


**SANYO Semiconductors**

# DATA SHEET

## LA75501 — Monolithic Linear IC For Use in TV/VCR Applications VIF/SIF Signal Processing IC

### Overview

The LA75501 is an adjustment free VIF/SIF signal processing IC for PAL TV/VCR. It supports 38MHz, 38.9MHz, and 39.5MHz as the IF frequencies, as well as PAL sound multi-system (M/N,B/G, I, D/K), and contains an on-chip sound carrier trap and sound carrier BPF. To adjust the VCO circuit, AFT circuit, and sound filter, 4MHz external crystal or 4MHz external signal is needed.

### Function

- VIF Block: VIF Amplifier, PLL Detector, IF AGC, RF AGC, Equalizer, amplifier, Buzz Canceller, SIF Trap, Digital AFT, FLL, 4MHz X'tal oscillation
- 1st SIF Block: 1st SIF Amplifier, 1st SIF Detector, 1st SIF AGC
- SIF Block: Limiter Amplifier Down Converter, PLL FM Detector SIF PLL SIF VCO, SIF BPF
- Others: IF SW (38.9MHz, 38MHz), SIF4 System SW (B/G, I, D/K, M/N), IFAGC 2nd filter

### Specifications

**Maximum Ratings** at Ta = 25°C

| Parameter                   | Symbol          | Conditions | Ratings         | Unit |
|-----------------------------|-----------------|------------|-----------------|------|
| Maximum Supply voltage      | V <sub>CC</sub> |            | 7               | V    |
| Circuit voltage             | V <sub>13</sub> |            | V <sub>CC</sub> | V    |
|                             | V <sub>15</sub> |            | V <sub>CC</sub> | V    |
| Circuit Current             | I <sub>24</sub> |            | -1              | mA   |
|                             | I <sub>14</sub> |            | +0.5            | mA   |
|                             | I <sub>4</sub>  |            | -10             | mA   |
|                             | I <sub>3</sub>  |            | -3              | mA   |
| Allowable power dissipation | Pd max          | Ta ≤ 50°C  | 470             | mW   |
| Operating temperature       | Topr            |            | -20 to +70      | °C   |
| Storage temperature         | Tstg            |            | -55 to +150     | °C   |

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## Operating Ranges at Ta = 25°C

| Parameter                  | Symbol             | Conditions | Ratings    | Unit |
|----------------------------|--------------------|------------|------------|------|
| Recommended supply voltage | V <sub>CC</sub>    |            | 5.0        | V    |
| Operating supply voltage   | V <sub>CC op</sub> |            | 4.5 to 6.0 | V    |

