HIGHNESS™

One of a kind

HM315FH111OE

31.5" Color TFT-LCD

Release Date
28th Feb 2024

HIGHNESS MICROELECTRONICS LTD.

URL: www.highnessmicro.com, Email: sales@highnessmicro.com

1. General Features

Active Screen Size	31.55 inches diagonal
Active Area	698.4 (H) x 392.845 (V)
Outline Dimension	729.4(H)X424.2(V)X29.5(D)(Typ.)
Pixel Pitch	0.36375 mm x 0.36375 mm
Pixel Format	1920 horiz. by 1080 vert. Pixels, RGB stripe arrangement
Display Mode	IPS
Color Depth	8-bit, 16.7 Million colors
Interface	LVDS 2 port
Transmittance (with POL)	5.75%(Typ.)
Viewing Angle (CR>10)	Viewing angle free (R/L 178 (Min.), U/D 178 (Min.))
Power Consumption	Logic= 64 W (Typ.),72 W (Max.)
Weight	TBD Kg (Typ.) , TBD Kg (Max.)
Display Mode	Transmissive mode, Normally black
Surface Treatment (Top)	Hard coating(2H), Anti-glare treatment of the front polarizer (Haze 1%(Typ.))
Possible Display Type	Landscape Only Enable

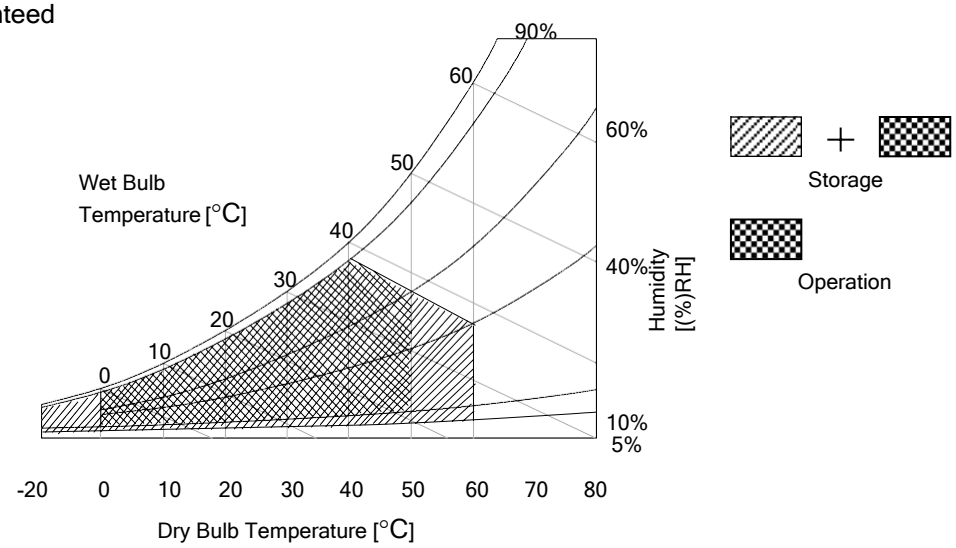
2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or permanent damage to the LCD module.

Parameter		Symbol	Value		Unit	Note
			Min	Max		
Power Input Voltage	LCD Circuit	V_{LCD}	-0.3	+14.0	V_{DC}	1
T-Con Option Selection Voltage		V_{LOGIC}	-0.3	+4.0	V_{DC}	
Operating Temperature		T_{OP}	0	+50	°C	2,3
Storage Temperature (without packing)		T_{ST}	-20	+60	°C	
Panel Front Temperature (Considering L/C Phase Transition Temperature)		T_{PT}	-	+68	°C	4
Operating Ambient Humidity		H_{OP}	10	90	%RH	2,3
Storage Humidity		H_{ST}	5	90	%RH	

Note 1. Ambient temperature condition (Ta = 25 ± 2 °C)

2. Temperature and relative humidity range are shown in the figure below.
   Wet bulb temperature should be Max 39°C, and no condensation of water.
3. Gravity mura can be guaranteed below 40°C and under backlight luminance 350nit condition.
4. The maximum operating temperatures is based on the test condition that the surface temperature of display area is less than or equal to 68°C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 68℃. The range of operating temperature may be degraded in case of improper thermal management in final product design.
5. Prevent products from being exposed to the direct sunlight. Otherwise, its reliability and function may not be guaranteed



