HA17358/A Series

Dual Operational Amplifier

HITACHI

ADE-204-033A (Z)
Rev. 1
Mar. 2001

Description

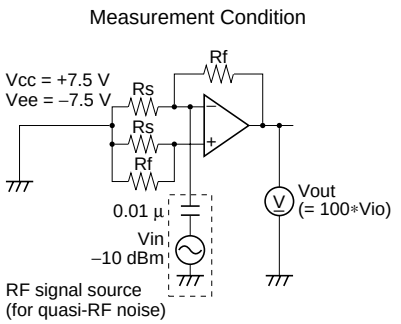
HA17358 series and HA17358A series are dual operational amplifier that provide high gain and internal phase compensation, with single power supply. They can be widely applied to control equipments and to general use.

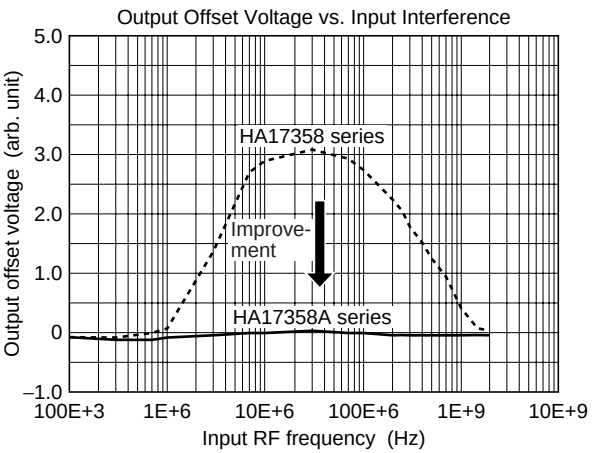
Features

- Wide range of supply voltage, and single power supply used
- Wide range of common mode voltage, and possible to operate with an input about 0 V, and output around 0 V is available
- Frequency characteristics and input bias current are temperature compensated

Features only for "A" series

- Low electro-magnetic susceptibility level



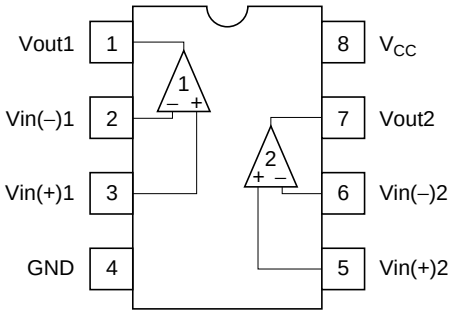


Hitachi semiconductor

Ordering Information

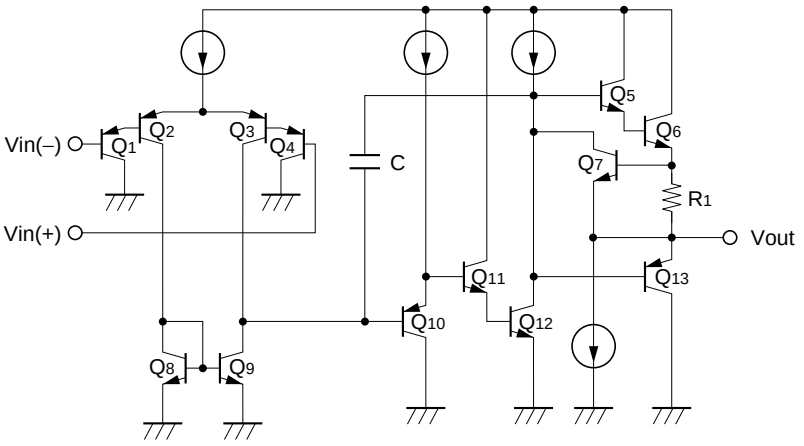
Type No.	Application	Package
HA17358	Commercial use	DP-8B
HA17358F		FP-8D
HA17358APS	Industrial use	DP-8B
HA17358ARP	Commercial use	FP-8DC
HA17358AFP		FP-8D

Pin Arrangement



(Top View)

Circuit Schematic (1/2)



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings				Unit
		HA17358	HA17358F	HA17358APS	HA17358AFP/ARP	
Supply voltage	V_{CC}	32	32	32	32	V
Sink current	Isink	50	50	50	50	mA
Power dissipation	P_T	570 *1	385 *2	570 *1	385 *2	mW
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}	V
Differential input voltage	Vin (diff)	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	V
Operating temperature	Topr	–20 to +75	–20 to +75	–40 to +85	–40 to +85	°C
Storage temperature	Tstg	–55 to +125	–55 to +125	–55 to +125	–55 to +125	°C

Notes: 1. This is the allowable values up to Ta = 50°C. Derate by 8.3 mW/°C.

