

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
SHERMAN DIVISION**

BELL SEMICONDUCTOR, LLC,

Plaintiff,

v.

TEXAS INSTRUMENTS,
INCORPORATED,

Defendant.

Civil Action No. 4:23-cv-609

JURY TRIAL DEMANDED

ORIGINAL COMPLAINT

Plaintiff Bell Semiconductor, LLC (“Bell Semic” or “Plaintiff”) brings this Complaint against Defendant Texas Instruments Incorporated (“Defendant” or “TI”) for infringement of U.S. Patent Nos. 7,345,245 (“the ’245 patent”), 8,530,375 (“the ’375 patent”), and 7,646,091 (“the ’091 patent”) (collectively, the “Asserted Patents”). Plaintiff, on personal knowledge of its own acts, and on information and belief as to all others based on investigation, alleges as follows:

SUMMARY OF THE ACTION

1. This is a patent infringement suit relating to TI’s unauthorized and unlicensed use of the Asserted Patents. The inventions claimed in the Asserted Patents are used by TI in the production, packaging, and/or features of one or more of its devices, including but not limited to its exemplary TI 66AK2E05XABD and TI 66AK2H05 devices (“Exemplary Accused Products”).

2. Bell Semic brings this action to put a stop to TI’s unauthorized and unlicensed use of the inventions claimed in the Asserted Patents.

THE PARTIES

3. Plaintiff Bell Semic is a limited liability company organized under the laws of the State of Delaware with a place of business at One West Broad Street, Suite 901, Bethlehem, PA 18018.

4. Bell Semic stems from a long pedigree that began at Bell Labs. Bell Labs sprung out of the Bell System as a research and development laboratory, and eventually became known as one of America's greatest technology incubators. Bell Labs employees invented the transistor in 1947 in Murray Hill, New Jersey. It was widely considered one of the most important technological breakthroughs of the time, earning the inventors the Nobel Prize in Physics. Bell Labs made the first commercial transistors at a plant in Allentown, Pennsylvania. For decades, Bell Labs licensed its transistor patents to companies throughout the world, creating a technological boom that led to the use of transistors in the semiconductor devices prevalent in most electronic devices today.

5. Bell Semic, a successor to Bell Labs' pioneering efforts, owns over 1,900 worldwide patents and applications, approximately 1,500 of which are active United States patents. This patent portfolio of semiconductor-related inventions was developed over many years by some of the world's leading semiconductor companies, including Bell Labs, Lucent Technologies, Agere Systems, and LSI Logic and LSI Corporation ("LSI"). This portfolio reflects technology that underlies many important innovations in the development of semiconductors and integrated circuits for high-tech products, including smartphones, computers, wearables, digital signal processors, IoT devices, automobiles, broadband carrier access, switches, network processors, and wireless connectors.

6. The principals of Bell Semic all worked at Bell Labs' Allentown facility, and have continued the rich tradition of innovating, licensing, and helping the industry at large since

those early days at Bell Labs. For example, Bell Semic's CTO was a LSI Fellow and Broadcom Fellow. He is known throughout the world as an innovator with more than 300 patents to his name, and he has a sterling reputation for helping semiconductor fabs improve their efficiency. Bell Semic's CEO took a brief hiatus from the semiconductor world to work with Nortel Networks in the telecom industry during its bankruptcy. His efforts saved the pensions of tens of thousands of Nortel retirees and employees. In addition, several Bell Semic executives previously served as engineers at many of these companies and were personally involved in creating the ideas claimed throughout Bell Semic's extensive patent portfolio.

7. On information and belief, Defendant TI is a corporation organized and existing under the laws of Delaware, with its principal place of business at 12500 TI Boulevard, Dallas, Texas 75243. TI is registered with the State of Texas and may be served with process through its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, TX 75201. On information and belief, TI has a regular and established place of business in this District, including at least 6412 US-75, Sherman, Texas 75090.

8. On information and belief, TI develops, designs, and/or manufactures products in the United States, including in this District, according to the Asserted Patents' patented processes/methodologies; and/or uses the Asserted Patents' patented processes/methodologies in the United States, including in this District, to make products; and/or distributes, markets, sells, or offers to sell in the United States and/or imports products into the United States, including in this District, that were manufactured or otherwise produced using the Asserted Patents' patented processes. Additionally, TI introduces those products into the stream of commerce knowing that they will be sold and/or used in this District and elsewhere in the United States.

