

Features

- Supply Range: 2.7V to 5.5V
- Low Offset Voltage: 1 μ V(TYP)
- Input Offset Drift: 0.005 μ V/ $^{\circ}$ C
- Gain Bandwidth: 10MHz
- Rail-to-Rail Input and Output
- High Slew rate: 5V/ μ s
- Operating Temperature: -40 $^{\circ}$ C ~ +125 $^{\circ}$ C
- Type Package:SOP-14

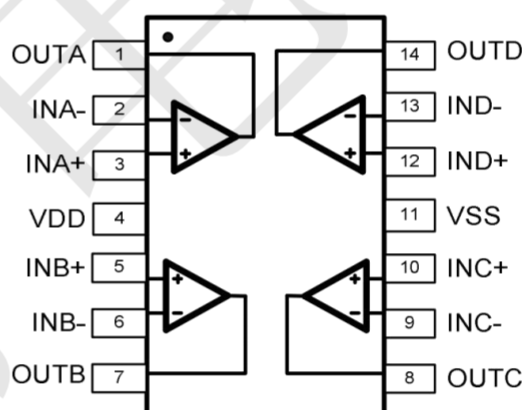
Applications

- Temperature Sensors
- Battery-Powered Instruments
- Smoke/Gas/Environment Sensors
- Medical Equipment
- Portable Instruments and Mobile Device
- Active Filters
- Piezo Electrical Transducer Amplifier
- Sensor Interface
- Handheld Test Equipment

General Description

The is Of CMOS operational amplifiers use auto-zero techniques to simultaneously provide very low offset voltage (5 μ V max) and near-zero drift over time and temperature. This family of amplifiers has ultra low noise, offset and power. This miniature, high-precision operational amplifiers offset high input impedance and rail-to-rail input and rail-to-rail output swing. With high gain-bandwidth product of 10MHz and slew rate of 5V/ μ s. Single or dual supplies as low as +2.7V($\pm$ 1.35V) and up to +5.5V ($\pm$ 2.75V) may be used.

Pinout (top view)



Pin Configurations

Pin Number	Pin Name	Pin Function	Pin Number	Pin Name	Pin Function
1	OUT A	Output A	8	OUT C	Output C
2	IN A-	Reverse input A	9	IN C-	Reverse input C
3	IN A+	In-phase input A	10	IN C+	In-phase input C
4	VDD	Chip VDD	11	VSS	Chip GND
5	IN B+	In-phase input B	12	IN D+	In-phase input D
6	IN B-	Reverse input B	13	IN D-	Reverse input D
7	OUT B	Output B	14	OUT D	Output D

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) ⁽¹⁾

PARAMETER	MIN	MAX	UNIT
Supply Voltage, $V_s=(V^+) - (V^-)$	--	6	V
Input Terminal Voltage ⁽²⁾	$(V^-)-0.5$	$(V^+)+0.5$	V
Input Terminal Current ⁽²⁾	-10	+10	mA
Signal Output Current	-35	+35	mA
Maximum Junction Temperature	--	+150	°C
Storage Temperature Range	-65	+150	°C
Electrostatic discharge (HBM) $V_{(ESD)}$	± 2000		V

Note 1: Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

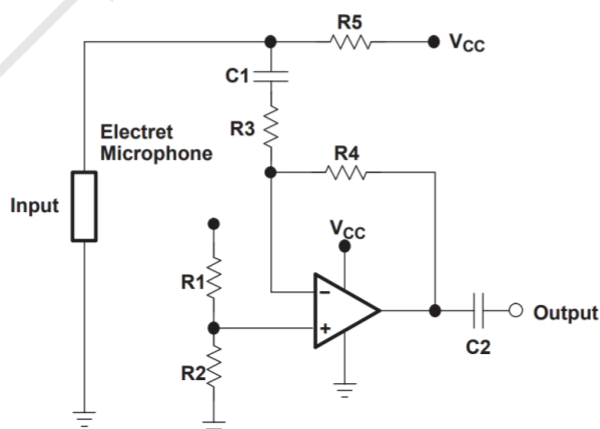
Note 2: Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current-limited to 10mA or less.

