

AN1101SSM

CMOS single power supply

■ Overview

AN1101SSM is an operational amplifier with a single power supply by CMOS diffusion process.

It has low current-consumption compared to general purpose operational amplifier by bipolar diffusion process. 0 V to V_{DD} is available for both input voltage and output voltage. And this IC is widely applicable to the battery-driven equipment and to many amplifier circuits which adopt small package products.

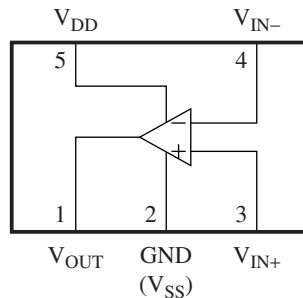
■ Features

- Low current-consumption: $I_{DD} = 55 \mu\text{A}$ (typ.), $V_{DD} = 3 \text{ V}$
- Operating input/output voltage range: 0 V to V_{DD}
- Small offset voltage: 0.5 mV (typ.)
- Small input bias current: 1 pA (typ.)
- Operating supply voltage range:
2.5 V to 5.5 V or $\pm 1.25 \text{ V}$ to $\pm 2.75 \text{ V}$

■ Applications

- Various small-size general consumer electronics equipment

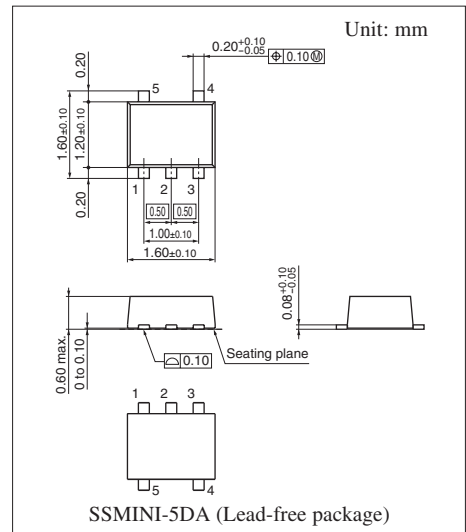
■ Block Diagram



■ Pin Descriptions

| Pin No. | Symbol | Description |
|---------|------------------|--|
| 1 | V_{OUT} | Output |
| 2 | GND (V_{SS}) | Ground, V_{SS} (negative supply) at using two power supply |
| 3 | V_{IN+} | Input (positive) |
| 4 | V_{IN-} | Input (negative) |
| 5 | V_{DD} | Power supply |

Note) The AN1101SSM has been designed for general consumer electronics equipment, not for the specific one requiring such a high reliability that may prevent it from threatening the human lives.



■ Absolute Maximum Ratings

| Parameter | Symbol | Rating | Unit |
|----------------------------------|-----------|----------------------|------|
| Supply voltage | V_{DD} | 5.6 | V |
| Differential input voltage | DV_{IN} | ± 5.6 | V |
| Input voltage | V_{IN} | V_{SS} to V_{DD} | V |
| Supply current | I_{DD} | — | mA |
| Power dissipation *2 | P_D | 50 | mW |
| Operating ambient temperature *1 | T_{opr} | -30 to +85 | °C |
| Storage temperature *1 | T_{stg} | -55 to +125 | °C |

Note) 1. *1: Except for the operating ambient temperature and storage temperature, all ratings are for $T_a = 25^\circ\text{C}$.

*2: The value at $T_a = +85^\circ\text{C}$.

2. This IC is not suitable for car electrical equipment.

■ Recommended Operating Range

| Parameter | Symbol | Range | Unit |
|----------------|----------|--------------------------|------|
| Supply voltage | V_{DD} | 2.5 to 5.5 | V |
| | | ± 1.25 to ± 2.75 | |

