

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.

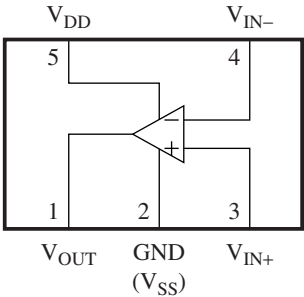
Features

- Low current-consumption: $I_{DD} = 55 \mu A$ (typ.), $V_{DD} = 3 V$
- 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 $\pm 1.25 V$ to $\pm 2.75 V$

Applications

- Various small-size general consumer electronics equipment

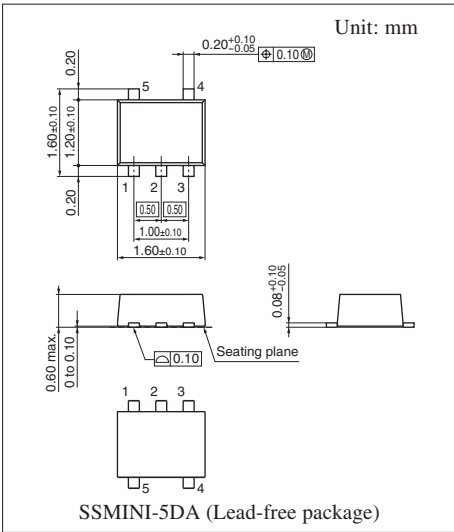
Block Diagram



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 $+85$	$^{\circ}\text{C}$
Storage temperature *1	T_{stg}	-55 to $+125$	$^{\circ}\text{C}$

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), $V_{DD} = 3\text{ V}$.

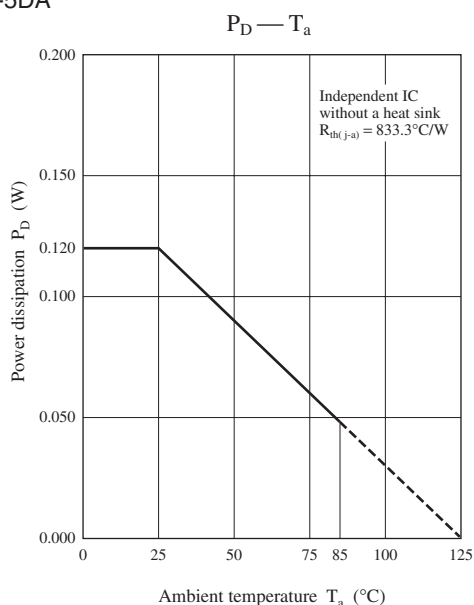
• Design reference data

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

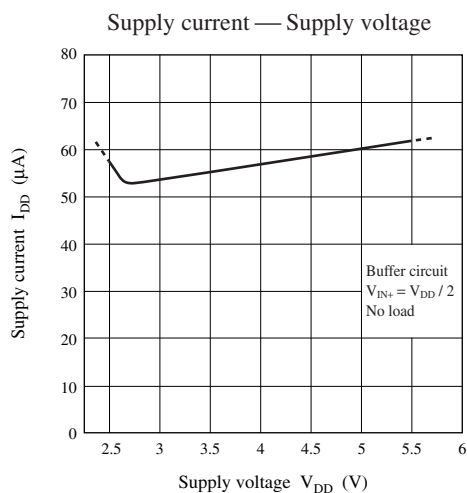
Parameter	Symbol	Conditions	Reference	Unit
Offset current	I_O	—	1	pA
Input bias current	I_{IO}	—	1	pA
Slew rate	SR	$R_L \geq 10\text{ k}\Omega$	0.35	$\text{V}/\mu\text{s}$
Zero-cross frequency	f_T	$A_V = 1$	0.8	MHz

