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

SRS (●)
everything else is only stereo™

M62434FP

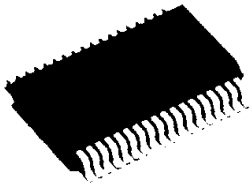
SOUND CONTROLLER FOR TV

Tone, Volume and SRS by I²C Bus System

OUTLINE

M62434FP has tone, volume and SRS 3D stereo controlled by I²C bus.
This IC broad applications because of low noise and distortion.

PACKAGE OUTLINE



24Pin SOP

FEATURE

- TONE(Bass/Treble) control, 1dB step volume, and 3dB/step SRS "Space" and "Center" controls.
- Controlled by serial data in accordance with the I2C bus format .

Note !!

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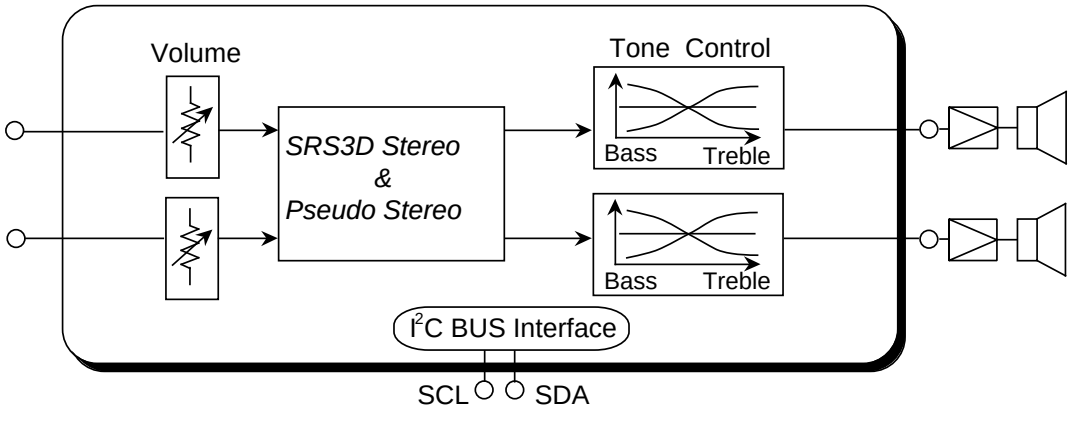
APPLICATION

- TV , Mini-Stereo , etc

RECOMMENDED OPERATING CONDITION

- Supply voltage range 8.5~9.5V (analog)
- Rated supply voltage 9V (analog)

