DESCRIPTION

The M52790 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 controled independently .
The video switches contain amplifiers can be controled 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 (M52790SP) ; and SSOP with a lead pitch of 0.8mm (M52790FP) .

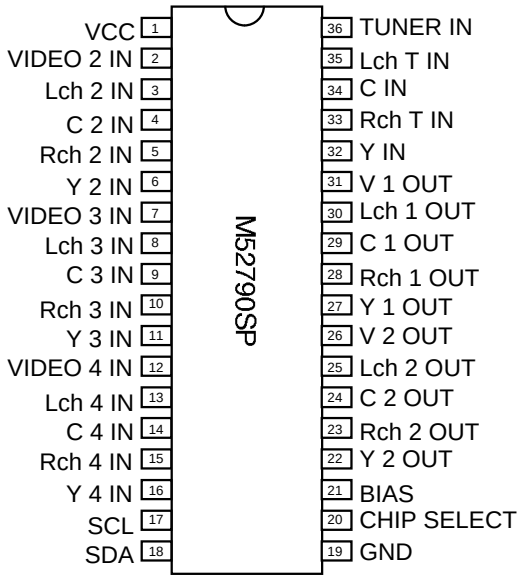
APPLICATION

Video equipment

RECOMMENDED OPERATING CONDITION

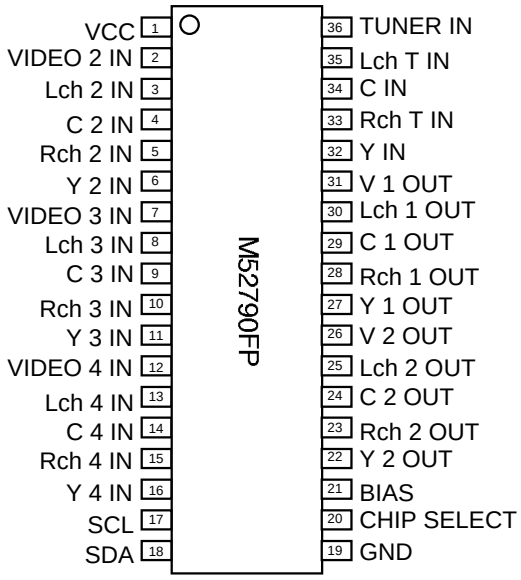
Supply voltage	4.7V ~ 9.3V
Rated supply voltage	5V,9V
Maximum output current	63mA(at 9V)

PIN CONFIGURATION (TOP VIEW)



