

# DATA SHEET

Part No.	AN8004M
Package Code No.	HSIP003-P-0000Q

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planned maintenance type  
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# AN8004M

## 3-pin, positive output, low dropout voltage regulator (50 mA type)

### ■ Overview

The AN80xxM series are 3-pin, low dropout, fixed positive output type monolithic voltage regulators.

Since their power consumption can be minimized, they are suitable for battery-used power supply and reference voltage.

12 types of output voltage are available; 2 V, 2.5 V, 3 V, 4 V, 4.5 V, 5 V, 6 V, 7 V, 8 V, 8.5 V, 9 V, and 10 V.

### ■ Features

- Input/output voltage difference: 0.3 V max.
- Output current of up to 50 mA
- Low bias current: 0.6 mA typ.
- Output voltage: 4 V
- Built-in over current protection circuit

### ■ Applications

- 3-pin positive output voltage regulator (low drop 50 mA type)

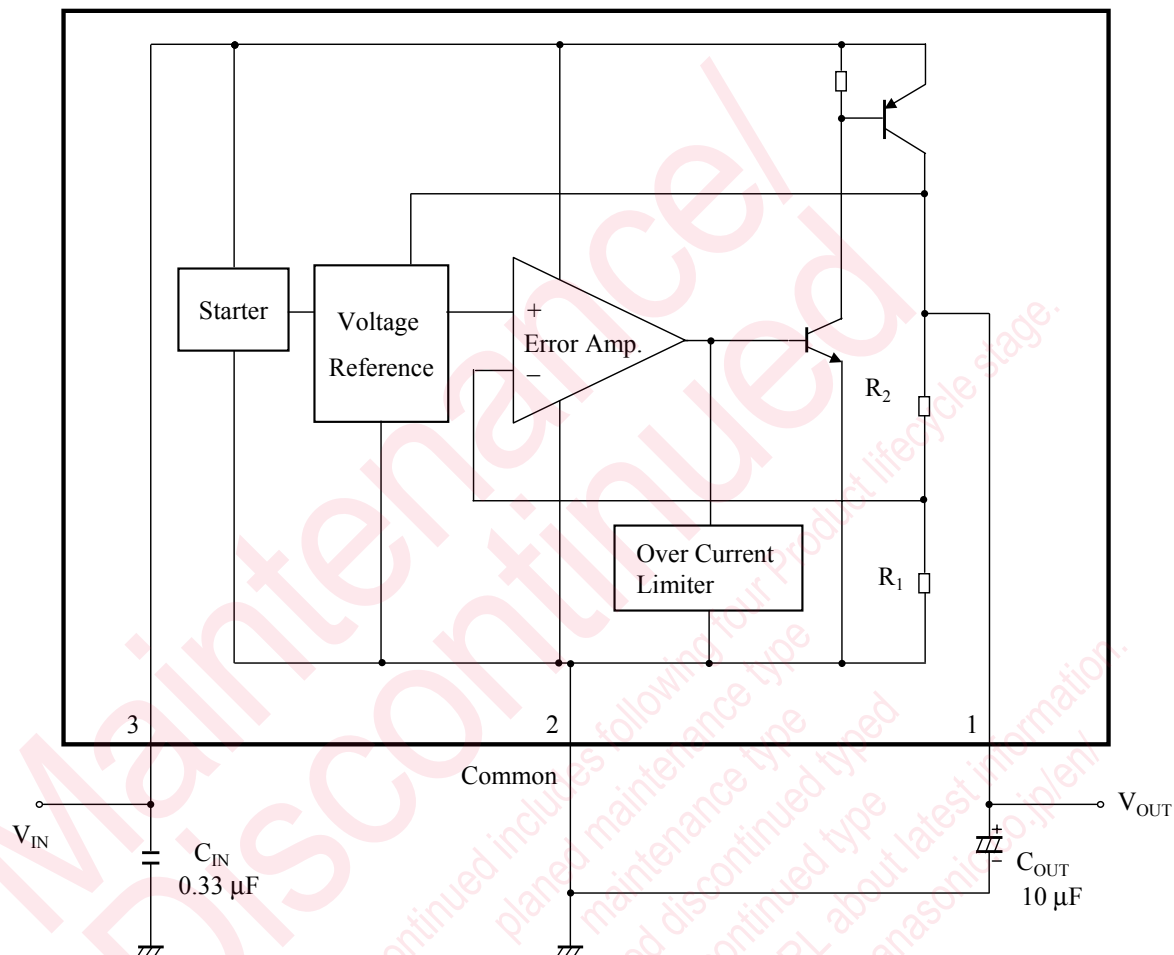
### ■ Package

- 3-pin plastic single inline package with heat sink (SIP type)

