

FEATURES

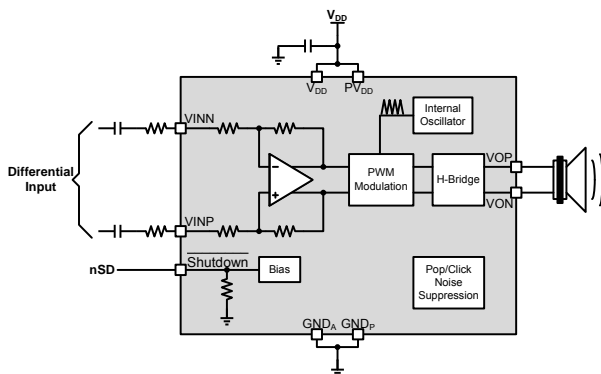
- Efficiency with an 8-Ω speaker:
 - 90% at 400 mW
 - 82% at 100 mW
- Only three external components
- Optimized PWM output stage eliminates LC output filter
- Internally generated 300-kHz switching frequency eliminates capacitor and resistor.
- Fully differential design reduces RF rectification and eliminates bypass capacitor improved CMRR eliminates two input coupling capacitors
- Wafer Chip Scale Packaging (WCSP)
- Operating temperature: -40 °C - 85 °C
- Over current and temperature protection

DESCRIPTIONS

The MT6802 is a 2.5W Class-D audio power amplifier. It is low noise, filter-free with PWM architecture, minimizing external component count, PCB area, system cost. The design of MT6802 is targeted for cellular phone and portable devices. The efficiency can be up to 90% at 400mW with 8Ω speaker. Its flexible power supply requirements allow operation from 2.5V to 5.5V.

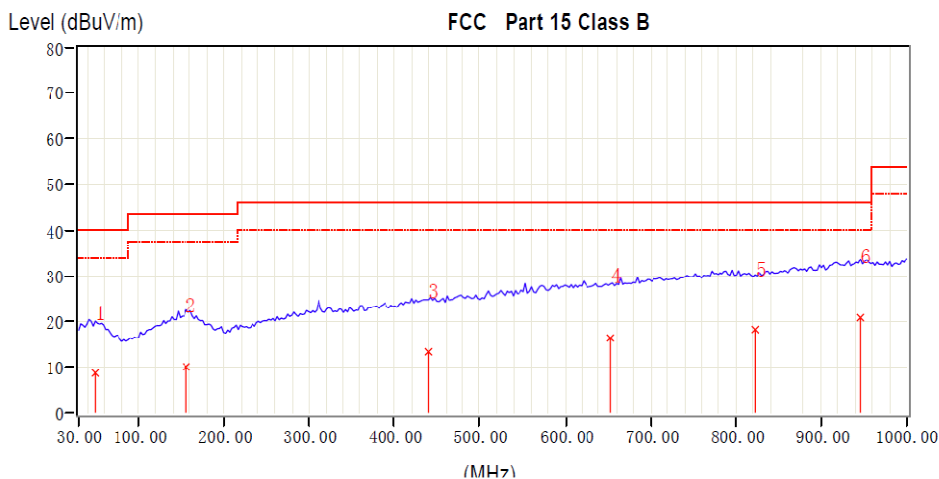
The MT6802 features a low-power consumption shutdown mode. The gain of the MT6802 is externally configurable which allows independent gain control from multiple sources by summing the signals. Output short circuit and thermal overload protection prevent the device from damage during fault conditions

APPLICATION CIRCUIT



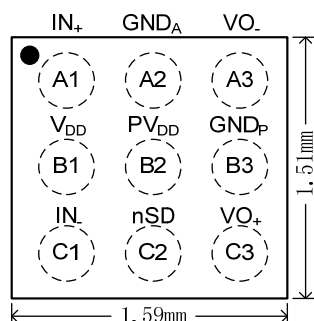
APPLICATIONS

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



MT6802 Rf Emissions graph

PIN CONFIGURATION



PIN DESCRIPTIONS

Pin#	Symbol	Function
IN+	A1	Positive differential input
GND	A2	Analog ground
VO-	A3	Negative BTL output
VDD	B1	Analog power supply
PVDD	B2	Power supply
PGND	B3	Power ground
IN-	C1	Negative differential input
SHUTDOWN	C2	Shutdown pin(active low logic)
VO+	C3	Positive BTL output