## Electrical Characteristics at Ta = 25°C, V<sub>CC</sub> = 5V, fp = 38.0MHz

### VIF Block

| Parameter                      | Symbol             | Conditions                        | Ratings |      |      | Unit   |
|--------------------------------|--------------------|-----------------------------------|---------|------|------|--------|
|                                |                    |                                   | min     | typ  | max  |        |
| Circuit current                | I <sub>17</sub>    |                                   |         | 64.0 | 73.6 | mA     |
| Maximum RF AGC voltage         | V <sub>14H</sub>   | Collector load 30kΩ VC2 = 9V      | 8.5     | 9    |      | V      |
| Minimum RF AGC voltage         | V <sub>14L</sub>   |                                   |         | 0.3  | 0.7  | V      |
| Input sensitivity              | vi                 |                                   | 33      | 39   | 45   | dBμV   |
| AGC range                      | GR                 |                                   | 58      |      |      | dB     |
| Maximum allowable input        | Vi max             |                                   | 92      | 97   |      | dBμV   |
| No-signal video output voltage | V <sub>4</sub>     |                                   | 3.3     | 3.6  | 3.9  | V      |
| Sync. Signal tip voltage       | V <sub>4</sub> tip |                                   | 1.0     | 1.3  | 1.6  | V      |
| Video output amplitude         | V <sub>O</sub>     |                                   | 1.7     | 2.0  | 2.3  | Vp-p   |
| Video S/N                      | S/N                | B/G                               | 48      | 52   |      | dB     |
| C-S best                       | IC-S               | P/S = 10dB                        | 26      | 32   | 38   | dB     |
| Differential gain              | DG                 | V <sub>IN</sub> = 0dBμ, 87.5% MOD |         | 3    | 6    | %      |
| Differential phase             | DP                 |                                   |         | 2    | 10   | deg    |
| Black noise threshold voltage  | V <sub>BTH</sub>   |                                   |         | 0.7  |      | V      |
| Black noise clamp voltage      | V <sub>BCL</sub>   |                                   |         | 1.8  |      | V      |
| VIF input resistance           | R <sub>i</sub>     |                                   |         | 2.5  | 3.0  | kΩ     |
| VIF input capacitance          | C <sub>i</sub>     |                                   |         | 3    | 6    | PF     |
| Maximum AFT voltage            | V <sub>16H</sub>   |                                   | 4.3     | 4.7  | 5.0  | V      |
| Minimum AFT voltage            | V <sub>16L</sub>   |                                   | 0       | 0.2  | 0.7  | V      |
| AFT tolerance 1                | dfa1               | f = 38.9MHz                       |         | ±15  | ±25  | KHz    |
| AFT tolerance 2                | dfa2               | f = 38.0MHz                       |         | ±15  | ±25  | KHz    |
| ATF detection sensitivity      | sf                 | R <sub>L</sub> = 100k/100KΩ       | 30      | 55   | 80   | mV/kHz |
| AFT Dead Zone                  | fda                |                                   |         | 30   | 60   | MHz    |
| AFT leak current               | AFTL               |                                   |         |      | ±4.0 | μA     |
| APC pull-in range (U)          | fpu                |                                   | 1.5     | 2.0  |      | MHz    |
| APC pull-in range (L)          | fpl                |                                   | 1.5     | 2.0  |      | MHz    |
| VCO maximum variable range (U) | dfu                |                                   | 1.5     | 2.0  |      | MHz    |
| VCO maximum variable range (L) | dfl                |                                   | 1.5     | 2.0  |      | MHz    |
| VCO control sensitivity        | β                  |                                   | 2.0     | 4.0  | 8.0  | kHz/mV |
| N Trap 1 (4.5M)                | NT1                |                                   | -30     | -35  |      | dB     |
| N Trap 2 (4.8M)                | NT1-1              |                                   | -19     | -24  |      | dB     |
| B/G Trap 1 (5.5M)              | BT1                |                                   | -27     | -32  |      | dB     |
| B/G Trap 2 (5.85M)             | BT1-1              |                                   | -20     | -25  |      | dB     |
| I Trap 1 (6.0M)                | IT1                |                                   | -25     | -30  |      | dB     |
| I Trap 2 (6.55M)               | IT1-1              |                                   | -15     | -20  |      | dB     |
| D/K Trap1 (6.5M)               | DT1                |                                   | -25     | -30  |      | dB     |
| Group delay 1 NTSC (3.0M)      | ngd1               |                                   | 30      | 60   | 90   | ns     |
| Group delay 1-1 NTSC (3.5M)    | ngd1-1             |                                   | 160     | 230  | 300  | ns     |
| Group delay 2 B/G (4M)         | bgd2               |                                   | 70      | 100  | 130  | ns     |
| Group delay 2-1 B/G (4.4M)     | bgd2-1             |                                   | 160     | 230  | 300  | ns     |
| Group delay 3 I (4M)           | bgd3               |                                   | 20      | 50   | 80   | ns     |
| Group delay 3-1 I (4.4M)       | bgd3-1             |                                   | 60      | 90   | 120  | ns     |
| Group delay 4 D/K (4M)         | bgd4               |                                   | 0       | 30   | 60   | ns     |
| Group delay 4-1 D/K (4.4M)     | bgd4-1             |                                   | 10      | 40   | 70   | ns     |

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| Parameter                   | Symbol | Conditions    | Ratings |     |     | Unit |
|-----------------------------|--------|---------------|---------|-----|-----|------|
|                             |        |               | min     | typ | max |      |
| Video f-characteristics MN1 | VFMN1  | M/N 1 to 2MHz | -1.0    | 0.0 | 1.0 | dB   |
| Video f-characteristics MN2 | VFMN2  | M/N 2 to 3MHz | 0.0     | 1.0 | 2.0 | dB   |
| Video f-characteristics MN3 | VFMN3  | M/N 3.58MHz   | 0.5     | 2.0 | 3.5 | dB   |
| Video f-characteristics BG1 | VFBG1  | B/G 1 to 3MHz | -1.0    | 0.0 | 1.5 | dB   |
| Video f-characteristics BG2 | VFBG2  | B/G 3 to 4MHz | 0.0     | 1.5 | 3.0 | dB   |
| Video f-characteristics BG3 | VFBG3  | B/G 4.43MHz   | 1.0     | 2.5 | 4.0 | dB   |
| Video f-characteristics I1  | VFI1   | I 1 to 3MHz   | -1.0    | 0.0 | 1.5 | dB   |
| Video f-characteristics I2  | VFI2   | I 3 to 4MHz   | 0.0     | 1.0 | 2.0 | dB   |
| Video f-characteristics I3  | VFI3   | I 4.43Hz      | 0.5     | 2.0 | 3.5 | dB   |
| Video f-characteristics DK1 | VFDK1  | D/K 1 to 3MHz | -1.0    | 0.0 | 1.5 | dB   |
| Video f-characteristics DK2 | VFDK2  | D/K 3 to 4MHz | 0.0     | 1.0 | 2.0 | dB   |
| Video f-characteristics DK3 | VFDK3  | D/K 4.43MHz   | 0.0     | 1.5 | 3.0 | dB   |