JURISDICTION AND VENUE

9. This is an action for patent infringement arising under the Patent Laws of the United States, Title 35 of the United States Code. Accordingly, this Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

10. Defendant TI is subject to this Court's general personal jurisdiction at least because TI is a resident of Texas as defined by Texas law. On information and belief, TI is headquartered in Texas.

11. Defendant TI is additionally subject to this Court's general and specific personal jurisdiction because TI has sufficient minimum contacts within the State of Texas and this District, pursuant to due process and/or the Texas Long Arm Statute, Tex. Civ. Prac. & Rem. Code § 17.042. On information and belief, Defendant TI contracted with one or more Texas residents in this District and one or both parties performed the contract at least in part in the State of Texas and this District; TI committed the tort of patent infringement in State of Texas and this District; TI purposefully availed itself of the privileges of conducting business in the State of Texas and in this District; TI regularly conducts and solicits business within the State of Texas and within this District; TI recruits residents of the State of Texas and this District for employment inside or outside the State of Texas; Plaintiff's causes of action arise directly from TI's business contacts and other activities in the State of Texas and this District; and TI distributes, makes available, imports, sells and offers to sell products and services throughout the United States, including in this judicial District, and introduces infringing products and services that into the stream of commerce knowing that they would be used and sold in this judicial district and elsewhere in the United States.

12. This Court has specific personal jurisdiction over TI pursuant to due process and/or the Texas Long Arm Statute, at least in part, because (i) TI has conducted and continue to

conduct business in this District and (ii) Bell Semic's causes of action arise, at least in part, from TI's contacts with and activities in the State of Texas and this District. Upon information and belief, TI has committed acts of infringement within the State of Texas and this District by, *inter alia*, directly using, testing, selling, offering to sell, and/or importing products that infringe one or more claims of each of the Asserted Patents in this District and/or importing Accused Products, including but not limited to the Exemplary Accused Products, into this District, and/or committing at least a portion of any other infringements alleged herein. In the State of Texas and in this District, TI, directly: (i) performs at least a portion of the infringements alleged herein; (ii) manufactures products according to each of the Asserted Patents' inventions; (iii) distributes, markets, sells, or offers to sell products formed according to each of the Asserted Patents' inventions; and/or (iv) imports products formed according to the Asserted Patents' patented inventions.

13. On information and belief, venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400 because TI has committed, and continues to commit, acts of infringement in this District and has a regular and established place of business in this District. For example, on information and belief, TI has a regular and established place of business in this District, including at least at 6412 US-75, Sherman, TX 75090. On information and belief, TI's acts of infringement have taken place within this District. On information and belief, TI's presence in this District is substantial, including at least at 6412 US-75, Sherman, TX 75090. TI's presence in this District includes an 80,000 square foot, 150 mm fabrication facility that produces over 4,500 device types, including at least semiconductors for use in multiple automotive, commercial, military, and space applications.

14. Additionally, TI—directly or through intermediaries (including distributors, retailers, and others), subsidiaries, alter egos, and/or agents—ships, distributes, offers for sale, and/or sells its products and services in the United States and this District. TI has purposefully and voluntarily placed one or more of its products into the stream of commerce through the accused instrumentalities that infringe the patents asserted in this action with the awareness and/or intent that they will be purchased by consumers in this District. TI knowingly and purposefully ships infringing products into, and within, this District. These infringing products have been, and continue to be, purchased by consumers and businesses in this District. Currently, on information and belief, TI is seeking no fewer than 25 positions relating to engineering and/or manufacturing in its Richardson location.

15. Venue is also convenient in this District. This is at least true because of this District’s close ties to this case—including the technology, relevant witnesses, and sources of proof noted above—and its ability to quickly and efficiently move this case to resolution.

16. On information and belief, Bell Semic’s cause of action arises directly from TI’s manufacturing and sales activities in this District. Moreover, on information and belief, TI has derived substantial revenues from its infringing acts occurring within the State of Texas and within this District.

