

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

FIRST SOLAR, INC.,

Plaintiff,

v.

**CANADIAN SOLAR INC.,
CSI SOLAR CO., LTD.,
CANADIAN SOLAR MANUFACTURING
(THAILAND) CO., LTD., CANADIAN
SOLAR INTERNATIONAL LIMITED,
CANADIAN SOLAR (USA) INC., and
CANADIAN SOLAR US MODULE
MANUFACTURING CORPORATION.**

Defendants.

No. _____

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff First Solar, Inc. (“First Solar”), by its undersigned counsel, brings this Complaint for patent infringement against Defendants Canadian Solar Inc.; CSI Solar Co., Ltd.; Canadian Solar Manufacturing (Thailand) Co., Ltd.; Canadian Solar International Limited; Canadian Solar (USA) Inc. and Canadian Solar US Module Manufacturing Corporation. (collectively, “Canadian Solar”) alleging, with knowledge as to its own acts and on information and belief as to all other matters, as follows:

NATURE OF THE ACTION

1. This action arises under the patent laws of the United States, 35 U.S.C. §§ 1 *et seq.*, including specifically 35 U.S.C. § 271, based on Defendants' infringement of U.S. Patent No. 9,130,074 (the "'074 Patent").

2. First Solar is a leading solar technology company and a global provider of responsibly produced, eco-efficient solar modules. Born in the Midwest, headquartered in the Southwest, and with products that are shipped worldwide, First Solar is an American success story. Driven by a passion for innovation and powered by American ingenuity, First Solar has consistently invested in American manufacturing and American jobs. Today, it is the only U.S.-headquartered company among the world's ten largest producers of solar products.

3. Solar modules or panels, which are made of solar cells, are a sustainable alternative to traditional energy sources such as coal or gas. First Solar's solar modules, which use advanced thin film solar technology developed in its research facilities in California and Ohio, provide a competitive, high-performance, lower-carbon alternative to conventional crystalline silicon ("c-Si") solar modules. First Solar's modules have half the carbon footprint of conventional solar technology, use less water over the life of the module compared to c-Si modules and provide the fastest energy payback time in the industry. From raw material sourcing and manufacturing through end-of-life module recycling, First Solar's approach to technology embodies sustainability and ecological responsibility.

4. First Solar's unwavering dedication to innovative technology and sustainable energy is matched by its loyalty to the American value chain. As more and more companies are outsourcing their materials, labor and research to other countries, First Solar remains committed to investing in the American people and preserving domestic industry. In

2023 alone, First Solar's operations supported, directly and indirectly, over 15,000 jobs and generated nearly \$1.6 billion in labor income for the U.S. economy. With its commitment to cultivating domestic industry, First Solar is projected to support more than 30,000 jobs, representing almost \$2.8 billion in labor income, by 2026. And between 2016 and 2026, First Solar will have invested approximately \$4 billion in manufacturing and research and development infrastructure in the United States. First Solar is the only company among the world's ten largest solar manufacturers that does not manufacture in China.

5. As the solar industry evolves, new technologies are adopted. One of those emerging technologies is TOPCon, which stands for "tunnel oxide passivated contact". TOPCon solar cells can cost-effectively achieve a high operational efficiency and have other desirable performance metrics. TOPCon solar cells can also have superior bifaciality, meaning that they are able to generate more power from sunlight absorbed from the side of the module that faces away from the sun. This improved bifaciality can further increase the efficiency of the module.

6. First Solar owns a large portfolio of patents covering methods of manufacturing solar cells, including patents on TOPCon technology. The '074 Patent asserted in this action is one of First Solar's TOPCon patents.

7. Canadian Solar is a photovoltaics company founded in 2001 that has historically manufactured its products in China. Canadian Solar has a history of unfairly competing with American companies, such as First Solar, by unlawfully dumping solar modules on the U.S. market. Canadian Solar has been found to have attempted to avoid antidumping and countervailing duties by shipping its Chinese-made products through Thailand for minor processing before importing those products into the United States.

8. Canadian Solar makes TOPCon solar cells overseas using methods covered by the '074 Patent. Canadian Solar incorporates such infringing solar cells into their TOPCon solar modules, including the TOPBiHiKu and TOPHiKu product lines. Canadian Solar imports these TOPCon solar cells and modules into the U.S., uses them in the U.S., and offers to sell and sells them in the U.S., thereby infringing the '074 Patent.

9. Canadian Solar is aware of the '074 Patent and has no excuse for its infringement. In July 2024, First Solar publicly announced to the solar industry that it owns patents on TOPCon technology and that it intends to enforce those patents against companies that practice them without a license from First Solar. Canadian Solar is undoubtedly aware of that announcement, which was widely reported in the solar industry trade press. Even if the announcement escaped its attention, Canadian Solar was on notice of its infringing activity at least as of September 10, 2024, when First Solar notified Canadian Solar in writing of its infringement of the '074 Patent. Despite its knowledge of the '074 Patent, Canadian Solar has refused to take a license and has instead continued willfully to infringe the '074 Patent.

10. This suit seeks to hold Canadian Solar accountable for its unauthorized use of First Solar's patented inventions, to provide redress for the damage Canadian Solar has caused to First Solar, and to end Canadian Solar's infringement. Canadian Solar must not be permitted to use technological advances owned by First Solar unfairly to compete with First Solar's products.

THE PARTIES

11. Plaintiff **First Solar** is a Delaware corporation with its principal place of business located at 350 West Washington Street, Suite 600, Tempe, Arizona, 85288. First Solar produces advanced thin film solar modules designed and developed in the United States. It has a

prominent manufacturing footprint in the United States, with three manufacturing locations in Ohio, a fourth factory in Alabama, and a fifth factory set to open in Louisiana in 2026.

12. First Solar is the only one of the world's ten largest solar manufacturers that is headquartered in the United States. Over the past two decades, First Solar has been committed to delivering high-quality, responsibly-produced American solar products to the global marketplace. First Solar manufactures advanced thin film solar modules that were designed and developed in the U.S. at a cost of over \$1.5 billion in cumulative R&D investment.

13. First Solar produces energy-efficient solar modules with a superior degradation rate, temperature coefficient, spectral and shading response, and the smallest environmental footprint of any solar technology. Those modules have set industry benchmarks for quality, durability, reliability, design and sustainability. First Solar's solar products compete with other solar products, including Canadian Solar's TOPCon products.

14. First Solar has been a continuous innovator in the field and has built a robust intellectual property portfolio, including hundreds of patents covering inventions in solar technology, including TOPCon. First Solar's TOPCon portfolio includes patents and patent applications in the United States, Australia, Canada, China, Europe, Hong Kong, Japan, Mexico, Malaysia, Singapore, South Korea, the United Arab Emirates and Vietnam.

15. Defendant **Canadian Solar Inc.** ("CSI Canada") is a company organized under the laws of Ontario whose principal place of business is located at 4273 King Street East, Suite 102, Kitchener, Ontario, N2P 2E9 Canada.

16. CSI Canada is an integrated global enterprise with operations and sales in numerous countries. As of December 31, 2023, CSI Canada has subsidiaries and operations in China, Thailand, the United States, Canada, Germany, France, Italy, Greece, Netherlands,

Poland, Spain, the United Kingdom, Brazil, United Arab Emirates, South Africa, Japan, Australia, Singapore, South Korea, Hong Kong, Taiwan, India, Indonesia, and Vietnam. CSI Canada sells to customers in more than 160 countries, including in the United States.

17. CSI Canada does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSI Canada's business throughout the U.S. includes, either directly and/or through its subsidiaries, distributors, retailers, suppliers, customers and/or affiliates, importing into, and/or using, selling, and/or offering to sell in, the U.S. TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured using methods claimed by the '074 Patent.

18. Defendant **CSI Solar Co., Ltd.** ("CSI China") is a Chinese company whose principal place of business is located at 199 Lushan Road, SND, Suzhou, Jiangsu, China, 215129. CSI China is a subsidiary of, or otherwise owned by, CSI Canada. CSI China operates under the direction of CSI Canada.

19. CSI China does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSI China business throughout the U.S. includes, either directly and/or through its distributors, retailers, suppliers, customers, and/or affiliates, importing into, and/or using, selling, and/or offering to sell in, the U.S. TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. CSI China is responsible for Canadian Solar's solar module and battery energy storage manufacturing operations.

20. Defendant **Canadian Solar Manufacturing (Thailand) Co., Ltd.** (“CSI Thailand”) is a Thai company whose principal place of business is located at 168, Bo Win, Si Racha District, Chon Buri 20230, Thailand. CSI Thailand is a subsidiary of, or otherwise owned by, CSI China. CSI Thailand operates under the direction of CSI China and/or CSI Canada.

21. CSI Thailand does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSI Thailand’s business throughout the U.S. includes, either directly and/or through its distributors, retailers, suppliers, customers, and/or affiliates, importing into, and/or using, selling, and/or offering to sell in, the U.S. TOPCon solar cells that are manufactured overseas using methods claimed by the ’074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the ’074 Patent. CSI’s business includes at least manufacturing TOPCon solar cells and solar modules containing TOPCon solar cells with the knowledge, intent and expectation that the cells and modules will be imported into, used, sold and offered for sale in the United States by its affiliates.

22. Defendant **Canadian Solar International Limited** (“CSIL”) is a company organized under the laws of Hong Kong whose principal place of business is located at Unit 1520, 15/F, Tower 2, Grand Century Place 193 Prince Edward Road West, Kowloon, Hong Kong. CSIL is a subsidiary of, or otherwise owned by, CSI China. CSIL operates under the direction of CSI China and/or CSI Canada.

23. CSIL does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSIL’s business throughout the U.S. includes, either directly and/or through its distributors, retailers, suppliers, customers, and/or affiliates, importing into, and/or using, selling, and/or offering to sell in, the U.S. TOPCon solar cells that are

manufactured overseas using methods claimed by the '074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. CSIL's business includes at least exporting into the United States TOPCon solar modules manufactured by CSI Thailand with the knowledge, intent and expectation that the cells and modules will be imported into, used, sold and offered for sale in the United States by its affiliates.

24. Defendant **Canadian Solar (USA) Inc.** ("CSI USA") is a Delaware company whose principal place of business is located at 1350 Treat Blvd. Ste 500, Walnut Creek, California 94597. CSI USA does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSI USA is a subsidiary of CSI China. CSI USA operates under the direction of CSI China and/or CSI Canada. CSI USA's business includes importing into the United States, selling and offering for sale within the United States TOPCon solar modules manufactured by CSI Thailand.

25. CSI USA's business throughout the U.S. includes, either directly and/or through its distributors, retailers, suppliers, customers, and/or affiliates, importing into, and/or selling, offering to sell, and/or using in, the U.S. TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent.

26. Defendant **Canadian Solar US Module Manufacturing Corporation** ("CSI US MMC") is a Delaware company whose principal place of business is located at 3000 Skyline Dr, Mesquite, Texas 75149-1802. CSI US MMC is a subsidiary of, or otherwise owned by, CSI Canada. CSI US MMC operates under the direction of CSI China and/or CSI Canada.

CSI US MMC does business, directly and/or indirectly, throughout the United States, including in this judicial district. CSI US MMC's business throughout the U.S. includes, either directly and/or through its distributors, retailers, suppliers, customers, and/or affiliates, importing into, and/or selling, offering to sell, and/or using in, the U.S. TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and/or products that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. CSI US MMC's business includes at least importing into the United States TOPCon solar cells manufactured by CSI Thailand, assembling solar modules incorporating these cells in the United States and selling and offering for sale the TOPCon modules it produces.

27. Canadian Solar's various subsidiaries and companies are interconnected and work in concert with one another. Canadian Solar has overlapping executives who control and operate Canadian Solar's various companies and subsidiaries in a coordinated fashion.

