



SANYO Semiconductors

DATA SHEET

LA7958 — Monolithic Linear IC For TV, VTR Audio/Video Switch

Overview

This LA7958 is a Audio/Video Switch for TV, VTR.

Functions

- Audio: Possible to Change 4 Channel×2
- Video: Possible to Change 4 Channel, 6dB Amplifier, Y+C Amplifier

Specifications

Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|-----------------------|------------|-------------|------|
| Maximum supply voltage | V _{CC} V max | Pin 8 | 13.2 | V |
| Allowable power dissipation | Pd max | Ta ≤ 70°C | 300 | mW |
| Operating temperature | Topr | | -20 to +70 | °C |
| Storage temperature | Tstg | | -55 to +150 | °C |

Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|--------------------------------|--------------------|------------|-------------|------|
| Recommending operation voltage | V _{CC} | Pin 8 | 9.0 | V |
| Operating voltage range | V _{CC} op | Pin 8 | 8.0 to 12.0 | V |

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Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 9\text{V}$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|----------------------------------|-----------|--|---------|------|------|-----------|
| | | | min | typ | max | |
| Current dissipation | I_{CC} | $V_{CC} = 9\text{V}$, No signal | 11.2 | 14.0 | 16.8 | mA |
| Audio Block | | | | | | |
| Audio input DC voltage | I_{Na} | | 4.0 | 4.3 | 4.6 | V |
| Audio output DC voltage | O_a | | 3.2 | 3.6 | 4.0 | V |
| Audio channel bandwidth | F_a | -3dB frequency | 100 | | | kHz |
| Audio signal voltage gain | A_a | $f = 1\text{kHz}$, $V_{IN} = 500\text{mVrms}$ | 5.0 | 6.0 | 7.0 | dB |
| Audio input dynamic range | D_a | $f = 1\text{kHz}$, $\text{THD} \leq 1\%$ | 2.0 | 2.5 | | Vp-p |
| Audio channel PSRR | PS_a | $V_{CC} = 9\text{V} + 1\text{Vp-p}$, SINE WAVE (50Hz) | 35 | 50 | | dB |
| Audio channel input impedance | R_{ia} | | 80 | 100 | 120 | $k\Omega$ |
| Audio channel output impedance | R_{oa} | | 40 | 50 | 65 | Ω |
| Audio channel crosstalk | CT_a | $f = 1\text{kHz}$ | 65 | 80 | | dB |
| Audio channel S/N | SN_a | Filter = DIN/AUDIO | 70 | 85 | | dB |
| Audio channel THD | THD_a | $f = 1\text{kHz}$, $V_{IN} = 500\text{mVrms}$ | | 0.15 | 0.3 | % |
| Video Block | | | | | | |
| Video input DC voltage | I_{Nv} | | 4.0 | 4.3 | 4.6 | V |
| Video output DC voltage | O_v | | 3.2 | 3.6 | 4.0 | V |
| Video channel bandwidth | F_v | -3dB frequency | 10 | | | MHz |
| Video signal voltage gain | A_v | $f = 500\text{kHz}$, $V_{IN} = 1\text{Vp-p}$ | 5.0 | 6.0 | 7.0 | dB |
| Video input dynamic range | D_v | $f = 100\text{kHz}$, $\text{THD} \leq 1\%$ | 2.0 | 2.5 | | Vp-p |
| Video channel PSRR | PS_v | SINE WAVE (50Hz) | 35 | 50 | | dB |
| Video channel input impedance | R_{iv} | | 8.0 | 10 | 12.0 | $k\Omega$ |
| Video channel output impedance | R_{ov} | | 29 | 37 | 48 | Ω |
| Video channel crosstalk | CT_v | $f = 3.58\text{MHz}$, $V_{IN} = 1\text{Vp-p}$ | 45 | 60 | | dB |
| Video channel noise | SN_v | Bandwidth 10MHz | 57 | 62 | | dB |
| Y, C Mixer | | | | | | |
| Y input DC voltage | I_{Ny} | | 4.0 | 4.3 | 4.6 | V |
| C input DC voltage | I_{Nc} | | 4.0 | 4.3 | 4.6 | V |
| Y+C signal voltage gain | A_{yc} | $Y_{in} = 1\text{Vp-p}$, $C_{in} = 0.3\text{Vp-p}$ | 5.0 | 6 | 7.0 | dB |
| Differential gain | DG | | | 2.0 | 3.5 | % |
| Differential phase | DP | | | 1.0 | 2.0 | deg |
| Mode Selection Block | | | | | | |
| Mode selection threshold voltage | V_{mth} | | 2.2 | 2.6 | 3.0 | V |

