

TDA440 Video IF Amplifier

General Description

The integrated circuit has the following functions incorporated: 3 symmetrical IF (broad band) amplifier with first and second regulated stages, controlled color carrier demodulator; video post-amplifier with low pass response and output independent of supply fluctuations; gated AGC section for the IF amplifier; delayed regulated output voltage for the tuner pre-stage.

Features

- High gain — high stability
- Constant input impedance independent of AGC
- Poor noise increase due to AGC action
- Negative video signal hardly affected by supply voltage variations

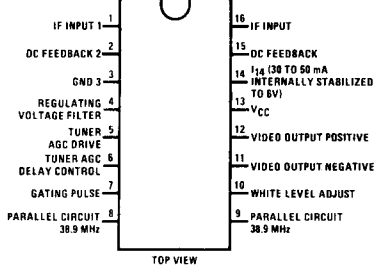
- Minimum RF breakthrough to video outputs
- Fast AGC action — gating largely independent of pulse shape and amplitude
- Very low intermodulation products
- Minimum differential error
- Positive as well as negative video signal available from low impedance outputs
- Integrated temperature compensating circuit
- DC output component adjustable (peak white)

Applications

- Video IF amplifier for color and monochrome television receivers

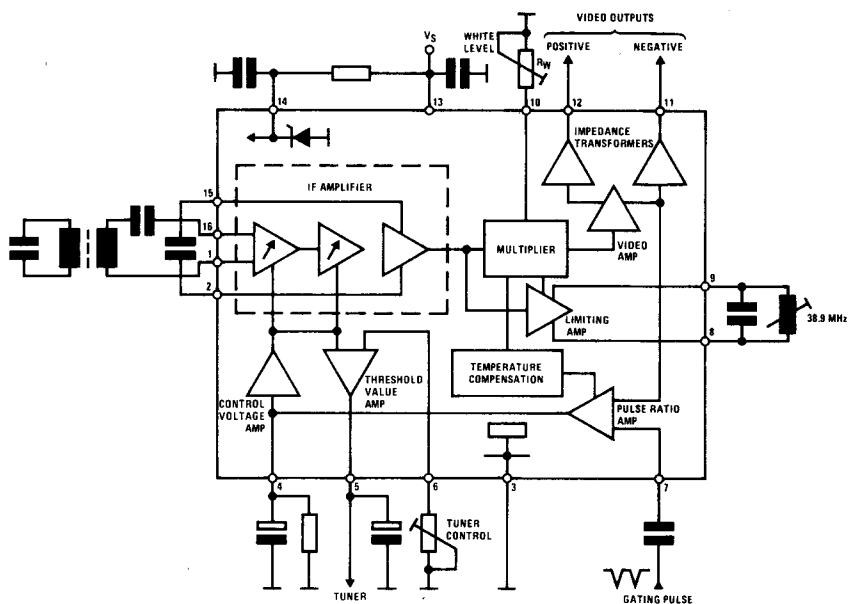
Connection and Block Diagrams

Dual-In-Line Package



Dual-In-Line Package, Order Number TDA440
See NS Package N16A

Quad-In-Line Package, Order Number TDA440Q
See NS Package N16C



Absolute Maximum Ratings

V _S , Supply Voltage Range (Pin 13)	10 to 15V	V _{EXT} , External Voltage (Pin 4)	3.2V
I _S , Supply Current of Low Voltage Stabilizer (Pin 14)	50 mA	Power Dissipation	700 mW
V _Q , Open Loop Voltage (Pin 5)	15V	P _{TOT} , T _A ≤ 55°C	125°C
Video DC Output Current		T _J , Junction Temperature	-25°C to +70°C
I _Q , Positive (Pin 12)	5 mA	T _A , Ambient Temperature Range	-25°C to +125°C
I _Q , Positive (Pin 10)	30 mA	T _{STG} , Storage Temperature Range	
I _Q , Negative (Pin 11)	5 mA		
I _Q , Negative (Pin 11)	30 mA		
V _W , White Level Control (R _W) (Pin 10)	-1 to +3V	Thermal Resistance	
		R _{thJA} , Junction Ambient	100°C/W Max

