



# LA7533

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

### Overview

The LA7533 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 LA7530N, the LA7533 is improved in characteristics when it is operated at supply voltage 9V (DG, DP, RF AGC temperature characteristics).

The LA7533 is applicable to the circuit designed for the LA7530N.

### 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.
- Operated at supply voltage 9V.

### Specifications

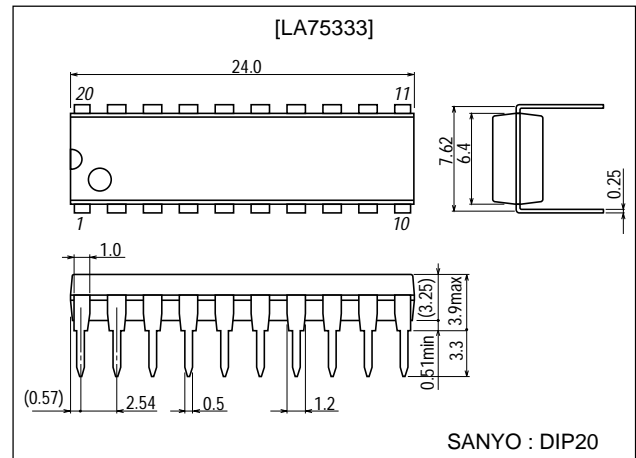
#### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}$ max		14	V
External flow-out current	$I_{16}$ max		5	mA
Pin 20 maximum supply 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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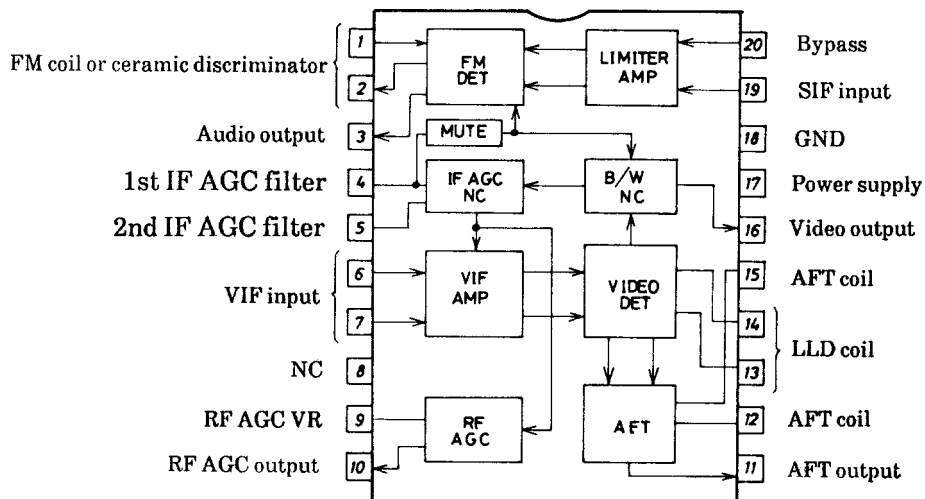
## Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		9	V
Operating voltage range	V <sub>CC op</sub>		8.1 to 13.2	V

## Operating Characteristics at Ta = 25°C, V<sub>CC</sub>=9V, f<sub>p</sub>=58.75MHz, f<sub>s</sub>=54.25MHz (VIF), f<sub>o</sub>=4.5MHz (SIF)

