

SANYO**LA7220****Electronic Switch for VCR/Audio Use**

Overview

The LA7220 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

Specifications

Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|--------------|-----------------------------|-------------|------|
| Maximum supply voltage | V_{CC} max | | 15 | V |
| Allowable power dissipation | P_d max | $T_a \leq 65^\circ\text{C}$ | 500 | mW |
| Operating temperature | T_{opr} | | -20 to +70 | °C |
| Storage temperature | T_{stg} | | -40 to +125 | °C |

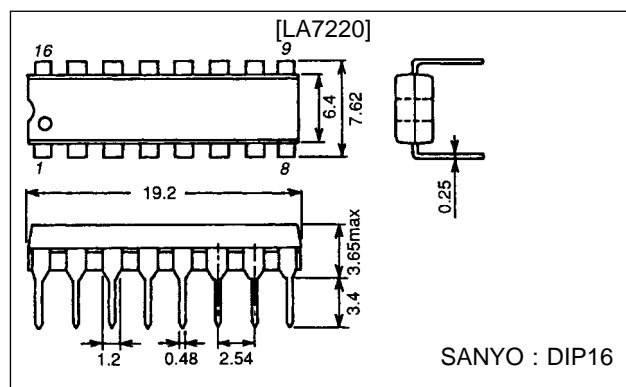
Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------------|------------|------------|---------|------|
| Recommended supply voltage | V_{CC} | | 12 | V |
| Operating voltage range | V_{CCop} | | 9 to 13 | V |

Package Dimensions

unit : mm

3006B-DIP16



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Operating Characteristics at Ta = 25°C, V_{CC} = 12 V

| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|-----------------------------|----------|---------------------|---|-----------------|-------|---------|------|
| Current drain | | I _{CC} | | | 30.0 | 39.9 | mA |
| Total harmonic distortion | | THD | R _g = 600 Ω, 4.5 Vp-p, f = 1 kHz, R _L = ∞, (Note 1) | | 0.007 | 0.1 | % |
| Noise voltage | | V _{NO} | R _g = 600 Ω, f = 20 Hz to 20 kHz, R _L = ∞, (Note 1) | | -93 | -80 | dBs |
| Crosstalk | 1ch | CR1 | Input 1: R _g = 50 Ω, 2 Vp-p, f = 3.58 MHz, Input 2: R _g = 500 Ω, (Note 2) | | -50 | | dB |
| | 2ch | CR2 | Input 1: R _g = 50 Ω, (Note 2) | -60 | | | dB |
| | 3ch | CR3 | Input 1: R _g = 50 Ω, (Note 2) | -50 | | | dB |
| Pedestal level | | ΔV _{ped} | V _{CTL} (Pins 10, 13, 15) = 0 to 12 V, (Note 1) | -100 | | 0 + 100 | mV |
| Maximum input voltage | | V _{IN max} | R _g = 600 Ω, f = 1 kHz, R _L = ∞, THD = 1%, (Note 1) | 5.0 | | | Vp-p |
| 2nd harmonic voltage | | H2 | R _g = 50 Ω, 4.0 Vp-p, f = 1 MHz, R _L = ∞, (Note 1) | -46 | -55 | | dB |
| 3rd harmonic voltage | | H3 | R _g = 50 Ω, 4.0 Vp-p, f = 1 MHz, R _L = ∞, (Note 1) | -46 | -55 | | dB |
| Switch changeover voltage | | V _{CTLS} | (Note 1) | 2.6 | 3.1 | 4.0 | V |
| Mute threshold voltage | | V _{ML} | Low level, (Note 3) | 1.1 | 1.5 | 1.9 | V |
| | | V _{MH} | High level, (Note 3) | 6.6 | 7.3 | 8.0 | V |
| Crosstalk between channels | 1ch | | R _g = 500 Ω, R _L = ∞, other channel input R _g = 50 Ω, 2 Vp-p, f = 3.58 MHz, (Note 4) | -50 | -68 | | dB |
| | 2ch | | | -50 | -68 | | dB |
| | 3ch | | | -50 | -68 | | dB |
| Mute compression ratio | | | R _g = 600 Ω, 2 Vp-p, f = 1 kHz, R _L = ∞, series resistance 10 kΩ, (Note 3) | | -60 | | dB |
| Control pin flow-in current | | I _{CTL} | (Note 1) | | 8 | | μA |
| Input impedance | | Z _{IN} | (Note 1) | | 10 | | kΩ |
| Output impedance | | Z _{OUT} | (Note 1) | | 29 | | Ω |
| Pin voltage | (Pin 1) | V _{pin1} | V _{pin15} = 0 V | Test point: V14 | 7.9 | | V |
| | | | V _{pin15} = 12 V | | 7.9 | | V |
| | (Pin 2) | V _{pin2} | | Test point: V2 | 7.2 | | V |
| | (Pin 5) | V _{pin5} | V _{pin13} = 0 V | Test point: V16 | 7.9 | | V |
| | | | V _{pin13} = 12 V | | 7.9 | | V |
| | (Pin 6) | V _{pin6} | | Test point: V5 | 7.2 | | V |
| | (Pin 7) | V _{pin7} | | Test point: V7 | 7.2 | | V |
| | (Pin 8) | V _{pin8} | V _{pin10} = 0 V | Test point: V18 | 7.9 | | V |
| | | | V _{pin10} = 12 V | | 7.9 | | V |
| | (Pin 9) | V _{pin9} | V _{pin10} = 0 V | Test point: V17 | 7.9 | | V |
| | | | V _{pin10} = 12 V | | 7.9 | | V |
| | (Pin 12) | V _{pin12} | V _{pin13} = 0 V | Test point: V15 | 7.9 | | V |
| | | | V _{pin13} = 12 V | | 7.9 | | V |
| | (Pin 16) | V _{pin16} | V _{pin15} = 0 V | Test point: V13 | 7.9 | | V |
| | | | V _{pin15} = 12 V | | 7.9 | | V |

