Crystal Clear Technology

Product Specification

T1010A02X00

(REVISION 4)

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	Capacitive Touch Panel Specification	

2.0 Record of Revision

Rev	Date	Item	Page	Comment	Originator	Checked By
1.0	20/02/17			Initial Release	Azhar	WHong
2.0	03/11/17			Update CTP Specification Add F00C version	Azhar	Azhar
3.0	16/11/17			Update Mechanical spec Remove F00C version, add in C00C version.	Azhar	Azhar
4.0	1/3/18			Update CTP specification	Othman	WHong

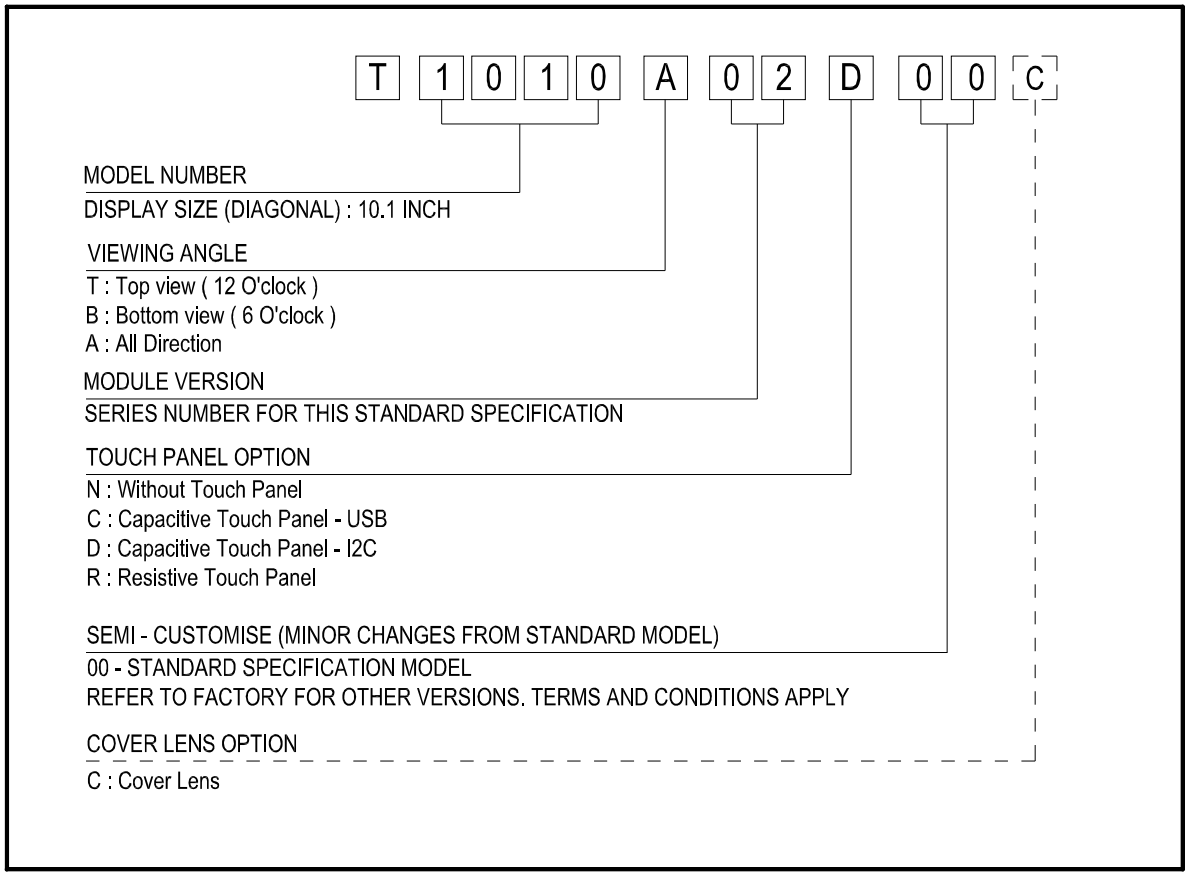
3.0 General Specification

T1010A02X00 is 10.1” colour TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs control circuit, LED backlight and Capacitive Touch Panel. By applying 1280×800 images are displayed on the 10.1” diagonal screen. Display 16.7M colours by R.G.B signal input.

General Specification are summarized in the following table:

Item	Contents	Unit	Note
LCD Type	10.1” TFT	-	
Display colour	16.7M	-	1
Viewing Direction (Optimum View)	ALL	O ’Clock	
Display Mode	Transmissive, Normally Black	-	
Operating temperature	-0~+50	℃	
Storage temperature	-20~+60	℃	
Module size	262.7 X 178.7 X 4.42	mm	2
Active Area(W×H)	216.96 X 135.60	mm	
Number of Dots	1280×RGB×800	dots	
Pixel Size	0.1695 x 0.1695	mm	
Controller	-	-	
Backlight	36 White LEDs	pcs	
Brightness	280 (min)	cd/m2	3
Interface Mode	LVDS	-	
Data Transfer	RGB	-	

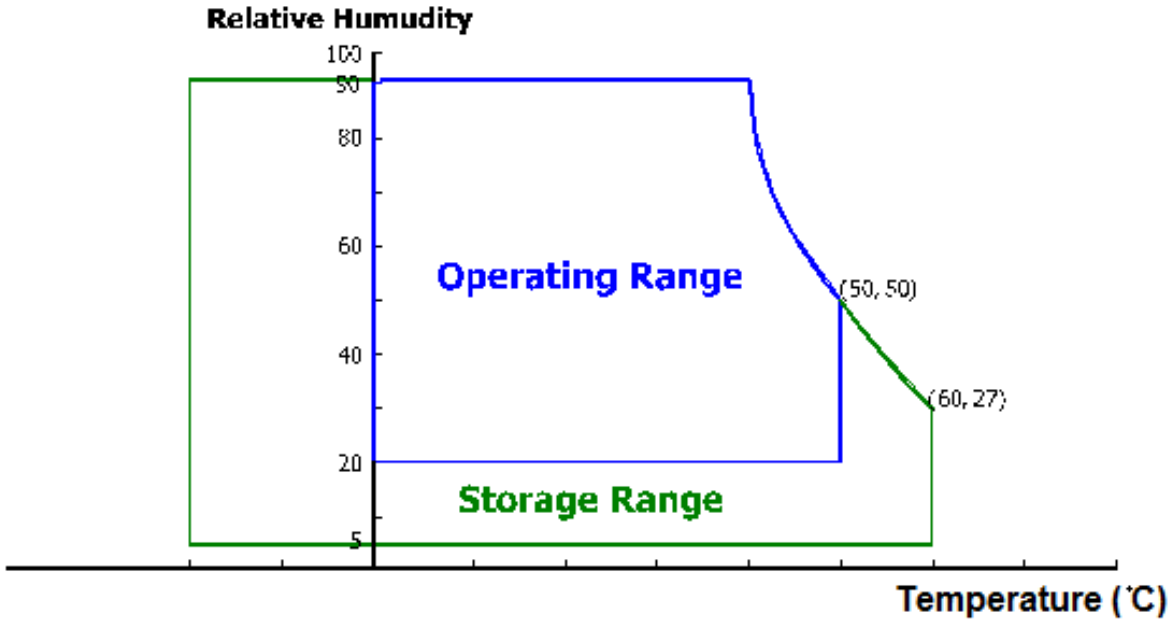
Note 1: Colour tone is slightly changed by temperature and driving voltage.
Note 2: Include cover lens. FPC or wire are not included.
Note 3: Measured at TFT surface.


T 1 0 1 0 A 0 2 D 0 0 C
MODEL NUMBER
DISPLAY SIZE (DIAGONAL) : 10.1 INCH
VIEWING ANGLE
T : Top view (12 O'clock)
B : Bottom view (6 O'clock)
A : All Direction
MODULE VERSION
SERIES NUMBER FOR THIS STANDARD SPECIFICATION
TOUCH PANEL OPTION
N : Without Touch Panel
C : Capacitive Touch Panel - USB
D : Capacitive Touch Panel - I2C
R : Resistive Touch Panel
SEMI - CUSTOMISE (MINOR CHANGES FROM STANDARD MODEL)
00 - STANDARD SPECIFICATION MODEL
REFER TO FACTORY FOR OTHER VERSIONS. TERMS AND CONDITIONS APPLY
COVER LENS OPTION
C : Cover Lens

4.0 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage (LCD Module)	V_{DD}	-0.3	4.2	V	
Backlight Supply Voltage	HV_{DDOUT}	-0.3	18	V	
Backlight Current	I_{HVDD}	-	96	mA	
Backlight Reverse Voltage	V_R	-	2	V	
Operating Temperature	T_{OP}	0	+50	℃	Note1
Storage Temperature	T_{ST}	-20	+60	℃	

Note 1: Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be 39°C (max) and no condensation of water.