ORDER INFORMATION

TA	PACKAGE	PART NUMBER	Remarks
-40°C to 85°C	Wafer chip scale package	MT6802-WC	Tape & Reel (1,000pcs)

ABSOLUTE MAXIMUM RATINGS

Operating at free air temperature range

VDD	Supply voltage	In active mode	-0.3 V to 6 V
		In SHUTDOWN 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
TA	Operating free-air temperature		-40°C to 85°C
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

RECOMMENDED OPERATING CONDITION

		MIN	MAX	UNIT
VDD	Supply voltage	2.5	5.5	V
V _{IH}	High-level input voltage	SHUTDOWN	V _{DD}	V
V _{IL}	Low-level input voltage	SHUTDOWN	0.35	V
V _{ic}	Common mode input voltage range	VDD = 2.5 V, 5.5 V CMRR ≤ -49 dB	V _{DD} -0.8	
TA	Operating free-air temperature	-40	85	°C



PACKAGE DISSIPATION RATING

PACKAGE	DERATING FACTOR	TA ≤ 25°C POWER RATING	TA = 70°C POWER RATING	TA = 85°C POWER RATING
WCSP	7.8 mW/°C	780 mW	429 mW	312 mW

THERMAL CHARACTERISTICS

Symbol	Description	Value	Units
θ_{JA}	Maximum Thermal Resistance	160	°C/W
PD	Maximum power Dissipation	625	mW

TYPICAL PERFORMANCE CHARACTERISTICS

TA=25°C, VDD=5V, f=1kHz, Gain=2V/V, unless otherwise noted

ELECTRICAL CHARACTERISTICS

TA = 25°C

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
VOS	Output offset voltage (measured differentially)	VI = 0 V, AV = 2 V/V, VDD = 2.5 V to 5.5 V		2	19	mV
IIH	High-level input current	VDD = 5.5 V, VI = 5.8 V			100	μA
IIL	Low-level input current	VDD = 5.5 V, VI = -0.3 V			5	μA
I(Q)	Quiescent current	VDD = 5.5 V, no load		4.2		mA
		VDD = 3.6 V, no load		3.4		
		VDD = 2.5 V, no load		2.8		
I(SD)	Shutdown current	V(SHUTDOWN) = 0.35 V, VDD = 2.5 V to 5.5 V		0.1		μA
r _{DSON(P)}	Static drain-source on-state resistance	VDD = 2.5 V		531		mΩ
		VDD = 3.6 V		393		
		VDD = 5.5 V		313		
r _{DSON(N)}	Static drain-source on-state resistance	VDD = 2.5 V		474		mΩ
		VDD = 3.6 V		341		
		VDD = 5.5 V		281		
	Output impedance in SHUTDOWN	V(SHUTDOWN) = 0.35 V		>1		kΩ
f(sw)	Switching frequency	VDD = 2.5 V to 5.5 V		300		kHz
	Gain	VDD = 2.5 V to 5.5 V		$\frac{180k\Omega}{60k\Omega+R_i}$		V/V
	Resistance from shutdown to GND			300		kΩ

