
HA12232FP

Audio Signal Pre-Amp. for Car Deck

HITACHI

ADE-207-328 (Z)

Target Specifications
1st Edition
Sep. 2000

Description

HA12232FP is audio signal pre-amp. LSI providing PB equalizer op-amp. in one chip.

Function

- PB equalizer × 2 channel
- Vref buffer × 1 channel

Features

- Built-in referential voltage (VREF) for PB equalizer decreases external components.
- This IC is low noise.
- This IC is strong for a cellular phone noise.

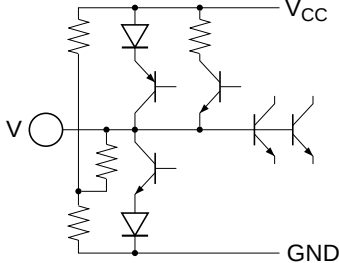
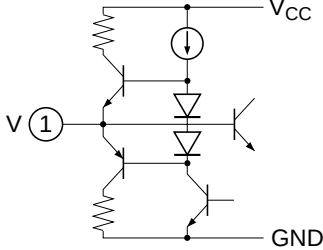
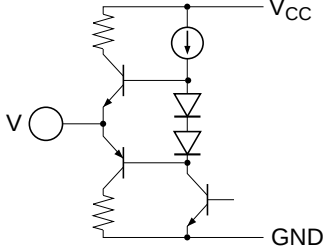
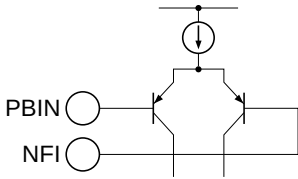
Operating Voltage Range

Product	Min	Max	Unit
HA12232FP	6.5	15	V

Note: This IC is designed to operate on single supply.

HA12232FP

Pin Description, Equivalent Circuit ($V_{cc} = 9\text{ V}$ single supply, $T_a = 25^\circ\text{C}$, No Signal, The value in the table shows typical value.)

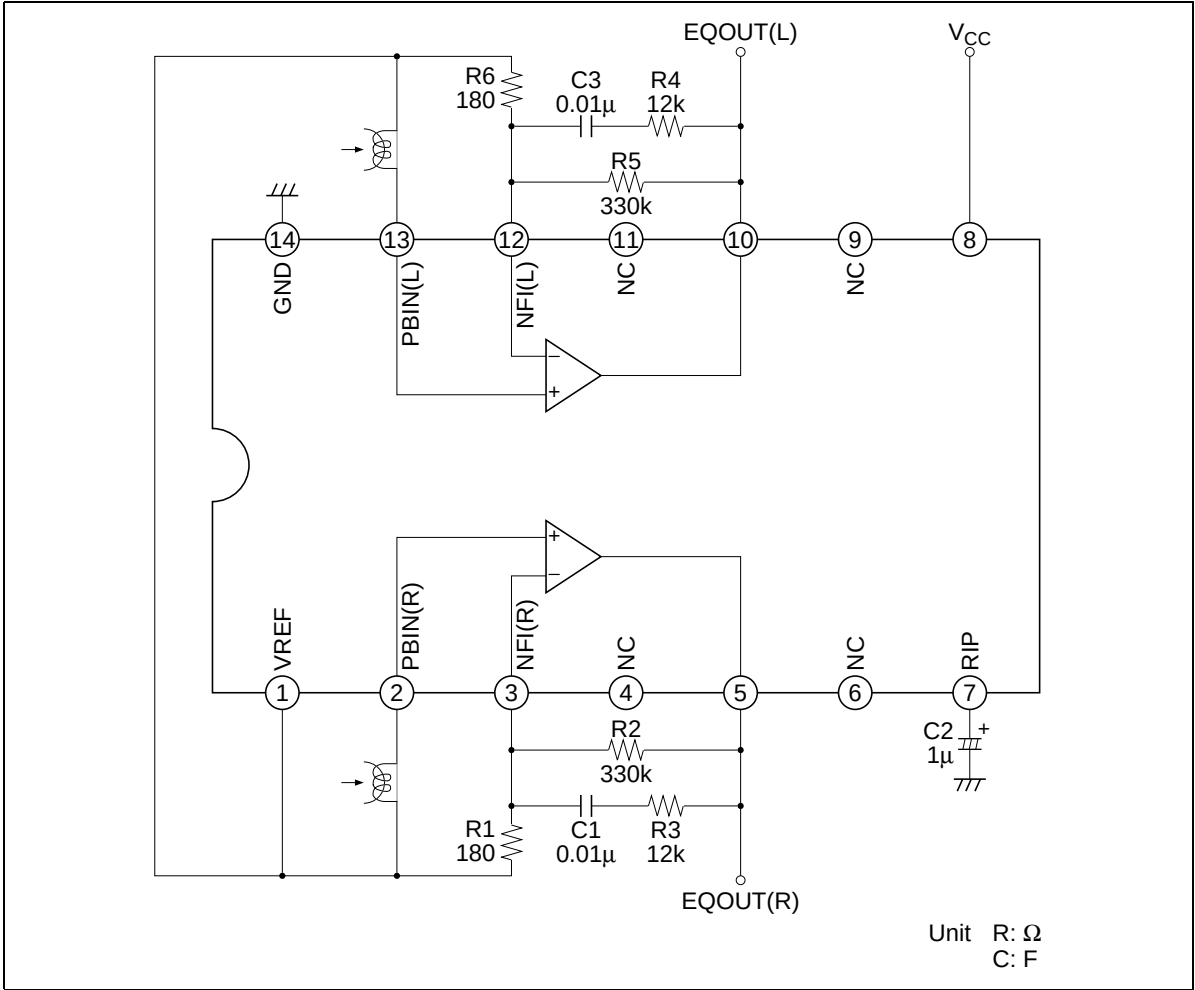
Pin No.	Pin Name	Note	Equivalent Circuit	Description
7	RIP	$V = V_{cc}/2$		Ripple filter
1	VREF	$V = V_{cc}/2$		Reference output
10	EQOUT(L)	$V = V_{cc}/2$		Equalizer output
5	EQOUT(R)			
2	PBIN(R)	—		PB equalizer input
13	PBIN(L)			
3	NFI(R)	$V = V_{cc}/2$		Equalizer output
12	NFI(L)			for time constant

