

**SANYO****SANYO Semiconductors****DATA SHEET****LA7320**

Monolithic Linear IC

**LA7320M****VHS VTR Playback Head Amplifier  
Recording Amplifier****Functions and Features**

(Functions) · 2-channel playback head amp

- 1-channel recording amp
- PB : 1 head select switch
- REC : 3 head select switches

(Features) · Designed for 2 heads

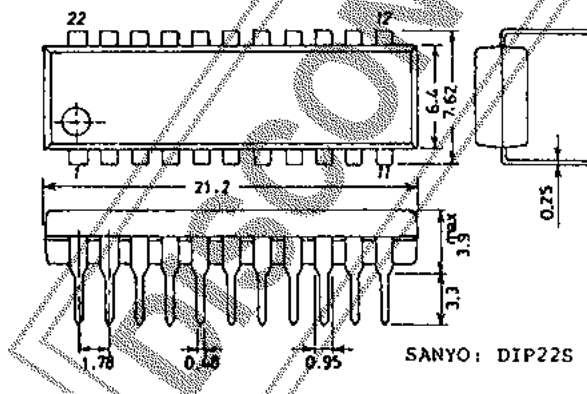
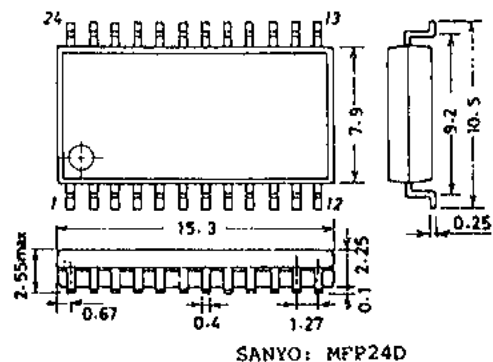
- On-chip driver transistor permitting direct recording (current type)
- On-chip head select switches (2 types) facilitating printed circuit pattern design of a set
- Load variations cause less recording current variations because of recording amp of constant-current type.

(Maximum recording current : 40mA<sub>p-p</sub>)**Maximum Ratings at Ta = 25°C**

| Maximum Supply Voltage      | V <sub>CC</sub> max |             | unit |
|-----------------------------|---------------------|-------------|------|
|                             |                     | (PB) 7.0    | V    |
|                             |                     | (REC) 14.0  | V    |
| Allowable Power Dissipation | P <sub>d</sub> max  | (DIP) 750   | mW   |
| Operating Temperature       | T <sub>opg</sub>    | -10 to +65  | °C   |
| Storage Temperature         | T <sub>stg</sub>    | -40 to +125 | °C   |

**Operating Conditions at Ta = 25°C**

| Recommended Supply Voltage | V <sub>CC</sub>    |                  | unit |
|----------------------------|--------------------|------------------|------|
|                            |                    | (PB) 5.0         | V    |
|                            |                    | (REC) 12.0       | V    |
| Operating Voltage Range    | V <sub>CC OP</sub> | (PB) 4.75 to 5.5 | V    |
|                            |                    | (REC) 10 to 13   | V    |

Case Outline 3059-D22SIC  
(unit : mm) [LA7320]Case Outline 3108-M24IC  
(unit : mm) [LA7320M]

Specifications and information herein are subject to change without notice.

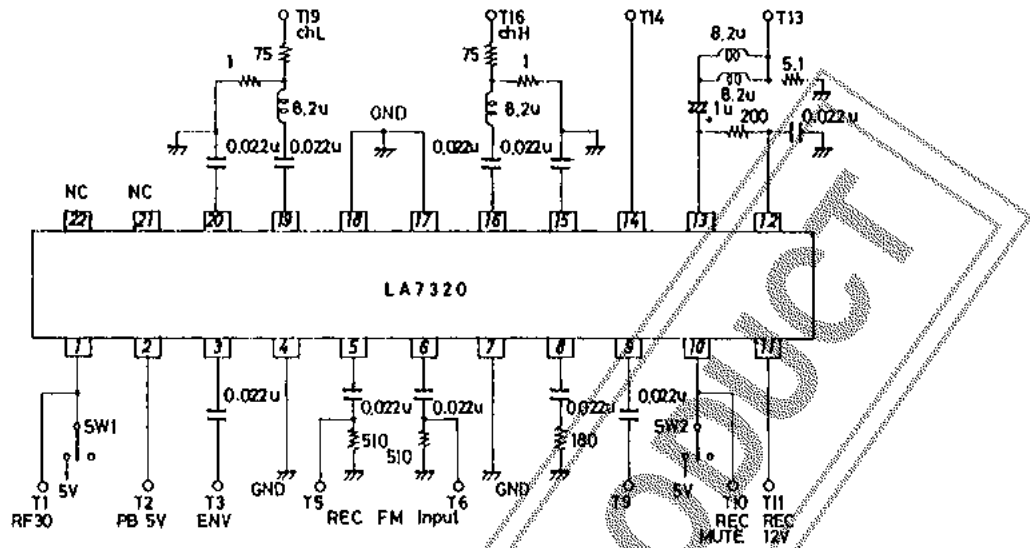
**SANYO Electric Co., Ltd. Semiconductor Company**

