HCC P50/P5F LED

Application Note

This application note is for P50/P5F eries products.

This application note describes the handling, measurement, and testing methods for P50 LED products.

Table of Content

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Recommended Solder Pad Design

The polarity of die heat sink at bottom is Anode; please make sure polarity isolation on MCPCB is done

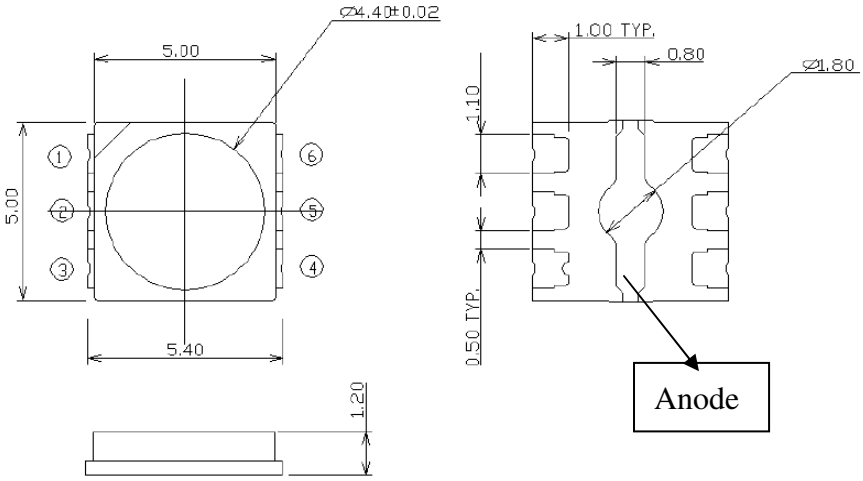


Figure 1: The Lead Polarity of the P50/P5F LED

Cleaning and Storage

Cleaning P50/P5F LEDs

1. Keeping the lens of the P50 clean is very important. Excessive dust may cause a dramatic decrease in optical output.
2. If an emitter requires cleaning, first try a gentle swabbing with a lint-free swab.
3. If needed, the gentle use of a lint-free swab and isopropyl alcohol can remove dirt from the lens.
4. Don't press or screw the lens.

Storage of P50/P5F LEDs

Please store P50/P5F LEDs in a dry box. The recommended storage conditions are: 5~30℃，RH<50%。The LEDs should be soldered within one day.

1. If unused LEDs remain, they should be stored in moisture proof packages or in a dry box. The storage conditions are: 5~40℃，RH<30%。
2. If unused LEDs are stored for more than one week, baking treatment should be performed with the following conditions:
   Baking condition: more than 4 hours at 60±5℃

Handling

Recommended handling

Pick up the LED by gripping the white plastic body (as shown in Figure 3A). Avoid pressing or puncturing the silicone lens. When stress is applied on the silicone lens, it may damage optical properties and the wire bond.

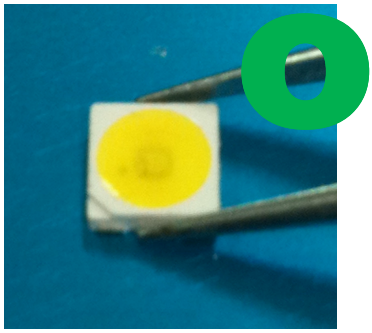


Figure 3B: Grip the white plastic body with tweezers

When manually mounting the P50/P5F LED onto the MCPCB, gently press the white plastic body or the lead.

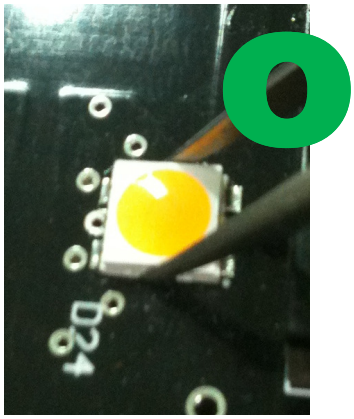


圖 Figure 4: Grip the white plastic body and press the lead with tweezers

Mishandling

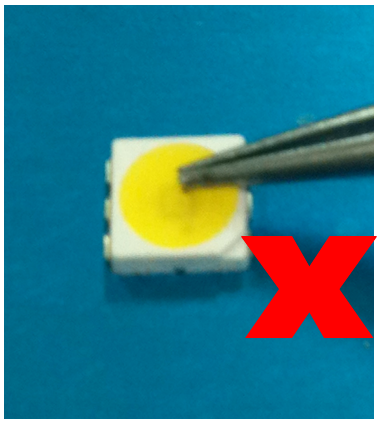


Figure 5A: Grip on the lens

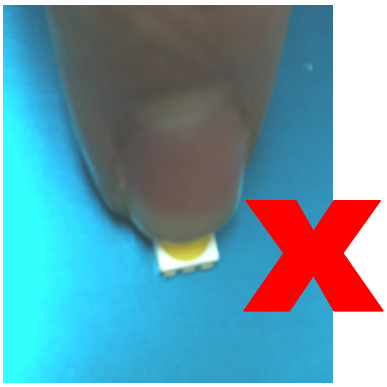


Figure 5B: Press the lens

Avoid striking the lens of the LEDs with tools used in the assembly process. This may damage the emitters.

