

SPECIFICATION

Customer : _____
Model Name: SAT070AT40D21Y0-35100T071KN
ERP NO. : 1010700399
Spec Vision: V.2
Date: 2020/07/02

- Preliminary Specification
- Final Specification

Approved by	Comment

Prepared by	Reviewed by	Approved by

Record of Revision

Version	Revise Date	Page	Content	Modified by
V. 1	2016. 03. 18	-	First Issued.	Li Shun
V. 2	2020.07.02			

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1. General Specifications

NO.	Item	Specification	Remark
1	Panel Size	7.0 inch(Diagonal)	
2	Resolution	800 x 3(RGB) x 480	
3	Driver Method	A-Si TFT active matrix	
4	Active Area	154.08(W)× 85.92(H) mm	
5	Dot Pitch	0.0642(W)×0.1790(H) mm	
6	Pixel Arrangement	RGB-stripe	
7	Module Size	165(W)x100(H)x3.5(D)mm	
8	Display Mode	Normally White	
9	Display Color	16.7M	
10	Viewing Direction	6 o'clock	
11	Interface	TTL RGB-24Bit parallel interface	
12	Driving IC	EK9713CA+EK73002ACGB	
13	Weight	TBD	g

2. Pin Assignment

No.	Symbol	Function	Remarks
1	VLED-	Power for LED backlight (Cathode)	
2	VLED+	Power for LED backlight (anode)	
3	GND	Power ground	
4	VDD	Power for digital circuit	
5-12	R0~R7	Red data	
13-20	G0~G7	Green data	
21~28	B0~B7	Blue data	
29	GND	Power ground	
30	PCLK	Pixel clock	
31	NC	No connection	
32	HSYNC	Horizontal Sync input	
33	VSYNC	Vertical Sync input	
34	DE	Data input enable	
35	NC	No connection	
36	GND	Power ground	
37	XR	Right electrode-differential analog	When this pin not used, please leave it open
38	YD	Bottom electrode-differential analog	
39	XL	Left electrode-differential analog	
40	YU	Top electrode-differential analog	

3. Operation Specifications

3.1. Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	DV_{DD}	-0.3	5.0	V	
	AV_{DD}	6.5	13.5	V	
	V_{GH}	-0.3	40.0	V	
	V_{GL}	-20.0	0.3	V	
	$V_{GH}-V_{GL}$	-	40.0	V	
Operation Temperature	T_{OP}	-20	70	°C	
Storage Temperature	T_{ST}	-30	80	°C	

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings case, the module may be permanently destroyed.

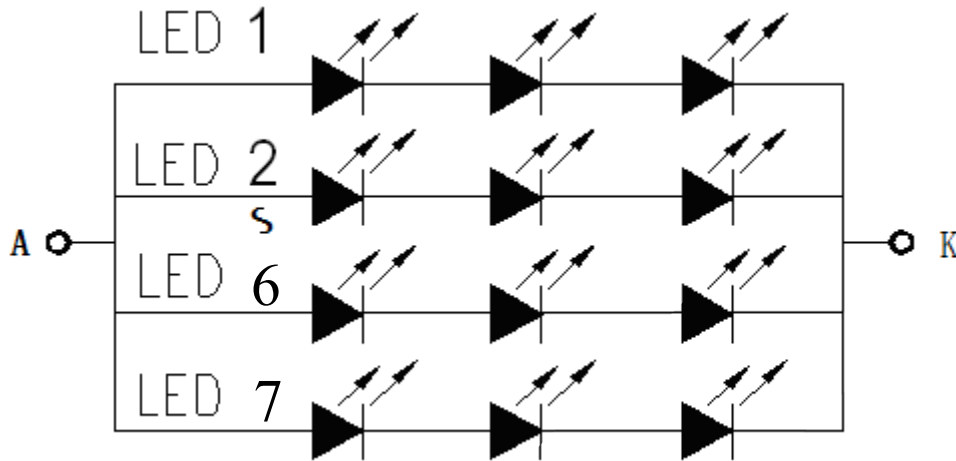
3.1.1. Recommended Operation Range

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	9.80	10.0	10.2	V	
	V_{GH}	15	16	17	V	
	V_{GL}	-7.7	-7.0	-6.3	V	
Input signal voltage	V_{COM}	3.8	4.0	4.2	V	Note 4
Input logic high voltage	V_{IH}	0.7 DV_{DD}	-	DV_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	-	0.3 DV_{DD}	V	

3.1.2. Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage of white LED backlight	V_L	8.7	9.6	10.5	V
Current for LED backlight	I_L	105	140	175	mA
Luminance (on the module surface ,BM-7)		250	280	-	cd/m ²
LED life time	-	50000	-	-	Hr



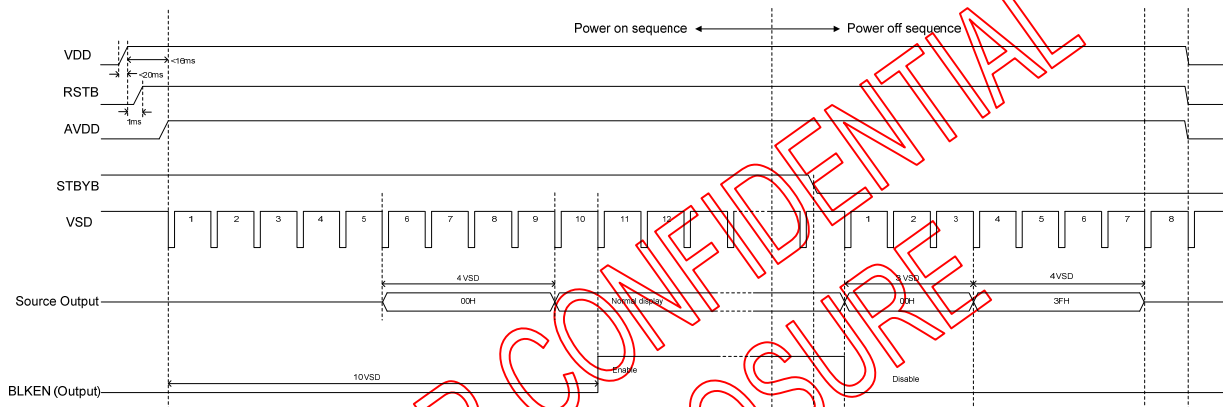
3.2. Power Sequence

3.2.1. Power On Sequence

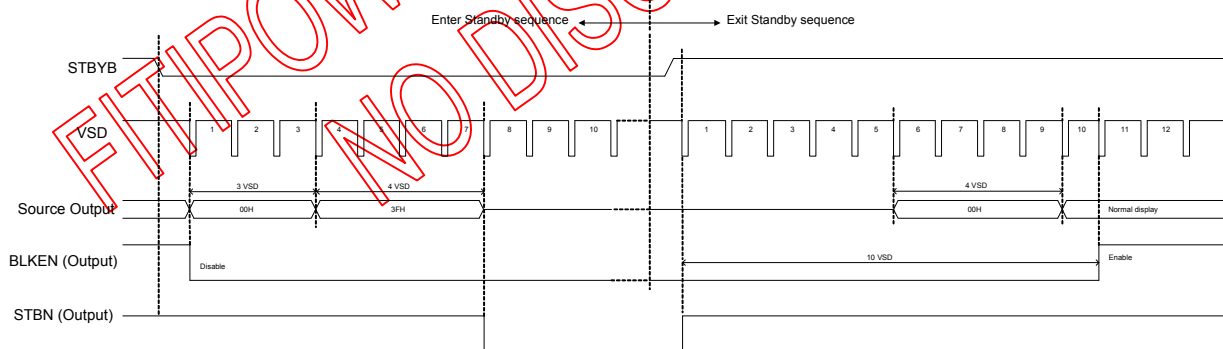
Power On/Off Sequence

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to “AC Characteristics” for more detail on timing.

