

SANYO

LC99260FL

1/5-Inch Optical Size Color CCD for CIF Format Camera Systems

Preliminary

Overview

The LC99260FL is a 1/5-inch optical size frame transfer CIF color CCD featuring high sensitivity and high resolution.

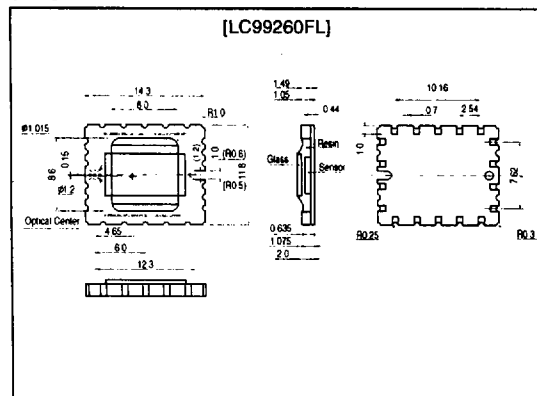
Features

- 1/5-inch type frame transfer CCD.
- Unit cell size : $6.1\mu\text{m}$ (H) $\times 7.6\mu\text{m}$ (V)
- Chip size : 4.18mm (H) $\times 5.10\text{mm}$ (V)
- Built-in high-sensitivity output amplifier.
- Cyan-Green-Yellow-White complementary color mosaic filter.
- Number of effective pixels : $492\text{H} \times 294\text{V}$
[Number of total pixels] : $[512\text{H} \times 300\text{V}]$
- Nunmer of optical blacks : H direction
: 17 pixels in front, 3pixels in back.
: V direction
: 3 pixels above, 3 pixels below
- Dummy bits : H direction : 4 pixels
- Supports miniature, compact camera designs.
- Package : 18-pin ceramic leadless chip carrier
- Horizontal shift register : 5V drive
- Supports variable-speed electric shutter operation.

Package Dimensions

unit:mm

3243



Specifications

Absolute Maximum Ratings at T_a = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
NSUB-PW			-0.3 to +50	V
NSUB-ø1 to ø4, øS1 to øS4			-0.3 to +55	V
V _{DD}	V _{DD}	V _{PW} =0V	-0.3 to +18	V
V _{GG}	V _{GG}	V _{PW} =0V	-0.3 to +5	V
Horizontal clock and øR terminals		V _{PW} =0V	-0.3 to +18	V
Other clock terminal		V _{PW} =0V	-15 to +18	V
Other terminals		V _{PW} =0V	-0.3 to +10	V
Operating temperature	T _{opr}		-10 to +60	°C
Storage temperature	T _{stg}		-30 to +80	°C

