



## General Description

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.

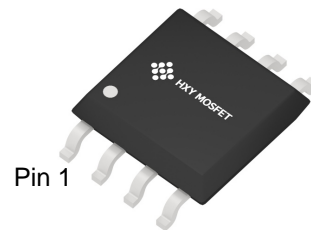
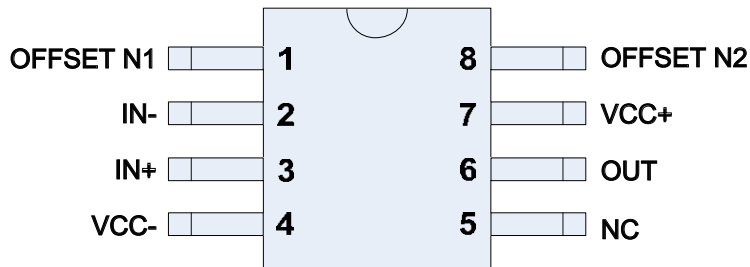
## Features

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

## Ordering Information

Product Model	Package Type	Packing	Packing Qty
OP07CDR	SOP-8	Tape	2500Pcs/Reel

## Pin Configurations



## Function Block

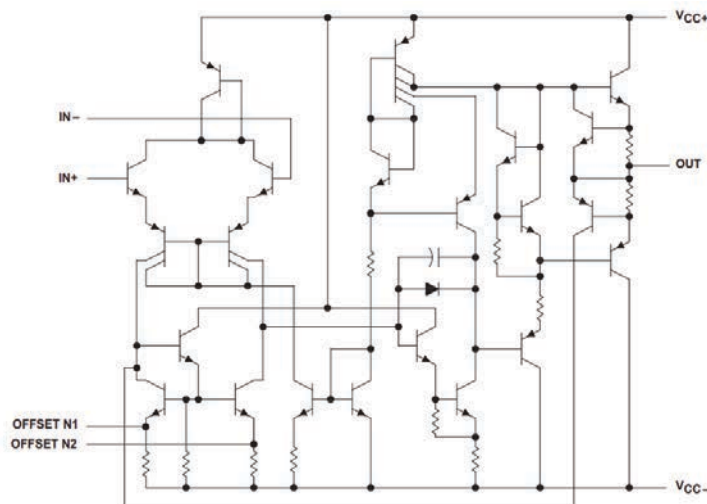


Figure 1 Function Block Diagram of OP07CDR



## Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
VCC	Supply voltage	±22	V
V <sub>id</sub>	Differential input voltage	±30	
V <sub>i</sub>	Input voltage	±22	
	Output short-circuit duration	Infinite	
R <sub>thja</sub>	Thermal resistance junction to ambient	125	°C/W
R <sub>thjc</sub>	Thermal resistance junction to case	40	
ESD	HBM: human body model <sup>(1)</sup> DIP package SO package	500 400	V
	MM: machine model <sup>(2)</sup>	100	
	CDM: charged device model <sup>(3)</sup>	1.5	kV
Tstg	Storage temperature range	-65 to +150	°C

1. Human body model: a 100 pF capacitor is charged to the specified voltage, then discharged through a 1.5kΩ resistor between two pins of the device. This is done for all couples of connected pin combinations while the other pins are floating.

2. Machine model: a 200 pF capacitor is charged to the specified voltage, then discharged directly between two pins of the device with no external series resistor (internal resistor <5Ω). This is done for all couples of connected pin combinations while the other pins are floating.

3. Charged device model: all pins and the package are charged together to the specified voltage and then discharged directly to the ground through only one pin. This is done for all pins.

