

Approval Sheet

Manufacturer:

深圳市科蓬达电子有限公司

Customer:

CAT (HK) Limited

Approved By:	Checked By:	Prepared By :

Approved By:	Examined By:	Tested By :

Company Stamp	
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Company Stamp	
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Approval No. : _____

Product : NTC THERMISTOR

Part No : KPD05-223H3R

Specifications : R25 22,000 Ω $\pm$ 3 %

B25/85 3900 K $\pm$ 1 %

Date : 2018/01/05

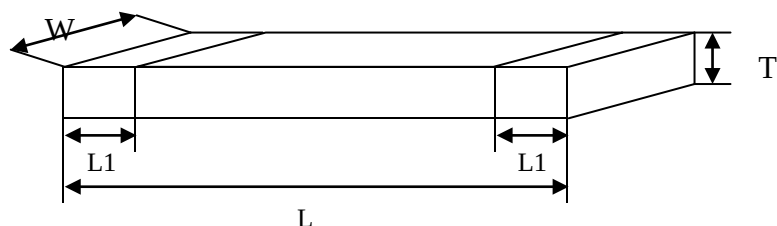
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Specification of SMD Chips Thermistor

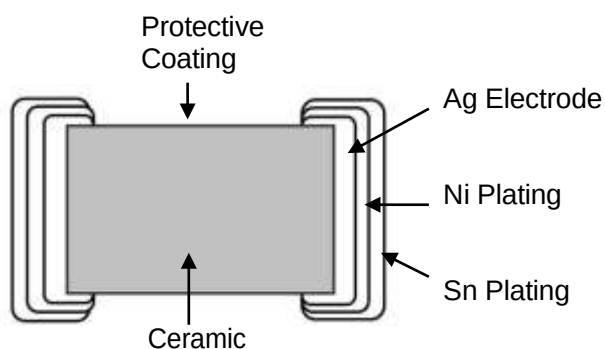
◆ **PART NO. :** KPD05-223H3R

◆ **CHIP DIMENSIONS :**



ITEM	L (mm)	W (mm)	T (mm)	L1 (mm)
0805 (2012)	2.00 ± 0.20	1.25 ± 0.20	0.90 ± 0.30	0.20 ~ 0.60

◆ **CHIP STRUCTURE**

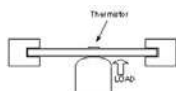
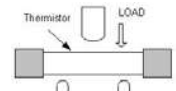
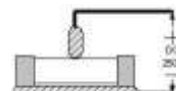


◆ **ELECTRICAL CHARACTERISTICS**

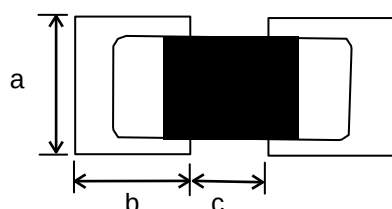
Style	Symbol	Condition	Specification
Resistance at Ta	R ₂₅	Ta = 25 °C	22 K Ω ± 3 %
B Constant	B	25 °C / 85 °C	3900 K ± 1 %
Thermal Time Constant	T	Ta = 25 °C	Approx. 7.5 seconds
Thermal Dissipation Constant	C	Ta = 25 °C	Approx. 4 mW/°C
Maximum Power Rating*	P _{max}	Ta = 25 °C → 125 °C	400 mW
Operating Temp. Range	--	--	- 40 °C ~ 125 °C

*Maximum Power Rating = Thermal Dissipation Constant × (Max. Operating Temp. (125 °C) – 25 °C)