## 1st SIF Block

| Parameter                 | Symbol            | Conditions                                | Ratings |     |     | Unit             |
|---------------------------|-------------------|-------------------------------------------|---------|-----|-----|------------------|
|                           |                   |                                           | min     | typ | max |                  |
| Conversion gain           | $V_G$             | $f_p=5.5\text{MHz}, V_i = 500\mu\text{V}$ | 26      | 32  | 36  | dB               |
| SIF carrier output level  | $S_O$             | $V_i = 10\text{mV}$                       |         | 100 |     | mVrms            |
| 1st SIF maximum input     | $S_i \text{ max}$ | $S_O \pm 2\text{dB}$                      |         | 106 |     | dB $\mu\text{V}$ |
| 1st SIF input resistance  | $R_i s$           |                                           |         | 2.0 | 2.4 | K $\Omega$       |
| 1st SIF input capacitance | $C_i s$           |                                           |         | 3   | 6   | PF               |

## SIF Block

| Parameter                            | Symbol             | Conditions                                        | Ratings |           |     | Unit             |
|--------------------------------------|--------------------|---------------------------------------------------|---------|-----------|-----|------------------|
|                                      |                    |                                                   | min     | typ       | max |                  |
| Limiting sensitivity                 | $V_i (\text{lim})$ | $f = 5.5\text{MHz}$                               | 46      | 52        | 58  | dB $\mu\text{V}$ |
| FM detector output voltage           | $V_O (\text{FM})$  | $\Delta F = \pm 30\text{kHz}$ at 400Hz            | 480     | 600       | 750 | mVrms            |
| AM rejection ratio                   | AMR                | AM = 30% at 400Hz                                 | 50      | 60        |     | dB               |
| Distortion                           | THD                | $f = 5.5\text{MHz}$ $\Delta F = \pm 30\text{kHz}$ |         | 0.3       | 1.0 | %                |
| FM detector output S/N               | S/N (FM)           | DIN. Audio                                        | 55      | 60        |     | dB               |
| BPF 3dB band width                   | BW                 |                                                   |         | $\pm 100$ |     | kHz              |
| PAL de-emphasis                      | Pdeem              | $f_m = 3\text{kHz}$                               |         | -3        |     | dB               |
| NTSC de-emphasis                     | Ndeem              | $f_m = 2\text{kHz}$                               |         | -3        |     | dB               |
| PAL/NT Audio voltage gain difference | GD                 |                                                   |         | 6         |     | dB               |

## Others

| Parameter                              | Symbol               | Conditions     | Ratings |     |     | Unit       |
|----------------------------------------|----------------------|----------------|---------|-----|-----|------------|
|                                        |                      |                | min     | typ | max |            |
| Minimum 4MHz level (at external input) | $X_4 \text{ MIN}$    | Terminal value | 80      | 86  | 92  | dB $\mu$   |
| SIF system SW threshold voltage        | $V_{10}$<br>$V_{11}$ |                |         | 1.4 |     | V          |
| IF system SW threshold voltage         | $V_{12}$             |                |         |     | 270 | K $\Omega$ |
| Split/Inter SW                         | $V_{16}$             |                |         | 0.5 |     | V          |

## System Changeover

### SW/SIF system SW

The SIF system can be changed over by setting A (pin 13) and B (pin 14) to GND and the open state respectively.

| A    | B    | B/G | I | D/K | M/N | FM DET<br>LEVEL | De-emphasis |
|------|------|-----|---|-----|-----|-----------------|-------------|
| GND  | GND  |     |   |     | O   | 6dB             | 75μs        |
| GND  | OPEN |     |   | O   |     | 0dB             | 50μs        |
| OPEN | GND  |     | O |     |     | 0dB             | 50μs        |
| OPEN | OPEN | O   |   |     |     | 0dB             | 50μs        |

Note: 'O' indicates that the system is selected.

### IF system SW

The IF frequency is selected 38.9MHz mode with the pin 12 (crystal oscillation) open.

The IF frequency is selected 38MHz mode by adding 220KΩ between the pin 12 and GND.

