DATA SHEET

Part No.	AN79L10
Package Code No.	SSIP003-P-0000S (Exclusive use for AN79Lxx)

Contents

AN79L10

3-pin negative output voltage regulator (100 mA type)

■ Overview

The AN79Lxx series are 3-pin, fixed negative output type monolithic voltage regulators.
Stabilized fixed output voltage is obtained from unstable DC input voltage without using any external components.
12 types of output voltage are available; –4 V, –5 V, –6 V, –7 V, –8 V, –9 V, –10 V, –12 V, –15 V, –18 V, –20 V and –24 V.
They can be used widely in power circuits with current capacity of up to 100 mA.
The AN79L10 is the –10 V output voltage type in these series.

■ Features

- No external components
- Output voltage: –10 V
- Built-in overcurrent limit circuit
- Built-in thermal overload protection circuit

■ Applications

- 3-pin negative output voltage regulator (100 mA type)

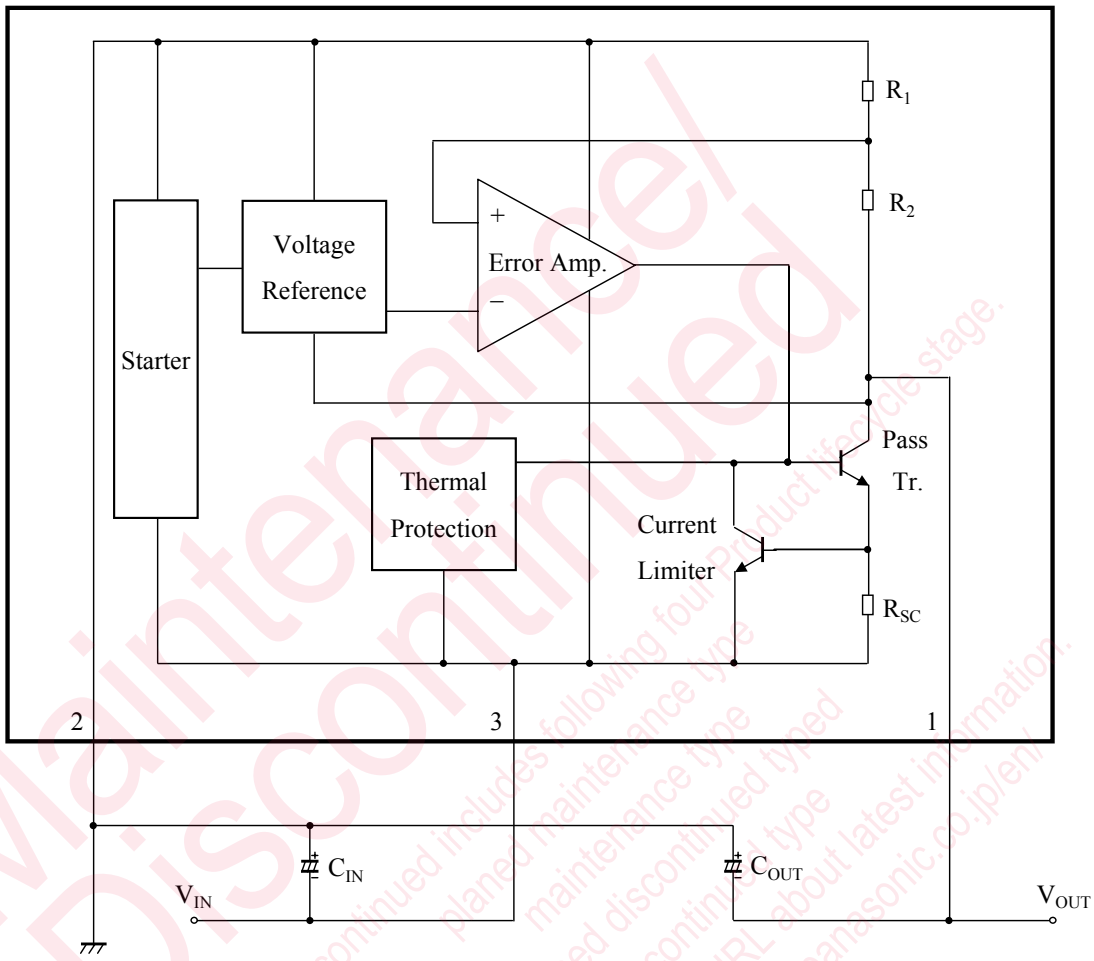
■ Package

- 3-pin plastic shrink single inline package (SSIP type)

