



EV7770-F-01A

2 x 45W Stereo Single-Ended Class-D Audio Amplifier Evaluation Board

DESCRIPTION

The EV7770-F-01A is a single-ended configuration evaluation board designed to demonstrate the capabilities of the MP7770, an analog Class-D audio amplifier that can deliver 45W per channel to a 4Ω speaker under a 36V input voltage (V_{DD}). It is part of MPS's family of fully integrated audio amplifiers that dramatically reduce solution size by integrating 100mΩ power MOSFETs, start-up/shutdown pop elimination, and short-circuit protection (SCP) circuits.

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

The MP7770 is available in a TSSOP-28EP package.

PERFORMANCE SUMMARY ⁽¹⁾

Specifications are at $T_A = 25^\circ\text{C}$, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{DD}) range		9.5V to 36V

EV7770-F-01A EVALUATION BOARD



LxWxH (9cmx6.1cmx4cm)

Board Number	MPS IC Number
EV7770-F-01A	MP7770GF

QUICK START GUIDE

The EV7770-F-01A evaluation board is configured at the factory for 24V single-ended operation. To use the EV7770-F-01A with a 36V or 12V power supply, adjust the components according to step 5 or step 6, respectively. Refer to the MP7770 datasheet for more details. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Set the power supply between 9.5V to 36V.
2. Set the audio signal source between $0V_{RMS}$ and $2V_{RMS}$ (max)
3. Set the speaker between 3Ω and 8Ω (typically).
4. For 24V operation, follow the steps below:
 - a. Adjust the power supply to 24V, then keep the power supply turned off.
 - b. Connect the outputs to the external speakers.
 - c. Connect the power supply to the VDD terminals.
 - d. Disable the enable switch.
 - e. Connect the audio input signal source to the amplifier input (CN1).
 - f. After making the connections, turn on the power supply.
5. For 36V operation with a 3Ω minimum resistance load, follow the steps below:
 - a. Refer to Table 2 in the MP7770 datasheet to optimize the frequency.
 - b. Adjust R16 to $64.3k\Omega$ to set the 30V input voltage (V_{DD}) shutdown voltage.
 - c. Adjust the power supply to 36V, then keep the power supply turned off.
 - d. Follow steps 4b to 4f.
6. For 12V operation, follow the steps below:
 - a. Refer to Table 2 in the MP7770 datasheet to optimize the frequency.
 - b. Adjust R16 to $16.9k\Omega$ to set the 9.5V V_{DD} shutdown voltage.
 - c. Adjust R15 to $27k\Omega$ to ensure sufficient EN voltage (V_{EN}) at 12V V_{DD} .
 - d. Adjust the power supply to 12V, then keep the power supply turned off.
 - e. Follow steps 4b to 4f.
7. For the music turn-on sequence, enable the enable switch.
8. For the music turn-off sequence, disable the enable switch, then turn off the power supply.

9. Table 1 shows the OTW and FAULT pin settings for error reporting.

Table 1: OTW or FAULT Indication

Pin Setting		Error Reporting Description		
FAULT	OTW	Over-Temperature (OT) Warning	Over-Temperature Protection (OTP)	Over-Current Protection (OCP)
0	0	0	0	0
0	1	1	0	0
1	0	0	0	1
1	1	0	1	0