Pin Description, Equivalent Circuit ($V_{CC} = 9\text{ V}$ single supply, $T_a = 25^{\circ}\text{C}$, No Signal, The value in the table shows typical value.) (cont.)

Pin No.	Pin Name	Note	Equivalent Circuit	Description
8	V_{CC}	—		Power supply
14	GND	—		GND pin
4	NC	—		
6				
9				
11				

HA12232FP

Block Diagram



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

Item	Symbol	Rating	Unit	Note
Supply voltage	V_{cc} Max	16	V	
Power dissipation	P_d	400	mW	$T_a \leq 85^{\circ}\text{C}$
Operating temperature	T_{opr}	-40 to $+85$	$^{\circ}\text{C}$	
Storage temperature	T_{stg}	-55 to $+125$	$^{\circ}\text{C}$	

Electrical Characteristics ($T_a = 25^{\circ}\text{C}$, $V_{cc} = 9\text{ V}$, $R_g = 680\ \Omega$)

Item	Symbol	Test Condition	Specification			Unit	Remark
			Min	Typ	Max		
Quiescent current	I_Q	No signal	1.5	2.2	3.2	mA	
Channel separation	CT RL	$F_{in} = 1\text{kHz}$, $V_{in} = 6\text{mVrms}$	50.0	60.0	—	dB	
EQ gain	G_v 1k	$F_{in} = 1\text{kHz}$, $V_{in} = 0.6\text{mVrms}$	37.0	40.0	43.0	dB	
	G_v 10k	$F_{in} = 10\text{kHz}$, $V_{in} = 0.6\text{mVrms}$	33.0	36.0	39.0	dB	
THD	THD	$F_{in} = 1\text{kHz}$, $V_{in} = 2.4\text{mVrms}$	—	0.1	0.5	%	
EQ maximum output	V_{OM}	$F_{in} = 1\text{kHz}$, THD = 1%	300	600	—	mVrms	*1
Noise voltage level converted in input	VN	$R_g = 680\ \Omega$, Din-Audio Filter	—	0.7	1.5	μVrms	

Note: 1. $V_{cc} = 6.5\text{ V}$

HA12232FP

Functional Description

Power Supply Range

HA12232FP is designed to operate on single supply only.

Table 1 Supply Voltage Range

Product	Single Supply
HA12232FP	6.5 V to 15.0 V

Reference Voltage

HA12232FP provides the reference voltage of half the supply voltage that is the signal grounds. As the peculiarity of this device, the capacitor for the ripple filter is very small about 1/100 compared with their usual value. The block diagram is shown as figure 1.

