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LA73076V

Monolithic Linear IC

Video Driver for DVC/DSC, Cell Phone

Overview

The LA73076V is a low voltage drive (2.7V to 3.6V) video driver developed for portable appliances including digital video cameras, digital still cameras and cell phones. It incorporates a minus-voltage generator that allows the LA73076V to generate its output with the pedestal voltage set to 0V, so that no output coupling capacitor is required. This enables substantial reduction in mounting space without concerned about V-sag.

Features

- Output coupling capacity not required
- Low-voltage drive ($V_{CC} = 2.7V$ to $3.6V$)
- No V-sag
- Sextic LPF incorporated ($f_c = 10MHz$)
- 6dB amplifier
- Current drain of $0\mu A$ in the standby mode
- Output drive capable of covering maximum 75Ω output, one channel

Specifications

Maximum Ratings at $T_a = 25^\circ C$

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|---------------|---|-------------|------------|
| Maximum supply voltage | $V_{CC\ max}$ | | 4.0 | V |
| Allowable power dissipation | $P_d\ max$ | $T_a \leq 80^\circ C$, *Mounted on a specified board | 220 | mW |
| Operating temperature | T_{opr} | | -20 to +80 | $^\circ C$ |
| Storage temperature | T_{stg} | | -55 to +150 | $^\circ C$ |

*: Mounted on a specified board: 114.3mm×76.1mm×1.6mm, glass epoxy

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LA73076V

Recommended Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|--------------------------------------|-----------------------|------------|------------|------|
| Recommended Operating supply voltage | V _{CC} STD | | 3.1 | V |
| Operating supply voltage range | V _{CC} RANGE | | 2.7 to 3.6 | V |

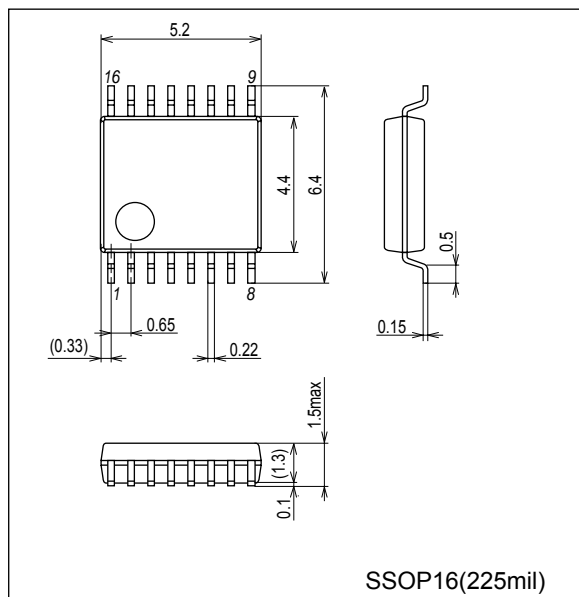
Electrical Characteristics at Ta = 25°C, V_{CC} = 3.1V

