



The Future of Analog IC Technology®

# EV7721DF-00A

## 10W Stereo Class D

## Single Ended Audio Amplifier EV Board

### DESCRIPTION

The EV7721DF-00A is the evaluation board for the MP7721, a stereo 10W Class D Audio Amplifier. It is one of MPS' productions 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
- Mute / Standby

The MP7721 utilizes a single ended output structure capable of delivering 2x10W into 8Ω speakers. MPS Class D Audio Amplifiers exhibit the high fidelity of a Class A/B amplifier at efficiencies greater than 90%. 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

- 10W Output at  $V_{DD} = 24V$  into a 8Ω load
- THD+N = 0.06% at 1W, 8Ω
- 93% Efficiency at 10W
- Low Noise (190μV Typical)
- 9.5V to 24V Operation from a Single Supply
- Mute/Standby Modes (Sleep)

### APPLICATIONS

- Flat Panel and Projection Televisions
- DVD and Surround Sound Systems
- Flat Panel Monitors
- Multimedia Computers
- Home Stereo Systems

"MPS" and "The Future of Analog IC Technology" are Trademarks of Monolithic Power Systems, Inc.

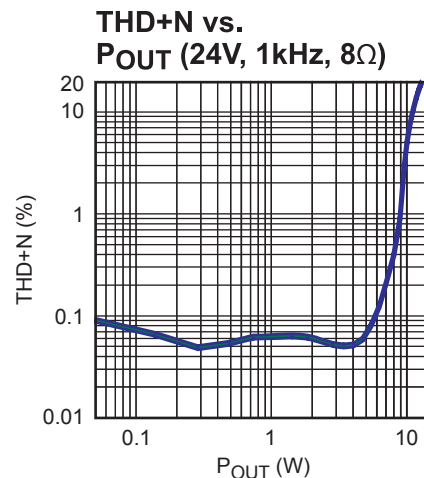
AAM (Analog Adaptive Modulation) is a Trademark of Monolithic Power Systems, Inc.

