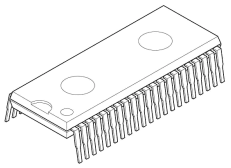
Audio Processor with SRS WOW

■ GENERAL DESCRIPTION

The **NJW1183** is an audio processor with SRS WOW. It includes all of functions processing audio signal for TV, such as volume, balance and tone control. All of internal status and variables are controlled by I^2C BUS.

■ PACKAGE OUTLINE

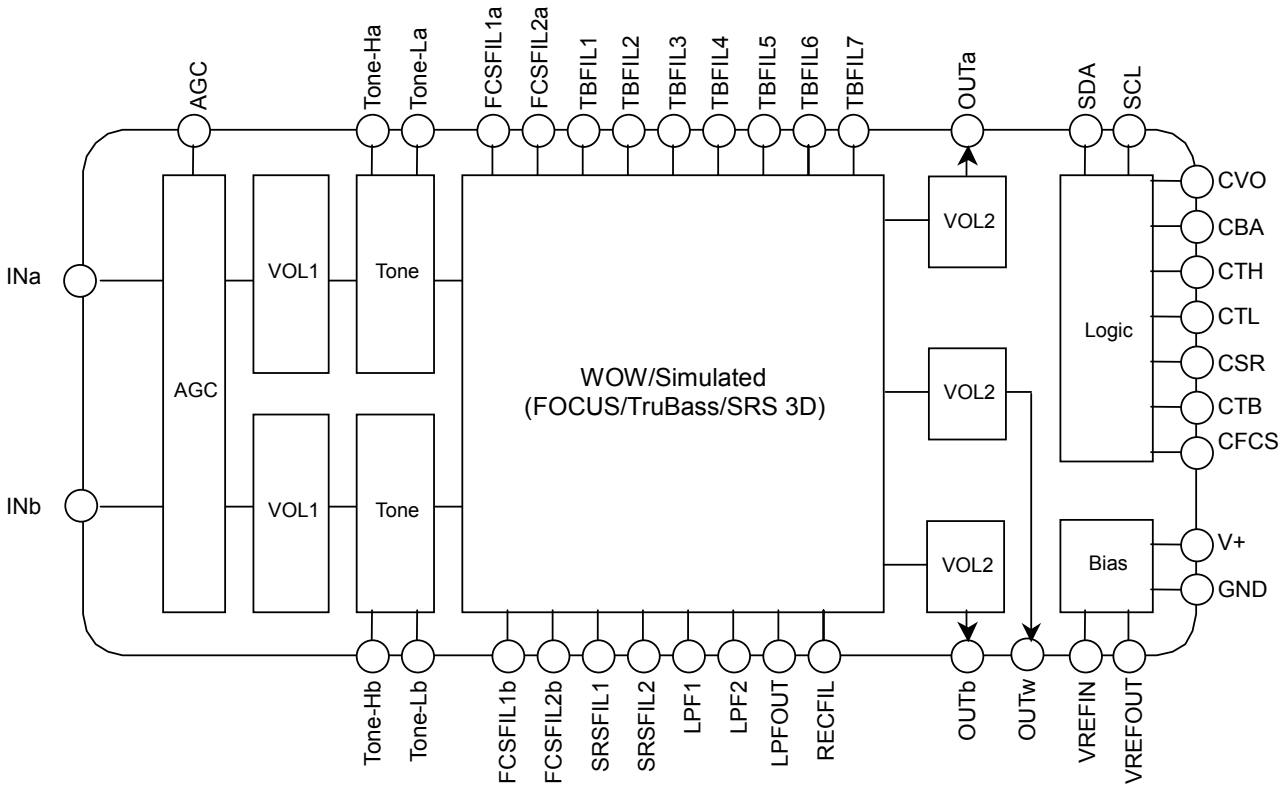


NJW1183L

■ FEATURES

- Operating Voltage 8 to 13 V
- SRS WOW (including SRS 3D, FOCUS and TruBass function)
- Simulated Stereo
- 4ch Input Selector
- Volume 0 to -80dB (0.5dB/step), MUTE
- Balance 0 to -30dB (1dB/step), MUTE
- Tone Control -9dB to +9dB(1dB/step)
- I^2C BUS Interface
- Bi-CMOS Technology
- Package Outline SDIP42

■ BLOCK DIAGRAM



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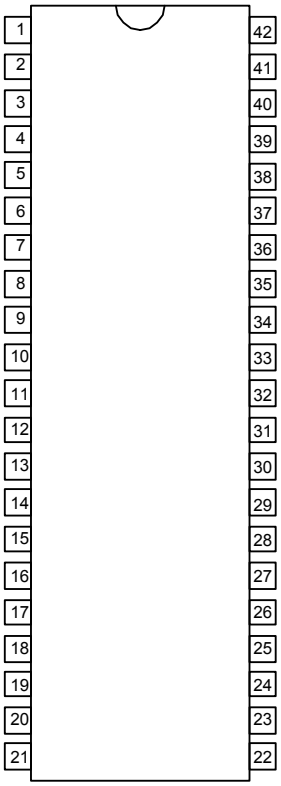
■ PIN FUNCTION

(SDIP42)



1.	TBFIL2	15.	TONE-La	29.	TONE-Hb
2.	TBFIL1	16.	OUTa	30.	TESTb
3.	LPFOUT	17.	CTH	31.	INb
4.	LPF2	18.	CTL	32.	AGC
5.	LPF1	19.	SDA	33.	FCSFIL2b
6.	OUTW	20.	SCL	34.	FCSFIL1b
7.	SRSFIL1	21.	GND	35.	CTB
8.	CSR	22.	V+	36.	SRSFIL2
9.	FCSFIL1a	23.	VREFOUT	37.	RECFIL
10.	FCSFIL2a	24.	VREFIN	38.	TBFIL7
11.	CFCS	25.	CVO	39.	TBFIL6
12.	INa	26.	CBA	40.	TBFIL5
13.	TESTa	27.	OUTb	41.	TBFIL4
14.	TONE-Ha	28.	TONE-Lb	42.	TBFIL3

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■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V^+	15	V
Power Dissipation	P_D	700	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +125	°C