SYSTEM BLOCK DIAGRAM

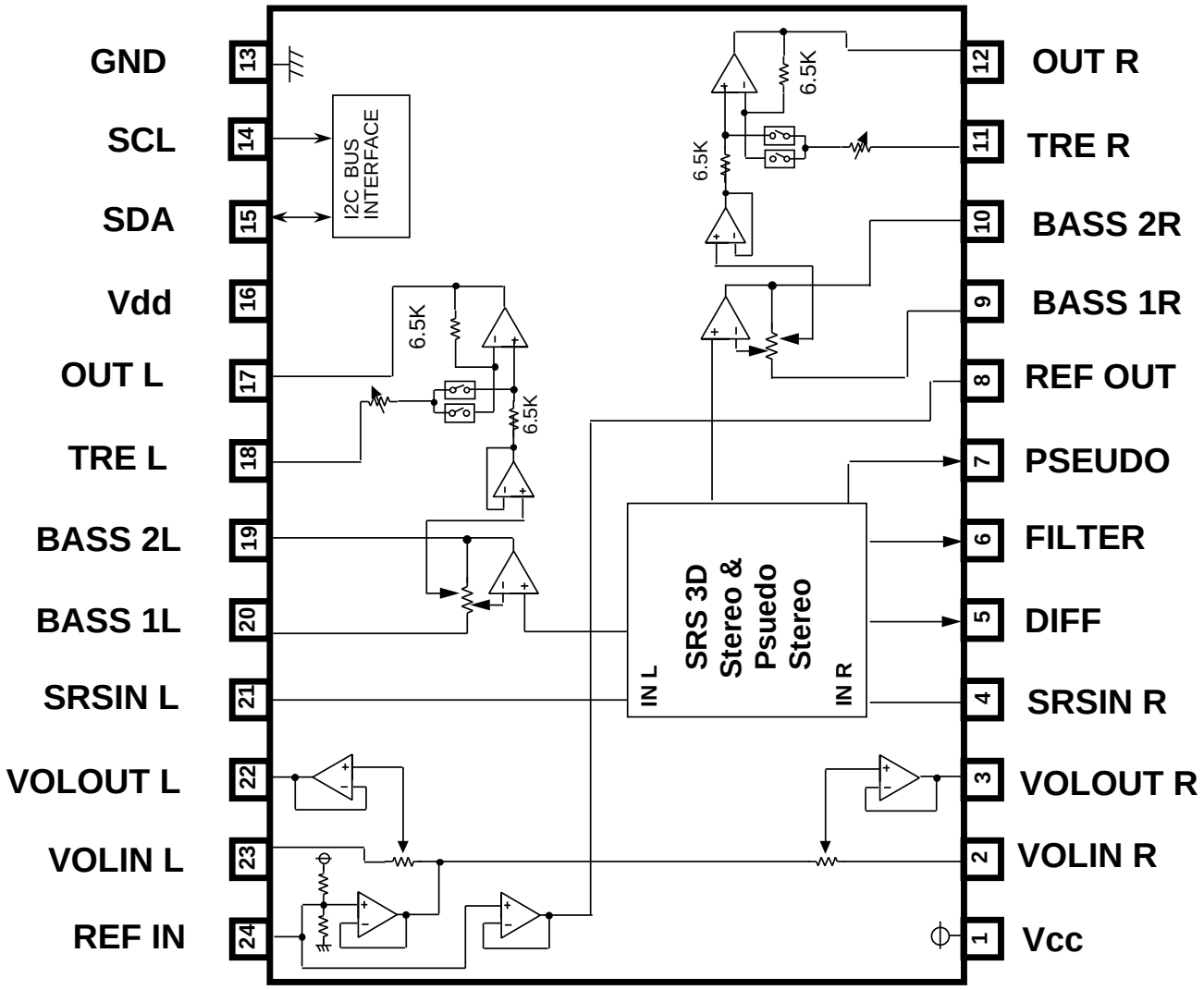


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M62434FP

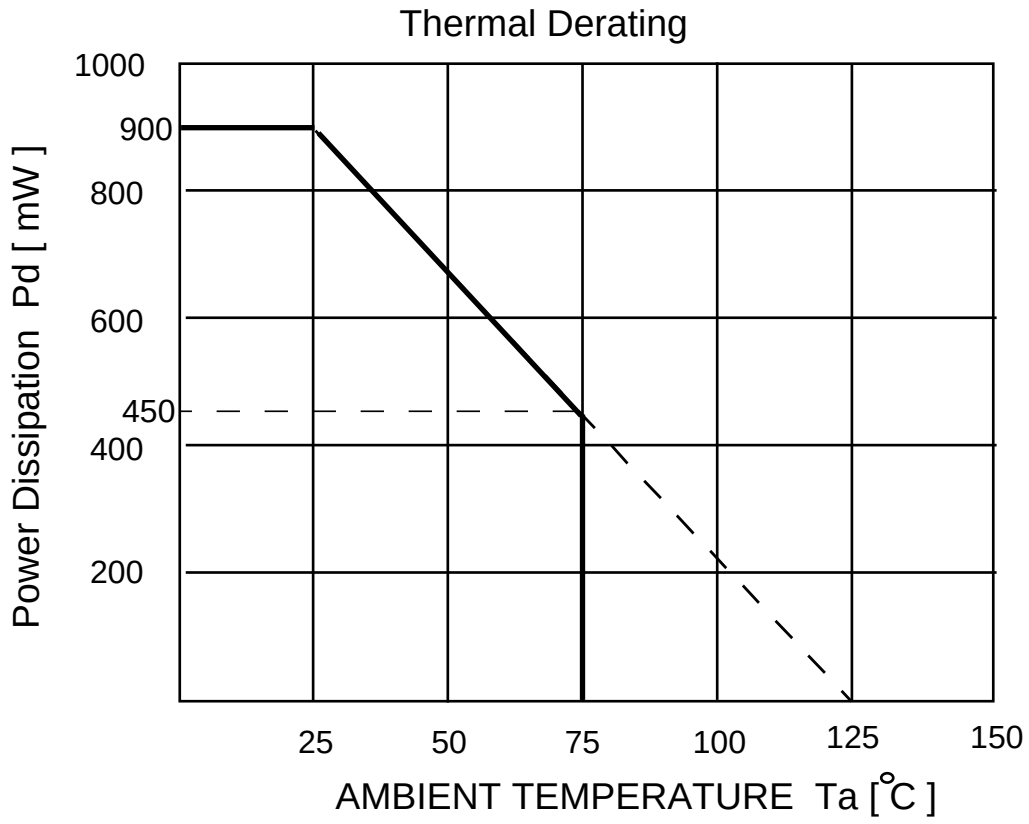
SOUND CONTROLLER FOR TV

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply Voltage		10.0	V
Pd	Power Dissipation	Ta<25°C	900	mW
K_θ	Thermal Derating	Ta>25°C	9	mW/°C
Topr	Operating Temperature		-20 ~ 75	°C
Tstg	Storage Temperature		-55 ~ 125	°C



RECOMMENDED OPERATING CONDITION

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
AVDD	Analog Supply Voltage		8.5	9.0	9.5	V
DVDD	Digital Supply Voltage		4.5	5.0	5.5	V
V_{IH}	High Level Input Voltage		0.7 DVDD	—	VDD	V
V_{IL}	Low Level Input Voltage		0	—	0.3 DVDD	V

ELECTRICAL CHARACTERISTICS

(Ta=25°C, Vcc=9V, Tone Control;Flat , Bass Boost;0dB, ATT=0dB)

(1) Power Suppy Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Icc	Circuit Current		—	30	45	mA

(2) -1 Input / Output Characteristics

Symbol	Parameter	Conditions		ATT (dB)	SRS	TONE	Limit			Unit
		Input	Output				Min.	Typ.	Max.	
V_{IM1}	Maximum Input Voltage1	pin 2,23 f=1kHz	pin 12,17 THD=1% IHF-A filter	-6	By-Pass	Flat	2.0	3.2	—	Vrms
