M61522FP

8ch ELECTRONIC VOLUME WITH 8 INPUT SELECTOR

REJ03F0034-0100Z
Rev.1.0
Sep.19.2003

Feature

FUNCTION	FEATURE
Electronic Volume	8 channel Dependant Electronic Volume with High Voltage Transistor. (0~-99dB/ 1dBstep, -∞dB)
Input Selector	(1) Front L/R channel 8 Input Selector.(Main/Sub) (2) 2 channel Selector Output.
Multi Channel Input	All channel 2 Input Selector.
External Input	2 External Input.(C/SBLch)
REC Output	4 Lines REC Output (Both L and R channels)
Input ATT	Input ATT (0/-3/-6/-9/-12dB)
Output Gain Control	Output Gain Control (0/+3/+6/+9/+10/+12dB)
Balance Out	Built-in Balance Output (for ADC)

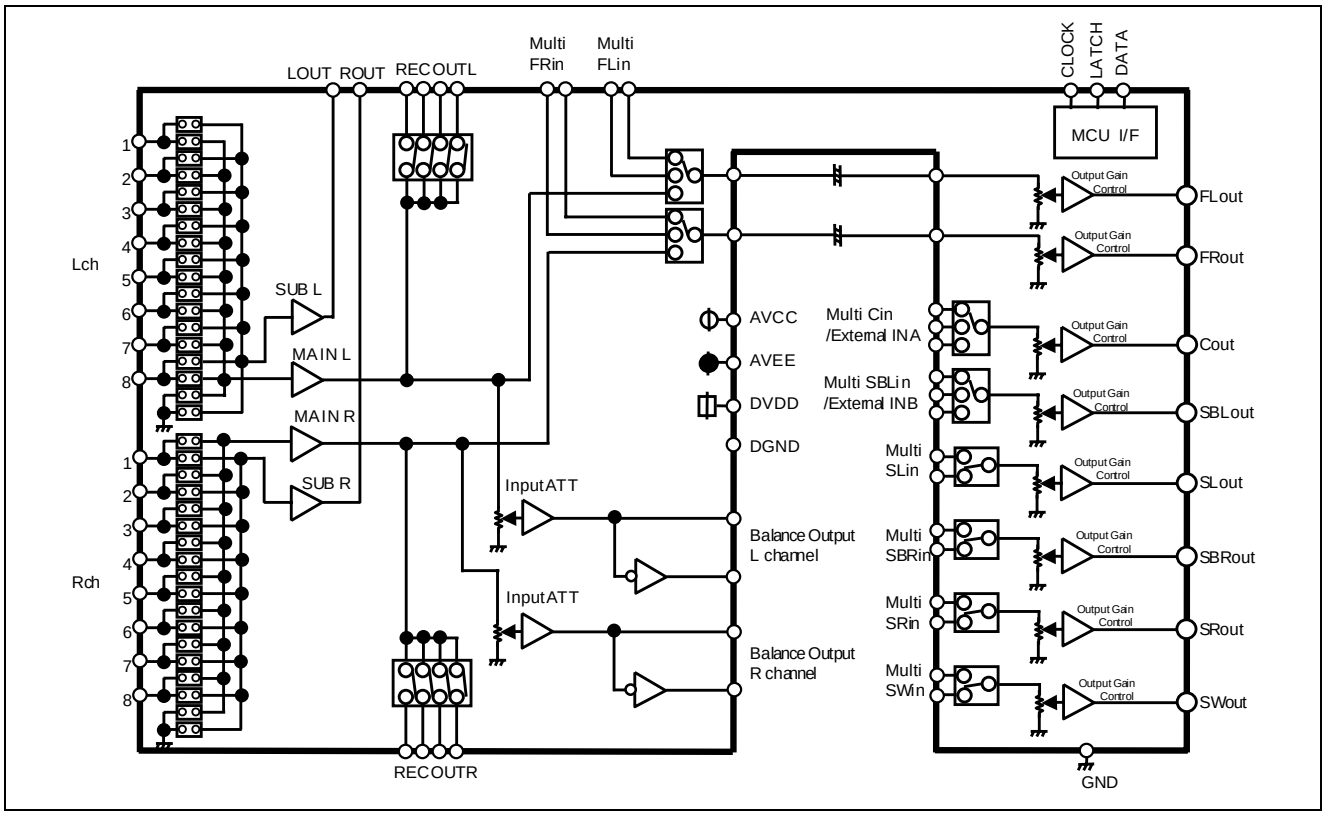
Application

Receiver, AV Amp, Mini Stereo etc.

