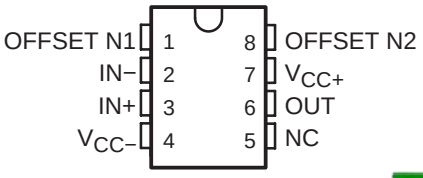
OP07C
PRECISION OPERATIONAL AMPLIFIERS

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

PACKAGE (TOP VIEW)



Description/ordering information

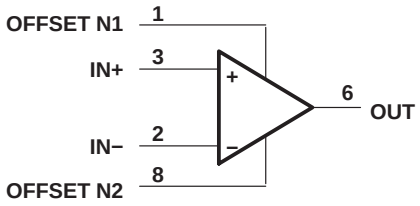
These devices offer low offset and long-term stability by means of a low-noise, chopperless, bipolar-input-transistor amplifier circuit. For most applications, external components are not required for offset nulling and frequency compensation. The true differential input, with a wide input-voltage range 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. The OP07 is unsurpassed for low-noise, high-accuracy amplification of very-low-level signals.

These devices are characterized for operation from 0°C to 70°C.

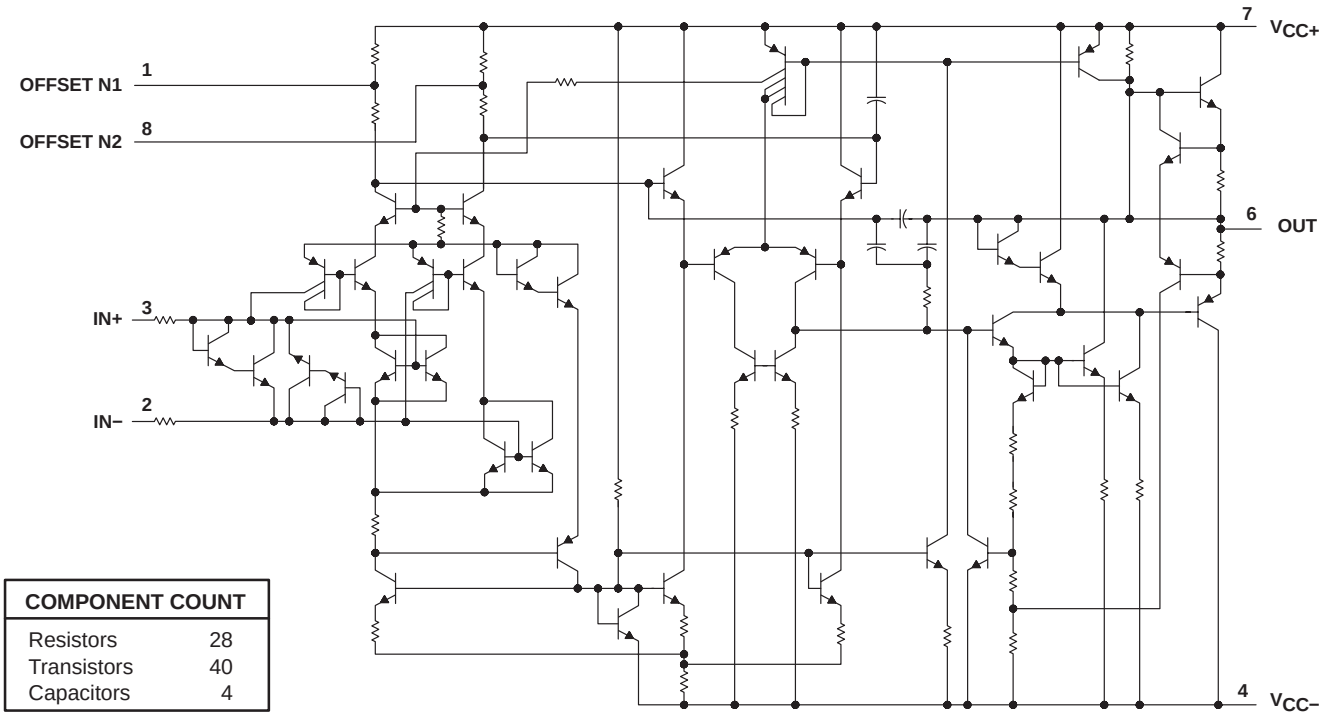
ORDERING INFORMATION

T_A	PACKAGE	ORDERABLE PART NUMBER
0°C to 70°C	PDIP	OP07CP
	SOIC	OP07CM

Symbol



Schematic



COMPONENT COUNT	
Resistors	28
Transistors	40
Capacitors	4

Absolute maximum ratings over operating free-air temperature range (unless otherwise noted)*

Supply voltage: V_{CC+} (see Note 1) . . . . . 22 V
V_{CC-} (see Note 1) . . . . . −22 V
Differential input voltage (see Note 2) . . . . . ±30 V
Input voltage, V_I (either input, see Note 3) . . . . . ±22 V
Duration of output short circuit (see Note 4) . . . . . Unlimited
Operating virtual junction temperature, T_J . . . . . 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C
Storage temperature range, T_{stg} . . . . . −65°C to 150°C

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.
2. Differential voltages are at IN+ with respect to IN−.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
4. The output may be shorted to ground or to either power supply.

