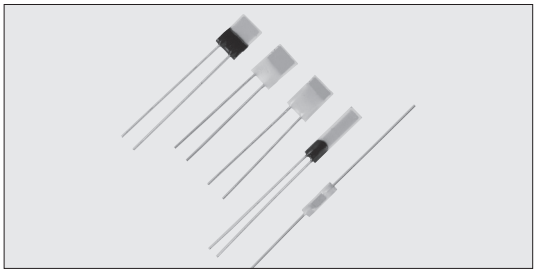
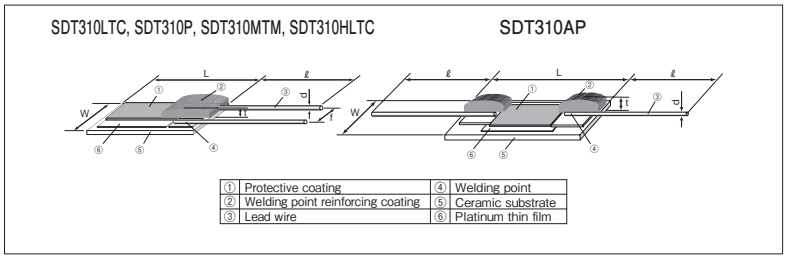
EU RoHS

SDT310 Small Type Platinum Thin Film Thermal Sensors



■Construction



■Features

- T.C.R. is equivalent to JIS・IEC standards.
- The small package with a real ability of 1kΩ resistance.
- Thermal time constant is improved with the small package.
- Products meet EU-RoHS requirements. EU-RoHS regulation is not intended for Pb-glass contained in glass.

■Applications

- Cold Point compensation and temperature detection probe for thermocouple temperature controllers.
- Hot wires and temperature compensation of anemometers.
- Temperature compensation and revision for RF circuit of telecommunication equipment.

■Reference Standards

IEC 60751[-1995] JIS C 1604[-1997]

■Dimensions

Type	Dimensions (mm)						Weight (g) (1000pcs)
	W	L	t max.	f	d±0.05	ℓ	
SDT310LTC	2.0±0.25	3.0±0.25	1.2	1.1±0.25	0.2	10^{+5}_{-2}	18.5
SDT310P						8±2	24.5
SDT310MTM							25.4
SDT310HLTC	1.2±0.10	5.0±0.10	1.1	0.3±0.1		10^{+5}_{-2}	17.4
SDT310AP	0.8±0.2	3.0±0.25	1.2	–		8±2	13.1

■Type Designation

Example

SDT310		LT	C	100	A	3850
Product Code	Style	Operating Temperature Range	Terminal Surface Material	Nominal Resistance	Class or Resistance Tol.	T.C.R. (×10⁻⁶/K)
	Nil : Standard H : H style A : A style	LT:−55℃~+155℃ Nil:−55℃~+400℃ MT:−55℃~+650℃	C:SnCu (SDT310LT / SDT310HLT) P:Pt clad (SDT310・310A) M:Ptlr (SDT310MT)	10:10Ω (SDT310AP) 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)	

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.

■Ratings

Type	Resistance Range (Ω at 0℃)	Tolerance Class Tolerance (℃)	Resistance Tolerance (%)	T.C.R.※1 (×10⁻⁶/K)	Thermal Time※2 constant (s)	Thermal Dissipation※2 constant (mW/℃)	Specified※3 Current (mA) max.	Operating Temperature Range (℃)
SDT310LTC	100 500, 1k	A:±(0.15+0.002|t|)	±0.059	3850	7.0	0.9	10Ω, 100Ω : 1 500Ω, 1kΩ : 0.1	−55~+155
		B:±(0.3 +0.005|t|)	±0.12					
		C:±(1.0 +0.01|t|)	±0.39					
SDT310P	100 500, 1k	A:±(0.15+0.002|t|)	±0.059					−55~+400
		B:±(0.3 +0.005|t|)	±0.12					
		C:±(1.0 +0.01|t|)	±0.39					
SDT310MTM	100	B:±(0.3 +0.005|t|)	±0.12					−55~+650
		C:±(1.0 +0.01|t|)	±0.39					
SDT310HLTC	1k	A:±(0.15+0.002|t|)	±0.059		2.8	1.0		−55~+155
		B:±(0.3 +0.005|t|)	±0.12					
		C:±(1.0 +0.01|t|)	±0.39					
SDT310AP	10	–	±10	3850±2%	6	1.0		−55~+400

