



- ☒ Draft Specifications
☐ Preliminary Specifications
☐ Final Specifications

Title	15.6-inches Touch Display Product Specifications
Model Name	F156PET-T53
Version	0

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

Approved By	Prepared By
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2026-05-22	2026-05-22



REVISION HISTORY

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

1.1.INTRODUCTION

F156PET-T53 is a 15.6" color active matrix TFT LCD module G156HAN02.3 03 with projected capacitive multi-touch B156PFU-E10 air bonding and Touch Driver Board ETP-MB-EXC84H4254STAG.

The display format is intended to support the 16:9 FHD mode (1920(H) x 1080(V)) screen and 16.7M colors (LVDS RGB 8-bits) with LED backlight driving circuit.

1.2.FEATURES

- 16:9 FHD (1920x1080) resolution
- Long life LED backlight (50k hrs)
- Industrial application
- RoHS product

1.3.APPLICATION

- TFT LCD monitor
- Industrial application



2. GENERAL SPECIFICATIONS

Parameter	Specification	Unit	Remarks
Active Area Size	15.6	inch	
Display Area	344.16(H) x 193.59 (V)	mm	
Outline Dimension	364.30 (H) x 215.90 (V) x 13.10 (D)	mm	D:PCAP+LCM
Weight	1110	g	Typ.
Driver Element	a-Si TFT active matrix	-	
Display Colors	16,7M (RGB 8-bits)	Colors	
Electrical Interface	2-ch LVDS	-	
Number of Pixels	1920 (H) x 1080 (V)	pixels	
Pixel Pitch	0.17925 (H) x 0.17925(W)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Mode	AHVA / Normal Black	-	
Color Gamut	72	%	
Touch Technology	Projected Capacitive Multi-Touch Panel	-	
Touch Method	Finger or exclusive pen	-	
Numbers of Touch	10	Points	
Touch FPC Type	COB	-	
Touch Sensor Glass Type	Strengthening Glass	-	
Touch Controller Board	ETP-MB-EXC84H4254STAG	-	
Touch Driver Interface	USB	-	
Support OS	Android, Linux, Win7, Win8, Win10, XP	-	

3. 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
Logic/LCD Drive Voltage	V_{DD}	-0.3	+4.0	V
LCD Input Signal Voltage	V_{signal}	-0.3	+4.0	V
LED Input Voltage	LED_V_{DD}	-0.3	+13.2	V
LED Control Signal Voltage	LED_EN, PWM	-0.3	+6.0	V
Operating Temperature	T_{op}	-20	+70	°C
Operating Humidity	H_{op}	10	90	%RH
Storage Temperature	T_{st}	-20	+70	°C
Storage Humidity	H_{st}	10	90	%RH
Touch DC Supply Voltage	I ² C	-0.3	3.6	V
Touch DC Supply Voltage	USB	-0.3	6.0	V

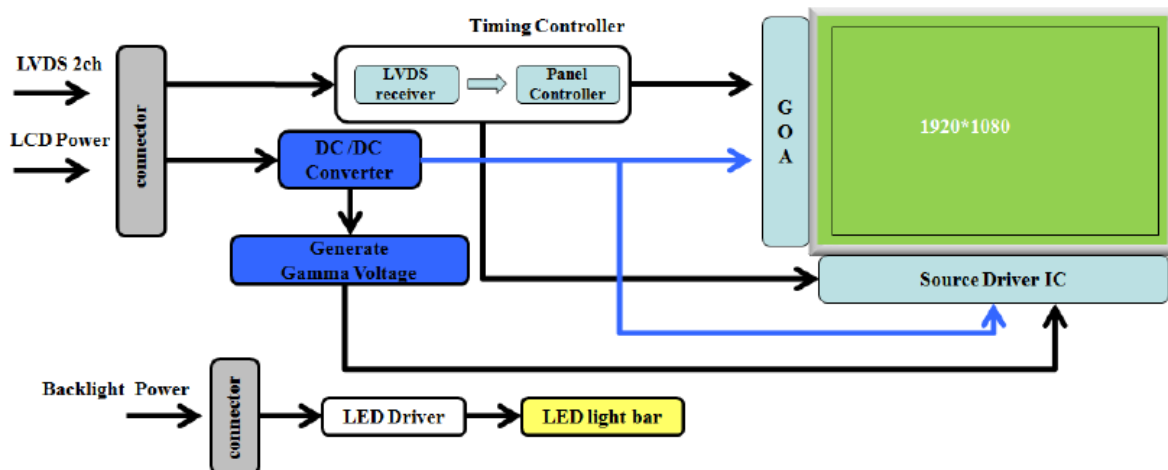
Note: Maximum Wet-Bulb temperature should be 39°C and no condensation.

4. ELECTRICAL CHARACTERISTICS

4.1. LCD MODULE

4.1.1. LCD BLOCK DIAGRAM

The following diagram shows the function block of the 15.6 inches wide Color TFT/LCD module.



4.1.2. POWER SPECIFICATION

LCD Input power specifications are as below;

The power specifications are measured under 25°C and frame frequency under 60Hz.

