DESCRIPTION

The MT6832 is a 3W, filterless, ultra-low EMI noise, single-ended input, stereo class-D audio amplifier. It is low noise, filter-free with PWM architecture, minimizing external component count, PCB area, system cost.

The chip features very low 0.1% THD+N, high 90dB SNR, and therefore offer high quality sound. MT6832 delivers up to 3W per channel into a 4Ω load with an efficiency up to 90%.

The MT6832 features a low-power consumption shutdown mode. The gain of the MT6832 is externally configurable which allows independent gain control from multiple sources by summing the signals. Output short circuit and thermal overload protection prevent the device from damage during fault conditions

The high efficiency and a low shutdown current make the MT6832 an ideal choice for both battery-powered speakers and portable devices.

MT6832 integrates Maxic's unique EMI suppression technique, can work with FM tuner without extra Ferrite-bead components.

FEATURES

- 3W output at 10% THD with a 4Ω load and 5V power supply
- 2.5V~5.5V single supply operation
- Filterless and ultra-low EMI, can work with FM tuner without extra Ferrite-bead components
- Less than 0.1% THD+N
- Excellent Power up/down "Pop sound" suppression
- Low quiescent current and low-power shutdown current
- Few external components to save the space and cost
- Over current/Short circuit and over temperature protection
- Available in SOP16 package (Pb-free)

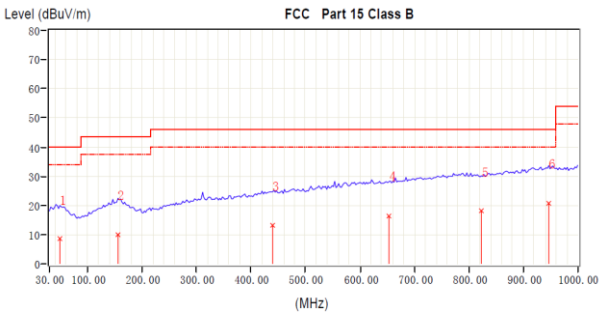
APPLICATION

- Mobile phone
- Portable audio product
- Portable media player
- Personal navigation device
- Video game
- Cordless phone

