



SANYO Semiconductors

DATA SHEET

LA7975

Monolithic Linear IC
For TV and VCR Multi-system
PAL SIF Converter Circuit

Overview

The LA7975 is an IC that converts PAL SIF signals (5.5MHz, 6MHz, and 6.5MHz) to 6MHz. For the sake of high sound quality, this IC uses a unique mixer technique to suppress interference from NICAM signals.

Features

- Resistant to interference by NICAM signals.
- Small SIP-5 package.
- Wide range of usage voltage (5V to 12V).

Functions

- Mixer, amplifier, oscillator, oscillator mute.

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC max}		13.2	V
Maximum feed current	I _{5 max}		3	mA
	I _{4 max}		1	mA
Allowable power dissipation	P _{d max}	Ta ≤ 70°C	200	mW
Operating temperature	T _{opr}		-20 to +70	°C
Storage temperature	T _{stg}		-40 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		9	V
Operating voltage range	V _{CC op}		5 to 12	V

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LA7975

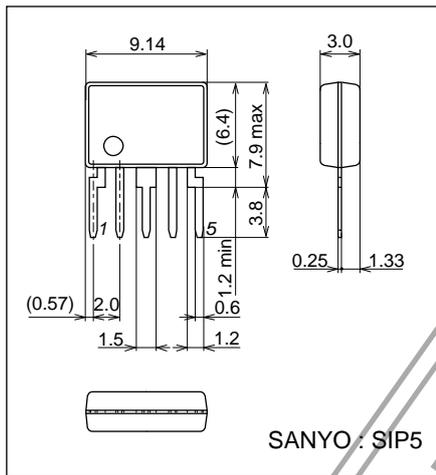
Electrical Characteristics at Ta = 25°C, VCC = 9V

Parameter	Symbol	Conditions	Test point	Ratings			Unit	
				min	typ	max		
Current drain	I _{CC}		Pin 2	5	6.5	9	mA	
Conversion gain	5.5MHz	G5.5	80dB/μV input	Pin 5	10	13.5	17	dB
	6.5MHz	G6.5	80dB/μV input	Pin 5	10	13.5	17	dB
	6.0MHz	G6.0	80dB/μV input, Pin 4 grounded with 10kΩ	Pin 5	18.5	22	25.5	dB
Oscillation level	V _O SC		Pin 4	15	36	80	mVp-p	
Maximum output level	V _O max	5.5MHz 100dB/μV input	Pin 5	109	112	115	dB/μV	
Input impedance	R _i	5.5MHz input			4.8		kΩ	
Pin voltages	V ₁		Pin 1	2.6	3	3.4	V	
	V ₄		Pin 4	7.6	8	8.4	V	
	V ₅		Pin 5	7.2	7.6	8	V	
500 kHz level difference relative to 6 MHz	OSC leak		Pin 5	30	44		dB	
Maximum input level	V _I N max			90			dB/μV	
Oscillation stop current	I ₄		Pin 4			300	μA	

