

SENSISTORS®

Positive – Temperature – Coefficient Silicon Thermistors

TG1/8
TM1/8
RTH42
RTH22
TM1/4

FEATURES

- Qualified to MIL-T-23648A
- TG1/8 – Similar to RTH42 (MIL-T-23648A/19)
- TM1/8 – Similar to RTH22 (MIL-T-23648A/9)
- Large Positive Temperature Coefficient $\approx 0.7\%/^{\circ}\text{C}$
- Wide Resistance Value Ranges Available in 5% or 10% Tolerances

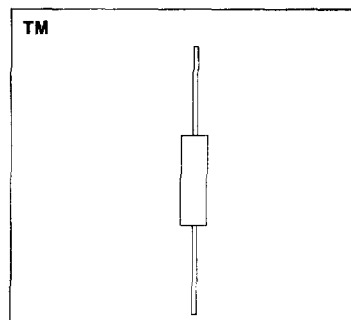
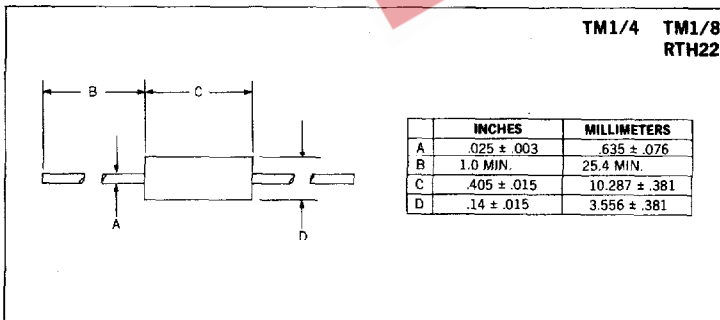
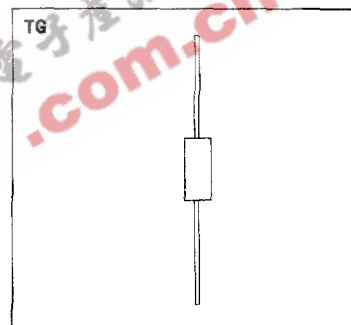
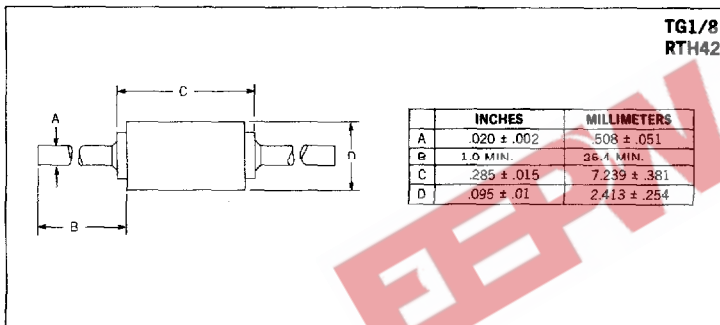
DESCRIPTION

The TG1/8 thermistor is encapsulated in a glass, hermetically sealed package. The TM1/8 and TM1/4 thermistors are encapsulated in a molded package. Both have hot solder-dipped leads and are used in temperature sensing and compensation circuits. They meet or exceed all of the requirements of MIL-T-23648A.

ABSOLUTE MAXIMUM RATINGS

	TG1/8 RTH42	TM1/8 RTH22	TM1/4
Power Dissipation at (or below) 25°C Free-Air Temperature (See Figure 1)	300mW	500mW	500mW
Power Dissipation at (or below) 100°C Free Air Temperature (See Figure 1)	125mW	250mW	250mW
Operating Free-Air Temperature Range	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
Storage Temperature Range	-65°C to +150°C	-65°C to +150°C	-65°C to +150°C

MECHANICAL SPECIFICATIONS



Microsemi Corp.
Watertown
The diode experts

TG1/8 TM1/8 TM1/4
RTH42 RTH22

ELECTRICAL AND THERMAL CHARACTERISTICS

TG1/8 TM1/8 TM1/4
RTH42 RTH22

Zero Power Resistance Ratio (R_{25°C}/R_{125°C}) 0.55 ± 15%
 Thermal Time Constant - Typical 35s
 Thermal Time Constant - Maximum 60s

NOMINAL RESISTANCE AT VARIOUS TEMPERATURES

Standard Zero Power Resistance Value (Ω) at 25°C Free-Air Temperature	Type No.					Resistance (Ω) of Sensistor® at Temperature other than 25°C						
						-55°	-15°C	0°C	50°C	75°	100°C	125°C
10	TG1/8	RTH42	TM1/8	RTH22	TM1/4	6.15	7.9	8.63	11.6	13.5	15.45	17.5
12	TG1/8	RTH42	TM1/8	RTH22	TM1/4	7.38	9.48	10.356	13.92	16.2	18.54	21
15	TG1/8	RTH42	TM1/8	RTH22	TM1/4	9.225	11.85	12.945	17.4	20.25	23.175	26.25
18	TG1/8	RTH42	TM1/8	RTH22	TM1/4	11.07	14.22	15.534	20.88	24.3	27.81	31.5
22	TG1/8	RTH42	TM1/8	RTH22	TM1/4	13.53	17.38	18.986	25.52	29.7	33.99	38.5
27	TG1/8	RTH42	TM1/8	RTH22	TM1/4	16.605	21.33	23.301	31.32	36.45	41.715	47.25
33	TG1/8	RTH42	TM1/8	RTH22	TM1/4	20.295	26.07	28.479	38.28	44.55	50.985	57.75
39	TG1/8	RTH42	TM1/8	RTH22	TM1/4	23.985	30.81	33.657	45.24	52.65	60.255	68.25
47	TG1/8	RTH42	TM1/8	RTH22	TM1/4	28.905	37.13	40.561	54.52	63.45	72.615	82.25
50	TG1/8	RTH42	TM1/8	RTH22	TM1/4	30.75	39.5	43.15	58	67.5	77.25	87.5
56	TG1/8	RTH42	TM1/8	RTH22	TM1/4	34.44	44.24	48.328	64.96	75.6	86.52	98
68	TG1/8	RTH42	TM1/8	RTH22	TM1/4	41.82	53.72	58.684	78.88	91.8	105.06	119
82	TG1/8	RTH42	TM1/8	RTH22	TM1/4	47.724	63.14	69.454	95.94	112.34	129.888	147.6
100	TG1/8	RTH42	TM1/8	RTH22	TM1/4	58.2	77	84.7	117	137	158.4	180
120	TG1/8	RTH42	TM1/8	RTH22	TM1/4	69.84	92.4	101.64	140.4	164.4	190.08	216
150	TG1/8	RTH42	TM1/8	RTH22	TM1/4	87.3	115.5	127.05	175.5	205.5	237.6	270
180	TG1/8	RTH42	TM1/8	RTH22	TM1/4	100.8	135.9	150.84	212.4	252	292.14	334.8
220	TG1/8	RTH42	TM1/8	RTH22	TM1/4	123.2	166.1	184.36	259.6	308	357.06	409.2
270	TG1/8	RTH42	TM1/8	RTH22	TM1/4	151.2	203.85	226.26	318.6	378	438.21	502.2
330	TG1/8	RTH42	TM1/8	RTH22	TM1/4	184.8	249.15	276.54	389.4	462	535.59	613.8
390	TG1/8	RTH42	TM1/8	RTH22	TM1/4	218.4	294.45	326.82	460.2	546	632.97	725.4
470	TG1/8	RTH42	TM1/8	RTH22	TM1/4	263.2	354.85	393.86	554.2	658	762.81	874.2
500	TG1/8	RTH42	TM1/8	RTH22	TM1/4	280	377.5	419	590	700	811.5	930
560	TG1/8	RTH42	TM1/8	RTH22	TM1/4	308	414.4	467.6	672	795.2	927.36	1,075.2
680	TG1/8	RTH42	TM1/8	RTH22	TM1/4	374	503.2	567.8	816	965.6	1,126.08	1,305.6

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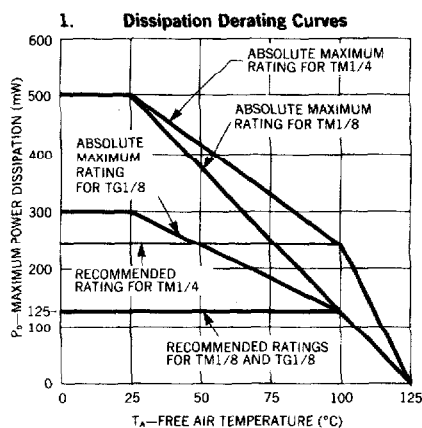
NOMINAL RESISTANCE AT VARIOUS TEMPERATURES

Standard Zero Power Resistance Value (Ω) at 25°C Free-Air Temperature	Type No.					Resistance (Ω) of Sensistor® at Temperature other than 25°C						
						-55°	-15°C	0°C	50°C	75°	100°C	125°C
820	TG1/8	RTH42	TM1/8	RTH22	TM1/4	451	606.8	684.7	984	1,164.4	1,357.92	1,574.4
1,000	TG1/8	RTH42	TM1/8	RTH22	TM1/4	550	740	835	1,200	1,420	1,656	1,920
1,200	TG1/8	RTH42	TM1/8	RTH22	TM1/4	660	888	1,002	1,440	1,704	1,987.2	2,304
1,500	TG1/8	RTH42	—	—	TM1/4	772.5	1,095	1,237.5	1,845	2,175	2,505	2,940
	—	—	TM1/8	RTH22	TM1/4	825	1,110	1,252.5	1,800	2,130	2,484	2,880
1,800	TG1/8	RTH42	TM1/8	RTH22	TM1/4	927	1,314	1,485	2,214	2,610	3,006	3,528
2,200	TG1/8	RTH42	TM1/8	RTH22	TM1/4	1,133	1,606	1,815	2,706	3,190	3,674	4,312
2,700	TG1/8	RTH42	TM1/8	RTH22	TM1/4	1,390.5	1,971	2,275	3,321	3,915	4,509	5,292
3,300	TG1/8	—	TM1/8	RTH22	TM1/4	1,699.5	2,409	2,722.5	4,059	4,785	5,511	6,468
3,900	TG1/8	—	TM1/8	RTH22	TM1/4	2,008.5	2,847	3,217.5	4,797	5,655	6,513	7,644
4,700	TG1/8	—	TM1/8	RTH22	TM1/4	2,420.5	3,431	3,877.5	5,781	6,815	7,849	9,212
5,000	TG1/8	—	TM1/8	RTH22	TM1/4	2,575	3,650	4,125	6,150	7,250	8,350	9,800
5,600	TG1/8	—	TM1/8	RTH22	TM1/4	2,884	4,088	4,620	6,888	8,120	9,352	10,976
6,800	TG1/8	—	—	—	TM1/4	3,468	4,964	5,610	8,092	9,520	10,948	12,444
	—	—	TM1/8	RTH22	TM1/4	3,502	4,964	5,610	8,364	9,860	11,356	13,328
8,200	TG1/8	—	TM1/8	RTH22	TM1/4	4,182	5,986	6,765	9,758	11,480	13,202	15,006
	—	—	TM1/8	RTH22	TM1/4	4,223	5,986	6,765	10,086	11,890	13,694	16,072
10,000	TG1/8	—	TM1/8	RTH22	TM1/4	5,100	7,300	8,250	11,900	14,000	16,100	18,300
	—	—	TM1/8	RTH22	TM1/4	5,150	7,300	8,250	12,300	14,500	16,700	19,600
12,000	—	—	TM1/8	—	—	6,180	8,760	9,900	14,760	17,400	20,040	23,520
15,000	—	—	TM1/8	—	—	7,215	10,680	12,210	18,150	21,450	20,050	28,500
18,000	—	—	TM1/8	—	—	8,658	12,816	14,652	21,780	25,740	30,060	34,200
22,000	—	—	TM1/8	—	—	10,582	15,664	17,908	26,620	31,460	36,740	41,800
27,000	—	—	TM1/8	—	—	12,987	19,224	21,978	32,670	38,610	45,090	51,300
33,000	—	—	TM1/8	—	—	15,873	23,496	26,862	39,930	47,190	55,110	62,700
39,000	—	—	TM1/8	—	—	18,759	27,768	31,746	47,190	55,770	65,130	74,100

DEVICE TOLERANCE

The actual resistance of the thermistor at T/°C may vary from the calculated value by an amount not exceeding the tolerances tabulated below.

Temperature	±5%	±10%
(°C)	(J)	(K)
-55	±15%	±20%
-15	±9%	±14%
0	±7%	±12%
25	±5%	±10%
50	±7%	±12%
75	±9%	±14%
100	±12%	±17%
125	±15%	±20%

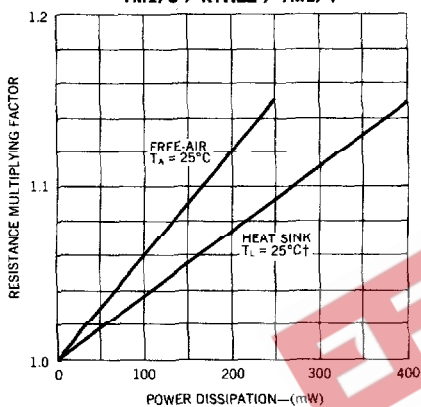


TYPICAL CHARACTERISTICS WITH POWER APPLIED

To determine resistance value with power applied, obtain a multiplying factor from the applicable curve below. The free-air curve is for the condition of heat removal by free-air convection only. The heat sink curve is for the maximum cooling rate condition of a heat sink strap, with leads attached to an infinite heat sink. Actual conditions encountered will be between these two extremes. After selecting an applicable multiplying factor from figure 2 or 3, multiply this by the 25°C zero power resistance. This product is then corrected for the actual ambient temperature by use of the appropriate temperature column in the Nominal Resistance at Various Temperatures table.

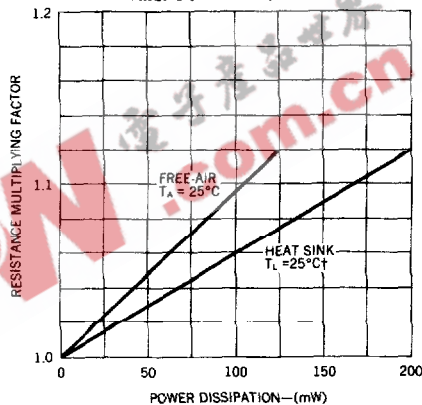


2. Percent Resistance Change vs Power Dissipation TM1/8 / RTH22 / TM1/4



† T_L is lead temperature measured 1/16 inch from the body.

3. Percent Resistance Change vs Power Dissipation TM1/8 / RTH42 / TM1/4



† T_L is lead temperature measured 1/16 inch from the body.

PART NUMBER DESIGNATION (EXAMPLE)

