

| | | |
|--------------|---|----------------|
| SANYO | No.2896 | LA7220M |
| | 3-Channel 2-Position Electronic Switch for VCR / Audio Use | |

The LA7220M is a 3-channel 2-position high-performance analog switch having wide application from audio band to video band . It is also provided with 2 channels of muting function.

Features

- 3-channel 2-position switch
- Wide input dynamic range
- Low distortion
- Good frequency characteristic
- Muting available

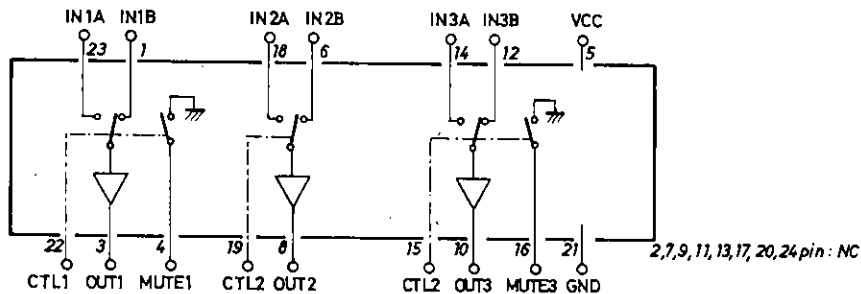
Maximum Ratings at Ta = 25°C

| | | | | |
|-----------------------------|---------------------|-----------|---------------|----|
| Maximum Supply Voltage | V _{CC} max | | 15 | V |
| Allowable Power Dissipation | P _d max | Ta ≤ 65°C | 500 | mW |
| Operating Temperature | T _{op} | | - 20 to + 65 | °C |
| Storage Temperature | T _{stg} | | - 40 to + 125 | °C |

Operating Conditions at Ta = 25°C

| | | | |
|----------------------------|--------------------|---------|---|
| Recommended Supply Voltage | V _{CC} | 12 | V |
| Operating Voltage Range | V _{CC} op | 9 to 13 | V |

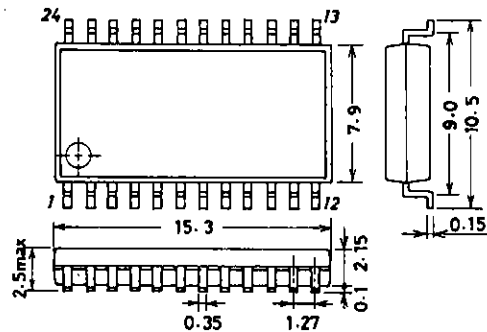
Equivalent Circuit Block Diagram



Package Dimensions

(unit : mm)