V_{IM2}	Maximum Input Voltage2	pin 2,23 f=100Hz	pin 12,17 THD=1% DIN-A filter	0	Center 0dB Space 0dB	Bass 12dB Treble 12dB	—	0.18	—	Vrms
V_{OM}	Maximum Output Voltage	pin 2,23 f=1kHz	pin 12,17 THD=1% IHF-A filter R_L=10KΩ	0	By-Pass	Flat	1.2	1.7	—	Vrms
THD	Total Harmonic Distortion	pin 2,23 f=1kHz Vi=0dBm	pin 12,17 DIN-A filter R_L=10KΩ	0	By-Pass	Flat	—	0.1	0.2	%
CS	Channel Separation	pin 2,23 f=1kHz Vi=0dBm	pin 12,17 IHF-A filter	0	By-Pass	Flat	—	-60	-50	dB
V_{NO1}	Output Noise Voltage1	pin 2,23 to GND	pin 12,17 IHF-A filter	-∞	By-Pass	Flat	—	10	20	µVrms
V_{NO2}	Output Noise Voltage2	pin 2,23 to GND	pin 12,17 IHF-A filter	0	By-Pass	Flat	—	10	20	µVrms
V_{NO3}	Output Noise Voltage3	pin 2,23 to GND	pin 12,17 IHF-A filter	0	Center 0dB Space 0dB	Bass 0dB Treble 0dB	—	60	—	µVrms

(2)-2 Input / Output Characteristics

Symbol	Parameter	Conditions		ATT (dB)	SRS	TONE	Limit			Unit
		Input	Output				Min.	Typ.	Max.	
GV_{pass}	By-Pass Gain	pin 23 f=1kHz Vi= 500mVrms	pin 17 IHF-A filter	0	By-Pass	Flat	-4.5	-2.5	-0.5	dB
GV_{srsf}	Feed Through Gain				Center -∞ Space -∞	Flat	-15	-13	-11	dB
GV_{srsL-R}	L(2ch)-R(1ch) Gain				Center -∞ Space 0dB	Flat	0.4	2.4	4.4	dB
GV_{srsL+R}	L(2ch)+R(1ch) Gain				Center 0dB Space -∞	Flat	-6.5	-4.5	-2.5	dB

