FANNAL
ELECTRONICS

杭州凡诺电子有限公司

FANNAL ELECTRONICS CO., LTD

Specifications for Module

Model NO: FN043AM030-V1.0

Revision: 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	2018/12/20

2、Table of Content

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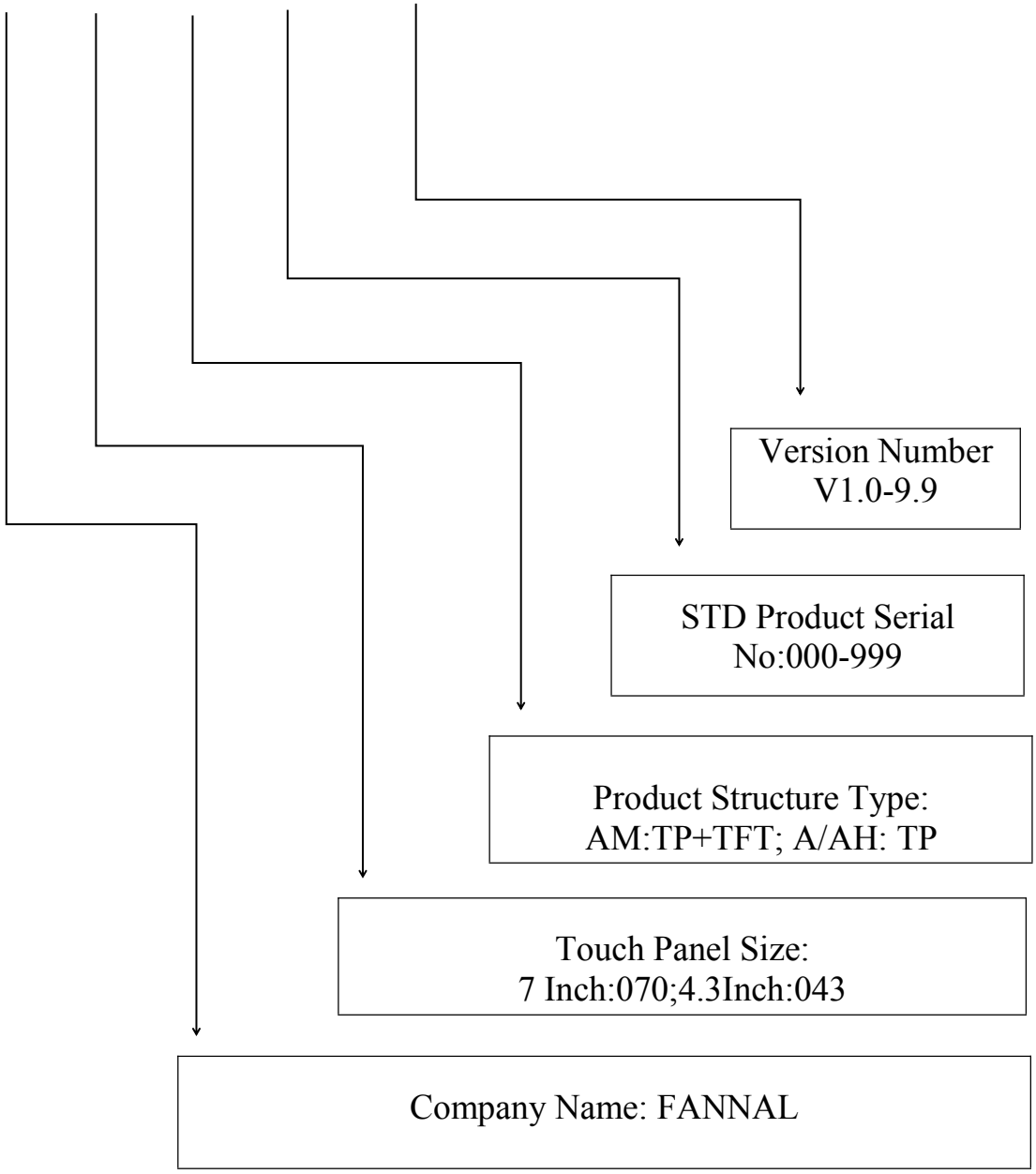
3、Module Numbering System

FN 043 AM 030 - 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、Feature

NO.	Item	Specifications
1	Type	TP+LCD
2	Input Mode	Finger
3	TP Connector	COF-FPC

6、General Specifications

6.1 Touch Panel General Specifications

NO.	Item		Specifications	Unit
1	Touch Panel Size		4.3(Diagonal)	inch
2	Structure		G+G	
3	View Area		96.04*54.86	mm
4	Outline Dimension		105.5(H)x67.20(V)x1.43(D)	mm
5	Transparency		85% Min	
6	Surface Hardness		≥6H	
7	Driver IC		FT5426DQ8	
8	Detect Points		5	
9	Interface		I2C	
10	Power supply		2.8-3.3	v
11	Operating Temperature		-20~70	℃
12	Storage Temperature		-30~80	℃
13	ESD	Air	±8	KV
		Contact	±4	KV
14	ROHS Compliance		OK	

6.2 TFT-LCD General Specifications

NO	Item	Specifications	Unit
1	LCD Size	4.3 (digital)	inch
2	Panel Type		-
3	Resolution	480 x 3(RGB) x 272	pixel
4	Display Mode	Normally White	-
5	Surface hardness		H
6	Contrast Ratio	300（MIN），500(TYP)	-
7	Luminance	280（MIN），320(TYP)	cd/m^2
8	Module Size	105.5(W) x 67.2(H) x3.0(D))	mm
9	Active Area	95.04(W) x 53.856(H)	mm
10	Dot Pitch	0.198(W) x 0.198(H)	mm
11	Weight	TBD	g
12	Interface	TTL RGB-24Bit parallel interface	-
13	Operating Temperature	-20~70	℃
14	Storage Temperature	-20~70	℃

7、 Pin Assignment

7.1 TP Pin Assignment

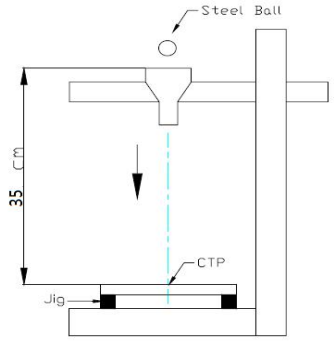
Pin No.	Symbol	I/O	Description
1	VDD(3.3V)	-	Power supply
2	GND	-	System ground
3	INT(3.3V)	O	Interrupt signal, active low, asserted to request Host start a new transcation
4	SDA(3.3V)	I/O	I^2C data signal
5	SCL(3.3V)	I/O	I^2C clock signal
6	RST(3.3V)	I	External reset signal, active low
7			
8			
9			
10			
11			
12			
13			

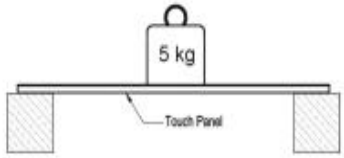
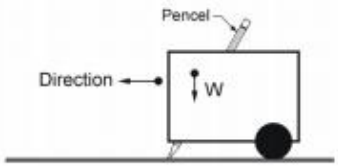
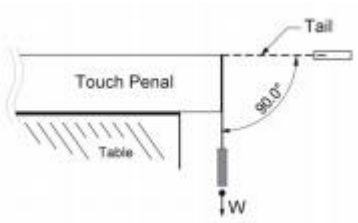
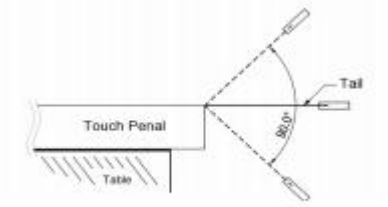
7.2 TFT-LCD Pin Assignment

PIN NO.	SYMBOL	DESCRIPTIONS	REMARK
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	R0	Red data	
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	
13	G0	Green data	
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	
21	B0	Blue data	
22	B1	Blue data	
23	B2	Blue data	
24	B3	Blue data	
25	B4	Blue data	

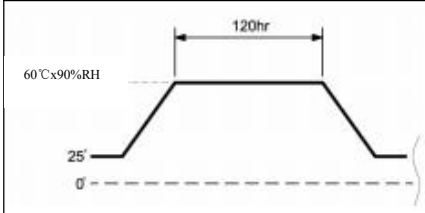
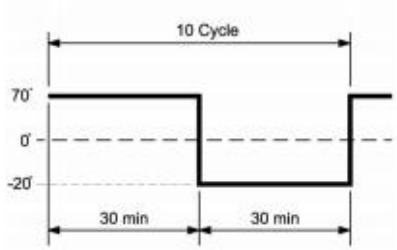
PIN NO.	SYMBOL	FUNCTION DESCRIPTIONS	REMARK
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data	
29	GND	Power ground	
30	PCLK	Pixel clock	
31	NC	No connection	
32	HSYNC	Horizontal Sync input	
33	VSYNC	Vertical Sync input	
34	DE	Data input enable	
35	NC	No connection	
36	GND	Power ground	
37	XR	Right electrode-differential analog	When this pin not used,please leave it open
38	YD	Left electrode-differential analog	
39	XL	LED drive power source.(Cathode side)	
40	YU	Top electrode-differential analog	

8、 Mechanical Characteristic

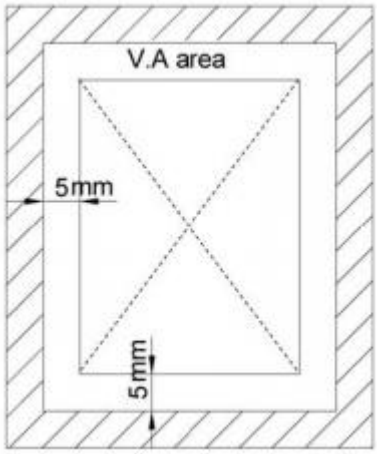
NO.	Item	Condition	Specifications
1	Operating Force	Finger≦10g	Satisfy- 1.Optical Characteristics 2.Electrical Characteristics Appearance- 1.Ignore test area 2.No mechanical damage
2	Impact	30.0ΦDIA.Steel Ball/132g/Height=27cm/1 time, Impact at center area 	

NO.	Item	Condition	Specifications
3	Static Load	5000g within 10cmΦ area for 30sec	Satisfy- 1. Optical Characteristics 2. Electrical Characteristics Appearance- 1. Ignore test area 2. No mechanical damage
			
4	Hardness	6H pencil,pressure 500g/45°	
			
5	Tail Peeling	500g/cm by vertical 90° for 30sec	
			
6	Tail Bending	90° 10times left & right	
			

9、Reliability Test

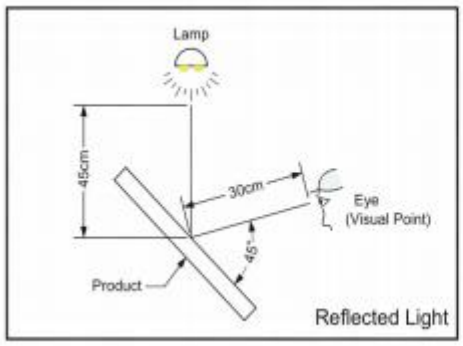
NO.	Item	Condition	Specifications
1	Constant Temperature/Humidity	60℃ X 90%RH,120hrs and normalized for 24hrs 	Satisfy- 1、Electrical Characteristics
2	Heat Cycle	70℃/120hrs and normalized for 24hrs	
3	Cold Cycle	-20℃/120hrs and normalized for 24hrs	
4	Thermal Cycle	-20℃~60℃ [30min/cycle]*10cycles and normalized for 24hrs 	

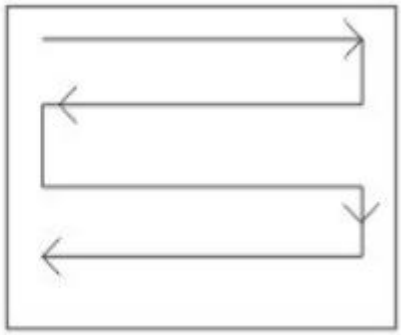
10、 Function test

Function Test	Test Method: Use Φ8 copper stick to draw the square diagonal line. Test Area: 5mm inward view area. Disapproval Criteria: It is NG when we see the off-liner or jumping out spec shift.	

