



Product Specification

F101PET-Z10

- ☐ Draft Specifications
☒ Preliminary Specifications
☐ Final Specifications

Title	10.1-inches Touch Display Product Specifications
Model Name	F101PET-Z10
Version	0

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

Approved By	Prepared By
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REVISION HISTORY

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

1.1. INTRODUCTION

F101PET-Z10 is a 10.1" color active matrix TFT LCD module G101EAN02.2 with projected capacitive multi-touch B101PFU-E03 air bonding.

The display format is intended to support the 16:10 WXGA, 1280(H) x 800(V) screen and 16.7M colors (LVDS RGB 6-bits+FRC) with LED backlight driving circuit.

1.2. FEATURES

- 16:10 Wide view angle
- Long life LED backlight (50k hrs)
- RoHS product

1.3. APPLICATION

- TFT LCD monitor
- Industrial application

1.4. GENERAL SPECIFICATIONS

Parameter	Specification	Unit	Remarks
Active Area Size	10.1	inch	
Display Area	216.96 x 135.6 (V)	mm	
Outline Dimension	247.76 (H) x 166.40 (V) x 8.58 (D)	mm	D:PCAP+LCM
Weight	500	g	Typ.
Driver Element	a-Si TFT active matrix	-	
Display Colors	16.7M (RGB 6-bits + Hi-FRC)	Colors	
Electrical Interface	LVDS	-	
Number of Pixels	1280 (H) x 800 (V)	pixels	
Pixel Pitch	0.1695 (H) x 0.1695(W)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Mode	AHVA, Normal Black	-	
Color Gamut	45	%	
Touch Technology	Projected Capacitive Multi-Touch Panel	-	
Touch Method	Finger or exclusive pen	-	
Numbers of Touch	10	Points	
Touch FPC Type	COF	-	
Touch Sensor Glass Type	Strengthening Glass	-	
Touch Controller IC	EETI, EXC80W46	-	
Touch Driver Interface	USB / I2C	-	
Support OS	Windows (Embedded/CE/XP/2000/Vista/7/8/10) / Linux / Android	-	

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
Logic/LCD Drive Voltage	V_{DD}	-0.3	3.6	V
LCD Input Signal Voltage	V_{signal}	-0.3	3.6	V
Converter Input Voltage	LED_V_{DD}	-0.3	14	V
Converter Control Signal Voltage	LED_PWM	0.3	6	V
Converter Control Signal Voltage	LED_EN	0.3	6	V
Operating Temperature	T_{op}	-20	+70	°C
Operating Humidity	H_{op}	5	90	%RH
Storage Temperature	T_{st}	-30	+80	°C
Storage Humidity	H_{st}	5	90	%RH
Touch DC Supply Voltage	I2C	-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.

3. ELECTRICAL CHARACTERISTICS

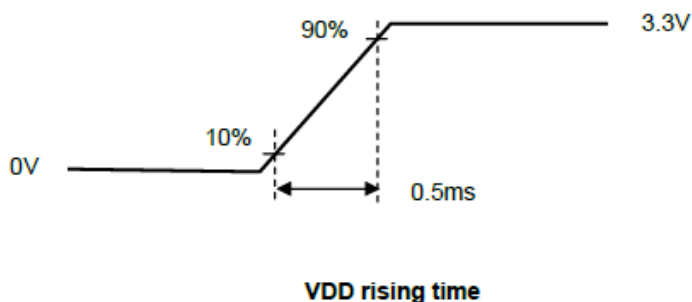
3.1. LCD MODULE

3.1.1. POWER SPECIFICATION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Logic/LCD Drive Voltage	VDD	3.0	3.3	3.6	V	
V _{DD} Current	I _{VDD}	-	278.7	303	mA	White Pattern (VDD=3.3V at 59.9Hz)
LCD Inrush Current	I _{rush}	-	-	1500	mA	Note 1
V _{DD} Power	P _{VDD}	-	0.92	1	W	White Pattern (VDD=3.3V at 59.9Hz)
Allowable Logic/LCD Drive Ripple Voltage	VDDrp	-	-	100	mV p-p	White Pattern (VDD=3.3V at 59.9Hz)