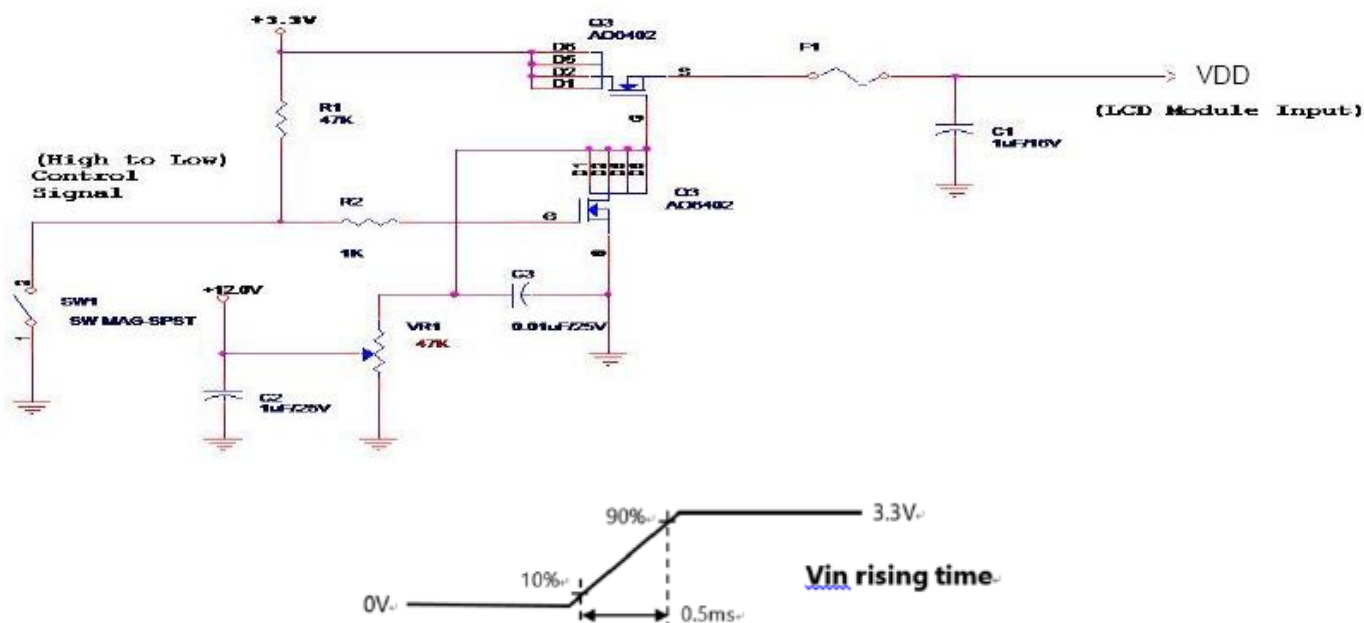
Symbol	Parameter	Min.	Typ.	Max.	Units	Remark
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	V	
PDD	VDD Power	-	1.75	2.11	W	All White pattern (VDD=3.3V, at 60Hz), Note 1
IDD	IDD Current	-	0.53	0.64	A	All White pattern (VDD=3.3V, at 60Hz), Note 2
IRush	Inrush Current	-	-	2000	mA	Note 1
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	mV p-p	All White pattern (VDD=3.3V, at 60Hz)

Note 1: Maximum Measurement Condition: White pattern at 3.3V driving voltage. ($P_{max}=V_{3.3} \times I_{white}$)

Note 2: Typical Measurement Condition: Mosaic Pattern

Current fuse is built in a module. Current capacity of power supply for VDD should be larger than 1.5A, so that the fuse can be opened at the trouble of electrical circuit of module.

Note 3: Measure Condition



4.1.3. LVDS DC ELECTRICAL CHARACTERISTICS

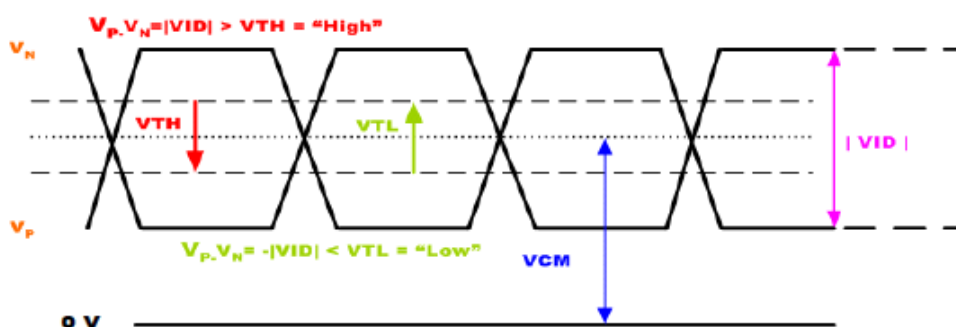
Input signals shall be low or High-impedance state when VDD is off.

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold			+100	mV	VCM=1.2V
VTL	Differential Input Low Threshold	-100			mV	VCM=1.2V
VID	Input Differential Voltage	100		600	mV	
VICM	Differential Input Common Mode Voltage	1.0	1.2	1.5	V	VTH/VTl=+-100mV

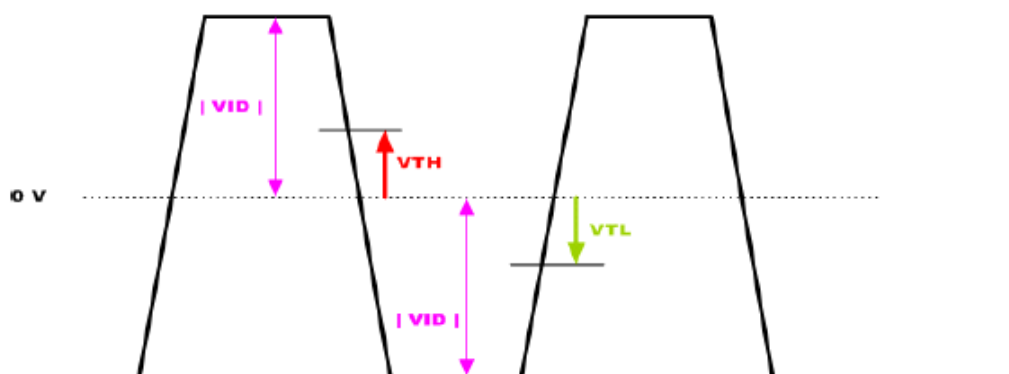
Note: LVDS Signal Waveform

$V_P - V_N = |VID| > V_{TH} = \text{"High"}$
 $V_P - V_N = -|VID| < V_{TL} = \text{"Low"}$

