

# SANYO Semiconductors DATA SHEET

#### **Monolithic Linear IC**

## **LA8160V**— AGC Amplifier and Pre Amplifier

#### Overview

The LA8160V is an AGC amplifier for the digital ADC and a pre amplifier for the analog SAW filter.

#### **Features**

• VCC = 5V

• IF Input Frequency Range 30 to 100MHz

AGC Amplifier GainAGC Gain Reduction40dB

• 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.

- Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.
- Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

#### **LA8160V**

#### **Maximum Ratings** at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> 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 <sub>CC</sub>	V
Circuit current	16	Pin 6 sink current	2	mA
	I <sub>7</sub>	Pin 7 sink current	2	mA
Allowable power dissipation	Pd max	Ta ≤ 85°C	430*	mW
Operating temperature	Topr		-20 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

<sup>\*</sup>On the board (60  $\times$  70  $\times$  1.6mm³ Double-Layers epoxy glass)

#### **Recommended Operating Conditions** at Ta = 25°C

	Parameter	Symbol	Conditions	Ratings	Unit
Rec	ommended supply voltage	VCC	Pin 3, 4, 11, 14	5.0	٧
Ope	rating supply voltage range	V <sub>CC</sub> op	Pin 3, 4, 11, 14	4.5 to 5.45	V

#### **Electrical Characteristics**

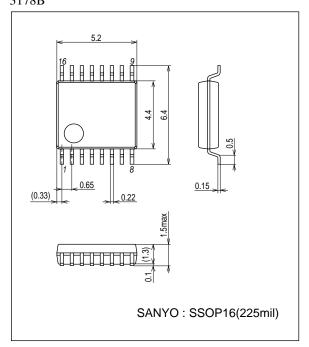
AC Characteristics at Ta = 25°C,  $V_{CC} = 5.0V$ 

Parameter	Symbol	Pin Conditions			Ratings			Unit
Parameter		No.	Conditions		min	typ	max	Unit
Input frequency range	f (in)	1, 16		*1	30		100	MHz
AGC amp section [V8 = Lo]						•	•	
AGC amp circuit current	I <sub>CC</sub> 1	3, 4	No signal	*1	29	39	48	mA
AGC amp maximum gain	G max	6/1, 16 7/1, 16	V9 = 2.5V f = 45.75MHz	*1	26	30	32	dB
AGC amp noise figure	NF1	6, 7	V9 = 2.5V, f = 45.75MHz			8		dB
Intermodulation	IM3	6/1, 16 7/1, 16	V <sub>IN</sub> = 30dBmV, f = 45MHz, 50MHz Output level = 1Vp-p	*1	45	54		dB
AGC range	GR	6/1, 16 7/1, 16	Output level < ±1dB f = 45.75MHz	*1	40			dB
Output level 1	V <sub>O</sub> 6	6		*1		1.0		Vp-r
Output level 2	V <sub>O</sub> 7	7		*1		1.0		Vp-r
Maximum AGC voltage	V9 max	9	Maximum gain		2.5		Vcc	V
LO leakage	Lp	6, 7	Lp = 6, 7/11 AGC amp gain = max	*2		-48	-40	dBo
Pre amp section [V8 = Hi]		1			•	•		
Pre amp. circuit current	I <sub>CC</sub> 2	3, 11, 14	No signal	*3	50	67	79	mA
Pre amp gain	G2	11/1, 16	f = 45.75MHz	*3	25	29	31	dB
Pre amp noise figure	NF2	11	f = 45.75MHz			8		dB
920k beat level	B920	11	P/C = 15dB, P/S = 15dB Output level = 2Vp-p	*4		-78	-74	dBo
Output level	V <sub>O</sub> 11	11	V <sub>IN</sub> = 27dBmV	*3	1.3	2.0	2.5	Vp-p
Function switch Section						•	•	
AGC amp active	V8L	8	13, 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	μА
	I8H	8	V8 = 5V I4 = OFF, I3, 11, 14 = ON				200	μΑ

 $<sup>^{\</sup>star}1$  : Test circuit (1),  $^{\star}2$  : Test circuit (2),  $^{\star}3$  : Test circuit (3),  $^{\star}4$  : Test circuit (4)

#### **Package Dimensions**

unit: mm (typ) 3178B



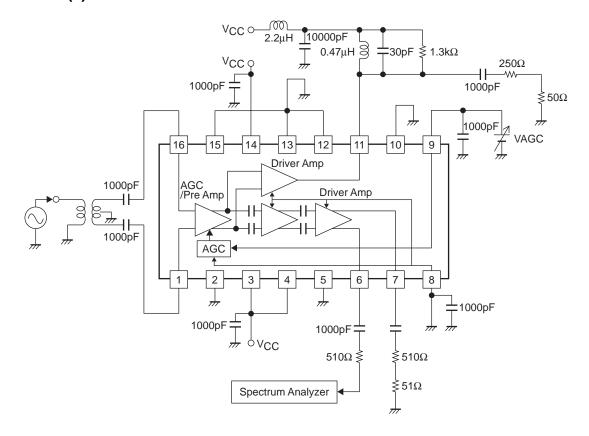
#### **Pin Description**

Pin Number	Description	Equivalent circuit
1 16	IF Input	Bias  1kΩ  1kΩ  1kΩ  1kΩ  1kΩ
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	Driver Amp. GND	
12		
13		
15		
14	Driver Amp. V <sub>CC</sub>	

