

SPECIFICATION
FOR
LCM+CTP Module

MODULE No:	KD101UXFLD024-C035A
CUSTOMER:	

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

Date	Rev. No.	Page	Summary
2021.04.07	V1.0	ALL	FIRST ISSUE
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	常备库存 Stock For Sale	长期供货 Long Time supply	支持小量 NO MOQ	品种齐全 In Full Range

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*** Description**

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, capacitance touch panel, back-light unit. The resolution of a 10.1 " TFT-LCD contains 1920X1200 pixels, and can display up to 16.7M colors.

*** Features**

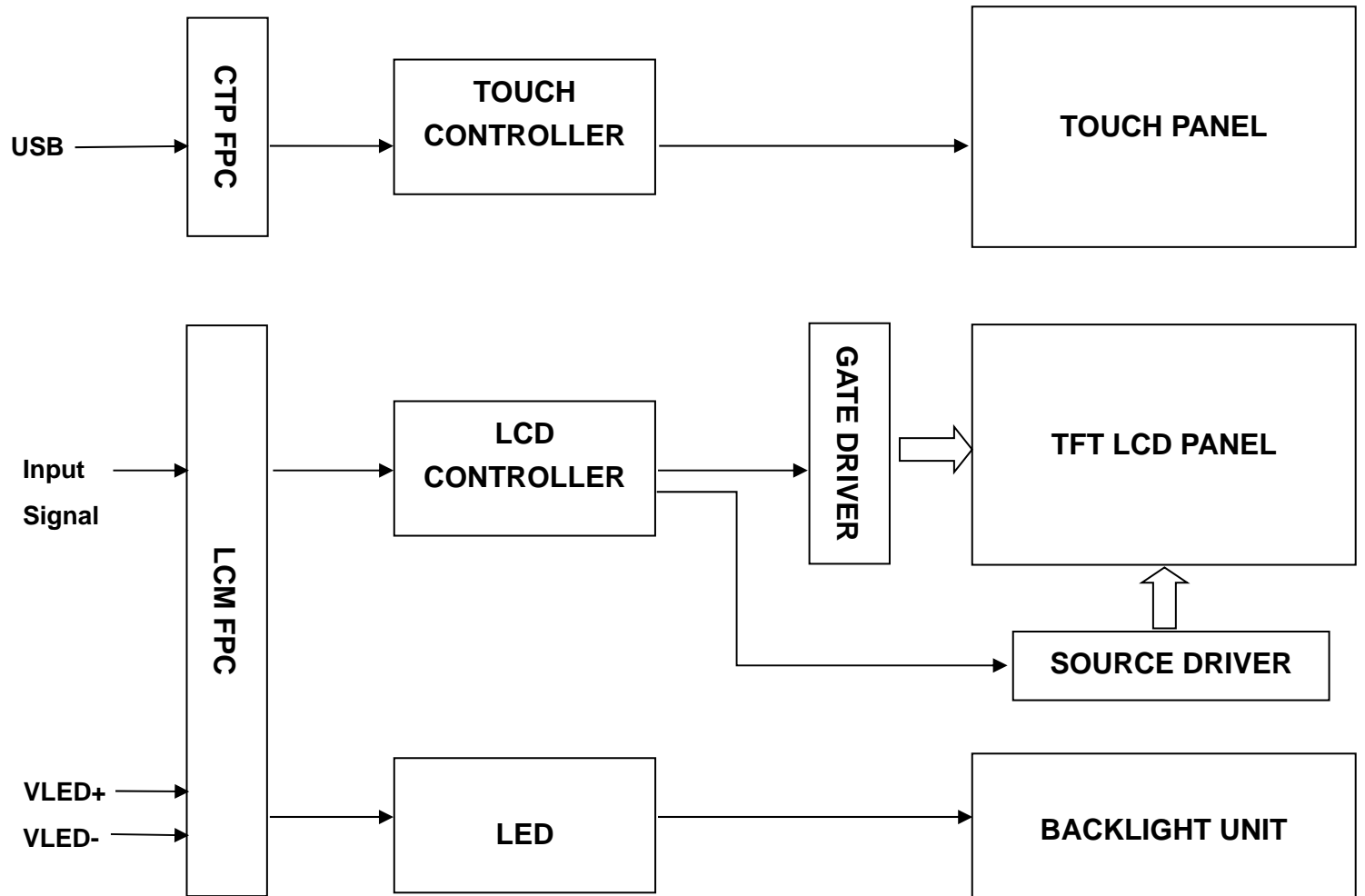
General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	216.81(H)*135.50(V) (10.1 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1920(RGB)*1200	dots	
Pixel arrangement	Pixels RGB stripe arrangement	-	
Pixel pitch	0.03764(H)*0.11292(V)	mm	
Viewing angle	ALL	o'clock	
Controller IC	Source(HX8290-B)x3	-	
Display mode	Transmissive /Normally Black	-	
LCM Interface	LVDS	-	
CTP Driver IC	ILI2511	-	
CTP Interface	USB	-	
Operating temperature	-20~+70	°C	
Storage temperature	-30~+85	°C	
Module bonding technology	Use Optical bonding between LCM and CTP	-	

*** Mechanical Information**

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	246.31	-	mm	
	Vertical(V)	-	168.75	-	mm	
	Depth(D)	-	4.87	-	mm	
Weight		-	399	-	g	

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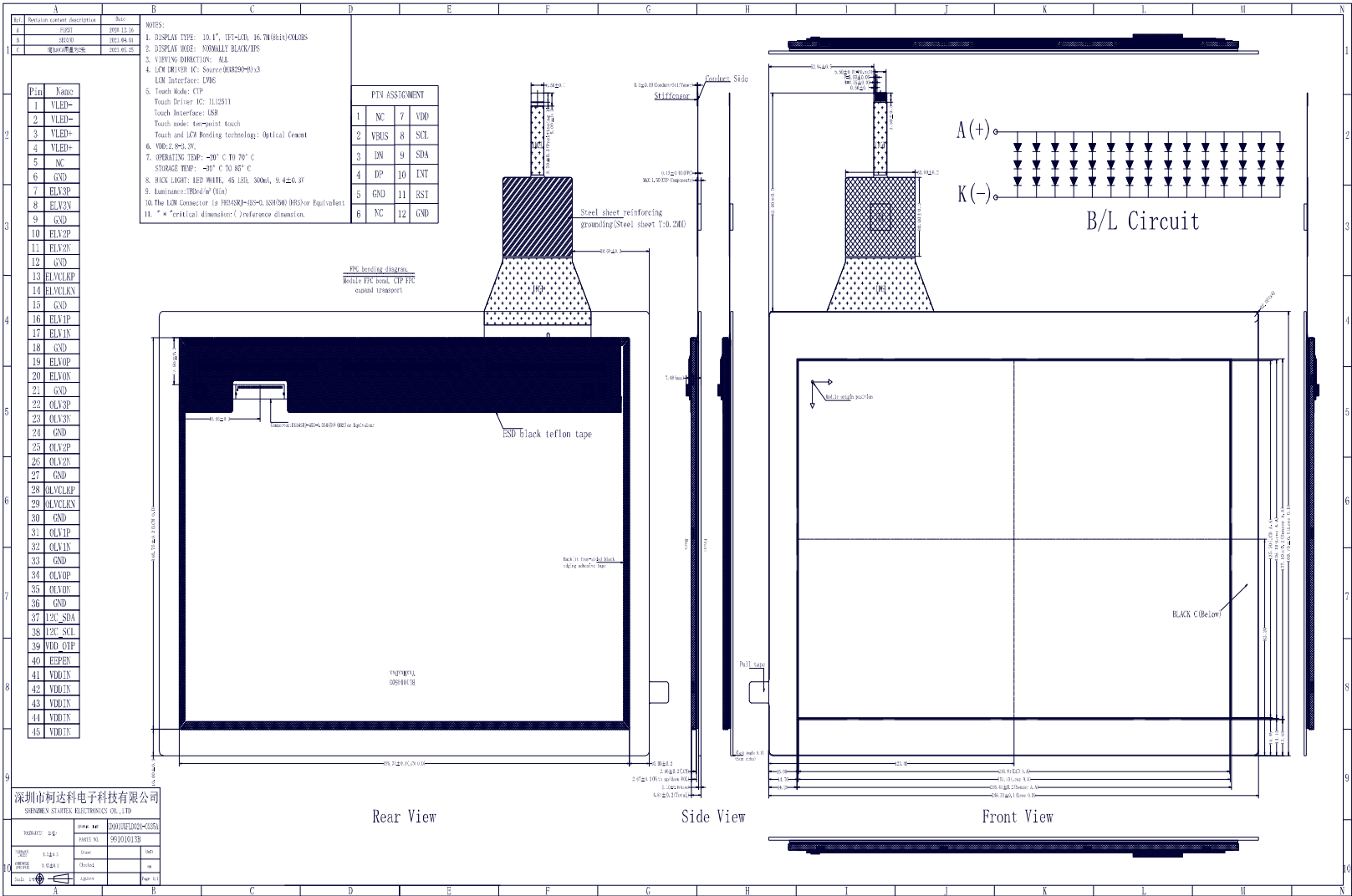
1. Block Diagram



