This version is stopped from 31.05.2021

MF72 power direct heat type negative temperature coefficient thermistor

KLS6-MF72

Specification

Customer name:

Part No: L-KLS6-MF72

Customer Signature	
Date	

Prepared	Checked	Approved	Date
伊 涛	许少永	席乐平	2017.06.08

KLS ELECTRONIC CO., LTD.
Add: NO. 8-1, RONGXIA RD. XIAPU SHANQIAN INDUSTRIAL ZONE BEILUN NINGBO ZHEJIANG 315807

Tel: +86-574-86828566 **Fax: +86-574-86824882**
E-Mail: sales@cnkls.com **Http:** www.cnkls.com

1、**Feature of Power Thermistor**

1.1 Appliaction

○Switching power-supply,switch power,ups power

○Electronic energy saving lamps electronic ballast and all kinds of electric heater

○All kinds of RT,display

○Bulb and other lighting lamps

1.2 Characteristic

○Small size,large power,strong capacity of suppression of inrush current

○Fast response

○Big material constant (B value), small residual resistance

○Long life and high reliability

○Complete series,wide applications

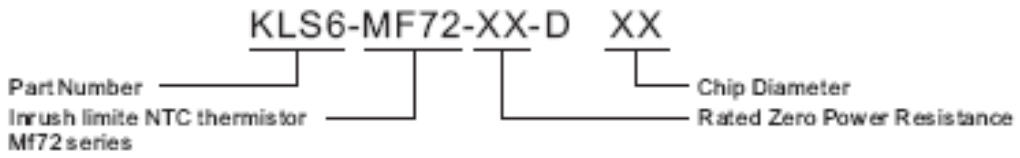
2、**Quality Certification**

2.1 Safety Approval Certificate:CQC 10001052520

2.2 Quality management system Certificates:

IS09001： 2015Certificates

3、**PART NUMBER**



4、**Technical parameters**

Part No	**R_{25}** （Ω）	**Max. steady State current (A)**	**Residual Resistance* (Ω)**	**Dissipation factor* （mw/℃）**	**Thermal time Constant* (s)**	**Operating Temperature (℃)**
5D5	5	1	0.35	6	20	-40-+150
10D5	10	0.7	0.77	6	20	
60D5	60	0.5	1.88	6	18	
200D5	200	0.1	18.70	6	18	
5D7	5	2	0.28	10	30	
8D7	8	1	0.54	9	28	
10D7	10	1	0.62	9	27	
12D7	12	1	0.82	9	27	
16D7	16	0.7	1.00	9	27	
22D7	22	0.6	1.11	9	27	
33D7	33	0.5	1.49	10	28	
200D7	200	0.2	11.65	11	28	
3D9	3	4	0.12	11	35	-40-+175
4D9	4	3	0.19	11	35	
5D9	5	3	0.21	11	34	
6D9	6	2	0.32	11	34	
8D9	8	2	0.40	11	32	
10D9	10	2	0.46	11	32	
12D9	12	1	0.66	11	32	

KLS ELECTRONIC CO., LTD.

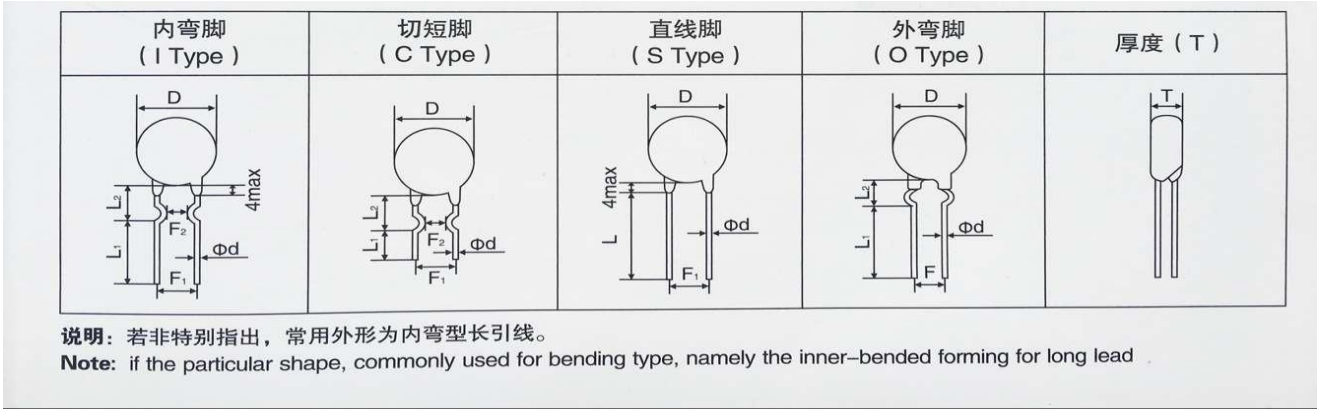
Part No	R_{25} (Ω)	Max. steady State current (A)	Residual Resistance* (Ω)	Dissipation factor* (mw/℃)	Thermal time Constant* (s)	Operating Temperature (℃)
16D9	16	1	0.80	11	31	
20D9	20	1	0.88	11	30	
22D9	22	1	0.95	11	30	
33D9	33	1	1.12	11	30	
50D9	50	1	1.25	11	30	
80D9	80	0.8	2.01	11	30	
120D9	120	0.8	3.02	11	30	
200D9	200	0.5	5.01	11	30	
2.5D11	2.5	5	0.10	13	43	
3D11	3	5	0.10	13	43	
4D11	4	4	0.15	13	44	
5D11	5	4	0.16	13	45	-40-+175
6D11	6	3	0.24	13	45	
8D11	8	3	0.25	14	47	
10D11	10	3	0.28	14	47	
12D11	12	2	0.46	14	48	
16D11	16	2	0.47	14	50	
20D11	20	2	0.51	15	52	
22D11	22	2	0.56	15	52	
30D11	30	1.5	0.67	15	52	
50D11	50	1.5	1.02	15	52	
60D11	60	1.5	1.22	15	52	
80D11	80	1.2	1.66	15	52	
1.3D13	1.3	7	0.06	13	60	
2.5D13	2.5	6	0.088	13	60	
3D13	3	6	0.092	14	60	
4D13	4	5	0.12	15	67	-40-+200
5D13	5	5	0.125	15	68	
6D13	6	4	0.17	15	65	