11、 Appearance Inspection

The inspection is to be performed with 20W(800-1000 LUX)fluorescent lamp lighting from the back or side.The panel is to be placed 30cm away from eyes.(Figure 13-1)





12、Appearance Specification

NO.	Item	Specifications	Judgment
1	Dot Contamination	1)D ≤0.1mm 2)0.10mm<D≤0.40mm 3)D>0.40mm	1)Ignore 2)OK with 5 3)NG
2	Linear Contamination	1)W＜0.03mm 2)0.03mm≤W≤0.08mm L≤5mm 3)W≥0.08mm or L≥5mm	1)Ignore 2)OK with 5 3)NG
3	Cracks and Chips(Surface)	X<0.3mm，Y<0.3mm，Z<½T	Ignore

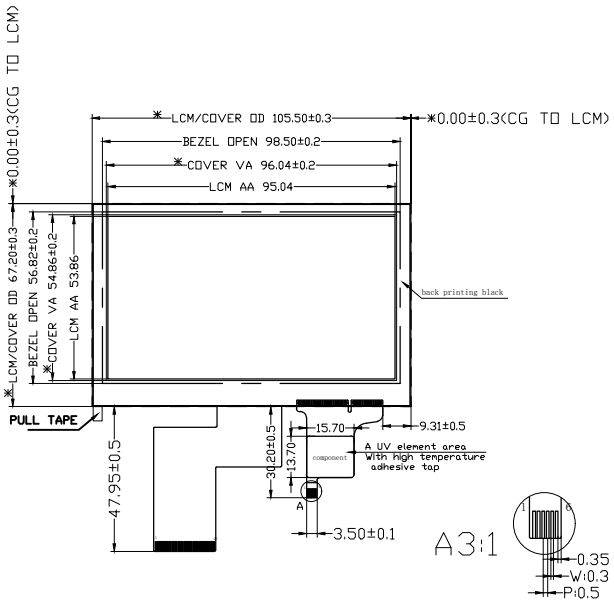
<Endorse>

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.

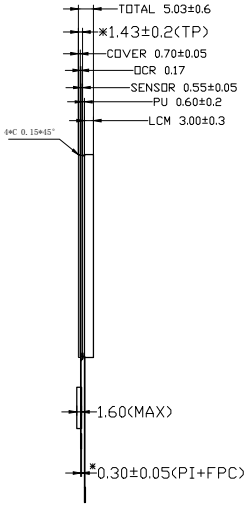
13、Mechanical Drawing

THE DRAWING ON THIS PRINT AND INFORMATION THEREWITH ARE PROPRIETARY TO FANNAL AND SHALL NOT BE USED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF FANNAL

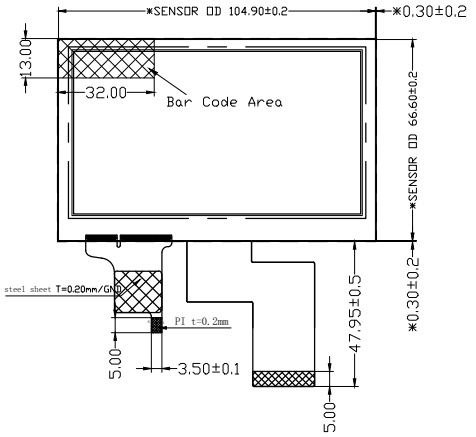
Rev	Revision note	Date
V1.0	First Release	2018-05-11



Front view



Side view



Back view

TECHNOLOGY CHARACTERISTICS CTP	
PROPERTY	Requirement
IC	FT5426DQ8
NO OF TOUCH	5
COVER GLASS Thickness	0.7mm
ITO GLASS Thickness	0.55mm(常规DITO)
Surface Hardness	6H
Light Transmission	85% Min
Operating Temperature	-20~70°C
Storage Temperature	-20~70°C
Operating Humidity	45~90%RH
Storage Humidity	5~95%RH
Luminance(TP+LCM)	240cd/m² (MIN)
	270cd/m² (TYP)
Viewing Angle(LCM)	70/70/50/60

IIC PIN DEFINITION	
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.x ±0.3
OTHERWISE SPECIFIED: x.xx ±0.2
DIMENSIONS IN MM: ANGULAR:±1°

RoHS

LCM (SAT043AT40D08B2-30671T051KN) PIN:

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

TM **FANNAL ELECTRONICS CO., LTD**

Drawing No.: CT0228-V1.0

Product No.: FN043AM030-V1.0

	NAME	SIGN	DATE
DRAWN:	Jeff		2018-05-11
CHECKED:	hong		2018-05-11
APPROVED:	Jeff		2018-05-11

Project No:TPM8080

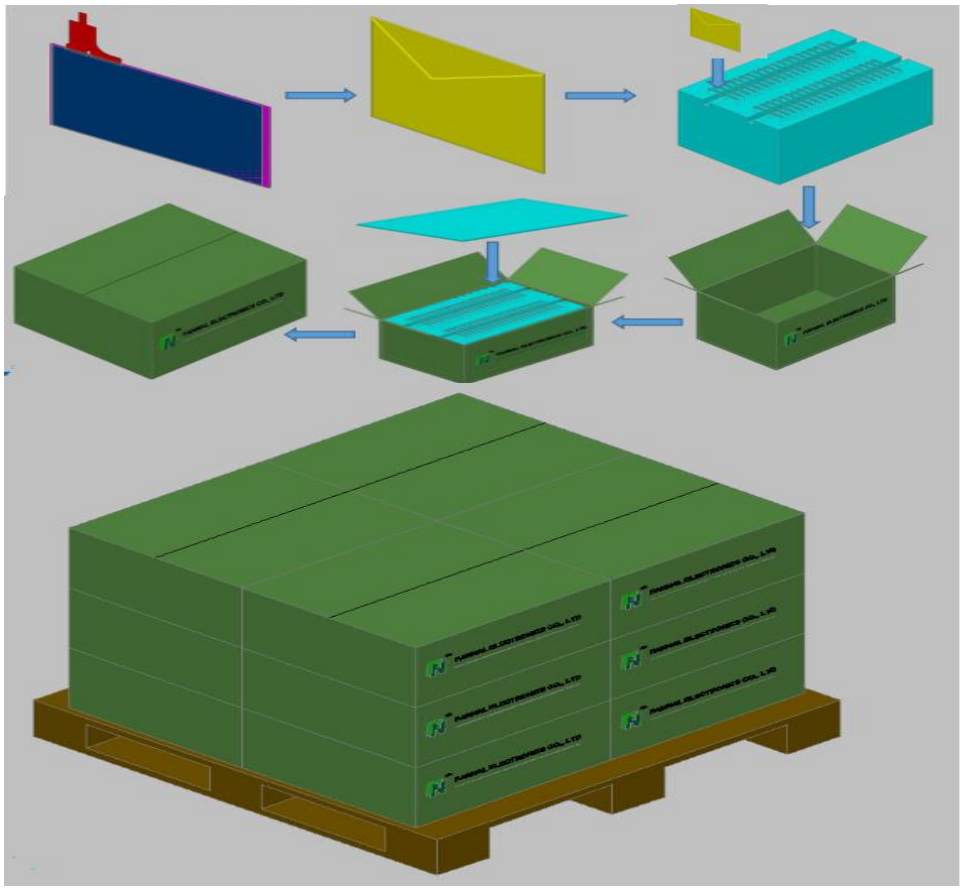
Customer No:

Customer drawing No:

THIRD ANGLE PROJECTION

SHEET 1 OF 1

14、Packaging



The above is for reference only, specific to prevail in kind.

SIZE(Carton): 47.5X43.5X19.5cm

NO.	Item	Specifications	Unit
1	Unit Weight	TBD	Kg
2	Gross Weight	TBD	Kg

日期	记录
2014.07.29	1. 工厂模式增加 自容噪声值 0x47 0x48
2014.07.30	1. 增加0x1E Diff增益寄存器
2014.08.01	1. 修改工作模式下, 0xC0寄存器为手套开关寄存器
2014.08.01	1. 修改工作模式下, 0x1F的范围改为 20--200
2014.08.06	1. 待机寄存器A5 写 03值修改
2014.08.07	1. 增加0x57 Win8平台HomeKey GPIO量产测试使能寄存器
2014.08.07	1.增加调试版本寄存器0xAE说明
2014.08.08	1.AD为调试版本号，内部用 2.AE改为 公版版本号高位 3.工厂模式增加 IC流水信息 0x60--0x6C
2014.08.11	1.AD为调试版本号，内部用 2.AE改为 公版版本号高位 3.工厂模式增加 IC流水信息 0x60--0x6C
2014.08.18	1. 工厂模式0x1F 改为 20--150
2014.08.25	1.流水信息校正
2014.08.25	1、补充详细数据格式说明 2、修正部分不正确的描述 3、增加工作模式0xFE寄存器说明 4、工作模式0xFC寄存器改名为ID_G_UPGRADE，避免重名，并与0xFD寄存器互换位
2014.08.26	1. 更正一些说明
2014.09.05	1. 增加Down all.bin命令
2014.09.09	1. 自容检测寄存器，增加防水不检测的标志
2014.09.16	1. 工厂模式增加Offset寄存器
2015.02.27	1. 更正工作模式对阈值移位的错误说明 2. 更正工厂模式对互容扫描电压的错误说明 3. 增加工厂模式自动归一寄存器描述 4. 增加工厂模式自容频点噪声分析寄存器描述
2015.03.11	1.增加TE信号输出信息
2015.03.16	1. 修改工厂0xb 寄存器描述，避免误解 2. 增加自定义手势相关寄存器描述
2015.05.14	1. 增加工厂模式SC verf
2015.05.19	1. 增加工厂模式VCC 2.8V或3.3V状态寄存器（0x0c，仅FT5822使用）

