

Specification for Colour TFT LCD Module

12.3" Ultra-Wide Screen 16:6 aspect ratio with Capacitive Touch Panel

Manufacturer	Data Image
Part n°	LCX1203255GGU00
Ordering n°	
Customer Part n°	
Revision n°	1
Issue Date	2015-11-09

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"> <input type="checkbox"/> Sample / Prototype <input type="checkbox"/> Pre-Series <input type="checkbox"/> Mass Production
Approval Date	

Supplied by Anders Electronics plc
Manufactured by Data Image Corporation.



DATA IMAGE CORPORATION

CTP Module Specification

ITEM NO.: LCX1203255GGU00

CUST NO: M7845A

Table of Contents

1. COVER & CONTENTS	1
2. RECORD OF REVISION	2
3. GENERAL SPECIFICATIONS	3
4. LCD ABSOLUTE MAXIMUM RATINGS.....	3
5. LCD ELECTRICAL CHARACTERISTICS	3
6. LCD TIMING CHARACTERISTICS.....	5
7. LCD BLOCK DIAGRAM	7
8. PIN CONNECTIONS	8
9. OPTICAL CHARACTERISTIC	13
10. CTP INTERFACE AND DATA FORMAT	16
11. QUALITY ASSURANCE	19
12. APPEARANCE SPECIFICATION	21
13. PRODUCT LABEL DEFINE	24
14. PRECAUTIONS IN USE LCM	25
15. OUTLINE DRAWING	26
16. PACKAGE INFORMATION	27

Customer Companies	QA Approval	QA Check	R&D Approval	R&D Check
	<i>pretty</i>	<i>Seven</i>	<i>Jack</i>	<i>Terry</i>
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	1	09/NOV/15'		27



2. RECORD OF REVISION

Rev	Date	Item	Page	Comment	Source
1	09/NOV/15'			Initial PRELIMINARY	ESR0410009

3. GENERAL SPECIFICATIONS

Composition: A touch panel module with 12.3 inches Capacitive Touch Panel (CTP).

CTP Interface: I²C

Parameter	Specifications	Unit
Display resolution	1280(H) × (RGB) × 480 (V)	dot
Screen size	12.3 (diagonal)	inch
Outline dimension	340.74(W) x 150.75(H) x20.9 Max(D)	mm
Display active area	291.84(H) x 109.44(V)	mm
Sensor active area	293.84(W) x 111.44(D)	mm
Pixel pitch	0.228 (H) x 0.228 (V)	mm
Color configuration	RGB Vertical stripe	
Surface treatment	AG coating	
LCM number	FG120300DSSWJG01	
LCD type	Normally black	
View angle direction	All	
Our components and processes are compliant to RoHS & REACH standard		

4. LCD ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter	Symbol	Min.	Max.	Unit	Remark
Power supply voltage	VDD	-0.3	+4.0	V	
Input Voltage of Logic	VI	-0.3	VDD+0.3	V	Note 1
Operating Temperature	Top	-20	70	°C	Note 2
Storage Temperature	Tst	-30	80	°C	Note 2
Backlight Input Voltage	VLED	-	15	V	

Note 1: The rating is defined for the signal voltages of the interface such as CLK and pixel data pairs.

Note 2: The maximum rating is defined as above based on the chamber temperature, which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Background color, contrast and response time would be different in temperatures other than 25°C.
- Operating under high temperature will shorten LED lifetime > 25°C.

Note 3: Do not operate at or near the maximum rating listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

5. LCD ELECTRICAL CHARACTERISTICS

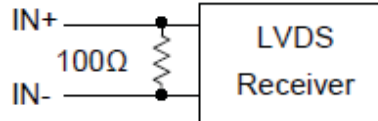
5.1 TFT-LCD Operating Conditions

Ta=25°C , VSS=0V

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	-	3.0	3.3	3.6	V	-
Differential Input Voltage for LVDS Receiver Threshold	VI	VIH	-	-	+100	mv	Note 1
		VIL	-100	-	-		
Power Supply Current	IDD	VDD-VSS =3.3V	-	520	620	mA	Note 2,3
Frame Frequency	fv	-	55	60	65	Hz	
DCLK Frequency	fCLK	-	39.6	43.2	46.8	MHz	

Note 1: $V_{CM}=+1.2V$

V_{CM} is common mode voltage of LVDS transmitter/receiver.
The input terminal of LVDS transmitter is terminated with 100Ω .



Note 2: An all white check pattern is used when measuring I_{DD} , f_v is set to 60Hz.

Note 3; 1.0A fuse is applied in the module for I_{DD} . For display activation and protection purpose, power supply is recommended larger than 2.5A to start the display and break fuse once any short circuit occurred.

5.2 Backlight Characteristics

$T_a=25^\circ C$

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
LED Input Voltage	VLED	-	11.5	12	12.5	V	Note 1
LED Forward Current (Dim Control)	ILED	0V ; 0% duty	650	680	710	mA	Note 2
		3.3VDC; 100% duty	10	20	30		
LED lifetime	-	680 mA	-	70000	-	Hrs	Note 3

Note 1: As Fig. 5.1 shown, LED current is constant, 680mA, controlled by the LED driver when applying 12V VLED.

Note 2: Dimming function can be obtained by applying DC voltage or PWM signal from the display interface CN1. The recommended PWM signal is 1K ~ 10K Hz with 3.3V amplitude..

Note 3: The estimated lifetime is specified as the time to reduce 50% brightness by applying 680mA at 25°C.

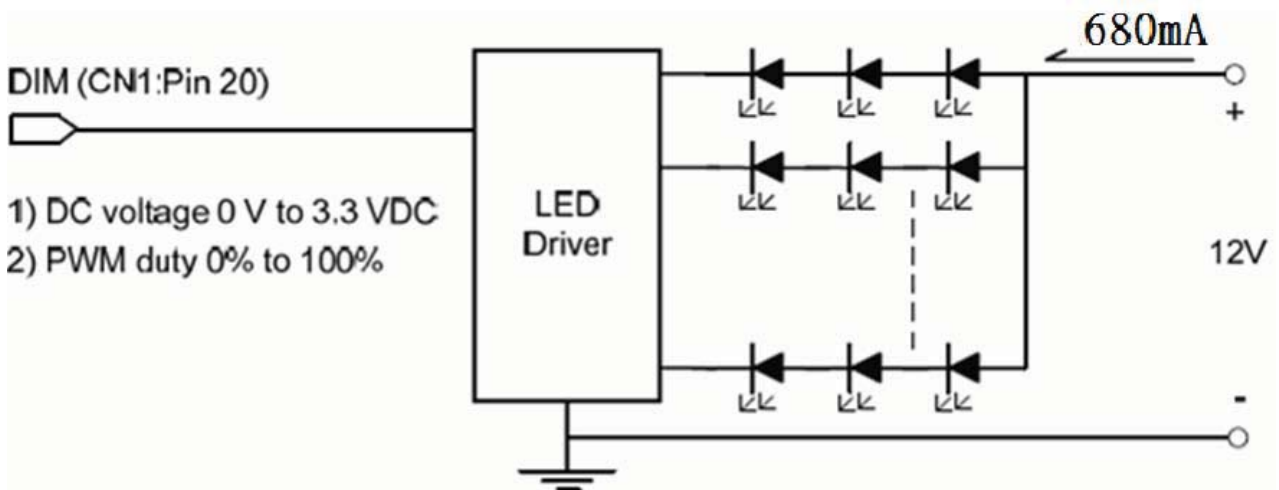


Fig 5.1

6. LCD TIMING CHARACTERISTICS

The column of timing sets including minimum, typical, and maximum as below are based on the best optical performance, frame frequency (Vsync) = 60 Hz to define. If 60 Hz is not the aim to set, less than 66 Hz for Vsync is recommended to apply for better performance by other parameter combination as the definitions in section 5.1

