Op Amplifier 2 Circuit and Shunt Regulator (2.5V)
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	3mV typ. (MM1462BN-A amp)
(V_{CC}=2.5~5V)	0.5mV typ. (MM1462BN-B amp)

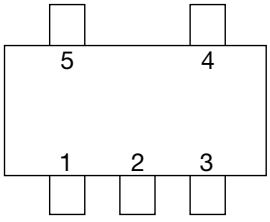
Package

SOT-25A
SOT-25B

Applications

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

Pin Assignment

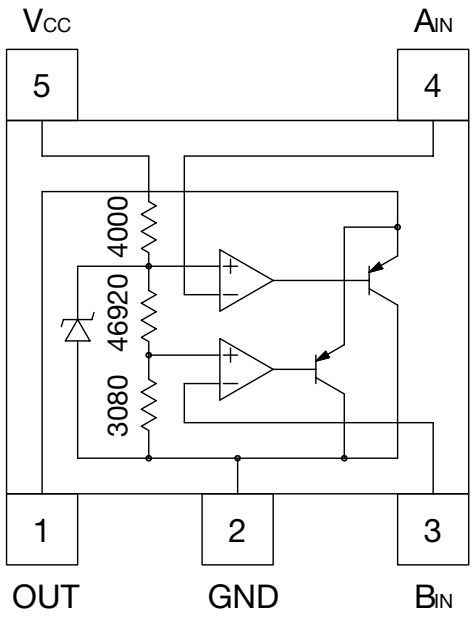


1	OUT
2	GND
3	B_{IN}
4	A_{IN}
5	V_{CC}

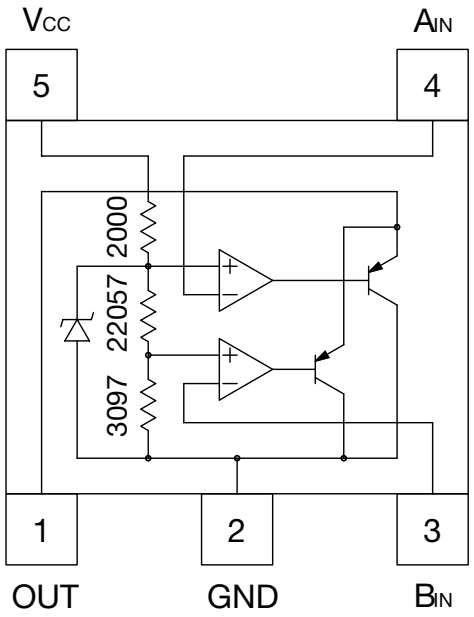
SOT-25A, SOT-25B
(TOP VIEW)

Block Diagram

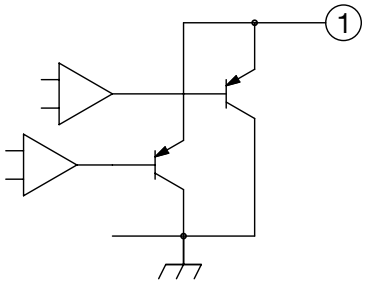
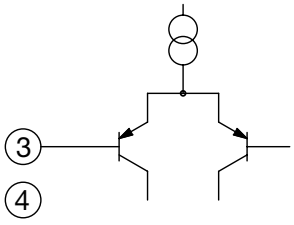
MM1462XN



MM1462BN



Pin Description

Pin No.	Pin name	Function	Internal equivalent circuit diagram
1	OUT	Output pin	
3 4	BIN AIN	Input pin	

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Strage temperature	TSTG	−40~+125	°C
Operating temperature	TOPR	−25~+85	°C
Supply voltage	VCC max	−0.3~+20	V
Allowable loss	Pd	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, Ta=25°C, V_{CC}=5V)

