Ordering number : ENA2050

# LA74309FA

**Monolithic Linear IC**

# Microphone Amplifier for Digital Still Camera

ON Semiconductor®

http://onsemi.com

## Overview

LA74309FA is a microphone amplifier for digital still cameras that have mono audio recording. The analog signal processing for the recording of the digital still camera or other equipment can be easily composed, because the MIC power supply and the ALC circuit are built-in. Moreover, the regulator is built-in, therefore external regulator IC is unnecessary.

## Features

- Microphone (MIC) amplifier (+20dB)
- MIC power supply with built-in pull-up resistor
- Automatic level control (ALC) amplifier (output level=-1dBV≈2.5Vpp)
- 3rd order LPF (fc=11kHz)
- 3V regulator (At the time of $V_{CC}$=3.3V, internal supply voltage: $V_{CC}A$≈3.0V)
- Standby control ($I_{CC}$≤10μA)

## Specifications

### Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum power supply voltage | $V_{CC}$ max | | 4.0 | V |
| Allowable power dissipation | Pd max | Ta≤85°C | 50 | mW |
| Operating temperature | Topr | | -20 to +85 | °C |
| Storage temperature | Tstg | | -55 to +150 | °C |

Caution 1) Absolute maximum ratings represent the value which cannot be exceeded for any length of time.

Caution 2) Even when the device is used within the range of absolute maximum ratings, as a result of continuous usage under high temperature, high current, high voltage, or drastic temperature change, the reliability of the IC may be degraded. Please contact us for the further details.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

## Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Recommended power supply voltage | $V_{CC}$ | | 3.3 | V |
| Operating voltage range of $V_{CC}$ | $V_{CC}op$ | | 3.1 to 3.6 | V |

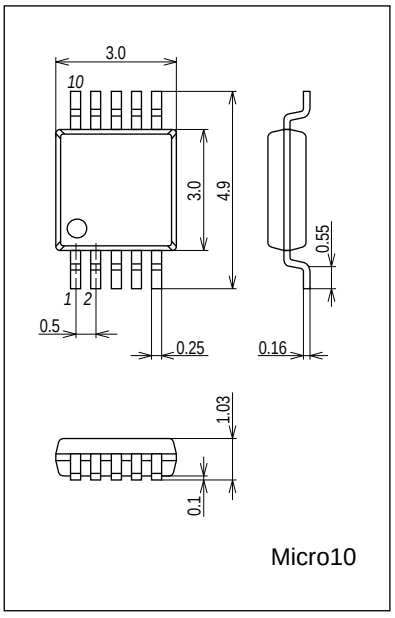
## Electrical Characteristics at Ta=25°C, $V_{CC}$=3.3V, f=1kHz

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| **Circuit current** | | | | | | |
| $V_{CC}$ no signal current dissipation | $I_{CC}$ | $V_{CC}$=3.3V, Active mode (Pin3=3V) | 3.9 | 5.3 | 6.7 | mA |
| $V_{CC}$ standby current dissipation | $I_{CC}S$ | $V_{CC}$=3.3V, Standby mode (Pin3=0V) | | | 10 | μA |
| **REC output system** | | | | | | |
| Standard REC output level | VOR | $V_{IN}$=-49dBV at ALC IN pin (=Standard level) | -10 | -9 | -8 | dBV |
| Standard REC output distortion | HDR | ALC IN, $V_{IN}$=-49dBV, THD from to 5th harmonic | | 0.1 | 0.2 | % |
| ALC characteristics | ALM | ALC IN, $V_{IN}$=-17dBV (=Standard level +32dB) | -3 | -1 | | dBV |
| ALC THD | ALMD | ALC IN, $V_{IN}$=-17dBV (=Standard level +32dB), THD from to 5th harmonic | | 0.25 | 1 | % |
| ALC IN maximum input level | VINRMX | REC output THD≤3% | | | -10 | dBV |
| REC output noise level | VNOR | No signal at MIC IN pin, with JIS-A Filter | | -53 | -47 | dBV |
| REC output frequency characteristics 1 | FEQR1 | ALC IN, $V_{IN}$=-17dBV, The output level ratio at f=11kHz/1kHz | -5 | -3 | -1 | dB |
| REC output frequency characteristics 2 | FEQR2 | ALC IN, $V_{IN}$=-17dBV, The output level ratio at f=22kHz/1kHz | | -18 | -12 | dB |
| REC output frequency characteristics 3 | FEQR3 | ALC IN, $V_{IN}$=-17dBV, The output level ratio at f=100kHz/1kHz | | -55 | -45 | dB |
| **MIC output system** | | | | | | |
| MIC voltage gain | VGMIC | $V_{IN}$=-39dBV at MIC IN pin | 19 | 20 | 21 | dB |
| MIC output THD | HDMIC | MIC IN, $V_{IN}$=-39dBV, THD from to 5th harmonic | | 0.03 | 0.1 | % |
| MIC IN maximum input level | VINMMX | MIC output THD=3% | | | -30 | dBV |
| MIC $V_{CC}$ output DC voltage | VMIC | With 6.2kΩ load | 1.5 | 1.7 | 1.9 | V |

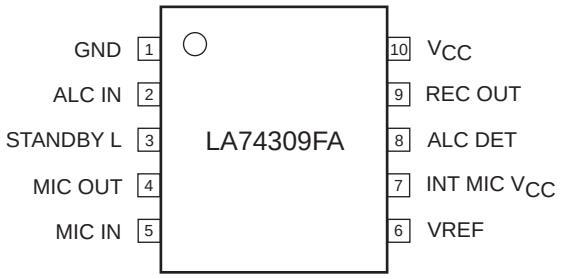
## Package Dimensions

unit : mm (typ)

