

## DESCRIPTION

The EV7742DF-00D is the evaluation board for the MP7742, a stereo 15W Class D Audio Amplifier. It is one of MPS' products of fully integrated audio amplifiers which dramatically reduces solution size by integrating the following:

- 250mΩ power MOSFETs
- Startup / Shutdown pop elimination
- Short circuit protection circuits

The MP7742 utilizes a single ended output structure capable of delivering 2x15W into 4Ω speakers. MPS Class D Audio Amplifiers exhibit the high fidelity of a Class A/B amplifier at high efficiency. The circuit is based on the MPS' AAM™ proprietary variable frequency topology that delivers excellent linearity, fast response time and operates on a single power supply.

## ELECTRICAL SPECIFICATIONS

| Parameter      | Symbol   | Value | Units |
|----------------|----------|-------|-------|
| Supply Voltage | $V_{DD}$ | 24    | V     |

## FEATURES

- 15W Output at  $V_{DD} = 24V$  into a 4Ω load
- THD+N = 0.04% at 1W, 8Ω, 1kHz
- 90% Efficiency at 15W and  $V_{DD}=24V$  with 4Ω load
- Low Noise (103μV Typical)
- 9.5V to 28V Operation from a Single Supply

## APPLICATIONS

- Flat Panel TV
- Portable Docking Stations
- Surround Sound DVD Systems
- Televisions
- Multimedia Computers
- Home Stereo Systems

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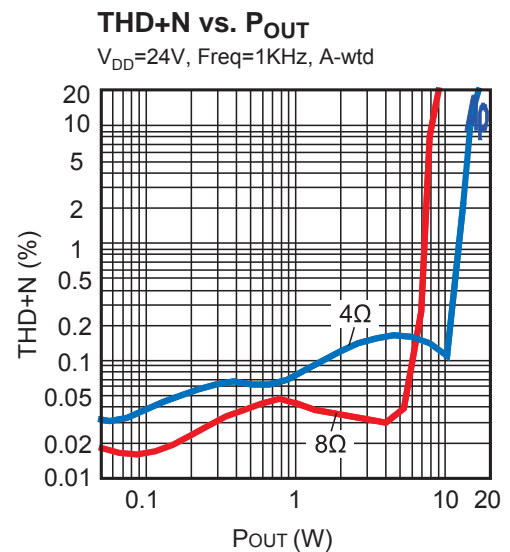
AAM (Analog Adaptive Modulation) is a Trademark of Monolithic Power Systems, Inc.

