



**NANJING SHIHENG ELECTRONICS CO., LTD.**

## **MF52A Series NTC Thermistors for Temperature Measurement**

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### **MF52A Series NTC Thermistors for Temperature Measurement**

#### ***Precision · Stability · Reliability***

The MF52A Series features compact epoxy-coating construction, high sensitivity, and fast thermal response, providing accurate and stable temperature measurement.

Its excellent consistency and long-term reliability make it ideal for precision sensing applications in consumer, automotive, and industrial electronics.

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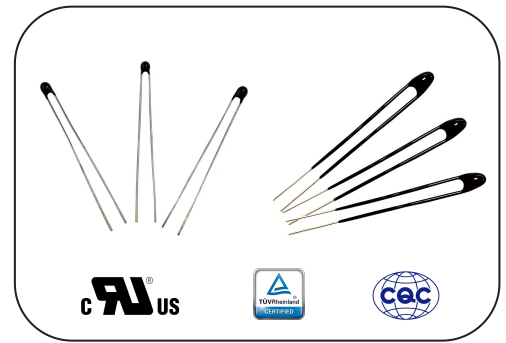
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Specifications and data are subject to change without prior notice.

Please contact us for the latest specifications.

## Features

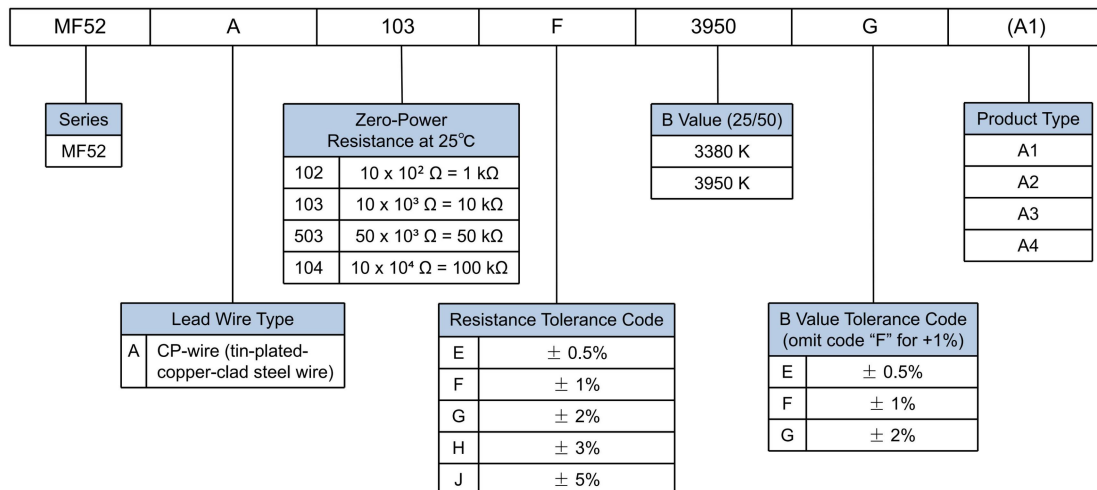
- Compliant with RoHS, Halogen-Free, and REACH requirements
- Radial leads coated with black epoxy resin
- Operating temperature range:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$   
(Customization up to  $150^{\circ}\text{C}$ )
- Safety certifications: UL / cUL / TÜV / CQC
- High measurement accuracy
- Compact size and fast thermal response
- Stable performance over long-term operation
- Excellent interchangeability and consistency
- Mass-production capability with superior cost performance



## Applications

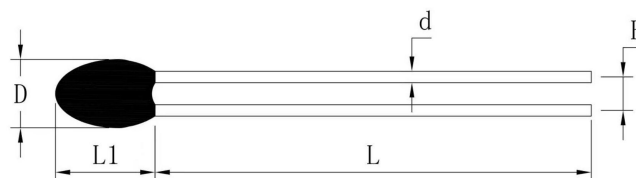
- Air conditioners and heating equipment
- Electronic thermometers
- Liquid level sensors
- Automotive electronics
- Electronic clocks and calendars
- Mobile phone batteries