◆ RELIABILITY TEST

Performance	Standard	Test Method	$\Delta R_{25} / R_{25}$
Life	MIL-STD-202F Method 108A	70 °C, Load Power, 1000 hours.	Max.± 3 %
Humidity	MIL-STD-202F Method 103B	Temperature : 40 °C, Humidity: 95 % RH Load Power, 1000 hours.	Max.± 3 %
Thermal Shock	MIL-STD-202F Method 107	- 40 °C to 125 °C (30 min) , 10 times.	Max.± 3 %
High Temperature storage	IEC 68-2-2	125 °C, 1000 hours.	Max. ± 3 %
Solderability	MIL-STD-202F Method 208	Soldering 235 °C for 2 seconds.	Min. 95 % coverage
Resistance to Soldering Heat	MIL-R-55342D Para 4.7.7	Soldering 260 °C for 10 seconds.	Max.± 3 %
Bending Strength	JIS C 5202 6.1.4	Pressurizing rod at distance 1 mm for 5 seconds. 	No visible damage
Resistance to flexure of Substrate	JIS C 5202 6.2.1	Pressurizing force shall be over 3 Kg . 	Min.3 Kg
Insulation Resistance	MIL-STD-202F Method 302	DC 250 V For 10 seconds. 	Min.1000 MΩ
Dielectric Withstand Voltage	MIL-STD-202F Method 301		Not Short

◆ RECOMMENDED LAND DIMENSIONS

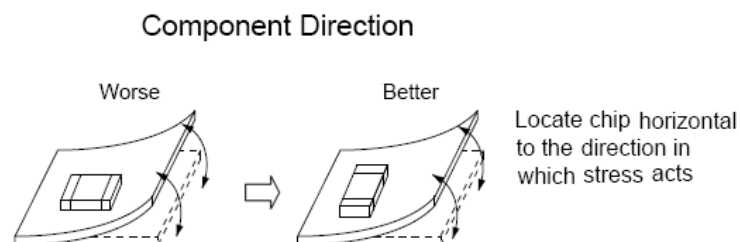


Unit : mm

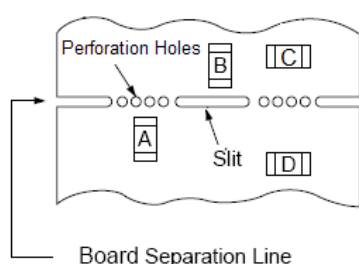
Type	a	b	c
0402 (1005)	0.6 ~ 0.7	0.8 ~ 0.9	0.4 ~ 0.5
0603 (1608)	0.9 ~ 1.0	1.0 ~ 1.1	0.6 ~ 0.7
0805 (2012)	1.4 ~ 1.5	1.2 ~ 1.3	0.7 ~ 0.8
1206 (3216)	1.7 ~ 1.8	1.5 ~1.6	1.3 ~ 1.4

◆ MOUNTING POSITION

Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.

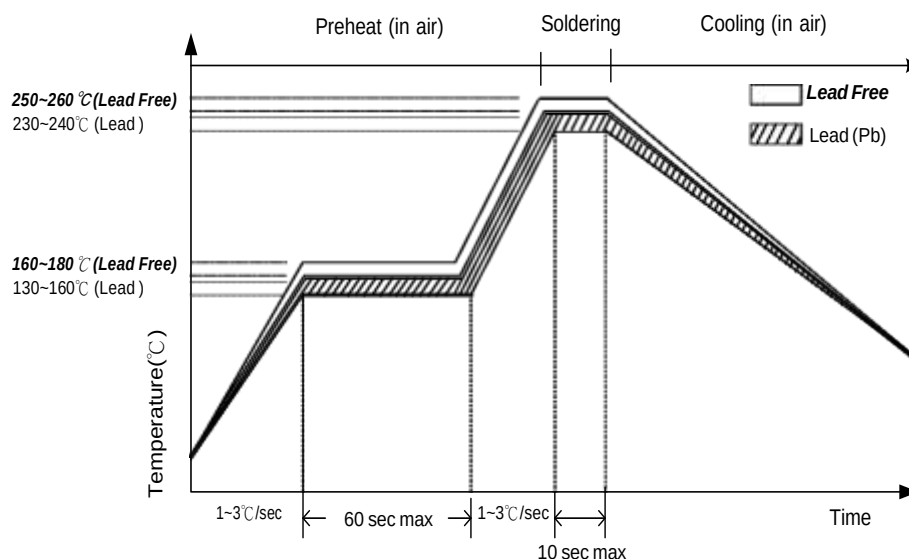


Chip Mounting Close to Board Separation Line



Put this product on the PC Board near the Slit, not near the Perforation Holes.
Keep this product on the PC Board away from the Separation Line.
Worst A-B-C-D Better

