

PRDDUCT SPECIFCATION

Model: NT050IA18840442A-C

CUSTOMER		
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Contents

NO.	Contents	Page
---	Cover	1
---	Contents	2
---	Document Revision History	3
一	General Description	4
二	Absolute Maximum Ratings	5
三	Optical Characteristics	6
四	Block Diagram	9
五	Interface Pin Connection	10
六	Electrical Characteristics	11
七	Reliability Test Items	16
八	Outline Dimension	17

Document Revision History

Change No.	Date	Subject And Reason	Version No.	Responder
1	2016.09.25	New	01	

1.0 General Description

1.1 Introduction

NT050IA18840442A-C is a coloractive matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel and a driving circuit. This TFT LCD has a 5.0 (16:9) inch diagonally measured active display area with (800 horizontal by 480 vertical pixel) resolution.

1.2. Features

5 (16:9 diagonal) inch configuration
Compatible with NTSC & PAL system
Image Reversion: UP/DOWN and LEFT/RIGHT
ROHS design

1.3. General information

Item	Specification	Unit
Outline Dimension	132.72(H) x 87.8 (V) x5.0(D)	mm
Display area	108.6 (H) x 65.16 (V)	mm
Number of Pixel	800 RGB (H) x480 (V)	pixels
Pixel pitch	0.04525 (H) x 0.13575 (V)s	mm
Pixel arrangement	RGB Vertical stripe	
Display mode	Normally Black	
Color Filter Array	RGB vertical stripes	
Backlight	White LED	
Weight	TBD	g

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-10	60	°C	
Storage Temperature	Tstg	-20	70	°C	

2.2 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	60	–	mA	–	–
LED Voltage	VF	18	19.2	20.4	V	–	–
Life Time		–	10000	–	Hr.	$I \leq 60\text{mA}$	–
Color	White						

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) $T_a = 25 \pm 2^\circ\text{C}$

(3) Test condition: LED Current 60mA

3.0 Optical Characteristics

3.1 Optical specification

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	70	80	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	70	80	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	70	80	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	70	80	-		
Response time	T_{R+T_F}	Normal $\theta=\Phi=0^\circ$		20	35	msec	Note 3
						msec	Note 3
Contrast ratio	CR			100	-	-	Note 4
Color chromaticity	W_x		0.26	0.31	0.36	-	Note 2 Note 5
	W_y		0.28	0.33	0.38	-	Note 6
Luminance	L		400	450	-	cd/m ²	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7

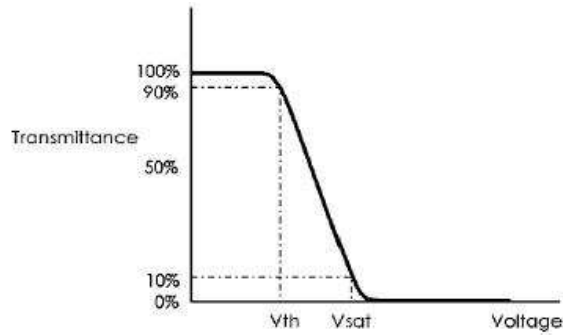
3.2 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±3°C
- 15min. warm-up time.

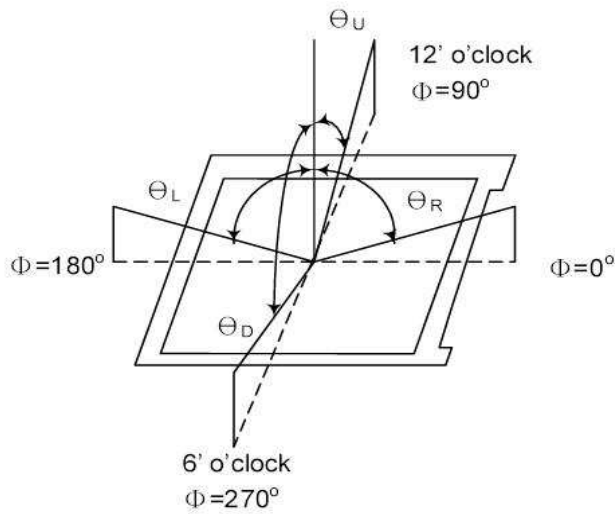
3.3 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