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2. Outline dimension



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Long Time supply

支持小量
NO MOQ

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3. Input terminal Pin Assignment

3.1 TFT Interface

NO.	SYMBOL	DISCRIPTION	I/O
1	VLED-	LED Cathode	P
2	VLED-	LED Cathode	P
3	VLED+	LED Anode	P
4	VLED+	LED Anode	P
5	NC	--	-
6	GND	Ground.	P
7	ELV3P	EVEN LVDS Positive data signal (+)	I
8	ELV3N	EVEN LVDS Negative data signal (-)	I
9	GND	Ground.	P
10	ELV2P	EVEN LVDS Positive data signal (+)	I
11	ELV2N	EVEN LVDS Negative data signal (-)	I
12	GND	Ground.	P
13	ELVCLKP	EVEN LVDS Positive CLK signal (+)	I
14	ELVCLKN	EVEN LVDS Negative CLK signal (-)	I
15	GND	Ground.	P
16	ELV1P	EVEN LVDS Positive data signal (+)	I
17	ELV1N	EVEN LVDS Negative data signal (-)	I
18	GND	Ground.	P
19	ELV0P	EVEN LVDS Positive data signal (+)	I
20	ELV0N	EVEN LVDS Negative data signal (-)	I
21	GND	Ground.	P
22	OLV3P	Odd LVDS Positive data signal (+)	I
23	OLV3N	Odd LVDS Negative data signal (-)	I

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24	GND	Ground.	P
25	OLV2P	Odd LVDS Positive data signal (+)	I
26	OLV2N	Odd LVDS Negative data signal (-)	I
27	GND	Ground.	P
28	OLVCLKP	Odd LVDS Positive CLK signal (+)	I
29	OLVCLKN	Odd LVDS Negative CLK signal (-)	I
30	GND	Ground.	P
31	OLV1P	Odd LVDS Positive data signal (+)	I
32	OLV1N	Odd LVDS Negative data signal (-)	I
33	GND	Ground.	P
34	OLV0P	Odd LVDS Positive data signal (+)	I
35	OLV0N	Odd LVDS Negative data signal (-)	I
36	GND	Ground.	P
37	I2C _SDA	Reserved for LCD manufacturer' s use, not connection	I
38	I2C _SCL		I
39	VDD_OTP		P
40	EEPEN	Not Connection	I
41	VDDIN	Power supply VDDIN=3.3V (Typ.)	P
42	VDDIN		P
43	VDDIN		P
44	VDDIN		P
45	VDDIN		P

3.2 CTP PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	NC	Open.	--
2	VBUS	USB 5V input power supply voltage.	P
3	DN	USB D-	I/O
4	DP	USB D+	I/O
5	GND	Ground	P
6	NC	Open	--
7	VDD(NC)	Supply voltage (Open)	P
8	SCL(NC)	I2C clock input (Open)	I
9	SDA(NC)	I2C data input and output (Open)	I
10	INT(NC)	External interrupt to the host (Open)	I
11	RST(NC)	External Reset, Low is active (Open)	I
12	GND(NC)	Ground. (Open)	P

4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio	CR	$\Theta=0$	700	900	--		(1)(2)
Response time	Rising	Normal viewing angle	--	30	35	msec	(1)(3)
	Falling						
Color Gamut	S(%)		60	65	--	%	
Color Filter Chromaticity	White	W_x	0.2604	0.3004	0.3404		(1)(4) CA-310
		W_y	0.3037	0.3437	0.3837		
	Red	R_x	0.5979	0.6379	0.6779		
		R_y	0.3150	0.3550	0.3950		
	Green	G_x	0.2816	0.3216	0.3616		
		G_y	0.5478	0.5878	0.6278		
	Blue	B_x	0.1067	0.1467	0.1867		
		B_y	0.0278	0.0678	0.1078		
Viewing angle	Hor.	Θ_L	70	80	--		(1)(4)
		Θ_R	70	80	--		
	Ver.	Θ_U	70	80	--		
		Θ_D	70	80	--		
Option View Direction	ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

Ambient temperature : $25 \pm 2^\circ\text{C}$

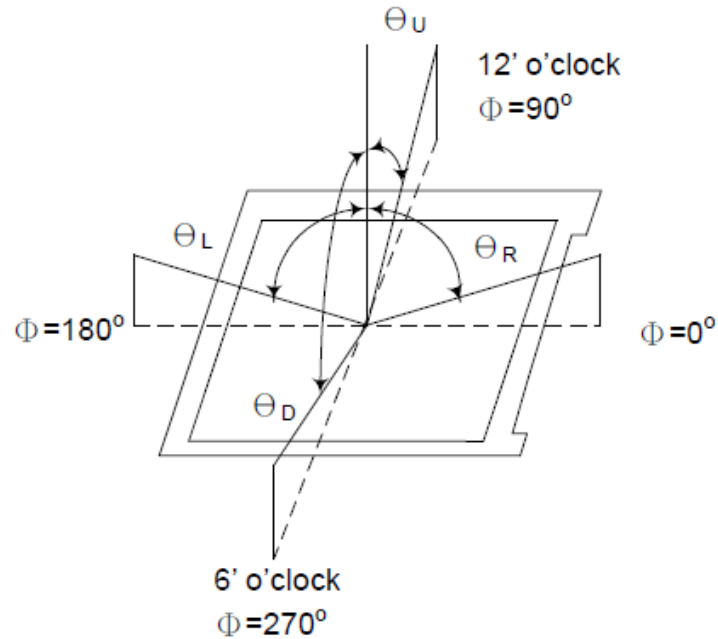
15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

