



NANJING SHIHENG ELECTRONICS CO., LTD.

MF52C/D Series Bead-type Temperature Measurement NTC Thermistor



AEC-Q200 Qualified



MF52C/D Series Bead-type Temperature Measurement NTC Thermistors

Precision · Stability · Reliability

Designed for precision temperature measurement and control, the MF52CD Series features high sensitivity, fast response, and long-term stability.

With superior interchangeability and excellent insulation performance, it provides reliable operation across a wide temperature range for industrial and consumer applications.

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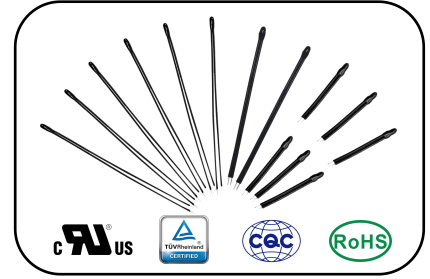
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Specifications and data are subject to change without prior notice.

Please contact us for the latest specifications.

Features

- High measurement accuracy
- Compact size with fast response
- Capable of long-term stable operation
- Excellent interchangeability and consistency
- Mass-produced with superior cost performance
- Safety certifications: UL / cUL / TÜV / CQC



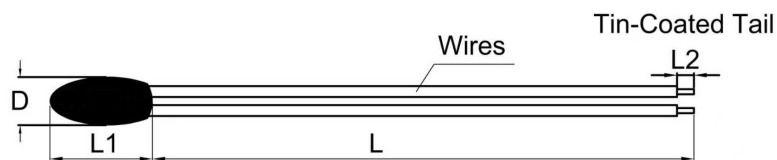
Applications

Air conditioners, heating equipment, electronic thermometers, liquid level sensors, automotive electronics, electronic calendars, and mobile phone batteries.

Part Number Construction

MF52	C	103	F	3950	F
Series MF52	Lead Wire / Temperature Type C High Temperature Wire D Standard Temperature Wire	Zero-Power Resistance at 25°C 102 10 x 10 ² Ω = 1 kΩ 103 10 x 10 ³ Ω = 10 kΩ 503 50 x 10 ³ Ω = 50 kΩ 104 10 x 10 ⁴ Ω = 100 kΩ	Resistance Tolerance Code E ± 0.5% F ± 1% G ± 2% H ± 3% J ± 5%	B Value (25/50°C) 3380 K 3950 K	B Value Tolerance Code F ± 1% G ± 2%

Structure and Dimensions



Model	Configuration	Coating Dimensions		Lead Tin-Dipped Length L2 (mm)	Wire Length L (mm)	Reference Lead Material
		Diameter D (mm)	Length L1 (mm)			
MF52C	Single-ended (High temp wire)	2.0 ± 0.5	6 ± 1.5	≥ 2.0	Customizable upon customer request	AWG 30
		3.0 ± 0.5	6 ± 1.5			AWG 28
MF52D	Single-ended (Standard wire)	2.0 ± 0.5	6 ± 1.5			AWG 32
		2.4 ± 0.5	6 ± 1.5			AWG 30
		3.0 ± 0.5	6 ± 1.5			AWG 28
MF52D	Double-ended (Standard wire)	2.4 ± 0.5	6 ± 1.5			AWG 30
		3.0 ± 0.5	6 ± 1.5			AWG 30 / AWG 28
		3.5 ± 0.5	6 ± 1.5			AWG 28

Note:

High-temperature wire type (MF52C) uses Tefion-insulated wires.

Standard wire type (MF52D) uses PVC-insulated or XLPE (cross-linked polyethylene) insulated wires.

