High Precision Operational Amplifier
Monolithic IC MM1278

Outline

This IC is a dual-type operational amplifier, with two built-in operational amplifiers, and achieves extremely low offset voltage with a single power supply. The input offset voltage and the input offset voltage temperature drift of this operation amplifier are one digit less than those of our conventional products. A single power supply can be used, so there is no need to create a mid-point potential, and it can be operated with the voltage from two batteries. Due to the single power supply, low current consumption, and low offset voltage, two batteries can be used for operation, making it appropriate for equipment that amplifies the very small signal of portable equipment.

Features

General

1. Power supply voltage	V_{CC}=1.8V~6V optimum for drive by batteries
2. Current consumption	0.1mA typ.
3. Power supply line elimination ratio	60dB typ.

Amplifier section

1. Input voltage range	−0.2V~+0.3V
2. Super low input offset voltage	±0.1mV typ.
3. Input offset voltage	±1μV/°C typ.
4. Input offset current	1nA typ.
5. Input bias current	50nA typ.
6. Gain	100dB typ.

Package

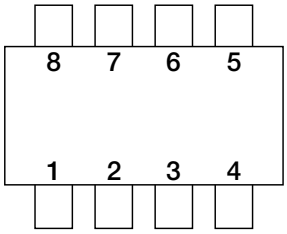
SOP-8D (MM1278XA)
DIP-8A (MM1278XD)

Applications

1. Amplification and detection of normal very small voltage on portable equipment.
2. Amplification of very small voltage for sensors (thermocouples, strain gauges, magnetic sensors)
3. Detedtion of very small current

Pin Assignment

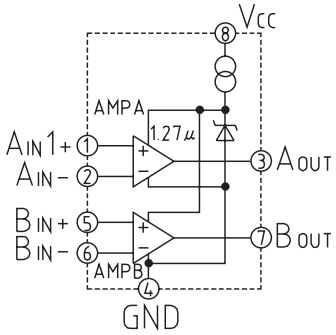
MM1278XF, MM1278XD



SOP-8D/DIP-8A

1	AIN+
2	AIN-
3	AOUT
4	GND
5	BIN+
6	BIN-
7	BOUT
8	VCC

Block Diagram



Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Units
Storage temperature	TSTG	–40~+125	°C
Operating temperature	TOPR	–20~+75	°C
Power supply voltage	VCC max.	–0.3~+10	V
Input voltage	VIN	–0.3~+10	V
Allowable power dissipation	Pd	300	mW

Electrical Characteristics (Unless otherwise specified Ta=25°C, V_{CC}=3V, V_{IN}=0V)

Item		Symbol	Measurement Conditions	Min.	Typ.	Max.	Units
Current consumption		I_{CC}			0.1	0.15	mA
Power supply line elimination ratio		P_{SRR}	f=100Hz	50	60		dB
Power supply voltage range		V_{CC}		1.8	3.0	6.0	V
Amplifier section	Input voltage range	V_I		–0.2		0.3	V
	Input offset voltage	V_{IOA}			±0.1	±0.35	mV
	Input offset voltage temperature drift	ΔV_{IOA}	Ta=–20~+70°C		±1	±3	µV/°C
	Input offset current	I_{IOA}			1	10	nA
	Input bias current	I_{BA}			50	150	nA
	Gain	G_V	R_L=100kΩ	80	100		dB
	Output current	I_{OA}	V_{IN}=10mV, V_O=0.5V	0.5			mA
	Output voltage	V_{OA}	V_{IN}=–5~–25mV R_L=10kΩ	0.01		V_{CC} –1.0	V

Note : Use a gain range of 20dB ~ 50dB in the amplifier section (40dB recommended).
Also, insert the capacitor between output and GND, instead of parallel to the gain setting feedback resistor, in order to eliminate noise from the input.
Please note that use of the equipment under different conditions will cause vibration.