



# LA7282, ~~7282M~~

## VCR Audio Signal Recording / Playback Processor

### Overview

The LA7282 and 7282M are small package ICs containing all functions necessary to record and playback VCR audio signal.

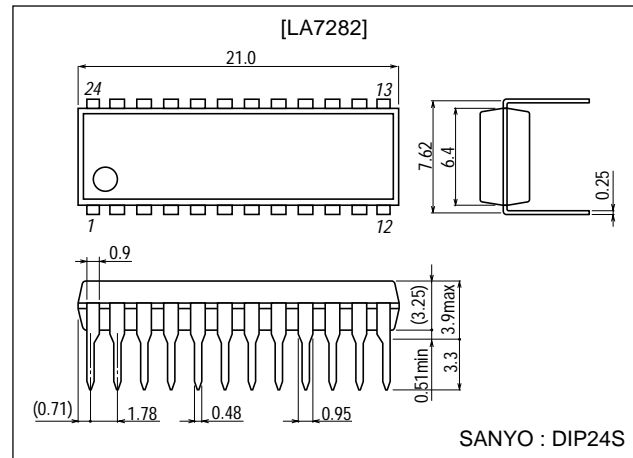
### Features

- Small package leaves large space for other components.
- Delete of In and Output electrolysis capacitor.
- Low capacitor (0.1 $\mu$ F) for the line amplifier inputs (PB IN and AUDIO IN)
- Non-Adjustment of PB Gain by less gain scatter.

### Package Dimensions

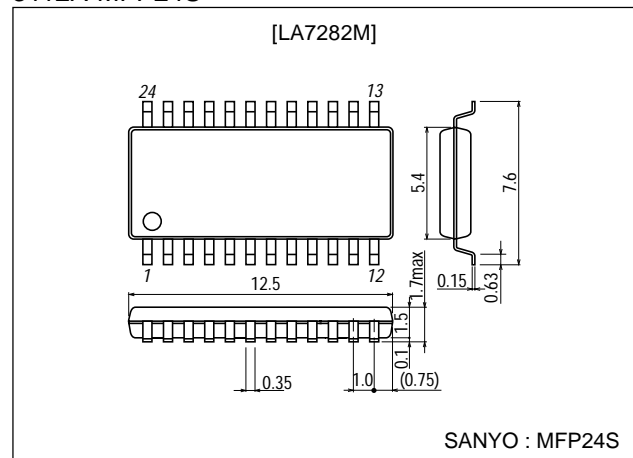
unit:mm

3067A-DIP24S



unit:mm

3112A-MFP24S



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## Specifications

### Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max		14	V
Pin 1 input voltage	V <sub>IN1</sub>	Ta=65°C, f=80kHz (sin), I <sub>LK</sub> =10μA	90 (±45)	Vp-p
Pin 1 input current	I <sub>IN1</sub>		±1.5	mA
Allowable power dissipation	Pd max	Ta≤65°C, when mounted on the recommended PCB	400	mW
Operating temperature	Topr		-10 to +65	°C
Storage temperature	Tstg		-55 to +125	°C