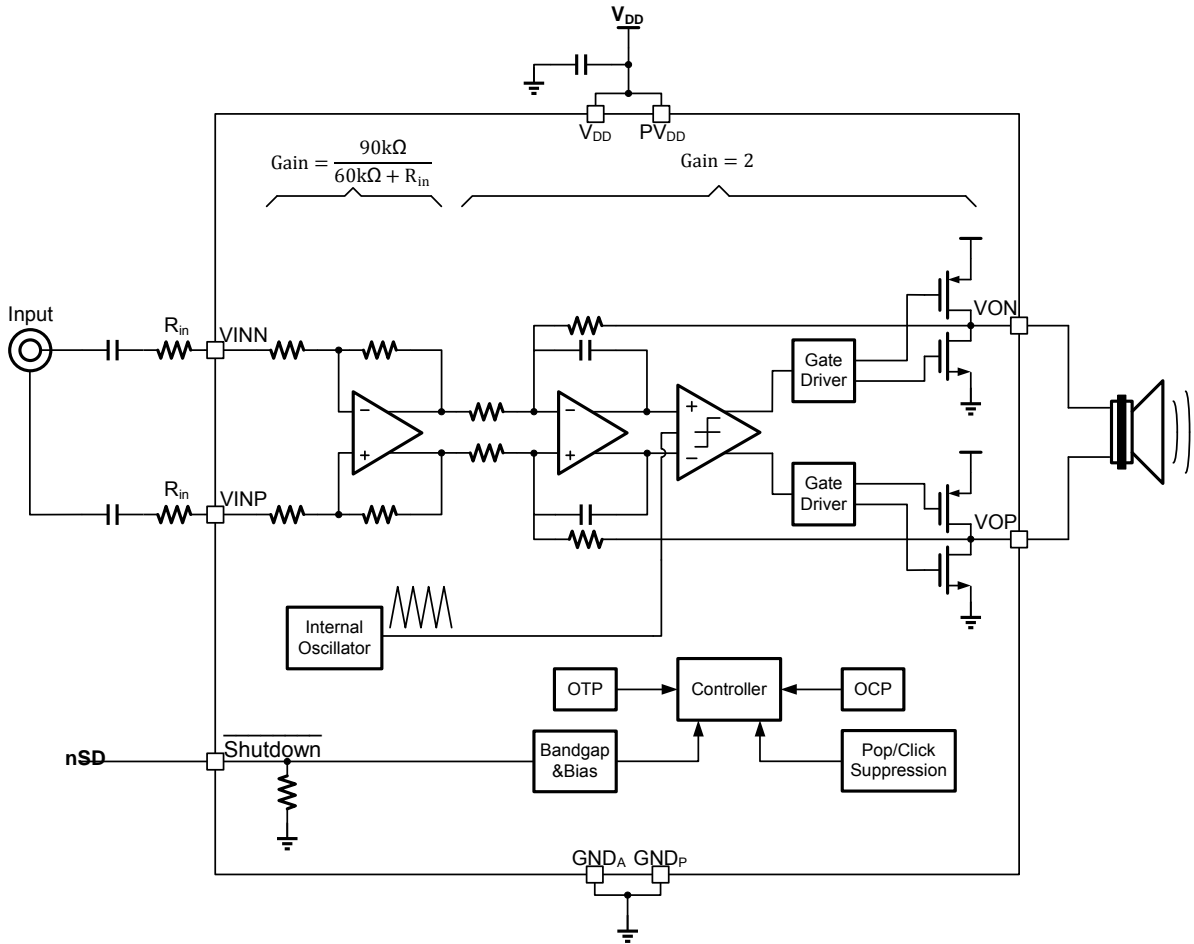


OPERATING CHARACTERISTICS

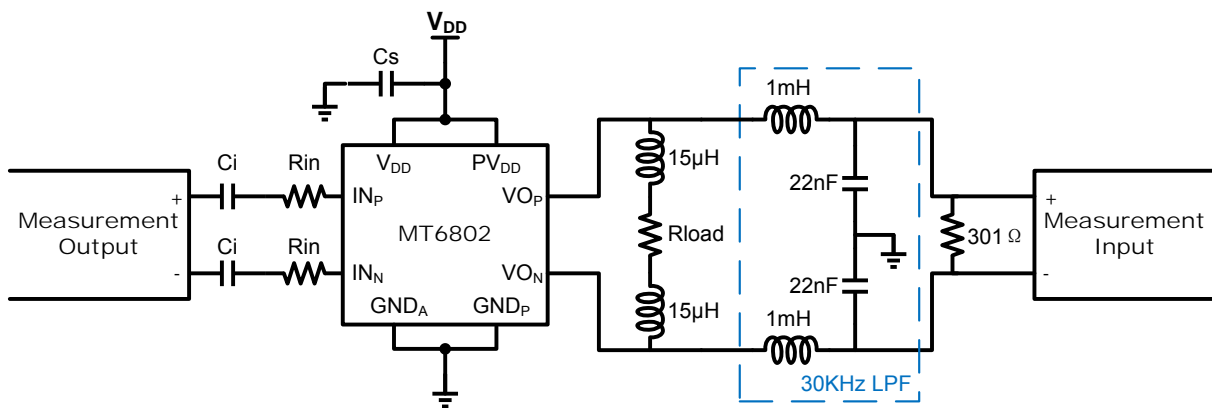
TA = 25°C, Gain = 2 V/V, RL = 8 Ω

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
PO	Output power	THD + N = 10%, f = 1 kHz, RL = 4 Ω	VDD = 5 V	2.72		W
			VDD = 3.6 V	1.32		
			VDD = 2.5 V	0.55		
		THD + N = 1%, f = 1 kHz, RL = 4 Ω	VDD = 5 V	2.15		W
			VDD = 3.6 V	1.05		
			VDD = 2.5 V	0.44		
		THD + N = 10%, f = 1 kHz, RL = 8 Ω	VDD = 5 V	1.77		W
			VDD = 3.6 V	0.89		
			VDD = 2.5 V	0.38		
		THD + N = 1%, f = 1 kHz, RL = 8 Ω	VDD = 5 V	1.25		W
			VDD = 3.6 V	0.78		
			VDD = 2.5 V	0.37		
THD+N	Total harmonic distortion plus noise	VDD= 5V, PO=1W, RL=8Ω, f=1kHz		0.07%		
		VDD= 3.6V, PO=0.5 W, RL=8 Ω, f = 1kHz		0.07%		
		VDD=2.5V,PO=200mW, RL = 8 Ω, f = 1kHz		0.09%		
PSRR	Supply ripple rejection ratio	VDD = 3.6 V, Inputs ac-grounded with Ci = 2 μF	f=217Hz, V(ripple)=0.2Vpp	-65		dB
SNR	Signal-to-noise ratio	VDD = 5V, PO = 1W, RL = 8Ω		91		dB
CMRR	Common mode rejection ratio	VDD = 3.6V, VIC = 1Vpp	f = 217Hz	-62		dB
	Start-up time from shutdown	VDD = 3.6V		1		ms

