



SANYO Semiconductors

DATA SHEET

LA74302FN — Monolithic Linear IC Audio Interface for DSC

Overview

The LA74302FN is a SPEAKER AMP and MIC AMP built-in audio interface for DSC.

Functions

- Three-wire type SERIAL communications, MIC AMP
- MIC power supply provided
- ALC (ALC LEVEL: level changeover in three stages possible)
- REC/PB LPF (fc=4kHz: 3rd order)
- LINE output (with SERIAL MUTE)
- SPEAKER AMP (compatible with BEEP input MIX)
- With serial communications control electronic VOLUME

Specifications

Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|---------------------|------------|-------------|------|
| Maximum supply voltage | V _{CC} max | | 5.0 | V |
| Allowable power dissipation | P _d max | Ta≤85°C * | 500 | mW |
| Operating temperature | T _{opr} | | -15 to +85 | °C |
| Storage temperature | T _{stg} | | -55 to +150 | °C |

* Substrate mounting condition (30mm × 50mm × 0.8mm: glass epoxy) 2S2P

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Operating Conditions at $T_a=25^{\circ}\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------------|------------|---------------------------------|------------|------|
| Recommended supply voltage | V_{CCL} | | 3.0 | V |
| | V_{CCD} | | 3.0 | V |
| | V_{CCSP} | | 3.0 | V |
| Allowable operating voltage range | V_{CCL} | | 2.7 to 3.6 | V |
| | V_{CCD} | | 2.7 to 3.6 | V |
| | V_{CCSP} | Take care not to exceed Pd max. | 2.7 to 3.6 | V |

Electrical Characteristics at $T_a=25^{\circ}\text{C}$, $V_{CCL, D, SP}=3.0\text{V}$, $f=1\text{kHz}$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|-------------|---|---------|------|------|------|
| | | | min | typ | max | |
| Circuit current | | | | | | |
| Quiescent circuit current 1 | I_{CCA1} | $V_{CCA}=3.0\text{V}$: FULL operation | 5.2 | 7.0 | 8.8 | mA |
| Quiescent circuit current 2 | I_{CCA2} | $V_{CCA}=3.0\text{V}$: REC BLOCK (MIC/ALC/REC AMP) POWER SAVE | 2.4 | 3.2 | 4 | mA |
| Quiescent circuit current 3 | I_{CCA3} | $V_{CCA}=3.0\text{V}$: LINE AMP POWER SAVE | 4.8 | 6.4 | 8.0 | mA |
| Quiescent circuit current 4 | I_{CCD1} | $V_{CCD}=3.0\text{V}$ | 2.1 | 2.8 | 3.5 | mA |
| Quiescent circuit current 5 | I_{CCSP1} | $V_{CCSP}=3.0\text{V}$: SPK POWER ON | 1.2 | 2.5 | 5 | mA |
| Quiescent circuit current 6 | I_{CCSP2} | $V_{CCSP}=3.0\text{V}$: SPK POWER SAVE | 0.3 | 0.6 | 0.9 | mA |
| REC output system | | | | | | |
| REC reference output LEVEL | VOR | ALC IN, $V_{IN}=-44\text{dBV}$ | -15 | -14 | -13 | dBV |
| REC reference output distortion rate 1 | HDR1 | ALC IN, $V_{IN}=-44\text{dBV}$, THD: from 2nd to 5th harmonic | | 0.03 | 0.1 | % |
| ALC characteristics 1 | ALM1 | ALC IN, $V_{IN}=-28\text{dBV}$ (reference+16dB), ALC LEVEL: reference +10dB | -7 | -4 | -1 | dBV |
| ALC distortion rate 1 | ALMD1 | ALC IN, $V_{IN}=-28\text{dBV}$ (reference +16dB), ALC LEVEL: reference +10dB | | 0.3 | 0.5 | % |
| ALC characteristics 2 | ALM2 | ALC IN, $V_{IN}=-12\text{dBV}$ (reference +32dB), ALC LEVEL: reference +10dB | -7 | -4 | -1 | dBV |
| ALC distortion rate 2 | ALMD2 | ALC IN, $V_{IN}=-12\text{dBV}$ (reference +32dB), ALC LEVEL: reference +10dB, THD: from 2nd to 5th harmonic | | 0.4 | 1 | % |
| REC output noise voltage | VNOR | ALC IN no input, JIS-A Filter | | -82 | -68 | dBV |
| REC output frequency characteristics 1 | FEQR1 | ALC IN, $V_{IN}=-36\text{dBV}$, Comparison of $f=4\text{kHz}/1\text{kHz}$ | -4.5 | -3 | -1.5 | dBV |
| REC output frequency characteristics 2 | FEQR2 | ALC IN, $V_{IN}=-36\text{dBV}$, Comparison of $f=22\text{kHz}/1\text{kHz}$ | | -31 | -25 | dB |
| REC output frequency characteristics 3 | FEQR3 | ALC IN, $V_{IN}=-36\text{dBV}$, Comparison of $f=100\text{kHz}/1\text{kHz}$ | | -70 | -60 | dB |
| LINE output system | | | | | | |
| LINE reference output LEVEL | VOL | PB IN, $V_{IN}=-14\text{dBV}$ | -7 | -6 | -5 | dBV |
| LINE reference output distortion rate | HDL | PB IN, $V_{IN}=-14\text{dBV}$, THD: from 2nd to 5th harmonic | | 0.1 | 0.2 | % |
| LINE reference output noise voltage | VNOL | PB IN, no input, JIS-A Filter | | -90 | -82 | dBV |
| LINE max output LEVEL | VOML | PB IN, LEVEL at which THD (from 2nd to 5th harmonic)=1% | -1 | 0 | | dBV |
| LINE output frequency characteristics 1 | FEQP1 | PB IN, $V_{IN}=-10\text{dBV}$, Comparison of $f=4\text{kHz}/1\text{kHz}$ | -4.5 | -3 | -1.5 | dB |
| LINE output frequency characteristics 2 | FEQP2 | PB IN, $V_{IN}=-10\text{dBV}$, Comparison of $f=22\text{kHz}/1\text{kHz}$ | | -31 | -25 | dB |
| LINE output frequency characteristics 3 | FEQP3 | PB IN, $V_{IN}=-10\text{dBV}$, Comparison of $f=100\text{kHz}/1\text{kHz}$ | | -70 | -60 | dB |

