



SANYO Semiconductors

# DATA SHEET

## LA8161V — Monolithic Linear IC AGC Amplifier and Pre Amplifier

### Overview

The LA8161V is a AGC amplifier for the digital ADC and a pre amplifier for the analog SAW filter.

### Features

- $V_{CC} = 5V$
- IF Input Frequency Range                      30 to 100MHz
- AGC Amplifier Gain                                49dB
- AGC Gain Reduction                               40dB
- AGC Amplifier Output Amplitude            2Vp-p (differential)
  
- Pre Amplifier Gain                                 29dB
- Pre Amplifier Output Amplitude            2Vp-p

### Functions

- IF AGC control
- IF AGC amplifier for AD Converter
- Pre Amplifier for SAW Filter
- Function mode switch

Notes : This device is ESD sensitive. So, the device should be treated carefully.

### Maximum Ratings at $T_a = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$	Pin 3, 4, 14	6.0	V
Maximum pin voltage	$V\ max_{11}$	Pin 11	6.5	V
Circuit voltages	$V\ max$	Pin 8, 9	$V_{CC}$	V
Circuit current	$I_6$	Pin 6 sink current	2	mA
	$I_7$	Pin 7 sink current	2	mA
Allowable power dissipation	$P_d\ max$	$T_a \leq 70^{\circ}C$	450*	mW
Operating temperature	$T_{opr}$		-20 to +70	$^{\circ}C$
Storage temperature	$T_{stg}$		-55 to +150	$^{\circ}C$

\*On the board (114.3×76.1×1.6mm<sup>3</sup>)

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# LA8161V

## Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>	Pin 3, 4, 11, 14	5.0	V
Operating supply voltage range	V <sub>CC op</sub>	Pin 3, 4, 11, 14	4.5 to 5.45	V

## Electrical Characteristics

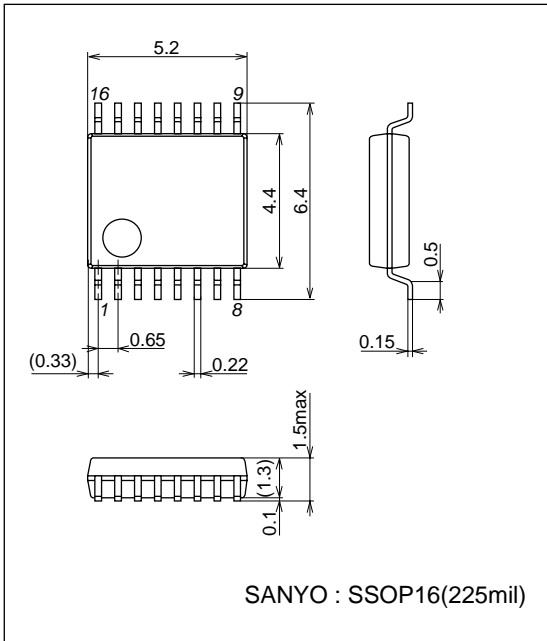
### AC Characteristics at Ta = 25°C, V<sub>CC</sub> = 5.0V

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit	
				min	typ	max		
Input frequency range	f (in)	1, 16		*1	30		100	MHz
AGC amp section [V8 = Lo]								
AGC amp circuit current	I <sub>CC1</sub>	3, 4	No signal	*1	29	39	48	mA
AGC amp maximum gain	G max	6/1, 16 7/1, 16	V <sub>9</sub> = 2.5V	*1	45	49	51	dB
AGC amp noise figure	NF1	6, 7	V <sub>9</sub> = 2.5V			8		dB
Intermodulation	IM3	6/1, 16 7/1, 16	V <sub>IN</sub> = 30dBmV Output level = 1Vp-p	*1	45	54		dB
AGC range	GR	6/1, 16 7/1, 16	Output level < ±1dB	*1	40			dB
Output level 1	V <sub>O6</sub>	6		*1		1.0		Vp-p
Output level 2	V <sub>O7</sub>	7		*1		1.0		Vp-p
Maximum AGC voltage	V <sub>9 max</sub>	9	Maximum gain		2.5		V <sub>CC</sub>	V
LO leakage	Lp	6, 7	Lp = 6, 7/11 AGC amp gain = max	*2		-48	-40	dBc
Pre amp section [V8 = Hi]								
Pre amp. circuit current	I <sub>CC2</sub>	3, 11, 14	No signal	*3	50	67	79	mA
Pre amp gain	G2	11/1, 16		*3	25	29	31	dB
Pre amp noise figure	NF2	11				8		dB
920k beat level	B920	11	P/C = 15dB, P/S = 15dB Output level = 2Vp-p	*4		-78	-74	dBc
Output level	V <sub>O11</sub>	11	V <sub>IN</sub> = 27dBmV	*3	1.3	2.0	2.5	Vp-p
Function switch Section								
AGC amp active	V8L	8	I3, 4, 14 = ON, I11 = OFF				0.8	V
Pre amp active	V8H	8	I4 = OFF, I3, 11, 14 = ON		2.0			V
AGC amp active	I8L	8	V8 = 0V I3, 4, 14 = ON, I11 = OFF				5	μA
	I8H	8	V8 = 5V I4 = OFF, I3, 11, 14 = ON				200	μA

