General Description

These devices offer low offset and long-term stability by means of alow-noise,chopperless,bipolar-input-transistor amplifier circuit.Formost applications,external components are not required for offset nulling and frequency compensation.The true differential input, with a wide input-voltage range and out standing common-oderejection,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.

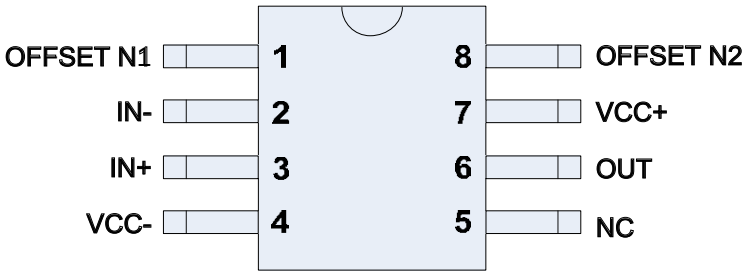
Features

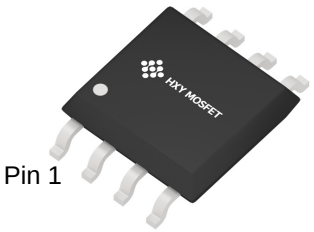
- Low Noise
- No External Components Required
- Replace Chopper Amplifiers at a Lower Cost
- Wide Input-Voltage Range: 0 to ±14 V (Typ)
- Wide Supply-Voltage Range: ±3 V to ±18 V

Ordering Information

Product Model	Package Type	Packing	Packing Qty
OP07CDR	SOP-8	Tape	4000Pcs/Reel

Pin Configurations





Function Block

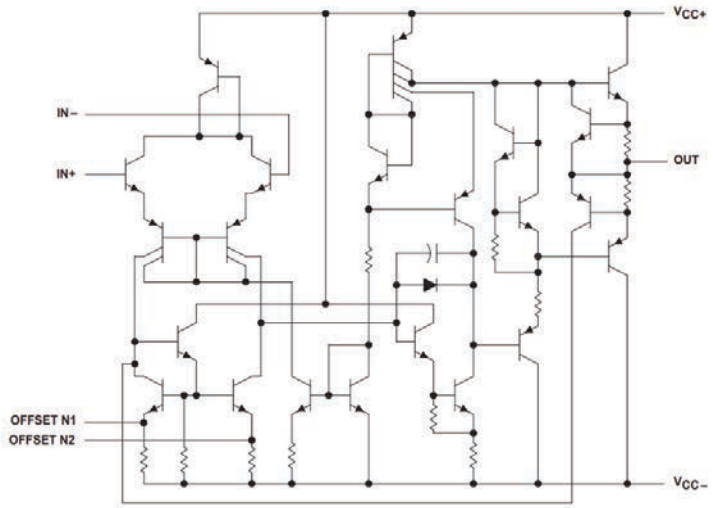


Figure 1 Function Block Diagram of OP07CDR

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
VCC	Supply voltage	±22	V
V_{id}	Differential input voltage	±30	
V_i	Input voltage	±22	
	Output short-circuit duration	Infinite	
R_{thja}	Thermal resistance junction to ambient	125	°C/W
R_{thjc}	Thermal resistance junction to case	40	
ESD	HBM: human body model(1) DIP package SO package	500 400	V
	MM: machine model(2)	100	
	CDM: charged device model(3)	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
Vicm	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

