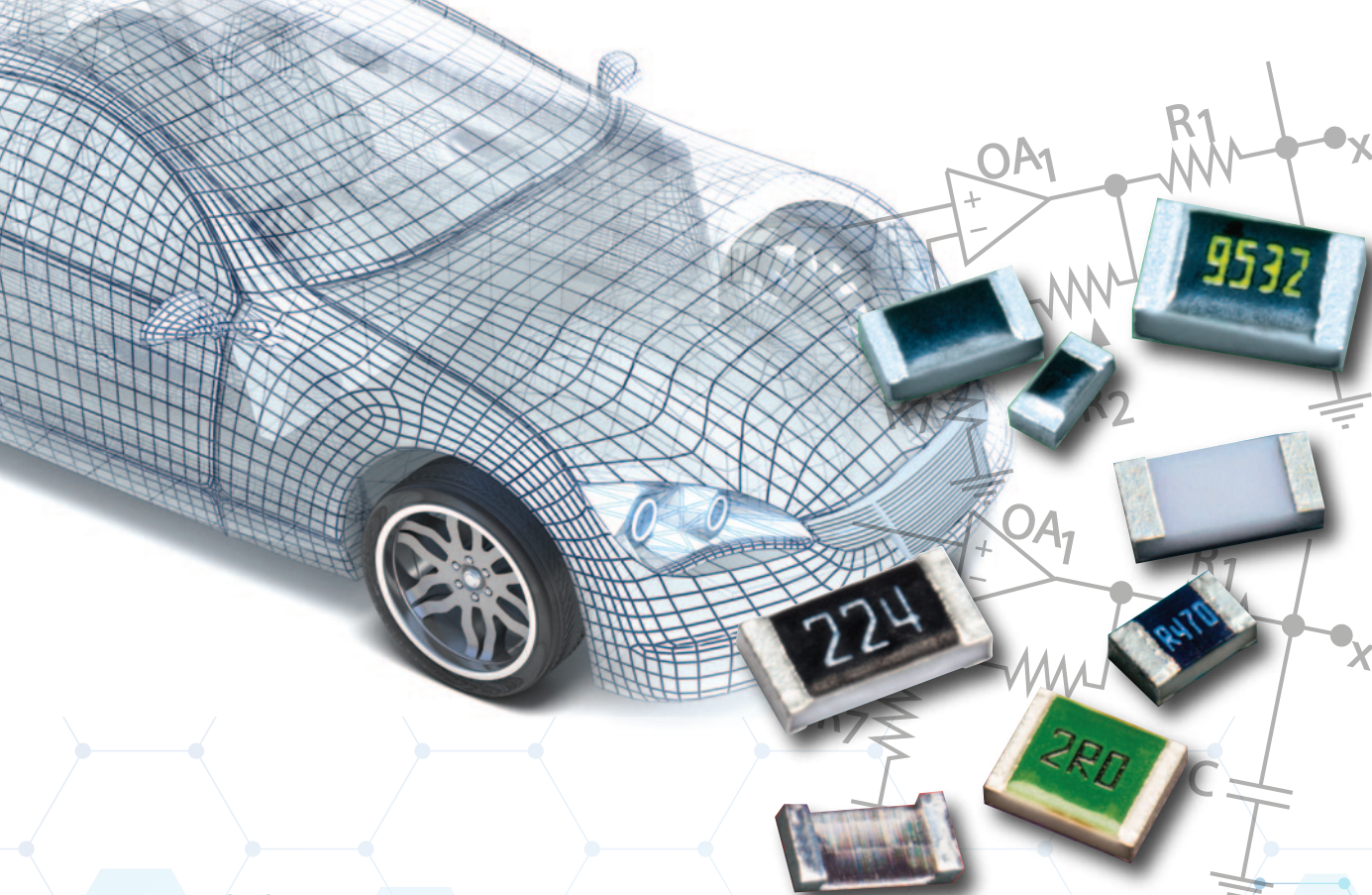




KOA[®]
KOA SPEER ELECTRONICS, INC.

2020
CALENDAR



From Concept to Reality

Bring Your Designs to Life
with our NEW Passive Components

KOA[®]
KOA SPEER ELECTRONICS, INC.

ISO 9001:2015
IATF16949:2016

Whether you're designing the car of tomorrow or connecting the Internet of Things, you need cutting-edge product solutions to bring your design to fruition. At KOA Speer, we're the ideal partner to help you do just that. Our constantly expanding line of passive components will give you the solution to make your concept a reality!