Single-end Signal



Differential Signal



4.1.4. LCD BACKLIGHT UNIT

Parameter	Symbol	Min.	Typ.	Max.	Units	Remark
LED Power Supply	VLED	10.8	12	13.2	V	Define as Connector Interface (Ta=25°C)
PWM Dimming Frequency	F _{PWM}	200		20K	Hz	
LED Enable Input High level	VLED_EN	3	3.3	5	V	
LED Enable Input Low Level		-	-	0.8	V	
PWM Logic Input High Level	VPWM_EN	3	3.3	5	V	
PWM Logic Input Low Level		-	-	0.8	V	
PWM Duty Ratio (200Hz~5KHz)	Duty	5	-	100	%	
PWM Duty Ratio (5KHz~20KHz)	Duty	15	-	100	%	
Backlight Power Consumption	PLED	-	9.23	10.44	W	(Ta=25°C), Vin=12V, Note 2
LED Life-Time	N/A	50,000	-	-	Hour	(Ta=25°C), Note 3, 4

Note 1: Re-commanded system pull up/down resistor no bigger than 10k ohm.

Note 2: Ta means ambient temperature of TFT-LCD module.

Note 3: Operating life means brightness goes down to 50% initial brightness. Min. operating life time is estimated data.

4.1.5. LCD INPUT TERMINAL PIN ASSIGNMENT (CN1)

The module uses a LVDS receiver embedded in AUO's ASIC. LVDS is a differential signal technology for LCD interface and a high-Speed data transfer device.

LVDS Connector

TFT-LCD Connector	Manufacturer	STM
	Part Number	MSBKT2407P30HB
Mating Connector	Manufacturer	JAE or Equivalent
	Part Number	FI-X30HL (Locked Type)

LVDS Connector Pin Assignment

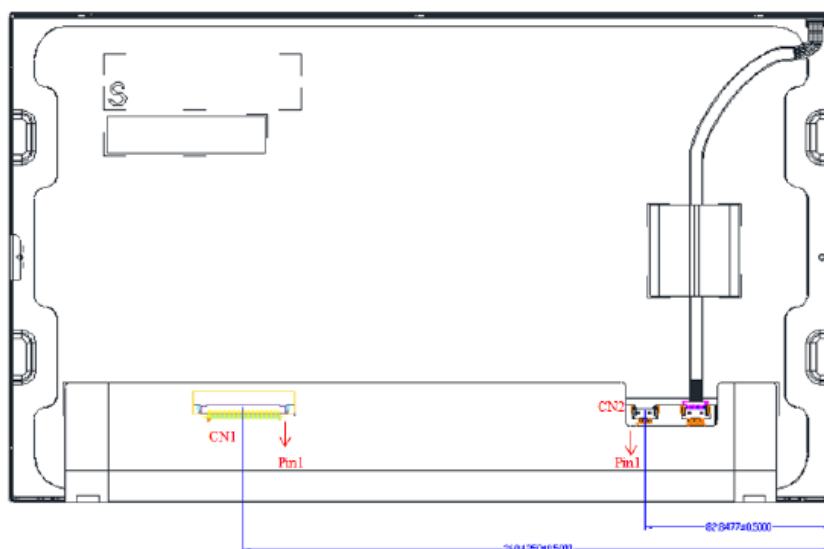
Pin	Symbol	Description	Note
1	RXO0-	Negative LVDS differential data input (Odd data)	
2	RXO0+	Positive LVDS differential data input (Odd data)	
3	RXO1-	Negative LVDS differential data input (Odd data)	
4	RXO1+	Positive LVDS differential data input (Odd data)	
5	RXO2-	Negative LVDS differential data input (Odd data)	
6	RXO2+	Positive LVDS differential data input (Odd data)	
7	GND	Ground	
8	RXOCLK-	Negative LVDS differential clock input (Odd data)	
9	RXOCLK+	Positive LVDS differential clock input (Odd data)	
10	RXO3-	Negative LVDS differential data input (Odd data)	
11	RXO3+	Positive LVDS differential data input (Odd data)	
12	RXE0-	Negative LVDS differential data input (Even data)	
13	RXE0+	Positive LVDS differential data input (Even data)	
14	GND	Ground	
15	RXE1-	Negative LVDS differential data input (Even data)	
16	RXE1+	Positive LVDS differential data input (Even data)	
17	GND	Ground	
18	RXE2-	Negative LVDS differential data input (Even data)	
19	RXE2+	Positive LVDS differential data input (Even data)	
20	RXECLK-	Negative LVDS differential clock input (Even data)	
21	RXECLK+	Positive LVDS differential clock input (Even data)	
22	RXE3-	Negative LVDS differential data input (Even data)	
23	RXE3+	Positive LVDS differential data input (Even data)	
24	GND	Must connect to ground	
25	NC	No connection (for AUO test only, Do not connect)	
26	NC	No connection (for AUO test only, Do not connect)	
27	NC	No connection (for AUO test only, Do not connect)	
28	VDD	Power Supply Input Voltage	
29	VDD	Power Supply Input Voltage	
30	VDD	Power Supply Input Voltage	

Note 1: Input signals shall be low or High-impedance state when VDD is off.

