



SANYO Semiconductors

DATA SHEET

Monolithic Linear IC

LA1070 — On-Glass Antenna Amplifier AGC IC

Overview

The LA1070 is an automatic gain control IC for use with automotive on-glass antennas.

Functions

- RF-AGC

Features

- AGC circuit includes a 20dB hysteresis function
- Can implement an FM/AM tuner AGC circuit with just one IC
- AGC circuit provides improved interference characteristics
- Built-in time constant circuit for underbridge countermeasures
- Allows implementation of miniature antenna amplifier modules with a minimal number of external components
- Includes a total of four PIN diode driver circuits

■ 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.

SANYO Semiconductor Co., Ltd.

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

Specifications

查阅LA1070供应商

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

Parameter	Symbol	Conditions		Ratings	Unit
Maximum supply voltage	V_{CC1} Max	The pin 1 voltage (115°C)		9	V
	V_{CC2} Max (DC)	The pin 14 voltage (115°C)		16	V
	V_{CC2} Max (Pulse)	The pin 14 voltage (25°C) (*1, *2)		18	V
Maximum sink current	ITHA	The pin 11 sink current (*1)		2	mA
Maximum output current	DRV I _{OUT}	(*1)		10	mA
Maximum current consumption	ICC1 Max	INPUT = 130dB _u , $V_{CC1} = 9\text{V}$, DRV I _{OUT} = 10mA		29	mA
	ICC2 Max	INPUT = 130dB _u , $V_{CC2} = 16\text{V}$, DRV I _{OUT} = 10mA		29	mA
Allowable power dissipation	P _d max	INPUT = 130dB _u , DRV I _{OUT} = 10mA	115°C	320	mW
			25°C	1	W
Circuit board size : $30 \times 70 \times 1.6$ (*1)					
Operating temperature	Topr			-40 to +115	°C
Storage temperature	T _{stg}			-55 to +150	°C

*1: The stipulated P_{dmax} must not be exceeded.*2: Ten cycles with $V_{Hi} = 18\text{V}$ for 1 minute and $V_{Lo} = 0\text{V}$ for 9 minutes.Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage 1	V_{CC1}		8	V
Guaranteed operating supply voltage 1	V_{CC1} op	(*1)	7 to 8.8	V
Recommended supply voltage 2	V_{CC2}		12	V
Guaranteed operating supply voltage 2	V_{CC2} op	(*1)	7 to 15.8	V
Maximum allowable RF input	Input max	Pins 2-4, 6, 7, 27-25, 23, 22	130	dB _u

*1: The stipulated P_{dmax} must not be exceeded.Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC1} = 8.0\text{V}$, $V_{CC2} = 12\text{V}$ in the specified circuit

Parameter	Symbol	Conditions	Frequency (Hz)	Ratings			Unit
				min	typ	max	
Signal detection sensitivity 1	Sen1	The input level when the pin 12 and pin 17 (DRV_OUT) output voltage switches from 10.3V to 0V.	100K	79	83	87	dB _u
			1M	79	83	87	
			110M	79	83	87	
		The input level when the pin 13 and pin 16 (DRV_OUT) output voltage switches from 0V to 10.3V. (*1)	250M (*2)	89	93	97	
			800M (*2)		91		
Signal detection sensitivity 2	Sen2	The input level when the pin 12 and pin 17 (DRV_OUT) output voltage switches from 0 V to 10.3 V.	100k	99	103	107	dB _u
			1M	99	103	107	
			110M	99	103	107	
		The input level when the pin 13 and pin 16 (DRV_OUT) output voltage switches from 10.3 V to 0 V. (*1)	250M (*2)	99	103	107	
DRV circuit output voltage	V_{OHi}	The high-level output voltage provided by pins 12, 13, 17, and 16 (DRV_OUT).		9.8	10.3	10.8	V
	V_{OLo}	The low-level output voltage provided by pins 12, 13, 17, and 16 (DRV_OUT).			0.1	0.2	V
Latch start time	FFAT	The time from the point the RF signal goes on to the point the pin 12 and 17 output voltage reaches 10% of the saturation voltage.		58	90	122	ms
Latch release time	FFRE	The time from the point the RF signal goes on to the point the pin 12 and 17 output voltage reaches 90% of the saturation voltage.		570	950	1520	ms
Comparator reference voltage 1	Traise	The pin 9 and pin 20 (VREF_OUT) pin output voltage with the pins open		2.2	2.4	2.6	V

Continued on next page.

*1: The DRV circuit depends on VCC. The DRV circuit output voltage (output saturation voltage) varies with the output current setting set with an external resistor. See the internal equivalent circuit diagram for details.

*2: The values at 250MHz and 800MHz are used for the specifications and refer to the "Input circuit when the input signal is in the range 250MHz to 800MHz" in the specified peripheral components circuit diagram and block diagram.