## Operating Conditions

Symbol	Parameter	Value	Unit
VCC	Supply voltage	6 to 36	V
V <sub>icm</sub>	Common mode input voltage range	±13	
Toper	Operating free air temperature range	-40 to +125	°C



## Electrical Characteristics

TA = 25°C, unless otherwise noted, VCC = ±15 V, Tamb = 25 °C

Symbol	Parameter		Min.	Typ.	Max.	Unit
V <sub>io</sub>	Input offset voltage ((R <sub>S</sub> ≤ 10 kΩ) T <sub>amb</sub> = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>			260	300 350	μV
I <sub>io</sub>	Input offset current Tamb = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>			2	6 8	nA
I <sub>ib</sub>	Input bias current Tamb = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>				±12 ±14	
A <sub>vd</sub>	Large signal voltage gain (V <sub>o</sub> = ±10 V, R <sub>L</sub> = 2 kΩ) T <sub>amb</sub> = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>		120 100	400		V/mV
SVR	Supply voltage rejection ratio ((R <sub>S</sub> ≤ 10 kΩ) T <sub>amb</sub> = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>		77 77	90		dB
I <sub>cc</sub>	Supply current, no load Tamb = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>			1.7	2.8 3.3	mA
V <sub>icm</sub>	Input common mode voltage range T <sub>amb</sub> = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>		±13 ±13			V
CMR	Common mode rejection ratio (R <sub>S</sub> ≤ 10 kΩ) T <sub>amb</sub> = +25 °C T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>		70 70	90		dB
I <sub>os</sub>	Output short circuit current		10	25	40	mA
±V <sub>opp</sub>	Output voltage swing Tamb = +25 °C Tmin ≤ Tamb ≤ Tmax	R <sub>L</sub> = 10 kΩ R <sub>L</sub> = 2 kΩ R <sub>L</sub> = 10 kΩ R <sub>L</sub> = 2 kΩ	12 10 12 10	14 13		V
SR	Slew rate V <sub>i</sub> = ±10 V, R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 100 pF, unity gain		0.25	0.5		V/μs
t <sub>r</sub>	Rise time V <sub>i</sub> = ±20 mV, R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 100 pF, unity gain			0.3		μs
K <sub>ov</sub>	Overshoot V <sub>i</sub> = 20 mV, R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 100 pF, unity gain			5		%
R <sub>i</sub>	Input resistance		7	31		MΩ

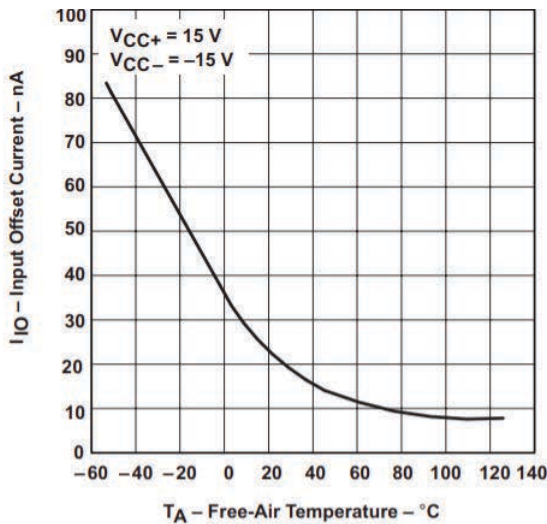


## Electrical Characteristics

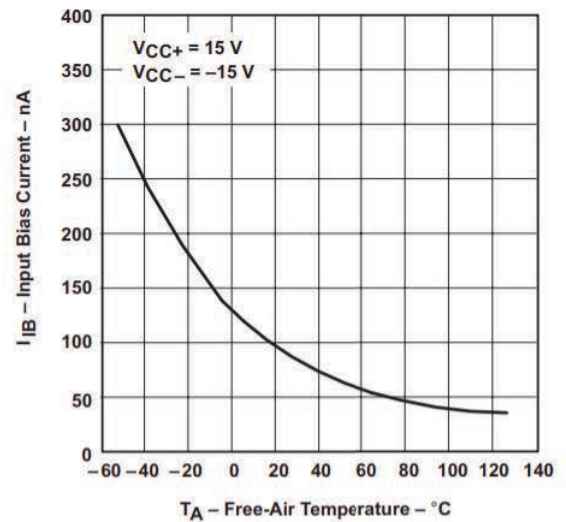
$T_A = 25^\circ\text{C}$ , unless otherwise noted,  $V_{CC} = \pm 15\text{ V}$ ,  $T_{\text{amb}} = 25^\circ\text{C}$