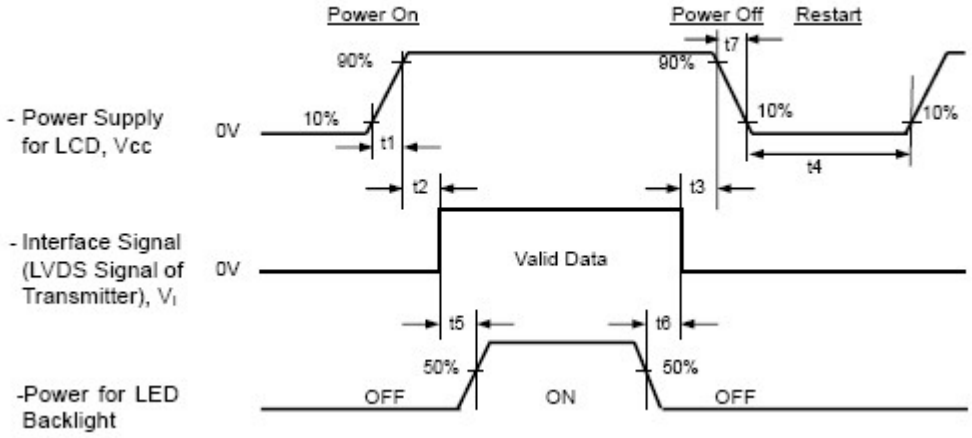
5.0 Electrical Characteristics

5.1 TFT LCD

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
Power Supply Input Voltage	VDD	3.0	3.3	3.6	V	Note 1
Power Supply Current	IDD	-	303	-	mA	
LED Driver Power Supply Voltage	HVDD	3	-	18	V	Note 2
LED Driver Power Supply Current	IHVDD	-	568	-	mA	
LED Driver Efficiency	η	-	85	-	%	
Positive-going Input Threshold Voltage	VIT+	-	-	+100	mV	Vcom = 1.2V typ.
Negative-going Input Threshold Voltage	V_{IT-}	-100	-	-	mV	
Differential input common mode voltage	Vcom	-	1.2	-	V	V_{IH}=100mV, V_{IL}=-100mV
Power Consumption	P_D	-	1.0		W	
	P_{BL}	-	2.4		W	Have Driver
	PTotal	-	3.4		W	

5.2 Power Signal sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	0	-	30	ms
T4	200	-	-	ms
T5	200	-	-	ms
T6	200	-	-	ms

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

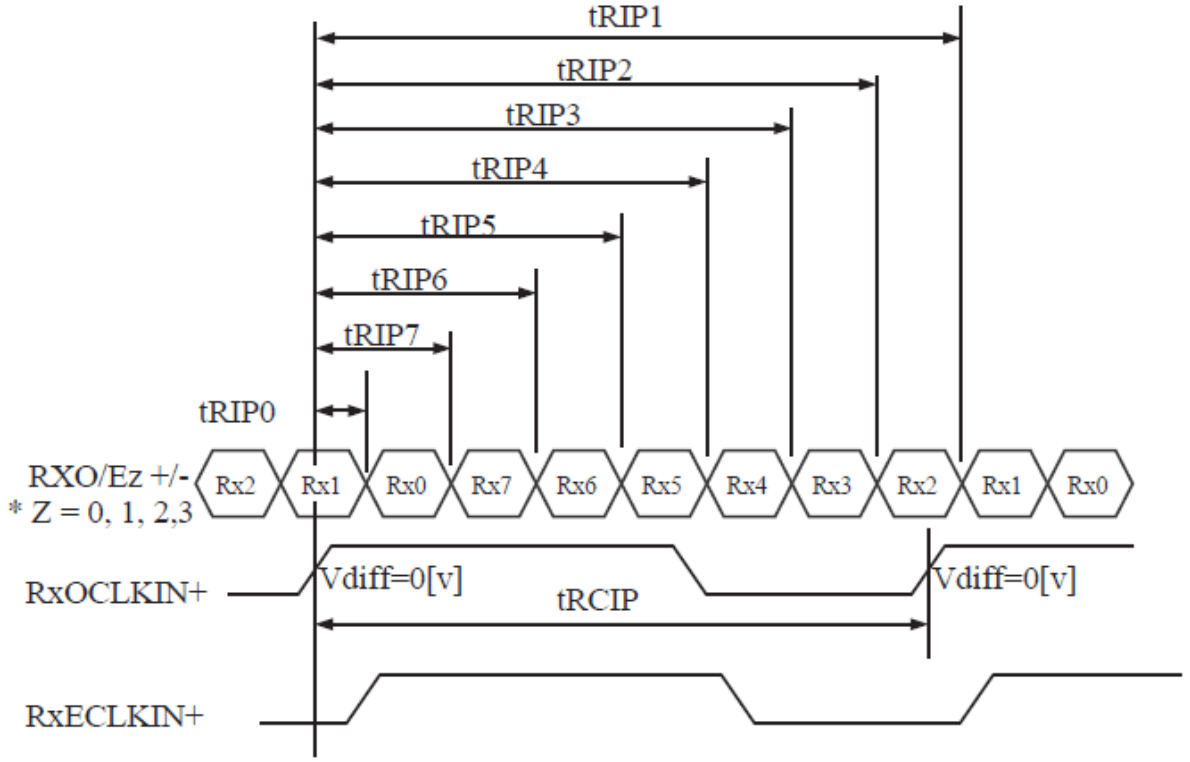
5.3 Signal Timing Specification

5.3.1 This model only operated by the DE

Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock	Frequency	1/Tc	60	65	80	MHz
	Cycle	Tc	16.66	15.38	12.5	ns
Data Enable	Horizontal Period	THd	1280	1280	1280	Tc
	Horizontal Cycle	TH	1310	1330	1560	TC
		TH_time	19.5	20.46	21.83	ns
	Vertical Period	TVd	800	800	800	TC
	Vertical Cycle	TV		812		TC

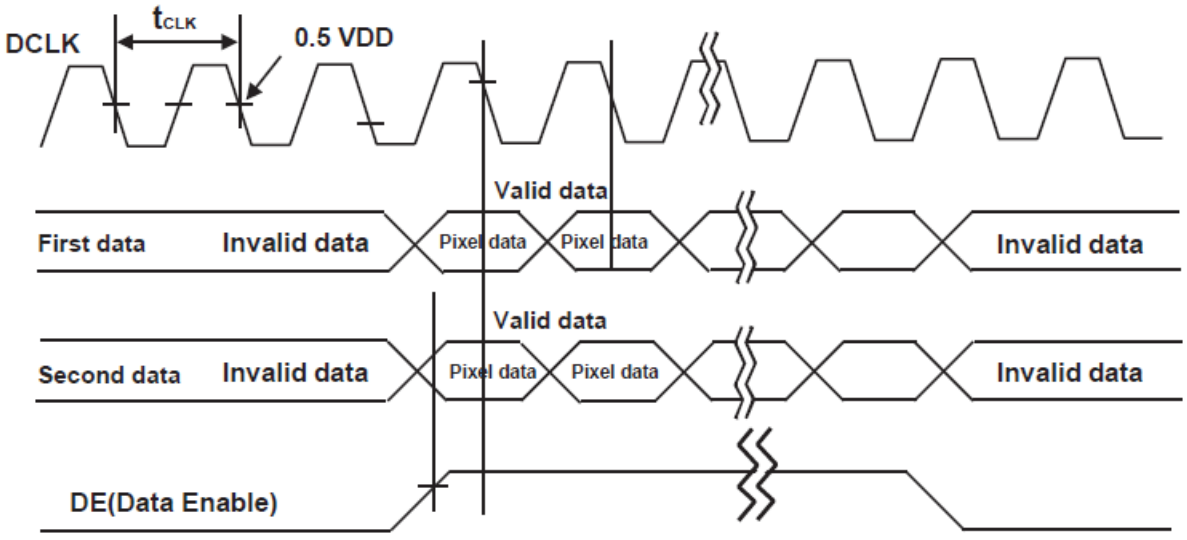
5.3.2 LVDS Rx Interface Timing Parameter

