

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) .

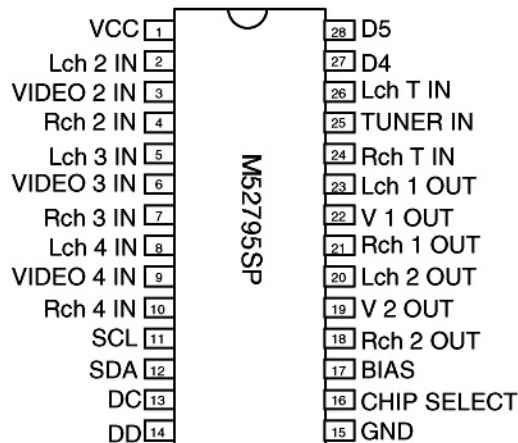
APPLICATION

Video equipment

RECOMMENDED OPERATING CONDITION

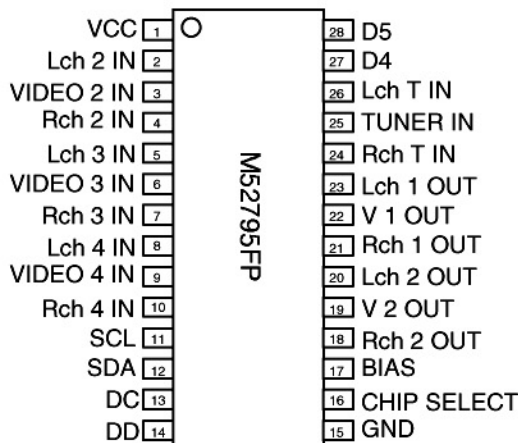
Supply voltage	4.7V~9.3V
Rated supply voltage	5V,9V
Maximum output current	32mA(at 9V)

PIN CONFIGURATION (TOP VIEW)



Outline 28P4B
(Lead pitch :1.778mm)

PIN CONFIGURATION (TOP VIEW)



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

PRELIMINARY

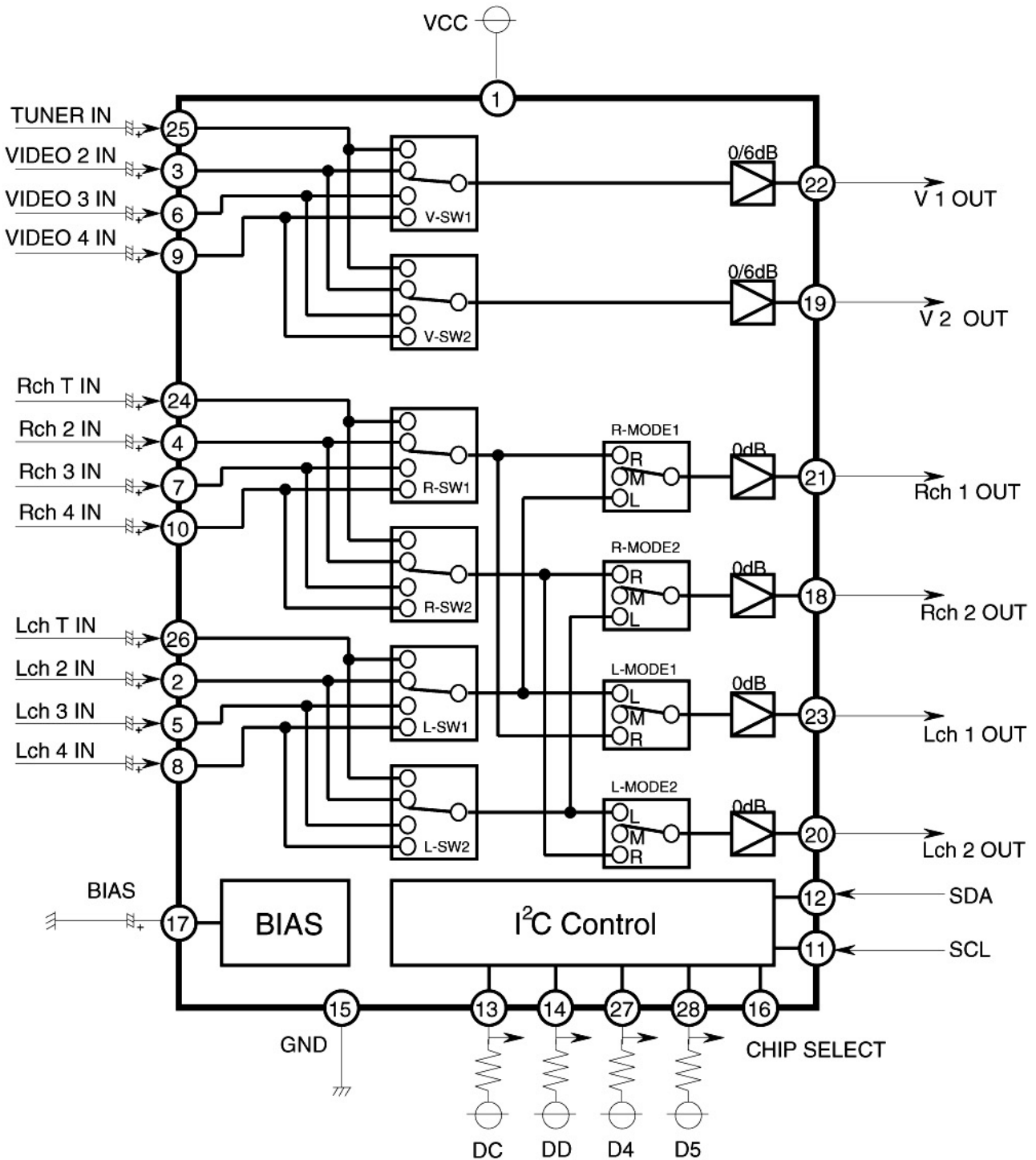
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MITSUBISHI ICs (AV COMMON)