Note (1) Definition of Vsat and Vth (at 20°C)



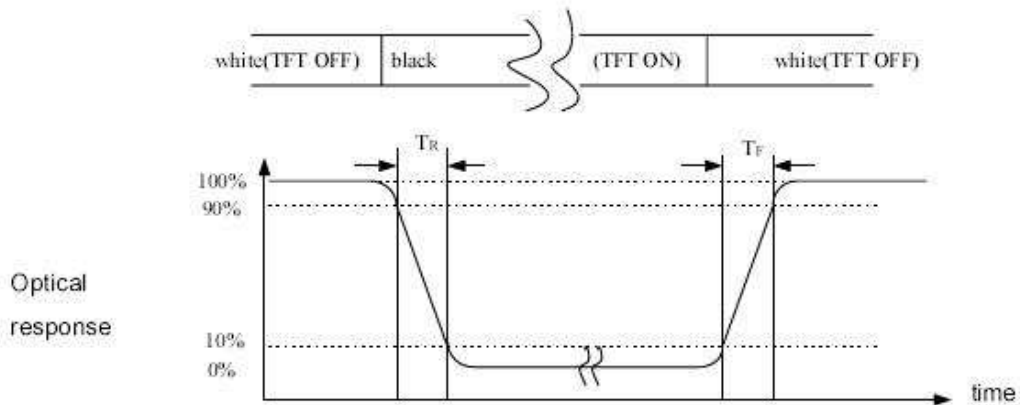
Note (2) Definition of Viewing Angle :



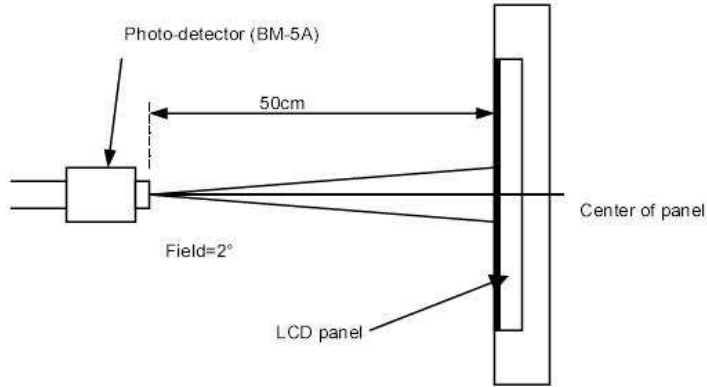
Note (3) Definition of Contrast Ratio(CR) :
measured at the center point of panel

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

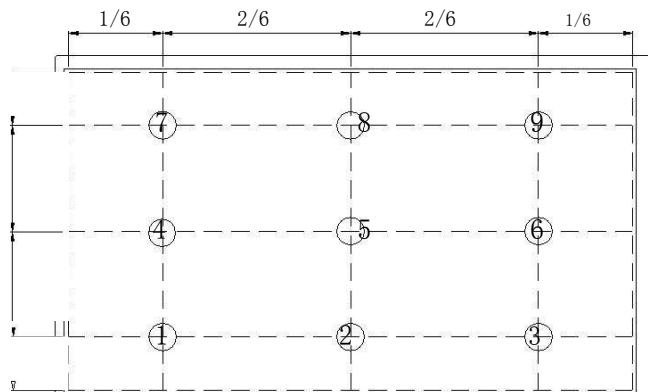
Note (4) Definition of Response Time : Sum of T_R and T_F



Note (5) Definition of optical measurement setup



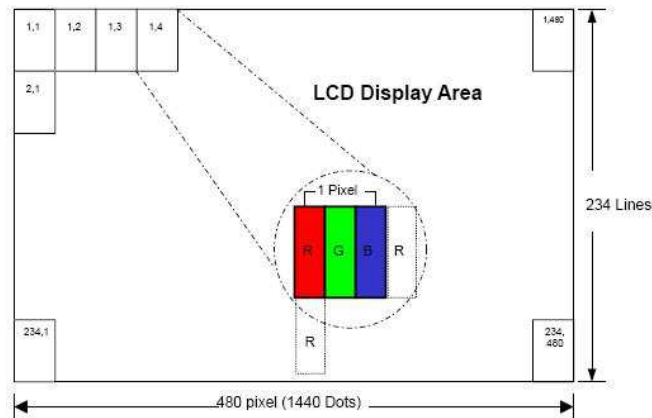
Note (6) Definition of brightness uniformity



