

DESCRIPTION

The EV7770-F-00A is the single-ended configuration evaluation board for the MP7770GF, which can deliver 45W per channel into 4Ω speaker under 36V VDD. It is one of MPS' products of fully integrated audio amplifiers which dramatically reduce solution size by integrating:

- 100mΩ power MOSFETs
- Startup/Shutdown pop elimination
- Short-circuit protection circuits

MPS's class D audio amplifiers exhibit the high fidelity of a Class A/B amplifier at higher efficiencies. The circuit is based on the MPS's proprietary variable-frequency topology, which delivers excellent linearity, fast response time and operates from a single power supply.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|-----------------|--------|-------|
| Supply Voltage | V _{DD} | 9.5~36 | V |

FEATURES

- 2 x 45W Output at V_{DD} = 36V into a 4Ω load, 10% THD
- 2 x 23W Output at V_{DD} = 36V into a 8Ω load, 10% THD
- THD+N = 0.03% at 1W, 8Ω, 1kHz
- 95% Efficiency at 23W and V_{DD}=36V with 8Ω load
- 92% Efficiency at 45W and V_{DD}=36V with 4Ω load
- Low Noise (90μV Typical)
- 9.5V to 36V Operation from a Single Supply

APPLICATIONS

- DVD Receiver
- Mini Combo System
- Home Theater Systems
- Surround Sound Systems
- Audio Docking or High-Power Sound Box

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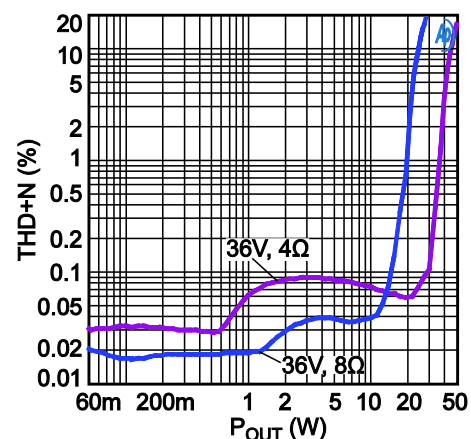
EV7770-F-00A EVALUATION BOARD



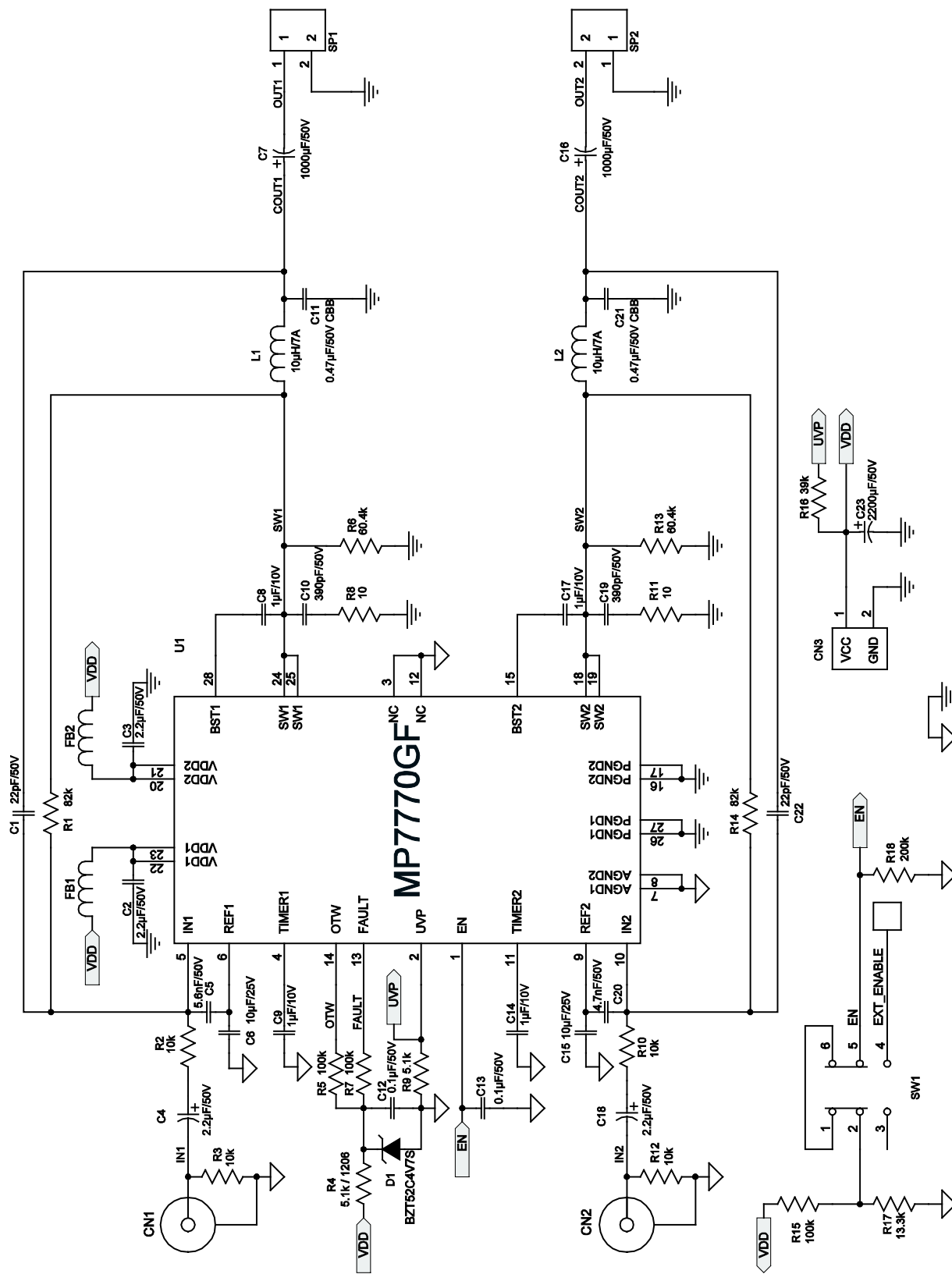
(L x W x H) 3.5" x 2.4" x 1.6"
9.0cm x 6.1cm x 4.0cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV7770-F-00A | MP7770GF |

