



## UA1029

## LINEAR INTEGRATED CIRCUIT

### LOW FREQUENCY POWER AMPLIFIER

#### DESCRIPTION

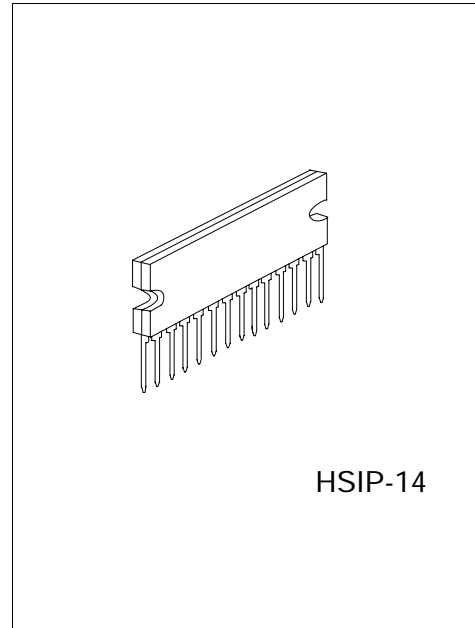
The UTC **UA1029** is a low frequency power amplifier and developed for portable radio cassette tape recorder with power ON/OFF switch.

The audio power IC has built-in two channels and thermal shut down protection circuit.

#### FEATURES

- \* High Power
  - : P<sub>OUT</sub>(1) = 2.5W (Typ.)  
(V<sub>CC</sub> = 9V, R<sub>L</sub> = 4Ω, f = 1kHz, THD = 10%)
  - : P<sub>OUT</sub>(2) = 4.6W (Typ.)  
(V<sub>CC</sub> = 12V, R<sub>L</sub> = 4Ω, f = 1kHz, THD = 10%)
- \* Low Popping Noise at Power ON
- \* Small Quiescent Current
  - : I<sub>Q</sub> = 21mA (Typ.) (V<sub>CC</sub> = 15V, V<sub>IN</sub> = 0)
- \* Soft Clip
- \* Thermal Shut Down Protection
- \* Best for Supply Voltage 9V, 12V
- \* Operation Supply Voltage Range from 6V to 15V

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\*Pb-free plating product number: UA1029L

