Ordering number:ENN4040

Monolithic Linear IC

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.

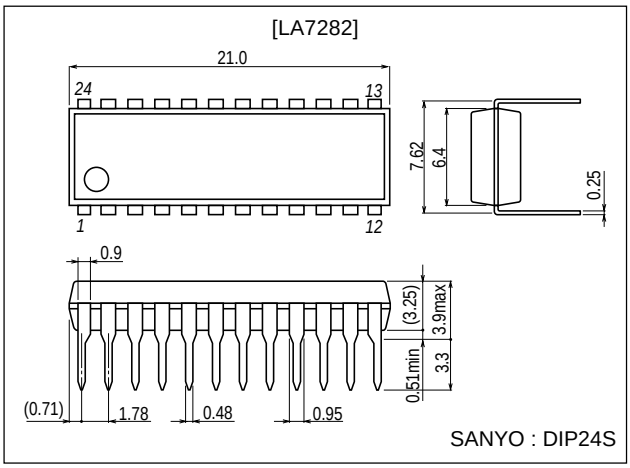
Features

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

Package Dimensions

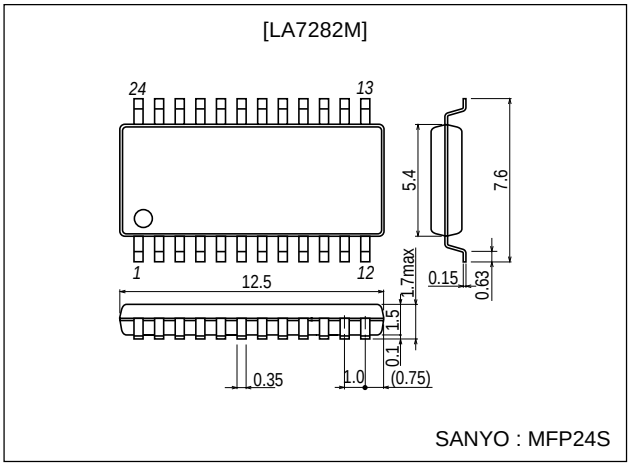
unit:mm

3067A-DIP24S



unit:mm

3112A-MFP24S



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Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maxumum supply voltage	V_{CC} max		14	V
Pin 1 input voltage	V_{IN1}	Ta=65˚C, f=80kHz (sin), I_{LK}=10µA	90 (±45)	Vp-p
Pin 1 input current	I_{IN1}		±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

