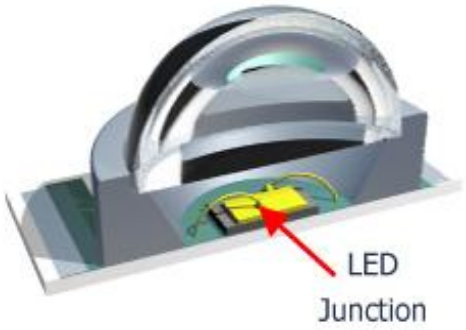
LEDs basic information.

A, What is LED Junction temperature (Tj)?

The following is Cree's XRE LEDs Section drawing:



The Tj is the heat produced at the surface of the PCB where the diode sits.

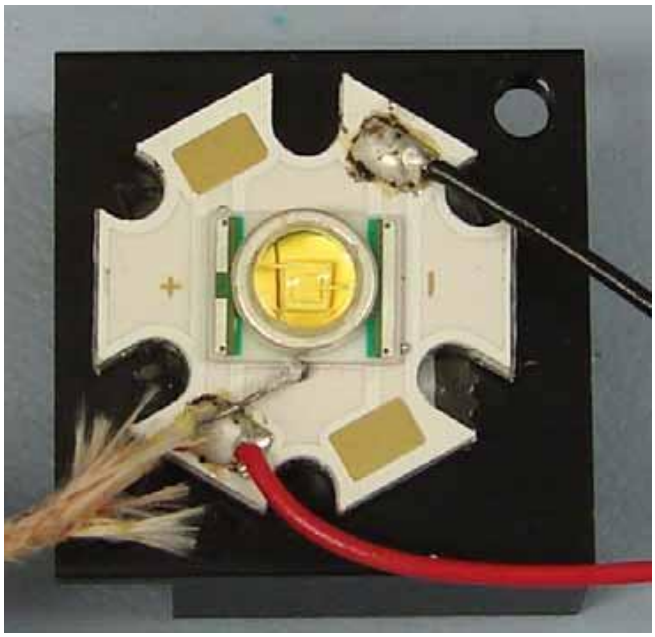
B, Testing the LEDs Junction temperature:

From the above picture, it is impossible to test the temperature on the LED Junction where the diode touches the PCB.

So, we have to know the **Thermal Resistance** (junction to solder point) of the LEDs. (You can find this data from different brands of LEDs specifications).

For example, Cree XRE LED's thermal resistance is 8°C/W, First, we test out the solder point temperature, then, we can calculate the Junction temperature according to thermal resistance and the LEDs working power consumption.

The following Cree XRE LEDs power consumption: 3.3 V × 0.35 A = 1.155 W
The solder point temperature is 51.2°C.
The LED Junction Temperature (Tj) is 51.2°C +1.155Wx8°C/W=60.44°C

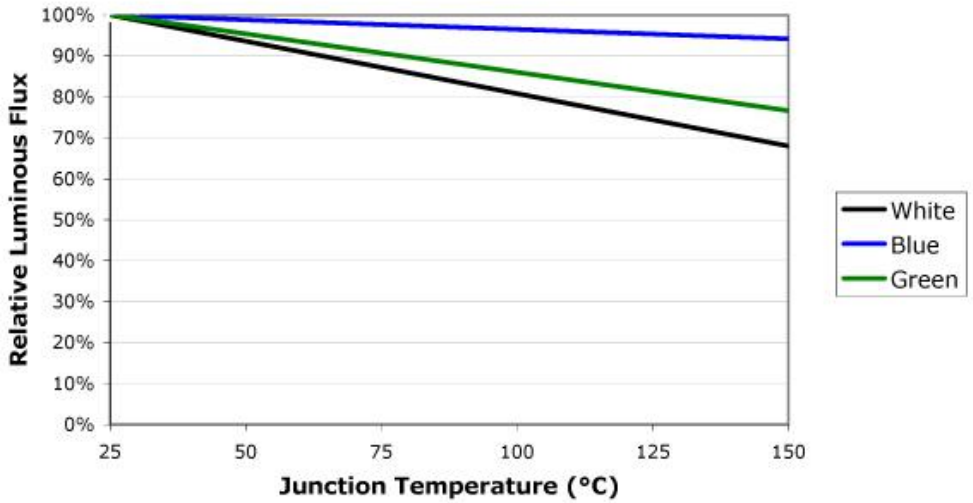


C, The actual LED lamps light efficiency:

Now, the popular LEDs used for LED lamps are 90-100LM/W, or above 100LM/W based on Junction temperature of 25℃.
But, For LED lamps, the actual LED junction temperature during working is almost 80℃.
Normally, when the Tj is about 80℃, the Luminous flux will be down 10%-20%.

Cree XRE LED information for your reference:

Relative Flux vs. Junction Temperature (I_F = 350 mA)



For the actual lighting efficiency, we have to think about the following factors:

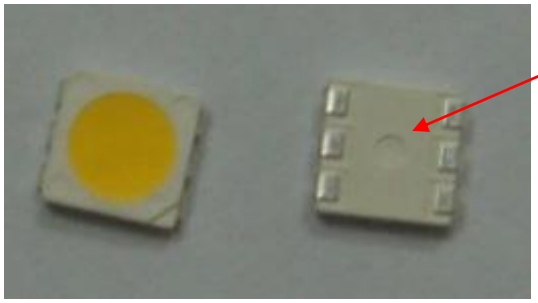
1, The single LEDs light efficiency.
2, The LED driver's technical specifications. (Driver's output current)
3, The heat-sink solution.
4, The LED's Junction temperature.
5, The LEN's or cover's light transmission rate.

