

Low TCR and Tight Tolerance for Accuracy

Features

- TCR down to ± 5 ppm/ $^{\circ}\text{C}$
- Tolerance down to 0.05%
- Products with lead-free terminations meet EU RoHS requirements
- Most are AEC-Q200 Qualified

Applications

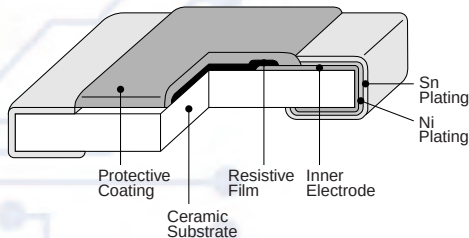
- Automotive Electronics
- Industrial Equipment
- Measurement Equipment
- Medical Equipment
- Computer and Networking Equipment



KOA Precision Surface Mount Lineup

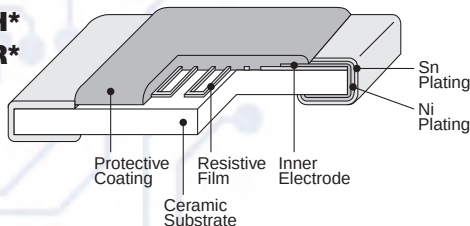
Thick Film

RK73G*
RS73*
SG73G*

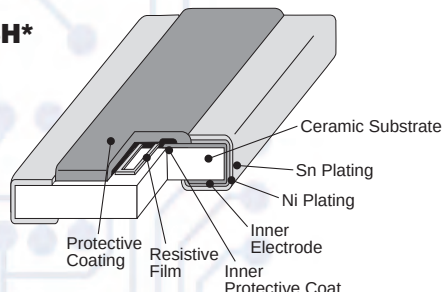


Thin Film

RN73H*
RN73R*



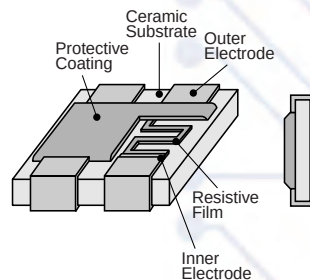
WN73H*



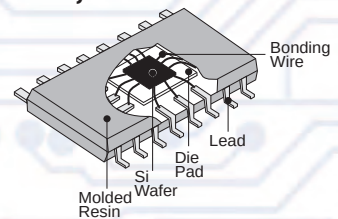
*AEC-Q200 qualified

Network

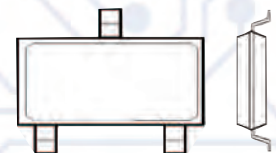
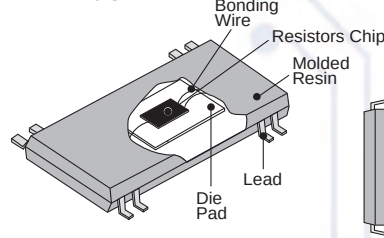
CNN



**RB(X), RD(X),
RTX, RIA/RNX**

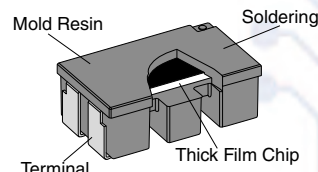


HVDP08



RTY

MHVD



Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

Precision Thick and Thin Film Resistors

	PRODUCT SERIES					
Characteristics	RK73G	SG73G	RS73	RN73R	RN73H	WN73H
Technology	Thick Film	Thick Film	Thick Film	Thin Film	Thin Film	Thin Film
TCR (ppm/°C)	±50	±50	±25 - ±50	±5 - ±100	±5 - ±100	±10 - ±50
Tolerance	±0.25% - ±1%	±0.25% - ±0.5%	±0.1% - ±1%	±0.05% - ±1%	±0.05% - ±1%	±0.1% - ±0.5%
Endurance Test Limit %*	±2% - ±3%	±2%	±0.2% - ±0.4%	±0.10%†	±0.10%†	±0.1%
Endurance Test Typical %*	±0.6% - ±1%	±0.75%	±0.05% - ±0.2%	±0.04%†	±0.03%†	±0.04%
Endurance Test Temp & Hrs.	70°C, 1,000h	70°C, 1,000h	85°C, 1,000h	85°C, 1,000h	85°C, 3,000h	85°C, 1,000h

*Size &/or value dependent. †Standard mode.