- *Shawn (Xiohua) Wu* is the founder, Chairman, President and Chief Executive Officer of CSI Canada. (Form 20-F for Canadian Solar Inc. for the Fiscal Year Ended December 31, 2023 at 42, 113.) He is also the Chairman of CSI China. (*Id.*)
- *Leslie Li Hsien Chang* is a director of CSI Canada. (Form 20-F for Canadian Solar Inc. for the Fiscal Year Ended December 31, 2023 at 114.) He is also a director of CSI China. (*Id.*)
- *Yan Zhuang* is a director of CSI Canada. (Form 20-F for Canadian Solar Inc. for the Fiscal Year Ended December 31, 2023 at 115.) He is also the President and a director of CSI China. (*Id.*)
- *Thomas Koerner* is Corporate Senior Vice President of CSI Canada. (<https://www.linkedin.com/in/thomas-koerner-52015>.) He is also the Chief Executive

Officer of CSI USA. State of California Office of the Secretary of State, Statement of Information Canadian Solar (USA) Inc., filed on August 15, 2024.

- *Oscar Araujo* is Vice President and General Manager, North & Central America of CSI Canada. (<https://www.linkedin.com/in/oscararaujo>.) He is also a Vice President of CSI USA. State of California Office of the Secretary of State, Statement of Information Canadian Solar (USA) Inc., filed on August 15, 2024.
- *Philip Zheng* is Vice President and General Manager, Manufacturing, North America of CSI Canada. (<https://www.linkedin.com/in/oscararaujo>.) He is also the President of CSI US MMC. (https://apps.cityofmesquite.com/city_secweb/resolutions/2023-28.pdf.) He was previously General Manager for CSI Thailand. (<https://www.canchamthailand.org/exclusive-interview-with-philip-zheng>.)

JURISDICTION AND VENUE

28. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a) because the claims herein arise under the Patent Laws of the United States, 35 U.S.C. §§ 1 *et seq.*, including 35 U.S.C. § 271.

29. This Court has personal jurisdiction over CSI Canada because it manufactures, and/or induces its subsidiaries, distributors, retailers, suppliers and/or affiliates to manufacture, TOPCon solar cells overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI Canada imports into, and/or uses, sells and/or offers to sell in, the U.S., and/or induces its subsidiaries, distributors, retailers, suppliers, customers and/or affiliates to import into, and/or use, sell and/or offer to sell in, the U.S., TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar

cells made overseas using the claimed methods. CSI Canada availed itself of this forum by purposefully directing its activities here; CSI Canada intentionally placed, and continues to place, into the stream of commerce TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, with the knowledge, understanding and/or expectation that those TOPCon solar cells and products that incorporate such TOPCon solar cells, will be sold in Delaware. CSI Canada intentionally supplies TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, directly, and/or to and/or through its subsidiaries, affiliates, distributors and/or retailers, with the intention that such products will be sold to, and purchased and used by, customers in Delaware. CSI Canada derives substantial revenue from sales of TOPCon solar products, in Delaware, that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. This action arises from these activities directed at the U.S., including Delaware, by CSI Canada. Exertion of personal jurisdiction in this forum over CSI Canada does not offend traditional notions of fair play and substantial justice because of the aforementioned contacts CSI Canada has with this forum.

30. This Court has personal jurisdiction over CSI China because it manufactures, and/or induces its subsidiaries, distributors, retailers, suppliers and/or affiliates to manufacture, TOPCon solar cells overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI China imports into, and/or sells and/or offers to sell in, the U.S., and/or induces its subsidiaries, distributors, retailers, suppliers and/or affiliates to import into, and/or use, sell

and/or offer to sell in, the U.S., such TOPCon solar cells made overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI China availed itself of this forum by purposefully directing its activities here; CSI China intentionally placed, and continues to place into the stream of commerce TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, with the knowledge, understanding and/or expectation that those TOPCon solar cells and/or products that incorporate such TOPCon solar cells, will be sold in Delaware. CSI China intentionally supplies TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, directly and/or to and/or through its subsidiaries, affiliates, distributors and/or retailers, with the intention that such products will be sold to, and purchased and used by, customers in Delaware. CSI China derives substantial revenue from sales of TOPCon solar products, in Delaware, that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. This action arises from these activities directed at the U.S., including Delaware, by CSI China. Exertion of personal jurisdiction in this forum over CSI China does not offend traditional notions of fair play and substantial justice because of the aforementioned contacts CSI China has with this forum.

31. This Court has personal jurisdiction over CSIL because it manufactures, and/or induces its subsidiaries, distributors, retailers, suppliers and/or affiliates to manufacture, TOPCon solar cells overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSIL imports into, and/or sells and/or offers to sell in, the U.S., and/or induces its distributors, retailers,

suppliers and/or affiliates to import into, and/or use, sell and/or offer to sell in, the U.S., such TOPCon solar cells made overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSIL induces its affiliates, distributors, retailers, suppliers and/or customers to use, offer to sell and/or sell in the U.S. such TOPCon solar cells made overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSIL availed itself of this forum by purposefully directing its activities here; CSIL intentionally imports, offers to sell, sells and/or places into the stream of commerce TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, with the knowledge, understanding and/or expectation that those TOPCon solar cells and/or products that incorporate such TOPCon solar cells, will be sold in Delaware. CSIL intentionally imports, offers to sell and/or sells TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, directly and/or through affiliates, distributors and/or retailers, with the intention that such products will be sold to, and purchased and used by, customers in Delaware. CSIL derives substantial revenue from sales of TOPCon solar products, in Delaware, that incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. This action arises from these activities directed at the U.S., including Delaware, by CSIL. Exertion of personal jurisdiction in this forum over CSIL does not offend traditional notions of fair play and substantial justice because of the aforementioned contacts CSIL has with this forum.

32. This Court has personal jurisdiction over CSI Thailand because it manufactures, and/or induces its subsidiaries, distributors, retailers, suppliers and/or affiliates to manufacture, TOPCon solar cells overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI Thailand imports into, and/or sells and/or offers to sell in, the U.S., and/or induces its distributors, retailers, suppliers and/or affiliates to import into, and/or use, sell and/or offer to sell in, the U.S., such TOPCon solar cells made overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI Thailand induces its affiliates, distributors, retailers, suppliers and/or customers to use, offer to sell and/or sell in the U.S. such TOPCon solar cells made overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods. CSI Thailand availed itself of this forum by purposefully directing its activities here; CSI Thailand intentionally imports, offers to sell, sells and/or places into the stream of commerce TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, with the knowledge, understanding and/or expectation that those TOPCon solar cells and/or products that incorporate such TOPCon solar cells, will be sold in Delaware. CSI Thailand intentionally imports, offers to sell and/or sells TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells made overseas using the claimed methods, directly and/or through affiliates, distributors and/or retailers, with the intention that such products will be sold to, and purchased and used by, customers in Delaware. CSI Thailand derives substantial revenue from sales of TOPCon solar products, in Delaware, that

incorporate TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent. This action arises from these activities directed at the U.S., including Delaware, by CSI Thailand. Exertion of personal jurisdiction in this forum over CSI Thailand does not offend traditional notions of fair play and substantial justice because of the aforementioned contacts CSI Thailand has with this forum.

33. In the event that this Court does not have personal jurisdiction over Defendants CSI Canada, CSI China, CSIL or CSI Thailand by virtue of the above-pleaded facts, this Court nonetheless has personal jurisdiction over each of these entities under Federal Rule of Civil Procedure 4(k)(2). Under Rule 4(k)(2), personal jurisdiction over a defendant is established if the claim arises under federal law, the defendant is not subject to jurisdiction in any state's courts of general jurisdiction and exercising jurisdiction is consistent with the United States Constitution and laws. All three elements are met: (i) this case arises under federal law pursuant to 35 U.S.C. §§ 1 *et seq.*, including 35 U.S.C. § 271; (ii) if by virtue of the above, this Court does not have general jurisdiction over CSI Canada, CSI China, CSIL or CSI Thailand, then such entities do not appear to be subject to jurisdiction in any state's courts of general jurisdiction; and (iii) CSI Canada, CSI China, CSIL or CSI Thailand have sufficient contacts with the U.S. to justify the exercise of jurisdiction consistent with the United States Constitution and laws because these entities have purposefully availed themselves of the privilege of conducting business in the U.S. by manufacturing TOPCon solar cells overseas using methods claimed by the '074 Patent that are imported into, and/or used, offered for sale and/or sold in, the U.S., and/or incorporated into products that are imported into, and/or used, offered for sale and/or sold in the U.S., and/or inducing others to do the same. CSI Canada controls and otherwise directs and authorizes all activities of its U.S. and foreign subsidiaries to conduct

infringing activities on their behalf, such as importing into, and/or selling, offering to sell and/or using in, the U.S. TOPCon solar cells that are manufactured overseas using the methods claimed by the '074 Patent and/or products that incorporate such TOPCon solar cells.

34. This Court has personal jurisdiction over CSI USA and CSI US MMC because they are incorporated in Delaware and reside within, and have consented to, personal jurisdiction within this judicial district.

35. The subsidiaries and affiliated companies of Canadian Solar, acting in concert and as principal and agents, have done, and continue to do, substantial, continuous and systematic business in this judicial district, including marketing, selling and distributing products that contain TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and have committed, and continue to commit, acts of patent infringement, and/or have done so through subsidiaries, distributors, retailers, suppliers, customers and/or affiliates, such as distributing, offering to sell, selling, importing and/or using TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent and/or TOPCon products that use such TOPCon solar cells, and/or inducing others to do the same.

36. Canadian Solar has derived substantial revenue from sales in Delaware of products that include TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent.

37. Canadian Solar has purposefully and voluntarily placed, and is continuing to place, products that contain TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent into the stream of commerce through established distribution channels with the expectation, knowledge and intent that such products, containing TOPCon

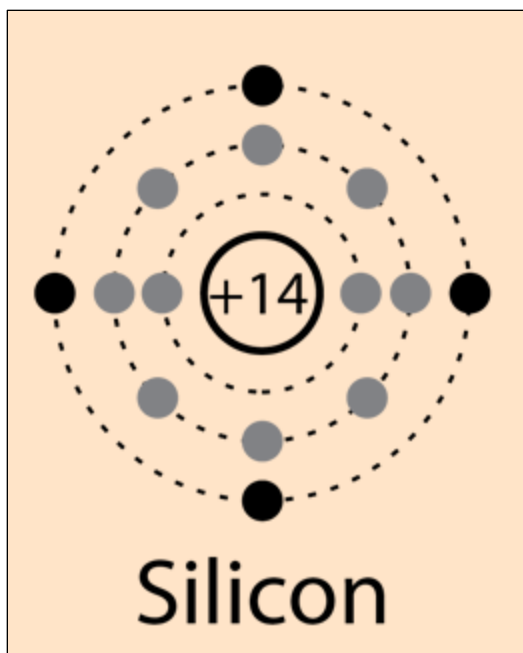
solar cells that are manufactured overseas using methods claimed by the '074 Patent, will be imported into, offered for sale, sold, purchased and/or used in, Delaware.

38. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b).

BACKGROUND ON SOLAR TECHNOLOGY

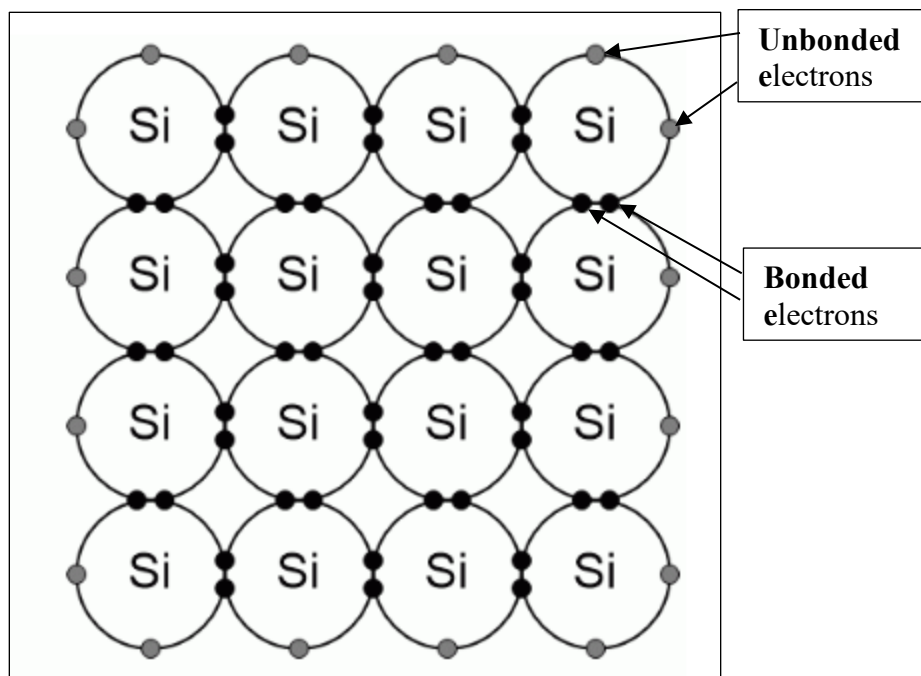
39. Solar technologies convert sunlight into electrical energy. Solar, or photovoltaic ("PV"), cells are devices that can absorb energy from sunlight to create electrical charges, generating electricity. That electricity can be introduced into the electrical grid for immediate use or stored in energy storage devices, such as batteries, for later use. To boost power output, solar cells can be connected together in solar modules.

