

Crystal Clear Technology

Product Specification

T700T10X00

(REVISION 1)

Crystal Clear Technology sdn. bhd.

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	CAPACITIVE TOUCH PANEL – TP0085	



Record of revision

Rev	Date	Item	Page	Comment	Originator	Checked
1	21/05/13			Preliminary	CF Liew	Azhar



1. General Specifications

T700T10X00 is 7.0" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) OLB module (finish outer lead bonding) composed of LCD panel, driver IC and backlight). This 7.0" screen produces 800 x RGB x 480 resolution images with 16.2M colors by R.G.B signal input.

2. Features

Item	Specifications	Remarks
Size	7.0" Diagonal	
Display type	16.2M color TFT, Transmissive	1
Viewing direction	12' O'clock	
Outline dimensions	164.9mm (H) x 100mm (V)	2
Active Area	154.08mm (H) x 85.92mm (V)	
Resolution	800 (H) x RGB x 480 (V)	
Pixel Size	0.1926mm (H) x 0.1790mm (V)	
Pixel arrangement	RGB vertical strip	
Driving IC	OTA7001A/OTD9960A	
Backlight	24 Chips white LED	
Luminance	300 cd/m2	3
Operating temperature	-20°C ~ 70°C	
storage temperature	-30°C ~ 80°C	

Note1: Color tone is slightly changed by temperature and driving voltage.

Note2: FPC or wire are not included.

Note3: Brightness on LCD surface. Module with CTP or RTP, brightness will be about 20% (max) lower on the touch panel surface.

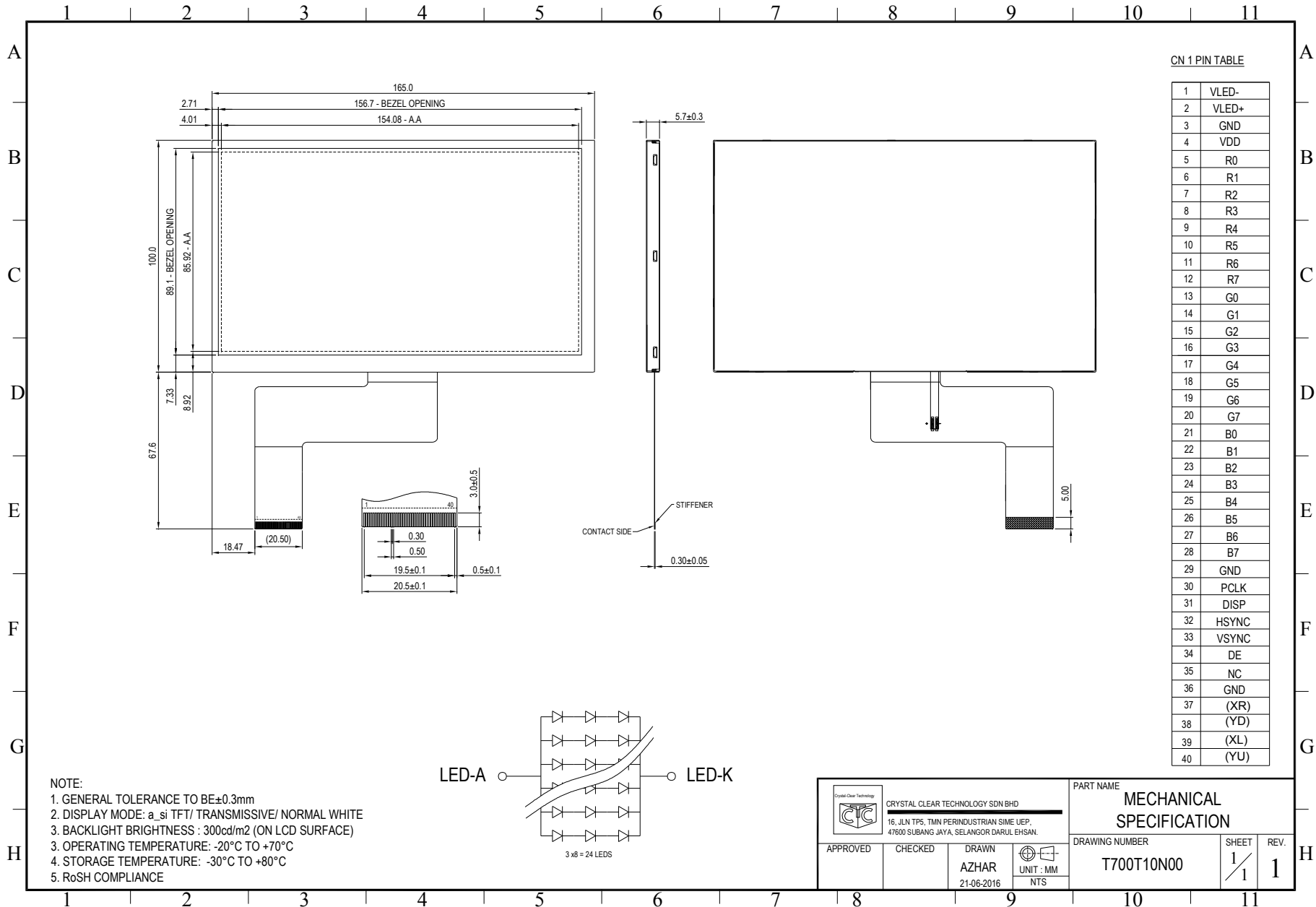
Available Option

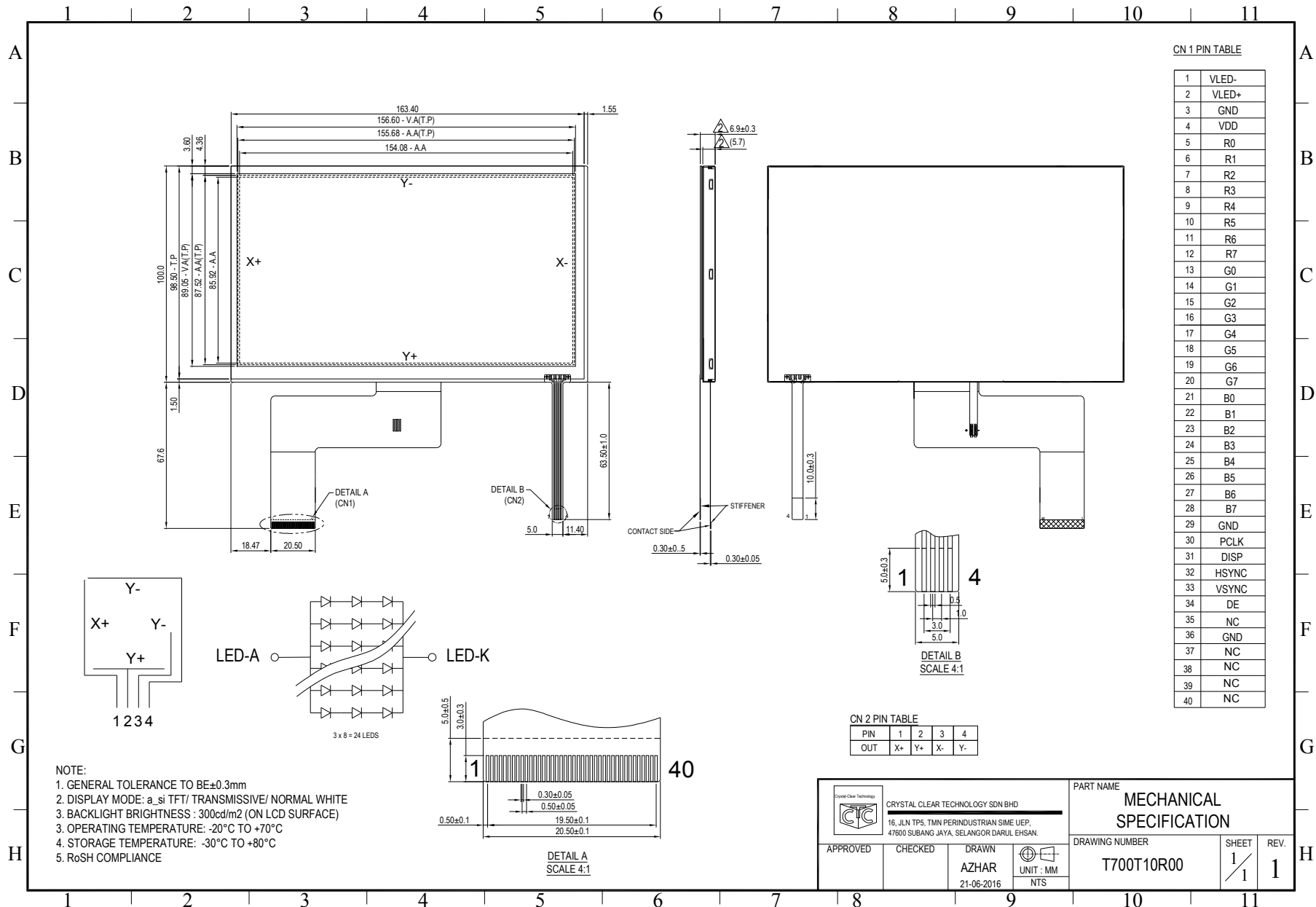
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<p>TOUCH PANEL</p> <p>N : Without Touch Panel</p> <p>C : Capacitive Touch Panel</p> <p>R : Resistive Touch Panel</p> <p>SEMI - CUSTOMISE (MINOR CHANGES FROM STANDARD MODEL)</p> <p>00 - STANDARD SPECIFICATION MODEL</p> <p>OTHER OPTION</p> <p>C : STANDARD COVER LENS</p> <p>REFER TO FACTORY FOR FURTHER INFORMATION.</p> <p>TERMS AND CONDITIONS APPLY</p>



