

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

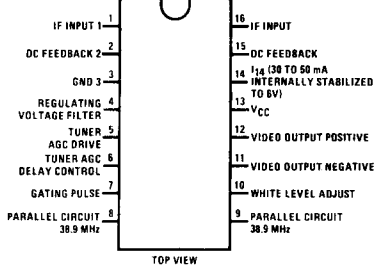
- Minimum RF breakthrough to video outputs
- Fast AGC action — gating largely independent of pulse shape and amplitude
- Very low intermodulation products
- Minimum differential error
- Positive as well as negative video signal available from low impedance outputs
- Integrated temperature compensating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

Applications

- Video IF amplifier for color and monochrome television receivers

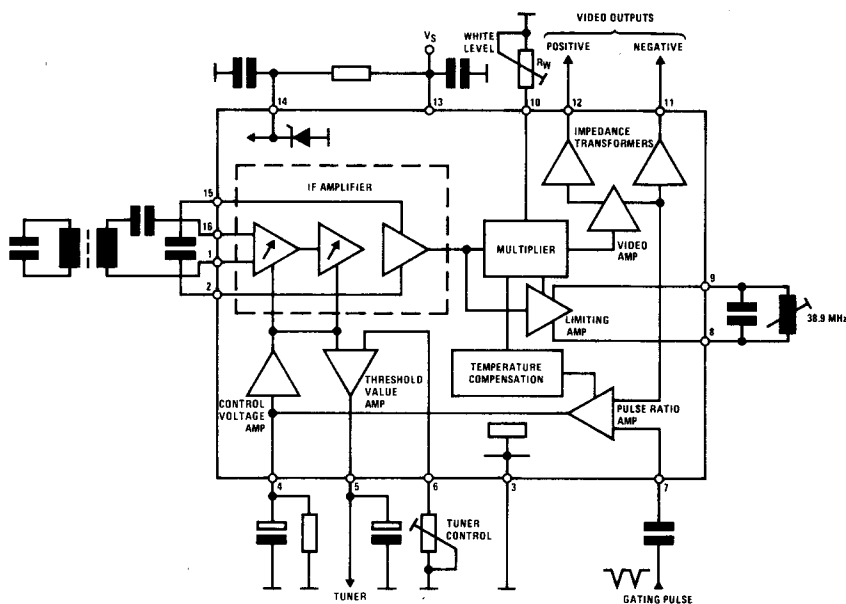
Connection and Block Diagrams

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} , $T_A \leq 55^\circ\text{C}$	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 12)	30 mA	T_{STG} , Storage Temperature Range	
I_Q , Negative (Pin 11)	5 mA		
I_Q , Negative (Pin 11)	30 mA	Thermal Resistance	
V_W , White Level Control (R_W) (Pin 10)	-1 to +3V	R_{thJA} , Junction Ambient	100°C/W Max

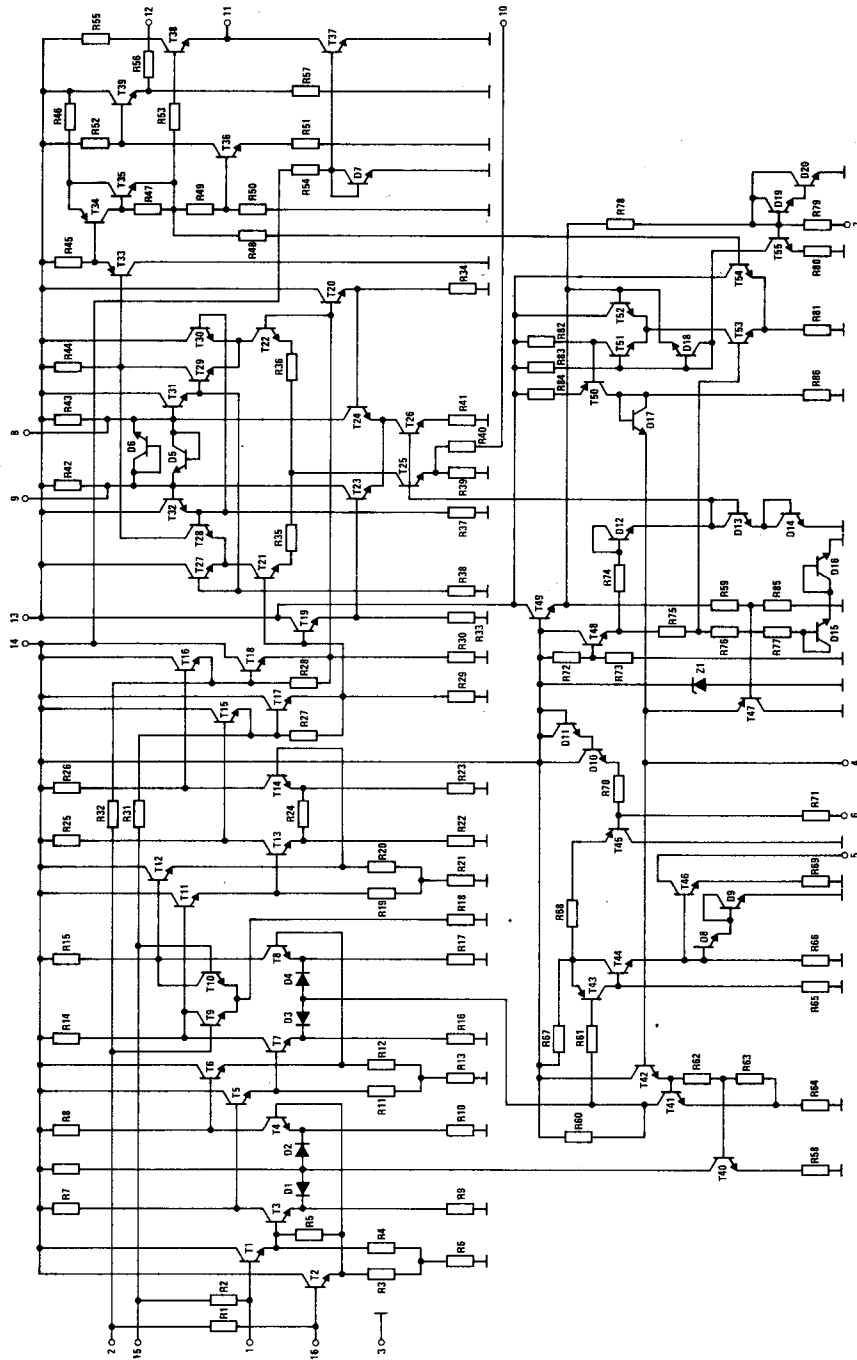
Electrical Characteristics $V_S = 12V$, $T_A = 25^\circ\text{C}$, Reference point pin 3 unless otherwise specified

