
Evaluation board for TDA7803A and TDA7808 power amplifiers

Introduction

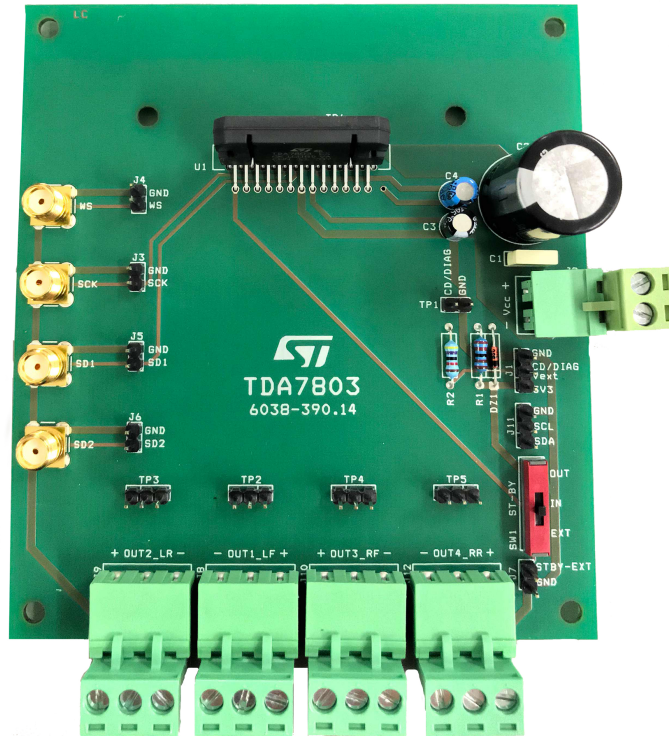
This note provides preliminary information about how to operate the boards offered to evaluate two components in FW27 package: TDA7803A and TDA7808.

This document describes how to use the evaluation board in order to check devices performance; for any other information and deeper details please refer to the TDA7803A and TDA7808 datasheet (see [Appendix A](#)).

1 Hardware description

1.1 Board description

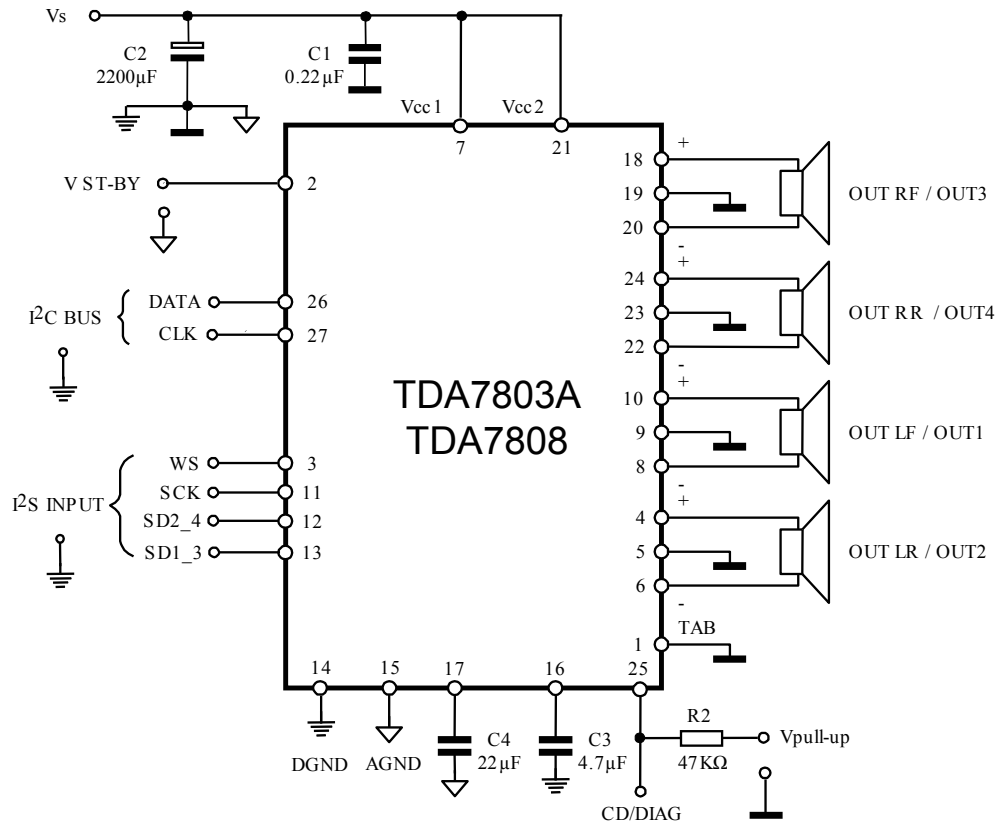
Figure 1. EVAL-TDA7803A board Top view



1.2 Application circuit

The basic application diagram is shown in Figure 2. A key components description and a suggestion about how to choose the right components, are respectively shown in Table 1.