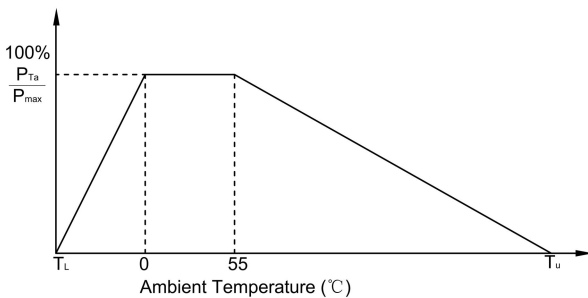
Electrical Specifications

Part No.	Zero-Power Resistance at 25 °C		B Value (25/50°C)		Thermal Time Constant (Approx.)	Dissipation Constant (Approx.)	P _{max}	Operating Temperature Range
	Resistance Value (kΩ)	Tolerance (%)	Typical (K)	Tolerance (%)	τ (s)	δ (mW / °C)	mW	°C
MF52X 202□3470*	2	± 0.5 ± 1 ± 2 ± 3 ± 5	3470	± 1 ± 2	7	12	50	Operating temperature range: -40°C to +150°C (varies with lead wire type), Custom designs available up to +200°C
MF52X 502□3470*	5		3470					
MF52X 502□3950*	5		3950					
MF52X 103□3380*	10		3380					
MF52X 103□3470*	10		3470					
MF52X 103□3950*	10		3950					
MF52X 153□3950*	15		3950					
MF52X 203□3950*	20		3950					
MF52X 503□3950*	50		3950					
MF52X 104□3950*	100		3950					
MF52X 104□4450*	100		4450					

Notes:

- X = Product type, representing C、D
□ = R₂₅ tolerance
* = B value tolerance
- UL Certificate No.: E240991
TÜV Certificate No.: R50245892
CQC Certificate No.: CQC07001019009
Custom designs are available for extended operating temperature up to +200°C
- The difference between B_{25/50} = 3380K and B_{25/85} = 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:

