



The Future of Analog IC Technology™

# EV7731-F-00A

## 30W Class D Mono Bridged Audio Amplifier

### DESCRIPTION

The EV7731-F-00A is the evaluation board for the MP7731, a mono, 30W Class D Audio Amplifier. It is one of MPS' products of fully integrated audio amplifiers which dramatically reduce solution size by integrating the following:

Start Up / Shut Down Pop Elimination

Short Circuit Protection Circuits

180mΩ Power MOSFETs

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 AB amplifier with an efficiency of 90%. The circuit is based on the MPS' proprietary variable frequency topology Analog Adaptive Modulation that delivers excellent linearity, fast response time and operates on a single power supply.

### FEATURES

- 30W into 4Ω with  $V_{DD} = 16.5V$
- 93% Efficiency at 19W with  $V_{DD}=16.5V$ , 8Ω load
- Low THD+N (0.1% at 1W, 8Ω, 1kHz)
- 9.5V to 18V Supply Voltage Operation

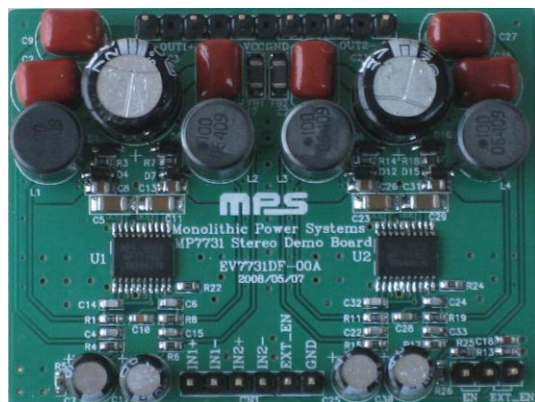
### APPLICATIONS

- Flat Panel LCD and PDP Displays
- Notebook and Multimedia Computers
- Televisions
- Home Stereos
- DVD and VCD Players
- Game Devices and Systems
- Monitors

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AAM (Analog Adaptive Modulation) is a Trademark of Monolithic Power Systems, Inc.

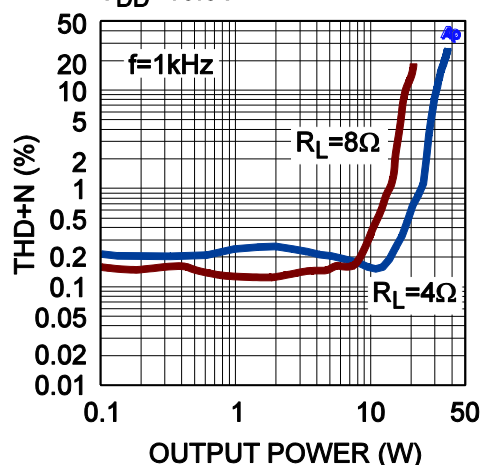
### EV7731-F-00A EVALUATION BOARD



Dimensions (2.2"X x1.7"Y x 0.8"Z)

