

- Features:
- Precision tolerances to  $\pm 0.01\%$
  - TCR down to  $\pm 2\text{ppm}/^\circ\text{C}$
  - Wide R-value range
  - Lower values may be available
  - Consult factory for tighter tolerances
  - 2010 and 2512 sizes now available
  - RoHS compliant



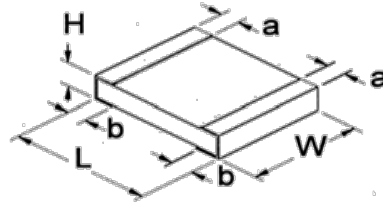
Electrical Specifications										
Type / Code	Power Rating (Watts) @ 70°C	Maximum Working Voltage <sup>(1)</sup>	Maximum Overload Voltage	Resistance Temperature Coefficient	Ohmic Range ( $\Omega$ ) and Tolerance					
					0.01%	0.05%	0.1%	0.25%	0.5%	1%
RNCF0201	0.032W	15V	30V	$\pm 25\text{ ppm}/^\circ\text{C}$	-				49.9 - 5K	
				$\pm 50\text{ ppm}/^\circ\text{C}$	-				49.9 - 33K	
RNCF0402	0.063W	25V	50V	$\pm 2\text{ ppm}/^\circ\text{C}$	49.9 - 4.99K			-		
				$\pm 5\text{ ppm}/^\circ\text{C}$	49.9 - 5K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	49.9 - 12K		49.9 - 60K			
				$\pm 15\text{ ppm}/^\circ\text{C}$	49.9 - 12K		49.9 - 69.8K			
				$\pm 25\text{ ppm}/^\circ\text{C}$	-	49.9 - 12K	10 - 255K			
				$\pm 50\text{ ppm}/^\circ\text{C}$	-	49.9 - 12K	10 - 255K	1 - 255K		
RNCF0603	0.063W	50V	100V	$\pm 2\text{ ppm}/^\circ\text{C}$	24.9 - 15K			-		
				$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 15K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 511K			
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 511K			
				$\pm 25\text{ ppm}/^\circ\text{C}$	-			2 - 4.64		
	0.1W	75V	150V	$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 15K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 332K			
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 332K			
				$\pm 25\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 1M			
				$\pm 50\text{ ppm}/^\circ\text{C}$	24.9 - 100K	4.7 - 332K	4.7 - 1M			
RNCF0805	0.1W	100V	200V	$\pm 2\text{ ppm}/^\circ\text{C}$	24.9 - 30K			-		
				$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 30K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 1M				
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 1M				
				$\pm 25\text{ ppm}/^\circ\text{C}$	-			1.1M - 2M		
	0.125W	150V	300V	$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 30K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 511K	4.7 - 511K			
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 511K	4.7 - 1M			
				$\pm 25\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 511K	4.7 - 1M	1 - 1M		
				$\pm 50\text{ ppm}/^\circ\text{C}$	24.9 - 200K	4.7 - 511K	4.7 - 1M	1 - 1M		
RNCF1206	0.125W	150V	300V	$\pm 2\text{ ppm}/^\circ\text{C}$	24.9 - 49.9K			-		
				$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 49.9K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				
				$\pm 25\text{ ppm}/^\circ\text{C}$	-			1.1M - 2.49M		
	0.25W	200V	400V	$\pm 5\text{ ppm}/^\circ\text{C}$	24.9 - 49.9K					
				$\pm 10\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				
				$\pm 15\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				
				$\pm 25\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				
				$\pm 50\text{ ppm}/^\circ\text{C}$	24.9 - 499K	4.7 - 1M				

(1) Lesser of  $\sqrt{\text{PR}}$  or maximum working voltage.