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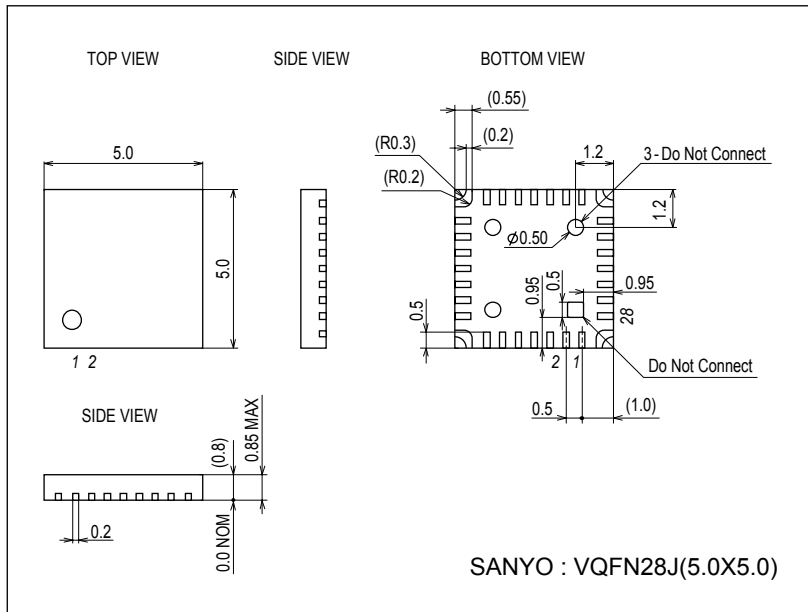
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| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|--------|--|---------|------|-----|------|
| | | | min | typ | max | |
| SP output system (SP load=as measured at 8Ω end) | | | | | | |
| SP reference output LEVEL1 (Vol.MAX) | VOSP1 | PB IN, $V_{IN}=-14\text{dBV}$, Vol=MAX (Serial DATA=31) | -8 | -4 | 0 | dBV |
| SP reference output distortion rate | THDSP | PB IN, $V_{IN}=-14\text{dBV}$, Vol=MAX, THD: from 2nd to 5th harmonic | | 0.7 | 1.5 | % |
| SP reference output LEVEL2 (Vol.TYP) | VOSP2 | PB IN, $V_{IN}=-14\text{dBV}$, Vol=TYP (Serial DATA=12) | -22 | -16 | -10 | dBV |
| SP reference output LEVEL3 (Vol.MIN) | VOSP3 | PB IN, $V_{IN}=-14\text{dBV}$, Vol=MIN (Serial DATA=0), JIS-A Filter | | -90 | -70 | dBV |
| SP reference output noise voltage | VNOSP | PB IN no input, Vol=MAX, JIS-A Filter | | -86 | -70 | dBV |
| SP max rated output | VOMSP | PB IN, Vol=MAX, LEVEL at which THD=10% | 150 | 250 | | mW |
| MIC output system | | | | | | |
| MIC voltage gain | VGMIC | MIC IN, $V_{IN}=-40\text{dBV}$ | 25 | 26 | 27 | dB |
| MIC output distortion rate | HDMIC | MIC IN, $V_{IN}=-40\text{dBV}$, THD: up to quintic | | 0.1 | 0.5 | % |
| MIC output noise voltage | VNOMIC | MIC IN, no input, JIS-A Filter | | -91 | -83 | dBV |
| MIC max output LEVEL | VOMIC | Output LEVEL at which THD=1% | -3 | -1 | | dBV |
| MIC V_{CC} output voltage | VMIC | At 2.2kΩ load | 2.1 | 2.3 | 2.5 | V |
| Control system | | | | | | |
| Serial CLOCK frequency | FCLK | | | 1.25 | 1.5 | MHz |
| Serial input LOW level | SERLO | | 0 | | 0.7 | V |
| Serial input HIGH level | SERHI | | 2.3 | | 3.5 | V |

