


Product Specification

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Thin-Film-Transistor LCD Module
Model: GKIXA4MNGE1A0


Acceptance

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Revise Records

Rev.	Date	Contents	Written	Approved
A	2019/02/15	Preliminary Specification	Carl Lin	Ken Hung

Special Notes


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1. General Description and Features

GKIXA4MNGE1A0 is a transmissive type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a receiver circuit, and a back-light unit. Graphics and texts can be displayed on a HD 1024 (W) x 3 x 768 (H) dots (4:3 aspect ratio) with 262K/16.2M colors by supplying 18/24 bits data signal (8bits/each color). The following table described the features of GKIXA4MNGE1A0.

1.1 Features

- Transmissive and back-light with 42 LEDs are available.
- MVA mode.
- LVDS Receiver 24 bit Interface.

1.2 LCD Module


Item	Specification	Unit
Screen Size	10.4 inches	Diagonal
Display Resolution	1024 (H) x 768 (V)	Pixel
Active Area	211.2 (H) x 158.4 (V)	mm
Outline Dimension	243.0 (H) x 185.6 (V) x 7.3 (T)	mm
Display Mode	Normally Black mode/ Transmissive	--
Surface Treatment	Anti-glare(AG)	--
Pixel Arrangement	R,G,B Vertical Stripe	--
Pixel Size	206.25 x 206.25	um
Display Color	262K/16.2M	--
Viewing Direction	Full View	--
Input Interface	LVDS Receiver 24 bit Interface	--

2. Mechanical Information

Item	Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	(243)	--	mm
	Vertical (V)	--	(185.6)	--	mm
	Thickness (T)	--	(7.3)	--	mm (1)
Weight	--	(TBD)	--	g	--

Note (1) Not Include Component. Refer to the Outline Dimension Drawing as attached.

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3. Electrical Specifications

3.1 Absolute Max. Ratings

3.1.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25±2°C, GND=0)


Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T _{STG}	-30	80	°C	(1)
Operating temperature	T _{OPR}	-20	70	°C	(1,2,3)

Note (1) 95 % RH Max. (40 °C ≥ Ta). Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation.

Note (2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

Note (3) Only operation is guaranteed at operating temperature. Contrast, response time, another display quality are evaluated at +25°C.

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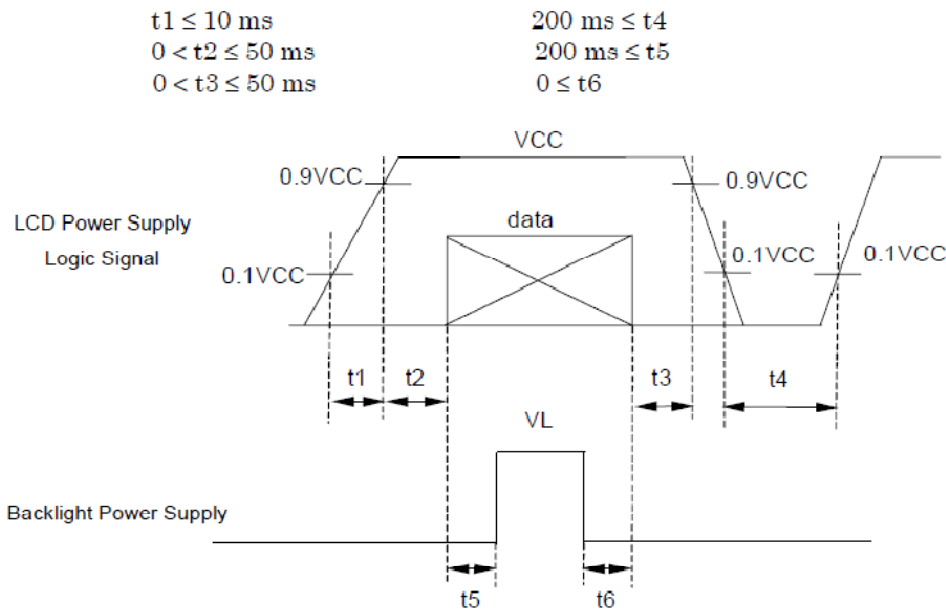
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3.1.2 Electrical Absolute Maximum Ratings


