



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

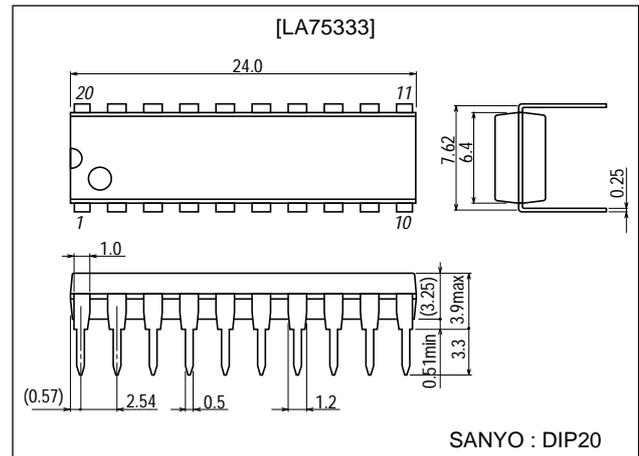
Maximum Ratings at $T_a = 25^\circ\text{C}$

| 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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LA7533

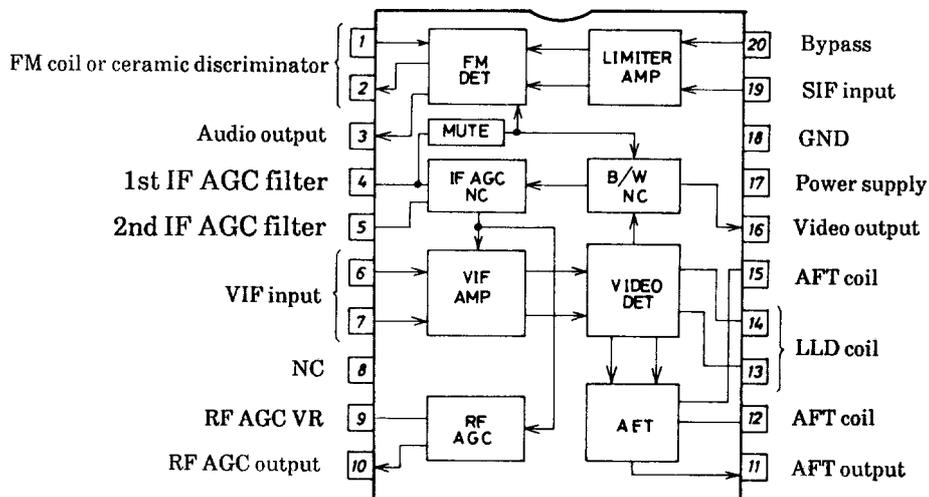
Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------------|--------------------|------------|-------------|------|
| Recommended supply voltage | V _{CC} | | 9 | V |
| Operating voltage range | V _{CC op} | | 8.1 to 13.2 | V |

Operating Characteristics at Ta = 25°C, V_{CC}=9V, f_p=58.75MHz, f_s=54.25MHz (VIF), f_o=4.5MHz (SIF)

