

Claims:

1. A package substrate that comprises:
 - a first side to receive a die;
 - a second side opposite the first side, the second side with a plurality of contacts disposed thereon;
 - a vertical interconnect between the first side and the second side, wherein the vertical interconnect includes a cluster of ground vias that are electrically coupled with an individual contact of the plurality of contacts; and
 - signal vias of a same layer of vias as the ground vias, wherein the signal vias surround the cluster of ground vias.
2. A package substrate comprising:
 - a plurality of contacts disposed on a first side of the package substrate; and
 - two ground vias of a same layer of vias, wherein the two ground vias form a cluster of ground vias electrically coupled with an individual contact of the plurality of contacts.
3. The package substrate of claim 2, wherein the cluster of ground vias is part of a vertical interconnect between the first side of the package substrate and a second side of the package substrate opposite the first side.
4. The package substrate of claim 2, wherein the same layer of vias is an outermost first layer of vias adjacent to a second side of the package substrate opposite the first side of the package substrate, a second layer of vias directly adjacent to the outermost first layer of vias, or a third layer of vias directly adjacent to the second layer of vias.
5. The package substrate of claim 2, wherein the cluster of ground vias is a part of a column of ground vias closest to an edge of the package substrate.
6. The package substrate of claim 2, wherein the cluster of ground vias is surrounded by signal vias of the same layer of vias.
7. The package substrate of claim 6, wherein the signal vias are configured in a substantially hexagonal arrangement around the cluster of ground vias.
8. The package substrate of claim 2, wherein the cluster of ground vias includes three ground vias in a triangular arrangement.

9. The package substrate of claim 8, wherein a center of the triangular arrangement is disposed over a center of the individual contact.

10. The package substrate of claim 2, wherein a distance between the two ground vias is less than a diameter of the individual contact.

11. The package substrate of claim 2, wherein the two ground vias have a same diameter.

12. The package substrate of claim 2, wherein the package substrate is a stacked via a laminate core package or a core ball grid array (BGA) package.

13. A method of fabricating an integrated circuit (IC) package assembly comprising:
forming a plurality of contacts on a package substrate; and
forming a cluster of ground vias with at least two ground vias of a same layer of vias to electrically couple with an individual contact of the plurality of contacts.

14. The method of claim 13, wherein forming the cluster of ground vias comprises forming a vertical interconnect including the cluster of ground vias between two sides of the package substrate.

15. The method of claim 13, wherein forming the cluster of ground vias comprises forming a cluster of core vias in the same layer of vias.

16. The method of claim 13, wherein forming the cluster of ground vias comprises forming the cluster of ground vias surrounded by signal vias of the same layer of vias.

17. The method of claim 13, wherein forming the cluster of ground vias comprises forming three ground vias in a triangular arrangement.

18. The method of claim 17, wherein a center of the triangular arrangement is disposed over a center of the individual contact.

19. The method of claim 13, wherein forming the cluster of ground vias comprises forming two ground vias apart from each other.

20. The method of claim 13, wherein forming the cluster of ground vias comprises forming the cluster of ground vias in a column of ground vias closest to an edge of the package substrate.