

TDA2541 Video IF/AFT

Product Specification

Linear Products

DESCRIPTION

The TDA2541 is an IF amplifier and demodulator circuit for color and black-and-white television receivers using PNP tuners.

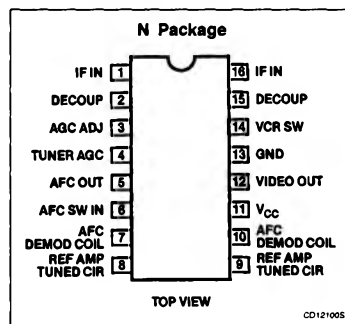
FEATURES

- Gain-controlled wide-band amplifier, providing complete IF gain
- Synchronous demodulator
- White spot inverter
- Video preamplifier with noise protection
- AFC circuit which can be switched on/off by a DC level, e.g., during tuning
- AGC circuit with noise gating
- Tuner AGC output (PNP tuners)
- VCR switch, which switches off the video output; e.g., for insertion of a VCR playback signal

APPLICATIONS

- Black/white and color TV receivers
- Video cassette recorders (VCRs)
- CATV converters

PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
16-Pin Plastic DIP (SOT-38)	-25°C to +60°C	TDA2541N

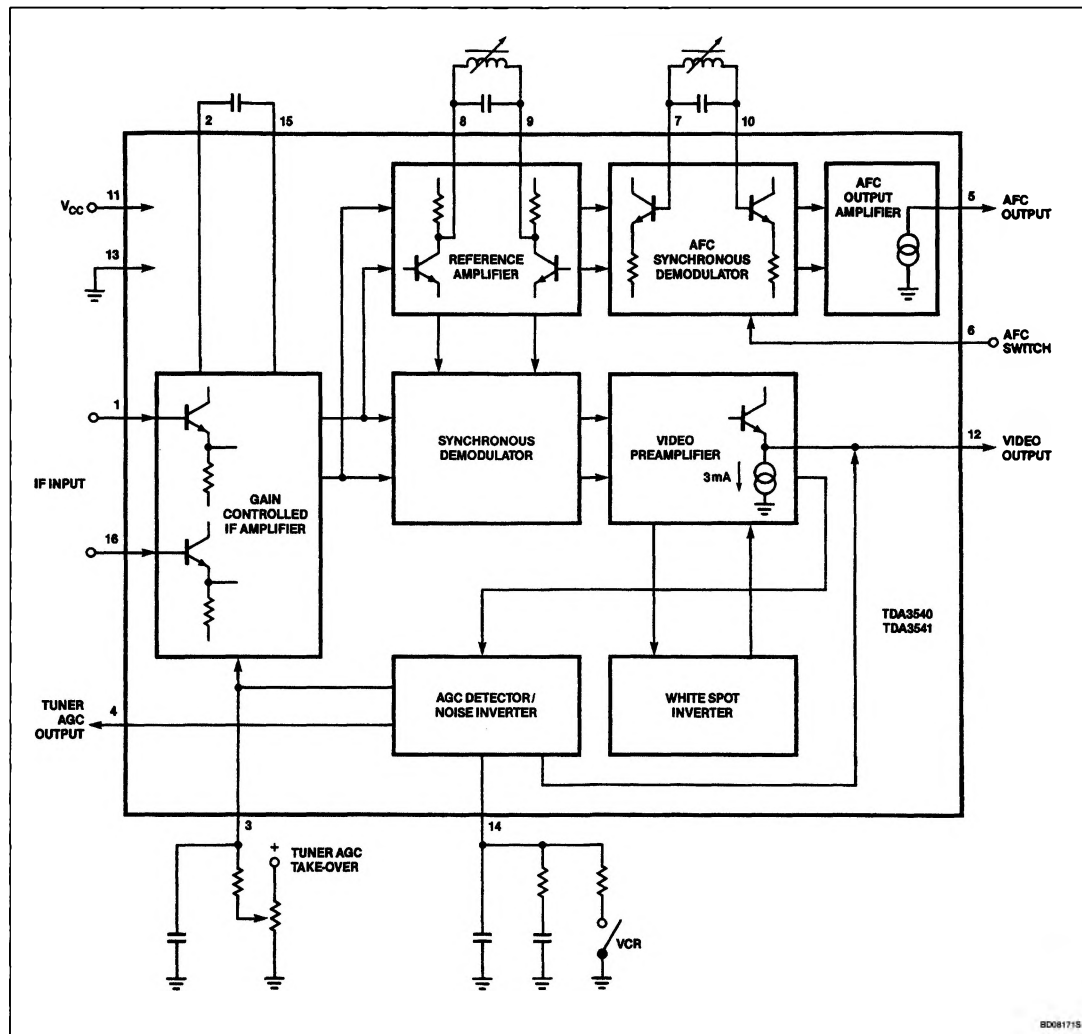
ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V _{CC}	Supply voltage	13.2	V
V ₄₋₁₃	Tuner AGC voltage	12	V
P _{TOT}	Total power dissipation	900	mW
T _{STG}	Storage temperature range	-65 to +150	°C
T _A	Operating ambient temperature range	-25 to +60	°C