## Part Number Construction



## Dimensions and Electrical Specification

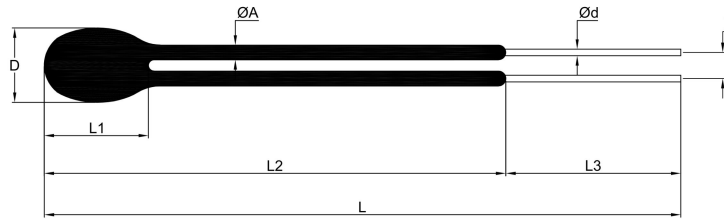
1.Type: A1 / A2



(Unit: mm)

Product Type	$D_{\max}$	$L1_{\max}$	$L_{\min}$	$F \pm 0.5$	$d \pm 0.05$
A1	2.5	4.0	25	1.7	0.3
A2	3.0	4.5	25	2.2	0.45

## 2.Type: A3 / A4



(Unit: mm)

Product Type	D <sub>max</sub>	L1 <sub>max</sub>	L <sub>max</sub>	F ± 0.5	d ± 0.05	A ± 0.2	L2 ± 2	L3 ± 2
A3	2.5	5.0	50	1.7	0.3	0.6	Customizable upon request	
A4	3.0	6.5	50	2.2	0.45	0.7	Customizable upon request	

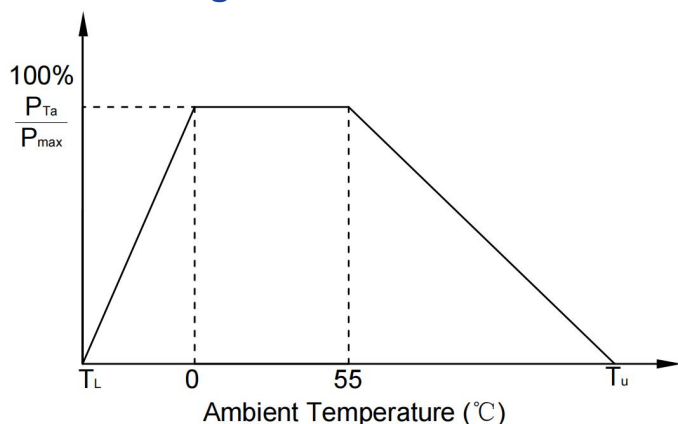
## Electrical Specifications

Part No.	Zero-Power Resistance at 25°C		B Value (25/50°C)		Dissipation Constant (Approx.)	Thermal Time Constant (Approx.)	P <sub>max</sub>
	Resistance Value (kΩ)	Tolerance (%)	Typical (K)	Tolerance (%)	mW/°C	s	mW
MF52A 502□3470* (Ax)	5	± 0.5 ± 1 ± 3 ± 5	3470	± 1 ± 2	2	12	50
MF52A 103□3380* (Ax)	10		3380				
MF52A 103□3435* (Ax)	10		3435 (B25/85)				
MF52A 103□3950* (Ax)	10		3950				
MF52A 503□3950* (Ax)	50		3950				
MF52A 104□3950* (Ax)	100		3950				
MF52A 502□3950* (Ax)	5		3950				
MF52A 103□3470* (Ax)	10		3470				
MF52A 202□3470* (Ax)	2		3470				
MF52A 153□3950* (Ax)	15		3950				
MF52A 104□4450* (Ax)	100		4450				

### Notes:

- = R<sub>25</sub> tolerance
- \* = B value tolerance
- Ax = product type (represented by A1, A2, A3, or A4)
- Lead Material: Tinned Copper-Clad Steel Wire (CP wire)
- Coating Material: Black epoxy resin
- UL / cUL Certificate No.: E240991  
TÜV Certificate No.: R50245892  
CQC Certificate No.: CQC07001019009
- For special requirements, please contact our sales department
- The difference between B<sub>25/50</sub> = 3380K and B<sub>25/85</sub> = 3435K arises solely from the use of different temperature points in the B-value calculation. Except for the selected temperature range used for calculation, all other electrical and mechanical characteristics of the thermistor remain identical.