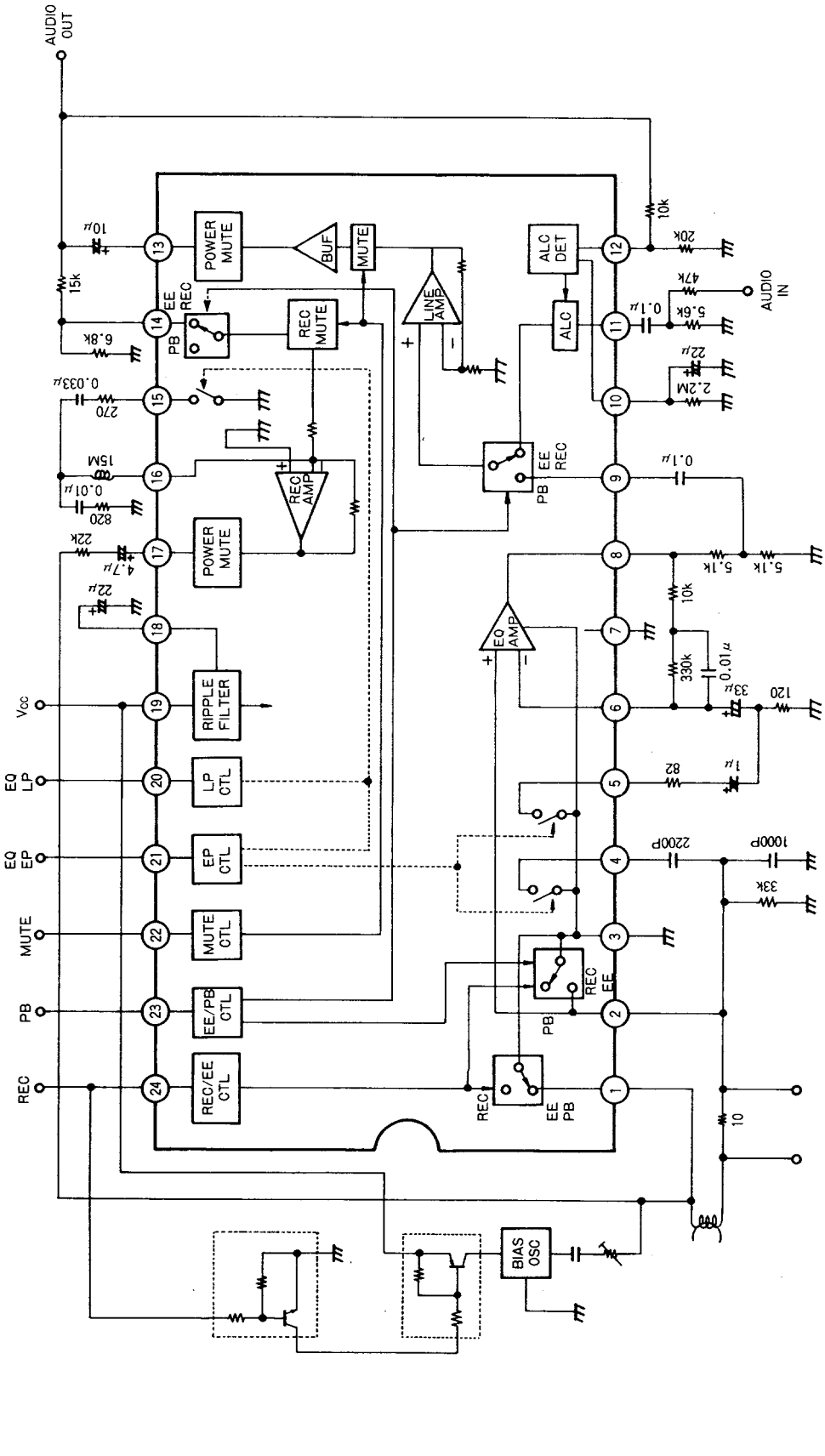
Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		12.0	V
Operating voltage range	V_{CC} op		11.25 to 12.75	V