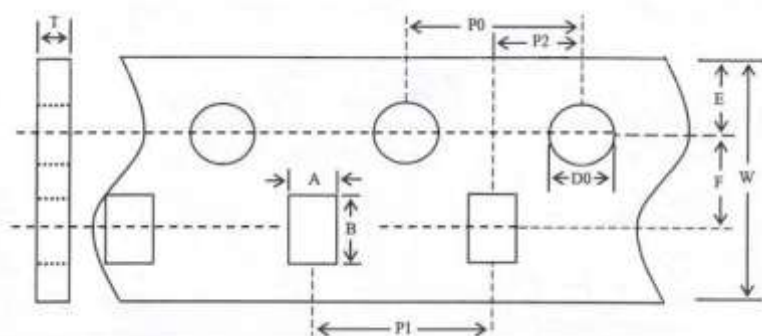
◆ REFLOW SOLDERING PROFILE



◆ HAND SOLDERING IRON

Item	Condition
Temperature of Soldering Iron-tip	360 °C Max.
Diameter of Soldering Iron-tip	ø 3 mm Max.
Soldering Iron Wattage	30 W Max.
Soldering Time	5 seconds Max.

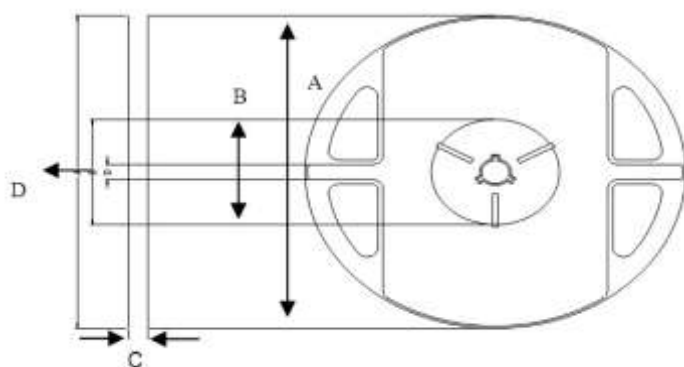
◆ TAPING DIMENSIONS



Unit : mm

Dimension	0402	0603	0805	1206
A	0.65 ± 0.03	1.08 ± 0.05	1.50 ± 0.10	2.00 ± 0.20
B	1.15 ± 0.03	1.85 ± 0.05	2.30 ± 0.10	3.57 ± 0.10
W	8.00 ± 0.05	8.00 ± 0.05	8.00 ± 0.20	8.00 ± 0.20
D0	1.50 ± 0.10	1.50 ± 0.10	1.50 ± 0.25	1.55 ± 0.25
E	1.75 ± 0.05	1.75 ± 0.05	1.75 ± 0.05	1.75 ± 0.10
F	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05
P0	2.00 ± 0.10	4.00 ± 0.05	4.00 ± 0.05	4.00 ± 0.10
P1	2.00 ± 0.05	4.00 ± 0.05	4.00 ± 0.05	4.00 ± 0.10
P2	2.00 ± 0.05	2.00 ± 0.05	2.00 ± 0.05	2.00 ± 0.10
T	1.10 Max.	1.10 Max.	1.10 Max.	1.10 Max.

◆ REEL DIMENSIONS



Unit : mm

Item	A	B	C	D
Dimension	178.0 ± 1.0	60.0 ± 1.0	9.0 ± 0.1	13.0 ± 0.1

Item	0402	0603	0805	1206
Qty. / Reel	10000 pcs	4000 pcs	4000 pcs	3000 pcs

◆ STORAGE CONDITIONS

1. Storage Temperature : - 10 °C ~ + 40 °C.
2. Relative humidity : 30 ~ 75 % RH.
3. Thermistor must be kept away from sunshine and stored in a non-corrosive atmosphere.
4. Period of Storage : 1 year.