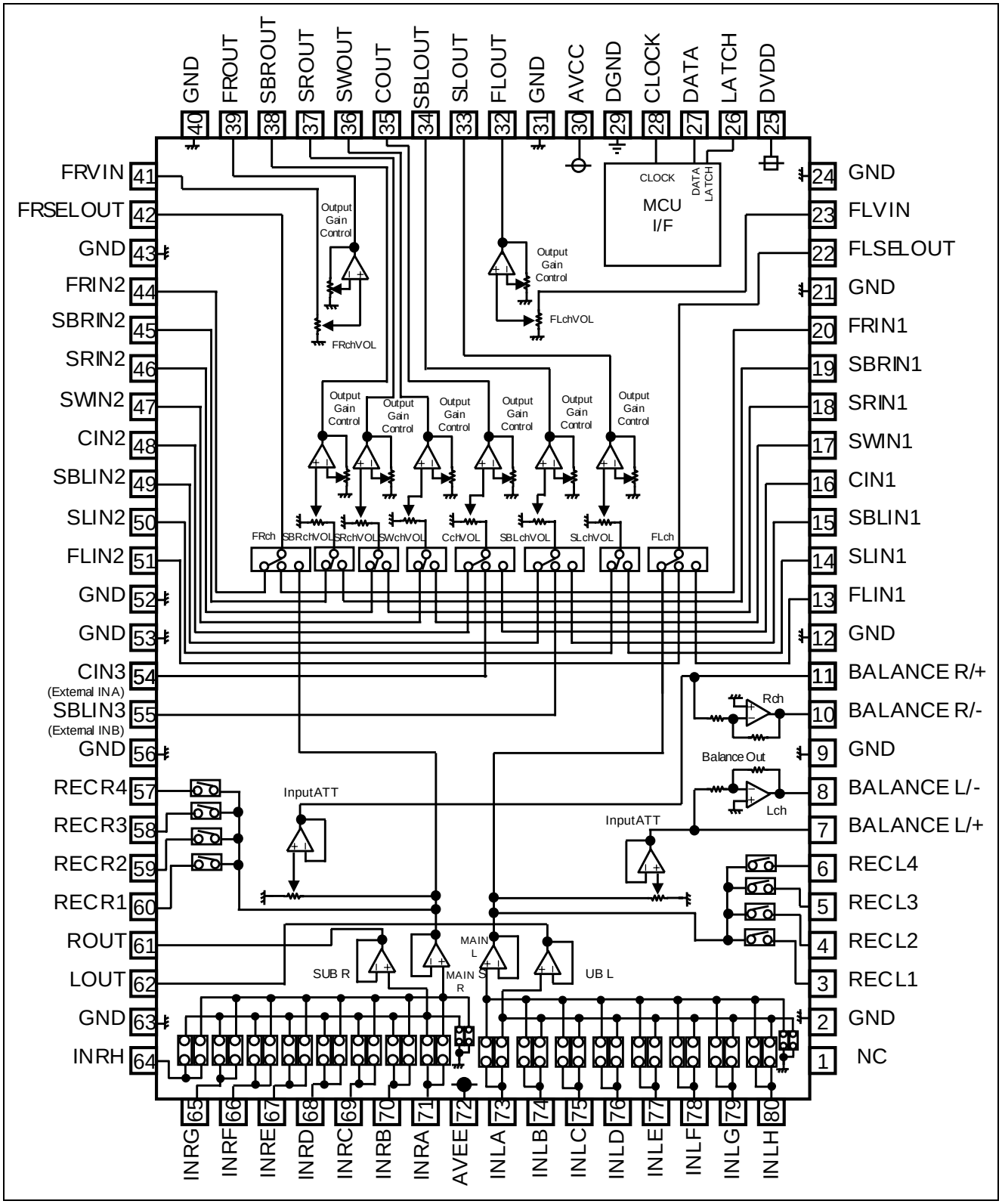
Recommended Operating Condition

Rated Supply Voltage ……AVCC=7.0V(typ), AVEE=-7.0V(typ), DVDD=3.3V(typ)

System Block Diagram



Block Diagram and Pin Configuration (Top View)



