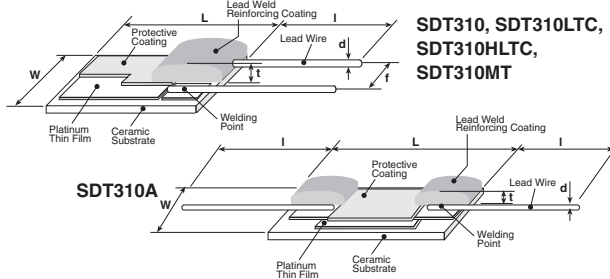


### features

- T.C.R. is in accordance with JIS-DIN standards
- The small package with a real ability of 1kΩ resistance
- Thermal time constant is improved with the small package
- Products with lead-free terminations meet EU RoHS requirements. Pb located in glass material, electrode and resistor element is exempt per Annex 1, exemption 5 of EU directive 2005/95/EC

circuit protection

### dimensions and construction



Type	Dimensions inches (mm)						
	L	W	t	f	d (Nom.)	l	
SDT310AP	.118±.010 (3.0±0.25)	.031±.008 (0.8±0.2)	.047 max. (1.2 max.)	.043±.010 (1.1±0.25)	.008±.002 (ø0.2±0.05)	.315±.079 (8±2)	
SDT310LTC		.079±.010 (2.0±0.25)				.394 <sup>+0.179</sup> <sub>-.079</sub> (10 <sup>+3</sup> <sub>-2</sub> )	
SDT310P						.315±.079 (8±2)	
SDT310MTM	.197±.004 (5.0±0.10)	.047±.004 (1.2±0.10)	.043 max. (1.1 max.)	.012±.004 (0.3±0.10)	.008±.002 (ø0.2±0.05)	.315±.079 (8±2)	
SDT310HLTC (1KΩ)						.079±.004 (2.0±0.10)	.394 <sup>+0.179</sup> <sub>-.079</sub> (10 <sup>+3</sup> <sub>-2</sub> )
SDT310HLTC (100Ω)							

### ordering information

New Part #	SDT310	2B	LT	C	100	B	3850
Type	Size Code	Temperature Range	Terminal Surface Temperature	Nominal Resistance	Class	T.C.R. (x 10 <sup>-6</sup> /K)	
	Nil: Standard A N	LT: -55°C~+155°C Nil: -55°C~+400°C MT: -55°C~+650°C	C: SnCu (SDT310LT, SDT310HLT) P: Pt clad wire (SDT310, SDT310A) M: Ptlr (SDT310MT)	100: 100Ω 500: 500Ω 1K: 1kΩ	A: ±(0.15+0.002[t]) B: ±(0.3+0.005[t]) C: ±(1.0+0.01[t]) K: ±10%(SDT310A)		

### applications and ratings

Part Designation	Resistance Range @ 0°C	Class: Tolerance of Measuring Temperature*	Resistance Tolerance	Thermal Time Constant***	Thermal Dissipation Constant****	T.C.R. (ppm/°C)**	Specified Current****	Operating Temperature Range
SDT310LTC	100Ω, 500Ω, 1kΩ	A: ±(0.15+0.002 [t])	±0.059%	7 seconds in stationary air	0.9mW/°C	3850	1mA max.	-55°C to +155°C
		B: ±(0.3+0.005 [t])	±0.12%					
		C: ±(1.0+0.01 [t])	±0.39%					
SDT310P	100Ω, 500Ω, 1kΩ	A: ±(0.15+0.002 [t])	±0.059%	7 seconds in stationary air	0.9mW/°C	3850	1mA max.	-55°C to +400°C
		B: ±(0.3+0.005 [t])	±0.12%					
		C: ±(1.0+0.01 [t])	±0.39%					
SDT310MTM	100Ω	B: ±(0.3+0.005 [t])	±0.12%	7 seconds in stationary air	0.9mW/°C	3850	1mA max.	-55°C to +650°C
		C: ±(1.0+0.01 [t])	±0.39%					
SDT310HLTC	1kΩ	A: ±(0.15+0.002 [t])	±0.059%	2.7 seconds in stationary air	1.0mW/°C	3850	1mA max.	-55°C to +155°C
		B: ±(0.3+0.005 [t])	±0.12%					
		C: ±(1.0+0.01 [t])	±0.39%					
NEW SDT310AP	10Ω	—	±10%	6 seconds in stationary air	1.0mW/°C	3850	1mA max.	-55°C to +400°C

