CLAIMS

1. An apparatus comprising:

a die, wherein one or more electrical contacts are accessible on a surface of the die;

a substrate comprising a cavity, wherein the die is oriented in a portion of the cavity in the substrate, wherein the substrate comprises exposed electrical contacts electrically coupled to the electrical contacts on the surface of the die, wherein the orientation defines a first space in the cavity adjacent to a first edge of the upper surface of the die and a second space in the cavity adjacent to the second edge of the upper surface of the die; and

fluidics fan-out regions comprising a first cured material deposited in the first space and the second space, a surface of the fluidics fan-out regions being contiguous with the upper surface of the die.

2. The apparatus of claim 1, further comprising:

a fluidic flow channel over the active surface of the die defined by the surface of the fluidics fan-out regions and the upper surface of the die and a lid attached to portions of the substrate adjacent to the fluidics fan-out regions.

3. The apparatus of claim 2, further comprising:

an under-fill layer in the cavity between the lower surface of the die and the substrate.

4. The apparatus of claim 2, further comprising: an under-fill layer in the cavity between the lower surface of the die and the substrate, wherein the cavity comprises: a die cavity portion, a fluidics cavity portion, and a top level portion, wherein the die cavity portion and the under-fill layer, together, are substantially equal in height to the die, wherein the fluidics cavity portion comprises a space comprising a height of the fluidic flow channel, and wherein the top level portion comprises a height of the portions of the substrate adjacent to the fluidics fan-out regions.

5. The apparatus of claim 4, wherein the portion of the cavity in the substrate in which the die is oriented comprises the die cavity portion.

6. The apparatus of claim 4, wherein the portions of the substrate adjacent to the fluidics fan-out regions comprise portions of a circuit board, and wherein the top level portion comprises an interface between the circuit board and the lid.

7. The apparatus of claim 6, wherein the circuit board is selected from the group consisting of: a printed circuit board and a ceramic circuit board.

8. The apparatus of claim 2, wherein the lid comprises an inlet for fluids and an outlet for fluid.

9. The apparatus of claim 2, wherein the fluidic flow channel is approximately 100 um from the active surface to the lid.

10. The apparatus of claim 1, wherein the exposed electrical contacts comprise substrate bonding pads and the electrical contacts on the surface of the die comprise die bonding pads, and wherein each die bonding pad is coupled to at least one substrate bonding pad with a wire, forming wire-bonded connections.

11. The apparatus of claim 10, further comprising:

a fluidic flow channel over the active surface of the die defined by the surface of the fluidics fan-out regions and the upper surface of the die and a lid attached to portions of the substrate adjacent to the fluidics fan-out regions, wherein the lid is oriented to be in physical contact with a top surface of each of the encapsulated wire-bonded connections.

12. The apparatus of claim 1, wherein the wire-bonded connections are encapsulated in a second cured material.

13. The apparatus of claim 12, wherein each of the first cured material and the second cured material is selected from the group consisting of: epoxy and glue.

14. The apparatus of claim 1, the die further comprising a silicon wafer, a passivation stack, and one or more through silicon vias extended through a portion of the silicon wafer and the passivation stack, wherein the passivation stack is disposed below a lower surface of the portion of the silicon wafer, wherein a portion of each of the one or more through silicon vias is

exposed through an opening of one or more openings in the passivation stack, and wherein each exposed portion is coupled to the electrical contacts.

15. The apparatus of claim 1, wherein the electrical contacts of the die comprise pillar bumps.

16. The apparatus of claim 1, the die comprising a sensor.

17. The apparatus of claim 16, wherein the sensor comprises a Complementary Metal-Oxide-Semiconductor (CMOS) detection device.

18. The apparatus of claim 1, wherein the surface is selected from the group consisting of: an upper surface of the die, a portion of the upper surface of the die comprising an active surface, and a lower surface parallel to the upper surface.

19. The apparatus of claim 1, wherein the die is singulated from a silicon wafer.

20. An apparatus comprising:

a die;

a substrate comprising a cavity, wherein the die is oriented in a portion of the cavity in the substrate, wherein the orientation defines a first space in the cavity adjacent to a first edge of the upper surface of the die and a second space in the cavity adjacent to the second edge of the upper surface of the die;

fluidics fan-out regions comprising a first cured material deposited in the first space and the second space, a surface of the fluidics fan-out regions being contiguous with the upper surface of the die; and

a fluidic flow channel over the active surface of the die defined by the surface of the fluidics fan-out regions and the upper surface of the die and a lid attached to portions of the substrate adjacent to the fluidics fan-out regions.