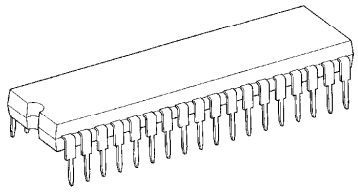
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA1219AN

AUDIO / VIDEO SWITCHING IC FOR TVs

The TA1219AN is an audio / video switching IC for TV sets.
Conforming to I^2C bus standards, it allows you to perform various switching operations through the bus lines by using a microcomputer. Furthermore, since the presence of a signal on its sync signal output pin can be determined by a microcomputer, it is possible to check each input / output channel (self-diagnosis).
This IC has the same pin assignments as the TA1218AN (SDIP42), a 2-channel output version of the TA1219AN, so these chips are pin compatible on pins 3 to 20 and 23 to 40 in TA1218AN.



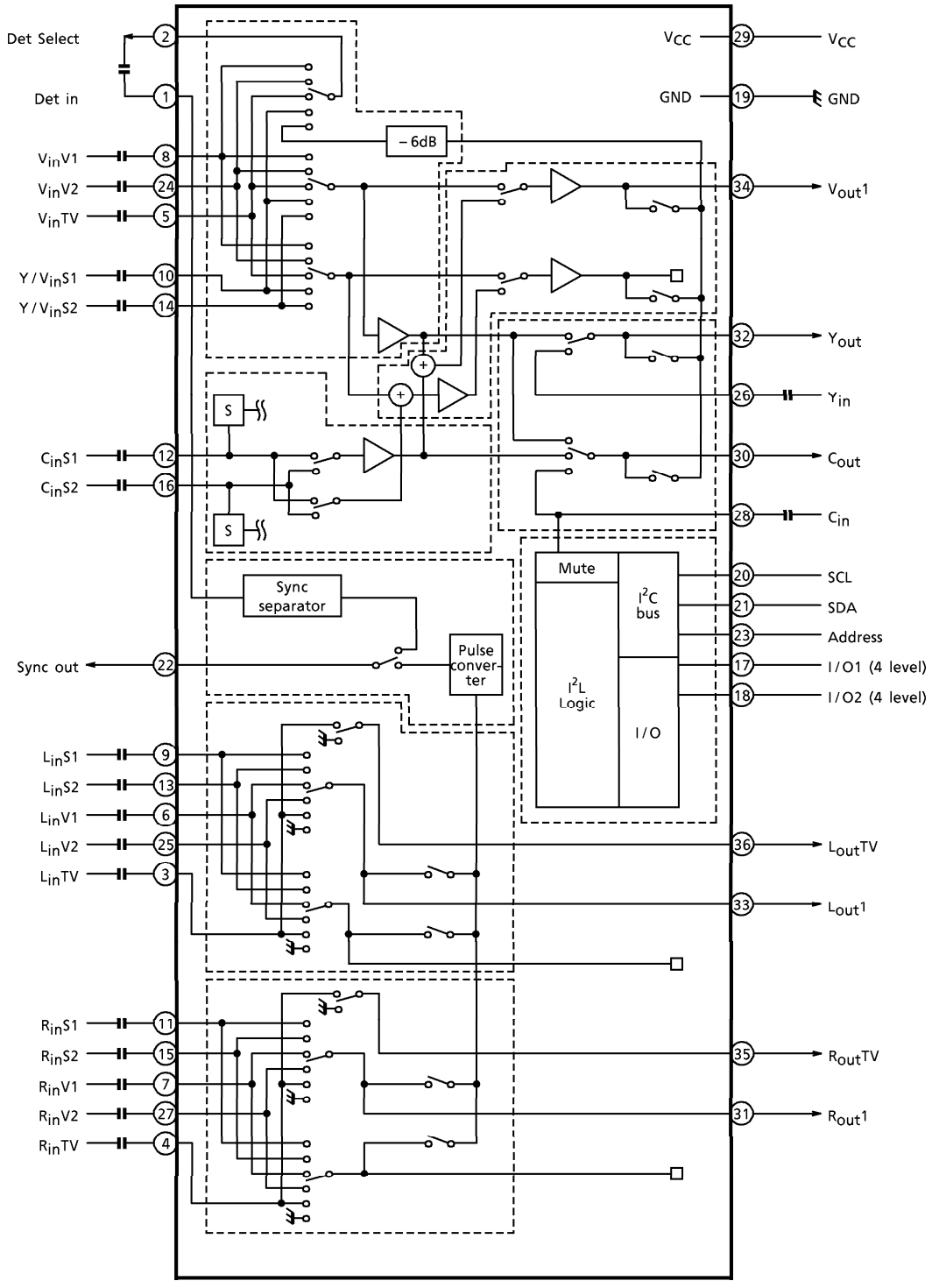
SDIP36-P-500-1.78

Weight : 2.98g (Typ.)

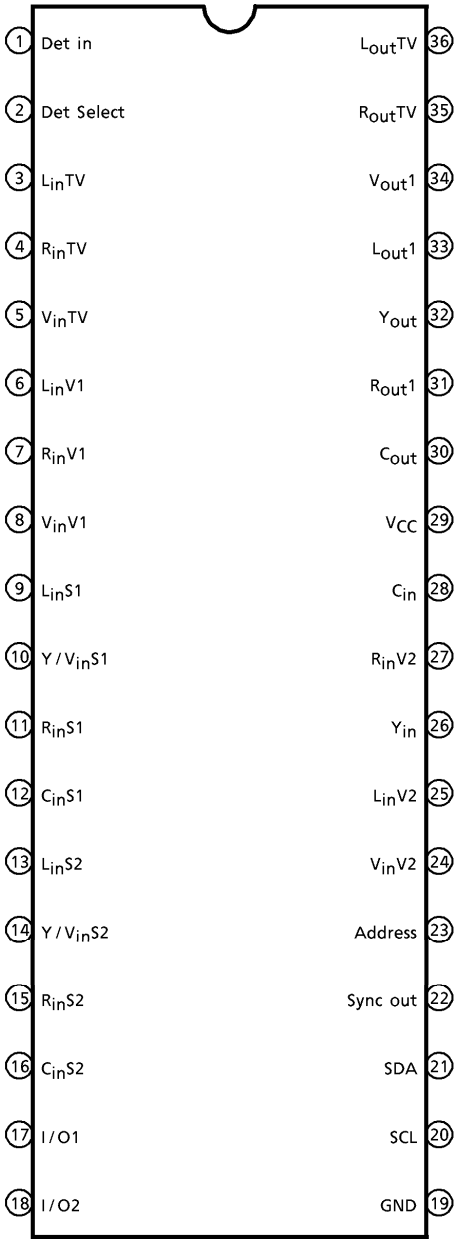
FEATURES

- I^2C bus control
- Video : 5-channel inputs and 1-channel outputs (2 channels conforming to S system)
- Audio : 5-channel inputs and 2-channel outputs
- Self-diagnostic function
- ADC inputs based on European 21-pin standards
- ADC inputs based on S1 / S2 terminal standards
- Switchable subaddress

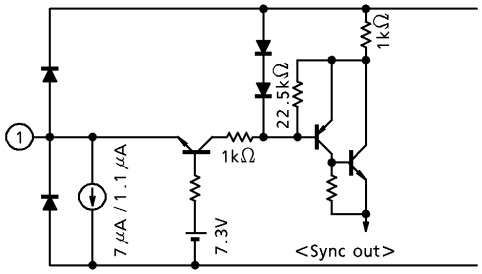
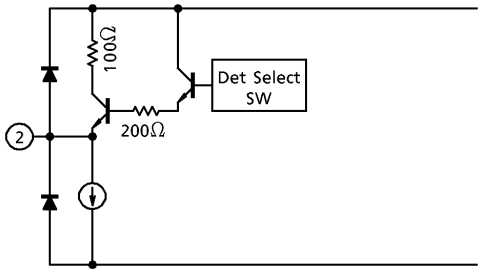
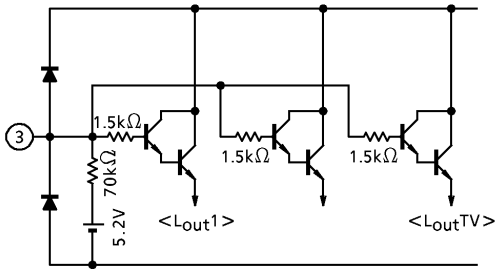
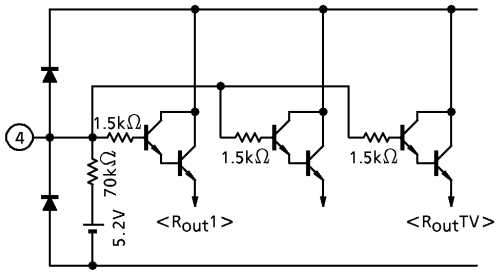
BLOCK DIAGRAM