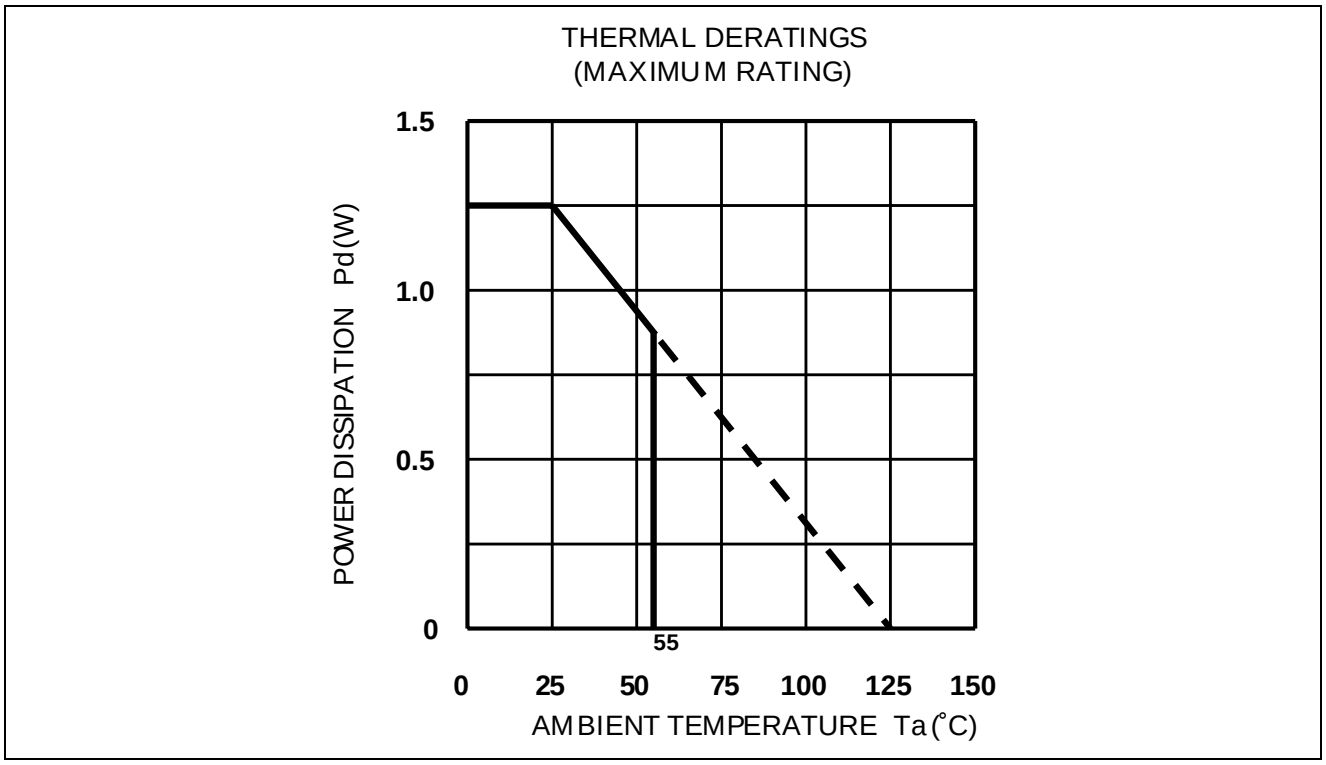
Pin Description

PIN No.	Name	Function
1	NC	Non-connection terminal
2,9,12,21,24,31, 40,43,52,53,56,63	GND	Analog Ground
3,4,5,6, 57,58,59,60	REC L1,L2,L3,L4 /REC R1,R2,R3,R4	Output pin of REC (Lch and Rch)
7,8	BALANCE L/+,L/-	Output pin of L channel Balance Output(+/-)
10,11	BALANCE R/+,R/-	Output pin of R channel Balance Output(+/-)
13,51	FLIN1/FLIN2	Input pin of FL channel (2 Input Selector)
14,50	SLIN1/SLIN2	Input pin of SL channel (2 Input Selector)
15,49	SBLIN1/SBLIN2	Input pin of SBL channel (2 Input Selector)
16,48	CIN1/CIN2	Input pin of C channel (2 Input Selector)
17,47	SWIN1/SWIN2	Input pin of SW channel (2 Input Selector)
18,46	SRIN1/SRIN2	Input pin of SR channel (2 Input Selector)
19,45	SBRIN1/SBRIN2	Input pin of SBR channel (2 Input Selector)
20,44	FRIN1/FRIN2	Input pin of FR channel (2 Input Selector)
22	FLSELOUT	Output pin of FL channel volume input selector
23	FLVIN	Input pin of FL channel volume
25	DVDD	Power supply to internal logic circuit
29	DGND	Ground of internal logic circuit
26,27,28	LATCH,DATA,CLOCK	Input pin of Control trigger/data/clock
30	AVCC	Positive power supply to internal analog circuit
32	FLOUT	Output pin of FL channel
33	SLOUT	Output pin of SL channel
34	SBLOUT	Output pin of SBL channel
35	COUT	Output pin of C channel
36	SWOUT	Output pin of SW channel
37	SBROUT	Output pin of SBR channel
38	SROUT	Output pin of SR channel
39	FROUT	Output pin of FR channel
41	FRVIN	Input pin of FR channel volume
42	FRSELOUT	Output pin of FR channel volume input selector
54	CIN3	External input pinA(Input pin of C channel)
55	SBLIN3	External input pinB(Input pin of SBL channel)
61,62	ROUT/LOUT	Output pin of Input selector
64,65,66,67,68,69, 70,71	INRA,B,C,D,E,F,G,H	Input pin of R channel (8 Input Selector)
73,74,75,76,77,78, 79,80	INLA,B,C,D,E,F,G,H	Input pin of L channel (8 Input Selector)
72	AVEE	Negative power supply to internal analog circuit

Absolute Maximum Ratings

(Ta=25°C, unless otherwise noted)

Symbol	Parameter	Condition	Ratings	Unit
Supply voltage	Power supply	AVCC-AVEE	±7.8	V
		DVDD-GND	6.0	
Pd	Power dissipation	Ta≤25°C	1250	mW
Kθ	Thermal derating	Ta>25°C	12.5	mW/°C
Topr	Operating temperature		-20~+55	°C
Tstg	Storage temperature		-40~+125	°C



Recommended Operating Conditions

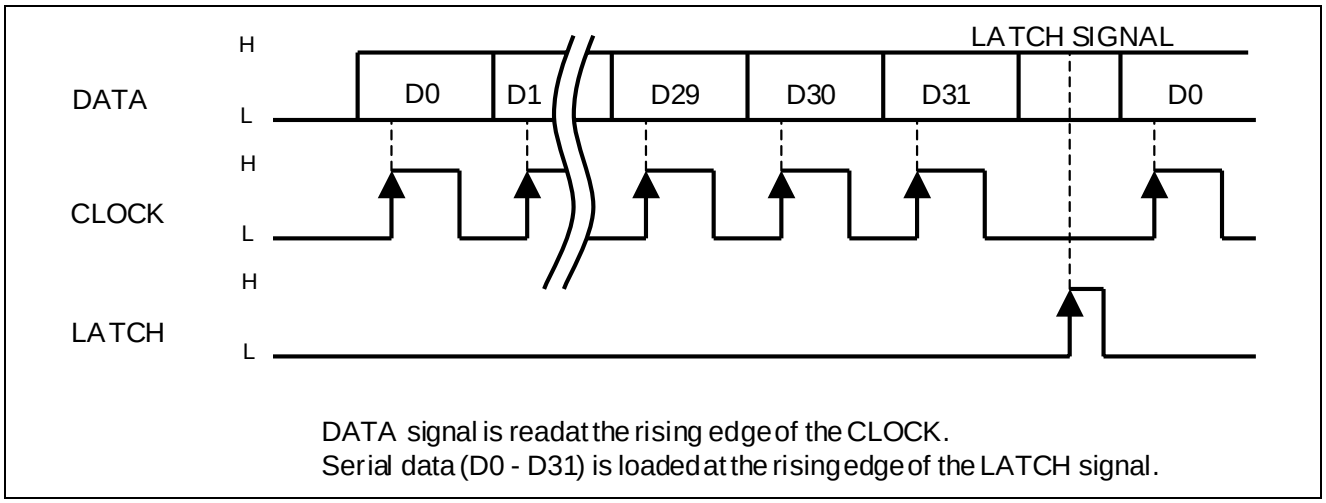
(Ta=25°C, unless otherwise noted)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Analog supply voltage (Positive)	AVCC		4.5	7.0	7.3	V
Analog supply voltage (Negative)	AVEE		-7.3	-7.0	-4.5	V
Digital supply voltage	DVDD		3.0	3.3	3.6	V
Logic ìHî level input voltage	VIH	DGND reference	2.4	—	DVDD	V
Logic ì Lî level input voltage	VIL	DGND reference	DGND	—	0.5	V