Symbol	Parameter	Min.	Typ.	Max.	Unit
GBP	Gain bandwidth product $V_i = 10\text{ mV}$ , $R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$ , $f = 100\text{ kHz}$	0.4	0.6		MHz
THD	Total harmonic distortion $f = 1\text{ kHz}$ , $A_V = 20\text{ dB}$ , $R_L = 2\text{ k}\Omega$ , $V_O = 2\text{ V}_{pp}$ , $C_L = 100\text{ pF}$ , $T_{\text{amb}} = +25^\circ\text{C}$		0.06		%
$e_n$	Equivalent input noise voltage $f = 1\text{ kHz}$ , $R_S = 100\ \Omega$		23		$\frac{\text{nV}}{\sqrt{\text{Hz}}}$
$\phi_m$	Phase margin		50		Degree

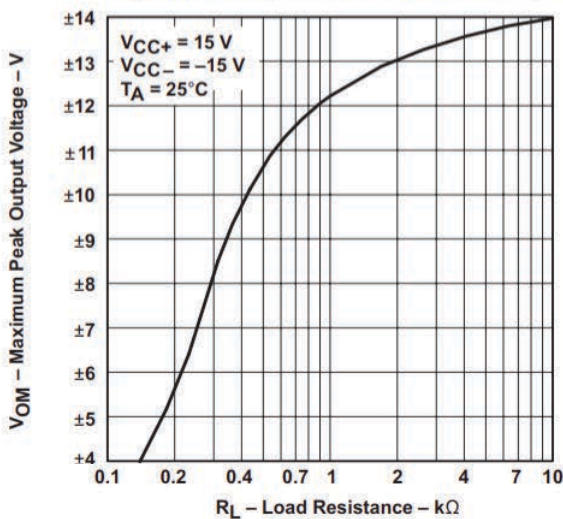
## Typical Characteristics



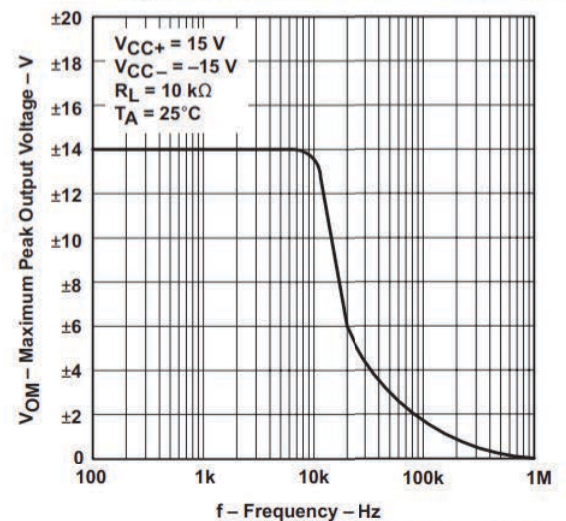
Input Offset Current vs Free-Air Temperature



