

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

<p>VICOR CORPORATION,</p> <p style="text-align: center;">Plaintiff,</p> <p>v.</p> <p>DELTA ELECTRONICS, INC., CYNTEC CO., LTD., DELTA ELECTRONICS (AMERICAS) LTD., DELTA ELECTRONICS (USA) INC., HON HAI PRECISION INDUSTRY CO. LTD. D/B/A FOXCONN TECHNOLOGY GROUP, FOXCONN INDUSTRIAL INTERNET CO. LTD., INGRASYS TECHNOLOGY INC., QUANTA COMPUTER INC., QUANTA CLOUD TECHNOLOGY INC.,</p> <p style="text-align: center;">Defendants.</p>	<p>Civil Action No.</p> <p style="text-align: center;">JURY TRIAL DEMANDED</p>
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COMPLAINT FOR PATENT INFRINGEMENT

This is an action for patent infringement in which Vicor Corporation makes the following allegations against Defendants Delta Electronics, Inc., Cyntec Co., Ltd., Delta Electronics (Americas) Ltd., Delta Electronics (USA) Inc., Hon Hai Precision Industry Co. Ltd. d/b/a Foxconn Technology Group, Foxconn Industrial Internet Co. Ltd., Ingrasys Technology Inc., Quanta Computer Inc., and Quanta Cloud Technology Inc., each of whom is a manufacturer and/or distributor who, without authority, makes, imports, uses, offers for sale, and/or sells in the United States power modules and power systems and/or products containing the same that infringe U.S. Patents Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893 (collectively, the “Asserted Patents”):

PARTIES

Vicor

1. Plaintiff Vicor Corporation (“Plaintiff” or “Vicor”) is a Delaware corporation with its principal place of business at 25 Frontage Road, Andover, MA 01810. Vicor is a NASDAQ-listed public company that was founded in 1981 by Dr. Patrizio Vinciarelli in Massachusetts. Dr. Vinciarelli, the lead inventor of the patents asserted in this Complaint, remains Vicor’s CEO to this day. Headquartered in the United States, Vicor is a leading provider of high-performance power modules and systems for use in datacenters. Vicor is the owner of all rights, title, and interest in and to the Asserted Patents.

Delta Defendants

2. On information and belief, Defendant Delta Electronics, Inc. is organized under the laws of Taiwan with its principal place of business at 186, Ruey Kuang Road, Neihu District, Taipei 114501, Taiwan, and is the parent corporation of the Delta Electronics brand. Delta Electronics, Inc. and its subsidiaries—including those named in this action—describe themselves as “global leaders” in “providing AC/DC and DC/DC power supplies, brushless DC fans and thermal systems, and the miniaturization of key components” at locations “all over the world,” including in the United States. *See* Delta 2022 Annual Report, at 4, 121, 162 (<https://www.deltaww.com/en-US/investors/annual-Reports>). One of Delta Electronics Inc.’s “core businesses” is its “Power Electronics Business,” which is responsible for the development of “high efficiency, high power density, compact size and low noise AC/DC and DC/DC switching power supplies [and] DC/DC converters” like those accused here. *Id.* at 122.

3. Delta Electronics, Inc. has a large network of foreign and domestic subsidiaries and affiliates that make up the “Delta Group” and that are wholly owned (directly or indirectly) and/or

controlled by Delta Electronics, Inc. *See* Delta 2022 Annual Report, at 4, 121, 162 (<https://www.deltaww.com/en-US/investors/annual-Reports>) (“Consolidation of subsidiaries begins from the date the Group obtains control of the subsidiaries.”). Delta Electronics, Inc. exercises a substantial degree of control over these entities, including by setting employment and personnel policies for “all Delta employees, subsidiaries, business partners, suppliers, and contractors;” compensation plans for the employees of subsidiaries meeting specific requirements; and information security policies. *Id.* at 112, 135-37. Delta Electronics, Inc. also enjoys substantial business advantages by directing and controlling these subsidiaries and affiliates’ conduct with respect to the Delta brand and Delta products, including the Delta products accused here. The Complaint uses “Delta” and “Delta Defendants” to refer collectively to Delta Electronics, Inc. and its named subsidiaries Cyntec Co., Ltd., Delta Electronics (USA) Inc., and Delta Electronics (Americas) Ltd., described further below.

4. On information and belief, Defendant Cyntec Co., Ltd. is organized under the laws of Taiwan with its principal place of business at 2 R&D 2nd Road, Science-Based Industry Park, Hsinchu 30076, Taiwan. Cyntec Co., Ltd. is a wholly owned subsidiary of Delta Electronics, Inc. *See* Delta 2022 Annual Report, at 166, 442 (<https://www.deltaww.com/en-US/investors/annual-Reports>). Delta Electronics, Inc.’s U.S. website identifies Defendant Cyntec Co., Ltd. as one of the subsidiaries responsible for the manufacture and distribution Delta’s Power Modules, including those accused here. *See* <https://www.deltaww.com/en-us/Products/Power-Modules/ALL/>. Cyntec Co., Ltd.’s website, in turn, identifies Cyntec Co., Ltd. as “A Delta Group Company” whose “major products” include Delta “power module[s].” *See* <https://www.cyntec.com/about.aspx?id=21>. Cyntec Co. Ltd.’s leadership consists exclusively of representatives of Delta Electronics, Inc. *See* Delta 2022 Annual Report, at 442. Further, per Delta

Electronics, Inc.’s Annual Report, Cynotec Co., Ltd. “manufacture[s] electronic products” through Defendant Delta Electronics (USA) Inc. and “s[ells] electronic products through” Defendant Delta Electronics (Americas) Ltd. in the United States. *Id.* at 439-40; *see id.* at 212 (describing Cynotec Co., Ltd. as one of the Delta Group’s high “cash-generating units”). On information and belief, Cynotec Co., Ltd. manufactures and imports the accused Delta products into the United States for distribution and sale by U.S. subsidiaries of Delta Electronics, Inc. and/or third-party distributors, and also manufactures and sells the accused Delta products through U.S. subsidiaries of Delta Electronics, Inc., including Defendants Delta Electronics (USA) Inc. and Delta Electronics (Americas) Ltd.

5. On information and belief, Defendant Delta Electronics (USA) Inc. is organized under the laws of Delaware and has its principal place of business at 2925 E. Plano Pkwy, Plano, Texas 75074. *See* <https://www.deltaww.com/en-US/about/Global-Operations>. Delta Electronics (USA) Inc. is a wholly owned subsidiary of Delta Electronics, Inc. and is responsible for “[m]anufacturing and sales of power supplies” in the United States, including in Texas. *See* Delta 2022 Annual Report, at 264, 382, 435 (identifying Delta Electronics (USA) Inc.’s “[I]and and buildings” in Texas as part of Delta Electronics, Inc.’s “[a]cquisition of real estate”). Delta Electronics (USA) Inc. and Defendant Delta Electronics (Americas) Ltd. (described further below) share the same President and Director—Kelvin Huang—who previously held several positions with the Delta Group in Taiwan and currently “[m]anag[e]s business across [the] Americas Region for [the] Delta Group in Power Electronics.” Delta 2022 Annual Report, at 445-46; <https://www.linkedin.com/in/kelvin-huang-ab2728152/details/experience/>. On information and belief, Delta Electronics (USA) Inc. manufactures, imports, uses distributes, offers to sell, and/or sells the accused Delta products throughout the United States, including through activities at its

facilities in Plano, Texas.

6. On information and belief, Defendant Delta Electronics (Americas) Ltd. is organized under the laws of California, has its principal place of business at 46101 Fremont Blvd., Fremont, CA 94538, and conducts significant business activities at 575 Round Rock West Drive, Bldg. K, Suite #440, Round Rock, Texas 78681. Delta Electronics (Americas) Ltd. is a subsidiary of Delta Electronics, Inc. and is responsible for, among other tasks, “[s]ales of electronic components,” including components manufactured by Cyntec Co. Ltd. and/or Delta Electronics (USA) Inc. *See* Delta 2022 Annual Report, at 284, 431, 435, 439-40. On information and belief, Delta Electronics (Americas) Ltd. imports, distributes, offers to sell, and/or sells the accused Delta products throughout the United States, including through activities at its location in Round Rock, Texas.

7. On information and belief, the Delta Defendants do business themselves, and/or through their subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, including through their wholly owned subsidiary Delta Electronics (USA) Inc., which is headquartered at 2925 E. Plano Parkway, Plano, Texas 75074, and through their subsidiary Delta Electronics (Americas) Ltd, which conducts significant business at 575 Round Rock West Drive, Bldg. K, Suite #440, Round Rock, Texas 78681. On information and belief, Delta has many employees based in, and does business across, the State of Texas, including at these locations. For example, Delta currently lists several job openings at this Plano, Texas location for both Defendant Delta Electronics (Americas) Ltd. and Defendant Delta Electronics (USA) Inc., including for a Repair Technician, Logistics Manager, Compliance Test Engineer, Quality Control Inspector, and Customer Support Representative:

Compliance Test Engineer

Delta Electronics Americas · Plano, TX (On-site) · 3 weeks ago · 58 applicants

Full-time · Mid-Senior level

201-500 employees · Appliances, Electrical, and Electronics Manufacturing

See how you compare to 58 applicants. [Reactivate Premium](#)

Skills: Electrical Engineering, Power Systems, +8 more

View verifications related to this job post. [Show all](#)

[Easy Apply](#) [Save](#)

About the job

Delta, founded in 1971, is a global leader in switching power supplies and thermal management products with a thriving portfolio of smart energy-saving systems and solutions in the fields of industrial automation, building automation, telecom power, data center infrastructure, EV charging, renewable energy, energy storage and display, to nurture the development of smart manufacturing and sustainable cities. As a world-class corporate citizen guided by its mission statement, "To provide innovative, clean and energy-efficient solutions for a better tomorrow," Delta leverages its core competence in high-efficiency power electronics and its ESG-embedded business model to address key environmental issues, such as climate change. Delta serves customers through its sales offices, R&D centers and manufacturing facilities spread over close to 200 locations across five continents. Delta has 158 sales offices, 72 R&D centers and 48 manufacturing facilities

Quality Control Inspector

Delta Electronics (USA) Inc.
Plano, TX

[Apply directly on Glassdoor](#)

3 days ago \$ 19–21 an hour Full-time


Job highlights

Identified by Google from the original job post

Qualifications

- Education, previous experience, technical knowledge, skills required for the job
- High School Diploma or equivalent
- Two to four six years of previous quality assurance experience in the electronics or power industry or equivalent is required
- Production and Processing; knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods
- Demonstrated strong proficiency with computer software to include MS Office (Word, Excel, Access and PowerPoint) and e-mail

Tech Support Engineer

 Delta Electronics (USA) Inc.
Plano, TX

[Apply directly on Glassdoor](#)

🕒 27 days ago 💰 \$ 30–35 an hour 📅 Full-time 🏥 Health insurance 🗨️ De

Job highlights


Identified by Google from the original job post

Qualifications

- Associates degree in Electronics or related discipline or equivalent required
- Programmable Logic Controllers
- Assembly Language Programming
- Three to five years of previous technical support or product repair/test experience of telecom power products required
- Excellent analytical and troubleshooting skills required
- N/A

8 more items

Lead Customer Service Representative

 Delta Electronics Americas
Plano, TX

[Apply on LinkedIn](#)

🕒 21 days ago 📅 Full-time 🏥 Health insurance 🦷 Dental insurance 📅 Paid time off

Job highlights

Identified by Google from the original job post

<h3>Qualifications</h3> <ul style="list-style-type: none"> • This role requires a self-managed professional who is able to comprehend and utilize Information quickly • Build on your Customer Service experience by leading a team of Customer Service professionals • Utilizes advanced Excel functions: charts, pivot tables, V-lookup • Associate degree in business or related discipline – Minimum • Work experience demonstrating a high level of competence • Five years of previous customer service experience or business operations required 	<h3>Responsibilities</h3> <ul style="list-style-type: none"> • As part of and proces • You will en judgement <p>15 more ite</p> <h3>Benefits</h3> <ul style="list-style-type: none"> • 401(k) • Dental insu <p>4 more iter</p>
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See: https://www.linkedin.com/jobs/delta-electronics-americas-jobs-worldwide?f_C=414254&trk=job-results_see-all-jobs-link&position=1&pageNum=0.

8. On information and belief, Delta designs, manufactures, distributes, uses, imports,

offers for sale, and/or sells in the State of Texas and the Eastern District of Texas certain power modules and power systems and/or products containing the same that infringe the Asserted Patents, contributes to such patent infringement by making, using, selling, offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed, and/or induces others to commit acts of patent infringement in the State of Texas and the Eastern District of Texas, as described further herein.

9. On information and belief, the Delta Defendants themselves, and/or through their subsidiaries, affiliates, and agents, have placed the accused Delta products into the stream of commerce throughout the State of Texas and/or in the Eastern District of Texas, including via their locations at, e.g., 2925 E. Plano Parkway, Plano, Texas 75074 and 575 Round Rock West Drive, Bldg. K, Suite #440, Round Rock, Texas 78681. On information and belief, these locations are regular, continuous, and established physical places of business of Delta that operate under the Delta brand name and trademark and at the instructions, direction, and control of Delta Electronics, Inc. and Cyntec Co., Ltd.

10. Through offers to sell, sales, importations, distributions, and other related agreements with affiliates, distributors, and customers operating in and maintaining a significant business presence in the U.S. and/or via their subsidiaries maintaining such a presence, including via wholly owned (directly or indirectly), consolidated, and controlled subsidiaries such as Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc., the Delta Defendants conduct significant business in the United States, the state of Texas, and in this District.

11. Further, on information and belief, the foreign Delta Defendants may be served with process in the United States through at least Delta Electronics (USA) Inc. and Delta

Electronics (Americas) Ltd. because these entities operate as the alter ego of the foreign Delta Defendants and/or are the general managers or agents of the same within the United States.

Foxconn Defendants

12. On information and belief, Defendant Hon Hai Precision Industry Co. Ltd. d/b/a Foxconn Technology Group is organized under the laws of China with its principal place of business at No. 2, Zihyou St., Tucheng Dist., New Taipei City 236, and has as its subsidiaries Defendant Foxconn Industrial Internet Co. Ltd., which is organized under the laws of China with its principal place of business at 2F C1 Foxconn Technology Park 2 Donghuan 2 Road Longhua, Shenzhen, 518109 China, and Defendant Ingrasys Technology Inc., which is organized under the laws of Taiwan with its principal place of business at 5F., No. 1188, Nanqing Rd., Luzhu Dist., Taoyuan City, Taiwan. The Complaint refers collectively to Hon Hai Precision Industry Co. Ltd. d/b/a Foxconn Technology Group, Foxconn Industrial Internet Co. Ltd., and Ingrasys Technology Inc. as “Foxconn” or the “Foxconn Defendants.”

13. Defendant Hon Hai Precision Industry Co. Ltd. d/b/a Foxconn Technology Group and its subsidiaries and affiliates—including those named in this action—are “engaged in the manufacture, sales and service of ... wired/wireless communication products, optical products, power supply modules, and assemblies for use in the IT, communications, automotive, equipment, precision molding, automobile, and consumer electronics industries,” among other business lines. *See* Foxconn 2022 Q4 Consolidated Report, at 16 (<https://www.foxconn.com/en-us/investor-relations/financial-information/quarterly-reports>). One of Foxconn’s principal business segments includes cloud network products, which have “benefited from strong demand in the server market” from major Foxconn customers such as Google. *See, e.g.*, Foxconn Annual Report 2022, at 2; <https://www.techradar.com/news/foxconns-wisconsin-plant-wins-google-server-contract>. Hon

Hai Precision Industrial Co. Ltd. d/b/a Foxconn Technology Group, in addition to being the Foxconn parent corporation and leader of the “Foxconn Group,” manufactures and imports cloud network products, including power systems such as those accused here, to the United States for distribution and sale, including via or in concert with other Foxconn subsidiaries and affiliates. *See, e.g.,* <https://www.seair.co.in/us-import/product-server/e-hon-hai.aspx>; <https://www.seair.co.in/us-import/product-server/e-foxconn.aspx>.

14. Defendant Foxconn Industrial Internet Co. Ltd., which Foxconn identifies as part of its “FII subgroup,” is responsible for, *inter alia*, research and development of industrial Internet and server technology, the provision of enterprise management services, and the “[i]mport and export of electronic products and their spare parts.” *See* Foxconn Annual Report 2022, at 771 (<https://www.honhai.com/en-us/investor-relations/financial-information/reports?section=annual>); Foxconn 2022 Q4 Consolidated Report, at 122. Foxconn Industrial Internet Co. Ltd.’s website directs customers of Foxconn’s “Cloud Computing” products, including “High Performance Server[s],” “Edge Computing,” and “Storage Equipment,” to the website of Foxconn subsidiary Defendant Ingrasys Technology Inc. *See* <https://www.fii-foxconn.com/en/index>. On information and belief, Foxconn Industrial Internet Co. Ltd. manufactures, distributes, and/or imports the accused Foxconn products to/in the United States, including via or in concert with other Foxconn subsidiaries and affiliates.

15. Defendant Ingrasys Technology Inc. is responsible for, *inter alia*, Foxconn “data storage media manufacturing,” “electronic parts and components manufacturing,” “computing equipment installation construction,” “retail sale of computing and business machinery equipment,” and server production, among other business lines. *See* Foxconn Annual Report, at

809.¹ On information and belief, Ingrasys Technology Inc. imports the accused Foxconn products to the United States from Taiwan, both directly and through or in concert with its subsidiaries and affiliates. *See, e.g.*, <https://www.seair.co.in/us-import/product-server/e-ingrasys-technology-inc.aspx>; <https://www.seair.co.in/us-import/product-server/e-ingrasys.aspx>. Ingrasys Technology Inc. also has locations throughout the United States, including in Texas, Washington, and Wisconsin, which, on information and belief, it uses to advertise, offer for sale, sell and/or distribute the accused Foxconn products throughout the United States. *See, e.g.*, <https://www.ingrasys.com/about>.

16. In addition to their direct role in the manufacture, importation, distribution, and/or sale of the accused Foxconn products in the United States, the Foxconn Defendants also utilize their network of subsidiaries and affiliates to domestically manufacture, import, distribute, and/or sell the accused Foxconn products. *See, e.g.*, Foxconn Annual Report 2022, 681 (<https://www.honhai.com/en-us/investor-relations/financial-information/annual-reports>); Foxconn Company Profile (<https://www.foxconn.com/en-us/about/group-profile>) (noting that Foxconn “has established R&D and manufacturing centers in other markets around the world including...the U.S.”). For example, wholly owned Foxconn subsidiary Hon Hai/Foxconn Logistics Texas LLC performs “[l]ogistics services in America” for Foxconn products and operates facilities in Texas. *See* Foxconn 2022 Q4 Consolidated Report, at 20; <https://epcad.org/Search> (identifying property of “Foxconn” at 543 S. Americas Ave. A-2, El Paso, Texas, and property of “Foxconn/Hon Hai Logistics TX LLC” at 1430 Henry Brennan Dr., El Paso, Texas). As another example, Foxconn subsidiary FII USA Inc. operates a facility in Wisconsin that Foxconn touts on its public website

¹ *See also* <https://www.foxconn.com/en-us/press-center/press-releases/latest-news/1053>; <https://asia.nikkei.com/Business/Technology/Foxconn-s-Young-Liu-says-AI-demand-to-boost-server-business>.

and financial filings as specifically devoted to servers and server products that are then distributed across the country. *See, e.g.*, Foxconn 2021 Q3 Consolidated Statements, at 156 (identifying “[p]lants and datacenters” of FII USA Inc. as real estate of Foxconn); Foxconn in Wisconsin Overview (<https://www.foxconnwiofficial.com/foxconn-in-wisconsin>); Foxconn Worldwide Locations Overview (<https://www.foxconn.com/en-us/about/worldwide>). Numerous sources report that Foxconn’s Wisconsin facility assembles “key components” for Google and other customers in the United States. *E.g.*, <https://www.techradar.com/news/foxconns-wisconsin-plant-wins-google-server-contract>.

