



Product Specification

F238PET-Z07

- ☐ Draft Specifications
☒ Preliminary Specifications
☐ Final Specifications

Title	23.8-inches Touch Display Product Specifications
Model Name	F238PET-Z07
Version	0

Customer	
Approved by	Date
Notice: This Specification is subject to change without notice.	

Approved By	Prepared By
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2026-05-26	2026-05-26



REVISION HISTORY

Version	ECN No.	Description of Changes	Date	Prepared
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1. GENERAL DESCRIPTION

1.1. INTRODUCTION

F238PET-Z07 is a 23.8" color active matrix TFT LCD module G238HCJ-L02 with projected capacitive multi-touch B238PBU-E04 air bonding, with touch driver ETP-MB-EXC84H5680STAG.

The display format is intended to support 1920 x 1080 FHD mode screen and 2 channel 30 pins LVDS interface, 16.7M colors, with white LEDs backlight built in PCBA.

1.2. FEATURES

- FHD (1920 x 1080) resolution
- RoHS Compliance

1.3. APPLICATION

- TFT LCD monitor
- Factory application

1.4. GENERAL SPECIFICATIONS

Parameter	Specification	Unit	Remarks
Active Area Size	23.8	inch	
Display Area	527.04 x 296.46 (V)	mm	
Outline Dimension	544.00 (H) x 322.00 (V) x 17.15 (D)	mm	D:PCAP+LCM
Weight	3470	g	Typ.
Driver Element	a-Si TFT active matrix	-	
Display Colors	16.7M	Colors	
Number of Pixels	1920 (H) x 1080 (V)	pixels	
Pixel Pitch	0.2745(H) x 0.2745(W)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Mode	Normal Black	-	
Touch Technology	Projected Capacitive Multi-Touch Panel	-	
Touch Method	Finger or exclusive pen	-	
Numbers of Touch	10	Points	
Touch Driver	ETP-MB-EXC84H5680STAG : USB	-	
Touch Sensor Glass Type	Strengthening Glass	-	
Touch Controller IC	EETI, EXC80H84	-	
Touch Driver Interface	USB 2.0	-	
Support OS	Windows (Embedded/CE/XP/2000/Vista/7/8/10) / Linux / Android / MAC / QNX	-	

2. ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	-0.3	6.0	V	Note 1
Converter Voltage	V _I	-0.3	18	V	
Enable Voltage	EN	-0.3	5.5	V	
Dimming Voltage	PWM	-0.3	5.5	V	
Operating Temperature	T _{op}	0	60	°C	Note 2
Operating Humidity	H _{op}	20	90	%RH	
Storage Temperature	T _{st}	-20	60	°C	
Storage Temperature	H _{st}	10	90	%RH	
Touch DC Supply Voltage	USB_V _{DD}	-0.3	6.0	V	

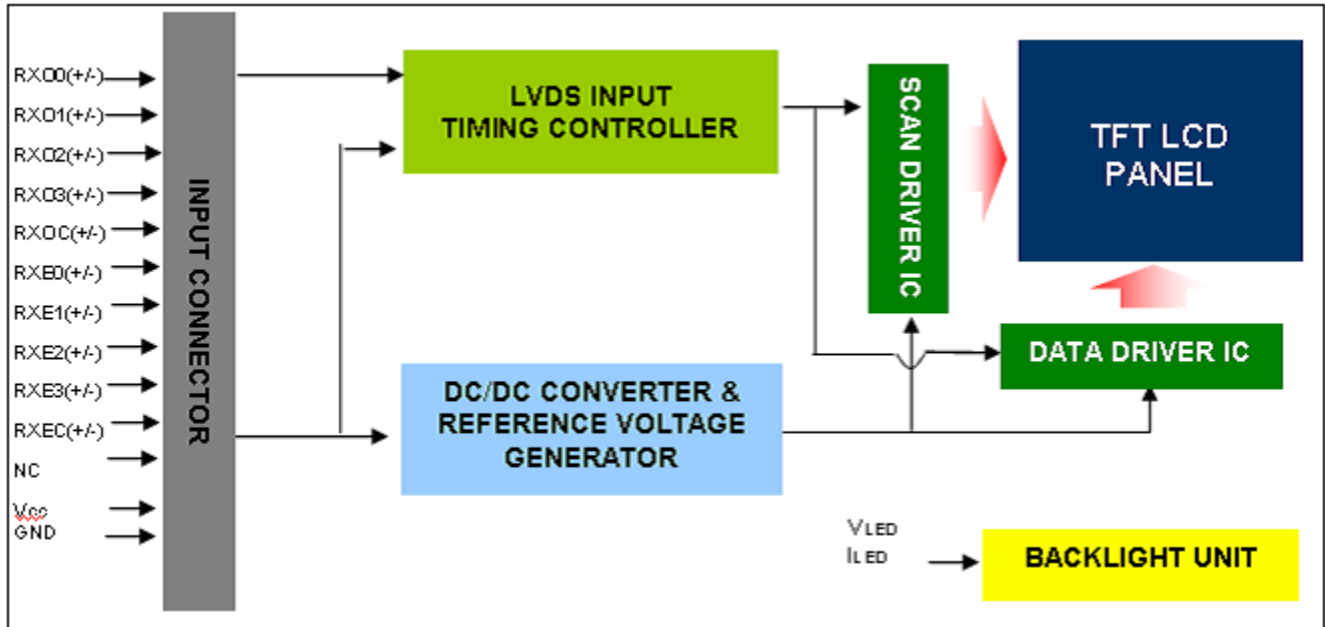
Note:

1. Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.
2. Maximum Wet-Bulb temperature should be 39°C and no condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.

3. ELECTRICAL CHARACTERISTICS

3.1. LCD BLOCK DIAGRAM



3.2. INTERFACE CONNECTIONS

3.2.1. LVDS PIN ASSIGNMENT

Pin	Symbol	Description
1	RX00-	Negative LVDS differential data input Channel O0 (odd)
2	RX00+	Positive LVDS differential data input Channel O0 (odd)
3	RX01-	Negative LVDS differential data input Channel O1 (odd)
4	RX01+	Positive LVDS differential data input Channel O1 (odd)
5	RX02-	Negative LVDS differential data input Channel O2 (odd)
6	RX02+	Positive LVDS differential data input Channel O2 (odd)
7	GND	Ground
8	RXOC-	Negative LVDS differential clock input (odd)
9	RXOC+	Positive LVDS differential clock input (odd)
10	RX03-	Negative LVDS differential data input Channel O3 (odd)
11	RX03+	Positive LVDS differential data input Channel O3 (odd)
12	RXE0-	Negative LVDS differential data input Channel E0 (even)
13	RXE0+	Positive LVDS differential data input Channel E0 (even)
14	GND	Ground
15	RXE1-	Negative LVDS differential data input Channel E1 (even)

16	RXE1+	Positive LVDS differential data input Channel E1 (even)
17	GND	Ground
18	RXE2-	Negative LVDS differential data input Channel E2 (even)
19	RXE2+	Positive LVDS differential data input Channel E2 (even)
20	RXEC-	Negative LVDS differential clock input (even)
21	RXEC+	Positive LVDS differential clock input (even)
22	RXE3-	Negative LVDS differential data input Channel E3 (even)
23	RXE3+	Positive LVDS differential data input Channel E3 (even)
24	GND	Ground
25	NC	For LCD internal use only, Do not connect
26	NC	For LCD internal use only, Do not connect
27	NC	For LCD internal use only, Do not connect
28	V _{CC}	+5.0V power supply
29	V _{CC}	+5.0V power supply
30	V _{CC}	+5.0V power supply

Note (1) Connector Part No.:

Foxconn : GS23301-0321R-7H

or FCN : WF13-422-3033 or P-TWO : 187098-30091 or equivalent

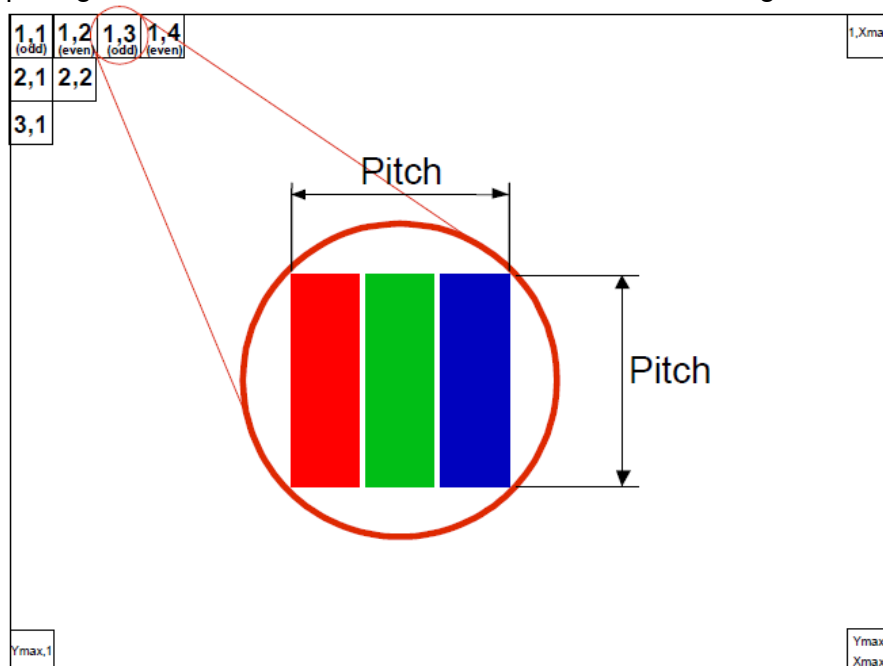
Note (2) User's connector Part No.:

Mating Wire Cable Connector Part No.: FI-X30H (JAE) or FI-X30HL (JAE)

Mating FFC Cable Connector Part No.: 217007-013001 (P-TWO) or JF05X030-1 (JAE).

Note (3) the first pixel is odd.

Note (4) Input signal of even and odd clock should be the same timing.

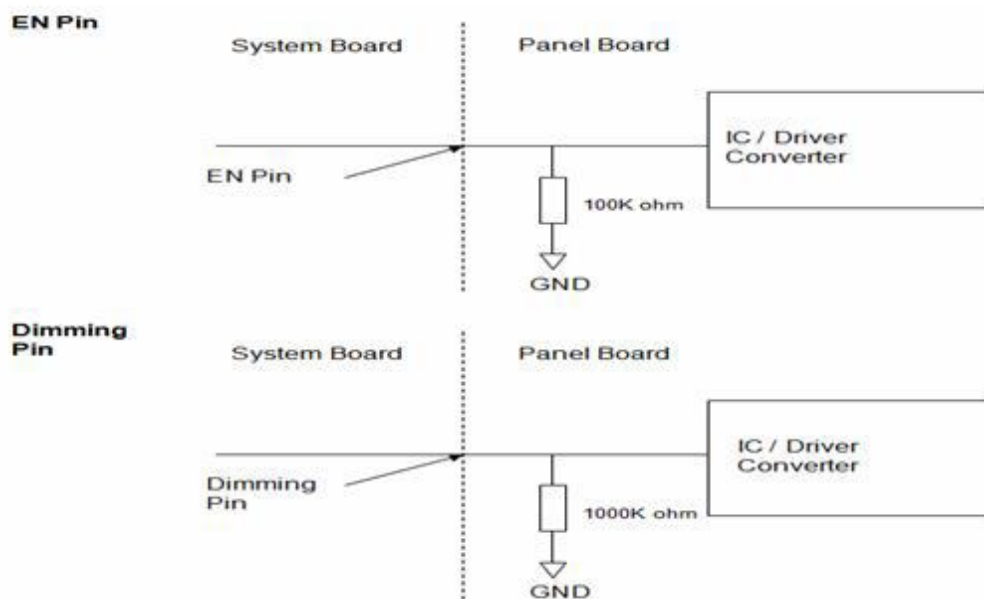


3.2.2. BACKLIGHT UNIT (Converter connector pin)

Pin	Symbol	Description	Remark
1	Vi	Converter input voltage	12V
2	Vi	Converter input voltage	12V
3	Vi	Converter input voltage	12V
4	Vi	Converter input voltage	12V
5	V _{GND}	Converter ground	Ground
6	V _{GND}	Converter ground	Ground
7	V _{GND}	Converter ground	Ground
8	V _{GND}	Converter ground	Ground
9	EN	Enable pin	3.3V
10	Dimming	Backlight Adjust	PWM Dimming (Hi: 3.3V _{DC} , Lo: 0V _{DC})

Note (1) Connector Part No.: CI0110M1HR0-NH (Cvilux) or equivalent.

Note (2) User's connector Part No.: Cvilux CI01 or equivalent

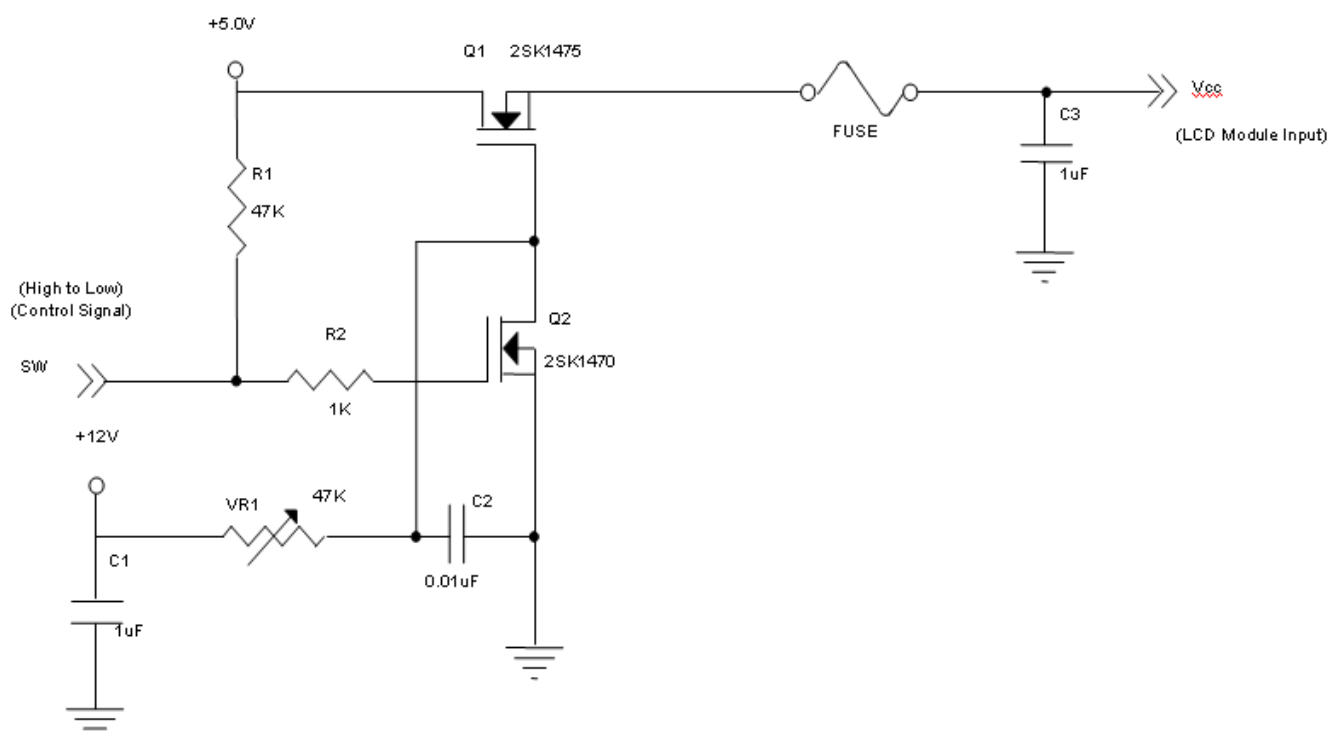


3.3. LCD MODULE

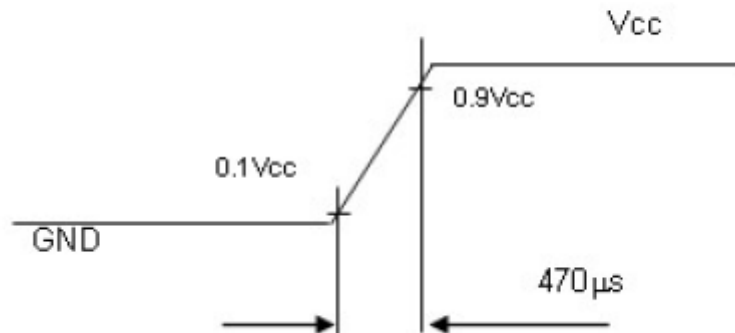
Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Power Supply Input Voltage		V _{CC}	4.5	5.0	5.5	V	
Power Supply Ripple Voltage		V _{RP}	-	-	300	mVp-p	
Rush Current		I _{RUSH}	-	-	3	A	(2)
Power Supply Input Current	White Pattern		-	0.362	0.449	A	(3)a
	Black Pattern		-	0.361	0.434	A	(3)b
	Vertical Stripe		-	0.703	0.836	A	(3)c
Power Consumption		P _{LCD}	-	3.516	4.29	W	(4)
LVDS differential input voltage		V _{id}	100	-	600	mV	
LVDS common input voltage		V _{ic}	1.0	1.2	1.4	V	
Logic High Input Voltage		V _{IH}	-	-	100	mV	
Logic Low Input Voltage		V _{IL}	-100	-	-	mV	

Note (1) the assembly should be always operated within above ranges.