U.S. PATENT NO. 7,345,245

17. Bell Semiconductor owns by assignment the entire right, title, and interest in the ’245 patent, entitled “Robust High Density Substrate Design for Thermal Cycling Reliability,” which issued on March 18, 2008.

18. The ’245 patent issued to inventors Anand Govind, Zafer Kutlu, and Farshad Ghahghahi from United States Patent Application No. 10/681,554, filed October 8, 2003.

19. A true and correct copy of the ’245 patent is attached as Exhibit A.

20. The '245 patent is valid and enforceable under the United States Patent Laws.

21. Bell Semic owns, by assignment, all right, title, and interest in and to the '245 patent, including the right to collect for past damages.

22. Recent silicon technology advances have placed increased demand for high density signal routing on organic BGA substrates. Increased signal routing density in the substrate is obtained by using fine pitch vias through the core so that routing layers below the core can be efficiently utilized. The via pitch reduction requires the use of thin core substrates which are susceptible to warpage during thermal excursions. Typically, the regions under the die corner are regions of stress concentration. Under cycled thermal excursions, cracks can initiate from the ball pad edges and spread into the layers above the ball pad layer.

23. The '245 patent is generally related to a semiconductor package for a die with improved thermal cycling reliability. To eliminate package failures and occurrences cracks in signal traces, the '245 patent teaches routing of signals away from the high stress area associated with the ball pads and the corner of the die.

24. The '245 patent contains 2 independent claims and 12 total claims, covering an integrated circuit substrate. Claim 1 of the '245 patent reads:

1. A semi-conductor package comprising:

a top layer having a die mounted thereon, said die having a corner;
and

a plurality of layers under the top layer, 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, 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.

25. This claim, as a whole, provides significant benefits and improvements to the function of the semiconductor device, e.g., improving system reliability by avoiding functional failures from cracks in the signal traces caused by thermal cycling stresses under the die corner.

U.S. PATENT NO. 8,530,375

26. Bell Semic is the owner by assignment of the '375 patent. The '375 patent is titled "Flipchip Bump Patterns for Efficient I-Mesh Power Distribution Schemes" The '375 patent issued on January 8, 2013.

27. A true and correct copy of the '375 patent is attached as Exhibit B.

28. The inventors of the '375 patent are Anwar Ali, Kalyan Doddapaneni, and Wilson Leung ("the '375 Inventors") from United States Patent Application No. 12/121,163, filed on May 15, 2008.

29. The '375 patent claims priority to May 15, 2008.

30. The '375 patent is valid and enforceable under the United States Patent Laws.

31. Bell Semic owns, by assignment, all right, title, and interest in and to the '375 patent, including the right to collect for past damages.

32. The '375 patent generally relates to "a flipchip scheme where power and ground bumps are arranged in a striped configuration" where "there are a plurality of lines of power bumps and a plurality of lines of ground bumps" where each line is interconnected by a respective mesh core bus that is shorted across the bumps without having to use metal tab extensions. Ex. B at Abst.

33. The '375 patent contains two independent claims and 20 total claims. Claim 1 reads:

1. A portion of a flipchip scheme, said portion comprising:
 - a metal layer which comprises power bumps and ground bumps arranged in a striped configuration,
 - wherein there are a plurality of lines of power bumps, and a plurality of lines of ground bumps,
 - wherein each line of power bumps is interconnected by a mesh core power bus on the metal layer which is shorted across the line of power bumps, and
 - wherein each line of ground bumps is interconnected by a mesh core ground bus on the metal layer which is shorted across the line of ground bumps,
 - wherein each of the mesh core power busses on the metal layer is wider than the power bumps which are connected to the mesh core power bus on the metal layer.

34. This claim, as a whole, provides significant benefits and improvements to the manufacturability and/or function of the semiconductor device, *e.g.*, allowing signal routing to be provided between lines of bumps, and/or enabling wider mesh core power buses that provide improved power mesh performance and/or reduce or eliminate the metal required on the second top-most metal layer. *See, e.g.*, Ex. B at Abst.