A. Horizontal and Vertical Timing

Item		Symbol	Min.	Typ.	Max.	Unit
CLK	CLK frequency	fCLK	39.6	43.2	48	MHz
Horizontal	Display Data	thd	1280	1280	1280	CLK
	Cycle Time	th	1320	1360	1400	CLK
Vertical	Display Data	tvd	480	480	480	H
	Cycle Time	tv	500	530	555	H

B. Setup and Hold Time

Item		Symbol	Min.	Typ.	Max.	Unit
CLK	Duty	Tcwh	40	50	60	%
	Cycle Time	Tcph	18.5	23	--	ns
Data	Setup Time	Tdsu	8	--	--	ns
	Hold Time	Tdhd	8	--	--	ns
DE	Setup Time	Tesu	8	--	--	ns
	Hold Time	Tehd	8	--	--	ns

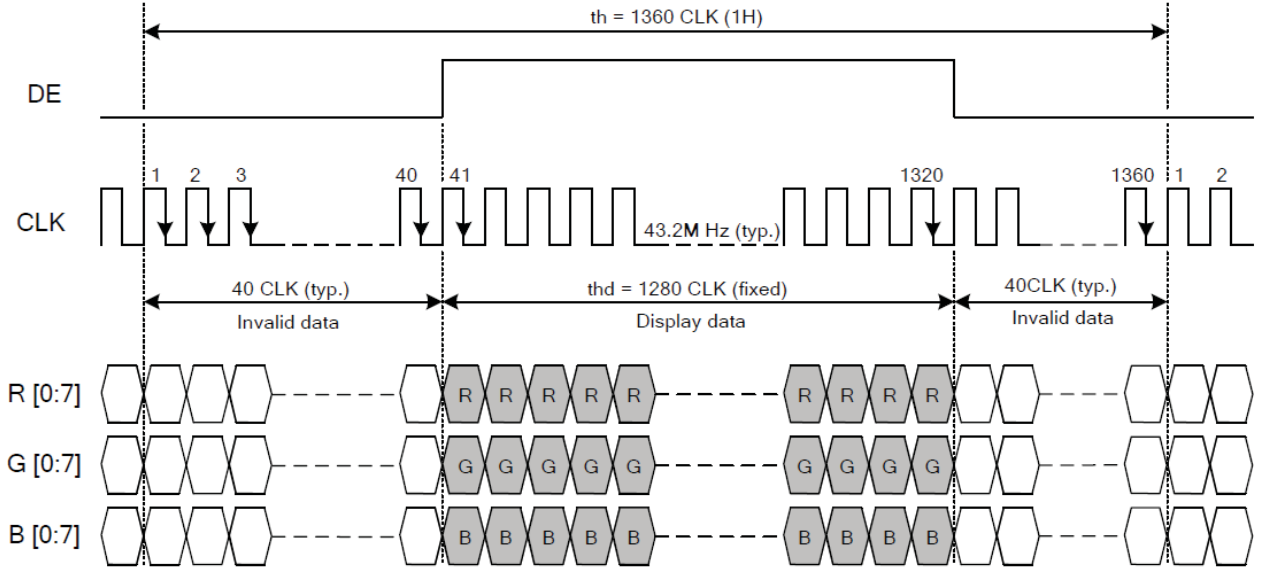


Fig. 1.1 Horizontal Timing

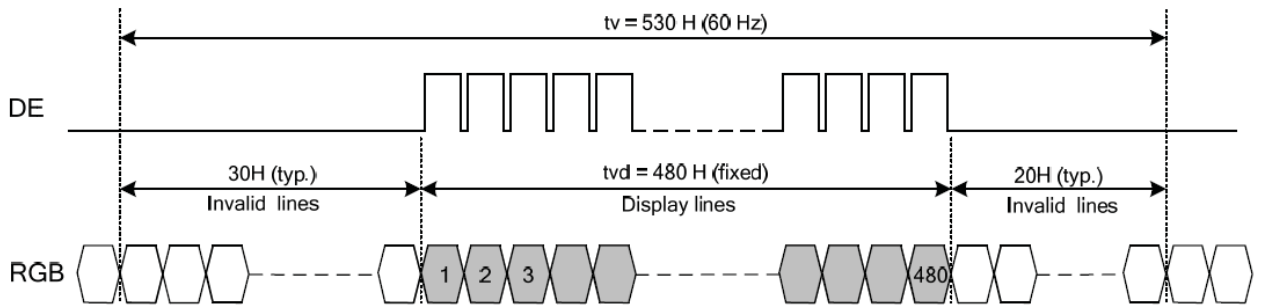


Fig. 6.2 Vertical Timing

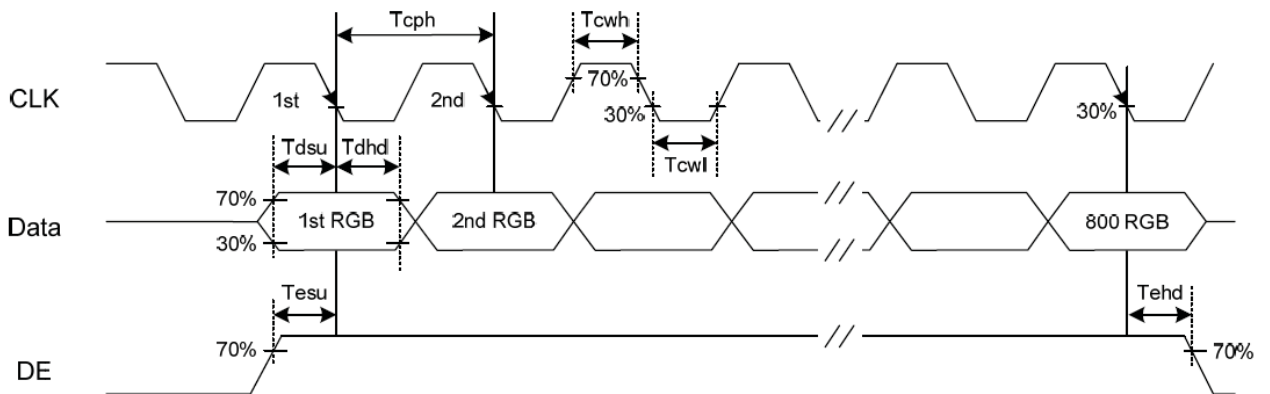
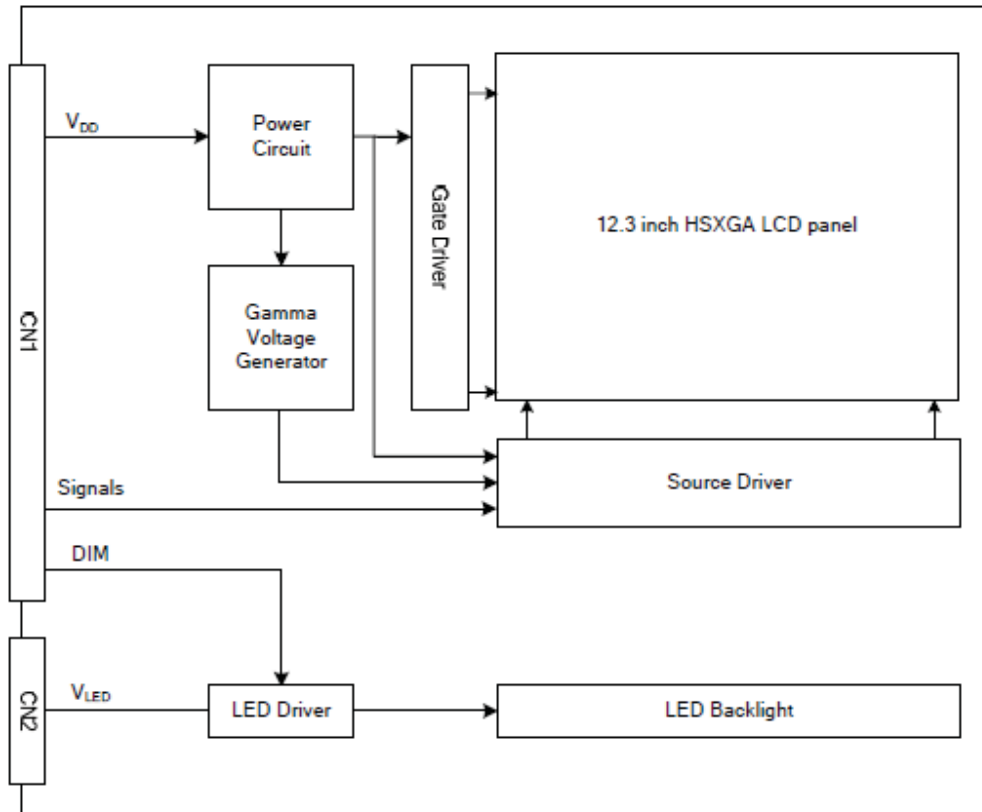