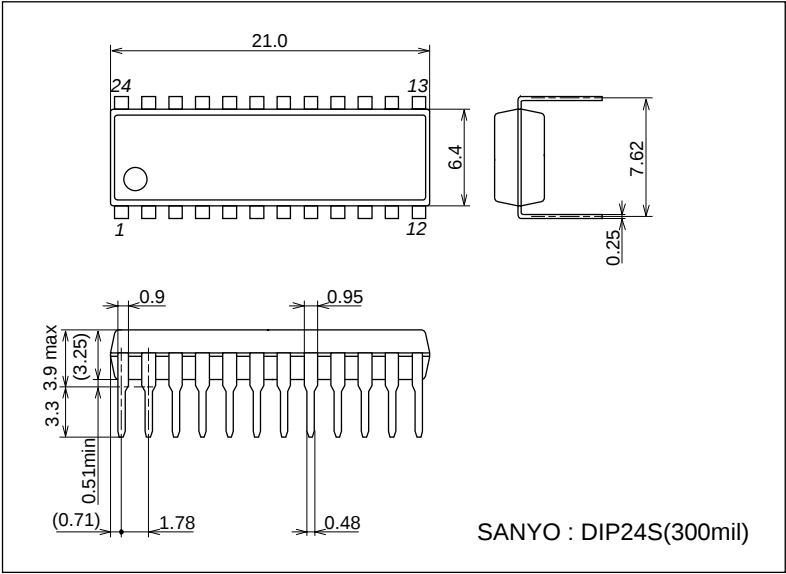
### Inter carrier SW

Inter-carrier is selected by setting the 1st SIF input (pin 16) to GND.

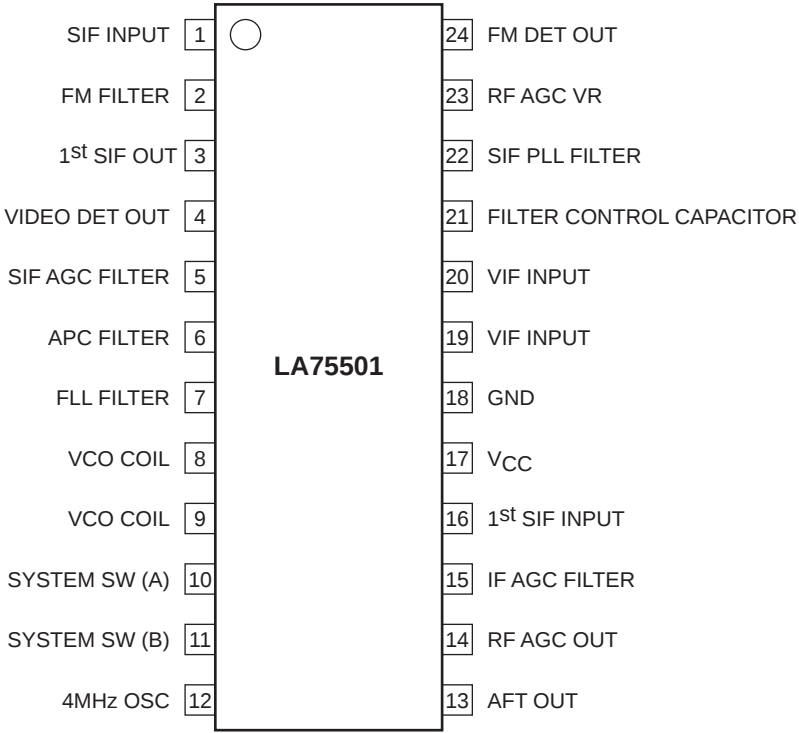
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## Package Dimensions

