

General Description

The EV0065 is a Mono Full Bridge Class D Audio Amplifier board configured to drive 4Ω to 8Ω speakers. The board was designed to demonstrate the capabilities of MPS' MP7781. The MP7781 is a 80W Digital Audio Amplifier specially designs for subwoofer application. It is a fully integrated audio amplifier, which dramatically reduces solution size by integrating the following:

- 105mΩ power MOSFETs
- Start up / shut down pop elimination
- Short circuit protection circuits
- Mute / Standby Mode

The MP7781 utilizes a full bridge output structure capable of delivering 80W into 4Ω speakers. As in all other MPS Digital Audio Amplifiers, this device exhibits the high fidelity of a Class A/B amplifier at efficiencies greater than 90%. The MP7781 is packaged in a reverse bend 24 pin SOIC package with an exposed pad to allow for top mounted heat sinks.

Ordering Information

Board Number	MPS IC Part Number
EV0065	MP7781DWR

EV0065 Evaluation Board



(Actual Size: 4"X x 3"Y)

Absolute Maximum Ratings

Supply Voltage (V+)	26V
PGND to AGND	-0.3V to 0.3V
BS1 to SW Voltage	-0.3V to 6V
BS2 to SW Voltage	-0.3V to 6V
Enable Voltage (V _{EN})	-0.3V to 6V
M1, M2 Voltage (V _{M1} , V _{M2})	6V
V _{AI} , V _{BI}	-1V to V+ +1V

Recommended Operating Conditions

Supply Voltage (V+)	7.5V to 24V
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Features

- 80W into 4Ω with 24V Input
- 95% Efficiency at 80W
- Amplifies full audio range with THD+N Typical = 0.3%
- 7.5V to 24V operation
- Full Bridge output drive
- 4 Integrated 105mΩ switches
- Turn On / Turn Off Click and Pop Elimination
- Integrated Short Circuit Protection
- Integrated Thermal shutdown
- Mute Mode

Applications

- Amplified speaker
- Amplified subwoofer
- Multimedia Computers
- Television
- Monitors
- Home Stereo
- DVD and VCD players
- Game machines

