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Author **Topic: WS2812 reflow soldering failure rate (Read 241 times)**

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okaresz
Contributor
Posts: 8

WS2812 reflow soldering failure rate
« **on:** January 22, 2015, 02:24:17 AM »

Good day,

I have a board design with 12 WS2812 modules in a circle layout on the top (see attached picture, sorry for the poor quality, it's just for the layout). The first batch recently came back from the pick&place company, and when I started to test the boards, it turned out that on EVERY board, there are 2-3 LED modules are dead. I have however one board which I hand-soldered, no faulty LEDs there.

Now I did my fair research on the WS2812 modules, and how reliable others found it. 1-3% failure rate can be said to be normal, during handling, mounting or during operation. Of course I too am dealing with IC-s ordered from china, so there is something to be said for a reliable source...
But a consistent ~30% failure rate in a 50pcs board (600pcs LEDs) batch? Come on.. And since I haven't found a specific topic on the possible reflow failure of these LEDs, here is one

I'm using the older - 6pin - revision of WS2812, sometimes referred as "S" version. Additional to the standard docsheet, I found this soldering and reflow manual:
http://www.insomnialighting.com/datasheets/WS2811RGB_WS2812_manual.pdf.
I consulted with the P&P company, the peak of the reflow profile was to the specification (even below, ~ 220-230 celsius), for about 12s.

There are LEDs which are completely blown, not even forwarding data, and there are a few in which just one of the colors is dead. I don't have a microscope or other inspection equipment, so I shot a few pictures with a macro lens: http://goo.gl/1I7zAI
The ones, marked with black corner are the faulty ones.

That strange gooey stuff appearing to flow and crack beneath the top cover could be the silica gel, which the reflow manual mentions. The transparent top cover is completely undamaged, looks shiny and smooth, as it should, on every LED. I checked the soldering, it' totally fine.

I hope some more experienced eyes can see more than mine.

thanks,
okaresz

PCBA-v2.1-top.jpg (222.57 kB, 804x858 - viewed 74 times.)

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langwadt
Regular Contributor
Posts: 98

Re: WS2812 reflow soldering failure rate
« **Reply #1 on:** January 22, 2015, 02:35:12 AM »

Were they stored in a sealed bag and/or baked before soldering? If moisture gets inside they can crack from steam when soldering.

That would also explain why hand-soldering works, because you are not heating the whole part just the pins

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okaresz
Contributor
Posts: 8

Re: WS2812 reflow soldering failure rate
« **Reply #2 on:** January 22, 2015, 10:24:43 PM »

Wow. That hit me in the head. I almost feel dumb, I guess I never really understood the importance of baking... till now.
No, the chinese don't bother with moisture sealed bags, and I doubt the assembler baked the parts before reflow. So yepp, this can be a very possible reason, thanks!

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