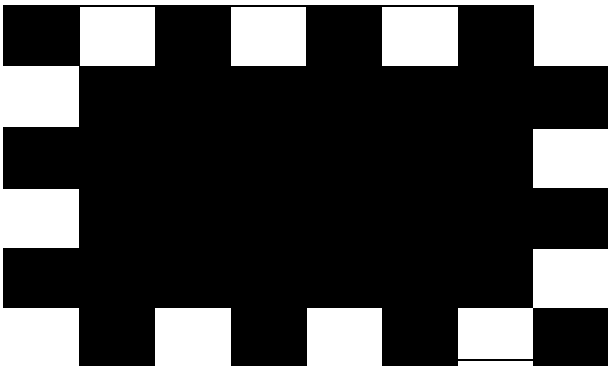
3. Electrical Specifications

3-1. Electrical Characteristics

Parameter		Symbol	Value			Unit	Note
			Min	Typ	Max		
Circuit :							
Power Input Voltage		V_{LCD}	10.8	12.0	13.2	V_{DC}	4
Power Input Current		I_{LCD}	-	380	495	mA	1
			-	505	660	mA	2
T-CON Option Selection Voltage	Input High Voltage	V_{IH}	2.7	-	3.6	V_{DC}	
	Input Low Voltage	V_{IL}	0	-	0.7	V_{DC}	
Power Consumption		P_{LCD}	-	4.6	5.98	Watt	1
			-	6.1	7.93	Watt	**2**
Rush current		I_{RUSH}	-	-	5.0	A	3

Note 1. The specified current and power consumption are under the V_{LCD}=12.0V, Ta=25 ± 2°C, f_V=60Hz condition, and mosaic pattern(8 x 6) is displayed and f_V is the frame frequency.
2. The current and power consumption are specified at the maximum current patter.
3. The duration of rush current is about 2ms and rising time of power input is 0.5ms (min.).
4. Ripple voltage level is recommended under ±5% of typical voltage

White : 255 Gray
Black : 0 Gray



Mosaic Pattern (8 x 6)

Max Current Pattern

3-2. Interface Connections

This LCD module employs two kinds of interface connection, 51-pin connector is used for the module electronics.

3-2-1. LCD Module

- LCD Connector (CN1): FI-RE51S-HF (manufactured by JAE) or GT05S-51S-H38(manufactured by LSM) or IS050-C51B-C39(manufactured by UJU) or 05030WR-H51B(manufactured by YEONHO)
- Mating Connector : FI-RE51HL(JAE) or compatible

MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	NC	No Connection (Note 4)	27	NC	No connection
2	NC	No Connection (Note 4)	28	R2AN	SECOND LVDS Receiver Signal (A-)
3	NC	No Connection (Note 4)	29	R2AP	SECOND LVDS Receiver Signal (A+)
4	NC	No Connection (Note 4)	30	R2BN	SECOND LVDS Receiver Signal (B-)
5	NC	No Connection (Note 4)	31	R2BP	SECOND LVDS Receiver Signal (B+)
6	NC	No Connection (Note 4)	32	R2CN	SECOND LVDS Receiver Signal (C-)
7	LVDS Select	'H' =JEIDA , 'L' or NC = VESA	33	R2CP	SECOND LVDS Receiver Signal (C+)
8	NC	No Connection (Note 4)	34	GND	Ground
9	NC	No Connection (Note 4)	35	R2CLKN	SECOND LVDS Receiver Clock Signal (-)
10	NC	No Connection (Note 4)	36	R2CLKP	SECOND LVDS Receiver Clock Signal (+)
11	GND	Ground	37	GND	Ground
12	R1AN	FIRST LVDS Receiver Signal (A-)	38	R2DN	SECOND LVDS Receiver Signal (D-)
13	R1AP	FIRST LVDS Receiver Signal (A+)	39	R2DP	SECOND LVDS Receiver Signal (D+)
14	R1BN	FIRST LVDS Receiver Signal (B-)	40	NC	No connection
15	R1BP	FIRST LVDS Receiver Signal (B+)	41	NC	No connection
16	R1CN	FIRST LVDS Receiver Signal (C-)	42	NC or GND	No Connection or Ground
17	R1CP	FIRST LVDS Receiver Signal (C+)	43	NC or GND	No Connection or Ground
18	GND	Ground	44	GND	Ground (Note 5)
19	R1CLKN	FIRST LVDS Receiver Clock Signal (-)	45	GND	Ground
20	R1CLKP	FIRST LVDS Receiver Clock Signal (+)	46	GND	Ground
21	GND	Ground	47	NC	No connection
22	R1DN	FIRST LVDS Receiver Signal (D-)	48	VLCD	Power Supply +12.0V
23	R1DP	FIRST LVDS Receiver Signal (D+)	49	VLCD	Power Supply +12.0V
24	NC	No connection	50	VLCD	Power Supply +12.0V
25	NC	No connection	51	VLCD	Power Supply +12.0V
26	NC or GND	No Connection or Ground	-	-	-