Electrical Characteristics

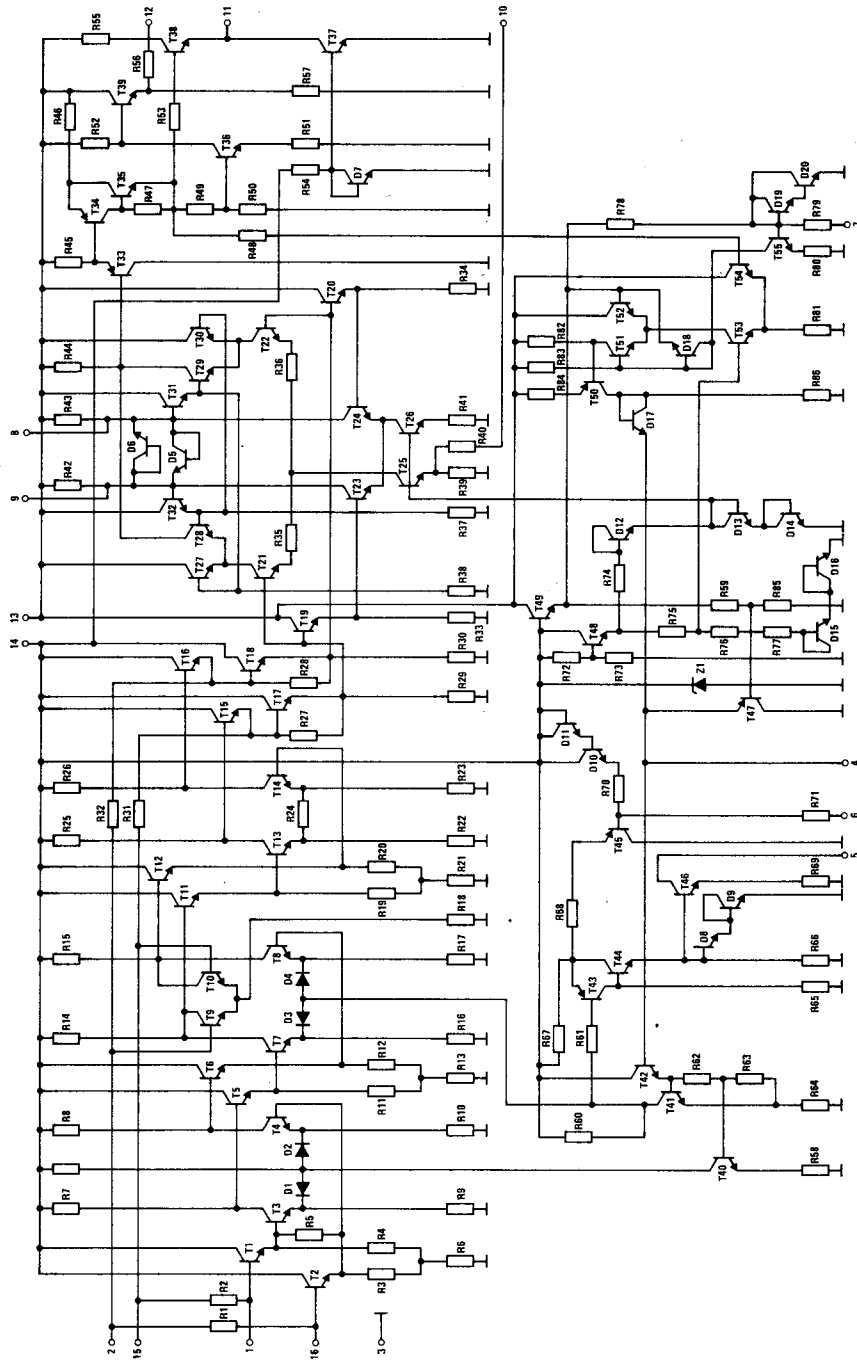
V_S = 12V, T_A = 25°C, Reference point pin 3 unless otherwise specified