■ Type

- Silicon monolithic bipolar IC

■ Block Diagram



C_{IN} : When a wiring from a smoothing circuit to a three-pin regulator is long, it is likely to oscillate at output. A capacitor of 0.1 µF to 0.47 µF should be connected near an input pin.

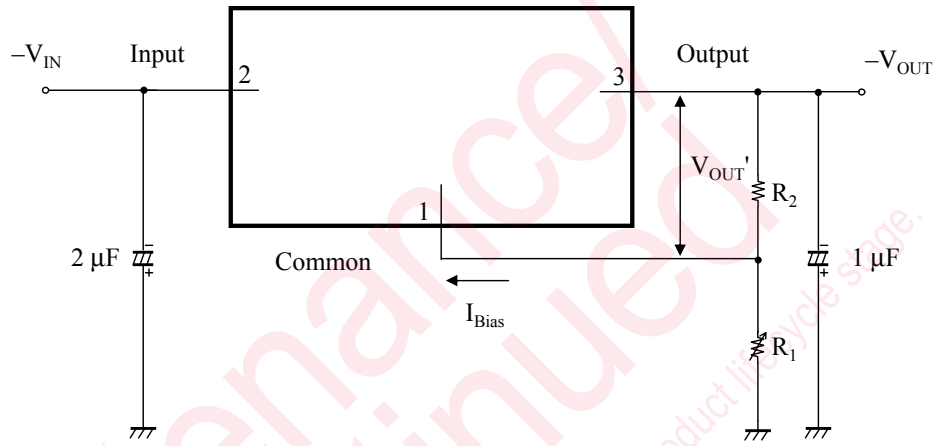
C_{OUT} : Deadly needed to prevent from oscillation (0.33 µF to 1.0 µF). It is recommended to use a capacitor of a small internal impedance (ex. tantalum capacitor) when using it under a low temperature. When any sudden change of load current is likely to occur, connect an electrolytic capacitor of 10 µF to 100 µF to improve a transitional response of output voltage.

R_1 : 3 kΩ

R_2 : 7 kΩ

■ Application Circuit Example

Adjustable output regulator



$$| V_{OUT} | = V_{OUT}' \left(1 + \frac{R_1}{R_2}\right) + I_Q R_1$$

Note) $-V_{OUT}$ varies due to sample to sample variation of I_{Bias}.
Never fail to adjust individually with R_1.

■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	Output	Output	Regulated power output
2	Common	GND	Ground
3	Input	Input	Input supplies power to the internal circuitry

■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Note
1	Input voltage	V_{IN}	−35	V	*1
2	Supply current	I_{CC}	200	mA	*2
3	Power dissipation	P_D	368	mW	*3
4	Operating ambient temperature	T_{opr}	−20 to + 80	°C	*4
5	Storage temperature	T_{stg}	−55 to +150	°C	*4

Note) *1: The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.
*2: Since current limiting circuit is built in, current value never exceeds the limit.
*3: The power dissipation shown is the value at T_a = 80°C.
When using this IC, refer to the • $P_D - T_a$ diagram in the ■ Technical Data and use under the condition not exceeding the allowable value.
When T_j exceeds 150°C, the internal circuit cuts off the output.
*4: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for T_a = 25°C.

