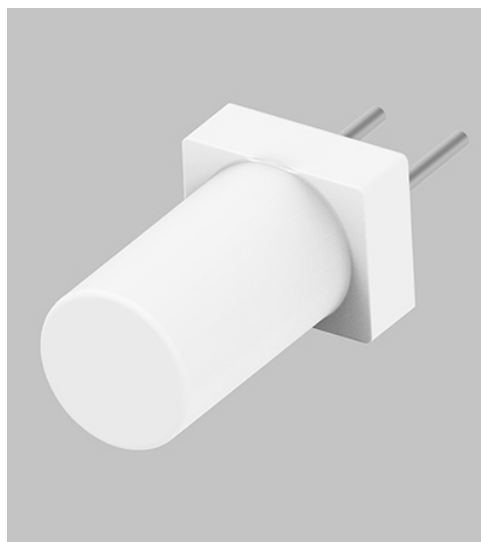




Plug-In NTC Temperature Probe

NTC Temperature Sensor

Description

The Plug-In NTC Temperature Probe is designed for fast, accurate temperature tracking in high voltage systems. The design combines an accurate and stable glass encapsulated NTC thermistor element that is potted inside a small ceramic tube. The design provides a high degree of isolation between the sensing element and the housing which makes the assembly well suited for higher voltage applications such as e-meters, electric motors, and a wide range of other applications. The assembly has passed a range of reliability requirements including both high-temperature storage and temperature cycling testing.

Features

- Interchangeable accuracy
- Proven stability and reliability
- Rapid time response
- Wide operating temperature range:
-40°C to +200°C
- Very small size: Housing OD=φ4.5mm
- Simple, cost-effective, reliable design
- High voltage isolation:
4500VAC, ≤1mA
- Insulation resistance:
500VDC, ≥100MΩ

Applications

- Electric power meter monitoring
- Hermetic motors
- High voltage motors
- Electric vehicle systems
- Rechargeable battery systems
- Generators
- Transformers

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1. Operating Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes/Conditions
Operating temperature range ^(a)	T_o	-40		200	°C	
Storage temperature	T_s	-40		85	°C	
Resistance at 25°C	R_{25}	97,644	98,630	99,616	Ω	
Beta Value (25°C/85°C)	β	3911	3950	3990	K	3950 $\pm$ 1%
Resistance Tolerance				± 1.0	%	@25°C
Dissipation factor	δ		3.6		mW/°C	Still air
Thermal time constant	$t_{63.2}$			7	Sec	Stirred oil
Insulation resistance			500		V	Min of 100M Ω for 1 sec
High pot insulation				1	mA	4500VAC

