

# 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.

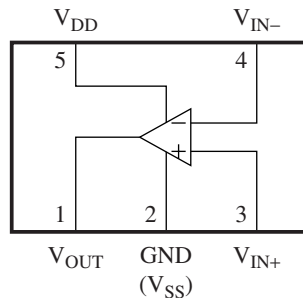
### ■ Features

- 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

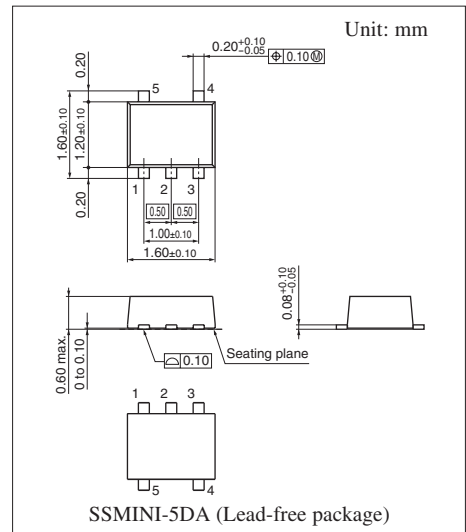
### ■ Block Diagram



### ■ 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	$DV_{IN}$	$\pm 5.6$	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
		$\pm 1.25$ to $\pm 2.75$	

### ■ 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 $3.0\text{ V}$ , $R_S = R_F = 10\text{ k}\Omega$	50	65	—	dB
Supply voltage ripple rejection ratio *	SVRR	$V_{DD} = 2.5\text{ V}$ to $5.5\text{ V}$	55	70	—	dB
Supply current	$I_{DD}$	No load	—	55	100	$\mu\text{A}$

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

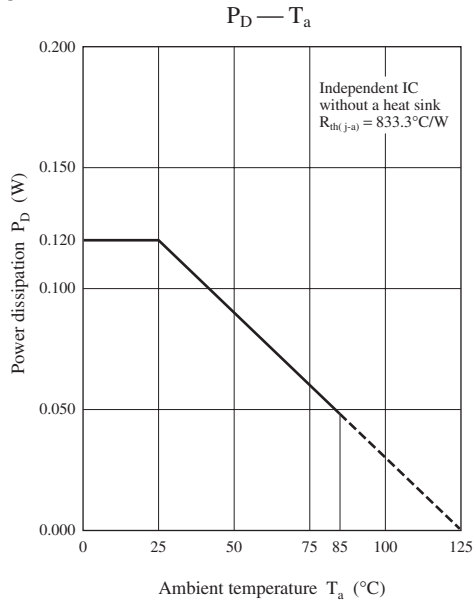
#### • Design reference data

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

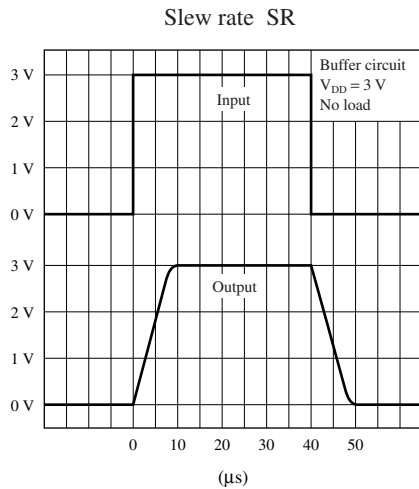
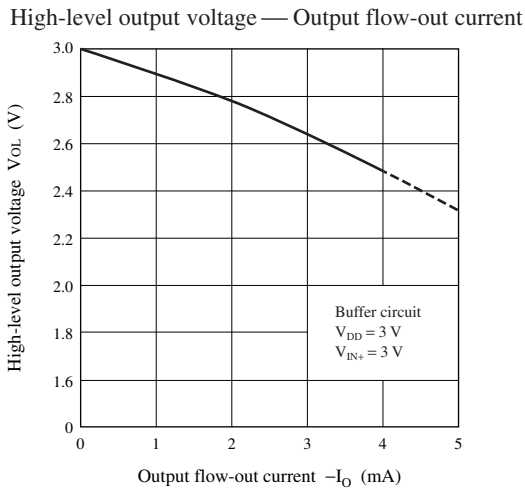
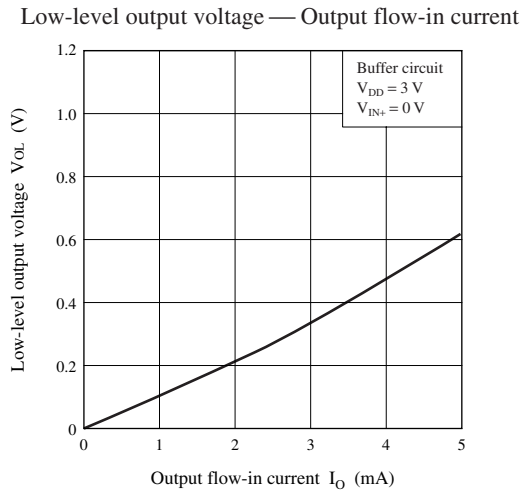
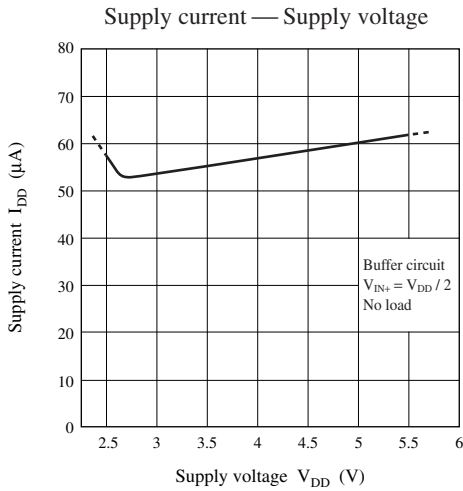
Parameter	Symbol	Conditions	Reference	Unit
Offset current	$I_O$	—	1	pA
Input bias current	$I_{IO}$	—	1	pA
Slew rate	SR	$R_L \geq 10\text{ k}\Omega$	0.35	V/ $\mu\text{s}$
Zero-cross frequency	$f_T$	$A_V = 1$	0.8	MHz

