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# HA17558 Serise

Dual Operational Amplifier

# HITACHI

ADE-204-042 (Z)  
Rev. 0  
Dec. 2000

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## Description

HA17558 is dual operational amplifiers which provides internal frequency compensation and high performance. It can be applied widely to measuring control equipment and to general Use. The two amplifiers share a common bias network and power supply leads.

## Features

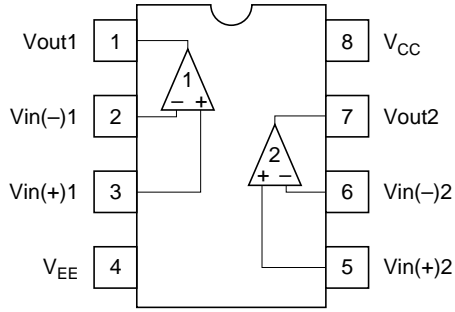
- High voltage Gain: 104dB (Typ)
- High speed: 1V/ $\mu$ s
- Continuous short-circuit protection
- Low-noise operational amplifiers
- Internal frequency compensation

## Ordering Information

Type No.	Application	Package
HA17558FP	Industrial use	FP-8D
HA17558F	Commercial use	FP-8D
HA17558	Commercial use	DP-8
HA17558PS	Industrial use	DP-8

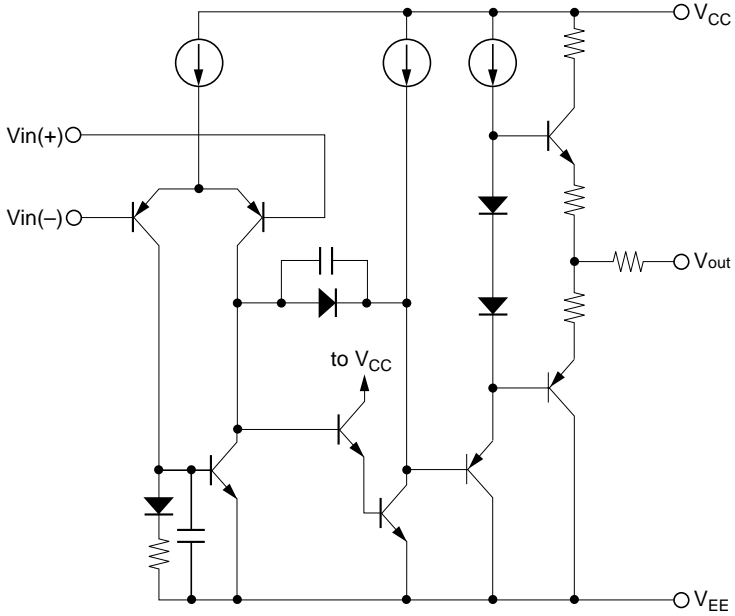
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## Pin Arrangement



(Top View)

## Circuit Schematic (1/2)



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

Item	Symbol	Ratings				Unit
		HA17558	HA17558 PS	HA17558 F	HA17558 FP	
Supply voltage	$V_{CC}$	+18	+18	+18	+18	V
	$V_{EE}$	-18	-18	-18	-18	V
Differential input voltage	$V_{IN(diff)}$	$\pm 30$	$\pm 30$	$\pm 30$	$\pm 30$	V
Common-mode input voltage	$V_{CM}^{*3}$	$\pm 15$	$\pm 15$	$\pm 15$	$\pm 15$	V
Power dissipation	$P_T$	$670^{*1}$	$670^{*1}$	$385^{*2}$	$385^{*2}$	mW
Operating temperature	$T_{opr}$	-20 to +75	-20 to +75	-20 to +75	-20 to +75	-20 to +75
Storage temperature	$T_{stg}$	-55 to +125	-55 to +125	-55 to +125	-55 to +125	$^\circ\text{C}$