### Operating Conditions at Ta = 25°C

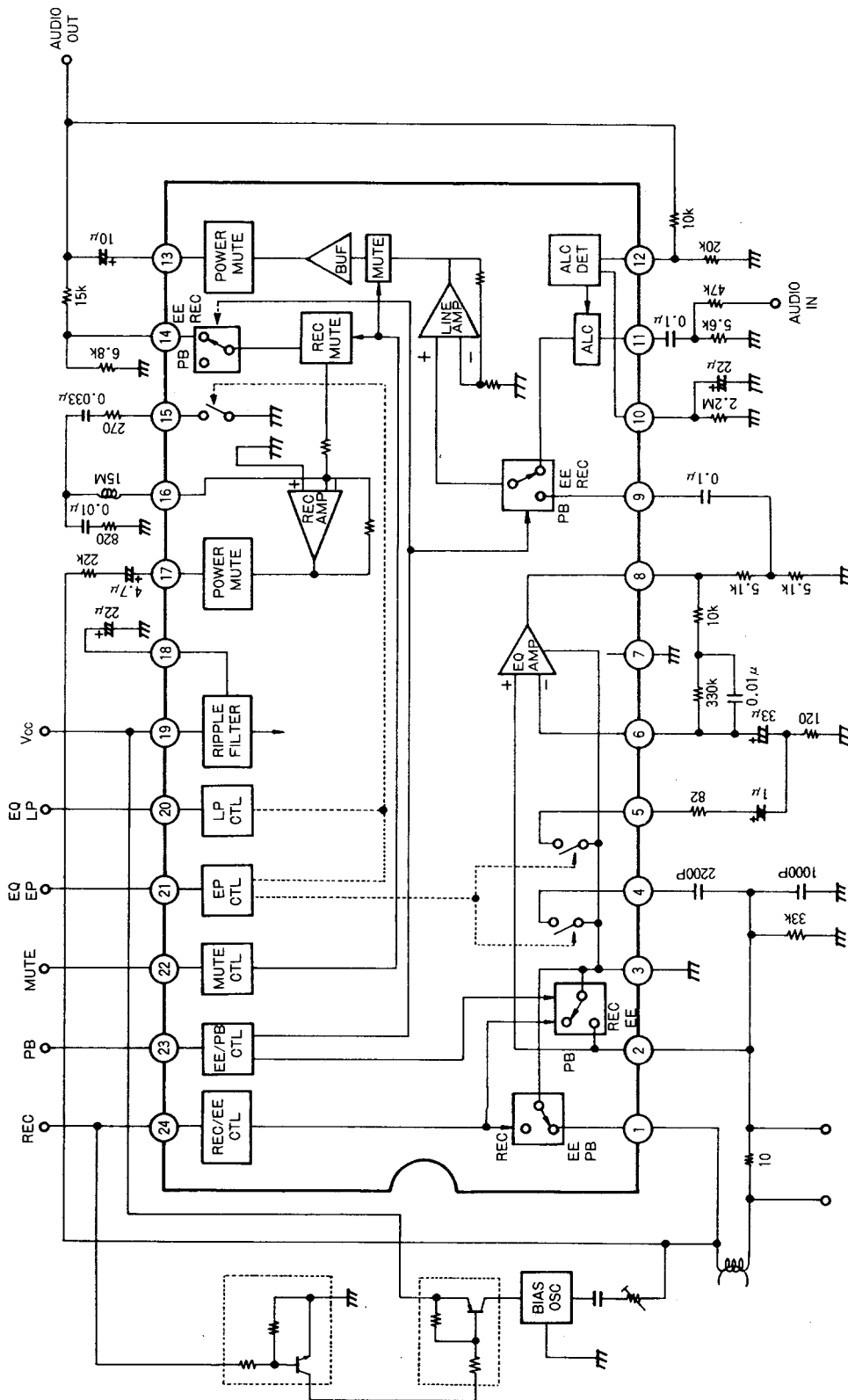
Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		12.0	V
Operating voltage range	V <sub>CC</sub> op		11.25 to 12.75	V