Note1: VEE≤DGND<VDD≤VCC

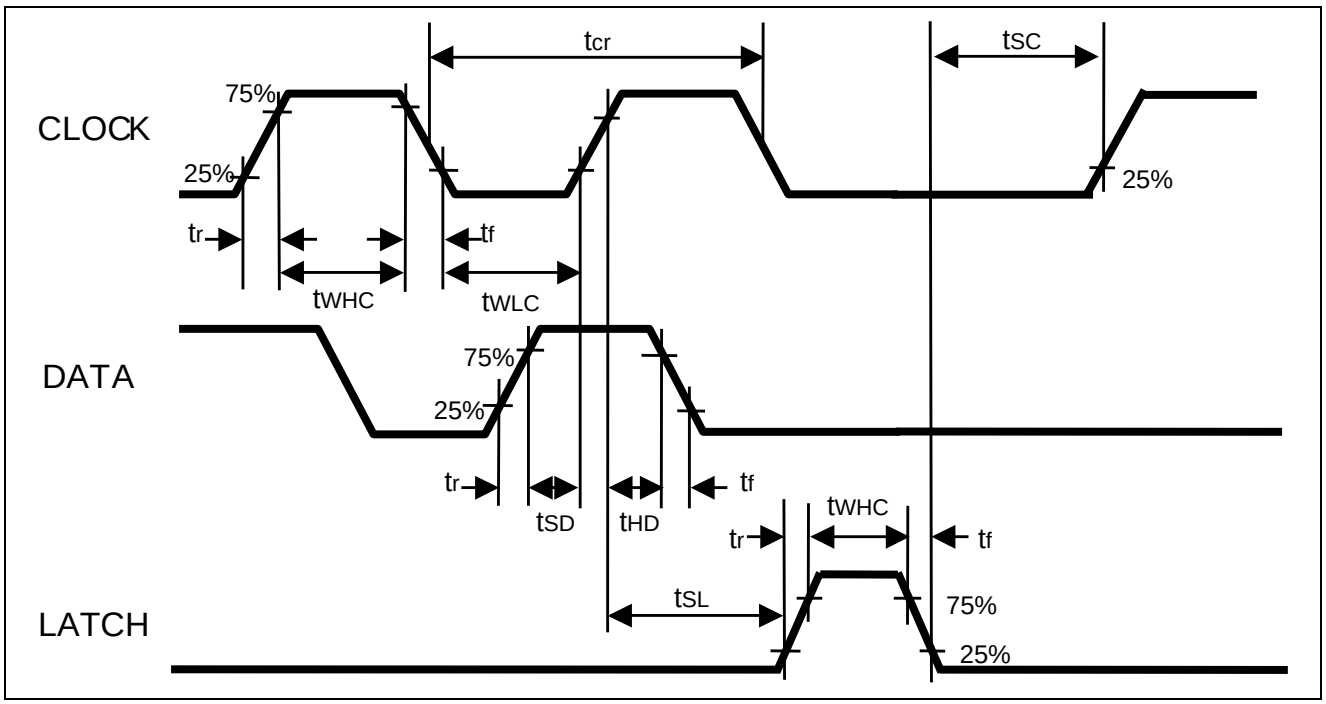
Note2: After applying AVCC, then apply AVEE and DVDD.

Relationship between Data and Clock



DATA signal is read at the rising edge of the CLOCK.
Serial data (D0 - D31) is loaded at the rising edge of the LATCH signal.

Clock and Data Timings



Timing Definition of Digital Block

Symbol	Parameter	Limits Min	typ	Max	Unit
tcr	Clock cycle time	4	—	—	µsec
tWHC	Clock pulse width (ìHî level)	1.6	—	—	
tWLC	Clock pulse width (ìLî level)	1.6	—	—	
tr	Rising time of clock, data and latch	—	—	0.4	
tf	Falling time of clock, data and latch	—	—	0.4	
tSD	Data setup time	0.8	—	—	
tHD	Data hold time	0.8	—	—	
tSL	Latch setup time	1	—	—	
tWHL	Latch pulse width	1.6	—	—	
tSC	Clock setup time	4	—	—	

Data Control Specification

Three types of input format can be selected by changing the D30/D31 slot setting status.
(Initialize all data of the 3 formats when Digital Powersupply (DVDD) turn on).

