

Op Amplifier 2 Circuit and Shunt Regulator Monolithic IC MM1462BN, MM1462XN

Outline

MM1462BN incorporates a 2-circuit op amp + shunt regulator (1.25V), and MM1462XN incorporates a 2-circuit op amp + shunt regulator (2.5V).

Supports voltage control and sensors for adapters, etc.

Features

- | | |
|--|--|
| 1. Input bias current | 30nA typ. |
| 2. Power supply voltage removal | 65dB min. (B amp) |
| 3. Current consumption | 2.4mA typ. (MM1462BN)
1.2mA typ. (MM1462XN) |
| 4. Reference voltage | 1.25V typ. (MM1462BN)
2.50V typ. (MM1462XN) |
| 5. Output inversion voltage fluctuation
($V_{CC}=2.5\sim 5V$) | 3mV typ. (MM1462BN-A amp)
0.5mV typ. (MM1462BN-B amp) |

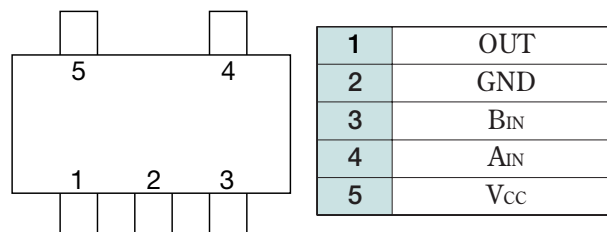
Package

SOT-25A
SOT-25B

Applications

1. Charger
2. Switching power supply
3. AC adapter

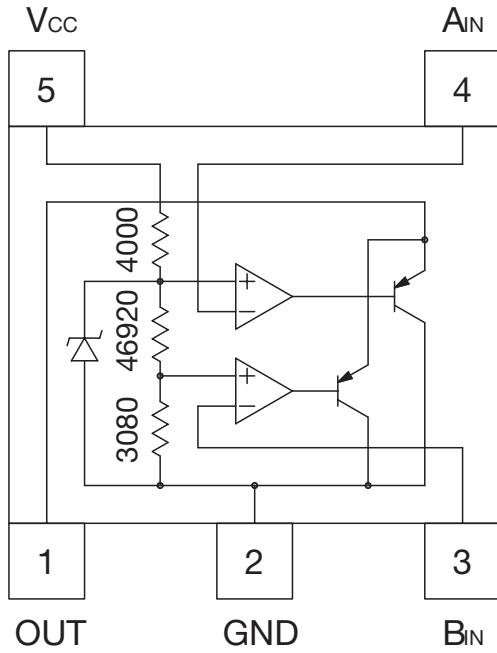
Pin Assignment



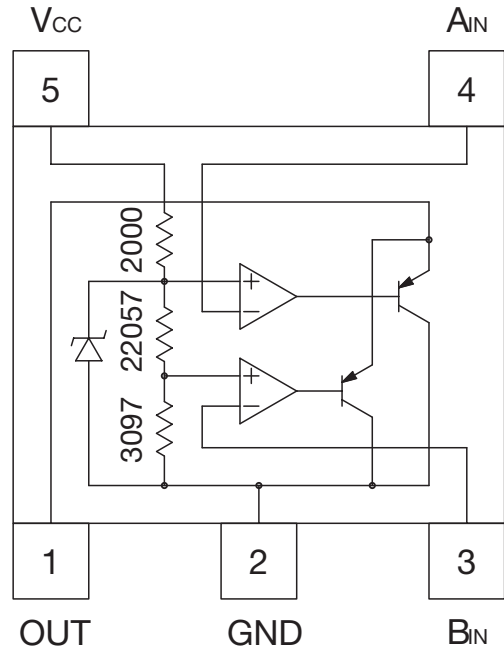
SOT-25A, SOT-25B
(TOP VIEW)

Block Diagram

MM1462XN



MM1462BN



Pin Description

Pin No.	Pin name	Function	Internal equivalent circuit diagram
1	OUT	Output pin	
3 4	B _{IN} A _{IN}	Input pin	