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V+=9V, Rg=600Ω, R_L=47k Ω, Vin=100mVrms/1kHz unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+		8.0	9.0	13.0	V
Supply Current	I_{CC}	No Signal	-	20	35	mA
Reference Voltage	V_{REF}	No Signal	4.0	4.5	5.0	V
Maximum Input Voltage	V_{IM}	VOL=-20dB,THD=10%	2.8	3.0	-	Vrms
Maximum Output Voltage	V_{OM}	OUTPUT VOL=0dB,THD=1%	-	2.5	-	Vrms
Maximum Gain	G_{VMAX}	VOL= 0dB	-2.0	0.0	2.0	dB
Minimum Gain	G_{VMIN}	VOL= MUTE, Vin=2Vrms	-	-100	-90	dB
Channel Balance 1	G_{CB1}	VOL=0dB	-1.0	0.0	1.0	dB
Channel Balance 2	G_{CB2}	VOL=-70dB, Vin=1Vrms	-1.0	0.0	1.0	dB
Balance Boost A	BA_{BST}	CHS="0", BAL="11111"	-2.0	0.0	2.0	dB
Balance Cut A	BA_{CUT}	CHS="1", BAL="11111" Vin = 1Vrms	-	-	-70	dB
Balance Boost B	BB_{BST}	CHS="1", BAL="11111"	-2.0	0.0	2.0	dB
Balance Cut B	BB_{CUT}	CHS="0", BAL="11111" Vin = 1Vrms	-	-	-70	dB
Total Harmonic Distortion	THD	Vo=0.5Vrms BW=400Hz to 30kHz	-	-	0.5	%
Channel Separation	CS	Vin = 1Vrms A-weighting	-	-80	-70	dB
Output Noise 1	V_{NO1}	VOL = 0dB A-weighting	- -	-90 (31.6)	-85 (56.2)	dBV (μVrms)
Output Noise 2	V_{NO2}	VOL = MUTE A-weighting	- -	-106 (5.0)	-96 (15.8)	dBV (μVrms)

♦ TONE CONTROL

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Frequency Boost	HF_{BST}	BCT="1", TREB="1001", f=10kHz	6.5	9.0	11.5	dB
High Frequency Flat	HF_{FLT}	TREB="0000", f=10kHz	-2.0	0.0	2.0	dB
High Frequency Cut	HF_{CUT}	BCT="0", TREB="1001", f=10kHz	-11.5	-9.0	-6.5	dB
Low Frequency Boost	LF_{BST}	BCB="1", BASS="1001", f=100Hz	6.5	9.0	11.5	dB
Low Frequency Flat	LF_{FLT}	BASS="0000", f=100Hz	-2.0	0.0	2.0	dB
Low Frequency Cut	LF_{CUT}	BCB="0", BASS="1001", f=100Hz	-11.5	-9.0	-6.5	dB

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♦ AGC CONTROL

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
AGC Boost	AGC_{BST}	AGC-FLAT = “300mVrms”, Vin=50mVrms, f=1kHz	1.5	3.5	5.5	dB
AGC Flat1	AGC_{FLT1}	AGC-FLAT = “300mVrms”, Vin=300mVrms, f=1kHz	-2.5	0.0	2.5	dB
AGC Flat2	AGC_{FLT2}	AGC-FLAT = “400mVrms”, Vin=400mVrms, f=1kHz	-2.5	0.0	2.5	dB
AGC Flat3	AGC_{FLT3}	AGC-FLAT = “500mVrms”, Vin=500mVrms, f=1kHz	-2.5	0.0	2.5	dB
AGC Flat4	AGC_{FLT4}	AGC-FLAT = “600mVrms”, Vin=600mVrms, f=1kHz	-2.5	0.0	2.5	dB
AGC Cut	AGC_{CUT}	AGC-FLAT = “300mVrms”, Vin=2Vrms, f=1kHz	-14	-10	-6.0	dB

♦ SURROUND

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
FOCUS Gain1	G_{FCS1}	FCS=”001”, f=10kHz, Ain → Aout	2.0	4.0	6.0	dB
FOCUS Gain2	G_{FCS2}	FCS=”010”, f=10kHz, Ain → Aout	3.0	5.0	7.0	dB
FOCUS Gain3	G_{FCS3}	FCS=”011”, f=10kHz, Ain → Aout	4.0	6.0	8.0	dB
FOCUS Gain4	G_{FCS4}	FCS=”100”, f=10kHz, Ain → Aout	5.0	7.0	9.0	dB
TruBass Gain1	G_{TB1}	TB=”001”, f=100Hz, Ain+Bin → Aout	4.0	6.0	8.0	dB
TruBass Gain2	G_{TB2}	TB=”010”, f=100Hz, Ain+Bin → Aout	5.0	7.0	9.0	dB
TruBass Gain3	G_{TB3}	TB=”011”, f=100Hz, Ain+Bin → Aout	6.0	8.0	10.0	dB
TruBass Gain4	G_{TB4}	TB=”100”, f=100Hz, Ain+Bin → Aout	7.0	9.0	11.0	dB
Simulated Stereo Gain	G_{SIM1}	SUR=”001”, f=1kHz, Ain+Bin → Aout	1.0	3.0	5.0	dB
SRS Gain1	G_{SRS1}	SUR=”010”, f=125Hz, Ain → Aout	4.0	6.0	8.0	dB
SRS Gain2	G_{SRS2}	SUR=”011”, f=125Hz, Ain → Aout	5.0	7.0	9.0	dB
SRS Gain3	G_{SRS3}	SUR=”100”, f=125Hz, Ain → Aout	6.0	8.0	10.0	dB
SRS Gain4	G_{SRS4}	SUR=”101”, f=125Hz, Ain → Aout	7.0	9.0	11.0	dB

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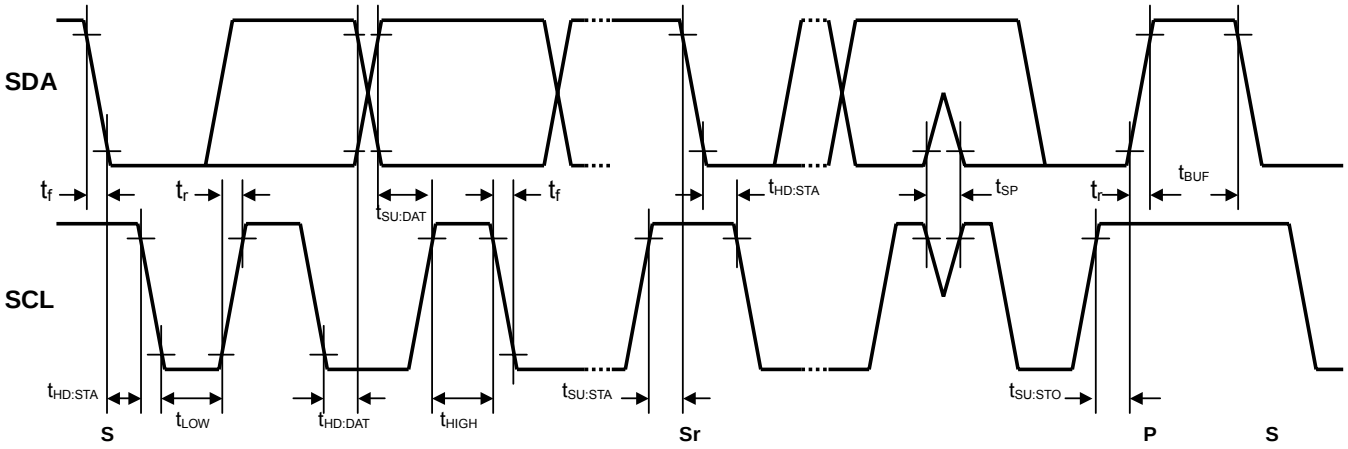
■ I²C BUS CHARACTERISTICS (SDA, SCL)

