

# Optical Image Stabilization (OIS) Controller & Driver

CMOS LSI

## LC898121XA

### Overview

The LC898121XA is a system LSI integrating a digital signal processing function for Optical Image Stabilization (OIS) and a saturation-driven H bridge driver function.

### Features

#### Digital Signal Processing

- Built-in Digital Servo Circuit
- Built-in Gyro Filter
- AD Converter
  - ◆ 12 Bit
  - ◆ Input 3ch
  - ◆ Equipped with a Sample-hold Circuit
- DA Converter
  - ◆ 8 Bit
  - ◆ Output 2ch
- Built-in Serial I/F Circuit (4-wire SPI or 2-wire I<sup>2</sup>C-Bus Interface)
- Built-in Hall Bias Circuit
- Built-in Hall Amp
- Built-in OSC (Oscillator)
  - ◆ Typ. 48 MHz
- Built-in LDO (Low Drop-Out Regulator)
  - ◆ Generation Logic Power (Typ 1.8 V)
- Digital Gyro I/F for the Companies (Please Refer for the Details)

#### Motor Driver

- Saturation-drive H Bridge x2ch
- I<sub>O</sub> max: 300 mA

#### Package

- WLCSP40, 2.44 mm x 3.94 mm, Thickness Max 0.65 mm
- This is a Pb-Free and Halogen Free Device

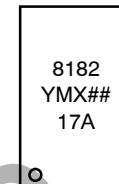
#### Power Supply Voltage

- DA/VGA: DAOPVDD = 2.6 V to 3.6 V
- AD: ADVDD = 2.6 V to 3.6 V
- IO/OSC/LDO: DVDD30 = 2.6 V to 3.6 V
- Driver: VM = 2.6 V to 5.5 V
- Core Logic: Use built-in LDO/External VDD:  
DVDD18 = 1.8 V ±10%



WLCSP40, 2.44 x 3.94  
CASE 567JB

### MARKING DIAGRAM



8121 = Specific Device Code  
Y = Year  
M = Month  
X = Assembly Location  
## = Conversion Character Representing Assembly Lot

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
LC898121XA-MH	WLCSP40, 2.44 x 3.94 (Pb-Free / Halogen Free)	4000 / Tape & Reel

<sup>†</sup>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.

