WHAT IS CLAIMED IS:

1. A micro-LED display chip, comprising:

a substrate supporting an array of pixel drivers; and

two or more strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, each stratum containing an array of micro LEDs, wherein the arrays of micro LEDs for each stratum are electrically connected to the array of pixel drivers, and

wherein each stratum comprises:

an epitaxial structure forming the micro LEDs;

lower contact metal pads electrically connected to a bottom of the micro LEDs; and

upper contact metal pads electrically connected to a top of the micro LEDs;

wherein the lower contact metal pads are also electrically connected to the array of pixel drivers and the upper contact metal pads are also electrically connected to a common electrode.

2. The micro-LED display chip of claim 1, wherein the epitaxial structure of each stratum is one of a III-V nitride epitaxial structure, a III-V arsenide epitaxial structure, a III-V phosphide epitaxial structure, and a III-V antimonide epitaxial structure.

3. The micro-LED display chip of claim 1, wherein the lower contact metal pads of each stratum comprise aluminum, silver, rhodium, zinc, gold, germanium, nickel,

chromium, platinum, tin, copper, tungsten, indium-tin-oxide, palladium, indium, and/or titanium.

4. The micro-LED display chip of claim 1, wherein the common electrode comprises a grid of metal traces on top of all the strata, each upper contact metal pad electrically connected to the grid of metal traces.

5. The micro-LED display chip of claim 1, wherein the common electrode comprises a transparent electrode on top of all the strata, each upper contact metal pad electrically connected to the transparent electrode.

6. The micro-LED display chip of claim 1, wherein the common electrode includes a top electrode on top of all the strata, each upper contact metal pad electrically connected to the top electrode by vias through any intervening strata.

7. The micro-LED display chip of claim 1, wherein the common electrode comprises a separate common electrode structure for each stratum located on top of that stratum, each upper contact metal pad for each stratum electrically connected to the common electrode structure for that stratum.

8. The micro-LED display chip of claim 1, wherein the lower contact metal pads of each stratum are electrically connected to the array of pixel drivers by vias through any intervening strata.

9. The micro-LED display chip of claim 1, wherein the bottom of the strata contains a metal pad electrically connected to the array of pixel drivers for each micro LED in all of the strata, the metal pad functioning as the lower contact metal pad for micro LEDs in the bottom stratum and the metal pad electrically connected to the lower contact metal pad for micro LEDs in all other strata by vias through any intervening strata.

10. The micro-LED display chip of claim 1, wherein the micro LEDs of different strata produce light of different wavelengths.

11. The micro-LED display chip of claim 10, wherein the micro LEDs of different strata produce light of different visible wavelengths.

12. The micro-LED display chip of claim 10 wherein the two or more strata are exactly three strata, and the micro LEDs are red micro LEDs for one of the strata, green micro LEDs for another one of the strata, and blue micro LEDs for a third one of the strata.

13. The micro-LED display chip of claim 10, wherein the micro LEDs of each stratum are ultraviolet, blue, green, orange, red, or infrared micro LEDs.

14. The micro-LED display chip of claim 1, wherein the micro LEDs of different strata are grouped into multi-color pixels, and the micro-LED display chip further comprises:

a structure in the strata that optically separates adjacent multi-color pixels.

15. The micro-LED display chip of claim 14, wherein the structure is either absorbent or reflective.

16. The micro-LED display chip of claim 1, wherein each stratum is transparent in regions that are laterally located above micro LEDs of lower strata, so that light produced by the micro LEDs of the lower strata are able to propagate through such regions.

17. The micro-LED display chip of claim 1, wherein the pixel drivers comprise thin-film transistor pixel drivers or silicon CMOS pixel drivers.

18. A micro-LED display chip, comprising:

a substrate supporting an array of pixel drivers; and

three strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, one of the strata containing red micro LEDs, another one of the strata containing green micro LEDs, and a third one of the strata containing blue micro LEDs, each stratum further comprising:

an epitaxial structure forming the micro LEDs;

lower contact metal pads electrically connected to a bottom of the micro LEDs; and

upper contact metal pads electrically connected to a top of the micro LEDs;

wherein the lower contact metal pads are also electrically connected to the array of pixel drivers by vias through any intervening strata, and the upper contact metal pads are also electrically connected to a common electrode; and

wherein each stratum is transparent in regions that are laterally located above micro LEDs of lower strata, so that light produced by the micro LEDs of the lower strata are able to propagate through such regions.