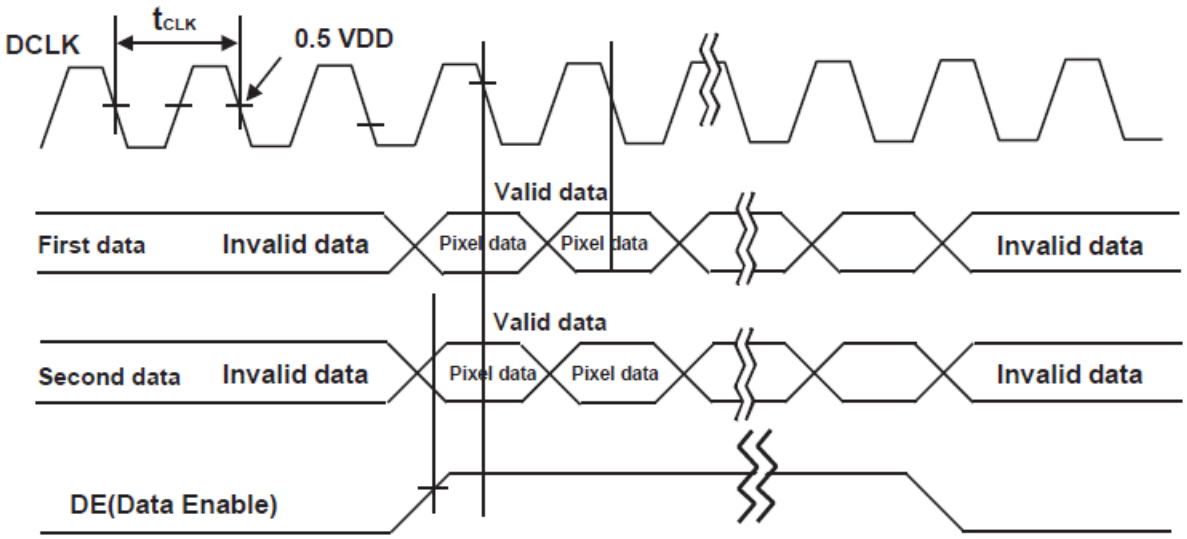
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	14.88	19.53	24.51	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRICP/7-0.4	tRICP/7	tRICP/7+0.4	nsec	
Input Data 2	tRIP7	2 ×tRICP/7-0.4	2 ×tRICP/7	2 ×tRICP/7+0.4	nsec	
Input Data 3	tRIP6	3 ×tRICP/7-0.4	3 ×tRICP/7	3 ×tRICP/7+0.4	nsec	
Input Data 4	tRIP5	4 ×tRICP/7-0.4	4 ×tRICP/7	4 ×tRICP/7+0.4	nsec	
Input Data 5	tRIP4	5 ×tRICP/7-0.4	5 ×tRICP/7	5 ×tRICP/7+0.4	nsec	
Input Data 6	tRIP3	6 ×tRICP/7-0.4	6 ×tRICP/7	6 ×tRICP/7+0.4	nsec	
Input Data 7	tRIP2	7×tRICP/7-0.4	7 ×tRICP/7	7 ×tRICP/7+0.4	nsec	



* Vdiff = (RXO/Ez+)-(RXO/Ez-),…. ,(RXO/ECLK+)-(RXO/ECLK-)

5.4 Signal Timing Waveforms of Interface Signal





5.5 Input Signals, Basic Display Colours and Grey Scale of Colours

Color & Gray Scale		Input Data Signal																							
		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
Basic Colors	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
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	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	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	1
Gray Scale of 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	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of 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	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	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	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	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	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

6.0 Interface Connection

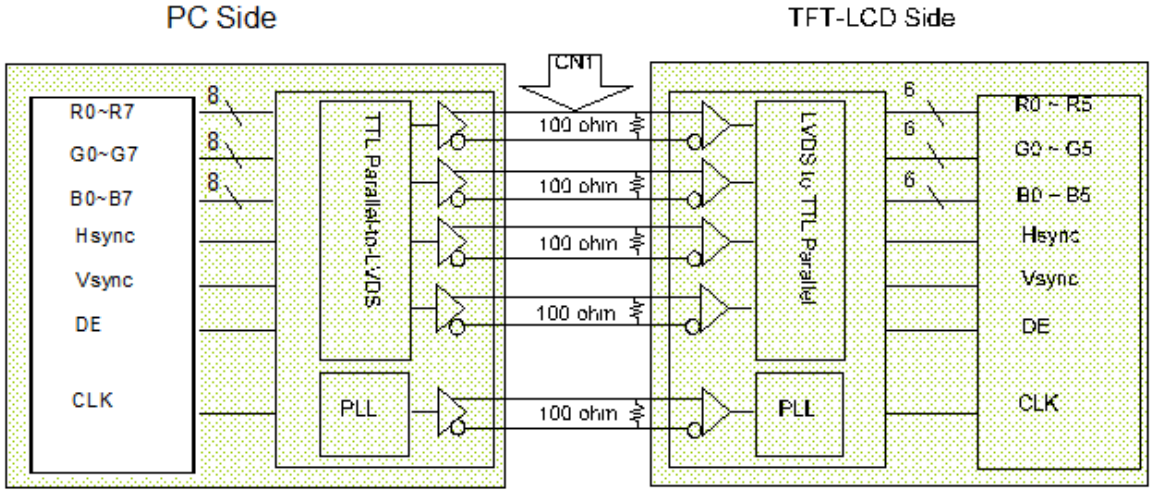
6.1 Electrical Interface Connection.

The electrical interface connector is 20455-040E-12

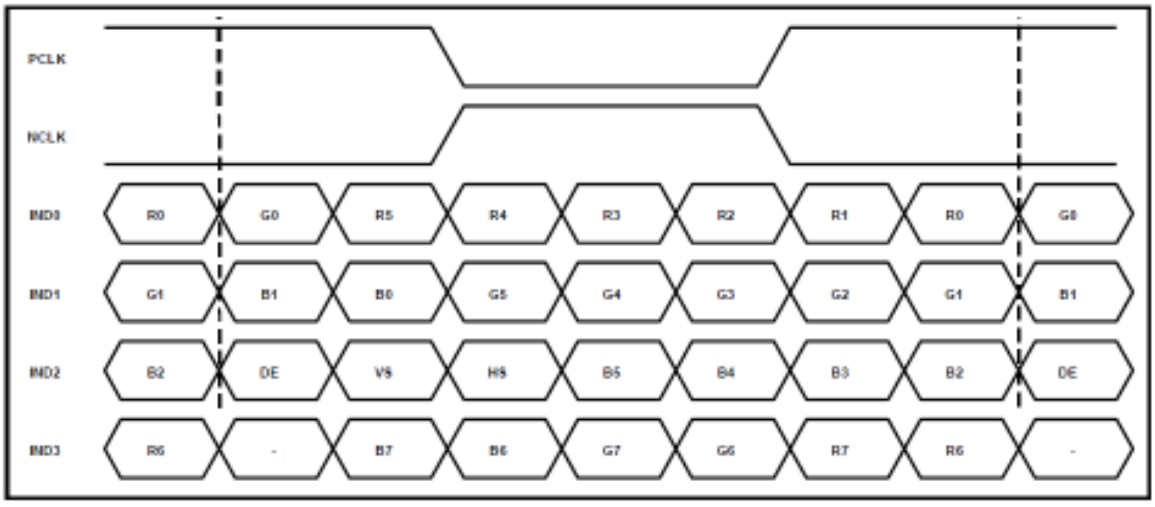
Pin No.	Symbol	Function
1	NC	Non Connection
2	VDDIN	Power supply VDDIN=3.3V (Typ.)
3	VDDIN	
4	VDC	Power supply VDC=3.3V (Typ.)
5	NC	Non Connection
6	CLK EDID	CLK for EDID function use
7	Data EDID	CLK for EDID function use
8	RIN0-	LVDS Negative data signal (-)
9	RIN0+	LVDS Positive data signal (+)
10	GND	GROUND
11	RIN1-	LVDS Negative data signal (-)
12	RIN1+	LVDS Positive data signal (+)
13	GND	GROUND
14	RIN2-	LVDS Negative data signal (-)
15	RIN2+	LVDS Positive data signal (+)
16	GND	GROUND
17	LVDS_CLK-	LVDS Negative CLK signal (-)
18	LVDS_CLK+	LVDS Positive CLK signal (+)
19	GND	GROUND
20	RIN3-	LVDS Negative data signal (-)
21	RIN3+	LVDS Positive data signal (+)
22	CE_EN	Color engine enable
23	NC	Non Connection
24	NC	Non Connection
25	GND	GROUND
26	NC	Non Connection
27	NC	Non Connection
28	GND	GROUND
29	NC	Non Connection
30	NC	Non Connection

31	LED_GND	LED GROUND
32	LED_GND	
33	LED_GND	
34	NC	Non Connection
35	LED_PWM	LED driver PWM duty
36	LED_EN	LED driver enable
37	CABC_EN	CABC function enable
38	VLED	Power Supply VLED = 3 ~ 18V (typ)
39	VLED	
40	VLED	