Operating Characteristics at Ta = 25˚C, V_{CC}=12V, f=1kHz, 0dBv= : 1.0Vrms

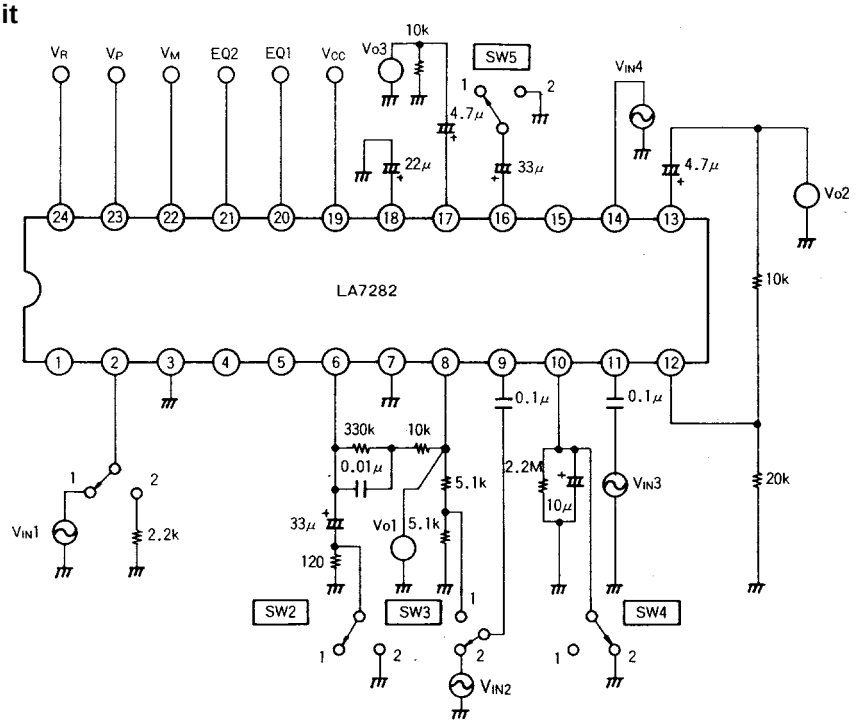
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain (FE)	I_{CCE}	Quiescent	8.0	12.0	17.0	mA
Current drain (PB)	I_{CCP}	Quiescent	9.0	13.0	18.0	mA
Current drain (REC)	I_{CCR}	Quiescent	7.0	10.0	14.0	mA
Overall gain at PB mode	VG_{PB}	EQ IN-LINE OUT, V_O=–5dBv	59.0	59.5	60.0	dB
[Equalizing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

Block Diagram



Unit (resistance : Ω, capacitance : F)

Test Circuit

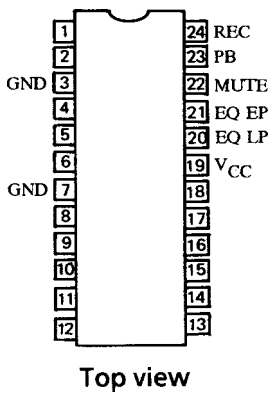


Unit (resistance : Ω, capacitance : F)

<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
ICCR	2	1	1	2	1	GND	5V	5V	–	A
VG_{PB}	1	1	1	2	1	GND	GND	GND	$V_{IN}1$	V_O2
VG_{OE}	1	2	2	2	1	GND	GND	GND	$V_{IN}1$	V_O1
V_{NIE}	2	1	2	2	1	GND	GND	GND	–	V_O1
VG_{LP}, THD_L, V_{OML}	2	1	2	2	1	GND	GND	GND	$V_{IN}2$	V_O2
VG_{LR}	2	1	1	2	1	GND	5V	GND	$V_{IN}3$	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	$V_{IN}3$	V_O2
VG_{OR}	2	1	2	2	2	GND	5V	GND	$V_{IN}4$	V_O3
VG_{CR}, THDR, V_{OMR}	2	1	2	2	1	GND	5V	GND	$V_{IN}4$	V_O3
M_P	1	1	1	2	1	5V	GND	GND	$V_{IN}1$	V_O2
M_R	2	1	1	2	1	5V	5V	GND	$V_{IN}4$	V_O3
M_E	2	1	2	2	1	5V	5V	GND	$V_{IN}2$	V_O2

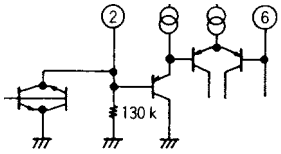
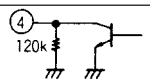
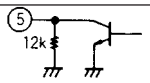
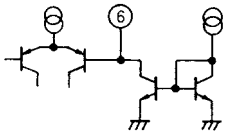
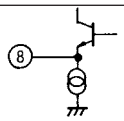
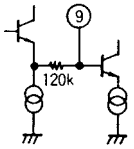
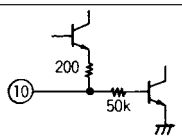
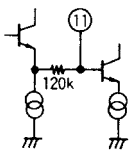
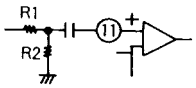
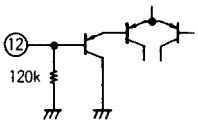
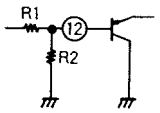
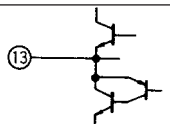
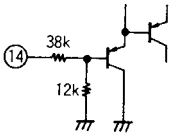
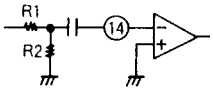
Pin Assignment