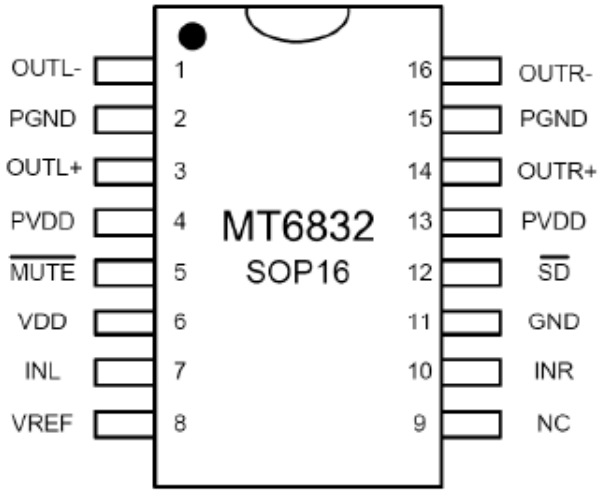
ORDERING INFORMATION

Part #	Package	Remarks
MT6832	SOP-16	Tube 50pcs/tube

RADIATED EMISSION



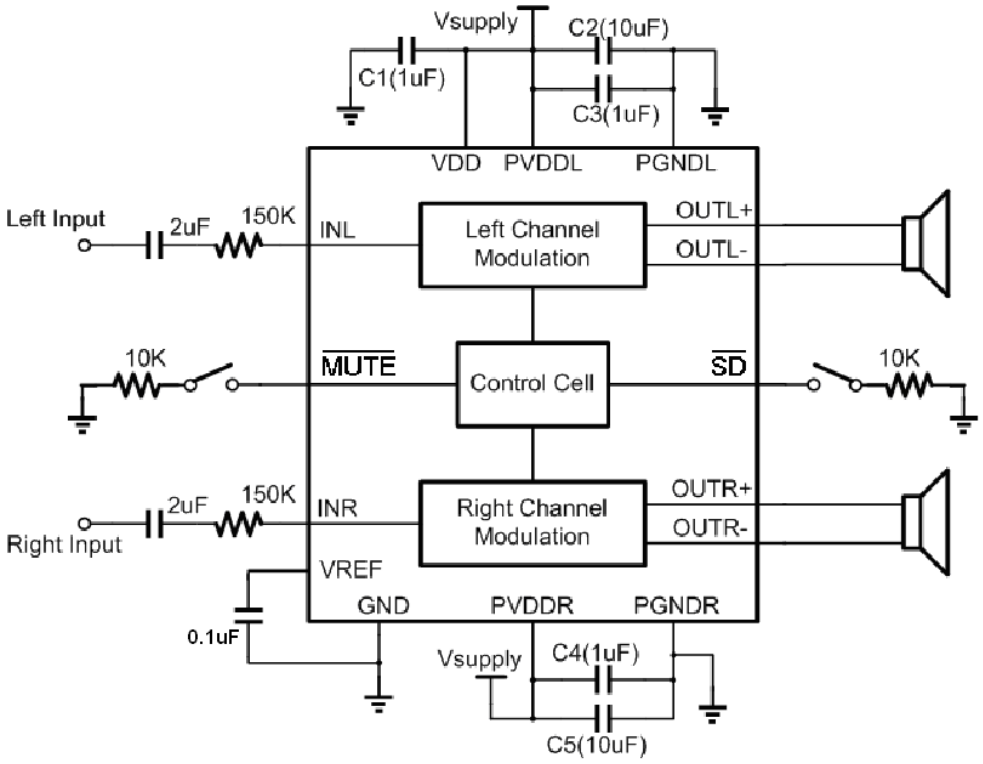
PIN CONFIGURATIONS



PIN DESCRIPTIONS

Pin#	Symbol	Function
1	OUTL-	Left channel negative output
2	PGNDL	Left channel ground
3	OUTL+	Left channel positive output
4	PVDDL	Left channel power supply
5	$\overline{\text{MUTE}}$	Mute control input(active low); Internal has a 300kohm resistor pull to VDD.
6	VDD	Analog power supply
7	INL	Left channel audio input
8	VREF	Internal Analog reference. Connect a 0.1uF capacitor to GND.
9	NC	No Connection
10	INR	Right channel audio input
11	GND	Analog ground
12	$\overline{\text{SD}}$	Shutdown pin(active low)； Internal has a 300kohm resistor pull to VDD.
13	PVDDR	Right channel power supply
14	OUTR+	Right channel positive output
15	PGNDR	Right channel ground
16	OUTR-	Right channel negative output

TYPICAL APPLICATION CIRCUITS



MT6832: Single-Ended Input Application Circuit

Note: C1~C5 are ceramic capacitor and should be put as close to MT6832 as possible!

ABSOLUTE MAXMUM RATINGS

VDD	Supply voltage	In active mode	–0.3 V to 6 V
		In $\overline{SD}$ mode	–0.3 V to 7 V
VI	Input voltage		–0.3 V to VDD + 0.3 V
	Continuous total power dissipation		See Dissipation Rating Table
TJ	Operating junction temperature		–40°C to 150°C
Tstg	Storage temperature		–65°C to 150°C
	Lead temperature from case for 10 seconds		260°C

THERMAL CHARACTERISTIC

Symbol	Description	Value	Units
θJA	Maximum Thermal Resistance	80	°C/W

RECOMMENDED OPERATING CONDITIONS

			MIN	MAX	UNIT
VDD	Supply voltage		2.5	5.5	V
VIH	High-level input voltage	$\overline{SD}$	1.3	VDD	V
VIL	Low-level input voltage	$\overline{SD}$	0	0.35	V
VIC	Common mode input voltage range	VDD = 2.5V - 5.5V	0.5	VDD–0.8	V
T_A	Operating free-air temperature		–40	85	°C

ELECTRICAL CHARACTERISTICS

TA = 25℃ (unless otherwise noted)