3. Pin Assignment Table

Pin No.	Symbol	Description
1	VLED-	Backlight +ve
2	VLED+	Backlight -ve
3	GND	Ground
4	VDD	Power Supply (3.3V)
5 ~ 12	R0 ~ R7	Data Bus (R0 ~ R7)
13 ~ 20	G0 ~ G7	Data Bus (G0 ~ G7)
21 ~ 28	B0 ~B7	Data Bus (B0 ~ B7)
29	GND	Ground
30	PCLK	Dot-clock signal and oscillator source
31	DISP	Display on/off
32	HSYNC	Line synchronization signal
33	VSYNC	Frame synchronization signal
34	DE	Display enable pin from controller
35	NC	Not connected
36	GND	Ground
37	NC	Not connected
38	NC	Not connected
39	NC	Not connected
40	NC	Not connected





CN 1 PIN TABLE

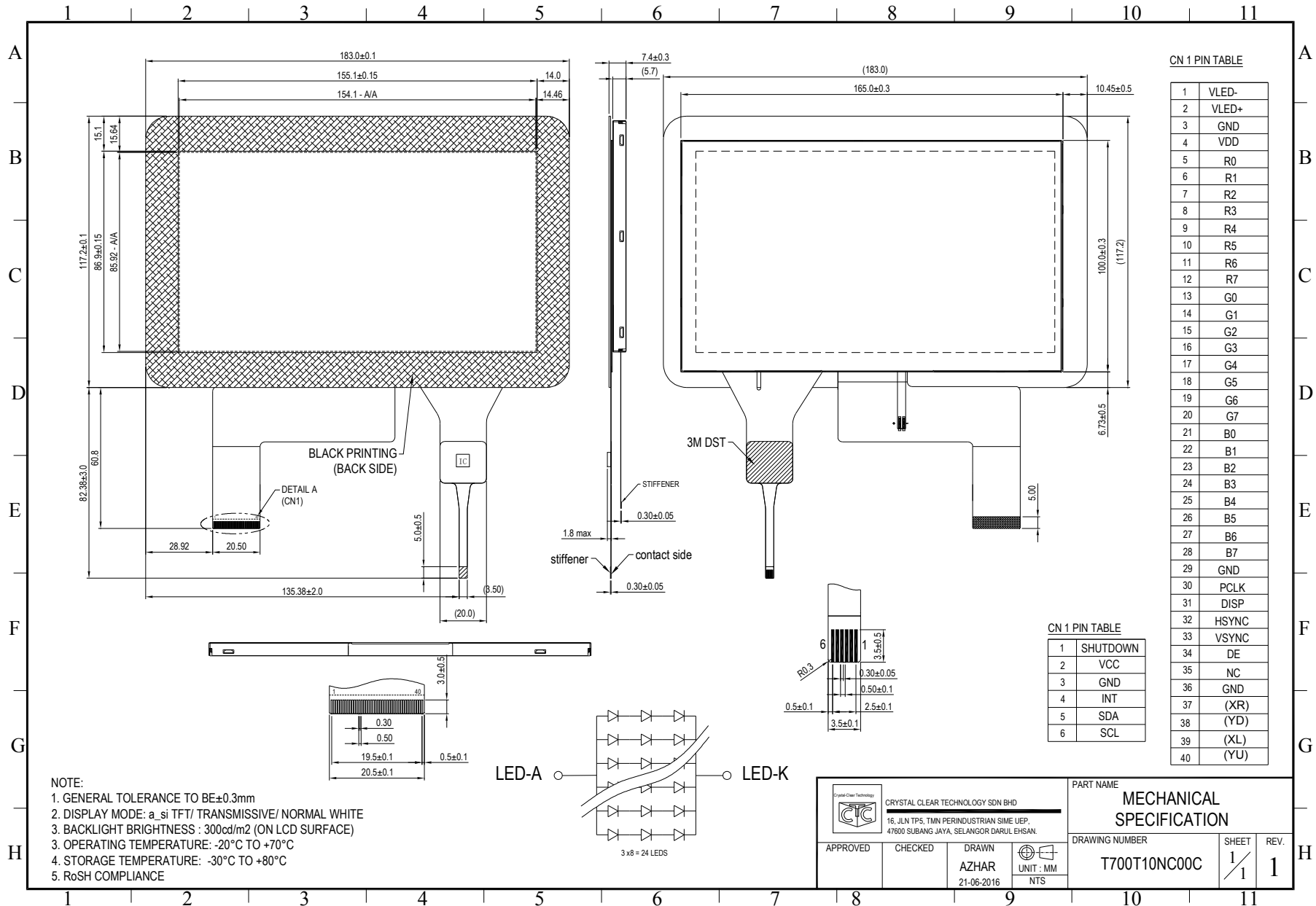
1	VLED-
2	VLED+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	PCLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	NC
38	NC
39	NC
40	NC

CN 2 PIN TABLE

PIN	1	2	3	4
OUT	X+	Y+	X-	Y-

- NOTE:
1. GENERAL TOLERANCE TO BE ±0.3mm
 2. DISPLAY MODE: a. si TFT/ TRANSMISSIVE/ NORMAL WHITE
 3. BACKLIGHT BRIGHTNESS : 300cd/m2 (ON LCD SURFACE)
 4. OPERATING TEMPERATURE: -20°C TO +70°C
 5. STORAGE TEMPERATURE: -30°C TO +80°C
 6. RoSH COMPLIANCE

