Signetics

TDA2540
Video IF/AFT

Product Specification

Linear Products

DESCRIPTION

The TDA2540 is an IF amplifier and demodulator circuit for color and black-and-white television receivers using NPN tuners.

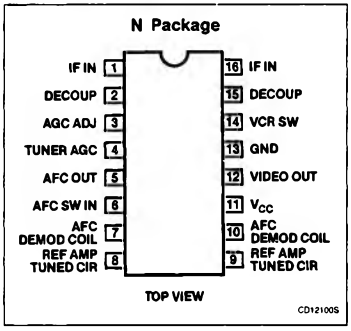
FEATURES

- **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 (NPN 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/monitors**
- **Video cassette recorders (VCRs)**
- **CATV converters**

PIN CONFIGURATION



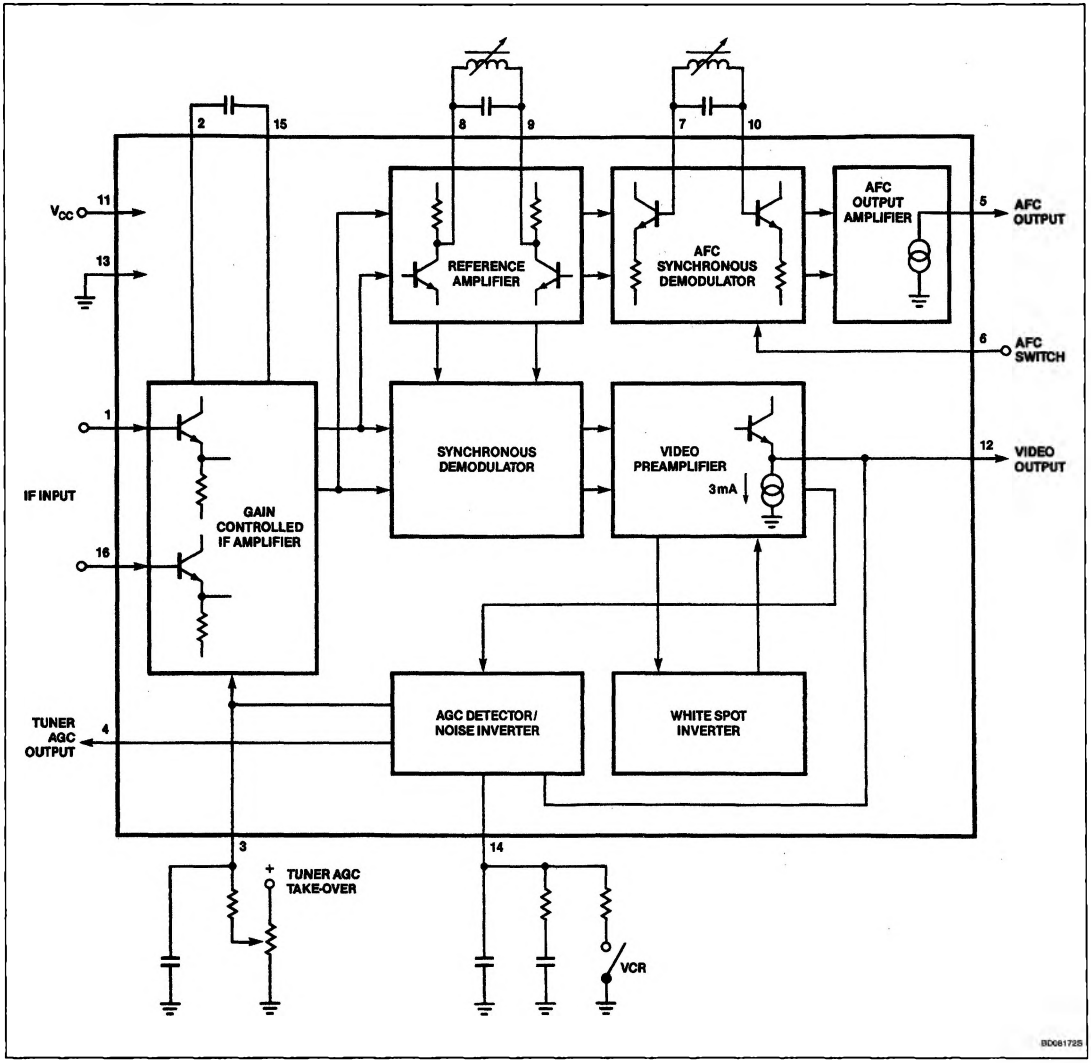
ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
16-Pin Plastic DIP (SOT-38)	−25°C to +60°C	TDA2540N

