

General Description

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:

- **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 A/B amplifier at efficiencies greater than 90%. The circuit is based on the MPS' proprietary variable frequency topology Analog Adaptive Modulation (AAM™, Patent pending) that delivers excellent PSRR, fast response time and operates on a single power supply.

Ordering Information

Part Number*	Package	Temperature
MP7731DF	TSSOP20 W/ Exposed Paddle	-40°C to +85°C

* For Tape & Reel, use suffix -Z (MP7731DF-Z)

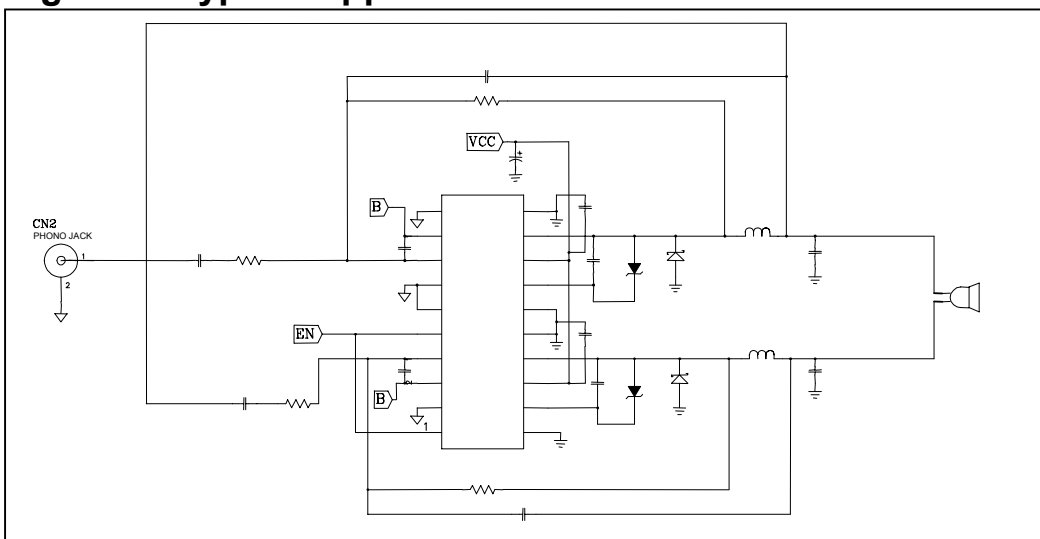
Features

- 30W into 4Ω with 16V Input
- 90% Efficiency at 5W
- Amplifies full audio range with low THD+N
 - Typical = 0.1%
- 7.5V to 16V input 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
- Home Stereo
- DVD and VCD players
- Game machines
- Monitors

Figure 1: Typical Application Circuit



Absolute Maximum Ratings

Supply Voltage (V _{IN})	18V
Logic Inputs	-0.3V to 6.5V
Boost Pin Voltage	V _{sw} + 6V
Power Dissipation	5W
Junction Temperature	150°C
Storage Temperature	-55°C to +150°C

Recommended Operating Conditions

Supply Voltage (V _{IN})	7.5V to 16V
Feedback Input Voltage	0 to 6V
Operating Temperature	-40°C to + 85°C

Package Thermal Characteristics

Thermal Resistance θ_{JA} (TSSOP20 EP)	140°C/W
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Electrical Specifications (Unless otherwise specified V_{IN} =16.0V, T_A=25 °C)

Parameters	Symbol	Condition	Min	Typ	Max	Units
Voltage Supply						
Standby Current	I _{CC(OFF)}	V _{EN} = 0V			10	μA
Quiescent Current	I _{CC(ON)}	Typical Application, Output forced low		2		mA
Operating Range	V _{IN}	V _{EN} = 5V	7.5		16	V
Power Supply Rejection Ratio	PSRR	V _{IN(AC)} = 1V _{P-P}		1		mV/V
Output Drivers						
On Resistance	R _{ON}	V _{EN} = 5V		180		mΩ
Short Circuit Current	I _{SC}			5		A
Inputs						
NIN Input Common Mode Voltage Range	V _{CMRR}		0	2	2.5	Vdc
NIN Input Current	I _{NIN}			0	1	μA
Enable Voltage (IC supply)	V _{EN}		4.75		6	V
Enable Current	I _{EN}	V _{EN} = 5V		2		mA
Thermal shutdown	T _{SD}			150		°C

Operating Specifications (Unless otherwise specified V_{IN}=16.0V, R_L= 4Ω, T_A=25°C)

Power Output	P _{OUT}	f=1KHz @ 10% THD+N		30		W
THD+N	THD+N	P _{OUT} =1W, f=1KHz		0.1		%
Closed Loop Gain	A _{VOL}	See Typical Application		25		dB
Efficiency	η	f=1KHz, P _{OUT} =0.1 to 30W		90		%
Frequency Response bandwidth			20		20000	Hz
Dynamic Range				80		dB