■ Electrical Characteristics at $V_{DD} = 3.0\text{ V}$, $V_{SS} = \text{GND}$, $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|------------|---|------|------|------|---------------|
| Input offset voltage | V_{IO} | Buffer circuit | — | 0.5 | 5.5 | mV |
| Common-mode input voltage | CMV_{IN} | $R_S = 10\text{ k}\Omega$, $R_F = 10\text{ k}\Omega$ | 0 | — | 3 | V |
| Open-loop gain | GV | $f = 100\text{ Hz}$ | 60 | 90 | — | dB |
| Maximum output amplitude voltage 1 | V_{OH} | $R_L \geq 10\text{ k}\Omega$ | 2.90 | 2.98 | — | V |
| Maximum output amplitude voltage 2 | V_{OL} | $R_L \geq 10\text{ k}\Omega$ | — | 0.01 | 0.05 | V |
| Common-mode input voltage rejection ratio | CMRR | $V_{IN} = 0.0\text{ V}$ to 3.0 V , $R_S = R_F = 10\text{ k}\Omega$ | 50 | 65 | — | dB |
| Supply voltage ripple rejection ratio * | SVRR | $V_{DD} = 2.5\text{ V}$ to 5.5 V | 55 | 70 | — | dB |
| Supply current | I_{DD} | No load | — | 55 | 100 | μA |

Note) * : Except for the supply voltage ripple rejection ratio (SVRR), $V_{DD} = 3\text{ V}$.

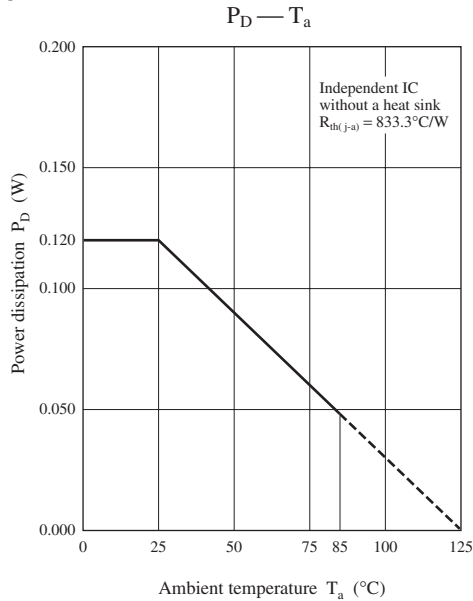
• Design reference data

Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

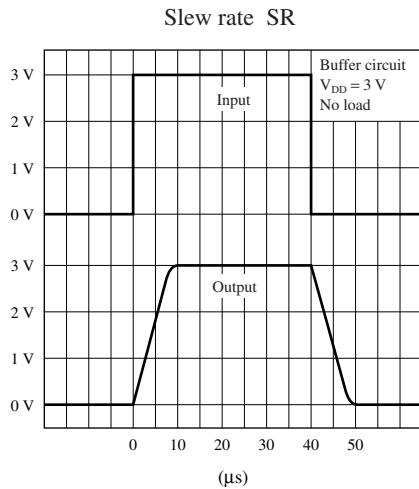
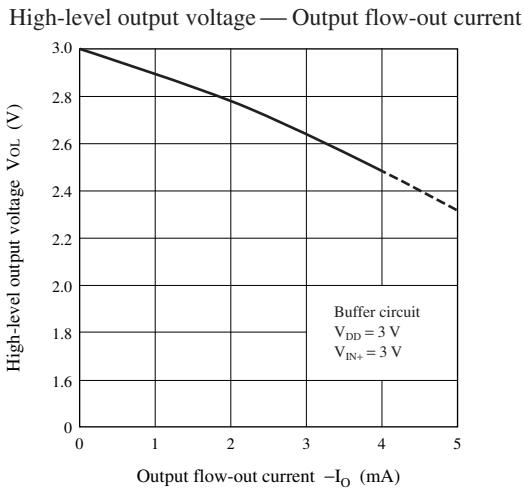
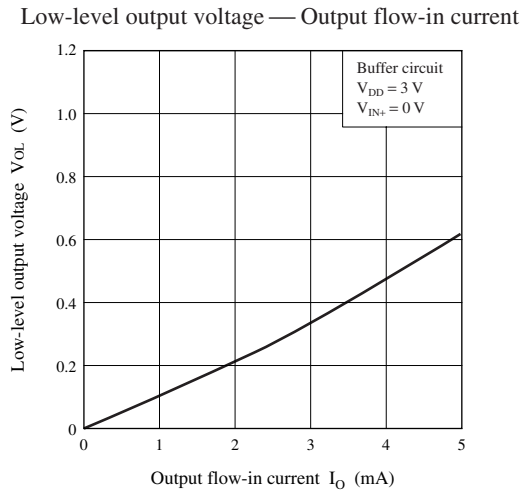
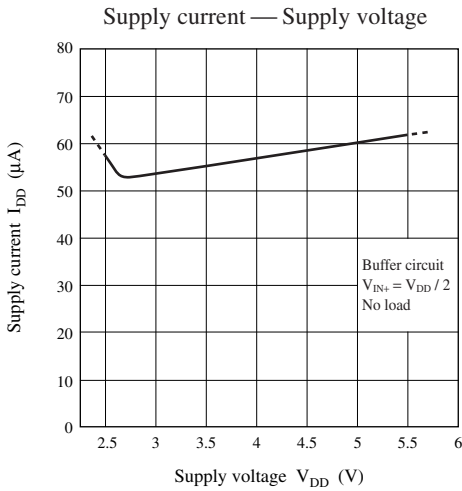
| Parameter | Symbol | Conditions | Reference | Unit |
|----------------------|----------|------------------------------|-----------|------------------|
| Offset current | I_O | — | 1 | pA |
| Input bias current | I_{IO} | — | 1 | pA |
| Slew rate | SR | $R_L \geq 10\text{ k}\Omega$ | 0.35 | V/ μs |
| Zero-cross frequency | f_T | $A_V = 1$ | 0.8 | MHz |