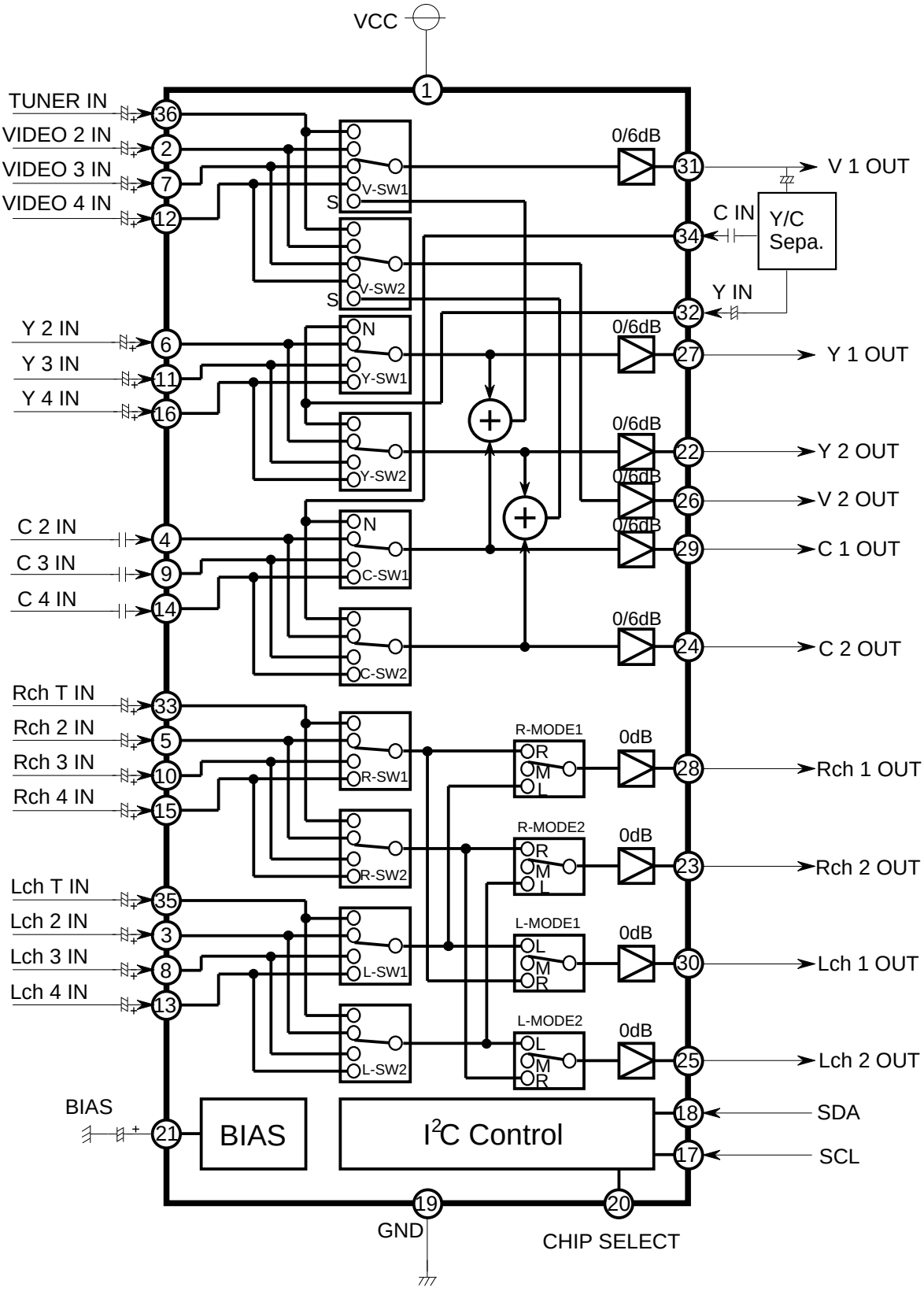
Outline 36P4E
(Lead pitch :1.778mm)

PIN CONFIGURATION (TOP VIEW)

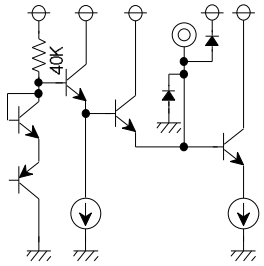
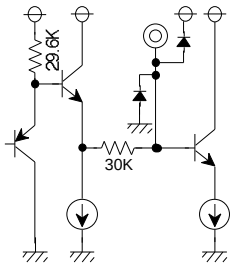
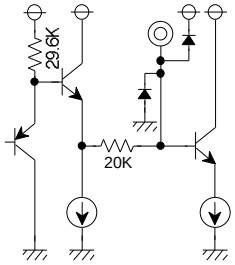
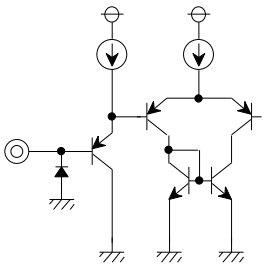
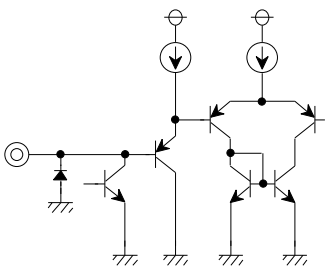


Outline 36P2R-D
(Lead pitch :0.8mm)

