

Comlinear® CLC1050, CLC2050, CLC4050

Low Power, 3V to 36V, Single, Dual, Quad Amplifiers



FEATURES

- Unity gain stable
- 100dB voltage gain
- 550kHz unity gain bandwidth
- 0.5mA supply current
- 20nA input bias current
- 2mV input offset voltage
- 3V to 36V single supply voltage range
- ±1.5V to ±18V dual supply voltage range
- Input common mode voltage range includes ground
- 0V to $V_S - 1.5V$ output voltage swing
- CLC2050: improved replacement for industry standard LM358
- CLC4050: Improved replacement for industry standard LM324
- CLC1050: Pb-free SOT23-5
- CLC2050: Pb-free SOIC-8
- CLC4050: Pb-free SOIC-14

APPLICATIONS

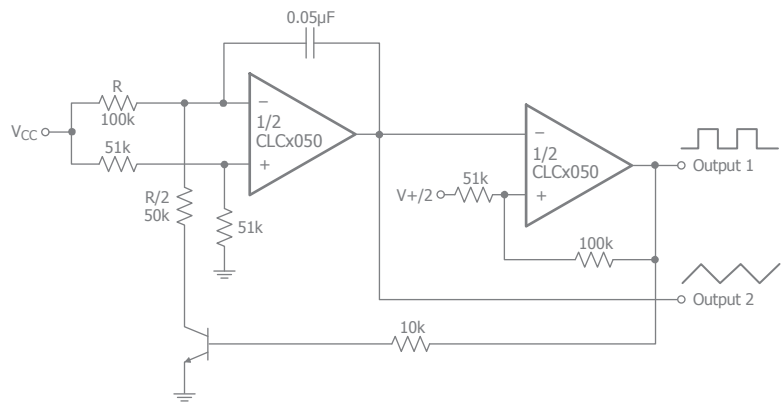
- Battery Charger
- Active Filters
- Transducer amplifiers
- General purpose controllers

General Description

The COMLINEAR CLC1050 (single), CLC2050 (dual), and CLC4050 (quad) are voltage feedback amplifiers that are internally frequency compensated to provide unity gain stability. At unity gain ($G=1$), these amplifiers offer 550kHz of bandwidth. They consume only 0.5mA of supply current over the entire power supply operating range. The CLC1050, CLC2050, and CLC4050 are specifically designed to operate from single or dual supply voltages.

The COMLINEAR CLC1050, CLC2050, and CLC4050 offer a common mode voltage range that includes ground and a wide output voltage swing. The combination of low-power, high supply voltage range, and low supply current make these amplifiers well suited for many general purpose applications and as alternatives to several industry standard amplifiers on the market today.

Typical Application - Voltage Controlled Oscillator (VCO)



Ordering Information

Part Number	Package	Pb-Free	RoHS Compliant	Operating Temperature Range	Packaging Method
CLC1050IST5X	SOT23-5	Yes	Yes	-40°C to +85°C	Reel
CLC2050ISO8X	SOIC-8	Yes	Yes	-40°C to +85°C	Reel
CLC4050ISO14X	SOIC-14	Yes	Yes	-40°C to +85°C	Reel

Moisture sensitivity level for all parts is MSL-1.

