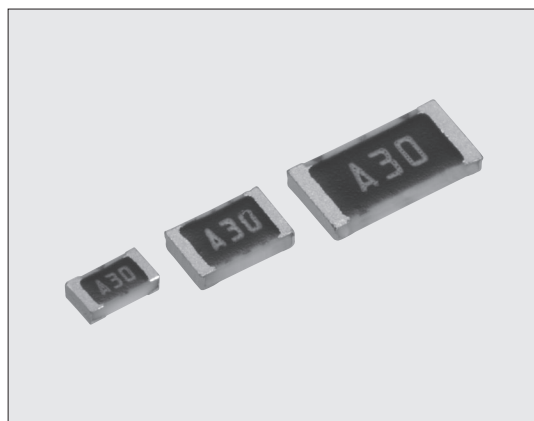


THERMAL SENSORS



LP73 矩形薄膜片式温度传感器 Thin Film Resistance Thermal Chip Sensors



外观颜色：黑色 Coating color: Black

■ 特点 Features

- 是表面贴装的薄膜温度传感器。
- 阻值允许偏差±1%以上以标准对应。T.C.R.范围广。对应+3000×10⁻⁶/K~+5000×10⁻⁶/K。
- 适用于各种工业设备的温度控制。
- 对应回流焊、波峰焊。
- 端子无铅品，符合欧盟RoHS。
- LP73s are thin-film thermal sensors of SMD type.
- LP73s accommodate resistance tolerance ±1%, a wide range of TCRs +3000×10⁻⁶/K~+5000×10⁻⁶/K with the standard products.
- Suitable for control of temperatures in various industrial equipment.
- Suitable for both flow and reflow soldering.
- Products with lead free termination meet EU-RoHS requirements.

■ 用途 Applications

- FDD、照相机、小型直流电动机的温度补偿或防止过热。
- 各种传感器传动电路的温度补偿。
- 通信设备、计量测量设备的温度补偿。
- 混合IC的温度补偿。
- Temperature compensation on overheat prevention for FDDs, Cameras and Small DC Motors.
- Temperature compensation for various kinds of Sensor Drive Circuits.
- Temperature compensation for Telecommunication and Measuring Devices.
- Temperature compensation for Hybrid ICs.

■ 额定值 Ratings

型号 Type	额定功率 Power Rating	热时间常数* Thermal Time Constant	热消散系数* Thermal Dissipation Constant	额定环境温度 Rated Ambient Temperature	使用温度范围 Operating Temperature Range	编带和包装数/卷 Taping & Q'ty/Reel (pcs)
LP73 1J	0.016W	2s	1.2mW/°C	+70°C	-55°C~+125°C	5,000
LP73 2A	0.031W	4s	1.8mW/°C			
LP73 2B	0.063W	6.5s	2.4mW/°C			

※1 热时间常数·热消散系数是在静止空气中测定的值，成为参考值。又是元件单体的值，因连接方法和固定方法而变化。

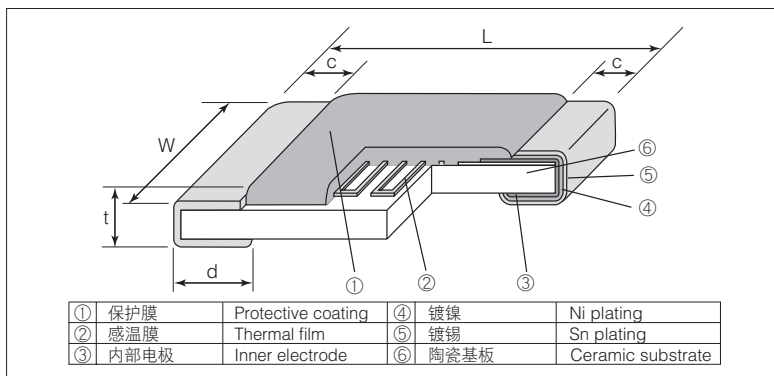
※1 Thermal time constant and dissipation constant are reference values, which are values of elements and vary with connecting or fixing methods.

■ 电阻温度系数和电阻值范围 T.C.R. and Resistance Range

电阻温度系数 T.C.R. (×10 ⁻⁶ /K)	电阻温度系数允许偏差 T.C.R. Tolerance	电阻值范围 (Ω) Resistance Range (E24 & 5.0×10 ⁿ)			阻值允许偏差 Resistance Tolerance		
		1J	2A	2B			
3000	±5%	100~1k	100~2k	100~10k	F: ±1%、G: ±2%、J: ±5%		
3300					G: ±2%、J: ±5%		
3600							
4000		100~1k			F: ±1%、G: ±2%、J: ±5%		
4500							
5000							

T.C.R.测定温度+25°C/+65°C T.C.R. Measuring Temperature: +25°C/+65°C

■ 结构图 Construction



■ 外形尺寸 Dimensions

型号 Type (Inch Size Code)	尺寸 Dimensions (mm)					Weight (g/1000pcs)
	L±0.2	W±0.2	c	d	t	
1J (0603)	1.6	0.8	0.3±0.2	0.3±0.2	0.5±0.1	1.91
2A (0805)	2.0	1.25	0.4±0.2	0.4±0.2	0.5±0.15	4.09
2B (1206)	3.2	1.6	0.5±0.3	0.5±0.3		7.61

