

# HA17747/P

## Dual Operational Amplifier

# HITACHI

### Description

The HA17747/P is a dual internal phase compensation high-performance operational amplifier, that is appropriate for use in a wide range of applications in the test and control fields.

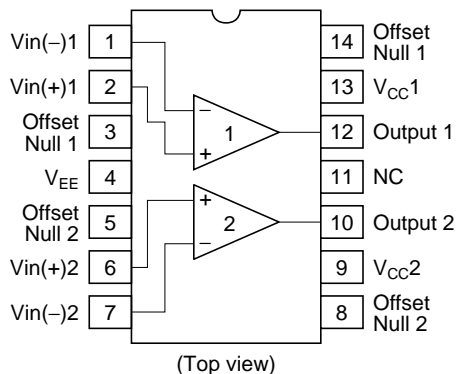
### Features

- High voltage gain : 106 dB (Typ)
- Wide output amplitude :  $\pm 13$  V (Typ) (at  $R_L \geq 2$  k $\Omega$ )
- Shorted output protection
- Adjustable offset voltage
- Internal phase compensation

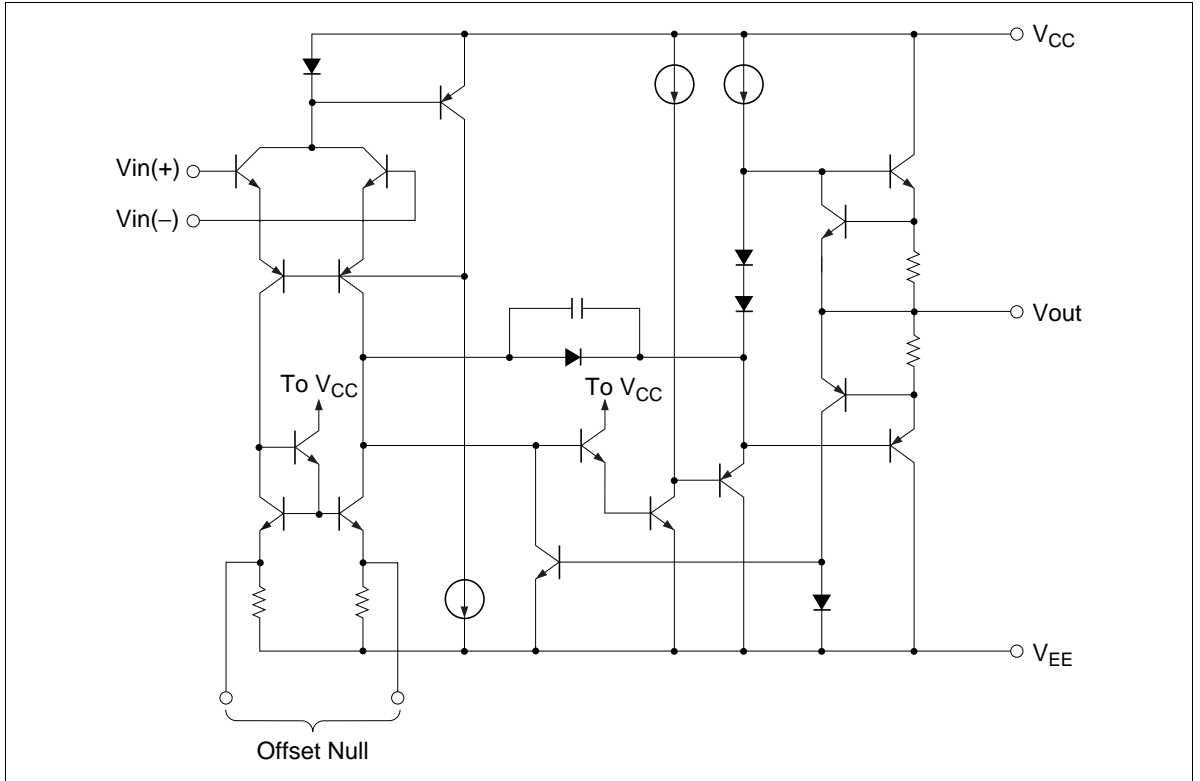
### Ordering Information

Type No.	Application	Package
HA17747P	Industrial use	DP-14
HA17747	Commercial use	

### Pin Arrangement



## Circuit Structure



## Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings		Unit
		HA17747P	HA17747	
Power-supply voltage	V <sub>CC</sub>	+18	+18	V
	V <sub>EE</sub>	-18	-18	V
Input voltage	V <sub>in</sub>	±15 *1	±15 *1	V
Differential input voltage	V <sub>in(diff)</sub>	±30	±30	V
Offset adjustment pin - V <sub>EE</sub> voltage	V <sub>OFF</sub> - V <sub>EE</sub>	±0.5	±0.5	V
Allowable power dissipation	P <sub>T</sub>	670 *2	670 *2	mW
Operating temperature	T <sub>opr</sub>	-20 to +75	-20 to +75	°C
Storage temperature	T <sub>stg</sub>	-55 to +125	-55 to +125	°C

Notes: 1. When the power-supply voltage is less than ±15 V, the input voltage must fall within the power-supply voltage range.