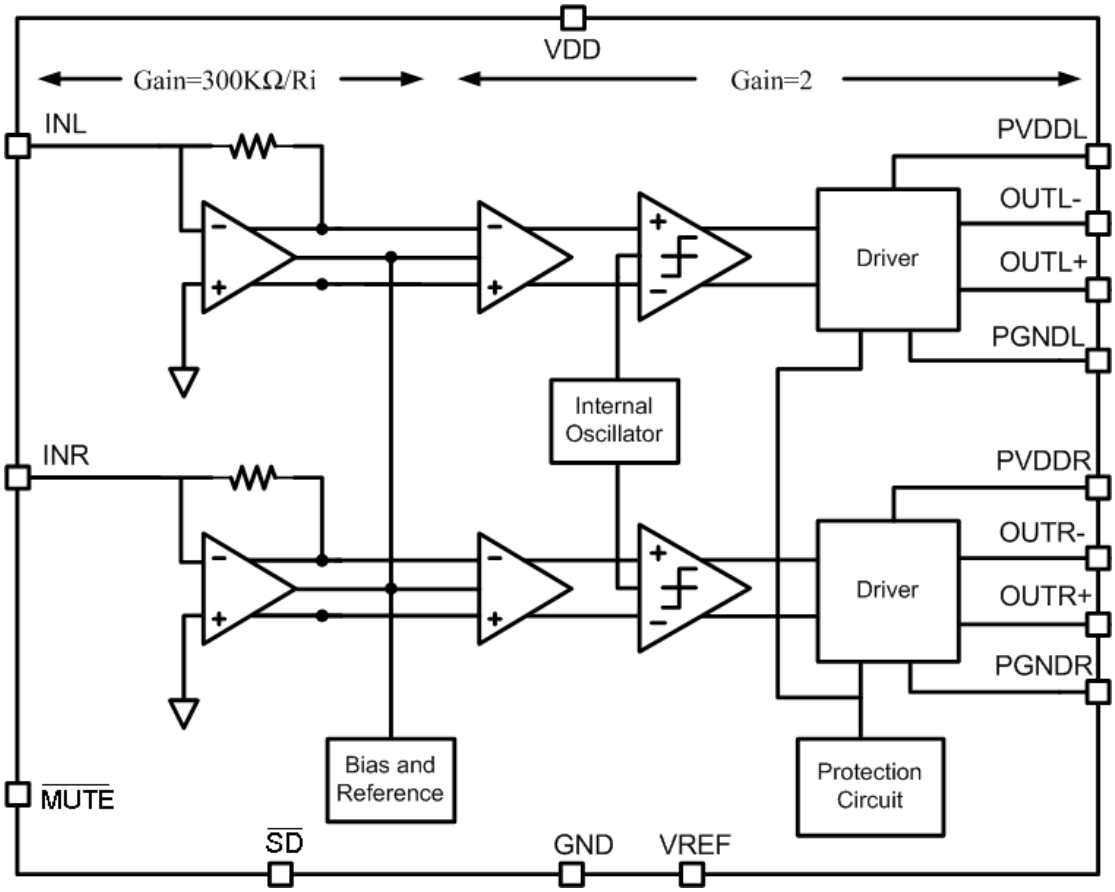
	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
|VOS|	Output offset voltage	Inputs AC grounded, VDD = 2.5 V to 5.5 V		2	19	mV
|IIH|	High-level input current	VDD = 5.0 V, VI = 5.3 V			50	μA
|IIL|	Low-level input current	VDD = 5.0 V, VI = –0.3 V			5	μA
I(Q)	Quiescent current	VDD = 5.0 V, no load		10		mA
		VDD = 3.6 V, no load		6.5		
		VDD = 2.5 V, no load		5.3		
I(SD)	Shutdown current	V($\overline{SD}$)= 0.35 V, VDD = 3.6 V		10		μA
r_{DSON}(P)	Static drain-source on-state resistance	VDD = 2.5 V		715		mΩ
		VDD = 3.6 V		540		
		VDD = 5.0 V		490		
r_{DSON}(N)	Static drain-source on-state resistance	VDD = 2.5 V		720		mΩ
		VDD = 3.6 V		550		
		VDD = 5.0 V		510		
	Output impedance in SHUTDOWN mode	V($\overline{SD}$) = 0.35 V		>1		kΩ
f(sw)	Switching frequency	VDD = 2.5 V to 5.5 V		300		kHz
A_{GAIN}	Amplifier Gain	VDD = 2.5 V to 5.5 V		$\frac{600k\Omega}{Ri}$		V/V
R_{UP_SD}	Resistance from $\overline{SD}$ to VDD			300/1000		kΩ
R_{UP_MUTE}	Resistance from $\overline{MUTE}$ to VDD			300/1000		kΩ

OPERATING CHARACTERISTICS

TA = 25℃ (unless otherwise noted)