(3) Tone Control Characteristic

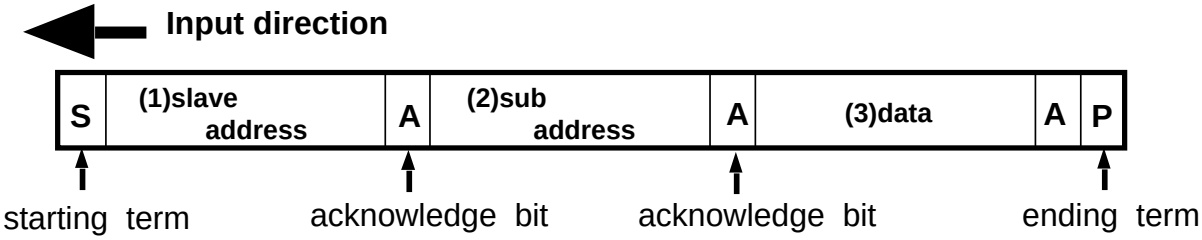
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Gbassb	Voltage Gain of Tone Control (Bass)	f=100Hz	9	12	15	dB
GbassC			-15	-12	-9	dB
Gtrebb	Voltage Gain of Tone Control (treble)	f=10KHz	9	12	15	dB
GtrebC			-15	-12	-9	dB

(4) Volume Characteristic

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
ATTmax	Maximum ATT	Input ; pin 2,23 Output ; pin 12,17 ,f=1KHz IHF-A filter	—	-90	-80	dB
ATTmin	Minimum ATT		-1.5	0	1.5	dB

PRELIMINARY
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I²C BUS INPUT DATA FORMAT



(1)slave address

The following slave address is assigned for this IC.

A6	A5	A4	A3	A2	A1	A0
1	0	0	0	0	0	1

(2)sub address

The following sub address is defined for this IC.

subA7	subA6	subA5	subA4	subA3	subA2	subA1	subA0
empty slot	SRS BLOCK Space Volume 1: SELECT 2: UN SELECT	Center Volume 1: SELECT 2: UN SELECT	Pseudo Surround 1: SELECT 2: UN SELECT	TREBLE level mode 1: SELECT 2: UN SELECT	BASS level mode 1: SELECT 2: UN SELECT	channel 2 volume mode 1: SELECT 2: UN SELECT	channel 1 volume mode 1: SELECT 2: UN SELECT

(3)-1: volume control

The volume control is enabled by the following condition.

subA0 :	0	,	1	,	1	(either bit is 1)	subA2 :	0	subA5 :	0
subA1 :	1	,	0	,	1		subA3 :	0	subA6 :	0

volume code

ATT	D4	D3	D2	D1	D0
0dB	H	L	H	L	H
-4dB	H	L	H	L	L
-8dB	H	L	L	H	H
-12dB	H	L	L	H	L
-16dB	H	L	L	L	H
-20dB	H	L	L	L	L
-24dB	L	H	H	H	H
-28dB	L	H	H	H	L
-32dB	L	H	H	L	H
-36dB	L	H	H	L	L
-40dB	L	H	L	H	H
-44dB	L	H	L	H	L
-48dB	L	H	L	L	H
-52dB	L	H	L	L	L
-56dB	L	L	H	H	H
-60dB	L	L	H	H	L
-64dB	L	L	H	L	H
-68dB	L	L	H	L	L
-72dB	L	L	L	H	H
-76dB	L	L	L	H	L
-80dB	L	L	L	L	H
- ∞dB	L	L	L	L	L

ATT	D6	D5
0dB	H	H
-1dB	H	L
-2dB	L	H
-3dB	L	L

(3)-2: tone level control

The tone control is enabled by the following condition.