17. Per its statements to the public, Defendant Hon Hai Precision Industry Co. Ltd. “control[s]” the subsidiaries set forth in its consolidated financial statements, including Defendant Foxconn Industrial Internet Co. Ltd. and other domestic subsidiaries, such as Hon Hai/Foxconn Logistics Texas LLC and FII USA, Inc. *See* Foxconn 2022 Q4 Consolidated Report, at 18 (“The Group controls an entity when the Group is exposed, or has rights, to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. Consolidation of subsidiaries begins from the date the Group obtains control.”). On information and belief, the Foxconn Defendants exercise a substantial degree of control over these entities, including with respect to the manufacture, importation, sale, marketing, and branding of the accused Foxconn products. On information and belief, the Foxconn Defendants also enjoy substantial business advantages by directing and controlling these subsidiaries and affiliates’ conduct with respect to the Foxconn brand and Foxconn products, including the Foxconn products accused here.

18. On information and belief, Foxconn distributes, imports, offers for sale, and/or sells in the State of Texas and the Eastern District of Texas certain power modules and power systems

and/or products containing the same that infringe the Asserted Patents, contributes to such patent infringement by making, using, selling, offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed, and/or induces others to commit acts of patent infringement in the State of Texas and the Eastern District of Texas, as described further herein.

19. On information and belief, Foxconn does business itself, and/or through its subsidiaries, affiliates, and agents, in the State of Texas and the Eastern District of Texas and has placed the accused products into the stream of commerce throughout the State of Texas, including via Ingrasys' location at 12345 N. Lamar Suite, 250, Austin, Texas 78753, and the locations of other Foxconn subsidiaries at, e.g., 543 S. Americas Ave. A-2, El Paso, Texas, and 1430 Henry Brennan Dr., El Paso, Texas. On information and belief, these locations are regular, continuous, and established physical places of business of Foxconn that operate under the Foxconn brand name and trademark and at the instructions, direction, and control of Foxconn. *See, e.g.*, <https://www.ingrasys.com/about> (identifying Ingrasys logo with the tagline "Foxconn Technology Group").

20. Through offers to sell, sales, importations, distributions, and other related agreements with affiliates, distributors, and customers operating in and maintaining a significant business presence in the U.S. and/or via their subsidiaries maintaining such a presence, including via wholly owned (directly or indirectly), consolidated, and controlled subsidiaries, Foxconn does business in the United States, the state of Texas, and in this District.

21. Further, on information and belief, the Foxconn Defendants may be served with process in the United States through their domestic subsidiaries because these entities operate as

the alter ego of the Foxconn Defendants and/or are the general managers or agents of the same within the United States.

Quanta Defendants

22. On information and belief, Quanta Computer Inc. is organized under the laws of Taiwan with its principal place of business at No. 211, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan, and has as its wholly owned subsidiary Quanta Cloud Technology Inc., which is organized under the laws of Taiwan and has its principal place of business at 1F, No. 211 Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan. The Complaint refers collectively to Quanta Computer Inc. and Quanta Cloud Technology Inc. as “Quanta.”

23. Quanta Computer Inc. advertises its “global network” of “engineering, manufacturing, distribution, [and] supply chain support” spanning the “cloud computing business [and] mobile communications products,” among other product lines. *See* Quanta Computer Inc. Annual Report 2022, at 107 (<https://www.quantatw.com/Quanta/english/investment/annualreports.aspx>); Quanta Cloud Technology Inc. Overview (<https://www.qct.io/Company-AboutQCT/index>). Quanta Computer Inc.’s “Cloud Computing and Enterprise Network Solutions” business provides “IT infrastructure solutions for hyperscale datacenters worldwide,” such as “high-capacity enterprise network systems, storages, servers, network switches, and rack architecture solutions,” including for large customers like Google. *See* Quanta Computer Inc. Annual Report 2022, at 107.

24. Quanta Computer Inc. imports servers, power systems, and related products such as those accused here directly to the United States for distribution and sale. *See, e.g.*, <https://www.seair.co.in/us-import/e-quanta-computer-inc.aspx>; <https://www.seair.co.in/us-import/product-server/i-quanta-cloud.aspx>. Quanta Computer, Inc. also has developed “regional

manufacturing sites and maintenance locations in...the U.S....to complete the top-down integration” approach it has taken to “maximize the effectiveness of mass production with centralized management and just-in-time distribution” for the accused Quanta products. *See* Quanta Computer Inc. Overview (<https://www.quantatw.com/Quanta/english/about/company.aspx>). Part of this “top-down integration” and “centralized management” includes its control, direction, and oversight of U.S.-based subsidiaries, affiliates, and partners so it can “provide services with proximity to customers and market and assemble products with flexibility based on different customer requirements.” *Id.*; *see* Quanta Computer Inc. Annual Report, at 113-16. Indeed, Quanta Computer, Inc. describes the United States as Quanta’s “major exporting region,” where it provides “mega data center customers with more efficient global services and technical supports.” *see* Quanta Computer Inc. Annual Report, at 118. On information and belief, the Quanta Defendants exercise a substantial degree of control over these U.S.-based subsidiaries and affiliates, including with respect to the manufacture, importation, sale, marketing, and branding of the accused Quanta products. On information and belief, the Quanta Defendants also enjoy substantial business advantages by directing and controlling these subsidiaries and affiliates’ conduct with respect to the Quanta brand and Quanta products, including the Quanta products accused here.

25. Quanta Computer Inc. launched Defendant Quanta Cloud Technology as a subsidiary in 2012 “to offer a full spectrum of off-the-shelf products and services directly to cloud service providers, enterprises and SMBs.” *See* Quanta Cloud Technology Inc. Overview (<https://www.qct.io/Company-AboutQCT/index>). In doing so, Quanta Cloud Technology “effectively inherited the Quanta [Computer, Inc.] hyperscale ‘DNA’ and its 14-year heritage of leadership within the datacenter hardware space.” *See id.* Quanta Computer, Inc. retains “total

ownership” of Quanta Cloud Technology Inc. to this day. *See* Quanta Computer, Inc. Annual Report 2022, at 95 (<https://www.quantatw.com/Quanta/english/investment/annualreports.aspx>). Quanta Cloud Technology Inc.’s product lines include “servers, storage, switches, integrated racks,” which it manufactures, distributes, and sells through locations in Taiwan, the United States (Washington and California), China, Japan, and Germany. *See* Quanta Computer Technology Inc. Overview (<https://www.qct.io/Company-AboutQCT/index>). Quanta Cloud Technology Inc. also uses Quanta Computer Inc.’s “engineering, manufacturing, distribution, supply chain support and rack assembly” via “the Quanta global network” to further disseminate Quanta products, including the Quanta products accused here. *See id.*; Quanta Computer Inc. Annual Report, at 114-15. On information and belief, Quanta Cloud Technology Inc. designs, manufactures, imports, distributes, markets, offers to sell, and/or sells the accused Quanta products in the United States, including directly and through or in concert with its affiliates and subsidiaries.

26. On information and belief, Quanta distributes, imports, offers for sale, and/or sells in the State of Texas and the Eastern District of Texas certain power modules and power systems and/or products containing the same that infringe the Asserted Patents, contributes to such patent infringement by making, using, selling, offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed, and/or induces others to commit acts of patent infringement in the State of Texas and the Eastern District of Texas, as described further herein.

27. On information and belief, Quanta does business itself, and/or through its subsidiaries, affiliates, and agents, in the State of Texas and the Eastern District of Texas and has placed the accused products into the stream of commerce throughout the State of Texas and/or in

the Eastern District of Texas.

28. Through offers to sell, sales, importations, distributions, and other related agreements with affiliates, distributors, and customers operating in and maintaining a significant business presence in the U.S. and/or via their subsidiaries maintaining such a presence, including via wholly owned (directly or indirectly), consolidated, and controlled subsidiaries, Quanta does business in the United States, the state of Texas, and in this District.

29. Further, on information and belief, the Quanta Defendants may be served with process in the United States through their domestic subsidiaries because these entities operate as the alter ego of the Quanta Defendants and/or are the general managers or agents of the same within the United States.

JURISDICTION AND VENUE

30. This is an action for patent infringement arising under the patent laws of the United States. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

31. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391(b)-(c) and 1400(b) either because (A) the Defendant is a foreign corporation who is not a resident of the United States and is subject to personal jurisdiction in this District, and thus is subject to venue in any judicial district, including this District; or (B) resides in this District and/or has committed acts of infringement in this District and has a regular and established place of business in this District.

32. Each Defendant is subject to this Court's general and specific jurisdiction pursuant to due process and/or the Texas Long Arm Statute due at least to each Defendant's substantial business in the State of Texas and this District, including through its past infringing activities, because each Defendant regularly does and solicits business herein, and/or because each Defendant has engaged in persistent conduct and/or has derived substantial revenues from goods and services

provided to customers in the State of Texas and this District, as explained further below.

Delta Defendants

33. This Court has personal jurisdiction over each Delta Defendant because each Defendant conducts business in and has committed acts of patent infringement in this District, contributed to acts of patent infringement in this District, and/or induced others to commit acts of patent infringement in this District, the State of Texas, and elsewhere in the United States and has established minimum contacts with this forum state such that the exercise of jurisdiction over each Defendant would not offend the traditional notions of fair play and substantial justice. The Delta Defendants conduct substantial business with entities and individuals in the State of Texas and the Eastern District of Texas by, among other things: (A) manufacturing, importing, offering to sell, distributing, and selling products that infringe the Asserted Patents, both through their own infringing activities and those committed vicariously through and/or in concert with their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers, which purposely avail the Delta Defendants of the privilege of conducting those activities in this state and this District; and (B) regularly doing or soliciting business in this District, providing service and support to their customers in this District, deriving substantial revenue from infringing goods offered for sale, sold, and imported in or to this District, and/or engaging in other persistent conduct targeting residents of Texas both through their own conduct and/or in concert with or through their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers.

34. For example, Delta Electronics Inc. and Cyntec Co. Ltd. are related to, own, and/or control consolidated subsidiaries (such as Defendants Delta Electronics (USA) Inc. and Delta Electronics (Americas) Ltd.) that have a significant business presence in the United States and

Texas and conduct activities through or in concert with these entities with respect to the accused products. For example, Delta Electronics (USA) Inc. and Delta Electronics (Americas) Ltd. conduct significant business activities at the Delta facilities in Plano, Texas and El Paso, Texas, where the entities employ customer service representatives, engineers, and quality control inspectors for the Delta accused products. Such presence and activities further the development, design, manufacture, importation, distribution, sale, and use of the infringing Delta products in Texas. Through both their own direct conduct and their direction and control of their subsidiaries, affiliates, and partners, the Delta Defendants have committed acts of direct and/or indirect patent infringement within Texas, and elsewhere in the United States, giving rise to this action and/or have established minimum contacts with Texas such that personal jurisdiction would not offend traditional notions of fair play and substantial justice.

35. Further, on information and belief, each Delta Defendant utilizes established distribution channels to distribute, market, offer for sale, sell, service, and warrant infringing products directly to consumers in the United States and in Texas, including by offering such products for sale via its own websites. For example, Delta Electronics Inc.'s website provides links for consumers and professionals to access on-line stores operated by the "Delta Group," including, the website of Cyntec Co. Ltd., which directs Delta customers to contact information for purchasing the Delta power modules. *See, e.g.*, <https://www.deltaww.com/en-us/Products/Power-Modules/ALL/>. As another example, the Delta Defendants also purposefully place infringing Delta products in established distribution channels in the stream of commerce by contracting with national retailers who sell Delta's products in the U.S., including in Texas. For example, Cyntec Co. Ltd.'s website identifies national distributor Digikey as a domestic retailer of Cyntec Co. Ltd.'s Power Module products. *See, e.g.*, <https://www.cyntec.com/wheretobuy.aspx>. On information and

belief, Delta Electronics Inc. and Cyntec Co. Ltd., directly or through their subsidiaries and affiliates, contract with these companies with the knowledge and expectation that the Delta accused products will be imported, distributed, advertised, offered for sale, sold, and/or serviced in the U.S. market.

36. Accordingly, each Delta Defendant places the accused power modules and power systems and/or products containing the same into the stream of commerce via authorized and established distribution channels with the knowledge and expectation that they will be sold in the State of Texas, including in this District, and does not otherwise permit the sale of the accused power modules and power systems and/or products containing the same in the State of Texas, or in this District, outside of these established, authorized, and ratified distribution channels and networks.

37. Venue is proper in this District as to Delta Electronics, Inc. and Cyntec Co., Ltd. because Delta Electronics, Inc. and Cyntec Co., Ltd. are foreign entities and venue is proper in any judicial district.

38. Venue is proper in this District as to Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc. because (1) Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc. have a physical place located in the District including at least at 2925 E. Plano Pkwy, Plano, Texas 75074; (2) it is a regular and established place of business, and (3) it belongs to Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc.

Foxconn Defendants

39. This Court has personal jurisdiction over each Foxconn Defendant because each Defendant conducts business in and has committed acts of patent infringement in this District, contributed to acts of patent infringement in this District, and/or induced others to commit acts of

patent infringement in this District, the State of Texas, and elsewhere in the United States and has established minimum contacts with this forum state such that the exercise of jurisdiction over each Defendant would not offend the traditional notions of fair play and substantial justice. The Foxconn Defendants conduct substantial business with entities and individuals in the State of Texas and the Eastern District of Texas by, among other things: (A) manufacturing, importing, offering to sell, distributing, and selling products that infringe the Asserted Patents, both through their own infringing activities and those committed vicariously through and/or in concert with their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers, which purposely avail the Foxconn Defendants of the privilege of conducting those activities in this state and this District; and (B) regularly doing or soliciting business in this District, providing service and support to their customers in this District, deriving substantial revenue from infringing goods offered for sale, sold, and imported in or to this District, and/or engaging in other persistent conduct targeting residents of Texas both through their own conduct and/or in concert with or through their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers.

40. For example, Hon Hai Precision Industry Co. Ltd., Foxconn Industrial Internet Co. Ltd., and Ingrasys Technology Inc. are related to, own, and/or control consolidated subsidiaries (such as Hon Hai/Foxconn Logistics Texas LLC) that have a significant business presence in the United States and Texas and conduct activities through or in concert with these entities with respect to the accused products. Such presence and activities further the development, design, manufacture, importation, distribution, sale, and use of infringing Foxconn products in Texas. Through both their own conduct and their direction and control of their subsidiaries, affiliates, and partners, Hon Hai Precision Industry Co. Ltd., Foxconn Industrial Internet Co. Ltd., and Ingrasys

Technology Inc. have committed acts of direct and/or indirect patent infringement within Texas, and elsewhere in the United States, giving rise to this action and/or have established minimum contacts with Texas such that personal jurisdiction over Hon Hai Precision Industry Co. Ltd., Foxconn Industrial Internet Co. Ltd., and Ingrasys Technology Inc. would not offend traditional notions of fair play and substantial justice.

41. Further, on information and belief, each Foxconn Defendant utilizes established distribution channels to distribute, market, offer for sale, sell, service, and warrant infringing products directly to consumers, including offering such products for sale via its own websites. Hon Hai Precision Industry Co. Ltd. touts its “global footprint that spans over 20 countries” and “wide network” that affords it “the flexibility in creating a synergy to strengthen [its] customer services, product manufacturing, and supply chains across industries.” *See* <https://www.foxconn.com/en-us/products-and-services>. Part of this global network includes Defendant Foxconn Industrial Internet Co. Ltd., whose website directs customers interested in server and datacenter products to the website of Foxconn subsidiary Ingrasys Technology Inc., where a customer can view products and contact Ingrasys’ “Sales” department for purchase. *See* <https://www.fii-foxconn.com/en/index>; <https://www.ingrasys.com/server>. On information and belief, the Foxconn Defendants also purposefully place infringing Foxconn products in established distribution channels in the stream of commerce by contracting with national retailers who sell Foxconn products in the U.S., including in Texas. On information and belief, the Foxconn Defendants, directly or through their subsidiaries and affiliates, contract with these companies with the knowledge and expectation that Foxconn products will be imported, distributed, advertised, offered for sale, sold, and/or serviced in the U.S. market.

42. Accordingly, each Foxconn Defendant places the accused power modules and

power systems and/or products containing the same into the stream of commerce via authorized and established distribution channels with the knowledge and expectation that they will be sold in the State of Texas, including in this District, and does not otherwise permit the sale of the accused power modules and power systems and/or products containing the same in the State of Texas, or in this District, outside of these established, authorized, and ratified distribution channels and networks.

43. Venue is proper in this District with respect to Hon Hai Precision Industry Co. Ltd., Foxconn Industrial Internet Co. Ltd., and Ingrasys Technology Inc. because Hon Hai Precision Industry Co. Ltd., Foxconn Industrial Internet Co. Ltd., and Ingrasys Technology Inc. are foreign entities and venue is proper in any judicial district.

Quanta Defendants

44. This Court has personal jurisdiction over each Quanta Defendant because each Defendant conducts business in and has committed acts of patent infringement in this District, contributed to acts of patent infringement in this District, and/or induced others to commit acts of patent infringement in this District, the State of Texas, and elsewhere in the United States and has established minimum contacts with this forum state such that the exercise of jurisdiction over each Defendant would not offend the traditional notions of fair play and substantial justice. The Quanta Defendants conduct substantial business with entities and individuals in the State of Texas and the Eastern District of Texas by, among other things: (A) manufacturing, importing, offering to sell, distributing, and selling products that infringe the Asserted Patents, both through their own infringing activities and those committed vicariously through and/or in concert with their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers, which purposely avail the Quanta Defendants of the privilege of conducting those activities in this

state and this District; and (B) regularly doing or soliciting business in this District, providing service and support to their customers in this District, deriving substantial revenue from infringing goods offered for sale, sold, and imported in or to this District, and/or engaging in other persistent conduct targeting residents of Texas both through their own conduct and/or in concert with or through their alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers.

45. For example, Quanta Computer Inc. advertises the accused Quanta products through its subsidiary Quanta Cloud Technology Inc., which in turn identifies several established distribution channels to distribute, market, offer for sale, sell, service, and warrant infringing products directly to consumers in the United States. *See, e.g.*, https://www.quantatw.com/Quanta/english/product/qci_es.aspx; <https://www.qct.io/product/index/Server>; <https://www.qct.io/wheretobuy/index>. For example, one of Quanta's authorized domestic retailers of Quanta products, Synnex, specifically advertises the ability to purchase offered products "24/7" and deliver them throughout the United States promptly and quickly. *E.g.*, <https://www.synnexcorp.com/us/commerce/>. Such presence and activities further the development, design, manufacture, importation, distribution, sale, and use of the infringing Quanta products in Texas. Through their own conduct and their direction and control of their subsidiaries, affiliates, and partners, Quanta Computer Inc. and Quanta Cloud Technology Inc. have committed acts of direct and/or indirect patent infringement within Texas, and elsewhere in the United States, giving rise to this action and/or has established minimum contacts with Texas such that personal jurisdiction over Quanta Computer Inc. and Quanta Cloud Technology Inc. would not offend traditional notions of fair play and substantial justice.