4.1.6. LED BACKLIGHT UNIT (CN2)

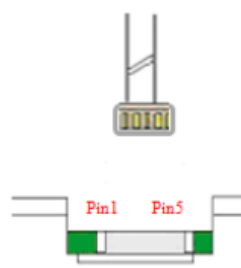
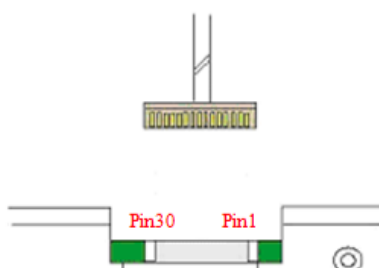
Connector Name / Description	Lamp Connector
Manufacturer	STM
Connector Model Number	MSB24038P5D or compatible
Mating Model Number	P24038P5 or compatible

Pin No.	Symbol	Description
Pin1	VLED	12V Input
Pin2	GND	GND
Pin3	VLED_EN	5V-ON, 0V-OFF
Pin4	VPWM_EN	PWM
Pin5	NA	NC



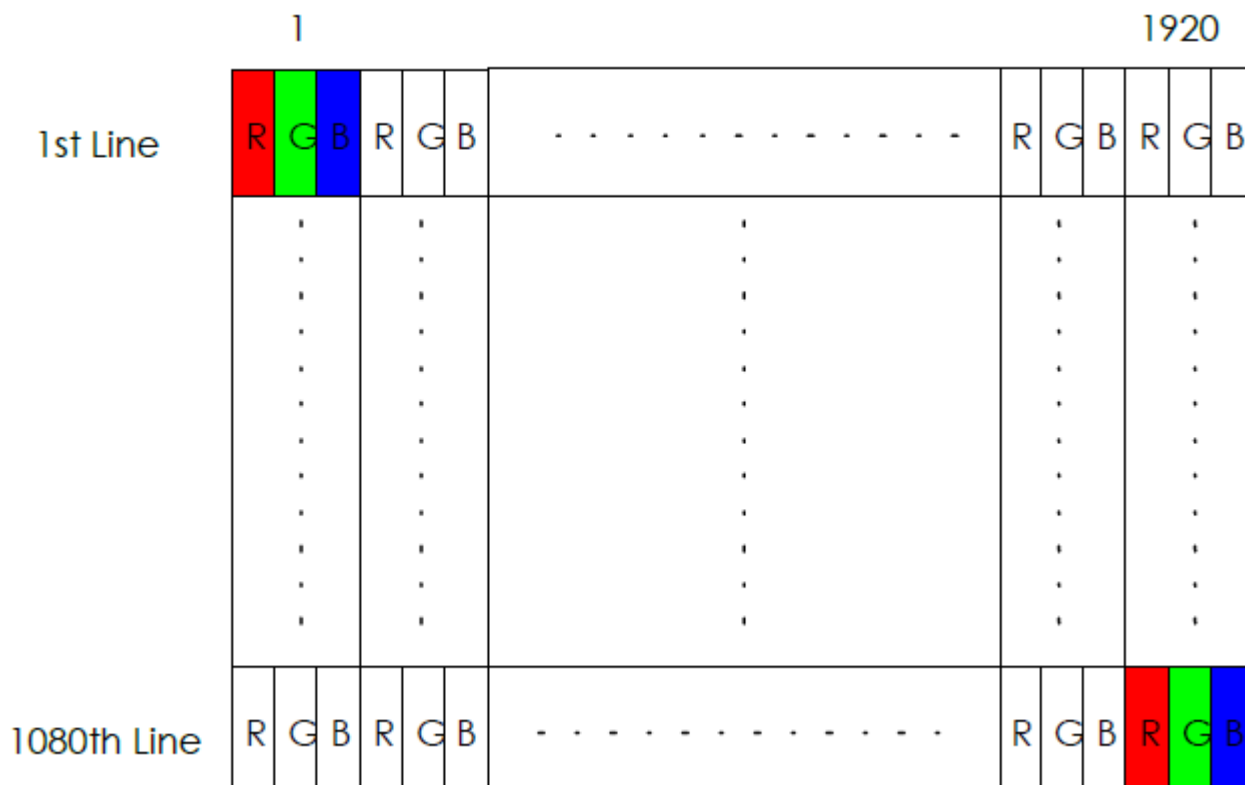
LVDS (CN1):

BLU Power in (CN2):

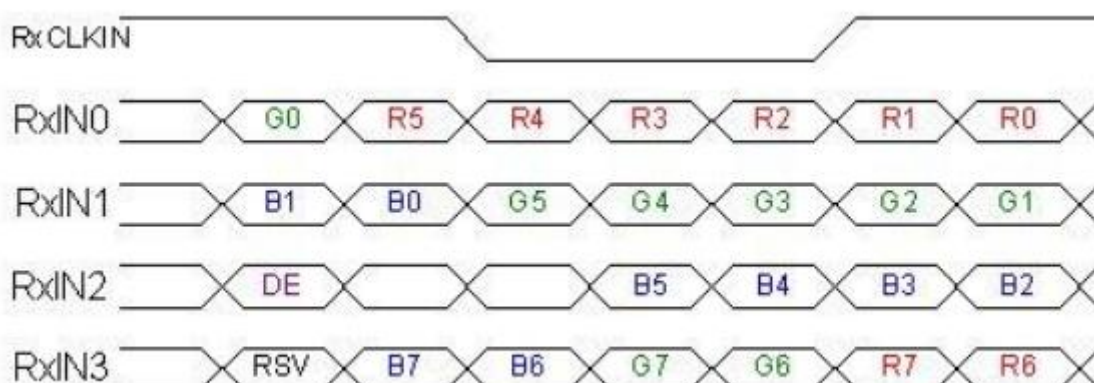


4.1.7. PIXEL FORMAT IMAGE

Following figure shows the relationship of the input signals and LCD pixel format.