Applications & Ratings

Thick Film

RK73G: ±50 ppm/°C Thick Film Chip Resistors

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (ppm/°C) Max.	Resistance Range			Absolute Maximum Working Voltage	Absolute Maximum Overload Voltage
					New E-24, E-96 (C±0.25%)	E-24, E-96 (D±0.5%)	E-24, E-96 (F±1%)		
RK73G1H (0201)	.05W	70°C	125°C	±50	—	100Ω - 1MΩ*	100Ω - 1MΩ*	25V	50V
RK73G1E (0402)	.10W				100Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	50V	100V
RK73G1J (0603)	.10W							75V	150V
RK73G2A (0805)	.125W							150V	200V
RK73G2B (1206)	.25W							200V	400V

Operating Temperature Range: -55°C ~ +155°C.

* RK73G1H available in E-24 decade values only.

SG73G: ±50 ppm/°C High-Pulse Thick Film Chip Resistors

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (ppm/°C) Max.	Resistance Range (Ω) C±0.25%, D±0.5% E-24/E-96	Absolute Maximum Working Voltage	Absolute Maximum Overload Voltage	Operating Temp. Range
SG73G1J (0603)	0.2W	70°C	125°C	±50	10 - 1M	150V	200V	-55°C to +155°C
	0.33W*	70°C	125°C					
SG73G2A (0805)	0.25W	70°C	125°C	±50	10 - 1M	200V	400V	
	0.5W*	70°C	100°C					
SG73G2B (1206)	0.33W	70°C	125°C	±50	10 - 1M	200V	400V	
	0.5W*	70°C	120°C					

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

Applications & Ratings

Thick Film (continued)

RS73: Low TCR & Tolerance Thick Film Chip Resistors

Part Designation	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (X 10 ⁻⁶ /K)	Resistance Range*2				Maximum Working Voltage	Maximum Overload Voltage	Operating Temperature Range		
					B±0.1% E-24, E-96	C±0.25% E-24, E-96	D±0.5% E-24, E-96	F±1% E-24, E-96					
RS73F1E (0402)	.125W	85°C	+125°C	±25*1	300Ω - 100kΩ	300Ω - 1MΩ	300Ω - 1MΩ	300Ω - 1MΩ	75V	100V	-55°C to +155°C		
RS73G1E (0402)				±50									
RS73F1J (0603)	.2W			±25*1	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	100V	150V				
RS73G1J (0603)				±50									
RS73F2A (0805)	.25W			±25*1	10Ω - 3MΩ	10Ω - 6.8MΩ	10Ω - 10MΩ	10Ω - 10MΩ	150V	300V			
RS73G2A (0805)				±50									
RS73F2B (1206)	.33W			±25*1	10Ω - 5.1MΩ	10Ω - 5.1MΩ			200V	400V			
RS73G2B (1206)				±50									

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

*1 Cold T.C.R. (-55°C/+25°C) is -50~+25x10⁻⁶/K.

*2 Please inquire about E-192.