■ 品名构成 Type Designation

实例 Example

品种 Product Code	尺寸 Size	端子表面材质 Termination Surface Material	二次加工 Taping	公称电阻值 Nominal Resistance	阻值允许偏差 Resistance Tolerance	电阻温度系数 T.C.R. (×10 ⁻⁶ /K)
LP73	2B	T	TE	103	J	3600
	1J: 1.6x0.8mm 2A: 2.0x1.25mm 2B: 3.2x1.6mm	T: Sn	TE: 4mm pitch plastic embossed BK: Bulk	3digits	F: ±1% G: ±2% J: ±5%	

端子表面材质以无铅品为标准。

欲知关于此产品含有的环境负荷物质详情(除EU-RoHS以外)，请与我们联系。编带细节请参考卷末附录C。

The terminal surface material lead free is standard.

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

For further information on taping, please refer to APPENDIX C on the back pages.

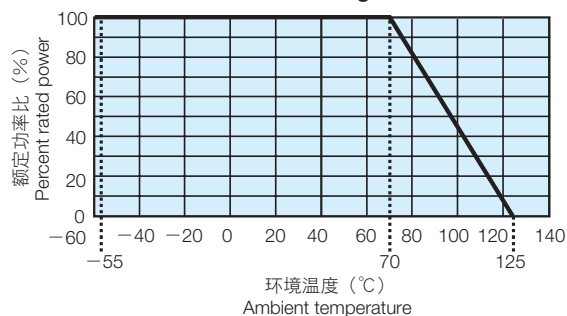
T.C.R.测定温度+25°C/+65°C T.C.R. Measuring Temperature: +25°C/+65°C

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Nov. 2018

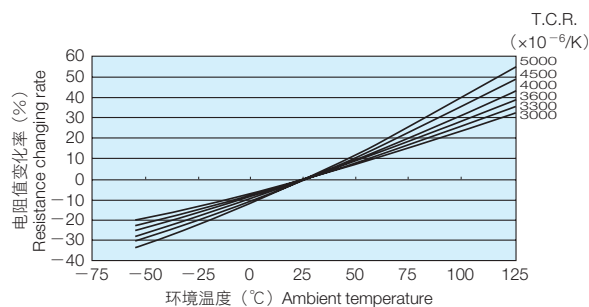
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■ 负荷减轻特性曲线 Derating Curve



■ 电阻温度特性实例

Examples of Temperature Characteristics of Resistance



■ 电阻温度特性近似式

Approximate Expression for Resistance-Temperature Characteristics
(是代表值，不是保证值。 Values are not guaranteed but typical.)

$$R_T = R_{25} (C_0 + C_1 T + C_2 T^2)$$

R_T : T℃时的电阻值 R_T : Resistance value at T℃
 R_{25} : 25℃时的电阻值 R_{25} : Resistance value at 25℃
 T : 环境温度(℃) T : Ambient temperature (℃)
 C_0, C_1, C_2 : 常数 C_0, C_1, C_2 : Constants

T.C.R. ($\times 10^{-6}/K$)	C_0	C_1	C_2
3000	0.931258	0.00265213	3.90112×10^{-6}
3300	0.924355	0.00292569	4.00516×10^{-6}
3600	0.916356	0.00323714	4.34428×10^{-6}
4000	0.907039	0.00361006	4.33457×10^{-6}
4500	0.897412	0.00395222	6.05201×10^{-6}
5000	0.886014	0.00437224	7.48809×10^{-6}

■ 性能 Performance

试验项目 Test Items	标准值 Performance Requirements $\Delta R \pm (\% \pm 0.05 \Omega)$		试验方法 Test Methods
	保证值 Limit	代表值 Typical	
电阻值 Resistance	在规定的允许偏差内 Within specified tolerance	—	25℃
电阻温度系数 T.C.R.	在规定值以内 Within specified T.C.R.	—	+25℃/+65℃
过载(短时间) Overload (Short time)	0.5	0.3	额定电压的2.5倍施加5秒钟。 Rated voltage $\times 2.5$ for 5s.
耐焊接热 Resistance to soldering heat	0.5	0.3	260℃ $\pm 5^\circ\text{C}$, 10s \rightarrow 1s
温度突变 Rapid change of temperature	0.5	0.3	-55℃ (30min.) / +25℃ (2~3min.) / +125℃ (30min.) / +25℃ (2~3min.) 5 cycles
耐湿负荷 Moisture resistance	2	1.5	40℃ $\pm 2^\circ\text{C}$, 90%~95%RH, 1000h 1.5小时ON、0.5小时OFF的周期 1.5h ON/0.5h OFF cycle
在70℃时的耐久性 Endurance at 70℃	2	1.5	70℃ $\pm 2^\circ\text{C}$, 1000h 1.5小时ON、0.5小时OFF的周期 1.5h ON/0.5h OFF cycle

本产品因为在超过70℃高温环境下有电阻值漂移大的倾向，所以请确认之后能使用。并且本产品使用特殊的皮膜，由于静电破坏皮膜导致电阻变化所以在静电使用时请注意。
Confirming resistance drift is recommended since this product has a tendency to have bigger resistance change than general flat chip over 70℃.
Please pay attention not to be applied ESD, it may cause of resistance change.

