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SPECIFICATIONS

Product Name

LPM013M126C

Approval Signature

Company Name : _____

Accepted by : _____

Date : _____

Japan Display Inc.

Proposed by : _____

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文件编号 : JDG010000620 -04

规格书

产品名称

LPM013M126C

批准签名

公司名称 : _____

接受人 : _____

日期 : _____

Japan Display Inc.

提议人 : _____

<h1>Revision History</h1>			Issued No.	JDG010000620
			Revision	04
			Product Name	LPM013M126C
			Customer Part No.	-
Date/Rev.	Contents of change			Reasons
Dec.20,2016	-	-	New Release	-
Mar.21,2017	C	P1/33	1.1 STRUCTURES Changed the Outward specifications.	Correction of misdescription
	A	P7/33	4.2 INPUT SIGNAL CHARACTERISTICS Added "VIL=0 V" to Driving Condition.	Clarification of conditions
	C	P9/33	5.2 MODE CHART Changed the word of note. <u>Maintained</u> → kept	Correction of word
	C	P16/33	6.7 NO-UPDATE MODE Changed the word of the upper caption. Maintains → Keeps	Correction of word
	C	P18/33	6.9 DISPLAY BLINKING COLOR MODE Changed the word of the upper caption. Maintains → Keeps	Correction of word
	C	P19/33	6.10 DISPLAY COLOR INVERSION MODE Changed the word of the upper caption and M5. Caption: Maintains → Keeps M5: complementally → complementary	Correction of word
	C	P30/33	14.1 HANDLING (14):FCP → FPC	Correction of word
	C	P1/4	1.1 Inspection condition Changed (3) Viewing Angle	Clarification of conditions
	C	P4/4	3. EXTERNAL APPEARANCE STANDARDS Changed Fig.Chipping on the corner	Clarification of conditions
	A	P1/33	1. BASIC SPECIFICATIONS Added explanation about product and contents described in this specification.	Clarification of conditions
LPM013M126C(01)		LPM013M126C(02) specification		
LPM013M126C(03) specification				

(C): Changed

(A): Appended

(D): Deleted

(F): Filled in

修订历史			发行编号	JDG010000620	
			修订	04	
			产品名称	LPM013M126C	
			客户 部件编号	-	
日期/修订	变更内容			原因	备注
2016年12月20日	-	-	新版本	-	LPM013M126C(01)
2017年3月21日	C	P1/33	1.1 结构 更改了外部 规格。	描述错误的 更正	LPM013M126C(02) 规格
	A	P7/33	4.2 输入信号特性 添加“VIL=0 V”到驱动 条件。	条件的 澄清	
	C	P9/33	5.2 模式图表 更改了注释的用词。 保持 → 保持	更正单词	
	C	P16/33	6.7 无更新模式 更改了 上方标题的单词。 保持 → 保持	更正单词	
	C	P18/33	6.9 显示闪烁颜色模式 更改了上方标 题的单词。 保持 → 保持	更正单词	
	C	P19/33	6.10 显示颜色反转模式 更改了上方标题的 单词和 M5. 标题: 保持 → 保持 M5: 补充性 AE 补 充性	更正单词	
	C	P30/33	14.1 处理 (14):FCP → FPC	更正单词	
	C	P1/4	1.1 检查条件 更改 (3) 视角	条件的 澄清	
2018年2月26日	C	P4/4	3. 外观标准 更改图示。角落的 缺口	条件的 澄清	LPM013M126C(02) 出货检查 标准
	A	P1/33	1. 基本规格 添加了关于产品 及本规格中描述内容的说 明。	条件的 澄清	LPM013M126C(03) 规格

(C): 更改

(A): 附加

(D): 删除

(F): 填写

Date/Rev.	Contents of change			Reasons	Remarks
Feb.26.2018	A	P1/33	1.1 STRUCTURES Added No.9 Number of colors and No.10 Interface. Renumbering from No. 11.	Clarification of conditions	
	C	P2/33	1.2.1 PIN LAYOUT AND INTERNAL CIRCUIT Changed the description in LCD block diagram. Pixel pitch → Dot pitch	Correction of misdescription	
	C, A	P22/33	9.1.1 REFLECTIVE MODE Corrected the item name in the table.(definition → Definition) Added definition of Reflectance. Measurement system- I	Correction of misdescription	
			9.1.2 TRANSMISSIVE MODE Corrected the item name in the table.(definition → Definition) Added definition of Brightness. Measurement system-II	Clarification of conditions	
	A	P23/33	Added chapter head 9.2.1 Definitions of optical characteristics	Clarification of conditions	LPM013M126C(03) specification
	A	P24/33	Added chapter head 9.2.2 Measurement method of optical characteristics 9.2.2.1 Basic measurement conditions 9.2.2.2 Measurement system-I for reflective mode	Clarification of conditions	
	A	P25/33	Added chapter head 9.2.2.3 Measurement system-II for transmissive mode	Clarification of conditions	
	C	P25/33	10. INSPECTION Upgrade the shipping inspection standard	Upgrade	
	C	P26/33	11.1 CONDITIONS OF RELIABILITY AND MECHANICAL TEST Changed No.8 ESD V = 1.0kV → V = +/-1.0kV	Clarification of conditions	

(C): Changed

(A): Appended

(D): Deleted

(F): Filled in

日期/修订	变更内容			原因	备注
2018年2月26日	A	P1/33	1.1 结构 添加第9项 颜色数量 和第10项 接口。 重新编号从第11项开始。	条件的 澄清	
	C	P2/33	1.2.1 引脚布局和内部电 路 修改了LCD框图中 的描述。 像素间距 → 点间距	描述错误的 更正	
	C, A	P22/33	9.1.1 反射模式 更正了表中 的项目名称。 (definition →Defi nition) 添加了反射率的定义 。 测量系统- I	更正 误描述	
			9.1.2 透射模式 更正了表中的项 目名称。 (definition →Definition) 添加了亮度的定义。 测量 系统-II	澄清 条件	
	A	P23/33	添加章节标题 9.2.1 光学特性定义	条件的 澄清	LPM013M126C(03) 规格
	A	P24/33	添加章节标题 9.2.2 光学特性测量方法 9.2.2.1 基 本测量条件 9.2.2.2 测量系统- I 反射模式	条件的 澄清	
	A	P25/33	添加章节标题 9.2.2.3 测量系统- II 透射模式	条件的 澄清	
	C	P25/33	10. 检查 升级运输 检查标准	升级	
	C	P26/33	11.1 可靠性和机械测试 条件 修改第8条 E SD V = 1.0kV →V = +/-1.0kV	条件的 澄清	

(C): 更改

(A): 附加

(D): 删除

(F): 填写

Date/Rev.	Contents of change			Reasons	Remarks
Feb.26.2018	C	P26/33	11.2 CRITERIA FOR JUDGEMENT Updated the sentence of (2)	Clarification of conditions	LPM013M126C(03) specification
	A	P28/33	13.1 INNER CARTON Added (Note)	Clarification of conditions	
	A	P1/4	1.1 Inspection condition Added (4) Transmissive mode	Clarification of conditions	
	C	P2/4	Corrected the chapter head 1.3 Treatment of other problems → 1.3 Treatment of problems Updated the sentence	Correction of misdescription	LPM013M126C(03) shipment inspection standard
	A	P3/4	2 DISPLAY APPEARANCE STANDARDS Added notes	Clarification of conditions	
Apr.20.2018	A	P33/33	15. OUTLINE DRAWING Added viewing area dimensions	Clarification of LCD dimensions	LPM013M126C(04) specification

(C): Changed

(A): Appended

(D): Deleted

(F): Filled in

日期/修订	变更内容			原因	备注
2018年2月26日	C	P26/33	11.2 判断标准 更新第(2)句	条件的澄清	LPM013M126C(03) 规格
	A	P28/33	13.1 内箱 添加 (注)	条件的澄清	
	A	P1/4	1.1 检查条件 添加 (4) 透射模式	条件的澄清	LPM013M126C(03) 发货检查 标准
	C	第2页/第4页	修正了章节标题 1.3 其他问题的处理 → 1.3 问题的处理 更新了句子	描述错误的更正	
	A	第3页/第4页	2 显示外观 标准 添加了备注	条件的澄清	
2018年4月20日	A	第33页/第33页	15.轮廓图 添加了视图区域 dimensions	LCD dimensions的澄清	LPM013M126C(04) 规格

(C): 更改

(A): 附加

(D): 删除

(F): 填写



SPECIFICATION

[Product Name : LPM013M126C]



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[Product Name : LPM013M126C]

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1. BASIC SPECIFICATIONS

This product is the System on the Glass display with SPI(Serial Peripheral Interface) featuring MIP(Memory In Pixel) function which is low power technology.

This display is the reflective LCD, therefore the specification is defined in reflective mode only unless otherwise specified in this specification sheet.

1.1 STRUCTURES

No.	FACTOR	SPECIFICATIONS	UNIT
1	LCD structure	LTPS (Memory in Pixel type)	-
2	Outward * ¹ (W x H x D)	26.62 x 29.72 x 1.45 * ¹)	mm
3	Weight	1.6(typ.)	g
4	Screen size	23.02(H) x 23.02(V) (1.282 inch)	mm
5	Resolution	176 x RGB x 176	dot
6	Dot pitch (Horizontal x Vertical)	0.0436 x 0.1308	mm
7	Dot layout	RGB stripe	-
8	Liquid crystal mode	ECB normally black (Reflective type)	-
9	Number of colors	8 colors	-
10	Interface	SPI (Serial Peripheral Interface)	-
11	Polarizer	Hard Coat type (*Pencil Hardness : 2H)	-
12	Light source type	Backlight with white LED (2 chips * ²)	-

*1) Excluding FPC and part of protruding. See attached drawing for details.

*2) Each LED is connected in parallel in Backlight-FPC.

1. 基本规格

本产品为带有SPI（串行外设接口）的玻璃系统显示器，具有低功耗技术的MIP（像素内存）功能。

该显示器为反射式LCD，因此规格仅在反射模式下定义，除非在本规格表中另有说明。

1.1 结构

否	因子	规格书	单位
1	LCD 结构	LTPS (像素内存类型)	-
2	外部 * ¹ (宽 x 高 x 深)	26.62 x 29.72 x 1.45 * ¹	毫米
3	重量	1.6 (典型)	克
4	屏幕尺寸	23.02 (高) x 23.02 (纵) (1.282 英寸)	毫米
5	分辨率	176 x RGB x 176	点
6	点距 (水平 x 垂直)	0.0436 x 0.1308	毫米
7	点阵布局	RGB条纹	-
8	液晶模式	ECB通常为黑色 (反射型)	-
9	颜色数量	8种颜色	-
10	接口	SPI (串行外设接口)	-
11	偏光片	硬涂层类型 (*铅笔硬度：2H)	-
12	光源类型	带有白色LED的背光 (2个芯片 * ²)	-

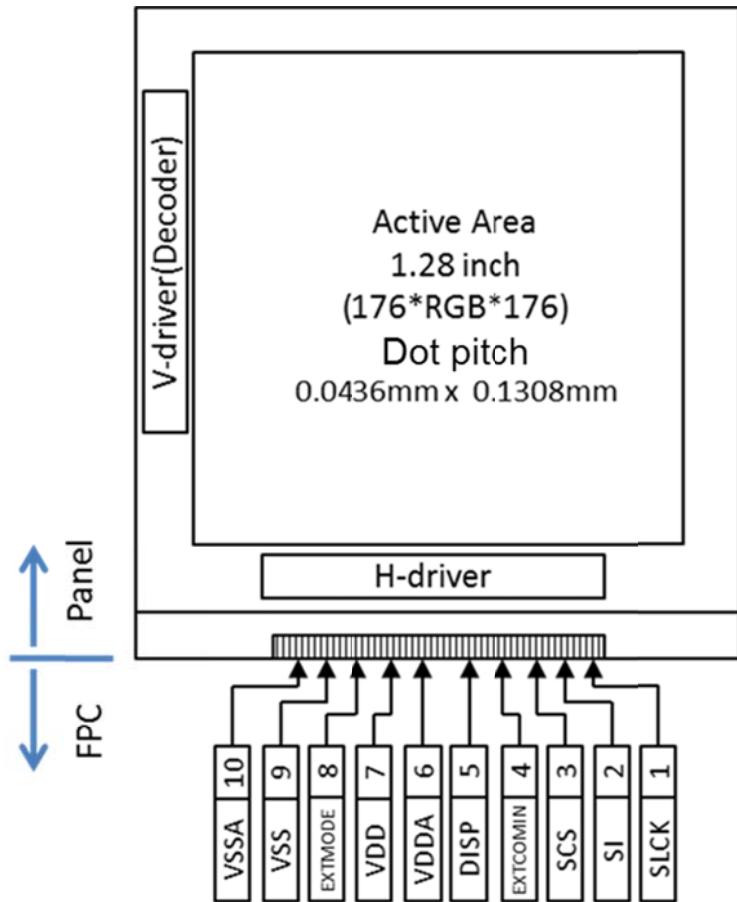
*1) 不包括FPC和部分突出部分。有关详细信息，请参见附图。

*2) 每个LED在背光-FPC中并联连接。

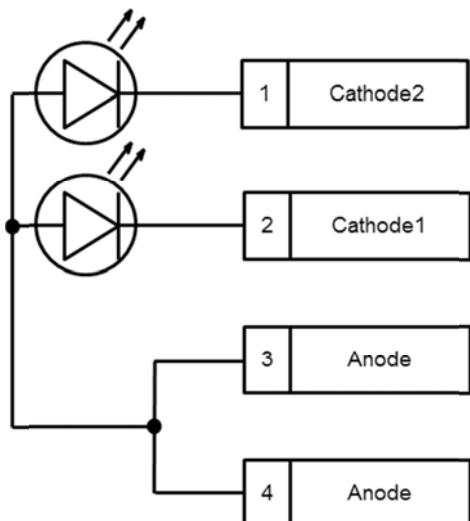
1.2 BLOCK DIAGRAM

The block diagram of a panel is shown below.

1.2.1 PIN LAYOUT AND INTERNAL CIRCUIT



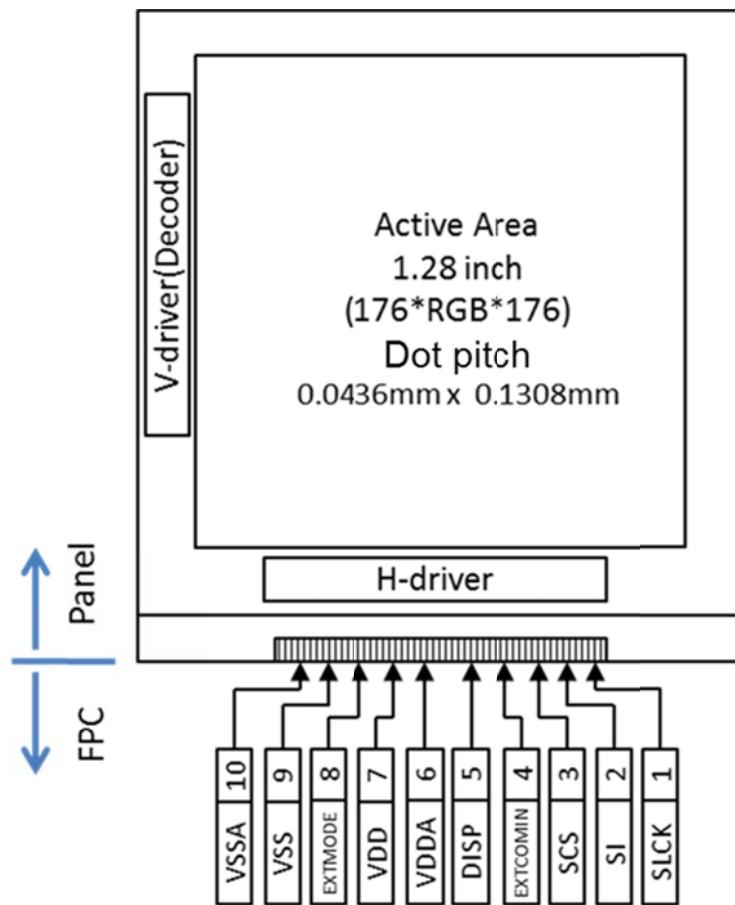
Viewing in front of an LCD panel



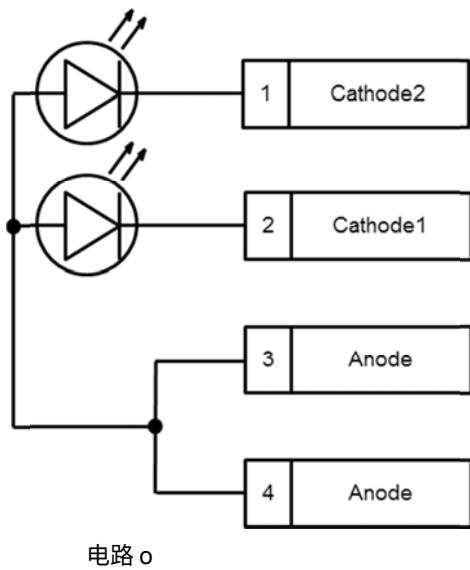
Circuit of Backlight with white LED

1.2 块

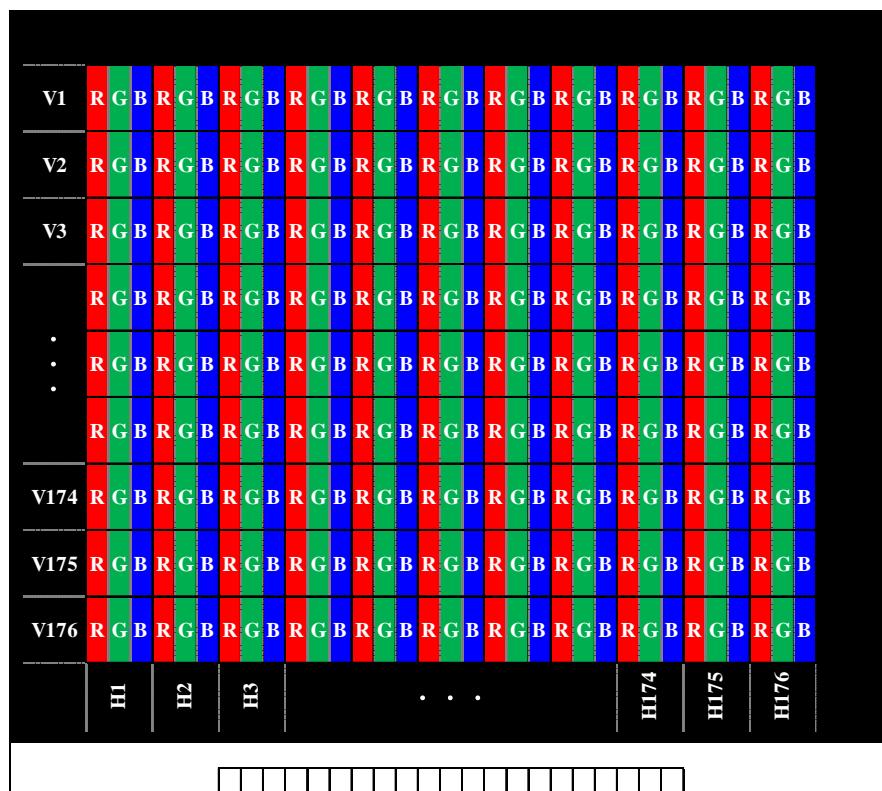
该块的图示的p 面板显示

1.2.1 引脚ND 内部

查看 在 LCD 面板前 LCD 面板



1.3 DISPLAY ADDRESS MAP AND PIXEL LAYOUT



Pixels indicated "RGB" are displayed

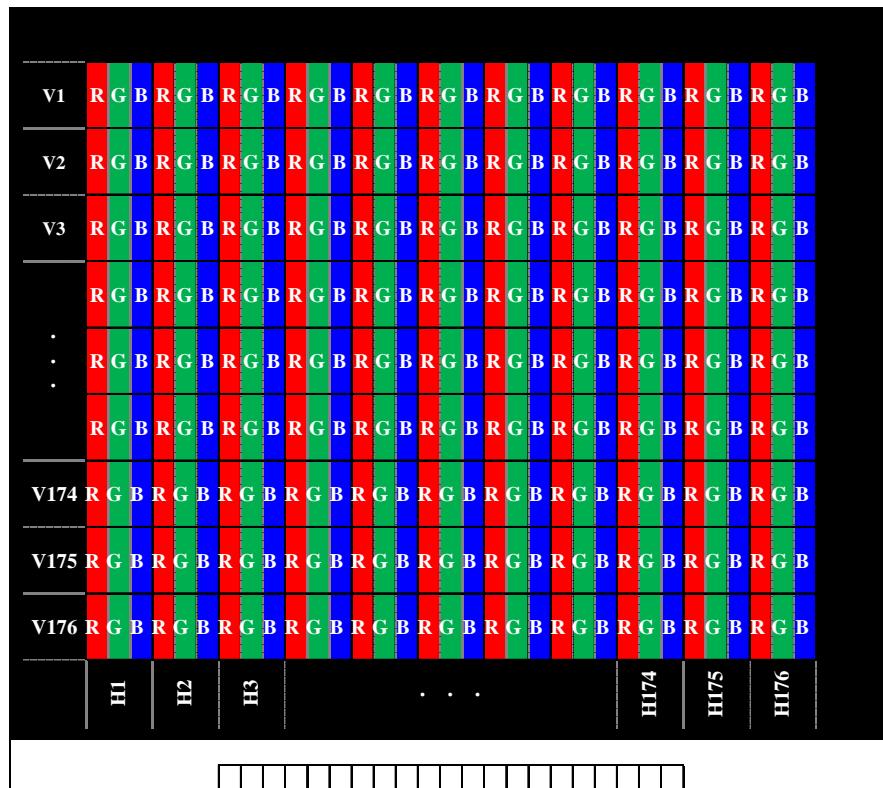
Number of active pixels: 176 x RGB x 176 dot

(Viewing in front of an LCD panel)

H1...176 x RGB : Horizontal line

V1...176 : Vertical line

1.3 显示地址映射和像素布局



1.4 I/O PINS1.4.1 LCD FPC

PIN	SYMBOL	FUNCTION	I/O	REMARKS
1	SCLK	Serial Clock Signal	I	
2	SI	Serial Data Input Signal	I	
3	SCS	Chip Select Signal	I	
4	EXTCOMIN	COM Inversion Polarity Input	I	
5	DISP	Display ON/OFF Switching Signal	I	(*1-1)
6	VDDA	Power Supply for Analog	P	
7	VDD	Power Supply for Logic	P	
8	EXTMODE	COM Inversion Mode Select Terminal	I	(*1-2)
9	VSS	Logic Ground	P	
10	VSSA	Analog Ground	P	

P: Power supply, I: Input

Note)

(*1-1) ON/OFF switching signal is only for display. Data memory is kept at the time of ON/OFF.

"H" : Data memory is displayed.

"L" : Black color is displayed with data memory kept.

(*1-2)

"H" : Enable EXTCOMIN signal, connect to VDD.

"L" : Enable serial input flag, connect to VSS.

Recommended circuit

EXTMODE=L : COM Signal Serial Input

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

EXTMODE=H : COM Signal External Input

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

External circuit example

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

1.4 I/O 引脚1.4.1 LCD FPC

引脚	符号	功能	输入/输出	备注
1	串行时钟	串行时钟信号	I	
2	SI	串行数据输入信号	I	
3	SCS	芯片选择信号	I	
4	EXTCOMIN	COM反相极性输入	I	
5	DISP	显示开/关切换信号	I	(*1-1)
6	VDDA	模拟电源	P	
7	VDD	逻辑电源	P	
8	扩展模式	COM反相模式选择端子	I	(*1-2)
9	VSS	逻辑接地	P	
10	VSSA	模拟接地	P	

P: 电源,

I: 输入

(注意)

(*1-1) 开/关切换信号仅用于显示。数据存储在开/关时保持。

"H": 数据存储被显示。

"L": 显示黑色, 同时保持数据存储。

(*1-2)

"H": 启用EXTCOMIN信号, 连接到VDD。

"L": 启用串行输入标志, 连接到VSS。

推荐电路

EXTMODE=L : COM信号串行输入

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

EXTMODE=H : COM信号外部输入

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

外部电路示例

No.	symbol
1	SCLK
2	SI
3	SCS
4	EXTCOMIN
5	DISP
6	VDDA
7	VDD
8	EXTMODE
9	VSS
10	VSSA

C1 : 0.1uF/B/10V
C2 : 0.1uF/B/10V
C3 : 1.0uF/B/10V

1.4.2 BACKLIGHT FPC

PIN	SYMBOL	FUNCTION	I/O	REMARKS
1	Cathode2	Power Supply for LED backlight	P	(*1-3)
2	Cathode1	Power Supply for LED backlight	P	(*1-3)
3	Anode	Power Supply for LED backlight	P	(*1-4)
4	Anode	Power Supply for LED backlight	P	(*1-4)

P: Power supply

Note)

(*1-3) Each LED is connected in parallel.

(*1-4) 3Pin and 4Pin (Anode pins) are connected in Backlight-FPC.

2. ABSOLUTE MAXIMUM RATINGS (VSS=0V)

PARAMETER	SYMBOL	RATINGS	UNIT	REMARKS
Power supply voltage Analog	VDDA	3.6	V	
Power supply voltage Logic	VDD	3.6	V	
Input signal voltage High	VIH	3.6	V	

PARAMETER	SYMBOL	RATINGS	UNIT	REMARKS
Operating temperature range (LCD panel surface)	Topr	-20 ~ +70	°C	(*2-1)
Storage temperature range	Tstg	-30 ~ +80	°C	(*2-1)

PARAMETER	SYMBOL	RATINGS	UNIT	REMARKS
LED forward current	Iled	30	mA	(*2-2)

Note)

(*2-1): Maximum humidity is defined as follows:

Ta≤40°C : 85%RH Max.

Ta> 40°C : Absolute humidity needs to be equal or less than the numeric value at the condition of Ta=40°C, 85%RH.

Don't condense dew.

(*2-2): Ambient Temperature vs Allowable Forward Current is due to the following graph.