10. Figure 1 shows the measurement equipment set-up.

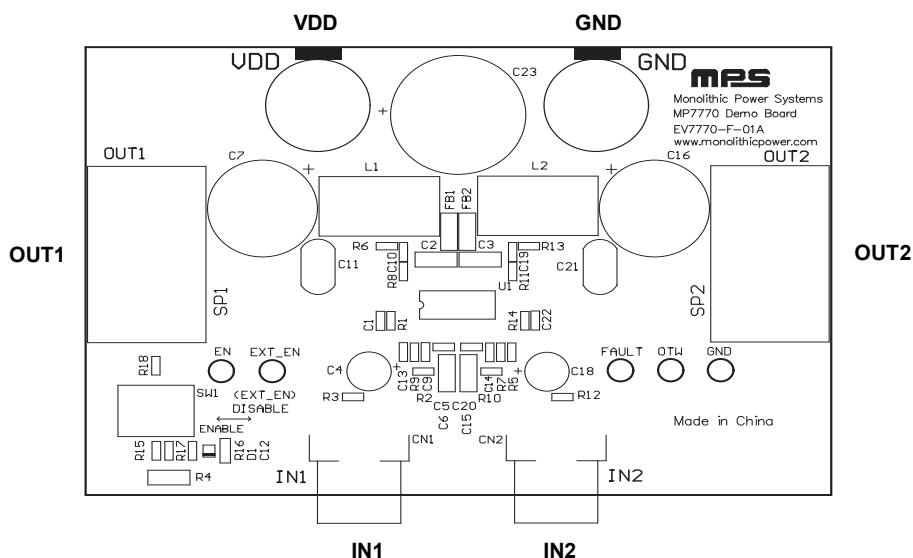


Figure 1: Measurement Equipment Set-Up

EVALUATION BOARD SCHEMATIC

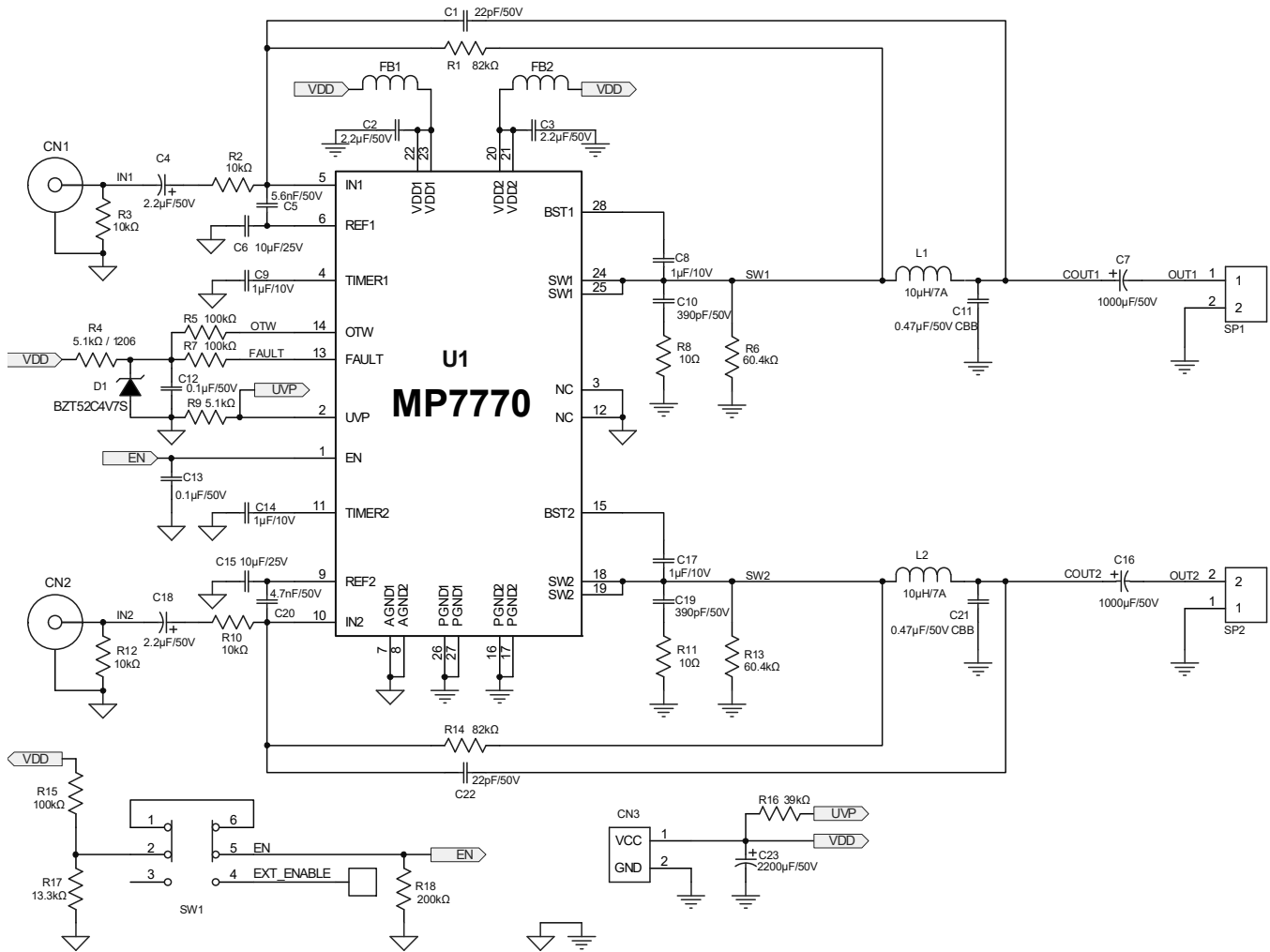


Figure 2: Evaluation Board Schematic

EV7770-F-01A BILL OF MATERIALS

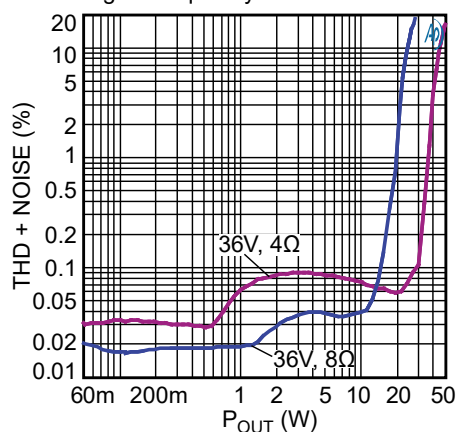
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
2	C1, C22	22pF	Ceramic capacitor, 50V, C0G	0603	TDK	C1608C0G1H220J
2	C2, C3	2.2μF	Ceramic capacitor, 50V, X7R	1206	Murata	GRM31CR71H225KA88L
2	C4, C18	2.2μF	Electrolytic capacitor, 50V	DIP	Rubycon	50YXF2R2MEFC5X11
1	C5	5.6nF	Ceramic capacitor, 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	82kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0782KL
4	R2, R3, R10, R12	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
1	R4	5.1kΩ	Film resistor, 1%, 1/4W	1206	Yageo	RC1206FR-075K1L
3	R5, R7, R15	100kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
2	R6, R13	60.4kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0760K4L
2	R8, R11	10Ω	Film resistor, 1%	0603	Yageo	RC0603FR-0710RL
1	R9	5.1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-075K1L
1	R16	39kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0739KL
1	R17	13.3kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0713K3L
1	R18	200kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07200KL
2	FB1, FB2	6A	Magnetic bead, 6A	1206	Murata	BLM31PG330SN1
2	L1, L2	10μH	Digital audio inductor, 8.5A, 9mΩ	DIP	Wurth	7444011480100
1	D1	5mA	Zener diode, 4.7V	SOD-323	Diodes, Inc.	BZT52C4V7S-7-F
2	CN1, CN2	12mm	RCA connector	DIP	Any	
1	VDD	11mm	Female banana connector, red	DIP	Any	
1	GND	11mm	Female banana connector, black	DIP	Any	
1	SP1	24mm	Speaker connector	DIP	Any	
1	SP2	24mm	Speaker connector	DIP	Any	
1	SW1	9mm	DPDT switch	DIP	Any	
1	U1	MP7770	2 x 45W stereo SE Class-D audio amplifier	TSSOP-28EP	MPS	MP7770GF

EVB TEST RESULTS

THD + Noise vs.