I²C BUS Load Conditions: Pull up resistance 4kΩ (Connected to +5V), Load capacitance 200pF (Connected to GND)

PARAMETER	SYMBOL	STANDARD MODE			FAST MODE			UNIT
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Low Level Input Voltage	V_{IL}	0.0	-	1.5	0.0	-	1.5	V
High Level Input Voltage	V_{IH}	2.7	-	5.0	2.7	-	5.0	V
Hysteresis of Schmitt trigger inputs	V_{hys}	-	-	-	0.25	-	-	V
LOW level output voltage (3mA at SDA pin)	V_{OL}	0	-	0.4	0	-	0.4	V
Output fall time from V_{IHmin} to V_{ILmax} with a bus capacitance from 10pF to 400pF	t_{of}	-	-	250	$20+0.1C_b$	-	250	ns
Pulse width of spikes which must be suppressed by the input filter	t_{SP}	-	-	-	0	-	50	ns
Input current each I/O pin with an input voltage between $0.1V_{DD}$ and $0.9V_{DDmax}$	I_i	-10	-	10	-10	-	10	μA
Capacitance for each I/O pin	C_i	-	-	10	-	-	10	pF
SCL clock frequency	f_{SCL}	-	-	100	-	-	400	kHz
Hold time (repeated) START condition.	$t_{HD:STA}$	4.0	-	-	0.6	-	-	μs
LOW period of the SCL clock	t_{LOW}	4.7	-	-	1.3	-	-	μs
HIGH period of the SCL clock	t_{HIGH}	4.0	-	-	0.6	-	-	μs
Set-up time for a repeated START condition	$t_{SU:STA}$	4.7	-	-	0.6	-	-	μs
Data hold time	$t_{HD:DAT}$	0	-	3.45	0	-	0.9	μs
Data set-up time	$t_{SU:DAT}$	250	-	-	100	-	-	ns
Rise time of both SDA and SCL signals	t_r	-	-	1000	-	-	300	ns
Fall time of both SDA and SCL signals	t_f	-	-	300	-	-	300	ns
Set-up time for STOP condition	$t_{SU:STO}$	4.0	-	-	0.6	-	-	μs
Bus free time between a STOP and START condition	t_{BUF}	4.7	-	-	1.3	-	-	μs
Capacitive load for each bus line	C_b	-	-	400	-	-	400	pF
Noise margin at the LOW level	V_{nL}	0.5	-	-	0.5	-	-	V
Noise margin at the HIGH level	V_{nH}	1	-	-	1	-	-	V

C_b ; total capacitance of one bus line in pF.



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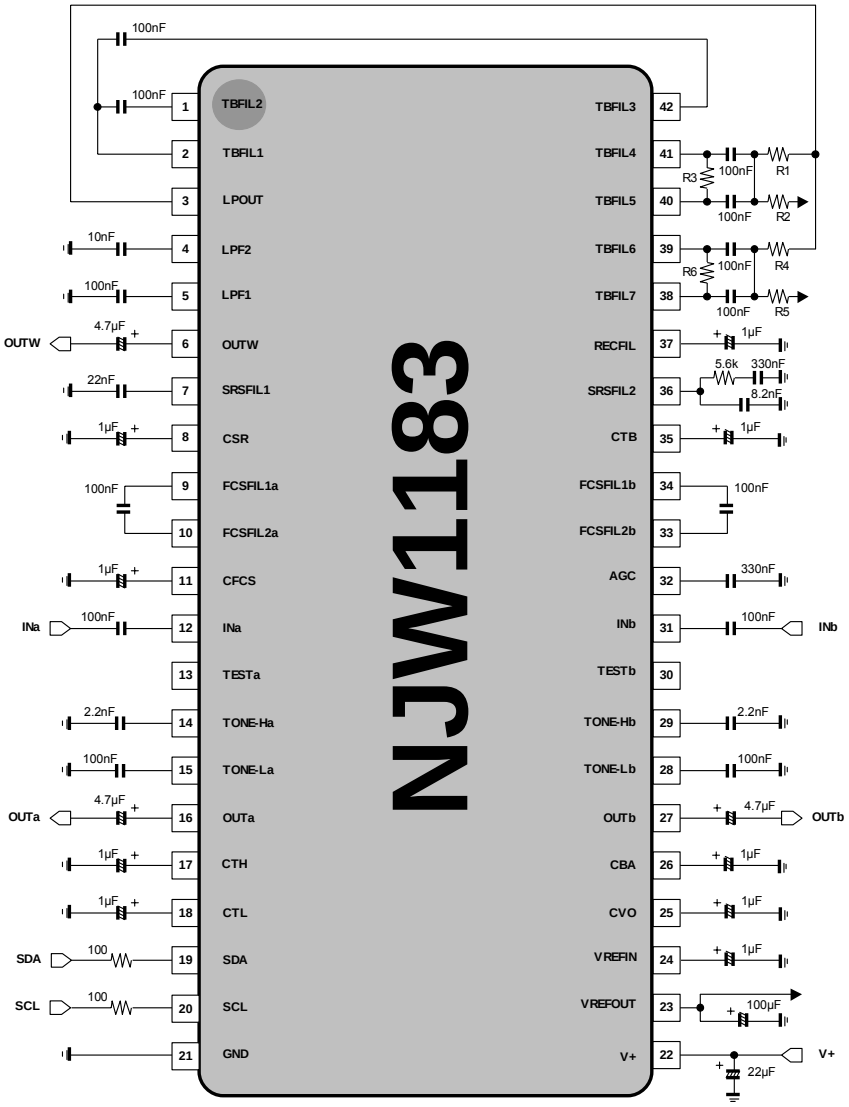
■ APPLICATION CIRCUIT

(SDIP42)



	SPEAKER SIZE		
	LARGE	MEDIUM	SMALL (TruBass mode only)
R1	56.2k	21k	21k
R2	13k	3.09k	3.09k
R3	158k	42k	42k
R4	37.4k	37.4k	22.1k
R5	8.87k	8.87k	2.32k
R6	107k	107k	32k

The standard setting of speaker size is as follows. (Reference)
Large Mode: fo 80Hz
Medium Mode: 80Hz < fo 150Hz
Small Mode: 150Hz < fo 250Hz

(NOTE1) Separate the I^2C bus line and Signal line from the following terminals for avoiding digital noise problem and cross talk.

Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol
1	TBFIL2	7	SRSFIL1	28	TONE-Lb	38	TBFIL7
2	TBFIL1	9	FCSFIL1a	29	TONE-Hb	39	TBFIL6
3	LPFOUT	10	FCSFIL2a	33	FCSFIL2b	40	TBFIL5
4	LPF2	14	TONE-Ha	34	FCSFIL1b	41	TBFIL4
5	LPF1	15	TONE-La	36	SRSFIL2	42	TBFIL3

(NOTE2) Pin 13 and Pin30 should be opened.

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■ DEFINITION OF I²C REGISTER

● I²C BUS FORMAT

MSB		LSB	MSB		LSB	MSB		LSB		
S	Slave Address	A	Select Address		A	Data		A	P	
1bit	8bit	1bit	8bit		1bit	8bit		1bit	1bit	

S: Starting Term
A: Acknowledge Bit
P: Ending Term

● SLAVE ADDRESS

MSB							LSB
1	0	0	0	0	0	1	R/$\overline{W}$

R/$\overline{W}$=0: Write mode for register setting
R/$\overline{W}$=1: Not available

● CONTROL REGISTER TABLE

The select address sets each function (Volume, Balance, AGC, Tone Control, Surround etc.).
The auto-increment function cycles the select address as follows.

00H→01H→02H→03H→04H→00H

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
00H	VOL							
01H	CHS	BAL					SEL	
02H	BCB	BASS				AGC-SW	AGC-FLAT	
03H	BCT	TREB				FCS		
04H	MODE	TB			SUR			Don't Care

● CONTROL REGISTER DEFAULT VALUE

Control register default value is all “0”.

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
00H	0	0	0	0	0	0	0	0
01H	0	0	0	0	0	0	0	0
02H	0	0	0	0	0	0	0	0
03H	0	0	0	0	0	0	0	0
04H	0	0	0	0	0	0	0	0

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■ I²C CONTROL COMMAND DESCRIPTION

●MASTER VOLUME CONTROL

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
00H	VOL							

The volume controls both Ach and Bch by the 0.5dB step.
The volume is consisted of volume1 and volume2. The level is divided into half to each volume1 and volume2.

●BALANCE SETTINGS

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
01H	CHS	BAL					SEL	

- CHS: Channel select for balance control
  "0": Ach "Bch is attenuated"
  "1": Bch "Ach is attenuated"
- BAL: Balance control for both Ach and Bch (1dB/Step)

●TONE CONTROL (Bass) and AGC SETTINGS

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
02H	BCB	BASS				AGC-SW	AGC-FLAT	

- BCB : Bass Boost or Cut
  "0" : Cut
  "1" : Boost
- BASS : BASS Level
  Cut Level : -9 to 0dB(1dB/Step)
  Boost Level : 0 to +9dB(1dB/Step)
- AGC-SW : AGC ON/OFF Switch
  "0" : AGC OFF
  "1" : AGC ON (Default : 300mVrms)
- AGC-FLAT : AGC Flat Level

AGC Flat Level	AGC-FLAT	
	D1	**D0**
300mVrms	0	0
400mVrms	0	1
500mVrms	1	0
600mVrms	1	1

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●TONE CONTROL (Treble) and FOCUS EFFECT SETTINGS

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
03H	BCT	TREB				FCS		

•BCT : Treble Boost or Cut
"0" : Cut
"1" : Boost
•TREB : Treble Level
Cut Level : -9 to 0dB(1dB/Step)
Boost Level : 0 to +9dB(1dB/Step)

•FCS: FOCUS Effect

FOCUS Effect	FCS		
	D2	D1	D0
OFF	0	0	0
Effect 1 (Minimum)	0	0	1
Effect 2	0	1	0
Effect 3	0	1	1
Effect 4 (Maximum)	1	Don't Care	Don't Care

● WOW Output Mode Select, TruBass and Surround EFFECT SETTINGS

Select Address	BIT							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
04H	MODE	TB			SUR			Don't Care

•MODE : Output Mode Select

MODE	D7	Output terminals
2ch	0	OUTa, OUTb
2.1ch	1	OUTa, OUTb, OUTw

•TB : TruBass Effect

TruBass Effect	TB		
	D6	D5	D4
OFF	0	0	0
Effect 1 (Minimum)	0	0	1
Effect 2	0	1	0
Effect 3	0	1	1
Effect 4 (Maximum)	1	Don't Care	Don't Care

NOTE)

	MODE=2ch		MODE=2.1ch	
	TB=OFF	TB=Effect1-4	TB=OFF	TB=Effect1-4
OUTa(14pin), OUTb(25pin)	Bypass NOTE1)	TB effect (WOW)	Bypass NOTE1)	
OUTw(1pin)	No Output		No Output	TB effect

NOTE1) TruBass is not effective.

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•SUR : Surround Effect

Surround Effect	SUR		
	D3	D2	D1
OFF	0	0	0
Simulated Stereo NOTE2)	0	0	1
Effect 1 (Minimum)	0	1	0
Effect 2	0	1	1
Effect 3	1	0	0
Effect 4 (Maximum)	1	0	1
	1	1	Don't Care

NOTE2) Simulated Stereo dose not adapt to SRS WOW.