KLS ELECTRONIC CO., LTD.

Part No	R_{25} （Ω）	Max. steady State current (A)	Residual Resistance* (Ω)	Dissipation factor* （mw/℃）	Thermal time Constant* (s)	Operating Temperature (℃)
8D13	8	4	0.194	15	65	-40-+200
10D13	10	4	0.206	15	65	
12D13	12	3	0.316	16	65	
15D13	15	3	0.335	16	65	
20D13	20	3	0.372	16	65	
30D13	30	2.5	0.517	16	65	
47D13	47	2	0.81	17	65	
2.5D15	2.5	8	0.071	18	76	
3D15	3	7	0.075	18	76	
5D15	5	6	0.112	20	76	
6D15	6	5	0.155	20	80	
7D15	7	5	0.173	20	80	
8D15	8	5	0.178	20	80	
10D15	10	5	0.18	20	75	
12D15	12	4	0.25	20	75	
15D15	15	4	0.268	21	85	
20D15	20	4	0.288	17	86	
30D15	30	3.5	0.438	18	75	
47D15	47	3	0.68	21	86	
50D15	50	3	0.72	21	86	
1.3D20	1.3	9	0.037	24	113	
3D20	3	8	0.055	24	113	
5D20	5	7	0.087	23	112	
8D20	8	6	0.142	25	115	
10D20	10	6	0.162	24	113	
12D20	12	5	0.195	24	114	
16D20	16	5	0.212	25	113	

4.1、Common Parameters：

引线图

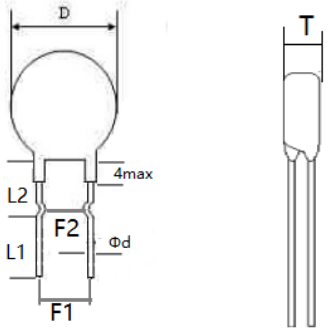


Product Dimension

Dim (mm) Sym / Part No	D max	T max	⌀d ±0.05	F1 ±1	F2 ±1.5	Straight Lead Wire	Bend straight wire lead	
						L min	L1±0.5	L2±2
KLS6-MF72-☐D-5	7	5	0.55	5	3	15	3.5-20	7or4
KLS6-MF72-☐D-7	9	5	0.55	5	3	15	3.5-20	7or4
KLS6-MF72-☐D-9	11	5.5	0.75/0.55	7.5/5	5/3	15	3.5-20	7or4
KLS6-MF72-☐D-11	11	4.2	0.75	7.5/5	5/3	15	3.5-20	7or4
KLS6-MF72-☐D-13	15.5	6	0.75	7.5	5	15	3.5-20	7or4
KLS6-MF72-☐D-15	17.5	6	0.75	10/7.5	5	15	3.5-20	7or4
KLS6-MF72-☐D-20	22.5	7	1.0	10/7.5	/	15	/	/

Note: ☐Rated zero-power resistance

(1) Lead the shape



(2) Product size

Part No.	D max	T max	⌀d±0.03mm	F1±1mm	F2±1.5mm	Lmin	L2±2mm
10D-11	11mm	4.2mm	0.75mm	7.5mm	5.0mm	20mm	4

(3) Materials

① 、Wrapper: Modified phenolic resin

② 、Down-lead: CP Wire

③ 、Coating color: Black

Marking		
NTC 10D-11	NTC	NTC thermistor
	10	Rated zero power resistance 10Ω
	D	Disk-Type
	11	Dia:12±1(mm)

4.2、Parameters of Technology:

① Zero Power Resistance at 25℃（Ω）：10±20%

② Thermal Time Constant (S)：47

③ Thermal Dissipation Constant（mW/℃）：14

④ Operating Temperature（℃）：-40 +175

⑤ Max Steady State Current (A)：3

⑥ Maximum allowable capacity value (240Vac) ：330μF

⑦ Insulation resistance: 1000 MΩ ohm, the terminal of the thermistor connected as an electrode, metal foil as another electrode, 100V ± 15V DC voltage is applied between the two electrodes measure the insulation resistance between the two electrodes, the voltage applied to the time of 1min, the insulation resistance of not less than 1000 MΩ;

⑧ High voltage terminal: thermistor connected as an electrode, metal foil as another electrode in two electrode applied between a frequency of 40Hz-60Hz, AC voltage and insulation voltage of 1.4 times the provisions (AC500V) for the duration of the peak voltage, 60s + 5S, the rate of voltage should be similar to the 100V / s thermistor applied gradually, there should be no breakdown or arcing.