3045B



LA7220M

| Operating Characteristics at Ta = 25°C, VCC = 12V | | | | min | typ | max | unit |
|---|-------------------|--|-----------|------|-------|------|------------------|
| Current Dissipation | I _{CC} | | | | 30.0 | 39.9 | mA |
| Total Harmonic Distortion | THD | *1, R _g = 600Ω, 4.5V _{p-p} , f = 1kHz R _L = ∞ | | | 0.007 | 0.1 | % |
| Noise Voltage | V _{NO} | *1, R _g = 600Ω, f = 20Hz to 20kHz R _L = ∞ | | | -93 | -80 | dBs |
| Crosstalk 1ch | CR1 | *2, Input 1: R _g = 50Ω, 2V _{p-p} , f = 3.58MHz, Input 2: R _g = 500Ω | | | -50 | | dB |
| 2ch | CR2 | *2, Input 1: R _g = 50Ω | | | -60 | | dB |
| 3ch | CR3 | *2, Input 1: R _g = 50Ω | | | -50 | | dB |
| Pedestal Level | ΔV _{ped} | *1, V _{CTL} (Pins 10, 13, 15) = 0 to 12V | | -100 | 0 | +100 | mV |
| Maximum Input Voltage | vinmax | *1, R _g = 600Ω, f = 1kHz, R _L = ∞, THD = 1% | | 5.0 | | | V _{p-p} |
| 2nd Harmonic Voltage | H2 | *1, R _g = 50Ω, 4.0V _{p-p} , f = 1MHz, R _L = ∞ | | -46 | -55 | | dB |
| 3rd Harmonic Voltage | H3 | *1, " | | -46 | -55 | | dB |
| Switch Changeover Voltage | V _{CTLs} | *1 | | 2.6 | 3.1 | 4.0 | V |
| Mute Threshold Voltage | V _{ML} | *3, L Level, mute threshold voltage | | 1.1 | 1.5 | 1.9 | V |
| | V _{MH} | *3, H Level, mute threshold voltage | | 6.6 | 7.3 | 8.0 | V |
| Crosstalk between Channels | | | | | | | |
| 1ch | | *4, R _g = 500Ω, R _L = ∞, other channel input R _g = 50Ω, 2V _{p-p} , f = 3.58MHz | | -50 | -68 | | dB |
| 2ch | | *4, " | | -50 | -68 | | dB |
| 3ch | | *4, " | | -50 | -68 | | dB |
| Mute Compression Ratio | | *3, R _g = 600Ω, 2V _{p-p} , f = 1kHz, R _L = ∞, series resistance 10kΩ | | | -60 | | dB |
| Control Pin Flow-in Current | I _{CTL} | *1 | | | | 8 | μA |
| Input Impedance | z _{in} | *1 | | | | 10 | kΩ |
| Output Impedance | z _{out} | *1 | | | | 29 | Ω |
| Pin Voltage | (Pin 1) | V1 | V22 = 0V | | | 7.9 | V |
| " | (Pin 1) | V1 | V22 = 12V | | | 7.9 | V |
| " | (Pin 3) | V3 | | | | 7.2 | V |
| " | (Pin 6) | V6 | V19 = 0V | | | 7.9 | V |
| " | (Pin 6) | V6 | V19 = 12V | | | 7.9 | V |
| " | (Pin 8) | V8 | | | | 7.2 | V |
| " | (Pin 10) | V10 | | | | 7.2 | V |
| " | (Pin 12) | V12 | V15 = 0V | | | 7.9 | V |
| " | (Pin 12) | V12 | V15 = 12V | | | 7.9 | V |
| " | (Pin 14) | V14 | V15 = 0V | | | 7.9 | V |
| " | (Pin 14) | V14 | V15 = 12V | | | 7.9 | V |
| " | (Pin 18) | V18 | V19 = 0V | | | 7.9 | V |
| " | (Pin 18) | V18 | V19 = 12V | | | 7.9 | V |
| " | (Pin 23) | V23 | V22 = 0V | | | 7.9 | V |
| " | (Pin 23) | V23 | V22 = 12V | | | 7.9 | V |

*1 Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.

Input A : V_{CTL}(pins 10, 13, 15) is 12V at the measurement mode.

Input B : V_{CTL} is 0V at the measurement mode.

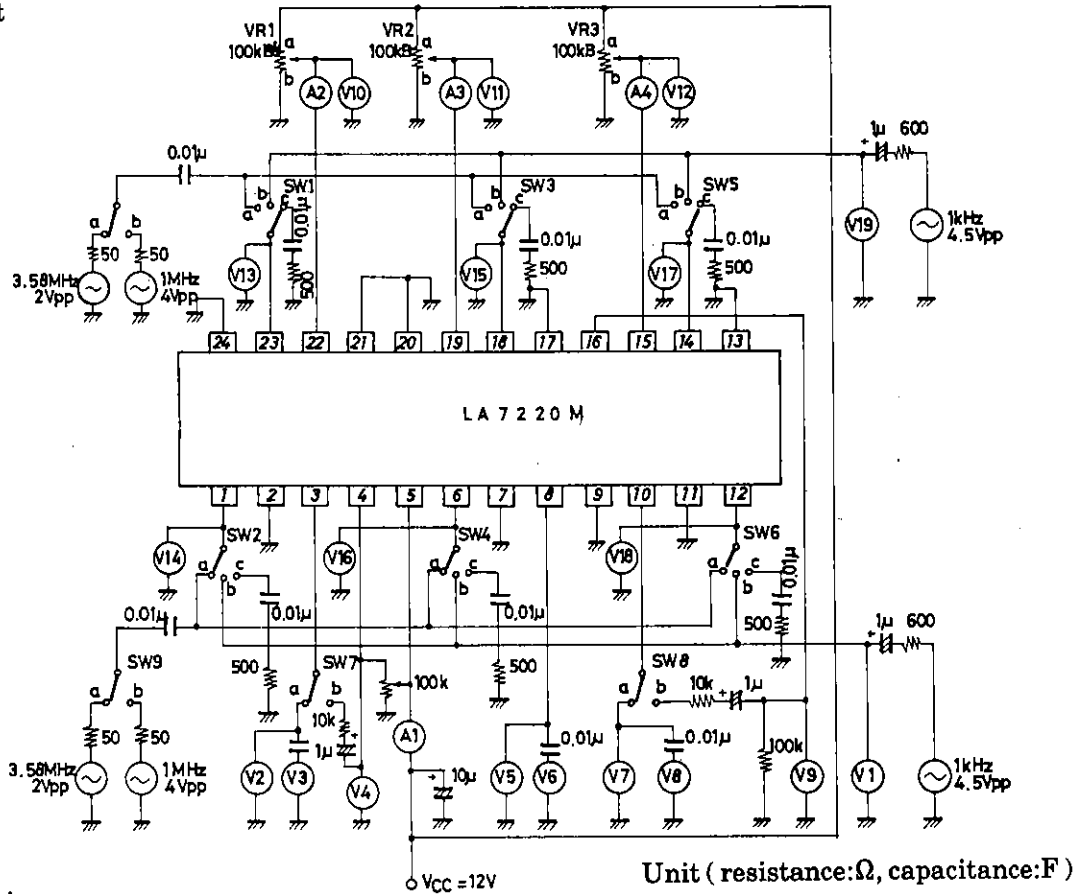
*2 Measurements are made using input A and input B.

