

# BIPOLAR ANALOG INTEGRATED CIRCUIT

# $\mu$ PC1308V

## 18 W AF POWER AMPLIFIER

### SILICON BIPOLAR MONOLITHIC INTEGRATED CIRCUIT

#### DESCRIPTION

The  $\mu$ PC1308V is an audio power amplifier in a 14-lead vertical dual in-line package, specifically designed for car stereo applications.

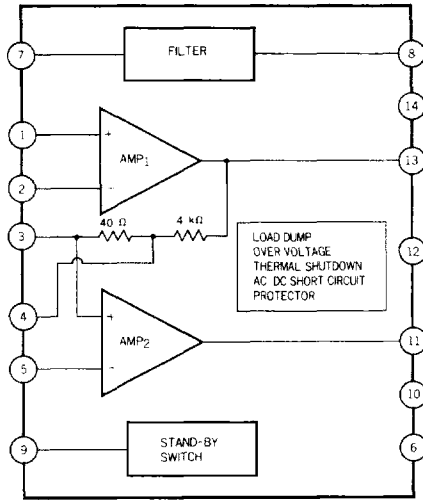
Typically it provides output power of 18 W at 14.4 V or 15 W at 13.2 V to a 4  $\Omega$  load.

This IC can be used without output capacitors, because its two output terminals have the same potential and it includes an original short circuit protection function which protects internal output power transistors and a speaker at the same time when one output terminal is shorted to ground.

#### FEATURES

- Internal stand-by switch circuit, CMOS drive possible.
- Can be used as OCL connection.
- Very low output offset voltage :  $V_{\text{offset}} = 150 \text{ mV (MAX.)}$
- High output power :  $P_{\text{O}} = 18 \text{ W (TYP.) @ } R_{\text{L}} = 4 \Omega, V_{\text{CC}} = 14.4 \text{ V, THD} = 10 \%$   
 $P_{\text{O}} = 15 \text{ W (TYP.) @ } R_{\text{L}} = 4 \Omega, V_{\text{CC}} = 13.2 \text{ V, THD} = 10 \%$
- Very low distortion :  $\text{THD} = 0.1 \%$  (TYP.)
- Following protection circuits are included.
  - (1) Load dump voltage surge protection circuit.
  - (2) Thermal shut down protection circuit.
  - (3) Output terminal short circuit protection circuit. ( $V_{\text{CC}}$  to OUT, OUT to GND, OUT to OUT)
  - (4) Loudspeaker protection circuit.

**BLOCK DIAGRAM**

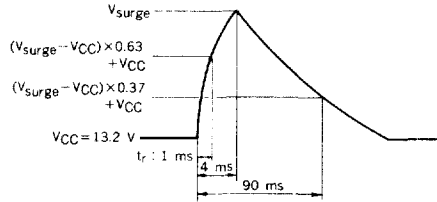


**CONNECTION DIAGRAM**

PIN No.	CONNECTION	PIN No.	CONNECTION
1	Input 1	8	VCC
2	NFB 1	9	Stand-by switch
3	GND (Input)	10	NC
4	Output 1 Devided	11	Output 2
5	NFB 2	12	GND (Output)
6	GND (Output)	13	Output 1
7	Filter	14	NC

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

Supply Voltage (Note)	V <sub>CC surge</sub>	60	V
Supply Voltage (Operational)	V <sub>CC</sub>	18	V
Circuit Current (Peak)	I <sub>CC peak</sub>	4.5	A
Power Dissipation	P <sub>D</sub>	20	W
Operating Temperature	T <sub>opt</sub>	-30 to +75	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C



Surge Pulse Waveform

**RECOMMENDED OPERATING CONDITIONS (T<sub>a</sub> = 25 °C)**

Supply Voltage Range	9 to 16	V
Load Impedance	3.2 to 16	Ω
Pin 9 Voltage (Operating)	3.5 to V <sub>CC</sub>	V
Pin 9 Voltage (Stand-by)	0 to 1.5	V

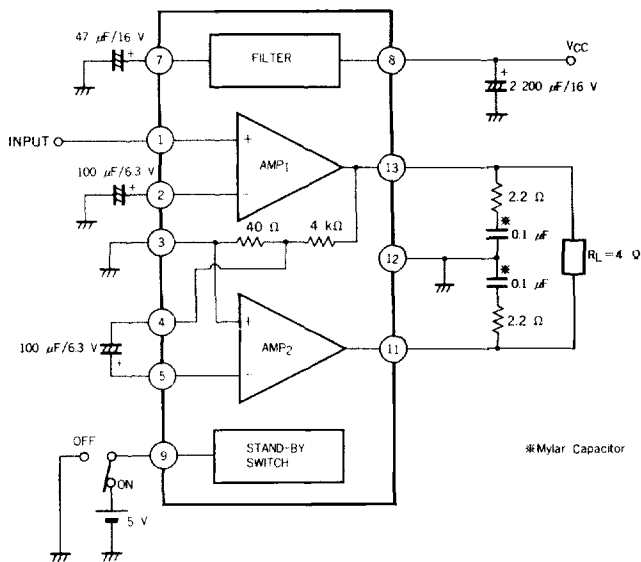
**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C, V<sub>CC</sub> = 13.2 V, R<sub>L</sub> = 4 Ω, f = 1 kHz, Using 4 °C/W heat sink)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Quiescent Current	I <sub>CC</sub>		90	150	mA	V <sub>i</sub> = 0
Output Offset Voltage	V <sub>offset</sub>		0	±150	mV	V <sub>i</sub> = 0
Output Power	P <sub>O</sub>		18		W	V <sub>CC</sub> = 14.4 V, THD = 10 %**
		12	15		W	V <sub>CC</sub> = 13.2 V, THD = 10 %**
Voltage Gain	A <sub>v</sub>	44	46	48	dB	
Total Harmonic Distortion	THD		0.1	0.5	%	P <sub>O</sub> = 1 W
Output Noise Level	V <sub>n</sub>		0.45	1.5	mV <sub>r.m.s.</sub>	R <sub>G</sub> = 10 kΩ, BW = 20 Hz to 20 kHz
Supply Voltage Rejection Ratio	SVR	40	46		dB	R <sub>G</sub> = 0, f <sub>rip</sub> = 100 Hz, V <sub>rip</sub> = 0.5 V
Input Resistance	R <sub>i</sub>	45	65		kΩ	
Roll-off Frequency	f <sub>H</sub>		80		kHz	A <sub>v</sub> = -3 dB from 1 kHz Ref High
	f <sub>L</sub>		10		Hz	A <sub>v</sub> = -3 dB from 1 kHz Ref Low
Stand-by Current	I <sub>CC(SB)</sub>		0.32	0.5	mA	0 ≤ V <sub>g</sub> ≤ 1.5 V

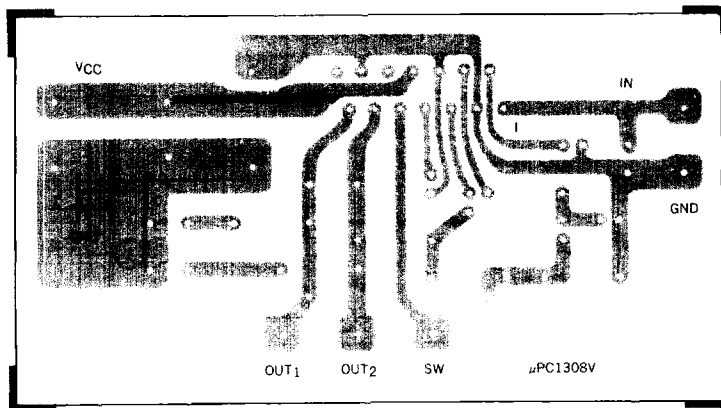
(\*\*Using a Voltmeter: HP-400FL)