◆ ORDERING INFORMATION

KPD 05 - 223 H 3R
 ① ② ③ ④ ⑤

1. KPD SMD Thermistor. (TF - Lead Free ; TH - Lead (Pb))
2. Dimension : 02 (0402) , 03 (0603) , 05 (0805) , 06 (1206) .
3. Resistance at 25 °C : 223 = $22 \times 10^3 = 22,000 (\Omega)$.
4. Tolerance of R : F:±1% ; G:±2% ; H:±3% ; J:±5% ; K:±10%.
5. B value : 3 R = 3435 (3000 + 900)

1: 1000	C: 101~150	I: 401~450	O: 701~750
2: 2000	D: 151~200	J: 451~500	P: 751~800
3: 3000	E: 201~250	K: 501~550	Q: 801~850
4: 4000	F: 251~300	L: 551~600	R: 851~900
A: 0~50	G: 301~350	M: 601~650	S: 901~950
B: 51~100	H: 351~400	N: 651~700	T: 951~999

Resistance-Temperature CharacteristicsPart No. : KPD05-223H3R

R25 :	22,000	Ω	±	3%
B25/85 :	3900	K	±	1%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
-40	671817	717152	764857	-10.94	-6.32	6.65	-0.61	0.58
-39	603896	643954	686051	-10.59	-6.22	6.54	-0.62	0.59
-38	544705	580232	617519	-10.25	-6.12	6.43	-0.63	0.60
-37	492937	524558	557704	-9.93	-6.03	6.32	-0.64	0.61
-36	447502	475744	505312	-9.61	-5.94	6.22	-0.65	0.62
-35	407492	432799	459263	-9.31	-5.85	6.11	-0.66	0.63
-34	372144	394893	418656	-9.02	-5.76	6.02	-0.67	0.64
-33	340816	361330	382733	-8.74	-5.68	5.92	-0.68	0.65
-32	312967	331519	350854	-8.48	-5.60	5.83	-0.69	0.66
-31	288137	304962	322479	-8.22	-5.52	5.74	-0.70	0.67
-30	265936	281236	297150	-7.98	-5.44	5.66	-0.71	0.68
-29	246030	259981	274475	-7.74	-5.37	5.58	-0.72	0.69
-28	228134	240886	254122	-7.52	-5.29	5.49	-0.73	0.70
-27	212003	223688	235805	-7.30	-5.22	5.42	-0.74	0.72
-26	197427	208159	219276	-7.09	-5.16	5.34	-0.75	0.73
-25	184224	194102	204326	-6.89	-5.09	5.27	-0.76	0.74
-24	172235	181347	190769	-6.70	-5.02	5.20	-0.78	0.75
-23	161324	169747	178448	-6.52	-4.96	5.13	-0.79	0.76
-22	151372	159172	167224	-6.34	-4.90	5.06	-0.80	0.77
-21	142275	149513	156978	-6.18	-4.84	4.99	-0.81	0.78
-20	133941	140669	147603	-6.02	-4.78	4.93	-0.82	0.79
-19	126291	132557	139008	-5.86	-4.73	4.87	-0.83	0.81
-18	119256	125099	131111	-5.72	-4.67	4.81	-0.84	0.82
-17	112771	118231	123843	-5.58	-4.62	4.75	-0.85	0.83
-16	106785	111892	117139	-5.44	-4.56	4.69	-0.86	0.84
-15	101247	106033	110945	-5.32	-4.51	4.63	-0.87	0.85
-14	96115	100605	105211	-5.19	-4.46	4.58	-0.88	0.86
-13	91351	95569	99893	-5.08	-4.41	4.52	-0.89	0.87
-12	86921	90889	94953	-4.97	-4.37	4.47	-0.90	0.88
-11	82794	86532	90357	-4.86	-4.32	4.42	-0.91	0.89
-10	78944	82468	86072	-4.76	-4.27	4.37	-0.92	0.90
-9	75347	78673	82073	-4.66	-4.23	4.32	-0.93	0.91
-8	71980	75123	78333	-4.57	-4.18	4.27	-0.93	0.92
-7	68824	71797	74831	-4.49	-4.14	4.23	-0.94	0.92
-6	65862	68676	71546	-4.40	-4.10	4.18	-0.95	0.93
-5	63077	65744	68462	-4.32	-4.06	4.13	-0.96	0.94
-4	60456	62985	65561	-4.25	-4.01	4.09	-0.96	0.94
-3	57985	60385	62828	-4.18	-3.97	4.05	-0.97	0.95
-2	55653	57933	60251	-4.11	-3.93	4.00	-0.97	0.96
-1	53449	55616	57818	-4.05	-3.90	3.96	-0.98	0.96
0	51364	53424	55517	-3.99	-3.86	3.92	-0.98	0.97

