

光学触摸屏模块资料

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1. Description

The 6400CL linear image sensor module is a mixed mode IC. It integrated digital circuitry, image sensor array and analog circuitry into a tiny silicon chip. An on chip timing generator provides all of the timing circuitry to operate the device. The active element array consists of 1000 active pixel sensors (APS), and 20 optical black elements (10 elements on each side) for dark voltage cancellation as well as 4 dummy elements (2 elements on each side) for protecting the first and last active pixels from the edge effect; The device can be select for either 3200 dpi resolution or 6400 dpi resolution. There are two video output. They are analog output (AOUT) and reference output (VREF). User can either use one analog output alone or used both output. If used both output, a differential amplifier is used to eliminate DC offset. The device provides a SYNC output pulse to indicate the first pixel and last pixel (#1000). The device has a built-in power down circuitry to reduce the power consumption when device is not used. The image sensing length is 100 μm . All of the photo detectors are integration simultaneously. The device is easy to operate. In addition to the power supply, only 2 clock signals (start pulse SP and clock pulse CP) are required to operate this device.

The 6400CL has a capability to readout 3200 dpi, or 6400 dpi resolution by control RES-SEL pins. For 3200 dpi resolution, two adjacent pixels add together. The readout time is reduced by half compare to 6400 dpi resolution.

2. Brief Spec

NO.	Item	Specifications	
2-1	Image Sensor	Image Format	CMOS Linear Image Sensor
		Active Pixels	1000 Pixels
		Data Rate	250KHz
		Pixel size	3.9 μm x 100 μm (6400dpi)
		Output Data	1 Analogue
2-2	Lens	Focal Length	f _l =2.26mm
		F Number	2.8
		Angular field of view	100°
		Composition	2P Plastic Lens
		IR pass	850nm
2-3	Power Supply	3V	
2-4	Scanning speed	10 ms/line	
2-5	Dimension	10.6mm x 5.5mm x 3.0mm	
2-6	Depth of field	2cm~60cm	
2-7	Operating & Storage Temp	0~50°C , -25~75°C	

3. Pin Function Description

No.	Signature	I/O	Name	Description
1	VOUT	O	Signal output	Video output signal
2	GND	I	Ground	0V DC, reference point
3	SP	I	Start Pulse	Start Pulse
4	RE_SEL	I	Resolution select	L=3200dpi; H=6400dpi
5	CP	I	Clock Pulse	Main clock
6	VDD	I	Supply Voltage	Power Supply, +3V
7	NC		No Connection	No Connection
8	NC		No Connection	No Connection

4. Electrical Characteristics (@Ta=25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VDD	2.7	3	3.3	V
Power supply current	IDD		16	20	mA
Input voltage	Vi			VDD	V
High level input voltage	Vih	VDD x 0.7		VDD	V
Low level input voltage	ViL	0		VDD x 0.3	V
Power down mode			15		uA
Clock frequency	f	0.015	0.5	1	MHz
Pixel rate out rate		0.015	0.5	1	Mpixel/sec
Wavelength of light source	λ	400		1000	nm
Clock pulse high duty cycle			50		%
Operating free-air temperature	TA	0		50	°C

5. Maximum Rating (@Ta=25°C)

ITEM	SYMBOL	MAXIMUM RATING	UNIT
Power Supply	VDD	3.6V	Volts
Input Voltage	Vin	3.6V	SI/CLK
Storage Temperature	TSTG	-25~75	°C
Storage Humidity	HSTG	10~90	%RH
Operating Temperature	TOP	0~50	°C
Operating Humidity	HOP	10~85	%RH

6. Image-Data Output Characteristics

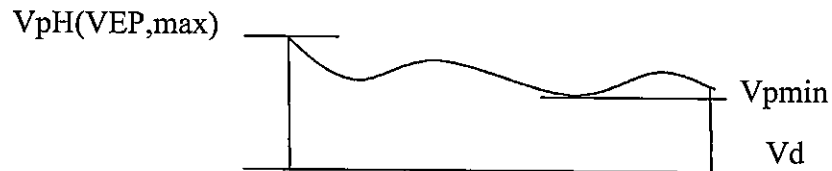
(CLK=250KHz, SP=10ms/line, Ta=25°C)

