

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>)

Send any inquiries to <http://www.renesas.com/inquiry>.

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: “Standard”, “High Quality”, and “Specific”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as “Specific” without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as “Specific” or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is “Standard” unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
 - “Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
 - “High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
 - “Specific”: Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.)

Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

PRELIMINARY

Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

DESCRIPTION

The M52795 is AV switch semiconductor integrated circuit with I2C bus control .

This IC contains 2-channels of 4-input audio switches and 2-channels of 4-input video switches. Each channel can be controlled independently .

The video switches contain amplifiers can be controlled a gain of output 0dB or 6dB .

FEATURES

- Video and stereo sound switches in one package
- Wide frequency range (video switch).....DC~20MHz
- High separation (video switch)
.....Crosstalk -60dB (typ.) at 1MHz
- Two types of packages are provided : SDIP with a lead pitch of 1.778mm (M52795SP) ; and SOP with a lead pitch of 1.27mm (M52795FP) .

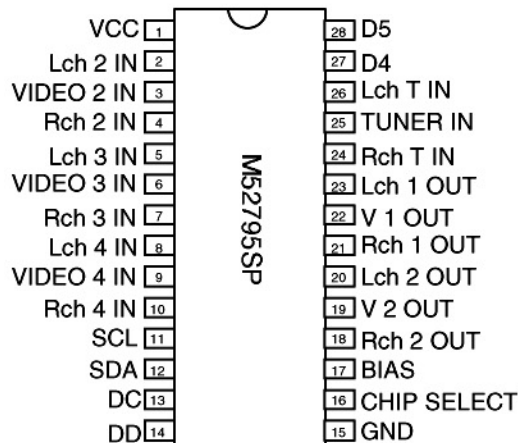
APPLICATION

Video equipment

RECOMMENDED OPERATING CONDITION

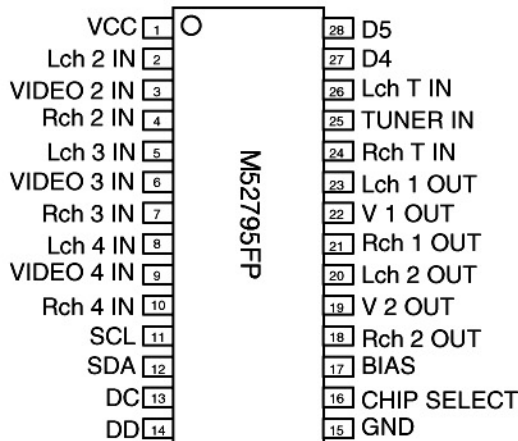
Supply voltage	4.7V~9.3V
Rated supply voltage	5V,9V
Maximum output current	32mA(at 9V)

PIN CONFIGURATION (TOP VIEW)



Outline 28P4B
(Lead pitch :1.778mm)

PIN CONFIGURATION (TOP VIEW)



Outline 28P2W-A
(Lead pitch :1.27mm)