19. The micro-LED display chip of claim 18, wherein:

the common electrode includes a top electrode on top of all the strata, each upper contact metal pad electrically connected to the top electrode by vias through any intervening strata; and

the lower contact metal pads of each stratum are electrically connected to the array of pixel drivers by vias through any intervening strata.

20. A method for fabricating a micro-LED display chip, comprising:

providing a substrate supporting an array of pixel drivers; and

fabricating two or more strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, by:

for a bottom stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of the substrate and pixel drivers; and

for any other stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of a previous stratum;

patterning the epitaxial structure to form micro LEDs and patterning the bonding metal layers to form metal pads, some of the metal pads functioning as lower contact metal pads electrically connected to bottoms of the micro LEDs; and

for all strata except a top stratum, filling and planarizing the stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs.

21. The method of claim 20 wherein patterning the epitaxial structure to form micro LEDs comprises fully separating the epitaxial structures for different micro LEDs.

22. The method of claim 20 wherein patterning the epitaxial structure comprises dry etching the epitaxial structure to form the micro LEDs.

23. The method of claim 20 wherein patterning the bonding metal layers to form metal pads comprises forming one metal pad for every micro LED in every strata.

24. The method of claim 20 wherein bonding the unpatterned epitaxial structure on top of the substrate or previous stratum comprises:

bonding unpatterned epitaxial layers supported on an epitaxy substrate to the top of the substrate or previous stratum; and

removing the epitaxy substrate.

25. The method of claim 24 wherein removing the epitaxy substrate comprises removing the epitaxy substrate using one of a lift-off process or wet chemical etching.

26. The method of claim 20 wherein filling the stratum comprises filling the stratum with transparent material.

27. The method of claim 26 wherein the transparent material is silicon dioxide or silicon nitride.

28. The method of claim 20 wherein filling the stratum comprises filling the stratum with transparent material in regions that are laterally located above micro LEDs of lower strata, so that light produced by the micro LEDs of the lower strata are able to propagate through such regions.

29. The method of claim 20 wherein planarizing the stratum comprises using chemical mechanical polishing to planarize the stratum.

30. The method of claim 20 further comprising:

depositing upper contact metal pads on the tops of the micro LEDs before filling and planarizing the stratum.

31. The method of claim 30 further comprising:

after filling, fabricating vias from the planar top interface through the filling to the upper contact metal pads.

32. The method of claim 20 further comprising:

after filling, fabricating vias from the planar top interface through the filling to metal pads that do not function as lower contact metal pads.

33. The method of claim 20 further comprising:

filling and planarizing the top stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs; and

fabricating a common electrode on top of the planar top interface of the top stratum, the tops of the micro LEDs electrically connected to the common electrode.

34. The method of claim 33 wherein the common electrode is further electrically connected to one or more of the metal pads of the bottom stratum.

35. The method of claim 20 wherein the micro LEDs of different strata are grouped into multi-color pixels, and fabricating the strata further comprises:

fabricating a structure in the strata that optically separates adjacent multi-color pixels.

36. The method of claim 20 wherein the two or more strata are exactly three strata, and the micro LEDs are red micro LEDs for one of the strata, green micro LEDs for another one of the strata, and blue micro LEDs for a third one of the strata.

37. The method of claim 20 wherein fabricating the strata further comprises:

fabricating vias to provide electrical connection through the stratum.

38. The method of claim 37 wherein fabricating vias comprises:

etching via holes; and

filling the via holes with a conductor.

39. A method for fabricating a micro-LED display chip, comprising:

providing a substrate supporting an array of pixel drivers; and

fabricating three strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, one of the strata containing red micro LEDs, another one of the strata containing green micro LEDs, and a third one of the strata containing blue micro LEDs, wherein fabricating each stratum comprises:

for a bottom stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of the substrate and pixel drivers; and for any other stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of a previous stratum;

patterning the epitaxial structure to form the micro LEDs for the stratum, and patterning the bonding metal layers to form metal pads, some

of the metal pads functioning as lower contact metal pads electrically connected to bottoms of the micro LEDs;

depositing upper contact metal pads electrically connected to tops of the micro LEDs;

for all strata except a top stratum, filling and planarizing the stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs; and

fabricating vias from the planar top interface to the upper contact metal pads and to the metal pads that do not function as lower contact metal pads.