

## Specification for Colour LCD Display module

### 7.0" Colour TFT module with PCAP Touch and Coverlens

Manufacturer	Data Image Corporation
Part n°	LCX0700313GGU25
Ordering n°	LCX0700313GGU25
Customer Part n°	n/a
Revision n°	1
Issue Date	2016/12/29

### Customer's Approval

Company name	
Printed name	
Job title	
Signature	
Approval Stage:	<p>This product is approved for the following production stage: -</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sample / Prototype</li> <li><input type="checkbox"/> Pre-Production</li> <li><input type="checkbox"/> Mass Production</li> </ul>
Approval Date	

Supplied by Anders Electronics plc  
 Manufactured by Data Image Corporation



# DATA IMAGE CORPORATION

## CTP Module Specification Preliminary

ITEM NO.: LCX0700313GGU25

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Customer Companies	QA Approved	DQA Check	R&D Approved	R&D Check
	<i>Beth</i>	<i>Huong</i>	<i>Alex</i>	<i>Nomo</i>
Customer Approved by	Version:	Issued Date:	Total Pages:	Prepared
	1	29/DEC/16'	30	<i>Rudy</i>



### 3. GENERAL SPECIFICATIONS

Composition: 7inch WSVGA resolution display with a projected Capacitive Touch Panel (CTP).

Interface : LVDS Interface for panel and I<sup>2</sup>C for the CTP.

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	800(W) x (R,G,B) x 1280(H)	Dots
Pixel pitch	0.11775(W) x 0.11775(H)	mm
LCD Active Area	150.72(W) x 94.2(H)	mm
CTP Active Area	153.32(W) x 96.8(H)	mm
Pixel Configuration	Stripe	
Outline Dimension	187(W) x 124(H) x 8(D)	mm
Back-light	LED	
Display mode	Normally Black	
Weight	TBD	g
View Angle direction	All	
Our components and processes are compliant to RoHS & REACH standard		

### 4. LCD ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	VDD	-0.3	3.8	V	Ta=25°C
	AVDD	-0.3	13.5	V	
	VGH	-0.3	VGL+40	V	
	VGL	-20	0.3	V	
	VGH-VGL	12	40	V	
Operating temperature	Top	-30	85	°C	Module surface*
Storage temperature	Tst	-30	85	°C	-
Humidity	Operation	20%~90% relative humidity			Ta ≤ 40°C
	Non Operation	5%~90% relative humidity			Ta ≤ 40°C

### 5. LCD ELECTRICAL CHARACTERISTICS

#### 5.1 Operating Conditions

Ta=25°C

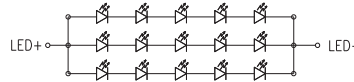
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	3	3.3	3.6	V	Note 4
Logic Input Voltage (LVDS:IN+,IN-)	VCM	1	1.2	1.4	V	Note 1
	VCM	200	-	600	mV	Note 1
	VTH	-	-	100	mV	Note 1
	VTL	-100	-	-	mV	VCM=1.2V
1 Data time	UI	-	tclk*1/7	-	tclk	Note 3
LVDS clock to data skew	tskew	-	-	300	ps	Note 3
Input data eye width	tsyew	1082	-	-	ps	Note 3
Analog Power Supply Voltage	AVDD	11.880	12.080	12.280	V	Note 4
Gate On Power Supply Voltage	VON	22.5	23.5	24.5	V	Note 4
Gate Off Power Supply Voltage	VOFF	-6.6	-6.0	-5.4	V	Note 4
Common Power Supply Voltage	VCOM	3.45	4.15	4.85	V	Note 2
Logic Input Voltage	VIH	0.8*VDD	-	VDD	V	
	VIL	GND	-	0.2*VDD	V	

### 5.2 Current Consumption

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Rush Current	$I_{rush}$	-	-	2	A	Note 6
Gate on power current	IVON	-	0.5	5	mA	Note 5
Gate off power current	IVOFF	-	0.5	5	mA	
Digital power current	IVDD	-	40	80	mA	
Analog power current	IAVDD	-	90	150	mA	

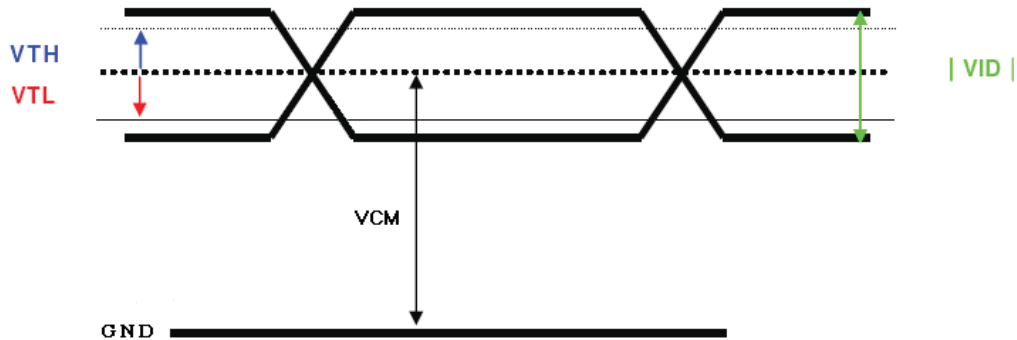
### 5.3 Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED voltage	$V_F$	-	-	32	V	
LED current	$I_F$	-	180	--	mA	
LED life time	-	30,000	50,000	-	hr	Note 7

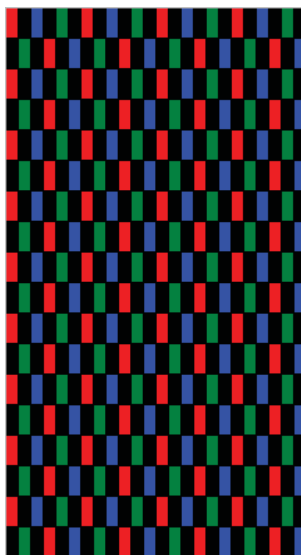


$V_F = 32V$  (max)  
 $I_F = 180mA$

Note 1 : LVDS signal

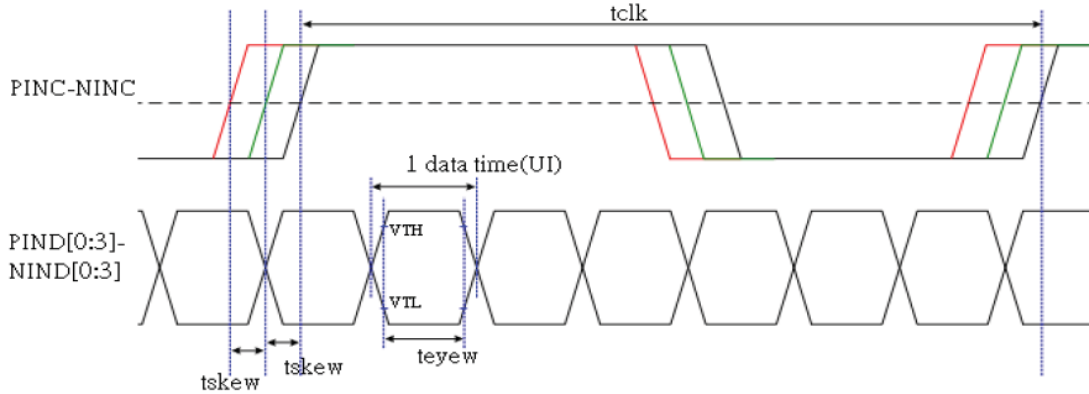


Note 2 : Vcom is supplied from FPCA, it could be adjusted by VR to make the flicker level be minimum.



Flicker pattern

Note 3 : The following condition is base on operation frequency at 85MHz.

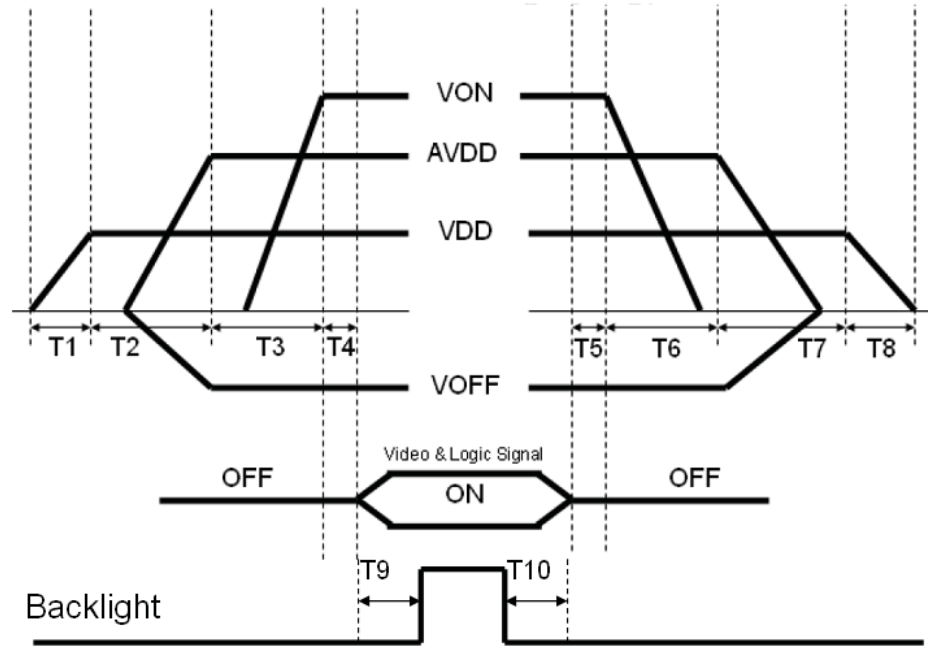


Note 4 :