Logic True Table

Video-Output

| A : Pin 11 | B : Pin 13 | C : Pin 15 | | |
|------------|------------|------------|------|------|
| | | L | OPEN | H |
| L | L | VTV | VTV | VTV |
| H | L | V1 | V1 | V1 |
| L | H | V2 | V2 | V2 |
| H | H | Y+C | V3/Y | V3/Y |

$VTV = (-A)*(-B)$ $V1 = (A)*(-B)$
 $V2 = (-A)*(B)$ $V3 = (A)*(B)*(-(C=L))/Y=(A)*(B)*(-(C=L))$
 $Y+C = (A)*(B)*(C=L)$

Audio-R-Output

| A : Pin 11 | B : Pin 13 | C : Pin 15 | | |
|------------|------------|------------|------|-----|
| | | L | OPEN | H |
| L | L | RTV | RTV | RTV |
| H | L | R1 | R1 | R1 |
| L | H | R2 | R2 | R2 |
| H | H | R3 | R3 | R3 |

$RTV = (-A)*(-B)$ $R1 = (A)*(-B)$
 $R2 = (-A)*(B)$ $R3 = (A)*(B)$

Audio-L-Output

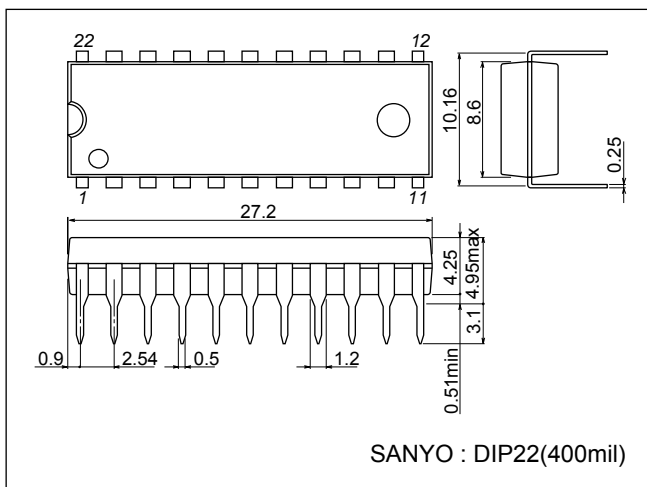
| A : Pin 11 | B : Pin 13 | C : Pin 15 | | |
|------------|------------|------------|------|-----|
| | | L | OPEN | H |
| L | L | LTV | LTV | LTV |
| H | L | L1 | L1 | L1 |
| L | H | L2 | L2 | L2 |
| H | H | L3 | L3 | L3 |

