DESCRIPTION

The A2430 is a digital audio power amplifier IC with maximum output of 2.1W (R_L = 4Ω) x 2ch, which directly drives speakers while reducing distortion of pulse output signal and reducing noise on the signal, and realizes the highest standard low distortion rate characteristics and low noise characteristics .

The A2430 detects output signal clip due to the over level input signal and suppress the output signal clip automatically. Also the non-clip output control function can adapt the output clip caused by power supply voltage down with battery. Attack time and release time can be freely set by external resistances or capacitances.

The independent power-down function for L channel and R channel minimizes consumption current at standby. As for protection function, short-current protection function for speaker output terminal, over-temperatue protection function for inside of the device, and low supply voltage malfunction preventing function are prepared.

The A2430 is available in QFN20(4x4) package.

ORDERING INFORMATION

Package Type	Part Number	
QFN20 (4x4)	Q20	A2430Q20R
		A2430Q20VR
Note	R: Tape & Reel V: Green Package	
AiT provides all Pb free products Suffix " V " means Green Package		

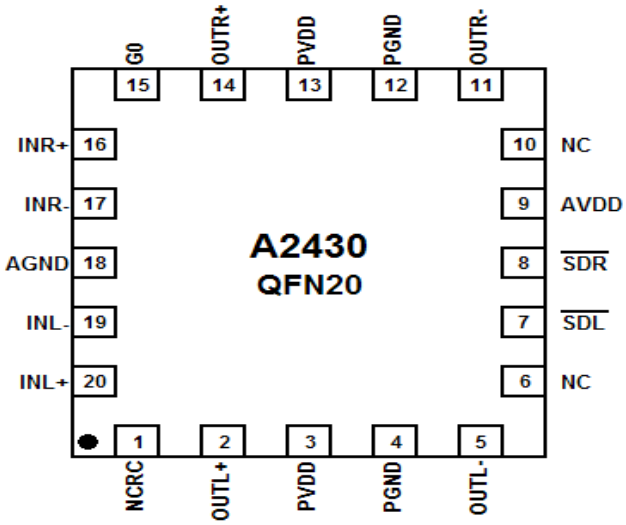
FEATURES

- Maximum output
  2.1W x 2ch
  (V_{DDP} = V_{DDA} = 5.0V, R_L = 4Ω, THD+N = 1%)
  0.75W x 2ch
  (V_{DDP} = V_{DDA} = 3.6V, R_L = 8Ω, THD+N = 10%)
- Distortion Rate (THD+N)
  0.03 %
  (V_{DDP} = V_{DDA} = 3.6V, R_L = 8Ω, P_O = 0.4W, 1kHz)
- Efficiency
  84 % (V_{DDP} = V_{DDA} = 3.6V, R_L = 8Ω, P_O == 600mW)
- Channel separation
  95dB
  (V_{DDP} = V_{DDA} = 3.6V, R_L = 8Ω, A_V = 18dB, 1kHz)
- Non-clip output
- 2ch independent power-down control function
- Thermal Protection function
- Available in QFN20(4x4) package.

APPLICATION

- Multimedia monitors
- Portable and desktop computers
- Portable televisions

PIN DESCIPTION



TOP VIEW

Pin #	Symbol	I/O	Functions
1	NCRC	I/O	Non-Clip control terminal
2	OUTL+	O	Positive output terminal (differential +) Lch
3, 13	PVDD	Power	Power supply for output
4, 12	PGND	GND	GND for output
5	OUTL-	O	Negative output terminal (differential -) Lch
6, 10	NC		Non connection or connect to AGND
7	SDL	I	Shut-down terminal for Lch
8	SDR	I	Shut-down terminal for Rch
9	AVDD	Power	Power supply for analog circuits
11	OUTR-	O	Negative output terminal (differential -) Rch
14	OUTR+	O	Positive output terminal (differential +) Rch
15	G0	I	Gain setting terminal
16	INR+	A	Positive input terminal (differential +) Rch
17	INR-	A	Negative output terminal (differential -) Rch
18	AGND	GND	GND for analog circuits
19	INL-	A	Negative input terminal (differential -) Lch
20	INL+	A	Positive input terminal (differential +) Lch

NOTE: I: Input terminal; O: Output terminal; A: Analog terminal.