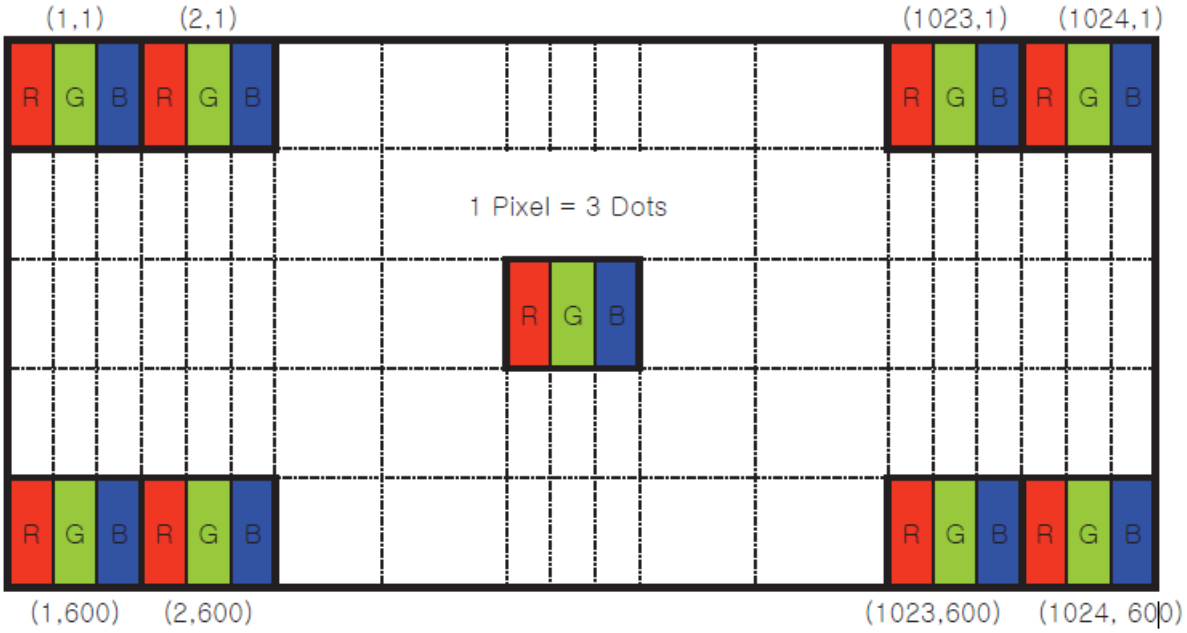
6.2 LVDS Interface



6.3 LVDS Input Signal



6.4 Data Input Format



Display Position of Input Data (V-H)

7.0 Optical Characteristics

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	70	80	-	degree	Note 1
	θR	Φ=0°(3 o'clock)	70	80	-		
	θ_T	Φ=90°(12 o'clock)	70	80	-		
	θB	Φ=270°(6 o'clock)	70	80	-		
Response time Rise + Fall	TRT	Normal θ=Φ=0°	-	30	45	msec	Note 3
Contrast ratio	CR		600	-	-	-	Note 4
Colour chromaticity	R_X		Typ-0.03	0.600	Typ + 0.03	-	
	R_Y			0.340		-	
	G_X			0.315		-	
	G_Y			0.565		-	
	B_X			0.150		-	
	B_Y			0.125		-	
	W_X			0.313		-	Note 2 Note 5 Note 6
	W_Y			0.329		-	
Luminance	L		280	330		-	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 6,7
Cross talk	CT		-	-	2.0	%	Note 8

Note 1: Definition of viewing angle range

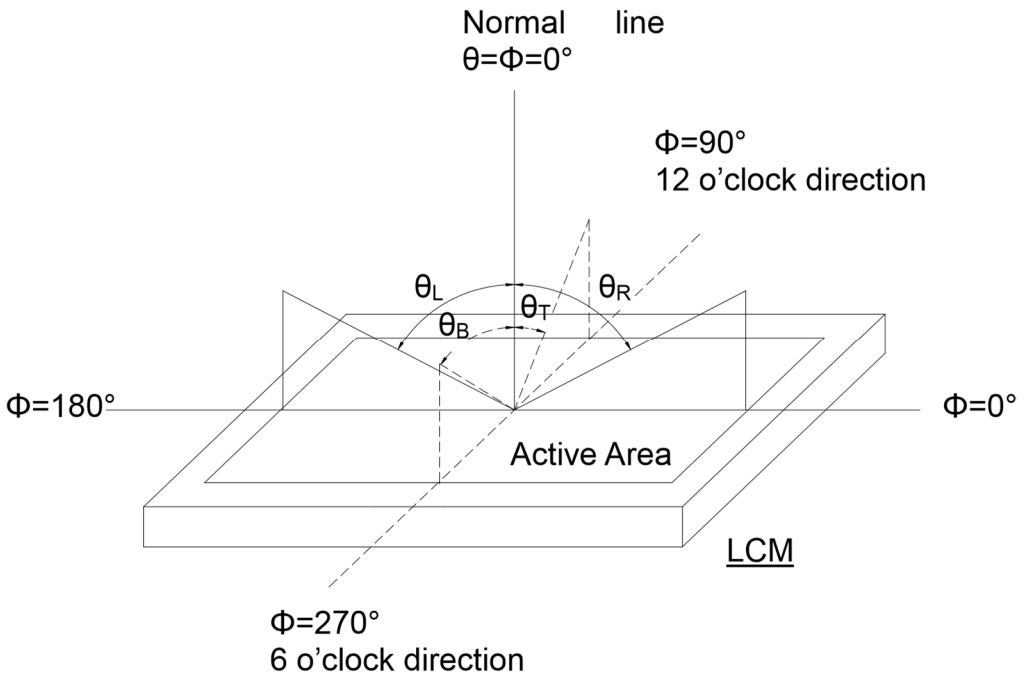


Fig. 4-1 Definition of viewing angle Note

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the centre point of the LCD screen. Viewing angle is measured by ELDIM-EZ contrast/Height: 1.2mm. Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

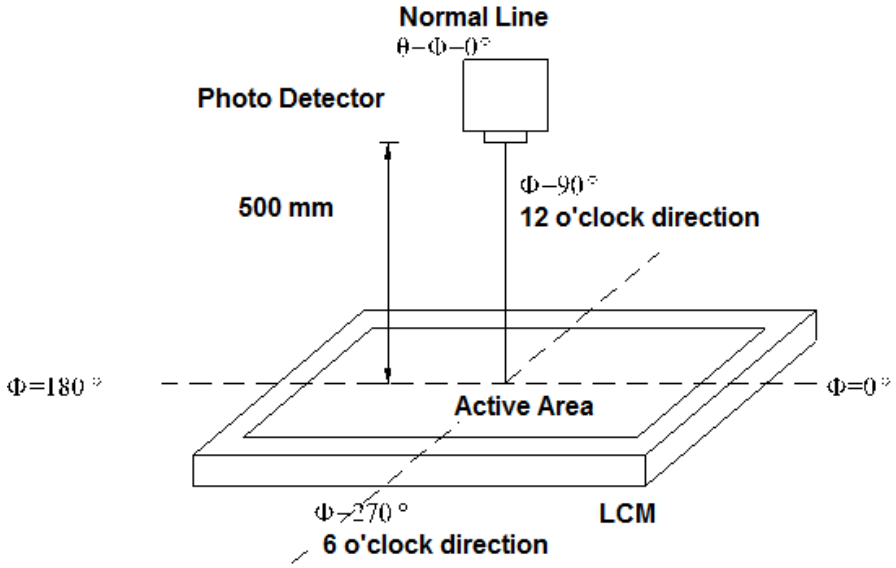


Fig. 4.2 Optical measurement system setup

Note 3: Definition of Response time

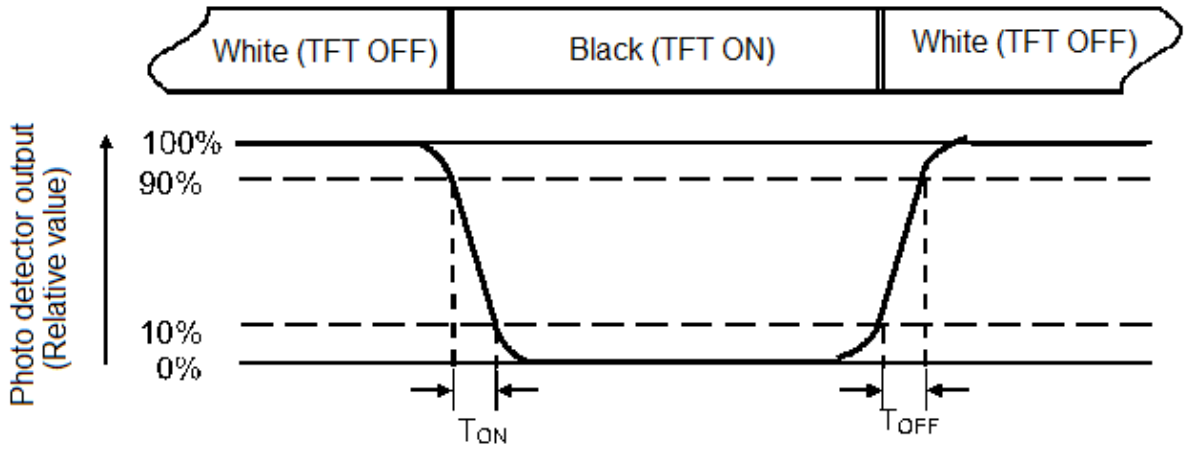


Fig. 4-3 Definition of response time

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 colour chromaticity (CIE1931)
Colour coordinates measured at centre point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the centre area of the panel. The LED driving condition is I_{LED}=240mA.