Resistance-Temperature CharacteristicsPart No. : KPD05-223H3R

R25 :	22,000	Ω	±	3%
B25/85 :	3900	K	±	1%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
1	49388	51349	53339	-3.93	-3.82	3.88	-0.99	0.97
2	47513	49381	51275	-3.88	-3.78	3.84	-0.99	0.97
3	45734	47512	49316	-3.83	-3.74	3.80	-0.99	0.98
4	44041	45737	47455	-3.79	-3.71	3.76	-0.99	0.98
5	42431	44048	45685	-3.74	-3.67	3.72	-0.99	0.98
6	40896	42439	44001	-3.70	-3.64	3.68	-0.99	0.98
7	39433	40906	42395	-3.66	-3.60	3.64	-0.99	0.98
8	38036	39442	40863	-3.63	-3.56	3.60	-0.99	0.98
9	36701	38044	39401	-3.59	-3.53	3.57	-0.99	0.98
10	35424	36707	38003	-3.56	-3.50	3.53	-0.99	0.98
11	34202	35428	36665	-3.53	-3.46	3.49	-0.99	0.98
12	33031	34203	35385	-3.51	-3.43	3.46	-0.99	0.98
13	31908	33029	34158	-3.48	-3.39	3.42	-0.98	0.97
14	30830	31902	32981	-3.46	-3.36	3.38	-0.98	0.97
15	29795	30820	31852	-3.44	-3.33	3.35	-0.97	0.97
16	28800	29781	30768	-3.42	-3.29	3.31	-0.97	0.96
17	27844	28782	29725	-3.40	-3.26	3.28	-0.96	0.96
18	26923	27821	28723	-3.39	-3.23	3.24	-0.96	0.95
19	26036	26895	27758	-3.38	-3.19	3.21	-0.95	0.95
20	25182	26004	26829	-3.36	-3.16	3.17	-0.94	0.94
21	24358	25145	25934	-3.35	-3.13	3.14	-0.94	0.93
22	23563	24316	25071	-3.35	-3.10	3.10	-0.93	0.93
23	22796	23517	24239	-3.34	-3.06	3.07	-0.92	0.92
24	22056	22745	23435	-3.33	-3.03	3.03	-0.91	0.91
25	21340	22000	22660	-3.33	-3.00	3.00	-0.90	0.90
26	20635	21280	21926	-3.33	-3.03	3.03	-0.91	0.91
27	19953	20584	21216	-3.32	-3.06	3.07	-0.92	0.92
28	19294	19911	20529	-3.32	-3.10	3.10	-0.93	0.93
29	18657	19260	19864	-3.32	-3.13	3.14	-0.94	0.94
30	18041	18630	19221	-3.33	-3.16	3.17	-0.95	0.95
31	17445	18020	18598	-3.33	-3.19	3.21	-0.96	0.96
32	16868	17430	17995	-3.33	-3.23	3.24	-0.97	0.97
33	16309	16859	17411	-3.34	-3.26	3.27	-0.98	0.98
34	15768	16305	16844	-3.34	-3.29	3.31	-0.99	0.98
35	15245	15768	16296	-3.35	-3.32	3.34	-1.00	0.99
36	14737	15249	15764	-3.36	-3.35	3.38	-1.01	1.00
37	14245	14745	15248	-3.36	-3.39	3.41	-1.01	1.01
38	13769	14257	14748	-3.37	-3.42	3.45	-1.02	1.01
39	13307	13783	14263	-3.38	-3.45	3.48	-1.03	1.02
40	12860	13324	13793	-3.39	-3.49	3.52	-1.04	1.03
41	12426	12879	13337	-3.40	-3.52	3.55	-1.04	1.03