2015.05.21	1. 增加工厂模式读初始的MC和SC的触摸阈值，用于工厂模式噪声检测
2015.06.03	1.修改TE信号寄存器说明；
2015.06.09	1.增加工厂模式下读取互容最大Diff寄存器说明； 2. 增加工作模式FW异常原因寄存器0xAB，供FW内部调试使用

寄存器页面	工作模式
切换方式	写0x00到寄存器0x00

寄存器地址	读写	寄存器名称	b7	b6	b5	b4	b3	b2	b1	b0
0x00	读写(RW)	Mode_Switch		Device Mode[2:0] 0 :工作模式 4 :工厂模式						
0x01	只读(RO)	Guesture	Gesture ID [7:0]; 0x10: 向上滑动; 0x18: 向下滑动; 0x1c: 向左滑动; 0x14: 向右滑动; 0x48: 缩小; 0x49: 放大; 0x00: 无手势.							
0x02	只读(RO)	Cur Point	Number of touch points[7:0]							
0x03	只读(RO)	**TOUCH1_XH**	**1st Event Flag** *0: DOWN_EVENT* *1: UP_EVENT* *2: CONTACT_EVENT* *3: NO_EVENT*				**1st Touch X Position[11:8]**			
0x04	只读(RO)	**TOUCH1_XL**	**1st Touch X Position[7:0]**							
0x05	只读(RO)	**TOUCH1_YH**	**1st Touch ID[3:0]**				**1st Touch Y**			
0x06	只读(RO)	**TOUCH1_YL**	**1st Touch Y Position[7:0]**							
0x07	只读(RO)	**TOUCH1_WEIGHT**	**1st Touch Weight[7:0]**							
0x08	只读(RO)	**TOUCH1_MISC**	**1th Touch Area[3:0]**				**1th Touch**		**1th Touch**	
0x09	只读(RO)	**TOUCH2_XH**	**2nd Event Flag**				**2nd Touch X**			
0x0A	只读(RO)	**TOUCH2_XL**	**2nd Touch X Position[7:0]**							
0x0B	只读(RO)	**TOUCH2_YH**	**2nd Touch ID[3:0]**				**2nd Touch Y**			
0x0C	只读(RO)	**TOUCH2_YL**	**2nd Touch Y Position[7:0]**							
0x0D	只读(RO)	**TOUCH2_WEIGHT**	**2nd Touch Weight[7:0]**							
0x0E	只读(RO)	**TOUCH2_MISC**	**2th Touch Area[3:0]**				**2th Touch**		**2th Touch**	

寄存器页面		工作模式					
0x0F	只读(RO)	**TOUCH3_XH**	**3rd Event Flag**		**3rd Touch X**		
0x10	只读(RO)	**TOUCH3_XL**	**3rd Touch X Position[7:0]**				
0x11	只读(RO)	**TOUCH3_YH**	**3rd Touch ID[3:0]**		**3rd Touch Y**		
0x12	只读(RO)	**TOUCH3_YL**	**3rd Touch Y Position[7:0]**				
0x13	只读(RO)	**TOUCH3_WEIGHT**	**3rd Touch Weight[7:0]**				
0x14	只读(RO)	**TOUCH3_MISC**	**3th Touch Area[3:0]**		**3th Touch**	**3th Touch**	
0x15	只读(RO)	**TOUCH4_XH**	**4th Event Flag**		**4th Touch X**		
0x16	只读(RO)	**TOUCH4_XL**	**4th Touch X Position[7:0]**				
0x17	只读(RO)	**TOUCH4_YH**	**4th Touch ID[3:0]**		**4th Touch Y**		
0x18	只读(RO)	**TOUCH4_YL**	**4th Touch Y Position[7:0]**				
0x19	只读(RO)	**TOUCH4_WEIGHT**	**4th Touch Weight[7:0]**				
0x1A	只读(RO)	**TOUCH4_MISC**	**4th Touch Area[3:0]**		**4th Touch**	**4th Touch**	
0x1B	只读(RO)	**TOUCH5_XH**	**5th Event Flag**		**5th Touch X**		
0x1C	只读(RO)	**TOUCH5_XL**	**5th Touch X Position[7:0]**				
0x1D	只读(RO)	**TOUCH5_YH**	**5th Touch ID[3:0]**		**5th Touch Y**		
0x1E	只读(RO)	**TOUCH5_YL**	**5th Touch Y Position[7:0]**				
0x1F	只读(RO)	**TOUCH5_WEIGHT**	**5th Touch Weight[7:0]**				
0x20	只读(RO)	**TOUCH5_MISC**	**5th Touch Area[3:0]**		**5th Touch**	**5th Touch**	
0x21	只读(RO)	**TOUCH6_XH**	**6th Event Flag**		**6th Touch X**		
0x22	只读(RO)	**TOUCH6_XL**	**6th Touch X Position[7:0]**				
0x23	只读(RO)	**TOUCH6_YH**	**6th Touch ID[3:0]**		**6th Touch Y**		
0x24	只读(RO)	**TOUCH6_YL**	**6th Touch Y Position[7:0]**				
0x25	只读(RO)	**TOUCH6_WEIGHT**	**6th Touch Weight[7:0]**				
0x26	只读(RO)	**TOUCH6_MISC**	**6th Touch Area[3:0]**		**6th Touch**	**6th Touch**	
0x27	只读(RO)	**TOUCH7_XH**	**7th Event Flag**		**7th Touch X**		
0x28	只读(RO)	**TOUCH7_XL**	**7th Touch X Position[7:0]**				
0x29	只读(RO)	**TOUCH7_YH**	**7th Touch ID[3:0]**		**7th Touch Y**		
0x2A	只读(RO)	**TOUCH7_YL**	**7th Touch Y Position[7:0]**				
0x2B	只读(RO)	**TOUCH7_WEIGHT**	**7th Touch Weight[7:0]**				
0x2C	只读(RO)	**TOUCH7_MISC**	**7th Touch Area[3:0]**		**7th Touch**	**7th Touch**	
0x2D	只读(RO)	**TOUCH8_XH**	**8th Event Flag**		**8th Touch X**		
0x2E	只读(RO)	**TOUCH8_XL**	**8th Touch X Position[7:0]**				

寄存器页面		工作模式			
0x2F	只读(RO)	**TOUCH8_YH**	**8th Touch ID[3:0]**	**8th Touch Y**	
0x30	只读(RO)	**TOUCH8_YL**	**8th Touch Y Position[7:0]**		
0x31	只读(RO)	**TOUCH8_WEIGHT**	**8th Touch Weight[7:0]**		
0x32	只读(RO)	**TOUCH8_MISC**	**8th Touch Area[3:0]**	**8th Touch**	**8th Touch**
0x33	只读(RO)	**TOUCH9_XH**	**9th Event Flag**	**9th Touch X**	
0x34	只读(RO)	**TOUCH9_XL**	**9th Touch X Position[7:0]**		
0x35	只读(RO)	**TOUCH9_YH**	**9th Touch ID[3:0]**	**9th Touch Y**	
0x36	只读(RO)	**TOUCH9_YL**	**9th Touch Y Position[7:0]**		
0x37	只读(RO)	**TOUCH9_WEIGHT**	**9th Touch Weight[7:0]**		
0x38	只读(RO)	**TOUCH9_MISC**	**9th Touch Area[3:0]**	**9th Touch**	**9th Touch**
0x39	只读(RO)	**TOUCH10_XH**	**10th Event Flag**	**10th Touch X**	
0x3A	只读(RO)	**TOUCH10_XL**	**10th Touch X Position[7:0]**		
0x3B	只读(RO)	**TOUCH10_YH**	**10th Touch ID[3:0]**	**10th Touch Y**	
0x3C	只读(RO)	**TOUCH10_YL**	**10th Touch Y Position[7:0]**		
0x3D	只读(RO)	**TOUCH10_WEIGHT**	**10th Touch Weight[7:0]**		
0x3E	只读(RO)	**TOUCH10_MISC**	**10th Touch Area[3:0]**	**10th Touch**	**10th**
0x3F~0x7F		RESERVED			
0x80	读写(RW)	ID_G_MC_THGROUP	互电容触摸阈值/4		
0x81	读写(RW)	ID_G_MC_THPEAK	互电容Peak阈值/4		
0x82	读写(RW)	ID_G_SC_THGROUP	自容触摸阈值/16		
0x83	读写(RW)	ID_G_SC_TXTHPEAK	自容Tx Peak阈值/16		
0x84	读写(RW)	ID_G_SC_RXTHPEAK	自容Rx Peak阈值/16		
0x87	读写(RW)	ID_G_THDIFF	点滤波范围阈值/16		
0x86	读写(RW)	ID_G_CTRL	是否允许进入monitor模式（1 - 允许，0 - 禁止）		
0x87	读写(RW)	ID_G_TIMEENTERMONITOR	在指定时间内没有触摸则进入MONITOR状态		
0x88	读写(RW)	ID_G_PERIODACTIVE	工作模式扫描周期 (用于控制报点率）		
0x89	读写(RW)	ID_G_PERIODMONITOR	MONITOR模式扫描周期 （控制报点率）		
0x8A		Reserved	保留		
0x8B	读写(RW)	ID_G_CHARGER_STATE	充电器插入指示标志（1 - 开，0 - 关）		
0x8C	只读(RO)	ID_G_FACE_DETECT_STATE	接近感应状态（1 - 接近，0 - 离开）, 调试用,主要用于		
0x8D	只读(RO)	ID_G_FACE_DETECT_HUGE_REDUCE	接近感应自容变化大小, K为单位, 调试用, 将来扩展+G sensor项目使用		

寄存器页面		工作模式	
0x8E	只写(WO)	ID_G_FACE_DETECT_G_STATE	G sensor状态（0x1E - 大动作， 0x5A - 很大动作, 0x0F - 无动作或小动作）
0x8F	读写(RW)	ID_G_TOUCH_INT_CNT	中断次数统计, 用于ESD等异常情况下, INT无法正确发出的处理,需Host配合
0x90		Reserved	保留
0x91	只读(RO)	REG_CHECK_IF_FLOW_WORK_RUNNING	Flow work的循环次数统计, 用于ESD等异常情况下, WDT无法正确工作的处理,需Host配合
0x92-0x98		Reserved	保留
0x9F	只读(RO)	ID_G_CHIPER_LOW	IC内核--低字节 0x22
0xA0	只读(RO)	ID_G_TYPE	IC型号名称
0xA1	只读(RO)	ID_G_LIB_VERSION_H	App库文件版本号高字节
0xA2	只读(RO)	ID_G_LIB_VERSION_L	App库文件版本号低字节
0xA3	只读(RO)	ID_G_CHIPER_HIGH	IC内核--- 高字节 0x54
0xA4	读写(RW)	ID_G_MODE	1 - INT trigger模式，0 - INT polling模式
0xA5	读写(RW)	ID_G_PMODE	Power Mode：0 - Active，1 - Monitor，3 - Sleep
0xA6	只读(RO)	ID_G_FIRMID	Firmware version number
0xA7	读写(RW)	ID_G_STATE	FW内部工作状态切换（工作模式和工厂模式切换)，寄
0xA8	只读(RO)	ID_G_VENODRID	Vendor ID（屏厂）
0xA9	只读(RO)	ID_G_DRVLIB_VER_H	驱动库文件版本号高字节
0xAA	只读(RO)	ID_G_DRVLIB_VER_L	驱动库文件版本号低字节
0xAB	只读(RO)		FW异常时对应错误码，供FW内部调试用
0xAC		Reserved	保留
0xAD	读写(RW)	ID_G_FIRM_DEBUG_ID	开发或调试阶段的 Firmware版本信息，便于在调试阶段进行版本记录.可写，但掉电后会恢复到默认值。
0xAE	只读(RO)	ID_G_RELEASE_ID_HIGH	公版release code ID 高位
0xAF	只读(RO)	ID_G_RELEASE_ID_LOW	公版release code ID 低位
0xB0	读写(RW)	ID_G_FACE_DEC_MODE	近距离感应使能 (1 - enable，0 - disable)
0xB1	只读(RO)	ID_G_IC_VERSION	IC version number: 0x01 - A, 0x02 - B, 0x03 - C, 0x04 - D,
0xB2	只读(RO)	ID_G_PRESIZE_EN	压力大小上报使能
0xB3	读写(RW)	ID_G_HOVER_MODE	悬浮模式 (1 - enable，0 - disable)
0xB4-0xBD		Reserved	保留