4.1.8. THE LCD INPUT DATA FORMAT



Note 1: Please follow PSWG.

Note 2: R/G/B data 7: MSB, R/G/B data 0: LSB

Signal Name	Description	Remark
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7 Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0	Red-pixel Data 8Bits LVDS input MSB: R7 ; LSB: R0
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7 Green Data 6 Green Data 5 Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0	Green-pixel Data 8Bits LVDS input MSB: G7 ; LSB: G0
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7 Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0	Blue-pixel Data 8Bits LVDS input MSB: B7 ; LSB: B0
RxCLKIN	LVDS Data Clock	
DE	Data Enable Signal	When the signal is high, the pixel data shall be valid to be displayed.

Note: Output signals from any system shall be low state or High-impedance state when VDD is off.

4.1.9. LCD TIMING CHARACTERISTICS

Basically, interface timing should match the 1920x1080 / 60 Hz manufacturing guide line timing.

Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		-	-	60	-	Hz
Clock frequency		1/T _{CLOCK}	68.5	70.5	73	MHz
Vertical Section	Period	T _V	1104	1116	1080+A	T _{LINE}
	Active	T _{VD}	1080			
	Blanking	T _{VB}	24	36	A	
Horizontal Section	Period	T _H	1050	1052	960+B	T _{CLOCK}
	Active	T _{HD}	960			
	Blanking	T _{HB}	90	92	B	

Note 1: The above is as optimized setting

Note 2: The maximum clock frequency = $[(960+B) \times (1080+A) \times 60] < 74.5 \text{ MHz}$

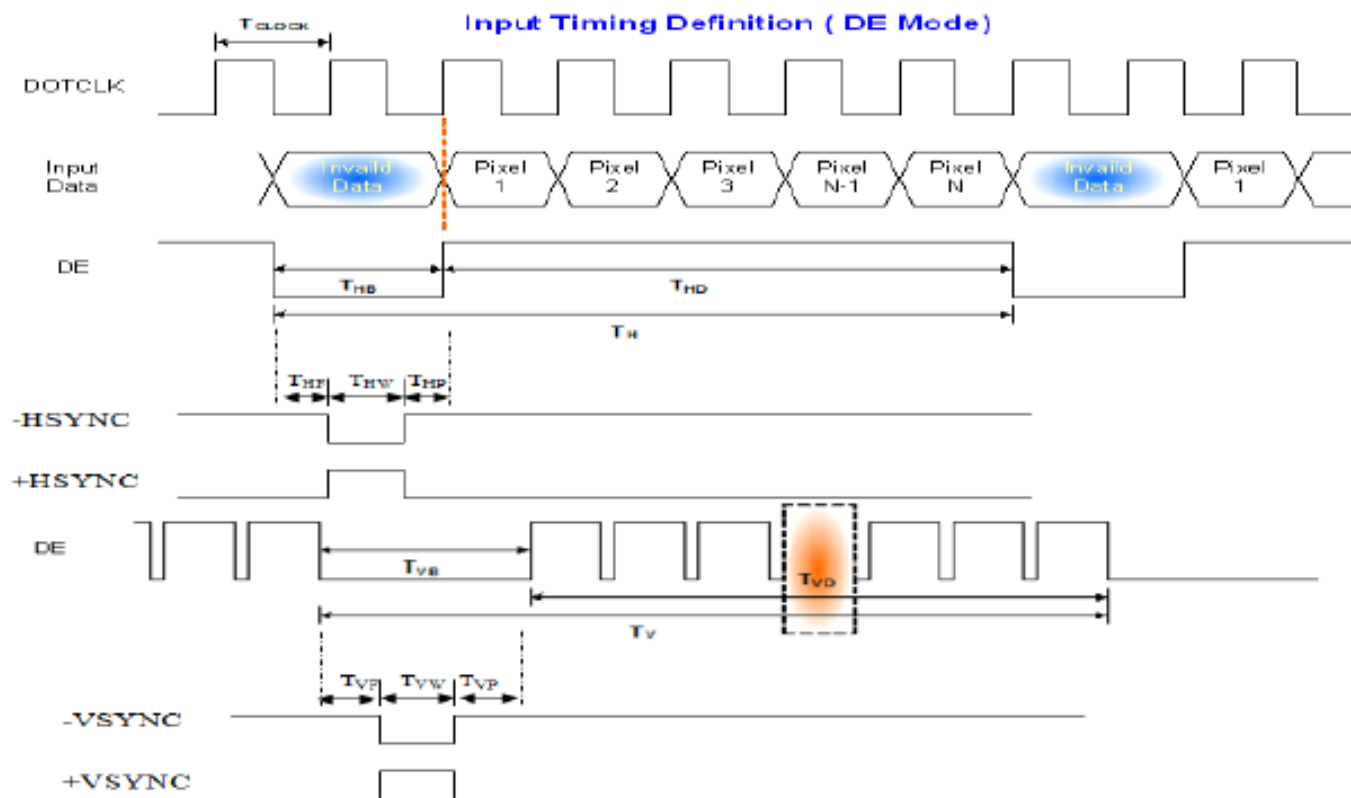
Note 3: Horizontal related parameters must be constant without variation ($H_Sync_Width (T_{HW})$, $H_Front_Porch (T_{HF})$ and $H_Back_Porch (T_{HP})$ must be constant on each scan line).

