

# 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.

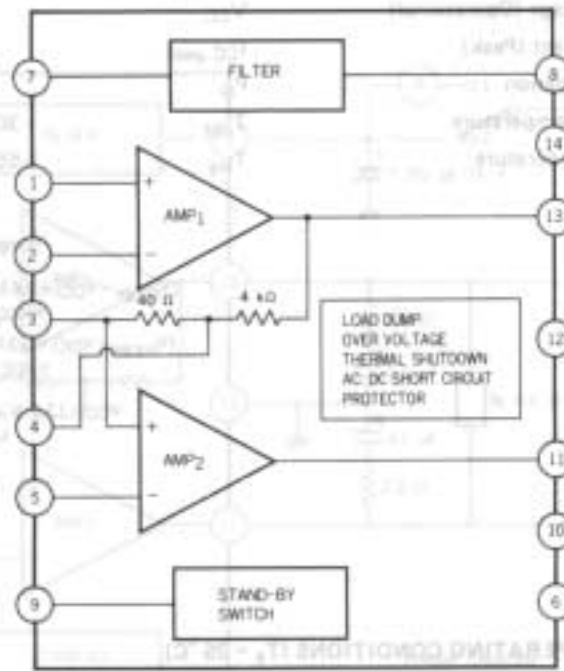
Typically it provides output power of 18 W at 14.4 V or 15 W at 13.2 V to a 4  $\Omega$  load.

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 :  $P_O = 18 \text{ W (TYP.)}$  @  $R_L = 4 \Omega$ ,  $V_{CC} = 14.4 \text{ V}$ , THD = 10 %  
 $P_O = 15 \text{ W (TYP.)}$  @  $R_L = 4 \Omega$ ,  $V_{CC} = 13.2 \text{ V}$ , THD = 10 %
- Very low distortion : 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, ( $V_{CC}$  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       | V <sub>CC</sub> |
| 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              |

# BIPOLAR ANALOG INTEGRATED CIRCUIT

## ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

|                              |                |             |                  |
|------------------------------|----------------|-------------|------------------|
| Supply Voltage (Notel)       | $V_{CC}$ surge | 60          | V                |
| Supply Voltage (Operational) | $V_{CC}$       | 18          | V                |
| Circuit Current (Peak)       | $I_{CC}$ peak  | 4.5         | A                |
| Power Dissipation            | $P_D$          | 20          | W                |
| Operating Temperature        | $T_{opt}$      | -30 to +75  | $^\circ\text{C}$ |
| Storage Temperature          | $T_{stg}$      | -55 to +150 | $^\circ\text{C}$ |

## DESCRIPTION

The PC1308V is a monolithic bipolar integrated circuit designed for use as a power amplifier. It features a high output power capability and a wide bandwidth. The device is fabricated using standard bipolar technology and is available in a standard 8-pin package. The typical operating supply voltage is 13.2 V, and the maximum output power is 20 W. The device is designed to operate over a temperature range of -30 to +75  $^\circ\text{C}$ .

## FEATURES

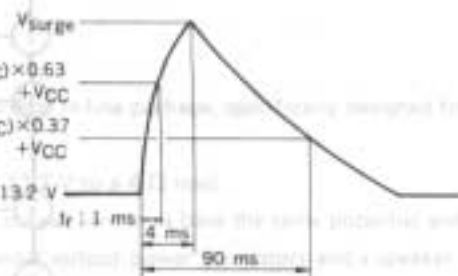
- Standard bipolar technology
- High output power capability
- Wide bandwidth
- Standard 8-pin package

## RECOMMENDED OPERATING CONDITIONS ( $T_a = 25^\circ\text{C}$ )

|                           |            |                 |          |
|---------------------------|------------|-----------------|----------|
| Supply Voltage Range      | $V_{CC}$   | 9 to 16         | V        |
| Load Impedance            | $R_L$      | 3.2 to 16       | $\Omega$ |
| Pin 9 Voltage (Operating) | $V_{pin9}$ | 3.5 to $V_{CC}$ | V        |
| Pin 9 Voltage (Stand-by)  | $V_{pin9}$ | 0 to 1.5        | V        |

- Following connection groups are included:

Surge Pulse Waveform



## ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ , $V_{CC} = 13.2\text{ V}$ , $R_L = 4\ \Omega$ , $f = 1\text{ kHz}$ , Using 4 $^\circ\text{C/W}$ heat sink)