($V_{SS}=GND=0$)

Parameter	Symbol	Min.	Max.	Unit	Remark
Power supply Logic voltage	VCC	-0.3	4.0	V	
Power supply LED voltage	VLED	-0.3	18	V	
Permissive input ripple voltage	V_{RF}	--	100	mVp-p	VCC=3.3V

Display On/Off Sequence :



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3.1.3 DC Electrical Characteristics of the TFT LCD

(Ta=25±2°C, GND=0)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power supply Logic Voltage	VCC	3.0	3.3	3.6	V	
Power supply LED Voltage	VLED	-	12	-	V	
Input Voltage for logic	H Level	VIH	0.7xVDD	-	VDD	V
	L Level	VIL	0	-	0.3xVDD	V
Power Supply current	ICC	-	TBD	TBD	mA	Note 1
Power Supply current (LED Driver)	ILED	-	TBD	TBD	mA	VLED=12V
LED Life time	-	(50000)	-	-	Hrs	Note 2

Note : 1 : White Pattern & 60Hz



Note2: The environmental conducted under ambient air flow ,at Ta=25±2 °C,60%RH±5%

3.1.4 AC Timing Condition

Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
DCLK	CLK frequency	fclk	52	65	71	MHz	
Horizontal Timing	Horizontal display area	Thd	1024			DCLK	
	HSYNC period time	Th	1114	1344	1400	DCLK	
	HSYNC Blanking	thb+thfp	90	320	376	DCLK	
Vertical Timing	Vertical display area	Tvd	768			TH	
	VSYNC Period time	Tv	778	806	845	TH	
	VSYNC Blanking	Tvb+tvfp	10	38	77	TH	