Note (2) Measurement Condition :

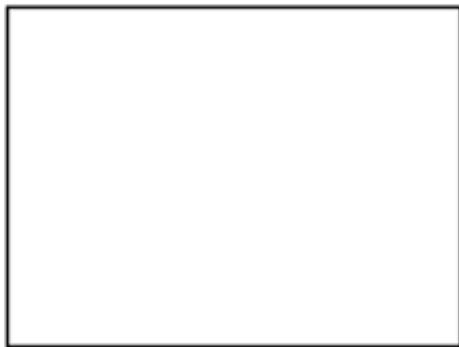


V_{CC} rising time is 470μs



Note (3) the specified power supply current is under the conditions at V_{CC} = 5.0 V, T_a = 25 ± 2 °C, Fr = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



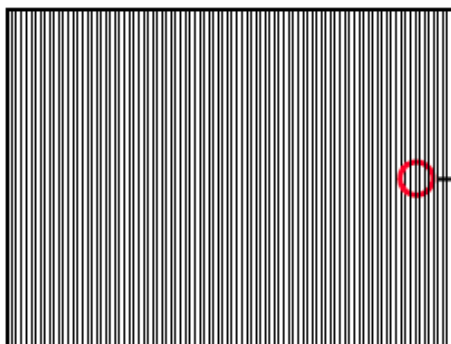
Active Area

b. Black Pattern

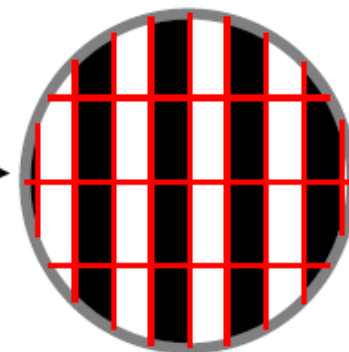


Active Area

c. Vertical Stripe Pattern



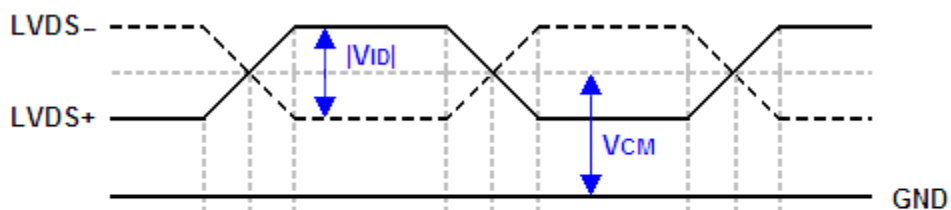
Active Area



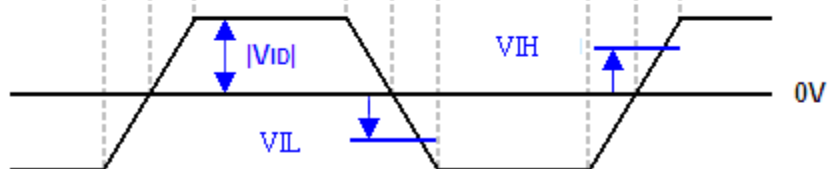
Note (4) the power consumption is a specified at the pattern with the maximum current.

Note (5) VID waveform condition

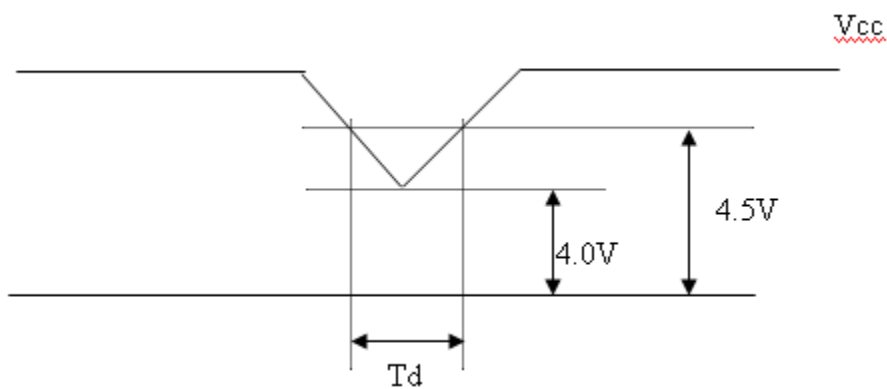
Single-end Signals



Differential Signal



VCC POWER DIP CONDITION

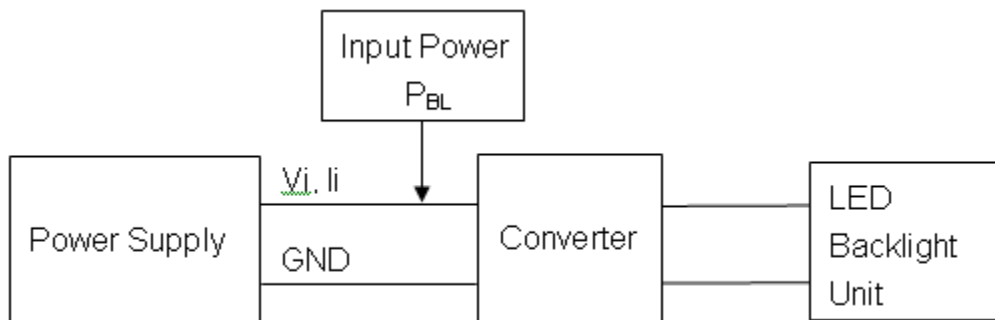


3.4. LCD BACKLIGHT UNIT

Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Converter Input Voltage		V_i	10.8	12.0	13.2	V	
Converter Input Current		I_i	-	1.3	1.6	A _{DC}	@ $V_i=12V$ (Duty 100% For V_f 3.05Vmax)
Input Power Consumption		P_{BL}	-	15.6	19.2	W	@ $V_i=12V$ (Duty 100%)
EN Control Level	Backlight on	ENLED (BLON)	2.0	3.3	5.0	V	
	Backlight off		0	-	0.15	V	
PWM Control level	PWM High	Dimming (E_PWM)	2.0	3.3	5.0	V	
	PWM Low		0	-	0.15	V	
PWM Control Duty Ratio		-	1	-	100	%	@200Hz
PWM Control Frequency		f_{PWM}	190	200	20k	Hz	(2)
LED Life Time		L_L	50,000	-	-	Hrs	(3)

