

AUDIO/VIDEO SWITCHING IC FOR TV

The KIA1218AN is an audio/video switching IC for TV sets. Conforming to I²C bus standards, it allows you to perform various switching operations through the bus lines by using a microcomputer. Thanks to its 2-channel outputs, the KIA1218AN can also be used for the PIP systems. 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).

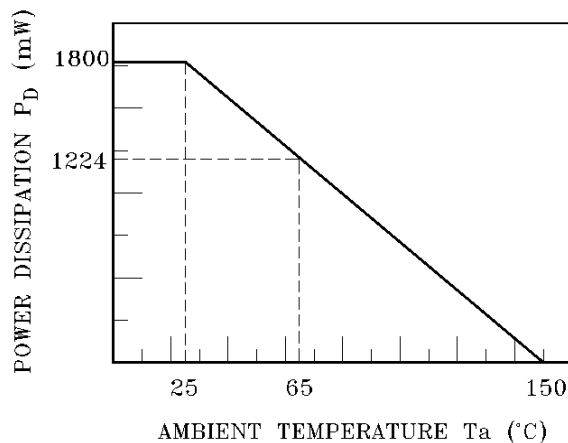
FEATURES

- I²C bus control.
- Video : 5-channel inputs and 2-channel outputs.
(2 channels conforming to S system)
- Audio : 5-channel inputs and 3-channel outputs.
- Self-diagnostic function.
- ADC inputs based on European 21-pin standards.
- ADC inputs based on S1/S2 terminal standards.
- Switchable subaddress.

MAXIMUM RATINGS (Ta=25°C)

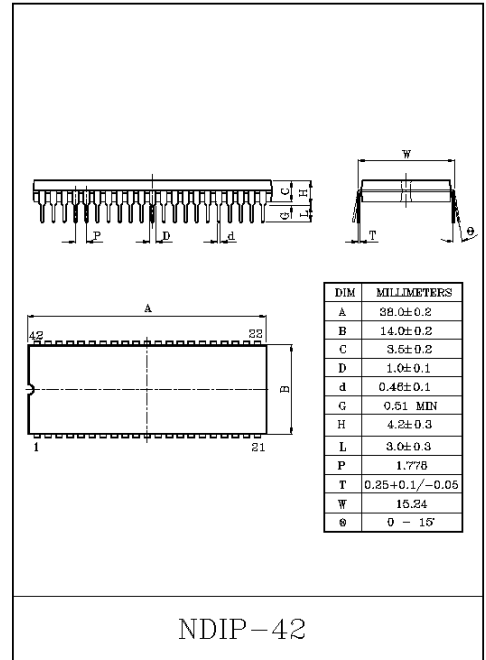
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------|--------------------|-------------|------|
| Power Supply Voltage | V _{CC} | 14 | V |
| Power Dissipation | P _{D MAX} | 1800 (Note) | mW |
| Operating Temperature | T _{opr} | -20~65 | °C |
| Storage Temperature | T _{stg} | -55~150 | °C |

(Note) When using the device at temperatures above Ta=25°C, reduce the rated power dissipation by 14.4mW per degree of centigrade. (See the diagram below).



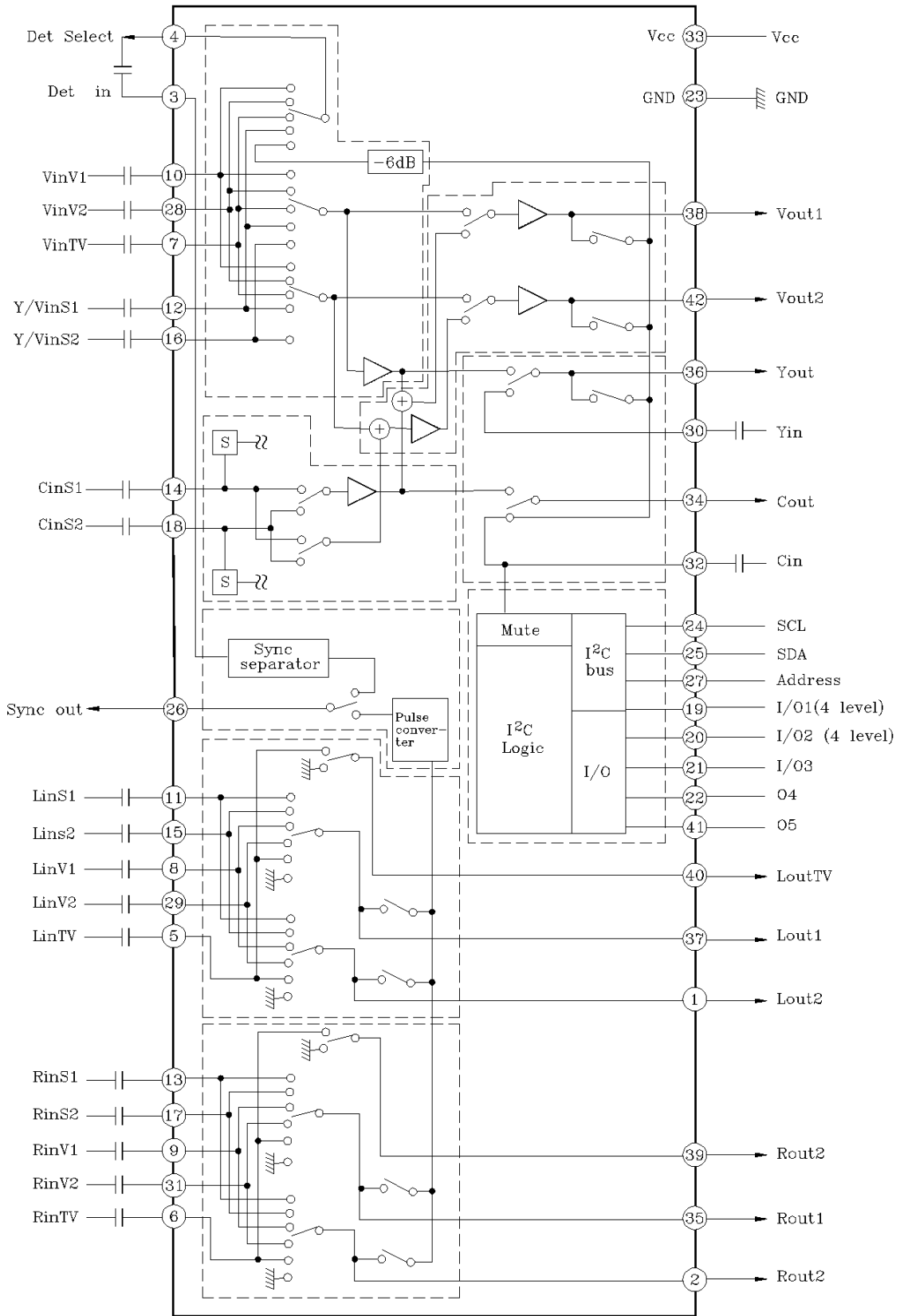
RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | PIN No. | MIN. | TYP. | MAX. | UNIT | REMARK |
|----------------------------------|------------------------------------|------|------|------|-------------------|---------|
| Supply Voltage | 33 | 8.1 | 9.0 | 9.9 | V | - |
| Composite Signal Input Amplitude | 7, 10, 12, 16, 28 | - | 1.0 | - | V _{P-P} | 100 IRE |
| Y Input Amplitude | 12, 16 | - | 1.0 | - | V _{P-P} | 100 IRE |
| Comb Y Input Amplitude | 30 | - | 2.0 | - | V _{P-P} | - |
| Chroma Input Amplitude | 14, 18 | - | 286 | - | mV _{P-P} | Burst |
| Comb Chroma Input Amplitude | 32 | - | 572 | - | mV _{P-P} | Burst |
| Audio Input Amplitude | 5, 6, 8, 9, 11, 13, 15, 17, 29, 31 | - | - | 6.0 | V _{P-P} | - |