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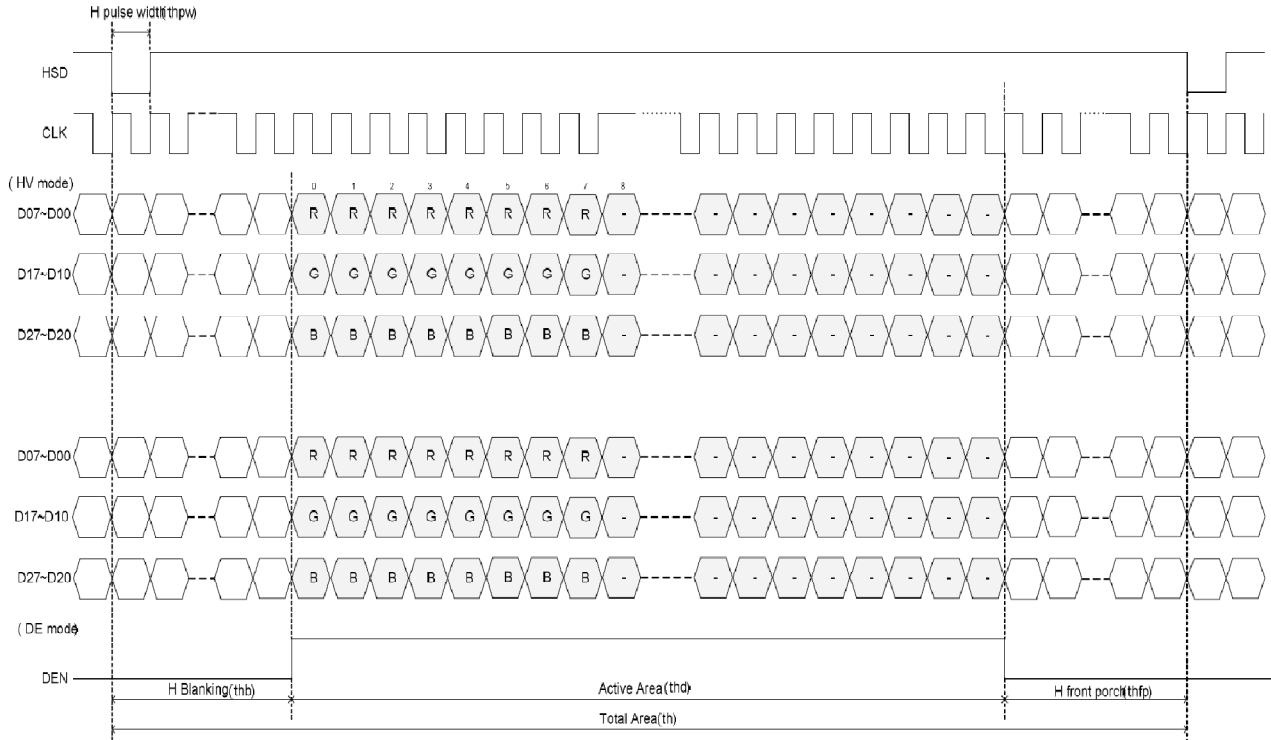
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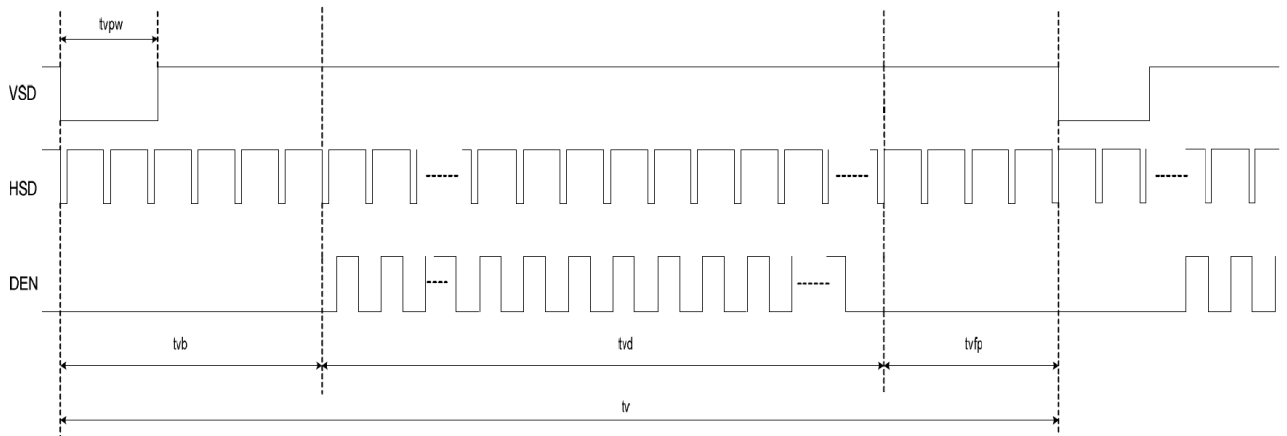
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3.1.5 Timing Characteristic


3.1.5.1 Horizontal Timing



3.1.5.2 Vertical Timing



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4. Optical Characteristics


4.1 Optical characteristic of the LCD

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods.

Measuring equipment: BM-7A

Item	Symbol	Condition	Min	Type	Max	Unit	Note	
Brightness	B		(1000)	(1200)	--	cd/m ²		
Response time	T _r +T _f	θ=0°	-	30	40	ms	.	
Contrast ratio	CR	At optimized viewing angle	(600)	(900)	--	--		
Luminance Uniformity	ΔL		70	75		%		
Color Chromaticity (CIE 1931)	White	W _x	θ=0° Normal Viewing Angle	(TBD)	(TBD)	(TBD)	--	BM-7A
		W _y		(TBD)	(TBD)	(TBD)		
Viewing Angle	Hor.	θ _R	CR≥10	80	85	--	Degree	
		θ _L		80	85	--		
	Ver.	θ _U		80	85	--		
		θ _D		80	85	--		