Resistance-Temperature Characteristics

Part No. : KPD05-223H3R

R25 :	22,000	Ω	±	3%
B25/85 :	3900	K	±	1%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
42	12006	12448	12895	-3.41	-3.55	3.59	-1.05	1.04
43	11598	12029	12465	-3.43	-3.58	3.62	-1.06	1.05
44	11203	11624	12049	-3.44	-3.62	3.66	-1.06	1.05
45	10820	11230	11645	-3.45	-3.65	3.69	-1.07	1.06
46	10449	10849	11253	-3.46	-3.68	3.73	-1.08	1.06
47	10089	10478	10873	-3.48	-3.72	3.77	-1.08	1.07
48	9740	10119	10504	-3.49	-3.75	3.80	-1.09	1.07
49	9402	9771	10147	-3.51	-3.78	3.84	-1.09	1.08
50	9074	9434	9800	-3.52	-3.82	3.88	-1.10	1.08
51	8756	9107	9463	-3.54	-3.85	3.91	-1.11	1.09
52	8448	8789	9136	-3.55	-3.89	3.95	-1.11	1.09
53	8149	8482	8820	-3.57	-3.92	3.99	-1.12	1.10
54	7860	8183	8513	-3.59	-3.95	4.02	-1.12	1.10
55	7579	7894	8215	-3.60	-3.99	4.06	-1.13	1.11
56	7308	7614	7926	-3.62	-4.02	4.10	-1.13	1.11
57	7045	7343	7646	-3.64	-4.06	4.14	-1.14	1.12
58	6790	7080	7375	-3.66	-4.09	4.17	-1.14	1.12
59	6543	6825	7112	-3.68	-4.13	4.21	-1.15	1.12
60	6304	6578	6857	-3.69	-4.16	4.25	-1.15	1.13
61	6072	6339	6611	-3.71	-4.20	4.29	-1.16	1.13
62	5848	6107	6371	-3.73	-4.24	4.33	-1.16	1.14
63	5632	5883	6140	-3.75	-4.27	4.37	-1.16	1.14
64	5422	5666	5915	-3.77	-4.31	4.41	-1.17	1.14
65	5219	5456	5698	-3.79	-4.34	4.45	-1.17	1.15
66	5022	5252	5488	-3.81	-4.38	4.49	-1.18	1.15
67	4832	5056	5285	-3.83	-4.42	4.53	-1.18	1.15
68	4649	4865	5088	-3.85	-4.45	4.57	-1.19	1.16
69	4471	4681	4897	-3.87	-4.49	4.61	-1.19	1.16
70	4300	4503	4713	-3.89	-4.53	4.65	-1.20	1.16
71	4134	4331	4534	-3.91	-4.56	4.69	-1.20	1.17
72	3973	4165	4362	-3.92	-4.60	4.73	-1.20	1.17
73	3819	4004	4195	-3.94	-4.64	4.77	-1.21	1.18
74	3669	3849	4034	-3.96	-4.68	4.81	-1.21	1.18
75	3525	3699	3879	-3.98	-4.71	4.85	-1.22	1.18
76	3385	3554	3728	-4.00	-4.75	4.89	-1.22	1.19
77	3251	3414	3583	-4.02	-4.79	4.94	-1.23	1.19
78	3121	3279	3443	-4.04	-4.83	4.98	-1.23	1.19
79	2996	3149	3307	-4.06	-4.87	5.02	-1.24	1.20
80	2875	3023	3176	-4.08	-4.91	5.06	-1.24	1.20
81	2759	2902	3050	-4.10	-4.95	5.11	-1.24	1.20
82	2646	2785	2929	-4.12	-4.98	5.15	-1.25	1.21