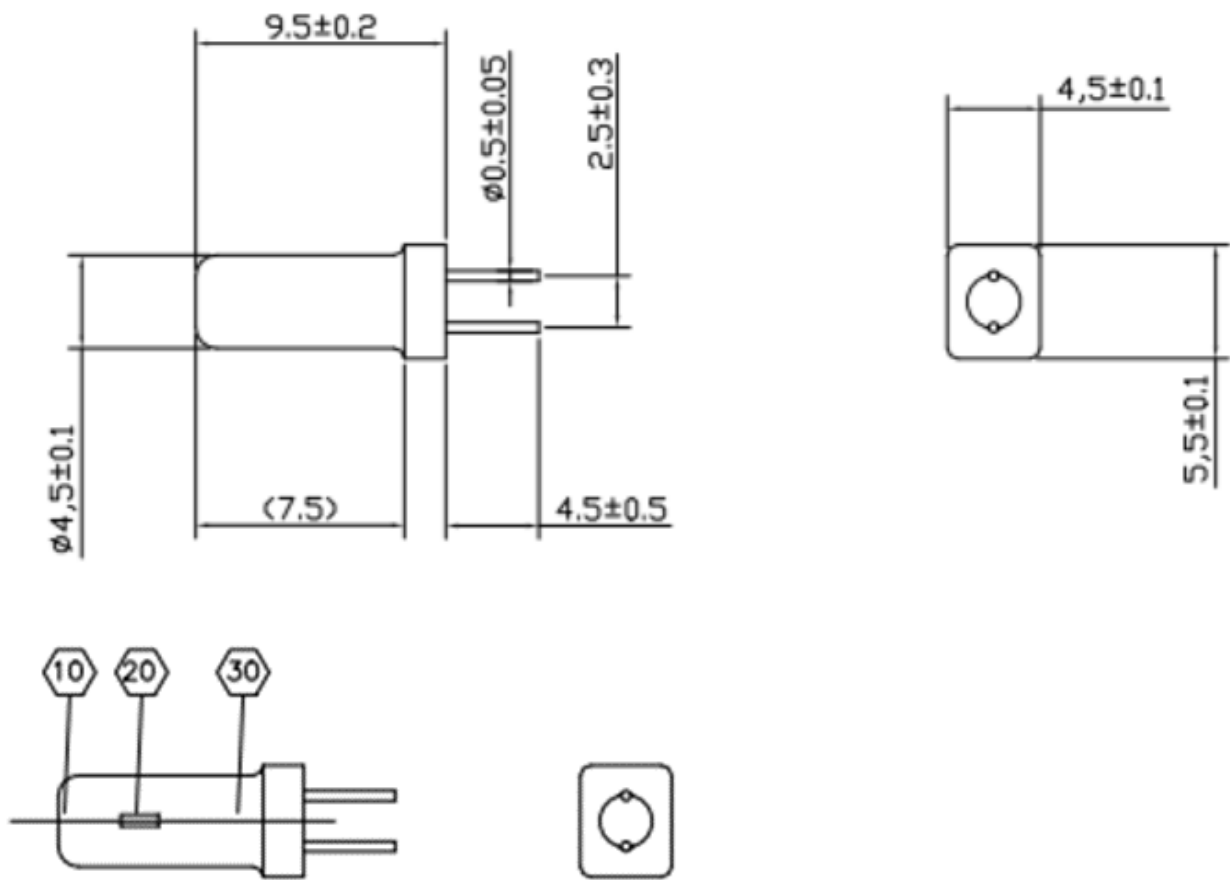
Notes:

- Operation outside the recommended operating temperature range can lead to shifts in the resistance versus temperature characteristics and changes in the overall accuracy of the sensor. Extended operation outside this temperature range can lead to sensor failures

2. Reliability

Characteristic	Symbol	Min	Typ	Max	Units	Notes/Conditions
Dry Heat Storage testing	$\Delta R/R_{25}$			3	%	Temp: 200°C $\pm$ 5°C Duration: 500 hours $\pm$ 24 hours
Temperature Cycling testing	$\Delta R/R_{25}$			3	%	High temp limit: 150°C $\pm$ 5°C Low temp limit: -40°C $\pm$ 2°C High temp dwell time: 10min $\pm$ 0.5min Low temp dwell time: 10min $\pm$ 0.5min Change time: 60S, 500 cycles

