



SPECIFICATION

KOE
JDI Group

TX11D200VM1AAA

4.4" TFT - VGA - SPI

Version: TX11D200VM1AAA-2

Date: 23.05.2017

Note: This specification is subject to change without prior notice

KOE

JDI Group

TENTATIVE

Kaohsiung Opto-Electronics Inc.

FOR MESSRS : _____

DATE : May 23rd,2017

TECHNICAL DATA

TX11D200VM1AAA

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ACCEPTED BY: _____

PROPOSED BY: Oblack Tsai

2. RECORD OF REVISION

DATE	SHEET No.	SUMMARY																
May 23,'17	7B64LTD-2531-2 Page 3-1/1	3. GENERAL DATA Revised : <table border="1" style="margin-left: 20px;"> <tr> <td>Module Dimensions</td> <td>96.82(W) mm x 78.7(H) mm x 4.385 max. (D) mm (include 4 pillars)</td> </tr> <tr> <td>Weight</td> <td>52g</td> </tr> <tr> <td>Power Supply Voltage</td> <td>3.3V for LCD; 9.0V for Backlight</td> </tr> <tr> <td>Power Consumption</td> <td>(TBD) W for LCD ;(TBD)W for backlight</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" style="margin-left: 20px;"> <tr> <td>Module Dimensions</td> <td>96.82(W) mm x 78.7(H) mm x 3.0 (D) mm</td> </tr> <tr> <td>Weight</td> <td>30g</td> </tr> <tr> <td>Power Supply Voltage</td> <td>3.3V for LCD; 3.3V for Backlight</td> </tr> <tr> <td>Power Consumption</td> <td>0.153 W for LCD ;0.396W for backlight</td> </tr> </table>	Module Dimensions	96.82(W) mm x 78.7(H) mm x 4.385 max. (D) mm (include 4 pillars)	Weight	52g	Power Supply Voltage	3.3V for LCD; 9.0V for Backlight	Power Consumption	(TBD) W for LCD ;(TBD)W for backlight	Module Dimensions	96.82(W) mm x 78.7(H) mm x 3.0 (D) mm	Weight	30g	Power Supply Voltage	3.3V for LCD; 3.3V for Backlight	Power Consumption	0.153 W for LCD ;0.396W for backlight
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7B64LTD-2531-2 Page 4-1/1	4. ABSOLUTE MAXIMUM RATINGS Revised : <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Item</th> <th>Symbol</th> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Backlight Input Voltage</td> <td>V_{BL+}</td> <td>8.4</td> <td>9.6</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Item</th> <th>Symbol</th> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Backlight Input Voltage</td> <td>LED</td> <td>-</td> <td>3.4</td> </tr> </tbody> </table>	Item	Symbol	Min.	Max.	Backlight Input Voltage	V _{BL+}	8.4	9.6	Item	Symbol	Min.	Max.	Backlight Input Voltage	LED	-	3.4	
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7B64LTD-2531-2 Page 5-1/1	5. ELECTRICAL CHARACTERISTICS Revised : Power Supply Voltage																	
7B64LTD-2531-2 Page 6-1/3	6. OPTICAL CHARACTERISTICS Revised : Optical Data																	
7B64LTD-2531-2 Page 7-1/1	7. BLOCK DIAGRAM Revised : LED Driving Board → Backlight																	
7B64LTD-2531-2 Page 8-3/14	8.4 TIMING TABLE Revised : <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Item</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Frame frequency</td> <td>12.15</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Item</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Frame frequency</td> <td>2.15</td> </tr> </tbody> </table>	Item	Max.	Frame frequency	12.15	Item	Max.	Frame frequency	2.15									
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7B64LTD-2531-2 Page 9-1/1	9. OUTLINE DIMENSIONS Added : Outline																	

3. GENERAL DATA

3.1 DISPLAY FEATURES

This module is a 4.4" VGA of 4:3 format of LTPS(Lower temperature Poly-Silicon) TFT. The pixel format is vertical stripe and sub pixels are arranged as R(red), G(green), B(blue) sequentially .This display is RoHS compliant , and LED backlight are applied on this display.

Part Name	TX11D200VM1AAA
Module Dimensions	96.82(W) mm x 78.7(H) mm x 3.0(D) mm
LCD Active Area	89.664(W) mm x 67.248(H) mm
Pixel Pitch	0.140(W) mm x 0.140(H) mm
Resolution	640 x 3(RGB)(W) x 480(H) Dots
Color Pixel Arrangement	R, G, B Vertical stripe
LCD Type	Reflective color TFT; Normal Black
Display Type	Active Matrix
Number of Colors	8 Colors
Backlight	Light Emitting Diode (LED)
Weight	30g
Interface	SPI ; 10 pins
Power Supply Voltage	3.3V for LCD; 3.3V for Backlight
Power Consumption	0.153 W for LCD ;0.396W for backlight
Feature	MIP(Memory in pixel) Reflective type LCD
Polarizer	Hard Coat type (*Pencil Hardness : 2H)

4. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Remarks
Supply Voltage for Analog	V_{DDA}	-0.3	(TBD)	V	-
Supply Voltage for Logic	V_{DD}	-0.3	(TBD)	N	-
Input Voltage of Logic	V_I	$V_{SS}-0.3$	(TBD)	V	-
Operating Temperature	T_{op}	-20	70	°C	Note 1
Storage Temperature	T_{st}	-30	80	°C	Note 1
Backlight Input Voltage	V_{BL+}	0	4	V	-
LED forward current	I_F	-	30	mA	Note 2
LED Pulse Forward current	I_{FP}	-	100	mA	Note 3

Note 1: The maximum rating is defined as above based on the chamber temperature, which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Optical performances and response time would be different in temperatures other than 25°C.
- Operating under high temperature will shorten LED lifetime.

Note 2: Fig 4.1 shows the maximum rating of forward current based on different temperature.

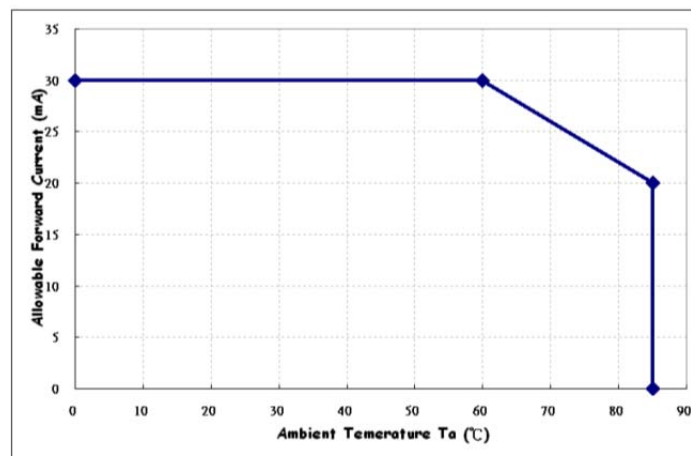


Fig 4.1

Note 3: Fig 4.2 shows the LED characteristics of the relationship I_{FP} v.s duty ratio.

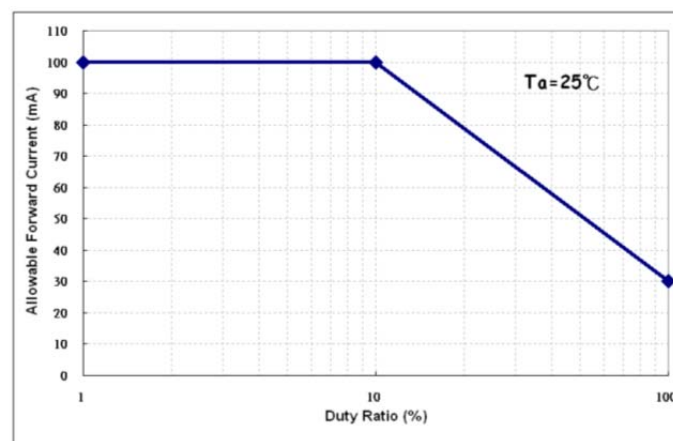


Fig 4.2

- I_{FP} condition : Pulse width \leq 10ms, Duty \leq 1/10

5. ELECTRICAL CHARACTERISTICS

5.1 LCD CHARACTERISTICS

$T_a = 25\text{ }^\circ\text{C}$, $V_{SS} = 0\text{V}$

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	Analog	V_{DDA}	2.7	3.0	(TBD)	-
		V_{SSA}	-	0	-	-
	Logic	V_{DD}	2.7	3.0	(TBD)	Note 1
		V_{SS}	-	0	-	Note 2
Input Signal Voltage	Hi	V_{IH}	$V_{DD}-0.1$	V_{DD}	V_{DD}	Note 3
	Low	V_{IL}	V_{SS}	V_{SS}	$V_{SS}+0.1$	
Power Supply Current	-	IDD	-	120	(TBD)	μW Note 4

Note 1: Apply to EXTMODE = "H".

Note 2: Apply to EXTMODE = "L".

Note 3: Apply to SCLK, SI, SCS, DISP, EXTCOMIN.

Note 4: Data update frequency=1Hz, fCOM frequency=60Hz, test pattern by "All White".

5.2 BACKLIGHT CHARACTERISTICS

$T_a = 25\text{ }^\circ\text{C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
LED Input Voltage	V_{LED}	-	3.0	3.3	3.6	V	Note1
LED Forward Current	I_{LED}	-	-	120	-	mA	Note2
LED lifetime	-	$I_{LED}=120\text{ mA}$	-	50K	-	hrs	-

Note 1: As Fig. 5.1 shown the LED backlight circuit, V_{LED} and I_{LED} is many to one relationship, the above V_{LED} range is defined to obtain 120 mA.

Note 2: Estimated lifetime is specified as the time to reduce 50% brightness by applying 120 mA.