# LC898121XA

## BLOCK DIAGRAM

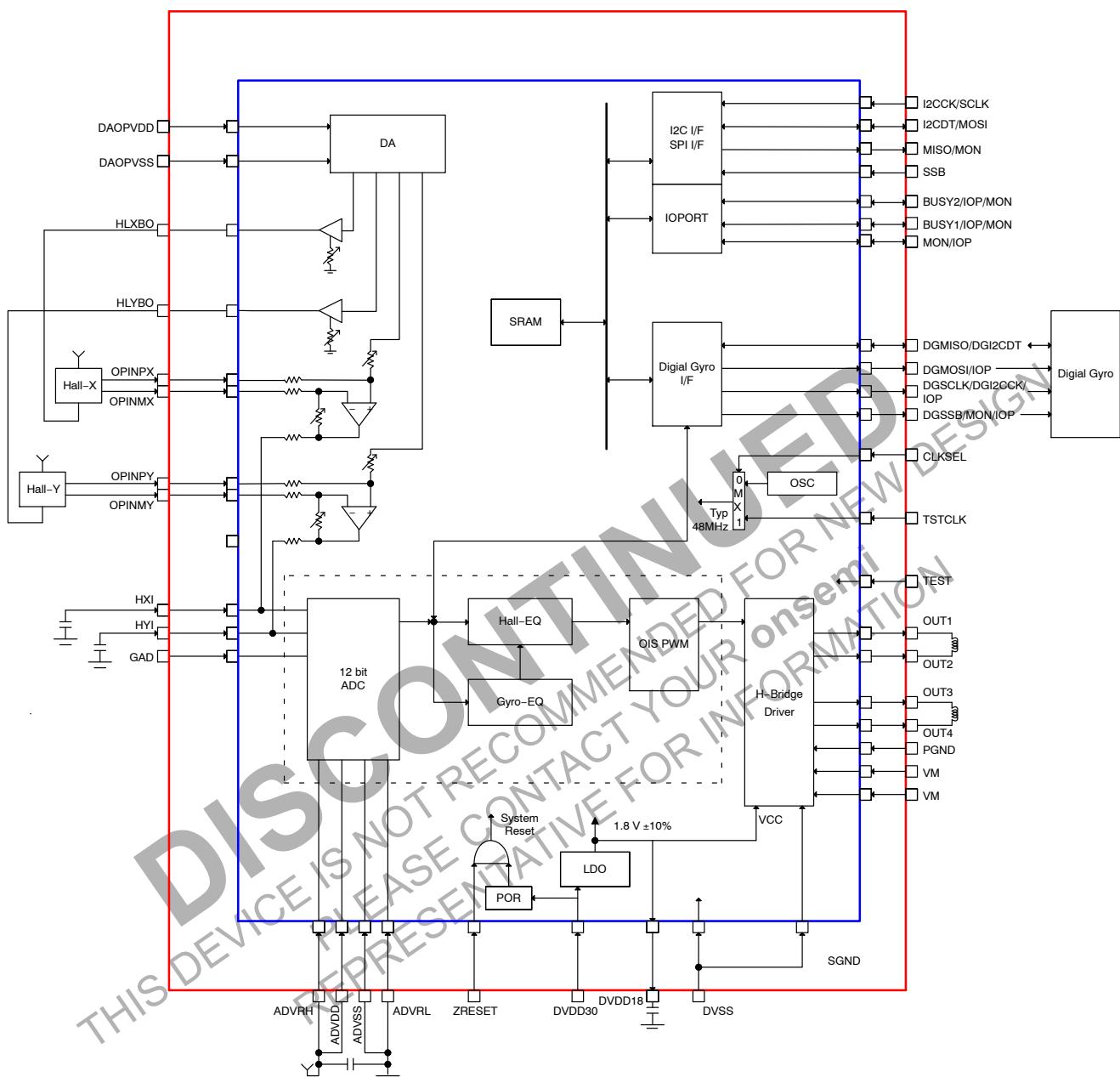


Figure 1. Example of Wiring Diagram [Hall] in LC898121XA (WLP40)

# LC898121XA

## PIN ASSIGNMENT

E	D	C	B	A
8	OPINPX	OPINMY	ADVDD	ADVSS
7	OPINMX	OPINPY	ADVRH	ADVRL
6	HLXBO	HLYBO	DAOPVDD	DAOPVSS
5	DGSCLK	DGMOSI	GAD	MISO
4	DGMISO	DGSSB	MON	SSB
3	DVSS	CLKSEL	TSTCLK	TEST
2	VM	BUSY2	BUSY1	ZRESET
1	OUT4	OUT3	PGND	OUT2
				OUT1

**Legend:**

- Driver (Pink)
- AD 3 V (Orange)
- VGA & DAC 3 V (Purple)
- Digital GND (Yellow)
- Digital 3 V VDD (Green)
- Logic Core 1.8 V VDD (Output) (Blue)

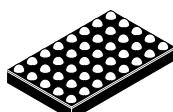
Figure 2. WLP40 Bottom View

# LC898121XA

## PIN DESCRIPTION (Type – I: INPUT, O: OUTPUT, B: BIDIRECTION, P: Power)

Ball No	Pin Name	Type	Description
A1	OUT1	O	Driver Output
A2	VM	P	Driver VDD (2.6 V to 5.5 V)
A3	DVDD30	P	Logic 3 V VDD (2.6 V to 3.6 V)
A4	DVDD18	P	LDO Power supply out (Logic Core VDD (typ 1.8 V))
A5	I2CDT	B	I2C_IF data (B) / SPI IF data (I)
A6	I2CCK	I	I2C_IF clock / SPI IF clock
A7	HYI	I	Hall-Y AD input
A8	HXI	I	Hall-X AD input
B1	OUT2	O	Driver output
B2	ZRESET	I	HardWafer Reset
B3	TEST	I	SPI & External clock case sets [1]. other cases set [0]
B4	SSB	B	SPI I/F Chip Select (I) / General-purpose IOPORT(B) / inner signal monitor (O)
B5	MISO	B	SPI I/F data (O) / inner signal monitor / General-purpose IOPORT
B6	DAOPVSS	P	DA&OpAmp VSS
B7	ADVRL	I	ADC ReferenceVoltage Low input
B8	ADVSS	I	AD GND
C1	PGND	P	Driver GND
C2	BUSY1	B	BUSY1 (O) / General-purpose IOPORT (B) / inner signal monitor (O)
C3	TSTCLK	I	CLKSEL = 1: External Clock, CLKSEL = 0: change pin of I <sup>2</sup> C (0) and SPI (1)
C4	MON	B	inner signal monitor / general-purpose IOPORT
C5	GAD	I	General AD input
C6	DAOPVDD	P	DA&OpAmp VDD (2.6 V to 3.6 V)
C7	ADVRH	I	ADC ReferenceVoltage High input
C8	ADVDD	P	AD VDD (2.6 V to 3.6 V)
D1	OUT3	O	Driver output
D2	BUSY2	B	BUSY2 (O) / General-purpose IOPORT (B) / inner signal monitor (O)
D3	CLKSEL	I	change pin of OSC (0) and External clock (1)
D4	DGSSB	B	Digital Gyro SPNF Chip Select (O) / inner signal monitor (O) / General-purpose IOPORT (B)
D5	DGMOSI	B	Digital Gyro (4-wire) IF data (O) / General-purpose IOPORT (B)
D6	HLYBO	O	Hall-Y Bias (Current drive)
D7	OPINPY	I	Hall-Y OpAmp input+
D8	OPINMY	I	Hall-Y OpAmp input-
E1	OUT4	O	Driver output
E2	VM	P	Driver VDD (2.6 V to 5.5 V)
E3	DVSS	P	Logic GND
E4	DGMISO	B	Digital Gyro SPI IF data(I) / Digital Gyro I <sup>2</sup> C IF data (B)
E5	DGSCLK	B	Digital Gyro SPI IF clock (O) / Digital Gyro I <sup>2</sup> C IF clock (O) / General purpose IOPORT (B)
E6	HLXBO	O	Hall-Y Bias (Current drive)
E7	OPINMX	I	Hall-X OpAmp input-
E8	OPINPX	I	Hall-X OpAmp input+