U.S. PATENT NO. 7,646,091

35. Bell Semiconductor owns by assignment the entire right, title, and interest in the '091 patent, entitled "Semiconductor Package and Method Using Isolated Vss Plane to Accommodate High Speed Circuitry Ground Isolation," which issued on January 12, 2010.

36. The '091 patent issued to inventors Maurice Othieno, Chok Chia, and Amar Amin from United States Patent Application No. 11/399,723, filed April 6, 2006. A true and correct copy of the '091 patent is attached as Exhibit C.

37. The '091 patent is valid and enforceable under the United States Patent Laws.

38. Bell Semic owns, by assignment, all right, title, and interest in and to the '091 patent, including the right to collect for past damages.

39. Modern integrated circuits require both low-speed and high-speed circuitry. Excessive noise generated by the high-speed circuitry interferes with the operation of the low-speed circuitry sharing the same ground plane. At high data rates this is a serious problem. Additionally, at high system performance the problem of ground bounce is magnified.

40. In order to eliminate those problems, the '091 patent teaches the use of a dedicated high-speed ground plane that is electrically isolated from the ground plane used to ground the low-speed circuitry. As described in the '091 patent, a semiconductor integrated circuit package includes a substrate which can have an integrated circuit die attached to it. The package may include a dedicated high-speed ground plane that is electrically isolated from the ground plane used to ground the low-speed circuitry of the package.

41. The '091 patent contains 1 independent claim and 14 total claims, covering an integrated circuit substrate. Claim 1 of the '091 patent reads:

1. A semiconductor integrated circuit (IC) package which comprises:
 - a substrate having a first surface and a second surface wherein;
 - a first layer of the substrate includes,
 - a first ground plane enabling electrical connection with low speed electronic circuitry, and
 - a second ground plane that is spatially separated and electrically isolated from the first ground plane, the second ground plane enabling electrical connection with high speed electronic circuitry;
 - a second layer of the substrate includes,
 - a third ground plane configured for electrical connection with low speed electronic circuitry, and
 - a fourth ground plane that is spatially separated and electrically isolated from the third ground plane, the third ground plane configured for electrical connection with high speed electronic circuitry;

a plurality of electrical connections that electrically connect the first ground plane with solder balls mounted on the second surface of the substrate;

a plurality of additional electrical connections that electrically connect the second ground plane with solder balls mounted on the second surface of the substrate; and

peripheral electrical contacts arranged on the substrate and configured for connection with electronic circuitry external to the package; and

at least one reference plane associated with each layer of the substrate and the ground planes included thereon.

42. This claim, as a whole, provides significant benefits and improvements to the function of the semiconductor device, e.g., improving system performance by reducing cross-talk and ground-bounce.

COUNT I – INFRINGEMENT OF U.S. PATENT NO. 7,345,245

43. Bell Semic re-alleges and incorporates by reference the allegations of the foregoing paragraphs as if fully set forth herein.

44. On information and belief, TI has and continues to directly infringe pursuant to 35 U.S.C. § 271(a) one or more claims of the '245 patent by making, using, offering to sell, or selling within the United States, or importing into the United States, one or more semiconductor devices (“’245 Accused Products”), including, by way of example, the TI 66AK2E05XABD device (“’245 Exemplary Accused Product), in the United States.

45. A claim chart demonstrating TI’s infringement of the ’245 patent via the ’245 Exemplary Accused Product is attached hereto as Exhibit D.

46. TI’s ’245 Accused Products infringe and continue to infringe one or more claims of the ’245 patent during the pendency of the ’245 patent.

47. On information and belief, TI has and continues to infringe pursuant to 35 U.S.C. § 271, *et seq.*, directly, either literally or under the doctrine of equivalents, by using the ’245

Accused Products in violation of one or more claims of the '245 patent. TI has and continues to infringe pursuant to 35 U.S.C. § 271, *et seq.*, directly, either literally or under the doctrine of equivalents, by making, using, selling or offering to sell in the United States, and/or importing into the United States '245 Accused Products in violation of one or more claims of the '245 patent.

48. TI's infringement of the '245 patent is exceptional and entitles Bell Semic to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

49. Bell Semic is entitled to recover from TI all damages that Bell Semic has sustained as a result of TI's infringement of the '245 patent, including without limitation and/or not less than a reasonable royalty.