1.4.2 背光FPC

引脚	符号	功能	输入/输出	备注
1	阴极2	LED 背光电源	P	(*1-3)
2	阴极1	LED 背光电源	P	(*1-3)
3	阳极	LED 背光电源	P	(*1-4)
4	阳极	LED 背光电源	P	(*1-4)

P: 电源

注意)

(*1-3) 每个 LED 以并联方式连接。

(*1-4) 3Pin 和 4Pin (阳极引脚) 连接在背光-FPC 上。

2. 绝对最大额定值 (VSS=0V)

参数	符号	额定值	单位	备注
电源电压 模拟	VDDA	3.6	V	
电源电压 逻辑	VDD	3.6	V	
输入信号电压 高	VIH	3.6	V	

参数	符号	额定值	单位	备注
工作温度范围 (LCD 面板表面)	Topr	-20 ~ +70	°C	(*2-1)
存储温度范围	Tstg	-30 ~ +80	°C	(*2-1)

参数	符号	额定值	单位	备注
LED正向电流	Iled	30	毫安	(*2-2)

注意)

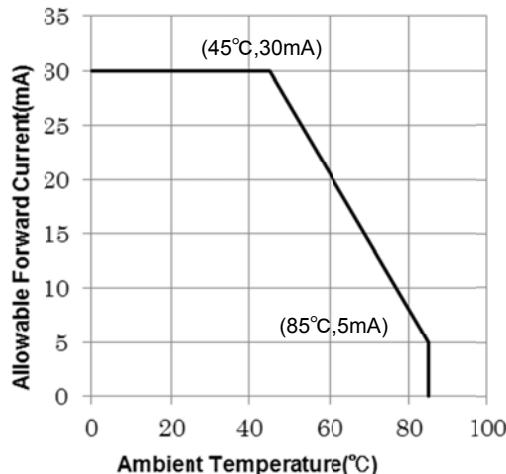
(*2-1): 最大湿度定义如下:

Ta≤40°C : 最大 85%RH。

Ta>40°C : 在Ta=40°C, 85%RH条件下, 绝对湿度需小于或等于该数值。

不要出现露水凝结。

(*2-2): 环境温度与允许正向电流的关系见下图。



3. OPERATING CONDITIONS

3.1 POWER SUPPLY VOLTAGE AND INPUT SIGNALS

PARAMETER	SYMBOL	Min.	Typ.	Max.	UNIT	REMARKS
Power supply voltage Analog	VDDA	2.7	3.0	VDD	V	
	VSSA	-	0	-	V	
Power supply voltage Logic	VDD	2.7	3.0	3.3	V	(*3-1)
	VSS	-	0	-	V	(*3-2)
Input signal voltage High	VIH	VDD-0.1	3.0	VDD	V	(*3-3)
Input signal voltage Low	VIL	VSS	VSS+0.1	V	V	(*3-3)
Backlight forward voltage	VF	(2.62)	(2.67)	(2.72)	V	(*3-4)

Note)

(*3-1) Apply to EXTMODE="H"

(*3-2) Apply to EXTMODE="L"

(*3-3) Apply to SCLK, SI, SCS, DISP, EXTCOMIN

(*3-4) IF : Equivalent to 2.5(mA/each LED)

4. ELECTRICAL CHARACTERISTICS

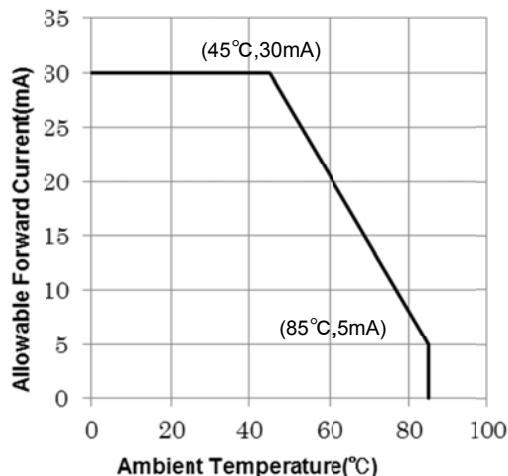
4.1 POWER CONSUMPTION

* Ta=25°C, Driving Condition : VDD=3.0V, VDDA=3.0V, VIH=3.0V, VIL=0V, Frame frequency=1Hz, COM frequency=0.5Hz

Mode	Display	Min.	Typ.	Max.	UNIT	REMARKS
No update mode	White raster	-	2	105	uW	(*4-0)
Data update mode	White raster	-	10	116	uW	3bit all lines data (*4-0)

Note)

(*4-0) Excluding LED backlight power consumption.



3. 工作 状态 S

3.1 电源 供电电压 电压和

参数	符号	最小值	典型值	马克..	单位	REMARKS
电源供应 供电电压 A 模拟	VDDA	2.7	3.0	VDD	V	
	VSSA	-	0	-	V	
电源供应 供电电压 L 逻辑	VDD	2.7	3.0	3.3	V	(*3-1)
	VSS	-	0	-	V	(*3-2)
输入信号 高	VIH	VDD-0.1	3.0	VDD	V	(*3-3)
输入信号 低电位	VIL	VSS	VSS+0	V	V	(*3-3)
背光 正向电压 地	VF	(2.62)	(2.67)	(2.72)	V	(*3-4)

注意

(*3-1) 适用于EX

(*3-2) TMODE="L"

(*3-3) LK, SI, SCS, 显示, 外部控制

(*3-4) /每个LED)

4. 电气 L 字符 特性

4.1 功率 消耗 类型

* Ta= VDD=3.0V, VD H=3.0V, VIL=0V, 帧频 COM 频率

模式	显示	最小值	典型值	马克.	单位	REM
N	白色光栅	-	2	105	微瓦	(*4
D 模式	白色光栅	-	10	116	微瓦	3位所有线路 (*4-0)

注意

(*4-0) 背光功率 功耗

4.2 INPUT SIGNAL CHARACTERISTICS

* Ta=25°C, Driving Condition : VDD=3.0V, VDDA=3.0V, VIH=3.0V, Vil=0V

PARAMETER	SYMBOL	Min.	Typ.	Max.	UNIT	REMARKS
Clock frequency	fSCLK	-	1.00	2.00	MHz	(*4-1)
COM frequency	fCOM	0.5	-	70	Hz	(*4-2)
SCS rising time	trSCS	-	-	50	ns	
SCS falling time	tfSCS	-	-	50	ns	
SCS Low width	twSCSL	6.0	-	-	us	
SCS settling time	tsSCS	6.0	-	-	us	
SCS holding time	thSCS	2.0	-	-	us	(*4-3)
SI rising time	trSI	-	-	50	ns	
SI falling time	tfSI	-	-	50	ns	
SI settling time	tsSI	200	450	-	ns	
SI holding time	thSI	250	500	-	ns	
SCLK rising time	trSCLK	-	-	50	ns	
SCLK falling time	tfSCLK	-	-	50	ns	
SCLK High width	twSCLKH	250	500	-	ns	(*4-4)
SCLK Low width	twSCLKL	250	500	-	ns	(*4-4)
EXTCOMIN frequency	fEXTCOMIN	1	-	140	Hz	
EXTCOMIN rising time	trEXTCOMIN	-	-	50	ns	
EXTCOMIN falling time	tfEXTCOMIN	-	-	50	ns	
EXTCOMIN High width	twEXTCOMIN	2.0	-	-	us	
DISP rising time	trDISP	-	-	50	ns	
DISP falling time	tfDISP	-	-	50	ns	

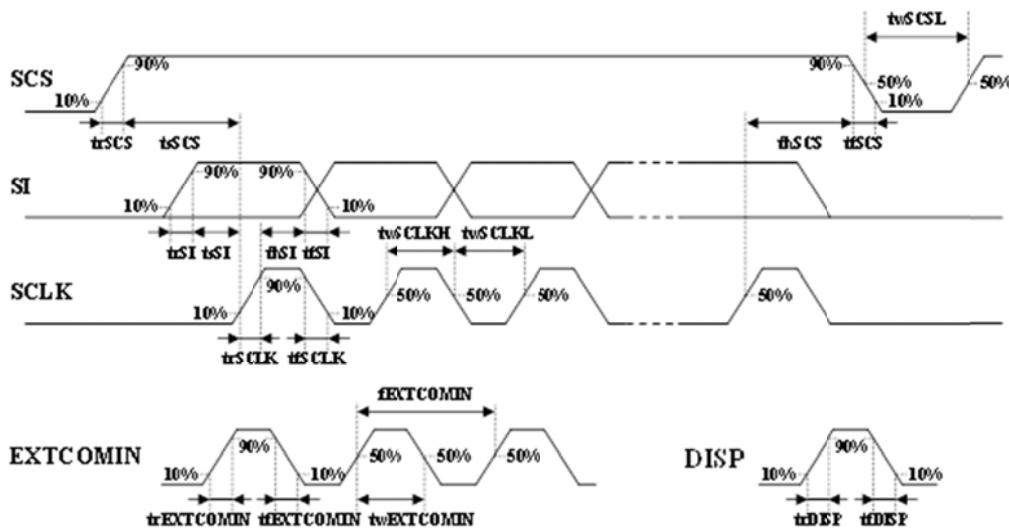
Note)

(*4-1) Please note that Max. fSCLK may be lowered when VDD and VDDA fall than 3.0V at a low temperature.

(*4-2) COM frequency should be around 60Hz (EXTCOMIN frequency : around 120Hz) for transmissive mode.

(*4-3) In case of data update mode in transmissive mode, thSCS should be 50us or less.

(*4-4) twSCLKH and twSCLKL should be approximately the same length, if possible.



4.2 输入 S 信号通道 特性 CS

* Ta= VDD=3.0V, VD H=3.0V, Vil=0V

参数 特征	符号	M	T	M	UNIT	备注
时钟频率频率	fSCL	-	1	2.00	M	(*4-1)
COM 频率	fCOM	0	-	70	Hz	(*4-2)
SCS 上升	trSC	-	-	50	ns	
SCS 下降	tfSC	-	-	50	ns	
SCS 低	twSC	6	-	-	us	
SCS 稳定时间	tsSC	6	-	-	us	
SCS 保持时间	thSC	2	-	-	us	(*4-3)
SI 上升	trSI	-	-	50	ns	
SI 下降	tfSI	-	-	50	ns	
SI 稳定	tsS	2	4	-	ns	
SI 保持	thS	2	5	-	ns	
SCLK 上升时间	trSCL	-	-	50	ns	
SCLK 下降时间	tfSCL	-	-	50	ns	
SCLK 高	twSCL	2	5	-	ns	(*4-4)
SCLK 低 宽度	twSCL	2	5	-	ns	(*4-4)
EXTCOMIN 频率	fEXTCO	1	-	140	Hz	
EXTCOMIN r上升时间	trEXTCO	-	-	50	ns	
EXTCOMIN f下降时间	tfEXTCO	-	-	50	ns	
EXTCOMIN 高宽度	twEXTCOMIN	2	-	-	us	
DISP 上升	trDIS	-	-	50	ns	
DISP 下降 时间	tfDIS	-	-	50	ns	

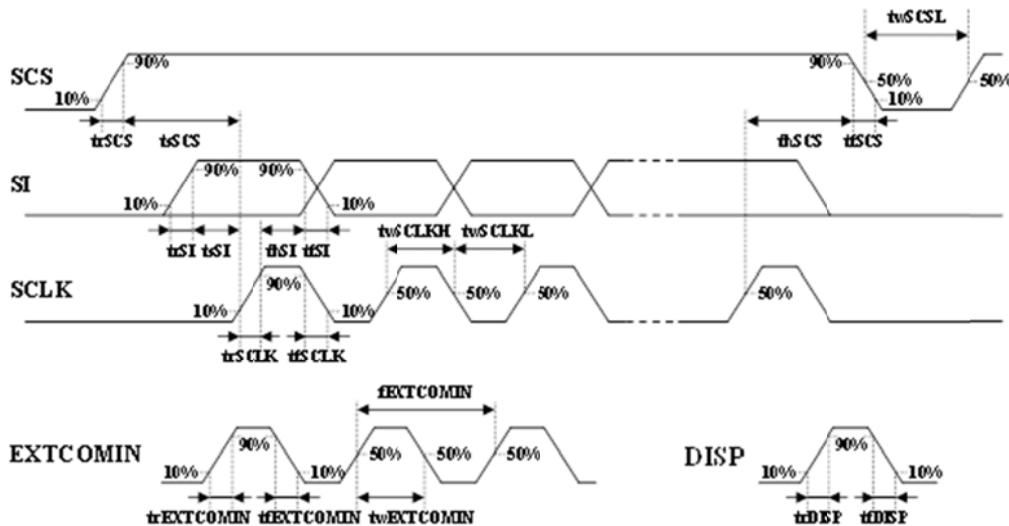
注意

(*4-1) 请注意 时钟可能在60 VDD和VDD 低温下的0V

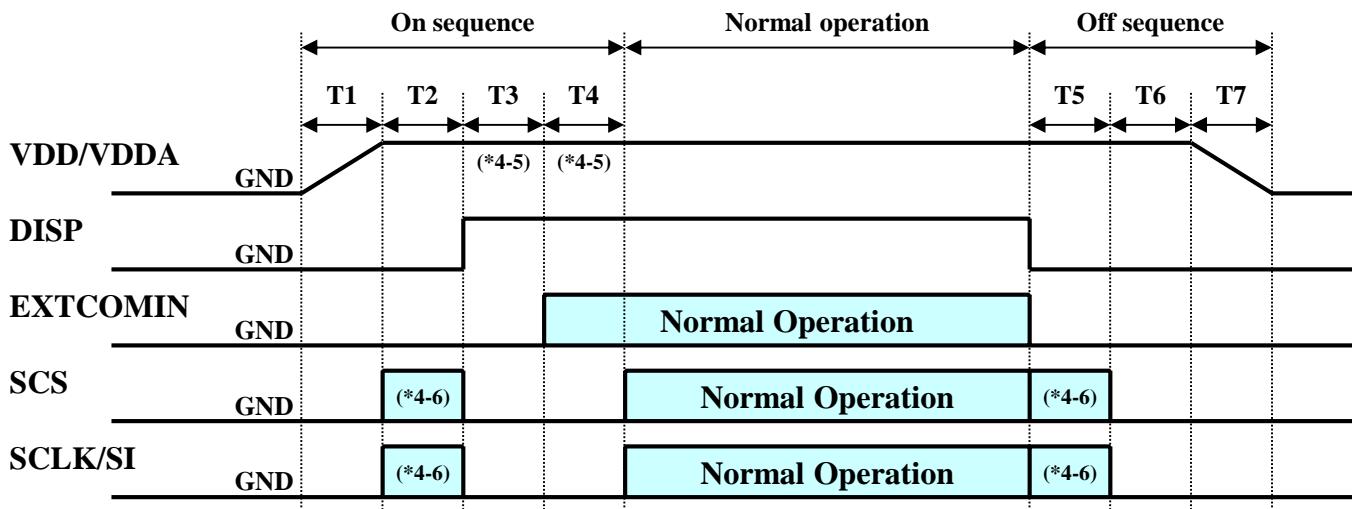
(*4-2) H模式下传输 z (EXTCOMIN 约120Hz

(*4-3) 数据更新模 时应应用 t 为50us或更少ss.

(*4-4) 块 SCLKL s 相同长度



4.3 POWER ON/OFF SEQUENCE



[On sequence]

- T1 : Power supply rising time. (Depends on external power supply)
- T2 : Pixel memory initialization. 1ms or more initialize with M2 (all clear flag).
- T3 : Release time for internal latch circuits. 30us or more
- T4 : COM polarity initialization time. 30us or more

[Normal operation]

Duration of normal operation

[Off sequence]

- T5 : Pixel memory initialization. Same as T2.
- T6 : COM and latch circuits initialization. 30us or more
- T7 : Power supply falling time. (Depends on external power supply)

Note)

Refer to the timing chart and electrical characteristics for details.

(*4-5) It is allowed to replace T3 and T4 mutually.

In case of starting EXTCOMIN before rising DISP, EXTCOMIN is ignored during DISP="L".

Also, it is allowed to start simultaneously DISP and EXTCOMIN.

In that case, need 100us or more (200us or less) before normal operation.

(*4-6) Pixel memory initialization.

Use M2 (all clear flag : refer to 6.8),

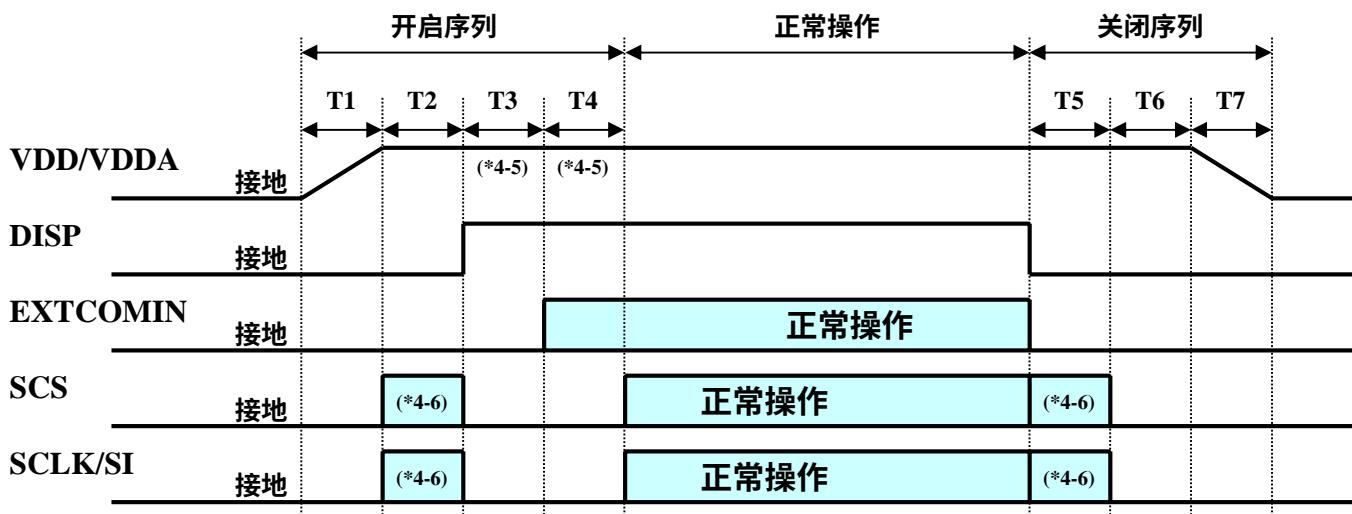
or write black data to all pixel memories (refer to the data update mode).

[Remark]

VDD and VDDA should rise simultaneously or VDD should rise first.

VDD and VDDA should fall simultaneously or VDDA should fall first.

4.3 电源开/关序列



(注意)

有关详细信息，请参阅时序图和电气特性。

(*4-5) 允许互换T3和T4。

如果在DISP上升之前启动EXTCOMIN，则在DISP=L期间EXTCOMIN将被忽略。

同时启动DISP和EXTCOMIN也是允许的。

在这种情况下，需要在正常操作之前等待100us或更多（200us或更少）。

(*4-6) 像素内存初始化。

使用M2（全部清除标志：请参阅6.8），

或将黑色数据写入所有像素存储器（请参阅数据更新模式）。

[备注]

VDD 和 VDDA 应同时上升，或 VDD 应先上升。

VDD 和 VDDA 应同时下降，或 VDDA 应先下降。

5. MODE

5.1 MODE TABLE

Mode select

Unassigned bit and AG9-8 : No care, it can be H or L (L is Recommended)

Mode (6bit)

Gate Address (10bit)

Function table

M0=L or M0=H/M2=H

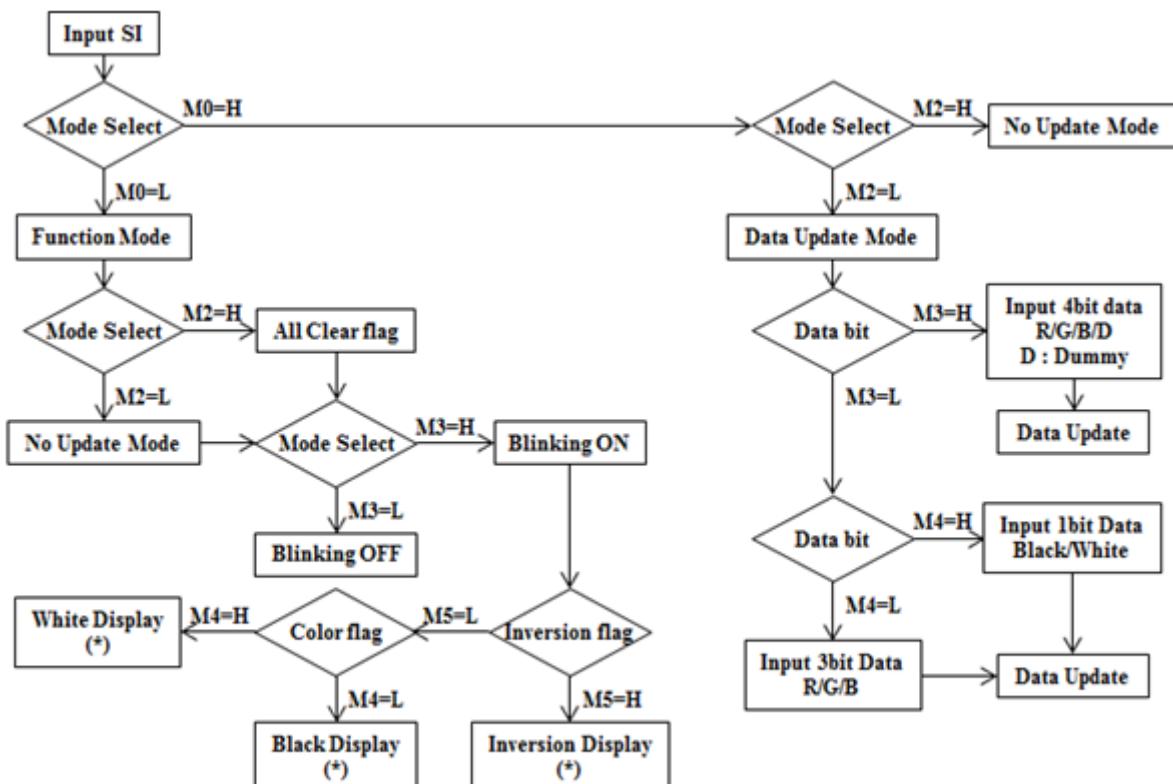
Mode	M3	M4	M5
Blinking OFF	L	-	-
Blink Black	H	L	L
Blink White	H	H	L
Blink Inversion	H	-	H

$$M_0 = H/M_2 = L$$

Mode	M3	M4	M5
3bit data input	L	L	-
1bit data input	L	H	-
4bit data input	H	-	-

Unassigned bit : No care, it can be H or L (L is Recommended)

5.2 MODE CHART



(*) Pixel memories are kept.

5. 模式

5.1 模式表

Mode select Unassigned bit and AG9-8 : No care, it can be H or L (L is Recommended)

M0	M1	M2	M3	M4	M5	AG9	AG8	AG7	AG6	AG5	AG4	AG3	AG2	AG1	AG0	Mode
L	L/H	L	L	-	-	-	-	-	-	-	-	-	-	-	-	No-Update
L	L/H	L	H	L/H	L/H	-	-	-	-	-	-	-	-	-	-	Blinking
L	L/H	H	L/H	L/H	L/H	-	-	-	-	-	-	-	-	-	-	All Clear
H	L/H	L	L/H	L/H	-	AG9	AG8	AG7	AG6	AG5	AG4	AG3	AG2	AG1	AG0	Data-Update
H	L/H	H	L/H	L/H	L/H	-	-	-	-	-	-	-	-	-	-	No-Update

Mode (6bit)

Gate Address (10bit)

Function table

M0=L or M0=H/M2=H

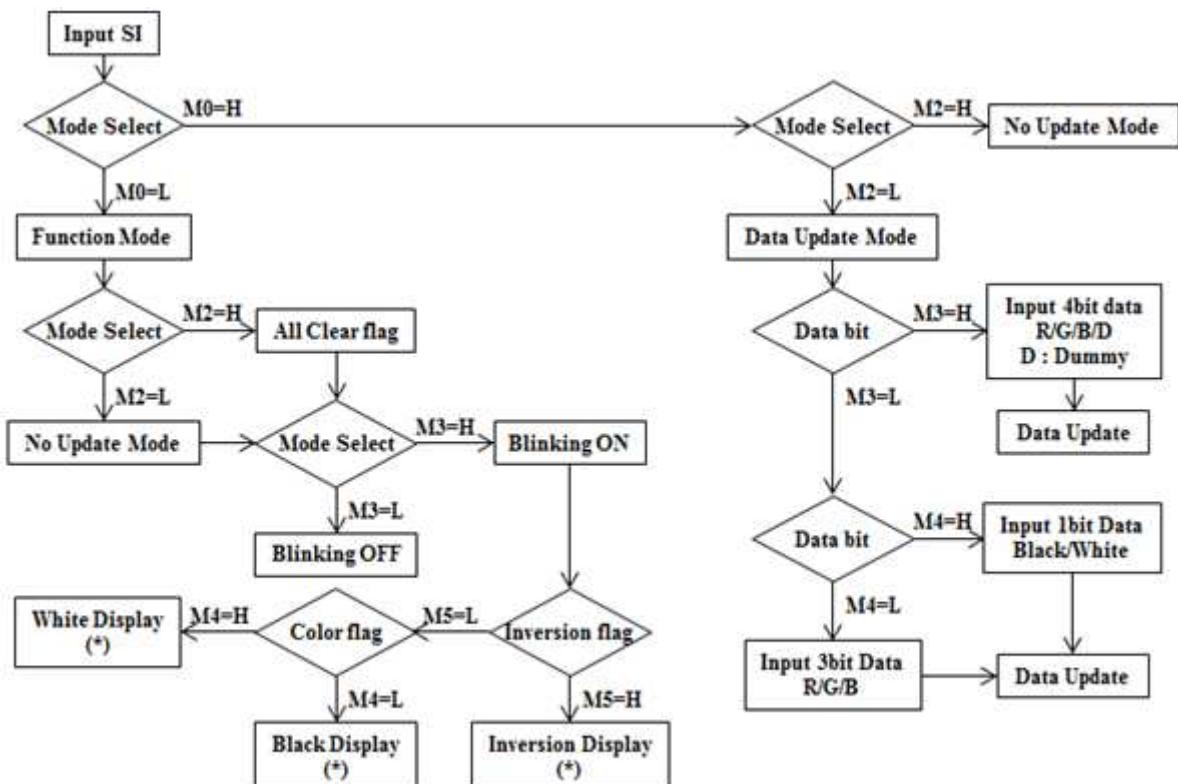
Mode	M3	M4	M5
Blinking OFF	L	-	-
Blink Black	H	L	L
Blink White	H	H	L
Blink Inversion	H	-	H

M0=H/M2=L

Mode	M3	M4	M5
3bit data input	L	L	-
1bit data input	L	H	-
4bit data input	H	-	-

Unassigned bit : No care, it can be H or L (L is Recommended)

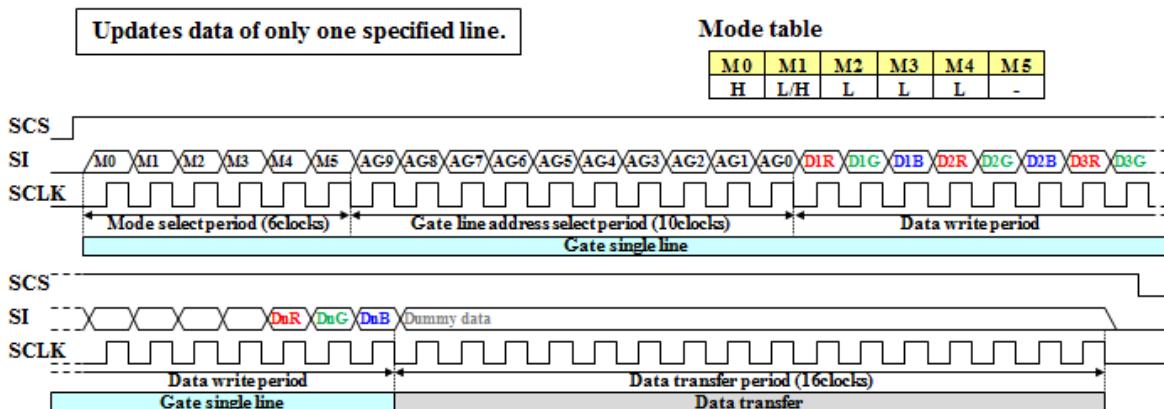
5.2 模式图



(*) Pixel memories are kept.