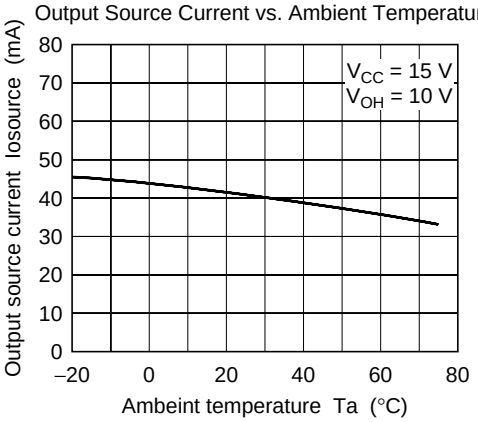
2. These are the allowable values up to Ta = 25°C mounting in air.
   When it is mounted on glass epoxy board of 40 mm × 40 mm × 1.5 mmt with 30% wiring density, the allowable value is 570 mW up to Ta = 45°C. If Ta > 45°C, derate by 7.14 mW/°C.

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

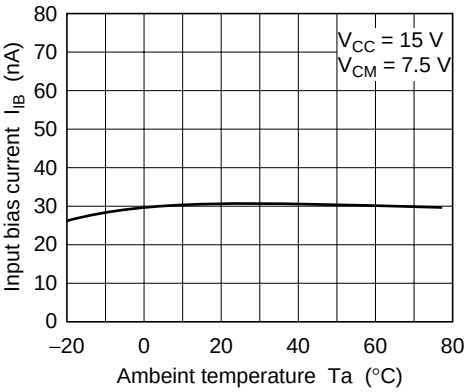
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	3	7	mV	V_{CM} = 7.5V, R_S = 50Ω, Rf = 50kΩ
Input offset current	I_{IO}	—	5	50	nA	V_{CM} = 7.5V, $I_{IO} = \lvert I_{I(+)} - I_{I(-)} \rvert$
Input bias current	I_{IB}	—	30	250	nA	V_{CM} = 7.5V
Power source rejection ratio	PSRR	—	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	—	µA	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/µs	R_L = ∞, V_{CM} = 7.5V, f = 1.5kHz
Channel separation	CS	—	120	—	dB	f = 1kHz

Characteristic Curves

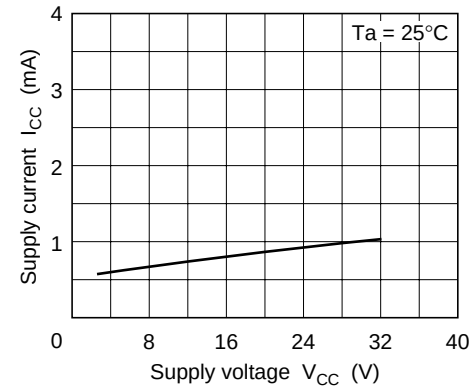
Output Source Current vs. Ambient Temperature



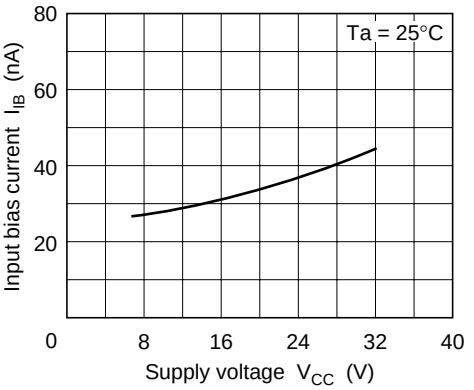
Input Bias Current vs. Ambient Temperature



