



Monolithic Power Systems

# EV0045 (MP7731) Compact 25W Class D Stereo Bridged Audio Amplifier

## EVALUATION BOARD – PRELIMINARY INFORMATION

### GENERAL DESCRIPTION

The EV0045 is a stereo evaluation board featuring MPS' MP7731 Class D Full Bridge Audio Amplifier. The EV0045 can deliver 25W into a 4Ω load with a 14.5V input supply.

The MP7731 is a mono 30W Class D Audio Amplifier. It is one of MPS' second generation of fully integrated audio amplifiers which dramatically reduces solution size by integrating the following:

- 180mΩ power MOSFETs
- Start up / shut down pop elimination
- Short circuit protection circuits
- Mute / Standby Mode

The MP7731 utilizes a full bridge output structure capable of delivering 30W into 4Ω speakers. As in all other MPS Class D Audio Amplifiers, this device exhibits the high fidelity of a Class A/B amplifier at efficiencies greater than 90%.

### FEATURES

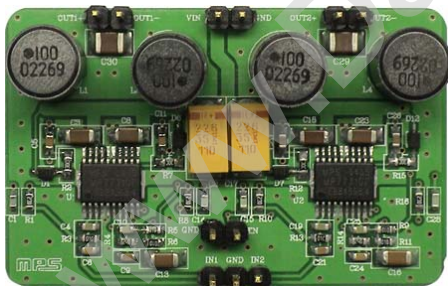
- 25W into 4Ω with 14.5V Input
- 90% Efficiency at 5W
- 9.5V to 14.5V Supply Voltage Operation
- Full Bridge Output Drive
- Integrated 180mΩ Switches
- Turn On / Turn Off Click and Pop Suppression
- Integrated Short Circuit Protection
- Integrated Thermal shutdown
- Mute / Standby Mode

### APPLICATIONS

- Notebook and Multimedia Computers
- Television and Home Theatre Systems
- DVD and VCR Players

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### EVALUATION BOARD



Dimensions (1.9"X x 1.2"Y)

Board Number	MPS IC Number
EV0045	MP7731DF

### ABSOLUTE MAXIMUM RATINGS

Supply Voltage $V_{IN}$ .....	26V
BS Voltage.....	$V_{SW}-0.3V$ to $V_{SW}+6.5V$
Enable Voltage $V_{EN}$ .....	-0.3V to 6V
$V_{SW}$ , $V_{PIN}$ , $V_{NIN}$ .....	-1V to $V_{DD}+1V$
AGND to PGND.....	-0.3V to 0.3V

### Recommended Operating Conditions

Input Voltage $V_{DD}$ .....	9.5V to 14.5V
Signal Input Voltage.....	$\pm 1V$ rms
Signal Input Frequency.....	20Hz to 20kHz
Signal Source Impedance.....	less than 600Ω
External Enable Input.....	0V to 5V
Speaker Resistance.....	4Ω to 8Ω