寄存器页面		工作模式	
0xBE	只读(RO)	ID_G_SCAN_STATUS	Scan扫描状态
0xBF	读写(RW)	Reserved	Reserved
0xC0	读写(RW)	ID_G_GLOVE_MODE_EN	手套模式开关，1：开; 0: 关
0xC1	读写(RW)	ID_G_COVER_MODE_EN	皮套模式，1：开; 0: 关
0xC2	读写(RW)	ID_G_PEN_SUPPORT_EN	被动笔模式，1：开; 0: 关
0xC3	读写(RW)	ID_G_HOST_EVENT_MSG	HOST 消息通知（如来电通知），0x0：无消息；0x1：
0xC4	读写(RW)	ID_G_COVER_WINDOW_LEFT	皮套透明窗口左边坐标，等于（实际坐标*255/分辨率）
0xC5	读写(RW)	ID_G_COVER_WINDOW_RIGHT	皮套透明窗口右边坐标，等于（实际坐标*255/分辨率）
0xC6	读写(RW)	ID_G_COVER_WINDOW_UP	皮套透明窗口上边坐标，等于（实际坐标*255/分辨率）
0xC7	读写(RW)	ID_G_COVER_WINDOW_DOWN	皮套透明窗口下边坐标，等于（实际坐标*255/分辨率）
0xC8--0xCF			保留
0xD0	读写(RW)	ID_G_SPEC_GESTURE_EN	特殊手势模式，1：开; 0: 关
0xD1	读写(RW)	ID_G_SPEC_GESTURE_CONFIG1	特殊手势字符开
0xD2	读写(RW)	ID_G_SPEC_GESTURE_CONFIG2	特殊手势字符开关,Bit0--7:“o”, "w", "m", "e", "c", "g", "a",
0xD3	读写(RW)	ID_G_SPEC_GESTURE_COOR	特殊手势信息输出;写操作:输出游标归0,读操作:信息输出
0xD4	只读(RO)	ID_G_SPEC_GESTURE_COOR1	特殊手势信息输出;写操作:无效,读操作:信息输出
0xD5	读写(RW)	ID_G_SPEC_GESTURE_CONFIG3	特殊手势字符开关,Bit0:"n", Bit2--Bit7: "b", "q", "L", "p",
0xD6	读写(RW)	ID_G_SPEC_GESTURE_CONFIG4	特殊手势字符开关,Bit0:"@", Bit2--Bit5: ">", "^", "v", "△"
0xD7	读写(RW)	ID_G_SPEC_GESTURE_CONFIG5	特殊手势字符开关,Bit0--3:"h", "k", "y", "r"
0xD8	读写(RW)	ID_G_SPEC_GESTURE_CONFIG6	特殊手势字符开关,Bit0--5:"3", "6", "9", "7", "8", "2"
0xD9	读写(RW)	ID_G_SELF_DEFINED_GESTURE_STATUS	特殊手势字符, 自定义手势状态读取寄存器
0xDA	读写(RW)	ID_G_SELF_DEFINED_GESTURE_OUTPUT	特殊手势字符,自定义手势模板读取寄存器
0xDB	读写(RW)	ID_G_SELF_DEFINED_GESTURE_OUTPUT1	特殊手势字符,自定义手势模板读取寄存器
0xDC	读写(RW)	ID_G_SELF_DEFINED_GESTURE_INPUT	特殊手势字符,自定义手势模板添加寄存器
0xDD	读写(RW)	ID_G_SELF_DEFINED_GESTURE_INPUT1	特殊手势字符,自定义手势模板添加寄存器
0xDE	读写(RW)	ID_G_SELF_DEFINED_GESTURE_OPTION	特殊手势字符,自定义手势模板操作寄存器
0xE0	读写(RW)	ID_G_PERIOD_WAK_INVALD	唤醒后手势有效延迟时间
0xF0	读写(RW)	RegAddrH	内部寄存器地址高8位
0xF1	读写(RW)	RegAddrL	内部寄存器地址高8位
0xF2	读写(RW)	RegDataH	内部寄存器数据高8位
0xF3	读写(RW)	RegDataL	内部寄存器数据高8位

寄存器页面		工作模式	
0xFC	读写(RW)	ID_G_UPGRADE	读 - 返回FW工作状态 （见0xA7寄存器说明） W FC AA ; W FC 55 : 升级命令 W FC AA ; W FC 66 : 软件复位命令 W FC AA ; W FC 88 : Download all.bin命令
0xFD	只读(RW)	Debug-state	状态寄存器输出
0xFE	只读(RW)	Work Freq	返回当前工作频点值
备注：灰色表示预留，未用			

寄存器页	工厂模式（TEST）
切换方式	写0x40到寄存器0x00

模块	寄存器地址	寄存器长度	读写	寄存器名称	寄存器默认	寄存器描述
	0x00	1 Byte	读写(RW)	Mode_Switch		寄存器页面模式切换 Bit[0]~Bit[3]: 保留 Bit[4~6]: 0 工作模式，4 工厂模式 Bit[7]: 写1时FW开始采集RawData，一帧数据采集完成后FW自动清零
	0x01	1 Byte	读写(RW)	RawData Line Addr		RawData类型切换，切换时RawData地址寄存器偏移量会相应的清零 AA: Mc RawData, RawData地址寄存器指向互容 AB: Sc Nomal, RawData地址寄存器指向自容非防水 AC: Sc Water, RawData地址寄存器指向自容防水 AD: RawData地址寄存器偏移量清零 AE: 设置RawData地址寄存器偏移量，见0x2c(高8位),
	0x02	1 Byte	只读(RO)	TxNum		当前使用Tx数量
	0x03	1 Byte	只读(RO)	RxNum		当前使用Rx数量
	0x04	1 Byte	读写(RW)	CLB cmd&status		写 - 触发校准和保存参数 0x04: 自容自动校准 0x05：保存校准后的参数到flash 0x06：互容自动归一计算 读 - 返回校准状态 0x00：未校准初始状态 0x01：校准进行中 0x02：校准成功 0x03：校准失败 0xFF：校准失败
	0x05	1 Byte	读写(RW)	MaxPointNum		支持的点数 最大10点，默认5点
	0x06	1 Byte	读写(RW)	DataSelect		工厂模式下显示数据类型选择 0：显示固件采集的RawData 1：显示固件原始Diff(带环境跟踪)

寄存器页	工厂模式（TEST）					
系统	0x07	1 Byte	读写(RW)	ShortTestEn		工厂模式下短路检测使能 写：使能短路检测 1: enable 0: disable 读：返回短路检测状态 1: 短路检测中 0: 短路检测完成
	0x08	1 Byte	只写(WO)	IntTest		INT脚测试，INT脚波形反转
	0x09	1 Byte	只读(RO)	Water_Channel_Select		**防水模式：** Bit6: 0 : 检测防水Rx+Tx； 1：只检测一个通道 Bit5: 0：检测防水模式; 1：不检测防水模式. Bit2: 0: 只检测防水Tx; 1: 只检测防水Rx 有效性判断, 先Bit5 --> Bit6 --> Bit2 **普通模式：** Bit7: 0 普通模式检测； 1：普通模式不检测; Bit1,Bit0: 00:普通模式Tx; 01: 普通模式Rx; 10: 普通模式Rx+Tx 有效性判断, 先Bit7 --> Bit1,0
	0x0A	1 Byte	读写(RW)	FreList	0x00	跳频开启时,切换工作频点 0--3为对应的跳频频点表中的索引; 0x80: 切换到跳频频点表中的最低频点; 0x81: 切换到跳频频点表中的最高频点;
	0x0B	1 Byte	读写(RW)	OffsetSelect	0x00	仅供部分较早期项目使用 1: 读取归一后Rawdata; 0: 读取调均匀后的Rawdata;
	0x0C	1Byte	只读(RO)	VCC select status	1	能区分VCC状态选择的firmware版本寄存器（仅供FT5822使
	0x0D	1Byte	只读(RO)	互电容原始阈值		正常模式的互电容触摸阈值/4，固定不变，用于LCD噪声卡控
	0x0E	1Byte	只读(RO)	自电容原始阈值		正常模式的自电容触摸阈值/16，固定不变
	0x0F ~0x1	8Byte		RESERVED		保留
	0x16	1 Byte	读写(RW)	McRawDataType	0	互容Rawdata类型 (如果打开自动归一化，则默认值为1，即按行列自动归一后的rawdata类型; 如果不开，则默认值为0，即原始(整体归一化)的rawdata).
	0x17	1 Byte	读写(RW)	McEQLimitH	0	互容自动归一化的最大限制(百分比值)

