



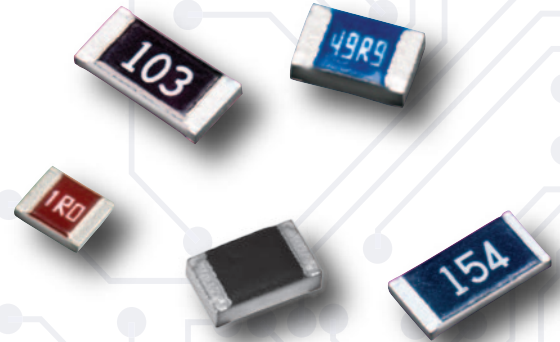
### A Family of Resistors Capable of Handling More Thermal Cycles

#### Features

- Enhanced solder joint reliability from thermal cycles
- Suitable for high-strength solders as well as SAC (Sn-Ag-Cu) solders
- Excellent high heat resistance and weather resistance due to metal glaze resistance film
- AEC-Q200 Qualified

#### Applications

- Automotive
- Industrial
- Power Supply



Does your existing design require high heat shock resistance?

### High Solder Joint Reliability from Thermal Cycling

#### Wide Terminal

WK73R  
WK73S  
WG73  
WN73H  
WU73

#### General Purpose

RK73B AT  
RK73H AT  
RK73Z AT

#### High Precision

RK73G AT

#### High Voltage

HV73V AT

#### Anti-Surge

SG73 AT  
SG73G AT  
SG73P AT  
SG73S AT

#### High Temperature

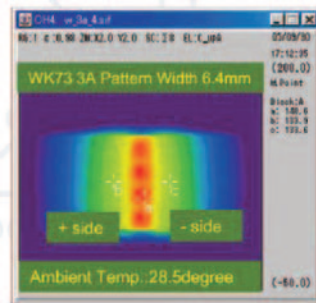
HSG73P AT

### Heat Dissipation: WK73 Compared to RK73

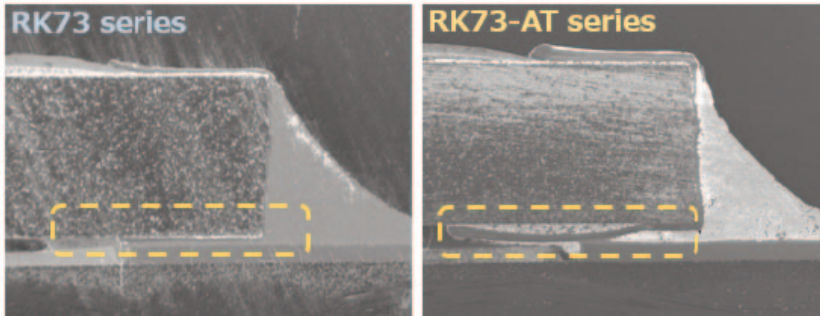
Wide Terminal Type (WK73) Heat Dissipation Image



Nominal Terminal Type (RK73) Heat Dissipation Image



# Crack Incidence in Thermal Shock Test by Solder Type: RK73 Series Compared to RK73-AT

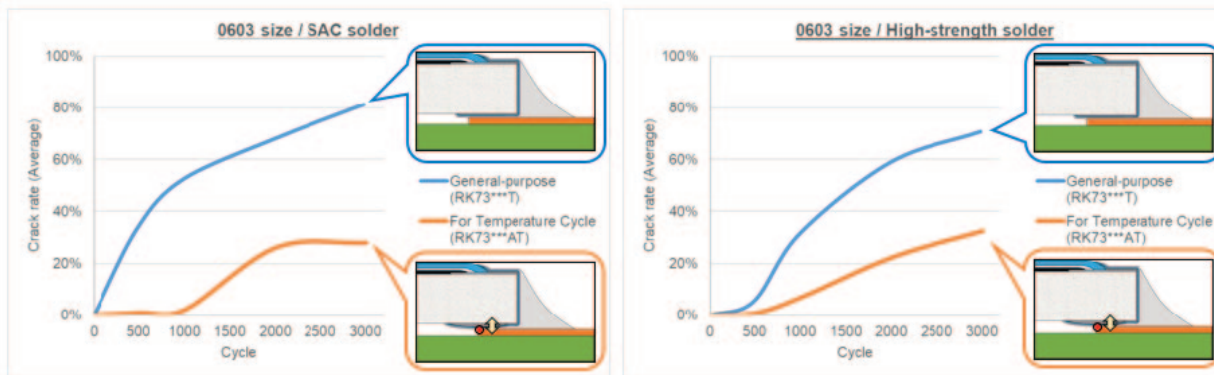


RK73-AT series is designed with a thicker bottom electrode compared to the general thick film products to suppress cracking and delamination caused by thermal shock