M52795SP/FP

AV SWITCH with I2C BUS CONTROL

BLOCK DIAGRAM



PRELIMINARY

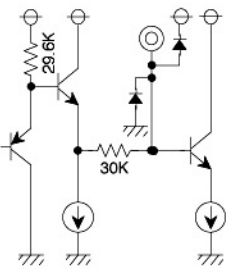
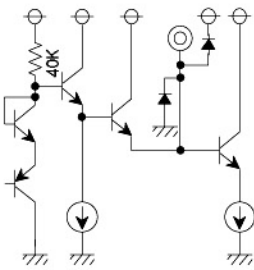
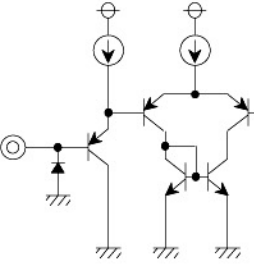
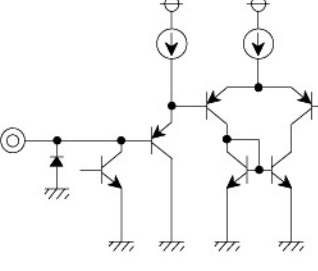
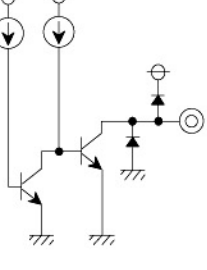
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MITSUBISHI ICs (AV COMMON)

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			$V_{IL} \text{ max.}=1.5V$ $V_{IH} \text{ min.}=3.0V$
12	SDA			$V_{IL} \text{ max.}=1.5V$ $V_{IH} \text{ min.}=3.0V$ $V_{OL} \text{ max.}=0.4V$ (at $I_{in}=3mA$)
13	DC			$V_{OL} \text{ max.}=0.4V$ (at $I_{in}=1mA$)
14	DD			
27	D4			
28	D5			

PRELIMINARY

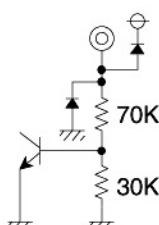
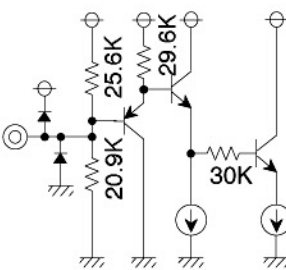
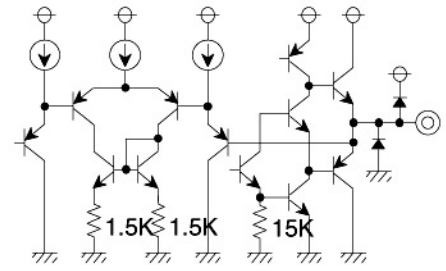
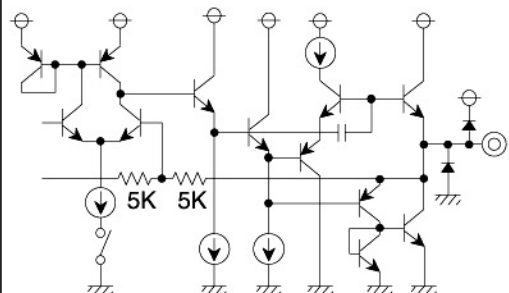
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MITSUBISHI ICs (AV COMMON)