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T _{STG}	-40~+125	°C
Operating temperature	T _{OPR}	-25~+85	°C
Supply voltage	V _{CC} max	-0.3~+20	V
Allowable loss	P _d	250	mW

Recommended Operating Conditions

MM1462BN

Item	Symbol	Ratings	Units
Operating temperature	T _{OPR}	-20~+70	°C
Operating voltage	V _{OPR}	+2.5~+20	°C

MM1462XN

Item	Symbol	Ratings	Units
Operating temperature	T _{OPR}	-25~+85	°C
Operating voltage	V _{OPR}	+4~+20	°C

Electrical Characteristics (Except where noted therwise, T_a=25°C, V_{CC}=5V)

MM1462BN

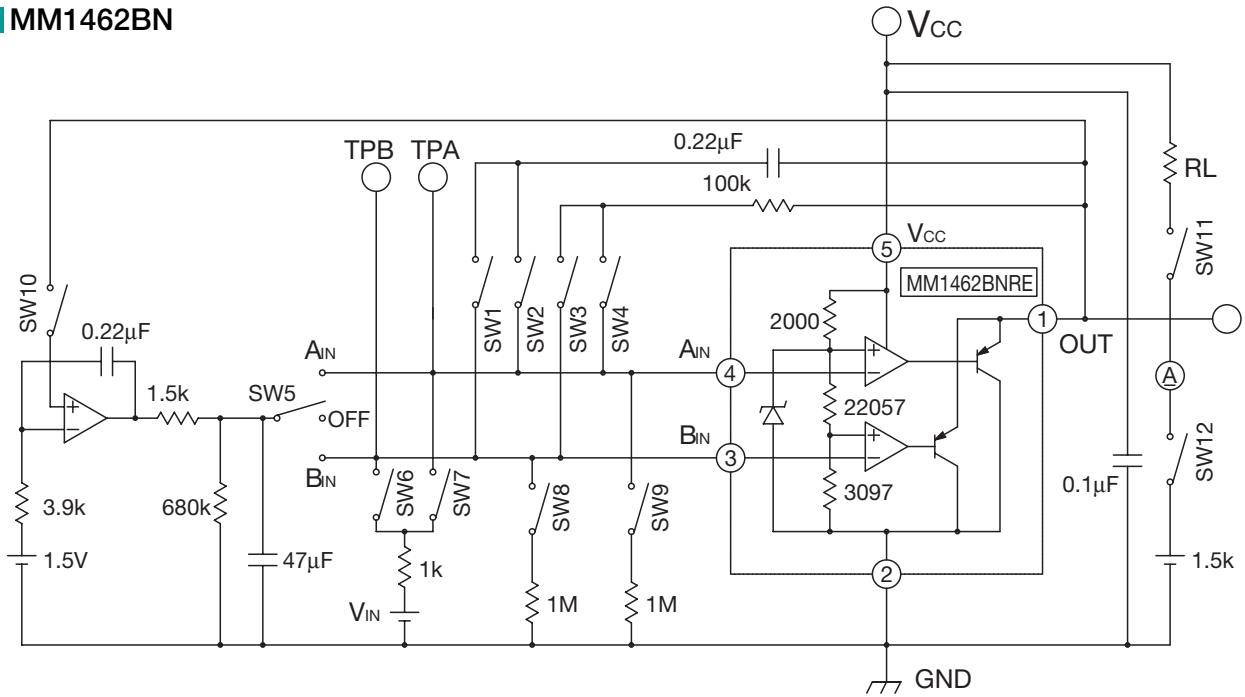
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Current consumption	I _{CC}	A _{IN} =0V, B _{IN} =0V, R _L =∞		2.4	3.4	mA
A amplifier						
Output inverting voltage (A)	V _A	B _{IN} =0V, R _L =4.3k, V _{CC} =3~5V	1.225	1.25	1.275	V
Input bias current (A)	I _B	B _{IN} =0V, R _L =4.3k		30	150	nA
PSRR (A)	PSRR	B _{IN} =0V, R _L =4.3k	50			dB
Output sink current (A)	I _{SI}	A _{IN} =1.35V, B _{IN} =0V, V _{OUT} =1.5V	5			mA
Output inverting voltage (A) deviation	ΔV _A	B _{IN} =0V, R _L =4.3k, V _{CC} =2.5~5V		3		mV
Output inverting voltage (A) temperature coefficient				±100		ppm/°C
B amplifier						
Output inverting voltage (B)	V _B	A _{IN} =0V, R _L =4.3k, V _{CC} =3~5V	151	154	157	mV
Input bias current (B)	I _B	A _{IN} =0V, R _L =4.3k, V _{CC} =3~5V		30	150	nA
PSRR (B)	PSRR	A _{IN} =0V, R _L =4.3k	65			dB
Output sink current (B)	I _{SI}	A _{IN} =0V, B _{IN} =0.17V, V _{OUT} =1.5V	5			mA
Output inverting voltage (B) deviation	ΔV _B	A _{IN} =0V, R _L =4.3k, V _{CC} =2.5~5V		0.5		mV
Output inverting voltage (B) temperature coefficient				±100		ppm/°C