3. Mechanical Details



No	Description
10	Ceramic tube
20	NTC
30	Silicon

4. Resistance versus Temperature Table

T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)	T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)
-40	3048.957	3188.689	3334.491	-3	364.703	373.323	382.109
-39	2854.648	2983.490	3117.835	-2	346.810	354.827	362.993
-38	2674.071	2792.918	2916.756	-1	329.883	337.338	344.927
-37	2506.203	2615.876	2730.075	0	313.865	320.797	327.849
-36	2350.094	2451.342	2556.697	1	298.702	305.146	311.698
-35	2204.865	2298.375	2395.611	2	284.343	290.333	296.420
-34	2069.697	2156.096	2245.878	3	270.742	276.309	281.962
-33	1943.836	2023.699	2106.632	4	257.855	263.027	268.276
-32	1826.586	1900.437	1977.075	5	245.640	250.445	255.317
-31	1717.300	1785.619	1856.470	6	234.060	238.521	243.044
-30	1615.387	1678.613	1744.141	7	223.078	227.220	231.415
-29	1520.297	1578.834	1639.461	8	212.661	216.505	220.396
-28	1431.525	1485.741	1541.856	9	202.777	206.343	209.951
-27	1348.605	1398.837	1450.795	10	193.397	196.704	200.047
-26	1271.110	1317.667	1365.794	11	184.492	187.558	190.655
-25	1198.641	1241.807	1286.400	12	176.038	178.878	181.745
-24	1130.835	1170.871	1212.204	13	168.008	170.638	173.292
-23	1067.357	1104.501	1142.823	14	160.381	162.815	165.269
-22	1007.896	1042.367	1077.909	15	153.134	155.385	157.654
-21	952.168	984.168	1017.141	16	146.247	148.328	150.424
-20	899.908	929.621	960.219	17	139.701	141.624	143.558
-19	850.875	878.471	906.872	18	133.478	135.253	137.037
-18	804.843	830.480	856.848	19	127.561	129.198	130.843
-17	761.606	785.427	809.913	20	121.934	123.442	124.957
-16	720.973	743.112	765.854	21	116.581	117.970	119.363
-15	682.766	703.345	724.472	22	111.489	112.766	114.047
-14	646.824	665.956	685.585	23	106.644	107.817	108.992
-13	612.995	630.784	649.024	24	102.033	103.109	104.186
-12	581.139	597.681	614.633	25	97.644	98.630	99.616
-11	551.127	566.512	582.267	26	93.383	94.368	95.354
-10	522.840	537.148	551.793	27	89.330	90.312	91.295
-9	496.164	509.473	523.087	28	85.474	86.451	87.430
-8	470.999	483.379	496.035	29	81.804	82.775	83.750
-7	447.249	458.764	470.529	30	78.312	79.276	80.243
-6	424.823	435.535	446.473	31	74.987	75.943	76.903
-5	403.641	413.605	423.773	32	71.823	72.769	73.721
-4	383.625	392.893	402.344	33	68.809	69.746	70.688

4. Resistance versus Temperature Table (Continued)

T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)	T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)
34	65.940	66.865	67.797	71	15.982	16.435	16.899
35	63.207	64.121	65.042	72	15.436	15.879	16.334
36	60.604	61.505	62.415	73	14.912	15.345	15.790
37	58.123	59.013	59.910	74	14.408	14.832	15.267
38	55.760	56.637	57.521	75	13.924	14.338	14.764
39	53.508	54.371	55.243	76	13.458	13.864	14.280
40	51.362	52.212	53.070	77	13.011	13.407	13.814
41	49.316	50.152	50.997	78	12.580	12.968	13.366
42	47.365	48.188	49.019	79	12.166	12.545	12.935
43	45.505	46.314	47.132	80	11.768	12.139	12.520
44	43.732	44.526	45.331	81	11.385	11.747	12.120
45	42.040	42.821	43.611	82	11.016	11.370	11.735
46	40.427	41.193	41.970	83	10.661	11.007	11.364
47	38.887	39.640	40.403	84	10.319	10.658	11.007
48	37.418	38.157	38.906	85	9.990	10.321	10.662
49	36.017	36.742	37.477	86	9.673	9.997	10.331
50	34.679	35.390	36.112	87	9.367	9.684	10.011
51	33.356	34.053	34.762	88	9.073	9.383	9.702
52	32.090	32.773	33.468	89	8.790	9.093	9.405
53	30.879	31.548	32.229	90	8.516	8.813	9.118
54	29.719	30.374	31.042	91	8.253	8.543	8.842
55	28.608	29.251	29.904	92	7.999	8.282	8.575
56	27.545	28.174	28.814	93	7.754	8.031	8.317
57	26.526	27.142	27.770	94	7.517	7.788	8.069
58	25.550	26.153	26.768	95	7.289	7.554	7.829
59	24.615	25.206	25.807	96	7.069	7.329	7.597
60	23.720	24.297	24.886	97	6.857	7.111	7.373
61	22.861	23.426	24.003	98	6.652	6.900	7.157
62	22.038	22.591	23.155	99	6.454	6.697	6.948
63	21.248	21.789	22.342	100	6.263	6.500	6.746
64	20.491	21.020	21.561	101	6.078	6.311	6.552
65	19.765	20.283	20.812	102	5.900	6.127	6.363
66	19.068	19.575	20.093	103	5.728	5.950	6.181
67	18.399	18.895	19.402	104	5.561	5.779	6.005
68	17.758	18.242	18.738	105	5.400	5.614	5.835
69	17.141	17.615	18.101	106	5.245	5.453	5.670
70	16.550	17.013	17.488	107	5.095	5.299	5.510

