

	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28
EV238FH2-M00 Preliminary Product Specification Rev. 00 Beijing BOE Display Technology CO.,LTD			
SPEC. NUMBER Spec-00002917	SPEC. TITLE EV238FH2-M00 Product Specification	PAGE 1 OF 36	
DBG-RD-2025003-A		A4(210 X 297)	

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

REVISION HISTORY

(√)preliminary specification
()Final specification

REV	PAGE	DESCRIPTION OF CHANGES	DATE	PREPARED
00	-	Initial Release	2026.04.28	Zhang Di

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

Contents

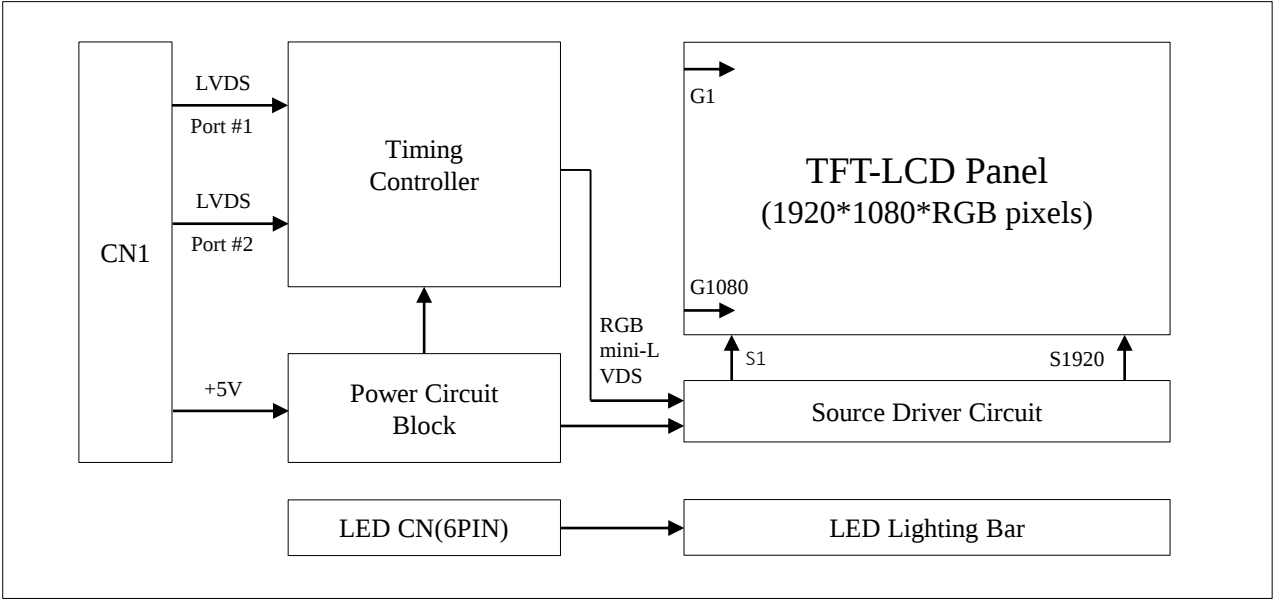
No.	Items	Page
1.0	GENERAL DESCRIPTION	4
2.0	ABSOLUTE MAXIMUM RATINGS	6
3.0	ELECTRICAL SPECIFICATIONS	7
4.0	INTERFACE CONNECTION	9
5.0	SIGNAL TIMING SPECIFICATION	13
6.0	POWER SEQUENCE	20
7.0	OPTICAL SPECIFICATIONS	21
8.0	MECHANICAL CHARACTERISTICS	24
9.0	RELIABILITY TEST	25
10.0	PRODCUT SERIAL NUMBER	26
11.0	PACKING INFORMATION	27
12.0	PRECAUTIONS	29
13.0	APPENDIX	34

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

1.0 GENERAL DESCRIPTION

1.1 Introduction

EV238FH2-M00 is a color active matrix TFT LCD Module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 23.8 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD module is adapted for a low reflection and higher color type.



1.2 Features

- LVDS interface with 2 pixel / clock
- High-speed response
- Low color shift image quality
- 8-bit color depth, display 16.7M colors
- Wide viewing angle
- DE (Data Enable) only mode
- ADS technology is applied for high display quality
- RoHS compliant
- Reverse Type

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	4 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

1.3 Application

●Ultrasound

1.4 General Specification

< Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Active area	527.04(H)x296.46(V)	mm	
Number of pixels	1920(H) × 1080(V)	pixels	
Pixel pitch	91.5(H) × 3 (RGB) × 274.5(V)	um	
Pixel arrangement	Pixels RGB Vertical stripe		
Display mode	Normally Black		
Display colors	16.7M	colors	Real 8bit
Brightness	500(Typ.)	nit	At center point
Power Consumption	17.6(Typ.)	Watt	
Frame Rate	60 (Typ.)	Hz	
Dimensional Outline	535(H) × 309.3(V)	mm	Dimensional outline
MDL Thickness	6.75(Body)/12(W/I PCBA)	mm	
Weight	1860g (Typ.)	g	
Surface Treatment	AG42, 3H		

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

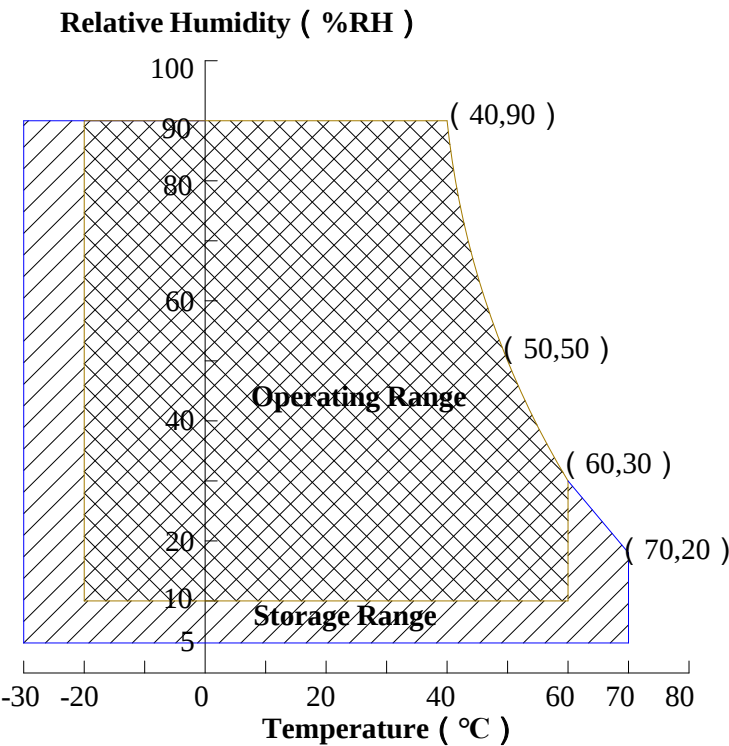
2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Open Cell Electrical Specifications > [VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	6	V	Ta = 25 °C
	VBLU	VSS-0.3	58	V	
CMOS/TTL Input Voltage	DVDD	VSS-0.3	4	V	
Operating Temperature	T _{OP}	0	+50	°C	Note 1、 2
	T _{SUR}	-	+60	°C	
Storage Temperature	T _{ST}	-20	+60	°C	
Operating Ambient Humidity	Hop	10	90	%RH	
Storage Humidity	Hst	5	90	%RH	

Note 1 : Temperature and relative humidity range are shown in the figure below.



BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Open Cell

< Table 3-1. Open Cell Electrical Specifications >

[Ta =25±2 °C]

Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	4.5	5	5.5	Vdc	
Power Supply Ripple Voltage		VRP	-	-	300	mV	Note 1
Power Supply Current		IDD	-	600	1640	mA	Note 2
Power Consumption		PDD	-	3	8.2	Watt	
Rush current		IRUSH	-		3.0	A	Note 3
LVDS Interface	Differential Input High Threshold Voltage	VLVTH		-	+100	mV	
	Differential Input Low Threshold Voltage	VLVTL	-100	-	-	mV	
	Input Differential Voltage	VID	100	-	600	mV	
	Common Input Voltage	VLVC	0.6	1.2	1.6	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3		
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

Note 1 : The supply voltage ripple should not exhibit over damped ringing.

