



# **WT272C/WT274C**

## **Dual/Quad Low Power CMOS OP Amplifiers**

### **Data Sheet**

REV. 1.1

December 31, 1999

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## DESCRIPTION

The WT272C/WT274C is a dual/quad low power CMOS operational amplifiers IC. It provides high performance operation at low supply voltages. The basic amplifier can operate at supply voltage as low as 1.2V with very low power consumption and makes it perfect for battery-powered application. The input common-mode voltage extends to the negative rail. The output swings to both rails with light load. The input bias current is inherently low and the input impedance is extremely high. The devices are ideal upgrades for industrial standards OP amp.

## FEATURES

- Low Power Replacement for Standard OP Amps
- Wide supply operating range (1.2V to 7V)
- Input common-mode voltage range includes negative rail
- Output swing to rail
- Low input bias current (typical 1pA)
- High input impedance
- Single supply operation
- Internal compensated
- Output short circuit protection

## APPLICATIONS

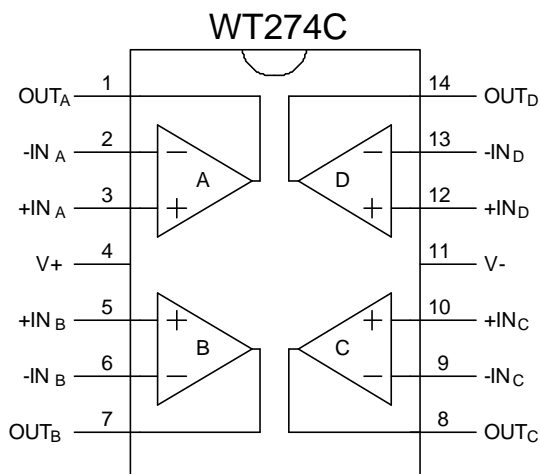
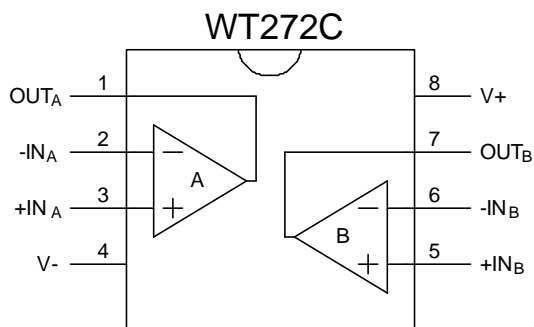
- Portable Instruments
- Battery-Powered Systems
- Transducer Interfacing
- Active Filter
- High Impedance Buffer

## ORDERING INFORMATION

Part Number	Package
WT272C-N080	8 pin PDIP
WT272C-S080	8 pin SO

Part Number	Package
WT274C-N140	14 pin PDIP
WT274C-S140	14 pin SO

## PIN CONFIGURATION



## ABSOLUTE MAXIMUM RATINGS

Parameter	Min.	Max.	Units
DC supply voltage (V+ - V- )	0	8.5	V
Input and output voltage	V- - 0.3	V+ + 0.3	V
Storage temperature	-65	150	°C
Ambient temperature with power applied	-20	100	°C
Duration of output short circuit		Unlimited	

\*Note: Stresses above those listed may cause permanent damage to the devices

## RECOMMENDED OPERATING CONDITION

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V <sub>SUPPLY</sub>	Supply Voltage		1.2		7	V
I <sub>SOURCE</sub>	Output Source Current				5	mA
I <sub>SINK</sub>	Output Sink Current				9	μA
T <sub>a</sub>	Ambient Temperature		0		85	°C

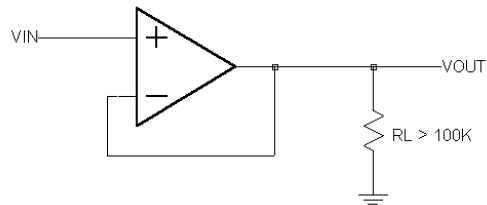
## ELECTRICAL CHARACTERISTICS

(V+ = 5V, V- = 0V, T<sub>a</sub> = +25°C unless otherwise specified)

