

Spec. No.: HL3528-4P164W

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# SPECIFICATION

Model Name: Multi Emitters 760/810/830

Model NO. : HL3528-4P164W

Customer No.:

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## Multi Emitters

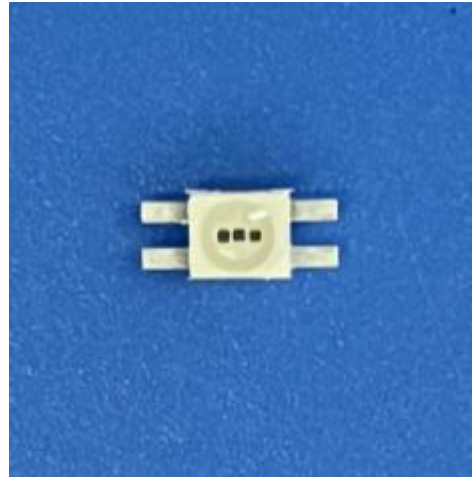
### HL3528-4P164W

#### ■Features

- molded packages
- 4pin designs
- Multi wavelengths LEDs
- Matching detector response

#### ■Applications

- SPO2
- Blood analysis
- Medical instrumentation
- Radiometric instruments



Name	Model	IR	IR	IR	Package
Multi Emitters	HL3528-4P164W	760	810	830	4Pin, COB

#### ■Absolute Maximum Ratings

(Ta= 25℃)

Parameter	Symbol	Max.	Unit	Note
Power Dissipation	P <sub>d</sub>	60	mW	---
Forward Current	I <sub>F</sub>	20	mA	---
Peak Forward Current	I <sub>FP</sub>	100	mA	1/10 Duty cycle,0.1ms pulse width
Reverse Voltage	V <sub>R</sub>	5	V	---
Operating Temperature	T <sub>opr</sub>	-25~+85	℃	---
Storage Temperature	T <sub>Stg</sub>	-40~+100	℃	---

# Multi Emitters

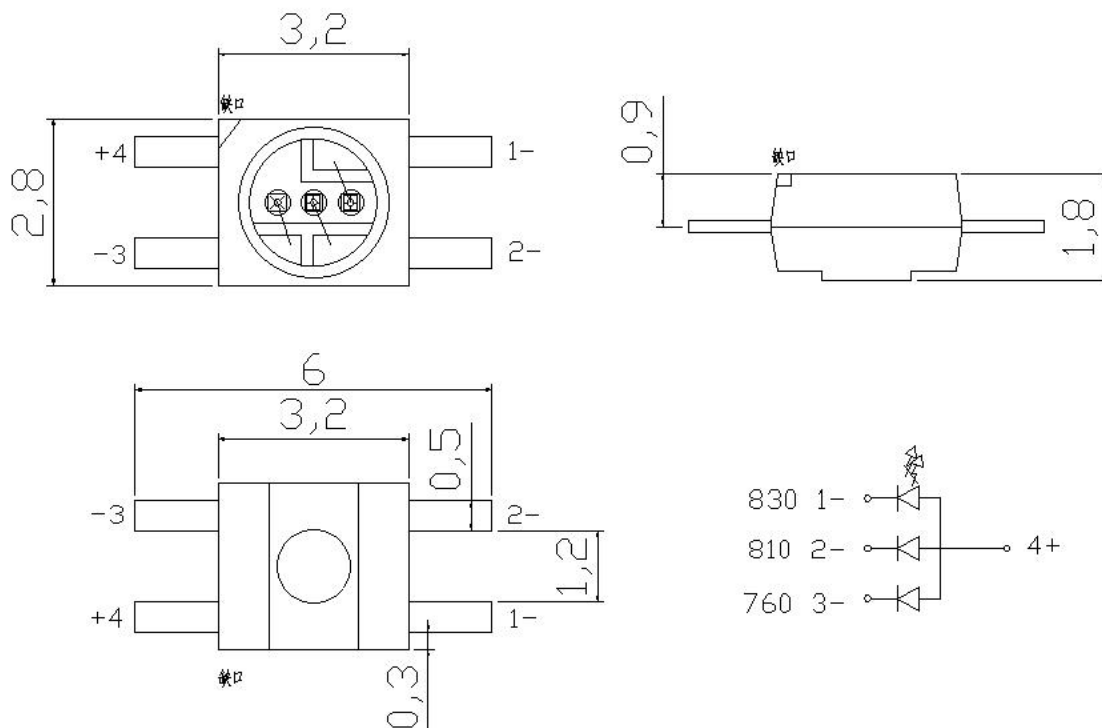
## HL3528-4P164W

### ■Electrical/Optical Characteristics

(Ta= 25℃)

