AN1281SSM

Ripple filter IC

■ Overview

The AN1281SSM is a ripple filter IC that rejects the ripple component superimposed on the regulator output. Use for the VCO bias of cellular phones improves C/N and S/N.

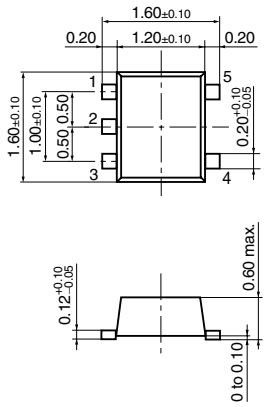
■ Features

- Small I/O voltage difference
- The mounting area is reduced by adopting the SSmini-type package

■ Applications

- Cellular phones and others

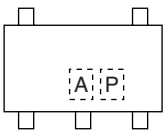
Unit: mm



SSMINI-5D

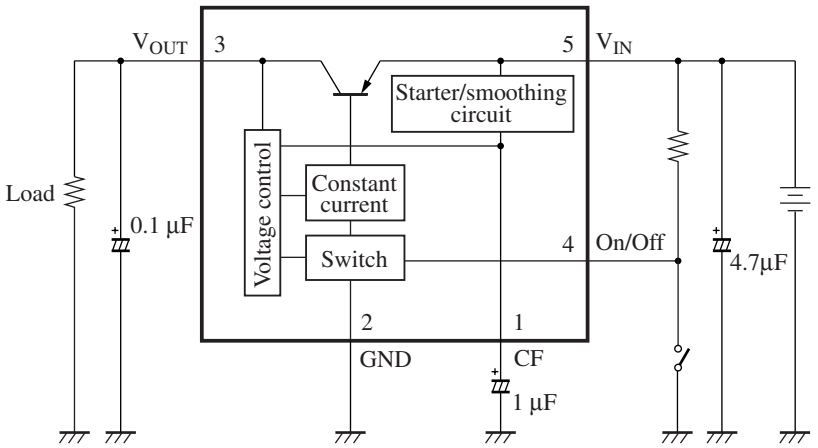
Note) The package of this product will be changed to lead-free type (SSMINI-5DA). See the new package dimensions section later of this datasheet.

Part No. and marking



AP is the Part No. for AN1281SSM

■ Block Diagram



■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{IN}	4.5	V
Supply current	I_{CC}	20	mA
Power dissipation *2	P_D	60	mW
Operating ambient temperature *1	T_{opr}	−25 to +75	°C
Storage temperature *1	T_{stg}	−40 to +125	°C
Output current	I_O	−15	mA
Allowable application voltage for on/off pin *3	$V_{ON/OFF}$	V_{IN}	V
Allowable maximum capacitance for CF pin	CF	10	µF

Note) 1. Do not apply external currents or voltages to any pins not specifically mentioned.
For circuit currents, '+' denotes current flowing into the IC, and '−' denotes current flowing out of the IC.
2. ∗1: Except for the power dissipation, the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.
∗2: The power dissipation shown is the value for T_a = 75°C.
∗3: Do not over the supply voltage.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	2.5 to 4.3	V

■ Electrical Characteristics at T_a = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage 1	V_{O1}	V_{IN} = 2.5 V, I_{OUT} = −1 µA	2.10	2.30	—	V
Output voltage 2	V_{O2}	V_{IN} = 2.5 V, I_{OUT} = −15 mA	1.97	2.17	—	V
Output voltage 3	V_{O3}	V_{IN} = 3.0 V, I_{OUT} = −1 µA	2.62	2.82	—	V
Output voltage 4	V_{O4}	V_{IN} = 3.0 V, I_{OUT} = −15 mA	2.55	2.70	—	V
Output voltage 5	V_{O5}	V_{IN} = 4.3 V, I_{OUT} = −1 µA	3.95	4.15	—	V
Output voltage 6	V_{O6}	V_{IN} = 4.3 V, I_{OUT} = −15 mA	3.83	4.03	—	V
Consumption current 1	I_{CC1}	V_{IN} = 2.5 V, I_{OUT} = −1 µA	−485	−370	—	µA
Consumption current 2	I_{CC2}	V_{IN} = 2.5 V, I_{OUT} = −15 mA	−420	−320	—	µA
Consumption current 3	I_{CC3}	V_{IN} = 3.0 V, I_{OUT} = −1 µA	−735	−565	—	µA
Consumption current 4	I_{CC4}	V_{IN} = 3.0 V, I_{OUT} = −15 mA	−670	−515	—	µA
Consumption current 5	I_{CC5}	V_{IN} = 4.3 V, I_{OUT} = −1 µA	−1.42	−1.09	—	mA
Consumption current 6	I_{CC6}	V_{IN} = 4.3 V, I_{OUT} = −15 mA	−1.36	−1.04	—	mA
Load regulation 1	REG_{L1}	V_{IN} = 2.5 V, I_{OUT} = −1 µA to −15 mA	0	130	230	mV
Load regulation 2	REG_{L2}	V_{IN} = 3.0 V, I_{OUT} = −1 µA to −15 mA	0	120	220	mV
Load regulation 3	REG_{L3}	V_{IN} = 4.3 V, I_{OUT} = −1 µA to −15 mA	0	120	220	mV
Consumption current against load change 1	I_{REG1}	V_{IN} = 2.5 V, I_{OUT} = −1 µA to −15 mA	0	49	110	µA
Consumption current against load change 2	I_{REG2}	V_{IN} = 3.0 V, I_{OUT} = −1 µA to −15 mA	0	51	110	µA

