Mass production solution of Micro-LED without mass transfer

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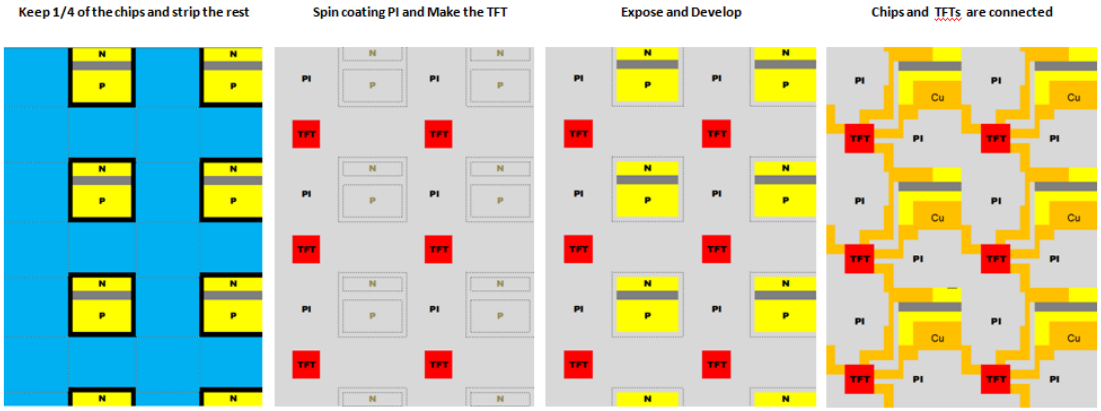
Micro-LED technology are facing lots of technology challenge, mass transfer takes the hardest part of manufacturing. we are trying to redesign the Micro-LED manufacturing process, using existing proven processes to avoid mass transfer. it will bring more opportunities of breakthrough for the mass production.

Photolithography and electroplating are widely performed in the electronics industry to deposit conducting metals used in semiconductor interconnects. and photosensitive polyimide (PI) is widely used in wafer level packaging.

In our design, the flip-chips of Micro-LEDs need not be removed from the wafer substrate until the chips are packaged, the connection between the flip-chip and the TFT are made directly on the substrate of epitaxial wafer by electroplating.



1. The first layer(red) makes the required flip-chips on the epitaxial wafer.

2. Retain 1/4 of the chips on the substrate, and the remaining 3/4 are stripped.

3. Spin coating PI and make TFT beside of the 1/4 chips.

4. Remove the PI covered on the 1/4 chip.

5. Sputtering and coating photoresist.

6. Photolithography and electroplating is performed according to the designed circuit diagram to electrically connect the electrode of the chips and the TFT.

7. Overall removal of the substrate (optional).

8. The second layer(green) and the third layer(blue) repeat the operation1-7, except that the position of chips needs to be corresponding to the position where the other two layers have no chip arrangement.