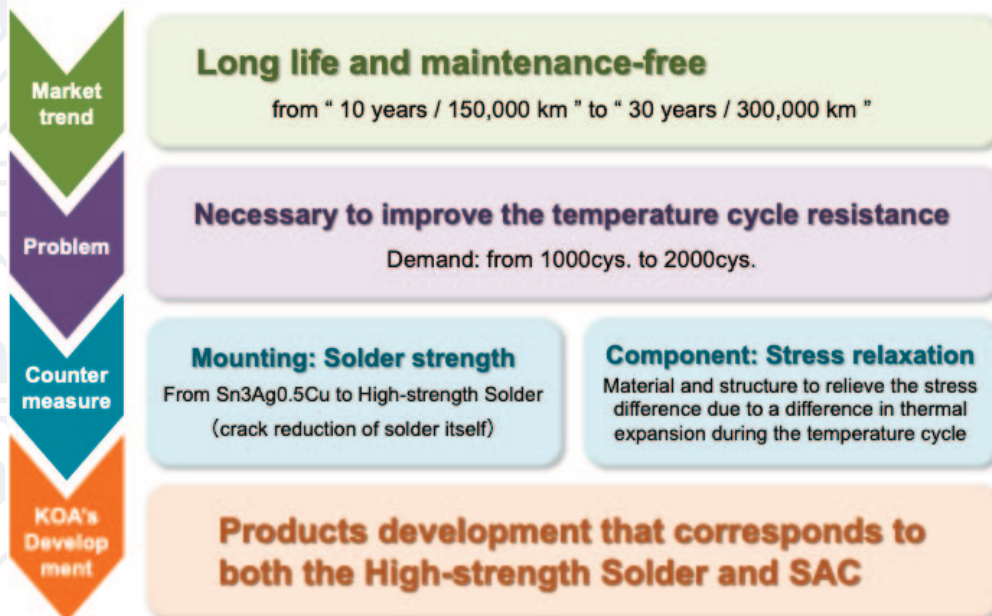
## Temperature Cycling Test Results

### Test Condition

- Product size: 0603 inch
- Test board: FR-4 t= 1.6mm
- Test condition: -55 to 155°C 30min 3,000 cycles



## Market Trend of Flat Chip Resistor for Temperature Cycle



# Applications & Ratings

## Wide Terminal Thick Film

### WK73R

Part Designation	Power Rating <sup>1</sup>	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (X 10 <sup>-6</sup> /K)	Resistance Range (Ω)			Maximum Working Voltage	Maximum Overload Voltage	Operating Temp. Range
					D±0.5% E-24/E-96	F±1% E-24/E-96	J±5% E-24			
WK73R1E (0204)	0.33W	70°C	125°C	±100	—	10 - 1M	10 - 1M	75V	100V	-55°C to +155°C
WK73R1J (0306)	0.5W	70°C	125°C	±100	—	10k - 1M	10k - 1M	150V	200V	
	0.66W					10 - 9.76k	10 - 9.1k			
WK73R2A (0508)	0.75W	70°C	125°C	±100	20.5k - 1M	20.5k - 1M	22k - 1M	200V	400V	
	1.0W		125°C	±100	10 - 20k	10 - 20k	10 - 20k			
WK73R2B (0612)	0.75W	70°C	125°C	±100	10k - 1M	10k - 1M	10k - 1M	200V	400V	
	1.5W		125°C	±100	10 - 9.76k	10 - 9.76k	10 - 9.1k			
WK73R2H (1020)	2W	70°C	125°C	±100	—	10 - 430k	10 - 430k	200V	400V	
				±200	—	432k - 1M	470k - 1M			
WK73R3A (1225)	3W	70°C	125°C	±100	—	10 - 330k	10 - 330k	200V	400V	
				±200	—	332k - 1M	360k - 1M			

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$  or max. working voltage, whichever is lower

<sup>1</sup> If the terminal part temperature exceeds the rated terminal part temperature, even if it is below the rated ambient temperature, apply the derating curve for the terminal part temperature.

