

DESCRIPTION

The EV7745DF-01A is the evaluation board for the MP7745, a stereo 20W Class D Audio Amplifier. It is one of MPS' products of fully integrated audio amplifiers which dramatically reduce solution size by integrating the following:

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

The MP7745 utilizes a single ended output structure capable of delivering 2x20W 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

- 2 x 20W Output at $V_{DD} = 24V$ into a 4Ω load
- THD+N = 0.05% at 1W, 8Ω, 1kHz
- 93% Efficiency at 19W and $V_{DD}=24V$ with 4Ω load
- Low Noise (103μV Typical)
- 9.5V to 26V 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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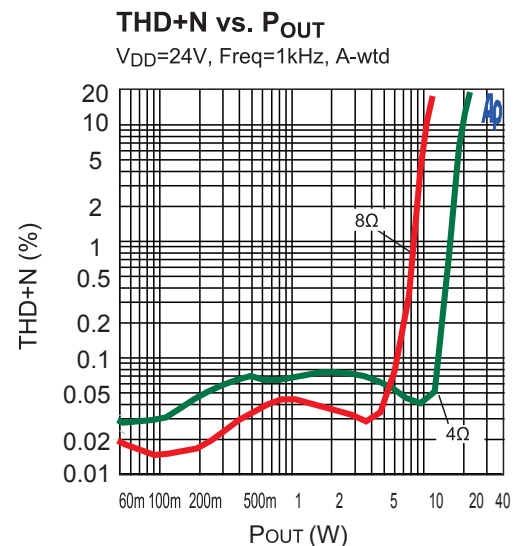
AAM (Analog Adaptive Modulation) is a Trademark of Monolithic Power Systems, Inc.

EV7745DF-01A EVALUATION BOARD

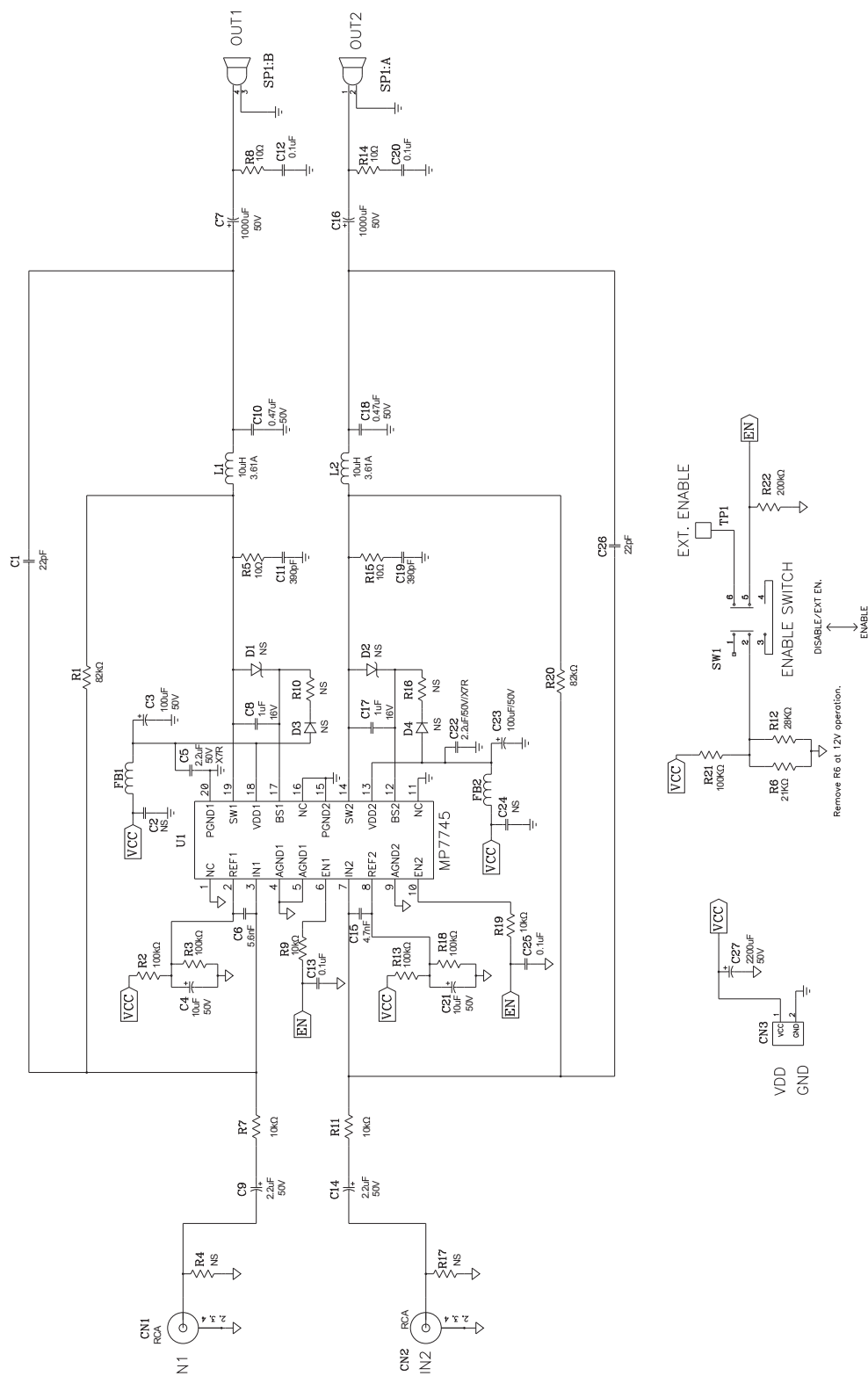


(L x W x H) 3.5" x 2.5" x 1.2"
9.0cm x 6.3cm x 3.0cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV7745DF-01A | MP7745DF |