■ Technical Data

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



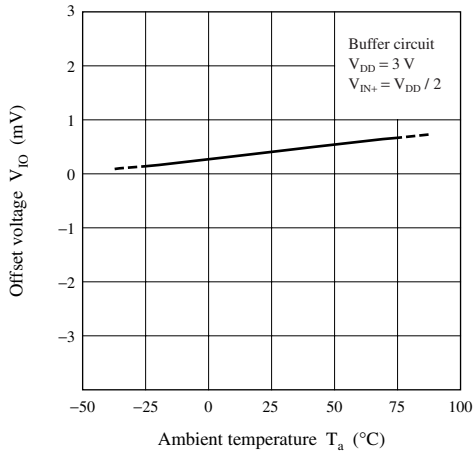
- Main characteristics



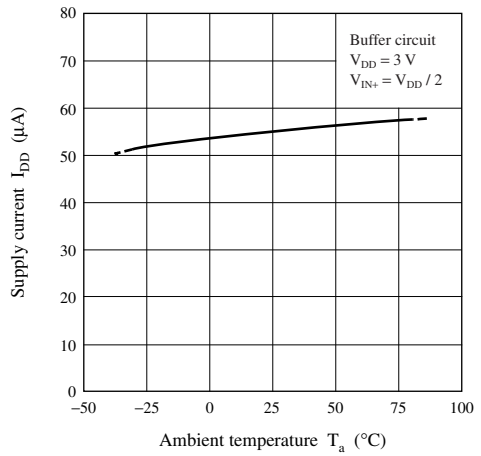
■ Technical Data (continued)

• Main characteristics (continued)

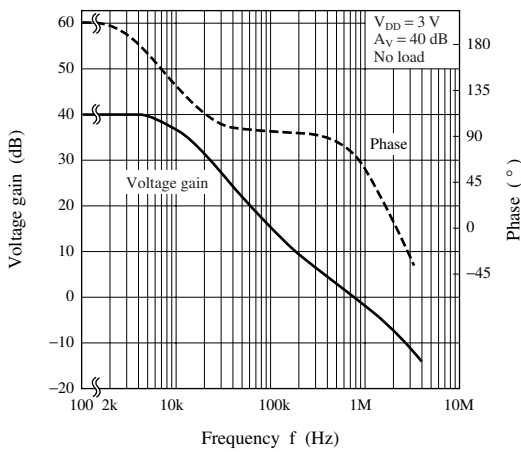
Offset voltage — Ambient temperature



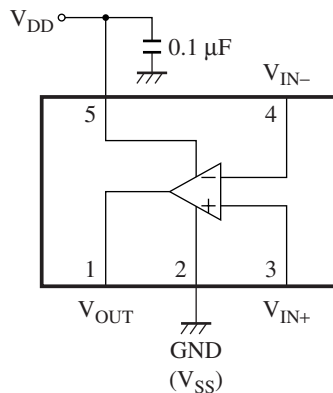
Supply current — Ambient temperature



Voltage gain · Phase — Frequency characteristics



■ Application Circuit Example



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