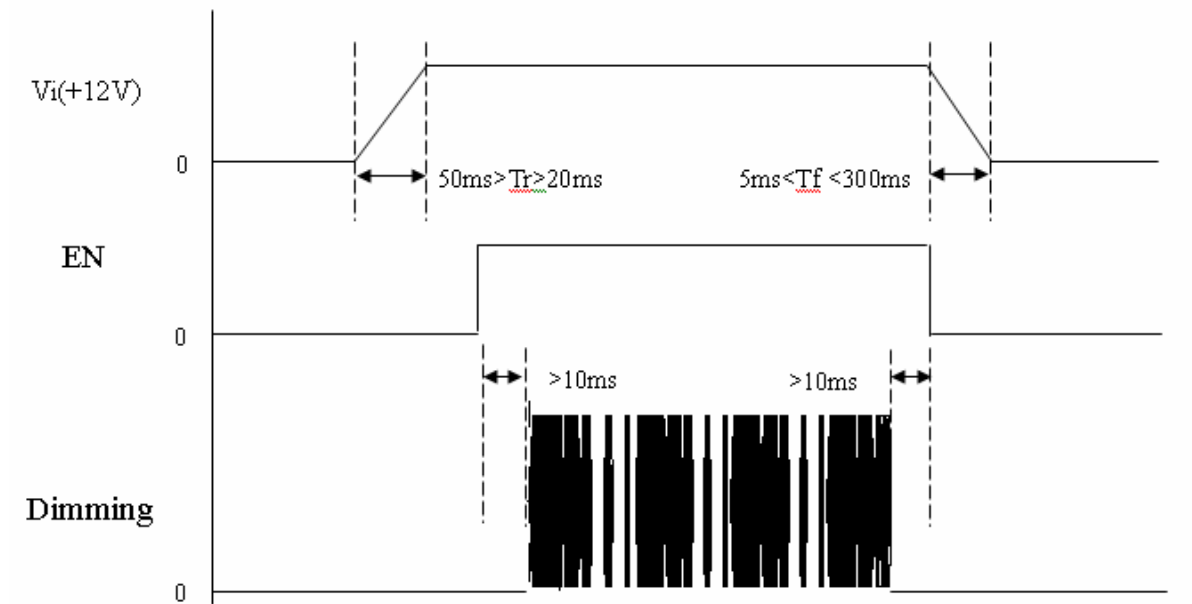
Notes:

- (1) LED current is measured by utilizing a high frequency current meter as shown below:



- (2) At 20k Hz PWM control frequency, duty ratio range is restricted from 20% to 100%.
- (3) The lifetime of LED is estimated data and defined as the time when it continues to operate under the conditions at $T_a = 25 \pm 2^\circ C$ and Duty 100% until the brightness becomes $\leq 50\%$ of its original value. Operating LED at high temperature condition will reduce life time and lead to color shift.

Power sequence and control signal timing are shown in the following figure

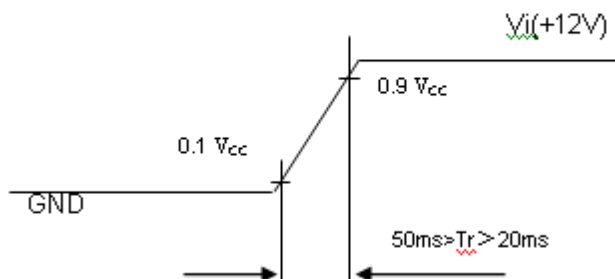


Note: While system is turned ON or OFF, the power sequences must follow as below descriptions

Turn ON sequence: $V_i(+12V) \rightarrow EN \rightarrow \text{Dimming}$

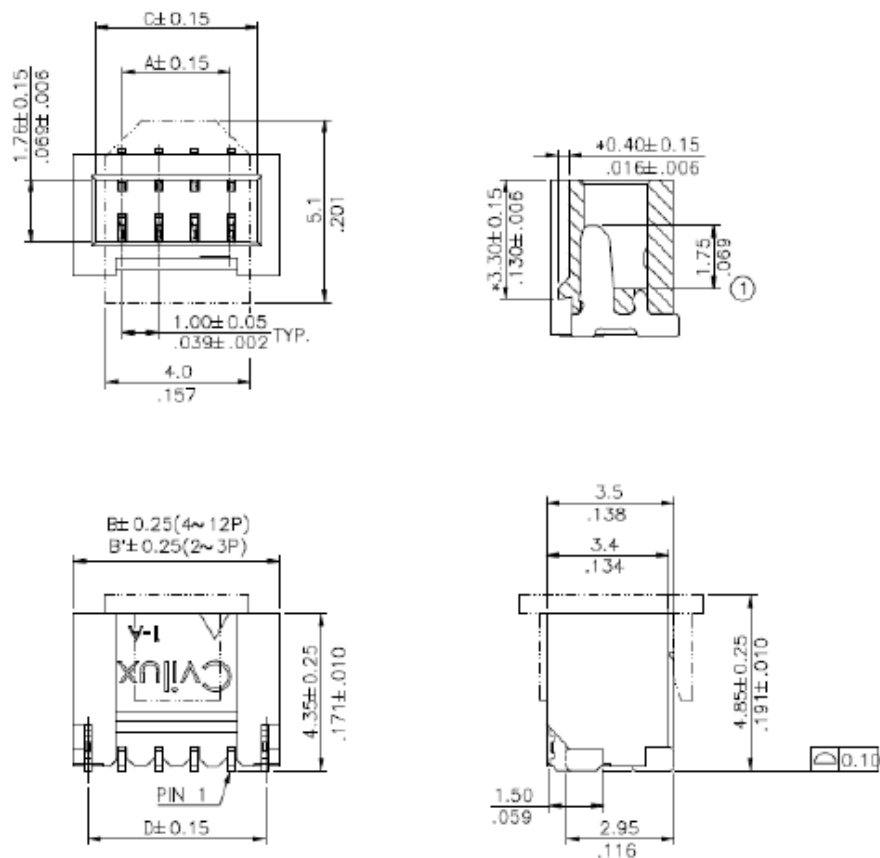
Turn OFF sequence: $\text{Dimming} \rightarrow EN \rightarrow V_i(+12V)$

(4)



POWER CONNECTOR PIN ASSIGNMENT

Connector: CI1406M1VL0-NH (CviLux) or Compatible

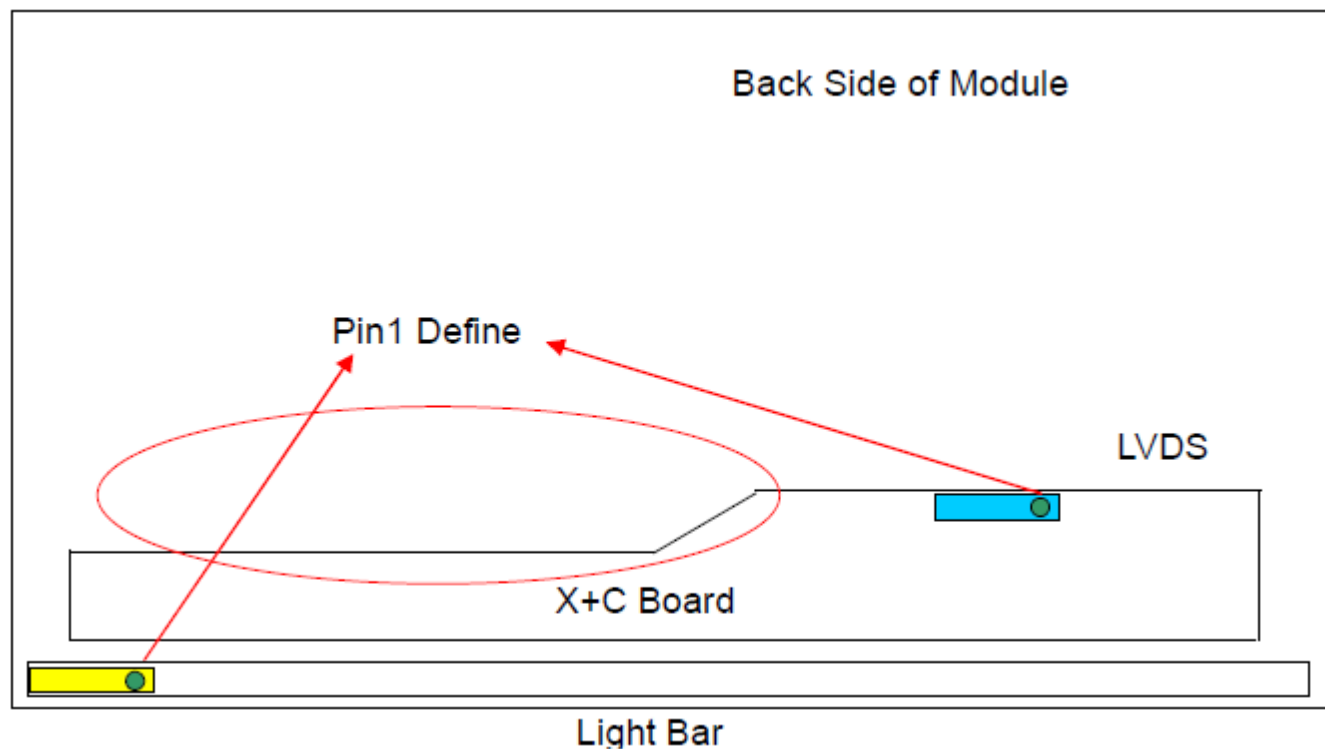


CN1

Pin number	Description
1	Cathode of LED string
2	Cathode of LED string
3	VLED
4	VLED
5	Cathode of LED string
6	Cathode of LED string

Note(1) Connector(wire type): CI1406M1VL0-NH (CviLux) or equivalent.