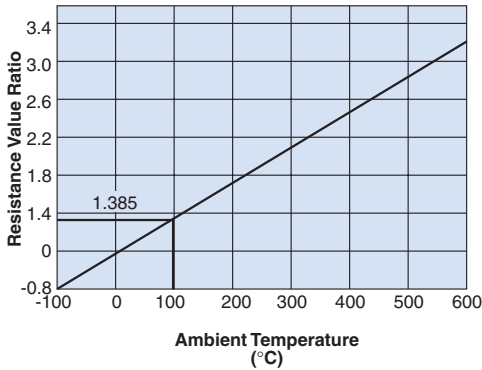
\* [t] is a measuring temperature indicated at °C that is not related to marking + or - \*\* T.C.R. measuring temperature: 0°C/+100°C.  
 \*\*\* Thermal time constant and thermal dissipation constant are values measured in stationary air and are typical values, which are values of elements and vary with connecting or fixing methods.  
 \*\*\*\* Specified current is a current value that is used at reliability test under the condition of self heat-generation that can be disregarded.  
 Recommended measuring currents are 1mA for 100Ω and 0.1mA for 500Ω or 1kΩ.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

1/06/09

### environmental applications

#### Temperature Characteristics



Approximate Expression for Resistance-Temperature Characteristics  
 -55°C~0°C :  $R_T = R_0 \{1 + C_1 T + C_2 T^2 + C_3 (T-100) T^3\}$   
 0°C~+650°C :  $R_T = R_0 (1 + C_1 T + C_2 T^2)$

$R_T$  : Resistance value at T°C  
 $R_0$  : Resistance value at 0°C  
 T : Ambient temperature(°C)  
 Constants  $C_1, C_2, C_3$ :  
 $C_1 = 3.9083 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$   
 $C_2 = -5.775 \times 10^{-7} \text{ } ^\circ\text{C}^{-2}$   
 $C_3 = -4.183 \times 10^{-12} \text{ } ^\circ\text{C}^{-4}$

#### Pt100 Resistance - Temperature Characteristic (JIS C1604<sup>1997</sup>) 100 at 0°C

Temperature (°C)	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-50	80.31	79.91	79.51	79.11	78.72	78.32	—	—	—	—
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62
-10	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55
0	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48
	0	1	2	3	4	5	6	7	8	9
0	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51
10	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29
30	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15
40	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01
50	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52
80	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13
100	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91
110	142.29	142.67	143.05	143.43	143.80	144.18	144.56	144.94	145.31	145.69
120	146.07	146.44	146.82	147.20	147.57	147.95	148.33	148.70	149.08	149.46
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.20	156.58	156.95
150	157.33	157.70	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68
160	161.05	161.43	161.80	162.17	162.54	162.91	163.29	163.66	164.03	164.40
170	164.77	165.14	165.51	165.89	166.26	166.63	167.00	167.37	167.74	168.11
180	168.48	168.85	169.22	169.59	169.96	170.33	170.70	171.07	171.43	171.80
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47
230	186.84	187.20	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11
240	190.47	190.84	191.20	191.56	191.92	192.29	192.65	193.01	193.37	193.74
250	194.10	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55
280	204.90	205.26	205.62	205.98	206.34	206.70	207.05	207.41	207.77	208.13
290	208.48	208.84	209.20	209.56	209.91	210.27	210.63	210.98	211.34	211.70
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.90	215.25
310	215.61	215.96	216.32	216.67	217.03	217.38	217.74	218.09	218.44	218.80
320	219.15	219.51	219.86	220.21	220.57	220.92	221.27	221.63	221.98	222.33
330	222.68	223.04	223.39	223.74	224.09	224.45	224.80	225.15	225.50	225.85
340	226.21	226.56	226.91	227.26	227.61	227.96	228.31	228.66	229.01	229.37
350	229.72	230.07	230.42	230.77	231.12	231.47	231.82	232.17	232.52	232.87
360	233.21	233.56	233.91	234.26	234.61	234.96	235.31	235.66	236.00	236.35
370	236.70	237.05	237.40	237.74	238.09	238.44	238.79	239.13	239.48	239.83
380	240.18	240.52	240.87	241.22	241.56	241.91	242.26	242.60	242.95	243.29
390	243.64	243.99	244.33	244.68	245.02	245.37	245.71	246.06	246.40	246.75
400	247.09	247.44	247.78	248.13	248.47	248.81	249.16	249.50	249.85	250.19
410	250.53	250.88	251.22	251.56	251.91	252.25	252.59	252.93	253.28	253.62
420	253.96	254.30	254.65	254.99	255.33	255.67	256.01	256.35	256.70	257.04
430	257.38	257.72	258.06	258.40	258.74	259.08	259.42	259.76	260.10	260.44
440	260.78	261.12	261.46	261.80	262.14	262.48	262.82	263.16	263.50	263.84

Note: Desired temperature values are obtained by adding temperatures in the vertical and horizontal axes. When calculating a resistance value of 105°C, read the value in the column where 100°C in the vertical axis and 5°C in the horizontal axis cross. The value will be 140.40Ω. The value for 500Ω at 0°C will be the value obtained by multiplying the resistance value in this table by 5. Similarly, the value for 1KΩ at 0°C will be the value obtained by multiplying the resistance value by 10.