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|-------------------------|---|----------------------|-----|-----------------|-------|
| | | | min | typ | max | |
| Current dissipation part | | | | | | |
| Current dissipation 1 (Non-signal active mode) | I _{CC} | 2pin = Low, Input = White50% | 25 | 37 | 44 | mA |
| Current dissipation 2 (Non-signal active mode) | I _{CC} 2 | 2pin = Low, Input = No signal | 10.0 | 14 | 17.5 | mA |
| Current dissipation 3 (Standby mode) | I _{CC} -STBY | 2pin = High | | 0 | 5.0 | μA |
| Control terminal part | | | | | | |
| Stand-by control pin H voltage (SET = STANDBY MODE) | V _{TH} -STBY-H | 2 pin voltage range at which I _{CC} ≤ 5μA | V _{CC} -0.5 | | V _{CC} | V |
| Stand-by control pin L voltage (SET = ACTIVE MODE) | V _{TH} -STBY-L | 2 pin voltage range at which I _{CC} ≥ 5μA | GND | | 0.5 | V |
| Output control pin H voltage range (SET=MIX_OUT) | V _{OUT} _M | Voltage in which only output of MIX is selected | 2.2 | | V _{CC} | V |
| Output control pin M voltage range (SET=Y,C_OUT) | V _{OUT} _YC | Voltage in which output of Y and C is selected | 1.5 | | 1.7 | V |
| Output control pin L voltage range (SET=ALL_OUT) | V _{OUT} _ALL | Voltage in which all outputs are selected | GND | | 0.5 | V |
| SW, MUTE control pin voltage range (SET=MUTE MODE) | V _{SW} _MUTE | As for this voltage, SW selects MUTE | V _{CC} -0.5 | | V _{CC} | V |
| SW, through control pin voltage range (SET=through MODE) | V _{SW} _THR | As for this voltage, SW selects through | GND | | 0.5 | V |
| Y-in | | | | | | |
| Voltage gain | V _{Gain} Y | 100% white V _{YIN} = 1Vp-p | 5.7 | 6.2 | 6.7 | dB |
| Freq. characteristics | V _{f7.2} Y | f = 100kHz/7.2MHz | -1.0 | 0 | +1.0 | dB |
| | V _{f20} Y | f = 100kHz/20MHz | | | -30 | dB |
| Allowable sync input level | V _{IN} -Sync | V _{YIN} = Black burst, Output R conditions Mix_out: 150Ω, Y_out: 150Ω | 200 | | | mVp-p |
| C-in | | | | | | |
| Voltage gain | V _{gain} c | V _{CIN} = 350mVp-p | 5.7 | 6.2 | 6.7 | dB |
| Freq. characteristics | V _{f20} C | f = 4MHz/20MHz | | | -25 | dB |

Package Dimensions

unit : mm (typ)

