

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

ARIGNA TECHNOLOGY LTD.,
Patent Owner.

IPR2022-00285
Patent 7,049,850 B2

Before GARTH D. BAER, SHARON FENICK, and IFTIKHAR AHMED,
Administrative Patent Judges.

BAER, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Unified Patents, LLC (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claim 7 of U.S. Patent No. 7,049,850 B2 (Ex. 1001, “the ’850 patent”). Arigna Technology Ltd. (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 7. Following institution, Patent Owner filed a Response. Paper 16 (“PO Resp.”). Subsequently, Petitioner filed a Reply to Patent Owner’s Response (Paper 18, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 21, “PO Sur-reply”). On March 24, 2023, we held an oral hearing. A transcript of the hearing is included in the record. Paper 29.

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision issued pursuant to 35 U.S.C. § 318(a). For the reasons we discuss below, we determine that Petitioner has not proven by a preponderance of the evidence that claim 7 of the ’850 patent is unpatentable.

II. BACKGROUND

A. RELATED MATTERS

The ’850 patent is at issue in *Arigna Technology Limited v. Bayerische Motoren Werke AG*, No. 2:21-cv-00172 (E.D. Tex.); *Arigna Tech. v. General Motors Company*, No. 2-21-cv-00174 (E.D. Tex.); *Arigna Tech. v. Daimler AG*, No. 2-21-cv-00175 (E.D. Tex.); *Volkswagen Group of America v. Arigna Tech.*, IPR2022-00147; and *BMW of North America, LLC v. Arigna Tech.*, IPR2022-00481. Pet. 1–2; Paper 6, 2.

B. THE ’850 PATENT

The ’850 patent describes a high voltage integrated circuit (HVIC) for driving power devices. Ex. 1001, 5:23–30. Figure 25 is reproduced below.

FIG. 25

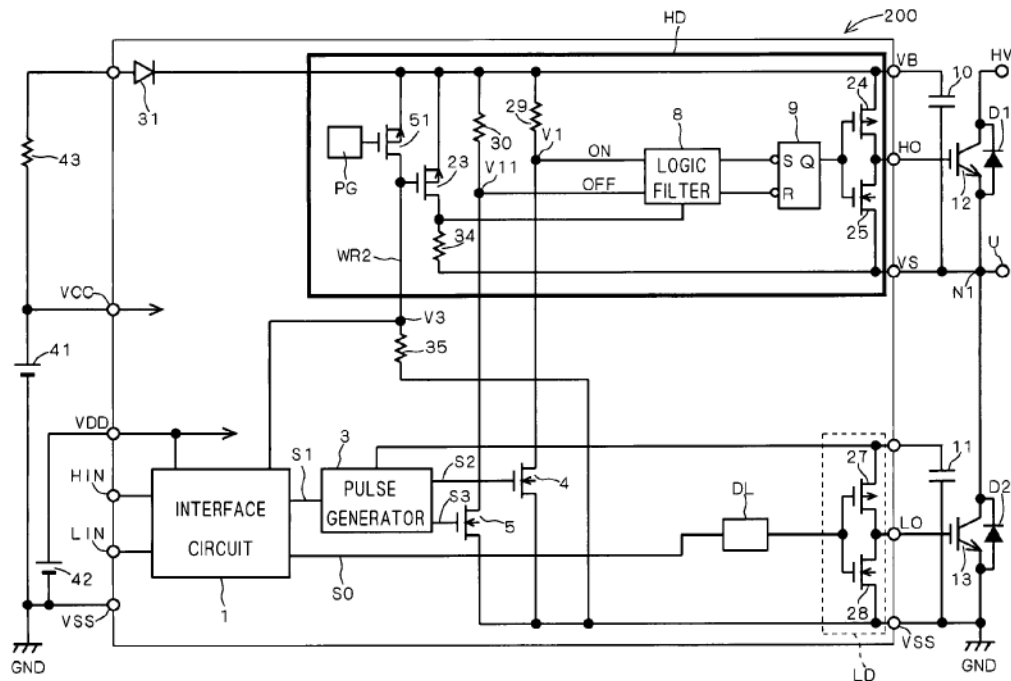


Figure 25 depicts HVIC 200, in which a voltage detector is in a high side power device driving circuit HD. *Id.* at 19:4, 19:10–18, 19:65–67.