This is another paragraph of sub-function description.



Power-On/Off Timing Sequence



Enter and Exit Standby Mode Sequence

3.2.2. DC Characteristics

DC Characteristics

(TA = -20 to 85°C, VDD = 1.8 to 3.6V, AVDD = 6.5 to 13.5V, GND = AVSS = 0V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Low level input voltage	Vil	For the digital circuit	0	-	0.3×VDD	V
High level input voltage	Vih	For the digital circuit	0.7×VDD	-	VDD	V
Input leakage current	Ii	For the digital circuit	-	-	±1	μA
High level output voltage	Voh	Ioh= -400 μA	VDD-0.4	-	-	V
Low level output voltage	Vol	Iol= +400 μA	-	-	GND+0.4	V
Pull low/high resistor	Ri	For the digital input pin @ VDD=3.3V	150K	250K	350K	ohm
Digital Operation current	Idd	Fclk=40 MHz, FLD=37.88KHz, VDD=3.3V	-	8	10	mA
Digital Stand-by current	Ist1	Clock and all functions are stopped	-	10	50	μA
Analog Operating Current	Idda	No load, Fclk=40MHz, FLD=37.88KHz @ AVDD=10V, V1=8V, V14=0.4V	-	10	12	mA
Analog Stand-by current	Ist2	No load, Clock and all functions are stopped	-	10	50	μA
Input level of V1 ~ V7	Vref1	Gamma correction voltage input	0.4×AVDD	-	AVDD-0.1	V
Input level of V8 ~ V14	Vref2	Gamma correction voltage input	0.1	-	0.6×AVDD	V
Output Voltage deviation	Vod1	Vo = AVSS+0.1V ~ AVSS+0.5V and Vo = AVDD-0.5V ~ AVDD-0.1V	-	±20	±35	mV
Output Voltage deviation	Vod2	Vo = AVSS+0.5V ~ AVDD-0.5V	-	±15	±20	mV
Output Voltage Offset between Chips	Voc	Vo = AVSS+0.5V ~ AVDD-0.5V	-	-	±20	mV
Dynamic Range of Output	Vdr	SO1 ~ SO1200	0.1	-	AVDD-0.1	V
Sinking Current of Outputs	IOLy	SO1 ~ SO1200; Vo=0.1V v.s 1.0V, AVDD=13.5V	80	-	-	uA
Driving Current of Outputs	IOHy	SO1 ~ SO1200; Vo=13.4V v.s 12.5V, AVDD=13.5V	80	-	-	uA
Resistance of Gamma Table	Rg	Rn: Internal gamma resistor	0.7×Rn	1.0×Rn	1.3×Rn	ohm

3.3. Timing Characteristics

3.3.1. Timing table

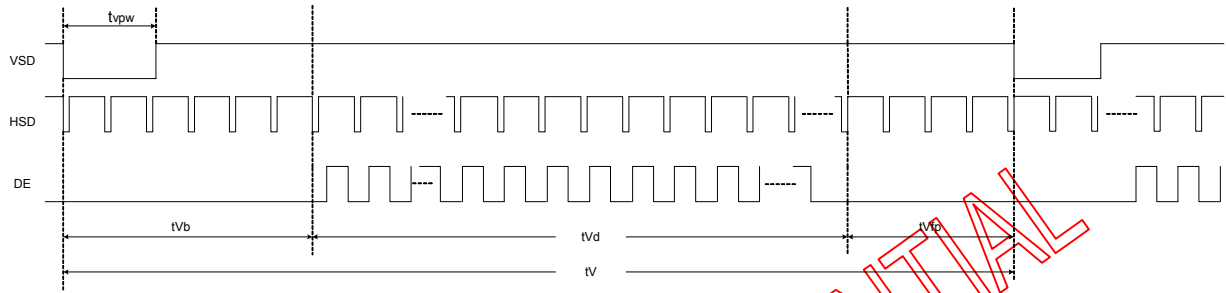
Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd	800			DCLK
DCLK frequency		fclk	Min.	Typ.	Max	MHz
			-	33.3	50	
1 Horizontal Line		th	862	1056	1200	DCLK
HSD pulse width	Min.	thpw	1			
	Typ.		-			
	Max.		40			
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	

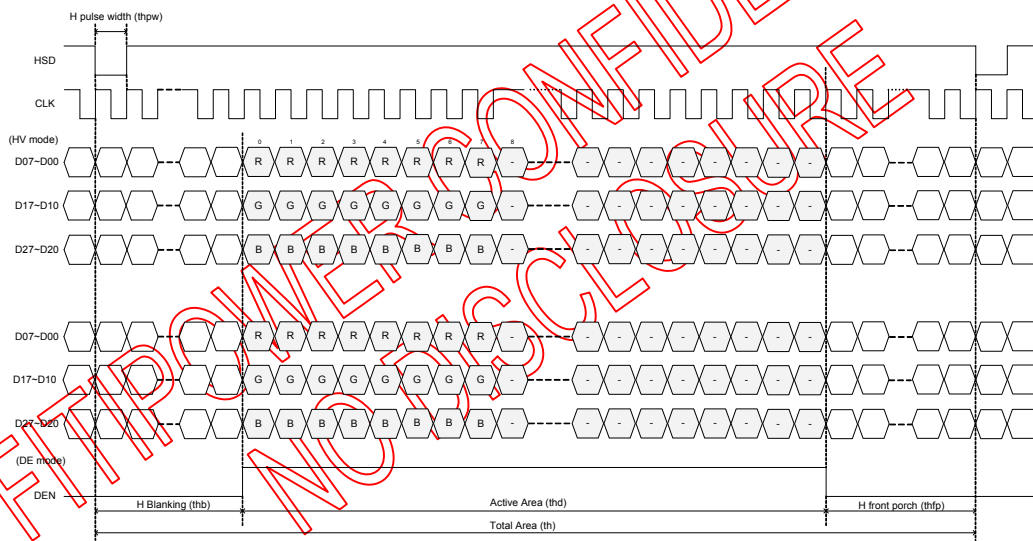
Vertical input timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd	480			H
VSD period time	tv	510	525	650	H
VSD pulse width	tpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

