DATA SHEET

Part No.	AN77L045M
Package Code No.	HSIP003-P-0000Q

Contents

AN77L045M

3-pin, positive output, low dropout voltage regulator (100 mA type)

■ Overview

The AN77LxxM series are 3-pin, fixed positive output type monolithic voltage regulators. The AN77L045M is the 4.5 V output voltage type in these series. They can be used widely in power supply circuits with current capacity of up to 100 mA. It is suitable for the low-voltage equipment using batteries and consumer/industrial equipment with great fluctuation of the supply voltage.

Stabilized fixed output voltage is obtained from unstable DC input voltage with using a 10 µF output capacitor.

11 types of fixed output voltage are available; 3 V, 3.5 V, 4 V, 4.5 V, 5 V, 6 V, 7 V, 8 V, 9 V, 10 V and 12 V.

■ Features

- Minimum input/output voltage difference: 0.23 V typ.
- Built-in over current limit circuit
- Built-in rush current prevention circuit at input voltage rise
- Built-in overheat protection circuit
- Built-in input short-circuit protection circuit

■ Applications

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

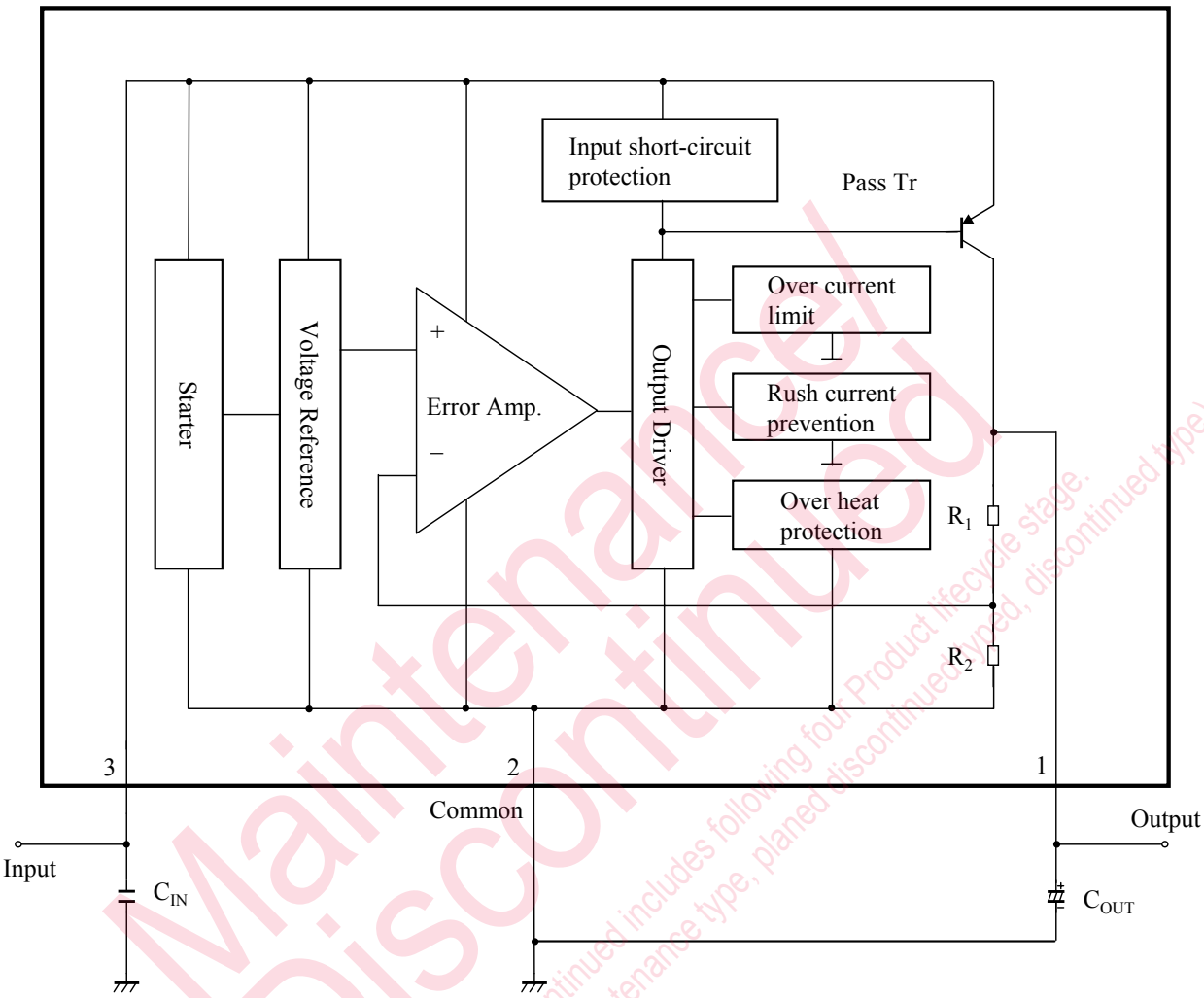
■ Package

- 3-pin Plastic Single Inline Package With Heat Sink (SIP type)

■ Type

- Silicon monolithic bipolar IC

■ Block Diagram



C_{IN} : 0.33 µF
C_{OUT} : 10 µF
R_1 : 26 kΩ
R_2 : 10 kΩ

■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	Output	Output	Output voltage
2	Common	GND	Ground.
3	Input	Input	Input voltage

■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Note
1	Input voltage	V_{IN}	30	V	*1
