



SANYO Semiconductors

DATA SHEET

LA8160V — Monolithic Linear IC AGC Amplifier and Pre Amplifier

Overview

The LA8160V 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 30dB
- 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	$V_{\ max11}$	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	$Pd\ max$	$T_a \leq 85^{\circ}C$	430*	mW
Operating temperature	$Topr$		-20 to +85	$^{\circ}C$
Storage temperature	$Tstg$		-55 to +150	$^{\circ}C$

*On the board (60×70×1.6mm³ Double-Layers epoxy glass)

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SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}	Pin 3, 4, 11, 14	5.0	V
Operating supply voltage range	$V_{CC\text{ op}}$	Pin 3, 4, 11, 14	4.5 to 5.45	V

Electrical Characteristics

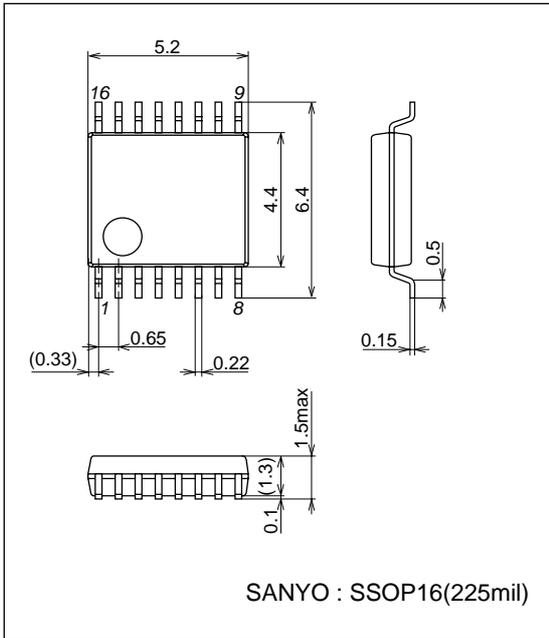
AC Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$

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_{CC1}	3, 4	No signal	*1	29	39	48	mA
AGC amp maximum gain	G max	6/1, 16 7/1, 16	$V_{IN} = 2.5\text{V}$	*1	26	30	32	dB
AGC amp noise figure	NF1	6, 7	$V_{IN} = 2.5\text{V}$			8		dB
Intermodulation	IM3	6/1, 16 7/1, 16	$V_{IN} = 30\text{dBmV}$ Output level = 1Vp-p	*1	45	54		dB
AGC range	GR	6/1, 16 7/1, 16	Output level < $\pm 1\text{dB}$	*1	40			dB
Output level 1	V_{O6}	6		*1		1.0		Vp-p
Output level 2	V_{O7}	7		*1		1.0		Vp-p
Maximum AGC voltage	$V_{9\text{ max}}$	9	Maximum gain		2.5		V_{CC}	V
LO leakage	L_p	6, 7	$L_p = 6, 7/11$ AGC amp gain = max	*2		-48	-40	dBc
Pre amp section [V8 = Hi]								
Pre amp. circuit current	I_{CC2}	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_{O11}	11	$V_{IN} = 27\text{dBmV}$	*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	$V_8 = 0\text{V}$ I3, 4, 14 = ON, I11 = OFF				5	μA
	I8H	8	$V_8 = 5\text{V}$ 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



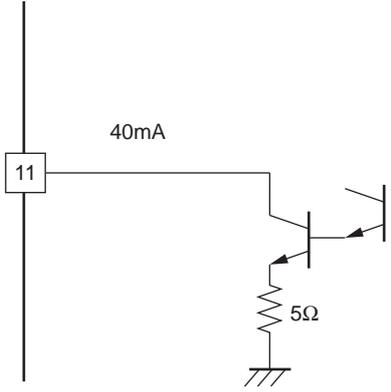
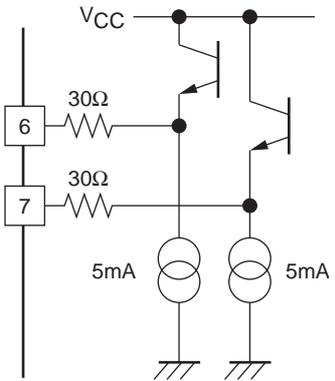
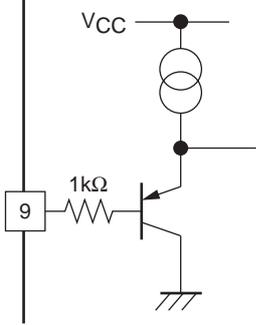
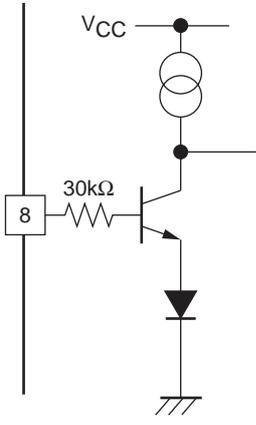
Pin Description