## Power Derating Curve



For example:

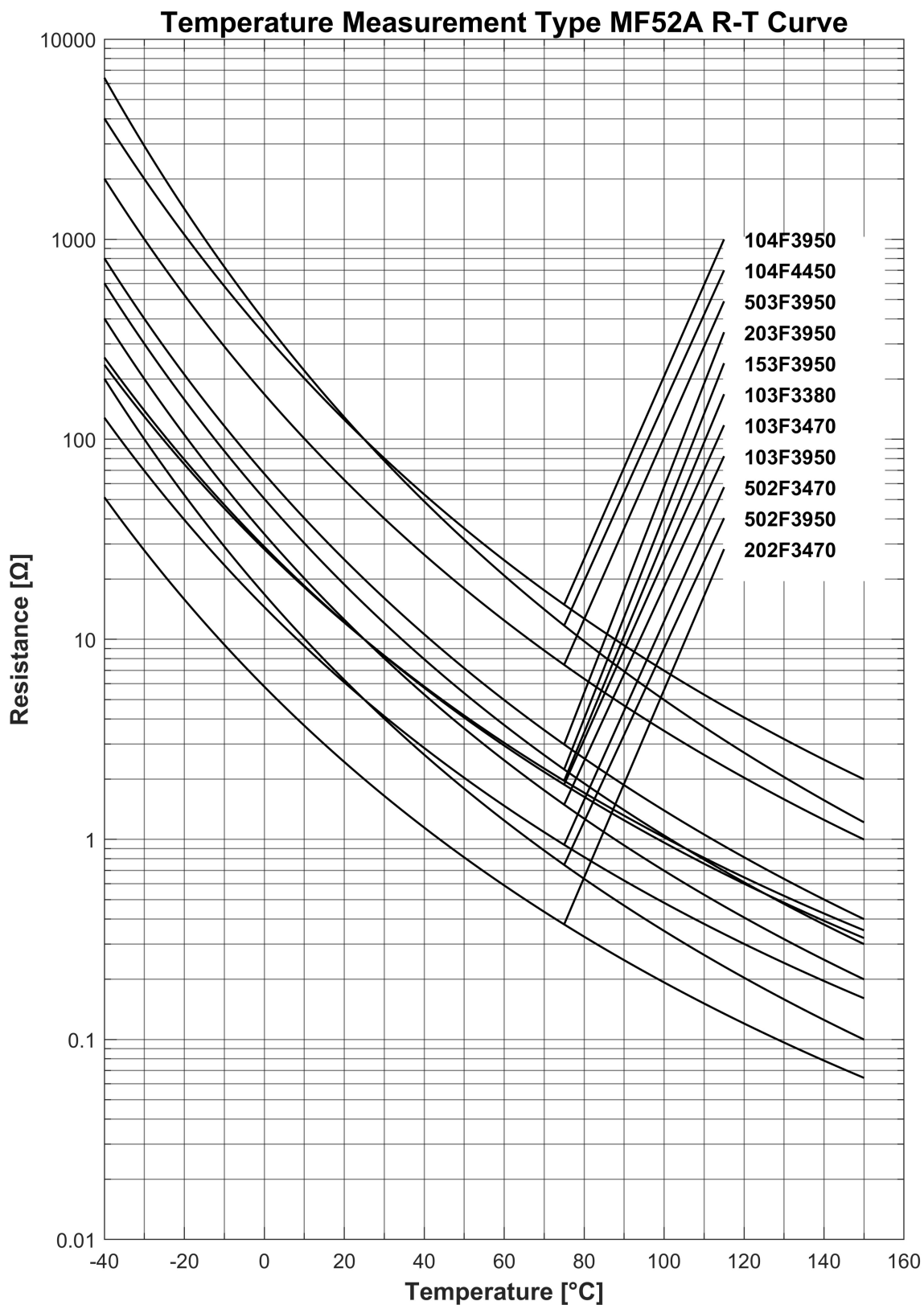
Ambient temperature ( $T_a$ ) = 90°C

