

# HA17558B Series

## Dual Operational Amplifier

REA03D0003-0100

Rev.1.00

Dec 25, 2006

### Description

HA17558B is dual bipolar op-amp with improved characteristics compared to HA17558A. It has wide bandwidth, low noise, high slew rate; wide operating voltage range and high gain characteristics.

This product has a wide range of applications that is appropriate for audio application, as well as AC/DC converter.

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### Features

- Wide bandwidth: 7 MHz
- High speed: 3 V/ $\mu$ s
- Low input noise voltage: 1  $\mu$ Vrms
- Large DC voltage gain: 110 dB
- Operating voltage:  $\pm 2$  V to  $\pm 18$  V
- Package outline available in Pb free lead frame:
  - DP-8
  - SOP-8 (JEITA)
  - SOP-8 (JEDEC)

### Applications

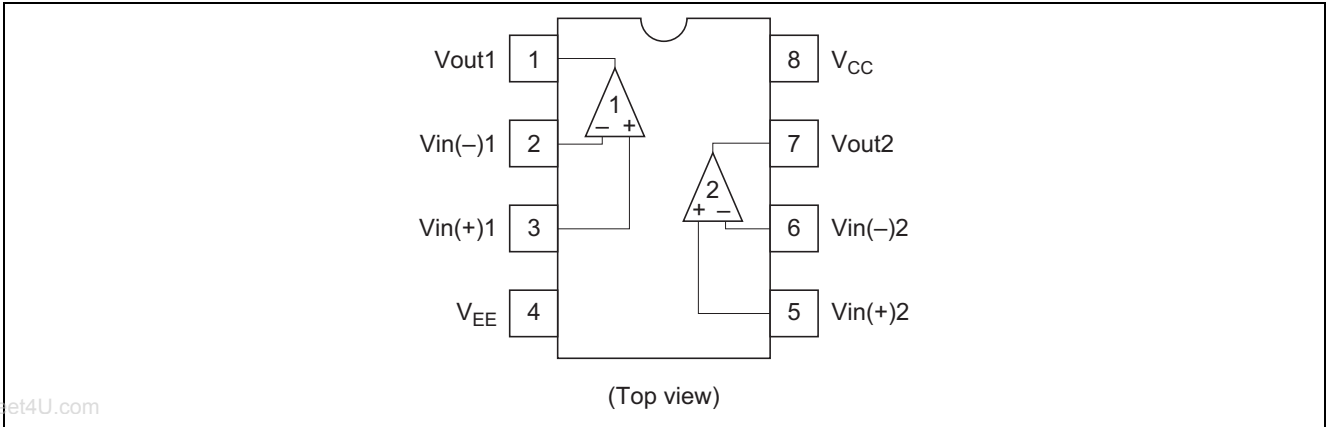
- Audio AC-3 decoder system
- Audio amplifier
- AC/DC converter