■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Consumption current against load change 3	I_{REG3}	V_{IN} = 4.3 V, I_{OUT} = −1 µA to −15 mA	0	51	110	µA
Ripple rejection ratio 1	RR_1	V_{IN} = 3 V± 0.1 V, I_{OUT} = −15 mA f = 1 kHz	26.5	29.5	—	dB
Ripple rejection ratio 2	RR_2	V_{IN} = 3 V± 0.1 V, I_{OUT} = −15 mA f = 25 kHz	30.5	33.5	—	dB
Ripple rejection ratio 3	RR_3	V_{IN} = 3 V± 0.1 V, I_{OUT} = −15 mA f = 100 kHz	26.5	29.1	—	dB
Consumption current at off	I_{OFF}	V_{IN} = 4.3 V, On/Off = 0 V	—	—	1	µA

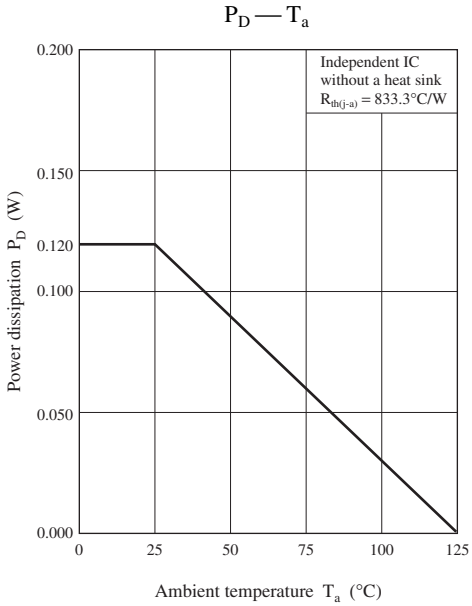
• Design reference data

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

Parameter	Symbol	Conditions	Reference value	Unit
Output voltage 7	V_{O7}	V_{IN} = 3.0 V, I_{OUT} = −15 mA T_a = −25°C to +75°C	2.50 to 2.8	V
Consumption current 7	I_{CC7}	V_{IN} = 3.0 V, I_{OUT} = −15 mA T_a = −25°C to +75°C	400 to 800	µA
Load regulation 4	REG_{L4}	V_{IN} = 3.0 V, I_{OUT} = −1 µA to −15 mA T_a = −25°C to +75°C	100 to 350	mV
Consumption current against load change 4	I_{REG4}	V_{IN} = 3.0 V, I_{OUT} = −1 µA to −15 mA T_a = −25°C to +75°C	to 200	µA
Ripple rejection ratio 4	RR_4	V_{IN} = 3.0 V± 0.1 V, I_{OUT} = −15 mA f = 1 kHz, T_a = −25°C to +75°C	20 to	dB
Ripple rejection ratio 5	RR_5	V_{IN} = 3.0 V± 0.1 V, I_{OUT} = −15 mA f = 25 kHz, T_a = −25°C to +75°C	20 to	dB
Ripple rejection ratio 6	RR_6	V_{IN} = 3.0 V± 0.1 V, I_{OUT} = −15 mA f = 100 kHz, T_a = −25°C to +75°C	18 to	dB
Output voltage rise time	t_r	V_{IN} = 3 V, $V_{ON/OFF}$ = 0 V → 3 V I_{OUT} = −15 mA, V_{OUT}: 10% → 90% T_a = −25°C to +75°C	to 10	µs
Output voltage fall time	t_f	V_{IN} = 3 V, $V_{ON/OFF}$ = 3 V → 0 V I_{OUT} = −15 mA, V_{OUT}: 90% → 10% T_a = −25°C to +75°C	to 500	µs
Oscillation frequency margin	G_f	C_{OUT} ≥ 0.1 µF, V_{IN} = 3.0 V I_{OUT} = −1 µA to −15 mA T_a = −25°C to +75°C	Without abnormal oscillation.	

