

Precision Thin Film Chip Resistors (High Power)

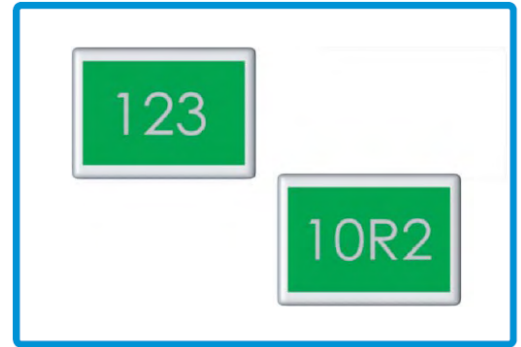


RH73 Series

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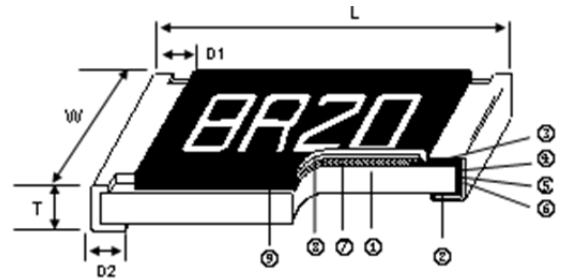
Feature

- Advanced thin film technology
- Very tight tolerance down to $\pm 0.01\%$
- Extremely low TCR down to $\pm 5 \text{ PPM}/^\circ\text{C}$
- Wide resistance range 1 ohm ~ 3M ohm



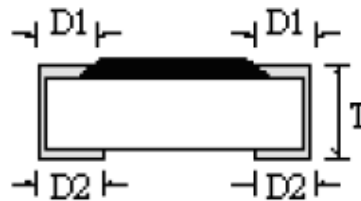
PART NUMBERING SYSTEM

Precision Thin Film Chip Resistors (High Power)	RH73	F	2A	TD	1001	C
TCR (PPM/ $^\circ\text{C}$)						
Code	C	F	G			
PPM/ $^\circ\text{C}$	± 10	± 25	± 50			
Code	1J	2A	2B	2E	2H	3A
Size	0603	0805	1206	1210	2010	2512
-----	Bulk					
TD	Paper Tape(Reel) (1H,1E,1J,2A,2B,2E)					
TE	Plastic Tape(Reel) (2H,3A)					
TP	Paper Tape(1E)					
Resistance Value	1% - 4 digits, First 3 are significant, Forth is multiplier (10^x)					
Resistance Tolerance						
Code	A	B	C	D	F	
Value	$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1\%$	



① Alumina Substrate	⑦ Resistor Layer (NiCr)
② Bottom Electrode (Ag)	⑧ Overcoat (Epoxy)
③ Top Electrode (Ag-Pd)	⑨ Marking
④ Edge Electrode (NiCr)	
⑤ Barrier Layer (Ni)	
⑥ External Electrode (Sn)	

Dimension



Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
1J	0603	1.55 \pm 0.10	0.80 \pm 0.10	0.45 \pm 0.10	0.30 \pm 0.20	0.30 \pm 0.20	1.83
2A	0805	2.00 \pm 0.15	1.25 \pm 0.15	0.55 \pm 0.10	0.30 \pm 0.20	0.40 \pm 0.20	4.71
2B	1206	3.05 \pm 0.15	1.55 \pm 0.15	0.55 \pm 0.10	0.42 \pm 0.20	0.35 \pm 0.25	9.02
2E	1210	3.10 \pm 0.15	2.40 \pm 0.15	0.55 \pm 0.10	0.40 \pm 0.20	0.55 \pm 0.25	10
2H	2010	4.90 \pm 0.15	2.40 \pm 0.15	0.55 \pm 0.10	0.60 \pm 0.30	0.50 \pm 0.25	23.61
3A	2512	6.30 \pm 0.15	3.10 \pm 0.15	0.55 \pm 0.10	0.60 \pm 0.30	0.50 \pm 0.25	38.06

