

AF Control LSI

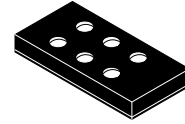
LC898249XH

Overview

This LSI is Closed–Auto Focus control LSI equipped with hall sensor. It consists of 1 system of feedback circuit and constant current driver. It has also a built–in EEPROM and temperature sensor.

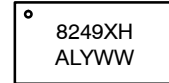
Features

- Built–in Equalizer Circuit Using Digital Operation
 - ◆ AF Control Equalizer Circuit
 - ◆ Any Coefficient can be Specified by 2–wire Serial I/F (TWIF)
- 2–wire Serial Interface
 (The Communication Protocol is Compatible with I²C)
 - ◆ 4 Selectable Slave Addresses
 - 50h(W)/51h(R), 53h(R)
 - 74h(W)/75h(R), 77h(R)
 - E8h(W)/E9h(R), EBh(R)
 - E4h(W)/E5h(R), E7h(R) factory–configured
 Right Side Addresses are Used at the Access of Built–in EEPROM
- Built–in A/D Converter
- Built–in D/A Converter
 - ◆ Hall Offset
 - ◆ Constant Current Bias
- Built–in Hall Sensor
 - ◆ Si Hall Sensor
- Built–in EEPROM
 - ◆ 64 Byte (16 Byte / Page)
- Built–in OSC
- Built–in Constant Current Driver
 - ◆ 150 mA
- Package
 - ◆ WLCSP 6–pin (2 x 3 Pin), Thickness Max 0.29 mm, with Backside Coat
- Supply Voltage
 - ◆ VDD (2.6 V to 3.3 V)
- This Device is Pb–Free, Halogen Free/BFR Free and is RoHS Compliant



WLCSP6, 0.86x1.75x0.265
 CASE 567XD

MARKING DIAGRAM



8249XH = Specific Device Code
 A = Assembly Location
 L = Wafer Lot
 Y = Year
 WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping [†]
LC898249XHTBG	WLCSP6	4000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

LC898249XH

PIN DESCRIPTION

Table 1. PIN DESCRIPTION

Pin Name	Description
I	Input
P	Power Supply, GND
NC	Not Connect
O	Output
B	Bidirection

- 2-wire serial interface
 - SCL I 2-wire serial interface clock pin
 - SDA B 2-wire serial interface data pin
- Driver interface
 - OUT1 O Driver output (to Actuator)
 - OUT2 O Driver output (to Actuator)
- Power supply pin
 - VDD P Power Supply
 - VSS P GND

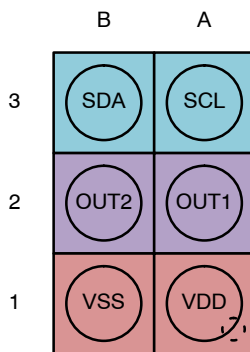
**Process when pins are not used*

PIN TYPE “O” – Ensure that it is set to OPEN.
 PIN TYPE “I” – OPEN is inhibited. Ensure that it is connected to the VDD or VSS even when it is unused.
 (Please contact **onsemi** for more information about selection of VDD or VSS.)
 PIN TYPE “B” – If you are unsure about processing method on the pin description of pin layout table, please contact us.
 Note that incorrect processing of unused pins may result in defects.