## Wide Terminal Current Sense

### WK73S

Part Designation	Power Rating <sup>1</sup>	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (X 10 <sup>-6</sup> /K)	Resistance Range (Ω)			Operating Temp. Range
					D±0.5% E-24/E-96	F±1% E-24/E-96	J±5% E-24	
WK73S2A (0508)	1.25W	70°C	125°C	±100	—	1 - 9.76	1 - 9.1	-55°C to +155°C
				0~+200	—	30m - 976m	30m - 910m	
				0~+300	—	20m - 29.4m	20m - 27m	
WK73S2B (0612)	1.5W	70°C	125°C	±100	430m - 9.76	430m - 9.76	430m - 9.1	
				±200	—	30m - 422m	30m - 390m	
				±800	—	—	10m - 27m	
WK73S2H (1020)	3W	70°C	125°C	±100	—	220m - 9.76	220m - 9.1	
				±200	—	27m - 215m	27m - 200m	
				±800	—	—	10m - 24m	
WK73S3A (1225)	4.0W	70°C	125°C	±100	—	360m - 9.76	360m - 9.1	
				±200	—	33m - 357m	33m - 330m	
				±300	—	22m - 32.4m	22m - 30m	
				±800	—	—	10m - 20m	

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$ .

<sup>1</sup> If the terminal part temperature exceeds the rated terminal part temperature, even if it is below the rated ambient temperature, apply the derating curve for the terminal part temperature.

NEW >

If any questions arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature", please give priority to the "Rated Terminal Part Temperature." For more details on derating click here, ["Derating Curves – Caution & Terms."](#)

# Applications & Ratings

## Wide Terminal High Pulse/Surge

### WG73

Part Designation	Power Rating	Rated Ambient Temperature	Rated Terminal Part Temperature	T.C.R. (X 10 <sup>-6</sup> /K)	Resistance Range (Ω)		Maximum Working Voltage	Maximum Overload Voltage	Operating Temperature Range
					K±10% E-12	M±20% E-12			
WG732B (0612)	1.0W	70°C	±125°C	±100	560m ~ 1k	560m ~ 1k	200V	400V	-55°C to +155°C
WG732H (1020)	1.5W	70°C	±125°C	±100	560m ~ 1k	560m ~ 1k	200V	400V	-55°C to +155°C
WG733A (1225)	2.0W	70°C	±125°C	±100	560m ~ 1k	560m ~ 1k	200V	400V	-55°C to +155°C

## Thin Metal Film

### WN73H

Part Designation	Power Rating	Rated Ambient Temperature	Rated Terminal Part Temperature	T.C.R. (X 10 <sup>-6</sup> /K)	Resistance Range (Ω) E24 • E96			Maximum Working Voltage	Maximum Overload Voltage	Operating Temperature Range
					B: ±0.1%	C: ±0.25%	D: ±0.5%			
WN73H1J (0306)	0.3W	85°C	±125°C	±10	100 ~ 43k	100 ~ 43k	100 ~ 43k	75V	150V	-55°C to +155°C
				±25	15 ~ 100k	15 ~ 100k	10 ~ 100k			
				±50	15 ~ 100k	15 ~ 100k	10 ~ 100k			
WN73H2B (0612)	1W	85°C	±125°C	±10	100 ~ 100k	100 ~ 100k	100 ~ 100k	100V	200V	-55°C to +155°C
				±25	15 ~ 100k	15 ~ 100k	10 ~ 100k			
				±50	15 ~ 100k	15 ~ 100k	10 ~ 100k			

## Thick Film Current Sense

### Low T.C.R

### WU73

Part Designation	Power Rating	Rated Ambient Temperature	Rated Terminal Part Temperature	T.C.R. (X 10 <sup>-6</sup> /K)	Resistance Range (Ω) E-24, 25m, 50m*1	Resistance Tolerance	Operating Temperature Range
WU732B (0612)	1.0W	70°C	115°C	±100	10m~12m	F: ±1%	-55°C to +155°C
				±75	13m~27m		
				±100	30m~100m		
WU732B15 (0612)	1.5W*2	70°C	95°C	±100	10m~12m	F: ±1%	-55°C to +155°C
				±75	13m~27m		
				±100	30m~100m		

\*1 25mΩ and 50mΩ are available.

\*2 If you use at the rated power, please keep the condition that the terminal of the resistor is below the rated terminal part temperature.

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$  or max. working voltage, whichever is lower.

