



Product Specification

F238PET-T22

- ☒ Draft Specifications
☐ Preliminary Specifications
☐ Final Specifications

Title	23.8-inches Touch Display Product Specifications
Model Name	F238PET-T22
Version	0

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

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1. GENERAL DESCRIPTION

1.1. INTRODUCTION

F238PET-T22 is a 23.8" color active matrix TFT LCD module M238HVN01.0 HE with projected capacitive multi-touch B238PBU-E04 air bonding, with touch driver ETP-MB-EXC84H5680STAG.

The display format is intended to support the FHD mode (1920(H) x 1080(V)) screen and 2 channel 30 pins LVDS interface, 16.7M colors, and doesn't contain driver board for backlight.

1.2. FEATURES

- FHD (1920 x 1080 pixels) resolution
- RoHS Compliance

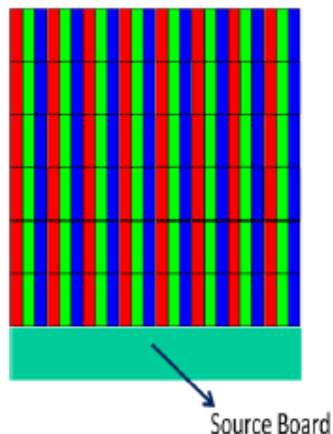
1.3. APPLICATION

- TFT LCD monitor
- Factory application

2. 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 324.50 (V) x 15.00 (D)	mm	D:PCAP+LCM
Weight	3480	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	VA 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	-	

LCD pixel arrangement



3. ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. Ta=25°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	-0.3	6.0	V	Note 1
LED String Current	I _S	-0.3	180	mA	
Operating Temperature	T _{op}	0	+50	°C	Note 2
Operating Humidity	H _{op}	10	90	%RH	
Storage Temperature	T _{st}	-20	+60	°C	
Storage Humidity	H _{st}	10	90	%RH	
Touch DC Supply Voltage	USB_V _{DD}	-0.3	6.0	V	

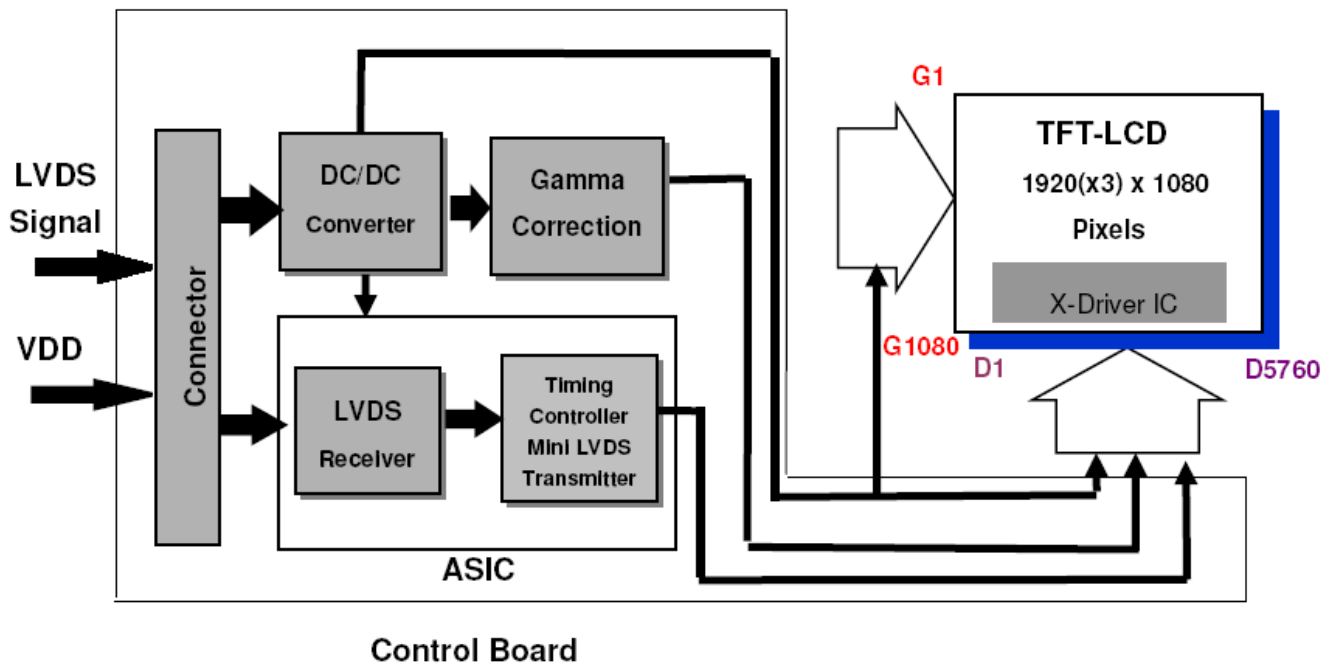
Note:

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.

4. ELECTRICAL CHARACTERISTICS

4.1. LCD MODULE

4.1.1. LCD BLOCK DIAGRAM

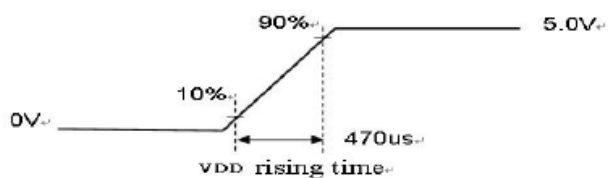
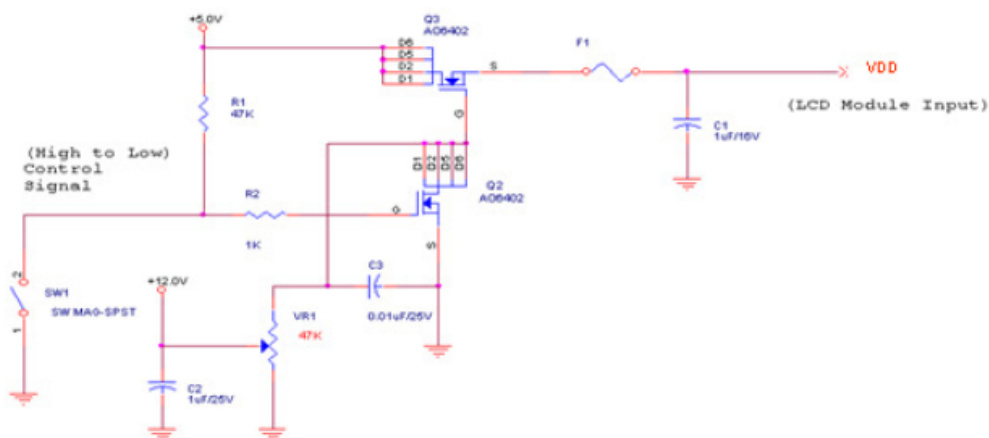


4.1.2. RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max.		
Power Supply Input Voltage	V _{DD}	4.5	5.0	5.5	V	
Power Supply Input Current (RMS)	I _{DD}	-	0.64	0.78	A	VDD=5.0V, All white pattern, Fv=60Hz
		-	0.74	0.9	A	VDD=5.0V, All white pattern, Fv=75Hz
V _{DD} Power Consumption	P _{DD}	-	3.2	3.9	W	VDD=5.0V, All white pattern, Fv=60Hz
		-	3.7	4.5	W	VDD=5.0V, All white pattern, Fv=75Hz
Inrush Current	I _{Rush}	-	-	3.0	A	1
Power Supply Ripple Voltage	V _{DDRp}	-	-	500	mV	VDD=5.0V, All white pattern, Fv=75Hz

Note 1. Inrush Current measurement :

Test Circuit:



The duration of VDD rising time: 470us.