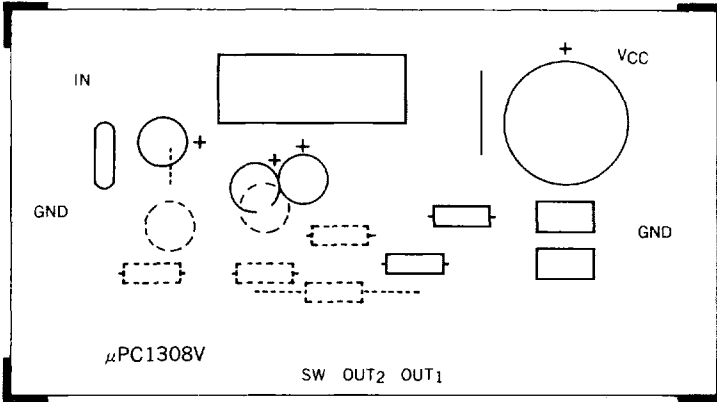
**TYPICAL APPLICATION**



**EXAMPLE FOR PRINTED CIRCUIT BOARD (Copper foil side)**

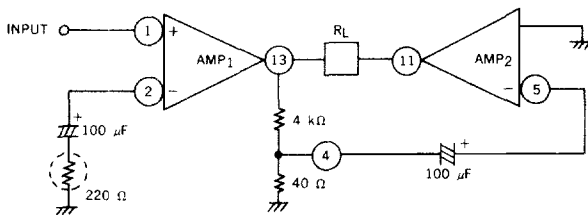


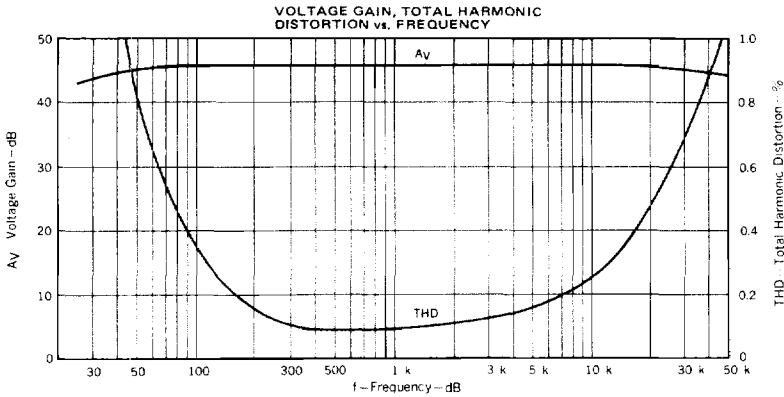
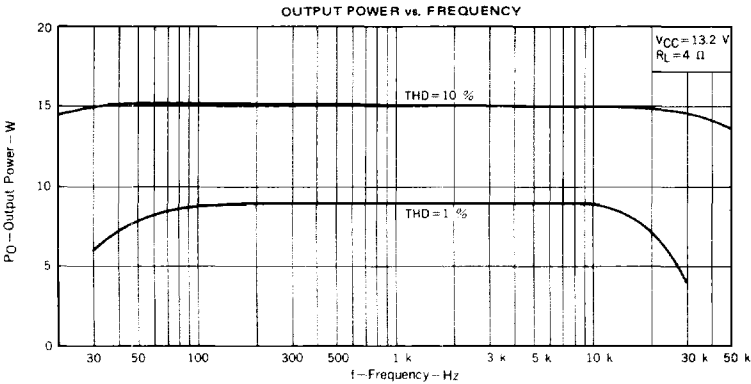
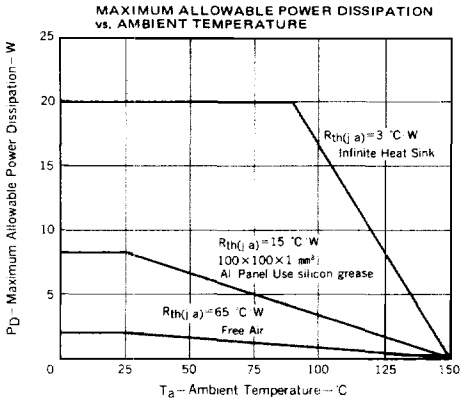
## COMPONENT LAYOUT

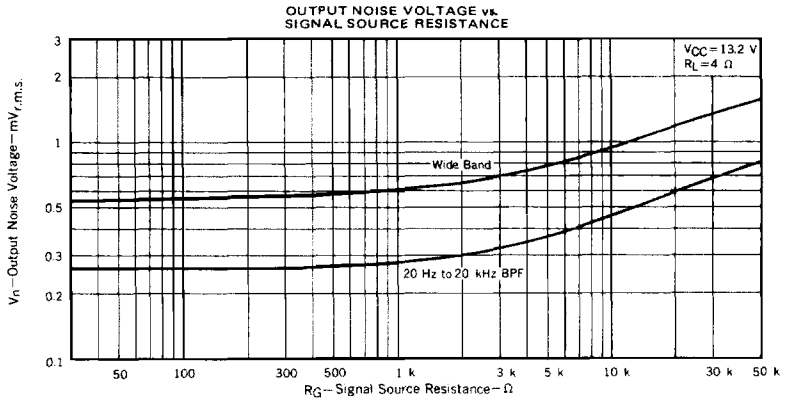
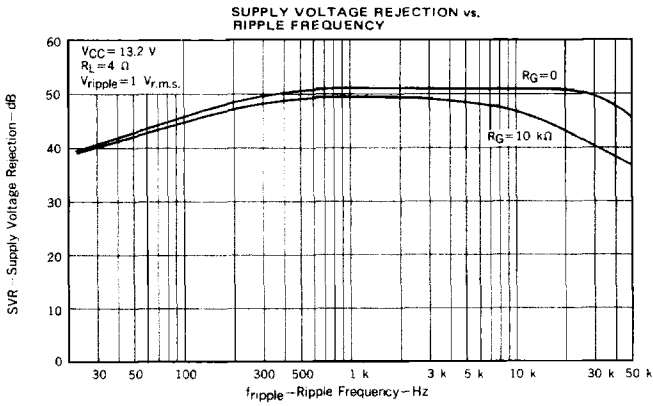
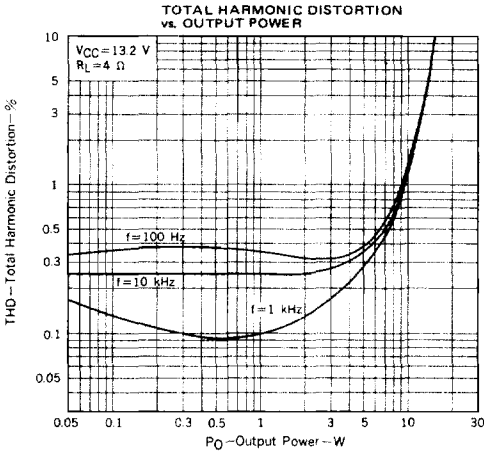