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

PARAMETER		MIN	TYP	MAX	UNIT
Supply Voltage, $V_s=(V^+) - (V^-)$	Signal-supply	2.7	--	5.5	V
	Dual-supply	± 1.35	--	± 2.75	V
Operating Temperature Range		-40	+25	+125	°C

Typical Application



Electrical Characteristics

(At $T_A=+25^{\circ}\text{C}$, $V_S=5\text{V}$, $R_L=10\text{k}\Omega$ connected to $V_S/2$, and $V_{OUT}=V_S/2$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Operating Voltage Range	V_S		2.7	--	5.5	V
Quiescent Current/Amplifier	I_Q		--	700	--	μA
Power-Supply Rejection Ratio	PSRR	$V_S=2.7\text{V}$ to 5.5V , $V_{CM}=0\text{V}$	110	130	--	dB
INPUT						
Input Offset Voltage	V_{OS}	$V_{CM}=V_S/2$	--	± 1	± 5	μV
Input Offset Voltage Average Drift	dV_{OS}/dT		--	0.005	--	$\mu\text{V}/^{\circ}\text{C}$
Input Bias Current	I_B	$V_{CM}=V_S/2$	--	± 50	--	pA
Input Offset Current	I_{OS}	$V_{CM}=V_S/2$	--	± 10	--	pA
Common-Mode Voltage Range	V_{CM}		(V-)-0.1		(V+)+0.1	V
Common-Mode Rejection Ratio	CMRR	$(V-)-0.1\text{V} < V_{CM} < (V+)+0.1\text{V}$	110	130	--	dB
Input Differential Capacitance			--	1	--	pF
Input Common Capacitance			--	5	--	pF
OUTPUT						
Open-Loop Voltage Gain	A_{OL}	$R_L=10\text{k}\Omega$, $V_O=0.3\text{V}$ to 4.7V	110	130	--	dB
Output Voltage High	V_{OH}	$R_L=100\text{k}\Omega$ to GND	4.99	4.998	--	V
		$R_L=10\text{k}\Omega$ to GND	4.95	4.98	--	V
Output Voltage Low	V_{OL}	$R_L=100\text{k}\Omega$ to V+	--	1	10	mV
		$R_L=10\text{k}\Omega$ to V+	--	10	30	mV
Short-Circuit Current	I_{OUT}		--	35	--	mA
FREQUENCY RESPONSE						
Slew Rate	SR	$G=+1$	--	5	--	V/ μs
Gain-Bandwidth Product	GBW		--	10	--	MHz
Overload Recovery Time			--	1	--	μs
NOISE						
Input Voltage Noise	e_{n-p-p}	$f=0.01\text{Hz}$ to 10Hz	--	0.75	--	μV_{pp}
		$f=0.01\text{Hz}$ to 1Hz	--	0.22	--	μV_{pp}
Input Voltage Noise Density	e_n	$f=1\text{KHz}$	--	35	--	nV/Hz

TYPICAL CHARACTERISTICS

(At $T_A=+25^{\circ}\text{C}$, $V_S=5\text{V}$, $R_L = 10\text{k}\Omega$ connected to $V_S/2$, $V_{OUT}=V_S/2$, unless otherwise noted.)

