

# **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 N	Order Number		Dealing	
Lead Free	Halogen Free	Раскаде	Packing	
OP07CL-D08-T	OP07CG-D08-T	DIP-8	Tube	
OP07CL-S08-R	OP07CG-S08-R	SOP-8	Tape Reel	
Nata: Din Assignment C. C	Cata D. Duain C. Cauna	-		

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

OP07CG-D08-T	(4) T. T. I. I. D. Tana Daol
(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 Date Code   UTC □□□□□ L: Lead Free   OP07C □□ G: Halogen Free   1 2 3 4	8 7 6 5   UTC □□□□□ L: Lead Free   OP07C□ → G: Halogen Free   ● □□ ↓ Lot Code   1 2 3



# OP07C

#### ■ 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	Vcc-	Negative supply
5	NC	Do not connect
6	OUT	Output
7	Vcc+	Positive supply
8	OFFSET N2	External input offset voltage adjustment

#### SIMPLIFIED SCHEMATIC





## OP07C

#### BLOCK DIAGRAM





#### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	Vcc+	0 ~ 22 (Note 2)	V
Supply Vollage	Vcc-	-22 ~ 0 (Note 2)	V
Differential Input Voltage (Note 3)	VID	±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 Vcc+ and Vcc-.

- 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
	V <sub>CC</sub> +	3 ~ 18	V
Supply Vollage	Vcc-	-3 ~ -18	V
Common-Mode Input Voltage (V <sub>CC</sub> ±=±15 V)	VIC	-13 ~ 13	V
Operating Free-Air Temperature	T <sub>A</sub>	-40 ~ +85	°C



#### ■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> (Note 2)	MIN	TYP	MAX	UNIT
Input Offect Veltage (Nete 2)	N/		25°C		60		μV
input Oliset Voltage (Note 3)	VIO	$v_0 - 0v, R_S - 50\Omega$	0°C~70°C		85		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
In much Offerent Comment			25°C		0.8		nA
Input Oliset Current	IIO		0°C~70°C		1.6		nA
Innut Dies Cument			25°C		±1.8		nA
Input Blas Current	IIB		0°C~70°C		±2.2		nA
Common-Mode Input Voltage	N		25°C	±13	±14		V
Range	VICR		0°C~70°C	±13	±13.5		V
	V <sub>ом</sub>	R <sub>L</sub> ≥10kΩ		±12	±13		V
		R <sub>L</sub> ≥2kΩ	25°C	±11.5	±12.8		V
Peak Output voltage		R∟≥1kΩ			±12		V
		R∟≥2kΩ	0°C~70°C	±11	±12.6		V
Large-Signal Differential	Avd	V <sub>CC</sub> =15V, V₀=1.4V~11.4V, R <sub>L</sub> ≥500kΩ	25°C	100	400		V/mV
voltage Amplification		V₀=±10, R∟=2kΩ	25°C	120	400		V/mV
			0°C~70°C	100	400		V/mV
Unity-Gain Bandwidth	B1		25°C	0.4	0.6		MHz
Input Resistance	r <sub>i</sub>		25°C	8	33		MΩ
Common-Mode Rejection		V <sub>IC</sub> =±13V, Rs=50Ω	25°C	100	120		dB
Ratio	CIVIRR		0°C~70°C	97	120		dB
Supply-Voltage Sensitivity		V <sub>CC</sub> +=±3V~±18V, R <sub>S</sub> =50Ω	25°C		7	32	μV/V
$(\Delta V_{IO}/\Delta V_{CC})$	JVKK		0°C~70°C		10	51	μV/V
Supply Current	lcc	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.

3. Input offset voltage measurements are according Figure 1, use external resistors to balance the resistance values from V<sub>CC</sub>+ to Pin1 (OFFSET N1) and Pin8 (OFFSET N2) then measure.



#### 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		n\//	
nput Offset Voltage	Vn	f=100Hz		10.2		/11-	
		f=1kHz		9.8		√HZ	
Peak-to-Peak Equivalent Input Noise Voltage	V <sub>N(PP)</sub>	f=0.1Hz~10Hz		0.38		μV	
	In	f=10Hz		0.35		− nV/ − √Hz	
Equivalent Input Noise Current		f=100Hz		0.15			
		f=1kHz		0.13			
Peak-to-Peak Equivalent Input Noise Current	I <sub>N(PP)</sub>	f=0.1Hz~10Hz		15		pА	
Slew Rate SR F		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



Figure 1. Input Offset-Voltage Null Circuit

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