NTC THERMISTORS:
STANDARD DISCS – D158 MATERIAL

DATA:

Resistance range @ 25°C .....20K Ω to 300K Ω†
Temperature coefficient of
resistance (α) @ 25°C.....–4.96%/°C
Operating temperature range .....–50°C to +150°C

Temp. Range (°C)	Resistance Ratio (Nom.)	Beta (°K)
0/50	12.1	4404
37.8/104.4	13.8	4627
25/125	49.4	4630

†This resistance range is based on the diameter/thickness combinations shown in the table below. Other R_o @ 25°C values are available in this material system.

CALCULATIONS:

To calculate $\frac{R_T}{R_{25}}$ at temperatures other than those listed in the table, use the following equation:

$$\frac{R_T}{R_{25}} = e^{(\text{Ln } A - C \text{ Ln } T + \frac{D}{T})}$$

T = temperature in °K and equation constants are as follows:

Temperature Range (°C)	Ln A	C	D
–50 to 0	40.50185	8.28684	1998.92
0 to 50	25.81320	6.06368	2604.41
50 to 100	11.35433	3.92833	3289.67
100 to 150	6.09208	3.16947	3576.35

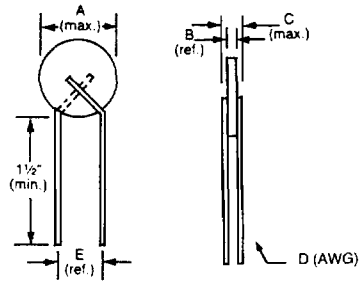
To calculate the actual thermistor temperature as a function of the thermistor resistance, use the following equation:

$$T = \frac{1}{a + b(\text{Ln}\frac{R_T}{R_{25}}) + c(\text{Ln}\frac{R_T}{R_{25}})^2 + d(\text{Ln}\frac{R_T}{R_{25}})^3}$$

T = temperature in °K and equation constants are as follows:

$\frac{R_T}{R_{25}}$ Range	a	b	c	d
3.783 to 104.10	3.355980E-03	2.238104E-04	4.130221E-06	–3.560322E-08
.3122 to 3.783	3.354016E-03	2.266351E-04	3.134588E-06	–5.433609E-08
.0453 to .3122	3.352695E-03	2.241266E-04	1.944971E-06	–6.287106E-08
.0098 to .0453	3.347139E-03	2.206036E-04	1.352375E-06	–7.384770E-08

DIMENSIONS:



Temperature (°F)	Temperature (°C)	$\frac{R_T}{R_{25}}$	Temperature Coef. Of Resistance (α) (%/°C)
–58	–50	104.10	–7.73
–49	–45	71.21	–7.47
–40	–40	49.31	–7.23
–31	**–35**	**34.55**	**–7.00**
–22	**–30**	**24.47**	**–6.79**
–13	**–25**	**17.52**	**–6.59**
– 4	–20	12.66	–6.39
5	–15	9.242	–6.21
14	–10	6.805	–6.04
23	**– 5**	**5.053**	**–5.87**
32	**0**	**3.783**	**–5.71**
41	**5**	**2.855**	**–5.55**
50	10	2.172	–5.39
59	15	1.665	–5.24
68	20	1.286	–5.10
77	**25**	**1.000**	**–4.96**
86	**30**	**0.7828**	**–4.83**
95	**35**	**0.6166**	**–4.71**
104	40	0.4887	–4.59
113	45	0.3895	–4.48
122	50	0.3122	–4.37
131	**55**	**0.2517**	**–4.25**
140	**60**	**0.2041**	**–4.14**
149	**65**	**0.1663**	**–4.04**
158	70	0.1363	–3.94
167	75	0.1122	–3.84
176	80	0.09278	–3.75
185	**85**	**0.07709**	**–3.66**
194	**90**	**0.06433**	**–3.58**
203	**95**	**0.05391**	**–3.49**
212	100	0.04535	–3.42
221	105	0.03831	–3.34
230	110	0.03250	–3.27
239	**115**	**0.02764**	**–3.20**
248	**120**	**0.02361**	**–3.13**
257	**125**	**0.02023**	**–3.06**
266	130	0.01740	–3.00
275	135	0.01501	–2.94
284	140	0.01299	–2.88
293	**145**	**0.01127**	**–2.82**
302	**150**	**0.009811**	**–2.77**

Type Number	R° @ 25°C Ω	Tolerance* ±%	A (in.)	A (mm)	B (in.)	B (mm)	C (in.)	C (mm)	D (AWG)	E (in.)	E (mm)	δ (mW/°C)	τ (Sec.)
RL1007-162.3K-138-D1	**300K**	10	**0.110**	2.79	**0.070**	1.78	**0.150**	3.81	26	**0.100**	2.54	2.8	10
RL1006-135.2K-138-D1	**250K**				**0.060**	1.52	**0.140**	3.56				2.7	10
RL1005-108.2K-138-D1	**200K**				**0.050**	1.27	**0.130**	3.30				2.5	10
RL1004-81.1K-138-D1	**150K**				**0.040**	1.02	**0.120**	3.05				2.5	9
RL2010-54.1K-138-D1	**100K**	10	**0.220**	5.59	**0.100**	2.54	**0.190**	4.83	24	**0.156**	3.96	7.0	35
RL2007-40.6K-138-D1	**75K**				**0.070**	1.78	**0.160**	4.06				6.5	30
RL2005-27K-138-D1	**50K**				**0.050**	1.27	**0.140**	3.56				6.5	20
RL2004-21.6K-138-D1	**40K**				**0.040**	1.02	**0.130**	3.30				6.5	20
RL3006-16.2K-138-D1	**30K**	10	**0.320**	8.13	**0.060**	1.52	**0.150**	3.81	24	**0.250**	6.35	7.2	35
RL3004-10.8K-138-D1	**20K**				**0.040**	1.02	**0.130**	3.30				7.0	35

*Consult Keystone Thermometrics Engineering Department for information on other tolerances or tolerances at temperatures other than 25°C.

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