PRELIMINARY

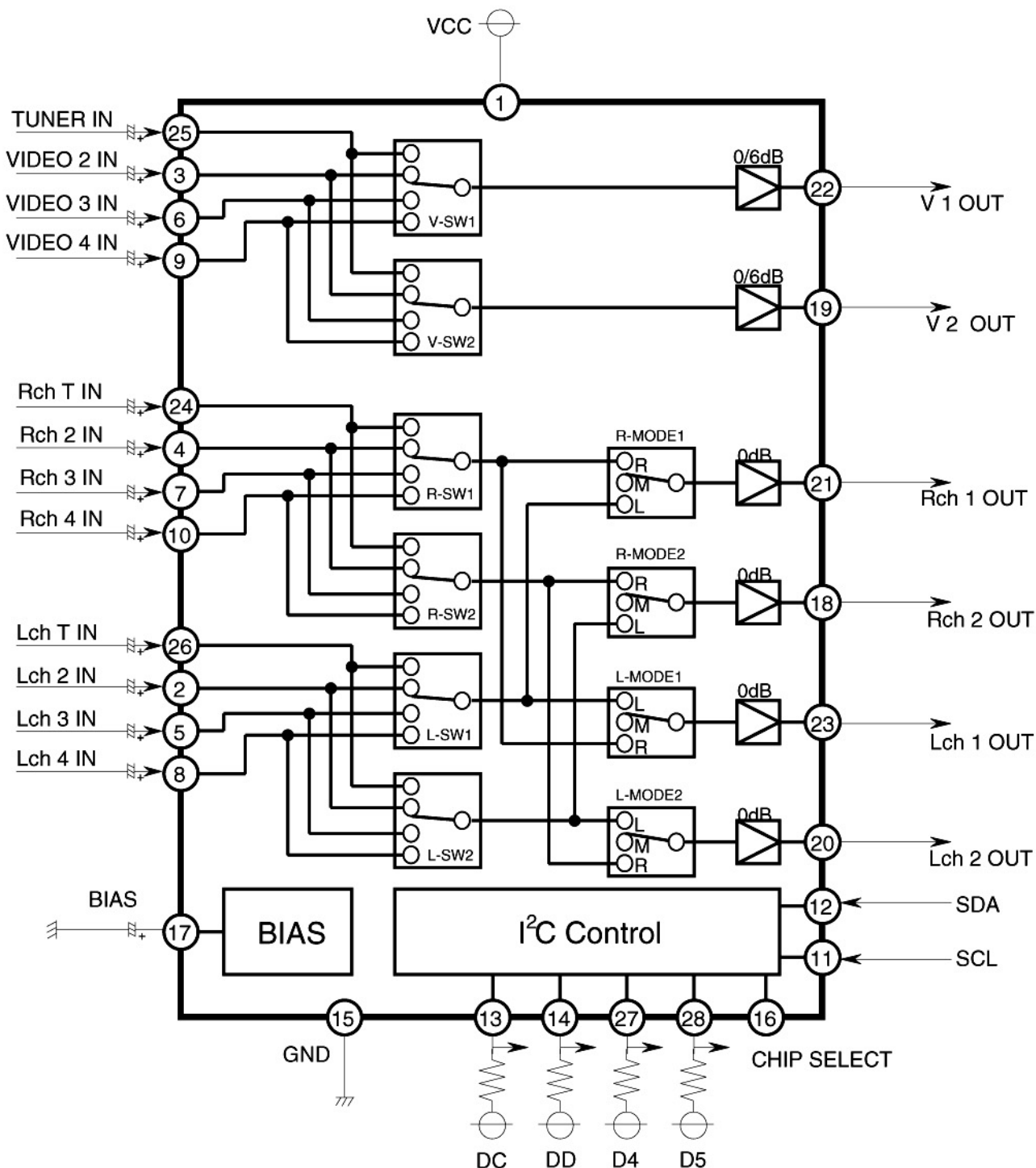
Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I²C BUS CONTROL

BLOCK DIAGRAM



PRELIMINARY

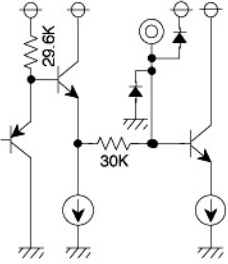
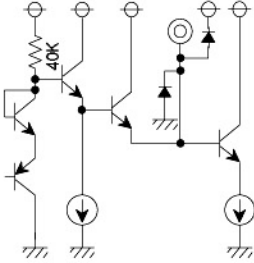
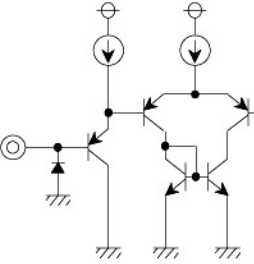
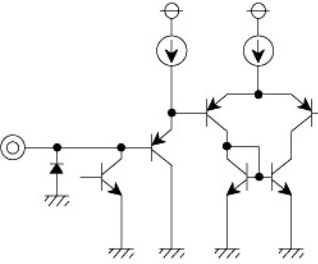
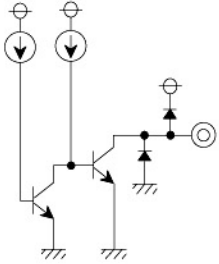
Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