Maximum operating temperature ( $T_u$ ) = 125°C

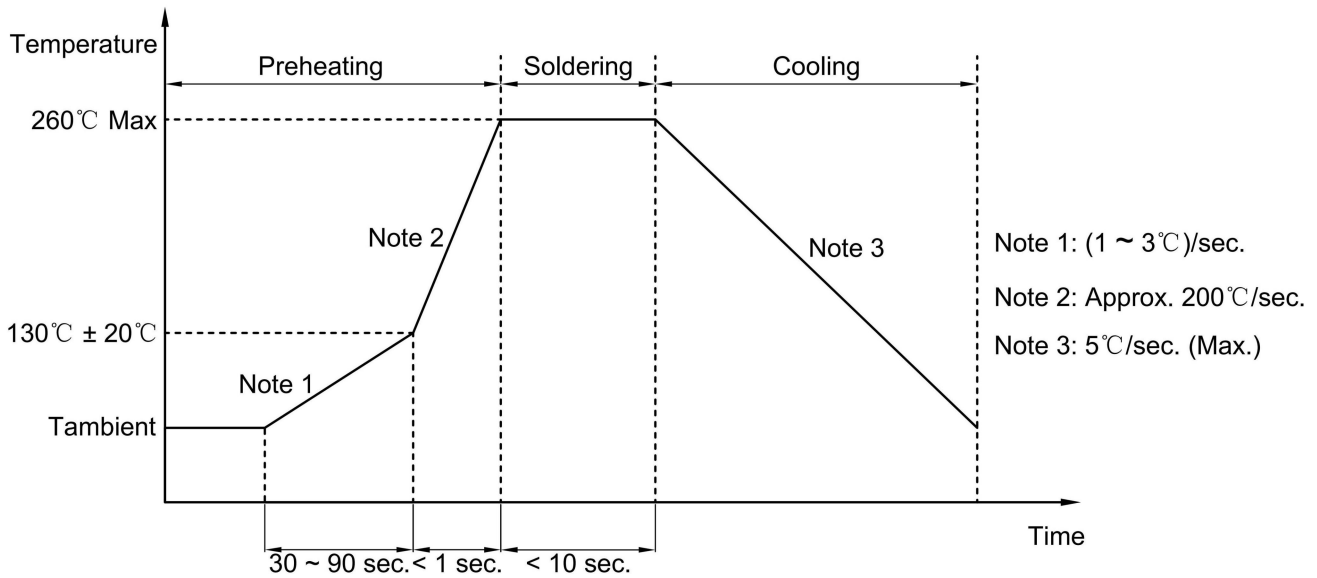
$$P_{T_a} = \frac{T_u - T_a}{T_u - 55} \times P_{max} = 50\% P_{max}$$