ABSOLUTE MAXIMUM RATINGS

V_{DDP}, PVDD Voltage Range	-0.3V ~ 6.0V
V_{DDA}, AVDD Voltage Range	-0.3V ~ 6.0V
V_{IN}, Analog Input terminal Voltage Range	-0.3V ~ V_{DDA} + 0.3V
T_{JMAX}, Junction Temperature	125℃
T_{STG}, Storage Temperature	-50℃ ~ 125℃

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

DC Characteristics (V_{DDP} = V_{DDA} = 2.7V to 5.5V, T_A = -40℃ to 85℃, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AVDD consumption current	I_{DD}	V_{DDA} = 3.6, no load	-	6.0	-	mA
PVDD consumption current	I_{DD}	V_{DDA} = 3.6, no load No signal input	-	2.0	-	mA
Power-down current	I_{PD}	SDL = SDR = 0	-	-	1	uA
SDL, SDR ,G0 H level input voltage	V_{IH}		1.35	-	-	V
SDL, SDR ,G0 L level input voltage	V_{IL}		-	-	0.35	V

AC Characteristics (V_{DDP} = V_{DDA} = 2.7V to 5.5V, T_A = -40℃ to 85℃, unless otherwise specified)

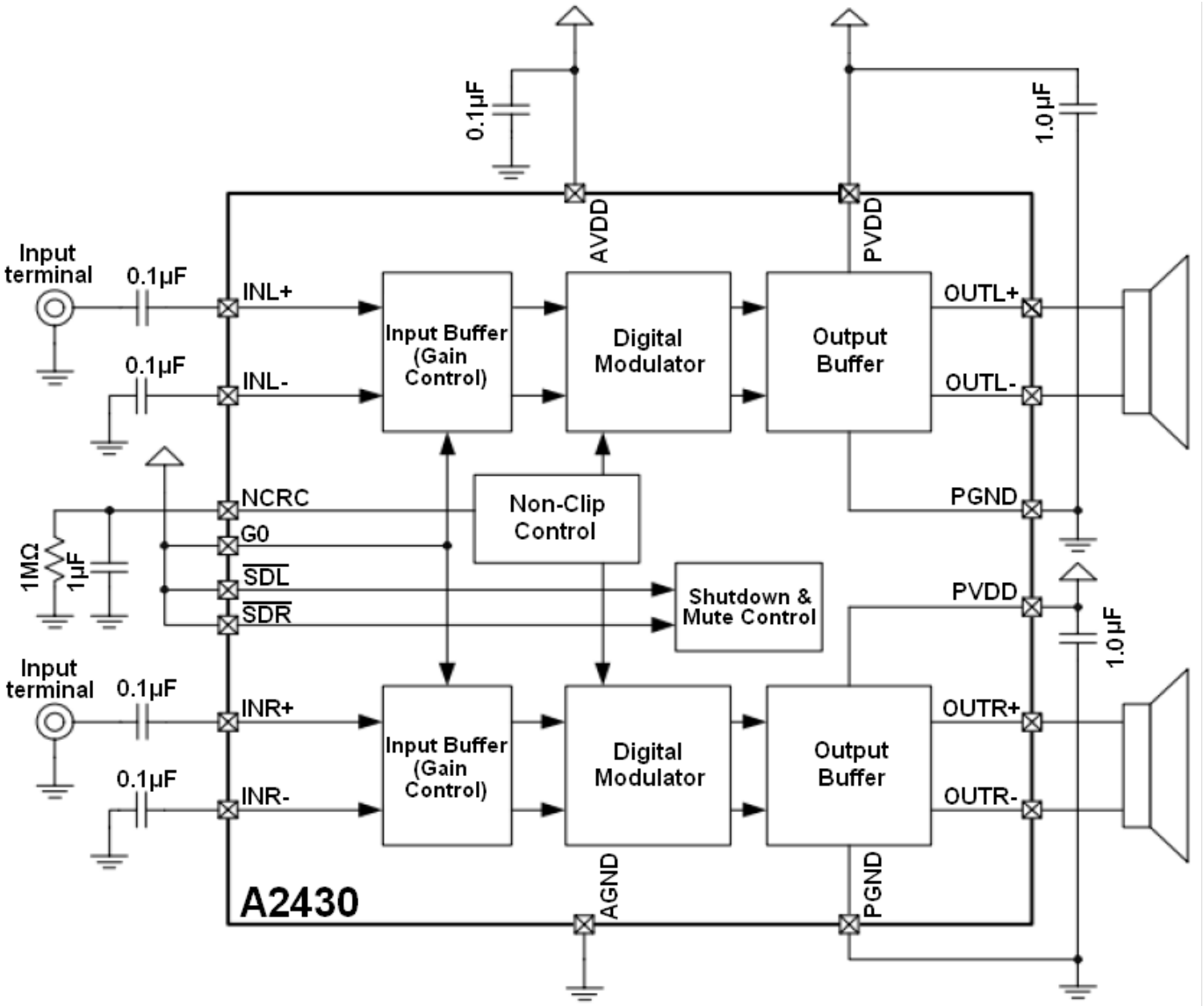
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Start-up time	T_{STUP}		-	3.5	-	ms
Input cut-off frequency	f_C	C_{IN} = 0.1uF, A_V = 18dB	-	57	-	Hz
Attack time	T_{AT}	V_{DDA} = 3.6 A_V = 10dB Cex = 1uF, Rex = 1MΩ	-	10	-	ms
Release time	T_{RL}	V_{DDA} = 3.6 A_V = 10dB Cex = 1uF, Rex = 1MΩ	-	0.8	-	s
Carrier clock frequency	f_{PWM}		-	500	-	kHz

