

# **UTC** UNISONIC TECHNOLOGIES CO., LTD

## **OP07C**

### LINEAR INTEGRATED CIRCUIT

## **VERY LOW OFFSET VOLTAGE** SINGLE OPERATIONAL AMPLIFIER

#### 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**

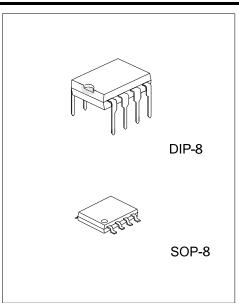
Order	Deekees	Deaking		
Lead Free	Halogen Free	Package	Packing	
OP07CL-D08-T	OP07CG-D08-T	DIP-8	Tube	
OP07CL-S08-R	OP07CG-S08-R	SOP-8	Tape Reel	
Note: Din Assignment: C: Cate	D: Drain C: Course			

Note: Pin Assignment: G: Gate D: Drain S: Source

OP07CG-D08-T	
T T └──── (1)Packing Type	(1) T: Tube, R: Tape Reel
(2)Package Type	(2) D08: DIP-8, S08: SOP-8
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

#### MARKING

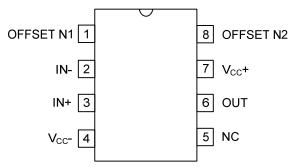
DIP-8	SOP-8
8 7 6 5   UTC □□□□□ → Date Code   OP07C ⊥ L: Lead Free   G: Halogen Free ↓ Lot Code   1 2 3 4	8 7 6 5   UTC □□□□ L: Lead Free   OP07C□ → G: Halogen Free   ● □□ Lot Code   1 2 3



# OP07C

## LINEAR INTEGRATED CIRCUIT

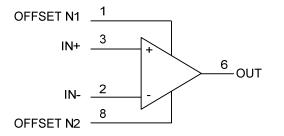
#### ■ PIN CONFIGURATION



#### ■ 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 <sub>cc</sub> -	Negative supply
5	NC	Do not connect
6	OUT	Output
7	V <sub>CC</sub> +	Positive supply
8	OFFSET N2	External input offset voltage adjustment

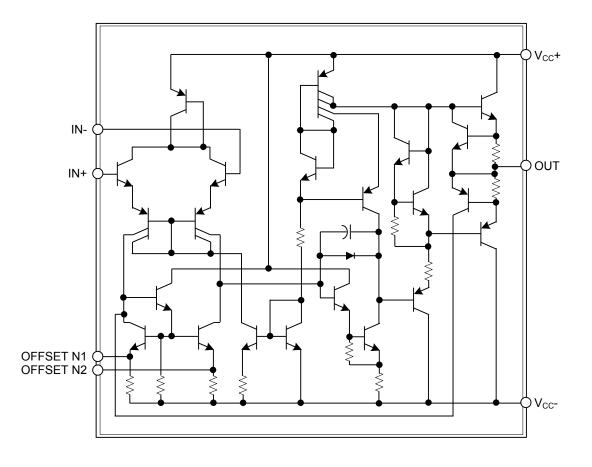
#### SIMPLIFIED SCHEMATIC





## OP07C

#### BLOCK DIAGRAM





#### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT		
Cumple ) (alterna	V <sub>CC</sub> +	0 ~ 22 (Note 2)	V		
Supply Voltage	V <sub>cc</sub> -	-22 ~ 0 (Note 2)	V		
Differential Input Voltage (Note 3)	V <sub>ID</sub>	±30	V		
Input Voltage Range (Either Input) (Note 4)	VI	±22	V		
Operating Virtual-Junction Temperature	TJ	+150	°C		

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

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.