MM1462XN

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Current consumption	I _{CC}	A _{IN} =0V, B _{IN} =0V, R _L =∞		1.2	1.7	mA
A amplifier						
Output inverting voltage (A)	V _A	B _{IN} =0V, R _L =4.3k	2.45	2.50	2.55	V
Input bias current (A)	I _B	B _{IN} =0V, R _L =4.3k		30	150	nA
PSRR (A)	PSRR (A)	B _{IN} =0V, R _L =4.3k	62			dB
Output sink current (A)	I _{SI}	A _{IN} =2.7V, B _{IN} =0V, V _{OUT} =1.5V	5			mA
B amplifier						
Output inverting voltage (B)	V _B	A _{IN} =0V, R _L =4.3k	151	154	157	mV
Input bias current (B)	I _B	A _{IN} =0V, R _L =4.3k		30	150	nA
PSRR (B)	PSRR (B)	A _{IN} =0V, R _L =4.3k	65			dB
Output sink current (B)	I _{SI}	A _{IN} =0V, B _{IN} =0.17V, V _{OUT} =1.5V	5			mA

Measuring Circuit

MM1462BN



(Except where noted therwise, Ta=25°C, Vcc=5.0V)

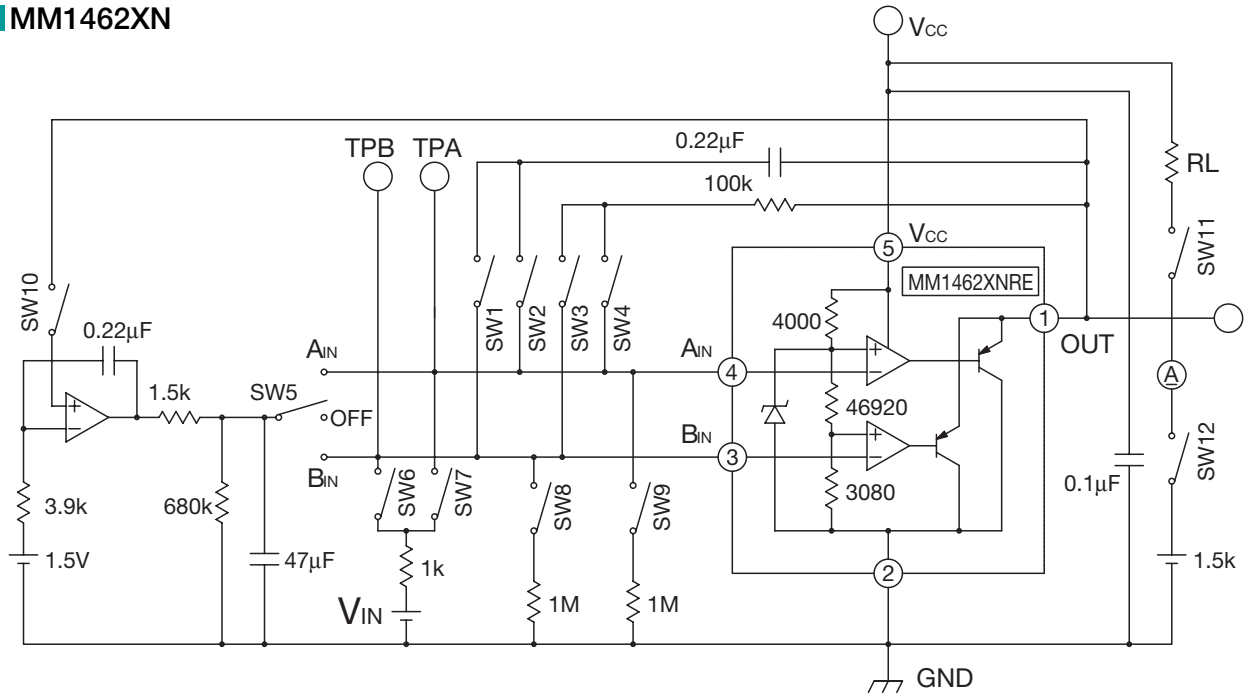
Item	Switch Status												RL (Ω)	VIN (V)	○: ON ×: OFF
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12			
Current consumption	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		
Output inverting voltage (A)	×	○	×	×	A _{IN}	×	×	○	×	○	○	×	4.3k		Mesure TPA voltage
Input bias current (A)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		Mesure TPA voltage
Output sink current (A)	×	×	×	×	×	×	○	○	×	×	×	○		1.35	Mesure output sink current
PSRR (A)	×	○	×	○	×	×	○	○	×	×	○	×	4.3k	V _A	*1
Output inverting voltage (B)	○	×	×	×	B _{IN}	×	×	×	○	○	○	×	4.3k		Mesure TPB voltage