40. Solar cells are typically small and delicately crafted out of semiconductor materials. One of those materials is silicon, which is incorporated into solar cells as the central base layer or "substrate". Silicon atoms have a central nucleus that is made up of protons (positively charged particles) and neutrons (neutrally charged particles). Electrons (negatively charged particles) orbit around this nucleus in "shells". At a high level, silicon atoms have four "valence" electrons (that is, electrons in the outermost electron shell of the atom), as shown by the four black circles in the outer ring in the schematic of a silicon atom reproduced below.



(<http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/sili.html>.)

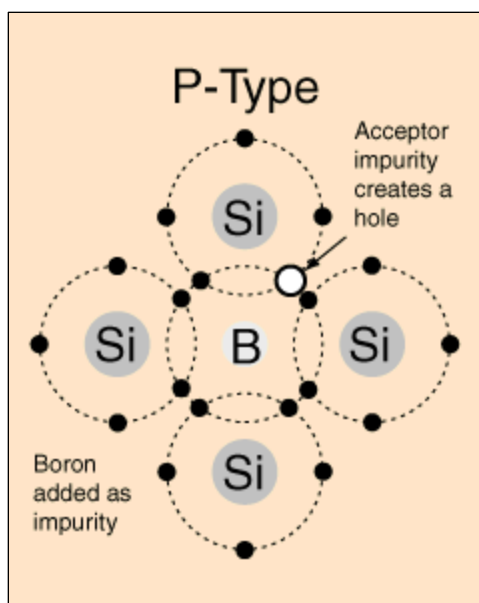
41. Silicon atoms will form a lattice-like structure with other silicon atoms, as shown in the diagram below. The silicon atoms bond by sharing valence electrons, shown in the diagram below as two dark circles between the silicon atoms. This results in a stable structure where the valence band of each silicon atom has eight electrons. However, atoms at the surface or edge of the silicon lattice structure, such as the outer silicon atoms in the diagram, do not have four silicon atoms to bond to, and thus have electrons that are not bound to another silicon atom, depicted in the diagram below as gray circles.



(<https://www.eeweb.com/how-semiconductors-work/> (annotated).)

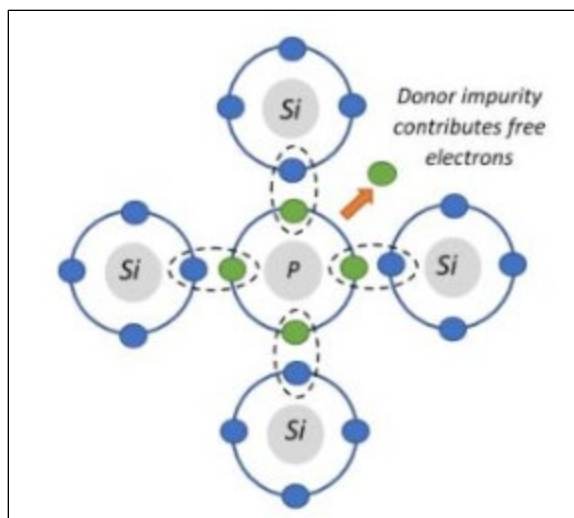
42. In silicon solar cells, there are two layers of silicon: an “N-doped layer” and a “P-doped layer”. P-doped and N-doped refer to the process of “doping”—the addition of impurities into the silicon lattice—with an N-type or P-type dopant. A dopant is a substance that modifies the electrical conductivity of the silicon layer.

43. A P-type dopant, commonly the element boron, has three valence electrons. When a boron atom replaces a silicon atom in the lattice, it leaves a space for an electron because it only has three valence electrons that it may share with neighboring silicon atoms, as shown in the diagram below. The absence of an electron is commonly referred to as a “hole”, which is depicted in the diagram below as a white circle. The “P” in P-type refers to “positive”, because the P-type dopant has extra spaces in the valence shell, or “holes”, and these holes are positive charge carriers. Electrostatic forces will attract electrons to these “holes” to try to fill the valence shell.



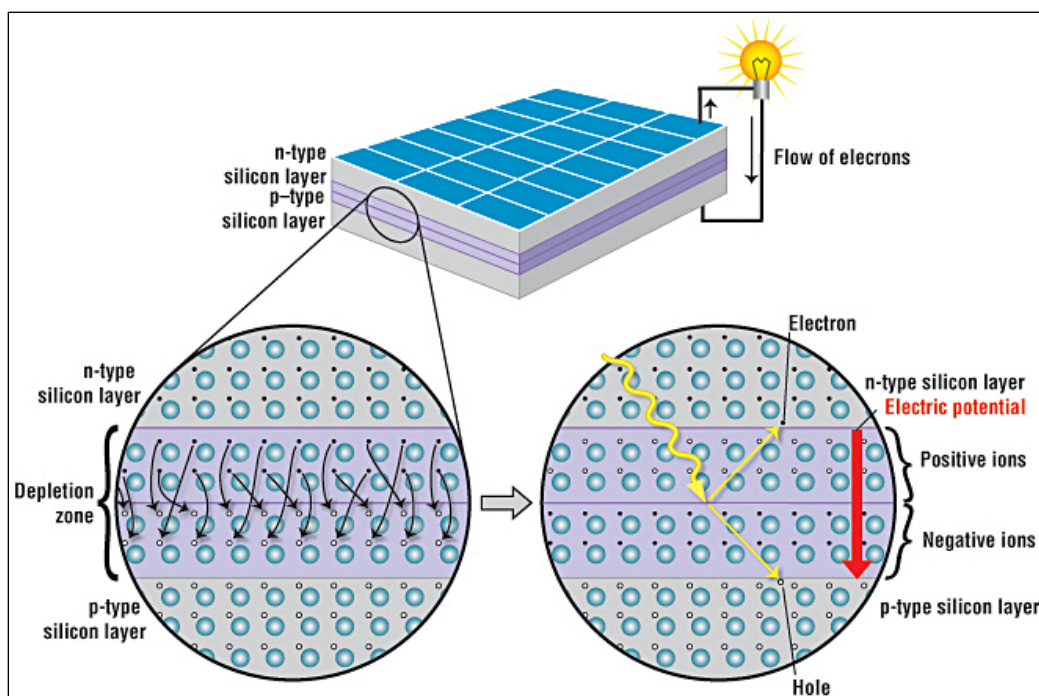
(<http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/dope.html>.)

44. An N-type dopant, commonly the element phosphorus, has five valence electrons. The “N” in N-type refers to “negative”, because the N-type dopant has extra electrons that are negative charge carriers. When a phosphorus atom replaces a silicon atom in the lattice, it has an extra electron that is not bonded to an adjacent silicon atom. The fifth valence electron of the phosphorus atom is easily energized or “excited”, which causes it to become a “free” electron. Such a free electron is shown in the diagram below as the green circle that is not located within any valence shell. Once free electrons are created, the valence shell will contain eight electrons, which is a stable configuration. The free electrons may move and become a part of the electric current.



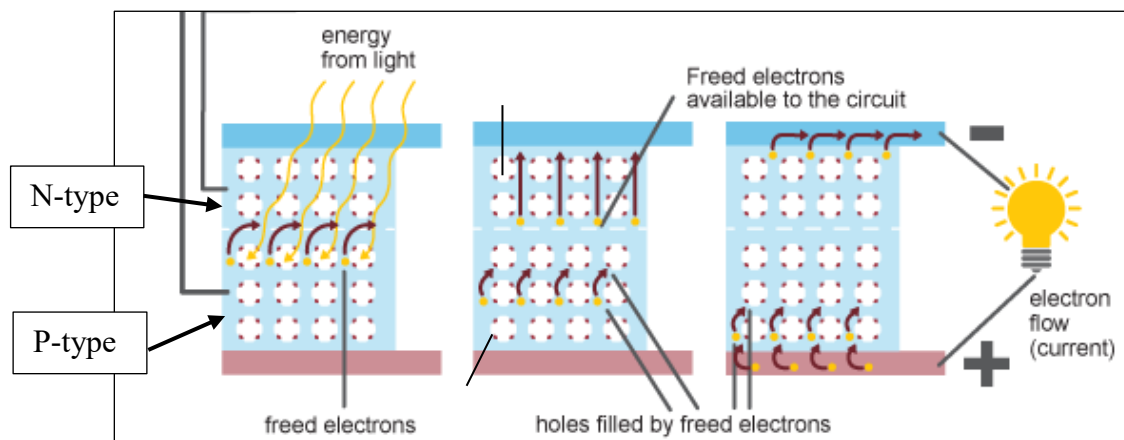
(<https://www.vedantu.com/question-answer/an-n-type-and-p-type-silicon-can-be-obtained-by-class-12-physics-cbse-5f9202bf146d684d25783a73>.)

45. When P-doped and N-doped silicon layers are put into contact, free electrons are able to move from the N-doped layer to the P-doped layer, where they settle in the holes in the P-doped layer, as shown by the red line in the diagram below, forming what is known as a “p-n junction” at the interface between the two layers.



(<https://www.acs.org/education/chemmatters/past-issues/archive-2013-2014/how-a-solar-cell-works.html>.)

46. At the center of the p-n junction is a “depletion zone” that is made up of negatively charged P-doped silicon (where the holes in the dopant have been filled with free electrons) and positively charged N-doped silicon (where the dopant has expelled its free electrons). In traditional solar cells, this p-n junction is on the front surface of the silicon substrate, and a metal layer is applied to the back surface of the silicon substrate to serve as an electrical contact or “electrode”. When a solar cell constructed like this is exposed to the sun, energy from sunlight excites electrons in the N-type and P-type regions, as well as in the depletion zone. When electrons become excited, they are knocked free from their atoms and flow through the solar cell as electrical current to the electrodes incorporated into the cell, and ultimately into the electrical grid or an energy storage device.



(<https://www.eia.gov/energyexplained/solar/photovoltaics-and-electricity.php> (annotated).)

47. Electricity is generated because the free electrons diffuse within the silicon substrate and are eventually pushed by the electrical field of the depletion zone toward the electrodes (similar to a magnet) and flow in that direction, as shown in the leftmost and middle images in the diagram above (where the N-type silicon layer is on top of the P-type silicon layer). The electrons are pushed through the N-type silicon layer along with additional excited electrons to the first electrodes (the blue rectangle at the top, in the diagram above). The

movement of the electrons from the N-type silicon layer causes a positive charge as the N-type silicon layer loses electrons. To complete the circuit and ensure that the device stays charge-neutral, electrons enter from the other electrode (red rectangle at the bottom of the diagram above) to flow through the circuit, as shown in the rightmost image, through the depletion zone and then the N-type silicon layer. While sunlight continues to hit the solar cell, electrons continuously flow along this path forming an electrical current.

48. One problem with this approach is that significant amounts of free electrons excited by sunlight will recombine into silicon atoms in the substrate that have lost electrons, typically at the outer surfaces of the silicon substrate where there are unbonded electrons (as described above) and holes. This “recombination” of electrons into silicon atoms weakens the available electric current by reducing the flow of free electrons to an electrode. Solar cells use various methods to reduce this recombination so that more electrons can be directed to an electrode to form a stronger electrical current and increase the efficiency of the solar module.

