Video and Sound IF with V & S-SCART

TDA 5940

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Bipolar IC

Features

- Features video / sound scart
- Active FM PLL demodulator
- AF control
- Alignment - free sound IF

VPD 05053

P-DIP-24 (300 mil)

Type	Ordering Code	Package
TDA 5940	Q67000-A 5144	P-DIP-24 (300 mil)

Functional Description and Application

Video IF-Section

Video IF-broadband amplifier followed by a quasi-synchronous demodulator for negative modulated IF-signals. A Full-SCART interface is included in the video section. A separate video output after the demodulator permits the installation of one or more sound traps at the input of the SCART-switch. The tuner AGC-threshold is set by means of a potentiometer, all other functions can switched with open collector transistors.

Sound IF-Section

FM-IF-limiter with FM-PLL-demodulator. The AF-section has a Full-SCART switch followed by a volume control. The volume is controlled by an analog voltage.

Application

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The TDA 5940 is suitable for application in television receivers with Full-SCART.

Circuit Description

Video IF-Section

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The video IF-section incorporates a four-stage, capacitively coupled, symmetrical and controlled amplifier, a limiter with selection and a mixer for quasi-synchronous demodulation of negative modulated IF-signals followed by a video output amplifier. The video demodulator output and the SCART-switch input are connected by means of a sound trap. The SCART-switch has two inputs (for signals from video demodulator and SCART-socket) and two outputs (SCART-socket and TV-output). Parallel to the video output amplifier the video signal is used for generating the AGC-voltage. The control circuit is designed on the integralaction AGC-principle, employing a noise-free peak value detector. A delayed tuner AGC-voltage with positive control direction is derived from the AGC-voltage via a threshold amplifier that is set by means of an external potentiometer.

Sound IF-Section

The sound IF-section incorporates a five-stage, symmetrical limiter amplifier followed by a PLL-demodulator. The AF-section contains an analog switch for the Full-SCART-interface and a volume control with AF-output.

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Pin Functions

Pin No.	Function
1	Video IF-input
2	Video IF-input
3	Low-pass capacitor
4	Deemphasis capacitor
5	Audio SCART-output
6	Audio output
7	Audio SCART-input
8	Audio volume control
9	Sound IF-input
10	Ground
11	Video demodulator output
12	Video input at sound trap output
13	Demodulator tank circuit
14	Demodulator tank circuit
15	MUTE control
16	Video SCART-input
17	Video output
18	Video SCART-output
19	+ V_S supply voltage
20	Ground
21	SCART-control
22	AGC-time constant
23	Delayed tuner AGC-threshold
24	Delayed tuner AGC-output