THD+N vs. P_{OUT}
Signal Frequency=1kHz



EVALUATION BOARD SCHEMATIC



EV7770F-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|------------------------|----------------|--------------------------------|---------|--------------|---------------------|
| 2 | C1, C22 | 22pF | Ceramic Capacitor; 50V;C0G | 0603 | TDK | C1608C0G1H220J |
| 2 | C2, C3 | 2.2μF | Ceramic Capacitor; 50V;X7R | 1206 | muRata | GRM31CR71H225KA88L |
| 2 | C4, C18 | 2.2μF | Electrolytic Capacitor; 50V | DIP | Rubycon | 2.2uF/50V Rubycon |
| 1 | C5 | 5.6nF | Ceramic Capacitor; 50V;X7R | 0603 | muRata | GRM188R71H562KA01 |
| 2 | C6, C15 | 10μF | Ceramic Capacitor; 25V;X5R | 1206 | muRata | GRM31CR61E106KA12L |
| 2 | C7, C16 | 1000μF | Electrolytic Capacitor; 50V | DIP | Rubycon | SK050YXA102MEFC |
| 4 | C8, C9, C14, C17 | 1μF | Ceramic Capacitor; 10V;X7R | 0603 | muRata | GRM188R71A105KA61D |
| 2 | C10, C19 | 390pF | Ceramic Capacitor; 50V;C0G | 0603 | TDK | C1608C0G1H391J |
| 2 | C11, C21 | 0.47μF | Ceramic Capacitor; 50V;CBB | DIP | Panasonic | ECQV1H474JL |
| 2 | C12, C13 | 0.1μF | Ceramic Capacitor; 50V;X7R | 0603 | muRata | GRM188R71H104KA93D |
| 1 | C20 | 4.7nF | Ceramic Capacitor; 50V;X7R | 0603 | TDK | C1608X7R1H472K |
| 1 | C23 | 2200μF | Electrolytic Capacitor; 50V | DIP | Rubycon | SK050YXA222MEFC |
| 2 | R1, R14 | 82k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0782KL |
| 4 | R2, R3, R10, R12 | 10k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R4 | 5.1k | Film Resistor;1%;1/4W | 1206 | Yageo | RC1206FR-075K1L |
| 3 | R5, R7, R15 | 100k | Film Resistor;1%; | 0603 | Yageo | RC0603FR-07100KL |
| 2 | R6, R13 | 60.4k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0760K4L |
| 2 | R8, R11 | 10 | Film Resistor;1% | 0603 | Yageo | RC0603FR-0710RL |
| 1 | R9 | 5.1k | Film Resistor;1% | 0603 | Yageo | RC0603FR-075K1L |
| 1 | R16 | 39k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0739KL |
| 1 | R17 | 13.3k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0713K3L |
| 1 | R18 | 200k | Film Resistor;1% | 0603 | Yageo | RC0603FR-07200KL |
| 2 | FB1, FB2 | 6A | Magnetic Bead;6A | 1206 | muRata | BLM31PG330SN1 |
| 2 | L1, L2 | 10μH | 13m ohm, 7A AUDIO INDUCTOR | DIP | TOKO | DA1476S-1138FS-1001 |
| 1 | D1 | BZT52C 4V7S | Zener Diode; 4.7V;5mA | SOD-323 | Diodes | BZT52C4V7S-7-F |
| 2 | CN1, CN2 | | RCA Connector | DIP | | |