3.3.2. Date input format

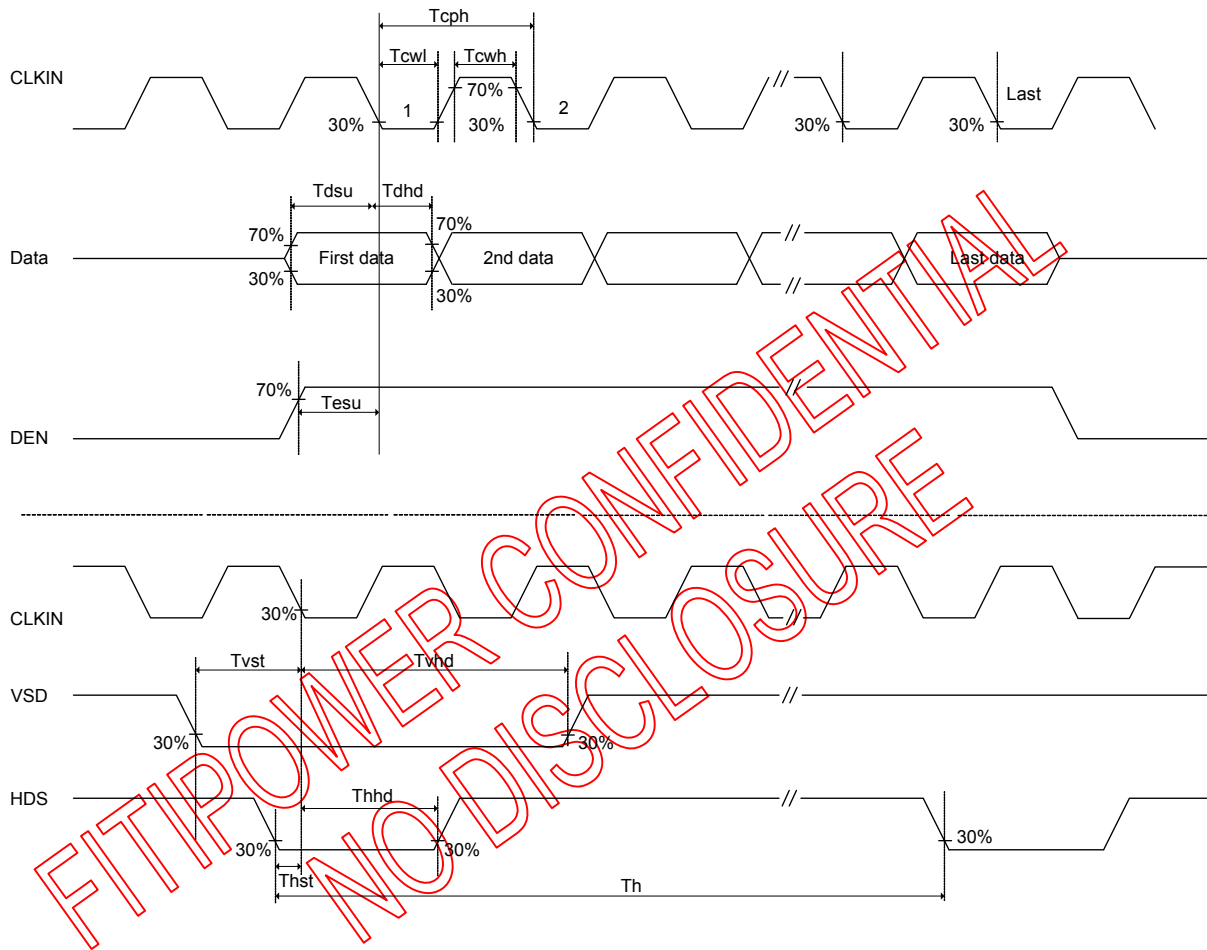


Vertical input timing

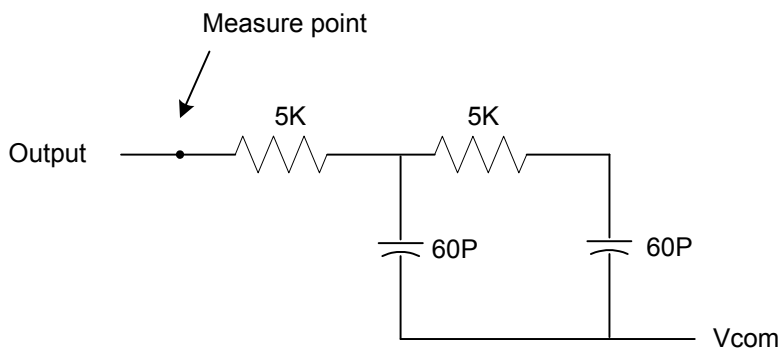


Horizontal input timing

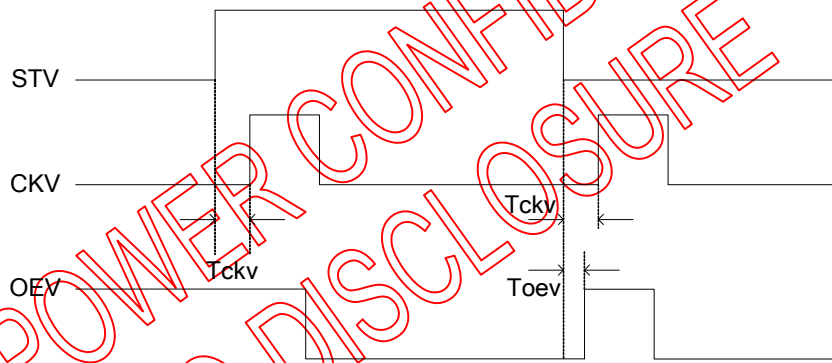
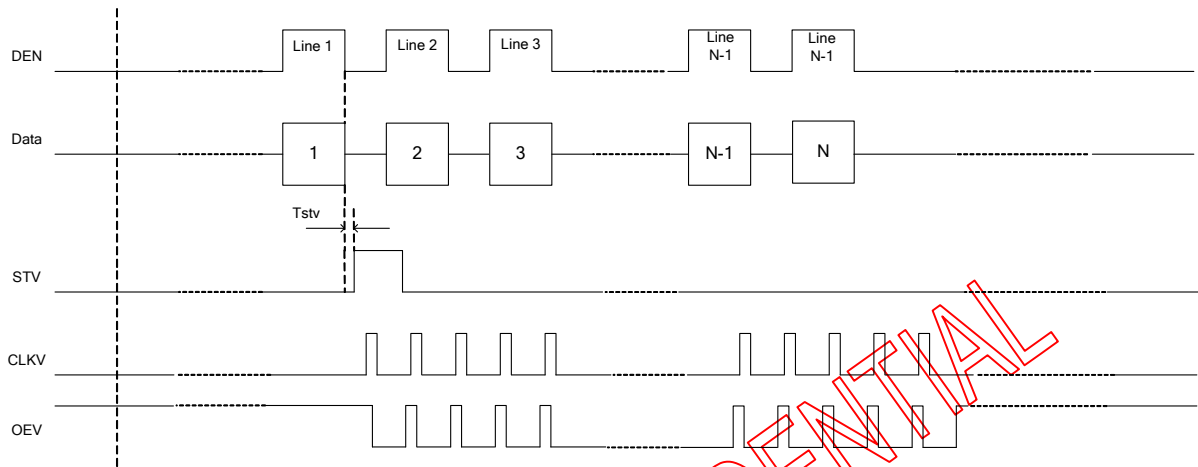
3.3.3. Timing Diagram