## EV7742DF-00D EVALUATION BOARD

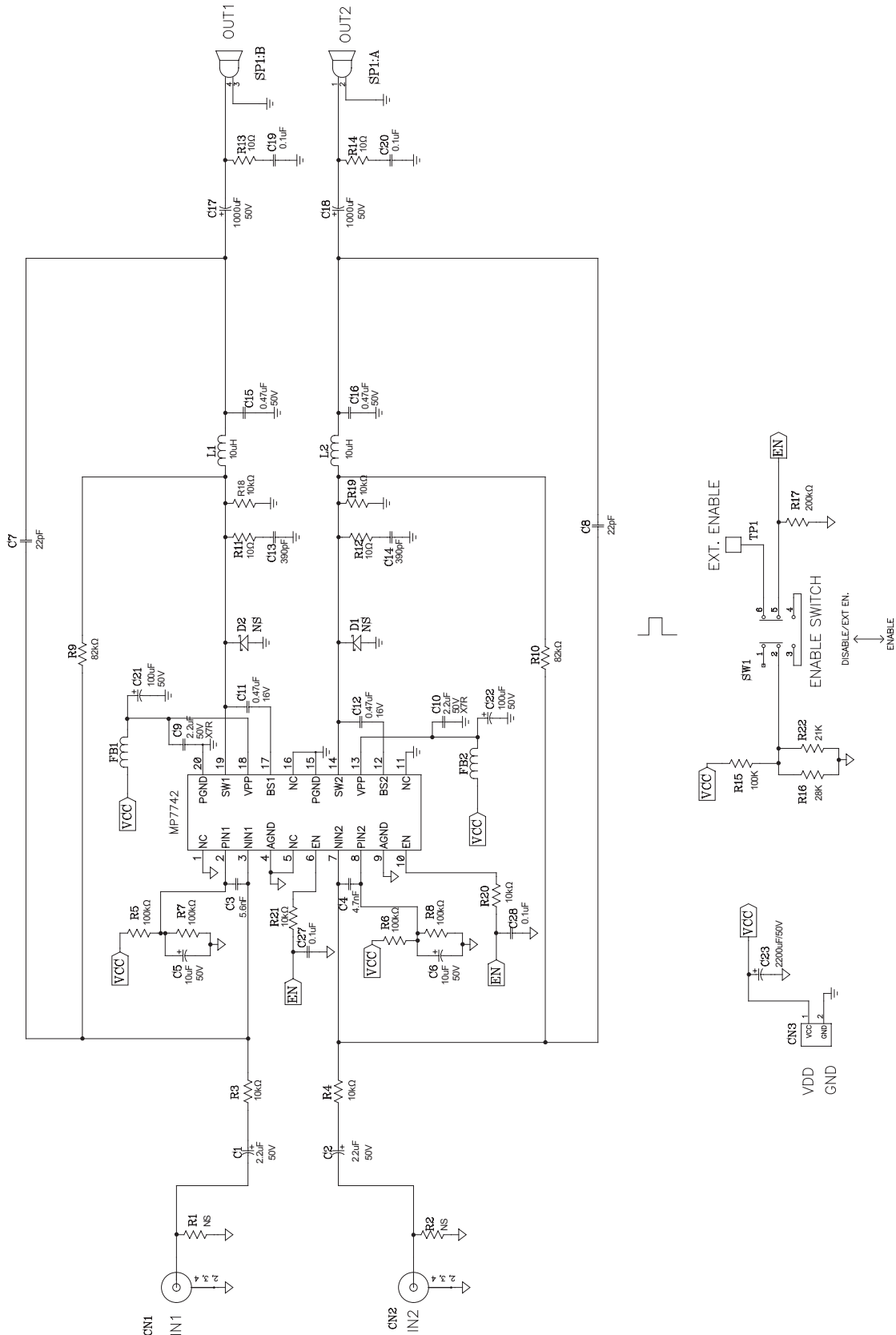


(L x W x H) 3.5" x 2.4" x 1.2"  
8.9cm x 6.1cm x 3.0cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV7742DF-00D | MP7742DF      |



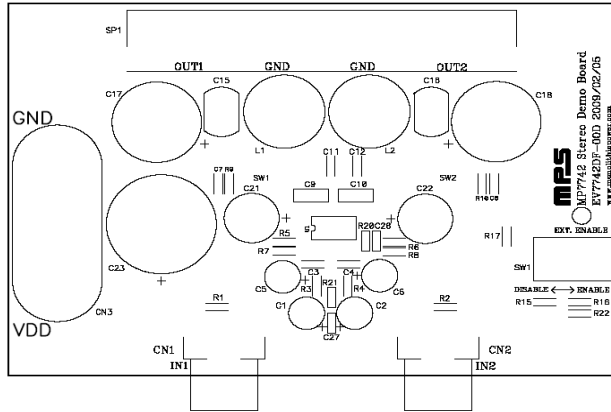
**EVALUATION BOARD SCHEMATIC**



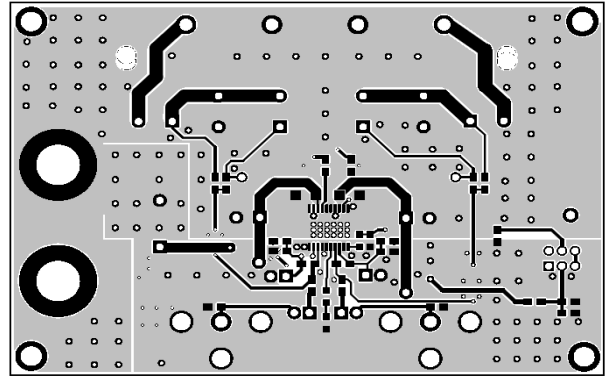
**EV7742DF-00D BILL OF MATERIALS**

| Qty | Ref                        | Value  | Description                 | Package  | Manufacturer | Manufacturer P/N    |
|-----|----------------------------|--------|-----------------------------|----------|--------------|---------------------|
| 2   | C1, C2                     | 2.2uF  | Electrolytic Capacitor, 50V | Radial   | Rubycon      |                     |
| 1   | C3                         | 5.6nF  | Ceramic Capacitor, 50V, X7R | 0603     | muRata       | GRM188R71H562KA01   |
| 1   | C4                         | 4.7nF  | Ceramic Capacitor, 50V, X7R | 0603     | muRata       | GRM188R71H472KA01D  |
| 2   | C5, C6                     | 10u    | Electrolytic Capacitor, 50V | Radial   | Rubycon      |                     |
| 2   | C7, C8                     | 22pF   | Ceramic Capacitor, 50V, C0G | 0603     | muRata       | GRM1885C1H220JA01D  |
| 2   | C9, C10                    | 2.2uF  | Ceramic Capacitor, 50V, X7R | 1206     | muRata       | GRM31CR71H225KA88L  |
| 2   | C11, C12                   | 0.47uF | Ceramic Capacitor, 16V, X7R | 0603     | muRata       | GRM188R71C474KA88D  |
| 2   | C13, C14                   | 390pF  | Ceramic Capacitor, 50V, C0G | 0603     | muRata       | GRM1885C1H3901JA01  |
| 2   | C15, C16                   | 0.47uF | FILM, 50V                   | Radial   | any          |                     |
| 2   | C17,C18                    | 1000uF | Electrolytic Capacitor, 50V | Radial   | Rubycon      |                     |
| 4   | C19, C20, C27, C28         | 0.1uF  | Ceramic Capacitor, 50V, X7R | 0603     | muRata       | GRM188R71H104KA93D  |
| 2   | C21, C22                   | 100uF  | Electrolytic Capacitor, 50V | Radial   | Rubycon      |                     |
| 1   | C23                        | 2200uF | Electrolytic Capacitor, 50V | Radial   | Rubycon      |                     |
| 2   | D1, D2,                    | NS     | Diode Schottky, 40V, 1A     |          |              |                     |
| 2   | FB1, FB2                   |        | Ferrite Bead, 6A            | 1206     | LION         | PB321611-320        |
| 1   | SW1                        |        | DPDT Slide Switch           |          |              |                     |
| 2   | CN1,CN2                    |        | Phone Jack, Female          |          |              |                     |
| 1   | CN3                        |        | Banana Jack Connector       |          |              |                     |
| 1   | TP1                        |        | Test Point/EXT.EN           |          |              |                     |
| 1   | SP1                        |        | Speaker Connector           |          |              |                     |
| 2   | L1, L2                     | 10uH   | Inductor, 3.61A             | Radial   | Toko         | 10RHBP-#A671HN-100L |
| 2   | R1,R2                      | NS     |                             |          |              |                     |
| 6   | R3, R4, R18, R19, R20, R21 | 10kΩ   | Film Res., 1%               | 0603     | Yageo        | RC0603FR-0710KL     |
| 5   | R5, R6, R7, R8, R15        | 100kΩ  | Film Res., 1%               | 0603     | Yageo        | RC0603FR-07100KL    |
| 2   | R9, R10                    | 82.5kΩ | Film Resistor, 1%           | 0603     | Yageo        | RC0603FR-0782K5L    |
| 4   | R11, R12, R13, R14         | 10Ω    | Film Resistor, 5%           | 0603     |              | 0603SAJ0100T5E      |
| 1   | R16                        | 28kΩ   | Film Resistor, 1%           | 0603     | Yageo        | RC0603FR-0728KL     |
| 1   | R17                        | 200kΩ  | Film Resistor, 5%           | 0603     | Yageo        | RC0603JR-07200KL    |
| 1   | R22                        | 21kΩ   | Film Resistor, 1%           | 0603     | Yageo        | RC0603FR-0721KL     |
| 1   | U1                         |        | Class D Audio Amplifier     | TSSOP20F | MPS          | MP7742DF            |

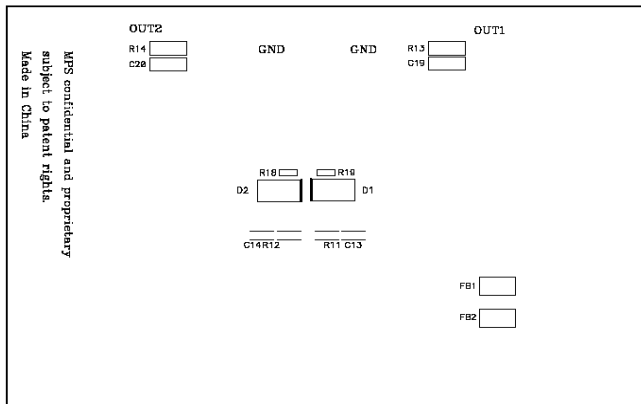
**PRINTED CIRCUIT BOARD LAYOUT**



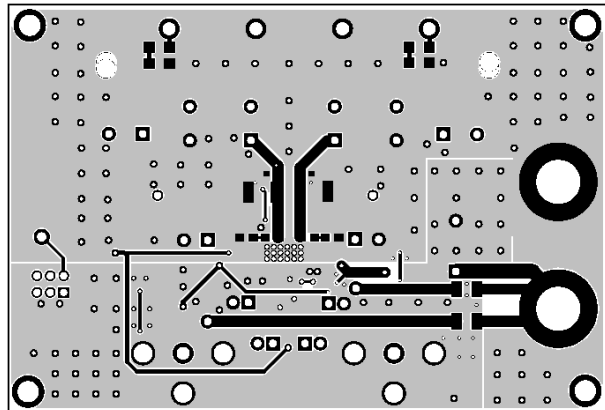
**Figure 1—Top Silk Layer**



**Figure 2—Top Layer**



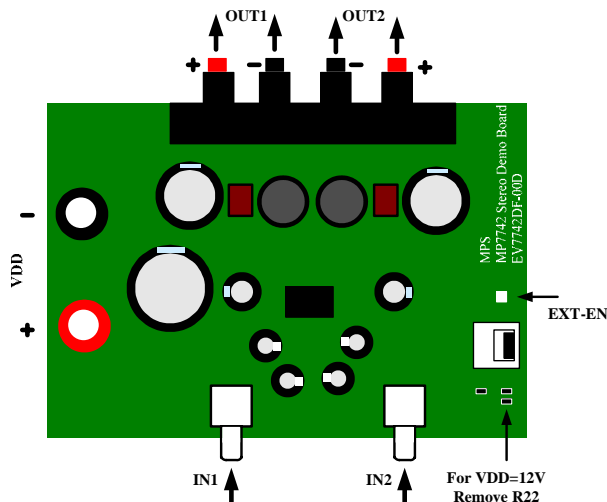
**Figure 3—Bottom Silk Layer**



**Figure 4—Bottom Layer**

## QUICK START GUIDE

This board set up from the factory for 24V operation. To use with a 12V power supply, adjust the components as specified in the 12V Operation Modifications section below. For more information, consult the MP7742 datasheet.



**Figure 5—EV7742DF-00D Connection Diagram**

1. Power Requirements
  - a. Power supply: 9.5V to 28V, 3.5A maximum.
  - b. 0V to 1.3V<sub>RMS</sub> (max) audio signal source.
  - c. Speaker: 4Ω to 8Ω.
2. Setup Condition for 24V Operation
  - a. Adjust the power supply to 24V (do not turn on).
  - b. Connect the outputs to the external speakers.
  - c. Connect the power supply to the V<sub>DD</sub> terminals.
  - d. Set the enable switch to the DISABLE position.
  - e. Connect the audio input signal source to the amplifier inputs (IN1, IN2).
  - f. Turn on the power supply to apply power to the board.
3. 12V Operation Modifications
  - a. Change C3 to 3.3nF and C4 to 2.2nF components.
  - b. Remove R22 from the demo board.
  - c. Adjust the power supply to 12V (do not turn on).
  - d. Do as step b~f specified in Section 2.
4. Music Turn-On Sequence
  - a. Set the enable switch to the ENABLE position.
5. Music Turn-Off Sequence
  - a. Set the enable switch to the DISABLE position.
  - b. Turn off power supply.

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