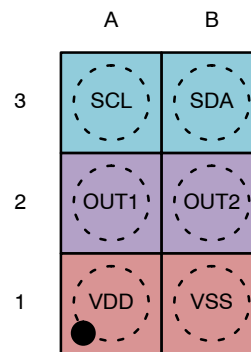
PIN LAYOUT

Table 2. PIN LAYOUT

Circuit Name	Number of PINs
Driver	2
Power	2
Logic	2



BOTTOM VIEW

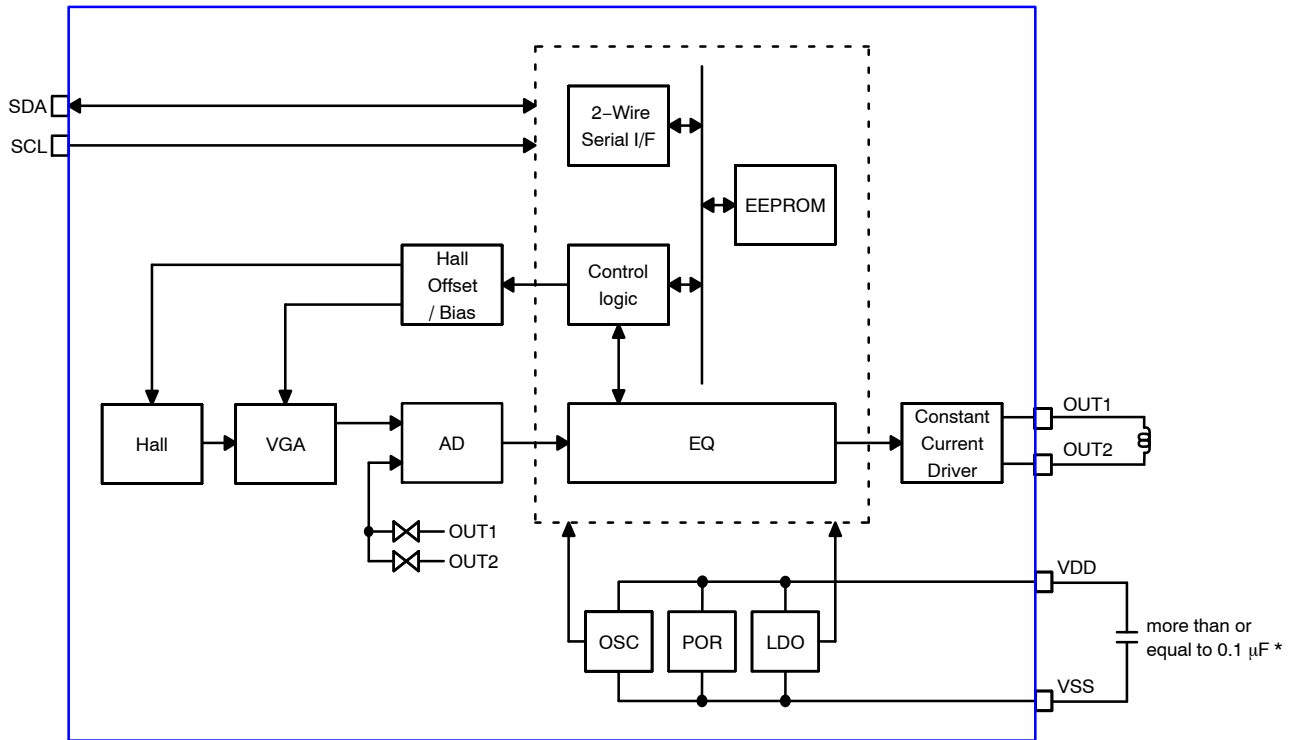


TOP VIEW

Figure 1. Pin Layout

LC898249XH

BLOCK DIAGRAM



*Consider capacitance of capacitor between VDD and VSS. According to power source environment, attach an additional capacitor in camera module.