(1) Power Sequence

Power On : VDD→AVDD/VOFF→VON→Video & Logic Signal→Backlight

Power Off : Backlight → Video & Logic Signal→ VON→ AVDD/VOFF→ VDD



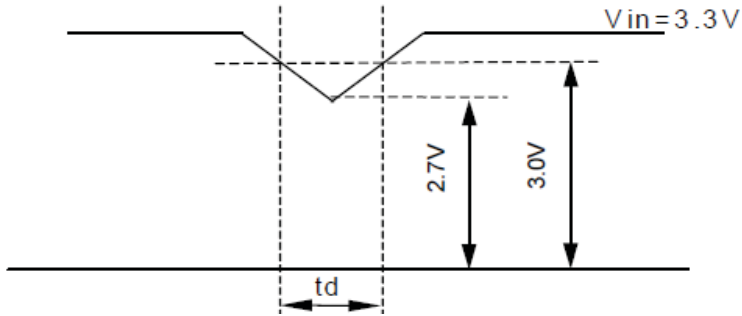
$0 < T1 \leq 10\text{ms}$   
 $20\text{ms} < T2$   
 $10\text{ms} < T3$   
 $0 < T4 \leq 10\text{ms}$   
 $200\text{ms} < T9$

$0 < T5 \leq 10\text{ms}$   
 $0 < T6$   
 $0 < T7$   
 $0 < T8$   
 $200\text{ms} < T10$

(2) Vin-dip state

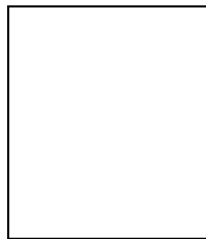
a) When  $3.0V > V_{in} \geq 2.7V$  ,  $t_d \leq 10ms$ .

b) When  $V_{in} > 2.7V$  , Vin-dip condition should as Vin-turn-off condition.

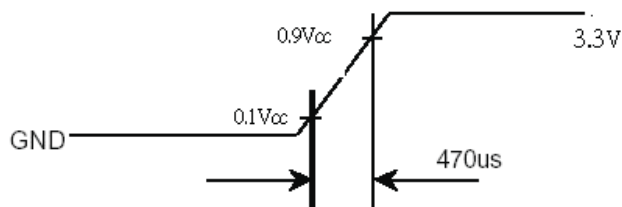
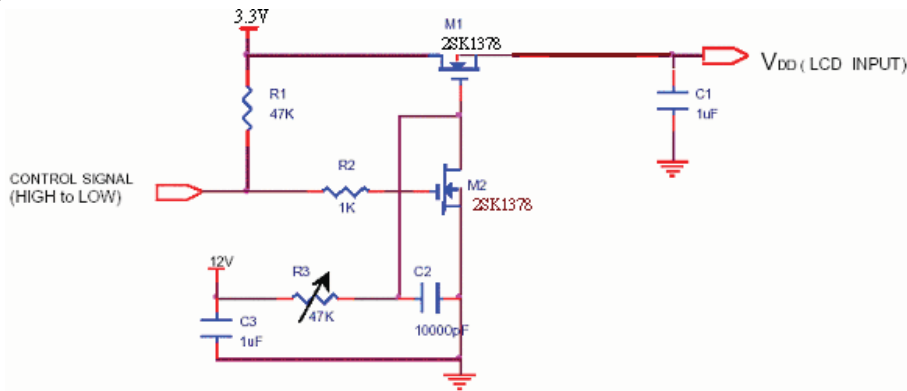


Note 5 : Typ. value is White Pattern : 1280 line mode.

Circuit condition(Typ.) :  $V_{DD} = 3.3V$  ,  $f_v = 60Hz$  ,  $f_H = 77.28kHz$  ,  $f_{CLK} = 66.77MHz$ .



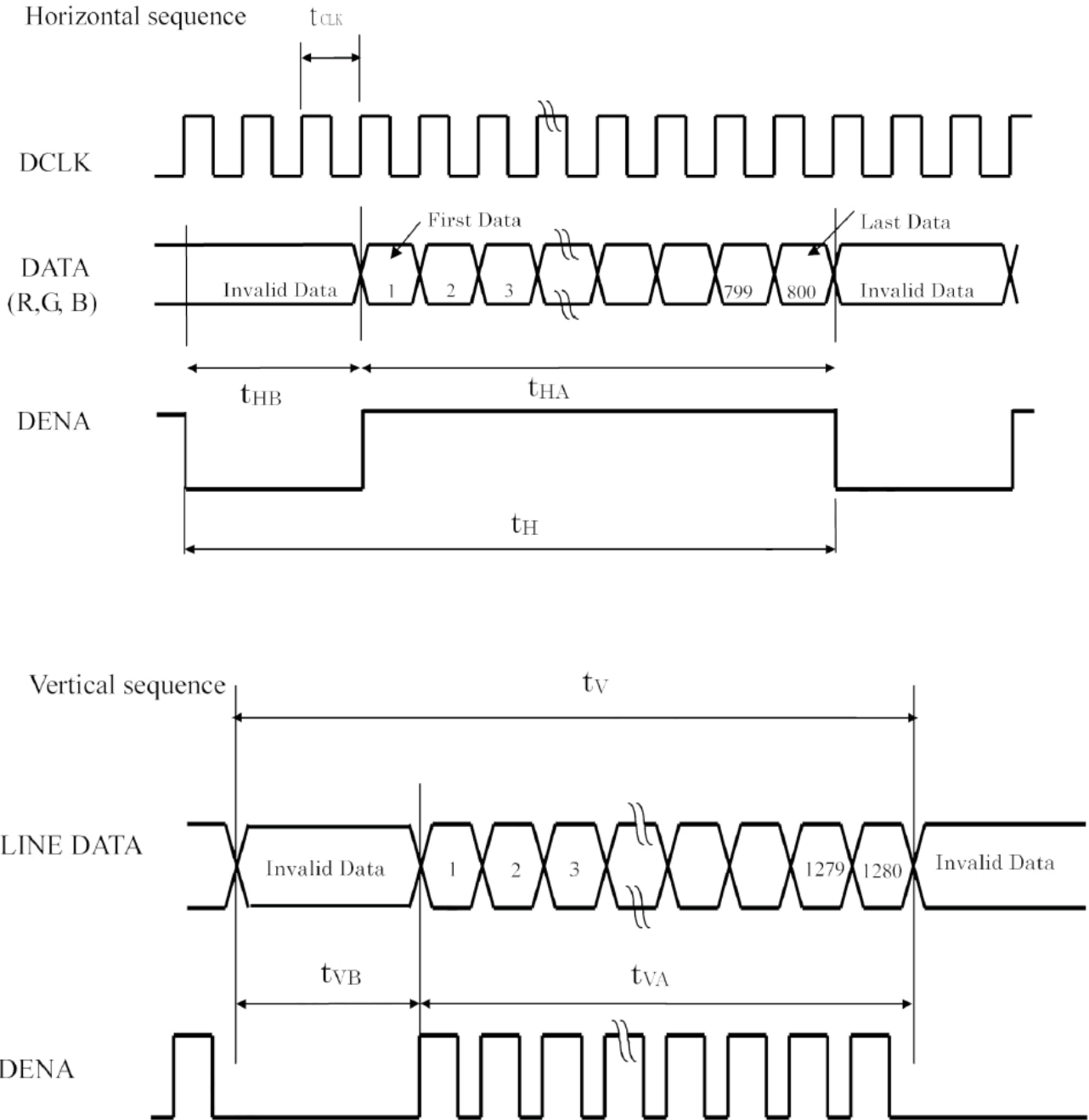
Note 6 :



Note 7 : The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $I_F = 180mA$  &  $T_a = 25^\circ C$ .