Note 2 : The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=5.0V,

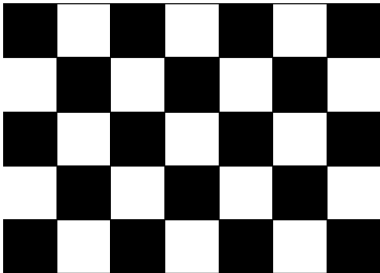
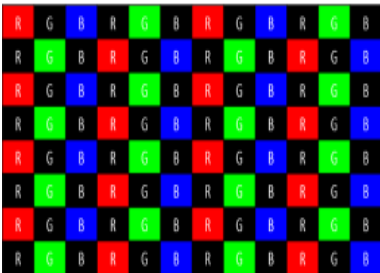
Frame rate f_V=60Hz and Clock frequency = 71.2MHz.

Test Pattern of power supply current

a) Typ : Mosaic 7X5 (L0/L255)

b) Max : Skip sub pixel(L255)

c) Flicker Pattern


Note 3 : The duration of rush current is about 2ms and rising time of Power Input is 0.5 ms(min)

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	7 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

3.0 ELECTRICAL SPECIFICATIONS

3.2 Backlight Unit

< Table 3-2. LED Backlight Unit >

Parameter		Min.	Typ.	Max.	Unit	Remarks
LED Light Bar Input Voltage Per Input Pin	V _{PIN}	-	56	58	V	Duty 100%
LED Light Bar Input Current Per Input Pin	I _{PIN}	-	65	-	mA	Note(1),(2)
LED Power Consumption	P _{BL}	-	14.6	15.1	W	Note (3)
LED Life-Time	-	50,000	-		Hrs	Note (4)
LED bar consists-Strings(parallel)	-	-	4	-	-	
LED bar consists-Packages(serial)	-	-	20	-	-	

- Note : 1. There are one light bar ,and the specified current is input LED chip 100% duty current.
2. The sense current of each input pin is 65mA.
3. The typical power consumption is calculated as $P_{BL}=V_{PIN} \text{ (Typ.)} * I_{PIN} \text{ (Typ.)} * \text{No. of strings}$
The maximum power consumption is calculated as $P_{BL}= V_{PIN} \text{ (Max.)} * I_{PIN} \text{ (Typ.)} * \text{No. of strings.}$
4. The lifetime is determined as the time at which luminance of LED become 50% of the initial brightness or not normal lighting at I_{PIN}=65mA on condition of continuous operating at 25 ± 2 °C.

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

4.0 INTERFACE CONNECTION

4.1 Open Cell Input Signal & Power

- LVDS Connector : LS1030-L4005W480H225-E02(恩利旺),MSBKT2407P30HC(SMT)

< Table 4-1. Open Cell Input Connector Pin Configuration >

Pin No	Symbol	Function	Remark
1	RO0N	Odd LVDS Negative Data Differential Input	
2	RO0P	Odd LVDS Positive Data Differential Input	
3	RO1N	Odd LVDS Negative Data Differential Input	
4	RO1P	Odd LVDS Positive Data Differential Input	
5	RO2N	Odd LVDS Negative Data Differential Input	
6	RO2P	Odd LVDS Positive Data Differential Input	
7	BIST	Bist function	
8	ROCLKN	Odd LVDS Negative Clock Differential Input	
9	ROCLKP	Odd LVDS Positive Clock Differential Input	
10	RO3N	Odd LVDS Negative Data Differential Input	
11	RO3P	Odd LVDS Positive Data Differential Input	
12	RE0N	EvenLVDS Negative Data Differential Input	
13	RE0P	Even LVDS Positive Data Differential Input	
14	GND	Power Ground	
15	RE1N	EvenLVDS Negative Data Differential Input	
16	RE1P	Even LVDS Positive Data Differential Input	
17	GNG	Power Ground	
18	RE2N	EvenLVDS Negative Data Differential Input	
19	RE2P	Even LVDS Positive Data Differential Input	
20	RECLKN	Even LVDS Negative Clock Differential Input	
21	RECLKP	Even LVDS Positive Clock Differential Input	
22	RE3N	EvenLVDS Negative Data Differential Input	
23	RE3P	Even LVDS Positive Data Differential Input	
24	GND	Power Ground	
25	NC	*Reserved for LCD manufacturer's use (SCL)	
26	NC	*Reserved for LCD manufacturer's use (SDA)	
27	NC	Do not Use	
28	VDD	Power Supply: +5V	
29	VDD		
30	VDD		

Notes : 1. NC(Not Connected) : These pins are only used for BOE internal operations.

2. Input Level of LVDS signal is based on the IEA 664 Standard.

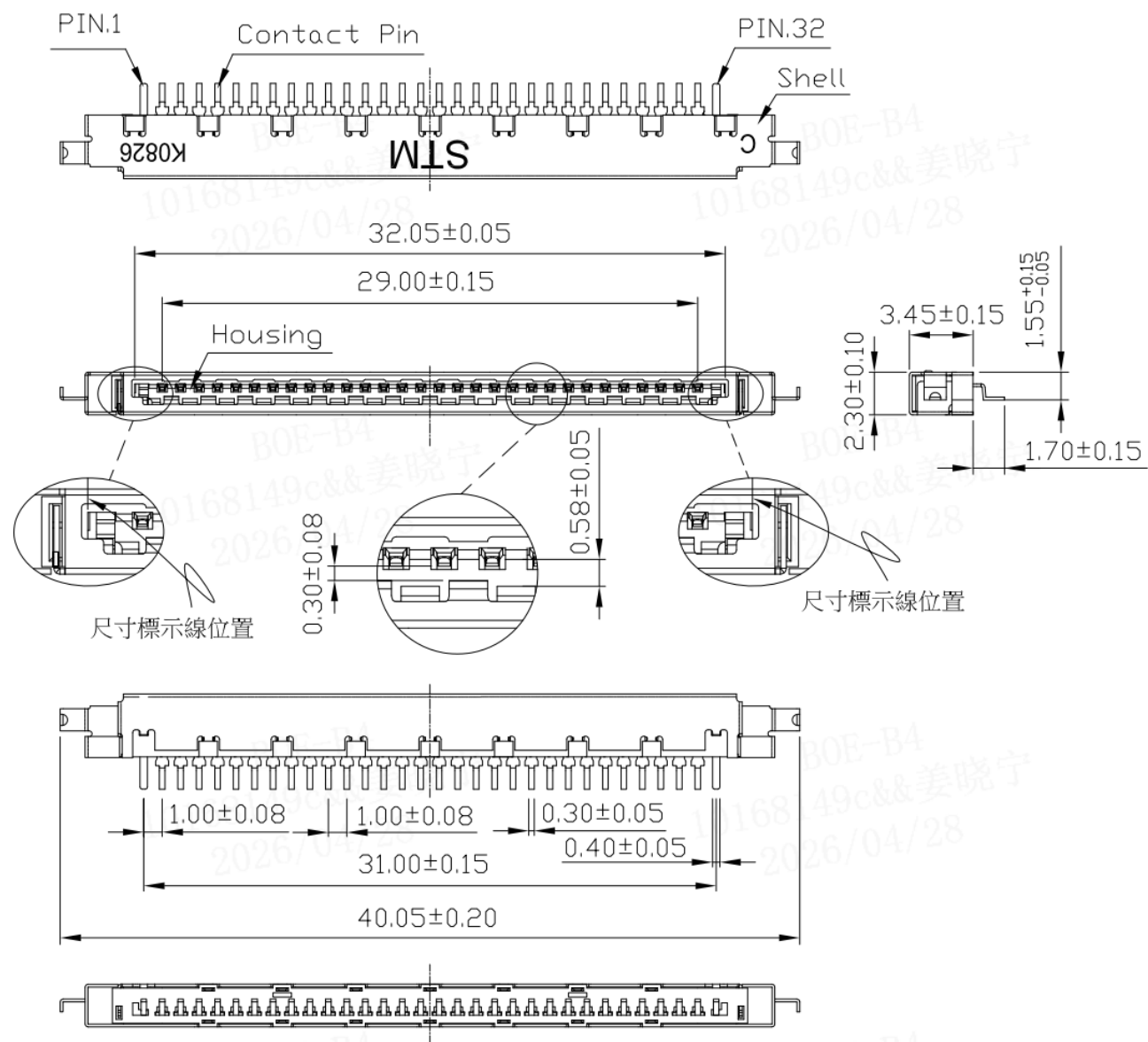
SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	9 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

4.2 Dimension

Input Connector Drawing

-30pin Connector: MSBKT2407P30HC(SMT)



SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	10 OF 36

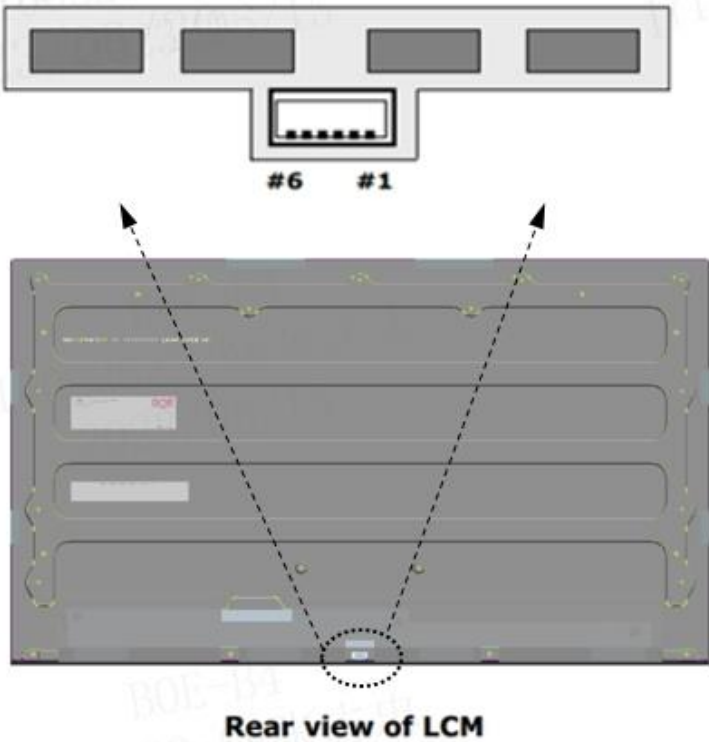
BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

4.3 Backlight Input Pin Assignments

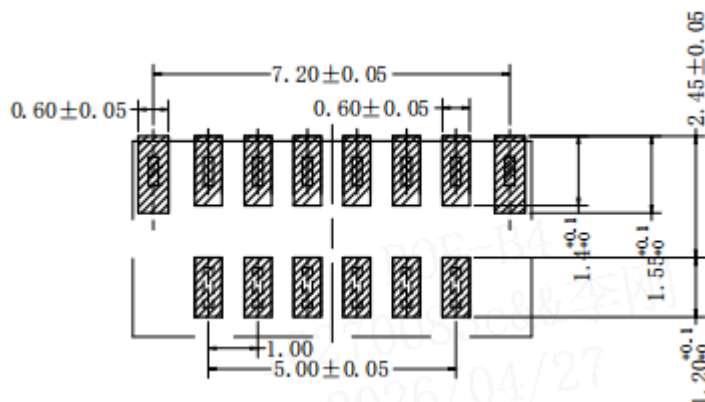
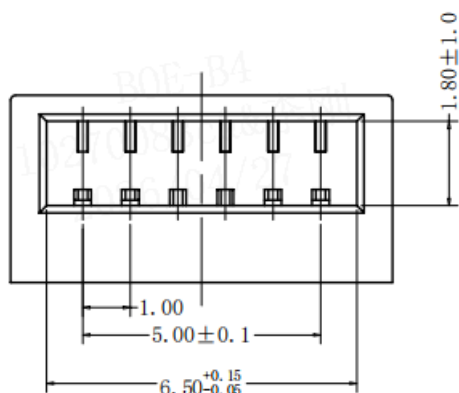
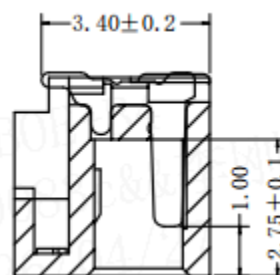
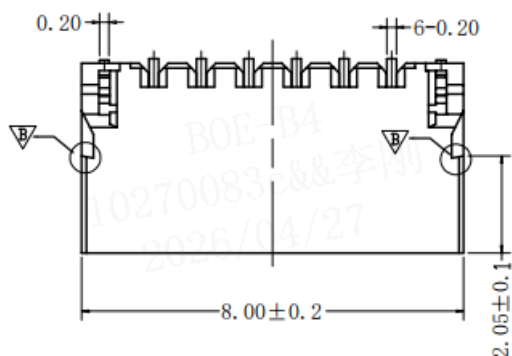
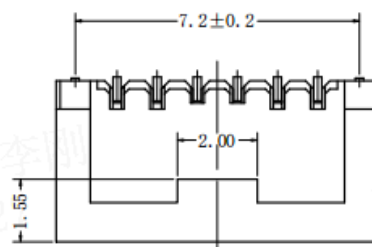
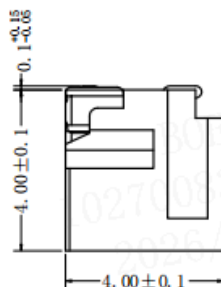
Connector type : A10035WV-H06E(or Equivalent)

< Table 4-2. Backlight Input Input Connector Pin Configuration >

Pin No.	Symbol	Feature
1	IRLED1	Channel 1 Current Feedback
2	IRLED2	Channel 2 Current Feedback
3	VLED	LED power supply
4	VLED	LED power supply
5	IRLED4	Channel 4 Current Feedback
6	IRLED3	Channel 3 Current Feedback



SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	11 OF 36



GENERAL TOLERANCE	
X.±0.25	X.*±2°
.X±0.20	.X.*±1°
.XX±0.15	.XX.*±0.5°
.XXX±0.10	.XXX.*±0.5°

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

5.0 SIGNAL TIMING SPECIFICATION

5.1 LVDS Interface

- LVDS Receiver : Timing Controller (LVDS Rx merged) / LVDS Data : Pixel Data

< Table 5-1. LVDS Input Data Mapping >

Channel No.	Data No.	8-bit LVDS Type
		VESA
0	Bit-0	R0
	Bit-1	R1
	Bit-2	R2
	Bit-3	R3
	Bit-4	R4
	Bit-5	R5
	Bit-6	G0
1	Bit-0	G1
	Bit-1	G2
	Bit-2	G3
	Bit-3	G4
	Bit-4	G5
	Bit-5	B0
	Bit-6	B1
2	Bit-0	B2
	Bit-1	B3
	Bit-2	B4
	Bit-3	B5
	Bit-4	HS
	Bit-5	VS
	Bit-6	DE
3	Bit-0	R6
	Bit-1	R7
	Bit-2	G6
	Bit-3	G7
	Bit-4	B6
	Bit-5	B7
	Bit-6	-

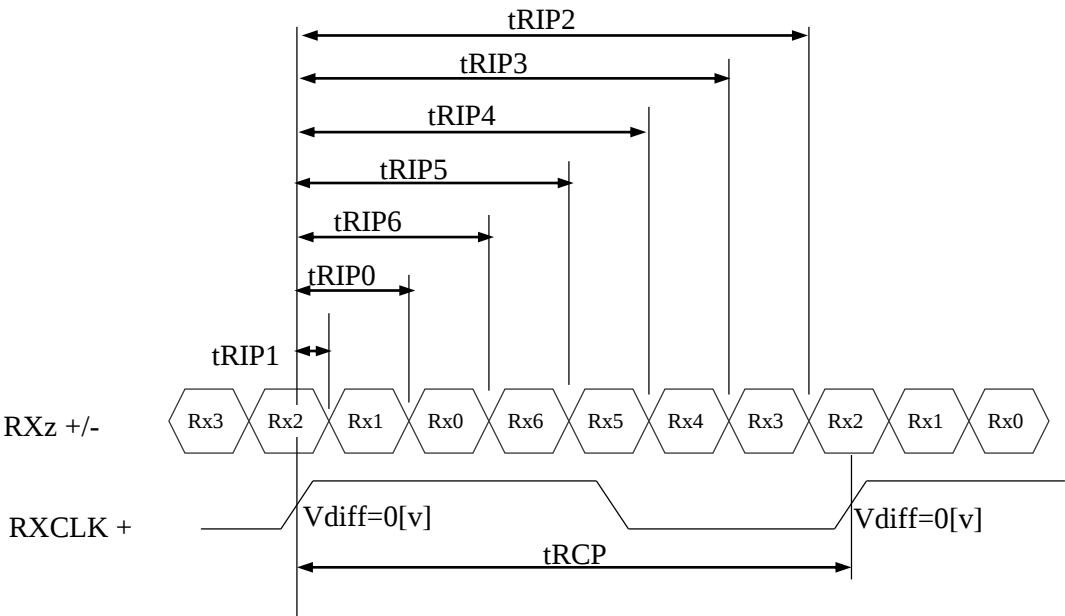
SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	13 OF 36

5.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 5-2.

