To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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HA17558B Series

Dual Operational Amplifier

REA03D0003-0200
Rev.2.00
Dec 24, 2008

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.

Features

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

Applications

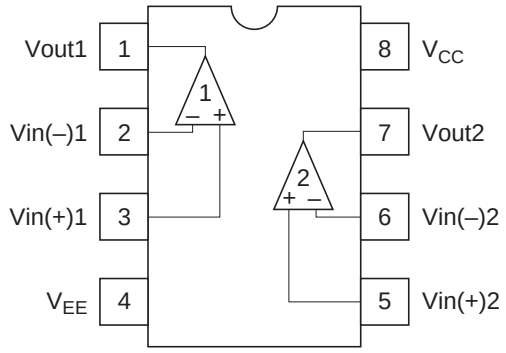
- Audio AC-3 decoder system
- Audio amplifier
- AC/DC converter

Ordering Information

Part No.	Application	Package Code (Package Name)	Packing Abbreviation (Quantity)
HA17558B	Commercial use	PRDP0008AF-B (DP-8FV)	— (50 pcs/stick 1,000 pcs/box)
HA17558BF		PRSP0008DE-B (FP-8DGV)	EL (2,500 pcs/reel)
HA17558BRP		PRSP0008DD-C (FP-8DCV)	EL (2,500 pcs/reel)

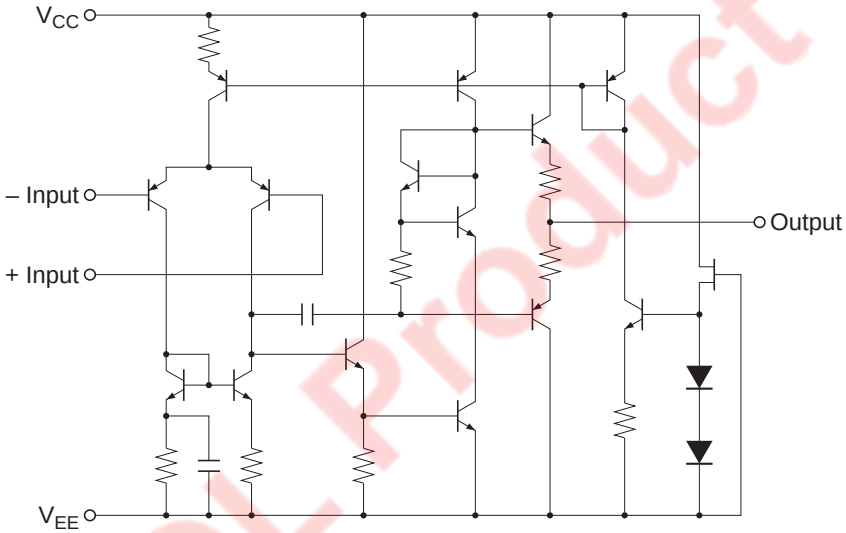
Note: This product is designed for consumer use and not for automotive and industry.

Pin Arrangement



(Top view)

Circuit Schematic (1/2)