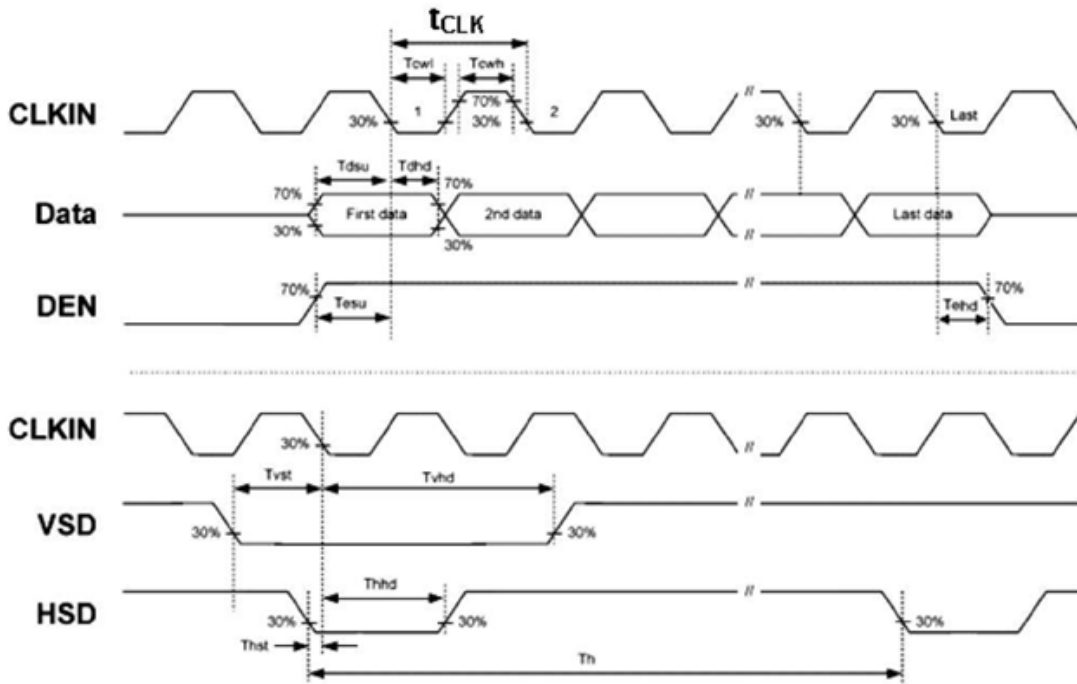
		CRYSTAL CLEAR TECHNOLOGY SDN BHD 16, JLN TP5, TMN PERINDUSTRIAN SIME UEP. 47600 SUBANG JAYA, SELANGOR DARUL EHSAN.		PART NAME MECHANICAL SPECIFICATION	
APPROVED	CHECKED	DRAWN	UNIT : MM NTS	DRAWING NUMBER	SHEET
		AZHAR 21-06-2016		T700T10R00	1/1





5. Timing and Characteristics

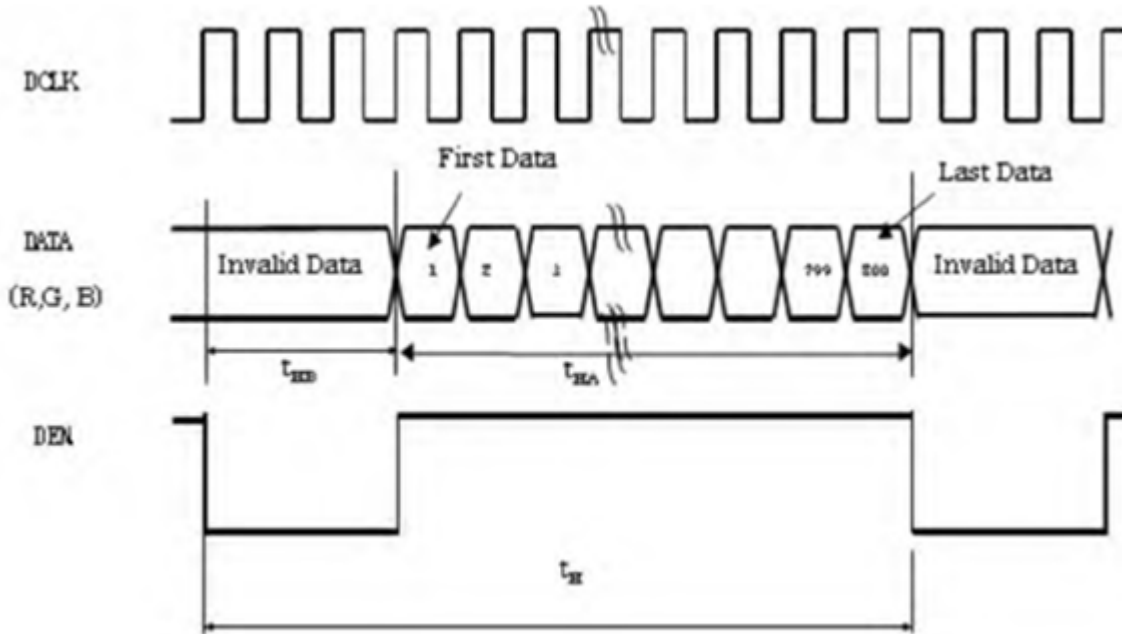
	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DCLK	Dot Clock	$1/t_{CLK}$	29	33	38	MHz	
	DCLK pulse duty	T_{cwh}	40	50	60	%	
DE	Setup Time	T_{esu}	8	-	-	ns	
	Hold time	T_{ehd}	8	-	-	ns	
	Horizontal Period	t_H	1026	1056	1086	t_{CLK}	
	Horizontal Valid	t_{HA}		800		t_{CLK}	
	Horizontal Blank	t_{HB}	226	256	286	t_{CLK}	
	Vertical Period	t_V	515	525	535	t_H	
	Vertical Valid	t_{VA}		480		t_H	
	Vertical Blank	t_{VB}	35	45	55	t_H	
	SYNC	HSYNC Setup Time	T_{hst}	8	-	-	ns
HSYNC Hold Time		T_{hhd}	8	-	-	ns	
VSYNC Setup Time		T_{vst}	8	-	-	ns	
VSYNC Hold Time		T_{vhd}	8	-	-	ns	
Horizontal Period		t_H	1026	1056	1086	t_{CLK}	
Horizontal Pulse Width		t_{hpw}	-	30	-	t_{CLK}	$t_{hb} + t_{hpw} = 46DCLK$ is fixed
Horizontal Back Porch		t_{hb}	-	16	-	t_{CLK}	
Horizontal Front Porch		t_{hfp}	180	210	240	t_{CLK}	
Horizontal Valid		t_{hd}		800		t_{CLK}	
Vertical Period		t_V	515	525	535	t_H	
Vertical Pulse Width		t_{vpw}	-	13	-	t_H	$t_{vpw} + t_{vb} = 23t_H$ is fixed
Vertical Back Porch		t_{vb}	-	10	-	t_H	
Vertical Front Porch		t_{vfp}	12	22	32	t_H	
Vertical Valid	t_{vd}		480		t_H		
DATA	Setup Time	T_{dsu}	8	-	-	ns	
	Hold Time	T_{dhd}	8	-	-	ns	