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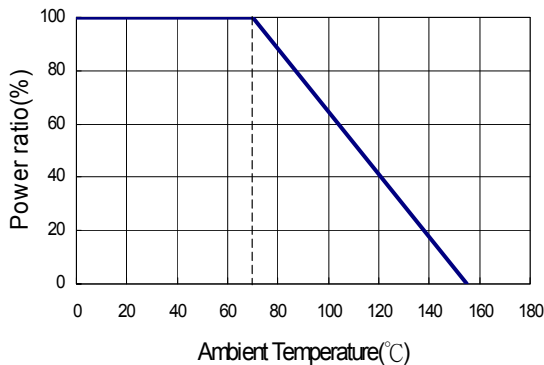
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High Power Rating Electrical Specifications

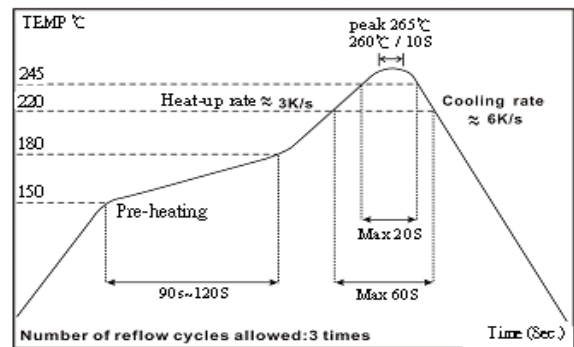
Type	Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range						TCR (PPM/°C)
						±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
1J (0603)	1/10W	-55 ~ +155°C	75V	150V	24.9Ω - 15KΩ						±5	
					24.9Ω - 100KΩ	4.7Ω - 332KΩ	4.7Ω - 332KΩ				±10	
							4.7Ω - 1MΩ				±15	
2A (0805)	1/8W	-55 ~ +155°C	150V	300V	24.9Ω - 30KΩ						±5	
					24.9Ω - 200KΩ	4.7Ω - 511KΩ	4.7Ω - 511KΩ				±10	
							4.7Ω - 1MΩ				±15	
							4.7Ω - 1MΩ	1Ω - 1MΩ			±25	
2B (1206)	1/4W	-55 ~ +155°C	200V	400V	24.9Ω - 49.9KΩ						±5	
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10		
						4.7Ω - 1MΩ				±15		
2E (1210)	1/3W	-55 ~ +155°C	200V	400V	24.9Ω - 49.9KΩ						±5	
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10		
						4.7Ω - 1MΩ				±15		
2H (2010)	1/3W	-55 ~ +155°C	200V	400V	24.9Ω - 49.9KΩ						±5	
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10		
						4.7Ω - 1MΩ				±15		
3A (2512)	3/4W	-55 ~ +155°C	200V	400V	24.9Ω - 2KΩ	4.7Ω - 2KΩ		1Ω - 2KΩ			±10	
											±25	
											±50	

- Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.
- Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.
(Lower Resistance: 1~10Ω ; High Power Rating)

Derating Curve



Reflow



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Environmental Characteristics

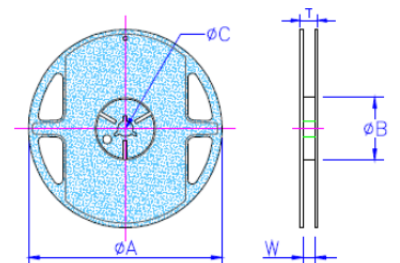
Item	Requirement		Test Method
	Tol. $\leq 0.05\%$	Tol. $> 0.05\%$	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
Short Time Overload	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	JIS-C-5201-1 5.5 RCWV*2.5 or Max. overload voltage for 5 seconds
	$\Delta R \pm 0.2\%$ for high power rating		
Insulation Resistance	$> 1000 \text{ M}\Omega$		MIL-STD-202F Method 302 Apply 100VDC for 1 minute
Endurance	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	MIL-STD-202F Method 108A 70 $\pm 2^\circ\text{C}$, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	$> 7\text{k}\Omega \Delta R \pm 0.5\%$		
	$\Delta R \pm 0.5\%$ for high power rating		
Damp Heat with Load	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	MIL-STD-202F Method 103B 40 $\pm 2^\circ\text{C}$, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	$\Delta R \pm 0.5\%$ for high power rating		
Bending Strength	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	JIS-C-5201-1 6.1.4 Bending amplitude 3 mm for 10 seconds
Solderability	95% min. coverage		MIL-STD-202F Method 208H 245 $\pm 5^\circ\text{C}$ for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	MIL-STD-202F Method 210E 260 $\pm 5^\circ\text{C}$ for 10 seconds
Dielectric Withstand Voltage	By Type		MIL-STD-202F Method 301 Max. overload voltage for 1 minute
Thermal Shock	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.25\%$	MIL-STD-202F Method 107G -55°C ~150°C, 100 cycles
Low Temperature Operation	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	JIS-C-5201-1 7.1 1 hour, -65°C, followed by 45 minutes of RCWV
	$\Delta R \pm 0.5\%$ for high power rating		