If any questions arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature", please give priority to the "Rated Terminal Part Temperature." For more details on derating click here, "[Derating Curves – Caution & Terms.](#)"

# Applications & Ratings

## General Purpose

### RK73B-AT & RK73H-AT

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range				TCR (X 10 <sup>-6</sup> /K)
				RK73H		RK73B		
				D±0.5% E-24, E-96	F±1% E-24, E-96	G±2% E-24	J±5% E-24	
RK73H1E AT RK73B1E AT (0402)	0.1W	70°C	125°C	10 - 1MΩ	10 - 1MΩ	1 - 10MΩ	1 - 10MΩ	±100 (H1E), ±200 (B1E)
				—	1Ω - 9.76Ω 1.02MΩ - 10MΩ	—	—	±200 (H1E)
RK73H1J AT RK73B1J AT (0603)	0.1W			1.02kΩ - 1MΩ	1.02kΩ - 1MΩ	1.1kΩ - 10MΩ	1.1kΩ - 10MΩ	±100 (H1J), ±200 (B1J)
				—	1.02MΩ - 10MΩ	—	11MΩ - 22MΩ	±200 (H1J) ±400(B1J)
	0.125W			10Ω - 1kΩ	10Ω - 1kΩ	—	—	±100 (H1J)
				—	1Ω - 9.76Ω	1Ω - 1kΩ	1Ω - 1kΩ	±200 (H1J, B1J)
RK73H2A AT RK73B2A AT (0805)	0.25W			10Ω - 1MΩ	10Ω - 1MΩ	—	—	±100 (H2A)
				—	1Ω - 9.76Ω	1Ω - 1MΩ	1Ω - 1MΩ	±200 (H2A, B2A)
	0.25W			—	1.02MΩ - 10MΩ	1.1MΩ - 10MΩ	1.1MΩ - 10MΩ	±400 (H2A, B2A)
				10Ω - 1MΩ	10Ω - 1MΩ	—	—	±100 (H2A)
RK73H2B AT RK73B2B AT (1206)	0.25W	—	1Ω - 9.76Ω 1.02MΩ - 5.6MΩ	1Ω - 5.6MΩ	1Ω - 5.6MΩ	±200 (H2A, B2A)		
		—	5.62MΩ - 10MΩ	6.2MΩ - 10MΩ	6.2MΩ - 22MΩ	±400 (H2A, B2A)		

### RK73Z-AT

Part Designation	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range	Maximum Continuous Current @70°C	Maximum Overload Current @70°C (for <1 sec.)
RK73Z1E AT (0402)	70°C	125°C	50mΩ max.	1A	2A
RK73Z1J AT (0603)			50mΩ max.	1A	2A
RK73Z2A AT (0805)			50mΩ max.	2A	5A
RK73ZB AT (1206)			50mΩ max.	2A	10A

## High Precision

### RK73G-AT

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range			TCR (X 10 <sup>-6</sup> /K)
				C±0.25% E-24, E-96	D±0.5% E-24, E-96	F±1% E-24, E-96	
RK73G1E AT (0402)	0.1W	70°C	125°C	100Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	±50
RK73G1J AT (0603)	0.1W			100Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	±50
RK73G2A AT (0805)	0.125W			100Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	±50
RK73G2B AT (1206)	0.25W			100Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	±50

## High Voltage

### HV73V-AT

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range				TCR (X 10 <sup>-6</sup> /K)
				D±0.5% E-24, E-96	F±1% E-24, E-96	G±2% E-24	J±5% E-24	
HV73V1J AT (0603)	0.1W	70°C	125°C	—	10kΩ - 10MΩ	10kΩ - 10MΩ	10kΩ - 10MΩ	±100*
HV73V2A AT (0805)	0.25W			100kΩ - 1MΩ	100kΩ - 10MΩ	100kΩ - 10MΩ	100kΩ - 10MΩ	±100
				—	—	—	11MΩ - 51MΩ	±200
HV73V2B AT (1206)	0.33W			100kΩ - 1MΩ	100kΩ - 10MΩ	100kΩ - 10MΩ	100kΩ - 10MΩ	±100
		—	—	—	11MΩ - 51MΩ	±200		

\* Cold T.C.R. (-55°C ~ +25°C) of 1.02MΩ ~ 10MΩ is +200x10<sup>-6</sup>/K

Rated voltage = √Power rating x resistance value or max. working voltage, whichever is lower.

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# Applications & Ratings

## High Pulse/Surge

### SG73-AT

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range E-12	TCR (X 10 <sup>-6</sup> /K)
SG731J AT (0603)	0.1W	70°C	125°C	1Ω - 8.2Ω	±400
				10Ω - 1MΩ	±200
SG732A AT (0805)	0.125W			1Ω - 8.2Ω	±400
				10Ω - 1MΩ	±200
SG732B AT (1206)	0.33W			1Ω - 8.2Ω	±400
				10Ω - 1MΩ	±200

## High Precision Pulse Power

### SG73G-AT

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range (Ω) C±0.25%, D±0.5% E-24/E-96	T.C.R. (ppm/°C) Max.
SG73G1J AT (0603)	0.2W	70°C	125°C	10 - 1M	±50
	0.33W*1		125°C		
SG73G2A AT (0805)	0.25W		125°C	10 - 1M	±50
	0.5W*1		100°C		
SG73G2B AT (1206)	0.33W		125°C	10 - 1M	±50
	0.5W*1		120°C		

\*1 If you use the rated power, please keep the terminal of the resistor below the rated terminal part temperature.

