

T H E R M O M E T R I C S
A C O M M I T M E N T T O E X C E L L E N C E

Type GC11 GC14, GC16 Thermometrics Glass Encapsulated NTC Chip Thermistor



Description

Small glass encapsulated chip thermistors on fine diameter platinum alloy lead wires.

Features

- Glass encapsulated bead thermistors.
- Suitable for temperature measurement, control or compensation applications.
- Fast thermal response times.
- Suitable for self-heated applications such as liquid level sensing or gas flow measurement.
- Operating temperatures range from -40°C to +250°C.
- Unaffected by severe environmental exposures, including nuclear radiation.
- Intermittent operation up to 450°C is permissible; however, stability will be degraded.
- Improved beta tolerance with respect to glass encapsulated beads.
- RoHS compliant to 2002/95/CE.

Options

- Non-standard resistance tolerances and values
- Reference temperature(s) other than 25°C - specify.
- Custom packaging available.
- Welded or soldered extension leads - specify lead material, diameter, length and insulation, if any.
- Calibration - specify temperature(s).
- Interchangeable pairs or sets, curve matching — specify temperature ranges and tolerance(s).
- Special aging and conditioning for high reliability applications.

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Specifications

Thermal and Electrical Properties

Note: These thermal and electrical properties are for all small glass encapsulated thermistors. All definitions and test methods are per MIL-PRF-23648.

Thermistor Series		GC11	GC14	GC16
Body Dimensions	Maximum Diameter	0.012"	0.016"	0.017"
	Maximum Length	0.024"	0.032"	0.034"
Lead Wires	Nominal Diameter	0.0012"		
	Minimum Lead Length	0.156" for adjacent cut	0.312"	
	Lead Material	Platinum alloy		
	Available Cuts	"K" adjacent "P" opposite		
Material System				
Code Letter	R-vs-T Curve	25/125 Ratio	Nominal Resistance Range @ 25°C	
A	GC1	11.9	-	1000-2500 Ω
A	GC2	14.7	-	2500-7000 Ω
A	GC3	21.1	14004 Ω only for adjacent cut, 9000 opposite cut with 19.1 25/125 ratio	7500-30000 Ω
F	GC4	27.8		30-100 k Ω
B	GC9	30.9		100-200 k Ω
G	GC6	36.4	-	200-500 k Ω
D	GC10	41.1	-	500-1000 k Ω
D	GC11	46.1	-	1000-2000 k Ω
Thermal Time Constant				
		Still Air @ 25°C	0.65	1.2 seconds
		Plunge into Water	12 milliseconds	16 milliseconds
Dissipation Constant				
		Still Air @ 25°C	0.07 mW/°C	0.12 mW/°C
		Still Water @ 25°C	-	0.60 mW/°C
Power Rating (in air)				
		Maximum Power Rating	-	0.015 Watt
		100% Maximum Power to:	-	75 °C
		Derated to 0% at	-	250 °C

Resistance-Vs.-Temperature Characteristics

The nominal resistance range for the zero-power resistance at 25°C is shown for each available Material System. Each Material System is denoted by an ordering Code Letter, a referenced curve number and the nominal 25°C/125°C resistance ratio. The R-vs.-T curves are on the facing page.