4. Resistance versus Temperature Table (Continued)

T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)	T(°C)	Rmin(KΩ)	Rnom(KΩ)	Rmax(KΩ)
108	4.949	5.149	5.356	145	1.840	1.933	2.030
109	4.809	5.004	5.207	146	1.794	1.886	1.981
110	4.673	4.864	5.063	147	1.751	1.840	1.934
111	4.541	4.729	4.923	148	1.708	1.796	1.888
112	4.414	4.597	4.788	149	1.666	1.752	1.843
113	4.291	4.470	4.657	150	1.626	1.710	1.799
114	4.172	4.347	4.530	151	1.587	1.669	1.756
115	4.056	4.228	4.407	152	1.548	1.630	1.715
116	3.945	4.113	4.288	153	1.511	1.591	1.675
117	3.836	4.001	4.173	154	1.475	1.553	1.635
118	3.732	3.893	4.061	155	1.440	1.517	1.597
119	3.630	3.788	3.953	156	1.406	1.481	1.560
120	3.532	3.687	3.848	157	1.373	1.447	1.524
121	3.437	3.588	3.746	158	1.341	1.414	1.490
122	3.344	3.493	3.648	159	1.310	1.381	1.456
123	3.255	3.400	3.552	160	1.280	1.349	1.423
124	3.168	3.311	3.459	161	1.250	1.319	1.390
125	3.084	3.224	3.369	162	1.222	1.289	1.359
126	3.003	3.139	3.282	163	1.194	1.260	1.329
127	2.924	3.058	3.197	164	1.167	1.231	1.299
128	2.847	2.978	3.115	165	1.140	1.204	1.271
129	2.773	2.901	3.035	166	1.115	1.177	1.243
130	2.700	2.826	2.958	167	1.090	1.151	1.215
131	2.630	2.754	2.883	168	1.066	1.126	1.189
132	2.563	2.683	2.810	169	1.042	1.101	1.163
133	2.497	2.615	2.739	170	1.019	1.077	1.138
134	2.433	2.549	2.670	171	0.997	1.054	1.114
135	2.371	2.484	2.603	172	0.975	1.031	1.090
136	2.310	2.422	2.538	173	0.954	1.009	1.067
137	2.252	2.361	2.475	174	0.933	0.987	1.044
138	2.195	2.302	2.414	175	0.913	0.966	1.022
139	2.140	2.245	2.354	176	0.894	0.946	1.001
140	2.086	2.189	2.296	177	0.875	0.926	0.980
141	2.034	2.135	2.240	178	0.856	0.906	0.959
142	1.983	2.082	2.186	179	0.838	0.887	0.940
143	1.934	2.031	2.132	180	0.821	0.869	0.920
144	1.886	1.981	2.081	181	0.804	0.851	0.902

4. Resistance versus Temperature Table (Continued)

[illegible]

5. Ordering Information (Standard Configurations)

Order Code	Description	R@25°C (Ohms)	MOQ	Packaging
20021955-00	NTC Temperature Sensor Assembly	98,630	1000*	Bulk

* For quantities less than Minimum Order Quantity – Contact Distribution

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