寄存器页	工厂模式（TEST）					
互容	0x18	1 Byte	读写(RW)	McEQLimitL	0	互容自动归一化的最小限制(百分比值)
	0x19	1 Byte	读写(RW)	McEQAddrR	0	互容读取自动归一化参数的地址地址 (0 ~
	0x1A	1 Byte	读(R)	McTxOffsetAddrR	0	取互容最大diff功能开关，1：支持，其他：不支持
	0x1B	1 Byte	读写(RW)	McTxOffsetAddrW	0	取互容diff数据连续N帧最大diff开关，写1有效
	0x1C	1 Byte	读写(RW)	McRxOffsetAddrR	0	取互容diff数据帧数
	0x1D	1 Byte	读写(RW)	McRxOffsetAddrW	0	互容写RX OFFSET起始地址 （0--27）仅供部分较早期项目使
	0x1E	1 Byte	读写(RW)	ucMcGain	64	Diff增益 = gain/64, 默认1倍
	0x1F	1 Byte	读写(RW)	McClbVal	90	归一目标值 = Reg[0x1F]*100 范围： 20--150
	0x20	1 Byte	读写(RW)	ChpVol	4	扫描电压（自互容共用）(0~7) , 每档0.5V , 默认7.5V 0=5.5v; 1=6.0v; 2=6.5v; 3=7.0v; 4=7.5v; 5=8.0v; 6=8.5v
	0x21	1 Byte	读写(RW)	VK mul	64	虚拟按键归一系数（1~255）
	0x22	1 Byte	读写(RW)	Va mul	64	VA区归一系数（1~255）
	0x23	1 Byte	读写(RW)	Shift	0	互电容归一移位数（0~6）
	0x24	1 Byte	读写(RW)	McTxCapAddrR	0	互容TxCap读地址寄存器（0~34）
	0x25	1 Byte	读写(RW)	McTxCapAddrW	0	互容TxCap写地址寄存器（0~34）
	0x26	1 Byte	读写(RW)	McRxCapAddrR	0	互容RxCap读地址寄存器（0~27）
	0x27	1 Byte	读写(RW)	McRxCapAddrW	0	互容RxCap写地址寄存器（0~27）
	0x28	1 Byte	读写(RW)	McTxOrderAddrR	0	互容TxOrder读地址寄存器（0~34）
	0x29	1 Byte	读写(RW)	McTxOrderAddrW	0	互容TxOrder写地址寄存器（0~34）
	0x2A	1 Byte	读写(RW)	RxOrderAddrR	0	互容RxOrder读地址寄存器（0~27）
	0x2B	1 Byte	读写(RW)	RxOrderAddrW	0	互容RxOrder写地址寄存器（0~27）
	0x2C	1 Byte	读写(RW)	RawAddrH	0	RawData地址寄存器偏移量高8位
	0x2D	1 Byte	读写(RW)	RawAddrL	0	RawData地址寄存器偏移量低8位， 必须先设高位，然后再设
	0x2E	1 Byte	读写(RW)	McOverFlag	0	
	0x2F	1 Byte	只读(RO)	McFreMinH	0x01	基准频率高8位，
	0x30	1 Byte	只读(RO)	McFreMinL	0xF4	基准频率低8位，0.1KHz为单位，0x1F4即500表示50KHz
	0x31	1 Byte	读写(RW)	McFreStep	25	频率步长，0.1KHz为单位，默认2.5KHz
	0x32	1 Byte	读写(RW)	SCAN_FREQ	0	互容扫描频率实际可用(0~136), 即最高工作频点390KHz *互容实际扫描频率 = ((Reg[McFreMinH]<<8 | Reg[McFreMinL]) + Reg[SCAN_FREQ]*Reg[McFreStep])/10(KHz),* **实际调屏时，不超过360KHz**
	0x33	1 Byte	读写(RW)	TX_CLK_NUM	32	TX的时钟数量，16，32，48，64四档
	0x34	1 Byte	读写(RW)	ADC_THR	85	Adc溢出的阈值 （10～100）

寄存器页	工厂模式（TEST）					
	0x35	1 Byte	读(RO)	SAMPLE_MOD	1	互容采样倍数 0: 4倍 1: 8倍 2: 16倍
	0x36	1 Byte	只读(RO)	RawBuf0	0	Rawdata数据寄存器0
	0x37	1 Byte	只读(RO)	RawBuf1	0	Rawdata数据寄存器1
	0x38	1 Byte	读写(RW)	McTxCapBuf0	0	互容TxCap数据寄存器0
	0x39	1 Byte	读写(RW)	McTxCapBuf1	0	互容TxCap数据寄存器1
	0x3A	1 Byte	读写(RW)	McRxCapBuf0	0	互容RxCap数据寄存器0
	0x3B	1 Byte	读写(RW)	McRxCapBuf1	0	互容RxCap数据寄存器1
公用	0x3C	1 Byte	读写(RW)	TxOrderBuf0	0	TxOrder数据寄存器0
	0x3D	1 Byte	读写(RW)	TxOrderBuf1	0	TxOrder数据寄存器1
	0x3E	1 Byte	读写(RW)	RxOrderBuf0	0	RxOrder数据寄存器0
	0x3F	1 Byte	读写(RW)	RxOrderBuf1	0	RxOrder数据寄存器1
自容	0x40	1 Byte	读写(RW)	K1Delay	0x10	自电容K1周期 (1-128)
	0x41	1 Byte	读写(RW)	K2Delay	0x10	自电容K2周期 (10-128)
	0x42	1 Byte	读写(RW)	SCSampleCycle	3	自电容扫描周期0：1次样, (1-62) = 8*(n) 0: 1 samples 1: 8 samples 2: 16 samples 3: 24 samples ...
	0x43	1 Byte	读写(RW)	SCChannelCf	0x80	自电容通道CF值 （0~255）， 默认值0x80
	0x44	1 Byte	读写(RW)	ScWorkMode		自容工作模式选择: 1: 防水模式 0: 非防水模式
	0x45	1 Byte	读写(RW)	ScCbAddrR		自容CB读地址寄存器
	0x46	1 Byte	读写(RW)	ScCbAddrW		自容CB写地址寄存器
	0x47-	2Byte	只读(RO)	usScNoise		当前自容的噪声值(需要关自容跳频)
	0x47	4Byte		RESERVED		保留
	0x4D	1 Byte	只读(RO)	ScVref		自容的参考电压
	0x4E	1 Byte	读写(RW)	ScCbBuf0		自容CB数据寄存器0
	0x4F	1 Byte	读写(RW)	ScCbBuf1		自容CB数据寄存器1

寄存器页	工厂模式（TEST）					
量产相关	0x50	1 Byte	读写(RW)	FwCnt	0x00	设置读取FW 配置信息buf地址偏移量 0: I2C从地址; 1: I2C从地址校验码，按位取反; 2: I/O接口电压驱动，0为1.8V，1为VCC; 3: I/O接口电压校验码，按位取反; 4: 厂家ID; 5: 厂家ID校验码，按位取反; 6~31: 保留未用; 32: FW固件版本号; 33: FW固件版本号校验码，按位取反; 34~46: 客户代码，不超过13个字符; 47: 保留为零，留作字符串分隔符用
	0x51	1Byte	只读(RO)	FwBuf0		FW 信息buf(Host读接口)
	0x52	1Byte	只读(RO)	FwBuf1		FW 信息buf (固件内部自锁用)
	0x53	1Byte	只读(RO)	PatternType		屏体类型 1: V3 屏体.
	0x54	1Byte	读写(RW)	V3PatternNoMapping	0	屏体通道是否mapping(只对V3屏体有效). 0: 表示mapping后. 1: 表示mapping前
	0x55	1Byte	只读(RO)	TxNumScan		实际使用扫描Tx个数(只对V3屏体有效).
	0x56	1Byte	只读(RO)	RxNumScan		实际使用扫描Rx个数(只对V3屏体有效).
	0x57	1Byte	只写(WO)	Win8 HomeKey GPIO Pin Test		Win8 HomeKey GPIO脚测试， HomeKey GPIO脚波形反转
	0x58	1Byte	读写(RW)	McTxOffsetBuf	0	互容Tx Offset数据寄存器
	0x59	1Byte	读写(RW)	McTxOffsetBuf-	0	互容Tx Offset数据寄存器-bak
	0x5A	1Byte	读写(RW)	McRxOffsetBuf	0	互容Rx Offset数据寄存器
	0x5B	1Byte	读写(RW)	McRxOffsetBuf-	0	互容Rx Offset数据寄存器-bak
	0x5C	1Byte	读写(RO)	RX/TX归一化参数	0	互容自动归一参数 数据寄存器0
	0x5D	1Byte	读写(RO)	RX/TX归一化参数	0	互容自动归一参数 数据寄存器1
	0x5F	1Byte	只读(RO)	TE信号输出信息	0	bit7~4: 0---FW不使用TE 1---FW使用TE bit3~0: 0---未检测到TE信号 1---检测到TE信号 bit3~0 仅在bit7~4为1的情况下有效

寄存器页	工厂模式（TEST）					
IC OTP 信息	0x60--0x67	8Byte	只读(RO)	Wafer lot Number	XX	Wafer 的编码，使用 ASCII 码表示
	0x68	1Byte	只读(RO)	Wafer 刻号	XX	每片Wafer的编号
	0x69	1Byte	只读(RO)	Wafer X 轴座标	XX	IC 在 Wafer X 轴坐标值
	0x6A	1Byte	只读(RO)	Wafer Y 轴座标	XX	IC 在 Wafer Y 轴坐标值
	0x6B	1Byte	只读(RO)	CP 测试厂识别	XX	对测试厂的编码
	0x6C	1Byte	只读(RO)	CP 测试结果记录	XX	记录CP测试结果OK还是NG
自容频点噪声分析	0xD0	1Byte	读写(RW)	扫频K1起始频率	10	扫频K1起始频率
	0xD1	1Byte	读写(RW)	扫频K1总长度	1	扫频K1总长度
	0xD2	1Byte	读写(RW)	扫频K2起始频率	10	扫频K2起始频率
	0xD3	1Byte	读写(RW)	扫频K2总长度	1	扫频K2总长度
	0xD4	1Byte	只读(RO)	噪声检测状态	0	0： 空闲状态 1： 启动噪声检测 2：噪声检测中 3： 噪声检测
	0xD5	1Byte	读写(RW)	噪声数据频率起始		设置读出噪声数据的频率起始
	0xD6	1Byte	只读(RO)	噪声数据的高8位		噪声数据的高8位
	0xD7	1Byte	只读(RO)	噪声数据的低8位		噪声数据的低8位
	0xD8	1Byte	只读(RO)	每个频点测试帧数	16	每个频点测试帧数
	0xD9	1Byte	只读(RO)	当前扫描完频点		当前扫描完的频点K1
	0xDA	1Byte	只读(RO)	当前扫描完频点		当前扫描完的频点K2
	0xDB	1Byte	只读(RO)	自容噪声扫描模式		0：取防水模式噪声 1：取非防水模式噪声
互容频点噪声分析	0xE0	1 Byte	读写(RW)	McFrePolBegin	0	噪声检测的起始频率(0~199)，频率意义同0x32寄存器
	0xE1	1 Byte	读写(RW)	McFrePolEnd	0	噪声检测的结束频率(0~199), 频率意义同0x32寄存器
	0xE2	1 Byte	读写(RW)	McFrePolState	0	噪声检测状态 0：空闲状态 1：启动噪声检测 2：噪声检测中 3：噪声检测完成
	0xE3	1 Byte	读写(RW)	McFreAddrBegin	0	设置读噪声数据的起始频率，频率意义同0x32寄存器
	0xE4	1 Byte	只读(RO)	McFreNoiseDataH	0	噪声数据寄存器高8位
	0xE5	1 Byte	只读(RO)	McFreNoiseDataL	0	噪声数据寄存器低8位
	0xF0	1 Byte	读写(RW)	RegAddrH		内部通用寄存器地址高8位
	0xF1	1 Byte	读写(RW)	RegAddrL		内部通用寄存器地址低8位
	0xF2	1 Byte	读写(RW)	RegDataH		内部通用寄存器数据高8位
	0xF3	1 Byte	读写(RW)	RegDataL		内部通用寄存器数据低8位