Figure 25 includes first power device 12, second power device 13, a high side (HV) power line, and a low side (ground potential (GND)) power line. *Id.* at 5:26–32, 19:7–9. The ’850 patent states that “the potential V3 . . . can be considered substantially equal to the potential VS” and therefore describes “detecting the potential VS by monitoring the potential V3.” *Id.* at 19:44–48. According to the ’850 patent,

since the low side interconnect line WR2 is connected to the low side circuit . . . , its potential is basically close to the ground potential GND. Therefore, in the case where the potential VS at the node N1 in the high side power device driving circuit HD becomes the ground potential, for example, due to ground-fault, the PMOS transistor 23 is brought into an off state, and the drain potential V3 becomes equal to the potential VS at that time, i.e.,

GND, so that an output of the PMOS transistor 23 becomes “LOW”.

On the other hand, when the potential VS at the node N1 becomes the high potential HV, the PMOS transistor 23 is brought into an on state, and the drain potential V3 becomes equal to the potential VS at that time, i.e., GND, so that an output of the PMOS transistor 23 becomes “HIGH”.

Id. at 19:49–64.

C. CHALLENGED CLAIM

Petitioner challenges claim 7, reproduced below:

7. A semiconductor device performing drive control of first and second switching devices connected in series and interposed between a high main power potential and a low main power potential, comprising:

a high potential part including a control part configured to control conduction/non-conduction of a high side switching device which is one of said first and second switching devices;

a reverse level shift part configured to level-shift a signal from said high potential part to supply the level-shifted signal to a low side logic circuit operating on the basis of said low main power potential; and

a voltage detecting device provided in said high potential part and configured to detect a potential at an output line of said reverse level shift part and to supply a logic value based on said potential for said control part, thereby causing said control part to control conduction/non-conduction of said high side switching device.

Ex. 1001, 25:56–26:6.

D. ASSERTED GROUND OF UNPATENTABILITY

Petitioner asserts the following ground of unpatentability. Pet. 4.

Challenged Claim	Basis (35 U.S.C. §) ¹	References
7	103	Majumdar ² , Cowles ³

Petitioner also relies on declarations from Dr. Jacob Baker (Exs. 1003, 1024). Patent Owner relies on a declaration from Dr. Gregory Taylor (Ex. 2022).

III. PRELIMINARY MATTERS

A. LEVEL OF SKILL IN THE ART

Petitioner contends a person of ordinary skill in the art “would have had a bachelor’s degree in electrical engineering, physics, or a related subject, and one to two years of work experience in semiconductor devices,” and that “[l]ess experience can be remedied with additional education.” Pet. 11 (citing Ex. 1003 ¶¶ 56–60). Patent Owner asserts that a skilled artisan would have also had “experience working with HVICs, not just semiconductor devices.” PO Resp. 26 (citing Ex. 2022 ¶¶ 26–27).

Patent Owner’s description is consistent with the prior art and patent specification before us and is supported by credible expert testimony. See *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill). We adopt Patent Owner’s description. However, our patentability analysis would be the same under Petitioner’s formulation.

¹ Because the parties agree that the challenged claim has an effective filing date before March 16, 2013, (Pet. 3; PO Resp. 2), we apply the pre-AIA (America Invents Act) version of § 103. Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011).

² US 6,452,365 B1, Sept. 17, 2002 (Ex. 1005, “Majumdar”).

³ US 6,545,510 B1, Apr. 8, 2003 (Ex. 1006, “Cowles”).