Electrical Characteristics

$T_A = 25^\circ\text{C}$ (if **bold**, $T_A = -40$ to $+85^\circ\text{C}$), $V_S = +5\text{V}$, $-V_S = \text{GND}$, $R_f = R_g = 2\text{k}\Omega$, $R_L = 2\text{k}\Omega$ to $V_S/2$, $G = 2$; unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response					
Unity Gain Bandwidth	$G = +1, V_{OUT} = 0.2V_{pp}, V_S = 5\text{V}$		330		kHz
	$G = +1, V_{OUT} = 0.2V_{pp}, V_S = 30\text{V}$		550		kHz
-3dB Bandwidth	$G = +2, V_{OUT} = 0.2V_{pp}, V_S = 5\text{V}$		300		kHz
	$G = +1, V_{OUT} = 0.2V_{pp}, V_S = 30\text{V}$		422		kHz
Large Signal Bandwidth	$G = +2, V_{OUT} = 1V_{pp}, V_S = 5\text{V}$		107		kHz
	$G = +2, V_{OUT} = 2V_{pp}, V_S = 30\text{V}$		76		kHz
Time Domain Response					
Slew Rate	1V step, $V_S = 5\text{V}$		200		V/ms
	4V step, $V_S = 30\text{V}$		285		V/ms
Distortion/Noise Response					
Total Harmonic Distortion	$V_{OUT} = 2V_{pp}, f = 1\text{kHz}, G = 20\text{dB}, C_L = 100\text{pF}, V_S = 30\text{V}$		0.015		%
Input Voltage Noise	$> 10\text{kHz}, V_S = 5\text{V}$		45		nV/ $\sqrt{\text{Hz}}$
	$> 10\text{kHz}, V_S = 30\text{V}$		40		nV/ $\sqrt{\text{Hz}}$
Crosstalk	Channel-to-channel, 1kHz to 20kHz		120		dB
DC Performance					
Input Offset Voltage ⁽¹⁾	$V_{OUT} = 1.4\text{V}, R_S = 0\Omega, V_S = 5\text{V}$ to 30V		2	5	mV
				7	mV
Average Drift			7		$\mu\text{V}/^\circ\text{C}$
Input Bias Current ⁽¹⁾	$V_{CM} = 0\text{V}$		20	100	nA
Input Offset Current ⁽¹⁾	$V_{CM} = 0\text{V}$		5	30	nA
Power Supply Rejection Ratio ⁽¹⁾	DC, $V_S = 5\text{V}$ to 30V	70	100		dB
		60			dB
Open-Loop Gain ⁽¹⁾	$+V_S = 15\text{V}, R_L \geq 2\text{k}\Omega, V_{OUT} = 1\text{V}$ to 11V	85	100		dB
		80			dB
Supply Current, CLC1050 ⁽¹⁾	$R_L = \infty, V_S = 30\text{V}$		0.65	1.5	mA
	$R_L = \infty, V_S = 5\text{V}$		0.45	1.0	mA
Supply Current, CLC2050 ⁽¹⁾	$R_L = \infty, V_S = 30\text{V}$		0.7	2.0	mA
	$R_L = \infty, V_S = 5\text{V}$		0.5	1.2	mA
Supply Current, CLC4050 ⁽¹⁾	$R_L = \infty, V_S = 30\text{V}$		1.0	3.0	mA
	$R_L = \infty, V_S = 5\text{V}$		0.7	1.2	mA
Input Characteristics					
Common Mode Input Range ⁽¹⁾	$+V_S = 30\text{V}$	0		$+V_S - 1.5$	V
Common Mode Rejection Ratio ⁽¹⁾	DC, $V_{CM} = 0\text{V}$ to $(+V_S - 1.5\text{V})$	60	70		dB
Output Characteristics					
Output Voltage Swing, Hi ⁽¹⁾	$+V_S = 30\text{V}, R_L = 10\text{k}\Omega$	27	28		V
Output Voltage Swing, Low ⁽¹⁾	$+V_S = 5\text{V}, R_L = 10\text{k}\Omega$		5	20	mV
Short Circuit Output Current ⁽¹⁾	$+V_S = 15\text{V}$		40	60	mA

Notes:

1. 100% tested at 25°C .
Refer to the data sheet for complete product specifications

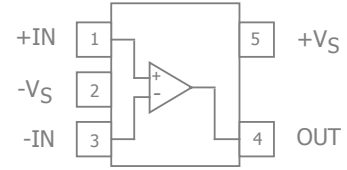
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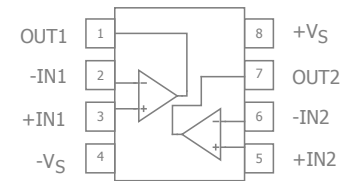
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Available Packages

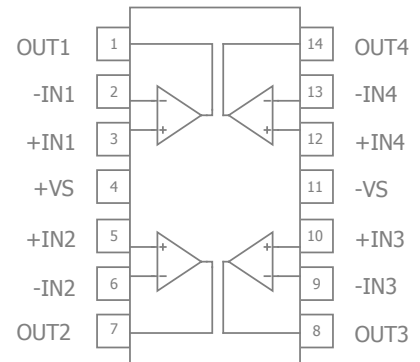
CLC1050 SOT23-5



CLC2050 SOIC-8



CLC4050 SOIC-14



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