寄存器页	工厂模式（TEST）					
DEBUG	0xF4	1 Byte	只读(RO)	ValLBuf0	0	短路检测ValL数据寄存器0 数据总长度 :(TxNum+RxNum)*4 + 6 Bytes, 偏移顺序及字节长度说明如下： Offset高8位数据：1 Bytes Offset低8位数据：1 Bytes 校正通道0对地短路高8位数据：1 Bytes 校正通道0对地短路低8位数据： 1 Bytes Tx1~TxNum通道对地短路数据(高8位在前，低8位在后)：(TxNum*2) Bytes Rx1~RxNum通道对地短路数据(高8位在前，低8位在后)：(RxNum*2) Bytes 校正通道0通道互短路高八位数据：1 Bytes 校正通道0通道互短路低八位数据：1 Bytes Tx1~TxNum通道互短路数据(高8位在前，低8位在后)：(TxNum*2) Bytes Rx1~RxNum通道互短路数据(高8位在前，低8位在后)：(RxNum*2) Bytes
	0xF5	1 Byte	只读(RO)	ValLBuf1	0	短路检测ValL数据寄存器1
	0xF6	1 Byte	读写(RW)	ID_G_SWITCH_AFE	0	AFE参数组切换工厂测试寄存器， 0x1 高信噪比模式，0x0 普通模式
	0xF7	1 Byte	读写(RW)	ID_G_LCD_NOISE_	80	LCD噪声阈值工厂测试寄存器
	0xF8	1Byte	只读(RO)	RESERVED		预留单通道对地短路测试异常通道上报
	0xF9	1Byte	只读(RO)	RESERVED		预留单通道对地短路测试异常通道上报
	0xFA	1Byte		RESERVED		保留
	0xFB	1Byte	读写(RW)	Fir开关		FIR使能 1: 使能FIR 0: 不使能FIR
	0xFC	1 Byte		RESERVED		
	0xFD	1 Byte	读写(RW)	I2C_DEBUG_LEN		I2C Debug 字节长度
	0xFF	1 Byte	读写(RW)	I2C_DEBUG_DATA		I2C Debug 数据

备注：
1、灰色表示预留;
2、写16位寄存器时, 必需先写高8位，然后写低8位

0x00	0x01	0x02	0x03	0x04	0x05			
Slave_address	Slave_address取反	iovoltage	Iovoltage取反	屏厂ID	屏厂ID取反			
0x20			…			0x3F		
Project Code(ASCII) 32字节								
0x40						0x41		
FW Version								
0x42		…..				0x4F		
Customer code(ASCII) 14字节								

SPECIFICATION

Customer : _____

Model Name: SAT043AT40D08B2-30671T051KN

ERP NO. : 1010430205

Spec Vision: V.1

Date: 2018/04/23

■ **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	2018.04.23	-	First Issued.	Li Shun

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1. General Specifications

NO.	Item	Specification	Remark
1	Panel Size	4.3 inch(Diagonal)	
2	Resolution	480 x 3(RGB) x 272	
3	Driver Method	A-Si TFT active matrix	
4	Active Area	95.04(W) x 53.856(H) mm	
5	Dot Pitch	0.198(W) x 0.198(H) mm	
6	Pixel Arrangement	RGB-stripe	
7	Module Size	105.5(W) x 67.2(H) x3.0(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	ST7282	
13	Weight	TBD	g

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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	

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3. Operation Specifications

3.1. Absolute Maximum Ratings

Voltage (AGND=GND=0V, Ta = 25℃)

Parameter	Min.	Max.	Unit
Power Supply Voltage V_{DD}	-0.3	+4.6	V
I/O Supply Voltage VDDI	-0.3	+4.6	V
Charge Pump Supply Voltage PVDD	-0.3	+4.6	V
Storage Temperature	-0.3	+4.6	V
Operating Temperature	-20	55	℃
Storage Temperature	-20	60	℃

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

Parameter	Symbol	values			Unit
		Min.	Typ.	Max.	
Digital Supply Voltage	V_{DD}	3.0	3.3	3.6	V
I/O Supply Voltage	V_{DDI}	1.65	-	V_{DD}	V
Charge Pump Supply	P_{VDD}	3.0	3.3	3.6	V
Positive High-Voltage power	V_{GH}	13	15	17.5	V
Negative High-Voltage power	V_{GL}	-11.5	-10	-7	V
Standby Current	I_{SC}	-	-	50	uA
Operation Current	I_{OC}	-	20	-	mA

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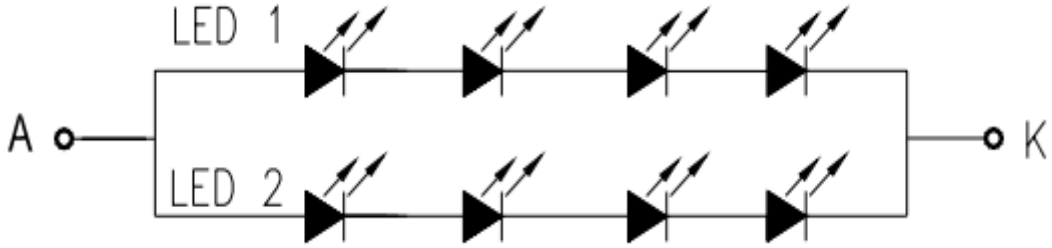
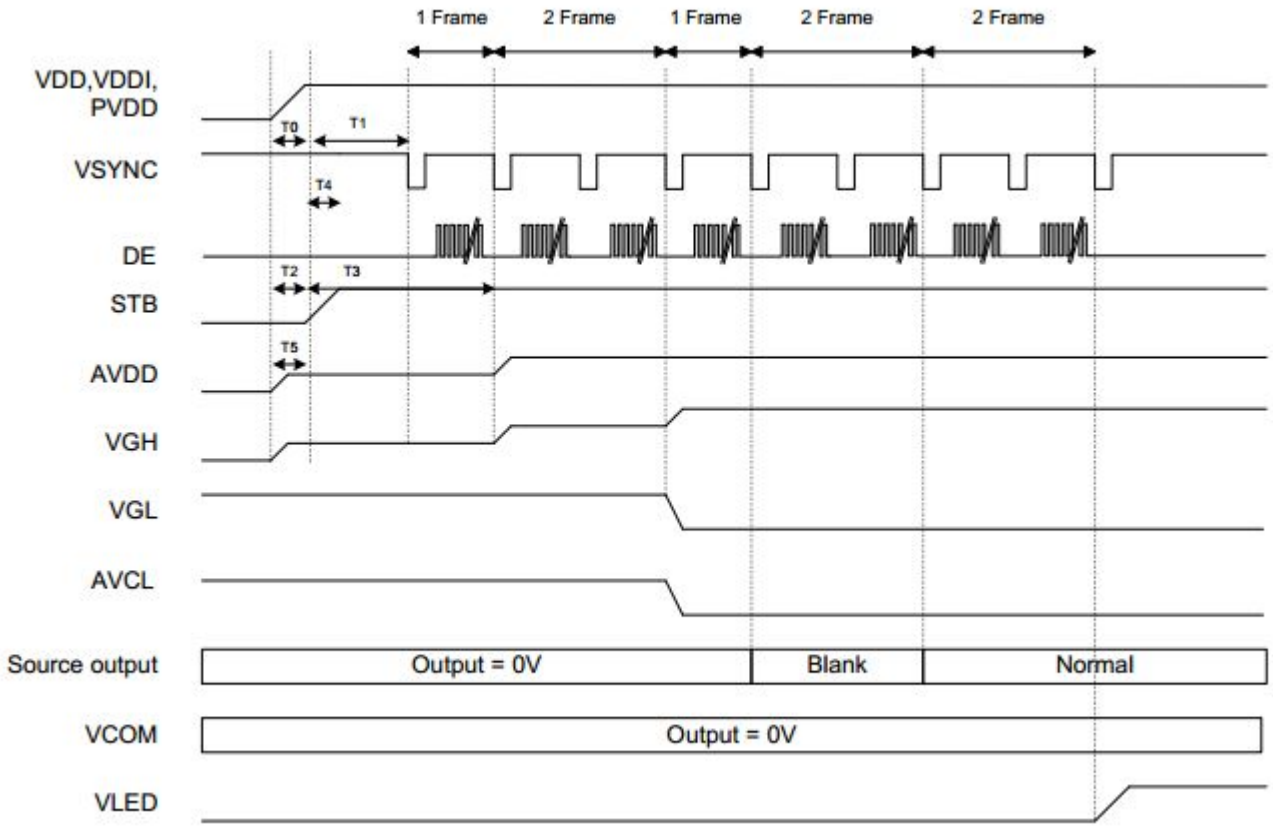
3.1.2. Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage of white LED backlight	V_L	11.6	13.2	14	V
Current for LED backlight	I_L	30	40	50	mA
Luminance (on the module surface ,BM-7)		280	320	-	cd/m^2
LED life time	-	50000	-	-	Hr



3.2. Power Sequence

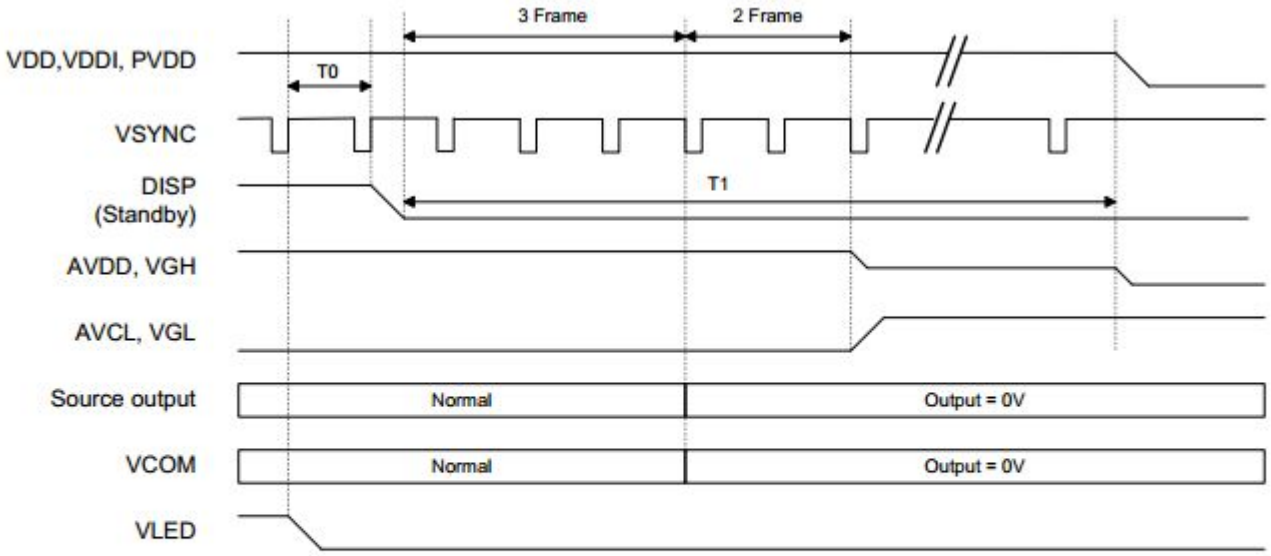
3.2.1. Power On Sequence



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

Note: Recommend the LCM power on rise time T0= 0~ 1ms

3.2.2. Power Off Sequence



	Description	Min. Time
T0	Time from backlight power off to DISP="L"	1*Frame
T1	Time from DISP="L" to LCM Power off	5*Frame