Fig. 6.3 Setup & Hold Time

7. LCD BLOCK DIAGRAM



Note : Signals are CLK and pixel data pairs.

8. PIN CONNECTIONS

8.1 CN1 Pin Function

The display interface connector (CN1) is FI-SEB20P-HF13E made by JAE and pin assignment is as below:

Pin NO.	SYMBOL	SIGNAL
1	VDD	Power Supply for Logic
2	VDD	Power Supply for Logic
3	VSS	GND
4	VSS	GND
5	IN0-	R2~R7, G2
6	IN0+	
7	VSS	GND
8	IN1-	G3~G7, B2~B3
9	IN1+	
10	VSS	GND
11	IN2-	B4~B7, DE
12	IN2+	
13	VSS	GND
14	CLK IN-	Pixel Clock
15	CLK IN+	
16	VSS	GND
17	IN3-	R0~R1 , G0~G1 , B0~B1
18	IN3+	
19	SD	Scan Direction Control (Note1)
20	DIM	Brightness dimming(Note3)

Note1: Scan direction is available to be switched as below.



SD : Low or Open (Default)



SD : High

Note 2: INn- and INn+ (n=0,1,2,3), CLK IN- and CLK IN+ should be wired by twist-pairs or side-by-side FPC patterns, respectively.

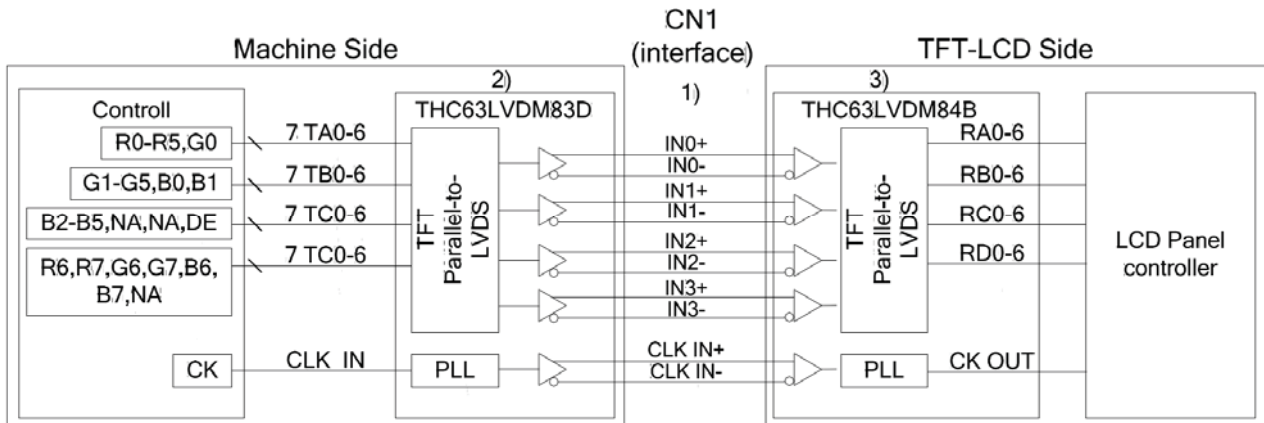
Note 3: Normal brightness: 0V or 100% PWM duty ; Brightness control: 0V to 3.3V DC or 0% to 100% PWM duty.

8.2 CN2 Pin Function

The backlight connector (CN2) is SM02(8.0)B-BHS-1-TB made by JST, and pin assignment is as below:

Pin NO.	SYMBOL	DESCRIPTION
1	VLED	Power Supply for LED
2	GND	GND

8.3 LVDS Interface

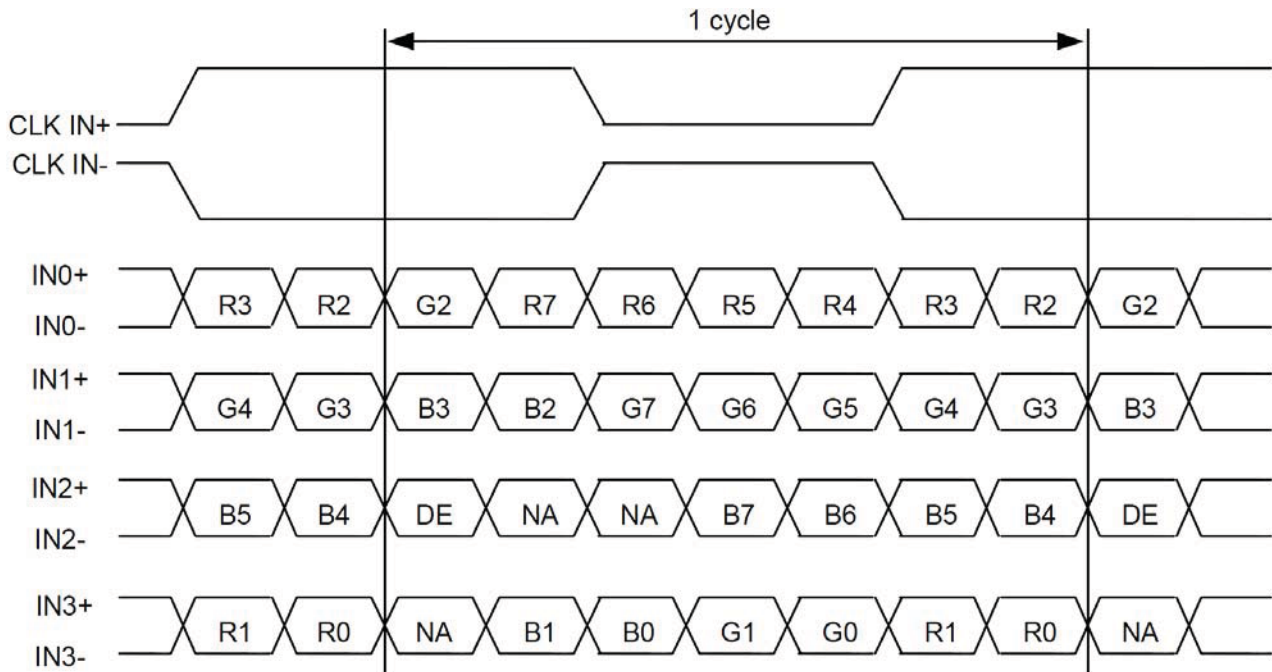


Note 1: LVDS cable impedance should be 100 ohms per signal line when each 2-lines (+,-) is used in differential mode.