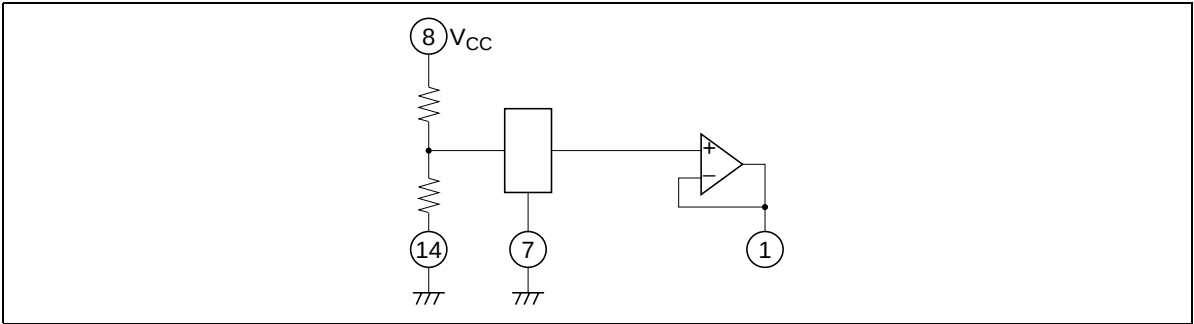


Figure 1 The Block Diagram of Reference Supply Voltage

Input Block Diagram and Level Diagram

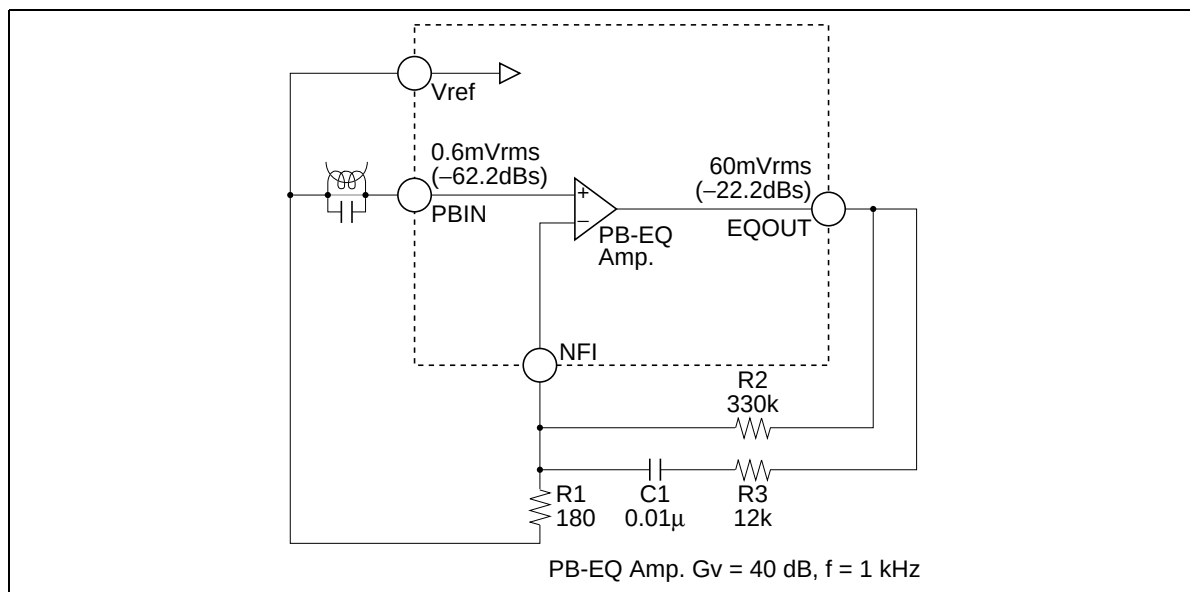


Figure 2 Input Block Diagram

Cutoff Frequency, Gain of PB-EQ Amp.