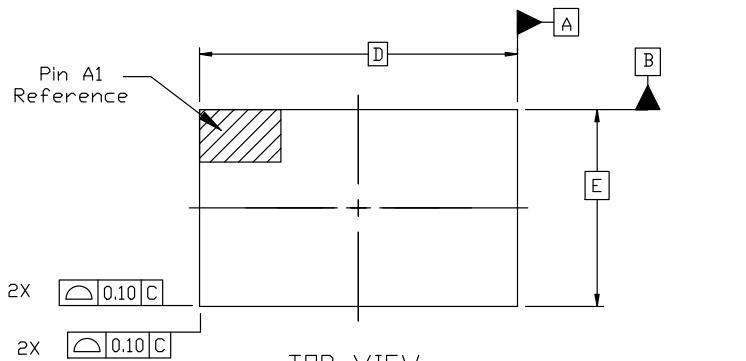
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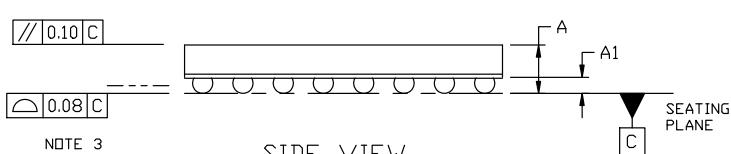
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**WLCSP40, 2.44x3.94**  
CASE 567JB  
ISSUE A

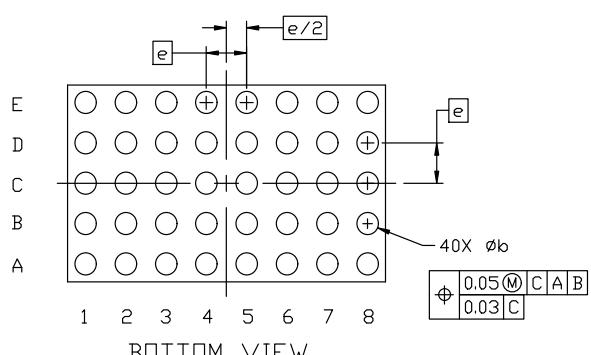
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TOP VIEW



NOTE 3

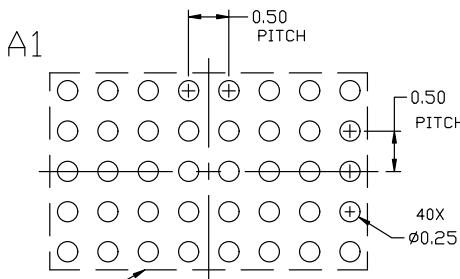


BOTTOM VIEW

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE SPHERICAL CROWNS OF THE SOLDER BALLS.

DIM	MILLIMETERS	
	MIN.	MAX.
A	---	0.65
A1	0.14	0.24
b	0.22	0.32
D	3.94	BSC
E	2.44	BSC
e	0.50	BSC



RECOMMENDED  
MOUNTING FOOTPRINT

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

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DESCRIPTION:	WLCSP40, 2.44X3.94	PAGE 1 OF 1

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