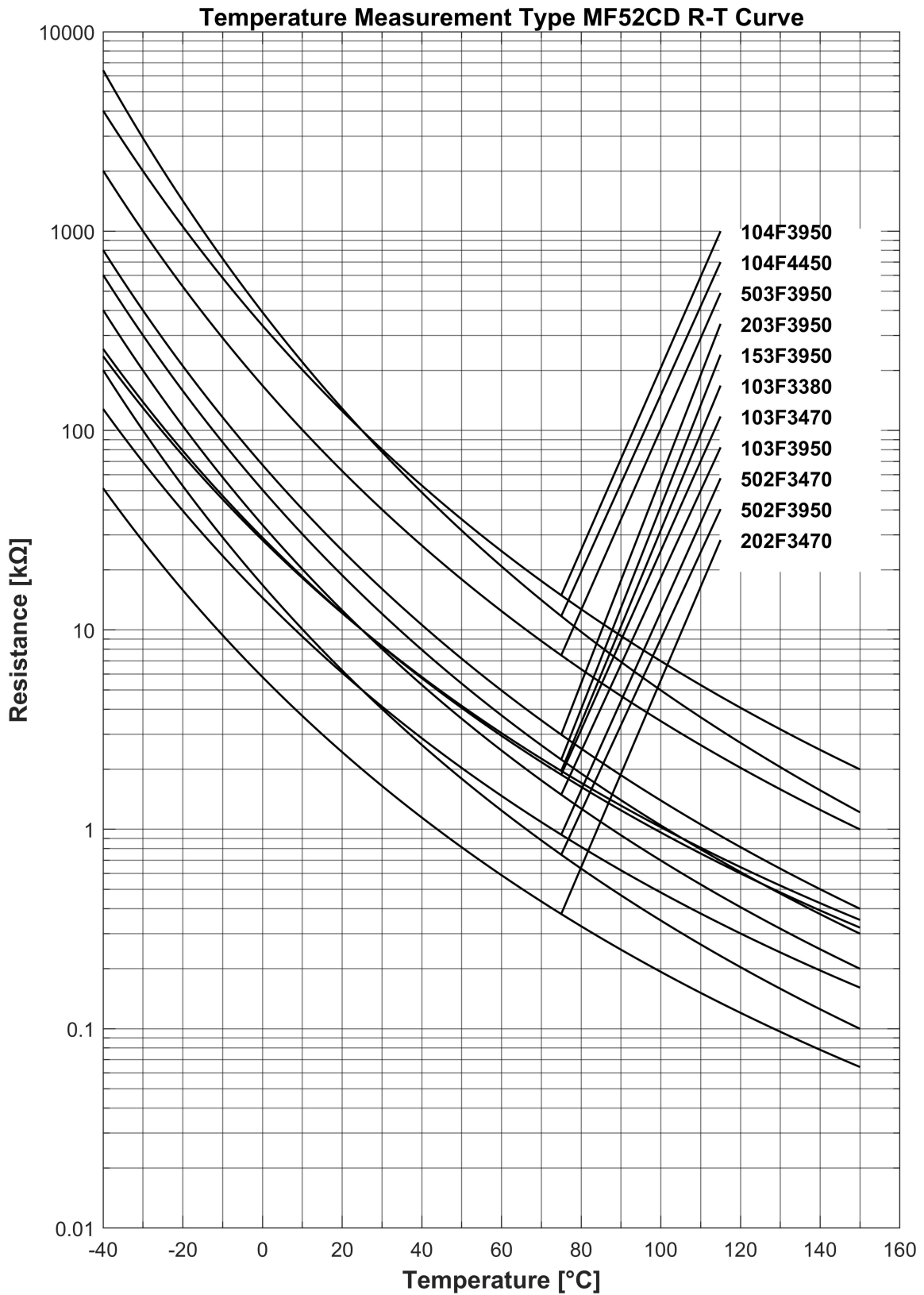
Ambient temperature (T_a) = 85°C

Maximum operating temperature (T_u) = 200°C

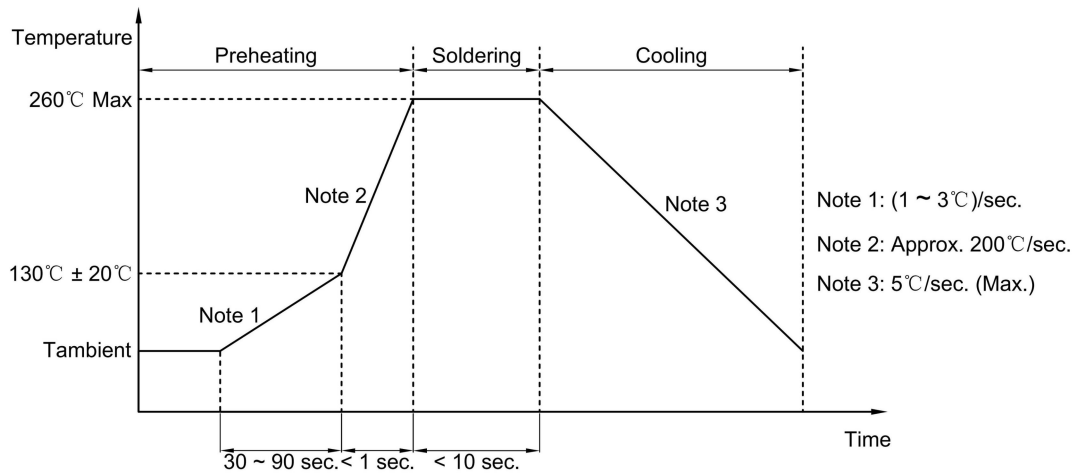
$$P_{T_a} = \frac{T_u - T_a}{T_u - 55} \times P_{max} = 79.3\%P_{max}$$

R-T Characteristics and Curves

Resistance Value (kΩ) Temperature (°C)	Type										
	202F 3470	502F 3470	502F 3950	103F 3380	103F 3470	103F 3950	153F 3950	203F 3950	503F 3950	104F 3950	104F 4450
-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	28.5	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	202.6	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	14.72	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	5.00	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	0.06	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°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 of terminals	IEC60068-2-21	Keep the unit fixed, apply 5 ± 1 N for 10 ± 1 seconds.	No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%		
2	Solderability	IEC60068-2-20	Temperature: 245°C ± 5°C for 2 ~ 3 seconds.	Coverage area ≥ 95%		
3	Resistance to soldering heat	IEC60068-2-20	Temperature of solder bath: 260°C ± 5°C, insertion depth: 6 mm from resistor body, duration: 5 ± 1 seconds.	No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%		
4	Damp heat, steady state	IEC60068-2-78	Temperature: 40°C ± 2°C, 93% RH ± 2% RH, 500 hrs.	No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%		
5	Rapid changes of temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles.		No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%	
			Step	Temperature (°C)		Period (minutes)
			1	T _L ± 5		30 ± 3
			2	Room temperature		5 ± 3
			3	T _U ± 5		30 ± 3
4	Room temperature	5 ± 3				
6	High temperature storage	IEC60068-2-2	Temperature: T _U ± 2°C, Duration: 1000 hrs.	No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%		
7	Low temperature storage	IEC60068-2-1	Temperature: T _L ± 2°C, Duration: 1000 hrs.	No visible damage. ΔR ₂₅ / R ₂₅ ≤ 2%		

Packaging and Quantity

- Bulk: 500 pcs / bag (customizable upon request)

Storage Conditions

- Recommended storage environment:
 1. Temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$.
 2. Relative Humidity: $\leq 75\%$ RH.
 3. Do not store in environments containing corrosive gases or in direct sunlight.
- Shelf Life: 1 year (from date of delivery, under recommended storage conditions).