



# LA7530N

## IF Signal Processing (VIF+SIF) Circuit for TV / VCR Use

### Overview

The LA7530N is an IC containing the VIF section and SIF section on a single chip in the DIP20 package. The use of the small-sized package serves to make VCR tuner units smaller.

As compared with the LA7530, the LA7530N is provided with 2 pins for IF AGC, permitting higher AGC speed. The LA7530N can substitute for the LA7530, but the LA7530 cannot substitute for the LA7530N. For 9V supply, use the LA7533.

### Functions

- VIF section : VIF AMP, VIDEO DET, PEAK IF AGC, B/W NOISE CANCELLER, RF AGC, AFT, VIDEO MUTE.
- SIF section : SIF LIMITER AMP, FM DET, SND MUTE.

### Features

- High-gain VIF amplifier requiring no preamplifier.
- Higher AGC speed.
- Adjustment-free FM detector because of ceramic discriminator-used quadrature detection.
- Possible to mute video, sound for VCR.
- Small-sized package.
- Minimum number of external parts required.

### Specifications

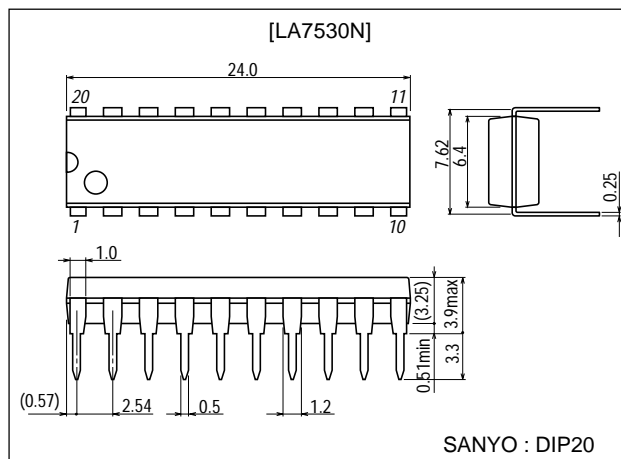
Maximum Ratings at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}$ max		14	V
Flow-out current	$I_{16}$ max		5	mA
Maximum applied voltage	$V_{20}$ max		$V_{CC}$	V
Allowable power dissipation	$P_d$ max	$T_a \leq 40^\circ\text{C}$	1.1	W
Operating temperature	$T_{opr}$		$-20$ to $+70$	$^\circ\text{C}$
Storage temperature	$T_{stg}$		$-55$ to $+125$	$^\circ\text{C}$

### Package Dimensions

unit:mm

3021C-DIP20



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# LA7530N

## Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		12	V
Operating voltage range	V <sub>CC</sub> op		9 to 13.2	V

## Operating Characteristics at Ta = 25°C, V<sub>CC</sub>=12V, f<sub>p</sub>=58.75MHz, f<sub>s</sub>=54.25MHz (VIF), fo=4.5MHz (SIF)

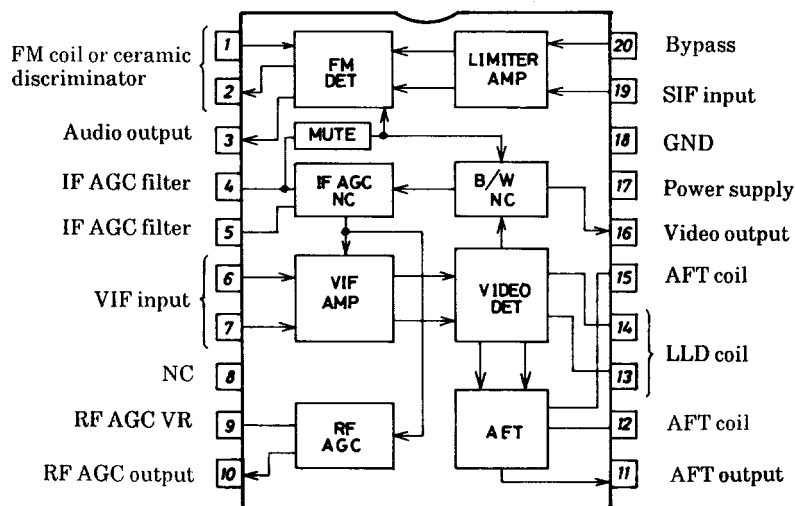
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Total circuit current	I <sub>17</sub>	DC	47	58	74	mA
Maximum RF AGC voltage	V <sub>10H</sub>	DC	8.5	8.9	9.2	V
Minimum RF AGC voltage	V <sub>10L</sub>	DC			0.5	V
Quiescent video output voltage	V <sub>16</sub>	DC	5.7	6.1	6.5	V
Quiescent AFT output voltage	V <sub>11</sub>	DC	4.5	6.5	7.5	V
Input sensitivity	V <sub>i</sub>	fm=400Hz, 40%AM, V <sub>O</sub> =0.8Vp-p	30	36	42	dBμ
AGC range	GR	fm=400Hz, 40%AM, V <sub>O</sub> =0.8Vp-p	57	65		dB
Maximum allowable input	V <sub>i</sub> max	fm=15kHz, 78%AM, V <sub>O</sub> =±1dB	100	200		mVrms
Video output amplitude	V <sub>O</sub> (VIDEO)	V <sub>i</sub> =10mVrms, fm=15kHz, 78%AM	1.9	2.2	2.5	Vp-p
Output S/N	S/N	V <sub>i</sub> =10mVrms CW	48	54		dB
Carrier leakage	CL	V <sub>i</sub> =100mVrms, fm=15kHz, 78%AM	50	55		dB
Maximum AFT voltage	V <sub>11H</sub>	V <sub>i</sub> =10mVrms CW SWEEP	11	11.4		V
Mimimum AFT voltage	V <sub>11L</sub>	V <sub>i</sub> =10mVrms CW SWEEP		0.5	1.0	V
AFT detection sensitivity	S <sub>f</sub>	V <sub>i</sub> =10mVrms CW SWEEP	80	110	150	mV/kHz
White noise threshold level	V <sub>WTH</sub>	V <sub>i</sub> =10mVrms SWEEP	6.4	6.8	7.2	V
White noise clamp level	V <sub>WCL</sub>	V <sub>i</sub> =10mVrms SWEEP	4.2	4.6	5.0	V
Black noise threshold level	V <sub>BTH</sub>	V <sub>i</sub> =10mVrms SWEEP	2.1	2.4	2.7	V
Black noise clamp level	V <sub>BCL</sub>	V <sub>i</sub> =10mVrms SWEEP	3.8	4.2	4.6	V
SIF output signal voltage	V <sub>O</sub> (SIF)	P/S=20dB	80	140	210	mVrms
Frequency characteristic	f <sub>C</sub>	-3dB	5	7		MHz
Differential gain	DG	V <sub>i</sub> =-27dBm (peak) 87.5% VIDEOMOD		3		%
Differential phase	DP	V <sub>i</sub> =-27dBm (peak) 87.5% VIDEOMOD		3		deg
Input resistance	R <sub>i</sub>		1.0	1.5	2.0	kΩ
Input capacitance	C <sub>i</sub>			3.0	6.0	pF
SIF limiting voltage	V <sub>i</sub> (lim)	-3dB		200	500	μVrms
Detection output voltage	V <sub>O</sub> (DET)	V <sub>i</sub> =100mVrms, fm=400Hz, Δf=±25kHz	450	680	850	mVrms
Total harmonic distortion	THD(DET)	V <sub>i</sub> =100mVrms, fm=400Hz, Δf=±25kHz		0.5	1.3	%
AM rejection	AMR	V <sub>i</sub> =100mVrms, fm=400Hz, Δf=±25kHz, 30% AM	50	60		dB