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Block Diagram

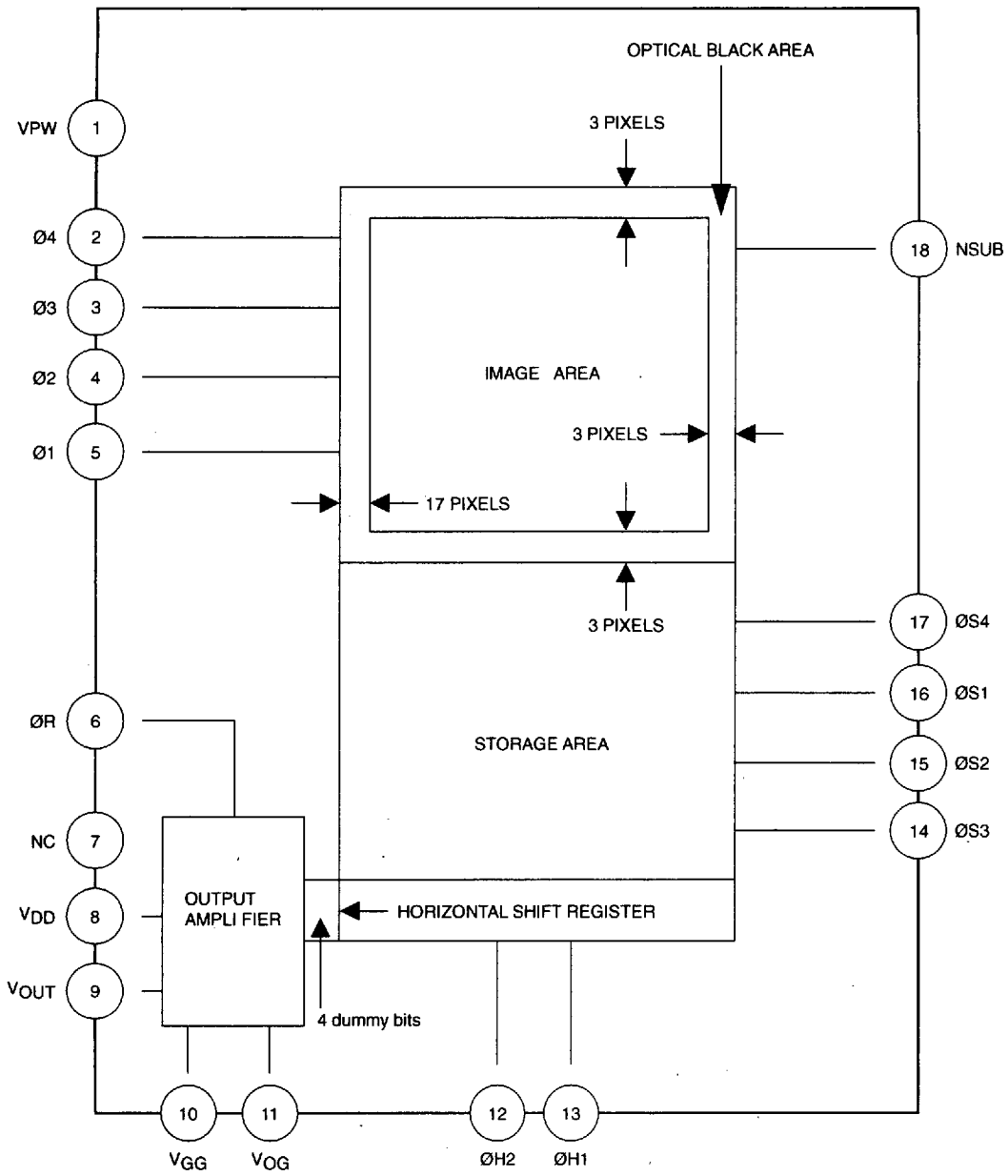


Fig. 1