## 6. LCD INPUT SIGNAL CHARACTERISTICS

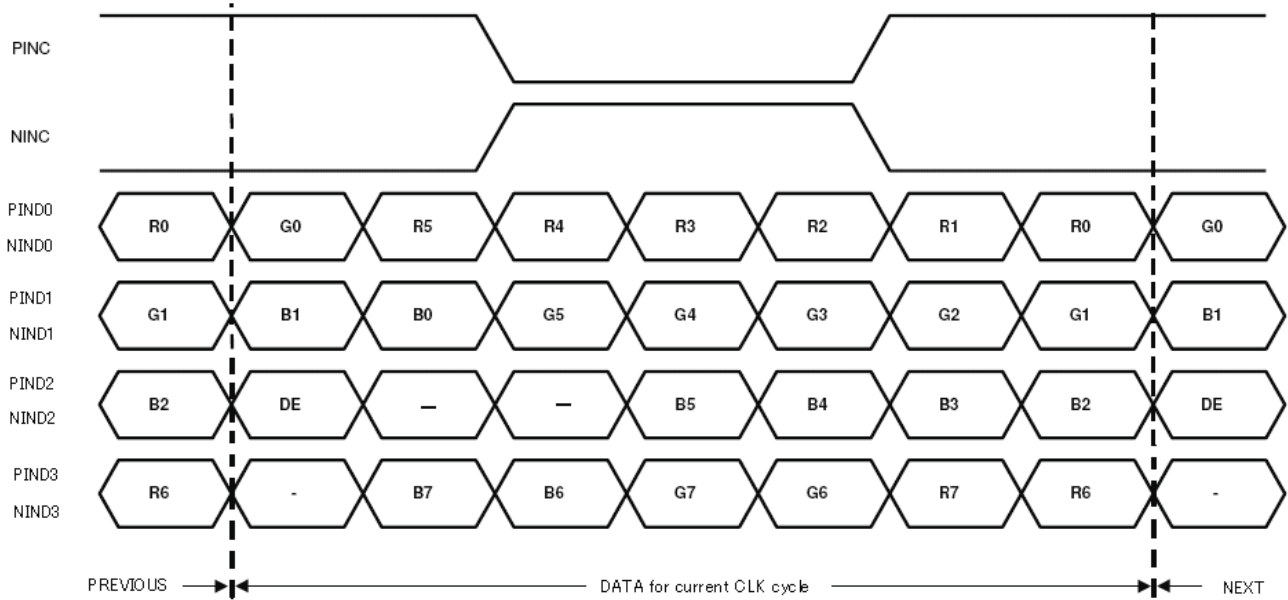
### 6.1 LVDS input time sequence





## LVDS Input Data mapping

## 8 Bit LVDS input



## 6.2 Timing Chart

Parameter		Symbol	Min.	Typ.	Max.	Unit	
Frame Rate		-	60	60	60	Hz	
DCLK	Frequency	fCLK	66.3	66.8	85	MHz	
DENA	Horizontal	Horizontal total time	t <sub>H</sub>	860	864	1026	tCLK
		Horizontal Active time	t <sub>HA</sub>	800	800	800	tCLK
		Horizontal Blank time	t <sub>HB</sub>	60	64	226	tCLK
	Vertical	Vertical total time	t <sub>V</sub>	1286	1288	1380	tH
		Vertical Active time	t <sub>VA</sub>	1280	1280	1280	tH
		Vertical Blank time	t <sub>VB</sub>	6	8	100	tH

Note 1 : DENA(DATA ENABLE) usually is positive.

Note 2 : During the whole blank period, DCLK should keep input.

**6.3 DATA Mapping**

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7 MSB	R6	R5	R4	R3	R2	R1	R0 LSB	G7 MSB	G6	G5	G4	G3	G2	G1	G0 LSB	B7 MSB	B6	B5	B4	B3	B2	B1	B0 LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
	GREEN(254)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
	GREEN(255)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0		
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		

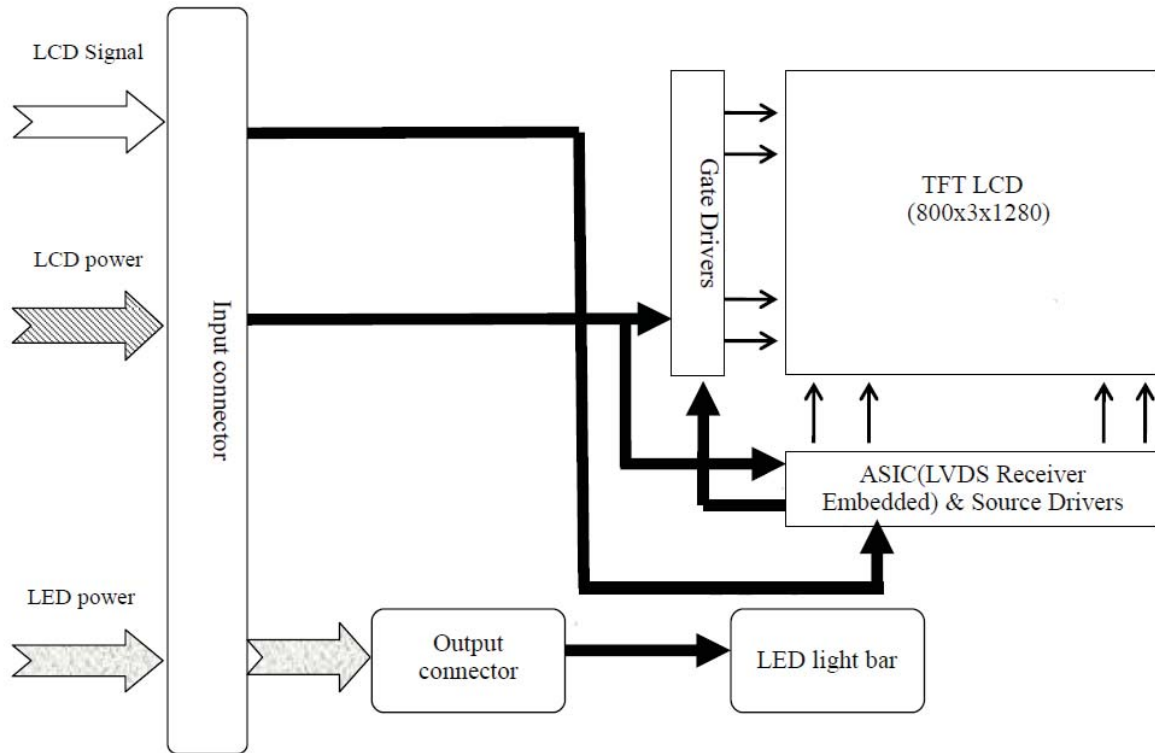
Note 1 : Gary level :

Color(n) : n is level order ; higher n means brighter level.

Note 2 : DATA

1 : high , 0 : low

## 7. LCD BLOCK DIAGRAM

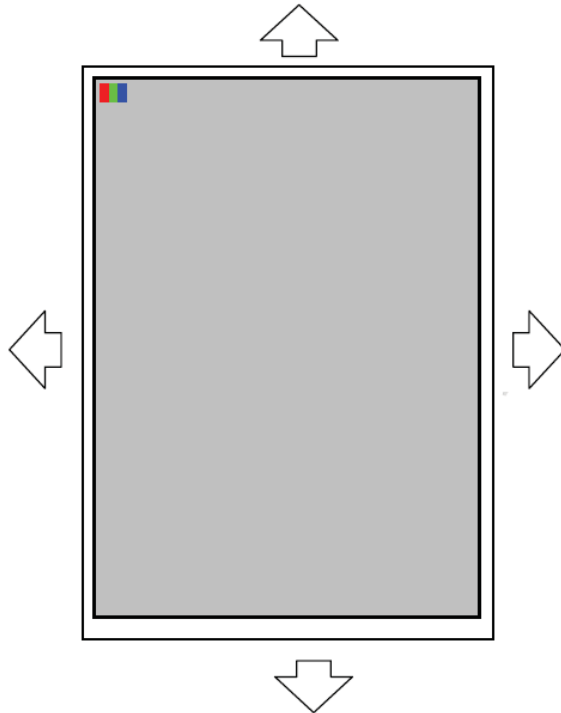


## 8. LCD PIN CONNECTIONS

Pin No.	Symbol	Function	Remark
1	NC	No Connection	
2	VDD	Power Voltage for digital circuit	
3	VDD	Power Voltage for digital circuit	
4	NC	No Connection	
5	Reset	Global reset pin, low active	
6	STBYB	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller and source driver are off and all output are High-Z	
7	GND	Ground	
8	RXIN0-	- LVDS differential data input	
9	RXIN0+	+ LVDS differential data input	
10	GND	Ground	
11	RXIN1-	- LVDS differential data input	
12	RXIN1+	+ LVDS differential data input	
13	GND	Ground	
14	RXIN2-	- LVDS differential data input	
15	RXIN2+	+ LVDS differential data input	
16	GND	Ground	
17	RXCLKIN-	- LVDS differential data input	
18	RXCLKIN+	+ LVDS differential data input	
19	GND	Ground	
20	RXIN3-	- LVDS differential data input	
21	RXIN3+	+ LVDS differential data input	
22	GND	Ground	
23	TP_SYNC	Sync signal for touch panel, keep floating if not used	
24	NC	No Connection	
25	GND	Ground	
26	NC	No Connection	
27	NC	No Connection	
28	NC	No Connection	
29	AVDD	Power for Analog Circuit	
30	GND	Ground	
31	LED-	Power for LED backlight (Cathode)	
32	LED-	Power for LED backlight (Cathode)	
33	L/R	Left/right selection	Note 1
34	U/D	Up/down selection	
35	VOFF	Gate OFF Voltage	
36	NC	No Connection	
37	NC	No Connection	
38	VON	Gate ON Voltage	
39	LED+	Power for LED backlight (Anode)	
40	LED+	Power for LED backlight (Anode)	

Note 1 : Selection of scanning mode

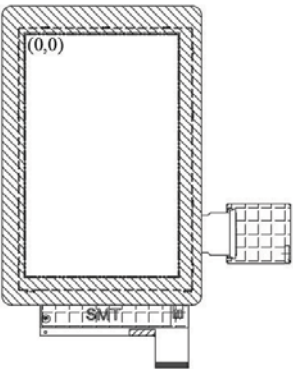
Setting of scan control input		Scanning direction
U/D (Normally pull high)	L/R (Normally pull high)	
1.8V	1.8V	Up to down , left to right(Default)
GND	GND	Down to up , right to left
1.8V	GND	Up to down , right to left
GND	1.8V	Down to up , left to right



## 9. CTP SPECIFICATIONS

### 9.1 CTP General Specifications

Composition: It's 7 inch Capacitive Touch Panel (CTP).

