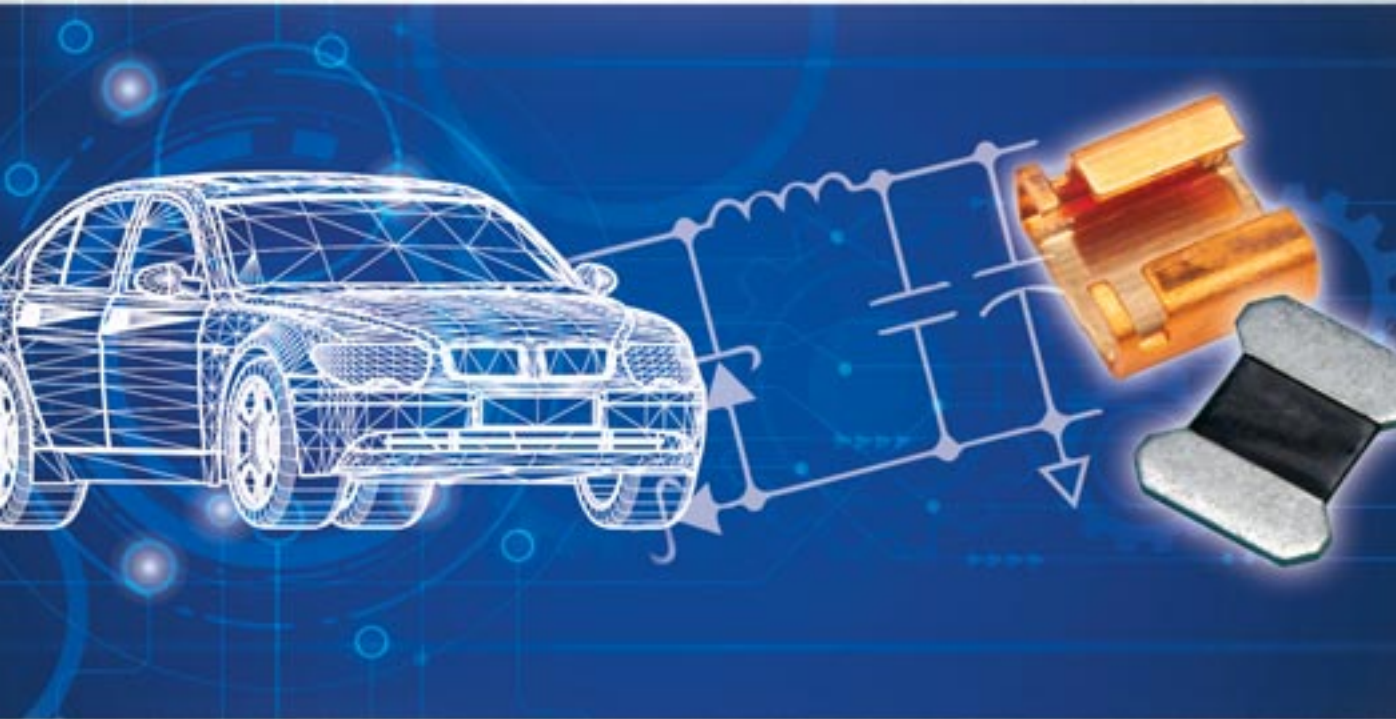




2019

CALENDAR

From Concept to Reality



**Our new passive component solutions
will help you make the leap!**

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.

**Make the Leap from Concept to Reality,
visit KOASpeer.com**



JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5						1	2						1	2
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27	28	29	30	31			24	25	26	27	28			24	25	26	27	28	29	30
														31						

APRIL							MAY							JUNE						
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														30						

JULY							AUGUST							SEPTEMBER						
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28	29	30	31				25	26	27	28	29	30	31	29	30					

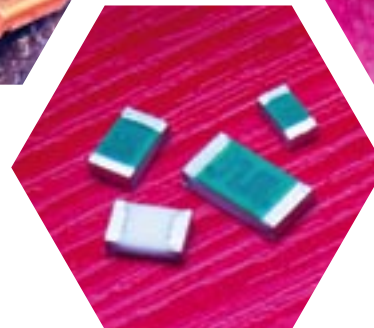
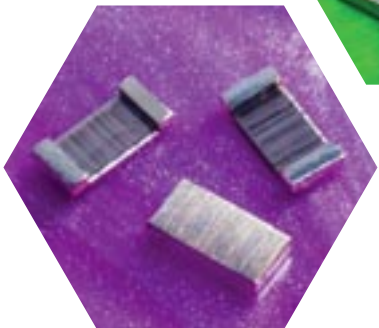
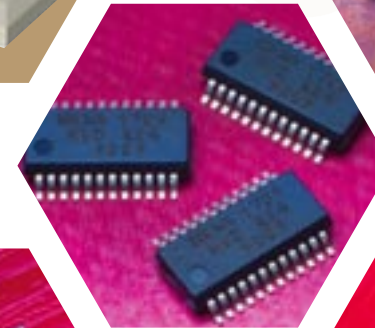
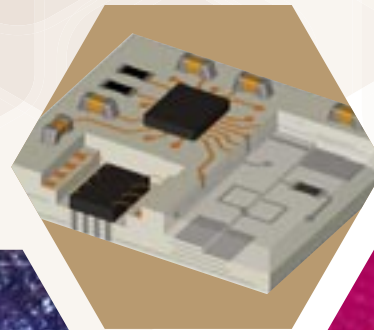
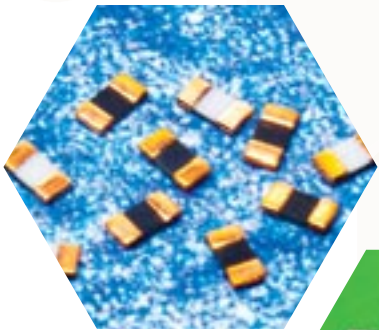
OCTOBER							NOVEMBER							DECEMBER						
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27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				