Output Power

Signal frequency = 1kHz



PCB LAYOUT

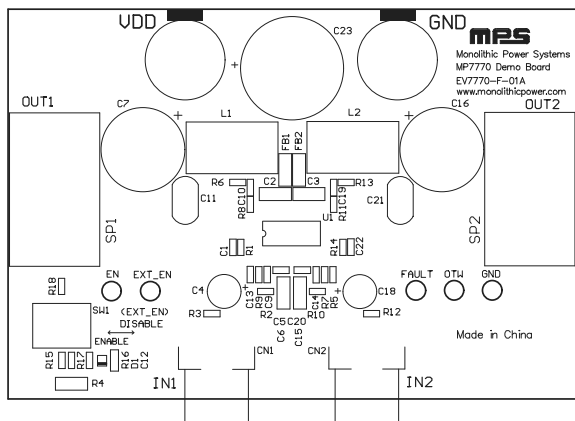


Figure 3: Top Silk

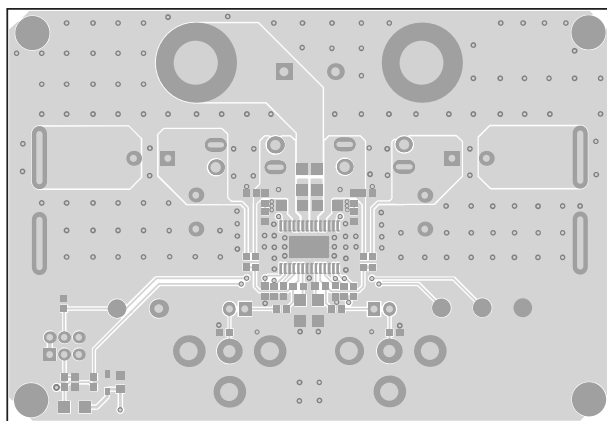


Figure 4: Top Layer

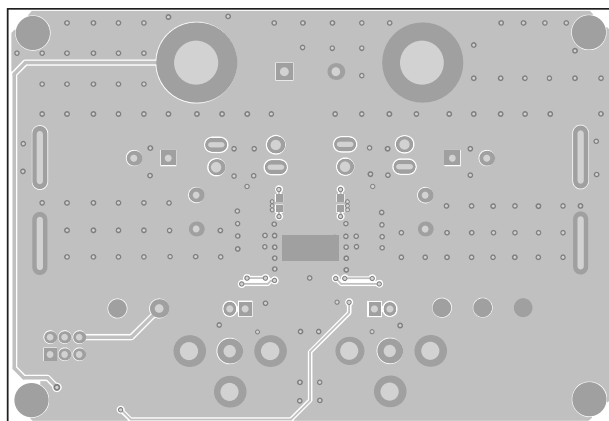


Figure 5: Bottom Layer

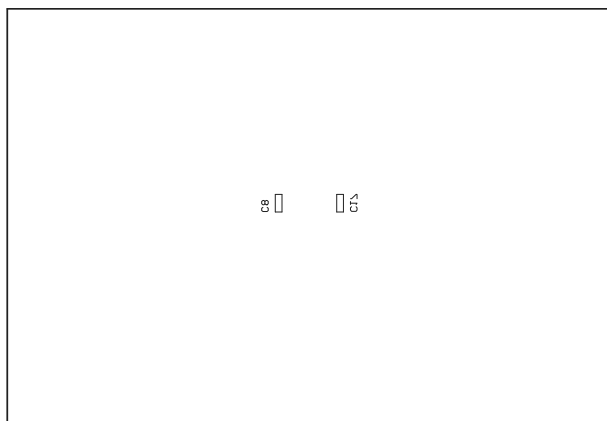


Figure 6: Bottom Silk



REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	4/3/2024	Initial Release	-

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