Note(2) User's mating connector part No.: FCN(WF1300106-B) and hook width must be less than 4.5mm.



3.5. LCD LVDS DATA MAPPING TABLE

LVDS Channel O0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	OG0	OR5	OR4	OR3	OR2	OR1	OR0
LVDS Channel O1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	OB1	OB0	OG5	OG4	OG3	OG2	OG1
LVDS Channel O2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	OB5	OB4	OB3	OB2
LVDS Channel O3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	OB7	OB6	OG7	OG6	OR7	OR6
LVDS Channel E0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	EG0	ER5	ER4	ER3	ER2	ER1	ER0
LVDS Channel E1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	EB1	EB0	EG5	EG4	EG3	EG2	EG1
LVDS Channel E2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	EB5	EB4	EB3	EB2
LVDS Channel E3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	EB7	EB6	EG7	EG6	ER7	ER6

3.6. LCD COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the



higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		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
	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
	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
	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
	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
	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	Red (0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red (253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (255)	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	Green (0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green (253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green (254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green (255)	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	Blue(0)/Dark	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 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue (253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue (254)	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 (255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note1. 0: Low Level Voltage, 1: High Level Voltage

3.7. DISPLAY TIMING SPECIFICATION

The signal input timing specification as shown as the following table and timing diagram.

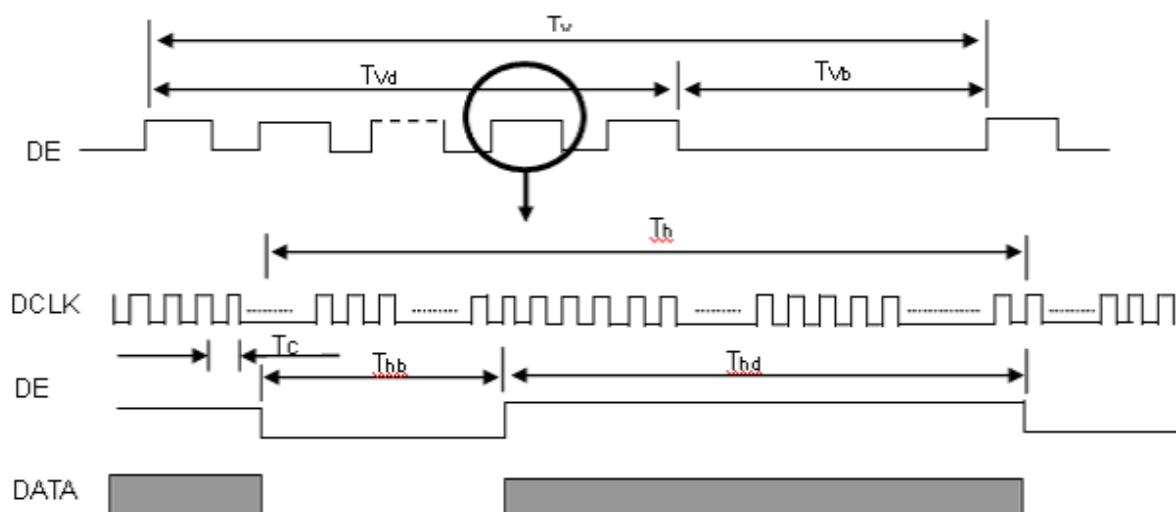
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	F_C	56	74.25	(97.98)	MHz	
	Period	T_C	-	13.47	-	ns	
	Input cycle to cycle jitter	T_{rcl}	$-0.02 \cdot T_C$	-	$0.02 \cdot T_C$	ns	(1)
	Input Clock to data skew	TLVCCS	$-0.02 \cdot T_C$	-	$0.02 \cdot T_C$	ps	(2)
	Spread spectrum modulation range	F_{clkin_mod}	$0.97 \cdot F_C$	-	$1.03 \cdot F_C$	MHz	(3)
	Spread spectrum modulation frequency	F_{SSM}	-	-	100	KHz	
Vertical Display Term	Frame Rate	F_r	49	60	77	Hz	$T_v = T_{vd} + T_{vb}$
	Total	T_v	1110	1125	1257	T_h	
	Active Display	T_{vd}	1080	1080	1080	T_h	
	Blank	T_{vb}	20	45	177	T_h	
Horizontal Display Term	Total	T_h	1050	1100	1150	T_c	$T_h = T_{hd} + T_{hb}$
	Active Display	T_{hd}	960	960	960	T_c	
	Blank	T_{hb}	90	140	190	T_c	

Notes: Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

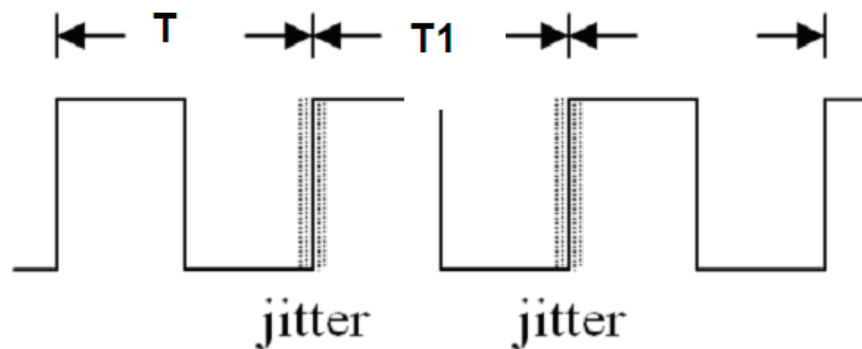
$$F_C = F_r \times T_v \times T_h$$

Please make sure the range of pixel clock has follow the below equation and F_C , F_r , T_v , T_h not allow to get beyond the min or max spec.

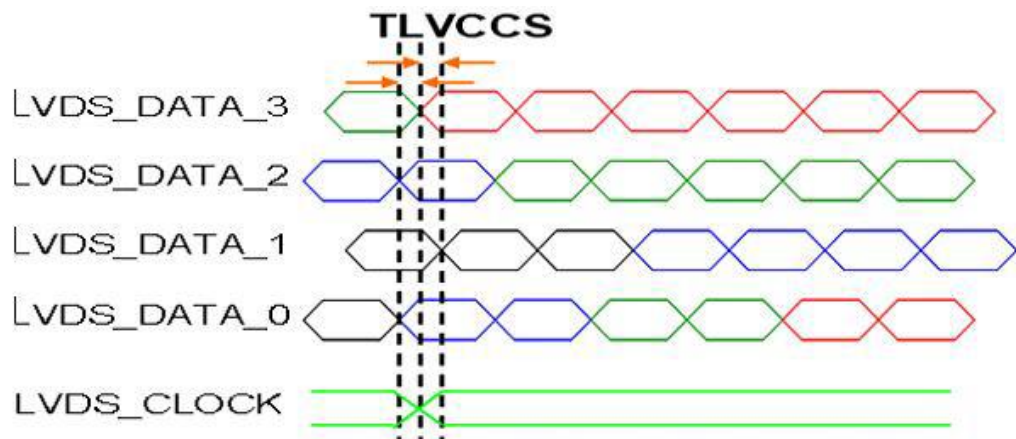
INPUT SIGNAL TIMING DIAGRAM



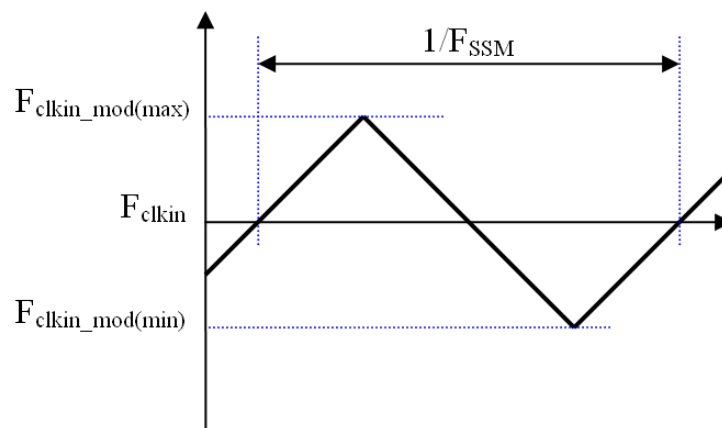
(1) The input clock cycle-to cycle jitter is defined as below figures. $T_{rcl} = |T_1 - T|$



(2) Input Clock to data skew is defined as below figures.