2019

AT-A-GLANCE

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



JANUARY 2019

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

DECEMBER 2018

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16	17	18	19	20	21	22
23 30	24 31	25	26	27	28	29




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FEBRUARY

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24	25	26	27	28		



KOA SPEER ELECTRONICS, INC.

Power Shunt Current Sense Chip Resistors

Power Shunt for High Power Current Sensing

NEW! PSL2

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

NEW! 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 , **NEW! 3m Ω , 4m Ω**

PSG4

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

PSB – Power Shunt Current Sensing Chip Resistor

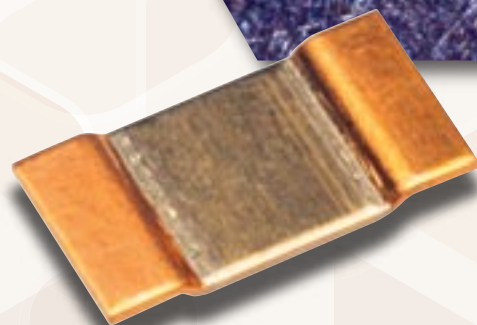
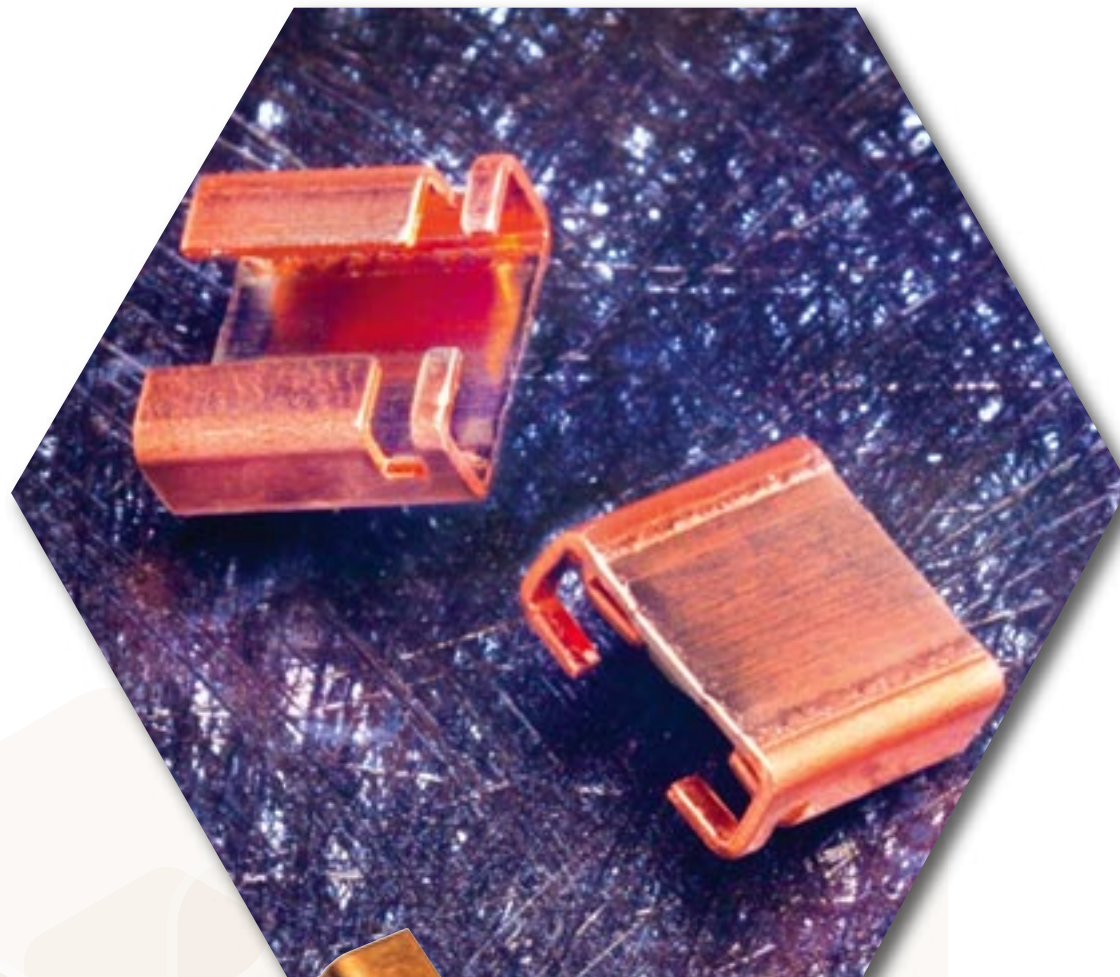
- KOA's unique butterfly-style terminal shape allows for enhanced absorption of thermal expansion
- Higher Power Rating: 6W & **NEW! 12.5W**

