CLAIMS

What is claimed is:

1. A method comprising:

obtaining a packaging substrate comprising a top surface, a bottom surface opposite the top surface, an embedded metal inlay, a plurality of conductive vias in the packaging substrate, and a plurality of conductive contacts on the bottom surface of the packaging substrate, each electrically coupled to a respective one of the plurality of conductive vias;

disposing a plurality of passive components on the top surface of the packaging substrate;

forming a hybridized device;

attaching a bottom surface of the hybridized device to a top surface of the metal inlay; and

wire bonding a top surface of the hybridized device to the top surface of the packaging substrate using a plurality of conductive connectors whereby each of the plurality of conductive connectors is electrically coupled to a respective one of the plurality of conductive contacts on the bottom surface of the packaging substrate by a respective one of the plurality of conductive vias, and at least some of the plurality of conductive connectors are electrically coupled to at least one of the plurality of passive components.

2. The method of claim 1, further comprising dispensing a light-blocking encapsulant over the plurality of conductive connectors.

3. The method of claim 1, further comprising molding a light-blocking encapsulant over the plurality of conductive connectors.

4. The method of claim 1, wherein the forming the hybridized device comprises attaching a bottom surface of a segmented monolithic light-emitting array to a top surface of a silicon backplane.

5. The method of claim 4, wherein the attaching the bottom surface of the segmented monolithic light-emitting array to the top surface of the silicon backplane comprises electrically coupling individual drivers to each of a plurality of light-emitting segments in the segmented monolithic light-emitting array or to each subset of the plurality of light-emitting segments in the segmented monolithic light-emitting array.

6. The method of claim 5, wherein the electrically coupling comprises copper pillar bump attaching an array of copper pillar bumps on the silicon backplane to the bottom surface of the segmented monolithic light-emitting array.

7. The method of claim 1, wherein the attaching the bottom surface of the hybridized device to the top surface of the metal inlay comprises:

dispensing a layer of a thermally conductive material on the top surface of the metal inlay, and

die attaching the hybridized device to the layer of the thermally conductive material.

8. The method of claim 1, further comprising forming at least one metallization layer on the top surface of the packaging substrate, electrically coupled between the plurality of conductive connectors and the vias.

9. A method comprising:

embedding a metal inlay in a packaging substrate that comprises a top surface and a bottom surface opposite the top surface;

forming a plurality of conductive vias in the packaging substrate;

forming a plurality of conductive contacts on the bottom surface of the packaging substrate, each electrically coupled to one of the plurality of conductive vias;

disposing a plurality of passive components on the top surface of the packaging substrate;

forming a hybridized device;

attaching a bottom surface of the hybridized device to a top surface of the metal inlay; and

wire bonding the top surface of the hybridized device to a top surface of the packaging substrate using a plurality of conductive connectors whereby each of the plurality of conductive connectors is electrically coupled to a respective one of the plurality of conductive contacts on the bottom surface of the packaging substrate by a respective one of the plurality of conductive vias, and at least some of the plurality of conductive connectors are electrically coupled to at least one of the plurality of passive components.

10. The method of claim 9, further comprising dispensing a light-blocking encapsulant over the plurality of conductive connectors.

11. The method of claim 9, further comprising molding a light-blocking encapsulant over the plurality of conductive connectors.

12. The method of claim 9, wherein the forming the hybridized device comprises attaching a bottom surface of a segmented monolithic light-emitting array to a top surface of a silicon backplane.

13. The method of claim 12, wherein the attaching the bottom surface of the segmented monolithic light-emitting array to the top surface of the silicon backplane comprises electrically coupling individual drivers to each of a plurality of light-emitting segments in the segmented monolithic light-emitting array or to each subset of the plurality of light-emitting segments in the segmented monolithic light-emitting array.

14. The method of claim 13, wherein the electrically coupling comprises copper pillar bump attaching an array of copper pillar bumps on the silicon backplane to the bottom surface of the segmented monolithic light-emitting array.

15. The method of claim 9, wherein the attaching the bottom surface of the hybridized device to the top surface of the metal inlay comprises:

dispensing a layer of a thermally conductive material on the top surface of the metal inlay, and

die attaching the hybridized device to the layer of the thermally conductive material.

16. The method of claim 9, further comprising forming at least one metallization layer on the top surface of the packaging substrate, electrically coupled between the plurality of conductive connectors and the vias.

17. A method comprising:

obtaining a light-emitting package comprising a hybridized device mounted on a packaging substrate that comprises a top surface and a bottom surface opposite the top surface, the packaging substrate comprising an embedded first metal inlay, a plurality of conductive vias in the packaging substrate and a plurality of conductive contacts on a bottom surface of the packaging substrate and each electrically coupled to a respective one of the plurality of conductive vias;

disposing a plurality of passive components on the top surface of the packaging substrate;

obtaining a control board having an embedded second metal inlay;

wire bonding a top surface of the hybridized device to the top surface of the packaging substrate using a plurality of conductive connectors whereby each of the plurality of conductive connectors is electrically coupled to a respective one of the plurality of conductive contacts on the bottom surface of the packaging substrate by a respective

one of the plurality of conductive vias, and at least some of the plurality of conductive connectors are electrically coupled to at least one of the plurality of passive components;

mounting the light-emitting package on a top surface of the control board with the embedded first metal inlay adjacent the embedded second metal inlay; and

wire bonding the top surface of the packaging substrate to the top surface of the control board.

18. The method of claim 17, wherein the mounting the light-emitting package on the top surface of the control board comprises soldering the first embedded metal inlay to the second embedded metal inlay.

19. The method of claim 17, wherein the mounting the light-emitting package on the top surface of the control board further comprises soldering the plurality of conductive contacts on the bottom surface of the packaging substrate to a plurality of corresponding contacts on a top surface of the control board.

20. The method of claim 17, further comprising attaching a bottom surface of the control board to a top surface of a heat sink.