DESCRIPTION OF PIN

Pin No.	Name	Peripheral circuit pins	DC voltage(V)	Remarks
1	VCC		9V	5~9V
2	Lch 2 IN		4.7V	
4	Rch 2 IN			
5	Lch 3 IN			
7	Rch 3 IN			
8	Lch 4 IN			
10	Rch 4 IN			
24	Rch T IN			
26	Lch T IN			
3	VIDEO 2 IN		3.6V	Clamp in
6	VIDEO 3 IN			
9	VIDEO 4 IN			
25	TUNER IN			
11	SCL			V _{IL} max.=1.5V V _{IH} min.=3.0V
12	SDA			V _{IL} max.=1.5V V _{IH} min.=3.0V V _{OL} max.=0.4V (at I _{in} =3mA)
13	DC			V _{OL} max.=0.4V (at I _{in} =1mA)
14	DD			
27	D4			
28	D5			

PRELIMINARY

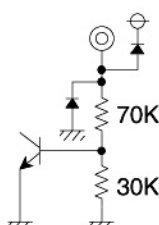
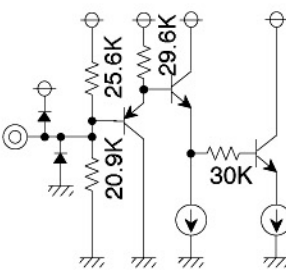
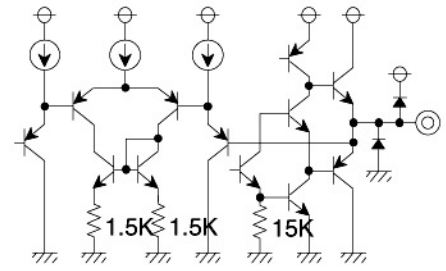
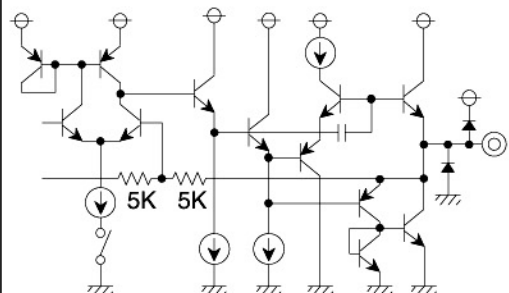
Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit pins	DC voltage(V)	Remarks
15	GND			
16	CHIP SELECT			SLAVE ADDRESS 0~1.5V-----90H 2.5V~Vcc-----92H OPEN-----90H
17	BIAS		4.2V	
18 20 21 23	Rch 2 OUT Lch 2 OUT Rch 1 OUT Lch 1 OUT		4.0V	
19 22	V 2 OUT V 1 OUT		SYNC CHIP DC=2.9V	

PRELIMINARY

Notice. This is not a final specification.
Some parametric limits are subject to change.

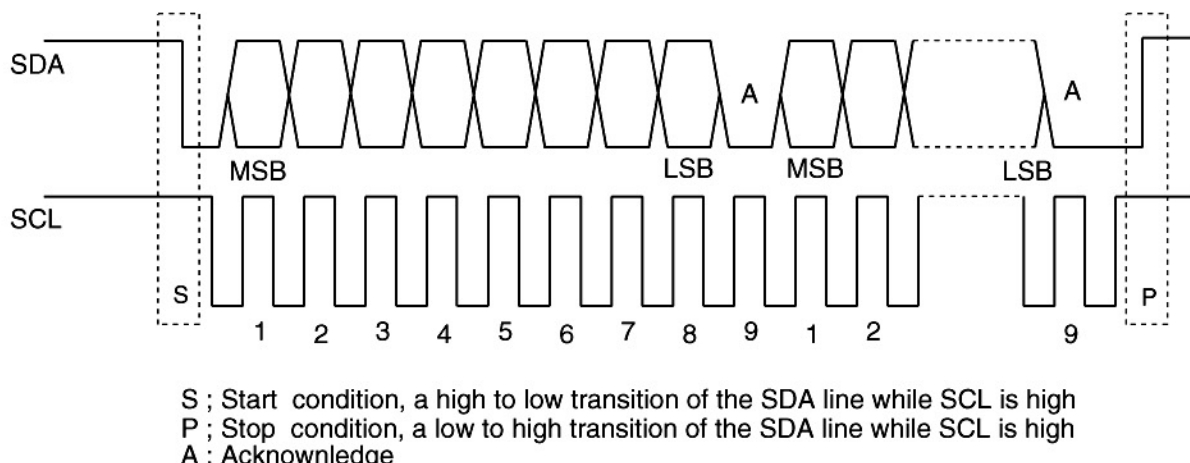
MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