Electrical Specifications (cont.)												
Type / Code	Power Rating (Watts) @ 70°C	Maximum Working Voltage <sup>(1)</sup>	Maximum Overload Voltage	Resistance Temperature Coefficient	Ohmic Range (Ω) and Tolerance							
					0.01%	0.05%	0.1%	0.25%	0.5%	1%		
RNCF1210	0.25W	150V	300V	±2 ppm/°C	24.9 - 49.9K			-				
				±5 ppm/°C	24.9 - 49.9K							
				±10 ppm/°C	24.9 - 499K					4.7 - 1M		
				±15 ppm/°C	24.9 - 499K					4.7 - 1M		
				±25 ppm/°C	-					1.1M - 2.49M		
				±50 ppm/°C	-					1.1M - 2.49M		
	0.33W	200V	400V	±5 ppm/°C	24.9 - 49.9K							
				±10 ppm/°C	24.9 - 499K					4.7 - 1M		
				±15 ppm/°C	24.9 - 499K					4.7 - 1M		
				±25 ppm/°C	24.9 - 499K					4.7 - 1M		
±50 ppm/°C				24.9 - 499K					4.7 - 1M			
RNCF2010	0.25W	150V	300V	±2 ppm/°C	24.9 - 100K			-				
				±5 ppm/°C	24.9 - 100K							
				±10 ppm/°C	24.9 - 499K					4.7 - 1M		
				±15 ppm/°C	24.9 - 499K					4.7 - 1M		
				±25 ppm/°C	-					1.1M - 3M		
				±50 ppm/°C	-					1.1M - 3M		
	0.33W	200V	400V	±5 ppm/°C	24.9 - 49.9K							
				±10 ppm/°C	24.9 - 499K					4.7 - 1M		
				±15 ppm/°C	24.9 - 499K					4.7 - 1M		
				±25 ppm/°C	24.9 - 499K					4.7 - 1M		
±50 ppm/°C				24.9 - 499K					4.7 - 1M			
RNCF2512	0.5W	150V	300V	±2 ppm/°C	24.9 - 100K			-				
				±5 ppm/°C	24.9 - 100K							
				±10 ppm/°C	24.9 - 499K					4.7 - 1M		
				±15 ppm/°C	24.9 - 499K					4.7 - 1M		
				±25 ppm/°C	-	2.05K - 1M					2.05K - 3M	
				±50 ppm/°C	-	2.05K - 1M					2.05K - 3M	
	0.75W	200V	400V	±10 ppm/°C	24.9 - 2K	4.7 - 2K					102 - 2K	
				±15 ppm/°C	24.9 - 2K	4.7 - 2K					102 - 2K	
				±25 ppm/°C	24.9 - 2K	4.7 - 2K					102 - 2K	
				±50 ppm/°C	24.9 - 2K	4.7 - 2K					102 - 2K	
	1W	200V	400V	±25 ppm/°C	-	4.7 - 100		1 - 100				
±50 ppm/°C				-	4.7 - 100		1 - 100					

(1) Lesser of  $\sqrt{PR}$  or maximum working voltage.