Pin Description

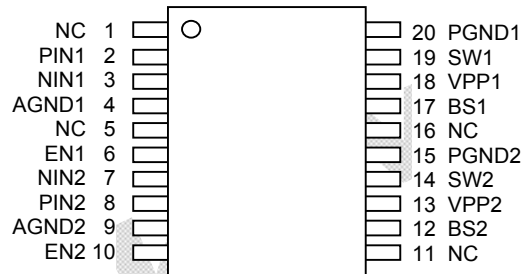
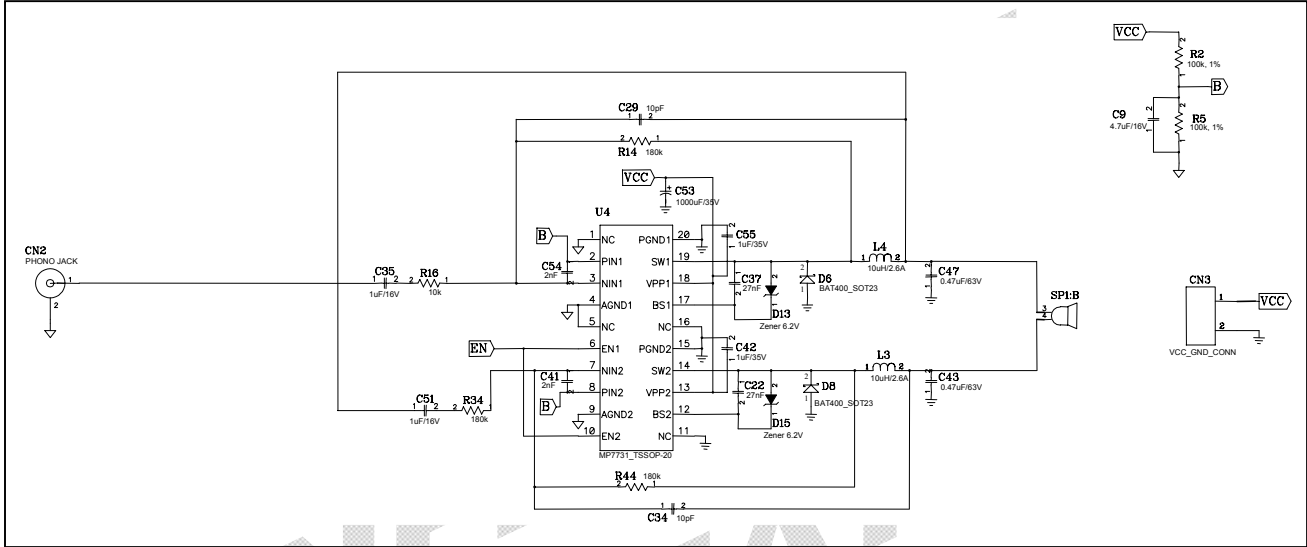


Table 1: Pin Designators

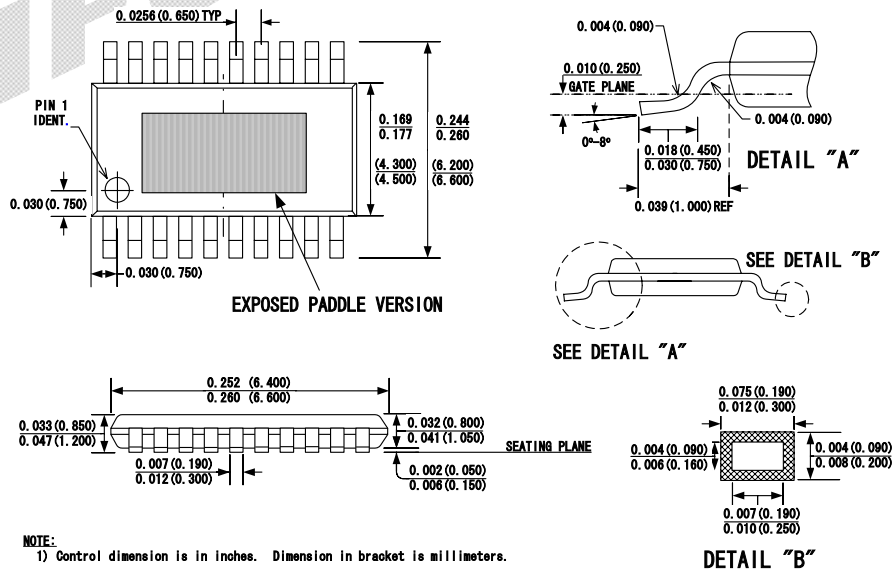
Pin Number	Pin Name	Pin Function
1, 5, 11, 16	NC	No Connect
2	PIN1	Common-mode reference voltage for the amplifier input Channel 1
3	NIN1	Input to the amplifier Channel 1
4	AGND1	Analog Ground Channel 1
6	EN1	Enable / LDO Output and Compensation. Channel 1
7	NIN2	Input to the amplifier Channel 2
8	PIN2	Common-mode reference voltage for the amplifier input. Channel 2
9	AGND2	Analog Ground Channel 2
10	EN2	Enable / LDO Output and Compensation Channel 2
12	BS2	Bootstrap pin for Output MOSFET. Channel 2
13	VPP2	Power Supply (7.5V-16V). Channel 2
14	SW2	Switch Output 1. Output connected to inductor. Channel 2
15	PGND2	Power Ground Channel 2
17	BS1	Bootstrap pin for Output MOSFET. 1nF to OUT, Channel 1
18	VPP1	Power Supply (7.5V-16V). Channel 1
19	SW1	Switch Output 2. Output connected to inductor. Channel 1
20	PGND1	Power Ground Channel 1

Figure 2: Mono Full Bridge Circuit



Packaging Information

TSSOP20F (Exposed Paddle)



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