HA17358, HA17904 Series

Dual Operational Amplifier

HITACHI

Description

HA17904 and HA17358 are dual operational amplifiers which, provide internal phase compensation and high gain, and mono power source operation is possible. It can be widely applied to control equipment and to general use.

Features

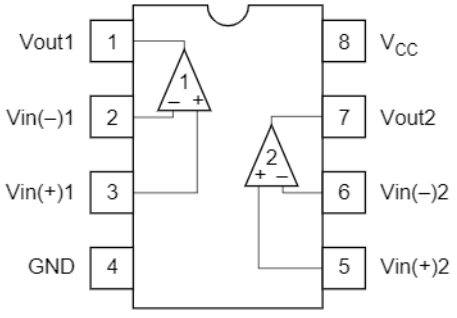
- Wide range of operating supply voltage and mono power source operation is possible.
- Wide range of common mode input voltage possible to operate with an input around 0V, and output around 0V is available.
- Frequency characteristics and input bias currrent are temperature compensated.

Ordering Information

Type No.	Application	Package
HA17904PSJ	Car use	DP-8
HA17904FPJ	Car use	FP-8D
HA17904FPK	Car use	
HA17904PS	Industrial use	DP-8
HA17904FP	Industrial use	FP-8D
HA17358	Commercial use	DP-8
HA17358F	Commercial use	FP-8D

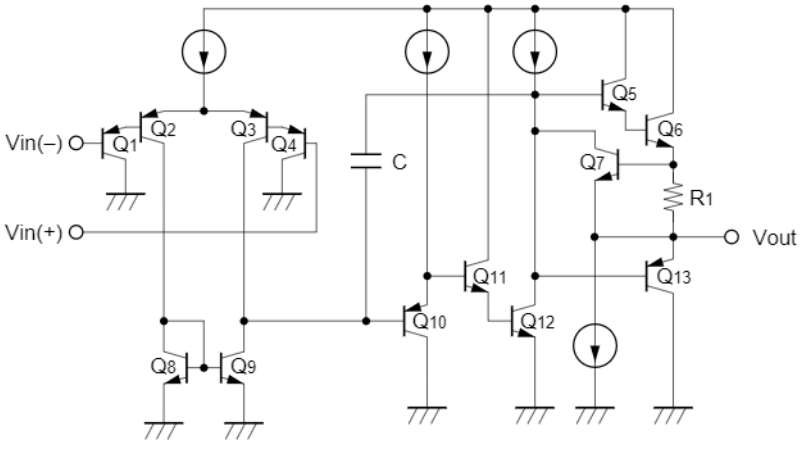
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Pin Arrangement



(Top View)

Circuit Schematic (1/2)



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings							Unit
		HA17358	HA17358 F	HA17904 PS	HA17904 FP	HA17904 PSJ	HA17904 FPJ	HA17904 FPK	
Supply voltage	V_{CC}	32	32	32	32	32	32	32	V
Output sink current	$I_{O\ sink}$	50	50	50	50	50	50	50	mA
Common-mode input voltage	V_{CM}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	V
Common-mode differential voltage	$V_{IN(diff)}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	V
Power dissipation	P_T	570*1	385*2	570*1	385*2	570*1	385*2	385*2	mW
Operating temperature range	Topr	–20 to +75	–20 to +75	–20 to +75	–20 to +75	–40 to +85	–40 to +85	–40 to +125	°C
Storage temperature range	Tstg	–55 to +125	–55 to +125	–55 to +125	–55 to +125	–55 to +125	–55 to +125	–55 to +150	°C

Notes: 1. These are the allowable values up to Ta = 55 °C. Derate by 8.3mW/°C above that temperature.
2. These are the allowable values up to Ta = 45 °C mounting on 30% wiring density glass epoxy board. Derate by 7.14mW/°C above that temeperature.