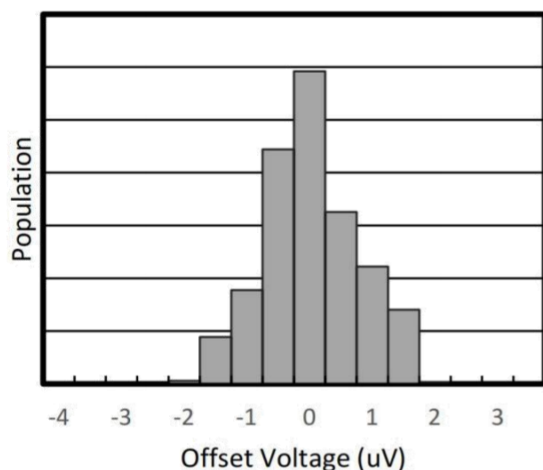


Figure 1. Offset Voltage Production Distribution

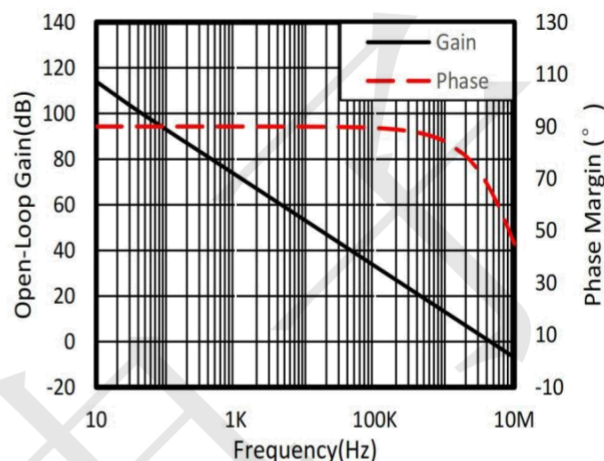


Figure 2. Open-Loop Gain And Phase vs Frequency

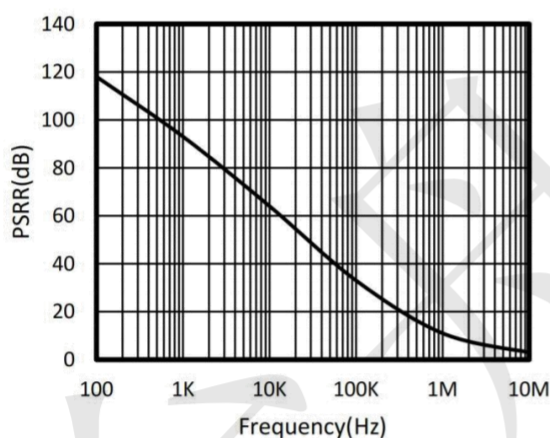


Figure 3. Power-Supply Rejection Ratio vs Frequency

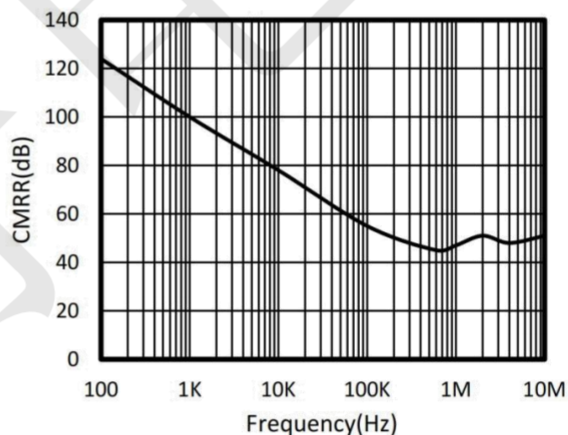


Figure 4. Common-Mode Rejection Ratio vs Frequency

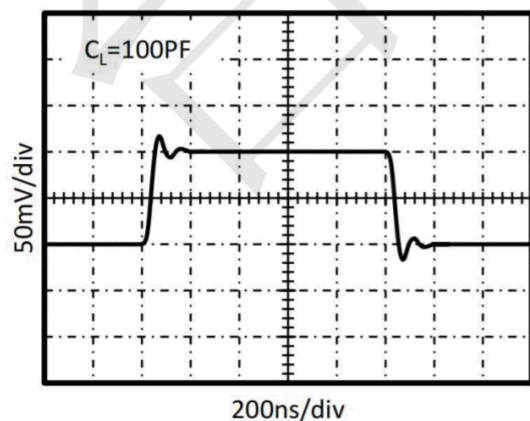


Figure 5. Small-Signal Step Response

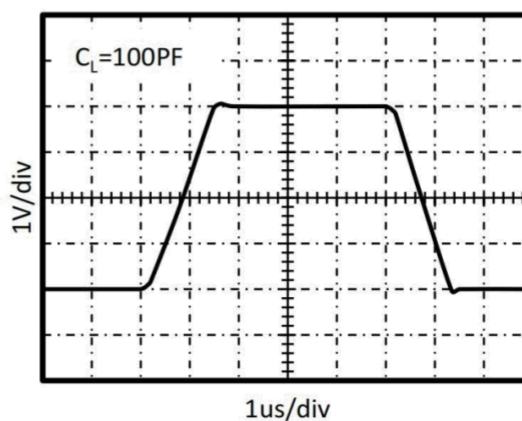