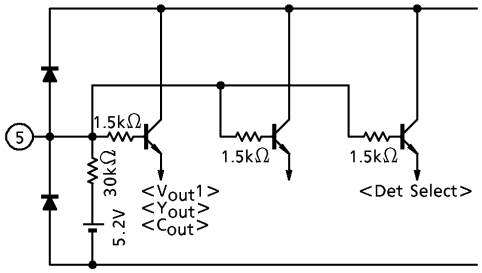
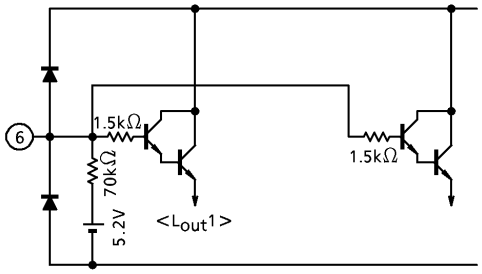
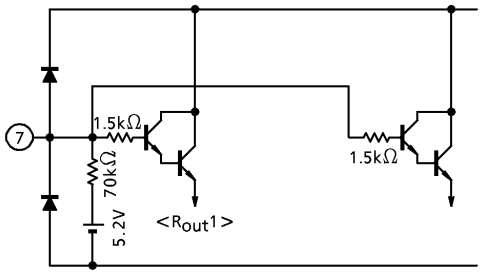
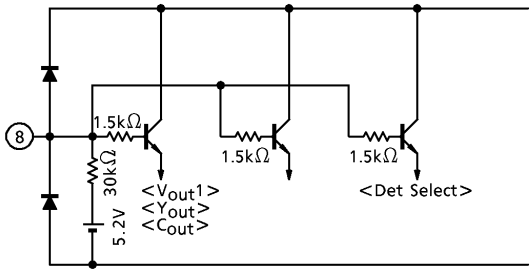


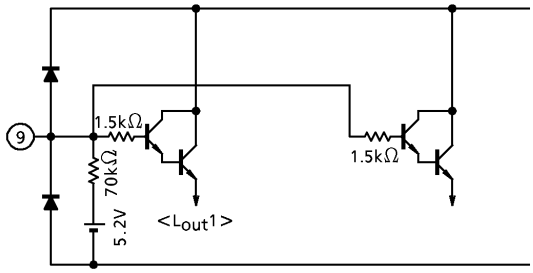
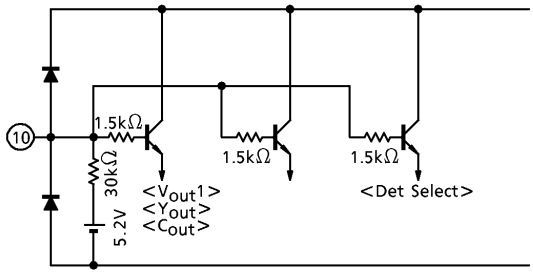
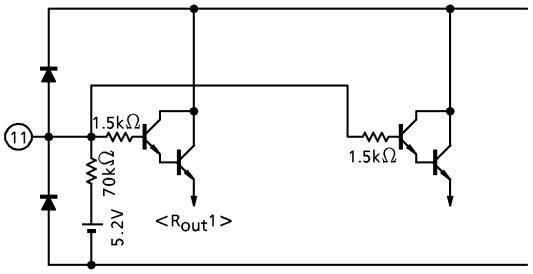
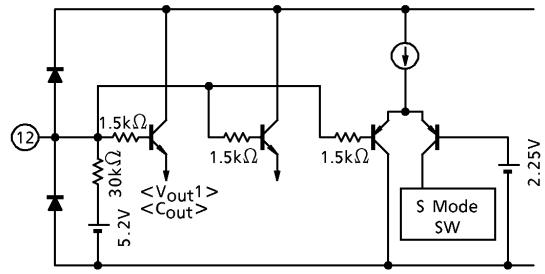
PIN ASSIGNMENT

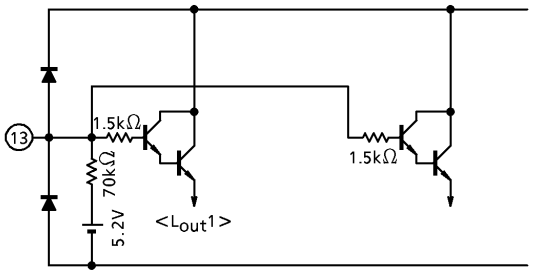
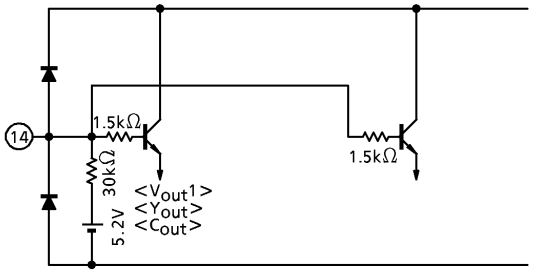
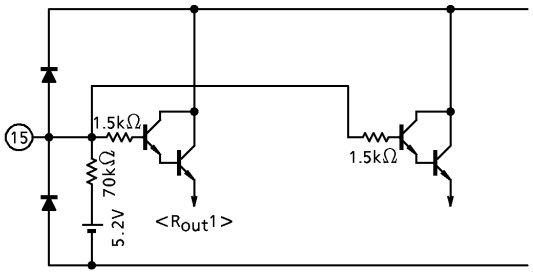
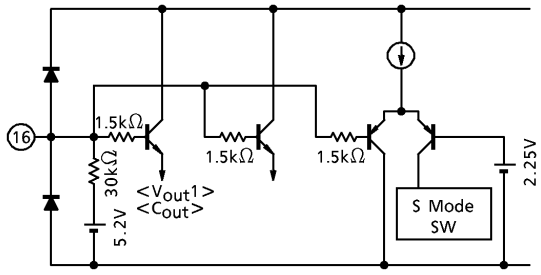


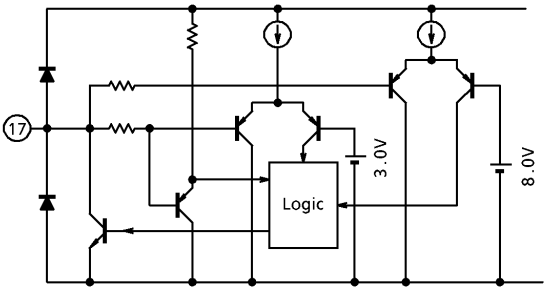
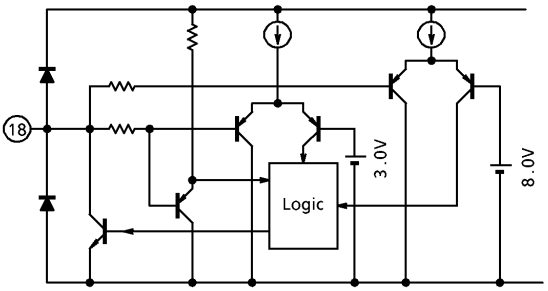
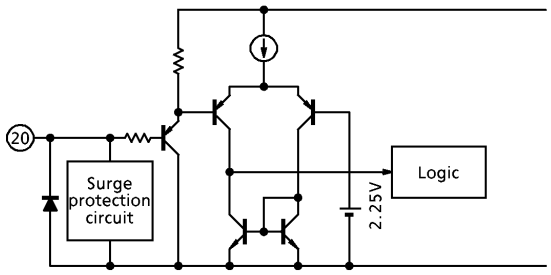
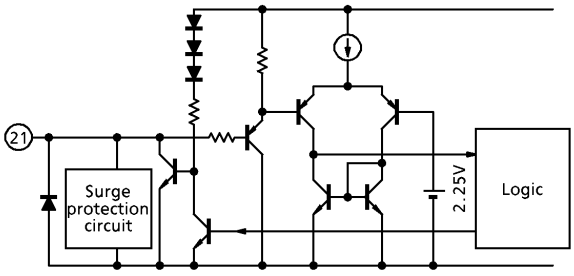
PIN DESCRIPTION