## R-T Characteristics and Curves

Resistance (kΩ) Temperature (°C)	Type										
	202F3470	502F3470	502F3950	103F3380	103F3470	103F3950	153F3950	203F3950	503F3950	104F3950	104F4450
-40	35.58	112.2	141.2	203.7	214.8	280.6	413.0	550.6	1475	3169	4155
-35	27.17	83.15	105.9	152.9	162.6	206.7	306.8	409.1	1090	2336	2970
-30	20.93	62.58	80.03	116.2	123.7	154.0	228.6	304.8	809.0	1730	2144
-25	16.26	47.68	60.76	89.35	94.78	116.0	171.2	228.4	603.3	1287	1562
-20	12.76	36.70	46.29	69.39	73.15	88.23	129.4	172.5	453.0	962.9	1149
-15	10.10	28.50	35.38	54.39	56.93	67.70	98.75	131.6	343.2	725.5	852.0
-10	8.067	22.32	27.16	43.00	44.69	52.35	76.11	101.4	262.5	551.1	636.9
-5	6.494	17.62	20.94	34.24	35.36	40.74	59.20	78.93	202.66	422.0	479.6
0	5.246	14.06	16.15	27.51	28.11	32.04	46.72	62.29	157.9	326.5	362.8
5	4.296	11.27	12.65	22.17	22.64	25.10	36.66	48.88	123.9	253.6	277.7
10	3.524	9.128	9.932	18.01	18.30	19.85	29.12	38.83	98.03	198.9	213.4
15	2.902	7.441	7.845	14.724	14.88	15.77	23.25	31.00	78.01	157.1	165.0
20	2.399	6.105	6.238	12.10	12.17	12.58	18.64	24.86	62.42	124.9	128.3
25	2.000	5.000	5.000	10.00	10.00	10.00	15.00	20.00	50.00	100.0	100.0
30	1.654	4.173	4.022	8.315	8.278	8.123	12.14	16.18	40.53	80.50	78.87
35	1.379	3.472	3.259	6.946	6.879	6.573	9.855	13.14	32.86	65.18	62.34
40	1.153	2.897	2.657	5.831	5.745	5.345	8.033	10.71	26.75	53.08	49.53
45	0.967	2.425	2.178	4.918	4.821	4.368	6.578	8.770	21.86	43.45	39.55
50	0.814	2.035	1.796	4.168	4.064	3.590	5.410	7.214	17.94	35.75	31.75
55	0.687	1.711	1.487	3.546	3.440	2.965	4.471	5.961	14.77	29.55	25.62
60	0.583	1.443	1.238	3.030	2.925	2.463	3.712	4.949	12.21	24.55	20.77
65	0.496	1.221	1.036	2.600	2.496	2.056	3.097	4.129	10.14	20.48	16.93
70	0.425	1.036	0.871	2.239	2.139	1.726	2.595	3.460	8.455	17.17	13.87
75	0.365	0.882	0.735	1.935	1.839	1.456	2.185	2.913	7.077	14.45	11.41
80	0.315	0.753	0.623	1.678	1.587	1.235	1.847	2.463	5.948	12.21	9.445
85	0.274	0.647	0.531	1.461	1.374	1.052	1.567	2.090	5.020	10.36	7.850
90	0.238	0.557	0.454	1.275	1.193	0.889	1.335	1.780	4.253	8.824	6.554
95	0.208	0.482	0.389	1.118	1.040	0.772	1.140	1.521	3.618	7.544	5.497
100	0.183	0.419	0.336	0.983	0.911	0.666	0.977	1.303	3.090	6.474	4.631
105	0.160	0.365	0.290	0.867	0.800	0.575	0.839	1.119	2.648	5.576	3.917
110	0.141	0.319	0.252	0.767	0.707	0.499	0.722	0.963	2.278	4.822	3.327
115	0.124	0.279	0.219	0.681	0.627	0.433	0.622	0.830	1.967	4.187	2.836
120	0.108	0.245	0.191	0.607	0.560	0.377	0.537	0.717	1.704	3.651	2.426
125	0.095	0.215	0.168	0.544	0.504	0.329	0.465	0.620	1.482	3.199	2.082
130	0.082	0.188	0.147	0.488	0.456	0.287	0.402	0.536	1.292	2.815	1.791
135	0.071	0.163	0.129	0.440	0.417	0.250	0.348	0.465	1.130	2.491	1.546
140	0.060	0.141	0.113	0.398	0.385	0.218	0.302	0.403	0.992	2.217	1.337
145	0.051	0.121	0.100	0.362	0.360	0.190	0.263	0.351	0.874	1.985	1.158
150	0.042	0.103	0.088	0.331	0.340	0.166	0.229	0.305	0.772	1.789	1.005