Note 2: The recommended transmitter, THC63LVDM83R, is made by Thine or equivalent, which is not contained in the module.

Note 3: The receiver built-in the module is THC63LVDM84B.

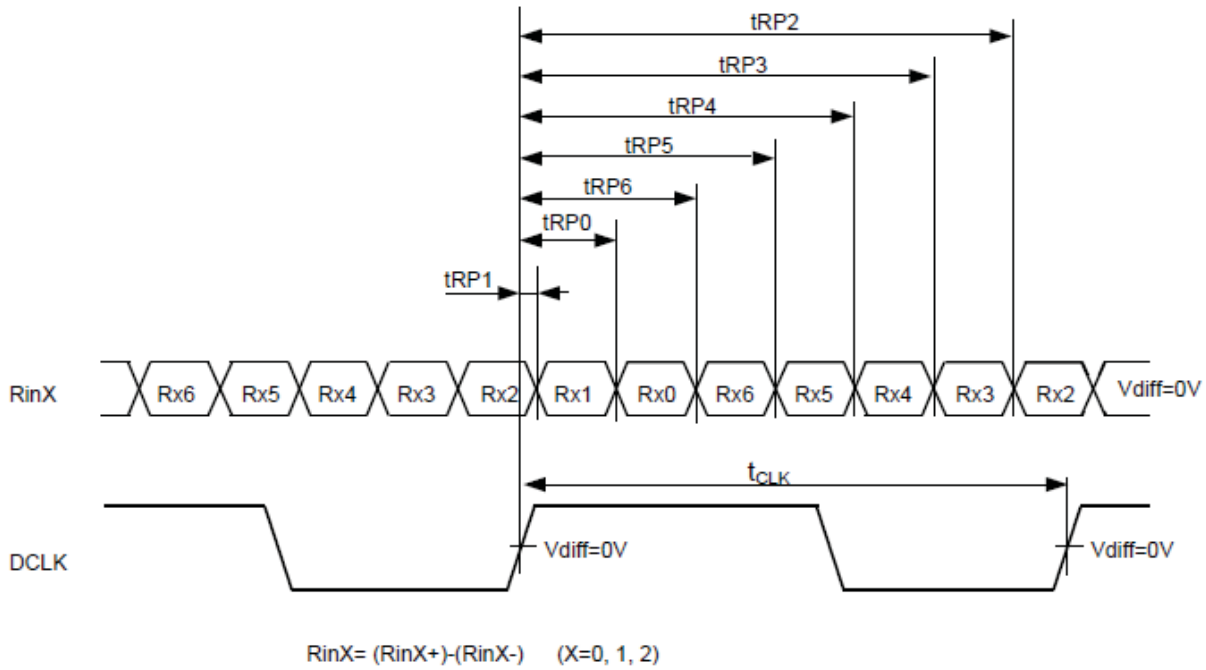
8.4 LVDS Data Format



DE: Display Enable

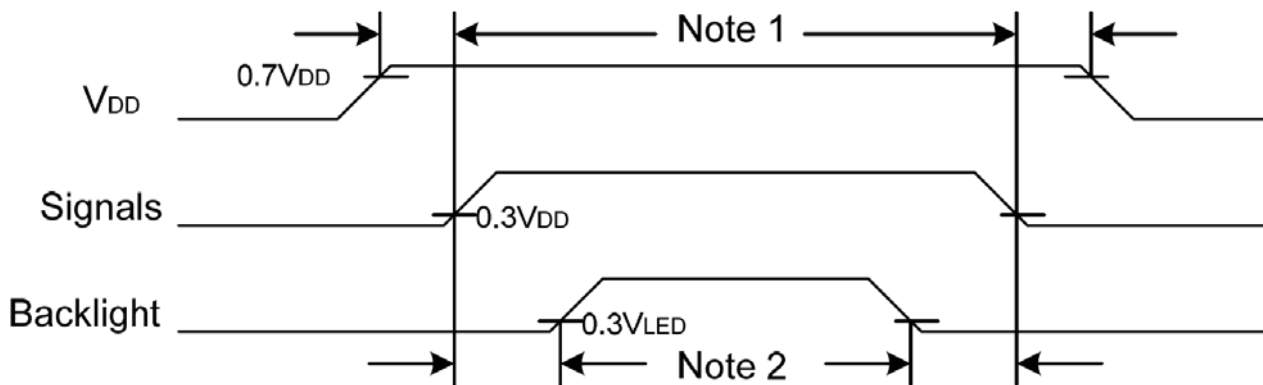
NA: Not Available

8.5 LVDS Timing



Parameter		Symbol	Min.	Typ.	Max.	Unit
DCLK	Frequency	$1/t_{CLK}$	39.6	43.2	48	MHz
RinX (X=0,1,2,3)	0 data position	tRP0	$1/7 * t_{CLK} - 0.4$	$1/7 * t_{CLK}$	$1/7 * t_{CLK} + 0.4$	ns
	1st data position	tRP1	-0.4	0	+0.4	
	2nd data position	tRP2	$6/7 * t_{CLK} - 0.4$	$6/7 * t_{CLK}$	$6/7 * t_{CLK} + 0.4$	
	3rd data position	tRP3	$5/7 * t_{CLK} - 0.4$	$5/7 * t_{CLK}$	$5/7 * t_{CLK} + 0.4$	
	4th data position	tRP4	$4/7 * t_{CLK} - 0.4$	$4/7 * t_{CLK}$	$4/7 * t_{CLK} + 0.4$	
	5th data position	tRP5	$3/7 * t_{CLK} - 0.4$	$3/7 * t_{CLK}$	$3/7 * t_{CLK} + 0.4$	
	6th data position	tRP6	$2/7 * t_{CLK} - 0.4$	$2/7 * t_{CLK}$	$2/7 * t_{CLK} + 0.4$	

8.6 Power Sequence



Note 1: In order to avoid any damages, VDD has to be applied before all other signals. The opposite is true for power off where VDD has to be remained on until all other signals have been switch off.

The recommended time period is 1 second. Hot plugging might cause display damage due to incorrect power sequence, please pay attention on interface connecting before power on.

Note 2: In order to avoid showing uncompleted patterns in transient state. It is recommended that switching the backlight on is delayed for 1 second after the signals have been applied. The opposite is true for power off where the backlight has to be switched off 1 second before the signals are removed.

8.7 Color Data Input Assignment

Input		Red Data								Green Data								Blue Data															
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0								
color		MSB								LSB								MSB								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	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	0	0	0	0					
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0					
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	0	0	0	0					
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1					
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1					
Red	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	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	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	0	0	0	0						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	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	0	0	0	0						
	Red(255)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Green	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	0	0						
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	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	0	0	0	0						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	Green(253)	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	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	0	0	0							
	Green(255)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0							
Blue	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	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	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	0	0	1	0	0	0						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:						
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1							
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	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	1	1	1							

9. OPTICAL CHARACTERISTIC

The optical characteristics are measured based on the conditions as below:

- Supplying the signals and voltages defined in the section of electrical characteristics.
- The backlight unit needs to be turned on for 30 minutes.
- The ambient temperature is 25°C
- In the dark room less than 100 lx, the equipment has been set for the measurements as shown in Fig9.1

$T_a=25^{\circ}\text{C}$, $f_{\text{Frame}}=60\text{Hz}$, $V_{\text{DD}}=3.3\text{V}$