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■ **Master Volume (Select Address: 00H)**

		VOL							
Gain(dB)	HEX	**D7**	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
0	FF	1	1	1	1	1	1	1	1
-1	FD	1	1	1	1	1	1	0	1
-2	FB	1	1	1	1	1	0	1	1
-3	F9	1	1	1	1	1	0	0	1
-4	F7	1	1	1	1	0	1	1	1
-5	F5	1	1	1	1	0	1	0	1
-6	F3	1	1	1	1	0	0	1	1
-7	F1	1	1	1	1	0	0	0	1
-8	EF	1	1	1	0	1	1	1	1
-9	ED	1	1	1	0	1	1	0	1
-10	EB	1	1	1	0	1	0	1	1
-11	E9	1	1	1	0	1	0	0	1
-12	E7	1	1	1	0	0	1	1	1
-13	E5	1	1	1	0	0	1	0	1
-14	E3	1	1	1	0	0	0	1	1
-15	E1	1	1	1	0	0	0	0	1
-16	DF	1	1	0	1	1	1	1	1
-17	DD	1	1	0	1	1	1	0	1
-18	DB	1	1	0	1	1	0	1	1
-19	D9	1	1	0	1	1	0	0	1
-20	D7	1	1	0	1	0	1	1	1
-21	D5	1	1	0	1	0	1	0	1
-22	D3	1	1	0	1	0	0	1	1
-23	D1	1	1	0	1	0	0	0	1
-24	CF	1	1	0	0	1	1	1	1
-25	CD	1	1	0	0	1	1	0	1
-26	CB	1	1	0	0	1	0	1	1
-27	C9	1	1	0	0	1	0	0	1
-28	C7	1	1	0	0	0	1	1	1
-29	C5	1	1	0	0	0	1	0	1
-30	C3	1	1	0	0	0	0	1	1
-31	C1	1	1	0	0	0	0	0	1
-32	BF	1	0	1	1	1	1	1	1
-33	BD	1	0	1	1	1	1	0	1
-34	BB	1	0	1	1	1	0	1	1
-35	B9	1	0	1	1	1	0	0	1
-36	B7	1	0	1	1	0	1	1	1
-37	B5	1	0	1	1	0	1	0	1
-38	B3	1	0	1	1	0	0	1	1
-39	B1	1	0	1	1	0	0	0	1
-40	AF	1	0	1	0	1	1	1	1
-41	AD	1	0	1	0	1	1	0	1
-42	AB	1	0	1	0	1	0	1	1

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■MASTER VOLUME (Cont'd)

		VOL							
Gain(dB)	HEX	**D7**	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
-43	A9	1	0	1	0	1	0	0	1
-44	A7	1	0	1	0	0	1	1	1
-45	A5	1	0	1	0	0	1	0	1
-46	A3	1	0	1	0	0	0	1	1
-47	A1	1	0	1	0	0	0	0	1
-48	9F	1	0	0	1	1	1	1	1
-49	9D	1	0	0	1	1	1	0	1
-50	9B	1	0	0	1	1	0	1	1
-51	99	1	0	0	1	1	0	0	1
-52	97	1	0	0	1	0	1	1	1
-53	95	1	0	0	1	0	1	0	1
-54	93	1	0	0	1	0	0	1	1
-55	91	1	0	0	1	0	0	0	1
-56	8F	1	0	0	0	1	1	1	1
-57	8D	1	0	0	0	1	1	0	1
-58	8B	1	0	0	0	1	0	1	1
-59	89	1	0	0	0	1	0	0	1
-60	87	1	0	0	0	0	1	1	1
-61	85	1	0	0	0	0	1	0	1
-62	83	1	0	0	0	0	0	1	1
-63	81	1	0	0	0	0	0	0	1
-64	7F	0	1	1	1	1	1	1	1
-65	7D	0	1	1	1	1	1	0	1
-66	7B	0	1	1	1	1	0	1	1
-67	79	0	1	1	1	1	0	0	1
-68	77	0	1	1	1	0	1	1	1
-69	75	0	1	1	1	0	1	0	1
-70	73	0	1	1	1	0	0	1	1
-71	71	0	1	1	1	0	0	0	1
-72	6F	0	1	1	0	1	1	1	1
-73	6D	0	1	1	0	1	1	0	1
-74	6B	0	1	1	0	1	0	1	1
-75	69	0	1	1	0	1	0	0	1
-76	67	0	1	1	0	0	1	1	1
-77	65	0	1	1	0	0	1	0	1
-78	63	0	1	1	0	0	0	1	1
-79	61	0	1	1	0	0	0	0	1
-80	5F	0	1	0	1	1	1	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
-90	4B	0	1	0	0	1	0	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
-100	37	0	0	1	1	0	1	1	1
Mute	00	0	0	0	0	0	0	0	0

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■ **Balance (Select Address: 01H)**

Channel Setting (CHS)	**D7**
Attenuated Bch Gain	0
Attenuated Ach Gain	1

Gain(dB)	BAL				
	D6	**D5**	**D4**	**D3**	**D2**
0	0	0	0	0	0
-1	0	0	0	0	1
-2	0	0	0	1	0
-3	0	0	0	1	1
-4	0	0	1	0	0
-5	0	0	1	0	1
-6	0	0	1	1	0
-7	0	0	1	1	1
-8	0	1	0	0	0
-9	0	1	0	0	1
-10	0	1	0	1	0
-11	0	1	0	1	1
-12	0	1	1	0	0
-13	0	1	1	0	1
-14	0	1	1	1	0
-15	0	1	1	1	1
-16	1	0	0	0	0
-17	1	0	0	0	1
-18	1	0	0	1	0
-19	1	0	0	1	1
-20	1	0	1	0	0
-21	1	0	1	0	1
-22	1	0	1	1	0
-23	1	0	1	1	1
-24	1	1	0	0	0
-25	1	1	0	0	1
-26	1	1	0	1	0
-27	1	1	0	1	1
-28	1	1	1	0	0
-29	1	1	1	0	1
-30	1	1	1	1	0
MUTE	1	1	1	1	1

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■ **Tone Control Bass (Select Address: 02H)**

Bass Cut or Boost	BCB
	D7
Cut	0
Boost	1

		BASS			
Cut Gain(dB)	Boost Gain(dB)	**D6**	**D5**	**D4**	**D3**
-9	9	1	0	0	1
-8	8	1	0	0	0
-7	7	0	1	1	1
-6	6	0	1	1	0
-5	5	0	1	0	1
-4	4	0	1	0	0
-3	3	0	0	1	1
-2	2	0	0	1	0
-1	1	0	0	0	1
0	0	0	0	0	0

■ **Tone Control Treble (Select Address: 03H)**

Treble Cut or Boost	BCT
	D7
Cut	0
Boost	1

		TREB			
Cut Gain(dB)	Boost Gain(dB)	**D6**	**D5**	**D4**	**D3**
-9	9	1	0	0	1
-8	8	1	0	0	0
-7	7	0	1	1	1
-6	6	0	1	1	0
-5	5	0	1	0	1
-4	4	0	1	0	0
-3	3	0	0	1	1
-2	2	0	0	1	0
-1	1	0	0	0	1
0	0	0	0	0	0