Figure 2. Block Diagram

LC898249XH

HALL ELEMENT POSITION

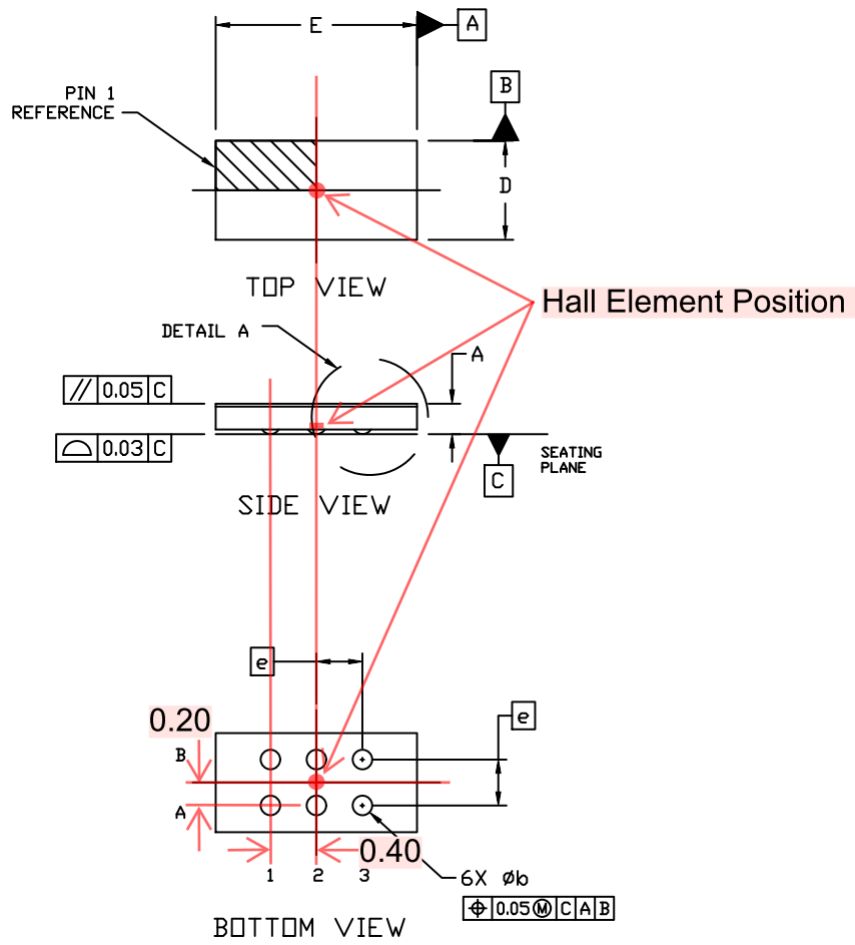


Figure 3. Hall Element Position

LC898249XH

ELECTRICAL CHARACTERISTICS

Table 3. ABSOLUTE MAXIMUM RATINGS (VSS = 0 V)

Symbol	Item	Condition	Rating	Unit
V _{DD33} max	Supply voltage	Ta ≤ 25°C	-0.3~4.6	V
V _{I33} ,V _{O33}	Input/output voltage	Ta ≤ 25°C	-0.3~V _{DD33} + 0.3	V
Tstg	Storage ambient temperature		-55~125	°C
Topr	Operating ambient temperature		-30~70	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 4. ACCEPTABLE OPERATION RANGE (Ta = -30~70°C, VSS = 0 V, 3 V power supply (VDD))

Symbol	Item	Min	Typ	Max	Unit
V _{DD33}	Supply voltage	2.6	2.8	3.3	V
V _{IN}	Input voltage range	0	-	V _{DD33}	V

Table 5. DC CHARACTERISTICS (Input / output level at VSS = 0 V, VDD = 2.6 V~3.3V, Ta = -30~70°C)

Symbol	Item	Condition	Min	Typ	Max	Unit	Applicable Pins
V _{IH}	High-level input voltage	CMOS compliant schmitt	1.4	-	-	V	SCL, SDA
V _{IL}	Low-level input voltage		-	-	0.4	V	
V _{OL}	Low-level output voltage	IOL = 2 mA	-	-	0.2	V	SDA

Table 6. DRIVER OUTPUT (OUT1, OUT2) (VSS = 0 V, VDD = 2.8 V, Ta = 25°C)

Symbol	Item	Condition	Min	Typ	Max	Unit	Applicable Pins
I _{full}	Maximum current		142.5	150	157.5	mA	OUT1, OUT2

Table 7. NON-VOLATILE MEMORY CHARACTERISTICS

Symbol	Item	Condition	Min	Typ	Max	Unit	Applicable Circuit
EN	Endurance		-	-	1000	Cycles	EEPROM
RT	Data retention		10	-	-	Years	
t _{WT}	Write time		-	-	20	ms	