### Ordering Information

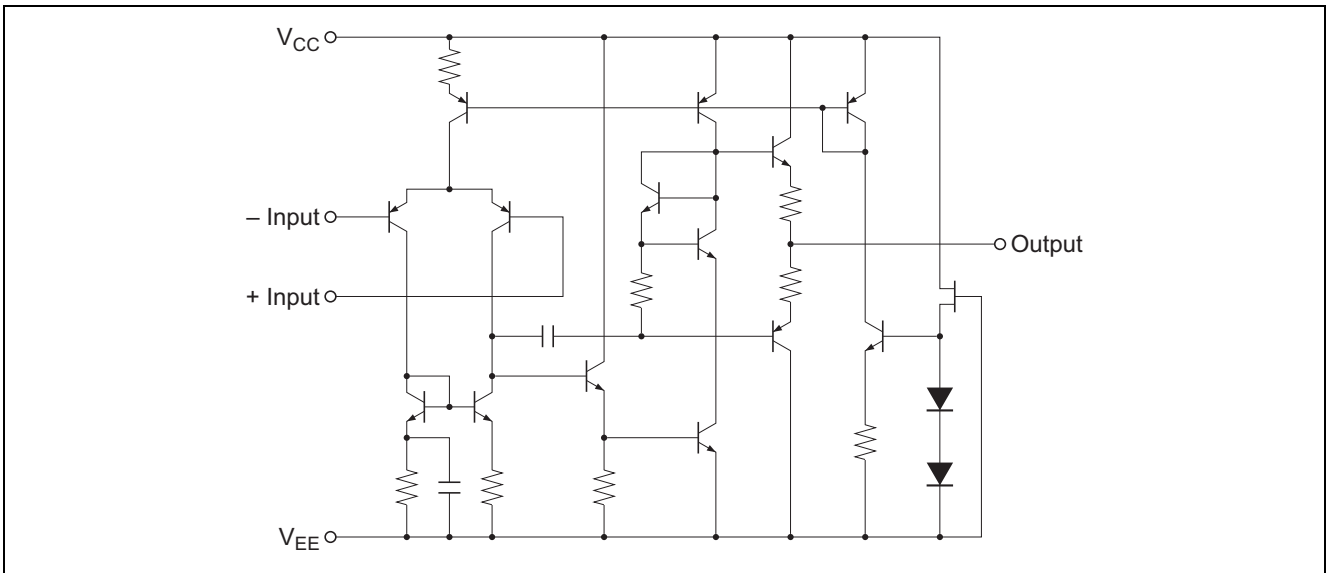
Type No.	Application	Package Code (Package Name)
HA17558B	Commercial use	PRDP0008AF-B (DP-8FV)
HA17558BF		PRSP0008DE-B (FP-8DGV)
HA17558BRP		PRSP0008DD-C (FP-8DCV)

Note: This product is designed for consumer use and not for automotive.

### Pin Arrangement



### Circuit Schematic (1/2)



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings			Unit
		HA17558B	HA17558BF	HA17558BRP	
Supply Voltage	V <sub>CC</sub>	18	18	18	V
	V <sub>EE</sub>	-18	-18	-18	V
Differential input voltage	V <sub>IN</sub> (diff)	±30	±30	±30	V
Common mode input voltage	V <sub>CM</sub> *3	±15	±15	±15	V
Power dissipation	P <sub>T</sub>	670 *1	385 *2	385 *2	mW
Operating temperature	Topr	-40 to +85	-40 to +85	-40 to +85	°C
Storage temperature	Tstg	-55 to +125	-55 to +125	-55 to +125	°C

Notes: 1. This is the allowable value up to Ta = 45°C. Derate by 8.3 mW/°C above that temperature.

2. These are the allowable values up to Ta = 60°C mounting on 40mm × 40mm × 1.6mm (t) 10% wiring density glass epoxy board. Derate by 5.9 mW/°C above that temperature.