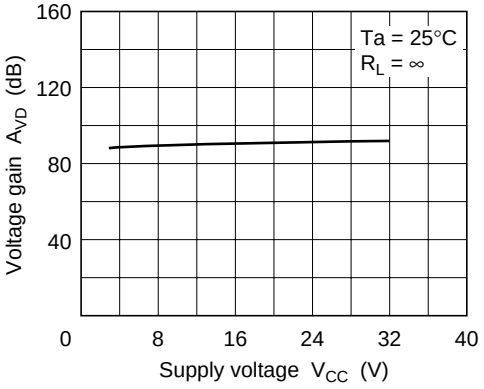
Supply Current vs. Supply Voltage



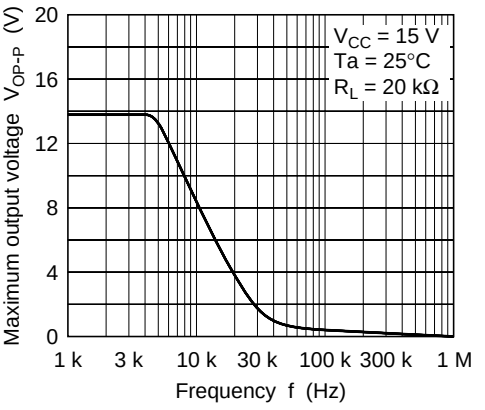
Input Bias Current vs. Supply Voltage



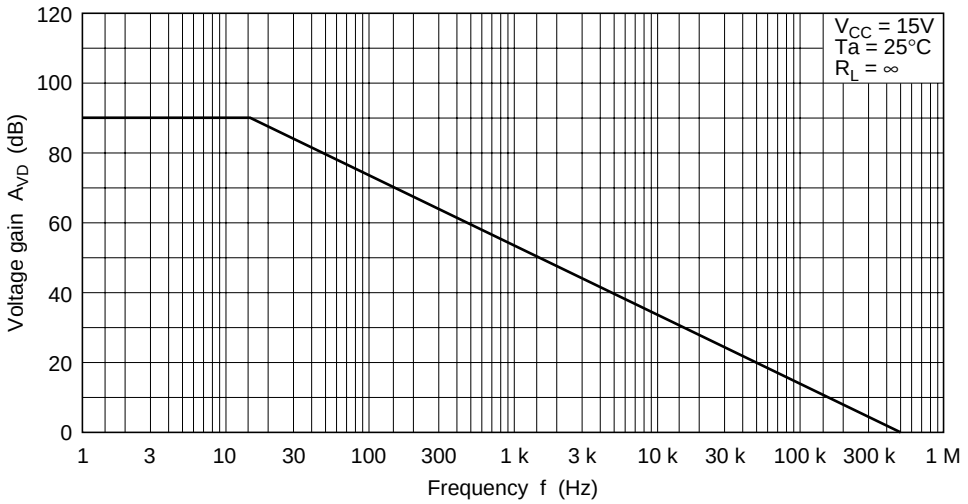
Voltage Gain vs. Supply Voltage



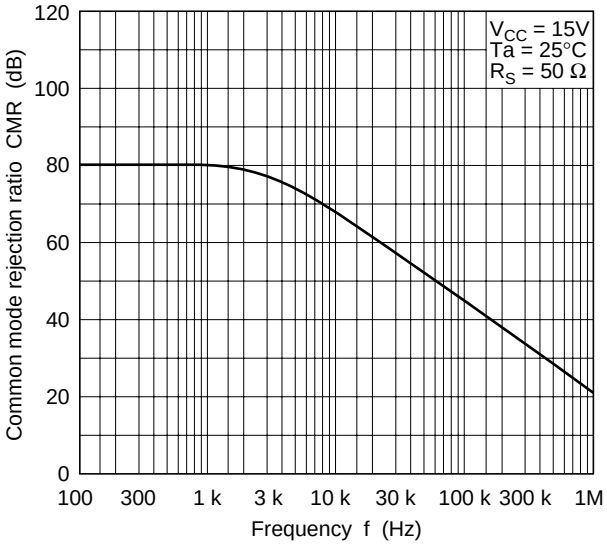
Maxlmum Output Voltage vs. Frequency



Voltage Gain vs. Frequency



Common Mode Rejection Ratio vs. Frequency



Solder Mounting Method

1. Small and light surface-mount packages require spicial attentions on solder mounting.
   On solder mounting, pre-heating before soldering is needed.
   The following figure show an example of infrared rays refow.

2. The difference of thermal expansion coefficeient between mounted substrates and IC leads may cause a failure like solder peeling or soler wet, and electrical characteristics may change by thermal stress. Therefore, mounting should be done after sufficient confirmation for especially in case of ceramic substrates.