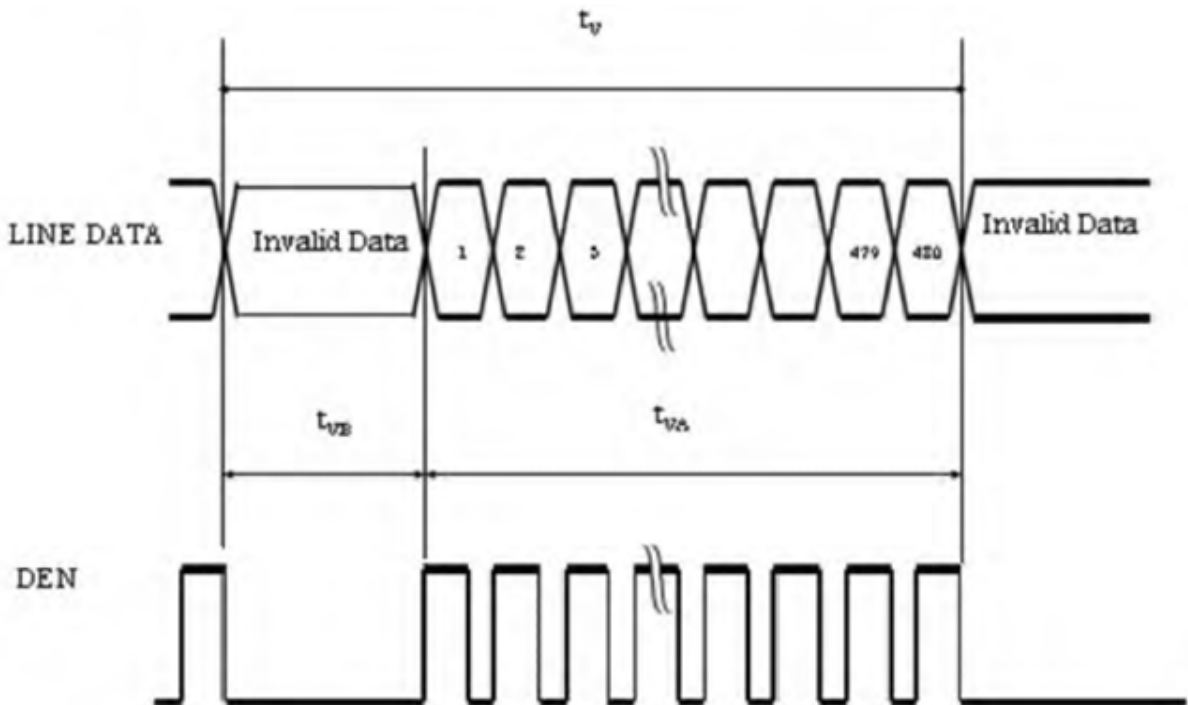


DE Mode

Horizontal timing



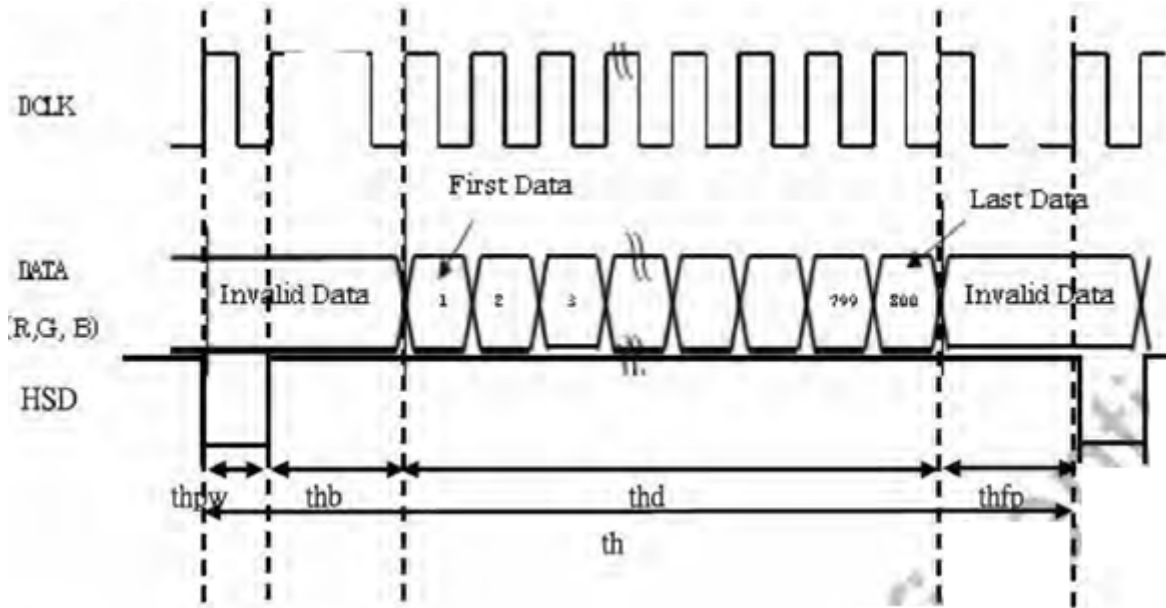
Vertical Timing



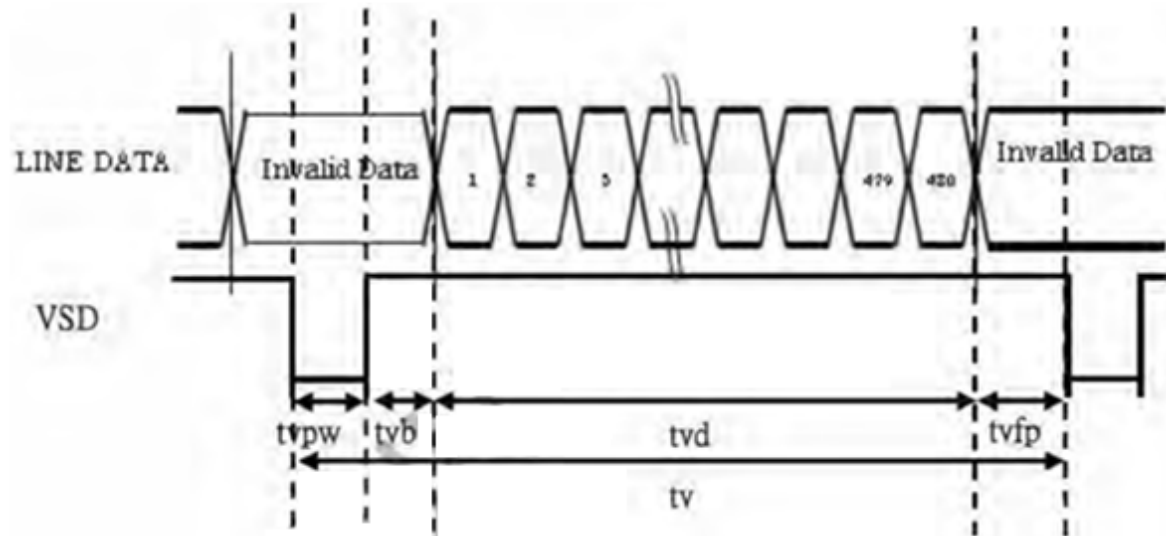


SYNC mode

Horizontal timing



Vertical timing

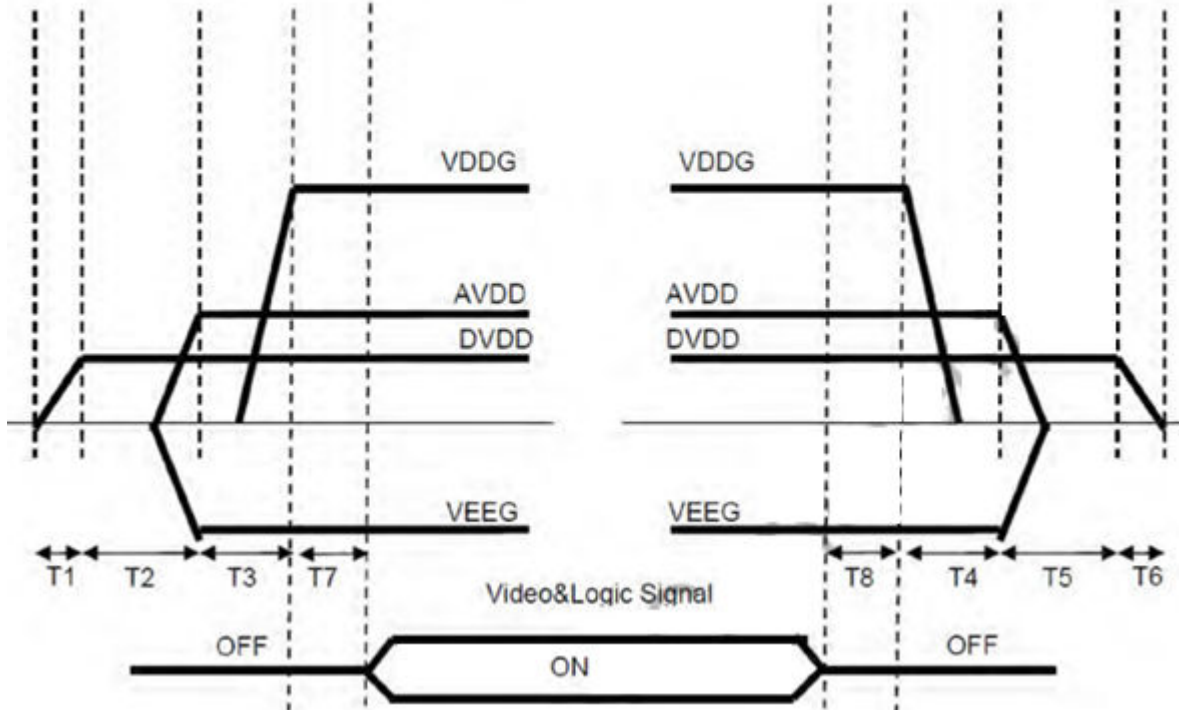




6. Power ON/OFF Sequence

Power On : DVDD→AVDD/VEEG→VDDG→Video & Logic Signal

Power Off : Video & Logic Signal→VDDG→AVDD/VEEG→DVDD



$0 < T1 \leq 10\text{ms}$	$T5 > 0\text{ms}$
$T2 > 20\text{ms}$	$T6 > 0\text{ms}$
$T3 > 10\text{ms}$	$0 < T7 \leq 10\text{ms}$
$T4 > 0\text{ms}$	$0 < T8 \leq 10\text{ms}$

7. Electrical Characteristics
7.1 Typical Operating Condition

Item	Symbol	Min.	Typ.	Max.	Unit.	Note.
Digital Supply Voltage	DVDD	3	3.3	3.6	V	
Analog Supply Voltage	AVDD	9.4	9.6	9.8	V	
Gate On Voltage	VDDG	17	18	19	V	
Gate Off Voltage	VEEG	-6.6	-6	-5.4	V	
Common Voltage	VCOM	3.8	4	4.2	V	Note1
Logic Input Voltage	VIH	0.7DVDD	-	DVDD	V	
	VIL	GND	-	0.3DVDD	V	

Note 1: Please adjust VCOM to make the flicker level be minimum

7.2 Current Consumptions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
Gate on Current	IVDDG	VDDG = 18 V	-	0.5	1	mA	Note1
Gate off Current	IVEEG	VEEG = -6 V	-	0.5	1	mA	Note1
Digital Current	IDVDD	DVDD = 3.3V	-	8	15	mA	Note1
Analog Current	IAVDD	AVDD = 9.6 V	-	30	40	mA	Note1
Total Power Consumption	PC		-	327	458	mW	Note1

Note1: Typical Specification: Grey-level test pattern

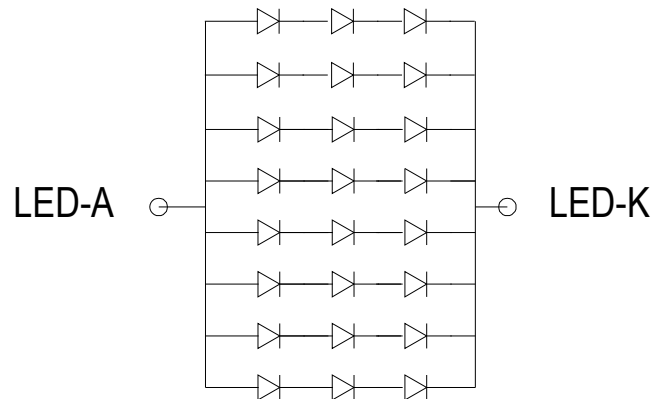
Maximum Specification: Black test Pattern



(a) Gray-level Pattern



(b) Black Pattern

8. LED Backlight
8.1 Power Supply for LED Backlight

8.2 Backlight Characteristic (complete Module)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	Vf	Ta=25 °C, If=200mA	8.7	9.9	11	V
Power Supply Current	If	Ta=25°C,Vf=9.9V	-	140	-	mA
Luminous intensity	Vf	White LED	250	300		cd/m ²
Half life expectancy	LL	IF=200mA	30,000			Hrs