Storage Temperature: 25 $\pm 3^\circ\text{C}$; Humidity < 80%RH

Packaging

Unit: mm

Type	$\varnothing A$	$\varnothing B$	$\varnothing C$	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
1J	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
2A	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
2B	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
2E	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
2H	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	13.5 ± 1.0	15.5 ± 1.0	-	4,000
3A	178.0 ± 1.0	60.0 ± 1.0	13.5 ± 0.7	13.5 ± 1.0	15.5 ± 1.0	-	4,000



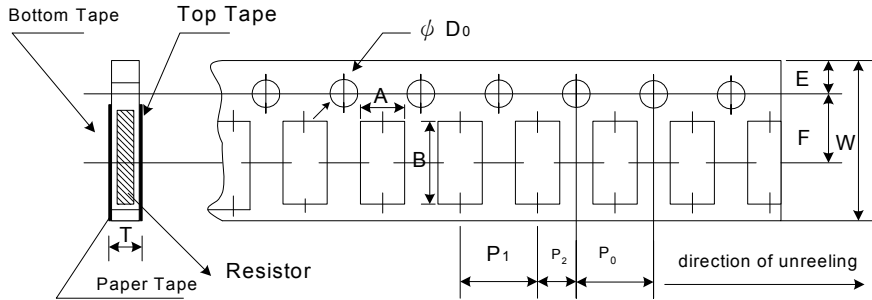
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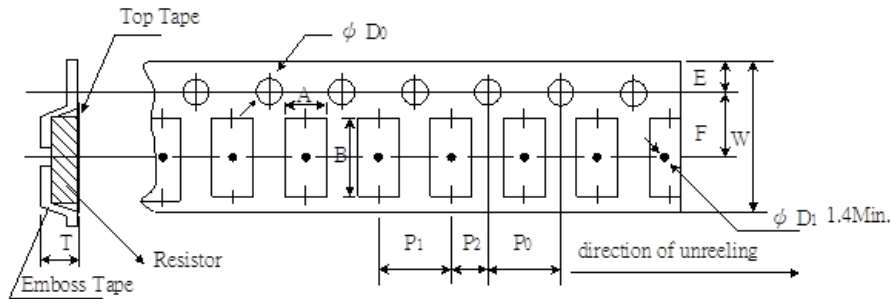
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
1J	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
2A	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
2B	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
2E	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.60±0.10	0.75±0.05

Emboss Plastic Tape Specifications

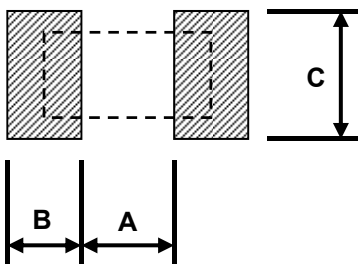


Unit: mm

Type	A	B	W	E	F	P0	P1	P2	ØD0	T
2B	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20
3A	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20

Recommend Land Pattern

Unit: mm



Type	A	B	C
1J	0.80	1.00	0.90±0.2
2A	1.00	1.00	1.35±0.2
2B	2.00	1.15	1.70±0.2
2E	2.00	1.15	2.50±0.2
2H	3.60	1.40	2.50±0.2
3A	4.90	1.60	3.10±0.2