Analog Characteristics (V_{DDP} = V_{DDA} = 3.6V, T_A = 25ºC, R_L = 8Ω, Non-clip off ,unless otherwise specified)

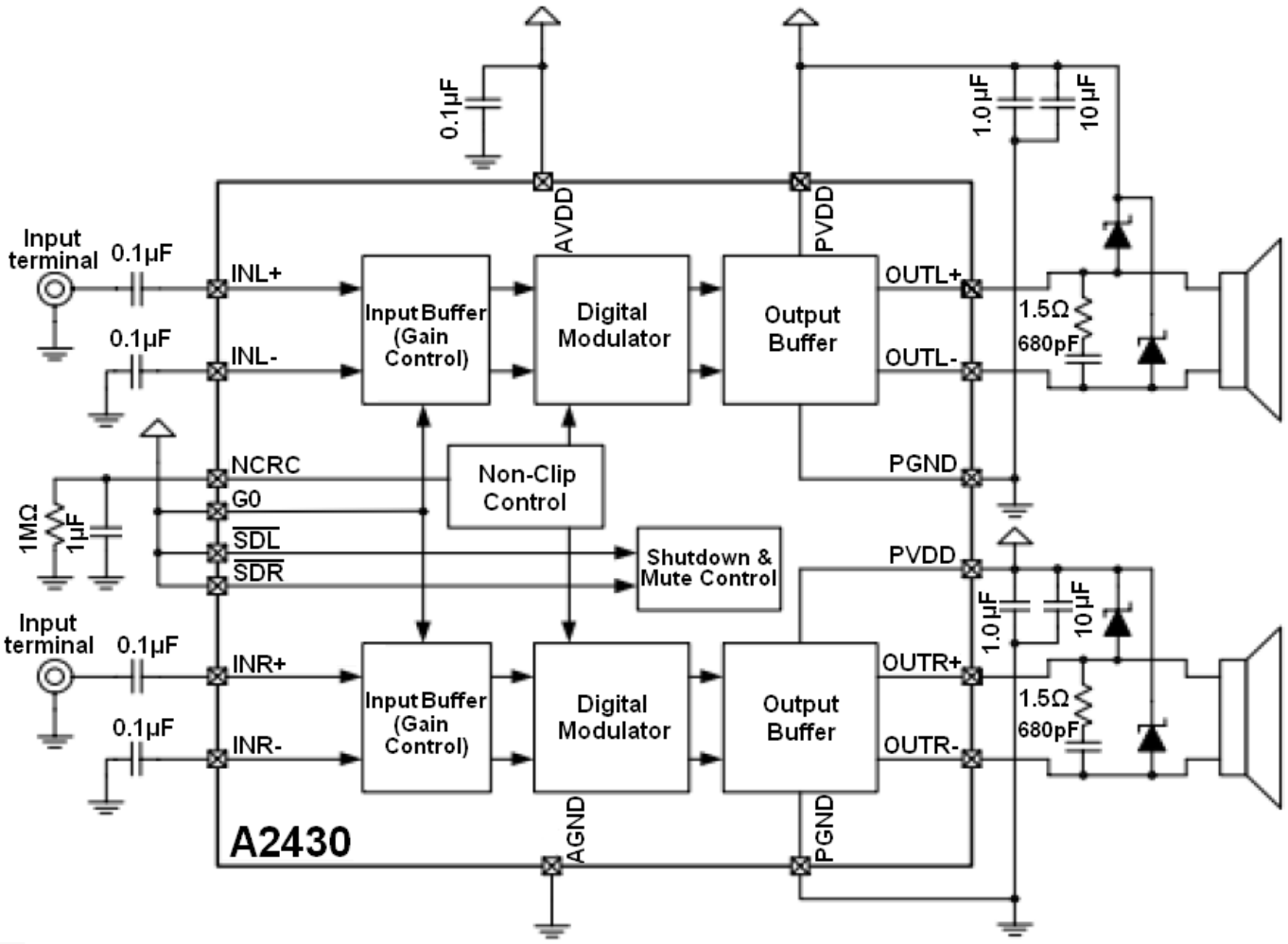
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum output	P_O	R_L = 4Ω, f = 1kHz THD + N = 10% V_{DDA} = V_{DDP} = 5	-	2.1	-	W
Voltage Gain	A_V	G0 = L	-	12	-	dB
		G0 = H	-	18	-	
THD + Noise		V_{DDA} = 3.6, A_V = 10dB Cex =1uF, Rex =1MΩ	-	0.03	-	%
PSRR		217Hz to PVDD	-	-85	-	dB
Non-Clip maximum attenuation gain	A_a		-	-10	-	dB