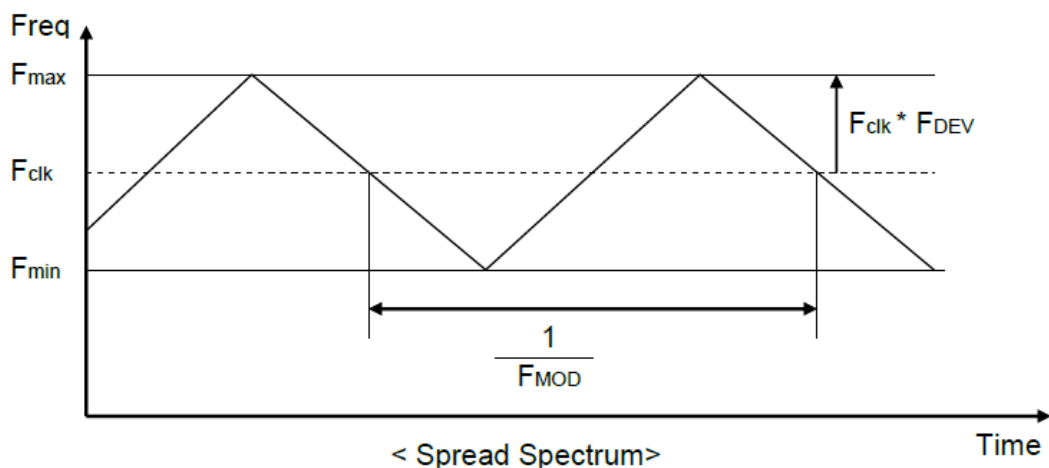
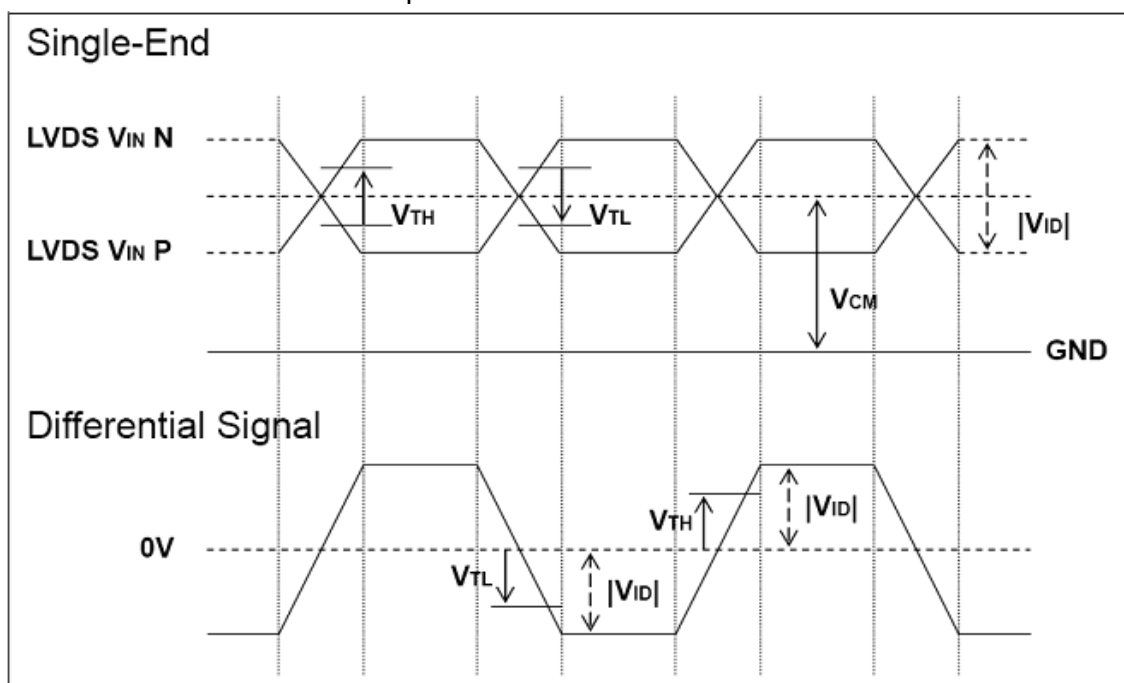
4.1.3. LVDS Specification

DC Characteristics

Description	Symbol	Min.	Typ.	Max.	Units	Condition
Logic High Input Voltage	V_{TH}	-	-	100	mV	$V_{CM}=1.2V$
Logic Low Input Voltage	V_{TL}	-100	-	-	mV	$V_{CM}=1.2V$
LVDS differential input voltage	V_{ID}	100	-	600	mV	
LVDS common input voltage	V_{CM}	1.0	1.2	1.5	V	$V_{TH}-V_{TL}=200mV$

LVDS Signal Waveform :

Use RxOCLK-& RxOCLK+ as example



F_{clk} : LVDS Clock Frequency

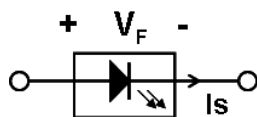
4.1.4. LCD BACKLIGHT UNIT

Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max.		
LED String Current	I_S	-	50	55	mA	100% Duty ratio of LED chip.
LED String Voltage	V_S	38.87	44.86	47.85	V	$I_S=50\text{mA}@100\%$ duty ratio
Maximum VS Voltage Deviation of light bar	ΔV_S	-	-	3.2	V	$I_S=50\text{mA}@100\%$ duty ratio
LED Light Bar Power Consumption	P_{BLU}	-	8.97	9.57	W	
LED Life Time	LT_{LED}	30,000	-	-	Hrs	
Over Voltage Protection in system board	OVP	110% V_{Smax}	-	-	V	

Note 1: V_S (Typ.) = V_F (Typ.) X LED No. (One string);

a. V_F : LED chip forward voltage, V_F (Min.) = 2.43V, V_F (Typ.) = 2.8V, V_F (Max.) = 2.99V

b. The same equation to calculate V_S (Min.) & V_S (Max.) for respective V_F (Min.) & V_F (Max.);



LED chip

Note 2: ΔV_S (Max.) = ΔV_F X LED No. (One string);

a. ΔV_F : LED chip forward voltage deviation; (0.2V , each Bin of LED V_F)

Note 3: P_{BLU} (Typ.) = V_S (Typ.) X I_S (Typ.) X 4; (4 is total String No. of LED Light bar)

P_{BLU} (Max.) = V_S (Max.) X I_S (Typ.) X 4;

Note 4: Definition of life time:

a. Brightness of LED becomes to 50% of its original value

b. Test condition: $I_S = 50\text{mA}$ and 25°C (Room Temperature)

Note 5: Recommendation for LED driver power design:

Due to there are electrical property deviation in LED & monitor set system component after long time operation. It's strongly recommend the design value of LED driver board OVP (over voltage protection) should be 10% higher than max. The value of LED string voltage (V_S) at least.