unit : mm  
3067B

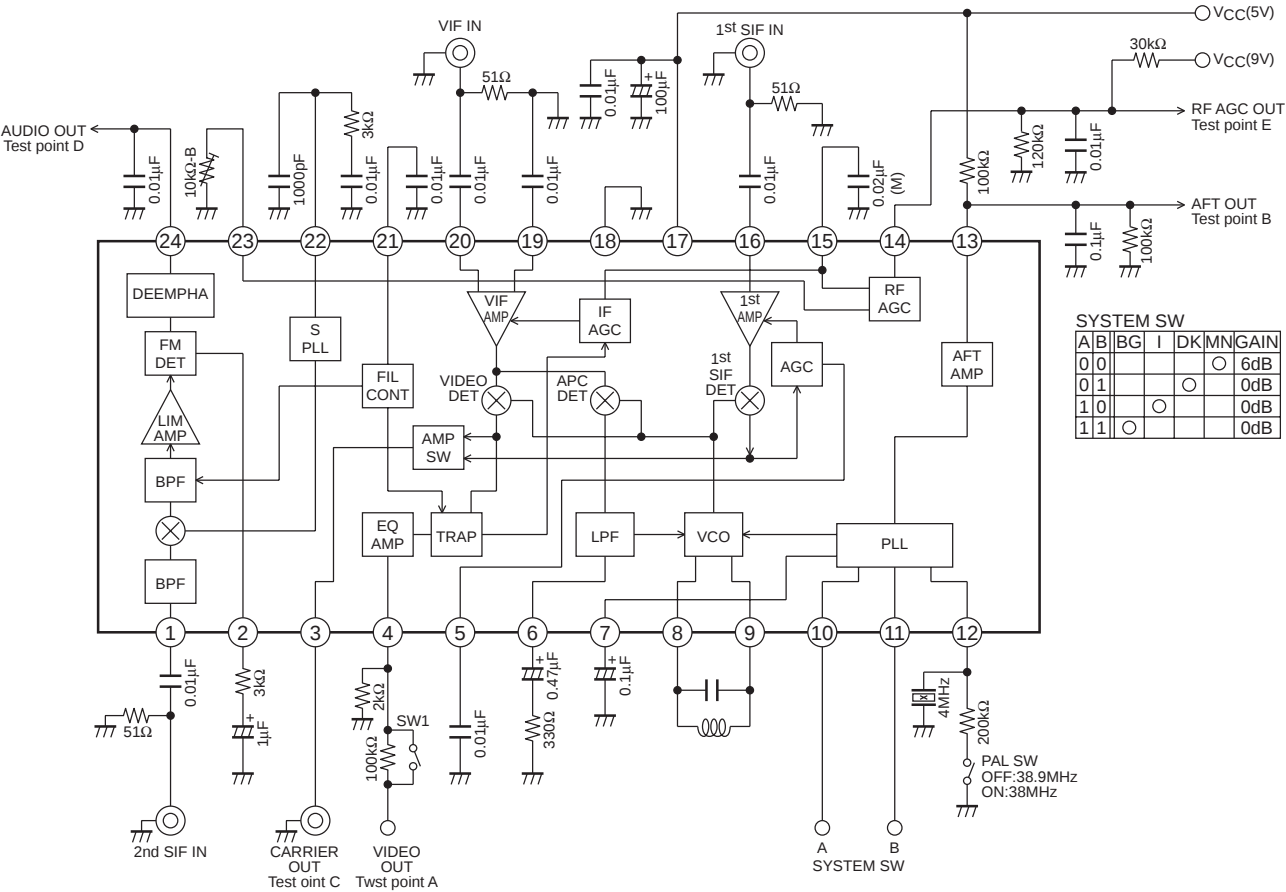


## Pin Assignment

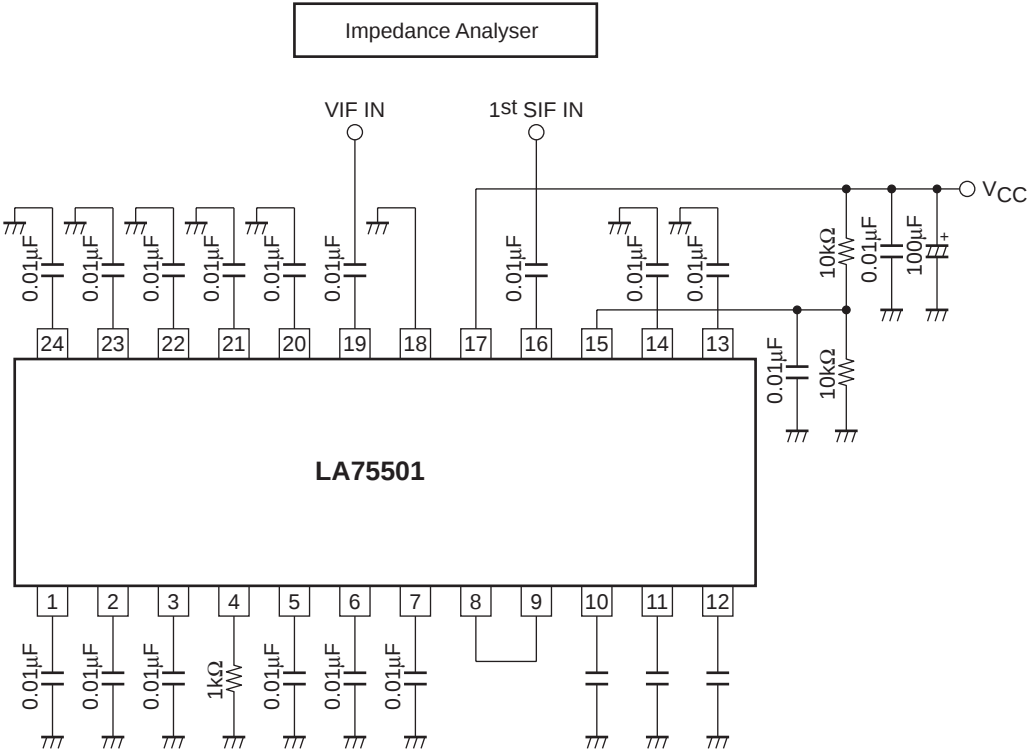


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Block Diagram and AC Characteristics Test Circuit



Input Impedance Test Circuit



**Test Conditions****V1. Circuit current [I<sub>17</sub>]**

- (1) External AGC ( $V_{17} = 1.5V$ )
- (2) RF AGC VR MAX
- (3) Connect an ammeter to the  $V_{CC}$  and measure the incoming current to pin 17.