### EV7721DF-00A EVALUATION BOARD

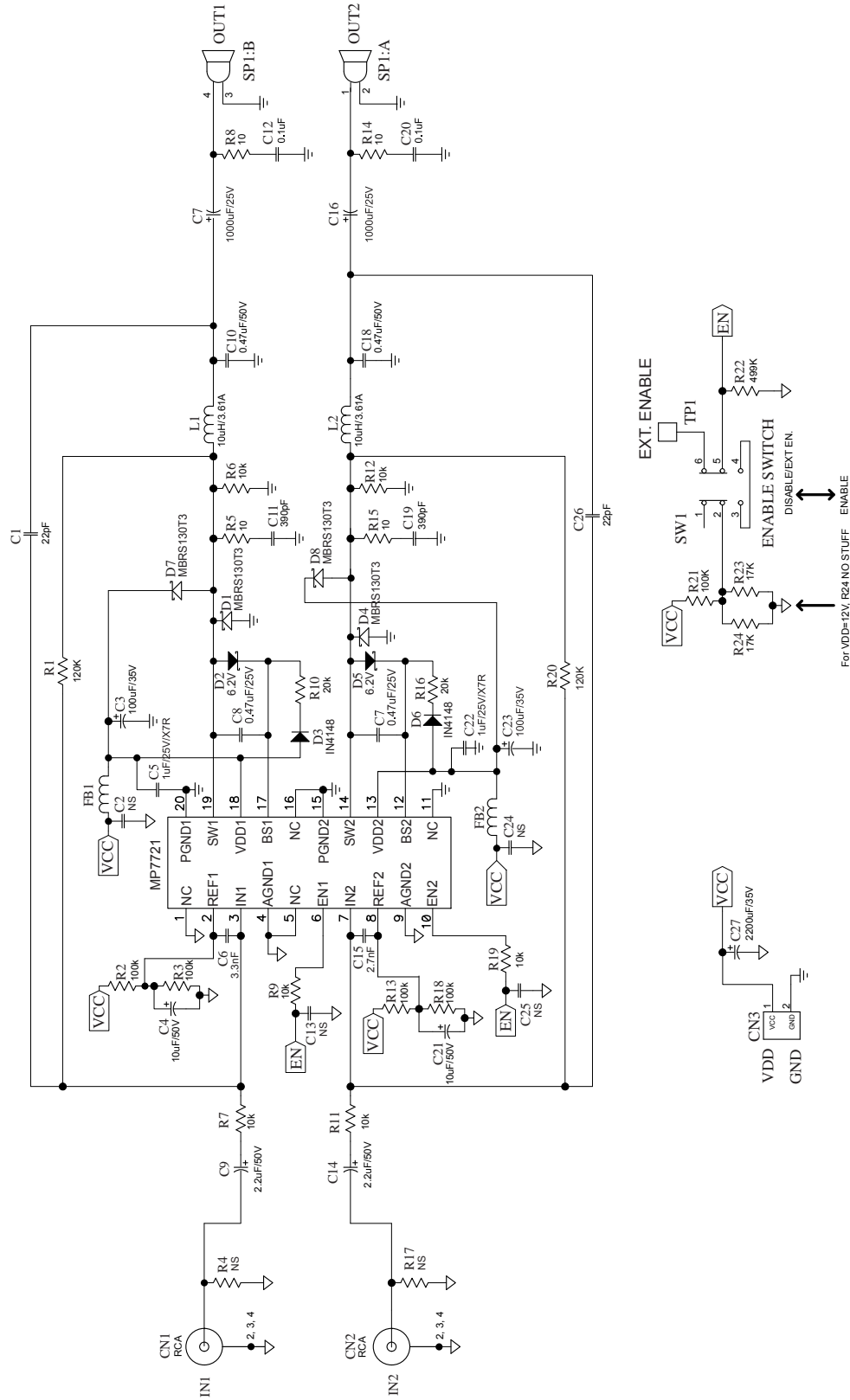


(L x W x H) 3.5" x 2.4" x 1.2"  
8.9cm x 6.1cm x 3.0cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV7721DF-00A | MP7721DF      |