Note 4: On vertical blank area, $H_Sync_Width (T_{HW})$ and $H_Total (T_H)$ must be same as on the V_Active area.

Note 5: Vertical related parameters must be constant without variation. ($V_Sync_Width (T_{VW})$, $V_Front_Porch (T_{VF})$ and $V_Back_Porch (T_{VP})$ must be constant on each video field).

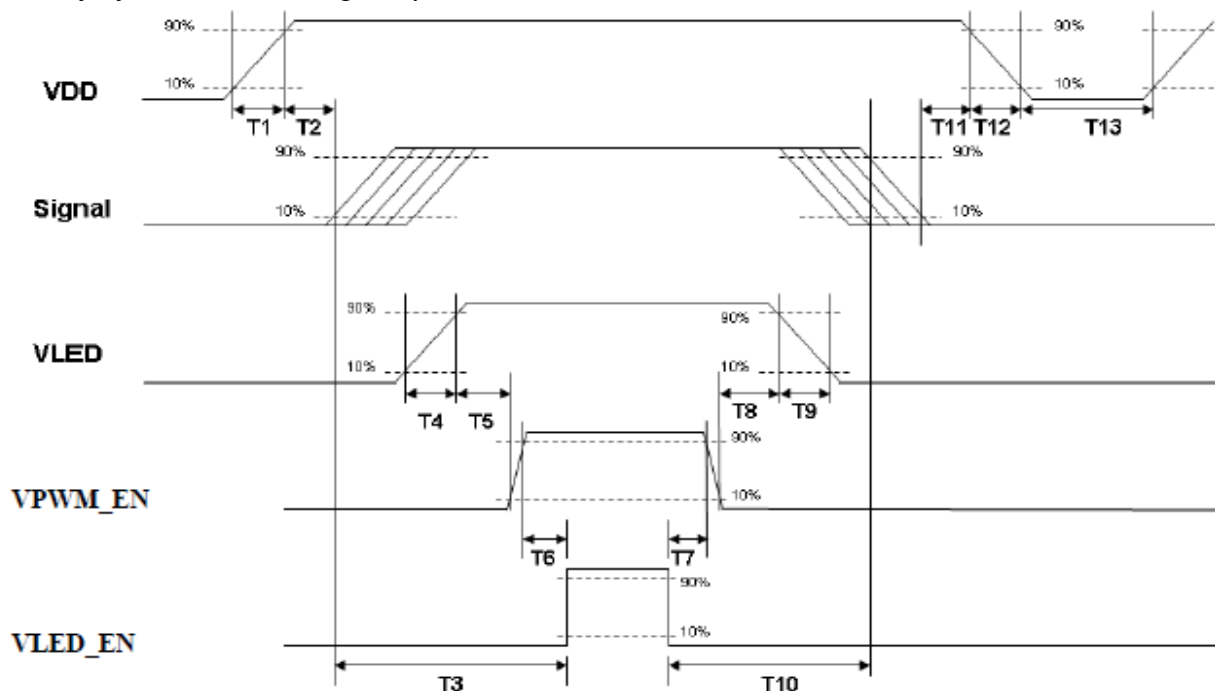
Note 6: The DE timings also must be constant without variation (H/V timing requirements are as same as previous. Blank timing must also be constant).

4.1.10. LCD INPUT TIMING DIAGRAM



4.1.11. POWER SEQUENCE FOR LCD

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be High-impedance state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	ms
T2	30	40	50	ms
T3	200	-	-	ms
T4	0.5	-	10	ms
T5	10	-	-	ms
T6	10	-	-	ms
T7	0	-	-	ms
T8	10	-	-	ms
T9	-	-	10	ms
T10	110	-	-	ms
T11	0	16	50	ms
T12	-	-	10	ms
T13	1000	-	-	ms

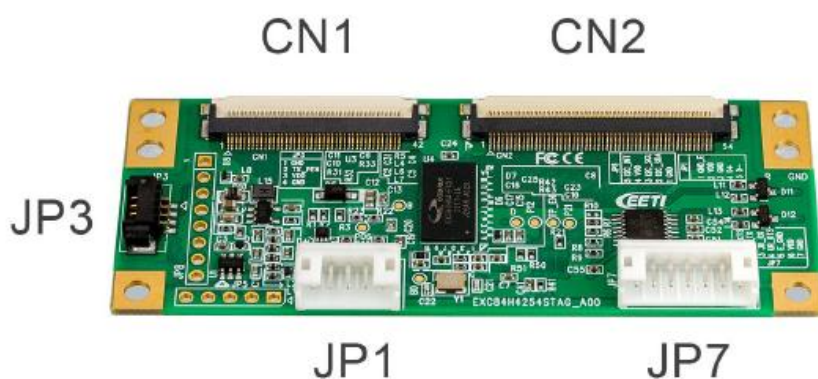
The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

4.2.TOUCH CONTROL BOARD

ETP-MB-EXC84H4254STAG : JP1-USB

Interface	Symbol	Condition	Min.	Typ.	Max.	Unit
CN1 / CN2 / JP1	VDD	DC	3.5	5	5.5	V