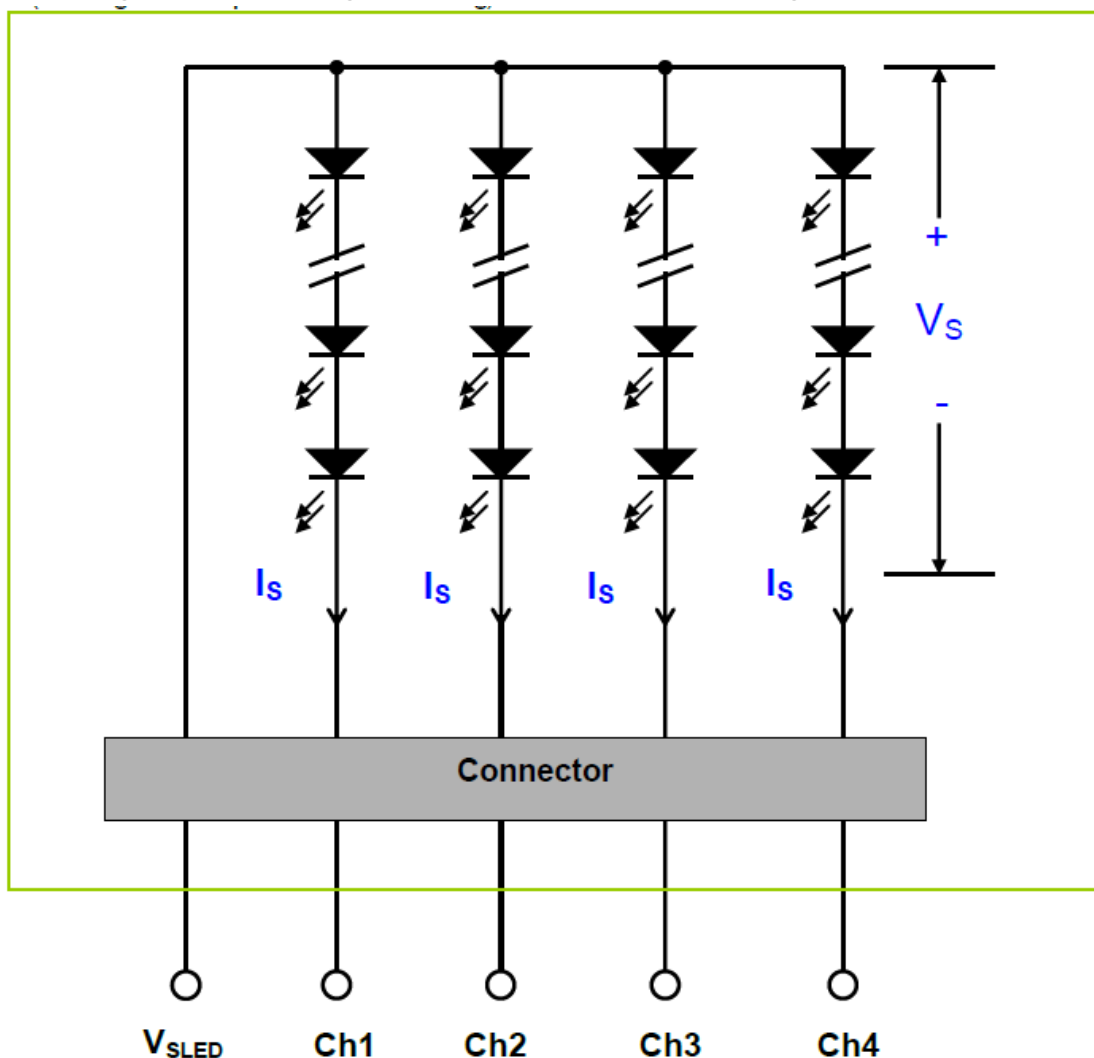
Note 6: Recommend "Analog Dimming" method for backlight brightness control for Wavy Noise Free.

Otherwise, recommend that Dimming Control Signal (PWM Signal) should be synchronized with Frame Frequency.

Note 7: Ensure that the LED light bar is not subjected either forward or reverse voltage while monitor set is on standby mode or not in use.

4.1.5. LCD BLU Block Diagram

The following shows the block diagram of the 23.8 inch Backlight Unit. And it includes 64 pcs LED in the LED light bar. (4 strings and 16 pcs LED of one string).

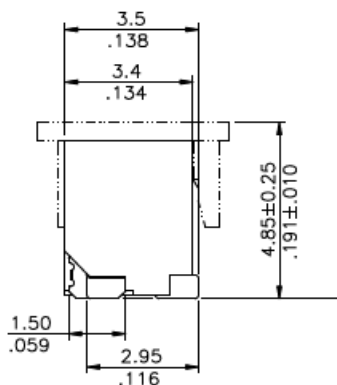
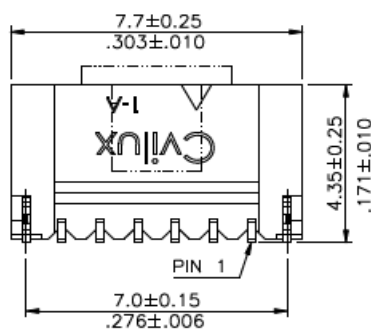
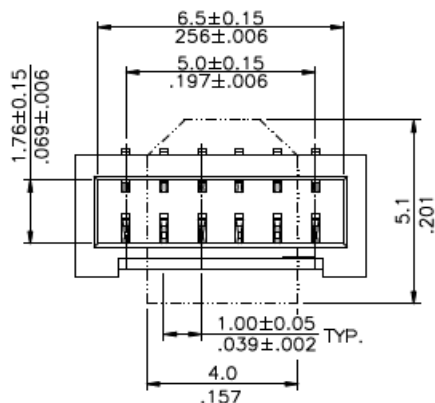


4.1.6. LCD BLU CONNECTOR TYPE

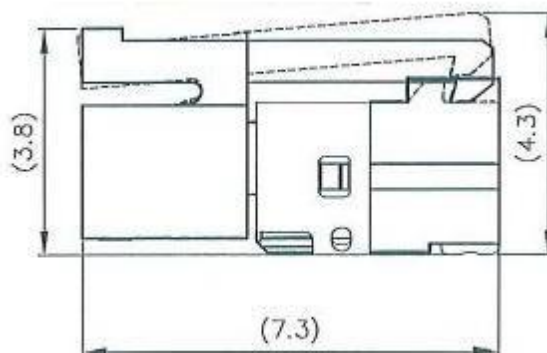
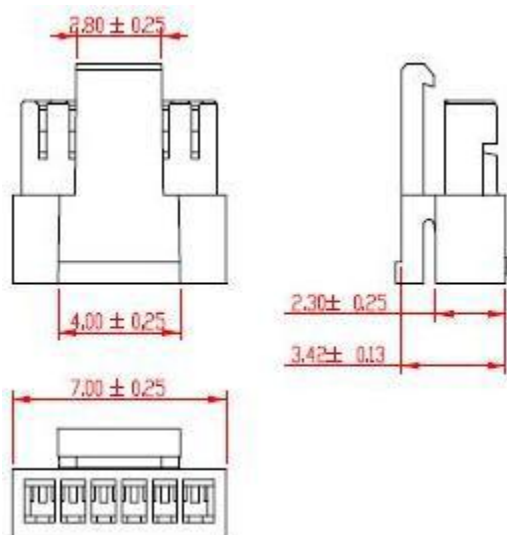
Backlight Connector	Manufacturer	ENTRY
	Part Number	3707K-S06N-21R (BLACK) (Locking Type, Wire Harness)
Mating Connector	Manufacturer	ENTRY
	Part Number	H112K-P06N-00B (Non-Locking type) H112K-P06N-11B(White) (Locking type) H112K-P06N-13B(Black) (Locking type)

