AN7513

1-W BTL audio power amplifier

■ Overview

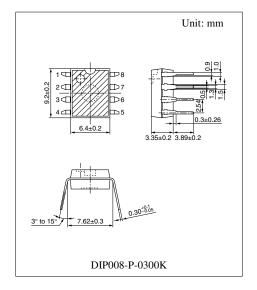
The AN7513 is an audio power amplifier IC with 1-ch output. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

■ Features

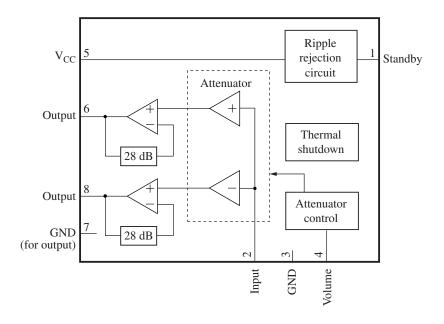
- 1-W output (8 Ω) with supply voltage of 5 V
- On-chip standby function
- On-chip volume function

Applications

• Televisions, radios, and personal computers



■ Block Diagram



■ Pin Descriptions

Pin No.	Description			
1	Standby (standby state if this pin is open.)			
2	Input			
3	Ground (for input)			
4	Volume (max. volume if this pin is open.)			
5	Supply voltage			
6	+ Output			
7	Ground (for output ch.1)			
8	– Output			

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	
Supply voltage *2	V _{CC}	14	V	
Supply current	I_{CC}	1.0	A	
Power dissipation *3	P_{D}	541	mW	
Operating ambient temperature *1	T _{opr}	-25 to +70	°C	
Storage temperature *1	T_{stg}	-55 to +150	°C	

Note) *1: Except for the operating ambient temperature and storage temperature, all ratings are for $T_a = 25$ °C.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit	
Supply voltage	V _{CC}	3.5 to 13.5	V	

■ Electrical Characteristics at $V_{CC} = 5.0 \text{ V}$, $R_L = 8 \Omega$, f = 1 kHz, $T_a = 25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Quiescent circuit current	I_{CQ}	$V_{IN} = 0 \text{ mV}, \text{ Vol.} = 0 \text{ V}$	_	20	60	mA
Standby current	I _{STB}	$V_{IN} = 0$ mV, Vol. = 0 V	_	1	10	μΑ
Output noise voltage *	V _{NO}	$R_g = 10 \text{ k}\Omega, \text{ Vol.} = 0 \text{ V}$	_	0.10	0.4	mV[rms]
Voltage gain	G_{V}	P _O = 0.25 W, Vol. = 1.25 V	31	33	35	dB
Total harmonic distortion	THD	P _O = 0.25 W, Vol. = 1.25 V	_	0.10	0.5	%
Maximum output power	P _{O1}	THD = 10%, Vol. = 1.25 V	0.7	1.0	_	W
Ripple rejection ratio *	RR	$R_g = 10 \text{ k}\Omega, \text{ Vol.} = 0 \text{ V},$ $V_R = 0.5 \text{ V[rms]}, f_R = 120 \text{ Hz}$	30	50	_	dB
Output offset voltage	V _{OFF}	$R_g = 10 \text{ k}\Omega, \text{ Vol.} = 0 \text{ V}$	-250	0	250	mV
Volume attenuation rate *	Att	P _O = 0.25 W, Vol. = 0 V	70	85	_	dB
Intermediate voltage gain	G_{VM}	$P_{O} = 0.25 \text{ W}, \text{ Vol.} = 0.6 \text{ V}$	20.5	23.5	26.5	dB

Note) *: In measuring, the filter for the range of 15 Hz to 30 kHz (12 dB/OCT) is used.

^{*2:} At no signal

^{*3:} The power dissipation shown is the value for $T_a = 70^{\circ}$ C.

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■ Terminal Equivalent Circuits

Pin No.	Pin name	Equivalent circuit	Voltage
1	Standby pin	$V_{CC} \circ \begin{array}{c} & & & & & \\ & $	5 V
2	Input pin	V _{CC} • V _{REF1} (1.4 V) V _{CC} • V _{REF1} (1.4 V)	1.4 V
3	GND	3	0 V
4	Volume pin	V _{CC} ο 1 kΩ 8 2 1 1 kΩ 8 2 1 1 kΩ 8 1 kΩ	

■ Terminal Equivalent Circuits (continued)

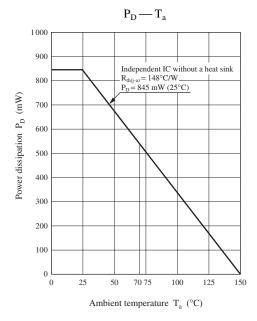
Pin No.	Pin name	Equivalent circuit	Voltage
5	V_{CC}	_	5.0 V
6	+ Output pin	V _{CC} V _{CC} δ0 Ω δ0	2.15 V
7	GND	7	0 V
8	– Output pin	1/2 V _{CC} 800 Ω 20 kΩ 8	2.15 V

■ Usage Notes

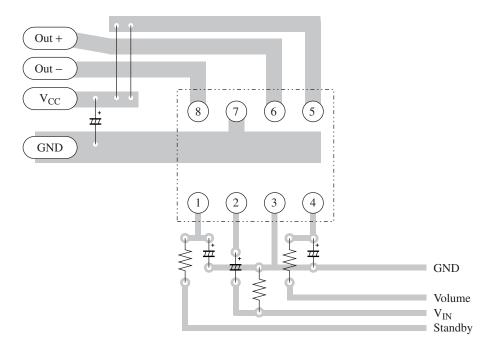
- \bullet Please avoid the short circuit to V_{CC} , ground, or load short circuit.
- Please connect the cooling fin with the GND potential.
- The thermal shutdown circuit operates at about $T_j = 150^{\circ}$ C. However, the thermal shutdown circuit is reset automatically if the temperature drops.
- \bullet Please carefully design the heat radiation especially when you take out high power at high V_{CC} .
- Please connect only the ground of signal with the signal GND of the amplifier in the previous stage.

■ Technical Data

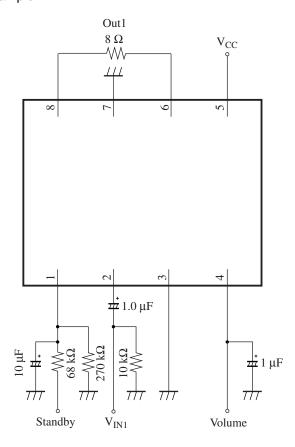
1. Package power dissipation



2. Example of PCB pattern



■ Application Circuit Example



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