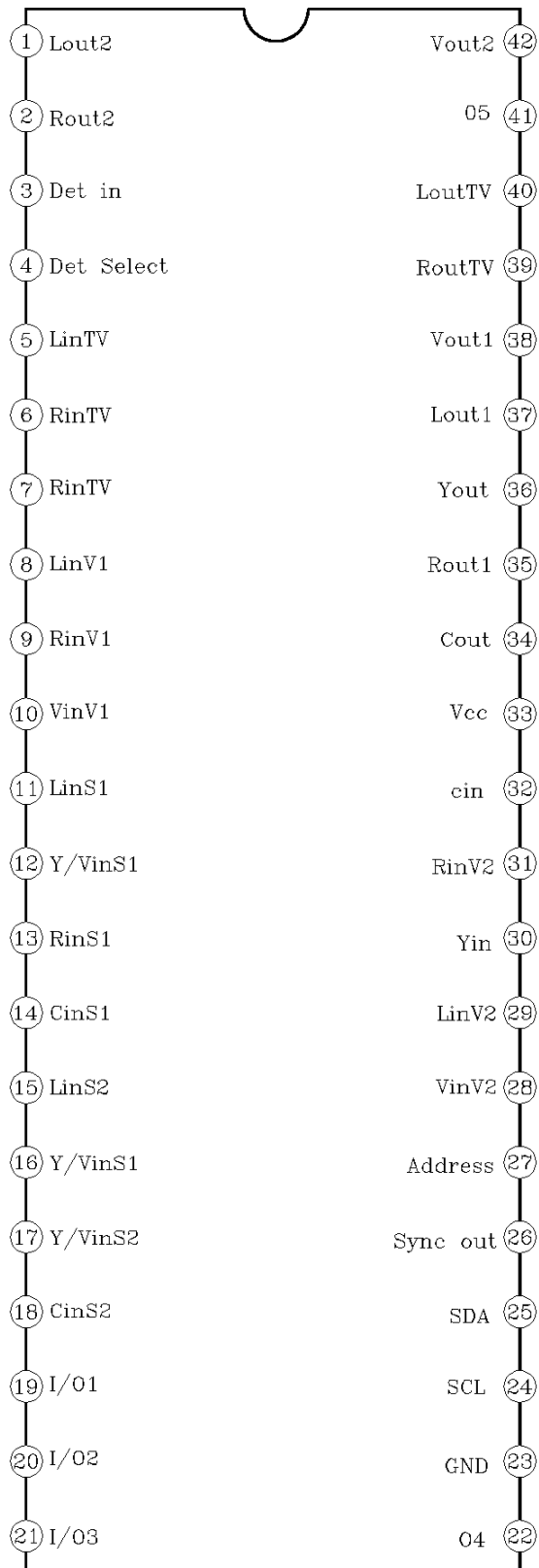
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BLOCK DIAGRAM



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PIN ASSIGNMENT



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PIN DESCRIPTION

| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1 | L _{out2} | <p>This pin is for output a sub-channel left audio signal. The signals fed into the chip via L_{in}V1, L_{in}V2, L_{in}S1, L_{in}S2, or L_{in} TV is output from this pin is 45Ω.</p> <p>Furthermore, the signal output from this pin is pulse-converted for use in self-diagnosis. The converted signal is output from Sync Out. This output can be muted in combination with R_{out2} by bus control.</p> | |
| 2 | R _{out2} | <p>This pin is for output a sub-channel right audio signal. The signals fed into the chip via R_{in}V1, R_{in}V2, R_{in}S1, R_{in}S2, or R_{in}TV is output from this pin. The output resistance of this pin is 45Ω. Furthermore, the signal output from this pin is pulse-converted for use in self-diagnosis. The converted signal is output from Sync Out. This output can be muted in combination with L_{out2} by bus control.</p> | |
| 3 | Det in | <p>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.</p> | |
| 4 | Det Select | <p>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, V_{out}2, V_{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.</p> | |

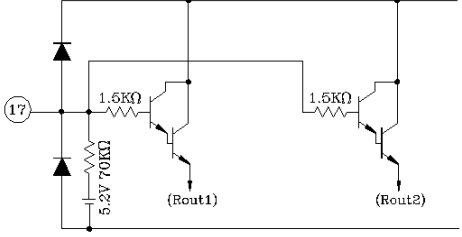
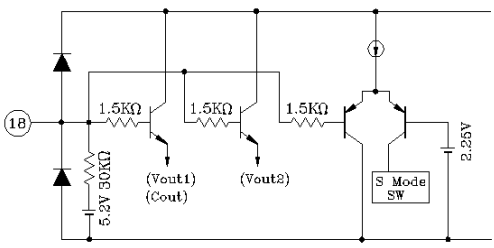
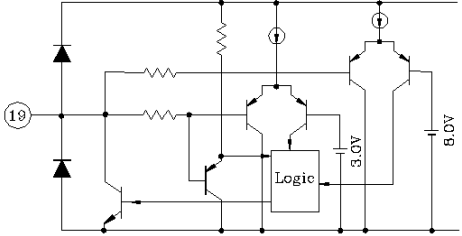
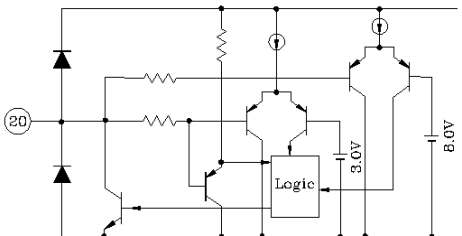
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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 9 | R _{in} V1 | <p>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_{out1} and R_{out2}. The input dynamic range of this pin is 6.5V_{P-P} and the input resistance is 70kΩ.</p> | |
| 10 | V _{in} V1 | <p>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_{out1}, V_{out2}, 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.</p> | |
| 11 | L _{in} S1 | <p>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_{out1} and L_{out2}. The input dynamic range of this pin is 6.5V_{P-P} and the input resistance is 70kΩ.</p> | |
| 12 | Y/V _{in} S1 | <p>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_{out1}, V_{out2}, 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.</p> | |

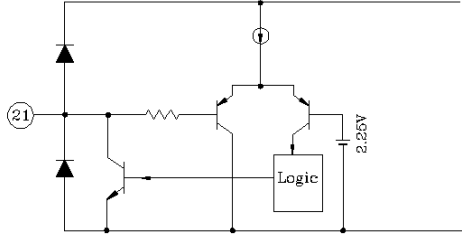
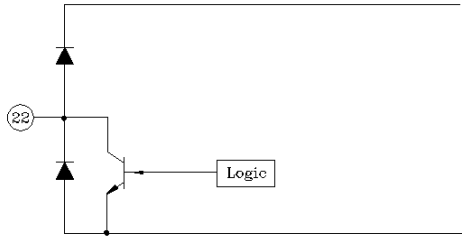
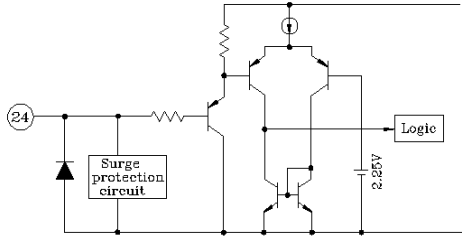
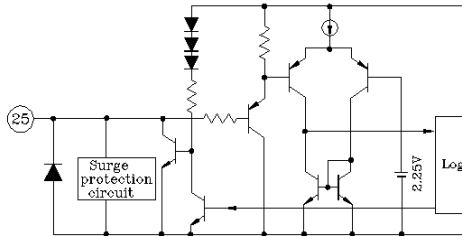
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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 13 | R_{inS1} | <p>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_{out1} and R_{out2}. The input dynamic range of this pin is $6.5V_{P-P}$ and the input resistance is $70k\Omega$.</p> | |
| 14 | C_{inS1} | <p>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_{out1}, and V_{out2} after being combined with the Y_{inS1} signal. The input dynamic range of this pin is $2.0V_{P-P}$ and the input resistance is $30k\Omega$.</p> | |
| 15 | L_{inS2} | <p>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_{out1} and L_{out2}. The input dynamic range of this pin is $6.5V_{P-P}$ and the input resistance is $70k\Omega$.</p> | |
| 16 | Y/V_{inS2} | <p>This pin is for input a luminance signal or composite audio signal from an external source (S2 channel). The signal fed into this pin is presented to V_{out1}, V_{out2}, Y_{out}, and C_{out}. The input dynamic range of this pin is $2.0V_{P-P}$ and the input resistance is $30k\Omega$.</p> | |

