

BELL SEMICONDUCTOR LLC’S ANALYSIS OF INFRINGEMENT

NXP

U.S. Patent No. 7,345,245

Bell Semiconductor, LLC (“Bell Semic”) provides evidence of infringement of claims 1, 5, and 6 of U.S. Patent No. 7,345,245 (“the ’245 patent”) by NXP USA, Inc. (“NXP”). In support thereof, Bell Semic provides the following claim charts.

“Accused Products” as used herein refers to the i.MX8 products listed by part number in the table below. These Accused Products include semiconductor packaged devices having high density substrate design for thermal cycling reliability, with the understanding that infringement has also taken place through the manufacture, importation, offer for sale, and/or sale of products including such Accused Products. These Accused Products include the representative MIMX8QP6AVUFFAB Microprocessor, along with any devices or other products comprising the MIMX8QP6AVUFFAB Microprocessor or another one of the Accused Products. The MIMX8QP6AVUFFAB Microprocessor is representative of the other i.MX8 products below, for example, because they share the same or similar Data Sheets (e.g., Document Number: IMX8QXPAEC; IMX8DXAEC), and on information and belief, therefore share the same high-performance processor features shown below. These claim charts demonstrate infringement by comparing each element of the asserted claims to corresponding components, aspects, and/or features of the Accused Products. These claim charts are not intended to constitute an expert report on infringement. These claim charts include information provided by way of example, and not by way of limitation.

The analysis set forth below is based only upon information from available resources regarding the Accused Products, as NXP has not yet provided any non-public information. An analysis of NXP’s (or other third parties’) technical documentation may assist in fully identifying all infringing features and functionality. Accordingly, Bell Semic reserves the right to supplement this infringement analysis once such information is made available to Bell Semic. Furthermore, Bell Semic reserves the right to revise this infringement analysis, as appropriate, upon issuance of a court order construing any terms recited in the asserted claims.

Unless otherwise noted, Bell Semic contends that NXP and customers of NXP directly infringe under 35 U.S.C. § 271(a) the ’245 patent by selling, offering to sell, making, using, and/or importing semiconductor products comprising the Accused Products. Unless otherwise noted, Bell Semic further contends that the evidence below supports a finding of indirect infringement under 35 U.S.C. § 271(b) since January 30, 2022, the time when NXP had actual notice of NXP’s infringement of the ’245 patent.

NXP and/or its customers make, use, sell, import, or offer for sale in the United States, or have done the same in the past, without authority, and/or induce or have induced others to make, use, sell, import, or offer for sale in the United States, without authority, products, equipment, or services that infringe claims 1, 5, and 6 of the ’245 patent, including without limitation, the Accused Products or semiconductor products containing the Accused Products.

Unless otherwise noted, Bell Semic believes and contends that each element of each claim asserted herein is literally met through NXP’s provision of the Accused Products. However, to the extent that NXP attempts to allege that any asserted claim element is not literally met, Bell Semic believes and contends that such elements are met under the doctrine of equivalents. More specifically, in its investigation and analysis of the Accused Products, Bell Semic did not identify any substantial differences between the elements of the patent claims and

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the corresponding features of the Accused Products, as set forth herein. In each instance, the identified feature of the Accused Products performs at least substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim element.

To the extent the chart of an asserted claim relies on evidence about certain specifically-identified Accused Products, Bell Semic asserts that, on information and belief, any similarly-functioning instrumentalities also infringes the charted claim. Bell Semic reserves the right to amend this infringement analysis based on other products made, used, sold, imported, or offered for sale by NXP. Bell Semic also reserves the right to amend this infringement analysis by citing other claims of the '245 patent, not listed in the claim chart, that are infringed by the Accused Products. Bell Semic further reserves the right to amend this infringement analysis by adding, subtracting, or otherwise modifying content in the "Accused Products" column of each chart.

Part Number	Data Sheet
MIMX8QP6AVUFFAB	https://www.mouser.com/datasheet/2/302/IMX8QPAEC-1815284.pdf
MIMX8DX1AVLFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
MIMX8DX2AVLFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
MIMX8DX2AVOFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
MIMX8DX5AVLFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
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MIMX8QX1AVLFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
MIMX8QX1AVOFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf
MIMX8QX1AVOFZAC	https://www.mouser.com/datasheet/2/302/IMX8QXPAEC-1950139.pdf