3428



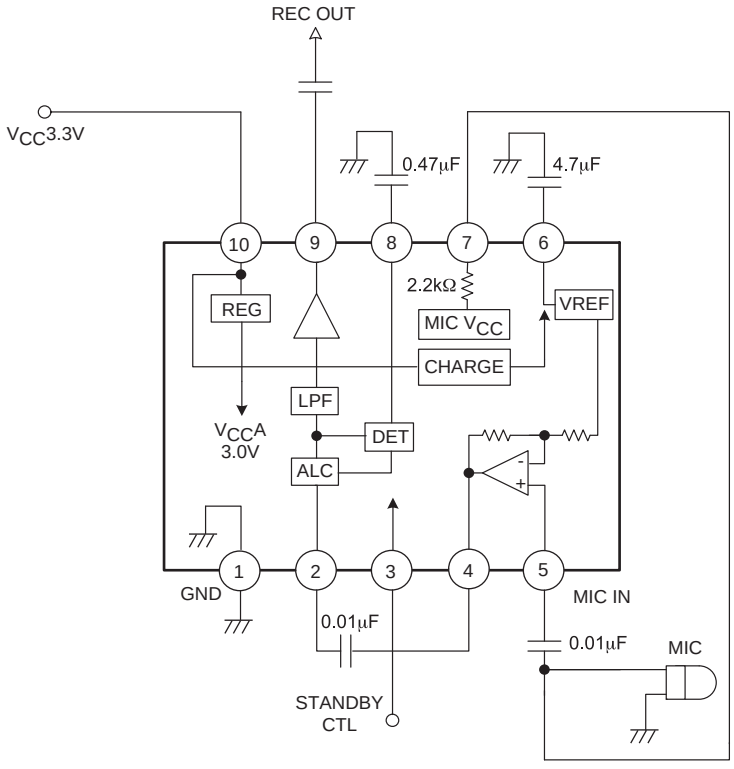
## Pin assinment



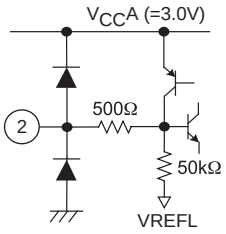
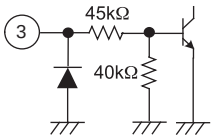
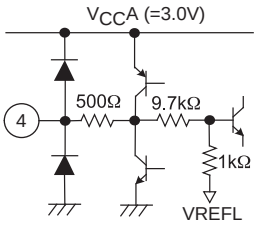
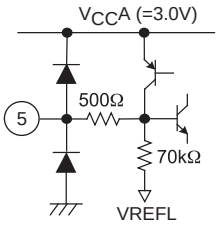
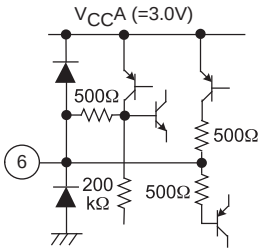
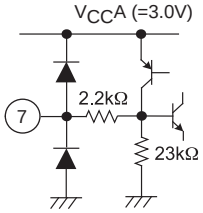

## Pin Description

| Pin No. | Pin Description |
|---|---|
| 1 | GND |
| 2 | ALC input |
| 3 | STANDBY CTL |
| 4 | MIC output |
| 5 | MIC input |
| 6 | Ripple removal for VREF |
| 7 | Internal MIC power supply |
| 8 | ALC DET |
| 9 | REC output |
| 10 | $V_{CC}$ |

## Equivalent Circuit Block Diagram & Application Circuit



## Pin Functions

| PIN No. | Pin Name | DC voltage | AC voltage | Functions | Equivalent Circuit |
|---|---|---|---|---|---|
| 1 | GND | 0V | | Ground | |
| 2 | ALC IN | | Output level=-49dBV<br>(At MIC IN=-69dBV)<br>Maximum input level<br>=-10dBV | |  |
| 3 | STANDBY L | | | Standby control pin<br>Over 2V: Standby OFF |  |
| 4 | MIC OUT | 1.60V | Output level=-49dBV<br>(At MIC IN=-69dBV) | MIC output pin |  |
| 5 | MIC IN | | Standard input level<br>=-69dBV<br><br>Maximum input level<br>=-30dBV | MIC input pin |  |
| 6 | VREF | 2.30V | | MIC $V_{CC}$ and ripple rejection pin for VREFL |  |
| 7 | INT MIC<br>$V_{CC}$ | 2.30V | | MIC power supply pin |  |

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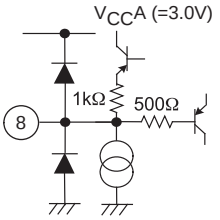
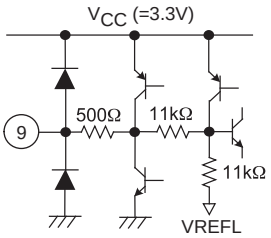
| PIN No. | Pin Name | DC voltage | AC voltage | Functions | Equivalent Circuit |
|---|---|---|---|---|---|
| 8 | ALC DET | | | ALC detector pin |   |
| 9 | REC OUT | 1.60V | Output level=-9dBV (At MIC IN=-69dBV) | REC output pin |   |
| 10 | $V_{CC}$ | 3.3V | | Power supply pin | |

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