Drive method	Constant current					
LED configuration	24 White LED ,3 in series ,8 in Parallel					

9. Optical Characteristic

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE	
Panel Transmittance	T	--	4.8	5.1	--	%		
Response Time	Tr +Tf	Point-5	--	25	35	ms	1	
Viewing Angle	Horizontal	ϕ	Point-5	120	140	--	°	2
	Vertical	θ	CR \geq 10	100	120	--	°	2
Color Filter Chromaticity	White	x	$\theta = \phi = 0^\circ$	0.273	0.313	0.353		3
		y		0.289	0.329	0.369		3
	Red	x	$\theta = \phi = 0^\circ$	(0.562)	(0.602)	(0.642)		3
		y		(0.297)	(0.337)	(0.377)		3
	Green	x	$\theta = \phi = 0^\circ$	(0.309)	(0.349)	(0.389)		3
		y		(0.547)	(0.587)	(0.627)		3
	Blue	x	$\theta = \phi = 0^\circ$	(0.123)	(0.163)	(0.203)		3
		y		(0.074)	(0.114)	(0.154)		3

Note 1: Definition of Response Time (white-Black)

The response time is defined as the time interval between the 10% and 90% amplitudes

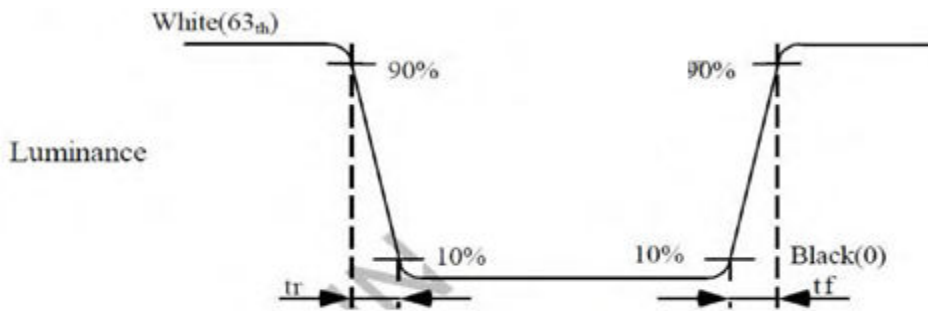


Fig. 6-1 Measuring point

Note 2: Definition of Viewing Angle (θ, ϕ)

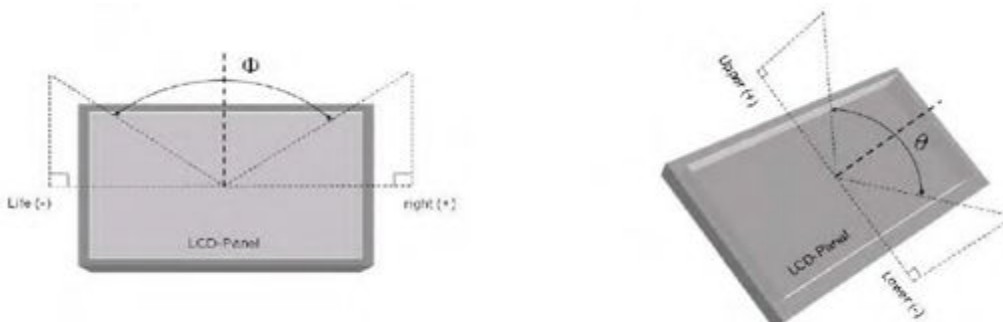


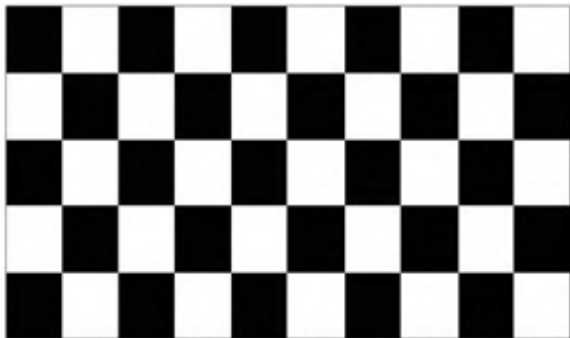
Fig.6-2 Definition of Viewing Angle

10. Reliability Test

Item		Test Condition
Operating	High Temperature	70degC, 240 hrs
	Low Temperature	-20degC,240 hrs
Storage	High Temperature	80degC, 240hrs and recovery for 2hrs
	Low Temperature	-30degC, 240hrs and recovery for 2hrs
	High Temperature and High Humidity	50degC, 90%RH, 240hrs and recovery for 2 hrs
Thermal	Cycle	RT → 20degC → Rt → 70degC → RT 0min 30min 5min 30min 5min 50 cycles (Power off)
	Shock	RT → 20degV → 70degC 0min 30min 30min 50 cycles (Power off)
Image Sticking	25°C: 24hrs	1

Note: RT means Room temperature

Note 1 : Condition of Image Sticking test : 25 °C± 2 °C. Operation with sustained test pattern for 24 hours, then change to grey pattern immediately. After 5 min, the mural should disappear completely.



