

---

# HA17474/P

Quad Operational Amplifier

# HITACHI

---

## Description

HA17474/P is a quad operational amplifier with provided internal frequency compensation and high performance. It can be applied widely to measuring control equipment and to general use.

## Features

- High speed: 1.6 V/ $\mu$ s
- Continuous short-circuit protection
- Low-noise operational amplifiers
- Internal frequency compensation
- Wide operating power supply voltage range:  $V = \pm 2$  V to  $\pm 20$  V
- Pin compatible with HA17324, HA17902

## Ordering Information

Type No.	Application	Package
HA17474P	Industrial use	DP-14
HA17474	Commercial use	

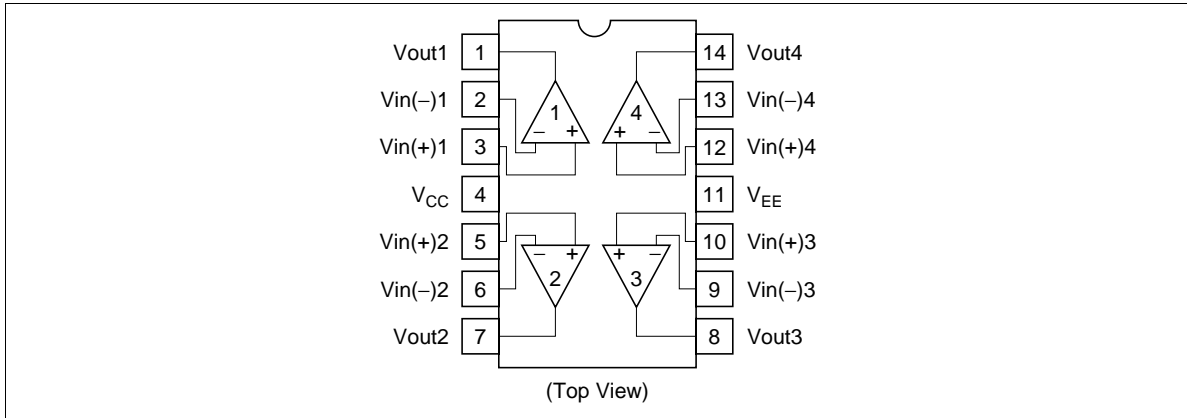
---

---

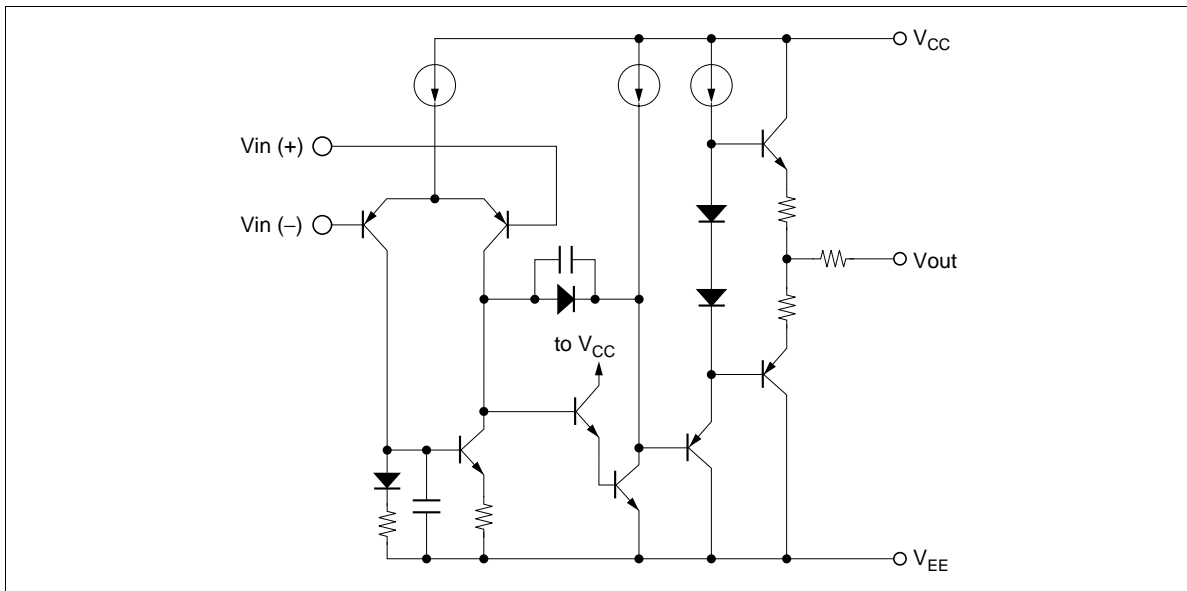
# HA17474/P

---

## Pin Arrangement



## Circuit Schematic



**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings			Unit
		HA17474	HA17474P	HA17474RP	
Power supply	$V_{CC}$	+20	+20	+20	V
	$V_{EE}$	-20	-20	-20	V
Common-mode differential voltage	Vin(diff)	$\pm 30$	$\pm 30$	$\pm 30$	V
Common-mode input voltage	$V_{CM}$	$\pm 15$ *1	$\pm 15$ *1	$\pm 15$ *1	V
Power dissipation	$P_T$	670 *2	670 *2	670 *2	mW
Operating temperature range	Topr	-20 to +75	-20 to +75	-20 to +75	$^\circ\text{C}$
Storage temperature range	Tstg	-55 to +125	-55 to +125	-55 to +125	$^\circ\text{C}$

