

# AN7513

## 1-W BTL audio power amplifier

### ■ Overview

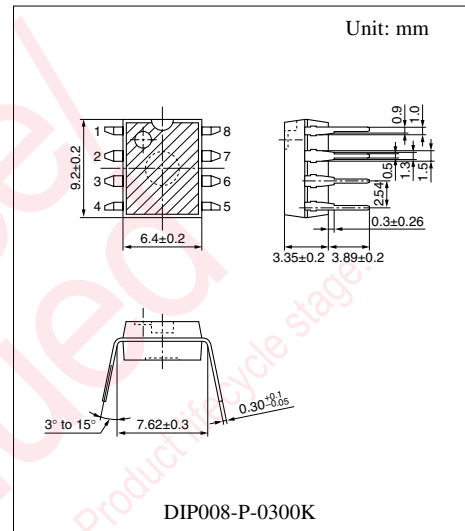
The AN7513 is an audio power amplifier IC with 1-ch output. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

### ■ Features

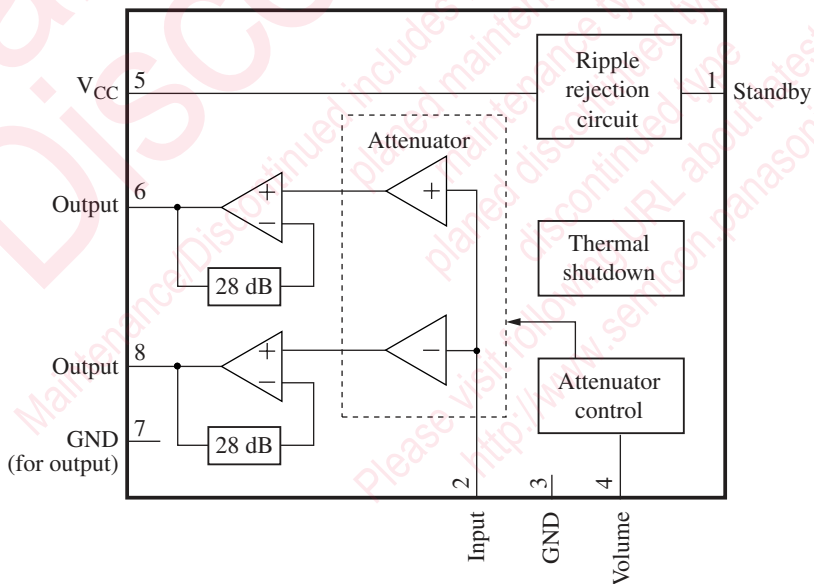
- 1-W output (8  $\Omega$ ) with supply voltage of 5 V
- On-chip standby function
- On-chip volume function

### ■ 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  $T_a = 25^\circ\text{C}$ .

\*2: At no signal

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

### ■ Recommended Operating Range

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

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	$I_{CQ}$	$V_{IN} = 0\text{ mV}$ , Vol. = 0 V	—	20	60	mA
Standby current	$I_{STB}$	$V_{IN} = 0\text{ mV}$ , Vol. = 0 V	—	1	10	$\mu\text{A}$
Output noise voltage *	$V_{NO}$	$R_g = 10\text{ k}\Omega$ , Vol. = 0 V	—	0.10	0.4	mV[rms]
Voltage gain	$G_V$	$P_O = 0.25\text{ W}$ , Vol. = 1.25 V	31	33	35	dB
Total harmonic distortion	THD	$P_O = 0.25\text{ W}$ , 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	$R_g = 10\text{ k}\Omega$ , Vol. = 0 V, $V_R = 0.5\text{ V[rms]}$ , $f_R = 120\text{ Hz}$	30	50	—	dB
Output offset voltage	$V_{OFF}$	$R_g = 10\text{ k}\Omega$ , Vol. = 0 V	-250	0	250	mV
Volume attenuation rate *	Att	$P_O = 0.25\text{ W}$ , Vol. = 0 V	70	85	—	dB
Intermediate voltage gain	$G_{VM}$	$P_O = 0.25\text{ W}$ , Vol. = 0.6 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.