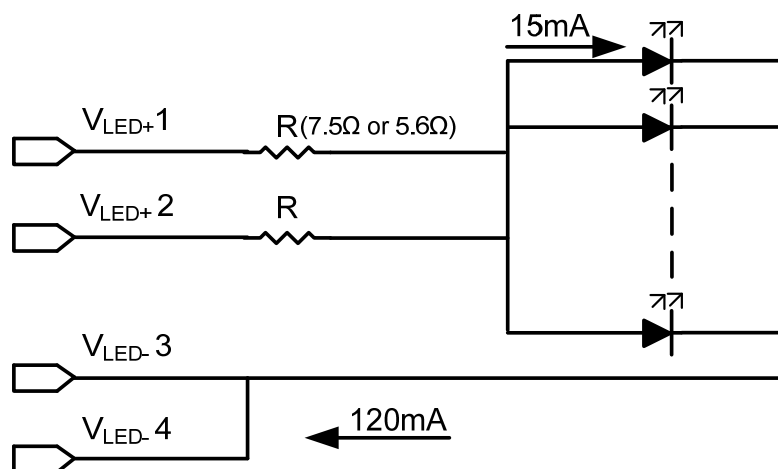


Fig 5.1

6. OPTICAL CHARACTERISTICS

The optical characteristics are measured based on the conditions as below:

- Supplying the signals and voltages defined in the section of electrical characteristics.
- The backlight unit needs to be turned on for 20 minutes.
- The ambient temperature is $25 \pm 5^{\circ}\text{C}$.
- In the dark room less than 100lx, the equipment has been set for the measurements as shown in Fig 6.1 and Fig 6.3.

For reflection mode

$T_a = 25^{\circ}\text{C}, V_{DD} = 3.0\text{V}$

Item	Symbol	Temp.(°C)	Rating			Unit	Remark
			Min.	Typ.	Max.		
Contrast	CR	25	20	40	-	-	Note 1
Response	tr	25	-	4	8	ms	Note 2
	tf		-	6	12		
Color Coordinates	Rx	25	-	0.51	-	-	Note 3
	Ry		-	0.32	-		
	Gx		-	0.30	-		
	Gy		-	0.45	-		
	Bx		-	0.16	-		
	By		-	0.18	-		
	Wx		-	0.30	-		
Wy	-	0.33	-				
NTSC ratio	-	25	-	23	-	%	Note 4
Reflectance	-	25	10	18	-	%	-
Viewing Angle (CR>2)	θ_L	25	55	70	-	°	Note 5
	θ_R		55	70	-		
	θ_T		55	70	-		
	θ_B		55	70	-		

For transmission mode

$T_a = 25^{\circ}\text{C}, V_{DD} = 3.0\text{V}$

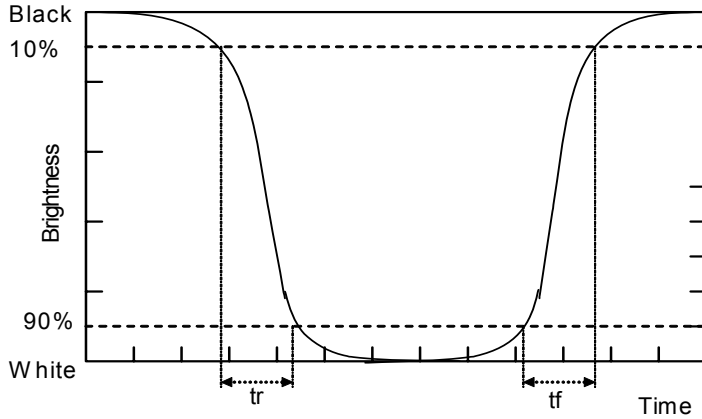
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Brightness of White	B	$I_{BL}=120\text{mA}$	(TBD)	10	-	cd/m^2	Note 7
Brightness Uniformity	-	-	70	-	-	%	Note 8

Note 1: This is a ratio between the screen surface reflectance of the white raster and the black raster

$$CR = \frac{\text{ReflectionintensityonallpixelsWhite}}{\text{ReflectionintensityonallpixelsBlack}}$$

Note 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

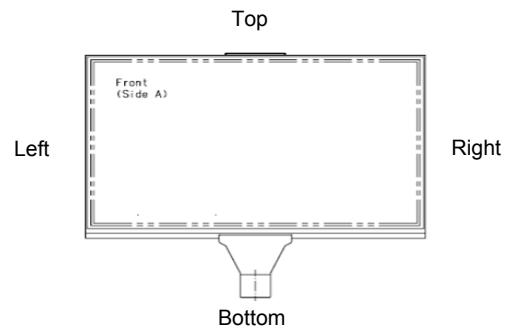
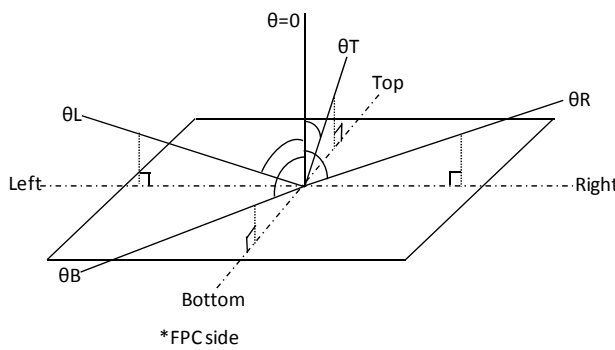


tr : Response time from Black to White
tf : Response time from White to Black

Note 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)

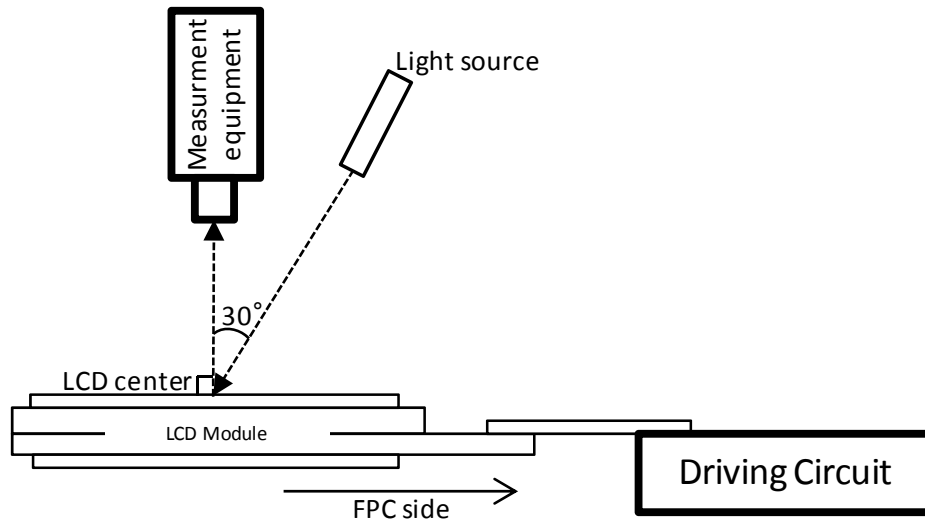
Note 4: This is an area of a triangle shaped by R, G and B coordinates on the CIE1931 chromaticity diagram.

Note 5: This is a maximum angle θ from the normal direction that keeps having the contrast more than 2.



Note 6: Measurement system-for reflective mode

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



Note 7: The brightness and reflective ratio is measured from the panel center point, P5 in Fig. 6.2, for the typical value.

Note 8: The brightness uniformity is calculated by the equation as below:

$$\text{Brightness uniformity} = \frac{\text{Max. Brightness} - \text{Min. Brightness}}{\text{Max. Brightness}} \times 100\%$$

which is based on the brightness values of the 9 points measured by BM-5 as shown in Fig. 6.2.

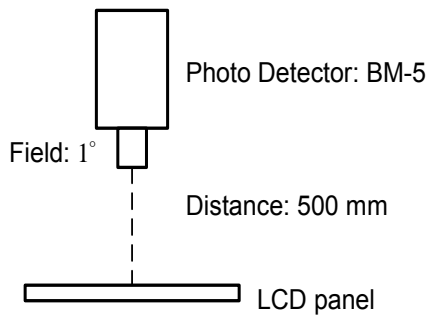


Fig 6.1

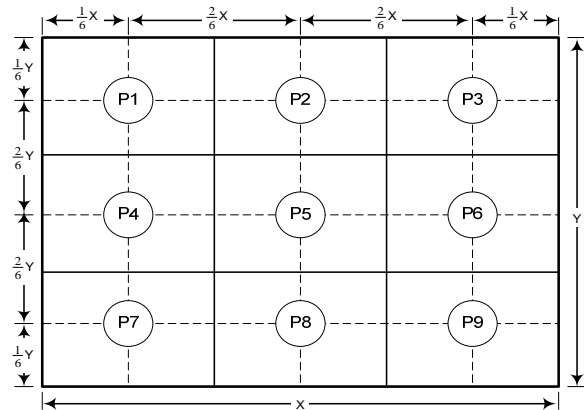
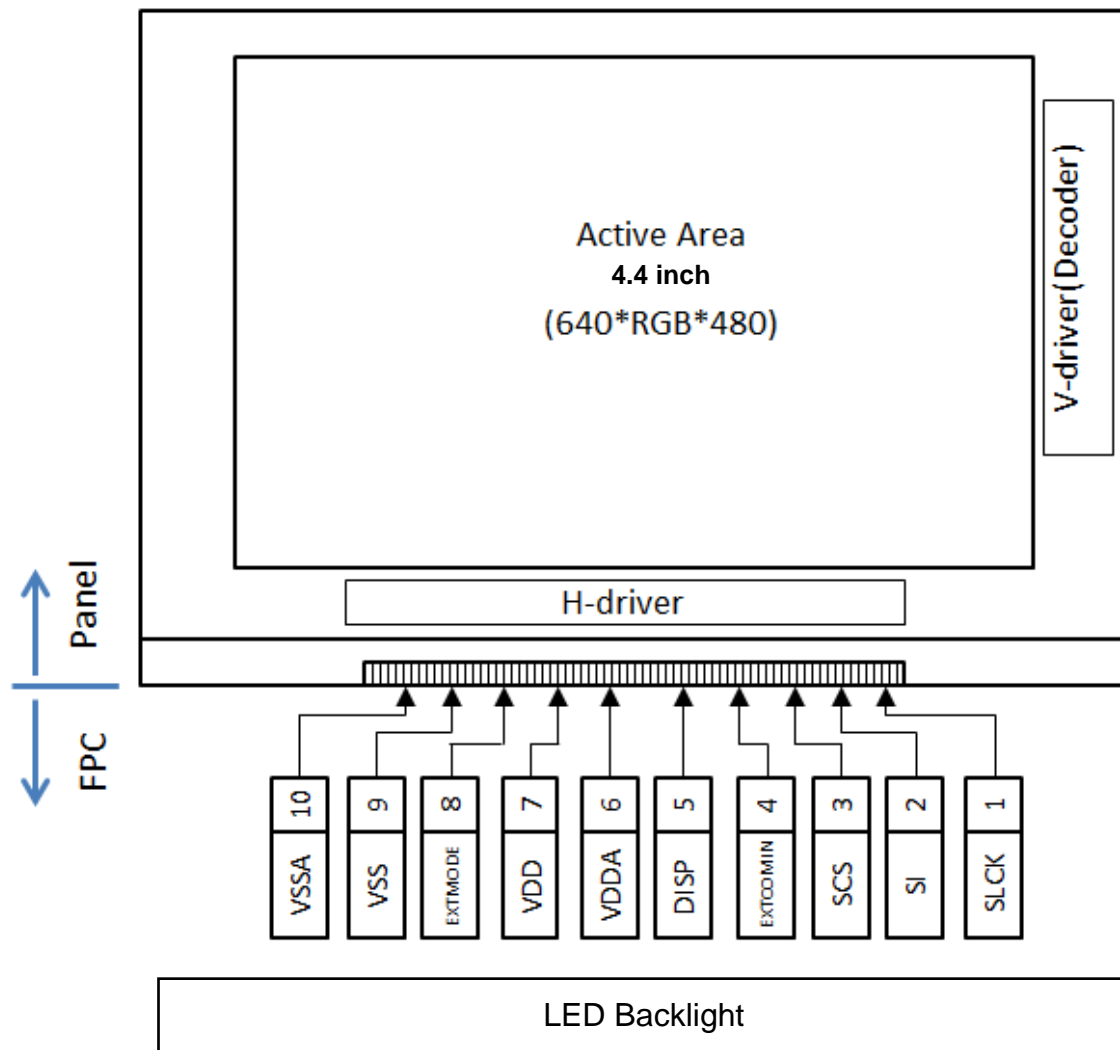