6. TIMING CHART AND DETAILS OF MODE

6.1 SINGLE LINE UPDATE MODE (3BIT-DATA MODE)



M0 : Mode flag. Set “H”, data update mode.

M1 : COM inversion flag. In case of EXTMODE=“L”, validate.

In case of “H”, outputs COM=“H”.

In case of “L”, outputs COM=“L”.

In case of EXTMODE=“H”, invalidate, it can be “H” or “L”.

M2 : All clear flag. Set “L”, data update mode.

M3-M4 : Data-bit control flag. In case of M3=“L” and M4=“L”, 3bit-data mode.

M5 : Invalid data, it can be “H” or “L”.

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of “L”, pixel is black.

In case of 3bit-data mode,

input serially the pixel data in the order of Red-Green-Blue (3bit).

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

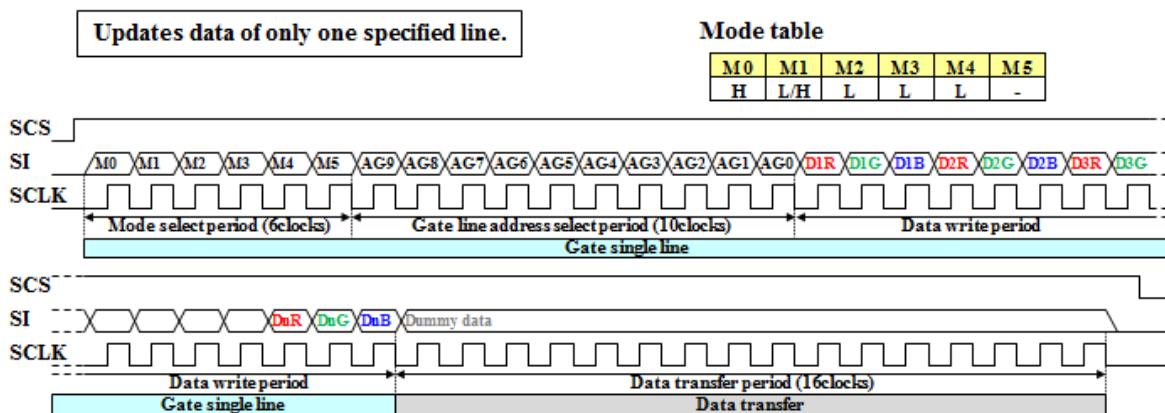
Dummy data : It can be “H” or “L”.

Need transfer period which is 16clocks after the last data.

M0, M2 flags are cleared by SCS=“L”, and M3-M4 flags are cleared by DISP=“L”.

6.时序图和模式详细信息

6.1 单行更新模式 (3位数据模式)



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3-M4 : 数据位控制标志。在M3=“L”和M4=“L”的情况下，3位数据模式。

M5 : 无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在3位数据模式下，

按红-绿-蓝（3位）的顺序串行输入像素数据。

n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

需要在最后一个数据之后的16时钟的传输周期。

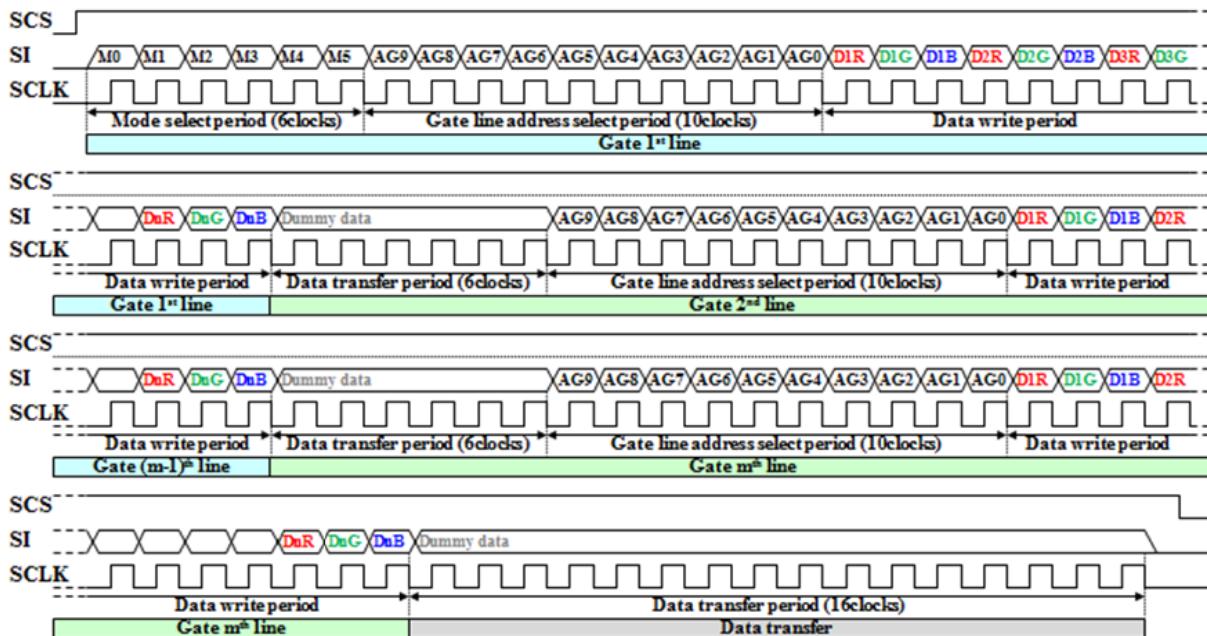
M0、M2标志由SCS=“L”清除，M3-M4标志由DISP=“L”清除。

6.2 MULTIPLE LINES UPDATE MODE (3BIT-DATA MODE)

Updates arbitrary multiple lines data.

Mode table

M0	M1	M2	M3	M4	M5
H	L/H	L	L	L	-



M0 : Mode flag. Set "H", data update mode.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag. Set "L", data update mode.

M3-M4 : Data-bit control flag. In case of M3="L" and M4="L", 3bit-data mode.

M5 : Invalid data, it can be "H" or "L".

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of "L", pixel is black.

In case of 3bit-data mode,

input serially the pixel data in the order of Red-Green-Blue (3bit).

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Dummy data : It can be "H" or "L".

Input data continuously.

m : Number of vertical line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Need transfer period which is 6clocks between the gate line and the next gate line.

Need transfer period which is 16clocks after the last data.

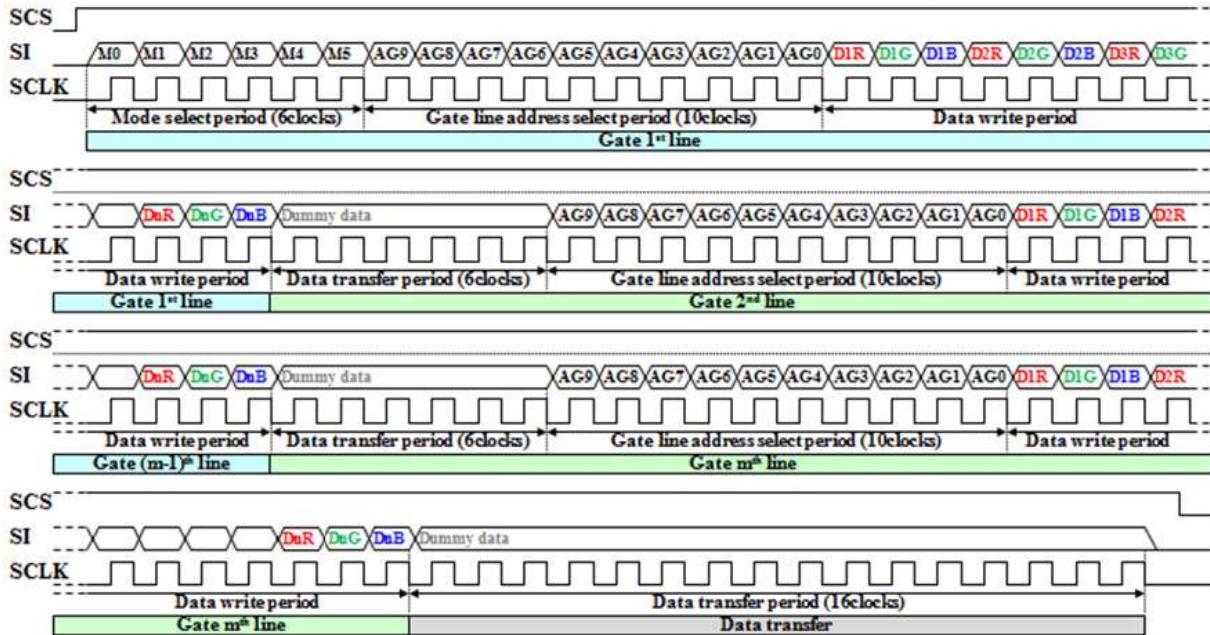
M0, M2 flags are cleared by SCS="L", and M3-M4 flags are cleared by DISP="L".

6.2 多行更新模式（3位数据模式）

Updates arbitrary multiple lines data.

Mode table

M0	M1	M2	M3	M4	M5
H	L/H	L	L	L	-



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3-M4 : 数据位控制标志。在M3=“L”和M4=“L”的情况下，3位数据模式。

M5 : 无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在3位数据模式下，

按红-绿-蓝（3位）的顺序串行输入像素数据。

n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

连续输入数据。

m: 垂直线的数量，参考显示地址映射和像素布局。

在门线和下一个门线之间需要6时钟的传输周期。

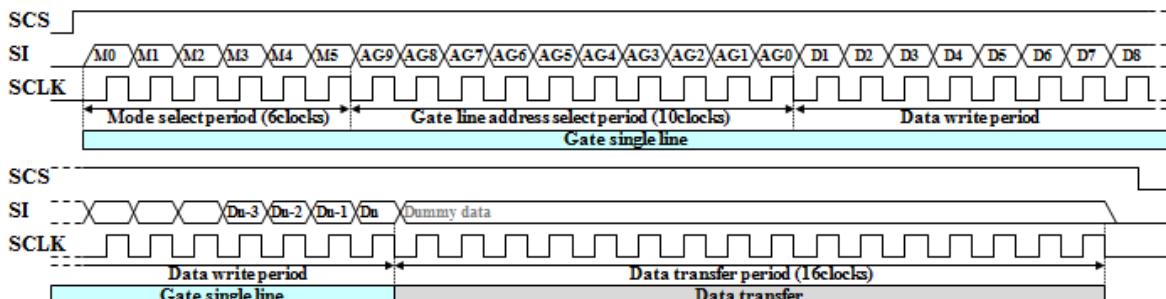
需要在最后一个数据之后的16时钟的传输周期。

M0、M2标志由SCS=“L”清除，M3-M4标志由DISP=“L”清除。

6.3 SINGLE LINE UPDATE MODE (1BIT-DATA MODE)

Updates data of only one specified line.

M0	M1	M2	M3	M4	M5
H	L/H	I	I	H	-



M0 : Mode flag. Set "H", data update mode.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag. Set "L", data update mode.

M3-M4 : Data-bit control flag. In case of M3="L" and M4="H", 1bit-data mode.

M5 : Invalid data, it can be "H" or "L".

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of "L", pixel is black.

In case of 1bit-data mode, input the pixel data "H" or "L" (1bit).

Pixel memories of red, green and blue are written the same data.

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Dummy data : It can be "H" or "L".

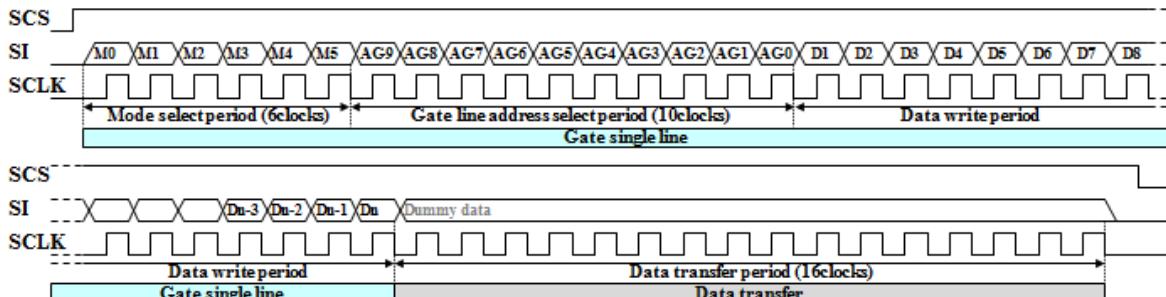
Need transfer period which is 16clocks after the last data.

M0, M2 flags are cleared by SCS="L", and M3-M4 flags are cleared by DISP="L".

6.3 单行更新模式（1位数据模式）

Updates data of only one specified line.

M0	M1	M2	M3	M4	M5
H	L/H	L	L	H	-



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3-M4 : 数据位控制标志。当 M3=“L” 和 M4=“H” 时，1位数据模式。

M5 : 无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在1位数据模式下，输入像素数据“H”或“L”（1位）。

红、绿、蓝的像素存储器写入相同的数据。

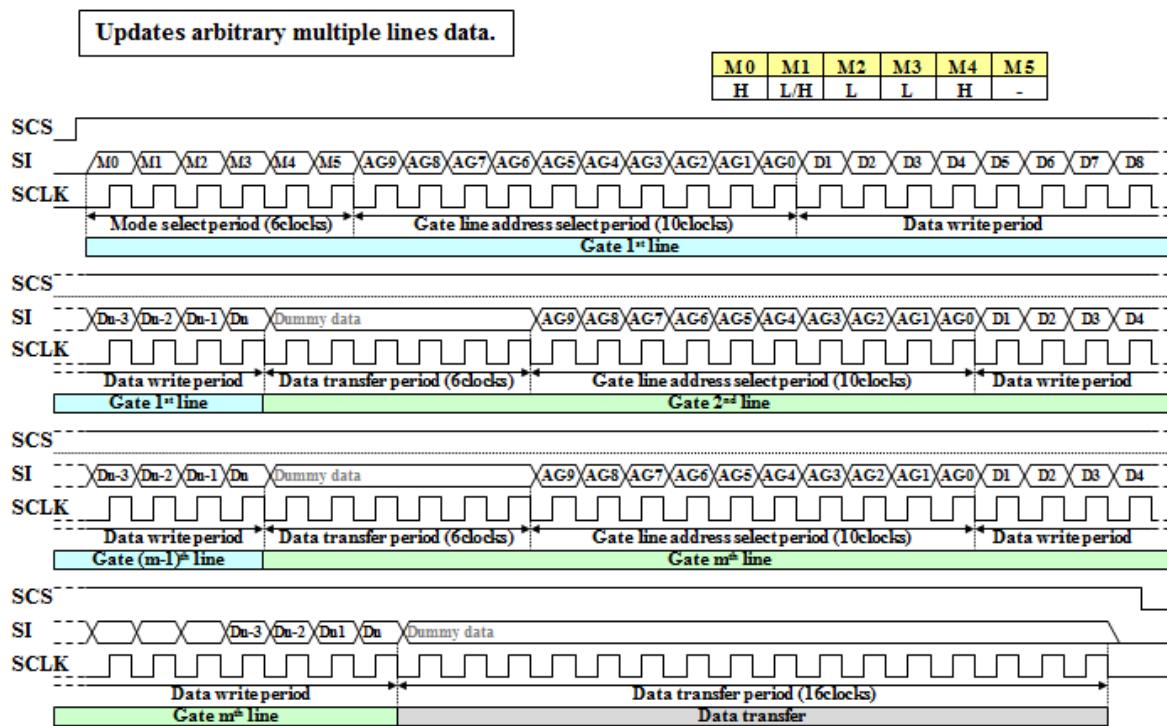
n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

需要在最后一个数据之后的16时钟的传输周期。

M0、M2标志由SCS=“L”清除，M3-M4标志由DISP=“L”清除。

6.4 MULTIPLE LINES UPDATE MODE (1BIT-DATA MODE)



M0 : Mode flag. Set "H", data update mode.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag. Set "L", data update mode.

M3-M4 : Data-bit control flag. In case of M3="L" and M4="H", 1bit-data mode.

M5 : Invalid data, it can be "H" or "L".

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of "L", pixel is black.

In case of 1bit-data mode, input the pixel data "H" or "L" (1bit).

Pixel memories of red, green and blue are written the same data.

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Dummy data : It can be "H" or "L".

Input data continuously.

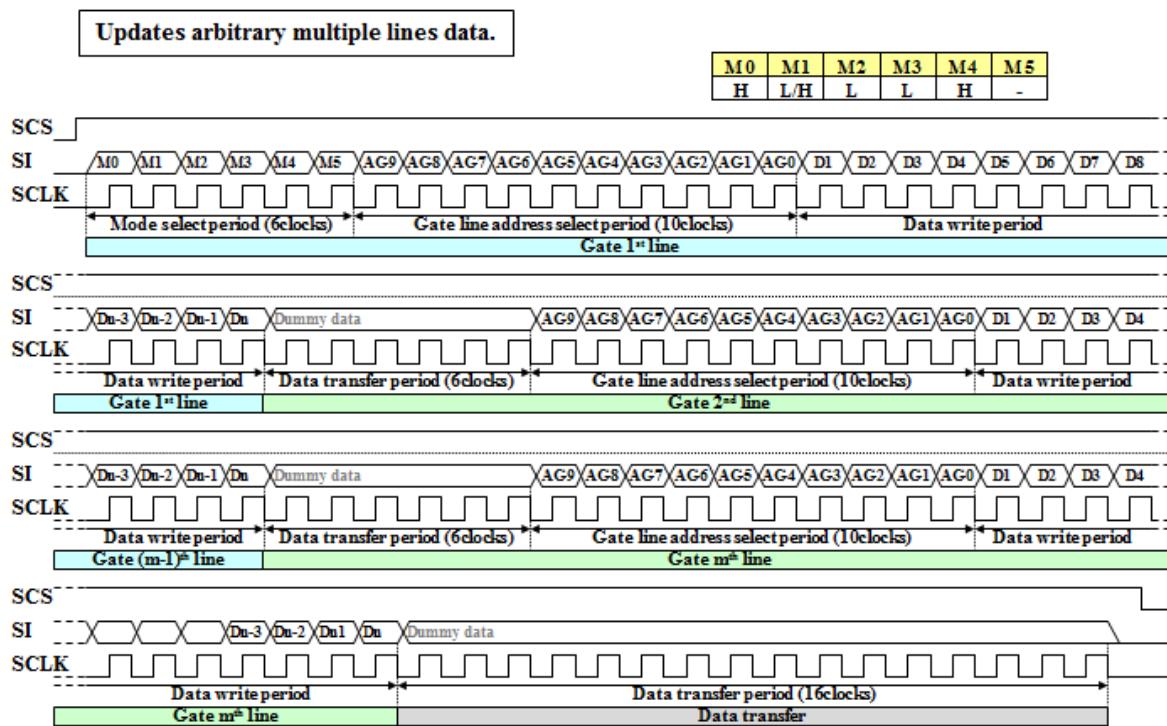
m : Number of vertical line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Need transfer period which is 6clocks between the gate line and the next gate line.

Need transfer period which is 16clocks after the last data.

M0, M2 flags are cleared by SCS="L", and M3-M4 flags are cleared by DISP="L".

6.4 多行更新模式（1位数据模式）



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3-M4 : 数据位控制标志。当 M3=“L” 和 M4=“H” 时，1位数据模式。

M5 : 无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在1位数据模式下，输入像素数据“H”或“L”（1位）。

红、绿、蓝的像素存储器写入相同的数据。

n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

连续输入数据。

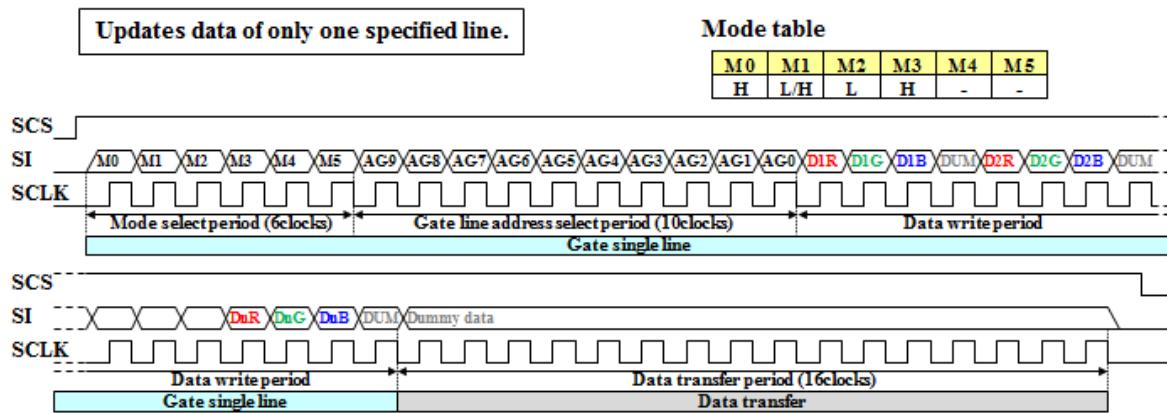
m: 垂直线的数量，参考显示地址映射和像素布局。

在门线和下一个门线之间需要6时钟的传输周期。

需要在最后一个数据之后的16时钟的传输周期。

M0、M2标志由SCS=“L”清除，M3-M4标志由DISP=“L”清除。

6.5 SINGLE LINE UPDATE MODE (4BIT-DATA MODE)



M0 : Mode flag. Set “H”, data update mode.

M1 : COM inversion flag. In case of EXTMODE=“L”, validate.

In case of “H”, outputs COM=“H”.

In case of “L”, outputs COM=“L”.

In case of EXTMODE=“H”, invalidate, it can be “H” or “L”.

M2 : All clear flag. Set “L”, data update mode.

M3 : Data-bit control flag. In case of M3=“H”, 4bit-data mode.

M4-M5 : Invalid data, it can be “H” or “L”.

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of “L”, pixel is black.

In case of 4bit-data mode,

input serially the pixel data in the order of Red-Green-Blue-Dummy (4bit).

Dummy data (DUM) can be “H” or “L”.

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Dummy data : It can be “H” or “L”.

Need transfer period which is 16clocks after the last data.

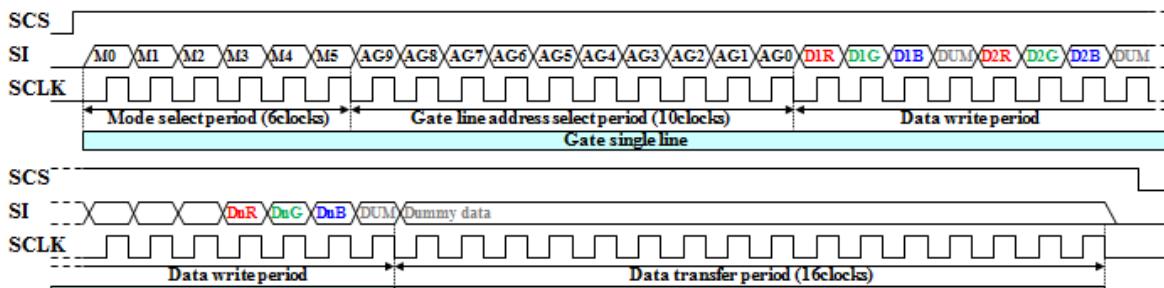
M0, M2 flags are cleared by SCS=“L”, and M3 flag is cleared by DISP=“L”.

6.5 单行更新模式（4位数据模式）

Updates data of only one specified line.