$LTV = (-A)*(-B)$ $L1 = (A)*(-B)$
 $L2 = (-A)*(B)$ $L3 = (A)*(B)$

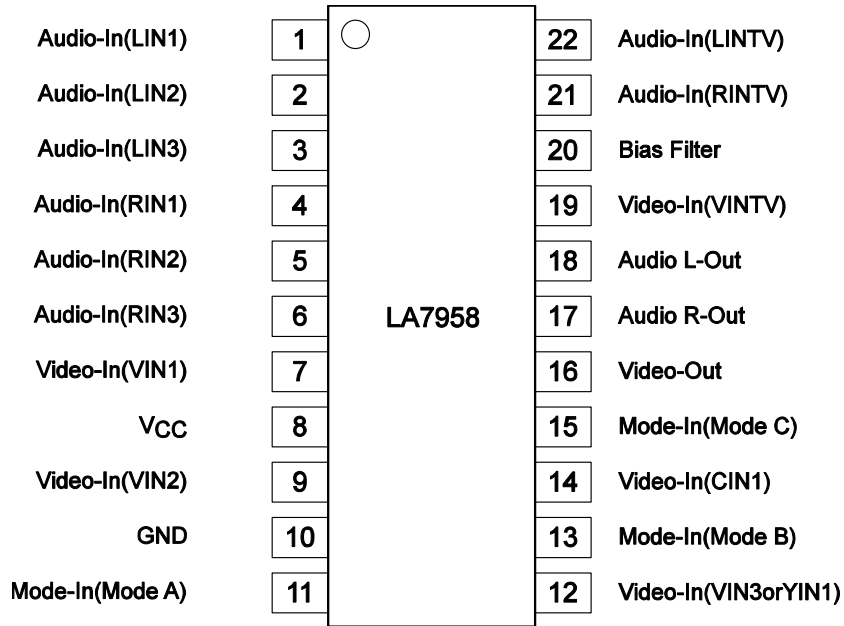
Package Dimensions

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3010A

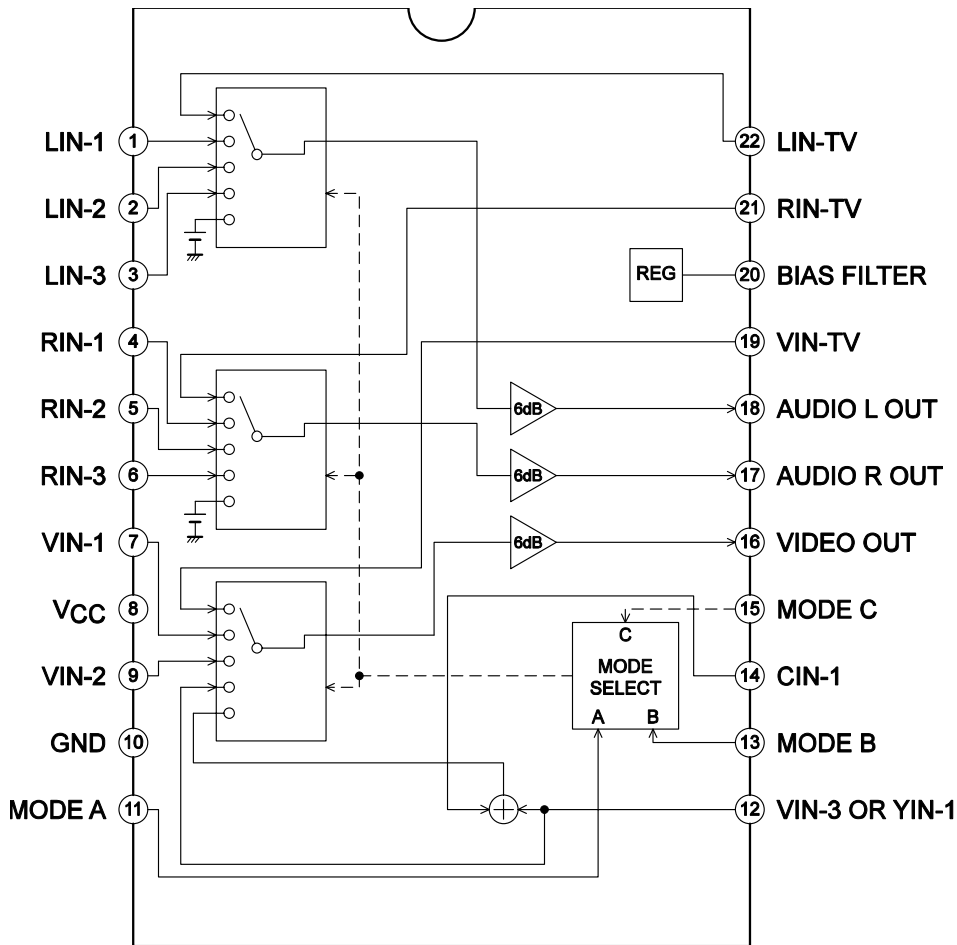