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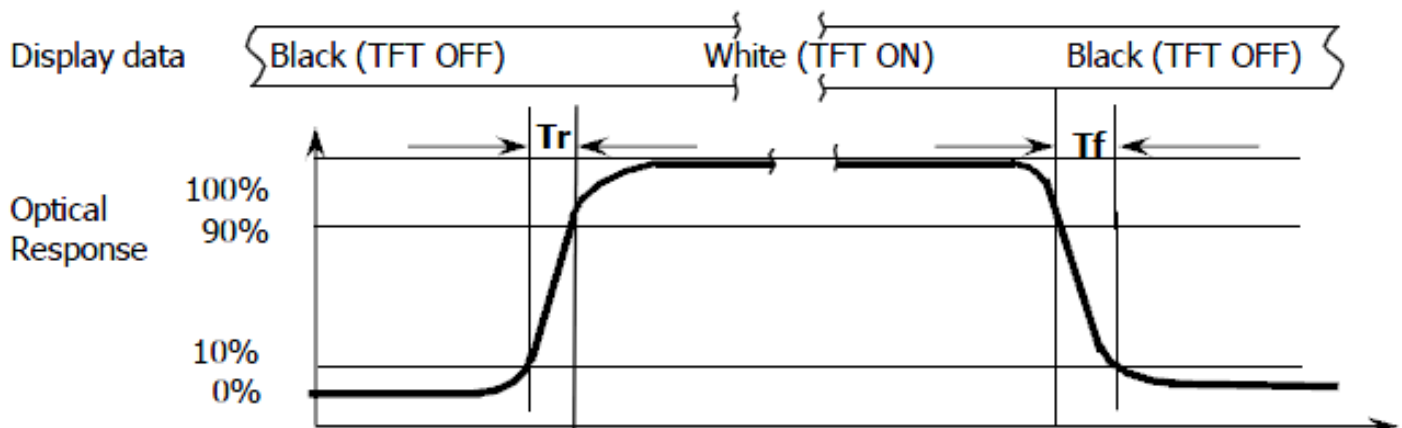
Note (1): Definition of Viewing Angle :



Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

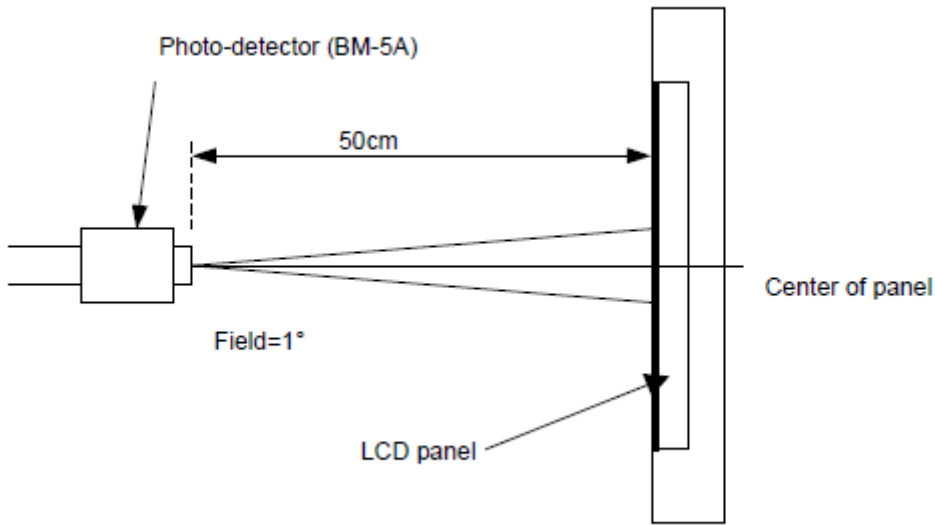
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time



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Note (4): Definition of optical measurement setup



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5. Electrical Characteristics

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	VDD	-0.3	3.6	V	Note1
Operating temperature	T _{OP}	-20	+70	°C	
Storage temperature	T _{ST}	-30	+85	°C	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
	V _{RP}	--	--	300	mV	Ripple
Normal mode Current	IDD	--	300	600	mA	
Level input voltage	V _{IH}	2.7	--	3.3	V	
	V _{IL}	0	--	0.5	V	
Level output voltage	V _{OH}	2.7	--	3.3	V	
	V _{OL}	0	--	0.5	V	

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5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 45 chips LED

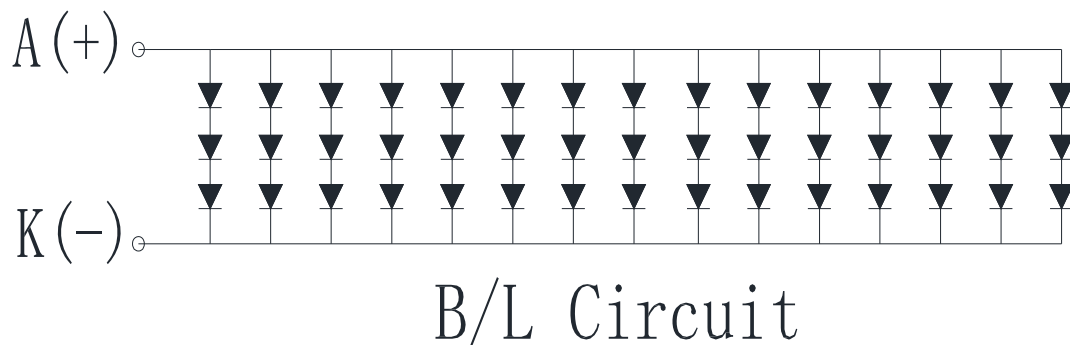
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	225	300	--	mA	
Forward Voltage	V_F	8.4	9.0	10.2	V	
LCM Luminance	LV	450	500	--	cd/m ²	Note3
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	70	80	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm 3\text{ }^\circ\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

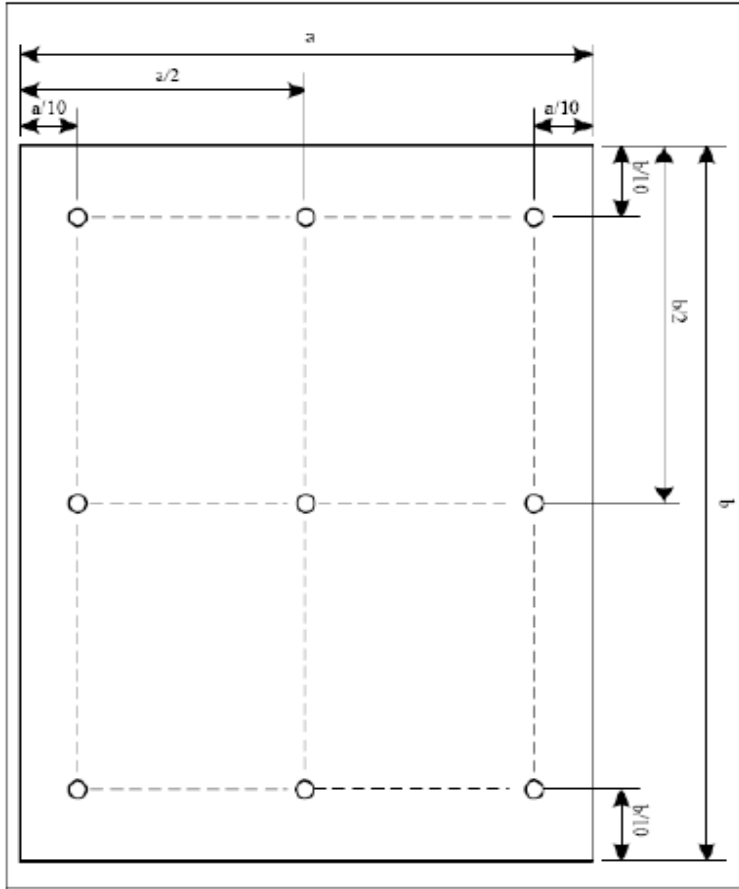
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at

$T_a=25\text{ }^\circ\text{C}$ and $I_L=300\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 300mA. The constant current driving method is suggested.



