HIGHNESS™

One of a kind

HM064XG211HK

6.4" Color TFT-LCD

Release Date
24th Jun 2024

HIGHNESS MICROELECTRONICS LTD

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1. General Specification

Item	Specification
Module Dimensions	153.0(W) mm x 118.0(H) mm x 8.7 (D) mm typ.
LCD Active Area	129.792(W) mm x 97.344(H) mm
Pixel Pitch	0.12675(W) mm x 0.12675 (H) mm
Resolution	1024 x 3(RGB)(W) x 768(H) dots
Color Pixel Arrangement	R, G, B Vertical stripe
LCD Type	LTPS TFT; Transmissive Normally Black
Top Polarizer Type	Glare Polarizer Film
Display Type	Active Matrix
Number of Colors	16.7M Colors (8-bit RGB)
Backlight	Light Emitting Diode (LED)
Weight	190g typ.
Interface	LVDS; 20 pins
Power Supply Voltage	3.3V for LCD; 12V for Backlight
Power Consumption	0.33 W for LCD; 4.56 W for Backlight
Viewing Direction	Super Wide Version (In-Plane Switching)

2. Absolute Maximum Ratings

2.1 Environmental Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remarks
Supply Voltage	V_{DD}	-0.3	4.5	V	-
Input Voltage of Logic	V_I	-0.3	V_{DD}	V	Note 1
Operating Temperature	Top	-30	80	°C	Note 2
Storage Temperature	Tst	-30	80	°C	Note 2
Backlight Input Voltage	V_L	0	15	V	-

Note 1: The rating is defined for the signal voltages of the interface such as CLK and pixel data pairs.

Note 2: The maximum rating is defined as above based on the panel surface 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:

- Background color, contrast and response time would be different in temperatures other than 25°C.
- Operating under high temperatures will shorten LED lifetime.

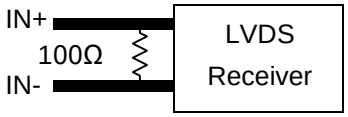
3. Electrical Characteristics

3.1 LCD Characteristics

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

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-	3.0	3.3	3.6	V	-
Differential Input Voltage for LVDS Receiver Threshold	V_I	"H" level	$0.7V_{DD}$	-	V_{DD}	mV	Note 1
		"L" level	V_{SS}	-	$0.3V_{DD}$		
Power Supply Current	I_{DD}	V_{DD}=3.3V	70	100	130	mA	Note 2
Frame Frequency	f_{Frame}	-	55	60	65	Hz	-
CLK Frequency	f_{CLK}	-	51	56.3	66	MHz	-
Input Voltage of Logic	V_I	"H" level	2.1	-	3.6	V	-
		"L" level	0	-	0.5		

Note 1: VCM 1.2V is common mode voltage of LVDS transmitter and receiver. The input terminal of LVDS transmitter is terminated with 100Ω.



Note 2: An all white check pattern is used when measuring I_{DD}. f_{Frame} is set to 60 Hz. Moreover, 0.5A fuse is applied in the module for I_{DD}. For display activation and protection purpose, power supply is recommended larger than 1.25A to start the display and break fuse once any short circuit occurred.

3.2 Backlight Characteristics

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

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
LED Input Voltage	V_L	-	10.8	12.0	13.2	V	Note1
LED Forward Current (Dim Control)	I_L	0% duty	340	380	420	mA	Note 2
		100% duty	-	10	-		
LED lifetime	-	I_{LED}= 380 mA	-	70K	-	hrs	Note 3

Note 1: As Fig. 5.1 shown, LED current is constant, 380 mA, controlled by the LED driver when applying 12V.

Note 2: Dimming function can be obtained by applying PWM signal from the display interface DIM (No.6pin) of CN2. The recommended PWM signal is 200Hz ~ 1K Hz with 3.3V amplitude.

Note 3: The estimated lifetime is specified as the time to reduce 50% brightness by applying 380 mA at 25 °C.