Parameter	Symbol	Min.			Typ.			Max.			Units	Test Conditions
		760	810	830	760	810	830	760	810	830		
Forward Voltage	VF	1.5	1.3	1.3	1.7	1.5	1.48	1.9	1.7	1.7	V	IF=20mA
Reverse Current	IR	--	--	--	--	--	--	10	10	10	uA	VR=5V
Radiant Power	PO	12	6	6	16	9	9	18	12	12	mW	IF=20mA
Peak Wavelength	$\lambda_p$	750	795	820	760	805	830	770	815	840	nm	IF=20mA
Spectral Line Half-width	$\Delta\lambda$	--	--	--	20	24	32	--	--	--	nm	IF=20mA

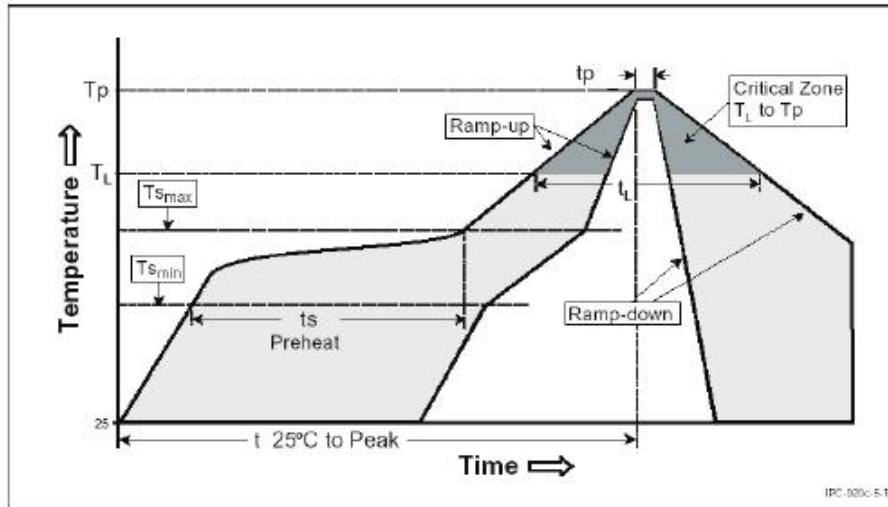
### ■Dimension:



#### Notes:

- 1.All dimensions are in millimeters
2. Tolerances unless dimensions  $\pm 0.1\text{mm}$

## ■Reflow Soldering Characteristics 回流焊特征曲线图



ProfileFeature 分布特征	Lead Free Assembly 无铅装配
Average Ramp-Up Rate (T <sub>smax</sub> to T <sub>p</sub> ) 平均升温速度 (T <sub>smax</sub> 到 T <sub>p</sub> )	3°C / second max 最快 3° C / 秒
Average Ramp-Up Rate (T <sub>smax</sub> to T <sub>p</sub> ) 最低预热温度 (T <sub>smin</sub> )	150°C
PreheatTemperature Max (T <sub>smax</sub> ) 最高预热温度 (T <sub>smax</sub> )	200°C
PreheatTime (t <sub>smin</sub> to t <sub>smax</sub> ) 预热时间 (t <sub>smin</sub> 到 t <sub>smax</sub> )	60 - 180 seconds 60 - 180 秒
Temperature (T <sub>L</sub> ) 温度 (T <sub>L</sub> )	220°C
Time Maintained AboveTemperature (T <sub>L</sub> ) 保持在此温度以上的时间 (T <sub>L</sub> )	30-60 seconds 30-60 秒
Peak / ClassificationTemperature (T <sub>p</sub> ) 峰值 / 分类温度 (T <sub>p</sub> )	260°C
Time Within 5°C of Actual PeakTemperature (t <sub>p</sub> ) 保持与实际峰值温度相差 5° C 以内的时间 (t <sub>p</sub> )	10 seconds 10 秒
Ramp - Down Rate 降温速度	6°C / second max 最快 6° C / 秒

Notes for Table : 上图说明:

- All temperatures refer to the application Printed Circuit Board (PCB), measured on the surface adjacent to the package body.