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

Note 2: Measure Condition

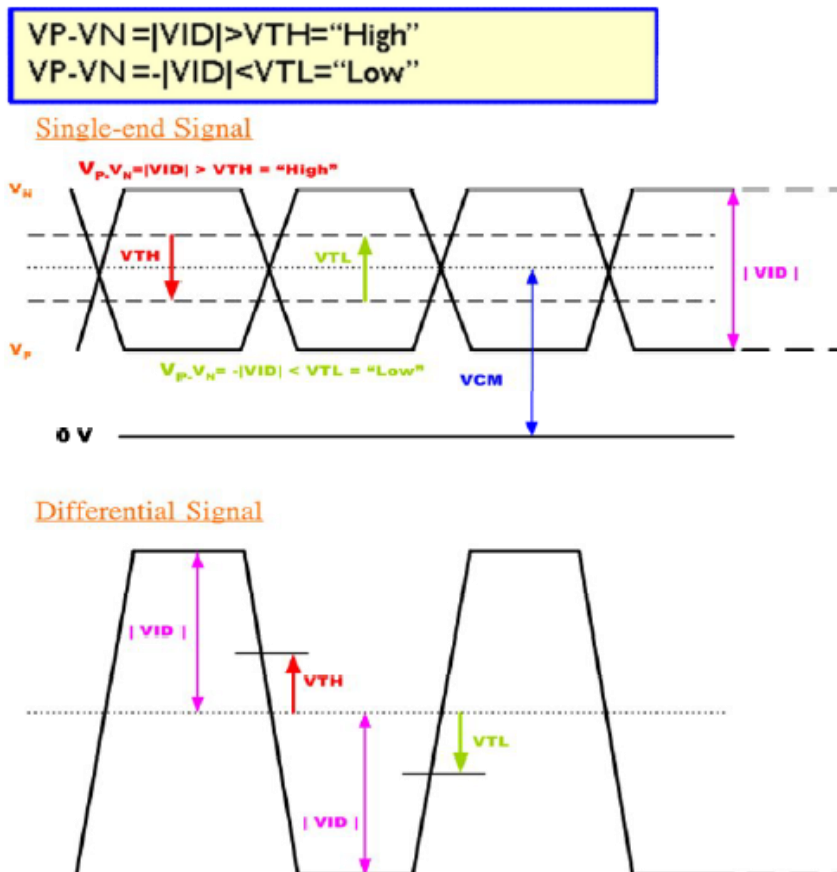


3.1.2. SIGNAL ELECTRICAL CHARACTERISTICS

Input signals should be low or Hi-Z state when VDD is off.

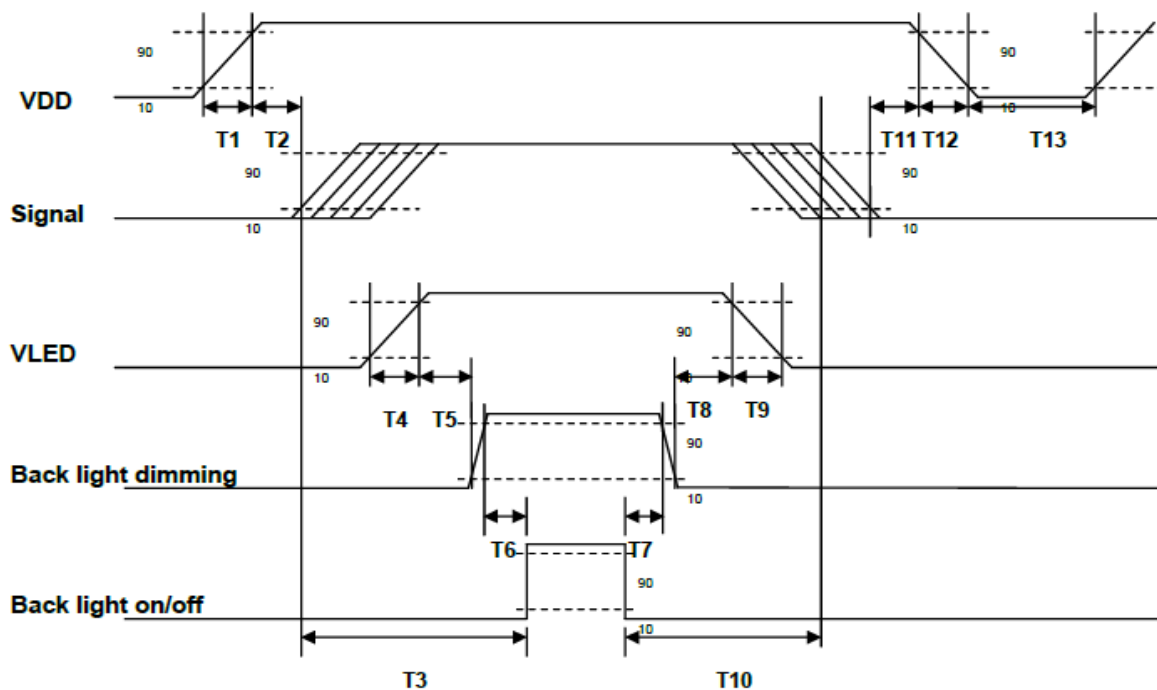
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Differential Input High Threshold	VTH	-	-	100	mV	VCM=1.2V
Differential Input Low Threshold	VTL	-100	-	-	mV	VCM=1.2V
Input Differential Voltage	VID	100	-	600	mV	
Differential Input Common Mode Voltage	VICM	1.0	1.2	1.5	V	VTH/VTL=±100mV

Note: LVDS Signal Waveform



3.1.3. POWER ON/OFF SEQUENCE

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



Parameter	Values			Unit
	Min.	Typ.	Max.	
T1	0.5	---	10	ms
T2	50	60	70	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.