<Table 5-2. LVDS Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCP	11.1	T	18.2	nsec	
Input Data 0	tRIP1	- tRMG	0.0	tRMG	Clock	
Input Data 1	tRIP0	T/7- tRMG	T/7	T/7+ tRMG	Clock	
Input Data 2	tRIP6	2 T/7- tRMG	2T/7	2T/7+ tRMG	Clock	
Input Data 3	tRIP5	3T/7- tRMG	3T/7	3T/7+ tRMG	Clock	
Input Data 4	tRIP4	4T/7- tRMG	4T/7	4T/7+ tRMG	Clock	
Input Data 5	tRIP3	5T/7- tRMG	5T/7	5T/7+ tRMG	Clock	
Input Data 6	tRIP2	6T/7- tRMG	6T/7	6T/7+ tRMG	Clock	



* Vdiff = (RXz+)-(RXz-),... ,(RXCLK+)-(RXCLK-)

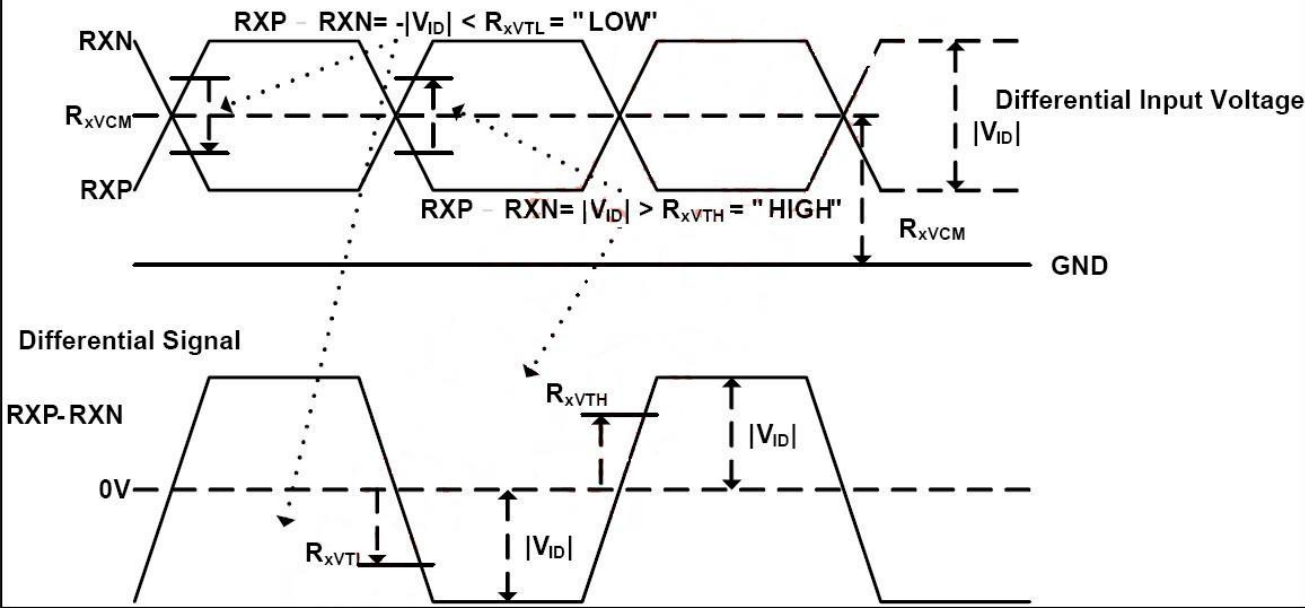
BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

5.3 LVDS Receiver Differential Input (DC Characteristics)

< Table 5-3. LVDS Rx DC Characteristics >

Parameter	Symbo l	Min	Typ	Max	Uni t	Notes
Differential Input High Threshold Voltage	VTH	-	-	+100	mV	VCM =1.2V
Differential Input Low Threshold Voltage	VTL	-100	-	-	mV	
Differential Input Common Mode Voltage	VCM	0.7	1.2	2.4- VID /2	V	
Differential Input Voltage	VID	100	-	600	mV	

Single- end Signals

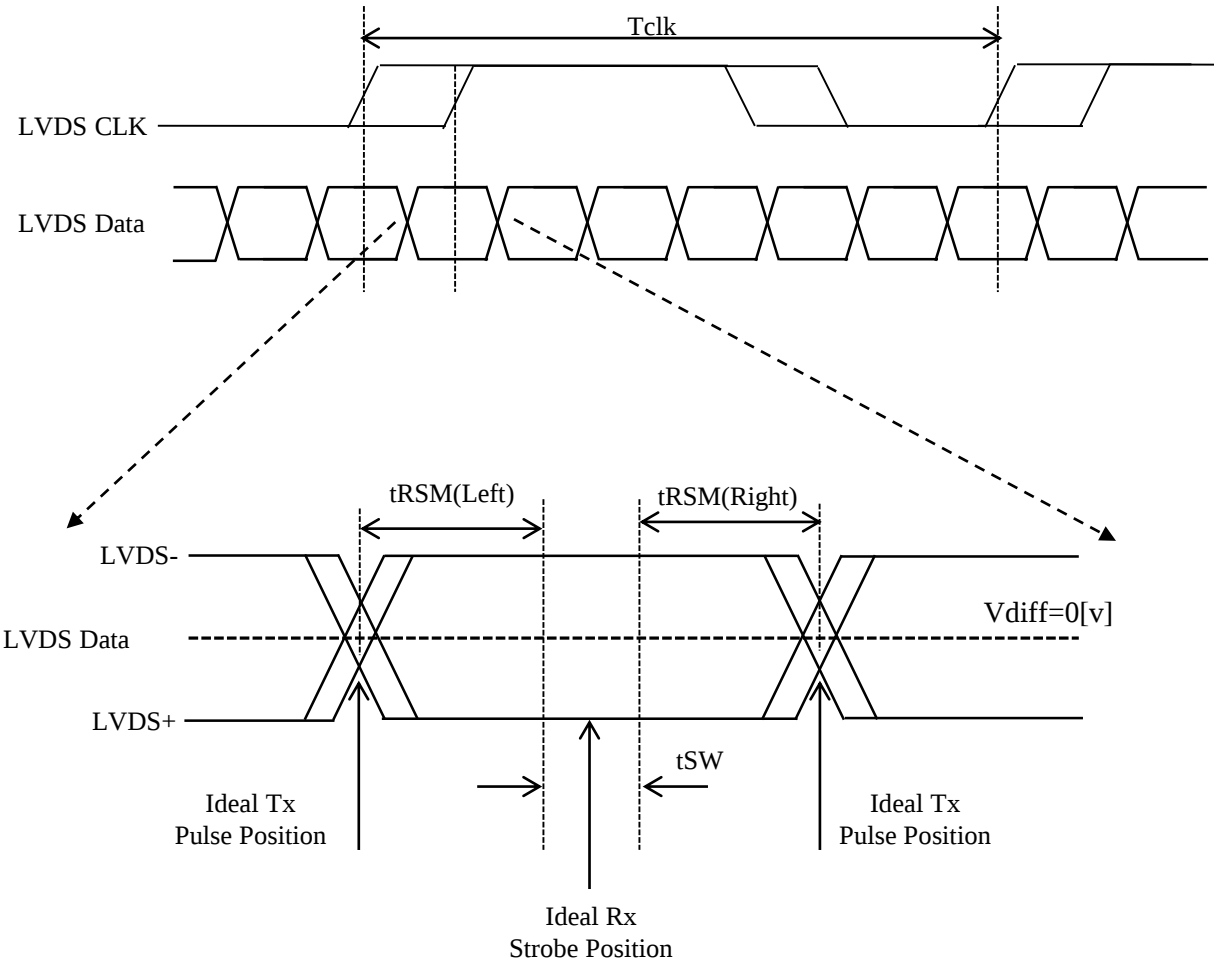


SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	15 OF 36

5.4 LVDS Receiver Differential Input (AC Characteristics)

< Table 5-4. LVDS Rx AC Characteristics >

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVDS Strobe Width	tSW	200	-	-	ps	Vcm=1.2V VID = 400mV @65MHz
LVDS Receiver Skew Margin	trSM	-380	-	380	ps	



Note:
RSM: Receiver Skew Margin
SW: Strobe Width (Setup and Hold time; TCON Internal data sampling window)

5.5 Timing Parameters

< Table 5-5. Timing Table >

Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	11.1	14	18.2	ns	
	Frequency	-	53.7	71.2	90	MHz	
Horizontal	Horizontal Period	tHP	1005	1050	1100	tCLK	
	Horizontal Valid	tHV	960			tCLK	
	Horizontal Blank	tHB	45	90	140		
	Frequency	fH	54	68	90	KHz	
Vertical	Vertical Period	tVP	1092	1130	1300	tHP	
	Vertical Valid	tVV	1080			tHP	
	Vertical Blank	tVB	12	50	220	tHP	
	Frequency	fV	49	60	76	Hz	

- Note :
1. While operation, DE signal should be have the same cycle. The input of HSYNC & VSYNC signal does not have an effect on normal operation (DE Only Mode, but the signals of Hsync and Vsync must be inputted even though this TCON is operated at DE Only Mode.