Input Bias Current vs Free-Air Temperature



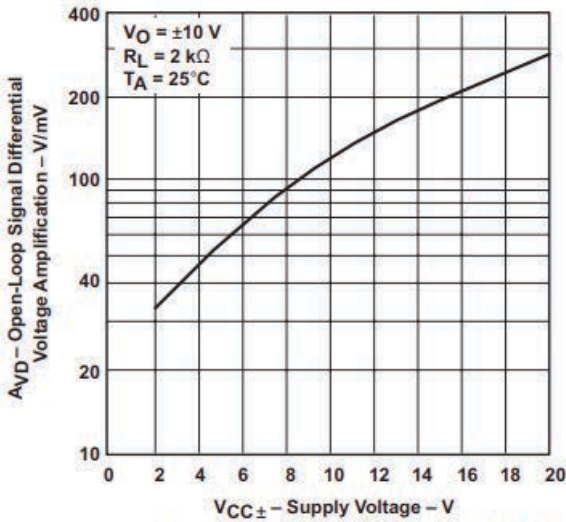
Maximum Output Voltage vs Load Resistance



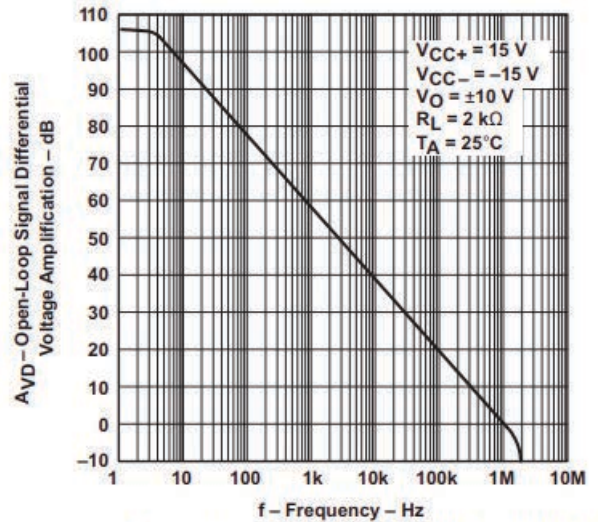
Maximum Peak Output Voltage vs Frequency



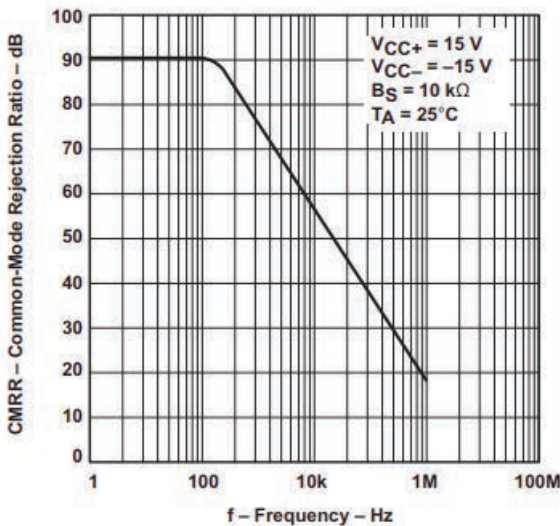
### Typical Characteristics



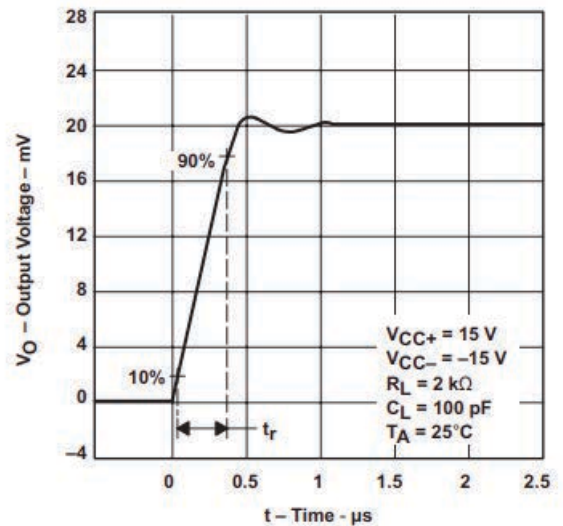
Open-Loop Signal Differential Voltage Amplification vs Supply Voltage