B. CLAIM CONSTRUCTION

Although the parties note several claim constructions from related district court proceedings, neither party asserts that additional claim construction is necessary for our determination whether to institute *inter partes* review. See Pet. 12–13; PO Resp. 35–36. We agree with the parties that we do not need to explicitly construe any terms to determine unpatentability. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. ASSERTED PRIOR ART

1. Majumdar (Ex. 1005)

Majumdar describes a power converter. Ex. 1005, code (54).

Figure 6 is reproduced below.

F I G. 6

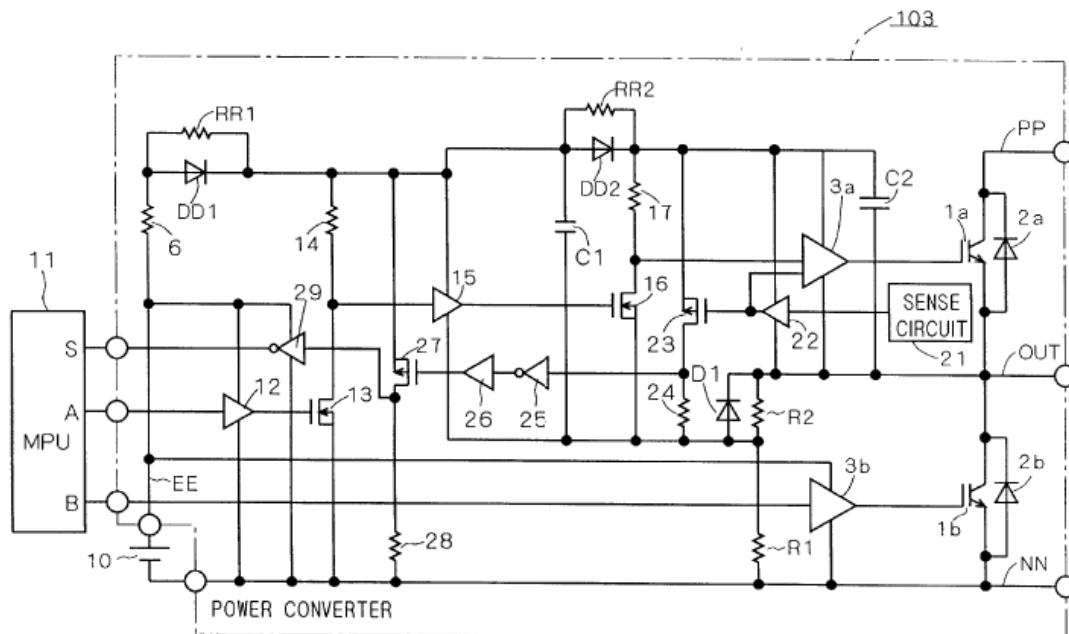


Figure 6 is a circuit diagram of a power converter 103. *Id.* at 6:53. Figure 6 includes power switching elements 1a and 1b, as well as high potential power line PP and low potential power line NN. *Id.* at 8:46–52; *see id.* at 10:54–63. Figure 6 further includes sense circuit 21, microcomputer 11, and buffer 15. *Id.* at 10:62–63; 11:20–21.

2. Cowles (Ex. 1006)

Cowles is titled “Input Buffer and Method for Voltage Level Detection.” Ex. 1006, code (54). Petitioner relies on Cowles for teaching that “input buffers are configured for optimizing voltage detection.” Ex. 1006, 1:17–18; *see* Pet. 18–19, 44–47.

IV. UNPATENTABILITY ANALYSIS

Petitioner asserts claim 7 would have been obvious over Majumdar and Cowles. *See* Pet. 21–58. For the reasons explained below, we find Petitioner has not proven by a preponderance of the evidence that claim 7 would have been obvious over Majumdar and Cowles.