Figure 2. EVAL-TDA7803A application circuit



- Note:
- C3 and C4 capacitors must be SMD ceramic types.
 - GND separations unnecessary if a dedicated ground layer is available at PCBoard level.

Table 1. EVAL-TDA7803A components description

| Component name | Recomm. value | Min/Max value | Purpose | Lower than recomm. | Higher than recomm. | Notes |
|----------------|---------------|----------------------|---|--|-------------------------------|---|
| C1 | 0.1 µF | 0.1 µF/0.47 µF ± 20% | Vbatt HF filter | Danger of high frequency instabilities | Lower HF suppression | low-ESR type (e.g. X7R). Placed very close to the IC |
| C2 | 2200 µF | 1000 µF min | Vbatt LF filte | Higher ripple | Audio performance improvement | Standard electrolytic/ 25 V. Reasonably close to the IC |
| C3 | 4.7 µF | 2.2 µF/10 µF ± 20% | Supply filter of the IC's digital section | instability | dysfunction | low-ESR type (e.g. X7R) |
| C4 | 22 µF | 10 µF/47 µF | Supply filter of the IC's analog section | instability | dysfunction | low-ESR type (e.g. X7R) |
| R2 | 47 KΩ | 10 KΩ/75 KΩ | CD/DIAG pull-up | dysfunction | dysfunction | - |

2 Board operation

Before any operation, please insert the power amplifier in the socket provided with the board.

A heat-sink (not provided) has to be used. Please refer to [Section 3 Power dissipation/Heat-sink](#) to choose the right heat-sink.

A supply voltage (battery voltage or equivalent) on VS-GND connectors, between 6 V and 18 V, is needed to operate the board.

Please refer to datasheet to understand load impedance compatibility of power amplifiers, then connect resistive loads (or speakers) to OUT1, OUT2, OUT3, OUT4 connectors.

I²S format (SDA, CLK, WS lines) has to be used for input audio signals.

I²C bus format (SDA, CLK lines) is necessary for sending any operation instructions to the IC.

HW Mute and Standby should be disabled (both are active low).

The TDA7803A power amplifier can only operate with I²C bus active.

The IC can work in high efficiency mode too (please, refer to datasheet). This operating mode can be selected through the I²C bus.

3 Power dissipation/Heat-sink

The heat-sink size / characteristics largely depend on the operating conditions and consequently power dissipation levels are implied. Dissipation can be higher if sine test tones are used instead of music or audio-simulation signals (e.g. Pink Noise).

Considering the standard car-radio conditions ($V_s = 14\text{ V}$, $R_L = 4\ \Omega$, 4-CH operation), the P_{diss} levels implied are as follows (STD mode / SB-I mode @ $T_{amb} = 70\text{ }^\circ\text{C}$, $T_{j-max} = 150\text{ }^\circ\text{C}$):

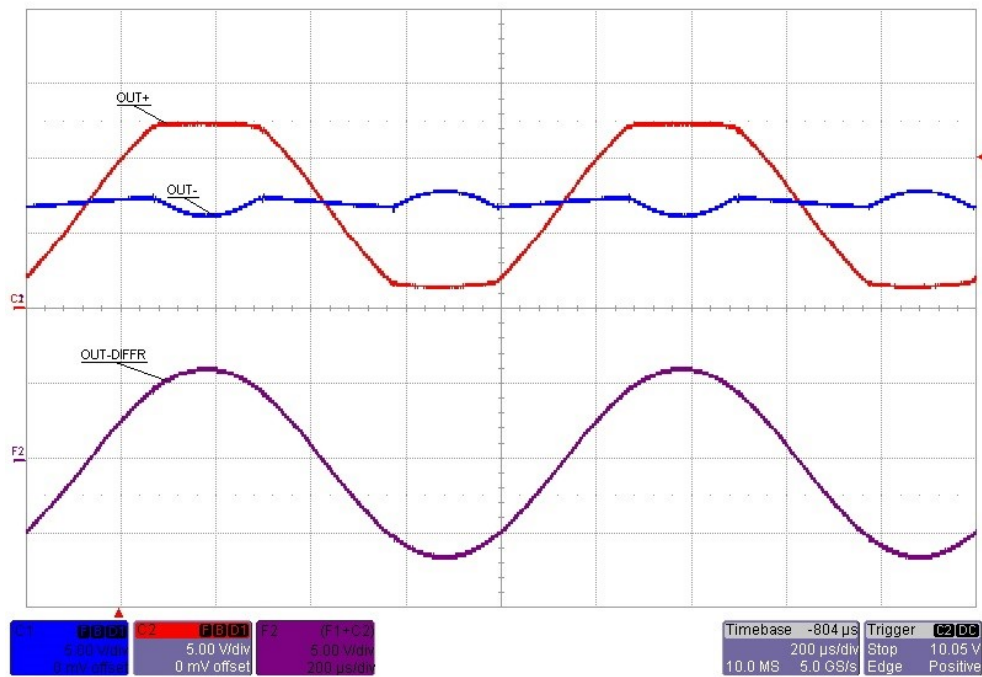
- SINE WAVE: $P_{diss} = 42\text{ W}$ / $38\text{ Rth htsk} = 1.9\text{ }^\circ\text{C/W}$ / $2.1\text{ }^\circ\text{C/W}$
- PINK NOISE: $P_{diss} = 30\text{ W}$ / $18\text{ Rth htsk} = 12.7\text{ }^\circ\text{C/W}$ / $4.4\text{ }^\circ\text{C/W}$