Backlight Connector dimension:

H x V x D = 7.7 x 3.5 x 4.35, Pitch = 1.0 (unit = mm)

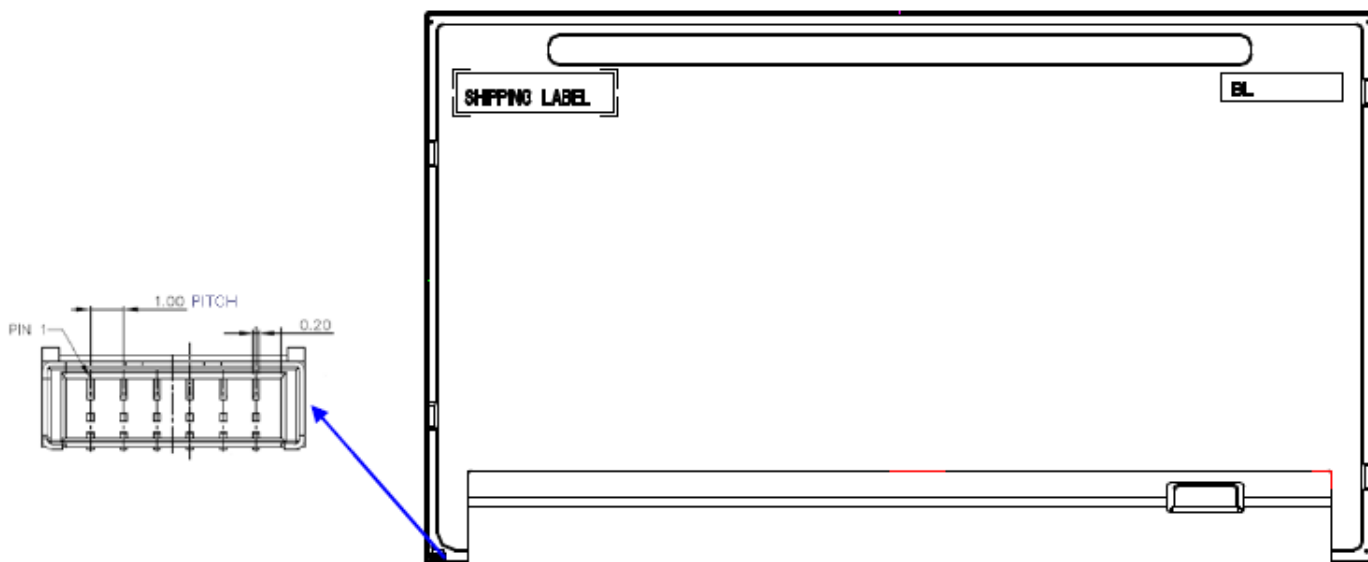


Mating Connector dimension:



4.1.7. LCD BLU CONNECTOR PIN ASSIGNMENT

Pin#	Symbol	Description	Remark
1	Ch1	LED Current Feedback Terminal (Chanel 1)	
2	Ch2	LED Current Feedback Terminal (Chanel 2)	
3	V _{SLED}	LED Power Supply Voltage Input Terminal	
4	V _{SLED}	LED Power Supply Voltage Input Terminal	
5	Ch3	LED Current Feedback Terminal (Chanel 3)	
6	Ch4	LED Current Feedback Terminal (Chanel 4)	

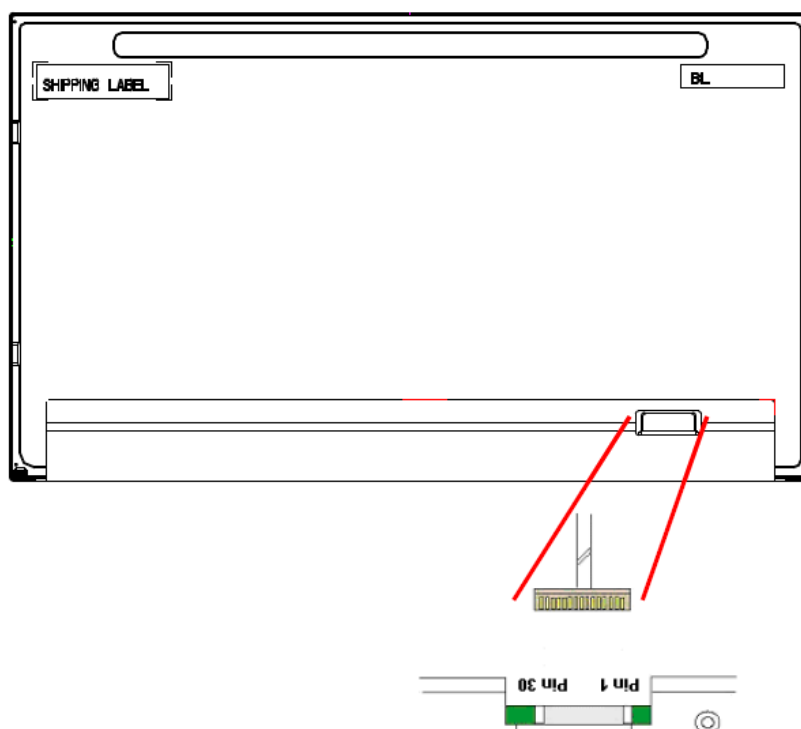


4.1.8. LCD INPUT TERMINAL PIN ASSIGNMENT

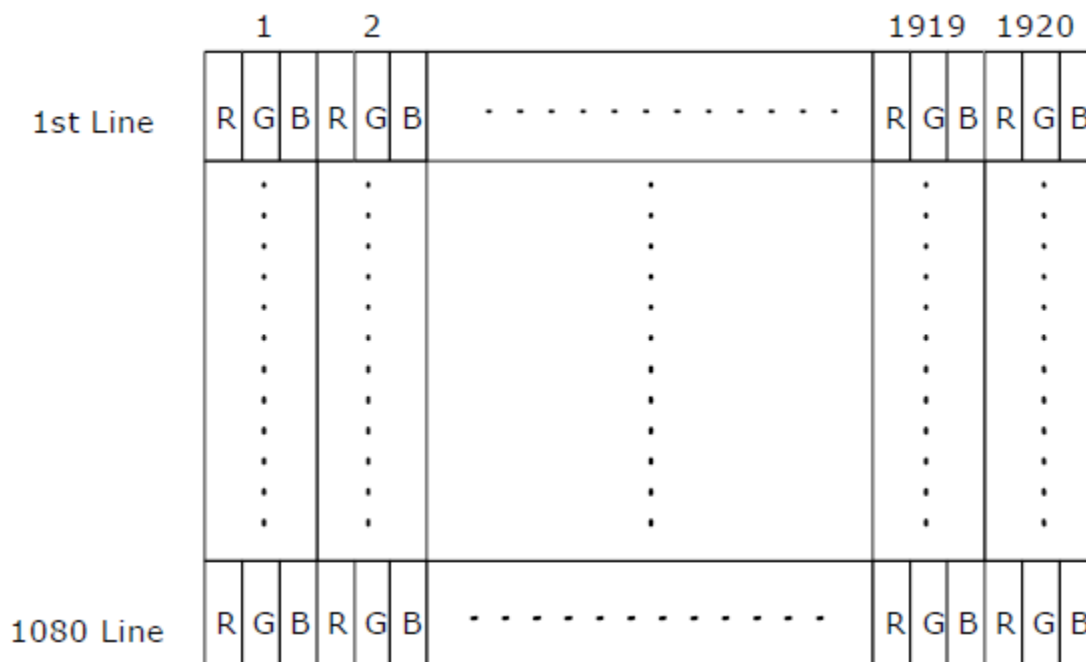
Pin	Symbol	Description	Note
1	RXO0-	Negative LVDS differential data input Channel O0 (odd)	
2	RXO0+	Positive LVDS differential data input Channel O0 (odd)	
3	RXO1-	Negative LVDS differential data input Channel O1 (odd)	
4	RXO1+	Positive LVDS differential data input Channel O1 (odd)	
5	RXO2-	Negative LVDS differential data input Channel O2 (odd)	
6	RXO2+	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	RXO3-	Negative LVDS differential data input Channel O3 (odd)	
11	RXO3+	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	
27	NC	For LCD internal use only	
28	V _{CC}	+5.0V power supply	
29	V _{CC}	+5.0V power supply	
30	V _{CC}	+5.0V power supply	