■ 实效值(不在保证范围) Actual Value (Out of guarantee)

试验项目 Test Items	参考值 Reference	试验方法 Test Methods
高温放置 High temperature exposure	8%	+125℃, 1000h
静电特性 ESD	500V	人体模型, Human model, 100pF 1.5k Ω

■ 使用注意事项 Precautions for Use

- 由于是因自身发热而电阻值变动的，因此应考虑自身发热后使用。使用额定功率时，会引起10℃以上的温度误差。
- 部件的编带材料，使用了已施加适当的防静电措施的物质，但在安装时遇到过度干燥的状况和在编带包装时加上长时间振动后，在顶带有被静电（在150pF相当于500V以上）破坏、电阻值产生变化的危险，应注意。底板安装时，同样地应注意不要施加过度的静电。
- 助焊剂等在本产品和安装的印刷电路板上附着离子性杂质时，其耐湿性·耐腐蚀性将受到影响。助焊剂内有时含有氯·酸等离子性物质，为除去这些离子性物质应进行清洗。特别是使用无铅助焊剂时，由于湿润性提高了，有时会含有大量离子性物质，所以在使用RMA系的焊锡或助焊剂时，应充分进行清洗。并且，保管环境和安装条件、环境等，附着了汗·盐等离子性物质时，其耐湿性·耐腐蚀性也将受到影响。对于这种污染，为了除去这些离子性物质，应当进行清洗。
- 产品受到人的汗水和唾液等中所含的钠(Na⁺)、氯(Cl⁻)等离子性杂质污染时会引发电蚀。因此，在保管、贴装或使用时应注意防止污染。此外，发现有污染时，应用纯水等清洗干燥，注意不使离子性物质残留。
- 应注意不使烙铁直接接触产品。它会有引起电阻值变化的危险。还有，烙铁直接接触保护涂层，有瞬间炭化的危险，对电蚀的耐候性和保护涂层的绝缘性也会降低，应注意。并且，烙铁温度非常高时同样会使保护涂层劣化，应注意。
- 关于这一产品的保管，应避免阳光直射·高温多湿。直射阳光，会发生编带变质，难以保持适当的剥离强度，应注意。在5~35℃/35~75%RH以下时，交货后12个月内，焊接性不会降低，但由于结露·有毒气体（硫化氢、二氧化硫、氯化氢等）、灰尘等，焊接性会降低，保管时应充分注意。
- The resistance varies by its self heat-generation. Reasonable care must be exercised in using it by taking its self-heating into consideration. Sensors operated at rated power will cause temperature errors in excess of 10℃.
- The properly and electrostatically measured taping materials are used for the components, but attention should be paid to the fact that there is some danger the parts absorb on the top tapes to cause a failure in the mounting and the parts are destructured by static electricity (equivalent to 500V or over at 150pF) to change the resistance in the conditions of an excessive dryness or after the parts are given vibration for a long time as they are packaged on the tapes. Similarly, care should be given not to apply the excessive static electricity when mounting on the boards.
- Ionic impurities such as flux etc. that are attached to these products or those mounted onto a PCB, negatively affect their moisture resistance, corrosion resistance, etc. The flux may contain ionic substances like chlorine, acid, etc. Please wash them to get rid of these ionic substances especially when using lead-free solder that may contain much of the said substances for improving a wetting characteristic. Using RMA solder or RMA flux, or well-washing is needed. Also, attaching ionic substances such as perspiration, salt etc. by storage environments or mounting conditions/ environments negatively affects their moisture resistance, corrosion resistance etc. Please wash them to remove the ionic substances when they are polluted.
- When the components are polluted by ionic impurities like sodium(Na⁺), chlorine(Cl⁻) etc. included in perspiration and saliva, it leads to electric erosion. Avoid the pollution when storage, mounting and using. Consider not to remain ionic substances on the components. Wash by pure water etc. and dry them when you find pollution.
- Please pay attention that the top of an iron does not direct touch to the components. There is a risk that may cause a change in resistance. Take care that another risk may happen that the protecting coat is carbonized in an instant when touched directly by the top of the iron, also climatic-proof for electric corrosion or insulation of protecting coat may be dropped down. Be sure not to give high temperature on the top of the iron as it will degrade the protecting coat.
- Avoid storing components under direct sun rays, high temperature/humidity. Direct sun rays will cause quality change of taping and difficulty of keeping appropriate peeling strength. 5~35℃/35~75% RH, there is no deterioration of solderability for 12 months, but take special care for storing, because condensation, dust, and toxic gas like hydrogen sulfide, sulfurous acid gas, hydrogen chloride, etc. may drop solderability.