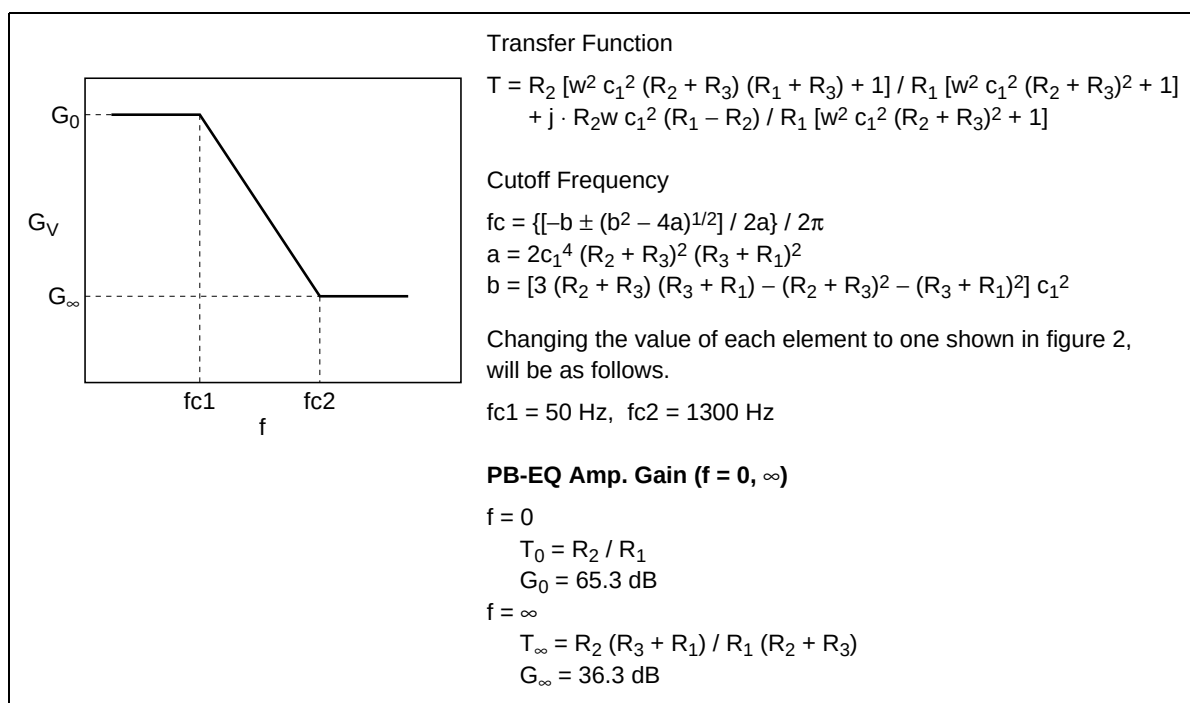
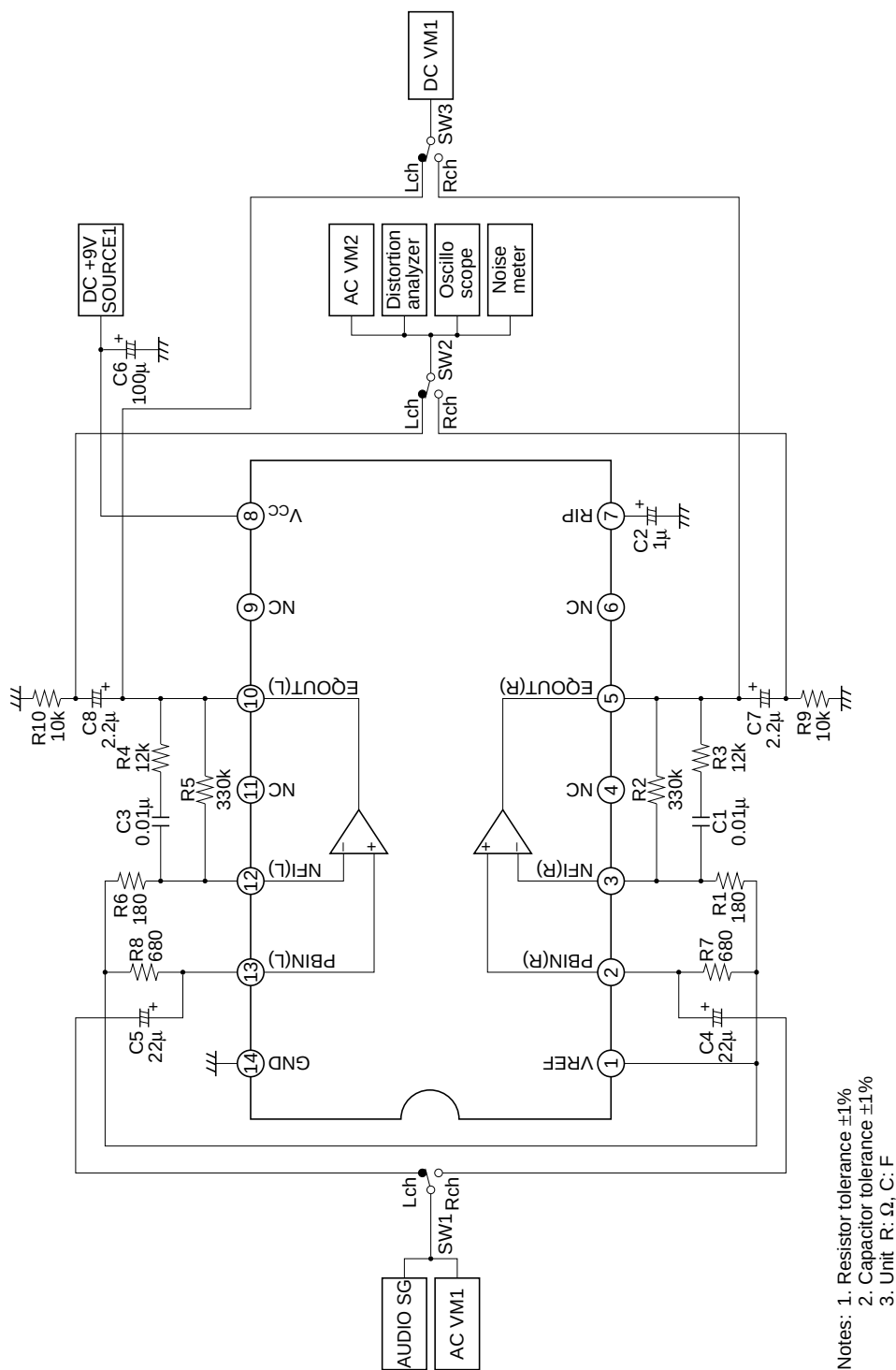