If sine-wave trials (especially with 4-CH operation / $R_L = 2\ \Omega$) are to be run, then the heatsink has to be replaced by a larger / lower- R_{th} one.

4 High frequency output waveforms

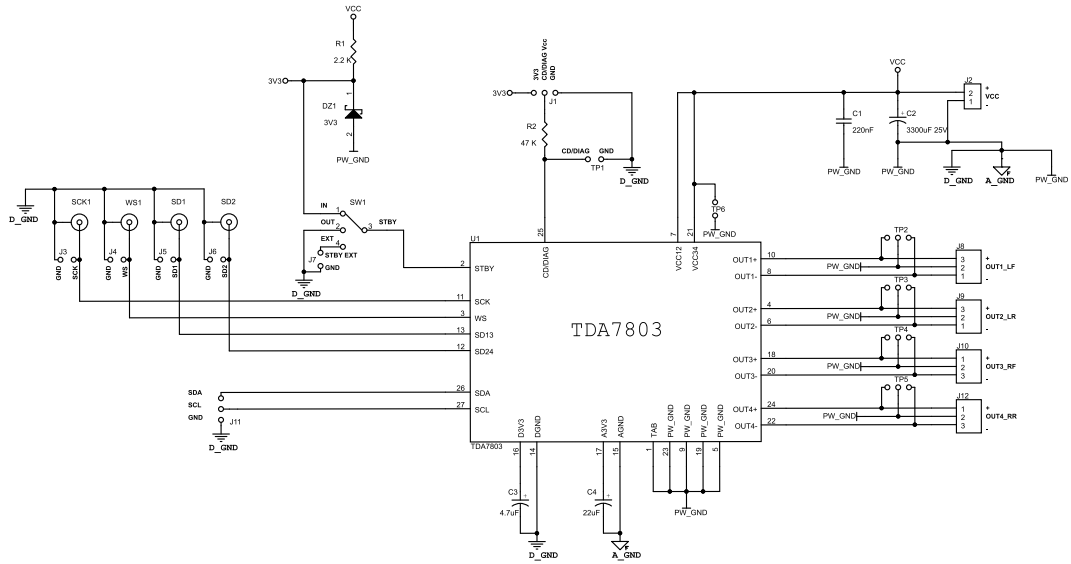
In SB-I mode the speaker signal (OUT-OUT) is the sum of the signals at OUT+ and OUT- pins, which are not sinusoidal (in STD mode they are). Here below it is reported an oscilloscope snapshot, which shows the output waveforms in SB-I mode (@ $P_o > 2.5 \text{ W} / 4 \Omega$).

Figure 3. Output signals in high efficiency mode



5 Demo board schematic

Figure 4. EVAL-TDA7803A Demo board schematic



6 Information on board use

This evaluation board/kit is intended to be used for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and it is not considered by ST Microelectronics (ST) a finished end product fit for general consumer use. People handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing- and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore they may not meet the technical requirements of these directives or other related directives.

Appendix A Reference documents

Table 2. Reference documents

| Doc Name | ID | Title |
|----------|--------|---|
| DS12195 | 030745 | High efficiency digital input automotive quad power amplifier with built-in diagnostics features, 'start stop' compatible |
| DS12230 | 030826 | High efficiency digital input automotive quad power amplifier, 'start stop' compatible |

Revision history

Table 3. Document revision history

| Date | Version | Changes |
|-------------|---------|----------------------|
| 05-Apr-2018 | 1 | Initial release. |
| 05-Aug-2020 | 2 | Removed PSO package. |

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