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

N228TA, TS No.2734-1/6

LA7320, 7320M

LA7320 Test Circuit



Operating Characteristics at T<sub>a</sub> = 25°C

| Characteristic                 | Symbol                   | Test Conditions |                       | min  | typ | max  | unit |      |                   |    |
|--------------------------------|--------------------------|-----------------|-----------------------|--|-----|------|------|------|-------------------|----|
|                                |                          | Input           | Output                |  |     |      |      |      |                   |    |
| (PB Mode)                      |                          | T2              | PB + 5V               |  |     |      |      |      |                   |    |
| Current Dissipation            | I <sub>ccp</sub>         | T2              | Pin 2 flow-in current | 9  | 12  | 15   | mA   |      |                   |    |
| Voltage Gain                   | CH1 G <sub>VP</sub> (1)  | T19             | T3                    | V <sub>i</sub> = 38mV <sub>pp</sub><br>f = 1MHz  | 1   | 66.5 | 69.5 | 62.5 | dB                |    |
|                                | CH2 G <sub>VP</sub> (2)  | T16             | T3                    |  |     |      |      |      |                   |    |
| Voltage Gain Difference        | ΔG <sub>VP</sub>         |                 |                       | G <sub>VP</sub> (1) - (2)  |     | -1.0 | 0    | 1.0  | dB                |    |
| Equivalent Input Noise Voltage | CH1 V <sub>NI</sub> (1)  |                 | T3                    | V <sub>out</sub><br>G <sub>VP</sub> (1),(2)<br>after f = 1MHz L.P.F.   | 2   |      | 1.1  | 1.5  | μV <sub>rms</sub> |    |
|                                | CH2 V <sub>NI</sub> (2)  |                 | T3                    |  |     |      |      |      |                   |    |
| Frequency Characteristic       | CH1 ΔV <sub>FP</sub> (1) | T19             | T3                    | V <sub>i</sub> = 30mV <sub>pp</sub><br>f = 100k, 7MHz<br>7MHz<br>100kHz<br>output ratio                        | 2   |      | -2.5 | 0    | dB                |    |
|                                | CH2 ΔV <sub>FP</sub> (2) | T16             | T3                    |  |     |      |      |      |                   |    |
| 2nd Harmonic Distortion        | CH1 V <sub>HDP</sub> (1) | T19             | T3                    | V <sub>i</sub> = 38mV <sub>pp</sub><br>f = 4MHz<br>8M component<br>4M component<br>output ratio                | 2   |      | -40  | -35  | dB                |    |
|                                | CH2 V <sub>HDP</sub> (2) | T16             | T3                    |  |     |      |      |      |                   |    |
| Maximum Output Level           | CH1 V <sub>OMP</sub> (1) | T19             | T3                    | V <sub>i</sub> = 1MHz<br>Output level when 3rd<br>distortion is -30dB.   | 2   |      | 0.8  | 1.0  | V <sub>pp</sub>   |    |
|                                | CH2 V <sub>OMP</sub> (2) | T16             | T3                    |  |     |      |      |      |                   |    |
| Crosstalk                      | CH1 V <sub>CR</sub> (1)  | T16             | T3                    | V <sub>i</sub> = 38mV <sub>pp</sub><br>f = 4MHz<br>V <sub>out</sub><br>G <sub>VP</sub> (1),(2)<br>output ratio | 2   |      | -40  | -35  | dB                |    |
|                                | CH2 V <sub>CR</sub> (2)  | T19             | T3                    |  |     |      |      |      |                   |    |
| Output DC Offset               | ΔV <sub>ODC</sub>        |                 | Pin 3                 | Output pin DC voltage<br>difference  | 2→1 |      | -100 | 0    | 100               | mV |

Continued on next page.