3.2. LCD BACKLIGHT UNIT

Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Input Voltage		V _{LED}	10.8	12	13.2	V	
Input Current		I _{VLED}	-	222	252	mA	Note 2
Power Consumption		P _{VLED}	-	2.664	3.024	W	Note 2
EN Control Level	Backlight on	LED_EN	2.3	-	5.5	V	
	Backlight off		-	-	0.3	V	
PWM Control level	PWM High	V _{PWM}	2.3	-	5.5	V	
	PWM Low		-	-	0.3	V	
PWM Control Duty Ratio		D _{PWM}	5	-	100	%	
PWM Control Frequency		F _{PWM}	200	-	20K	Hz	
LED Forward Current		I _F	-	28	-	mA	Ta=25°C
LED Life Time		LT _{LED}	50,000	-	-	Hrs	I _F =28mA, Ta=25°C

Note:

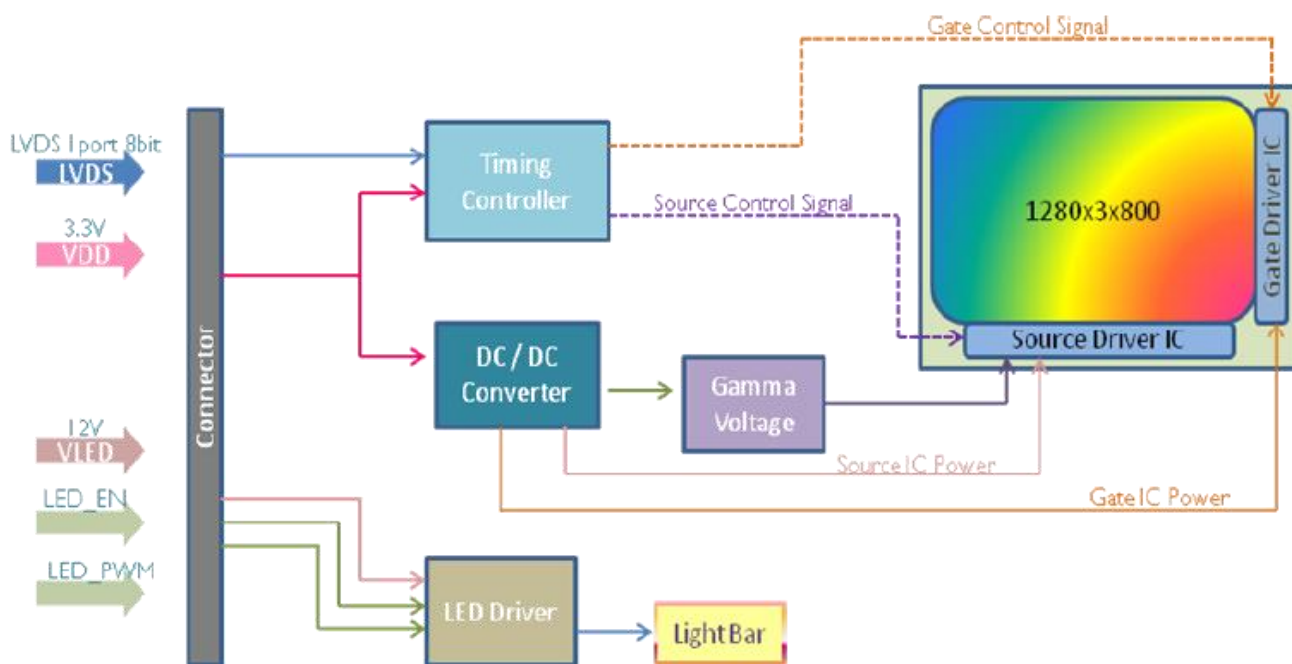
1. Ta, means ambient temperature of TFT-LCD module.
2. V_{LED}, I_{VLED}, P_{VLED} are defined for LED backlight. (V_{LED}=12V, 100% duty of PWM dimming)
3. If G101EAN02.2 module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.
4. Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

3.3. TOUCH CONTROL

Parameter	Values			Unit
	Min.	Typ.	Max.	
I2C Input Voltage	-	3.3	-	V
USB Input Voltage	-	5	-	V
FPC Type / Interface	COF / USB & I2C			-
Touch Controller IC	EXC80W46			-
Max Resolution	4096*4096			-
Precision	≤2.5			mm
Two points separate distance	≥15 (pitch of finger center)			mm
Touch point	1~10 points			-
Power consumption (mA)	Active Mode: About 50mA			mA
Report rate (points/sec)	≥120			Hz
Response time	15			ms

3.4. LCD BLOCK DIAGRAM

The following diagram shows the function block of the 10.1 inch color TFT/LCD module.