Mode table

M0	M1	M2	M3	M4	M5
H	L/H	L	H	-	-



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3：数据位控制标志。当 M3=“H”时，4位数据模式。

M4-M5：无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在4位数据模式下，

按红-绿-蓝-虚拟的顺序串行输入像素数据（4位）。

虚拟数据（DUM）可以是“H”或“L”。

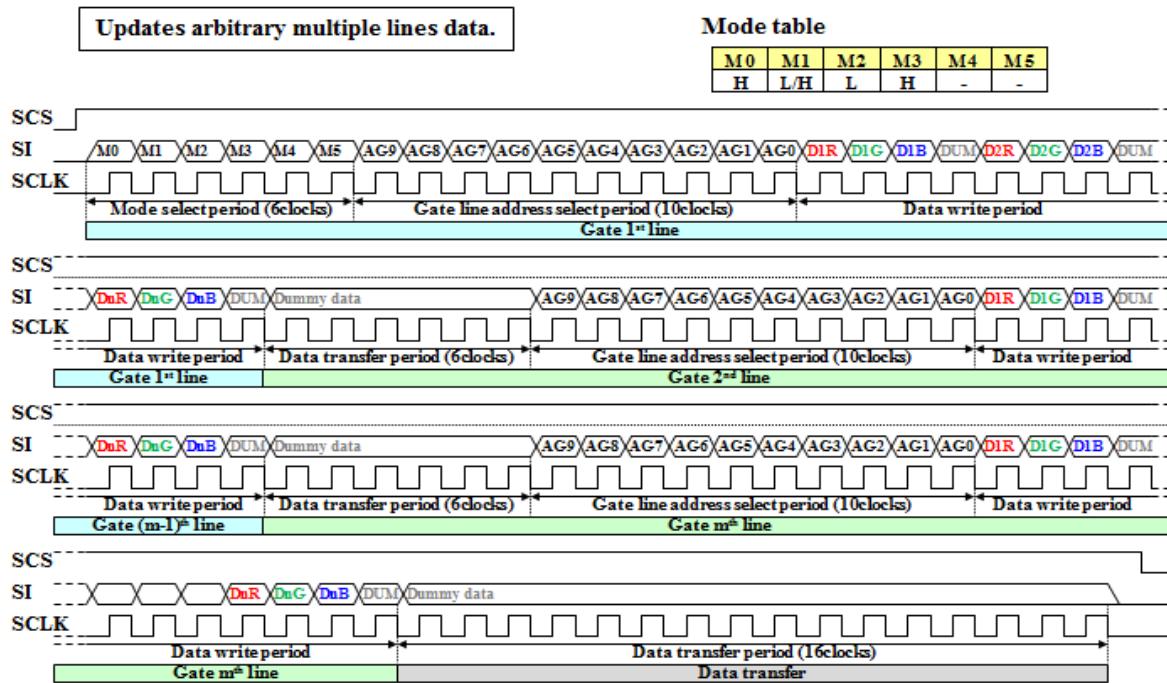
n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

需要在最后一个数据之后的16时钟的传输周期。

M0、M2 标志由 SCS=“L”清除，M3 标志由 DISP=“L”清除。

6.6 MULTIPLE LINES UPDATE MODE (4BIT-DATA MODE)



M0 : Mode flag. Set "H", data update mode.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag. Set "L", data update mode.

M3 : Data-bit control flag. In case of M3="H", 4bit-data mode.

M4-M5 : Invalid data, it can be "H" or "L".

AG9-AG0 : Gate line address (10bit), refer to the GATE ADDRESS TABLE.

Data : Pixel memory data. In case of "L", pixel is black.

In case of 4bit-data mode,

input serially the pixel data in the order of Red-Green-Blue-Dummy (4bit).

Dummy data (DUM) can be "H" or "L".

n : Number of horizontal line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Dummy data : It can be "H" or "L".

Input data continuously.

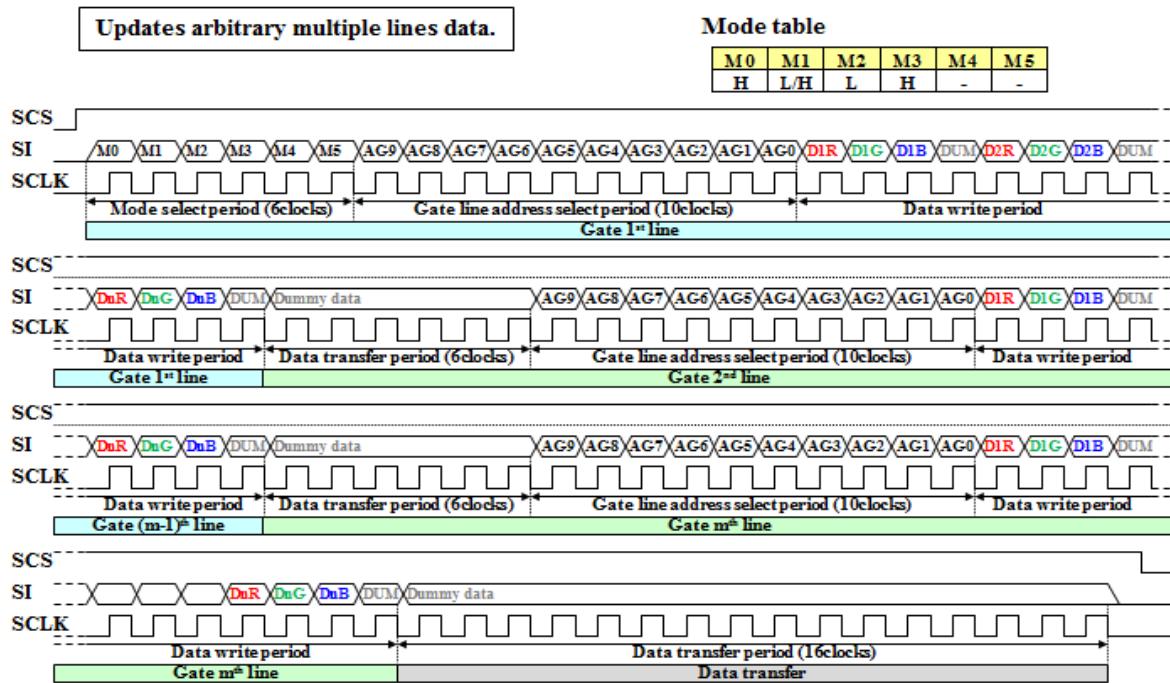
m : Number of vertical line, refer to the DISPLAY ADDRESS MAP AND PIXEL LAYOUT.

Need transfer period which is 6clocks between the gate line and the next gate line.

Need transfer period which is 16clocks after the last data.

M0, M2 flags are cleared by SCS="L", and M3 flag is cleared by DISP="L".

6.6 多行更新模式 (4位数据模式)



M0 : 模式标志。设置为“H”，数据更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清标志。设置为“L”，数据更新模式。

M3: 数据位控制标志。当 M3=“H”时，4位数据模式。

M4-M5: 无效数据，可以是“H”或“L”。

AG9-AG0 : 门线地址 (10位)，请参阅门地址表。

数据：像素内存数据。在“L”的情况下，像素为黑色。

在4位数据模式下，

按红-绿-蓝-虚拟的顺序串行输入像素数据（4位）。

虚拟数据（DUM）可以是“H”或“L”。

n: 水平线的数量，参考显示地址映射和像素布局。

虚拟数据：可以是“H”或“L”。

连续输入数据。

m: 垂直线的数量，参考显示地址映射和像素布局。

在门线和下一个门线之间需要6时钟的传输周期。

需要在最后一个数据之后的16时钟的传输周期。

M0、M2 标志由 SCS=“L”清除，M3 标志由 DISP=“L”清除。

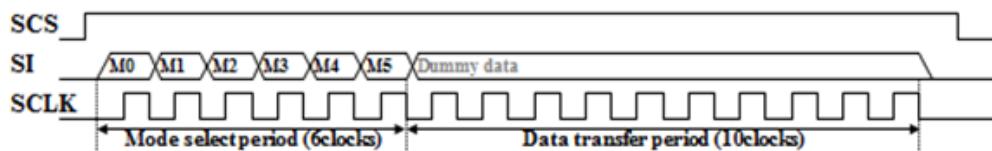
6.7 NO-UPDATE MODE

Keeps memory internal data (current display).

Mode table

M0	M1	M2	M3	M4	M5
L	L/H	L	L	-	-

M0	M1	M2	M3	M4	M5
H	L/H	H	L	-	-



M0 : Mode flag.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag.

Set "L" or "H" to both M0 and M2, no-update mode.

M3 : Blinking flag. In case of "L", no-update mode and display blinking mode is terminated.

In case of "H", display blinking mode. Refer to 6.9 for details.

M4-M5 : Invalid data, it can be "H" or "L".

Dummy data : It can be "H" or "L".

M0, M2 flags are cleared by SCS="L", and M3 flag is cleared by DISP="L".

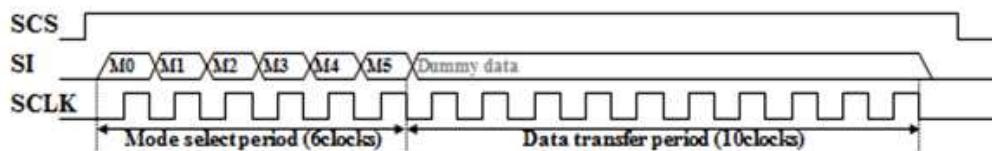
6.7 无更新模式

Keeps memory internal data (current display).

Mode table

M0	M1	M2	M3	M4	M5
L	L/H	L	L	-	-

M0	M1	M2	M3	M4	M5
H	L/H	H	L	-	-



M0 : 模式标志。

M1 : COM反转标志。在EXTMODE="L"的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE="H"的情况下，失效，可以是“H”或“L”。

M2 : 全清除标志。

将“L”或“H”设置为M0和M2，进入无更新模式。

M3 : 闪烁标志。在“L”的情况下，无更新模式和显示闪烁模式被终止。

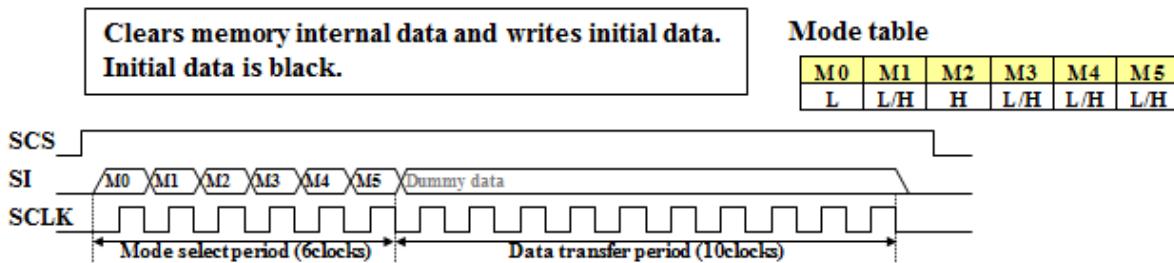
在“H”的情况下，显示闪烁模式。有关详细信息，请参见6.9。

M4-M5：无效数据，可以是“H”或“L”。

虚拟数据：可以是“H”或“L”。

M0、M2 标志由 SCS="L" 清除，M3 标志由 DISP="L" 清除。

6.8 ALL CLEAR MODE



M0 : Mode flag. Set “L”, no-update mode.

M1 : COM inversion flag. In case of EXTMODE=“L”, validate.

In case of “H”, outputs COM=“H”.

In case of “L”, outputs COM=“L”.

In case of EXTMODE=“H”, invalidate, it can be “H” or “L”.

M2 : All clear flag. Set “H”, all clear mode.

M3 : Blinking flag. In case of “L”, display blinking mode is terminated.

In case of “H”, display blinking mode. Refer to 6.9 for details.

M4-M5 : Blinking mode flag. In case of M3=“H”, validate.

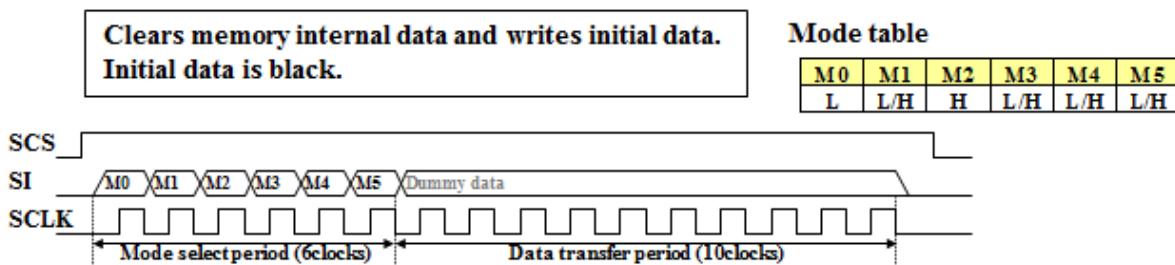
In case of M3=“L”, invalidate, it can be “H” or “L”.

Dummy data : It can be “H” or “L”.

M0, M2 flags are cleared by SCS=“L”, and M3-M4 flags are cleared by DISP=“L”.

Display gives priority to blinking flag (M3).

6.8 全清除模式



M0 : 模式标志。设置为“L”，无更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清除标志。设置为“H”，全清除模式。

M3 : 闪烁标志。在“L”的情况下，显示闪烁模式被终止。

在“H”的情况下，显示闪烁模式。有关详细信息，请参见6.9。

M4-M5 : 闪烁模式标志。在M3=“H”的情况下，验证。

如果 M3=“L”，则无效，可以是“H”或“L”。

虚拟数据：可以是“H”或“L”。

M0、M2标志由SCS=“L”清除，M3-M4标志由DISP=“L”清除。

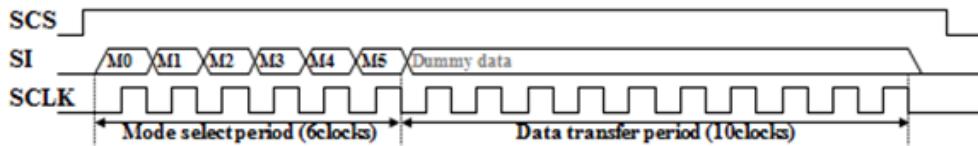
显示优先考虑闪烁标志 (M3)。

6.9 DISPLAY BLINKING COLOR MODE

**Forcibly display blinking color.
Keeps memory internal data, but ignored.**

Mode table

M0	M1	M2	M3	M4	M5
L	L/H	L	H	L/H	L



M0 : Mode flag. Set “L”, no-update mode.

M1 : COM inversion flag. In case of EXTMODE=“L”, validate.

In case of “H”, outputs COM=“H”.

In case of “L”, outputs COM=“L”.

In case of EXTMODE=“H”, invalidate, it can be “H” or “L”.

M2 : All clear flag. Set “L”, no-update mode.

In case of “H”, all clear mode. Refer to 6.8 for details.

M3 : Blinking flag. In case of “H”, display blinking mode and forcibly display blinking color.

In case of “L”, no-update mode and display blinking mode is terminated.

M4 : Blinking color flag. Apply to display blinking color.

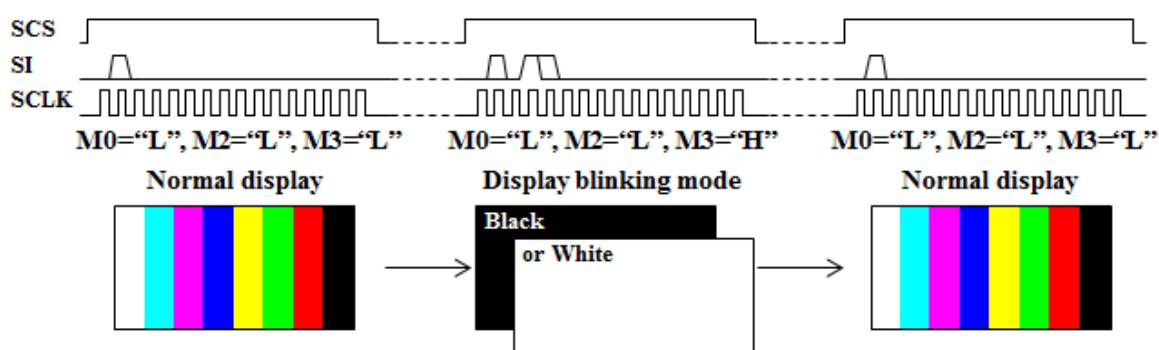
In case of “H”, display blinking color is white.

In case of “L”, display blinking color is black.

M5 : Blinking inversion flag. Set “L”, blinking color mode.

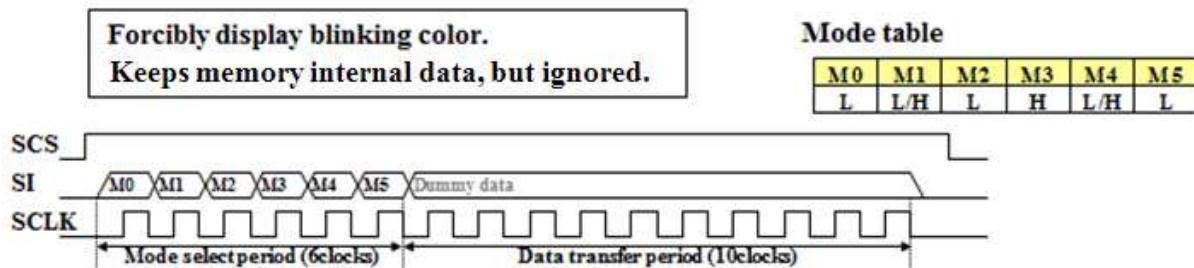
Dummy data : It can be “H” or “L”.

M0, M2 flags are cleared by SCS=“L”, and M3-M5 flags are cleared by DISP=“L”.



Blink display to alternate between normal display and display blinking mode.

6.9 显示闪烁颜色模式



M0 : 模式标志。设置为“L”，无更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清除标志。设置为“L”，无更新模式。

如果为“H”，则为全清除模式。详细信息请参见 6.8。

M3 : 闪烁标志。如果为“H”，则显示闪烁模式并强制显示闪烁颜色。

在“L”的情况下，无更新模式和显示闪烁模式被终止。

M4 : 闪烁颜色标志。应用于显示闪烁颜色。

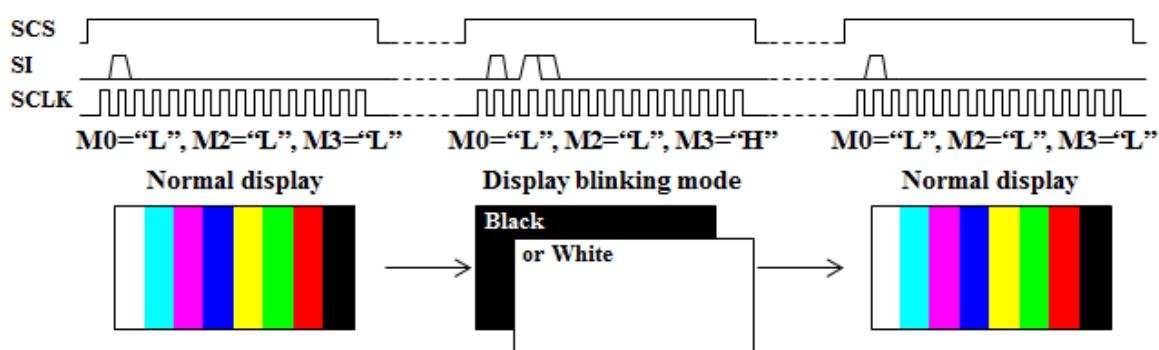
如果为“H”，则显示闪烁颜色为白色。

如果为“L”，则显示闪烁颜色为黑色。

M5 : 闪烁反转标志。设置为“L”，闪烁颜色模式。

虚拟数据：可以是“H”或“L”。

M0、M2 标志由 SCS=“L” 清除，M3-M5 标志由 DISP=“L” 清除。



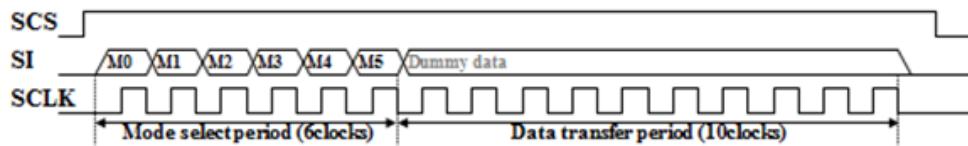
Blink display to alternate between normal display and display blinking mode.

6.10 DISPLAY COLOR INVERSION MODE

**Forcibly display color inversion.
Keeps memory internal data, but ignored.**

Mode table

M0	M1	M2	M3	M4	M5
L	L/H	L	H	-	H



M0 : Mode flag. Set "L", no-update mode.

M1 : COM inversion flag. In case of EXTMODE="L", validate.

In case of "H", outputs COM="H".

In case of "L", outputs COM="L".

In case of EXTMODE="H", invalidate, it can be "H" or "L".

M2 : All clear flag. Set "L", no-update mode.

In case of "H", all clear mode. Refer to 6.8 for details.

M3 : Blinking flag. In case of "H", display blinking mode and forcibly display color inversion.

In case of "L", no-update mode and display blinking mode is terminated.

M4 : Blinking color flag. In case of M5="H", invalidate, it can be "H" or "L".

In case of M5="L", refer to 6.9 for details.

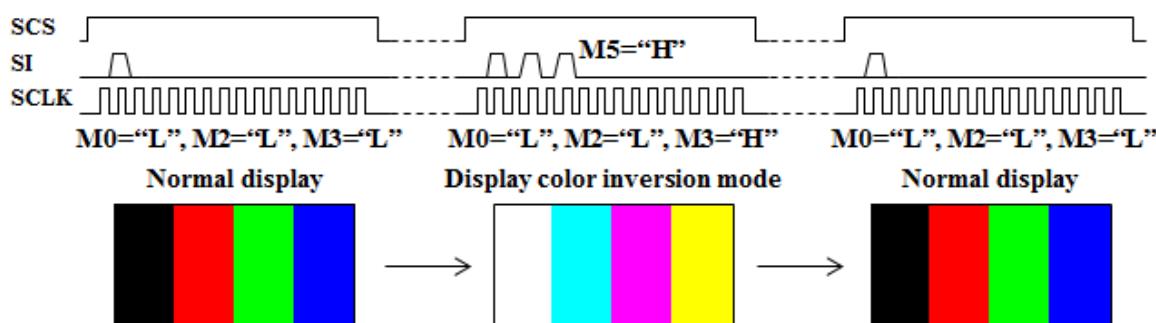
M5 : Color inversion flag. Set "H", display color is inverted.

For example, "Red" is changed to "Cyan".

"Cyan" is complementary color of "Red".

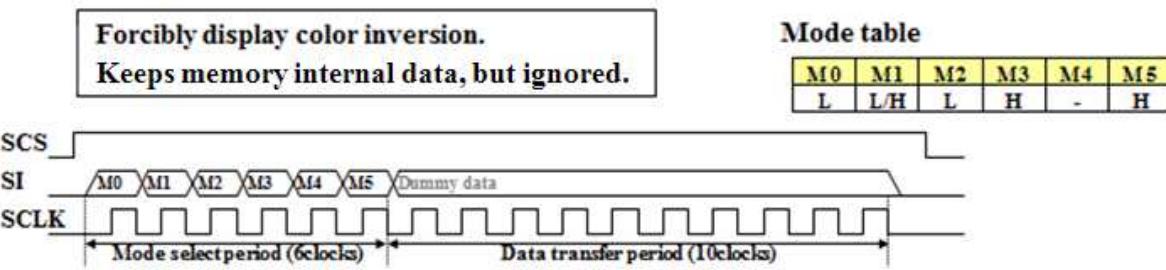
Dummy data : It can be "H" or "L".

M0, M2 flags are cleared by SCS="L", and M3, M5 flags are cleared by DISP="L".



Blink display to alternate between normal display and display blinking mode.

6.10 显示颜色反转模式



M0 : 模式标志。设置为“L”，无更新模式。

M1 : COM反转标志。在EXTMODE=“L”的情况下，验证。

在“H”的情况下，输出COM=“H”。

在“L”的情况下，输出COM=“L”。

在EXTMODE=“H”的情况下，失效，可以是“H”或“L”。

M2 : 全清除标志。设置为“L”，无更新模式。

如果为“H”，则为全清除模式。详细信息请参见 6.8。

M3 : 闪烁标志。在“H”的情况下，显示闪烁模式并强制显示颜色反转。

在“L”的情况下，无更新模式和显示闪烁模式被终止。

M4 : 闪烁颜色标志。在M5=“H”的情况下，失效，可以是“H”或“L”。

在M5=“L”的情况下，详细信息请参见6.9。

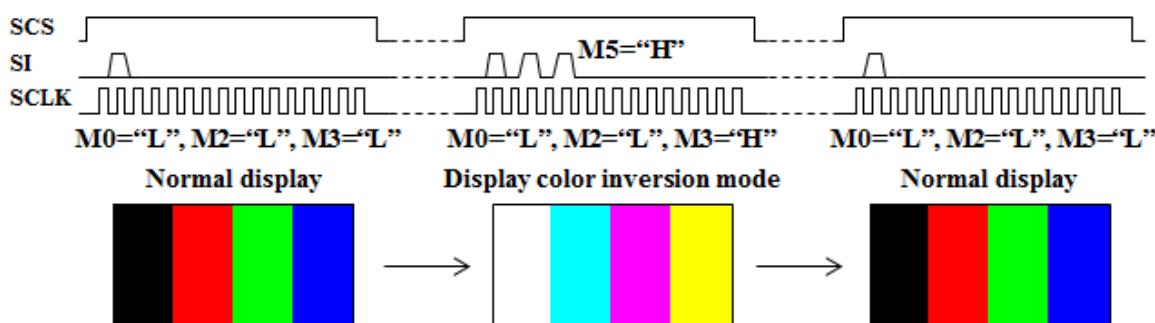
M5: 颜色反转标志。设置为“H”，显示颜色被反转。

例如，“红色”被更改为“青色”。

“青色”是“红色”的互补色。

虚拟数据：可以是“H”或“L”。

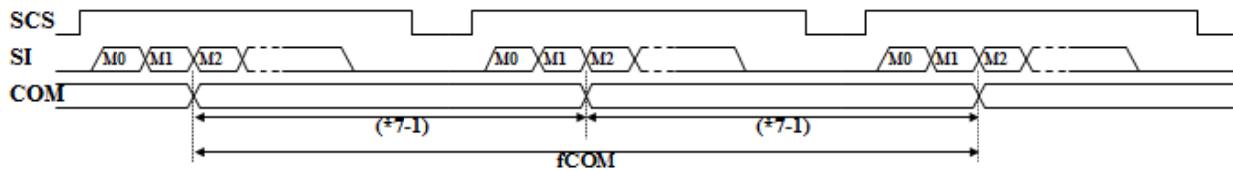
M0、M2标志由SCS=“L”清除，M3、M5标志由DISP=“L”清除。



Blink display to alternate between normal display and display blinking mode.