Fig 6.2

7. BLOCK DIAGRAM



Note 1: Signals are SCLK, SI, SCS, EXTCOMIN, DISP and EXTMODE.

8. LCD INTERFACE

8.1 INTERFACE PIN CONNECTIONS

CN1 pin assignment of LCD interface is as below:

Pin No.	Symbol	Function	Remark
1	SCLK	Serial Clock Signal	
2	SI	Serial Data Input Signal	
3	SCS	Chip Select Signal	
4	EXTCOMIN	COM Inversion Signal Input	
5	DISP	Display ON/OFF Switching Signal	Note 1
6	V _{DDA}	Power Supply for Analog	
7	V _{DD}	Power Supply for Logic	
8	EXTMODE	COM Inversion Mode Select Terminal	Note 2
9	V _{SS}	Logic Ground	
10	V _{SSA}	Analog Ground	

Note 1: ON/OFF signal is only for display. Data memory is kept also at the time of on/off.

"H" : Data memory will be displayed.

"L" : Solid black color will be displayed and data memory will be saved.

Note 2: "H": Enable EXTCOMIN signal, connect to V_{DD}.

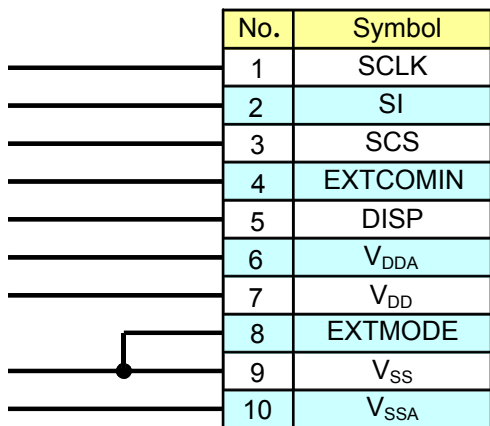
"L": Enable serial input flag, connect to V_{SS}.

CN2 pin assignment of Backlight is as below:

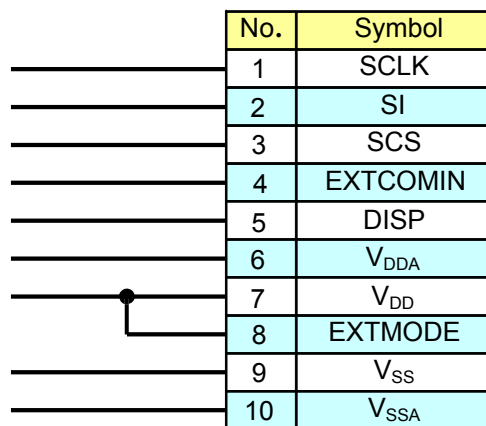
Pin No.	Signal	Level	Function
1	V _{LED+}	-	Power Supply for LED
2	V _{LED+}	-	Power Supply for LED
3	V _{LED-}	-	GND
4	V _{LED-}	-	GND

8.2 RECOMMENDED CIRCUIT

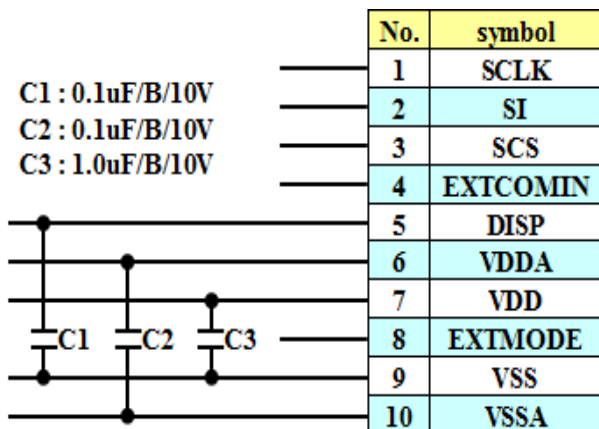
EXTMODE=L : COM Signal Serial Input



EXTMODE=H : COM Signal External Input



External circuit example



8.3 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	Note1
COM frequency	fCOM	(TBD)	60	(TBD)	Hz	Note2
SCS rising time	trSCS	-	-	50	ns	
SCS falling time	tfSCS	-	-	50	ns	
SCS Low width	twSCLSL	6.0	-	-	us	
SCS settling time	tsSCS	6.0	-	-	us	
SCS holding time	thSCS	2.0	-	-	us	Note3
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	Note4
SCLK Low width	twSCLKL	250	500	-	ns	Note4
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	

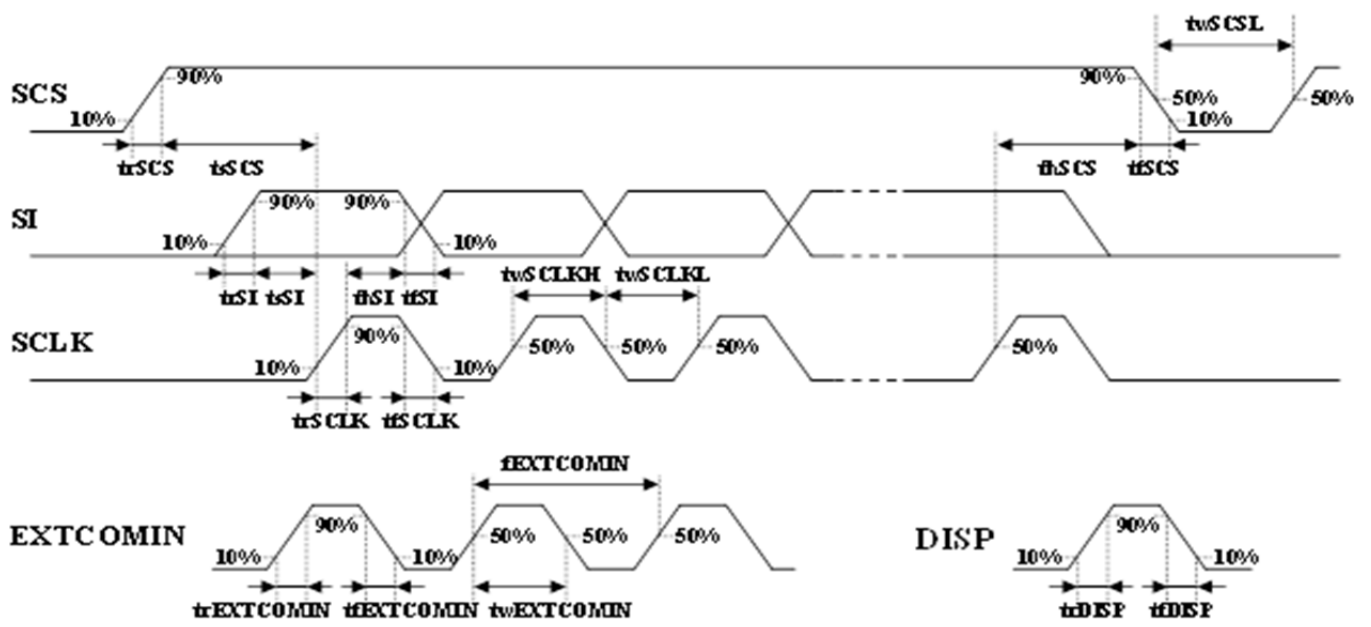
Note 1: Please note that Max. fSCLK may be lowered when VDD and VDDA fall than 3.0V at a low temperature.

Note 2: COM frequency should be around 60Hz for transmissive mode.

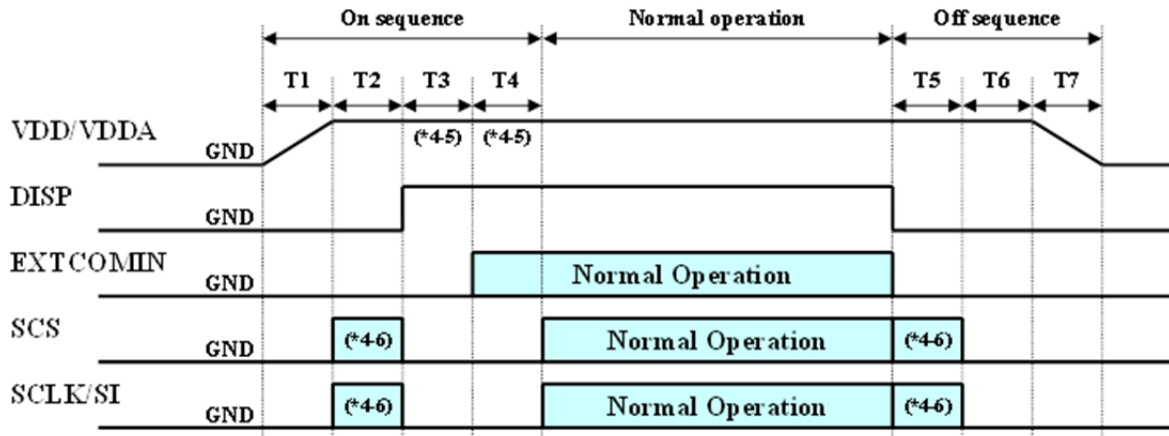
ex: For Data update mode M2 level must be reversed per 8 gate lines based on fSCLK =1MHz.