Continued from preceding page.

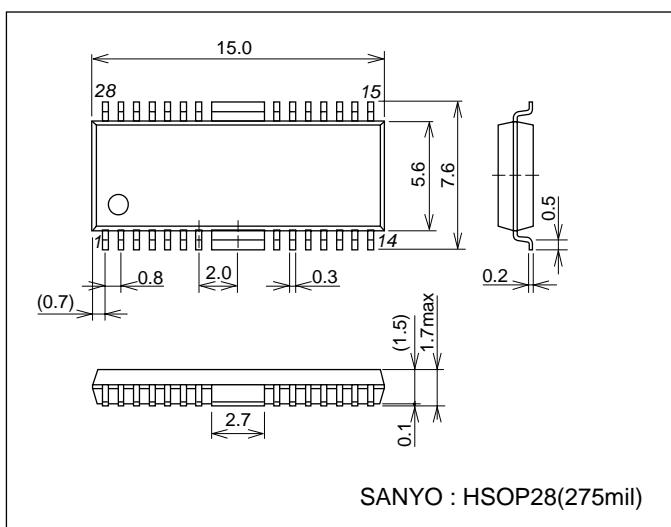
查询"LA1070"供应商

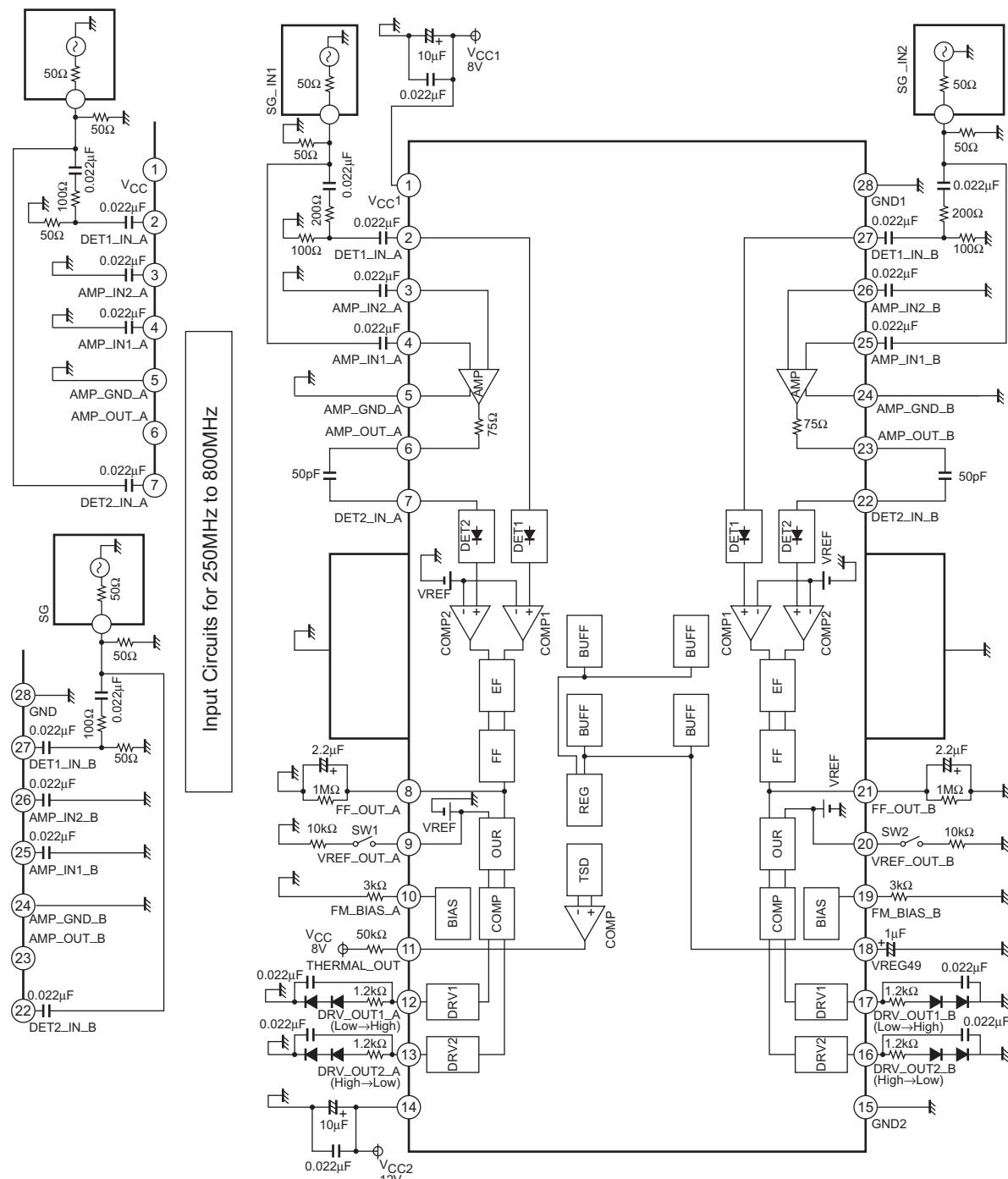
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Comparator reference voltage 2	VREF1	The pin 9 and pin 20 (VREF_OUT) pin output voltage with the pins grounded through a 10 k _Ω resistor.	1.3	1.5	1.7	V
Temperature fluctuation type voltage output	VREF2	The pin 10 and pin 19 (FM_BIAS) output voltage level Maximum output current = 1 mA	2.6	2.8	3.0	V
Temperature detection circuit output voltage	VTHA1	The pin 11 (THAMAL_OUT) output voltage	7.5	7.9	8	V
	VTHA2	The pin 11 (THAMAL_OUT) output voltage, sink current =160 $μ$ A, Ta=115°C		0.25	0.35	V
Current drain 1	ICCO1	The VCC1 current drain with no input	15	19	23	mA
Current drain 2	ICCO2	The VCC2 current drain with no input	15	18	21	mA
Temperature detection sensitivity	TTHA	The ambient temperature when pin 11 (THAMAL_OUT) is low. (Design guarantee value)	80	95	110	°C