3178B

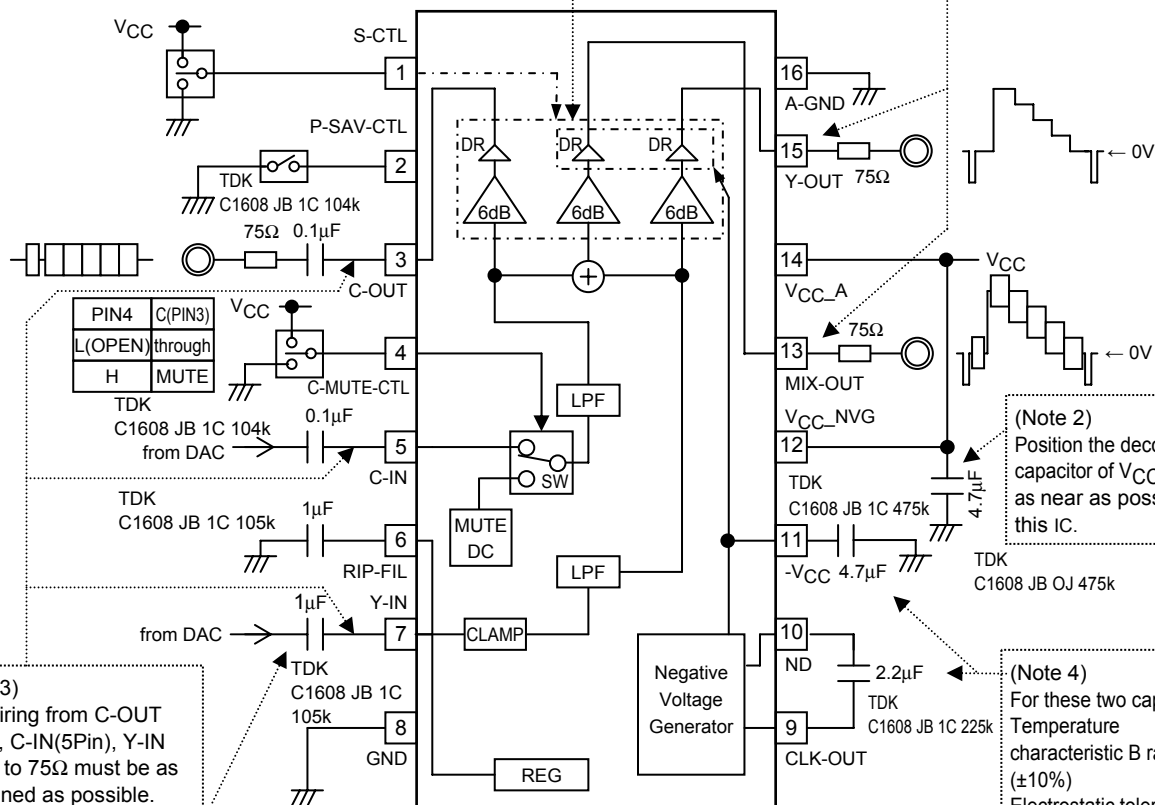


Pin Assignment, Pin Function Diagram and Block Diagram

| Control | | OUT | | |
|---------|---------|-----|---|---|
| PIN2 | PIN1 | MIX | Y | C |
| L | L(GND) | ○ | ○ | ○ |
| | M(OPEN) | × | ○ | ○ |
| | H | ○ | × | × |
| H(OPEN) | * | × | × | × |

☆ Active
(Input signal)
Signal → ON
No signal → OFF
☆ Standby → OFF

(Note 1)
The wiring from MIX-OUT(13Pin),
Y_OUT(Pin15) to 75Ω must be as
shortened as possible.



(Note 3)
The wiring from C-OUT
(3Pin), C-IN(5Pin), Y-IN
(7Pin) to 75Ω must be as
shortened as possible.

(Note 5)
Use the input capacity value within a range of
0.1μF to 1μF while checking the sag
condition of the output waveform.

(Note 2)
Position the decoupling
capacitor of V_{CC}-GND
as near as possible to
this IC.

(Note 4)
For these two capacitors;
Temperature