subA0 : 0
subA1 : 0
subA2 : 0 , 1 , 1
subA3 : 1 , 0 , 1
subA5 : 0
subA6 : 0

tone code

	BASS				TREBLE			
	D7	D6	D5	D4	D3	D2	D1	D0
12dB	L	H	H	L	L	H	H	L
10dB	L	H	L	H	L	H	L	H
8dB	L	H	L	L	L	H	L	L
6dB	L	L	H	H	L	L	H	H
4dB	L	L	H	L	L	L	H	L
2dB	L	L	L	H	L	L	L	H
0dB	L	L	L	L	L	L	L	L
-2dB	H	L	L	H	H	L	L	H
-4dB	H	L	H	L	H	L	H	L
-6dB	H	L	H	H	H	L	H	H
-8dB	H	H	L	L	H	H	L	L
-10dB	H	H	L	H	H	H	L	H
-12dB	H	H	H	L	H	H	H	L

non-used code HHHH
LHHH
HLLL

(3)-3: Pseudo Surround mode

The pseudo surround mode is enabled by the following condition.

subA0 : not defined
subA1 : not defined
subA2 : not defined
subA3 : not defined
subA4 : 1
subA5 : 0
subA6 : 0

(3)-4: SRS level control

The SRS level control is enabled by the following condition.

subA0 : 0
subA1 : 0
subA2 : 0
subA3 : 0
subA4 : 0
subA5 : 0 , 1 , 1
subA6 : 1 , 0 , 1

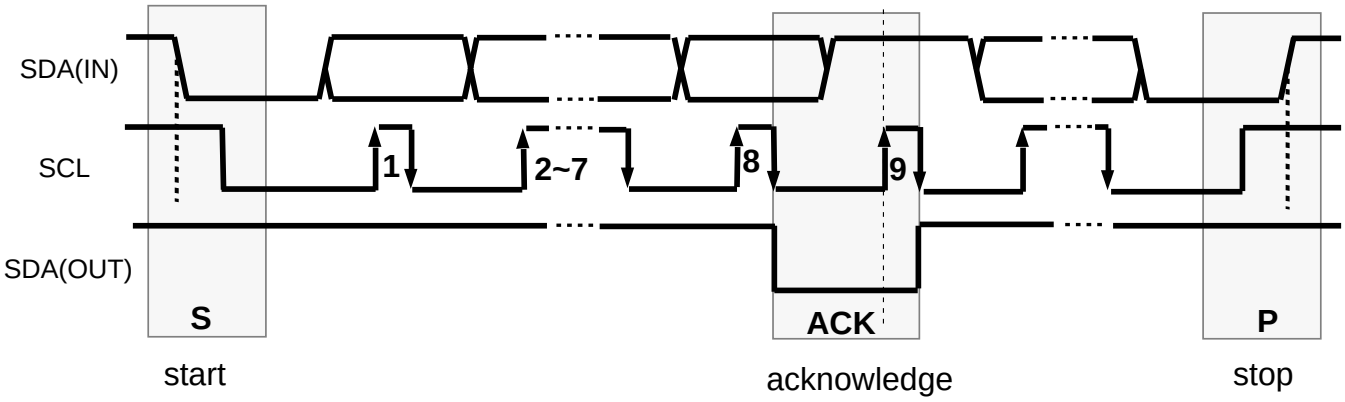
SRS level

ATT	Center Vol.				Space Vol.			
	D7	D6	D5	D4	D3	D2	D1	D0
0dB	H	L	L	H	H	L	L	H
-3dB	H	L	L	L	H	L	L	L
-6dB	L	H	H	H	L	H	H	H
-9dB	L	H	H	L	L	H	H	L
-12dB	L	H	L	H	L	H	L	H
-15dB	L	H	L	L	L	H	L	L
-18dB	L	L	H	H	L	L	H	H
-21dB	L	L	H	L	L	L	H	L
-24dB	L	L	L	H	L	L	L	H
- ∞	L	L	L	L	L	L	L	L

SRS OFF

	Center Vol.				Space Vol.			
	D7	D6	D5	D4	D3	D2	D1	D0
SRS OFF	H	H	H	H	H	H	H	H

DATA and CLOCK



start

This term is defined by SDA(in) falling edge at SCL H .

stop

This term is defined by SDA(in) rising edge at SCL H .