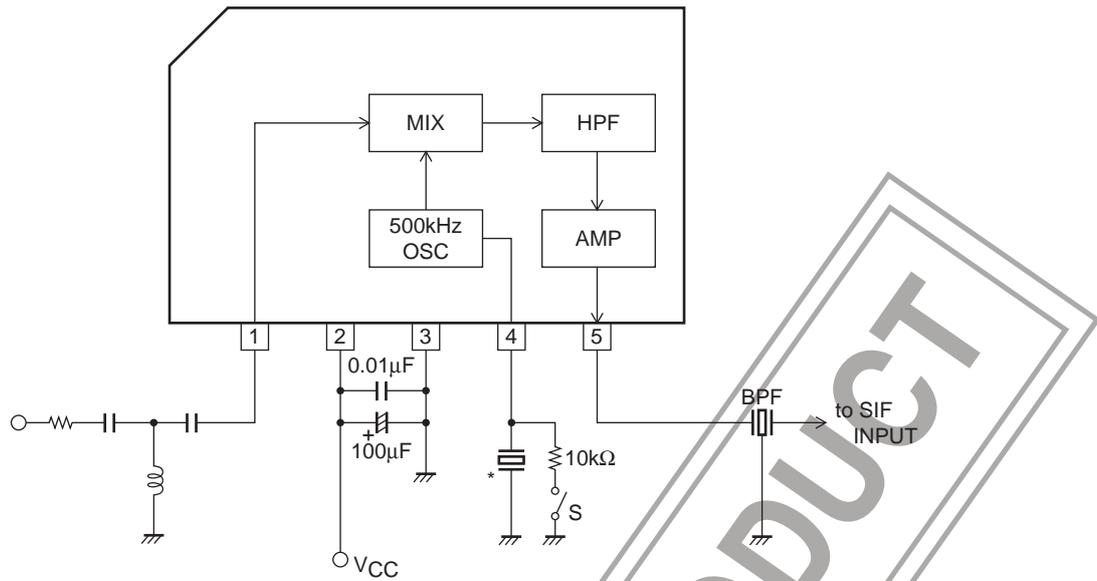
Package Dimensions

unit : mm (typ)

3042D

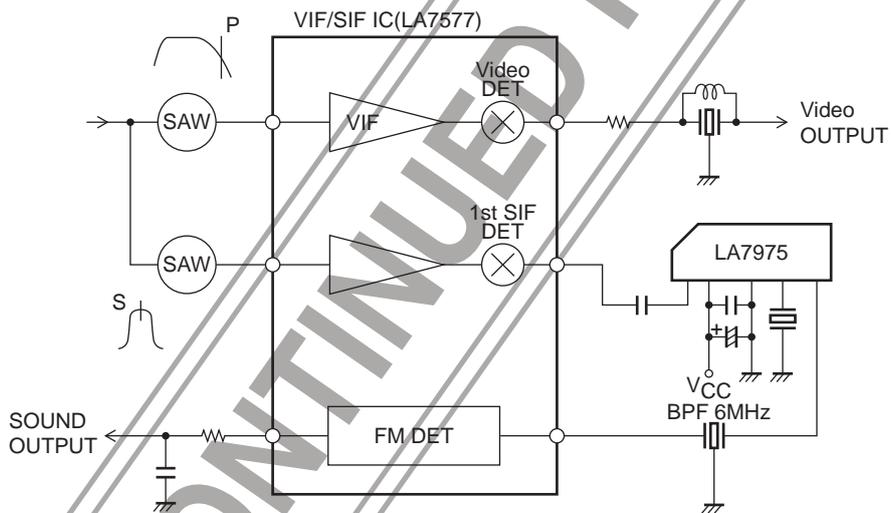


Sample Application Circuit

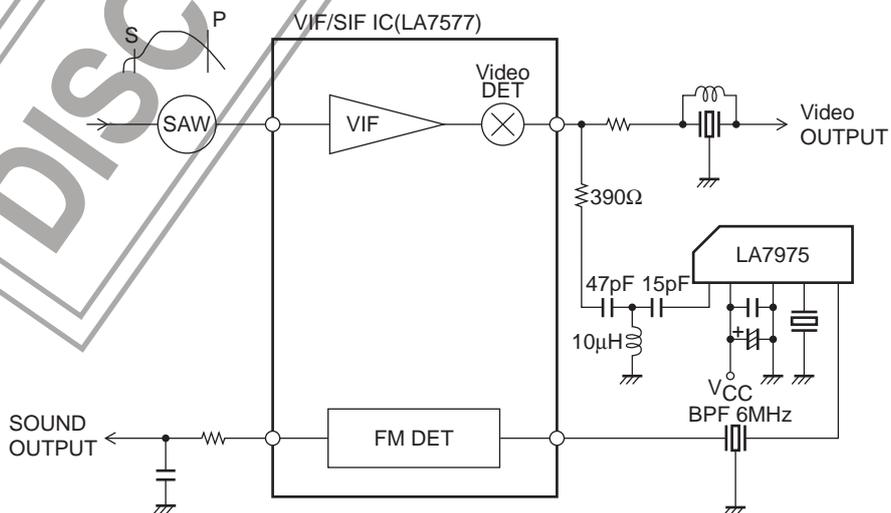


* Oscillator
 500kHz CSB503E5Murata Industries, Ltd.
 1.5MHz CSA1.500MK2Murata Industries, Ltd.
 500kHz EFOA500K04SMurata Industries, Ltd.