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

11.0 Inspection Criteria

No	Defect	Definition of defect	Inspection Criteria														
1	a) Definition of dot	<p>The size of defective dot over 1/2 of whole is regards as one defective dot.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Smaller than 1/2</p> <p>R G B</p> <p>'No dot defect' (ignore)</p> </div> <div style="text-align: center;"> <p>Larger than 1/2</p> <p>R G B</p> <p>'1 dot defect' (counted)</p> </div> </div>	<p>A – Viewing area B – Viewing area C – Outside Viewing area</p>														
	b) Bright Dot	Dot appear bright and unchanged in size when LCD panel is displaying black pattern	<table border="1"> <thead> <tr> <th>Defect</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Bright Dot</td> <td>1</td> <td>1</td> <td rowspan="3">NC</td> </tr> <tr> <td>Dark Dot</td> <td>2</td> <td>2</td> </tr> <tr> <td>Total</td> <td colspan="2">4</td> </tr> </tbody> </table> <p>NC – Not Count</p>	Defect	A	B	C	Bright Dot	1	1	NC	Dark Dot	2	2	Total	4	
	Defect	A		B	C												
	Bright Dot	1	1	NC													
Dark Dot	2	2															
Total	4																
c) Dark Dot	Dot appear dark and unchanged in size when LCD panel is displaying pure color (RED, GREEN or BLUE) pattern																
d) 2 dot adjacent	<p>1 pair = 2 dots</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Type 1</p> </div> <div style="text-align: center;"> <p>Type 2</p> </div> </div> <p>or</p> <div style="text-align: center;"> <p>Type 3</p> </div>	<table border="1"> <thead> <tr> <th>Defect</th> <th>Acc. Count</th> </tr> </thead> <tbody> <tr> <td>2 Bright dot Adjacent</td> <td>0</td> </tr> <tr> <td>2 Dark dot Adjacent</td> <td>1</td> </tr> </tbody> </table>	Defect	Acc. Count	2 Bright dot Adjacent	0	2 Dark dot Adjacent	1									
Defect	Acc. Count																
2 Bright dot Adjacent	0																
2 Dark dot Adjacent	1																
2	Black spot White spot Bright spot Pin Hole Foreign Particle	<p>-Black/Dark/Bright Spot is points on display which appear dark/bright and usually result from contamination</p> <p>- These defect do not vary in size intensity (contrast) when contrast is varied.</p> <p>$D = (a+b)/2(\text{mm})$</p>	<p>A: Viewing area B: Outside Viewing area</p> <table border="1"> <thead> <tr> <th>Defect Category</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>$D < 0.10$</td> <td>NC</td> <td rowspan="4">NC</td> </tr> <tr> <td>$0.10 \leq D < 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 \leq D \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$D > 0.30$</td> <td>0</td> </tr> </tbody> </table>	Defect Category	A	B	$D < 0.10$	NC	NC	$0.10 \leq D < 0.20$	2	$0.20 \leq D \leq 0.30$	1	$D > 0.30$	0		
	Defect Category	A	B														
	$D < 0.10$	NC	NC														
$0.10 \leq D < 0.20$	2																
$0.20 \leq D \leq 0.30$	1																
$D > 0.30$	0																
Black Line White line Particle between POL and Glass Scratch on Glass		<table border="1"> <thead> <tr> <th>Defect Category</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>$W < 0.03$</td> <td>NC</td> <td rowspan="3">NC</td> </tr> <tr> <td>$0.03 \leq W \leq 0.08, L \leq 2.0$</td> <td>2</td> </tr> <tr> <td>$W > 0.08$</td> <td>0</td> </tr> </tbody> </table>	Defect Category	A	B	$W < 0.03$	NC	NC	$0.03 \leq W \leq 0.08, L \leq 2.0$	2	$W > 0.08$	0					
Defect Category	A	B															
$W < 0.03$	NC	NC															
$0.03 \leq W \leq 0.08, L \leq 2.0$	2																
$W > 0.08$	0																
POL Bubble POL Dented		<table border="1"> <thead> <tr> <th>Defect Category</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>$D < 0.20$</td> <td>NC</td> <td rowspan="4">NC</td> </tr> <tr> <td>$0.20 \leq D < 0.30$</td> <td>3</td> </tr> <tr> <td>$0.30 \leq D \leq 0.50$</td> <td>2</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table>	Defect Category	A	B	$D < 0.20$	NC	NC	$0.20 \leq D < 0.30$	3	$0.30 \leq D \leq 0.50$	2	$D > 0.5$	0			
Defect Category	A	B															
$D < 0.20$	NC	NC															
$0.20 \leq D < 0.30$	3																
$0.30 \leq D \leq 0.50$	2																
$D > 0.5$	0																
3	Mura (50% Grey)		Judged by Limit sample														



12.0 Precaution for Using TFT Modules

1. Handling Precautions

- a. The display panel is made of glass and polarizer. As glass is fragile. It tends to chip during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock of impact or by dropping it.
- b. If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance is in contact with your skin or clothes, wash it off using soap and water.
- c. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degrade the insulation between terminals. Scratch and dents may occur on polarizer too.
- d. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than a HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in to contact with room temperature air.
- e. If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
 - Isopropyl alcohol
 - Ethyl alcohol
 - Do not scrub hard to avoid damaging the display surface.
- f. Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
 - Water
 - Ketone
 - Aromatic solvents
 - Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil and fats.
- g. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
- h. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
- i. Do not attempt to disassemble or process the LCD module.
- j. NC terminal should be open. Do not connect anything.
- k. If the logic circuit power is off, do not apply the input signals.
- l. Electro-Static Discharge Control. Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.
 - Tools required for assembly, such as soldering irons, must be properly grounded. Make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screw driver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.



- To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work environment is not too dry. A relative humidity of 50%-60% is recommended. As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.
- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- m. Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.
 - Do not alter, modify or change the shape of the tab on the metal frame.
 - Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
 - Do not damage or modify the pattern writing on the printed circuit board.
 - Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
 - Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
 - Do not drop, bend or twist the LCM.

2. Storage Precautions

When storing the LCD modules, the following precaution are necessary.

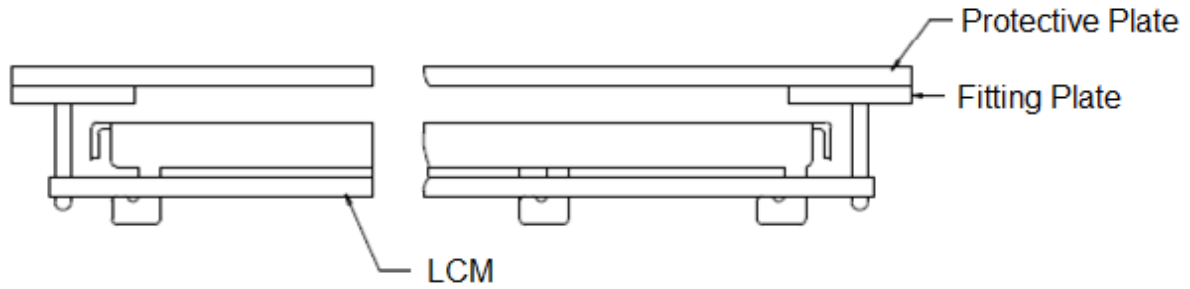
- a. Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desiccant.
- b. Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C, and keep the relative humidity between 40%RH and 60%RH.
- c. The polarizer surface should not come in contact with any other objects.