Connector Type

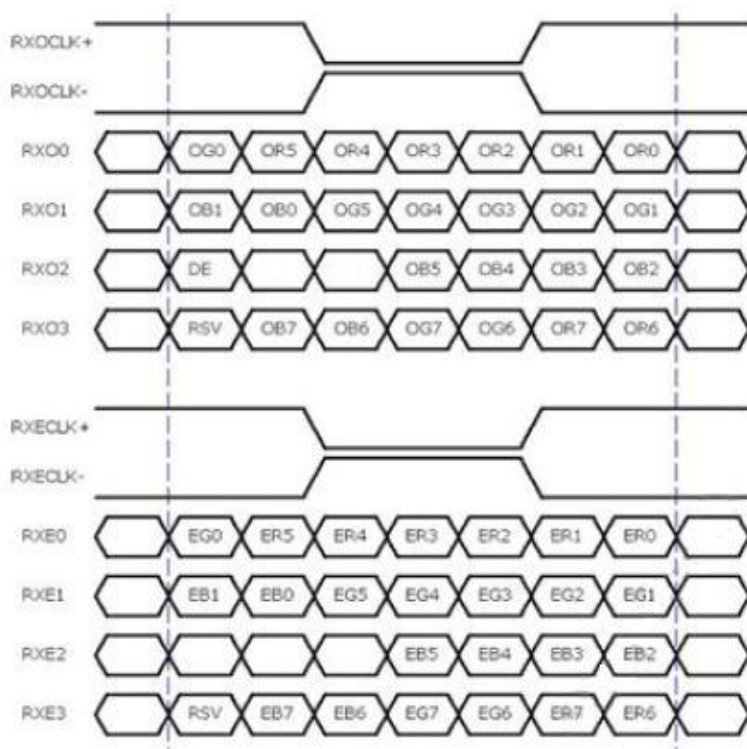
TFT-LCD Connector	Manufacturer	ENTRY	STM
	Part Number	187034-3009	MSBKT240P30HB
Mating Connector	Manufacturer	JAE or Compatible	
	Part Number	FI-X30HL (Locked Type)	



4.1.9. LCD PIXEL FORMAT



4.1.10. LCD LVDS DATA FORMAT



8 Bit Color Bit Order			
MSB	R7	G7	B7
	R6	G6	B6
	R5	G5	B5
	R4	G4	B4
	R3	G3	B3
	R2	G2	B2
	R1	G1	B1
LSB	R0	G0	B0

a. O = "Odd Pixel Data" E = "Even Pixel Data"

b. Refer to 3.7. LCD pixel format, the 1st data is 1 (Odd pixel Data), the 2nd data is 2 (Even Pixel Data) and the last data is 1920 (Even Pixel Data)

4.1.11. LCD COLOR VERSUS INPUT DATA

The following table is for color versus input data (8bit). The higher the gray level, the brighter the color

Color	Gray Level	Color Input Data																								Remark
		RED data (MSB :R7, LSB :R0)								GREEN data (MSB :G7, LSB :G0)								BLUE data (MSB :B7, LSB :B0)								
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0	
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	
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 127	-	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	
Red	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	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	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	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	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	

4.1.12. LCD INPUT TIMING SPECIFICATION

It only support DE mode, and the input timing are shown as the following table

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Vertical Display Term	Period	T_v	1094	1130	1836	T_h	
	Active	T_{vd}	1080	1080	1080	T_h	
	Blanking	T_{vb}	14	50	756	T_h	
	Frequency	F_v	49	60	76	Hz	$T_v = T_{vd} + T_{vb}$
Horizontal Display Term	Period	T_h	1000	1050	1678	T_{clk}	$T_h = T_{hd} + T_{hb}$
	Active	T_{hd}	960	960	960	T_{clk}	
	Blanking	T_{hb}	40	90	718	T_{clk}	
	Frequency	F_h	53.7	67.8	90	KHz	1
LVDS Clock	Period	T_{clk}	11.2	14.0	18.6	ns	$1/F_{CLK}$
	Frequency	F_{clk}	53.7	71.2	90.0	MHz	2

Notes 1 : The equation is listed as following. Please don't exceed the above recommended value.