Pin Assignment



Top view
OMP08170

Block Diagram

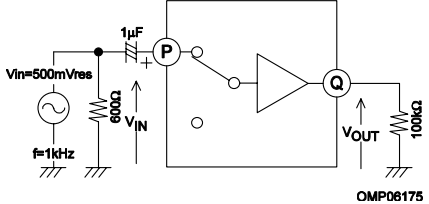
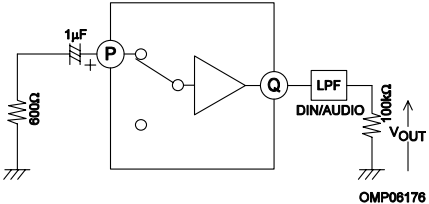
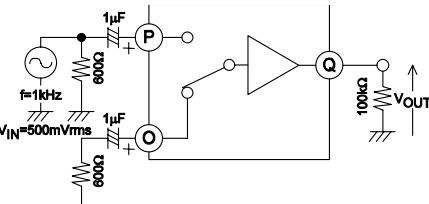
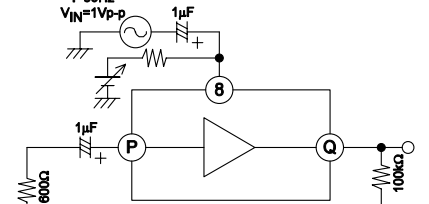