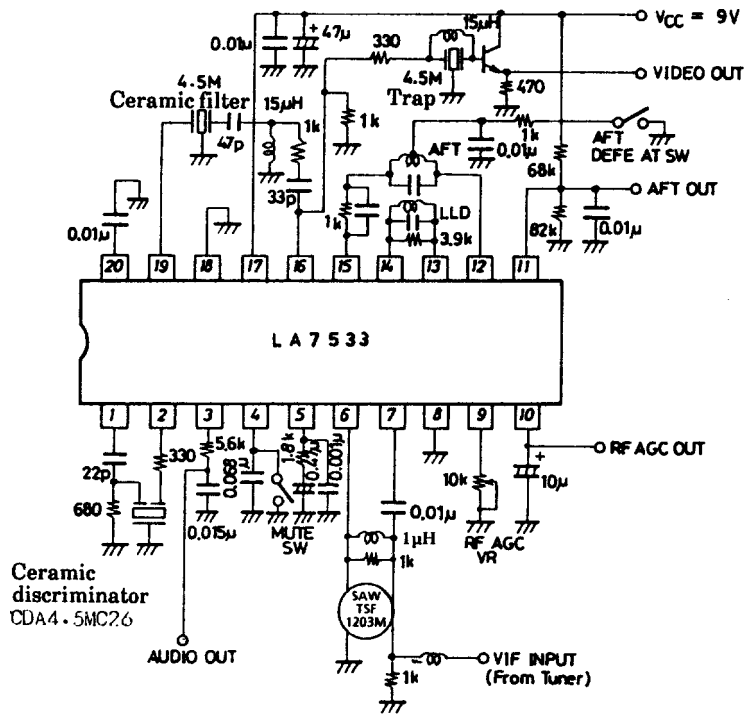
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Total circuit current	I <sub>17</sub>	DC	40	49	63	mA
Maximum RF AGC voltage	V <sub>10H</sub>	DC	6.2	6.5	6.8	V
Minimum RF AGC voltage	V <sub>10L</sub>	DC		0.1	0.5	V
Quiescent video output voltage	V <sub>16</sub>	DC	4.2	4.6	5.0	V
Quiescent AFT output voltage	V <sub>11</sub>	DC	2.9	4.9	5.9	V
Input sensitivity	V <sub>i</sub>	f <sub>m</sub> =400Hz, 40%AM, V <sub>o</sub> =0.8Vp-p	31	37	42	dBμ
AGC range	GR	f <sub>m</sub> =400Hz, 40%AM, V <sub>o</sub> =0.8Vp-p	57	63		dB
Maximum allowable input	V <sub>i max</sub>	f <sub>m</sub> =15kHz, 78%AM, V <sub>o</sub> =±1dB	90	130		mVrms
Video output amplitude	V <sub>o</sub> (VIDEO)	V <sub>i</sub> =10mVrms, f <sub>m</sub> =15kHz, 78%AM	1.4	1.65	1.9	Vp-p
Output S/N	S/N	V <sub>i</sub> =10mVrms CW	48	53		dB
Carrier leakage	CL	V <sub>i</sub> =100mVrms, f <sub>m</sub> =15kHz, 78%AM	50	55		dB
Maximum AFT voltage	V <sub>11H</sub>	V <sub>i</sub> =10mVrms SWEEP	8.1	8.5	8.9	V
Minimum AFT voltage	V <sub>11L</sub>	V <sub>i</sub> =10mVrms SWEEP	0.1	0.4	0.9	V
AFT detection sensitivity	S <sub>f</sub>	V <sub>i</sub> =10mVrms SWEEP	45	70	90	mV/kHz
White noise threshold level	V <sub>WTH</sub>	V <sub>i</sub> =10mVrms SWEEP	4.7	5.1	5.5	V
White noise clamp level	V <sub>WCL</sub>	V <sub>i</sub> =10mVrms SWEEP	2.9	3.3	3.7	V
Black noise threshold level	V <sub>BTH</sub>	V <sub>i</sub> =10mVrms SWEEP	1.6	1.85	2.1	V
Black noise clamp level	V <sub>BCL</sub>	V <sub>i</sub> =10mVrms SWEEP	2.6	2.9	3.2	V
SIF output signal voltage	V <sub>o</sub> (SIF)	P/S=20dB	70	100	140	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
VIF input resistance	r <sub>i</sub>			1.5		kΩ
VIF input capacitance	c <sub>i</sub>			3.0		pF
SIF limiting voltage	V <sub>i</sub> (lim)	-3dB		300	600	μVrms
Detection output voltage	V <sub>o</sub> (DET)	V <sub>i</sub> =100mVrms, f <sub>m</sub> =400Hz, Δf=±25kHz	440	670	800	mVrms
Total harmonic distortion	THD(DET)	V <sub>i</sub> =100mVrms, f <sub>m</sub> =400Hz, Δf=±25kHz		0.6	1.5	%
AM rejection	AMR	V <sub>i</sub> =100mVrms, f <sub>m</sub> =400Hz, Δf=±25kHz 30%AM	50	60		dB
Noise output voltage	V <sub>N</sub>				3.5	mVrms
Pin 4 muting start voltage	V <sub>M</sub> (4)		0.3	0.5		V
Pin 20 muting attenuation	ATT <sub>M</sub> (20)		60			dB

## Equivalent Circuit Block Diagram



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## Sample Application Circuit (USA)



Unit ( resistance:Ω, capacitance:F )

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