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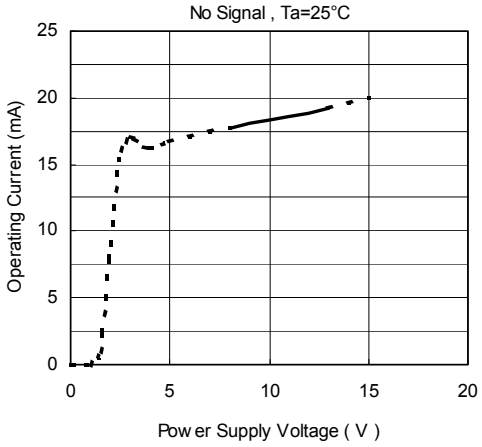
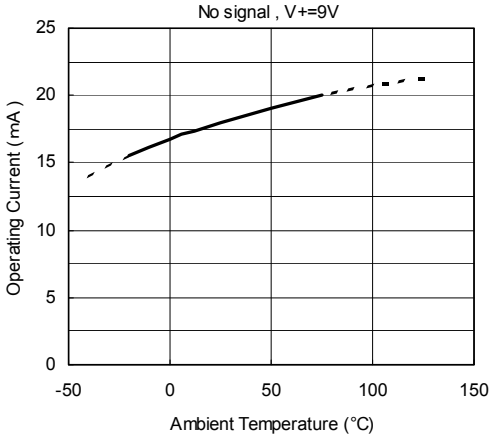
■TYPICAL CHARACTERISTICS

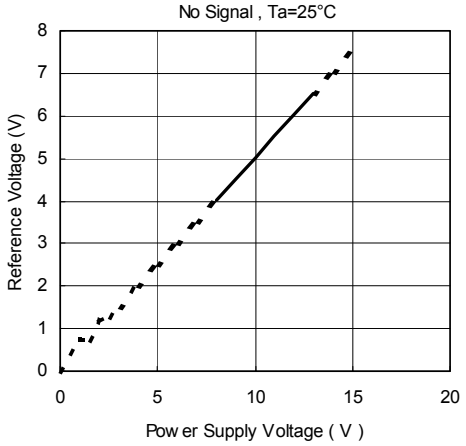
Operating Current vs. Power Supply Voltage



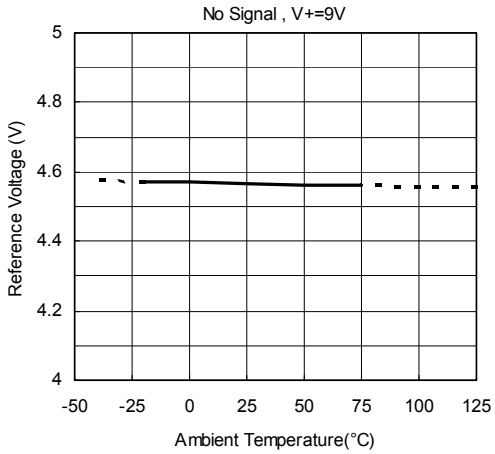
Operating Current vs. Ambient Temperature



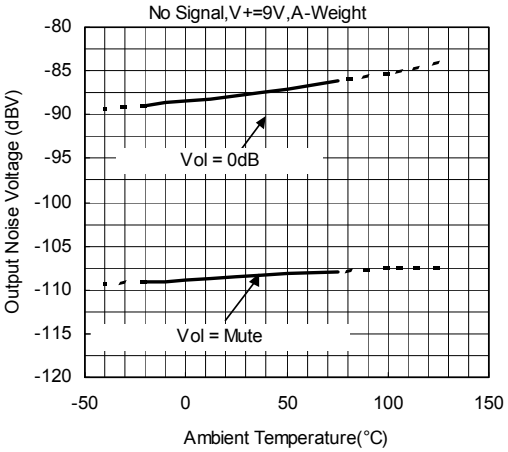
Reference Voltage vs.Power Supply Voltage



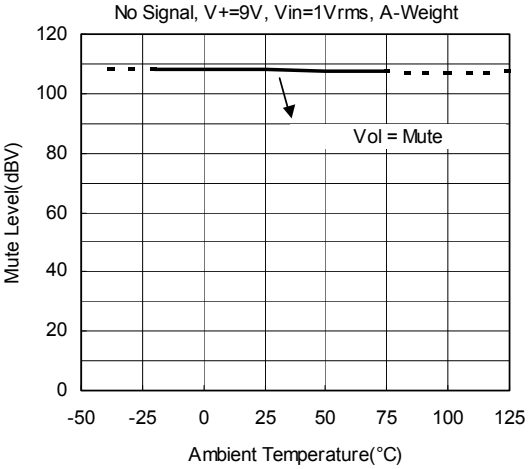
Reference Voltage vs.Ambient temperature



Output Noise Voltage (OUT) vs. Frequency



Mute Level vs.Ambient Temperature



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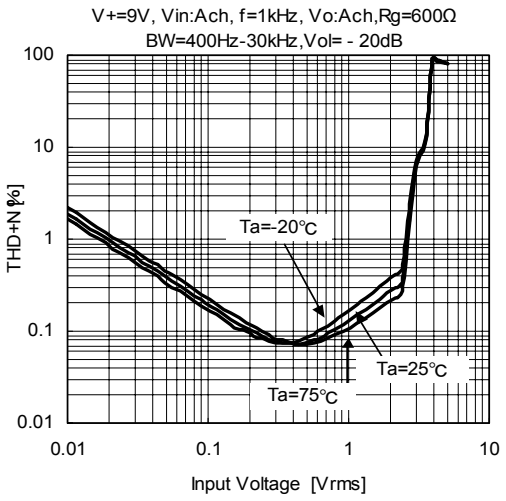
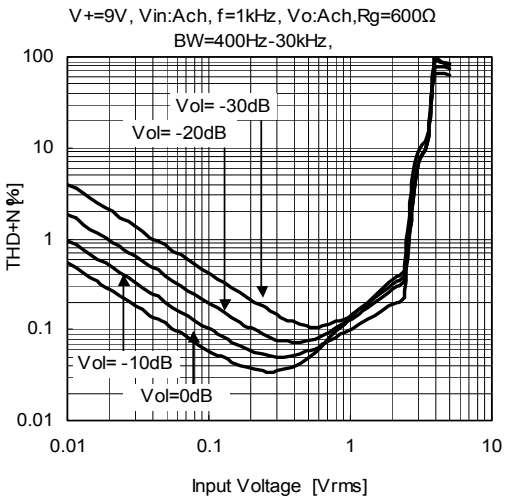
■TYPICAL CHARACTERISTICS