ITEM	SYMBOL	SPECIFICATION	UNIT	NOTE
DC Supply	VDD	3 0.15	V	
Analog output Saturation Voltage	Vsat	1.8 min.	V	Ref to Vd level
SP,CP Voltage	VSC	3 0.15	V	
Bright Output min.	Vpmin	0.5 min	V	Ref to Vd level
Dark Output	Vd	0.75 ± 0.2	V	LEDs OFF, Ref to GND
Reference Level Output	VREF	0.75 ± 0.2	V	clamp level
Dark Output Uniformity	Ud	200 max	mV	
Modulation Transfer Function	MTF	30 min	%	0.34lp/mm@10cm
Analog output Data Rate	Vrate	250	KHz	Vrate =CP rate
Random noise	RN	6	mV	LEDs OFF

7. Definition

- (1) V_{pmin} level is defined as follows: (reference to V_d level)

$$V_{p \min} = \text{Min}[V_p(i)] \quad i = 1 \sim 500$$

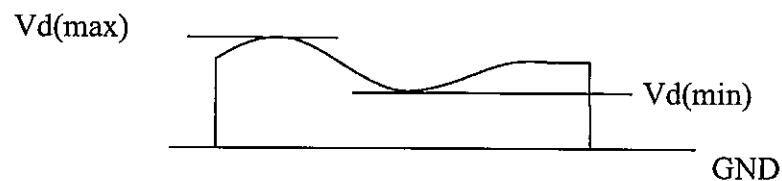


- (2) V_d is defined as follows: (reference to GND.)

V_d is the average output level in the dark.

- (3) U_d is defined as follows: (reference to GND.)

$$U_d = V_d(\text{max}) - V_d(\text{min})$$



- (4) Modulation Transfer Function is defined as follows:

$$MTF = \frac{V_{OUT, \max} - V_{OUT, \min}}{V_{OUT, \max} + V_{OUT, \min}} \times 100\%$$