Note 3: In the case of data update mode in transmissive mode, thSCS should be 50us or less.

Note 4: twSCLKH and twSCLKL should be approximately the same length, if possible.



8.4 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)

*Refer to the timing chart and electrical characteristics for details.

Note 5: It is allowed to replace T3 and T4 mutually.

In the 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, it is necessary to insert 100us or more (200us or less) before normal operation.

Note 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.

8.5 Mode

8.5.1 MODE TABLE

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

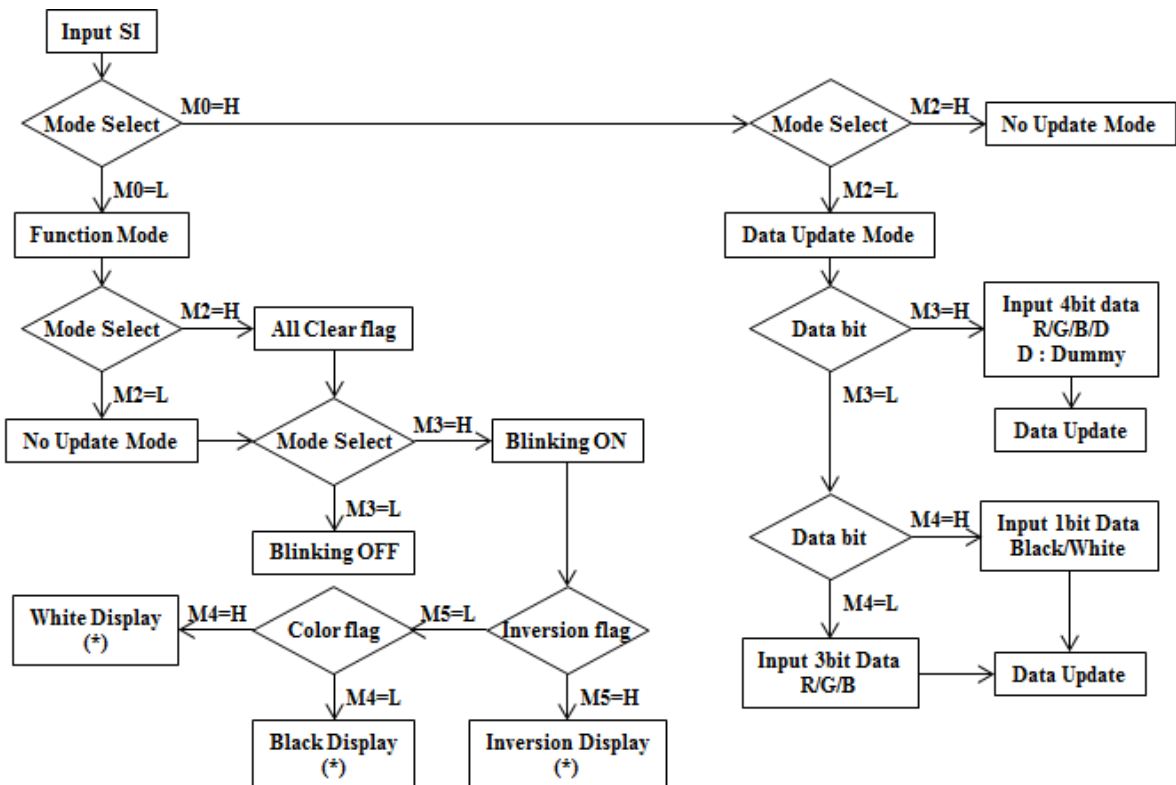
Mode	M3	M4	M5
Blinking OFF	L	-	-
Blink Black	H	L	L
Blink White	H	H	L
Blink Inversion	H	-	H

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)

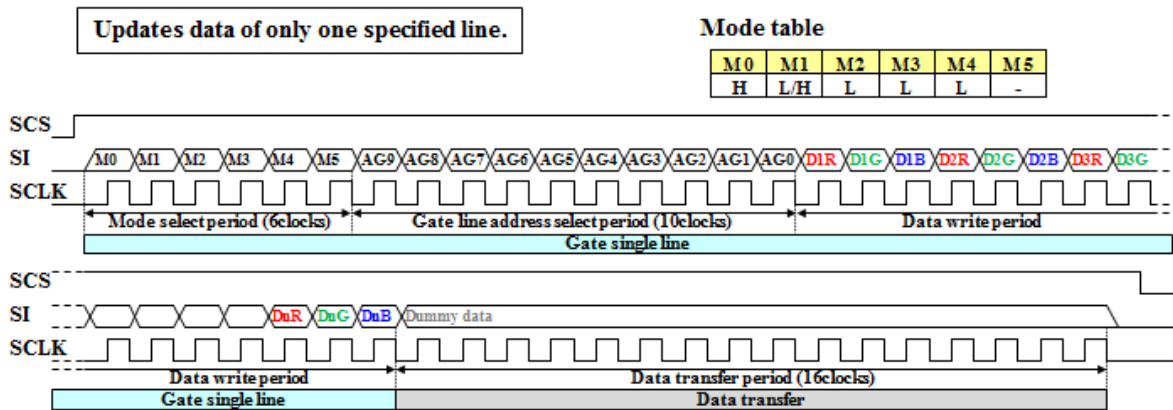
8.5.2 MODE CHART



(*) Pixel memories are kept.

8.6 Timing chart and details of mode

8.6.1 SINGLE LINE UPDATE MODE (3bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

M3-M4 : Data-bit control flag. In the 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 line address table.

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

In the case of 3bit-data mode,

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

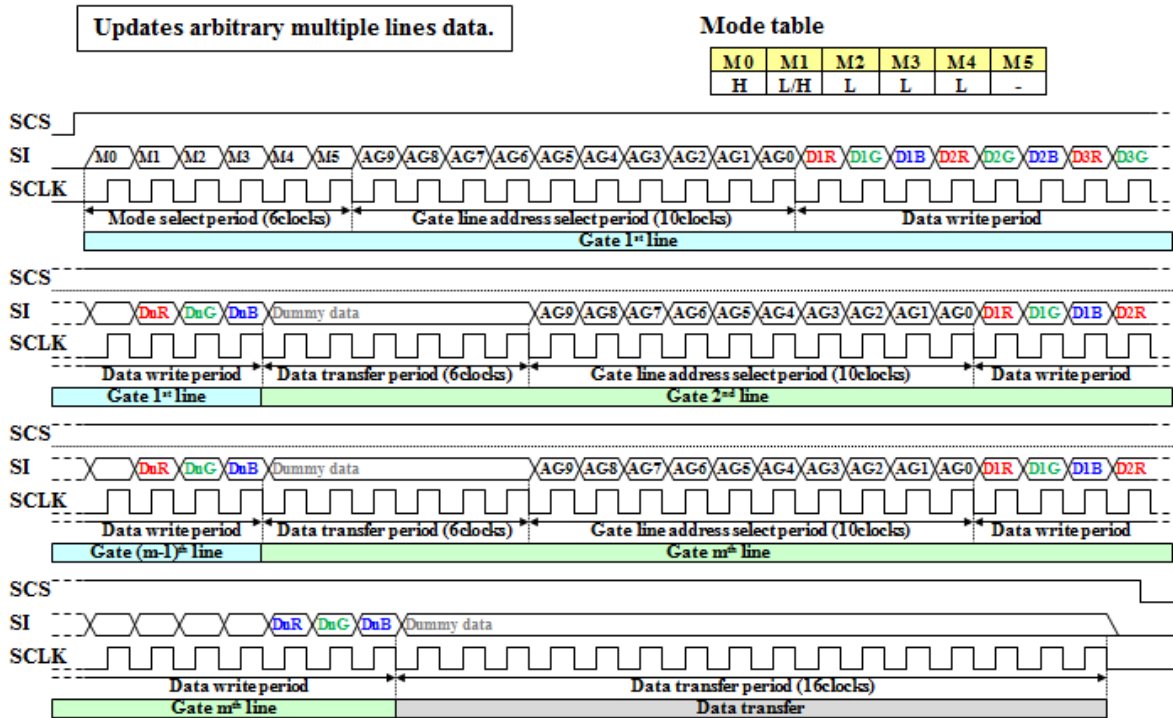
n : Number of horizontal line, refer to the Display address map and Pixel layout.

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

Insert 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".

8.6.2 MULTIPLE LINES UPDATE MODE (3bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

M3-M4 : Data-bit control flag. In the 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 line address table.

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

In the 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.

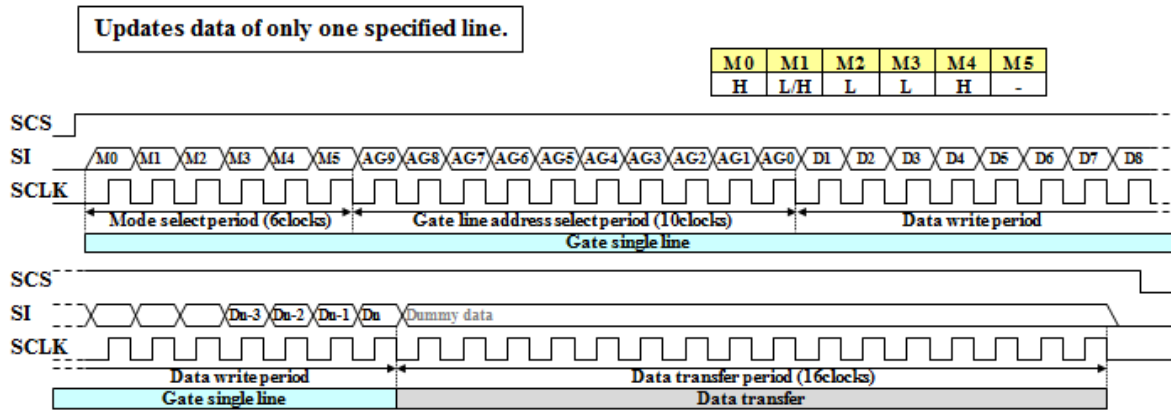
m : Number of vertical line, refer to the Display address map and Pixel layout.

