

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

AIDO LLC)	
)	
Plaintiff,)	
)	Civil Action No. _____
v.)	
)	JURY TRIAL DEMANDED
STMICROELECTRONICS, INC.)	
)	
Defendant.)	
_____)	

COMPLAINT

For its Complaint, Plaintiff Aido LLC ("Aido"), by and through the undersigned counsel, alleges as follows:

THE PARTIES

1. Aido is a Texas limited liability company with a place of business located at 1400 Preston Road, Suite 400, Plano, Texas 75093.
2. Defendant STMicroelectronics, Inc. is a Delaware company, with, upon information and belief, a place of business located at 1900 AM Drive, Suite 102, Quakertown, Pennsylvania 18951.

JURISDICTION AND VENUE

3. This action arises under the Patent Act, 35 U.S.C. § 1 *et seq.*
4. Subject matter jurisdiction is proper in this Court under 28 U.S.C. §§ 1331 and 1338.
5. Upon information and belief, Defendant conducts substantial business in this forum, directly or through intermediaries, including: (i) at least a portion of the infringements alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct and/or deriving substantial revenue from goods and services provided to individuals

in this district.

6. Venue is proper in this district pursuant to § 1400(b).

THE PATENT-IN-SUIT

7. On August 30, 2005, U.S. Patent No. 6,937,090 (the "'090 patent"), entitled "Charge Injection Reduction Technique in Single and Multi-Reference Switching Amplifiers," was duly and lawfully issued by the U.S. Patent and Trademark Office. A true and correct copy of the '785 patent is attached hereto as Exhibit A.

8. Aido is the assignee and owner of the right, title and interest in and to the '090 patent, including the right to assert all causes of action arising under said patent and the right to any remedies for infringement of it.

COUNT I – INFRINGEMENT OF U.S. PATENT NO. 6,937,090

9. Aido repeats and realleges the allegations of paragraphs 1 through 8 as if fully set forth herein.

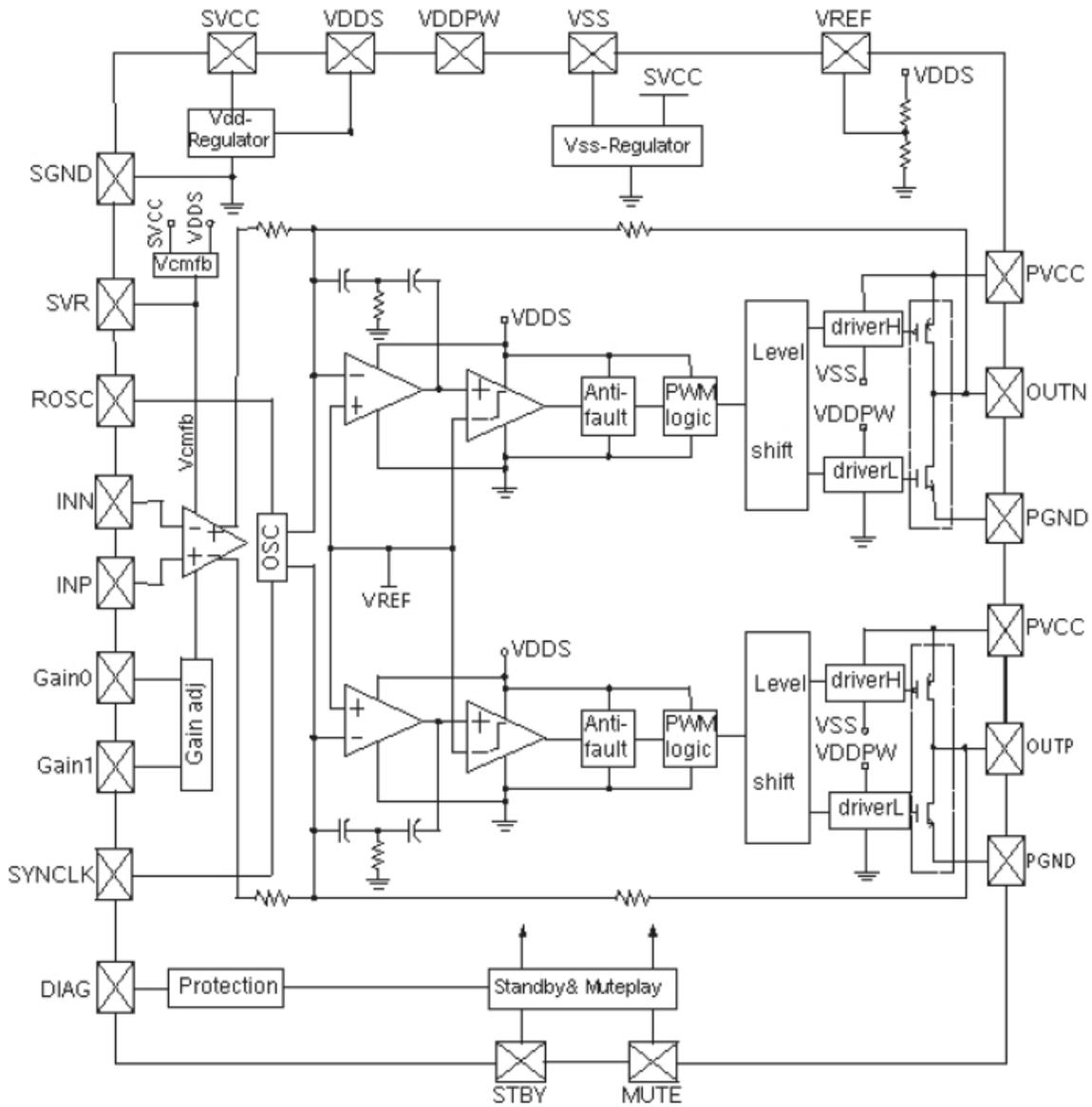
10. Without license or authorization and in violation of 35 U.S.C. § 271(a), Defendant has infringed and continues to infringe at least claim 1 of the '090 patent by making, using, importing, offering for sale, and/or selling a switching amplifier, including, but not limited to, TDA7491HV (the "Accused Device"), because each and every element is met either literally or equivalently.