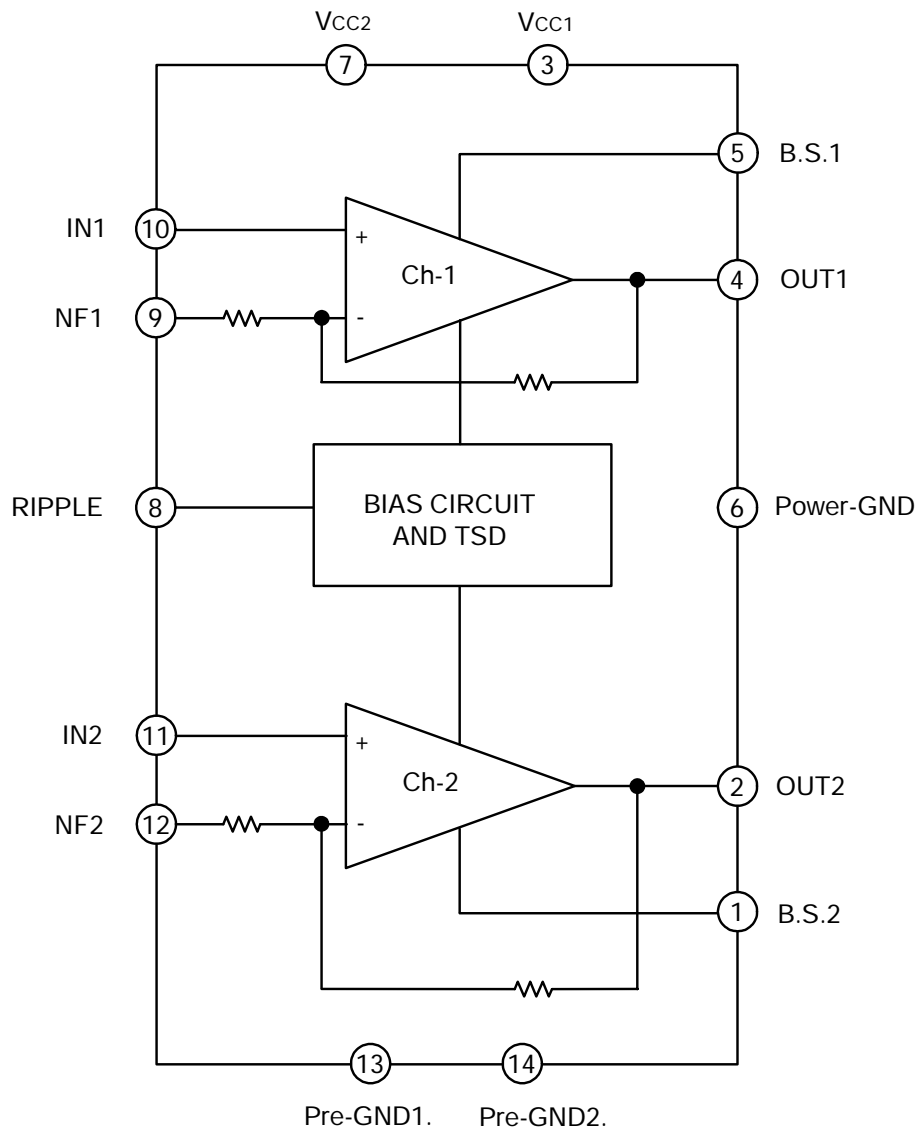
#### PIN CONFIGURATION

| PIN NO. | PIN NAME  |
|---------|-----------|
| 1       | B.S. 2    |
| 2       | OUT 2     |
| 3       | Vcc 1     |
| 4       | OUT 1     |
| 5       | B.S.1     |
| 6       | Power-GND |
| 7       | Vcc 2     |
| 8       | RIPPLE    |
| 9       | NF1       |
| 10      | IN 1      |
| 11      | IN 2      |
| 12      | NF 2      |
| 13      | Pre-GND 1 |
| 14      | Pre-GND 2 |

#### ORDERING INFORMATION

| Ordering Number |                   | Package | Packing |
|-----------------|-------------------|---------|---------|
| Normal          | Lead Free Plating |         |         |
| UA1029-H14-T    | UA1029L-H14-T     | HSIP-14 | Tube    |

### ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS (Ta = 25 )

| PARAMETER             | SYMBOL                | RATINGS    | UNIT |
|-----------------------|-----------------------|------------|------|
| Supply Voltage        | V <sub>CC</sub>       | 20         | V    |
| Peak Output Current   | I <sub>O (peak)</sub> | 2.5        | A    |
| Power Dissipation     | P <sub>D</sub>        | 15         | W    |
| Derated above Ta = 25 |                       | 120        |      |
| Operating Temperature | T <sub>OPR</sub>      | 0 ~ +70    |      |
| Storage Temperature   | T <sub>STG</sub>      | -40 ~ +150 |      |