Note (7) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)

4.0 Block Diagram

4.1 TFT-LCD Module



5.0 Interface Pin Connection

PIN NO	SYMBOL	DESCRIPTION
1	GLED	Power for LED backlight (Cathode)
2	VLED	Power for LED backlight (Anode)
3	GND	Power ground
4	VDD	Power for Digital Circuit
5	R0	Red data(LSB)
6	R1	Red data
7	R2	Red data
8	R3	Red data
9	R4	Red data
10	R5	Red data
11	R6	Red data
12	R7	Red data(MSB)
13	G0	Green data(LSB)
14	G1	Green data
15	G2	Green data
16	G3	Green data
17	G4	Green data
18	G5	Green data
19	G6	Green data
20	G7	Green data(MSB)
21	B0	Blue data(LSB)
22	B1	Blue data
23	B2	Blue data
24	B3	Blue data
25	B4	Blue data
26	B5	Blue data
27	B6	Blue data
28	B7	Blue data(MSB)
29	GND	Power ground
30	DCLK	Sample clock
31	DISP	
32	HS	Horizontal sync input. Negative polarity
33	VS	Vertical sync input. Negative polarity
34	DE	Data Input Enable
35	NC	Power ground
36	GND	Power ground
37	XR	
38	YD	
39	XL	
40	YU	

6. Electrical Characteristics

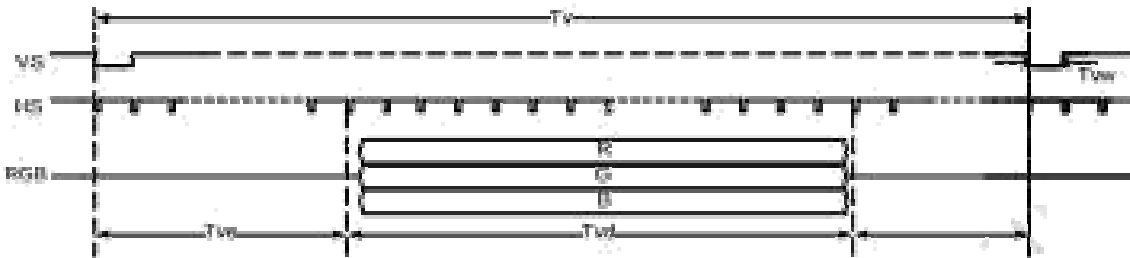
6.1 TFT LCD Module

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power Supply	VDD	3.1	3.3	3.5	V	
	IVDD	--	6.7	13	mA	
	AVDD	V1+0.1	12.5	13.5	V	
	IAVDD	-	26	34	mA	
	VGH	14.5	15	15.5	V	
	IVGH	-	0.15	0.2	mA	
	VGL	-9.5	-9	-8.5	V	
	IVGL	-	0.2	0.3	mA	
	VCOM	4.9	5.0	5.1	V	TBD
	IVCOM	-	0.3	0.65	uA	
Input Signal Voltage	V_i	-0.3	-	Vdd+ 0.3	V	
	Vref(V1~V7)	0.4Avdd	-	Avdd-0.3	V	
	Vref(V8~V14)	0.1	-	0.6Avdd	V	
Input high voltage	Vh	0.7Vdd	-	Vdd	V	
Input low voltage	Vi	0	-	0.3Vdd		
Vertical cycle	f_v	50	60	80	Hz	
Horizontal cycle	f_H	28.9	31.5	42	kHz	
Dot Frequency	f_{DCLK}		33.3	45	MHz	