characteristic B rank
(±10%)
Electrostatic tolerance
K rank(±10%)
and Withstand voltage
of 6.3V or more are
recommended.

(Note 6)

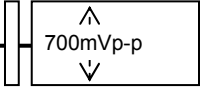
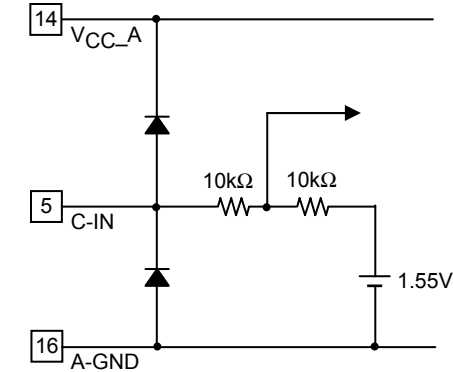
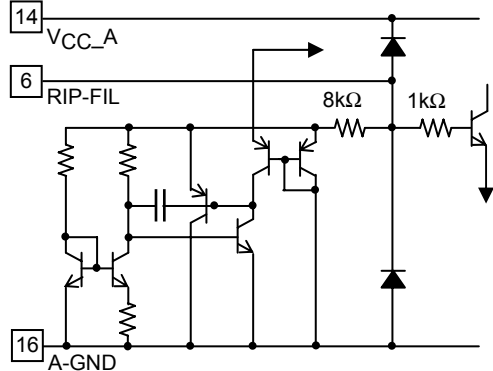
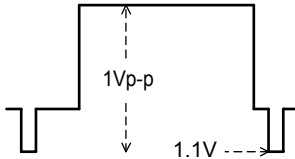
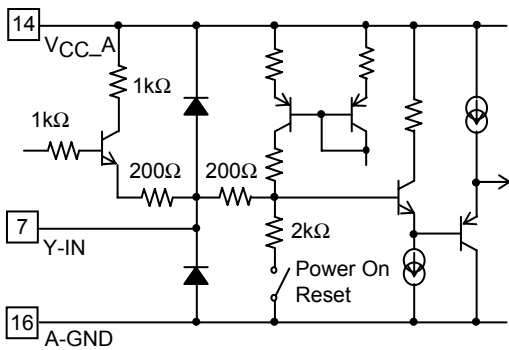
As the minus power supply in this IC generates the clock for charge pump power supply by extracting the sink component of the input video signal (synchronous isolation) and by detecting its fall, the portion around the V-synchronization of this IC output may be reduced when the pseudo V signal without cut-in pulse is inserted as in the case of certain analog VCR special play (search). On the contrary, there is no problem when the pseudo V signal has the cut-in pulse. Pay due attention on this fact during use.