*3 Measurements are made for 1ch, 3ch.

*4 Measurements are made for each of 1ch, 2ch, 3ch using input A and input B on other channel.

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Test Circuit



Test Conditions

| Item | Symbol | SW VR Mode | | | | | | | | | | | Test Point | | |
|---------------------------|-----------------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|-----|-----|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | | VR3 | |
| Current Dissipation | I _{CC} | c | c | c | c | c | c | c | a | a | a | b | b | b | A1 |
| Total Harmonic Distortion | 1 chA | THD | b | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB | THD | c | b | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA | THD | c | c | b | c | c | c | a | a | a | b | a | b | V6 |
| | 2 chB | THD | c | c | c | b | c | c | a | a | a | b | b | b | V6 |
| | 3 chA | THD | c | c | c | c | b | c | a | a | a | b | b | a | V8 |
| | 3 chB | THD | c | c | c | c | c | b | a | a | a | b | b | b | V8 |
| Noise | 1 chA | V _{N0} | c | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB | V _{N0} | c | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA | V _{N0} | c | c | c | c | c | c | a | a | a | b | a | b | V6 |
| | 2 chB | V _{N0} | c | c | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3 chA | V _{N0} | c | c | c | c | c | c | a | a | a | b | b | a | V8 |
| | 3 chB | V _{N0} | c | c | c | c | c | c | a | a | a | b | b | b | V8 |
| Crosstalk | 1 chA | CR1 | c | a | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB | CR1 | a | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA | CR2 | c | c | c | a | c | c | a | a | a | b | a | b | V6 |
| | 2 chB | CR2 | c | c | a | c | c | c | a | a | a | b | b | b | V6 |
| | 3 chA | CR3 | c | c | c | c | c | a | a | a | a | b | b | a | V8 |
| | 3 chB | CR3 | c | c | c | c | a | c | a | a | a | b | b | b | V8 |
| Pedestal | 1 ch | ΔV _{PED} | c | c | c | c | c | c | a | a | a | a/b | b | b | V2 |
| | 2 ch | ΔV _{PED} | c | c | c | c | c | c | a | a | a | b | a/b | b | V5 |
| | 3 ch | ΔV _{PED} | c | c | c | c | c | c | a | a | a | b | b | a/b | V7 |
| Maximum Input Voltage | 1 chA | V _{inmax} | b | c | c | c | c | c | a | a | a | a | b | b | V19 |
| | 1 chB | V _{inmax} | c | b | c | c | c | c | a | a | a | b | b | b | V1 |
| | 2 chA | V _{inmax} | c | c | b | c | c | c | a | a | a | b | a | b | V19 |
| | 2 chB | V _{inmax} | c | c | c | b | c | c | a | a | a | b | b | b | V1 |
| | 3 chA | V _{inmax} | c | c | c | c | b | c | a | a | a | b | b | a | V19 |
| | 3 chB | V _{inmax} | c | c | c | c | c | b | a | a | a | b | b | b | V1 |