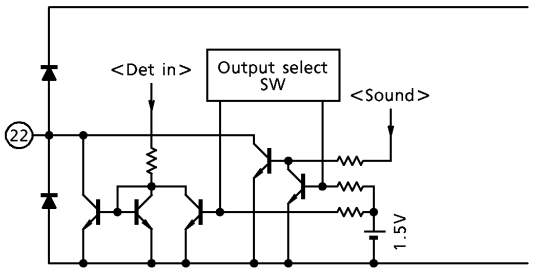
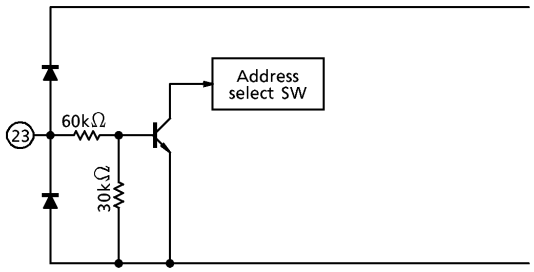
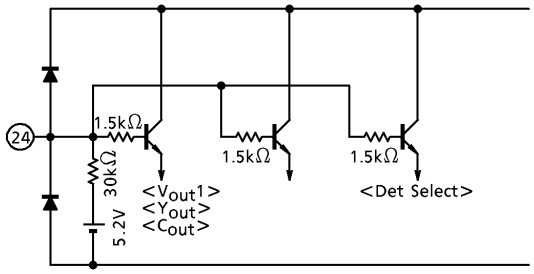
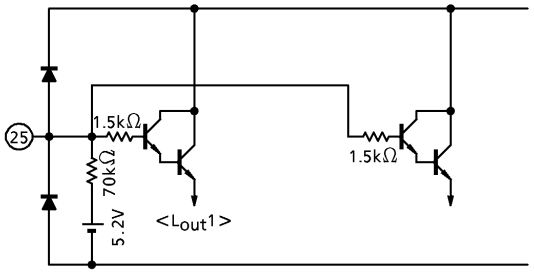
PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
1	Det in	This pin is for input a sync separation signal. Input the signal from Det Select to this pin with capacitance coupling. The input resistance of this pin is 18kΩ. The sync signal separated from Det Select is outputted from Sync Out for use in self-diagnosis.	
2	Det Select	This pin is for output a sync separation signal. Signals $V_{in}V1$, $V_{in}V2$, $V_{in}TV$, $Y/V_{in}S1$, $V_{out}1$, Y_{out} or C_{out} are outputted from this pin. The output resistance of this pin is 35Ω. Input the signal from this pin to Det in with capacitance coupling.	
3	$L_{in}TV$	This pin is for input a left audio signal from the main demodulator in the TV set. The signal fed into this pin is presented to $L_{out}TV$ and $L_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	
4	$R_{in}TV$	This pin is for input a right audio signal from the main demodulator in the TV set. The signal fed into this pin is presented to $R_{out}TV$ and $R_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	

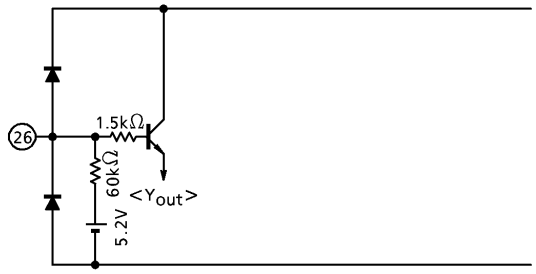
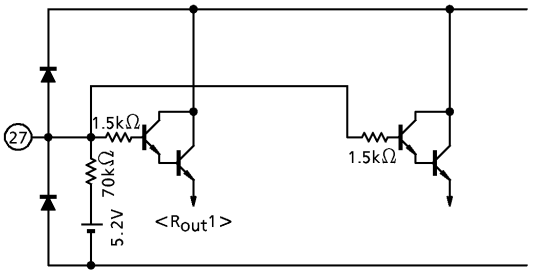
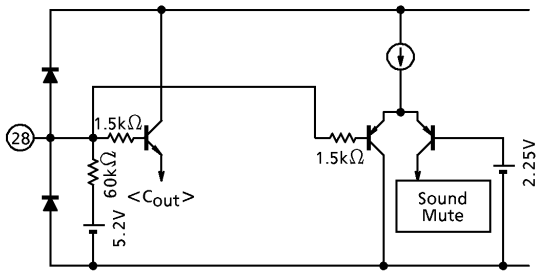
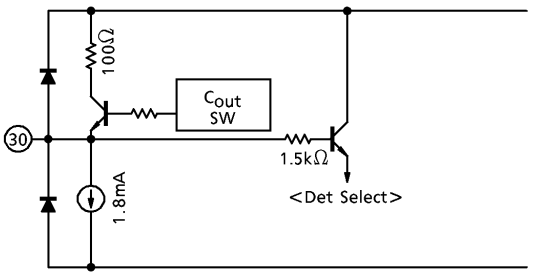
PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
5	$V_{in}TV$	This pin is for input a composite audio signal from the main demodulator in the TV set. The signal fed into this pin is presented to $V_{out}1$, Y_{out} and C_{out}. The same signal is also output from Det Select as a sync separation signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is 30kΩ.	
6	$L_{in}V1$	This pin is for input a left audio signal from an external source (V1 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $L_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70Ω.	
7	$R_{in}V1$	This pin is for input a right audio signal from an external source (V1 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $R_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	
8	$V_{in}V1$	This pin is for input a composite video signal from an external source (V1 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $V_{out}1$, Y_{out} and C_{out}. The same signal is also output from Det Select as a sync separation signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is 30kΩ.	

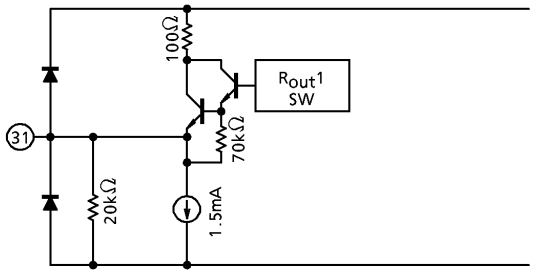
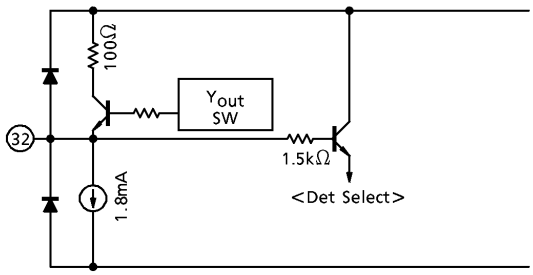
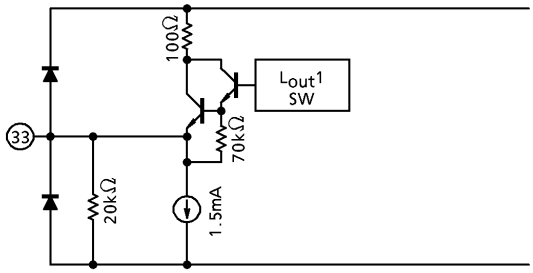
PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
9	$L_{in}S1$	This pin is for input a left audio signal from an external source (S1 channel). The signal fed into this pin is presented to $L_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is $70k\Omega$.	
10	$Y/V_{in}S1$	This pin is for input a luminance signal or composite video signal from an external source (S1 channel). The signal fed into this pin is presented to $V_{out}1$, Y_{out} and C_{out}. The same signal is also output from Det Select as a sync separation signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is $30k\Omega$.	
11	$R_{in}S1$	This pin is for input a right audio signal from an external source (S1 channel). The signal fed into this pin is presented to $R_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is $70k\Omega$.	
12	$C_{in}S1$	This pin is for input a chroma signal from an external source (S1 channel). It also functions as an S-mode select switch for the S1 channel. The S mode is selected when the pin voltage is DC opened. The signal fed into this pin is presented to C_{out} directly and to $V_{out}1$ after being combined with the $Y_{in}S1$ signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is $30k\Omega$.	