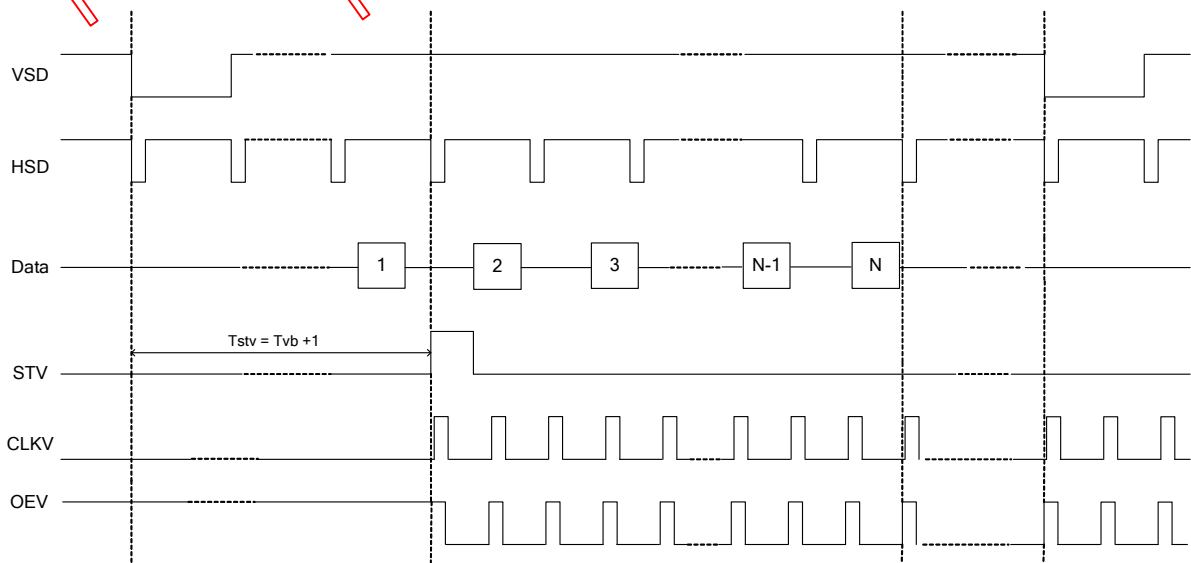
Input Clock and Data Timing Diagram



Output load condition



Vertical Timing Diagram DE



4. Optical Specifications

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	
View Angles	θT	$CR \geq 10$	40	50	--	Degree	Note1	
	θB		60	70	--			
	θL		60	70	--			
	θR		60	70	--			
Contrast Ratio	CR	$\theta=0^\circ$	400	500	--		Note4	
Response Time	T_{ON}	25°C	--	10	20	ms	Note3	
	T_{OFF}		--	15	30			
Chromaticity	White	Backlight is on	x	0.278	0.298	0.318		Note2 Note5 Note6
			y	0.263	0.283	0.303		
Luminance	L		280	330	--	cd/m ²	Note6	

Test Conditions:

1. $DV_{DD}=3.3V$, $I_L=140mA$ (Backlight current),the ambient temperature is 25°C.
2. The test systems refer to Note 2.

5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta=80°C 120h	Note1 ,Note4
Low Temperature Storage	Ta=-30°C 120h	Note1, Note4
High Temperature Operation	Ts=70°C 120h	Note2 ,Note4
Low Temperature Operation	Ts=-20°C 120h	Note4
Operation at High Temperature and Humidity	+60°C,90%RH 120h	Note4
Thermal Shock	-20°C/30min~+60°C/30min for a total 100 cycles , Start with cold temperature and end with high temperature	
Package Drop Test	Height 60cm 1corner , 3edges , 6surfaces	
Elector Static Discharge	±2KV,Human Body Mode, 150pF/330 Ω	

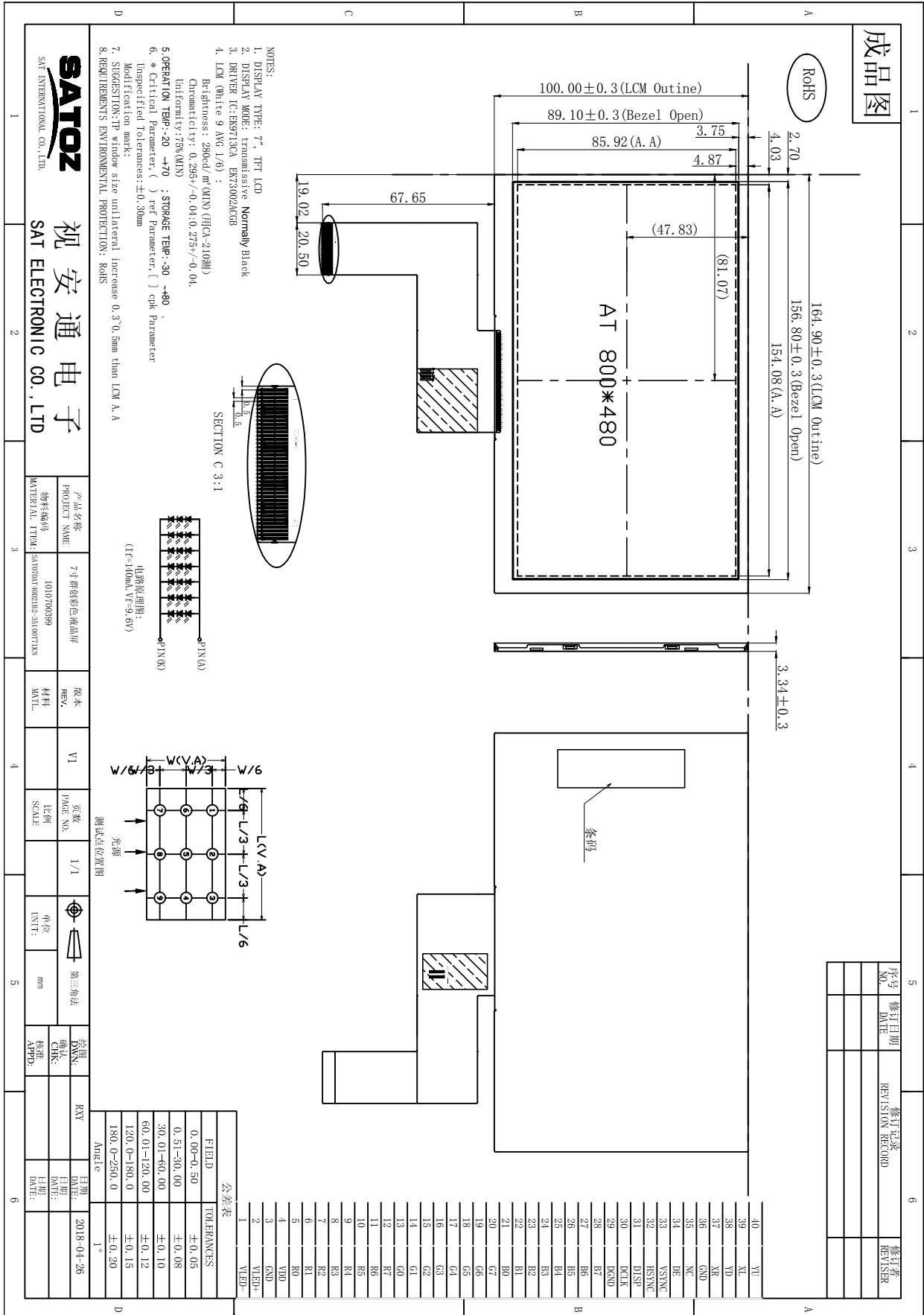
Note1: Ta is the ambient temperature of samples.