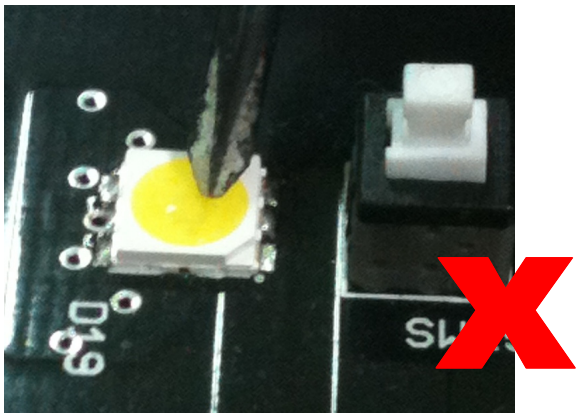
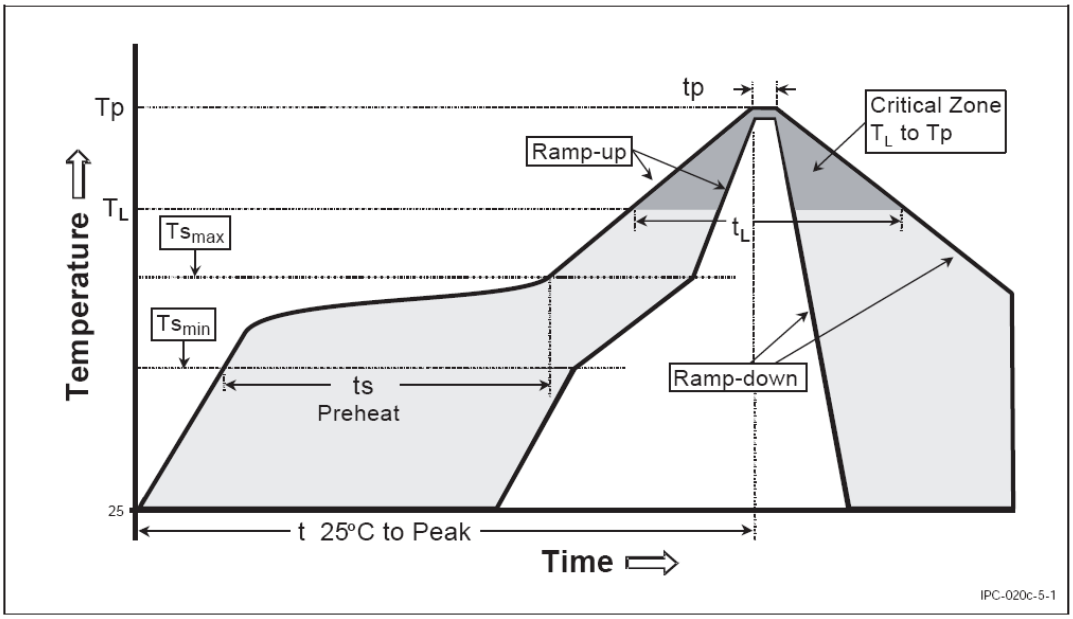


Figure 6: The screw driver strikes the LED

Recommended Soldering Profile

The LEDs can be soldered using the parameter listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest possible temperature is preferred for the LEDs.



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (Ts_{max} to Tp)	3℃/second max.	3℃/second max.
Preheat - Temperature Min(Ts_{min}) - Temperature Max(Ts_{max}) - Time(ts_{min} to ts_{max})	 100℃ 150℃ 60-120 seconds	 150℃ 200℃ 60-180 seconds
Time maintained above: - Temperature(T_L) - Time(t_L)	 183℃ 60-150 seconds	 217℃ 60-150 seconds
Peak/classification Temperature(Tp)	215℃	240℃
Time within 5℃ of actual Peak Temperature(tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6℃/second max.	6℃/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

Light Up Test

1. When using a power supply to light up the LEDs, the voltage should be limited. The voltage can't exceed 4V for each LED. When the voltage is 4V, the current will be in excess of 1500mA. This will damage the emitter.
   ea.：If there is a module with 3 LEDs in series, the maximum voltage of the power supply should be lower than 12V.