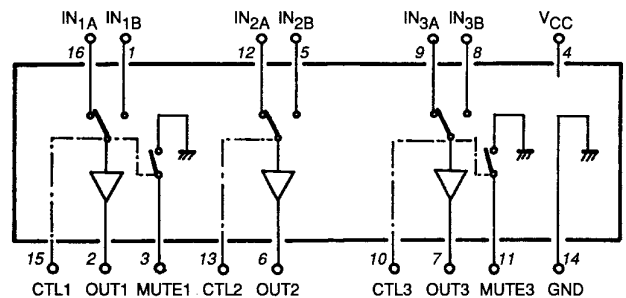
Note 1. Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.

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

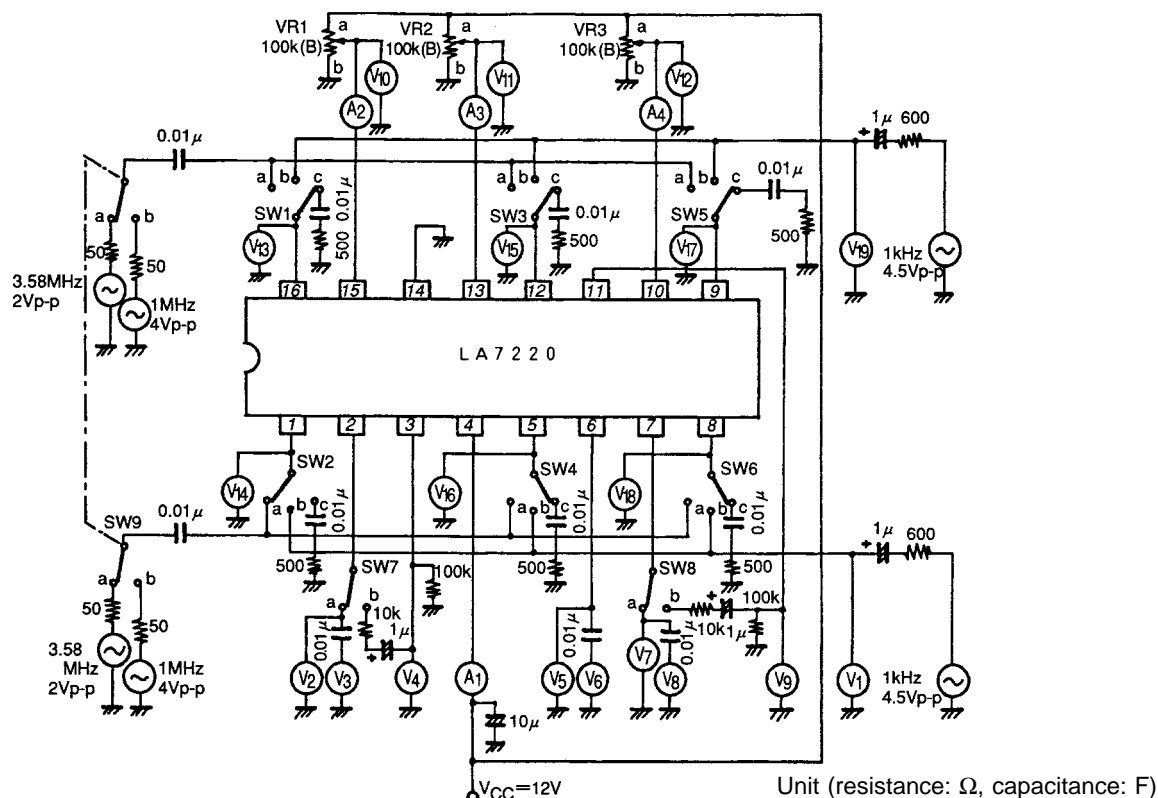
Input B: V_{CTL} is 0 V at the measurement mode.