Usage Note : 1. Protective circuits must be inserted when using this IC with lines directly connecting the IC pins to external circuits.

(For example, this applies to pins 12 and 15.)

2. A 1000pF capacitor must be connected between either pin 5 and ground or between pin 5 and pin 8 to prevent VIF amplifier oscillation.

## Equivalent Circuit Block Diagram



## Sample Application Circuit (Japan)

The schematic diagram illustrates the internal circuitry of the LA 7530 N integrated circuit, which is a 14-pin DIP package. The IC is divided into two main functional blocks: a video section (pins 11-20) and an audio section (pins 1-10).

**Video Section (Pins 11-20):**

- Pin 11:** Connected to the video input through a 0.01  $\mu$ F capacitor.
- Pin 12:** Connected to the video input through a 3.9k resistor.
- Pin 13:** Connected to the video input through a 1k resistor.
- Pin 14:** Connected to the video input through a 1k resistor.
- Pin 15:** Connected to the video input through a 1.5k resistor.
- Pin 16:** Connected to the video input through a 1k resistor.
- Pin 17:** Connected to the video input through a 4.5M resistor.
- Pin 18:** Connected to the video input through a 4.5M resistor.
- Pin 19:** Connected to the video input through a 4.5M resistor.
- Pin 20:** Connected to the video input through a 0.01  $\mu$ F capacitor.

**Audio Section (Pins 1-10):**

- Pin 1:** Connected to the audio input through a 680 resistor.
- Pin 2:** Connected to the audio input through a 22pF capacitor.
- Pin 3:** Connected to the audio input through a 330 resistor.
- Pin 4:** Connected to the audio input through a 5.6k resistor.
- Pin 5:** Connected to the audio input through a 0.08  $\mu$ F capacitor.
- Pin 6:** Connected to the audio input through a 0.015  $\mu$ F capacitor.
- Pin 7:** Connected to the audio input through a 0.01  $\mu$ F capacitor.
- Pin 8:** Connected to the audio input through a 10k resistor.
- Pin 9:** Connected to the audio input through a 10k resistor.
- Pin 10:** Connected to the audio input through a 10  $\mu$ F capacitor.

**Internal Components:**

- LA 7530 N:** The central integrated circuit package.
- Ceramic filter:** Connected to pins 17 and 18.
- Ceramic discriminator (CDA4.5MC26):** Connected to pins 1 and 2.
- SAW filter (TSF1111):** Connected to pins 5 and 6.
- Transistors:** Several transistors are shown, including a 4.5M resistor connected to a transistor base, and a 4.5M resistor connected to a transistor collector.
- Resistors:** Various resistors are used throughout the circuit, including 330, 4.5M, 1.5k, 1k, 3.9k, 680, 22pF, 0.015  $\mu$ F, 0.01  $\mu$ F, 10k, and 10  $\mu$ F.
- Capacitors:** Various capacitors are used, including 0.01  $\mu$ F, 0.015  $\mu$ F, 0.08  $\mu$ F, 0.01  $\mu$ F, 10k, and 10  $\mu$ F.
- Inductors:** A 15  $\mu$ H inductor is connected to the video input, and a 0.26  $\mu$ H inductor is connected to the audio input.

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