FUNCTIONAL BLOCK DIAGRAM



TEST SET-UP FOR GRAPHS



Efficiency vs. Output Power

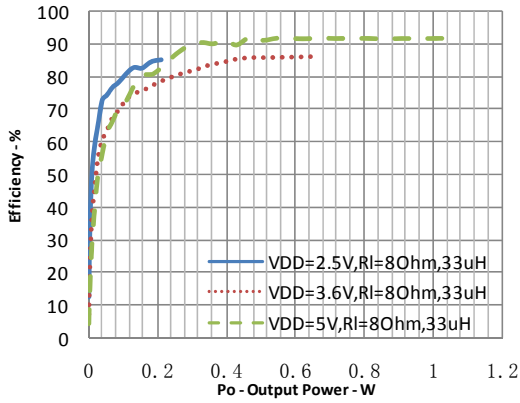


Fig 1

Efficiency vs. Output Power

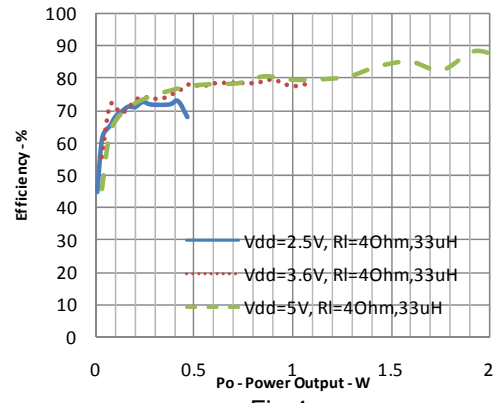


Fig 4

THD+N vs. Output Power

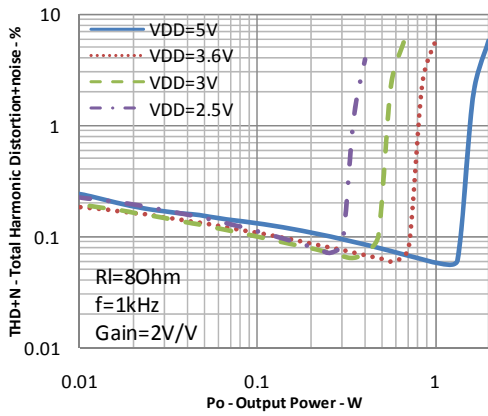


Fig 2

THD+N vs. Output Power

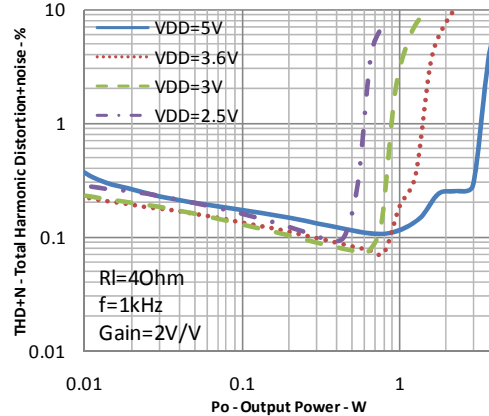


Fig 5

Output Power vs. Supply Voltage

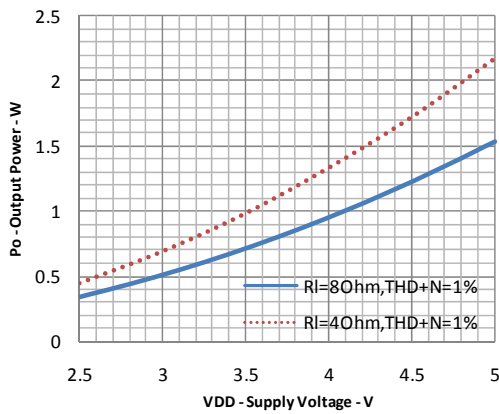


Fig 3

Supply Current vs. Supply Voltage

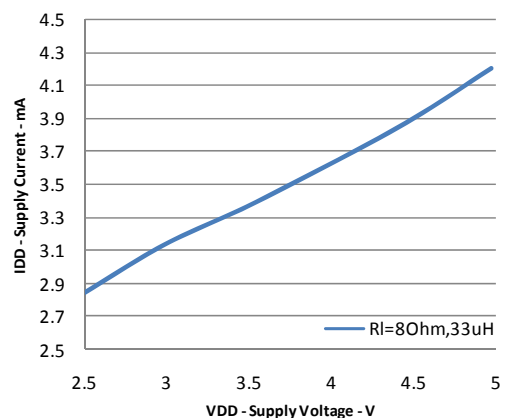


Fig 6

THD+N vs Frequency

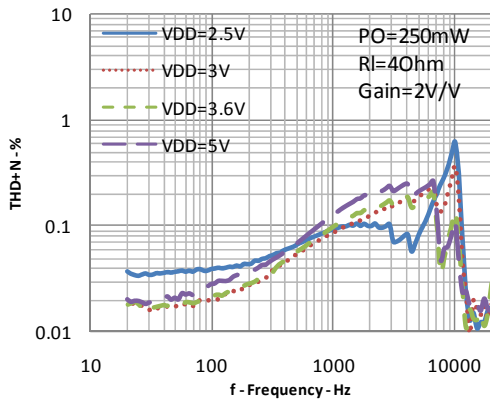


Fig 7

THD+N vs Frequency(2.5V)

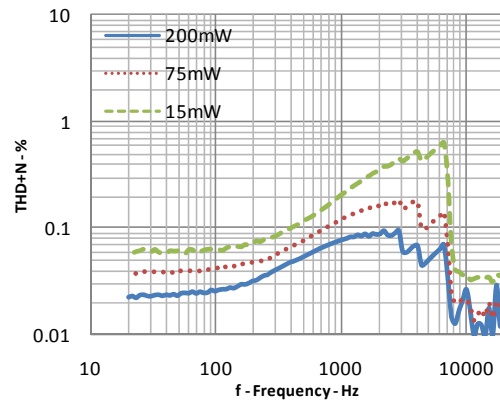


Fig 10

THD+N vs Frequency(3.6V)