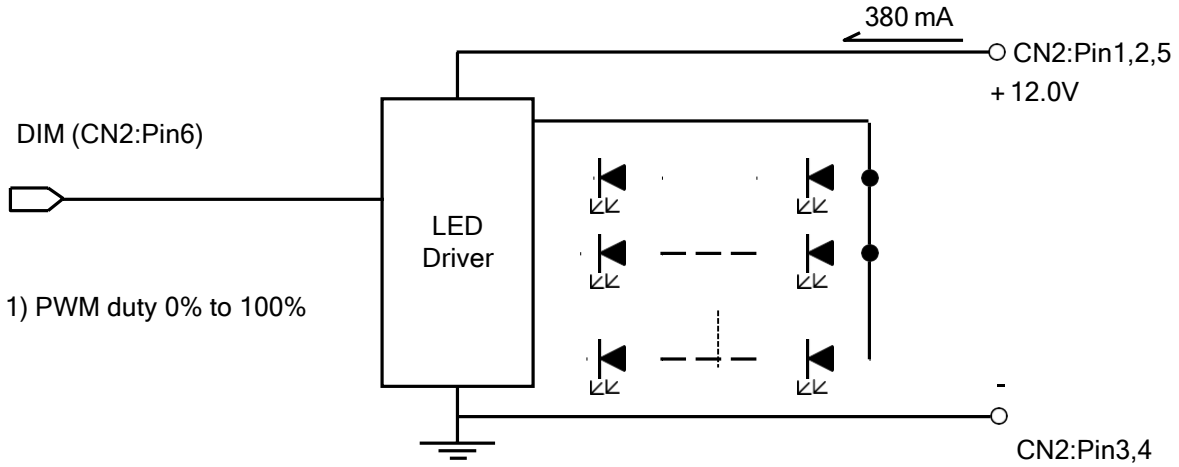


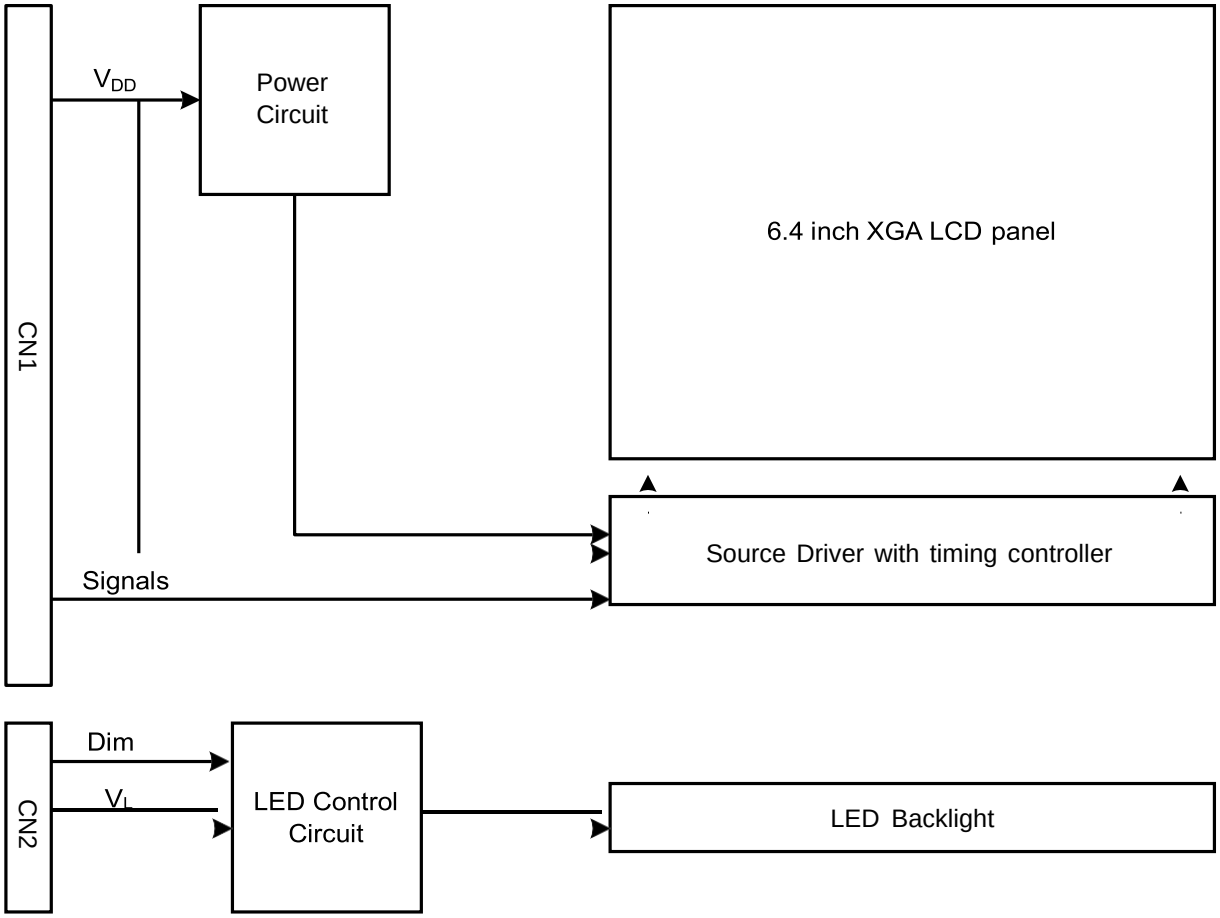
Fig. 5.1

4. Optical Characteristics

$T_a = 25\,^{\circ}C,\ f_{Frame} = 60\,\text{Hz}, V_{DD} = 3.3\text{V}$

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Brightness of White		-	$\phi = 0^{\circ}, \theta = 0^{\circ}$, I_{LED}= 380 mA	1100	1400	-	cd/m^2
Brightness Uniformity		-		75	-	-	%
Contrast Ratio		CR		1000	1500	-	-
Response Time		$T_r + T_f$	$\phi = 0^{\circ}, \theta = 0^{\circ}$	-	30	-	ms
NTSC Ratio		-	$\phi = 0^{\circ}, \theta = 0^{\circ}$	-	60	-	%
Viewing Angle		θ x	$\phi = 0^{\circ}$, CR ≥ 10	70	85	-	Degree
		θ x′	$\phi = 180^{\circ}$, CR ≥ 10	70	85	-	
		θ y	$\phi = 90^{\circ}$, CR ≥ 10	70	85	-	
		θ y′	$\phi = 270^{\circ}$, CR ≥ 10	70	85	-	
Color Chromaticity	Red	X	$\phi = 0^{\circ}, \theta = 0^{\circ}$	0.57	0.62	0.67	-
		Y		0.28	0.33	0.38	
	Green	X		0.27	0.32	0.37	
		Y		0.53	0.58	0.63	
	Blue	X		0.11	0.16	0.21	
		Y		0.03	0.08	0.13	
	White	X		0.26	0.31	0.36	
		Y		0.28	0.33	0.38	

5. Block Diagram



Note 1: Signals are SD, AMODE, CLK and pixel data pairs.

6. Reliability Tests

Test Item	Condition	
High Temperature	Operating 80°C	240 hrs
Low Temperature	Operating -30°C	240 hrs
High Temperature	Storage 80°C	240 hrs
Low Temperature	Storage -30°C	240 hrs
