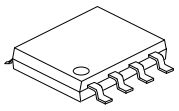
VERY LOW OFFSET VOLTAGE SINGLE OPERATIONAL AMPLIFIER



SOP-8

■ DESCRIPTION

The **OP07C** offers low offset and long-term stability by means of a low-noise, chopperless, bipolar-input-transistor amplifier circuit. For most applications, external components are not required for offset nulling and frequency compensation. The true differential input, with a wide input-voltage range and outstanding common-mode rejection, provides maximum flexibility and performance in high-noise environments and in noninverting applications. Low bias currents and extremely high input impedances are maintained over the entire temperature range.

■ FEATURES

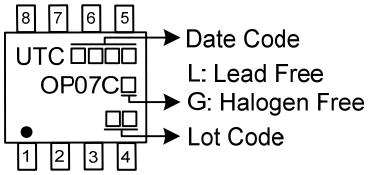
* Low Noise
* No External Components Required
* Replace Chopper Amplifiers at a Lower Cost
* Wide Input-Voltage Range: 0 to ±14V (Typ.)
* Wide Supply-Voltage Range: ±3V to ±18V

■ ORDERING INFORMATION

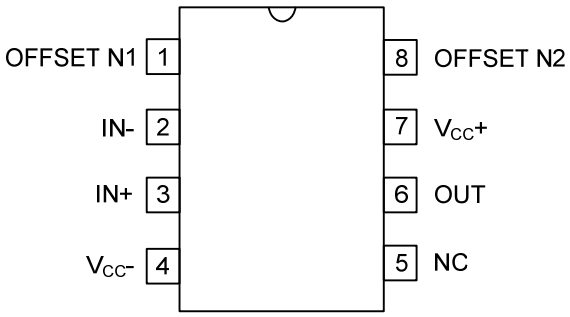
Ordering Number		Package	Packing
Lead Free	Halogen Free		
OP07CL-S08-R	OP07CG-S08-R	SOP-8	Tape Reel

OP07CG-S08-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



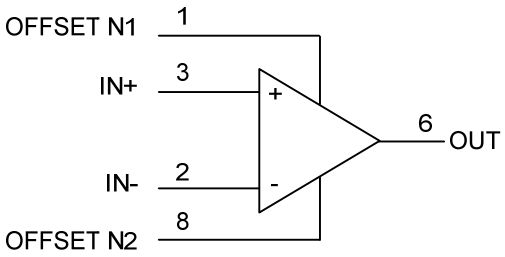
■ PIN CONFIGURATION



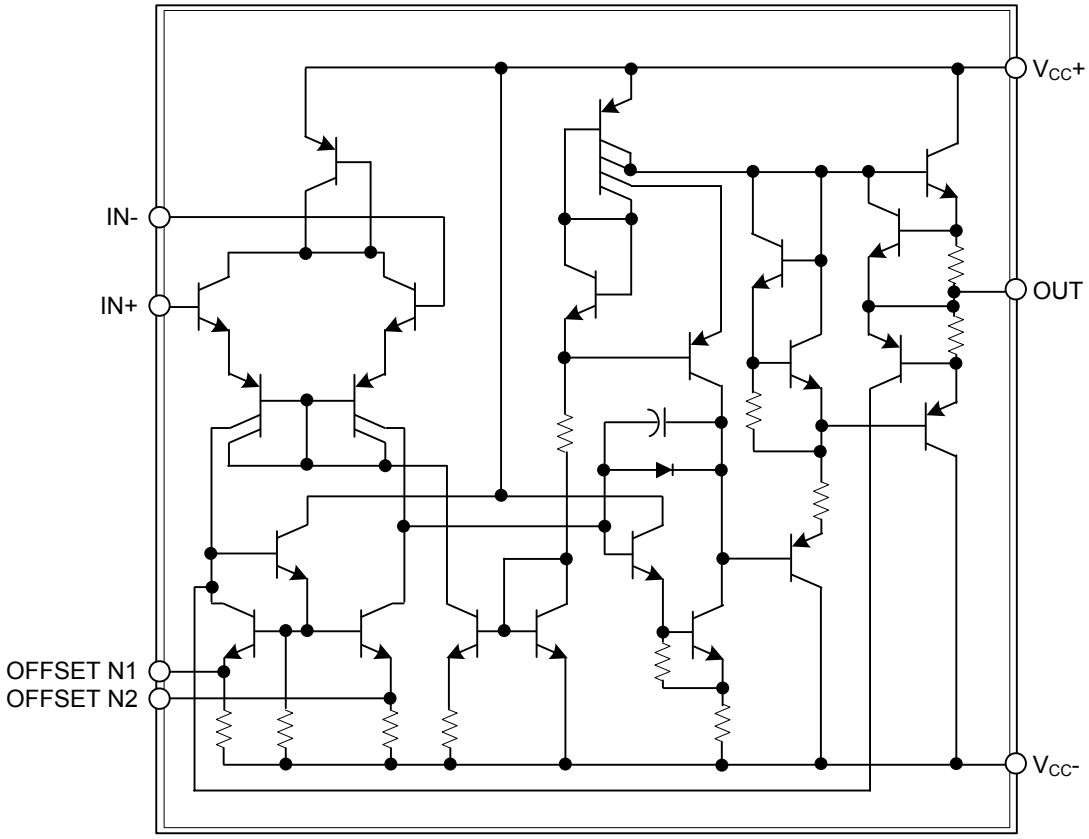
■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OFFSET N1	External input offset voltage adjustment
2	IN-	Inverting input
3	IN+	Noninverting input
4	V_{CC}-	Negative supply
5	NC	Do not connect
6	OUT	Output
7	V_{CC}+	Positive supply
8	OFFSET N2	External input offset voltage adjustment

