
HA17324 Series

Quad Operational Amplifier

HITACHI

Description

HA17324 is quad operational amplifier that provide high gain and internal phase compensation, with single power supply. They can be widely used to control equipments.

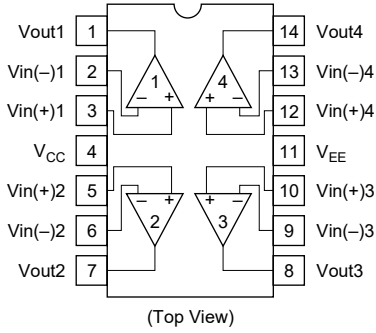
Features

- Wide range of supply voltage, and single power supply used
- Internal phase compensation
- Wide range of common mode voltage, and possible to operate with an input about 0V

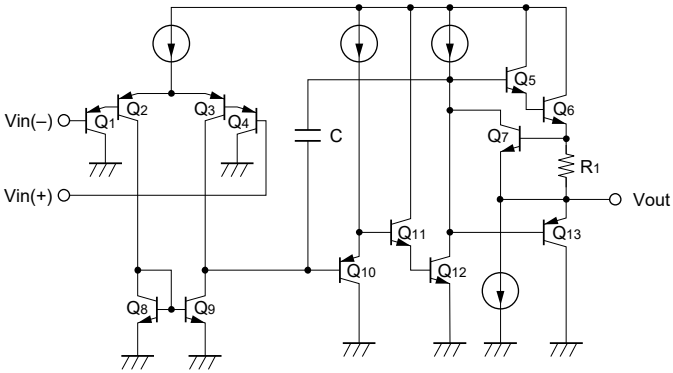
Ordering Information

Type No.	Application	Package
HA17324FP	Industrial use	FP-14DA
HA17324F	Commercial use	FP-14DA
HA17324	Commercial use	DP-14
HA17324P	Industrial use	DP-14

Pin Arrangement



Circuit Schematic (1/4)



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

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	32	V
Sink current	I_{sink}	50	mA
Power dissipation	P_T	625*	mW
Common mode input voltage	V_{CM}	-0.3 to V_{CC}	V
Differential input voltage	V_{in} (diff)	$\pm V_{CC}$	V
Operating temperature	T_{opr}	-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +125	$^\circ\text{C}$

Note: These are allowable values up to $T_a=50^\circ\text{C}$.

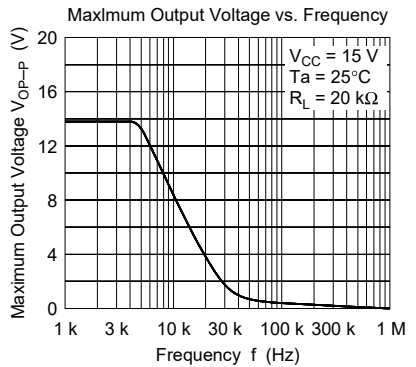
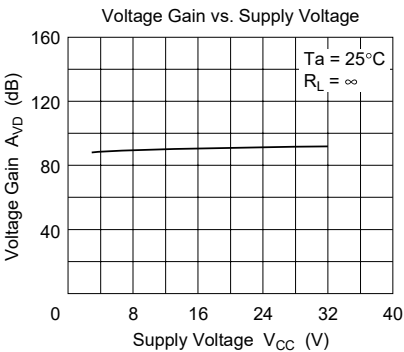
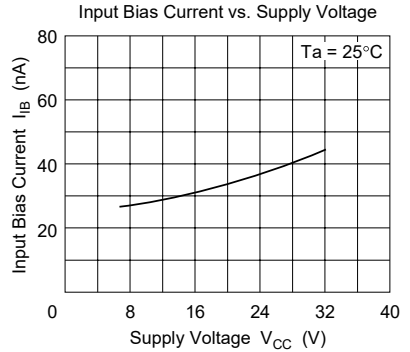
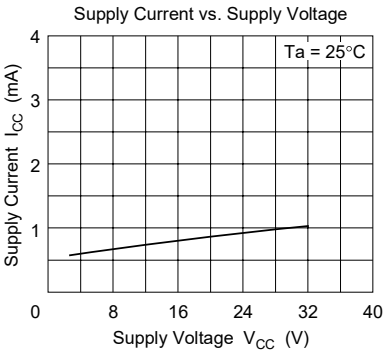
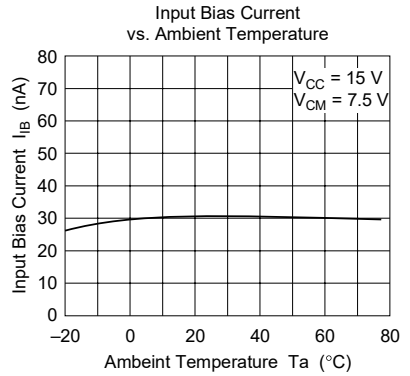
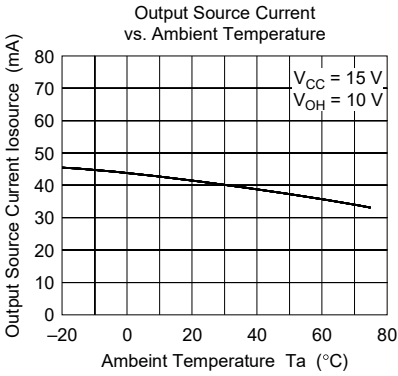
Derate by 8.3mW/ $^\circ\text{C}$ above that temperature.