AC CHARACTERISTICS

VDD Supply Timing

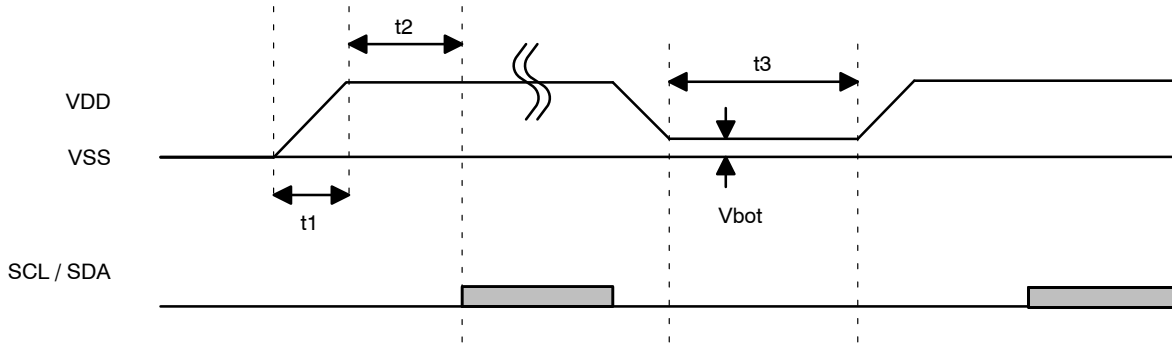


Figure 4. VDD Supply Timing

It is available to use 2-wire serial interface 5 ms later for Power On Reset of VDD.

Table 8. VDD SUPPLY TIMING

Symbol	Item	Min	Typ	Max	Unit
t1	VDD turn on time	-	-	3	ms
t2	2-wire serial interface start time from VDD on	5	-	-	ms
t3	VDD off time	100	-	-	ms
Vbot	Bottom Voltage	-	-	0.1	V

AC Specification

Figure 5 shows interface timing definition and Table 9 shows electric characteristics.

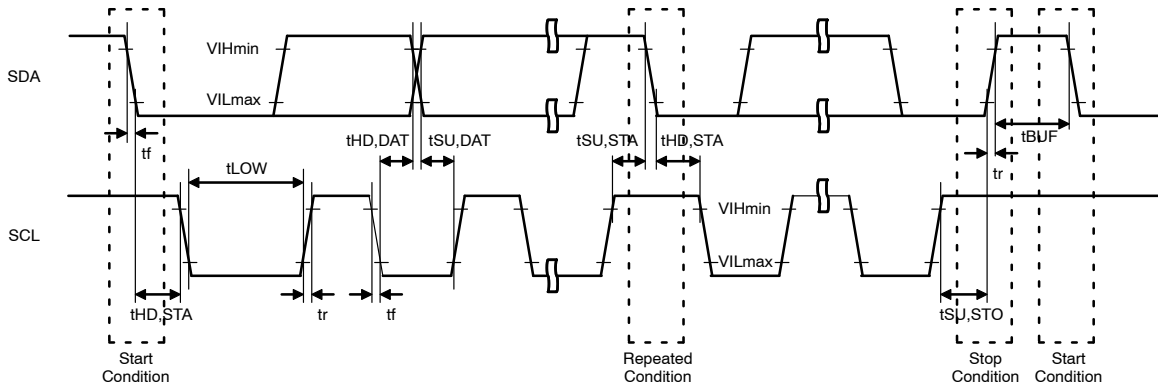


Figure 5. 2-wire Serial Interface Timing Definition

LC898249XH

Table 9. ELECTRICAL CHARACTERISTICS FOR 2-WIRE SERIAL INTERFACE (AC CHARACTERISTICS)