Pin Functions

| Pin No | Symbol | Voltage | Description | Equivalent Circuit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|-------------------------------|-------------------------------|--|--------------------|---|--|------|--|--|--|--|--------|--------------------|---|---------|---------------------|-------------------------------|---|--------------|---|---|---------|-------------------|---|---|---|---|---------------------|-------------------------|---|---|---|---|--|
| 1 | S-CTL | V _{CC} or OPEN or 0V | Output select pin <table><tr><th colspan="2">Control of Pin1</th><th></th><th colspan="3">OUT</th></tr><tr><th></th><th></th><th></th><th>MIX</th><th>Y</th><th>C</th></tr><tr><td>L(GND)</td><td>0V to 0.5V</td><td>⇒</td><td>○</td><td>○</td><td>○</td></tr><tr><td>M(OPEN)</td><td>OPEN or 1.6V±0.1V</td><td>⇒</td><td>×</td><td>○</td><td>○</td></tr><tr><td>H(V_{CC})</td><td>2.2V to V_{CC}</td><td>⇒</td><td>○</td><td>×</td><td>×</td></tr></table> | Control of Pin1 | | | OUT | | | | | | MIX | Y | C | L(GND) | 0V to 0.5V | ⇒ | ○ | ○ | ○ | M(OPEN) | OPEN or 1.6V±0.1V | ⇒ | × | ○ | ○ | H(V _{CC}) | 2.2V to V _{CC} | ⇒ | ○ | × | × | |
| Control of Pin1 | | | OUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | MIX | Y | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L(GND) | 0V to 0.5V | ⇒ | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M(OPEN) | OPEN or 1.6V±0.1V | ⇒ | × | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(V _{CC}) | 2.2V to V _{CC} | ⇒ | ○ | × | × | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | P-SAV-CTL | V _{CC} or 0V | Power save mode select pin <table><tr><th colspan="2">Control of Pin2</th><th></th><th>Mode</th></tr><tr><th></th><th></th><th></th><th></th></tr><tr><td>L(GND)</td><td>0V to 0.5V</td><td>⇒</td><td>Active</td></tr><tr><td>H(V_{CC})</td><td>OPEN or V_{CC}±0.5V</td><td>⇒</td><td>Standby</td></tr></table> | Control of Pin2 | | | Mode | | | | | L(GND) | 0V to 0.5V | ⇒ | Active | H(V _{CC}) | OPEN or V _{CC} ±0.5V | ⇒ | Standby | | | | | | | | | | | | | | | |
| Control of Pin2 | | | Mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L(GND) | 0V to 0.5V | ⇒ | Active | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(V _{CC}) | OPEN or V _{CC} ±0.5V | ⇒ | Standby | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | C-OUT | 1.55V | Video output terminal (Push-pull output low-impedance) 1.55V -> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | C-MUTE-CTL | V _{CC} or 0V | Mute select pin <table><tr><th colspan="2">Control of Pin</th><th></th><th>OUT</th></tr><tr><th></th><th></th><th></th><th></th></tr><tr><td>L(GND)</td><td>0V to 0.5V or OPEN</td><td>⇒</td><td>through</td></tr><tr><td>H(V_{CC})</td><td>V_{CC}±0.5V</td><td>⇒</td><td>Pin4: H→MUTE</td></tr></table> | Control of Pin | | | OUT | | | | | L(GND) | 0V to 0.5V or OPEN | ⇒ | through | H(V _{CC}) | V _{CC} ±0.5V | ⇒ | Pin4: H→MUTE | | | | | | | | | | | | | | | |
| Control of Pin | | | OUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L(GND) | 0V to 0.5V or OPEN | ⇒ | through | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(V _{CC}) | V _{CC} ±0.5V | ⇒ | Pin4: H→MUTE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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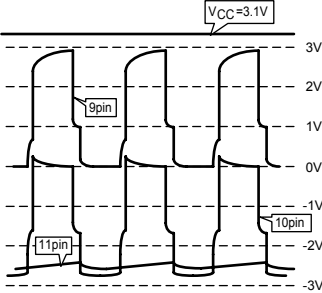
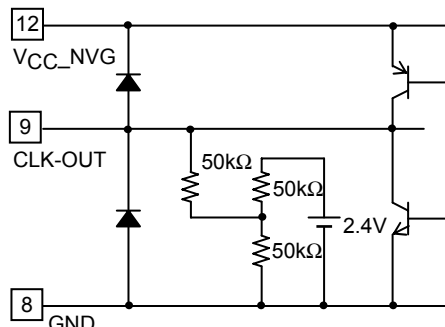
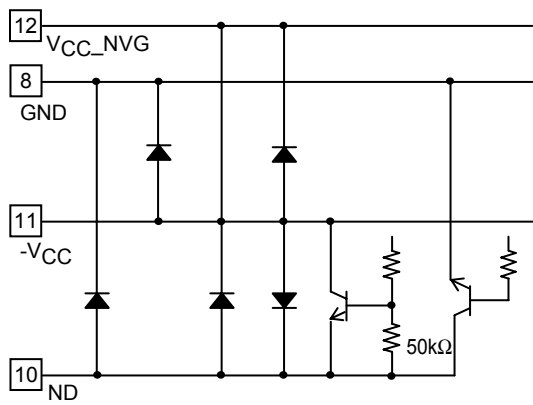
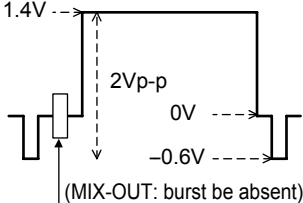
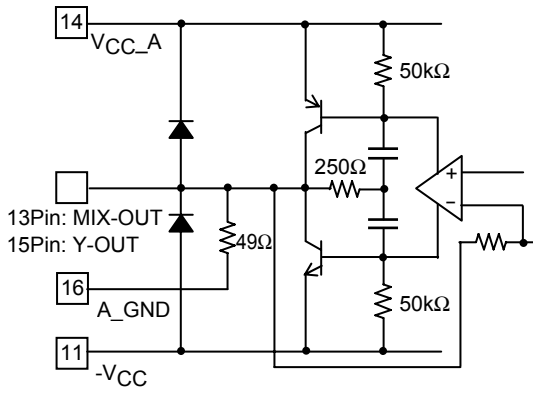
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| Pin No | Symbol | Voltage | Description | Equivalent Circuit |
|--------|---------|---------|--|--|
| 5 | C-IN | 1.55V | Video input terminal (Input high-impedance) 1.55V ->  |  |
| 6 | RIP-FIL | 1.2V | |  |
| 7 | Y-IN | 1.1V | Video input terminal (Sync-chip clamp (Input high-impedance))  |  |
| 8 | GND | 0V | | |