■ SIMPLIFIED SCHEMATIC



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}+	0 ~ 22 (Note 2)	V
	V_{CC}-	-22 ~ 0 (Note 2)	V
Differential Input Voltage (Note 3)		±30	V
Input Voltage Range (Either Input) (Note 4)	V_I	±22	V
Duration of Output Short Circuit (Note 5)		Unlimitde	
Operating Virtual-Junction Temperature	T_J	+150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC}+ and V_{CC}−.
3. Differential voltages are at IN+ with respect to IN−.
4. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15V, whichever is less.
5. The output may be shorted to ground or to either power supply.

■ RECOMMENDED OPERATING CONDITIONS

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}+	3 ~ 18	V
	V_{CC}-	-3 ~ -18	V
Common-Mode Input Voltage (V_{CC}±=±15 V)	V_{IC}	-13 ~ 13	V
Operating Free-Air Temperature	T_A	-40 ~ +85	°C

■ ELECTRICAL CHARACTERISTICS

(At specified free-air temperature, V_{CC}±=±15V, unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A (Note 2)	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_O=0V, R_S=50Ω	25°C		60		μV
			0°C~70°C		85		μV
Long-Term Drift of Input Offset Voltage		(Note 1)			0.4		μV/mo
Offset Adjustment Range		R_S=20kΩ	25°C		±4		mV
Input Offset Current	I_{IO}		25°C		0.8		nA
			0°C~70°C		1.6		nA
Input Bias Current	I_{IB}		25°C		±1.8		nA
			0°C~70°C		±2.2		nA
Common-Mode Input Voltage Range	V_{ICR}		25°C	±13	±14		V
			0°C~70°C	±13	±13.5		V
Peak Output Voltage	V_{OM}	R_L≥10kΩ	25°C	±12	±13		V
		R_L≥2kΩ		±11.5	±12.8		V
		R_L≥1kΩ			±12		V
		R_L≥2kΩ	0°C~70°C	±11	±12.6		V
Large-Signal Differential Voltage Amplification	A_{VD}	V_{CC}=15V, V_O=1.4V~11.4V, R_L≥500kΩ	25°C	100	400		V/mV
		V_O=±10, R_L=2kΩ	25°C	120	400		V/mV
			0°C~70°C	100	400		V/mV
Unity-Gain Bandwidth	B_1		25°C	0.4	0.6		MHz
Input Resistance	r_i		25°C	8	33		MΩ
Common-Mode Rejection Ratio	CMRR	V_{IC}=±13V, R_S=50Ω	25°C	100	120		dB
			0°C~70°C	97	120		dB
Supply-Voltage Sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)	SVRR	V_{CC}+=±3V~±18V, R_S=50Ω	25°C		7	32	μV/V
			0°C~70°C		10	51	μV/V
Supply Current	I_{CC}	Vo=0, No load	25°C		2.67	5	mA

Notes: 1. Because long-term drift cannot be measured on the individual devices prior to shipment, this specification is not intended to be a warranty. It is an engineering estimate of the averaged trend line of drift versus time over extended periods after the first 30 days of operation.

2. All characteristics are measured with zero common-mode input voltage, unless otherwise specified.

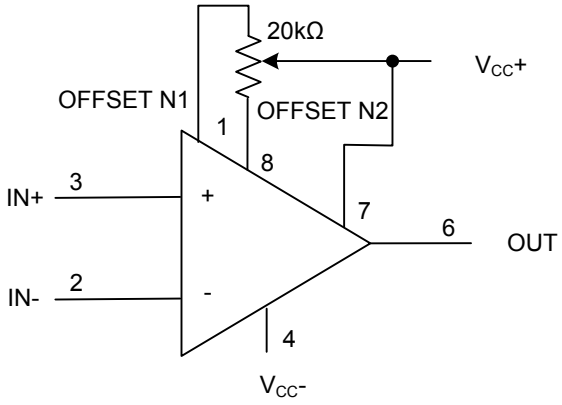
■ OPERATING CHARACTERISTICS

at specified free-air temperature, V_{CC}=5V (unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP	MAX	UNIT
Input Offset Voltage	Vn	f=10Hz		10.5		nV/$\sqrt{Hz}$
		f=100Hz		10.2		
		f=1kHz		9.8		
Peak-to-Peak Equivalent Input Noise Voltage	$V_{N(PP)}$	f=0.1Hz~10Hz		0.38		μV
Equivalent Input Noise Current	I_n	f=10Hz		0.35		nV/$\sqrt{Hz}$
		f=100Hz		0.15		
		f=1kHz		0.13		
Peak-to-Peak Equivalent Input Noise Current	$I_{N(PP)}$	f=0.1Hz~10Hz		15		pA
Slew Rate	SR	R_L≥2kΩ		0.3		V/μs

Note: All characteristics are measured under open-loop conditions, with zero common-mode input voltage, unless otherwise noted.

■ APPLICATION CIRCUIT



Input Offset-Voltage Null Circuit