3.5. INPUT TERMINAL PIN ASSIGNMENT

LVDS is a differential signal technology for LCD interface and a high-speed data transfer device.

Pin	Symbol	Description	Note
1	GND	Ground	
2	V _{DD}	Power supply: +3V	
3	V _{DD}	Power supply: +3V	
4	V _{DD}	Power supply: +3V	
5	N.C.	AUO Self Test Pin	
6	N.C.	AUO Self Test Pin	
7	N.C.	AUO Self Test Pin	
8	RX0-	Negative transmission data of pixel 0	
9	RX0+	Positive transmission data of pixel 0	
10	GND	Ground	
11	RX1-	Negative transmission data of pixel 1	
12	RX1+	Positive transmission data of pixel 1	
13	GND	Ground	
14	RX2-	Negative transmission data of pixel 2	
15	RX2+	Positive transmission data of pixel 2	
16	GND	Ground	
17	RXCLK-	Negative of clock	
18	RXCLK+	Positive of clock	
19	GND	Ground	
20	RX3-	Negative transmission data of pixel 3	
21	RX3+	Positive transmission data of pixel 3	
22	GND	Ground	
23	N.C.	No connection	
24	N.C.	No connection	
25	GND	Ground	
26	N.C.	No connection	
27	N.C.	No connection	
28	GND	Ground	

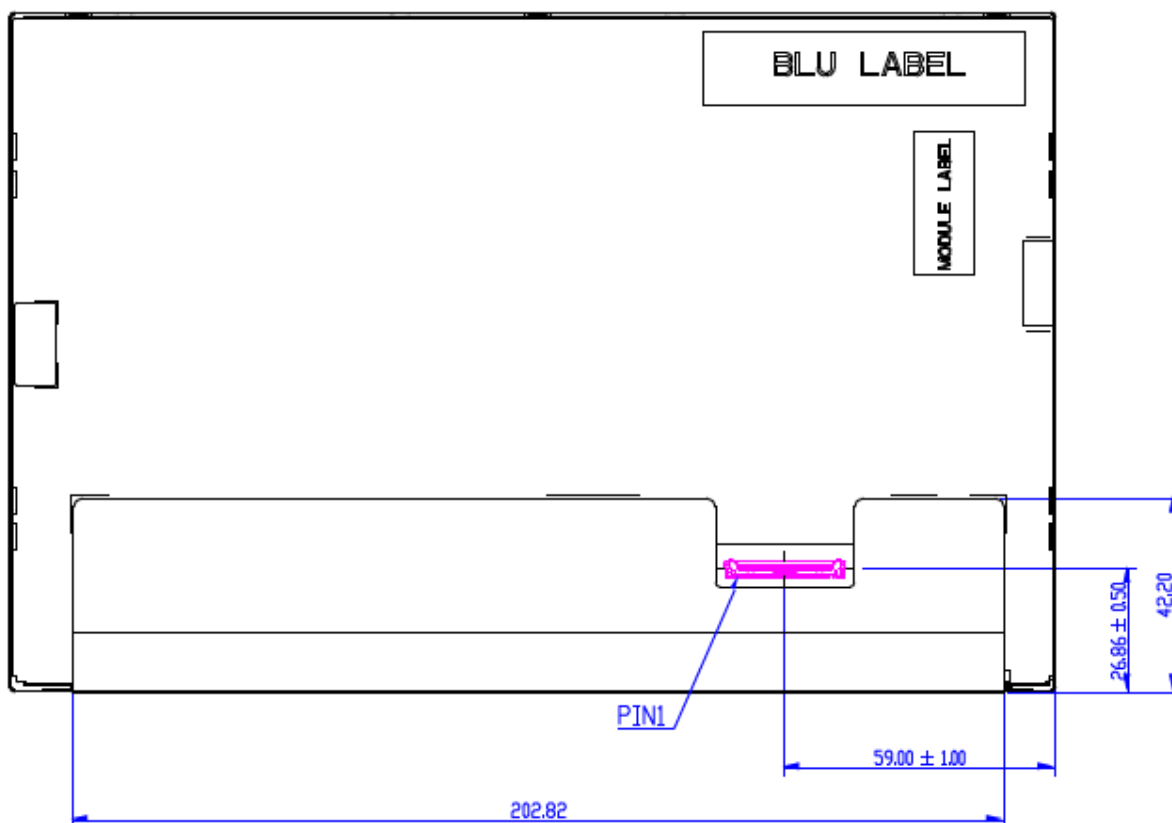
29	N.C.	No connection	
30	N.C.	No connection	
31	LED_GND	LED Ground	
32	LED_GND	LED Ground	
33	LED_GND	LED Ground	
34	N.C.	No connection	
35	LED_PWM	PWM Dimming	
36	LED_EN	LED ON/OFF	
37	N.C.	No connection	
38	VLED	LED Power Supply +12V	
39	VLED	LED Power Supply +12V	
40	VLED	LED Power Supply +12V	

Note1. LCD connector: **IPEX 20765-040E-11A** or compatible

Note2. User's connector Part No.: **IPEX 20453-040T-01** or compatible

Note3. Input Signals should be in low status when VDD is off.