## INSTRUCTION FOR USE

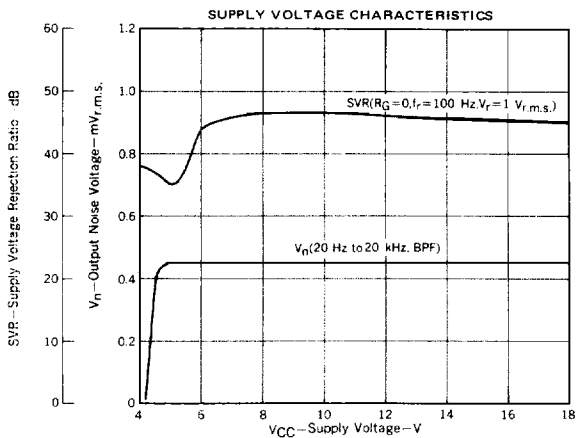
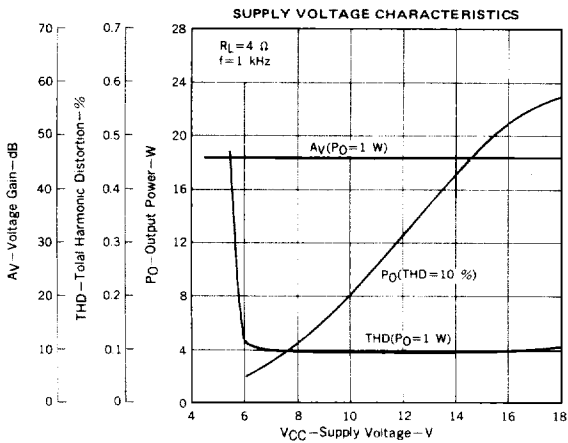
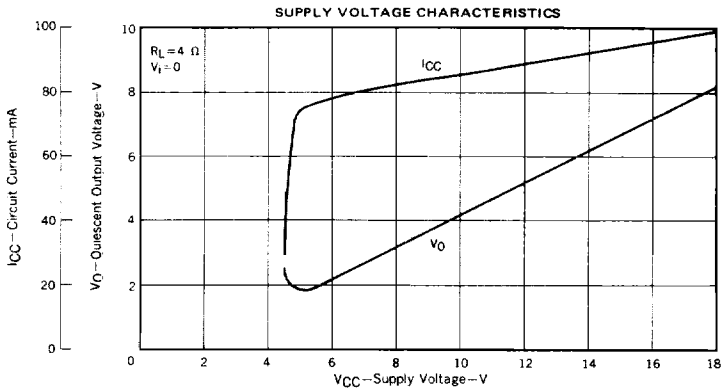
- (1) How to attach the heat sink.
  - Surely use the silicon grease.
  - Please keep the fastening torque for the screw in the range of 5 to 8 kg-cm.
  - Flatness of attached area of heat sink should be kept within 0.1 mm.
- (2) When this IC is unstable due to the high impedance of signal source, connect a capacitor (about 1 000 pF) between Pin 1 and Pin 3.
- (3) How to decrease voltage gain  $A_V$ .  
 This IC is designed to use  $A_V$  of 46 dB but  $A_V$  can be set down to 40 dB by modifying the application circuit. The modified point are shown by dotted areas which include additional components. Other external components are as same as in the case of typical application (page 5).
- (4) Polarity inversion of the power supply cause  $\mu$ PC1308V to break down immediately.











14 PIN V-DIP PACKAGE DIMENSIONS (Unit : mm)