Applications & Ratings

Thin Film

RN73R: High Reliability Thin Film Chip Resistors

Part Designation	Power Rating @ 85°C	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (x10 ⁻⁶ /K)	Resistance Range (Ω) E-24, E-96, E-192					Maximum Working Voltage	Maximum Overload Voltage
					(A±0.05%)	(B±0.1%)	(C±0.25%)	(D±0.5%)	(F±1.0%)		
RN73R1E (0402)	0.063W	85°C	90°C	±10	—	47~10k	47~10k	47~10k	47~10k	50V	100V
				±25	—	47~300k	47~300k	10~300k	10~300k		
				±50	—	47~300k	47~300k	10~300k	10~300k		
	0.1W	85°C	105°C	±10	—	47~10k	47~10k	47~10k	47~10k	50V	100V
RN73R1J (0603)	0.1W	85°C	95°C	±25	—	47~300k	47~300k	47~300k	47~300k	75V	150V
				±50	—	47~300k	47~300k	47~300k	47~300k		
				±5	100~59k	100~59k	—	—	—		
				±10	47~59k	47~59k	47~59k	47~59k	47~59k		
				±25	47~59k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
	0.125W	85°C	105°C	±100	—	—	—	10~1M	10~1M	75V	150V
				±5	100~59k	100~59k	—	—	—		
				±10	47~59k	47~59k	47~59k	47~59k	47~59k		
				±25	47~59k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
				±100	—	—	—	47~1M	47~1M		
RN73R2A (0805)	0.125W	85°C	100°C	±5	100~100k	100~100k	—	—	—	150V	300V
				±10	47~100k	47~100k	47~100k	47~100k	47~100k		
				±25	47~100k	15~1.5M	15~1.5M	10~1.5M	10~1.5M		
				±50	—	15~1.5M	15~1.5M	10~1.5M	10~1.5M		
				±100	—	—	—	10~1.5M	10~1.5M		
	0.25W	85°C	105°C	±5	100~100k	100~100k	—	—	—	150V	300V
				±10	47~100k	47~100k	47~100k	47~100k	47~100k		
				±25	47~100k	47~1.5M	47~1.5M	47~1.5M	47~1.5M		
				±50	—	47~1.5M	47~1.5M	47~1.5M	47~1.5M		
				±100	—	—	—	47~1.5M	47~1.5M		
	0.25W	85°C	110°C	±5	100~300k	100~300k	—	—	—	200V	400V
				±10	47~300k	47~300k	47~300k	47~300k	47~300k		
				±25	47~300k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
				±100	—	—	—	10~1M	10~1M		
	0.4W	85°C	105°C	±5	100~300k	100~300k	—	—	—	200V	400V
				±10	47~300k	47~300k	47~300k	47~300k	47~300k		
				±25	47~300k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
				±100	—	—	—	47~1M	47~1M		
	0.25W	85°C	110°C	±10	100~510k	100~510k	100~510k	100~510k	100~510k	200V	400V
				±25	51~510k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
				±100	—	—	—	10~1M	10~1M		
	0.5W	85°C	105°C	±10	100~510k	100~510k	100~510k	100~510k	100~510k	200V	400V
				±25	51~510k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
				±100	—	—	—	47~1M	47~1M		

Operating Temperature: -55°C to +155°C. Rated voltage = $\sqrt{\text{Power rating} \times \text{resistance value}}$ or max. working voltage, whichever is lower.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

Applications & Ratings

Thin Film (continued)

RN73H: High Reliability Thin Film Chip Resistors (for Automotive)