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Brightness		L	$\theta_x=\theta_y=0^{\circ}$ ILED= 680 mA	680	850	--	cd/m ²	Note 1
Uniformity		B-uni		70	80	--	%	Note 2
Contrast Ratio		CR		400	800	--	--	Note 3
Response Time (Rising + Falling)		Tr + Tf	$\theta_x=\theta_y=0^{\circ}$	--	25	35	ms	Note 4
Viewing Angle	Horizontal	θ_{x+}	Center CR \geq 10	75	85	--	deg	Note 5
		θ_{x-}		75	85	--		
	Vertical	θ_{y+}		75	85	--		
		θ_{y-}		75	85	--		
Chromaticity	Red	x_R	Center $\theta_x=\theta_y=0^{\circ}$	Typ -0.05	0.65	Typ +0.05	--	Note 6
		y_R			0.32			
	Green	x_G			0.30			
		y_G			0.61			
	Blue	x_B			0.14			
		y_B			0.10			
	White	x_w			0.29			
		y_w			0.31			

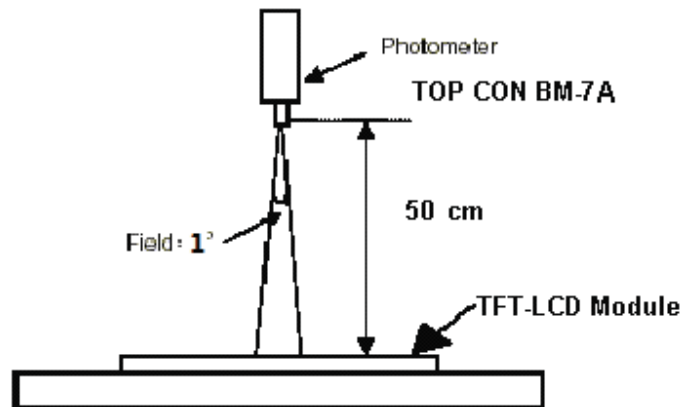


Fig. 9.1

Note 1: The brightness is measured from 9 point of the panel, P1~P9 in Fig. 9.2, for the average value.

Note 2: The brightness uniformity is calculated by the equation as below:

$$\text{Brightness uniformity} = \frac{\text{Min. Brightness}}{\text{Max. Brightness}} \times 100\%$$

which is based on the brightness values of the 9 points measured by BM-5 as shown in Fig. 9.2.

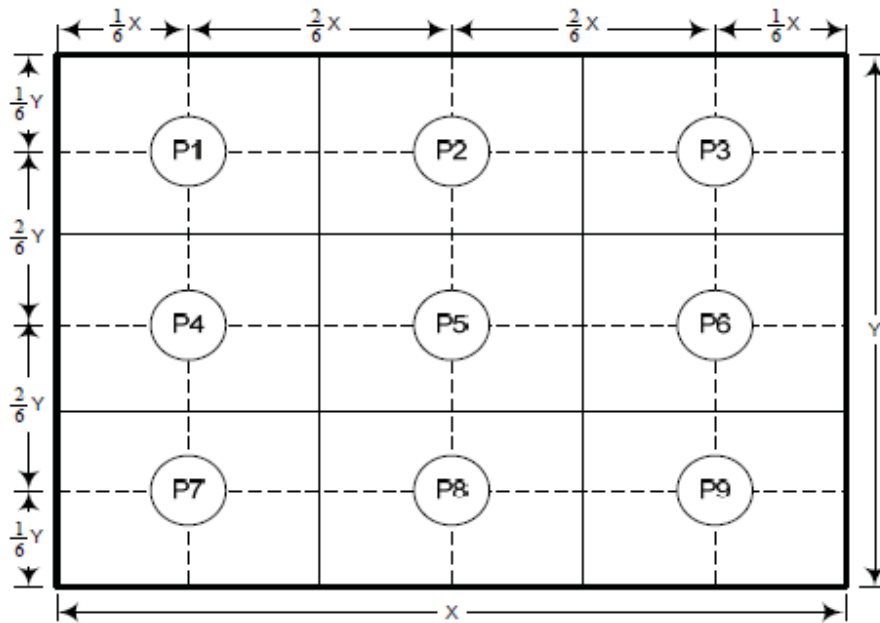
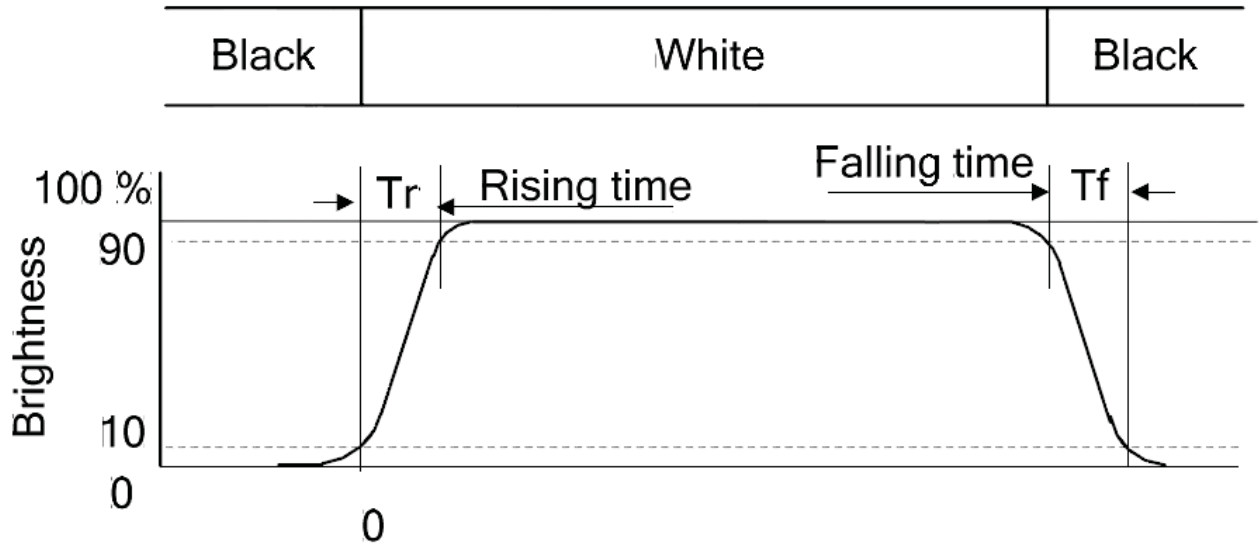


Fig. 9.2

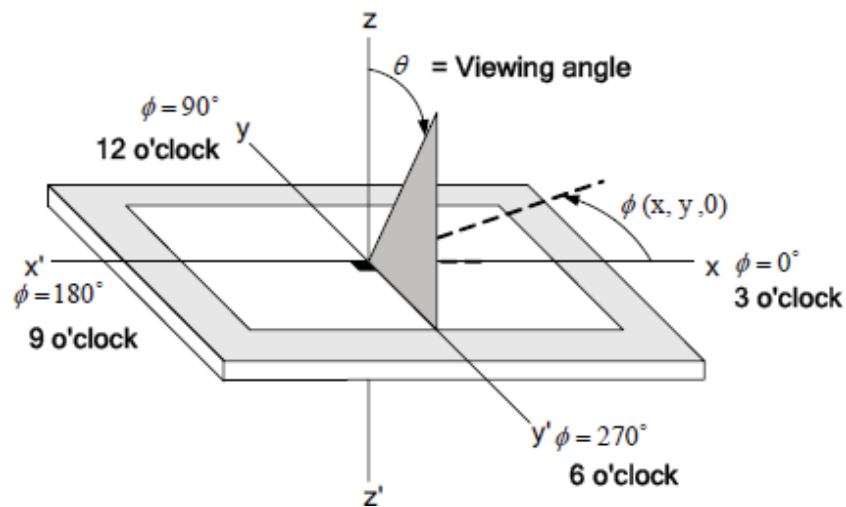
Note 3: The contrast ratio is measured from the center point of the panel, P5, and defined as the following equation:

$$CR = \frac{\text{Brightness of White}}{\text{Brightness of Black}}$$

Note 4: The definition of response time is shown in Fig. 9.3. The rising time is the period from 10% brightness to 90% brightness when the data is from black to white. Oppositely, Falling time is the period from 90% brightness falling to 10% brightness.