Note2: Ts is the temperature of panel's surfaces.

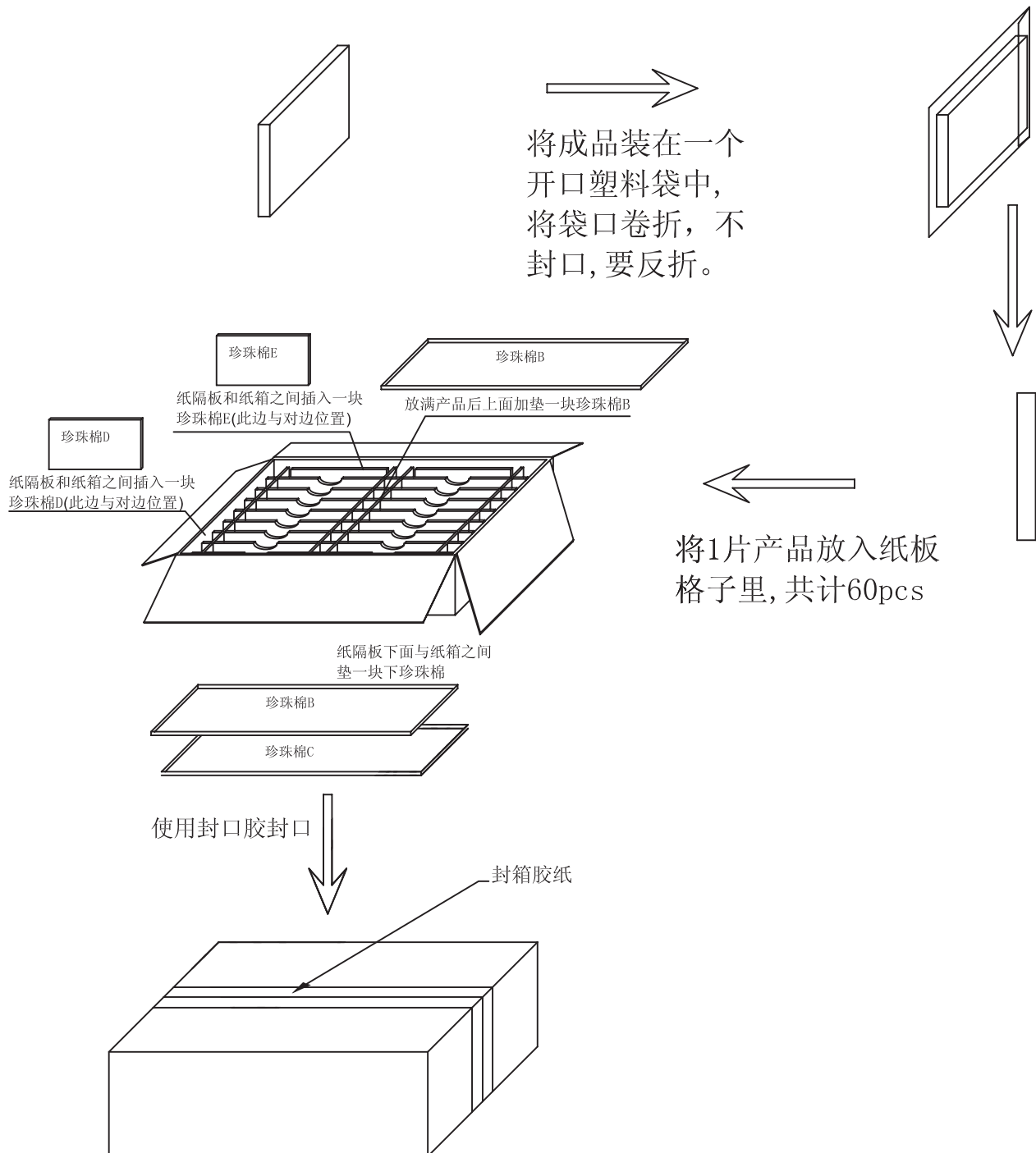
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all of the cosmetic specification.

Note4: before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

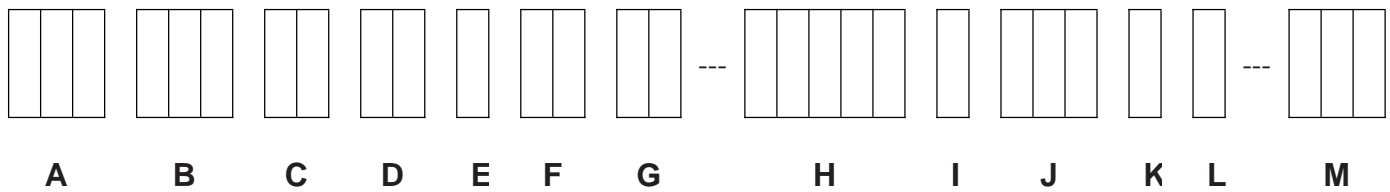
6. Mechanical Drawing



7. Package Drawing



8. Numbering System



NO.	Definition	Specifications
A	Company code	SAT INTERNATIONAL CO.LTD.
B	Display monitor opposite angle line size	Unit : inch (size<10inch:take two integers;size>=10inch:takes three integers)
C	LCD Brands	AU-AUO; CP-CPT; IV-IVO; TM-TIANMA; HS-HSD; CM-CMO; BO-BOE; AT--INNOLUX;
D	Interface PIN Number	Arabic numerals from 01 to 99
E	LCD Type	A--Alternated Video Signal; D--Data Video Signal; H--High Definition ; I--IPS
F	Backlight LED Number	Arabic numerals from 01 to 99
G	Backlight Color Are	Include R1、 R2、 Y0、 Y1、 B1、 B2;
H	Structure Size	Include module length and width size
I	Interface Mode	T:TTL L:LVDS M:MIPI
J	FPC Length	It represents the length of FPC with three figures, divided into long rows ,middle rows and short rows
K	View Angles	Z : represent narrow viewing angle K : represent wide viewing angle I : represent all viewing angle
L	Operating Mode	D: DE mode V: VSD mode F: Inverting mode N: No mode requirements
M	Suffix	1. NULL ; 2. TP/CTP-- Touch panel; 3. other--Insignificance

