

# LMC6681 Single/LMC6682 Dual/LMC6684 Quad Low Voltage, Rail-To-Rail Input and Output CMOS Amplifier with Powerdown

## General Description

The LMC6681/2/4 is a high performance operational amplifier which can operate over a wide range of supply voltages, from 1.8V to 10V. It has guaranteed specs at 1.8V, 2.2V, 3V, 5V, and 10V.

The LMC6681/2/4 provides an input common-mode voltage range that exceeds both rails. The rail-to-rail output swing of the amplifier assures maximum dynamic signal range. This rail-to-rail performance of the amplifier, combined with its high open-loop voltage gain makes it unique among CMOS rail-to-rail amplifiers. The LMC6681/2/4 is an excellent upgrade for circuits using limited common-mode range amplifiers.

The LMC6681/2/4 has a powerdown mode which can be triggered externally. In this powerdown mode, the supply current decreases from 1.4 mA (for two amplifiers) to 1.5  $\mu$ A (for two amplifiers). The LMC6684 has two powerdown options. Each of the powerdown pins disables two amplifiers.

The LMC6681/2/4 has been designed specifically to improve system performance in low voltage applications. The amplifier's 80 fA input current, 0.5 mV offset voltage, and 82 dB CMRR maintain accuracy in battery-powered systems.

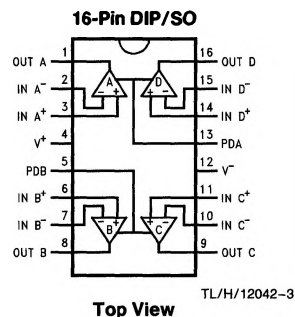
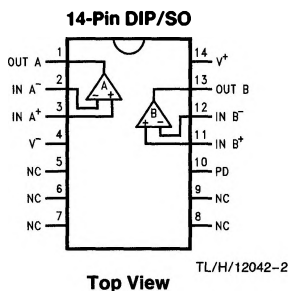
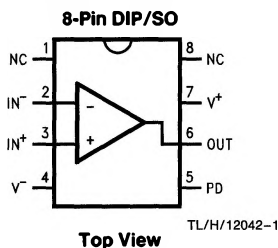
## Features (Typical unless otherwise noted)

- Guaranteed Specs at 1.8V, 2.2V, 3V, 5V, 10V
- Rail-to-Rail Input Common-Mode Voltage Range
- Rail-to-Rail Output Swing  
(within 10 mV of supply rail, @  $V_S = 3V$  and  $R_L = 10\text{ k}\Omega$ )
- Powerdown Mode  $I_{S\text{OFF}} \leq 1.5\ \mu\text{A}/\text{Amplifier}$   
(Guaranteed at  $V_S = 1.8V, 2.2V, 3V,$  and  $5V$ )
- Ultra Low Input Current 80 fA
- High Voltage Gain ( $V_S = 3V, R_L = 10\text{ k}\Omega$ ) 120 dB
- Unity Gain Bandwidth 1.2 MHz

## Applications

- Battery Operated Circuits
- Sensor Amplifiers
- Portable Communication Devices
- Medical Instrumentation
- Battery Monitoring Circuits
- Level Detectors, Sample-and-Hold Circuits

## Connection Diagrams



## Ordering Information

Package	Temperature Range Industrial, -40°C to +85°C	NSC Drawing	Transport Media
8-Pin Molded DIP	LMC6681AIN, LMC6681BIN	N08E	Rails
8-Pin Small Outline	LMC6681AIM, LMC6681BIM LMC6681AIMX, LMC6681B1MX	M08A M08A	Rails Tape and Reel
14-Pin Molded DIP	LMC6682AIN, LMC6682BIN	N14A	Rails
14-Pin Small Outline	LMC6682AIM, LMC6682BIM LMC6682AIMX, LMC6682B1MX	M14A M14A	Rails Tape and Reel
16-Pin Molded DIP	LMC6684AIN, LMC6684BIN	N16A	Rails
16-Pin Small Outline	LMC6684AIM, LMC6684BIM LMC6684AIMX, LMC6684B1MX	M16A M16A	Rails Tape and Reel