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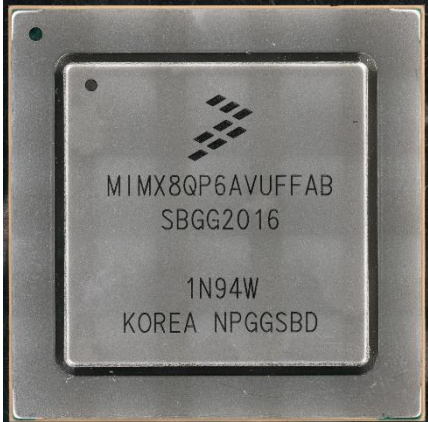
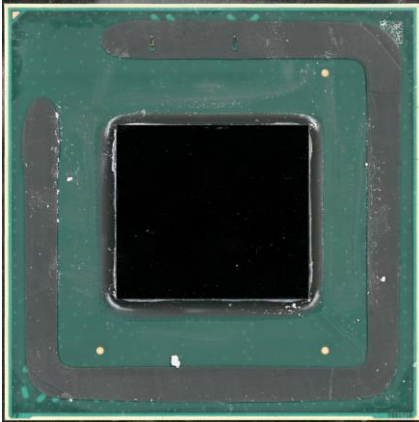
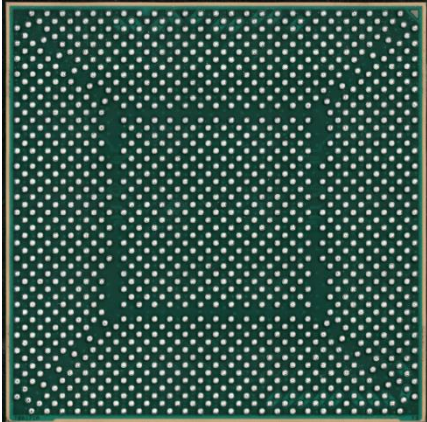
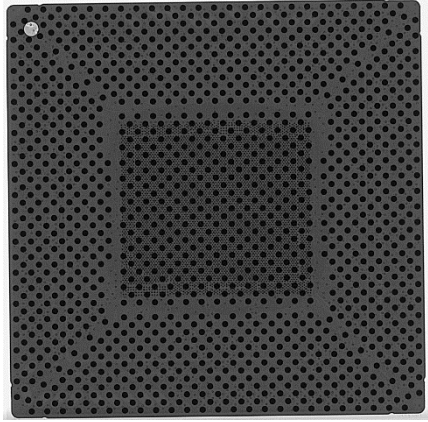
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MIMX8QX2AVLFZAC	https://www.mouser.com/datasheet/2/302/phgl_s_a0010457494_1-2279790.pdf
MIMX8QX2AVLFZAC	https://www.mouser.com/datasheet/2/302/phgl_s_a0010457494_1-2279790.pdf
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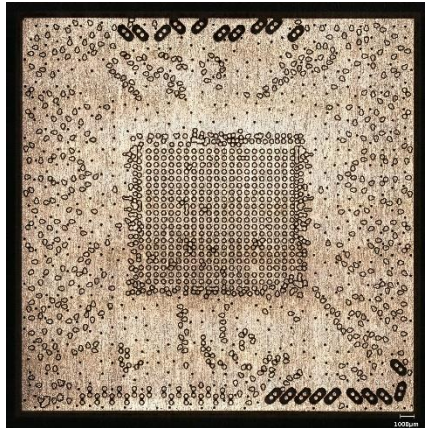
Claim 1	Accused Products
1[pre]. A semi-conductor package comprising:	To the extent the preamble is limiting, the NXP MIMX8QP6AVUFFAB Microprocessor is a semiconductor integrated circuit package with a semiconductor integrated circuit (IC) therein. Component Top View  Component Top View Lid Removed  Component – Bottom (BGA View)   X-ray (Top View)  X-ray (Side View)

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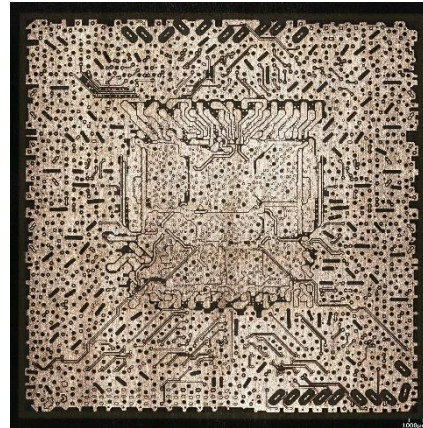
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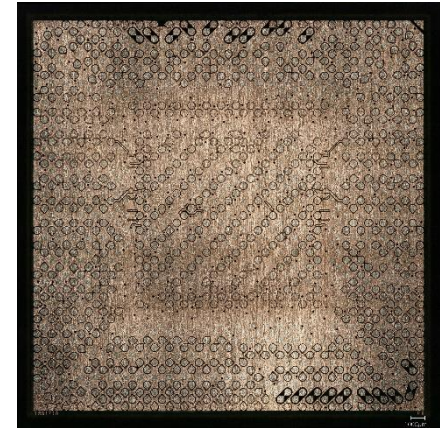
The integrated circuit package of the NXP MIMX8QP6AVUFFAB Microprocessor is manufactured to have 6 metal layers (including the BGA Metal Layer 6) and 5 via layers. A die with a corner is mounted on the top layer.