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Multi touch	5	Point
Interface	I <sup>2</sup> C	
(X,Y) Position		

### 9.2 Absolute Maximum Rating

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	-0.3	-	4	V	
VIO	Input I/O pin voltage	-0.3	-	VDD+0.3	V	

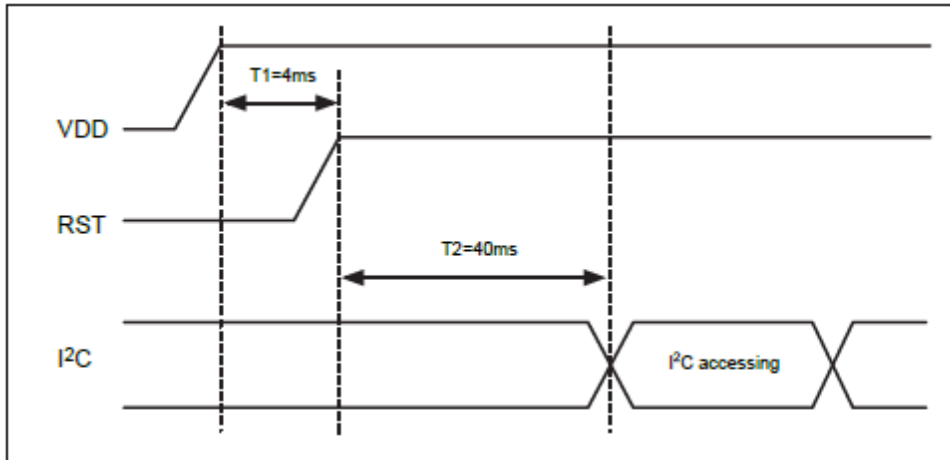
### 9.3 Electrical Characteristic

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	3.0	3.3	3.6	V	
IDD	Supply current		35	100	mA	VDD=3.3V
VIH	Input high voltage	VDD-0.8	-	-	V	
VIL	Input low voltage	-	-	0.8	V	
VOH	Output high voltage	VDD-0.4	-	-	V	
VOL	Output low voltage	-	-	0.4	V	

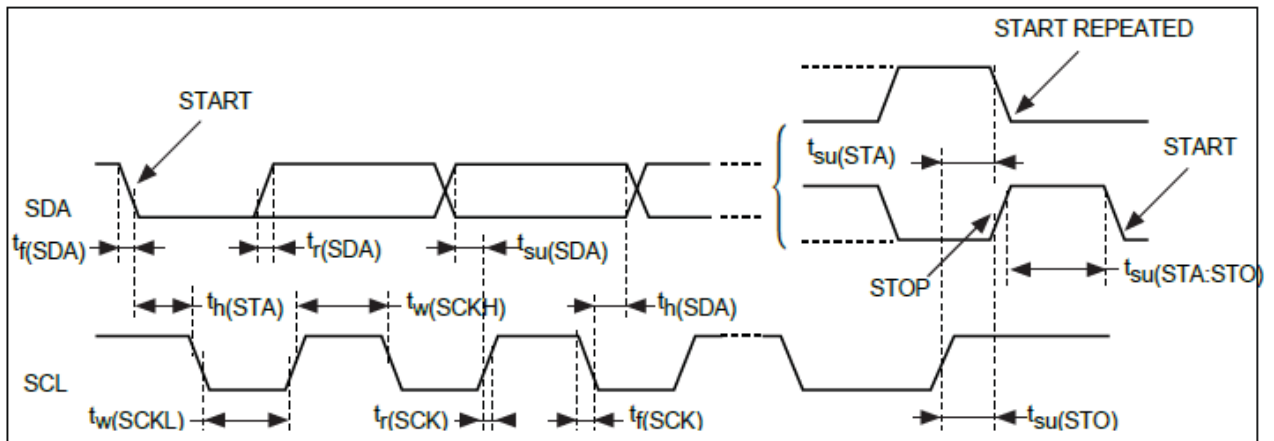
### 9.4 Pin Connections

Pin Number	Pin Name	Description
1	VDD	Power Supply voltage for CTP
2	GND	Ground
3	GND	Ground
4	RST	Reset, active low
5	INT	Interrupt output, active low
6	SCL	I <sup>2</sup> C Clock
7	GND	Ground
8	SDA	I <sup>2</sup> C Data

### 9.5 Power- on Timing Chart



### 9.6 I<sup>2</sup>C AC Waveform

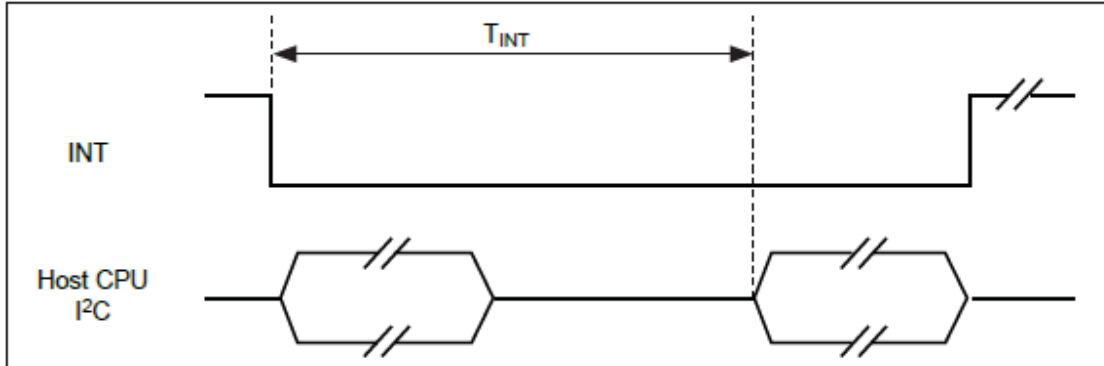


### I<sup>2</sup>C Characteristics

Symbol	Parameter	SCL = 100KHz		SCL = 400KHz		Unit
		Min	Max	Min	Max	
$t_w(SCLH)$	SCL clock high time	4.7		1.3		$\mu s$
$t_w(SCLL)$	SCL clock low time	4.0		0.6		
$t_{su}(SDA)$	SDA setup time	250		100		ns
$t_h(SDA)$	SDA data hold time	0		0	900	
$t_r(SDA)$ $t_r(SCL)$	SDA and SCL rise time		1000		300	
$t_f(SDA)$ $t_f(SCL)$	SDA and SCL fall time		300		300	$\mu s$
$t_h(STA)$	Start condition hold time	4.0		0.6		
$t_{su}(STA)$	Repeated Start condition setup time	4.7		0.6		$\mu s$
$t_{su}(STO)$	Stop condition setup time	4.0		0.6		$\mu s$
$t_w(STO:STA)$	Stop to Start condition time (bus free)	4.7		1.3		$\mu s$

### 9.7 Software Protocol

I<sup>2</sup>C Transaction Frame: each I<sup>2</sup>C transaction frame transfers one I<sup>2</sup>C packet data. The INT pin is low level trigger. The controller will pull INT pin low until no data in the controller buffer.



Report rate =  $1 / T_{INT}$ , it depends on properties of touch screen such as resistive value, I<sup>2</sup>C clock rate, channel number, thickness and material of cover lens, etc.

For better touch performance, we strongly recommend using the 400K clock rate.

	From Host to Device
	From Device to Host

S= START condition  
 Sr= Repeat START condition  
 P= STOP condition  
 R= Data direction READ (SDA HIGH)  
 W= Data direction WRITE (SDA LOW)  
 Ack= Acknowledge (SDA LOW)  
 Nak= Not acknowledge (SDA HIGH)  
 Address= 7-bit (0x2A)  
 DATA= 8-bit

**Read mode :** Host-receiver, Device-transmitter.

S	Address	R	Ack	Len-LSB	Ack	Len-MSB	Ack	DATA	Ack
	DATA	Ack				DATA	Nak	P	

Host need to read 66 Bytes for input report retrieval. The total 66 Bytes contains 2 Bytes "Length" and 64 Bytes data payload. The value of "Len" is calculated by 2 Bytes for "Len" field and n Bytes for valid "Input Data" in the payload.

The input data packet format inside the I<sup>2</sup>C payload is defined as

Report ID	Data
-----------	------



According to different report ID, there are different data format as below.

Report ID = 6, for parallel mode multi-touch data.

**Multi-Touch format :**

Byte0	Byte1								
Report ID = 0x06	Num Of Fingers*								
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9	Byte10	Byte11
Contact data 1									
Byte12	Byte13	Byte14	Byte15	Byte16	Byte17	Byte18	Byte19	Byte20	Byte21
Contact data 2									
Byte22	Byte23	Byte24	Byte25	Byte26	Byte27	Byte28	Byte29	Byte30	Byte31
Contact data 3									
Byte32	Byte33	Byte34	Byte35	Byte36	Byte37	Byte38	Byte39	Byte40	Byte41
Contact data 4									
Byte42	Byte43	Byte44	Byte45	Byte46	Byte47	Byte48	Byte49	Byte50	Byte51
Contact data 5									
Byte52	Byte53	Byte54	Byte55						
Scan Time									

\* The device input report contains maximum 5 contacts in one I<sup>2</sup>C frame. If it must report 10 contacts, device will break these down into 2 I<sup>2</sup>C frames that report 5 contacts each. The "Nums of Fingers" indicates the actual contact in this report. The actual contact number is reported in the first frame. The other frames should have an actual count of 0. For 10 contacts example, the actual count in the first frame has a value of 10, and the second frame has an actual count of 0.