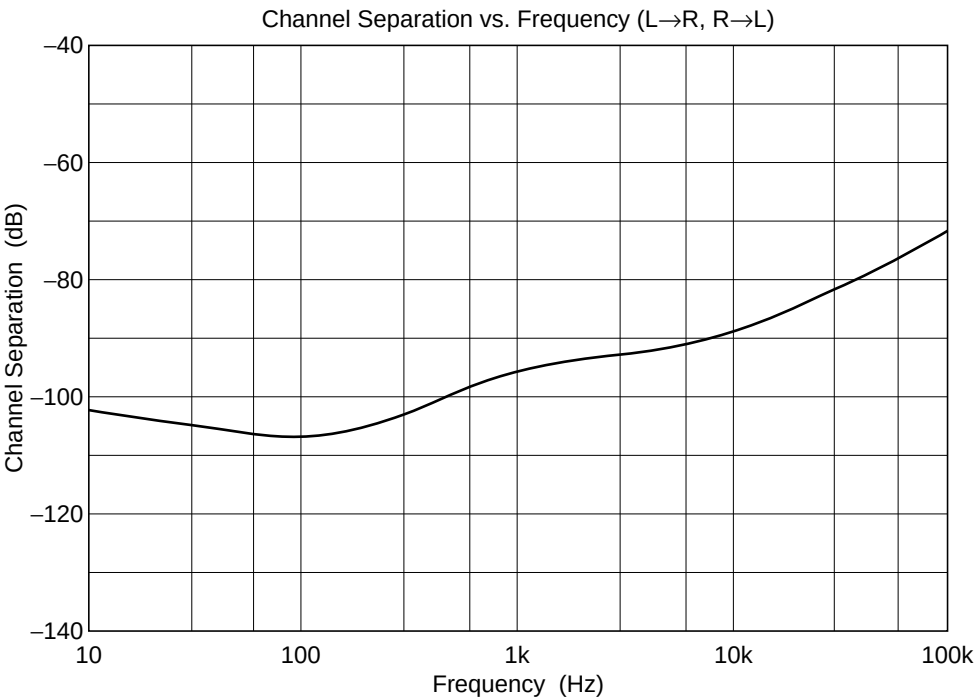
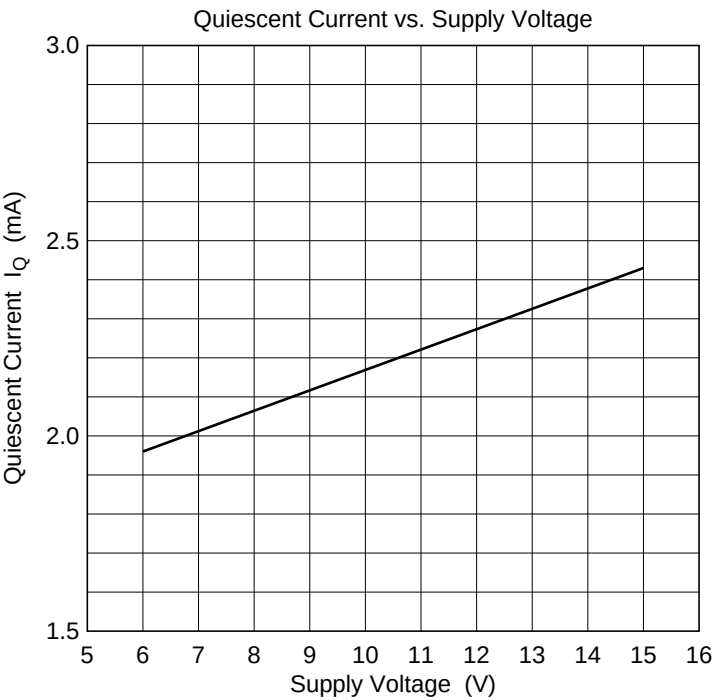