**Mechanical Specifications**



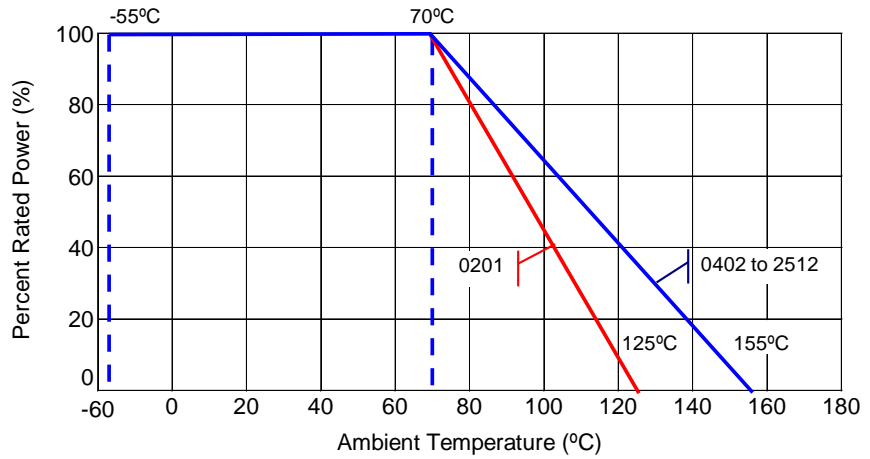
Type / Code	L Body Length	W Body Width	H Body Height	a Top Termination	b Bottom Termination	Unit
RNCF0201	0.024 ± 0.002	0.012 ± 0.002	0.009 ± 0.001	0.005 ± 0.002	0.005 ± 0.002	inches
	0.60 ± 0.05	0.30 ± 0.05	0.23 ± 0.03	0.12 ± 0.05	0.12 ± 0.05	mm
RNCF0402	0.039 ± 0.002	0.020 ± 0.002	0.014 ± 0.002	0.008 ± 0.004	0.010 ± 0.004	inches
	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	mm
RNCF0603	0.063 ± 0.008	0.031 ± 0.008	0.016 ± 0.006	0.012 ± 0.008	0.012 ± 0.008	inches
	1.60 ± 0.20	0.80 ± 0.20	0.40 ± 0.15	0.30 ± 0.20	0.30 ± 0.20	mm
RNCF0805	0.079 ± 0.008	0.049 ± 0.008	0.020 ± 0.006	0.016 ± 0.008	0.016 ± 0.008	inches
	2.00 ± 0.20	1.25 ± 0.20	0.50 ± 0.15	0.40 ± 0.20	0.40 ± 0.20	mm
RNCF1206	0.126 ± 0.008	0.063 ± 0.008	0.020 ± 0.006	0.020 ± 0.012	0.016 ± 0.008	inches
	3.20 ± 0.20	1.60 ± 0.20	0.50 ± 0.15	0.50 ± 0.30	0.40 ± 0.20	mm
RNCF1210	0.122 ± 0.008	0.094 ± 0.006	0.024 ± 0.004	0.020 ± 0.012	0.016 ± 0.008	inches
	3.10 ± 0.20	2.40 ± 0.15	0.60 ± 0.10	0.50 ± 0.30	0.40 ± 0.20	mm
RNCF2010	0.193 ± 0.006	0.094 ± 0.006	0.024 ± 0.004	0.024 ± 0.012	0.020 ± 0.010	inches
	4.90 ± 0.15	2.40 ± 0.15	0.60 ± 0.10	0.60 ± 0.30	0.50 ± 0.25	mm
RNCF2512	0.248 ± 0.006	0.122 ± 0.006	0.024 ± 0.004	0.024 ± 0.012	0.020 ± 0.010	inches
	6.30 ± 0.15	3.10 ± 0.15	0.60 ± 0.10	0.60 ± 0.30	0.50 ± 0.25	mm