2. Best operation clock frequency is 71.2 Mhz.

3. Frequency = [H Total] * [V Total] * [vertical Frame rate]
H Total, V Total and Frame rate should operate within the range between Frequency_Min and Max

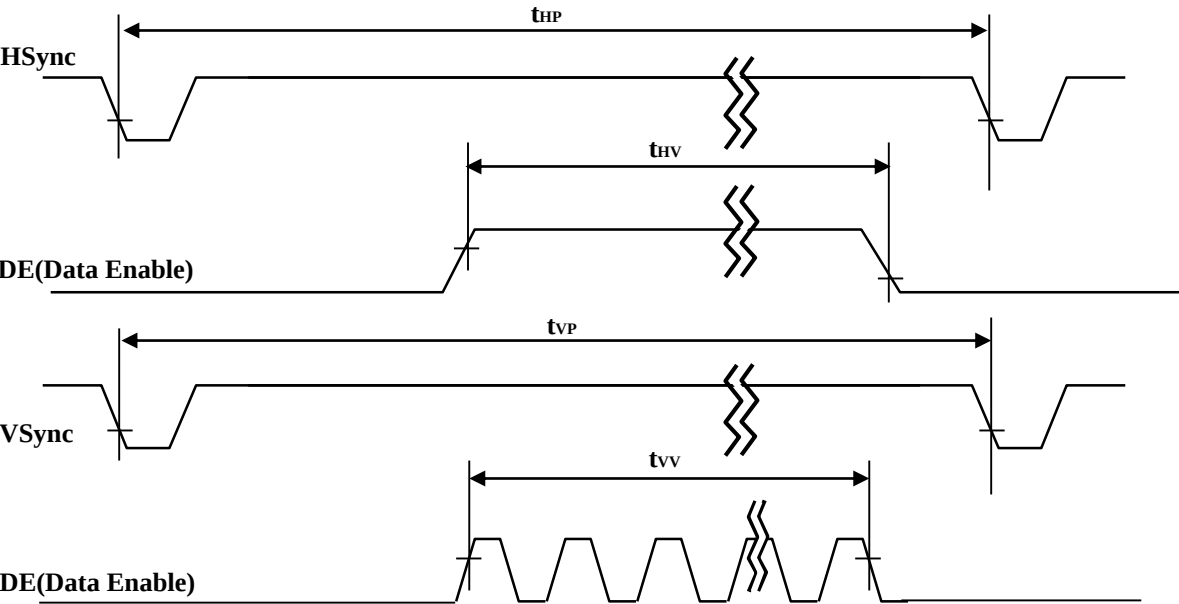
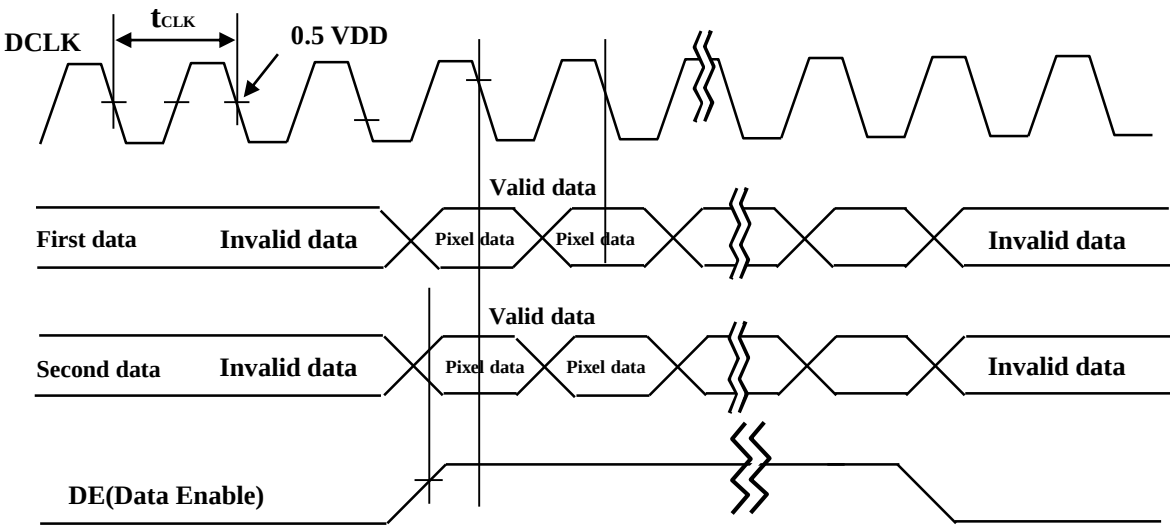
4. Except Best operation clock frequency, FOS(Flicker & Brightness & Crosstalk, Etc.) are not guaranteed.

5. Main frequency Max is 90Mhz without spread spectrum

6. When operating in non-VRR mode, signals from the mainboard shoud remain consistently stable with no abnormalities such as signal interruptions, frame rate jumps, Active/Blank transitions, and or noise.

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

5.6 Signal Timing Waveform



Note: While operation, DE signal should be have the same cycle and continuous;

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	18 OF 36

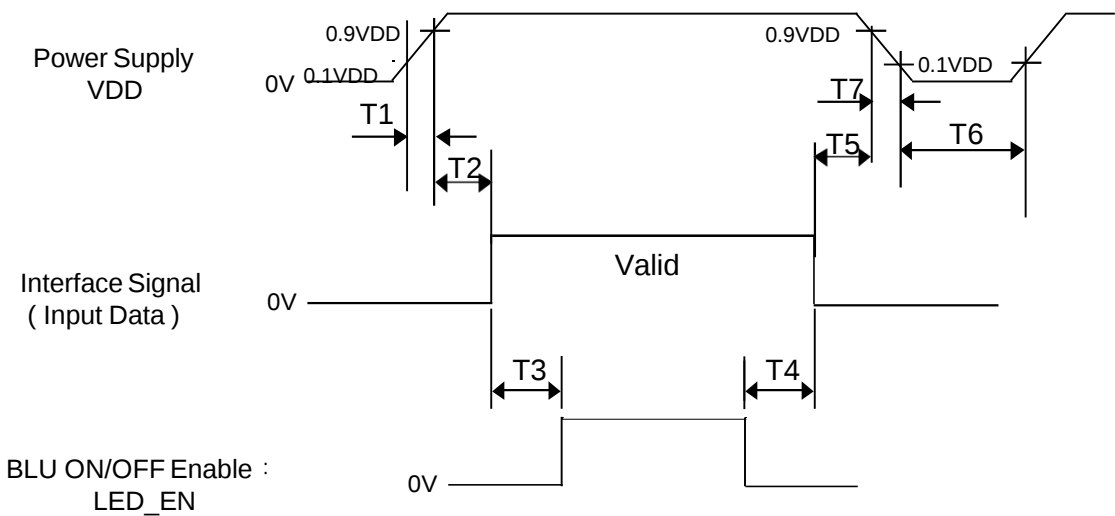
5.7 Input Signals, Basic Display Colors and Gray Scale of Colors

< Table 5-6. Input Signal and Display Color Table >

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue Data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1	1	1
Gray Scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1
	▽	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

6.0 Power Sequence

To prevent a latch-up or DC operation of the Open Cell, the power on/off sequence shall be as shown in below



< Table 6. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	10	-	100	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0	-	-	ms
T6	1	-	-	s
T7	0.5	-	100	ms

Note 1: Even though T1 is over the specified value, there is no problem if the rush current is within Spec.

Note 2: When the power supply VDD is 0V, keep the level of input signals on the low or high impedance;
※ Please avoid floating state of interface signal at invalid period.
※ When the power supply for LCD (VDD) is off, be sure to pull down the valid and invalid data to 0V.