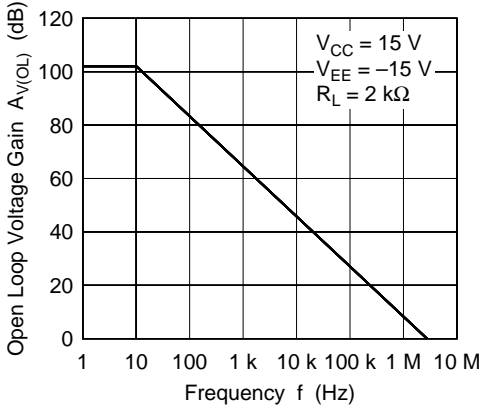
- Notes: 1. These are the allowable values up to  $T_a = 45^\circ\text{C}$ . Derate by  $8.3\text{mW}/^\circ\text{C}$  above that temperature.  
 2. These are the allowable values up to  $T_a = 31^\circ\text{C}$  mounting on 30% wiring density glass epoxy board. Derate by  $7.14\text{mW}/^\circ\text{C}$  above that temperature.  
 3. If the supply voltage is less than  $\pm 15\text{V}$ , input voltage should be less than supply voltage.

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

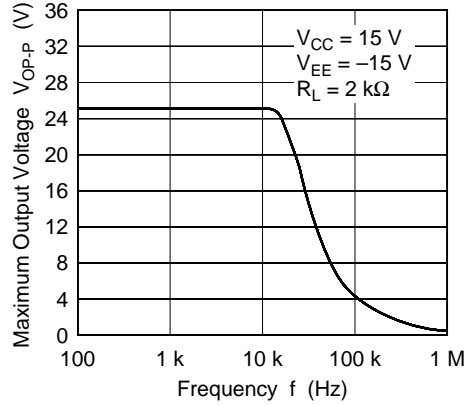
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Input offset voltage	$V_{IO}$	—	0.5	6	mV	$R_s \leq 10\text{k}\Omega$
Input offset current	$I_{IO}$	—	5	200	nA	
Input bias current	$I_{IB}$	—	50	500	nA	
Voltage gain	$A_{VD}$	86	104	—	dB	$R_L \geq 2\text{k}\Omega$ , $V_O = \pm 10\text{V}$
Maximum output voltage	$V_{op-p}$	$\pm 12$	$\pm 14$	—	V	$R_L \geq 10\text{k}\Omega$
Maximum output voltage	$V_{op-p}$	$\pm 10$	$\pm 12.4$	—	V	$R_L \geq 2\text{k}\Omega$
Common mode input voltage range	$V_{CM}$	$\pm 12$	$\pm 14$	—	V	
Common mode rejection ratio	CMR	70	100	—	dB	$R_s \leq 10\text{k}\Omega$
Supply voltage rejection ratio	PSRR	—	10	150	$\mu\text{V}/\text{V}$	$R_s \leq 10\text{k}\Omega$
Power dissipation	$P_d$	—	90	170	mW	2-channel, No load
Slew rate	SR	—	1.0	—	$\text{V}/\mu\text{s}$	$A_{VD} = 1$
Equivalent input noise voltage	$V_{NI}$	—	6	—	$\mu\text{Vp-p}$	$R_s = 1\text{k}\Omega$ , $f = 1\text{Hz}$ to $1\text{kHz}$
Channel separation	CS	—	105	—	dB	$f = 1\text{kHz}$