3. Others

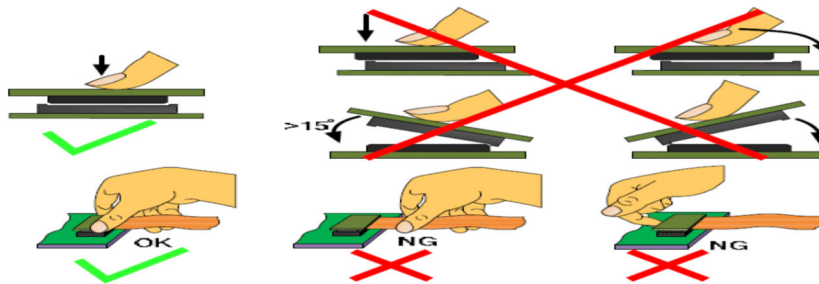
- a. Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.
- b. If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.
- c. To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc. Exercise care to avoid holding the following sections when handling the modules.
 - Exposed area of the printed circuit board.
 - Terminal electrode sections.

4. Using LCD Modules

- a. Installing LCD Modules
 - The hole in the printed circuit board is used to fix LCM as shown in the picture below.
 - Attend to the following items when installing the LCM.
- b. Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



- c. When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be 0.1mm.
- d. Precaution for assemble the module with BTB connector:
Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows



5. Precaution for soldering the LCM

	Manual soldering	Machine drag soldering	Machine press soldering
No RoHS Product	290°C ~350°C. Time: 3-5S.	330°C ~350°C. Speed: 4-8 mm/s.	300°C ~330°C. Time: 3-6S. Press: 0.8~1.2Mpa
RoHS Product	340°C ~370°C. Time: 3-5S.	350°C ~370°C. Time: 4-8 mm/s.	330°C ~360°C. Time: 3-6S. Press: 0.8~1.2Mpa

- a. If soldering flux is used, be sure to remove any remaining flux after finishing the soldering operation (This does not apply in the case of a non-halogen type of flux). It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.
- b. When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.
- c. When removing the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

6. Precautions for Operation

- a. Viewing angle varies with the change of liquid crystal driving voltage (VLCD). Adjust VLCD to show the best contrast.
- b. It is recommended to drive LCD's within the specified voltage limit since over limit will cause shorter LCD life. An electrochemical reaction due to direct current causes LCD-deterioration. Avoid the use of direct current drive.



- c. Response time will be extremely delayed at lower temperature compared to room operating temperature range and on the other hand, at higher temperature LCD shows dark color in them. However those phenomena do not mean malfunction. The LCD will return to normal performance when ambient temperature revert to room condition.
- d. If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and on.
- e. A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.
- f. Input logic voltage before apply analogue high voltage such as LCD driving voltage when power on. Remove analogue high voltage before logic voltage when power off the module. Input each signal after the positive/negative voltage becomes stable.
- g. Please keep the temperature within the specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

7. Safety

- a. It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.
- b. If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

8. Limited Warranty

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

9. Return LCM under Warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are:

- Broken LCD glass
- PCB eyelet's damaged or modified
- PCB conductors damaged
- Circuit modified in any way, including addition of components.
- PCB tampered with by grinding, engraving or painting varnish.
- Soldering to, or modifying the bezel in any manner.

Module repairs will be invoiced to customer upon mutual agreement. Modules must be returned with sufficient description of failure or defects. Any connectors or cable installed by customer must be removed completely without damaging the PCB eyelet's, conductors and terminals.

Product Specification

TP0085

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1. Introduction

The purpose of this specification is defined the general provision and quality requirement apply to 7 inch Capacitive Touch module integrated by Crystal Clear Technology. This document, together with the module drawing, is the highest level specification for this product. When users touch module by finger, the module can send coordinates of point at the contact point to host. The finger position information is sent to host by I2C bus which is determined by host through IRQ line.

2. General Description

This document contains the Capacitive Touch module specification. The maximum rating, characteristics, hardware, and inspection of the module are described in the subsequent sections. In special, I2C protocol will be introduced in detail.

2.1. Touch sensor characteristics

- Technology: Use the character of capacitive among the touch electrodes on touch panel to identify the positions of touch signals
- Touch method: Ten fingers multi touch with pressure sensing
- Interface: I2C

2.2. General Specification

Item	Specification	Unit
Screen Diagonal	7.0	Inch
Applied Resolution	800 x 480	pixel
Module Outline	100(H) x 164.1(W) x 1.4(T) (Excluded FPC)	Mm
Touch Area	(H) x (W)	Mm
Cover Lens Material	Glass	-
Transparency	85	%
Origin	-	-
Controller	GT911	-

3. Absolute Maximum Ratings

Absolute Maximum rating of touch panel module is as following

Symbol	Parameter	Value	Unit
VCORE	Supply Voltage for Logic	-0.3 to +2.8	V
VDDIO	Supply Voltage for I/O	-0.3 to +3.3	V
TA	Operating Temperature	-20 to +85	°C
TSTG	Storage Temperature	-30 to +85	°C

Note: If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also, if the module operated with the absolute maximum ratings for a long time, its reliability may drop.

4. Electrical Characteristics

DC Characteristics (Unless otherwise specified, Voltage Referenced to VSS, TA = -20 to 85°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
AVDD	Analog power supply		2.8	-	3.3	V
VDDIO	Digital I/O power supply		1.8	-	3.3	V
IDD	Operating mode current		-	8	14.5	mA
IGR	Green mode current		-	3.3	-	mA
Isleep	Sleep mode current		70	-	120	uA
VOH1	Logic High Output Voltage		0.85* VDDIO	-	-	V
VOL1	Logic Low Output Voltage		-	-	0.15* VDDIO	V
VIH1	Logic High Input voltage		0.75* VDDIO	-	VDDIO +3	V
VIL1	Logic Low Input voltage		-0.3	-	0.25* VDDIO	V

5. Pin Definition

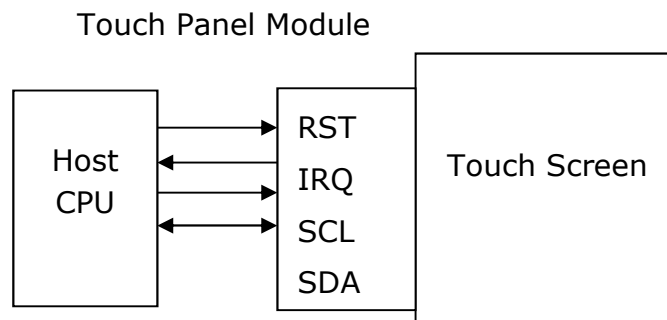
No.	Symbol	I/O	Function
1	RST	I	Sensor system global reset
2	VDD	P	Power supply
3	VSS	P	Ground
4	IRQ	O	Sensor data ready request
5	SDA	I/O	I2C serial data
6	SCL	I	I2C serial clock

6. I2C Interface

Touch panel is used as I2C Slave Device, I2C Slave address is 0x14.

6.1. Interface Diagram

The system block diagram is as shown in below. There are three communication pins connected between CPU and Touch Panel Module which are including external interrupt IRQ, I2C pins SCL and SDA. The IRQ is active low while the touch state is calculated by Touch Panel Module and the touch information can be translated via I2C communication interface. The I2C data format, protocol and report packet are described as following.