PSE – Power Shunt Current Sensing Chip Resistor

- Power Rating: 3W, 5W
- Low ohm Resistance Range: 0.5m Ω ~ 2m Ω

PSI – Power Shunt Current Sensing Chip Resistor

- Power Rating: 3W
- Low ohm Resistance Range: 3m Ω , 4m Ω



Visit KOASpeer.com/PowerShunt

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

FEBRUARY 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27	28	29	30	31	1	Groundhog Day 2
wk6/47 3	4	5	6	7	8	9
wk7/46 10	11	Lincoln's Birthday 12	13	Valentine's Day 14	15	16
wk8/45 17	Presidents' Day 18	19	20	21	Washington's Birthday 22	23
wk9/44 24	25	26	27	28	1	2

JANUARY

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MARCH

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KOA SPEER ELECTRONICS, INC.

Current Sense Thick Film Resistors

NEW! WU73 – Wide Terminal, Low Resistance Current Sense Resistor

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

UR73/UR73V – Current Sense Flat Chip Resistor

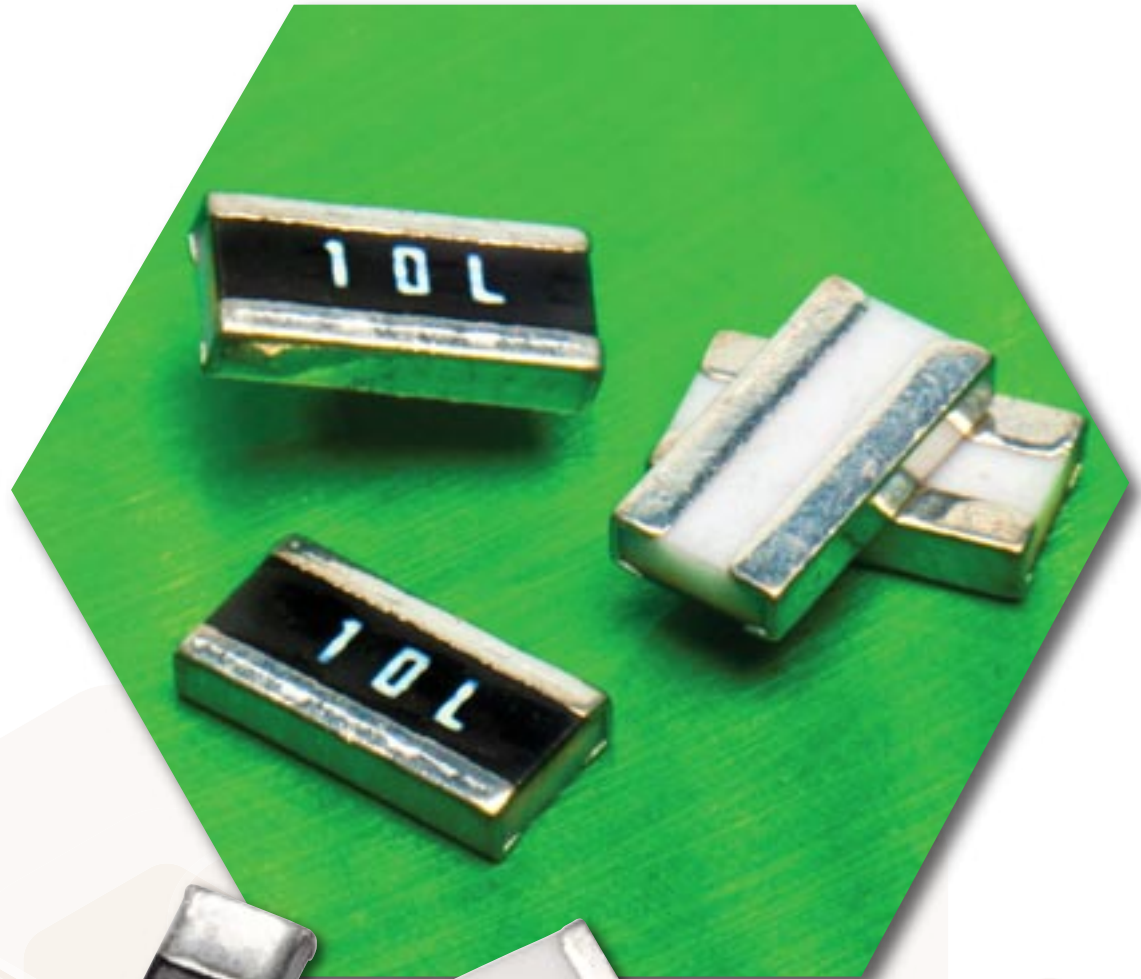
- Resistance Range: 10m Ω ~ 100m Ω
- High accuracy ($\pm 1\%$) for current detection
- Size: 0402 ~ 2512
- UR73V: Operating Temp: -55° C ~ $+155^{\circ}$ C for Automotive

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 ~ 10 Ω
- 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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Power Type Leaded • Precision Thick Film



MARCH 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
24	25	26	27	28	1	2
wk10/43 3	4	5	Ash Wednesday 6	7	8	9
Daylight Savings Time Begins wk11/42 10	11	12	13	14	15	16
St. Patrick's Day wk12/41 17	18	19	20	21	22	23
24 wk13/40 31	25	26	27	28	29	30