	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30	D31
Slot 0	Input Selector (MAIN)				Input Selector (SUB)				Input ATT			Output Gain Control			FL/FR VOL Input Selector		C/SBL VOL Input Selector		SW SR SL SBR VOL Input Selector	All ch Output Mute	REC Output 1	REC Output 2	REC Output 3	REC Output 4	0	0	0	0	0	0	0	0
Slot 1	FLch Volume								FRch Volume						Cch Volume							SWch Volume							0	0	0	1
Slot 2	SLch Volume								SRch Volume						SBLch Volume							SBRchVolume							0	0	1	0

Setting Code

(1)Input Selector(MAIN/SUB)
(D30=0,D31=0)

Setting		D0	D1	D2	D3
	MAIN	D0	D1	D2	D3
	SUB	D4	D5	D6	D7
ALL OFF		0	0	0	0
A		0	0	0	1
B		0	0	1	0
C		0	0	1	1
D		0	1	0	0
E		0	1	0	1
F		0	1	1	0
G		0	1	1	1
H		1	0	0	0

(2) Input ATT
(D30=0,D31=0)

Setting	D8	D9	D10
0dB	0	0	0
-3dB	0	0	1
-6dB	0	1	0
-9dB	0	1	1
-12dB	1	0	0

(3)Output Gain Control
(D30=0,D31=0)

Setting	D11	D12	D13
0dB	0	0	0
+3dB	0	0	1
+6dB	0	1	0
+9dB	0	1	1
+10dB	1	0	0
+12dB	1	0	1

(4)FL/FR channel Volume
Input Selector (D30=0,D31=0)

Setting	D14	D15
Bypass	0	0
Multi IN1	0	1
Multi IN2	1	0

(5)C/SBL channel Volume
Input Selector (D30=0,D31=0)

Setting	D16	D17
External IN	0	0
Multi IN1	0	1
Multi IN2	1	0

(6)SW/SR/SL/SBR channel
Volume Input Selector
(D30=0,D31=0)

Setting	D18
Multi IN1	0
Multi IN2	1

(7)All channel Output Mute
(D30=0,D31=0)

Setting	D19
Mute OFF	0
Mute ON	1

(8)REC Output
(D30=0,D31=0)

REC output	REC1	REC2	REC3	REC4
Setting	D20	D21	D22	D23
OFF	0	0	0	0
ON	1	1	1	1

It's initial setting when DVDD turn on.

Note : Please don't input except specification data.

(9)8 channel Volume (FLch,FRch,Cch,SWch:D30=0,D31=1 / SLch,SRch,SBLch,SBRch:D30=1,D31=0)

ATT	FLch SLch	D0	D1	D2	D3	D4	D5	D6
	FRch SRch	D7	D8	D9	D10	D11	D12	D13
	Cch SBLch	D14	D15	D16	D17	D18	D19	D20
	SWch SBRch	D21	D22	D23	D24	D25	D26	D27
0dB		0	0	0	0	0	0	0
-1dB		0	0	0	0	0	0	1
-2dB		0	0	0	0	0	1	0
-3dB		0	0	0	0	0	1	1
-4dB		0	0	0	0	1	0	0
-5dB		0	0	0	0	1	0	1
-6dB		0	0	0	0	1	1	0
-7dB		0	0	0	0	1	1	1
-8dB		0	0	0	1	0	0	0
-9dB		0	0	0	1	0	0	1
-10dB		0	0	0	1	0	1	0
-11dB		0	0	0	1	0	1	1
-12dB		0	0	0	1	1	0	0
-13dB		0	0	0	1	1	0	1
-14dB		0	0	0	1	1	1	0
-15dB		0	0	0	1	1	1	1
-16dB		0	0	1	0	0	0	0
-17dB		0	0	1	0	0	0	1
-18dB		0	0	1	0	0	1	0
-19dB		0	0	1	0	0	1	1
-20dB		0	0	1	0	1	0	0
-21dB		0	0	1	0	1	0	1
-22dB		0	0	1	0	1	1	0
-23dB		0	0	1	0	1	1	1
-24dB		0	0	1	1	0	0	0
-25dB		0	0	1	1	0	0	1
-26dB		0	0	1	1	0	1	0
-27dB		0	0	1	1	0	1	1

ATT	FLch SLch	D0	D1	D2	D3	D4	D5	D6
	FRch SRch	D7	D8	D9	D10	D11	D12	D13
	Cch SBLch	D14	D15	D16	D17	D18	D19	D20
	SWch SBRch	D21	D22	D23	D24	D25	D26	D27
-28dB		0	0	1	1	1	0	0
-29dB		0	0	1	1	1	0	1
-30dB		0	0	1	1	1	1	0
-31dB		0	0	1	1	1	1	1
-32dB		0	1	0	0	0	0	0
-33dB		0	1	0	0	0	0	1
-34dB		0	1	0	0	0	1	0
-35dB		0	1	0	0	0	1	1
-36dB		0	1	0	0	1	0	0
-37dB		0	1	0	0	1	0	1
-38dB		0	1	0	0	1	1	0
-39dB		0	1	0	0	1	1	1
-40dB		0	1	0	1	0	0	0
-41dB		0	1	0	1	0	0	1
-42dB		0	1	0	1	0	1	0
-43dB		0	1	0	1	0	1	1
-44dB		0	1	0	1	1	0	0
-45dB		0	1	0	1	1	0	1
-46dB		0	1	0	1	1	1	0
-47dB		0	1	0	1	1	1	1
-48dB		0	1	1	0	0	0	0
-49dB		0	1	1	0	0	0	1
-50dB		0	1	1	0	0	1	0
-51dB		0	1	1	0	0	1	1
-52dB		0	1	1	0	1	0	0
-53dB		0	1	1	0	1	0	1
-54dB		0	1	1	0	1	1	0
-55dB		0	1	1	0	1	1	1