TYPICAL APPLICATION

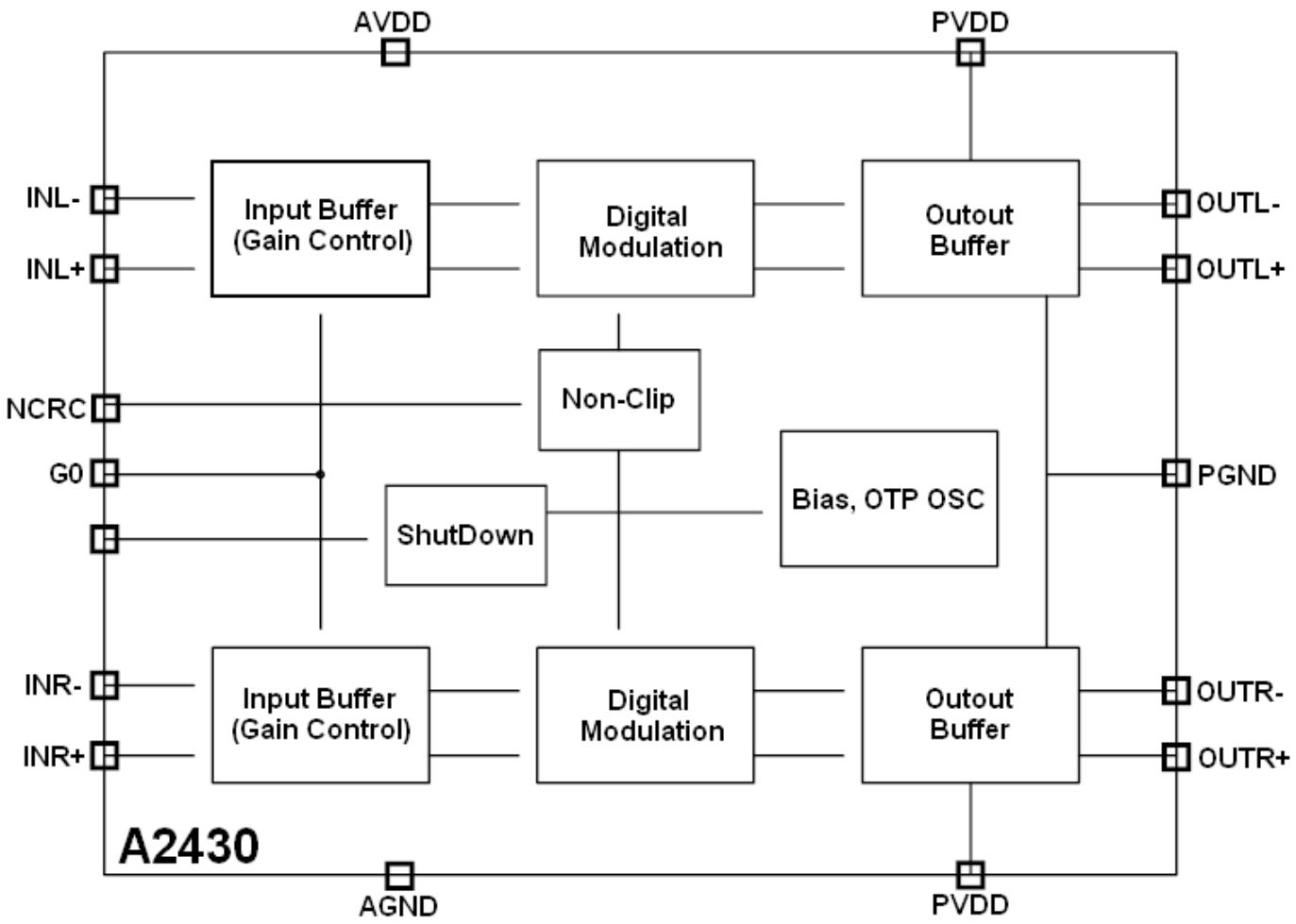
Application 1. (2.7V ≦ PVDD ≦ 4.5V)