Input bias current (B)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		Mesure TPB voltage
Output sink current (B)	×	×	×	×	×	○	×	×	○	×	×	○		0.17	Mesure output sink current
PSRR (B)	○	×	○	×	×	○	×	×	○	×	○	×	4.3k	*3	*2

*1 V_{out1} is defined by the voltage when V_{cc}=4V. V_{out2} is defined by the voltage when V_{cc}=25V. PSRR (A) is shown in the equation below.

*2 V_{out1} is defined by the voltage when V_{cc}=4V. V_{out2} is defined by the voltage when V_{cc}=25V. PSRR (B) is shown in the equation below.
 $PSRR = 40 + 20 \log | (25V - 4V) / (V_{out1} - V_{out2}) |$

*3 V_B-20mV

MM1462XN



(Except where noted therwise, Ta=25°C, Vcc=5.0V)

Item	Switch Status												RL (Ω)	VIN (V)	○ : ON × : OFF
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12			
Current consumption	×	×	×	×	×	×	×	○		×		×	4.3k		
Output inverting voltage (A)	×	○	×	×	A _{IN}	×	×	○	×	○	○	×	4.3k		Mesure TPA voltage
Input bias current (A)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		Mesure TPA voltage
Output sink current (A)	×	×	×	×	×	×	○	○	×	×	×	○		2.7V	Mesure output sink current
PSRR (A)	×	○	×	○	×	×	○	○	×	×	○	×	4.3k	VA	*1
Output inverting voltage (B)	○	×	×	×	B _{IN}	×	×	×	○	○	○	×	4.3k		Mesure TPB voltage
Input bias current (B)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		Mesure TPB voltage
Output sink current (B)	×	×	×	×	×	○	×	×	○	×	×	○		0.17	Mesure output sink current
PSRR (B)	○	×	○	×	×	○	×	×	○	×	○	×	4.3k	*3	*2