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: $0.5\text{m}\Omega \sim 20\text{m}\Omega, 0\Omega$
- 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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Power Type Leaded • Precision Thick Film

APRIL 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
wk14/39 31	1	2	3	4	5	6
wk15/38 7	8	9	10	11	12	13
wk16/37 Palm Sunday 14	Taxes Due! 15	16	17	18	Good Friday 19	20
wk17/36 Easter 21	22	23	24	25	26	27
wk18/35 28	29	30	1	2	3	4

MARCH						
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24 31	25	26	27	28	29	30



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MAY						
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Integration

LTCC – Low Temperature Co-fired Ceramics Multilayer Substrates

XR73 – Thick Film Chip Resistor for Embedded Substrates

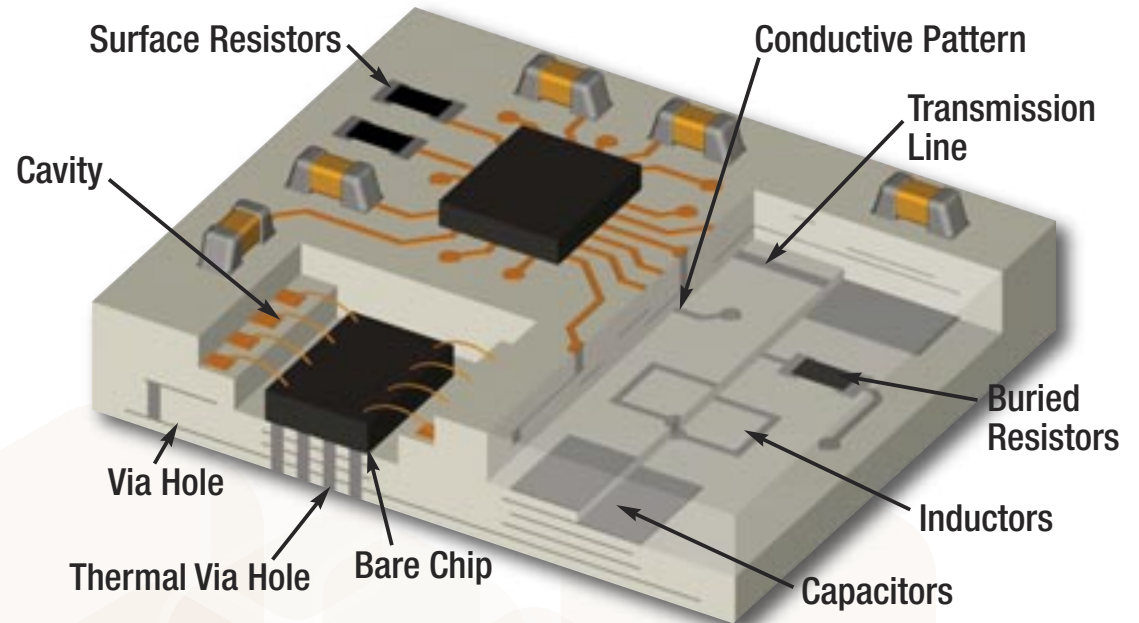
- Cu via hole connection is applicable by the Cu electrode
- Interlayer embedding in the multilayer substrates applicable from the height of 0.14mm
- Sizes available: 0201 & 0402

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



Visit KOASpeer.com/LTCC



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MAY 2019

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

APRIL						
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JUNE						
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23 30	24	25	26	27	28	29



KOA SPEER ELECTRONICS, INC.