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Note (3) Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

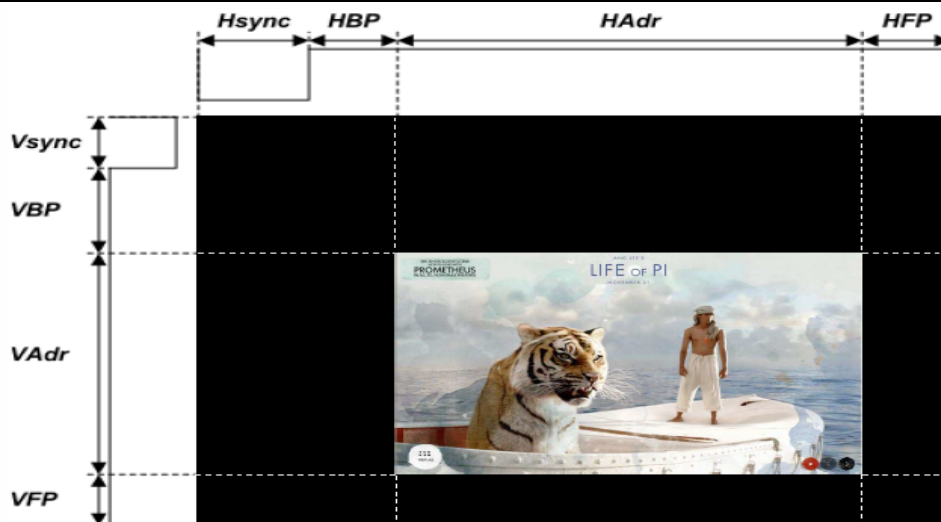
$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

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6. AC Characteristic

6.1 LVDS Timing Parameter

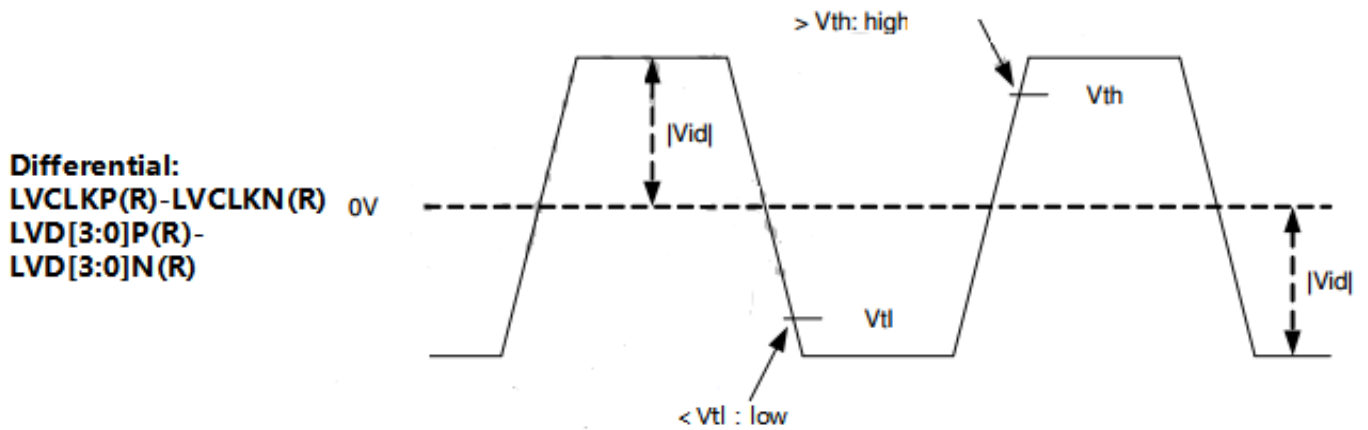
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	145	150	--	MHz
Horizontal display area	Thd	1920			DCLK
HSYNC period time	Th	1949	2000	2208	DCLK
Horizontal Blank	THB	29	80	288	DCLK
HSYNC pulse width	Thp	2	10	255	DCLK
HSYNC back porch	thbp	3	6	255	DCLK
HSYNC Front porch	thfp	24	64	260	DCLK
Vertical display area	Tvd	1200			H
VSYNC period time	Tv	1243	1243	1560	H
Vertical Blank	TVB	43	43	360	H
VSYNC Pluse width	Tvp	4	4	20	H
VSYNC back porch	Tvbp	20	20	255	H
VSYNC front porch	Tvfp	19	19	260	H
Frequency	fV	--	60	--	Hz



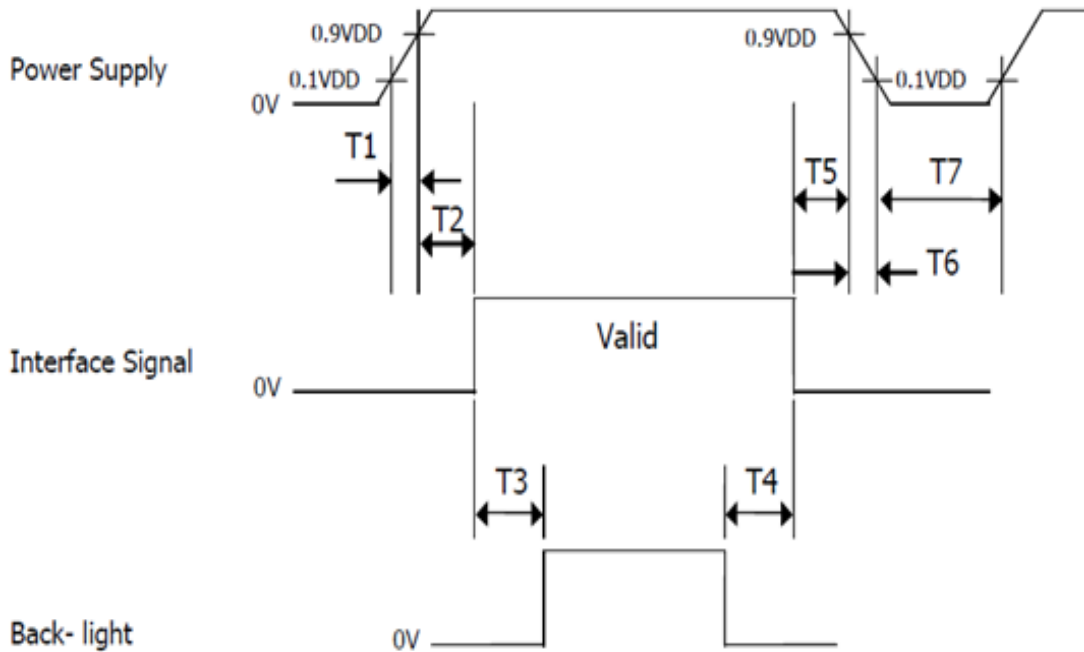
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6.2 LVDS DC Timing Specification
<Table 7. LVDS DC Timing Specification>

Item	Symbol	Condition	MIN	TYP	MAX	Unit
Differential input high Threshold voltage	Vth	Vcm=1.2V	-	-	+0.1	V
Differential input low Threshold voltage	Vtl	-	-0.1	-	-	V
Differential input common Threshold voltage	Vcm	-	1	1.2	1.7- Vid /2	V
LVDS input voltage	Vinlv	-	0.7	-	1.7	V
Differential input voltage	Vid	-	0.35	-	0.6	V
Differential input leakage voltage	Ilvleak	-	-10	-	+10	uA