⑨ B Value（K）：2800±10%

Using the following formula

$$B = \left[\left(T_a \times T_b \right) / \left(T_b - T_a \right) \right] \times \ln \left(R_a / R_b \right)$$

Or

$$B = 2.303 \times \left[\left(T_a \times T_b \right) / \left(T_b - T_a \right) \right] \times \log \left(R_a / R_b \right)$$

B-- Constant (unit K)

R_a-- Zero Power Resistance (Unit: Ω) in Temperature T_a (Unit: K)

R_b-- Zero Power Resistance (Unit: Ω) in Temperature T_b (Unit: K)

T_a=298.15K

T_b=358.15K

B value is the material coefficient or thermal index, B value is decided by the size of the material properties, allowing the + 5% tolerance range of B value, B value influence the size of the material properties; the B values are different, the residual resistance of different sizes, continuous working temperature rise is also different; the bigger the B value, the residual resistance is small when the temperature rise is small.

5、Principle of thermal resistor is chosen

5.1 Thermistor maximum operating current> loop operating current

5.2 Nominal resistance values of thermal resistance R≥1.414 * E / Im

E is the line voltage, Im a surge current. In general, the switching power supply, switching power supplies, uninterruptible power supplies, power inverter and other times operating current Im = 100For the filament heater circuit like Im = 30 times the operating current.

5.3 B The larger the value, the smaller the residual resistance, the smaller the temperature rise during operation.

5.4 Thermal time constant and dissipation factor as both mutually dependent relationship, not tosay that one or the greater the value, the better the smaller the better, but the product of the two greater the heat capacity of the thermistor greater, then resistance to surge current, the stronger

5.5 When the power supply circuit for the thermistor is mainly used to suppress largeinrush current at power-on, a large inrush current is the capacitor discharge, the filter to be installed in the tank circuit capacitance matching is a very critical condition to ensure that the thermistor circuit can play a role in security protection, so the powersupply design

requirements for manufacturers should also take full account of this factor.

5.6 Through the circuit maximum operating voltage and maximum starting current and other parameters can use the formula R = U / I calculated the resistance value range.

5.7 These principles may choose to lock the NTC thermistor corresponding model, if your company has special design needs with our technical department to discuss.

6、**Storage condition**

6.1 Storage environment conditions

Temperature	-10℃～+40℃
Humidity	≤70%RH
Term	≤6 months (First-in/ First-out)
Place	Do not exposing the components to the following conditions, otherwise, it may result in deterioration of characteristics 1. Corrosive gas or deoxidizing gas 2. Flammable and explosive gases 3. Oil, water and chemical liquid 4. Under the sunlight

6.2 **Do not apply the components under the following conditions, otherwise, it may result in deterioration of characteristics,destruction of components orin the worst case,to catching fire**

6.2.1 **Exceeding Imax**

6.2.2 **Exceeding rated temperature range**

6.2.3 **Inferior thermal dissipation， Due to badly inferior thermal dissipation, some part of the components body will become overheated and then be damaged**

7、 Properties of products

7.1 机械性能 Mechanical Characteristics

机械性能 MECHANICAL CHARACTERISTICS		
指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
可焊性 Solder-ability	浸润部分上锡均匀，上锡面积≥95% The terminals shall be uniformly tinned, and its area≥95%	将引出端沾助焊剂后，浸入到温度为240-245℃、深度为15mm 的锡槽中锡面距NTC 本体下端6mm 处，持续2-3秒。（参见IEC68-2-20 /GB2423.28 试验Ta） Dipping the NTC terminals to a depth of 15mm in a soldering bath of 240-245℃and to the place of 6mm far from NTC body for2-3s (See IEC68-2-20 /GB2423.28 Ta)
耐焊接热Resistance To Soldering Heat	无可见损伤 No visible mechanical damage. $\Delta R/R_N \leq 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	根据IEC68-2-20（GB2423 .28）试验Tb 进行试验。 采用焊槽法，将引出端沾助焊剂后，浸入到温度为265±5℃、深度为15mm 的锡槽中,锡面距NTC 本体下端6mm 处，维持10±1 秒. 在25±2℃条件下恢复4－5h 后，复测额定零功率电阻R_N'. Dipping the NTC terminals to a depth of 15mm in a soldering bath of 265±5℃and to the place for 6mm below from NTC body for 10±1s.After recovering4-5h under 25±2℃. The rated zero power resistance value R_N' shall be measured. (See IEC68-2-20 /GB2423.28 Tb)
引出端强度 Strength of lead terminal	无损坏 No break out $\Delta R/R_N \leq 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	根据IEC68-2-21（GB2423 .29）试验U 进行试验。 试验Ua：拉力10N，持续10 S； 试验Ub：弯曲90°，拉力5N，持续10 S； 扭转180°，拉力5N，持续10 S。 在25±2℃条件下恢复4～5 h 后，复测额定零功率电阻R_N' Fasten the body and apply a force gradually to each lead until 10N and then keep for 10sec, Hold body and apply a force to each lead until 90° slowly at 5N in the direction of lead axis and then keep for 10sec, and do this in the opposite direction repeat for other terminal. After recovering 4~5h under 25±2℃, the rated zero power resistance value R_N' shall be measured. (See IEC68-2-21/GB2423.29 Ua / Ub)