EV7770F-00A BILL OF MATERIALS *(continued)*

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|-----|--------|--------------------------------|------------|--------------|------------------|
| 1 | VDD | | Female Banana Connector, RED | DIP | | |
| 1 | GND | | Female Banana Connector, BLACK | DIP | | |
| 1 | SP1 | | Speaker Connector | DIP | | |
| 1 | SP2 | | Speaker Connector | DIP | | |
| 1 | SW1 | | DPDT Switch | DIP | | |
| 1 | U1 | MP7770 | Class D Audio Amplifier | TSSOP28-EP | MPS | MP7770GF |

PRINTED CIRCUIT BOARD LAYOUT

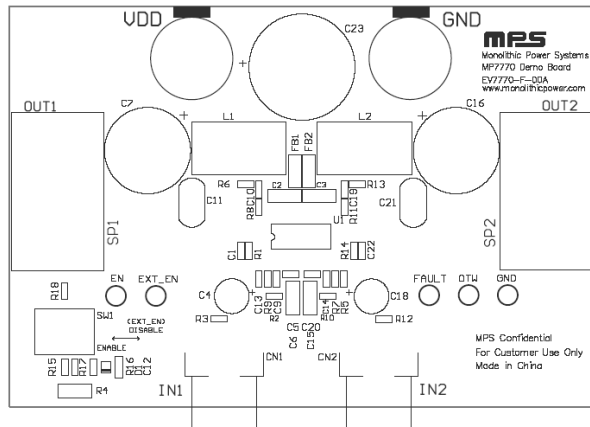


Figure 1—Top Silk Layer

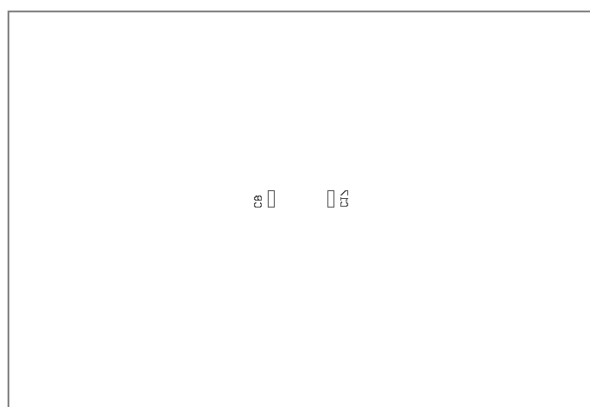


Figure 3—Bottom Silk Layer

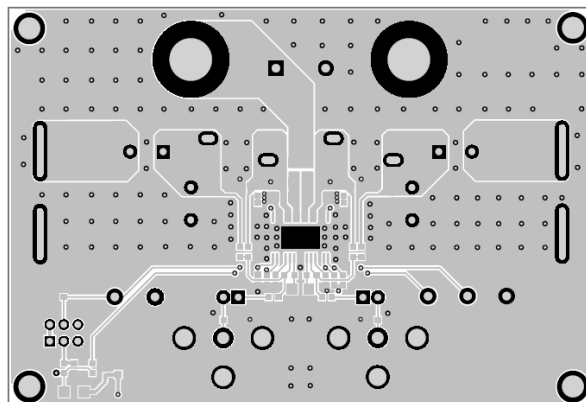


Figure 2—Top Layer

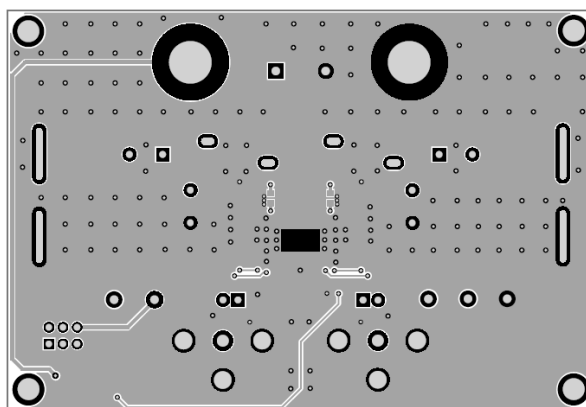


Figure 4—Bottom Layer

QUICK START GUIDE

This evaluation board is set up from the factory for 24V SE operation. To use with 36V (12V) power supply, adjust the components as specified in the 36V (12V) Operation Modifications section below. For more information, consult the MP7770 datasheet for details.

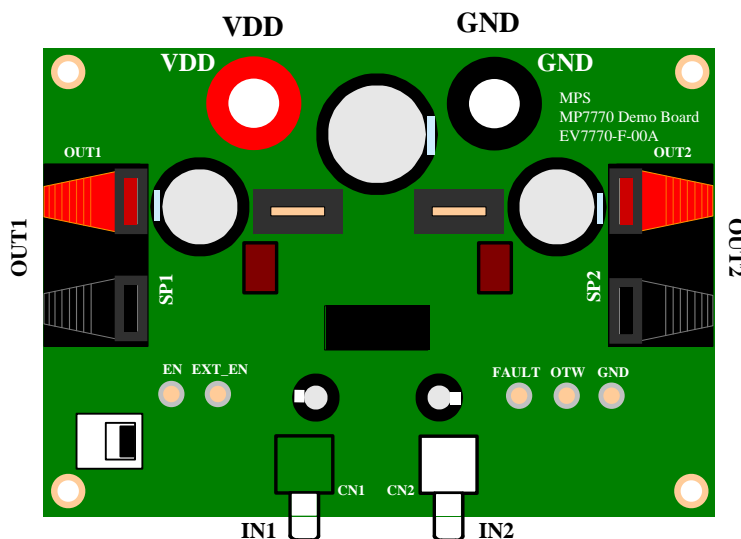


Figure 5—EV7770-F-00A Connection Diagram

1. Power Requirements
 - a. Power supply: 9.5V to 36V, 4A maximum.
 - b. 0V to 2VRMS (max) audio signal source.
 - c. Speaker: typically 3Ω 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 VDD terminals.
 - d. Set the enable switch to the DISABLE position.