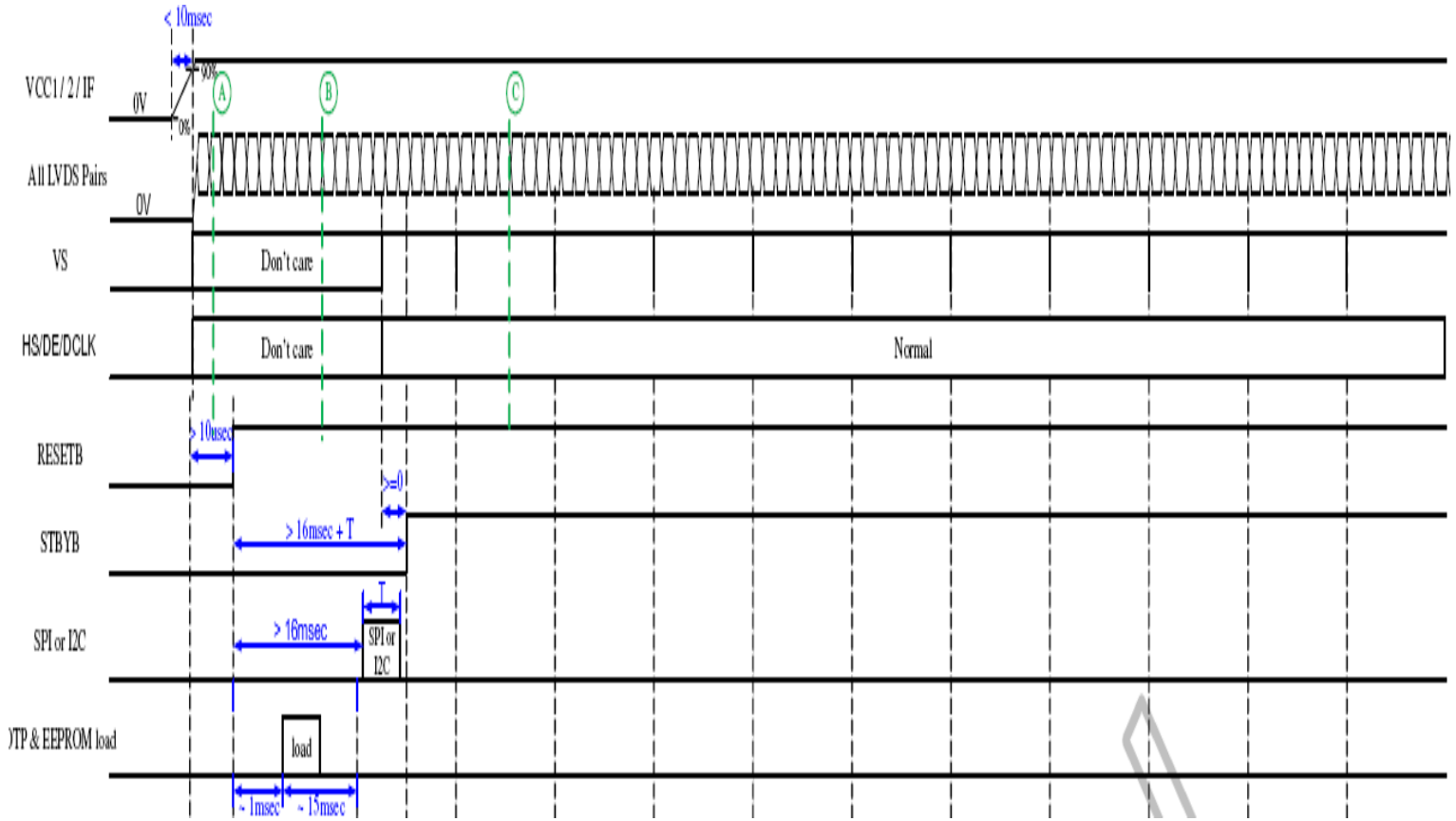


6.3 Power Sequence



< Table8. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms



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7. CTP Specification

7.1 Electrical Characteristics

7.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
I2C Power Supply Voltage	VDD	-0.3	3.6	V	
USB Power Supply Voltage	VBUS	-0.3	6.0	V	
Operating temperature	T _{OP}	-30	+80	°C	
Storage temperature	T _{ST}	-30	+80	°C	

7.1.2 I2C DC Electrical Characteristics (Ta=25°C)

(Ambient temperature:25°C, VDD=2.8V, VDDIO=1.8V or VDDIO=VDD)

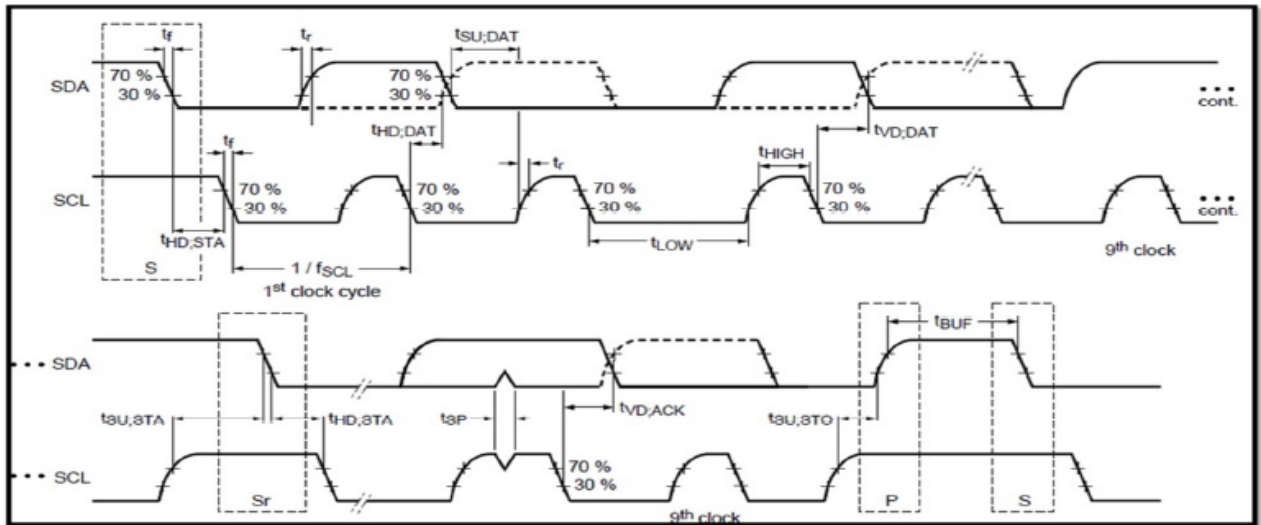
Item	Min.	Typ.	Max.	Unit	Note
I2C Power Supply Voltage	3.0	3.3	3.6	V	
USB Power Supply Voltage	4.4	5	5.5		
Normal mode operating current	--	100		mA	
Digital Input low voltage/VIL	0	--	0.3*VDDIO	V	
Digital Input high voltage/VIH	0.6*VDDIO	--	VDDIO+0.5	V	
Digital Output low voltage/VOL	0.7*VDDIO	--	--	V	
Digital Output high voltage/VOH	--	--	0.3*VDDIO	V	

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7.1.3 USB DC Electrical Characteristics

Item	Symbol	Min	Typ.	Max	Unit	Condition
Input Low	V_{IL}			0.8	V	
Input High (driven)	V_{IH}	2.0			V	
Differential input sensitivity	V_{DI}	0.2			V	(D+) – (D-)
Differential common-mode range	V_{CM}	0.8		2.5	V	Includes V_{DI} range
Single-ended receiver threshold	V_{SE}	0.8		2.0	V	
Receiver hysteresis	V_{RH}		200		mV	
Output low (driven)	V_{OL}	0		0.3	V	
Output high (driven)	V_{OH}	2.8		3.6	V	
Output signal cross voltage	V_{CRS}	1.3		2.0	V	
Pull-up resistor	R_{PU}	1.425		1.575	$k\Omega$	
Pull-down resistor	R_{PD}	14.25		15.75	$k\Omega$	
Termination Voltage for upstream port pull up (RPU)	V_{TRM}	3.0		3.6	V	