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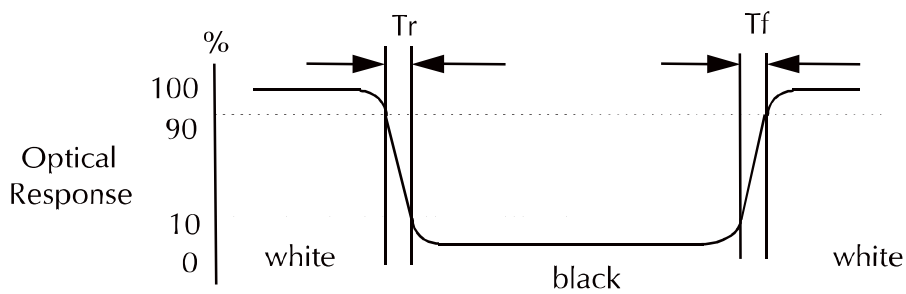
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a. Test equipment setup

After stabilizing and leaving the panel alone shall be warmed up for the stable operation of LCM, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7A(fast) with a viewing angle of 2° at a distance of 50cm and normal direction.

b. Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



c. Definition of contrast ratio:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at "white state"}}{\text{Brightness measured when LCD is at "black state"}}$$

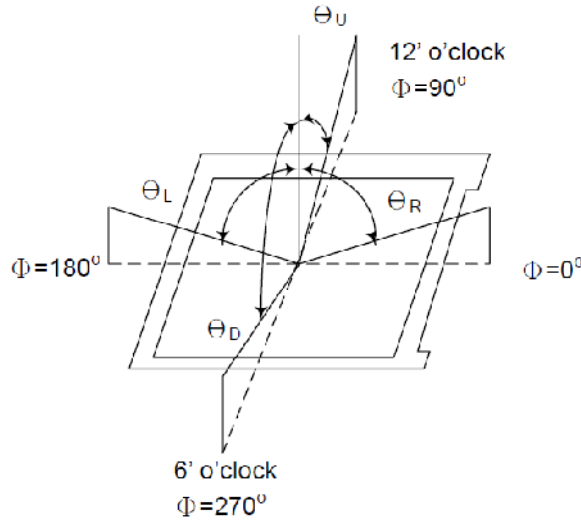
d. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

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e. View Angle



f. Definition of Luminance of White: Luminance of white at the center points

Light Source of Back-Light Unit	LED Type
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g. Definition of White Uniformity

$$\text{White Uniformity} = \frac{\text{Min. luminance of white among 9-points}}{\text{Max. luminance of white among 9-points}} \times 100\%$$

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5. I/O Terminal

5.1 Pin Assignment (MSB24013P20A or equivalent.)

Pin No.	Symbol	I/O	Function	Remark
1	VCC	P	Power Supply for LCM	
2	VCC	P	Power Supply for LCM	
3	SELB	P	6bit/8bit mode select	Note 1
4	GND	P	Ground	
5	RXI0-	I	Negative LVDS differential data 0 input	
6	RXI0+	I	Positive LVDS differential data 0 input	
7	GND	P	Ground	
8	RXI1-	I	Negative LVDS differential data 1 input	
9	RXI1+	I	Positive LVDS differential data 1 input	
10	GND	P	Ground	
11	RXI2-	I	Negative LVDS differential data 2 input	
12	RXI2+	I	Positive LVDS differential data 2 input	
13	GND	P	Ground	
14	RXICLK-	I	Negative LVDS differential CLK input	
15	RXICLK+	I	Positive LVDS differential CLK input	
16	GND	P	Ground	
17	RXI3-	I	Negative LVDS differential data 3 input	
18	RXI3+	I	Positive LVDS differential data 3 input	
19	GND	P	Ground	
20	GND	P	Ground	