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Pixel Arrangement

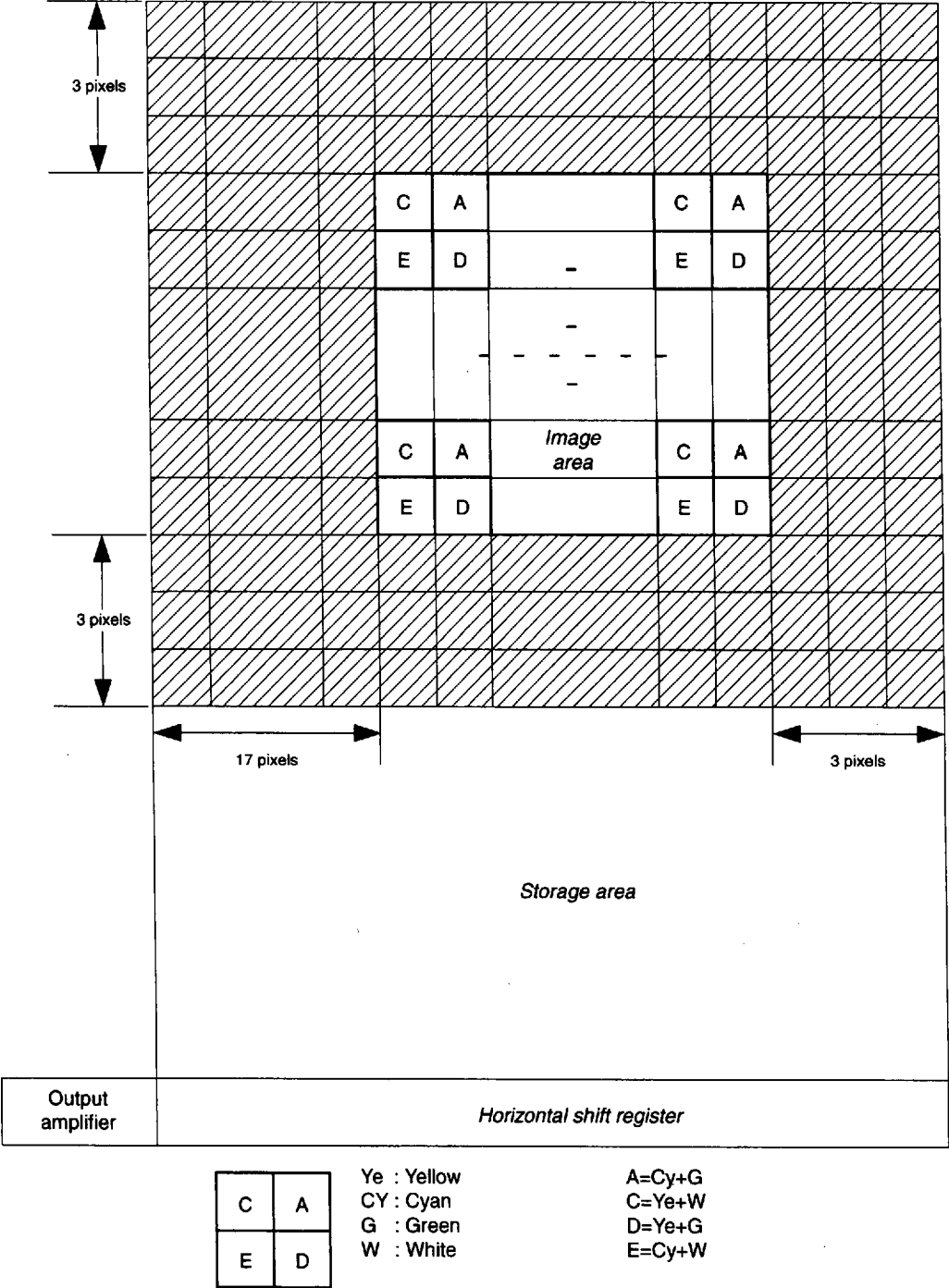
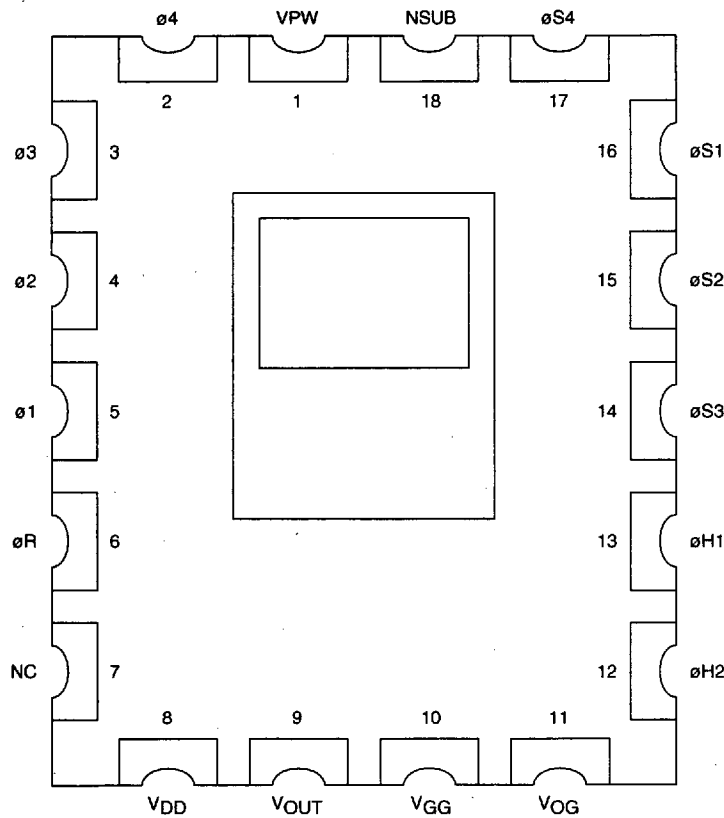