Notes: 1. For supply voltage less than  $\pm 15$  V, the absolute maximum input voltage is equal to the supply voltage.

2. Value under  $T_a \leq 35^\circ\text{C}$ . In case of more than it, 8.3 mW/ $^\circ\text{C}$  derating shall be done.

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

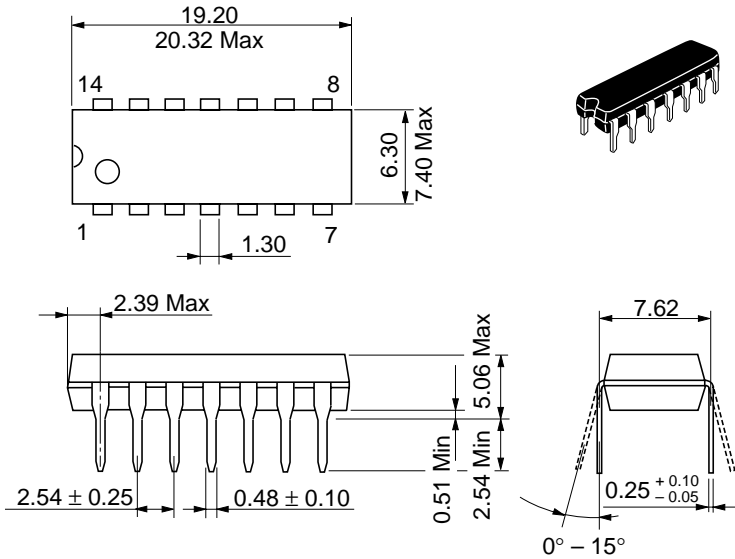
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Input offset voltage	$V_{IO}$	—	1.0	5.0	mV	$R_S \leq 10$ k $\Omega$
Input offset current	$I_{IO}$	—	30	50	nA	
Input bias current	$I_{IB}$	—	100	300	nA	
Voltage gain	$A_{VD}$	88	94	—	dB	$R_L \geq 2$ k $\Omega$ , $V_O = \pm 10$ V
Maximum output voltage	$V_{op-p}$	$\pm 12$	$\pm 13.7$	—	V	$R_L \geq 10$ k $\Omega$
		$\pm 10$	$\pm 12.5$	—	V	$R_L \geq 2$ k $\Omega$
Common-mode input voltage range	$V_{CM}$	$\pm 12$	$\pm 14$	—	V	
Common-mode rejection ratio	CMR	80	90	—	dB	$R_S \leq 10$ k $\Omega$
Supply voltage rejection ratio	PSRR	—	50	100	$\mu\text{V/V}$	$R_S \leq 10$ k $\Omega$
Power dissipation	$P_d$	—	150	210	mW	4-channel, No load
Slew rate	SR	—	1.6	—	V/ $\mu\text{s}$	$A_{VD} = 1$
Equivalent input noise voltage	$V_{NI}$	—	9	—	nV/ $\sqrt{\text{Hz}}$	$R_S = 1$ k $\Omega$ , $f = 1$ Hz to 1 kHz
Channel separation	CS	—	108	—	dB	$f = 1$ kHz

Note: Since these products provide a high slew rate, oscillation may occur due to load capacitance. An allowable capacitor value is minimum at voltage follower.

# HA17474/P

## Package Dimensions

Unit: mm



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

## Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

---

---

# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      NorthAmerica      : <http://semiconductor.hitachi.com/>  
             Europe                 : <http://www.hitachi-eu.com/hel/ecg>  
             Asia (Singapore)       : <http://www.has.hitachi.com.sg/grp3/sicd/index.htm>  
             Asia (Taiwan)            : [http://www.hitachi.com.tw/E/Product/SICD\\_Frame.htm](http://www.hitachi.com.tw/E/Product/SICD_Frame.htm)  
             Asia (HongKong)        : <http://www.hitachi.com.hk/eng/bo/grp3/index.htm>  
             Japan                        : <http://www.hitachi.co.jp/Sicd/indx.htm>

### For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00  
  
Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

Copyright ' Hitachi, Ltd., 1998. All rights reserved. Printed in Japan.