### Operating Characteristics at Ta = 25°C, V<sub>CC</sub>=12V, f=1kHz, 0dBv = 1.0Vrms

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain (FE)	I <sub>CCE</sub>	Quiescent	8.0	12.0	17.0	mA
Current drain (PB)	I <sub>CCP</sub>	Quiescent	9.0	13.0	18.0	mA
Current drain (REC)	I <sub>CCR</sub>	Quiescent	7.0	10.0	14.0	mA
Overall gain at PB mode	V <sub>GPB</sub>	EQ IN-LINE OUT, V <sub>O</sub> =-5dBv	59.0	59.5	60.0	dB
[Equalizing amplifier]						
Open loop voltage gain	V <sub>GOE</sub>	V <sub>O</sub> =-5dBv	66.0	71.0		dB
Equivalent input noise voltage	V <sub>NIE</sub>	Rg=2.2kΩ, DIN audio filter		1.2	1.8	μVrms
Input impedance	Z <sub>INE</sub>			130		kΩ
[Line amplifier]						
Voltage gain (PB IN)	V <sub>GLP</sub>	V <sub>O</sub> =-5dBv	21.0	21.5	22.0	dB
Voltage gain (EE, REC IN)	V <sub>GLR</sub>	V <sub>O</sub> =-5dBv	21.0	21.5	22.0	dB
Total harmonic distortion	THD <sub>L</sub>	V <sub>O</sub> =-5dBv		0.3	0.5	%
Output noise voltage	V <sub>NOL</sub>	DIN audio filter		-70.0	-64.0	dBv
Input impedance (PB IN)	Z <sub>IN1</sub>			120		kΩ
Input impedance (EE, REC IN)	Z <sub>IN2</sub>			120		kΩ
Maximum output voltage	V <sub>OML</sub>	THD=3%	1.5	2.1		Vrms
Output voltage at ALC	V <sub>OA</sub>	V <sub>IN</sub> =-28dBv	-9.0	-8.0	-7.0	dBv
ALC Effect	ALC	V <sub>IN</sub> =-28 to -8dBv		1.5	3.0	dB
Total harmonic distortion at ALC	THD <sub>A</sub>	V <sub>IN</sub> =-28dBv		0.25	0.6	%
[Recording amplifier]						
Voltage gain (open loop)	V <sub>GOR</sub>	V <sub>O</sub> =-5dBv	47.0	52.0		dB
Voltage gain (closed loop)	V <sub>GCR</sub>	V <sub>O</sub> =-5dBv	12.5	13.0	13.5	dB
Total harmonic distortion	THD <sub>R</sub>	V <sub>O</sub> =-5dBv		0.1	0.3	%
Input impedance	Z <sub>INR</sub>			50		kΩ
Maximum output voltage	Z <sub>OMR</sub>	THD=3%	1.5	2.0		Vrms
[Muting circuit]						
On voltage	V <sub>MON</sub>	Pin 22, DC	3.8		6.0	V
Off voltage	V <sub>MOFF</sub>	Pin 22, DC	0		1.0	V
Mute attenuation level (PB, EE)	M <sub>P, ME</sub>		80.0	90.0		dB
Mute attenuation level (REC)	M <sub>R</sub>		65.0	70.0		dB
[PB/EE selector circuit]						
PB mode hold voltage	V <sub>PP</sub>	Pin 23, DC	0		1.0	V
EE mode hold voltage	V <sub>PPE</sub>	Pin 23, DC	3.3		6.0	V
[REC/EE selector circuit]						
REC mode hold voltage	V <sub>RR</sub>	Pin 24, DC	3.3		V <sub>CC</sub>	V
EE mode hold voltage	V <sub>RE</sub>	Pin 24, DC	0		1.0	V
[Equalizer selector circuit]						
Switch on voltage	V <sub>EON</sub>	Pin 20, 21, DC	3.5		6.0	V
Switch off voltage	V <sub>EOFF</sub>	Pin 20, 21, DC	0		0.8	V
[Head selector switch]						
Pin 1 on resistance	R <sub>ON1</sub>	I1=±1mA		15	30	Ω
Pin 2 on resistance	R <sub>ON2</sub>	I2=±1mA		5	10	Ω
Pin 1 input voltage	V <sub>IN1</sub>	Ta=65°C, f=80kHz (sin), I <sub>LK</sub> =10μA			±45	V

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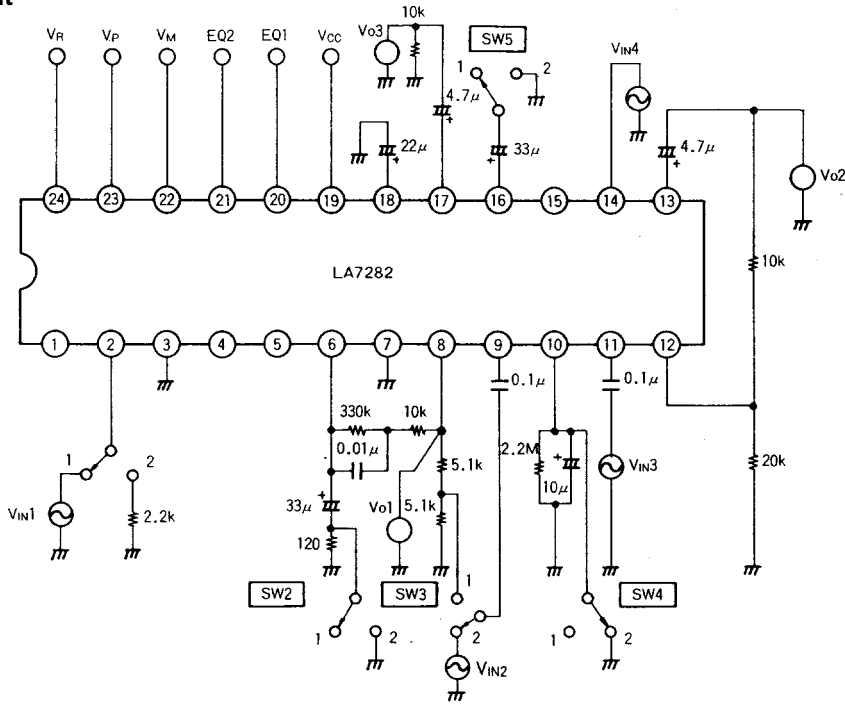
## Block Diagram



Unit (resistance : Ω, capacitance : F)