notes

1. All GND (ground) pins should be connected together to the LCD module's metal frame.
2. All V_{LCD} (power input) pins should be connected together.
3. All Input levels of LVDS signals are based on the EIA 644 Standard.
4. #1~#6 & #8~#10 NC (No Connection): These pins are used only for LGD (Do not connect)
5. Specific pin No. #44 is used for "No signal detection" of system signal interface. It should be GND for NSB (No Signal Black) during the system interface signal is not.If this pin is "H", LCD Module displays AGP (Auto Generation Pattern).

3-3. Intra interface Signal Specification

3-3-1. EPI Signal Specification

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit	notes
Logic & EPI Power Voltage	VCC	-	1.62	1.8	1.98	V_{DC}	
EPI input common voltage	VCM	LVDS Type	0.8	-	1.3	V	
EPI input differential voltage	Vdiff	-	150	-	500	mV	
EPI Input eye diagram	Veye	-	90	-	-	mV	
Effective Veye width time	B1&B2		0.25	-	-	UI	

3.4 Backlight Specification

Parameter			Symbol	Values			Unit	notes
				Min	Typ	Max		
LED Driver :								
Power Supply Input Voltage			VBL	21.6	24.0	24.5	Vdc	1
Power Supply Input Current			IBL	-	2.29	2.45	A	1
Power Supply Input Current (In-Rush)			In-rush	-	-	(TBD)	A	V_{BL} = 24.0V ExtV_{BR-B} = 100% 3
Power Consumption			PBL	-	55	60	W	1
Input Voltage for Control System Signals	On/Off	On	V on	2.5	-	5.5	Vdc	
		Off	V off	0	-	0.5	Vdc	
	Brightness Adjust		ExtV_{BR-B}	30	-	100	%	On Duty 5
				30	-	100	%	
	ExtV_{BR-B} Frequency		f_{PWM}	500	1000	1500	Hz	
	Pulse Duty Level (PWM)		High Level	2.5	-	5.5	Vdc	HIGH : on duty LOW : off duty
			Low Level	0.0	-	0.5	Vdc	
LED :								
Life Time				30,000	50,000		Hrs	2

notes :

1. Electrical characteristics are determined after the unit has been 'ON' and stable for approximately 60 minutes at 25±2°C. The specified current and power consumption are under the typical supply Input voltage 24Vand V_{BR} (ExtV_{BR-B} : 100%), it is total power consumption.
2. The life time (MTTF) is determined as the time which luminance of the LED is 50% compared to that of initial value at the typical LED current (Ext VBR-B :100%) on condition of continuous operating in LCM state at 25±2°C.
3. The duration of rush current is about 200ms. This duration is applied to LED on time.
4. Even though inrush current is over the specified value, there is no problem if I^2T spec of fuse is satisfied. ExtV_{BR-B} signal have to input available duty range and sequence.
5. After Driver ON signal is applied, ExtV_{BR-B} should be sustained from 30% to 100% more than 500ms. After that, ExtV_{BR-B} 30% and 100% is possible