Electrical Characteristics 1 (V_{CC} = +15V, Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	3	7	mV	V_{CM} = 7.5V, R_S = 50Ω, Rf = 50kΩ
Input offset current	I_{IO}	—	5	50	nA	V_{CM} = 7.5V, I_{IO} = | $I_{I(+)} - I_{I(-)}$ |
Input bias current	I_{IB}	—	30	250	nA	V_{CM} = 7.5V
Power source rejection ratio	PSRR	—	93	—	dB	R_S = 1kΩ, Rf = 100kΩ
Voltage gain	A_{VD}	75	90	—	dB	R_L = ∞, R_S = 1kΩ, Rf = 100kΩ
Common mode rejection ratio	CMR	—	80	—	dB	R_S = 50Ω, Rf = 5kΩ
Common mode input voltage range	$V_{CM(+)}$	13.5	—	—	V	R_S = 1kΩ, Rf = 100kΩ
	$V_{CM(-)}$	—	—	–0.3	V	R_S = 1kΩ, Rf = 100kΩ
Peak-to-peak output voltage	Vop-p	—	13.6	—	V	f = 100Hz, R_L = 20kΩ, R_S = 1kΩ, Rf = 100kΩ
Output source current	Iosource	20	40	—	mA	V_{IN}^+ = 1V, V_{IN}^- = 0V, V_{OH} = 10V
Output sink current	Iosink	10	20	—	mA	V_{IN}^- = 1V, V_{IN}^+ = 0V, V_{OL} = 2.5V
Output sink current	Iosink	15	50	—	∝A	V_{IN}^- = 1V, V_{IN}^+ = 0V, Vout = 200mV
Supply current	I_{CC}	—	0.8	2	mA	V_{IN} = GND, R_L = ∞
Slew rate	SR	—	0.2	—	V/∝s	R_L = ∞, V_{CM} = 7.5V, f = 1.5kHz
Channel separation	CS	—	120	—	dB	f = 1kHz

Note: As for the characteristic curve, refer to HA17902.

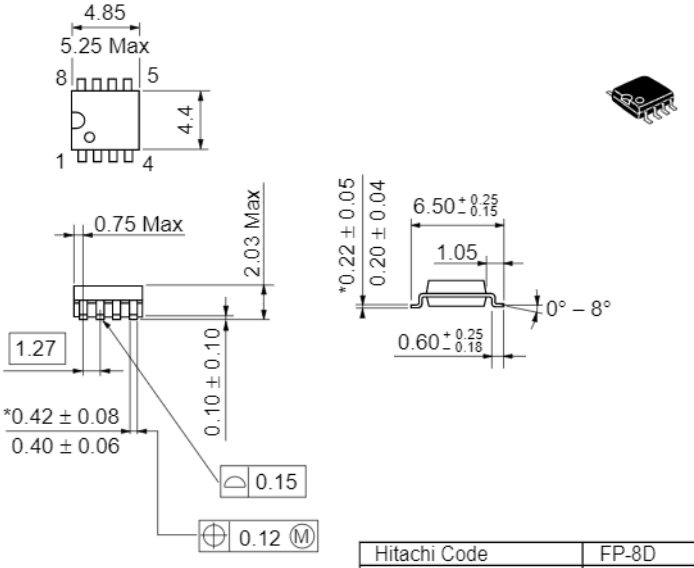
Electrical Characteristics 2 (V_{CC} = +15V, Ta = –40 to +125°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	—	7	mV	V_{CM} = 7.5V, R_S = 50Ω, R_L = 50kΩ
Input offset current	I_{IO}	—	—	200	nA	V_{CM} = 7.5V, I_{IO} = | $I_{I(+)} - I_{I(-)}$ |
Input bias current	I_{IB}	—	—	500	nA	V_{CM} = 7.5V
Common mode input voltage range	V_{CM}	0	—	13.0	V	R_S = 1kΩ, Rf = 100kΩ
Supply current	I_{CC}	—	—	4	mA	V_{IN} = GND, R_L = ∞

Note: As for the characteristic curve, refer to HA17904FPK.

Package Dimensions

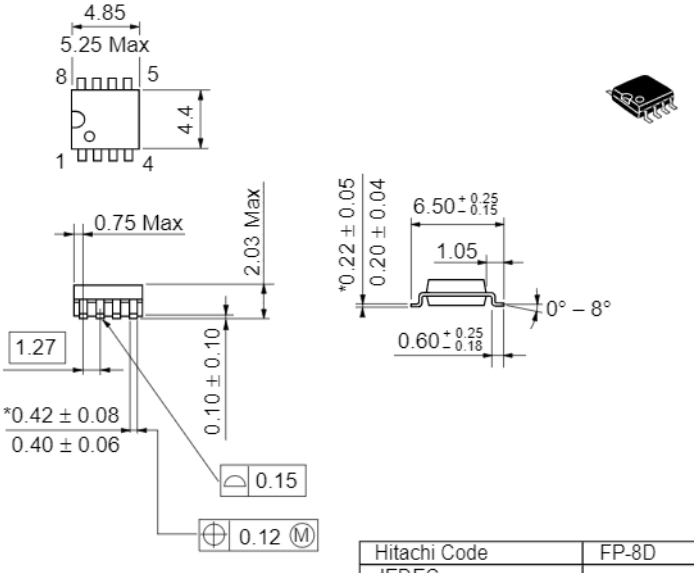
Unit: mm



Hitachi Code	FP-8D
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.10 g

*Dimension including the plating thickness
Base material dimension

Unit: mm



Hitachi Code	FP-8D
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.10 g

*Dimension including the plating thickness
Base material dimension

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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/
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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 Straβe 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

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