■ Terminal Equivalent Circuits

Pin No.	Pin name	Equivalent circuit	Voltage
1	Standby pin		5 V
2	Input pin		1.4 V
3	GND		0 V
4	Volume pin		—

■ Terminal Equivalent Circuits (continued)

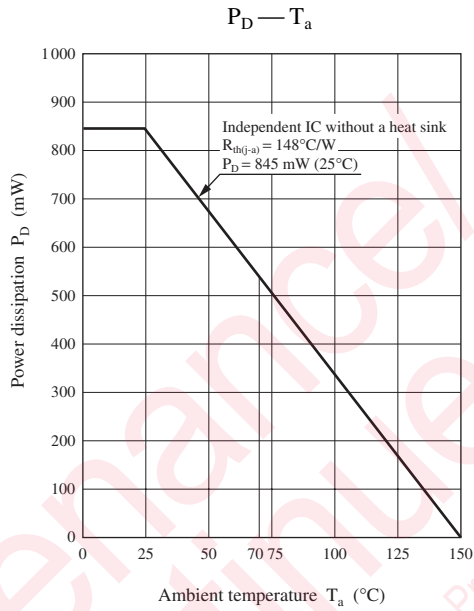
Pin No.	Pin name	Equivalent circuit	Voltage
5	$V_{CC}$	—	5.0 V
6	+ Output pin		2.15 V
7	GND		0 V
8	- Output pin		2.15 V

■ Usage Notes

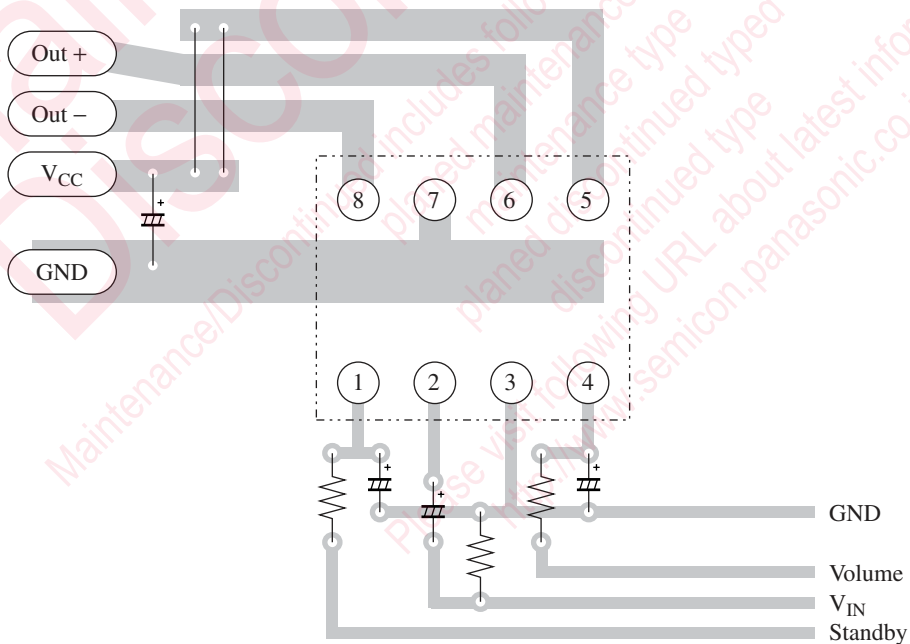
- Please avoid the short circuit to  $V_{CC}$ , ground, or load short circuit.
- Please connect the cooling fin with the GND potential.
- The thermal shutdown circuit operates at about  $T_j = 150^{\circ}\text{C}$ . However, the thermal shutdown circuit is reset automatically if the temperature drops.
- 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

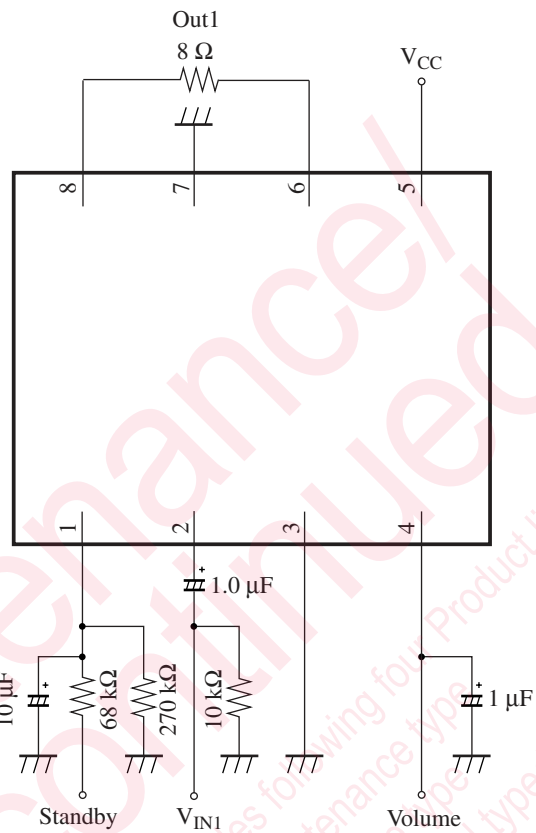
1. Package power dissipation



2. Example of PCB pattern



■ Application Circuit Example



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