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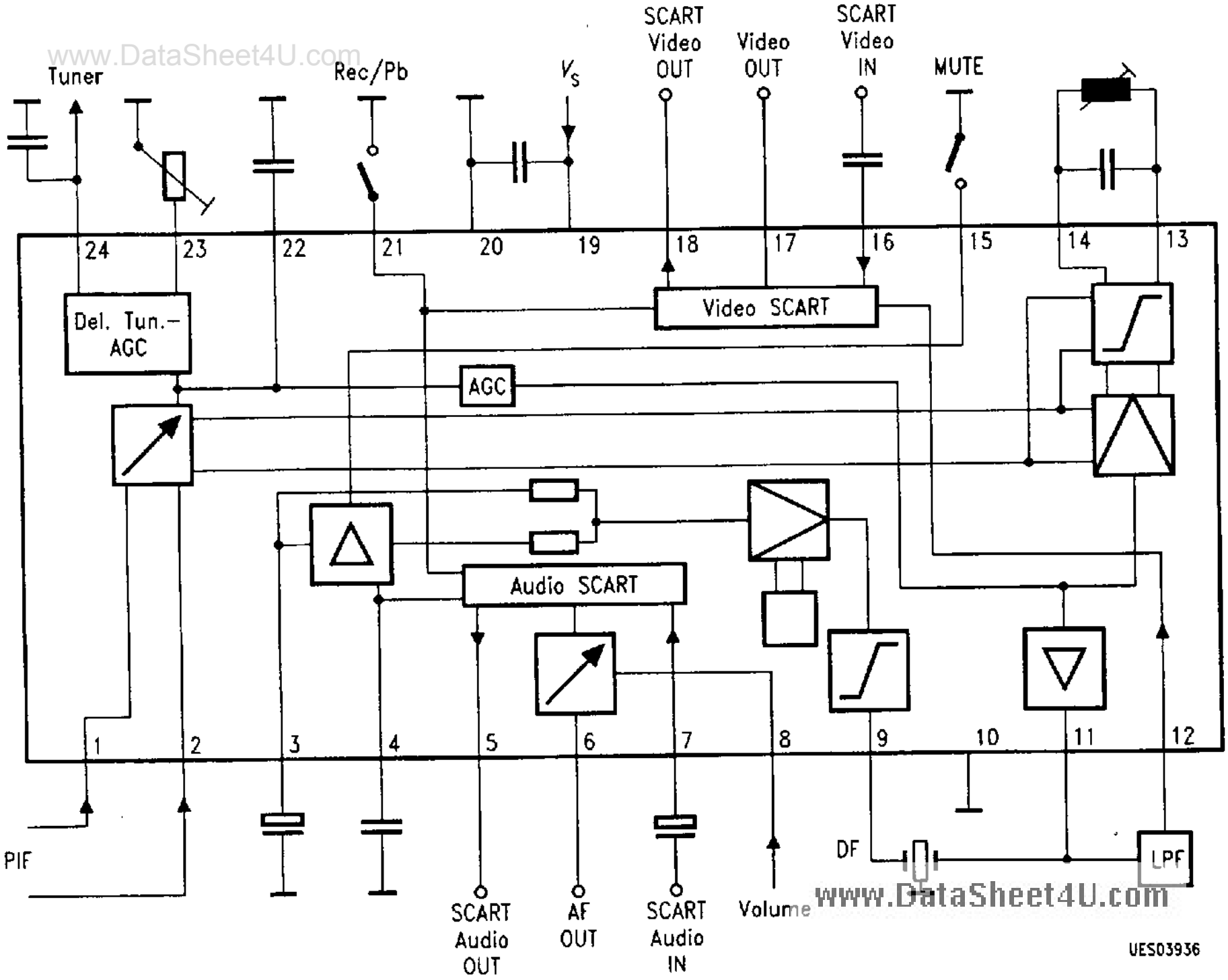

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Absolute Maximum Ratings

T_A = 0 to 85 °C

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Parameter	Symbol	Limit Values		Unit
		min.	max.	
Supply voltage	V_S		13.2	V
Junction temperature	T_j		150	°C
Storage temperature	T_{stg}		125	°C
Thermal resistance	$R_{th\ JA}$		70	K/W

Operating Range

Supply voltage	V_S	7.5	13.2	V
Supply voltage delayed tuner AGC	V_1	1	10	V
Ambient temperature during operation	T_A	0	85	°C
Input frequency range	f_{IF}	12	80	MHz

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Characteristics

T_A = 0 to 85 °C; V_S = 12 V

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Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Total current	I_{19}		38		mA	
SCART-Switch						
H/open = SCART = PB	V_{21}	2		5	V	
L = RF	V_{21}	0		1.5	V	
Volume Control Voltage						
Minimal volume	V_8	0			V	
Maximal volume	V_8		3.6	5	V	
MUTE Voltage						
H/open = AF ON	V_{15}	2		5	V	
L = AF MUTE	V_{15}	0		1.5	V	
Dynamic Parameter						
Video IF-Section						
IF-input sensitivity	$V_{1/2}$		70	100	µV	V_{Video} – 3 dB
Max. IF-input voltage	$V_{1/2}$	100	140		mV	V_{Video} + 3 dB
IF-control range	ΔV_{IF}		66		dB	
Video demodulator output voltage	V_{11PP}	1.35	1.5	1.65	V	V_{IFin} = 10 mV
Gain of SCART-Switch						
SCART/Video output	$G_{16\text{-}17}$		2			
Video/SCART output	$G_{12\text{-}18}$		– 1			
Video/Video output	$G_{12\text{-}17}$		2			
Cross talk attunation	a		50		dB	

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Characteristics (cont'd)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		

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Sound IF-section

Min. sound IF-input voltage (min. control)	V_9		70		µV	
AF-output voltage	V_6	500			mV	Δf = 30 kHz f_{mod} = 1 kHz F_{SIF} = 5.5 MHz
SCART-AF-output voltage	V_5	500			mV	Δf = 30 kHz f_{mod} = 1 kHz F_{SIF} = 5.5 MHz
Total harmonic distortion	THD_{AFo}			0.5	%	Δf = 30 kHz f_{mod} = 1 kHz F_{SIF} = 5.5 MHz
Max. SCART-input voltage	V_{7RMS}			2	V	
Gain SCART-sound switch	G_{7-6}		1			$V_8 \geq 3.6$ V