3-4-1 BACKLIGHT INTERFACE CONNECTION

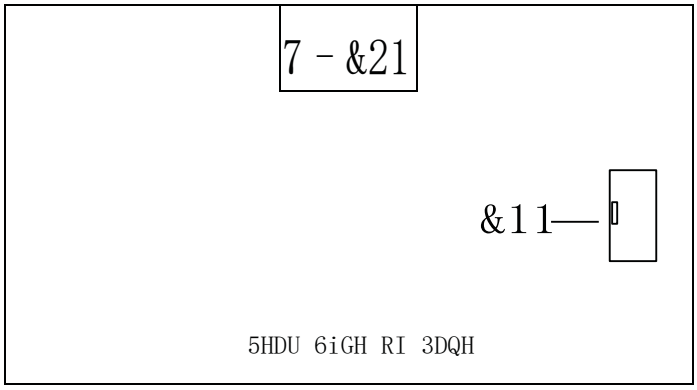


Table 4-2(CN1): Input terminal PH2.0-14(2.0mmX14)

PIN #	Symbol	Description
1	V_{DDB}	Operating Voltage Supply, +24V DC Regulated
2	V_{DDB}	Operating Voltage Supply, +24V DC Regulated
3	V_{DDB}	Operating Voltage Supply, +24V DC Regulated
4	V_{DDB}	Operating Voltage Supply, +24V DC Regulated
5	V_{DDB}	Operating Voltage Supply, +24V DC Regulated
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11		Not connect
12	VBLON	BL On-Off: High (2.5~5.5V) for BL , Low/Open (0~0.5V) for BL **off**
13	VDIM (note 1)	**Internal PWM Dimming** High (5.5V/100% Duty) for 100% Lum; <NC; when external PWM>
14	PDIM (note 1)	<NC; when internal PWM>

Note (1) PWM dimming function is included internal PWM and external PWM. Internal PWM: input voltage 0 (GND) ~5.5V to pin 13th, and duty ratio of output voltage/current of inverter is from 30% to 100%. When use pin 13th to control backlight luminance, the pin 14th will be NC .

4. Optical Specification

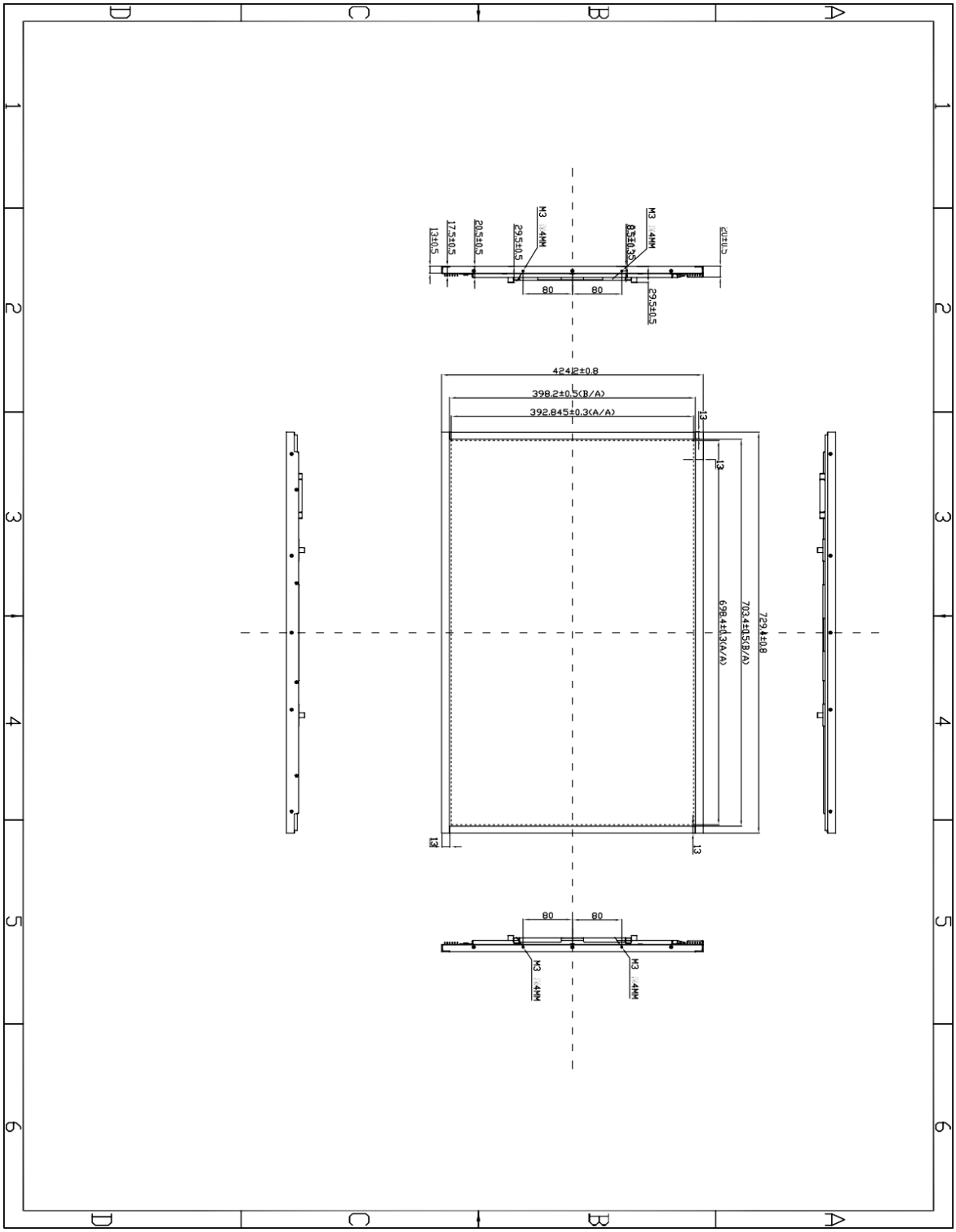
Ta= 25±2°C, V_{LCD}=12.0V, fV=60Hz, Dclk=74.25MHz,
Light Source : D65 Standard