LA7320, 7320M

Continued from preceding page.

| Characteristic                           |     | Symbol               | Test Conditions |        | SW1   | SW2 | min      | typ  | max  | unit |
|--|-----|----------------------|-----------------|--------|---|-----|----------|------|------|------|
|  |     |                      | Input           | Output |   |     |          |      |      |      |
| (REC Mode)                               |     |                      | T11             |        | REC + 12V   | RF  | REC MUTE |      |      |      |
| Current Dissipation                      |     | I <sub>ccR</sub>     | T11             |        | Pin 11 flow-in current  |     | 2        | 46.0 | 57.0 | mA   |
| Voltage Gain                             | C   | G <sub>VR(C)</sub>   | T5              | T13    | V <sub>i</sub> = 300mVpp<br>f = 1MHz  |     | 2        | -8.0 | -6.0 | -4.0 |
|  | Y   | G <sub>VR(Y)</sub>   | T6              | T13    | V <sub>i</sub> = 300mVpp<br>f = 4MHz  |     | 2        | -8.0 | -6.0 | -4.0 |
| Frequency Characteristic                 | C   | ΔV <sub>m(C)</sub>   | T5              | T13    | V <sub>i</sub> = 300mVpp<br>f = 1MHz, 7MHz  |     | 2        |      |      |      |
|  | Y   | ΔV <sub>m(Y)</sub>   | T6              | T13    | $\frac{7M}{1M}$<br>output ratio   |     | 2        | -2.0 | -0.5 | 1.0  |
| 2nd Harmonic Distortion                  | C   | V <sub>HDR(C)</sub>  | T5              | T13    | V <sub>out</sub> = 30mApp<br>f = 4MHz   |     | 2        |      |      |      |
|  | Y   | V <sub>HDR(Y)</sub>  | T6              | T13    | $\frac{8M \text{ component}}{4M \text{ component}}$<br>output ratio   |     | 2        | -45  | -40  | dB   |
| Maximum Output Level                     | C   | V <sub>OMP(C)</sub>  | T5              | T13    | f = 4MHz<br>Output level when 2nd distortion is -40dB.  |     | 2        | 30   | 40   | mApp |
|  | Y   | V <sub>OMP(Y)</sub>  | T6              | T13    |   |     | 2        |      |      |      |
| Muting Attenuation                       | C   | V <sub>MR(C)</sub>   | T5              | T13    | V <sub>i</sub> = 300mVpp<br>f = 1MHz, 4MHz  |     | 1        |      |      |      |
|  | Y   | V <sub>MR(Y)</sub>   | T6              | T13    | $\frac{V_{out}}{G_{m(1)(2)}}$<br>output ratio   |     | 1        | -50  | -45  | dB   |
| Cross Modulation Relative Level          |     | V <sub>CY</sub>      | T5<br>T6        | T13    | Input T5, V <sub>out</sub> = 40mVpp, f = 629kHz<br>Input T6, V <sub>out</sub> = 150mVpp, f = 4MHz<br>4M ± 629k / 4MHz<br>output ratio |     | 2        | -45  | -40  | dB   |
| Y/C MIX Amp Voltage Gain                 | C   | G(C)                 | T5              | T9     | V <sub>i</sub> = 300mVpp<br>f = 1MHz  |     |          | 8.0  | 10.5 | 13.0 |
|  | Y   | G(Y)                 | T6              | T9     | V <sub>i</sub> = 300mVpp<br>f = 4MHz  |     |          |      |      |      |
| (Switch Tr) ON Resistance                |     |                      |                 |        |   |     |          |      |      |      |
| ON Resistance of SW turned ON at PB      |     | R <sub>PON(14)</sub> |                 | Pin 14 | PB mode ※1<br>Difference between DC voltage at 1mA flow-in and DC voltage at 2mA flow-in  |     |          | 6    | 10   | Ω    |
| ON Resistance of SW turned ON at REC     | CH1 | R <sub>RON(19)</sub> |                 | Pin 19 | REC mode ※1<br>Difference between DC voltage at 1mA flow-in and DC voltage at 2mA flow-in   |     |          | 7    | 10   | Ω    |
|  | CH2 | R <sub>RON(16)</sub> |                 | Pin 19 |   |     |          |      |      |      |
| Switch Tr Leakage Current                |     |                      |                 |        |   |     |          |      |      |      |
| Leakage Current of SW Tr turned ON at PB |     | I <sub>L(14)</sub>   |                 | Pin 14 | REC mode<br>Flow-in current when ±5V is applied   |     |          | -2   | 0    | 2    |