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

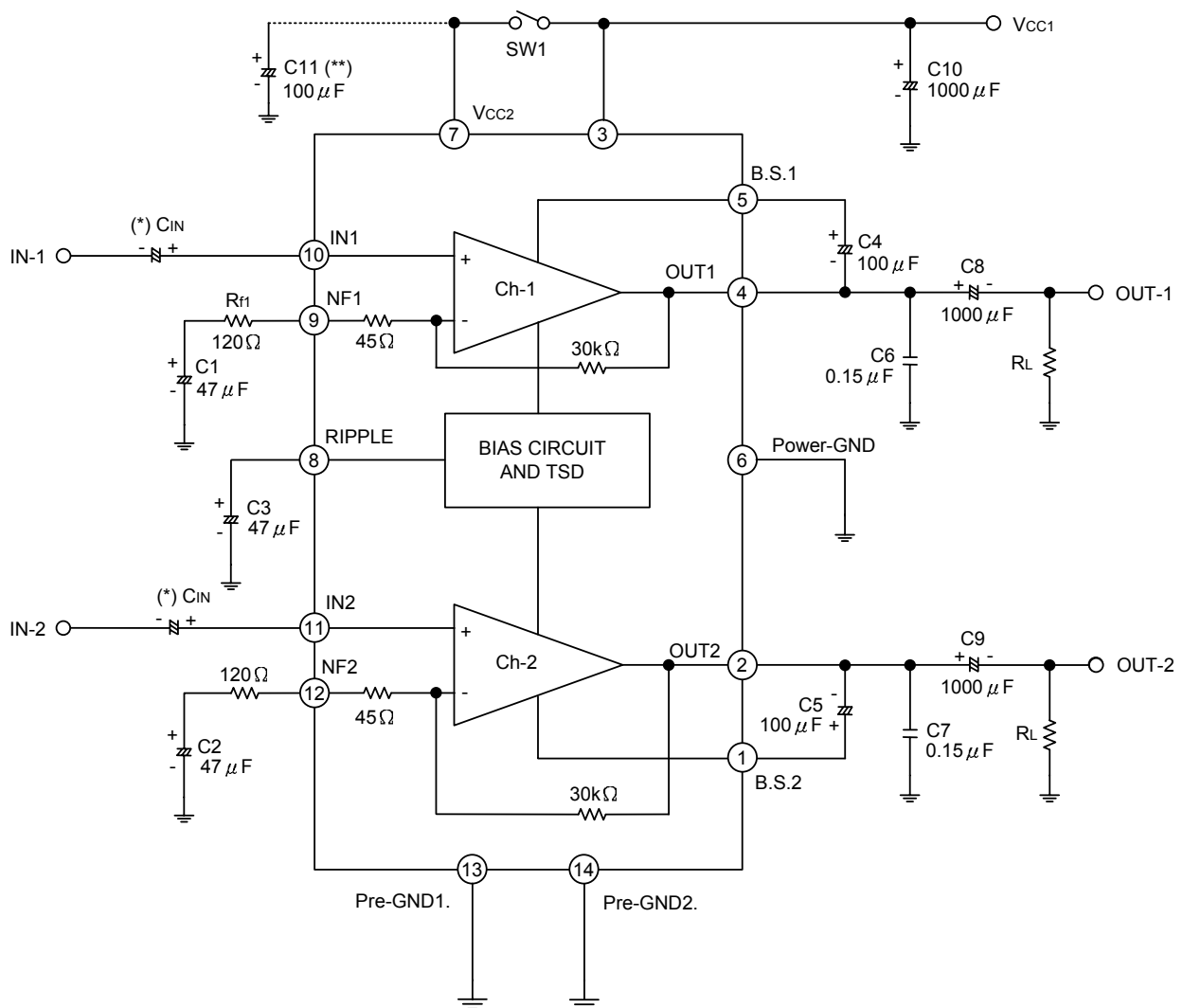
2. The device is guaranteed to meet performance specification within 0 ~70 operating temperature range and assured by design from -20 ~85 .

### ■ ELECTRICAL CHARACTERISTICS

(Ta=25 , V<sub>CC</sub>=9V, R<sub>L</sub>=4Ω, R<sub>g</sub>=600Ω, f=1kHz, R<sub>F</sub>=120Ω, unless otherwise specified.)