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings			Unit
		HA17558B	HA17558BF	HA17558BRP	
Supply Voltage	V_{CC}	18	18	18	V
	V_{EE}	–18	–18	–18	V
Differential input voltage	V_{IN} (diff)	±30	±30	±30	V
Common mode input voltage	V_{CM} *3	±15	±15	±15	V
Power dissipation	P_T	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_{CC} = +15 V, V_{EE} = –15 V, unless otherwise specified)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	0.5	3	mV	$R_S \leq 10$ kΩ
Input offset current	I_{IO}	—	5	50	nA	
Input bias current	I_{IB}	—	65	250	nA	
Supply current	I_{CC}	—	2.5	4	mA	
Power supply rejection ratio	PSRR	80	100	—	dB	$R_S \leq 10$ kΩ
Voltage gain	A_V	85	110	—	dB	$R_L \geq 2$ kΩ, V_O = ±10 V
Common mode rejection ratio	CMR	80	100	—	dB	$R_S \leq 10$ kΩ
Output swing voltage	V_{OS}	±10	±13	—	V	$R_L \geq 2$ kΩ
		±12	±14	—	V	$R_L \geq 10$ kΩ
Output sink current	I_{OSINK}	—	70	—	mA	$V_{IN(–)}$ = 1 V, $V_{IN(+)}$ = 0 V, V_O = 2 V
Output source current	$I_{OSOURCE}$	—	45	—	mA	$V_{IN(–)}$ = 0 V, $V_{IN(+)}$ = 1 V, V_O = 2 V
Slew rate	SR	—	3	—	V/µs	
Equivalent input noise voltage	V_{NI}	—	1	—	µVrms	RIAA, R_S = 1 kΩ, 30 kHz LPF
Gain bandwidth product	fu	—	7	—	MHz	f = 10 kHz
Total harmonic distortion	THD	—	0.0045	—	%	f = 1 kHz, V_O = 1 Vrms