Note4. N.C. means "No Connection".



G101EAN02.2 ver. 1.4

3.6. TOUCH CONTROL PIN ASSIGNMENT

J1 : I2C

Brand: Centenary Materials

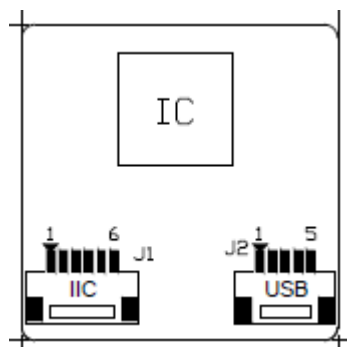
Part number: **SM06B-SRSS-TB** or equivalence

J2 : USB

Brand: JST

Part number: **SM05B-SRSS-TB** or equivalence

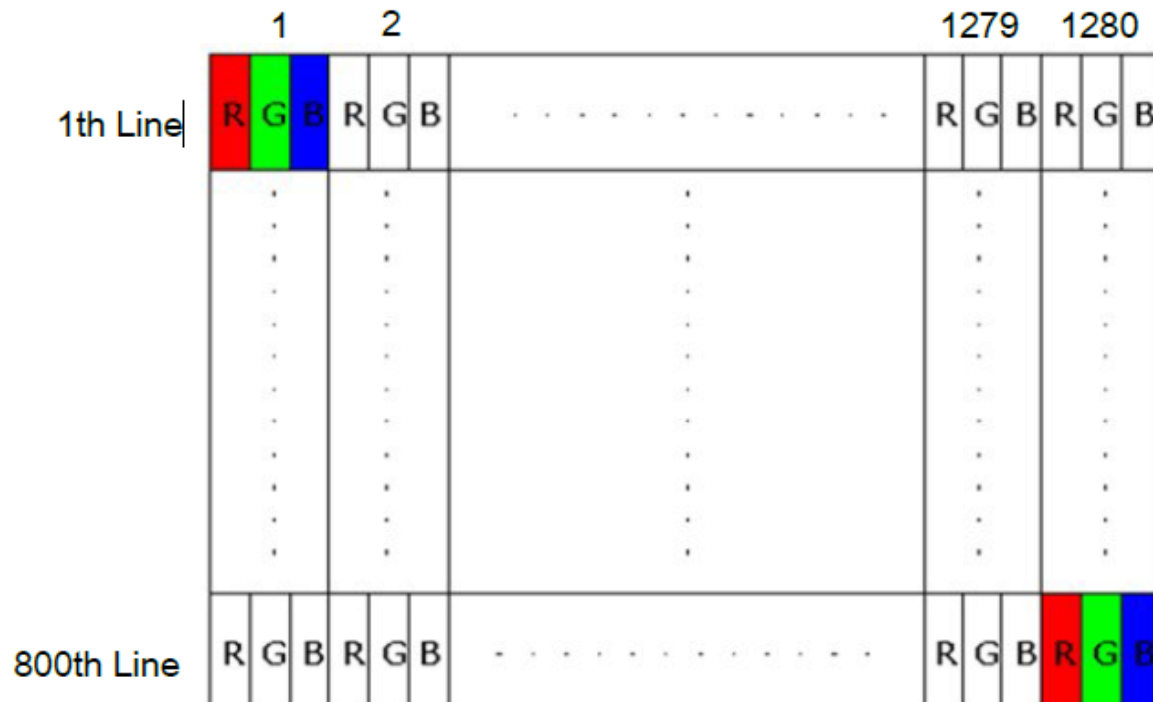
J1 I2C	Pin Definition	J2 USB	Pin Definition
1	RST	1	GND
2	VDD (3.3 V)	2	VDD (5V)
3	GND	3	GND
4	INT	4	D+
5	SDA	5	D-
6	SCL		



4. LCD SIGNAL CHARACTERISTIC

4.1. PIXEL FORMAT IMAGE

Following figure shows the relationship between input signal and LCD pixel format.



4.1.1. SCANNING DIRECTION

The following figure shows the image seen from the front view. The arrow indicates the direction of scan.