6.2. Timing Characteristic

Conditions:

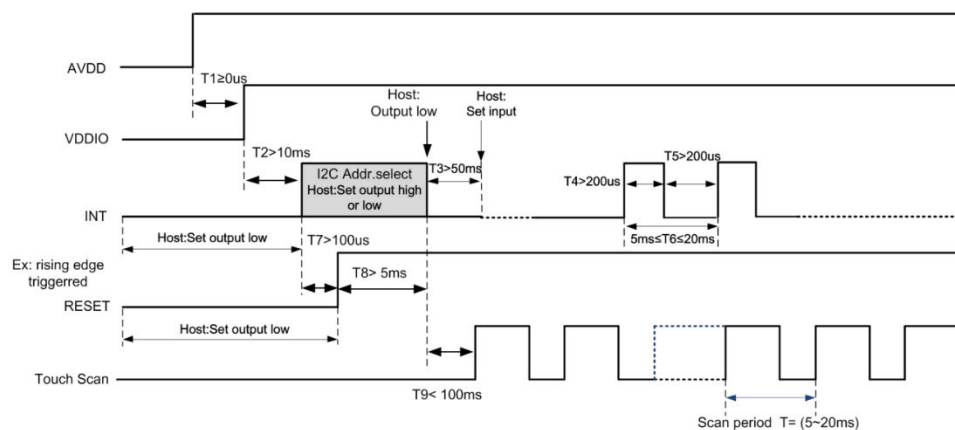
$V_{DD} - V_{SS} = 2.5 \text{ TO } 3.3\text{V}$

$T_A = 25^\circ\text{C}$

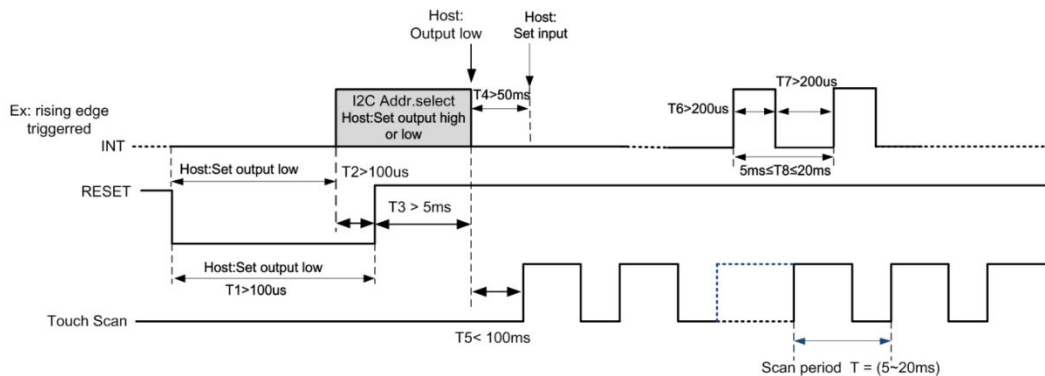
400Kbps transmission rate, 2K pull-up resistor

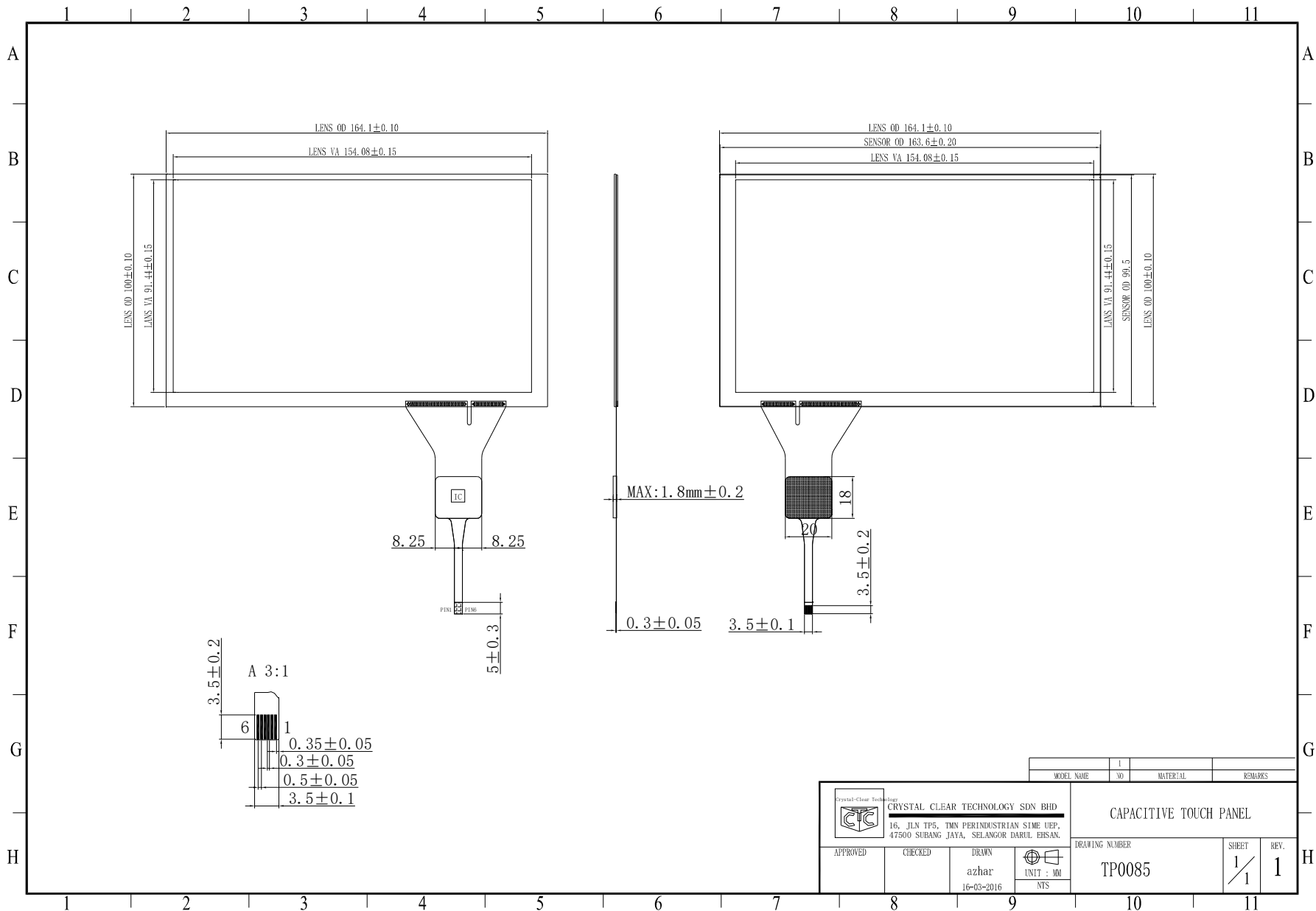
Symbol	Parameter	Min	Typ	Max	Unit
T _{lo}	SCL low period	1.3	-	-	us
t _{hi}	SCL high period	0.6	-	-	us
t _{st1}	SCL setup time for Start condition	0.6	-	-	us
t _{st3}	SCL setup time for Start condition	0.6	-	-	us
t _{hd1}	SCL setup time for Start condition	0.6	-	-	us
t _{st2}	SDA setup time	0.1	-	-	us
t _{hd2}	SDA hold time	0	-	-	us

Power On Timing:



Timing for host resetting





Crystal Clear Technology
CRYSTAL CLEAR TECHNOLOGY SDN BHD
 16, JLN TPS, TMN PERINDUSTRIAN SIMP. UEP,
 47500 SUBANG JAYA, SELANGOR DARUL EHSAN.

CAPACITIVE TOUCH PANEL

APPROVED	CHECKED	DRAWN	UNIT : MM
		azhar	NTS
		16-03-2016	

MODEL NAME	1	MATERIAL	REMARKS
	NO		
DRAWING NUMBER			
TP0085			
SHEET			REV.
1/1			1