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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 17 | R _{in} S2 | <p>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_{out1} and R_{out2}. The input dynamic range of this pin is 6.5V_{P-P} and the input resistance is 70kΩ.</p> |  |
| 18 | C _{in} S2 | <p>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_{out1}, and V_{out2} 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.</p> |  |
| 19 | I/O1 | <p>This pin 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.</p> |  |
| 20 | I/O2 | <p>This is an ADC input/DAC output pin. The ADC is a 4-level detection type (2bits). 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.</p> |  |

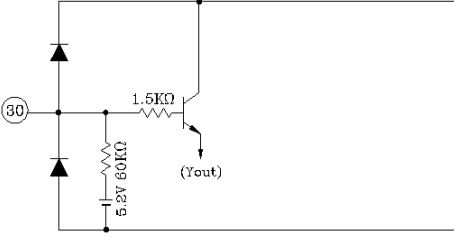
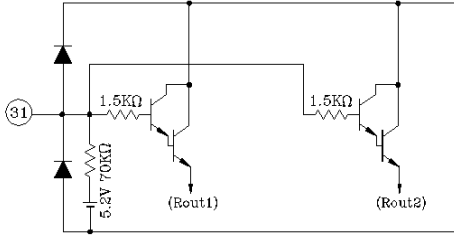
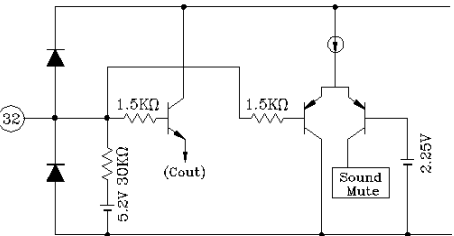
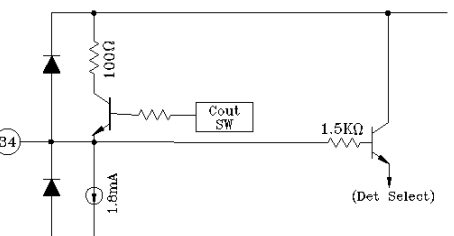
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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 21 | I/O3 | <p>This is an ADC input/DAC output pin. The ADC is a 2-level detection type (1bit). The threshold level is 2.25V. The DAC (1bit) is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.</p> |  |
| 22 | O4 | <p>This pin is for a 1bit DAC output. This is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.</p> |  |
| 23 | GND | <p>This is the GND pin.</p> | |
| 24 | SCL | <p>This pin is for input an I²C bus clock. The input threshold level of this pin is 2.25V.</p> |  |
| 25 | SDA | <p>This is an I²C 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.</p> |  |

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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 26 | Sync out | <p>This pin is for output a self-diagnostic sync signal. The signal separated from V_{inTV}, V_{inV1}, V_{inV2}, Y/V_{inS1}, V_{out2}, Y_{out}, or C_{out} is outputted from this pin. In addition, the signal derived from L_{out1}, R_{out1}, L_{out2}, or R_{out2}, 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.</p> | |
| 27 | Address | <p>This is for an I²C bus slave address select switch. The threshold level of this pin is 2.25V. The following lists the addresses :</p> <p>High : 92H (Write), 93H (Read) Low : 90H (Write), 91H (Read)</p> | |
| 28 | V_{inV2} | <p>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_{out1}, V_{out2}, 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.</p> | |
| 29 | L_{inV2} | <p>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_{out1} and L_{out2}. The input dynamic range of this pin is 6.5V_{P-P} and the input resistance is 70kΩ.</p> | |

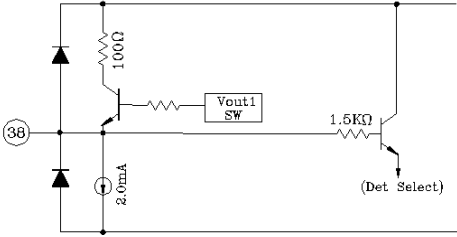
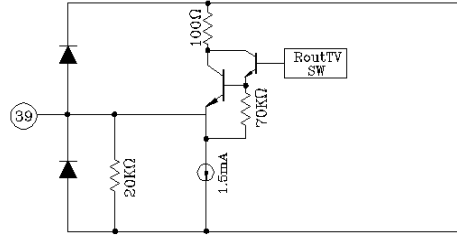
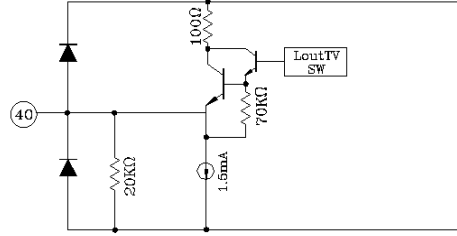
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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 30 | Y_{in} | <p>This pin is for input a luminance signal from an external comb filter.</p> <p>The signal fed into this pin is presented to Y_{out}.</p> <p>The input dynamic range of this pin is $5.5V_{P-P}$ and the input resistance is $60k\Omega$.</p> |  |
| 31 | R_{inV2} | <p>This pin is for input a right audio signal from an external source (V2 channel.)</p> <p>This pin can also be used for PIP signal input. The signal fed into this pin is presented to R_{out1} and R_{out2}.</p> <p>The input dynamic range of this pin is $6.5V_{P-P}$ and the input resistance is $70k\Omega$.</p> |  |
| 32 | C_{in} | <p>This pin is for input a chroma signal from an external comb filter. The signal fed into this pin is presented to C_{out}.</p> <p>The input dynamic range of this pin is $5.5V_{P-P}$ and the input resistance is $60k\Omega$.</p> <p>This pin also functions as a audio mute switch. The entire audio output can be muted by pulling the voltage on this pin below $2.25V$.</p> |  |
| 33 | V_{CC} | <p>This is the power supply pin. Apply $9V$ to this pin. The current consumption of this pin is $47mA$.</p> | |
| 34 | C_{out} | <p>This pin is for output a chroma signal.</p> <p>The signal fed into C_{in}, C_{inS1}, C_{inS2}, V_{inV1}, V_{inV2}, Y/V_{inS1}, Y/V_{inS2}, or V_{inTV} is outputted from this pin. The output resistance of this pin is 25Ω.</p> <p>The same signal is also outputted from Det Select as a sync separation signal.</p> |  |

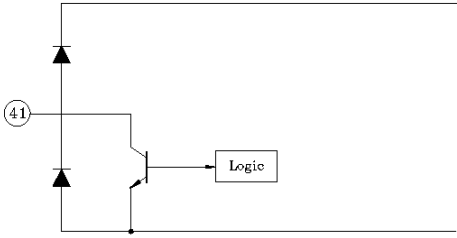
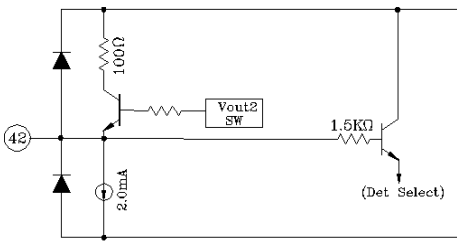
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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 35 | R _{out1} | <p>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.</p> <p>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 or L_{out1} by bus control.</p> | |
| 36 | Y _{out} | <p>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.</p> <p>The same signal is also outputted from Det Select as a sync separation signal.</p> | |
| 37 | L _{out1} | <p>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.</p> <p>Furthermore, the signal outputted from this pin is pulse-converted for use in self-diagnosis. The converted signal is outputted from Sync Out.</p> <p>This output can be muted independently of R_{out1} by bus control.</p> | |