2	Supply current	I_{CC}	200	mA	—
3	Power dissipation	P_D	252	mW	*2
4	Operating ambient temperature	T_{opr}	−30 to +85	°C	*3
5	Storage temperature	T_{stg}	−55 to +150	°C	*3

Note) *1: The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

*2: The power dissipation shown is the value at T_a = 85°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.

*3: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for T_a = 25°C.

■ Operating supply voltage range

Parameter	Symbol	Range	Unit	Note
Supply voltage range	V_{CC}	(V_{OUT} + 0.43 V) to 15.18	V	—

Note) The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

■ Electrical Characteristics

Note) Unless otherwise specified, T_a = 25°C±2°C , V_{IN} = 5.5 V, I_{OUT} = 50 mA, C_{IN} = 0.33 µF and C_{OUT} = 10 µF.

No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
1	Output voltage	V_{OUT}	—	4.32	4.50	4.68	V	—
2	Line regulation	REG_{IN}	V_{IN} = 5.18 V to 15.18 V	—	3.0	60	mV	—
3	Load regulation	REG_L	I_{OUT} = 0 mA to 100 mA	—	10.0	60	mV	—
4	Minimum input/output voltage difference 1	$V_{DIF(min)1}$	V_{IN} = 4.05 V, I_{OUT} = 50 mA	—	0.12	0.25	V	—
5	Minimum input/output voltage difference 2	$V_{DIF(min)2}$	V_{IN} = 4.05 V, I_{OUT} = 100 mA	—	0.23	0.43	V	—
6	Bias current before regulation start	I_{rush}	V_{IN} = 4.05 V, I_{OUT} = 0 mA	—	1.5	5	mA	—
7	Bias current	I_{Bias}	I_{OUT} = 0 mA	—	0.9	1.5	mA	—
8	Bias current fluctuation to load	$\Delta I_{Bias(L)}$	I_{OUT} = 0 mA to 100 mA	—	3.0	5	mA	—
9	Ripple rejection ratio	RR	V_{IN} = 5.18 V to 6.18 V, f = 120 Hz	58	68	—	dB	—