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
PO	Output power (per channel)	THD + N = 10%, f = 1 kHz, RL = 4 Ω	VDD = 5 V		3.06		W
			VDD = 3.6 V		1.69		
			VDD = 2.5 V		0.73		
		THD + N = 1%, f = 1 kHz, RL = 4 Ω	VDD = 5 V		2.53		W
			VDD = 3.6 V		1.36		
			VDD = 2.5 V		0.59		
		THD + N = 10%, f = 1 kHz, RL = 8 Ω	VDD = 5 V		1.71		W
			VDD = 3.6 V		0.80		
			VDD = 2.5 V		0.37		
		THD + N = 1%, f = 1 kHz, RL = 8 Ω	VDD = 5 V		1.37		W
			VDD = 3.6 V		0.65		
			VDD = 2.5 V		0.30		
THD+N	Total harmonic distortion plus noise	VDD= 5V, PO=1W, RL=8Ω, f=1kHz			0.10%		
		VDD= 3.6V, PO=0.5 W, RL=8 Ω, f = 1kHz			0.12%		
		VDD=2.5V,PO=200mW, RL = 8 Ω, f = 1kHz			0.15%		
PSRR	Supply ripple rejection ratio	VDD = 3.6 V, Inputs ac-grounded with Ci=2μF	f=217Hz, V(ripple)=0.2Vpp		-65		dB
SNR	Signal-to-noise ratio	VDD = 5V, PO = 1W, RL = 8Ω			91		dB
Cs	Crosstalk	f = 1kHz			-76		dB
	Start-up time from shutdown	VDD = 3.6V			12		ms

BLOCK DIAGRAM



TYPICAL OPERATING CHARACTERISTICS (TA=25°C)