Top view

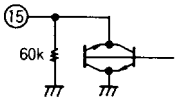
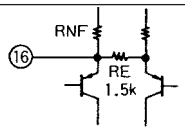
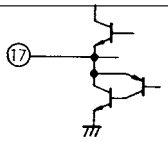
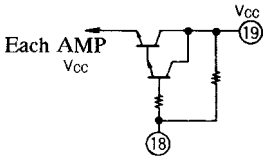
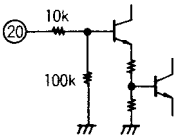
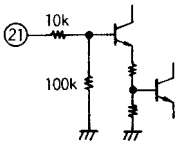
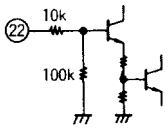
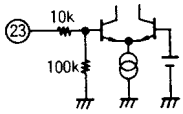
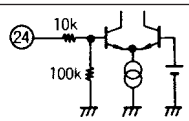
Pin Functions

Unit (resistance : Ω)

Pin No.	Function	Terminal Circuit	Description
1	Head Switch 1 (High voltage)		EE, PB : on ; REC : off On resistance : 10Ω, type. With stand voltage during off : ±45V (f=80kHz)
2	EQ AMP Input and Head Switch 2		Input playback signal to the head. Input impedance : 130kΩ, typ. EE, REC : on ; PB : off Switch on resistance : 5Ω, 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 : 15Ω typ. Input impedance : 120kΩ, 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 : 15Ω, typ. Input impedance : 12kΩ, 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 (120kΩ) and requires a small coupling capacitor of 0.1μF.
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 (120kΩ) and requires a small coupling capacitor of 0.1μF.
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 : 50Ω, typ.
14	REC AMP Input		Input recording signal from LINE AMP.  Input current is set by the divider consisting of R1 and R2. Pin 14 requires no coupling capacitor since REC AMP is to operate at zero level and as inverting amplifier.

Continued on next page.

Continued from preceding page. Unit (resistance : Ω)

Pin No.	Function	Terminal Circuit	Description
15	LP Switch		Sets the high peaking point to the frequency suitable for LP. On resistance : 15Ω typ. Input impedance : 60kΩ typ.
16	REC AMP NFB		Connecting an L, C, R network to this pin causes a peaking frequency to rise.
17	REC AMP Output		Output impedance : 40Ω typ.
18	Ripple Filter		Connecting a electrolytic capacitor across this pin and GND smoothes ripples.
19	Supply Voltage (V_{CC})		V_{CC}=15V max V_{CC}=11.25 - 12.75V typ.
20	LP Control		Applying 3.5V DC or more (6.0V max) to this pin turns on LP switch (pin 15). The switch turns off at 0.8V or below.
21	EP Control		Applying 3.5V DC or more (6.0V max.) to this pin turns on EP switch (pin 4, 5) and LP switch (pin 15). The switches turn off at 0.8V or below.
22	MUTE Control		Applying 3.8V DC or more (6.0V max.) to this pin turns on mute circuit. The mute is desabled at 1.0V or below. [Control mode]
23	PB Control		Applying 3.3V DC or more (6.0V max.) to this pin enters EE mode and 1.0V or below PB mode.
24	REC Control		Applying 3.0V DC or more (up to VCC) to this pin enters REC mode and 1.0V or below EE mode.

Mode	MUTE [L]		MUTE [H]	
	LINE AMP	REC AMP	LINE AMP	REC AMP
PB Mode	○	×	×	×
EE Mode	○	○	×	×
REC Mode	○	○	○	×

[○ : Pass signal, × : Block signal]