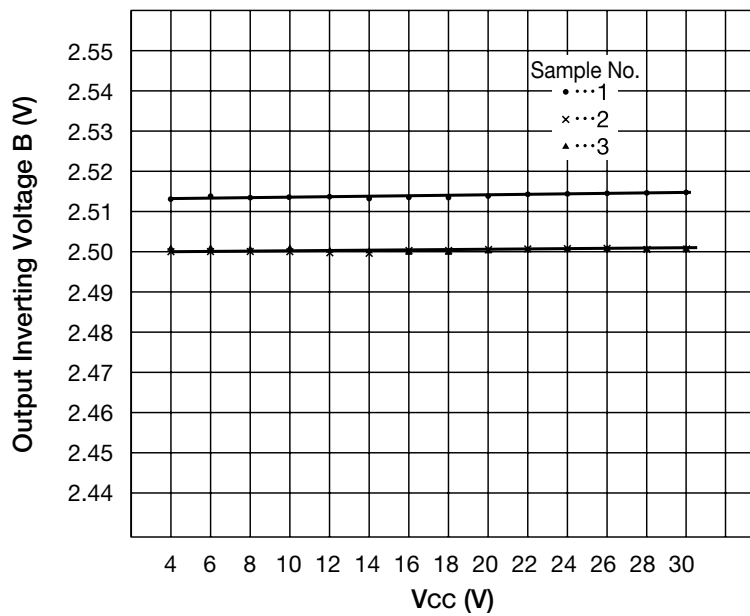
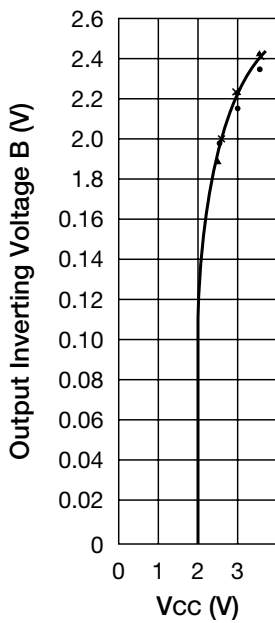
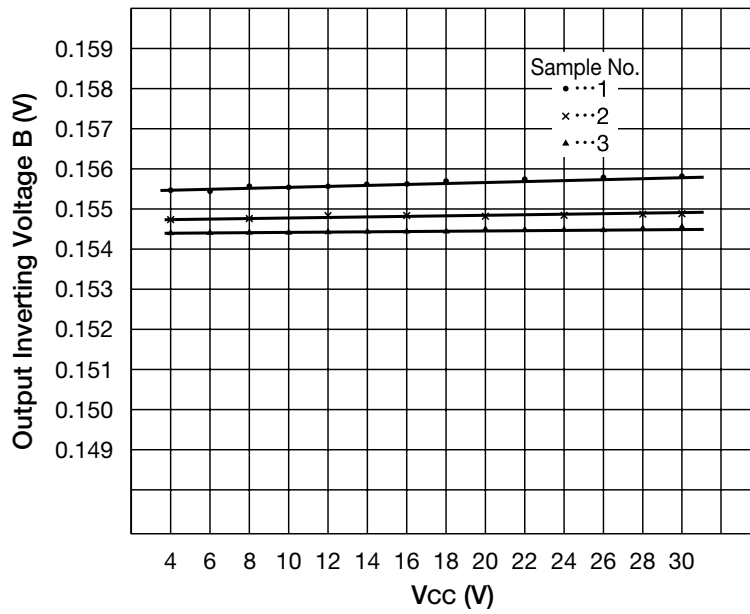
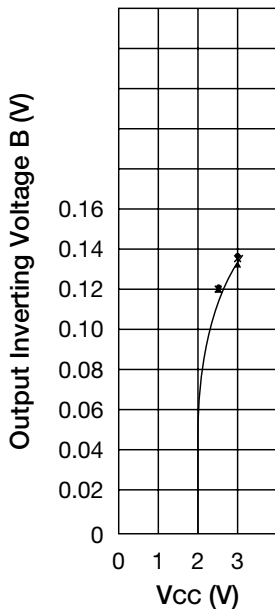
*1 V_{OUT1} is defined by the voltage when V_{CC}=4V. V_{OUT2} is defined by the voltage when V_{CC}=25V. PSRR (A) is shown in the equation below.

*2 V_{OUT1} is defined by the voltage when V_{CC}=4V. V_{OUT2} is defined by the voltage when V_{CC}=25V. PSRR (B) is shown in the equation below

$$PSRR=40+20\log |(25V-4V) / (V_{OUT1}-V_{OUT2})|$$

*3 V_B-20mV

MM1462XN



Note: these are typical characteristics