## Wave Soldering Profile



## Recommended Reworking Conditions With Soldering Iron

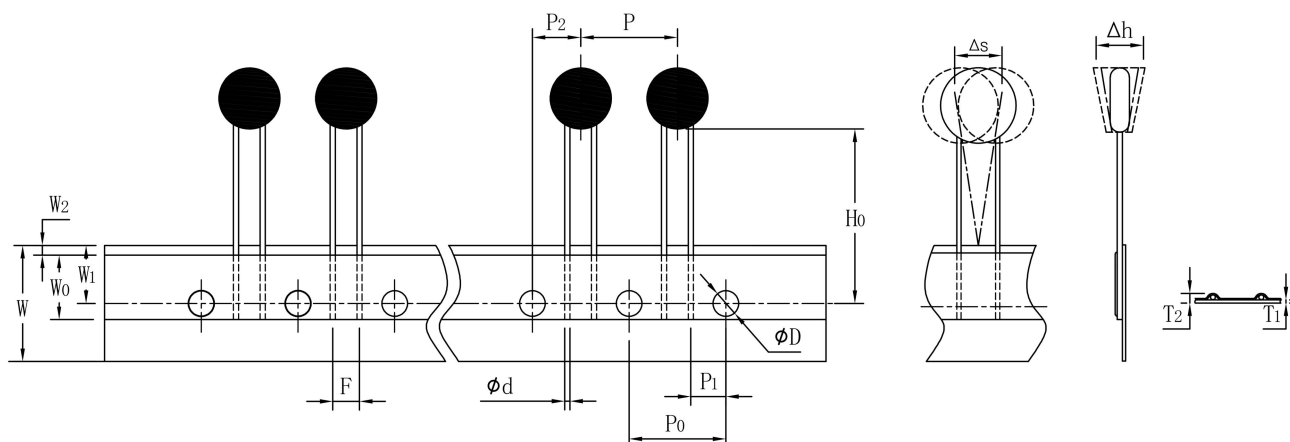
Item	Condition
Temperature of Soldering Iron Tip	$360^{\circ}\text{C}$ (max.)
Soldering Time	3 sec (max.)
Distance from Thermistor	2 mm (min.)

## Reliability

No.	Test Item	Test Standard	Test Conditions / Methods	Acceptance Criteria		
1	Tensile Strength	IEC60068-2-21	Keep the unit fixed, apply $5 \pm 1$ N, for $10 \pm 1$ seconds.	No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$		
2	Solderability	IEC60068-2-20	Temperature: $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , for 2 ~ 3 seconds.	Coverage area $\geq 95\%$		
3	Resistance to Soldering Heat	IEC60068-2-20	Temperature of solder bath: $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , insertion depth: 6 mm from resistor body, duration: $5 \pm 1$ seconds.	No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$		
4	Damp Heat Steady State	IEC60068-2-78	Temperature: $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , 93% RH $\pm 2\%$ RH, 500 hrs.	No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$		
5	Rapid Temperature Cycling	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles.		No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$	
			Step	Temperature ( $^{\circ}\text{C}$ )		Period (minutes)
			1	$-40 \pm 5$		$30 \pm 3$
			2	Room Temperature		$5 \pm 3$
			3	$125 \pm 5$		$30 \pm 3$
4	Room Temperature	$5 \pm 3$				
6	High Temperature Storage	IEC60068-2-2	Temperature: $125^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Duration: 1000 hrs.	No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$		
7	Low Temperature Storage	IEC60068-2-1	Temperature: $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Duration: 1000 hrs.	No visible damage. $ \Delta R_{25} / R_{25}  \leq 2\%$		

## Packing Method

- Bulk: (sealed bag)
- Taped packaging

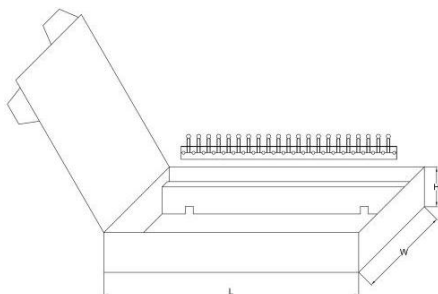


(Unit: mm)

Taping Dimensions	P	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	ØD	T <sub>1</sub>	T <sub>2</sub>	Δh	Δs	Ød	H <sub>0</sub>
	± 1.0	± 0.5	± 0.3	± 0.5	± 0.5	± 0.5	± 2	± 0.5	Max.	± 0.2	± 0.1	Max.	Max.	Max.	± 0.05	± 1
P0: 12.7	12.7	2.5	12.7	5.1	6.35	18	10	9	3	4	0.4	1.5	1	1.3	0.45	20.0

## Packaging Quantity

- Bulk: 500 pcs / bag, 40,000 pcs / carton
- Taped (Reel): 1,500 pcs / box



L	W	H
330 mm	240 mm	52 mm

## Storage Conditions

- Storage temperature: -10°C to +40°C; relative humidity: ≤ 75% RH.
- Avoid storage in environments containing corrosive substances or gases, or exposure to direct sunlight and radiation sources.
- Shelf Life: 1 year (from date of delivery, under recommended storage conditions).