| PARAMETER                 | SYMBOL                            | TEST CONDITIONS                                                        | MIN | TYP  | MAX | UNIT  |
|---------------------------|-----------------------------------|------------------------------------------------------------------------|-----|------|-----|-------|
| Quiescent Current         | I <sub>D</sub>                    | V <sub>IN</sub> = 0                                                    |     | 25   | 45  | mA    |
| Output Power              | P <sub>OUT(1)</sub>               | THD = 10%, V <sub>CC</sub> =9V                                         | 2.0 | 2.5  |     | W     |
|                           | P <sub>OUT(2)</sub>               | THD = 10%, V <sub>CC</sub> = 12V                                       |     | 4.6  |     |       |
| Total Harmonic Distortion | THD                               | P <sub>OUT</sub> = 0.4W/ch                                             |     | 0.2  | 1.0 | %     |
| Voltage Gain              | G <sub>V(1)</sub>                 | R <sub>F</sub> = 120Ω, V <sub>OUT</sub> = 0.775Vrms (0dBm)             | 43  | 45   | 47  | dB    |
|                           | G <sub>V(2)</sub>                 | R <sub>F</sub> = 0, V <sub>out</sub> = 0.775Vrms (0dBm)                |     | 56.5 |     |       |
| Input Resistance          | R <sub>IN</sub>                   |                                                                        |     | 30   |     | kΩ    |
| Output Noise Voltage      | V <sub>NO</sub>                   | R <sub>G</sub> = 10kΩ, BW = 20Hz ~ 20kHz                               |     | 0.3  | 1.0 | mVrms |
| Ripple Rejection Ratio    | RR                                | R <sub>G</sub> = 600Ω, f <sub>RIPPLE</sub> = 100kHz                    |     | -52  |     | dB    |
| Cross Talk                | C.T.                              | R <sub>G</sub> = 600Ω, amp1 ↔ 2<br>V <sub>OUT</sub> = 0.775Vrms (0dBm) |     | -50  |     | dB    |
| Input Offset Voltage      | V <sub>11</sub> , V <sub>12</sub> |                                                                        |     | 30   | 60  | mV    |
| Stand-by Current          | I <sub>STN-BY</sub>               | SW1 → OFF                                                              |     | 1    |     | μA    |

## ■ TEST CIRCUIT



(\*) This IC can be used without coupling capacitor ( $C_{IN}$ ).

If volume slide noise occurred by input offset voltage is undesirable, it needs to use the capacitor ( $C_{IN}$ ).

(\*\*) The condenser between the pin 8 and the GND ( $C11$ ) is for reducing POP noise when the power ON/OFF switch (SW1) is set to ON/OFF.

## APPLICATION INFORMATION

### 1. Adjustment of voltage gain

The voltage gain  $G_V$  is obtained by  $R_1$ ,  $R_2$  and  $R_F$  as below. By increasing  $R_F$ , reduction of  $G_V$  is possible. 40dB or over in use is recommended.

$$G_V = 20 \log \frac{R_F + R_1 + R_2}{R_F + R_1}$$

Sine oscillation is probable as a result of feedback in crease.

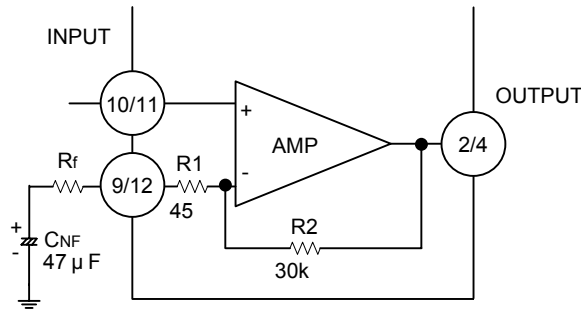


Fig. 1

### 2. Input stage

The input circuit of this IC is as shown as below.

PNP  $T_r$ : TR1 is provided in the input circuit so as to make its usage possible without the input coupling capacitor. However, at Pin 10 and Pin 11 max 60 mV offset voltage is produced.

Fig.2 illustrate the input circuit of UTC UA1029. A offset voltage of 60mV max is possible. TR1 is featured to eliminate the usage of coupling capacitor.