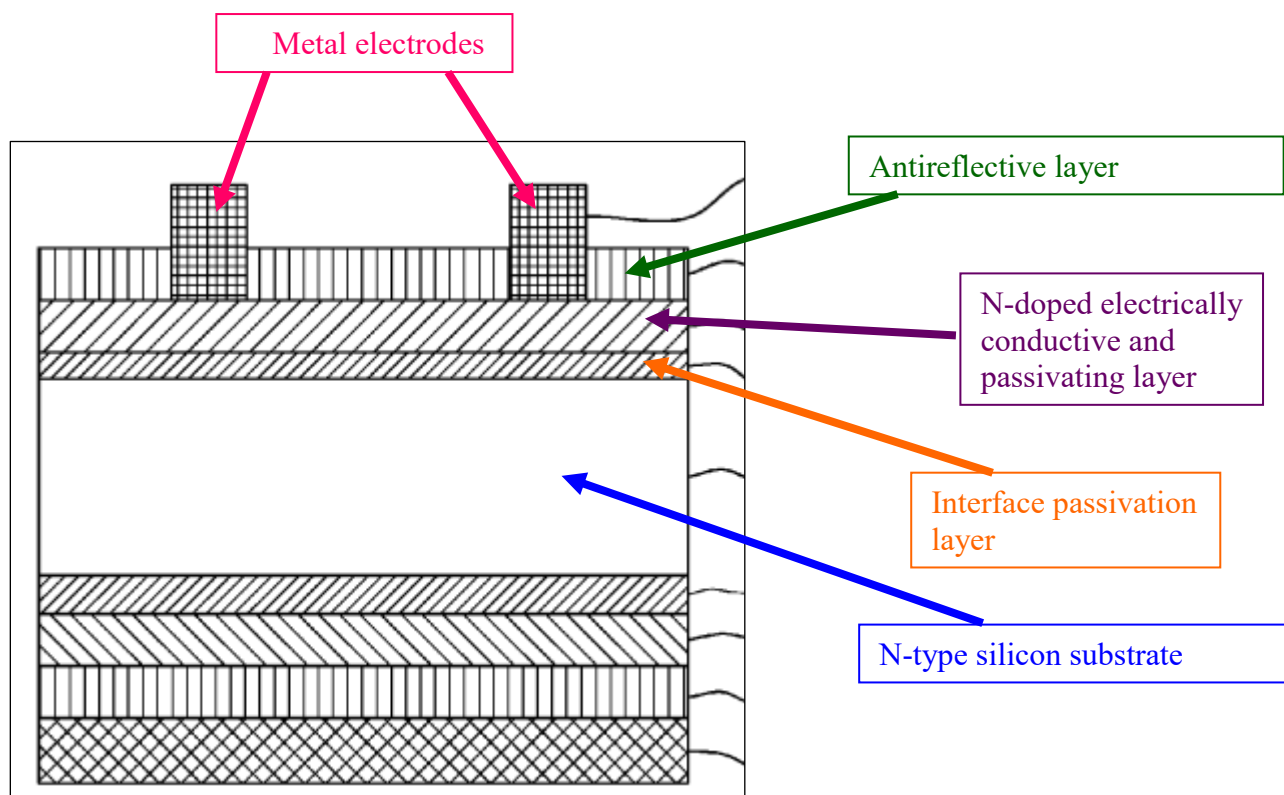
49. One of the ways solar cells are designed to reduce recombination is through “passivation”, which is the reduction in the reactivity of a material. In solar cells, the surfaces of the silicon substrate can be passivated with a different material (often silicon dioxide or silicon nitride) to reduce the occurrence of recombination along the surface of the substrate. This surface passivation layer bonds to the unbonded silicon electrons on the surface of the silicon, eliminating holes that would otherwise attract the free electrons. This suppression of the recombination of electrons and holes at or near the physical surfaces of the silicon substrate increases the efficiency of the solar cell by increasing the electric current and voltage.

THE PATENTED TECHNOLOGY

50. The '074 Patent is entitled "High-Efficiency Solar Cell Structures and Methods of Manufacture". Its inventors are Oliver Schultz-Wittmann and Denis DeCeuster. The application for the '074 Patent was filed on November 15, 2011 and claims priority to provisional patent application number 61/171,194, filed on April 21, 2009. The '074 patent was issued on September 8, 2015. A true and correct copy of the '074 Patent is attached as Exhibit A.

51. The claimed methods of the '074 Patent improve both upon the manufacturing efficiency and performance of solar cells, particularly TOPCon solar cells. As recited in claim 1, the inventive method of manufacturing solar cells generally involves providing a silicon wafer as a central substrate, depositing or growing an interface passivation layer (or "tunneling layer") onto the substrate, and depositing a doped conductive and passivating layer on the interface passivation layer. This assembly of layers is heat-treated at a temperature of about 500 °C or higher, which facilitates diffusion of the dopant material from the conductive and passivating layer through the interface passivation layer.

52. The claimed steps of depositing or growing an interface passivation layer on the substrate and depositing a doped conductive and passivating silicon layer on the passivation layer, and then heat-treating these layers, results in a structure, a non-limiting illustration of which is shown in the diagram below, that reduces electron recombination and increases the conductivity of electrons.



('074 Patent, Fig. 8 (annotated).)

53. In this exemplary embodiment, the N-doped electrically conductive and passivating silicon layer allows electrons to move between the N-type substrate and the metal electrodes. The interface passivating layer between the conductive and passivating layer and the silicon substrate “coats” the back surface of the substrate to reduce recombination at that surface. The interface passivation layer is also referred to as a “tunneling layer” because it is thin enough that excited electrons can “tunnel” through the layer. This tunneling ability is necessary because the interface passivation layer is made of an electrically insulating material, silicon oxide for

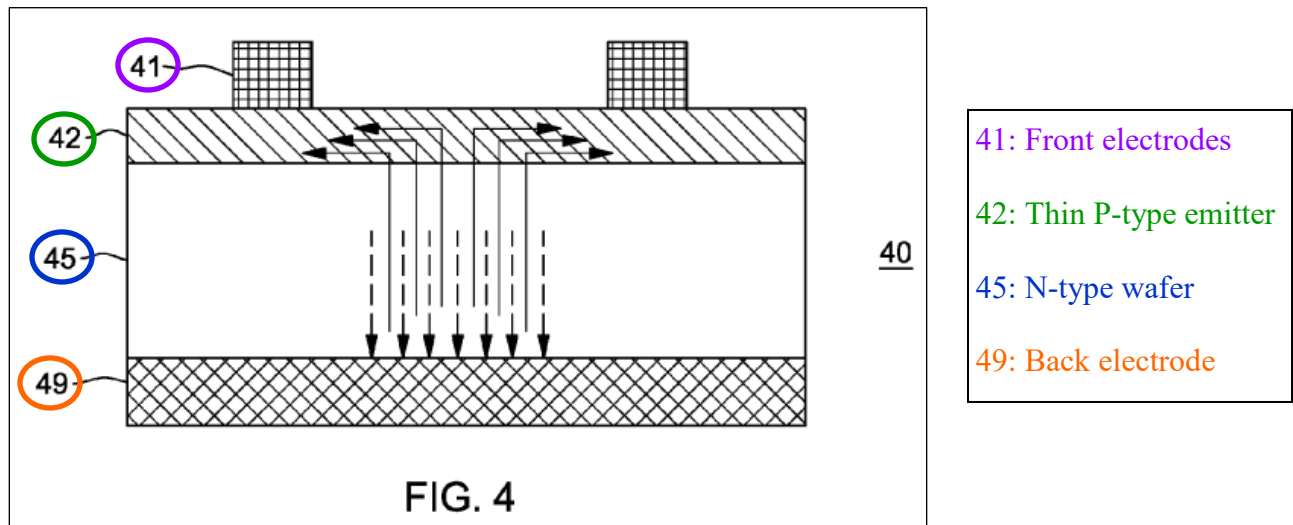
example, so, without the tunneling effect, electrons could not flow between the back electrodes and the silicon substrate through the silicon oxide.

54. The back surface passivation, a result of depositing or growing an interface passivation layer over the silicon substrate as claimed in the '074 Patent, results in improved bifaciality—meaning that the solar cells are able to generate more power from sunlight absorbed from the back side of the solar cell (the side facing away from the sun). This is possible because the interface passivation layer bonds to unbonded electrons at the back surface of the substrate, preventing recombination of electrons at the back surface.

55. As noted above, one of the steps of the methods claimed by the '074 Patent is providing thermal treatment to the assembly comprising the central silicon substrate, the conductive and passivating layer, and the interface passivation layer. This thermal treatment facilitates diffusion of the N-dopant material through the interface passivation layer and, in some embodiments, into the silicon substrate. That diffusion of dopant provides pathways from the silicon substrate to the electrodes along which the electrons travel, thereby effectively shortening the path the electrons must take through the substrate to reach the electrodes. These pathways are formed because the areas of the substrate into which dopant is diffused have orders of magnitude more dopant than the other portions of the substrate. These higher levels of dopant result in higher conductivity.

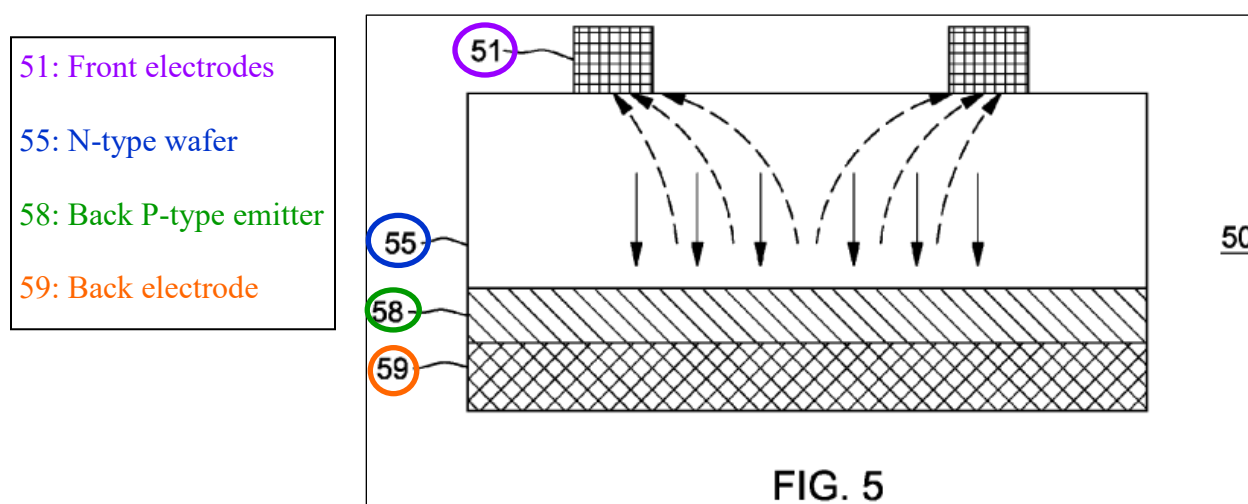
56. The general concept of shortened charge carrier flow paths is illustrated by comparing Figures 4 and 5 of the '074 Patent. When an electron is “excited”, the energy can cause it to move away from its current atom and take the path of least resistance to the electrodes. Figure 4, reproduced below with annotations, shows a solar cell wherein the silicon substrate (45) is less conductive than the doped emitter layer (42). Because the silicon substrate

is poorly conductive (and thus highly resistive) compared to the emitter layer, the path of least resistance to the electrodes is vertically through the silicon substrate and laterally through the emitter layer, as illustrated by the solid lines in the diagram below, even though the overall distance is longer compared to a path through the silicon substrate directly toward the electrodes.



('074 Patent, Fig. 4 (annotated).)