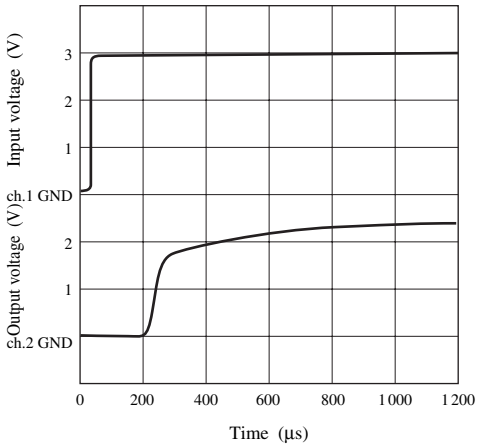
■ Application Notes

• P_D — T_a curves of SSMINI-5D package

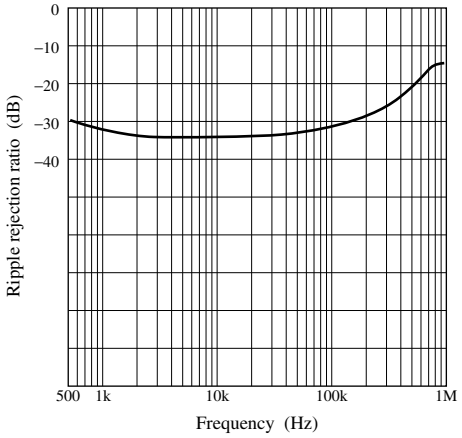


• Main characteristics

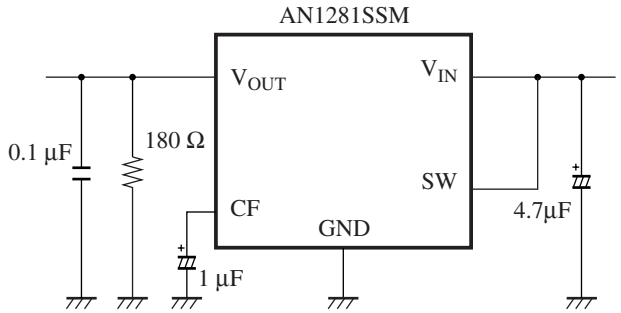
Output voltage rise time



Ripple rejection ratio — Frequency

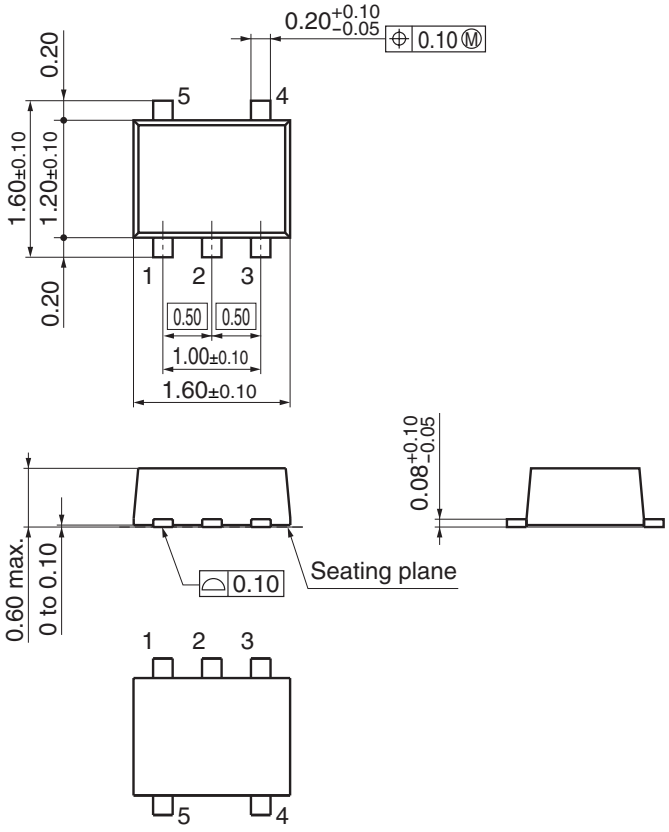


Measurement circuit



■ New Package Dimensions (Unit: mm)

• SSMINI-5DA (Lead-free package)



Request for your special attention and precautions in using the technical information and semiconductors described in this material

(1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

(2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.

(3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.

(6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.

(7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.

B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.

C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.

2001 MAR