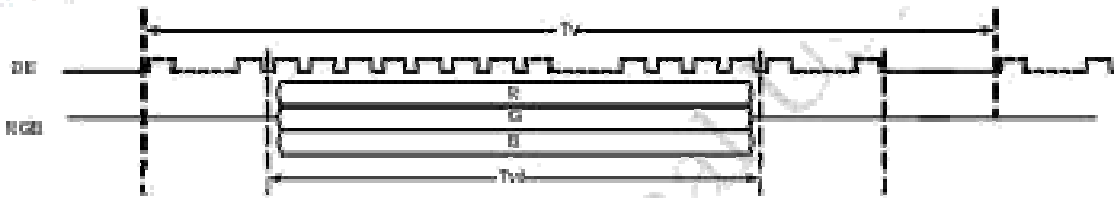
6.2 Timing Diagram of Interface Signal

Item	Symbol	Min	Typ	Max	Unit	Remark
DCLK frequency	dclk	30.5	33.3	45	MHZ	
DCLK cycle time	Tdclk	22	30	-	ns	=1/Fdclk
DCLK pulse duty	Tcwh	40	50	60	%	
Vertical display area	Tvd	480	480	480	H	
Vertical period area	Tv	522	525	762	H	
Vertical blanking area	Tvb	42	45	282	H	=Tv-Tvd
Vertical pulse width	Tvw		1			
Vertical back porch	Tve		31			
Vertical front porch	Tvf		13			
Horizontal display area	Thd	800	800	800	dclk	
Horizontal period area	Th	910	1056	1138	dclk	
Horizontal blanking area	Thb	110	256	338	dclk	=Th-Thd
Horizontal pulse width	Thw		48			
Horizontal back porch	The		40			
Horizontal front porch	Thf		168			
Data setup time	Tds	8	-	-	ns	DCLK Rising Latch
Data hold time	Tdh	8	-	-	ns	

c. Timing Diagram
Vertical Timing of Input

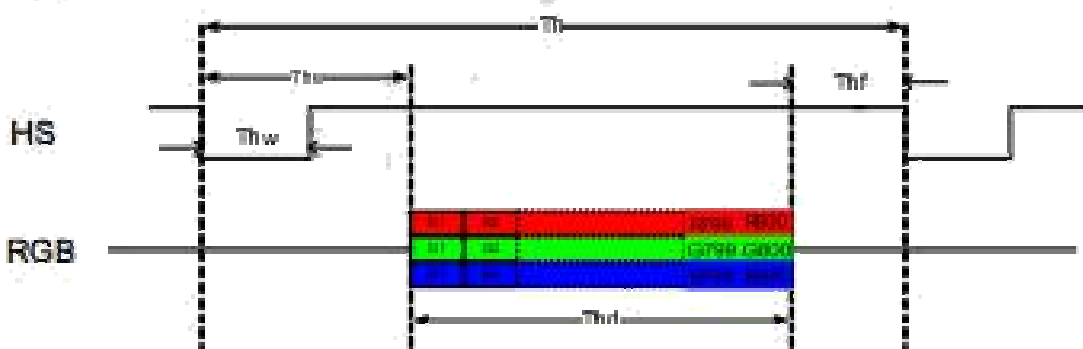


DE Mode :

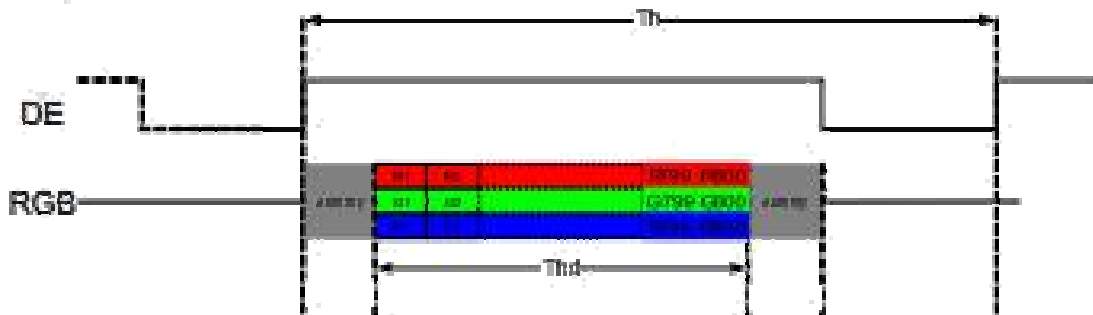


Horizontal Timing of Input

HV Mode :