Claim 7 requires “a voltage detecting device . . . configured to detect a potential at an output line of said reverse level shift part.” Petitioner corresponds Majumdar’s switching element 27, resistor 28, switching element 13, and resistor 14 to the claimed reverse level shift part. Pet. 28; Pet. Reply 2–3. Petitioner further explains that its proposed combination teaches the claimed voltage detecting feature because Majumdar discloses that buffer 15 receives the potential at an output line of switching element 13. Pet. 43. Majumdar’s Figure 6, with Petitioner’s annotations, is reproduced below.

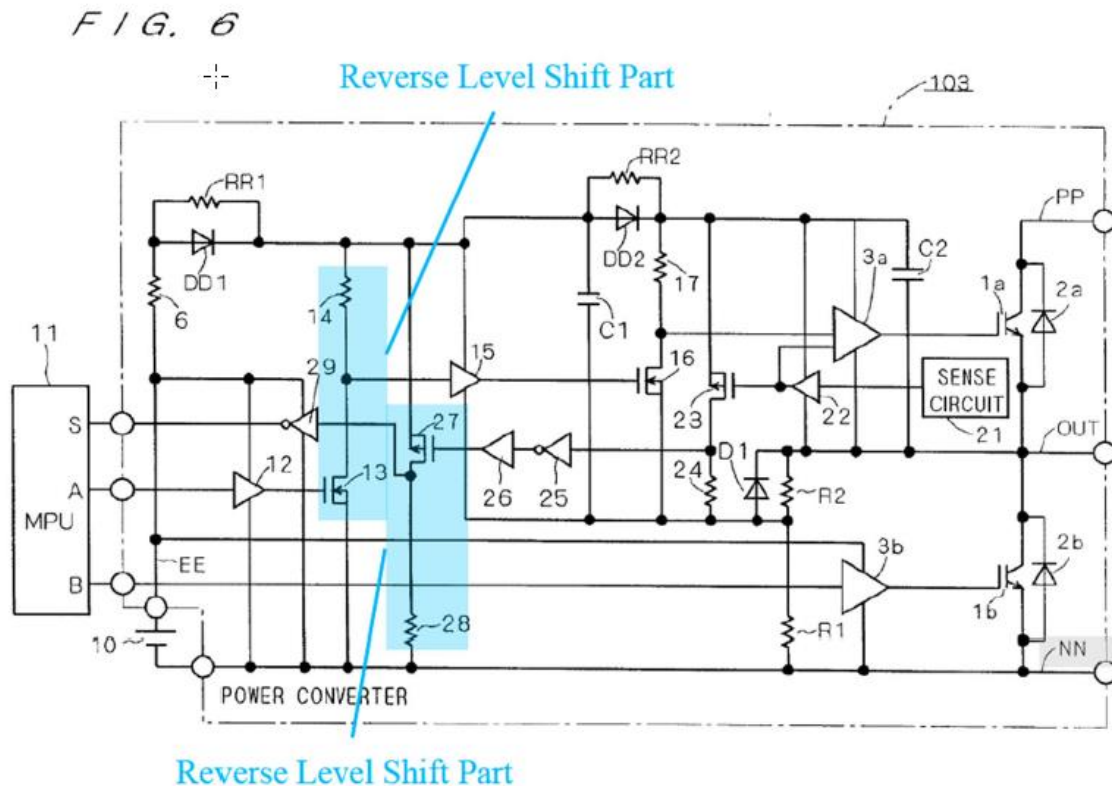


Figure 6 is a circuit diagram showing a power converter. Pet. Reply 3; Ex. 1005, 6:53–54.

Patent Owner argues that Petitioner’s obviousness challenge fails because Majumdar’s “circuit elements 13 and 14 identified in the Petition as being included in the **reverse** level shift circuit reside exclusively in the **forward** level shift circuit.” PO Resp. 41. We agree with Patent Owner’s argument. Petitioner corresponds the output of switching element 13 to the claimed “output line of said reverse level shift part.” Pet. 43. However, as Patent Owner explains, switching element 13 and its output are involved only in *forward* level shifting—from lower potential to higher potential—not in reverse level shifting. See PO Resp. 41; PO Sur-reply 2–8.