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{11-13}	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 +125	°C
T_A	Operating ambient temperature range	−25 to +60	°C

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS (Measured in Figure 4) The following characteristics are measured at $T_A = 25°C$; $V_{11-13} = 12V$; f = 38.9MHz, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
V_{11-13}	Supply voltage range	10.2	12	13.2	V
$V_{1-16(RMS)}$	IF input voltage for onset of AGC (RMS value)		100	150	μV
$\lvert Z_{1-16} \rvert$	Differential input impedance C_L = 2pF		2		kΩ
V_{12-13}	Zero-signal output level		6± 0.3		V[1]
V_{12-13}	Top sync output level	2.9	3.07	3.2	V
G_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[1]		2	10	degrees
	Intermodulation at 1.1MHz: blue[3] yellow[3] at 3.3MHz[4]	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_{14-13}	External video switch (VCR) switches off the output			1.1	V
I_4	Tuner AGC output current range	10		0	mA
V_{4-13}	Tuner AGC output voltage at I_4 = 10mA			0.3	V
I_4	Tuner AGC output leakage current V_{14-13} = 5V; 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	100 200	kHz kHz
V_{5-13}	AFC zero-signal output voltage (minimum gain)	4	6	8	V
V_{6-13}	AFC switches on at:	3.2		3	V
V_{6-13}	AFC switches off at:			1.5	V

NOTES:

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

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

3. $20\log \frac{V_O \text{ at 4.4MHz}}{V_O \text{ at 1.1MHz}} + 3.6\text{dB}.$

4. $20\log \frac{V_O \text{ at 4.4MHz}}{V_O \text{ at 3.3MHz}}$

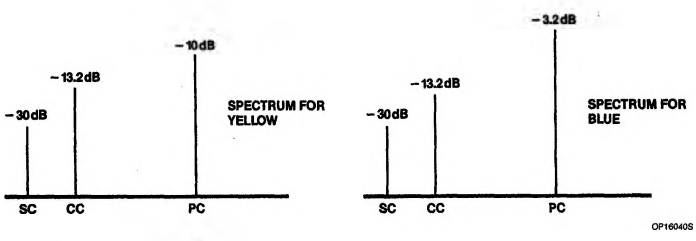


Figure 1. Input Conditions for Intermodulation Measurements; Standard Color Bar With 75% Contrast