Reference Example 1



Reference Example 2



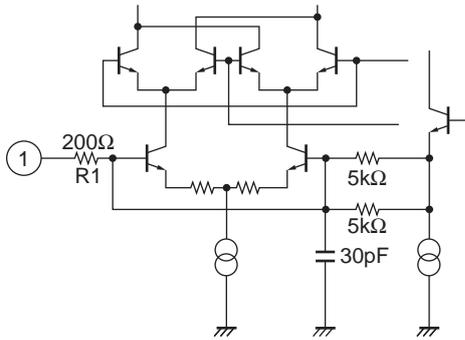


Figure 1

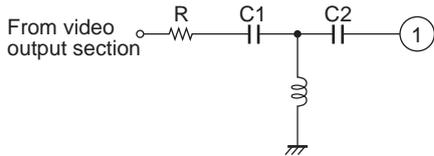


Figure 2

- Pin 1 is the SIF input pin.

The filter in Figure 2 can be connected to the input section to improve the buzz characteristic.

Figure 3 shows the characteristics for the filter in Figure 2. If C1 is too small, the buzz characteristic improves for normal input, but the filter cuts into the sound carrier and the buzz characteristic deteriorates for the P/S (picture/sound carrier) ratio.

Use $C1 \approx 20\text{pF}$ to 47pF .

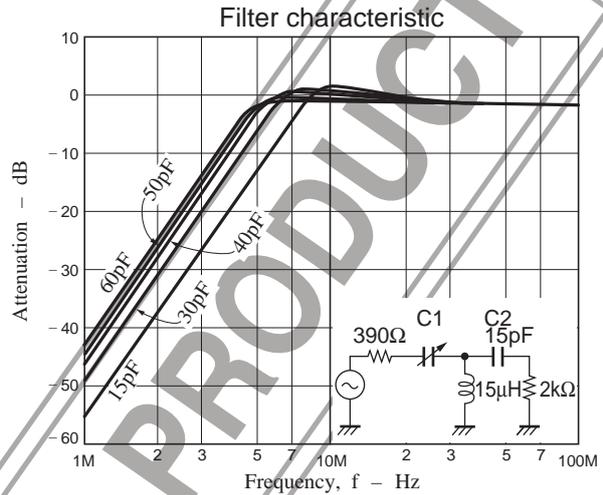


Figure 3

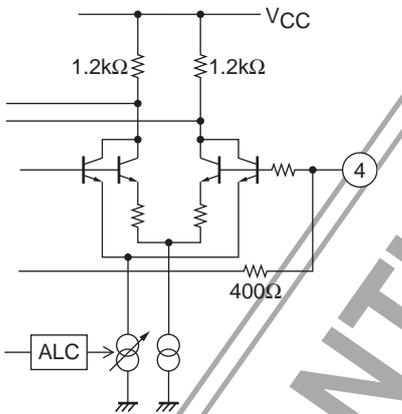


Figure 4

- Pin 4 is the ceramic oscillator pin.

To make the oscillation waveform approach a sine wave, the oscillation level is controlled internally.

Oscillation levels of 15 to 80mVp-p at Pin 4 give the waveform shown in Figure 5.

To stop oscillation, attach an external resistor as in Figure 6 and switch S1 on.

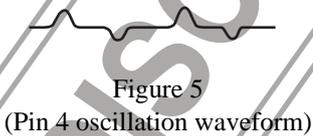


Figure 5

(Pin 4 oscillation waveform)

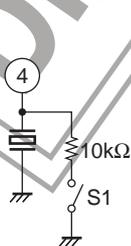


Figure 6

Here are the conditions for handling multiple systems.