3.3. Timing Characteristics

3.3.1. RGB Input Timing Table

Parallel 24-bit RGB Timing Table

(PVDD=VDD=VDDI=3.3V,AGND=0V,TA=25℃)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

Serial 8-bit RGB Timing Table

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	24	27	30	MHz	
DCLK Period		Tclk	33	37	42	ns	
HSYNC	Period Time	Th	1445	1491	1558	DCLK	
	Display Period	Thdisp		1440		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

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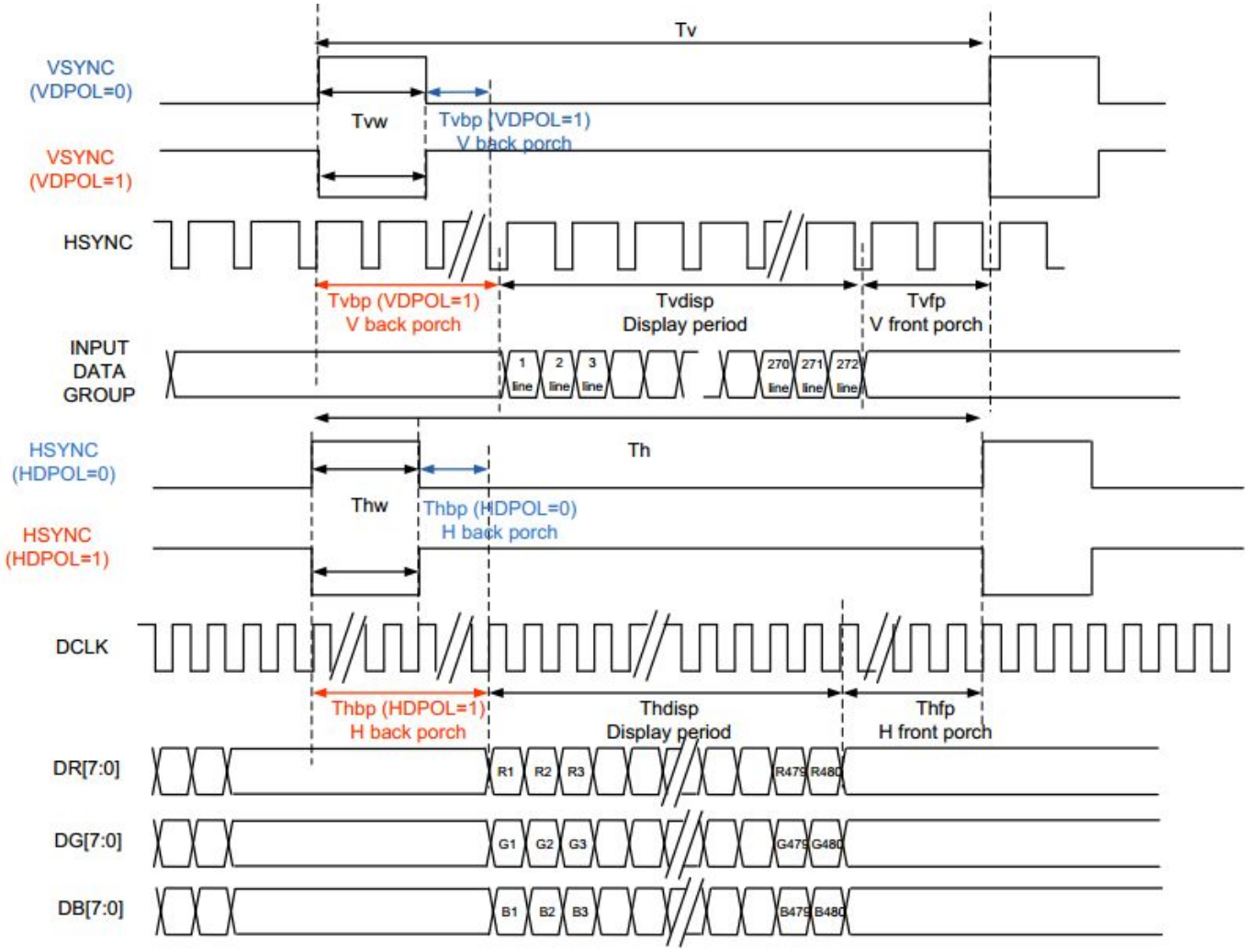
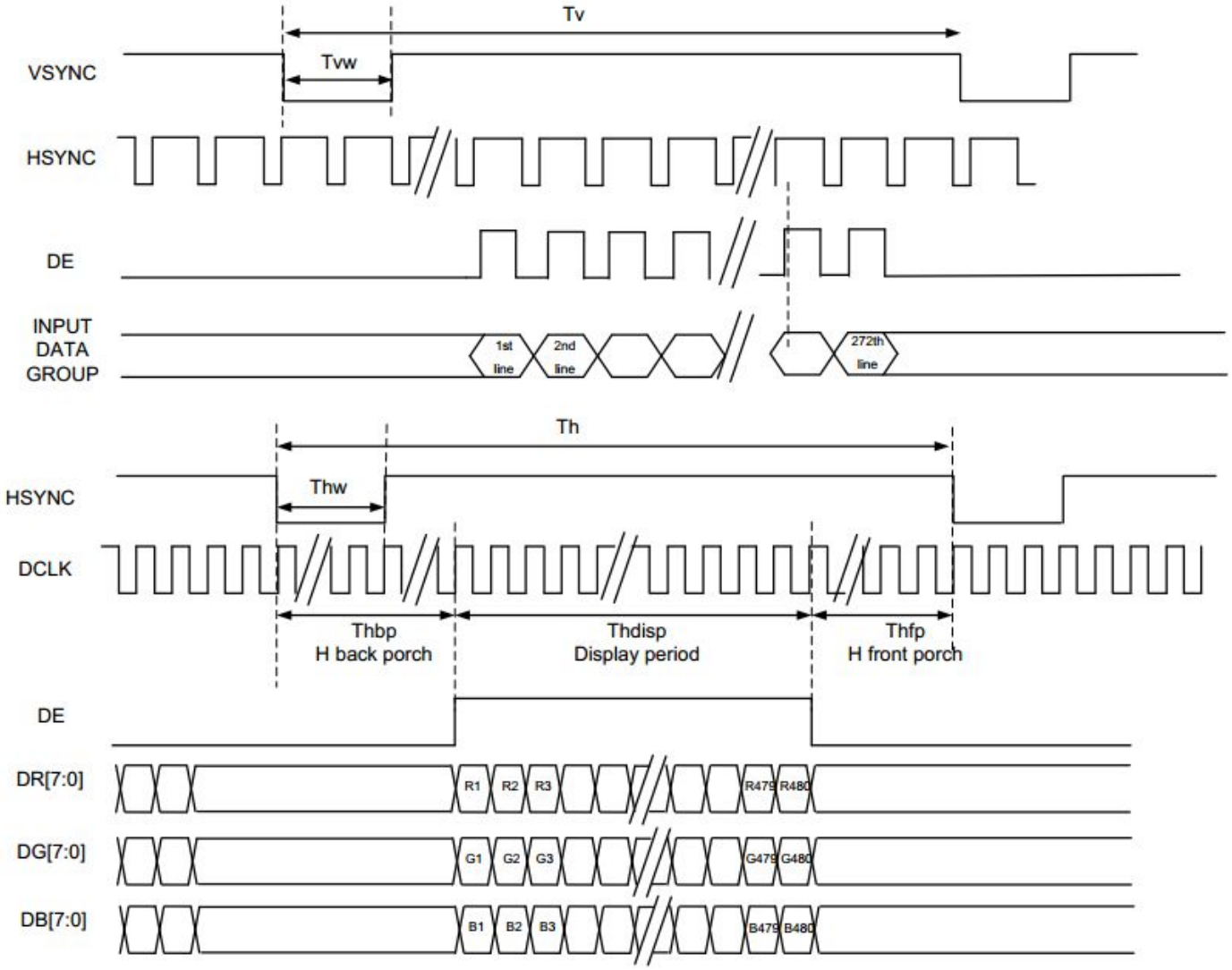
3.3.2. Timing Diagram