46. On information and belief, the Quanta Defendants also purposefully place

infringing Quanta products in established distribution channels in the stream of commerce by contracting with national retailers who sell Quanta's products in the U.S., including in Texas and this District. On information and belief, the Quanta Defendants, directly or through their subsidiaries and affiliates, contract with these companies with the knowledge and expectation that Quanta products will be imported, distributed, advertised, offered for sale, sold, and/or serviced in the U.S. market.

47. Accordingly, each Quanta Defendant places the accused power modules and power systems and/or products containing the same into the stream of commerce via authorized and established distribution channels with the knowledge and expectation that they will be sold in the State of Texas, including in this District, and does not otherwise permit the sale of the accused power modules and power systems and/or products containing the same in the State of Texas, or in this District, outside of these established, authorized, and ratified distribution channels and networks.

48. Venue is proper in this District with respect to Quanta Computer Inc. and Quanta Cloud Technology Inc. because to Quanta Computer Inc. and Quanta Cloud Technology Inc. are foreign entities and venue is proper in any judicial district.

SINGLE ACTION

49. This suit is commenced against Defendants pursuant to 35 U.S.C. § 299 in a single action because (a) a right to relief is asserted against Defendants jointly, severally, or in the alternative with respect to or arising out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing into the United States, offering for sale, and/or selling of the same accused products or processes, and (b) questions of fact common to all Defendants will arise in the action.

50. Plaintiff is informed and believes, and on that basis alleges, that each named Defendant manufactures, imports, uses, offers for sale, and/or sells the same products and processes accused in this action.

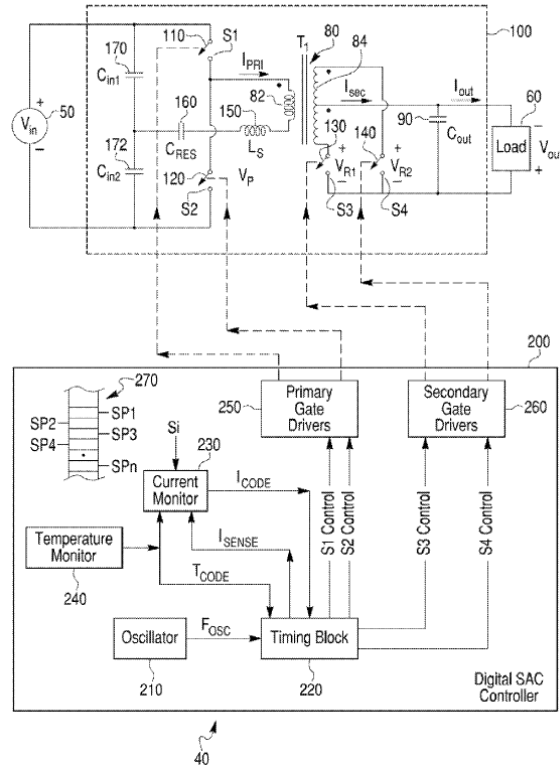
THE ASSERTED PATENTS

51. This action asserts causes of action for infringement of U.S. Patent Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893. U.S. Patent Nos. 9,166,481, 9,516,761, and 10,199,950 are valid and enforceable United States Patents. U.S. Patent No. 6,930,893 expired in 2022 but remains valid and enforceable as to past damages for infringement. Vicor owns the entire right, title, and interest to each of the Asserted Patents.

A. U.S. Patent No. 9,166,481

52. On October 20, 2015, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 9,166,481 (“’481 Patent”), which is entitled “Digital Control of Resonant Power Converters.” Plaintiff holds all rights and title to the Patent, including the sole and exclusive right to bring a claim for its infringement. A true and correct copy of the ’481 Patent is attached as **Exhibit A**.

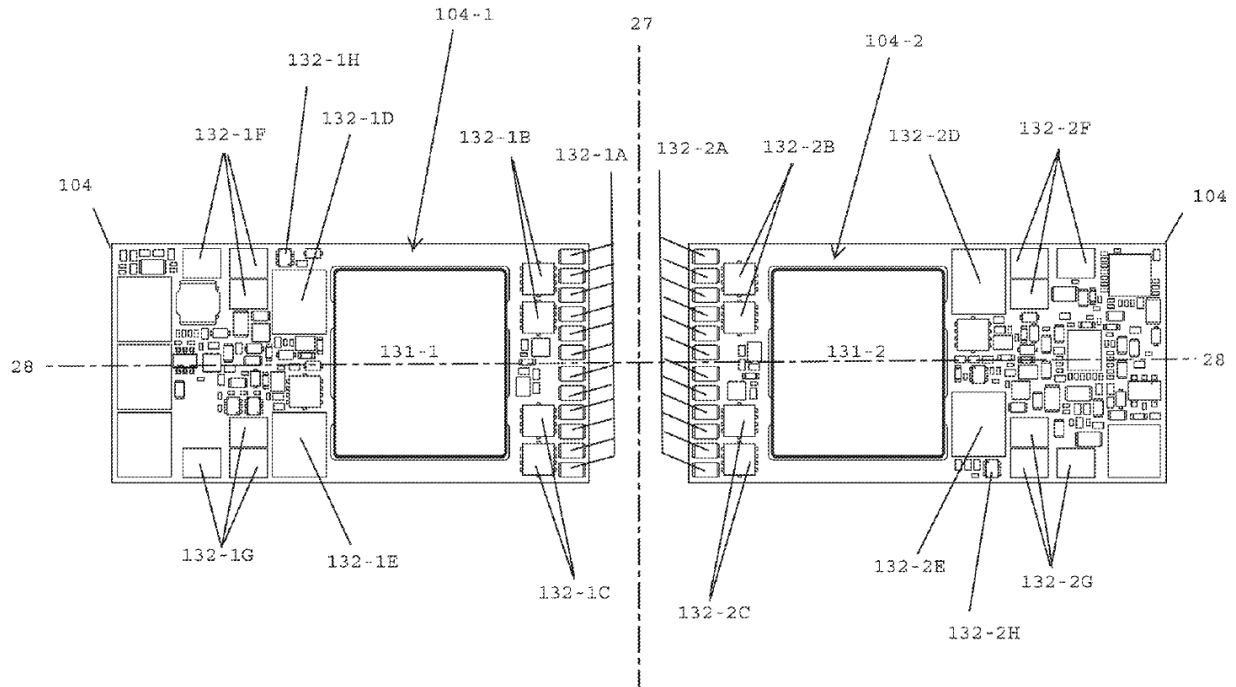
53. The ’481 Patent generally claims a method for digital control of Sine Amplitude Converters (“SAC”), *i.e.*, zero-current and zero-voltage switching power converters operating at their resonant frequency as fixed ratio converters. The method uses digitally generated timing-control signals for turning switches on and off without power loss at essentially zero voltage and zero current. The patented technology has applications in high density, high efficiency power converters used to change a DC source voltage to a load voltage at an essentially fixed voltage ratio. Such converters find application in, among other things, datacenters. The following exemplary diagram, taken from Figure 2 of the ’481 Patent, depicts a Digital SAC Controller:



B. U.S. Patent No. 9,516,761

54. On December 6, 2016, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 9,516,761 (the “’761 Patent”), which is entitled “Encapsulated Modular Power Converter with Symmetric Heat Distribution.” Plaintiff holds all rights and title to the Patent, including the sole and exclusive right to bring a claim for its infringement. A true and correct copy of the Patent is attached as **Exhibit B**.

55. The ’761 patent generally claims power converters with heat distribution through the converter’s top and bottom surfaces, using conductive vias in the PCB shared by complementary components on the top and bottom surfaces and symmetrical multi-cell converter topologies, reducing heat density and improving efficiency and power density. The following exemplary diagram, taken from Figure 27 of the ’761 Patent, depicts the top and bottom plan views of a section of a printed circuit board, illustrating patented component layout features:

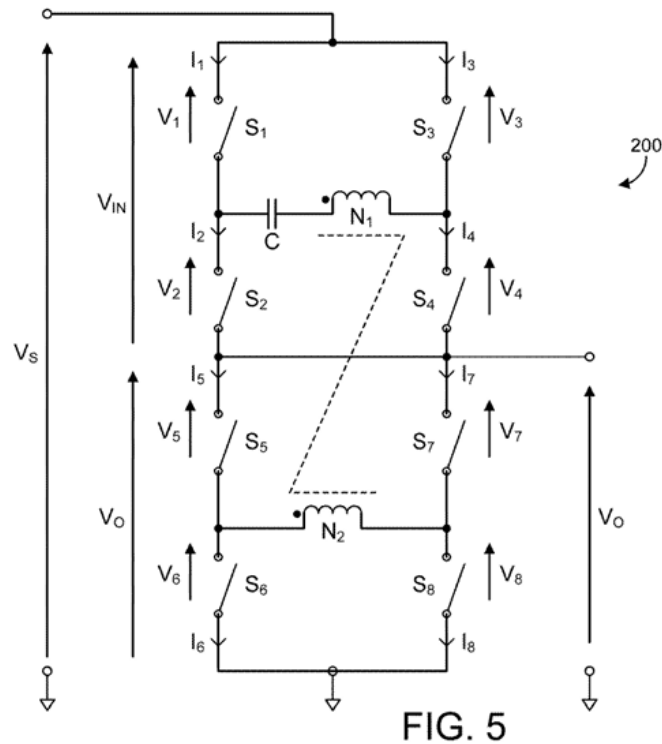


C. U.S. Patent No. 10,199,950

56. On February 5, 2019, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 10,199,950 (the “950 Patent”), which is entitled “Power Distribution Architecture with Series-Connected Bus Converter.” Plaintiff holds all rights and title to the Patent, including the sole and exclusive right to bring a claim for its infringement. A true and correct copy of the Patent is attached as **Exhibit C**.

57. The ’950 Patent generally claims Non-IBA power distribution using a class of fixed ratio Sine Amplitude Converter (“SAC”) modules which are non-isolated. Non-isolated Bus converter Modules (“NBMs”) enable efficient power distribution and provide superior power system density and efficiency. The patented technology has applications in high-performance computing, communications and network infrastructure which have extreme power requirements and benefit from small, power-dense DC-DC converters that save space and weight. The following

exemplary diagram, taken from Figure 5 of the patent, depicts a schematic of a series-connected SAC according to one of the illustrative embodiments of the patent:



C. U.S. Patent No. 6,930,893

58. On August 16, 2005, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 6,930,893 (the “’893 Patent”), which is entitled “Factorized Power Architecture With Point of Load Sine Amplitude Converters.” Plaintiff holds all rights and title to the Patent, including the sole and exclusive right to bring a claim for its infringement. A true and correct copy of the Patent is attached as **Exhibit D**.

59. The ’893 Patent claims a fixed ratio Sine Amplitude Converter (“SAC”) whose conversion frequency is “locked” to the resonance of a “low Q” resonant circuit, enabling greater power converter density and efficiency. The patented technology has applications in, for example, distributed electronic power conversion systems for, e.g., datacenters, automotive vehicles, and a

variety of medical, industrial, and military products. The following exemplary diagrams, taken from Figures 9 and 10 of the patent, depict a Sine Amplitude Converter and its characteristic waveforms:

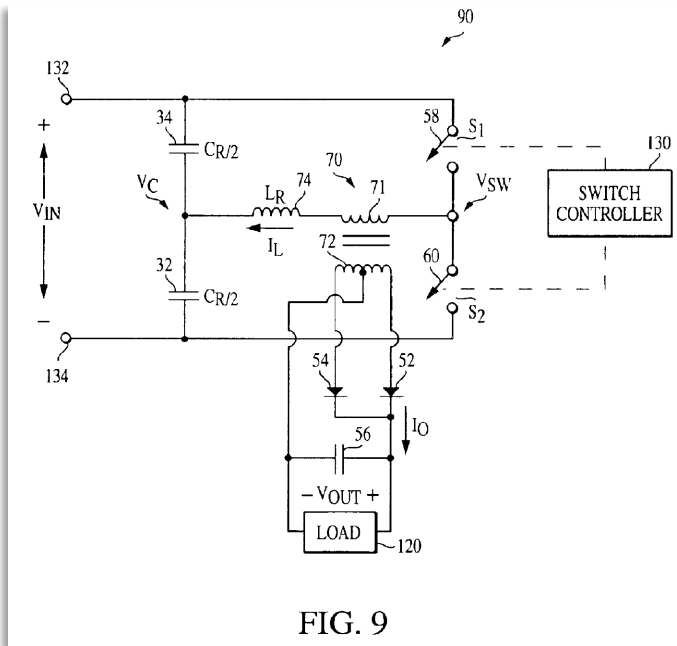
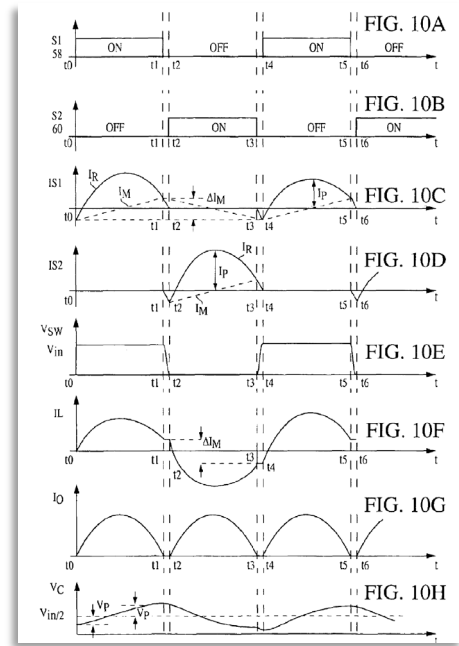


FIG. 9



FACTUAL ALLEGATIONS

60. As referred to in this Complaint, and consistent with 35 U.S.C. § 100(c), the “United States” means “the United States of America, its territories and possessions.”

61. Each Defendant does not have any right to practice the intellectual property protected by the Asserted Patents.

62. Each Defendant makes, uses, imports, offers to sell, and/or sells in the United States products made in accordance with the Asserted Patents—including, but not limited to, the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks (“PDNs”), servers, and AI accelerators)—and/or induces others to commit acts of patent

infringement in the United States.

63. Vicor has at all relevant times made a good faith effort to mark its products that practice U.S. Patent No. 6,930,893 with the patent number in accordance with 35 U.S.C. § 287.

COUNT I

INFRINGEMENT OF U.S. PATENT NO. 9,166,481

64. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

Delta

65. Delta has infringed and continues to infringe at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '481 Patent. Delta is liable for its infringement of the '481 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

66. More specifically, Delta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '481 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), including Vertical Power Delivery ("VPD"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '481 Patent.

67. Claim 1 is illustrative of the '481 Patent. It recites "[a] method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least

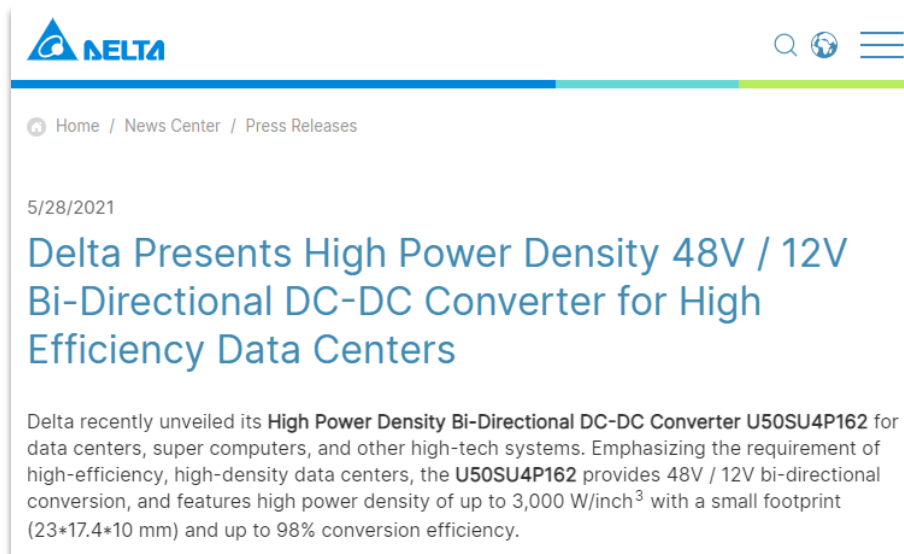
one primary switch to drive a resonant power train and at least one secondary switch, the resonant power train including a transformer and having a characteristic resonant frequency and period, the method comprising: providing an oscillator for generating clock signals at an oscillator frequency; generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch and essentially zero voltage is impressed across the respective at least one secondary switch; and wherein the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events may be set independently of other timing control signals and events.”

68. The Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) meet every element of this claim.² The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”

² This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Delta’s products infringe the ’481 Patent.




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



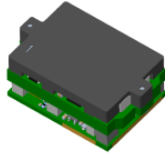
See: <https://www.deltaww.com/en-US/news/24124>

69. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

70. The Delta U50SU Series Power Module comprises a method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least one primary switch to drive a resonant power train and at least one secondary switch. Further, the resonant power train includes a transformer and has a characteristic frequency and method, further comprising a method providing an oscillator for generating clock signals at an oscillator frequency.

71. Further, the Delta U50SU Series Power Module also comprises generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch

and essentially zero voltage is impressed across the respective at least one secondary switch. Moreover, the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events has the ability to be set independently of other timing control signals and events.

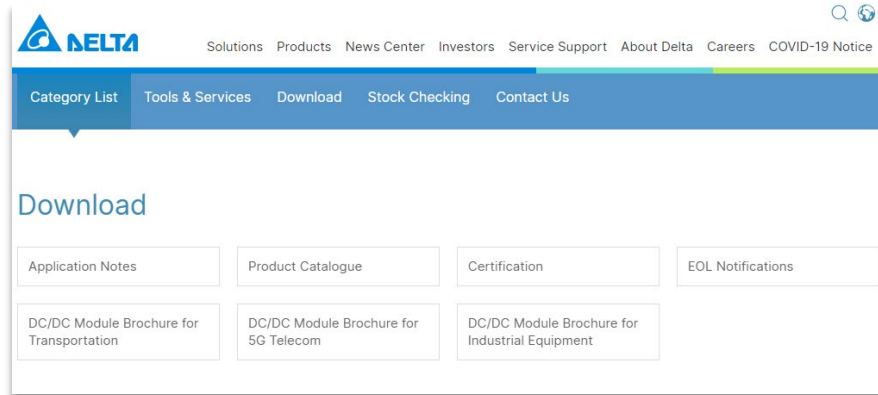
72. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

73. Delta engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Delta advertises in its technical specifications and datasheets such as those cited herein; and that they continue to properly function, including in the face of changes in external factors (e.g., interoperation with customer-specific hardware). For example, Delta has positions open for “testing engineer[s]” at its Plano, Texas location, whose duties include, for example, “equipment testing, testing record creation, and testing report presentation.” *E.g.*, <https://www.linkedin.com/jobs/view/%E3%80%902023-gem-program%E3%80%91testing-engineer-at-delta-electronics-americas-3529550744/>. In testing and using the accused products, Delta performs the claimed method described above.

74. Delta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the infringing Delta U50SU Series Power Module and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, such as Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc.

75. Delta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Delta has had knowledge of the '481 Patent and the infringing nature of the accused Delta U50SU Series Power Module and power systems and/or products containing the same. Despite this knowledge of the '481 Patent, Delta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Delta products in ways that directly infringe the '481 Patent literally and/or under the doctrine of equivalents. Delta does so knowing and intending that its customers and end users will commit these infringing acts. Delta also continues to make, use, import, offer for sale, and/or sell the accused Delta products, despite its knowledge of the '481 Patent, thereby specifically intending for and inducing its customers to infringe the '481 Patent through the customers' normal and customary use of the accused Delta products.