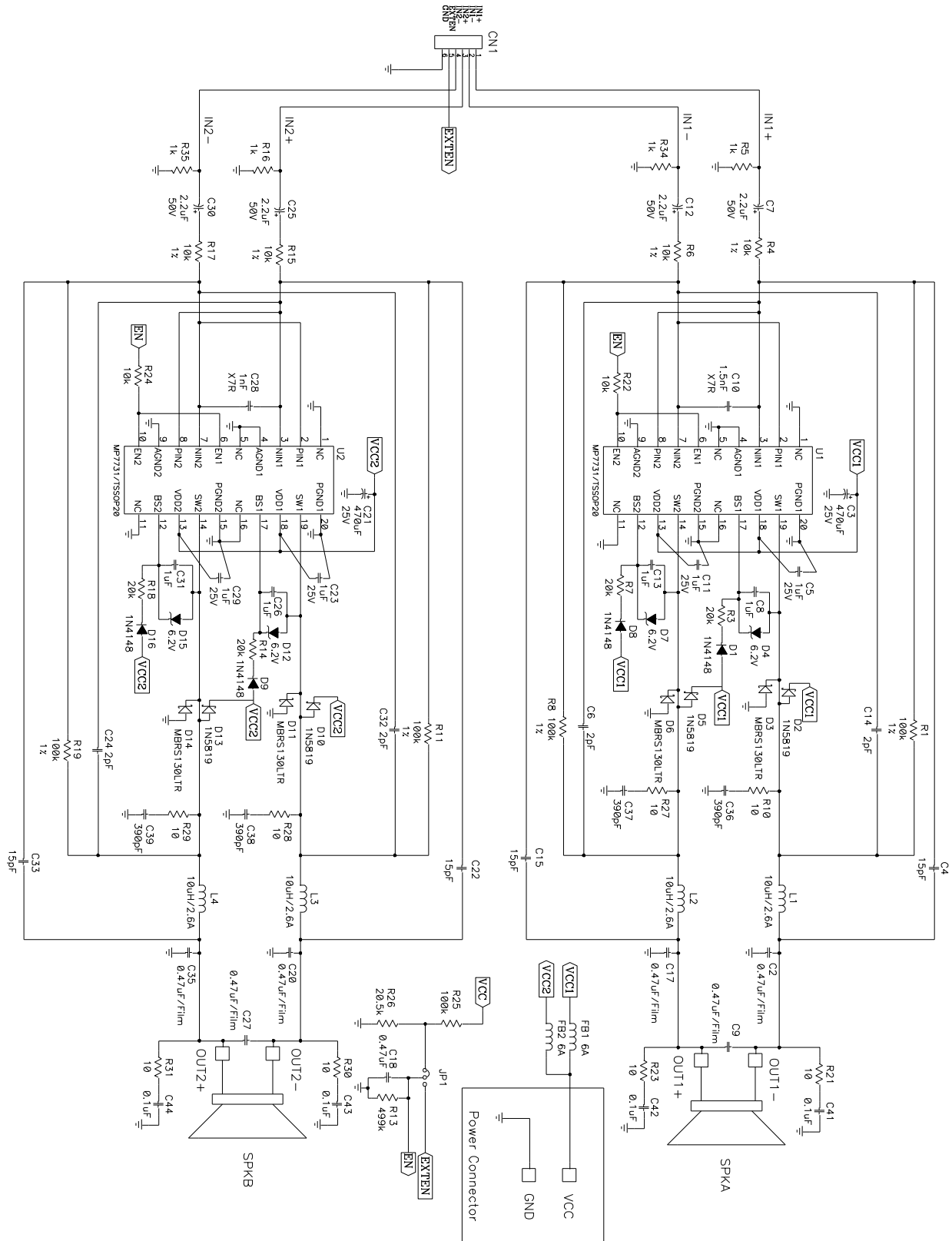
| Board Number | MPS IC Number |
|--------------|---------------|
| EV7731-F-00A | MP7731        |