### environmental applications (continued)

#### Pt100 Resistance - Temperature Characteristic (JIS C1604<sup>-1997</sup>) 100 at 0°C

Temperature (°C)	0	1	2	3	4	5	6	7	8	9
450	264.18	264.52	264.86	265.20	265.53	265.87	266.21	266.55	266.89	267.22
460	267.56	267.90	268.24	268.57	268.91	269.25	269.59	269.92	270.26	270.60
470	270.93	271.27	271.61	271.94	272.28	272.61	272.95	273.29	273.62	273.96
480	274.29	274.63	274.96	275.30	275.63	275.97	276.30	276.64	276.97	277.31
490	277.64	277.98	278.31	278.64	278.98	279.31	279.64	279.98	280.31	280.64
500	280.98	281.31	281.64	281.98	282.31	282.64	282.97	283.31	283.64	283.97
510	284.30	284.63	284.97	285.30	285.63	285.96	286.29	286.62	286.95	287.29
520	287.62	287.95	288.28	288.61	288.94	289.27	289.60	289.93	290.26	290.59
530	290.92	291.25	291.58	291.91	292.24	292.56	292.89	293.22	293.55	293.88
540	294.21	294.54	294.86	295.19	295.52	295.85	296.18	296.50	296.83	297.16
550	297.49	297.81	298.14	298.47	298.80	299.12	299.45	299.78	300.10	300.43
560	300.75	301.08	301.41	301.73	302.06	302.38	302.71	303.03	303.36	303.69
570	304.01	304.34	304.66	304.98	305.31	305.63	305.96	306.28	306.61	306.93
580	307.25	307.58	307.90	308.23	308.55	308.87	309.20	309.52	309.84	310.16
590	310.49	310.81	311.13	311.45	311.78	312.10	312.42	312.74	313.06	313.39
600	313.71	314.03	314.35	314.67	314.99	315.31	315.64	315.96	316.28	316.60
610	316.92	317.24	317.56	317.88	318.20	318.52	318.84	319.16	319.48	319.80
620	320.12	320.43	320.75	321.07	321.39	321.71	322.03	322.35	322.67	322.98
630	323.30	323.62	323.94	324.26	324.57	324.89	325.21	325.53	325.84	326.16
640	326.48	326.79	327.11	327.43	327.74	328.06	328.38	328.69	329.01	329.32
650	329.64	329.96	330.27	330.59	330.90	331.22	331.53	331.85	332.16	332.48

Note: Desired temperature values are obtained by adding temperatures in the vertical and horizontal axes. When calculating a resistance value of 105°C, read the value in the column where 100°C in the vertical axis and 5°C in the horizontal axis cross. The value will be 140.40Ω. The value for 500Ω at 0°C will be the value obtained by multiplying the resistance value in this table by 5. Similarly, the value for 1KΩ at 0°C will be the value obtained by multiplying the resistance value by 10.

### Performance Characteristics

Parameter	Requirement Δ R		Test Method
	Limit	Typical	
Resistance	Within specified tolerance	—	0°C
T.C.R.	Within specified T.C.R.	—	0°C/ +100°C
Insulation Resistance	100MΩ or more	—	d.c. 100V
Dielectric Withstanding Voltage	±0.12%	±0.010%	a.c. 100V, 60 seconds - 70 seconds
Resistance to Solder Heat	±0.5%	±0.014%	350°C for 3.5 seconds
Rapid Change of Temperature	±0.12%	-0.026%	-55°C (30 minutes)/ +25°C (2 - 3 minutes)/ +155°C (30 minutes)/ +25°C (2 - 3 minutes), 10 cycles (SDT310LTC, SDT310HLTC); -55°C (30 minutes)/ +25°C (2 - 3 minutes)/ +400°C (30 minutes)/ +25°C (2 - 3 minutes), 10 cycles (SDT310P, SDT310A); +25°C (30 minutes)/ +650°C (30 minutes) 10 cycles (SDT310MTM)
Moisture Resistance	±0.5%	-0.004%	60°C ± 2°C, 90 - 95% RH, 1000 hours, 1mA, 1.5 hr ON, 0.5 hr OFF cycle
Normal Temperature Load Life	±0.5%	-0.017%	20°C ± 10°C, 1000 hours, 1mA continuous turning on electricity
High Temperature Load Life	±0.5%	-0.022%	155°C ± 2°C (SDT310LTC, SDT310HLTC), 400°C ± 8°C (SDT310P, SDT310AP), 1000 hours, 650°C ± 13°C (SDT310MTM), 250 hours, 1mA continuous turning on electricity
High Temperature Exposure	±0.12%, ±0.5% (SDT310MTM)	-0.027%, -0.060% (SDT310MTM)	+155°C (SDT310LTC, SDT310HLTC), +400°C (SDT310P, SDT310AP), +650°C (SDT310MTM), 250 hours
Low Temperature Exposure	±0.12%	-0.036%	-55°C, 250 hours