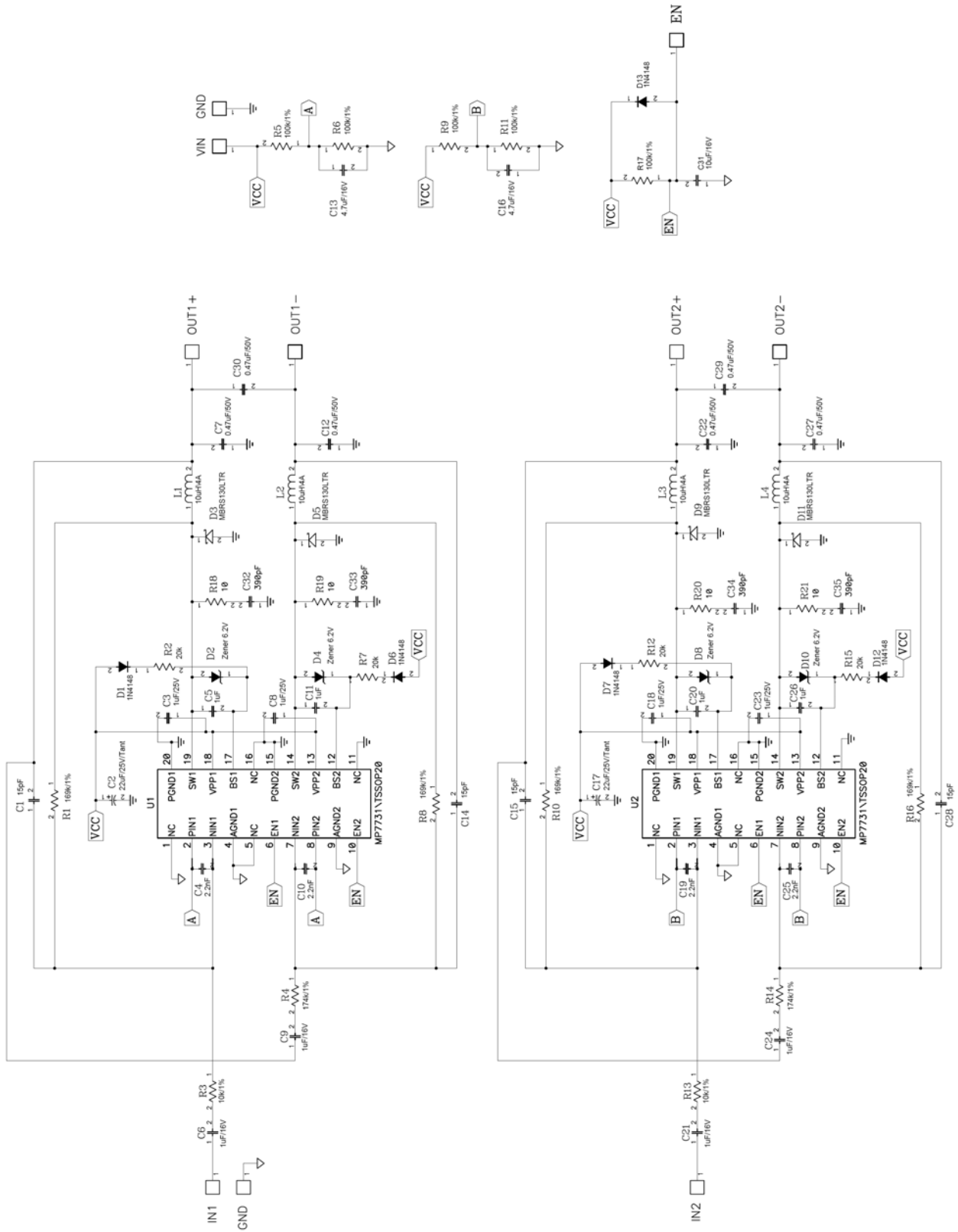


Figure 1: EV0045 Stereo Full Bridge Schematic

**Table 1: EV0045 Stereo Full Bridge Bill of Materials**

Item	Qty	Ref Des	Value	Description	Package	Manufacturer	Manufacturer Part Number	Distributor Part Number
1	4	D3		Schottky Diode, 30V, 1A	SMB	IRF	MBR5130LTR	MBR5130LCT-ND
		D5						
		D9						
		D11						
2	5	D1		Rectifier Diode	SOD-323	Diodes Inc	1N4148WS-7	1N4148WSCT-ND
		D6						
		D7						
		D12						
		D13						
3	4	D2		Zener Diode, 6.2V	SOD-323	Diodes Inc	BZT52C6V2S-7	BZT52C6V2SDICT-ND
		D4						
		D8						
		D10						
4	2	C2	22uF	Tantalum Cap., 25V	SMD	Panasonic	ECS-T1E0226R	PCC5226CT-ND
		C17						
5	4	C6	1uF	Ceramic Capacitor, 16V, X5R	SM0603	Panasonic	ECJ-1VB1C105K	PCC2224CT-ND
		C9						
		C21						
		C24						
6	4	C4	2200pF	Ceramic Capacitor, 50V, X7R	SM0603	Panasonic	ECU-V1H222KBV	PCC222BVCT-ND
		C10						
		C19						
		C25						
7	2	C13	4.7uF	Ceramic Capacitor, 16V, X5R	SM1206	Panasonic	ECJ-3YB1C475M	PCC2226CT-ND
		C16						
8	4	C1	15pF	Ceramic Capacitor, 50V, NPO	SM0603	Panasonic	ECJ-1VC1H150J	PCC150ACVCT-ND
		C14						
		C15						
		C28						
9	4	C5	1uF	Ceramic Capacitor, 16V, X5R	SM0805	Panasonic	ECJ-2FB1C105K	PCC2249CT-ND
		C11						
		C20						
		C26						
10	4	C3	1uF	Ceramic Capacitor, 25V, X7R	SM1206	Panasonic	ECJ-3YB1E105K	PCC1893CT-ND
		C8						
		C18						
		C23						