CAUTION

The SDA(IN) level never changes at SCK=H except start and stop .

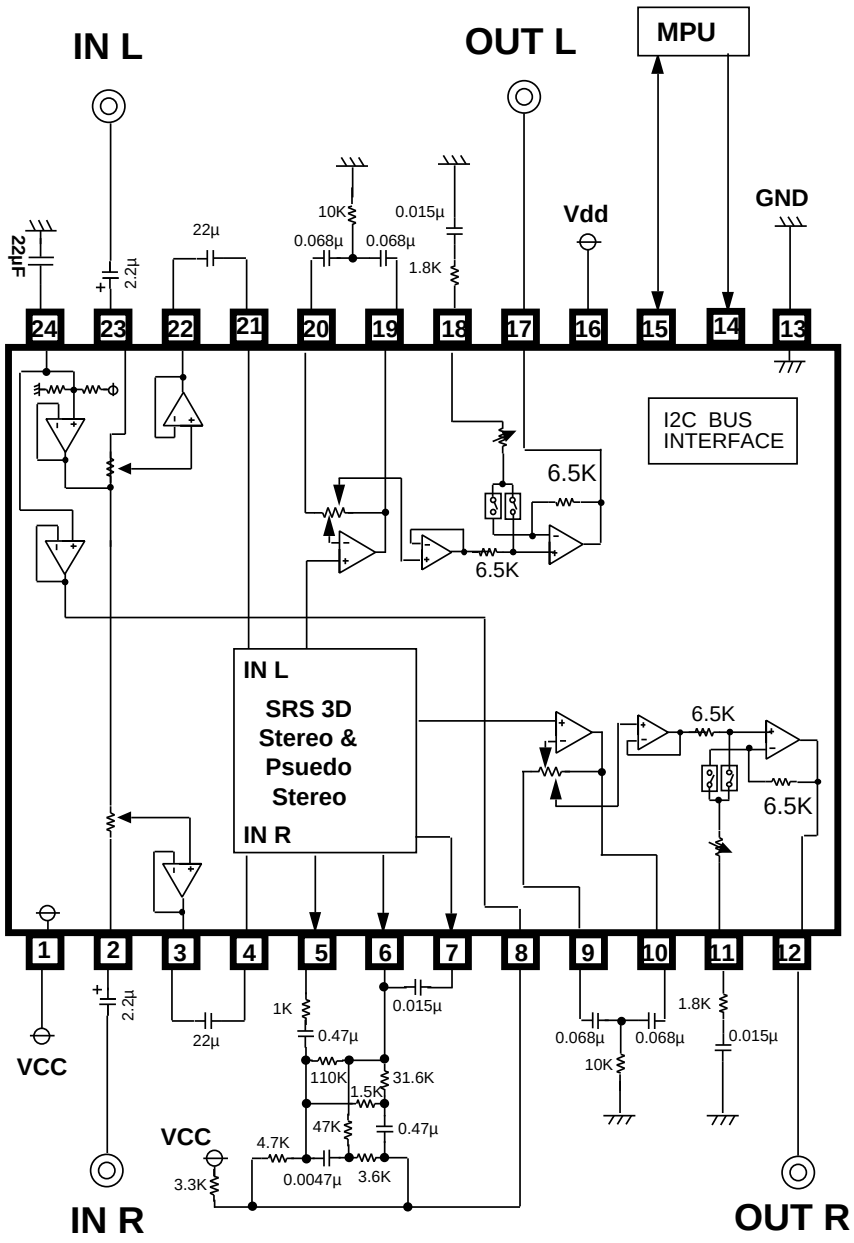
data transmisson

The SDA(IN) is enabled at SCL rising edge and H .

acknowledge

Transmitter must send H during ninth clock pulse of SCL .
The case of finished receives , the receiver replies L synchronized to falling edge of eighth pulse . And restart receiving the transmitted data synchronized to falling edge of ninth pulse .

APPLICATION EXAMPLE



Keep safety first in your circuit designs !

•Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them.Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, in order to prevent fires from spreading, redundancy, malfunction or other mishap.

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