## Characteristic Curves

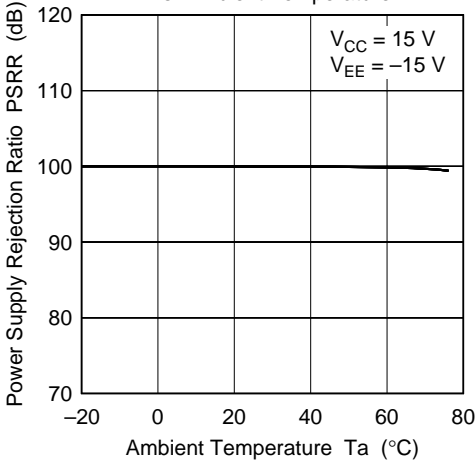
Open Loop Voltage Gain vs. Frequency



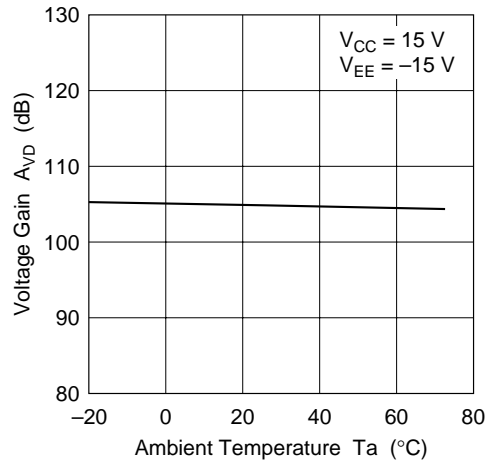
Maximum Output Voltage vs. Frequency



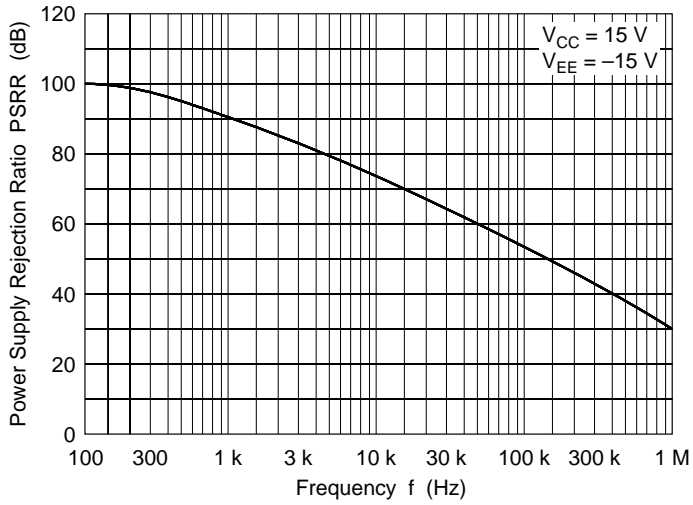
Power Supply Rejection Ratio vs. Ambient Temperature