所有温度都是指应用印刷电路板 (PCB) 的情况, 在与封装体邻接的表面测定。

### TOP LED manual TOP LED使用手册

#### 1.TOP of the packaging LED TOP LED的包装（依封装情况）

Depends on the package.

#### 2.TOP of the shipment and the preservation LED . TOP LED的装运与保存

Surface mount devices (SMDs) usually belongs to damp sensitivity components, moisture from the atmosphere by diffusion through to the packing material in. SMD components to the process of welding circuit board is to through the temperature of 150 °C 260 °C, the reflow soldering under high temperature, the rapid expansion of infiltration moisture to produce enough steam pressure damage or destroy the LED components, thus presents materials, layering, or inner\rubber crack golden line injury failure problem reliability.表面贴装器件（SMDs）通常都属于潮湿敏感性元件，大气中的湿气通过扩散渗透到包装材料之中。SMD元件焊接到电路板上的过程是将其通过温度为150℃-260℃的回流焊，在高温状态下，渗入其中的湿气快速膨胀产生足够的蒸汽压力损伤或毁坏LED元件，从而出现材料内胶裂、分层或金线损伤等可靠性失效问题。

##### 2.1 TOP LED the shipment TOP LED的装运

This series product has LED the moisture proof prevent electrostatic aluminum foil bag bag seal, handling should avoid extrusion, piercing bags, and need to be done to happen the static electricity protective measures necessary. As indicated line before operation already air leakage or LED bags damaged, please stop using the direct, the packing products with photoelectric performance testing and high-temperature dehumidification before use.此系列LED产品采用具有防潮防静电铝箔袋包封，搬运过程中应避免挤压、刺穿包装袋的情形发生，同时需做好必要的静电防护措施。如上线作业前LED包装袋已存在漏气或破损，请直接停止使用，将该包装产品进行光电性能检测与高温除湿动作后再行使用。

During the TOP LED mounting process, material transfer process, and finished product delivery and installation process, should pay attention to prevent external forces from acting directly or indirectly on the LED lamp body. Otherwise, external forces may damage the LED and cause dead lights.

Therefore, external force protection work must be done during the transportation of semi-finished products and finished products.TOP LED的贴装过程、转料过程，以及应用成品出货、安装过程中应注意防止外力直接或间接作用于LED灯体，不然可能导致外力损伤LED，造成死灯现象发生，故需做好半成品、成品搬运途中的外力防护工作。

##### 2.2 Storage of the TOP LED before opening TOP LED开封前的储存

To avoid moisture absorption of reliability caused by failure problem, need to be done to LED products before welding to storage and moisture-proof measures. If the moisture bag not open, the SMD of components of the storage time of 30 °C < / 60% RH for 3 months (Note: The starting calculation time is based on the label date, and should be used under the premise that the bag is well sealed and there is no air leakage, and the moisture-proof beads are in good condition. According to different level or packaging materials moistureproof keep aging have different specific save time, in specification or bags tip accurate), the preservation of the CHIP components for up to six months. Suggested that in the assembly should not arbitrarily before open moisture bag (feeding sampling except), if cannot avoid, components must be immediate and desiccant with the appropriate sealing packing, and kept at the moistureproof ark (< 30 °C / 60% RH).为避免由吸湿引发的可靠性失效问题，需做好LED产品焊接前的储存与防潮措施。如果防潮袋未打开，SMD元件的保存时间为<30℃/60%RH下3个月（注：起始计算时间以标签日期为基准，需在包装袋封口良好并无漏气现象，且防潮珠状态

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良好的前提下使用。)针对不同防潮等级材料或包装保存时效有一定差异,具体保存时间以规格书或包装袋提示为准),CHIP元件的保存时间为6个月。建议在装配之前不要随意打开防潮袋(进料抽检除外),如无法避免,元件必须立即与干燥剂一起进行恰当的密封包装,并保存于防潮柜中( $<30^{\circ}\text{C}/60\%\text{RH}$ )。