$V_{OUT, \max}$: The Maximum Output Value Measured 0.34lp/mm chart@10cm

$V_{OUT, \min}$: The Minimum Output Value Measured 0.34lp/mm chart@10cm

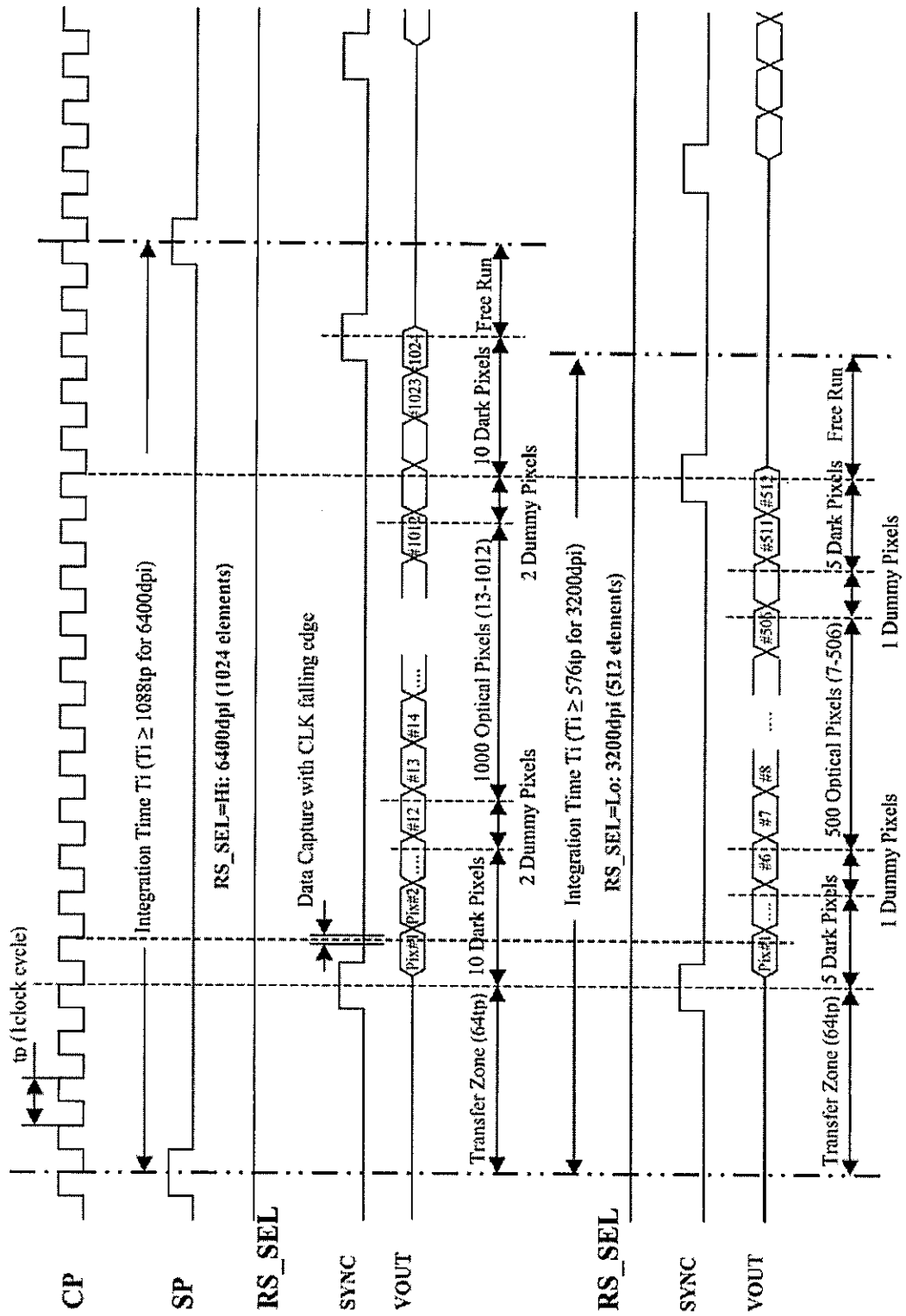
(5) Random noise is defined as follows:

The "n" must higher than 64 in the following equation.

The V_i is the i-th pixel output value when LED OFF.

$$RN = \sqrt{\frac{\sum_{i=1}^n (V_i - V)^2}{n}} \quad , \text{ where } V = \frac{1}{n} \sum_{i=1}^n V_i$$