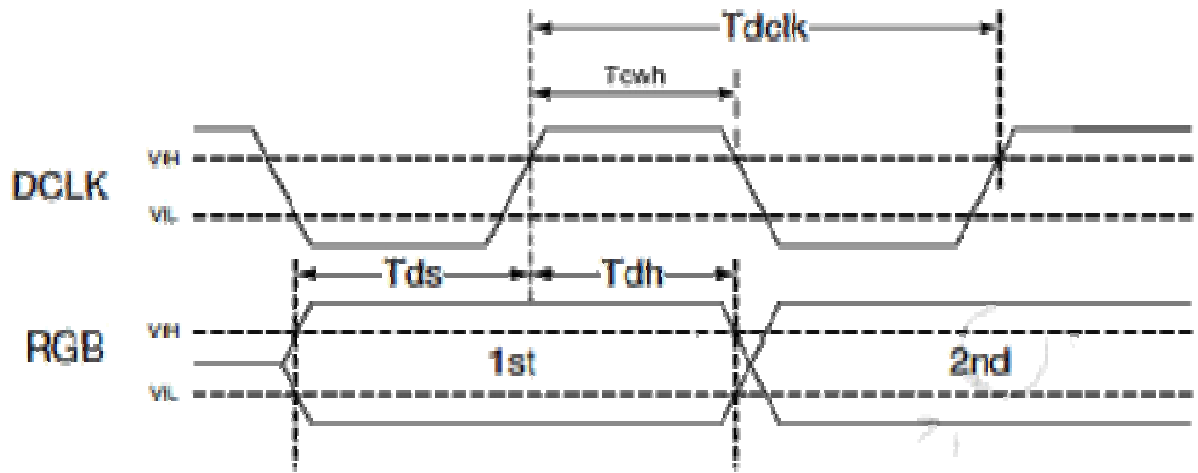


DE Mode :



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Clock and Data Timing of Input