7.2 I2C AC Characteristics

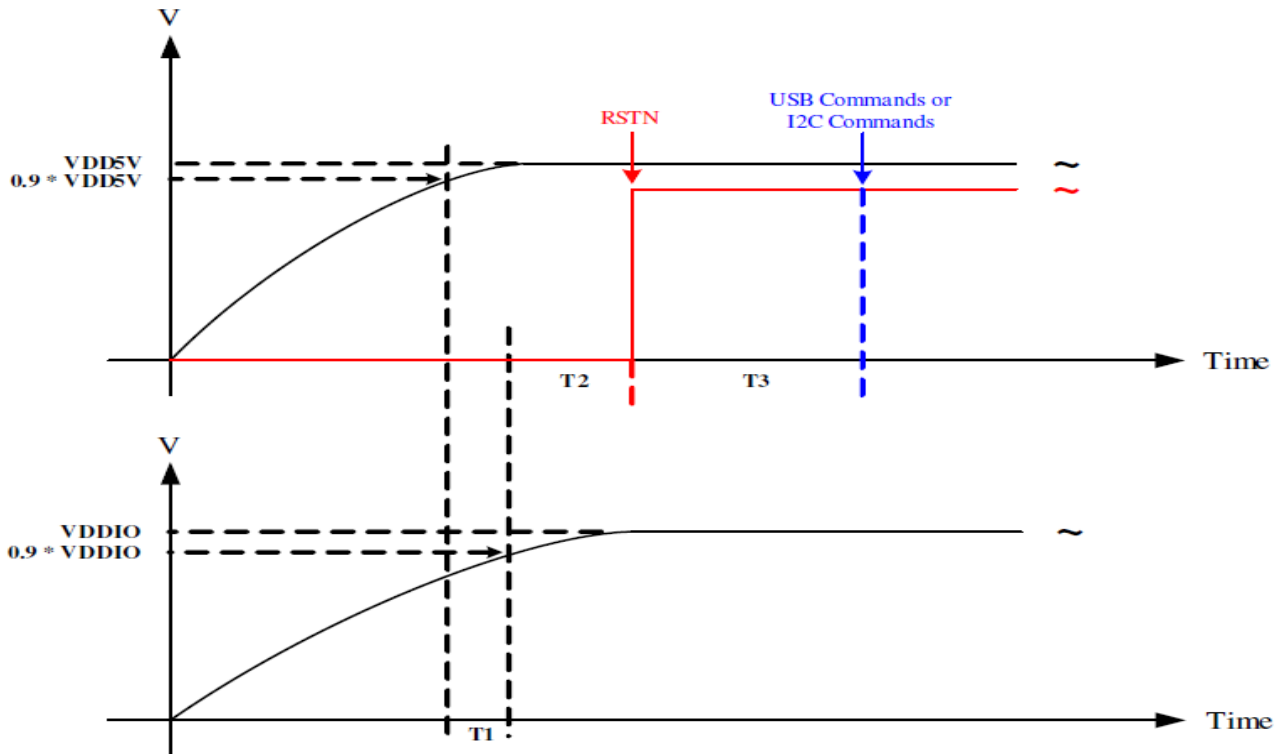


Parameter	Symbol	Standard-mode		Fast-mode		Unit
		Min	Max	Min	Max	
SCL clock frequency	f_{SCL}	0	100	0	400	kHz
Hold time START condition	$t_{HD:STA}$	4.0	-	0.6	-	us
LOW period of the SCL clock	t_{Low}	4.7	-	1.3	-	us
HIGH period of the SCL clock	t_{High}	4.0	-	0.6	-	us
Set-up time for a repeated START condition	$t_{SU:STA}$	4.7	-	0.6	-	us
Data hold time	$t_{HD:DAT}$	300	-	300	-	ns
Data set-up time	$t_{SU:DAT}$	250	-	100	-	ns
Rise time of both SDA and SCL signals (30% to 70%)	t_r	-	1000	20	300	ns
Fall time of both SDA and SCL signals (70% to 30%)	t_f	-	300	20	300	ns
Set-up time for STOP condition	$t_{SU:STO}$	4.0	-	0.6	-	us
Bus free time between a STOP and START condition	t_{BUF}	4.7	-	1.3	-	us
Capacitive load for each bus line	C_b	-	400	-	400	pF
Noise margin at the LOW level for each connected device	V_{nL}	$0.1V_{DD}$	-	$0.1V_{DD}$	-	V
Noise margin at the HIGH level for each connected device	V_{nH}	$0.2V_{DD}$	-	$0.2V_{DD}$	-	V

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7.3 Power Sequence

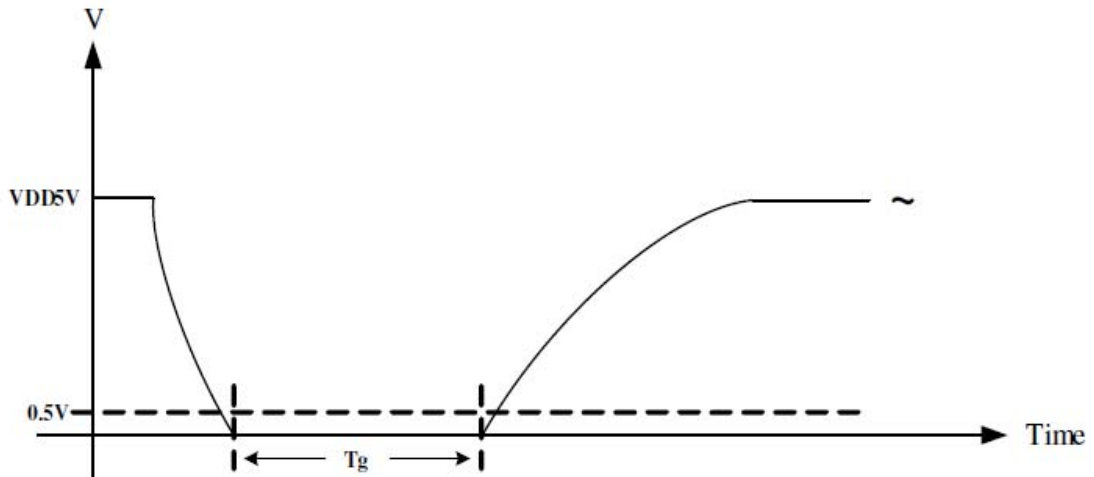
7.3.1 Power-on Sequence



1. T1: the time difference between $0.9 * VDD5V$ and $0.9 * VDDIO$. T1 must be ≥ 0 sec.
2. T2: the time difference between $0.9 * VDDIO$ and RSTN. T2 must be ≥ 200 us.
3. T3: the time difference between RSTN and Commands.
 - T3 in case of USB must be ≥ 20 ms.
 - T3 in case of I2C must be ≥ 300 ms.

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7.3.2 Power-off to Power-on Sequence



Tg : the time difference between power-off and power-on. Tg must be > 10us.

Note. During the power off time, the VDD5V must be lower than 0.5V that make sure the touch controller have been correctly reset.

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8. LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

8.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

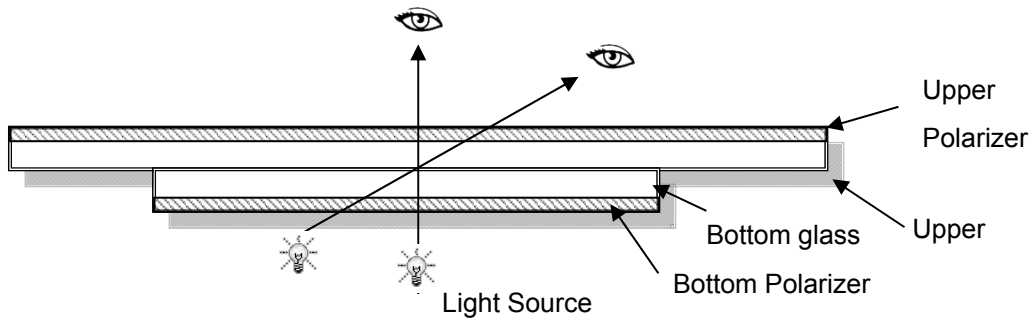
Temperature : 25±5°C

Humidity : 65%±10%RH

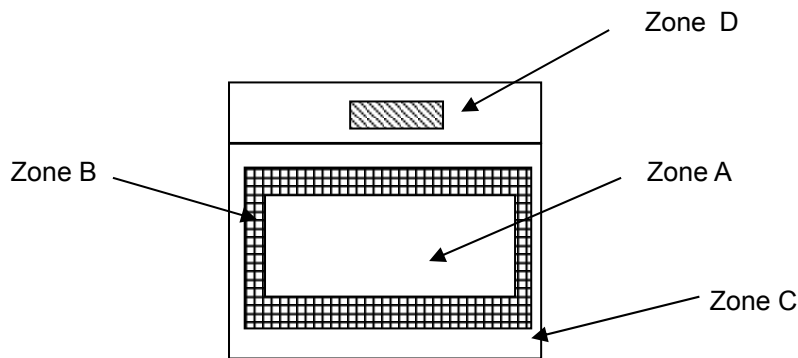
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