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

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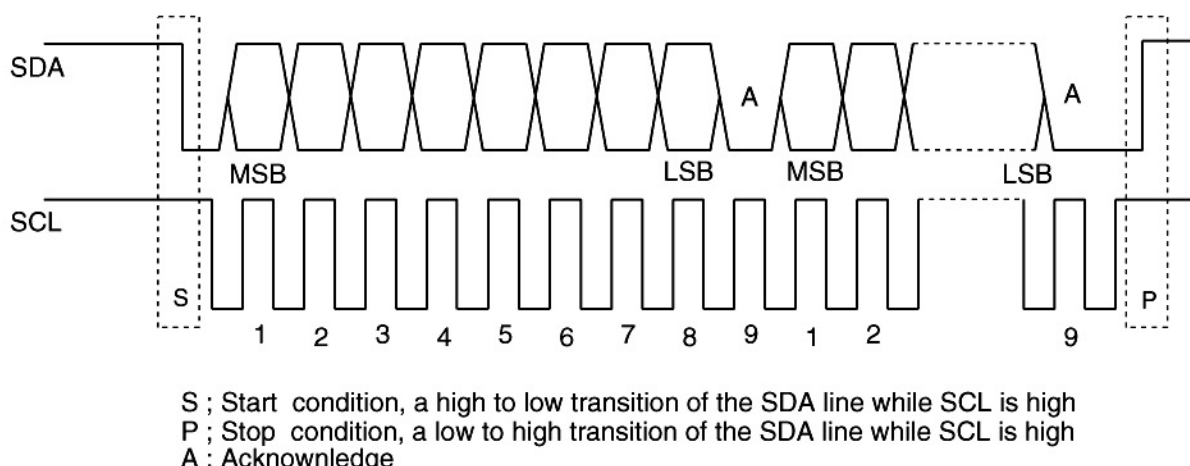
MITSUBISHI ICs (AV COMMON)

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.

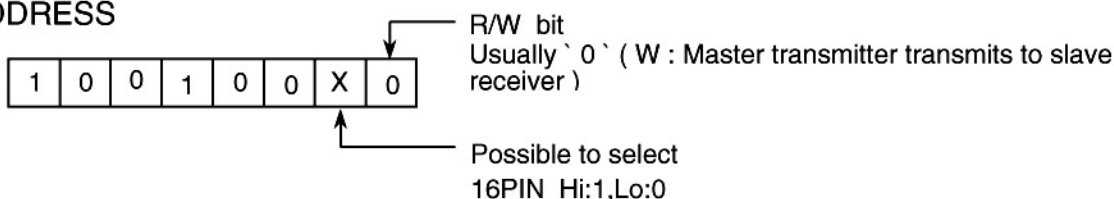
CONTROL

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

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

AUDIO SW1 CONT

AUDIO SWT 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	DE	MODE
DF		
0	0	MUTE
0	1	R/R
1	0	L/L
1	1	NORMAL

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)

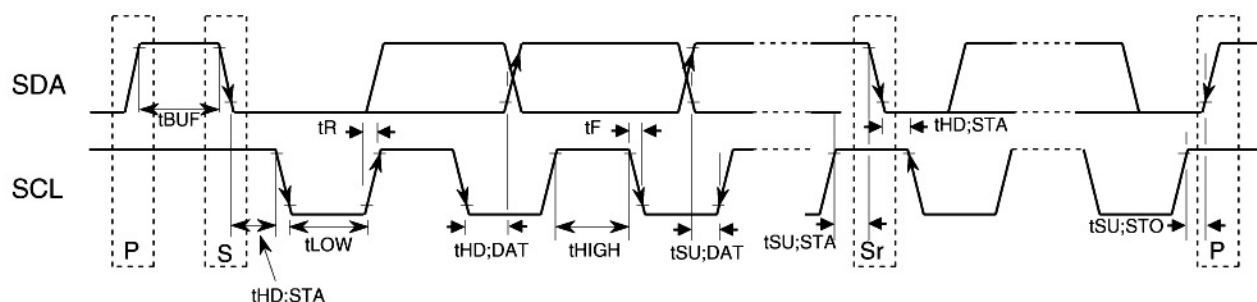
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Supply voltage	Vcc		4.7	-	9.3	V
Circuit current	Icc	Vcc=9V, Vin=0Vp-p, RI=∞Ω	-	32	42	mA
		Vcc=5V, Vin=0Vp-p, RI=∞Ω	-	28	37	
VIDEO						
Voltage gain	G	f=100kHz, 1Vp-p (0dB)(T→V1OUT)	-0.5	0	0.5	dB
		f=100kHz, 1Vp-p (6dB)(T→V1OUT)	5.5	6	6.5	
Frequency 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