76. For example, Delta's webpage regarding its DC/DC Converter offerings includes "Application Notes" and "DC/DC Module Brochures" that describe the functionalities and features of Delta's power modules. On information and belief, Delta also offers its customers more detailed brochures, product manuals, and other technical support that is not publicly available and that instructs their customers how to use the functionalities and features enabled by the Delta products' practice of the '481 Patent. In doing so, Delta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '481 Patent, but while remaining willfully blind to the infringement.



See: <https://www.deltaww.com/en-US/Products/Telecom-Networking-and-Datacenter/ALL/>

77. Delta also contributorily infringes the '481 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling, offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '481 Patent. Delta does so knowing that these products are especially made or especially adapted for uses that infringe the '481 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems and products containing the same implement circuitry and designs that directly infringe the technologies protected by the '481 Patent, and that infringing use is necessary for the accused Delta products to function. Without the use of these infringing technologies, the accused Delta products would not be able to perform the functions and features that are central to their operation.

78. Further, on information and belief, Delta has deliberately copied and infringed the technology protected by the '481 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Delta has had actual knowledge of the '481 Patent. Despite this knowledge, Delta continues to willfully infringe the '481 Patent by continuing to manufacture, import, sell, and offer for sale power modules and

power systems and/or products containing the same that infringe the '481 Patent and replicate Vicor's patented products. Delta has no plausible good faith defense to infringement when it purposefully created the accused power modules as a replica of, and substitute for, the copied Vicor products. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

79. Delta committed the foregoing infringing activities without license from Vicor. Delta's acts of infringement have damaged Vicor, as owner of the '481 Patent. Vicor is entitled to recover from Delta the damages it has sustained as a result of Delta's wrongful acts in an amount subject to proof at trial. Delta's infringement of Vicor's rights under the '481 Patent will continue to damage Vicor.

Foxconn

80. Foxconn has infringed and continues to infringe at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '481 Patent. Foxconn is liable for its infringement of the '481 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

81. More specifically, Foxconn designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '481 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent

claim 1 of the '481 Patent.

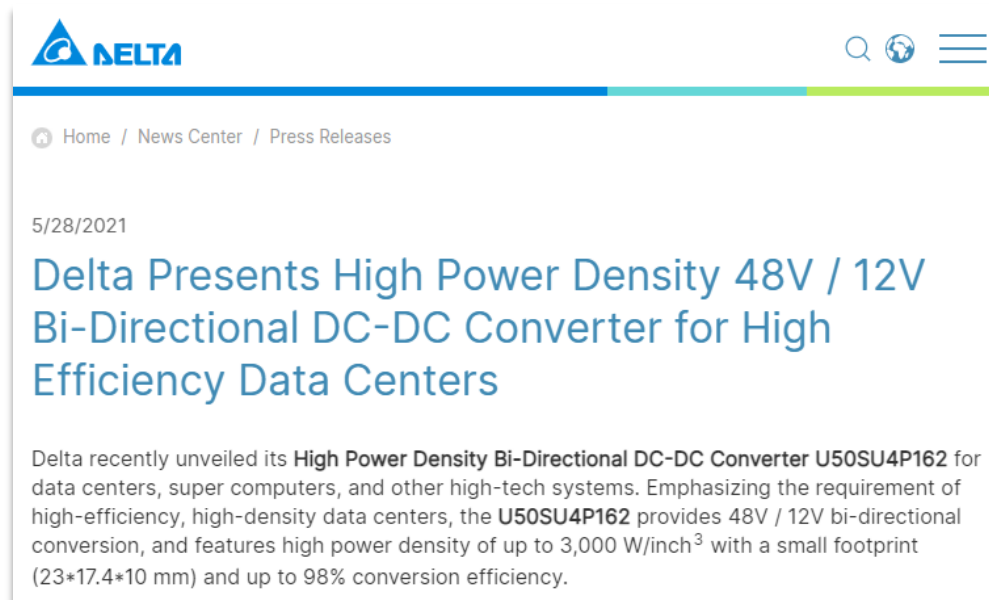
82. Claim 1 is illustrative of the '481 Patent. It recites “[a] method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least one primary switch to drive a resonant power train and at least one secondary switch, the resonant power train including a transformer and having a characteristic resonant frequency and period, the method comprising: providing an oscillator for generating clock signals at an oscillator frequency; generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch and essentially zero voltage is impressed across the respective at least one secondary switch; and wherein the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events may be set independently of other timing control signals and events.”

83. The Delta U50SU Series Power Modules meet every element of this claim.³ The Delta U50SU Series Power Modules offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”

³ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Foxconn’s products infringe the '481 Patent.




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



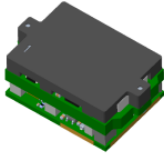
See: <https://www.deltaww.com/en-US/news/24124>

84. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

85. The Delta U50SU Series Power Modules comprise a method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least one primary switch to drive a resonant power train and at least one secondary switch. Further, the resonant power train includes a transformer and has a characteristic frequency and method, further comprising a method providing an oscillator for generating clock signals at an oscillator frequency.

86. Further, the Delta U50SU Series Power Modules also comprise generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch

and essentially zero voltage is impressed across the respective at least one secondary switch. Moreover, the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events has the ability to be set independently of other timing control signals and events.

87. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

88. Foxconn engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Foxconn advertises in its technical specifications and datasheets; and that they continue to properly function after sale. For example, Foxconn employs “test engineer[s]” in Wisconsin, whose duties include, for example, “design[ing] and develop[ing] testing diagnostics for new and existing products,” “engineering servers, server data and equipment calibration processes,” and “identify[ing] and troubleshoot[ing] issues encountered in testing.” *E.g.*, <https://www.linkedin.com/in/jie-xie-6b85a86/>; <https://www.wayup.com/i-j-Foxconn-Industrial-Internet-646415345456446/>. In testing and using the materials, Foxconn performs the claimed method described above.

89. Foxconn has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through, its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, including at 12345 N. Lamar Suite, 250, Austin, Texas 78753; 543 S. Americas Ave. A-2, El Paso, Texas; and 1430 Henry

Brennan Dr., El Paso, Texas.

90. Foxconn also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Foxconn has had knowledge of the '481 Patent and the infringing nature of the Delta U50SU Series Power Modules and Foxconn power systems and/or products containing the same. Despite this knowledge of the '481 Patent, Foxconn continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Foxconn products in ways that directly infringe the '481 Patent literally and/or under the doctrine of equivalents. Foxconn does so knowing and intending that its customers and end users will commit these infringing acts. Foxconn also continues to make, use, import, offer for sale, and/or sell the accused Foxconn products, despite its knowledge of the '481 Patent, thereby specifically intending for and inducing its customers to infringe the '481 Patent through the customers' normal and customary use of the accused products.

91. On information and belief, Foxconn offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the accused Foxconn products' practice of the '481 Patent. In doing so, Foxconn has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '481 Patent, but while remaining willfully blind to the infringement.

92. Foxconn also contributorily infringes the '481 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into

the United States, power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '481 Patent. Foxconn does so knowing that these products are especially made or especially adapted for uses that infringe the '481 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and Foxconn power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '481 Patent, and that infringing use is necessary for the power modules and power systems and/or products to function. Without the use of these infringing technologies, the power modules and power systems and/or products containing the same would not be able to perform the functions and features that are central to their operation.

93. Further, on information and belief, Foxconn has deliberately copied and infringed the technology protected by the '481 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Foxconn has had actual knowledge of the '481 Patent. Despite this knowledge, Foxconn continues to willfully infringe the '481 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '481 Patent and replicate Vicor's patented products. Foxconn has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

94. Foxconn committed the foregoing infringing activities without license from Vicor.

Foxconn's acts of infringement have damaged Vicor, as owner of the '481 Patent. Vicor is entitled to recover from Foxconn the damages it has sustained as a result of Foxconn's wrongful acts in an amount subject to proof at trial. Foxconn's infringement of Vicor's rights under the '481 Patent will continue to damage Vicor.

Quanta

95. Quanta has infringed and continues to infringe at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '481 Patent. Quanta is liable for its infringement of the '481 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

96. More specifically, Quanta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '481 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '481 Patent.

97. Claim 1 is illustrative of the '481 Patent. It recites "[a] method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least one primary switch to drive a resonant power train and at least one secondary switch, the resonant power train including a transformer and having a characteristic resonant frequency and period, the method comprising: providing an oscillator for generating clock signals at an oscillator frequency;

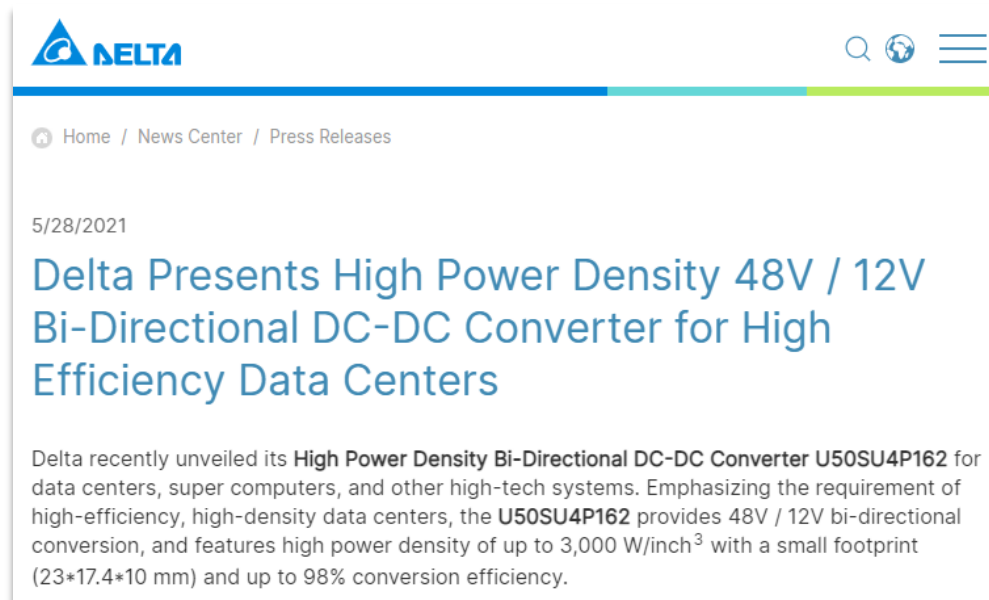
generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch and essentially zero voltage is impressed across the respective at least one secondary switch; and wherein the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events may be set independently of other timing control signals and events.”

98. The Delta U50SU Series Power Modules meet every element of this claim.⁴ The Delta U50SU Series Power Module is a High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module that offers “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”

⁴ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Quanta’s products infringe the ’481 Patent.




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



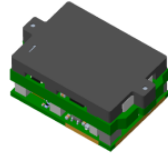
See: <https://www.deltaww.com/en-US/news/24124>

99. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

100. The Delta U50SU Series Power Modules comprise a method of synchronously operating a power converter in a series of converter operating cycles, the converter having at least one primary switch to drive a resonant power train and at least one secondary switch. Further, the resonant power train includes a transformer and has a characteristic frequency and method, further comprising a method providing an oscillator for generating clock signals at an oscillator frequency.

101. Further, the Delta U50SU Series Power Modules also comprise generating timing control signals for each of a plurality of events based upon the clock signals in a (A) standard converter operating cycle, having a standard operating period and frequency, to: (i) turn the at least one primary switch ON and OFF at times when essentially zero voltage is impressed across the respective at least one primary switch and essentially zero resonant current is flowing in the respective at least one primary switch; and (ii) turn the at least one secondary switch ON and OFF at times when essentially zero current is flowing in the respective at least one secondary switch

and essentially zero voltage is impressed across the respective at least one secondary switch. Moreover, the oscillator frequency is preset, and the timing of the timing control signals for one or more selected events has the ability to be set independently of other timing control signals and events.

102. On information and belief, variations of the Delta U50SU Series Power Modules, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

103. Quanta engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Quanta advertises in its technical specifications and datasheets; and that they continue to properly function after sale. For example, Quanta has “server test technician[s]” in the United States who are responsible for “testing, diagnosing and full repair of multiple model servers in a cloud computing business unit.” *E.g.*, <https://www.linkedin.com/in/phillip-j-parker-03ba4269/>. In testing and using the materials, Quanta performs the claimed method described above.

104. Quanta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas.

105. Quanta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '481 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Quanta has had knowledge of the

'481 Patent and the infringing nature of the Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '481 Patent, Quanta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Quanta products in ways that directly infringe the '481 Patent literally and/or under the doctrine of equivalents. Quanta does so knowing and intending that its customers and end users will commit these infringing acts. Quanta also continues to make, use, import, offer for sale, and/or sell the accused Quanta products despite its knowledge of the '481 Patent, thereby specifically intending for and inducing its customers to infringe the '481 Patent through the customers' normal and customary use of the accused products.

106. On information and belief, Quanta offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Quanta products' practice of the '481 Patent. In doing so, Quanta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '481 Patent, but while remaining willfully blind to the infringement.

107. Quanta also contributorily infringes the '481 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '481 Patent. Quanta does so knowing that these products are especially made or especially adapted for uses that infringe the '481 Patent, and are not staple articles or commodities of commerce suitable for substantial non-

infringing use. For example, the Delta U50SU Series Power Modules and Quanta power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '481 Patent, and that infringing use is necessary for the accused Quanta products to function. Without the use of these infringing technologies, the server boards and modules would not be able to perform the functions and features that are central to their operation.

108. Further, on information and belief, Quanta has deliberately copied and infringed the technology protected by the '481 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Quanta has had actual knowledge of the '481 Patent. Despite this knowledge, Quanta continues to willfully infringe the '481 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '481 Patent and replicate Vicor's patented products. Quanta has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

109. Quanta committed the foregoing infringing activities without license from Vicor. Quanta's acts of infringement have damaged Vicor, as owner of the '481 Patent. Vicor is entitled to recover from Quanta the damages it has sustained as a result of Quanta's wrongful acts in an amount subject to proof at trial. Quanta's infringement of Vicor's rights under the '481 Patent will continue to damage Vicor.

COUNT II

INFRINGEMENT OF U.S. PATENT NO. 9,516,761

110. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

Delta

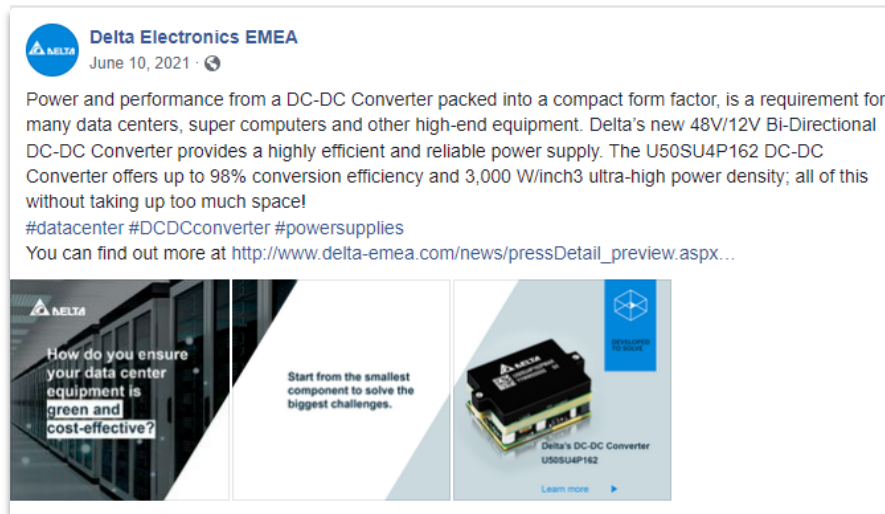
111. Delta has infringed and continues to infringe at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '761 Patent. Delta is liable for its infringement of the '761 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

112. More specifically, Delta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '761 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks (“PDNs”), including Vertical Power Delivery (“VPD”), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '761 Patent.

113. Claim 1 is illustrative of the '761 Patent. It recites “[a]n apparatus comprising: a power converter including a printed circuit board (PCB) comprising a plurality of conductive layers and having a top surface and a bottom surface; a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB; and a plurality of power semiconductor devices, a first set of the power semiconductor devices being

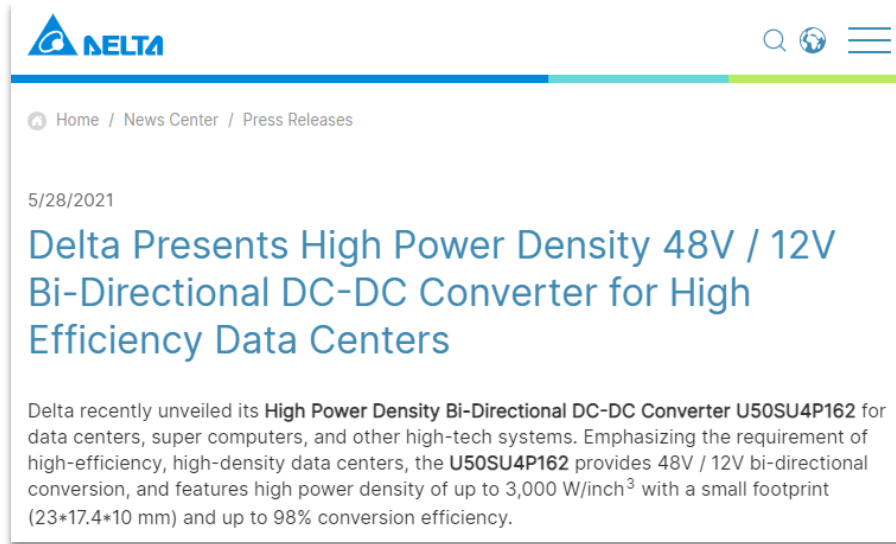
mounted on the top surface and electrically connected to dissipate power at a level, P_t , during operation of the converter, a second set of the power semiconductor devices being mounted on the bottom surface and electrically connected to dissipate power at a level, P_b , during operation of the converter; wherein the power semiconductor devices are distributed between the first and second sets to distribute heat generation during operation of the converter such that each level P_t , P_b is less than 150% of the other level P_b , P_t .”

114. The Delta U50SU Series Power Modules meet every element of this claim.⁵ The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”



See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>

⁵ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Delta’s products infringe the ’761 Patent.



See: <https://www.deltaww.com/en-US/news/24124>

115. As the product’s datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.

U50SU4P162
62A, Fixed Ratio Power Module

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

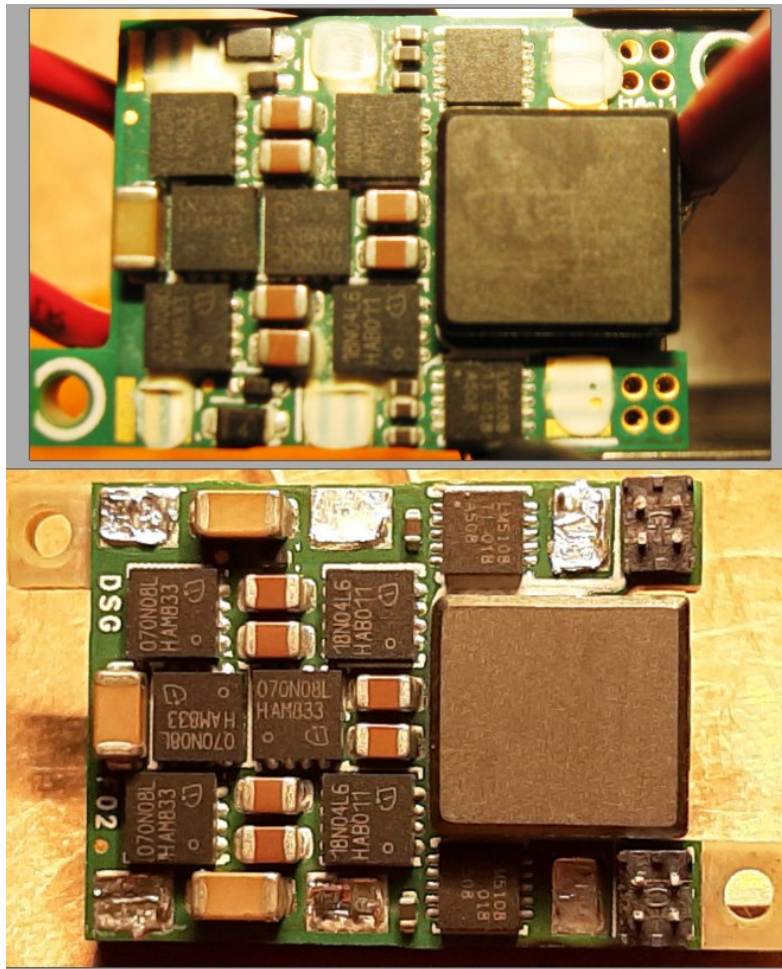
- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
Low-side input Voltage: 9.5V~15V
Fixed Ratio Factor: K=4
Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

116. The Delta U50SU Series Power Modules also comprise a printed circuit board

(“PCB”) that has a plurality of conductive layers, a top surface, a bottom surface, a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB, and a plurality of power semiconductor devices, as depicted in the teardown image below of the top and bottom of the board in the Delta U50SU4P162.