57. Figure 5, reproduced below with annotations, shows a solar cell that does not have a highly conductive, heavily doped emitter layer between the silicon substrate (55) and the electrodes (51), and thus the charge flow path in Figure 5 does not travel through a region where the conductivity varies as significantly as the region illustrated in Figure 4. Because of this, the path of least resistance in Figure 5 is the shortest path to the electrodes, and thus the charges take a shortened, curved path between the electrodes and the substrate as represented by the dashed lines.



('074 Patent, Fig. 5 (annotated).)

58. As noted above, using the thermal treatment step claimed in the '074 Patent results in diffusion of the dopant through the interface passivation layer and, in some embodiments, into the silicon substrate. The areas where the dopant, *e.g.*, phosphorus, is incorporated into the interface passivation layer and, in some embodiments, the substrate makes the silicon in those areas more conductive and forms low resistance pathways through those layers along which electrons can more easily travel. The diffusion of dopant into these layers thus increases the conductivity of the solar cell near the back surface of the silicon substrate, *i.e.*, through the interface passivation layer, such that its conductivity is more similar to the conductivity of the conductive and passivating layer. As a result, charges take a more direct route from the substrate toward the electrodes affixed to the back of the solar cell than they otherwise would without the diffusion of the dopant, similar in concept to that which is shown in Figure 5.

59. The diffusion of the dopant through the interface passivation layer further forms a junction between the doped conductive and passivating layer and the relatively lower doped silicon substrate. This “high-low junction” further reduces recombination by creating an

electrical field around the back side surface of the silicon substrate, which acts to push electrons through the solar cell, thus decreasing instances of recombination. The diffusion of phosphorus through the interface passivation layer has the added benefit of making tunneling therethrough more efficient.

60. In addition to reducing recombination by providing pathways through the solar cell via the diffusion of dopant, the claimed methods allow for electricity to flow between the electrodes and the substrate through the conductive and passivating layer rather than requiring direct contact between the electrodes and the substrate. Accordingly, the claimed method eliminates the cost and labor of forming a direct metal connection from the electrode to the back surface of the substrate, such as by etching down to the substrate or firing or melting metal all the way through the conductive and passivating layer and interface passivation layer to the substrate.

THE INFRINGING PRODUCTS

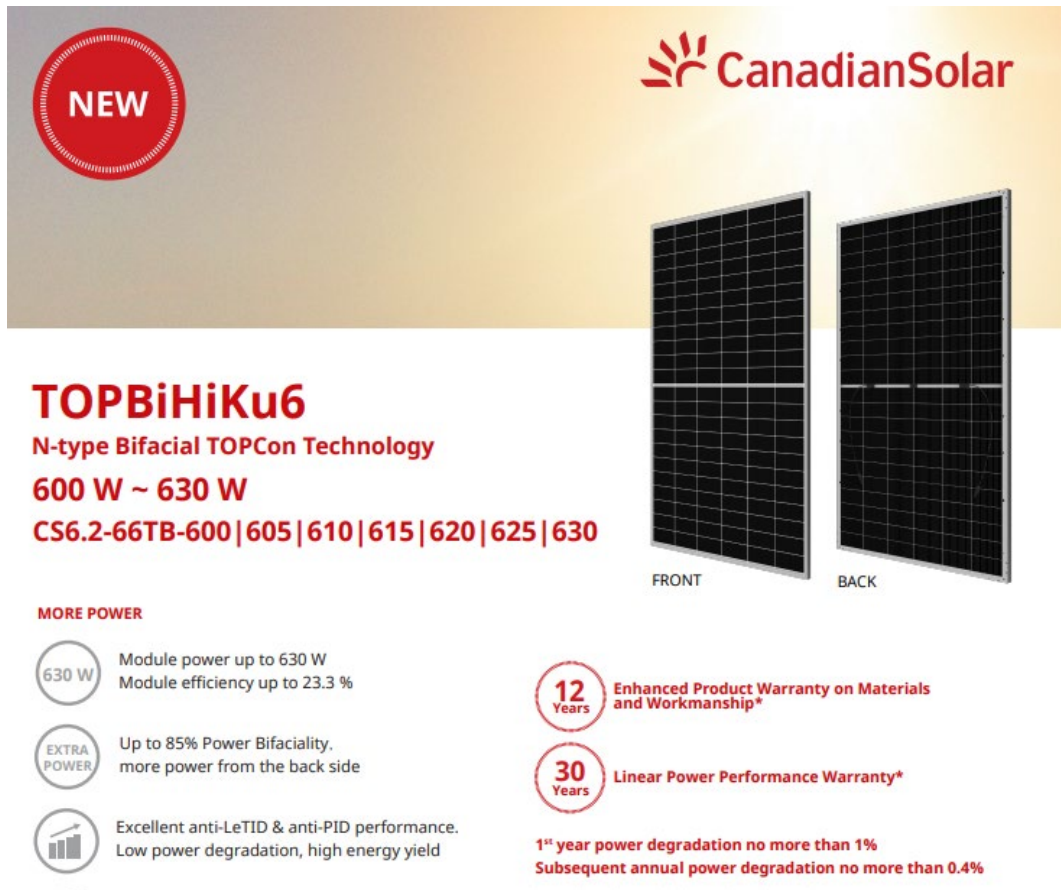
61. Canadian Solar manufactures solar cells by using methods claimed by the '074 Patent. Canadian Solar incorporates those TOPCon solar cells into TOPCon solar modules that are sold to consumers. Canadian Solar's TOPCon solar modules (collectively, the "Canadian Solar TOPCon products" or the "Infringing Products") include, for example, the TOPBiHiKu, and TOPHiKu lines. These products use and incorporate the same, or substantially similar, infringing TOPCon solar cells. Accordingly, the products analyzed below are representative of Canadian Solar's full offering of infringing TOPCon products.

62. Non-limiting examples of Canadian Solar's TOPCon products include the TOPBiHiKu7, 182 Pro TOP(Bi)HiKu6, TOPBiHiKu6, TOPHiKu6, and TOPBiHiKu CS6.2.

Canadian Solar provides data sheets and installation manuals for its TOPCon products.¹

Representative examples, shown below, of these data sheets tout Canadian Solar’s “N-type”

“TOPCon Technology”, which allegedly offers high module power and bifaciality, “low power degradation” and “high energy yield”.



NEW

CanadianSolar

TOPBiHiKu6
N-type Bifacial TOPCon Technology
600 W ~ 630 W
CS6.2-66TB-600 | 605 | 610 | 615 | 620 | 625 | 630

FRONT **BACK**

MORE POWER

- 630 W** Module power up to 630 W
Module efficiency up to 23.3 %
- EXTRA POWER** Up to 85% Power Bifaciality.
more power from the back side
- Excellent anti-LeTID & anti-PID performance.
Low power degradation, high energy yield

12 Years Enhanced Product Warranty on Materials and Workmanship*

30 Years Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

T

¹ E.g., https://static.csisolar.com/wp-content/uploads/2022/09/23133747/CS-Datasheet-TOPBiHiKu6_CS6.2-66TB_v1.4_EN.pdf; https://static.csisolar.com/wp-content/uploads/sites/9/2025/02/28085022/CS_Installation-Manual_PV-Modules_EN-v2.7-EN.pdf; and https://static.csisolar.com/wp-content/uploads/2024/07/23150819/CS-Datasheet-TOPBiHiKu7_CS7N-TB-AG_v1.8_EN.pdf.

(https://static.csisolar.com/wp-content/uploads/2022/09/23133747/CS-Datasheet-TOPBiHiKu6_CS6.2-66TB_v1.4_EN.pdf.)



CanadianSolar

TOPBiHiKu7
N-type Bifacial TOPCon Technology
690 W ~ 720 W
CS7N-690 | 695 | 700 | 705 | 710 | 715 | 720TB-AG

FRONT BACK

MORE POWER

- 720 W** Module power up to 720 W
Module efficiency up to 23.2 %
- EXTRA POWER** Up to 85% Power Bifaciality,
more power from the back side
- Excellent anti-LeTID & anti-PID performance.
Low power degradation, high energy yield

12 Years Enhanced Product Warranty on Materials and Workmanship*

30 Years Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*According to the applicable Canadian Solar Limited Warranty Statement.

(https://static.csisolar.com/wp-content/uploads/2024/07/23150819/CS-Datasheet-TOPBiHiKu7_CS7N-TB-AG_v1.8_EN.pdf.)



NEW

CanadianSolar

TOPHiKu6
N-type TOPCon Technology
440 W ~ 470 W
CS6.2-48TD-440 | 445 | 450 | 455 | 460 | 465 | 470

MORE POWER

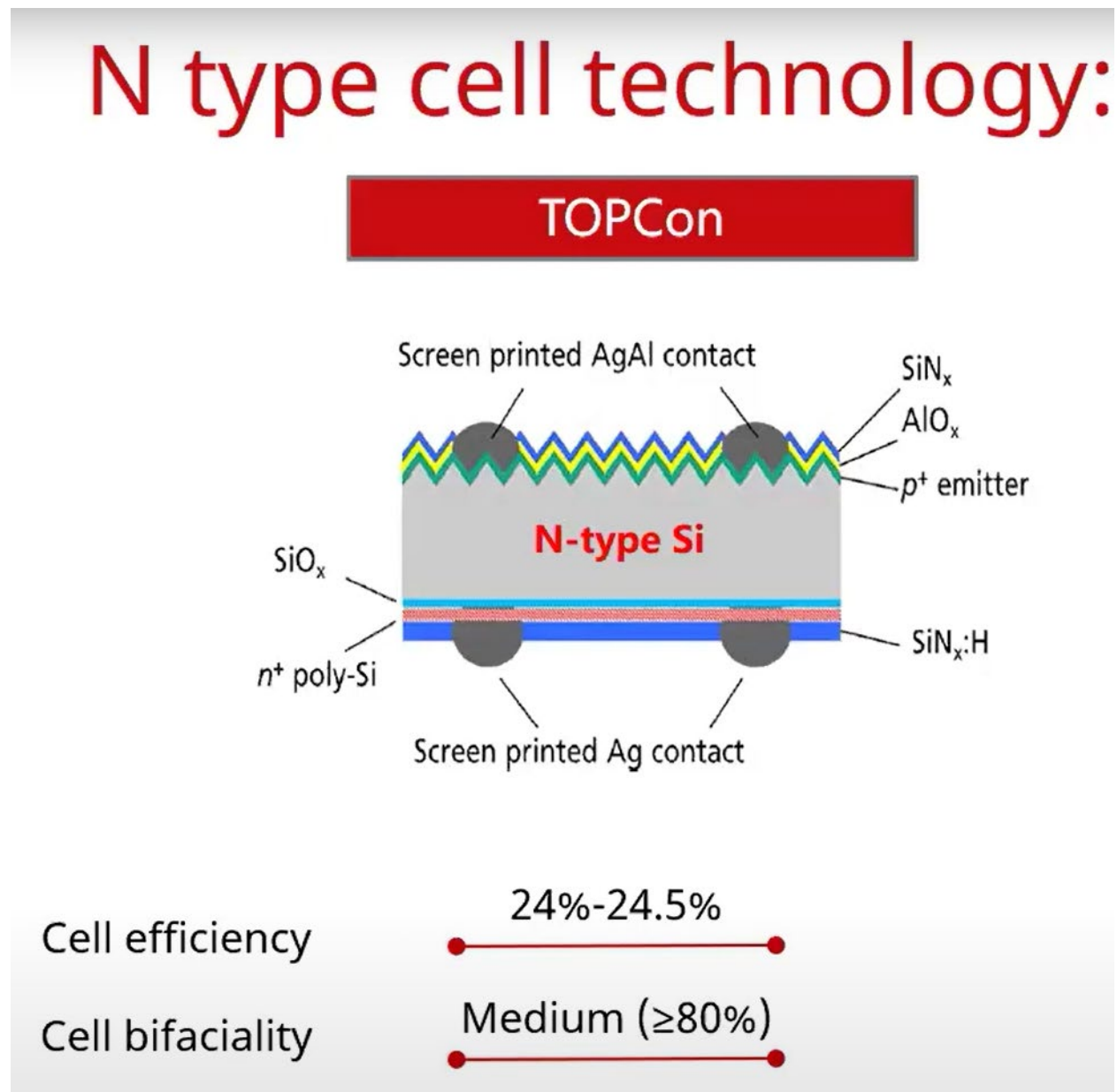
- 470 W** Module power up to 470 W
Module efficiency up to 23.5 %
- 25 Years** Industry Leading Product Warranty on Materials and Workmanship*
- Excellent anti-LeTID & anti-PID performance.**
Low power degradation, high energy yield
- 30 Years** Linear Power Performance Warranty*

(https://static.csisolar.com/wp-content/uploads/2022/09/19170028/CS-Datasheet-TOPHiKu6_Black-frame_CS6.2-48TD_v1.4_EN.pdf.)