Specialty Surface Mount Resistors

NEW! 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

WK73R – Wide Terminal Thick Film

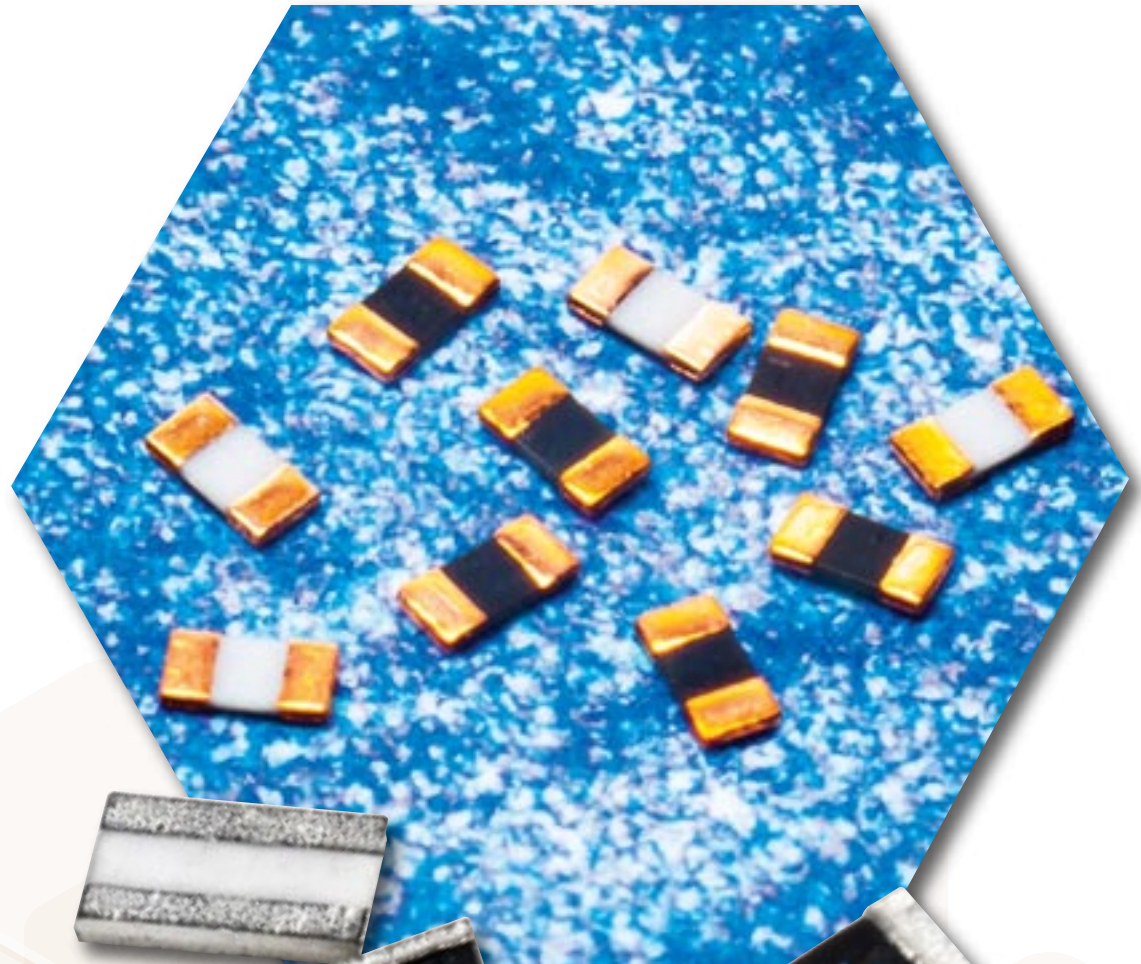
- Reverse geometry type flat chip resistor
- **NEW! 0204 and 0306 chip size**
- **NEW! Higher power ratings up to 3W**
- Resistance Range: 10Ω ~ 1MΩ

HV73V – High Voltage Resistor for Automotive

- AEC-Q200 Qualified
- Excellent heat and moisture resistance by the use of metal glaze film
- Max. Working Voltage: 350V, 400V, 800V
- Max. Overload Voltage (D.C.): 500V, 800V, 1000V

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



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Power Type Leaded • Precision Thick Film

JUNE 2019

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

Anti-Sulfur Surface Mount Resistors

NEW! RS73-RT – High Reliability, High Precision
TCR: ± 25 ppm/ $^{\circ}$ C

SR73-RT – Low Resistance (0.1 Ω) 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 100m Ω

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

NEW Higher Power RT Series

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

CN-RT – (Concave & CN_K_RT Convex) Square Corner
Isolated Chip Array Network



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JULY 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
wk27/26 30	1	2	3	Independence Day 4	5	6
wk28/25 7	8	9	10	11	12	13
wk29/24 14	15	16	17	18	19	20
wk30/23 21	22	23	24	25	26	27
wk31/22 28	29	30	31	1	2	3

JUNE						
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23 30	24	25	26	27	28	29



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AUGUST						
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KOA SPEER ELECTRONICS, INC.

Surge Current Thick Film

NEW! 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 ~ 1206

SG73P – Superior Pulse Withstanding Voltage

- Resistance Range: $1\Omega \sim 10\text{M}\Omega$
- Sizes: 0402 ~ 1210, **NEW 0.75W, 1W, 1210**
- Tolerance: $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 5\%$