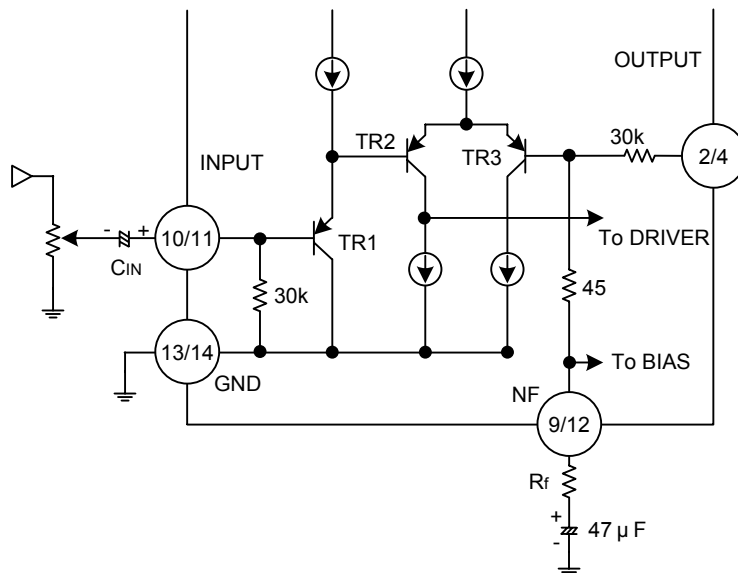


Fig. 2

### 3. Input voltage

When the excessive signal is input, turning-up is produced in the clip waveform.

### 4. Oscillation preventive measures

Mylar capacitor in use is strongly recommended to fulfill well handled of oscillation temperature and high frequency.

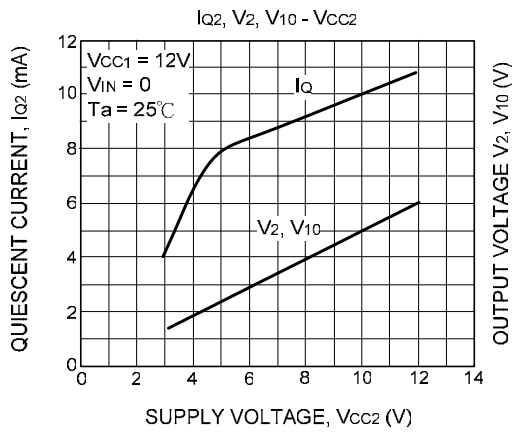
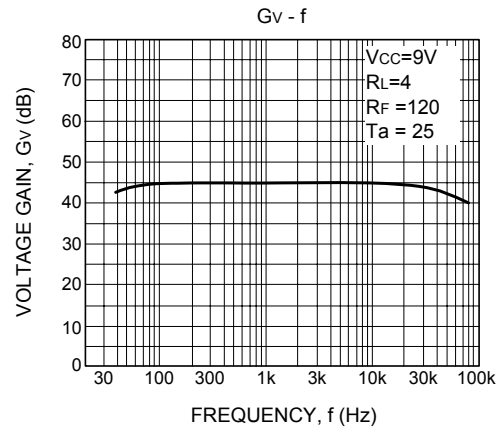
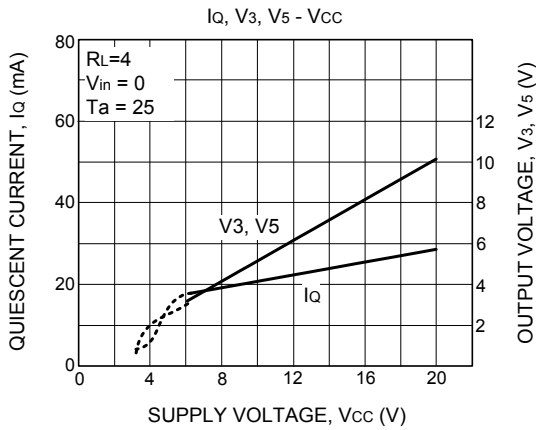
### 5. Power ON/OFF switch

There is power ON/OFF switch at Pin 7. However, output power is changed by Pin 7 supply voltage when Pin 7 supply voltage is not same Pin 3 supply voltage, after referring to attached date, select Pin 7 supply voltage.

### 6. Thermal shut-down Protection

The thermal shut-down circuit is built-in to dodge IC damage that result from the abnormal temperature rise during operating.

## TYPICAL CHARACTERISTICS



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