8.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note:As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

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8.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , LCM: Liquid Crystal Module

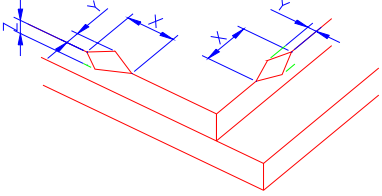
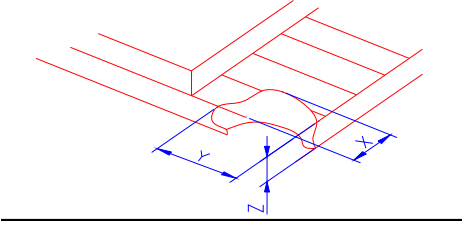
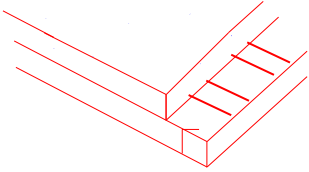
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. etc...	Major
2	Missing	Missing components and etc...	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed, deformation and etc...	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot/Line defect	Light dot, Dim spot, (Note1) Polarizer Air Bubble, Polarizer accidented spot and etc...	
6	Soldering appearance	Good soldering , Peeling off is not allowed and etc...	
7	LCD/Polarizer	Black/White spot/line, scratch, crack, etc.	

Note1: a) Light dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.



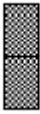
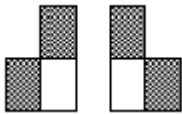
Part. No	KD101UXFLD024-C035A	REV	V1.2	Page 27 of 36
	常备库存 Stock For Sale	长期供货 Long Time supply	支持小量 NO MOQ	品种齐全 In Full Range


8.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 <table border="1" data-bbox="756 667 1455 815"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td><Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
X	Y	Z						
≤3.0mm	<Inner border line of the seal	≤T						
	(2)LCD corner broken	 <table border="1" data-bbox="836 1124 1375 1223"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	(3) LCD crack	 <p style="text-align: center;">Crack Not allowed</p>						



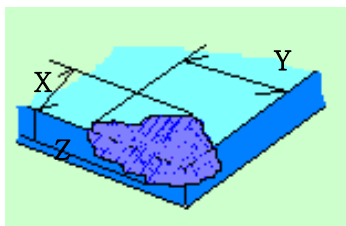
2.0	Spot defect	① light dot (black/white spot , pinhole, stain, etc.)			
	<p style="text-align: center;">$\Phi=(X+Y)/2$</p>	Zone	Acceptable Qty		
		Size (mm)	A	B	C
		$\Phi \leq 0.15$	Ignore		
		$0.15 < \Phi \leq 0.25$	3(distance ≥ 10 mm)		
	$0.25 < \Phi \leq 0.4$	2(distance ≥ 10 mm)			
	$\Phi > 0.4$	0			
		② Dim spot (light leakage、dent、dark spot, etc)			
		Zone	Acceptable Qty		
		Size (mm)	A	B	C
		$\Phi \leq 0.15$	Ignore		
		$0.15 < \Phi \leq 0.25$	3(distance ≥ 10 mm)		
		$0.25 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
		$\Phi > 0.4$	0		
		③ Polarizer accidented spot			
		Zone	Acceptable Qty		
		Size (mm)	A	B	C
		$\Phi \leq 0.2$	Ignore		
		$0.2 < \Phi \leq 0.5$	2(distance ≥ 10 mm)		
		$\Phi > 0.5$	0		
		④ Polarizer Bubble			
		Zone	Acceptable Qty		
		Size (mm)	A	B	C
		$\Phi \leq 0.2$	Ignore		
		$0.2 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
		$0.4 < \Phi \leq 0.5$	1		
		$\Phi > 0.5$	0		

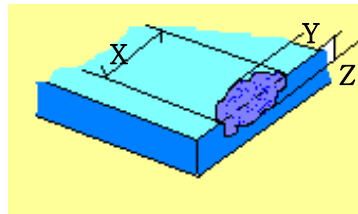
3.0	LCD Pixel defect	<p>Pixel bad points</p> <table border="1"> <thead> <tr> <th data-bbox="539 309 730 360">Item</th> <th data-bbox="730 309 1241 360">Zone A</th> <th data-bbox="1241 309 1492 360">Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td data-bbox="539 360 730 521" rowspan="3">Bright dot</td> <td data-bbox="730 360 1241 412">Random</td> <td data-bbox="1241 360 1492 412">N≤2</td> </tr> <tr> <td data-bbox="730 412 1241 463">2 dots adjacent</td> <td data-bbox="1241 412 1492 463">N≤0</td> </tr> <tr> <td data-bbox="730 463 1241 521">3 dots adjacent</td> <td data-bbox="1241 463 1492 521">N≤0</td> </tr> <tr> <td data-bbox="539 521 730 689" rowspan="3">Dark dot</td> <td data-bbox="730 521 1241 573">Random</td> <td data-bbox="1241 521 1492 573">N≤3</td> </tr> <tr> <td data-bbox="730 573 1241 631">2 dots adjacent</td> <td data-bbox="1241 573 1492 631">N≤0</td> </tr> <tr> <td data-bbox="730 631 1241 689">3 dots adjacent</td> <td data-bbox="1241 631 1492 689">N≤0</td> </tr> <tr> <td data-bbox="539 689 730 1003">Distance</td> <td data-bbox="730 689 1241 1003"> 1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot. </td> <td data-bbox="1241 689 1492 1003">5mm</td> </tr> <tr> <td colspan="2" data-bbox="539 1003 1241 1055">Total bright and dark dot</td> <td data-bbox="1241 1003 1492 1055">N≤4</td> </tr> </tbody> </table> <p>Note:</p> <p>A) Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.</p> <p>B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.</p> <p>C) 2 dot adjacent = 1 pair = 2 dots</p> <p>Picture:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>2 dot adjacent</p> </div> <div style="text-align: center;">  <p>2 dot adjacent</p> </div> <div style="text-align: center;">  <p>2 dot adjacent (vertical)</p> </div> <div style="text-align: center;">  <p>2 dot adjacent (slant)</p> </div> </div>	Item	Zone A	Acceptable Qty	Bright dot	Random	N≤2	2 dots adjacent	N≤0	3 dots adjacent	N≤0	Dark dot	Random	N≤3	2 dots adjacent	N≤0	3 dots adjacent	N≤0	Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm	Total bright and dark dot		N≤4
Item	Zone A	Acceptable Qty																							
Bright dot	Random	N≤2																							
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Total bright and dark dot		N≤4																							

4.0	Line defect (LCD /Polarizer backlight black/white line, scratch, stain)  W: width, L : length N : Count	<table border="1"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(m)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.05$</td> <td>Ignore</td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.05 < W \leq 0.06$</td> <td>$L \leq 5.0$</td> <td colspan="2">$N \leq 3$</td> </tr> <tr> <td>$0.06 < W \leq 0.08$</td> <td>$L \leq 4.0$</td> <td colspan="2">$N \leq 2$</td> </tr> <tr> <td>$W > 0.08$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(m)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore		Ignore	$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$		$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$		$W > 0.08$	Define as spot defect			
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$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$																										
$W > 0.08$	Define as spot defect																											
5.0	Electronic Components SMT.	Not allow missing parts, solderless connection, cold solder joint, mismatch. The positive and negative polarity opposite																										
6.0	Display color & Brightness.	1. Color: Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness: Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.																										
7.0	LCD Mura/Waving/ Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.																										