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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 38 | V_{out1} | <p>This pin is for output the main channel Composite video signal. The signal fed in V_{inTV}, V_{inV1}, V_{inV2}, V_{inS1}, V_{inS2}, $Y_{inS1}+C_{inS1}$, or $Y_{inS2}+C_{inS2}$ is outputted from this pin. The output resistance of this pin is 25Ω.</p> <p>The same signal is also outputted from Det Select as a sync separation signal.</p> |  |
| 39 | R_{outTV} | <p>This pin is for output only the signal that is forwarded from R_{inTV}. The output resistance of this pin is 45Ω. This output can be muted in combination with L_{outTV} by bus control.</p> |  |
| 40 | L_{outTV} | <p>This pin is for output only the signal that is forwarded from L_{inTV}. The output resistance of this pin is 45Ω. This output can be muted in combination with R_{outTV} by bus control.</p> |  |

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| PIN NO. | NAME | FUNCTION | INTERFACE |
|---------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 41 | O5 | <p>This is a 1bit DAC output pin. This is an open-collector output. Make sure that the current flowing into this pin is 2.0mA or less.</p> |  <p>The diagram shows pin 41 connected to the collector of an NPN transistor. The emitter is grounded. The base is connected to a logic block. Two diodes are connected in series between the supply and the collector, with their cathodes facing the collector.</p> |
| 42 | V _{out2} | <p>This pin is for output a sub-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.</p> |  <p>The diagram shows pin 42 connected to the collector of an NPN transistor. The emitter is grounded. The base is connected to a box labeled 'Vout2 SW'. A 100Ω resistor is connected between the supply and the collector. A 2.0mA current source is connected between the supply and the collector. The collector is also connected to a 1.5KΩ resistor, which is connected to a terminal labeled '(Det Select)'. Two diodes are connected in series between the supply and the collector, with their cathodes facing the collector.</p> |

KIA1218AN

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) ; switeched 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 | L _{out} 2 R _{out} 2 | 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 | | | | | Input Select (Sub) | | | | |
| Read | Data 4 | B37 | B36 | B35 | B34 | B33 | B32 | B31 | B30 |
| | | ADC input discrimination | | | | | S input discrimination | | Power- on reset |
| I/O3 | I/O2 Hi | I/O2 Low | I/O2 Hi | I/O2 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).

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Main Video Select

| MODE | | OUTPUT SIGNAL | S INPUT DISCRIMINATION | | BUS DATA | | |
|-------|-----|-------------------------|------------------------|------|---------------------|---|---|
| INPUT | S/V | | CS1 | CS2 | INPUT SELECT (MAIN) | | |
| S1 | V | $V_{in}S1$ | Low | * | 0 | 0 | 0 |
| | S | $Y/V_{in}S1 + C_{in}S1$ | Open | | | | |
| | FV | $Y/V_{in}S1$ | | | | | 0 |
| S2 | V | $Y/V_{in}S2$ | * | Low | 0 | 1 | 0 |
| | S | $Y/V_{in}S2 + C_{in}S2$ | | Open | | | |
| | FV | $Y/V_{in}S2$ | | | | | 0 |
| 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.

Main L/R Select

| MODE | MAIN L/R OUTPUT SIGNAL | | BUS DATA | | | |
|-------|------------------------|------------|-----------------|---------------------|-----|-----|
| | | | FORCED TV VOICE | 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.

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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 | $Y/V_{in}S1$ | | S | 1 |
| | Y through | $Y/V_{in}S1$ | | | * |
| S2 | Y_{in} | Y_{in} | S2 | V or FV | 0 |
| | V through | $Y/V_{in}S2$ | | S | 1 |
| | Y through | $Y/V_{in}S2$ | | | * |
| 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 | $Y/V_{in}S1$ | | S | 1 |
| | C through | $C_{in}S1$ | | | * |
| S2 | C_{in} | C_{in} | S2 | V or FV | 0 |
| | V through | $Y/V_{in}S2$ | | S | 1 |
| | C through | $C_{in}S2$ | | | * |
| 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 |

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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 | |
| | V _{out} 2 | V _{out} 2 | | | | 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} 2 | ★ | | | | L _{out} 1 | 0 | 1 |
| | R _{out} 2 | ★ | | | | R _{out} 2 | 1 | 0 |
| | L _{out} 2 | ★ | | | | L _{out} 2 | 0 | 0 |

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

Sync detection sensitivity switching

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

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Audio mute

| MODE | | BUS DATA | | | |
|------------------------------------------|------|------------|-----|-----|-----|
| | | AUDIO MUTE | | | |
| OUTPUT | MUTE | B07 | B06 | B05 | B04 |
| L _{out1} | off | * | * | * | 0 |
| | on | | | | 1 |
| R _{out1} | off | * | * | 0 | * |
| | on | | | 1 | |
| L _{out2} R _{out2} | off | * | 0 | * | * |
| | on | | 1 | | |
| L _{outTV} R _{outTV} | off | 0 | * | * | * |
| | on | 1 | | | |

DAC output switching

| MODE | | BUS DATA | | | | |
|--------|-------|----------------------|-----|-----|-----|-----|
| | | DAC OUTPUT SWITCHING | | | | |
| OUTPUT | STATE | B27 | B26 | B25 | B24 | B23 |
| I/O1 | Open | * | * | * | * | 0 |
| | Low | | | | | 1 |
| I/O2 | Open | * | * | * | 0 | * |
| | Low | | | | 1 | |
| I/O3 | Open | * | * | 0 | * | * |
| | Low | | | 1 | | |
| O4 | Open | * | 0 | * | * | * |
| | Low | | 1 | | | |
| O5 | Open | 0 | * | * | * | * |
| | Low | 1 | | | | |

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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 _m S2 | High (Open) | * | 1 |
| | Low | | 0 |
| C _m S1 | High (Open) | 1 | * |
| | Low | 0 | |

ADC input discrimination

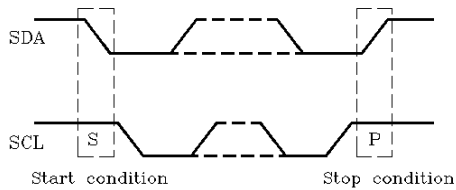
| MODE | | BUS DATA | | | | |
|-------|---------|--------------------------|-----|-----|-----|-----|
| | | ADC INPUT DISCRIMINATION | | | | |
| INPUT | VOLTAGE | B37 | B36 | B35 | B34 | B33 |
| I/O1 | High | * | * | * | 0 | 0 |
| | Mid | | | | 1 | 0 |
| | Low | | | | 0 | 1 |
| | Bottom | | | | 1 | 1 |
| I/O2 | High | * | 0 | 0 | * | * |
| | Mid | | 1 | 0 | | |
| | Low | | 0 | 1 | | |
| | Bottom | | 1 | 1 | | |
| I/O3 | High | 0 | * | * | * | * |
| | Low | 1 | | | | |

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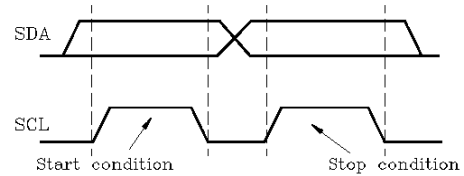
OUTLINE OF I²C BUS CONTROL FORMAT

The KIA1218AN's bus control format conforms to the philips I²C bus control format.

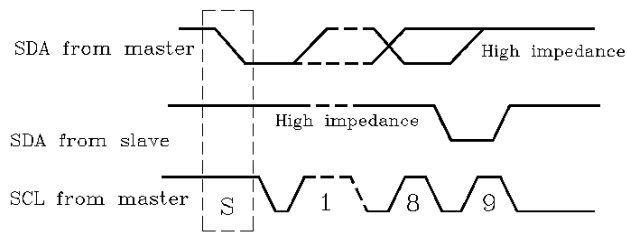
(1) Start and stop conditions



(2) Bit transfer



(3) Acknowledgement



Purchase of KEC 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.

