

Monolithic Linear IC

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.

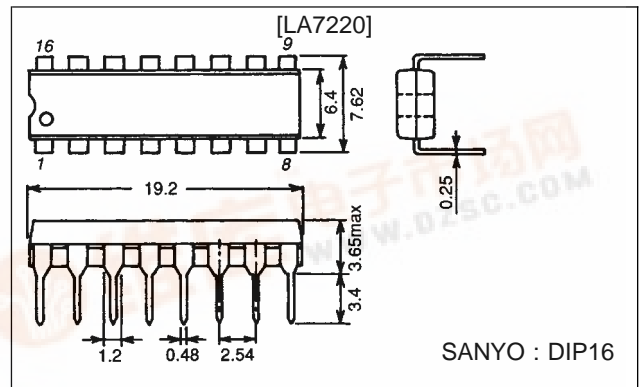
Package Dimensions

unit : mm

3006B-DIP16

Features

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



SANYO : DIP16

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 ≤ 65°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

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 V _{p-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 V _{p-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			V _{p-p}

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Parameter		Symbol	Conditions	min	typ	max	Unit
2nd harmonic voltage		H2	$R_g = 50 \Omega$, 4.0 Vp-p, $f = 1 \text{ MHz}$, $R_L = \infty$, (Note 1)	-46	-55		dB
3rd harmonic voltage		H3	$R_g = 50 \Omega$, 4.0 Vp-p, $f = 1 \text{ MHz}$, $R_L = \infty$, (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		$R_g = 500 \Omega$, $R_L = \infty$, other channel input $R_g = 50 \Omega$, 2 Vp-p, $f = 3.58 \text{ MHz}$, (Note 4)	-50	-68		dB
	2ch			-50	-68		dB
	3ch			-50	-68		dB
Mute compression ratio			$R_g = 600 \Omega$, 2 Vp-p, $f = 1 \text{ kHz}$, $R_L = \infty$, series resistance 10 k Ω , (Note 3)		-60		dB
Control pin flow-in current		I_{CTL}	(Note 1)		8		μA
Input impedance		Z_{IN}	(Note 1)		10		k Ω
Output impedance		Z_{OUT}	(Note 1)		29		Ω
Pin voltage	(Pin 1)	V_{pin1}	$V_{pin15} = 0 \text{ V}$	Test point: V14	7.9		V
			$V_{pin15} = 12 \text{ V}$		7.9		V
	(Pin 2)	V_{pin2}		Test point: V2	7.2		V
	(Pin 5)	V_{pin5}	$V_{pin13} = 0 \text{ V}$	Test point: V16	7.9		V
			$V_{pin13} = 12 \text{ V}$		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}	$V_{pin10} = 0 \text{ V}$	Test point: V18	7.9		V
			$V_{pin10} = 12 \text{ V}$		7.9		V
	(Pin 9)	V_{pin9}	$V_{pin10} = 0 \text{ V}$	Test point: V17	7.9		V
			$V_{pin10} = 12 \text{ V}$		7.9		V
	(Pin 12)	V_{pin12}	$V_{pin13} = 0 \text{ V}$	Test point: V15	7.9		V
$V_{pin13} = 12 \text{ V}$			7.9			V	
(Pin 16)	V_{pin16}	$V_{pin15} = 0 \text{ V}$	Test point: V13	7.9		V	
		$V_{pin15} = 12 \text{ V}$		7.9		V	

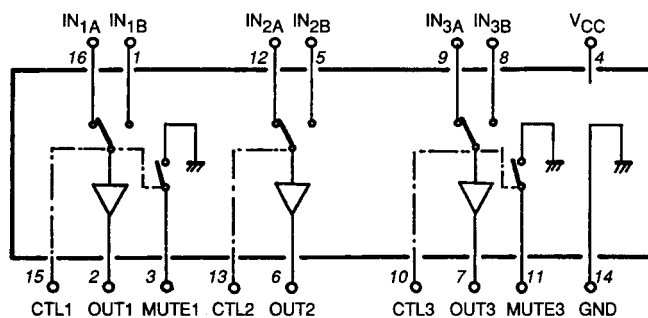
Note 1. Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.