63. Canadian Solar provides webinars that provide a technological overview of the Canadian Solar TOPCon products and the TOPCon cells used therein. A representative example of this information is Canadian Solar’s February 21, 2024 webinar titled “High Load and Attractive Design”, available on Canadian Solar’s website and YouTube.

(<https://csisolar.my.canva.site/cs-northamerica-webinars>; *see also*, <https://www.youtube.com/watch?v=p3A2rKq737M>). The webinar claims that the Canadian Solar TOPCon products have several advantages over other solar modules as a result of the TOPCon solar cells used therein, including “great efficiency and strong bifaciality” as well as relatively low amounts of silver needed and ease of manufacturing.

64. The webinar also discusses the structure of the Canadian Solar TOPCon products provides this diagram of the structure of Canadian Solar's TOPCon solar cells.



(<https://youtu.be/p3A2rKq737M?si=Uq2Ev0Vv1OFWL5kF&t=672.>)

65. Canadian Solar is able to capture the benefits of TOPCon technology by manufacturing solar cells using the methods claimed by the '074 Patent.

INFRINGEMENT OF U.S. PATENT NO. 9,130,074

66. First Solar is the assignee of the '074 Patent. First Solar has ownership of all substantial rights in the '074 Patent, including the right to exclude others from practicing the inventions of the '074 Patent and to recover damages for infringement of the '074 Patent.

67. The '074 Patent is valid and enforceable, and was duly issued in full compliance with Title 35 of the United States Code.

68. Independent Claim 1 of the '074 Patent recites:

A method of fabricating a solar cell comprising:

providing a wafer as a central substrate;

depositing or growing at least one amorphous interface passivation layer over the substrate;

depositing at least one conductive and passivating layer on the at least one interface passivation layer, the at least one conductive and passivating layer comprising a dopant;

providing thermal treatment at a temperature of about 500° C. or higher, the thermal treatment crystallizing, at least in part, the at least one conductive and passivating layer and facilitating diffusion of the dopant from the at least one conductive and passivating layer through the at least one interface passivation layer; and

providing metallization as electrodes which directly contact the at least one conductive and passivating layer following the thermal treatment thereof, wherein the dopant diffused through the at least one interface passivation layer provides shortened charge carrier flow paths between the substrate and the electrodes through the at least one conductive and passivating layer and the at least one interface passivation layer.

(Ex. A, '074 Patent at 19:14–35.)

69. Dependent Claim 2 of the '074 Patent recites:

The method of claim 1, further comprising depositing at least one antireflective layer, and/or a low reflective index layer forming a good internal mirror on a back of the solar cell.

(Ex. A, '074 Patent at 20:1–4.)

70. Dependent Claim 4 of the '074 Patent recites:

The method of claim 1, wherein the thermal treatment results in perforation of the at least one interface passivation layer to allow carrier transport therethrough.

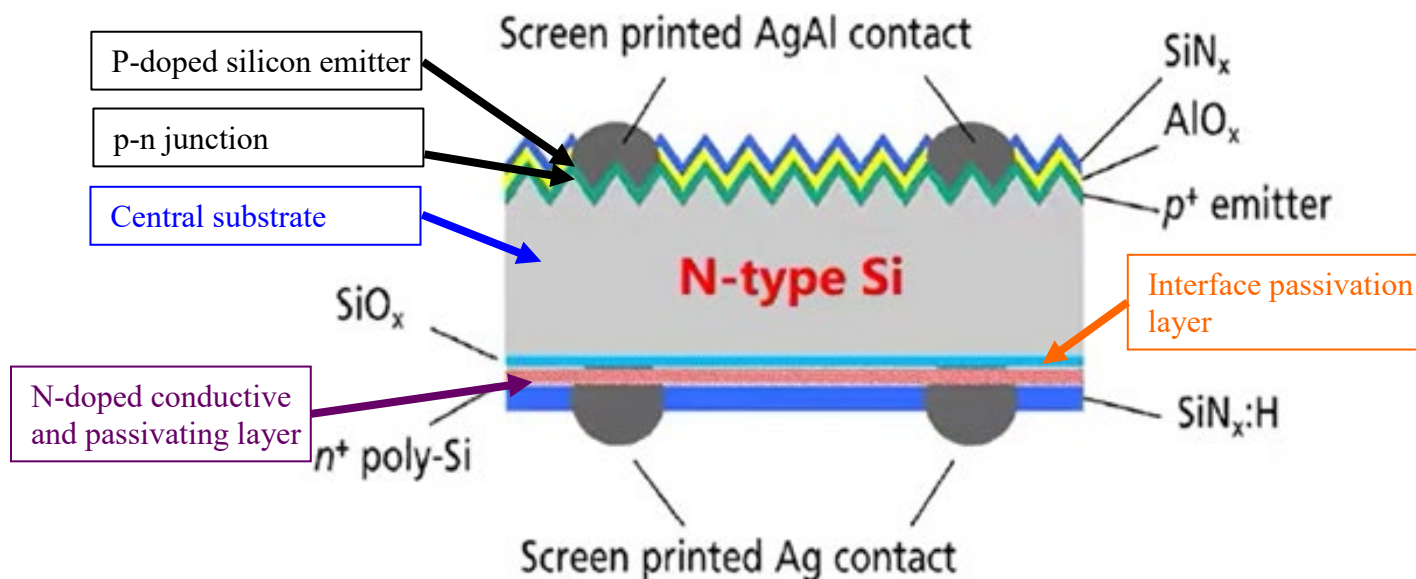
(Ex. A, '074 Patent at 20:13–15.)

71. Dependent Claim 8 of the '074 Patent recites:

The method of claim 1, wherein the at least one conductive and passivating layer comprises an amorphous, silicon containing compound, and wherein facilitating diffusion of the dopant further comprises facilitating diffusion of dopant atoms into the substrate to provide a high-low junction or a p-n junction.

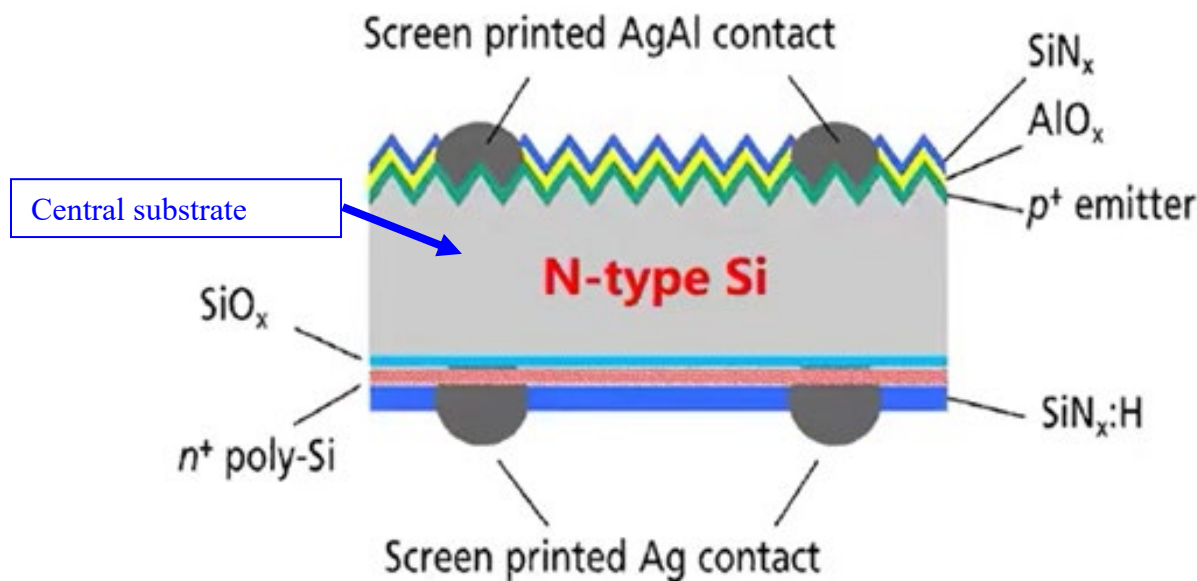
(Ex. A, '074 Patent at 20:30–35.)

72. Canadian Solar's infringing TOPCon products include a solar cell that is made by methods claimed by the '074 Patent. This is an excerpt of the schematic of Canadian Solar's TOPCon solar cell replicated above in paragraph 64. The schematic is annotated to show layers corresponding to those formed according to method of Claim 1.

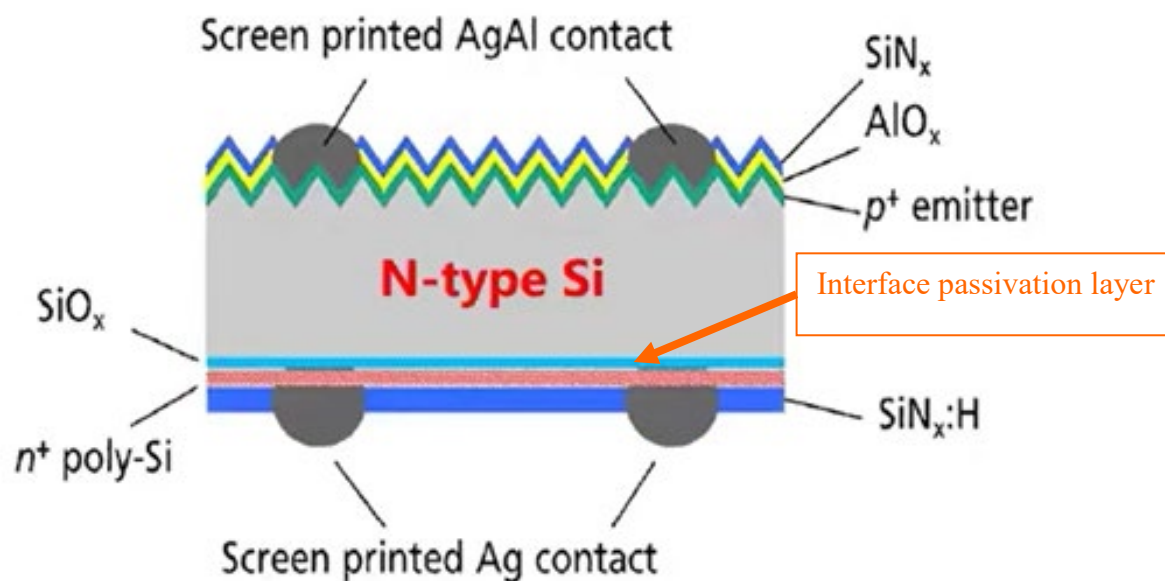


(Image from Canadian Solar's February 21, 2024 webinar titled "High Load and Attractive Design" (annotated).)