MM1462BN

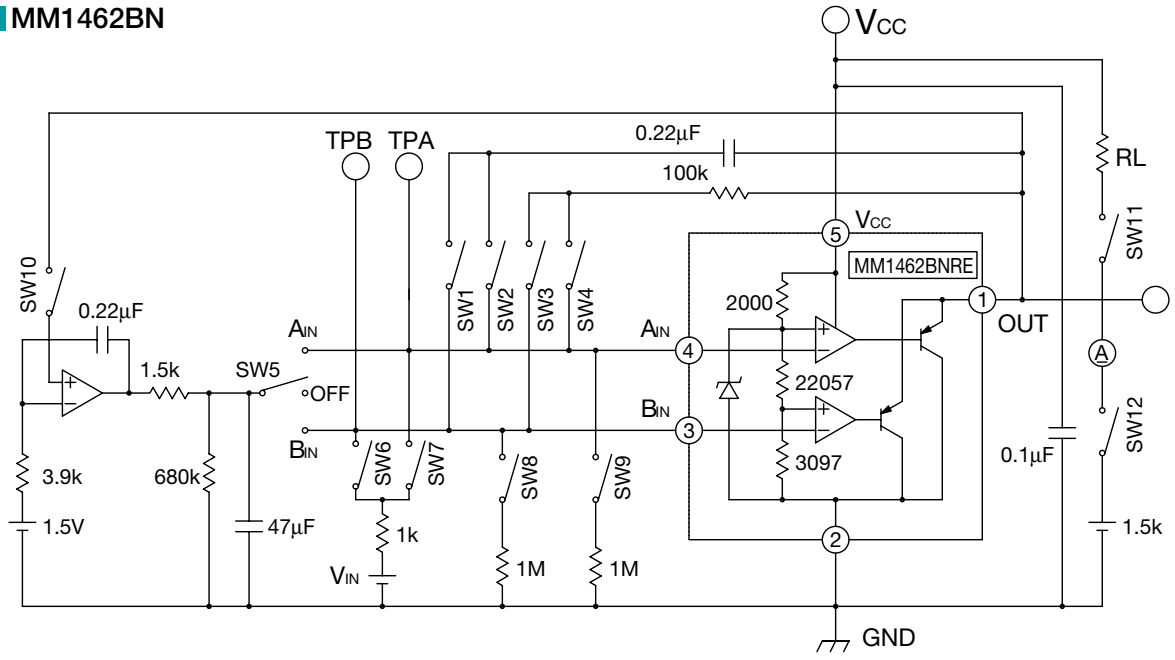
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Current consumption	I_{CC}	A_{IN}=0V, B_{IN}=0V, RL=∞		2.4	3.4	mA
A amplifier						
Output inverting voltage (A)	V_A	B_{IN}=0V, RL=4.3k, V_{CC}=3~5V	1.225	1.25	1.275	V
Input bias current (A)	I_B	B_{IN}=0V, RL=4.3k		30	150	nA
PSRR (A)	PSRR	B_{IN}=0V, RL=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	⊿V_A	B_{IN}=0V, RL=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, RL=4.3k, V_{CC}=3~5V	151	154	157	mV
Input bias current (B)	I_B	A_{IN}=0V, RL=4.3k, V_{CC}=3~5V		30	150	nA
PSRR (B)	PSRR	A_{IN}=0V, RL=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	⊿V_B	A_{IN}=0V, RL=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, RL=∞		1.2	1.7	mA
A amplifier						
Output inverting voltage (A)	V_A	B_{IN}=0V, RL=4.3k	2.45	2.50	2.55	V
Input bias current (A)	I_B	B_{IN}=0V, RL=4.3k		30	150	nA
PSRR (A)	PSRR (A)	B_{IN}=0V, RL=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, RL=4.3k	151	154	157	mV
Input bias current (B)	I_B	A_{IN}=0V, RL=4.3k		30	150	nA
PSRR (B)	PSRR (B)	A_{IN}=0V, RL=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, V_{CC}=5.0V)