Heat Cycle	Operating -20°C ~70°C 3hrs~1hr~3hrs	240 hrs
Thermal Shock	Non-Operating -35°C↔85°C 0.5 hr↔0.5 hr	240 hrs
High Temperature & Humidity	Operating 40°C & 85%RH Without condensation	240 hrs (Note 3)
Vibration	Non-Operating 20~200 Hz 2G X, Y, and Z directions	1 hr for each direction
Mechanical Shock	Non-Operating 10 ms 50G ±X, ± Y and ±Z directions	Once for each direction
ESD	Operating Tip: 150 pF, 330 Ω Air discharge for glass: ± 8KV Contact discharge for metal frame: ± 8KV	1) Glass: 9 points 2) Metal frame: 8 points (Note 4)

Note 1: Display functionalities are inspected under the conditions defined in the specification after the reliability tests.

Note 2: The display is not guaranteed for use in corrosive gas environments.

Note 3: Under the condition of high temperature & humidity, if the temperature is higher than 40°C, the humidity needs to be reduced as Fig. 8.1 shown.

Note 4: All pins of LCD interface (CN1) have been tested by ± 100V contact discharge of ESD under non-operating condition.

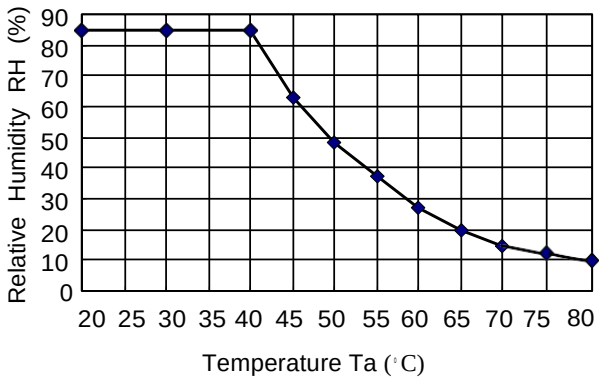


Fig. 8.1

7. LCD Interface

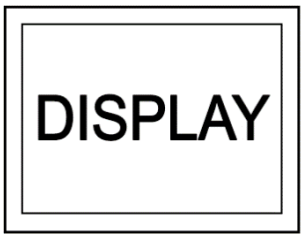
7.1 Interface Pin Connections

The display interface connector (CN1) is DF14H-20P-1.25H made by HIROSE and pin assignment is as below:

Pin No.	Symbol	Signal	Pin No.	Symbol	Signal
1	V_{DD}	Power Supply for Logic	11	IN2-	Pixel Data
2	V_{DD}		12	IN2+	
3	V_{SS}	GND	13	V_{SS}	GND
4	V_{SS}		14	CLK IN-	Pixel Clock
5	IN0-	Pixel Data	15	CLK IN+	
6	IN0+		16	V_{SS}	GND
7	V_{SS}	GND	17	IN3-	Pixel Data
8	IN1-	Pixel Data	18	IN3+	
9	IN1+		19	SD	Scan Direction Control (Note 2)
10	V_{SS}	GND	20	AMODE	Open / L:JEIDA, H:VESA

Note 1: IN n- and IN n+ (n=0, 1, 2, 3), CLK IN- and CLK IN+ should be wired by twist-pairs or side-by-side FPC patterns, respectively.

Note 2: Scan direction is available to be switched as below.



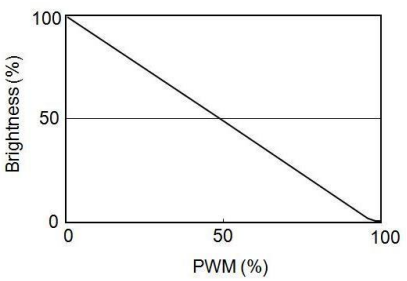
SD：H

SD：L or open

The backlight connector (CN2) is SM06B-SHLS-TF, and pin assignment is as below:

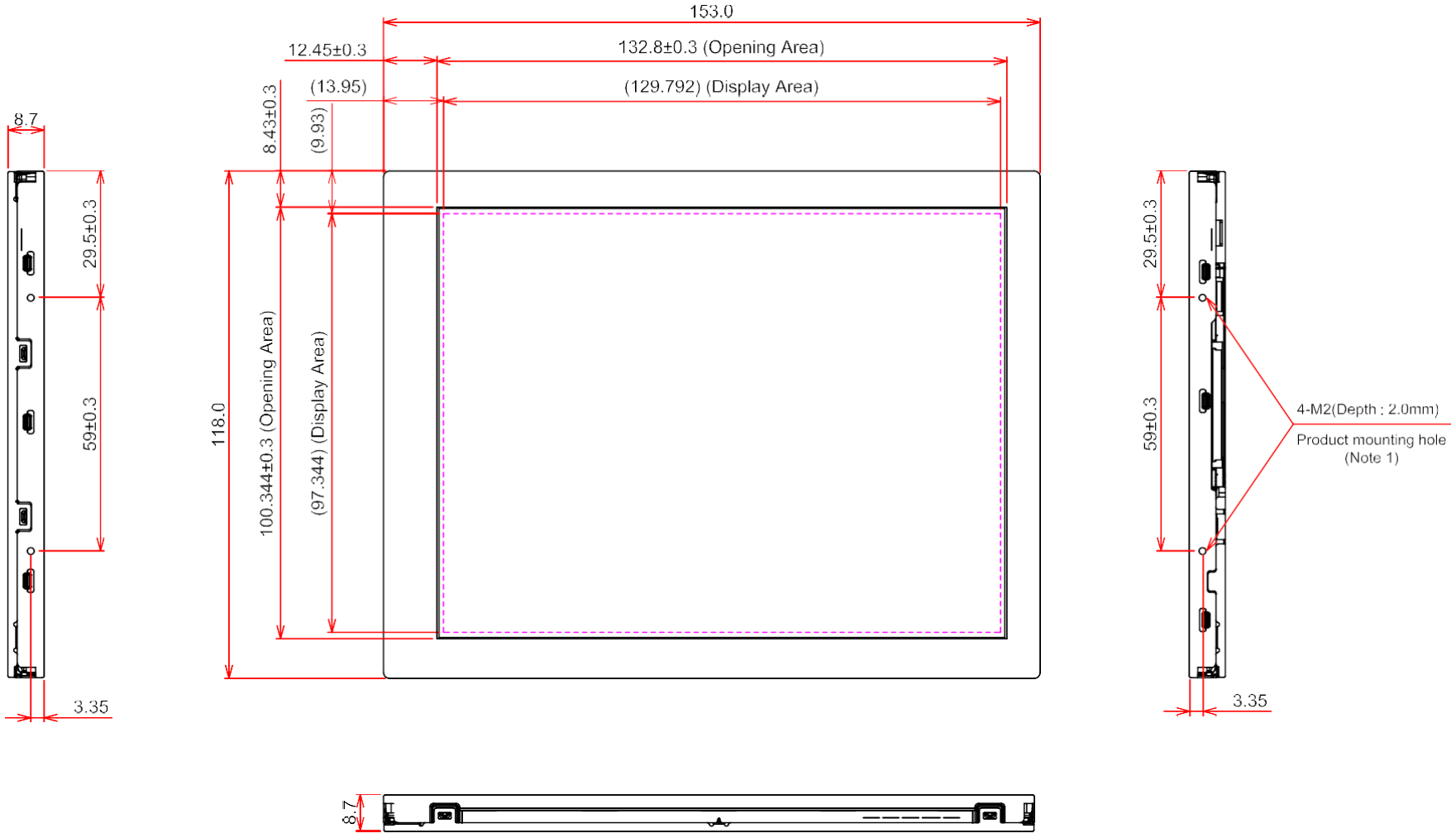
Pin No.	Signal	Signal
1	V_{LED}	12VDC
2	V_{LED}	12VDC
3	GND	Ground
4	GND	Ground
5	V_{LED}	12VDC
6	DIM	3.3V @200Hz~1000Hz