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, $R_W = \infty$			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 10 dB after Onset of Tuner Control Action (Note 1)	Pin 5	3	4.5		mA
V_i Negative Gating Pulse	Pin 7	1.5	3	5	V_{SS}
$-v_q$ Composite Video Output Level	Pin 11		3.3		V_{SS}
	$V_Q = 5.5V$		4.2		V_{SS}
	$V_Q = 6.4V$				V_{SS}
$\Delta A_{(IF)}$ AGC Range		50	56		dB
B_{VIDEO} Video Bandwidth	$\Delta v_{VIDEO} = -3$ dB	8	10		MHz
Δv_{VIDEO} Video Frequency Response Change	$\Delta A_{(IF)} = 50$ dB, $B_{VIDEO} = 0-5$ 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 Present at Video Outputs Over the Full AGC Range	Pins 11 and 12			30	mV
	$f = 38.9$ MHz			50	mV
	$f = 77.8$ MHz (2. Harm)				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		k Ω
C_i			2		pF
R_i $A_{(IF)}$ Min	Pin 1		1.4		k Ω
C_i			1.9		pF

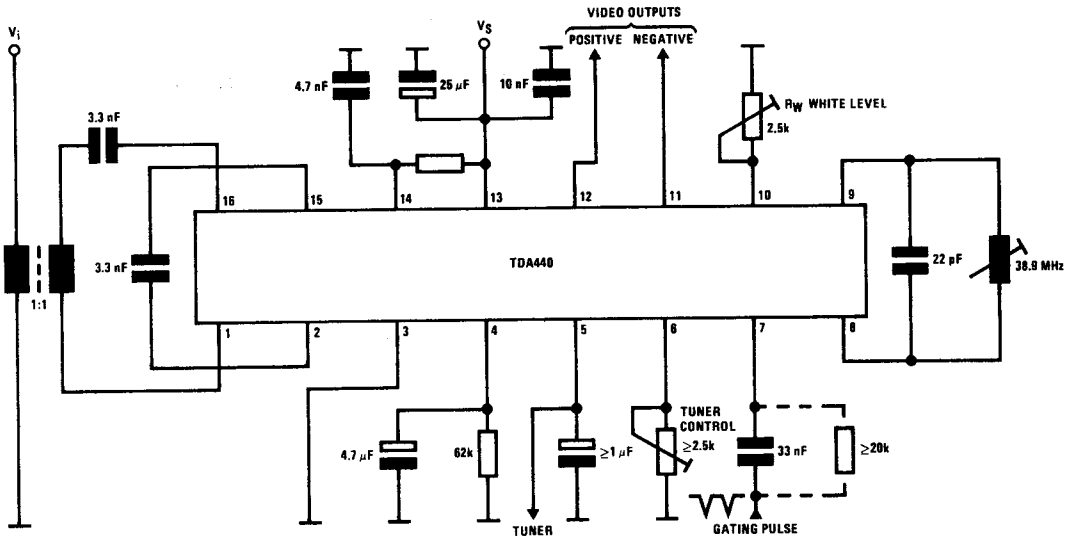
Note 1: On request ≥ 7 mA

Schematic Diagram

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



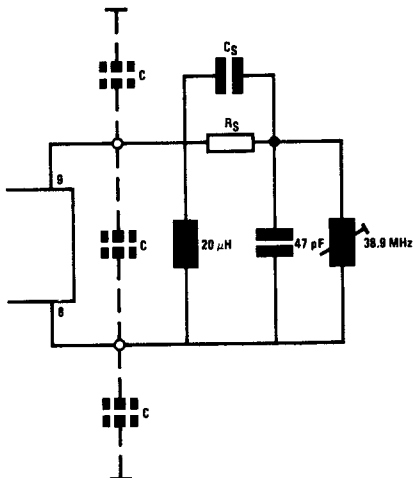
Test Circuit



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