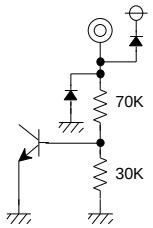
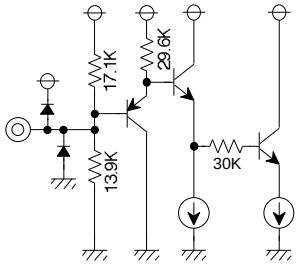
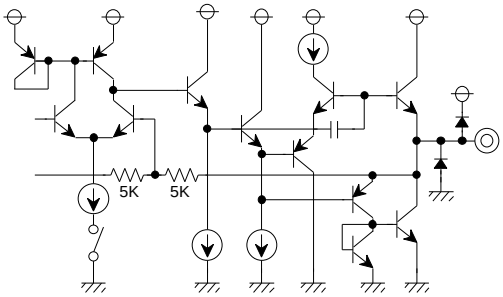
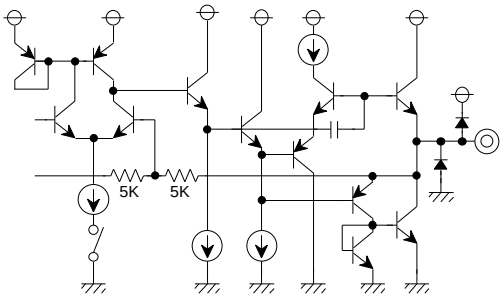
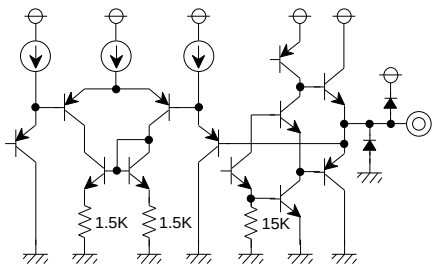
BLOCK DIAGRAM



DESCRIPTION OF PIN

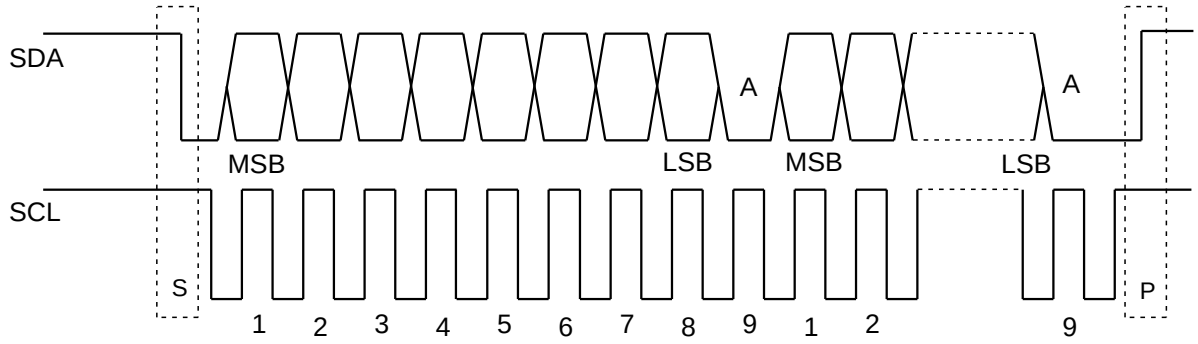
Pin No.	Name	Peripheral circuit pins	DC voltage(V)	Remarks
1	**Vcc**		9V	5~9V
2 6 7 11 12 16 32 36	**VIDEO 2 IN** **Y 2 IN** **VIDEO 3 IN** **Y 3 IN** **VIDEO 4 IN** **Y 4 IN** **Y IN** **TUNER IN**		3.6V	Clamp in
3 5 8 10 13 15 33 35	**Lch 2 IN** **Rch 2 IN** **Lch 3 IN** **Rch 3 IN** **Lch 4 IN** **Rch 4 IN** **Rch T IN** **Lch T IN**		4.7V	
4 9 14 34	**C 2 IN** **C 3 IN** **C 4 IN** **C IN**		4.7V	
17	**SCL**			V_{IL} max.=1.5V V_{IH} min.=3.0V
18	**SDA**			V_{IL} max.=1.5V V_{IH} min.=3.0V V_{OL} max.=0.4V (at Iin=3mA)