Table of Graphs

Typical Characteristics Curves

Figure 1. Open Loop Voltage Gain vs. Frequency

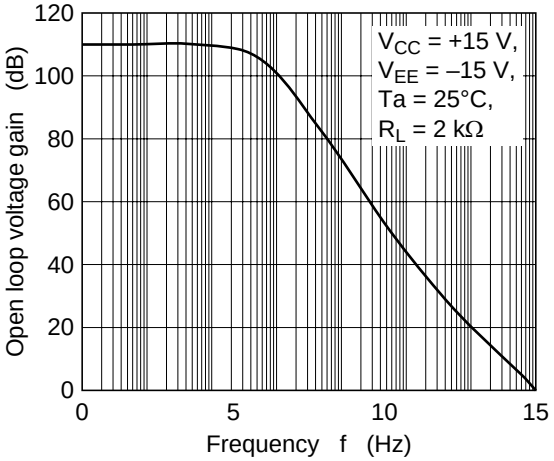


Figure 2. Output Swing Voltage vs. Frequency

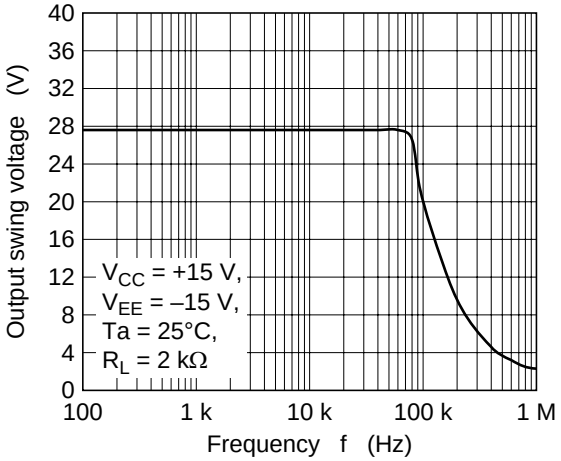


Figure 3. Output Swing Voltage vs. Load Resistance

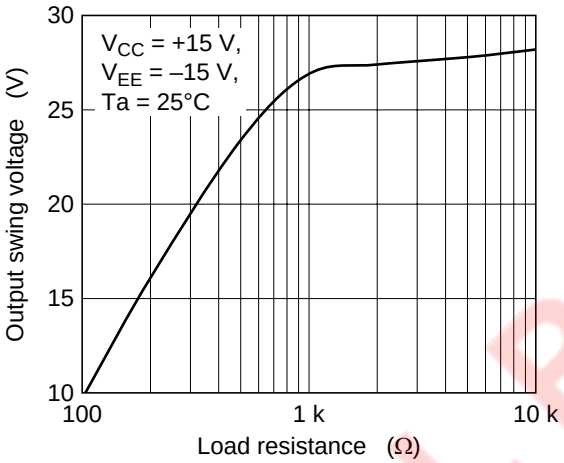


Figure 4. Equivalent Input Noise Voltage vs. Frequency

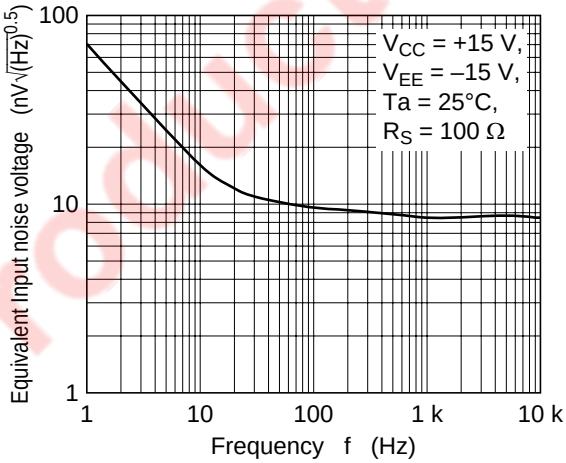


Figure 5. Input Offset Voltage vs. Temperature

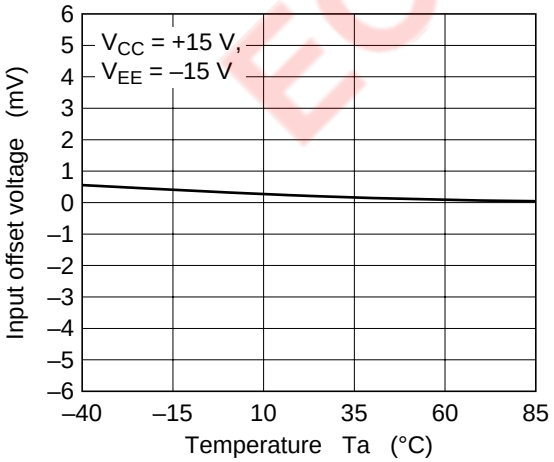
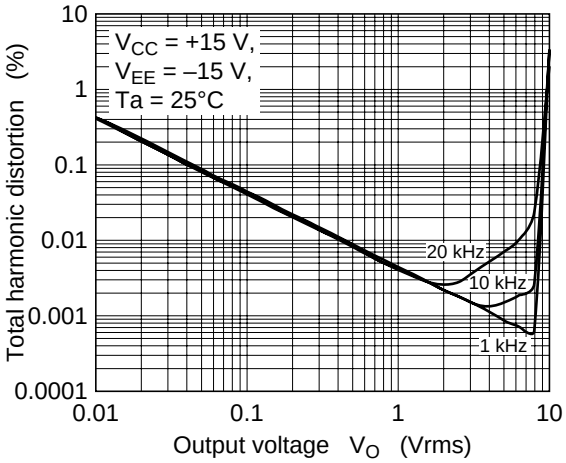
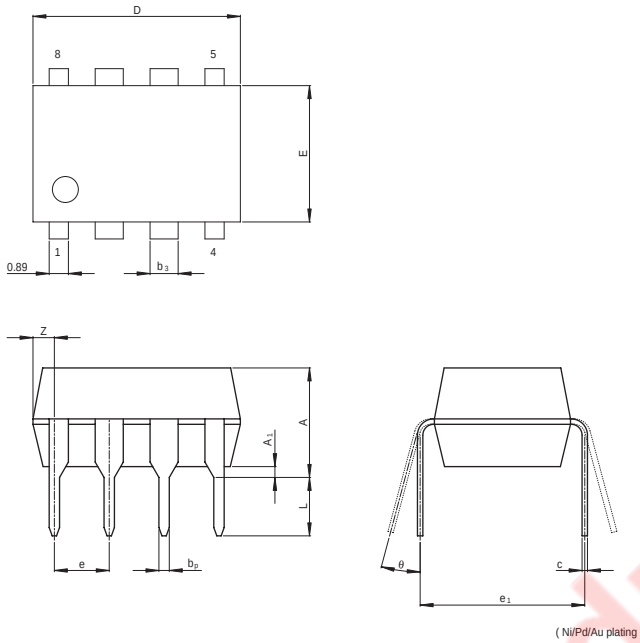