$$F_h (\text{Min.}) = F_{clk} (\text{Min.}) / T_h (\text{Min.});$$

$$F_h (\text{Typ.}) = F_{clk} (\text{Typ.}) / T_h (\text{Typ.});$$

$$F_h (\text{Max.}) = F_{clk} (\text{Max.}) / T_h (\text{Min.});$$

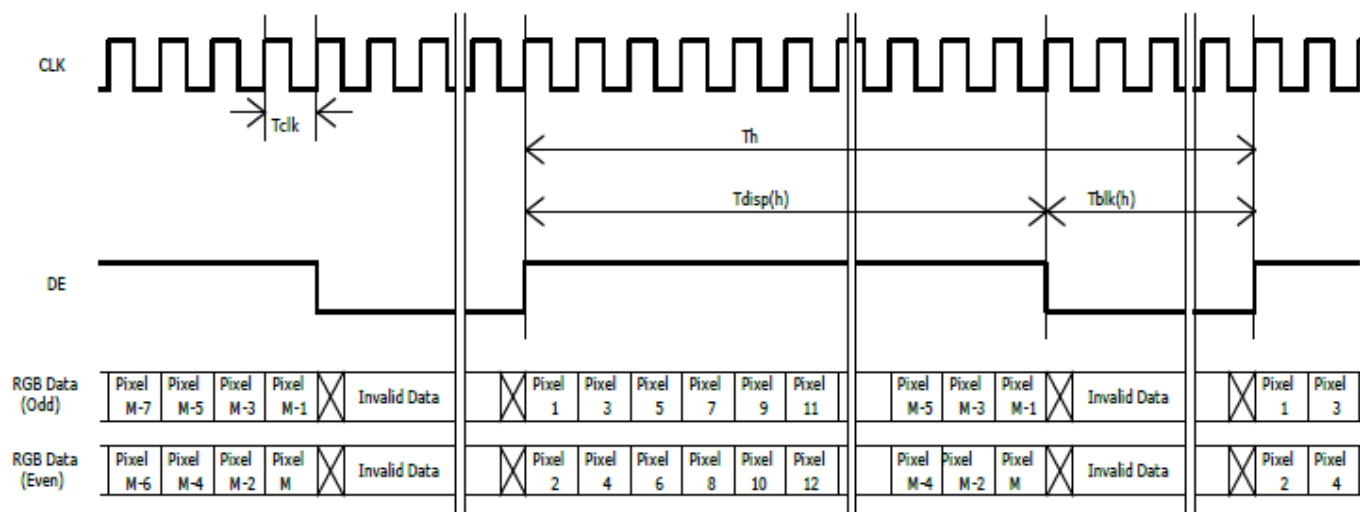
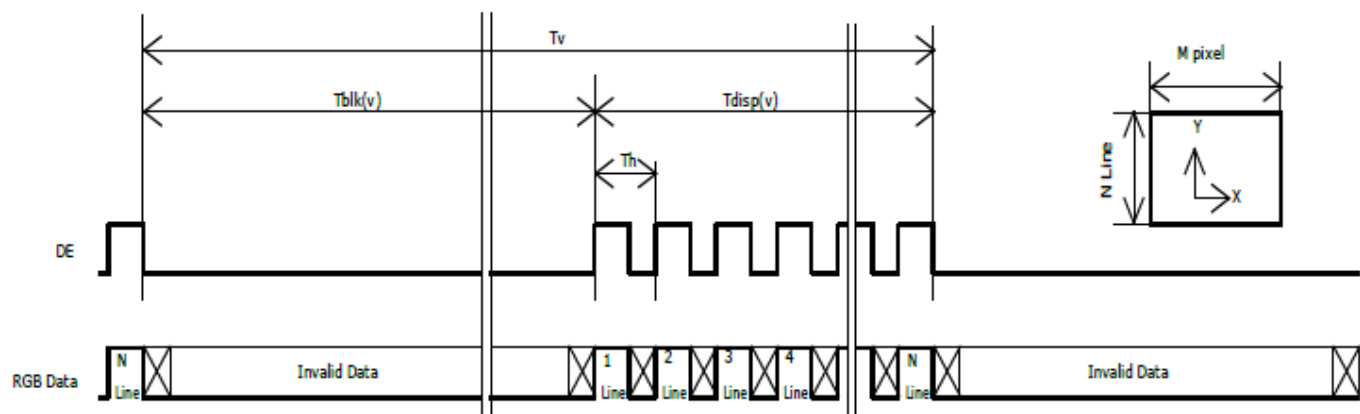
Notes 2 : The equation is listed as following. Please don't exceed the above recommended value.

$$F_{clk} (\text{Min.}) = F_v (\text{Min.}) \times T_h (\text{Min.}) \times T_v (\text{Min.});$$

$$F_{clk} (\text{Typ.}) = F_v (\text{Typ.}) \times T_h (\text{Typ.}) \times T_v (\text{Typ.});$$

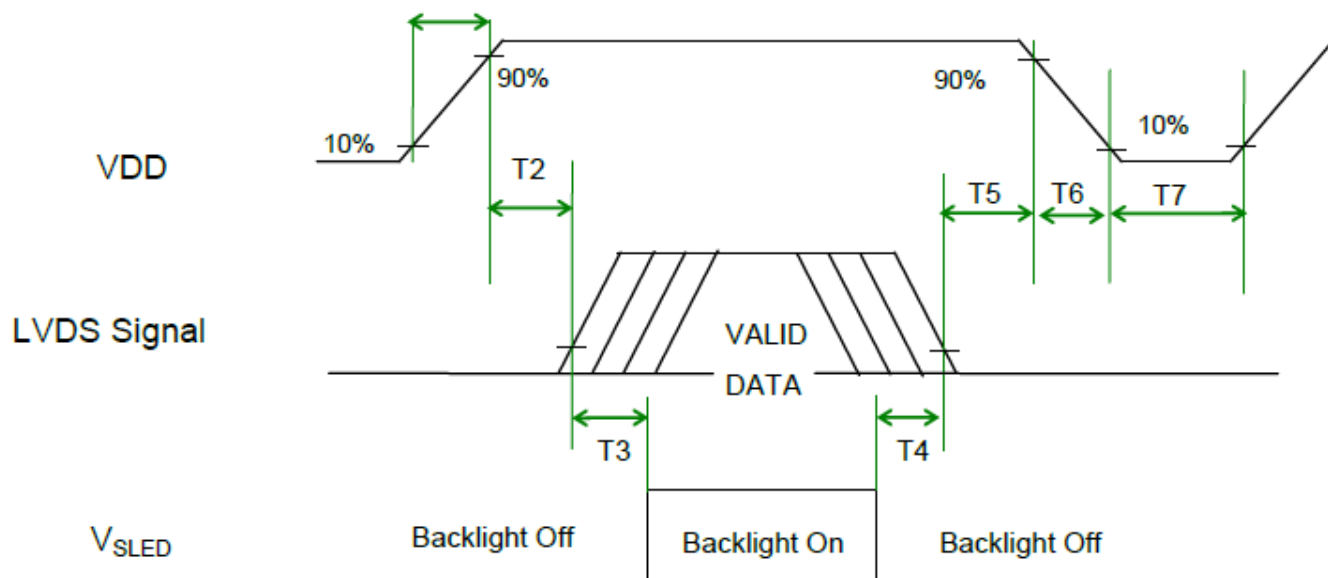
$$F_{clk} (\text{Max.}) = F_v (\text{Max.}) \times T_h (\text{Typ.}) \times T_v (\text{Typ.});$$

4.1.13. LCD INPUT TIMING DIAGRAM



4.1.14. POWER SEQUENCE FOR LCD

VDD power, LVDS signal and backlight on/off sequence are as following. LVDS signals from any system shall be Hi-Z state when VDD is off.



Power Sequence Timing

Parameter	Values			Unit
	Min.	Typ.	Max.	
T1	0.5	---	10	ms
T2	0	---	50	ms
T3	500	---	---	ms
T4	100	---	---	ms
T5	0	---	50	ms
T6	0	---	200	ms
T7	1000	---	---	ms

Note 1: Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.

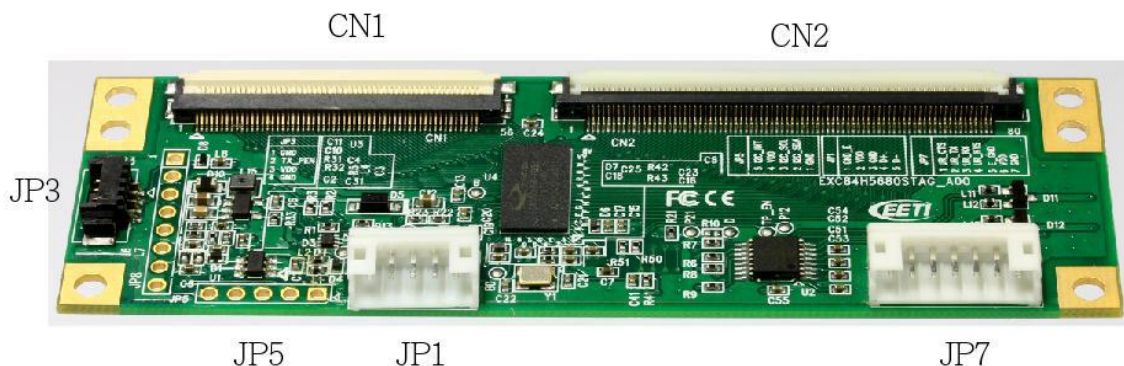
Note 2: During T5 period, please keep the level of input LVDS signals with Hi-Z state.

