Samsung LM101A Chip Scale Package LED

First Chip Scale Package LED from Samsung: strategic technical choices reduce manufacturing costs

The LM101A is the first LED family from Samsung in chip scale packaging (CSP). These LEDs have been developed for indoor lighting applications, including bulb, candle, MR16, PAR and spotlight. The reference device that was analyzed, the SCP8TT78HPL1TLS06E, is a neutral white LED with CRI of 80 and flux of 64 lm for a current of 150 mA, emitting 140 lm/W. With 64 lm coming from 1.44 mm², the LM101A LED from Samsung offers high light density.

CSP LEDs are a new market, representing 0.8% of the LED market today, but which will be six times larger in 2021 according to Yole Développement. This component gives Samsung a position in the CSP LED sector.

Samsung has developed CSP LEDs to minimize component area, reducing the footprint on the circuit board by up to 70%. Moreover, without substrates, these LEDs have lower thermal resistance.

Bringing together flip chip LEDs and silicone molding provides a wide beam angle in a very thin device.

The simplicity of the packaging, without substrate and wire bonding, explains the high reliability of the component and the very low cost of the packaging.

The LED die is manufactured with mature technology but some new advances have been observed that reduce the manufacturing cost. The noble metals were replaced by stacking standard metals and a dicing technique has been newly adapted to LEDs in order to increase the number of dies per wafer.

The report presents a deep technology analysis of the packaging and the components, with images of the epitaxial layer stack and electrode structure.
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