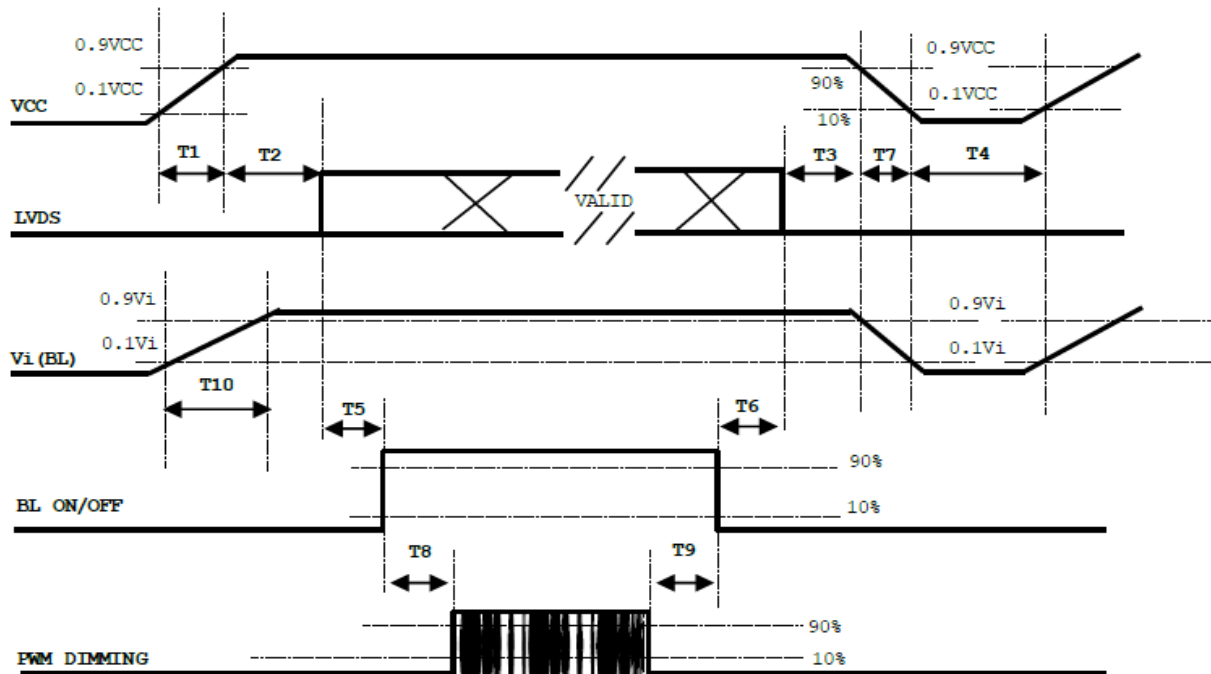
(3) The SSCG (Spread spectrum clock generator) is defined as below figures.



(4) The DCLK range at last line of v-blank should be set in 0 to Hdisplay/2

3.8. POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.



Power ON/OFF sequence

Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid be sure to pull down the power supply of LCD VCC to 0 V.

Note (3) The Backlight converter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

Parameter	Values			Unit
	Min.	Typ.	Max.	
T1	0.5	---	10	ms
T2	0	---	50	ms
T3	0	---	50	ms
T4	500	---	---	ms
T5	450	---	---	ms
T6	200	---	---	ms
T7	10	---	100	ms
T8	10	---	---	ms
T9	10	---	---	ms
T10	20	---	50	ms

ETP-MB-EXC84H5680STAG

4.1. TOUCH CONTROL BOARD PIN ASSIGNMENT



FPC Pin Description

CN1					
PN		PN		PN	
1	NC	21	TX34	41	TX14
2	NC	22	TX33	42	TX13
3	NC	23	TX32	43	TX12
4	NC	24	TX31	44	TX11
5	NC	25	TX30	45	TX10
6	NC	26	TX29	46	TX9
7	NC	27	TX28	47	TX8
8	NC	28	TX27	48	TX7
9	TX_S1	29	TX26	49	TX6
10	TX45	30	TX25	50	TX5
11	TX44	31	TX24	51	TX4
12	TX43	32	TX23	52	TX3
13	TX42	33	TX22	53	TX2
14	TX41	34	TX21	54	TX1
15	TX40	35	TX20	55	TX0
16	TX39	36	TX19	56	TX_S0
17	TX38	37	TX18		
18	TX37	38	TX17		
19	TX36	39	TX16		
20	TX35	40	TX15		

CN2							
PN		PN		PN		PN	
1	RX_S1	21	RX58	41	RX38	61	RX18
2	RX77	22	RX57	42	RX37	62	RX17
3	RX76	23	RX56	43	RX36	63	RX16
4	RX75	24	RX55	44	RX35	64	RX15
5	RX74	25	RX54	45	RX34	65	RX14
6	RX73	26	RX53	46	RX33	66	RX13
7	RX72	27	RX52	47	RX32	67	RX12
8	RX71	28	RX51	48	RX31	68	RX11
9	RX70	29	RX50	49	RX30	69	RX10
10	RX69	30	RX49	50	RX29	70	RX9
11	RX68	31	RX48	51	RX28	71	RX8
12	RX67	32	RX47	52	RX27	72	RX7
13	RX66	33	RX46	53	RX26	73	RX6
14	RX65	34	RX45	54	RX25	74	RX5
15	RX64	35	RX44	55	RX24	75	RX4
16	RX63	36	RX43	56	RX23	76	RX3
17	RX62	37	RX42	57	RX22	77	RX2
18	RX61	38	RX41	58	RX21	78	RX1
19	RX60	39	RX40	59	RX20	79	RX0
20	RX59	40	RX39	60	RX19	80	RX_S0

Connector Pin Configuration

JP1 USB connector

JP1	
1	GND_E
2	VDD
3	GND
4	D +
5	D -

JP5 I2C connector

JP5	
1	GND
2	I2C_SDA
3	I2C_SCL
4	VDD
5	I2C_INT

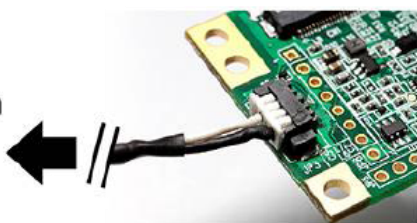
JP7 RS232 connector

JP7	
1	UR_CTS
2	UR_TX
3	UR_RX
4	UR_RTS
5	GND_E
6	VDD
7	GND

JP3 Tethered active stylus connector

JP3	
1	GND_D
2	TX_PEN
3	VDD
4	GND_D

eGalaxPen
Type E
Type T



*JP3 connector is reserved for EETI tethered active stylus :
Type E : Entry-type active stylus
Type T : Tethered USB active stylus

JP1 : USB
Brand: JST
Part number: SM05B-SRSS-TB or equivalence

5. OPTICAL CHARACTERISTICS

5.1. TEST CONDITIONS

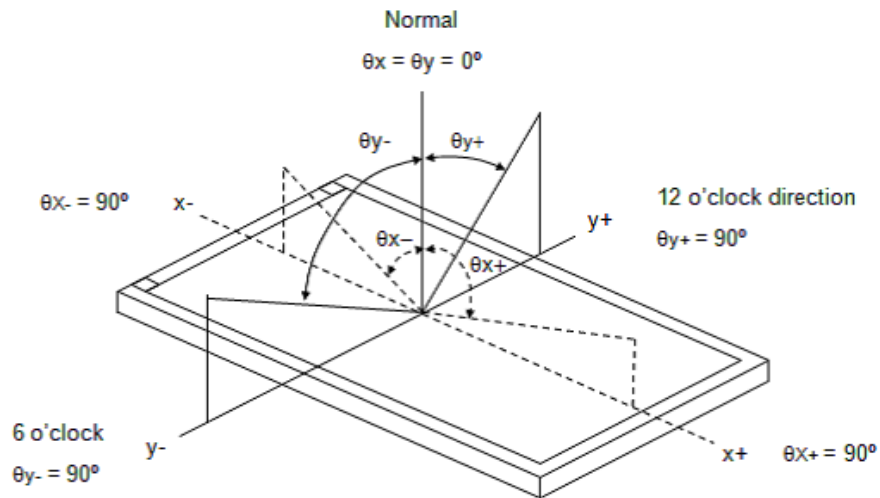
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	According to typical value and tolerance in “ELECTRICAL CHARACTERISTICS”		
Input Signal			
PWM Duty Ratio	D	100	%