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.

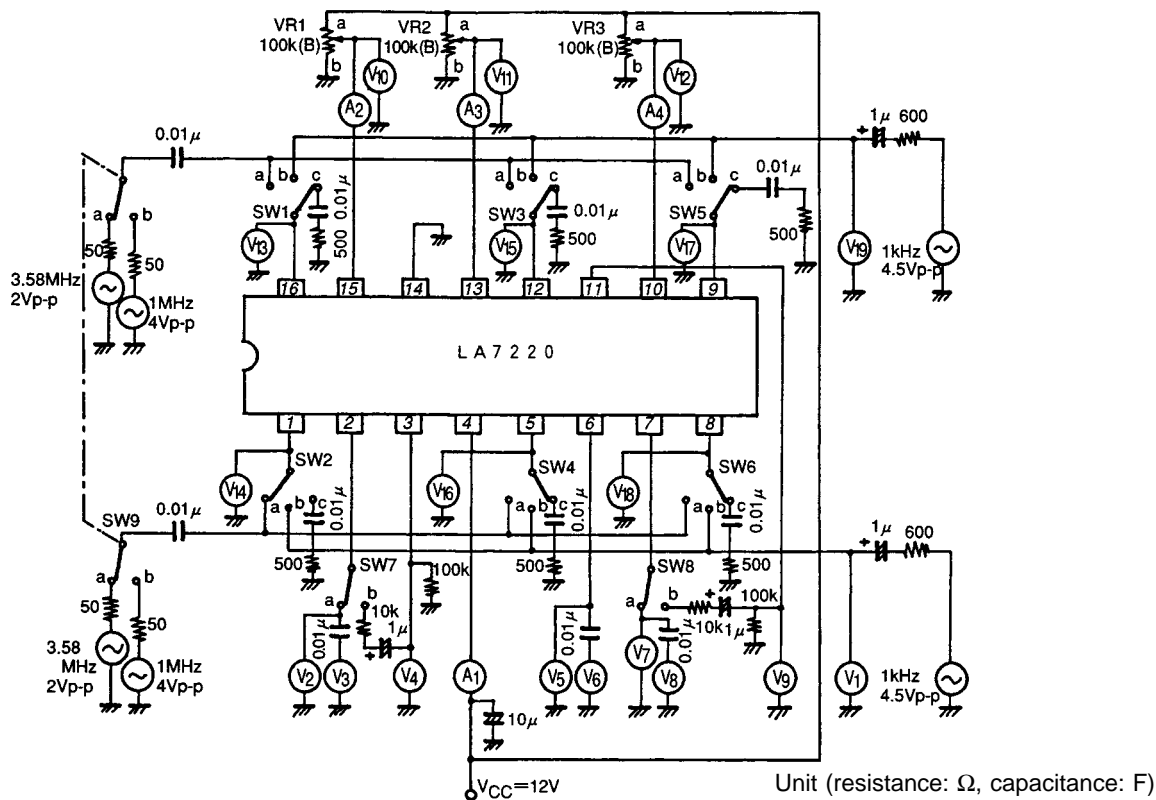
2. Measurements are made using input A and B.
3. Measurements are made for 1ch, 3ch.
4. Measurements are made for each of 1ch, 2ch, 3ch using input A and B on other channels.