117. Further, the power semiconductor devices of the Delta U50SU Series Power Module comprise a first set of power semiconductor devices that are mounted on the top surface and electrically connected to dissipate power at a level (e.g., “Pt” for top level) and a second set of power semiconductor devices that are mounted on the bottom surface and electrically connected to dissipate power at a level (e.g., “Pb” for bottom level) during operation of the converter. Because the power semiconductor devices of the Delta U50SU Series Power Module are distributed

between the first and second sets of devices to distribute heat generation during operation of the converter, Pt/Pb is less than 150% of the other level Pb/Pt.

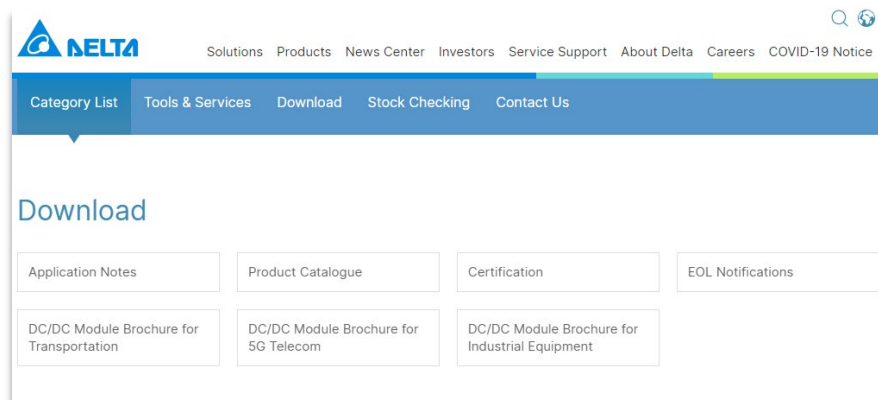
118. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

119. Delta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, such as Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc.

120. Delta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Delta has had knowledge of the '761 Patent and the infringing nature of the accused Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '761 Patent, Delta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Delta products in ways that directly infringe the '761 Patent literally and/or under the doctrine of equivalents. Delta does so knowing and intending that its customers and end users will commit these infringing acts. Delta also continues to make, use, import, offer for sale, and/or sell the accused Delta products, despite its knowledge of the '761 Patent, thereby specifically intending for and inducing its customers to infringe the '761 Patent through the customers' normal and customary use of the accused Delta

products.

121. For example, Delta's webpage regarding its DC/DC Converter offerings includes "Application Notes" and "DC/DC Module Brochures" that describe the functionalities and features of Delta's power modules. On information and belief, Delta also offers its customers more detailed brochures, product manuals, and other technical support that is not publicly available and that instructs their customers how to use the functionalities and features enabled by the Delta products' practice of the '761 Patent. In doing so, Delta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '761 Patent, but while remaining willfully blind to the infringement.



See: <https://www.deltaww.com/en-US/Products/Telecom-Networking-and-Datacenter/ALL/>

122. Delta also contributorily infringes the '761 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '761 Patent. Delta does so knowing that these products are especially made or especially adapted for uses that infringe the '761 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For

example, the Delta U50SU Series Power Module and power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '761 Patent, and that infringing use is necessary for the accused Delta products to function. Without the use of these infringing technologies, the accused Delta products would not be able to perform the functions and features that are central to their operation.

123. Further, on information and belief, Delta has deliberately copied and infringed the technology protected by the '761 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Delta has had actual knowledge of the '761 Patent. Despite this knowledge, Delta continues to willfully infringe the '761 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '761 Patent and replicate Vicor's patented products. Delta has no plausible good faith defense to infringement when it purposefully created the accused power modules as a replica of, and substitute for, the copied Vicor products. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

124. Delta committed the foregoing infringing activities without license from Vicor. Delta's acts of infringement have damaged Vicor, as owner of the '761 Patent. Vicor is entitled to recover from Delta the damages it has sustained as a result of Delta's wrongful acts in an amount subject to proof at trial. Delta's infringement of Vicor's rights under the '761 Patent will continue to damage Vicor.

Foxconn

125. Foxconn has infringed and continues to infringe at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making,

using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '761 Patent. Foxconn is liable for its infringement of the '761 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

126. More specifically, Foxconn designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '761 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '761 Patent.

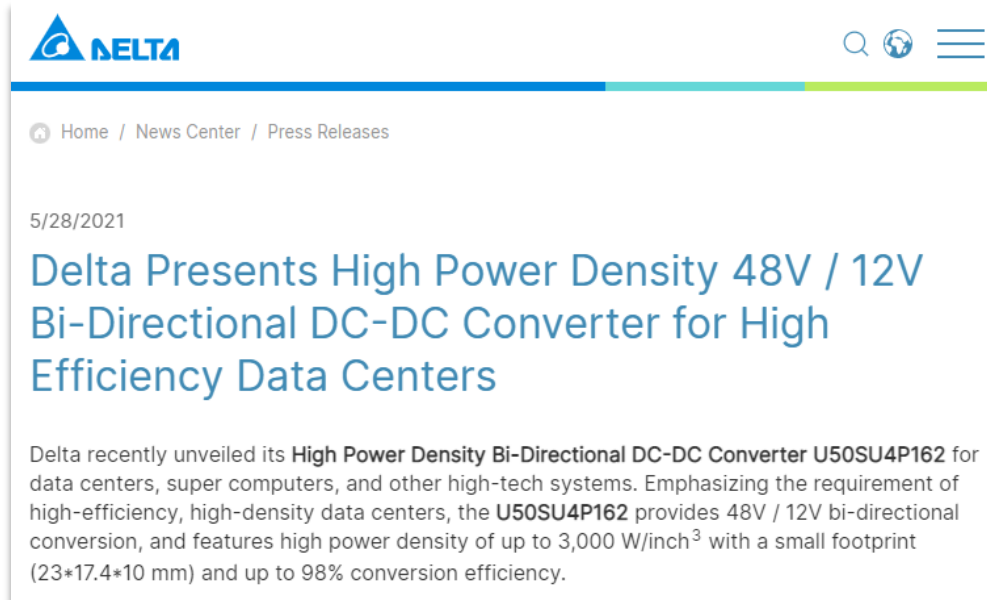
127. Claim 1 is illustrative of the '761 Patent. It recites "[a]n apparatus comprising: a power converter including a printed circuit board (PCB) comprising a plurality of conductive layers and having a top surface and a bottom surface; a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB; and a plurality of power semiconductor devices, a first set of the power semiconductor devices being mounted on the top surface and electrically connected to dissipate power at a level, P_t , during operation of the converter, a second set of the power semiconductor devices being mounted on the bottom surface and electrically connected to dissipate power at a level, P_b , during operation of the converter; wherein the power semiconductor devices are distributed between the first and second sets to distribute heat generation during operation of the converter such that each level P_t , P_b is less than 150% of the other level P_b , P_t ."

128. The Delta U50SU Series Power Modules meet every element of this claim.⁶ The Delta U50SU Series Power Modules are a High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module that offers “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>

⁶ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Foxconn's products infringe the '761 Patent.



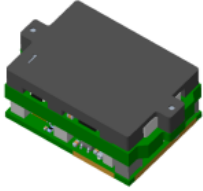
See: <https://www.deltaww.com/en-US/news/24124>

129. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

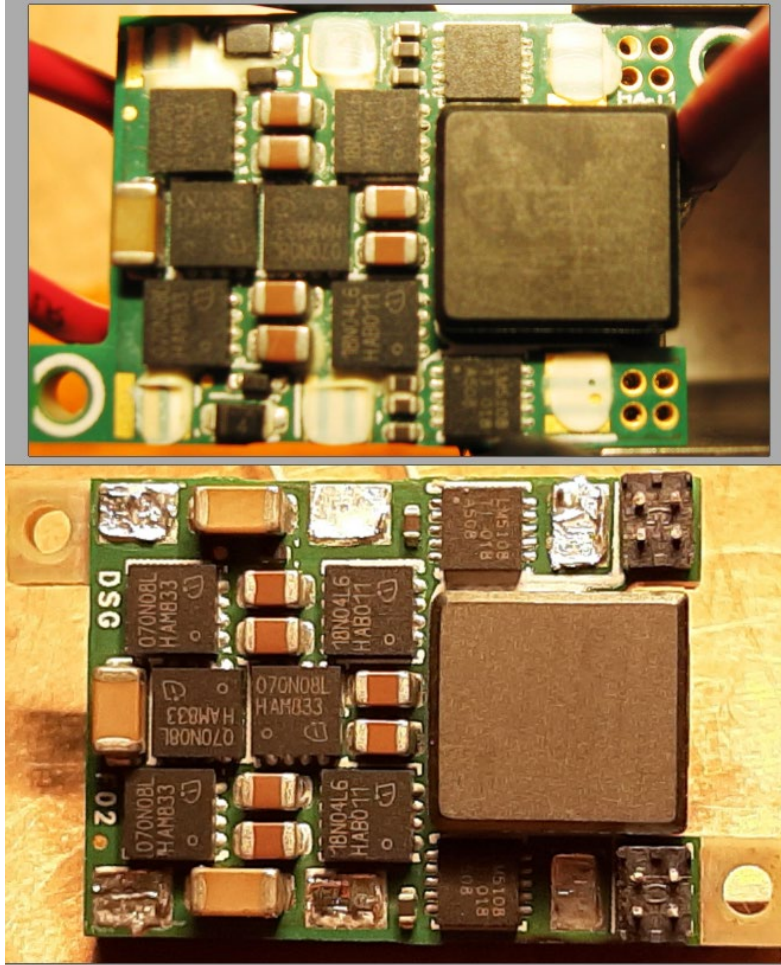
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

130. The Delta U50SU Series Power Modules also include a printed circuit board (“PCB”) that has a plurality of conductive layers, a top surface, a bottom surface, a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB, and a plurality of power semiconductor devices, as depicted in the teardown image below of the top and bottom of the board in the Delta U50SU Series Power Module.



131. Further, the power semiconductor devices of the Delta U50SU Series Power Modules comprise a first set of power semiconductor devices that are mounted on the top surface and electrically connected to dissipate power at a level (e.g., “Pt” for top level) and a second set of power semiconductor devices that are mounted on the bottom surface and electrically connected to dissipate power at a level (e.g., “Pb” for bottom level) during operation of the converter. Because the power semiconductor devices of the Delta U50SU Series Power Module are distributed between the first and second sets of devices to distribute heat generation during operation of the converter, P_t/P_b is less than 150% of the other level P_b/P_t .

132. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta

U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

133. Foxconn has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, including at 12345 N. Lamar Suite, 250, Austin, Texas 78753; 543 S. Americas Ave. A-2, El Paso, Texas; and 1430 Henry Brennan Dr., El Paso, Texas.

134. Foxconn also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Foxconn has had knowledge of the '761 Patent and the infringing nature of the Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '761 Patent, Foxconn continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Foxconn products in ways that directly infringe the '761 Patent literally and/or under the doctrine of equivalents. Foxconn does so knowing and intending that its customers and end users will commit these infringing acts. Foxconn also continues to make, use, import, offer for sale, and/or sell the accused Foxconn products, despite its knowledge of the '761 Patent, thereby specifically intending for and inducing its customers to infringe the '761 Patent through the customers' normal and customary use of the accused products.

135. On information and belief, Foxconn offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their

customers how to use the functionalities and features enabled by the Foxconn products' practice of the '761 Patent. In doing so, Foxconn has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '761 Patent, but while remaining willfully blind to the infringement.

136. Foxconn also contributorily infringes the '761 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States the Delta U50SU Series Power Modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '761 Patent. Foxconn does so knowing that these products are especially made or especially adapted for uses that infringe the '761 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and Foxconn power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '761 Patent, and that infringing use is necessary for the accused Foxconn products to function. Without the use of these infringing technologies, the server boards and modules would not be able to perform the functions and features that are central to their operation.

137. Further, on information and belief, Foxconn has deliberately copied and infringed the technology protected by the '761 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Foxconn has had actual knowledge of the '761 Patent. Despite this knowledge, Foxconn continues to willfully infringe the '761 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '761

Patent and replicate Vicor's patented products. Foxconn has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

138. Foxconn committed the foregoing infringing activities without license from Vicor. Foxconn's acts of infringement have damaged Vicor, as owner of the '761 Patent. Vicor is entitled to recover from Foxconn the damages it has sustained as a result of Foxconn's wrongful acts in an amount subject to proof at trial. Foxconn's infringement of Vicor's rights under the '761 Patent will continue to damage Vicor.

Quanta

139. Quanta has infringed and continues to infringe at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '761 Patent. Quanta is liable for its infringement of the '761 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

140. More specifically, Quanta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '761 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers,

and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '761 Patent.

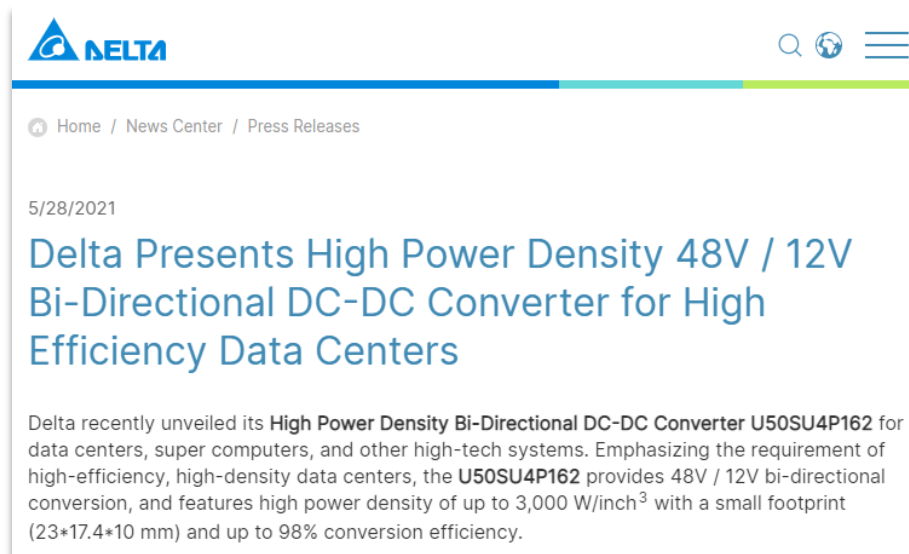
141. Claim 1 is illustrative of the '761 Patent. It recites “[a]n apparatus comprising: a power converter including a printed circuit board (PCB) comprising a plurality of conductive layers and having a top surface and a bottom surface; a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB; and a plurality of power semiconductor devices, a first set of the power semiconductor devices being mounted on the top surface and electrically connected to dissipate power at a level, P_t , during operation of the converter, a second set of the power semiconductor devices being mounted on the bottom surface and electrically connected to dissipate power at a level, P_b , during operation of the converter; wherein the power semiconductor devices are distributed between the first and second sets to distribute heat generation during operation of the converter such that each level P_t , P_b is less than 150% of the other level P_b , P_t .”

142. The Delta U50SU Series Power Modules meet every element of this claim.⁷ The Delta U50SU Series Power Modules are a High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module that offers “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”

⁷ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Quanta’s products infringe the '761 Patent.



See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



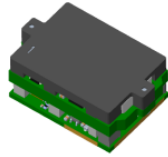
See: <https://www.deltaww.com/en-US/news/24124>

143. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

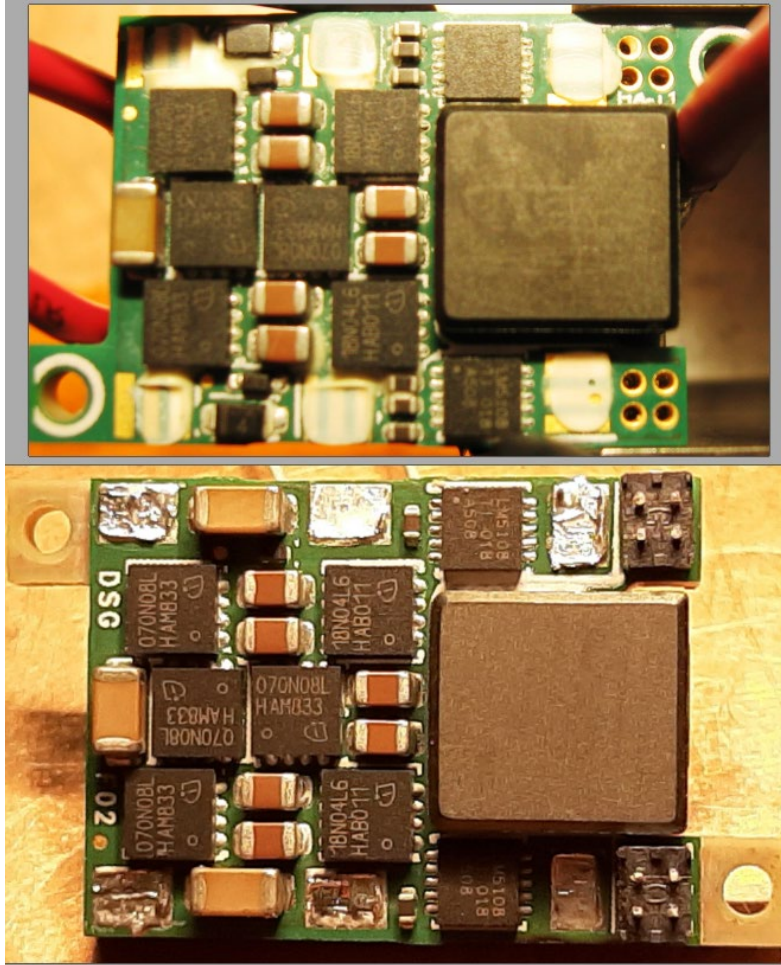
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

144. The Delta U50SU Series Power Modules also include a printed circuit board (“PCB”) that has a plurality of conductive layers, a top surface, a bottom surface, a magnetic core structure magnetically coupled to a winding formed by traces in one or more of the conductive layers in the PCB, and a plurality of power semiconductor devices, as depicted in the teardown image below of the top and bottom of the board in the Delta U50SU4P162.