Package Dimensions

unit : mm (typ)

3292A

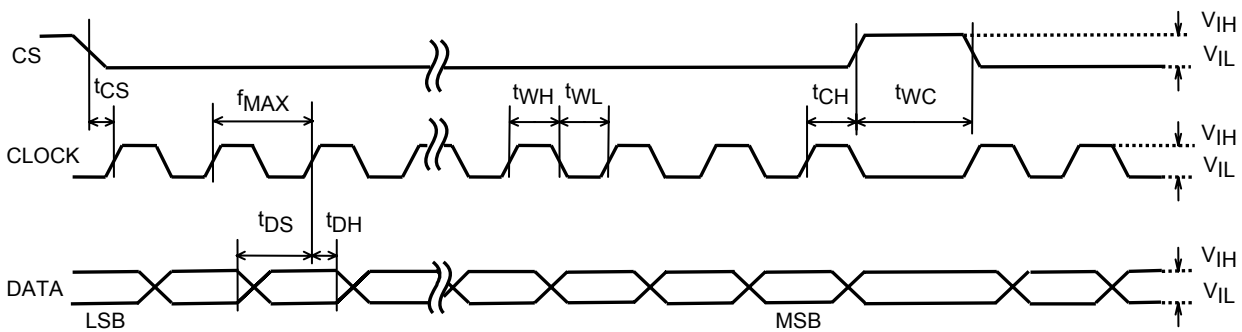


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Description of the Content of Serial Communication