Equivalent Circuit Block Diagram



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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 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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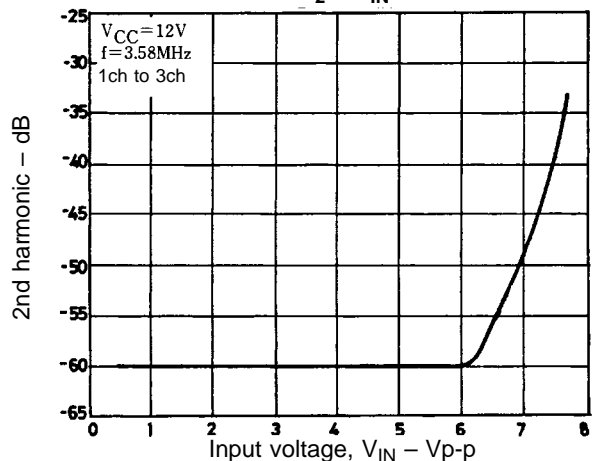
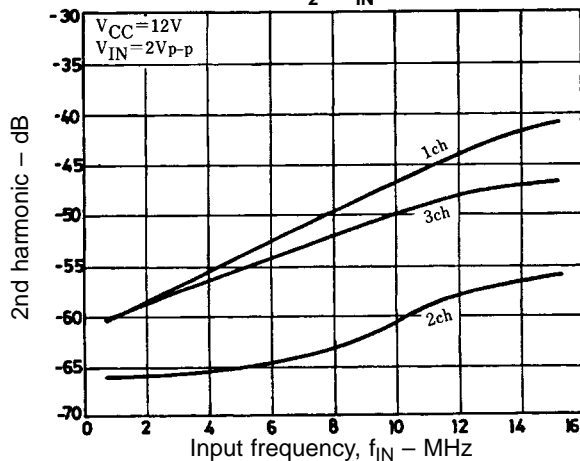
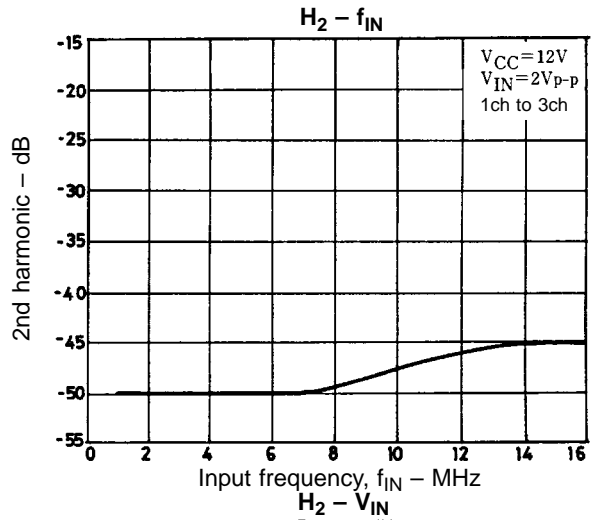
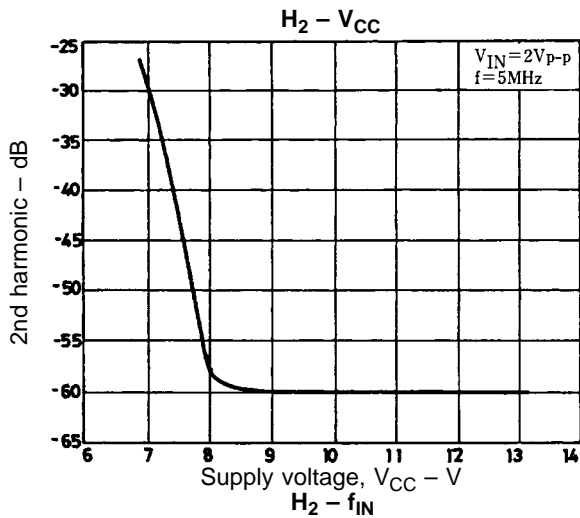
Item	Symbol	SW, VR mode											Test point		
		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2		VR3	
Maximum input voltage	1chA	$V_{IN\ max}$	b	c	c	c	c	c	a	a	a	a	b	b	V19
	1chB	$V_{IN\ max}$	c	b	c	c	c	c	a	a	a	b	b	b	V1
	2chA	$V_{IN\ max}$	c	c	b	c	c	c	a	a	a	b	a	b	V19
	2chB	$V_{IN\ max}$	c	c	c	b	c	c	a	a	a	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		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
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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