NEW>

Part Designation	Power Rating @ 85°C	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (ppm/°C) Max.	Resistance Range (Ω) E-24, E-96, E-192*					Maximum Working Voltage	Maximum Overload Voltage
					(A±0.05%)	(B±0.1%)	(C±0.25%)	(D±0.5%)	(F±1.0%)		
RN73H1E (0402)	0.063W	85°C	90°C	±5	—	220~10k	—	—	—	50V	100V
				±10	—	47~100k	47~100k	47~100k	47~100k		
				±25	—	47~300k	47~300k	47~300k	47~300k		
				±50	—	47~300k	47~300k	10~300k	10~300k		
				±5	—	220~10k	—	—	—		
RN73H1H (0201)	0.1W†	85°C	105°C	±10	—	47~100k	47~100k	47~100k	47~100k	50V	100V
				±25	—	47~300k	47~300k	47~300k	47~300k		
				±50	—	47~300k	47~300k	47~300k	47~300k		
				±10	—	270~10k	270~10k	270~10k	—		
				±25	—	270~10k	270~10k	270~10k	—		
RN73H1J (0603)	0.075W†	85°C	95°C	±50	—	270~10k	270~10k	270~10k	—	30V	100V
				±10	—	100~59k	100~59k	—	—		
				±10	—	47~59k	47~360k	47~360k	47~360k		
				±25	—	47~59k	15~1M	15~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
RN73H1J (0603)	0.1W	85°C	95°C	±100	—	—	—	10~1M	10~1M	75V	150V
				±5	100~59k	100~59k	—	—	—		
				±10	47~59k	47~360k	47~360k	47~360k	47~360k		
				±25	47~59k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
RN73H1J (0603)	0.125W†	85°C	105°C	±100	—	—	—	47~1M	47~1M	75V	150V
				±5	100~100k	100~100k	—	—	—		
				±10	47~100k	47~1M	47~1M	47~1M	47~1M		
				±25	47~100k	15~1.5M	15~1.5M	10~1.5M	10~1.5M		
				±50	—	15~1.5M	15~1.5M	10~1.5M	10~1.5M		
RN73H2A (0805)	0.125W	85°C	100°C	±100	—	—	—	10~1.5M	10~1.5M	150V	300V
				±5	100~100k	100~100k	—	—	—		
				±10	47~100k	47~1M	47~1M	47~1M	47~1M		
				±25	47~100k	47~1.5M	47~1.5M	47~1.5M	47~1.5M		
				±50	—	47~1.5M	47~1.5M	47~1.5M	47~1.5M		
RN73H2A (0805)	0.25W†	85°C	105°C	±100	—	—	—	47~1.5M	47~1.5M	150V	300V
				±5	100~300k	100~300k	—	—	—		
				±10	47~300k	47~1M	47~1M	47~1M	47~1M		
				±25	47~300k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
RN73H2B (1206)	0.25W	85°C	110°C	±100	—	—	—	10~1M	10~1M	200V	400V
				±5	100~300k	100~300k	—	—	—		
				±10	47~300k	47~1M	47~1M	47~1M	47~1M		
				±25	47~300k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
RN73H2B (1206)	0.4W†	85°C	105°C	±100	—	—	—	10~1M	10~1M	200V	400V
				±5	100~300k	100~300k	—	—	—		
				±10	47~300k	47~1M	47~1M	47~1M	47~1M		
				±25	47~300k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
RN73H2E (1210)	0.25W	85°C	110°C	±100	—	—	—	47~1M	47~1M	200V	400V
				±10	100~510k	100~510k	100~510k	100~510k	100~510k		
				±25	51~510k	15~1M	15~1M	10~1M	10~1M		
				±50	—	15~1M	15~1M	10~1M	10~1M		
				±100	—	—	—	10~1M	10~1M		
RN73H2E (1210)	0.5W†	85°C	105°C	±10	100~510k	100~510k	100~510k	100~510k	100~510k	200V	400V
				±25	51~510k	47~1M	47~1M	47~1M	47~1M		
				±50	—	47~1M	47~1M	47~1M	47~1M		
				±100	—	—	—	47~1M	47~1M		
				±10	—	—	—	47~1M	47~1M		

* No marking on E-192 values.

Operating Temperature: -55°C to +155°C.

† See the Environmental Applications table on the RN73H data sheet for use of resistor in Power Mode.

WN73H: Wide Terminal Thin Film Chip Resistors

Part Designation	Power Rating	Rated Ambient Temperature	Rated Terminal Part Temperature	T.C.R. (X 10 ⁻⁶ /K)	Resistance Range (Ω) E24 • E96			Maximum Working Voltage	Maximum Overload Voltage	Operating Temperature Range
					B: ±0.1%	C: ±0.25%	D: ±0.5%			
1J	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			
2B	1W	85°C	±125°C	±10	100 ~ 100k	100 ~ 100k	100 ~ 100k	100V	200V	-55°C to +155°C
				±25	15 ~ 100k	15 ~ 100k	15 ~ 100k			
				±50	15 ~ 100k	15 ~ 100k	15 ~ 100k			