THD+N vs Output Power  
 $V_{DD}=16.5V$



MP7731-TAC-G01

# EVALUATION BOARD SCHEMATIC



**EV7731-F-00A BILL OF MATERIALS**

| Qty | Ref                     | Value  | Description                 | Package | Manufacturer | Manufacturer P/N   |
|-----|-------------------------|--------|-----------------------------|---------|--------------|--------------------|
| 2   | C3,C21                  | 470uF  | Electrolytic Capacitor, 25V | Radial  | JH           | CD287-25V470       |
| 4   | C7,C12, C25,C30         | 2.2uF  | Electrolytic Capacitor, 50V | Radial  | Rubycon      |                    |
| 1   | C10                     | 1.5nF  | Ceramic Capacitor, 50V,X7R  | 0603    | muRata       | GRM188R71H152KA01  |
| 1   | C28                     | 1nF    | Ceramic Capacitor, 50V,X7R  | 0603    | muRata       | GRM188R71H102KA01D |
| 4   | C5,C11, C23,C29         | 1uF    | Ceramic Capacitor, 25V,X7R  | 1206    | muRata       | GRM31MR71E105KA01  |
| 4   | C8,C13, C26,C31         | 1uF    | Ceramic Capacitor, 50V,X7R  | 0805    | muRata       | GRM21BR71H105KA12L |
| 4   | C6,C14, C24,C32         | 2pF    | Ceramic Capacitor, 50V,COG  | 0603    | TDK          | C1608COG1H020CT    |
| 4   | C4,C15,C 22,C33         | 15pF   | Ceramic Capacitor, 50V,COG  | 0603    | TDK          | C1608COG1H150J     |
| 4   | C36,C37, C38,C39        | 390pF  | Ceramic Capacitor, 50V,COG  | 0603    | muRata       | GRM1885C1H391JA01D |
| 4   | C41,C42, C43,C44        | 0.1uF  | Ceramic Capacitor, 50V,X7R  | 0603    | muRata       | GRM188R71H104KA93D |
| 1   | C18                     | 0.47uF | Ceramic Capacitor, 16V,X7R  | 0603    | muRata       | GRM188R71C474KA88D |
| 6   | C2,C17, C20,C35, C9,C27 | 0.47uF | FILM,50V                    | Radial  | Any          |                    |
| 4   | D3, D6, D11, D14        |        | Diode Schottky, 30V, 1A     | SMB     | IR           | MBRS130LTR         |
| 4   | D4, D7, D12, D15        |        | Zener Diode, 6.2V           | SOD-323 | Diodes Inc   | BZT52C6V2S-7       |
| 4   | D2, D5, D10, D13        |        | Diode, 40V                  | SOD-123 | Diodes Inc   | 1N5819HW           |
| 4   | D1, D8, D9, D16         |        | Diode, 75V                  | SOD-323 | Diodes Inc   | 1N4148WS-7         |
| 2   | FB1, FB2                |        | Ferrite Bead, 6A            | 1206    | LION         | PB321611-320       |
| 1   | CN1                     |        | 6-Pins Sip Header, 0.1"     |         | Any          |                    |
| 4   | L1, L2, L3,L4           | 10uH   | Inductor, 3.6A              | Radial  | Toko         | 8RDY-A7040HN-100M  |
| 4   | R5,R16, R34,R35         | 1K     | Film Resistor, 1%           | 0603    | Yageo        | RC0603FR-071KL     |
| 6   | R4,R6, R15,R17, R22,R24 | 10K    | Film Resistor, 1%           | 0603    | Yageo        | RC0603FR-0710KL    |
| 5   | R1,R8, R11,R19, R25     | 100K   | Film Resistor, 1%           | 0603    | Yageo        | RC0603FR-07100KL   |
| 4   | R3,R7, R14,R18          | 20K    | Film Resistor, 1%           | 0603    | Yageo        | RC0603FR-0720KL    |

**EV7731-F-00A BILL OF MATERIALS (continued)**

| Qty | Ref                 | Value | Description             | Package  | Manufacturer | Manufacturer P/N |
|-----|---------------------|-------|-------------------------|----------|--------------|------------------|
| 1   | R13                 | 499K  | Film Resistor, 1%       | 0603     | Yageo        | RC0603FR-07499KL |
| 1   | R26                 | 20.5K | Film Resistor, 1%       | 0603     | Yageo        | RC0603FR-0720K5L |
| 4   | R10,R27,<br>R28,R29 | 10    | Film Resistor, 5%       | 1206     | Yageo        | RC1206JR-0710R   |
| 4   | R21,R23,<br>R30,R31 | 10    | Film Resistor, 1%       | 0603     | Yageo        | RC0603FR-0710RL  |
| 2   | U1,U2               |       | Class D Audio Amplifier | TSSOP-20 | MPS          | MP7731DF         |