- Measurements are made using input A and B.
- Measurements are made for 1ch, 3ch.
- Measurements are made for each of 1ch, 2ch, 3ch using input A and B on other channels.

Equivalent Circuit Block Diagram



Test Circuit



Test Conditions

| Item | Symbol | SW, VR mode | | | | | | | | | | | | Test point |
|---------------------------|----------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | |
| Current drain | I_{CC} | c | c | c | c | c | c | a | a | a | b | b | b | A1 |
| Total harmonic distortion | 1chA THD | b | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1chB THD | c | b | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2chA THD | c | c | b | c | c | c | a | a | a | b | a | b | V6 |
| | 2chB THD | c | c | c | b | c | c | a | a | a | b | b | b | V6 |
| | 3chA THD | c | c | c | c | b | c | a | a | a | b | b | a | V8 |
| | 3chB THD | c | c | c | c | c | b | a | a | a | b | b | b | V8 |
| Noise | 1chA V_{NO} | c | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1chB V_{NO} | c | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2chA V_{NO} | c | c | c | c | c | c | a | a | a | b | a | b | V6 |
| | 2chB V_{NO} | c | c | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3chA V_{NO} | c | c | c | c | c | c | a | a | a | b | b | a | V8 |
| | 3chB V_{NO} | c | c | c | c | c | c | a | a | a | b | b | b | V8 |
| Crosstalk | 1chA CR | c | a | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1chB CR | a | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2chA CR | c | c | c | a | c | c | a | a | a | b | a | b | V6 |
| | 2chB CR | c | c | a | c | c | c | a | a | a | b | b | b | V6 |
| | 3chA CR | c | c | c | c | c | a | a | a | a | b | b | a | V8 |
| | 3chB CR | c | c | c | c | a | c | a | a | a | b | b | b | V8 |
| Pedestal level | 1ch ΔV_{PED} | c | c | c | c | c | c | a | a | a | a/b | b | b | V2 |
| | 2ch ΔV_{PED} | c | c | c | c | c | c | a | a | a | b | a/b | b | V5 |
| | 3ch ΔV_{PED} | c | c | c | c | c | c | a | a | a | b | b | a/b | V7 |