※1 T.C.R. Mesuring Temperature : 0℃/+100℃
※2 Thermal time constant and dissipation constant are values measured in stationary air and are typical values, which are values of elements and vary with connecting or fixing methods.
※3 The electricity which it is charged with in the element is moved to the range that rise in temperature due to a self-heat generation can be ignored.. Recommended measuring currents are 1mA for 100Ω and 0.1mA for 500Ω or 1kΩ. SDT310AP can be used as hot-film sensor. Maximum specified current is 100mA when using under self-heating condition.

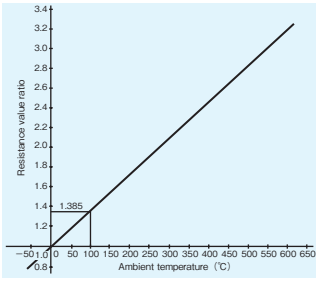
■Precautions for Use

- It is difficult to solder SDT310P, SDT310MTM and SDT310AP because of using heat-resistant leads. Make use of welding to connect the leads wire.
- When an operating current is specified current, calculate a rise in temperature by self-heating to confirm an error.
- If SDT310 series is used by being molded or placed in a metal protection tube filled with resin, the resistance value may occasionally vary slightly depending on the resin used.

■Performance

Test Items	Performance Requirements ΔR±(%+0.05Ω)		Test Methods
	Limit	Typical	
Resistance	Within specified tolerance	—	0℃
T.C.R.	Within specified T.C.R.	—	0℃/+100℃
Insulation resistance	100MΩ or more	—	d.c.100V
Dielectric withstanding voltage	0.12	0.010	a.c.100V 60s~70s
Resistance to soldering heat (SDT310LTC)	0.5	0.014	350℃、3.5s
Rapid change of temperature	0.12	−0.026	−55℃ (30min)/+25℃ (2~3min)/+155℃ (30min)/+25℃ (2~3min) 10 cycles (SDT310LTC・SDT310HLTC) −55℃ (30min)/+25℃ (2~3min)/+400℃ (30min)/+25℃ (2~3min) 10 cycles (SDT310P・SDT310A) +25℃ (30min)/+650℃ (30min) 10 cycles (SDT310MTM)
Moisture resistance	0.5	−0.004	60℃±2℃、90%~95%RH、1000h、1mA 1.5h ON/0.5h OFF cycle
Normal temperature load life	0.5	−0.017	20℃±10℃、1000h 1mA Continuous turning on electricity
High temperature load life	0.5	−0.022	155℃±2℃(SDT310LTC・SDT310HLTC)、400℃±8℃(SDT310P・SDT310AP)、1000h、650℃±13℃(SDT310MTM)、250h 1mA Continuous turning on electricity
High temperature exposure	0.12 0.5 (SDT310MTM)	−0.027 −0.060 (SDT310MTM)	+155℃(SDT310LTC・SDT310HLTC)、+400℃(SDT310P・SDT310AP)、+650℃(SDT310MTM)、250h
Low temperature exposure	0.12	−0.036	−55℃、250h

■Temperature Characteristics



Approximate Expression for Resistance-Temperature Characteristics

−55℃~0℃ $:R_T=R_0\{1+C_1T+C_2T^2+C_3(T-100)T^3\}$

0℃~+650℃ $:R_T=R_0(1+C_1T+C_2T^2)$

R_T : Resistance value at T℃

R_0 : Resistance value at 0℃

T : Ambient temperature (℃)

Constants C_1, C_2, C_3 : $C_1=3.9083\times10^{-3}℃^{-1}$

$C_2=-5.775\times10^{-7}℃^{-2}$

$C_3=-4.183\times10^{-12}℃^{-4}$

■Pt100 Resistance-Temperature Characteristic (JIS C1604-1997)

100Ω at 0℃

Temperature (℃)	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	229.02	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
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	—	—	—	—	—	—	—	—	—

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