Metal Layer 4



Metal Layer 5



Metal Layer 6 – Ball Pad Layer,
after removing BGA balls and
solder mask layer

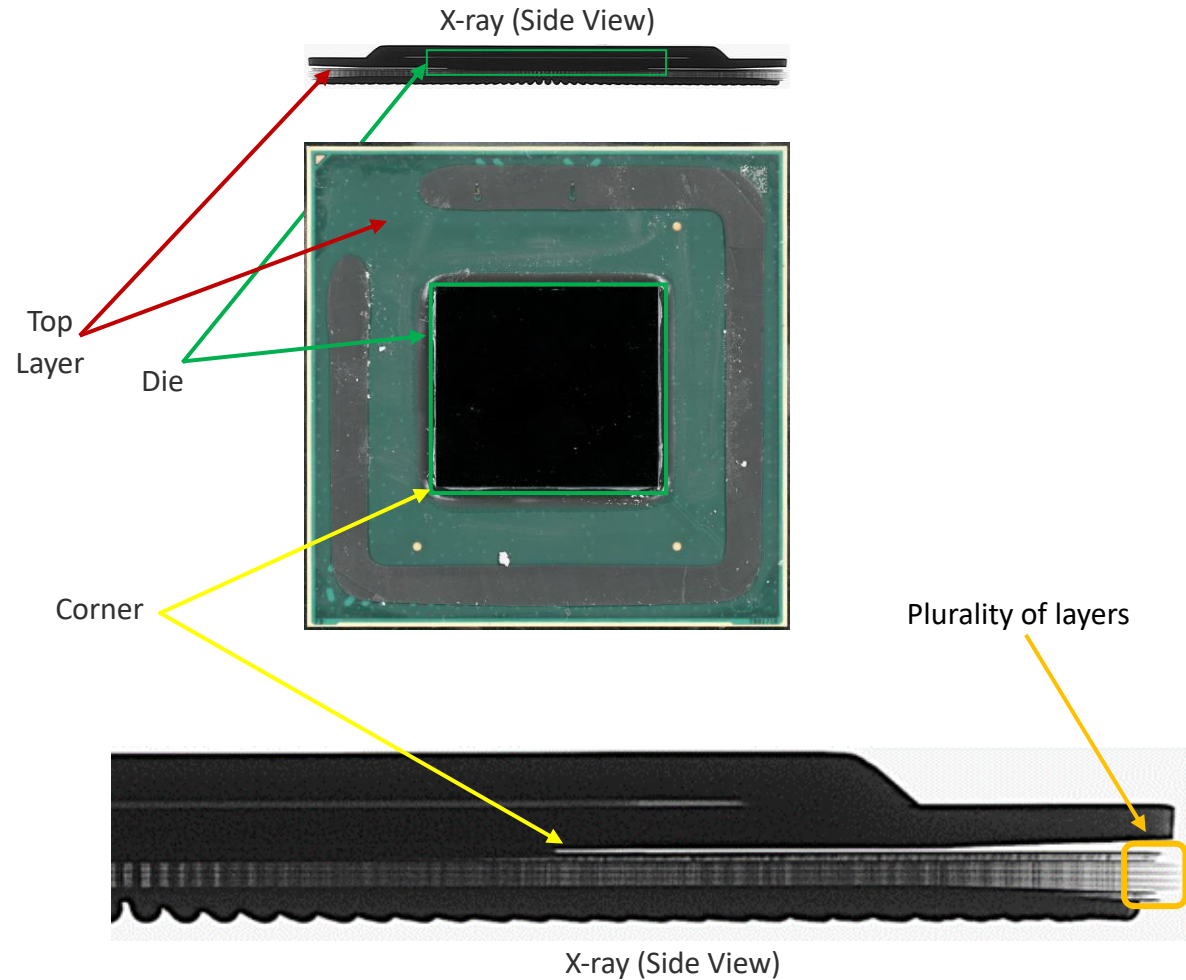
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[1.a] a top layer having a die mounted thereon, said die having a corner; and a plurality of layers under the top layer,

The integrated circuit package of the NXP MIMX8QP6AVUFFAB Microprocessor has a top layer with a die mounted thereon.