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

Network Resistors

	PRODUCT SERIES				
Characteristics	CNN	HVDP08	RB(X), RD(X), RLA, RTX	RIA, RNX	RTY
Technology	Array	Divider	Array	Array	Divider
TCR (ppm/°C)	±5 (relative), ±25 (absolute)	±25 ±50	±25 - ±100	±10 - ±100	±5 - ±50
Resistance Range	1kΩ, 10kΩ, 100kΩ	R1: 0.5M - 51MΩ R2: 4.5k - 1MΩ	10 - 100kΩ	10 - 510kΩ	30 - 200kΩ
Endurance Test Limit %*	±0.25%	±0.1%	±0.25%	±0.25%	±0.25%
Endurance Test Typical %*	±0.03%	±0.01%	±0.05%	±0.05%	±0.05%
Endurance Test Temp & Hrs.	70°C, 1,000h	85°C, 1,000h	70°C, 1,000h	70°C, 1,000h	70°C, 1,000h

*Size &/or value dependent.

Applications & Ratings

Network

CNN: Thin Film Chip Resistor Arrays

Part Designation	Power Rating w/Element	Resistance (Ω)	Resistance Tolerance		T.C.R. (ppm/°C)		Maximum Working Voltage	Maximum Overload Voltage	Rated Ambient Temperature	Operating Temperature Range
			Absolute	Relative	Absolute	Relative				
CNN	0.05	1k,10k,100k	B: ±0.1% C: ±0.25%	A: ±0.05% B: ±0.1%	±25	5	50V	100V	+70°C	-55°C to +125°C

HVDP08: High Precision High-Voltage Dividers

Part Designation	Max. Working Voltage	Max. Overload Voltage	Power Rating/ Resistor Element	Resistance Range Resistance Ratio 10:1~1,000:1 (R1+R2)/R2	Absolute Resistance Tolerance	Relative Resistance Tolerance	T.C.R. (X10 ⁻⁶ /K)	Relative T.C.R. Tracking	Rated Ambient Temperature	Operating Temperature Range
R1	1000V	2000V	250mW	0.5MΩ ~ 51MΩ	±0.1%, ±0.25%, ±0.5%, ±1%	0.1% 0.25%	±25 ±50	10 25	+85°C	-55°C to +155°C
R2	15V	30V	50mW	4.5kΩ ~ 1MΩ	—	0.5%				

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

Guaranteed value differs depending on resistance value.

MHVD: Thick Film High-Voltage Dividers

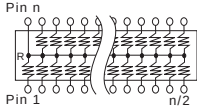
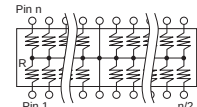
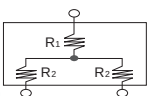
Power Rating (Vin-GND)	Rated Ambient Temp	Rated Terminal Part Temp.	Resistance Range Resistance Ratio 100.1~500.1 (R1+R2)/R2		Absolute Resistance Tolerance (R1)	Relative Resistance Tolerance	T.C.R. (x10 ⁻⁶ /K)	T.C.R. Tracking (x10 ⁻⁶ /K)	Max Working Voltage (Vin-GND)	Max Overload Voltage (Vin-GND)	Operating Temperature Range
			R1(E24/E96)	R2							
1W	85°C	90°C	0.5MΩ~51MΩ	1kΩ~510kΩ	±0.25% ±0.5%	0.25% 0.5%	±50	25 50	1500V	3000V	-55°C~+155°C

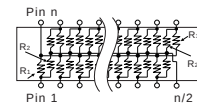
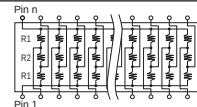
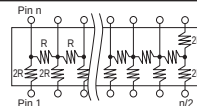
Rated voltage = $\sqrt{\text{Power rating} \times \text{resistance value}}$ or max. working voltage, whichever is lower. Guaranteed value differs depending on power usage. Please see the Performance table below. Relative Tolerance is calculated by $|\text{Dev.R1} - \text{Dev.R2}|$, TCR Tracking is $|\text{T.C.R. R1} - \text{T.C.R. R2}|$.