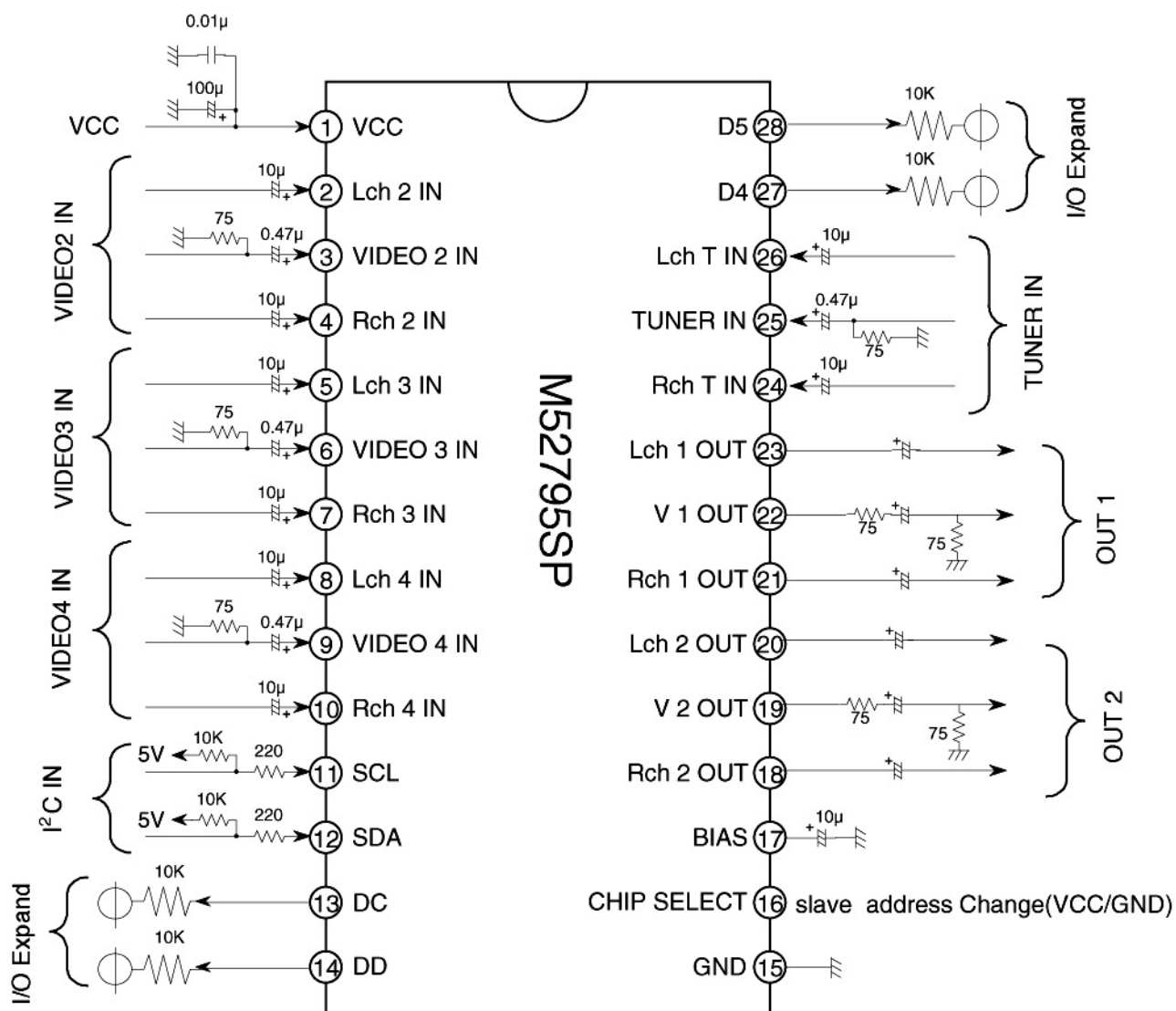
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MITSUBISHI ICs (AV COMMON)

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.