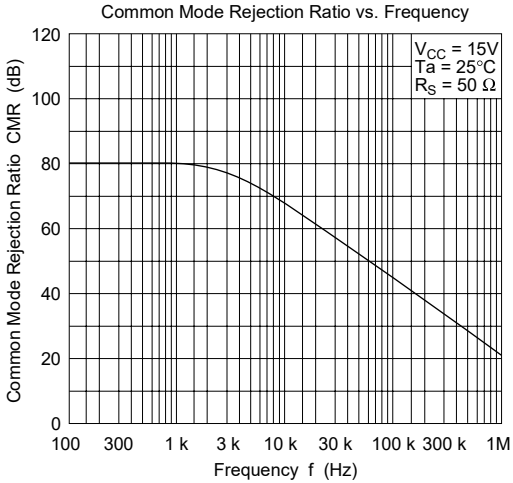
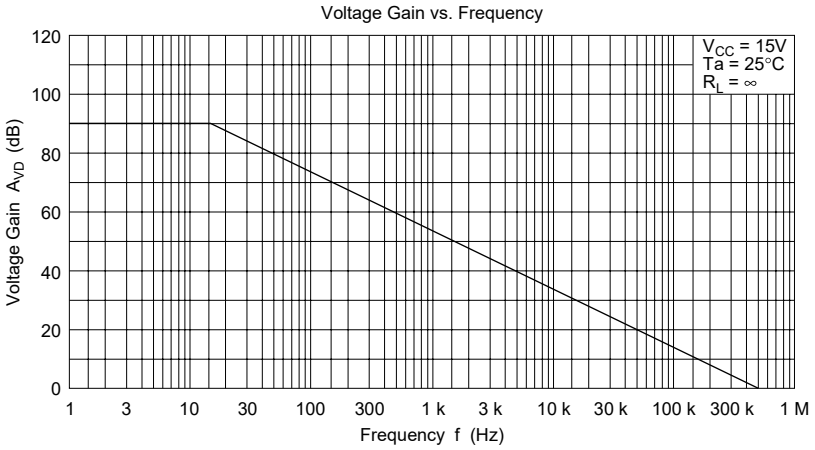
In case of SOP, see notes on SOP Package Usage in Reliability section.