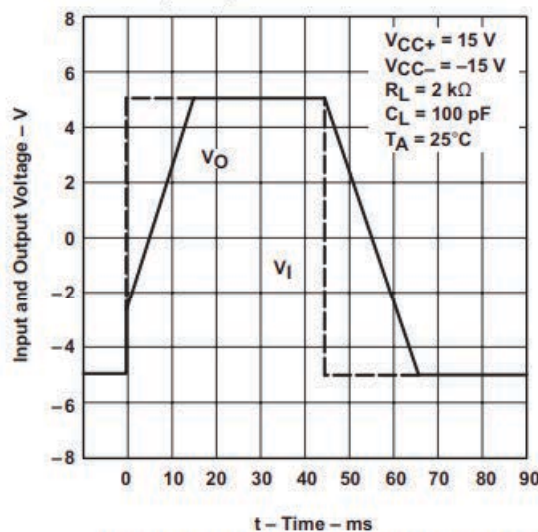
Open-Loop Large-Signal Differential Voltage Amplification vs Frequency



Common-Mode Rejection Ratio vs Frequency



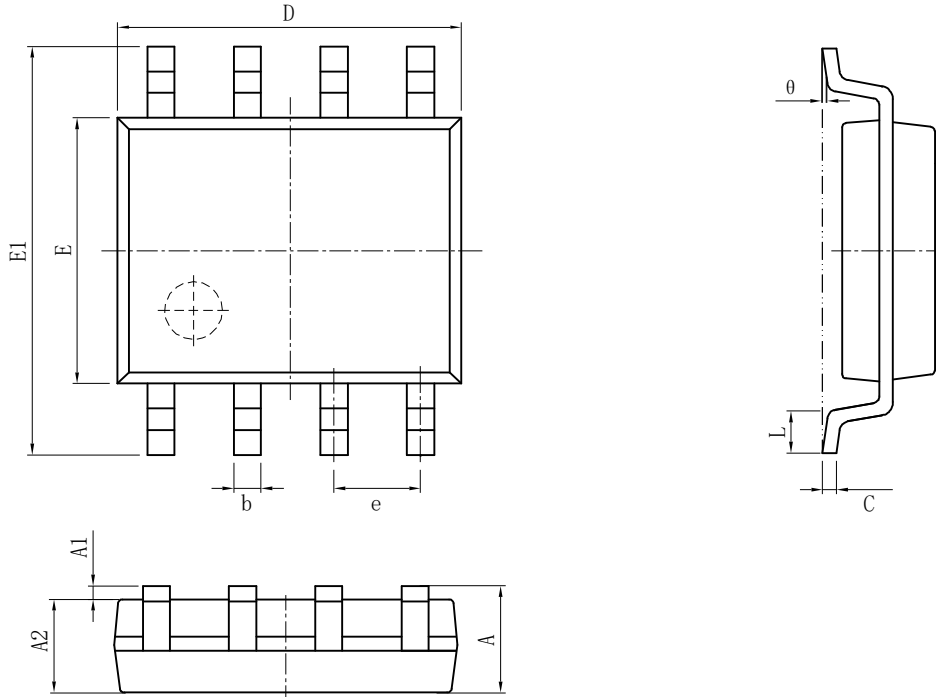
Output Voltage vs Elapsed Time



Voltage-Follower Large-Signal Pulse Response



**Package Information**  
SOP-8(SOIC-8)



Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	1.350	1.750	A	0.053	0.069
A1	0.100	0.250	A1	0.004	0.010
A2	1.350	1.550	A2	0.053	0.061
b	0.330	0.510	b	0.013	0.020
c	0.170	0.250	c	0.006	0.010
D	4.700	5.100	D	0.185	0.200
E	3.800	4.000	E	0.150	0.157
E1	5.800	6.200	E1	0.228	0.224
e	1.270(BSC)		e	0.050(BSC)	
L	0.400	1.270	L	0.016	0.050
θ	0°	8°	θ	0°	8°



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