Application 2. (4.5V ≦ PVDD)



BLOCK DIAGRAM



DEATILED INFORMATION

First Stage Amplifier Gain Setting Function

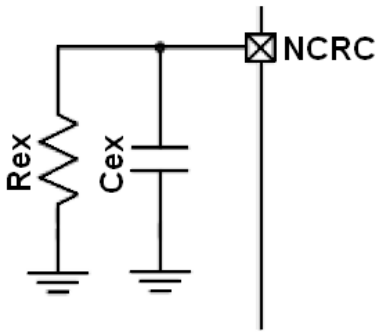
G0 terminal can set the Gain of A2430. When Non-Clip function is disabled, the relation between G0 terminal setting and Gain is as follows.

G0	Gain	Input Impedance(Zin)
L	12dB	44kΩ
H	18dB	28kΩ

Non-Clip control Function

This is the function to control the output in order to obtain a maximum output level without distortion when an excessive input which causes clipping at the differential signal output is applied. A2430 follows also to the clip of the output wave form due to the decrease in the power-supply voltage.

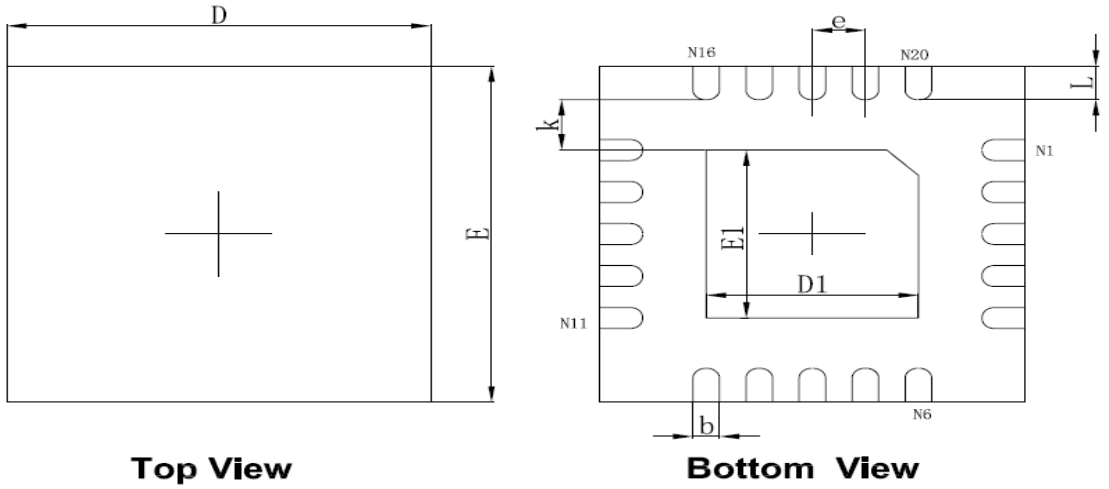
Connecting a resistor (Rex) and a capacitor (Cex) to NCRC terminal can set Attack Time and Release Time of the Non-Clip control.



Rex (MΩ)	1	4.7	1	1
Cex (uF)	1	1	0.47	4.7
Attack Time (ms)	10	10	4.7	47
Release Time (s)	0.8	3.8	0.38	3.8

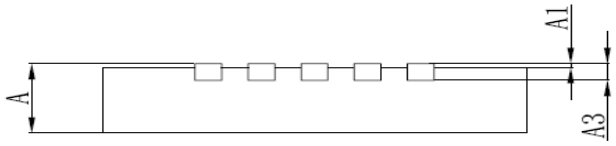
PACKAGE INFORMATION

Dimension in QFN20 (Unit: mm)



Top View

Bottom View



Side View

Symbol	Min	Max
A	0.700/0.800	0.800/0.900
A1	0.000	0.050
A3	0.203REF	
D	3.900	4.100
E	3.900	4.100
D1	1.900	2.100
E1	1.900	2.100
k	0.200MIN	
b	0.180	0.300
e	0.500TYP	
L	0.300	0.500

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