

SANYO

No.2896

LA7220M

Monolithic Linear IC

Electronic Switch
for Use in VTR, Audio Applications

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

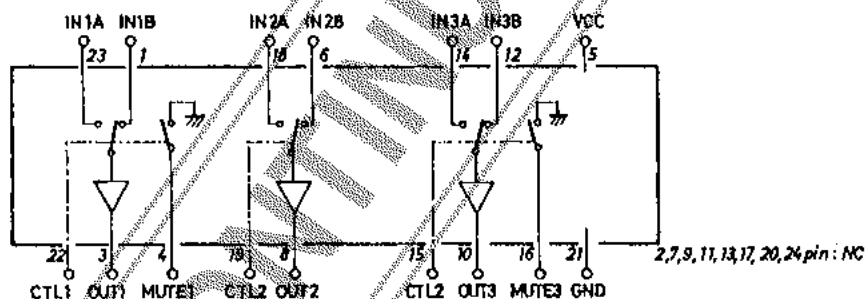
- 3-channel 2-position switch
- Wide input dynamic range
- Low distortion
- Good frequency characteristic
- Muting available

Maximum Ratings at $T_a = 25^\circ\text{C}$

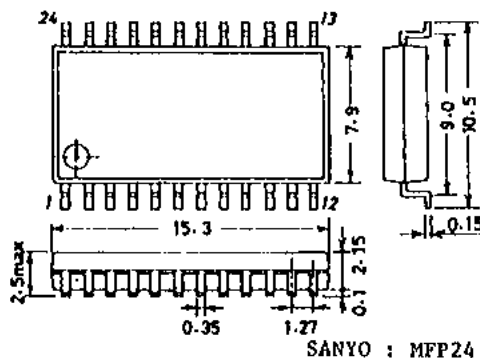
Maximum Supply Voltage	V_{CC} max	15	V
Allowable Power Dissipation	P_d max	500	mW
Operating Temperature	T_{opg}	-20 to +65	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +125	$^\circ\text{C}$

 $T_a \leq 65^\circ\text{C}$ **Operating Conditions at $T_a = 25^\circ\text{C}$**

Recommended Supply Voltage	V_{CC}	12	V
Operating Voltage Range	V_{CC} op	9 to 13	V

Equivalent Circuit Block Diagram

The application circuit diagrams and circuit constants herein are included as an example and provide no guarantee for designing equipment to be mass-produced. The information herein is believed to be accurate and reliable. However, no responsibility is assumed by SANYO for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

Case Outline 3045B-M241C (unit: mm)

Specifications and information herein are subject to change without notice.

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Operating Characteristics at Ta=25°C, V _{CC} =12V				min	typ	max	unit
Current Dissipation	I _{CC}				30.0	39.9	mA
Total Harmonic Distortion	THD	*1, R _g =600Ω, 4.5Vp-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, 2Vp-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	V _{inmax}	*1, R _g =600Ω, f=1kHz, R _L =∞, THD=1%		5.0			Vp-p
2nd Harmonic Voltage	H2	*1, R _g =50Ω, 4.0Vp-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, 2Vp-p, f=3.58MHz		-50	-68		dB
2ch		*4, "		-50	-68		dB
3ch		*4, "		-50	-68		dB
Mute Compression Ratio		*3, R _g =600Ω, 2Vp-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.