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## Test Circuit

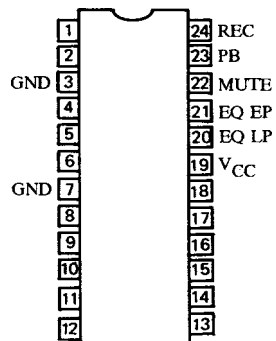


Unit (resistance :  $\Omega$ , capacitance : F)

## <Switch Setting Table>

Parameter (Symbol)	SW1	SW2	SW3	SW4	SW5	$V_M$	$V_P$	$V_R$	Input	Measurement
$I_{CCE}$	2	1	1	2	1	GND	5V	GND	-	A
$I_{CCP}$	2	1	1	2	1	GND	GND	GND	-	A
$I_{CCR}$	2	1	1	2	1	GND	5V	5V	-	A
$V_{GPB}$	1	1	1	2	1	GND	GND	GND	$V_{IN1}$	$V_{O2}$
$V_{GOE}$	1	2	2	2	1	GND	GND	GND	$V_{IN1}$	$V_{O1}$
$V_{NIE}$	2	1	2	2	1	GND	GND	GND	-	$V_{O1}$
$V_{GLP}, THD_L, V_{OML}$	2	1	2	2	1	GND	GND	GND	$V_{IN2}$	$V_{O2}$
$V_{GLR}$	2	1	1	2	1	GND	5V	GND	$V_{IN3}$	$V_{O2}$
$V_{NOL}$	2	1	2	2	1	GND	5V	GND	-	$V_{O2}$
$V_{OA}, ALC, THD_A$	2	1	2	1	1	GND	5V	GND	$V_{IN3}$	$V_{O2}$
$V_{GOR}$	2	1	2	2	2	GND	5V	GND	$V_{IN4}$	$V_{O3}$
$V_{GCR}, THDR, V_{OMR}$	2	1	2	2	1	GND	5V	GND	$V_{IN4}$	$V_{O3}$
$M_P$	1	1	1	2	1	5V	GND	GND	$V_{IN1}$	$V_{O2}$
$M_R$	2	1	1	2	1	5V	5V	GND	$V_{IN4}$	$V_{O3}$
$M_E$	2	1	2	2	1	5V	5V	GND	$V_{IN2}$	$V_{O2}$

## Pin Assignment



Top view

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## Pin Functions

Unit (resistance :  $\Omega$ )

Pin No.	Function	Terminal Circuit	Description
1	Head Switch 1 (High voltage)		EE, PB : on ; REC : off On resistance : $10\Omega$ , type. With stand voltage during off : $\pm 45V$ ( $f=80kHz$ )
2	EQ AMP Input and Head Switch 2		Input playback signal to the head. Input impedance : $130k\Omega$ , typ. EE, REC : on ; PB : off Switch on resistance : $5\Omega$ , typ.
3	GND		An exclusive GND for pin 1 head switch 1, EQ AMP and playback EP switch.
4	EP Switch 1		Sets the tape head resonant frequency. On resistance : $15\Omega$ typ. Input impedance : $120k\Omega$ , typ. (playback EP mode)
5	EP Switch 2		Increases the voltage gain at higher frequencies by reducing negative feedback amount of the PB EQ AMP. On resistance : $15\Omega$ , typ. Input impedance : $12k\Omega$ , typ. (playback EP mode)
6	EQ AMP NFB		Input of negative feedback of the EQ AMP to establish desired equalizing characteristics.
7	GND		Common return for all circuits except for EQ AMP and head switch 1.
8	EQ AMP Output		
9	LINE AMP PB Input		Input PB signal to the EQ AMP. The input impedance of pin 9 is high ( $120k\Omega$ ) and requires a small coupling capacitor of $0.1\mu F$ .
10	ALC FILTER		Connecting this pin to GND through a capacitor enables detection. The RC time constant sets attack recovery time.
11	LINE AMP Audio Input		Input EE, REC signal.  Select value of $R_1$ and $R_2$ so that the reference input is at the shoulder of the ALC.  The amplifier gain should be set for 21.5dB. The input impedance of pin 11 is high ( $120k\Omega$ ) and requires a small coupling capacitor of $0.1\mu F$ .
12	ALC Detect Input		 Accepts the output signal of LINE amplifier. The ALC level is determined by the voltage divider consisting of $R_1$ and $R_2$ .
13	LINE AMP Output		Output impedance : $50\Omega$ , typ.
14	REC AMP Input		Input recording signal from LINE AMP.  Input current is set by the divider consisting of $R_1$ and $R_2$ . Pin 14 requires no coupling capacitor since REC AMP is to operate at zero level and as inverting amplifier.

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