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BLOCK DIAGRAM



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DC ELECTRICAL CHARACTERISTICS (Measured in Figure 4) $T_A = 25^{\circ}\text{C}$; $V_{11-13} = 12\text{V}$; $f = 38.9\text{MHz}$, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
V _{CC}	Supply voltage range	10.2	12.0	13.2	V
V _{I-16(RMS)}	IF input voltage for onset of AGC (RMS value)		100	150	μV
Z _{I-16}	Differential input impedance C _L 2PF		2		kΩ
V _{I2-13}	Zero-signal output level		6 ± 0.3		V ¹
V _{I2-13}	Top sync output level	2.9	3.07	3.2	V
A _v	IF voltage gain control range		64		dB
BW	Bandwidth of video amplifier (3dB)		6		MHz
S/N	Signal-to-noise ratio at V _I = 10mV		58		dB ²
dG	Differential gain		4 10		% %
dφ	Differential phase		2 10		
	Intermodulation at 1.1MHz: blue ¹ yellow ¹ at 3.3MHz ²	46 46 46	60 50 54		dB dB dB
	Carrier signal at video output		4	30	mV
	2nd harmonic of carrier at video output		20	30	mV
	White spot inverter threshold level (Figure 3)		6.6		V
	White spot insertion level (Figure 3)		4.7		V
	Noise inverter threshold level (Figure 3)		1.8		V
	Noise insertion level (Figure 3)		3.8		V
V _{I4-13}	External video switch (VCR) switches off the output at:			1.1	V
I ₄	Tuner AGC output current range	0		10	mA
V ₄₋₁₃	Tuner AGC output voltage at I ₄ = 10mA			0.3	V
I ₄	Tuner AGC output leakage current V _{I4-13} = 11V; V ₄₋₁₃ = 12V			15	μA
ΔV ₅₋₁₃	Maximum AFC output voltage swing	10	11		V
Δf	Detuning for AFC output voltage swing of 10V		100	200	kHz
V ₅₋₁₃	AFC zero-signal output voltage (minimum gain)	4	6	8	V
V ₆₋₁₃	AFC switches on at:	3.2			
V ₆₋₁₃	AFC switches off at:			1.5	V

NOTES:

1. So-called 'projected zero point', e.g., with switched demodulator.

$$2. S/N = \frac{V_{O \text{ black-to-white}}}{V_{N(RMS)} \text{ at } B = 5\text{MHz}}$$

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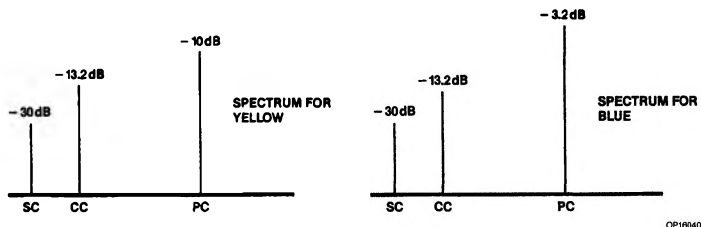
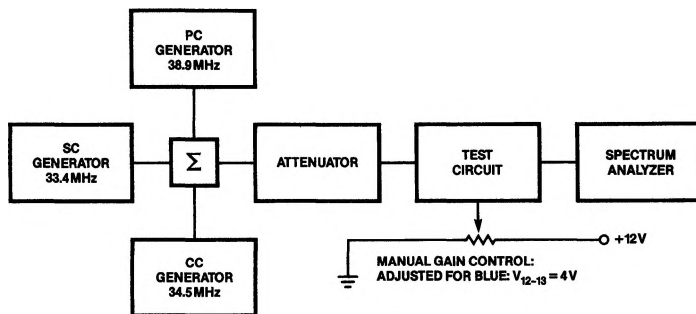


Figure 1. Input Conditions for Intermodulation Measurements; Standard Color Bar With 75% Contrast



NOTES:

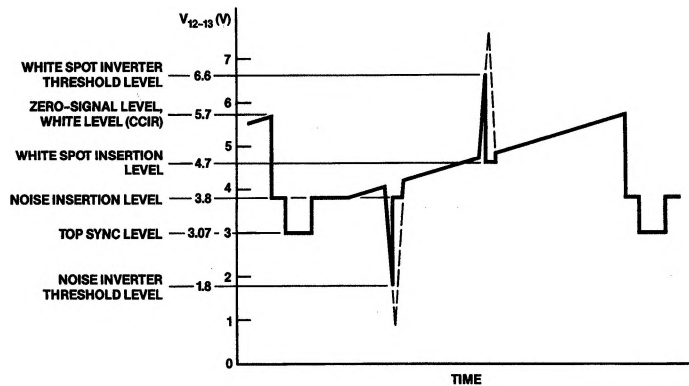
$$1. 20 \log \frac{V_O \text{ at } 4.4\text{MHz}}{V_O \text{ at } 1.1\text{MHz}} + 3.6\text{dB}$$

$$2. 20 \log \frac{V_O \text{ at } 4.4\text{MHz}}{V_O \text{ at } 3.3\text{MHz}}$$