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

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	2	7	mV	$V_{CM} = 7.5V$, $R_S = 50\Omega$, $R_f = 50k\Omega$
Input offset current	I_{IO}	—	5	50	nA	$V_{CM} = 7.5V$, $I_{IO} = I_{I(-)} - I_{I(+)} $
Input bias current	I_{IB}	—	30	500	nA	$V_{CM} = 7.5V$
Power source rejection ratio	PSRR	—	93	—	dB	$f = 100Hz$, $R_S = 1k\Omega$, $R_j = 100k\Omega$
Voltage gain	A_{VD}	75	90	—	dB	$R_S = 1k\Omega$, $R_f = 100k\Omega$, $R_L = \infty$
Common mode rejection ratio	CMR	—	80	—	dB	$R_S = 50\Omega$, $R_f = 5k\Omega$
Common mode input voltage range	V_{CM}	-0.3	—	13.5	V	$R_S = 1k\Omega$, $R_f = 100k\Omega$, $f = 100Hz$
Maximum output voltage	V_{op-p}	—	13.6	—	V	$f = 100Hz$, $R_S = 1k\Omega$, $R_f = 100k\Omega$, $R_L = 20k\Omega$
Output source current	$I_{osource}$	20	40	—	mA	$V_{IN}^+ = 1V$, $V_{IN}^- = 0V$, $V_{OH} = 10V$
Output sink current	I_{osink}	10	20	—	mA	$V_{IN} = 0V$, $V_{IN} = 1V$, $V_{OL} = 2.5V$
Supply current	I_{CC}	—	0.8	2	mA	$V_{IN} = GND$, $R_L = \infty$
Slew rate	SR	—	0.19	—	V/ μs	$f = 1.5kHz$, $V_{CM} = 7.5V$, $R_L = \infty$
Channel separation	CS	—	120	—	dB	$f = 1kHz$
Output sink current	I_{osink}	15	50	—	μA	$V_{IN}^+ = 0V$, $V_{IN}^- = 1V$, $V_{OL} = 200mV$
	I_{osink}	3	9	—	mA	$V_{IN}^+ = 0V$, $V_{IN}^- = 1V$, $V_{OL} = 1V$
Output voltage	V_{OH}	13.2	13.6	—	V	$I_{OH} = -1mA$
	V_{OH}	12.0	13.3	—	V	$I_{OH} = -10mA$
Output voltage	V_{OL}	—	0.8	1.0	V	$I_{OL} = 1mA$
	V_{OL}	—	1.1	1.8	V	$I_{OL} = 10mA$

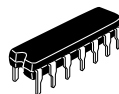
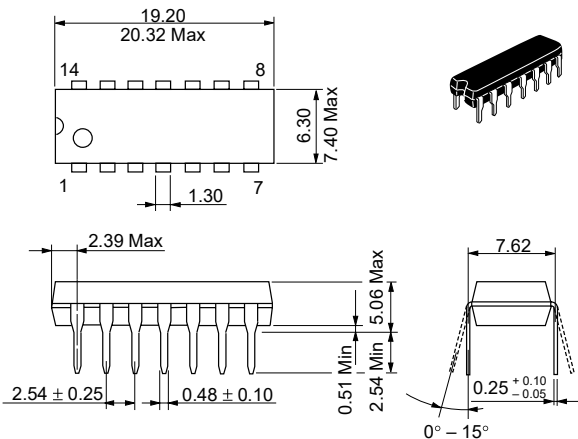
Characteristic Curves





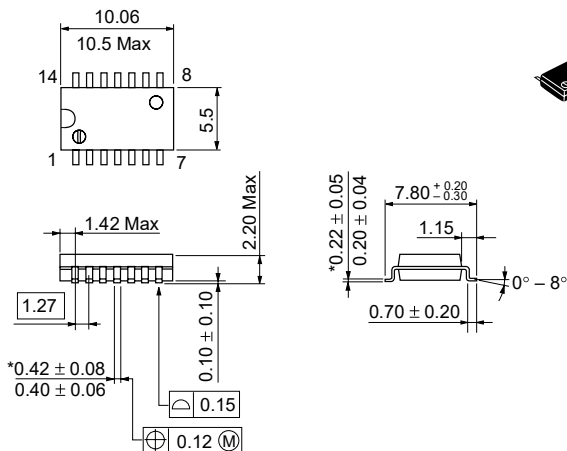
Package Dimensions

Unit: mm



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

Unit: mm



Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension

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