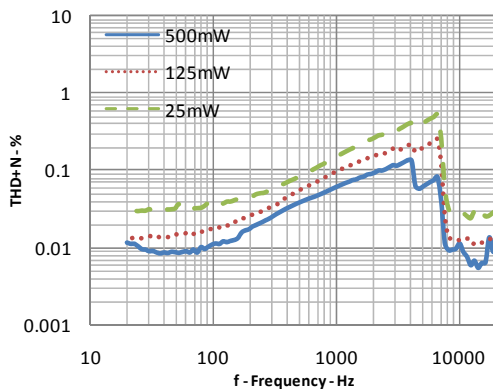


Fig 8

THD+N vs Frequency(5V)

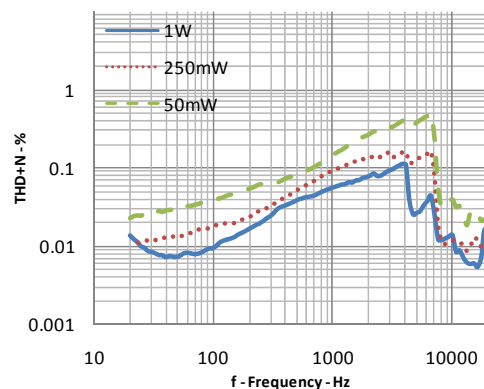


Fig 11

PSRR vs Frequency

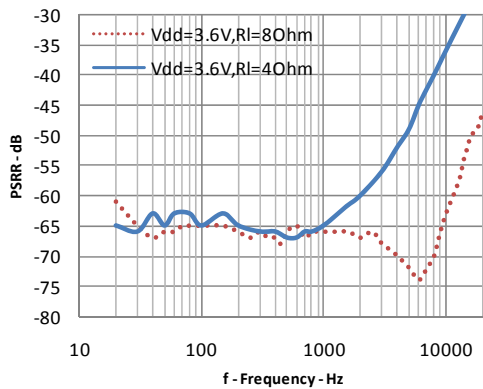


Fig 9

CMRR vs. Frequency

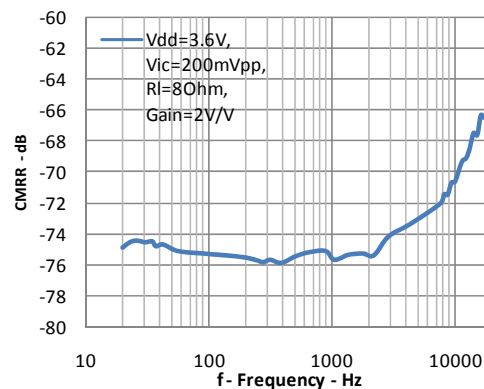


Fig 12

APPLICATION INFORMATION

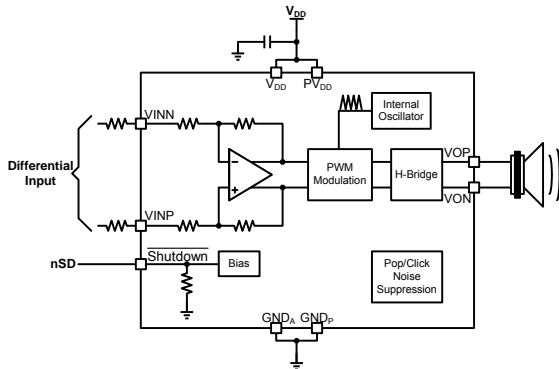