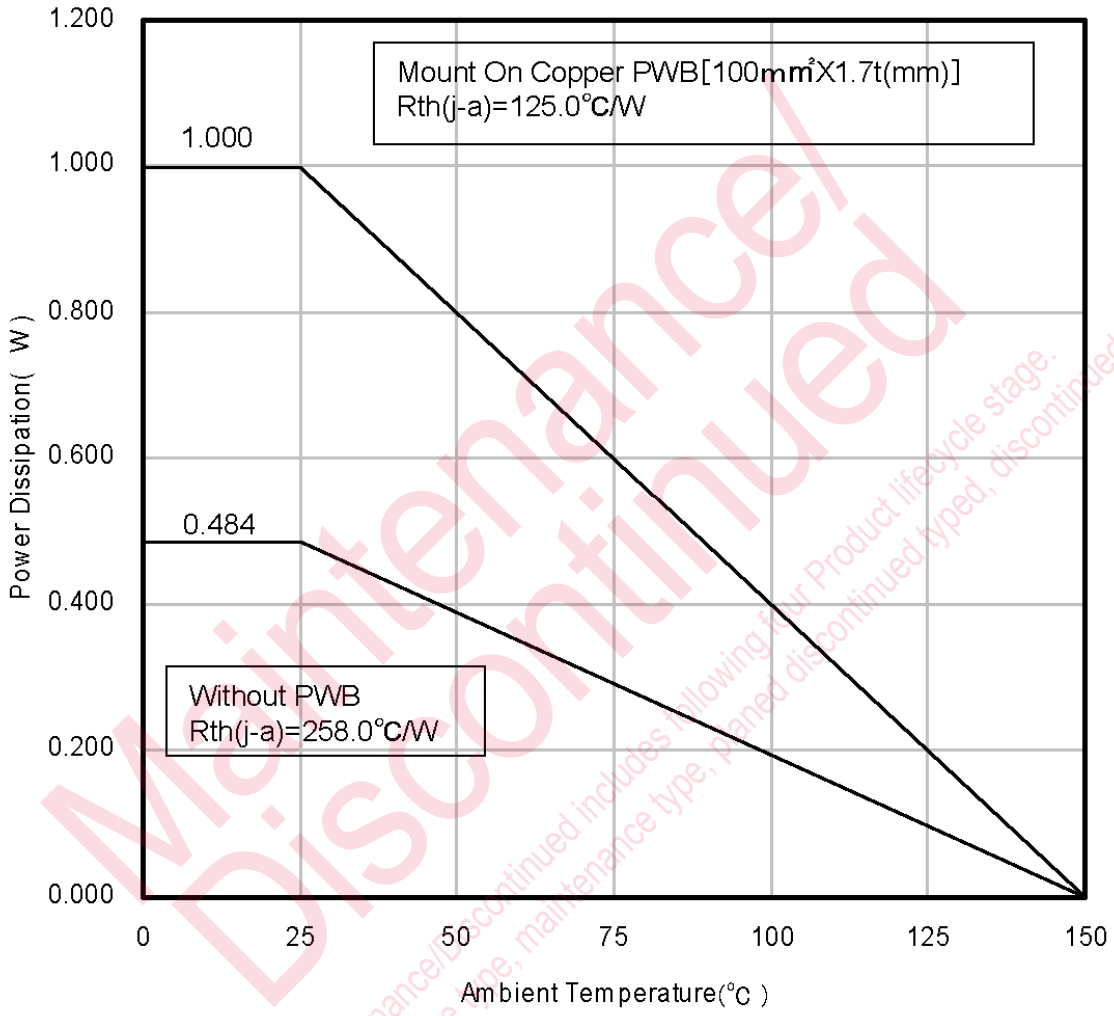
■ Electrical Characteristics (Reference values for design)

Note) Unless otherwise specified, T_a = 25°C±2°C, C_{IN} = 0.33 µF and C_{OUT} = 10 µF.
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.

No.	Parameter	Symbol	Conditions	Reference values			Unit	Note
				Min	Typ	Max		
1	Output noise voltage	Vno	V_{IN} = 5.5 V, I_{OUT} = 50 mA f = 10 Hz to 100 kHz	—	85	—	µV	—
2	Over heat protection temperature start	$T_{j(TH)}$	V_{IN} = 5.5 V	—	150	—	°C	—
3	Output voltage temperature coefficient	$\frac{\Delta V_{OUT}}{T_a}$	V_{IN} = 5.5 V T_j = −30°C to 125°C	—	0.30	—	mV/°C	—

■ Technical Data

• P_D — T_a diagram



■ Usage Notes

1. Input short-circuit protection circuit

For the conventional Panasonic 3-pin regulators (such as of the AN80xx series), when DC input pin (pin 3) is short-circuited with GND pin (pin 2) in the normal operation condition, the potential of output pin (pin 1) becomes higher than that of DC input pin and the electric charges which is charged in output capacitor C_{OUT} flows in the input side, having resulted in the breakage of elements.

