

DATA SHEET

Part No.	AN8009M
Package Code No.	HSIP003-P-0000Q

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AN8009M

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: 9 V
- Built-in over current protection circuit

■ Applications

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

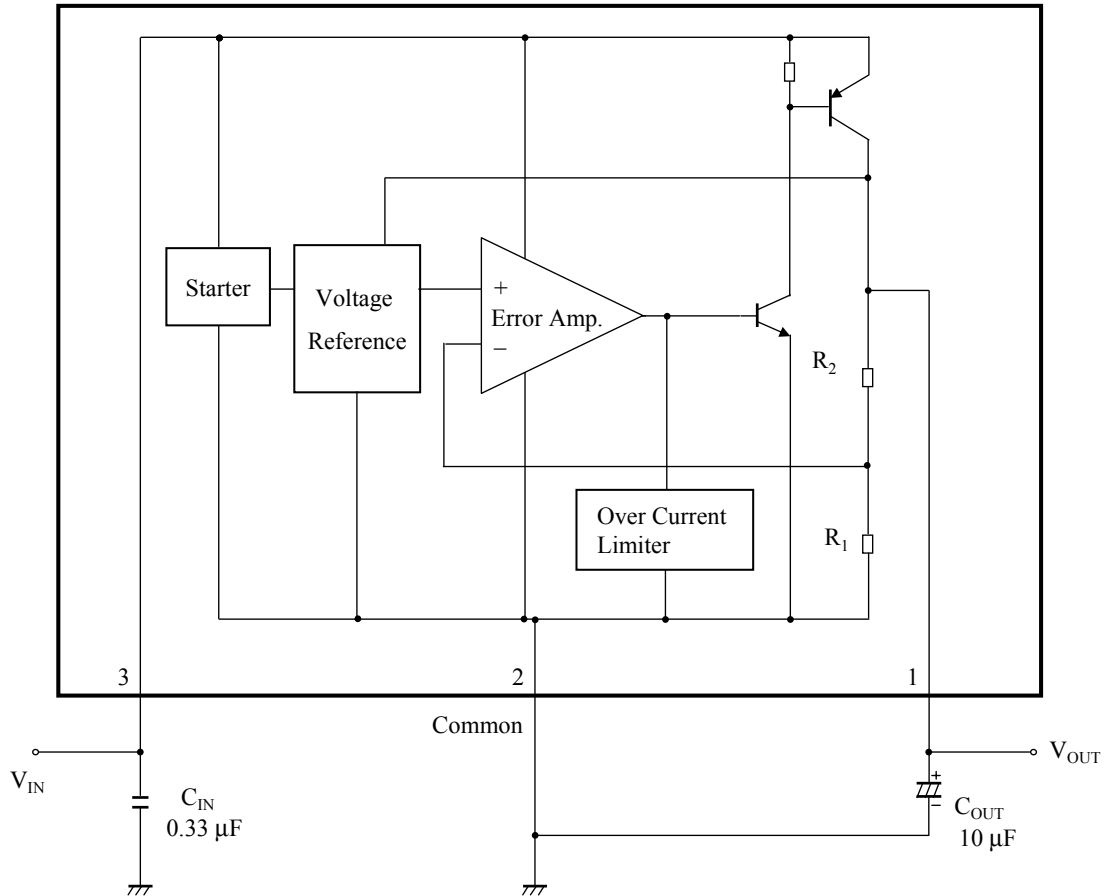
■ Package

- 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 μF .

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 $\text{k}\Omega$
 R_2 : 33 $\text{k}\Omega$

■ 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

■ 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}	9.5 to 15.0	V	—

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

■ Electrical Characteristics

Note) Unless otherwise specified, $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$, $V_{\text{IN}} = 10.0\text{ V}$, $I_{\text{OUT}} = 20\text{ mA}$, $C_{\text{IN}} = 0.33\ \mu\text{F}$ 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_{OUT}	$T_j = 25^\circ\text{C}$	8.64	9.00	9.36	V	—
2	Line regulation	REG_{LIN}	$T_j = 25^\circ\text{C}$ $9.5\text{ V} \leq V_{\text{IN}} \leq 15.0\text{ V}$	—	9.0	100	mV	—
3	Load regulation	REG_{LOA}	$T_j = 25^\circ\text{C}$ $1\text{ mA} \leq I_{\text{OUT}} \leq 40\text{ mA}$	—	17	70	mV	—
			$T_j = 25^\circ\text{C}$ $1\text{ mA} \leq I_{\text{OUT}} \leq 50\text{ mA}$	—	37	75		
4	Minimum input/output voltage difference	VD	$T_j = 25^\circ\text{C}$ $V_{\text{IN}} = 8.8\text{ V}$, $I_{\text{OUT}} = 20\text{ mA}$	—	0.07	0.2	V	—
			$T_j = 25^\circ\text{C}$ $V_{\text{IN}} = 8.8\text{ V}$, $I_{\text{OUT}} = 50\text{ mA}$	—	0.14	0.3		
5	Bias current	I_{Q}	$T_j = 25^\circ\text{C}$ $I_{\text{OUT}} = 0\text{ mA}$	—	0.8	1.4	mA	—