I²C BUS

I²C BUS (Inter IC BUS) is multi master bus system developed by PHILIPS. Two wires (SDA - serial data, SCL - serial clock) realize functions of start, stop, transferring data, synchronization and arbitration. The output stages of device connected to the bus must have an open drain or open collector in order to perform the wired-AND function.



Every byte put on the SDA line must be 8-bits long. Each byte has to be followed by an acknowledge bit. Data is transferred with the most significant bit (MSB) first. The data on the SDA line must be stable during the HIGH period of the clock. The HIGH or LOW state of the data line can only change when the clock signal on the SCL line is LOW.

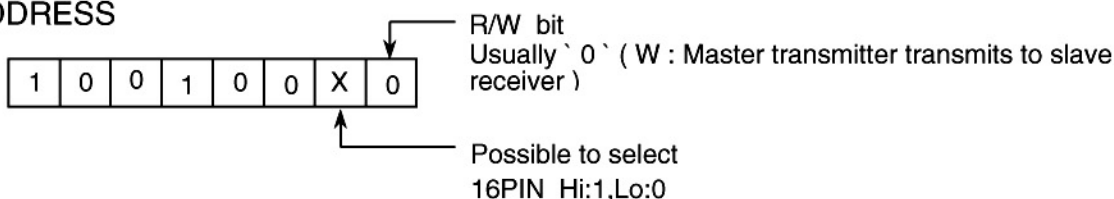
CONTROL

This IC controls 2-channel switches with 2-byte data (DATA1 and DATA2). SW1 is controlled by DATA1, SW2 is controlled by DATA2.



S : Start
A : Acknowledge
P : Stop

SLAVE ADDRESS



PRELIMINARY

Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

Data byte format

M52795 FUNCTION TABLE

S	SLAVE ADDRESS	A	DATA(D7~D0)	A	DATA(DF~D8)	A	P
---	---------------	---	-------------	---	-------------	---	---

SLAVE ADDRESS

SLAVE ADDRESS	A6	A5	A4	A3	A2	A1	A0	R/W
	1	0	0	1	0	0	0 / 1	0

DATA1(D7~D0) CONT

DATA	D7	D6	D5	D4	D3	D2	D1	D0
CONT	AUDIO MODE		I/O	I/O	V AMP1		SW1 CONT	

VIDEO SW1 CONT

DATA	OUT
V-SW1	V OUT1
D1	D0
0	0 T IN
0	1 V 2 IN
1	0 V 3 IN
1	1 V 4 IN

OUT1 AMP GAIN CONT.

DATA	AMP
D3	V AMP1
0	0dB
1	6dB

I/O CONT.