Standard Tolerances

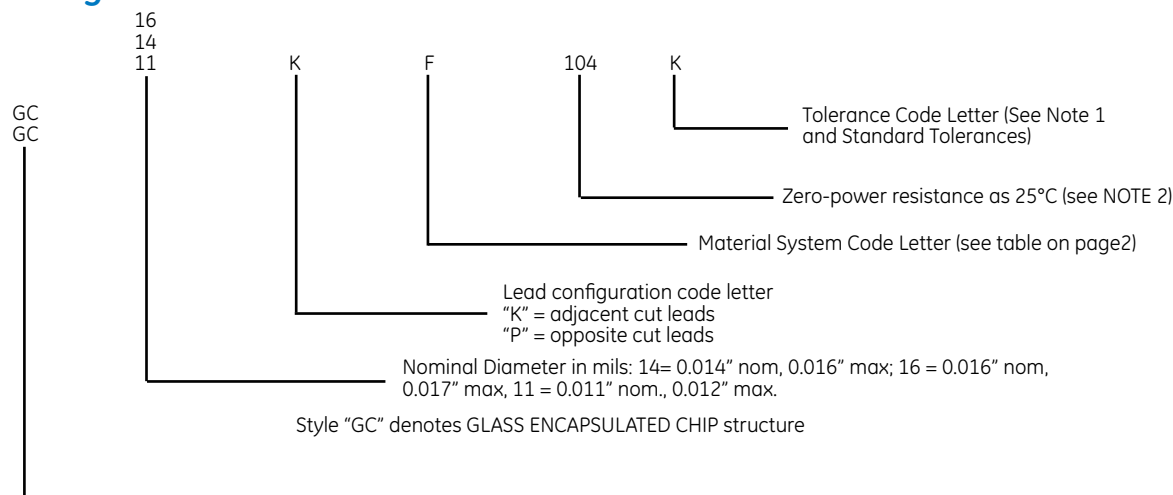
Tolerance Code Letter	G	J	K	L	M	N	S
±% Tolerance at 25 °C	2	5	10	15	20	25	Non-standard — consult factory

Resistance vs. Temperature Curves for GC14/16/11 Devices

BETA 0/50 RATIO 0/50	2859 5.05	3103 5.80	3494 7.24	3844 8.83	3953 9.38	4111 10.27	4193 10.76	4316 11.53
BETA 25/85 RATIO 25/85	2916 5.15	3174 5.95	3588 7.51	3918 9.04	4036 9.66	4220 10.71	4344 11.49	4478 12.38
BETA 0/70 RATIO 0/70	2876 8.56	3124 10.31	3522 13.87	3866 17.95	3977 19.50	4143 22.07	4236 23.69	4364 26.03
BETA 25/100 RATIO 25/100	2924 7.18	3182 8.54	3601 11.33	3930 14.15	4050 15.34	4239 17.42	4371 19.04	4506 20.86
BETA 25/125 RATIO 25/125	2935 11.85	3192 14.71	3620 21.10	3948 27.82	4072 30.88	4268 36.43	4410 41.05	4548 46.11
BETA 37.8/104.4 RATIO 37.8/104.4	2938 5.30	3197 6.14	3624 7.83	3949 9.42	4074 10.11	4269 11.29	4413 12.25	4551 13.25
R-vs-T Curve Material System: Temperature °C	GC1 A	GC2 A	GC3 A	GC4 F	GC9 B	GC6 G	GC10 D	GC11 D
0	2.38510	2.56365	2.88332	3.22243	3.32800	3.48195	3.55040	3.68144
5	1.98328	2.10061	2.30467	2.51276	2.57760	2.67266	2.71710	2.79650
10	1.65828	1.73088	1.85378	1.97488	2.01213	2.06756	2.09459	2.14001
15	1.39393	1.43403	1.50024	1.56297	1.58255	1.61148	1.62611	1.64935
20	1.17774	1.19442	1.22134	1.24597	1.25367	1.26507	1.27101	1.28000
25	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
30	0.85313	0.84143	0.82333	0.80780	0.80294	0.79573	0.79177	0.78631
35	0.73117	0.71145	0.68151	0.65660	0.64879	0.63723	0.63075	0.62214
40	0.62941	0.60439	0.56706	0.53689	0.52743	0.51343	0.50545	0.49523
45	0.54411	0.51579	0.47419	0.44153	0.43127	0.41612	0.40736	0.39650
50	0.47230	0.44211	0.39846	0.36510	0.35462	0.33917	0.33011	0.31925
55	0.41159	0.38059	0.33639	0.30349	0.29316	0.27795	0.26894	0.25845
60	0.36004	0.32897	0.28528	0.25356	0.24360	0.22898	0.22023	0.21033
65	0.31609	0.28549	0.24299	0.21288	0.20343	0.18959	0.18124	0.17204
70	0.27849	0.24872	0.20784	0.17957	0.17069	0.15774	0.14987	0.14142
75	0.24620	0.21749	0.17850	0.15215	0.14387	0.13186	0.12450	0.11679
80	0.21836	0.19086	0.15391	0.12948	0.12181	0.11072	0.10389	0.09690
85	0.19428	0.16808	0.13320	0.11064	0.10356	0.09337	0.08707	0.08076
90	0.17338	0.14852	0.11571	0.09493	0.08841	0.07907	0.07328	0.06759
95	0.15518	0.13165	0.10087	0.08175	0.07578	0.06723	0.06192	0.05681
100	0.13928	0.11707	0.08824	0.07069	0.06519	0.05739	0.05252	0.04793
105	0.12536	0.10442	0.07744	0.06133	0.05630	0.04918	0.04472	0.04061
110	0.11312	0.09341	0.06818	0.05340	0.04878	0.04229	0.03822	0.03453
115	0.10234	0.08380	0.06022	0.04665	0.04242	0.03649	0.03278	0.02947
120	0.09281	0.07538	0.05334	0.04088	0.03700	0.03160	0.02821	0.02523
125	0.08437	0.06798	0.04739	0.03594	0.03238	0.02745	0.02436	0.02169
130	0.07687	0.06147	0.04222	0.03169	0.02843	0.02393	0.02110	0.01870
135	0.07019	0.05572	0.03771	0.02803	0.02503	0.02092	0.01834	0.01617
140	0.06423	0.05063	0.03377	0.02486	0.02210	0.01834	0.01598	0.01403
145	0.05890	0.04611	0.03033	0.02210	0.01957	0.01612	0.01397	0.01221
150	0.05412	0.04209	0.02730	0.01971	0.01737	0.01422	0.01225	0.01066
155		0.03850	0.02463	0.01762	0.01546	0.01257	0.01076	0.00933
160		0.03529	0.02227	0.01579	0.01380	0.01114	0.00949	0.00819
165	Please	0.03241	0.02018	0.01418	0.01234	0.00990	0.00838	0.00721
170	inquire	0.02983	0.01833	0.01277	0.01107	0.00882	0.00743	0.00636
175	for	0.02750	0.01669	0.01152	0.00994	0.00788	0.00659	0.00563
180	details	0.02541	0.01522	0.01042	0.00896	0.00705	0.00587	0.00499