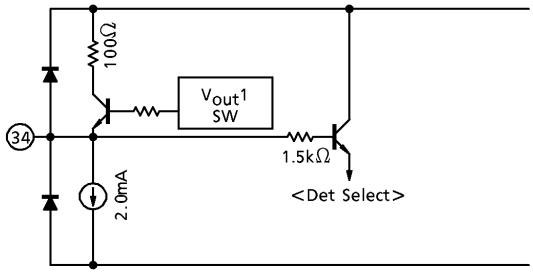
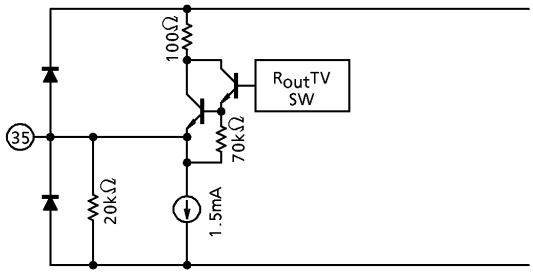
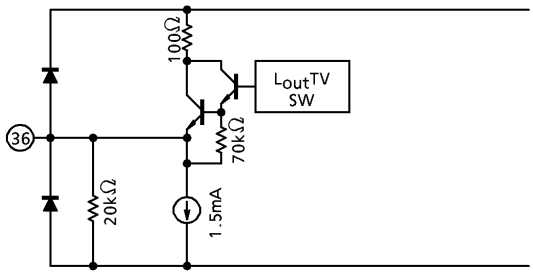
PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
13	$L_{in}S2$	This pin is for input a left audio signal from an external source (S2 channel). The signal fed into this pin is presented to $L_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	
14	$Y/V_{in}S2$	This pin is for input a luminance signal or composite aoudio signal from an external source (S2 channel). The signal fed into this pin is presented to $V_{out}1$, Y_{out} and C_{out}. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is 30kΩ.	
15	$R_{in}S2$	This pin is for input a right audio signal from an external source (S2 channel). The signal fed into this pin is presented to $R_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	
16	$C_{in}S2$	This pin is for input a chroma signal from an external source (S2 channel). It also functions as an S-mode select switch for the S2 channel. The S mode is selected when the pin voltage is DC opened. The signal fed into this pin is presented to C_{out} directly and to $V_{out}1$ after being combined with the $Y_{in}S2$ signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is 30kΩ.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
17	I/O1	This is an ADC input/DAC output pin. The ADC is a 4-level detection type (2 bits). The threshold levels are 8.0V, 3.0V, and 0.75V. The DAC (1bit) is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.	
18	I/O2	This is an ADC input/DAC output pin. The ADC is a 4-level detection type (2 bits). The threshold levels are 8.0V, 3.0V, and 0.75V. The DAC (1bit) is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.	
19	GND	This is the GND pin.	—
20	SCL	This pin is for input an I^2C bus clock. The input threshold level of this pin is 2.25V.	
21	SDA	This is an I^2C bus data input/output pin. The input threshold level of this pin is 2.25V. Make sure that the current flowing into this pin is 3.0mA or less.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
22	Sync out	This pin is for output a self-diagnostic sync signal. The signal separated from $V_{in}TV$ $V_{in}V1$, $V_{in}V2$, $Y/V_{in}S1$, $V_{out}1$, Y_{out} or C_{out} is outputted from this pin. In addition, the signal derived from $L_{out}1$ or $R_{out}1$ is also output from this pin for use in audio block diagnosis. This is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.	
23	Address	This is for an I^2C bus slave address select switch. The threshold level of this pin is 2.25V. The following lists the addresses : High : 92H (Write), 93H (Read) Low : 90H (Write), 91H (Read)	
24	$V_{in}V2$	This pin is for input a composite video signal from an external source (V2 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $V_{out}1$, Y_{out}, and C_{out}. The same signal is also output from Det Select as a sync separation signal. The input dynamic range of this pin is $2.0V_{p-p}$ and the input resistance is 30kΩ.	
25	$L_{in}V2$	This pin is for input a left audio signal from an external source (V2 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $L_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
26	Y_{in}	This pin is for input a luminance signal from an external comb filter. The signal fed into this pin is presented to Y_{out}. The input dynamic range of this pin is $5.5V_{p-p}$ and the input resistance is 60kΩ.	
27	$R_{in}V2$	This pin is for input a right audio signal from an external source (V2 channel). This pin can also be used for PIP signal input. The signal fed into this pin is presented to $R_{out}1$. The input dynamic range of this pin is $6.5V_{p-p}$ and the input resistance is 70kΩ.	
28	C_{in}	This pin is for input a chroma signal from an external comb filter. The signal fed into this pin is presented to C_{out}. The input dynamic range of this pin is $5.5V_{p-p}$ and the input resistance is 60kΩ. This pin also functions as a audio mute switch. The entire audio output can be muted by pulling the voltage on this pin below 2.25V.	
29	V_{CC}	This is the power supply pin. Apply 9V to this pin. The current consumption of this pin is 47mA.	—
30	C_{out}	This pin is for output a chroma signal. The signal fed into C_{in}, $C_{in}S1$, $C_{in}S2$, $V_{in}V1$, $V_{in}V2$, $Y/V_{in}S1$, $Y/V_{in}S2$, or $V_{in}TV$ is outputted from this pin. The output resistance of this pin is 25Ω. The same signal is also outputted from Det Select as a sync separation signal.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
31	$R_{out}1$	This pin is for output the main channel right audio signal. The signal fed into $R_{in}V1$, $R_{in}V2$, $R_{in}S1$, $R_{in}S2$, or $R_{in}TV$ is outputted from this pin. The output resistance of this pin is 45Ω. Furthermore, the signal outputted from this pin is pulse-converted for use in self-diagnosis. The converted signal is outputted from Sync Out. This outputted can be muted independently of $L_{out}1$ by bus control.	
32	Y_{out}	This pin is for output a luminance signal. The signal fed into Y_{in}, $Y/V_{in}S1$, $Y/V_{in}S2$, $V_{in}V1$, $V_{in}V2$, or $V_{in}TV$ is outputted from this pin. The output resistance of this pin is 25Ω. The same signal is also outputted from Det Select as a sync separation signal.	
33	$L_{out}1$	This pin is for output the main channel left audio signal. The signal fed into $L_{in}V1$, $L_{in}V2$, $L_{in}S1$, $L_{in}S2$, or $L_{in}TV$ is outputted from this pin. The output resistance of this pin is 45Ω. Furthermore, the signal outputted from this pin is pulse-converted for use in self-diagnosis. The converted signal is outputted from Sync Out. This output can be muted independently of $R_{out}1$ by bus control.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
34	$V_{out}1$	This pin is for output the main channel composite video signal. The signal fed into $V_{in}TV$, $V_{in}V1$, $V_{in}V2$, $V_{in}S1$, $V_{in}S2$, $Y_{in}S1 + C_{in}S1$, or $Y_{in}S2 + C_{in}S2$ is outputted from this pin. The output resistance of this pin is 25Ω. The same signal is also outputted from Det Select as a sync separation signal.	
35	$R_{out}TV$	This pin is for output only the signal that is forwarded from $R_{in}TV$. The output resistance of this pin is 45Ω. This output can be muted in combination with $L_{out}TV$ by bus control.	
36	$L_{out}TV$	This pin is for output only the signal that is forwarded from $L_{in}TV$. The output resistance of this pin is 45Ω. This output can be muted in combination with $R_{out}TV$ by bus control.	

BUS DATA SPECIFICATIONS

Data structure

(1) Write

S	Slave address (90H or 92H)	W (0)	A	Data 1	A	Data 2	A	Data 3	A	P

(2) Read

S	Slave address (91H or 93H)	R (1)	A	Data 4	A	P

* Slave address is switched by the voltage applied to pin 27 (address). Switched to 90H when low (GND) ; switched to 92H when high (V_{CC}) during write mode.

Contents of data

MODE	DATA No.	CONTENTS OF DATA							
Write	Data 1 [F0H]	B07	B06	B05	B04	B03	B02	B01	B00
		Audio mute				Forced TV Audio		YC output switching	
		$L_{out}TV$ $R_{out}TV$		$R_{out}1$	$L_{out}1$			Y_{out}	C_{out}
	Data 2 [1FH]	B17	B16	B15	B14	B13	B12	B11	B10
		Sync detection sensitivity switching	Sync output switching	Sync (diagnosis) detection switching			Input select (Main)		
	Data 3 [07H]	B27	B26	B25	B24	B23	B22	B21	B20
		DAC output switching							
					I/O2	I/O1			
Read	Data 4	B37	B36	B35	B34	B33	B32	B31	B30
		ADC input discrimination					S input discrimination		Power-on reset
			I/O2 Hi	I/O2 Low	I/O1 Hi	I/O1 Low	$C_{in}S1$	$C_{in}S2$	

(Note) Shown in [ ] are reset data.

(Note) The data contents marked by a slash (/) are an unused bit (data free).

Video select

MODE		OUTPUT SIGNAL	S INPUT DISCRIMINATION		BUS DATA INPUT SELECT (MAIN)		
INPUT	S / V	$V_{out}1$	CS1	CS2	B12	B11	B10
S1	V	Y / V_{in}S1	Low	*	0	0	0
	S	Y / V_{in}S1 + C_{in}S1	Open				
	FV	Y / V_{in}S1					1
S2	V	Y / V_{in}S2	*	Low	0	1	0
	S	Y / V_{in}S2 + C_{in}S2		Open			
	FV	Y / V_{in}S2					1
V1	V	V_{in}V1	*	*	1	0	1
V2	V	V_{in}V2	*	*	1	1	0
TV	V	V_{in}TV	*	*	1	1	1

Do not use [100] for the input select data.

L / R select

MODE	MAIN L / R OUTPUT SIGNAL		BUS DATA FORCED TV VOICE	BUS DATA INPUT SELECT (MAIN)		
INPUT	$L_{out}1$	$R_{out}1$	B03	B12	B11	B10
S1	L_{in}S1	R_{in}S1	0	0	0	*
S2	L_{in}S2	R_{in}S2		0	1	*
V1	L_{in}V1	R_{in}V1		1	0	1
V2	L_{in}V2	R_{in}V2		1	1	0
TV	L_{in}TV	R_{in}TV		1	1	1
TV	L_{in}TV	R_{in}TV	1	*	*	*

Do not use [100] for the input select data.