## PRINTED CIRCUIT BOARD LAYOUT

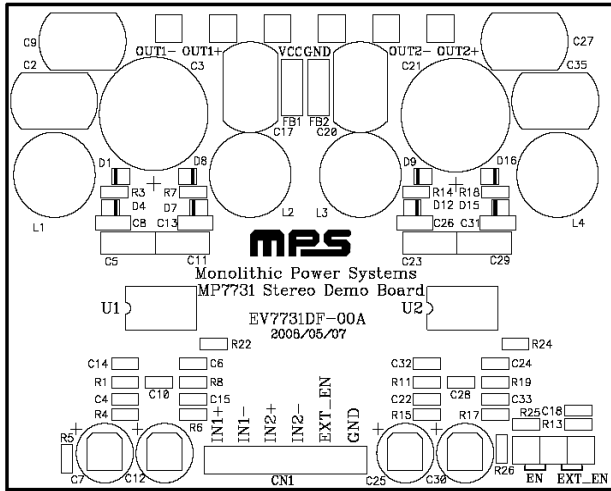


Figure 1—Top Silk Layer

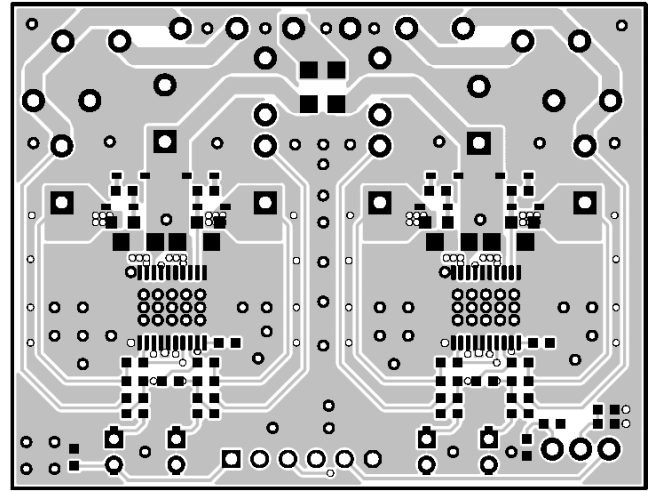


Figure 2—Top Layer

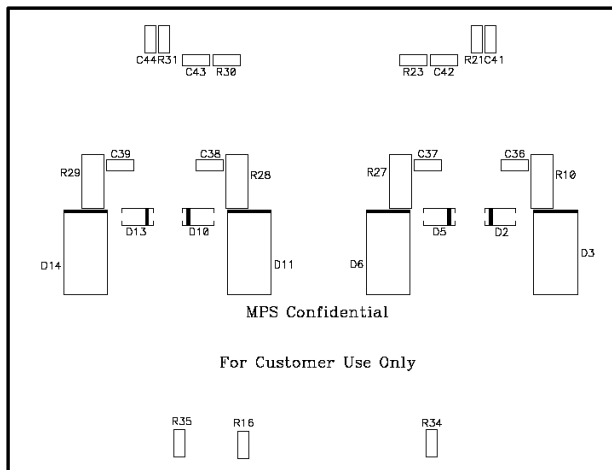


Figure 3—Bottom Silk Layer

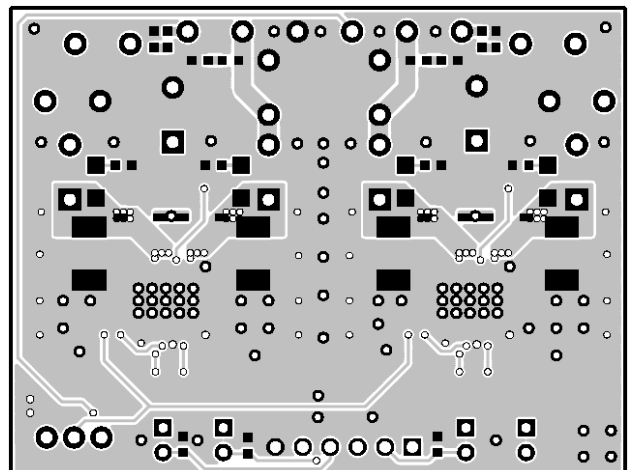


Figure 4—Bottom Layer

## QUICK START GUIDE

### Power Requirements

1. Power supply: 9.5V to 18V.
2. 0 -1V<sub>RMS</sub> (max) audio signal source.
3. Speaker: 4Ω or 8Ω.

### Setup Condition for 12V Operation

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

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