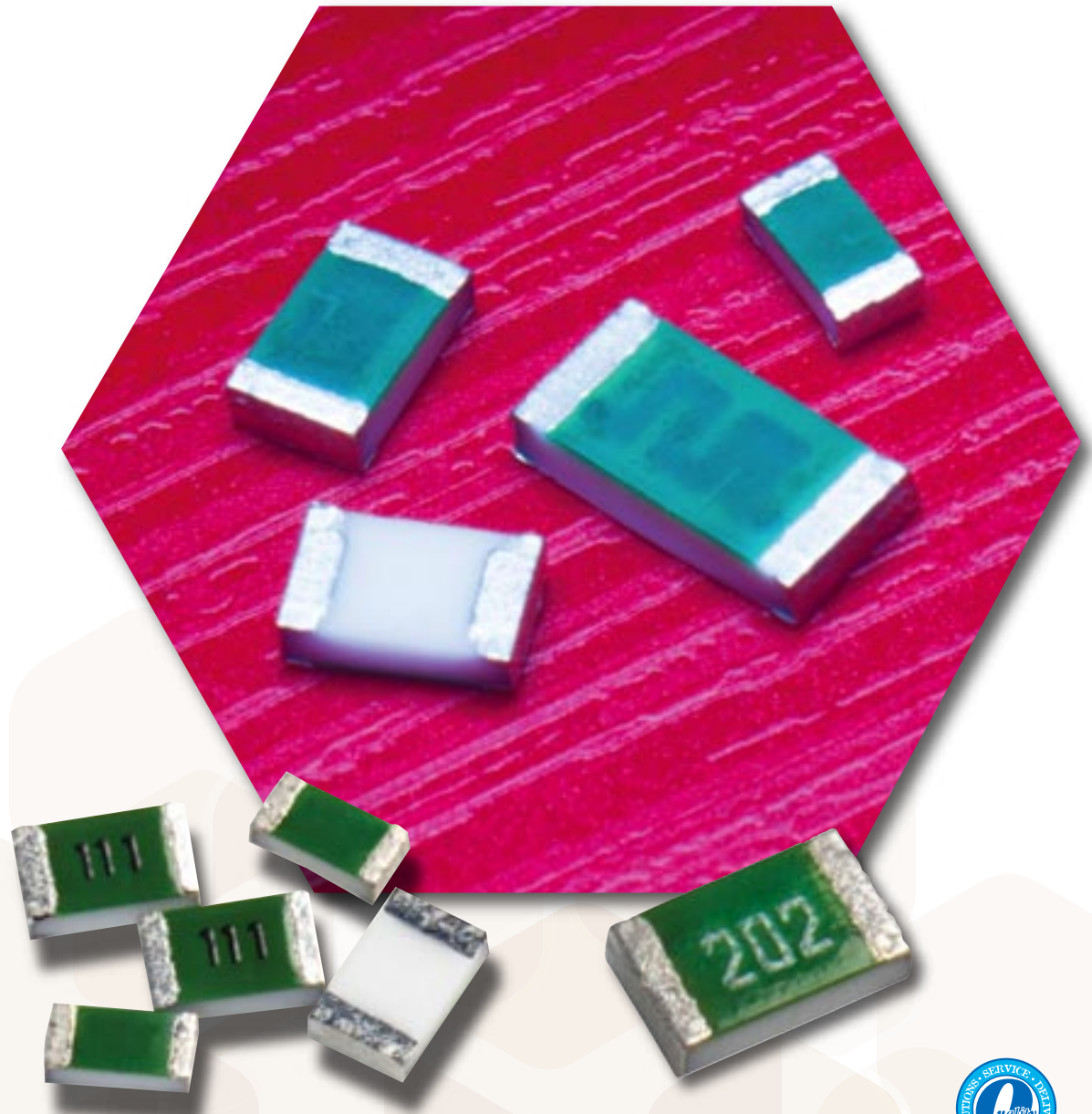
SG73S – Superior Surge Withstanding Voltage

- Highly ESD proof
- Resistance Range: $1\Omega \sim 10\text{M}\Omega$
- Sizes: 0402 ~ 1210, **NEW 0.75W, 1W, 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 ~ 2512
- Tolerance: $\pm 10\%$, $\pm 20\%$

Visit KOASpeer.com/Anti-Surge



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Power Type Leaded • Precision Thick Film

AUGUST 2019

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

JULY						
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28	29	30	31			



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SEPTEMBER						
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29	30					



KOA SPEER ELECTRONICS, INC.

Thin Film Resistors

RN73 – Ultra Precision Thin Film

- Tolerance Range: $\pm 0.05\%$ ~ $\pm 1\%$
- Low current noise
- TCR Max.: $\pm 5, \pm 10, \pm 25, \pm 50$ & $\pm 100\text{ppm}/^\circ\text{C}$
- Higher Operating Temperature: -55°C ~ $+155^\circ\text{C}$
- Resistance Range: 10Ω ~ $1\text{M}\Omega$

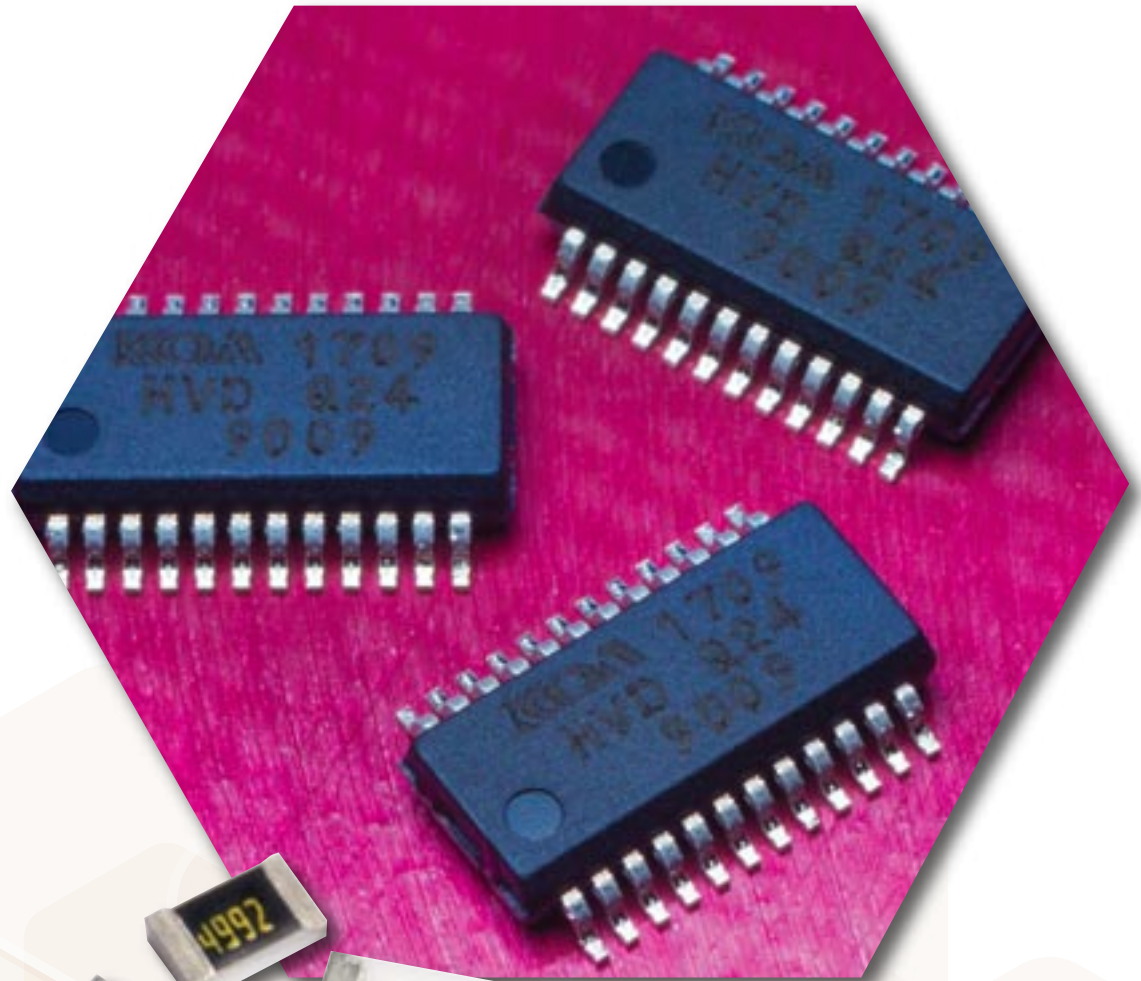
RN73H – High Heat Resistance for Automotive