■ Electrical Characteristics (Reference values for design)

Note) Unless otherwise specified, $T_a = 25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, $V_{\text{IN}} = 10.0\text{ V}$, $I_{\text{OUT}} = 20\text{ mA}$, $C_{\text{IN}} = 0.33\text{ }\mu\text{F}$ and $C_{\text{OUT}} = 10\text{ }\mu\text{F}$ (ESR less than $5\text{ }\Omega$).

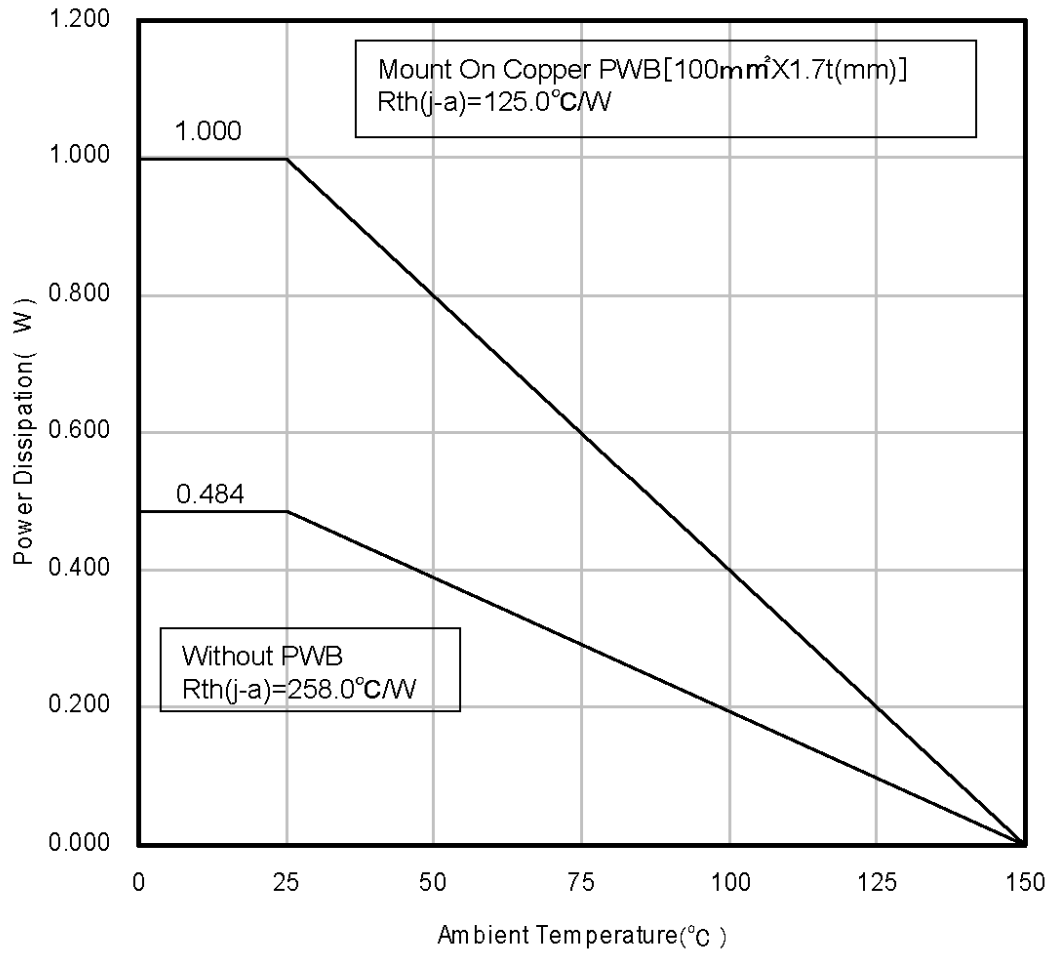
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.

If a problem does occur related to these characteristics, Matsushita 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	$10.0\text{ V} \leq V_{\text{IN}} \leq 12.0\text{ V}$ $f = 120\text{ Hz}$	47	59	—	dB	—
7	Output noise voltage	Vno	$10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	150	—	μV	—
8	Output voltage temperature coefficient	$\frac{\Delta V_{\text{OUT}}}{T_a}$	$-30^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$	—	0.45	—	$\text{mV}/^{\circ}\text{C}$	—

■ Technical Data

- $P_D - T_a$ diagram



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