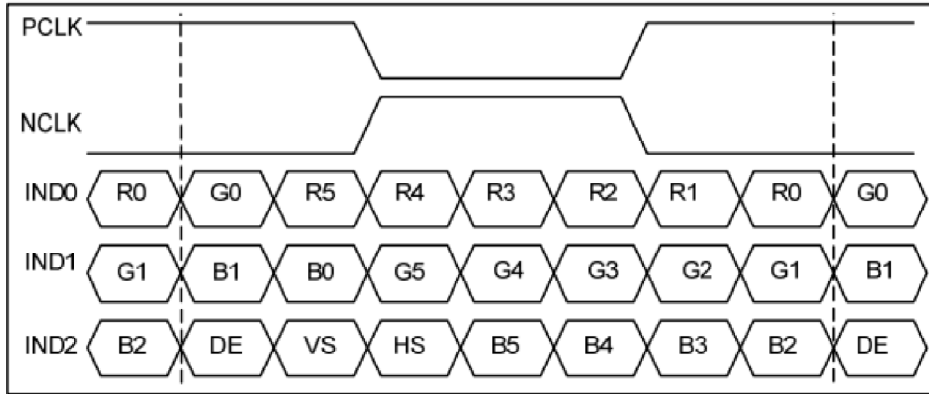
I: Input, O: Output, P: Power

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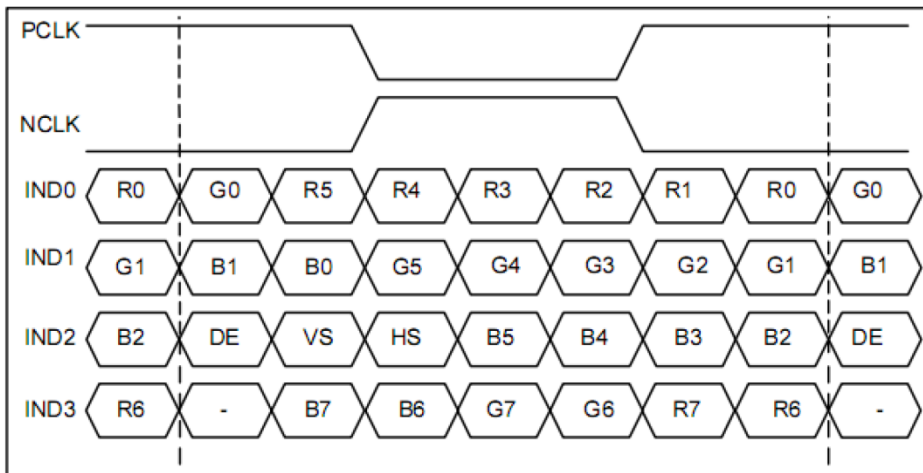
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Note 1 :LVDS Input