杭州凡诺电子有限公司
FANNAL ELECTRONICS CO., LTD

Specifications for Module
 Model NO: FN070A133-V1.0

Approved For Specifications Only
 Approved For Specifications And Sample

FANNAL			CUSTOMER
PREPARED	CHECKED	APPROVED	APPROVED
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1. Record of Revision

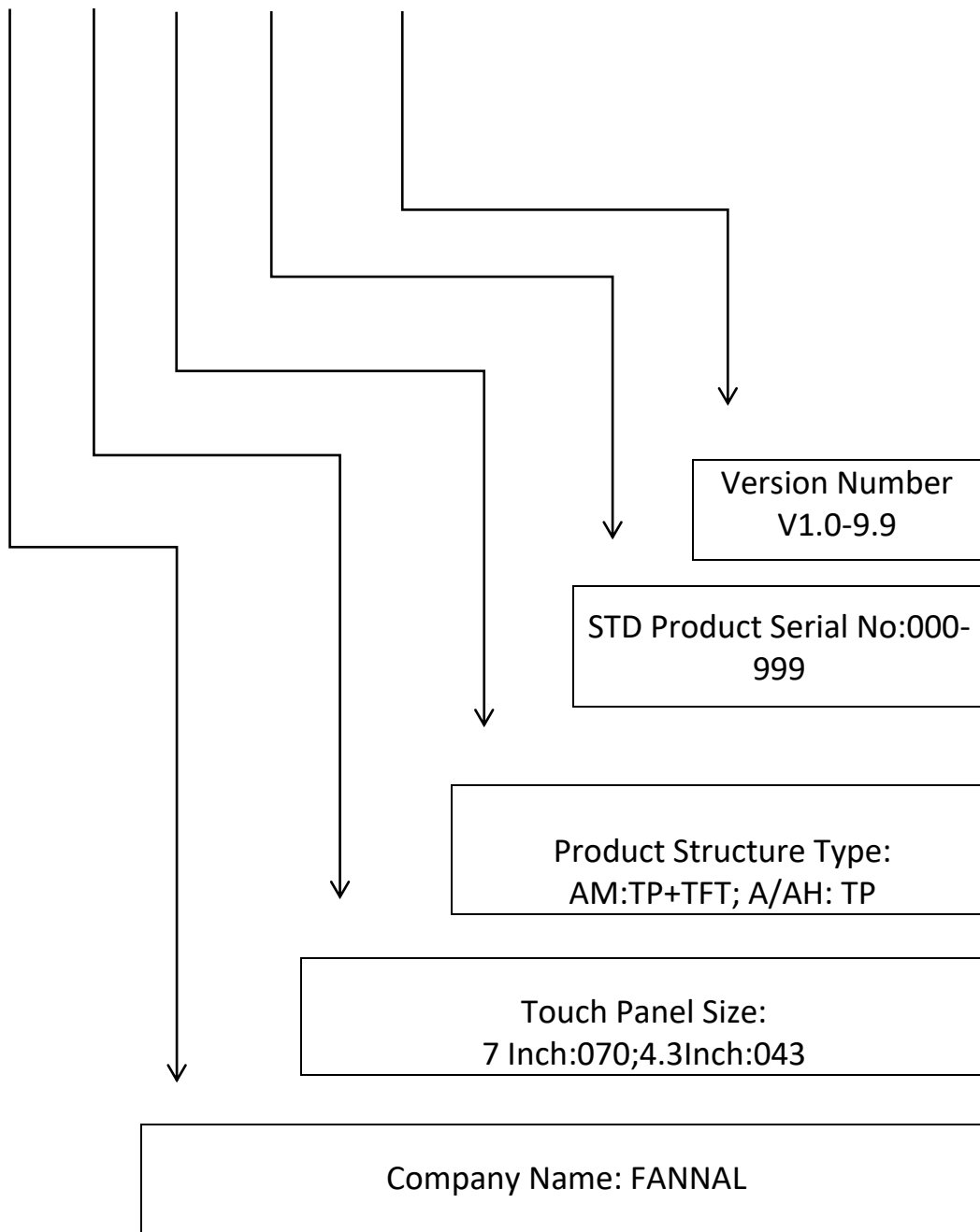
NO.	Content	Page	Date
1	Preliminary Specification was first issued	2	2020/02/19

2. Table of Content

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3. Module Numbering System

FN 070 A 133 - V1.0



4. Application

This improved projected capacitive touch panel module is applied to industrial applications which required touch input.

Industrial control, medical devices and automation industries (transportation, military, smart home, and others)

5. General Specifications

NO.	Item		Specifications	Unit
1	Touch Panel Size		7.0(Diagonal)	inch
2	Structure		G+G	
3	View Area		155.08(H)x86.92(V)	mm
4	Outline Dimension		164.9(H)x100(V)x1.58(D)	mm
5	Transparency		85%Min	
6	Surface Hardness		6H	
7	Driver IC		GT911	
8	Detect Points		5	
9	Interface		I2C	
10	Power supply		3.3	V
11	Operating Temperature		-20~70	°C
12	Storage Temperature		-30~80	°C
13	ESD	Air	±8	KV
		Contact	±4	KV
14	RoHS Compliance		OK	

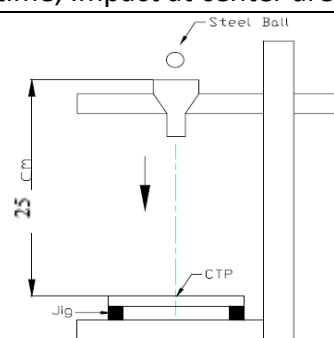
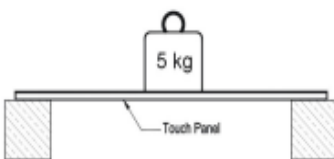
6. Pin Assignment

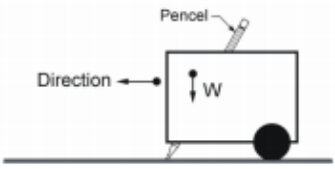
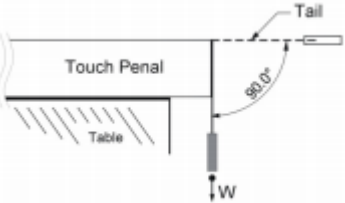
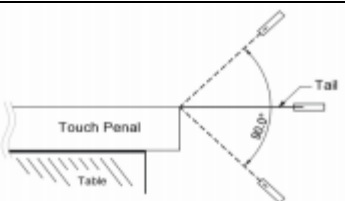
Pin No.	Symbol	I/O	Description	Note
1	VDD (3.3V)	--	Power supply	
2	GND	--	System ground	
3	INT (3.3V)	O	Interrupt signal, active low, asserted to request Host start a new transaction	
4	SDA (3.3V)	I/O	I ² C data signal	
5	SCL (3.3V)	I/O	I ² C clock signal	
6	RST (3.3V)	I	External reset signal, active low	