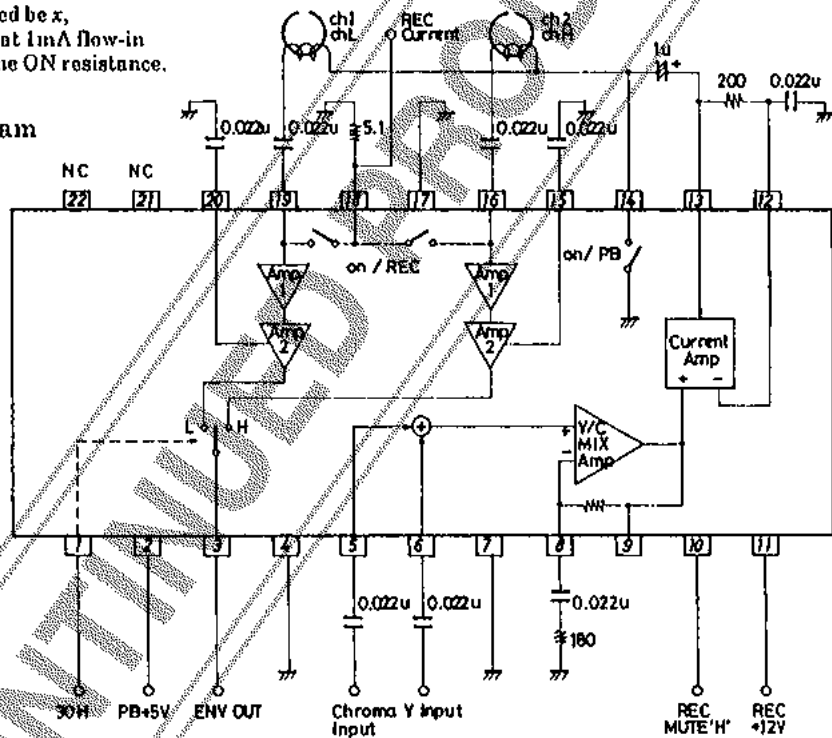
Continued on next page.

Continued from preceding page.

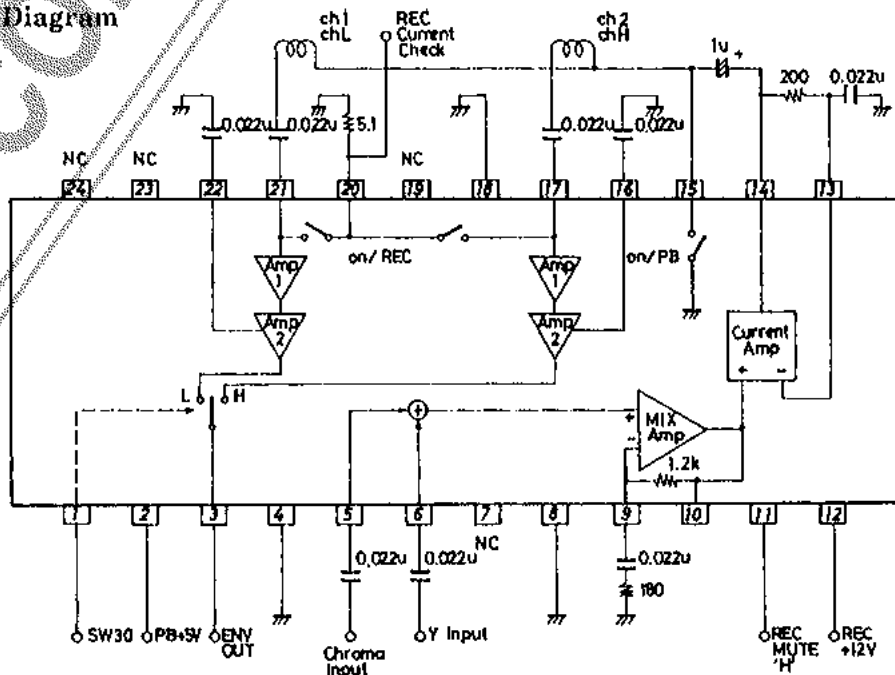
| Characteristic                    | Symbol     | Test Conditions |   | min | typ | max | unit |
|-----------------------------------|------------|-----------------|---|-----|-----|-----|------|
|                                   |            | Input           | Output  |     |     |     |      |
| Control Pin (Threshold Level)     |            |                 |   |     |     |     |      |
| RF Switch (Threshold Level)       | SW RF(1)   | T1              | CH1→CH2 changeover voltage                      | 2.5 |     | 5.0 | V    |
|                                   | SW RF(2)   |                 | CH2→CH1 changeover voltage                      | 0   |     | 0.8 |      |
| REC Muting Switch Threshold Level | SW MUTE(1) | T10             | T10 voltage when T13 output waveform disappears | 2.6 |     | 5.0 | V    |
|                                   | SW MUTE(2) |                 | T10 voltage when T13 output waveform appears    | 0   |     | 0.8 |      |

