National Semiconductor

PRELIMINARY

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 amplfiers) to 1.5 μA (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)

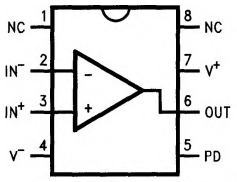
- Guaranteed Specs at 1.8V, 2.2V, 3V, 5V, 10V
- Rail-to-Rail Input Common-Mode Voltage Range
- Rail-to-Rail Output Swing
  (within 10 mV of supply rail, @ $V_S = 3V$ and $R_L = 10\ k\Omega$)
- Powerdown Mode $I_{S\ OFF} \leq 1.5\ \mu A$/Amplifier
  (Guaranteed at V_S = 1.8V, 2.2V, 3V, and 5V)
- Ultra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

8-Pin DIP/SO



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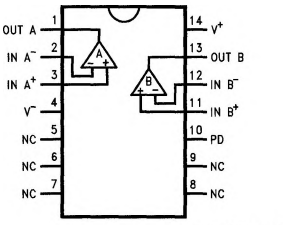
Top View

14-Pin DIP/SO



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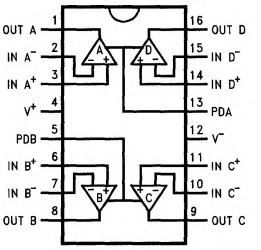
Top View

16-Pin DIP/SO



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Top View

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	M08A	Rails
	LMC6681AIMX, LMC6681B1MX	M08A	Tape and Reel
14-Pin Molded DIP	LMC6682AIN, LMC6682BIN	N14A	Rails
14-Pin Small Outline	LMC6682AIM, LMC6682BIM	M14A	Rails
	LMC6682AIMX, LMC6682BIMX	M14A	Tape and Reel
16-Pin Molded DIP	LMC6684AIN, LMC6684BIN	N16A	Rails
16-Pin Small Outline	LMC6684AIM, LMC6684BIM	M16A	Rails
	LMC6684AIMX, LMC6684BIMX	M16A	Tape and Reel