\*1 : Test circuit (1), \*2 : Test circuit (2), \*3 : Test circuit (3), \*4 : Test circuit (4)

**Package Dimensions**

unit : mm (typ)  
3107B



**Pin Description**

Pin Number	Description	Equivalent circuit
1 16	IF Input	<p>The equivalent circuit diagram for pins 1 and 16 shows a differential input stage. Pin 1 is connected to the base of a PNP transistor, and pin 16 is connected to the base of an NPN transistor. Both bases are biased by a voltage divider consisting of two 1kΩ resistors connected to a Bias supply. The emitters of both transistors are connected to ground through resistors. The collectors are connected to each other and to a common feedback network consisting of a resistor connected to ground and another resistor connected to the output of the driver amp.</p>
2	AGC/Pre Amp. GND	
3	AGC/Pre Amp. V <sub>CC</sub>	
4	Driver Amp. V <sub>CC</sub>	
5	Driver Amp. GND	
10 12 13 15	Driver Amp. GND	
14	Driver Amp. V <sub>CC</sub>	

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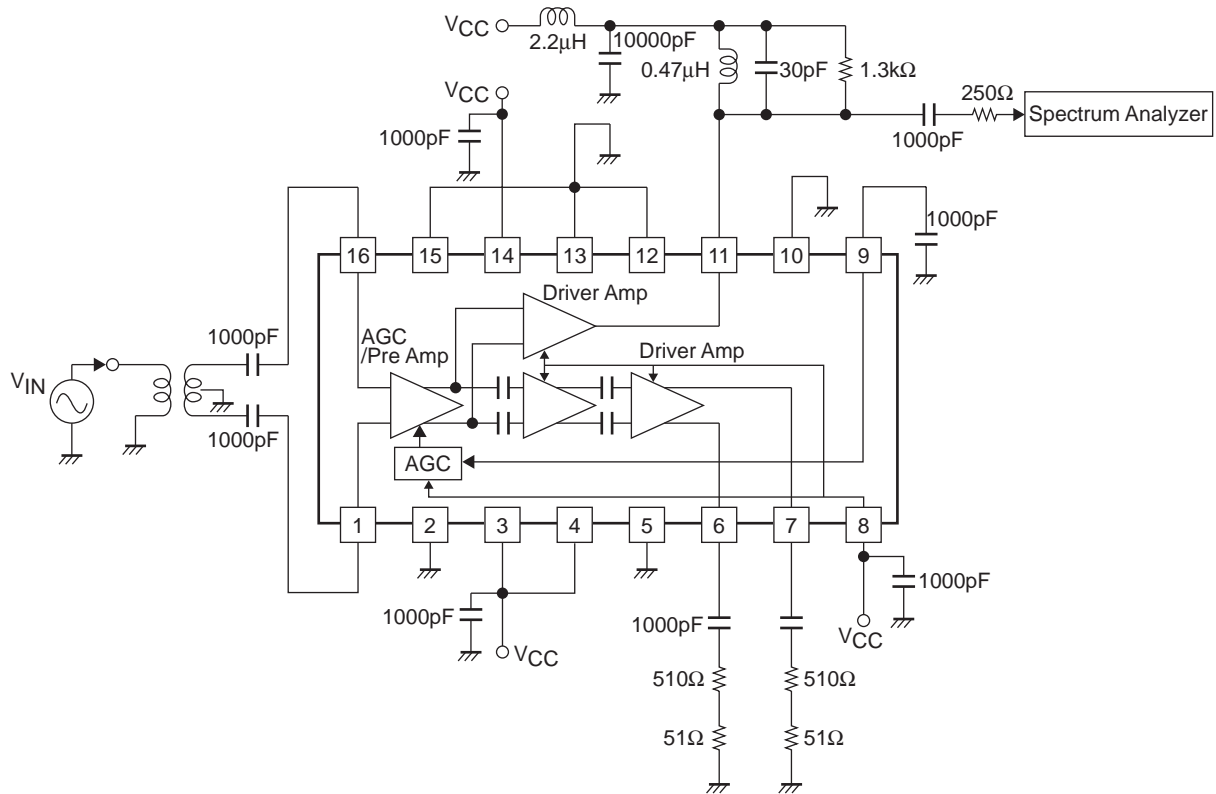
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Pin Number	Description	Equivalent circuit
11	Driver Amp. Output	
6 7	Driver Amp. Output	
9	IF AGC Control	
8	Function switch	