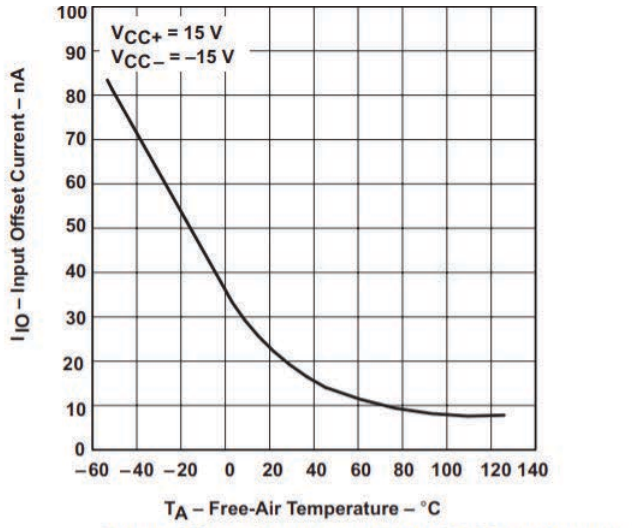
Symbol	Parameter		Min.	Typ.	Max.	Unit
V_{io}	Input offset voltage (R_S ≤10 kΩ) T_{amb} = +25 °C T_{min} ≤T_{amb} ≤T_{max}			260	300 350	uV
I_{io}	Input offset current Tamb = +25 °C T_{min} ≤T_{amb} ≤T_{max}			2	6 8	nA
I_{ib}	Input bias current Tamb = +25 °C T_{min} ≤T_{amb} ≤T_{max}				±12 ±14	
A_{vd}	Large signal voltage gain (Vo = ±10 V, R_L = 2 kΩ) T_{am} = +25 °C T_{min} ≤T_{amb} ≤T_{max}		120 100	400		V/mV
SVR	Supply voltage rejection ratio ((R_S ≤10 kΩ) T_{amb} = +25 °C T_{min} ≤T_{amb} ≤T_{max}		77 77	90		dB
I_{CC}	Supply current, no load Tamb = +25 °C T_{min} ≤T_{amb} ≤T_{max}			1.7	2.8 3.3	mA
V_{icm}	Input common mode voltage range T_{amb} = +25 °C T_{min} ≤T_{amb} ≤T_{max}		±13 ±13			V
CMR	Common mode rejection ratio (R_S ≤10 kΩ) T_{amb} = +25 °C T_{min} ≤T_{amb} ≤T_{max}		70 70	90		dB
I_{OS}	Output short circuit current		10	25	40	mA
±V_{opp}	Output voltage swing Tamb = +25 °C Tmin ≤Tamb ≤Tmax	R_L = 10 kΩ R_L = 2 kΩ R_L= 10 kΩ R_L = 2 kΩ	12 10 12 10	14 13		V
SR	Slew rate V_i = ±10 V, R_L = 2 kΩ, C_L = 100 pF, unity gai		0.25	0.5		V/μs
t_r	Rise time V_i = ±20 mV, R_L = 2 kΩ, C_L = 100 pF, unity gain			0.3		μs
K_{ov}	Overshoot V_i = 20 mV, R_L = 2 kΩ, C_L = 100 pF, unity gain			5		%
R_i	Input resistance		7	31		MΩ

Electrical Characteristics

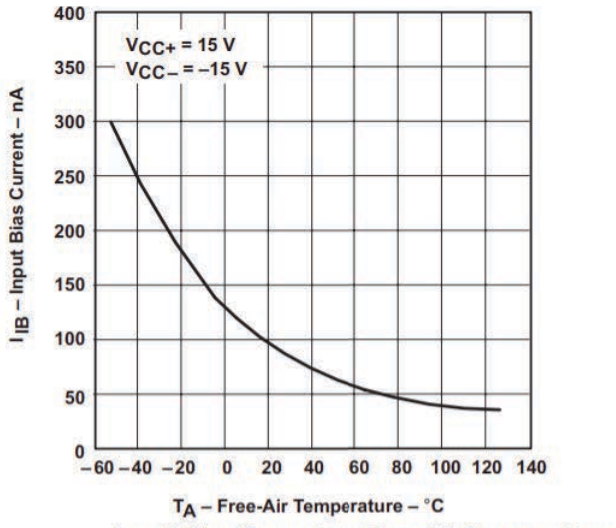
TA = 25°C, unless otherwise noted, VCC = ±15 V, Tamb = 25 °C