Note 3: Voltage of VDD must decay smoothly after power-off. (Customer system decide this value)

4.2.TOUCH CONTROL BOARD

ETP-MB-EXC84H5680STAG

Parameter	Values			Unit	Notes
	Min.	Typ.	Max.		
Input Voltage	3.5	5	5.5	V	
Interface	USB:2.0			-	
Max Resolution	16384 x 16384 resolution			-	
Channels of panel	Max. TX: 48 Rx:80 channels			mm	Including shielding pin
Linearity	Line drawing accuracy: 1pt +/- 1 mm offset /10 mm Touch (point) accuracy: 1pt +/- 1mm			mm	
Power consumption (mA)	Active Mode: <90 mA Idle Mode: depends on firmware			mA	
Report rate (points/sec)	≥100			Hz	
Response time	Average <25			ms	



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

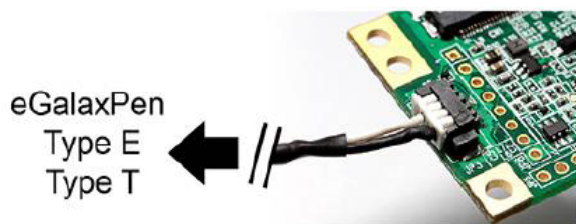
JP5	
1	GND
2	I2C_SDA
3	I2C_SCL
4	VDD
5	I2C_INT

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



*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

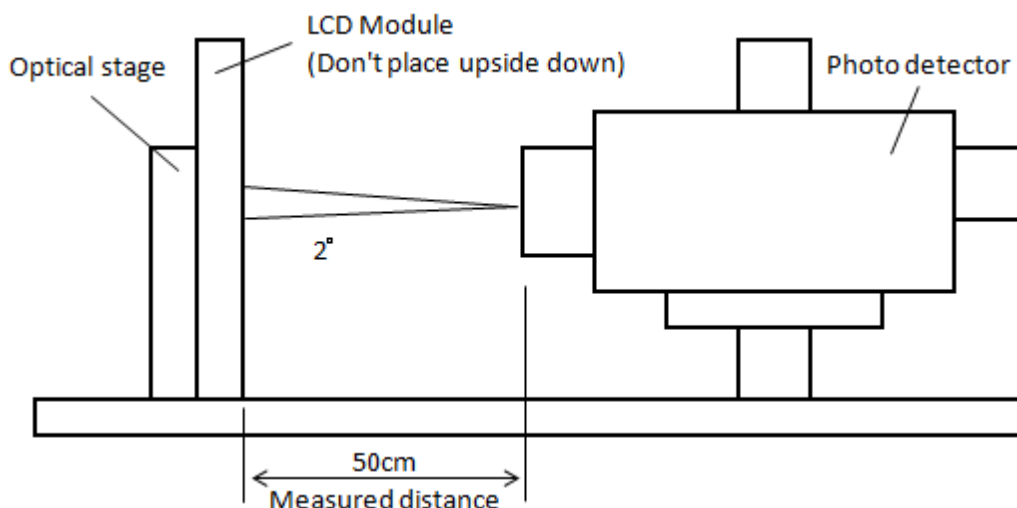
TEST CONDITIONS

1. Equipment setup: Please refer to Note1
2. Panel Lighting time: 30 minutes
3. VDD=5.0V, Fv=60Hz, Is=50mA, Ta=25°C
4. L/B must be in the bottom side at normal and MNT aging state

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
White Luminance (Center)		L _W		200	250	--	Cd/m ²	By SR-3
Luminance Uniformity		δ _W	9 points	75	80	-	%	
Contrast Ratio (Center)		CR		1800	3000	--		
Viewing Angle	Horizontal	θ _r	CR=10	75	89	--	Degree	
		θ _l		75	89	--		
	Vertical	θ _u		75	89	--		
		θ _d		75	89	--		
	Horizontal	θ _r	CR=5	75	89	--		
		θ _l		75	89	--		
	Vertical	θ _u		75	89	--		
		θ _d		75	89	--		
Color Coordinates (CIE 1931)	Red	R _x		0.623	0.653	0.683	-	
		R _y		0.305	0.335	0.365		
	Green	G _x		0.292	0.322	0.352		
		G _y		0.587	0.617	0.647		
	Blue	B _x		0.122	0.152	0.182		
		B _y		0.050	0.080	0.110		
	White	W _x		0.283	0.313	0.343		
		W _y		0.299	0.329	0.359		
Response Time		T _R	θ _X =0°, θ _Y =0°	--	10	20	ms	By TRD-100
		T _F		--	6	12		
		T _R +T _F		--	16	32		
NTSC ratio					72		%	

Note 1: Equipment setup

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring (at surface 35°C). In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room.

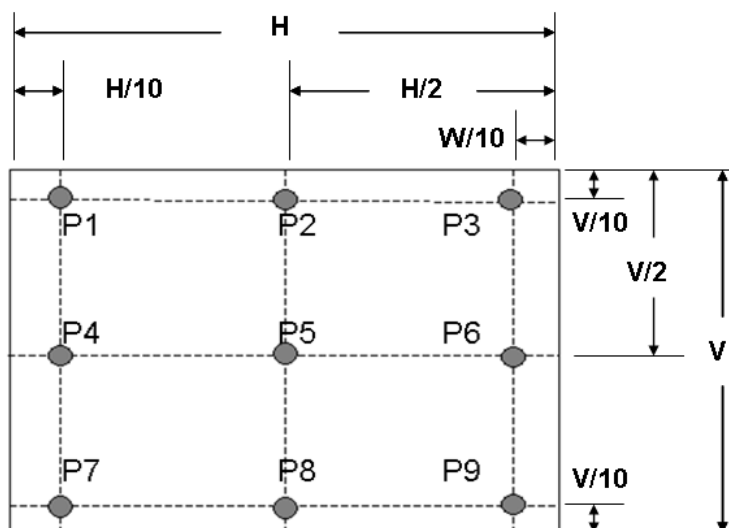


Note 2: Luminance Uniformity Measurement

Definition:

$$\text{Luminance Uniformity} = \frac{\text{Minimum Luminance of 9 points (P1~P9)}}{\text{Maximum Luminance of 9 points (P1~P9)}}$$

Test Pattern: White Pattern



Note 3: Contrast Ratio Measurement

Definition:

$$\text{Contrast Ratio} = \frac{\text{Luminance of White pattern}}{\text{Luminance of Black pattern}}$$

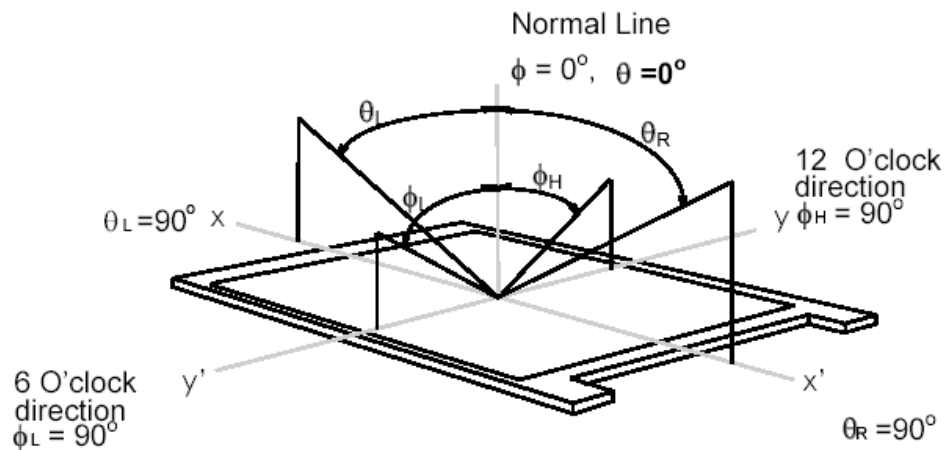
Measured position: Center of screen (P5) & perpendicular to the screen ($\theta=\phi=0$)

Note 4: Viewing angle Measurement

Definition: The angle at which the contrast ratio is greater than 10 & 5.