※1 Let the ON resistance to be obtained be  $x$ ,  
 $2x(\text{m}\Omega)$  at  $2\text{mA}$  flow-in  $x(\text{m}\Omega)$  at  $1\text{mA}$  flow-in  
 Therefore, difference  $2x - x = x$  is the ON resistance.

LA7320 (DIP22S) Block Diagram



LA7320M (MFP24) Block Diagram



LA7320, 7320M

Pin Description

| Pin No. | Function                          | Standard Potential | Input/Output Configuration | Remarks   |
|---------|-----------------------------------|--------------------|----------------------------|---|
| 1       | RF 30Hz control pin               |                    |                            | "L": CH1 at open state or 0.8V or less<br>"H": CH2 at 2.5 to 5.0V               |
| 2       | PB +5V                            | 5.0 (V)            |                            | 12mA typ.   |
| 3       | Preamp output                     | 2.3 (V)            |                            | Connect R = 2kΩ externally when the output line is routed around.               |
| 4       | Preamp GND                        | 0 (V)              |                            |   |
| 5       | REC amp input                     | 6.7 (V)            |                            |   |
| 6       |                                   |                    |                            |   |
| 7       | REC amp GND                       | 0 (V)              |                            |   |
| 8       | REC Y/C MIX amp feedback pin      | 5.9 (V)            |                            | The gain of Y/C MIX amp depends on R1.<br>(Example)<br>R1 : 180Ω = 10.5dB       |
| 9       | REC Y/C MIX amp output            |                    |                            |   |
| 10      | REC muting control pin            |                    |                            | "L": Muting OFF at open state or 0.8V or less<br>"H": Muting ON at 2.5V to 5.0V |
| 11      | REC +12V                          | 12.0 (V)           |                            | Typ.  |
| 12      | REC current amp feedback pin      | 5.9 (V)            |                            |   |
| 13      | REC current amp output pin        | 5.9 (V)            |                            | Max. REC current : 40mA p-p (2ch)   |
| 14      | Pin for switch Tr turned ON at PB |                    |                            | ON resistance : 6 to 10kΩ   |

Continued on next page.

LA7320, 7320M

Continued from preceding page.

| Pin No.  | Function                | Standard Potential | Input/Output Configuration | Remarks  |
|----------|-------------------------|--------------------|----------------------------|--|
| 15<br>22 | Preamp bypass capacitor | 1.9 (V)            |                            |  |
| 16<br>19 | Preamp input            | 0.65 (V)           |                            | $R_{in} \approx 400\Omega$<br>$C_{in} \approx 25$ to $35p$ |
| 17       | Pre GND                 | 0 (V)              |                            |  |
| 18       |                         |                    |                            | Switch Tr ON resistance :<br>7 to $10\Omega$               |
| 21<br>22 | N-C                     |                    |                            |  |

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.

DISCONTINUED PRODUCT