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

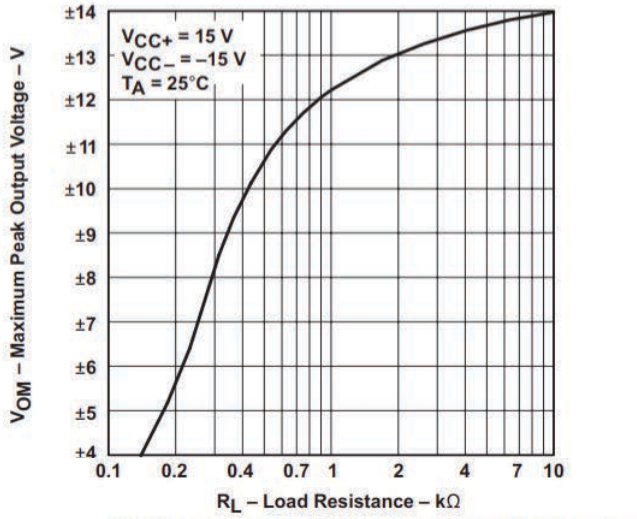
Typical Characteristics



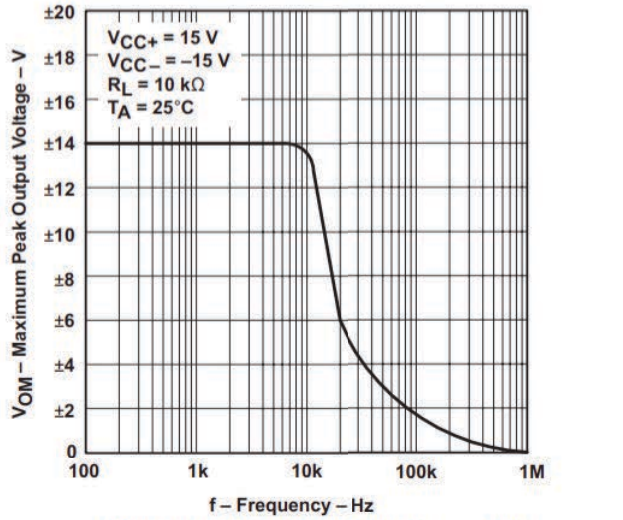
Input Offset Current vs Free-Air Temperature