2. These are the allowable values up to Ta = 45°C. Above that temperature, derate by 8.3 mW/°C.

## Electrical Characteristics

### Electrical Characteristics-1 ( $V_{CC} = -V_{EE} = 15\text{ V}$ , $T_a = 25^\circ\text{C}$ )

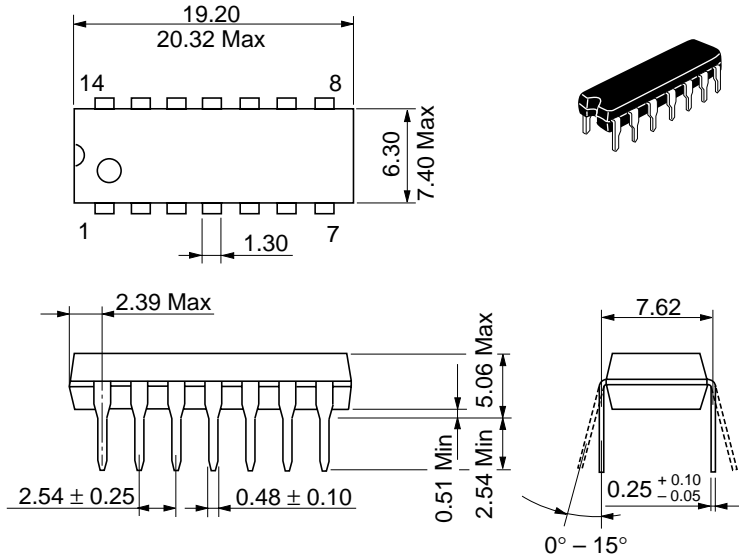
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Input offset voltage	$V_{IO}$	—	1.0	6.0	mV	$R_S \leq 10\text{ k}\Omega$
Input offset current	$I_{IO}$	—	20	200	nA	
Input bias current	$I_{IB}$	—	80	500	nA	
Voltage gain	$A_{VD}$	88	106	—	dB	$R_L \geq 2\text{ k}\Omega$ , $V_{out} = \pm 10\text{ V}$
Supply current	$I_{CC}$	—	1.7	2.8	mA	No load
Power dissipation	$P_d$	—	50	85	mW	(per channel rating)
Input resistance	$R_{in}$	0.3	2.0	—	$M\Omega$	
Input capacitance	$C_{in}$	—	1.4	—	pF	
Output resistance	$R_{out}$	—	75	—	$\Omega$	
Slew rate	SR	—	1.0	—	V/ $\mu\text{s}$	$R_L \geq 2\text{ k}\Omega$
Rise time	$t_r$	—	0.3	—	$\mu\text{s}$	$V_{in} = -20\text{ mV}$ ,
Overshoot	$V_{over}$	—	5.0	—	%	$R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$
Input offset voltage adjustment range	$\Delta V_{IO(adj)}$	—	$\pm 15$	—	mV	
Output shorted current	$I_{OS}$	—	25	—	mA	
Channel separation	CS	—	120	—	dB	

### Electrical Characteristics-2 ( $V_{CC} = -V_{EE} = 15\text{ V}$ , $T_a = -20\text{ to }+75^\circ\text{C}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Input offset voltage	$V_{IO}$	—	1.0	9.0	mV	$R_S \leq 10\text{ k}\Omega$
Input offset current	$I_{IO}$	—	20	400	nA	
Input bias current	$I_{IB}$	—	80	1,100	nA	
Power-supply rejection ratio	$\Delta V_{IO}/\Delta V_{CC}$	—	30	150	$\mu\text{V/V}$	$R_S \leq 10\text{ k}\Omega$
	$\Delta V_{IO}/\Delta V_{EE}$	—	30	150	$\mu\text{V/V}$	$R_S \leq 10\text{ k}\Omega$
Voltage gain	$A_{VD}$	80	—	—	dB	$R_L \geq 2\text{ k}\Omega$ , $V_{out} = \pm 10\text{ V}$
Common-mode rejection ratio	CMR	70	90	—	dB	$R_S \leq 10\text{ k}\Omega$
Common-mode input voltage range	$V_{CM}$	$\pm 12$	$\pm 13$	—	V	
Maximum output voltage amplitude	$V_{OP-P}$	$\pm 12$	$\pm 14$	—	V	$R_L \geq 10\text{ k}\Omega$
		$\pm 10$	$\pm 13$	—	V	$R_L \geq 2\text{ k}\Omega$
Supply current	$I_{CC}$	—	2.1	3.7	mA	No load
Power dissipation	$P_d$	—	65	110	mW	(per channel rating)

## Package Dimensions

Unit: mm



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.97 g

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