■ Technical Data

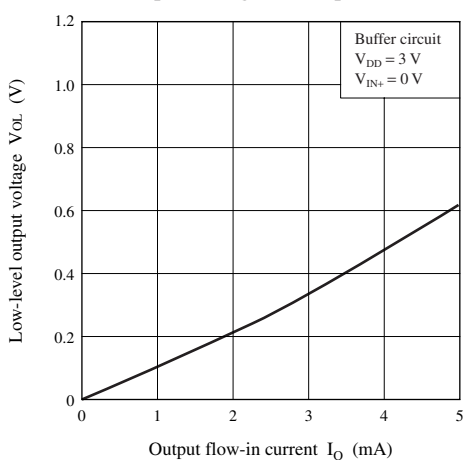
- $P_D - T_a$ curve of SSMINI-5DA



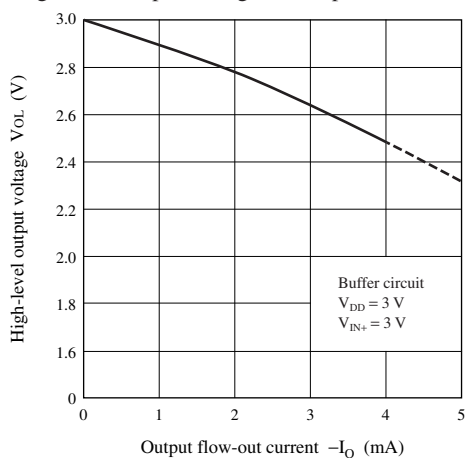
- Main characteristics



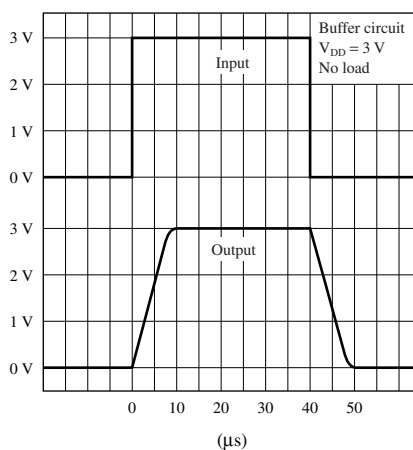
- Low-level output voltage — Output flow-in current



- High-level output voltage — Output flow-out current



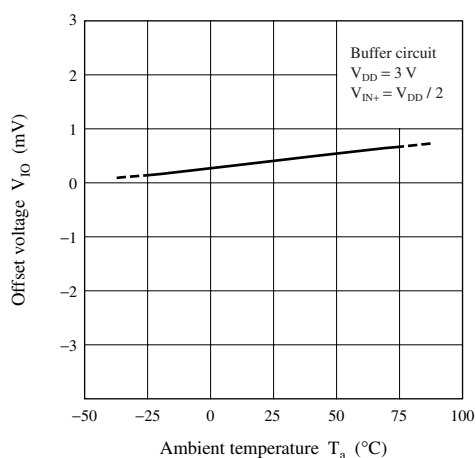
- Slew rate SR



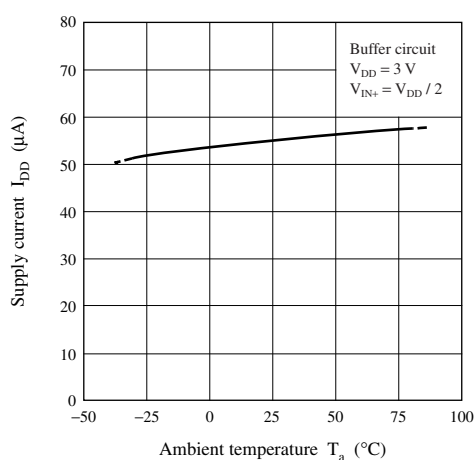
■ Technical Data (continued)

- Main characteristics (continued)

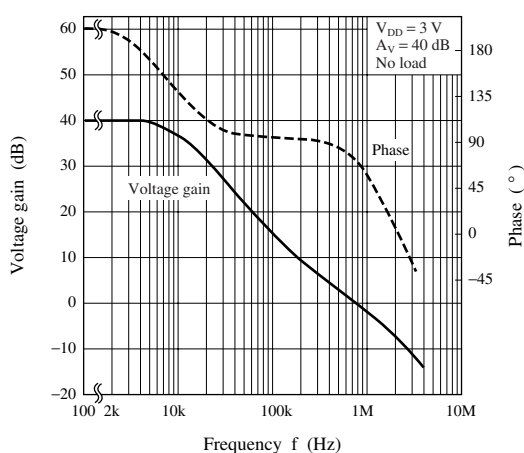
Offset voltage — Ambient temperature



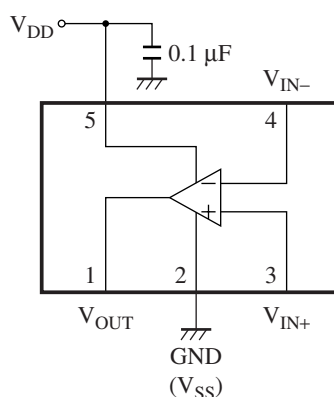
Supply current — Ambient temperature



Voltage gain · Phase — Frequency characteristics



■ Application Circuit Example



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