Note 7: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the centre of each measuring area.

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

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

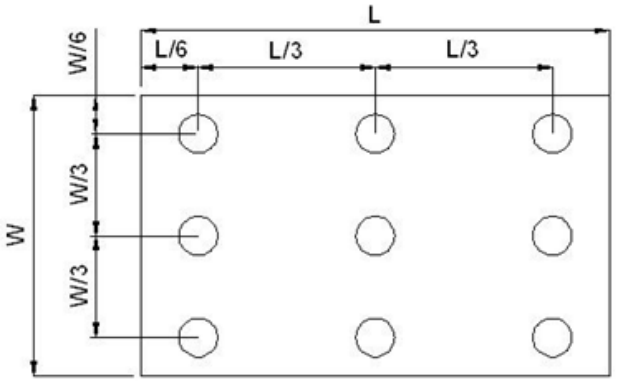
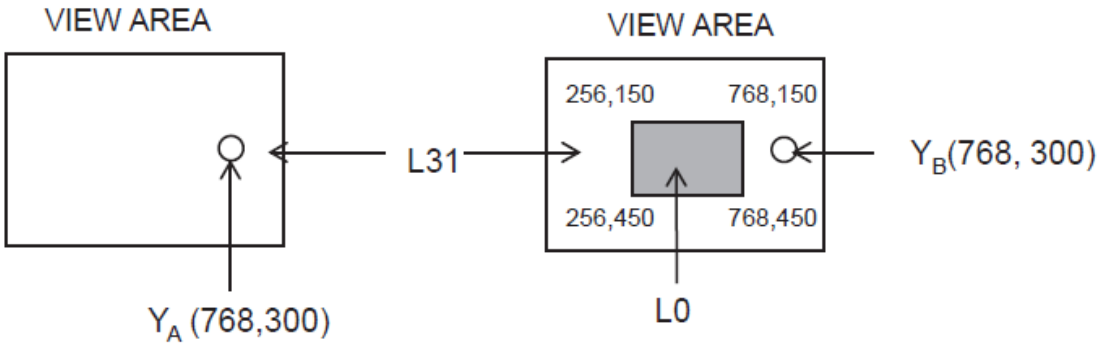


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

Note 8: Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark. (See FIGURE5).

Figure 5: Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$$

Where:

Y_A = Initial luminance of measured area (cd/m^2)
Y_B = Subsequent luminance of measured area (cd/m^2)

8.0 Reliability Test

Item		Test Condition
Operating	High Temperature	50degC, 96 hrs
	Low Temperature	0degC,96 hrs
Storage	High Temperature	60degC, 240hrs and recovery for 2hrs
	Low Temperature	-20degC, 240hrs and recovery for 2hrs
	High Temperature and High Humidity	50degC, 90%RH, 240hrs and recovery for 2 hrs
Thermal	Cycle	Rt → -20degV → Rt → 60degC → RT 0min 30min 5min 30min 5min 50 cycles (Power off)
	Shock	Rt → -20degV → 60degC 0min 30min 30min 50 cycles (Power off)

Rt means Room Temperature

9.0 Precaution for Using TFT Modules

1. Handing 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 colour 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 colour 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

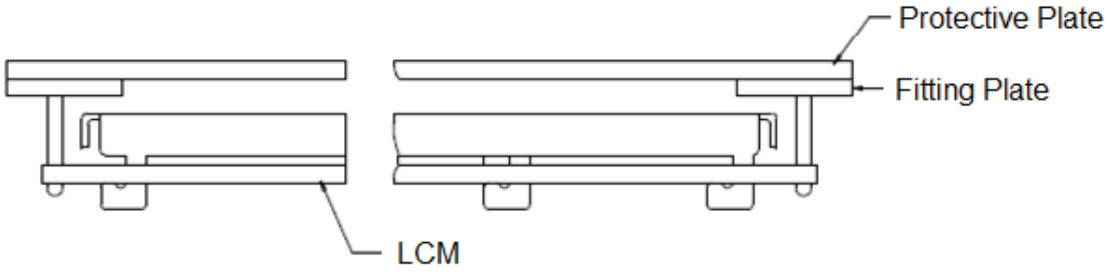
   a. Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.
   b. If the LCD modules have been operating for 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

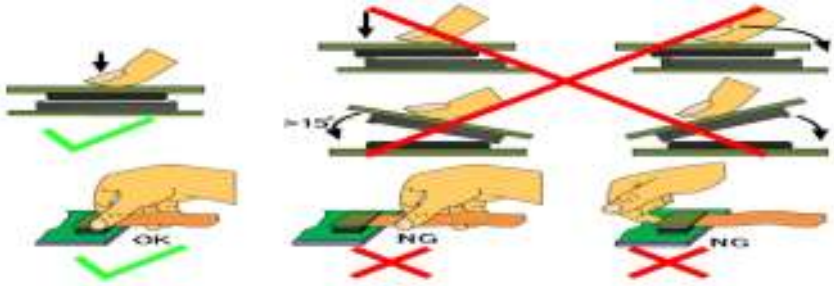
a. Installing LCD Modules
   The hole in the printed circuit board is used to fix LCM as shown in the picture below.
   Attend to the following items when installing the LCM.

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 colour 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

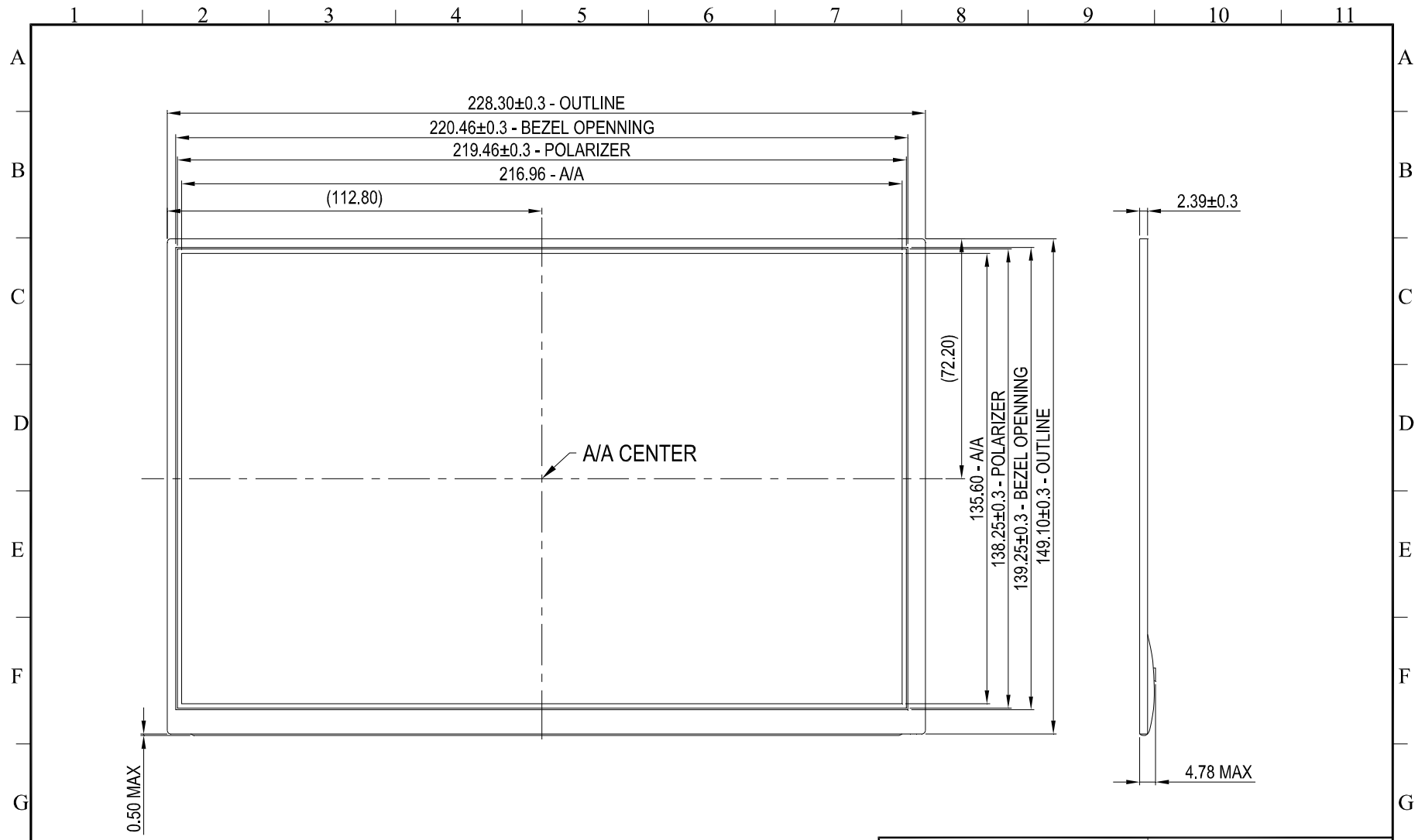
   Unless otherwise agreed between Crystal Clear Technology and customer, Crystal Clear Technology will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with Crystal Clear Technology acceptance standards, for a period of one year 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:

i. Broken LCD glass
ii. PCB eyelet's damaged or modified
iii. PCB conductors damaged
iv. Circuit modified in any way, including addition of components.
v. PCB tampered with by grinding, engraving or painting varnish.
vi. 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.