145. Further, the power semiconductor devices of the Delta U50SU Series Power Modules comprise a first set of power semiconductor devices that are mounted on the top surface and electrically connected to dissipate power at a level (e.g., “Pt” for top level) and a second set of power semiconductor devices that are mounted on the bottom surface and electrically connected to dissipate power at a level (e.g., “Pb” for bottom level) during operation of the converter. Because the power semiconductor devices of the Delta U50SU Series Power Module are distributed between the first and second sets of devices to distribute heat generation during operation of the converter, P_t/P_b is less than 150% of the other level P_b/P_t .

146. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta

U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

147. Quanta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas.

148. Quanta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '761 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Quanta has had knowledge of the '761 Patent and the infringing nature of the Delta U50SU Series Power Modules and Quanta power systems and/or products containing the same. Despite this knowledge of the '761 Patent, Quanta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Quanta products in ways that directly infringe the '761 Patent literally and/or under the doctrine of equivalents. Quanta does so knowing and intending that its customers and end users will commit these infringing acts. Quanta also continues to make, use, import, offer for sale, and/or sell the accused Quanta products, despite its knowledge of the '761 Patent, thereby specifically intending for and inducing its customers to infringe the '761 Patent through the customers' normal and customary use of the accused Quanta products.

149. On information and belief, Quanta offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Quanta products' practice of the '761 Patent. In doing so, Quanta has induced infringement by others, including end users, with

the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '761 Patent, but while remaining willfully blind to the infringement.

150. Quanta also contributorily infringes the '761 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States, the Delta U50SU Series Power Modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '761 Patent. Quanta does so knowing that these products are especially made or especially adapted for uses that infringe the '761 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '761 Patent, and that infringing use is necessary for the accused Quanta products to function. Without the use of these infringing technologies, the server boards and modules would not be able to perform the functions and features that are central to their operation.

151. Further, on information and belief, Quanta has deliberately copied and infringed the technology protected by the '761 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Quanta has had actual knowledge of the '761 Patent. Despite this knowledge, Quanta continues to willfully infringe the '761 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '761 Patent and replicate Vicor's patented products. Quanta has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same

technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

152. Quanta committed the foregoing infringing activities without license from Vicor. Quanta's acts of infringement have damaged Vicor, as owner of the '761 Patent. Vicor is entitled to recover from Quanta the damages it has sustained as a result of Quanta's wrongful acts in an amount subject to proof at trial. Quanta's infringement of Vicor's rights under the '761 Patent will continue to damage Vicor.

COUNT III

INFRINGEMENT OF U.S. PATENT NO. 10,199,950

153. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

Delta

154. Delta has infringed and continues to infringe at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 9 of the '950 Patent. Delta is liable for its infringement of the '950 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

155. More specifically, Delta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 9 of the '950 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta

U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks (“PDNs”), including Vertical Power Delivery (“VPD”), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 9 of the ’950 Patent.

156. Claim 9 is illustrative of the ’950 Patent. It recites “[a]n apparatus comprising: a power converter comprising an input circuit and an output circuit, wherein the power converter is configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit and an output voltage V_{OUT} is produced by the output of the power converter, and wherein the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$, wherein the power converter further comprises: a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1; wherein the power converter comprises an inductive component and one or more power switches in the input circuit, the output circuit, or both; and wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.”

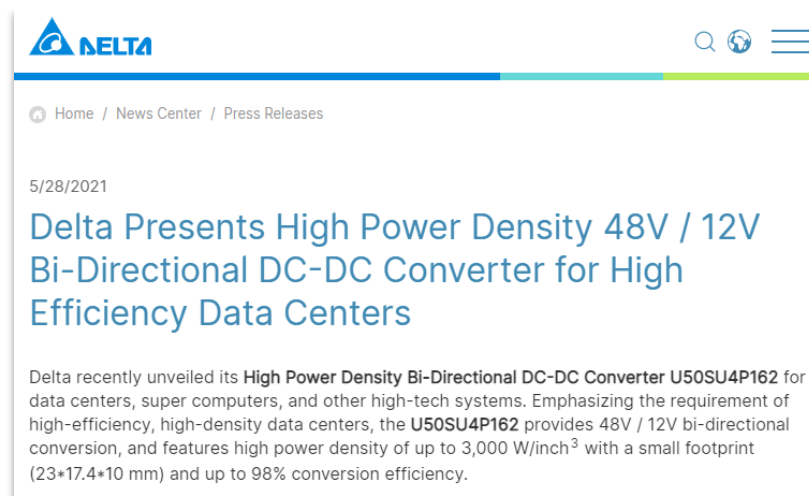
157. The Delta U50SU Series Power Modules meet every element of this claim.⁸ The

⁸ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Delta’s products infringe the ’950 Patent.

Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



See: <https://www.deltaww.com/en-US/news/24124>

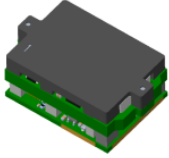
158. As the datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different

output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

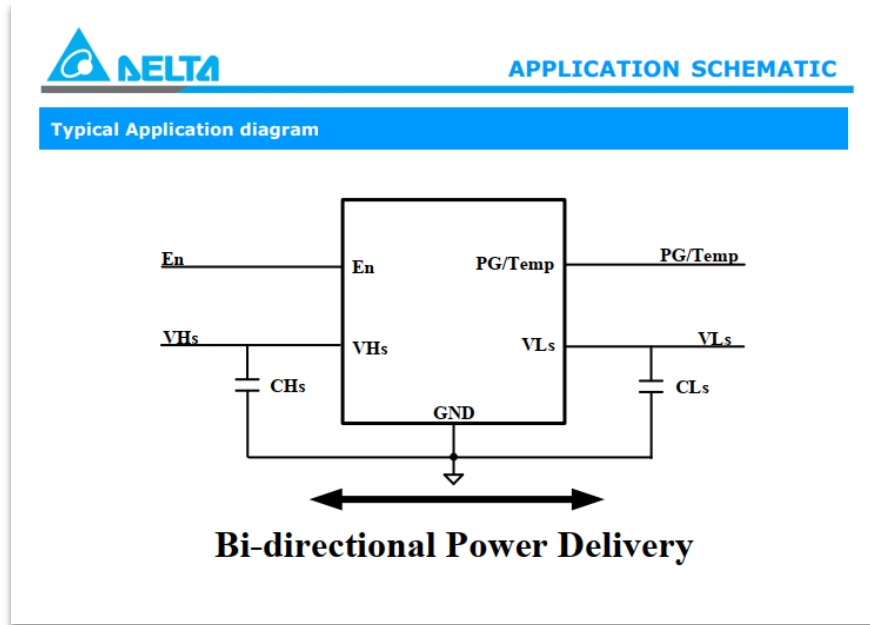
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

159. Further, the Delta U50SU Series Power Modules comprise an input circuit and an output circuit, wherein the power converter is configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit, an output voltage V_{OUT} is produced by the output of the power converter, and the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$. For example, the datasheet for the Delta U50SU4P162, excerpted below, includes an application diagram that depicts bi-directional power delivery via the converter between a high side voltage and a low side voltage and a fixed $K = 1/4$ conversion ratio between input and output.



U50SU4P162
62A, Fixed Ratio Power Module

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

160. The Delta U50SU Series Power Modules also comprise a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1.

161. The Delta U50SU Series Power Modules further comprise an inductive component and one or more power switches in the input circuit, the output circuit, or both, wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.

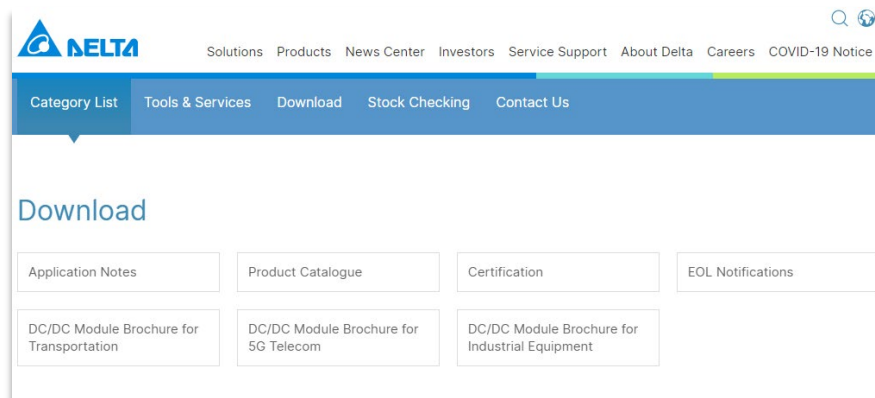
162. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

163. Delta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the infringing Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through, its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, such as Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc.

164. Delta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Delta has had knowledge of the '950 Patent and the infringing nature of the accused Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '950 Patent, Delta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Delta products in ways that directly infringe the '950 Patent literally and/or under the doctrine of equivalents. Delta does so knowing and intending that its customers and end users will commit these infringing acts. Delta also continues to make, use, import, offer for sale, and/or sell the accused Delta products, despite

its knowledge of the '950 Patent, thereby specifically intending for and inducing its customers to infringe the '950 Patent through the customers' normal and customary use of the accused Delta products.

165. For example, Delta's webpage regarding its DC/DC Converter offerings includes "Application Notes" and "DC/DC Module Brochures" that describe the functionalities and features of Delta's power modules. On information and belief, Delta also offers its customers more detailed brochures, product manuals, and other technical support that instruct their customers how to use the functionalities and features enabled by the Delta products' practice of the '950 Patent. In doing so, Delta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '950 Patent, but while remaining willfully blind to the infringement.



See: <https://www.deltaww.com/en-US/Products/Telecom-Networking-and-Datacenter/ALL/>

166. Delta also contributorily infringes the '950 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States, power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '950 Patent. Delta does so knowing that

these products are especially made or especially adapted for uses that infringe the '950 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '950 Patent, and that infringing use is necessary for the accused Delta products to function. Without the use of these infringing technologies, the accused Delta products would not be able to perform the functions and features that are central to their operation.

167. Further, on information and belief, Delta has deliberately copied and infringed the technology protected by the '950 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Delta has had actual knowledge of the '950 Patent. Despite this knowledge, Delta continues to willfully infringe the '950 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '950 Patent and replicate Vicor's patented products. Delta has no plausible good faith defense to infringement when it purposefully created the accused power modules as a replica of, and substitute for, the copied Vicor products. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

168. Delta committed the foregoing infringing activities without license from Vicor. Delta's acts of infringement have damaged Vicor, as owner of the '950 Patent. Vicor is entitled to recover from Delta the damages it has sustained as a result of Delta's wrongful acts in an amount subject to proof at trial. Delta's infringement of Vicor's rights under the '950 Patent will continue to damage Vicor.

Foxconn

169. Foxconn has infringed and continues to infringe at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 9 of the '950 Patent. Foxconn is liable for its infringement of the '950 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

170. More specifically, Foxconn designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 9 of the '950 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 9 of the '950 Patent.

171. Claim 9 is illustrative of the '950 Patent. It recites "[a]n apparatus comprising: a power converter comprising an input circuit and an output circuit, wherein the power converter is configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit and an output voltage V_{OUT} is produced by the output of the power converter, and wherein the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$, wherein the power converter further comprises: a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value


of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1; wherein the power converter comprises an inductive component and one or more power switches in the input circuit, the output circuit, or both; and wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.”

172. The Delta U50SU Series Power Modules meet every element of this claim.⁹ The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”



See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>

⁹ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Foxconn’s products infringe the ’950 Patent.



Home / News Center / Press Releases


5/28/2021

Delta Presents High Power Density 48V / 12V Bi-Directional DC-DC Converter for High Efficiency Data Centers

Delta recently unveiled its **High Power Density Bi-Directional DC-DC Converter U50SU4P162** for data centers, super computers, and other high-tech systems. Emphasizing the requirement of high-efficiency, high-density data centers, the **U50SU4P162** provides 48V / 12V bi-directional conversion, and features high power density of up to 3,000 W/inch³ with a small footprint (23*17.4*10 mm) and up to 98% conversion efficiency.

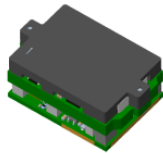
See: <https://www.deltaww.com/en-US/news/24124>

173. As the product’s datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

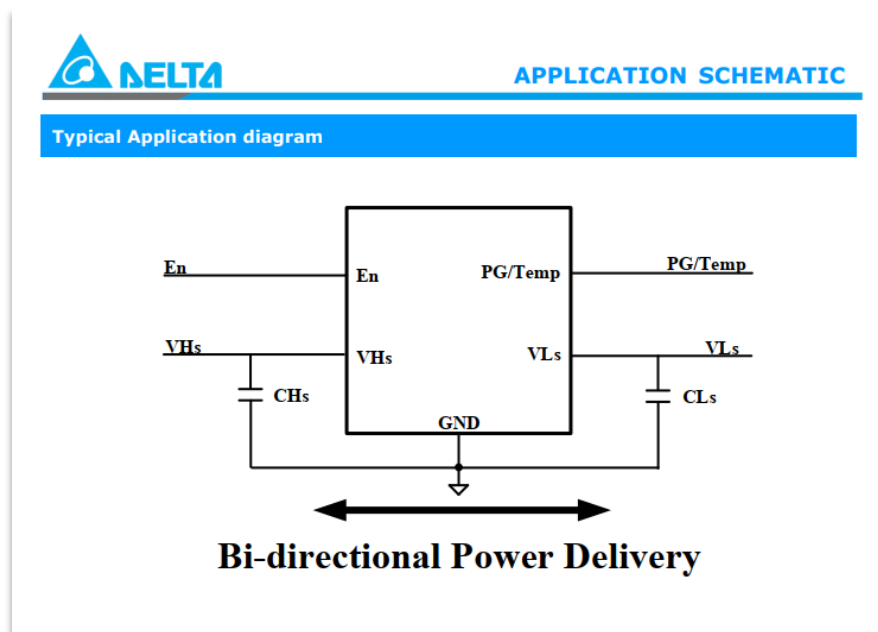
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

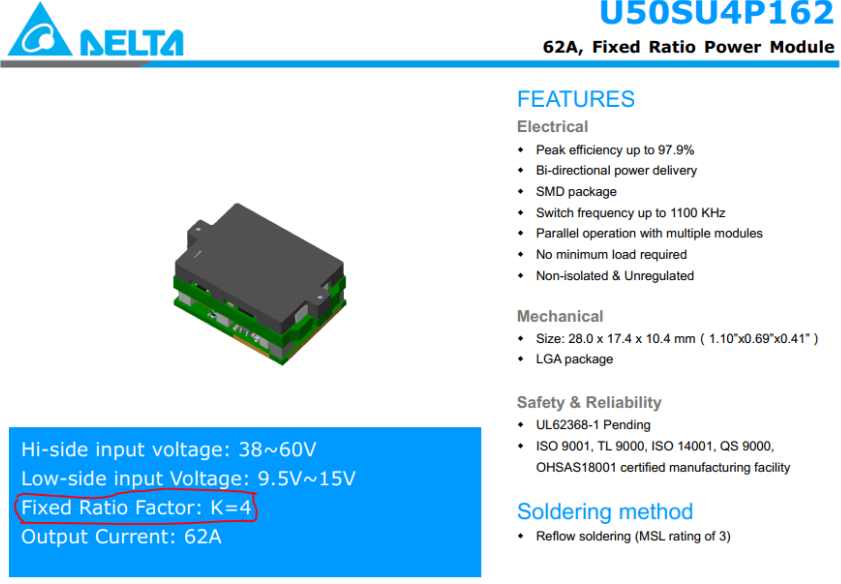
Soldering method

- Reflow soldering (MSL rating of 3)

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38-60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5-15V	65 A	54V	15.5A		
U50SU4P162PMDR	38-60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5-15V	65 A	54V	15.5A		

174. Further, the Delta U50SU Series Power Modules comprise an input circuit and an output circuit, wherein the power converter is configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit, an output voltage V_{OUT} is produced by the output of the power converter, and the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$. For example, the datasheet for the Delta U50SU4P162, excerpted below, includes an application diagram that depicts bi-directional power delivery via the converter between a high side voltage and a low side voltage and a fixed $K = 1/4$ conversion ratio between input and output.





DELTA **U50SU4P162**
62A, Fixed Ratio Power Module

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
Low-side input Voltage: 9.5V~15V
Fixed Ratio Factor: K=4
Output Current: 62A

175. The Delta U50SU Series Power Modules also comprise a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1.

176. The Delta U50SU Series Power Modules further comprise an inductive component and one or more power switches in the input circuit, the output circuit, or both, wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.

177. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

178. Foxconn has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or

products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, including at 12345 N. Lamar Suite, 250, Austin, Texas 78753; 543 S. Americas Ave. A-2, El Paso, Texas; and 1430 Henry Brennan Dr., El Paso, Texas.

179. Foxconn also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Foxconn has had knowledge of the '950 Patent and the infringing nature of the Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '950 Patent, Foxconn continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Foxconn products in ways that directly infringe the '950 Patent literally and/or under the doctrine of equivalents. Foxconn does so knowing and intending that its customers and end users will commit these infringing acts. Foxconn also continues to make, use, import, offer for sale, and/or sell the accused Foxconn products, despite its knowledge of the '950 Patent, thereby specifically intending for and inducing its customers to infringe the '950 Patent through the customers' normal and customary use of the accused Foxconn products.

180. On information and belief, Foxconn offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Foxconn products' practice of the '950 Patent. In doing so, Foxconn has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '950 Patent, but while remaining

willfully blind to the infringement.

181. Foxconn also contributorily infringes the '950 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States, power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '950 Patent. Foxconn does so knowing that these products are especially made or especially adapted for uses that infringe the '950 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and Foxconn power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '950 Patent, and that infringing use is necessary for the accused Foxconn products to function. Without the use of these infringing technologies, the accused Foxconn products would not be able to perform the functions and features that are central to their operation.

182. Further, on information and belief, Foxconn has deliberately copied and infringed the technology protected by the '950 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Foxconn has had actual knowledge of the '950 Patent. Despite this knowledge, Foxconn continues to willfully infringe the '950 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '950 Patent and replicate Vicor's patented products. Foxconn has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of

reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

183. Foxconn committed the foregoing infringing activities without license from Vicor. Foxconn's acts of infringement have damaged Vicor, as owner of the '950 Patent. Vicor is entitled to recover from Foxconn the damages it has sustained as a result of Foxconn's wrongful acts in an amount subject to proof at trial. Foxconn's infringement of Vicor's rights under the '950 Patent will continue to damage Vicor.

Quanta

184. Quanta has infringed and continues to infringe at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 9 of the '950 Patent. Quanta is liable for its infringement of the '950 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

185. More specifically, Quanta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 9 of the '950 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 9 of the '950 Patent.

186. Claim 9 is illustrative of the '950 Patent. It recites "[a]n apparatus comprising: a power converter comprising an input circuit and an output circuit, wherein the power converter is

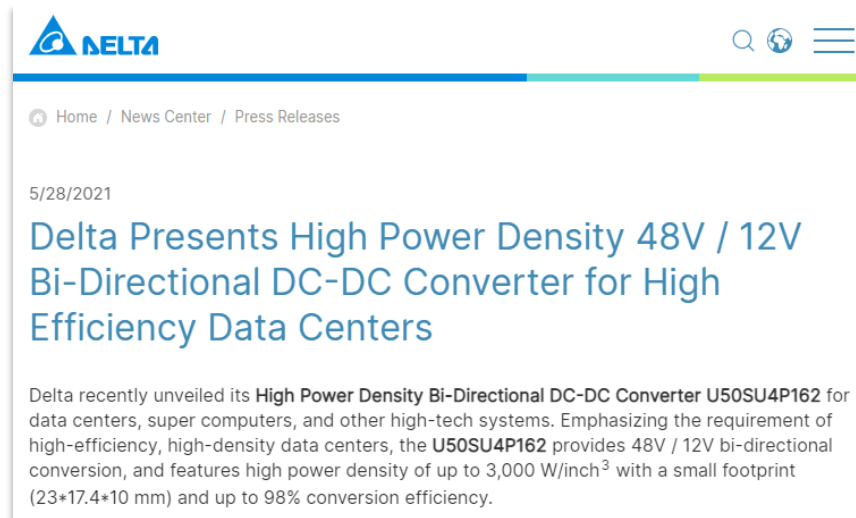
configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit and an output voltage V_{OUT} is produced by the output of the power converter, and wherein the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$, wherein the power converter further comprises: a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1; wherein the power converter comprises an inductive component and one or more power switches in the input circuit, the output circuit, or both; and wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.”