7.2 电气性能 **Electrical Characteristics**

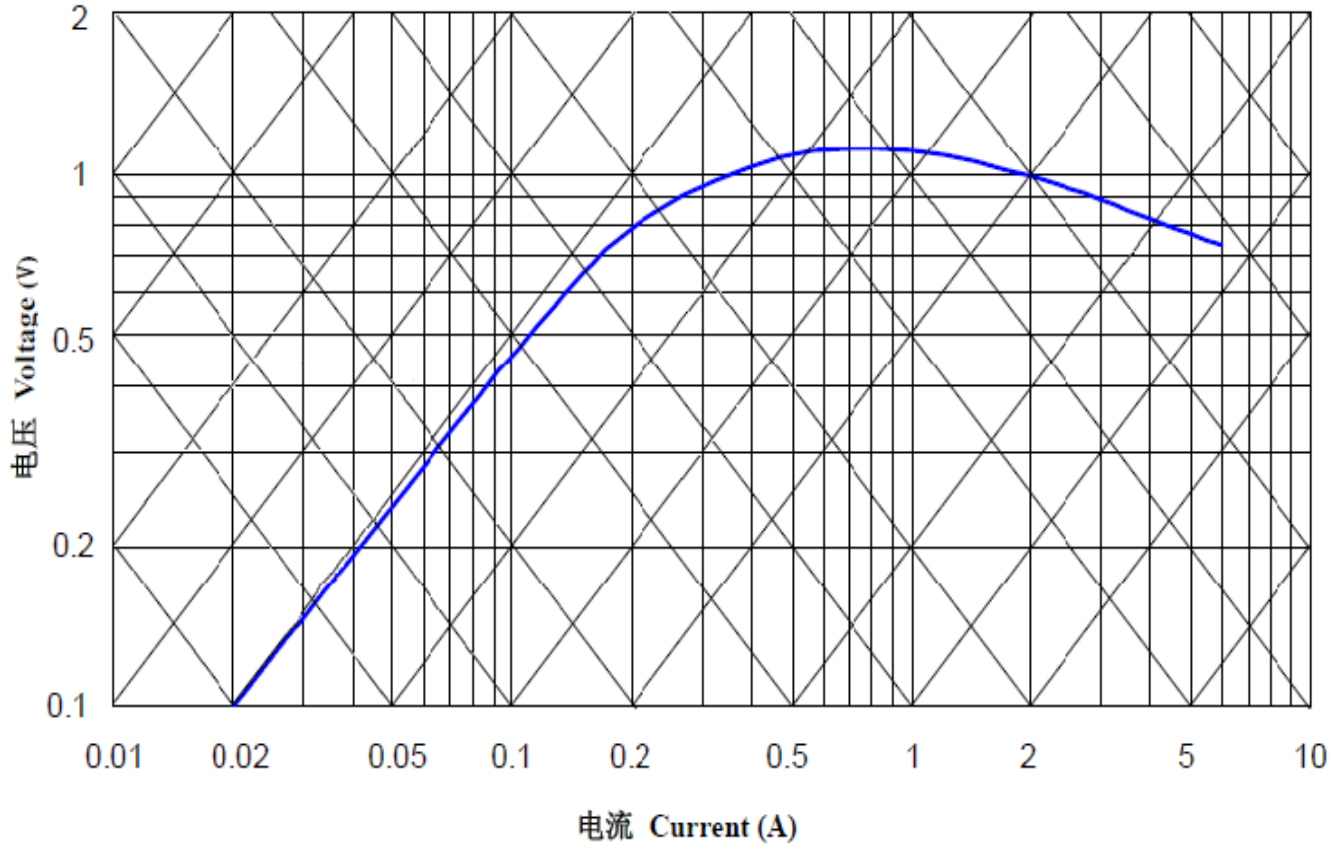
电气性能 **ELECTRICAL CHARACTERISTICS**
测试条件/方法 **Test Conditions & Method**

指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
额定零功率电阻 Rated Zero-Power Resistance R_N (Ω)	10±20%	环境温度T_A: 25℃±1℃ 测试电压: 1.5V_{DC} 在恒温T_A 条件下，放置1~2 小时后测得阻值R_N。 Ambient temp. Range:25℃±1℃(T_A). Testing voltage: 1.5V_{DC} After placing for 1~2 hours under T_A, the resistance value shall be measured
热耗散系数 δ (mW/℃) Thermal Dissipation Constant	≥14	在特定的环境温度下，热耗散系数(δ)为热敏电阻电功率消耗(ΔP)与本体温度变化量(ΔT)的比值. The thermal dissipation constant(δ) could becalculated by the ratio of a change in powerdissipation(ΔP) of the thermistor to a changein temperature(ΔT) of the thermistor at aspecified ambient temperature
热时间常数 τ (s) Thermal Time Constant	≤47	热时间常数(τ)为在零功率条件下，热敏电阻的温度下降到其最初温度与最终温度之差为63.2% 时所需要的时间 The time(τ shall be measured within whichthe temperature change of NTC thermistor isreached at 63.2% of the ambient temperaturechange under zero power condition
材料常数 Material Constant B	2800±10% $B=T_1T_2/(T_2-T_1)\times \ln(R_1/R_2)$	R_1, R_2 分别为T_1, T_2 温度下的零功率电阻 R_1, R_2 is zero-power resistance at T_1, T_2 T_1 = 298.15 K(25℃) T_2 = 323.15 K(50℃)
最大稳态电流(A) Max. Steady State Current	无可见损伤 visible mechanical damage. $\Delta R_N / R_N \leq 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	环境温度:25℃±2℃Ambient temp. Range. 测试电流:3.0A Testing Current