Package Dimensions

unit : mm (typ)

3222A





查询"LA1070"供应商
Pin Functions and bias voltage (Ta = 25°C)

PIN No.	Pin	Description	Pin bias voltage	Note
1	V _{CC1}	Power supply for circuits other than the DRV circuit	8.00	
2	DET1_IN_A	Detection circuit 1 input	1.85	
3	AMP_IN2_A	Differential amplifier single-sided input	1.87	
4	AMP_IN1_A	Differential amplifier single-sided input	1.87	
5	AMP_GND_A	RF circuit dedicated ground	0	
6	AMP_OUT_A	Differential amplifier output	6.62	
7	DET2_IN_A	Detection circuit 2 input	1.85	
8	FF_OUT_A	Hold circuit and time constant circuit output	0	
9	VREF_OUT_A	Comparator reference voltage output	2.39	
10	FM_BIAS_A	Temperature fluctuation type bias circuit output	2.79	
11	THERMAL_OUT	Temperature detection circuit output	7.97	
12	DRV1_OUT_A	DRV circuit output (low-level output with no input)	0	When set, Low → High
13	DRV2_OUT_A	DRV circuit output (high-level output with no input)	10.30	When set, High → Low
14	V _{CC2}	DRV circuit power supply	12.00	
15	GND2	DRV circuit ground	0	
16	DRV2_OUT_B	DRV circuit output (high-level output with no input)	10.30	When set, High → Low
17	DRV1_OUT_B	DRV circuit output (low-level output with no input)	0	When set, Low → High
18	VREG49	Internal power supply circuit. 4.9V output	4.92	
19	FM_BIAS_B	Temperature fluctuation type bias circuit output	2.78	
20	VREF_OUT_B	Comparator reference voltage output	2.39	
21	FF_OUT_B	Hold circuit and time constant circuit output	0	
22	DET2_IN_B	Detection circuit 2 input	1.85	
23	AMP_OUT_B	Differential amplifier output	6.61	
24	AMP_GND_B	RF circuit dedicated ground	0	
25	AMP_IN1_B	Differential amplifier single-sided input	1.87	
26	AMP_IN2_B	Differential amplifier single-sided input	1.87	
27	DET1_IN_B	Detection circuit 1 input	1.85	
28	GND1	Ground for circuits other than the DRV circuit	0	

Pin Equivalent Circuit 查询"LA1070"供应商

Pin No	Pin Function	Equivalent Circuit	Note
3, 4, 26, 25	Amplifier input		AMP Zin = 2kΩ
6, 23	Amplifier output		
7, 22	Detection circuit 2 input		
8, 21	Time constant setting capacitor connection		When a 2.2μF capacitor is used to set the time constant, DRV will be on for 100ms and off for 1 second.
9, 20	Comparator reference voltage output for DRV operation and switching		
10, 19	Temperature fluctuation type bias voltage output		Maximum rated load: 3kΩ

Continued on next page.

LA1070

Continued from preceding page.

Pin No	Pin Function	Equivalent Circuit	Note
11	Temperature detection circuit output		
12, 13, 16, 17	DRV circuit output		V _{CC} dependent type voltage output circuit
18	Bandgap regulator bypass capacitor connection		Recommended capacitance: 1µF

[查询"LA1070"供应商](#)

- Specifications of any and all SANYO Semiconductor 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.
- SANYO Semiconductor Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or 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 products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining 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 permission 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 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. SANYO Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of April, 2007. Specifications and information herein are subject to change without notice.