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 ≙ 0.7%/°C
- Wide Resistance Value Ranges Available in 5% or 10% Tolerances

DESCRIPTION

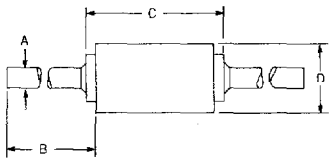
The TG1/8 thermistor is encapsulated in a glass, hermetically sealed package. The TM1/8 and TM1/4 thermistors are encapsulated in a molded package. Both have hot solder-dipped leads and are used in temperature sensing and compensation circuits. They meet or exceed all of the requirements of MIL-T-23648A.

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
Operating Free-Air Temperature Range	-55°C to +125°C		-55°C to +125°C
Storage Temperature Range	-65°C to +150°C		-65°C to +150°C

MECHANICAL SPECIFICATIONS

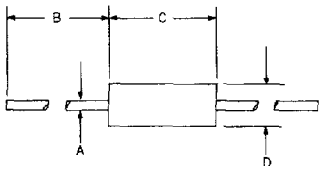
TG1/8 RTH42



	INCHES	MILLIMETERS
A	.020 ± .002	.508 ± .051
B	1.0 MIN.	25.4 MIN.
C	.285 ± .015	7.239 ± .381
D	.095 ± .01	2.413 ± .254

TG

TM1/4 TM1/8 RTH22



	INCHES	MILLIMETERS
A	.025 ± .003	.635 ± .076
B	1.0 MIN.	25.4 MIN.
C	.405 ± .015	10.287 ± .381
D	.14 ± .015	3.556 ± .381

TM

Microsemi Corp.
Watertown
The diode experts

ELECTRICAL AND THERMAL CHARACTERISTICS — **TG1/8 RTH42 TM1/8 RTH22 TM1/4**

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	2,27.5	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%

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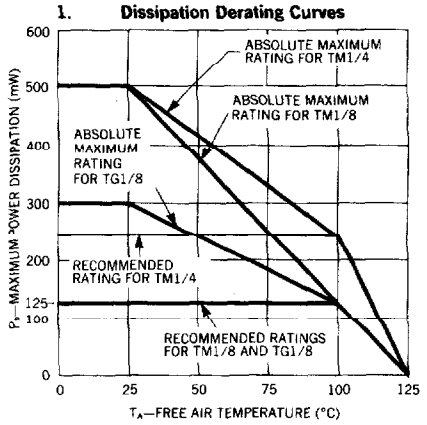
1. Dissipation Derating Curves



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.

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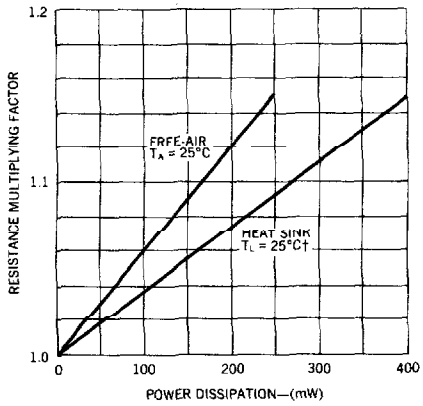
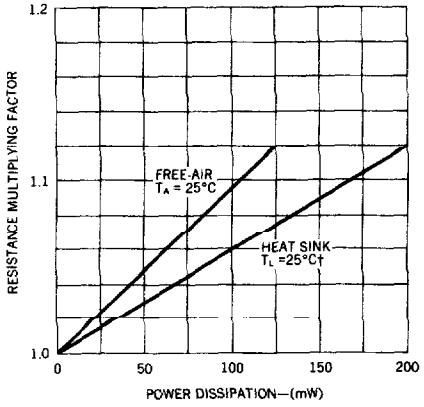
2. Percent Resistance Change vs Power Dissipation TM1/8 / RTH22 / TM1/4



†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)

TM1/8272K

TM 1/8 272 K

STYLE	WATTAGE	RESISTANCE VALUE CODE	TOLERANCE
TM	1/8	270 = 27Ω	J = 5%
TG	1/4	271 = 270Ω	K = 10%
RTH42 ES		272 = 2,700Ω	
RTH22 ES		273 = 27,000Ω	

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