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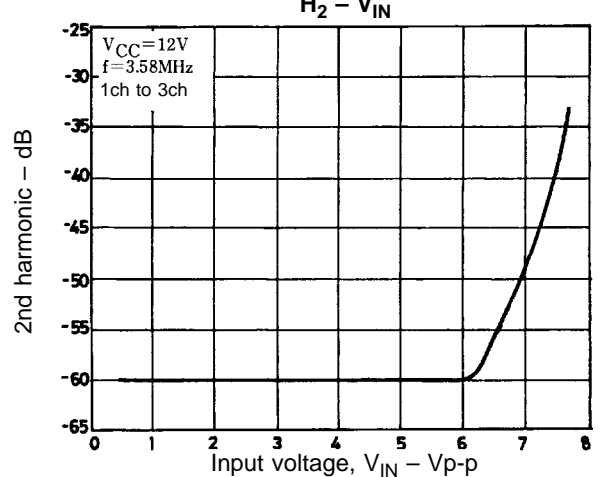
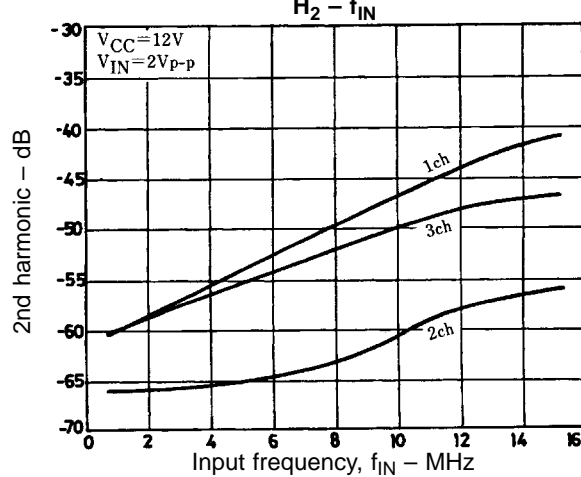
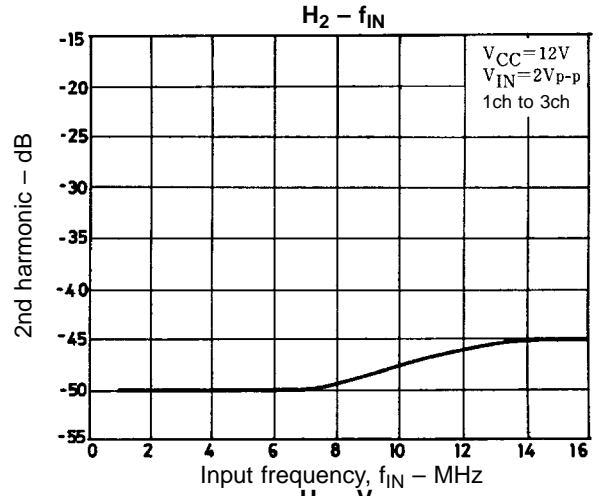
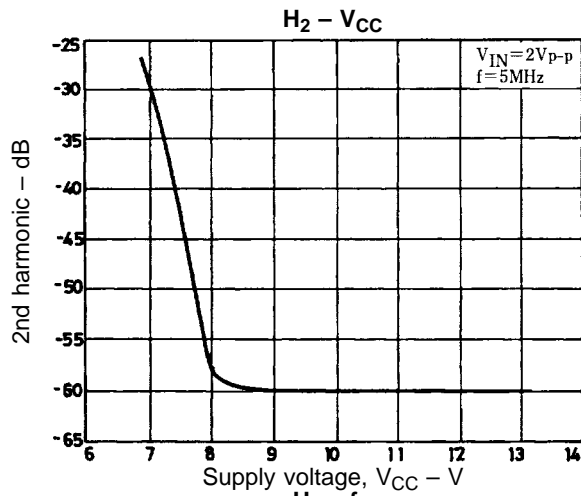
| Item | | Symbol | SW, VR mode | | | | | | | | | | | | Test point |
|----------------------------|------|---------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------------|
| | | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | |
| Maximum input voltage | 1chA | V _{IN max} | b | c | c | c | c | c | a | a | a | a | b | b | V19 |
| | 1chB | V _{IN max} | c | b | c | c | c | c | a | a | a | b | b | b | V1 |
| | 2chA | V _{IN max} | c | c | b | c | c | c | a | a | a | b | a | b | V19 |
| | 2chB | V _{IN max} | c | c | c | b | c | c | a | a | a | b | b | b | V1 |
| | 3chA | V _{IN max} | c | c | c | c | b | c | a | a | a | b | b | a | V19 |
| | 3chB | V _{IN max} | c | c | c | c | c | b | a | a | a | b | b | b | V1 |
| 2nd harmonic voltage | 1chA | H2-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1chB | H2-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2chA | H2-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2chB | H2-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3chA | H2-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3chB | H2-3 | c | c | c | c | c | a | a | a | b | b | b | b | V8 |
| 3rd harmonic voltage | 1chA | H3-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1chB | H3-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2chA | H3-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2chB | H3-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3chA | H3-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3chB | H3-3 | c | c | c | c | c | a | a | a | b | b | b | b | V8 |
| Switch changeover voltage | 1ch | V _{CTLS} | a | a | c | c | c | c | a | a | a | Var* | b | b | V10 |
| | 2ch | V _{CTLS} | c | c | a | a | c | c | a | a | a | b | Var* | b | V11 |
| | 3ch | V _{CTLS} | c | c | c | c | a | a | a | a | a | b | b | Var* | V12 |
| Mute threshold | 1ch | V _{ML} | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 1ch | V _{MH} | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 3ch | V _{ML} | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| | 3ch | V _{MH} | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| Crosstalk between channels | 1ch | | c | c | c | c | a | c | a | a | a | a | a | a | V3 |
| | 1ch | | c | c | c | c | c | a | a | a | a | a | a | b | V3 |
| | 1ch | | c | c | c | c | a | c | a | a | a | a | b | a | V3 |
| | 1ch | | c | c | c | c | c | a | a | a | a | a | b | b | V3 |
| | 1ch | | c | c | a | c | c | c | a | a | a | b | a | a | V3 |
| | 1ch | | c | c | a | c | c | c | a | a | a | b | a | b | V3 |
| | 1ch | | c | c | c | a | c | c | a | a | a | b | b | a | V3 |
| | 1ch | | c | c | c | a | c | c | a | a | a | b | b | b | V3 |
| | 2ch | | c | c | c | c | a | c | a | a | a | a | a | a | V6 |
| | 2ch | | c | c | c | c | c | a | a | a | a | a | a | b | V6 |
| | 2ch | | c | c | c | c | a | c | a | a | a | b | a | a | V6 |
| | 2ch | | c | c | c | c | c | a | a | a | a | b | a | b | V6 |
| | 2ch | | a | c | c | c | c | c | a | a | a | a | b | a | V6 |
| | 2ch | | a | c | c | c | c | c | a | a | a | a | b | b | V6 |
| | 2ch | | c | a | c | c | c | c | a | a | a | b | b | a | V6 |
| | 2ch | | c | a | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3ch | | c | c | a | c | c | c | a | a | a | a | a | a | V8 |
| | 3ch | | c | c | c | a | c | c | a | a | a | a | b | a | V8 |
| | 3ch | | c | c | a | c | c | c | a | a | a | b | a | a | V8 |
| | 3ch | | c | c | c | a | c | c | a | a | a | b | b | a | V8 |
| | 3ch | | a | c | c | c | c | c | a | a | a | a | a | b | V8 |
| | 3ch | | a | c | c | c | c | c | a | a | a | a | b | b | V8 |
| | 3ch | | c | a | c | c | c | c | a | a | a | b | a | b | V8 |
| | 3ch | | c | a | c | c | c | c | a | a | a | b | b | b | V8 |
| Mute compression ratio | 1ch | | b | b | c | c | c | c | b | a | a | Var* | b | b | V4 |
| | 3ch | | c | c | c | c | b | b | a | b | a | b | b | Var* | V9 |