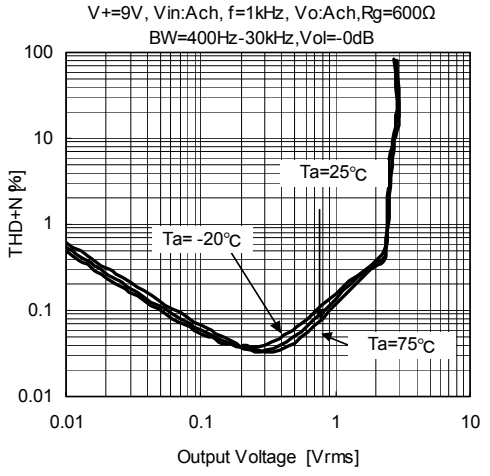
Total Harmonic Distortion vs.Input Voltage



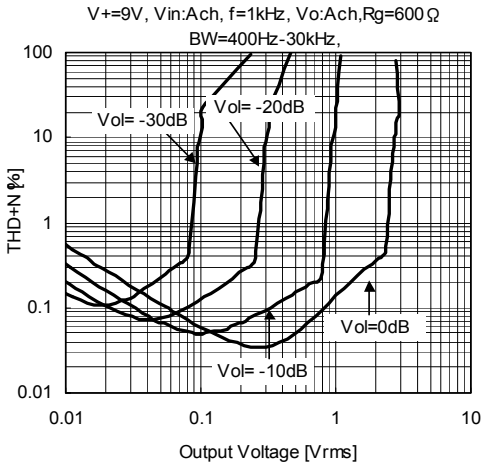
Total Harmonic Distortion vs.Input Voltage



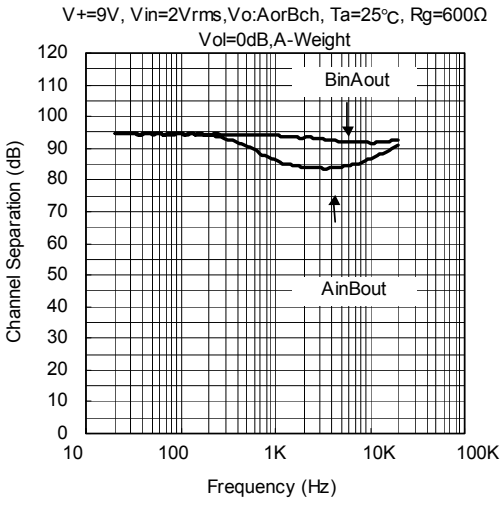
Total Harmonic Distortion vs.Output Voltage



Total Harmonic Distortion vs.Output Voltage



Channel Separation vs.Frequency



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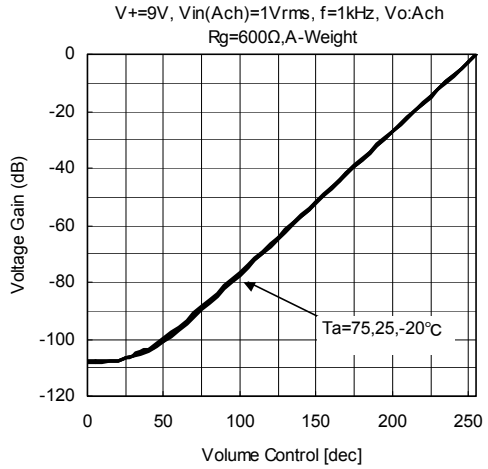
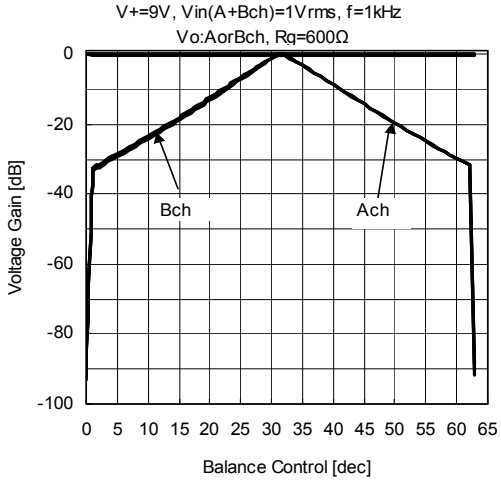
■TYPICAL CHARACTERISTICS

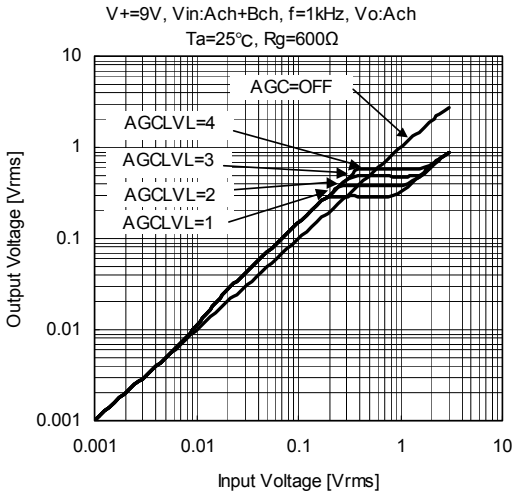
Voltage Gain vs.Volume Control



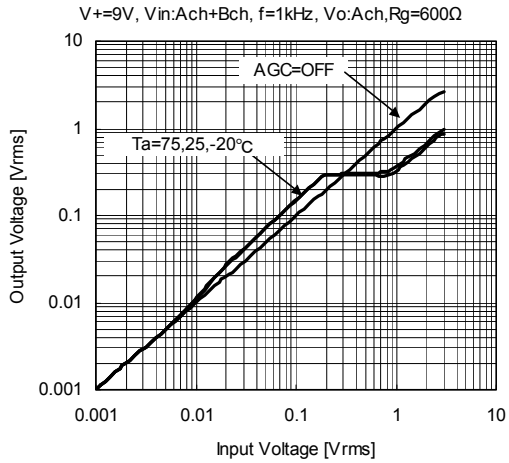
Voltage Gain vs.Balance Control



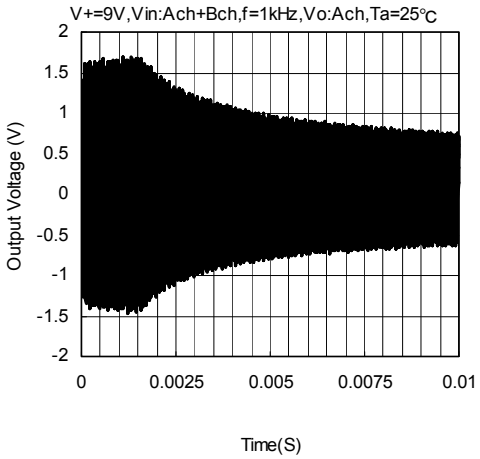
AGC Output Voltage vs.Input Voltage



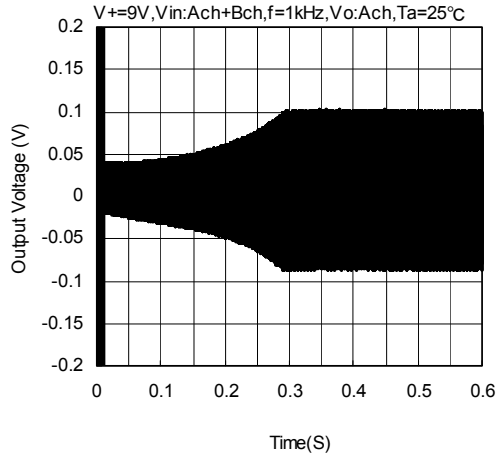
AGC Output Voltage vs.Input Voltage(LVL=1)