COUNT II – INFRINGEMENT OF U.S. PATENT NO. 8,530,375

50. Bell Semic re-alleges and incorporates by reference the allegations of the foregoing paragraphs as if fully set forth herein.

51. On information and belief, TI directly infringed pursuant to 35 U.S.C. § 271(a) one or more claims of the '375 patent by making, using, offering to sell, or selling within the United States, or importing into the United States, one or more semiconductor devices ("'375 Accused Products"), including, by way of example, the TI 66AK2H05 ("'375 Exemplary Accused Product), in the United States.

52. A claim chart demonstrating TI's infringement of the '375 patent via the '375 Exemplary Accused Product is attached hereto as Exhibit E.

53. TI's '375 Accused Products infringe and continue to infringe one or more claims of the '375 patent during the pendency of the '375 patent.

54. On information and belief, TI has and continues to infringe pursuant to 35 U.S.C. § 271, *et seq.*, directly, either literally or under the doctrine of equivalents, by making, using,

selling or offering to sell in the United States, and/or importing into the United States '375 Accused Products in violation of one or more claims of the '375 patent.

55. TI's infringement of the '375 patent is exceptional and entitles Bell Semic to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

56. Bell Semic is entitled to recover from TI all damages that Bell Semic has sustained as a result of TI's infringement of the '375 patent, including without limitation and/or not less than a reasonable royalty.

COUNT III – INFRINGEMENT OF U.S. PATENT NO. 7,646,091

57. Bell Semic re-alleges and incorporates by reference the allegations of the foregoing paragraphs as if fully set forth herein.

58. On information and belief, TI has and continues to directly infringe pursuant to 35 U.S.C. § 271(a) one or more claims of the '091 patent by making, using, offering to sell, or selling within the United States, or importing into the United States, one or more semiconductor devices ("'091 Accused Products"), including, by way of example, the TI 66AK2E05XABD device ("'091 Exemplary Accused Product), in the United States.

59. A claim chart demonstrating TI's infringement of the '091 patent via the '091 Exemplary Accused Product is attached hereto as Exhibit F.

60. TI's '091 Accused Products infringe and continue to infringe one or more claims of the '091 patent during the pendency of the '091 patent.

61. On information and belief, TI has and continues to infringe pursuant to 35 U.S.C. § 271, *et seq.*, directly, either literally or under the doctrine of equivalents, by making, using, selling or offering to sell in the United States, and/or importing into the United States '091 Accused Products in violation of one or more claims of the '091 patent.

62. TI's infringement of the '091 patent is exceptional and entitles Bell Semic to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

63. Bell Semic is entitled to recover from TI all damages that Bell Semic has sustained as a result of TI's infringement of the '091 patent, including without limitation and/or not less than a reasonable royalty.

PRAYER FOR RELIEF

WHEREFORE, Bell Semic respectfully requests that this Court enter judgment in its favor as follows and award Bell Semic the following relief:

- (a) a judgment declaring that TI has infringed one or more claims of each of the Asserted Patents in this litigation pursuant to 35 U.S.C. § 271, *et seq.*;
- (b) an award of damages adequate to compensate Bell Semic for infringement of the each of the Asserted Patents by TI, in an amount to be proven at trial, including supplemental post-verdict damages until such time as TI ceases its infringing conduct;
- (c) a permanent injunction, pursuant to 35 U.S.C. § 283, prohibiting TI and its officers, directors, employees, agents, consultants, contractors, suppliers, distributors, all affiliated entities, and all others acting in privity with TI, from committing further acts of infringement, with respect to each Asserted Patent.
- (d) a judgment requiring TI to make an accounting of damages resulting from TI's infringement of each of the Asserted Patents;
- (e) the costs of this action, as well as attorneys' fees as provided by 35 U.S.C. § 285;
- (f) pre-judgment and post-judgment interest at the maximum amount permitted by law;
- (g) all other relief, in law or equity, to which Bell Semic is entitled.

DEMAND FOR JURY TRIAL

Plaintiff hereby demands a jury trial for all issues so triable.

Dated: June 28, 2023

/s/ Clifford Chad Henson

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