### ■ Type

- Silicon monolithic bipolar IC

■ Block Diagram



$C_{OUT}$  : AN80xxM series have their internal gain in order to improve performance. When the power line on the output side is long, use a capacitor of 10  $\mu\text{F}$ .

Also, the capacitor on the output side should be attached as close to the IC as possible.

When using at a low temperature, it is recommended to use the capacitors with low internal impedance (for example, tantalum capacitor) for output capacitors.

$R_1$  : 5 k $\Omega$   
 $R_2$  : 11 k $\Omega$

## ■ Pin Descriptions

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

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### ■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Note
1	Supply voltage	$V_{CC}$	20	V	*1
2	Supply current	$I_{CC}$	100	mA	*4
3	Power dissipation	$P_D$	270	mW	*2
4	Operating ambient temperature	$T_{opr}$	-30 to +80	°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  $T_a = 80^\circ\text{C}$  for independent (unmounted) IC packaged.

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.

\*3: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .

\*4: Built-in over current limit circuit, and the current will not go over the limit.

### ■ Operating supply voltage range

Parameter	Symbol	Range	Unit	Note
Supply voltage range	$V_{CC}$	4.5 to 10.0	V	—

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

### ■ Electrical Characteristics

Note) Unless otherwise specified,  $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$ ,  $V_{\text{IN}} = 5.0 \text{ V}$ ,  $I_{\text{OUT}} = 20 \text{ mA}$ ,  $C_{\text{IN}} = 0.33 \mu\text{F}$  and  $C_{\text{OUT}} = 10 \mu\text{F}$  (ESR less than  $5 \Omega$ ).

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
1	Output voltage	$V_{\text{OUT}}$	$T_j = 25^\circ\text{C}$	3.84	4.00	4.16	V	—
2	Line regulation	$\text{REG}_{\text{LIN}}$	$T_j = 25^\circ\text{C}$ $4.5 \text{ V} \leq V_{\text{IN}} \leq 10.0 \text{ V}$	—	3.5	50	mV	—
3	Load regulation	$\text{REG}_{\text{LOA}}$	$T_j = 25^\circ\text{C}$ $1 \text{ mA} \leq I_{\text{OUT}} \leq 40 \text{ mA}$	—	10	30	mV	—
			$T_j = 25^\circ\text{C}$ $1 \text{ mA} \leq I_{\text{OUT}} \leq 50 \text{ mA}$	—	20	40		
4	Minimum input/output voltage difference	VD	$T_j = 25^\circ\text{C}$ $V_{\text{IN}} = 3.8 \text{ V}$ , $I_{\text{OUT}} = 20 \text{ mA}$	—	0.07	0.2	V	—
			$T_j = 25^\circ\text{C}$ $V_{\text{IN}} = 3.8 \text{ V}$ , $I_{\text{OUT}} = 50 \text{ mA}$	—	0.12	0.3		
5	Bias current	$I_{\text{Q}}$	$T_j = 25^\circ\text{C}$ $I_{\text{OUT}} = 0 \text{ mA}$	—	0.6	1.0	mA	—

### ■ Electrical Characteristics (Reference values for design)

Note) Unless otherwise specified,  $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$ ,  $V_{\text{IN}} = 5.0\text{ V}$ ,  $I_{\text{OUT}} = 20\text{ mA}$ ,  $C_{\text{IN}} = 0.33\text{ }\mu\text{F}$  and  $C_{\text{OUT}} = 10\text{ }\mu\text{F}$  (ESR less than  $5\text{ }\Omega$ ).

