

# AN7125

## Dual Channel BTL Power Amplifier

### ■ Overview

AN7125 is a monolithic integrated circuit designed for 13.5 W (12 V, 4 Ω) output audio power amplifier. It is a dual channel BTL IC suitable for stereo operation in radio cassette and TV application.

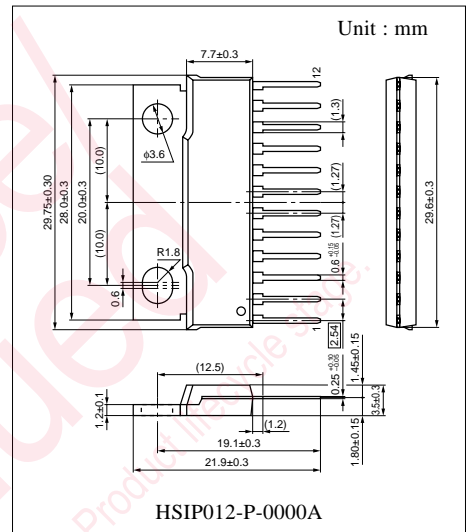
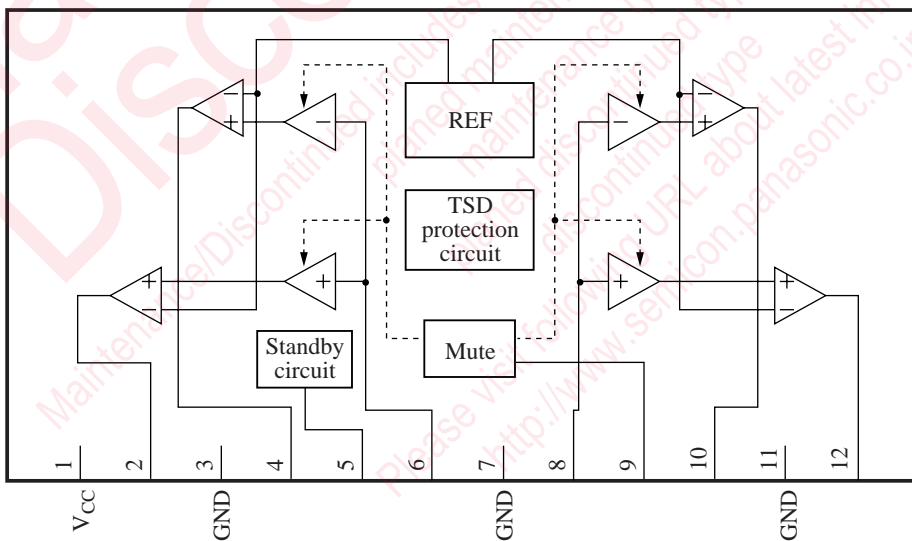
### ■ Features

- Built-in muting pin
- Built-in stand by pin
- Built-in thermal shutdown protection circuit
- Built-in current limiting circuit
- High power : (13.5 W/12 V/4 Ω)  
(13.0 W/15 V/8 Ω)
- Few external components
- Operating voltage range 6 V ~ 18 V (12 V typ.)

### ■ Applications

- Radio-cassette

### ■ Block Diagram



### ■ Pin Descriptions

| Pin No. | Description           | Pin No. | Description           |
|---------|-----------------------|---------|-----------------------|
| 1       | V <sub>CC</sub>       | 7       | Pre GND               |
| 2       | ch.1 +ve Phase Output | 8       | ch.2 Input            |
| 3       | ch.1 Output GND       | 9       | Mute                  |
| 4       | ch.1 -ve Phase Output | 10      | ch.2 -ve Phase Output |
| 5       | Standby               | 11      | ch.2 Output GND       |
| 6       | ch.1 Input            | 12      | ch.2 +ve Phase Output |

### ■ Absolute Maximum Ratings

| Parameter                     | Symbol           | Ratings     | Unit |
|-------------------------------|------------------|-------------|------|
| Supply voltage *1             | V <sub>CC</sub>  | 24          | V    |
| Supply current                | I <sub>CC</sub>  | 6.0         | A    |
| Power dissipation *2          | P <sub>D</sub>   | 38.5        | W    |
| Operating ambient temperature | T <sub>opr</sub> | -25 to +75  | °C   |
| Storage temperature           | T <sub>stg</sub> | -55 to +150 | °C   |

Note) \*1 : Without input signal, V<sub>CC</sub> is up to 24 V

\*2 : T<sub>a</sub> = 75 °C.