THD+N vs. Output Power

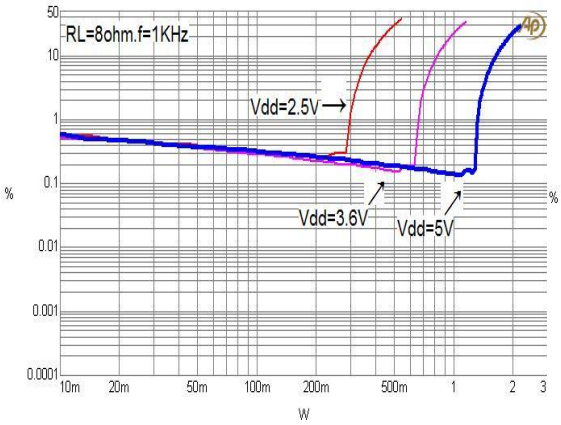


Fig.1

THD+N vs. Output Power

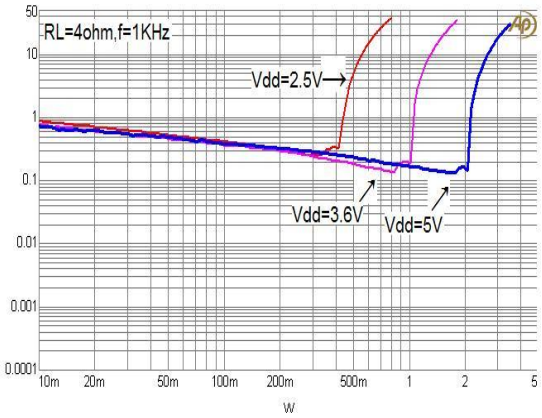


Fig. 2

THD+N vs. Frequency

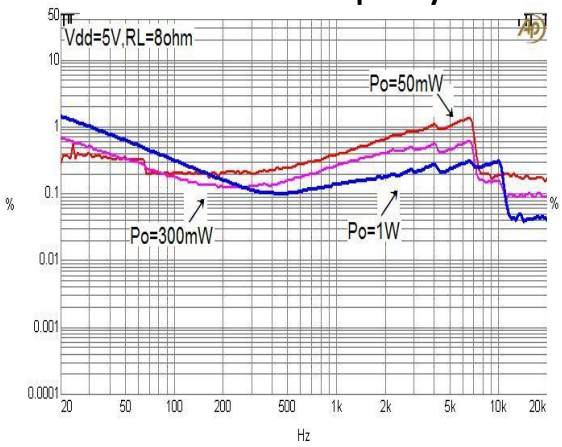


Fig. 3

THD+N vs. Frequency

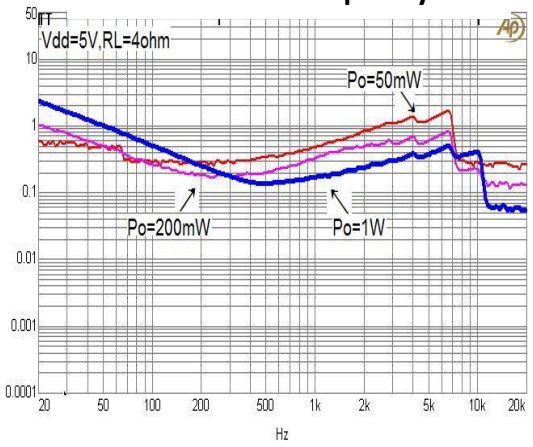


Fig. 4

THD+N vs. Frequency

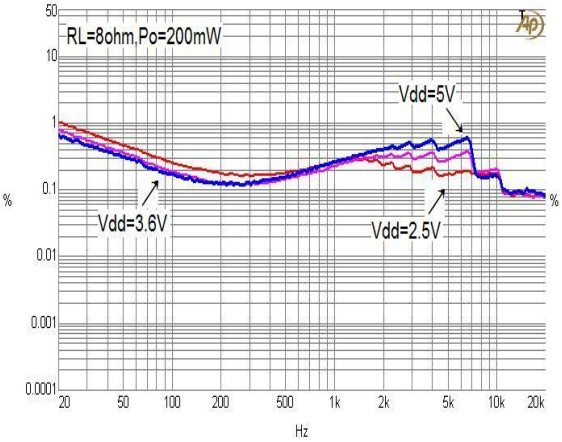


Fig. 5

THD+N vs. Frequency

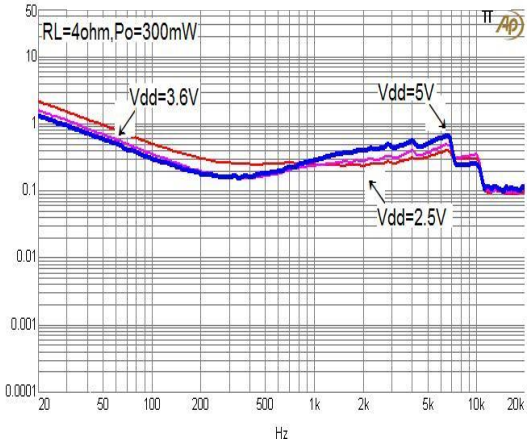


Fig. 6

Frequency Response

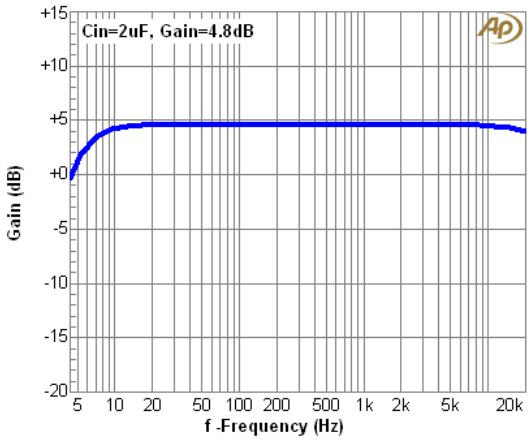


Fig. 7

Noise Floor

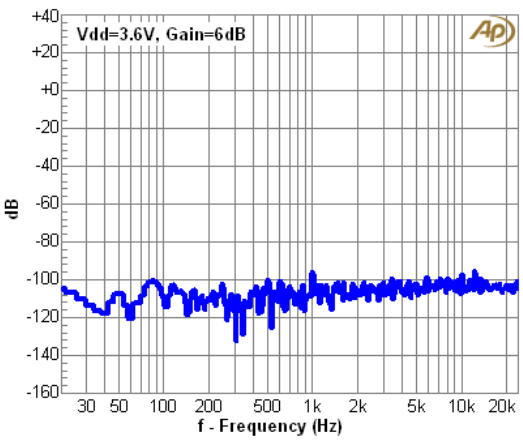


Fig. 8

PSRR vs. Frequency

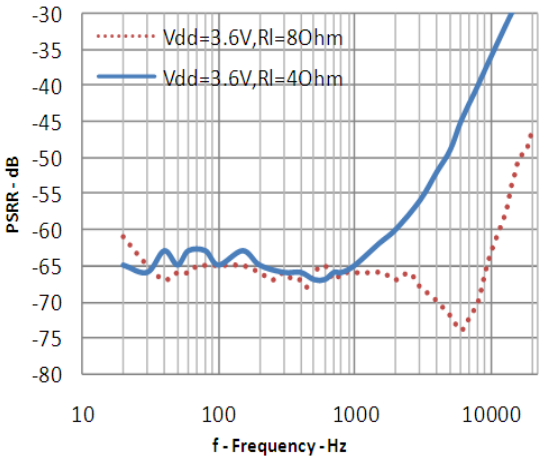