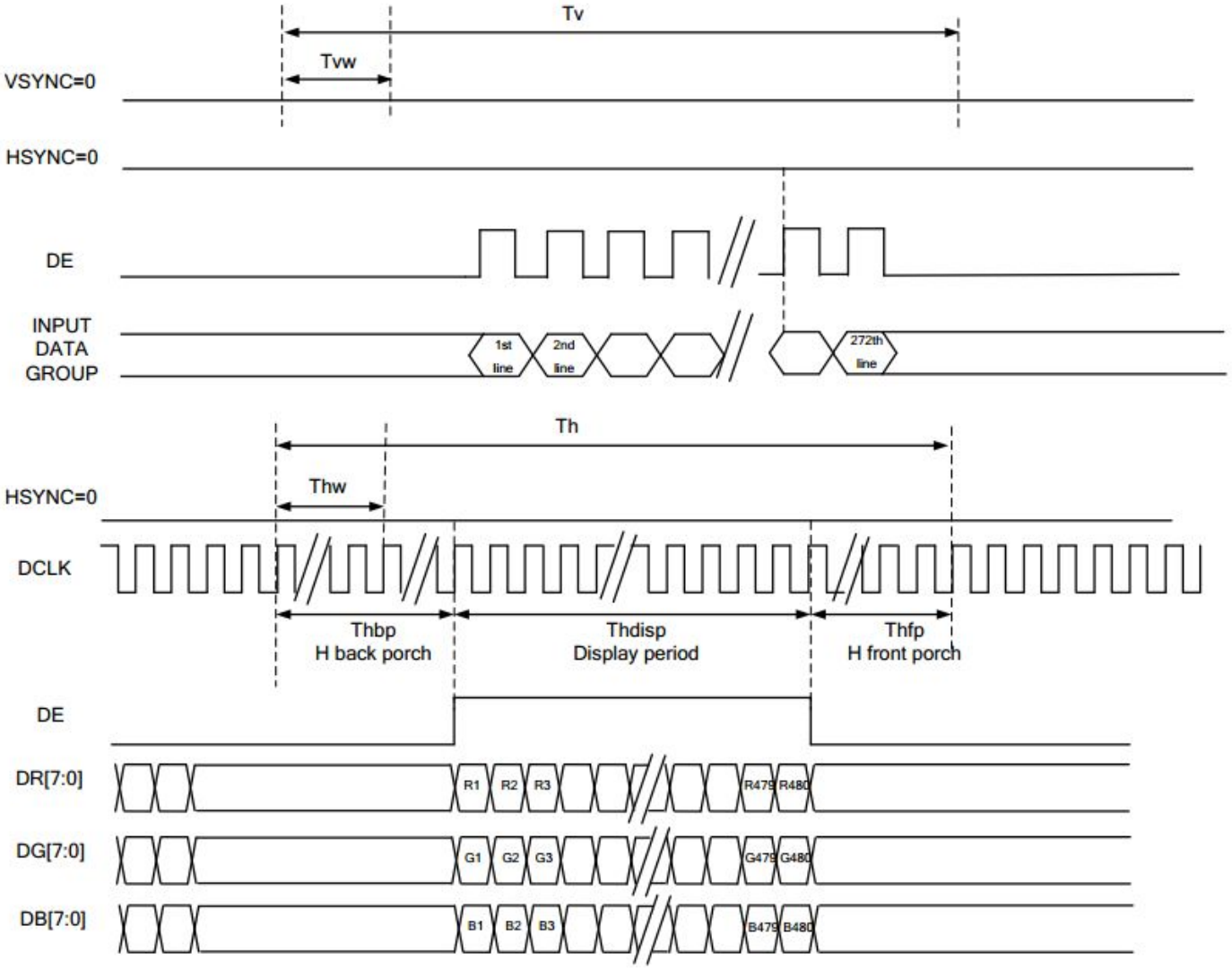
SYNC Mode Timing Diagram



SYNC-DE Mode Timing Diagram



DE Mode Timing Diagram



4. Optical Specifications

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	300	500	-	-	
Color gamut (NTSC ratio)		-	-	52	-	%	
Response Time		Rising + Falling	-	25	50	ms	
Viewing Angle	Horizontal	θx^+	60	70	-	degree	
		θx^-	60	70	-		
	Vertical	θy^+	40	50	-		
		θy^-	50	60	-		
Color Filter Chromaticity (CIE1931)	Red	X	-0.02	0.618	+0.02	-	
		Y		0.343			
	Green	X		0.306			
		Y		0.527			
	Blue	X		0.139			
		Y		0.098			
	White	X		0.267			
		Y		0.312			
Luminance (center)		L	280	320	-	cd/m2	
Luminance Uniformity		ΔL	75	80		%	

Test Condition:

1、VDD=3.3V,IL=40mA(Backlight current)，the ambient temperature is 25℃.

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5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta=60℃ 120h	Note1 ,Note4
Low Temperature Storage	Ta=-20℃ 120h	Note1, Note4
High Temperature Operation	Ts=55℃ 120h	Note2 ,Note4
Low Temperature Operation	Ts=-20℃ 120h	Note4
Operation at High Temperature and Humidity	+60℃,90%RH 120h	Note4
Thermal Shock	-20℃/30min~+60℃/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/330Ω	

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 don'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.

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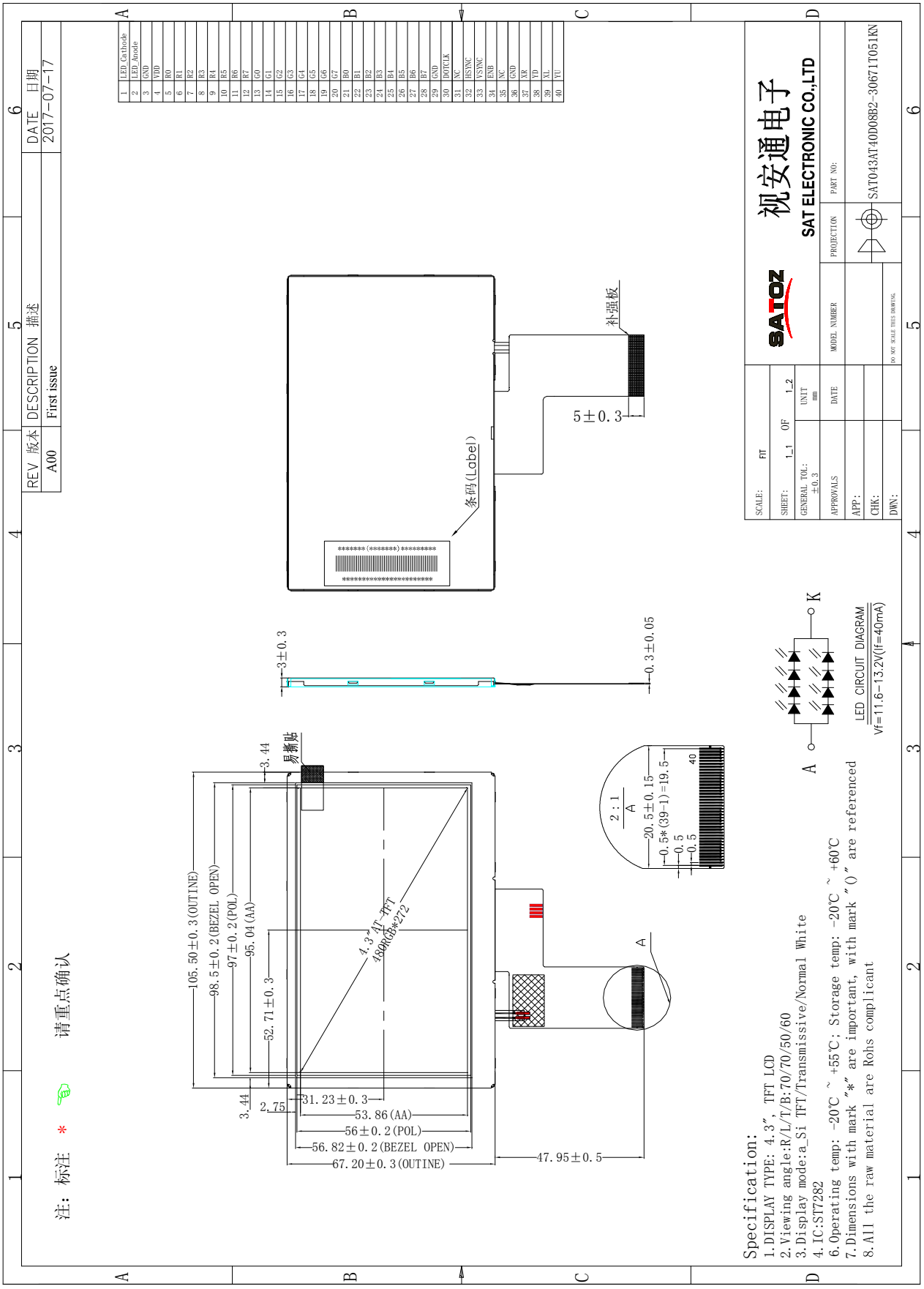
6. Mechanical Drawing



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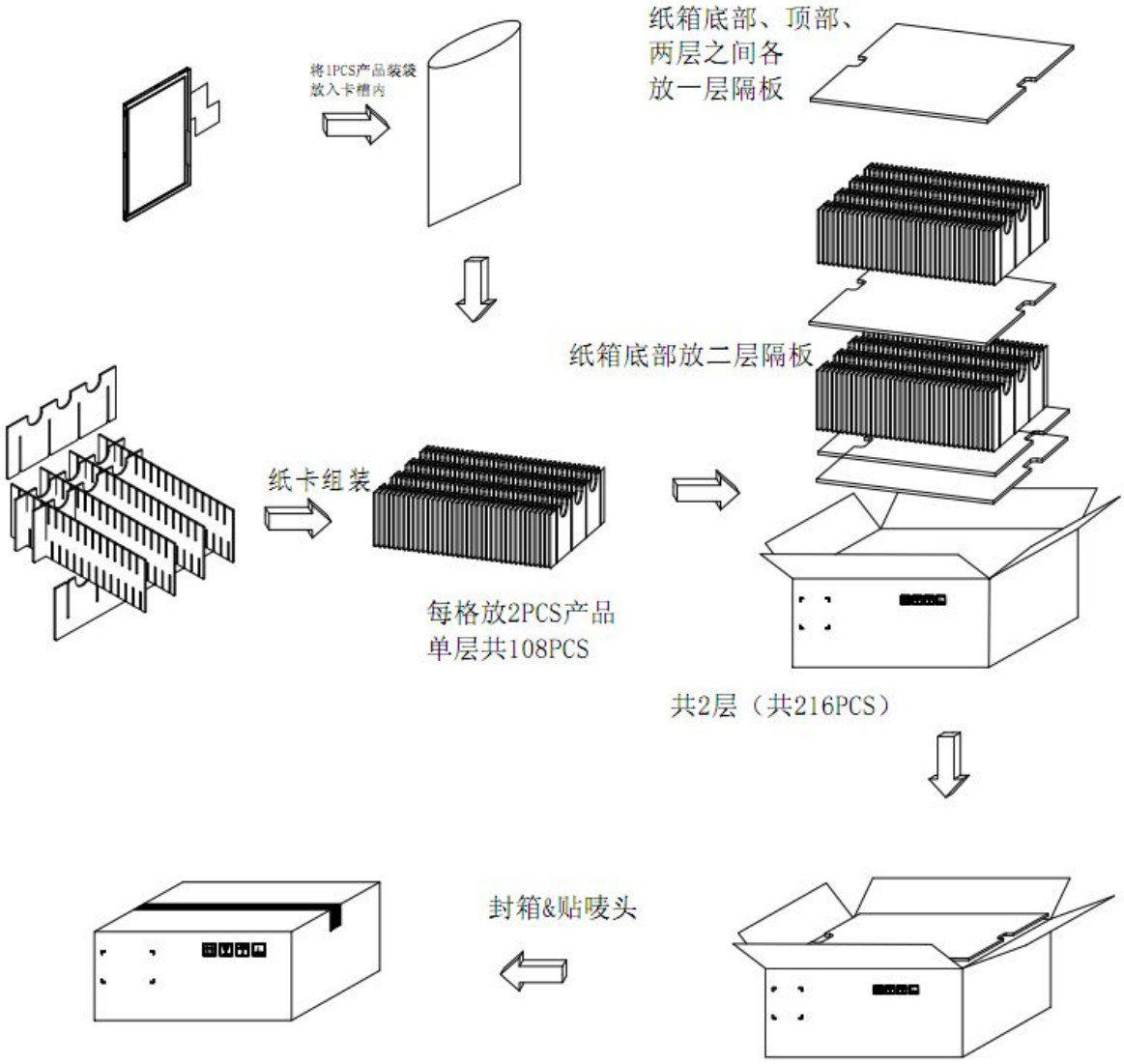
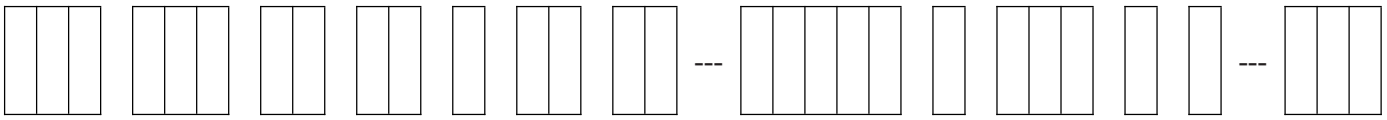
7. Package Drawing



8. Numbering System



A B C D E F G H I J K L M

NO.	Definition	Specifications
A	LCM Product NO.	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

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