### ■ Recommended Operating Range

| Parameter      | Symbol          | Range       | Unit |
|----------------|-----------------|-------------|------|
| Supply voltage | V <sub>CC</sub> | 6.0 to 18.0 | V    |

### ■ Electrical Characteristics at V<sub>CC</sub> = 12 V, R<sub>L</sub> = 4 Ω, freq. = 1 kHz, 2 channel outputs, T<sub>a</sub> = 25 °C

| Parameter                    | Symbol           | Conditions   | Min  | Typ  | Max | Unit  |
|------------------------------|------------------|--|------|------|-----|-------|
| Quiescent circuit current    | I <sub>CQ</sub>  | V <sub>IN</sub> = 0 mV   | —    | 100  | 210 | mA    |
| Output noise voltage *1      | V <sub>NO</sub>  | V <sub>IN</sub> = 0 mV, R <sub>G</sub> = 6.2 kΩ  | —    | 0.27 | 0.5 | mVrms |
| Voltage gain                 | G <sub>VC</sub>  | V <sub>IN</sub> = 20 mV  | 38   | 40   | 42  | dB    |
| Total harmonic distortion *2 | THD              | V <sub>IN</sub> = 20 mV  | —    | 0.07 | 0.4 | %     |
| Maximum output power         | P <sub>O</sub>   | THD = 10 %   | 10   | 12   | —   | W     |
| Channel balance              | CB               | V <sub>IN</sub> = 20 mV  | -1   | 0    | 1   | dB    |
| Channel crosstalk *2         | CT               | V <sub>IN</sub> = 20 mV, R <sub>G</sub> = 6.2 kΩ                                       | 55   | 70   | —   | dB    |
| Output offset voltage        | V <sub>OFF</sub> | R <sub>G</sub> = 6.2 kΩ  | -350 | 0    | 350 | mV    |
| Ripple rejection *1          | RR               | V <sub>R</sub> = 1 V <sub>rms</sub> , f <sub>R</sub> = 120 Hz, R <sub>G</sub> = 6.2 kΩ | 50   | 60   | —   | dB    |
| Standby current              | I <sub>STB</sub> | V <sub>IN</sub> = 0 mV   | —    | 1    | 10  | μA    |
| Muting effects *2            | MT               | V <sub>IN</sub> = 20 mV  | 70   | 80   | —   | dB    |

Note) \*1 : With a filter band 20 Hz to 20 kHz (12 dB/OCT) used.

\*2 : With a filter band 400 Hz to 30 kHz used.