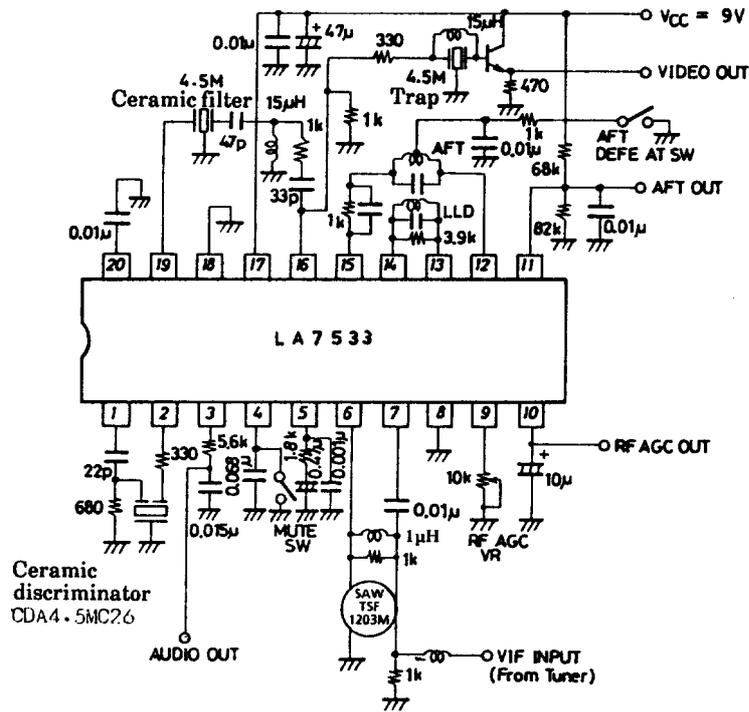
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--------------------------------|------------------------|--|---------|------|-----|--------|
| | | | min | typ | max | |
| Total circuit current | I ₁₇ | DC | 40 | 49 | 63 | mA |
| Maximum RF AGC voltage | V _{10H} | DC | 6.2 | 6.5 | 6.8 | V |
| Minimum RF AGC voltage | V _{10L} | DC | | 0.1 | 0.5 | V |
| Quiescent video output voltage | V ₁₆ | DC | 4.2 | 4.6 | 5.0 | V |
| Quiescent AFT output voltage | V ₁₁ | DC | 2.9 | 4.9 | 5.9 | V |
| Input sensitivity | V _i | f _m =400Hz, 40%AM, V _o =0.8Vp-p | 31 | 37 | 42 | dBμ |
| AGC range | GR | f _m =400Hz, 40%AM, V _o =0.8Vp-p | 57 | 63 | | dB |
| Maximum allowable input | V _{i max} | f _m =15kHz, 78%AM, V _o =±1dB | 90 | 130 | | mVrms |
| Video output amplitude | V _o (VIDEO) | V _i =10mVrms, f _m =15kHz, 78%AM | 1.4 | 1.65 | 1.9 | Vp-p |
| Output S/N | S/N | V _i =10mVrms CW | 48 | 53 | | dB |
| Carrier leakage | CL | V _i =100mVrms, f _m =15kHz, 78%AM | 50 | 55 | | dB |
| Maximum AFT voltage | V _{11H} | V _i =10mVrms SWEEP | 8.1 | 8.5 | 8.9 | V |
| Minimum AFT voltage | V _{11L} | V _i =10mVrms SWEEP | 0.1 | 0.4 | 0.9 | V |
| AFT detection sensitivity | S _f | V _i =10mVrms SWEEP | 45 | 70 | 90 | mV/kHz |
| White noise threshold level | V _{WTH} | V _i =10mVrms SWEEP | 4.7 | 5.1 | 5.5 | V |
| White noise clamp level | V _{WCL} | V _i =10mVrms SWEEP | 2.9 | 3.3 | 3.7 | V |
| Black noise threshold level | V _{BTH} | V _i =10mVrms SWEEP | 1.6 | 1.85 | 2.1 | V |
| Black noise clamp level | V _{BCL} | V _i =10mVrms SWEEP | 2.6 | 2.9 | 3.2 | V |
| SIF output signal voltage | V _o (SIF) | P/S=20dB | 70 | 100 | 140 | mVrms |
| Frequency characteristic | f _C | -3dB | 5 | 7 | | MHz |
| Differential gain | DG | V _i =-27dBm (peak) 87.5% VIDEOMOD | | 3 | | % |
| Differential phase | DP | V _i =-27dBm (peak) 87.5% VIDEOMOD | | 3 | | deg |
| VIF input resistance | r _i | | | 1.5 | | kΩ |
| VIF input capacitance | c _i | | | 3.0 | | pF |
| SIF limiting voltage | V _i (lim) | -3dB | | 300 | 600 | μVrms |
| Detection output voltage | V _o (DET) | V _i =100mVrms, f _m =400Hz, Δf=±25kHz | 440 | 670 | 800 | mVrms |
| Total harmonic distortion | THD(DET) | V _i =100mVrms, f _m =400Hz, Δf=±25kHz | | 0.6 | 1.5 | % |
| AM rejection | AMR | V _i =100mVrms, f _m =400Hz, Δf=±25kHz 30%AM | 50 | 60 | | dB |
| Noise output voltage | V _N | | | | 3.5 | mVrms |
| Pin 4 muting start voltage | V _M (4) | | 0.3 | 0.5 | | V |
| Pin 20 muting attenuation | ATT _M (20) | | 60 | | | dB |

Equivalent Circuit Block Diagram



LA7533

Sample Application Circuit (USA)



Unit (resistance:Ω, capacitance:F)

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