Note 3: The relationship of brightness and Dim control are shown as below.



OUTLINE DIMENSIONS

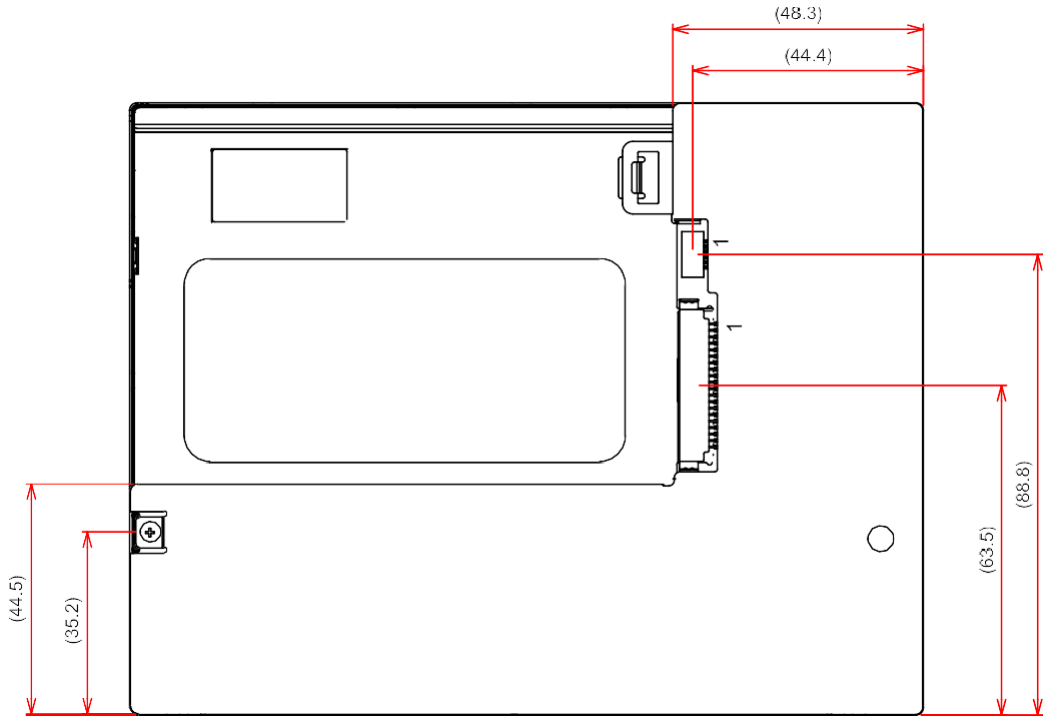
FRONT VIEW



Note 1: Within 0.147Nm (1.5kgfcm) of M2 screw torque is recommec.

General Tolerance:±0.5mm
Scale : NTS
Unit : mm

REAR VIEW



General Tolerance:±0.5mm
Scale : NTS
Unit : mm