**V2. V3. Maximum RF AGC voltage, Minimum RF AGC voltage [V<sub>14H</sub>, V<sub>14L</sub>]**

- (1) Internal AGC
- (2) Input a 38.0MHz, 10mVrms, continuous wave to the VIF input pin.
- (3) Adjust the RF AGC VR (resistance max.) and measure the maximum RF AGC voltage.
- (4) Adjust the RF AGC VR (resistance min.) and measure the minimum RF AGC voltage.
- (3), (4) Measuring point F

**V4. Input sensitivity [V<sub>i</sub>]**

- (1) Internal AGC
- (2)  $f_p = 38.0MHz$  400Hz 40% AM (VIF input)
- (3) Turn off the SW1 and put 100k $\Omega$  through.
- (4) Measure the VIF input level at which the 400Hz detection output level at test point A becomes 0.7Vp-p.

**V5. AGC range [GR]**

- (1) Apply the  $V_{CC}$  voltage to the external AGC, If AGC (pin 15).
- (2) In the same manner under the same conditions as for V4 (input sensitivity), measure the VIF input level at which the detection output level becomes 0.7Vp-p. ....  $V_{il}$

(3)  $GR = 20 \log \frac{V_{il}}{V_i}$  dB \* $V_i$ : Input sensitivity

**V6. Maximum allowable input [V<sub>i</sub> max]**

- (1) Internal AGC
- (2)  $f_p = 38.0MHz$  15kHz 78% AM (VIF input)
- (3) VIF input level at which the detection output level at test point A becomes video output ( $V_O$ )  $\pm 1dB$ .

**V7. No-signal video output voltage [V<sub>4</sub>]**

- (1) Apply the  $V_{CC}$  voltage to the external AGC, IF AGC (pin 15).
- (2) Measure the DC voltage of VIDEO output (A).

**V8. Sync. signal tip voltage [V<sub>6tip</sub>]**

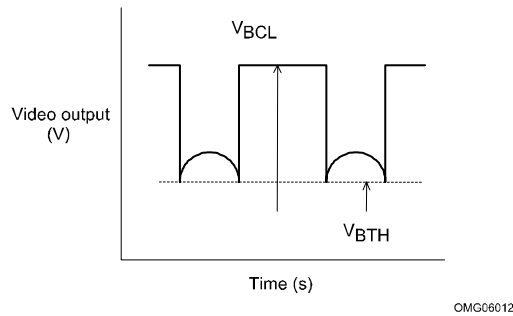
- (1) Internal AGC
- (2) Input a 38.0MHz, 10mVrms, continuous wave to the VIF input pin.
- (3) Measure the DC voltage of VIDEO output (A).

**V9. Video output level [V<sub>O</sub>]**

- (1) Internal AGC
- (2)  $f_p = 38.0MHz$  15kHz 78% AM  
 $V_i = 10mVrms$  (VIF input)
- (3) Measure the peak value of the detection output level at test point A. ( $V_{p-p}$ )

V10.V11. Black noise threshold and clamp voltage [ $V_{BTH}$ ,  $V_{BCL}$ ]

- (1) Apply DC voltage (1 to 3V) to the external AGC, IF AGC (pin 15) and adjust the voltage.
- (2)  $f_p = 38.0\text{MHz}$  400Hz 40% AM 10mVrms (VIF input)
- (3) Adjust the IF AGC (pin 15) voltage to operate the noise canceller.  
Measure the  $V_{BTH}$ ,  $V_{BCL}$  at test point A.



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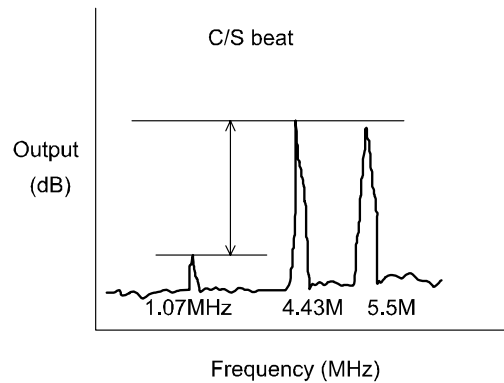
V12. Video S/N [S/N]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz}$  CW = 10mVrms (VIF input)
- (3) Measure the noise voltage at test point A in RMS volts through a HPF: 100kHz, LPF: 5MHz filter.  
..... Noise voltage (N)

$$(4) S/N = 20\log \frac{\text{Video voltage (V}_{p-p})}{N (V_{rms})} = 20\log \frac{1.3V_{p-p}}{N(V_{rms})} \text{ (dB)}$$

V13. C/S beat [lcs]

- (1) Internal AGC.
- (2)  $f_p = 38.0\text{MHz}$  APL50% 87.5% Modulation video signal.
- (3) Measure the difference between the levels for 4.43MHz and 1.07MHz components at test point A.