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

Insert 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".

8.6.3 SINGLE LINE UPDATE MODE (1bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

M3-M4 : Data-bit control flag. In the 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 line address table.

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

In the 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.

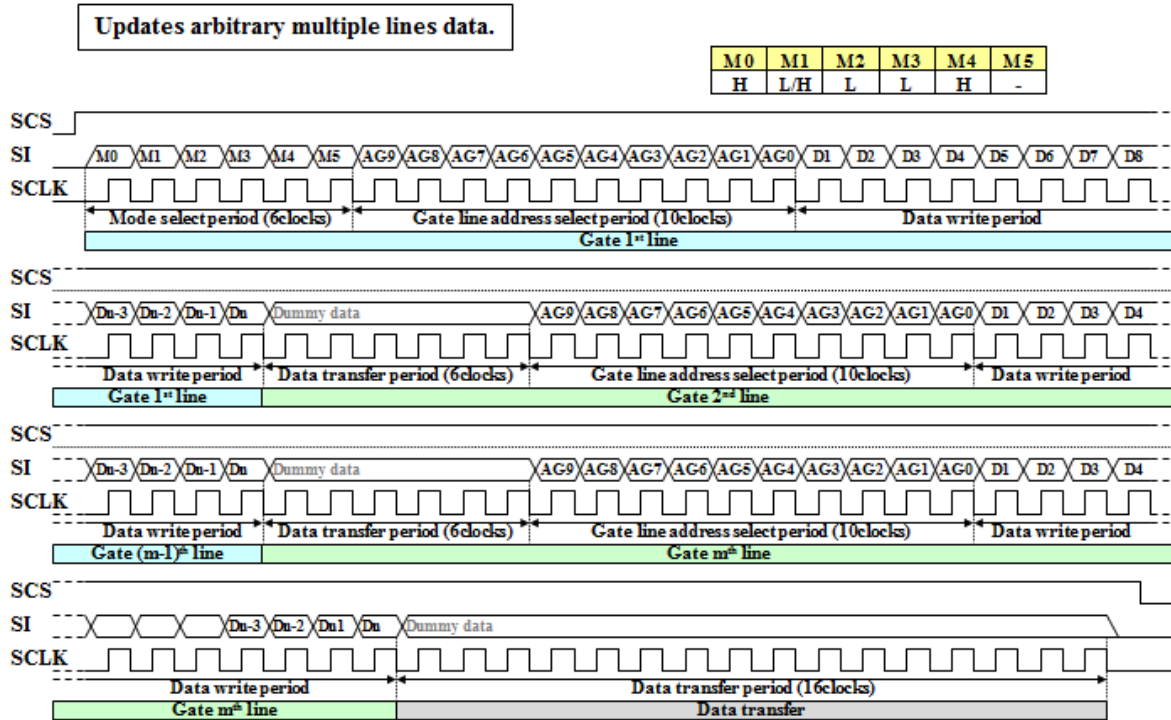
n : Number of horizontal line, refer to the Display address map and Pixel layout.

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

Insert 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".

8.6.4 MULTIPLE LINES UPDATE MODE (1bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE=“L”, it is valid.

In the case of “H”, outputs COM=“H”.

In the case of “L”, outputs COM=“L”.

In the case of EXTMODE=“H”, it is invalid, it can be “H” or “L”.

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

M3-M4 : Data-bit control flag. In the 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 line address table.

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

In the 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.

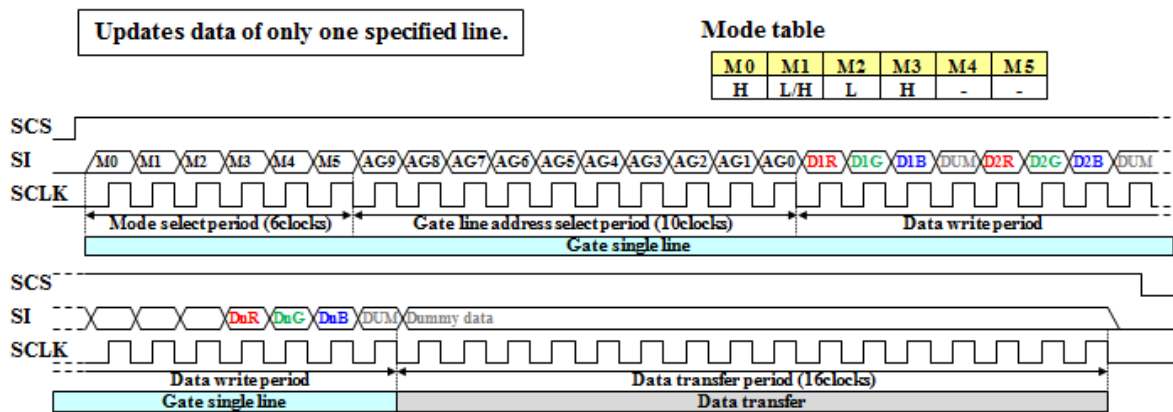
m : Number of vertical line, refer to the Display address map and Pixel layout.

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

Insert 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”.

8.6.5 SINGLE LINE UPDATE MODE (4bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

M3 : Data-bit control flag. In the 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 line address table.

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

In the 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".

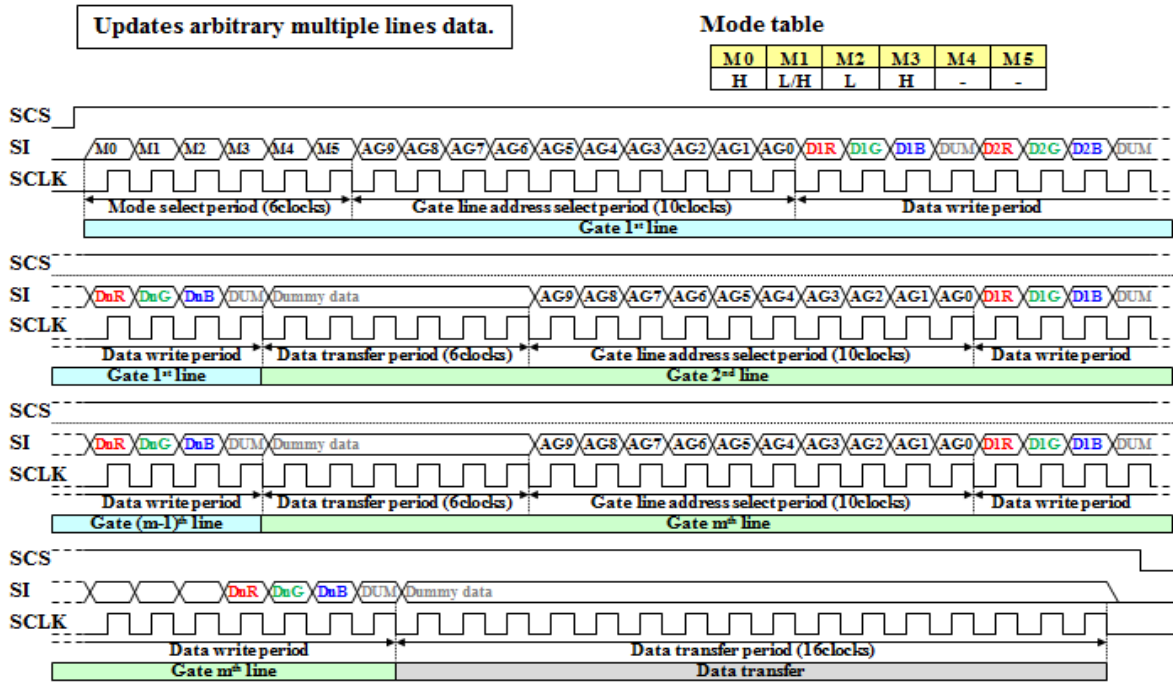
n : Number of horizontal line, refer to the Display address map and Pixel layout.

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

Insert 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".

8.7 MULTIPLE LINES UPDATE MODE (4bit-data mode)



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

M3 : Data-bit control flag. In the 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 line address table.

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

In the 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.

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

Insert 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".

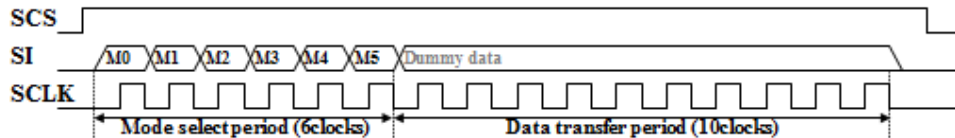
8.8 No-UPDATE MODE

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 the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, 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 the case of "L", no-update mode and display blinking mode is terminated.

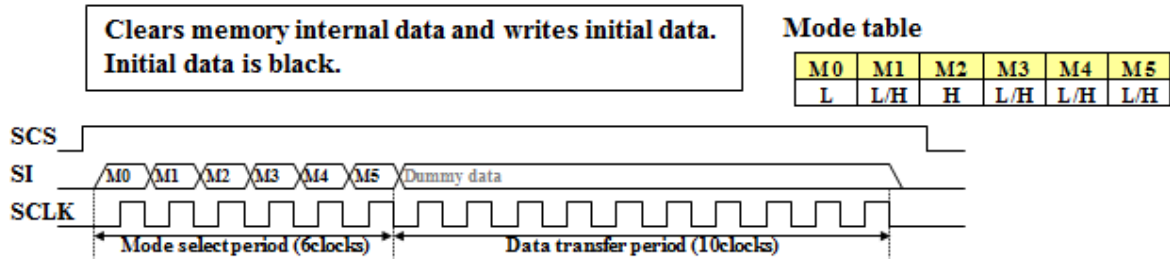
In the case of "H", display blinking mode. Refer to the 6.9 for details.

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".

8.9 ALL CLEAR MODE



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

M2 : All clear flag. Set "H", all clear mode.

M3 : Blinking flag. In the case of "L", display blinking mode is terminated.

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

M4-M5 : Blinking mode flag. In the case of M3="H", it is valid.

In the case of M3="L", it is invalid, 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".