5.2. OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown here and all items are measured at the center point of screen except white variation. The following items should be measured under the test conditions described in above and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Coordinates	Red	R _x	$\theta_x=0^\circ, \theta_y=0^\circ$ CS-2000 R=G=B=255 Grayscale	Typ.-0.03	0.652	Typ.+0.03	-	1, 5
		R _y			0.337			
	Green	G _x			0.313			
		G _y			0.626			
	Blue	B _x			0.151			
		B _y			0.066			
	White	W _x			0.313			
		W _y			0.329			
Center Luminance of White (center of Screen)		L _C		360	450	--	Cd/m ²	4, 5
Contrast Ratio		CR		700	1000	--		2, 5
Response Time		T _R	$\theta_x=0^\circ, \theta_y=0^\circ$	--	8	--	ms	3
		T _F		--	7	--	ms	
		T _{GtG_AVE}		--	14	--	ms	
White Variation		δ _W	$\theta_x=0^\circ, \theta_y=0^\circ$	75			%	5, 6
Viewing Angle	Horizontal	θ _r	CR ≥ 10	85	89	--	degree	1, 5
		θ _l		85	89	--	degree	
	Vertical	θ _u		85	89	--	degree	
		θ _d		85	89	--	degree	

Note 1: Definition of Viewing Angle (θ_x , θ_y):



Note 2: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression at center point.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level 255

L0: Luminance of gray level 0

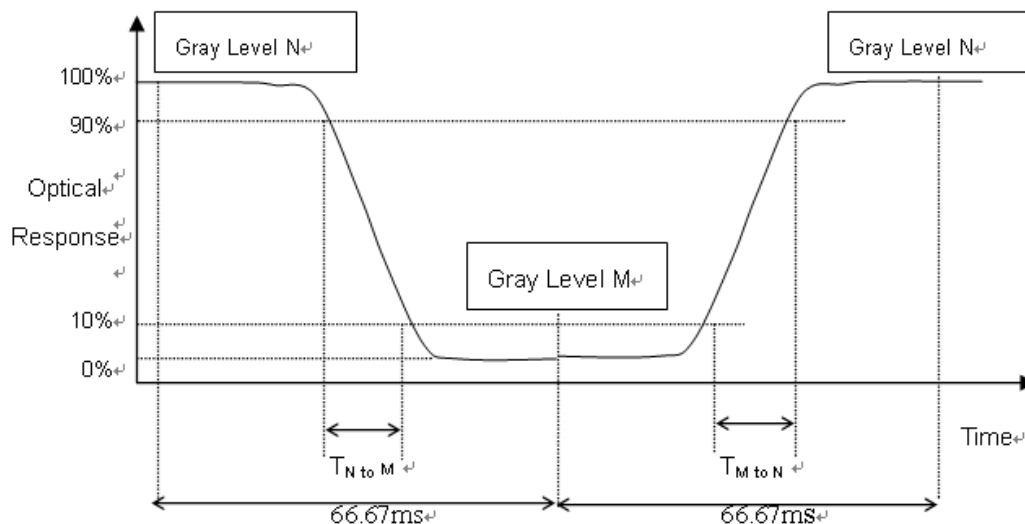
$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 6.

Note 3: Definition of Response Time :

-The TR is the rising-time means the transition time from “Full-Black (gray 0)” to “Full-White (gray 255)” and the TF is the falling-time means the transition time from “Full-White (gray 255)” to “Full-Black (gray 0)” as the following figure. (Measured by TEKTRONIX TDS3054B)

-The T_{GTG} is the response time means the transition time from “Gray N” to “Gray M” ($N, M=0\sim 255$).



- TGtG_AVE is the total average of the TGtG data (Measured by INX GTG instrument)
- The gray (N, M) stands for the (0, 31, 63, ~255) as the following table.
- If system uses ODC (Over Driving Circuit) function, TGtG_AVE may be 5ms~10ms.
- * It depends on Overshoot rate.

Gray to Gray		Rising time								
		0	31	63	95	127	159	191	223	255
Falling time	0									
	31									
	63									
	95									
	127									
	159									
	191									
	223									
	255									

Note 4: Definition of Luminance of White (L_C):

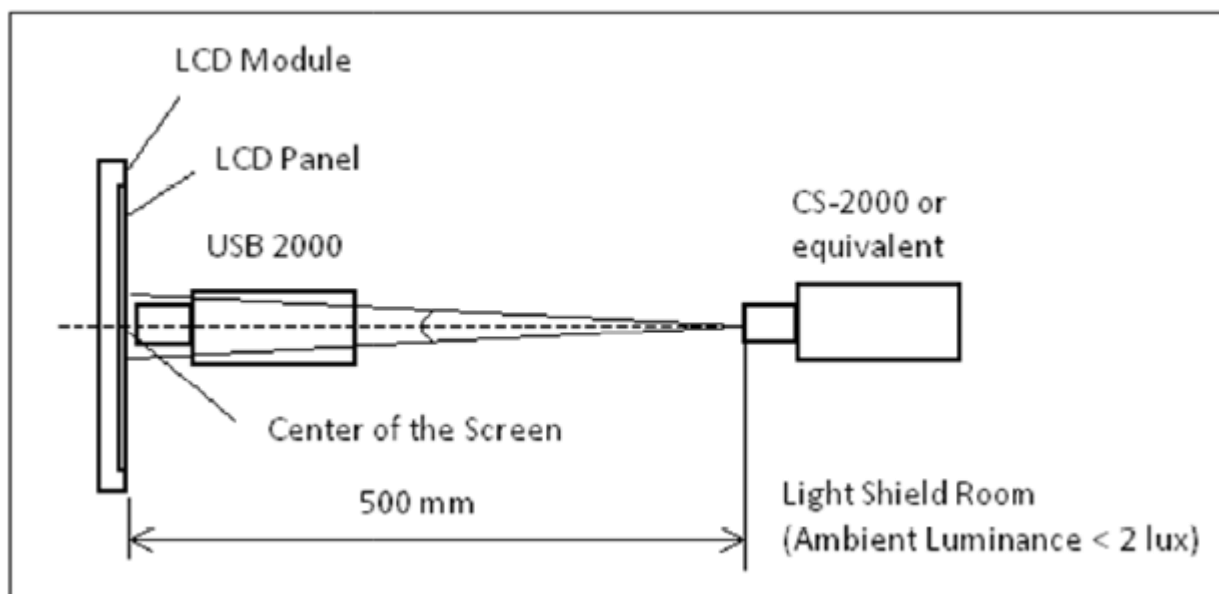
Measure the luminance of gray level 255 at center point.

$$LC = L(5)$$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note 6.

Note 5: Measurement Setup:

The LCD module should be stabilized at given temperature to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 40 minutes in a windless room. The measurement placement of module should be in accordance with module drawing.