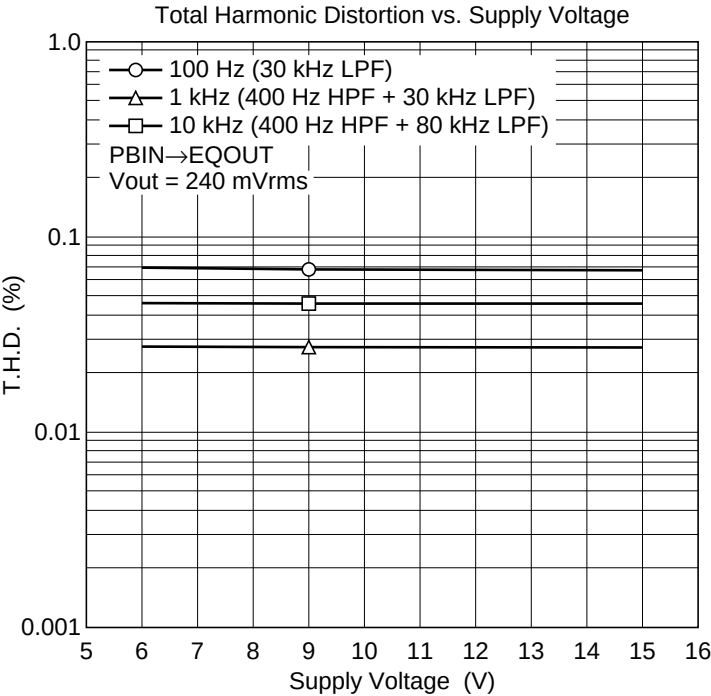
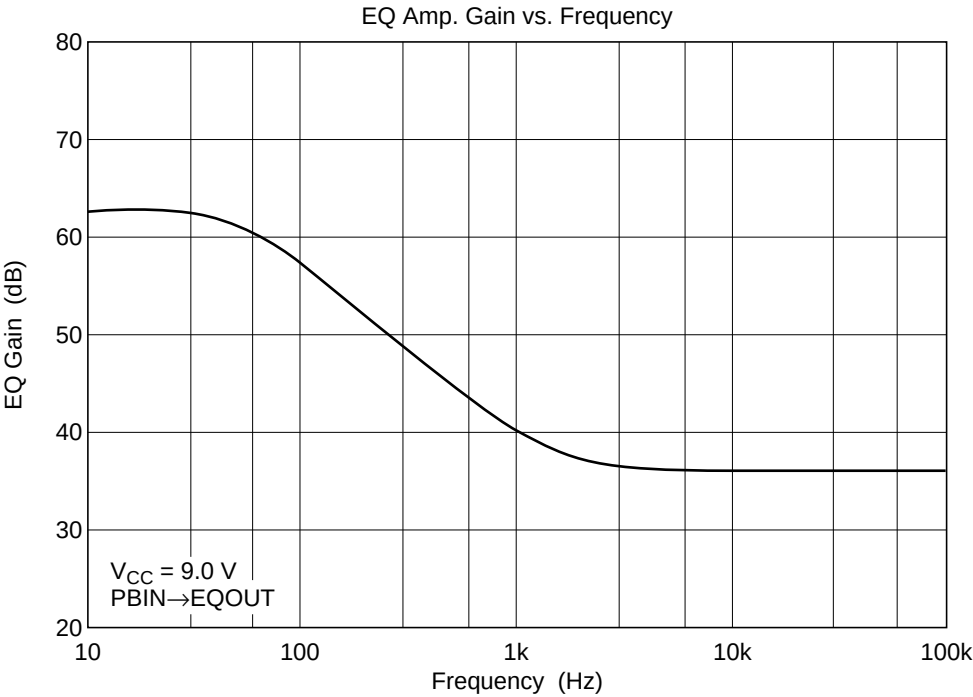
Figure 3 Cutoff Frequency of PB-EQ Amp.