**Contact data format :**


Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
State**	Finger ID	X *** (LSB)	X (MSB)	Y *** (LSB)	Y (MSB)	reserved		reserved	

\* State: Bit0=Down/Up bit, Bit0 = 1 for Touch Down, Bit0 = 0 for Lift off.

\*\* The X/Y resolution is 4096.


Report ID = 3, for vendor specific diagnostics data.

**Diagnostics packet format :**

Byte0	Byte1	
Report ID = 0x03	Length	data stream

The “Length” indicates the length of the coming data stream. This data stream must follow DI diagnostics format. The software integrator must be carefully handling this data stream.


**Write mode :** Host-transmitter, Device-receiver.

S	Address	W	Ack	0x67	Ack	0x00	Ack	
	Len-LSB	Ack	Len-MSB	Ack	DATA	Ack	DATA	Ack
	DATA	Ack		DATA	Ack	P		

Host need to write 2 Bytes [0x67] [0x00] to device first, and follow 2 Bytes length field and data payload. Each I<sup>2</sup>C transaction always contains 64 Bytes data payload so the length field should be always as 66 Bytes (2 Bytes for “Len”+64 Bytes for “Data” payload).If the data to be sent to the controller is less than 64 Bytes, 0 padding is necessary.

The packet format in the payload is defined as diagnostics packet.

**Diagnostics packet format :**

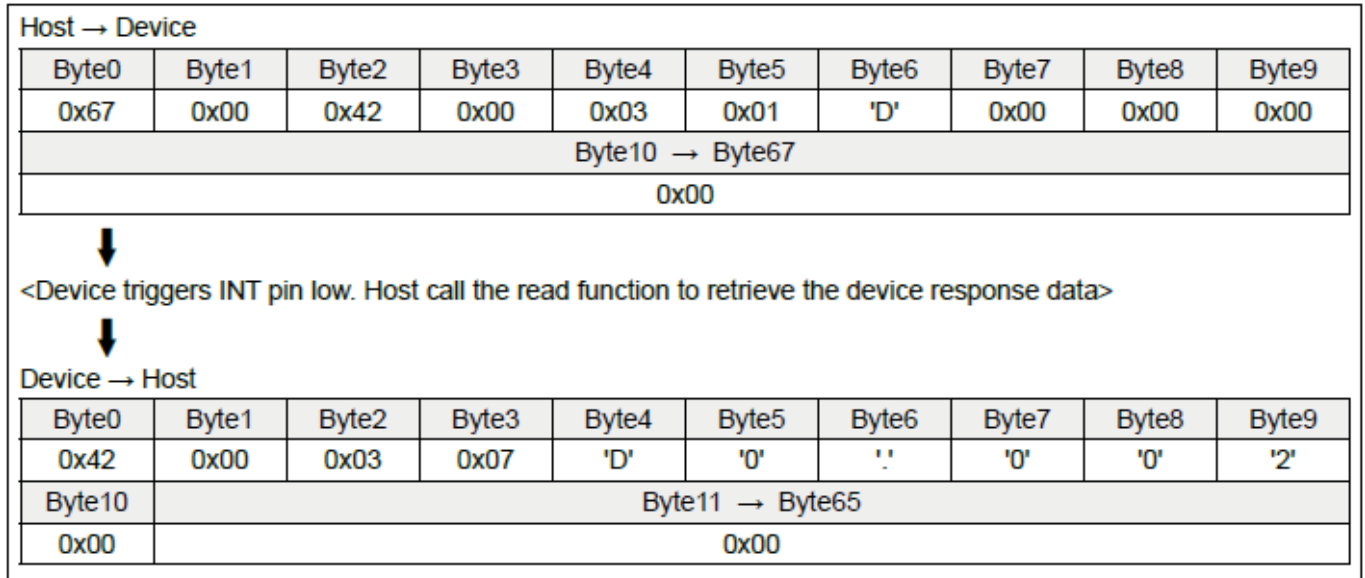
Byte0	Byte1	
Report ID = 0x03	Length	data stream

The “Length” indicates the length of the coming data stream. This data stream must follow DI diagnostics format.

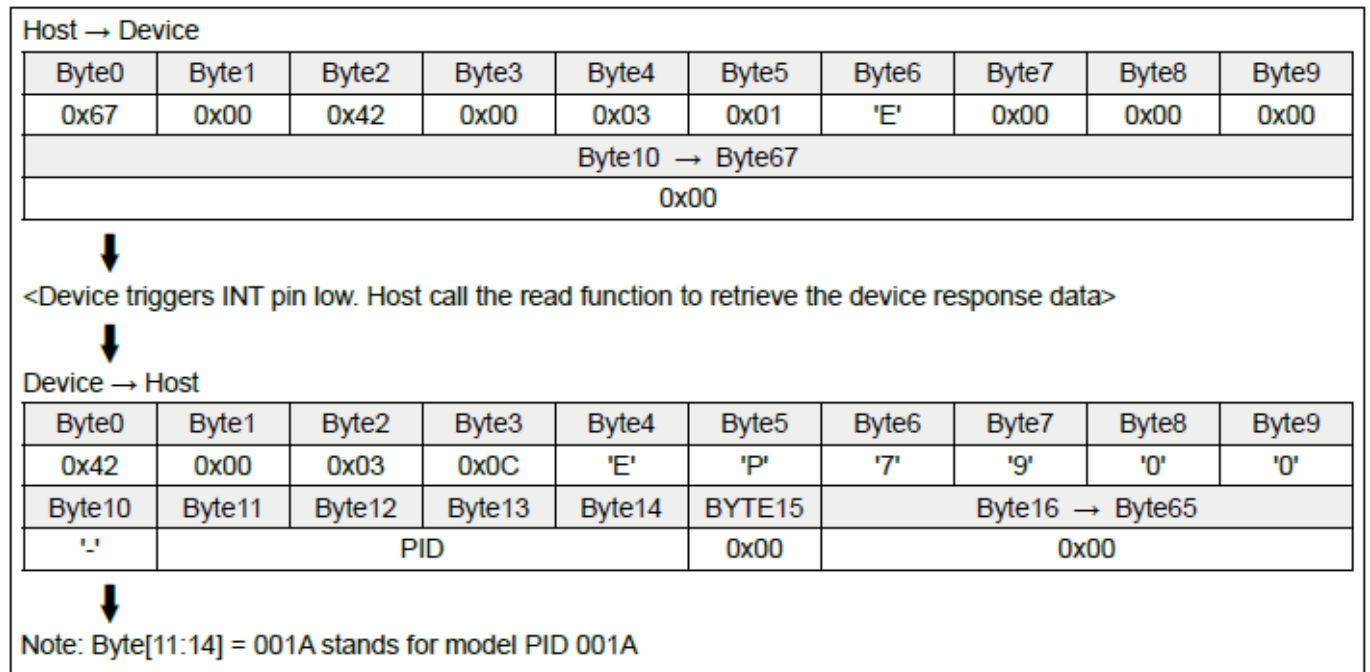
The software integrator must be carefully handling this data stream.

## 9.8 Command Example

### Query firmware version



### Query controller model name



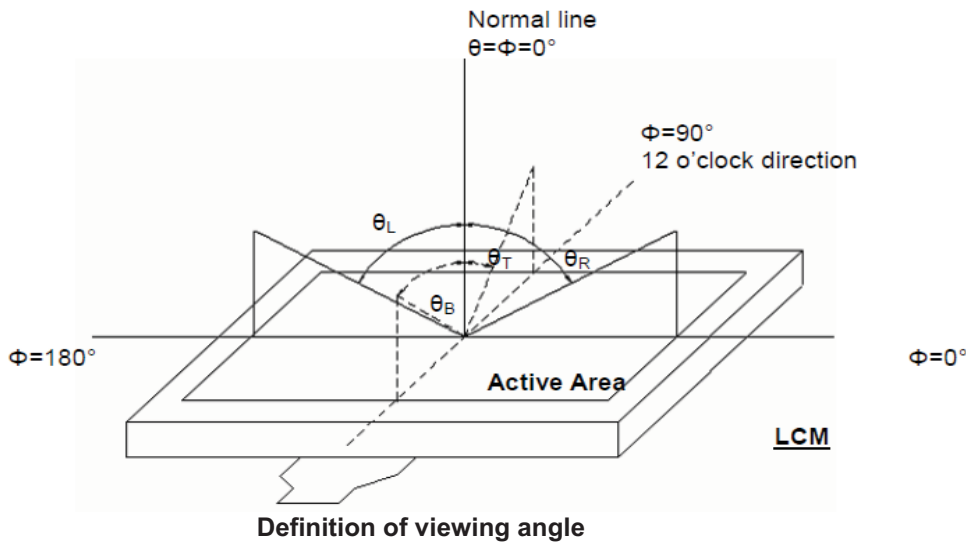
## 10. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Contrast Ratio		CR	at optimized viewing angle	600	800	-		Note 4
Brightness		L	$\theta_x=\theta_y=0^\circ$	800	1000	-	cd/m <sup>2</sup>	Note 7
Uniformity		YU	$\theta_x=\theta_y=0^\circ$	70	-	-	%	Note6
Response time		Ton+Toff	Center $\theta_x=\theta_y=0^\circ$	-	25	35	ms	Note 3
Viewing Angle	Horizontal	$\theta_L$	Center CR $\geq$ 10	80	85	-		Note 1
		$\theta_R$		80	85	-		
	Vertical	$\theta_T$		80	85	-		
		$\theta_B$		80	85	-		
Chromaticity		Wx	Center $\theta_x=\theta_y=0^\circ$	Typ -0.05	0.306	Typ +0.05		Note 5,
		Wy			0.340			
		Rx			0.647			
		Ry			0.331			
		Gx			0.306			
		Gy			0.556			
		Bx			0.153			
		By			0.078			

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance  $\leq 1$  lux, and at room temperature).