8.0	CTP Related	CTP Cover sensor accidented black/white spot	<table border="1"> <thead> <tr> <th rowspan="2">Size Φ(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.25$</td> <td colspan="2">4 (distance ≥ 10mm)</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.35$</td> <td colspan="2">3 (distance ≥ 10mm)</td> </tr> <tr> <td>$\Phi > 0.35$</td> <td colspan="3">0</td> </tr> </tbody> </table>	Size Φ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.15$	Ignore		Ignore	$0.15 < \Phi \leq 0.25$	4 (distance ≥ 10 mm)		$0.25 < \Phi \leq 0.35$	3 (distance ≥ 10 mm)		$\Phi > 0.35$	0		
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		CTP Cover scratch	<table border="1"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Ignore(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.05$</td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.05 < W \leq 0.06$</td> <td>$L \leq 4.0$</td> <td colspan="3">$N \leq 3$</td> </tr> <tr> <td>$0.06 < W \leq 0.08$</td> <td>$L \leq 3.0$</td> <td colspan="3">$N \leq 2$</td> </tr> <tr> <td>$0.08 < W$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Ignore(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$			$0.06 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$			$0.08 < W$	Define as spot defect			
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$0.08 < W$	Define as spot defect																														
CTP Cover Pinhole/ Lack of ink	<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th>Acceptable Qty</th> </tr> <tr> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>Ignore</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.3$</td> <td>4(distance ≥ 10mm)</td> </tr> <tr> <td>$0.3 < \Phi \leq 0.4$</td> <td>2(distance ≥ 10mm)</td> </tr> <tr> <td>$\Phi > 0.4$</td> <td>0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty	C	$\Phi \leq 0.2$	Ignore	$0.2 < \Phi \leq 0.3$	4(distance ≥ 10 mm)	$0.3 < \Phi \leq 0.4$	2(distance ≥ 10 mm)	$\Phi > 0.4$	0																			
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CTP Bonding bubble/ accidented spot	<table border="1"> <thead> <tr> <th rowspan="2">Size Φ(mm)</th> <th colspan="2">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.1$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.1 < \Phi \leq 0.2$</td> <td colspan="2">3(distance ≥ 10mm)</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.3$</td> <td colspan="2">2(distance ≥ 10mm)</td> </tr> <tr> <td>$\Phi > 0.3$</td> <td colspan="2">0</td> </tr> </tbody> </table>	Size Φ (mm)	Acceptable Qty		A	B	$\Phi \leq 0.1$	Ignore		$0.1 < \Phi \leq 0.2$	3(distance ≥ 10 mm)		$0.2 < \Phi \leq 0.3$	2(distance ≥ 10 mm)		$\Phi > 0.3$	0														
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$\Phi > 0.3$	0																														
Assembly deflection	beyond the edge of backlight ≤ 0.2 mm																														
CTP cover broken X : length Y : width Z : height	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$X \leq 0.5$mm</td> <td>$Y \leq 0.5$mm</td> <td>$Z < \text{cover thickness}$ s</td> </tr> </tbody> </table>	X	Y	Z	$X \leq 0.5$ mm	$Y \leq 0.5$ mm	$Z < \text{cover thickness}$ s																								
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Circuitry broken is not allowed.																															

		CTP cover broken X : length Y : width Z : height	X	Y	Z	
			$X \leq 0.3\text{mm}$	$Y \leq 0.3\text{mm}$	$Z < \text{cover thickness}$ s	
* Circuitry broken is not allowed.						

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	CTP no function	Not allowed

9. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	70°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20°C, 96HR	
High Temperature Storage	85°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-10°C,30 min ↔ 60°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

Remark:

- The test samples should be applied to only one test item.
- Sample size for each test item is 5~10pcs.
- For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
- In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
- The color fading mura of polarizing filter should not care.

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10. Cautions and Handling Precautions

10.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

10.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

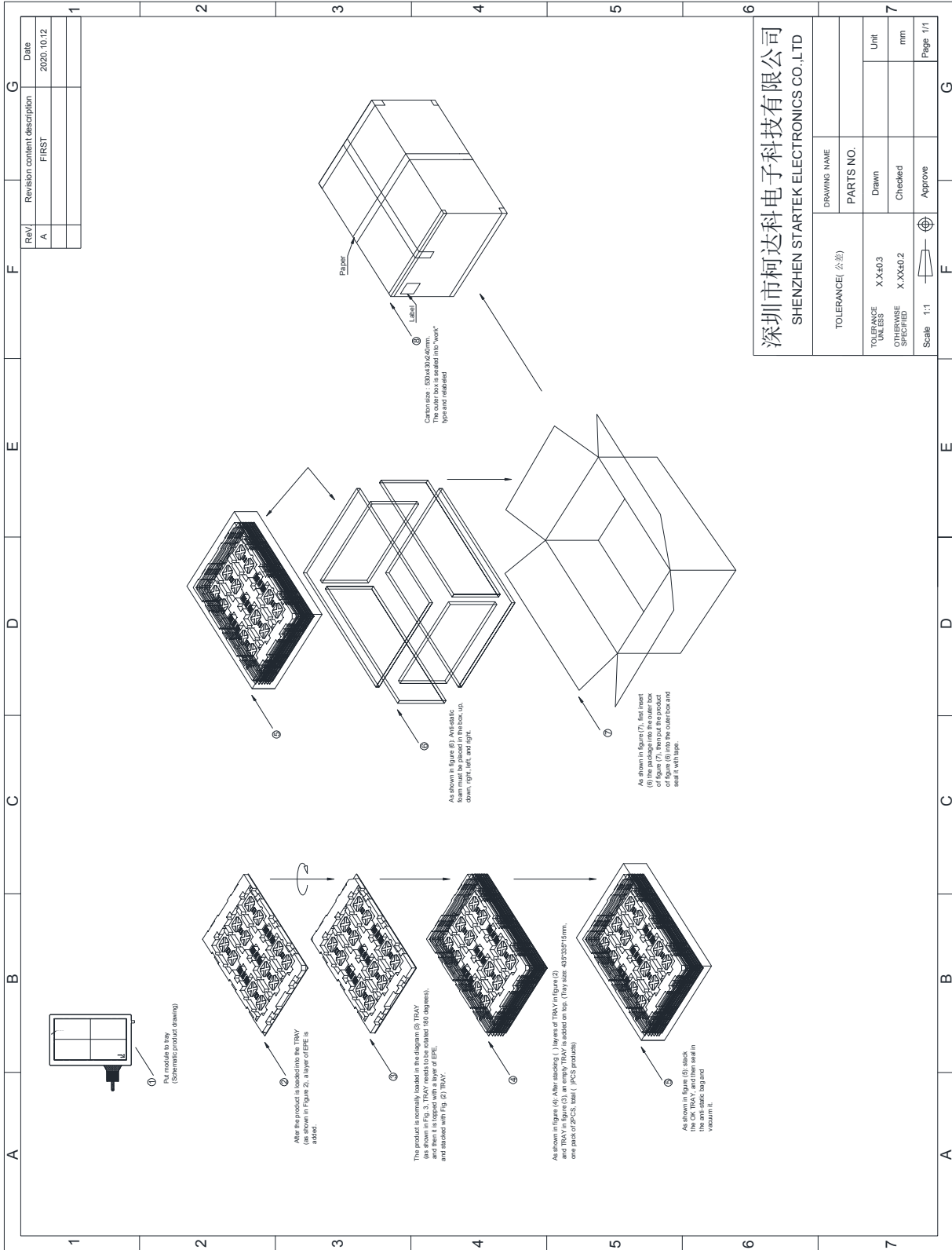
(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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11. Packing



DRAWING NAME		PARTS NO.	
TOLERANCE(公差)		Drawn	
TOLERANCE UNLESS OTHERWISE SPECIFIED		Checked	
Scale 1:1		Approve	
Unit		mm	
Page 1/1		Page 1/1	

深圳市柯达电子科技有限公司
SHENZHEN STARTEK ELECTRONICS CO.,LTD

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