3. If the supply voltage is less than ±15 V, input voltage should be less than supply voltage.

## Electrical Characteristics

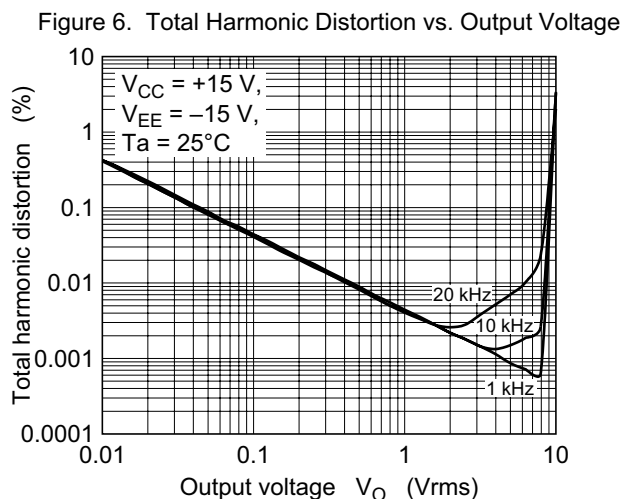
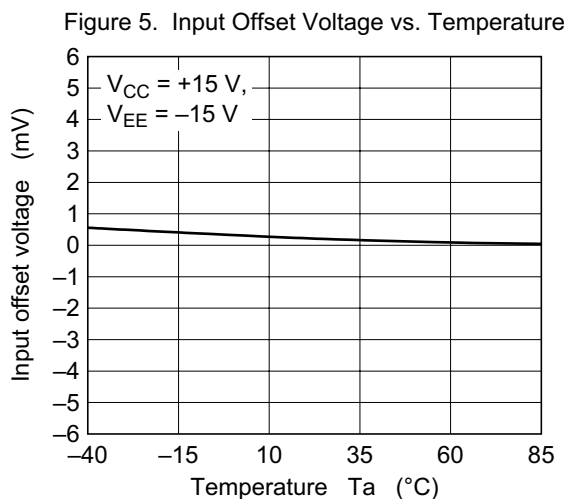
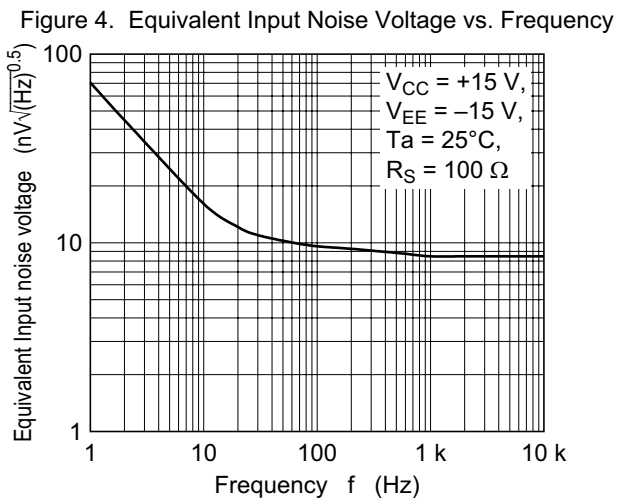
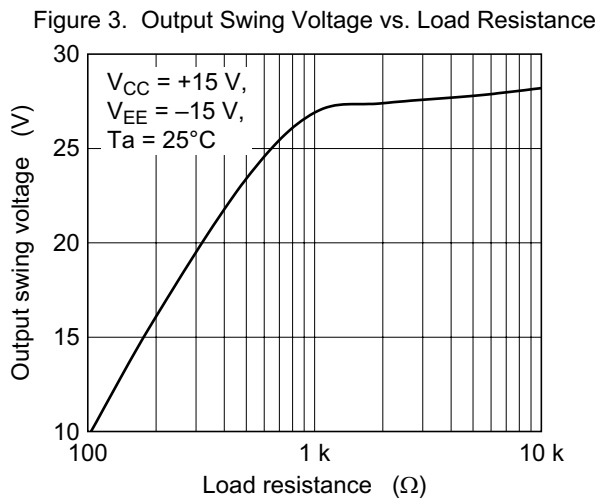
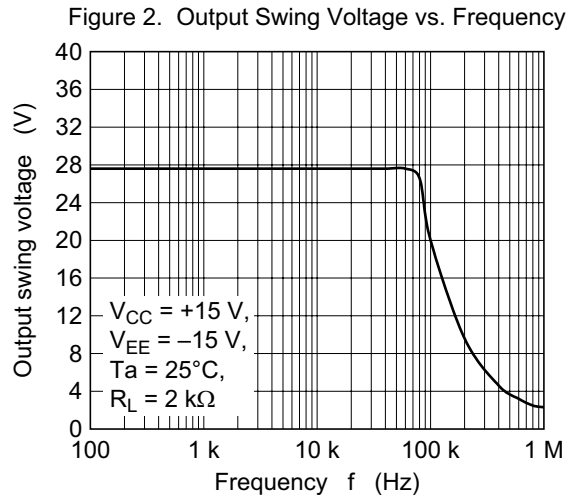
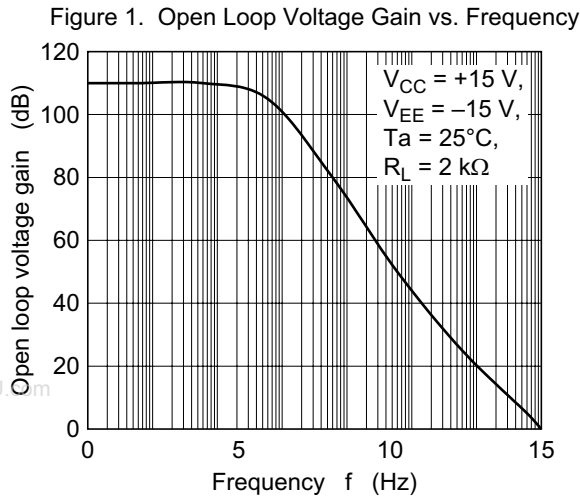
(Ta = 25°C, V<sub>CC</sub> = +15 V, V<sub>EE</sub> = -15 V, unless otherwise specified)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V <sub>IO</sub>	—	0.5	3	mV	R <sub>S</sub> ≤ 10 kΩ
Input offset current	I <sub>IO</sub>	—	5	50	nA	
Input bias current	I <sub>IB</sub>	—	65	250	nA	
Supply current	I <sub>CC</sub>	—	2.5	4	mA	
Power supply rejection ratio	PSRR	80	100	—	dB	R <sub>S</sub> ≤ 10 kΩ
Voltage gain	A <sub>V</sub>	85	110	—	dB	R <sub>L</sub> ≥ 2 kΩ, V <sub>O</sub> = ±10 V
Common mode rejection ratio	CMR	80	100	—	dB	R <sub>S</sub> ≤ 10 kΩ
Output swing voltage	V <sub>OS</sub>	±10	±13	—	V	R <sub>L</sub> ≥ 2 kΩ
		±12	±14	—	V	R <sub>L</sub> ≥ 10 kΩ
Output sink current	I <sub>OSINK</sub>	—	70	—	mA	V <sub>IN(-)</sub> = 1 V, V <sub>IN(+)</sub> = 0 V, V <sub>O</sub> = 2 V
Output source current	I <sub>OSOURCE</sub>	—	45	—	mA	V <sub>IN(-)</sub> = 0 V, V <sub>IN(+)</sub> = 1 V, V <sub>O</sub> = 2 V
Slew rate	SR	—	3	—	V/μs	
Equivalent input noise voltage	V <sub>NI</sub>	—	1	—	μV <sub>rms</sub>	RIAA, R <sub>S</sub> = 1 kΩ, 30 kHz LPF
Gain bandwidth product	f <sub>u</sub>	—	7	—	MHz	f = 10 kHz
Total harmonic distortion	THD	—	0.0045	—	%	f = 1 kHz, V <sub>O</sub> = 1 V <sub>rms</sub>