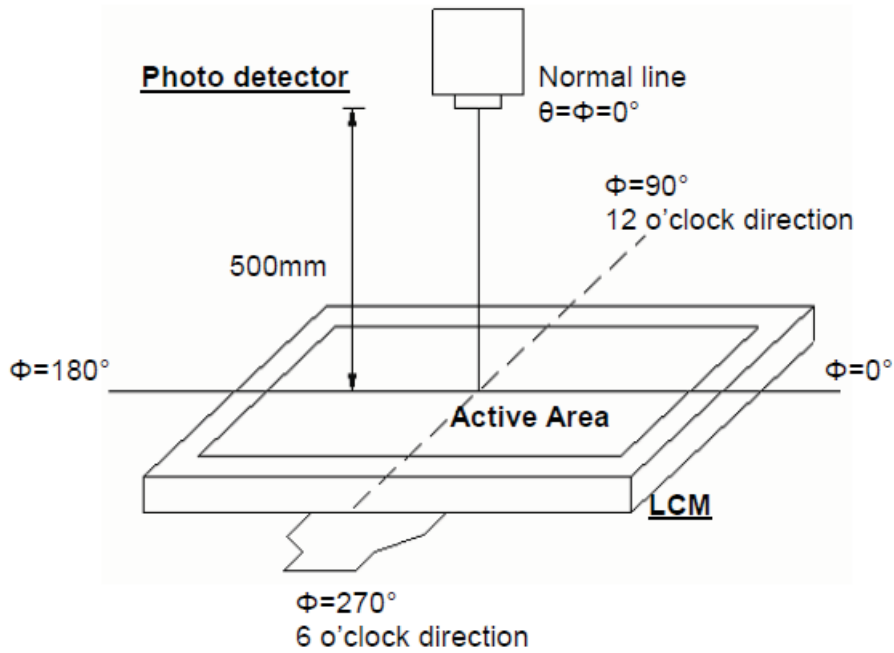
The operation temperature is  $25^\circ\text{C}\pm 2^\circ\text{C}$  and LED Backlight Current  $I_F=180\text{mA}$ .

Note 1: Definition of viewing angle range



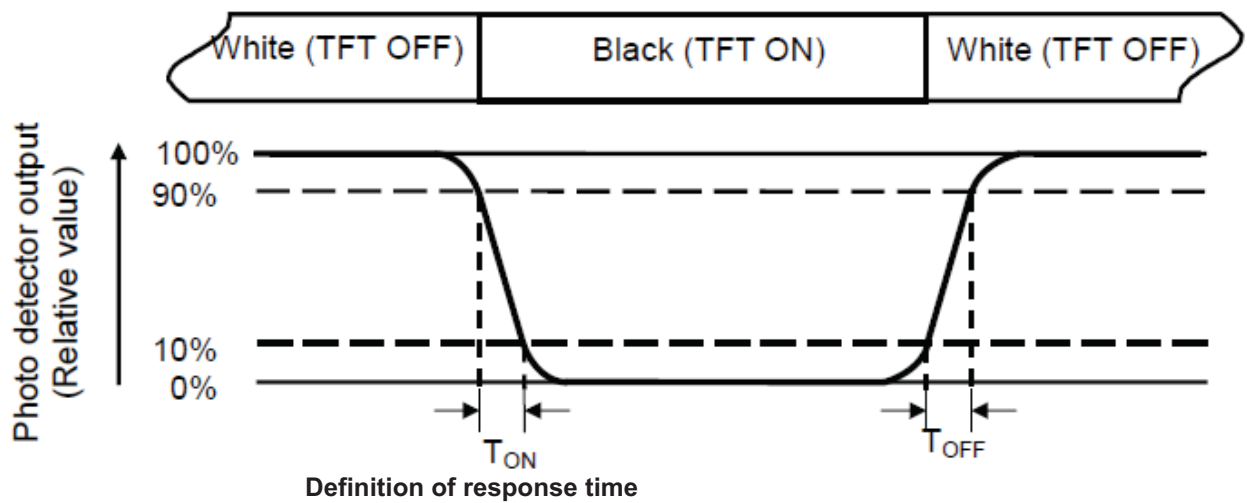
Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 2 minutes operation. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, other items are measured by BM-7A/ Field of view: 1° /Height: 500mm.)



Optical measurement system setup

Note 3: Definition of Response time



Note 4: Definition of contrast ratio

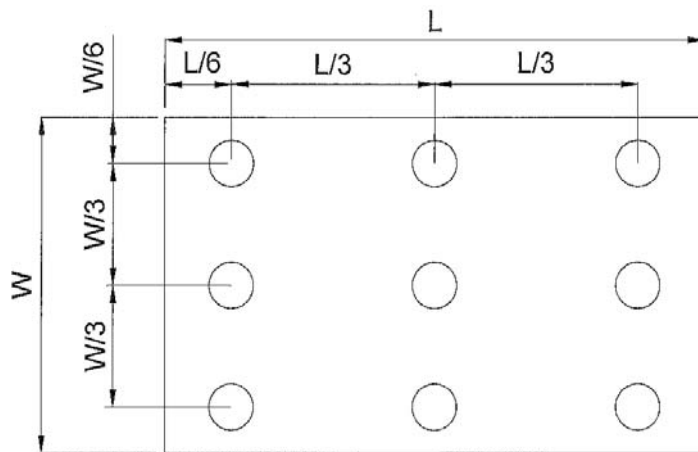
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)  
Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity  
Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L-----Active area length      W----- Active area width



Note7: Measured at the center area of the panel and at the viewing angle of  $\theta=\phi=0^\circ$

## 11. APPEARANCE SPECIFICATION

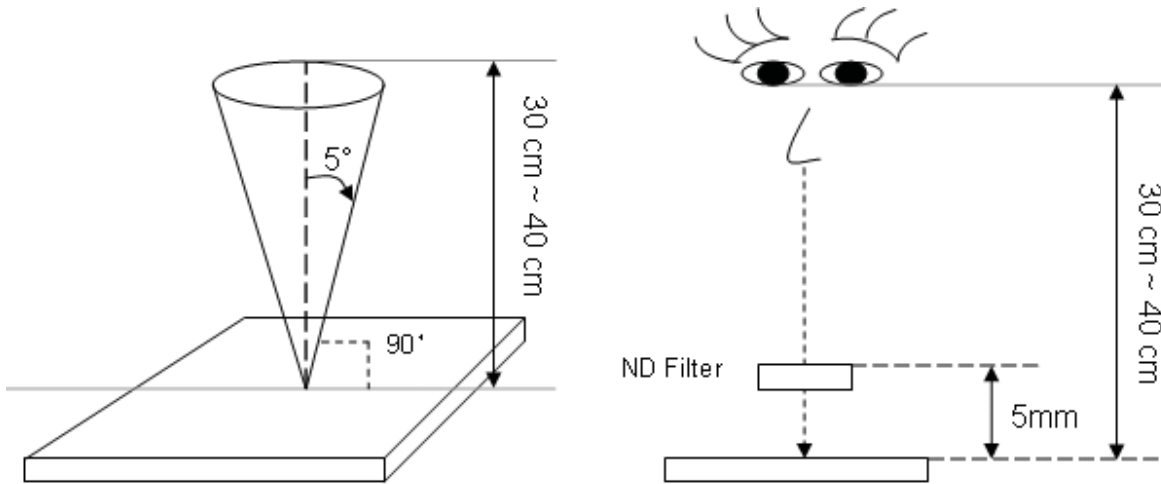
### 11.1 Inspection conditions

11.1.1.1 Inspection Distance :  $35 \pm 5$  cm

11.1.1.2 View Angle :

(1) Inspection that light pervious to the product:  $\pm 5^\circ$

(2) Inspection that light reflects on the product:  $\pm 45^\circ$

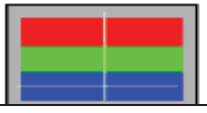


11.1.1.3 Environment conditions :

Ambient Temperature :	$25 \pm 5^\circ\text{C}$
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux


### 11.2 Inspection Parameters

Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness, n: number)


Inspection item	Inspection standard	Description
No image	Prohibited	
Image abnormal	Prohibited	
Bright line	Prohibited	
Mura	It is acceptable that the defect can not be seen with 2% ND filter.	