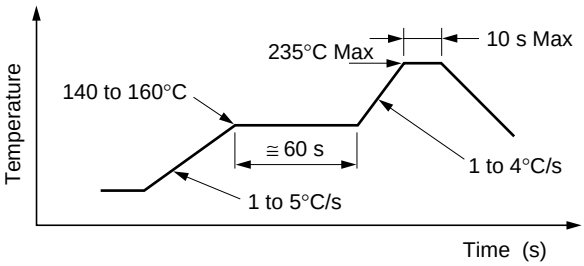
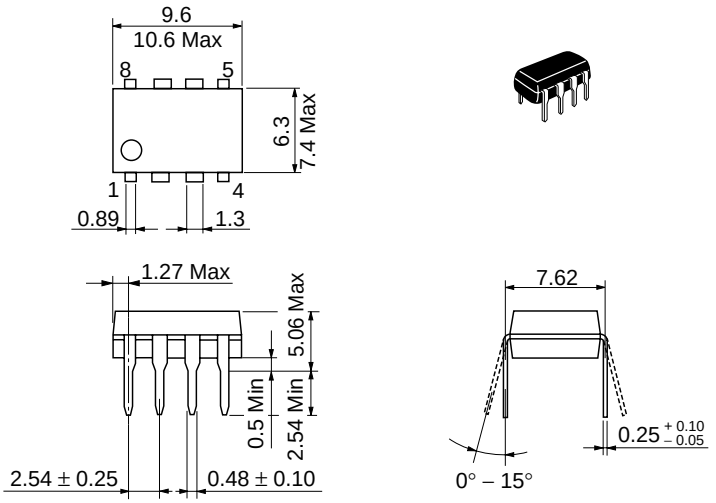


Figure 1 An Example of Infrared Rays Reflow Conditions

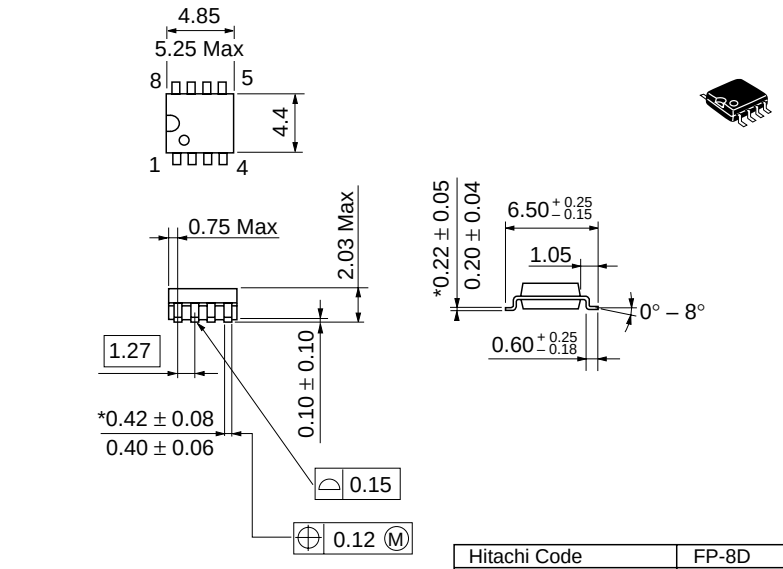
Package Dimensions

Unit: mm



Hitachi Code	DP-8B
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.51 g

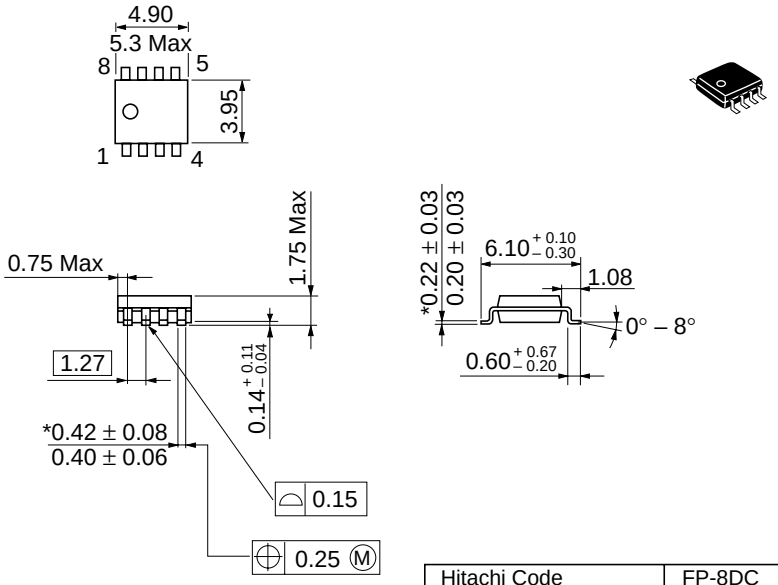
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8DC
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.085 g

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