

## DESCRIPTION

The M62447SP is 6 channels electric volume controlled 3-wire serial data.  
 The IC is suitable for use in home-use audio systems and TV sets.

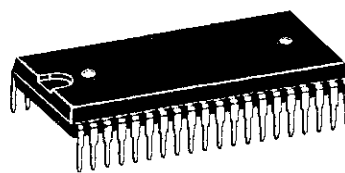
## FEATURES

- Electric volume
  - Volume level..... 0dB ~ -79dB, - dB (1dB / step)
- 4 Output ports
- Built-in microcomputer interface circuit controlled by 16-bit serial data.

## APPLICATION

DVD, Home Audio equipment, TV

## PACKAGE



Outline 42P4B

## RECOMMENDED OPERATING CONDITIONS

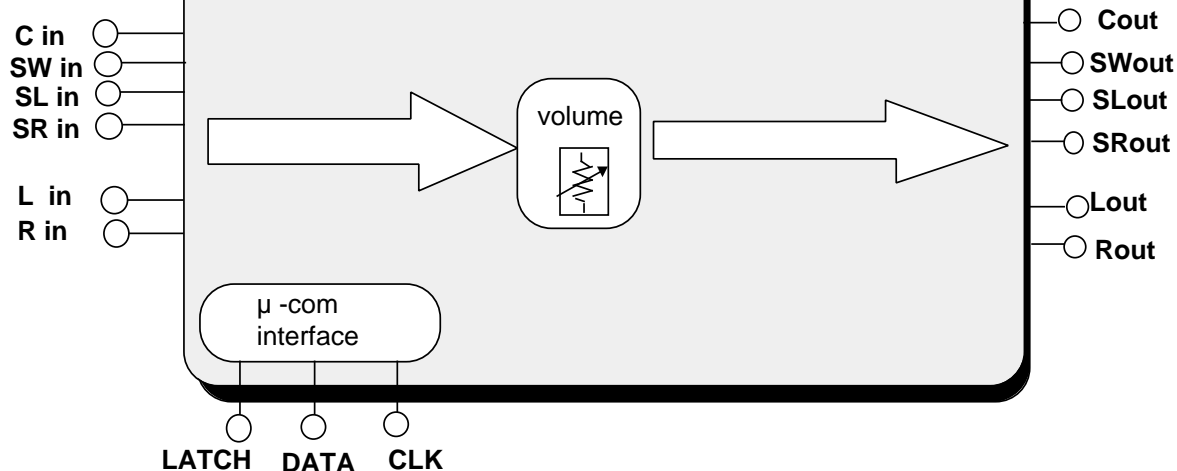
Supply voltage range.....  $\pm 4.5 \sim \pm 7.3V$  (analog)

4.5 ~ 5.5V (digital)

Rated supply voltage ....  $\pm 7.0V$  (analog)

5.0V (digital)