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit pins	DC voltage(V)	Remarks
19	**GND**			
20	**CHIP SELECT**			SLAVE ADDRESS 0~1.5V-------90H 2.5~Vcc------92H OPEN--------90H
21	**BIAS**		4.2V	
22 **26** **27** **31**	**Y 2 OUT** **V 2 OUT** **Y 1 OUT** **V 1 OUT**		SYNC CHIP DC=2.9V	
24 **29**	**C 2 OUT** **C 1 OUT**		4.0V	
23 **25** **28** **30**	**Rch 2 OUT** **Lch 2 OUT** **Rch 1 OUT** **Lch 1 OUT**		4.0V	

I^2C BUS

I^2C 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 .



S ; Start condition, a high to low transition of the SDA line while SCL is high
P ; Stop condition, a low to high transition of the SDA line while SCL is high
A ; Acknownledge

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 switchs with 2-byte data (DATA1 and DATA2) . SW1 is controled by DATA1 ,SW2 is controled by DATA2 .

S	SLAVE ADDRESS	A	DATA1	A	DATA2	A	P

S : Start
A : Acknowledge
P : Stop

SLAVE ADDRESS

1	0	0	1	0	0	X	0

R/W bit
Usually ` 0 ` (W : Master transmitter transmits to slave receiver)

Possible to select
20PIN Hi:1,Lo:0

Data byte format

M52790 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 MODE1			Y/C AMP1	V AMP1	S/N	SW1 CONT	

VIDEO SW1 CONT

DATA			OUT		
S/N(S:1)	V-SW1		V OUT1	Y OUT1	C OUT1
D2	D1	D0			
0	0	0	T IN	Y IN	C IN
0	0	1	V 2 IN	Y IN	C IN
0	1	0	V 3 IN	Y IN	C IN
0	1	1	V 4 IN	Y IN	C IN
1	0	0	Y/C MIX T	Y IN	C IN
1	0	1	Y/C MIX 2	Y 2 IN	C 2 IN
1	1	0	Y/C MIX 3	Y 3 IN	C 3 IN
1	1	1	Y/C MIX 4	Y 4 IN	C 4 IN

AMP1 GAIN CONT.

DATA	AMP	DATA	AMP
D4	YC AMP1	D3	V AMP1
0	0dB	0	0dB
1	6dB	1	6dB

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 MODE2			Y/C AMP2	V AMP2	S/N	SW2 CONT	

VIDEO SW2 CONT

DATA			OUT		
S/N(S:1)	V-SW2		V OUT2	Y OUT2	C OUT2
DA	D9	D8			
0	0	0	T IN	Y IN	C IN
0	0	1	V 2 IN	Y 2 IN	C 2 IN
0	1	0	V 3 IN	Y 3 IN	C 3 IN
0	1	1	V 4 IN	Y 4 IN	C 4 IN
1	0	0	Y/C MIX T	Y IN	C IN
1	0	1	Y/C MIX 2	Y 2 IN	C 2 IN
1	1	0	Y/C MIX 3	Y 3 IN	C 3 IN
1	1	1	Y/C MIX 4	Y 4 IN	C 4 IN

AMP2 GAIN CONT.

DATA	AMP	DATA	AMP
DC	YC AMP2	DB	V AMP2
0	0dB	0	0dB
1	6dB	1	6dB

AUDIO MODE2 CONT

DATA		MODE
DF	DE	
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)

