

**SANYO Semiconductors****DATA SHEET****LA7976****Monolithic Linear IC  
For TV and VCR Multi-system  
PAL SIF Converter IC****Overview**

The LA7976 is an IC that converts PAL SIF signals (5.5MHz, 6MHz, and 6.5MHz) to 6MHz.

**Functions**

- Mixer, amplifier, oscillator, oscillator mute

**Specifications****Maximum Ratings** at  $T_a = 25^\circ\text{C}$ 

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	$T_a \leq 85^\circ\text{C}$	200	mW
Operating temperature	$T_{opr}$		-20 tp +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

**Operating Conditions** at  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$ max		9	V
Operating voltage range	$V_{CC}$ op		4.5 to 12	V

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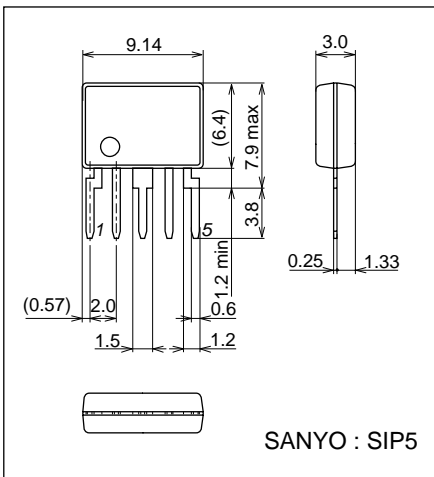
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**Electrical Characteristics** at Ta = 25°C, VCC = 9V

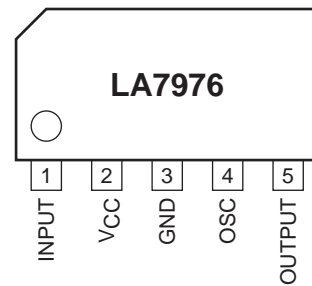
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I <sub>CC</sub>		5	6.5	9	mA
Conversion gain	G5.0	5.0MHz, 80dB $\mu$ V input	10	13.5	17	dB
	G5.5	5.5MHz, 80dB $\mu$ V input	10	13.5	17	dB
	G6.0	6.0MHz, 80dB $\mu$ V input	10	13.5	17	dB
Oscillation level	VO <sub>SC</sub>		15	48	80	mVp-p
Maximum output level	V <sub>O</sub> max	5.5MHz, 100 dB $\mu$ V input	104	108	112	dB/ $\mu$ V
Input impedance	R <sub>i</sub>	5.5MHz input		4.8		$\Omega$
Pin voltages	V <sub>1</sub>	Pin 1	2.6	3.0	3.4	V
	V <sub>4</sub>	Pin 4	7.3	7.7	8.1	V
	V <sub>5</sub>	Pin 5	7.2	7.6	8.0	V
500kHz level difference relative to 6MHz	OSC leak		30	40		dB
Maximum input level	V <sub>I<sub>N</sub></sub> max			85		dB/ $\mu$ V