#### 2.3 Bags after unpacking control 包装袋拆封后的控制

After opening the moisture-proof bag, immediately check whether the moisture-proof beads are normal To check if there is too much moisture in the moisture-proof bag. Assembly environment must be strictly controlled by the table below the maximum temperature and humidity and operation time limits. As long as SMD exposed to the surrounding environment, it is required to use time, the workshop accumulated except when baking. 打开防潮袋后,立即查看防潮珠是否正常,以确认防潮袋中的湿气是否过多。装配环境必须严格控制在下表所规定的最大温湿度及操作时间允许范围内。只要SMD暴露在周围环境中,则需累积其车间使用时间,烘烤时除外。

防潮等级	包装拆封后车间寿命	
	时间	条件
LEVEL1	无限制	$\leq 30^{\circ}\text{C}/85\%\text{RH}$
LEVEL2	1年	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL2a	4周	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL3	168小时	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL4	72小时	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL5	48小时	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL5a	24小时	$\leq 30^{\circ}\text{C}/60\%\text{RH}$
LEVEL6	取出即用	$\leq 30^{\circ}\text{C}/60\%\text{RH}$

#### 2.4 Storage of unused volume/plate material 未使用完的卷/盘中材料保存

If a roll of SMDs materials is not used up at one time, and the temperature and humidity in the workshop are under the specified conditions ( $<30^{\circ}\text{C}/60\%\text{RH}$ ), and the SMDs components exposed to air for a time not beyond the standards in "Table 1", the remaining part can be preserved by the following conditions:如果一卷SMDs材料未一次性用完,且车间温湿度在限定之条件( $<30^{\circ}\text{C}/60\%\text{RH}$ )下,SMDs元件暴露在空气中时间未超出“表一”标准,则剩余部分可按以下条件保存:

- (1). Store in sealed container with desiccant;与干燥剂一起进行密封存放;
- (2). If not sealed with desiccant, it can be stored in a drying oven at 5%RH. The workshop life is calculated as follows: the time the SMD components are exposed to the air after unpacking and before reflow soldering. If the unused materials are stored in the above manner, the workshop life calculation can be suspended and the accumulated time is used as the calculation basis. If the workshop life has exceeded the time specified in "Table 1", the calculation can be restarted after the components are baked and dehumidified. If the moisture-proof and anti-static aluminum foil bag is found to be unpacked, damaged, or perforated before feeding, it can be returned to the original factory in time for re-dehumidification. 若未与干燥剂一起密封,可存放于5%RH的干燥箱内。其车间寿命计算方式为:包装拆封后回流焊前SMD元件暴露在空气中的时间。未使用完的材料如按上述的方式进行保存时,车间使用寿命可暂停计算,以累加的时间为计算基准。如果车间寿命已超过“表一”所规定的时间,则元件经过烘烤除湿后可重新开始计算。如进料前,已发现防潮防静电铝箔袋拆封、破损、穿孔可及时退回原厂重新进行除湿。





铝箔袋褶皱，有穿孔



铝箔袋拆封后，采用透明胶带封口



铝箔袋用订书针封口

After unpacking, unused SMD products should be stored in a sealed, dry environment, and avoid simple sealing with transparent tape or staples. If the product is not strictly sealed and moisture proof, it must be dehumidified at high temperature before reuse. 在包装拆封后，对未用完的SMD产品需保存于密封、干燥的环境下，避免采用透明胶带、订书针进行简单的封口。如果产品未作严格的密封防潮保存，则再次使用前必须进行高温除湿。

### 3. Moisture control of SMD components assembled on PCB 已装配到PCB上的SMD元件的防潮控制

If moisture-sensitive SMD do not need to go through reflow or high-temperature processes after being assembled to PCB, no special treatment requirements will be made. However, if the SMD needs to go through reflow soldering or any other high temperature process (including rework) later, because the solder paste contains a lot of water, it is necessary to ensure that the LED product is exposed to the air in 2 hours before the reflow soldering is completed. 如果对湿气敏感的SMD装配至PCB后不需再经过回流焊或者高温工序，将不作特殊处理要求。然而，如果SMD后需要经过回流焊或任何其他的高温工序（包括返工在内），由于锡膏内含有大量水份，需注意在回流焊动作完成之前确保LED产品暴露在空气中时间控制在 2 小时内。