Product Photo



Connector CN1/CN2



Substitute Vendor for CN1/CN2



4.2.1. TOUCH FPC PIN ASSIGNMENT

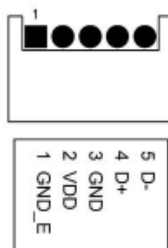
FPC Pin Description

CN1					
PN		PN		PN	
1	TX_S2	21	TX20	41	TX0
2	TX39	22	TX19	42	TX_S0
3	TX38	23	TX18		
4	TX37	24	TX17		
5	TX36	25	TX16		
6	TX35	26	TX15		
7	TX34	27	TX14		
8	TX33	28	TX13		
9	TX32	29	TX12		
10	TX31	30	TX11		
11	TX30	31	TX10		
12	TX29	32	TX9		
13	TX28	33	TX8		
14	TX27	34	TX7		
15	TX26	35	TX6		
16	TX25	36	TX5		
17	TX24	37	TX4		
18	TX23	38	TX3		
19	TX22	39	TX2		
20	TX21	40	TX1		

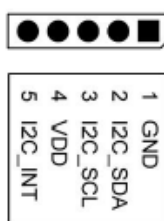
CN2					
PN		PN		PN	
1	RX_S1	21	RX32	41	RX12
2	RX51	22	RX31	42	RX11
3	RX50	23	RX30	43	RX10
4	RX49	24	RX29	44	RX9
5	RX48	25	RX28	45	RX8
6	RX47	26	RX27	46	RX7
7	RX46	27	RX26	47	RX6
8	RX45	28	RX25	48	RX5
9	RX44	29	RX24	49	RX4
10	RX43	30	RX23	50	RX3
11	RX42	31	RX22	51	RX2
12	RX41	32	RX21	52	RX1
13	RX40	33	RX20	53	RX0
14	RX39	34	RX19	54	RX_S0
15	RX38	35	RX18		
16	RX37	36	RX17		
17	RX36	37	RX16		
18	RX35	38	RX15		
19	RX34	39	RX14		
20	RX33	40	RX13		

Connector Pin Configuration

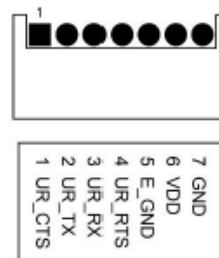
JP1 USB Connector



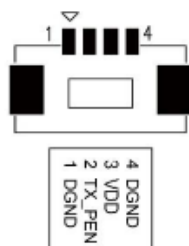
JP5 I2C Connector



JP7 RS232 Connector



JP3 GPIO Connector



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



5. OPTICAL CHARACTERISTICS

The optical characteristics are measured under stable conditions of 25°C (Room Temperature)

Item		Unit	Conditions		Min.	Typ.	Max.	Note
White Luminance		cd/m²	I _{LED} =58mA Center average		400	500	-	1, 2
Luminance Uniformity		%	9 points		75	80	-	1, 2, 3
Contrast Ratio		-			700	1000	-	1, 4
Response Time		ms	Rising + Falling		-	25	35	1, 5
View Angle		degree	Horizontal CR=10	Right	80	89	-	1, 6
				Left	80	89	-	
			Vertical CR=10	Upper	80	89	-	
				Lower	80	89	-	
Color / Chromaticity Coordinates (CIE 1931)	Red	Rx	CIE 1931		0.600	0.650	0.700	4
		Ry			0.283	0.333	0.383	
	Green	Gx			0.246	0.296	0.346	
		Gy			0.558	0.608	0.658	
	Blue	Bx			0.097	0.147	0.197	
		By			0.008	0.058	0.108	
	White	Wx			0.263	0.313	0.363	
		Wy			0.279	0.329	0.379	
Color Gamut		%			-	72	-	

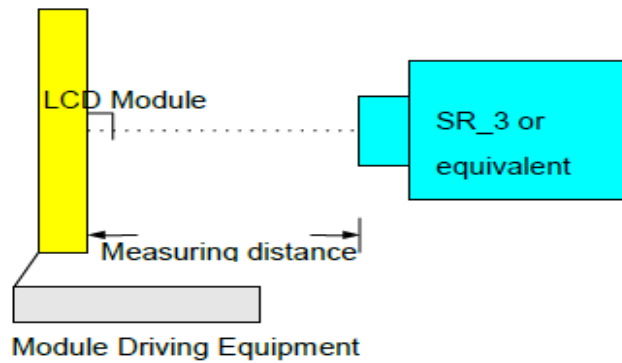
Note 1: Measurement method

Equipment Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR_3 or equivalent)

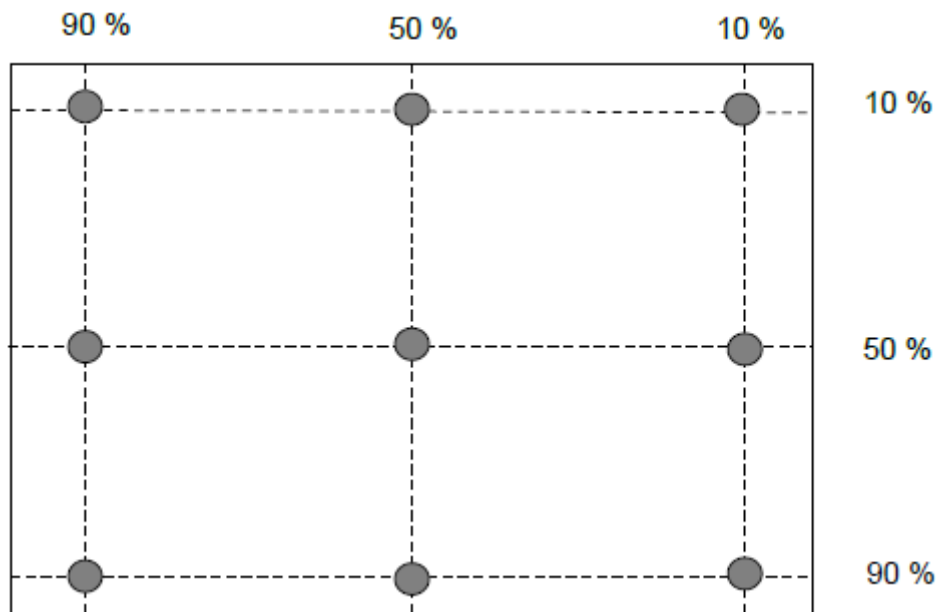
Aperture 1" with 50cm viewing distance

Test Point Center

Environment < 1 lux



Note 2: The 9 points position



Note 3: The luminance uniformity of 9 points is defined by dividing the maximum luminance values by the minimum test point luminance. And measured by TOPCON SR-3