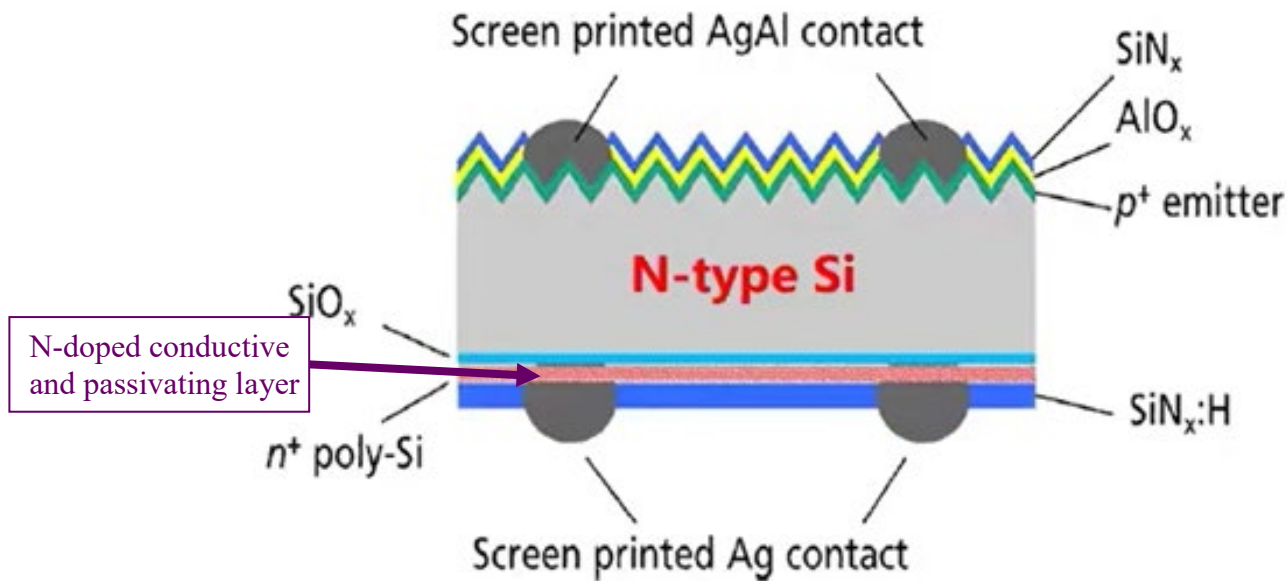
73. “A method of fabricating a solar cell, comprising; providing a wafer as a central substrate”: In manufacturing the Infringing Products, Canadian Solar uses a wafer as a central substrate. In the schematic below, the wafer is the gray-colored layer labeled “N-type Si” layer, which is a wafer made of a silicon crystal which has been doped with an n-type dopant.



74. “depositing or growing at least one amorphous interface passivation layer over the substrate”: Canadian Solar deposits or grows an amorphous interface passivation layer over the wafer substrate. This interface passivation layer in Canadian Solar’s TOPCon products is a layer of amorphous silicon oxide that “coats” the back surface of the substrate to reduce electron recombination. In the annotated schematic below, this interface passivation layer is the light blue layer labeled “SiO_x”. “Amorphous” means that the layer does not have a defined crystalline structure of atoms, but instead has silicon atoms that are arranged in a disordered manner, making cells more flexible and able to handle higher temperatures.



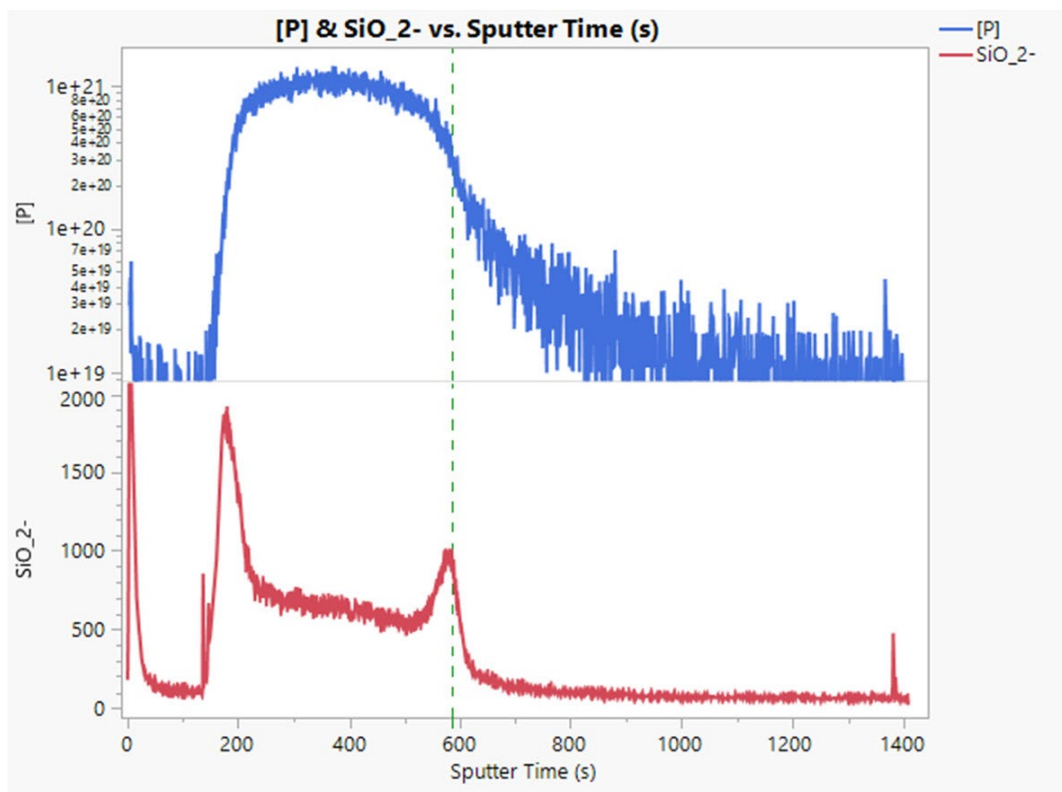
75. “depositing at least one conductive and passivating layer on the at least one interface passivation layer, the at least one conductive and passivating layer comprising a dopant”: Canadian Solar deposits a conductive and passivating layer, the orange “n⁺ poly-Si” in the annotated schematic below, on the interface passivation layer (the “SiO_x” layer). “Poly-Si” is short for polysilicon and the “n⁺” means it is (heavily) doped with an N-type dopant. In Canadian Solar’s TOPCon solar cells, the conductive and passivating layer includes phosphorus, which is an N-type dopant.



76. “providing thermal treatment at a temperature of about 500° C. or higher, the thermal treatment crystallizing, at least in part, the at least one conductive and passivating layer and facilitating diffusion of the dopant from the at least one conductive and passivating layer through the at least one interface passivation layer”: Canadian Solar applies a thermal treatment of at least a temperature of about 500 °C. The thermal treatment crystallizes, at least in part, the conductive and passivation layer (the “n⁺ poly-Si” in the diagram above). The thermal treatment facilitates the diffusion of the dopant, phosphorus, from the conductive and passivating layer through the interface passivation layer (the “SiO_x” in the diagram above).

77. Testing of the Canadian Solar TOPCon solar cell shows that, after the heat treatment, the phosphorus dopant has diffused from the conductive and passivating layer (the “n⁺ poly-Si”), through the interface passivation layer (the “SiO_x”), and into the central substrate (the “N-type Si” layer). For the tested Canadian Solar TOPCon cells, the figure below plots, on the y-axis, the amount of phosphorus (top graph) and silicon oxide (bottom graph) versus, on the x-axis, the “sputter time” or distance from the back surface of the cell (measured in the time of

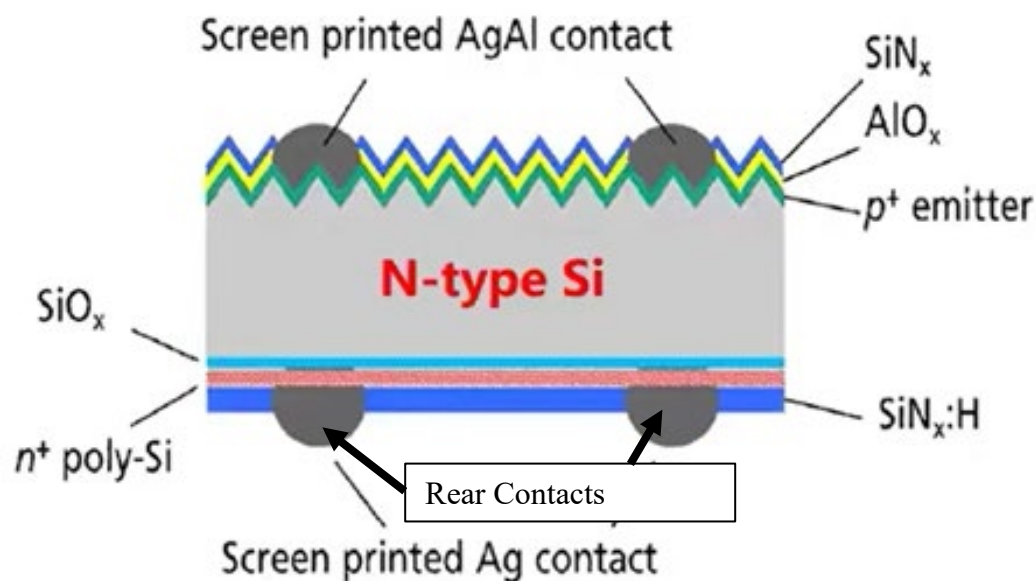
flight for an ion from the sensor to reach the depth). The vertical green dashed line represents the boundary between the interface passivating layer and the central substrate.



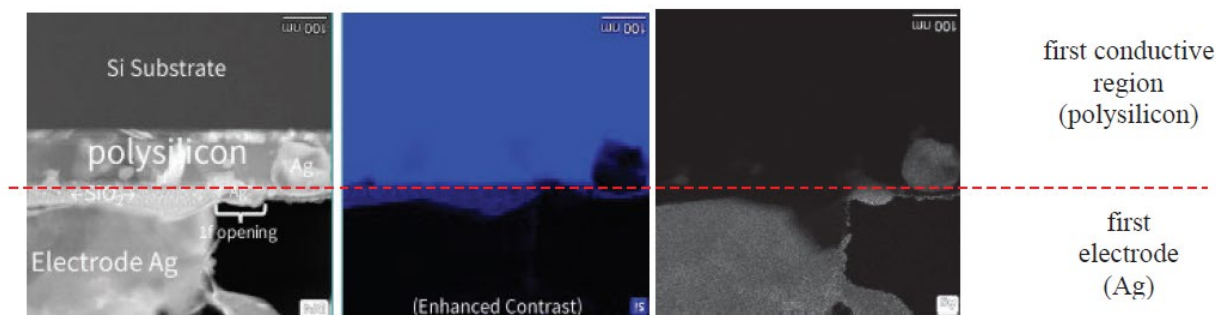
78. The top graph shows a high level of phosphorus “[P]” to the left of the dashed green line, which represents the back surface of the central substrate. To the far right of the top graph (at a depth of greater than 900), the amount of phosphorus drops to a level that is consistent with the amount of phosphorus found in a standard N-type silicon substrate. In between those two points, the graph shows elevated levels of phosphorus in the conductive and passivating layer that continues into the central substrate. The higher level of phosphorus near the back side of the central silicon substrate compared to deeper into the central substrate shows that phosphorus diffused into the central substrate from the back side (*i.e.*, from the conductive

and passivating layer). The degree of diffusion shown by these data necessarily requires a thermal treatment of the silicon cell assembly at a temperature above 500 °C.

79. “providing metallization as electrodes which directly contact the at least one conductive and passivating layer following the thermal treatment thereof, wherein the dopant diffused through the at least one interface passivation layer provides shortened charge carrier flow paths between the substrate and the electrodes through the at least one conductive and passivating layer and the at least one interface passivation layer”: Canadian Solar provides metallization as electrodes that directly contact the conductive and passivating layer (the “ n^+ poly-Si” layer). Metal electrodes are added to the cells such that they directly contact the conductive and passivating layer to form an electrical connection thereto. The diagram below shows that the electrodes (the “Screen printed Ag contact”) directly contact the orange-colored n^+ poly-Si layer. As shown in the diagram below, the antireflective layer (or coating) deposited on the back of the Canadian Solar TOPCon cells is silicon nitride (the “ $\text{SiN}_x\text{:H}$ ” layer). SiN_x is an electrical insulator, so the electrodes of the Canadian Solar TOPCon solar cells must make direct contact with the conductive and passivating layer to allow an electric current to pass through that layer. Otherwise, the antireflective layer would restrict the flow of electricity between the electrodes and the conductive and passivating layer.