## Table of Graphs

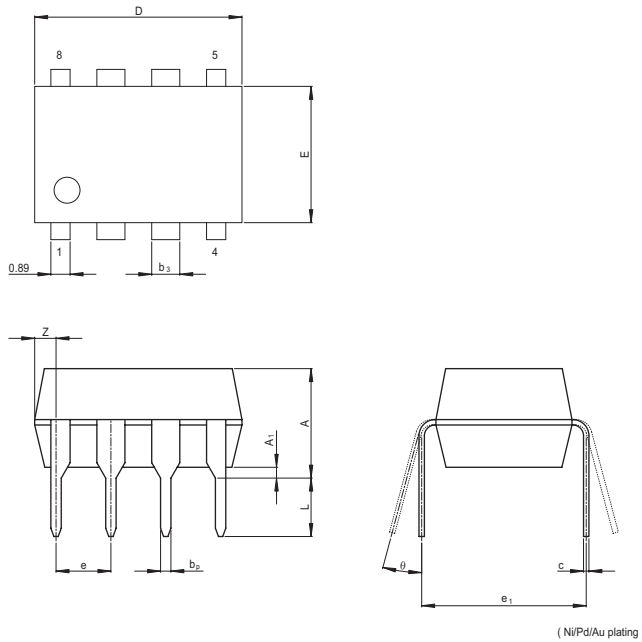
Electrical Characteristics		Figure
Open loop voltage gain	vs. Frequency $f$	1
Output swing voltage	vs. Frequency $f$	2
Output swing voltage	vs. Load resistance $R_L$	3
Equivalent input noise voltage	vs. Frequency $f$	4
Input offset voltage	vs. Temperature $T_a$	5
Total harmonic distortion	vs. Output Voltage $V_o$	6