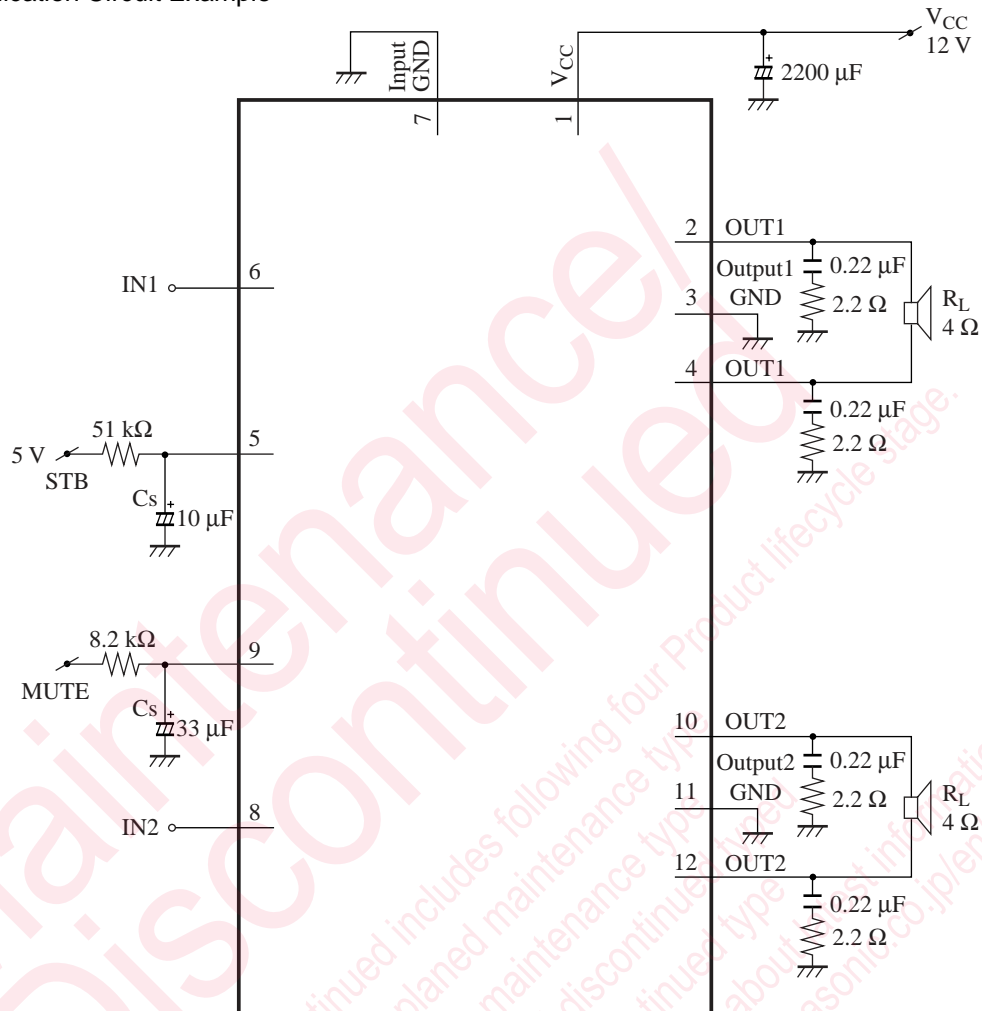
■ Terminal Equivalent Circuit

| Pin No. | Equivalent Circuit | Function   | Status                  |
|---------|--------------------|--|-------------------------|
| 1       | —                  | V <sub>CC</sub> :<br>V <sub>CC</sub> input   | typ. : 12 V             |
| 2       |                    | ch.1 O/P :<br>ch.1 positive phase output pin.  | V <sub>CC</sub> /2      |
| 3       |                    | ch.1 Power GND :<br>ch.1 output power ground pin.                                    | 0 V                     |
| 4       |                    | ch.1 O/P :<br>ch.1 inverse phase output pin.   | V <sub>CC</sub> /2      |
| 5       |                    | Standby :<br>This is the standby control pin.<br>STB off > 3.5 V<br>STB on = 0 V/GND | V <sub>TH</sub> = 2.8 V |
| 6       |                    | ch.1 Input :<br>This is the amplifier input pin.                                     | 0 V                     |
| 7       | —                  | Pre GND :<br>Input ground pin.   | 0 V                     |

■ Terminal Equivalent Circuit(continued)

| Pin No. | Equivalent Circuit | Function   | Status           |
|---------|--------------------|--|------------------|
| 8       |                    | ch.2 Input :<br>This is the amplifier input pin.               | 0 V              |
| 9       |                    | Mute :<br>Mute input pin.<br>Mute on > 2.5 V<br>Mute off = 0 V | $V_{TH} = 1.5 V$ |
| 10      |                    | ch.2 Output :<br>ch.2 inverse phase output pin                 | $V_{CC}/2$       |
| 11      |                    | ch.2 Power GND :<br>ch.2 output power ground                   | 0 V              |
| 12      |                    | ch.2 Output :<br>ch.2 positive phase output pin                | $V_{CC}/2$       |

### ■ Application Circuit Example



|            |     |
|------------|-----|
| STB 'Off'  | 5 V |
| STB 'On'   | 0 V |
| Mute 'Off' | 0 V |
| Mute 'On'  | 5 V |

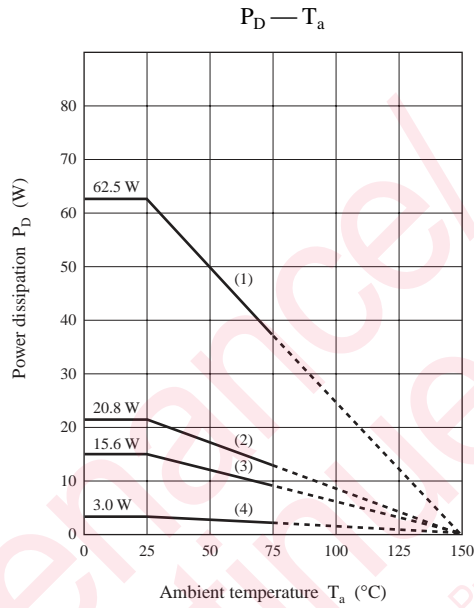
### ■ Application's Precautions

1. External heatsink is needed when used. External heatsink should be fixed to the chassis.
2. Fin of the IC can be connected to GND.
3. Please prevent output to  $V_{CC}$  short and output to GND short.
4. The temperature protection circuit will operate at  $T_j$  around 150 °C.

However, if temperature decrease, the protection circuit will automatically be decreased and resume normal operation.

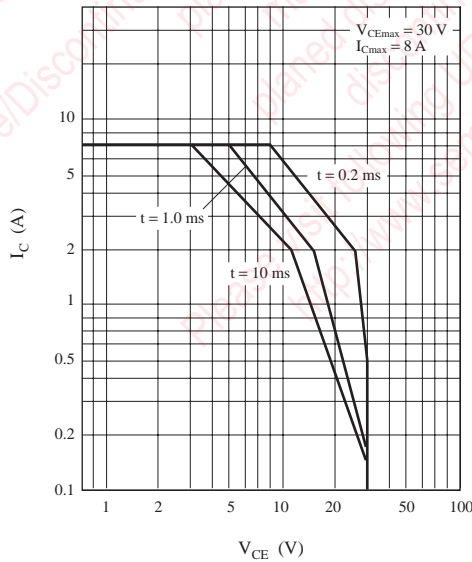
■ Technical Information

- HSIP012-P-0000A



1.  $T_C = T_a$ , 62.5 W ( $\theta_{j-c} = 2^{\circ}\text{C/W}$ )
2. 20.83 W ( $\theta_f = 4.0^{\circ}\text{C/W}$ )  
With a 100 cm<sup>2</sup> X 3 mm Al heat sink (black colour coated) or a 200 cm<sup>2</sup> X 2 mm Al heat sink (not lacquered)
3. 15.63 W ( $\theta_f = 6.0^{\circ}\text{C/W}$ )  
With a 100 cm<sup>2</sup> X 2 mm Al heat sink (not lacquered)
4. 3.0 W at  $T_a = 25^{\circ}\text{C}$  ( $\theta_{j-a} = 42^{\circ}\text{C/W}$ )  
Without heat sink

- Area of safe operation



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