## SYSTEM BLOCK DIAGRAM



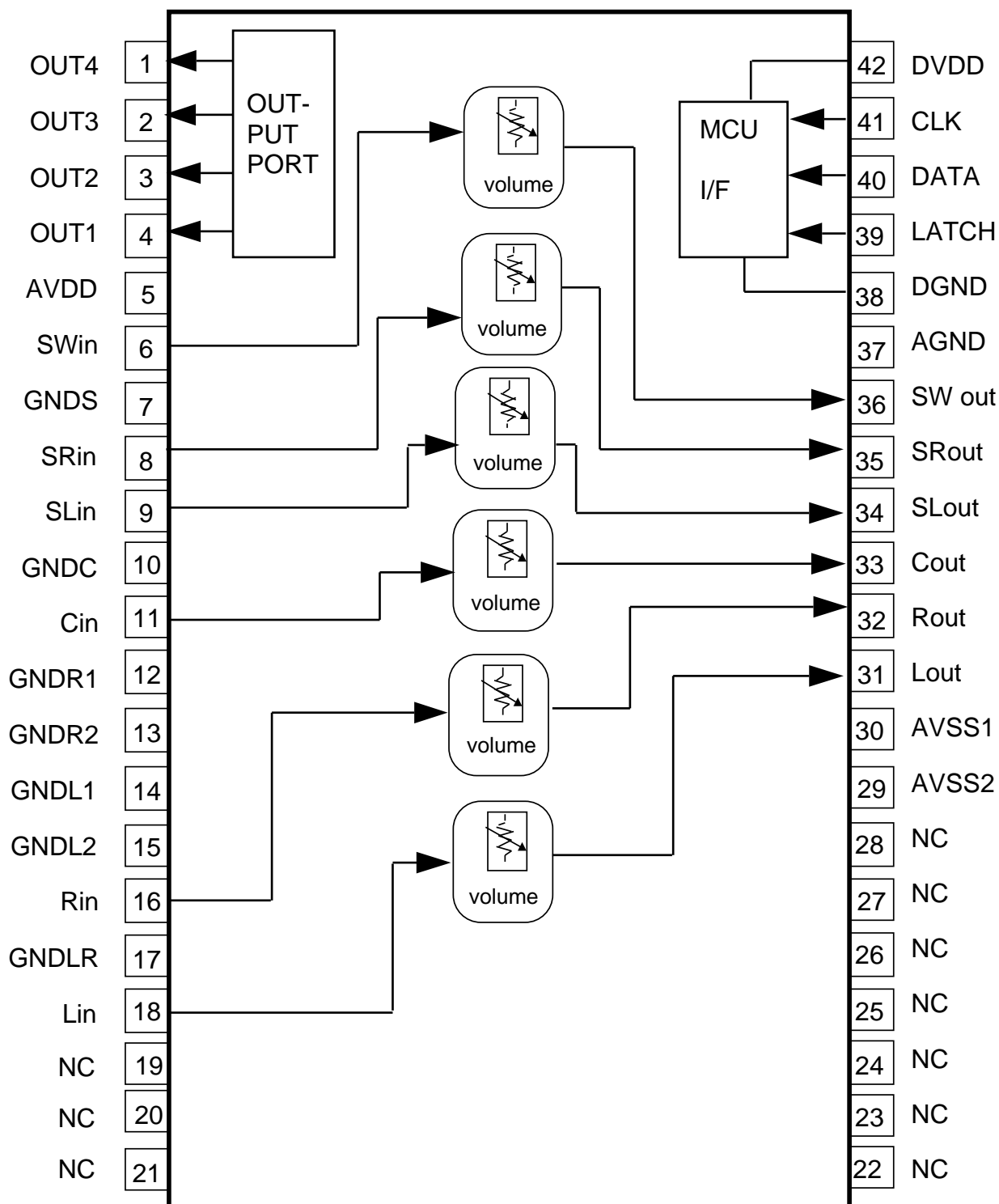
**PRELIMINARY**  
 Notice ; This is not a final specification.  
 some parametric limits are subject to change.