Petitioner does not dispute that switching element 13 is only involved in forward level shifting. See Pet. 25 (depicting Majumdar’s forward level

shift signal); *id.* at 30 (depicting Majumdar's reverse level shift signal); see also Pet. Reply 2–6; Paper 29, 10:7–10. Petitioner's argument is based on Majumdar's Figure 1, reproduced below. Pet. 32–34; Pet. Reply 3–4.

F I G. 1

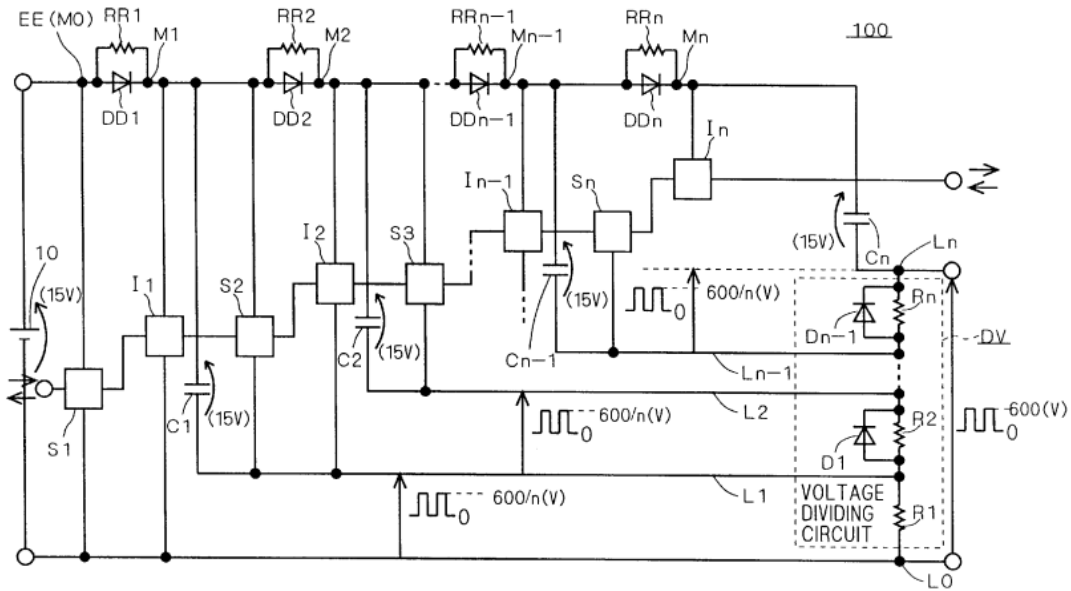


Figure 1 “is a circuit diagram showing a signal level converting circuit.”

Ex. 1005, 6:41–23. Petitioner asserts that Majumdar teaches the disputed feature because Majumdar teaches one circuit, I1, which includes switching element 13, that “is responsible for reverse (as well as forward) level shifting.” Pet. Reply 5; see *id.* at 2–3 (arguing that Mujumdar’s level shift circuit I1 “shifts the signal down and in reverse” and “is also responsible for shifting the signal forwards and up”). According to Petitioner, this single circuit, comprising switching elements 27 and 13, and resistive elements 14 and 28 “collectively constitute[s] a ‘level shift circuit’” that “correspond[s] to the reverse level shift part.” *Id.* at 2. We disagree with this argument.

Majumdar’s Figure 6 is reproduced below with Patent Owner’s annotations.

