Very low offset single bipolar operational amplifier

Features

- Extremely low offset: 150μV/ max.
- Low input bias current: 1.8nA
- LOW V_{io} drift: 0.5μV/°C
- Ultra stable with time: 2μV/month max.
- Wide supply voltage range: ±3V to ± 22V
- Temperature range: 0°C to -105°C

Description

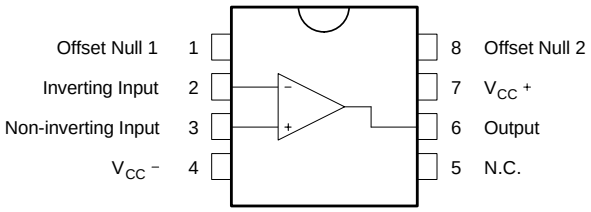
The OP07 is a very high precision op-amp with an offset voltage maximum of 150μV.

Offering also low input current (1.8nA) and high gain (400V/mV), the OP07 is particularly suitable for instrumentation applications.

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
OP07N	DIP8	OP07	TUBE	2000/box
OP07M/TR	SOP8	OP07	REEL	2500/reel

D OR P PACKAGE
(TOP VIEW)



1 Schematic diagram

Figure 1. Schematic diagram

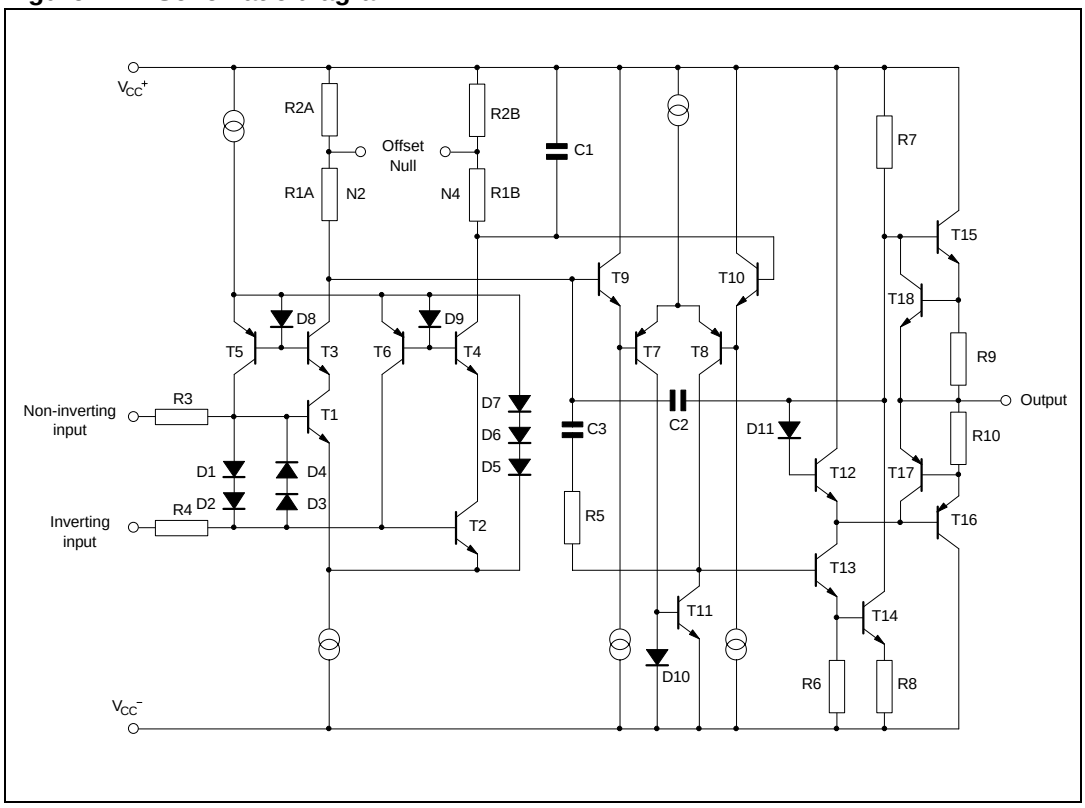
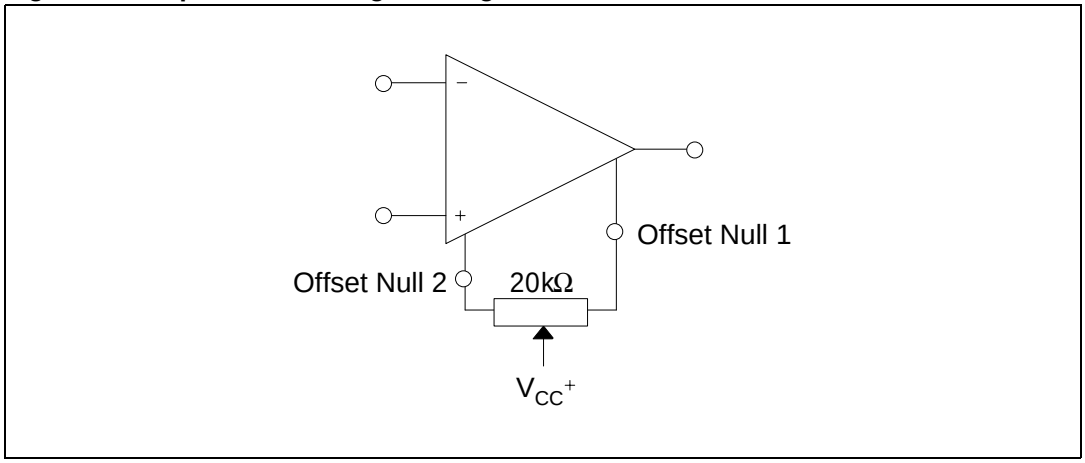