In the above case, the common silicon diode is connected as shown in the following figure (the dotted line).

However, for the AN77LxxM series, since the protection circuit, which protects the elements from the discharging current, is incorporated in the internal circuit, the protection diode is not required.

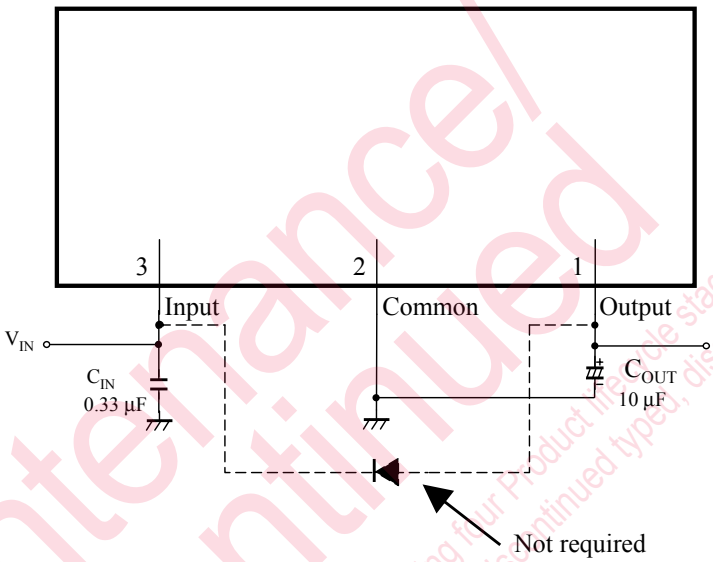


Figure 1. Protection diode

2. Short-circuit between the output pin and the GND pin

Because there is no in-built protection circuit in the AN77LxxM series, they have the drooping characteristics as shown in "Figure 3". When your use under a high voltage happens to cause any short-circuit between the output pin (pin 1) and the GND pin (pin 2), the IC is likely to be broken.

3. Capacitor for external compensation

In order to secure the stability, the capacitor of 10 µF is required in the output side and it should be added as near to output pin (pin 1) and GND pin (pin 2) as possible. When it is used under low temperature, oscillation may occur due to the decrease of the aluminum electrolytic capacitor's capacitance and an increase of ESR. For the AN77LxxM series, it is recommended that the tantalum capacitor or aluminum electrolytic capacitor whose equivalent serial resistance with temperature characteristics within the recommended range specified in “Figure 2" should be used.

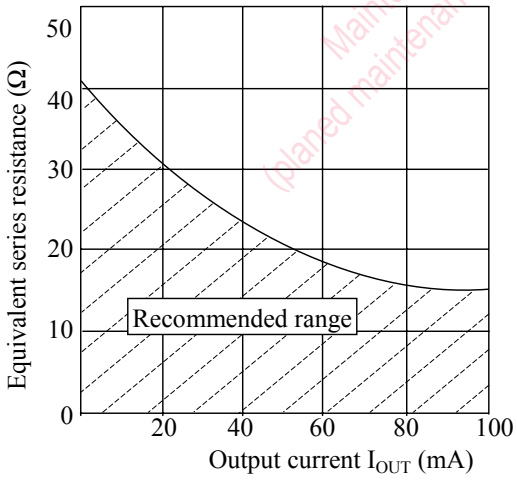


Figure 2. ESR recommended range

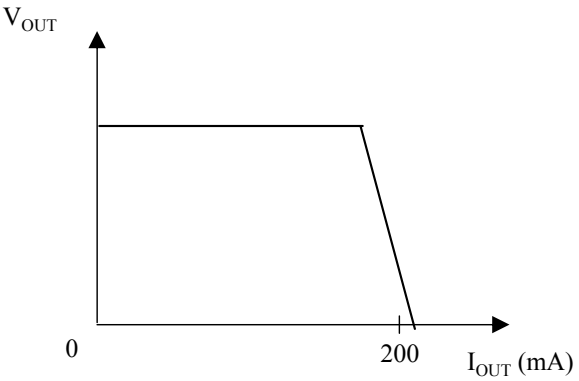


Figure 3. Over current limit control

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