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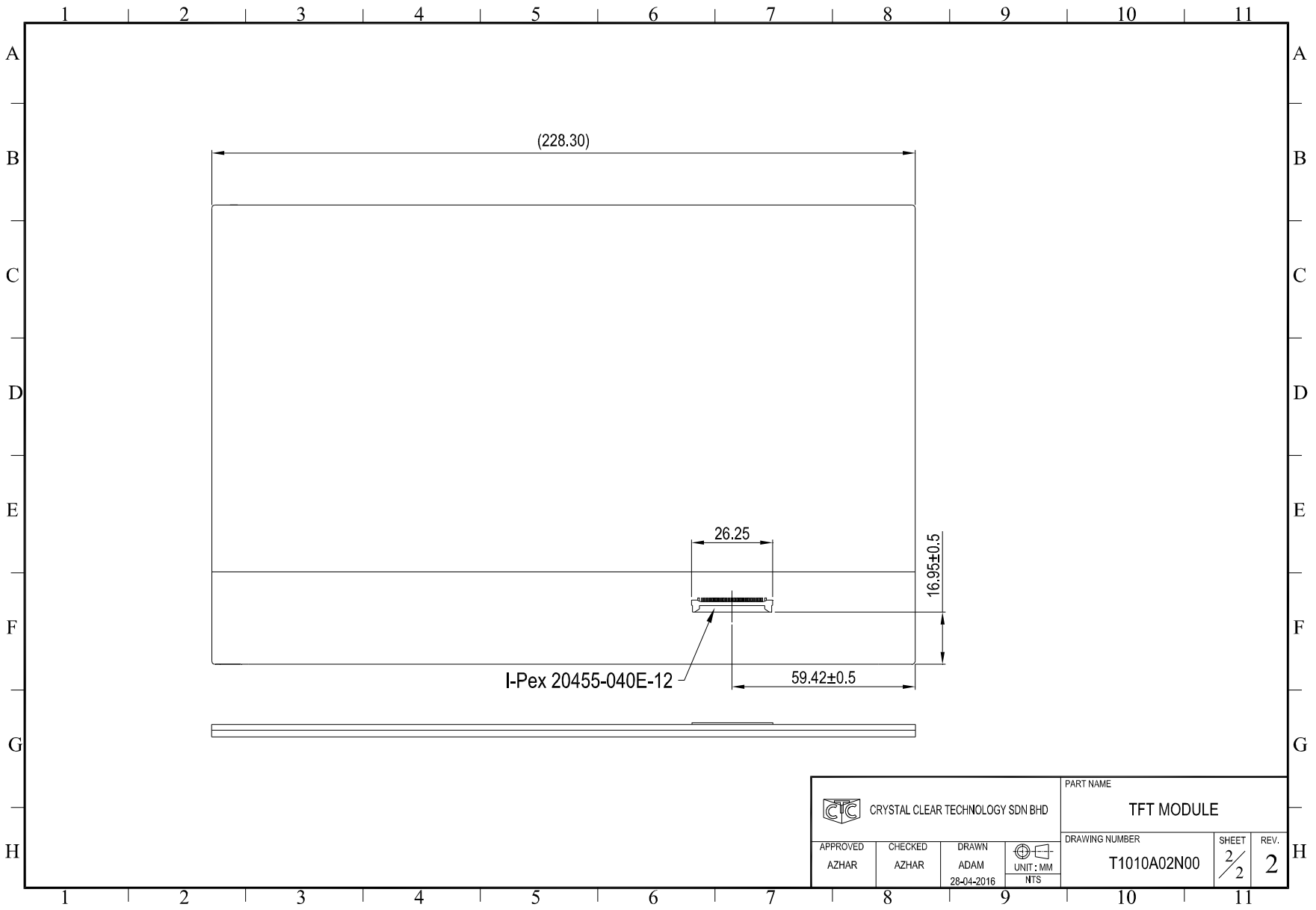
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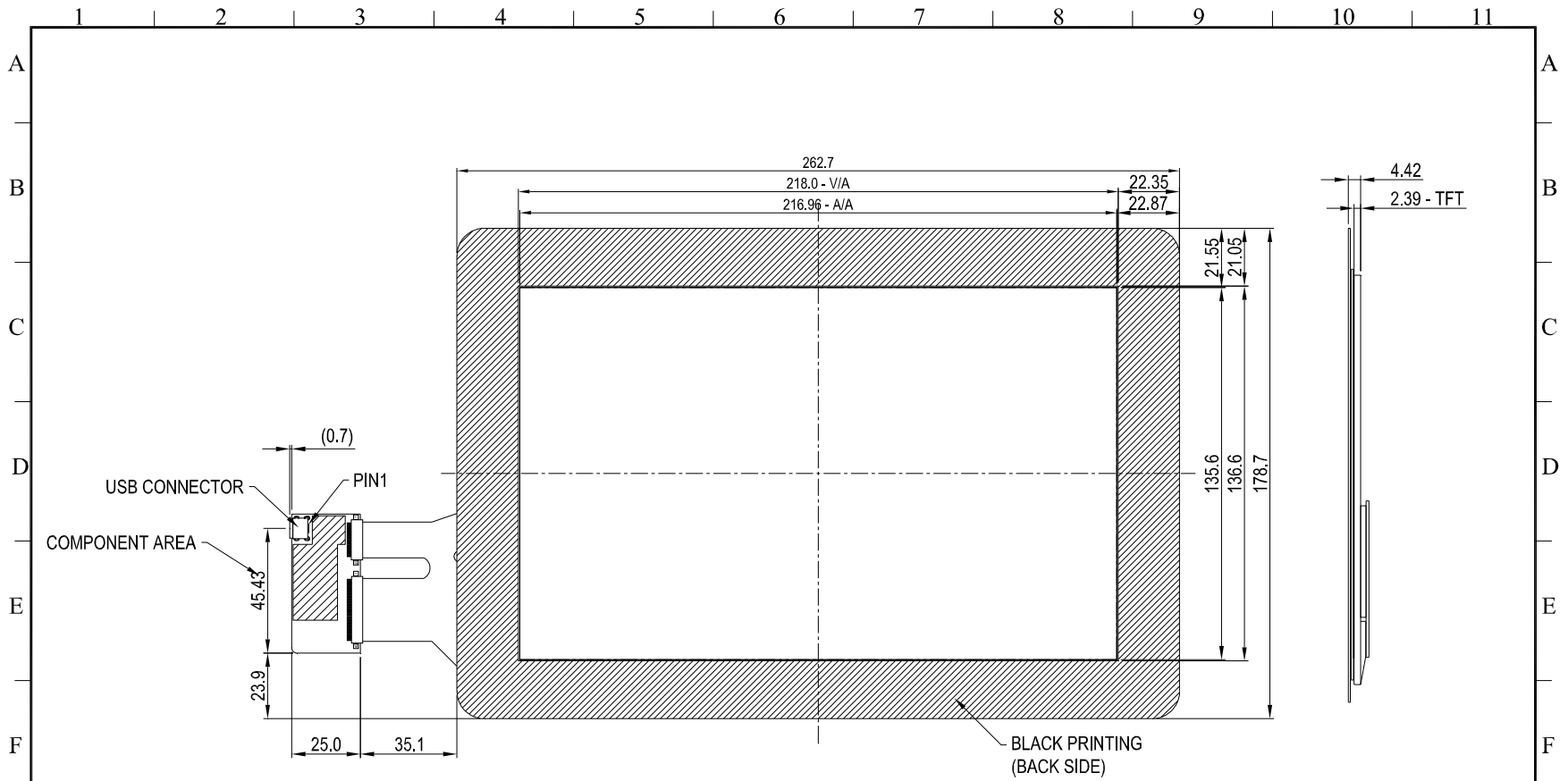
26.25
16.95±0.5
I-Pex 20455-040E-12
59.42±0.5
CRYSTAL CLEAR TECHNOLOGY SDN BHD
PART NAME
TFT MODULE
APPROVED
AZHAR
CHECKED
AZHAR
DRAWN
ADAM
28-04-2016
UNIT : MM
NTS
DRAWING NUMBER
T1010A02N00
SHEET
2/2
REV.
2