7.3 可靠性试验 **Reliability Test**

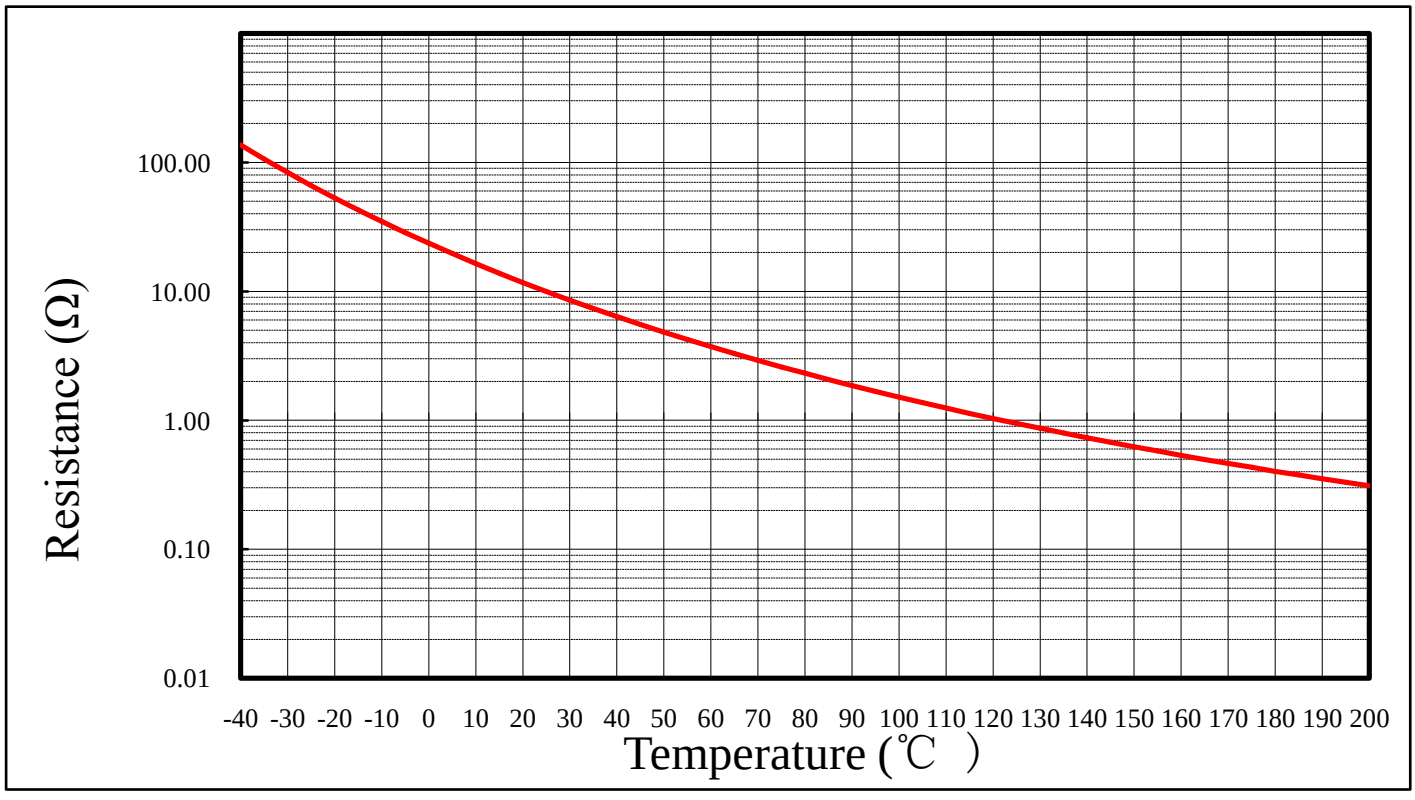
可靠性试验（周期性检测项目）**Reliability Test**		
指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
温度循环测试 Temp. Cycling Testing	无可见损伤 No visible mechanical damage. $\Delta R_N / R_N \leqslant 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	在Ta=-40±3℃和Tb=200±3℃的环境温度中各存放30 分钟，循环5 次.每次高低温循环都有在25±2℃的环境中过渡5 分钟。样品进行温度循环测试后，取出放置室温（25±2℃）4~5 小时后测量零功率电阻R_N'. Ta:-40±3℃/ 30min→25±2℃/ 5min→Tb:200±3℃/ 30min→25±2℃/ 5min Cycles: 5times After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured.
电循环测试 Electrical Cycling Testing	无可见损伤 No visible mechanical damage. $\Delta R_N / R_N \leqslant 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	环境温度:25℃±2℃. 循环次数: 1,000 次 通/断: 1 分钟/ 5 分钟 测试电流:1.0A 样品置于室温（25±2℃）4~5 小时后,测量其零功率电阻R_N'. Ambient temp. Range:25℃±2℃. Cycles: 1,000times On / Off: 1m / 5m Test Current 1.0A After recovering 4~5h under 25±2℃, the rated zero power resistance value R_N' shall be measured.
持久性测试 LoadLife (Endurance) Testing	无可见损伤 No visible mechanical damage. $\Delta R_N / R_N \leqslant 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	环境温度:25℃±2℃.样品通过最大工作电流1.0A ，1,000±24 小时后，取出置于室温（25±2℃）4~5 小时后,测量其零功率电阻R_N'. Ambient temp. Range:25℃±2℃; 6.0A/ 1,000±24hAfter recovering 4~5 h under 25±2℃, the ratedzero power resistance value R_N' shall be measured.
耐湿性测试 Humidity Testing	无可见损伤 No visible mechanical damage. $\Delta R_N / R_N \leqslant 20\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	在温度40±2℃,相对湿度93±3%的环境中放置1000±24 小时后，取出置于室温（25±2℃）4~5 小时后, 测量其零功率电阻R_N'. Ambient temp. range : 40℃±2℃ R.H.:93±3% , Energized time:1000±24 h After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured

8、电压-电流关系曲线 **Graph of Voltage vs. Current**



9、产品特性曲线 **Graph of Characteristics**

9.1 电阻-温度关系曲线 **Graph of Resistance vs. Temperature**



9.1.1 R-T chart 阻温特性表

温度 Temp℃	阻值 Resistance Ω			温度 Temp℃	阻值 Resistance Ω		
	下限值 lower limiting value	中心值 Central value	上限值 upper-limit value		下限值 lower limiting value	中心值 Central value	上限值 upper-limit value
-40.0	84.42	137.11	213.77	-19.0	34.56	50.83	71.76
-39.0	80.61	130.25	202.05	-18.0	33.24	48.68	68.43
-38.0	77.01	123.80	191.05	-17.0	31.99	46.64	65.28
-37.0	73.59	117.71	180.75	-16.0	30.79	44.70	62.30
-36.0	70.35	111.97	171.07	-15.0	29.64	42.85	59.48
-35.0	67.28	106.55	161.99	-14.0	28.54	41.10	56.80
-34.0	64.37	101.44	153.47	-13.0	27.50	39.42	54.26
-33.0	61.61	96.61	145.45	-12.0	26.49	37.83	51.86
-32.0	58.98	92.05	137.92	-11.0	25.54	36.32	49.58
-31.0	56.49	87.74	130.83	-10.0	24.62	34.87	47.41
-30.0	54.12	83.67	124.17	-9.0	23.74	33.49	45.36
-29.0	51.88	79.81	117.89	-8.0	22.91	32.18	43.41
-28.0	49.74	76.17	111.97	-7.0	22.10	30.93	41.55
-27.0	47.70	72.71	106.40	-6.0	21.33	29.74	39.79
-26.0	45.77	69.44	101.15	-5.0	20.59	28.60	38.12
-25.0	43.92	66.34	96.20	-4.0	19.89	27.51	36.52
-24.0	42.17	63.41	91.52	-3.0	19.21	26.47	35.01
-23.0	40.50	60.62	87.11	-2.0	18.56	25.48	33.57
-22.0	38.91	57.98	82.94	-1.0	17.94	24.53	32.20
-21.0	37.39	55.47	79.00	0.0	17.34	23.62	30.89
-20.0	35.94	53.09	75.28	1.0	16.77	22.75	29.64

KLS ELECTRONIC CO., LTD.

9.1.2 R-T chart 阻温特性表

温度 Temp℃	阻值 Resistance Ω			温度 Temp℃	阻值 Resistance Ω		
	下限值 lower limiting value	中心值 Central value	上限值 upper-limit value		下限值 lower limiting value	中心值 Central value	上限值 upper-limit value
2.0	16.22	21.92	28.46	23.0	8.47	10.65	12.87
3.0	15.69	21.13	27.33	24.0	8.23	10.32	12.42
4.0	15.18	20.37	26.25	25.0	8.00	10.00	12.00
5.0	14.69	19.65	25.22	26.0	7.73	9.69	11.67
6.0	14.22	18.95	24.24	27.0	7.47	9.39	11.34
7.0	13.77	18.28	23.30	28.0	7.22	9.11	11.03
8.0	13.34	17.64	22.41	29.0	6.98	8.83	10.73
9.0	12.92	17.03	21.56	30.0	6.75	8.57	10.44
10.0	12.52	16.45	20.74	31.0	6.53	8.31	10.16
11.0	12.13	15.88	19.96	32.0	6.31	8.06	9.89
12.0	11.76	15.34	19.22	33.0	6.11	7.82	9.62
13.0	11.40	14.83	18.51	34.0	5.91	7.59	9.37
14.0	11.06	14.33	17.83	35.0	5.72	7.37	9.12
15.0	10.73	13.85	17.17	36.0	5.54	7.16	8.88
16.0	10.41	13.40	16.55	37.0	5.36	6.95	8.65
17.0	10.10	12.96	15.95	38.0	5.20	6.75	8.43
18.0	9.80	12.53	15.38	39.0	5.03	6.56	8.21
19.0	9.52	12.13	14.84	40.0	4.88	6.38	8.00
20.0	9.24	11.74	14.31	41.0	4.73	6.20	7.80
21.0	8.97	11.36	13.81	42.0	4.58	6.03	7.61
22.0	8.72	11.00	13.33	43.0	4.44	5.86	7.42