Input frequency	Oscillator	Pin 5 output
5.5MHz	500kHz	6MHz
6.0MHz	Oscillation stop	6MHz (pass through)
6.5MHz	500kHz	6MHz
4.5MHz	1.5MHz	6MHz

Figure 7

Figure 8 shows a proposed multi-system

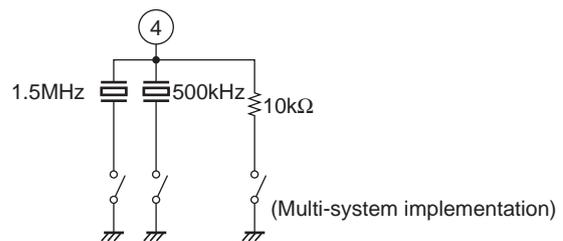


Figure 8

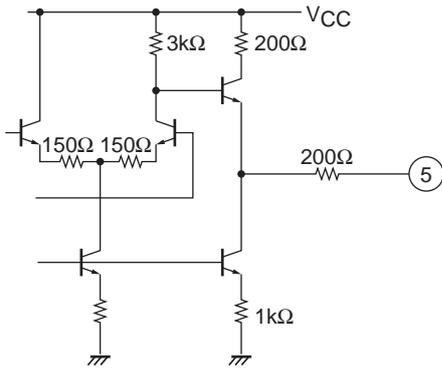


Figure 9

- Pin 5 is the output pin. The output from Pin 5 is input to the SIF via a 6MHz bandpass filter (BPF).
When 5.5MHz is input to Pin 1, the spectrum shown in Figure 10 is obtained at Pin 5. Even if there is a 5.85MHz NICAM signal, the D/U (desirable/undesirable) ratio at Pin 5 increases and the buzz characteristic does not deteriorate.

When 6MHz is input at Pin 1 and there is a 6.552MHz NICAM signal, then 6.552MHz is mixed with 500kHz to make 6.052MHz. This becomes an interference signal and is within the band for 6MHz. Therefore, for 6MHz input, Pin 4 is grounded with 10kΩ to stop the oscillation and pass through the input signal 6MHz as is.

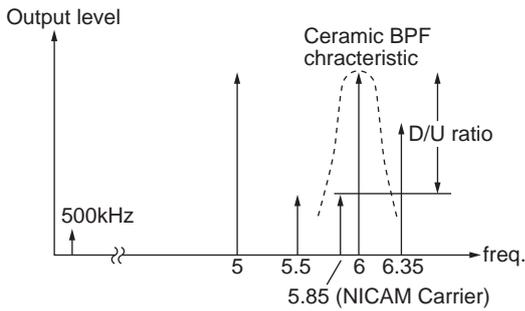


Figure 10 (5.5MHz input)