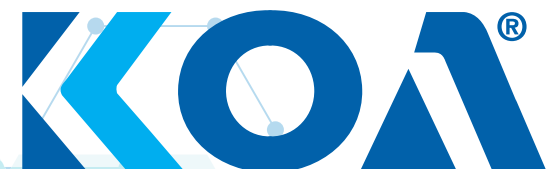
More than just Resistors - yes we're the world leader in thick film resistors, but our product line is broad and growing every day, including:

- Shunt/Current Sense Resistors
- Wide Terminal Resistors
- High Voltage Resistors
- Thin Film Chip Resistors
- Surge Resistors

Passive Component Solutions - our engineering group will work with your design team to develop the passive component solution you need. Many of the hundreds of new products we've introduced in recent years are the result of such collaboration.

Award Winning Passive Supplier - we're the industry's most recognized and awarded supplier for achieving the highest product quality, on-time delivery and responsive customer service.

To make your design a reality,
check out NEW products!
visit KOASpeer.com



KOA SPEER ELECTRONICS, INC.
MORE THAN JUST RESISTORS

2020
AT-A-GLANCE

JANUARY

S	M	T	W	T	F	S
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FEBRUARY

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MARCH

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APRIL

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

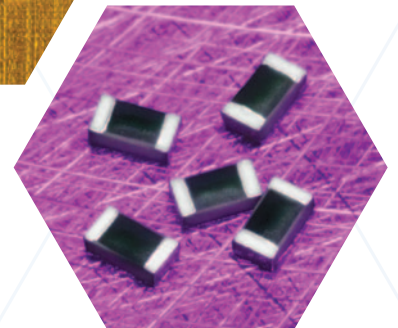
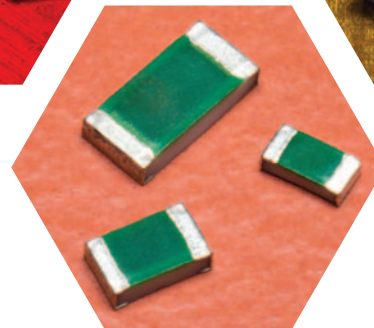
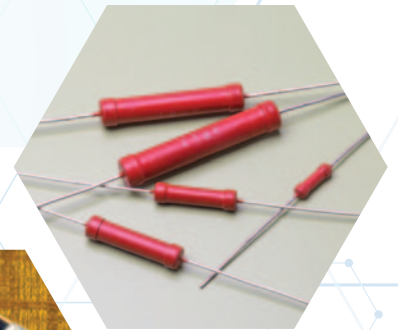
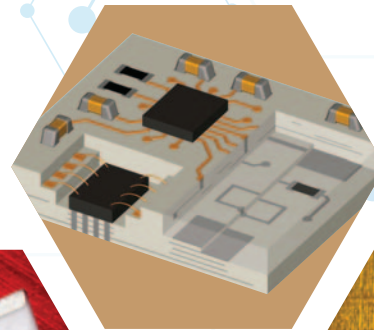
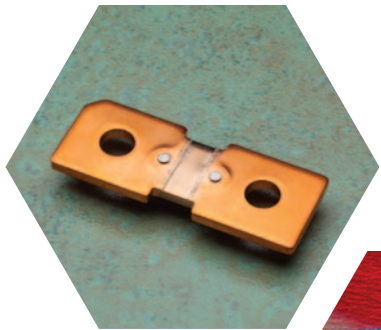
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DECEMBER

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Power Shunt Current Sense Chip • Current Sense Thick Film • Shunt • Integration • Specialty SMD
Anti-Sulfur SMD • Surge Current Thick Film • Thin Film • Power Type Lead • Precision Thick Film

**Power Shunt Current Sense Chip
Current Sense Thick Film • Shunt
Integration • Specialty SMD • Anti-Sulfur SMD
Surge Current Thick Film • Thin Film
Power Type Leded • Precision Thick Film**



JANUARY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
wk1/52 29	30	31	New Year's Day 1	2	3	4
wk2/51 5	6	7	8	9	10	11
wk3/50 12	13	14	15	16	17	18
wk4/49 19	Martin Luther King, Jr. Day 20	21	22	23	24	25
wk5/48 26	27	28	29	30	31	1

DECEMBER 2019

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22	23	24	25	26	27	28
29	30	31				



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FEBRUARY

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KOA SPEER ELECTRONICS, INC.

Power Shunt Current Sense Chip Resistors

Power Shunt for High Power Current Sensing HS – Large Current Shunt

- Ultra Low Resistance Values: (0.1 μ , 0.2 μ) suitable for large current sensing
- Under Development: 0.50 μ
- Excellent TCR achieved 50 $\pm$ 25ppm/ $^{\circ}$ C
- Correct electric current detection by a voltage pin
- Bus bar and cable can be screwed on

PSL2

- High Power Rating: 9W
- Ultra Low Resistance Values: 0.2m Ω , 0.3m Ω , 0.5m Ω

PSF4

- Corrector electronic current detecting possible due to 4 terminal construction
- Ultra Low Resistance Values: 0.5m Ω , 1m Ω