7. COM INVERSION

7.1 COM POLARITY SERIAL INPUT / EXTMODE = "L"

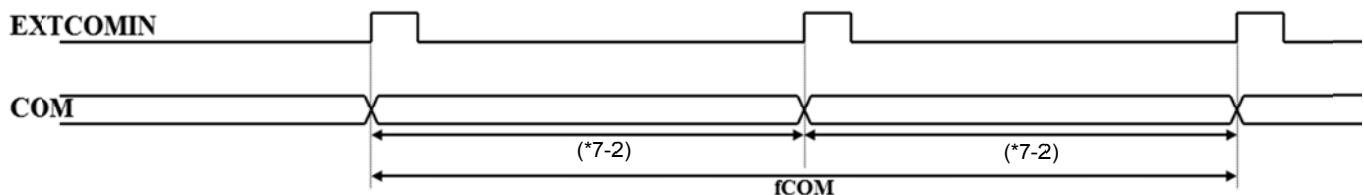


M1 : COM inversion flag. In case of "H", outputs COM="H". In case of "L", outputs COM="L".

COM polarity inversion has been changed by M1 flag statement.

(*7-1) The periods of positive and negative polarity should be same length as much as possible.

7.2 EXTCOMIN SIGNAL / EXTMODE="H"



COM polarity inversion has been changed by the rising timing of EXTCOMIN.

COM polarity (positive or negative) is controlled by internal circuit.

(*7-2) The periods of positive and negative polarity should be same length as much as possible.

7. 反相离子

7.1 反相输出 极性序列 串行输入 / EXTMODE =



M1 : 反相

例如，在“H”

反相极性

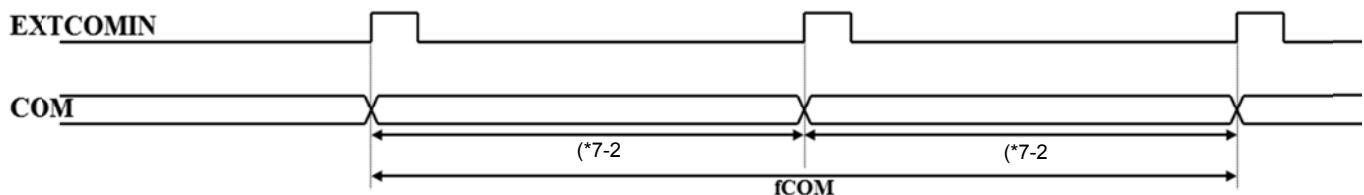
已被更改 由 M1 fla 更改

(*7-1) 该 p

敏感和负

可用。

7.2 外部控制 / EXTMODE=



反相极性

已被更改 由上升的

反相极性

负面) 是共

内部电路。

(*7-2) 该 pe

性和负面

8. GATE ADDRESS TABLE

V1 - V176

V 9 8 7 6 5 4 3 2 1 0	AG 9 8 7 6 5 4 3 2 1 0										
1 0 0 0 0 0 0 0 0 0 1	64 0 0 0 1 0 0 0 0 0 0	128 0 0 1 0 0 0 0 0 0 0	65 0 0 0 1 0 0 0 0 0 1	129 0 0 1 0 0 0 0 0 0 1	66 0 0 0 1 0 0 0 0 1 0	130 0 0 1 0 0 0 0 0 0 1	67 0 0 0 1 0 0 0 0 1 1	131 0 0 1 0 0 0 0 0 0 1	68 0 0 0 1 0 0 0 1 0 0	132 0 0 1 0 0 0 0 0 1 0	
2 0 0 0 0 0 0 0 0 1 0	69 0 0 0 1 0 0 0 1 0 1	133 0 0 1 0 0 0 0 0 1 0	70 0 0 0 1 0 0 0 1 1 0	134 0 0 1 0 0 0 0 0 1 1	71 0 0 0 1 0 0 0 1 1 1	135 0 0 1 0 0 0 0 0 0 1	72 0 0 0 1 0 0 1 0 0 0	136 0 0 1 0 0 0 0 1 0 0	73 0 0 0 1 0 0 1 0 0 1	137 0 0 1 0 0 0 0 1 0 1	
3 0 0 0 0 0 0 0 1 1 1	74 0 0 0 1 0 0 1 0 1 0	138 0 0 1 0 0 0 0 1 0 1	75 0 0 0 1 0 0 1 0 1 1	139 0 0 1 0 0 0 0 1 0 1	76 0 0 0 1 0 0 1 1 0 0	140 0 0 1 0 0 0 0 1 1 0	77 0 0 0 1 0 0 1 1 0 1	141 0 0 1 0 0 0 0 1 1 0	78 0 0 0 1 0 0 1 1 1 0	142 0 0 1 0 0 0 0 1 1 1	
4 0 0 0 0 0 0 1 0 0 0	79 0 0 0 1 0 0 1 1 1 1	143 0 0 1 0 0 0 0 1 1 1	80 0 0 0 1 0 1 0 0 0 0	144 0 0 1 0 0 0 1 0 0 0	81 0 0 0 1 0 1 0 0 0 1	145 0 0 1 0 0 0 1 0 0 1	82 0 0 0 1 0 1 0 0 1 0	146 0 0 1 0 0 0 1 0 0 1	83 0 0 0 1 0 1 0 0 1 1	147 0 0 1 0 0 0 1 0 0 1	
5 0 0 0 0 0 0 0 1 0 1	84 0 0 0 1 0 1 0 1 0 0	148 0 0 1 0 0 0 1 0 1 0	85 0 0 0 1 0 1 0 1 0 1	149 0 0 1 0 0 0 1 0 1 1	86 0 0 0 1 0 1 0 1 1 0	150 0 0 1 0 0 0 1 0 1 1	87 0 0 0 1 0 1 0 1 1 1	151 0 0 1 0 0 0 1 0 1 1	88 0 0 0 1 0 1 1 0 0 0	152 0 0 1 0 0 0 1 1 0 0	
6 0 0 0 0 0 0 0 1 1 0	89 0 0 0 1 0 1 1 0 0 1	153 0 0 1 0 0 0 1 1 0 1	90 0 0 0 1 0 1 1 0 1 0	154 0 0 1 0 0 0 1 1 1 0	91 0 0 0 1 0 1 1 0 1 1	155 0 0 1 0 0 0 1 1 1 1	92 0 0 0 1 0 1 1 1 0 0	156 0 0 1 0 0 0 1 1 1 0	93 0 0 0 1 0 1 1 1 0 1	157 0 0 1 0 0 0 1 1 1 1	
7 0 0 0 0 0 0 0 1 1 1	94 0 0 0 1 0 1 1 1 1 0	158 0 0 1 0 0 0 1 1 1 1	95 0 0 0 1 0 1 1 1 1 1	159 0 0 1 0 0 0 1 1 1 1	96 0 0 0 1 1 0 0 0 0 0	160 0 0 1 0 1 0 0 0 0 0	97 0 0 0 1 1 0 0 0 0 1	161 0 0 1 0 1 0 0 0 0 1	98 0 0 0 1 1 0 0 0 1 0	162 0 0 1 0 1 0 0 0 1 0	
8 0 0 0 0 0 0 1 0 0 0	99 0 0 0 1 1 0 0 0 1 1	163 0 0 1 0 1 0 0 0 1 1	100 0 0 0 1 1 0 0 1 0 0	164 0 0 1 0 1 0 0 1 0 0	101 0 0 0 1 1 0 0 1 0 1	165 0 0 1 0 1 0 0 1 0 1	102 0 0 0 1 1 0 0 1 1 0	166 0 0 1 0 1 0 0 1 1 0	103 0 0 0 1 1 0 0 1 1 1	167 0 0 1 0 1 0 0 1 1 1	
9 0 0 0 0 0 0 0 1 0 0	104 0 0 0 1 1 0 0 0 0 0	168 0 0 1 0 1 0 0 1 0 0	105 0 0 0 1 1 0 0 0 0 1	169 0 0 1 0 1 0 0 1 0 1	106 0 0 0 1 1 0 0 1 0 1	170 0 0 1 0 1 0 1 0 1 0	107 0 0 0 1 1 0 0 1 0 1	171 0 0 1 0 1 0 1 0 1 1	108 0 0 0 1 1 0 0 1 1 0	172 0 0 1 0 1 0 1 1 0 0	
10 0 0 0 0 0 0 0 1 0 1	109 0 0 0 1 1 0 0 1 1 0	173 0 0 1 0 1 0 1 1 0 1	110 0 0 0 1 1 0 0 1 1 1	174 0 0 1 0 1 0 1 1 1 0	111 0 0 0 1 1 0 0 1 1 1 1	175 0 0 1 0 1 0 1 1 1 1	112 0 0 0 1 1 0 0 0 0 0	176 0 0 1 0 1 0 1 1 0 0	113 0 0 0 1 1 0 0 0 0 1		
11 0 0 0 0 0 0 0 1 0 1	114 0 0 0 1 1 0 0 0 1 0		115 0 0 0 1 1 0 0 0 1 1		116 0 0 0 1 1 0 0 1 0 0		117 0 0 0 1 1 0 0 1 0 1		118 0 0 0 1 1 0 0 1 1 0		
12 0 0 0 0 0 0 0 1 1 0	119 0 0 0 1 1 0 0 1 1 1		120 0 0 0 1 1 0 0 1 1 0		121 0 0 0 1 1 0 0 1 0 0		122 0 0 0 1 1 0 0 1 0 1		123 0 0 0 1 1 0 0 1 1 1		
13 0 0 0 0 0 0 0 1 1 1	124 0 0 0 1 1 0 0 1 1 0		125 0 0 0 1 1 0 0 1 1 0		126 0 0 0 1 1 0 0 1 1 1		127 0 0 0 1 1 0 0 1 1 1				
14 0 0 0 0 0 0 0 1 1 1			128 0 0 0 1 1 0 0 1 1 1		129 0 0 0 1 1 0 0 1 1 1		130 0 0 0 1 1 0 0 1 1 1		131 0 0 0 1 1 0 0 1 1 1		
15 0 0 0 0 0 0 0 1 1 1			132 0 0 0 1 1 0 0 1 1 1		133 0 0 0 1 1 0 0 1 1 1		134 0 0 0 1 1 0 0 1 1 1		135 0 0 0 1 1 0 0 1 1 1		
16 0 0 0 0 0 0 0 1 1 1			136 0 0 0 1 1 0 0 1 1 1		137 0 0 0 1 1 0 0 1 1 1		138 0 0 0 1 1 0 0 1 1 1		139 0 0 0 1 1 0 0 1 1 1		
17 0 0 0 0 0 0 0 1 1 1			140 0 0 0 1 1 0 0 1 1 1		141 0 0 0 1 1 0 0 1 1 1		142 0 0 0 1 1 0 0 1 1 1		143 0 0 0 1 1 0 0 1 1 1		
18 0 0 0 0 0 0 0 1 1 1			144 0 0 0 1 1 0 0 1 1 1		145 0 0 0 1 1 0 0 1 1 1		146 0 0 0 1 1 0 0 1 1 1		147 0 0 0 1 1 0 0 1 1 1		
19 0 0 0 0 0 0 0 1 1 1			148 0 0 0 1 1 0 0 1 1 1		149 0 0 0 1 1 0 0 1 1 1		150 0 0 0 1 1 0 0 1 1 1		151 0 0 0 1 1 0 0 1 1 1		
20 0 0 0 0 0 0 0 1 1 1			152 0 0 0 1 1 0 0 1 1 1		153 0 0 0 1 1 0 0 1 1 1		154 0 0 0 1 1 0 0 1 1 1		155 0 0 0 1 1 0 0 1 1 1		
21 0 0 0 0 0 0 0 1 1 1			156 0 0 0 1 1 0 0 1 1 1		157 0 0 0 1 1 0 0 1 1 1		158 0 0 0 1 1 0 0 1 1 1		159 0 0 0 1 1 0 0 1 1 1		
22 0 0 0 0 0 0 0 1 1 1			160 0 0 0 1 1 0 0 1 1 1		161 0 0 0 1 1 0 0 1 1 1		162 0 0 0 1 1 0 0 1 1 1		163 0 0 0 1 1 0 0 1 1 1		
23 0 0 0 0 0 0 0 1 1 1			164 0 0 0 1 1 0 0 1 1 1		165 0 0 0 1 1 0 0 1 1 1		166 0 0 0 1 1 0 0 1 1 1		167 0 0 0 1 1 0 0 1 1 1		
24 0 0 0 0 0 0 0 1 1 1			168 0 0 0 1 1 0 0 1 1 1		169 0 0 0 1 1 0 0 1 1 1		170 0 0 0 1 1 0 0 1 1 1		171 0 0 0 1 1 0 0 1 1 1		
25 0 0 0 0 0 0 0 1 1 1			172 0 0 0 1 1 0 0 1 1 1		173 0 0 0 1 1 0 0 1 1 1		174 0 0 0 1 1 0 0 1 1 1		175 0 0 0 1 1 0 0 1 1 1		
26 0 0 0 0 0 0 0 1 1 1			176 0 0 0 1 1 0 0 1 1 1								
27 0 0 0 0 0 0 0 1 1 1											
28 0 0 0 0 0 0 0 1 1 1											
29 0 0 0 0 0 0 0 1 1 1											
30 0 0 0 0 0 0 0 1 1 1											
31 0 0 0 0 0 0 0 1 1 1											
32 0 0 0 0 0 0 0 1 1 1											
33 0 0 0 0 0 0 0 1 1 1											
34 0 0 0 0 0 0 0 1 1 1											
35 0 0 0 0 0 0 0 1 1 1											
36 0 0 0 0 0 0 0 1 1 1											
37 0 0 0 0 0 0 0 1 1 1											
38 0 0 0 0 0 0 0 1 1 1											
39 0 0 0 0 0 0 0 1 1 1											
40 0 0 0 0 0 0 0 1 1 1											
41 0 0 0 0 0 0 0 1 1 1											
42 0 0 0 0 0 0 0 1 1 1											
43 0 0 0 0 0 0 0 1 1 1											
44 0 0 0 0 0 0 0 1 1 1											
45 0 0 0 0 0 0 0 1 1 1											
46 0 0 0 0 0 0 0 1 1 1											
47 0 0 0 0 0 0 0 1 1 1											
48 0 0 0 0 0 0 0 1 1 1											
49 0 0 0 0 0 0 0 1 1 1											
50 0 0 0 0 0 0 0 1 1 1											
51 0 0 0 0 0 0 0 1 1 1											
52 0 0 0 0 0 0 0 1 1 1											
53 0 0 0 0 0 0 0 1 1 1											
54 0 0 0 0 0 0 0 1 1 1											
55 0 0 0 0 0 0 0 1 1 1											
56 0 0 0 0 0 0 0 1 1 1											
57 0 0 0 0 0 0 0 1 1 1											
58 0 0 0 0 0 0 0 1 1 1											
59 0 0 0 0 0 0 0 1 1 1											
60 0 0 0 0 0 0 0 1 1 1											
61 0 0 0 0 0 0 0 1 1 1											
62 0 0 0 0 0 0 0 1 1 1											
63 0 0 0 0 0 0 0 1 1 1											

8. 门地址表

V1 - V176

V	AG 9	AG 8	AG 7	AG 6	AG 5	AG 4	AG 3	AG 2	AG 1	AG 0	V	AG 9	AG 8	AG 7	AG 6	AG 5	AG 4	AG 3	AG 2	AG 1	AG 0	V	AG 9	AG 8	AG 7	AG 6	AG 5	AG 4	AG 3	AG 2	AG 1	AG 0
1	0	0	0	0	0	0	0	0	0	1	64	0	0	0	1	0	0	0	0	0	0	128	0	0	1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	1	0	65	0	0	0	1	0	0	0	0	0	1	129	0	0	1	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	0	0	1	66	0	0	0	1	0	0	0	0	1	0	130	0	0	1	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	1	0	0	67	0	0	0	1	0	0	0	0	1	1	131	0	0	1	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	1	0	1	68	0	0	0	1	0	0	0	1	0	0	132	0	0	1	0	0	0	0	1	0	0
6	0	0	0	0	0	0	0	1	1	0	69	0	0	0	1	0	0	0	1	0	1	133	0	0	1	0	0	0	0	1	0	1
7	0	0	0	0	0	0	0	1	1	1	70	0	0	0	1	0	0	0	1	1	0	134	0	0	1	0	0	0	0	1	1	0
8	0	0	0	0	0	0	1	0	0	0	71	0	0	0	1	0	0	0	1	1	1	135	0	0	1	0	0	0	0	1	1	1
9	0	0	0	0	0	0	1	0	0	1	72	0	0	0	1	0	0	1	0	0	0	136	0	0	1	0	0	0	1	0	0	0
10	0	0	0	0	0	0	1	0	1	0	73	0	0	0	1	0	0	1	0	0	1	137	0	0	1	0	0	0	1	0	0	1
11	0	0	0	0	0	0	1	0	1	1	74	0	0	0	1	0	0	1	0	1	0	138	0	0	1	0	0	0	1	0	1	0
12	0	0	0	0	0	0	1	1	0	0	75	0	0	0	1	0	0	1	0	1	1	139	0	0	1	0	0	0	1	0	1	1
13	0	0	0	0	0	0	1	1	0	1	76	0	0	0	1	0	0	1	1	0	0	140	0	0	1	0	0	0	1	1	0	0
14	0	0	0	0	0	0	1	1	1	0	77	0	0	0	1	0	0	1	1	0	1	141	0	0	1	0	0	0	1	1	0	1
15	0	0	0	0	0	0	1	1	1	1	78	0	0	0	1	0	0	1	1	1	0	142	0	0	1	0	0	0	1	1	1	0
16	0	0	0	0	0	0	1	0	0	0	79	0	0	0	1	0	0	1	1	1	1	143	0	0	1	0	0	0	1	1	1	1
17	0	0	0	0	0	0	1	0	0	1	80	0	0	0	1	0	1	0	0	0	0	144	0	0	1	0	0	1	0	0	0	0
18	0	0	0	0	0	0	1	0	0	1	81	0	0	0	1	0	1	0	0	0	1	145	0	0	1	0	0	1	0	0	0	1
19	0	0	0	0	0	0	1	0	0	1	82	0	0	0	1	0	1	0	0	1	0	146	0	0	1	0	0	1	0	0	1	0
20	0	0	0	0	0	0	1	0	1	0	83	0	0	0	1	0	1	0	0	1	1	147	0	0	1	0	0	1	0	0	1	1
21	0	0	0	0	0	0	1	0	1	0	84	0	0	0	1	0	1	0	1	0	0	148	0	0	1	0	0	1	0	1	0	0
22	0	0	0	0	0	0	1	0	1	1	85	0	0	0	1	0	1	0	1	0	1	149	0	0	1	0	0	1	0	1	0	1
23	0	0	0	0	0	0	1	0	1	1	86	0	0	0	1	0	1	0	1	1	0	150	0	0	1	0	0	1	0	1	1	0
24	0	0	0	0	0	0	1	1	0	0	87	0	0	0	1	0	1	0	1	1	1	151	0	0	1	0	0	1	0	1	1	1
25	0	0	0	0	0	0	1	1	0	1	88	0	0	0	1	0	1	1	0	0	0	152	0	0	1	0	0	1	1	0	0	0
26	0	0	0	0	0	0	1	1	0	1	89	0	0	0	1	0	1	1	0	0	1	153	0	0	1	0	0	1	1	0	0	1
27	0	0	0	0	0	0	1	1	0	1	90	0	0	0	1	0	1	1	0	1	0	154	0	0	1	0	0	1	1	0	1	0
28	0	0	0	0	0	0	1	1	1	0	91	0	0	0	1	0	1	1	0	1	1	155	0	0	1	0	0	1	1	0	1	1
29	0	0	0	0	0	0	1	1	1	0	92	0	0	0	1	0	1	1	0	0	0	156	0	0	1	0	0	1	1	1	0	0
30	0	0	0	0	0	0	1	1	1	1	93	0	0	0	1	0	1	1	1	0	1	157	0	0	1	0	0	1	1	1	0	1
31	0	0	0	0	0	0	1	1	1	1	94	0	0	0	1	0	1	1	1	1	0	158	0	0	1	0	0	1	1	1	1	0
32	0	0	0	0	0	0	1	0	0	0	95	0	0	0	1	0	1	1	1	1	1	159	0	0	1	0	0	1	1	1	1	1
33	0	0	0	0	0	0	1	0	0	0	96	0	0	0	1	1	0	0	0	0	0	160	0	0	1	0	1	0	0	0	0	0
34	0	0	0	0	0	0	1	0	0	0	97	0	0	0	1	1	0	0	0	0	1	161	0	0	1	0	1	0	0	0	0	1
35	0	0	0	0	0	0	1	0	0	0	98	0	0	0	1	1	0	0	0	1	0	162	0	0	1	0	1	0	0	0	1	0
36	0	0	0	0	0	0	1	0	0	0	99	0	0	0	1	1	0	0	0	1	1	163	0	0	1	0	1	0	0	0	1	1
37	0	0	0	0	0	0	1	0	0	1	100	0	0	0	1	1	0	0	1	0	0	164	0	0	1	0	1	0	0	1	0	0
38	0	0	0	0	0	0	1	0	0	1	101	0	0	0	1	1	0	0	1	0	1	165	0	0	1	0	1	0	0	1	0	1
39	0	0	0	0	0	0	1	0	0	1	102	0	0	0	1	1	0	0	1	1	0	166	0	0	1	0	1	0	0	1	1	0
40	0	0	0	0	0	0	1	0	1	0	103	0	0	0	1	1	0	0	1	1	1	167	0	0	1	0	1	0	0	1	1	1
41	0	0	0	0	0	0	1	0	1	0	104	0	0	0	1	1	0	1	0	0	0	168	0	0	1	0	1	0	1	0	0	0
42	0	0	0	0	0	0	1	0	1	0	105	0	0	0	1	1	0	1	0	0	1	169	0	0	1	0	1	0	1	0	0	1
43	0	0	0	0	0	0	1	0	1	1	106	0	0	0	1	1	0	1	0	1	0	170	0	0	1	0	1	0	1	0	1	0
44	0	0	0	0	0	0	1	0	1	1	107	0	0	0	1	1	0	1	0	1	1	171	0	0	1	0	1	0	1	0	1	1
45	0	0	0	0	0	0	1	0	1	1	108	0	0	0	1	1	0	1	1	0	0	172	0	0	1	0	1	0	1	1	0	0
46	0	0	0	0	0	0	1	0	1	1	109	0	0	0	1	1	0	1	1	0	1	173	0	0	1	0	1	0	1	1	0	1
47	0	0	0	0	0	0	1	0	1	1	110	0	0	0	1	1	0	1	1	1	0	174	0	0	1	0	1	0	1	1	1	0
48	0	0	0	0	0	0	1	1	0	0	111	0	0	0	1	1	0	1	1	1	1	175	0	0	1	0	1	0	1	1	1	1
49	0	0	0	0	0	0	1	1	0	0	112	0	0	0	1	1	1	0	0	0	1	176	0	0	1	0	1	1	0	0	0	0
50	0	0	0	0	0	0	1	1	0	0	113	0	0	0																		

9. OPTICAL SPECIFICATION

9.1 OPTICAL CHARACTERISTICS

9.1.1 REFLECTIVE MODE

* VDD=3.0V, VDDA=3.0V, VIH=3.0V, VIL=0V

Item	Symbol	Temp. (°C)	Rating			Unit	Definition (Measurement setup)	Remark
			Min.	Typ.	Max.			
Contrast	CR	25	15	30	-	-	1	
Response	tr	25	-	4	8	ms	2	Black → White
	tf		-	6	10			White → Black
Color coordinates	Rx	25	-	0.510	-	-	3	
	Ry		-	0.320	-			
	Gx		-	0.312	-			
	Gy		-	0.453	-			
	Bx		-	0.170	-			
	By		-	0.178	-			
	Wx		-	0.326	-			
	Wy		-	0.343	-			
NTSC ratio	-	25	16	23	-	%	4	
Reflectance	-	25	19	26	-	%	Measurement system-I	
Viewing Angle (CR>2)	θL	25	50	65	-	deg.	5	Horizontal
	θR		50	65	-			
	θT		50	65	-			
	θB		50	65	-			Vertical

9.1.2 TRANSMISSIVE MODE

*VDD=3.0V, VDDA=3.0V, VIH=3.0V, VIL=0V, Backlight current=5mA (*9-1)

COM frequency should be around 60Hz (EXTCOMIN frequency : around 120Hz) for transmissive mode.