### 4. Dehumidification method of SMD components SMD 元件的除湿方法

(1) Low temperature baking: Lay the trays flat (not overlapping) and bake in an oven at 60° C for 24 hours before use. 低温烘烤：将料盘平铺放置（不可重叠）烤箱内进行60℃/24小时烘烤方可使用。

(2) High temperature baking: TOP LED general light products must be dehumidified at 120° C for 12 hours; TOP LED white light products must be dehumidified at 150° C for 6 hours before use. The cooling process after baking must be carried out in a dry environment to avoid sudden and rapid cooling. (Note: High temperature baking is for bulk materials, without carrier tape or tray) 高温烘烤：TOP LED普光产品为120℃/12小时；TOP LED白光产品为150℃/6小时；除湿完成方可使用，且烘烤后的冷却过程须在干燥环境下进行，避免瞬间急速降温。（注：高温烘烤是散料，没有载带、料盘）

Tip: the roasting process for the products should be labeled and differentiate, avoid mixed file phenomenon. High temperature baking should be placed in the dry environment will materials (such as in the oven the cooling or placed on the oven) after an hour around cooling again use; at the same time, it should be noted that because the material tray, carrier tape, and cover tape cannot withstand high temperatures, the carrier tape can only be removed and the LED components can be removed and placed in a high-temperature oven. If the user do high temperature baking dehumidification, limited to manual mounted. 提示：烘烤过程中应进行产品档次标示和区分，避免发生混档现象。高温烘培后需将材料放置于干燥环境（例如在烤箱内逐渐降温或放置在烤箱周围）冷却1小时后再进行使用；同时要注意的是：因料盘、载带、盖带无法承受高温，只能拆除载带后，取下LED元件放入高温烤箱。如用户自行做高温烘烤除湿，仅限于手工贴装。

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用于 SMD 普光系列产品的高温除湿



用于 SMD 白光系列产品的高温除湿



光电烤箱



低温除湿必须取下包装袋



低温除湿必须取下包装袋包装材料无法承受高温必须取出来，不同的材料要做区分，避免混料

### 5. The preparing work before operation 作业前的准备工作

For the whole process (production, testing, packaging, etc) and LED the direct contact with all employee would have to do to prevent and eliminate static measures, the official production need before do the following the tally action: 对于整个工序（生产、测试、包装等）所有与LED直接接触的员工都要做好防止和消除静电措施，正式生产前需做以下点检动作：

- a: Check the machine equipment, the ground is normal or not. 检查机台设备、工作台接地线是否正常。
- b: Inspection personnel wearing electrostatic ring is normal, confirm whether the electrostatic ring and the metal skin contact closely. 检查人员佩戴静电环是否正常，确认静电环的金属是否与人的皮肤接触紧密。
- c: In a plugin best requirement with operators electrostatic gloves or electrostatic fingertip. 在插件时最好要求作业员戴好静电手套或静电手指套。
- d: Homework mesa requirements laid the static electricity, taping tape between each other should be connected grounded. 作业台面要求铺好静电胶布，胶布之间应互相连接接地。
- e: Check test instrument, driving power whether there is any leakage or electrostatic release. 检查测试仪器、驱动电源是否存在漏电或静电荷释放之情形。
- f: Check if the machine parameters, power supply output in qualified state debugging. 检查机台参数、电源输出是否调试在合格状态。

### 6. Workshop environment, and material safety control. 车间环境及物料安全的管控

(1) Workshop environment that best in 30 degrees below/temperature humidity 40% RH-60% RH limits (can use temperature and humidity monitoring environment change), project and contact should wear gloves LED check or fingertip, packing bag after opening should be sealed to prevent foot, a oxidation. Avoid exposure to partial acid LED (PH < 7) workshop environment, the other LED to the purchasing of materials, assembling complete may require manufacturers to provide the raw material of the MSDS report (material safety data sheet), confirm whether one containing sulphur (such as PCB board, rubber gloves, rubber band, the sulfur in the soap all contains sulfur), halogen kind material (such as glass glue, low-end two-component resin glue) to prevent its and LED material produce chemical or physical reaction, such as the LED and sulfur, including physical contact or stored in brine acidic conditions, is caused extremely easily LED products silver layer