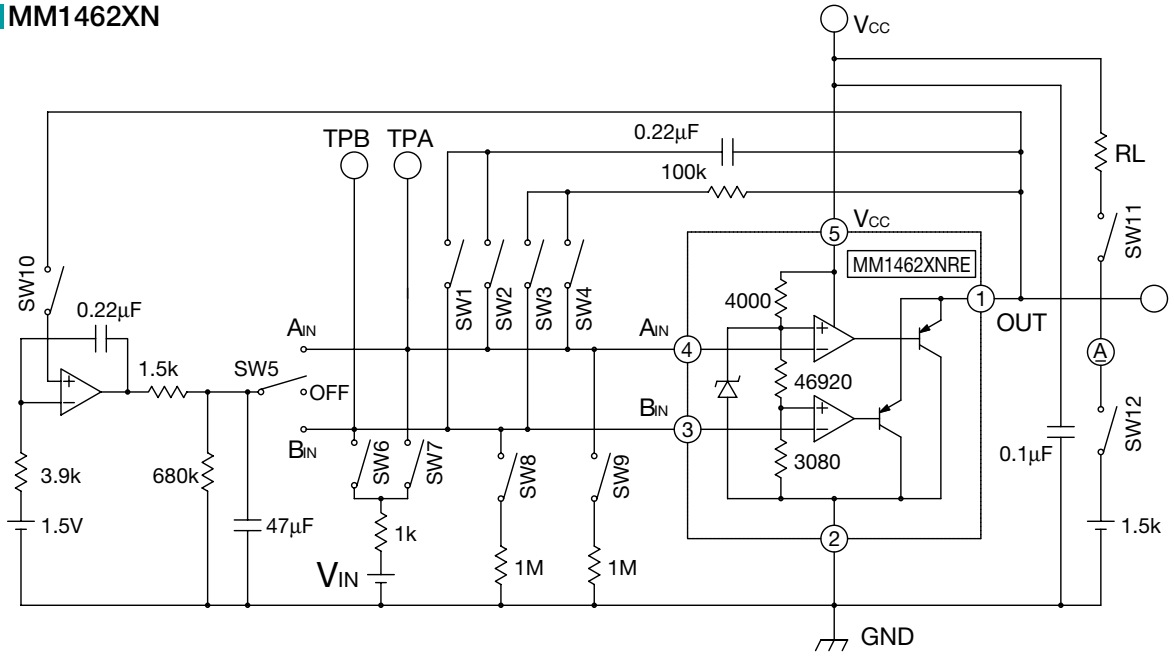
Item	Switch Status														○: ON ×: OFF
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12	RL (Ω)	V_{IN} (V)	
Current consunption	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		
Output inverting voltage (A)	×	○	×	×	A_{IN}	×	×	○	×	○	○	×	4.3k		Mesure TPA voltage
Input bias current (A)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		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_{OUT}1 is defined by the voltage when V_{CC}=4V. V_{OUT}2 is defined by the voltage when V_{CC}=25V.
PSRR (A) is shown in the eqation below.

*2 V_{OUT}1 is defined by the voltage when V_{CC}=4V. V_{OUT}2 is defined by the voltage when V_{CC}=25V.
PSRR (B) is shown in the eqation below.
$PSRR=40+20\log | (25V-4V) / (V_{OUT}1-V_{OUT}2) |$