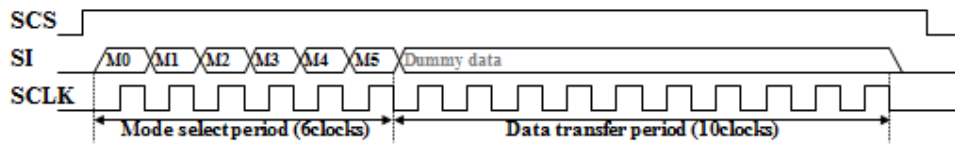
Display gives priority to blinking flag (M3).

8.10 DISPLAY BLINKING COLOR MODE

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

Mode table

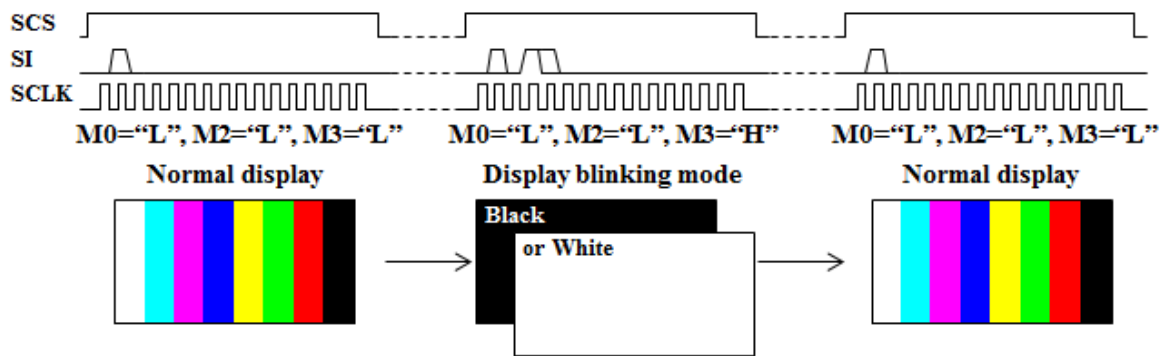
M0	M1	M2	M3	M4	M5
L	L/H	L	H	L/H	L



- M0 : Mode flag. Set "L", no-update mode.
- M1 : COM inversion flag. In the case of EXTMODE="L", it is valid. In the case of "H", outputs COM="H". In the case of "L", outputs COM="L". In the case of EXTMODE="H", it is invalid, it can be "H" or "L".
- M2 : All clear flag. Set "L", no-update mode. In the case of "H", all clear mode. Refer to the 6.8 for details.
- M3 : Blinking flag. In the case of "H", display blinking mode. In the case of "L", display blinking mode is terminated.
- M4 : Blinking color flag. Apply to display blinking color. In the case of "H", solid white color is forcibly displayed. In the case of "L", solid black color is forcibly displayed.
- M5 : Blinking inversion flag. Set "L", blinking color mode.

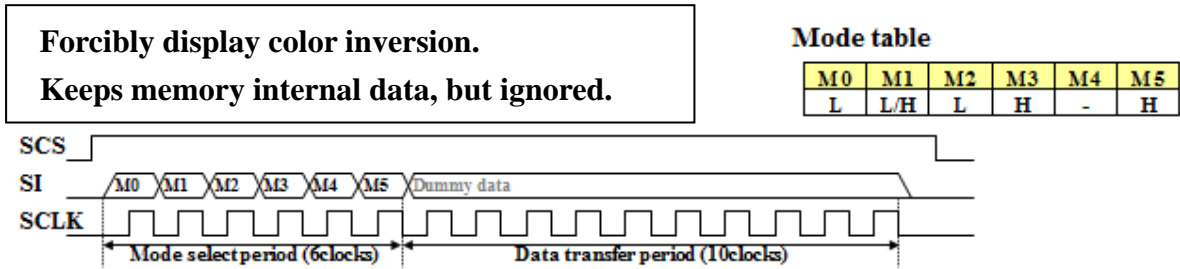
Dummy data : It can be "H" or "L".

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.

8.11 DISPLAY COLOR INVERSION MODE



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

M1 : COM inversion flag. In the case of EXTMODE="L", it is valid.

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

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

In the case of EXTMODE="H", it is invalid, it can be "H" or "L".

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

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

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

In the case of "L", display blinking mode is terminated.

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

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

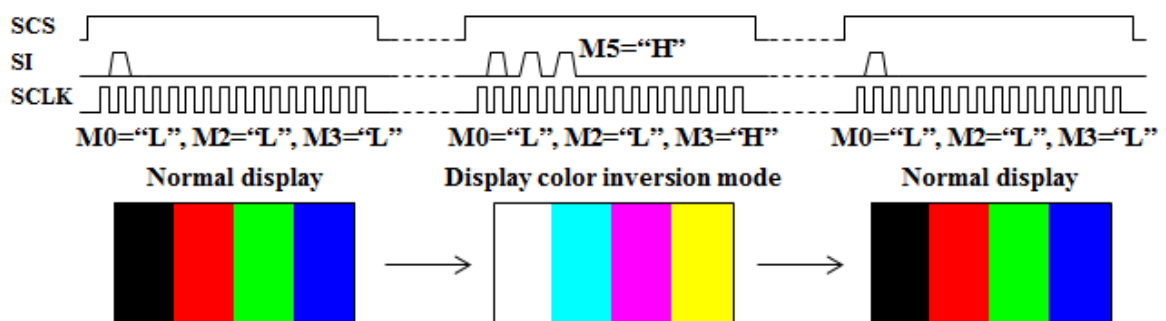
M5 : Color inversion flag. Set "H", display color is inverted.

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

"Cyan" is complementary color of "Red".

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

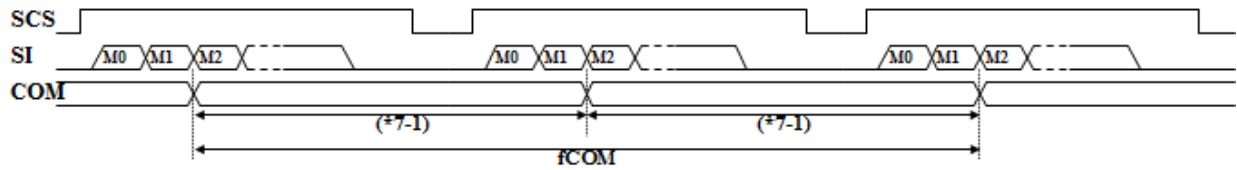
M0, M2 flags are cleared by SCS="L", and M3, M5 flags are cleared by DISP="L".



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

8.12 COM Inversion

8.12.1 COM POLARITY SERIAL INPUT / EXTMODE = "L"

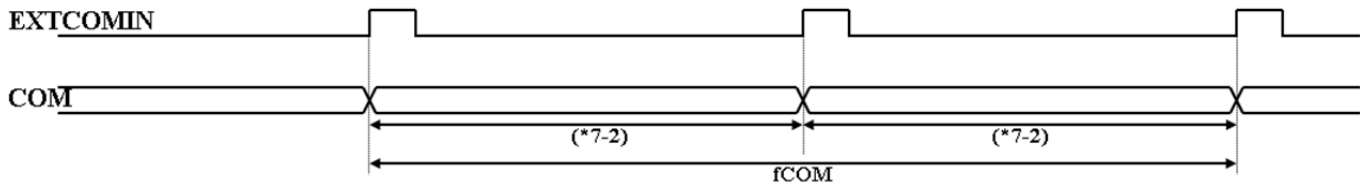


M1 : COM inversion flag. In the case of "H", outputs COM="H". In the case of "L", outputs COM="L".

COM polarity inversion has been changed by M1 flag state.

Note 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.

Note 2: The periods of positive and negative polarity should be same length as much as possible.