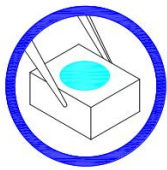
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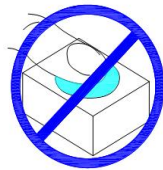
corrosion, LED the silica gel, the phosphor material properties change, which can lead to the failure of the photoelectric performance LED. 车间环境最好保证在温度30度以下/湿度40%RH-60%RH范围内（可采用温湿度计监测环境变化），并且接触LED检查时需戴手套或手指套，包装袋开口后应及时封口，防止脚位氧化。避免LED暴露在偏酸性（PH<7）的车间环境中，对于采购的其他LED组装配套的物料，可要求生产厂家提供原物料的MSDS报告（物质安全数据表），确认其中是否含硫（如PCB板材、橡胶手套、橡皮筋、硫磺香皂中均含有硫）、卤素类物质（如玻璃胶、低端的双组分树脂胶），以防止其与LED材料发生化学或物理反应，例如LED与含硫、含卤物质接触或存于酸性环境下，极易造成LED产品镀银层腐蚀、LED硅胶、荧光粉物料性能发生变异，从而导致LED光电性能的失效。

#### 7. Different materials handling and feet processing methods. 不同材料取拿及脚位加工方式

##### 7.1 How to take TOP LED TOP LED取拿方式



✓ 正确



✗ 错误

##### 7.2 SMD Process of LED TOP LED表面贴装工艺

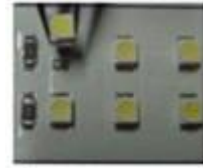
- a. Automatic machine mounted      b. Semi-automatic manual suction pen mounted      c. The tweezers mounted  
a. 自动机台贴装      b. 半自动手工吸笔贴装      c. 采用镊子贴装



(a)



(b)



(c)

(1) TOP LED by silica white light as encapsulation glue main, because there are certain viscous silicone gel, and a soft, colloid in by external extrusion or scratch the influence of the external force to a short deformation, colloid in the process of deformation stress will strain or pulled products the internal structure of the gold line in line, arc damaged or disconnected. TOP LED主要采用硅胶作为封装胶，由于硅胶存在一定的粘性，且胶体较软，胶体在受到外力挤压或者划伤的情况下易受外力影响有短暂的形变，胶体在变形的过程中应力释放会拉伤或拉断产品内部结构的金线，导致线弧受损或断线。

(2) To avoid SMD surface mounting defects caused by the sealing glue sticking to the nozzle, such as materials and can't stick from normal, and cast material (especially the phenomenon not appropriate suction nozzle, the trip not set properly, air pressure setting partial large easy cause LED structure damage, lead to function failure). In this connection, user can choose according to the product specification SMD size appropriate suction nozzle (when suction nozzle can learn from normal encapsulation colloid outside follow or PPA part of the internal force LED minimum), which can effectively prevent or reduce a series of problems caused by the poor. 为避免因封胶体粘吸嘴而造成的SMD表贴不良，如材料无法正常吸取、抛料现象（特别是采用不合适的吸嘴、机台行程设置不当、气压设置偏大时易造成LED结构损伤，导致功能失效）。针对此，用户可根据SMD产品规格选用尺寸合适吸嘴（当吸嘴能正常吸取封装胶体外沿或PPA部位对LED内部受力最小），可有效防止或降低由此引发的一系列不良问题。

(3) The semi-automatic manual suck pen in mounted SMD, should avoid material mounted to the PCB process, suction nozzle metal parts apply too pressure (artificial force has irregular) damage internal gold thread, advice LED the way with the user to assembly, metal suction nozzle in front of the increase necessary rubber

protective set for the proper pressure buffer.在采用半自动手工吸笔贴装SMD时,应避免将材料贴装至PCB过程中,吸嘴金属部位施加过大压力(人工施力具有不规则性)损伤LED内部金线,建议用户用此方式贴装时,在金属吸嘴前端增加必要的橡胶防护套,以作适当的压力缓冲。

(4)The LED application process should avoid have pointed to the scene LED encapsulation colloid, may cause damage to the LED to poor functioning.LED应用制程中应避免有尖状物体对LED封装胶体造成损伤,可能导致LED功能不良。