ATT	FLch SLch	D0	D1	D2	D3	D4	D5	D6
	FRch SRch	D7	D8	D9	D10	D11	D12	D13
	Cch SBLch	D14	D15	D16	D17	D18	D19	D20
	SWch SBRch	D21	D22	D23	D24	D25	D26	D27
-56dB		0	1	1	1	0	0	0
-57dB		0	1	1	1	0	0	1
-58dB		0	1	1	1	0	1	0
-59dB		0	1	1	1	0	1	1
-60dB		0	1	1	1	1	0	0
-61dB		0	1	1	1	1	0	1
-62dB		0	1	1	1	1	1	0
-63dB		0	1	1	1	1	1	1
-64dB		1	0	0	0	0	0	0
-65dB		1	0	0	0	0	0	1
-66dB		1	0	0	0	0	1	0
-67dB		1	0	0	0	0	1	1
-68dB		1	0	0	0	1	0	0
-69dB		1	0	0	0	1	0	1
-70dB		1	0	0	0	1	1	0
-71dB		1	0	0	0	1	1	1
-72dB		1	0	0	1	0	0	0
-73dB		1	0	0	1	0	0	1
-74dB		1	0	0	1	0	1	0
-75dB		1	0	0	1	0	1	1
-76dB		1	0	0	1	1	0	0
-77dB		1	0	0	1	1	0	1
-78dB		1	0	0	1	1	1	0
-79dB		1	0	0	1	1	1	1
-80dB		1	0	1	0	0	0	0
-81dB		1	0	1	0	0	0	1
-82dB		1	0	1	0	0	1	0

ATT	FLch SLch	D0	D1	D2	D3	D4	D5	D6
	FRch SRch	D7	D8	D9	D10	D11	D12	D13
	Cch SBLch	D14	D15	D16	D17	D18	D19	D20
	SWch SBRch	D21	D22	D23	D24	D25	D26	D27
-83dB		1	0	1	0	0	1	1
-84dB		1	0	1	0	1	0	0
-85dB		1	0	1	0	1	0	1
-86dB		1	0	1	0	1	1	0
-87dB		1	0	1	0	1	1	1
-88dB		1	0	1	1	0	0	0
-89dB		1	0	1	1	0	0	1
-90dB		1	0	1	1	0	1	0
-91dB		1	0	1	1	0	1	1
-92dB		1	0	1	1	1	0	0
-93dB		1	0	1	1	1	0	1
-94dB		1	0	1	1	1	1	0
-95dB		1	0	1	1	1	1	1
-96dB		1	1	0	0	0	0	0
-97dB		1	1	0	0	0	0	1
-98dB		1	1	0	0	0	1	0
-99dB		1	1	0	0	0	1	1
-∞ dB		1	1	1	1	0	0	0

Note : Please don't input except specification data.

Electrical Characteristics

Unless otherwise noted, Ta=25°C, AVCC=7V, AVEE=-7V, DVDD=3.3V, f=1kHz, Volume=0dB, Input ATT=0dB, Output Gain Control=0dB setting

(1) Power supply characteristics

Parameter	Symbol	Test condition	Limits min	typ	max	Unit
Analog positive power circuit current	AIcc	With AVCC=7V and AVEE=-7V Pin30 pin current, no signal.	—	40	60	mA
Analog negative power Circuit current	AIee	With AVCC=7V and AVEE=-7V Pin72 pin current, no signal.	—	40	60	mA
Digital power circuit current	DIdd	With DVDD=5V, Pin25 pin current, no signal.	—	3	6	mA

(2) Input/Output characteristics (OVER ALL)