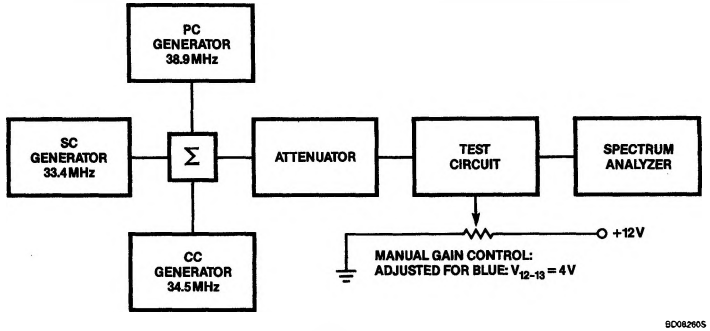


Figure 2. Test Setup for Intermodulation

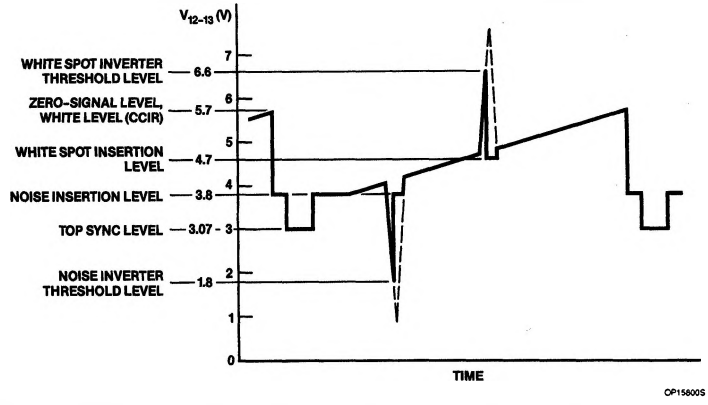
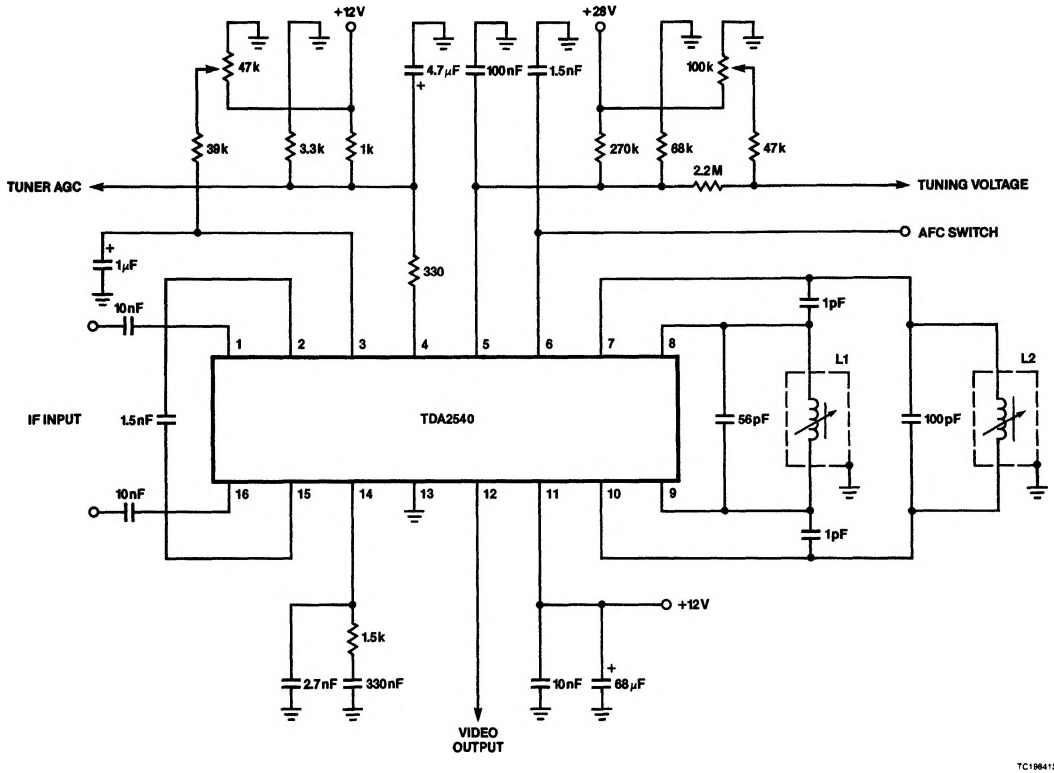


Figure 3. Video Output Waveform Showing White Spot and Noise Inverter Threshold Levels



NOTES:
Q of L1 and L2 ≈ 80; f = 38.9MHz

Figure 4. Typical Application Circuit Diagram

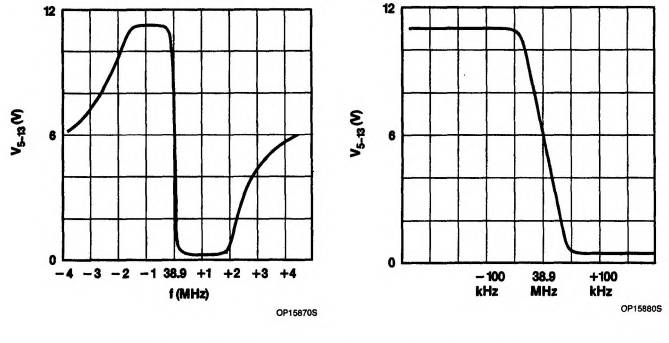


Figure 5. AFC Output Voltage (V_{5-13}) as a Function of the Frequency

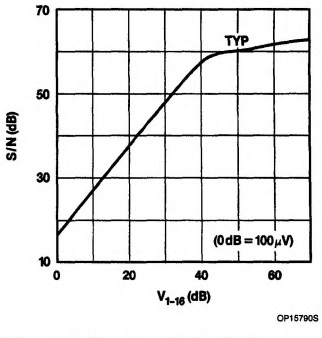


Figure 6. Signal-to-Noise Ratio as a Function of the Input Voltage (V_{1-16})