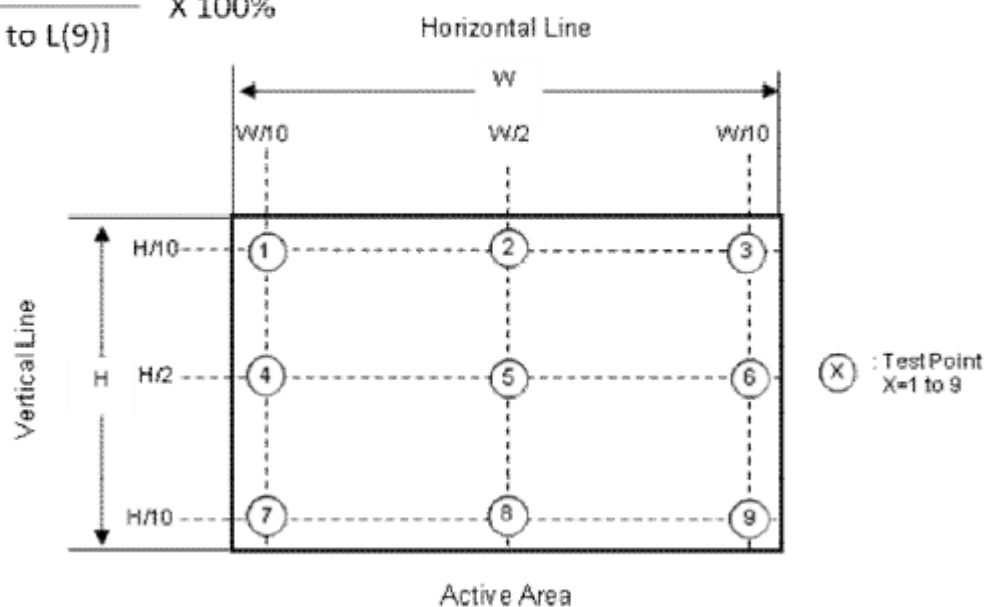


Note 6: Definition of White Variation (δW):

Measure the luminance of gray level 255 at 9 points.

Luminance of White: $L(X)$, where X is from 1 to 9.

$$\delta W = \frac{\text{Minimum [} L(1) \text{ to } L(9) \text{]}}{\text{Maximum [} L(1) \text{ to } L(9) \text{]}} \times 100\%$$



6. RELIABILITY TEST ITEMS

Test Item		Condition
1	Temperature/Humidity Bias (THB)	Ta = 50°C, 80%RH, 240hrs
2	High Temperature Operation (HTO)	Ta = 60°C, 240Hrs
3	Low temperature Operation test (LTO)	Ta = 0°C, 240hrs
4	High temperature Storage test (HTS)	Ta = 60°C, 240hrs
5	Low temperature Storage test (LTS)	Ta = -20°C, 240hrs
6	Thermal Cycle storage test (TST)	-20°C(30min)~60°C(30min), 10cycles

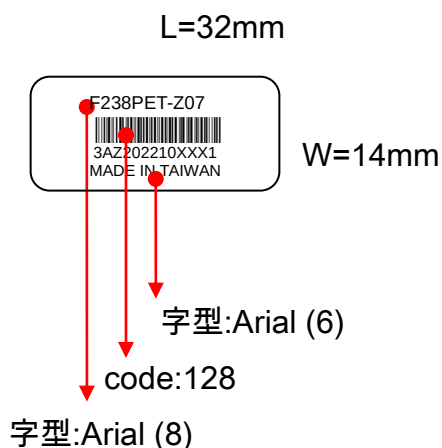
7. LABEL

Model NO. **F238PET-Z07**

條碼

SN **3A Z 20 2 21 0 XXX1**

code 1,2 Production location
 code 3 Production version
 code 4,5 Production year
 code 6 Production month
 code 7,8 Production day
 code 9 Production code
 code 10,11,12,13 Serial number



8. MECHANICAL CHARACTERISTICS

Item		Dimension	Unit	Note
Outline Dimension	Horizontal	544.00	mm	PCAP : B238PBU-E04
	Vertical	322.00	mm	
	Depth	2.70	mm	
	Horizontal	540.24	mm	LCD : G238HCJ-L02
	Vertical	315.66	mm	
	Depth	13.35	mm	
	Horizontal	100.00	mm	Touch Driver : ETP-MB-EXC84H5680STAG
	Vertical	33.00	mm	
	Depth	7.50	mm	
Weight		3470	g	F238PET-Z07
Item		Specification		Remarks
PCAP Sensor Area		543.00 mm x 321.00 mm		
PCAP Active Area		530.80 mm x 300.20 mm		
PCAP FPC Length		119.50 mm		
PCAP Input method		Finger or exclusive pen		
PCAP Light Transmission		90 ± 3 %		BYK Gardner, 550nm, ASTM D1003
PCAP Operation force		≤ 10g		Finger Input
PCAP Hardness of surface		≥ 7H		ASTM D3363, pressure 750g/45°
PCAP Surface Treatment		Haze < 4 %		BYK Gardner, ASTM D1003

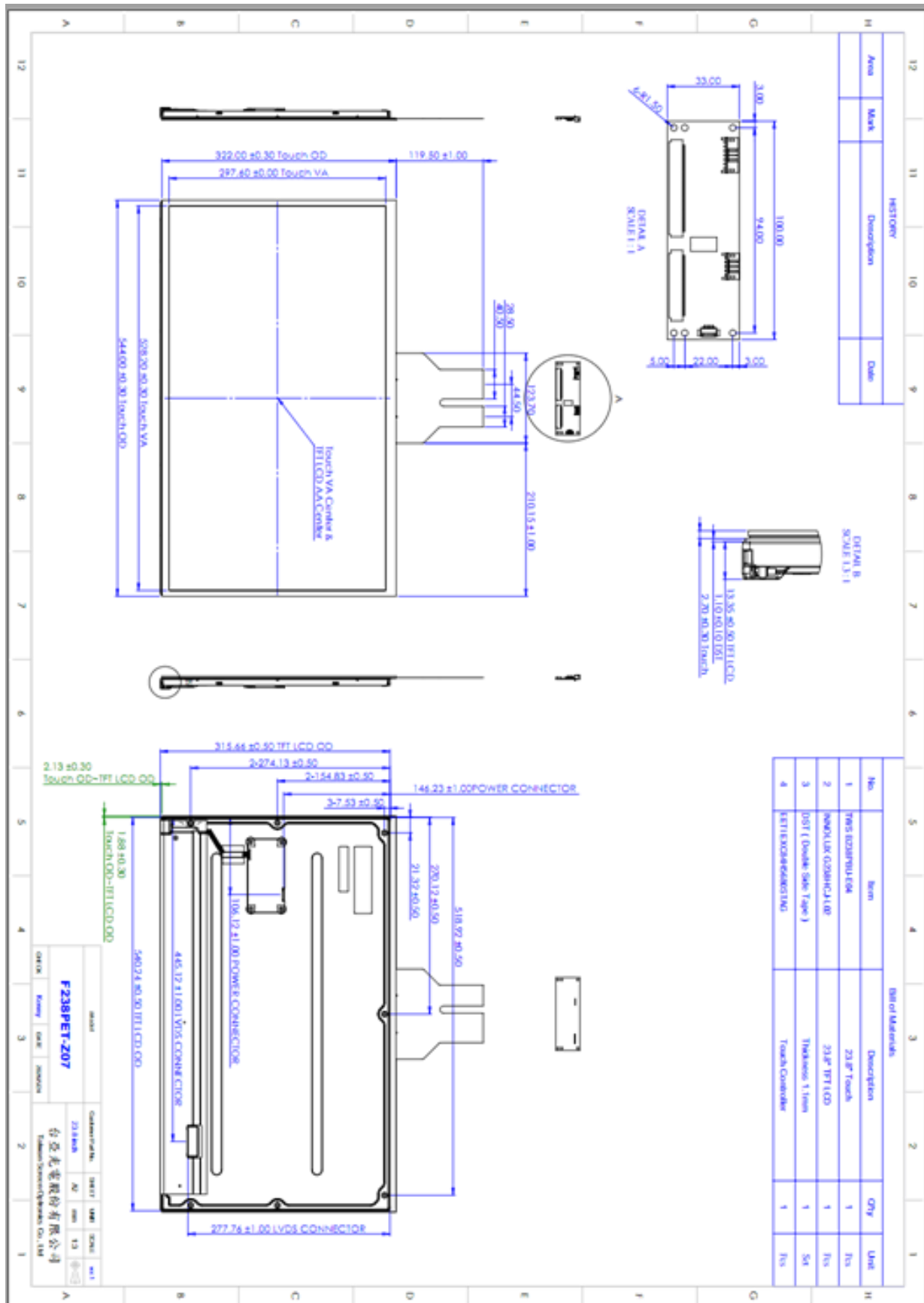
Front View

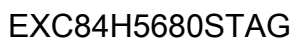


Back View



9. ENGINEERING DRAWING





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