DATA	OUT	DATA	OUT
D5	D5 OUT	D4	D4 OUT
0	HI	0	HI
1	LO	1	LO

AUDIO MODE1 CONT

DATA	MODE
D7	D6
0	0 MUTE
0	1 R/R
1	0 L/L
1	1 NORMAL

AUDIO SW1 CONT

MODE		MUTE		R/R		L/L		NORMAL	
DATA		OUT		OUT		OUT		OUT	
D1	D0	Lch OUT 1	Rch OUT 1	Lch OUT 1	Rch OUT 1	Lch OUT 1	Rch OUT 1	Lch OUT 1	Rch OUT 1
0	0	MUTE	MUTE	Rch T IN	Rch T IN	Lch T IN	Lch T IN	Lch T IN	Rch T IN
0	1	MUTE	MUTE	Rch 2 IN	Rch 2 IN	Lch 2 IN	Lch 2 IN	Lch 2 IN	Rch 2 IN
1	0	MUTE	MUTE	Rch 3 IN	Rch 3 IN	Lch 3 IN	Lch 3 IN	Lch 3 IN	Rch 3 IN
1	1	MUTE	MUTE	Rch 4 IN	Rch 4 IN	Lch 4 IN	Lch 4 IN	Lch 4 IN	Rch 4 IN

DATA2(DF~D8) CONT

DATA	DF	DE	DD	DC	DB	DA	D9	D8
CONT	AUDIO MODE		I/O	I/O	V AMP2		SW2 CONT	

VIDEO SW2 CONT

DATA	OUT
V-SW2	V OUT2
D9	D8
0	0 T IN
0	1 V 2 IN
1	0 V 3 IN
1	1 V 4 IN

OUT2 AMP GAIN CONT.

DATA	AMP
DB	V AMP2
0	0dB
1	6dB

I/O CONT.

DATA	OUT	DATA	OUT
DD	DD OUT	DC	DC OUT
0	HI	0	HI
1	LO	1	LO

AUDIO MODE CONT

DATA	MODE
DF	DE
0	0 MUTE
0	1 R/R
1	0 L/L
1	1 NORMAL

AUDIO SW2 CONT

AUDIO SW2 CONT.									
MODE		MUTE		R/R		L/L		NORMAL	
DATA		OUT		OUT		OUT		OUT	
D9	D8	Lch OUT 2	Rch OUT 2	Lch OUT 2	Rch OUT 2	Lch OUT 2	Rch OUT 2	Lch OUT 2	Rch OUT 2
0	0	MUTE	MUTE	Rch T IN	Rch T IN	Lch T IN	Lch T IN	Lch T IN	Rch T IN
0	1	MUTE	MUTE	Rch 2 IN	Rch 2 IN	Lch 2 IN	Lch 2 IN	Lch 2 IN	Rch 2 IN
1	0	MUTE	MUTE	Rch 3 IN	Rch 3 IN	Lch 3 IN	Lch 3 IN	Lch 3 IN	Rch 3 IN
1	1	MUTE	MUTE	Rch 4 IN	Rch 4 IN	Lch 4 IN	Lch 4 IN	Lch 4 IN	Rch 4 IN

ELECTRICAL CHARACTERISTICS

(Ta=25°C, Vcc=9V, unless otherwise noted)