Figure 6. Total Harmonic Distortion vs. Output Voltage



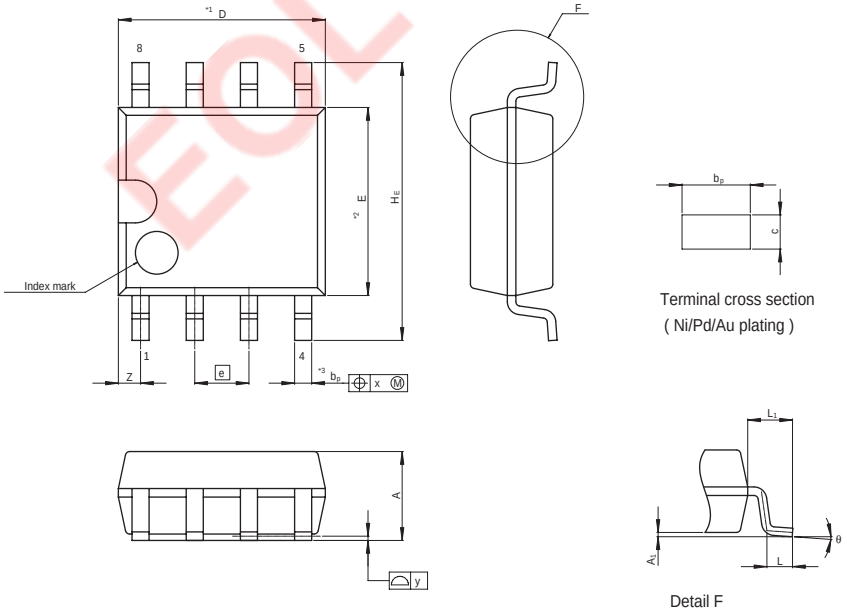
Package Dimensions

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
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.27
L	2.54	—	—

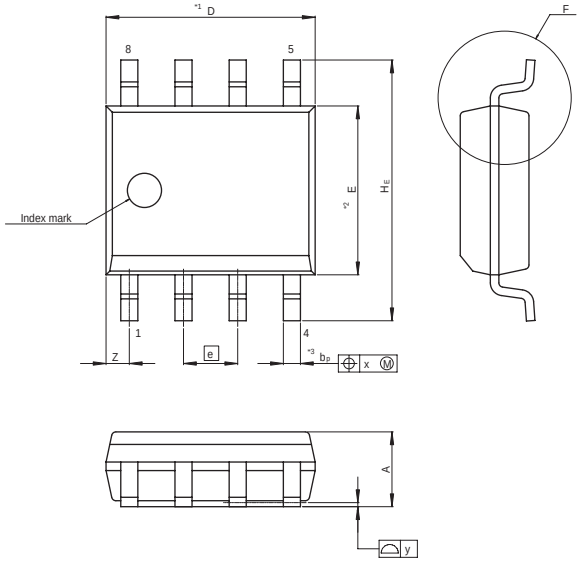
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-B	FP-8DGV	0.1g

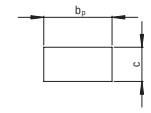


NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

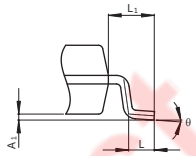
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.85	5.25
E	—	4.4	—
A_2	—	—	—
A_1	0.00	0.1	0.20
A	—	—	2.03
b_p	0.35	0.4	0.45
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	6.35	6.5	6.75
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.75
L	0.42	0.60	0.85
L_1	—	1.05	—

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)



Detail F

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	—	4.90	5.30
E	—	3.95	—
A_2	—	—	—
A_1	0.10	0.14	0.25
A	—	—	1.75
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.10
Z	—	—	0.75
L	0.40	0.60	1.27
L_1	—	1.08	—

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