**Performance Characteristics**

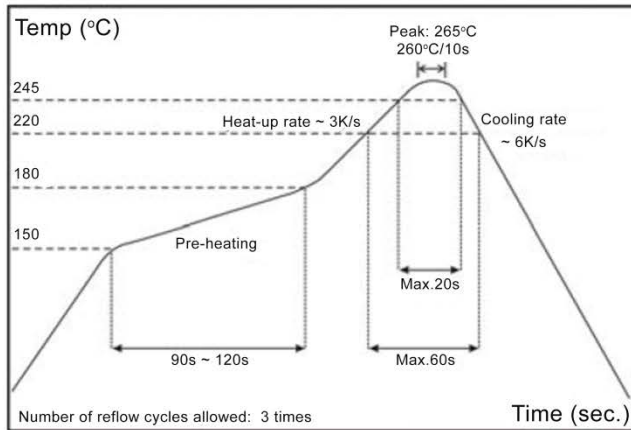
Test	Specification	Specification for Tolerances = 0.01%	Specification for Tolerances = 0.05%	Typical for Tolerances ≥ 0.1%	Test Method
Moisture Resistance, Thermal Shock	ΔR±0.25%	ΔR±0.01%	ΔR±0.05%	≤0.1%	-55°C - 150°C, 100 cycles
Load Life	ΔR±0.2%	ΔR±0.01%	ΔR±0.05%	≤0.2%	70±2°C, Maximum working voltage for 1000 hrs with 1.5 hrs ON and 0.5 hrs OFF
	>7KΩ ΔR ± 0.5% ΔR±0.5% for high power rating				
Load Life in Moisture	ΔR±0.3%	ΔR±0.01%	ΔR±0.05%	≤0.25%	40±2°C, 90-95% RH Maximum working voltage for 1000 hrs with 1.5 hrs ON and 0.5 hrs OFF
	ΔR±0.5% for high power rating				
Resistance to Soldering Heat	ΔR±0.2%	ΔR±0.01%	ΔR±0.05%	≤0.05%	260±5°C for 10 seconds
Solderability	Min 95% coverage			≥95%	245±5°C for 3 seconds
Bending Strength	ΔR±0.2%	ΔR±0.01%	ΔR±0.05%	≤0.05%	Bending amplitude 3mm for 10 seconds
Dielectric Withstanding Voltage	by type			≤0.05%	Maximum overload voltage for 1 minute
Short Time Overload	ΔR±0.2%	ΔR±0.01%	ΔR±0.05%	≤0.05%	RCWV*2.5 or Maximum overload voltage for 5 seconds
Insulation Resistance	>1GΩ			≥1GΩ	Apply 100V <sub>DC</sub> for 1 minute
Low Temperature Operation	ΔR±0.2%	ΔR±0.01%	ΔR±0.05%		1 hour, -65°C, followed by 45 minutes of RCWV
	ΔR±0.5% for high power rating				

Operating Temperature Range: -55°C to +125°C (0201); -55°C to +155°C (0402 to 2512)  
Reference Standards: MIL-STD-202, JIS-C 5201-1

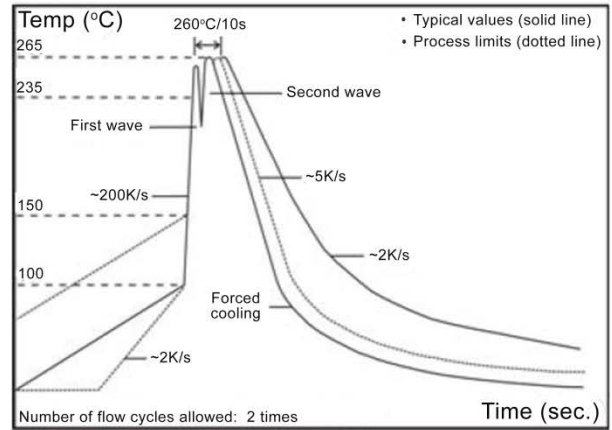
**Power Derating Curve:**



**Soldering Condition:**



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

**How to Order**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>R</b>	<b>N</b>	<b>C</b>	<b>F</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>5</b>	<b>D</b>	<b>T</b>	<b>E</b>	<b>4</b>	<b>K</b>	<b>7</b>	<b>5</b>

Product Series		Size			Tolerance			Packaging				TCR		Resistance Value <sup>(2)</sup>
RNCF	Precision Thin Film Chip Resistors	0201	Code	Tol	Value <sup>(1)</sup>	T	7" Reel Paper Tape	Code	Description	Size	Quantity	Code	ppm	Four characters with the multiplier used as the decimal holder. 24.9 ohm = 24R9 10 Kohm = 10K0 1 Mohm = 1M00
		0402	T	0.01%	E192, E96, E24			0201, 0402	10,000	W	2			
		0603	A	0.05%				0603, 0805	5,000	Y	5			
		0805	B	0.1%				1206, 1210	4,000	T	10			
		1206	C	0.25%			2010, 2512	1,000	S	15				
		1210	D	0.5%			K	7" Reel Paper Tape	All Sizes	1,000	E	25		
		2010	F	1%							C	50		
		2512									D	100		

(1) E192 values are not marked, and may be subject to 20Kpc MOQ  
 (2) Values below 10 ohm and above 1 Mohm may be subject to 20Kpc MOQ