Fig 9.3

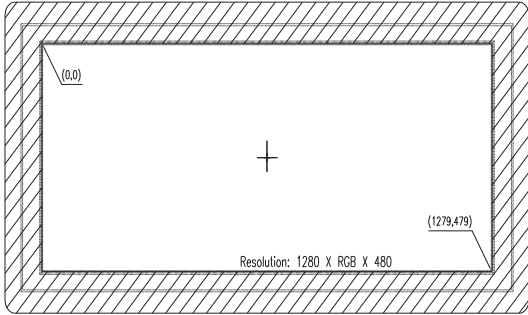
Note 5: The definition of viewing angle is shown in Fig. 9.4. Angle θ is used to represent viewing directions, for instance, $\theta = 270^\circ$ means 6 o'clock, and $\theta = 0^\circ$ means 3 o'clock. Moreover, angle ϕ is used to represent viewing angles from axis Z toward plane XY.


Fig. 9.4

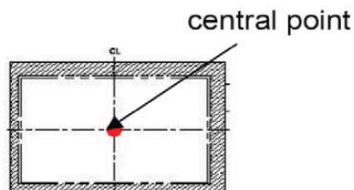
Note 6: The color chromaticity is measured from the center point of the panel, P5, as shown in Fig. 9.2.

10. CTP INTERFACE AND DATA FORMAT

10.1 CTP General Specifications

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Multi touch	5	Point
Interface	I ² C	
Report rate	100	Hz
Response time	10	ms
(X,Y) Position		
FW	TBD	
Point hitting life time	1,000,000 times min.	Note 1

Note: Use 8 mm diameter silicon rubber/force 3N to knock on the central point twice per second (no-operating), function pass after test.



10.2 CTP Absolute Maximum Rating

Symbol	Description	Min.	Typ.	Max.	Unit	Notes
VDD	Supply voltage	-	5	-	V	

10.3 CTP DC Electrical Characteristic

VDD=3.3V+/-5%, GND=0V

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Supply voltage	VDD	-	5	-	V
TTL Input High Voltage	VIH_TTL	2	-	VDD+0.3	V
TTL Input Low Voltage	VIL_TTL	-0.3	-	0.8	mV
TTL Output High Voltage	VOH_TTL	0.9 *OVDD	-		uA
TTL Output Low Voltage	VOL_TTL		-	0.45	V
TTL Output High Current	IOH_TTL	-4			V
TTL Output Low Voltage	IOL_TTL		-	4	V

NOTES:

1. Parameter applies to following pins:
GPIO [3:0], I²C *_*, UART *_*, INT and RESET#.

10.3 PIN CONNECTIONS

Pin Number	Pin Name	Description
1	VDD(5V)	Power Supply Voltage
2	SCL	I ² C Clock
3	SDA	I ² C Data
4	/INT	Interrupt pin sending request to HOST
5	/RESET	Reset active low
6	GND	Ground

10.4 I²C addresses issue

For kernel version beyond 2.6.35, address 0x04-0x07 and address above 0x78 are reserved (defined in **kernel/drivers/i2c/i2c-core.c**). We use 0x5c as default I²C slave address which is defined in firmware.

```
#define SIS_SLAVE_ADDR 0x5c
```

I²C touch data format (5 touch per package):

byte 0	byte 1	byte 2
Length field	Length field	Report ID

byte 3	byte 4	byte 5	byte 6	byte 7	byte 8
Status1	Contact ID1	X1	X1	Y1	Y1

byte 9	byte 10	byte 11	byte 12	byte 13	byte 14
Status2	Contact ID2	X2	X2	Y2	Y2

byte 15	byte 16	byte 17	byte 18	byte 19	byte 20
Status3	Contact ID3	X3	X3	Y3	Y3

byte 21	byte 22	byte 23	byte 24	byte 25	byte 26
Status4	Contact ID4	X4	X4	Y4	Y4

byte 27	byte 28	byte 29	byte 30	byte 31	byte 32
Status5	Contact ID5	X5	X5	Y5	Y5

byte 33	byte 34	byte 35
Actual Count	CRC	CRC

Lengthfield: byte count of the package

ReportID: 0x01

Status Nth: the touch status of Nth finger-touch

Contact ID Nth: the touch ID of Nth finger-touch

X Nth: X position of Nth finger-touch

Y Nth: Y position of Nth finger-touch

Actual count: total touch numbers

CRC: CRC check

10.5 Power On/Off Sequence

The 3.3V needs to be stable before the reset signal is activated and reaching 2V at least 5ms.

If the reset signal is controlled by GPIO, the designer has to make sure that the power sequence is following SiS's recommendation as showing in Figure 10.5