Item	Symbol	Temp. (°C)	Rating			Unit	Definition (Measurement setup)	Remark
			Min.	Typ.	Max.			
Brightness	B	25	-	10	-	cd/m ²	Measurement system-II	

Note)

(*9-1) Backlight current : Equivalent to 2.5(mA/each LED)

9. 光学规格

9.1 光学特性

9.1.1 反射模式

* VDD=3.0V, VDDA=3.0V, VIH=3.0V, VIL=0V

项目	符号	温度 (°C)	评级			单位	定义 (测量设置)	备注
			最小值	典型值	马克.			
对比度	CR	25	15	30	-	-	1	
响应	tr	25	-	4	8	毫秒	2	黑 → 白
	tf		-	6	10			白 → 黑
颜色坐标	Rx	25	-	0.510	-	-	3	
	Ry		-	0.320	-			
	Gx		-	0.312	-			
	Gy		-	0.453	-			
	Bx		-	0.170	-			
	By		-	0.178	-			
	Wx		-	0.326	-			
	Wy		-	0.343	-			
NTSC 比率	-	25	16	23	-	%	4	
反射率	-	25	19	26	-	%	测量系统-I	
视角 (CR>2)	θL	25	50	65	-	度	5	水平
	θR		50	65	-			
	θT		50	65	-			
	θB		50	65	-			垂直

9.1.2 透射模式

*VDD=3.0V, VDDA=3.0V, VIH=3.0V, VIL=0V, 背光电流=5mA (*9-1)

在透射模式下，COM频率应约为60Hz (EXTCOMIN频率：约120Hz)。

项目	符号	温度 (°C)	评级			单位	定义 (测量设置)	备注
			最小值	典型值	马克.			
亮度	B	25	-	10	-	cd/m ²	测量系统-II	

(注意)

(*9-1) 背光电流：相当于2.5(mA/每个LED)

9.2 DEFINITION AND CONDITION OF OPTICAL CHARACTERISTICS

9.2.1 Definitions of optical characteristics

Definition 1

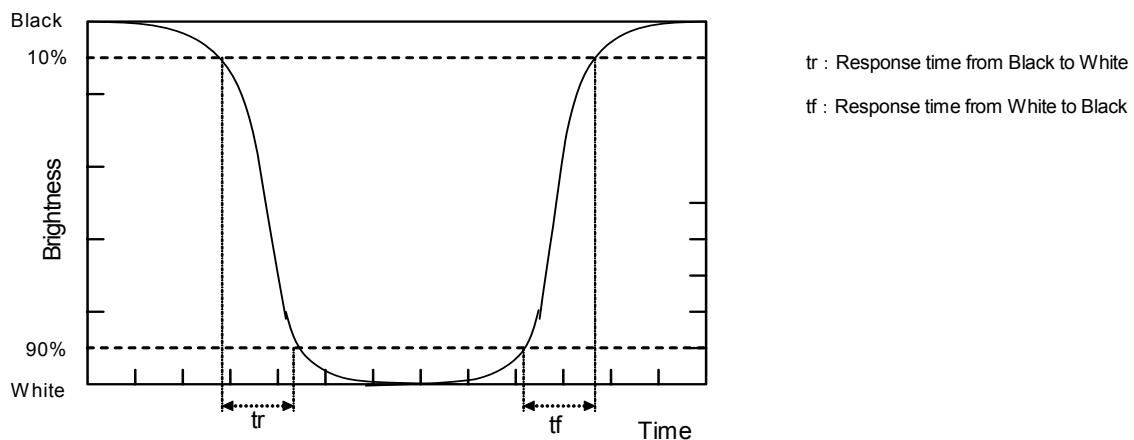
This is a ratio between the screen surface reflectance of the white raster and the black raster

$$\text{Contrast ratio (CR)} = \frac{\text{Reflection intensity on all pixels White}}{\text{Reflection intensity on all pixels Black}}$$

Definition 2

The response time is defined as the following figure and shall be measured by matching the input signal for "Black" and "White".

- Normally Black mode



Definition 3

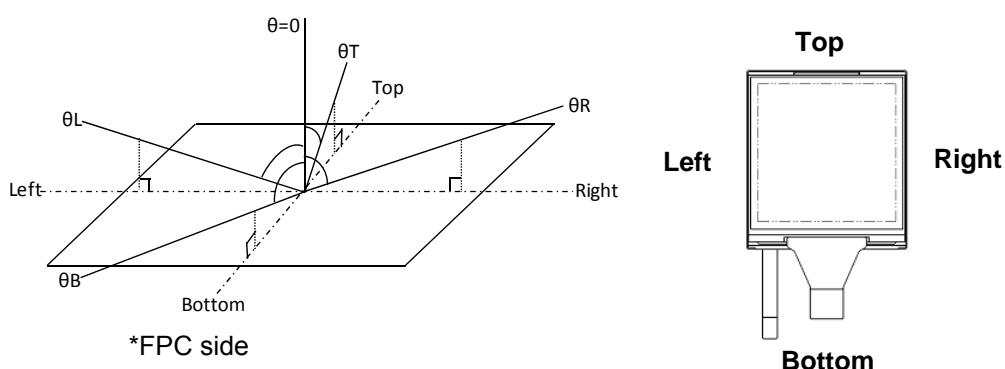
This is the x-y coordinate of Red, Green, Blue and White colors specified on the CIE1931 chromaticity diagram. (* It is not a guaranteed value)

Definition 4

This is an area of a triangle shaped by R, G and B coordinates on the CIE1931 chromaticity diagram.

Definition 5

This is a maximum angle θ from the normal direction that keeps having the contrast more than 2.



9.2 光学特性定义及条件

9.2.1 光学特性定义

定义1

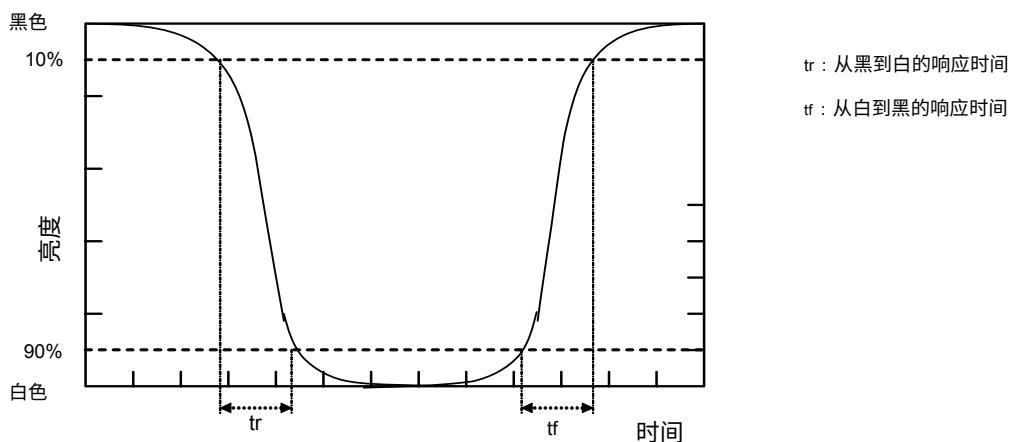
这是白色光栅与黑色光栅的屏幕表面反射率之间的比率

$$\text{对比度比 (CR)} = \frac{\text{所有像素的反射强度 白色}}{\text{所有像素的反射强度 黑色}}$$

定义2

响应时间定义如下图所示，并应通过匹配“黑色”和“白色”的输入信号进行测量。

- 通常黑色模式



定义 3

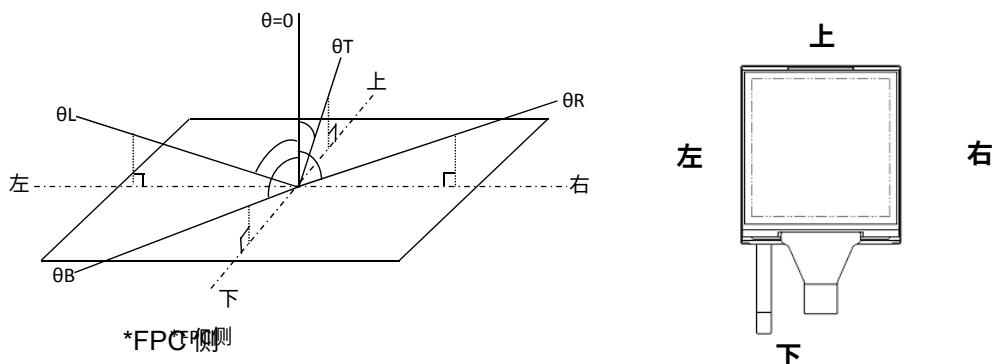
这是在CIE1931色度图上指定的红色、绿色、蓝色和白色的x-y坐标。(*这不是一个保证值)

定义 4

这是在CIE1931色度图上由R、G和B坐标形成的三角形的面积。

定义 5

这是一个最大角度θ，从法线方向保持对比度大于2。



9.2.2 Measurement method of optical characteristics

9.2.2.1 Basic measurement conditions

a) Driving voltage

VDD=3.0V

VDDA=3.0V

VIH = 3.0V

VIL = 0V

b) Measurement temperature

25°C unless otherwise specified

c) Measurement point

Center of the Active area (one point) unless otherwise specified

9.2.2.2 Measurement system- I for reflective mode

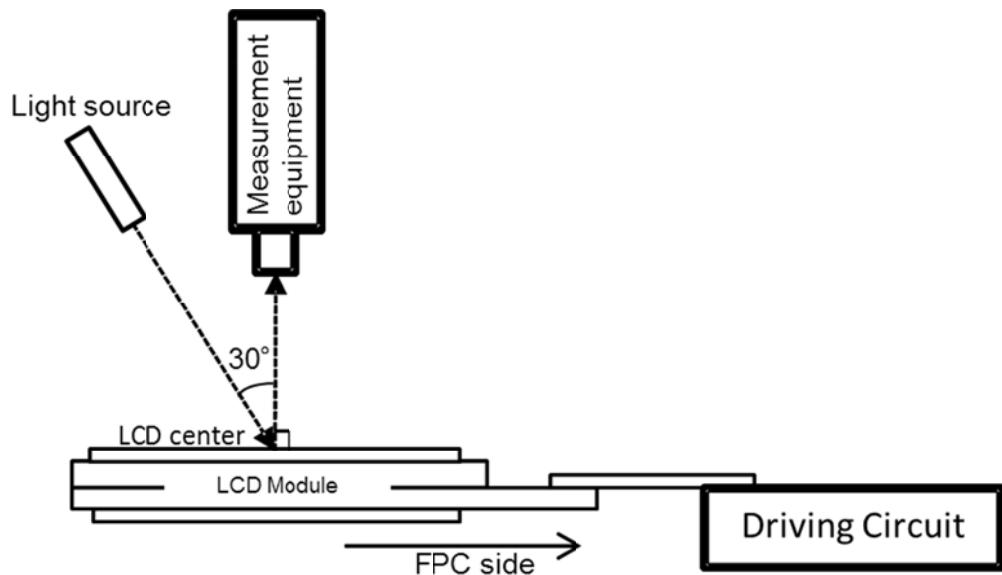
d) Measurement equipment

LCD-5200 or equivalent

f) Light source

Parallel light source

- D65 / 2 degree viewing angle
- Light source input direction: opposite side of FPC (30°)
- Light source receive direction: at LCD center (0°)



9.2.2 测量 光学方法 特性9.2.2.1 基础光学测量 测量条件

a) 驱动 电压

VDD=3.0V

VDDA=3.0V

VIH = 3.0V

VIL = 0V

b) 测量 温度

2 °C, 除非另行说明 否则规格

c) 测量

C 有效区域 (在 否则 s

9.2.2.2 测量 系统- I 用于重新 反射模式

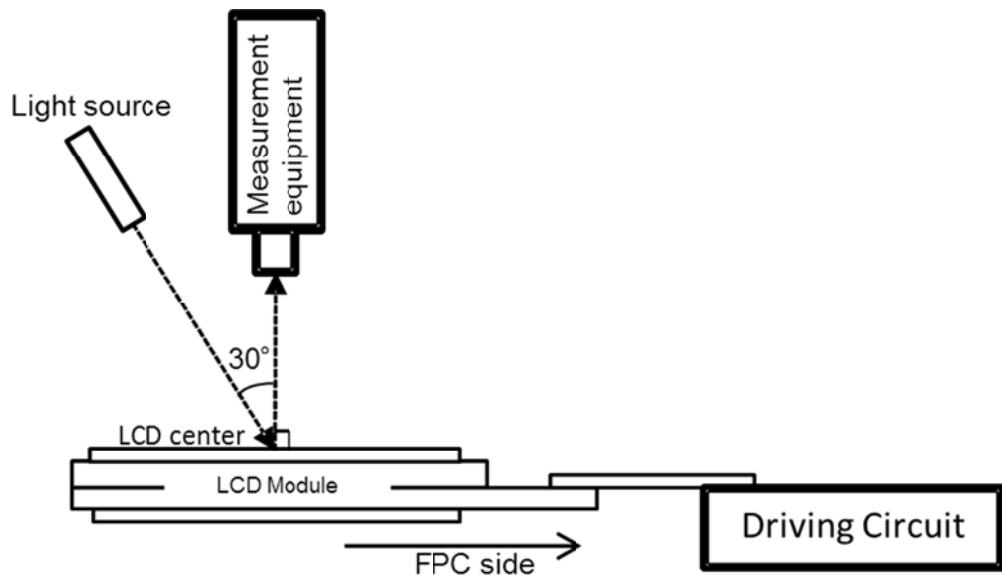
d) 测量 要求

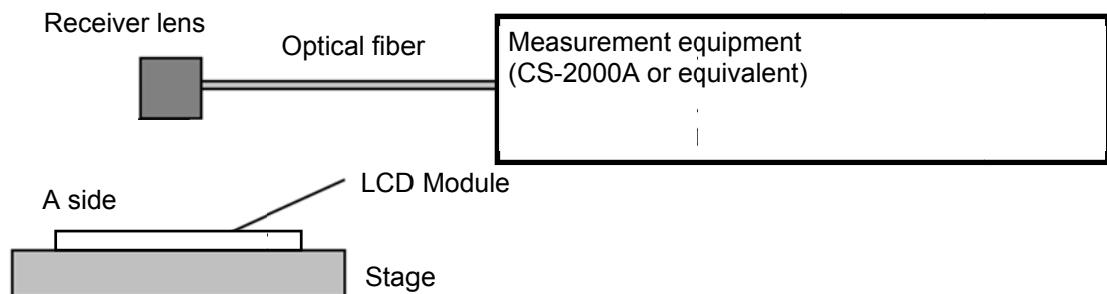
L 等效

f) 光源

平行 平行光源

- D65 / 2度 视角 角度
- 光源 源输入方向 (30°)
- 光源 源接收方向

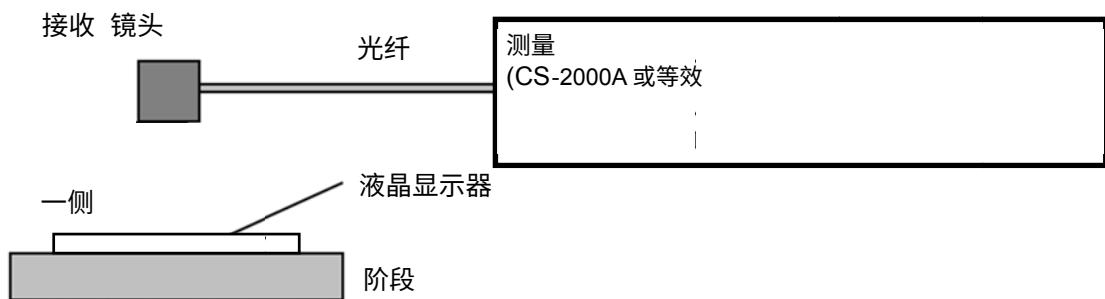


9.2.2.3 Measurement system-II for transmissive mode**10. INSPECTION**

Please refer to the shipment inspection standard Ver.04 for LPM013M126C.

9.2.2.3 我

系统-II 用于传输

**10. 检查****N**

P 请参考

发货

检查状态

标准版.04

11. RELIABILITY TEST

11.1 CONDITIONS OF RELIABILITY AND MECHANICAL TEST

No.	TEST ITEM	CONDITION	REMARK
1	High Temperature Storage	Ta=80°C	240h
2	Low Temperature Storage	Ta=-30°C	240h
3	High Temperature & High Humidity Storage	Ta=60°C／90%RH (No condensation)	240h
4	High Temperature & High Humidity Operation	Ta=40°C／90%RH (No condensation)	240h
5	High Temperature Operation	Ta=70°C	240h
6	Low Temperature Operation	Ta=-20°C	240h
7	Thermal shock (non-operating)	Ta=-20°C to 70°C (30min each)	50cycles
8	ESD	HBM IEC 61340-3-1, ESD STM5.1 V = +/-1.0kV (Contact) R = 1.5kΩ, C = 100pF	1 time each terminal
9	Shock	100G, 6ms, ±X, ±Y, ±Z	3 times Each direction
10	Packing Vibration	Random Vibration	101min Direction:Z
11	Packing Drop	Height 60cm, 1 corner 3 edges, 6 surfaces	1 time Each direction

Note)

If a nonconformance is found, both parties will have a discussion to solve it.

11.2 CRITERIA FOR JUDGEMENT

After the above tests, return samples to the normal temperature and moisture environment in the thermostat chamber room over 30 minutes not to condense. Inspect samples kept for more than 1 hour after pulling them out of the thermostat chamber room.

(1) There shall be no abnormality in the functions (Ex. No display, abnormal display, line defects).

(2) There shall be no serious degradation (Ex. Brightness uniformity, reversible changes, optical changes due to backlight or polarizer are ignored).

11. 可靠性测试

11.1 可靠性和机械测试条件

否	测试项目	状态	备注
1	高温储存	T _a =80°C	240小时
2	低温储存	T _a =-30°C	240小时
3	高温与 高湿存储	T _a =60°C／90%RH (无凝结)	240小时
4	高温与高湿操作	T _a =40°C／90%RH (无凝结)	240小时
5	高温操作	T _a =70°C	240小时
6	低温操作	T _a =-20°C	240小时
7	热冲击 (非操作)	T _a =-20°C至70°C (每个30分钟)	50次循环
8	静电放电	HBM IEC 61340-3-1, ESD STM5.1 V = +/-1.0kV (接触) R = 1.5kΩ, C = 100pF	每个端子1次
9	冲击	100G, 6ms, ±X, ±Y, ±Z	3次 每个方向
10	包装振动	随机振动	101分钟 方向: Z
11	包装跌落	高度60厘米, 1个角 3个边, 6个表面	1次 每个方向

注意)

如果发现不合格，双方将进行讨论以解决问题。

11.2 判定标准

在上述测试后，将样品放回恒温恒湿箱环境中，保持超过30分钟以避免凝结。从恒温恒湿箱中取出后，检查保持超过1小时的样品。

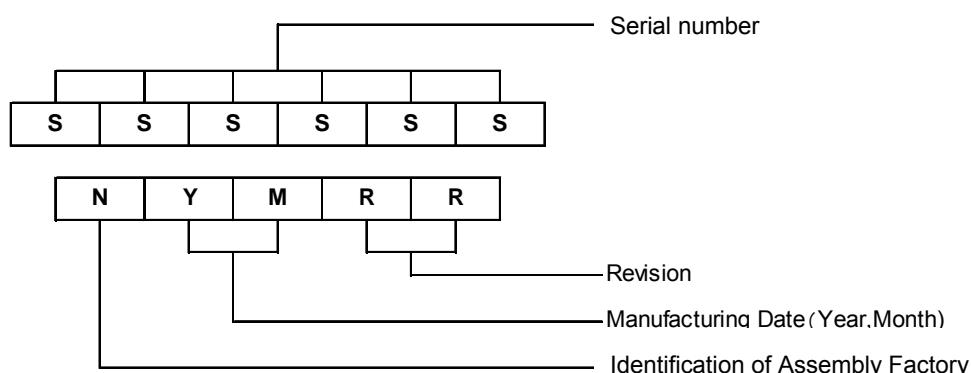
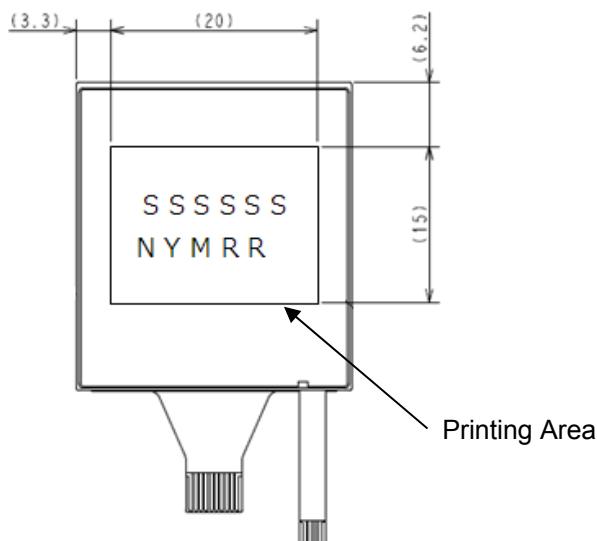
(1) 功能上不得有异常（例如：无显示、异常显示、线缺陷）。

(2) 不得有严重退化（例如：亮度均匀性、可逆变化、由于背光或偏振器引起的光学变化被忽略）。

12. DESIGNATION OF LOT MARK

12.1 LOT MARK

Lot mark is printed on the rear of the LCD module.



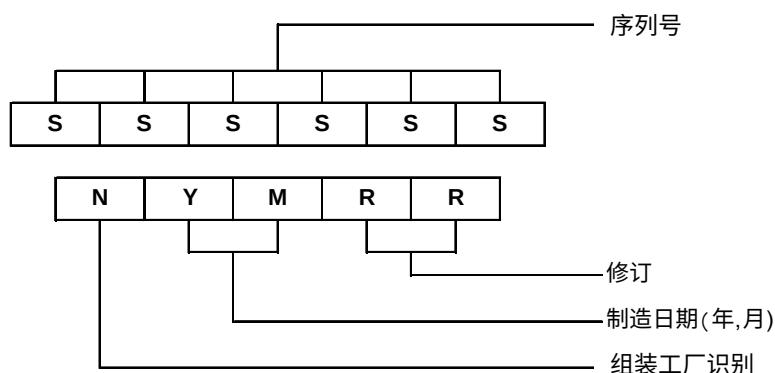
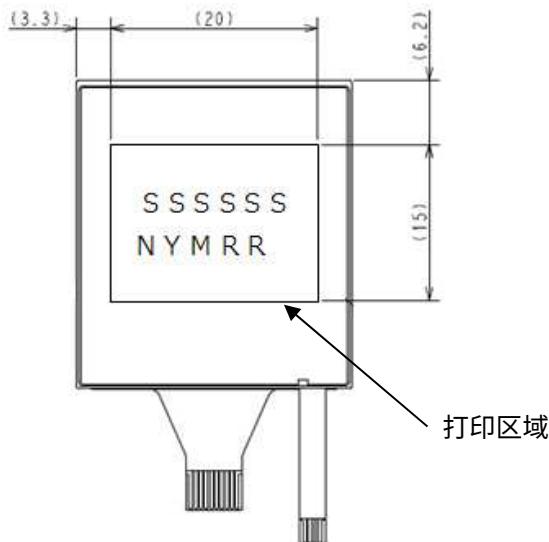
Year	Figure in lot mark
2016	6
2017	7
2018	8
2019	9
2020	0

Month	Figure in lot mark	Month	Figure in lot mark
Jan.	A	Jul.	G
Feb.	B	Aug.	H
Mar.	C	Sep.	I
Apr.	D	Oct.	J
May	E	Nov.	K
Jun.	F	Dec.	L

12. 批次标记的指定

12.1 批次标记

批次标记印刷在LCD模块的背面。

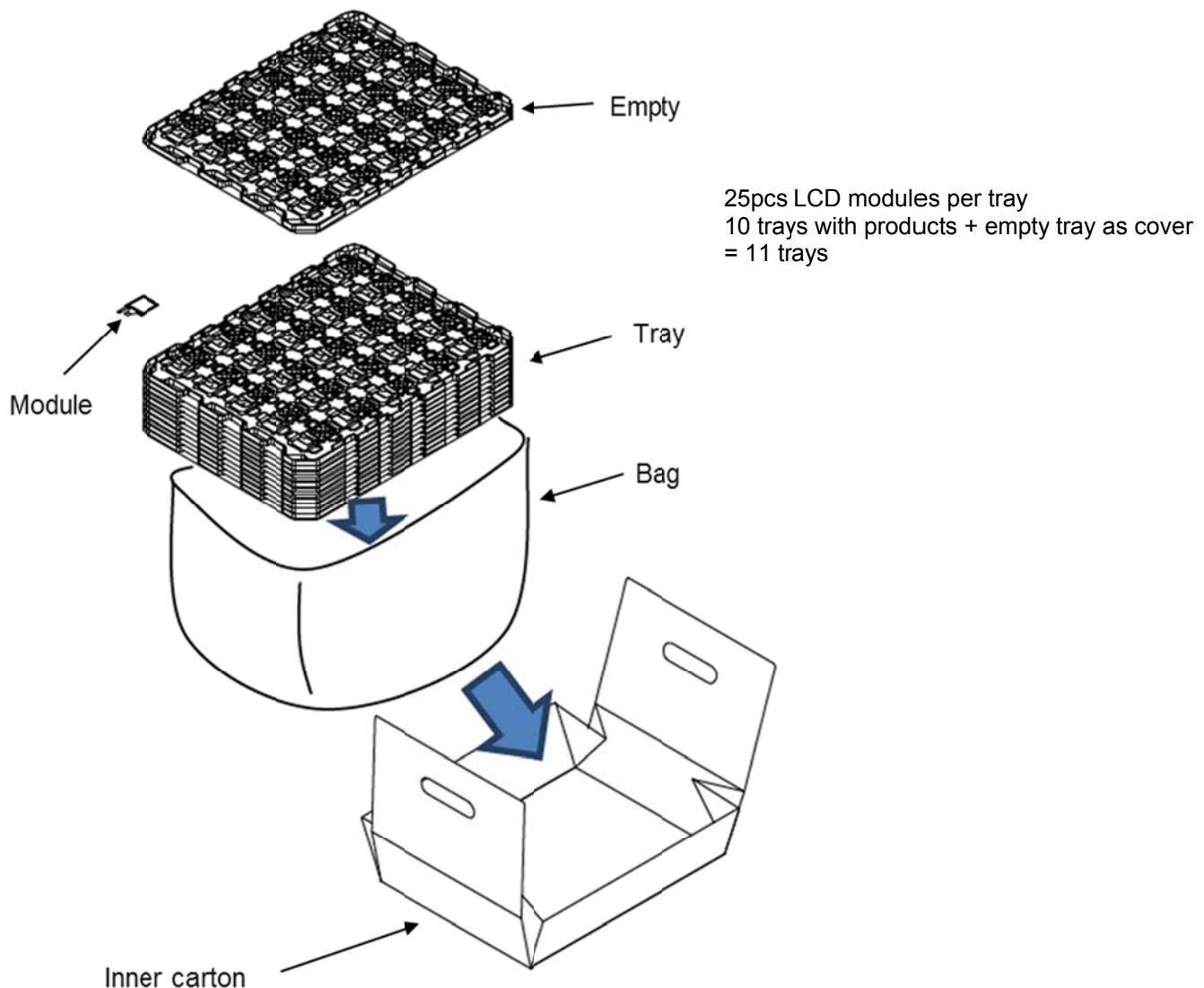


年	批次标记中的数字
2016	6
2017	7
2018	8
2019	9
2020	0

月	批次标记中的数字	月	批次标记中的数字
一月	A	七月	G
二月	B	八月	高
三月	C	九月	I
四月	D	十月	J
五月	E	十一月	K
六月	F	十进制	L