*3 VB−20mV

MM1462XN



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

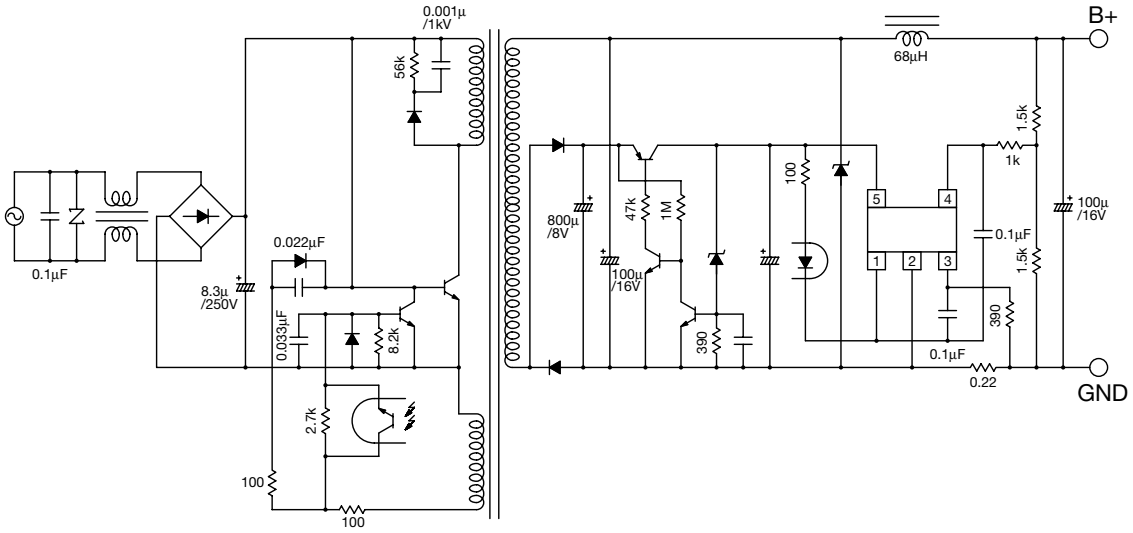
Item	Switch Status												RL (Ω)	VIN (V)	○ : ON × : OFF
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12			
Current consunption	×	×	×	×	×	×	×	○		×		×	4.3k		
Output inverting voltage (A)	×	○	×	×	AIN	×	×	○	×	○	○	×	4.3k		Mesure TPA voltage
Input bias current (A)	×	×	×	×	×	×	×	○	○	×	○	×	4.3k		Mesure TPA voltage
Output sink current (A)	×	×	×	×	×	×	○	○	×	×	×	○		2.7V	Mesure output sink current
PSRR (A)	×	○	×	○	×	×	○	○	×	×	○	×	4.3k	VA	*1
Output inverting voltage (B)	○	×	×	×	BIN	×	×	×	○	○	○	×	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 VOUT1 is defined by the voltage when VCC=4V. VOUT2 is defined by the voltage when VCC=25V.
PSRR (A) is shown in the eqation below.

*2 VOUT1 is defined by the voltage when VCC=4V. VOUT2 is defined by the voltage when VCC=25V.
PSRR (B) is shown in the eqation below
PSRR=40+20log | (25V−4V) / (VOUT1−VOUT2) |

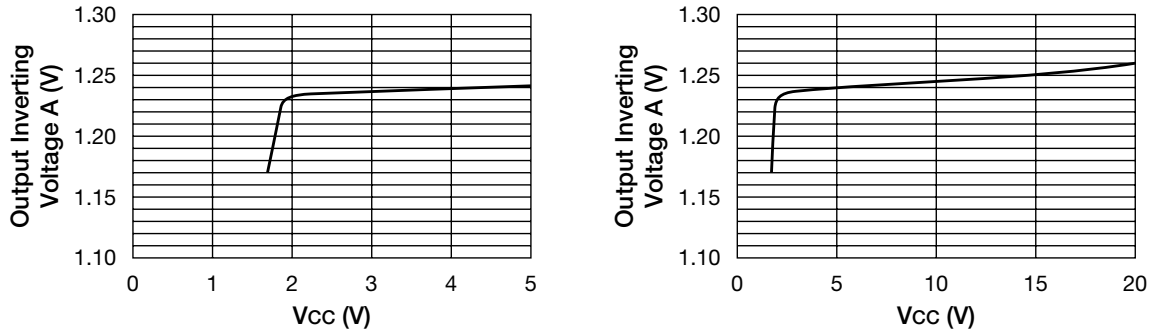
*3 VB−20mV

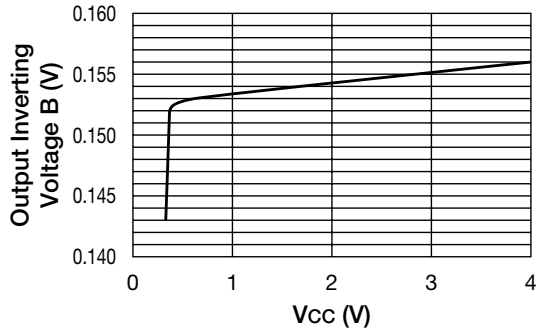
Application Circuit MM1462XN

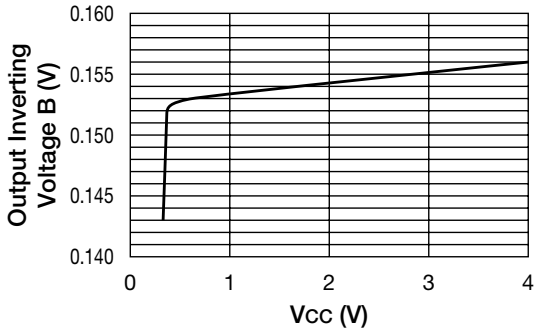


Characteristics (3.0V product except where noted therwise, Ta=25°C, VIN=5V, VCONT=5V, CIN=1µF, CO=2.2µ)

