

What is claimed is:

1. A method of manufacturing a light emitting diode (LED) device comprising:
forming an LED structure by depositing a plurality of semiconductor layers on a transparent substrate;
5 placing trenched metal in the plurality of semiconductor layers, with the trenched metal contacting the transparent substrate, the trenched metal is arranged to define a trenched grid;
attaching the LED structure to a CMOS structure with electrical interconnects that define a cavity therebetween;
directing laser light to provide laser lift-off of the transparent substrate from the
10 plurality of semiconductor layers.
2. The method of manufacturing a light emitting diode (LED) device of claim 1, further comprising depositing an underfill material in the cavity.
- 15 3. The method of manufacturing a light emitting diode (LED) device of claim 1, wherein the transparent substrate is sapphire.
4. The method of manufacturing a light emitting diode (LED) device of claim 1, wherein the electrical interconnects are electrically conductive pillars.
- 20 5. The method of manufacturing a light emitting diode (LED) device of claim 1, further comprising coating a sidewall of the transparent substrate with anti-stick coating.
6. The method of manufacturing a light emitting diode (LED) device of claim 5, wherein the
25 transparent substrate is dipped into anti-stick material to coat the sidewall.
7. A method of manufacturing a light emitting diode (LED) device comprising:
attaching an LED structure including trenched metal within a plurality of semiconductor layers to a CMOS structure with electrical interconnects that define a cavity
30 therebetween, the plurality of semiconductor layers and trenched metal arranged into a grid that defines pixels; and

directing laser light to provide laser lift-off of the transparent substrate from the plurality of semiconductor layers.

8. The method of manufacturing a light emitting diode (LED) device of claim 7, wherein the
5 substrate is sapphire.

9. The method of manufacturing a light emitting diode (LED) device of claim 7, wherein the plurality of semiconductor layers are GaN.

10 10. The method of manufacturing a light emitting diode (LED) device of claim 7, wherein the electrical interconnects are electrically conductive pillars.