$$\delta_{w9} = \frac{\text{Minimum Luminance of 9 points}}{\text{Maximum Luminance of 9 points}}$$

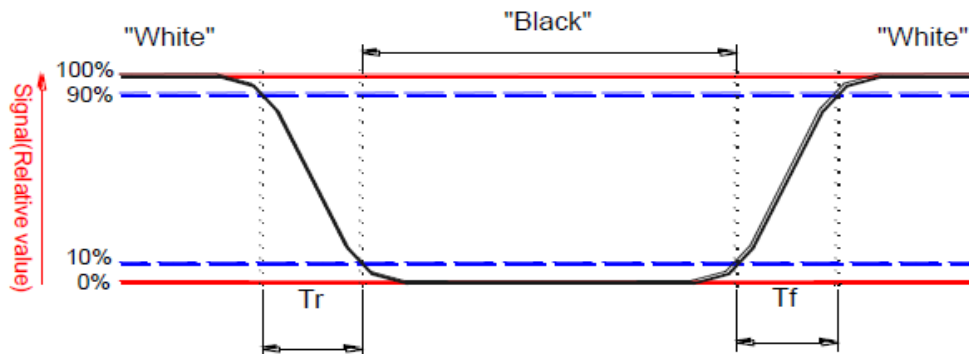
Note 4: Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

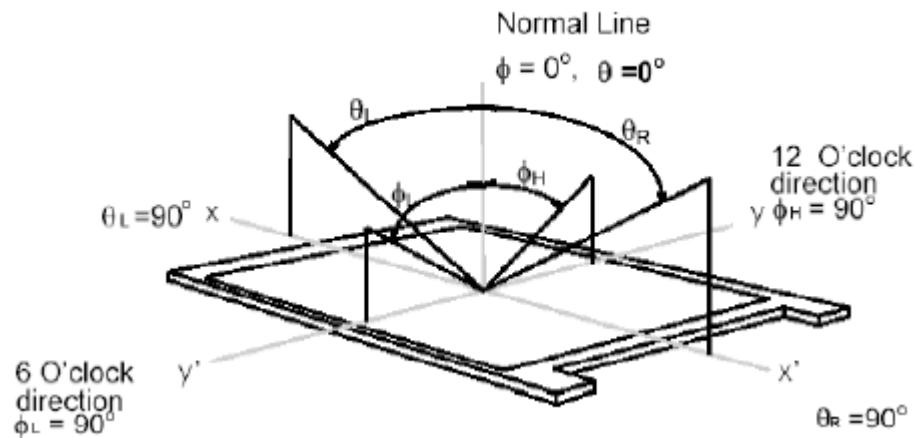
Note 5: Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are change from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Refer to figure as below.



Note 6:

Viewing angle is the measurement of contrast ratio ≥ 10 , at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° (θ) horizontal left and right and 90° (ϕ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotate about its center to develop the desired measurement viewing angle.



6. RELIABILITY TEST ITEMS

Test Item		Condition
1	High temperature/Humidity Bias	50°C, 80% 240hrs
2	High temperature storage test	70°C, 240hrs
3	Low temperature storage test	-20°C, 240hrs
4	High temperature operation test	70°C, 240hrs
5	Low temperature operation test	-20°C, 240hrs
6	Thermal Cycle storage test	-20°C(30min)~60°C(30min), 10cycles

7. LABEL

Model NO. F156PET-T53

條碼

L=32mm

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



W=14mm

字型:Arial (6)

code:128

字型:Arial (8)

8. MECHANICAL CHARACTERISTICS

Item		Dimension	Unit	Note
Outline Dimension	Horizontal	364.30	mm	PCAP : B156PBU-E10
	Vertical	214.6	mm	
	Depth	2.70	mm	
	Horizontal	363.80	mm	LCD : G156HAN02.3 03
	Vertical	215.90	mm	
	Depth	8.80	mm	
	Horizontal	82.50	mm	Touch Control Board : ETP-MB-EXC84H4254STAG
	Vertical	33.00	mm	
	Depth	7.50	mm	
Weight		1110	g	F156PET-T53
Item		Specification		Remarks
PCAP Sensor Area		363.30 mm x 213.60 mm		
PCAP Active Area		358.24 mm x 211.94 mm		
PCAP FPC Length		96.65 mm		
PCAP Input method		Finger or exclusive pen		
PCAP Light Transmission		$\geq 89 \pm 3 \%$		BYK Gardner, 550nm, ASTMD1003
PCAP Haze		$< 4 \%$		
PCAP Operation force		$\leq 10g$		Finger Input
PCAP Hardness of surface		$\geq 6H$		ASTM D3363, Pressure 750gf /45°test



Front View

TBD

Product Specification

F156PET-T53

Back View

TBD

9. ENGINEERING DRAWING