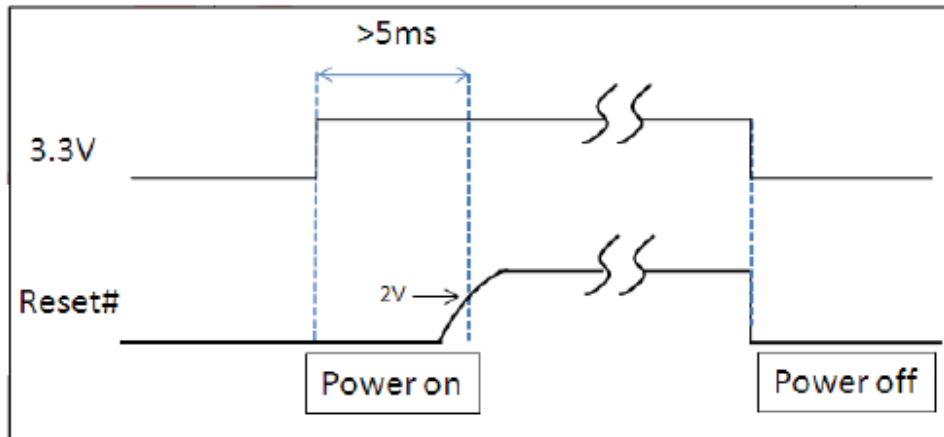


Figure 10.5 Power On/Off Sequence

11. QUALITY ASSURANCE

11.1 Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

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

Humidity : $65 \pm 5\%$

11.1.2 Operation

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

11.1.3 Container

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

11.1.4 Test Frequency

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

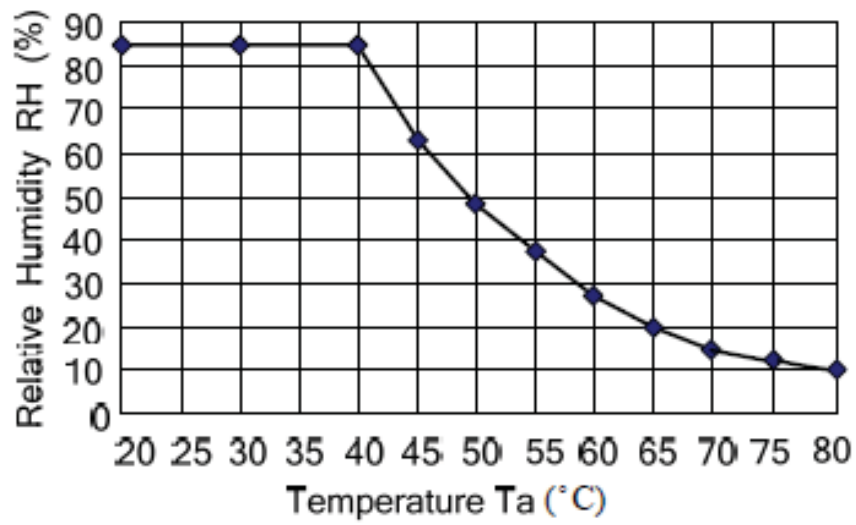
11.1.5 Test Method

No.	Reliability Test Item & Level	Test Level	Remark
1	High Temperature Storage Test	T=80°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=70°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-20°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,240hrs	IEC68-2-3
6	Thermal cycling storage test	-30°C ----25°C -----80°C ,200Cycle 30min 5min 30min	IEC68-2-14
7	vibration test(with carton)	Frequency:10~55HZ Amplitude:1.5mm Sweep time:11min Test period:6Cycles for each direction of X,Y,Z	IEC68-2-6
9	Shock test	100G,6ms,Direction:±X±Y±Z Cycle:3times	IEC68-2-27
10	ESD	Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 4kV Air +/-8kV Criteria: Class C	IEC61000-4-2

Note1: Display functionalities are inspected under the conditions defined in the specification after the reliability tests.

Note 2:The display is not guaranteed for use in corrosive gas environments.

Note 3:Under the condition of high temperature & humidity, if the temperature is higher than 40°C, the humidity needs to be reduced as below shown



Note 4: All pins of LCD interface (CN1) have been tested by ± 100 contact discharge of ESD under non-operating condition.

12. APPEARANCE SPECIFICATION

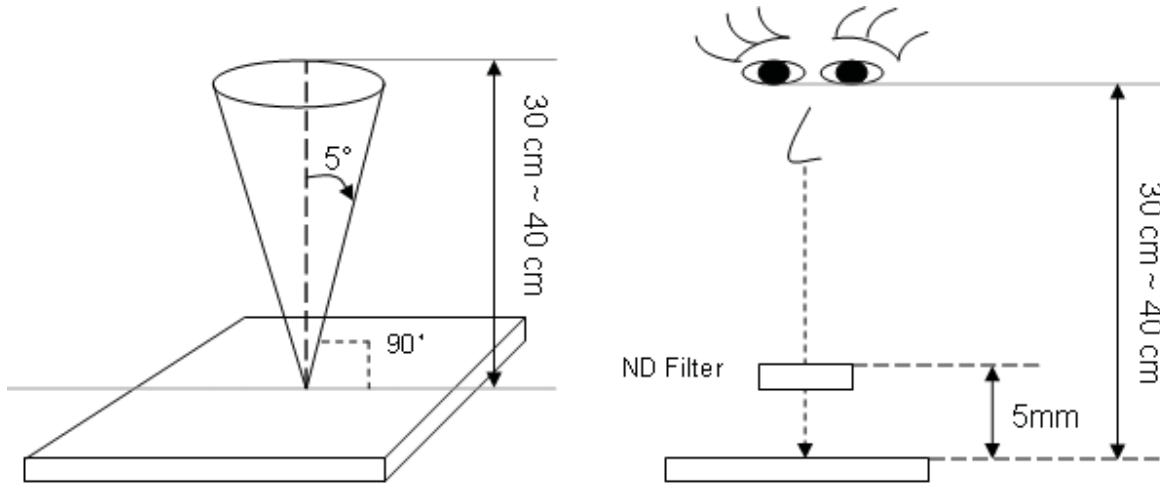
12.1 Inspection condition

12.1.1 Inspection conditions

12.1.1.1 Inspection Distance : 35 ± 5 cm

12.1.1.2 View Angle :

- (1) Inspection that light pervious to the product: $\pm 5^\circ$
- (2) Inspection that light reflects on the product: $\pm 45^\circ$

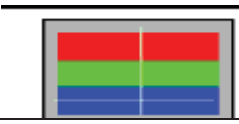


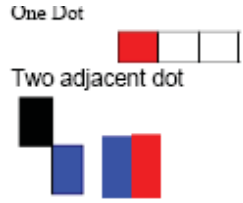
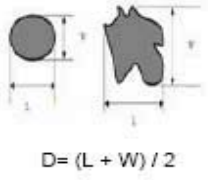
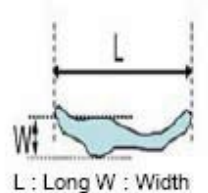
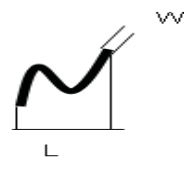
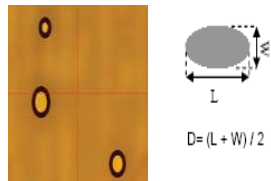
12.1.2 Environment conditions :

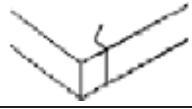
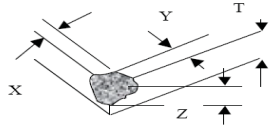
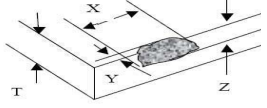
Ambient Temperature :	$25 \pm 5^\circ\text{C}$
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux

12.2 Inspection Parameters

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

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	2	
	Bright adjacent dots	1	1	
	Dark adjacent dots	2	2	
	Adjacent dots with a bright dot and a dark dot	2	2	
Foreign material in dot shape	SPEC (unit: mm)	Acceptable	 <p>$D = (L + W) / 2$</p>	
	$D \leq 0.5$	Ignored		
	$0.5 < D \leq 0.8$, distance > 5	$n \leq 5$		
	$D > 0.8$	0		
Foreign material in line shape	SPEC (unit: mm)	Acceptable	 <p>L : Long W : Width</p>	
	$W \leq 0.05$ 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		
Contamination	It is acceptable if the dirt can be wiped.			
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	 <p>$D = (L + W) / 2$</p>	
	$D \leq 0.3$	Ignored		
	Non visible area	Ignored		
	$0.3 < D \leq 0.5$, distance > 5	$n \leq 5$		
	$D > 0.5$	0		
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		