Note 3: The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.

Note 4: T6 should be measured after the Module has been fully discharged between power off and on period

Note 5: T7: Voltage of VDD must decay smoothly after power-off , there should be none re-bouncing voltage. (customer system decide this value)

Note 6.The supply voltage should not exhibit steps or drops.

Note 7.If IIC lines on the mainboard are pulled up, they should be powered after VDD and all power supplies shoud decrease to 0V during shutdown.

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

7.0 OPTICAL SPECIFICATIONS

The test of optical specifications shall be measured in a dark room (ambient luminance≤1 lux and temperature=25±2℃) with the equipment of Luminance meter system (Goniometer system and PR730) and test unit shall be located at an approximate distance 180cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to $\theta_{\varnothing=0}$ ($=\theta_3$) as the 3 o’clock direction (the “right”), $\theta_{\varnothing=90}$ ($=\theta_{12}$) as the 12 o’clock direction (“upward”), $\theta_{\varnothing=180}$ ($=\theta_9$) as the 9 o’clock direction (“left”) and $\theta_{\varnothing=270}$ ($=\theta_6$) as the 6 o’clock direction (“bottom”). While scanning θ and/or $\varnothing$, the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 5.0V at 25℃. Optimum viewing angle direction is 6 ’clock.

< Table 7. Optical Table >

[Ta =25±2 ℃]

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10	85	89	-	Deg.	Note 1
		Θ_9		85	89	-	Deg.	
	Vertical	Θ_{12}		85	89	-	Deg.	
		Θ_6		85	89	-	Deg.	
Contrast ratio	CR			2000:1	2500:1	-		Note 2
Reproduction of color	White	W_x	$\Theta = 0^\circ$ (Center) Normal Viewing Angle,	TYP. - 0.03	0.295	TYP. + 0.03		Note 3
		W_y			0.313			
	Red	R_x			0.674			
		R_y			0.317			
	Green	G_x			0.286			
		G_y			0.655			
	Blue	B_x			0.153			
		B_y			0.083			
Brightness		Lv		400	500	-	nit	
Color Gamut		NTSC		75	80		%	@CIE1931
White luminance uniformity		δ white	9Point	75	80		%	Note 5
Response Time	G to G	T _g		-	16	22	ms	Note 4
Gamma Scale				2.0	2.2	2.4		

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	21 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

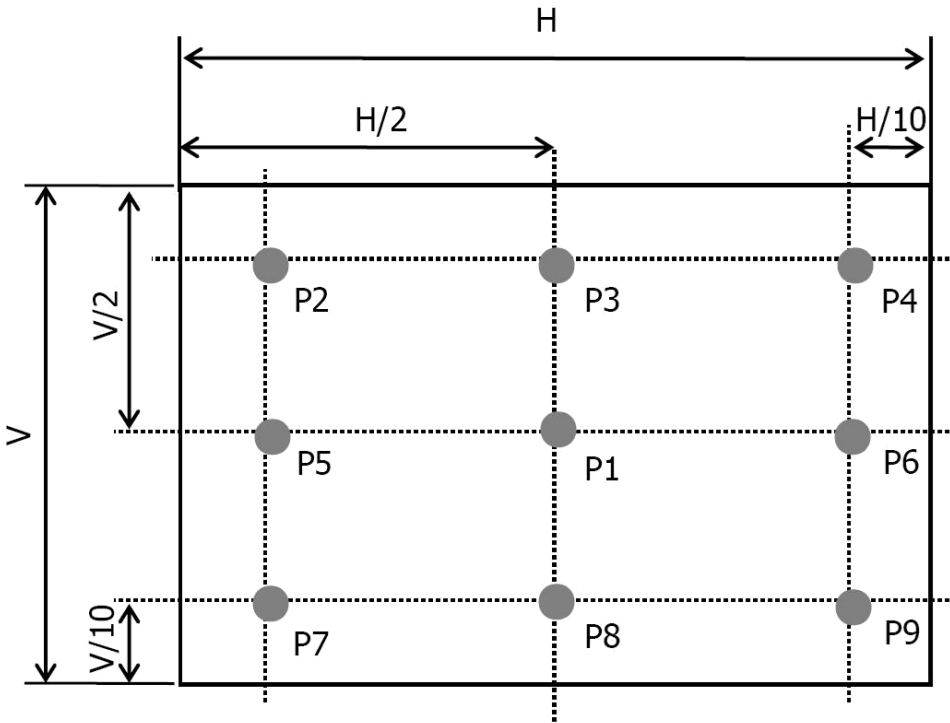
- Note :
- Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
 - Contrast measurements shall be made at viewing angle of $\theta= 0^{\circ}$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See Figure 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$
 - The color chromaticity coordinates specified in Table 7.shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel. The chromaticity coordinates are based on BOE backlight.
 - Response time Tg is the average time required for display transition by switching the input signal as below table and is based on Frame rate $f_v = 60\text{Hz}$ to optimize. Each time in below table shall be measured by switching the input signal for “any level of gray(bright)”and “any level of gray(dark)”

Measured Response Time		Target																
		0	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
Start	0																	
	15																	
	31																	
	47																	
	63																	
	79																	
	95																	
	111																	
	127																	
	143																	
	159																	
	175																	
	191																	
	207																	
	223																	
239																		
255																		

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

Note 5. δ_{white} = Minimum (Lon1,Lon2,..., Lon N) / Maximum (Lon1,Lon2,...,Lon N)*100(%), Where Lon1 to Lon N are the luminance with all pixels displaying white .



9 points for Brightness measure @ H,V: Active Area

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

8.0 MECHANICAL CHARACTERISTICS

8.1 Dimensional Requirements

Figure 3(located in Appendix) shows mechanical outlines for the Module EV238FH2-M00. Other parameters are shown in Table 8.

< Table 8-1. Dimensional Parameters >

Parameter	Specification	Unit
Dimensional Outline	535(H) × 309.3(V)	mm
MDL Thickness	6.75(Body)/12(W/I PCBA)	mm
Weight	1860g (Typ.)	g
Active area	527.04(H)x296.46(V)	mm
Pixel pitch	91.5(H) × 3 (RGB) × 274.5(V)	um
Number of pixels	1920(H) × 1080(V)(1 pixel = R + G + B dots)	pixels

8.2 Mounting

See FIGURE 3. (shown in Appendix)

8.3 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

< Table 8-2. Anti-Glare and Polarizer Hardness>

Items	Min	Typ	Max	Unit.	Remark
Haze	35	42	49	%	
Hardness	3H	-	-	-	Note 1

Note 1 : Hardness is tested at 500G weight pressure.

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	24 OF 36

9.0 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

< Table 9. Reliability Test Parameters >

No	Test Items	Conditions	
1	High temperature storage test	Ta = 60 °C, 240 hrs	
2	Low temperature storage test	Ta = -20 °C, 240 hrs	
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240hrs	
4	High temperature operation test	Ta = 50 °C, 240hrs	
5	Low temperature operation test	Ta = 0 °C, 240hrs	
6	Thermal shock	Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle	
7	Vibration test (non-operating)	Frequency	10 ~ 300 Hz, Sweep rate 30 min
		Gravity /AMP	1.05 G
		Period	X, Y, Z 30 min
8	Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV	

This test condition is based on BOE module.

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

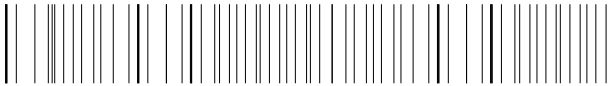
10.0 PRODCUT SERIAL NUMBER

DP/N

XXXXXXX-XXX

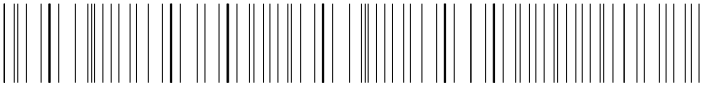
BXX

XXXXXX



XXXX

XXXXXXXXXXXXXXXXXXXXX



REV A00

XX-XXXXXX-XXXXX-XXX-XXXX









MADE IN CHINA

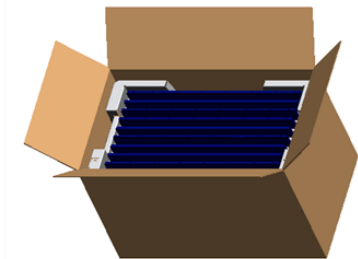
Digit	1		2	3	4	5	6					7						
Code	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Des.	1. Control Number 2. Rank/Grade 3. Line Classification 4. Year(2001:01, 2002:02, ...) 5. Month(1, 2, 3, ..., 9, X, Y, Z) 6. Internal Use 7. Serial Number																	

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

11.0 PACKING INFORMATION

BOE provides the standard shipping container for customers, unless customer specifies their packing information. The standard packing method and Barcode information are shown in below.