Figure 2. Input offset voltage nulling circuit



2 Absolute maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	± 22	V
V_{id}	Differential input voltage	± 30	V
V_i	Input voltage	± 22	V
T_{oper}	Operating temperature	-40 to 105	°C
T_{stg}	Storage temperature	-65 to 150	°C
R_{thja}	Thermal resistance junction to ambient(1) (2) DIP8	85	°C/W
R_{thjc}	Thermal resistance junction to case(1) (2) DIP8	41	°C/W
ESD	HBM: human body model(3)	1.5	kV
	MM: machine model(4)	200	V
	CDM: charged device model(5)	1.5	kV

1. Short-circuits can cause excessive heating and destructive dissipation.
2. R_{th} are typical values.
3. Human body model: 100pF discharged through a 1.5kΩ resistor between two pins of the device, done for all couples of pin combinations with other pins floating.
4. Machine model: a 200pF cap is charged to the specified voltage, then discharged directly between two pins of the device with no external series resistor (internal resistor < 5Ω). Done for all couples of pin combinations with other pins floating.
5. Charged device model: all pins plus package are charged together to the specified voltage and then discharged directly to the ground.

3 Electrical characteristics

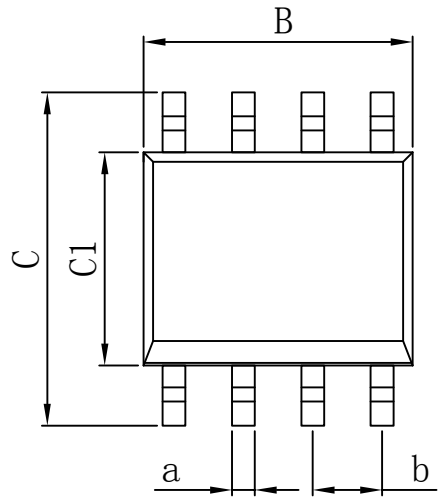
Table 2. V_{CC}^+ = 15 V, V_{CC}^- = Ground, T_{amb} = 25° C (unless otherwise specified)