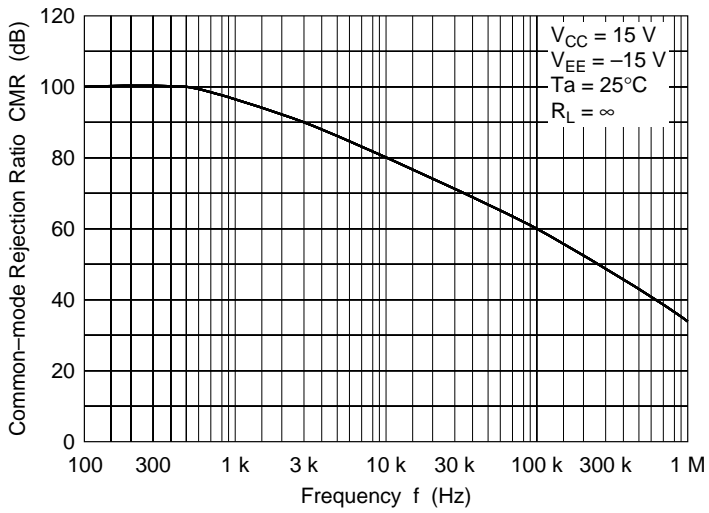
Voltage Gain vs. Ambient Temperature

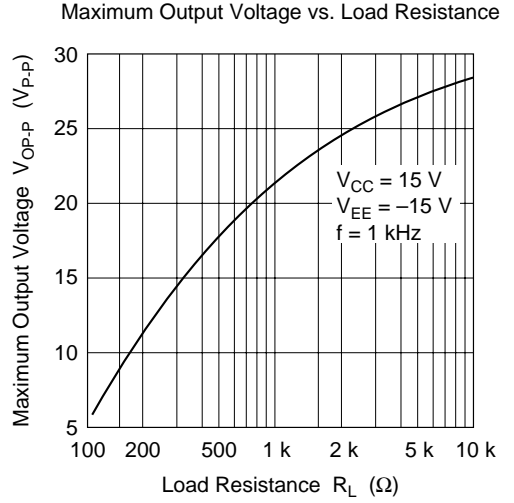
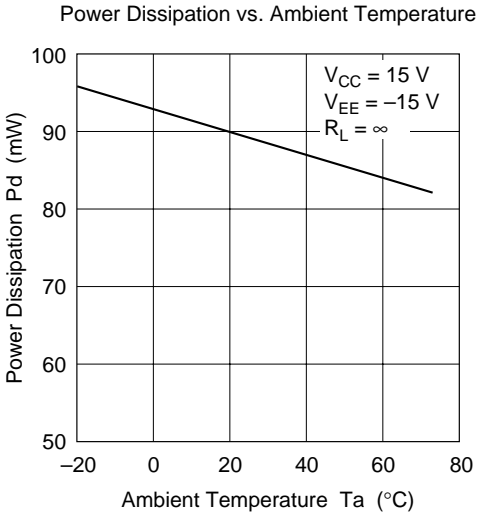
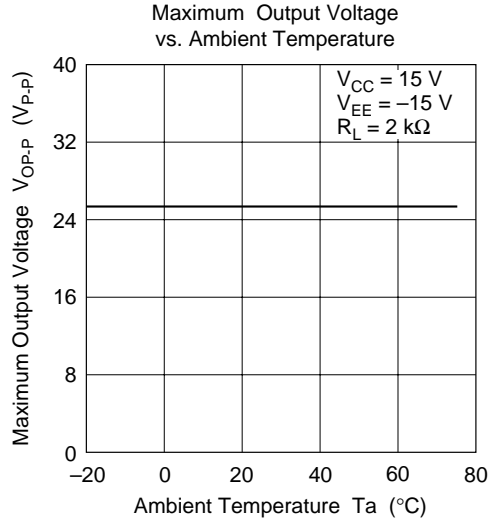
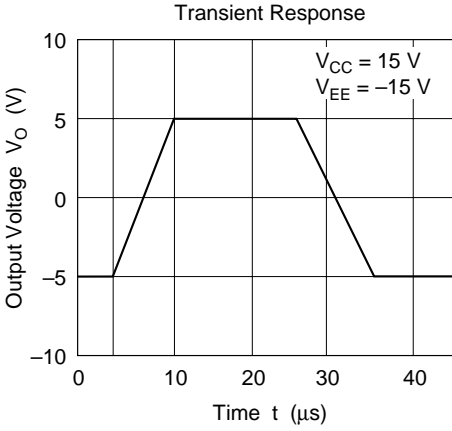