11.1 Packing Order

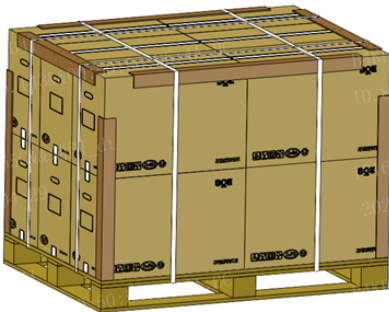


Put 1 EPS bottom into the inner box.

Put each module into a PE bag.

Insert 10 Pcs MDL into each box

Place the **PCB side up** inside the box



Place paper corners and wrap film around the boxes.

Pack with 4 packing belts.

Put 1 EPS cover in and seal the box.

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	27 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

11.2 Packing Note

- Box Dimension : 640mm(L)×370mm(W)×410mm(H)
- Package Quantity in one Box : 10pcs

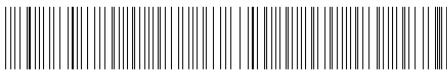
11.3 Box Label

- Label Size : 110mm (L) × 56mm (W)
 - Contents
- Model : EV238FH2-M00
- Q`ty : 10 Q`ty in one box
- Serial No. : Box Serial No.
- Date : Packing Date

BEIJING BOE DISPLAY TECHNOLOGY CO.,LTD.

MODEL: XXXXXXXXX-XXX ① Q'TY: XXX ②

SERIAL NO: XXXXXXXXXXXXXXXX ③ DATE: XXXX.XX.XX ④


XXXXXXXXXXXXXXXXXXXX


RoHS Compliant


XXXX ⑤

RoHS Mark

Internal CODE

- Note:**
- ① FG-CODE
 - ② Qty
 - ③ Box ID, as follow
 - ④ Box Packing Date
 - ⑤ FG-CODE the last four digits

Digit Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	A	1	6	3	D	0	0	1	A	1
Description	Products GB N		Grad e	Line	Year		Mont h	Revision Code	Serial No.				

	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

12.0 PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD Module.

12.1 Mounting Precautions

- Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- You must mount a module using specified mounting holes (Details refer to the drawings).
- You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress)is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- Do not apply mechanical stress or static pressure on module; Abnormal display cause by pressing some parts of module during assembly process, do not belong to product failure, the press should be agreed by two sides.
- Determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- You should adopt radiation structure to satisfy the temperature specification.
- Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental to the polarizer.)
- When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzine. Normal-hexane & alcohol is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene, because they cause chemical damage to the polarizer.
- Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- Do not apply static pressure on module, and avoid impact, vibration and falling.
- This module has its circuitry PCB’s on the rear side and Driver IC, should be handled carefully in order not to be stressed.
- Avoid impose stress on PCB and Driver IC during assembly process, Do not drawing, bending, COF package & wire
- Do not disassemble the module.

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	29 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

12.2 Operating Precautions

- Do not connect or disconnect the cable to/from the LCD at the “Power On”Condition.
- When the Module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the Module would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the Module would be damaged.
- Do not allow to adjust the adjustable resistance or switch.
- The electrochemical reaction caused by DC voltage will lead to LCD Moudle degradation, so DC drive should be avoided.
- The LCD Module use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to VDD or VSS, do not input any signals before power is turn on, and ground your body, work/assembly area, assembly equipment to protect against static electricity.
- Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the LCD Module may be damaged.
- Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
- The cables should be as short as possible between System Board and PCB interface.
- Connectors are precision devices to transmit electrical signals, and operators should plug in parallel.
- Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- Long side LED Bar design is recommended when using E-LED type Back Light.
- For long-term lighting products, it is recommended to shut down periodically.
- If the product is used for a long time under the condition of 7*24 hrs, it is strongly recommended to contact BOE for filed application engineering advice.
- Long time and large angle forward use or unconventional use, It is strongly recommended to contact BOE for filed application engineering advice.
- Products exposed to low temperature environment for a long time, need to carry out necessary protection, low temperature environment is usually refrigerators, vending machine Etc...

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	30 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

12.3 Electrostatic Discharge Precautions

- Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
- Since a Module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc.
- Do not close to static electricity to avoid product damage.
- Do not touch interface pin directly.

12.4 Precautions for Strong Light Exposure

- Do not leave the LCD operation or storage in Strong light . Strong light exposure causes degradation of polarizer and color filter.

12.5 Precautions for Storage

A. Atmosphere Requirement

ITEM	UNIT	MIN	TYP	MAX
Storage Temperature	(°C)	5	25	40
Storage Humidity	(%rH)	40	50	75
Storage Life	6 months			
Storage Condition	• The storage room should be equipped with a dark and good ventilation facility. • Prevent products from being exposed to the direct sunlight, moisture and water. • The product need to keep away from organic solvent and corrosive gas. • Be careful for condensation at sudden temperature change. • Storage condition is guaranteed under packing conditions.			

B. Package Requirement

- The product should be placed in a sealed polythene bag.
- Product Should be placed on the pallet, Which is away from the floor, Be cautions not to pile the product up.
- The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.
- As the original protective film, do not use the adhesive protective film to avoid change of Pol color and characteristic.

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	31 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

12.6 Precautions for protection film

- Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
- People who peeled off the protection film should wear anti-static strap and grounded well.

12.7 Appropriate Condition for Commercial Display

-Generally large-sized LCD module are designed for consumer applications . Accordingly, long-term display like in Commercial Display application, can cause uneven display including image sticking. To optimize module's lifetime and function, several operating usages are required.

1. Normal operating condition

- Temperature: 20±15℃
- Operating Ambient Humidity : 55±20%
- Display pattern: dynamic pattern (Real display)
- Well-ventilated place is recommended to set up Commercial Display system

2. Special operating condition

a. Ambient condition

- Well-ventilated place is recommended to set up Commercial Display system.

b. Power and screen save

- Periodical power-off or screen save is needed after long-term display.

- c. As the low temperature, the response time is greatly delayed. As the high temperatures (higher than the operating temperature) the LCD Module may turn black screen. The above phenomenon cannot explain the failure of the display. When the temperature returns to the normal operating temperature, the LCD Module will return to normal display.
- d. When expose to drastic fluctuation of temperature (hot to cold or cold to hot) ,the LCD Module may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD panel’s surface which may affect the operation of the polarizer and LCD Module.
- e. Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the LCD may be damaged.
- f. Product reliability and functions are only guaranteed when the product is used under right operation usages. If product will be used in extreme conditions such as high temperature, high humidity, high altitude, highlight, special display images, running time, long time operation, outdoor operation, etc. It is strongly recommended to contact BOE for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, banks, stock market and controlling systems.

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	32 OF 36

BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

- 3. Operating usages to protect against image sticking due to long-term static display.
 - a. Static information display recommended to use with moving image.
 - Cycling display between 5 minutes' information(static) display and 10 seconds' moving image.
 - b. Background and character (image) color change
 - Use different colors for background and character, respectively.
 - Change colors themselves periodically.
 - c. Avoid combination of background and character with large different luminance.
 - 1) Abnormal condition just means conditions except normal condition.
 - 2) Black image or moving image is strongly recommended as a screen save
- 4. Lifetime in this spec. is guaranteed only when Commercial Display is used according to operating usages.
- 5. LCD suggest be turned clockwise based on front view when used in portrait mode.