Fig. 2

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Terminal Arrangement



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Fig. 3 Top view

Terminal	Symbol	Description	Terminal	Symbol	Description
1	Vpw	P-Well	18	NSUB	N-Substrate
2	ø4	Image area clock	17	øS4	Storage area clock
3	ø3		16	øS1	
4	ø2		15	øS2	
5	ø1		14	øS3	
6	øR	Reset gate	13	øH1	Horizontal area clock
7	NC		12	øH2	
8	VDD	Supply voltage	11	VOG	CCD output gate
9	VOUT	CCD output	10	VGG	Load gate

Clock Characteristics at Frame shift frequency = 3.58MHz

Parameter		Symbol	Conditions	Ratings			Unit	Notes
				min	typ	max		
Image area pulse ø1, ø2, ø3, ø4	Pulse amplitude	V _{PIF}		14.0	14.5	15.0	V	*1
	Low Level	V _{LIF}		-10.0	-9.5	-9.0	V	
Storage area puls øS1, øS2	Pulse amplitude	V _{PSL}		14.0	14.5	15.0	V	
	Low Level	V _{LSL}		-8.0	-7.5	-7.0	V	
Storage area puls øS3, øS4	Pulse amplitude	V _{PSL}		14.0	14.5	15.0	V	
	Low Level	V _{LSL}		-9.0	-8.5	-8.0	V	
Horizontal register pulses øH1, øH2	Pulse amplitude	V _{PH}		4.5	5.0	5.5	V	
	Low Level	V _{LH}		0	0	0.5	V	
Reset gate pulse øR	Pulse amplitude	V _{PR}		4.5	5.0	5.5	V	*3
	Low Level	V _{LR}		1.0		6.0	V	
N-Substrate pulse øNSUB	Pulse amplitude	V _{HSUB} (*2)		30.0		40.0	V	Fig. 4
	Low Level	V _{LSUB}		17.5	18.0	18.5	V	

*1. Insert a 47pF capacitor as shown in Fig. 5.

*2. Adjust the pulse amplitude of V_{HSUB} within the range where image degradation dose not occur so that the saturated output level is maximized.

*3. Adjust this level so that image degradation does not occur.

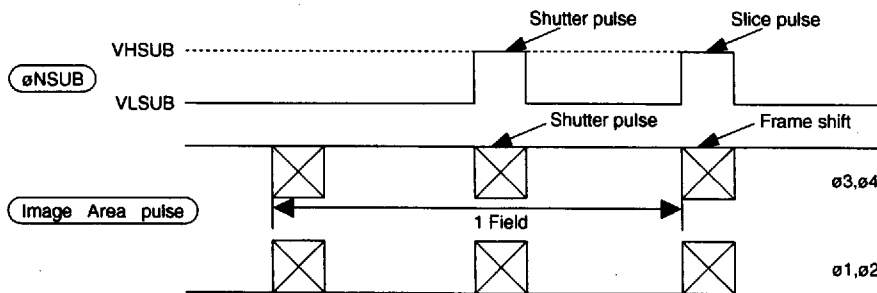
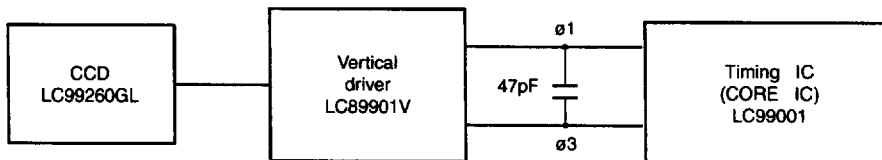