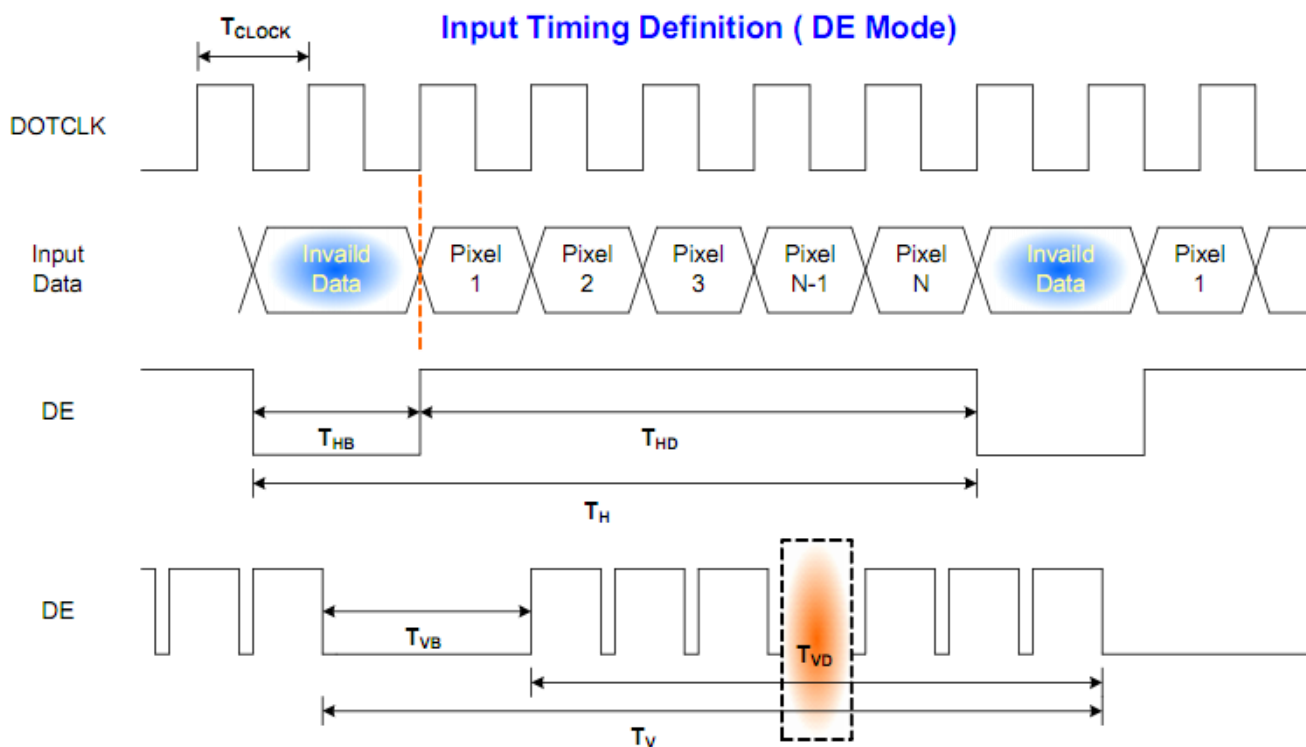
4.2. LCD INTERFACE TIMING

4.2.1. LCD TIMING CHARACTERISTICS

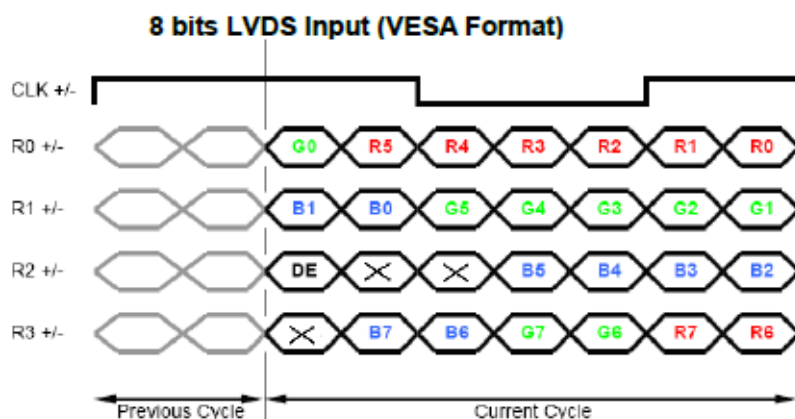
Signal		Symbol	Min.	Typ.	Max.	Unit
Clock Frequency		T _{dclk}	68.9	71.1	74.5	MHz
Vertical Section	Period	T _V	815	823	840	T _{Line}
	Active	T _{VD}	800			
	Blanking	T _{VB}	15	23	40	
Horizontal Section	Period	T _H	1410	1440	1480	T _{dclk}
	Active	T _{HD}	1280			
	Blanking	T _{HB}	130	160	200	
Frame Rate		F	--	59.99	--	Hz

Note: DE mode.

4.2.2. LCD INPUT TIMING DIAGRAM



4.2.3. LCD INPUT DATA FORMAT



Signal Name	Description	
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7 (MSB) Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB)	Red-pixel Data For 8Bits LVDS input MSB: R7 ; LSB: R0
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7 (MSB) Green Data 6 Green Data 5 Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0 (LSB)	Green-pixel Data For 8Bits LVDS input MSB: R7 ; LSB: R0
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7 (MSB) Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB)	Blue-pixel Data For 8Bits LVDS input MSB: R7 ; LSB: R0
RxCLKIN	Data Clock	The signal is used to strobe the pixel data and DE signals. All pixel data shall be valid at the falling edge when the DE signal is high.
DE	Display Timing	This signal is strobed at the falling edge of RxCLKIN. When the signal is high, the pixel data shall be valid to be displayed.