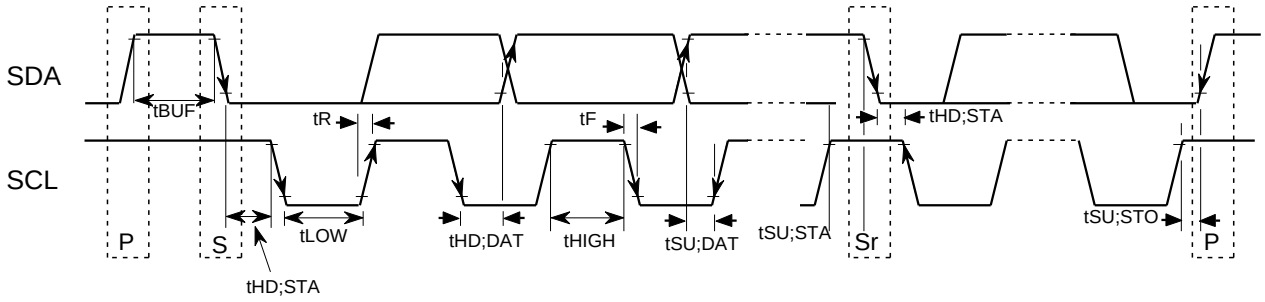
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Supply voltage	Vcc		4.7	-	9.3	V
Circuit current	Icc	Vcc=9V,Vin=0Vp-p,Rl=∞Ω	-	63	83	mA
		Vcc=5V,Vin=0Vp-p,Rl=∞Ω	-	54	71	
VIDEO						
Voltage gain	G	f=100kHz,1Vp-p (0dB)(T→V_{1OUT})	-0.5	0	0.5	dB
		f=100kHz,1Vp-p (6dB)(T→V_{1OUT})	5.5	6	6.5	
		f=100kHz,1Vp-p (0dB)(Y→V_{1OUT})	-0.5	0	0.5	
		f=100kHz,1Vp-p (6dB)(Y→V_{1OUT})	5.5	6	6.5	
Frequency characteristics	F	f=10MHz/100kHz,1Vp-p (0dB)(T→V_{1OUT})	-2.0	0	2.0	dB
		f=10MHz/100kHz,1Vp-p (6dB)(T→V_{1OUT})	-2.0	0	2.0	
		f=10MHz/100kHz,1Vp-p (0dB)(Y→V_{1OUT})	-2.0	0	2.0	
		f=10MHz/100kHz,1Vp-p (6dB)(Y→V_{1OUT})	-2.0	0	2.0	
Dynamic Range	D	Vcc=9V(0dB)(T→V_{1OUT}) f=100kHz Maximum with distortion <1.0%	4	-	-	Vp-p
		Vcc=5V(0dB)(T→V_{1OUT})	2	-	-	
		Vcc=9V(0dB)(Y→V_{1OUT})	4	-	-	
		Vcc=5V(0dB)(Y→V_{1OUT})	2	-	-	
Input impedance	Z_{IC}	(C,C_2,C_3,C_4)	14	20	26	kΩ
	Z_{IV}	Clamp in(T,V_2,V_3,V_4)	-	-	-	
	Z_{IY}	Clamp in(Y,Y_2,Y_3,Y_4)	-	-	-	
Crosstalk	CT	f=1MHz,1Vp-p T→V_{1OUT} (at V_2 mode)	-	-60	-54	dB
AUDIO						
Voltage gain	G	f=1kHz ,1Vp-p (Vcc9V)(R_T→R_{1OUT})	-0.5	0	0.5	dB
		f=1kHz ,1Vp-p (Vcc5V)(R_T→R_{1OUT})	-0.5	0	0.5	
Frequency characteristics	F	f=100kHz/1kHz , 1Vp-p(R_T→R_{1OUT})	-2.0	0	1	dB
Total harmonic distortion	THD	f=1kHz,2Vp-p,at 400HzHPF+30kHzLPF (R_T→R_{1OUT})	-	0.01	0.05	%
Dynamic Range	D	f=1kHz ,Maximum with distortion<0.5% (R_T→R_{1OUT})	5.5	6.0	-	Vp-p
Output DC offset voltage	V_{OFF}	(MODE:R_T,R_2,R_3,R_4→ R_{1OUT})	-20	0	20	mV
Input impedance	Z_1	(R_T,R_2,R_3,R_4,L_T,L_2,L_3,L_4)	22	30	38	kΩ
Crosstalk	CT	1kHz,1Vp-p R_T→R_{1OUT}(at R_2 mode)	-	-90	-84	dB