MITSUBISHI SOUND PROCESSORS

**M62447SP**

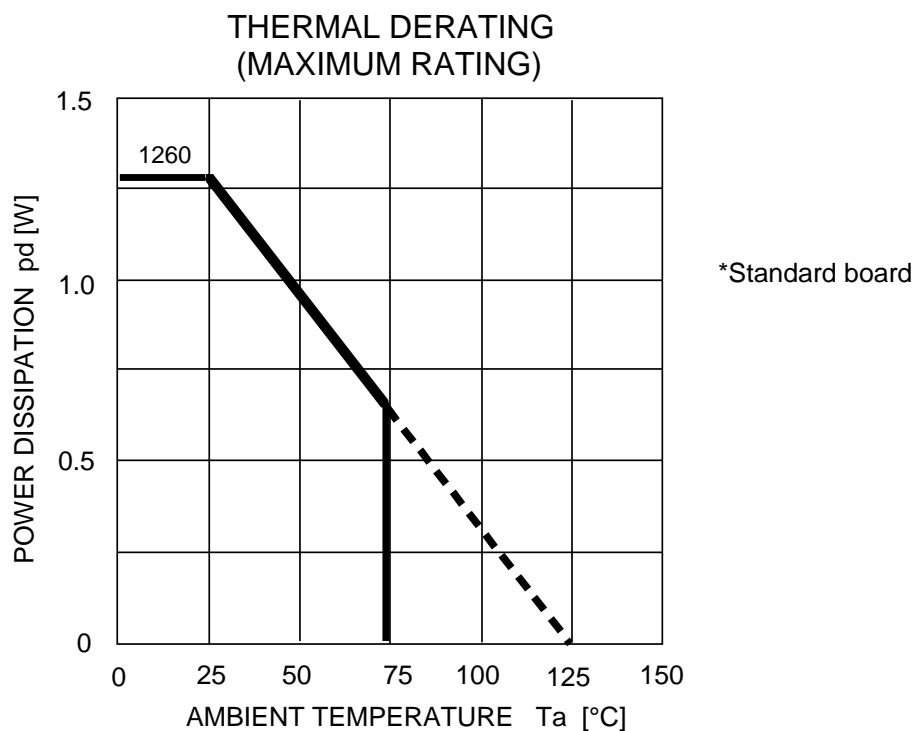
6CH ELECTRIC VOLUME

**PIN CONFIGURATION AND IC INTERNAL BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>supply</sub>	Supply Voltage	AVDD-AVSS	15.0	V
P <sub>d</sub>	Power dissipation	T <sub>a</sub> 25°C	1260	mW
K <sub>θ</sub>	Thermal derating	T <sub>a</sub> >25°C, *standard board	12.6	mW/°C
T <sub>opr</sub>	Operating temperature		-20 ~ +75	°C
T <sub>stg</sub>	Storage temperature		-40 ~ +125	°C

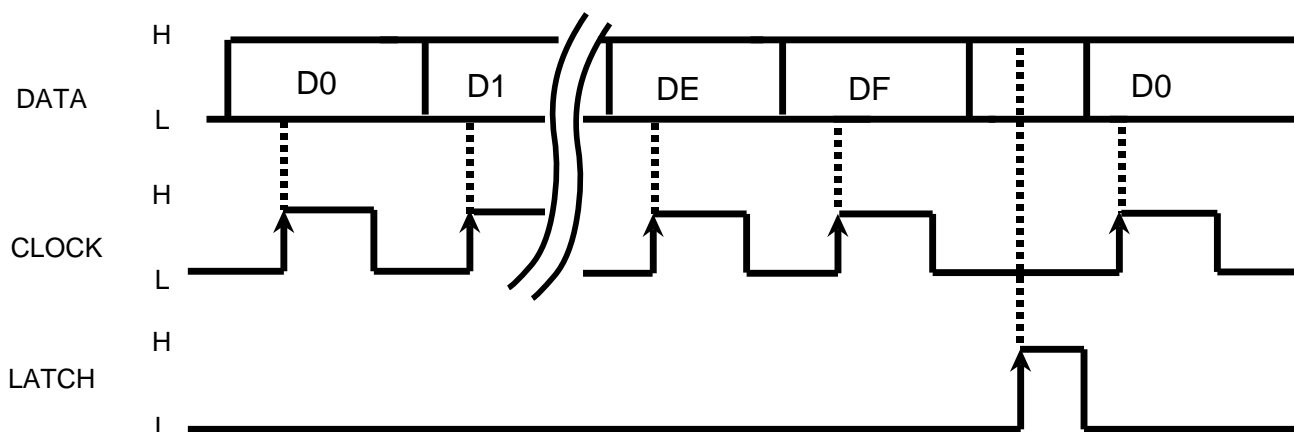


**RECOMMENDED OPERATING CONDITION**

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Analog positive Supply Voltage	AVDD		4.5	7.0	7.3	V
Analog negative Supply Voltage	AVSS		-7.3	-7.0	-4.5	V
Digital Supply Voltage	DVDD		4.5	5.0	5.5	V
High-level Input Voltage	VIH		DVDD/2+1	—	DVDD	V
Low-level Input Voltage	VIL		DGND	—	DVDD/2-1	V