- Enhanced moisture resistance ($\pm 0.05\%$ ΔR : $85^\circ\text{C}+2^\circ\text{C}$, $85\%+5\%\text{RH}$, 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.: $\pm 5, \pm 10, \pm 25, \pm 50$ & $\pm 100\text{ppm}/^\circ\text{C}$
- Resistance Range: 10Ω ~ **NEW $1.5\text{M}\Omega$**
- AEC-Q200 Qualified

HVD – High Voltage Divider-Precision Type

- Max. Resistance Value: $11.5\text{M}\Omega$
- Max. Working Voltage: 1000V
- Max. Resistance Ratio: 1:1000

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 2019

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

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	24
25	26	27	28	29	30	31



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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! BGRV – Rectangular Type Wirewound Resistor with Glass Core

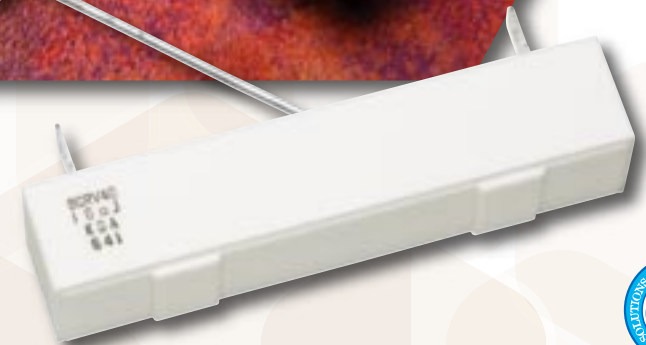
NEW! BSRV – Rectangular Type Metal Oxide Film for Automotive

- 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: 10Ω ~ 75KΩ (±5%), 5.1Ω ~ 9.1Ω (±10%)
- Operating Temperature Range: -40°C ~ +155°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: 4.7Ω ~ 100Ω
- Operating Temperature: -55°C ~ +200°C

Visit KOASpeer.com/LeadedResistors



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Thin Film • Precision Thick Film

OCTOBER 2019

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

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

NEW! RK73F – Ultra Precision Grade Low TCR Thick Film

- TCR: $\pm 25\text{ppm}/^\circ\text{C}$
- Resistance Range: $10\Omega \sim 1\text{M}\Omega$
- Tolerance: $\pm 0.25\%$, $\pm 0.5\%$
- Size: 0603, 0805