187. The Delta U50SU Series Power Modules meet every element of this claim.¹⁰ The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”

¹⁰ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Quanta’s products infringe the ’950 Patent.




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



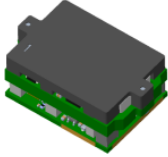
See: <https://www.deltaww.com/en-US/news/24124>

188. As the product's datasheet explains, the Delta U50SU Series Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts.



U50SU4P162

62A, Fixed Ratio Power Module



FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

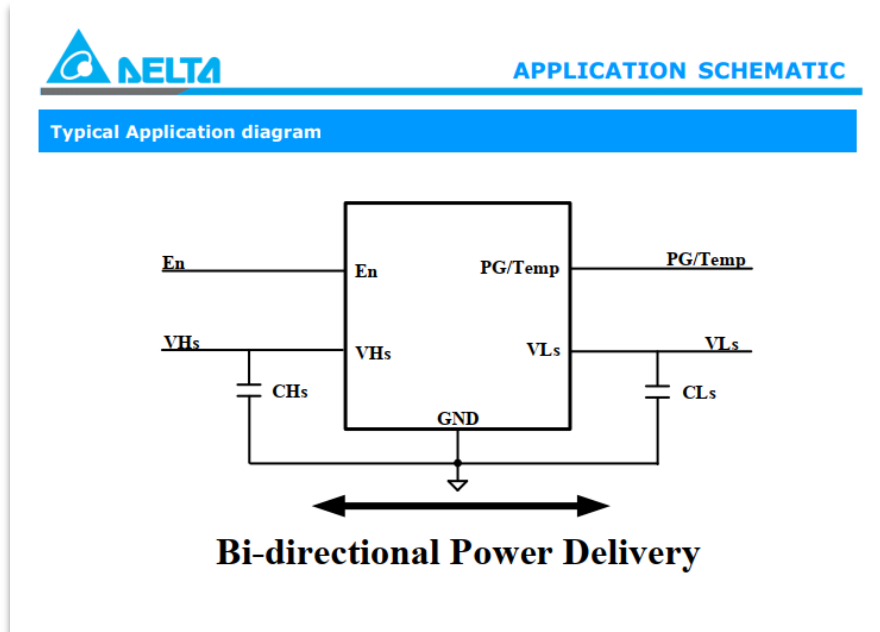
Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		

189. Further, the Delta U50SU Series Power Modules comprise an input circuit and an output circuit, wherein the power converter is configured to receive power from a power distribution system comprising a source for providing power at a DC source voltage V_S , the power converter being adapted to convert power from the input circuit to the output circuit at a substantially fixed voltage transformation ratio, K_{DC} , at an output current, wherein an input voltage V_{IN} is applied to the input circuit, an output voltage V_{OUT} is produced by the output of the power converter, and the substantially fixed voltage transformation ratio can be represented as $K_{DC} = V_{OUT} / V_{IN}$. For example, the datasheet for the Delta U50SU4P162, excerpted below, includes an application diagram that depicts bi-directional power delivery via the converter between a high side voltage and a low side voltage and a fixed $K = 1/4$ conversion ratio between input and output.



U50SU4P162
62A, Fixed Ratio Power Module

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
Fixed Ratio Factor: K=4
 Output Current: 62A

190. The Delta U50SU Series Power Modules also comprise a series connection between the input circuit of the power converter and at least a portion of the output circuit of the power converter across the source, such that an absolute value of the input voltage V_{IN} applied to the input circuit is approximately equal to the absolute value of the DC source voltage V_S minus a number N times the absolute value of the output voltage V_{OUT} , where N is at least 1.

191. The Delta U50SU Series Power Modules further comprise an inductive component and one or more power switches in the input circuit, the output circuit, or both, wherein a current flowing in the inductive component charges and discharges capacitances in the power converter reducing a voltage across said one or more switches prior to turning ON said one or more switches.

192. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

193. Quanta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas.

194. Quanta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 9 of the '950 Patent in violation of 35 U.S.C. § 271(b). No later than the filing and service of the Complaint, Quanta has had knowledge of the '950 Patent and the infringing nature of the accused Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '950 Patent, Quanta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Quanta products in ways that directly infringe the '950 Patent literally and/or under the doctrine of equivalents. Quanta does so knowing and intending that its customers and end users will commit these infringing acts. Quanta also continues to make, use, import, offer for sale, and/or sell the accused Quanta products, despite its knowledge of the '950 Patent, thereby specifically intending

for and inducing its customers to infringe the '950 Patent through the customers' normal and customary use of the accused products.

195. On information and belief, Quanta offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Quanta products' practice of the '950 Patent. In doing so, Quanta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '950 Patent, but while remaining willfully blind to the infringement.

196. Quanta also contributorily infringes the '950 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States, power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '950 Patent. Quanta does so knowing that these products are especially made or especially adapted for uses that infringe the '950 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and Quanta power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '950 Patent, and that infringing use is necessary for the accused Quanta products to function. Without the use of these infringing technologies, the accused Quanta products would not be able to perform the functions and features that are central to their operation.

197. Further, on information and belief, Quanta has deliberately copied and infringed the technology protected by the '950 Patent by copying the design, layout, and functions of the Vicor products that practice that technology. No later than the filing of this Complaint, Quanta has

had actual knowledge of the '950 Patent. Despite this knowledge, Quanta continues to willfully infringe the '950 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '950 Patent and replicate Vicor's patented products. Quanta has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

198. Quanta committed the foregoing infringing activities without license from Vicor. Quanta's acts of infringement have damaged Vicor, as owner of the '950 Patent. Vicor is entitled to recover from Quanta the damages it has sustained as a result of Quanta's wrongful acts in an amount subject to proof at trial. Quanta's infringement of Vicor's rights under the '950 Patent will continue to damage Vicor.

COUNT IV

INFRINGEMENT OF U.S. PATENT NO. 6,930,893

199. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

Delta

200. Delta has infringed and continues to infringe at least claim 1 of the '893 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '893 Patent. Delta is liable for

its infringement of the '893 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

201. More specifically, Delta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '893 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks (“PDNs”), including Vertical Power Delivery (“VPD”), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '893 Patent.

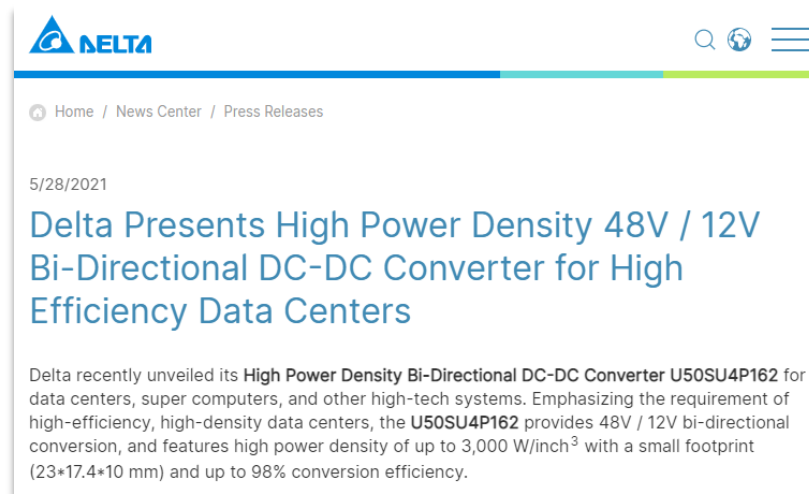
202. Claim 1 is illustrative of the '893 Patent. It recites “[a] method of converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising: providing a transformer; forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period; providing output circuitry connected to the transformer for delivering a rectified output voltage to the load; providing two or more primary switches to drive the resonant circuit; providing a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer; and providing a conversion efficiency from the source to the load having a peak greater than 90% within the normal operating range.”

203. The Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the

Delta U50SU4P162PMDRF) meets every element of this claim.¹¹ The Delta U50 Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”




See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>



See: <https://www.deltaww.com/en-US/news/24124>

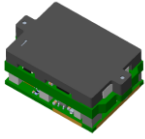
¹¹ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Delta’s products infringe the ’893 Patent.

204. As the datasheet explains, the Delta U50SU Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts. The output current range is 0 to 62 amps continuous. As seen in the second image below, the datasheet shows the module’s efficiency versus the output current and how it varies over a normal operating range.



U50SU4P162

62A, Fixed Ratio Power Module



FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

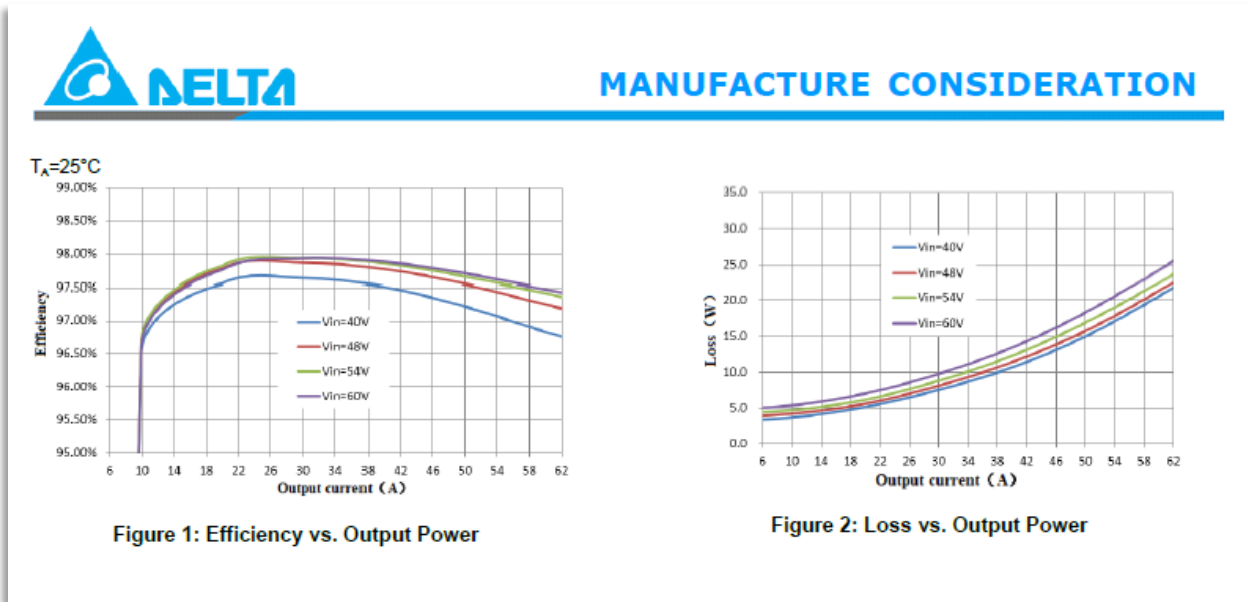
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
 Low-side input Voltage: 9.5V~15V
 Fixed Ratio Factor: K=4
 Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		



205. Further, the Delta U50SU Power Module further comprises providing a transformer and forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period. The Delta U50SU Power Module also provides output circuitry connected to the transformer for delivering a rectified output voltage to the load, wherein two or more primary switches are provided to drive the resonant circuit.

206. The Delta U50SU Power Module further provides a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer. The conversion efficiency from the source to the load has a peak greater than 90% within the normal operating range, as reflected above in Figure 1 from the module's datasheet.

207. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta

U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

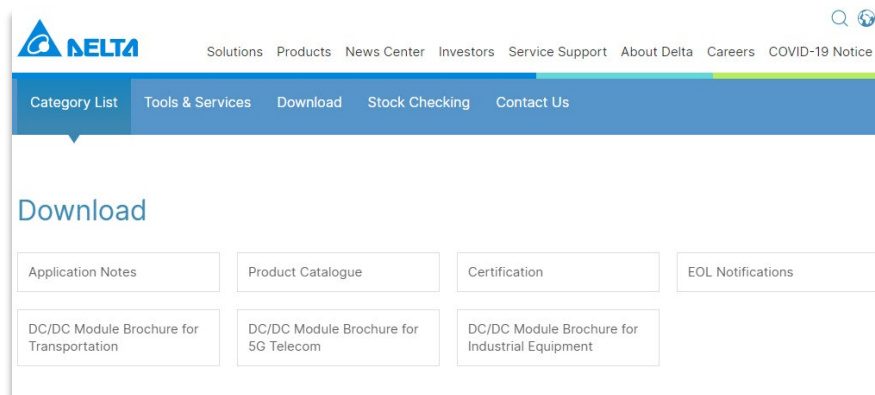
208. Delta engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Delta advertises in its technical specifications and datasheets such as those cited herein; and that they continue to properly function, including in the face of changes in external factors (e.g., interoperation with customer-specific hardware). For example, Delta has positions open for “testing engineer[s]” at its Plano, Texas location, whose duties include, for example, “equipment testing, testing record creation, and testing report presentation.” *E.g.*, <https://www.linkedin.com/jobs/view/%E3%80%902023-gem-program%E3%80%91testing-engineer-at-delta-electronics-americas-3529550744/>. In testing and using the accused products, Delta performs the claimed method described above.

209. Delta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, the Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, such as Delta Electronics (Americas) Ltd. and Delta Electronics (USA) Inc.

210. Delta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '893 Patent in violation of 35 U.S.C. § 271(b). No later than the date that Delta began copying Vicor's products that are marked with the '893 Patent and the filing and service of the Complaint, Delta has had knowledge of the '893 Patent and the infringing nature of the accused Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '893 Patent, Delta continues to

actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Delta products in ways that directly infringe the '893 Patent literally and/or under the doctrine of equivalents. Delta does so knowing and intending that its customers and end users will commit these infringing acts. Delta also continues to make, use, import, offer for sale, and/or sell the accused Delta products, despite its knowledge of the '893 Patent, thereby specifically intending for and inducing its customers to infringe the '893 Patent through the customers' normal and customary use of the accused Delta products.

211. For example, Delta's webpage regarding its DC/DC Converter offerings includes "Application Notes" and "DC/DC Module Brochures" that describe the functionalities and features of Delta's power modules. On information and belief, Delta also offers its customers more detailed brochures, product manuals, and other technical support that instruct their customers how to use the functionalities and features enabled by the Delta products' practice of the '893 Patent. In doing so, Delta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '893 Patent, but while remaining willfully blind to the infringement.



See: <https://www.deltaww.com/en-US/Products/Telecom-Networking-and-Datacenter/ALL/>

212. Delta also contributorily infringes the '893 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States, power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '893 Patent. Delta does so knowing that these products are especially made or especially adapted for uses that infringe the '893 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '893 Patent, and that infringing use is necessary for the accused Delta products to function. Without the use of these infringing technologies, the power modules would not be able to perform the functions and features that are central to their operation.

213. Further, on information and belief, Delta has deliberately copied and infringed the technology protected by the '893 Patent by copying the design, layout, and functions of the Vicor products that practice that technology and that are conspicuously marked with the '893 Patent. Delta thus has had knowledge of the '893 Patent at least since it began copying Vicor's products that practice the same. Despite this knowledge, Delta continues to willfully infringe the '893 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '893 Patent and replicate Vicor's patented products. Delta has no plausible good faith defense to infringement when it purposefully created the accused power modules as a replica of, and substitute for, the copied Vicor products. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

214. Delta committed the foregoing infringing activities without license from Vicor. Delta's acts of infringement have damaged Vicor, as owner of the '893 Patent. Vicor is entitled to recover from Delta the damages it has sustained as a result of Delta's wrongful acts in an amount subject to proof at trial. Delta's infringement of Vicor's rights under the '893 Patent will continue to damage Vicor.

Foxconn

215. Foxconn has infringed and continues to infringe at least claim 1 of the '893 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '893 Patent. Foxconn is liable for its infringement of the '893 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

216. More specifically, Foxconn designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '893 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '893 Patent.

217. Claim 1 is illustrative of the '893 Patent. It recites "[a] method of converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising: providing a transformer; forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period; providing output

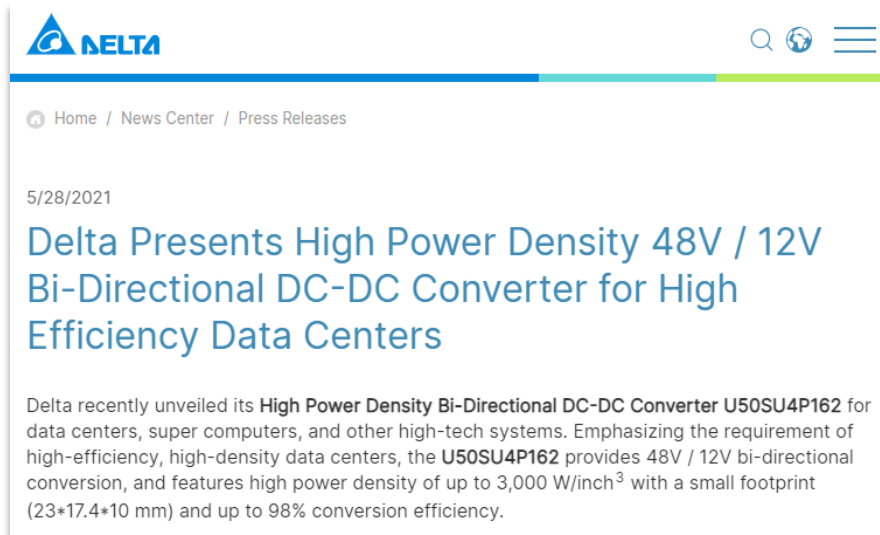
circuitry connected to the transformer for delivering a rectified output voltage to the load; providing two or more primary switches to drive the resonant circuit; providing a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer; and providing a conversion efficiency from the source to the load having a peak greater than 90% within the normal operating range.”

218. The Delta U50SU Series Power Modules meet every element of this claim.¹² The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”



See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>

¹² This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Foxconn’s products infringe the ’893 Patent.



See: <https://www.deltaww.com/en-US/news/24124>

219. As the datasheet explains, the Delta U50SU Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts. The output current range is 0 to 62 amps continuous. As seen in the second image below, the datasheet shows the module's efficiency versus the output current and how it varies over a normal operating range.