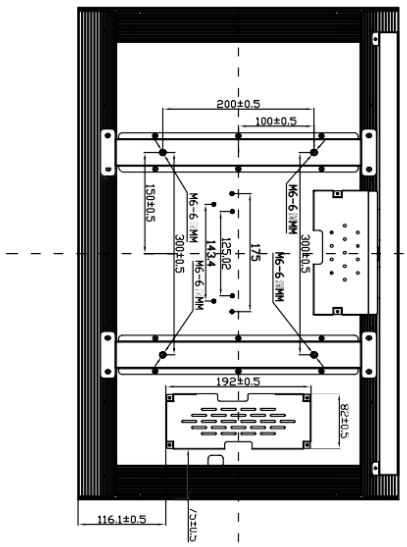
Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Contrast Ratio		CR	900	1200	-	
Response Time	Variation	G to G $_{\sigma}$		6	9	
	Gray to Gray (BW)	G to G $_{BW}$		9	13	ms
Transmittance		T	5.175	5.75		%
Color Coordinates [CIE1931]	RED	Rx	Typ -0.03	0.6497	Typ +0.03	
		Ry		0.3181		
	GREEN	Gx		0.3222		
		Gy		0.5782		
	BLUE	Bx		0.1437		
		By		0.0560		
Viewing Angle (CR>10)						
	x axis, right(ϕ=0°)	θr	89	-	-	degree
	x axis, left (ϕ=180°)	θl	89	-	-	
	y axis, up (ϕ=90°)	θu	89	-	-	
	y axis, down (ϕ=270°)	θd	89	-	-	
Gray Scale			-	-	-	
brightness			900	1000	-	cd/m^2

5. Mechanical Characteristics

Item	Value	
Outline Dimension	Horizontal	729.4mm
	Vertical	424.2mm
	Thickness	29.5 mm
Active Display Area	Horizontal	698.4 mm
	Vertical	392.85 mm
Weight	TBD	
Surface Treatment	Hard coating(2H), Anti-glare treatment of the front polarizer : Haze 1%(typ.)	

6. Mechanical Dimension




200±0.5
100±0.5
150±0.5
M6-6 MM
300±0.5
125.02
143.4
175
M6-6 MM
M6-6 MM
M6-6 MM
300±0.5
192±0.5
82±0.5
116.1±0.5

7. Reliability

Table 11. ENVIRONMENT TEST CONDITION

Test Item	Condition
High temperature storage test	Ta= 60°C 90% 240h
Low temperature storage test	Ta= -20°C 240h
High temperature operation test	Ta= 50°C 50%RH 500h
Low temperature operation test	Ta= 0°C 500h
Humidity condition Operation	Ta= 40 °C ,90%RH
Altitude operating storage / shipment	0 - 16,400 ft 0 - 40,000 ft