CLAIMS

What is claimed is:

1. A method of forming a flow cell, comprising:

applying a first adhesive to a substrate, wherein a top surface of the substrate comprises electrical contacts;

orienting a package on the first adhesive, the package comprising a die wherein a top surface of the die comprises an active surface and electrical contact points and surfaces adjacent to the active surface on at least two opposing sides of the active surface form fanout regions for utilization in a fluidic path of the flow cell;

connecting the electrical contacts on the top surface of the substrate to electrical contact points on the die;

applying a second adhesive to a part of the package; and

attaching a lid to the second adhesive, wherein the attaching defines a fluidic flow-cell cavity below the lid and above a surface comprising the active surface and the fanout regions.

2. The method of claim 1, further comprising:

forming the package, the forming the package comprising:

orienting the die on the first adhesive; and

forming the fanout regions by orienting one or more support pieces on the first adhesive adjacent to at least two sides of the die, wherein the fanout regions comprise a portion of a top surface of the support pieces.

3. The method of claim 2, wherein the one or more support pieces comprise two support pieces, and wherein the orienting the one or more support pieces on the first adhesive adjacent to

the at least two sides of the die comprises placing two support pieces adjacent to the die on opposing sides of the die.

4. The method of claim 2, wherein the one or more support pieces comprise one support piece, wherein the one support piece comprises a cutout, and wherein the orienting the one or more support pieces on the first adhesive adjacent to the at least two sides of the die comprises orienting the one support piece such that the die and electrical contacts are within the cutout.

5. The method of claim 1, wherein the package comprises a cured electronic molded compound (EMC) material molded around portions of the die, wherein a portion of the EMC material comprises the fanout regions.

6. A flow cell, comprising:

a substrate comprising electrical contacts on a top surface, wherein the electrical contacts on the top surface of the substrate are connected to electrical contact points on a top surface of a die;

a first cured adhesive, wherein the first cured adhesive is joined to a package, the package comprising:

the die, wherein the top surface of the die further comprises an active surface; and

fanout regions comprising surfaces adjacent at least two opposing sides of the active surface, the fanout regions at least partially defining a fluidic path of the flow cell;

a second cured adhesive, wherein the second cured adhesive joins a portion of a top surface of the package to a lid defining a fluidic flow-cell cavity below the lid and above a surface comprising the active surface and the fanout regions; and

the lid.

7. The flow cell of claim 6, wherein the package further comprises:

one or more support pieces adjacent to the at least two opposing sides of the active surface of the die, wherein the one or more support pieces comprise the fanout regions.

8. The flow cell of claim 7, wherein the one or more support pieces comprise two support pieces oriented on the at least two opposing sides of the active surface of the die.

9. The flow cell of claim 7, wherein the one or more support pieces comprise one support piece, wherein the one support piece comprises a cutout, wherein the die and the electrical contacts on the top surface of the substrate are oriented within the cutout.

10. The flow cell of claim 6, wherein the package further comprises:

a cured electronic molded compound (EMC) material molded around portions of the die;

a portion of the EMC material forming EMC material surfaces adjacent to the active surface on the at least two opposing sides of the active surface; and

a portion of the EMC material surfaces comprise the fanout regions.

11. The flow cell of claim 6, wherein the package comprises:

a cured electronic molded compound (EMC) material molded around portions of the die;

a layer deposited on the EMC material surfaces adjacent to the active surface on the at least two opposing sides of the active surface, wherein the fanout regions comprise portions of the layer.

12. The flow cell of claim 10, wherein the package further comprises vias embedded in the EMC material.

13. The flow cell of claim 6, wherein the substrate further comprises electrical contacts on a bottom surface of the substrate, wherein the electrical contacts on a bottom surface of the substrate are electrically coupled to the electrical contacts on the top surface of the substrate by vias formed through the substrate.

14. The flow cell of claim 6, the substrate further comprising a heating element.

15. The flow cell of claim 14, the heating element comprising:

one or more resistors on one or more of the top surface of the substrate and the bottom surface of the substrate;

a metal plane in the substrate; and

vias through the substrate coupling the one or more resistors to the metal plane in the substrate.

16. The flow cell of claim 14, the heating element comprising: a long wound metal trace in the substrate to function as a resistive heater.

17. The flow cell of claim 6, wherein the lid comprises two apertures and each aperture defines one of an inlet or an outlet fluidic port.

18. The flow cell of claim 6, wherein the top surface of the die comprises nanowells.

19. The flow cell of claim 6, wherein the substrate comprises a material selected from the group consisting of: a glass-reinforced epoxy laminate material, FR4, and co-fired ceramic sheets.

20. The flow cell of claim 6, wherein the die is a complementary metal–oxide–semiconductor.