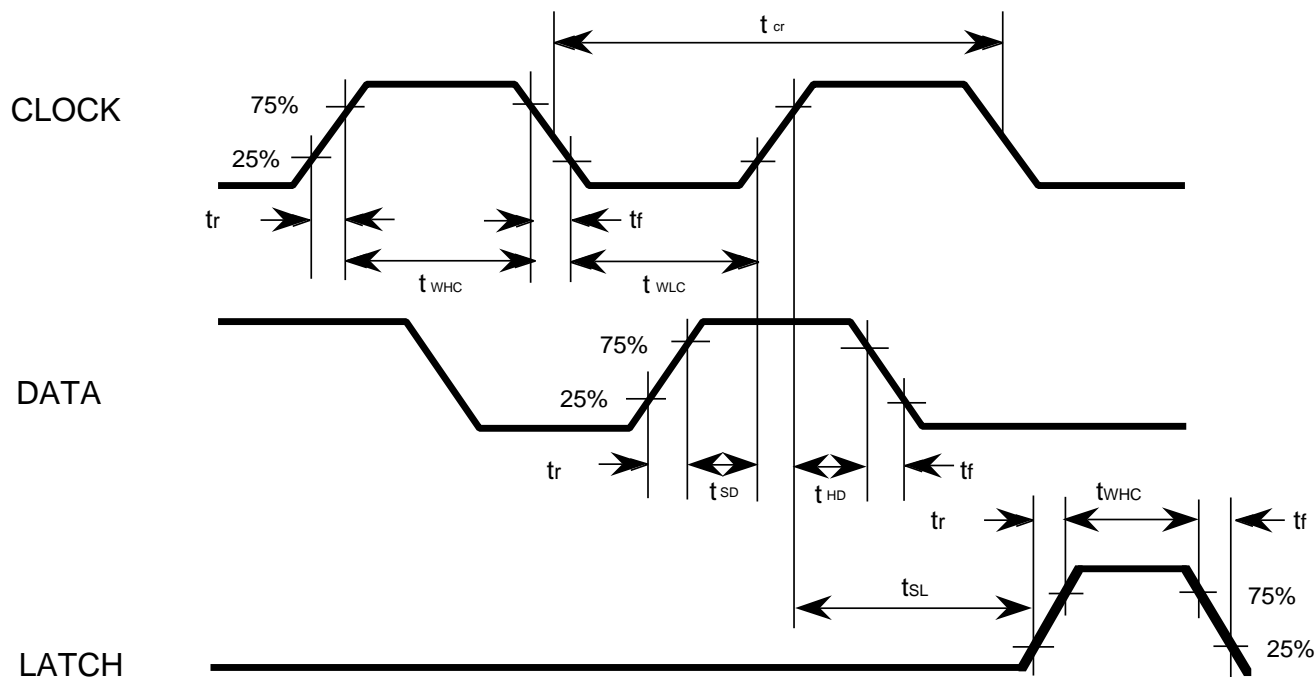
(note)AVSS DGND<DVDD AVDD

**DATA TIMING (Recommended conditions)**



note : CLOCK and LATCH function at raising edges of pulse .

**CLOCK, DATA, LATCH TIMING**



**DIGITAL BLOCK TIMING REGULATION**

Symbol	Parameter	Limits			Unit
		Min	typ	Max	
$t_{cr}$	CLOCK cycle time	8	—	—	$\mu\text{sec}$
$t_{WHC}$	CLOCK pulse width ("H"level)	3.2	—	—	
$t_{WLC}$	CLOCK pulse width ("L"level)	3.2	—	—	
$t_r$	CLOCK, DATA, LATCH rise time	—	—	0.8	
$t_f$	CLOCK, DATA, LATCH fall time	—	—	0.8	
$t_{SD}$	DATA setup time	1.6	—	—	
$t_{HD}$	DATA hold time	1.6	—	—	
$t_{SL}$	LATCH setup time	2	—	—	
$t_{WHL}$	LATCH pulse width	3.2	—	—	

**DIGITAL CONTROL SPECIFICATION**

Fore kinds of input format options are available by changing slot settings of DE and DF.  
 (When the IC is powered up , the internal settings are not fixed.)