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

5. OPTICAL CHARACTERISTICS

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

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Surface Luminance (White)		L _{WH}	I _{LED} =28mA (center)	400	500	--	Cd/m ²	1
Uniformity		δ _{W5p}	5 points	70	--	--	%	2, 3
Contrast Ratio		CR		600	800	--		4
Response Time		T _R +T _F		--	29	38	ms	
Viewing Angle	Horizontal	θ _r	CR=10	80	89	--	degree	6
		θ _l		80	89	--		
	Vertical	θ _u		80	89	--		
		θ _d		80	89	--		
Color Coordinates	Red	R _x	θ _X =0°, θ _Y =0° Grayscale Maximum	0.551	0.601	0.651		
		R _y		0.293	0.343	0.393		
	Green	G _x		0.274	0.324	0.374		
		G _y		0.512	0.562	0.612		
	Blue	B _x		0.101	0.151	0.201		
		B _y		0.085	0.135	0.185		
	White	W _x		0.263	0.313	0.363		
		W _y		0.279	0.329	0.379		
Color Gamut				--	45	--	%	

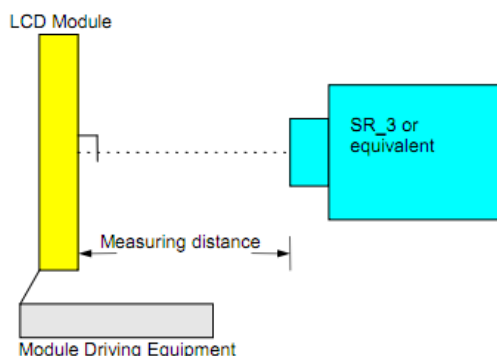
Note 1: Measurement method

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

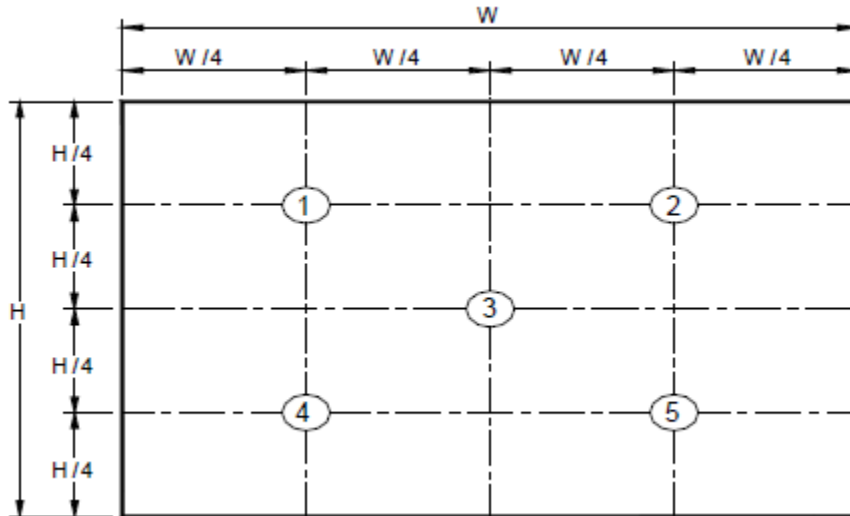
Aperture 1° with 50cm viewing distance

Test Point Center

Environment < 1 lux



Note 2: Definition of 5 points position (Display active area: 22.72(H) x125.28 (V))



Note 3: The luminance uniformity of 5 points is defined by dividing the minimum luminance values by the maximum test point luminance

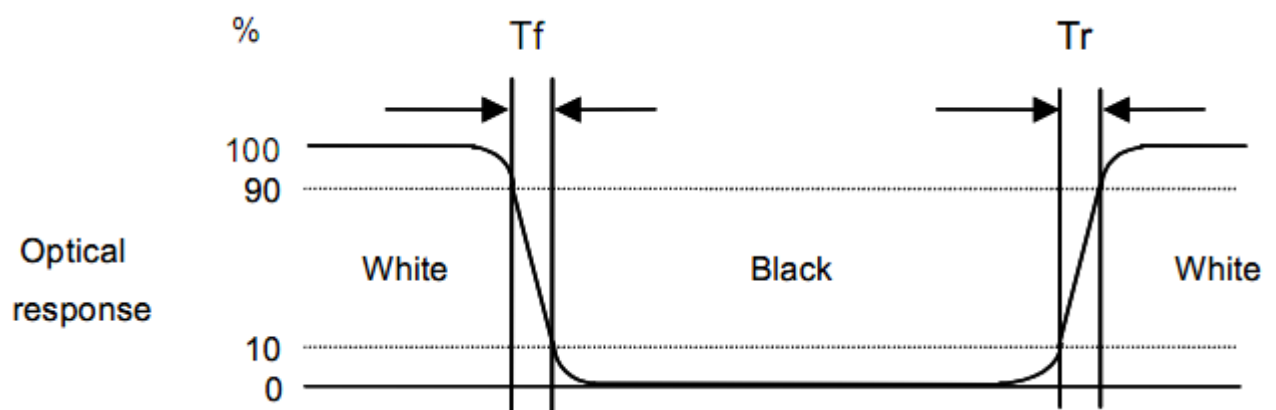
$$\delta_{w5} = \frac{\text{Minimum Brightness of five points}}{\text{Maximum Brightness of five points}}$$