R-vs-T Curve Material System: Temperature °C	GC1 A	GC2 A	GC3 A	GC4 F	GC9 B	GC6 G	GC10 D	GC11 D
185		0.02351	0.01391	0.00944	0.00808	0.00633	0.00524	0.00443
190		0.02180	0.01273	0.00857	0.00731	0.00569	0.00468	0.00395
195		0.02024	0.01168	0.00780	0.00663	0.00512	0.00420	0.00353
200		0.01882	0.01073	0.00711	0.00602	0.00463	0.00377	0.00316
205	Please enquire for details.		0.00988	0.00649	0.00548	0.00418	0.00339	0.00283
210			0.00911	0.00594	0.00499	0.00379	0.00306	0.00254
215			0.00841	0.00544	0.00456	0.00344	0.00276	0.00229
220			0.00778	0.00500	0.00417	0.00313	0.00250	0.00207
225			0.00721	0.00460	0.00382	0.00285	0.00227	0.00187
230			0.00669	0.00423	0.00351	0.00261	0.00206	0.00169
235			0.00622	0.00390	0.00322	0.00238	0.00187	0.00153
240			0.00579	0.00361	0.00297	0.00218	0.00171	0.00139
245			0.00539	0.00334	0.00274	0.00200	0.00156	0.00127
250			0.00503	0.00309	0.00253	0.00184	0.00143	0.00116

Coding



NOTE 1: Special tolerances are available on request. Consult factory for special resistance tolerances, non-standard resistances and/or non-standard temperatures.

NOTE 2: The zero-power resistance at 25°C, expressed in ohms, is identified by a three-digit code number. The first two digits represent significant figures, and the last digit specifies the number of zeros to follow. Example: 51 kOhms = "513". The standard resistance values are from the 24-value series decade as specified in Military Standard MS90178.

1.0 / 1.1 / 1.2 / 1.3 / 1.5 / 1.6 / 1.8 / 2.0 / 2.2 / 2.4 / 2.7 / 3.0
3.3 / 3.6 / 3.9 / 4.3 / 4.7 / 5.1 / 5.6 / 6.2 / 6.8 / 7.5 / 8.2 / 9.1

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