D: LEDs Types and Characteristics:

A: DIP LED:

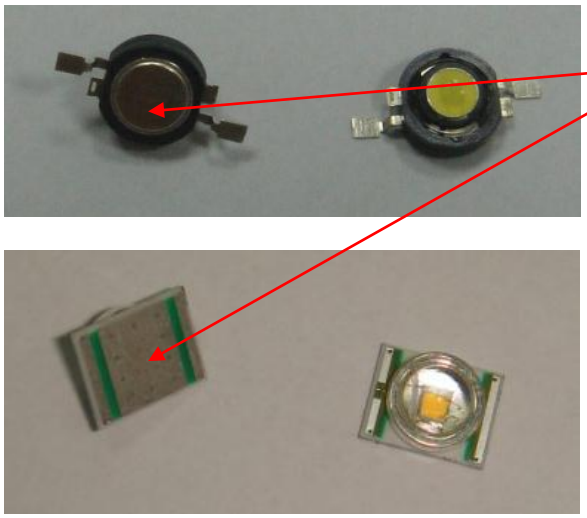
1), DIP LED is without any heat-sink solution. The chip is packaged in Epoxy resin lens.
2), The driving currency should be below 20mA.

B: SMD LED:



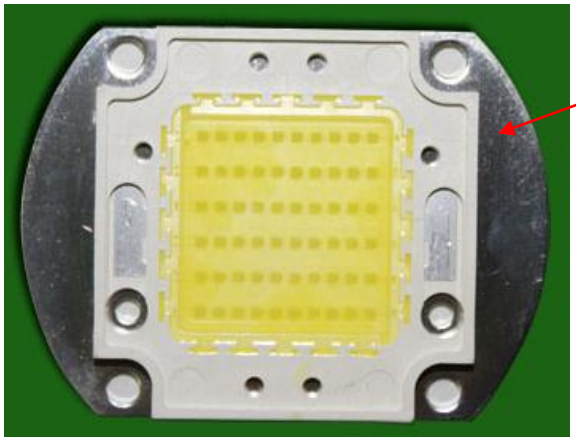
1), SMD LED is with ceramic heat-sink pad. The chip is covered by Epoxy resin.
2), The driving currency should be below 20mA for one Chip.

C: High power LEDs:



1), High power LED is with ceramic heat-sink pad, and with soldering back solution. The chip is covered by Epoxy resin.
2), The driving currency is from 300-1000mA, depending on light heat-sink solution.

D: COB LEDs



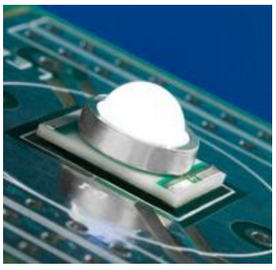
1), COB LED is with COPPER heat-sink pad, and the LED chips are bonded directly on the heat-sink pad.
2), It is independent light source. They don't need PCB, that avoid one thermo layer and good for heat-sink.
3), The driving currency is from 300-700mA, depending on light heat-sink solution.

==========

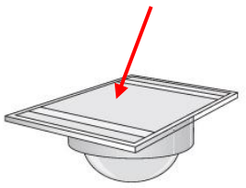
EMITECK COMPANY LTD.
SUZHOU NEOPOWER ELECTRONIC CO. LTD.
Tel: +86-512-62955217 69372811 69372812
Fax: +86-512-69370780
Website: www.neo-power.com
Email: marketing@neo-power.com

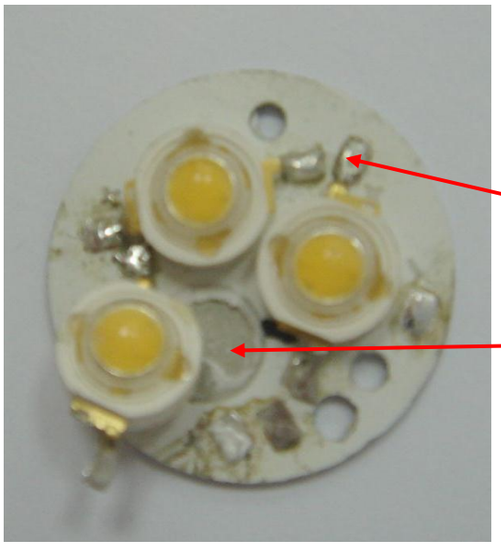
High power LEDs Soldering Solution:

We solder the LEDs on metal PCB including the heat-sink pad.



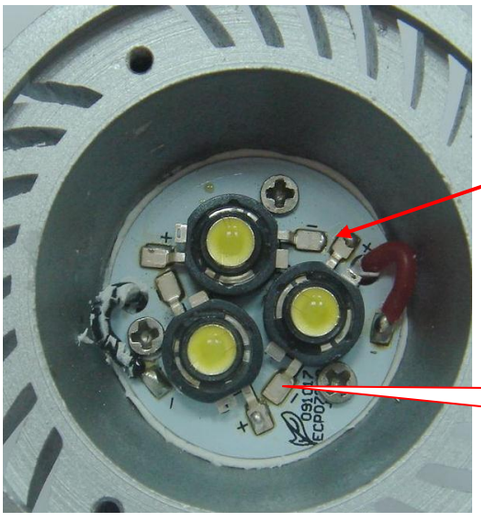
The heat-sink pad





*Most of suppliers just soldered the two legs of LEDs on the metal PCB.

They did not solder the LED's heat-sink pad on the back. They just put some silicon heat transfer materials on it. It is not stable and the heat-sink solution is not good.



We solder not only the two power legs but also the heat-sink pad on the back. The heat-sink solution is much better than silicon heat-transfer materials.

It is easy for you to check it out. If the LED's heat-sink pad is not soldered on Metal PCB, The LED heat-sink would be a problem. It will affect the whole lamps life time and the light output decay will be quick.