Alignment Instructions

At a video carrier input level of $V_{1/2}$ = 4 mVrms, f_{PIC} = 38.9 MHz, and a superimposed AGC-voltage of V_{22} = 1.5 V, the demodulator tank circuit is preliminarily aligned until a max. video signal 11Vpp is obtained at the video output. Any suitable video testsignal can be used for modulation. The AGC-voltage V_{22} is reduced until the signal is approx. 1 Vpp and the max. videosignal is obtained when fine-aligning the demodulator tank circuit. The alignment is not critical due to relatively large bandwidth of the demodulator tank circuit. Fine-tuning to intercarrier S/N, differential phase or 2T-pulse characteristics is possible.

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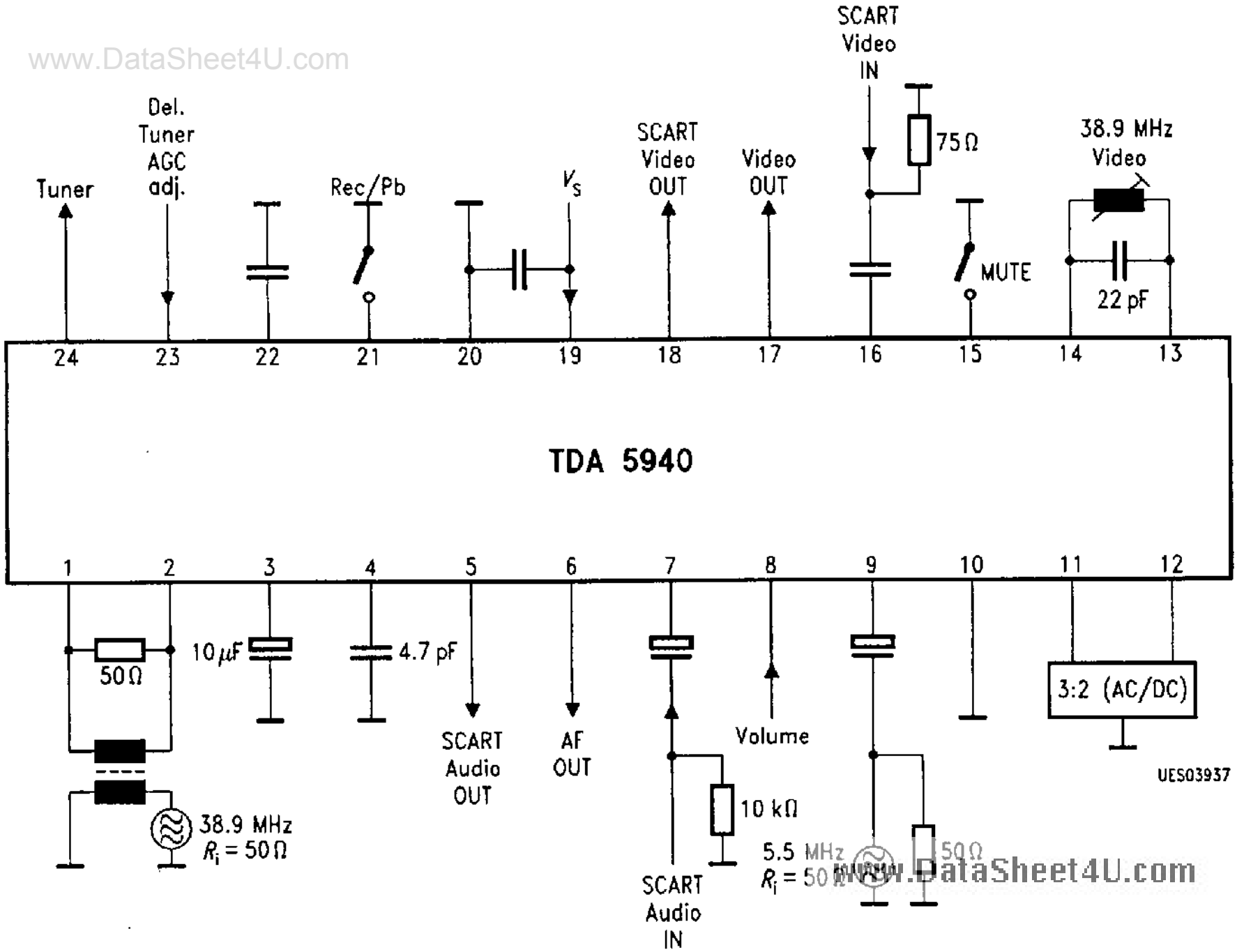