Y output select

MODE		Y OUTPUT SIGNAL	MAIN V SELECT MODE (SEE TABLE 2-2.)		BUS DATA Y OUTPUT SWITCHING
INPUT	THROUGH	Y_{out}			B01
S1	Y_{in}	Y_{in}	S1	V or FV	0
	V through	$Y / V_{in}S1$			1
	Y through	$Y / V_{in}S1$		S	*
S2	Y_{in}	Y_{in}	S2	V or FV	0
	V through	$Y / V_{in}S2$			1
	Y through	$Y / V_{in}S2$		S	*
V1	Y_{in}	Y_{in}	V1	V	0
	V through	$V_{in}V1$			1
V2	Y_{in}	Y_{in}	V2	V	0
	V through	$V_{in}V2$			1
TV	Y_{in}	Y_{in}	TV	V	0
	V through	$V_{in}TV$			1

C output select

MODE		Y OUTPUT SIGNAL	MAIN V SELECT MODE (SEE TABLE 2-2.)		BUS DATA C OUTPUT SWITCHING
INPUT	THROUGH	C_{out}			B00
S1	C_{in}	C_{in}	S1	V or FV	0
	V through	$Y / V_{in}S1$			1
	C through	$C_{in}S1$		S	*
S2	C_{in}	C_{in}	S2	V or FV	0
	V through	$Y / V_{in}S2$			1
	C through	$C_{in}S2$		S	*
V1	C_{in}	C_{in}	V1	V	0
	V through	$V_{in}V1$			1
V2	C_{in}	C_{in}	V2	V	0
	V through	$V_{in}V2$			1
TV	C_{in}	C_{in}	TV	V	0
	V through	$V_{in}TV$			1

Sync detection select

MODE		DETECTION SELECT	SYNC OUTPUT	BUS DATA			
				SYNC SWITCHING	SYNC DETECTION SWITCHING		
		DET SELECT	SYNC OUT	B16	B15	B14	B13
Video Input	TV	$V_{in}TV$	Sync	0	0	1	1
	V1	$V_{in}V1$				0	1
	V2	$V_{in}V2$				1	0
	S1	$Y/V_{in}S1$				0	0
Video Output	$V_{out}1$	$V_{out}1$	Sync	0	1	1	1
	△	—				0	1
	Y_{out}	Y_{out}				1	0
	C_{out}	C_{out}				0	0
Audio Output	$R_{out}1$	★	$R_{out}1$	1	*	1	1
	$L_{out}1$	★	$L_{out}1$			0	1
	△	★	$R_{out}2$			1	0
	△	★	$L_{out}2$			0	0

(Note 1) For Det Select marked by ★, the video input or video output corresponding to data B15, B14, and B13 is selected.

(Note 2) Don't use the data marked by △.

Sync detection sensitivity switching

MODE		BUS DATA
		DETECTION SENSITIVITY SWITCHING
		B17
Sensitivity	High	1
	Low	0

Audio mute

MODE		BUS DATA			
		AUDIO MUTE			
OUTPUT	MUTE	B07	B06	B05	B04
$L_{out}1$	off	*	*	*	0
	on				1
$R_{out}1$	off	*	*	0	*
	on			1	
$L_{out}TV$ $R_{out}TV$	off	0	*	*	*
	on	1			

DAC output switching

MODE		BUS DATA	
		DAC OUTPUT SWITCHING	
OUTPUT	STATE	B24	B23
I/O1	Open	*	0
	Low		1
I/O2	Open	0	*
	Low	1	

Read mode
Power-on reset discrimination

MODE		BUS DATA
		POWER-ON RESET
		B30
Reset	on	1
	off	0

S input discrimination

MODE		BUS DATA	
		S INPUT DISCRIMINATION	
INPUT	VOLTAGE	B32	B31
$C_{in}S2$	High (Open)	*	1
	Low		0
$C_{in}S1$	High (Open)	1	*
	Low	0	

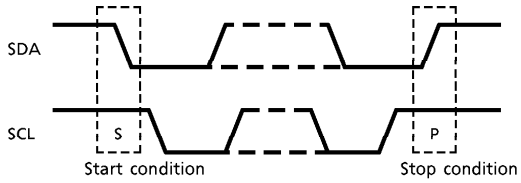
ADC input discrimination

MODE		BUS DATA				
		ADC INPUT DISCRIMINATION				
INPUT	VOLTAGE	B37	B36	B35	B34	B33
I/O1	High	*	*	*	0	0
	Mid				1	0
	Low				0	1
	Bottom				1	1
I/O2	High	*	0	0	*	*
	Mid		1	0		
	Low		0	1		
	Bottom		1	1		

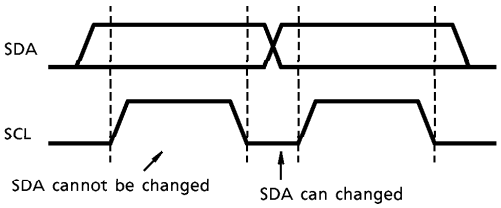
I²C BUS CONTROLLED FORMAT SUMMARY

Bus controlled format of TA1219AN is based on I²C BUS control format of Philips.

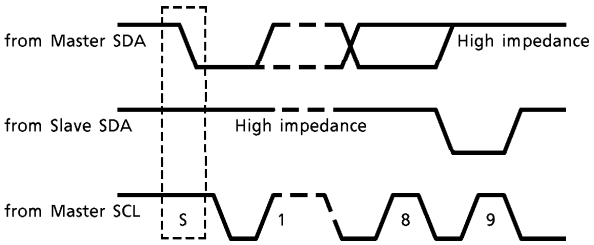
(1) Start and stop condition



(2) Bit transfer



(3) Acknowledge

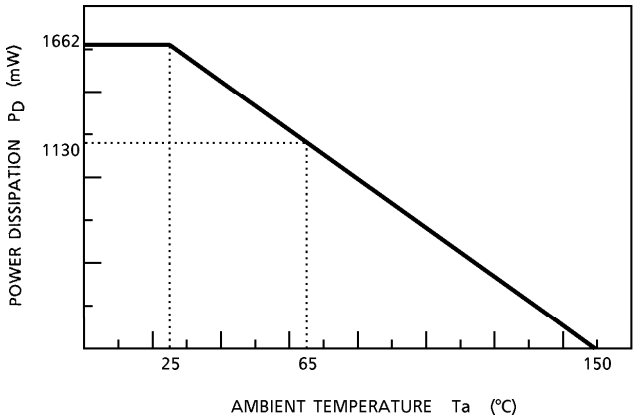


Purchase of TOSHIBA I²C components conveys a license under the Philips I²C Patent Rights to use these components in an I²C system, provided that the system conforms to the I²C Standard Specification as defined by Philips.

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	14	V
Power Dissipation	P_{DMAX}	1662 (Note)	mW
Operating Temperature	T_{opr}	−20~65	°C
Storage Temperature	T_{stg}	−55~150	°C

(Note) When using the device at temperatures above Ta = 25°C, reduce the rated power dissipation by 13.3mW per degree of centigrade. (See the diagram below.)



RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	PIN No.	MIN.	TYP.	MAX.	UNIT	REMARK
Supply Voltage	29	8.1	9.0	9.9	V	—
Composite Signal Input Amplitude	5, 8, 10, 14, 24	—	1.0	—	V_{p-p}	100IRE
Y Input Amplitude	10, 14	—	1.0	—	V_{p-p}	100IRE
Comb Y Input Amplitude	26	—	2.0	—	V_{p-p}	—
Chroma Input Amplitude	12, 16	—	286	—	mV_{p-p}	Burst
Comb Chroma Input Amplitude	28	—	572	—	mV_{p-p}	Burst
Audio Input Amplitude	3, 4, 6, 7, 9, 11, 13, 15, 25, 27	—	—	6.0	V_{p-p}	—

ELECTRICAL CHARACTERISTICS

(Referenced to V_{CC} = 9V at Ta = 25°C unless otherwise specified.)

Current consumption

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT
29	V_{CC}	I_{CC}	—	30	47	64	mA

Pin voltage

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT
1	Det in	V1	—	6.3	6.6	6.9	V
2	Det Select	V2	—	3.4	3.7	4.0	V
3	L_{in}TV	V3	—	5.0	5.2	5.4	V
4	R_{in}TV	V4	—	5.0	5.2	5.4	V
5	V_{in}TV	V5	—	5.0	5.2	5.4	V
6	L_{in}V1	V6	—	5.0	5.2	5.4	V
7	R_{in}V1	V7	—	5.0	5.2	5.4	V
8	V_{in}V1	V8	—	5.0	5.2	5.4	V
9	L_{in}S1	V9	—	5.0	5.2	5.4	V
10	Y / V_{in}S1	V10	—	5.0	5.2	5.4	V
11	R_{in}S1	V11	—	5.0	5.2	5.4	V
12	C_{in}S1	V12	—	5.0	5.2	5.4	V
13	L_{in}S2	V13	—	5.0	5.2	5.4	V
14	Y / V_{in}S2	V14	—	5.0	5.2	5.4	V
15	R_{in}S2	V15	—	5.0	5.2	5.4	V
16	C_{in}S2	V16	—	5.0	5.2	5.4	V
19	GND	V19	—	—	0	—	V
24	V_{in}V2	V24	—	5.0	5.2	5.4	V
25	L_{in}V2	V25	—	5.0	5.2	5.4	V
26	Y_{in}	V26	—	5.0	5.2	5.4	V
27	R_{in}V2	V27	—	5.0	5.2	5.4	V
28	C_{in}	V28	—	5.0	5.2	5.4	V
29	V_{CC}	V29	—	—	9.0	—	V
30	C_{out}	V30	—	3.5	3.8	4.1	V
31	R_{out}1	V31	—	3.7	4.0	4.3	V
32	Y_{out}	V32	—	3.5	3.8	4.1	V
33	L_{out}1	V33	—	3.7	4.0	4.3	V
34	V_{out}1	V34	—	4.1	4.4	4.7	V
35	R_{out}TV	V35	—	3.7	4.0	4.3	V
36	L_{out}TV	V36	—	3.7	4.0	4.3	V