( 1 )

DO1	D11	D21	D31	D41	D51	D61	D71	D81	D91	DA1	DB1	DC1	DD1	DE	DF
				1	2	3	4								
0	0	0	0	OUTPUT PORT n 1: High 0: Low				0	0	0	0	0	1	0	0

( 2 )

DO2	D12	D22	D32	D42	D52	D62	D72	D82	D92	DA2	DB2	DC2	DD2	DE	DF
VOLUME Lch							VOLUME Rch							0	1

( 3 )

DO3	D13	D23	D33	D43	D53	D63	D73	D83	D93	DA3	DB3	DC3	DD3	DE	DF
VOLUME Cch							VOLUME SWch							1	0

( 4 )

DO4	D14	D24	D34	D44	D54	D64	D74	D84	D94	DA4	DB4	DC4	DD4	DE	DF
VOLUME SLch							VOLUME SRch							1	1

**SETTING CODE**

Note : Do not input other data than the above.

(1) Port output

		D41	D51	D61	D71
PORT1	0	L	-	-	-
	1	H			
PORT2	0	-	L	-	-
	1		H		
PORT3	0	-	-	L	-
	1			H	
PORT4	0	-	-	-	L
	1				H

(2) VOLUME ( 0 ~ -39dB)

Note : Do not input other data than the above.

A T T	VOLUME	D0X	D1X	D2X	D3X	D4X	D5X	D6X
		D7X	D8X	D9X	DAX	DBX	DCX	DDX
- 0	dB	0	0	0	0	0	0	0
- 1	dB	0	0	0	0	0	0	1
- 2	dB	0	0	0	0	0	1	0
- 3	dB	0	0	0	0	0	1	1
- 4	dB	0	0	0	0	1	0	0
- 5	dB	0	0	0	0	1	0	1
- 6	dB	0	0	0	0	1	1	0
- 7	dB	0	0	0	0	1	1	1
- 8	dB	0	0	0	1	0	0	0
- 9	dB	0	0	0	1	0	0	1
- 10	dB	0	0	0	1	0	1	0
- 11	dB	0	0	0	1	0	1	1
- 12	dB	0	0	0	1	1	0	0
- 13	dB	0	0	0	1	1	0	1
- 14	dB	0	0	0	1	1	1	0
- 15	dB	0	0	0	1	1	1	1
- 16	dB	0	0	1	0	0	0	0
- 17	dB	0	0	1	0	0	0	1
- 18	dB	0	0	1	0	0	1	0
- 19	dB	0	0	1	0	0	1	1
- 20	dB	0	0	1	0	1	0	0
- 21	dB	0	0	1	0	1	0	1
- 22	dB	0	0	1	0	1	1	0
- 23	dB	0	0	1	0	1	1	1
- 24	dB	0	0	1	1	0	0	0
- 25	dB	0	0	1	1	0	0	1
- 26	dB	0	0	1	1	0	1	0
- 27	dB	0	0	1	1	0	1	1
- 28	dB	0	0	1	1	1	0	0
- 29	dB	0	0	1	1	1	0	1
- 30	dB	0	0	1	1	1	1	0
- 31	dB	0	0	1	1	1	1	1
- 32	dB	0	1	0	0	0	0	0
- 33	dB	0	1	0	0	0	0	1
- 34	dB	0	1	0	0	0	1	0
- 35	dB	0	1	0	0	0	1	1
- 36	dB	0	1	0	0	1	0	0
- 37	dB	0	1	0	0	1	0	1
- 38	dB	0	1	0	0	1	1	0
- 39	dB	0	1	0	0	1	1	1





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MITSUBISHI SOUND PROCESSORS

# M62447SP

6CH ELECTRIC VOLUME

VOLUME ( -40 ~ - dB)

Note : Do not input other data than the above.