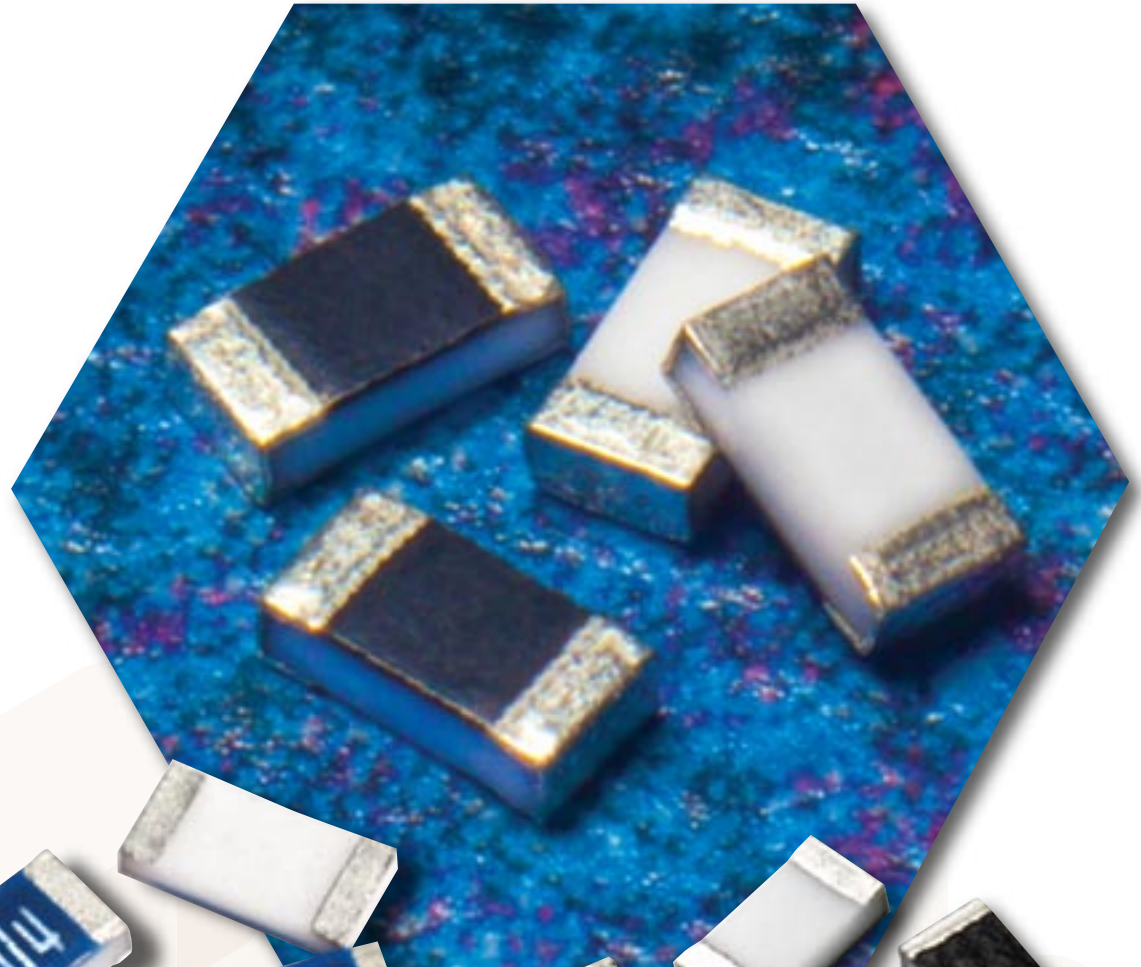
NEW! RS73 – Ultra Precision High Reliability Thick Film

- Excellent long-term stability with ΔR of $\pm 0.2\%$ & $\pm 0.4\%$ in the reliability test
- 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: $100\Omega \sim 1\text{M}\Omega$

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 ~ 1206

Visit KOASpeer.com/Precision



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Thin Film • Power Type Leded

NOVEMBER 2019

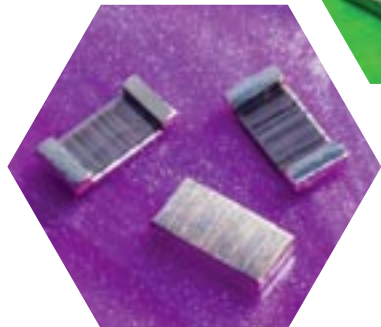
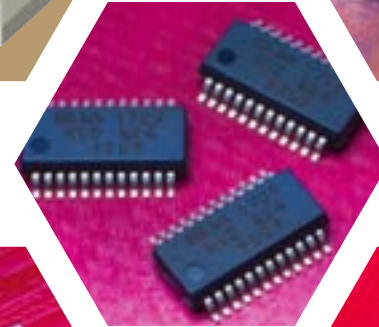
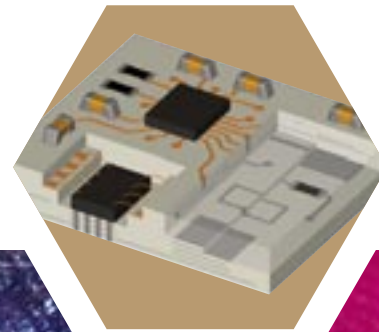
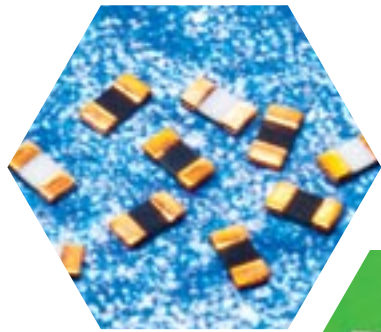
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27	28	29	30	31	1	2
Daylight Savings wk45/8 Time Ends 3	4	Election Day 5	6	7	8	9
wk46/7 10	Veterans Day 11	12	13	14	15	16
wk47/6 17	18	19	20	21	22	23
wk48/5 24	25	26	27	Thanksgiving Day 28	29	30

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				



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

DECEMBER 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
wk49/4 1	2	3	4	5	6	7
wk50/3 8	9	10	11	12	13	14
wk51/2 15	16	17	18	19	20	21
wk52/1 22	23	Christmas Eve 24	Christmas 25	26	27	28
wk1/52 29	30	New Year's Eve 31	1	2	3	4

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 2020						
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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