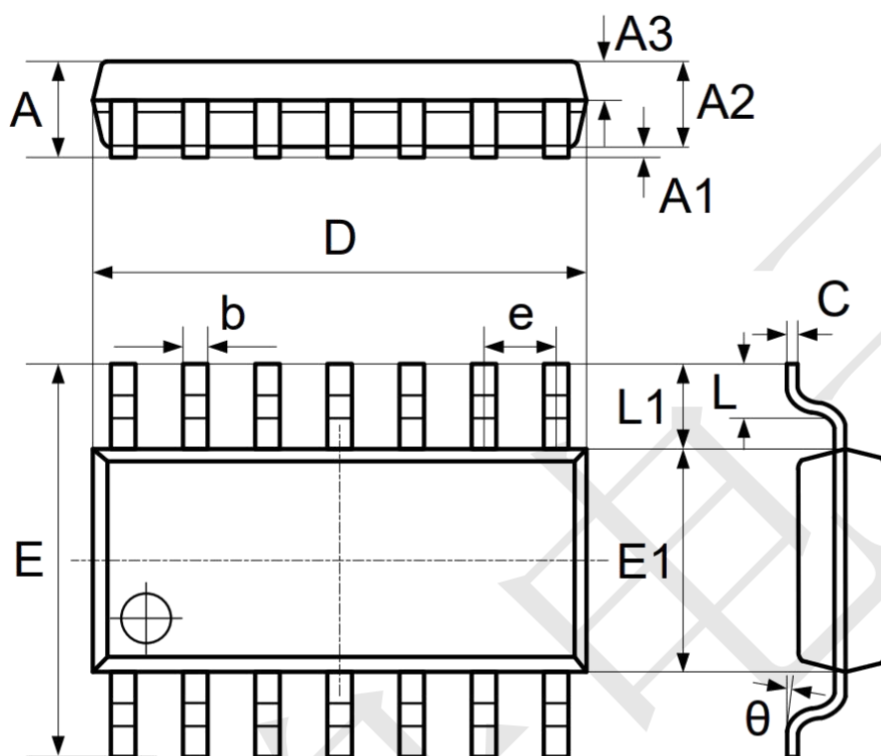


Figure 6. Large-Signal Step Response

Package information SOP-14



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.450	1.850	0.057	0.073
A1	0.100	0.300	0.004	0.012
A2	1.350	1.550	0.053	0.061
A3	0.550	0.750	0.022	0.030
b	0.406 TYP.		0.016 TYP.	
C	0.203 TYP.		0.008 TYP.	
D	8.630	8.830	0.340	0.348
E	5.840	6.240	0.230	0.246
E1	3.850	4.050	0.152	0.159
e	1.270 TYP.		0.050 TYP.	
L1	1.040 REF.		0.041 REF.	
L	0.350	0.750	0.014	0.030
θ	2°	8°	2°	8°