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ELECTRICAL CHARACTERISTICS

(Referenced to $V_{CC}=9V$ at $T_a=25^{\circ}C$ unless otherwise specified)

Current Consumption

| PIN No. | PIN NAME | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT |
|---------|----------|----------|--------------|------|------|------|------|
| 33 | V_{CC} | I_{CC} | - | 30 | 47 | 64 | mA |

Pin Voltage

| PIN No. | PIN NAME | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT |
|---------|--------------|--------|--------------|------|------|------|------|
| 1 | L_{out2} | V1 | - | 3.7 | 4.0 | 4.3 | V |
| 2 | R_{out2} | V2 | - | 3.7 | 4.0 | 4.3 | V |
| 3 | Det in | V3 | - | 6.3 | 6.6 | 6.9 | V |
| 4 | Det Select | V4 | - | 3.4 | 3.7 | 4.0 | V |
| 5 | L_{inTV} | V5 | - | 5.0 | 5.2 | 5.4 | V |
| 6 | R_{inTV} | V6 | - | 5.0 | 5.2 | 5.4 | V |
| 7 | V_{inTV} | V7 | - | 5.0 | 5.2 | 5.4 | V |
| 8 | L_{inV1} | V8 | - | 5.0 | 5.2 | 5.4 | V |
| 9 | R_{inV1} | V9 | - | 5.0 | 5.2 | 5.4 | V |
| 10 | V_{inV1} | V10 | - | 5.0 | 5.2 | 5.4 | V |
| 11 | L_{inS1} | V11 | - | 5.0 | 5.2 | 5.4 | V |
| 12 | Y/V_{inS1} | V12 | - | 5.0 | 5.2 | 5.4 | V |
| 13 | R_{inS1} | V13 | - | 5.0 | 5.2 | 5.4 | V |
| 14 | C_{inS1} | V14 | - | 5.0 | 5.2 | 5.4 | V |
| 15 | L_{inS2} | V15 | - | 5.0 | 5.2 | 5.4 | V |
| 16 | Y/V_{inS2} | V16 | - | 5.0 | 5.2 | 5.4 | V |
| 17 | R_{inS2} | V17 | - | 5.0 | 5.2 | 5.4 | V |
| 18 | C_{inS2} | V18 | - | 5.0 | 5.2 | 5.4 | V |
| 23 | GND | V23 | - | - | 0 | - | V |
| 28 | V_{inV2} | V28 | - | 5.0 | 5.2 | 5.4 | V |
| 29 | L_{inV2} | V29 | - | 5.0 | 5.2 | 5.4 | V |
| 30 | Y_{in} | V30 | - | 5.0 | 5.2 | 5.4 | V |
| 31 | R_{inV2} | V31 | - | 5.0 | 5.2 | 5.4 | V |
| 32 | C_{in} | V32 | - | 5.0 | 5.2 | 5.4 | V |
| 33 | V_{CC} | V33 | - | - | 9.0 | - | V |
| 34 | C_{out} | V34 | - | 3.5 | 3.8 | 4.1 | V |
| 35 | R_{out1} | V35 | - | 3.7 | 4.0 | 4.3 | V |
| 36 | Y_{out} | V36 | - | 3.5 | 3.8 | 4.1 | V |
| 37 | L_{out1} | V37 | - | 3.7 | 4.0 | 4.3 | V |
| 38 | V_{out1} | V38 | - | 4.1 | 4.4 | 4.7 | V |
| 39 | R_{outTV} | V39 | - | 3.7 | 4.0 | 4.3 | V |
| 40 | L_{outTV} | V40 | - | 3.7 | 4.0 | 4.3 | V |
| 42 | V_{out2} | V42 | - | 4.1 | 4.4 | 4.7 | V |

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DC Characteristics

| CHARACTERISTIC | MEASURED PIN | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | REMARK |
|-------------------------------------|----------------------|--------|--------------|------|------|------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Pin Input Resistance | Det in | R3 | - | 10 | 18 | 30 | k Ω | 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. $R=0.5V/\Delta I$ [Ω] |
| | V _{in} TV | R7 | - | 20 | 30 | 40 | k Ω | |
| | V _{in} V1 | R10 | - | 20 | 30 | 40 | k Ω | |
| | V _{in} V2 | R28 | - | 20 | 30 | 40 | k Ω | |
| | Y/V _{in} S1 | R12 | - | 20 | 30 | 40 | k Ω | |
| | Y/V _{in} S2 | R16 | - | 20 | 30 | 40 | k Ω | |
| | C _{in} S1 | R14 | - | 20 | 30 | 40 | k Ω | |
| | C _{in} S2 | R18 | - | 20 | 30 | 40 | k Ω | |
| | Y _{in} | R30 | - | 40 | 60 | 80 | k Ω | |
| | C _{in} | R32 | - | 40 | 60 | 80 | k Ω | |
| | L _{in} TV | R5 | - | 49 | 70 | 100 | k Ω | |
| | R _{in} TV | R6 | - | 49 | 70 | 100 | k Ω | |
| | L _{in} V1 | R8 | - | 49 | 70 | 100 | k Ω | |
| | R _{in} V1 | R9 | - | 49 | 70 | 100 | k Ω | |
| | L _{in} V2 | R29 | - | 49 | 70 | 100 | k Ω | |
| | R _{in} V2 | R31 | - | 49 | 70 | 100 | k Ω | |
| | L _{in} S1 | R11 | - | 49 | 70 | 100 | k Ω | |
| | R _{in} S1 | R13 | - | 49 | 70 | 100 | k Ω | |
| L _{in} S2 | R15 | - | 49 | 70 | 100 | k Ω | | |
| R _{in} S2 | R17 | - | 49 | 70 | 100 | k Ω | | |
| Output Pin Output Resistance | Det Select | R4 | - | 17 | 35 | 53 | Ω | Measure a voltage change ΔV on each pin when a current of 100 μ A flows into the pin. Then calculate the output resistance value R. $R= \Delta V/100\mu A$ [Ω] |
| | V _{out} 1 | R38 | - | 13 | 25 | 50 | Ω | |
| | V _{out} 2 | R42 | - | 13 | 25 | 50 | Ω | |
| | Y _{out} | R36 | - | 13 | 25 | 50 | Ω | |
| | C _{out} | R34 | - | 13 | 25 | 50 | Ω | |
| | L _{out} TV | R40 | - | 20 | 45 | 90 | Ω | |
| | R _{out} TV | R39 | - | 20 | 45 | 90 | Ω | |
| | L _{out} 1 | R37 | - | 20 | 45 | 90 | Ω | |
| | R _{out} 1 | R35 | - | 20 | 45 | 90 | Ω | |
| | L _{out} 2 | R1 | - | 20 | 45 | 90 | Ω | |
| R _{out} 2 | R2 | - | 20 | 45 | 90 | Ω | | |
| S Mode Discrimination Voltage | C _{in} S1 | VthC1 | - | 1.75 | 2.25 | 2.75 | V | Voltage on pin 14 at Which data B31 changes. |
| | C _{in} S2 | VthC2 | - | 1.75 | 2.25 | 2.75 | V | Voltage on pin 18 at Which data B32 changes. |
| External Mute ON Voltage | C _{in} | VthM | - | 1.75 | 2.25 | 2.75 | V | Voltage on pin 32 at Which voice is muted. |

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| CHARACTERISTIC | MEASURED PIN | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | REMARK |
|----------------------------------|--------------|--------|--------------|------|------|------|------|-------------------------------------------------------|
| Address Switching Voltage | address | VthA | - | 1.75 | 2.25 | 2.75 | V | Voltage on pin 27 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 19). |
| | I/O1 | VthI1M | - | 2.5 | 3.0 | 3.5 | V | Mid-Low threshold level of I/O1 input (pin 19). |
| | I/O1 | VthI1H | - | 7.5 | 8.0 | 8.5 | V | High-Mid threshold level of I/O1 input (pin 19). |
| | I/O2 | VthI2L | - | 0.55 | 0.75 | 0.95 | V | Low-Bottom threshold level of I/O2 input (pin 20). |
| | I/O2 | VthI2M | - | 2.5 | 3.0 | 3.5 | V | Mid-Low threshold level of I/O2 input (pin 20). |
| | I/O2 | VthI2H | - | 7.5 | 8.0 | 8.5 | V | High-Mid threshold level of I/O1 input (pin 20). |
| | I/O3 | VthI3 | - | 1.75 | 2.25 | 2.75 | V | High-Low threshold level of I/O1 input (pin 21). |