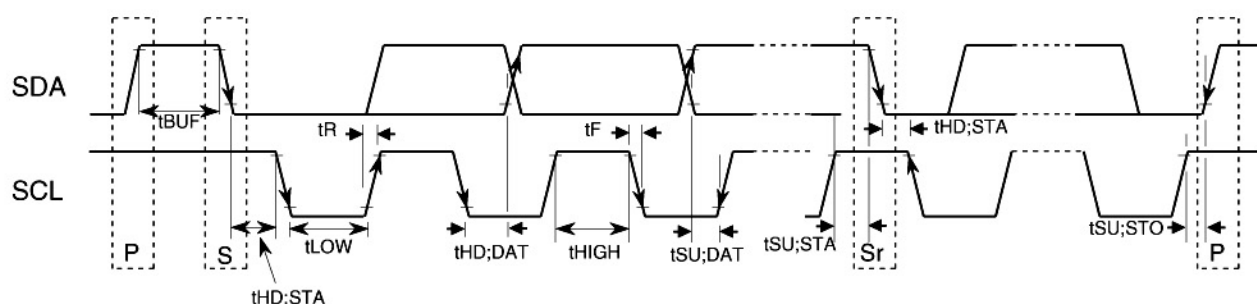
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Supply voltage	Vcc		4.7	-	9.3	V
Circuit current	Icc	Vcc=9V, Vin=0Vp-p, RI=∞Ω	-	32	42	mA
		Vcc=5V, Vin=0Vp-p, RI=∞Ω	-	28	37	
VIDEO						
Voltage gain	G	f=100kHz, 1Vp-p (0dB)(T→V1OUT)	-0.5	0	0.5	dB
		f=100kHz, 1Vp-p (6dB)(T→V1OUT)	5.5	6	6.5	
Frequency characteristics	F	f=10MHz/100kHz, 1Vp-p (0dB)(T→V1OUT)	-2.0	0	2.0	dB
		f=10MHz/100kHz, 1Vp-p (6dB)(T→V1OUT)	-2.0	0	2.0	
Dynamic Range	D	Vcc=9V(0dB)(T→V1OUT)	4	-	-	Vp-p
		Vcc=5V(0dB)(T→V1OUT)	2	-	-	
Input impedance	Ziv	Clamp in(T, V2, V3, V4)	-	-	-	kΩ
Crosstalk	CT	f=1MHz, 1Vp-p T→V1OUT (at V2 mode)	-	-60	-54	dB
AUDIO						
Voltage gain	G	f=1kHz , 1Vp-p (Vcc9V)(RT→R1OUT)	-0.5	0	0.5	dB
		f=1kHz , 1Vp-p (Vcc5V)(RT→R1OUT)	-0.5	0	0.5	
Frequency characteristics	F	f=100kHz/1kHz , 1Vp-p(RT→R1OUT)	-2.0	0	1.0	dB
Total harmonic distortion	THD	f=1kHz, 2Vp-p, at 400HzHPF+30kHzLPF (RT→R1OUT)	-	0.01	0.05	%
Dynamic Range	D	f=1kHz ,Maximum with distortion<0.5% (RT→R1OUT)	5.5	6.0	-	Vp-p
Output DC offset voltage	VOFF	(MODE:RT, R2, R3, R4→R1OUT)	-20	0	20	mV
Input impedance	Z1	(RT, R2, R3, R4, LT, L2, L3, L4)	22	30	38	kΩ
Crosstalk	CT	1kHz, 1Vp-p RT→R1OUT(at R2 mode)	-	-90	-84	dB

ELECTRICAL CHARACTERISTICS

(Ta=25°C, Vcc=9V, unless otherwise noted)

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
I2C BUS CONTROL SIGNAL						
Max. input high voltage	V _{IH}		3.0	-	5.0	V
Min. input low voltage	V _{IL}		0.0	-	1.5	
Low level output voltage(SDA)	V _{OL}	SDA = 3mA	0.0	-	0.4	
High level input current	I _{IH}	SDA, SCL = 4.5 V	-10	-	10	μA
Low level input current	I _{IL}	SDA, SCL = 0.4 V	-10	-	10	
SCL clock frequency	f _{SCL}		0.0	-	100	kHz
Time of bus must be free before a new transmission can start	t _{BUF}		4.7	-	-	μS
Hold time at start condition	t _{HD;STA}		4.0	-	-	
The low period of the clock	t _{LOW}		4.7	-	-	
The high period of the clock	t _{HIGH}		4.0	-	-	
Setup time for start condition	t _{SU;STA}		4.7	-	-	
Hold time DATA	t _{HD;DAT}		5.0	-	-	nS
Setup time DATA	t _{SU;DAT}		250	-	-	
Rise time of both SDA and SCL line	t _R		-	-	1000	
Fall time of both SDA and SCL line	t _F		-	-	300	μS
Setup time for stop condition	t _{SU;STO}		4.0	-	-	