Recommended operating conditions

			MIN	MAX	UNIT
$V_{CC\pm}$	Supply voltage		±3	±18	V
V_{IC}	Common-mode input voltage	$V_{CC\pm}$ = ±15 V	−13	13	V
T_A	Operating free-air temperature		0	70	°C

Electrical characteristics at specified free-air temperature, $V_{CC\pm}$=±15V (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_A	MIN	TYP	MAX	UNIT
V_{IO} input offset voltage	Vo=0, Rs=50Ω	25℃		60	150	μV
		0℃ to 70℃		85	250	
α_{VIO} Temperature coefficient of input offset voltage	Vo=0, Rs=50Ω	0℃ to 70℃		0.5	1.8	μV/℃
Long-term drift of input offset voltage	See Note 5			0.4		μV/mo
Offset adjustment range	Rs=20kΩ, See Figure 1	25℃		±4		mV
I_{IO} Input offset current		25℃		0.8	6	nA
		0℃ to 70℃		1.6	8	
α_{IIO} Temperature coefficient of input offset current		0℃ to 70℃		12	50	pA/℃
I_{IB} Input bias current		25℃		±1.8	±7	nA
		0℃ to 70℃		±2.2	±9	
α_{IIB} Temperature coefficient of input bias current		0℃ to 70℃		18	50	pA/℃
V_{ICR} Common-mode input voltage range		25℃	±13	±14		V
		0℃ to 70℃	±13	±13.5		
V_{OM} Peak output voltage	R_L≧10kΩ	25℃	±12	±13		V
	R_L≧2kΩ		±11.5	±12.8		
	R_L≧1kΩ			±12		
	R_L≧2kΩ	0℃ to 70℃	±11	±12.6		
A_{VD} Large-signal differential voltage amplification	$V_{CC\pm}$ =±3V, V_O=±0.5V, R_L≧500kΩ	25℃	100	400		V/mV
	V_O=±10V, R_L≧2kΩ	25℃	120	400		
		0℃ to 70℃	100	400		
B_1 Unity-gain bandwidth		25℃	0.4	0.6		MHz
r_I Input resistance		25℃	8	33		MΩ
CMRR Common-mode rejection ratio	V_{IC}=±13V, Rs=50Ω	25℃	100	120		dB
		0℃ to 70℃	97	120		
k_{SVS} Supply-voltage sensitivity ($\triangle V_{IO}/\triangle V_{CC}$)	$V_{CC\pm}$ =±3V to ±18V, R_S=50Ω	25℃		7	32	μV/V
		0℃ to 70℃		10	51	
P_D Power dissipation	V_O=0V, No load	25℃		80	150	mW
	$V_{CC\pm}$ =±3V, V_O=0V, No load			4	8	

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

Note 5: Since 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 thirty days of operation.

Operating characteristics, $V_{CC\pm}$ = ±15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS†	OP07C TYP	OP07D TYP	UNIT
V_n	Equivalent input noise voltage	f = 10 Hz	10.5	10.5	nV/√Hz
		f = 100 Hz	10.2	10.3	
		f = 1 kHz	9.8	9.8	
$V_{N(PP)}$	Peak-to-peak equivalent input noise voltage	f = 0.1 Hz to 10 Hz	0.38	0.38	μV
I_n	Equivalent input noise current	f = 10 Hz	0.35	0.35	pA/√Hz
		f = 100 Hz	0.15	0.15	
		f = 1 kHz	0.13	0.13	
$I_{N(PP)}$	Peak-to-peak equivalent input noise current	f = 0.1 Hz to 10 Hz	15	15	pA
SR	Slew rate	$R_L \geq 2$ kΩ	0.3	0.3	V/μs

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

APPLICATION INFORMATION

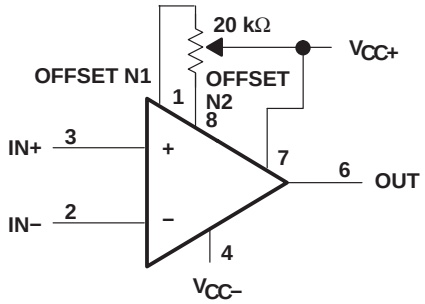
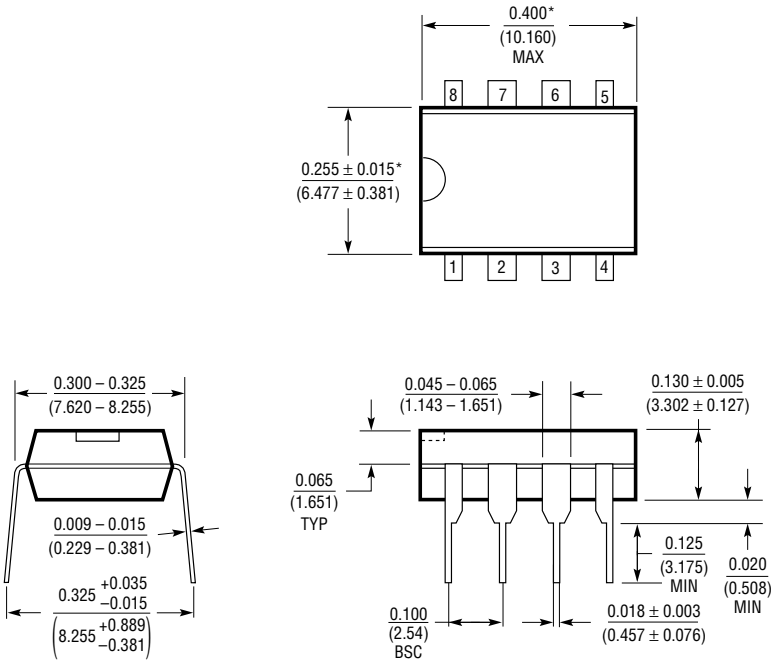


Figure 1. Input Offset-Voltage Null Circuit

PACKAGE DIMENSIONS

DIP8 Package

(Narrow .300 Inch)



SOP8 Package

(Narrow .150 Inch)