Fig 13 Application Schematic With Differential Input

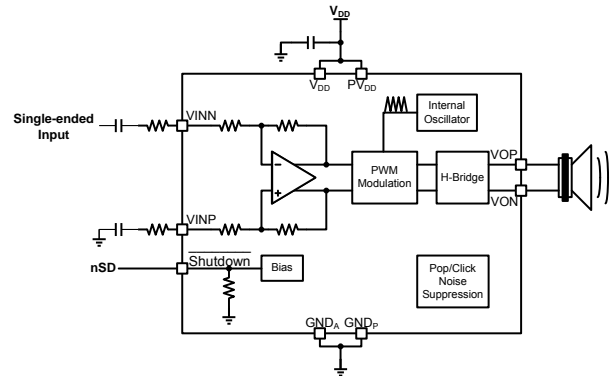


Fig 15 Application Schematic With Single-ended Input

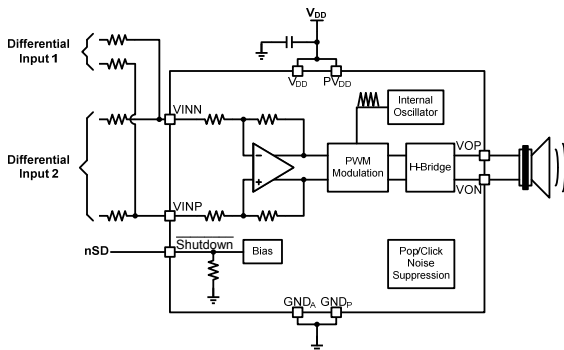


Fig 14 Application Schematic With Summing Two Differential Input

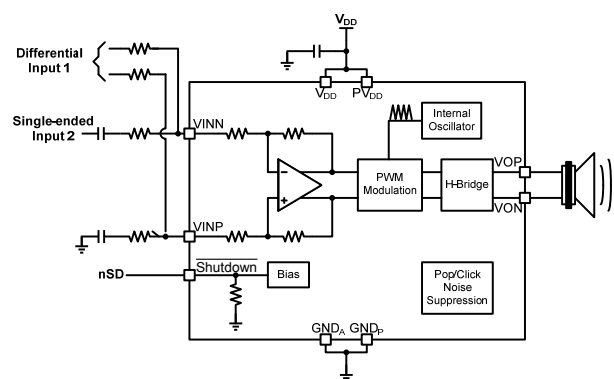
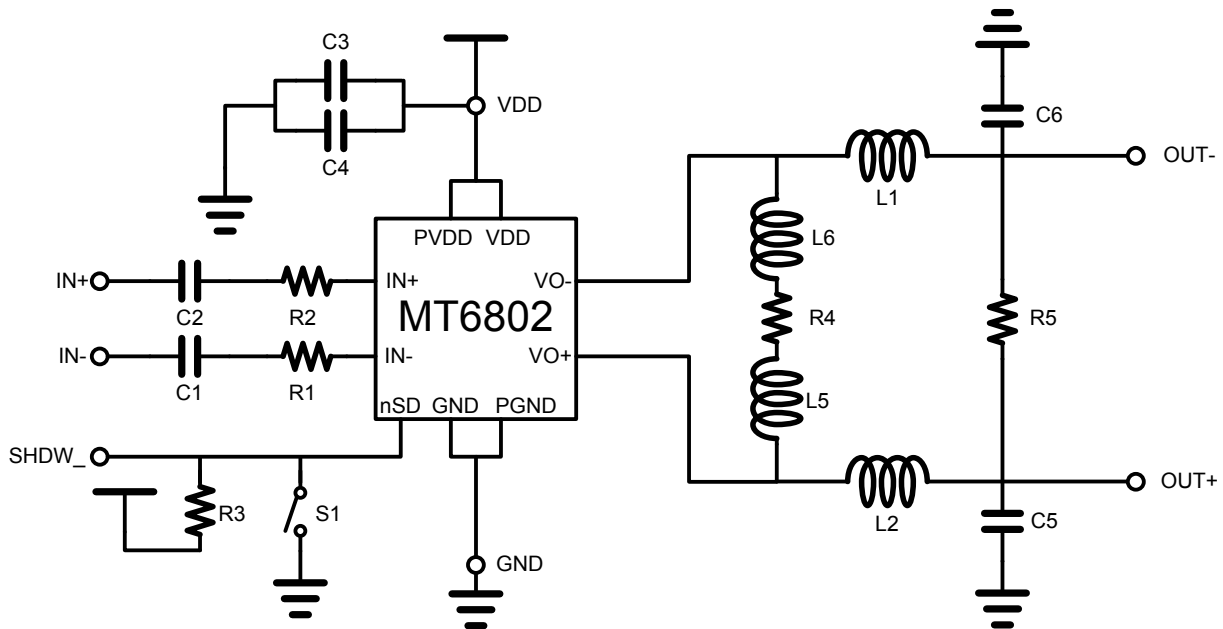