**Package Dimensions**

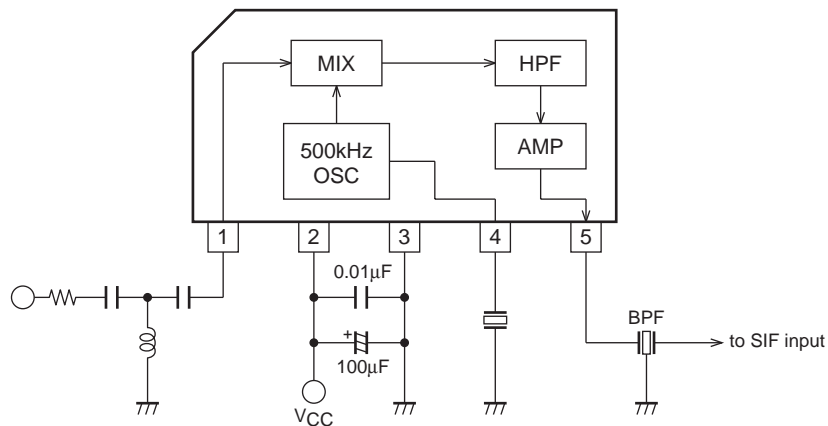
unit : mm (typ)  
3042D



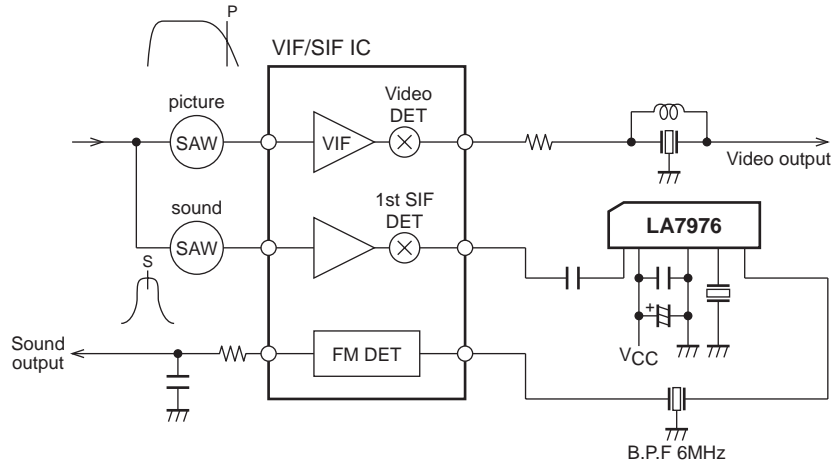
**Pin Assignment**



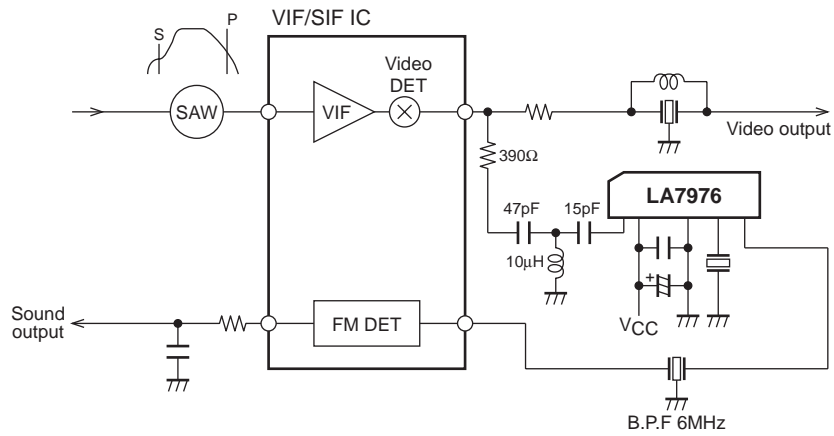
**Application Circuit Example**



**Reference Example 1**



**Reference Example 2**


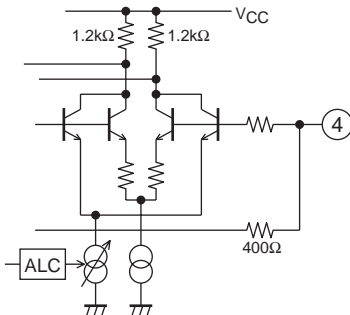
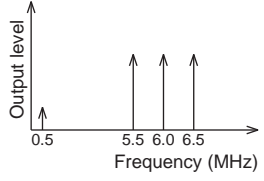
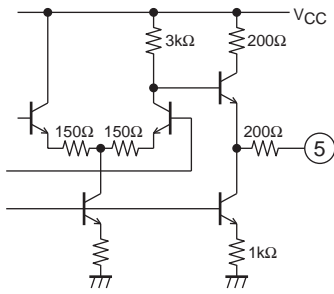


**Pin Description**

Pin No.	Pin name	Description	Equivalent circuit
1	INPUT	<p>SIF input pin.</p> <p>The filter in Fig.1 can be connected to the input section to improve the buzz characteristic.</p> <p>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.</p> <p style="text-align: center;"><b>Fig.1</b></p>	
2	V <sub>CC</sub>	Power supply pin.	
3	GND	Ground pin.	

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Pin No.	Pin name	Description	Equivalent circuit
4	OSC	<p>Ceramic oscillator pin.</p> <p>To make the oscillation waveform approach a sine wave, the oscillation level is controlled internally.</p> <p>Oscillation levels of 15 to 80mVp-p at Pin 4 give the waveform shown in Fig.2.</p>  <p><b>Fig.2</b> (Pin 4 oscillation waveform)</p>	
5	OUTPUT	<p>Output pin.</p> <p>The output from Pin 5 is input to the SIF via a 6MHz band-pass filter (BPF).</p> <p>When 5.5MHz is input to Pin 1, the spectrum shown in Fig.3 is obtained at Pin 5.</p>  <p><b>Fig.3</b></p>	

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