Dot	Item	Acceptable Visible area	Total
	Bright dot	3	
Dark dot	5		
Bright adjacent dots	1	1	
Dark adjacent dots	2	2	
Adjacent dots with a bright dot and a dark dot	2	2	

One Dot

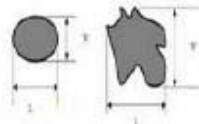


Two adjacent dot



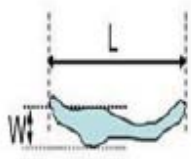
Foreign material in dot shape	SPEC (unit: mm)	Acceptable
	$D \leq 0.5$	Ignored
	$0.5 < D \leq 0.8$ , distance $> 5$	$n \leq 5$
	$D > 0.8$	0



$D = (L + W) / 2$

Foreign material in line shape	SPEC(unit: mm)	Acceptable
	$W \leq 0.05$ and $L \leq 10$	Ignored
	$0.05 < W \leq 0.1$ , $L \leq 10$ , distance $> 5$	$n \leq 5$
	$W > 0.1$ or $L > 10$	0



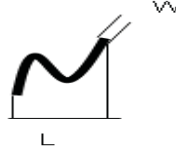
$L$  : Long  $W$  : Width

Contamination	It is acceptable if the dirt can be wiped.	
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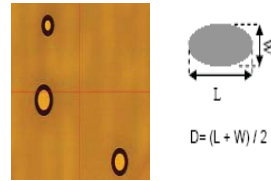
  

Inspection item	Inspection standard	Description
Scratch	SPEC(unit: mm)	Acceptable
	$W \leq 0.05$ and $L \leq 10$	Ignored
	$0.05 < W \leq 0.08$ , $L \leq 10$ , distance $> 5$	$n \leq 5$
	$0.08 < W \leq 0.1$ , $L \leq 10$ , distance $> 5$	$n \leq 3$
	$W > 0.1$ or $L > 10$	0



Bubble	SPEC (unit: mm)	Acceptable
	$D \leq 0.3$	Ignored
	Non visible area	Ignored
	$0.3 < D \leq 0.5$ , distance $> 5$	$n \leq 5$
	$D > 0.5$	0

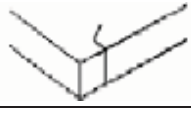
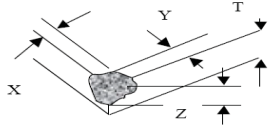
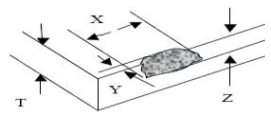


$D = (L + W) / 2$

Insufficient glue	SPEC (unit: mm)	Acceptable
	Non visible area	Ignored
	Visible area	0



Cover & Sensor Crack	Prohibited		
Sensor angle missing & edge break	SPEC (unit: mm)	Acceptable	
	Damage circuit or effect function	0	
Cover/Sensor angle missing	SPEC (unit: mm)	Acceptable	
	$X \leq 3.0, Y \leq 3.0, Z \leq T$	Ignored	
	$X > 3.0, Y > 3.0, Z > T$	0	
Cover/Sensor edge break	SPEC (unit: mm)	Acceptable	
	$X \leq 3.0, Y \leq 3.0, Z \leq T$	Ignored	
	$X > 3.0, Y > 3.0, Z > T$	0	
Ink	SPEC (unit: mm)	Acceptable	
	word unclear, inverted, mistake, break line	0	
Bubble under protection film	SPEC (unit: mm)	Acceptable	
	NA		
Function	Prohibited		

### 11.3 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: ISO 2859

Inspection level: Level II

Class of defects	Definition		
	<b>Major</b>	AQL 0.65	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
	<b>Minor</b>	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.

## 12. QUALITY ASSURANCE

### 12.1 Test Condition

#### 12.1.1 Temperature and Humidity(Ambient Temperature)

Temperature :  $25 \pm 5^{\circ}\text{C}$

Humidity :  $65 \pm 5\%$

#### 12.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

#### 12.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

#### 12.1.4 Test Frequency

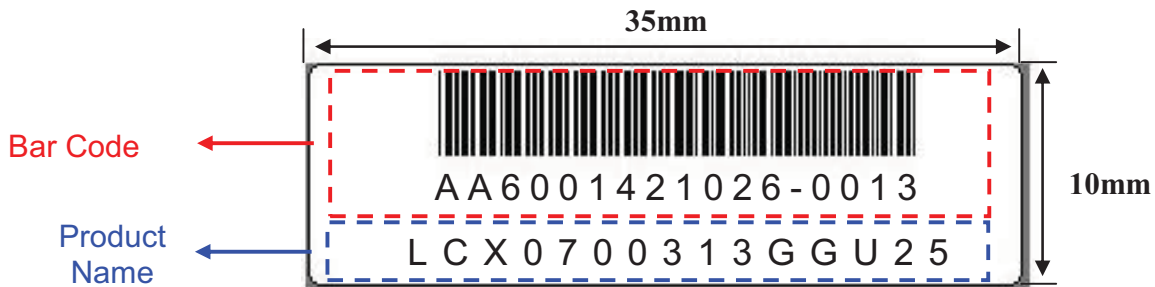
In case of related to deterioration such as shock test. It will be conducted only once.

#### 12.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1.	High Temperature Storage Test	T= 85°C, 240hrs	IEC68-2-2
2.	Low Temperature Storage Test	T= -30°C, 240hrs	IEC68-2-1
3.	High Temperature Operation Test	T= 85°C, 240hrs	IEC68-2-2
4.	Low Temperature Operation Test	T= -30°C, 240hrs	IEC68-2-1
5.	High Temperature and High Humidity Operation Test	T= 40°C,90%RH, 240hrs	IEC68-2-3
6.	ESD Test	Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 4kV Air +/-8kV Criteria: Class C	IEC61000-4-2
7.	UV Test	1000hours, Criteria : No visual degradation of materials or functionality	ISO 4892-2 Method A test

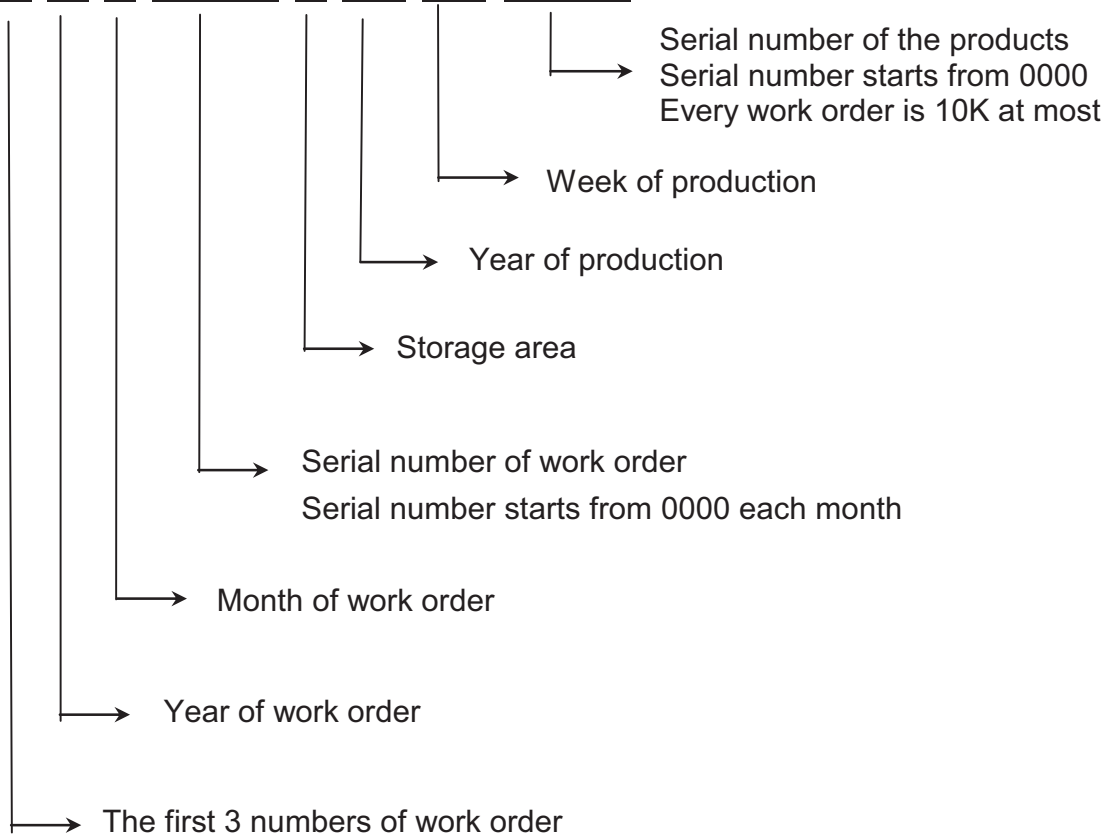
### 13. PRODUCT LABEL DEFINE

Product Label style:

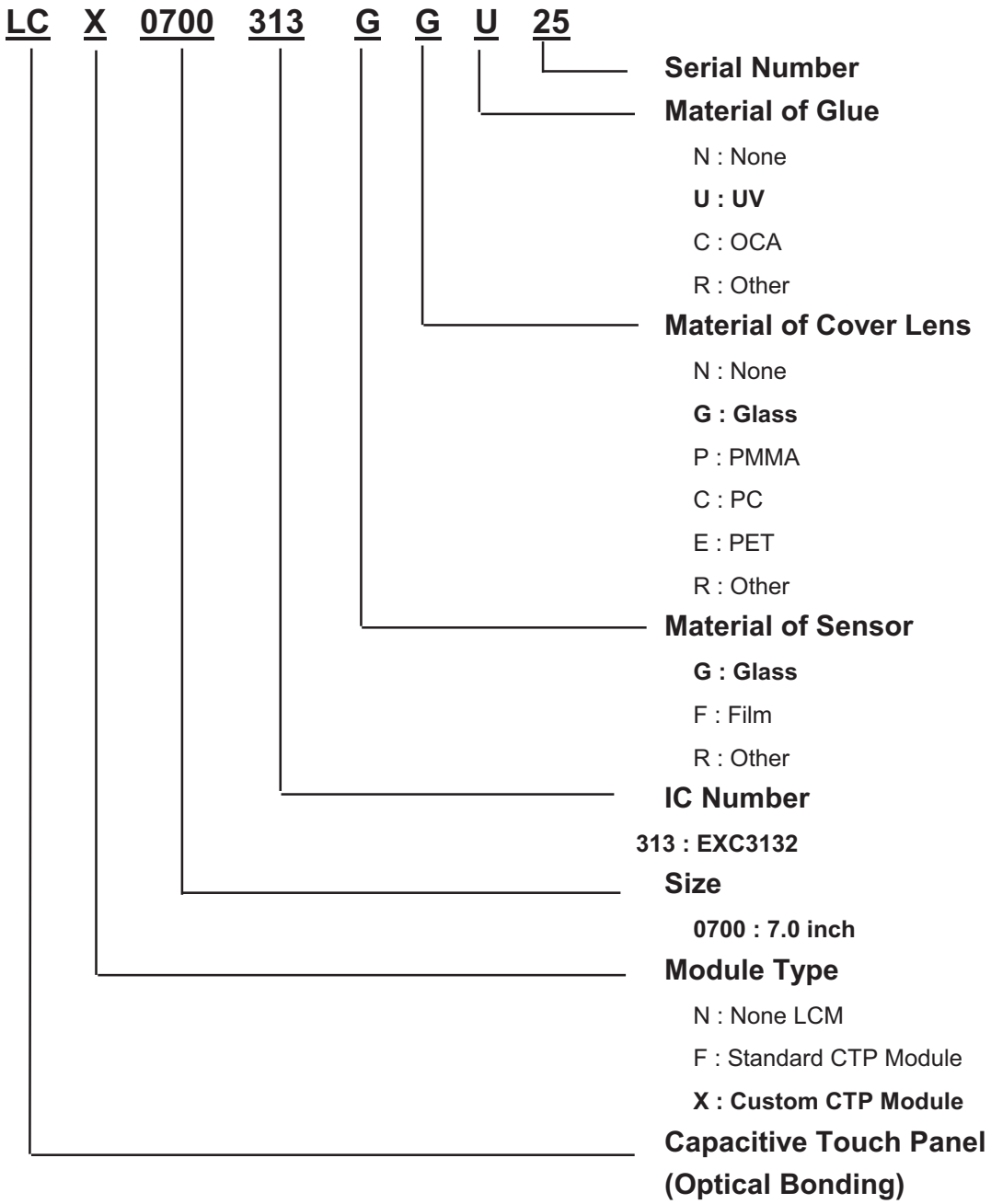


BarCode Define:

**A A 6 0014 2 10 26-0013**



**Product Name Define:**



## 14. PRECAUTIONS IN USE LCM

### 1. ASSEMBLY PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5) Do not open the case because inside circuits do not have sufficient strength.
- (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

### 2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

### 3. ELECTROSTATIC DISCHARGE CONTROL

The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.

- (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
- (3) Only properly grounded soldering irons should be used.
- (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

### 4. STORAGE PRECAUTIONS

- (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

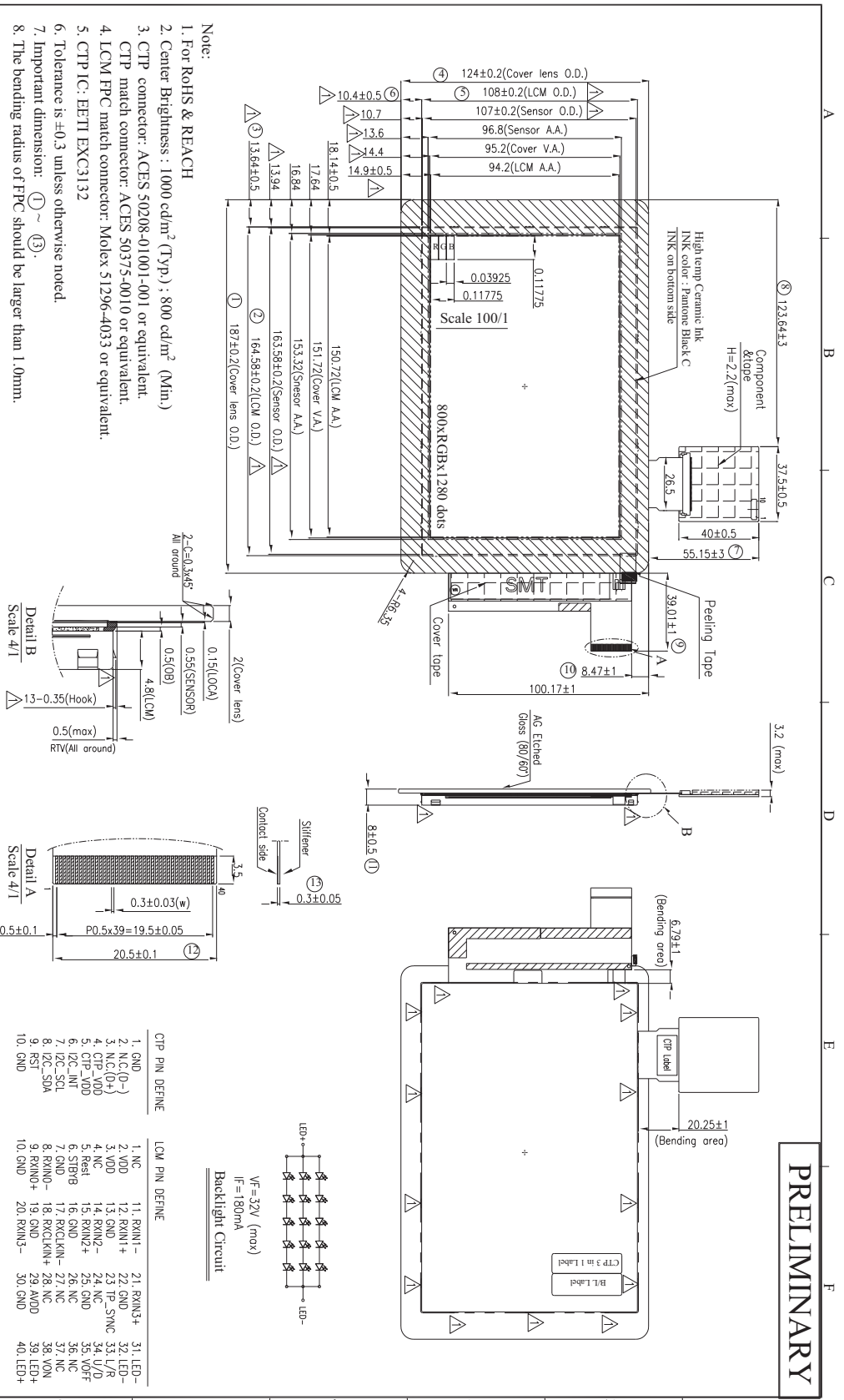
### 5. OTHERS

- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
  - a. Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
  - b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
  - c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)
- (4) Waste  
Liquid crystal module products shall not be arbitrarily discarded; the water and soil have a negative impact on the environment, the need to be handled by a qualified unit.

### 6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

Confidential Document  
**15. OUTLINE DRAWING**



Note:

1. For RoHS & REACH
2. Center Brightness : 1000 cd/m<sup>2</sup> (Typ.) ; 800 cd/m<sup>2</sup> (Min.)
3. CTP connector: ACES 50208-01001-001 or equivalent.
4. LCM match connector: ACES 50375-0010 or equivalent.
5. LCM FPC match connector: Molex 51296-4033 or equivalent.
6. CTP IC: BEHT EXC3132
7. Tolerance is ±0.3 unless otherwise noted.
8. Important dimension: ① ~ ⑩.
9. The bending radius of FPC should be larger than 1.0mm.

REVISIONS	DESCRIPTION	DATE	APPROVED
△	Change LCM & Sensor outline and baseline for manufacture & Add B/L hook.	<ES90511024> 2017/01/04	
AUTH			

DATE:	2016/11/29
DRAWN:	
CHECK:	
APPROVE:	

**TITLE:**  
**CTP Module Outline Dimension**

DWG. NO.	LCX0700313GGU25
UNITS	MM
SCALE	1/1

REV.	REV.
2	

SHEET 1 OF 1

CTP PIN DEFINE	LCM PIN DEFINE
1. GND	11. RINI+
2. N.C.(0-)	12. RINI+
3. N.C.(0+)	13. GND
4. CTP_VDD	14. RINI+
5. CTP_VDD	15. RINI+
6. I2C-ST	16. GND
7. I2C-ST	17. RINI+
8. I2C-SDA	18. RINI+
9. RST	19. RINI+
10. GND	20. RINI+
	21. RINI+
	22. GND
	23. TP_SINC
	24. NC
	25. GND
	26. NC
	27. NC
	28. VDD
	29. VDD
	30. GND
	31. LED-
	32. LED-
	33. L/R
	34. U/D
	35. VOFF
	36. NC
	37. NC
	38. VDD
	39. VDD
	40. LED+

Backlight Circuit

V<sub>F</sub> = 32V (max)  
 I<sub>F</sub> = 180mA

**PRELIMINARY**



## 16. PACKAGE INFORMATION

TBD