#### ■ RECOMMENDED OPERATING CONDITIONS

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

PARAMETER	SYMBOL	RATINGS	UNIT
Cumple Maltage	V <sub>CC</sub> +	3 ~ 18	V
Supply Voltage	V <sub>cc</sub> -	-3 ~ -18	V
Common-Mode Input Voltage (V <sub>CC</sub> ±=±15 V)	V <sub>IC</sub>	-13 ~ 13	V
Operating Free-Air Temperature	T <sub>A</sub>	-40 ~ +85	°C



#### ■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub>	MIN	TYP	MAX	UNIT
			(Note 2) 25°C		60		
Input Offset Voltage	V <sub>IO</sub>	V <sub>0</sub> =0V, R <sub>S</sub> =50Ω	25 C 0°C~70°C		85		μV μV
Long-Term Drift of Input Offset Voltage		(Note 1)			0.4		μV/mo
Offset Adjustment Range		R <sub>s</sub> =20kΩ	25°C		±4		mV
			25°C		0.8		nA
Input Offset Current	I <sub>IO</sub>		0°C~70°C		1.6		nA
Innut Dian Current			25°C		±1.8		nA
Input Bias Current	I <sub>IB</sub>		0°C~70°C		±2.2		nA
Common-Mode Input Voltage	V		25°C	±13	±14		V
Range	V <sub>ICR</sub>		0°C~70°C	±13	±13.5		V
	V <sub>OM</sub>	R <sub>L</sub> ≥10kΩ		±12	±13		V
Dook Output Voltage		R <sub>L</sub> ≥2kΩ	25°C	±11.5	±12.8		V
Peak Output Voltage		R <sub>L</sub> ≥1kΩ			±12		V
		R <sub>L</sub> ≥2kΩ	0°C~70°C	±11	±12.6		V
Large-Signal Differential	A <sub>VD</sub>	V <sub>CC</sub> =15V, V <sub>O</sub> =1.4V~11.4V, R <sub>L</sub> ≥500kΩ	25°C	100	400		V/mV
Voltage Amplification		V <sub>0</sub> =±10, R <sub>L</sub> =2kΩ	25°C	120	400		V/mV
			0°C~70°C	100	400		V/mV
Unity-Gain Bandwidth	B <sub>1</sub>		25°C	0.4	0.6		MHz
Input Resistance	r <sub>i</sub>		25°C	8	33		MΩ
Common-Mode Rejection	01/55		25°C	100	120		dB
Ratio	V <sub>IC</sub> =±13V, R <sub>S</sub> =50Ω	0°C~70°C	97	120		dB	
Supply-Voltage Sensitivity	SVRR	V <sub>CC</sub> +=±3V~±18V, R <sub>S</sub> =50Ω	25°C		7	32	μV/V
$(\Delta V_{IO}/\Delta V_{CC})$	SVKK		0°C~70°C		10	51	μV/V
Supply Current	I <sub>CC</sub>	Vo=0, No load	25°C		2.67	5	mA

(At specified free-air temperature, V<sub>CC</sub>±=±15V, unless otherwise specified) (Note 1)

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

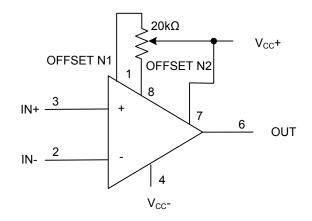
at specified free-air temperature, V<sub>CC</sub>=5V (unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP	MAX	UNIT	
		f=10Hz		10.5		nV/	
Input Offset Voltage	Vn	f=100Hz		10.2		$\sqrt{Hz}$	
		f=1kHz		9.8		√HZ	
Peak-to-Peak Equivalent Input Noise Voltage	$V_{N(PP)}$	f=0.1Hz~10Hz		0.38		μV	
		f=10Hz		0.35		nV/	
Equivalent Input Noise Current	I <sub>n</sub>	f=100Hz		0.15			
		f=1kHz		0.13		√Hz	
Peak-to-Peak Equivalent Input Noise Current	I <sub>N(PP)</sub>	f=0.1Hz~10Hz		15		pА	
Slew Rate	SR	R∟≥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

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