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AC Characteristics

| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|------------------------------------------|----------------------|---------|--------------|------|------|------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V _{out1} Input Dynamic Range | V _{in} TV | VDR7V1 | - | 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 38 begins to be distorted. |
| | V _{in} V1 | VDR10V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | V _{in} V2 | VDR28V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S1 | VDR12V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S1 | VDR14V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S2 | VDR16V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S2 | VDR18V1 | - | 1.5 | 2.0 | - | V _{P-P} | |
| V _{out1} Gain | V _{in} TV | G7V1 | - | 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 | G10V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| | V _{in} V2 | G28V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V _{in} S1 | G12V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| | C _{in} S1 | G14V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V _{in} S2 | G16V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| | C _{in} S2 | G18V1 | - | 5.5 | 6.0 | 6.5 | dB | |
| V _{out1} Frequency Response | V _{in} TV | F7V1 | - | 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 38 is 3dB down from the 15kHz applied level. |
| | V _{in} V1 | F10V1 | - | 10 | - | - | MHz | |
| | V _{in} V2 | F28V1 | - | 10 | - | - | MHz | |
| | Y/V _{in} S1 | F12V1 | - | 10 | - | - | MHz | |
| | C _{in} S1 | F14V1 | - | 10 | - | - | MHz | |
| | Y/V _{in} S2 | F16V1 | - | 10 | - | - | MHz | |
| | C _{in} S2 | F18V1 | - | 10 | - | - | MHz | |
| V _{out1} Crosstalk | V _{in} TV | CT7V1 | - | 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 | CT10V1 | - | 55 | 60 | - | dB | |
| | V _{in} V2 | CT28V1 | - | 55 | 60 | - | dB | |
| | Y/V _{in} S1 | CT12V1 | - | 55 | 60 | - | dB | |
| | C _{in} S1 | CT14V1 | - | 55 | 60 | - | dB | |
| | Y/V _{in} S2 | CT16V1 | - | 55 | 60 | - | dB | |
| | C _{in} S2 | CT18V1 | - | 55 | 60 | - | dB | |
| V _{out2} Input Dynamic Range | V _{in} TV | VDR7V2 | - | 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 42 begins to be distorted. |
| | V _{in} V1 | VDR10V2 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | V _{in} V2 | VDR28V2 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S1 | VDR12V2 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S1 | VDR14V2 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S2 | VDR16V2 | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S2 | VDR18V2 | - | 1.5 | 2.0 | - | V _{P-P} | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|-------------------------------|--------------|--------|--------------|------|------|------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V_{out2} Gain | V_{inTV} | G7V2 | - | 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_{inV1} | G10V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| | V_{inV2} | G28V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V_{inS1} | G12V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| | C_{inS1} | G14V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V_{inS2} | G16V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| | C_{inS2} | G18V2 | - | 5.5 | 6.0 | 6.5 | dB | |
| V_{out2} Frequency Response | V_{inTV} | F7V2 | - | 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 42 is 3dB down from the 15kHz applied level. |
| | V_{inV1} | F10V2 | - | 10 | - | - | MHz | |
| | V_{inV2} | F28V2 | - | 10 | - | - | MHz | |
| | Y/V_{inS1} | F12V2 | - | 10 | - | - | MHz | |
| | C_{inS1} | F14V2 | - | 10 | - | - | MHz | |
| | Y/V_{inS2} | F16V2 | - | 10 | - | - | MHz | |
| | C_{inS2} | F18V2 | - | 10 | - | - | MHz | |
| V_{out2} Crosstalk | V_{inTV} | CT7V2 | - | 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_{inV1} | CT10V2 | - | 55 | 60 | - | dB | |
| | V_{inV2} | CT28V2 | - | 55 | 60 | - | dB | |
| | Y/V_{inS1} | CT12V2 | - | 55 | 60 | - | dB | |
| | C_{inS1} | CT14V2 | - | 55 | 60 | - | dB | |
| | Y/V_{inS2} | CT16V2 | - | 55 | 60 | - | dB | |
| | C_{inS2} | CT18V2 | - | 55 | 60 | - | dB | |
| Y_{out} Input Dynamic Range | V_{inTV} | VDR7Y | - | 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 36 begins to be distorted. |
| | V_{inV1} | VDR10Y | - | 1.5 | 2.0 | - | V _{P-P} | |
| | V_{inV2} | VDR28Y | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V_{inS1} | VDR12Y | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V_{inS2} | VDR16Y | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y_{in} | VDR30Y | - | 5.0 | 5.5 | - | V _{P-P} | |
| Y_{out} Gain | V_{inTV} | G7Y | - | 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_{inV1} | G10Y | - | 5.5 | 6.0 | 6.5 | dB | |
| | V_{inV2} | G28Y | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V_{inS1} | G12Y | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V_{inS2} | G16Y | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y_{in} | G30Y | - | -0.5 | 0 | 0.5 | dB | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|--------------------------------------------|----------------------|--------|--------------|------|------|------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y _{out} Frequency Response | V _{in} TV | F7Y | - | 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 36 is 3dB down from the 15kHz applied level. |
| | V _{in} V1 | F10Y | - | 10 | - | - | MHz | |
| | V _{in} V2 | F28Y | - | 10 | - | - | MHz | |
| | Y/V _{in} S1 | F12Y | - | 10 | - | - | MHz | |
| | Y/V _{in} S2 | F16Y | - | 10 | - | - | MHz | |
| | Y _{in} | F30Y | - | 10 | - | - | MHz | |
| Y _{out} Crosstalk | V _{in} TV | CT7Y | - | 55 | 60 | - | dB | (1) Apply a 3.58MHz 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 | CT10Y | - | 55 | 60 | - | dB | |
| | V _{in} V2 | CT28Y | - | 55 | 60 | - | dB | |
| | Y/V _{in} S1 | CT12Y | - | 55 | 60 | - | dB | |
| | Y/V _{in} S2 | CT16Y | - | 55 | 60 | - | dB | |
| | Y _{in} | CT30Y | - | 55 | 60 | - | dB | |
| C _{out} Input Dynamic Range | V _{in} TV | VDR7C | - | 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 | VDR10C | - | 1.5 | 2.0 | - | V _{P-P} | |
| | V _{in} V2 | VDR28C | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S1 | VDR12C | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S1 | VDR14C | - | 1.5 | 2.0 | - | V _{P-P} | |
| | Y/V _{in} S2 | VDR16C | - | 1.5 | 2.0 | - | V _{P-P} | |
| | C _{in} S2 | VDR18C | - | 1.5 | 2.0 | - | V _{P-P} | |
| C _{in} | VDR32C | - | 5.0 | 5.5 | - | V _{P-P} | | |
| C _{out} Gain | V _{in} TV | G7C2 | - | 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 | G10C | - | 5.5 | 6.0 | 6.5 | dB | |
| | V _{in} V2 | G28C | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V _{in} S1 | G12C | - | 5.5 | 6.0 | 6.5 | dB | |
| | C _{in} S1 | G14C | - | 5.5 | 6.0 | 6.5 | dB | |
| | Y/V _{in} S2 | G16C | - | 5.5 | 6.0 | 6.5 | dB | |
| | C _{in} S2 | G18C | - | 5.5 | 6.0 | 6.5 | dB | |
| | C _{in} | G32C | - | -0.5 | 0 | 0.5 | dB | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|-------------------------------------------|----------------------|--------|--------------|------|------|------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y _{out} Frequency Response | V _{in} TV | F7Y | - | 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 | F10Y | - | 10 | - | - | MHz | |
| | V _{in} V2 | F28Y | - | 10 | - | - | MHz | |
| | Y/V _{in} S1 | F12Y | - | 10 | - | - | MHz | |
| | C _{in} S1 | F14Y | - | 10 | - | - | MHz | |
| | Y/V _{in} S2 | F16Y | - | 10 | - | - | MHz | |
| | C _{in} S2 | F18Y | - | 10 | - | - | MHz | |