■ Electrical Characteristics

Note) Unless otherwise specified, T_a = 25°C±2°C, V_{IN} = –16 V, I_{OUT} = 40 mA, C_{IN} = 2 µF and C_{OUT} = 1 µF, T_j = 0°C to 125°C

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
1	Output voltage	V_{OUT}	T_j = 25°C	–9.6	–10.0	–10.4	V	*1
			V_{IN} = –13 V to –25 V, I_{OUT} = 1 mA to 70 mA	–9.5	—	–10.5	V	*1
2	Line regulation	REG_{IN}	T_j = 25°C, V_{IN} = –12 V to –26 V	—	—	160	mV	*1
			T_j = 25°C, V_{IN} = –13 V to –23 V	—	—	80	mV	*1
3	Load regulation	REG_L	T_j = 25°C, I_{OUT} = 1 mA to 100 mA	—	17	100	mV	*1
			T_j = 25°C, I_{OUT} = 1 mA to 40 mA	—	9.0	50	mV	*1
4	Bias current	I_{Bias}	T_j = 25°C	—	3.0	5.0	mA	*1
5	Bias current fluctuation to input	$\Delta I_{Bias(IN)}$	T_j = 25°C, V_{IN} = –13 V to –25 V	—	—	0.5	mA	*1
6	Bias current fluctuation to load	$\Delta I_{Bias(L)}$	T_j = 25°C, I_{OUT} = 1 mA to 40 mA	—	—	0.1	mA	*1
7	Ripple rejection ratio	RR	f = 120 Hz , I_{OUT} = 40 mA, V_{IN} = –13 V to –23 V,	53	—	—	dB	—

Note) *1: The specified condition T_j = 25°C means that the test should be carried out within so short a test time (within 10ms) that the characteristic value drift due to the chip junction temperature rise can be ignored.

■ Electrical Characteristics (Reference values for design)

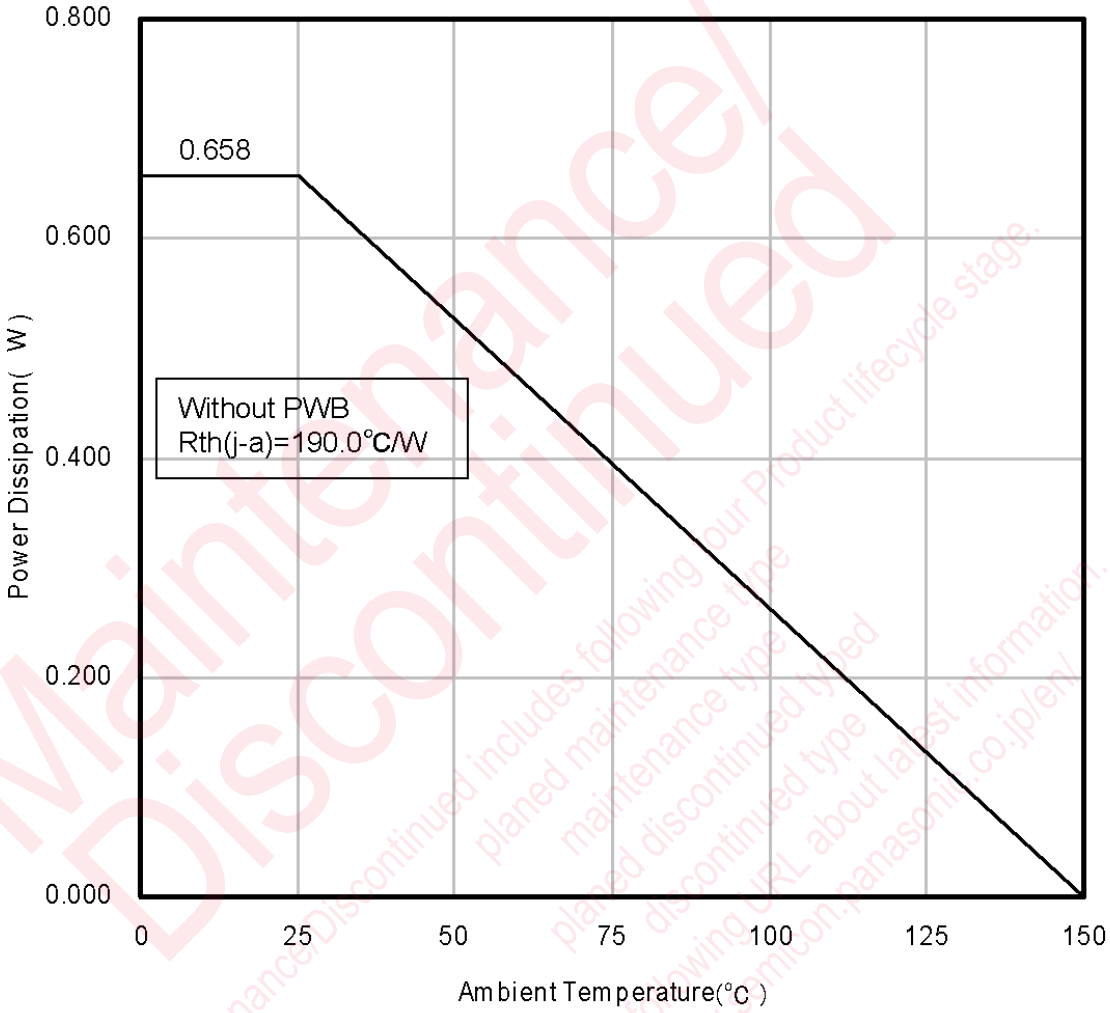
Note) Unless otherwise specified, T_a = 25°C±2°C, V_{IN} = –16 V, I_{OUT} = 40 mA, C_{IN} = 2 µF and C_{OUT} = 1 µF, T_j = 0°C to 125°C
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.
If a problem does occur related to these characteristics, Panasonic will respond in good faith to user concerns.