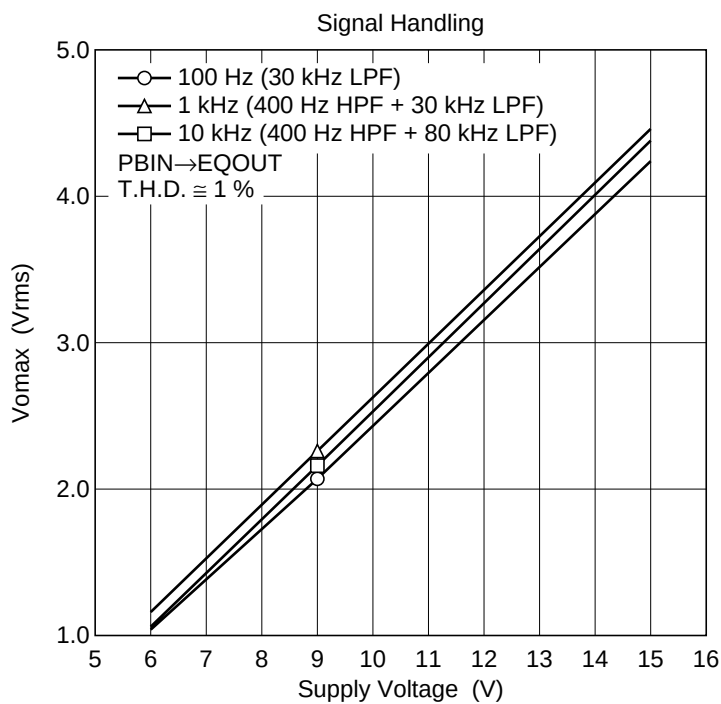
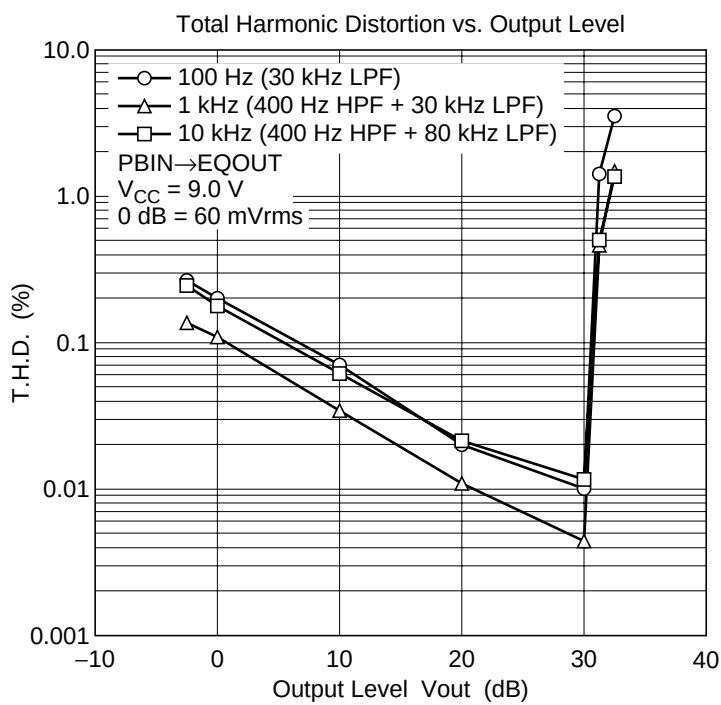
Test Circuit