13. PACKING SPECIFICATIONS

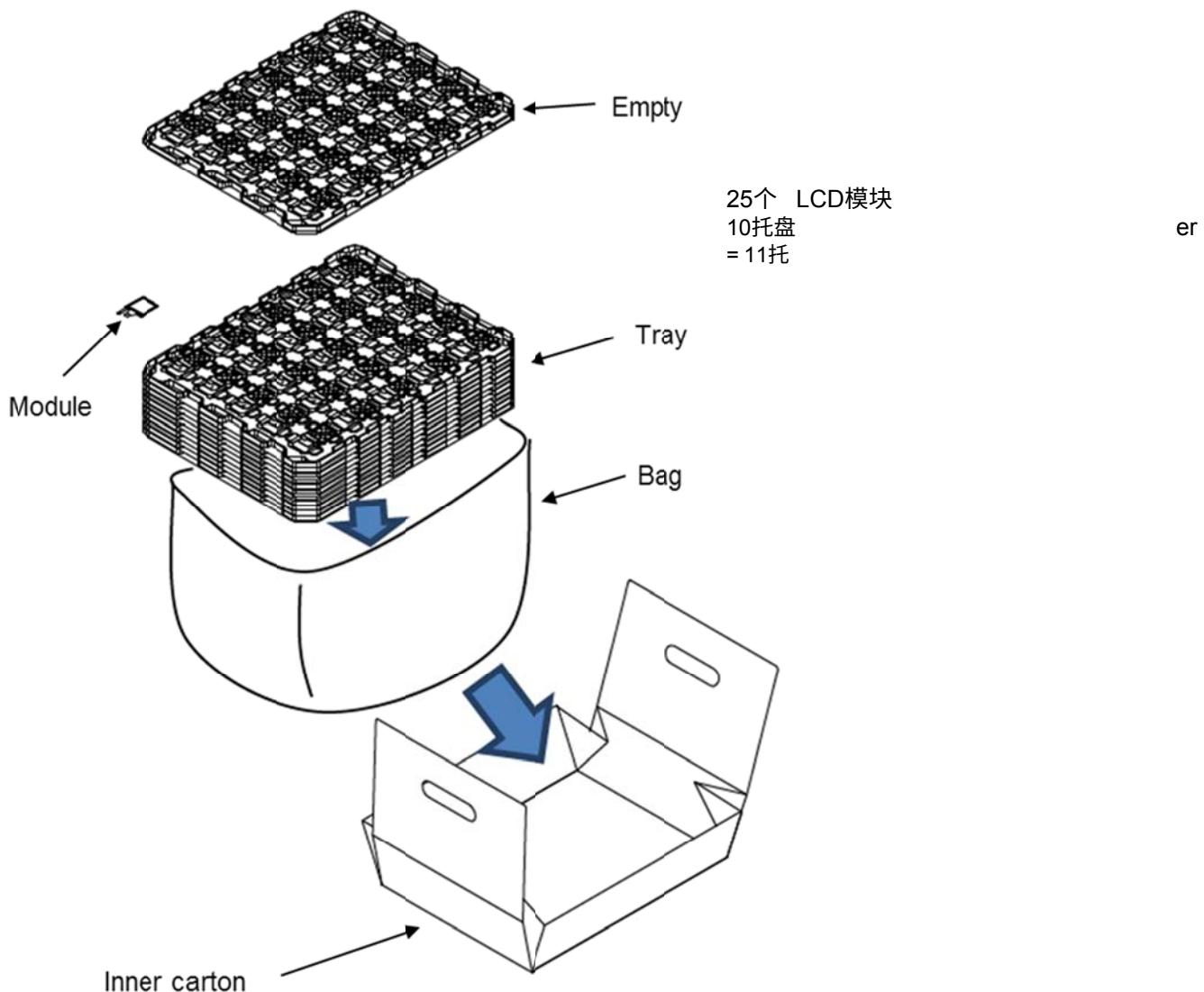
13.1 INNER CARTON



(Note)

Trays orientation should be stacked by turning 180 degrees alternately.

If you do not stack trays alternately, panel gets damaged.

13. 包装 S 规格 ONS**13.1 内部 纸箱**

(

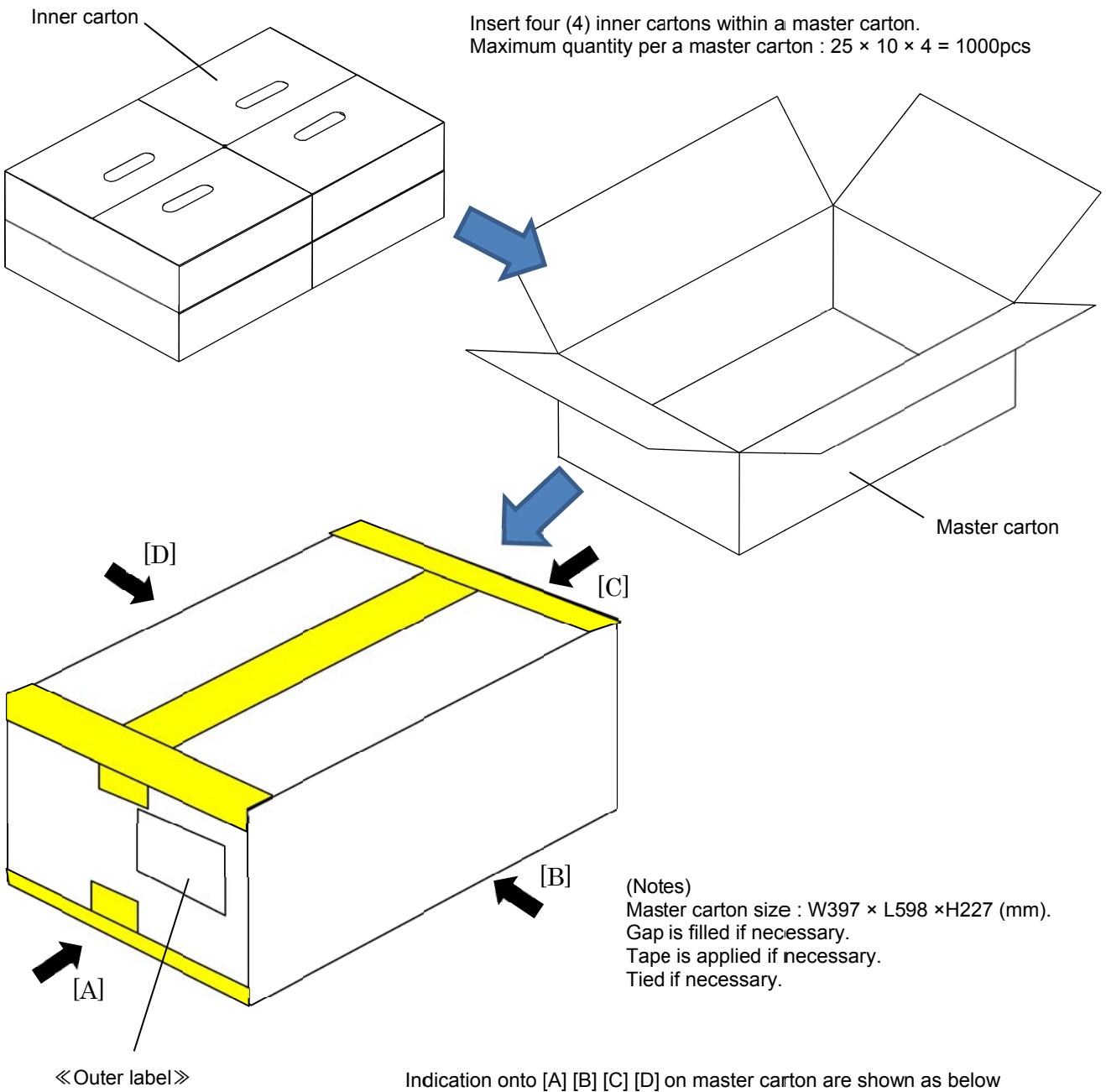
托盘方向

将交替堆叠

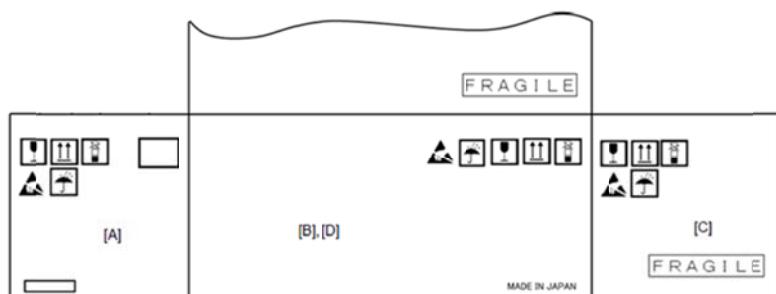
如果你这样做 不是堆叠的交易方式

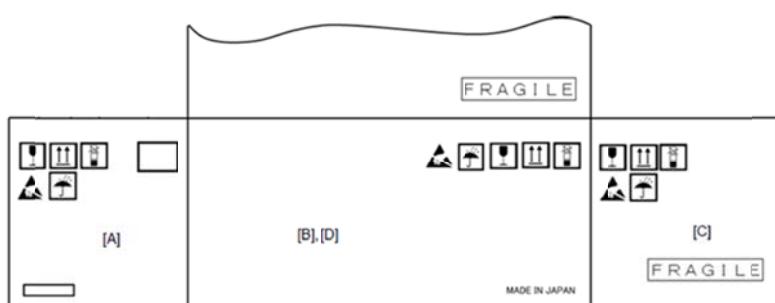
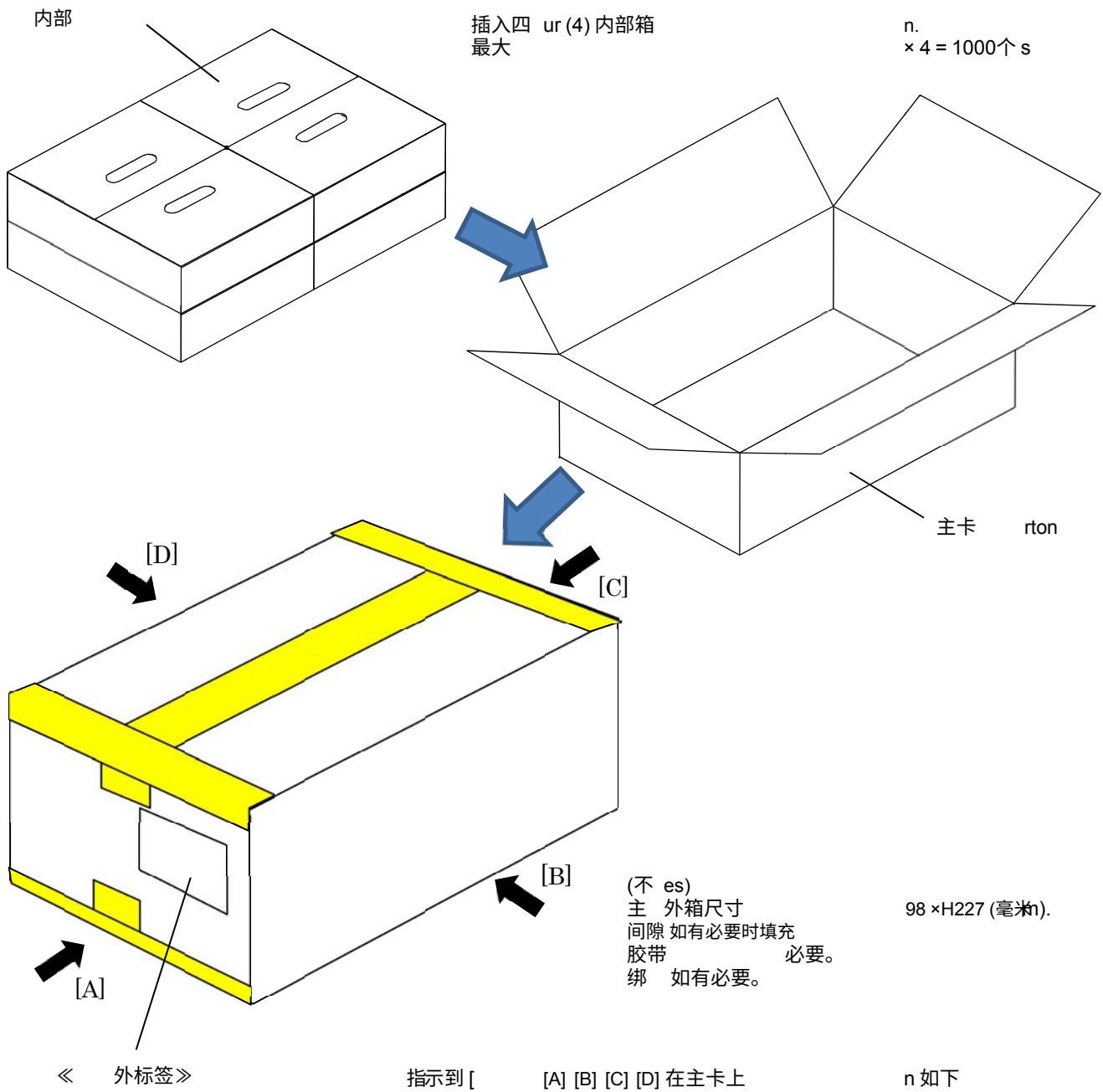
y, 面板得到

13.2 MASTER CARTON



Outer label



13.2 MASTER纸箱

外标签 标签

14. LCD MODULE USAGE AND PRECAUTIONS

14.1 HANDLING

- (1) The display panel is made of glass. Do not subject it to mechanical shock such as dropping it from a high position, etc.
- (2) If the display panel is damaged and internal liquid crystal substance leaks out, be sure not to inhale or consume it. If the internal liquid crystal substance comes into contact with skin or clothing, promptly wash it off using soap and running water.
- (3) Do not apply excessive force on the surface, perimeter or adjoining areas of LCD module since this may cause display panel color tone to vary.
- (4) The polarizer covering the display panel surface of the LCD module is soft and can be easily scratched. Handle this polarizer carefully.
- (5) If the surface polarizer becomes contaminated, use the following recommended or equivalent adhesive tape for contaminants removal.
 - Scotch-brand mending tape (No. 810)
- (6) Do not breathe on the display surface or use Ethyl Alcohol solvent for contaminant removal as polarizer discoloration may occur. Furthermore, solvent other than mentioned above may also damage the polarizer. Especially, do not use the followings.
 - Water
 - Ketones
 - Aromatic solvents
- (7) When mounting the LCD Module, be sure that it is free from twisting, warping, or distortion. Any stress can have great influence to the display quality. Also, in cases where outer case or frame is included, be sure to secure sufficient stiffness on the outer case or frame for a robust design.
- (8) Do not apply pressure at or around the FPC bonding area and the surrounding area.
- (9) Do not attempt to disassemble or rework the LCD module.
- (10) To prevent destruction of the elements by static electricity, be careful to maintain an optimum working environment.
 - Be sure to ground your body before handling the LCD module.
 - Make sure that solder guns and all other tools required for assembly have been grounded.
 - To reduce occurrence of static electricity, avoid using this product in dry environments.
 - A protective film has been attached to the surface of the LCD panel. When peeling off the protective film, be careful to prevent electrostatic discharges.
- (11) To minimize performance degradation of the LCD module caused by destructive forces such as static electricity, etc., avoid direct contact to the following sections when handling the LCD module.
 - terminal electrodes of connector
 - wiring pattern on FPC
- (12) LCD Panel surface is protected by a protective film layer. This protective film must be removed before final product installation. After removal of protective film layer, some adhesive residues maybe left on the LCD panel, especially after long storage period, please refer to section 5) listed above for proper contaminant removal procedure.
- (13) Take precaution to minimize corrosion of electrodes. Corrosion of electrodes is accelerated by moisture, condensation or a current flow in a high-humidity environment.
- (14) Do not apply excessive pressure to the FPC part. Force type such as twist, warp, etc., may damage FPC patterning traces.
- (15) Do not use sharp, pointy or rigid tools when handing LCD panels. These objects can scratch or nick the glass panel which can cause it to crack.
- (16) Do not touch or handle the LCD module directly with bare hands. Residue of dirt, oil or water may have the possibility to cause corrosion. Be sure to wear finger sacks or gloves when handling LCD modules. When holding an LCD panel module, carefully hold the panel by the edges of the glass plate.
- (17) Avoid using LCD module under condensation or high humidity environment because polarizer etc. maybe damaged in these conditions.
- (18) Trays are used to package LCD modules for shipment. If LCD modules scratch the tray during shipment, material of the scratched tray may be left on LCD modules. In such case, clean up LCD modules after removal from trays.
- (19) When installing LCD module, don't apply excess stress of bending or stretching to the input cable
- (20) Keep NC terminal open electrically.

14.LCD模块使用及注意事项

14.1 处理

- (1) 显示面板由玻璃制成。请勿将其置于机械冲击下，例如从高处掉落等。
- (2) 如果显示面板损坏并且内部液晶物质泄漏，请务必不要吸入或食用。如果内部液晶物质接触到皮肤或衣物，请及时用肥皂和流动水冲洗干净。
- (3) 请勿对LCD模块的表面、边缘或相邻区域施加过大的力量，因为这可能导致显示面板的色调变化。
- (4) 覆盖在LCD模块显示面板表面的偏振器较软，容易被划伤。请小心处理此偏振器。
- (5) 如果表面偏振器受到污染，请使用以下推荐或等效的胶带进行去污。
 - 斯科奇品牌修补胶带（编号810）
- (6) 请勿对显示表面呼气或使用乙醇溶剂去除污染物，因为可能会导致偏振器变色。此外，除上述提到的溶剂外，其他溶剂也可能损坏偏振器。特别是，请勿使用以下物品。
 - 水
 - 酚类
 - 芳香溶剂
- (7) 安装LCD模块时，确保其没有扭曲、翘曲或变形。任何应力都可能对显示质量产生重大影响。此外，在包含外壳或框架的情况下，确保外壳或框架具有足够的刚度，以实现稳健的设计。
- (8) 请勿在FPC粘接区域及其周围施加压力。
- (9) 请勿尝试拆卸或重新加工LCD模块。
- (10) 为防止静电对元件造成损坏，请注意保持最佳工作环境。
 - 在处理LCD模块之前，请确保接地。
 - 确保焊枪和所有其他组装所需工具已接地。
 - 为减少静电的发生，避免在干燥环境中使用本产品。
 - LCD面板的表面已附加保护膜。在撕下保护膜时，请小心以防止静电放电。
- (11) 为了最小化由静电等破坏性力量引起的LCD模块性能下降，处理LCD模块时请避免直接接触以下部分。
 - 连接器的端子电极
 - FPC上的布线图案
- (12) LCD面板表面由保护膜层保护。在最终产品安装之前，必须移除此保护膜。在移除保护膜后，LCD面板上可能会留下某些粘合剂残留物，特别是在长时间存储后，请参考上述第5)节以获取适当的污染物去除程序。(13) 请采取预防措施以最小化电极的腐蚀。电极的腐蚀在潮湿、高湿环境中因湿气、冷凝或电流流动而加速。
- (14) 请勿对FPC部件施加过大的压力。扭曲、变形等施加的力可能会损坏FPC图案线路。
- (15) 在处理LCD面板时，请勿使用尖锐、锋利或坚硬的工具。这些物体可能会划伤或划破玻璃面板，从而导致其破裂。
- (16) 请勿直接用裸手触摸或处理LCD模块。污垢、油脂或水的残留物可能会导致腐蚀。在处理LCD模块时，请务必佩戴手套或指套。在握持LCD面板模块时，请小心地从玻璃板的边缘握住面板。
- (17) 避免在冷凝或高湿环境下使用LCD模块，因为在这些条件下偏振器等可能会受到损坏。
- (18) 托盘用于包装LCD模块以便运输。如果在运输过程中LCD模块划伤托盘，划伤托盘的材料可能会留在LCD模块上。在从托盘中取出后，请清洁LCD模块。
- (19) 在安装LCD模块时，请勿对输入电缆施加过度的弯曲或拉伸应力。
- (20) 保持NC端子电气上开放。

(21) After storage under high humidity or condensation environment, keep LCD module under room temperature more than 30 minutes before operation.

(22) Take precautions to handling LCD module because the glass plate has very keen edges.

14.2 DESIGN OF APPLICATION

(1) The absolute maximum ratings represent the rated values which LCD module cannot exceed. When LCD modules are used beyond this rated value, the operating characteristics may be adversely affected.

(2) To prevent the occurrence of erroneous operation caused by noise, special attention on satisfying VIL, VIH specified values is required. This includes taking the precautionary measures of using short cables for signal transferring.

(3) An inherent characteristic of liquid crystal display is its temperature dependency. Be sure to use the LCD modules within the specified operating temperature range, as recognition of the display becomes difficult when the LCD module is used outside its range. Also, keep in mind that the voltage levels necessary for clear display images will vary according to temperature.

(4) It is recommended that power supply lines to include current surge protection. (Fuse etc. recommend value: 0.5A)

(5) Note the peripheral devices can cause mutual noise interference with LCD modules. Especially, input devices such as Touch Panel, etc., may output operational level by radiation noise even when these devices are not in operation. Actual performance confirmation and verification under actual usage environment by actual final product is highly recommended.

(6) To avoid EMI, preventive measures should be implemented in the final product.

(7) Display abnormality may occur with sudden removal of power supply such as device battery. Sudden removal of power supply shall be avoided at all time. LCD module quality cannot be guaranteed under such condition.

(8) Ensure sufficient light shading measures during design phase and when assemble the LCD module.

(9) Ensure sufficient light shading measures in the inspection process.

(10) Similar to general electronic components, ESD may cause LCD IC to malfunction. ESD preventive measures should be considered around the LCD module.

(11) While display data may be kept, data can be easily changed by external noise. Noise shall be minimized at device or system level.

(12) As unexpected noise may occur, periodic refresh operation such as resend the command and display data is highly recommended as part of the software routine.

(13) When logic circuit power is off, do not apply any signals to the input terminals.

(14) Do not use other components such as FPC or other features to fix the LCD module position, as pressure/tension may produce undesired result such as FPC trace crack.

14.3 DISPLAY CHARACTERISTICS

(1) Because the optimum LCD driving voltage depends on the ambient temperature, display may slightly flicker at the environment of high temperature.

(2) One of the special characteristics of liquid crystal is that it freezes when stored at the temperature below the storage temperature range. Such freezing may cause orientation defects or bubbles (black or white) to appear in the LCD panel. Bubbles may also occur if the panel receives an impact in a low-temperature environment.

(3) If the LCD module is left operating for a long time with the same display showing, the displayed pattern may leave traces on the screen or the contrast may become inconsistent.

14.4 KEEPING THE PRODUCTS

(1) When keeping LCD modules, avoid the following condition or environment.

- Exposure to direct sunlight or fluorescent lamps lightings.
- High-temperature/high-humidity or very low-temperature (below 0°C) environments.
- Exposure to water droplets, condensation, etc.

Furthermore, keep LCD modules in anti-static bags to prevent static electricity charge ups. Whenever possible, LCD modules should be stored in the same conditions in which they were shipped from Japan Display Inc.

(2) Take precaution to minimize corrosion of electrodes. Corrosion of electrodes is accelerated by moisture, condensation or a current flow in a high-humidity environment.

(21) 在高湿度或凝结环境下存储后，LCD模块在操作前应保持在室温下超过30分钟。

(22) 处理LCD模块时要小心，因为玻璃板边缘非常锋利。

14.2 应用设计

(1) 绝对最大额定值代表LCD模块不能超过的额定值。当LCD模块的使用超出此额定值时，操作特性可能会受到不利影响。

(2) 为防止因噪声引起的错误操作，需要特别注意满足指定的VIL、VIH值。这包括采取使用短电缆进行信号传输的预防措施。

(3) 液晶显示器的一个固有特性是其温度依赖性。请确保在指定的操作温度范围内使用LCD模块，因为在超出其范围时，显示的识别会变得困难。此外，请注意，清晰显示图像所需的电压水平会根据温度而有所不同。

(4) 建议电源线包括电流浪涌保护。（保险丝等推荐值：0.5A）

(5) 请注意，外围设备可能会与LCD模块产生相互噪声干扰。特别是，输入设备如触摸面板等，即使在这些设备未操作时，也可能因辐射噪声输出操作电平。强烈建议在实际使用环境中对实际最终产品进行实际性能确认和验证。

(6) 为避免电磁干扰，应在最终产品中实施预防措施。

(7) 突然断开电源（如设备电池）可能会导致显示异常。应始终避免突然断开电源。在这种情况下，LCD模块的质量无法得到保证。

(8) 在设计阶段和组装LCD模块时，确保采取足够的光遮蔽措施。

(9) 在检验过程中，确保采取足够的光遮蔽措施。

(10) 类似于一般电子元件，静电放电可能导致LCD集成电路故障。在LCD模块周围应考虑静电放电预防措施。

(11) 尽管显示数据可能被保留，但数据可以很容易地受到外部噪声的影响而改变。噪声应在设备或系统级别最小化。

(12) 由于可能发生意外噪声，建议定期刷新操作，例如重新发送命令和显示数据，作为软件例程的一部分。

(13) 当逻辑电路电源关闭时，请勿对输入端子施加任何信号。

(14) 请勿使用其他组件，如FPC或其他特性来固定LCD模块位置，因为压力/张力可能导致不良结果，例如FPC线路断裂。

14.3 显示特性

(1) 由于最佳LCD驱动电压取决于环境温度，因此在高温环境下显示可能会轻微闪烁。

(2) 液晶的一个特殊特性是，当储存温度低于储存温度范围时，它会冻结。这种冻结可能导致LCD面板出现方向缺陷或气泡（黑色或白色）。

如果面板在低温环境中受到冲击，也可能会出现气泡。

(3) 如果LCD模块长时间显示相同的图案，显示的图案可能会在屏幕上留下痕迹，或者对比度可能变得不一致。

14.4 产品存放

(1) 存放LCD模块时，避免以下条件或环境。

• 暴露在阳光直射或荧光灯照明下。

• 高温/高湿或非常低温（低于0°C）环境。

• 暴露于水滴、冷凝等。

此外，将LCD模块放在防静电袋中以防止静电积聚。尽可能将LCD模块存放在与其从日本显示公司发货时相同的条件下。(2) 采取预防措施以最小化电极的腐蚀。电极的腐蚀在高湿环境中因潮湿、冷凝或电流流动而加速。

(3) Recommended keeping conditions.

