Monolithic Linear IC

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

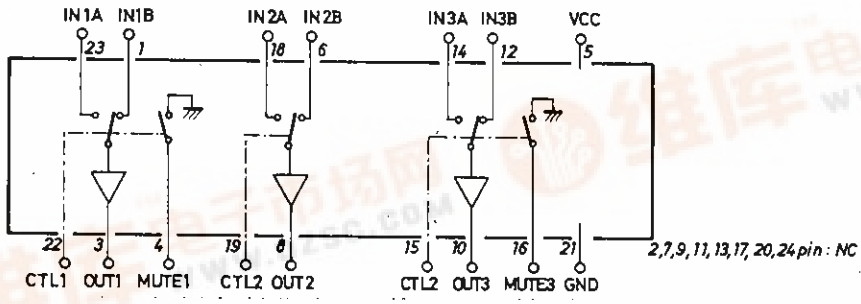
Maximum Ratings at Ta = 25°C

				unit
Maximum Supply Voltage	V_{CC} max		15	V
Allowable Power Dissipation	Pd max	Ta ≦ 65°C	500	mW
Operating Temperature	**Topr**		−20 to +65	°C
Storage Temperature	Tstg		−40 to +125	°C

Operating Conditions at Ta = 25°C

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

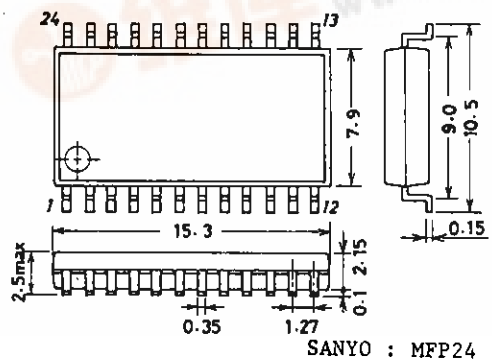
Equivalent Circuit Block Diagram



Package Dimensions

(unit : mm)

3045B



SANYO : MFP24

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,	Rg = 600Ω, 4.5Vp-p, f = 1kHz $R_L = \infty$		0.007	0.1	%
Noise Voltage	V_{NO}	*1,	Rg = 600Ω, f = 20Hz to 20kHz $R_L = \infty$		−93	−80	dBs
Crosstalk 1ch CR1		*2,	Input 1:Rg = 50Ω, 2Vp-p, f = 3.58MHz, Input 2:Rg = 500Ω		−50		dB
2ch CR2		*2,	Input 1:Rg = 50Ω		−60		dB
3ch CR3		*2,	Input 1:Rg = 50Ω		−50		dB
Pedestal Level	ΔVped	*1,	V_{CTL}(Pins 10, 13, 15) = 0 to12V	−100	0	+100	mV
Maximum Input Voltage	vinmax	*1,	Rg = 600Ω, f = 1kHz, $R_L = \infty$, THD = 1%	5.0			Vp-p
2nd Harmonic Voltage	H2	*1,	Rg = 50Ω, 4.0Vp-p, f = 1MHz, $R_L = \infty$	−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,	Rg = 500Ω, $R_L = \infty$, other channel input Rg = 50Ω, 2Vp-p, f = 3.58MHz	−50	−68		dB
2ch		*4,	"	−50	−68		dB
3ch		*4,	"	−50	−68		dB
Mute Compression Ratio		*3,	Rg = 600Ω, 2Vp-p, f = 1kHz, $R_L = \infty$, 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