Fig. 9

Quiescent Current vs. Supply Voltage

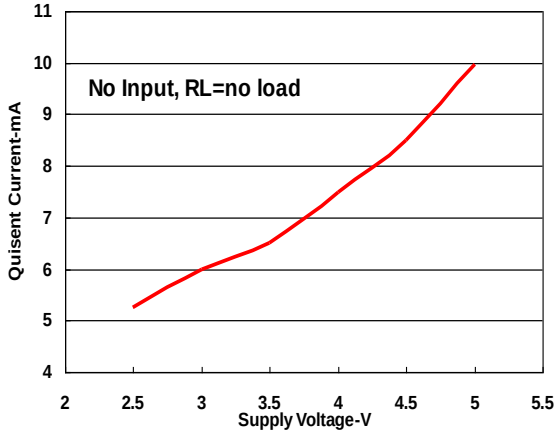


Fig. 10

Cross-talk vs. Frequency

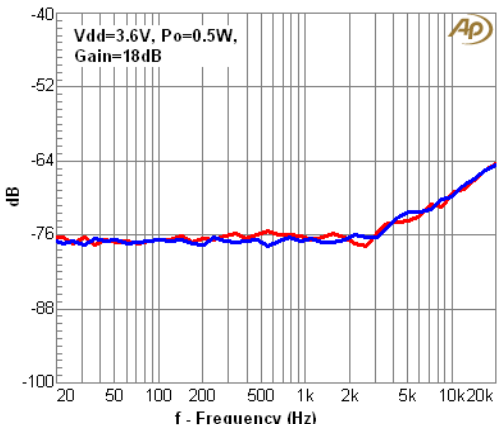


Fig.11

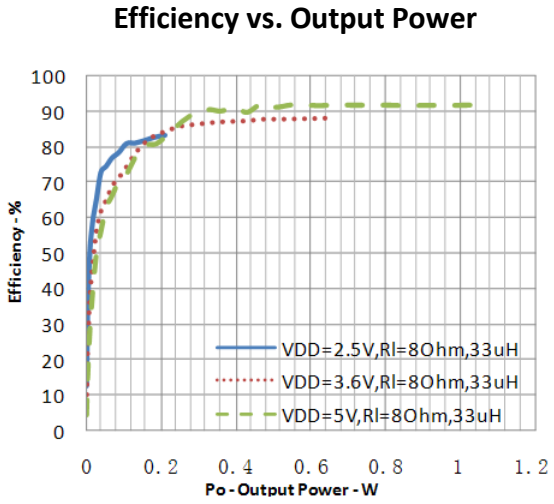


Fig.12

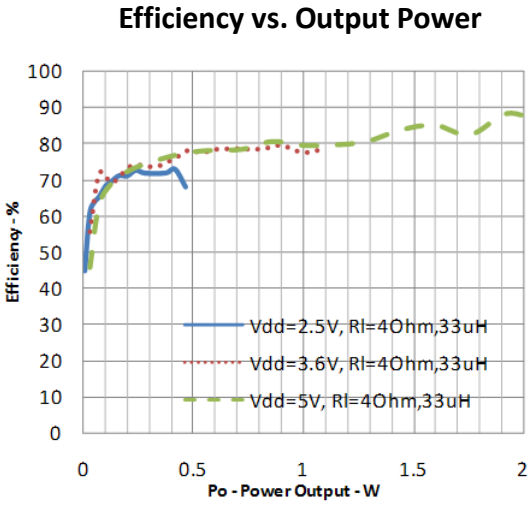


Fig.13

APPLICATION INFORMATION

- **Inputs Setting**

Only single-ended input mode is supported for MT6832. connect audio source to the INL/INR input through DC-cut capacitors (Ci) and input resistors (Ri), as Fig.14 shows.

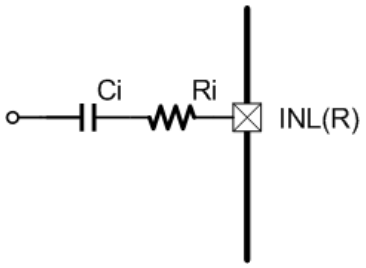


Fig.14. MT6832: Single-Ended Inputs

The VREF pin (Pin8) MUST connect to GND through a capacitor.