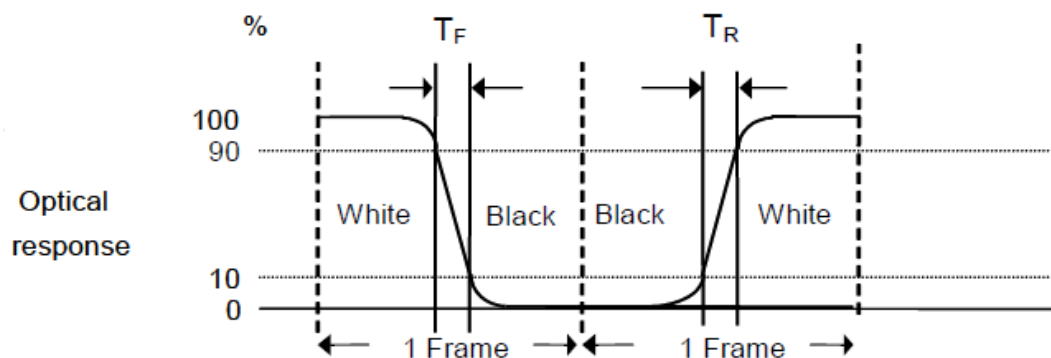
Horizontal view angle: Divide to left & right (θ_L & θ_R)

Vertical view angle: Divide to up & down (ϕ_H & ϕ_L)



Note 5: Definition of Response Time (T_R , T_F)

The output signals of photo detector are measured when the input signals are changed from "Gray level A" to "Gray level B" (falling time, T_F), and from "Gray level B" to "Gray level A" (rising time, T_R), respectively. The response time is interval between the 10% and 90% of optical response.



6. RELIABILITY TEST ITEMS

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

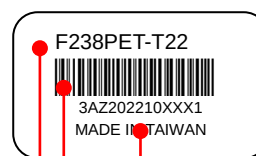
7. LABEL

Model No. **F238PET-T22**

條碼

SN 3A Z 20 2 21 0 XXX1

W=14mm



L=32mm

字型:Arial (6)

Code: 128

字型 : Arial(8)

Code1, 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

Colde 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 (min.)	2.70	mm	
	Horizontal	543.00	mm	LCD : M238HVN01.0 HE
	Vertical	317.40	mm	
	Depth (min.)	11.20	mm	
	Horizontal	100.00	mm	Touch Driver : ETP-MB-EXC84H5680STAG
	Vertical	33.00	mm	
	Depth (min.)	7.20	mm	
Weight		3480	g	F238PET-T22
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
PCAP Impact		Impact at center area one time, no damage (25.0ψDIA. Steel Ball/67g, Height=50cm)		



Product Specification

F238PET-T22

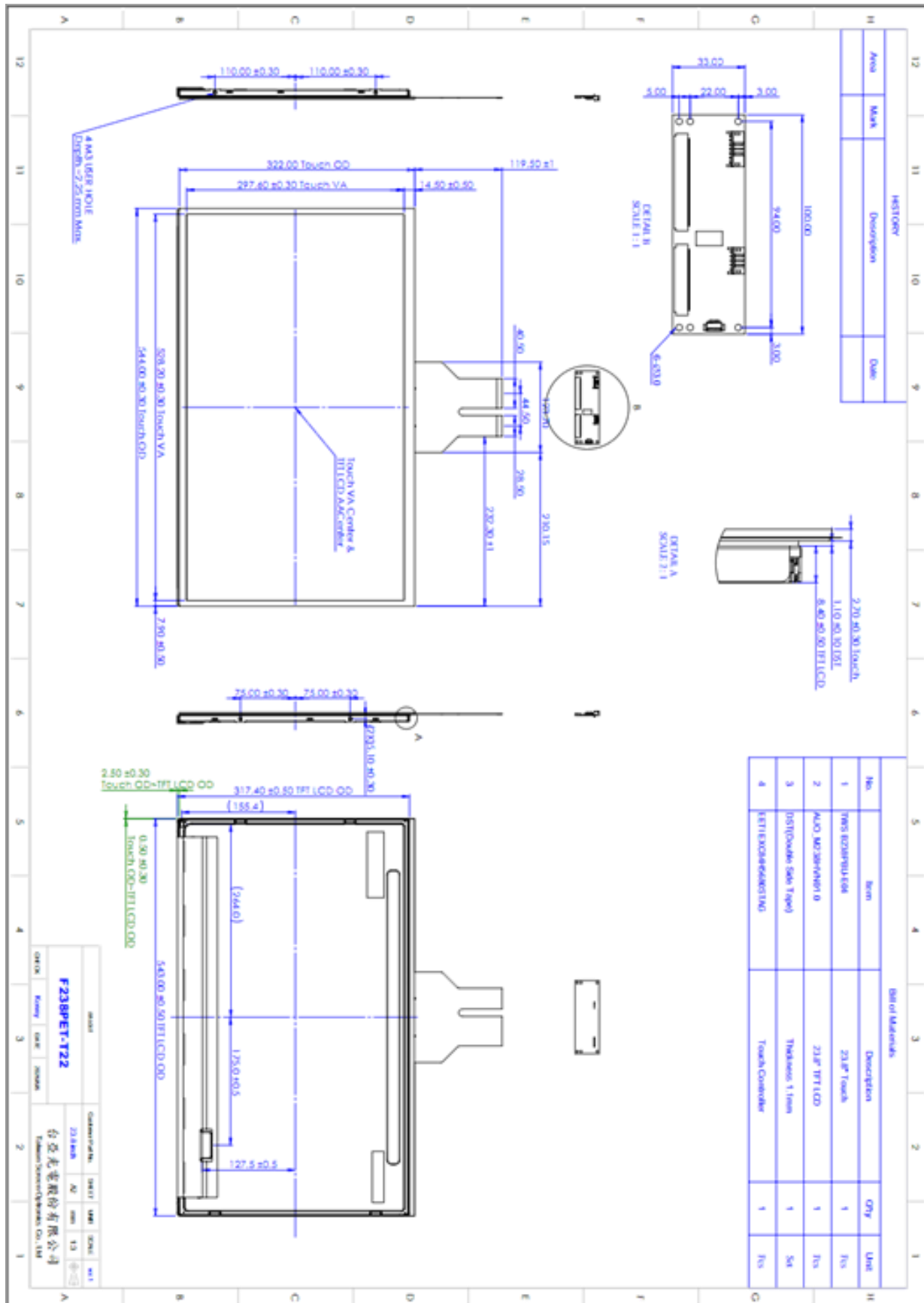
Front View

TBD

Back View

TBD

9. ENGINEERING DRAWING



Touch Driving Board :