9.1.3 R-T chart 阻温特性表

温度 Temp℃	阻值 Resistance Ω			温度 Temp℃	阻值 Resistance Ω		
	下限值 lower limiting value	中心值 Central value	上限值 upper-limit value		下限值 lower limiting value	中心值 Central value	上限值 upper-limit value
44.0	4.31	5.70	7.23	65.0	2.36	3.29	4.42
45.0	4.18	5.54	7.05	66.0	2.29	3.21	4.32
46.0	4.05	5.39	6.88	67.0	2.23	3.14	4.23
47.0	3.93	5.24	6.71	68.0	2.18	3.06	4.14
48.0	3.82	5.10	6.55	69.0	2.12	2.99	4.05
49.0	3.71	4.97	6.39	70.0	2.06	2.92	3.96
50.0	3.60	4.84	6.24	71.0	2.01	2.85	3.88
51.0	3.49	4.71	6.09	72.0	1.96	2.78	3.80
52.0	3.39	4.58	5.95	73.0	1.91	2.72	3.72
53.0	3.30	4.47	5.81	74.0	1.86	2.66	3.64
54.0	3.20	4.35	5.67	75.0	1.81	2.60	3.56
55.0	3.11	4.24	5.54	76.0	1.77	2.54	3.49
56.0	3.02	4.13	5.41	77.0	1.73	2.48	3.42
57.0	2.94	4.02	5.29	78.0	1.68	2.42	3.35
58.0	2.86	3.92	5.17	79.0	1.64	2.37	3.28
59.0	2.78	3.82	5.05	80.0	1.60	2.32	3.22
60.0	2.70	3.73	4.94	81.0	1.56	2.27	3.15
61.0	2.63	3.64	4.83	82.0	1.52	2.22	3.09
62.0	2.56	3.55	4.72	83.0	1.49	2.17	3.03
63.0	2.49	3.46	4.62	84.0	1.45	2.12	2.97
64.0	2.42	3.37	4.51	85.0	1.42	2.07	2.91

9.1.4 R-T chart 阻温特性表

温度 Temp℃	阻值 Resistance Ω			温度 Temp℃	阻值 Resistance Ω		
	下限值 lower limiting value	中心值 Central value	上限值 upper-limit value		下限值 lower limiting value	中心值 Central value	上限值 upper-limit value
86.0	1.38	2.03	2.86	108.0	0.84	1.29	1.90
87.0	1.35	1.99	2.80	109.0	0.83	1.27	1.87
88.0	1.32	1.94	2.75	110.0	0.81	1.25	1.84
89.0	1.29	1.90	2.69	111.0	0.79	1.22	1.81
90.0	1.26	1.86	2.64	112.0	0.78	1.20	1.78
91.0	1.23	1.82	2.59	113.0	0.76	1.18	1.75
92.0	1.20	1.79	2.54	114.0	0.74	1.15	1.72
93.0	1.17	1.75	2.50	115.0	0.73	1.13	1.69
94.0	1.15	1.71	2.45	116.0	0.71	1.11	1.66
95.0	1.12	1.68	2.41	117.0	0.70	1.09	1.64
96.0	1.10	1.64	2.36	118.0	0.69	1.07	1.61
97.0	1.07	1.61	2.32	119.0	0.67	1.05	1.58
98.0	1.05	1.58	2.28	120.0	0.66	1.03	1.56
99.0	1.03	1.55	2.24	121.0	0.65	1.02	1.53
100.0	1.00	1.51	2.19	122.0	0.63	1.00	1.51
101.0	0.98	1.48	2.16	123.0	0.62	0.98	1.48
102.0	0.96	1.46	2.12	124.0	0.61	0.96	1.46
103.0	0.94	1.43	2.08	125.0	0.60	0.95	1.44
104.0	0.92	1.40	2.04	126.0	0.59	0.93	1.41
105.0	0.90	1.37	2.01	127.0	0.57	0.91	1.39
106.0	0.88	1.34	1.97	128.0	0.56	0.90	1.37
107.0	0.86	1.32	1.94	129.0	0.55	0.88	1.35

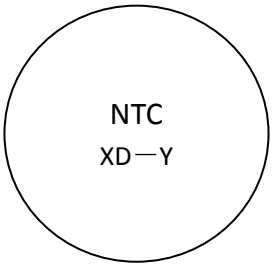
KLS ELECTRONIC CO., LTD.