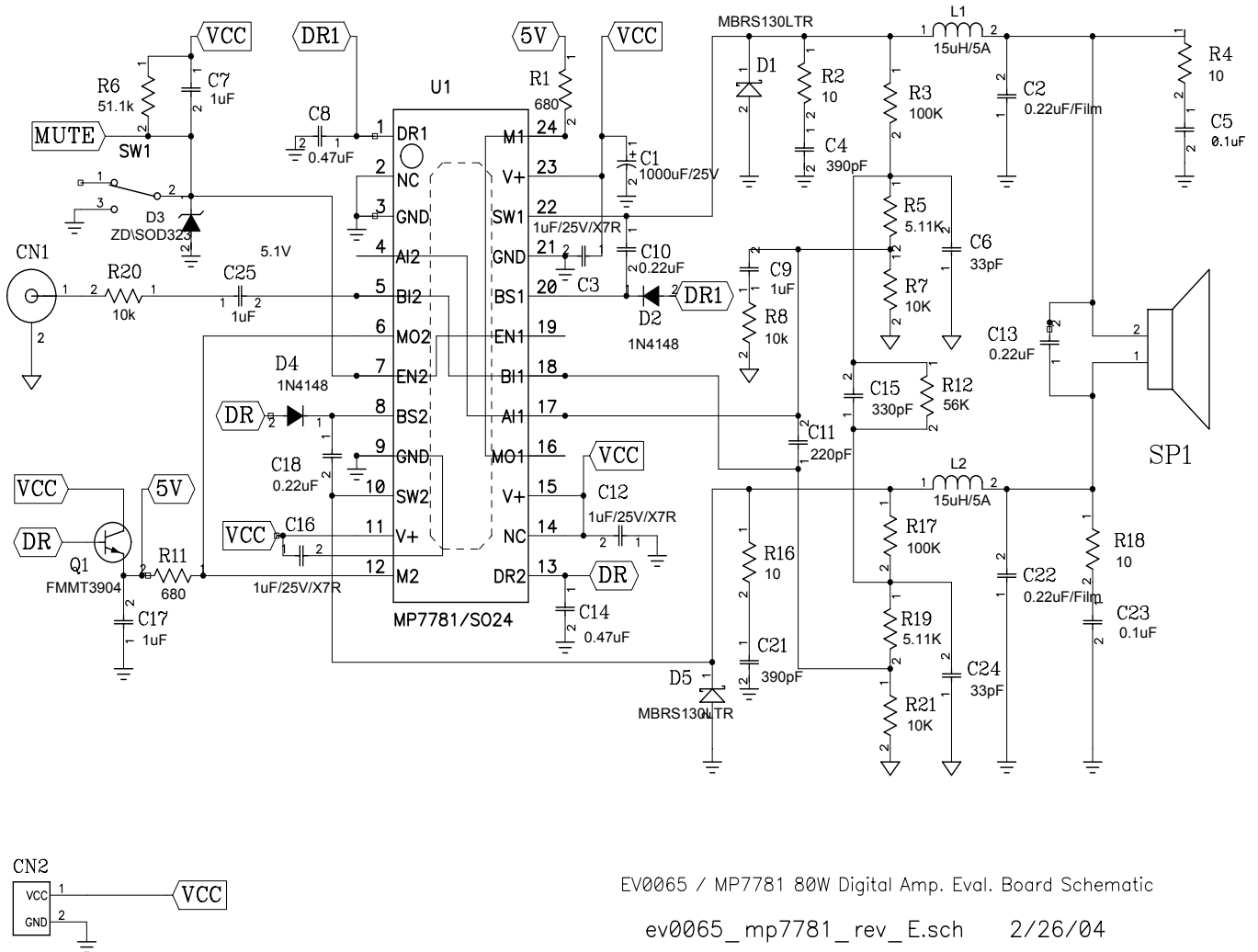


Figure 1: EV0065 Schematic

Table 1: EV0065 Bill of Materials

Component	Value	Description	Package	Manufacturer	Manufacturer Part Number	Qty
U1	80W	Class D Amplifier	SOIC24	MPS	MP7781DWR	1
Q1	40V, 200mA	Transistor, NPN	SOT-23	Zetex Inc	FMMT3904TA	1
L1, L2	15 μ H, 5A	Inductor Power,	Radial	Toko	16RHBP	2
D1, D5	30V, 1A	Diode Schottky	SMB	IRF	MBRS130LTR	2
D2, D4	75V, 400mW	Diode Switch	SOD-123	Diodes Inc	1N4148W-7	2
D3	5.1V, 200mW	Diode Zener	SOD323	Diodes Inc	BZT52C5V1S-7	1
C1	1000 μ F, 25V	Electrolytic Cap, FC	Radial	Panasonic	EEU-FC1E102S	1
C2, C13, C22	0.22 μ F, 50V	Film Cap	Radial	Panasonic	ECQ-V1H224JL	3
C3, C12, C16	1 μ F, 25V	Ceramic Cap, X7R	SM1206	Panasonic	ECJ-3YB1E105K	3
C4, C21	390pF, 50V	Ceramic Cap, X7R	SM0805	Panasonic	ECU-V1H391KBN	2
C5, C23	0.1 μ F, 50V	Ceramic Cap, X7R	SM1206	Panasonic	ECJ-3VB1H104K	2
C6, C15, C24	33pF, 50V	Ceramic Cap, NPO	SM0805	Panasonic	ECJ-2VC1H330J	3
C7, C9, C17, C25	1 μ F, 16V	Ceramic Cap, X5R	SM0805	Panasonic	ECJ-2FB1C105K	4
C8, C14	0.47 μ F, 16V	Ceramic Cap, X7R	SM0805	Panasonic	ECJ-2YB1C474K	2
C10, C18	0.22 μ F, 25V	Ceramic Cap, X7R	SM0805	Panasonic	ECJ-2YB1E224K	2
C11	220pF, 50V	Ceramic Cap, X7R	SM0805	Panasonic	ECU-V1H221KBN	1
R1, R11	680 Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ681V	2
R2, R16	10 Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ100V	2
R3, R17	100K Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ104V	2
R4, R18	10 Ω	Film Res, 5%	SM1206	Panasonic	ERJ-8GEYJ100V	2
R5, R19	5.11K Ω	Film Res, 1%	SM0805	Panasonic	ERJ-6ENF5111V	2
R6	51.1K Ω	Film Res, 1%	SM0805	Panasonic	ERJ-6ENF5112V	1
R7, R8, R20, R21	10K Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ103V	4
R9	1K Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ102V	1
R12	56K Ω	Film Res, 5%	SM0805	Panasonic	ERJ-6GEYJ563V	1
CN1		Connector RCA Jack, RA		CUI Inc	RCJ-041	1
SP1		Speaker Connector, 2-Pin				1
SW1		Switch SPDT, PC Mount		E-Switch Inc	EG1218	1
CN2		Connector Jack Banana				1
					Total	53