**EVALUATION BOARD SCHEMATIC**



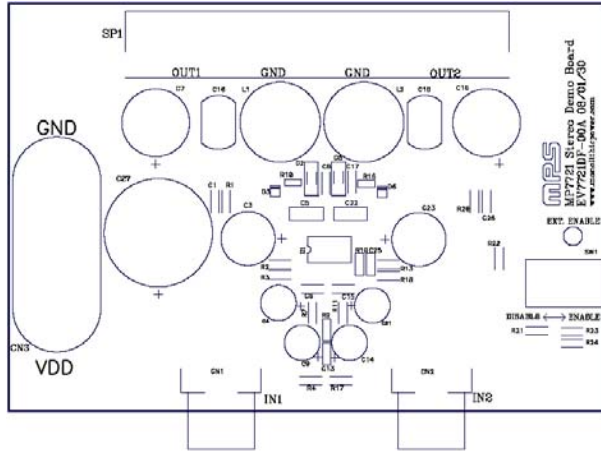
**EV7721DF-00A BILL OF MATERIALS**

| Qty | Ref                       | Value     | Description              | Package | Manufacturer | Part Number        |
|-----|---------------------------|-----------|--------------------------|---------|--------------|--------------------|
| 2   | C1, C26                   | 22pF      | Ceramic Cap., 50V, C0G   | 0603    | muRata       | GRM1885C1H220JA01D |
| 4   | C2, C13, C24, C25         | NS        | Not Stuffed              |         |              |                    |
| 2   | C3, C23                   | 100µF     | Electrolytic Cap., 35V   | Radial  | Rubycon      |                    |
| 2   | C4, C21                   | 10µF      | Electrolytic Cap., 50V   | Radial  | Rubycon      |                    |
| 2   | C5, C22                   | 1µF       | Ceramic Cap., 25V, X7R   | 1206    | TDK          | C3216X7R1H105K     |
| 1   | C6                        | 3.3nF     | Ceramic Cap., 50V, X7R   | 0603    | TDK          | C1608X7R1H332K     |
| 2   | C7, C16                   | 1µF       | Electrolytic Cap., 25V   | Radial  | Rubycon      |                    |
| 2   | C8, C17                   | 0.47µF    | Ceramic Cap., 25V, X7R   | 0805    | muRata       | GRM21BR71E474KA01L |
| 2   | C9, C14                   | 2.2µF     | Electrolytic Cap., 50V   | Radial  | Rubycon      |                    |
| 2   | C10, C18                  | 0.47µF    | FILM, 50V                | Radial  | Any          |                    |
| 2   | C11, C19                  | 390pF     | Ceramic Cap., 50V, C0G   | 0603    | muRata       | GRM1885C1H391JA01D |
| 2   | C12, C20                  | 0.1µF     | Ceramic Cap., 50V, X7R   | 1206    | muRata       | GMR21BR71H104KA01L |
| 1   | C15                       | 2.7nF     | Ceramic Cap., 50V, X7R   | 0603    | TDK          | C1608X7R1H272K     |
| 1   | C27                       | 2200µF    | Electrolytic Cap., 35V   | Radial  | Rubycon      |                    |
| 2   | R10, R16                  | 20kΩ      | Film Res., 1%            | 0603    | Yageo        | RC0603FR-0720KL    |
| 2   | R23, R24                  | 17kΩ      | Film Res., 1%            | 0603    | Yageo        | RC0603FR-0716K9L   |
| 1   | R22                       | 499kΩ     | Film Res., 1%            | 0603    | Yageo        | RC0603FR-07499KL   |
| 2   | R5, R15                   | 10Ω       | Film Res., 1%            | 0603    | Yageo        | RC0603FR-0710RL    |
| 6   | R6, R7, R9, R11, R12, R19 | 10kΩ      | Film Res., 1%            | 0603    |              | RC0603FR-0710KL    |
| 5   | R2, R3, R13, R18, R21     | 100kΩ     | Film Res., 1%            | 0805    | Yageo        | 9C08052A1003FKHFT  |
| 2   | R1, R20                   | 120kΩ     | Film Res., 1%            | 0805    | Yageo        | 9C08052A1203FKHFT  |
| 2   | R4, R17                   | NS        | Not Stuffed              |         |              |                    |
| 2   | R8, R14                   | 10Ω       | Film Res., 1%            | 1206    | Yageo        | 9C12063A10R0FKHFT  |
| 4   | D1, D4, D7, D8            | MBRS130T3 | Diode Schottky, 30V, 1A  | SMB     | Diodes Inc   | B130B              |
| 2   | D3, D6                    | 1N4148    | Diode Switch, 75V, 200mW | SOD-323 | Diodes Inc   | 1N4148WS-7-f       |
| 2   | D2, D5                    | 6.2V      | Diode Zener, 500mW       | SOD-123 | Diodes Inc   | BZT52C6V2          |

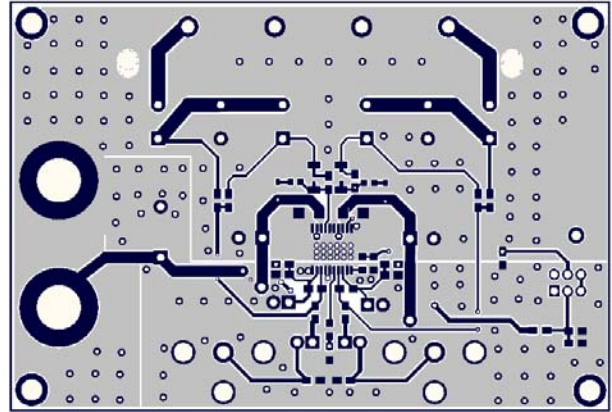
**EV7721DF-00A BILL OF MATERIALS** *(continued)*

| Qty | Ref      | Value | Description                  | Package  | Manufacturer | Part Number         |
|-----|----------|-------|------------------------------|----------|--------------|---------------------|
| 2   | FB1, FB2 |       | Ferrite Bead, 6A             | 1206     | Steward      | HI1206T500R-10      |
| 2   | L1, L2   | 10µH  | Inductor, 3.61A              | Radial   | Toko         | 13RHBP-A7502HY-100M |
| 1   | SP1      |       | Speaker Connector            |          |              |                     |
| 1   | SW1      |       | DPDT Slide Switch<br>12V .1A |          |              |                     |
| 1   | TP1      |       | Test Point/EXT.EN            |          |              |                     |
| 1   | CN3      |       | Banana Jack<br>Connector     |          |              |                     |
| 2   | CN1, CN2 |       | Phono Jack, Female           |          |              |                     |
| 1   | U1       |       | Class-D Audio Amplifier      | TSSOP20F | MPS          | MP7721DF            |

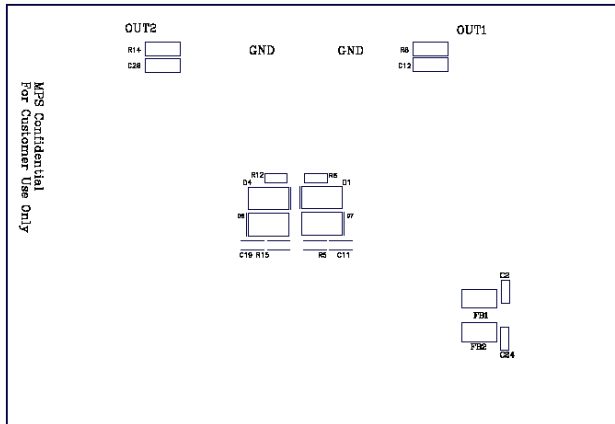
**PRINTED CIRCUIT BOARD LAYOUT**



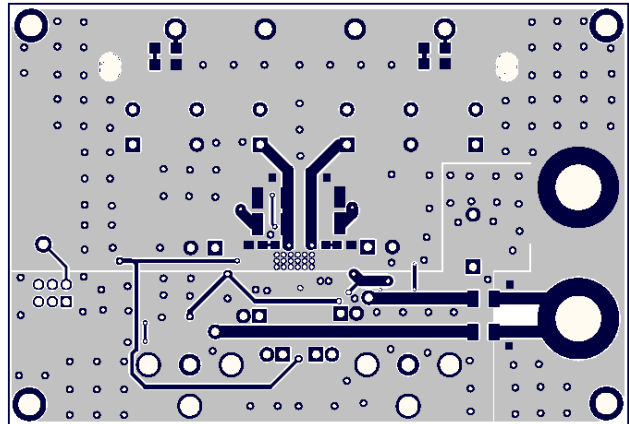
**Figure 1—Top Silk Layer**



**Figure 2—Top Layer**



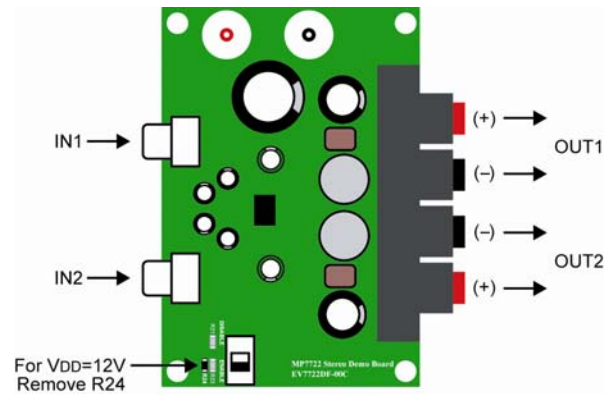
**Figure 3—Bottom Silk Layer**



**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 MP7721 datasheet.



**Figure 5—EV7721DF-00A Connection Diagram**

1. Power Requirements
  - a. Power supply: 9.5V to 24V, 3A maximum.
  - b. 0V to 1V<sub>RMS</sub> (max) audio signal source.
  - c. Speaker: 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 C6 to 2.2nF and C15 to 1.8nF components.
  - b. Remove R24 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.

**NOTICE:** The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.