CTP PINOUT

NO	SYMBOL
1	VBUS
2	D-
3	D+
4	NC
5	GND

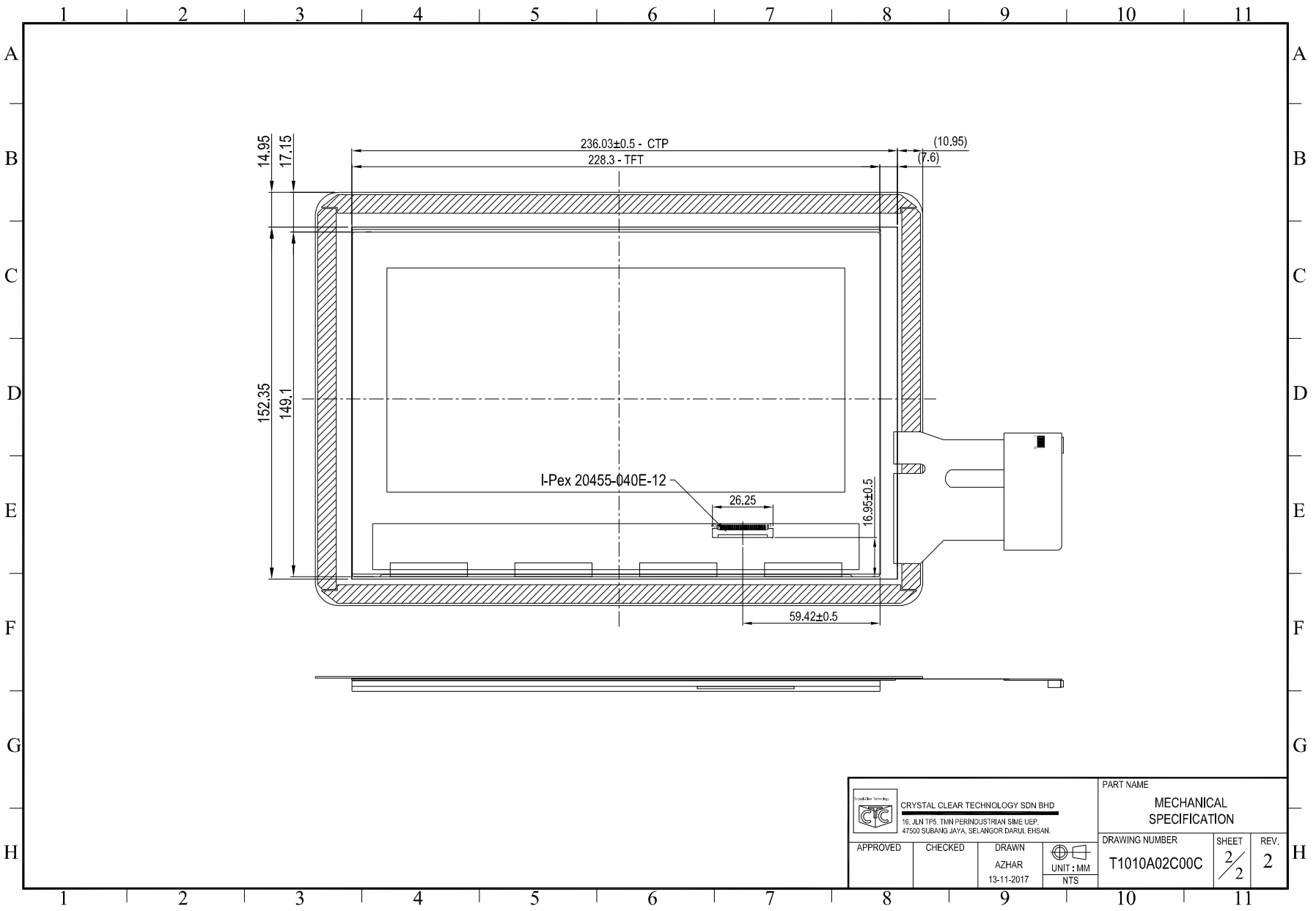
PIN NO.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
SYMBOL	VCOM	DVDD	DVDD	NC	Reset	STBYB	GND	NIND0	PIND0	GND	NIND1	PIND1	GND	NIND2	PIND2	GND	NINC	PINC	GND	NIND3
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		37	38	39	40
PIND3	GND	NC	NC	GND	NC	NC	SELB	AVDD	GND	LED-K	LED-K	NC	NC	VGL	NC		NC	VGH	LED-A	LED-A

CRYSTAL CLEAR TECHNOLOGY SDN BHD
16, JLN TP5, TMN PERINDUSTRIAN SIME UEP,
47500 SUBANG JAYA, SELANGOR DARUL EHSAN.

APPROVED	CHECKED	DRAWN	UNIT : MM
		AZHAR 13-11-2017	NTS

PART NAME: MECHANICAL SPECIFICATION

DRAWING NUMBER: T1010A02C00C | SHEET: 1/2 | REV.: 2


14.95
17.15
236.03±0.5 - CTP
228.3 - TFT
(10.95)
(7.6)
152.35
149.1
I-Pex 20455-040E-12
26.25
16.95±0.5
59.42±0.5
CRYSTAL CLEAR TECHNOLOGY SDN BHD
16, JLN TP5, TMN PERINDUSTRIAN SIME UEP,
47500 SUBANG JAYA, SELANGOR DARUL EHSAN.
PART NAME
MECHANICAL SPECIFICATION
APPROVED
CHECKED
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AZHAR
13-11-2017
UNIT : MM
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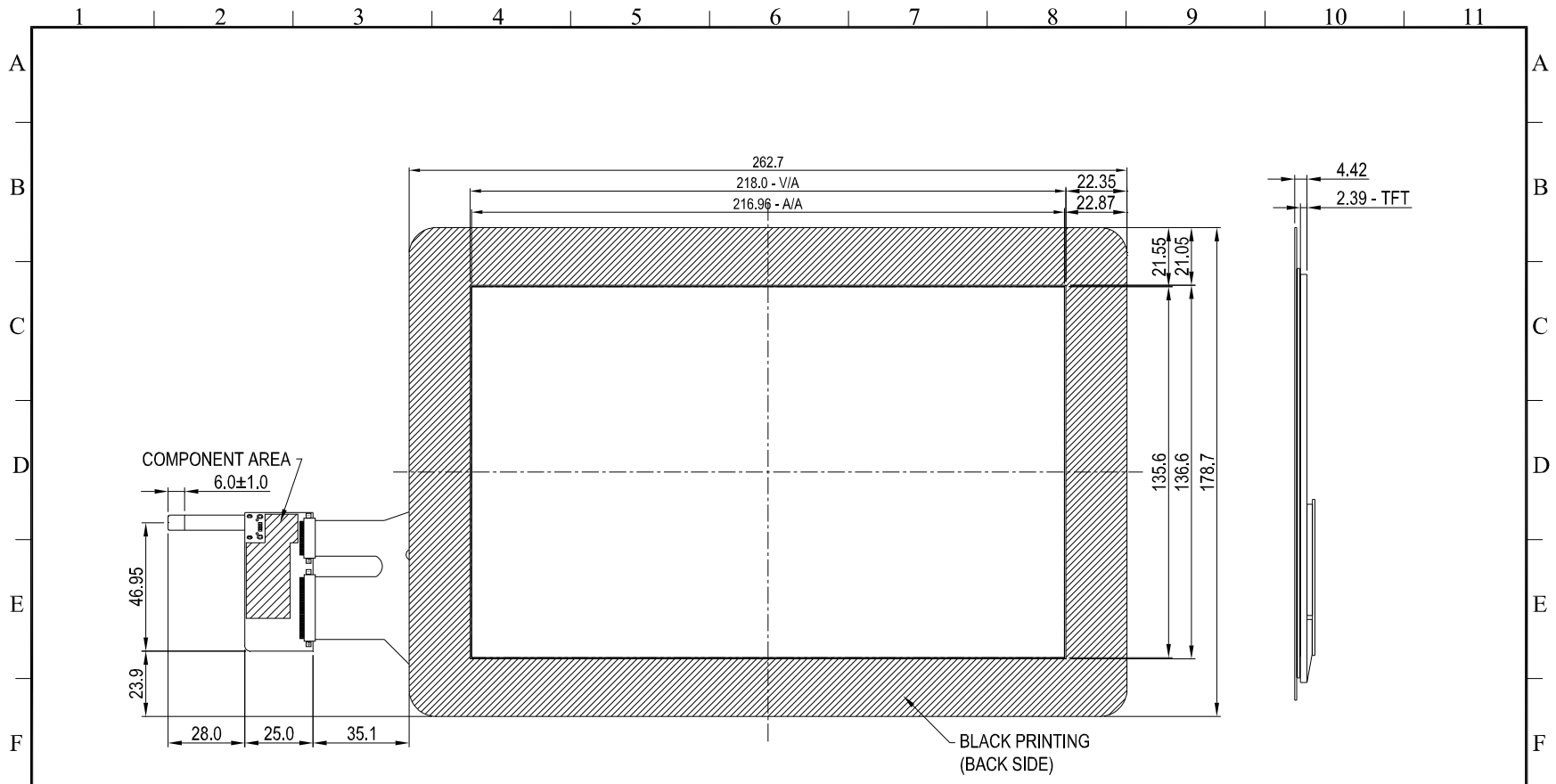
DRAWING NUMBER
T1010A02C00C
SHEET
2/2
REV.
2