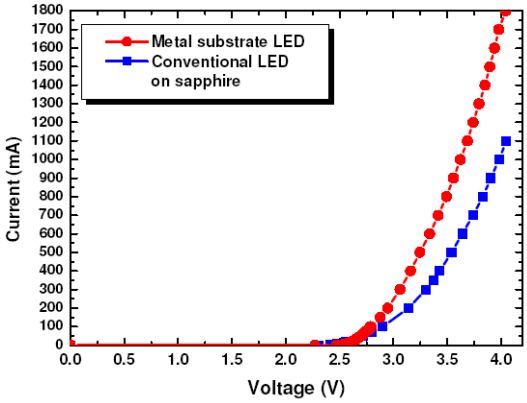


Figure 10: The I-V Curve Comparing Metal Substrate LEDs and Conventional LEDs

2. Check the polarity of the emitter. Applied reverse voltage and current may damage the emitter.

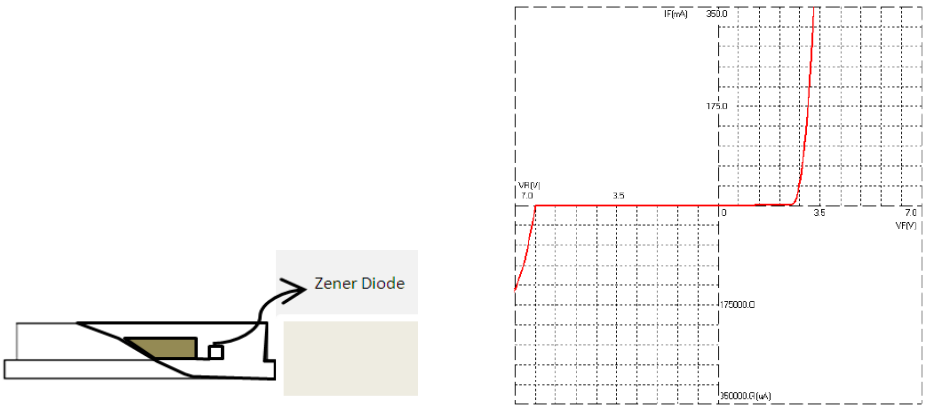


Figure 11.P50/P5F LEDI-V curve

3. If using a constant current limited voltage driver to light up the LED module, please connect the power supply and the LED module before plugging the power supply into the AC power cord. This can reduce the probability of surge current damaging the LED modules.

Measurement and Calibration

There are two causes which can result in LED measurement errors.

Types of Integrated Sphere

In non-standard LED measurements, the emitter is measured at the bottom and not the inside of the integrated sphere. Part of the light emitting from the LED transmits into the integrated sphere from the bottom glass window. The light pattern of the emitter affects the measurement results. There is a huge measurement error when the tester is not calibrated with the correct golden samples.

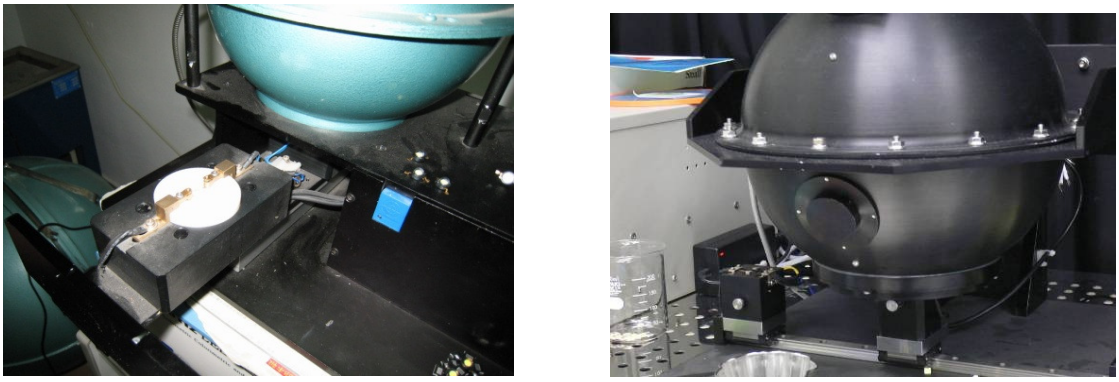


Figure 12: Non-standard LED Measurement

Recommended Method

1. Use measurement instruments which follow CIE 137 standards. The integration time should be shorter than 25ms.

2. If the operator uses non-standard testers, calibrate the tester with the golden sample before measurement. The golden sample should be measured by the instrument following CIE 137 standards (ea. IS CAS 140B).