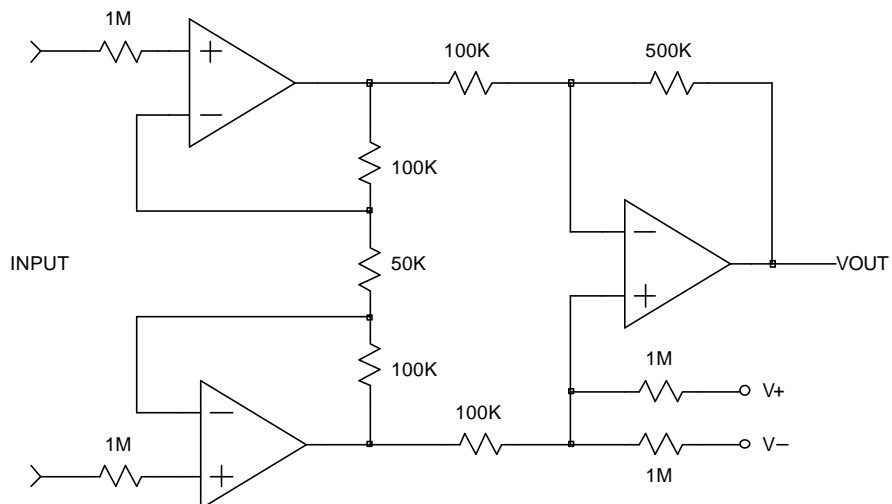
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V <sub>OS</sub>	Input Offset Voltage			2	5	mV
ΔV <sub>OS</sub> /ΔT	Average Temperature Coefficient of Input Offset Voltage			0.7		μV/°C
I <sub>OS</sub>	Input Offset Current			1		pA
I <sub>BIAS</sub>	Input Bias Current	T <sub>a</sub> =25°C		1		pA
V <sub>ICOM</sub>	Input Common Mode Voltage		0		V+ -1.3	V
V <sub>OUT</sub>	Output Voltage Swing	V <sub>in</sub> =10mV R <sub>L</sub> =1MΩ connected to V-	4.9	4.99		V
		V <sub>in</sub> =10mV R <sub>L</sub> =100KΩ connected to V-		4.95		V
		V <sub>in</sub> =10mV R <sub>L</sub> =10KΩ connected to V-		4.75		V
		V <sub>in</sub> = -10mV R <sub>L</sub> =1MΩ, connected to V+		0.5	0.7	V
		V <sub>in</sub> = -10mV R <sub>L</sub> =100KΩ connected to V+		0.65		V
		V <sub>in</sub> = -10mV R <sub>L</sub> =10KΩ connected to V+				
A <sub>VOL</sub>	Large Signal Voltage Gain	V <sub>O</sub> = 1V to 4V, V <sub>i</sub> =1.4V R <sub>L</sub> =1MΩ	20	100		V/mV
GBW	Unit Gain Bandwidth	R <sub>L</sub> =1MΩ, C <sub>L</sub> =50pF		0.1		MHz
CMRR	Common Mode Rejection Ratio	V <sub>O</sub> = 1V, V <sub>i</sub> =0 to 3.5V	60	80		dB
PSRR	Power Supply Rejection Ratio	V <sub>O</sub> = 1V	60	90		dB
SR	Slew Rate	A <sub>VOL</sub> =1, C <sub>L</sub> =100pF V <sub>IN</sub> =5V <sub>P-P</sub>		0.03		V/μs
I <sub>SUPPLY</sub>	Supply Current (per amplifier)			5	9	μA
φ <sub>m</sub>	Phase Margin at Unit Gain	R <sub>L</sub> =1MΩ, C <sub>L</sub> =50pF		55		Degree
e <sub>n</sub>	Input Equivalent Noise Voltage	f=1KHz, R <sub>s</sub> =100Ω		50		nV/√Hz
V <sub>O1</sub> /V <sub>O2</sub>	Channel Separation	A <sub>VOL</sub> =100		120		dB

## TYPICAL APPLICATION CIRCUIT

### Voltage Follower



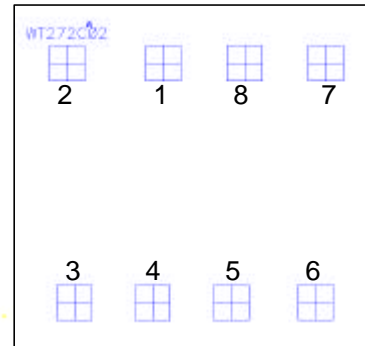
### Instrument Amplifier



## PAD LOCATION TABLE

### WT272C (version 2A)

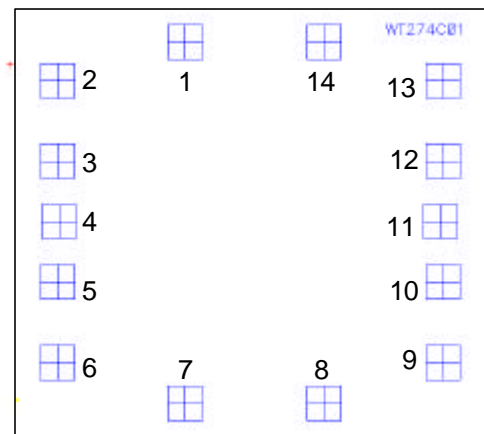
Pin No.	Pin Name	X (um)	Y (um)
1	OUT1	430	762
2	NEG1	163	762
3	POS1	183	95
4	GND	401	95
5	POS2	619	95
6	NEG2	853	95
7	OUT2	881	762
8	VDD	655	762



(X,Y)=(0,0)

### WT274C (version 1B)

Pin No.	Pin Name	X (um)	Y (um)
1	OUT1	461	1123
2	NEG1	100	1014
3	POS1	100	786
4	VDD	105	615
5	POS2	100	444
6	NEG2	100	216
7	OUT2	461	101
8	OUT3	854	101
9	NEG3	1191	216
10	POS3	1191	444
11	GND	1186	615
12	POS4	1191	786
13	NEG4	1191	1014
14	OUT4	854	1123



(X,Y)=(0,0)