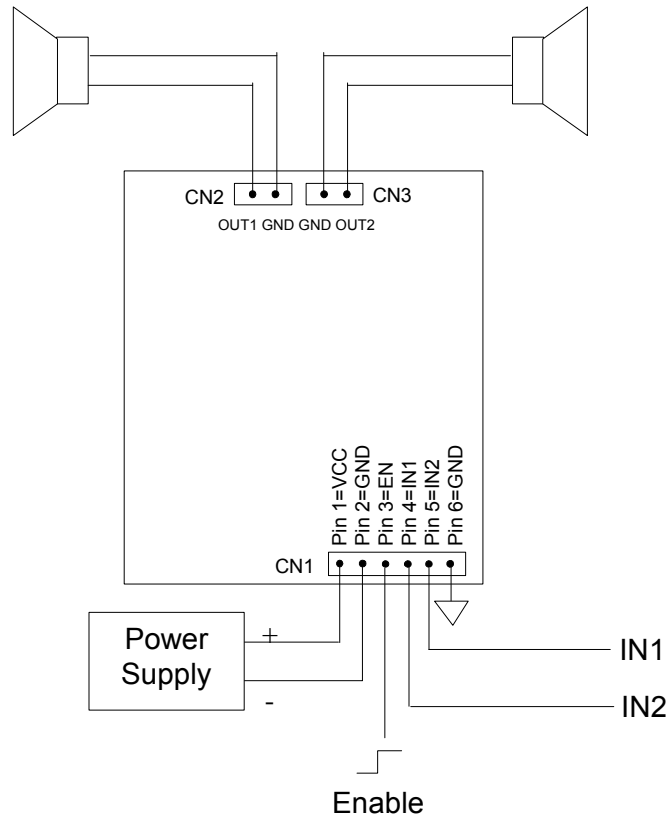


Figure 2: EV0066 Connection Diagram

Evaluation Board Operation

Power Requirements

1. Power supply: 7.5V to 24V, 6A maximum
2. 0V to 1V_{RMS} (max) audio signal source, $\leq 600\Omega$.
3. Speaker: 4 Ω or 8 Ω .

Setup Condition for 24V Operation

1. Connect + and - speakers terminals to OUT and GND pins of CN2 and CN3 respectively.
2. Connect the + and 1 power supply terminals to Pin 1 and 2 of CN1 respectively.
3. Adjust the power supply to $7.5 \leq V_{CC} \leq 24V$, (do not turn on).
4. Connect the audio input signal source to the amplifier inputs (IN1, IN2).
5. Turn on the power supply to apply power to the board.
6. To enable the board apply a voltage, $2V \leq V_{EN} \leq 6V$, to the EN pin. To disable the board connect the EN pin to ground.

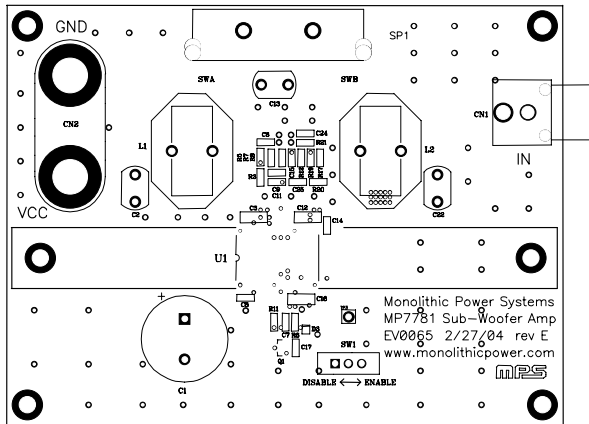


Figure 3: Top Silk Layer

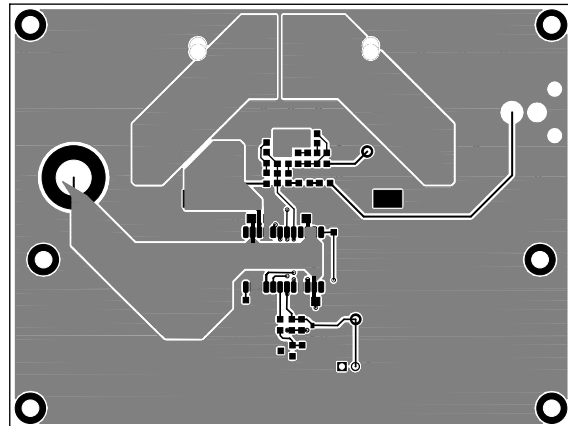


Figure 4: Top Layer

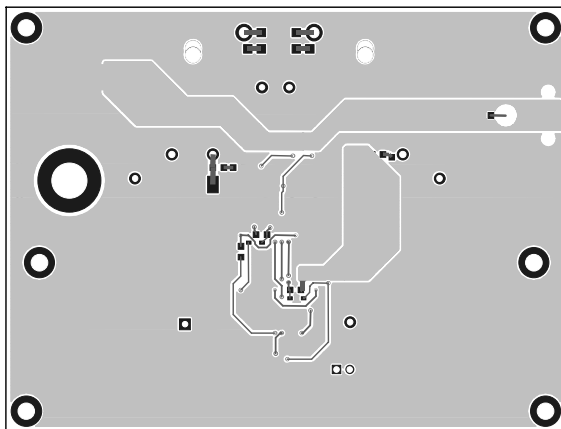


Figure 5: Bottom Layer

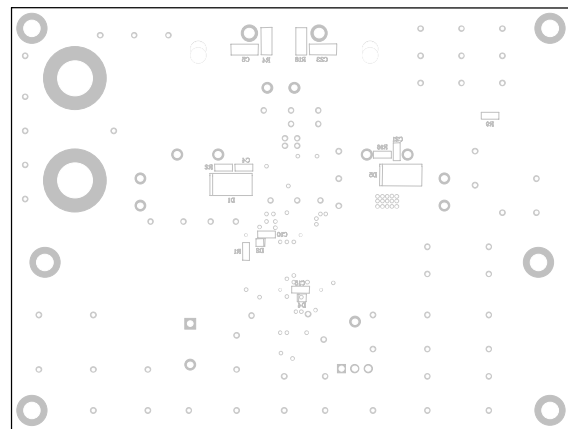


Figure 6: Bottom Silkscreen Layer

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