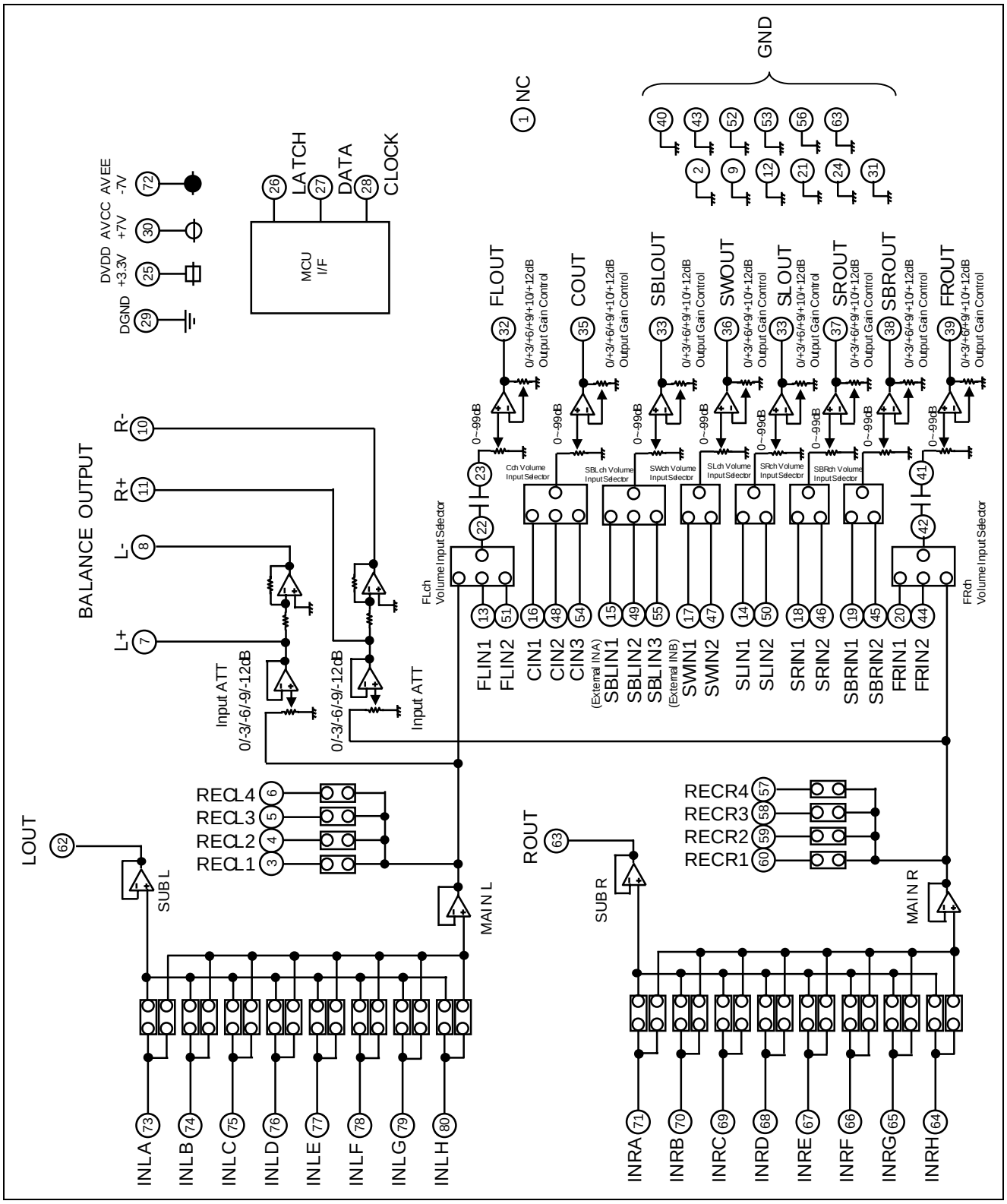
Parameter	Symbol	Test condition	Limits			Unit
			min	typ	max	
Input resistance	Rin	14~19, 45~50pin When each selector chooses a terminal concerned.	25	50	100	kΩ
Maximum output voltage	VOM	THD=1%, RL=10kohm Output Gain Contro=+10dB setting	3.6	4.2	—	Vrms
Pass gain	Gv	Vi=0.3Vrms, FLAT	-2.0	0	2.0	dB
Total harmonic distortion	THD1	BW: 400Hz~30kHz, f=1kHz, Vo=0.3Vrms, RL=10kΩ	—	0.005	0.05	%
	THD2	BW: 400Hz~30kHz, f=1kHz, Vo=2Vrms, RL=10kΩ	—	0.03	0.1	%
Channels balance	CBAL	Input Pin71,73/Output Pin39,32 Vi=0.3Vrms, JIS-A	-0.5	0	0.5	dB
Output noise voltage	Vono (VOL=-∞dB)	JIS-A, Rg=0ohm Volume=-∞dB setting	—	2	6	μVrms
	Vono (VOL=0dB)	JIS-A, Rg=0ohm Volume=0dB setting	—	4	12	μVrms
	Vonobal (Balance out)	Output Pin 7, 8, 10, 11 JIS-A, Rg=0Ω	—	5	10	μVrms
Input selector channel separation	CS1	(Input selector) Pin73~80, Pin71~64 Vo=0.5Vrms, Rg=0Ω, RL=10kΩ, JIS-A	—	-80	-65	dB
	CS2	(Multi channel/external input selector) Pin51~44, Pin13~20, Pin54,55 Vo=0.5Vrms, Rg=0Ω, RL=10kΩ, JIS-A	—	-80	-65	dB
Crosstalk of mutual channels	CT1	(Main line) Input Pin71,73/Output Pin32,39 Vo=0.5Vrms, Rg=0Ω, RL=10kΩ, JIS-A	—	-80	-65	dB
	CT2	(Sub line) Input Pin71,73/Output Pin62,61 Vo=0.5Vrms, Rg=0Ω, RL=10kΩ, JIS-A	—	-80	-65	dB