6 bit LVDS Input



8 bit LVDS Input



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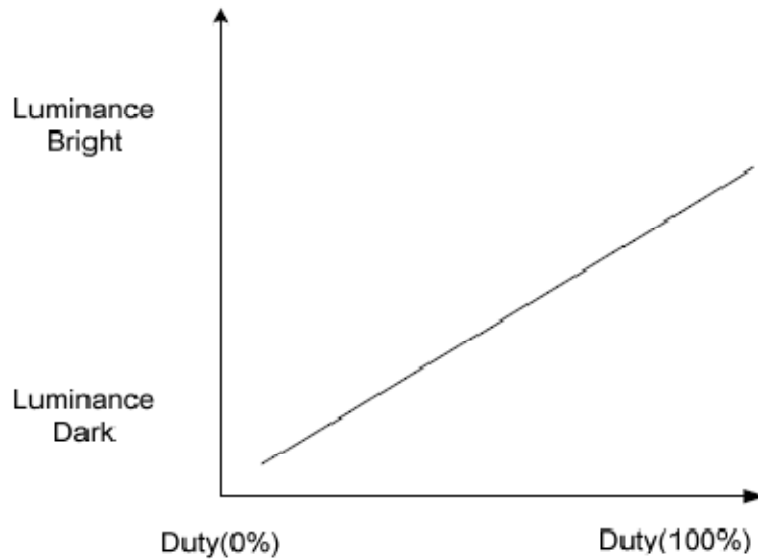
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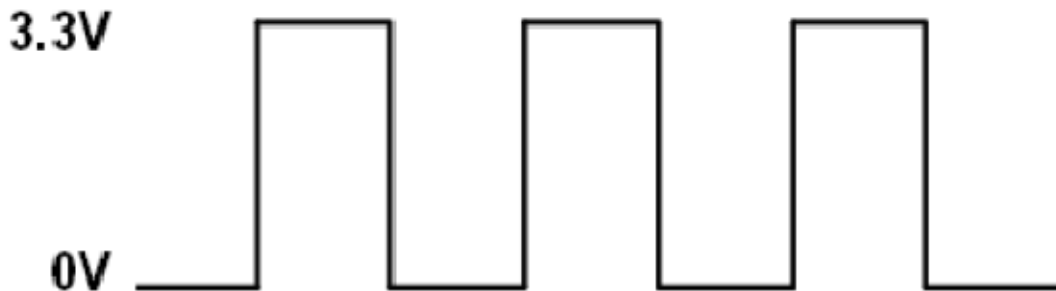
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5.2 Back-light (CN2:ENTERY 3808K-F05N-03L or Equivalent)

Pin No.	Symbol	I/O	Function	Remark
1	VLED	P	Power Supply voltage for Backlight	
2	GND	P	Ground	
3	ON/OFF	P	Backlight ON/OFF	
4	Dimming	P	Adjust brightness	Note 2
5	GND	P	Ground	



Note 2: Diming signal=0~3.3V, Operating frequency:100Hz~1KHz



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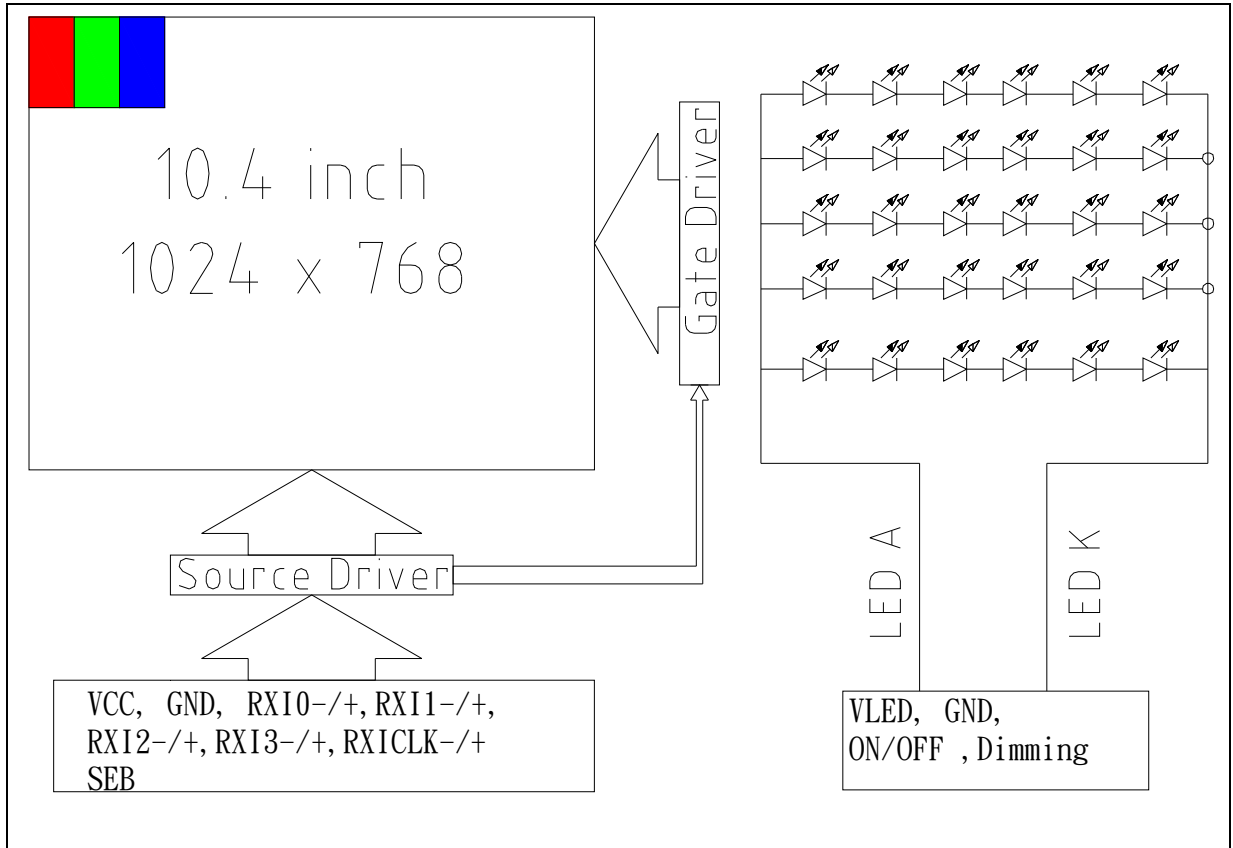
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5.3 Block Diagram