11. Upon information and belief, Defendant used the Accused Device via its internal use and testing in the United States, directly infringing one or more claims of the '090 patent.

12. More specifically and upon information and belief, the Accused Device is a class-D audio amplifier that powers a speaker (e.g., "load") which is coupled with a reference voltage

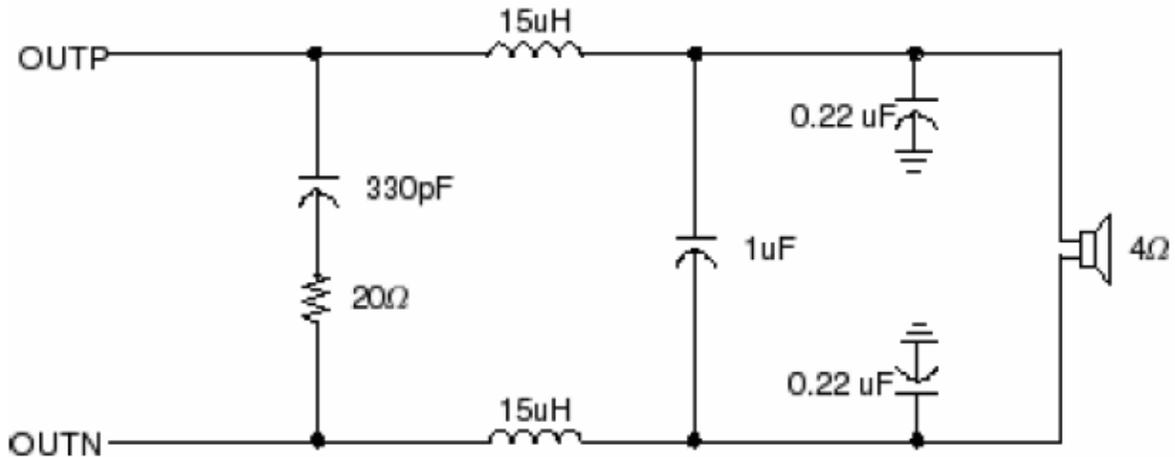
PVCC and PGND. The speaker load is connected through switches which is controlled by an input signal generator such as pulse width modulator ("PWM").

Figure 1. Internal block diagram (showing one channel only)



TDA7491HV Datasheet at 2 ("Datasheet") (available at <https://www.st.com/resource/en/datasheet/tda7491hv.pdf>).

Figure 56. Typical LC filter for an 8 Ω speaker



Id. at 37.

13. The Accused Device uses a PWM modulation scheme (e.g., adding a minimum pulse width) with each output change between the 0 V and supply voltage V_{CC} . The added minimum pulse is equivalent to a differential output of OUTP and OUTN (which are in same phase or "polarity"), that are provided as input to the connected load.

Modulation

The output modulation scheme of the BTL is called unipolar pulse width modulation (PWM).

The differential output voltages change between 0 V and $+V_{CC}$ and between 0 V and $-V_{CC}$.