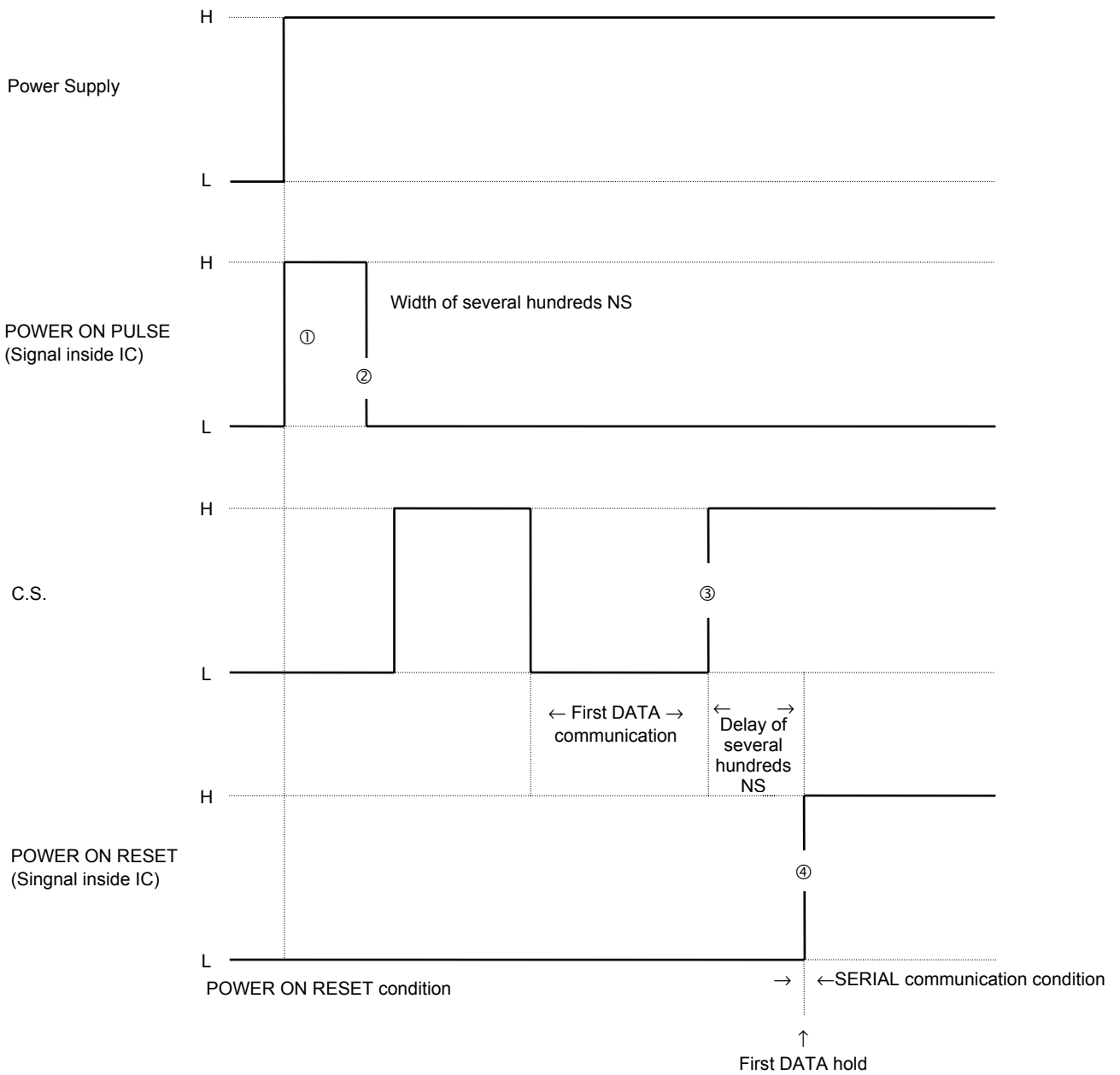
| DATA No. | Parameter | Default | |
|----------|--------------------|--|---|
| 0 | DUMMY | - | |
| 1 | DUMMY | - | |
| 2 | DUMMY | - | |
| 3 | MIC AMP POWER SW | 0: ON, 1: OFF | 0 |
| 4 | ALC AMP POWER SW | 0: ON, 1: OFF | 0 |
| 5 | ALC LEVEL CTL | +10dB: 0 +12dB: 1 +14dB: 0 | 0 |
| 6 | | 0 0 1 | 0 |
| 7 | REC BLOCK POWER SW | 0: ON, 1: OFF | 0 |
| 8 | LINE OUT POWER SW | 0: ON, 1: OFF | 0 |
| 9 | LINE MUTE SW | 0: ON, 1: OFF | 0 |
| 10 | SPK POWER SW | 0: ON, 1: OFF | 1 |
| 11 | DATA=1 | 1 1 1 1 1 : VOL MAX | 0 |
| 12 | DATA=2 | ┃ | 0 |
| 13 | DATA=4 | 0 0 0 0 0 : VOL MIN (MUTE) | 0 |
| 14 | DATA=8 | | 0 |
| 15 | DATA=16 | * EVR setting (the numeral shown in the left is decimal. For characteristics, see P9.) | 0 |