| | C _{in} | F32Y | - | 10 | - | - | MHz | |
| C _{out} Crosstalk | V _{in} TV | CT7C | - | 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 | CT10C | - | 55 | 60 | - | dB | |
| | V _{in} V2 | CT28C | - | 55 | 60 | - | dB | |
| | Y/V _{in} S1 | CT12C | - | 55 | 60 | - | dB | |
| | C _{in} S1 | CT14C | - | 55 | 60 | - | dB | |
| | Y/V _{in} S2 | CT16C | - | 55 | 60 | - | dB | |
| | C _{in} S2 | CT18C | - | 55 | 60 | - | dB | |
| | C _{in} | CT32C | - | 55 | 60 | - | dB | |
| Det Select Input Dynamic Range | V _{in} TV | VDR7D | - | 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 4 begins to be distorted. |
| | V _{in} V1 | VDR10D | - | 5.0 | 5.5 | - | V | |
| | V _{in} V2 | VDR28D | - | 5.0 | 5.5 | - | V | |
| | Y/V _{in} S1 | VDR12D | - | 5.0 | 5.5 | - | V | |
| | V _{out} 1 | VDR38D | - | 1.5 | 2.0 | - | V | |
| | V _{out} 2 | VDR42D | - | 1.5 | 2.0 | - | V | |
| | Y _{out} | VDR36D | - | 1.2 | 1.8 | - | V | |
| | C _{out} | VDR34D | - | 1.2 | 1.8 | - | V | |
| Det Select Gain | V _{in} TV | G7D | - | -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 | G10D | - | -0.5 | 0 | 0.5 | dB | |
| | V _{in} V2 | G28D | - | -0.5 | 0 | 0.5 | dB | |
| | Y/V _{in} S1 | G12D | - | -0.5 | 0 | 0.5 | dB | |
| | V _{out} 1 | G38D | - | -0.1 | 0 | 0.1 | dB | |
| | V _{out} 2 | G42D | - | -0.1 | 0 | 0.1 | dB | |
| | Y _{out} | G36D | - | -0.1 | 0 | 0.1 | dB | |
| | C _{out} | G34D | - | -0.1 | 0 | 0.1 | dB | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|------------------------------------------|--------------------|---------|--------------|------|------|------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R _{out1} Input Dynamic Range | R _{in} TV | VDR6R1 | - | 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 35 begins to be distorted. |
| | R _{in} V1 | VDR8R1 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} V2 | VDR31R1 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} S1 | VDR13R1 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} S2 | VDR17R1 | - | 6.0 | 6.5 | - | V _{P-P} | |
| R _{out1} Gain | R _{in} TV | G6R1 | - | -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 | G9R1 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} V2 | G31R1 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} S1 | G13R1 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} S2 | G17R1 | - | -0.5 | 0 | 0.5 | dB | |
| R _{out1} Frequency Response | R _{in} TV | F6R1 | - | 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 35 is 3dB down from the 1kHz applied level. |
| | R _{in} V1 | F9R1 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} V2 | F31R1 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} S1 | F13R1 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} S2 | F17R1 | - | 0.1 | 2.0 | - | MHz | |
| R _{out1} Crosstalk | R _{in} TV | CT6R1 | - | 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 | CT9R1 | - | 70 | 100 | - | dB | |
| | R _{in} V2 | CT31R1 | - | 70 | 100 | - | dB | |
| | R _{in} S1 | CT13R1 | - | 70 | 100 | - | dB | |
| | R _{in} S2 | CT17R1 | - | 70 | 100 | - | dB | |
| R _{out1} Mute Attenuation | R _{in} TV | M6R1 | - | 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 37 when mute is turned on and turned off to find mute attenuation. |
| | R _{in} V1 | M9R1 | - | 70 | 100 | - | dB | |
| | R _{in} V2 | M31R1 | - | 70 | 100 | - | dB | |
| | R _{in} S1 | M13R1 | - | 70 | 100 | - | dB | |
| | R _{in} S2 | M17R1 | - | 70 | 100 | - | dB | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|-----------------------------------|-------------|---------|--------------|------|------|------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L_{out2} Input Dynamic Range | $L_{in}TV$ | VDR5L2 | - | 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 35 begins to be distorted. |
| | $L_{in}V1$ | VDR8L2 | - | 6.0 | 6.5 | - | V_{P-P} | |
| | $L_{in}V2$ | VDR29L2 | - | 6.0 | 6.5 | - | V_{P-P} | |
| | $L_{in}S1$ | VDR11L2 | - | 6.0 | 6.5 | - | V_{P-P} | |
| | $L_{in}S2$ | VDR15L2 | - | 6.0 | 6.5 | - | V_{P-P} | |
| L_{out1} Gain | $L_{in}TV$ | G5L2 | - | -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. |
| | $L_{in}V1$ | G8L2 | - | -0.5 | 0 | 0.5 | dB | |
| | $L_{in}V2$ | G29L2 | - | -0.5 | 0 | 0.5 | dB | |
| | $L_{in}S1$ | G11L2 | - | -0.5 | 0 | 0.5 | dB | |
| | $L_{in}S2$ | G15L2 | - | -0.5 | 0 | 0.5 | dB | |
| L_{out2} Frequency Response | $L_{in}TV$ | F5L2 | - | 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 35 is 3dB down from the 1kHz applied level. |
| | $L_{in}V1$ | F8L2 | - | 0.1 | 2.0 | - | MHz | |
| | $L_{in}V2$ | F29L2 | - | 0.1 | 2.0 | - | MHz | |
| | $L_{in}S1$ | F11L2 | - | 0.1 | 2.0 | - | MHz | |
| | $L_{in}S2$ | F15L2 | - | 0.1 | 2.0 | - | MHz | |
| L_{out2} Crosstalk | $L_{in}TV$ | CT5L2 | - | 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. |
| | $L_{in}V1$ | CT8L2 | - | 70 | 100 | - | dB | |
| | $L_{in}V2$ | CT29L2 | - | 70 | 100 | - | dB | |
| | $L_{in}S1$ | CT11L2 | - | 70 | 100 | - | dB | |
| | $L_{in}S2$ | CT15L2 | - | 70 | 100 | - | dB | |
| L_{out2} Mute Attenuation | $L_{in}TV$ | M5L2 | - | 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 1 when mute is turned on and turned off to find mute attenuation. |
| | $L_{in}V1$ | M8L2 | - | 70 | 100 | - | dB | |
| | $L_{in}V2$ | M29L2 | - | 70 | 100 | - | dB | |
| | $L_{in}S1$ | M11L2 | - | 70 | 100 | - | dB | |
| | $L_{in}S2$ | M15L2 | - | 70 | 100 | - | dB | |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|--------------------------------------------|--------------------|---------|--------------|------|------|------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R _{out2} Input Dynamic Range | R _{in} TV | VDR6R2 | - | 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 2 begins to be distorted. |
| | R _{in} V1 | VDR9R2 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} V2 | VDR31R2 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} S1 | VDR13R2 | - | 6.0 | 6.5 | - | V _{P-P} | |
| | R _{in} S2 | VDR17R2 | - | 6.0 | 6.5 | - | V _{P-P} | |
| R _{out2} Gain | R _{in} TV | G6R2 | - | -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 | G9R2 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} V2 | G31R2 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} S1 | G13R2 | - | -0.5 | 0 | 0.5 | dB | |
| | R _{in} S2 | G17R2 | - | -0.5 | 0 | 0.5 | dB | |
| R _{out2} Frequency Response | R _{in} TV | F6R2 | - | 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 2 is 3dB down from the 1kHz applied level. |
| | R _{in} V1 | F9R2 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} V2 | F31R2 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} S1 | F13R2 | - | 0.1 | 2.0 | - | MHz | |
| | R _{in} S2 | F17R2 | - | 0.1 | 2.0 | - | MHz | |
| R _{out2} Crosstalk | R _{in} TV | CT6R2 | - | 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 in with leakage components from nonselected pins to find a crosstalk. |
| | R _{in} V1 | CT9R2 | - | 70 | 100 | - | dB | |
| | R _{in} V2 | CT31R2 | - | 70 | 100 | - | dB | |
| | R _{in} S1 | CT13R2 | - | 70 | 100 | - | dB | |
| | R _{in} S2 | CT17R2 | - | 70 | 100 | - | dB | |
| R _{out2} Mute Attenuation | R _{in} TV | M6R2 | - | 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 amplitudes on pin 2 when mute is turned on and turned off to find mute attenuation. |
| | R _{in} V1 | M9R2 | - | 70 | 100 | - | dB | |
| | R _{in} V2 | M31R2 | - | 70 | 100 | - | dB | |
| | R _{in} S1 | M13R2 | - | 70 | 100 | - | dB | |
| | R _{in} S2 | M17R2 | - | 70 | 100 | - | dB | |
| L _{out} TV Input Dynamic Range | L _{in} TV | VDR5LTV | - | 6.0 | 6.5 | - | V _{P-P} | While applying a 1kHz sine wave to pin 5, measure an input amplitude at which the output waveform on pin 40 begins to be distorted. |