Power Supply Rejection Ratio vs. Frequency

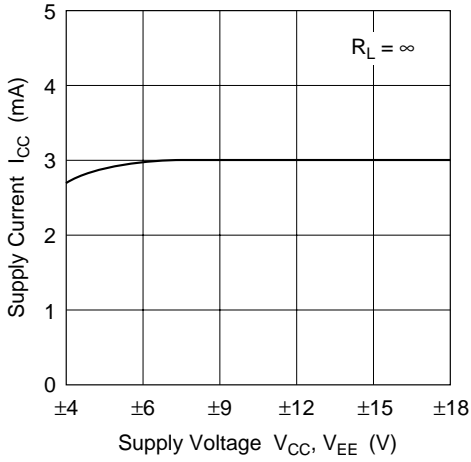


Common-mode Rejection Ratio vs. Frequency

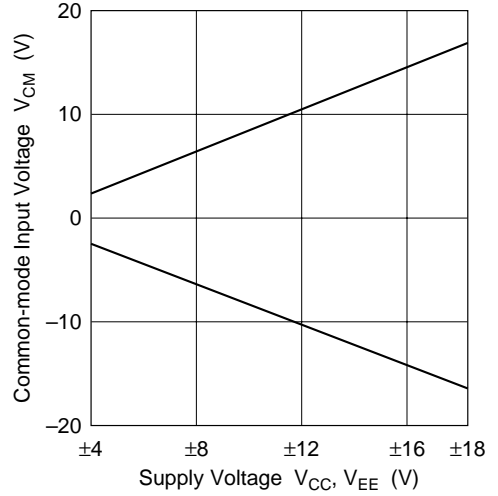




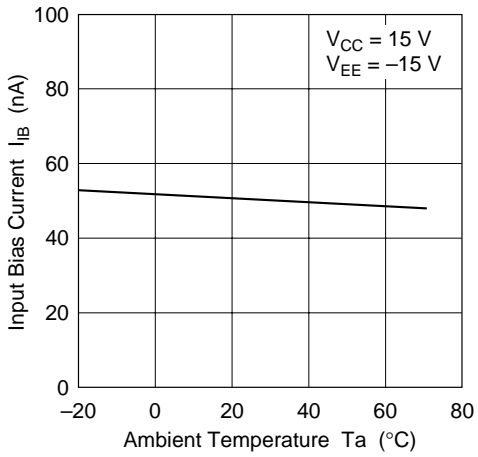
Supply Current vs. Supply Voltage



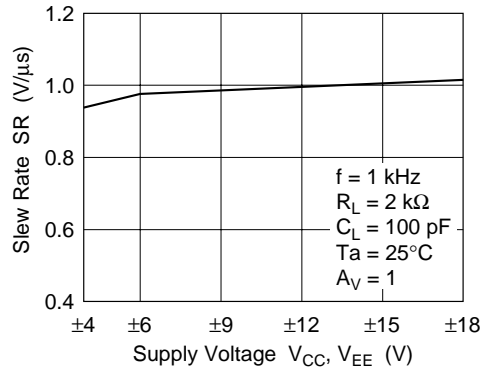
Common-mode Input Voltage vs. Supply Voltage



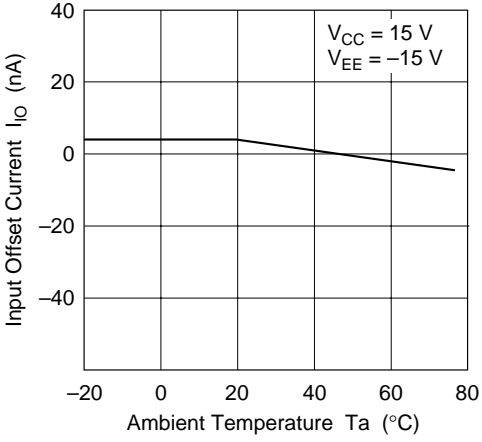
Input Bias Current vs. Ambient Temperature



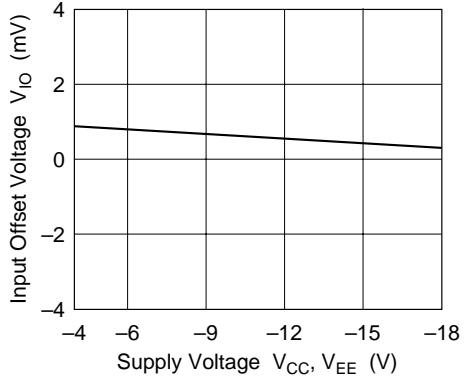
Slew Rate vs. Supply Voltage



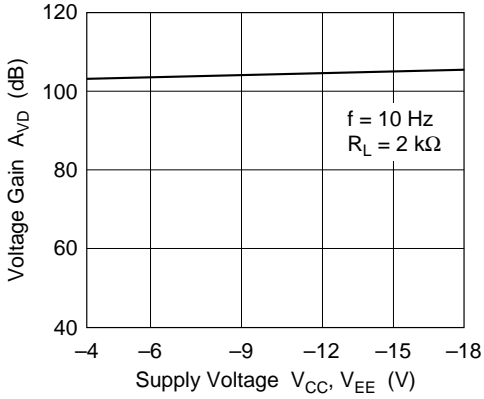
Input Offset Current vs. Ambient Temperature