(3) 8 channel Volume characteristics

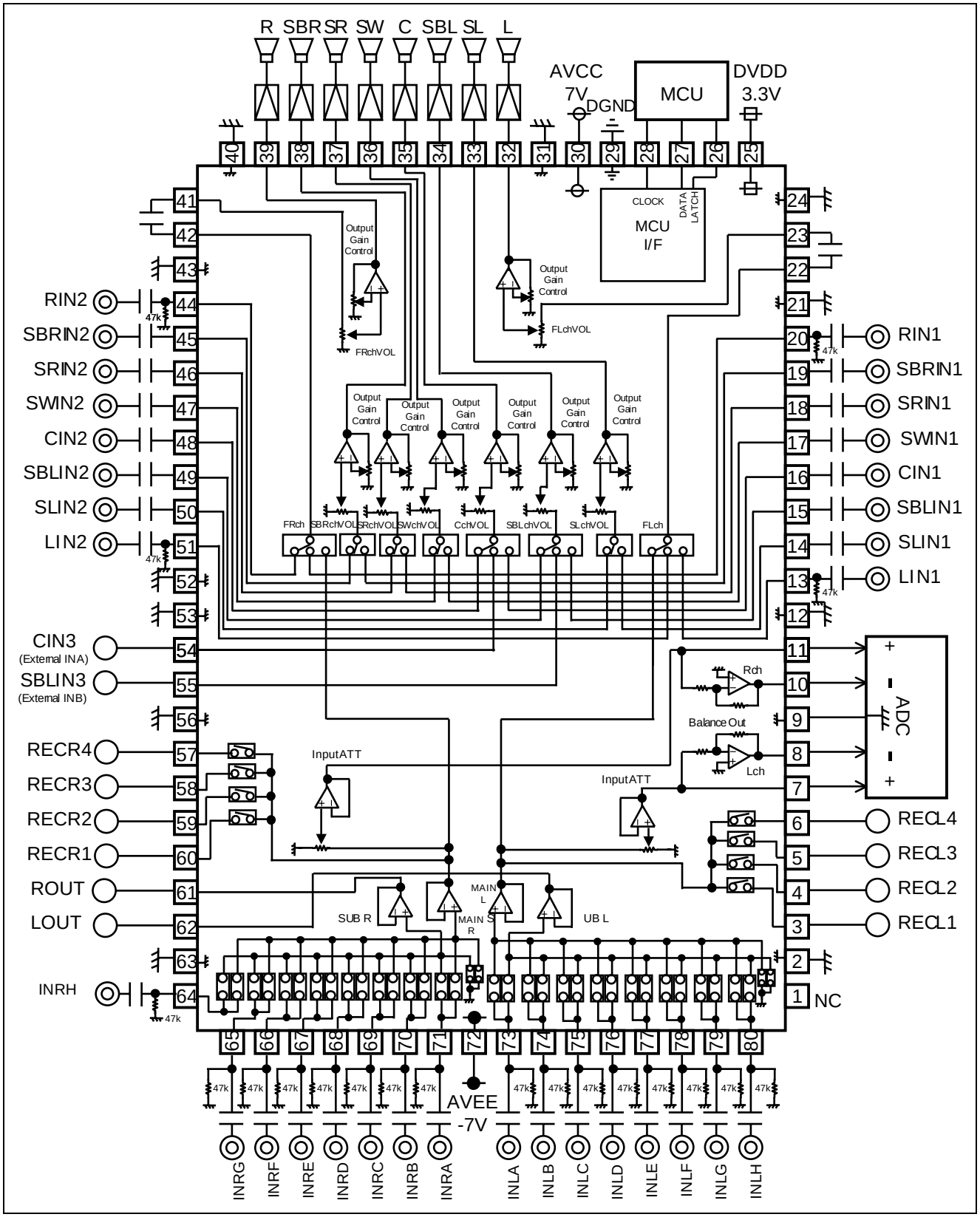
Unless otherwise noted, Output Gain Control=0dB setting

Parameter	Symbol	Test condition	Limits			Unit
			min	typ	max	
Maximum attenuation	ATTmax	Vi=1Vrms, JIS-A, VOL=-∞	—	-100	-95	dB
Volume gain gang error of mutual channels	Dvol	Pin32,33,34,35,36,37,38,39 Output, Volume=0dB setting	-0.5	0	+0.5	dB
Cross talk of mutual channels	CTvol	Vo=0.5Vrms, RL=10k Ω, JIS-A, Rg=0 Ω	—	-80	-65	dB

Internal Block Diagram



Application Example



Package Dimensions

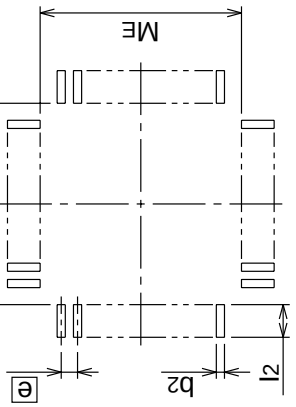
Plastic 80pin 14X20mm body QFP

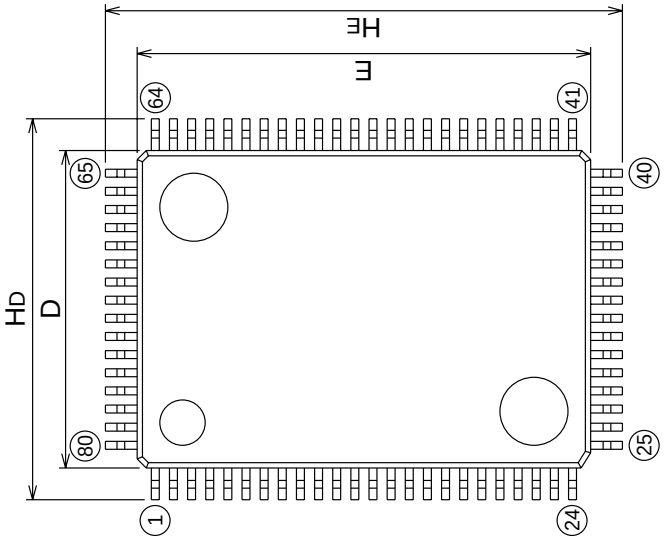
80P6N-A (MMP)

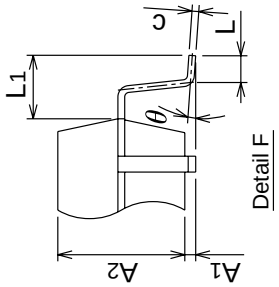
EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
QFP80-P-1420-0.80	—	1.58	Alloy 42

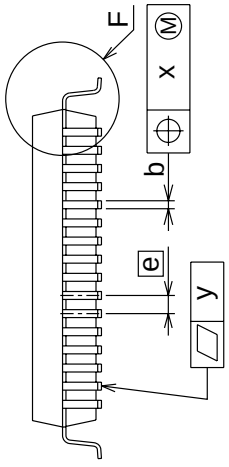
Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	—	—	3.05
A_1	0	0.1	0.2
A_2	—	2.8	—
b	0.3	0.35	0.45
c	0.13	0.15	0.2
D	13.8	14.0	14.2
E	19.8	20.0	20.2
e	—	0.8	—
H_D	16.5	16.8	17.1
H_E	22.5	22.8	23.1
L	0.4	0.6	0.8
L_1	—	1.4	—
x	—	—	0.2
y	—	—	0.1
θ	0°	—	10°
b_2	—	0.5	—
l_2	1.3	—	—
M_D	—	14.6	—
M_E	—	20.6	—

Recommended Mount Pad









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