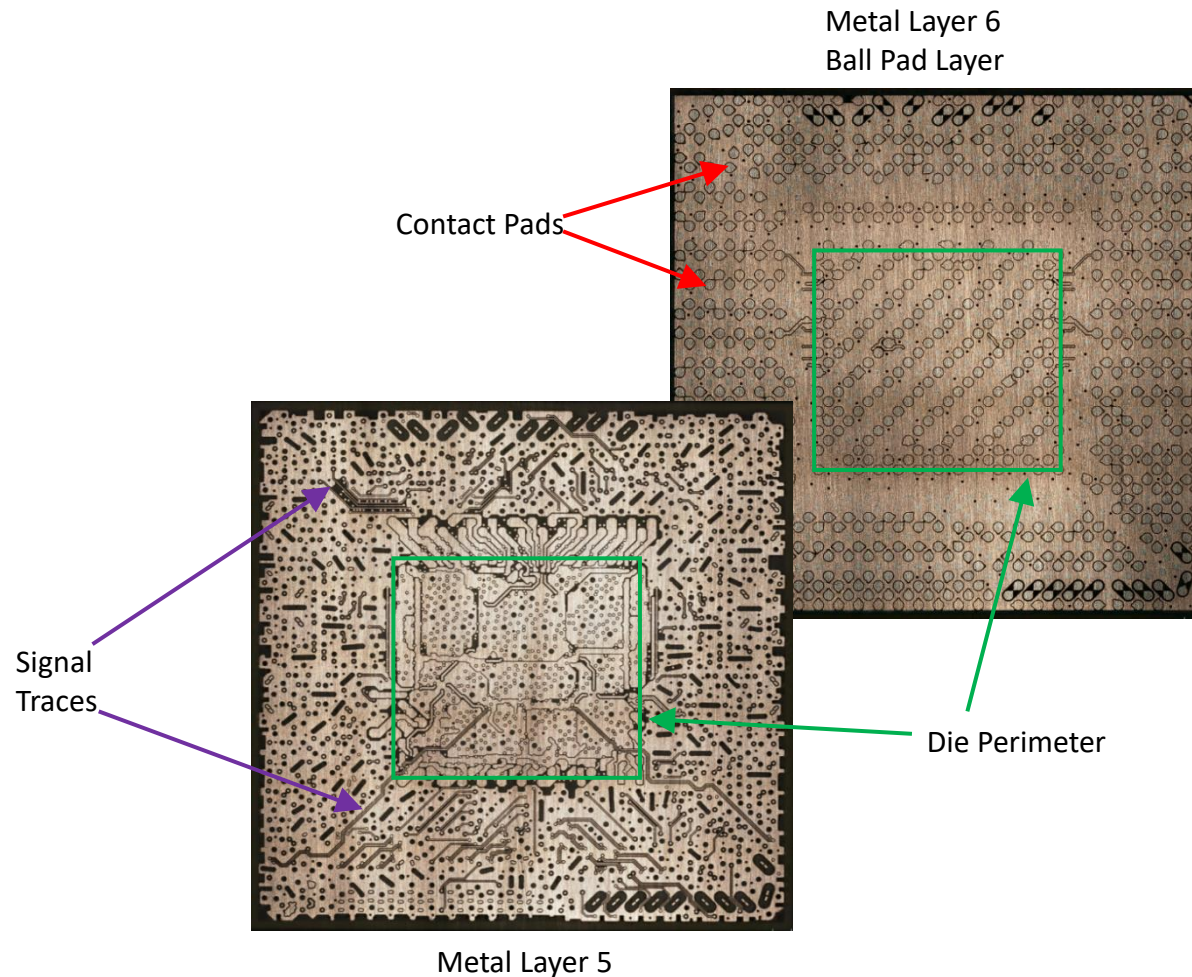
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[1.b] said plurality of layers comprising a bottom routing layer having signal traces thereon, and a ball pad layer under the bottom routing layer, said ball pad layer having a plurality of ball pads,

The plurality of layers comprises a bottom routing layer (Metal Layer 5) and a ball pad layer (Metal Layer 6) under the bottom routing layer. The bottom routing layer (Metal Layer 5) has signal traces thereon and the ball pad layer (Metal Layer 6) has a plurality of ball pads.