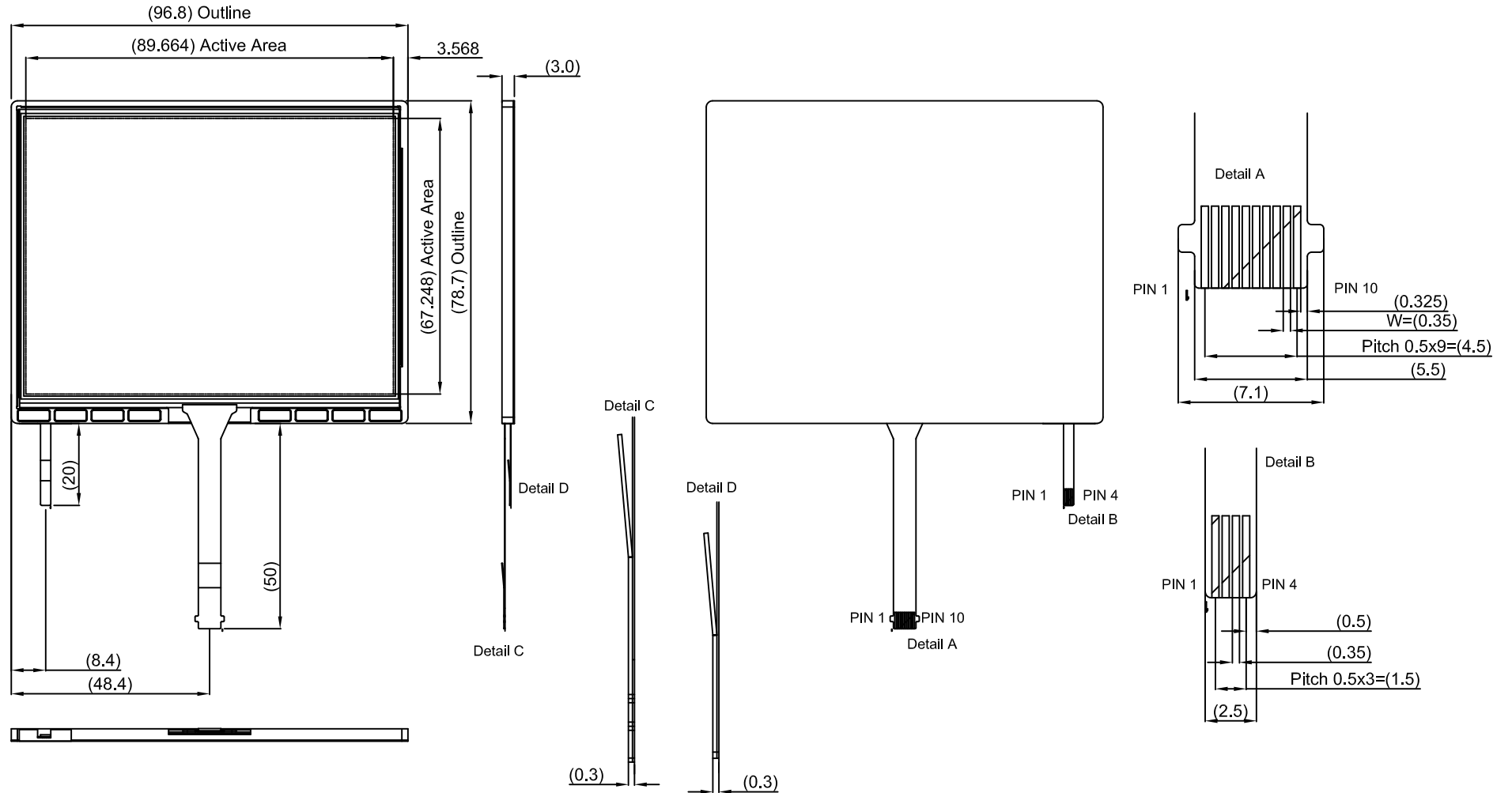
8.13 Gate address table

LPM044M141 : V1- V255

V	AG9	AG8	AG7	AG6	AG5	AG4	AG3	AG2	AG1	AG0	V	AG9	AG8	AG7	AG6	AG5	AG4	AG3	AG2	AG1	AG0	V	AG9	AG8	AG7	AG6	AG5	AG4	AG3	AG2	AG1	AG0									
0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	1	0	0	0	0	0	0	128	0	0	1	0	0	0	0	0	0	192	0	0	1	1	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	65	0	0	0	1	0	0	0	0	0	0	129	0	0	1	0	0	0	0	0	0	193	0	0	1	1	0	0	0	0	1
2	0	0	0	0	0	0	0	0	1	0	66	0	0	0	1	0	0	0	0	1	0	130	0	0	1	0	0	0	0	0	1	194	0	0	1	1	0	0	0	0	1
3	0	0	0	0	0	0	0	0	1	1	67	0	0	0	1	0	0	0	0	1	1	131	0	0	1	0	0	0	0	0	1	195	0	0	1	1	0	0	0	0	1
4	0	0	0	0	0	0	0	1	0	0	68	0	0	0	1	0	0	0	1	0	0	132	0	0	1	0	0	0	0	1	196	0	0	1	1	0	0	0	1	0	
5	0	0	0	0	0	0	0	1	0	1	69	0	0	0	1	0	0	0	1	0	1	133	0	0	1	0	0	0	0	1	197	0	0	1	1	0	0	0	1	0	
6	0	0	0	0	0	0	0	1	1	0	70	0	0	0	1	0	0	0	1	1	0	134	0	0	1	0	0	0	0	1	198	0	0	1	1	0	0	0	1	1	
7	0	0	0	0	0	0	1	1	1	1	71	0	0	0	1	0	0	0	1	1	1	135	0	0	1	0	0	0	0	1	199	0	0	1	1	0	0	0	1	1	
8	0	0	0	0	0	1	0	0	0	0	72	0	0	0	1	0	0	1	0	0	0	136	0	0	1	0	0	0	0	1	200	0	0	1	1	0	0	1	0	0	
9	0	0	0	0	0	1	0	0	1	0	73	0	0	0	1	0	0	1	0	0	1	137	0	0	1	0	0	0	1	0	201	0	0	1	1	0	0	1	0	0	
10	0	0	0	0	0	1	0	1	0	1	74	0	0	0	1	0	0	1	0	1	0	138	0	0	1	0	0	0	1	0	202	0	0	1	1	0	0	1	0	1	
11	0	0	0	0	0	1	0	1	1	1	75	0	0	0	1	0	0	1	0	1	1	139	0	0	1	0	0	0	1	0	203	0	0	1	1	0	0	1	0	1	
12	0	0	0	0	0	1	1	0	0	0	76	0	0	0	1	0	0	1	1	0	0	140	0	0	1	0	0	0	1	1	204	0	0	1	1	0	0	1	1	0	
13	0	0	0	0	0	1	1	0	1	0	77	0	0	0	1	0	0	1	1	0	1	141	0	0	1	0	0	0	1	1	205	0	0	1	1	0	0	1	1	0	
14	0	0	0	0	0	1	1	1	0	0	78	0	0	0	1	0	0	1	1	1	0	142	0	0	1	0	0	0	1	1	206	0	0	1	1	0	0	1	1	1	
15	0	0	0	0	0	1	1	1	1	1	79	0	0	0	1	0	0	1	1	1	1	143	0	0	1	0	0	0	1	1	207	0	0	1	1	0	0	1	1	1	
16	0	0	0	0	1	0	0	0	0	0	80	0	0	0	1	0	1	0	0	0	0	144	0	0	1	0	0	1	0	0	208	0	0	1	1	0	1	0	0	0	
17	0	0	0	0	1	0	0	0	1	0	81	0	0	0	1	0	1	0	0	0	1	145	0	0	1	0	0	1	0	0	209	0	0	1	1	0	1	0	0	0	
18	0	0	0	0	1	0	0	1	0	0	82	0	0	0	1	0	1	0	0	1	0	146	0	0	1	0	0	1	0	0	210	0	0	1	1	0	1	0	0	1	
19	0	0	0	0	1	0	0	1	1	1	83	0	0	0	1	0	1	0	0	1	1	147	0	0	1	0	0	1	0	0	211	0	0	1	1	0	1	0	0	1	
20	0	0	0	0	1	0	1	0	0	0	84	0	0	0	1	0	1	0	1	0	0	148	0	0	1	0	0	1	0	1	212	0	0	1	1	0	1	0	1	0	
21	0	0	0	0	1	0	1	0	1	0	85	0	0	0	1	0	1	0	1	0	1	149	0	0	1	0	0	1	0	1	213	0	0	1	1	0	1	0	1	0	
22	0	0	0	0	1	0	1	1	0	0	86	0	0	0	1	0	1	0	1	1	0	150	0	0	1	0	0	1	0	1	214	0	0	1	1	0	1	0	1	1	
23	0	0	0	0	1	0	1	1	1	1	87	0	0	0	1	0	1	0	1	1	1	151	0	0	1	0	0	1	0	1	215	0	0	1	1	0	1	0	1	1	
24	0	0	0	0	1	1	0	0	0	0	88	0	0	0	1	0	1	1	0	0	0	152	0	0	1	0	0	1	1	0	216	0	0	1	1	0	1	1	0	0	
25	0	0	0	0	1	1	0	0	1	0	89	0	0	0	1	0	1	1	0	0	1	153	0	0	1	0	0	1	1	0	217	0	0	1	1	0	1	1	0	0	
26	0	0	0	0	1	1	0	1	0	1	90	0	0	0	1	0	1	1	0	1	0	154	0	0	1	0	0	1	1	0	218	0	0	1	1	0	1	1	0	1	
27	0	0	0	0	1	1	0	1	1	1	91	0	0	0	1	0	1	1	0	1	1	155	0	0	1	0	0	1	1	0	219	0	0	1	1	0	1	1	0	1	
28	0	0	0	0	1	1	1	0	0	0	92	0	0	0	1	0	1	1	1	0	0	156	0	0	1	0	0	1	1	1	220	0	0	1	1	0	1	1	1	0	
29	0	0	0	0	1	1	1	0	1	0	93	0	0	0	1	0	1	1	1	0	1	157	0	0	1	0	0	1	1	1	221	0	0	1	1	0	1	1	1	0	
30	0	0	0	0	1	1	1	1	0	0	94	0	0	0	1	0	1	1	1	1	0	158	0	0	1	0	0	1	1	1	222	0	0	1	1	0	1	1	1	1	
31	0	0	0	0	1	1	1	1	1	1	95	0	0	0	1	0	1	1	1	1	1	159	0	0	1	0	0	1	1	1	223	0	0	1	1	0	1	1	1	1	
32	0	0	0	0	1	0	0	0	0	0	96	0	0	0	1	1	0	0	0	0	0	160	0	0	1	0	1	0	0	0	224	0	0	1	1	1	0	0	0	0	
33	0	0	0	0	1	0	0	0	1	0	97	0	0	0	1	1	0	0	0	0	1	161	0	0	1	0	1	0	0	0	225	0	0	1	1	1	0	0	0	1	
34	0	0	0	0	1	0	0	0	1	0	98	0	0	0	1	1	0	0	0	1	0	162	0	0	1	0	0	0	0	1	226	0	0	1	1	1	0	0	0	1	
35	0	0	0	0	1	0	0	0	1	1	99	0	0	0	1	1	0	0	0	1	1	163	0	0	1	0	1	0	0	0	227	0	0	1	1	1	0	0	0	1	
36	0	0	0	0	1	0	0	1	0	0	100	0	0	0	1	1	0	0	1	0	0	164	0	0	1	0	1	0	0	1	228	0	0	1	1	1	0	0	1	0	
37	0	0	0	0	1	0	0	1	0	1	101	0	0	0	1	1	0	0	1	0	1	165	0	0	1	0	1	0	0	1	229	0	0	1	1	1	0	0	1	0	
38	0	0	0	0	1	0	0	1	1	0	102	0	0	0	1	1	0	0	1	1	0	166	0	0	1	0	1	0	0	1	230	0	0	1	1	1	0	0	1	1	
39	0	0	0	0	1	0	0	1	1	1	103	0	0	0	1	1	0	0	1	1	1	167	0	0	1	0	1	0	0	1	231	0	0	1	1	1	0	0	1	1	
40	0	0	0	0	1	0	1	0	0	0	104	0	0	0	1	1	0	1	0	0	0	168	0	0	1	0	1	0	1	0	232	0	0	1	1	1	0	1	0	0	
41	0	0	0	0	1	0	1	0	0	1	105	0	0	0	1	1	0	1	0	0	1	169	0	0	1	0	1	0	1	0	233	0	0	1	1	1	0	1	0	0	
42	0	0	0	0	1	0	1	0	1	0	106	0	0	0	1	1	0	1	0	1	0	170	0	0	1	0	1	0	1	0	234	0	0	1	1	1	0	1	0	1	
43	0	0	0	0	1	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	235	0	0	1	1	1	0	1	0	1	
44	0	0	0	0	1	0	1	1	0	0	108	0	0	0	1	1	0	1	1	0	0	172	0	0	1	0	1	0	1	1	236	0	0	1	1	1	0	1	1	0	
45	0	0	0	0	1	0	1	1	0	1	109	0	0	0	1	1	0	1	1	0	1	173	0	0	1	0	1	0	1	1	237	0	0	1	1	1	0	1	1	0	
46	0	0	0	0	1	0	1	1	1	0	110	0	0	0	1	1	0	1	1	1	0	174	0	0	1																