12.8 Other Precautions

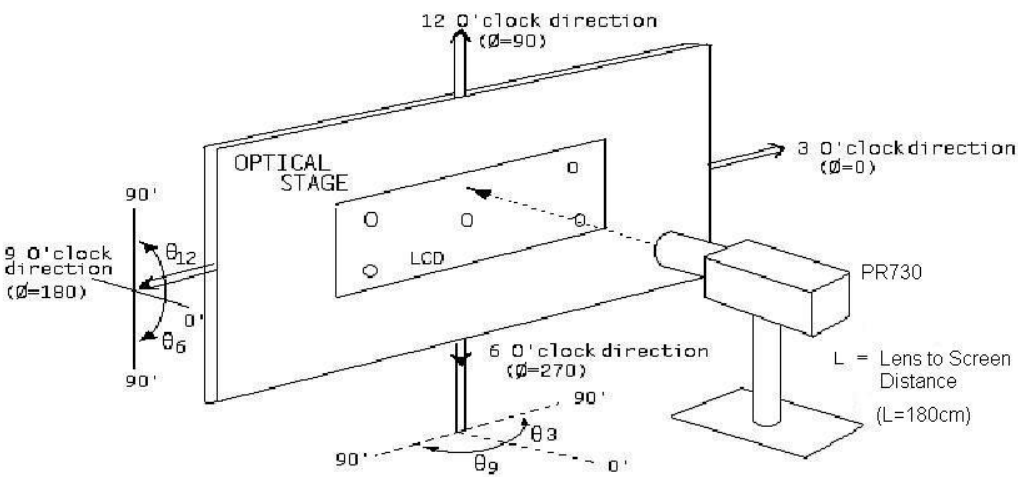
- A. LC Leak
 - If the liquid crystal material leaks from the panel, it is recommended to wash the LC with acetone or ethanol and then burn it.
 - If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
 - If LC in mouth, mouth need to be washed, drink plenty of water to induce vomiting and follow medical advice.
 - If LC touch eyes, eyes need to be washed with running water at least 15 minutes.
- B. Rework
 - When returning the Module for repair or etc., Please pack the Module not to be broken. We recommend to use the original shipping packages.
- C. In order to prevent potential problems, flicker should be adjusted by optimizing the Vcom value in customer Module Line through the I2C Interface.
- D. This Specification is the property of BOE and Shall not be reproduced or copied without the written permission of BOE and must be returned to BOE upon its Request

SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	33 OF 36

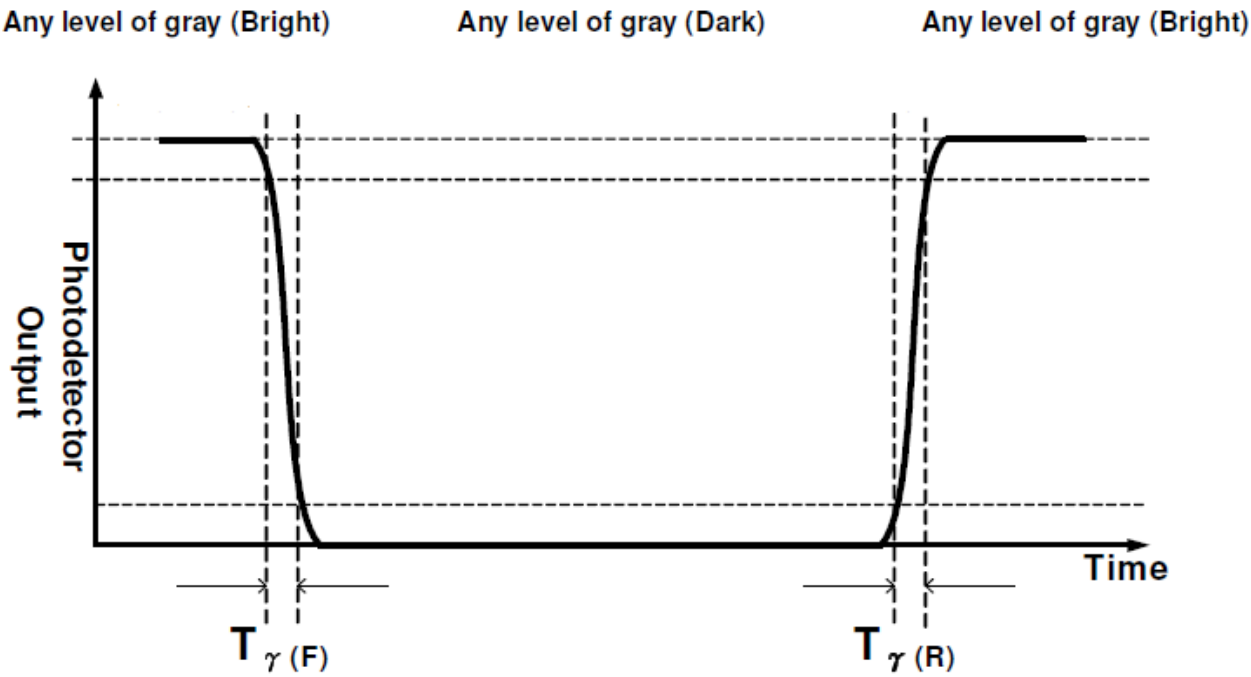
BOE	PRODUCT GROUP	REV	ISSUE DATE
	TFT-LCD	00	2026.04.28

13.0 APPENDIX

< Figure 1. Measurement Set Up >

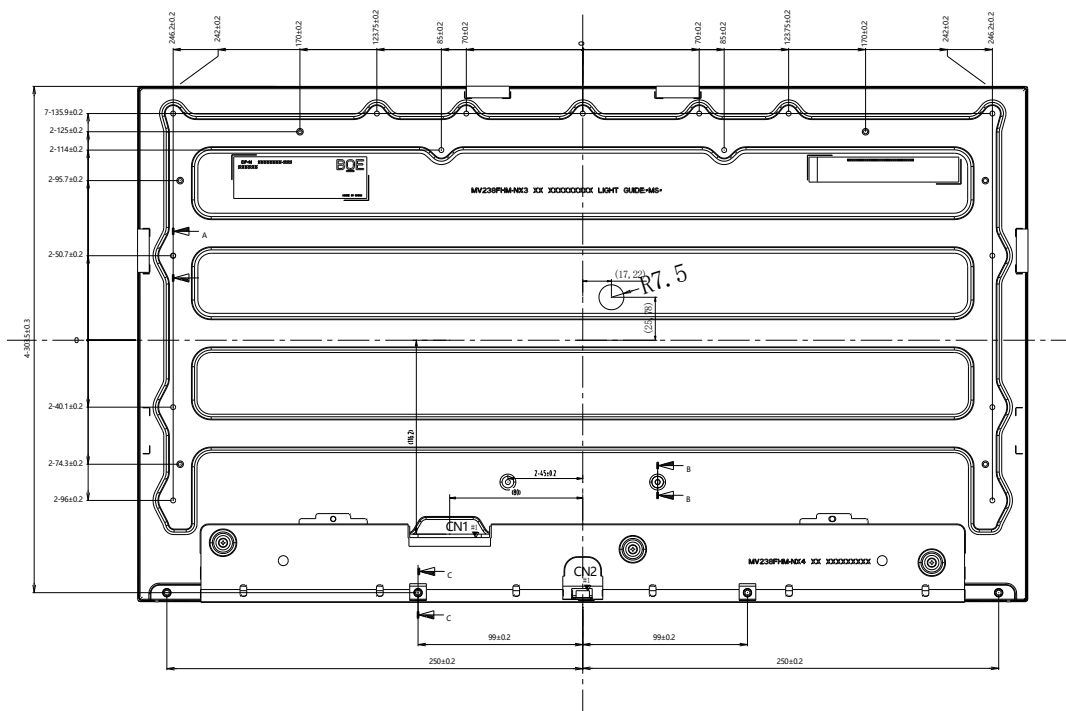


< Figure 2. Response Time Testing >



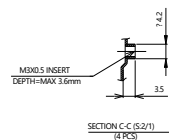
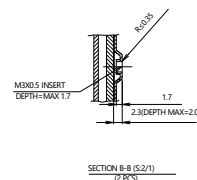
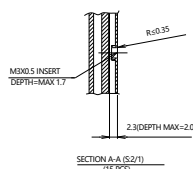
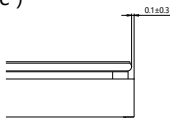
SPEC. NUMBER	SPEC. TITLE	PAGE
Spec-00002917	EV238FH2-M00 Product Specification	34 OF 36

< Figure 4. TFT-LCD Module Outline Dimensions (Rear View) >



NOTE:

1. CNT1: I/F CONNECTOR SPECIFICATION
LS1030-L4005W480H225-E02; MSBKT2407P30HC OR EQUIVALENT
2. CNT2: LED CONNECTOR SPECIFICATION
A10035WW-H06E or EQUIVALENT
3. USER MOUNTING TORQUE SPEC : 4 ~ 6 kgf-cm
- Tilt and partial disposition tolerance of display area as following
- Measuring Tool:Feeler Gauge or Vernier Caliper
- | Max-Min | ≤ 0.3 (@each side)
- MEXUS INS
2020.02.12



4.The COF area is weak &sensitive, so please don't press the COF Area