B No.	Parameter	Symbol	Conditions	Reference values			Unit	Note
				Min	Typ	Max		
1	Output noise voltage	Vno	f = 10 Hz to 100 kHz	—	65	—	µV	—
2	Minimum input/output voltage difference	$V_{DIF(min)}$	T_j = 25°C	—	0.8	—	V	*1
3	Output short-circuit current	$I_{O(Short)}$	T_j = 25°C	—	200	—	mA	*1
4	Output voltage temperature coefficient	$\frac{\Delta V_{OUT}}{T_a}$	I_{OUT} = 5 mA	—	– 0.7	—	mV/°C	—

Note) *1: The specified condition T_j = 25°C means that the test should be carried out within so short a test time (within 10ms) that the characteristic value drift due to the chip junction temperature rise can be ignored.

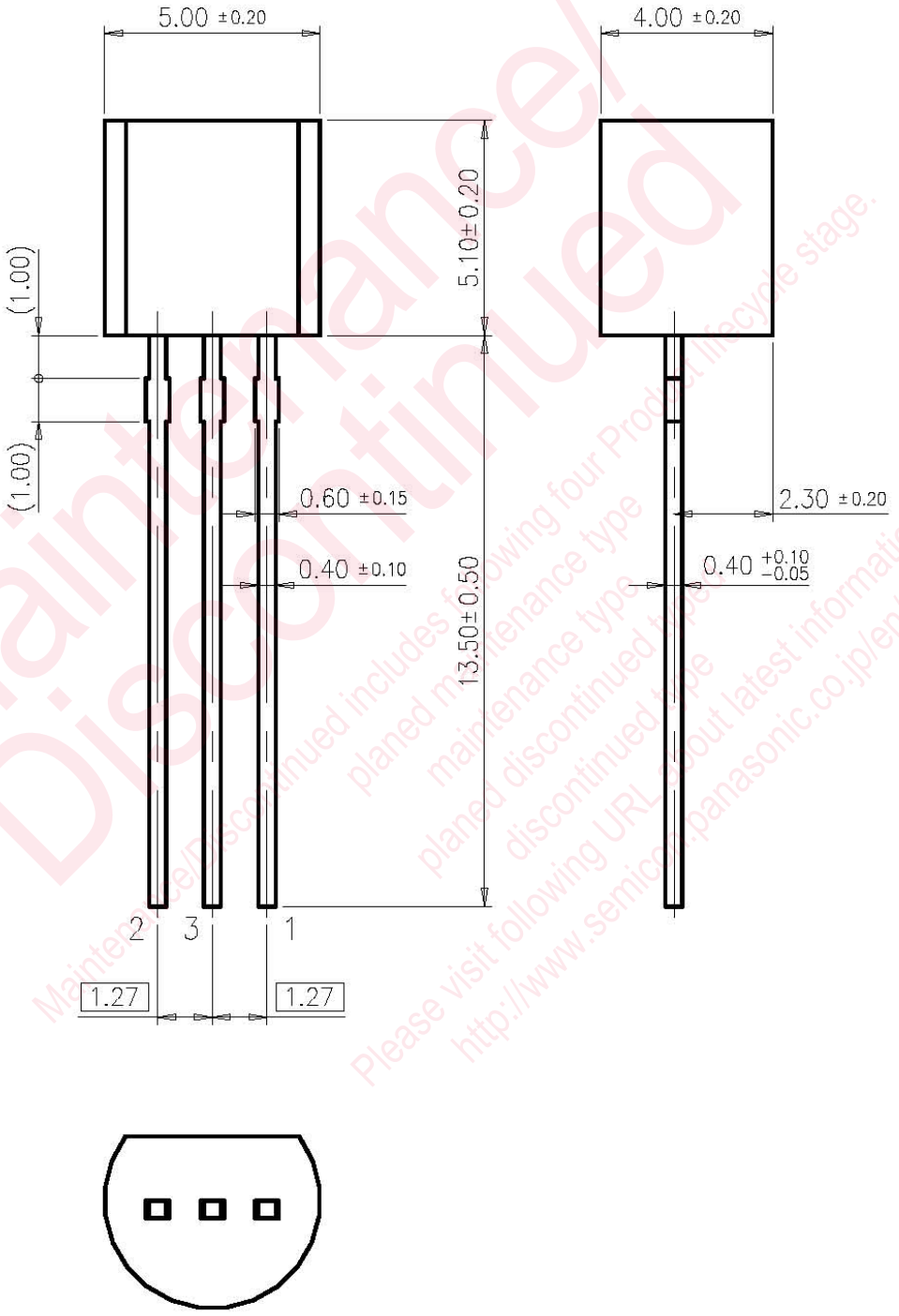
■ Technical Data

• P_D — T_a diagram



■ Package Dimensions (Unit: mm)

• SSIP003-P-0000S (Exclusive use for AN79Lxx)

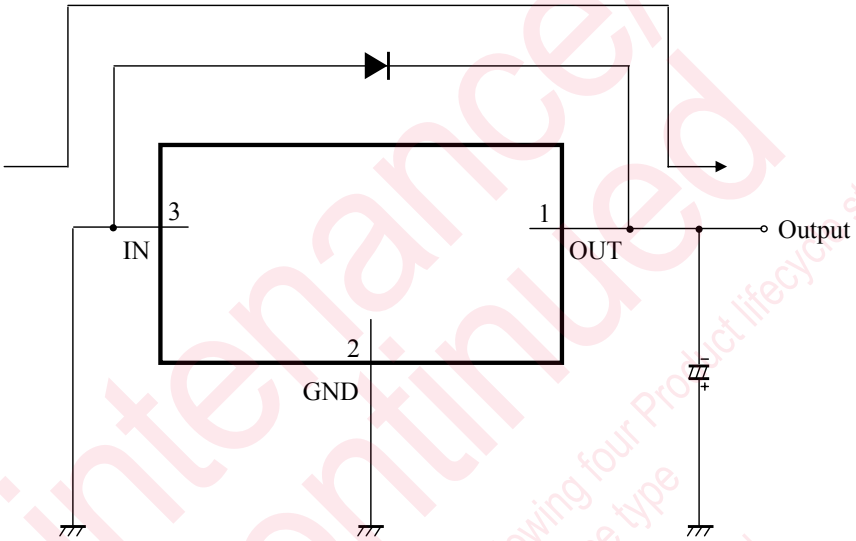


■ Usage Notes

1. Short-circuit between the input pin and the GND pin

If the input pin is short-circuitted to GND pin or is cut off when a large capacitance capacitor has been connected to the IC's load, a voltage of a capacitor connected to an output pin is applied between input/output of the IC and this likely results in damage of the IC.

It is necessary, therefore, to connect a diode, as shown in the figure below , to counter the reverse bias between input/output pins.



2. Floating of GND pin

If the GND pin is made floating in an operating mode, an unstabilized input voltage is outputted. In this case, the thermal protection circuit inside the IC does not normally operate. In this state, if the load is short-circuited or overloaded, it is likely to damage the IC.

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(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

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