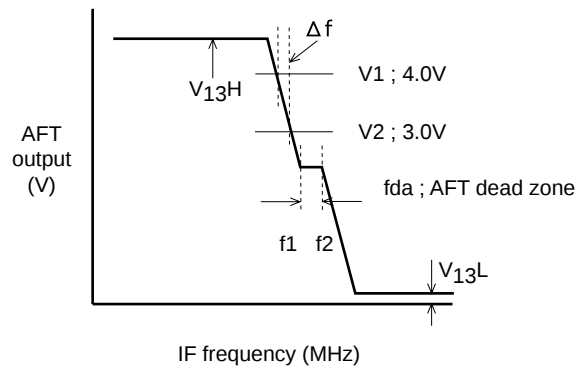
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V14.V15. Differential gain, differential phase [DG, DP]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz}$  APL50% 87.5% Modulation video signal  $V_i = 10\text{mVrms}$
- (3) Measure the DG and DP at test point A.

V16. V17.V18 Maximum, minimum AFT voltage [V<sub>13H</sub>, V<sub>13L</sub>]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz} \pm 1.5\text{MHz}$   $V_i = 10\text{mVrms}$  (VIF input)
- (3) Measure maximum and minimum AFT output voltage by changing the input frequency.
- (4) Maximum voltage: V<sub>13H</sub>, minimum voltage: V<sub>13L</sub>.



V19.V20.V21. AFT detector sensitivity, AFT Dead Zone, AFT tolerance [dfa, Sf, fda]

- (1) Measure the frequency deviation when the voltage at the measuring point B changes from V1 to V2. ....Δf

$$Sf (\text{mV/kHz}) = \frac{V1 - V2}{\Delta f}$$

- (2) Measure the width in which the voltage at the measuring point B does not change.
- (3) Calculate as follows:  
 $fda (\text{kHz}) = f2 - f1$
- (4) Calculate as follows:  
IF Center frequency: 38.9MHz, 38MHz

$$dfa (\text{kHz}) = f_c - \frac{f1 + f2}{2}$$

V23. V24. VIF input resistance, input capacitance [R<sub>i</sub>, C<sub>i</sub>]

- (1) External AGC (V<sub>15</sub> = 2V)
- (2) Referring to the Input Impedance Test Circuit, measure R<sub>i</sub> and C<sub>i</sub> with an impedance analyzer.

V25.V26. APC pull-in range [fpu, fpl]

- (1) Internal AGC
- (2)  $f_p = 33\text{MHz}$  to  $44\text{MHz}$  CW;  $10\text{mVrms}$
- (3) Adjust the SG signal frequency to be higher than  $f_p = 38.0\text{MHz}$  to bring the PLL to unlocked state.  
Note; The PLL is taken as in unlocked state when a beat signal appears at test point A.
- (4) When the SG signal frequency is lowered, the PLL is brought to locked state again. .... f1
- (5) Lower the SG signal frequency to bring the PLL to unlock state.
- (6) When the SG signal frequency is raised, the PLL is brought to locked state again. .... f2
- (7) Calculate as follows:  
 $f_{pu} = f1 - 38.0\text{MHz}$   
 $f_{pl} = f2 - 38.0\text{MHz}$

V27.V28. VCO maximum variable range (U, L) [dfu, dfl]

- (1) Apply the V<sub>CC</sub> voltage to the external AGC, IF AGC (pin 15).
- (2) fl is taken as the frequency when 1V is applied to the APC pin (pin 7). In the same manner, fu is taken as the frequency when 5V is applied to the APC pin (pin 7).  
 $dfu = fu - 38.0\text{MHz}$   
 $dfl = fl - 38.0\text{MHz}$

V29. VCO control sensitivity [ $\beta$ ]

- (1) Apply the  $V_{CC}$  voltage to the external AGC, IF AGC (pin 15).
- (2) Apply the 3V to the external FLL, FLL (pin 10).
- (3) Pick up the VCO oscillation frequency from the VIDEO output (A), GND, etc.  
And adjust the VCO coil so that the frequency becomes 38.0MHz.
- (4)  $f_1$  is taken as the frequency when 2.8V is applied to the APC pin (pin 7).  
In the same manner,  $f_2$  is taken as the frequency when 3.2V is applied to the APC pin (pin 7).

$$\beta = f_2 - \frac{f_1 - f_2}{400} \quad (\text{kHz/mV})$$

F1. 1st SIF conversion gain [ $V_G$ ]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz}$  CW; 10mV (VIF input)  
 $f_s = 32.5\text{MHz}$  CW; 500 $\mu$ V (1st SIF input) .....  $V_1$
- (3) measure the detection output level at test point C (5.5MHz) .....  $V_2$

$$(4) V_G = 20\log \frac{V_2}{V_1} \text{ dB}$$

F2. 5.5MHz output level [ $S_O$ ]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz}$  CW; 10mV (VIF input)  
 $f_s = 32.5\text{MHz}$  CW; 10mV (1st SIF input) .....  $V_1$
- (3) Measure the detection output level at test point C (5.5MHz). .....  $S_O$  (mVrms)