AGC Attack Time Response(AGCLVL=1)
C=330nF



AGC Recovery Time Response(AGCLVL=1)
C=330nF



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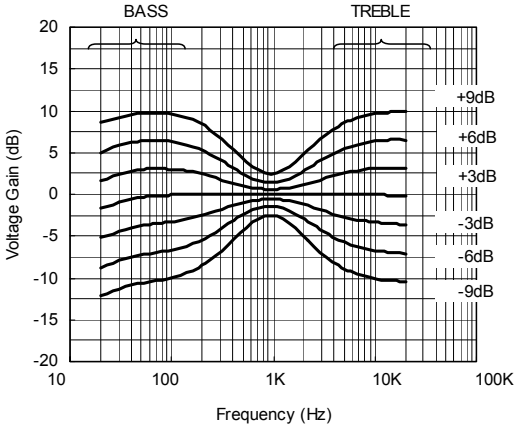
■TYPICAL CHARACTERISTICS

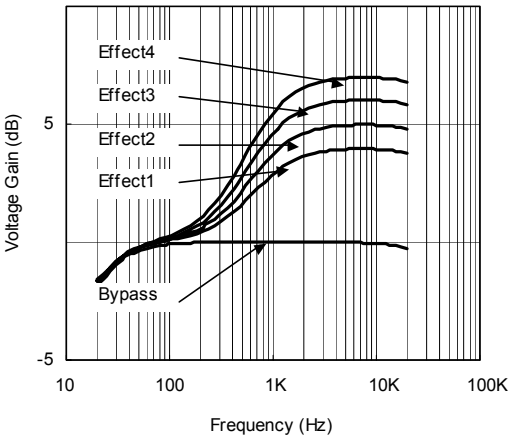
Voltage Gain vs.Frequency(TONE)

V+=9V, Vin(Ach)=0.1Vrms,Vo:Ach,Ta=25℃, Rg=600Ω



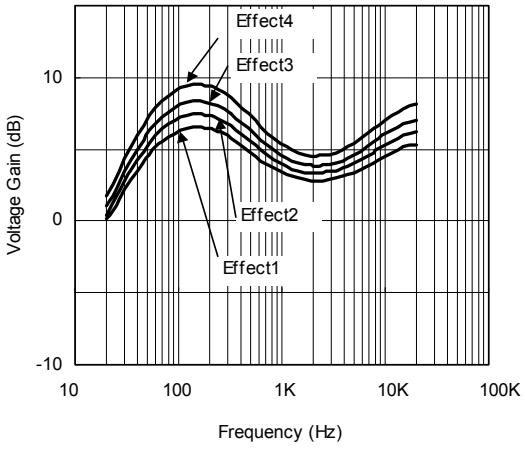
Voltage Gain vs.Frequency(FOCUS)

V+=9V, Vin(Ach)=0.1Vrms, Vo:Ach, Rg=600Ω



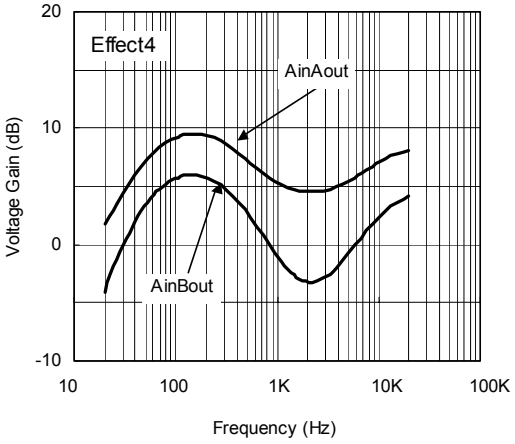
Voltage Gain vs.Frequency(SRS3D)

V+=9V, Vin(Ach)=0.1Vrms, Vo:Ach, Rg=600Ω



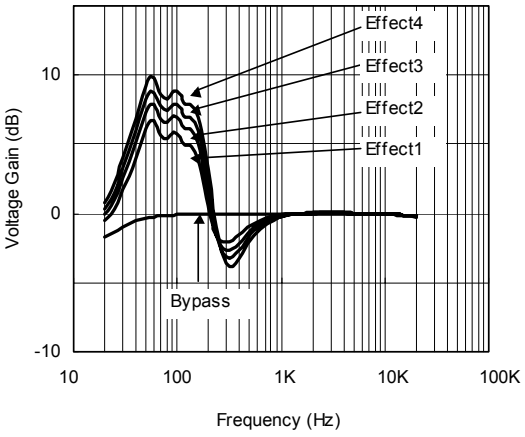
Voltage Gain vs.Frequency(SRS3D)

V+=9V, Vin(Ach)=0.1Vrms, Vo:AorBch, Rg=600Ω



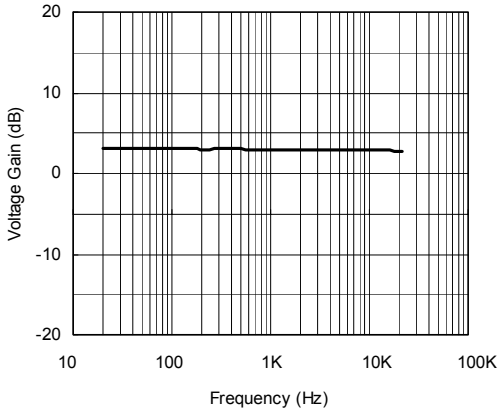
Voltage Gain vs.Frequency(TruBass)

V+=9V, Vin(A+Bch)=0.1Vrms, Vo:Ach, Rg=600Ω



Voltage Gain vs.Frequency
(Simulated Stereo)

V+=9V, Vin(A+Bch)=0.1Vrms, Vo:Ach, Rg=600Ω



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