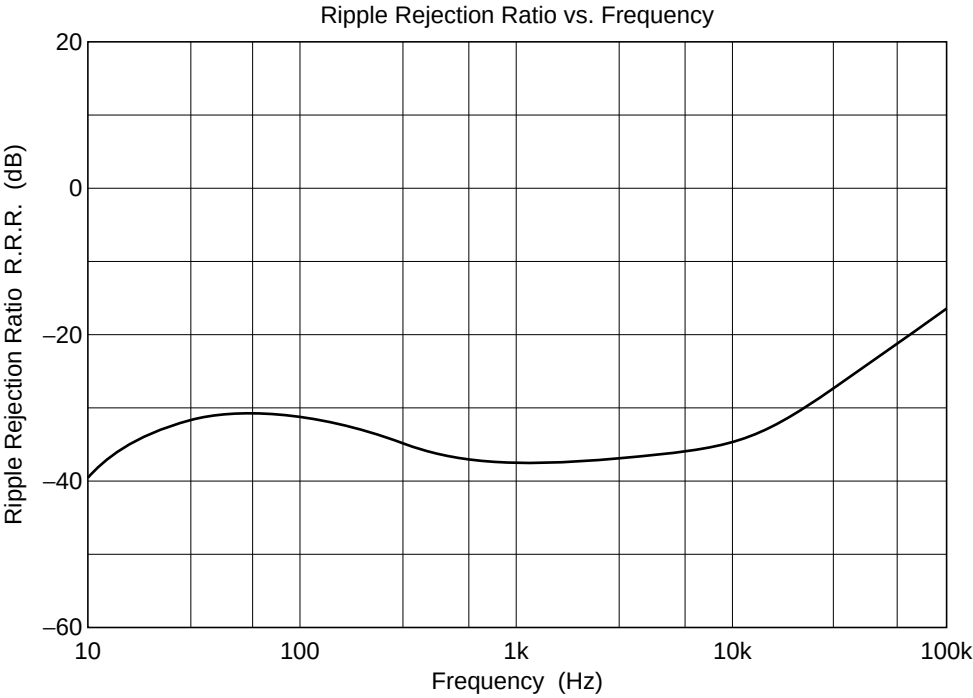
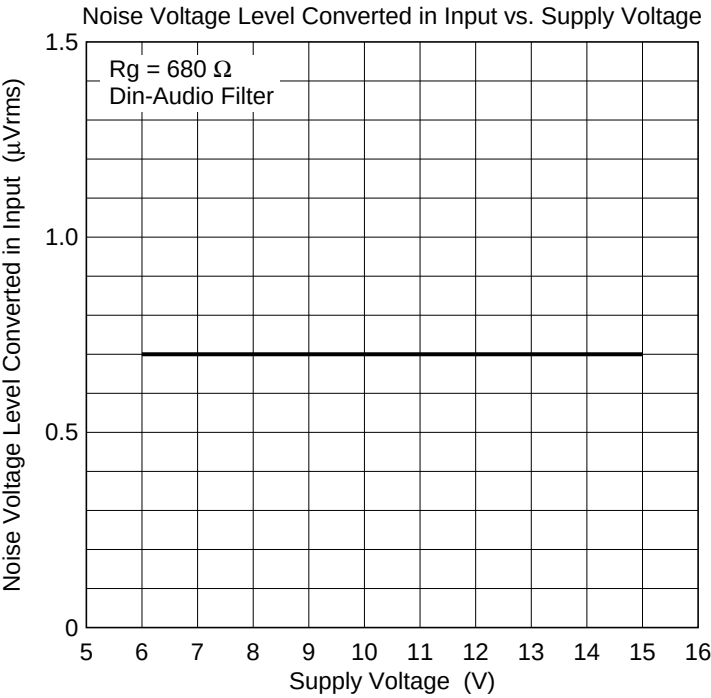


Characteristic Curves



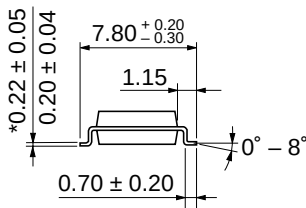
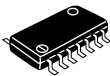
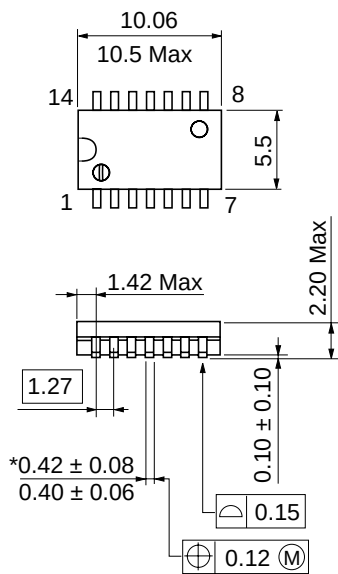






Package Dimensions

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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