This is in contrast to the traditional bipolar PWM outputs which change between $+V_{CC}$

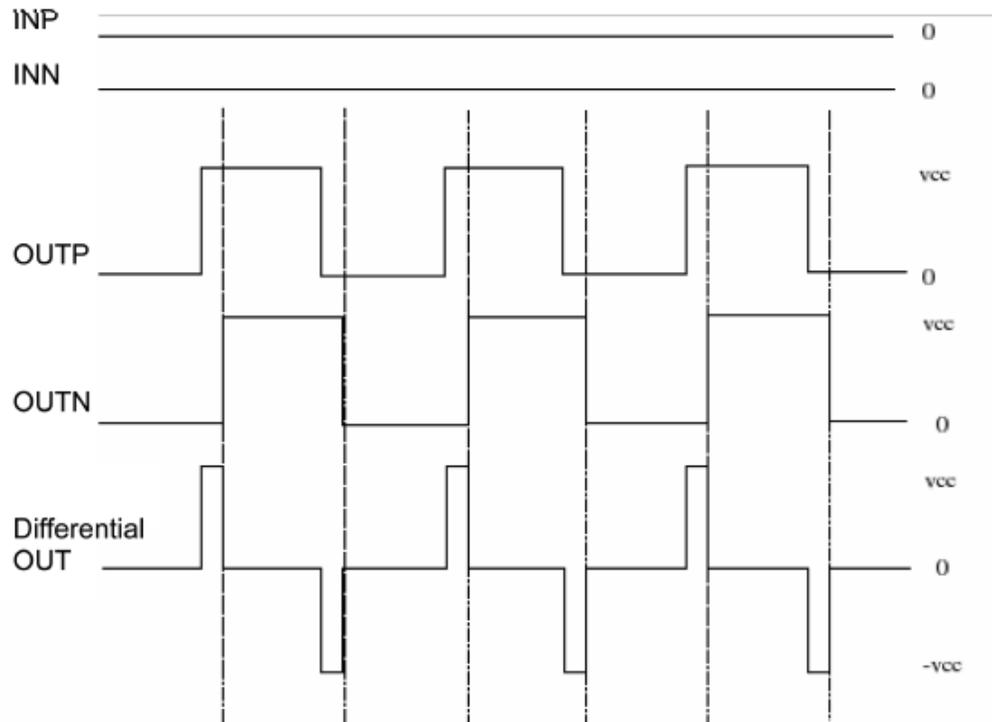
and $-V_{CC}$. An advantage of this scheme is that it effectively doubles the switching frequency of the differential output waveform on the load then reducing the current ripple accordingly. The OUTP and OUTN are in the same phase almost overlapped when the input is zero under this condition, then the switching current is low and the related losses in the load are low.

In practice, a short delay is introduced between these two outputs in order to avoid the BTL output switching simultaneously when the input is zero.

Figure below shows the resulting differential output voltage and current when a positive, zero and negative input signal is applied. The resulting differential voltage on the load has a double frequency with respect to outputs OUTP and OUTN, resulting in reduced current ripple.

Id. at 36.

Figure 55. Unipolar PWM output



Id. at 37.

14. The Accused Device uses differential input to minimize the common mode noise. With the effect of differential input, the switching current is low and the related losses in the load are also low (e.g., "null the common-mode output presented to the load").

Features

- 20 W + 20 W continuous output power:
 - $R_L = 8 \Omega$, THD = 10% at $V_{CC} = 18 \text{ V}$
- Wide-range single-supply operation (5 - 18 V)
- High efficiency ($\eta = 90\%$)
- Four selectable, fixed gain settings of nominally 20 dB, 26 dB, 30 dB and 32 dB
- Differential input minimize common-mode noise
- No 'pop' at turn-on/off
- Standby and mute features
- Short-circuit protection
- Thermal overload protection
- External synchronisation

Id. at 1.

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15. Aido is entitled to recover from Defendant the damages sustained by Plaintiff as a result of Defendant's infringement of the '090 patent in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

JURY DEMAND

Aido hereby demands a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Aido requests that this Court enter judgment against Defendant as follows:

- A. An adjudication that Defendant has infringed the '090 patent;
- B. An award of damages to be paid by Defendant adequate to compensate Aido for Defendant's past infringement of the '090 patent and any continuing or future infringement through the date such judgment is entered, including interest, costs, expenses and an accounting of all infringing acts including, but not limited to, those acts not presented at trial;

C. A declaration that this case is exceptional under 35 U.S.C. § 285, and an award of Aido's reasonable attorneys' fees; and

D. An award to Aido of such further relief at law or in equity as the Court deems just and proper.

Dated: June 17, 2019

STAMOULIS & WEINBLATT LLC

/s/ Richard C. Weinblatt

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