MM1462BN

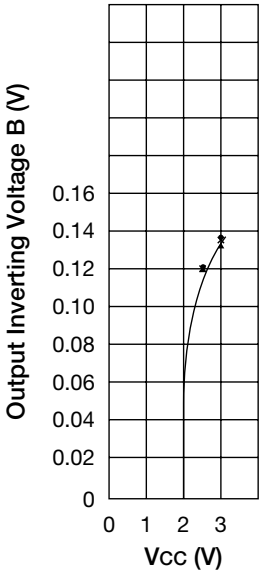


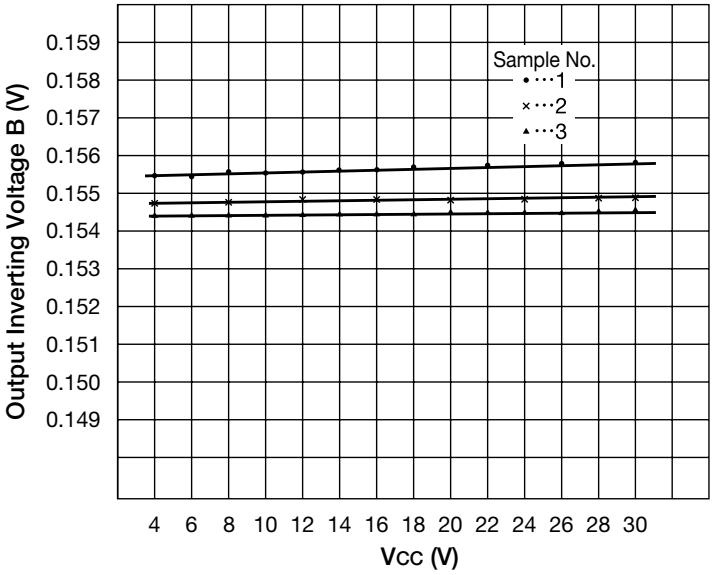


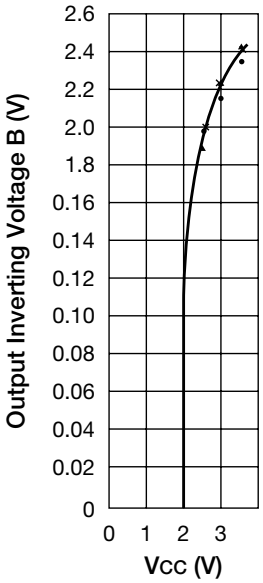


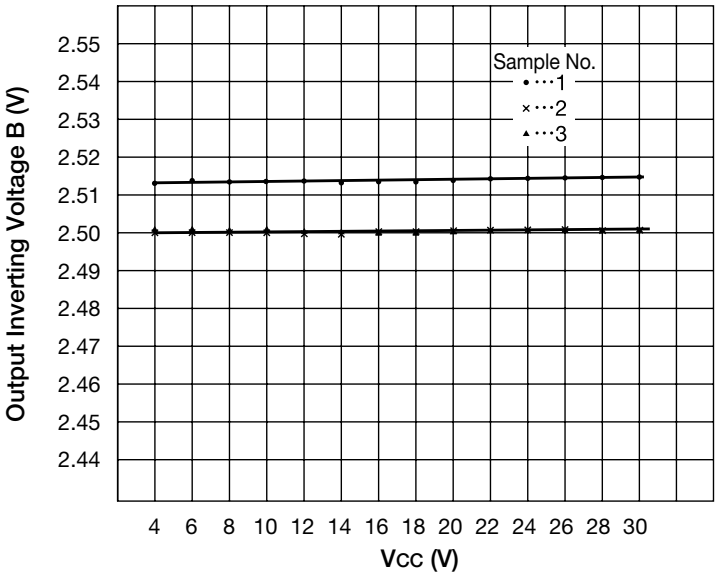
Note: these are typical characteristics

MM1462XN









Note: these are typical characteristics