EVALUATION BOARD SCHEMATIC



EV7745DF-01A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|-----------------------|--------|-----------------------------|---------|--------------|---------------------|
| 2 | C1, C26 | 22pF | Ceramic Capacitor, 50V, C0G | 0603 | muRata | GRM1885C1H220JA01D |
| 2 | C2, C24 | NS | | | | |
| 2 | C3, C23 | 100uF | Electrolytic Cap., 50V | Radial | Rubycon | |
| 2 | C4, C21 | 10uF | Electrolytic Cap., 50V | Radial | Rubycon | |
| 2 | C5, C22 | 2.2uF | Ceramic Capacitor, 50V, X7R | 1206 | muRata | GRM31CR71H225KA88L |
| 1 | C6 | 5.6nF | Ceramic Capacitor, 50V, X7R | 0603 | muRata | GRM188R71H562KA01 |
| 2 | C7, C16 | 1000uF | Electrolytic Cap., 50V | Radial | Rubycon | |
| 2 | C8, C17 | 1uF | Ceramic Capacitor, 16V, X7R | 0603 | muRata | GRM188R71C105KA1 |
| 2 | C9, C14 | 2.2uF | Electrolytic Cap., 50V | Radial | Rubycon | |
| 2 | C10, C18 | 0.47uF | FILM, 50V | Radial | any | |
| 2 | C11, C19 | 390pF | Ceramic Capacitor, 50V, C0G | 0603 | muRata | GRM1885C1H3901JA01D |
| 2 | C12, C20 | 0.1uF | Ceramic Capacitor, 50V, X7R | 0805 | muRata | GRM21BR71H104KA01L |
| 2 | C13, C25 | 0.1uF | Ceramic Capacitor, 50V, X7R | 0603 | muRata | GRM188R71H104KA93D |
| 1 | C15 | 4.7nF | Ceramic Capacitor, 50V, X7R | 0603 | muRata | GRM188R71H472KA01D |
| 1 | C27 | 2200uF | Electrolytic Cap, 50V | Radial | Rubycon | |
| 2 | R1, R20 | 82.5KΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0782K5L |
| 5 | R2, R3, R13, R18, R21 | 100KΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-07100KL |
| 4 | R4, R17, R10, R16 | NS | | | | |
| 2 | R5, R15 | 10Ω | Film Res., 5% | 0603 | | 0603SAJ0100T5E |
| 1 | R6 | 21KΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0721KL |
| 2 | R8, R14 | 10Ω | Film Res., 5% | 0805 | | CR05T05NJ10R |
| 4 | R7, R9, R11, R19 | 10KΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R12 | 28KΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0728KL |
| 1 | R22 | 200KΩ | Film Res., 5% | 0603 | Yageo | RC0603JR-07200KL |
| 2 | D2, D1, D3, D4 | NS | | | | |
| 2 | FB1, FB2 | | Ferrite Bead, 6A | 1206 | LION | PB321611-320 |

EV7745DF-01A BILL OF MATERIALS *(continued)*

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|-------------|-------|----------------------------------|----------|--------------|---------------------|
| 2 | L1, L2 | 10uH | Inductor, 3.61A | Radial | Toko | 10RHBP-#A671HN-100L |
| 1 | U1 | | Class D Audio Amplifier | TSSOP20F | MPS | MP7745DF |
| 1 | SW1 | | Switch slide DPDT 12V .1A L=4 | | | |
| 1 | CN3 | | Banana Jack Connector | | | |
| 2 | CN1, CN2 | | Phono Jack, Female | | | |
| 1 | TP1 | | Test point PC MINI .040"D | | | |
| 1 | SP1 | | Speaker Connector | | | |