12.3 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

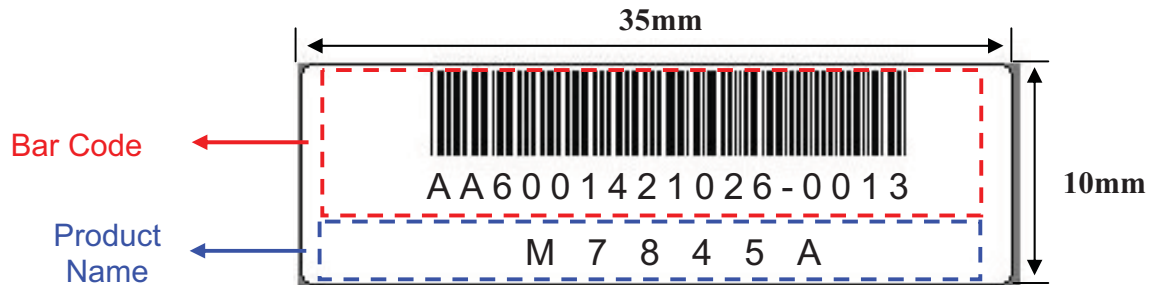
Sampling table: ISO2859

Inspection level: Level II

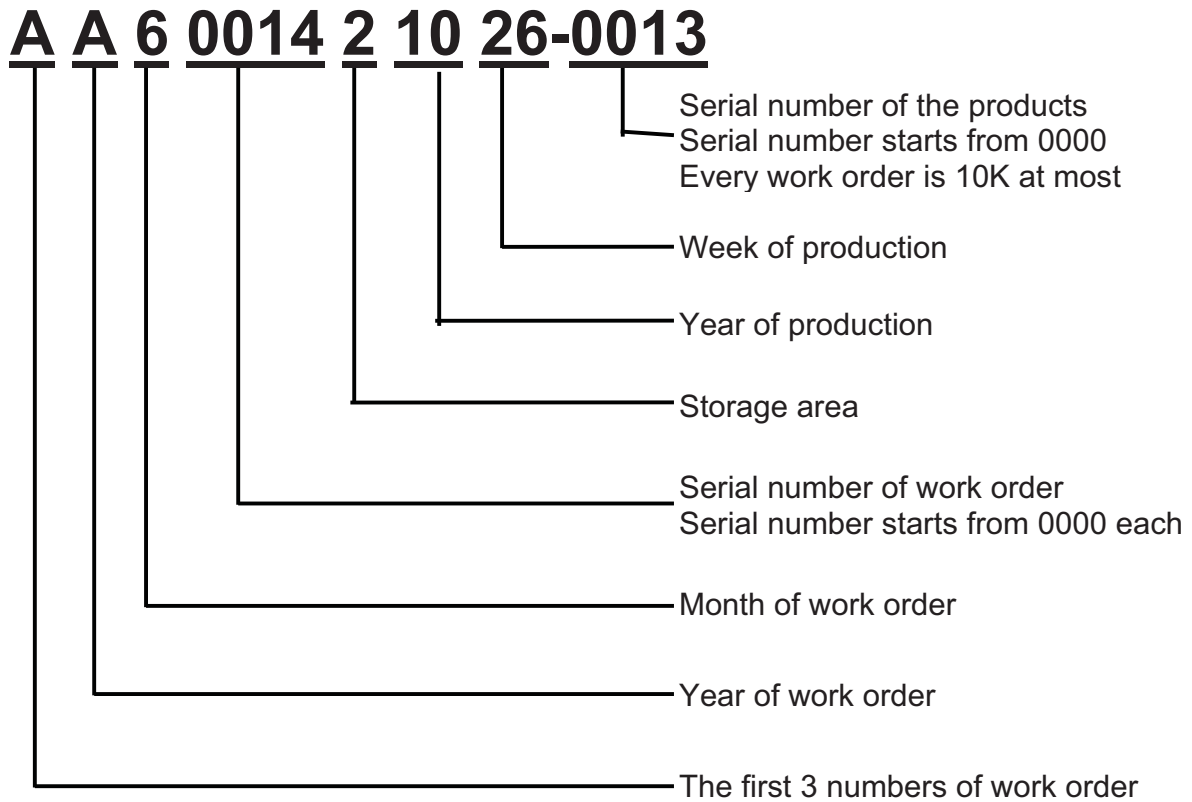
Class of defects	Definition		
	Major	AQL 0.65	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
	Minor	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.

13. PRODUCT LABEL DEFINE

Product Label style:



Bar Code 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

- (1) 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.

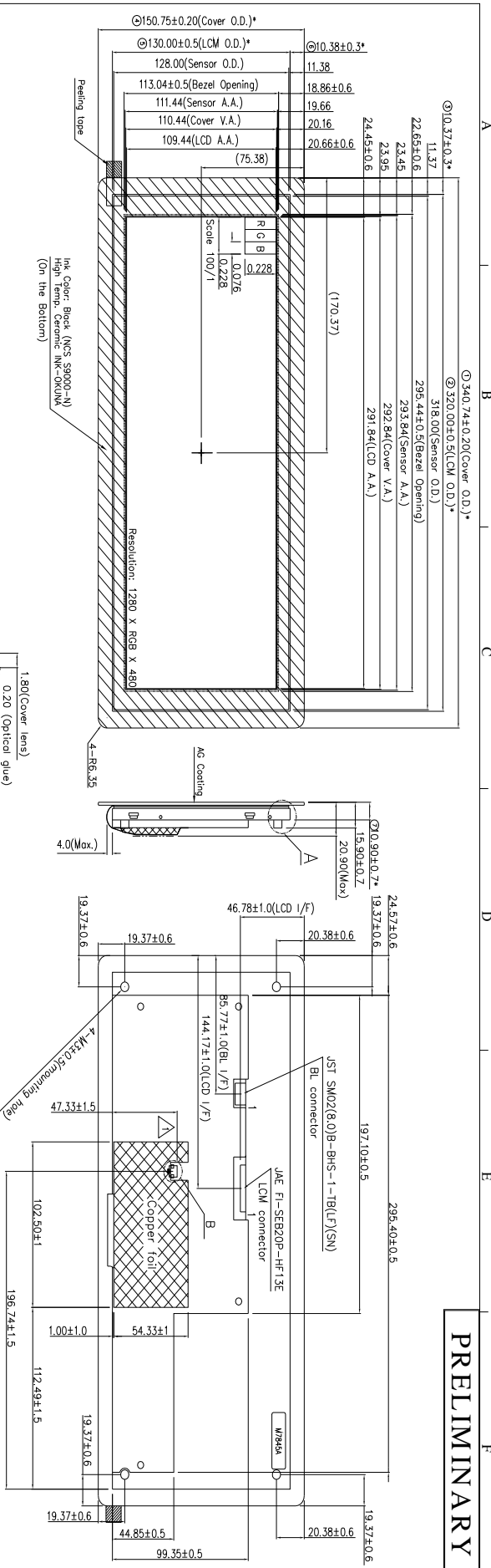
5. OTHERS

- (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:
- (4) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
- (5) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- (6) 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.)

6. LIMITED WARRANTY

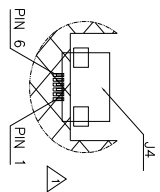
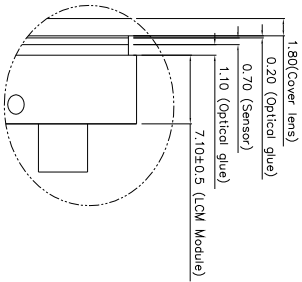
Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of 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



PRELIMINARY

- Note:
1. For ROHS & REACH
 2. * is important dimension : ①~⑦
 3. Tolerance is ±0.3 unless otherwise noted.
 4. LCM matching connector: JAE FI-SE20ME or equivalent.
 5. B/L matching connector: JST BHR-02(8.0)YS-1N or equivalent.
 6. J4 connector: Civlux CF25061D080-05-NH or equivalent.
 7. Center luminance : 850 cd/m² (typ.), 680 cd/m² (min.)
 8. CTP IC : SIS 9255
 9. Cover Lens Material : Physically Strengthened Glass.
 10. Coating : AG Coating



B/L PIN FUNCTIONS

1	VDD	11	IN2-
2	VDD	12	IN2+
3	VSS	13	VSS
4	VSS	14	CLK IN-
5	IN0-	15	CLK IN+
6	IN0+	16	VSS
7	VSS	17	IN3-
8	IN1-	18	IN3+
9	IN1+	19	SD
10	VSS	20	DM

"J4" PIN FUNCTION

1	VDD	4	/INT
2	SCL	5	/RESET
3	SDA	6	GND

DATE:	2015/11/09	DATE:	
DRAWN:		CHECK:	
APPROVE:		APPROVE:	
TITLE: 12.3" CTP Module outline dimension		DWG. NO. LCX1203255GGU00 UNITS MM SCALE 1/1	
Change CTP interface from USB to I ² C ESR0410009		SHEET 1 OF 1	
DESCRIPTION REVISIONS		REV. 2	



16. PACKAGE INFORMATION

TBD