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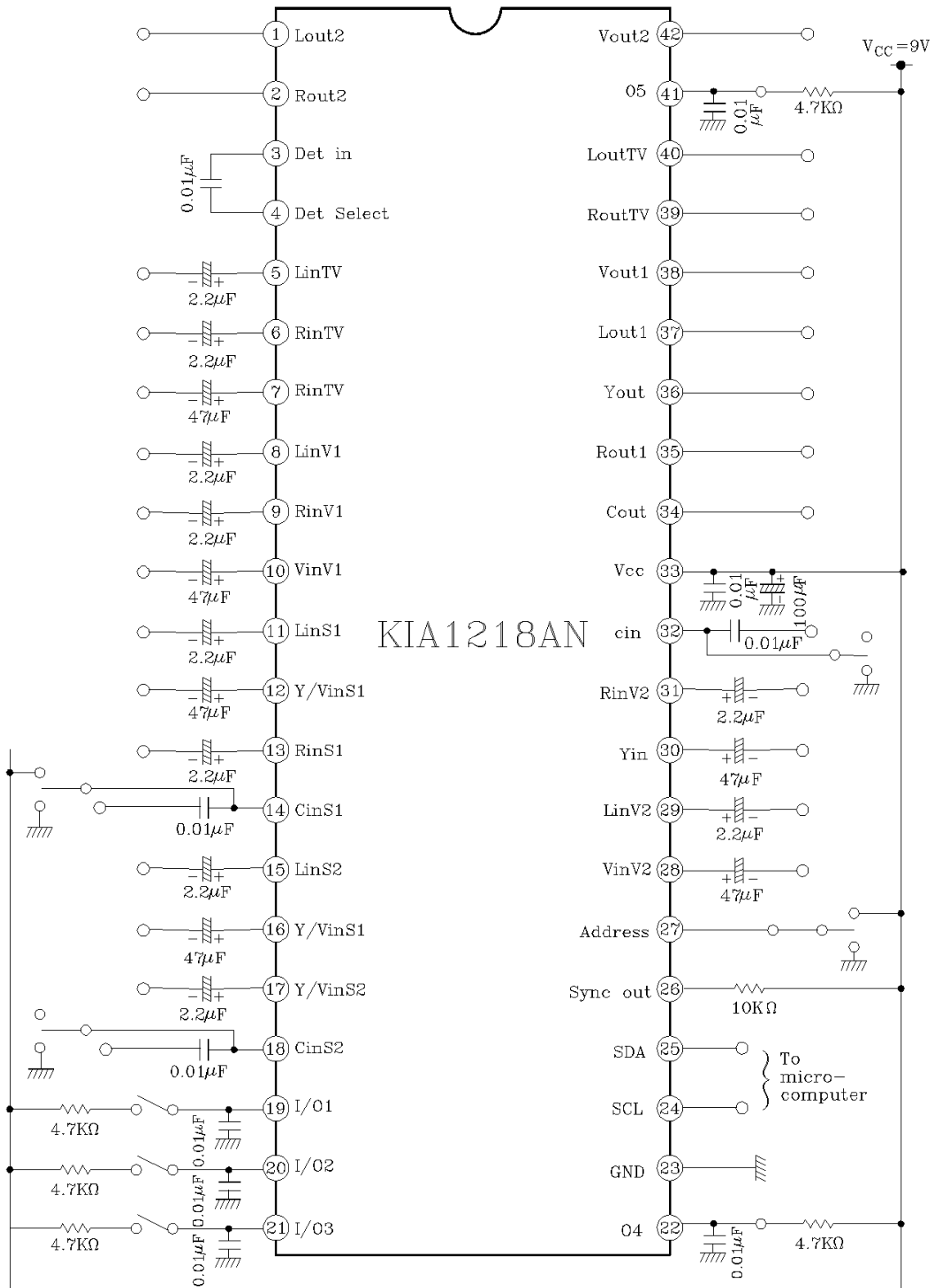
| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|---------------------------------|-------------|---------|--------------|------|------|------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L_{outTV} Gain | L_{inTV} | G5LTV | - | -0.5 | 0 | 0.5 | V _{P-P} | While applying a 1kHz 1.0V _{P-P} sine wave to pin 5, find the gain between pins 5 and 40. |
| L_{outTV} Frequency Response | L_{inTV} | F5LTV | - | 0.1 | 2.0 | - | MHz | While applying a 1.0V _{P-P} sine wave to pin 5, measure a frequency at which the output waveform on pin 40 is 3dB down from the 1kHz applied level. |
| L_{outTV} Crosstalk | L_{inTV} | CT5LTV | - | 70 | 100 | - | dB | (1) Apply a 1kHz, 1.0V _{P-P} sine wave to each input pin. (2) Compare the output amplitudes when L_{inTV} is selected with leakage components from nonselected pins to find a crosstalk. |
| | L_{inV1} | CT8LTV | - | 70 | 100 | - | dB | |
| | L_{inV2} | CT29LTV | - | 70 | 100 | - | dB | |
| | L_{inS1} | CT11LTV | - | 70 | 100 | - | dB | |
| | L_{inS2} | CT15LTV | - | 70 | 100 | - | dB | |
| L_{outTV} Mute Attenuation | L_{inTV} | M5LTV | - | 70 | 100 | - | dB | While applying a 1kHz sine 1.0V _{P-P} sine wave to pin 5, compare the output amplitudes on pin 40 when mute is turned on an turned off to find mute attenuation. |
| R_{outTV} Input Dynamic Range | R_{inTV} | VDR6RTV | - | 6.0 | 6.5 | - | V _{P-P} | While applying a 1kHz sine wave to pin 6, measure an input amplitude at which the output waveform on pin 39 begins to be distorted. |
| R_{outTV} Gain | R_{inTV} | G6RTV | - | -0.5 | 0 | 0.5 | dB | While applying a 1kHz 1.0V _{P-P} sine wave to pin 6, find the gain between pins 6 and 39. |
| R_{outTV} Frequency Response | R_{inTV} | F6RTV | - | 0.1 | 2.0 | - | MHz | While applying a 1.0V _{P-P} sine wave to pin 6, measure a frequency at which the output waveform on pin 39 is 3dB down from the 1kHz applied level. |

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| CHARACTERISTIC | SELECT MODE | SYMBOL | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT | TEST METHOD |
|--------------------------------------------|--------------------|---------|--------------|------|------|------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R _{out} TV Crosstalk | R _{in} TV | CT6RTV | - | 70 | 100 | - | dB | (1) Apply a 1kHz, 1.0V _{P-P} sine wave to each input pin. (2) Compare the output amplitudes when R _{in} TV is selected with leakage components from nonselected pins to find a crosstalk. |
| | R _{in} V1 | CT9RTV | - | 70 | 100 | - | dB | |
| | R _{in} V2 | CT31RTV | - | 70 | 100 | - | dB | |
| | R _{in} S1 | CT13RTV | - | 70 | 100 | - | dB | |
| | R _{in} S2 | CT17RTV | - | 70 | 100 | - | dB | |
| R _{out} TV Mute Attenuation | R _{in} TV | M6RTV | - | 70 | 100 | - | dB | While applying a 1kHz, 1.0V _{P-P} sine wave to pin 6, compare the output amplitudes on pin 39 when mute is turned on and turned off to find mute attenuation |

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APPLICATION CIRCUIT



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