A T T	VOLUME	D0X	D1X	D2X	D3X	D4X	D5X	D6X
		D7X	D8X	D9X	DAX	DBX	DCX	DDX
- 40 dB		0	1	0	1	0	0	0
- 41 dB		0	1	0	1	0	0	1
- 42 dB		0	1	0	1	0	1	0
- 43 dB		0	1	0	1	0	1	1
- 44 dB		0	1	0	1	1	0	0
- 45 dB		0	1	0	1	1	0	1
- 46 dB		0	1	0	1	1	1	0
- 47 dB		0	1	0	1	1	1	1
- 48 dB		0	1	1	0	0	0	0
- 49 dB		0	1	1	0	0	0	1
- 50 dB		0	1	1	0	0	1	0
- 51 dB		0	1	1	0	0	1	1
- 52 dB		0	1	1	0	1	0	0
- 53 dB		0	1	1	0	1	0	1
- 54 dB		0	1	1	0	1	1	0
- 55 dB		0	1	1	0	1	1	1
- 56 dB		0	1	1	1	0	0	0
- 57 dB		0	1	1	1	0	0	1
- 58 dB		0	1	1	1	0	1	0
- 59 dB		0	1	1	1	0	1	1
- 60 dB		0	1	1	1	1	0	0
- 61 dB		0	1	1	1	1	0	1
- 62 dB		0	1	1	1	1	1	0
- 63 dB		0	1	1	1	1	1	1
- 64 dB		1	0	0	0	0	0	0
- 65 dB		1	0	0	0	0	0	1
- 66 dB		1	0	0	0	0	1	0
- 67 dB		1	0	0	0	0	1	1
- 68 dB		1	0	0	0	1	0	0
- 69 dB		1	0	0	0	1	0	1
- 70 dB		1	0	0	0	1	1	0
- 71 dB		1	0	0	0	1	1	1
- 72 dB		1	0	0	1	0	0	0
- 73 dB		1	0	0	1	0	0	1
- 74 dB		1	0	0	1	0	1	0
- 75 dB		1	0	0	1	0	1	1
- 76 dB		1	0	0	1	1	0	0
- 77 dB		1	0	0	1	1	0	1
- 78 dB		1	0	0	1	1	1	0
- 79 dB		1	0	0	1	1	1	1
- dB		1	0	1	0	0	0	0

## ELECTRICAL CHARACTERISTICS

(Ta=25°C, AVDD=7.0V, AVSS=-7.0V, DVDD=5.0V, f=1kHz, unless otherwise noted.)

TONE CONTROL, VOLUME are set to 0dB)

### (1) Power supply characteristics

Parameter	Symbol	Test condition	Limits			Unit
			Min	typ	Max	
Analog positive circuit current	Aldd	Current at pin 5 No signal	—	25	35	mA
Analog negative circuit current	Alss	Current at pin 29 ~ 30 No signal	—	25	35	mA
Digital circuit current	Dldd	Current at pin 42 No signal	—	0.5	2.0	mA