80. The below STEM images of a Canadian Solar TOPCon solar cell, filed in a United States International Trade Commission investigation into Canadian Solar's importation of TOPCon solar cells, show direct contact between the rear electrodes (labelled "first electrode (Ag)") and the conductive and passivating layer (labelled "first conductive region (polysilicon)"). As shown below, portions of the electrode extend above the red dashed line to directly contact the conductive and passivating layer. The "Enhanced Contrast" image (the middle image below) shows silicon in blue and silver in black. The silicon directly above the red line is the polysilicon forming the conductive and passivating layer. As shown, at multiple spots along the width of the image the silver extends to or even above the red line, thus directly contacting the conductive and passivating layer.

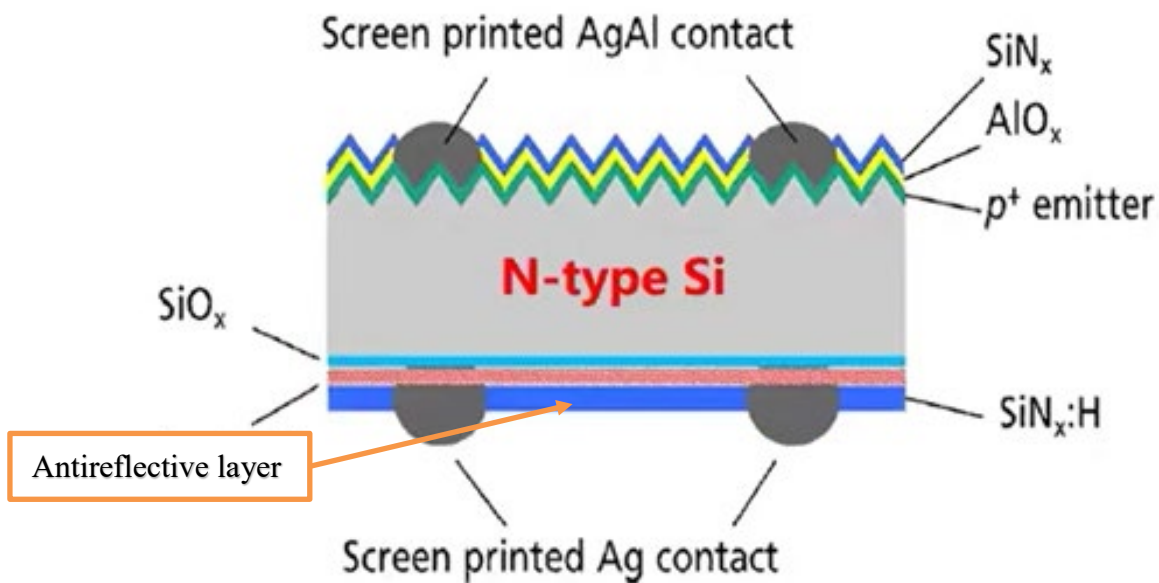


(STEM images of a Canadian Solar TOPCon solar cell from Ex. 17 to the complaint in U.S.I.T.C. Investigation No. 337-TA-1425.)

81. The phosphorus dopant that is diffused from the conductive and passivating layer (the “ n^+ poly-Si” layer) in the Canadian Solar TOPCon solar cell through the interface passivation layer (the “ SiO_x ” layer) provides shortened charge flow paths between the substrate (the “N-type Si” layer) and the electrodes through the conductive and passivating layer (the “ n^+ poly-Si” layer) and interface passivation layer (the “ SiO_x ” layer). This is reflected in the smooth transition of phosphorus levels shown in the graph above, resulting in higher conductivity near the back surface of the substrate compared to an assembly that does not have dopant diffused through the interface passivation layer. This causes charge flow paths to curve toward the electrodes, shortening them as illustrated in concept in Figure 5 of the ’074 Patent and described above. Thus, Canadian Solar practices the method of Claim 1 of the ’074 Patent.

82. Canadian Solar also infringes Claim 2 of the ’074 patent, which recites: “The method of claim 1, further comprising depositing at least one antireflective layer, and/or a low reflective index layer forming a good internal mirror on a back of the solar cell”. The manufacture of Canadian Solar’s TOPCon solar cells includes depositing at least one antireflective layer, a silicon nitride antireflective coating (the blue “ $\text{SiN}_x\text{:H}$ ” layer in the image below), on the back of the solar cell. The antireflective layer is used to increase absorption, and

minimize reflection, of light energy that hits the solar cell from the back (because the device is bifacial and accepts light from both the front and back sides of the device). Silicon nitride has a refractive index (a measurement of how much light bends when entering a material) well below 3.0 and therefore forms a good internal mirror on the inside surface of the antireflective layer, such that light that passes through the solar cell from the front is reflected by the antireflective layer back into the cell so as to excite additional electrons. In this way, the antireflective layer is akin to a one-way mirror allowing light from the back side to pass through, while reflecting light from the front side back into the cell.



83. Canadian Solar also infringes Claim 4 of the '074 Patent, which recites: "The method of claim 1, wherein the thermal treatment results in perforation of the at least one interface passivation layer to allow carrier transport therethrough": The amount of phosphorus diffusion into the silicon substrate, as reflected in the graph above, indicates that the Canadian Solar TOPCon solar cell exhibits perforation of the interface passivation layer (the "SiO_x" layer)

from the heat treatment, which allows greater amounts of phosphorus to diffuse through that layer. These perforations allow improved carrier transportation (electron and hole movement) through the interface passivation layer when the cell is in use.

84. Canadian Solar also infringes Claim 8 of the '074 Patent, which recites: “The method of claim 1, wherein the at least one conductive and passivating layer comprises an amorphous, silicon containing compound, and wherein facilitating diffusion of the dopant further comprises facilitating diffusion of dopant atoms into the substrate to provide a high-low junction or a p-n junction”: The manufacture of a Canadian Solar TOPCon solar cell includes making a conductive and passivating layer (the “ n^+ poly-Si”) that comprises an amorphous silicon containing compound. As shown above, facilitating diffusion of the dopant comprises facilitating diffusion of dopant (phosphorus) atoms into the substrate to provide a high-low junction.

85. In violation of 35 U.S.C. § 271(g), Canadian Solar (as detailed above for each Canadian Solar entity) infringes, literally and/or under the doctrine of equivalents, the '074 Patent by importing, and/or causing its subsidiaries and/or affiliates to import, into the United States, Canadian Solar TOPCon solar cells (either as standalone cells and/or as components of modules/panels) that are manufactured overseas using a process (as described above) that is claimed by the '074 Patent; offering to sell, selling and/or using, and/or causing its subsidiaries and/or affiliates to offer to sell, sell and/or use, in the U.S., Canadian Solar TOPCon solar cells (either as standalone cells and/or as components of modules/panels) that are manufactured overseas using a process that is claimed by the '074 Patent; and offering to sell, selling and/or using, and/or causing its subsidiaries and/or affiliates to offer to sell, sell and/or use, within the U.S., including within this judicial district, Canadian Solar products that contain Canadian Solar

TOPCon solar cells that are manufactured overseas using a process that is claimed by the '074 Patent.

86. In violation of 35 U.S.C. § 271(b), Canadian Solar (as detailed above for each Canadian Solar entity) has induced, and continues to induce, its subsidiaries, distributors, retailers, suppliers and/or affiliates to directly infringe, both literally and/or under the doctrine of equivalents, the '074 Patent by inducing said entities to import Canadian Solar TOPCon solar cells (either as standalone cells and/or as components of modules/panels) into, and/or offer to sell, sell and/or use such Canadian Solar TOPCon solar cells in, the U.S. that are manufactured overseas using a process that is claimed by the '074 Patent; and/or import into, and/or offer to sell, sell and/or use in, the U.S., including within this judicial district, Canadian Solar products that contain Canadian Solar TOPCon solar cells that are manufactured overseas using a process that is claimed by the '074 Patent.

87. In violation of 35 U.S.C. § 271(b), Canadian Solar has induced its customers, and continues to induce its customers, to directly infringe, both literally and/or under the doctrine of equivalents, the '074 Patent by inducing said customers to use within the United States Canadian Solar products containing Canadian Solar TOPCon solar cells that are manufactured overseas using a process that is claimed by the '074 Patent, by taking actions that include, but are not limited to, advertising its products and services and their infringing uses, including on Canadian Solar's website; establishing distribution channels for these products in the United States; drafting, distributing and/or making available product specifications, instructions and/or manuals for the products to Canadian Solar's customers and prospective customers; and/or providing technical support, replacement parts and/or other services for the products to Canadian Solar's customers and prospective customers in the United States.

88. Canadian Solar has had actual knowledge of its infringement, and inducement of infringement, of the '074 Patent since at least September 10, 2024, when First Solar notified Canadian Solar of its TOPCon patent portfolio and Canadian Solar's infringement of at least the '074 Patent. Canadian Solar also likely had knowledge of the '074 Patent on or about July 19, 2024, when First Solar issued a press release announcing its ownership of patents related to the manufacturing of TOPCon solar cells and its investigation into several leading solar manufacturers for potential infringement of these patents.

89. As a result of Canadian Solar's infringement, and inducement of infringement, of the '074 Patent, First Solar has been damaged and will continue to suffer damages. First Solar is entitled to recover for damages sustained as a result of Canadian Solar's wrongful acts, including lost profits and a reasonable royalty in amounts yet to be determined, and to receive such other and further relief as this Court deems just and proper. First Solar is also entitled to an injunction to prevent Canadian Solar from importing into, and/or using, selling and/or offering to sell in, the United States solar cells that are manufactured using methods claimed by the '074 Patent and/or products that incorporate such solar cells.

90. Canadian Solar's infringement, and inducement of infringement, of the '074 Patent has been, and continues to be, deliberate and willful, and, therefore, this is an exceptional case warranting an award of enhanced damages for up to three times the actual damages awarded and attorneys' fees to First Solar pursuant to 35 U.S.C. §§ 284–285.

91. First Solar makes the preliminary identification of the infringing Canadian Solar TOPCon Products without the benefit of discovery and/or claim construction in this action, and expressly reserves the right to augment, supplement and revise its identifications based on additional information obtained through discovery or otherwise. First Solar anticipates that

discovery will further confirm that Canadian Solar TOPCon solar cells that are manufactured overseas using methods claimed by the '074 Patent, and that products which incorporate such TOPCon solar cells are imported into and/or used, offered for sale and/or sold within, the U.S.

JURY DEMAND

92. First Solar demands a trial by jury on all issues triable as such.

PRAYER FOR RELIEF

WHEREFORE, First Solar respectfully requests that this Court enter judgment for it and against Canadian Solar as follows:

- A. That Canadian Solar has infringed, and continue to infringe, either literally and/or under the doctrine of equivalents, the '074 Patent;
- B. That Canadian Solar has induced others to infringe, and continue to induce others to infringe, either literally and/or under the doctrine of equivalents, the '074 Patent;
- C. That Canadian Solar and its officers, agents, employees and those acting in privity with them, be permanently enjoined from further direct and/or indirect infringement of the '074 Patent;
- D. That Canadian Solar pay damages adequate to compensate First Solar for its infringement, and inducement of infringement, together with interest and costs, arising out of Canadian Solar's past infringement, and past inducement of infringement, of the '074 Patent, Canadian Solar's ongoing infringement, and ongoing inducement of infringement, of the '074 Patent and enhanced damages pursuant to 35 U.S.C. § 284;
- E. That Canadian Solar be ordered to pay pre-judgment and post-judgment interest on the damages assessed;

- F. That Canadian Solar's infringement, and inducement of infringement, is willful and that the damages awarded to First Solar should be enhanced up to three times the actual damages awarded;
- G. That First Solar be awarded damages for its costs, disbursements, expert witness fees and attorneys' fees and costs incurred in prosecuting this action, with interest, including damages for an exceptional case pursuant to 35 U.S.C. § 285 and as otherwise provided by law;
- H. An order requiring Canadian Solar to pay an ongoing royalty to First Solar in an amount to be determined for any continued infringement, and continued inducement of infringement, after the date judgment is entered; and
- I. An award to First Solar of such further relief at law or in equity as the Court deems just and proper.

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