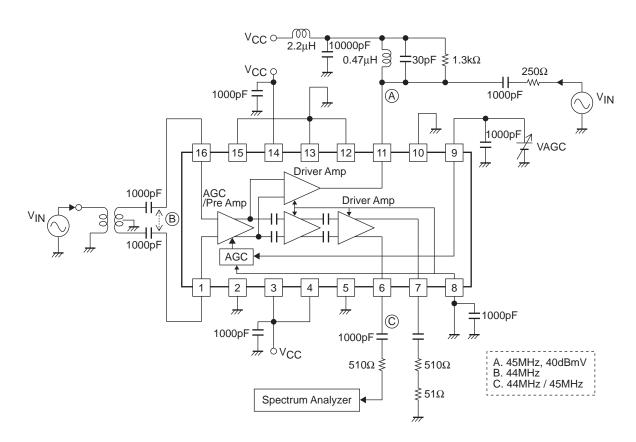
Continued on next page.

Continued from preceding		T
Pin Number	Description	Equivalent circuit
11	Driver Amp. Output	40mA 11 \$5Ω
6 7	Driver Amp. Output	VCC 30Ω 7 5mA 5mA
9	IF AGC Control	Vcc 1kΩ 9
8	Function switch	VCC 30kΩ 8

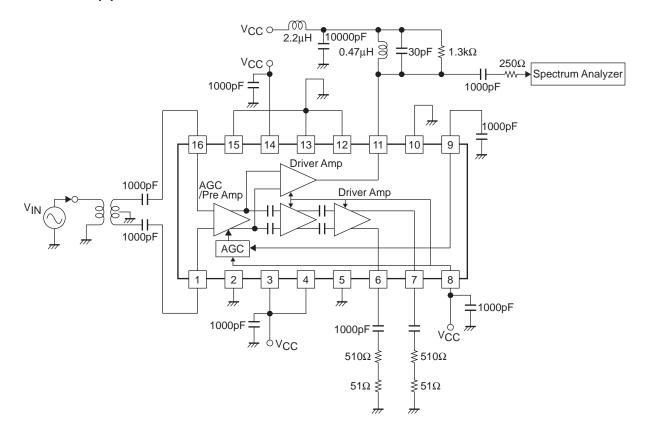
#### **Test Circuit (1)**



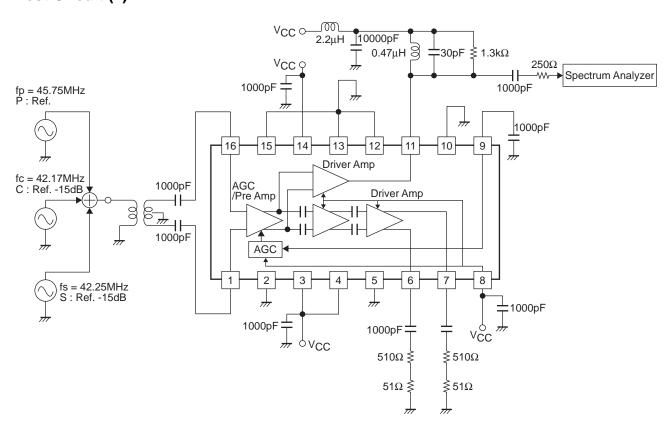
#### **Test Circuit (2)**

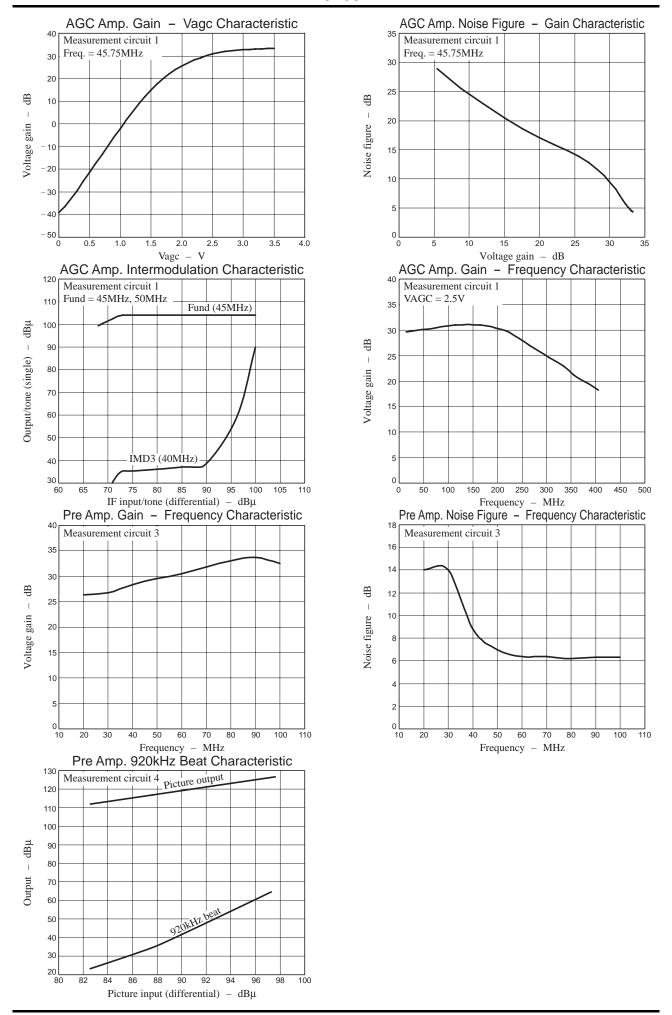


#### **Test Circuit (3)**



### Test Circuit (4)





- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of September, 2008. Specifications and information herein are subject to change without notice.