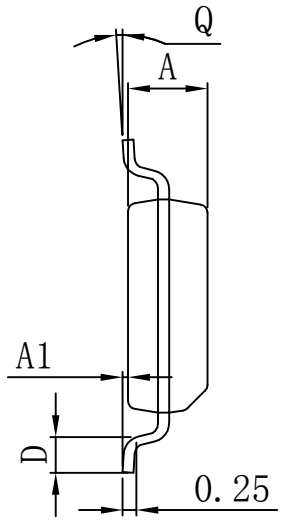
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input offset voltage 0°C ≤ T_{amb} ≤ +105°C		60	150 250	µV
	Long term input offset - voltage stability (1)		0.4	2	µV/Mo
DV_{io}	Input offset voltage drift		0.5	1.8	µV/°C
I_{io}	Input offset current (V_{ic} = 0V) 0°C ≤ T_{amb} ≤ +105°C		0.8	6 7	nA
DI_{io}	Input offset current drift		15	50	pA/°C
DI_{ib}	Input bias current drift		15	50	pA/°C
R_o	Open loop output resistance		60		Ω
R_{id}	Differential input resistance		33		MW
R_{ic}	Common mode input resistance		120		GW
V_{icm}	Input common mode voltage range 0°C ≤ T_{amb} ≤ +105°C	±13 ±13	±13.5		V
CMR	Common-mode rejection ratio (V_{ic} = $V_{icm\ -min}$) 0°C ≤ T_{amb} ≤ +105°C	100 97	120		dB
SVR	Supply voltage rejection ratio (V_{CC} = ±3 to ±18V) 0°C ≤ T_{amb} ≤ +105°C	90 86	104		dB
A_{vd}	Large signal voltage gain V_{CC} = ±15, R_L = 2kΩ, V_O = ±10V 0°C ≤ T_{amb} ≤ +105°C V_{CC} = ±3, R_L = 500Ω, V_O = ±0.5V	 120 100 100	 400 400		V/mV
V_{opp}	Output voltage swing R_L = 10kΩ R_L = 2kΩ R_L = 1kΩ 0°C ≤ T_{amb} ≤ +105°C R_L = 2kΩ	 ±12 ±11.5 ±11	 ±13 ±12.8 ±12		V
SR	Slew rate (R_L = 2kΩ, C_L = 100pF)		0.17		V/µs
GBP	Gain bandwidth product (R_L = 2kΩ, C_L = 100pF, f = 100kHz)		0.5		MHz
I_{CC}	Supply current - no load 0°C ≤ T_{amb} ≤ +105°C V_{CC} = ±3V		2.7 0.67	5 6 1.3	mA
e_n	Equivalent input noise voltage f = 10Hz f = 100Hz f = 1kHz		 11 10.5 10	 20 13.5 11.5	$\frac{nV}{\sqrt{Hz}}$
i_n	Equivalent input noise current f = 10Hz f = 100Hz f = 1kHz		 0.3 0.2 0.1	 0.9 0.3 0.2	$\frac{pA}{\sqrt{Hz}}$

1. Long term input offset voltage stability refers to the average trend line of Vio vs time over extended periods after the first 30 days of operation.

PACKAGE

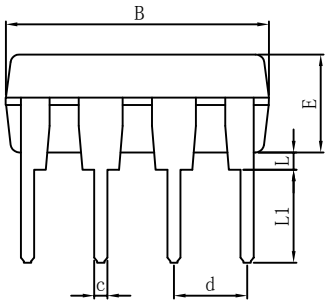
SOP8

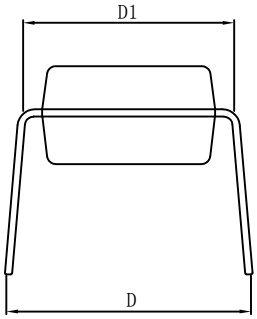


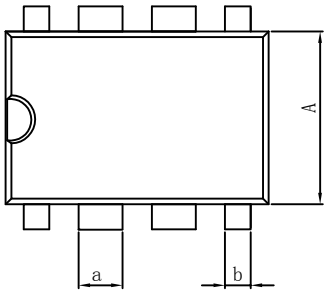


Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.225	1.570	D	0.400	0.950
A1	0.100	0.250	Q	0°	8°
B	4.800	5.100	a	0.420 TYP	
C	5.800	6.250	b	1.270 TYP	
C1	3.800	4.000			

DIP8







Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	6.100	6.680	L1	3.000	3.600
B	9.000	9.500	a	1.524 TYP	
D	8.400	9.000	b	0.889 TYP	
D1	7.420	7.820	c	0.457 TYP	
E	3.100	3.550	d	2.540 TYP	
L	0.500	0.700			

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