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	V	AG 9	AG 8	AG 7	AG 6	AG 5	AG 4	AG 3	AG 2	AG 1	AG 0			
256	0	1	0	0	0	0	0	0	0	0	320	0	1	0	1	0	0	0	0	0	0	384	0	1	1	0	0	0	0	0	0	0	0	448	0	1	1	1	0	0	0	0	0	0		
257	0	1	0	0	0	0	0	0	0	1	321	0	1	0	1	0	0	0	0	0	0	1	385	0	1	1	0	0	0	0	0	0	0	1	449	0	1	1	1	0	0	0	0	0	1	
258	0	1	0	0	0	0	0	0	0	1	322	0	1	0	1	0	0	0	0	0	1	0	386	0	1	1	0	0	0	0	0	0	1	0	450	0	1	1	1	0	0	0	0	1	0	
259	0	1	0	0	0	0	0	0	0	1	323	0	1	0	1	0	0	0	0	0	1	1	387	0	1	1	0	0	0	0	0	0	1	1	451	0	1	1	1	0	0	0	0	1	1	
260	0	1	0	0	0	0	0	0	1	0	324	0	1	0	1	0	0	0	0	1	0	0	388	0	1	1	0	0	0	0	0	1	0	0	452	0	1	1	1	0	0	0	1	0	0	
261	0	1	0	0	0	0	0	0	1	0	325	0	1	0	1	0	0	0	0	1	0	1	389	0	1	1	0	0	0	0	0	1	0	1	453	0	1	1	1	0	0	0	1	0	1	
262	0	1	0	0	0	0	0	0	1	1	326	0	1	0	1	0	0	0	0	1	1	0	390	0	1	1	0	0	0	0	0	1	1	0	454	0	1	1	1	0	0	0	1	1	0	
263	0	1	0	0	0	0	0	0	1	1	327	0	1	0	1	0	0	0	0	1	1	1	391	0	1	1	0	0	0	0	0	1	1	1	455	0	1	1	1	0	0	0	1	1	1	
264	0	1	0	0	0	0	1	0	0	0	328	0	1	0	1	0	0	0	0	1	0	0	392	0	1	1	0	0	0	0	0	1	0	0	456	0	1	1	1	0	0	1	0	0	0	
265	0	1	0	0	0	0	0	1	0	0	329	0	1	0	1	0	0	0	0	1	0	0	393	0	1	1	0	0	0	0	0	1	0	0	457	0	1	1	1	0	0	1	0	0	1	
266	0	1	0	0	0	0	0	1	0	1	330	0	1	0	1	0	0	0	0	1	0	1	394	0	1	1	0	0	0	0	0	1	0	1	458	0	1	1	1	0	0	1	0	1	0	
267	0	1	0	0	0	0	0	1	0	1	331	0	1	0	1	0	0	0	0	1	0	1	395	0	1	1	0	0	0	0	0	1	0	1	459	0	1	1	1	0	0	1	0	1	1	
268	0	1	0	0	0	0	0	1	1	0	332	0	1	0	1	0	0	0	1	1	0	0	396	0	1	1	0	0	0	0	1	1	0	0	460	0	1	1	1	0	0	1	1	0	0	
269	0	1	0	0	0	0	0	1	1	0	333	0	1	0	1	0	0	0	0	1	1	0	397	0	1	1	0	0	0	0	1	1	0	1	461	0	1	1	1	0	0	1	1	0	1	
270	0	1	0	0	0	0	0	1	1	1	334	0	1	0	1	0	0	0	0	1	1	1	398	0	1	1	0	0	0	0	0	1	1	1	0	462	0	1	1	1	0	0	0	1	1	1
271	0	1	0	0	0	0	0	1	1	1	335	0	1	0	1	0	0	0	0	1	1	1	399	0	1	1	0	0	0	0	0	1	1	1	1	463	0	1	1	1	0	0	1	1	1	1
272	0	1	0	0	0	0	1	0	0	0	336	0	1	0	1	0	0	0	0	0	0	0	400	0	1	1	0	0	0	0	0	0	0	0	464	0	1	1	1	0	0	0	0	0	0	
273	0	1	0	0	0	0	1	0	0	0	337	0	1	0	1	0	0	0	0	0	1	0	401	0	1	1	0	0	0	0	0	0	0	1	465	0	1	1	1	0	0	1	0	0	0	
274	0	1	0	0	0	0	1	0	0	1	338	0	1	0	1	0	0	0	0	0	1	0	402	0	1	1	0	0	0	0	0	0	0	0	1	466	0	1	1	1	0	0	1	0	0	1
275	0	1	0	0	0	0	1	0	0	1	339	0	1	0	1	0	0	0	0	1	1	0	403	0	1	1	0	0	0	0	0	0	0	1	467	0	1	1	1	0	0	1	0	0	1	
276	0	1	0	0	0	0	1	0	1	0	340	0	1	0	1	0	0	0	0	0	1	0	404	0	1	1	0	0	0	0	0	0	0	1	468	0	1	1	1	0	0	1	0	0	0	
277	0	1	0	0	0	0	1	0	1	0	341	0	1	0	1	0	0	0	0	0	1	0	405	0	1	1	0	0	0	0	0	0	0	1	469	0	1	1	1	0	0	1	0	0	1	
278	0	1	0	0	0	0	1	0	1	1	342	0	1	0	1	0	0	0	0	0	1	0	406	0	1	1	0	0	0	0	0	0	0	1	470	0	1	1	1	0	0	1	0	1	0	
279	0	1	0	0	0	0	1	0	1	1	343	0	1	0	1	0	0	0	0	1	1	1	407	0	1	1	0	0	0	0	0	0	0	1	471	0	1	1	1	0	0	1	0	1	1	
280	0	1	0	0	0	0	1	1	0	0	344	0	1	0	1	0	0	0	0	0	0	0	408	0	1	1	0	0	0	0	0	0	0	0	472	0	1	1	1	0	0	1	1	0	0	
281	0	1	0	0	0	0	1	1	0	0	345	0	1	0	1	0	0	0	0	0	0	0	409	0	1	1	0	0	0	0	0	0	0	0	473	0	1	1	1	0	0	1	1	0	0	
282	0	1	0	0	0	0	1	1	0	1	346	0	1	0	1	0	0	0	0	0	1	0	410	0	1	1	0	0	0	0	0	0	0	0	474	0	1	1	1	0	0	1	1	0	1	
283	0	1	0	0	0	0	1	1	0	1	347	0	1	0	1	0	0	0	0	0	1	1	411	0	1	1	0	0	0	0	0	0	0	0	475	0	1	1	1	0	0	1	1	0	1	
284	0	1	0	0	0	0	1	1	1	0	348	0	1	0	1	0	0	0	0	0	1	1	412	0	1	1	0	0	0	0	0	0	0	0	476	0	1	1	1	0	0	1	1	1	0	
285	0	1	0	0	0	0	1	1	1	0	349	0	1	0	1	0	0	0	0	0	1	0	413	0	1	1	0	0	0	0	0	0	0	0	477	0	1	1	1	0	0	1	1	0	1	
286	0	1	0	0	0	0	1	1	1	0	350	0	1	0	1	0	0	0	0	0	1	1	414	0	1	1	0	0	0	0	0	0	0	1	478	0	1	1	1	0	0	1	1	1	0	
287	0	1	0	0	0	0	1	1	1	1	351	0	1	0	1	0	0	0	0	0	1	1	415	0	1	1	0	0	0	0	0	0	0	1	479	0	1	1	1	0	0	1	1	1	1	
288	0	1	0	0	0	0	0	0	0	0	352	0	1	0	1	0	0	0	0	0	0	0	416	0	1	1	0	0	0	0	0	0	0	0	480	0	1	1	1	0	0	0	0	0	0	
289	0	1	0	0	0	0	0	0	0	1	353	0	1	0	1	0	0	0	0	0	0	1	417	0	1	1	0	0	0	0	0	0	0	0	481	0	1	1	1	0	0	0	0	0	1	
290	0	1	0	0	0	0	0	0	0	1	354	0	1	0	1	0	0	0	0	0	0	1	418	0	1	1	0	0	0	0	0	0	0	0	482	0	1	1	1	0	0	0	0	0	1	
291	0	1	0	0	0	0	0	0	1	1	355	0	1	0	1	0	0	0	0	0	1	1	419	0	1	1	0	0	0	0	0	0	0	0	483	0	1	1	1	0	0	0	0	0	1	
292	0	1	0	0	0	0	0	0	0	0	356	0	1	0	1	0	0	0	0	0	0	0	420	0	1	1	0	0	0	0	0	0	0	0	484	0	1	1	1	0	0	0	0	0	0	
293	0	1	0	0	0	0	0	0	0	1	357	0	1	0	1	0	0	0	0	0	0	1	421	0	1	1	0	0	0	0	0	0	0	0	485	0	1	1	1	0	0	0	0	0	1	
294	0	1	0	0	0	0	0	0	0	1	358	0	1	0	1	0	0	0	0	0	0	1	422	0	1	1	0	0	0	0	0	0	0	0	486	0	1	1	1	0	0	0	0	0	1	
295	0	1	0	0	0	0	0	0	1	1	359	0	1	0	1	0	0	0	0	0	1	1	423	0	1	1	0	0	0	0	0	0	0	1	487	0	1	1	1	0	0	0	0	0	1	
296	0	1	0	0	0	0	0	0	0	0	360	0	1	0	1	0	0	0	0	0	0	0	424	0	1	1	0	0	0	0	0	0	0	0	488	0	1	1	1	0	0	0	0	0	0	
297	0	1	0	0	0	0	0	0	0	0	3																																			

9. OUTLINE DIMENSIONS



General Tolerance: $\pm 0.5\text{mm}$
 Scale : NTS
 Unit : mm

DATA MODUL



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