U50SU4P162
62A, Fixed Ratio Power Module

FEATURES

Electrical

- Peak efficiency up to 97.9%
- Bi-directional power delivery
- SMD package
- Switch frequency up to 1100 KHz
- Parallel operation with multiple modules
- No minimum load required
- Non-isolated & Unregulated

Mechanical

- Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
- LGA package

Safety & Reliability

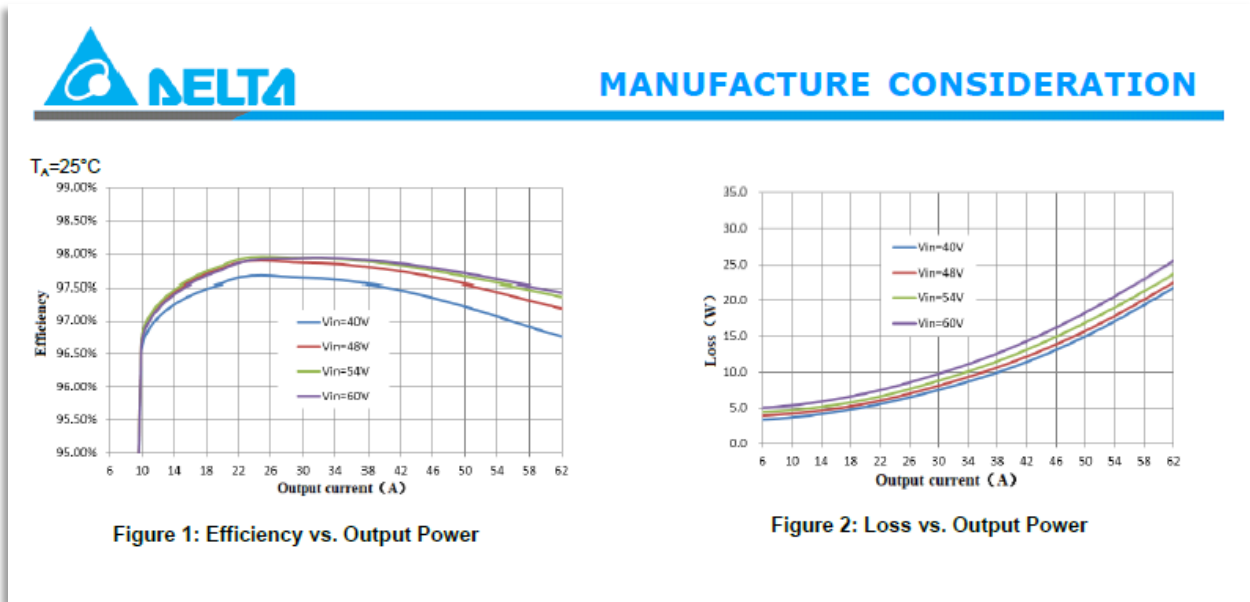
- UL62368-1 Pending
- ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility

Soldering method

- Reflow soldering (MSL rating of 3)

Hi-side input voltage: 38~60V
Low-side input Voltage: 9.5V~15V
Fixed Ratio Factor: K=4
Output Current: 62A

Recommended Part Number						
Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38~60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5~15V	65 A	54V	15.5A		
U50SU4P162PMDR	38~60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5~15V	65 A	54V	15.5A		



220. Further, the Delta U50SU Power Module further comprises providing a transformer and forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period. The Delta U50SU Power Module also provides output circuitry connected to the transformer for delivering a rectified output voltage to the load, wherein two or more primary switches are provided to drive the resonant circuit.

221. The Delta U50SU Power Module further provides a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer. The conversion efficiency from the source to the load has a peak greater than 90% within the normal operating range, as reflected above in Figure 1 from the module's datasheet.

222. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta

U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

223. Foxconn engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Foxconn advertises in its technical specifications and datasheets; and that they continue to properly function after sale. For example, Foxconn employs “test engineer[s]” in Wisconsin, whose duties include, for example, “design[ing] and develop[ing] testing diagnostics for new and existing products,” “engineering servers, server data and equipment calibration processes,” and “identify[ing] and troubleshoot[ing] issues encountered in testing.” *E.g.*, <https://www.linkedin.com/in/jie-xie-6b85a86/>; <https://www.wayup.com/i-j-Foxconn-Industrial-Internet-646415345456446/>. In testing and using the materials, Foxconn performs the claimed method described above.

224. Foxconn has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell the infringing Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas, including at 12345 N. Lamar Suite, 250, Austin, Texas 78753; 543 S. Americas Ave. A-2, El Paso, Texas; and 1430 Henry Brennan Dr., El Paso, Texas.

225. Foxconn also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the ’893 Patent in violation of 35 U.S.C. § 271(b). No later than the date that Foxconn began copying and/or using Vicor’s products that are marked with the ’893 Patent and the filing and service of the Complaint, Foxconn has had knowledge of the ’893 Patent and the infringing nature of the accused Delta U50SU Series Power

Modules and the Foxconn power systems and/or products containing the same. Despite this knowledge of the '893 Patent, Foxconn continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Foxconn products in ways that directly infringe the '893 Patent literally and/or under the doctrine of equivalents. Foxconn does so knowing and intending that its customers and end users will commit these infringing acts. Foxconn also continues to make, use, import, offer for sale, and/or sell the accused Foxconn products, despite its knowledge of the '893 Patent, thereby specifically intending for and inducing its customers to infringe the '893 Patent through the customers' normal and customary use of the accused Foxconn products.

226. On information and belief, Foxconn offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Foxconn products' practice of the '893 Patent. In doing so, Foxconn has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '893 Patent, but while remaining willfully blind to the infringement.

227. Foxconn also contributorily infringes the '893 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '893 Patent. Foxconn does so knowing that these products are especially made or especially adapted for uses that infringe the '893 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems

and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '893 Patent, and that infringing use is necessary for the accused Foxconn products to function. Without the use of these infringing technologies, the accused Foxconn products would not be able to perform the functions and features that are central to their operation.

228. Further, on information and belief, Foxconn has deliberately copied and infringed the technology protected by the '893 Patent by copying the design, layout, and functions of the Vicor products that practice that technology and that are conspicuously marked with the '893 Patent. Foxconn thus has had knowledge of the '893 Patent at least since it began using Vicor's products that practice the same. Despite this knowledge, Foxconn continues to willfully infringe the '893 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '893 Patent and replicate Vicor's patented products. Foxconn has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

229. Foxconn committed the foregoing infringing activities without license from Vicor. Foxconn's acts of infringement have damaged Vicor, as owner of the '893 Patent. Vicor is entitled to recover from Foxconn the damages it has sustained as a result of Foxconn's wrongful acts in an amount subject to proof at trial. Foxconn's infringement of Vicor's rights under the '893 Patent will continue to damage Vicor.

Quanta

230. Quanta has infringed and continues to infringe at least claim 1 of the '893 Patent in violation of 35 U.S.C. § 271, either literally or through the doctrine of equivalents, by making, using, selling, or offering for sale in the United States, and/or importing into the United States, without authorization, products that practice at least claim 1 of the '893 Patent. Quanta is liable for its infringement of the '893 Patent pursuant to 35 U.S.C. § 271(a), (b), and (c).

231. More specifically, Quanta designs, manufactures, assembles, uses, imports, offers for sale, and/or sells power modules and power systems and/or products containing the same that infringe at least independent claim 1 of the '893 Patent, including the Delta U50SU Series High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Module (e.g., the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta U50SU4P162PMDRF) and power systems and/or products containing the same (e.g., power distribution networks ("PDNs"), servers, and AI accelerators), and/or induces others to commit acts of infringement of at least independent claim 1 of the '893 Patent.

232. Claim 1 is illustrative of the '893 Patent. It recites "[a] method of converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising: providing a transformer; forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period; providing output circuitry connected to the transformer for delivering a rectified output voltage to the load; providing two or more primary switches to drive the resonant circuit; providing a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer;

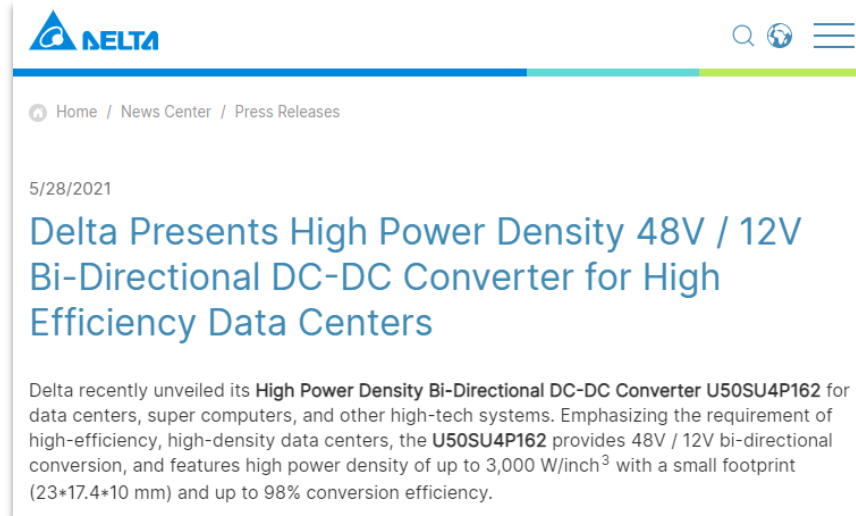
and providing a conversion efficiency from the source to the load having a peak greater than 90% within the normal operating range.”

233. The Delta U50SU Series Power Modules meet every element of this claim.¹³ The Delta U50SU Series Power Modules are High Power Density 48V / 12V Bi-Directional DC-DC Converter Power Modules that offer “a highly efficient and reliable power supply” “packed into a compact form factor,” which “is a requirement for many data centers, super computers and other high-end equipment.”



See: <https://www.facebook.com/Deltaemea/posts/power-and-performance-from-a-dc-dc-converter-packed-into-a-compact-form-factor-i/4036867753093142/>

¹³ This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which Quanta’s products infringe the ’893 Patent.



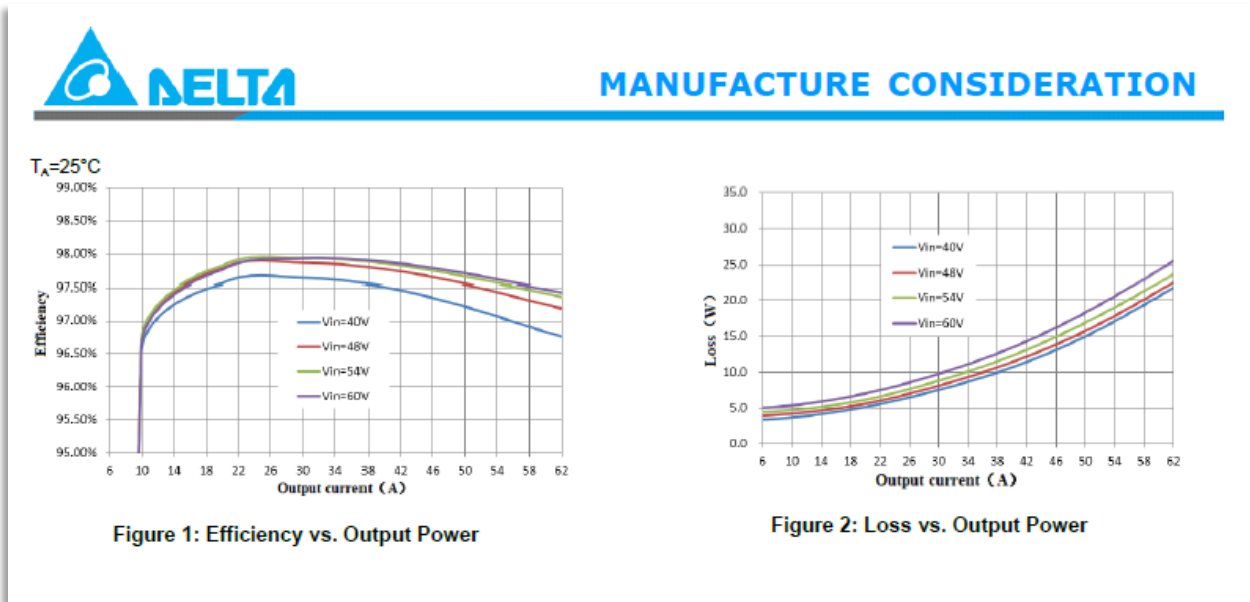
See: <https://www.deltaww.com/en-US/news/24124>

234. As the datasheet explains, the Delta U50SU Power Module is a power converter designed to, inter alia, take an input voltage of 38 to 60 volts and generate a different output voltage of approximately 9.5 to 15 volts. The output current range is 0 to 62 amps continuous. As seen in the second image below, the datasheet shows the module's efficiency versus the output current and how it varies over a normal operating range.

The datasheet for the Delta U50SU4P162 62A, Fixed Ratio Power Module includes the following information:

- Model Name:** U50SU4P162
- Rating:** 62A, Fixed Ratio Power Module
- Input/Output:**
 - Hi-side input voltage: 38~60V
 - Low-side input Voltage: 9.5V~15V
 - Fixed Ratio Factor: K=4
 - Output Current: 62A
- Features:**
 - Electrical:**
 - Peak efficiency up to 97.9%
 - Bi-directional power delivery
 - SMD package
 - Switch frequency up to 1100 KHz
 - Parallel operation with multiple modules
 - No minimum load required
 - Non-isolated & Unregulated
 - Mechanical:**
 - Size: 28.0 x 17.4 x 10.4 mm (1.10"x0.69"x0.41")
 - LGA package
 - Safety & Reliability:**
 - UL62368-1 Pending
 - ISO 9001, TL 9000, ISO 14001, QS 9000, OHSAS18001 certified manufacturing facility
 - Soldering method:**
 - Reflow soldering (MSL rating of 3)
- Recommended Part Number Table:**

Model Name	Input		Output		Eff. @ 50% Load	Others
U50SU4P162PMAR	38-60V	17 A	13.5V	62A	97.9% @54V	Without PMBus function
	9.5-15V	65 A	54V	15.5A		
U50SU4P162PMDR	38-60V	17 A	13.5V	62A	97.9% @54V	With PMBus function
	9.5-15V	65 A	54V	15.5A		



235. Further, the Delta U50SU Power Module further comprises providing a transformer and forming a resonant circuit including the transformer having a Q less than 13 and having a characteristic resonant frequency and period. The Delta U50SU Power Module also provides output circuitry connected to the transformer for delivering a rectified output voltage to the load, wherein two or more primary switches are provided to drive the resonant circuit.

236. The Delta U50SU Power Module further provides a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by two power transfer intervals of essentially equal duration each interval having a duration less than the characteristic resonant period, during which one or more of the primary switches are ON and power is transferred from the input to the output via the transformer. The conversion efficiency from the source to the load has a peak greater than 90% within the normal operating range, as reflected above in Figure 1 from the module's datasheet.

237. On information and belief, variations of the Delta U50SU Series Power Module, including the Delta U50SU4P162, the Delta U50SU4P162MAR, and the Delta

U50SU4P162PMDRF, operate in the same or substantially similar manner, as reflected by their shared technical documentation and naming convention.

238. Quanta engages in comprehensive testing, servicing, and use of the accused products in the United States to ensure that the accused products are customer-ready; that they provide the features, and meet the specific operating requirements, that Quanta advertises in its technical specifications and datasheets; and that they continue to properly function after sale. For example, Quanta has “server test technician[s]” in the United States who are responsible for “testing, diagnosing and full repair of multiple model servers in a cloud computing business unit.” *E.g.*, <https://www.linkedin.com/in/phillip-j-parker-03ba4269/>. In testing and using the materials, Quanta performs the claimed method described above.

239. Quanta has manufactured, imported, and sold, and continues to manufacture, import, offer for sale, and sell, Delta U50SU Series Power Modules and power systems and/or products containing the same in the United States, including through its subsidiaries, affiliates, and agents in the State of Texas and the Eastern District of Texas.

240. Quanta also knowingly and intentionally induces infringement, literally and/or under the doctrine of equivalents, of at least claim 1 of the '893 Patent in violation of 35 U.S.C. § 271(b). No later than the date that Quanta began copying and/or using Vicor's products that are marked with the '893 Patent and the filing and service of the Complaint, Quanta has had knowledge of the '893 Patent and the infringing nature of the accused Delta U50SU Series Power Modules and power systems and/or products containing the same. Despite this knowledge of the '893 Patent, Quanta continues to actively encourage and instruct its customers and end users (for example, through its marketing, user manuals, and online instruction materials) to use the accused Quanta products in ways that directly infringe the '893 Patent literally and/or under the doctrine

of equivalents. Quanta does so knowing and intending that its customers and end users will commit these infringing acts. Quanta also continues to make, use, import, offer for sale, and/or sell the accused Quanta products, despite its knowledge of the '893 Patent, thereby specifically intending for and inducing its customers to infringe the '893 Patent through the customers' normal and customary use of the accused products.

241. On information and belief, Quanta offers its customers more detailed brochures, product manuals, and other technical support that are not publicly available and that instruct their customers how to use the functionalities and features enabled by the Quanta products' practice of the '893 Patent. In doing so, Quanta has induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there is a high probability that others, including end users, infringe the '893 Patent, but while remaining willfully blind to the infringement.

242. Quanta also contributorily infringes the '893 Patent in violation of 35 U.S.C. § 271(c) by making, using, selling or offering to sell within the United States, or importing into the United States power modules and power systems and/or products containing the same that incorporate or constitute a material part of the inventions claimed by the '893 Patent. Quanta does so knowing that these products are especially made or especially adapted for uses that infringe the '893 Patent, and are not staple articles or commodities of commerce suitable for substantial non-infringing use. For example, the Delta U50SU Series Power Modules and power systems and/or products containing the same implement circuitry and designs that directly infringe the technologies protected by the '893 Patent, and that infringing use is necessary for the accused Quanta products to function. Without the use of these infringing technologies, the accused Quanta products would not be able to perform the functions and features that are central to their operation.

243. Further, on information and belief, Quanta has deliberately copied and infringed the technology protected by the '893 Patent by copying the design, layout, and functions of the Vicor products that practice that technology and that are conspicuously marked with the '893 Patent. Quanta thus has had knowledge of the '893 Patent at least since it began using Vicor's products that practice the same. Despite this knowledge, Quanta continues to willfully infringe the '893 Patent by continuing to manufacture, import, sell, and offer for sale power modules and power systems and/or products containing the same that infringe the '893 Patent and replicate Vicor's patented products. Quanta has no plausible good faith defense to infringement when it purposefully directed other companies to copy Vicor's products so it could obtain the same technology from unlicensed and infringing suppliers and/or knowingly incorporated such copied technology in their products or systems. Such actions rise to the level of reprehensible, flagrant, and bad faith conduct that justifies a finding of willfulness and the imposition of enhanced damages.

244. Quanta committed the foregoing infringing activities without license from Vicor. Quanta's acts of infringement have damaged Vicor, as owner of the '893 Patent. Vicor is entitled to recover from Quanta the damages it has sustained as a result of Quanta's wrongful acts in an amount subject to proof at trial. Quanta's infringement of Vicor's rights under the '893 Patent will continue to damage Vicor.

DEMAND FOR JURY TRIAL

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

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Vicor requests entry of judgment in its favor and against Defendants as follows:

A. Declaring that Defendants Delta, Foxconn, and Quanta have each infringed United

- States Patents Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893;
- B. Awarding damages to Plaintiff in an amount no less than a reasonable royalty for each Defendant's infringement of United States Patent Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893, together with prejudgment and post-judgment interest and without limitation under 35 U.S.C. § 287;
- C. Declaring that Defendants Delta's, Foxconn's, and Quanta's infringement of United States Patents Nos. 9,166,481, 9,516,761, and 10,199,950 has been willful and deliberate, at least from the filing of this Complaint;
- D. Declaring that Defendants Delta's, Foxconn's, and Quanta's infringement of United States Patent No. 6,930,893 has been willful and deliberate, at least from the date that each Defendant first began copying (or directing others to copy) Vicor's products that are marked with the same;
- E. Injunctive relief precluding Defendants Delta, Foxconn, and Quanta from ongoing infringement of United States Patents Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893, or, in the alternative, an ongoing royalty for each Defendant's continued infringement of United States Patent Nos. 9,166,481, 9,516,761, 10,199,950, and 6,930,893;
- F. Awarding attorney's fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law; and
- G. Awarding such other costs and further relief as the Court may deem just and proper.

Dated: July 12, 2023

Respectfully submitted,

/s/ Elizabeth L. DeRieux

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