Note 4: Definition of contrast ratio (CR)

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

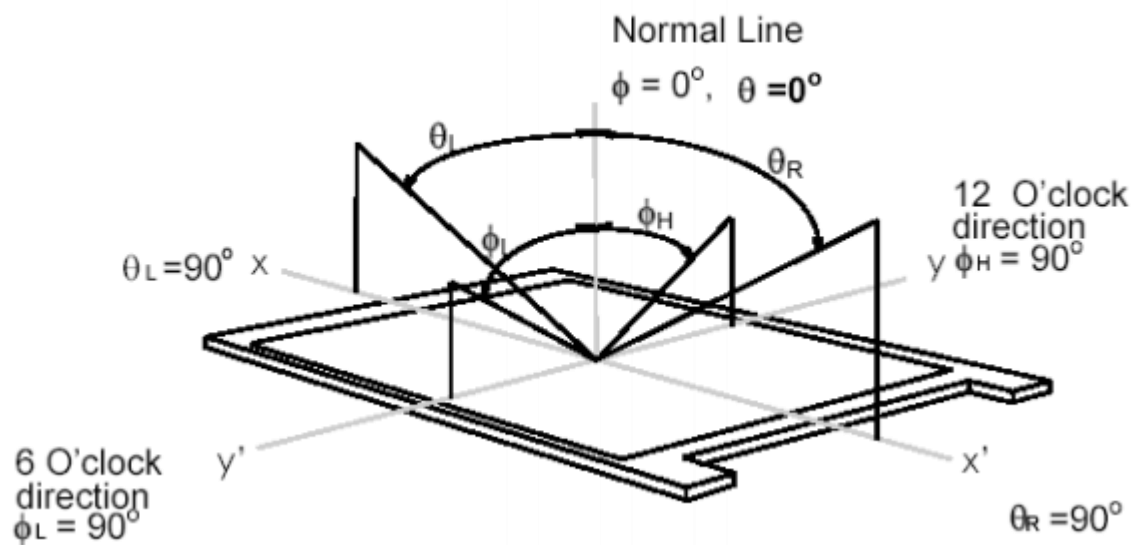
Note5: Definition of Response Time (T_R , T_F)

The output signals of photo detector are measured when the input signals are changed from "White" to "Black" (falling time) and from "Black" to "White" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.



Note6: Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≥ 10 , at the screen center, over a 180° horizontal and 180° vertical range (off-normal view angles). The 180° viewing angle range is broken down as below: 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 rotated to its center to develop the desired measurement viewing angle.



6. RELIABILITY TEST ITEMS

Test Item		Condition
1	Temperature Humidity Bias	40°C, 90%, 240hrs
2	High temperature Storage test	80°C, 240hrs
3	Low temperature Storage test	-30°C, 240hrs
4	High temperature Operation test	70°C, 240hrs
5	Low temperature Operation test	-20°C, 240hrs
6	Thermal Cycle storage test	-30°C(30min)~80°C(30min), 10cycles

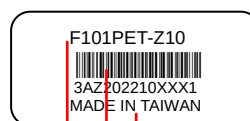
7. LABEL

Model NO. F101PET-Z10

條碼

L=32mm

SN 3A Z 20 2 21 0 XXX1



W=14mm

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

字型:Arial (6)

code:128

字型:Arial (8)

8. MECHANICAL CHARACTERISTICS

Item		Dimension	Unit	Note
Outline Dimension	Horizontal	247.76	mm	PCAP : B101PFU-E03
	Vertical	166.40	mm	
	Depth	2.05	mm	
	Horizontal	227.91	mm	LCD : G101EAN02.2
	Vertical	148.00	mm	
	Depth	5.43	mm	
Weight		500	g	F101PET-Z10
Item		Specification		Remarks
PCAP Viewing Area		217.56 mm x 136.2 mm		
PCAP Sensor Area		218.56 mm x 137.2 mm		
PCAP FPC Length		60 mm		
PCAP Input method		Finger or exclusive pen		
PCAP Light Transmission		≥85%		
PCAP Operation force		≤10g		Finger Input
PCAP Hardness of surface		≥6H		Pressure 500gf test
PCAP Surface Treatment		Clear Type		

Front View



Back View



9. ENGINEERING DRAWING