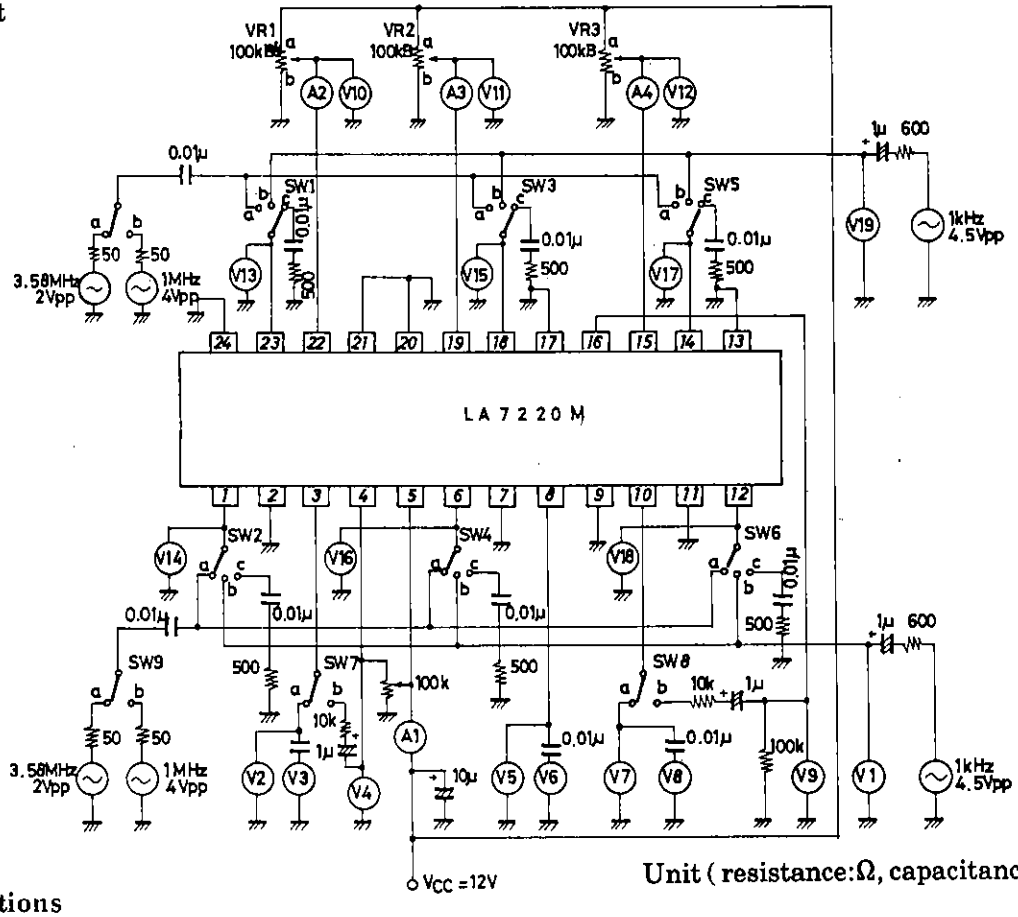
*1 Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.
Input A : V_{CTL}(pins 10, 13, 15) is 12V at the measurement mode.
Input B : V_{CTL} is 0V at the measurement mode.

*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.

Test Circuit



Unit (resistance:Ω, capacitance:F)

Test Conditions

Item		Symbol	SW VR Mode												Test Point
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2	VR3	
Current Dissipation		ICC	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	VNO	c	c	c	c	c	c	a	a	a	a	b	b	V3
	1chB	VNO	c	c	c	c	c	c	a	a	a	b	b	b	V3
	2chA	VNO	c	c	c	c	c	c	a	a	a	b	a	b	V6
	2chB	VNO	c	c	c	c	c	c	a	a	a	b	b	b	V6
	3chA	VNO	c	c	c	c	c	c	a	a	a	b	b	a	V8
	3chB	VNO	c	c	c	c	c	c	a	a	a	b	b	b	V8
Crosstalk	1chA	CR1	c	a	c	c	c	c	a	a	a	a	b	b	V3
	1chB	CR1	a	c	c	c	c	c	a	a	a	b	b	b	V3
	2chA	CR2	c	c	c	a	c	c	a	a	a	b	a	b	V6
	2chB	CR2	c	c	a	c	c	c	a	a	a	b	b	b	V6
	3chA	CR3	c	c	c	c	c	a	a	a	a	b	b	a	V8
	3chB	CR3	c	c	c	c	a	c	a	a	a	b	b	b	V8
Pedestal	1ch	⊿VPED	c	c	c	c	c	c	a	a	a	a/b	b	b	V2
	2ch	⊿VPED	c	c	c	c	c	c	a	a	a	b	a/b	b	V5
	3ch	⊿VPED	c	c	c	c	c	c	a	a	a	b	b	a/b	V7
Maximum Input Voltage	1chA	Vinmax	b	c	c	c	c	c	a	a	a	a	b	b	V19
	1chB	Vinmax	c	b	c	c	c	c	a	a	a	b	b	b	V1
	2chA	Vinmax	c	c	b	c	c	c	a	a	a	b	a	b	V19
	2chB	Vinmax	c	c	c	b	c	c	a	a	a	b	b	b	V1
	3chA	Vinmax	c	c	c	c	b	c	a	a	a	b	b	a	V19
	3chB	Vinmax	c	c	c	c	c	b	a	a	a	b	b	b	V1

Item		Symbol	SW VR Mode												Test Point
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2	VR3	
2nd Harmonic	1 ch A	H2-1	a	c	c	c	c	c	a	a	b	a	b	b	V3
	1 ch B	H2-1	c	a	c	c	c	c	a	a	b	b	b	b	V3
	2 ch A	H2-2	c	c	a	c	c	c	a	a	b	b	a	b	V6
	2 ch B	H2-2	c	c	c	a	c	c	a	a	b	b	b	b	V6
	3 ch A	H2-3	c	c	c	c	a	c	a	a	b	b	b	a	V8
	3 ch B	H2-3	c	c	c	c	c	a	a	a	b	b	b	b	V8
3rd Harmonic	1 ch A	H3-1	a	c	c	c	c	c	a	a	b	a	b	b	V3
	1 ch B	H3-1	c	a	c	c	c	c	a	a	b	b	b	b	V3
	2 ch A	H3-2	c	c	a	c	c	c	a	a	b	b	a	b	V6
	2 ch B	H3-2	c	c	c	a	c	c	a	a	b	b	b	b	V6
	3 ch A	H3-3	c	c	c	c	a	c	a	a	b	b	b	a	V8
	3 ch B	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	c	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

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.