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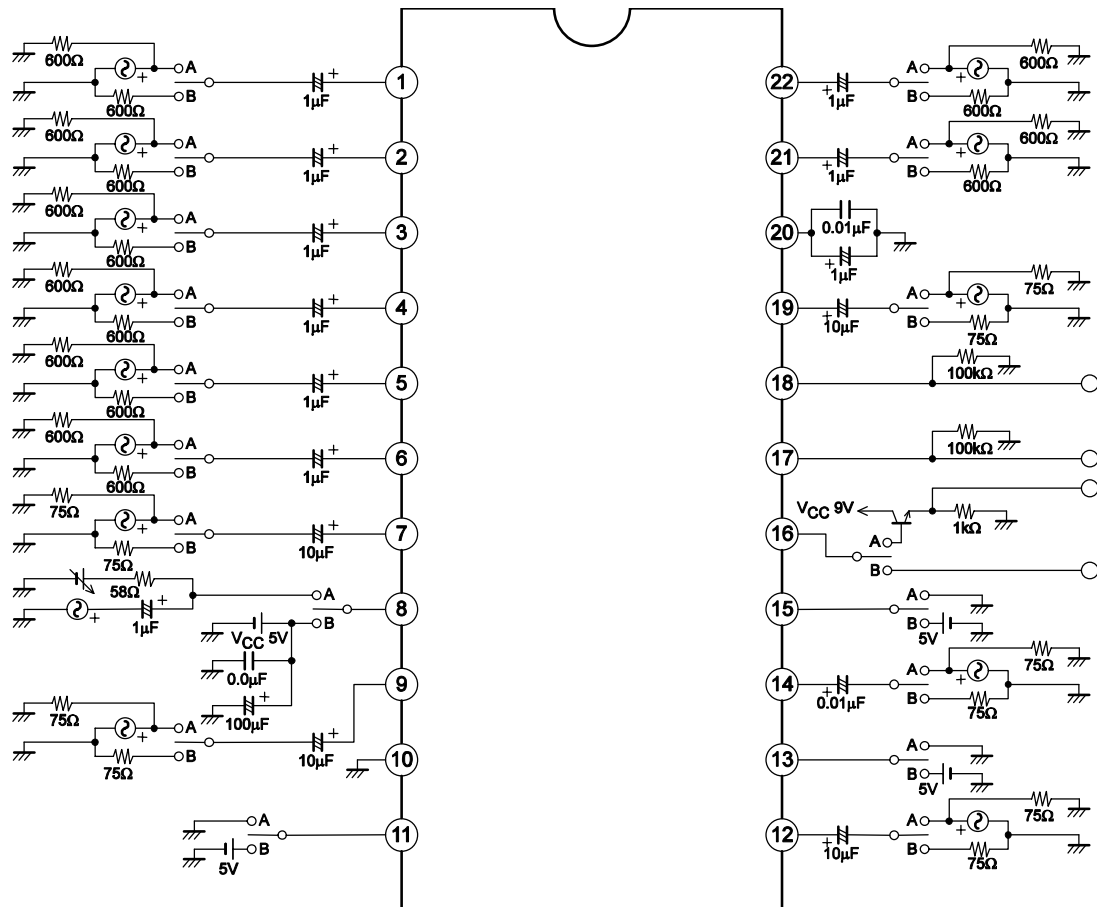
| No. | Parameter | Explanations | Test circuit |
|-----|-------------------------------------|---|--------------|
| 1 | Video signal voltage gain (A_v) | P : Pins 7, 9, 12, 19 Q : Pin 16 $V_{IN} = 1V_{p-p}$ Input impedance 75Ω $A_v = 20 \log V_{out}/V_{IN}$ (dB) | |
| 2 | Video channel bandwidth (F_v) | P : Pins 7, 9, 12, 19 Q : Pin 16 $V_{IN} = 1V_{p-p}$ A frequency which becomes -3dB is measured. | |
| 3 | Video channel noise (SN_v) | P : Pins 7, 9, 12, 19 Q : Pin 16 | |
| 4 | Video channel crosstalk (CT_v) | P : Pin 7 (Pins 9, 12, 19) O : Pins 9, 12, 19 (Pin 7) Q : Pin 16 | |
| 5 | Video channel PSRR (PS_v) | Pin 8, $f = 50Hz$ $V_{IN} = 1V_{p-p}$ P : Pins 7, 9, 12, 19 Q : Pin 16 | |
| 6 | Audio signal voltage gain (A_a) | P : Pins 1, 2, 3, 4, 5, 6, 21, 22 Q : Pins 17, 18 $V_{IN} = 500mV_{rms}$ $A_a = 20 \log V_{out}/V_{IN}$ (dB) | |

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| No. | Parameter | Explanations | Test circuit |
|-----|-------------------------------|--|--|
| 7 | Audio channel bandwidth (Fa) | P : Pins 1, 2, 3, 4, 5, 6, 21, 22 Q : Pins 17,18 $V_{IN} = 500mV_{rms}$ A frequency which becomes -3dB is measured. |  |
| 8 | Audio channel THD (THDa) | | It's the same Audio Signal Voltage Gain measurement circuit. |
| 9 | Audio channel S/N (SNa) | P : Pins 1, 2, 3, 4, 5, 6, 21, 22 Q : Pins 17, 18 |  |
| 10 | Audio channel crosstalk (CTa) | P : Pins 2, 3, 4, 5, 6, 21, 22 Q : Pins 17,18 |  |
| 11 | Audio channel PSSR (PSa) | Pin 8, f = 50Hz $V_{IN} = 1V_{p-p}$ P : Pins 1, 2, 3, 4,5, 6, 21, 22 Q : Pins 17, 18 |  |

Test Circuit



OMB06068

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