- Keeping environment : +15°C to 35°C, less than 65%RH
- Duration: up to 2 months after shipping date

(4) The shipping carton must not be stacked up over 1.5m in height.

14.5 DISPOSAL

(1) When disposing LCD modules, consult company specialized in industrial waste treatment which is permitted by the government or local authority. When incineration is the method of LCD module disposal, law of environmental hygienic must be obeyed.

14.6 OTHERS

(1) This product is designed to be used in ordinary electronic devices. Do not use this product in other applications, especially in devices that may cause direct bodily damage to end users (such as weapons, military purposes, aerospace equipment, life-support system equipment, or safety equipment).

(2) Japan Display Inc. shall not be responsible for defects that occur in this product or in equipment connected to this product if the product is used in an environment that exceeds the ranges specified in this document, or in an environment not described in this document.

- (3) 推荐的保存条件。
 - 保存环境: +15°C 到 35°C, 湿度低于 65%RH
 - 持续时间: 自发货日期起最长可达 2 个月
- (4) 运输纸箱的堆放高度不得超过 1.5 米。

14.5 处置

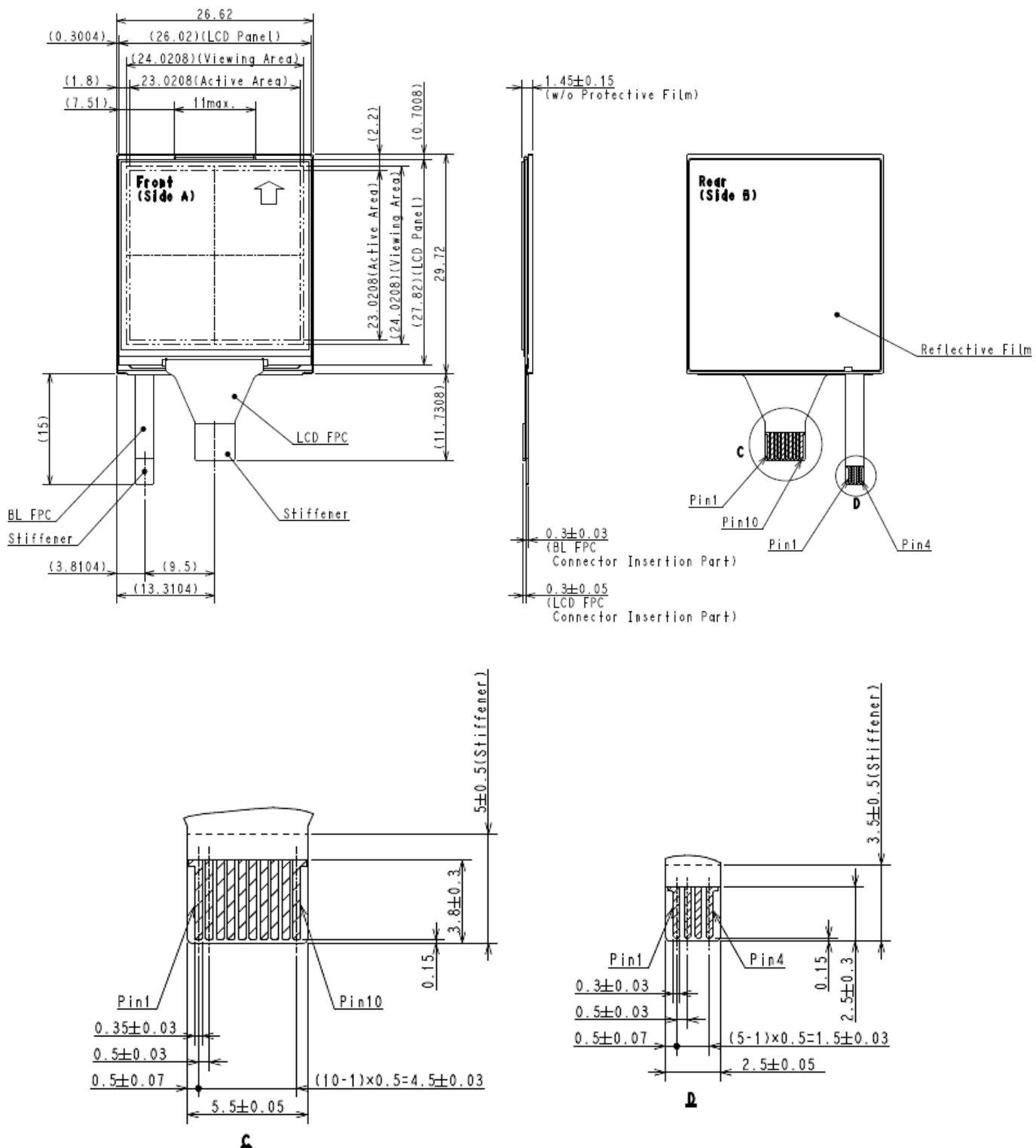
(1) 处置 LCD 模块时, 请咨询经政府或地方当局许可的工业废物处理公司。如果采用焚烧作为 LCD 模块的处置方法, 必须遵守环境卫生法律。

14.6 其他

(1) 本产品设计用于普通电子设备。请勿将本产品用于其他应用, 特别是在可能对最终用户造成直接身体伤害的设备中(例如武器、军事用途、航空设备、生命支持系统设备或安全设备)。

(2) 如果本产品在超出本文件规定范围的环境中使用, 或在本文件未描述的环境中使用, 日本显示株式会社对本产品或与本产品连接的设备发生的缺陷不承担责任。

15. OUTLINE DRAWING



Note 1) Unit : mm

2) General tolerance: +/-0.2

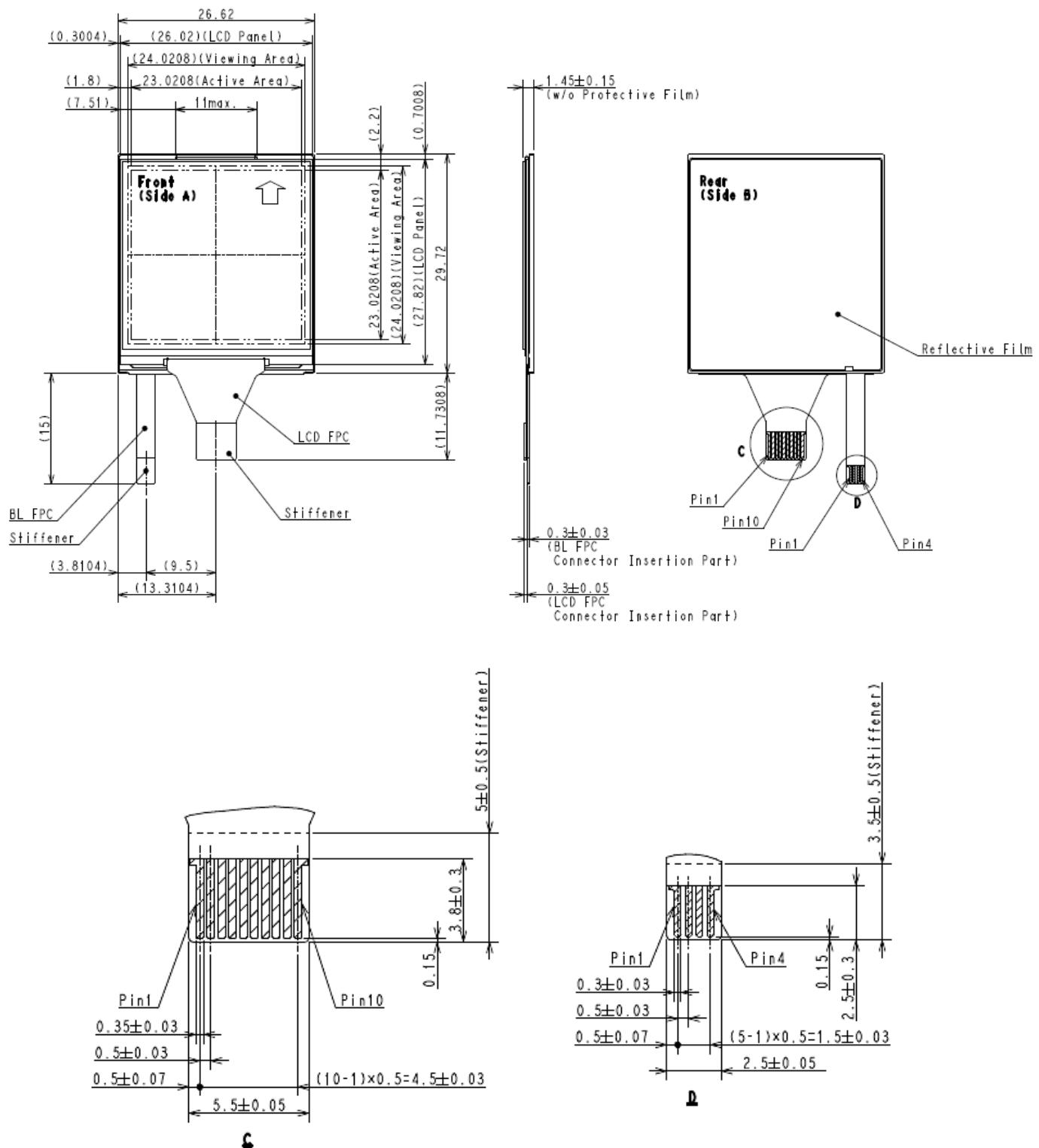
3) Scale: NTS

4) Unless otherwise specified, radius shall be R0.5.

5) Example of suitable FPC connector : LCD-FPC FH28-10S-0.5SH(05) 10pin / Hirose

Backlight-FPC 503480-0400 / molex

15. 轮廓图



注 1) 单位: mm

2) 一般公差: +/-0.2

3) 比例: NTS

4) 除非另有说明, 半径应为 R0.5。

5) 适用的 FPC 连接器示例 : LCD-FPC FH28-10S-0.5SH(05) 10针 / Hirose

背光-FPC 503480-0400 / molex



Shipment Inspection Standard

[Product Name : LPM013M126C]



出货检验标准

[产品名称 : LPM013M126C]

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2 显示外观标准	3
3 外部外观标准	4

1 QUALITY STANDARD

1.1 Inspection condition

(1) Ambient Conditions

- (a) Temperature : 25 °C ($\pm 5^{\circ}\text{C}$)
- (b) Humidity : 60% ($\pm 20\%$)
- (c) Ambient Luminance : 1000 – 2000 lux
- (d) Supply Voltage : VDD=3.0V, VDDA=3.0V, VIH=3.0V, Vil=0V

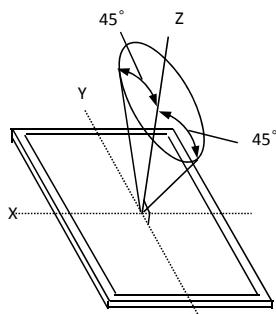
(2) Viewing Distance

The distance between the LCD and the inspector's eyes should be 30cm ($\pm 10\text{cm}$).

(3) Viewing Angle

Viewing angle : 0 ± 45 degrees (LCD:on, Appearance check for Reflective mode)

Normal direction (LCD:on, Transmissive mode)



(4) Transmissive mode

Backlight current : 5mA [Equivalent to 2.5(mA/each LED)]

1 质量标准

1.1 检验条件

(1) 环境条件

- (a) 温度 : 25 °C ($\pm 5^{\circ}\text{C}$)
- (b) 湿度 : 60% ($\pm 20\%$)
- (c) 环境亮度 : 1000 – 2000 流明
- (d) 供电电压 : VDD=3.0V, VDDA=3.0V, VIH=3.0V, Vil=0V

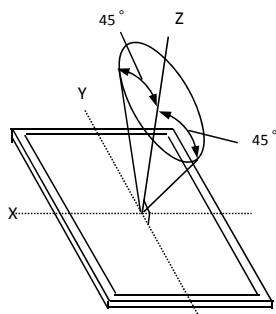
(2) 观看距离

LCD与检查者眼睛之间的距离应为30cm ($\pm 10\text{cm}$)。

(3) 观看角度

观看角度 : 0 \pm 45 度 (LCD开启, 反射模式外观检查)

正常方向 (LCD开启, 透射模式)

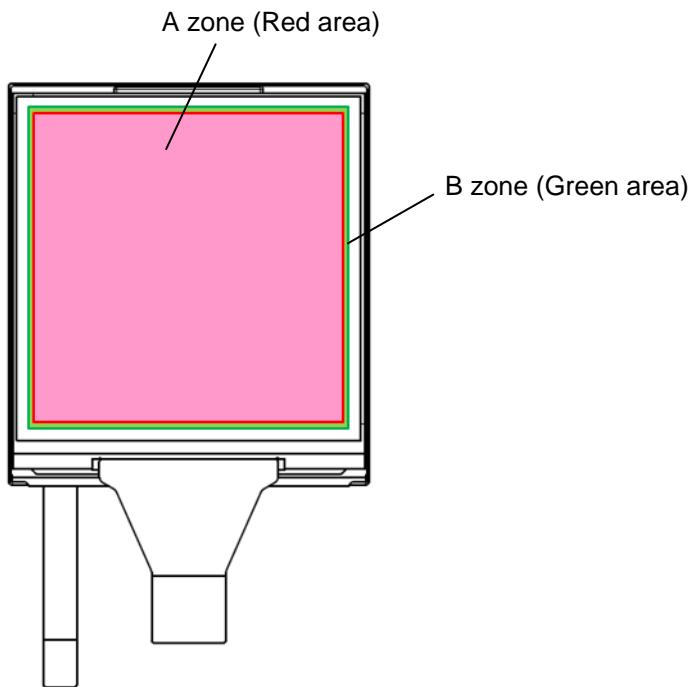


(4) 透射模式

背光电流 : 5mA [相当于2.5(mA/每个LED)]

1.2 Zone Definition

- A zone : Active area
- B zone : Viewing area
- C zone : Except A and B zone



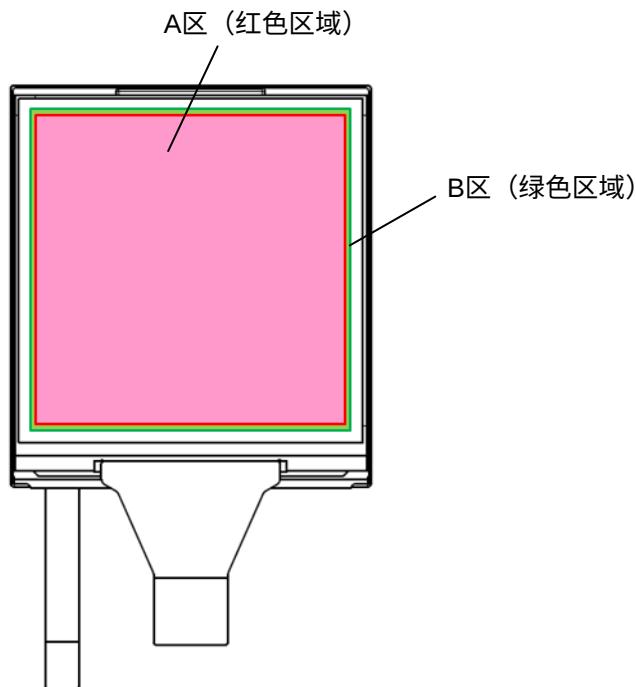
*For detail dimensions refer to outline drawing.

1.3 Treatment of problems

If there are any troubles which are concerned with our products assembled at your company's manufacturing processes, both companies shall jointly investigate and resolve the causes.

1.2 区域定义

- A区 : 有效区域
- B区 : 观看区域
- C区 : 除A区和B区外



*有关详细尺寸, 请参阅轮廓图。

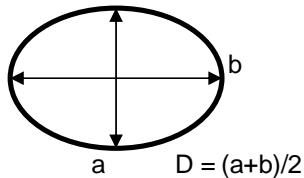
1.3 问题处理

如果在贵公司的制造过程中与我们的产品相关的任何问题, 双方应共同调查并解决原因。

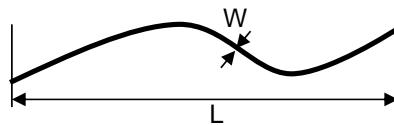
2 DISPLAY APPEARANCE STANDARDS

Item		Zone	Criteria		Remarks	
Name	Cause		Size(mm)	N		
Dot type defect	B/W spot (Dent in glass or Upper polarizer, Particle, Swell) Bright/Dark dot defect	A	D≤0.15	Ignore	Keep two defect distance more than 5mm	
			0.15<D≤0.25	2		
			0.25<D	0		
		B	D≤0.25	Ignore		
			0.25<D≤0.3	3		
			0.3<D	0		
	Line type defect	C	Ignore			
		A	W≤0.03	Ignore		
			0.03<W≤0.08, L≤2	2		
Line type defect	Scrach on Upper polarizer or Foreign material between Upper polarizer and Glass		0.08<W or 2<L	0	Keep two defect distance more than 5mm	
	B	W≤0.10, L≤3	3			
		0.10<W or 3<L	0			
	C	Ignore				
	Air bubble	A	D≤0.15	Ignore		
			0.15<D≤0.25	3		
			0.25<D	0		
		B	Ignore			
		C	Ignore			

Dot type defect



Line type defect



*C zone defects other than the above are ignored when function / display is not affected

*When there is an agreement limit samples, Item is judged according to limit sample.

*Total defect quantity : A zone ($N \leq 3$) *each inspection (lighting / appearance) , B zone ($N \leq 5$)

*Other items are to be decided by agreement between both parties.

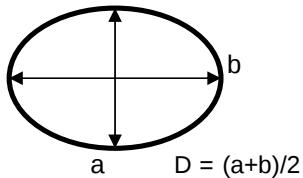
*Cosmetic imperfection will be allowed outside the V.A.(Viewing Area).

*Any cosmetic imperfection except for the above mentioned in the table in transmissive mode is allowed.

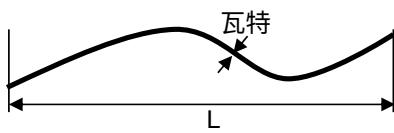
2 显示外观标准

项目		区域	标准		备注	
名称	原因		尺寸 (mm)	N		
点状缺陷	黑白斑点 (玻璃凹陷或 上偏振器， 颗粒， 膨胀) 亮/暗点缺陷	A	D ≤ 0.15	忽略	保持两个缺陷之间的距离 大于 5mm	
			0.15 < D ≤ 0.25	2		
			0.25 < D	0		
		B	D ≤ 0.25	忽略		
			0.25 < D ≤ 0.3	3		
			0.3 < D	0		
		C	忽略			
	上偏振器 上的划痕或上 偏振器与玻璃之 间的异 物	A	瓦特 ≤ 0.03	忽略	保持两个缺陷之间的距离 大于 5mm	
			0.03 < W ≤ 0.08, L ≤ 2	2		
			0.08 < W 或 2 < L	0		
		B	瓦特 ≤ 0.10, L ≤ 3	3		
			0.10 < W 或 3 < L	0		
		C	忽略			
气泡	气泡	A	D ≤ 0.15	忽略		
			0.15 < D ≤ 0.25	3		
			0.25 < D	0		
		B	忽略			
		C	忽略			

点状缺陷



线状缺陷



*C区缺陷在功能/显示不受影响时被忽略

*当存在协议限样本时，项目根据限样本进行判断。

*总缺陷数量：A区 (N ≤ 3) *每次检查（照明/外观），B区 (N ≤ 5)

*其他项目由双方协议决定。

*外观缺陷将在V.A.(观看区域)之外被允许。

*在透射模式下，除了上述表格中提到的外观缺陷外，其他外观缺陷均被允许。

3 EXTERNAL APPEARANCE STANDARDS

Item	Size(mm)	N	Remarks
Chipping	(A) $W \leq 3, L \leq 0.2, T=1/2t$	Ignore	Fig.1
	(B) $W \leq 3, L \leq 0.6, T < 1/2t$	Ignore	Fig.2
	Except (A) & (B)	0	
Crack(*)	$W \leq 3, L \leq 0.5$	Ignore	V-shaped chipping included , Fig3
	$3.0 < W \text{ or } 0.5 < L$	0	
Chipping on the corner	Showing on below figure		Fig.4
Projection	$W \leq 0.3, L \leq 5.0$	Ignore	Fig.5
	$0.3 < W \text{ or } 5.0 < L$	0	

Fig.1 *The state the amount of all one glass is missing

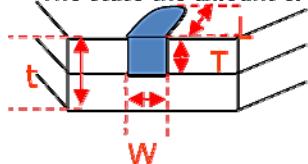
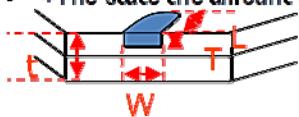


Fig.2 *The state the amount of all one glass is not missing



Definition of abbreviation

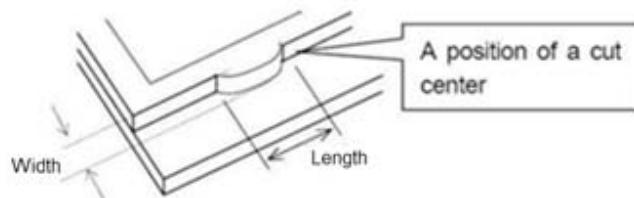


Fig.5 Projection

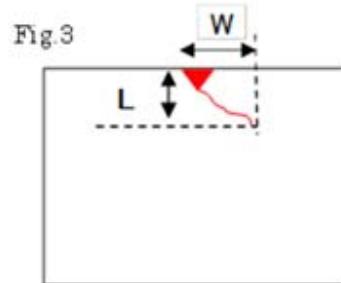
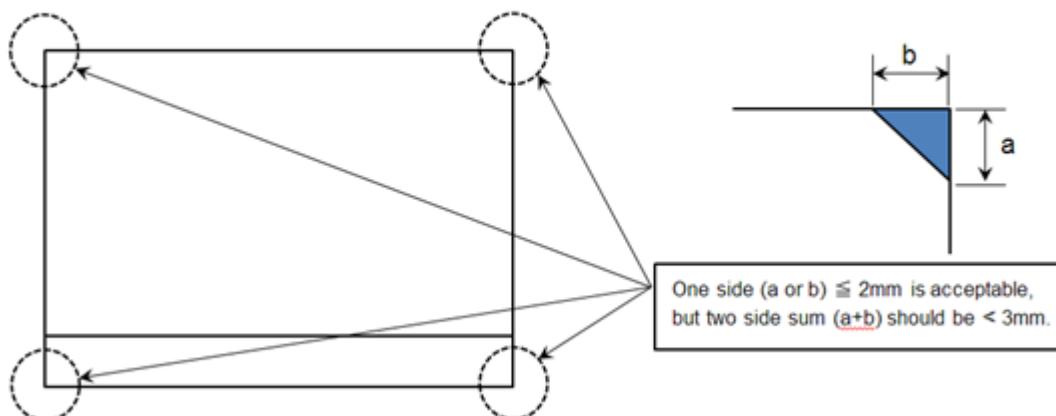


Fig.4 Chipping on the corner



3 外观标准

Item	Size(mm)	N	Remarks
Chipping	(A) $W \leq 3, L \leq 0.2, T=1/2t$	Ignore	Fig.1
	(B) $W \leq 3, L \leq 0.6, T < 1/2t$	Ignore	Fig.2
	Except (A) & (B)	0	
Crack(*)	$W \leq 3, L \leq 0.5$	Ignore	V-shaped chipping included, Fig3
	$3.0 < W \text{ or } 0.5 < L$	0	
Chipping on the corner	Showing on below figure		Fig.4
Projection	$W \leq 0.3, L \leq 5.0$	Ignore	Fig.5
	$0.3 < W \text{ or } 5.0 < L$	0	

Fig.1 *The state the amount of all one glass is missing

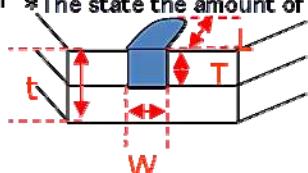
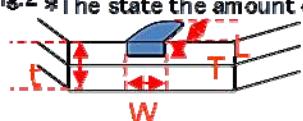


Fig.2 *The state the amount of all one glass is not missing



Definition of abbreviation

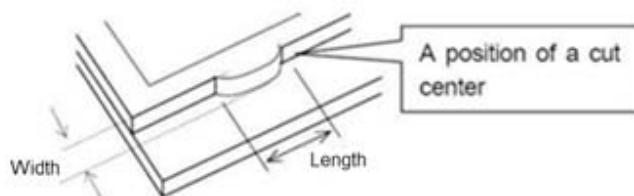
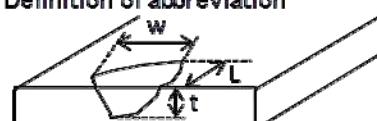


Fig.5 Projection

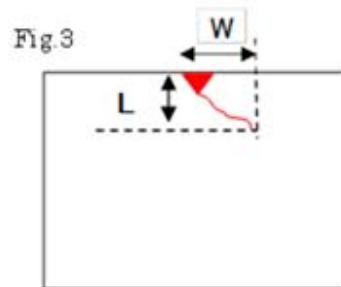


Fig.4 Chipping on the corner