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6. Displayed Color and Input Data

	Color & Gray Scale	Data Signal																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green(0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue(0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(61)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(31)	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(1)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(61)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(31)	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(1)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(31)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 : Low level voltage, 1 :High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. With the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

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7. Reliability Condition

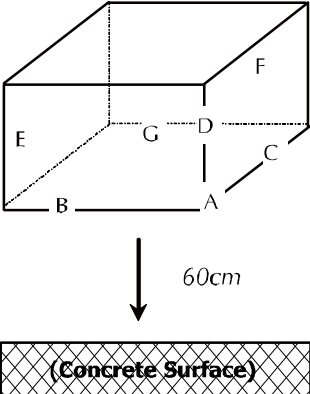
No change on display and in operation under the following test condition.

Condition: Unless otherwise specified, tests will be conducted under the following condition.

Temperature: 20±5°C.

Humidity: 65±5%RH.

Tests will be not conducted under functioning state.

No.	Parameter	Condition	Notes
1	High Temperature Operating	70°C±2°C, 240hrs (Operation state).	
2	Low Temperature Operating	-20°C±2°C, 240hrs (Operation state).	1
3	High Temperature Storage	80°C±2°C, 240hrs.	2
4	Low Temperature Storage	-30°C±2°C, 240hrs.	1,2
5	High Temperature and High Humidity Operation Test	60°C±2°C, 90%, 240hrs.	1,2
6	Vibration Test	Total fixed amplitude: 1.5mm. Vibration Frequency: 10~55Hz. One cycle 60 seconds to 3 direction of Random each 15 minutes.	3
7.	Drop Test	<p>To be measured after dropping from 60cm high on the concrete surface in packing state.</p> <div style="text-align: center;">  <p style="margin-left: 20px;"><i>Dropping method corner dropping:</i></p> <p style="margin-left: 20px;"><i>A corner: Once edge dropping.</i></p> <p style="margin-left: 20px;"><i>B, C, D edge: Once face dropping.</i></p> <p style="margin-left: 20px;"><i>E, F, G face: Once.</i></p> </div>	

- Notes:
1. No dew condensation to be observed.
 2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.
 3. Vibration test will be conducted to the product itself without putting I in a container.

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8. Dimensional Outlines