9.1.5 R-T chart 阻温特性表

温度 Temp℃	阻值 Resistance Ω			温度 Temp℃	阻值 Resistance Ω		
	下限值 lower limiting value	中心值 Central value	上限值 upper-limit value		下限值 lower limiting value	中心值 Central value	上限值 upper-limit value
130.0	0.54	0.87	1.33	153.0	0.36	0.60	0.95
131.0	0.53	0.85	1.31	154.0	0.35	0.59	0.93
132.0	0.52	0.84	1.29	155.0	0.35	0.58	0.92
133.0	0.51	0.82	1.27	156.0	0.34	0.57	0.91
134.0	0.50	0.81	1.25	157.0	0.34	0.56	0.90
135.0	0.49	0.80	1.23	158.0	0.33	0.55	0.88
136.0	0.49	0.78	1.21	159.0	0.33	0.54	0.87
137.0	0.48	0.77	1.19	160.0	0.32	0.54	0.86
138.0	0.47	0.76	1.18	161.0	0.31	0.53	0.85
139.0	0.46	0.74	1.16	162.0	0.31	0.52	0.84
140.0	0.45	0.73	1.14	163.0	0.30	0.51	0.83
141.0	0.44	0.72	1.12	164.0	0.30	0.50	0.82
142.0	0.44	0.71	1.11	165.0	0.29	0.50	0.81
143.0	0.43	0.70	1.09	166.0	0.29	0.49	0.80
144.0	0.42	0.69	1.08	167.0	0.29	0.48	0.79
145.0	0.41	0.68	1.06	168.0	0.28	0.48	0.78
146.0	0.41	0.66	1.05	169.0	0.28	0.47	0.77
147.0	0.40	0.65	1.03	170.0	0.27	0.46	0.76
148.0	0.39	0.64	1.02	171.0	0.27	0.46	0.75
149.0	0.38	0.63	1.00	172.0	0.26	0.45	0.74
150.0	0.38	0.62	0.99	173.0	0.26	0.44	0.73
151.0	0.37	0.61	0.97	174.0	0.26	0.44	0.72
152.0	0.37	0.60	0.96	175.0	0.25	0.43	0.71

10、Marking

The neutral marks

<table>
<tr><td rowspan="4"> 
</td><td>NTC</td><td>NTC thermistor</td></tr>
<tr><td>X</td><td>Rated ZeroPower Resistance</td></tr>
<tr><td>D</td><td>Disk-Type</td></tr>
<tr><td>Y</td><td>最大芯片直径 Max diameter of disk (mm)</td></tr>
</table>

All of the above types of marks round, mainly in the production of neutral markers, if you have special request, please contact our sales staff, for product specification and data are subject to change without notice

11 NTC 热敏电阻注意事项 NTC thermistor to use matters needing attention

请遵循以下事项，否则可能会造成 NTC 热敏电阻损坏，使用设备损伤或引起误动作等后果

Please follow the following, or may result in damage to the NTC thermistor, the use of equipment damage or cause false action, etc.

①、请勿在使用温度范围以外使用，请勿施加超出使用温度范围上下限的急剧温度变化。

Please follow the following, or may result in damage to the NTC thermistor, the use of equipment damage or cause false action, etc.

②、请在额定功率条件下使用 NTC 热敏电阻。各规格最大额定功率为Φ7—1.2W Φ9—1.9W Φ11—2.3W Φ13—3W Φ15—3.5W Φ20—4W

Please use the NTC thermistor under the rated power. The maximum rated power of each specification is Phi 7 Phi 9 - 1.2W - 1.9W 11 - 2.3W 13 - Phi Phi Phi Phi 20 3W 15 - 3.5W - 4W

③、在高湿高温环境下使用护套型 NTC 热敏电阻时应采取仅使护套封闭部分暴露于环境（水中 湿气）中，而护套开口部分不会直接接触到水及蒸汽的设计

In the high humidity and high temperature environment, the sheath type NTC thermal resistance should be used only to expose the sealing part of the sheath to the environment (moisture in water), and the opening part of the sheath will not be directly exposed to the design of water and steam.

④、配线时应确保导线端部（含连接器）不会深入水.蒸汽.电解质液等否则会造成接触不良。

Wiring should ensure that the end of the wire (including connectors) will not be deep water. Steam. Electrolyte solution, etc., will result in poor contact.

⑤、请勿在腐蚀性气体的环境（C12 .NH3 .SOx.NOx）以及会接触到电解质液.盐水.酸.碱.有机溶剂的场所中使用。

Please do not be exposed to the corrosive gas environment (.NH3.SOx.NOx C12) and will be exposed to the electrolyte solution.

⑥、请勿过度拉伸及弯曲导线，请勿施加过度的振动.冲击及压力

Do not over stretch and bend the wire, please do not exert excessive vibration.

⑦、金属腐蚀可能会造成设备功能故障，故在选择材质时应确保金属护套型及螺钉紧固型 NTC 热敏电阻与安装的金属件之间不会产生接触的电位差。

Metal corrosion may cause equipment fault, so make sure not between metal metal support and screw fastening type NTC thermistor and installation of the contact potential

difference in the choice of materials.

⑧、功率型 NTC 周围应避免安装发热和易燃元件，建议选用弯脚上部引线较高的产品，使 NTC 热敏电阻在线路板上高出其它元件，以免发热影响其它元件正常工作。

Around the power type NTC should be avoided to install heat and flammable components, recommended products with higher bending the upper lead, the NTC thermistor on the circuit board is higher than other elements, so as not to affect the normal work of other heating element.

⑨、NTC 热敏电阻是按不同的功能用途分别进行设计的,如有疑问可与我司联络。

NTC thermistor is designed according to different functions, such as the question can contact with me.