Fig. 4



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Fig. 5

DC Electrical Characteristics

Parameter	Symbol	Conditions	Ratings			Unit	Notes
			min	typ	max		
P Well	V _{PW}			0		V	
Output circuit voltage	V _{DD}		14.5	15.0	15.5	V	*1
	V _{GG}		1.2	1.5	1.8	V	*2
OG Bias	V _{OG}		3.0	3.5	4.0	V	*2

*1. Design applications so that this level never exceeds the substrate pulse low level V_{LSUB}.

*2. These are high-impedance inputs.

DC Specification

Parameter	Symbol	Conditions	Ratings			Unit	Notes
			min	typ	max		
Drain Current of output circuit	I _{DD}		4.5	7.0	11.0	mA	

Drive Pulse Waveform

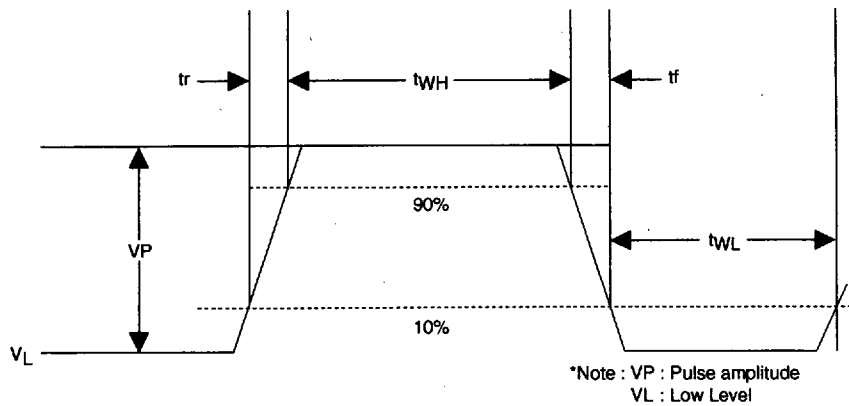


Fig. 6. Pulse Waveform

Symbol	t _{WH} typ	t _{WL} typ	t _r typ	t _f typ	Unit	Notes
ø1	166	100	6.5	6.5	ns	During 3.58MHz frame shift
ø2	141	116	11	11		
ø3	166	100	6.5	6.5		
ø4	141	116	11	11		
øS1	141	116	11	11	ns	During 3.58MHz frame shift
øS2	141	116	11	11		
øS3	141	116	11	11		
øS4	141	116	11	11		
øS1	1.36	62.1	30	30	ns	During Vertical shift of 1H. The values enclosed in bold lines are in µs units.
øS2	1.36	62.1	30	30		
øS3	62.1	1.36	30	30		
øS4	62.1	1.36	30	30		
øR	11	86	4	4	ns	Reset pulse
øH1	50	49	3	3		During horizontal shift.
øH12	50	49	3	3		
øNSUB	9.9	16.59*	0.07	1	µs	These are the values at slice operation and the value marked* is in ms units.
øNSUB	4.2	16.59*	0.07	1	µs	These are the values at shutter operation and the value marked* is in ms units.

Performance Characteristics at Ta = 25°C, accumulation = 1/60s, under specified test conditions.

Parameter	Symbol	Conditions	Ratings			Unit	Notes
			min	typ	max		
Sensitivity	S					mV	
R-Gain	G _R						
B-Gain	G _B						
Video output shading	V _F				15	%	
Saturation voltage	V _{sat}		600			mV	*1
Smear	SM			0.04		%	*2
Dark signal	V _{dark}				7	mV	Ta=55°C
Color Shading	V _{cs}				40	mV	
Gamma	Gamma			1		-	

*1. The minimum of saturation voltage is 450mV when the substrate pulse amplitude VHSUB is fixed at 40±2V.

*2. When the frame shift frequency is 3.58MHz.