PSJ2

- High Power Rating: 5W, 6W, 8W, 10W, 12W
- Ultra Low Resistance Values: 0.2m Ω , 0.5m Ω , 1m Ω , 2m Ω , 3m Ω , 4m Ω

PSG4

- Corrector electronic current detecting possible due to 4 terminal construction
- High Power Rating: 8W, 10W

Visit KOASpeer.com/PowerShunt



Current Sense Thick Film • Shunt • Integration • Specialty SMD
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Power Type Leaded • Precision Thick Film

FEBRUARY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	29	30	31	1
Groundhog Day wk6/47 2	3	4	5	6	7	8
9	10	11	Lincoln's Birthday 12	13	Valentine's Day 14	15
16	Presidents' Day 17	18	19	20	21	22
23	24	25	Ash Wednesday 26	27	28	29

JANUARY						
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MARCH						
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KOA SPEER ELECTRONICS, INC.

Current Sense Thick Film Resistors

WU73 – Wide Terminal, Low Resistance Current Sense Resistor

- Resistance Range: $10\text{m}\Omega \sim 100\text{m}\Omega$
- Low TCR: $\pm 75\text{ppm}/^\circ\text{C}$, $\pm 100\text{ppm}/^\circ\text{C}$
- Power Rating: 1W, 1.5W in a 1206 size

UR73/UR73V – Current Sense Flat Chip Resistor

- Resistance Range: $10\text{m}\Omega \sim 100\text{m}\Omega$
- High accuracy ($\pm 1\%$) for current detection
- Size: 0402 ~ 2512
- UR73V: Operating Temp: $-55^\circ\text{C} \sim +155^\circ\text{C}$ for Automotive

WK73S – Wide Terminal Current Sense Chip Resistor

- Wide terminal construction gives the WK73 resistor superior thermal shock characteristics
- Features higher power ratings as a result of its enhanced heat dissipation
- Power Ratings: 0.75W, 1W, 1.5W, 2W, 3W

SR73 – Ultra-Low Resistance Current Sense Flat Chip Resistor

- Resistance Range: $0.024 \sim 10\Omega$
- High reliability & performance with resistive tolerance: $\pm 0.5\%$
- Size: 0201 ~ 2512
- Higher Power Rating: 2W in a 2512 package



Visit KOASpeer.com/CurrentSenseThick

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MARCH 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 wk10/43	2	3	4	2	6	7
Daylight Savings Time Begins 8 wk11/42	9	10	11	12	13	14
15 wk12/41	16	St. Patrick's Day 17	18	19	20	21
22 wk13/40	23	24	25	26	27	28
29 wk14/39	30	31	1	2	3	4

FEBRUARY

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APRIL

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KOA SPEER ELECTRONICS, INC.

Shunt Resistors

SL – Molded Design to Absorb Thermal Expansion

- Offers excellent heat dissipation
- Enhanced power ratings up to 7W
- Ideal for high frequency due to non-wirewound part
- Flameproof UL94V0 molded polymer case
- TCR as low as $\pm 50\text{ppm}/^\circ\text{C}$
- Wide Resistance Range: $3\text{m}\Omega \sim 22\text{M}\Omega$
- Operating Temperature: $-65^\circ\text{C} \sim +180^\circ\text{C}$

TLR – Metal Alloy Substrate Provides Superior Corrosion and Heat Resistance

- Untrimmed device offers more even thermal distribution of heat and enhanced reliability
- Resistance Range: $0.5\text{m}\Omega \sim 20\text{m}\Omega$, 0Ω
- Power Ratings: $0.2\text{W} \sim 3\text{W}$
- Operating temperature up to $+170^\circ\text{C}$

TLRH – (Metal Film) Current Sensing Chip Resistor

- Improved corrosion resistance, able to withstand higher operating temperature up to $+170^\circ\text{C}$
- Sizes include: TLRH2A: 0805, TLRH3AW: 2512, TLRH3AP: 2512

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APRIL 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
29	30	31	1	2	3	4
wk15/38 Palm Sunday 5	6	7	8	9	Good Friday 10	11
wk16/37 Easter 12	13	14	Taxes Due! 15	16	17	18
wk17/36 19	20	21	22	23	24	25
wk18/35 26	27	28	29	30	1	2

MARCH

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MAY

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KOA SPEER ELECTRONICS, INC.

Integration

LTCC – Low Temperature Co-fired Ceramics Multilayer Substrates

XR73 – Thick Film Chip Resistor for Embedded Substrates

- Cu via hole connection is applicable by the Cu electrode
- Interlayer embedding in the multilayer substrates applicable from the height of 0.14mm
- Sizes available: 0201 & 0402

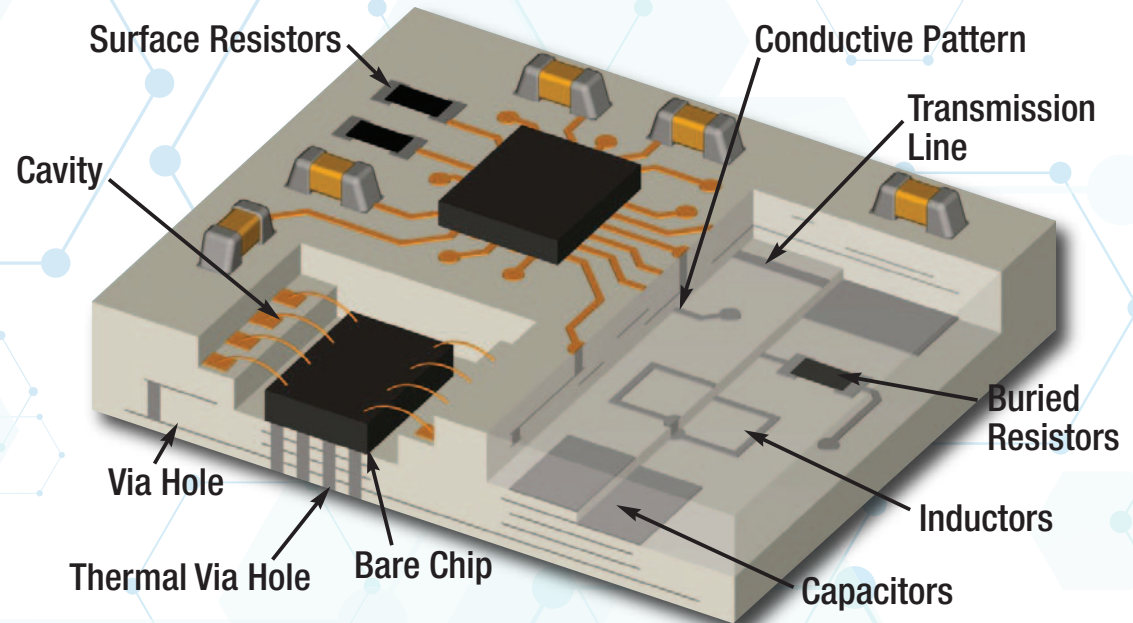
Ceramic Substrates for Mounting Bare Chips

- Suitable for mounting bare chips due to low coefficient of thermal expansion
- Multilayer and cavity structure achieves miniaturization

Semiconductor, MEMS & Interposer Packages

- Miniaturization and high performance at high frequency
- Cavity structure for mounting chip is available
- Buried resistors, inductors and capacitors can provide advantage in miniaturization
- Thermal vias with high conductivity make possible partial heat sink
- Fine pattern and multilayer structure provide advantages in low profile and miniaturization
- Special shapes available

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Power Type Leaded • Precision Thick Film

MAY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	29	30	1	2
3 wk19/34	4	5	6	7	8	9
10 Mother's Day wk20/33	11	12	13	14	15	16
17 wk21/32	18	19	20	21	22	23
24 wk22/31	25 Memorial Day	26	27	28	29	30
31						

APRIL						
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JUNE						
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KOA SPEER ELECTRONICS, INC.

Specialty Surface Mount Resistors

HRK73 – High Temperature Thick Film

- Max. Operating Temperature: +200°C
- Excellent heat and moisture resistance by the use of metal glaze thick film
- Resistance Range: 1Ω ~ 10MΩ
- Sizes: 0603 ~ 1206

WG73 – Wide Terminal Pulse Power Flat Chip (Anti-Surge)

- Superior to WK73 series in pulse withstanding voltage
- Power Rating: 1W (0612), **NEW! 1.5W (1020), 2W (1225)**
- Resistance Range: 560mΩ ~ 1KΩ
- Max. Overload Voltage: 400V

WK73R – Wide Terminal Thick Film

- Reverse geometry type flat chip resistor
- 0204 and 0306 chip size
- Higher power ratings up to 3W
- Resistance Range: 10Ω ~ 1MΩ

HV73 – Flat Chip Resistor for High Voltage

- Max. Working Voltage: 350V, 400V, 800V, 2kV(D.C.) and 3kV(D.C.)
- Excellent heat and moisture resistance by the use of metal glaze thick film
- Resistance Range: 10kΩ ~ 100MΩ
- HV73V – High Voltage Resistor for Automotive is available

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JUNE 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
31 wk23/30	1	2	3	4	5	6
7 wk24/29	8	9	10	11	12	13
14 wk25/28 Flag Day	15	16	17	18	19	20
21 wk26/27 Father's Day	22	23	24	25	26	27
28 wk27/26	29	30	1	2	3	4

MAY						
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JULY						
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KOA SPEER ELECTRONICS, INC.

Anti-Sulfur Surface Mount Resistors

RS73-RT – High Reliability, High Precision

TCR: $\pm 25 \text{ ppm}/^\circ\text{C}$

SR73-RT – Low Resistance (0.1Ω) Current Sense Thick Film

Flat Chip Resistor

RK73B-RT – $\pm 2\%$, $\pm 5\%$ General Purpose Flat Chip Resistor

RK73H-RT – $\pm 0.5\%$, $\pm 1\%$ High Precision Flat Chip Resistor

RK73Z-RT – Zero ohm with max. resistance of $100\text{m}\Omega$

RK73G-RT – 0.25% , $\pm 0.5\%$, $\pm 1\%$ Ultra Precision

Flat Chip Resistor

HV73V-RT – High Voltage Flat Chip Resistor for Automotive

HV73-RT – High Voltage Flat Chip Resistor

SG73P-RT, SG73S-RT – Anti-Pulse & Anti-Surge Current

Flat Chip Resistor

WK73-RT – Wide Terminal, Reverse Geometry Resistor

Higher Power RT Series

SG73-RT – Surge Resistor with 10x pulse power capability

Visit KOASpeer.com/Anti-Sulfur



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JULY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
28	29	30	1	2	3	Independence Day 4
5 wk28/25	6	7	8	9	10	11
12 wk29/24	13	14	15	16	17	18
19 wk30/23	20	21	22	23	24	25
26 wk31/22	27	28	29	30	31	1

JUNE						
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AUGUST						
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KOA SPEER ELECTRONICS, INC.

Surge Current Thick Film

SG73G – Ultra Precision Grade

- Superior to RK73 in pulse withstanding voltage and high power
- High Precision TCR: $\pm 50\text{ppm}/^{\circ}\text{C}$
- Tolerance: $\pm 0.25\%$, $\pm 0.5\%$
- Resistance Range: $10\Omega \sim 1\text{M}\Omega$
- Sizes: 0603 $\sim$ 1206

SG73P – Superior Pulse Withstanding Voltage

- Resistance Range: $1\Omega \sim 10\text{M}\Omega$
- Sizes: 0402 $\sim$ 1210
- Tolerance: $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 5\%$

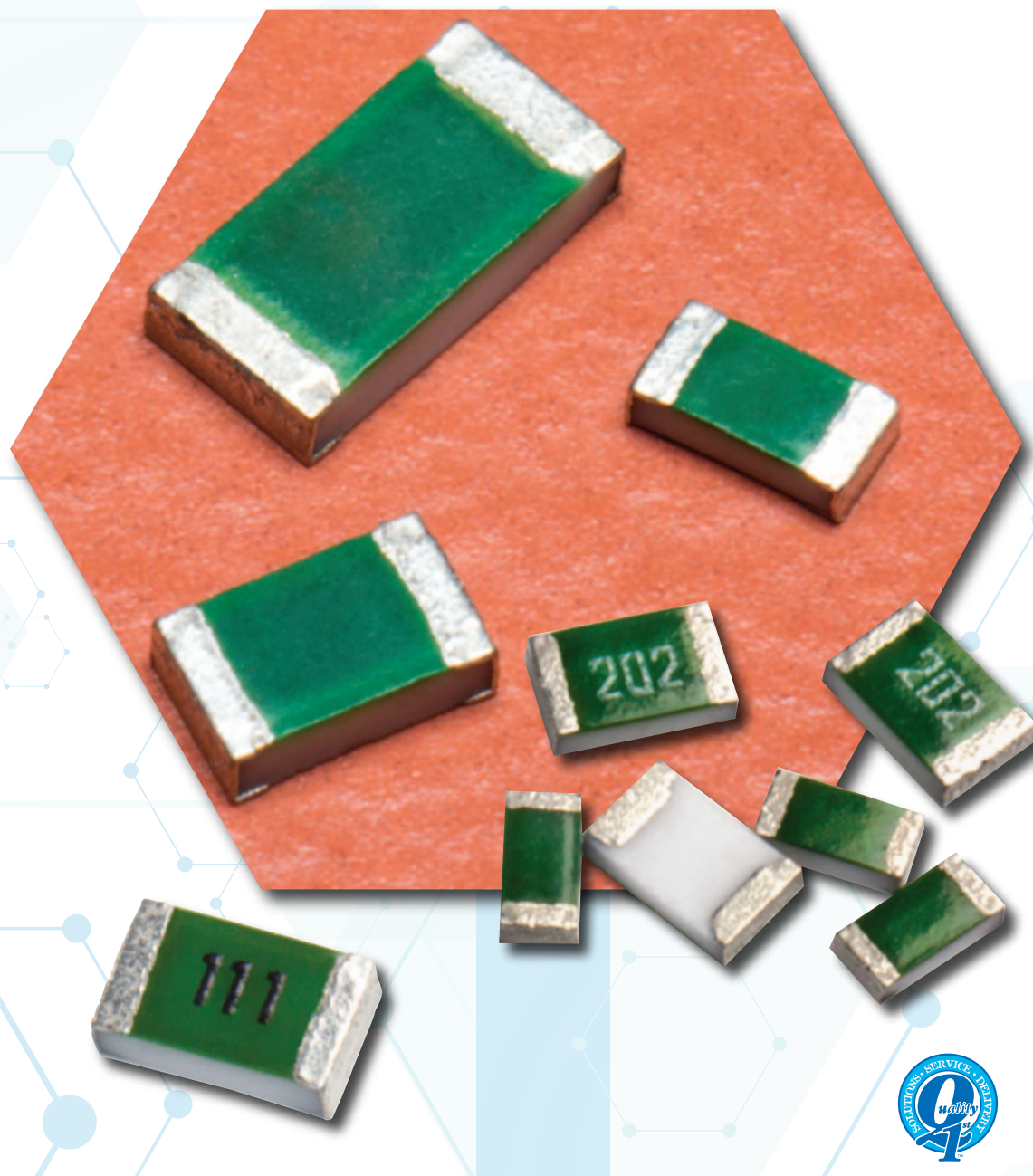
SG73S – Superior Surge Withstanding Voltage

- Highly ESD proof
- Resistance Range: $1\Omega \sim 10\text{M}\Omega$
- Sizes: 0402 $\sim$ 1210
- Tolerance: $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 5\%$

SG73 – High Pulse Power Capability Compared to RK73

- Resistance Range: $1\Omega \sim 1\text{M}\Omega$
- Sizes: 0603 $\sim$ 2512
- Tolerance: $\pm 10\%$, $\pm 20\%$

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AUGUST 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	29	30	31	1
2 wk32/21	3	4	5	6	7	8
9 wk33/20	10	11	12	13	14	15
16 wk34/19	17	18	19	20	21	22
23 wk35/18	24	25	26	27	28	29
30	31					

JULY						
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SEPTEMBER						
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KOA SPEER ELECTRONICS, INC.

Thin Film Resistors

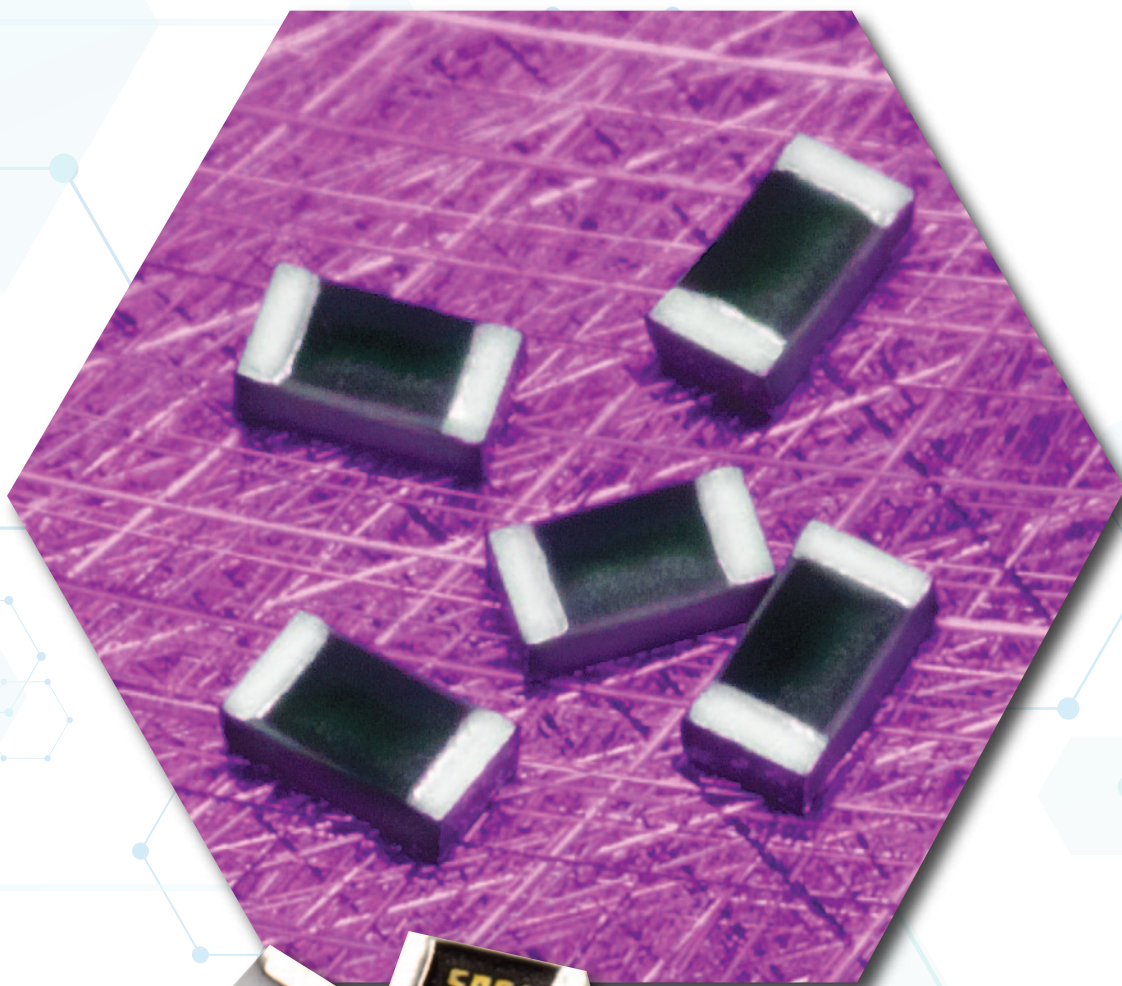
NEW! RN73R – Thin (Metal) Film Flat Chip Resistor (High Reliability)

- High Precision Type TCR: 05 ~100ppm/°C
- Low current noise
- Tolerance Range: $\pm 0.05\%$ ~ $\pm 1\%$
- Size include: 0402~1210

RN73H – Thin (metal) Film Flat Chip Resistor (High Reliability for Automotive)

- Enhanced moisture resistance ($\pm 0.05\%$ ΔR : 85°C+2°C, 85%+5%RH, 1000 hours)
- Moisture resistant protective layer over resistive film construction
- Rated Ambient Temperature: $\pm 85^\circ\text{C}$
- Operating Temperature: up to $+155^\circ\text{C}$
- TCR Max.: ± 5 , ± 10 , ± 25 , ± 50 & $\pm 100\text{ppm}/^\circ\text{C}$
- Resistance Range: 10Ω ~ **NEW 1.5M Ω**
- AEC-Q200 Qualified

Visit KOASpeer.com/ThinFilm



Power Shunt Current Sense Chip • Current Sense Thick Film • Shunt • Integration
Specialty SMD • Anti-Sulfur SMD • Surge Current Thick Film
Power Type Leaded • Precision Thick Film



SEPTEMBER 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
wk36/17 30	31	1	2	3	4	5
wk37/16 6	Labor Day 7	8	9	10	11	12
wk38/15 13	14	15	16	17	18	19
wk39/14 20	21	22	23	24	25	26
wk40/13 27	28	29	30	1	2	3

AUGUST						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23 30	24 31	25	26	27	28	29



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OCTOBER						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



KOA SPEER ELECTRONICS, INC.

Power Type Leaded Resistor

NEW! BWRV – Rectangular Type Wirewound Resistor with Ceramic Core (for Automotive)

NEW! BGRV – Rectangular Type Wirewound Resistor with Glass Core

NEW! BSRV – Rectangular Type Metal Oxide Film for Automotive

- High Power Rating: 5W, 7W, 10W, 15W, 20W, 30W, 40W
- Using flame-retardant/insulated ceramic case
- Excellent in anti-pulse and inrush current
- Resistance Range: $10\Omega \sim 75K\Omega$ ($\pm 5\%$), $5.1\Omega \sim 9.1\Omega$ ($\pm 10\%$)
- Operating Temperature Range: $-40^{\circ}\text{C} \sim +155^{\circ}\text{C}$

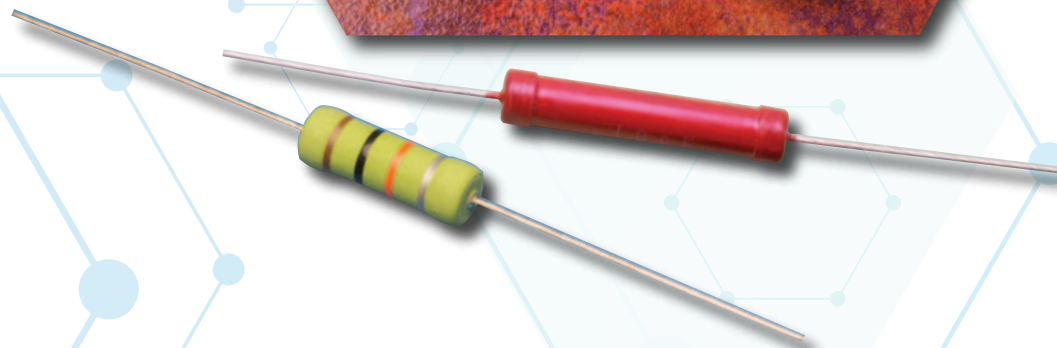
NEW! CWFS – Wirewound for Safety Fusing

- Power Rating: 3W, 5W
- Flame retardant coating (equivalent to UL94 V-0)
- Fail-safe mains fusing at AC 250V
- Resistance Range: $4.7\Omega \sim 100\Omega$
- Operating Temperature: $-55^{\circ}\text{C} \sim +200^{\circ}\text{C}$

PCF/HPC-Ceramic Resistors for Anti-Pulse Surge

- Excellent in anti-pulse characteristics
- Power Rating: $0.5\text{W} \sim 5\text{W}$
- Resistance Range: $3.3\Omega \sim 390K\Omega$
- PCF coated with UL94V0 flameproof material
- HPC - higher reliability against disconnection compared to wirewound and film resistors

Visit KOASpeer.com/LeadedResistors



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OCTOBER 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27	28	29	30	1	2	3
4 wk41/12	5	6	7	8	9	10
11 wk42/11	Columbus Day 12	13	14	15	16	17
18 wk43/10	19	20	21	22	23	24
25 wk44/9	26	27	28	29	30	Halloween 31

SEPTEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			



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NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



KOA SPEER ELECTRONICS, INC.

Precision Thick Film Resistors

RS73 – Ultra Precision High Reliability Thick Film

- Excellent long-term stability with ΔR of $\pm 0.2\%$ & $\pm 0.4\%$ in the reliability test
- Sizes available: 0603 (0.2W), **NEW! 0805 (0.25W)**, **NEW! 1206 (0.33W)**
- Low TCR: $\pm 25\text{ppm}/^\circ\text{C}$, $\pm 50\text{ppm}/^\circ\text{C}$
- Tolerance: $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$
- Resistance Range: $10\Omega \sim 10\text{M}\Omega$

RK73G – High Precision Thick Film

- Resistive film applies a metal glaze thick film to achieve excellent heat resistance
- TCR: $\pm 50\text{ppm}/^\circ\text{C}$
- Resistance Range: $10\Omega \sim 1\text{M}\Omega$
- Tolerance: $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$
- Sizes Available: 0201 $\sim$ 1206

Visit KOASpeer.com/Precision



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NOVEMBER 2020

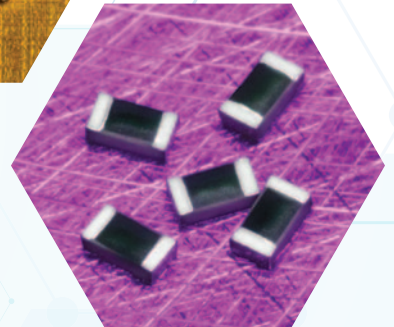
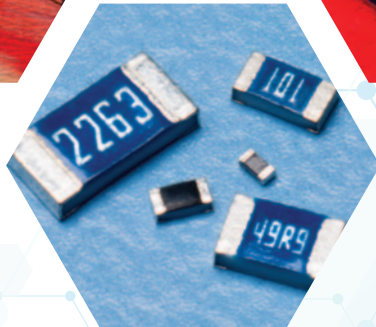
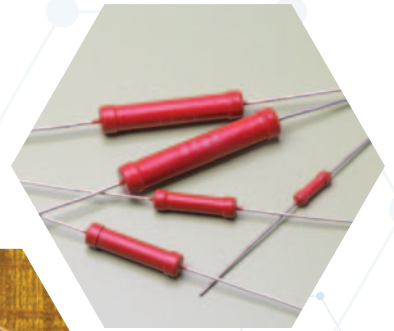
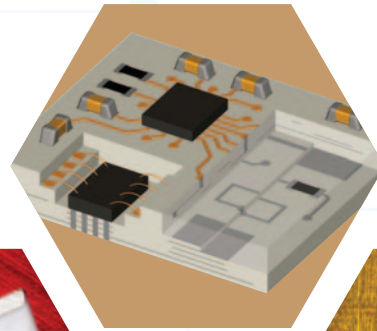
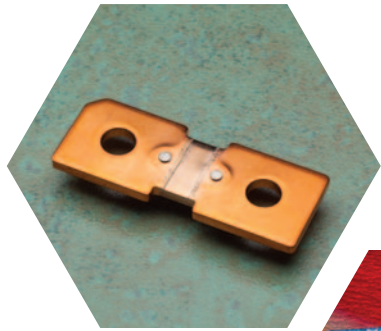
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Daylight Savings Time Ends 1 wk45/8	2	Election Day 3	4	5	6	7
8 wk46/7	9	10	Veterans Day 11	12	13	14
15 wk47/6	16	17	18	19	20	21
22 wk48/5	23	24	25	Thanksgiving Day 26	27	28
29 wk49/4	30	1	2	3	4	5

OCTOBER						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



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DECEMBER						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



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Surge Current Thick Film • Thin Film
Power Type Leded • Precision Thick Film**

DECEMBER 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
29	30	1	2	3	4	5
6 wk50/3	7	8	9	10	11	12
13 wk51/2	14	15	16	17	18	19
20 wk52/1	21	22	23	Christmas Eve 24	Christmas 25	26
27 wk1/52	28	29	30	New Year's Eve 31	1	2

NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



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JANUARY 2021

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 31	25	26	27	28	29	30



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