Serial Transmission Timing



- f_{MAX} (Max clock frequency) 1.5MHz
- t_{WL} (Clock pulse width: Low) 333ns or more
- t_{WH} (Clock pulse width: High) 333ns or more
- t_{CS} (Chip enable setup time) 333ns or more
- t_{CH} (Chip enable hold time) 333ns or more
- t_{DS} (Data setup time) 333ns or more
- t_{DH} (Data hold time) 333ns or more
- t_{WC} (Chip enable pulse width) 333ns or more
- V_{IH} (High voltage lower limit) 2.3V to 3.5V
- V_{IL} (Low voltage upper limit) 0V to 0.7V

POWER ON Condition (SERIAL communication)



The POWER ON RESET condition continues up to the second C.S rising (③) entered after falling (②) of POWER ON PULSE (①) generated inside IC at a time of power ON.
 Actually, because of delay of several hundreds NS in the IC, the first DATA condition begins in (④) and the normal SERIAL communication condition begins after (④).

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Electrical Characteristics Measurement Method at Ta=25°C, V_{CC}L, D, SP=3.0V, f=1kHz

| Symbol | Input | | Output | | Serial control setting | | | | | | | | | | | | | | | |
|--|-------|-------------------------------------|----------|--|------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| | Pin | Conditions | Pin | Conditions | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Circuit current | | | | | | | | | | | | | | | | | | | | |
| I _{CCA1} | 12 | V _{CCA} =3.0V No input | 12 | FULL operation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I _{CCA2} | 12 | V _{CCA} =3.0V No input | 12 | MIC/ALC/REC AMP POWER SAVE | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I _{CCA3} | 12 | V _{CCA} =3.0V No input | 12 | LINE AMP POWER SAVE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I _{CCS1} | 26 | V _{CCSP} =3.0V No input | 26 | FULL operation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I _{CCS2} | 26 | V _{CCSP} =3.0V No input | 26 | SPK AMP POWER SAVE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| I _{CCD} | 10 | V _{CCD} =3.0V No input | 10 | FULL operation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| REC output system | | | | | | | | | | | | | | | | | | | | |
| VOR1 | 16 | V _{IN} =-44dBV f=1kHz | 13 | 400 to 30kHz LPF used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HDR | 16 | V _{IN} =-44dBV f=1kHz | 13 | 400 to 30kHz LPF used THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALM1 | 16 | V _{IN} =-28dBV f=1kHz | 13 | 400 to 30kHz LPF used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALMD1 | 16 | V _{IN} =-28dBV f=1kHz | 13 | 400 to 30kHz LPF used THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALM2 | 16 | V _{IN} =-12dBV f=1kHz | 13 | 400 to 30kHz LPF used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALMD2 | 16 | V _{IN} =-12dBV f=1kHz | 13 | 400 to 30kHz LPF used THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VNOR | 16 | No input | 13 | JIS-A FILTER used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQR1 | 16 | V _{IN} =-36dBV f=4kHz | 13 | f=4kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQR2 | 16 | V _{IN} =-36dBV f=22kHz | 13 | f=22kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQR3 | 16 | V _{IN} =-36dBV f=100kHz | 13 | f=100kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LINE output system | | | | | | | | | | | | | | | | | | | | |
| VOL1 | 11 | V _{IN} =-14dBV f=1kHz | 5 | 400 to 30kHz LPF used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| HDL | 11 | V _{IN} =-14dBV f=1kHz | 5 | 400 to 30kHz LPF used THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| VNOL | 11 | No input | 5 | JIS-A FILTER used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOML | 11 | f=1kHz | 5 | 400 to 30kHz LPF used Level at which THD = 1% (from 2nd to 5th harmonic) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQP1 | 11 | V _{IN} =-10dBV f=4kHz | 5 | f=4kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQP2 | 11 | V _{IN} =-10dBV f=22kHz | 5 | f=22kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| FEQP3 | 11 | V _{IN} =-10dBV f=100kHz | 5 | f=100kHz/1kHz level ratio | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SPK output system (SPK end: measured with 8Ω) | | | | | | | | | | | | | | | | | | | | |
| VOSP1 | 11 | V _{IN} =-14dBV f=1kHz | 25 27 | 400 to 30kHz LPF used Vol.=MAX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| THDSP | 11 | V _{IN} =-14dBV f=1kHz | 25 27 | 400 to 30kHz LPF used Vol.=MAX, THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |

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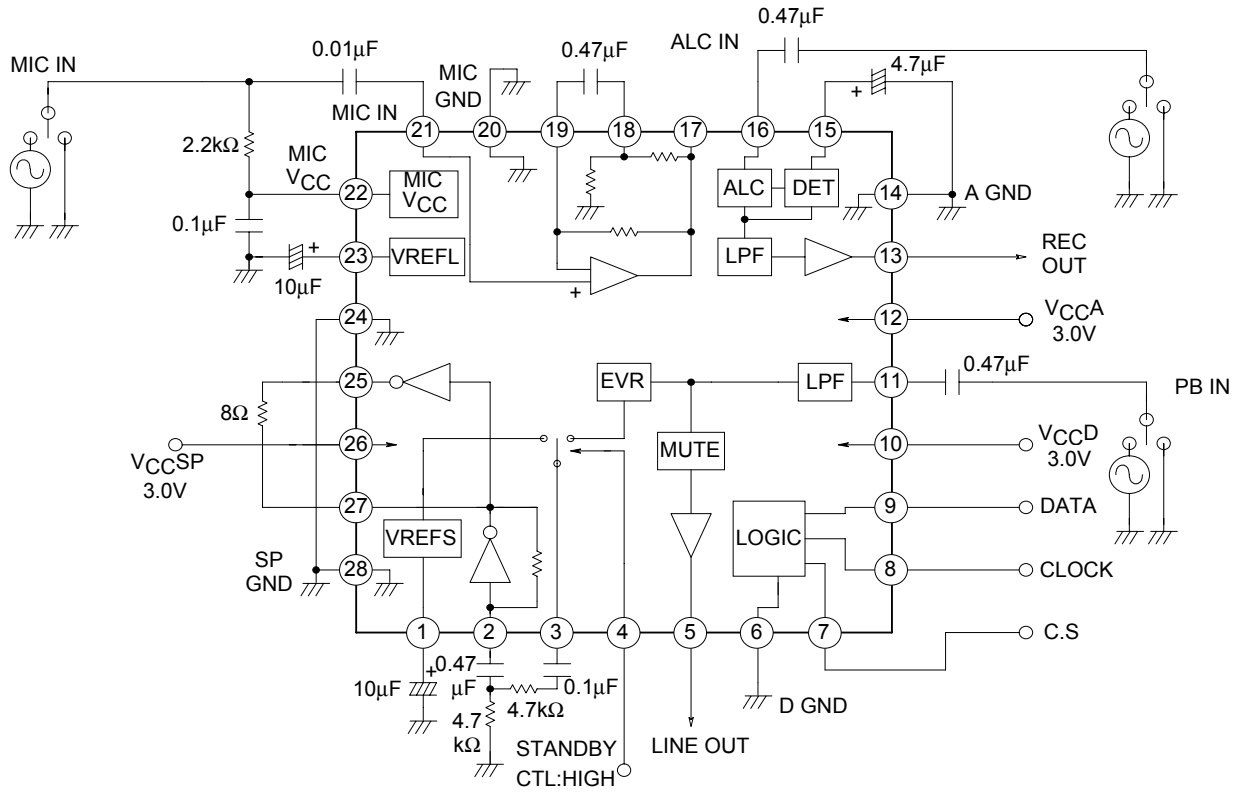
| Symbol | Input | | Output | | Serial control setting | | | | | | | | | | | | | | | |
|--|-------|---|----------|--|------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| | Pin | Conditions | Pin | Conditions | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| SPK output system (SPK end: measured with 8Ω) | | | | | | | | | | | | | | | | | | | | |
| VOSP2 | 11 | $V_{IN}=-14\text{dBV}$ $f=1\text{kHz}$ | 25 27 | 400 to 30kHz LPF used Vol.=TYP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| VOSP3 | 11 | $V_{IN}=-14\text{dBV}$ $f=1\text{kHz}$ | 25 27 | JIS-A FILTER used Vol.=MIN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SPK output system (SPK end: measured with 8Ω) | | | | | | | | | | | | | | | | | | | | |
| VNOSP | 11 | No input | 25 27 | JIS-A FILTER used Vol.=MAX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| VOSSP | 11 | $f=1\text{kHz}$ | 25 27 | 400 to 30kHz LPF used Vol.=MAX, Level at which THD = 10% (from 2nd to 5th harmonic) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| MIC output system | | | | | | | | | | | | | | | | | | | | |
| VGMIC | 21 | $V_{in}=-40\text{dBV}$ $f=1\text{kHz}$ | 17 | 400 to 30kHz LPF used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HDMIC | 21 | $V_{in}=-40\text{dBV}$ $f=1\text{kHz}$ | 17 | 400 to 30kHz LPF used THD: from 2nd to 5th harmonic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VNOMIC | 21 | No input | 17 | JIS-A FILTER used | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOMIC | 21 | $f=1\text{kHz}$ | 17 | 400 to 30kHz LPF used Level at which THD=1% (from 2nd to 5th harmonic) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VMIC | 22 | No input | 22 | Measure the output voltage at 2.2kΩ load | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Description of Pin Functions