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| Item | | Symbol | SW,VR mode | | | | | | | | | | | | Test point |
|-----------------------------|----------|--------------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| | | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | |
| Control pin flow-in current | 1ch | I _{CTL1} | c | c | c | c | c | c | a | a | a | a | b | b | A2 |
| | 2ch | I _{CTL2} | c | c | c | c | c | c | a | a | a | b | a | b | A3 |
| | 3ch | I _{CTL3} | c | c | c | c | c | c | a | a | a | b | b | a | A4 |
| Pin voltage | (Pin 1) | V _{pin1} | c | c | c | c | c | c | a | a | a | b | b | b | V14 |
| | (Pin 1) | V _{pin1} | c | c | c | c | c | c | a | a | a | a | b | b | V14 |
| | (Pin 2) | V _{pin2} | c | c | c | c | c | c | a | a | a | b | b | b | V2 |
| | (Pin 5) | V _{pin5} | c | c | c | c | c | c | a | a | a | b | b | b | V16 |
| | (Pin 5) | V _{pin5} | c | c | c | c | c | c | a | a | a | b | a | b | V16 |
| | (Pin 6) | V _{pin6} | c | c | c | c | c | c | a | a | a | b | b | b | V5 |
| | (Pin 7) | V _{pin7} | c | c | c | c | c | c | a | a | a | b | b | b | V7 |
| | (Pin 8) | V _{pin8} | c | c | c | c | c | c | a | a | a | b | b | b | V18 |
| | (Pin 8) | V _{pin8} | c | c | c | c | c | c | a | a | a | b | b | a | V18 |
| | (Pin 9) | V _{pin9} | c | c | c | c | c | c | a | a | a | b | b | b | V17 |
| | (Pin 9) | V _{pin9} | c | c | c | c | c | c | a | a | a | b | b | a | V17 |
| | (Pin 12) | V _{pin12} | c | c | c | c | c | c | a | a | a | b | b | b | V15 |
| | (Pin 12) | V _{pin12} | c | c | c | c | c | c | a | a | a | b | a | b | V15 |
| | (Pin 16) | V _{pin16} | c | c | c | c | c | c | a | a | a | b | b | b | V13 |
| | (Pin 16) | V _{pin16} | c | c | c | c | c | c | a | a | a | a | b | b | V13 |

(Note) Var*: While monitoring pins 2, 6, 7, adjust so that the minimum output is obtained.

Mute Threshold: While monitoring pins 3, 11, measure the minimum and maximum values of V10, V12 when the minimum output is obtained.



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