I²C BUS CONTROL SIGNAL



PRELIMINARY

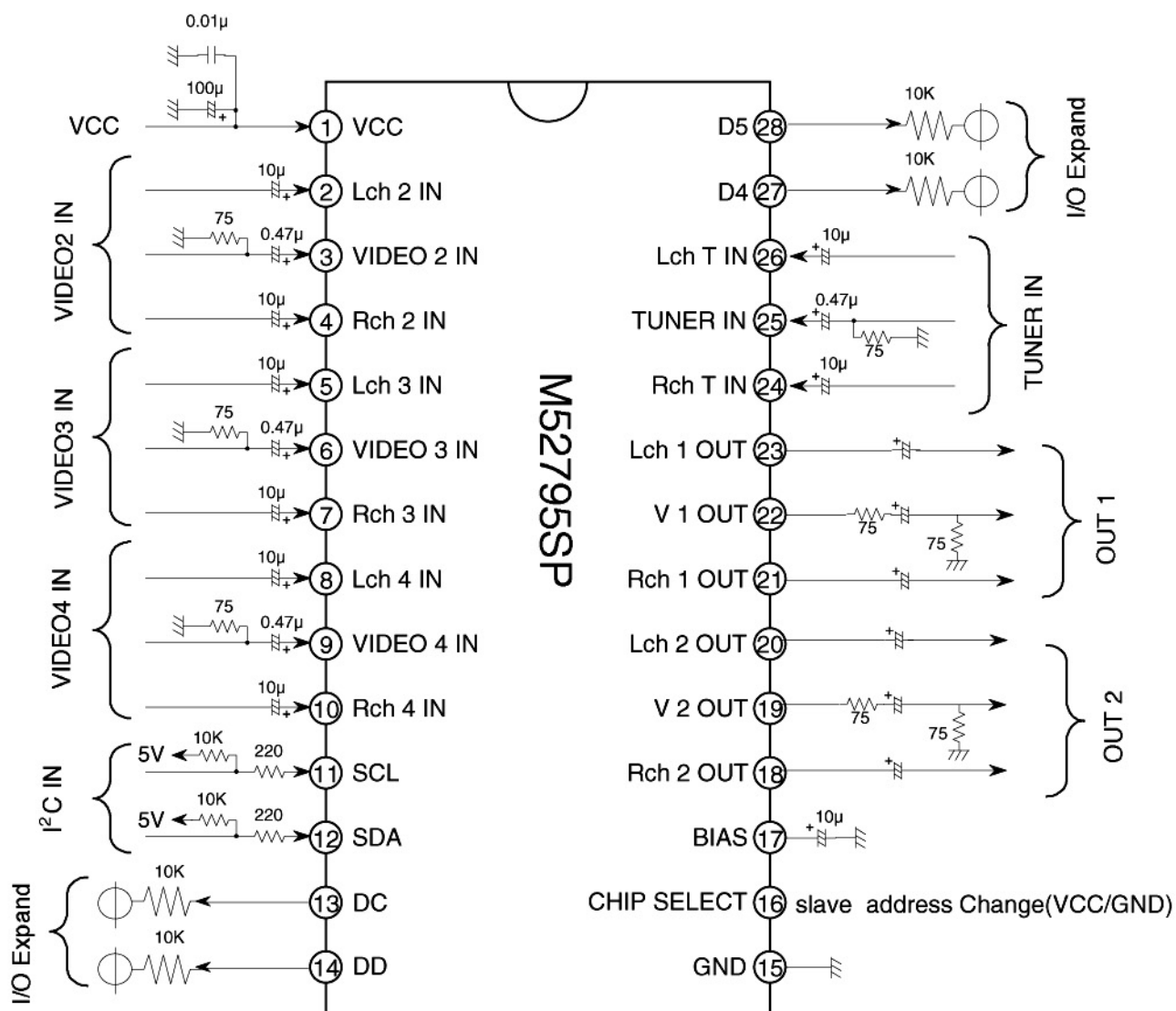
Notice. This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

Application Circuit Example



Note how to use this IC

Input signal with sufficient low impedance to input terminal.

The capacitance of output terminal as small as possible.

Set the capacitance between Vcc and GND near the pins if possible.

Assign an area as large as possible for grounding.

Power-on Reset

The M52795 has an internal power-on reset function that sets each control register to "0" during IC power ON.

The power-on reset V_{TH} has 2.5V.