Distributor: Digikey

**Table 1: EV0045 Stereo Full Bridge Bill of Materials (continued)**

Item	Qty	Ref Des	Value	Description	Package	Manufacturer	Manufacturer Part Number	Distributor Part Number
11	6	C7	0.47uF	Ceramic Capacitor, 100V, X7R	SM1210	Panasonic	ECJ-4YB2A474K	PCC2240CT-ND
		C12						
		C22						
		C27						
		C29						
		C30						
12	1	C31	10uF	Ceramic Capacitor, 16V, X5R	SM1206	Panasonic	ECJ-3YB1C106M	PCC2227CT-ND
13	4	C32	390pF	Ceramic Capacitor, 50V, X7R	SM0603	Panasonic	ECU-V1H391KBV	PCC391BVCT-ND
		C33						
		C34						
		C35						
14	2	U1		Class D Amplifier	TSSOP-20	MPS	MP7731	
		U2						
15	4	L1	10uH	Inductor/2.6A/0.035 Ohm/8RDY	Radial	Toko	A7040HN-100M	
		L2						
		L3						
		L4						
16	4	R2	20k Ohm	Film Resistor, 5%	SM0805	Panasonic	ERJ-6GEYJ203V	P20KACT-ND
		R7						
		R12						
		R15						
17	2	R3	10k Ohm	Film Resistor, 1%	SM0603	Panasonic	ERJ-3EKF1002V	P10.0KHCT-ND
		R13						
18	4	R18	10 Ohm					
		R19		Film Resistor, 5%	SM0603	Panasonic	ERJ-3GEYJ100V	P10GCT-ND
		R20						
		R21						
19	5	R5	100k Ohm	Film Resistor, 1%	SM0603	Panasonic	ERJ-3EKF1003V	P100KHCT-ND
		R6						
		R9						
		R11						
		R17						
20	4	R1	169k Ohm	Film Resistor, 1%	SM0603	Panasonic	ERJ-3EKF1693V	P169KHCT-ND
		R8						
		R10						
		R16						

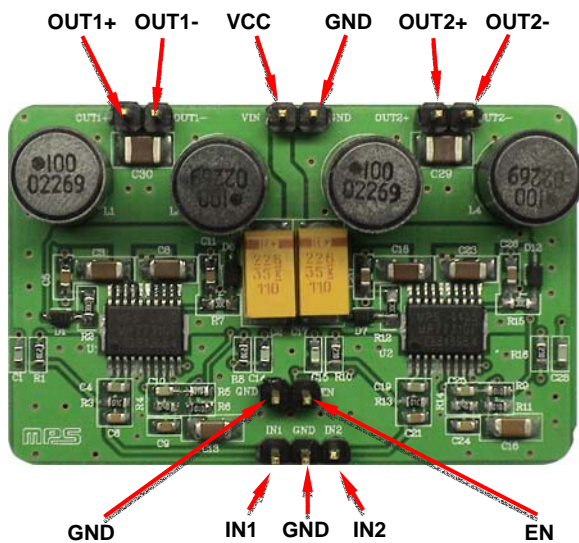
Distributor: Digikey

**Table 1: EV0045 Stereo Full Bridge Bill of Materials (continued)**

Item	Qty	Ref Des	Value	Description	Package	Manufacturer	Manufacturer Part Number	Distributor Part Number
21	2	R4	174k Ohm	Film Resistor, 1%	SM0603	Panasonic	ERJ-3EKF1743V	P174KHCT-ND
		R14						
22	10	TP1-TP10		Test Point Square Header		Sullins	PTC36SAAN	S1012-36-ND