■ Technical Data

- $P_D - T_a$ curve of SSMINI-5DA



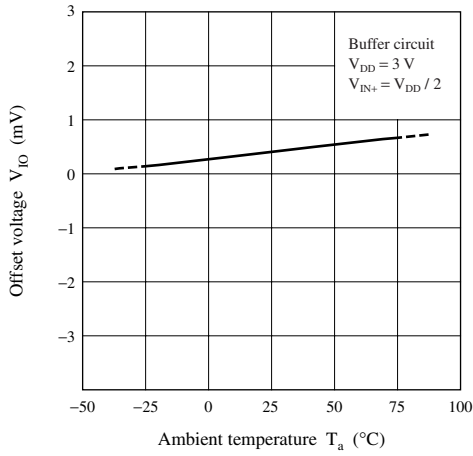
- Main characteristics



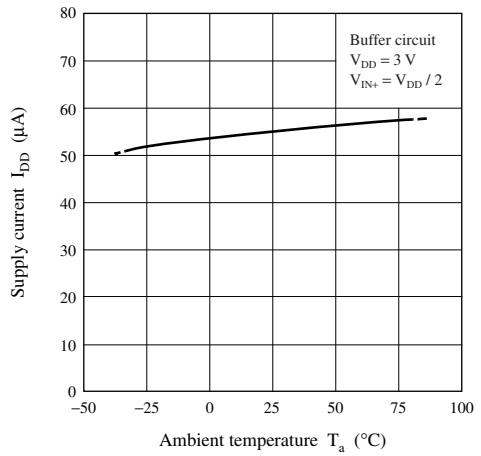
■ Technical Data (continued)

• Main characteristics (continued)

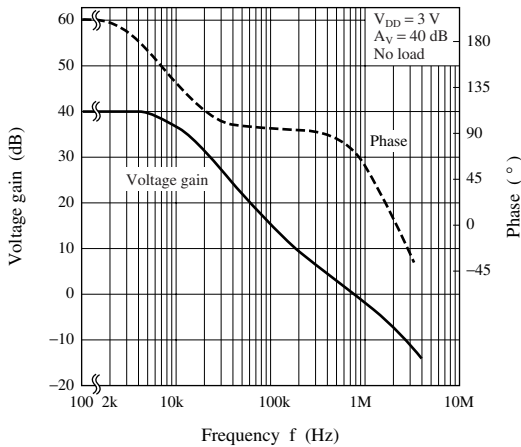
Offset voltage — Ambient temperature



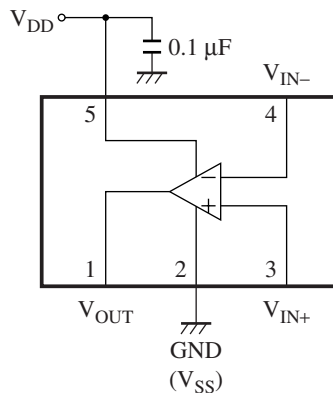
Supply current — Ambient temperature



Voltage gain · Phase — Frequency characteristics



■ Application Circuit Example



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