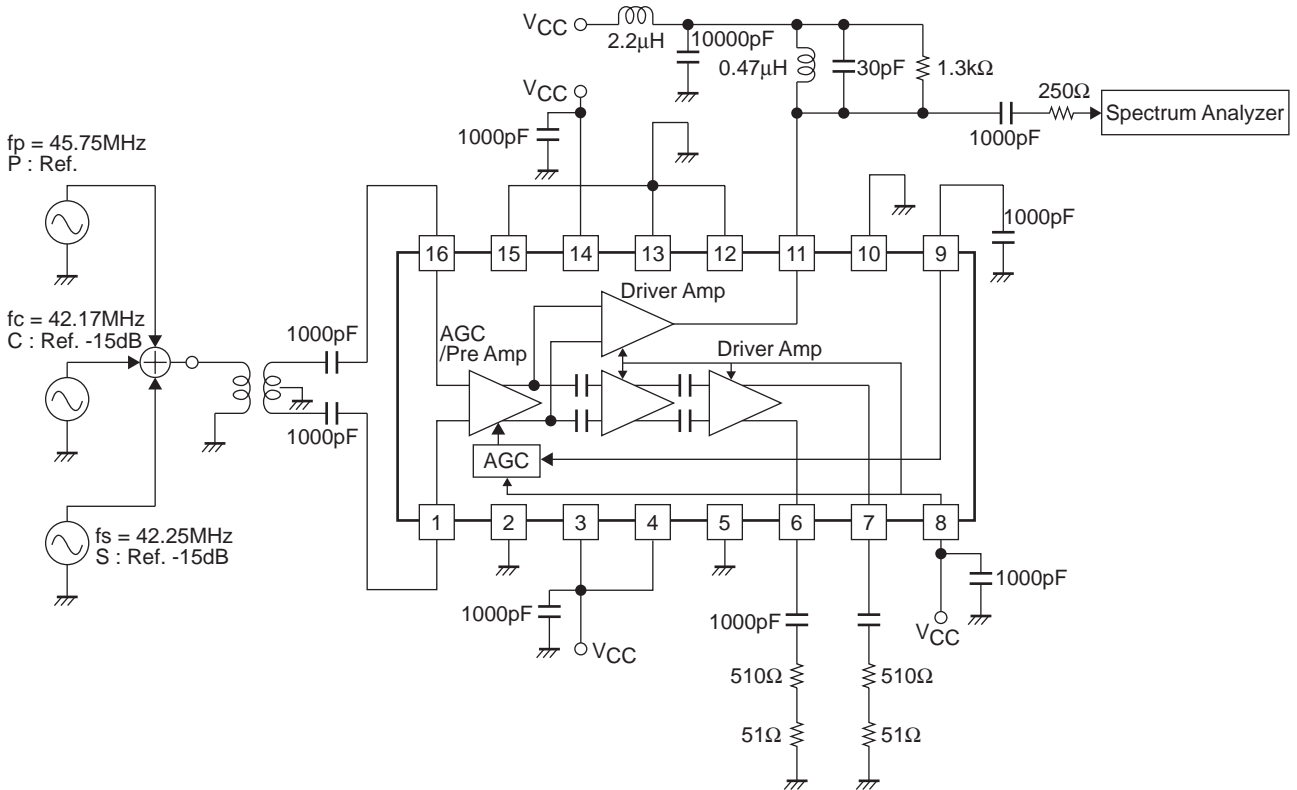


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## Test Circuit (3)



## Test Circuit (4)



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