Pin Number	Description	Equivalent circuit
1 16	IF Input	<p>The equivalent circuit diagram for pins 1 and 16 shows a differential input stage. A bias voltage is applied to the non-inverting input of the first op-amp through a 1kΩ resistor. The inverting input of the first op-amp is connected to pin 1 through a 1kΩ resistor. The non-inverting input of the second op-amp is connected to pin 16 through a 1kΩ resistor. The inverting input of the second op-amp is connected to pin 16 through a resistor. The outputs of both op-amps are connected to a common feedback network consisting of two resistors connected to ground.</p>
2	AGC/Pre Amp. GND	
3	AGC/Pre Amp. V _{CC}	
4	Driver Amp. V _{CC}	
5	Driver Amp. GND	
10 12 13 15	Driver Amp. GND	
14	Driver Amp. V _{CC}	

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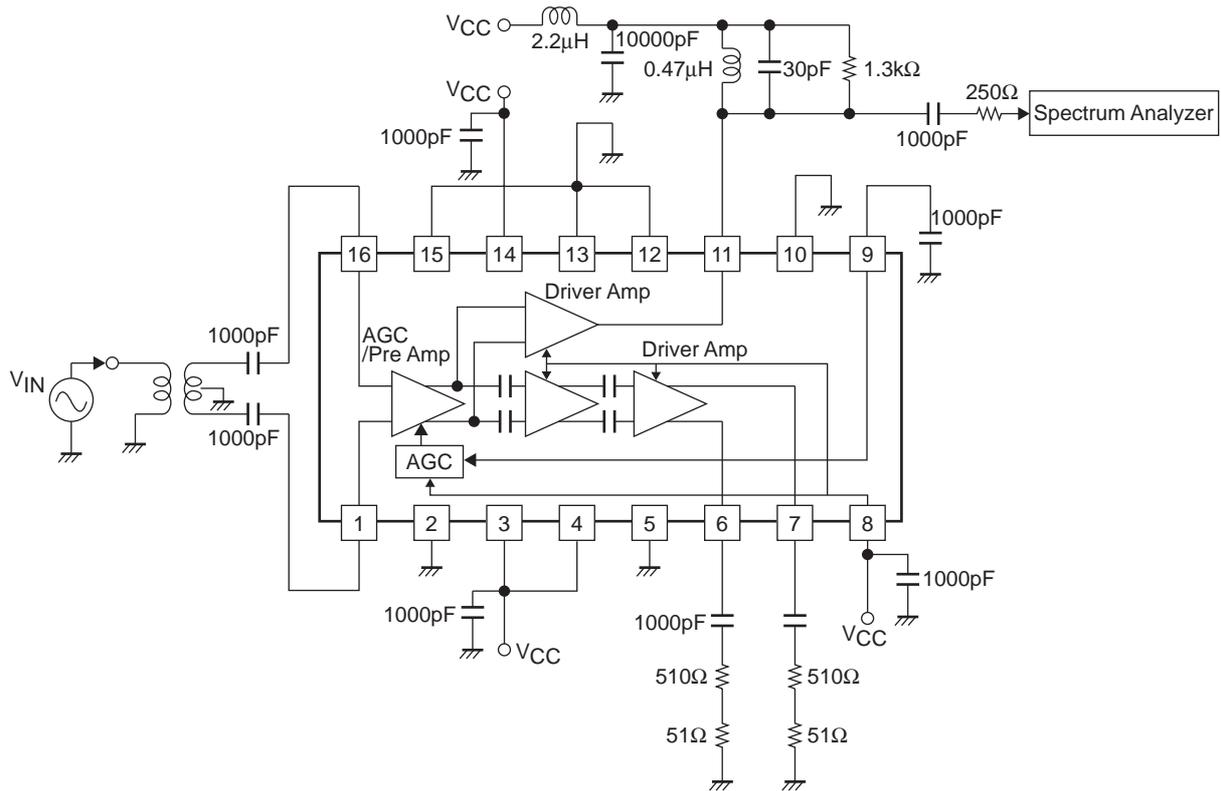
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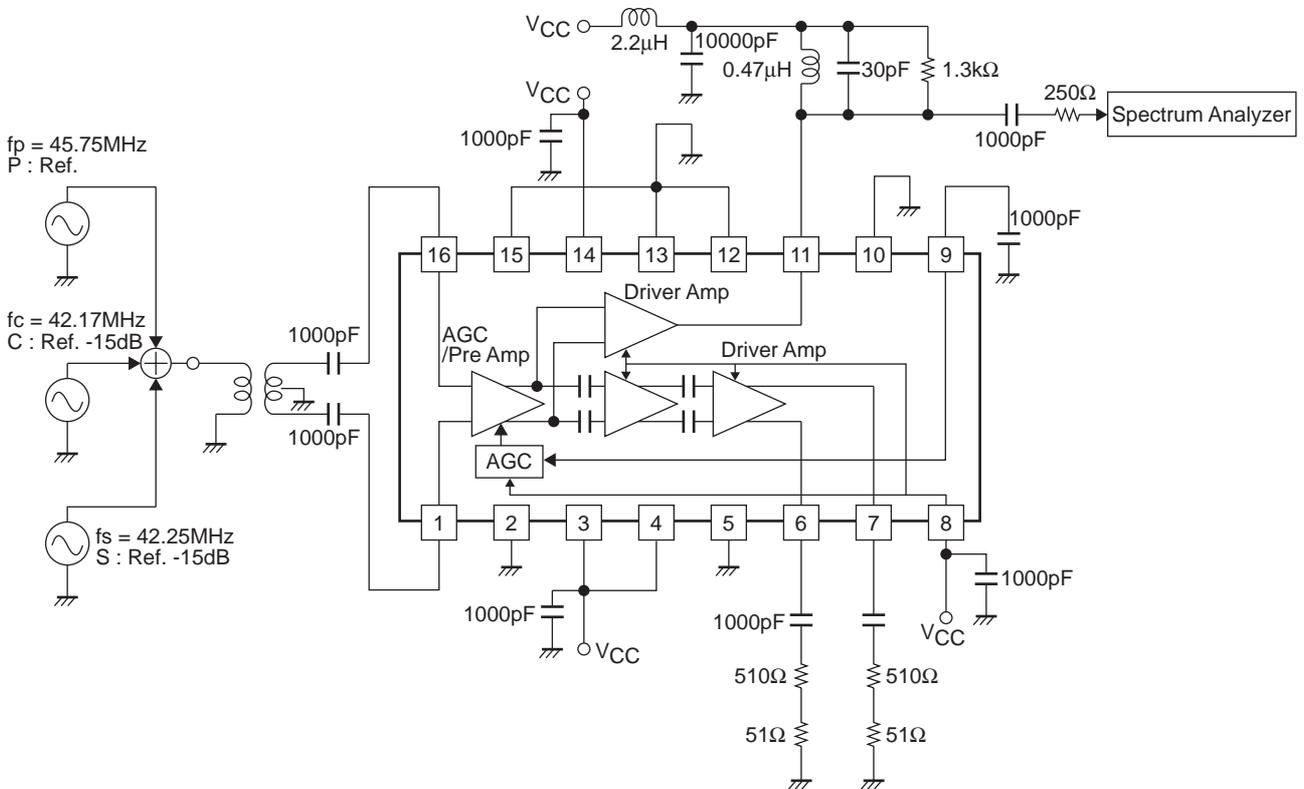
Pin Number	Description	Equivalent circuit
11	Driver Amp. Output	
6 7	Driver Amp. Output	
9	IF AGC Control	
8	Function switch	

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Test Circuit (3)



Test Circuit (4)



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