Input Bias Current vs Free-Air Temperature

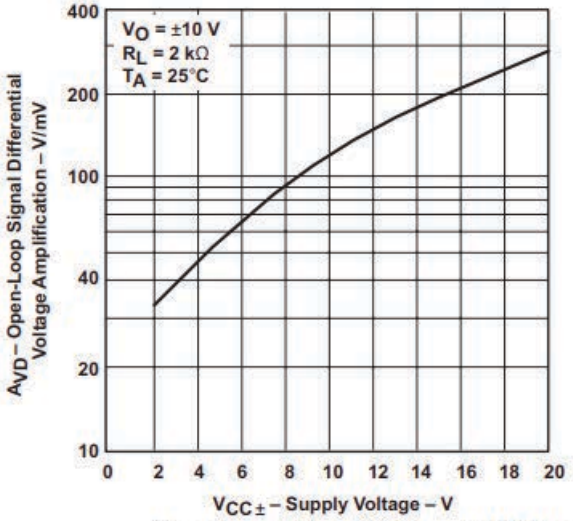


Maximum Output Voltage vs Load Resistance

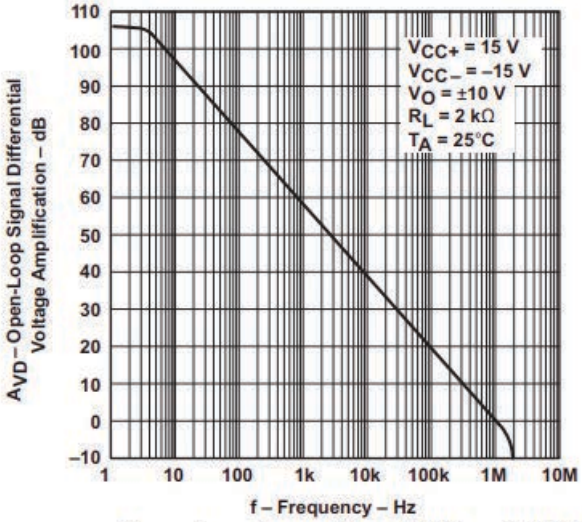


Maximum Peak Output Voltage vs Frequency

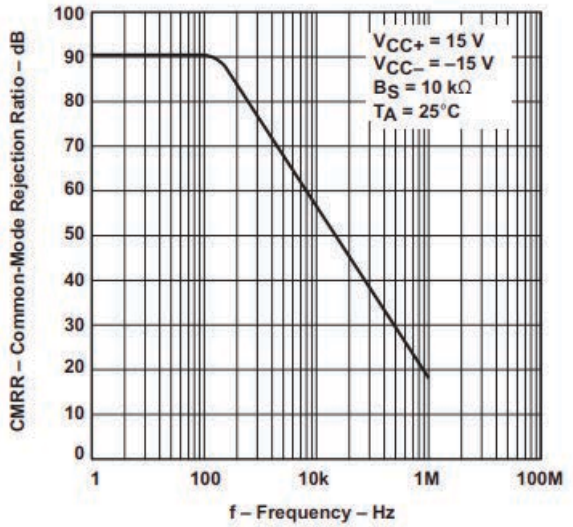
Typical Characteristics



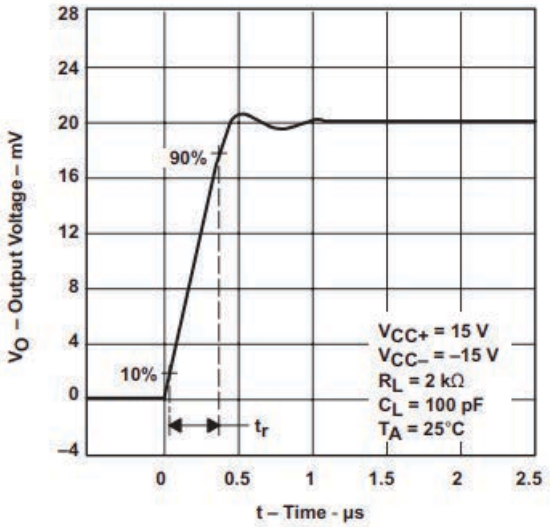
Open-Loop Signal Differential Voltage Amplification vs Supply Voltage



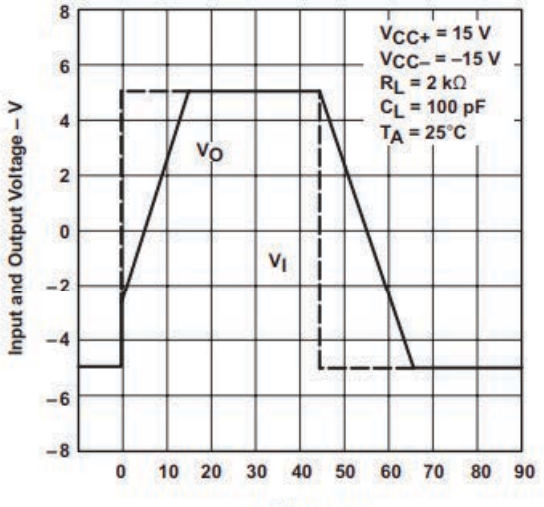
Open-Loop Large-Signal Differential Voltage Amplification vs Frequency



Common-Mode Rejection Ratio vs Frequency



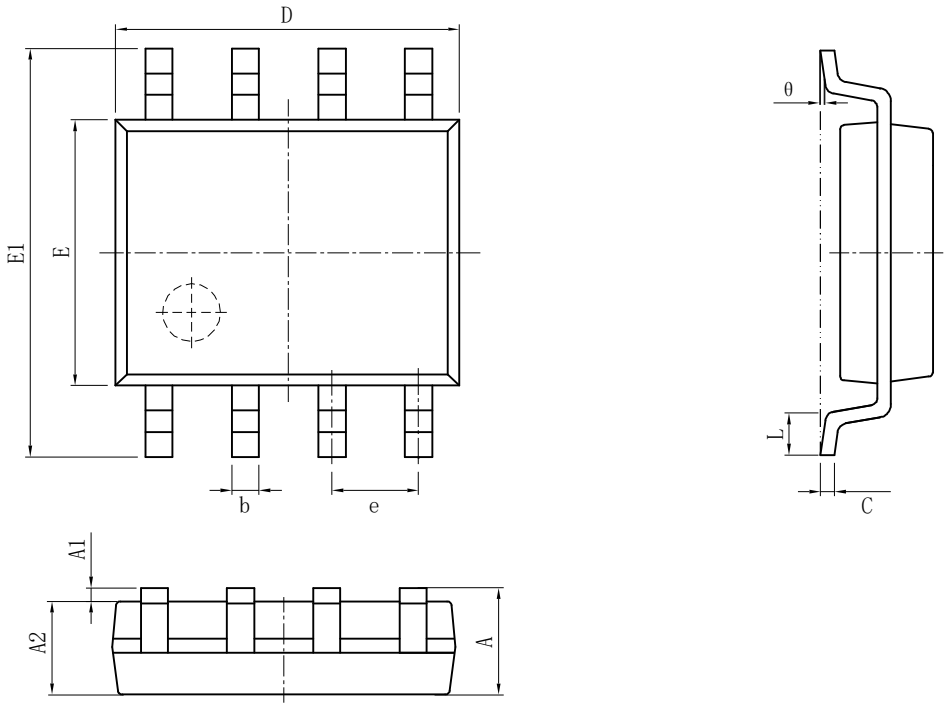
Output Voltage vs Elapsed Time



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°

Attention

■ Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.

■ HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS products described or contained herein.

■ Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could
give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.