Figure 2. Test Setup for Intermodulation

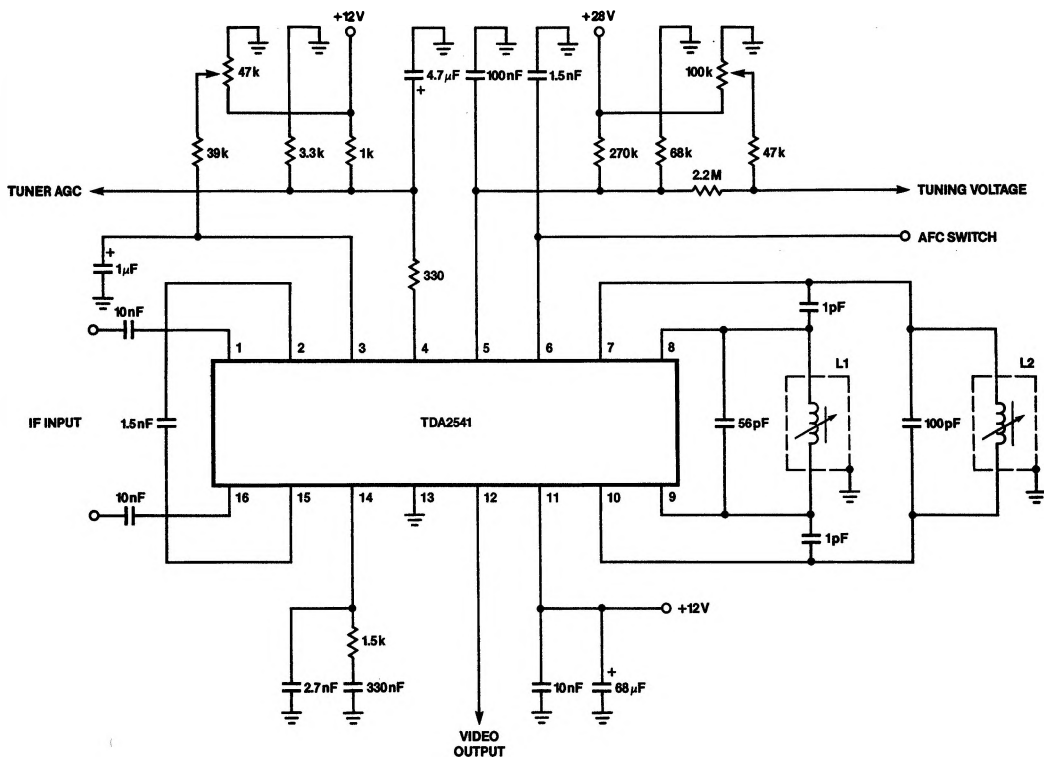
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Figure 3. Video Output Waveform Showing White Spot and Noise Inverter Threshold Levels

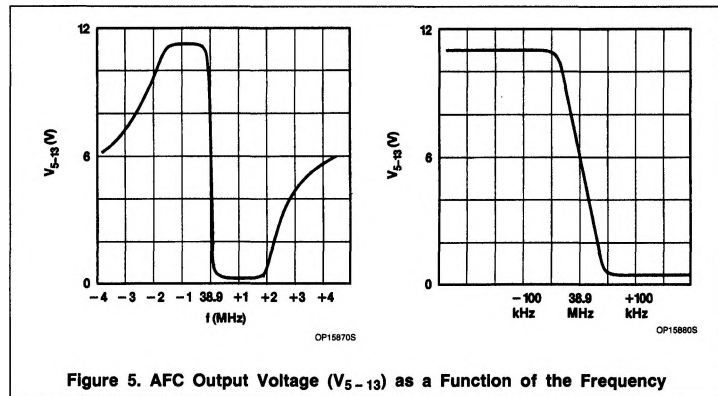
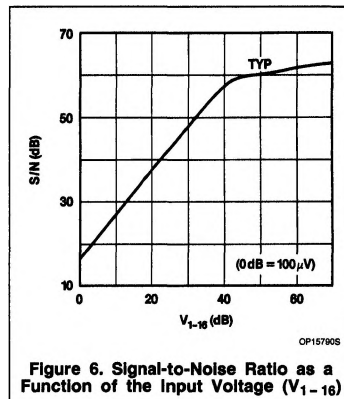


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Figure 4. Typical Application Circuit Diagram; Q of L1 and L2 ≈ 80 ; $f_0 = 38.9\text{MHz}$

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Figure 5. AFC Output Voltage (V_{5-13}) as a Function of the FrequencyFigure 6. Signal-to-Noise Ratio as a Function of the Input Voltage (V_{1-16})