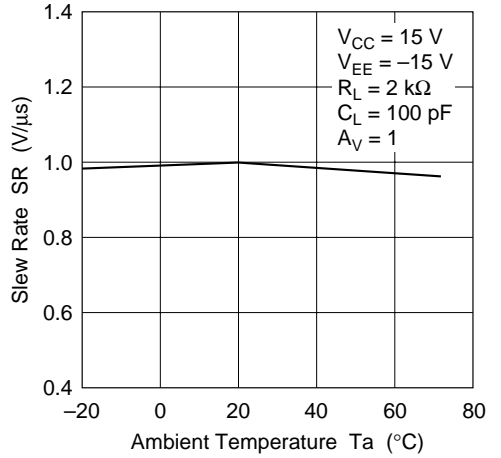
Input Offset Voltage vs. Supply Voltage



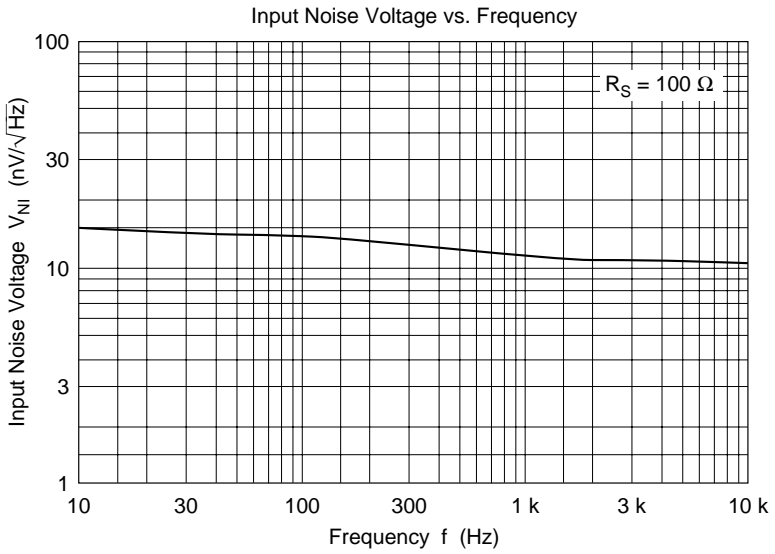
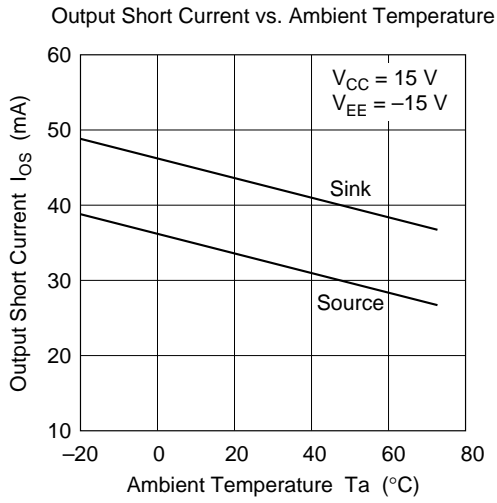
Voltage Gain vs. Supply Voltage



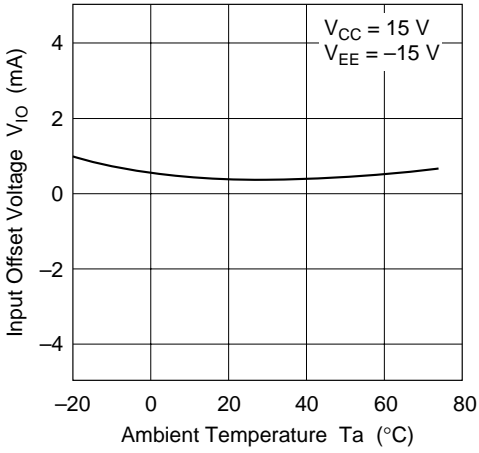
Slew Rate vs. Ambient Temperature



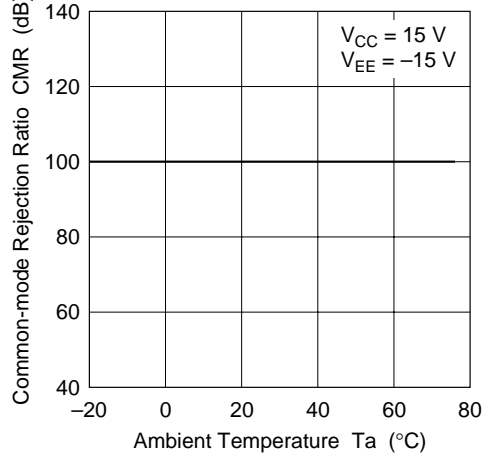




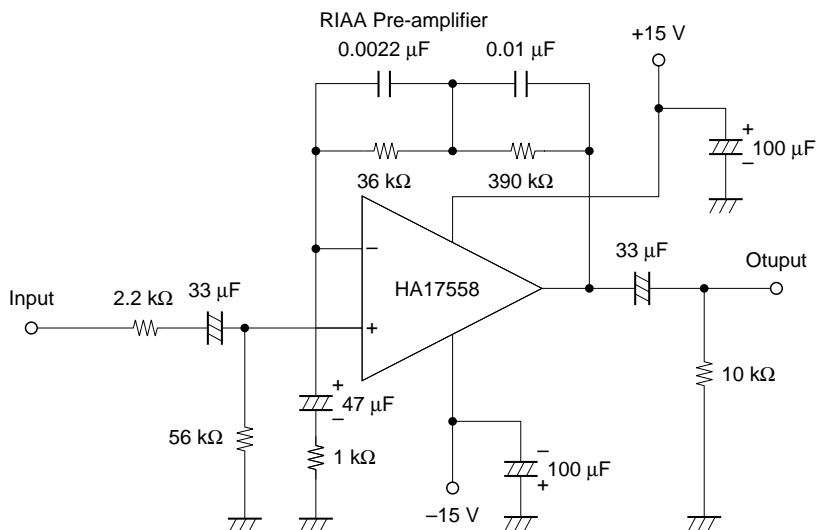
Input Offset Voltage vs. Ambient Temperature