DC CHARACTERISTICS

CHARACTERISTIC	MEASURED PIN	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	REMARK
Input Pin Input Resistance	Det in	R1	—	10	18	30	kΩ	Measure a change ΔI in the current flowing into each pin when the voltage is raised by 0.5V. Then calculate the input resistance value R. R = 0.5V / ΔI [Ω]
	V_{in}TV	R5	—	20	30	40	kΩ	
	V_{in}V1	R8	—	20	30	40	kΩ	
	V_{in}V2	R24	—	20	30	40	kΩ	
	Y / V_{in}S1	R10	—	20	30	40	kΩ	
	Y / V_{in}S2	R14	—	20	30	40	kΩ	
	C_{in}S1	R12	—	20	30	40	kΩ	
	C_{in}S2	R16	—	20	30	40	kΩ	
	Y_{in}	R26	—	40	60	80	kΩ	
	C_{in}	R28	—	40	60	80	kΩ	
	L_{in}TV	R3	—	49	70	100	kΩ	
	R_{in}TV	R4	—	49	70	100	kΩ	
	L_{in}V1	R6	—	49	70	100	kΩ	
	R_{in}V1	R7	—	49	70	100	kΩ	
	L_{in}V2	R25	—	49	70	100	kΩ	
	R_{in}V2	R27	—	49	70	100	kΩ	
	L_{in}S1	R9	—	49	70	100	kΩ	
	R_{in}S1	R11	—	49	70	100	kΩ	
	L_{in}S2	R13	—	49	70	100	kΩ	
	R_{in}S2	R15	—	49	70	100	kΩ	
Output Pin Output Resistance	Det Select	R2	—	17	35	53	Ω	Measure a voltage change ΔV on each pin when a current of 100μA flows into the pin. Then calculate the output resistance value R. R = ΔV / 100μA [Ω]
	V_{out}1	R34	—	13	25	50	Ω	
	Y_{out}	R32	—	13	25	50	Ω	
	C_{out}	R30	—	13	25	50	Ω	
	L_{out}TV	R36	—	20	45	90	Ω	
	R_{out}TV	R35	—	20	45	90	Ω	
	L_{out}1	R33	—	20	45	90	Ω	
	R_{out}1	R31	—	20	45	90	Ω	
S Mode Discrimination Voltage	C_{in}S1	VthC1	—	1.75	2.25	2.75	V	Voltage on pin 12 at which data B31 changes.
	C_{in}S2	VthC2	—	1.75	2.25	2.75	V	Voltage on pin 16 at which data B32 changes.
External Mute ON Voltage	C_{in}	VthM	—	1.75	2.25	2.75	V	Voltage on pin 28 at which voice is muted.

CHARACTERISTIC	MEASURED PIN	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	REMARK
Address Switching Voltage	address	VthA	—	1.75	2.25	2.75	V	Voltage on pin 23 at which the slave address changes.
ADC Input Discrimination Voltage	I/O1	VthI1L	—	0.55	0.75	0.95	V	Low-Bottom threshold level of I/O1 input (pin 17).
	I/O1	VthI1M	—	2.5	3.0	3.5	V	Mid-Low threshold level of I/O1 input (pin 17).
	I/O1	VthI1H	—	7.5	8.0	8.5	V	High-Mid threshold level of I/O1 input (pin 17).
	I/O2	VthI2L	—	0.55	0.75	0.95	V	Low-Bottom threshold level of I/O2 input (pin 18).
	I/O2	VthI2M	—	2.5	3.0	3.5	V	Mid-Low threshold level of I/O2 input (pin 18).
	I/O2	VthI2H	—	7.5	8.0	8.5	V	High-Mid threshold level of I/O1 input (pin 18).

AC CHARACTERISTICS

CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
$V_{out}1$ Input Dynamic Range	$V_{in}TV$	VDR5V1	—	1.5	2.0	—	V_{p-p}	(1) Apply a 15kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 34 begins to be distorted.
	$V_{in}V1$	VDR8V1	—	1.5	2.0	—	V_{p-p}	
	$V_{in}V2$	VDR24V1	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S1$	VDR10V1	—	1.5	2.0	—	V_{p-p}	
	$C_{in}S1$	VDR12V1	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S2$	VDR14V1	—	1.5	2.0	—	V_{p-p}	
	$C_{in}S2$	VDR16V1	—	1.5	2.0	—	V_{p-p}	
$V_{out}1$ Gain	$V_{in}TV$	G5V1	—	5.5	6.0	6.5	dB	(1) Apply a 15kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$V_{in}V1$	G8V1	—	5.5	6.0	6.5	dB	
	$V_{in}V2$	G24V1	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S1$	G10V1	—	5.5	6.0	6.5	dB	
	$C_{in}S1$	G12V1	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S2$	G14V1	—	5.5	6.0	6.5	dB	
	$C_{in}S2$	G16V1	—	5.5	6.0	6.5	dB	
$V_{out}1$ Frequency Response	$V_{in}TV$	F5V1	—	10	—	—	MHz	(1) Apply a 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, measure a frequency at which the output amplitude on pin 34 is 3dB down from the 15kHz applied level.
	$V_{in}V1$	F8V1	—	10	—	—	MHz	
	$V_{in}V2$	F24V1	—	10	—	—	MHz	
	$Y/V_{in}S1$	F10V1	—	10	—	—	MHz	
	$C_{in}S1$	F12V1	—	10	—	—	MHz	
	$Y/V_{in}S2$	F14V1	—	10	—	—	MHz	
	$C_{in}S2$	F16V1	—	10	—	—	MHz	
$V_{out}1$ Crosstalk	$V_{in}TV$	CT5V1	—	55	60	—	dB	(1) Apply a 3.58MHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare signal output from the selected pin with leakage components from nonselected pins to find a crosstalk.
	$V_{in}V1$	CT8V1	—	55	60	—	dB	
	$V_{in}V2$	CT24V1	—	55	60	—	dB	
	$Y/V_{in}S1$	CT10V1	—	55	60	—	dB	
	$C_{in}S1$	CT12V1	—	55	60	—	dB	
	$Y/V_{in}S2$	CT14V1	—	55	60	—	dB	
	$C_{in}S2$	CT16V1	—	55	60	—	dB	
Y_{out} Input Dynamic Range	$V_{in}TV$	VDR5Y	—	1.5	2.0	—	V_{p-p}	(1) Apply a 15kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 32 begins to be distorted.
	$V_{in}V1$	VDR8Y	—	1.5	2.0	—	V_{p-p}	
	$V_{in}V2$	VDR24Y	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S1$	VDR10Y	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S2$	VDR14Y	—	1.5	2.0	—	V_{p-p}	
	Y_{in}	VDR26Y	—	5.0	5.5	—	V_{p-p}	

CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
Y_{out} Gain	$V_{in}TV$	G5Y	—	5.5	6.0	6.5	dB	(1) Apply a 15kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$V_{in}V1$	G8Y	—	5.5	6.0	6.5	dB	
	$V_{in}V2$	G24Y	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S1$	G10Y	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S2$	G14Y	—	5.5	6.0	6.5	dB	
	Y_{in}	G26Y	—	−0.5	0	0.5	dB	
Y_{out} Frequency Response	$V_{in}TV$	F5Y	—	10	—	—	MHz	(1) Apply a 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, measure a frequency at which the output amplitude on pin 32 is 3dB down from the 15kHz applied level.
	$V_{in}V1$	F8Y	—	10	—	—	MHz	
	$V_{in}V2$	F24Y	—	10	—	—	MHz	
	$Y/V_{in}S1$	F10Y	—	10	—	—	MHz	
	$Y/V_{in}S2$	F14Y	—	10	—	—	MHz	
	Y_{in}	F26Y	—	10	—	—	MHz	
Y_{out} Crosstalk	$V_{in}TV$	CT5Y	—	55	60	—	dB	(1) Apply a 3.58MHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare signal output from the selected pin with leakage components from nonselected pins to find a crosstalk.
	$V_{in}V1$	CT8Y	—	55	60	—	dB	
	$V_{in}V2$	CT24Y	—	55	60	—	dB	
	$Y/V_{in}S1$	CT10Y	—	55	60	—	dB	
	$Y/V_{in}S2$	CT14Y	—	55	60	—	dB	
	Y_{in}	CT26Y	—	55	60	—	dB	
C_{out} Input Dynamic Range	$V_{in}TV$	VDR5C	—	1.5	2.0	—	V_{p-p}	(1) Apply a 15kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 30 begins to be distorted.
	$V_{in}V1$	VDR8C	—	1.5	2.0	—	V_{p-p}	
	$V_{in}V2$	VDR24C	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S1$	VDR10C	—	1.5	2.0	—	V_{p-p}	
	$C_{in}S1$	VDR12C	—	1.5	2.0	—	V_{p-p}	
	$Y/V_{in}S2$	VDR14C	—	1.5	2.0	—	V_{p-p}	
	$C_{in}S2$	VDR16C	—	1.5	2.0	—	V_{p-p}	
	C_{in}	VDR28C	—	5.0	5.5	—	V_{p-p}	
C_{out} Gain	$V_{in}TV$	G5C	—	5.5	6.0	6.5	dB	(1) Apply a 15kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$V_{in}V1$	G8C	—	5.5	6.0	6.5	dB	
	$V_{in}V2$	G24C	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S1$	G10C	—	5.5	6.0	6.5	dB	
	$C_{in}S1$	G12C	—	5.5	6.0	6.5	dB	
	$Y/V_{in}S2$	G14C	—	5.5	6.0	6.5	dB	
	$C_{in}S2$	G16C	—	5.5	6.0	6.5	dB	
	C_{in}	G28C	—	−0.5	0	0.5	dB	

CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
C_{out} Frequency Response	$V_{in}TV$	F5C	—	10	—	—	MHz	(1) Apply a 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, measure a frequency at which the output amplitude on pin 30 is 3dB down from the 15kHz applied level.
	$V_{in}V1$	F8C	—	10	—	—	MHz	
	$V_{in}V2$	F24C	—	10	—	—	MHz	
	$Y/V_{in}S1$	F10C	—	10	—	—	MHz	
	$C_{in}S1$	F12C	—	10	—	—	MHz	
	$Y/V_{in}S2$	F14C	—	10	—	—	MHz	
	$C_{in}S2$	F16C	—	10	—	—	MHz	
	C_{in}	F28C	—	10	—	—	MHz	
C_{out} Crosstalk	$V_{in}TV$	CT5C	—	55	60	—	dB	(1) Apply a 3.58MHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare signal output from the selected pin with leakage components from nonselected pins to find a crosstalk.
	$V_{in}V1$	CT8C	—	55	60	—	dB	
	$V_{in}V2$	CT24C	—	55	60	—	dB	
	$Y/V_{in}S1$	CT10C	—	55	60	—	dB	
	$C_{in}S1$	CT12C	—	55	60	—	dB	
	$Y/V_{in}S2$	CT14C	—	55	60	—	dB	
	$C_{in}S2$	CT16C	—	55	60	—	dB	
	C_{in}	CT28C	—	55	60	—	dB	
Det Select Input Dynamic Range	$V_{in}TV$	VDR5D	—	5.0	5.5	—	V	(1) Apply a 15kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 2 begins to be distorted.
	$V_{in}V1$	VDR8D	—	5.0	5.5	—	V	
	$V_{in}V2$	VDR24D	—	5.0	5.5	—	V	
	$Y/V_{in}S1$	VDR10D	—	5.0	5.5	—	V	
	V_{out1}	VDR34D	—	1.5	2.0	—	V	
	V_{out2}	VDR38D	—	1.5	2.0	—	V	
	C_{out}	VDR30D	—	1.2	1.8	—	V	
Det Select Gain	$V_{in}TV$	G5D	—	−0.5	0	0.5	dB	(1) Apply a 15kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$V_{in}V1$	G8D	—	−0.5	0	0.5	dB	
	$V_{in}V2$	G24D	—	−0.5	0	0.5	dB	
	$Y/V_{in}S1$	G10D	—	−0.5	0	0.5	dB	
	V_{out1}	G34D	—	−0.1	0	0.1	dB	
	Y_{out}	G32D	—	−0.1	0	0.1	dB	
	C_{out}	G30D	—	−0.1	0	0.1	dB	
L_{out1} Input Dynamic Range	$L_{in}TV$	VDR3L1	—	6.0	6.5	—	V_{p-p}	(1) Apply a 1kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 33 begins to be distorted.
	$L_{in}V1$	VDR6L1	—	6.0	6.5	—	V_{p-p}	
	$L_{in}V2$	VDR25L1	—	6.0	6.5	—	V_{p-p}	
	$L_{in}S1$	VDR9L1	—	6.0	6.5	—	V_{p-p}	
	$L_{in}S2$	VDR13L1	—	6.0	6.5	—	V_{p-p}	

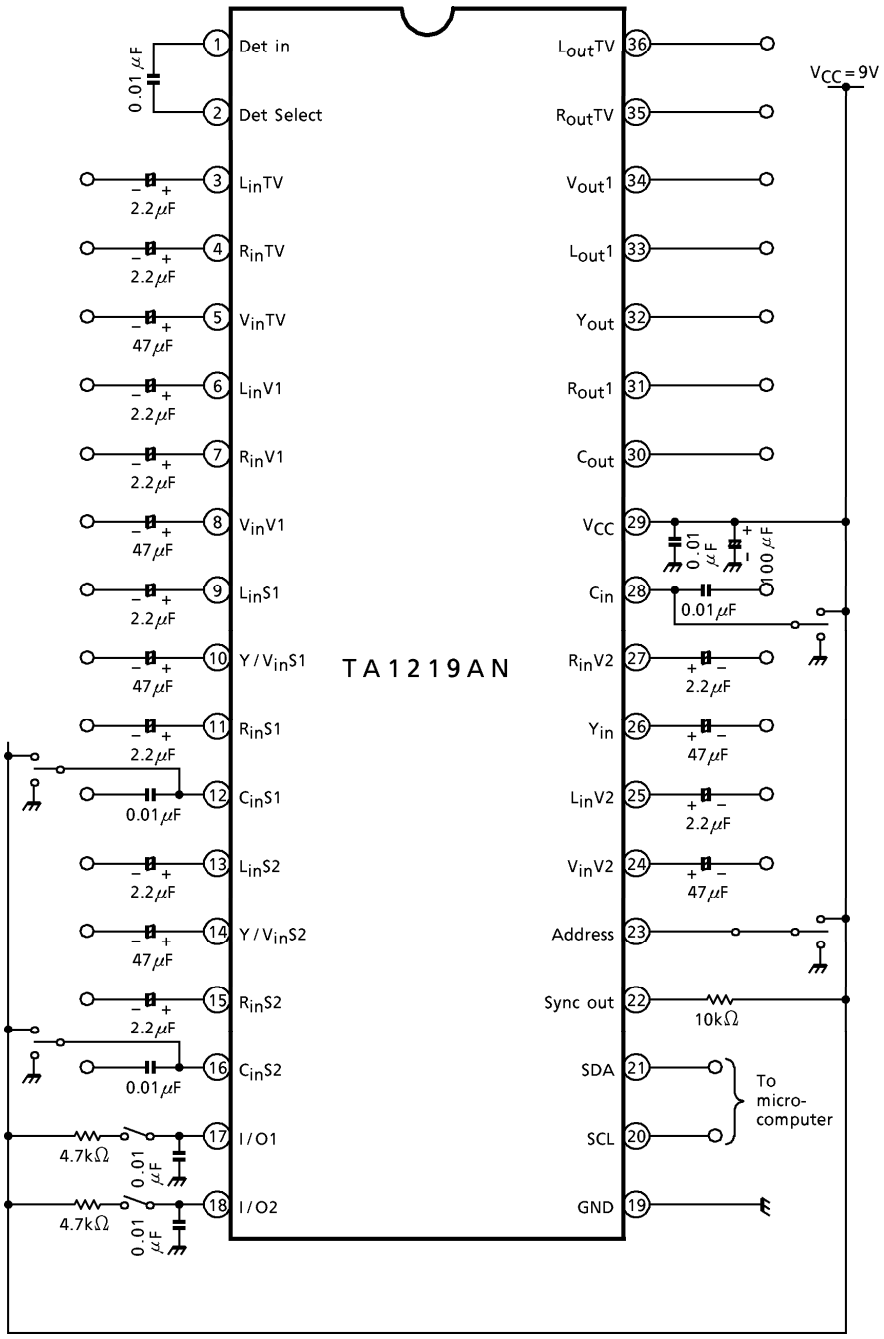
CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
$L_{out}1$ Gain	$L_{in}TV$	G3L1	—	−0.5	0	0.5	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$L_{in}V1$	G6L1	—	−0.5	0	0.5	dB	
	$L_{in}V2$	G25L1	—	−0.5	0	0.5	dB	
	$L_{in}S1$	G9L1	—	−0.5	0	0.5	dB	
	$L_{in}S2$	G13L1	—	−0.5	0	0.5	dB	
$L_{out}1$ Frequency Response	$L_{in}TV$	F3L1	—	0.1	2.0	—	MHz	(1) Apply a 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, measure a frequency at which the output amplitude on pin 33 is 3dB down from the 1 kHz applied level.
	$L_{in}V1$	F6L1	—	0.1	2.0	—	MHz	
	$L_{in}V2$	F25L1	—	0.1	2.0	—	MHz	
	$L_{in}S1$	F9L1	—	0.1	2.0	—	MHz	
	$L_{in}S2$	F13L1	—	0.1	2.0	—	MHz	
$L_{out}1$ Crosstalk	$L_{in}TV$	CT3L1	—	70	100	—	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare signal output from the selected pin with leakage components from nonselected pins to find a crosstalk.
	$L_{in}V1$	CT6L1	—	70	100	—	dB	
	$L_{in}V2$	CT25L1	—	70	100	—	dB	
	$L_{in}S1$	CT9L1	—	70	100	—	dB	
	$L_{in}S2$	CT13L1	—	70	100	—	dB	
$L_{out}1$ Mute Attenuation	$L_{in}TV$	M3L1	—	70	100	—	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare the output amplitudes on pin 33 when mute is turned on and turned off to find mute attenuation.
	$L_{in}V1$	M6L1	—	70	100	—	dB	
	$L_{in}V2$	M25L1	—	70	100	—	dB	
	$L_{in}S1$	M9L1	—	70	100	—	dB	
	$L_{in}S2$	M13L1	—	70	100	—	dB	
$R_{out}1$ Input Dynamic Range	$R_{in}TV$	VDR4R1	—	6.0	6.5	—	V_{p-p}	(1) Apply a 1kHz sine wave to each input pin. (2) In each select mode, measure an input amplitude at which the output waveform on pin 31 begins to be distorted.
	$R_{in}V1$	VDR7R1	—	6.0	6.5	—	V_{p-p}	
	$R_{in}V2$	VDR27R1	—	6.0	6.5	—	V_{p-p}	
	$R_{in}S1$	VDR11R1	—	6.0	6.5	—	V_{p-p}	
	$R_{in}S2$	VDR15R1	—	6.0	6.5	—	V_{p-p}	

CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
$R_{out}1$ Gain	$R_{in}TV$	G4R1	—	−0.5	0	0.5	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, find the gain between input and output.
	$R_{in}V1$	G7R1	—	−0.5	0	0.5	dB	
	$R_{in}V2$	G27R1	—	−0.5	0	0.5	dB	
	$R_{in}S1$	G11R1	—	−0.5	0	0.5	dB	
	$R_{in}S2$	G15R1	—	−0.5	0	0.5	dB	
$R_{out}1$ Frequency Response	$R_{in}TV$	F4R1	—	0.1	2.0	—	MHz	(1) Apply a 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, measure a frequency at which the output amplitude on pin 31 is 3dB down from the 1kHz applied level.
	$R_{in}V1$	F7R1	—	0.1	2.0	—	MHz	
	$R_{in}V2$	F27R1	—	0.1	2.0	—	MHz	
	$R_{in}S1$	F11R1	—	0.1	2.0	—	MHz	
	$R_{in}S2$	F15R1	—	0.1	2.0	—	MHz	
$R_{out}1$ Crosstalk	$R_{in}TV$	CT4R1	—	70	100	—	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare signal output from the selected pin with leakage components from nonselected pins to find a crosstalk.
	$R_{in}V1$	CT7R1	—	70	100	—	dB	
	$R_{in}V2$	CT27R1	—	70	100	—	dB	
	$R_{in}S1$	CT11R1	—	70	100	—	dB	
	$R_{in}S2$	CT15R1	—	70	100	—	dB	
$R_{out}1$ Mute Attenuation	$R_{in}TV$	M4R1	—	70	100	—	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) In each select mode, compare the output amplitudes on pin 31 when mute is turned on and turned off to find mute attenuation.
	$R_{in}V1$	M7R1	—	70	100	—	dB	
	$R_{in}V2$	M27R1	—	70	100	—	dB	
	$R_{in}S1$	M11R1	—	70	100	—	dB	
	$R_{in}S2$	M15R1	—	70	100	—	dB	
$L_{out}TV$ Input Dynamic Range	$L_{in}TV$	VDR3LTV	—	6.0	6.5	—	V_{p-p}	While applying a 1kHz sine wave to pin 3, measure an input amplitude at which the output waveform on pin 36 begins to be distorted.
$L_{out}TV$ Gain	$L_{in}TV$	G3LTV	—	−0.5	0	0.5	dB	While applying a 1kHz, 1.0V_{p-p} sine wave to pin 3, find the gain between pins 3 and 36.

CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
$L_{out}TV$ Frequency Response	$L_{in}TV$	F3LTV	—	0.1	2.0	—	MHz	While applying a $1.0V_{p-p}$ sine wave to pin 3, measure a frequency at which the output waveform on pin 36 is 3dB down from the 1kHz applied level.
$L_{out}TV$ Crosstalk	$L_{in}TV$	CT3LTV	—	70	100	—	dB	(1) Apply a 1kHz, $1.0V_{p-p}$ sine wave to each input pin. (2) Compare the output amplitude when $L_{in}TV$ is selected with leakage components from nonselected pins to find a crosstalk.
	$L_{in}V1$	CT6LTV	—	70	100	—	dB	
	$L_{in}V2$	CT25LTV	—	70	100	—	dB	
	$L_{in}S1$	CT9LTV	—	70	100	—	dB	
	$L_{in}S2$	CT13LTV	—	70	100	—	dB	
$L_{out}TV$ Mute Attenuation	$L_{in}TV$	M3LTV	—	70	100	—	dB	While applying a 1kHz, $1.0V_{p-p}$ sine wave to pin 3, compare the output amplitudes on pin 36 when mute is turned on and turned off to find mute attenuation.
$R_{out}TV$ Input Dynamic Range	$R_{in}TV$	VDR4RTV	—	6.0	6.5	—	V_{p-p}	While applying a 1kHz sine wave to pin 4, measure an input amplitude at which the output waveform on pin 35 begins to be distorted.
$R_{out}TV$ Gain	$R_{in}TV$	G4RTV	—	−0.5	0	0.5	dB	While applying a 1kHz, $1.0V_{p-p}$ sine wave to pin 4, find the gain between pins 4 and 35.
$R_{out}TV$ Frequency Response	$R_{in}TV$	F4RTV	—	0.1	2.0	—	MHz	While applying a $1.0V_{p-p}$ sine wave to pin 4, measure a frequency at which the output waveform on pin 35 is 3dB down from the 1kHz applied level.

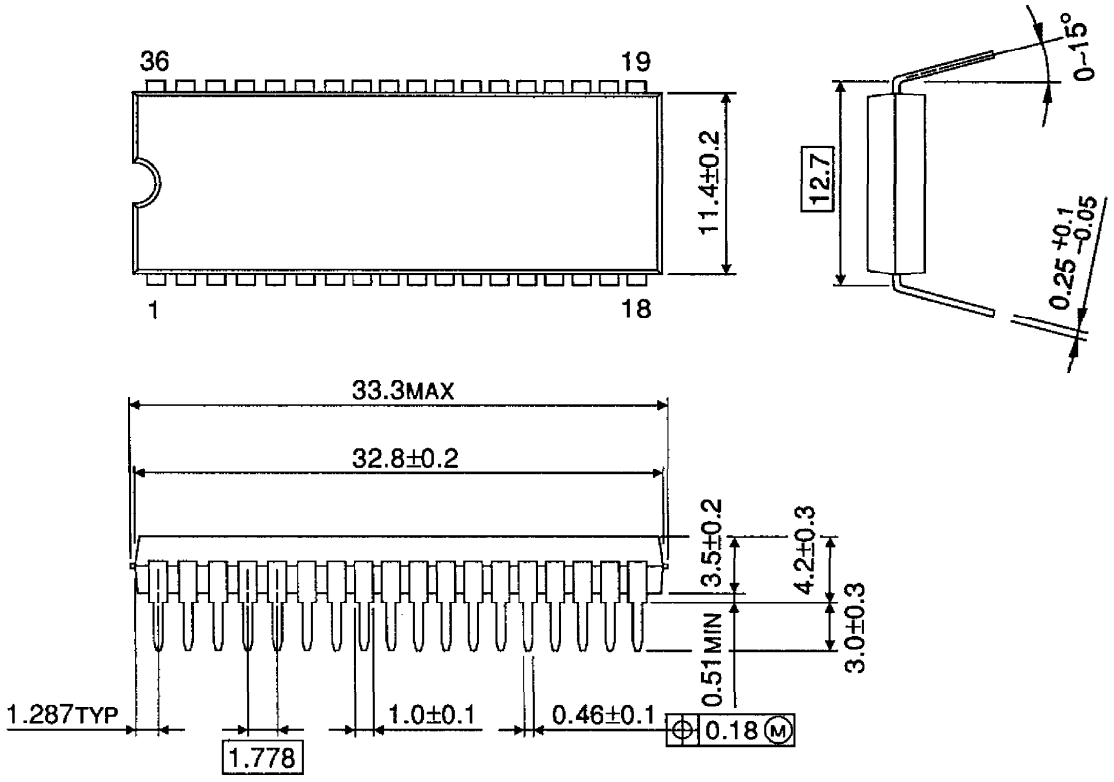
CHARACTERISTIC	SELECT MODE	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	TEST METHOD
R_{out}TV Crosstalk	R_{in}TV	CT4RTV	—	70	100	—	dB	(1) Apply a 1kHz, 1.0V_{p-p} sine wave to each input pin. (2) Compare the output amplitude when R_{in}TV is selected with leakage components from nonselected pins to find a crosstalk.
	R_{in}V1	CT7RTV	—	70	100	—	dB	
	R_{in}V2	CT27RTV	—	70	100	—	dB	
	R_{in}S1	CT11RTV	—	70	100	—	dB	
	R_{in}S2	CT15RTV	—	70	100	—	dB	
R_{out}TV Mute Attenuation	R_{in}TV	M4RTV	—	70	100	—	dB	While applying a 1kHz, 1.0V_{p-p} sine wave to pin 4, compare the output amplitudes on pin 35 when mute is turned on and turned off to find mute attenuation.

APPLICATION CIRCUIT



OUTLINE DRAWING

SDIP36-P-500-1.78 Unit : mm



Weight : 2.98g (Typ.)