CTP Test Program

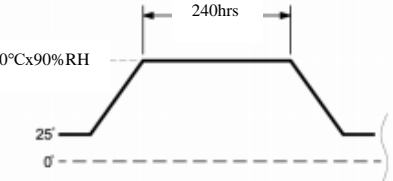
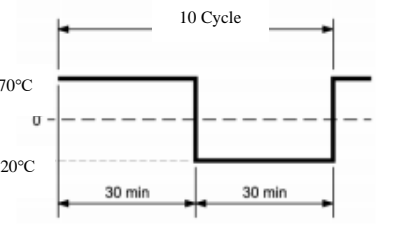
FW Name:	FN070A133_GT911_VER95_20200116.cfg
FW Version:	0X95
Test Config:	FN070A133_CTP_MP.ini

7. Mechanical Characteristic

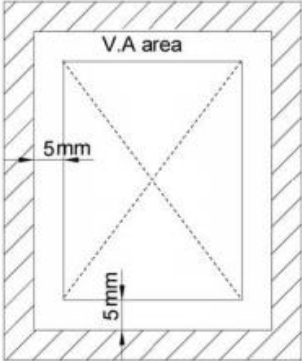
NO.	Item	Condition	Specifications
1	Operating Force	Finger \leq 10g	
2	Impact	Steel Ball/132g/Height=25cm/1 time, Impact at center area 	Satisfy- 1. Optical Characteristics 2. Electrical Characteristics Appearance- 1. Ignore test area 2. No mechanical damage
3	Static Load	5000g within 10cm Φ area for 30sec 	Satisfy- 1. Optical Characteristics 2. Electrical Characteristics Appearance- 1. Ignore test area 2. No mechanical damage

NO.	Item	Condition	Specifications
4	Hardness	6H pencil, pressure 500g/45°	Satisfy- 1. Optical Characteristics 2. Electrical Characteristics Appearance- 1. Ignore test area 2. No mechanical damage
			
5	Tail Peeling	500g/cm by vertical 90° for 30sec	
			
6	Tail Bending	90° 10times left & right	
			

8. Reliability Test

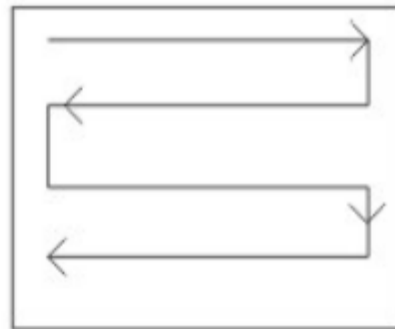
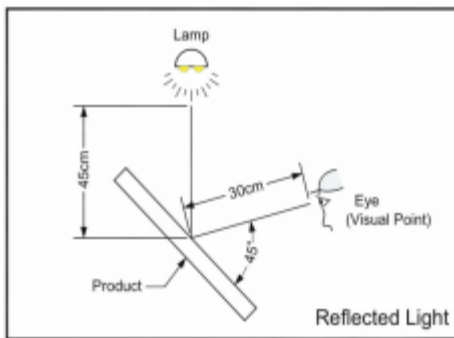
NO.	Item	Condition	Specifications
1	Constant Temperature/Humidity	60°C X 90%RH, 240hrs and normalized for 24hrs	Satisfy- 1. Electrical Characteristics
			
2	Heat Cycle	80°C/240hrs and normalized for 24hrs	
3	Cold Cycle	-30°C/240hrs and normalized for 24hrs	
4	Thermal Cycle	-20°C~70°C [30min/cycle]*10cycles and normalized for 24hrs	
			

9. Function test

Function Test	<p>Test Method: Use $\Phi 8$ copper stick to draw the square diagonal line.</p> <p>Test Area: 5mm inward view area.</p> <p>Disapproval Criteria: It is NG when we see the off-liner or jumping out spec shift.</p>	
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10. Appearance Inspection

The inspection is to be performed with 800-1000 LUX fluorescent lamp lighting from the back or side. The panel is to be placed 30cm away from eyes. Viewing Time: 15 ± 3 seconds/per face (Figure 13-1)



11. Appearance Specification

NO.	Item	Specifications	Judgment
1	Dot Contamination	1) $D \leq 0.2\text{mm}$ 2) $0.2\text{mm} < D \leq 0.50\text{mm}, DS \geq 10\text{mm}$ 3) $D > 0.5\text{mm}$	1) Ignore 2) OK with 5 3) NG
2	Linear Contamination	1) $W \leq 0.05\text{mm}, DS \geq 10\text{mm}$ 2) $0.05\text{mm} < W \leq 0.1\text{mm}, L \leq 5\text{mm}, DS \geq 10\text{mm}$ 3) $W > 0.1\text{mm}$ or $L \geq 5\text{mm}$	1) Ignore 2) OK with 5 3) NG
3	Cracks and Chips (Surface)	$X < 0.2\text{mm}, Y < 0.2\text{mm}, Z < \frac{1}{2}T$	Ignore

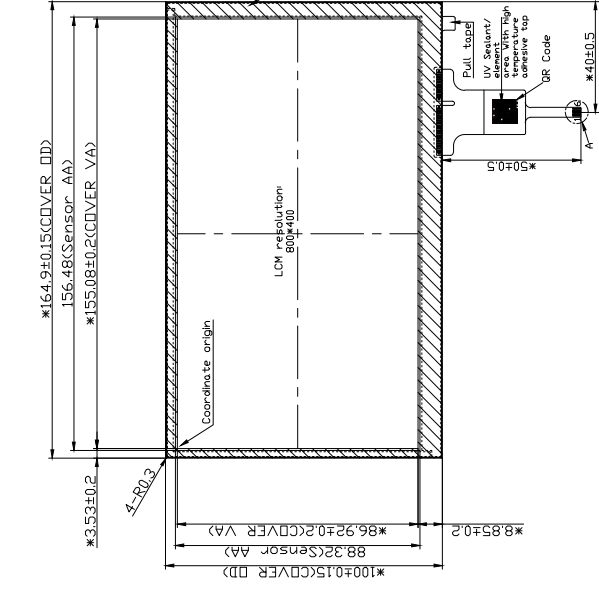
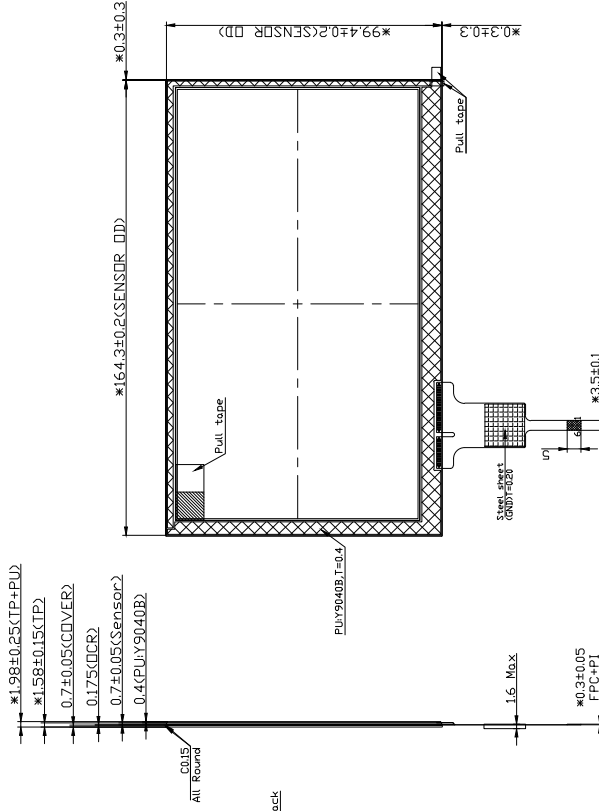
<Endorse>
 1. D=Diameter / W=Width / L=Length
 2. Tail: Slight bend mark is allowed on the tail; crack or tear is not allowed.
 3. Particle Spots: Flaws found coating if transparent, please follow Particle Spots specification.
 4. The dirty of surface can be clean that can be acceptable.