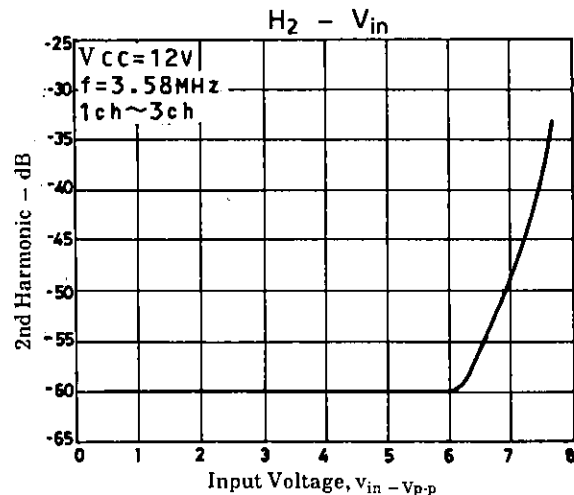
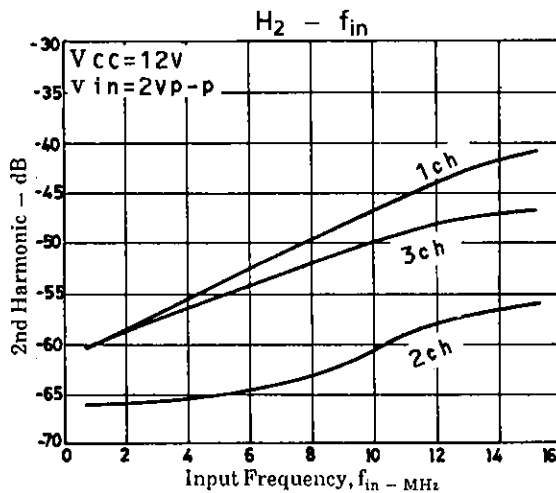
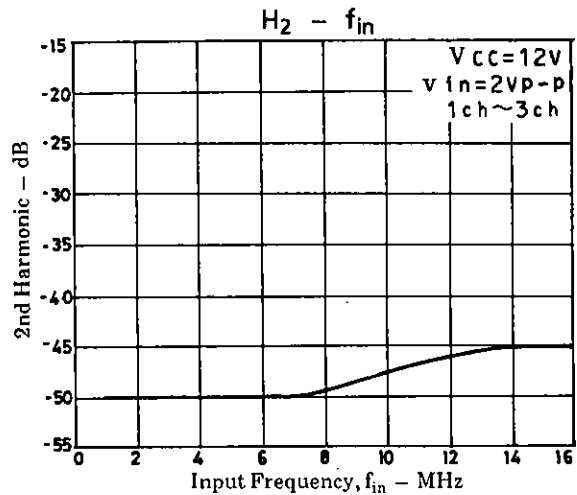
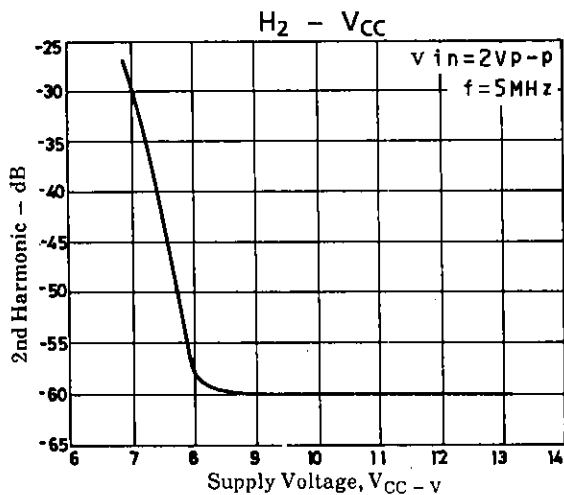
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| Item | Symbol | SW VR Mode | | | | | | | | | | | | Test | |
|-----------------------------|----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-------|-----|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | Point | |
| 2nd Harmonic | 1 chA | H2-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1 chB | H2-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2 chA | H2-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2 chB | H2-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3 chA | H2-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3 chB | H2-3 | c | c | c | c | c | a | a | a | b | b | b | b | V8 |
| 3rd Harmonic | 1 chA | H3-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1 chB | H3-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2 chA | H3-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2 chB | H3-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3 chA | H3-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3 chB | H3-3 | c | c | c | c | c | a | a | a | b | b | b | b | V8 |
| Switch Changeover Voltage | 1 ch | VCTLS | a | a | c | c | c | c | a | a | a | Var* | b | b | V10 |
| | 2 ch | VCTLS | c | c | a | a | c | c | a | a | a | b | Var* | b | V11 |
| | 3 ch | VCTLS | c | c | c | c | a | a | a | a | a | b | b | Var* | V12 |
| Mute Threshold | 1 ch | VML | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 1 ch | VMH | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 3 ch | VML | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| | 3 ch | VMH | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| Crosstalk between Channels | 1 ch | | c | c | c | c | a | c | a | a | a | a | a | a | V3 |
| | 1 ch | | c | c | c | c | c | a | a | a | a | a | a | b | V3 |
| | 1 ch | | c | c | c | c | a | c | a | a | a | a | b | a | V3 |
| | 1 ch | | c | c | c | c | c | c | a | a | a | a | b | a | V3 |
| | 1 ch | | c | c | a | c | c | c | a | a | a | b | a | b | V3 |
| | 1 ch | | c | c | c | a | c | c | a | a | a | b | b | a | V3 |
| | 1 ch | | c | c | c | a | c | c | a | a | a | b | b | b | V3 |
| | 1 ch | | c | c | c | a | c | c | a | a | a | b | b | b | V3 |
| | 2 ch | | c | c | c | c | a | c | a | a | a | a | a | a | V6 |
| | 2 ch | | c | c | c | c | c | a | a | a | a | a | a | b | V6 |
| | 2 ch | | c | c | c | c | a | c | a | a | a | b | a | a | V6 |
| | 2 ch | | c | c | c | c | c | a | a | a | a | a | b | a | V6 |