If there is one channel unused, input pin of the unused channel side, should be connected to GND through a capacitor as Fig. 15.

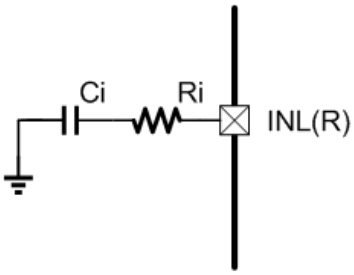


Fig.15. MT6832: Unused Channel Side

- **Shut down Mode**

The MT6832 provides a shutdown mode to reduce supply current to the absolute minimum level during periods of non-use for battery-power conservation. The $\overline{SD}$ input pin should be held high during normal operation when the amplifier is in use. Pulling $\overline{SD}$ low causes the outputs to mute and the amplifier to enter a low-current state. $\overline{SD}$ pin internally has a 300 KΩ/1MΩ resistor pull up to VDD. When $\overline{SD}$ pin is low, the

pull-up resistance is 1MΩ. When $\overline{SD}$ pin is high, the pull-up resistance is 300KΩ. So, this pin can be floating for normal operation.

- **Mute Function**

The $\overline{MUTE}$ pin is an input for controlling the output state of the MT6832. A logic low on this pin disables the outputs, and logic high on this pin enables the outputs. This pin may be used as a quick disable or enable of the outputs without a volume fade. Since there is 300KΩ/1MΩ pull-up resistor for this pin (When $\overline{MUTE}$ pin is low, the pull-up resistance is 1MΩ. When $\overline{MUTE}$ pin is high, the pull-up resistance is 300KΩ), it can be floating for non-mute operation.

- **Power Supply Decoupling**

The MT6832 is a high-performance CMOS audio amplifier that requires adequate power supply decoupling to ensure the output total harmonic distortion (THD) and PSRR are as low as possible. At this stage it is paramount that we acknowledge the need for separate power supplies and grounds. Noise currents in the output power stage need to be returned to output noise ground and nowhere else. Were these currents to circulate elsewhere, they may get into the power supply, the signal ground, etc, worse yet, they may form a loop and radiate noise. Any of these instances results in degraded amplifier performance. In the layout of the MT6832, the two channels amplifier should offer separate PVDD connections and PGND connections for each channel and signal currents for the inputs, reference, etc need to be returned to quite power supply VDD and GND.

As Fig. 16 showing, optimum decoupling is achieved by using two capacitors of different types that target different types of noise on the power supply leads. For higher frequency transients, spikes, or digital hash on the line, a good low equivalent series resistance (ESR) ceramic capacitor, typically 1.0μF, placed as close as possible to the device VDD terminal works best. For filtering lower-frequency noise signals, a larger capacitor of 10μF (ceramic) or greater placed near the audio power amplifier is recommended, this capacitor serves as local storage capacitor for supplying current during large signal transients on the amplifier outputs.

- **Over Current Protection**

The MT6832 has output short circuit protection circuitry on the outputs that prevents damage to the device during output-to-output short, output-to-GND short, and output-to-VDD short. MT6832 enters the shutdown state and the outputs are disabled when detects output short. This is a latched fault and must be reset by cycling the voltage on $\overline{SD}$ pin to a logic low and back to the logic high, or by cycling the power off and then back on. This clears the short circuit flag and allows for normal operation if the short was removed. If the short was not removed, the protection circuitry actives again.

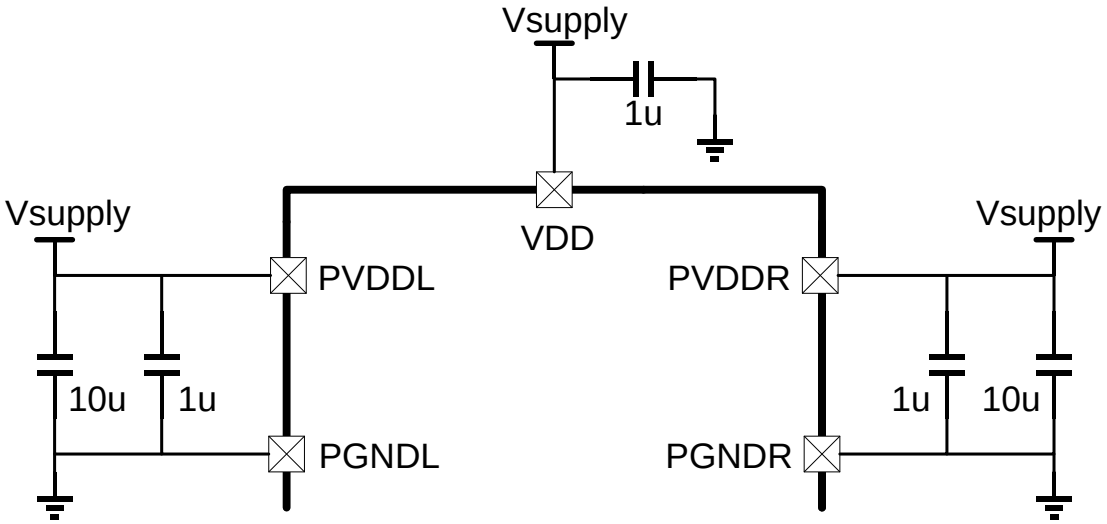
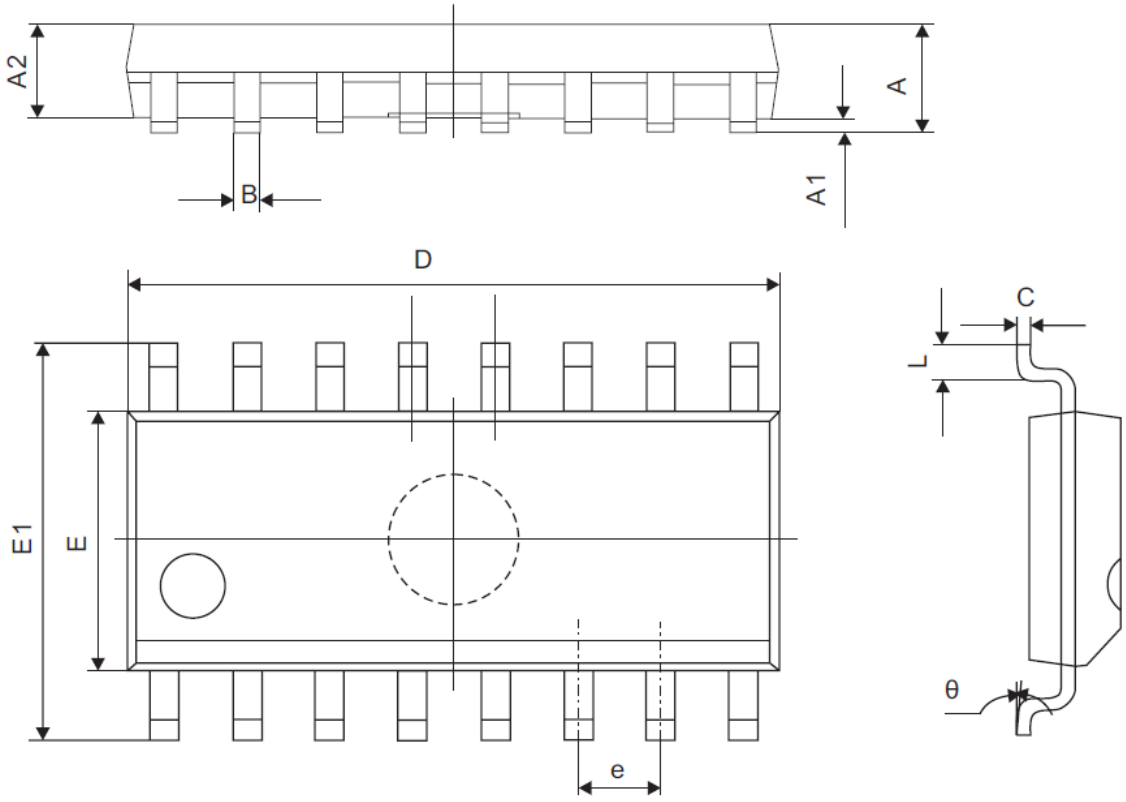


Fig.16. Power Supply Decoupling

PACKAGE DIMENSION

Package: SOP16



Symbol	Unit (mm)	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
B	0.330	0.510
C	0.190	0.250
D	9.800	10.000
E	3.800	4.000
E1	5.800	6.300
e	1.270(TYP)	
L	0.400	1.270
θ	0°	8°

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