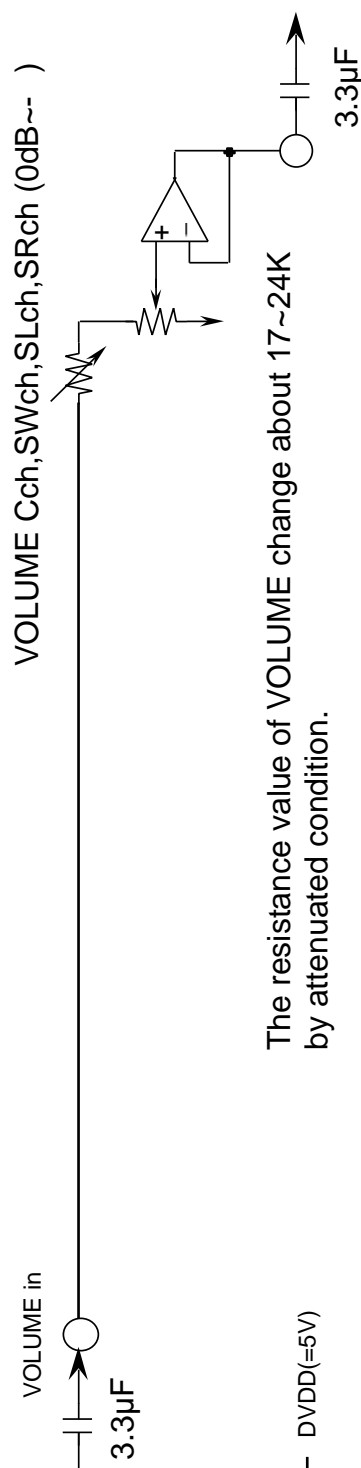
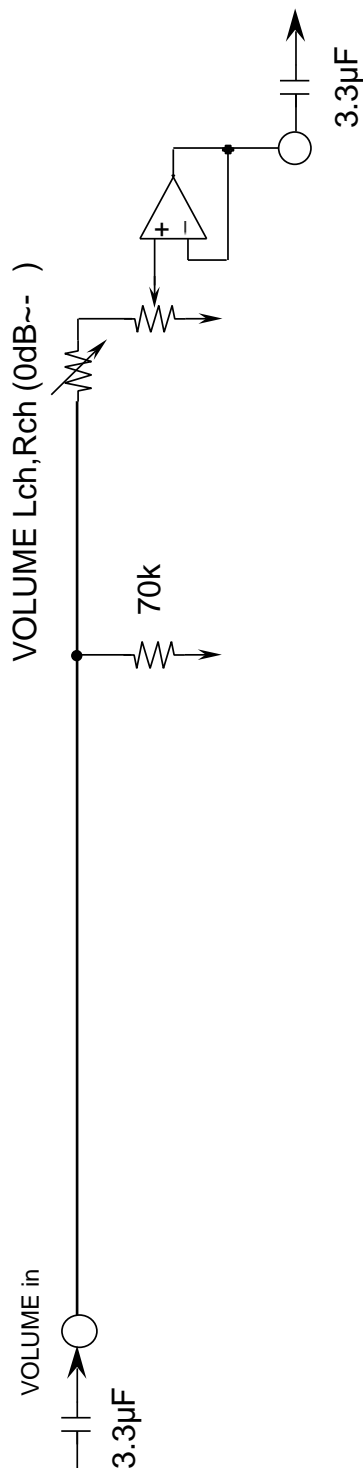
### (2) Input / Output characteristics

Parameter	Symbol	Test condition	Limits			Unit
			Min	typ	Max	
Maximum output voltage	VOM	6,8,9,11,16,18pin INPUT 31 ~ 36pin OUTPUT RL =10K, THD=1%	3.0	4.0	—	Vrms
Pass gain	Gv	Vi=0.2Vrms, FLAT 6,8,9,11,16,18pin INPUT 31 ~ 36pin OUTPUT	-2.0	0	2.0	dB
Distortion	THD	BW=400 ~ 30kHz Vi=0.2Vrms, RL=10K	—	0.02	0.09	%
Output noise voltage	Vn(VOL)	31 ~ 36pin, Rg=0K, JIS-A, VOL=0dB	—	2	6	μVrms
Maximum attenuation	ATTmax	31 ~ 36pin, Rg=1K, JIS-A, VOL=- dB	-86	—	—	dB
Volume gain between channels	Dvol		-1.5	0	1.5	dB
Crosstalk between channels	CT	Vo=0.5Vrms, RL=10K, JIS-A Rg=1K	—	-80	-65	dB
Port output current	IL		0.2	—	—	mA

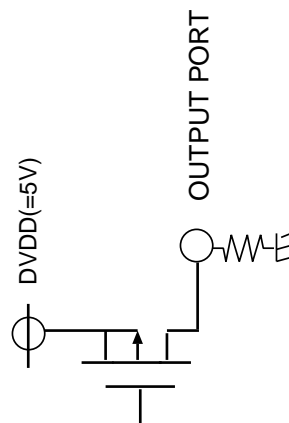
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6CH ELECTRIC VOLUME

## SYSTEM DIAGRAM



The resistance value of VOLUME change about 17~24K  
 by attenuated condition.