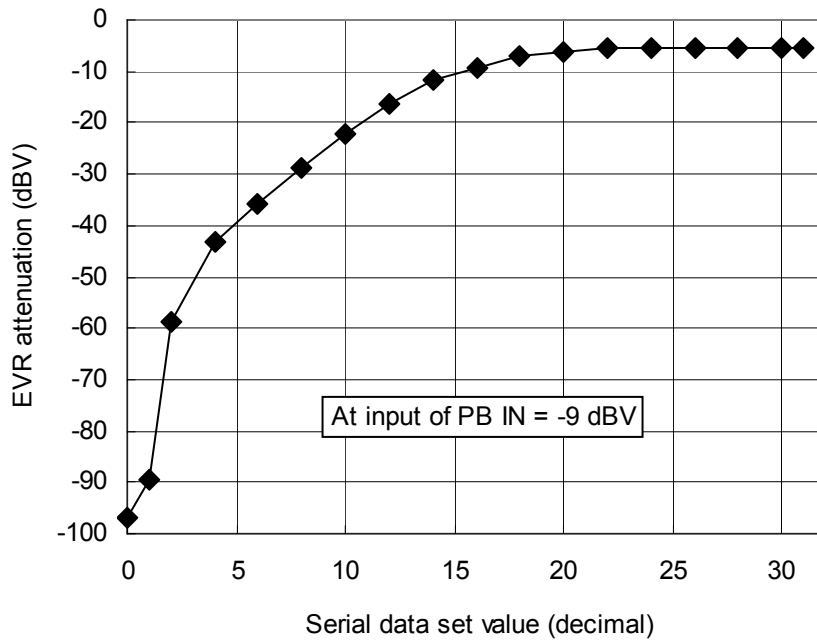
| Pin No. | Pin Description |
|---------|--|
| 1 | Removal of speaker ripple |
| 2 | Speaker input |
| 3 | EVR output |
| 4 | STANDBY control |
| 5 | LINE output |
| 6 | D GND |
| 7 | C.S. input |
| 8 | CLOCK input |
| 9 | DATA input |
| 10 | V_{CCD} |
| 11 | PB input |
| 12 | V_{CCA} |
| 13 | REC output |
| 14 | A GND |
| 15 | ALC detection |
| 16 | ALC input |
| 17 | MIC output |
| 18 | MIC Amp attenuator output |
| 19 | MIC Amp NFB |
| 20 | MIC GND |
| 21 | MIC input |
| 22 | INT power supply for MIC |
| 23 | MIC Removal of ripple for V_{CC} and VREFL |
| 24 | SPK GND |
| 25 | Speaker positive-phase output |
| 26 | V_{CCSP} |
| 27 | Speaker negative-phase output |
| 28 | SPK GND |