#### 8. Welding conditions of the TOP LED LED的焊接条件

a. Welding way: Soldering iron; Reflow soldering.焊接方式有:烙铁焊;回流焊

b. Unpacking material immediately after silica gel observation humidity compliance with requirements, if not as requirements please click "2.1.4" demanding homework, the proposal is less than 60% humidity conditions used in the 12 H. To avoid the adverse impact environment humidity, the proposal after unpacking, if the storage time more than 24 H, then the next time before use should be based on conditions and products for state take high temperature (or low temperature) dehumidifier. The product after unpacking not according to requirements assignments may be the adverse.拆封材料后,立即观察防潮珠是否符合要求,如不符合要求请按“2.1.4”点要求作业,建议湿度小于60%情况12H内用完。为避免环境湿度造成不良影响,建议拆封后,如果存放时间超过24H,则下次使用前需根据存放条件和产品状态采取高温(或低温)除湿。产品拆封后未按要求作业可能会产生的不良:

①. The material colloid peels off, causing the white light coordinates and luminous flux to shift and may cause dead light.材料胶体产生剥离,导致白光坐标及光通量产生偏移并有可能导致死灯。

②. The material colloid produces cracks, causing dead light of the material.材料胶体产生裂胶,导致材料产生死灯。

c. The welding temperature and time requirements of the way:各焊接方式的温度与时间要求:

(1)Soldering iron welding:烙铁焊:

The maximum temperature of TOP LED soldering iron is 300℃, and the maximum soldering time is 2S.

Welding position at least distance white shell or colloid 0.15 mm, DianLaoTie power should be less than 30 W.TOP LED烙铁温度最高300℃、焊接时间最长2S。焊接位置至少距离白壳或胶体0.15mm,电烙铁的功率宜低于 30W.

(2) Reflow soldering: 回流焊:

Divided into the lead and lead-free soldering welding.分为有铅焊接和无铅焊接。

(3) Note: 注意事项:

①Use first temperature measuring instrument measuring the temperature zone backflow welding temperature whether accord with and even.先用温度测量仪器测量回流焊机各温区温度是否符合并均匀。

②The recommended temperature curve for lead-free reflow soldering of the TOP LED is shown in the reflow diagram on page 2. No matter how set the highest 260 °C, no more than 10 seconds, 220 °C can't more than 60 seconds, or high temperatures may lead to failure LED products.The maximum reflow temperature recommended by our company is: 245±5℃. Only one reflow is allowed.TOP LED的无铅回流焊建议的温度曲线见第2页回流焊曲线图,不管如何设定,最高的260℃不能超过10秒,220℃不能超过60秒,否则高温下可能导致LED产品功能失效;我司推荐回流焊最高温度为:245±5℃。只允许一次回流焊。

③The peak temperature settings of different types of SMDs (a general term for TOP LED and CHIP LED) products should be different, with the difference between general categories, the greater the stress release me, the greater the resistance to high temperature ability relative decrease.不同类型的SMDs (SMD、CHIP LED

的统称) 产品峰值温度设置应有所差异, 一般同类别Size越大, 应力释放越大, 耐高温能力相对减弱。

5. TOP LED cleaning TOP LED的清洗

Avoid the use of unknown liquid chemical or acidic solvent, as cleaning, using in the solvent (such as washing board before water), please first confirm that contains the chemical composition of epoxy resin, whether organic silicon, silicon resin, support of silver cause corrosion, and thus lead to the LED properties change or function damage. Usually recommend using ethanol as solvent, first patch LED clean the body surface will light impurity wipe gently clean (to prevent excessive force package colloid or destroy a scratch light body internal structure), placed under normal temperature natural drying, again begin to use. And should also pay attention to avoid will patch LED dipping in ethanol solution.避免使用不明化学液体、或酸性溶剂作为清洗液, 在使用溶剂前(如洗板水), 请先确认其所含化学成份是否会对环氧树脂、有机硅、硅树脂、支架镀银层等造成腐蚀, 并由此导致LED特性改变或功能损坏。通常推荐使用乙醇作为贴片LED清洁溶剂, 先将灯体表面的杂质轻轻擦拭干净后(防止用力过度擦伤封装胶体或破坏灯体内部结构), 放置常温下自然干燥, 再开始使用。同时应注意避免将贴片LED浸渍于乙醇溶液中。

六、Important Tips重要提示

In order to improve the yield of mass production, please be sure to do the first confirmation before production, only the first confirmation OK can be mass production.

为了提升批量生产的良品率, 请一定要在生产前做好首件确认, 只有首件确认OK的情况下才能批量生产。

修订记录

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