Distributor: Digikey

## EVALUATION BOARD OPERATION


**Figure 2: Board Connections**

### Power Requirements

1. Power supply: 12V
2. 0 -1V<sub>RMS</sub> (max) audio signal source.
3. Speaker: 4Ω or 8Ω:

### Setup Condition for 12V Operation

1. Connect speaker outputs to OUT1+, OUT-, OUT2+, OUT2- respectively.
2. Connect the audio inputs to IN1, GND, IN2 respectively.
3. Adjust the power supply to 12V, (do not turn on)
4. Connect the power supply to the VCC, GND terminals
5. Apply power to the board
6. Audio should be heard from the speaker(s)

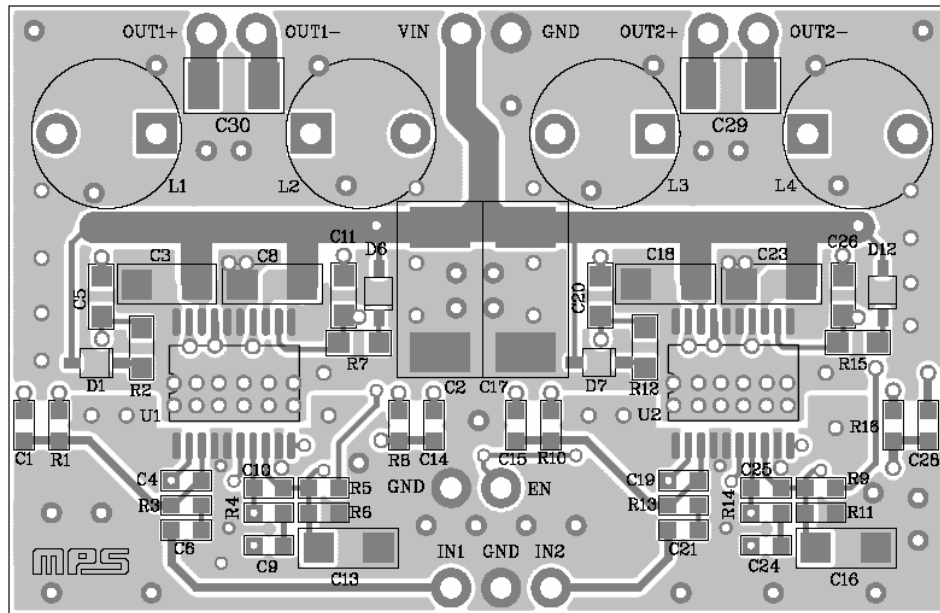


Figure 3: Top Layer with Silkscreen Overlay

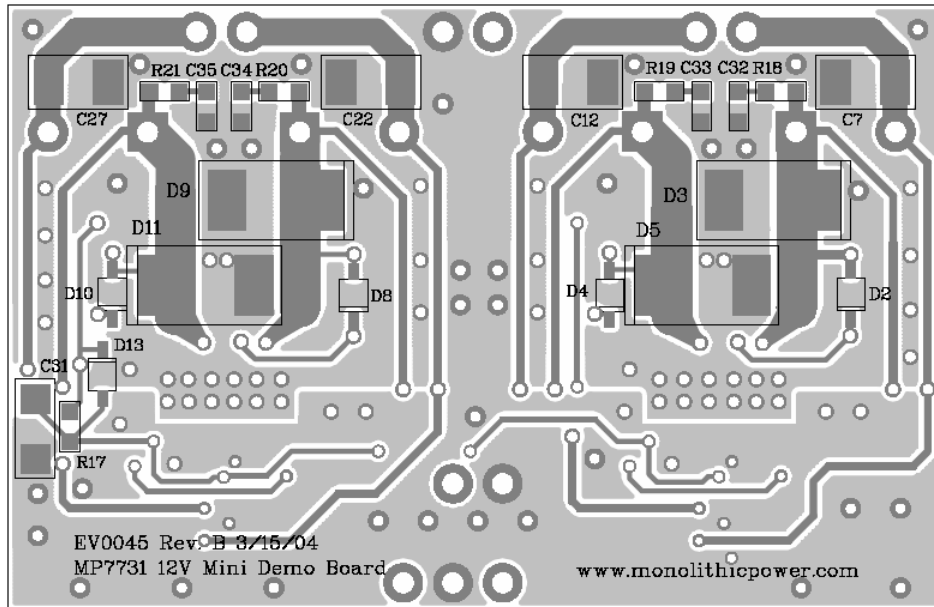


Figure 4: Bottom Layer with Silkscreen Overlay

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