## Low T.C.R. Pulse Power

### SG73P-AT

Part Designation	Power Rating*1	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range (Ω)			T.C.R. (ppm/°C) Max.
				D±0.5% E-24/E-96	F±1% E-24/E-96	G±2%, J±5% E-24	
SG73P1J AT (0603)	0.5W	70°C	105°C	510 - 576k	510 - 576k	510 - 560k	±100
				10 - 499 590k - 1M	1 - 499 590k - 1M	1 - 470 620k - 10M	±100*2
SG73P2A AT (0805)	0.75W			100 - 100k	100 - 100k	100 - 100k	±100
				10 - 97.6 102k - 1M	1 - 97.6 102k - 1M	1 - 91 110k - 10M	±200
SG73P2B AT (1206)	1W			300-1M	300-1M	300-1.1M	±100
				10 - 294	1 - 294	1 - 270 1.2M - 10M	±200

\*1 If the terminal part temperature exceeds the rated terminal part temperature, even if it is below the rated ambient temperature, apply the derating curve for the terminal part temperature.

\*2 Cold T.C.R. (-55°C ~ +25°C) is +150 x 10<sup>-6</sup>/K.

Please contact KOA Speer for how to handle a specific surge/pulse.

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$  or max. working voltage, whichever is lower.

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# Applications & Ratings

## High Voltage Surge

### SG73S-AT

Part Designation	Power Rating*1	Rated Ambient Temp.	Rated Terminal Part Temp.	Resistance Range ( $\Omega$ )			T.C.R. (ppm/°C) Max.
				D $\pm$ 0.5% E-24/E-96	F $\pm$ 1% E-24/E-96	G $\pm$ 2%, J $\pm$ 5% E-24	
SG73S1J AT (0603)	0.5W	70°C	105°C	510 - 576k	510 - 576k	510 - 560k	$\pm$ 100
				10 - 499 590k - 1M	1 - 499 590k - 1M	1 - 470 620k - 10M	$\pm$ 100*2
10 - 1M	1 - 1M			1 - 10M	$\pm$ 200		
10 - 1M	1 - 1M			1 - 10M	$\pm$ 200		
SG73S2A AT (0805)	0.75W						
SG73S2B AT (1206)	1W						

\*1 If the terminal part temperature exceeds the rated part temperature, even if it is below the rated ambient temperature, apply the derating curve for the terminal part temperature.

\*2 Cold T.C.R. (-55°C ~ +25°C) is +150 x 10<sup>-6</sup>/K.

Please contact KOA Speer for how to handle a specific surge/pulse.

## High Temperature

### HSG73P-AT

Part Designation	Power Rating	Rated Ambient Temp.		Rated Term. Part Temp.		Resistance Range		T.C.R. (x10 <sup>-6</sup> /K) Max.
		Term. Surf. Material: T (Sn plating)	Term. Surf. Material: G (Au plating)	Term. Surf. Material: T (Sn plating)	Term. Surf. Material: G (Au plating)	F: $\pm$ 1% E24	J: $\pm$ 5% E24	
HSG73P1E AT (0402)	0.125W	70°C	70°C	125°C	—	10 $\Omega$ ~1M $\Omega$	1 $\Omega$ ~10M $\Omega$	$\pm$ 200
	0.2W*		—	105°C	—			
HSG73P1J AT (0603)	0.2W		70°C	135°C	—	10 $\Omega$ ~1M $\Omega$	1 $\Omega$ ~10M $\Omega$	
	0.33W*		—	125°C	—			
HSG73P2A AT (0805)	0.25W		70°C	125°C	—	10 $\Omega$ ~1M $\Omega$	1 $\Omega$ ~10M $\Omega$	
	0.5W*		—	100°C	—			
HSG73P2B AT (1206)	0.33W		70°C	125°C	—	10 $\Omega$ ~1M $\Omega$	1 $\Omega$ ~10M $\Omega$	
	0.75W*		—	105°C	—			

\* If you use at the rated power, please keep the condition that the terminal of the resistor is below the rated terminal part temperature.

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$  or max. working voltage, whichever is lower.

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