Typical Characteristics Curves



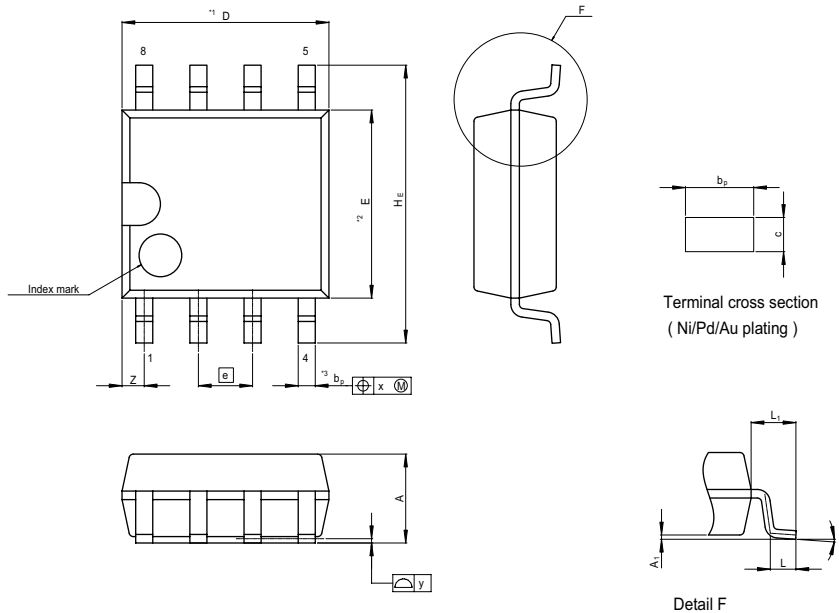
Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x9.6-2.54	PRDP0008AF-B	DP-8FV	0.54g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
$e_1$	—	7.62	—
$D$	—	9.60	10.6
$E$	—	6.30	7.4
$A$	—	—	5.06
$A_1$	0.5	—	—
$b_p$	0.40	0.48	0.56
$b_3$	—	1.30	—
$c$	0.19	0.25	0.31
$\theta$	0°	—	15°
$e$	2.29	2.54	2.79
$Z$	—	—	1.27
$L$	2.54	—	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-B	FP-8DGV	0.1g

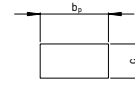
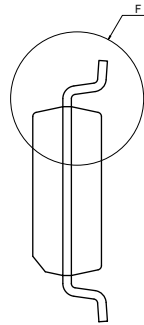
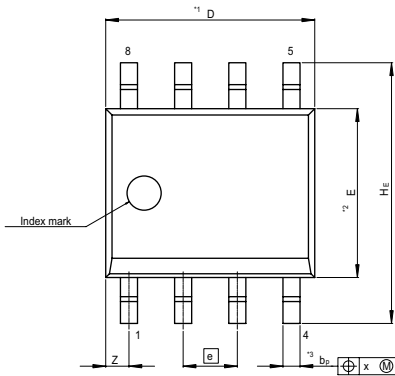


NOTE  
 1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2\* DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\* DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
$D$	—	4.85	5.25
$E$	—	4.4	—
$A_2$	—	—	—
$A_1$	0.00	0.1	0.20
$A$	—	—	2.03
$b_p$	0.35	0.4	0.45
$b_1$	—	—	—
$c$	0.15	0.20	0.25
$c_1$	—	—	—
$\theta$	0°	—	8°
$H_E$	6.35	6.5	6.75
$\text{Ⓢ}$	—	1.27	—
$x$	—	—	0.12
$y$	—	—	0.15
$Z$	—	—	0.75
$L$	0.42	0.60	0.85
$L_1$	—	1.05	—

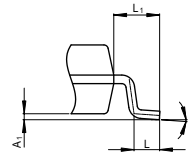
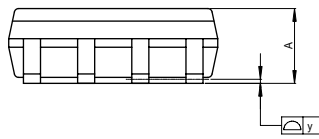
# HA17558B Series

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-3.95x4.9-1.27	PRSP0008DD-C	FP-8DCV	0.085g



Terminal cross section  
( Ni/Pd/Au plating )

NOTE)  
1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2"  
DO NOT INCLUDE MOLD FLASH.  
2. DIMENSION\*\*3"DOES NOT  
INCLUDE TRIM OFFSET.



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.30
E	—	3.95	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.10	0.14	0.25
A	—	—	1.75
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	5.80	6.10	6.20
ⓐ	—	1.27	—
x	—	—	0.25
y	—	—	0.10
Z	—	—	0.75
L	0.40	0.60	1.27
L <sub>1</sub>	—	1.08	—

Notes:

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