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	
V _S	Supply Voltage	Pin 13	10	12	15	V
I _S	Supply Current	Pin 13	15	19	25	mA
V _S	Supply Voltage	Pin 14, I _S = 40 mA	5.5	5.8	6.4	V
V _Q	Negative Video DC Output Voltage	Pin 11		5.5		V
V _Q	With White Level Adjustable	Pins 10 and 11, R _W = ∞			4.8	V
		R _W = 0	6.5			V
V _Q	Peak Black Clamping Level for Negative Video DC Output Voltage	Pin 11	1.75	1.9	2.15	V
I _Q	Output DC Current					
	Reference Point	Pins 11 and 13		3.2		mA
V _Q	Positive Video DC Output Voltage	Pin 12		5.6		V
I _Q	Available Tuner Control Current	Pin 5	3	4.5		mA
	10 dB after Onset of Tuner Control Action (Note 1)					
V _i	Negative Gating Pulse	Pin 7	1.5	3	5	V _{SS}
-v _q	Composite Video Output Level	Pin 11				
		V _Q = 5.5V		3.3		V _{SS}
		V _Q = 6.4V		4.2		V _{SS}
ΔA(IF)	AGC Range		50	56		dB
BVIDEO	Video Bandwidth		8	10		MHz
ΔvVIDEO	Video Frequency Response Change	ΔvVIDEO = -3 dB				
		ΔA(IF) = 50 dB, BVIDEO = 0-5 MHz		1.0	2.0	dB
v _i	Symmetrical Input Voltage	Pins 1-16, -v _q = 3.3 V _{SS} (Pin 11)	100	150	220	μV
	Maximum IF Voltage Level	Pins 11 and 12				
	Present at Video Outputs Over the Full AGC Range	f = 38.9 MHz			30	mV
		f = 77.8 MHz (2. Harm)			50	mV
	Sound IF Voltage Level Present at Video Outputs with Selective Circuit	Pin 12, f = 5.5 MHz, B _T /T _T = 30 dB	30			mV
d	Differential Gain of Negative Comp. Video Output Signal, for Full Black to White Swing				15	%
a _{IM}	Suppression of Sound Carrier/Color Subcarrier IP (1.07 MHz) with Respect to Color Subcarrier Level		40			dB
	Picture Carrier			0		dB
	IF Color Subcarrier Level			-6		dB
	IF Sound Carrier Level			-24		dB
	Input Impedance					
	Reference Point	Pin 16				
R _i	A(IF) Max	Pin 1		1.4		kΩ
C _i				2		pF
R _i	A(IF) Min	Pin 1		1.4		kΩ
C _i				1.9		pF

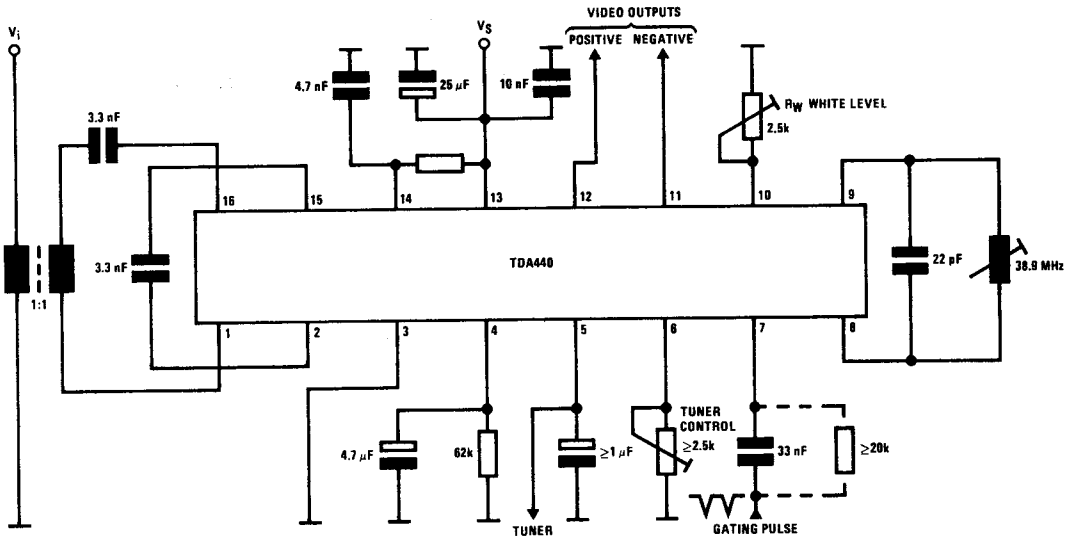
Note 1: On request ≥ 7 mA

Schematic Diagram

Application Note for Reference Circuit to Improve Audio Interference and Cross Color Characteristics



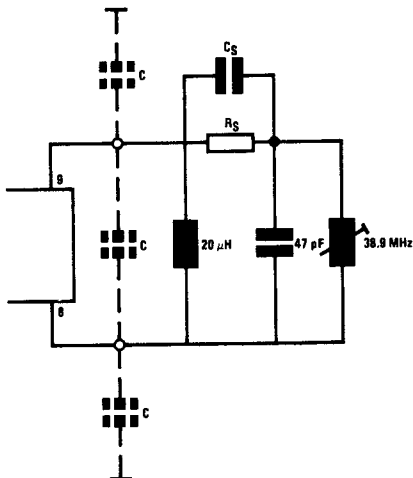
Test Circuit



Note. Supply voltage *must be disconnected* before inserting the integrated circuit in the socket.

Typical Application

Improved Tank Circuit to Reduce Audio Interference and Chroma Beat



C = Parasitic capacitance at pins 8 and 9 should be kept minimum

C_S = 6--10 pF -- series capacitance

f_0 = 38.9--(1.8--2.75) MHz--series resonance frequency

R_S = 1.8--3.3 k Ω -- series resonance damping determine the tuning characteristics

i.e., R_S = 2.4 k Ω tuning range, f = 3 MHz