ELECTRICAL CHARACTERISTICS

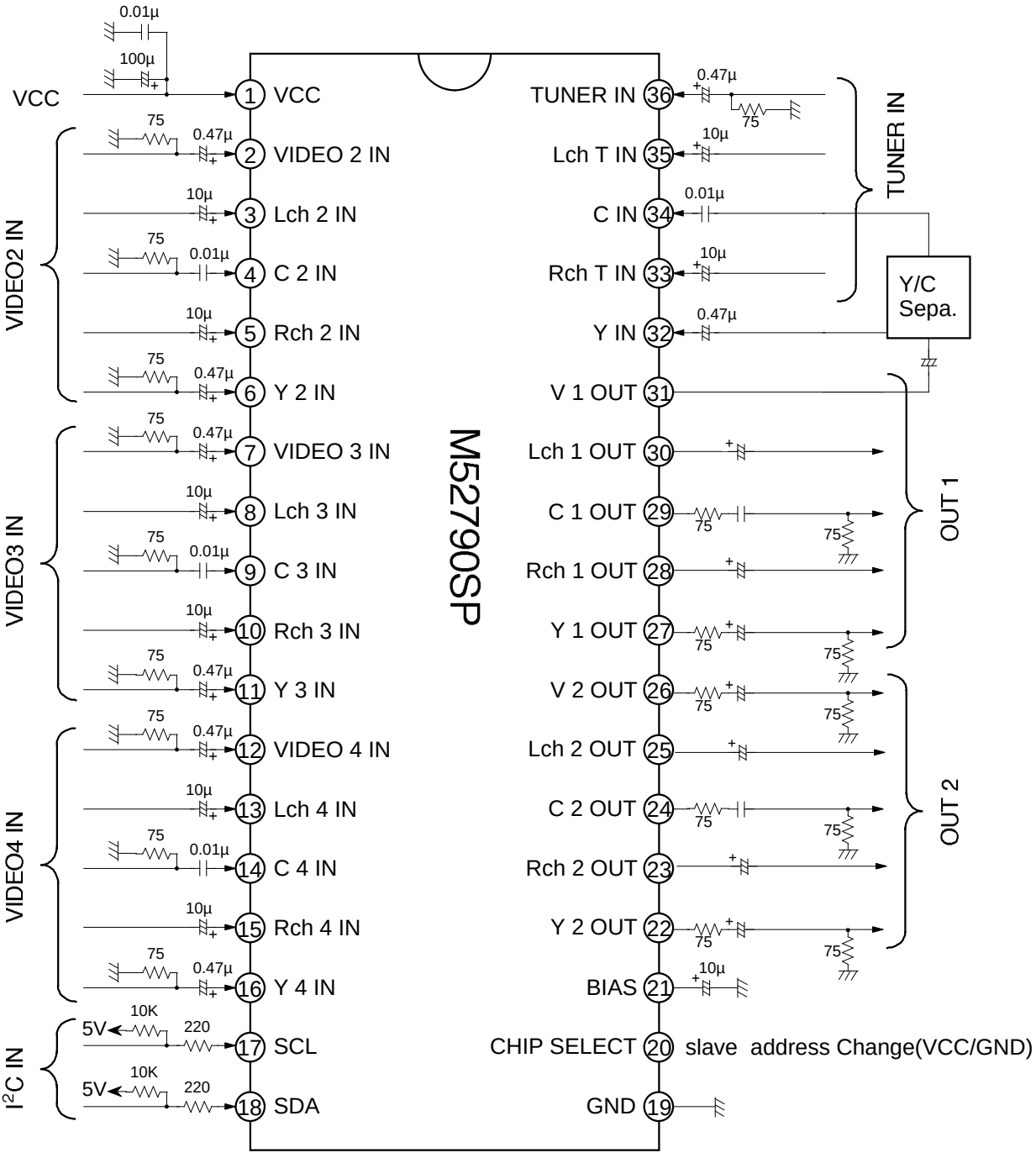
(Ta=25°C,Vcc=9V,unless otherwise noted)

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	
Setup time for stop condition	$t_{SU;STO}$		4.0	-	-	µS

I²C BUS CONTROL SIGNAL



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 M52790 has an intermal power-on reset function that sets each control register to "0" during IC power ON.

The power-on reset VTH has 2.5V.