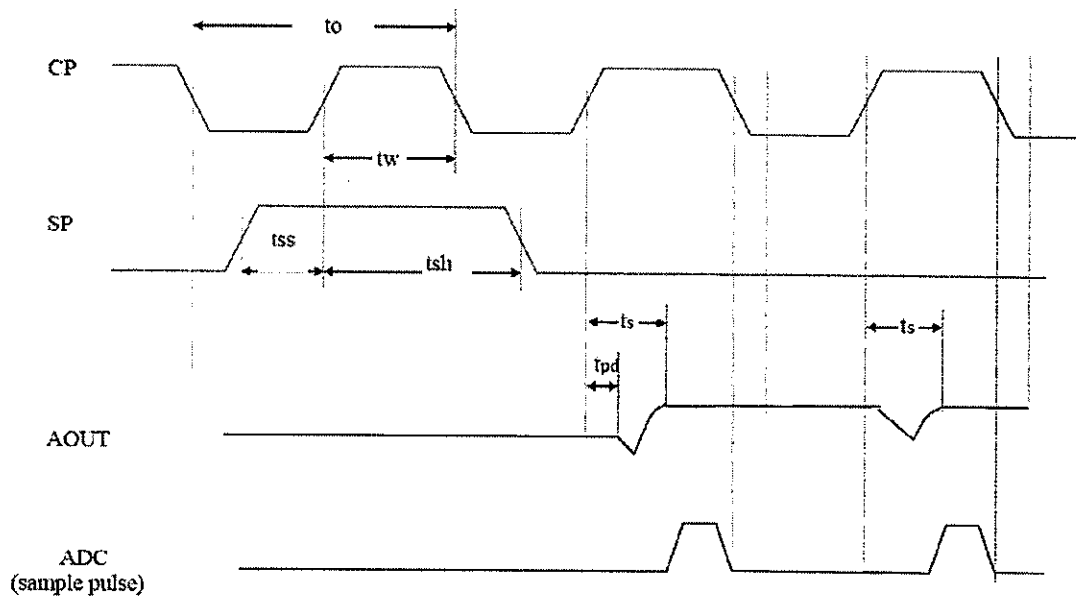
8. Timing Chart



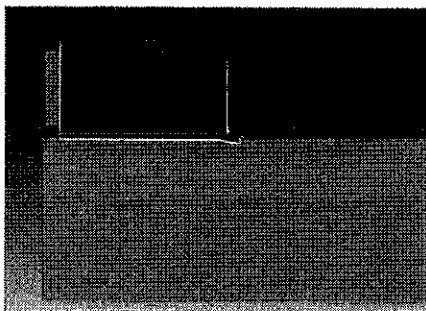
9. Switching Characteristics

Item	Description	Symbol	Min	Typ.	Max	Unit
1	Clock cycle time	t_o		1		μs
2	Clock pulse duty cycle: t_w/t_o			50		%
3	Clock pulse width	t_w		500		ns
4	ϕ Sp setup time	t_{ss}	50			ns
5	ϕ Sp hold time	t_{sh}	50			ns
6	Video digital delay time	t_{pd}		50		ns
8	Video signal stable time	t_s		200		ns

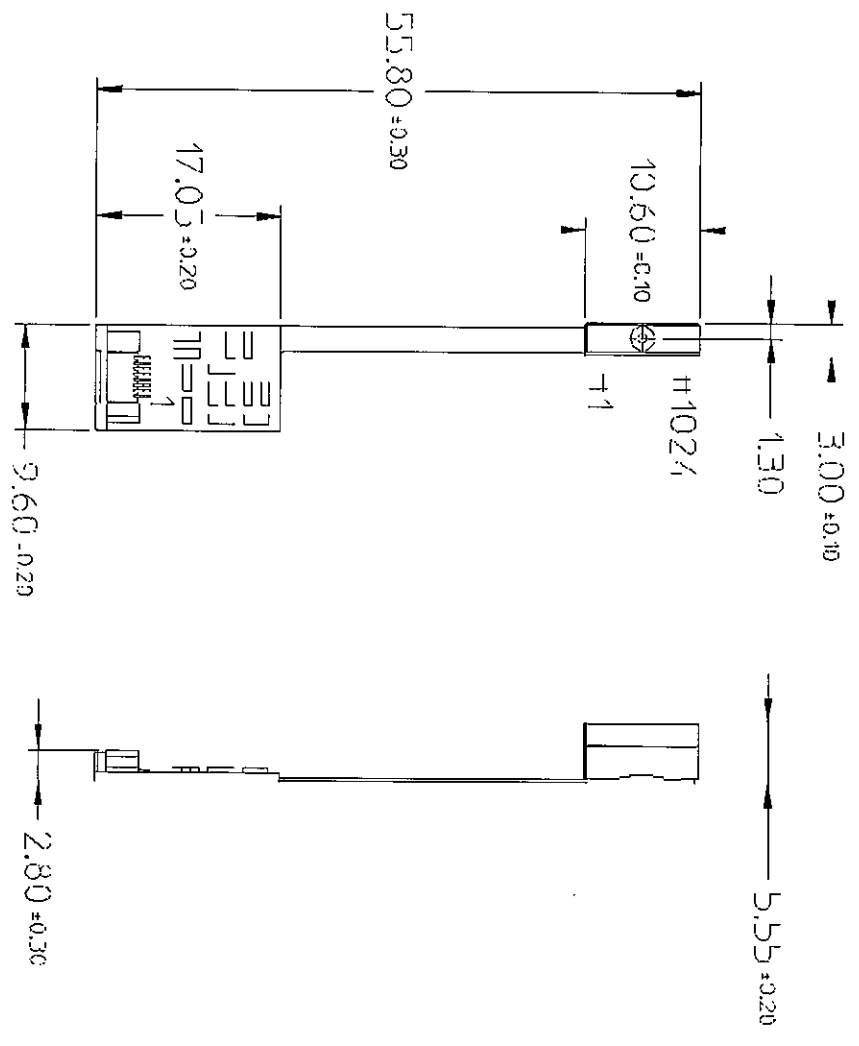
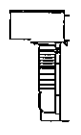
Switching Waveforms