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LA74302FN BLOCK Diagram and Test Circuit Diagram



LA74302FN EVR characteristics



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Table of Input/Output Forms of LA74302FN

| PIN | Pin Name | DC Voltage | AC Voltage | Description of Functions | Equivalent Circuit Diagram in Pin |
|-----|-----------|------------|---|--|-----------------------------------|
| 1 | VREFS | 1.25V | | Ripple removal pin | |
| 2 | SP IN | 1.25V | -10dBV (EVR MAX at PB reference input) | Speaker input pin | |
| 27 | SPK OUT- | 1.25V | -10dBV (EVR MAX at PB reference input) | Speaker negative-phase output pin | |
| 3 | EVR OUT | 1.64V | -10dBV (EVR MAX at PB reference input) | EVR output pin | |
| 4 | STANDBY H | | | STANDBY control pin 2V or more: STANDBY * Puts all amplifiers excluding speakers into the STANDBY state. | |
| 5 | LINE OUT | 1.50V | -6dBV (At PB reference input) | LINE output pin | |
| 6 | D_GND | 0V | | GND pin for serial communication block | |
| 7 | CS | | | CS input pin | |
| 8 | CLOCK | | | CLOCK input pin | |
| 9 | DATA | | | DATA input pin | |

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| PIN | Pin Name | DC Voltage | AC Voltage | Description of Functions | Equivalent Circuit Diagram in Pin |
|-----|------------------|------------|---|--|-----------------------------------|
| 10 | V _{CCD} | 3.0V | | Power pin for driving of the serial communication block and all amplifier starter circuits | |
| 11 | PB IN | 1.64V | -14dBV (Reference input level) | PB input pin | |
| 12 | V _{CCA} | 3.0V | | Analog signal block power pin | |
| 13 | REC OUT | 1.50V | -14dBV (At MIC reference input) | REC output pin | |
| 14 | A GND | 0V | | Analog signal block GND pin | |
| 15 | ALC DET | | | ALC detection pin | |
| 16 | ALC IN | 1.64V | -44dBV (At MIC reference input/output) | ALC input pin | |
| 17 | MIC OUT | 1.64V | -44dBV (At MIC reference input) | MIC output pin | |

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| PIN | Pin Name | DC Voltage | AC Voltage | Description of Functions | Equivalent Circuit Diagram in Pin |
|----------|---------------------|------------|---|--|-----------------------------------|
| 18 | MIC ATT | 0.30V | | MIC Amp attenuator output pin | |
| 19 | MIC NFB | 1.64V | | MIC Amp NFB pin | |
| 20 | MIC GND | 0V | | MIC Amp block GND pin | |
| 21 | MIC IN | 1.64V | -70dBV (Reference input level) | MIC input pin | |
| 22 | MIC V _{CC} | 2.30V | | MIC power pin | |
| 23 | VREFL | 2.30V | | MIC V _{CC} and VREFL ripple removal pin | |
| 24 28 | SP GND | 0V | | Speaker GND pin | |
| 25 | SPK OUT+ | 1.25V | -10dBV (EVR MAX at PB reference input) | Speaker positive-phase output pin | |
| 26 | V _{CC} SP | 3.0V | | Speaker power pin | |

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