Fig 16 Application Schematic With Summing Differential Input and Single-ended Input

MT6802 Demo Board

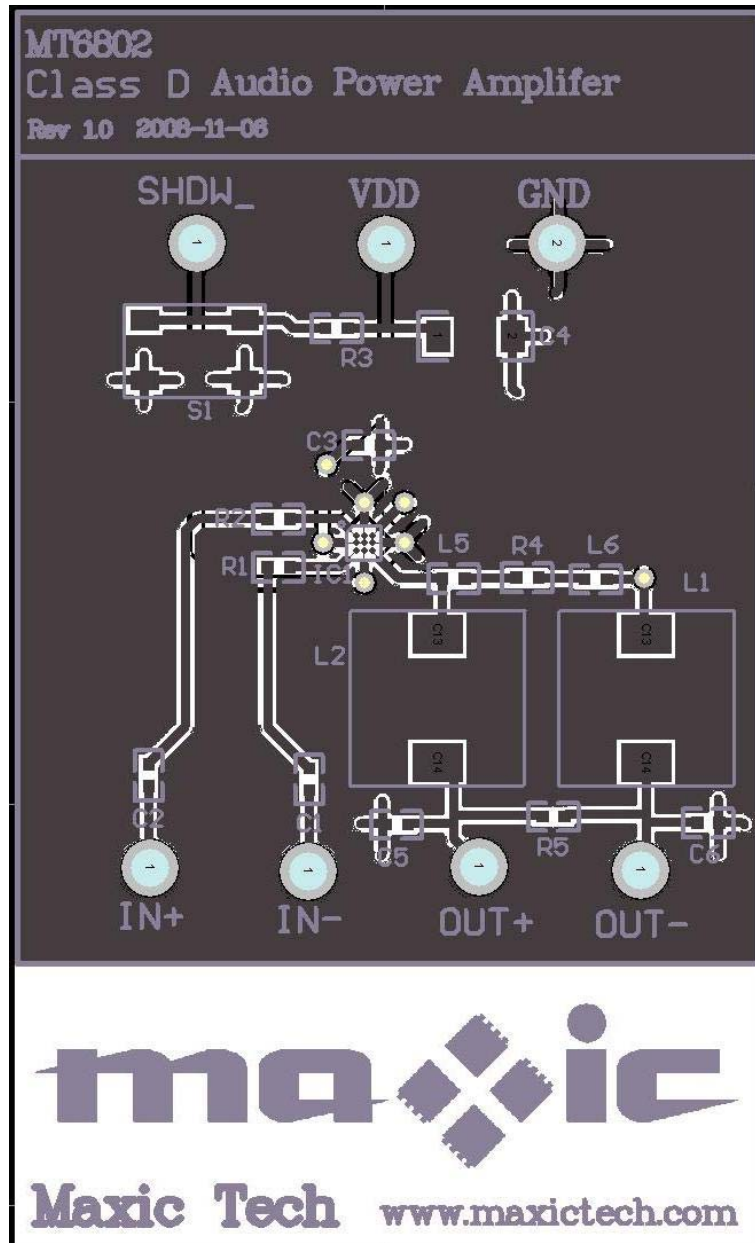
BOARD SCHEMATIC DIAGRAM



PARTS LIST

Qty.	Reference	Description	Size
3	C1,C2	Capacitor,2uF,nonpolarized	0603
1	C3	Capacitor,0.22uF,nonpolarized	0603
1	C4	Capacitor,10uF	A
2	C5,C6	Capacitor,22nF,nonpolarized	0603
2	L1,L2	Inductor,1mH	
2	L5,L6	Inductor,15uH,<0.2Ω,2A	
2	R1,R2	Resistor,30KΩ,0.1%	0603
1	R3	Resistor,100KΩ	0603
1	R4	Resistor,4/8Ω,2A	0603
1	R5	Resistor,301Ω	0603
1	S1	Switch	
7		Terminal post headers	
1	U1	IC, MT6802,Mono Class-D audio amplifier	WCSP 1.59mm*1.51mm
1	PCB	Printed-Circuit Board, MT6802 EVM	

BOARD LAYOUT



PACKAGE INFORMATION