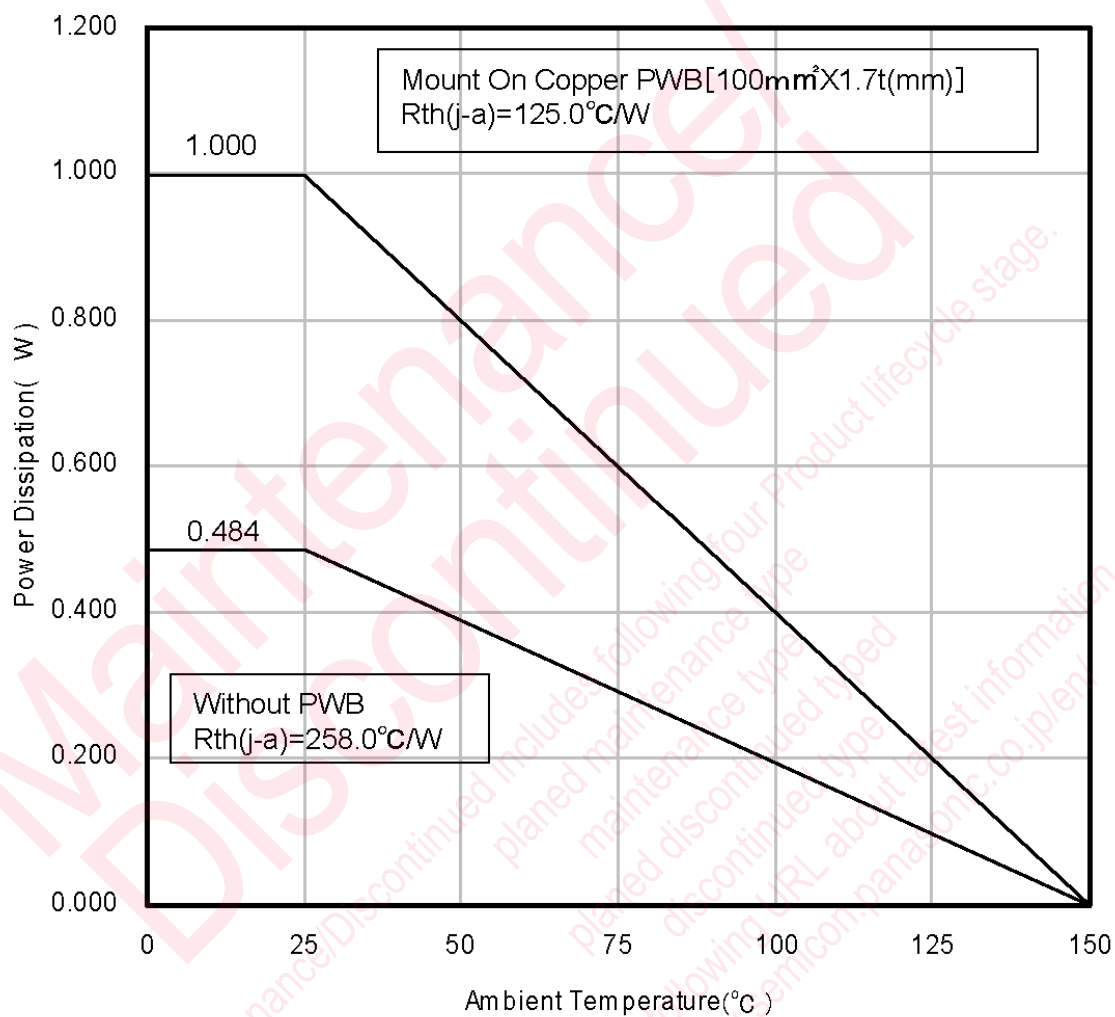
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.

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		
6	Ripple rejection ratio	RR	$5.0\text{ V} \leq V_{\text{IN}} \leq 7.0\text{ V}$ $f = 120\text{ Hz}$	56	67	—	dB	—
7	Output noise voltage	Vno	$10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	80	—	$\mu\text{V}$	—
8	Output voltage temperature coefficient	$\frac{\Delta V_{\text{OUT}}}{T_a}$	$-30^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$	—	0.2	—	$\text{mV}/^\circ\text{C}$	—



- Technical Data
- $P_D - T_a$  diagram



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