F3. 1st maximum input [ $S_i \text{ max}$ ]

- (1) Internal AGC
- (2)  $f_p = 38.0\text{MHz}$  CW; 10mV (VIF input)  
 $f_s = 32.5\text{MHz}$  CW; Variable (1st SIF input)
- (3) Input level at which the detection output (5.5MHz) at test point C becomes  $S_O \pm 2\text{dB}$ . .....  $S_i \text{ max}$

F4.F5. 1st SIF input resistance, input capacitance [ $R_i$  (SIF1),  $C_i$  (SIF1)]

- (1) Referring to the Input Impedance Test Circuit, measure  $R_i$  and  $C_i$  with an impedance analyzer.

S1. SIF Limiting sensitivity [ $V_i$  (lim)]

- (1) Apply the  $V_{CC}$  voltage to the external AGC, IF AGC (pin 15).
- (2)  $f_s = 5.5\text{MHz}$   $f_m = 400\text{Hz}$   $\Delta f = \pm 300\text{kHz}$  (SIF input)
- (3) Set the SIF input level to 31.6mVrms and measure the level at test point D. .....  $V_1$
- (4) Lower the SIF input level and measure the input level which becomes  $V_1$ . ..... 3dB.

S2.S4. FM detection output voltage, total harmonics distortion [ $V_O(\text{FM})$ , THD]

- (1) Apply the  $V_{CC}$  voltage to the external AGC, IF AGC (pin 15).
- (2)  $f_s = 5.5\text{MHz}$   $f_m = 400\text{Hz}$   $\Delta f = \pm 30\text{kHz}$   
(SIF input  $V_i = 31.6\text{mVrms}$ )
- (3) Measure the FM detection output voltage, total harmonics distortion at test point D.

S3. AM rejection ratio [AMR]

- (1) External AGC ( $V_{15} = V_{CC}$ )
- (2)  $f_s = 5.5\text{MHz}$   $f_m = 400\text{Hz}$  AM = 30%  
(SIF input  $V_i = 31.6\text{mVrms}$ )
- (3) Measure the output level at test point D. .....  $V_{AM}$

$$(4) \text{AMR} = 20\log \frac{V_O(\text{DET})}{V_{AM}} \text{ dB}$$

S5. SIF S/N [S/N (FM)]

- (1) External AGC ( $V_{15} = V_{CC}$ )
- (2)  $f_s = 5.5\text{MHz}$  NO MOD  $V_i = 31.6\text{mVrms}$
- (3) Measure the output level at test point D. .....  $V_n$

$$(4) \text{S/N} = 20\log \frac{V_O(\text{DET})}{V_n} \text{ dB}$$

## S6. PAL/NT Audio voltage gain difference [GD]

- (1) External AGC ( $V_{15} = V_{CC}$ )
- (2)  $f_s = 4.5\text{MHz}$   $f_m = 400\text{Hz}$   $\Delta F = \pm 30\text{kHz}$   
(SIF input  $V_i = 31.6\text{mV}_{\text{rms}}$ )
- (3) Set system switches [A (pin 10) and B (pin 11)] to GND.
- (4) Measure the FM detector output voltage at test point D. ....  $V_{nt}$
- (5) Calculate as follows:  
 $GD (\text{db}) = V_{nt} - V_O (\text{FM})$

## S7.S8. PAL, NT de-emphasis [Pdeem, Ndeem]

- (1) External AGC ( $V_{15} = V_{CC}$ )
- (2)  $f_s = 5.5\text{MHz}$   $f_m = 3\text{kHz}$   $\Delta F = \pm 30\text{kHz}$   
(SIF input  $V_i = 31.6\text{mV}_{\text{rms}}$ )
- (3) Open system switches (A (pin 10) and B (pin 11)). (BG mode)
- (4) Measure the FM detector output voltage at test point D. ....  $V_p$
- (5) Calculate as follows:  
 $P_{deem} (\text{dB}) = V_p - V_O (\text{FM})$
- (6)  $f_s = 4.5\text{MHz}$   $f_m = 2\text{kHz}$   $\Delta F = \pm 30\text{kHz}$   
(SIF input  $V_i = 31.6\text{mV}_{\text{rms}}$ )
- (7) Set system switches [A (pin 10) and B (pin 11)] to GND. (NT mode)
- (8) Measure the FM detector output voltage at test point D. ....  $V_p$
- (9) Calculate as follows:  
 $N_{deem} (\text{dB}) = V_{nt} - V_O (\text{FM})$

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