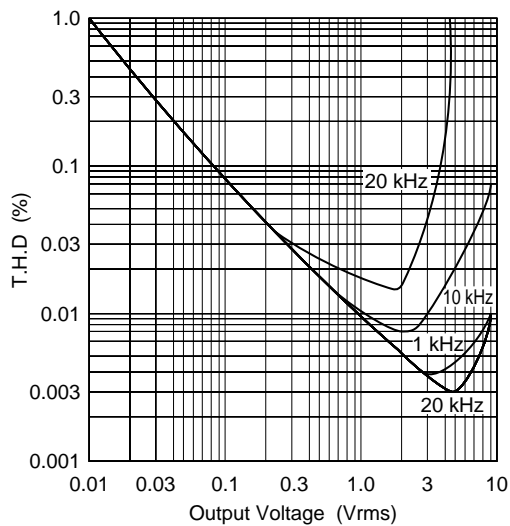
Common-mode Rejection Ratio vs. Ambient Temperature



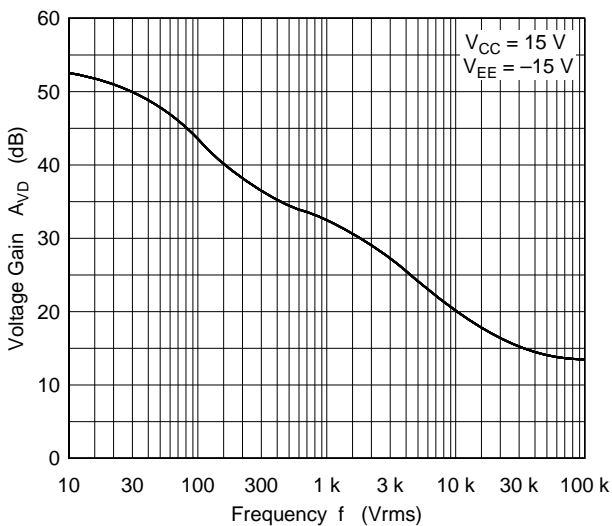
Circuit Example



T.H.D. vs. Output Voltage (RIAA Pre-Amp)

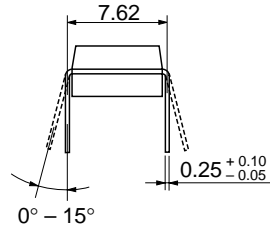
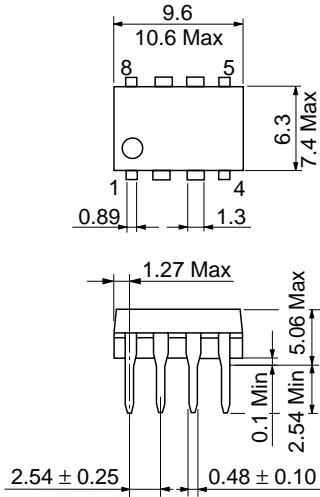


T.H.D. vs. Output Voltage (RIAA Pre-Amp)



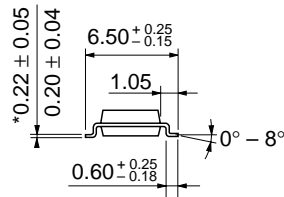
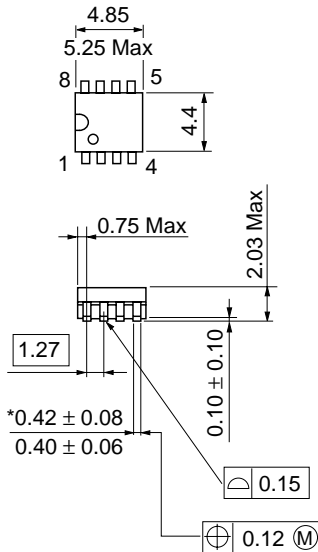
## Package Dimensions

Unit: mm



Hitachi Code	DP-8
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.54 g

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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