Applications & Ratings

Networks (continued)

RB(X), RD(X), RLA, RTX: High Precision Thin Film Networks

Circuit Code	Circuit Schematics	Number of Pins	T.C.R. (x10 ⁻⁶ /K)	Resistance Range (Ω) E24 & Absolute Tolerance	
				F: ±1%	G: ±2%, J: ±5%
RBA		8, 14, 16, 20, 24	E: ±25	100 ~ 100k	100 ~ 100k
			C: ±50	51 ~ 100k	51 ~ 100k
			H: ±100	30 ~ 100k	10 ~ 100k
RBB		8, 14, 16, 20, 24	E: ±25	100 ~ 100k	100 ~ 100k
			C: ±50	51 ~ 100k	51 ~ 100k
			H: ±100	30 ~ 100k	10 ~ 100k
RTX		3 (SOT- 23 only)	E: ±25	100 ~ 40k	100 ~ 40k
			C: ±50	51 ~ 40k	51 ~ 40k
			H: ±100		

Circuit Code	Circuit Schematics	Number of Pins	T.C.R.	Resistance Range (Ω) E24 & Absolute Tolerance G: ±2%, J: ±5%
RDA		16, 20	E: ±25	R1= 150 ~ 10k R1: R2= 1:1 ~ 1:4
			C: ±50	
			H: ±100	
RDB		16, 20	E: ±25	R1= 150 ~ 10k R1: R2= 1:1 ~ 1:4
			C: ±50	
			H: ±100	
RLA		14, 16	H: ±100	1k ~ 30k

RIA, RNX: High Precision Thin Film Arrays

Product Code	Number of Pins	T.C.R.	Resistance Range (E24) and Resistance Tolerance					Relative Resist. Tol.	TCR Tracking
			B: ±0.1%	C: ±0.25%	D: ±0.5%	F: ±1%	G: ±2%, J: ±5%		
RIA RNX	8, 14, 16, 20, 24	T: ±10	510Ω ~ 100kΩ	510Ω ~ 100kΩ	510Ω ~ 100kΩ	510Ω ~ 100kΩ	510Ω ~ 100kΩ	0.05%, 0.1%, 0.25%, 0.5%, 1%, 2%	5, 10, 25, 50
		E: ±25			100Ω ~ 510kΩ	100Ω ~ 510kΩ	100Ω ~ 510kΩ		
		C: ±50			51Ω ~ 510kΩ	51Ω ~ 510kΩ	51Ω ~ 510kΩ		
		H: ±100			30Ω ~ 510kΩ	30Ω ~ 510kΩ	10Ω ~ 510kΩ		

Rated power (70°C): 10Ω~1kΩ 200mW/element and 1.1kΩ~50mW/element.

Please inquire of us about your custom devices and circuits. Different resistance combinations are available. Depending on the circuit and package, much higher resistances are possible. For RIA20, 24 pin, highest resistance value/element is up to 100kΩ.

RTY: High Precision Voltage Dividers

Product Code	T.C.R.	Resistance Range (Ω) (E24) and Resistance Tolerance					Relative Resist. Tol.	TCR Tracking
		B: ±0.1%	C: ±0.25%	D: ±0.5%	F: ±1%	G: ±2%, J: ±5%		
RTY	T: ±10	1kΩ ~ 40kΩ	1kΩ ~ 40kΩ	1kΩ ~ 40kΩ	1kΩ ~ 40kΩ	1kΩ ~ 40kΩ	0.05%, 0.1%, 0.25%, 0.5%, 1%, 2%	5, 10, 25, 50
	E: ±25	1kΩ ~ 150kΩ	1kΩ ~ 150kΩ	100Ω ~ 150kΩ	100Ω ~ 150kΩ	100Ω ~ 150kΩ		
	C: ±50			51Ω ~ 200kΩ	51Ω ~ 200kΩ	51Ω ~ 200kΩ		
	H: ±100			30Ω ~ 200kΩ	30Ω ~ 200kΩ	30Ω ~ 200kΩ		

Specifications are limited by the circuit and resistance value.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.