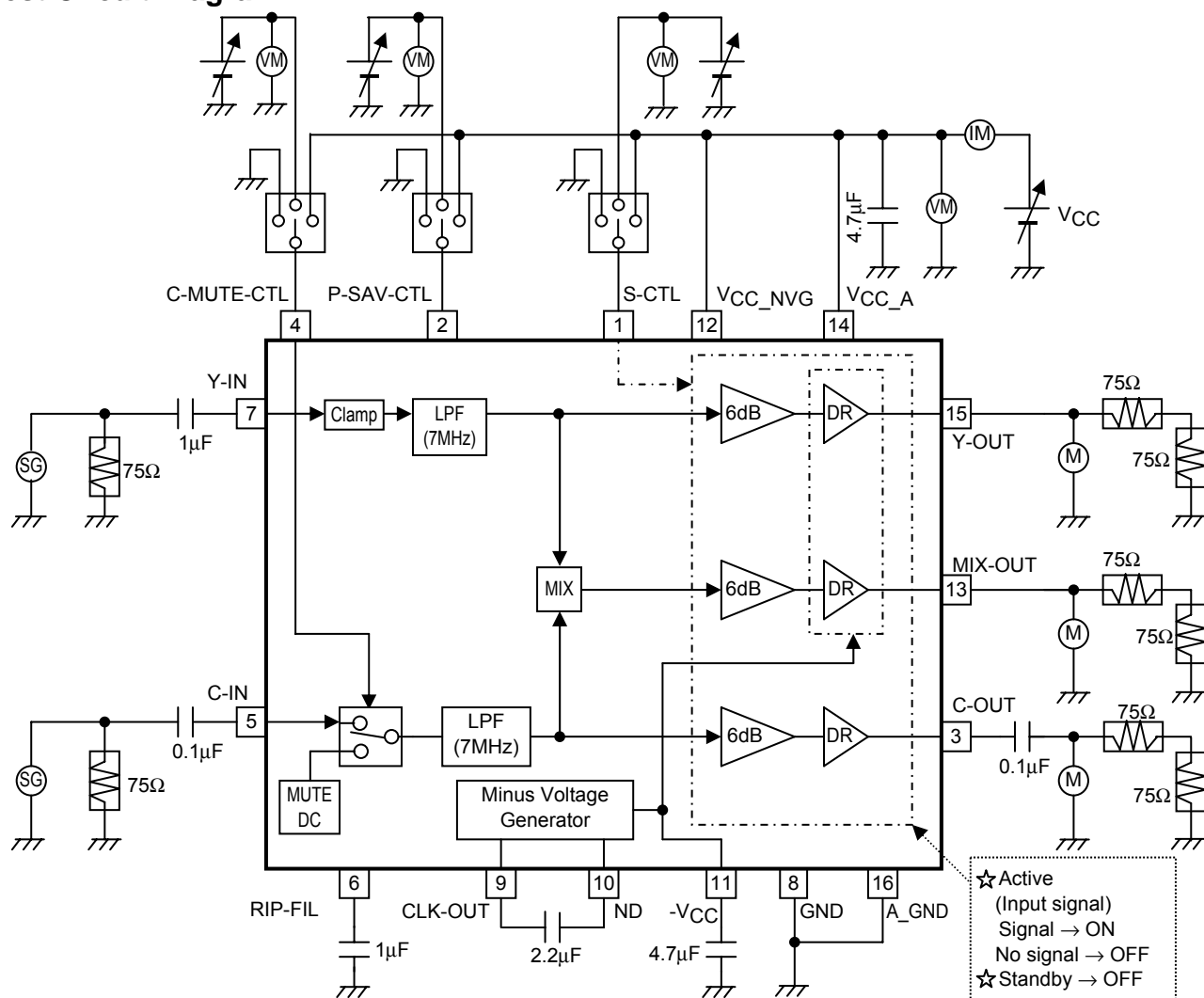
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| Pin No | Symbol | Voltage | Description | Equivalent Circuit |
|--------|---------------------|---|---|--|
| 9 | CLK-OUT | V_{CC} ↑↓ 0V | Pin 9: Clock output terminal  |  |
| 10 | ND | +0.5V ↑↓ -2.5V (-V _{CC}) | Pin 10: The terminal which transmits an electric charge Pin 11: -V _{CC} |  |
| 11 | -V _{CC} | 0V ↑↓ -2.2V (-V _{CC}) | | |
| 12 | V _{CC_NVG} | 2.7V to 3.6V | | |
| 13 | MIX-OUT | 0V | Video output terminal (Push-pull output low-impedance)  |  |
| 15 | Y-OUT | | | |
| 14 | V _{CC_A} | 2.7V to 3.6V | Analog V _{CC} | |
| 16 | A-GND | 0V | Analog GND | |

Test Circuit Diagram



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