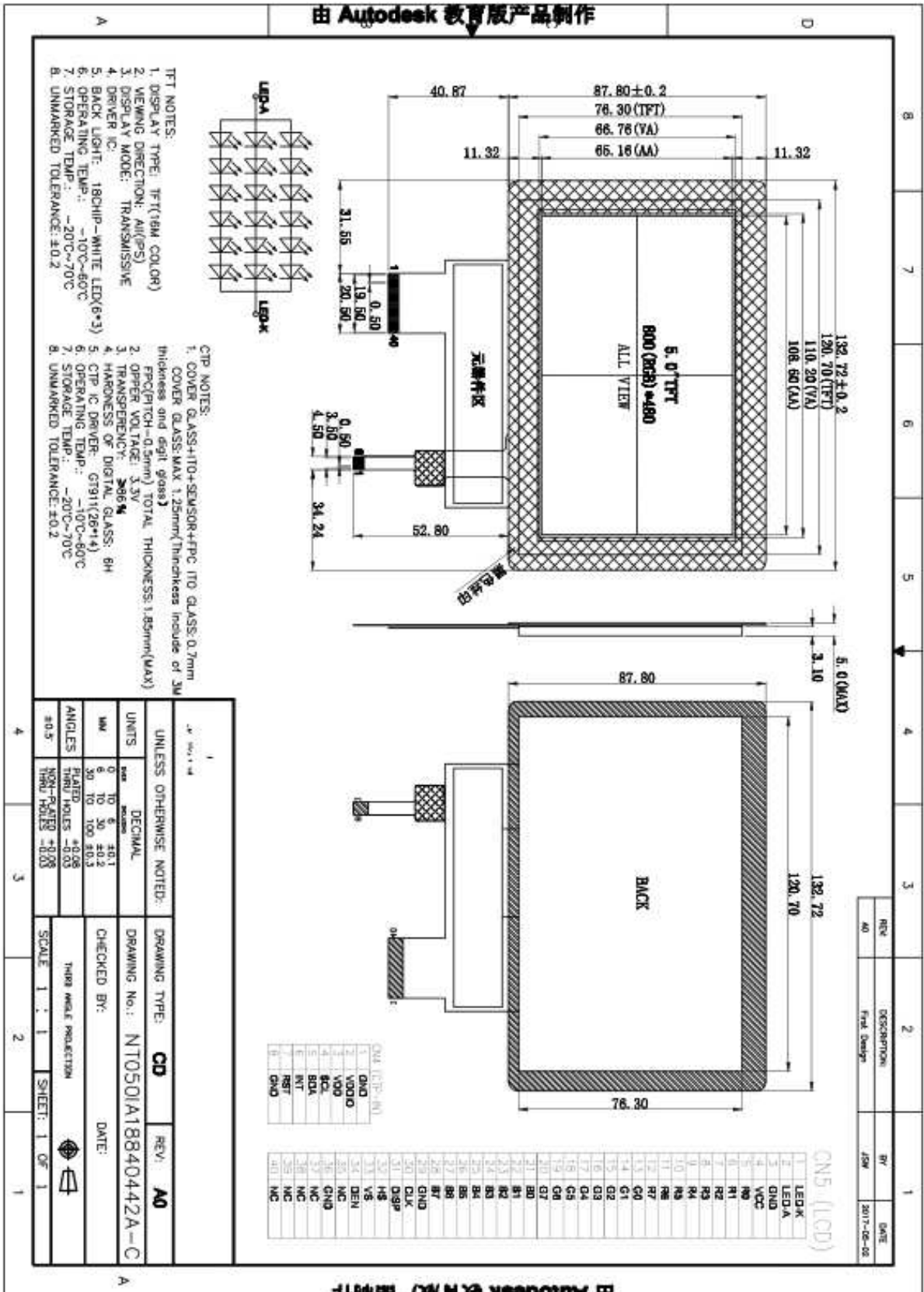
7.0 Reliability test items

0	Item	Conditions	Remark
1	High Temperature Storage	Ta=+70°C,24hrs	
2	Low Temperature Storage	Ta=-20°C,24hrs	
3	High Temperature Operation	Ta=+60°C,24hrs	
4	Low Temperature Operation	Ta=-10°C,24hrs	
5	High Temperature and High Humidity (operation)	Ta=+40°C,90%RH,24hrs	
6	Thermal Cycling Test (non operation)	-20°C(0.5hr)→+70°C(0.5hr),200cycles	
7	Vibration	1.Random:1.04G,10-500HZ,X,Y,Zdirection 30min/each direction 2.Sweep sine:1.5G, 5~500Hz, X/Y/Z,30min/each direction	
8	Shock	100G,6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
9	Vibration (with carton)	Random:1.04Grms, 10~500Hz, X/Y/Z 45min/each direction Fixed:5Hz, 1.5Grms, X/Y/Z 45min/each direction	
0	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202
1	Electrostatic Discharge	±200V,200PF,0Ω1 time/each terminal	

Note: All tests above are practiced at module type.

There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

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- TFT NOTES:
1. DISPLAY TYPE: TFT(16M COLOR)
 2. VIEWING DIRECTION: All(°S)
 3. DISPLAY MODE: TRANSMISSIVE
 4. DRIVER IC:
 5. BACK LIGHT: 18CHIP-WHITE LED(6*3)
 6. OPERATING TEMP.: -10°C~60°C
 7. STORAGE TEMP.: -20°C~70°C
 8. UNMARKED TOLERANCE: ±0.2

- CTP NOTES:
1. COVER GLASS+ITO+SENSOR+TPC ITO GLASS: 0.7mm
 2. COVER GLASS: MAX 1.25mm(Thickness include of 3M thickness and opt. glass)
 3. TRANSPARENT: 98.6%
 4. OPER. VOLTAGE: 3.3V
 5. HARDNESS OF DIGITAL GLASS: 6H
 6. CTP IC DRIVER: G1911(2P*4)
 7. OPERATING TEMP.: -10°C~60°C
 8. STORAGE TEMP.: -20°C~70°C
 9. UNMARKED TOLERANCE: ±0.2

UNITS	DECIMAL
mm	0 TO 6 ±0.1
	6 TO 30 ±0.2
	30 TO 100 ±0.3
ANGLES	PLATED THRU HOLES ±0.08
	NON-PLATED THRU HOLES ±0.05

DRAWING TYPE:	CD	REV:	A0
DRAWING No.:	NT0501A18840442A-C		
CHECKED BY:	DATE:		
THIRD ANGLE PROJECTION	SCALE: 1:1		
	SHEET: 1 OF 1		

REV	DESCRIPTION	BY	DATE
A0	Final Design	JSM	2017-06-06

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