10. Fixed Position



Fixed Plate



Connector: Upper type 0.5mm pitch FPC connector

Item	Specification
EFL	2.26mm
Fno.	2.8
FOV	100°
Relative Illumination	over 63%

Pin Assignment

1	VOUT
2	GND
3	SP
4	RE_SEL
5	CP
6	VDD
7	NC
8	NC

MATERIAL:	DIMENSIONS	DRAWN	DATE
	MILLIMETERS	DATE	DATE
PROCESSES:	SURFACE FINISHES	CHECKED	DATE
	INFORMATION	APPROVED	DATE

TITLE :	SPEC. NO.
	GY

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MILLIMETERS		INCHES	
X	±.250	X	±.010
XX	±.125	X	±.005
XXX	±.0625	X	±.0025
XXXX	±.03125	X	±.00125
XXXXX	±.015625	X	±.000625
XXXXXX	±.0078125	X	±.0003125
XXXXXXX	±.00390625	X	±.00015625
XXXXXXXX	±.001953125	X	±.000078125
XXXXXXXXX	±.0009765625	X	±.0000390625
XXXXXXXXXX	±.00048828125	X	±.00001953125
XXXXXXXXXXX	±.000244140625	X	±.000009765625
XXXXXXXXXXX	±.0001220703125	X	±.0000048828125
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12. Reliability specification

NO.	ITEM	CONDITION	TYPE	FUNCTION	APPERANCE
1	TEMPERATURE CYCLING TEST	-25°C(1HR), 0°C(5MIN), 75°C(1HR) TOTAL 30 CYCLES	MODULE	WORK	NORMAL
2	HIGH TEMP. & HIGH HUMIDITY STORAGE TEST	75°C, 85%RH, 120HRS	MODULE	WORK	NORMAL
3	LOW TEMP. STORAGE TEST	-25°C, 96HRS	MODULE	WORK	NORMAL
4	HIGH TEMP. STORAGE TEST	+75°C, 96HRS	MODULE	WORK	NORMAL
5	LOW TEMP. OPERATING TEST	0°C, 48HRS	MODULE	WORK	NORMAL
6	HIGH TEMP. OPERATING TEST	50°C, 48HRS	MODULE	WORK	NORMAL
7	VIBRATION TEST (XYZ dimension)	10Hz-500Hz(45MIN) 500Hz-1800Hz(45MIN) 0.05G2/8GS RMS	NON-PACKING &PACKING	WORK	NORMAL
8	DROP TEST	152cm 15times FREE DROP	MODULE	WORK	NORMAL
9	ESD TEST	150pF 330ohm AIR DISCHARGE +/-12KV(15times), AT GROUND &NON-FROUND	MODULE	WORK	NORMAL

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