 - e. Connect the audio input signal source to the amplifier input (CN1).
 - f. Turn on the power supply.
3. 36V Operation Modifications (minimum resistance load is 3 Ω)
 - a. Refer to MP7770 Data Sheet Table 2 for frequency optimization.
 - b. Change R16 to 64.3k to set 30V VDD shut down voltage.
 - c. Adjust the power supply to 36V (do not turn on).
 - d. Do as step b~f specified in Section 2.
4. 12V Operation Modifications
 - a. Refer to MP7770 Data Sheet Table 2 for frequency optimization.
 - b. Change R16 to 16.9kΩ to set 9.5V VDD shutdown voltage.
 - c. Adjust R15 to 27kΩ so that the EN voltage is high enough @ 12V VDD.
 - d. Adjust the power supply to 12V (do not turn on).
 - e. Do as step b~f specified in Section 2.
5. Music Turn-On Sequence
 - a. Set the enable switch to the ENABLE position.
6. Music Turn-Off Sequence
 - a. Set the enable switch to the DISABLE position.
 - b. Turn off the power supply.

INSTRUCTIONS FOR OTW/FAULT INDICATIONS (ERROR REPORTING):

| PIN | | Error Reporting Description | | |
|-------|-----|-----------------------------|-----------------------------|-------------------------|
| FAULT | OTW | Over Temperature Warning | Over Temperature Protection | Over Current Protection |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 |

Note: For more details, please find the datasheet of MP7770.

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