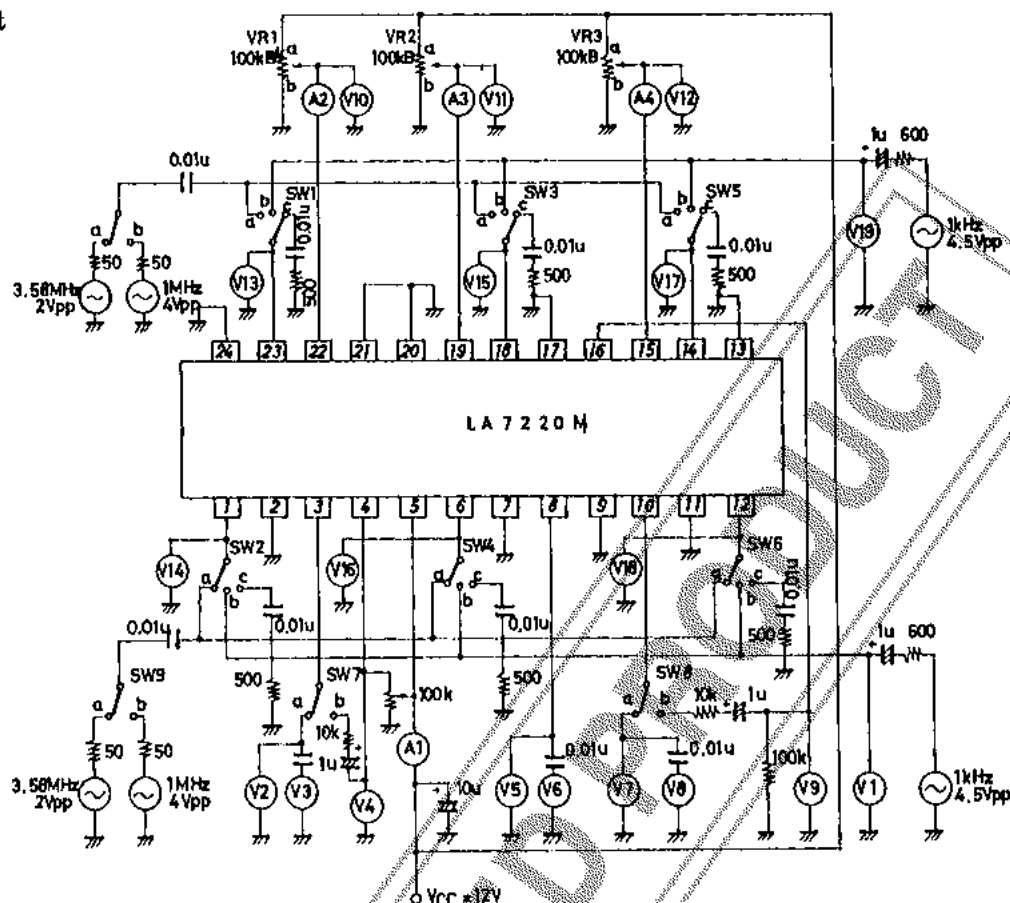
*2 Measurements are made using input A and input B.

*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	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	VNO	c	c	c	c	c	c	a	a	a	a	b	b	V3
	1 chB	VNO	c	c	c	c	c	c	a	a	a	b	b	b	V3
	2 chA	VNO	c	c	c	c	c	c	a	a	a	b	a	b	V6
	2 chB	VNO	c	c	c	c	c	c	a	a	a	b	b	b	V6
	3 chA	VNO	c	c	c	c	c	c	a	a	a	b	b	a	V8
	3 chB	VNO	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	ΔVPED	c	c	c	c	c	c	a	a	a	a/b	b	b	V2
	2 ch	ΔVPED	c	c	c	c	c	c	a	a	a	b	a/b	b	V5
	3 ch	ΔVPED	c	c	c	c	c	c	a	a	a	b	b	a/b	V7
Maximum Input Voltage	1 chA	Vinmax	b	c	c	c	c	c	a	a	a	a	b	b	V19
	1 chB	Vinmax	c	b	c	c	c	c	a	a	a	b	b	b	V1
	2 chA	Vinmax	c	c	b	c	c	c	a	a	a	b	a	b	V19
	2 chB	Vinmax	c	c	c	b	c	c	a	a	a	b	b	b	V1
	3 chA	Vinmax	c	c	c	c	b	c	a	a	a	b	b	a	V19
	3 chB	Vinmax	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	a	a	a	a	a	b	b	V3
	1 ch		c	c	a	c	c	a	a	a	a	b	a	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
	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	b	a	b	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	a	c	c	c	a	a	a	b	a	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		a	c	c	c	c	c	a	a	a	a	b	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	ICTL1	c	c	c	c	c	c	a	a	a	a	b	b	A2
	2 ch	ICTL2	c	c	c	c	c	c	a	a	a	b	a	b	A3
	3 ch	ICTL3	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.