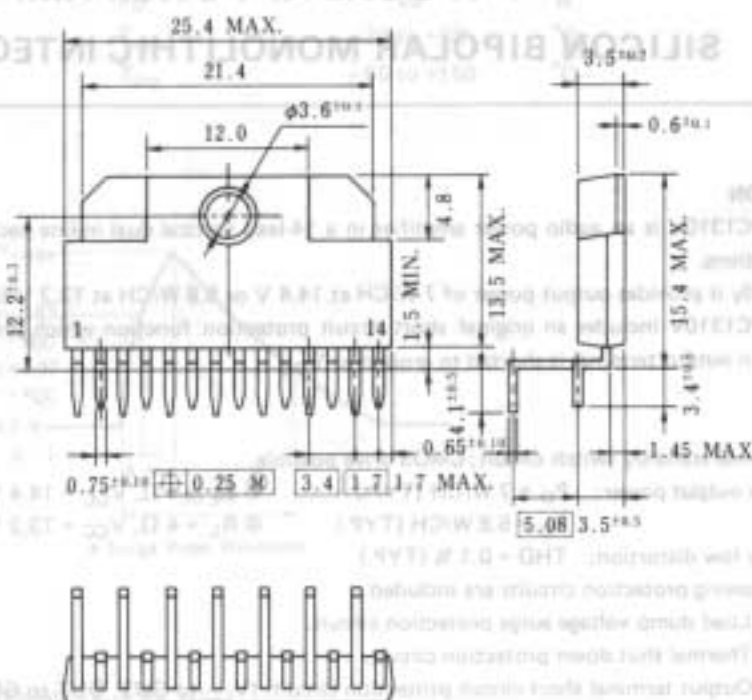
| CHARACTERISTIC                 | SYMBOL       | MIN. | TYP. | MAX.      | UNIT                 | TEST CONDITION                                                   |
|--------------------------------|--------------|------|------|-----------|----------------------|------------------------------------------------------------------|
| Quiescent Current              | $I_{CC}$     |      | 90   | 150       | mA                   | $V_i = 0$                                                        |
| Output Offset Voltage          | $V_{offset}$ |      | 0    | $\pm 150$ | mV                   | $V_i = 0$                                                        |
| Output Power                   | $P_O$        |      | 18   |           | W                    | $V_{CC} = 14.4\text{ V}$ , THD = 10 %**                          |
|                                |              | 12   | 15   |           | W                    | $V_{CC} = 13.2\text{ V}$ , THD = 10 %**                          |
| Voltage Gain                   | $A_V$        | 44   | 46   | 48        | dB                   |                                                                  |
| Total Harmonic Distortion      | THD          |      | 0.1  | 0.5       | %                    | $P_O = 1\text{ W}$                                               |
| Output Noise Level             | $V_n$        |      | 0.45 | 1.5       | mV <sub>r.m.s.</sub> | $R_G = 10\text{ k}\Omega$ , BW = 20 Hz to 20 kHz                 |
| Supply Voltage Rejection Ratio | SVR          | 40   | 46   |           | dB                   | $R_G = 0$ , $f_{rip} = 100\text{ Hz}$ , $V_{rip} = 0.5\text{ V}$ |
| Input Resistance               | $R_i$        | 45   | 65   |           | k $\Omega$           |                                                                  |
| Roll-off Frequency             | $f_H$        |      | 80   |           | kHz                  | $A_V = -3\text{ dB}$ from 1 kHz Ref. High                        |
|                                | $f_L$        |      | 10   |           | Hz                   | $A_V = -3\text{ dB}$ from 1 kHz Ref. Low                         |
| Stand-by Current               | $I_{CC(SB)}$ |      | 0.32 | 0.5       | mA                   | $0 \leq V_g \leq 1.5\text{ V}$                                   |

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



# BIPOLAR ANALOG INTEGRATED CIRCUIT

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



CONNECTION DIAGRAM

| SYMBOL                          | UNIT             | VALUE |
|---------------------------------|------------------|-------|
| Supply Voltage                  | V <sub>CC</sub>  | 5.0   |
| Output Current                  | I <sub>OUT</sub> | 10.0  |
| Input Current                   | I <sub>IN</sub>  | 1.0   |
| Common Mode Input Voltage       | V <sub>CM</sub>  | 0.0   |
| Common Mode Input Current       | I <sub>CM</sub>  | 1.0   |
| Output Voltage Swing            | V <sub>OUT</sub> | 0.0   |
| Output Current Swing            | I <sub>OUT</sub> | 10.0  |
| Input Voltage Swing             | V <sub>IN</sub>  | 0.0   |
| Input Current Swing             | I <sub>IN</sub>  | 1.0   |
| Common Mode Input Voltage Swing | V <sub>CM</sub>  | 0.0   |
| Common Mode Input Current Swing | I <sub>CM</sub>  | 1.0   |
| Output Voltage Swing            | V <sub>OUT</sub> | 0.0   |
| Output Current Swing            | I <sub>OUT</sub> | 10.0  |
| Input Voltage Swing             | V <sub>IN</sub>  | 0.0   |
| Input Current Swing             | I <sub>IN</sub>  | 1.0   |
| Common Mode Input Voltage Swing | V <sub>CM</sub>  | 0.0   |
| Common Mode Input Current Swing | I <sub>CM</sub>  | 1.0   |

BLOCK DIAGRAM