PRINTED CIRCUIT BOARD LAYOUT

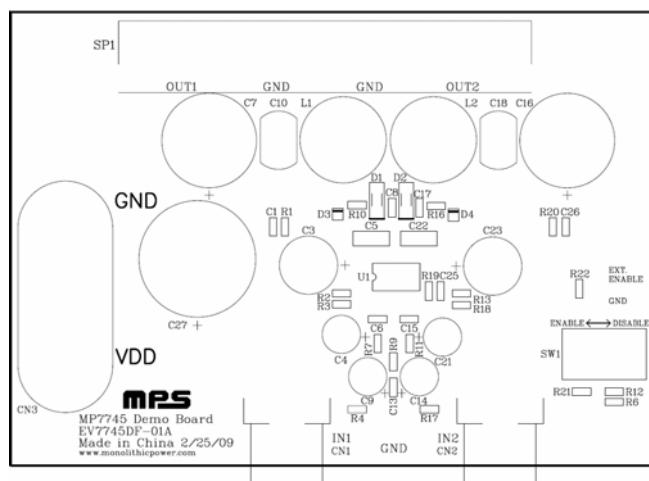


Figure 1—Top Silk Layer

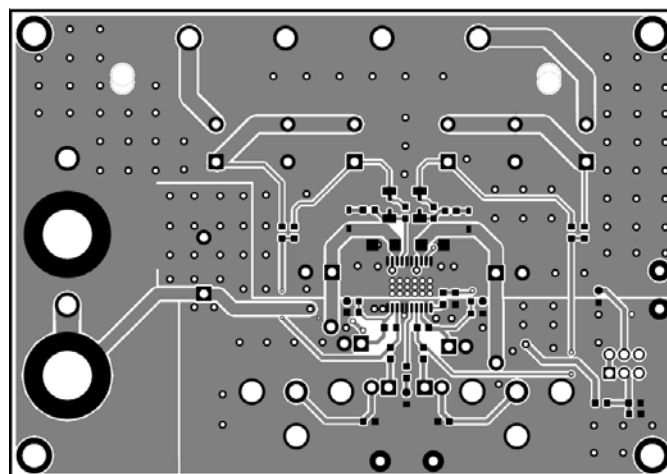


Figure 2—Top Layer

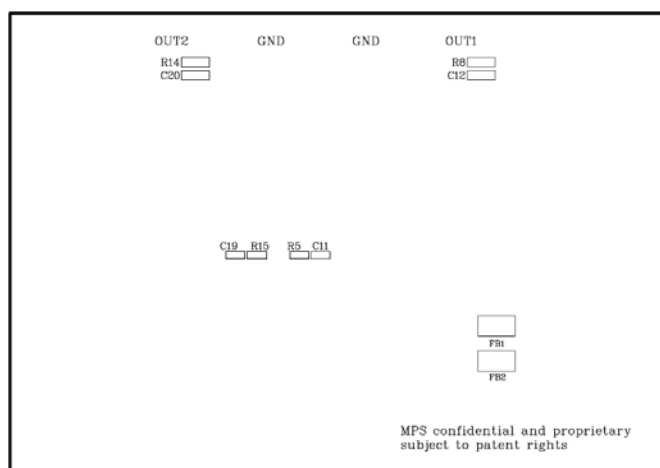


Figure 3—Bottom Silk Layer

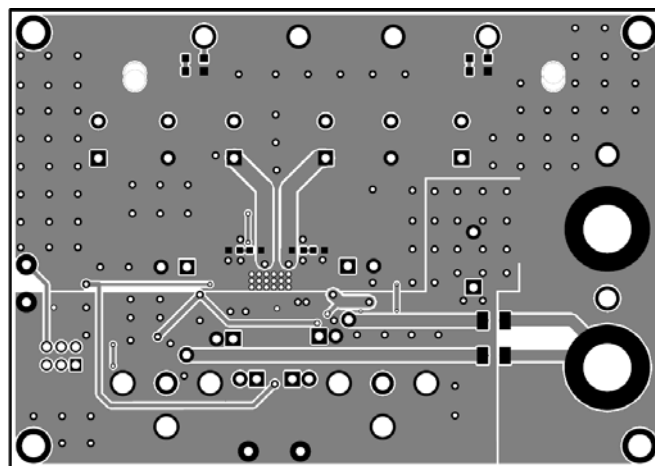


Figure 4—Bottom Layer

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 MP7745 datasheet.

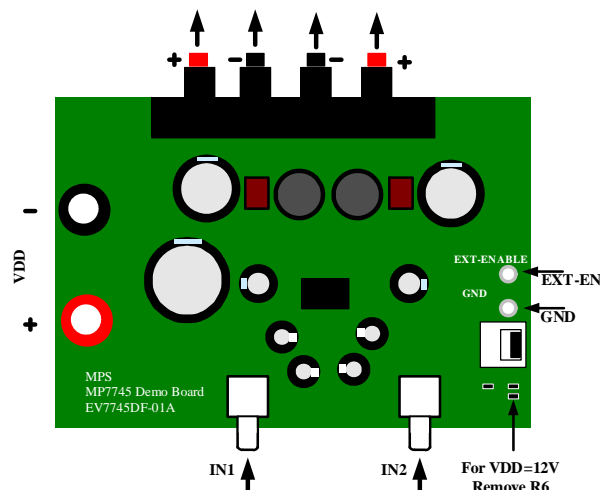


Figure 5—EV7745DF-01A Connection Diagram

1. Power Requirements
 - a. Power supply: 9.5V to 26V, 3.5A maximum.
 - b. 0V to 1.3V_{RMS} (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_{DD} 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 3.3nF and C15 to 2.2nF components.
 - b. Remove R6 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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