PIN NO.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
SYMBOL	VCOM	DVDD	DVDD	NC	Reset	STBYB	GND	NIND0	PIND0	GND	NIND1	PIND1	GND	NIND2	PIND2	GND	NINC	PINC	GND	NIND3
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		37	38	39	40
PIND3	GND	NC	NC	GND	NC	NC	SELB	AVDD	GND	LED−K	LED−K	NC	NC	VGL	NC		NC	VGH	LED−A	LED−A

CRYSTAL CLEAR TECHNOLOGY SDN BHD
16, JLN TP5, TMN PERINDUSTRIAN SIME UEP,
47500 SUBANG JAYA, SELANGOR DARUL EHSAN.

APPROVED	CHECKED	DRAWN	UNIT : MM
		AZHAR 13-11-2017	NTS

PART NAME: MECHANICAL SPECIFICATION

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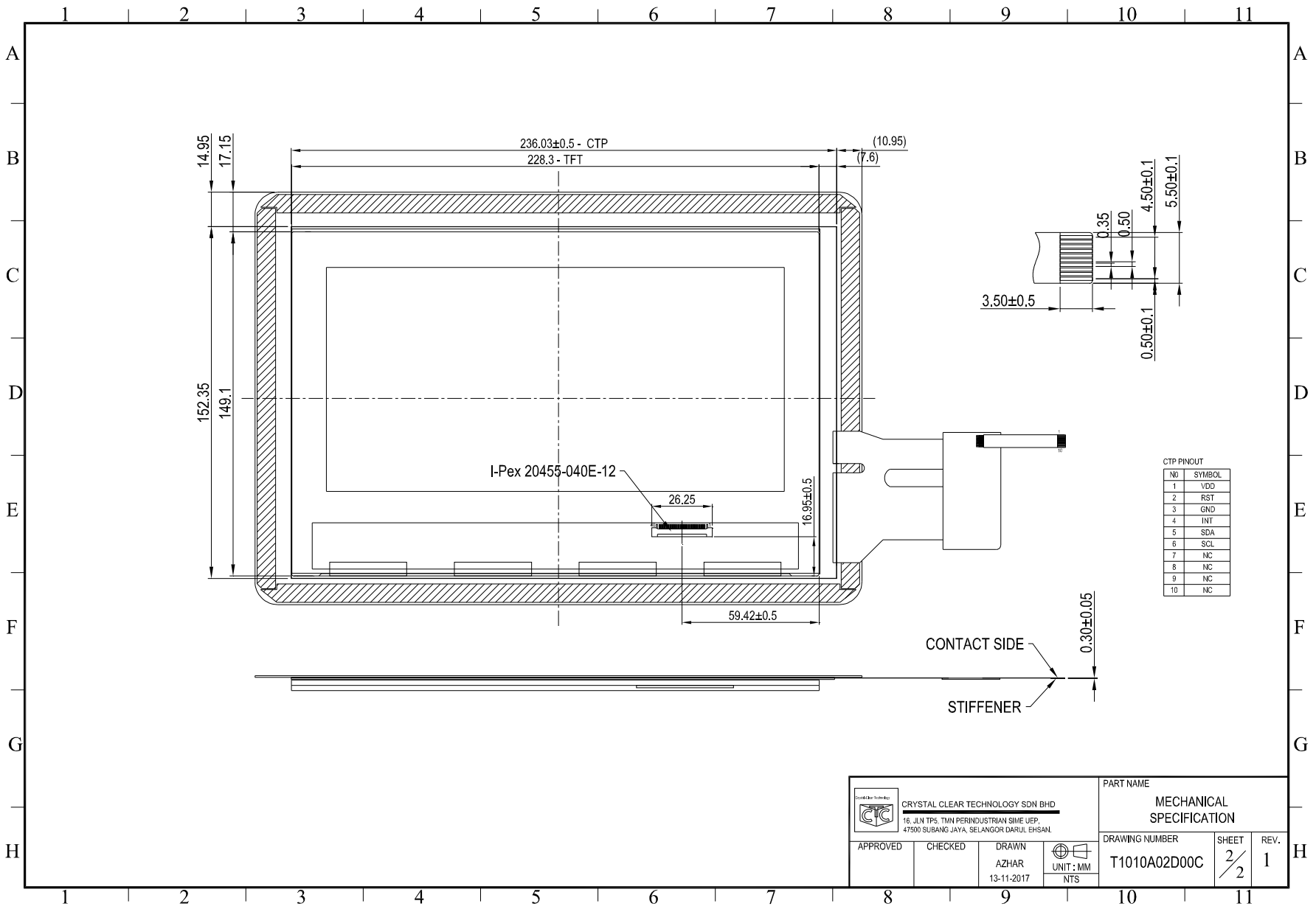
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I-Pex 20455-040E-12
26.25
16.95±0.5
59.42±0.5
0.35
0.50
4.50±0.1
5.50±0.1
3.50±0.5
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0.30±0.05
CONTACT SIDE
STIFFENER
CTP PINOUT
NO SYMBOL
1 VDD
2 RST
3 GND
4 INT
5 SDA
6 SCL
7 NC
8 NC
9 NC
10 NC
CRYSTAL CLEAR TECHNOLOGY SDN BHD
16, JLN TP5, TMN PERINDUSTRIAN SIME UEP,
47500 SUBANG JAYA, SELANGOR DARUL EHSAN.
PART NAME
MECHANICAL SPECIFICATION
APPROVED
CHECKED
DRAWN
AZHAR
13-11-2017
UNIT : MM
NTS
DRAWING NUMBER
T1010A02D00C
SHEET
2/2
REV.
1

Product Specification

CAPACITIVE TOUCH PANEL

Contents

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2. GENERAL DESCRIPTION 2
3. ABSOLUTE MAXIMUM RATINGS 2
4. ELECTRICAL CHARACTERISTICS 3
5. PIN DEFINITION 3

1. Introduction

The purpose of this specification is defined the general provision and quality requirement apply to 10.1 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 USB and I2C bus.

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.

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: USB / I2C

2.2. General Specification

Item	Specification	Unit
Screen Diagonal	10.1	Inch
Applied Resolution	16384 x 9600	Dot
Module Outline	232.23 x 149.60 x 1.1	Mm
Touch Area	216.96 x 135.6	Mm
Cover Lens Material		-
Transparency	85	%
Origin	Top left	-
Controller	ILI2511	-
I2C slave address	0x41	

3. Absolute Maximum Ratings

Absolute Maximum rating of touch panel module is as following

Symbol	Parameter	Value	Unit
V_{DD5}	USB 5V Input Power Supply Voltage	-0.3 to +6.0	V
V_{DD}	CTP Voltage	-0.3 to +3.6	V
TA	Operating Temperature	-40 to +105	°C
TSTG	Storage Temper	-40 to +150	°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 = -40 to +105°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DD5}	Input Power supply (USB)		4.4	-	5.5	V
V_{DD}	CTP Voltage (I2C)		3.0	-	3.6	V
IOP	Operating mode current	V_{DD} =3.3V	-	100	-	mA
VOH1	Logic High Output Voltage	IOL=8mA	0.7V_{DD}	-	-	V
VOL1	Logic Low Output Voltage	IOH=10mA	-	-	0.3V_{DD}	V
VIH1	Logic High Input voltage		0.6V_{DD}	-	V_{DD} +0.5	V
VIL1	Logic Low Input voltage		0	-	0.3V_{DD}	V

5. Pin Definition

5.1 USB interface

No.	Symbol	I/O	Function
1	VBUS	P	Power supply
2	D-	-	USB data- pin
3	D+	-	USB data+ pin
4	ID	-	No connection
5	GND	P	Ground

5.2 I2C Interface

No.	Symbol	I/O	Function
1	VDD	P	Power supply
2	RST	I	Reset
3	GND	P	Ground
4	INT	O	Interrupt
5	SDA	I/O	I2C Serial Data
6	SCL	I	I2C Serial Clock
7	NC	-	No Connection
8	NC	-	No Connection
9	NC	-	No Connection
10	NC	-	No Connection