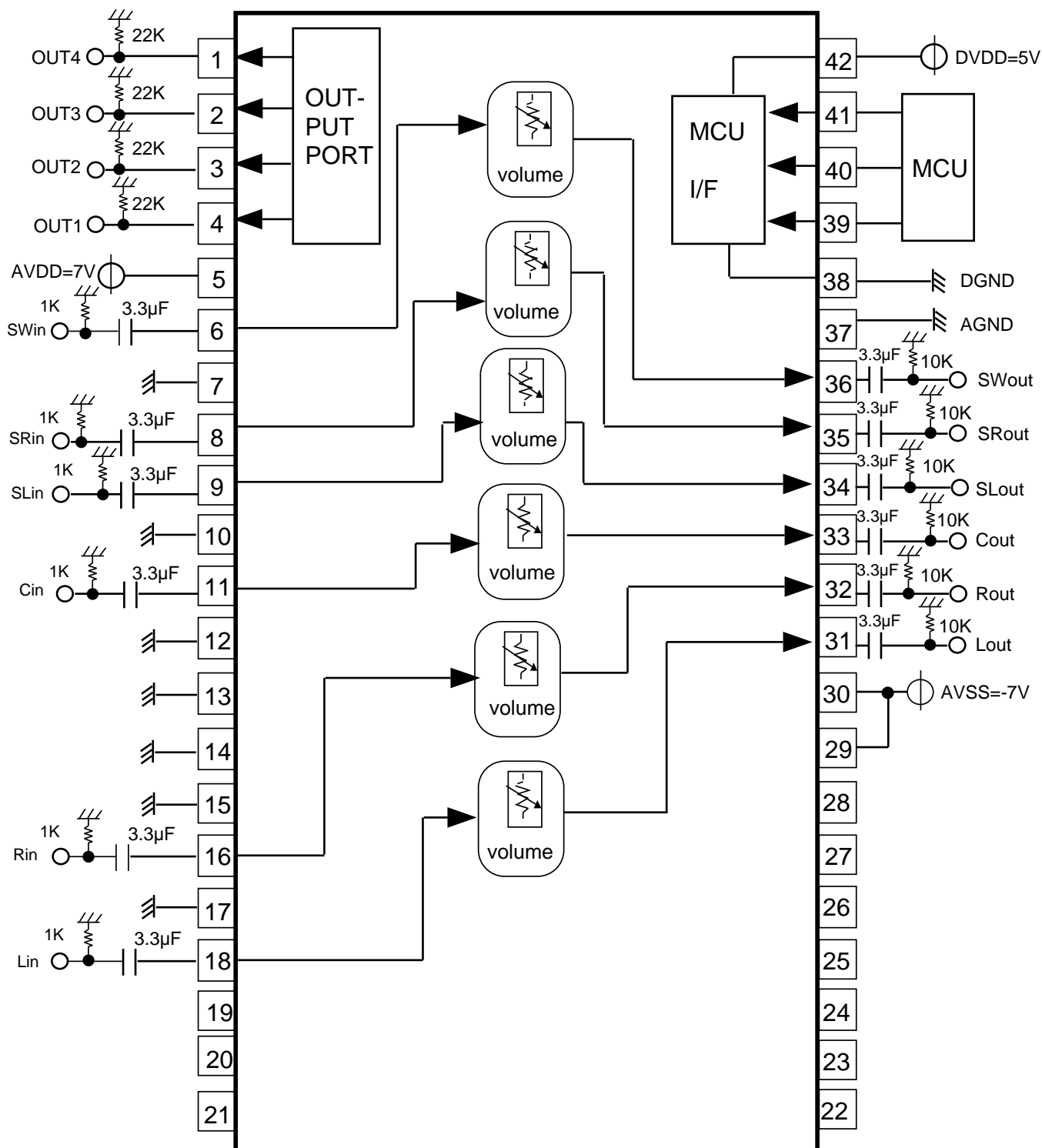
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**APPLICATION EXAMPLE**



Units Resistance :  
 Capacitance : F