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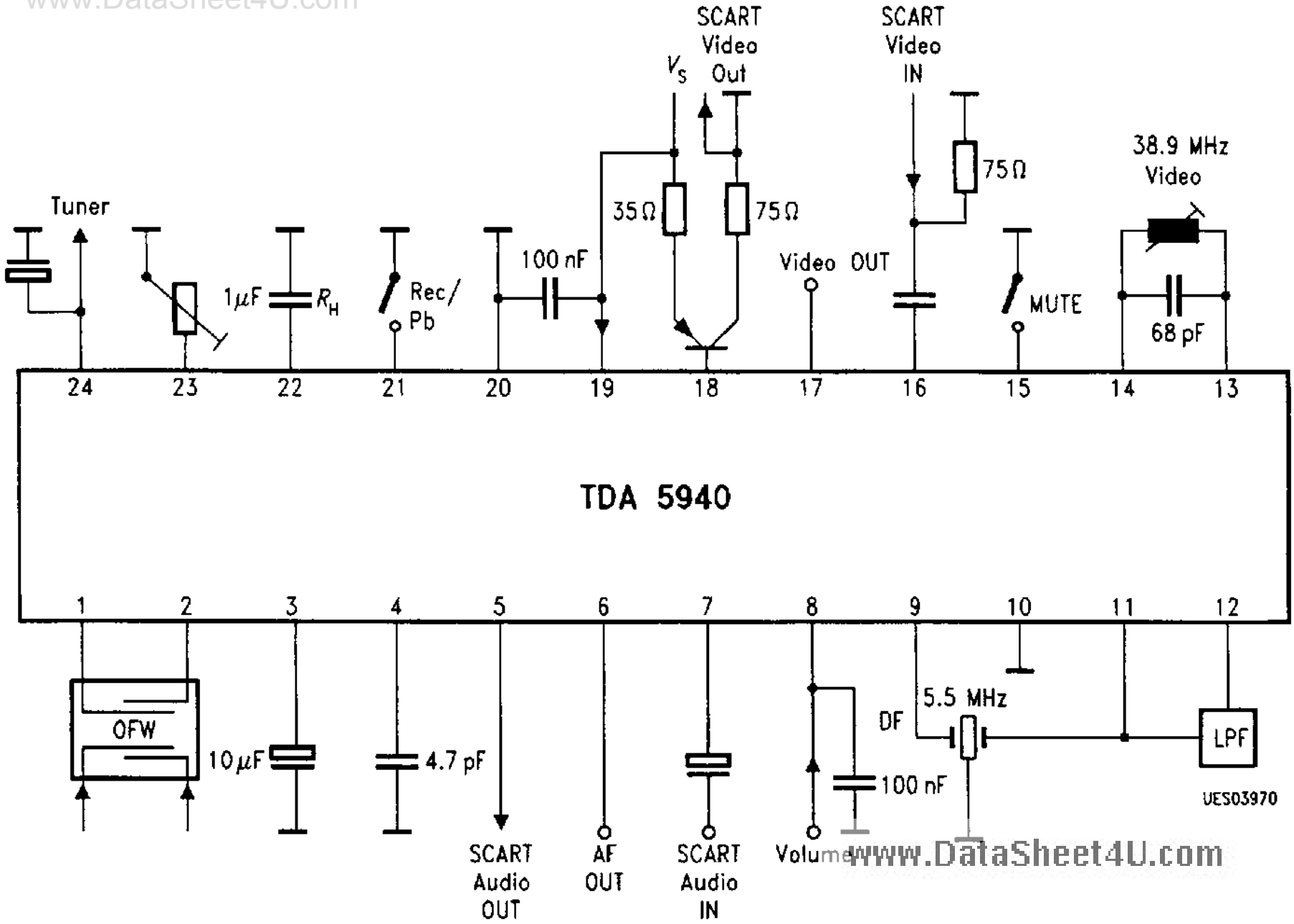

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