| | 2 ch | | a | c | c | c | c | c | a | a | a | a | b | a | V6 |
| | 2 ch | | a | c | c | c | c | c | a | a | a | a | b | b | V6 |
| | 2 ch | | c | a | c | c | c | c | a | a | a | b | b | a | V6 |
| | 2 ch | | c | a | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3 ch | | c | c | a | c | c | c | a | a | a | a | a | a | V8 |
| | 3 ch | | c | c | c | a | c | c | a | a | a | a | b | a | V8 |
| | 3 ch | | c | c | c | a | c | c | a | a | a | b | b | a | V8 |
| | 3 ch | | a | c | c | c | c | c | a | a | a | a | a | b | V8 |
| 3 ch | | c | a | c | c | c | c | a | a | a | b | a | b | V8 | |
| 3 ch | | c | a | c | c | c | c | a | a | a | b | b | b | V8 | |
| Mute Compression Ratio | 1 ch | | b | b | c | c | c | c | b | a | a | Var* | b | b | V4 |
| | 3 ch | | c | c | c | c | b | b | a | b | a | b | b | Var* | V9 |
| Control Pin Flow-in Current | 1 ch | I CTL1 | c | c | c | c | c | c | a | a | a | a | b | b | A2 |
| | 2 ch | I CTL2 | c | c | c | c | c | c | a | a | a | b | a | b | A3 |
| | 3 ch | I CTL3 | c | c | c | c | c | c | a | a | a | b | b | a | A4 |
| Pin Voltage | (Pin 1) | V1 | c | c | c | c | c | c | a | a | a | b | b | b | V14 |
| | (Pin 1) | V1 | c | c | c | c | c | c | a | a | a | a | b | b | V14 |
| | (Pin 3) | V3 | c | c | c | c | c | c | a | a | a | b | b | b | V2 |
| | (Pin 6) | V6 | c | c | c | c | c | c | a | a | a | b | b | b | V16 |
| | (Pin 6) | V6 | c | c | c | c | c | c | a | a | a | b | a | b | V16 |
| | (Pin 8) | V8 | c | c | c | c | c | c | a | a | a | b | b | b | V5 |
| | (Pin 10) | V10 | c | c | c | c | c | c | a | a | a | b | b | b | V7 |

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| Item | Symbol | SW VR Mode | | | | | | | | | | | | Test Point |
|----------|--------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | |
| (Pin 12) | V12 | c | c | c | c | c | c | a | a | a | b | b | b | V18 |
| (Pin 12) | V12 | c | c | c | c | c | c | a | a | a | b | b | a | V18 |
| (Pin 14) | V14 | c | c | c | c | c | c | a | a | a | b | b | b | V17 |
| (Pin 14) | V14 | c | c | c | c | c | c | a | a | a | b | b | a | V17 |
| (Pin 18) | V18 | c | c | c | c | c | c | a | a | a | b | b | b | V15 |
| (Pin 18) | V18 | c | c | c | c | c | c | a | a | a | b | a | b | V15 |
| (Pin 23) | V23 | c | c | c | c | c | c | a | a | a | b | b | b | V13 |
| (Pin 23) | V23 | c | c | c | c | c | c | a | a | a | a | b | b | V13 |

(Note) Var* : While monitoring pins 3, 8, 10, adjust so that the minimum output is obtained.
 Mute Threshold : While monitoring pins 4, 16, measure the minimum and maximum values of V15, V18 when the minimum output is obtained.



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