12. Mechanical Drawing

TECHNOLOGY CHARACTERISTICS CTP

PROPERTY	Requirement
STRUCTURE	G+G
Bonding Type	/
TOUCH IC	GT911
NO. OF TOUCH	5
Cover glass Thickness	0.7mm(Soda Lime)
ITO Glass Thickness	0.7mm
Surface Hardness	≥6H
Light Transmittance	85% Min
Operating Temperature	-20~70° C
Storage Temperature	-30~80° C

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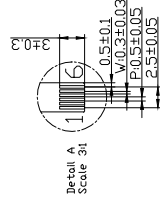


Front view

Back view

Side view

Pin No.	Definition
1	VDD(3.3V)
2	GND
3	INT(3.3V)
4	SDA(3.3V)
5	SCL(3.3V)
6	RST(3.3V)



NOTES:
 *: Important dimensions
 TOLERANCE UNLESS: x: ±0.3
 OTHERWISE SPECIFIED: xx: ±0.2
 DIMENSIONS IN MM: ANGULAR: ±1°

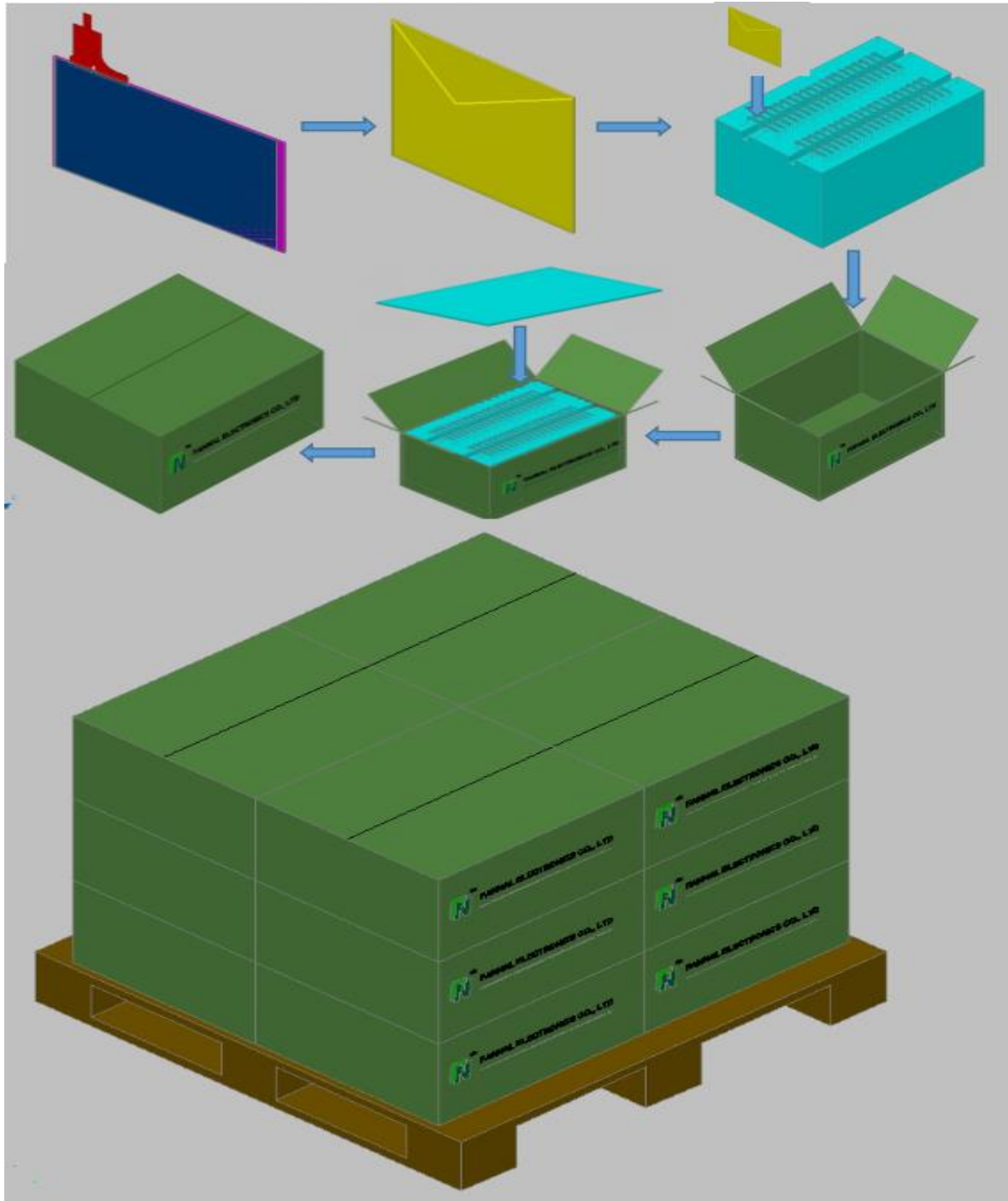
DRAWN		Yan
CHECKED		Lee
APPROVED		Dolphe
CSR APPROVED		
Customer No:	2019.12.10	Yan
3rd Angle	2019.12.05	Yan
SHEET 1 OF 1	DATE	SIGN
AMENDMENT		
1.0	Modify temperature range	Yan
	First issue	Yan

TITLE
MODULE SPEC.
 Drawing NO:CT0476-V2.0
 Product NO:FN070A133-V1.0
 Project No: TPM8469

FANNAL ELECTRONICS CO., LTD

ROHS

13. Packaging(NEUTRAL PACKING)



SIZE(Carton): 53X36X27.5cm