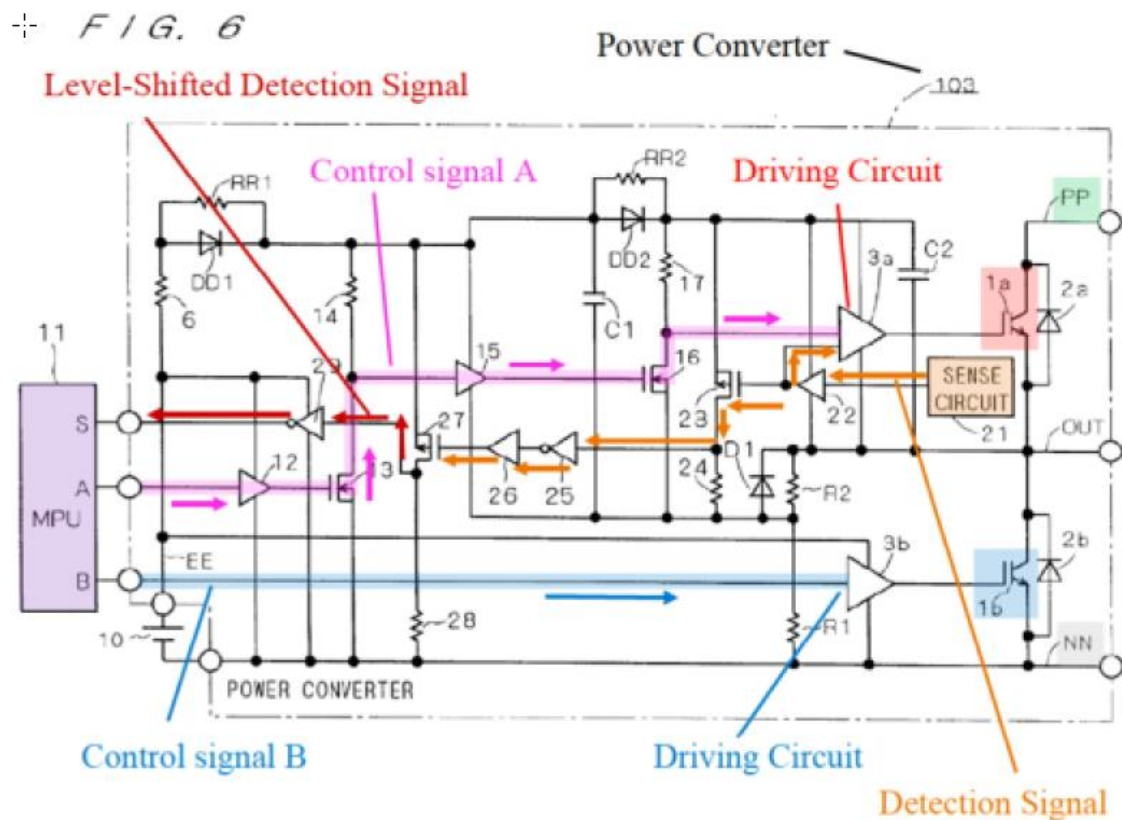


Figure 6 is a circuit diagram showing a power converter. PO Sur-reply 6; Ex. 1005, 6:53–54. Even though switching element 13 is within a larger circuit labeled I1 that performs both forward and reverse level shifting, element 13 itself is only part of the forward level shift part, as shown in the figure above. Ex. 2022 ¶ 69; see PO Resp. 43–49. Switching element 13 does not participate in the reverse level shift path. *See id.* Different elements within I1—namely switching element 27 and resistive element 28—are the only parts of I1 that are used in reverse level shifting. *See id.* ¶ 70. Because switching element 13’s functions are completely independent from reverse level shifting, its output is not “an output line of said reverse level shift part,” as claim 7 recites.

Given this deficiency, we agree with Patent Owner that Majumdar does not teach “detect[ing] a potential at an output line of said reverse level

shift part,” as claim 7 requires. Thus, we find Petitioner has not proven by a preponderance of the evidence that claim 7 would have been obvious over Majumdar and Cowles.

V. CONCLUSION

For the foregoing reasons, we determine Petitioner has not demonstrated by a preponderance of the evidence that claim 7 of the '850 patent is unpatentable. Our conclusion is summarized in the following table.

Claim	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
7	103	Majumdar, Cowles		7

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has not shown claim 7 of the '850 patent is unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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