Resistance-Temperature CharacteristicsPart No. : KPD05-223H3R

R25 :	22,000	Ω	±	3%
B25/85 :	3900	K	±	1%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
83	2538	2672	2811	-4.14	-5.02	5.19	-1.25	1.21
84	2434	2564	2698	-4.16	-5.06	5.24	-1.26	1.22
85	2333	2459	2589	-4.18	-5.10	5.28	-1.26	1.22
86	2237	2358	2483	-4.20	-5.14	5.33	-1.27	1.22
87	2143	2261	2382	-4.22	-5.18	5.37	-1.27	1.23
88	2054	2167	2284	-4.24	-5.22	5.42	-1.28	1.23
89	1967	2077	2190	-4.26	-5.26	5.46	-1.28	1.23
90	1884	1990	2099	-4.28	-5.30	5.51	-1.29	1.24
91	1804	1906	2012	-4.30	-5.34	5.55	-1.29	1.24
92	1728	1826	1928	-4.32	-5.38	5.60	-1.30	1.25
93	1654	1748	1847	-4.34	-5.43	5.64	-1.30	1.25
94	1583	1674	1769	-4.36	-5.47	5.69	-1.31	1.25
95	1514	1603	1694	-4.38	-5.51	5.73	-1.31	1.26
96	1449	1534	1622	-4.40	-5.55	5.78	-1.31	1.26
97	1386	1468	1553	-4.41	-5.59	5.83	-1.32	1.27
98	1325	1404	1487	-4.43	-5.63	5.87	-1.32	1.27
99	1267	1343	1423	-4.45	-5.67	5.92	-1.33	1.27
100	1211	1284	1361	-4.47	-5.72	5.97	-1.33	1.28
101	1157	1228	1302	-4.49	-5.76	6.02	-1.34	1.28
102	1106	1174	1245	-4.51	-5.80	6.06	-1.35	1.29
103	1057	1122	1191	-4.53	-5.84	6.11	-1.35	1.29
104	1009	1073	1139	-4.54	-5.89	6.16	-1.36	1.30
105	964	1025	1088	-4.56	-5.93	6.21	-1.36	1.30
106	921	979	1040	-4.58	-5.97	6.26	-1.37	1.30
107	879	935	994	-4.60	-6.02	6.30	-1.37	1.31
108	839	893	950	-4.61	-6.06	6.35	-1.38	1.31
109	801	853	907	-4.63	-6.10	6.40	-1.38	1.32
110	764	814	867	-4.65	-6.15	6.45	-1.39	1.32
111	729	777	828	-4.67	-6.19	6.50	-1.39	1.33
112	695	742	790	-4.68	-6.23	6.55	-1.40	1.33
113	663	708	754	-4.70	-6.28	6.60	-1.40	1.34
114	632	675	720	-4.72	-6.32	6.65	-1.41	1.34
115	603	644	687	-4.73	-6.37	6.70	-1.42	1.35
116	575	614	656	-4.75	-6.41	6.75	-1.42	1.35
117	548	586	625	-4.76	-6.45	6.80	-1.43	1.35
118	522	558	597	-4.78	-6.50	6.85	-1.43	1.36
119	497	532	569	-4.80	-6.54	6.91	-1.44	1.36
120	474	507	543	-4.81	-6.59	6.96	-1.45	1.37
121	451	483	517	-4.83	-6.63	7.01	-1.45	1.37
122	430	461	493	-4.84	-6.68	7.06	-1.46	1.38
123	409	439	470	-4.86	-6.72	7.11	-1.46	1.38

Resistance-Temperature CharacteristicsPart No. : KPD05-223H3R

R25 :	22,000	Ω	±	3%
B25/85 :	3900	K	±	1%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
124	390	418	448	-4.87	-6.77	7.16	-1.47	1.39
125	371	398	427	-4.89	-6.81	7.22	-1.48	1.39