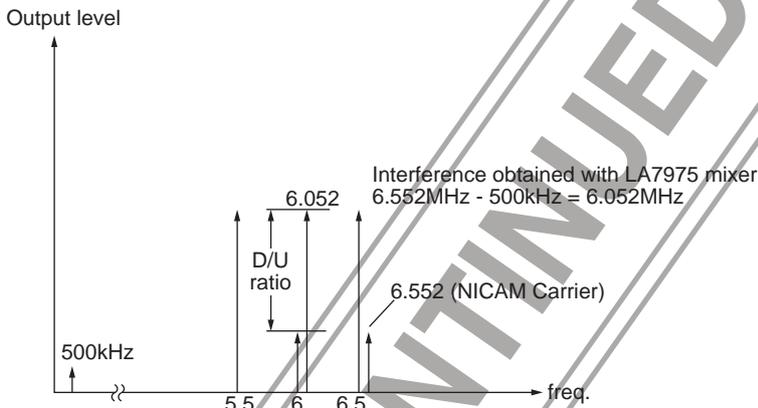
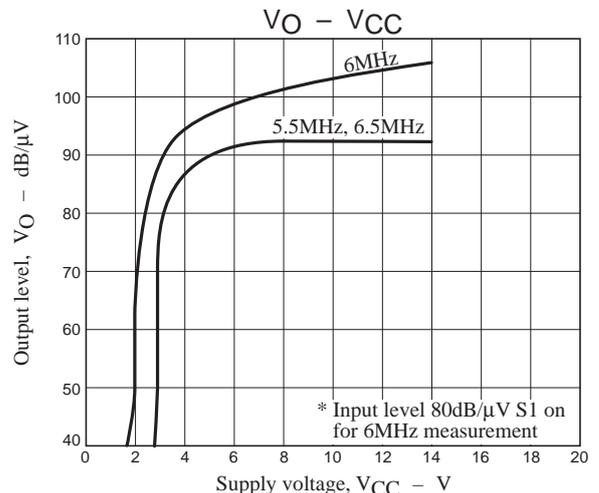
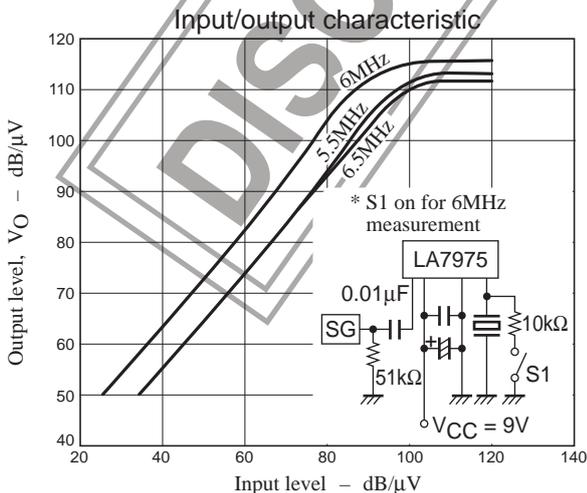
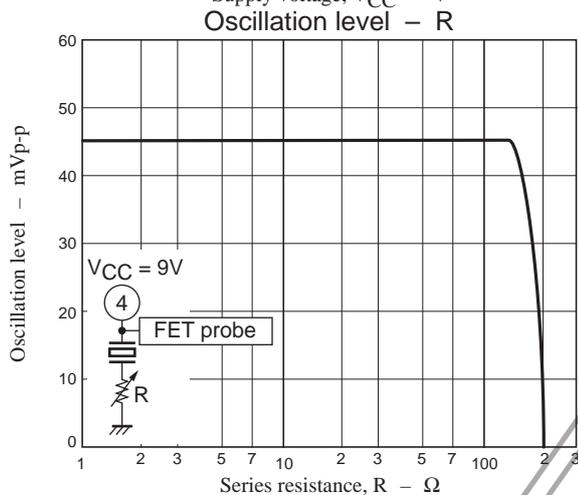
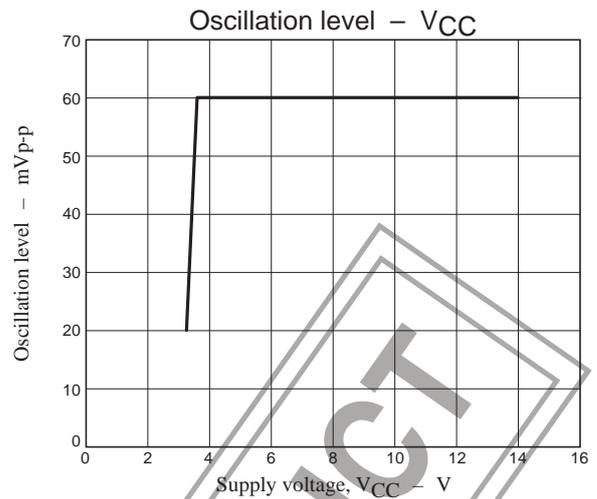
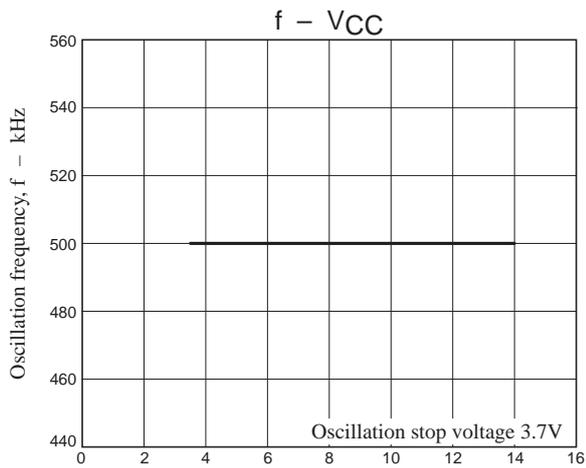


Figure 11 (6MHz input)

Reference Characteristic Diagram





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