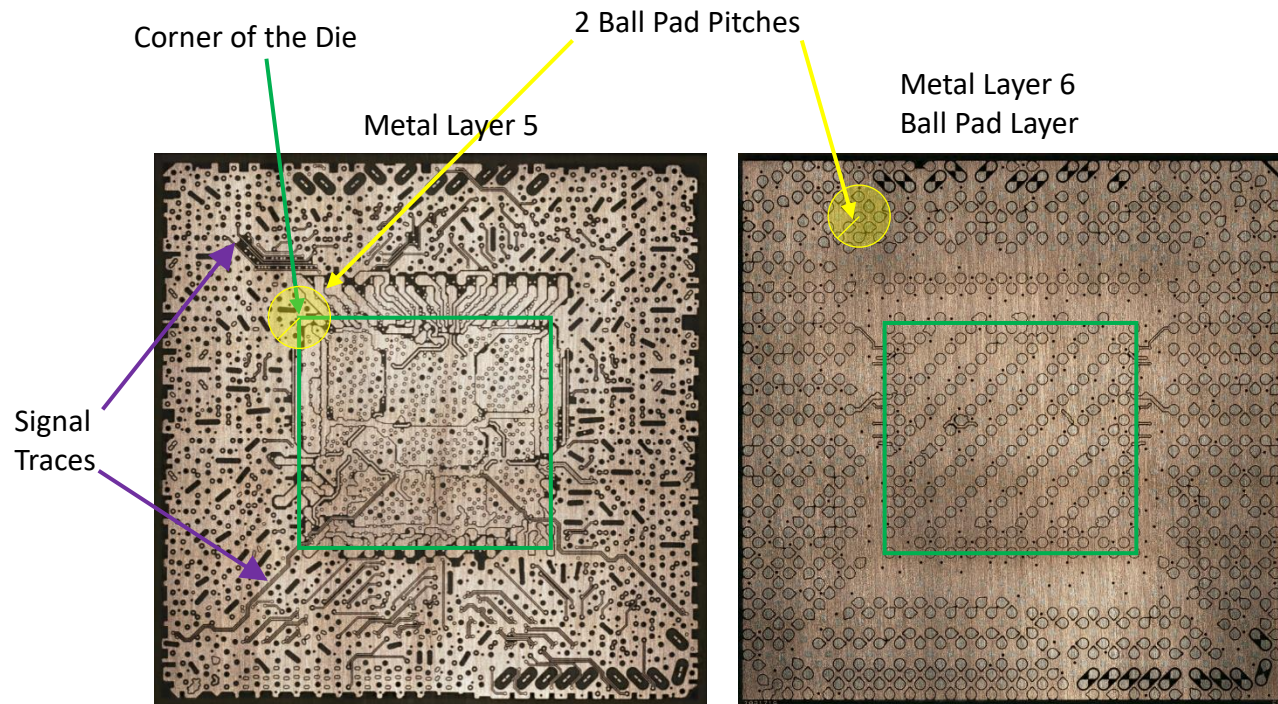
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[1.c] wherein none of the signal traces of the bottom routing layer are located over ball pads of the ball pad layer which are disposed in an area within two ball pad pitches of the corner of the die.

Within two ball pad pitches of the corner of the die (see yellow circle below), none of the signal traces of Metal Layer 5 are located over ball pads of the ball pad layer (Layer 6).



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Claim 5	Accused Products		
5. A package as recited in claim 1, wherein the die is mounted to the top layer in an arrangement other than a pin connection.	The Accused Products include a package as recited in claim 1, wherein the die is mounted to the top layer in an arrangement other than a pin connection. For example, the NXP MIMX8QP6AVUFFAB includes FCPBGA packaging, indicating that the die is mounted to the top layer in an arrangement other than a pin connection. <table><tr><td>Packaging</td><td>Case FCPBGA 29 x 29 mm, 0.75 mm pitch</td></tr></table> Source: https://www.mouser.com/datasheet/2/302/IMX8QPAEC-1815284.pdf	Packaging	Case FCPBGA 29 x 29 mm, 0.75 mm pitch
Packaging	Case FCPBGA 29 x 29 mm, 0.75 mm pitch		

Claim 6	Accused Products
6. A package as recited in claim 1, wherein the signal traces on the bottom routing layer comprise at least one voltage bus bar.	The Accused Products include a package as recited in claim 1, wherein the signal traces on the bottom routing layer comprise at least one voltage bus bar. See claim [1.c].

Caveat: The notes and/or cited excerpts utilized herein are set forth for illustrative purposes only and are not meant to be limiting in any manner. For example, the notes and/or cited excerpts, may or may not be supplemented or substituted with different excerpt(s) of the relevant reference(s), as appropriate. Further, to the extent any error(s) and/or omission(s) exist herein, all rights are reserved to correct the same.