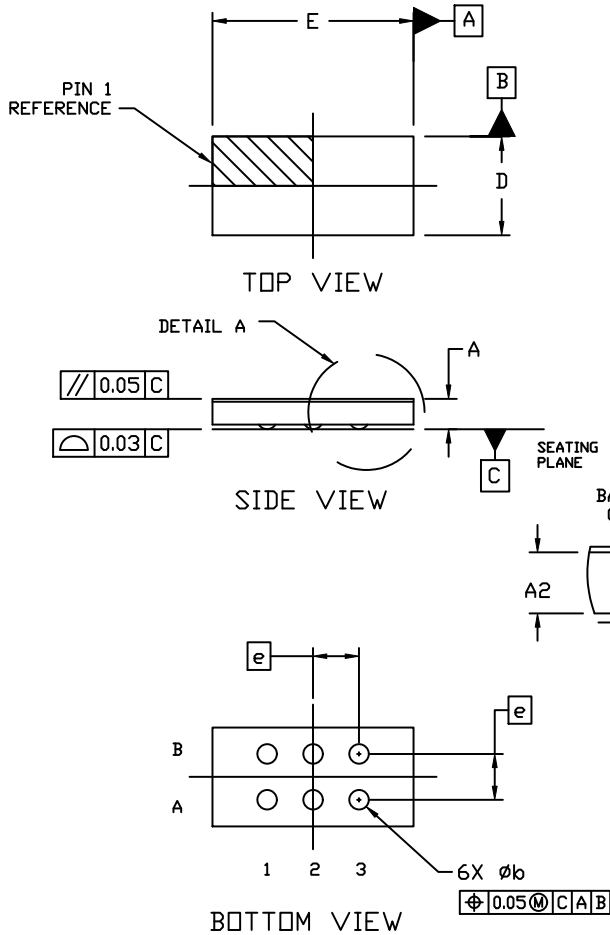
Symbol	Item	Pin Name	Fast-mode			Fast-mode Plus			Unit
			Min	Typ	Max	Min	Typ	Max	
F_SCL	SCL clock frequency	SCL	-	-	400	-	-	1000	kHz
t _{HD,STA}	START condition hold time	SCL SDA	0.6	-	-	0.26	-	-	μs
t _{LOW}	SCL clock Low period	SCL	1.3	-	-	0.5	-	-	μs
t _{HIGH}	SCL clock High period	SCL	0.6	-	-	0.26	-	-	μs
t _{SU,STA}	Setup time for repetition START condition	SCL SDA	0.6	-	-	0.26	-	-	μs
t _{HD,DAT}	Data hold time	SCL SDA	0 (Note 1)	-	0.9	0 (Note 1)	-	-	μs
t _{SU,DAT}	Data setup time	SCL SDA	100	-	-	50	-	-	ns
t _r	SDA, SCL rising time	SCL SDA	-	-	300	-	-	120	ns
t _f	SDA, SCL falling time	SCL SDA	-	-	300	-	-	120	ns
t _{SU,STO}	STOP condition setup time	SCL SDA	0.6	-	-	0.26	-	-	μs
t _{BUF}	Bus free time between STOP and START	SCL SDA	1.3	-	-	0.5	-	-	μs

1. This LSI is designed for a condition with typ. 20 ns of hold time. If SDA signal is unstable around falling point of SCL signal, please implement an appropriate treatment on board, such as inserting a resistor.



WLCSP6, 0.86x1.75x0.265
CASE 567XD
ISSUE O

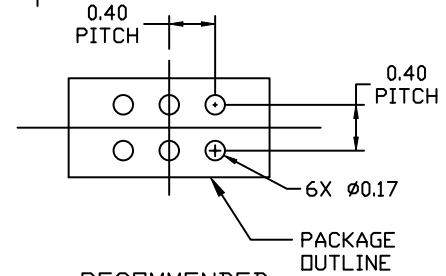
DATE 23 OCT 2018



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DATUM C, THE SEATING PLANE, IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. COPLANARITY APPLIES TO THE SPHERICAL CROWNS OF THE CONTACT BALLS.
5. DIMENSION b IS MEASURED AT THE MAXIMUM CONTACT BALL DIAMETER PARALLEL TO DATUM C.

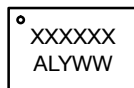
DIM	MILLIMETERS		
	MIN.	NDM.	MAX.
A	0.24	0.265	0.29
A1	0.04 REF		
A2	0.20 REF		
A3	0.025 REF		
b	0.12	0.17	0.22
D	0.81	0.86	0.91
E	1.70	1.75	1.80
e	0.40 BSC		



RECOMMENDED MOUNTING FOOTPRINT*

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
 A = Assembly Location
 L = Wafer Lot
 Y = Year
 WW = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON99381G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WLCSP6, 0.86x1.75x0.265	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative