



PRODUCT SPECIFICATION

Part Number

PT482743A-TLMWD-EH13

CUSTOMER	
CUSTOMER PART NUMBER	
DESCRIPTION	4.3" TFT LCD, High Brightness
APPROVED BY	
DATE	

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

2

1. Table of Contents

No.	Contents	Page
1	Table of Contents	2
2	Record of Revisions	3
3	Module Numbering System	4
4	Application	5
5	Features	5
6	General Specifications	5
7	Absolute Maximum Ratings	6
8	Electrical Characteristics	7
9	Block Diagram	9
10	Input / Output Terminals Pin Assignment	10
11	Interface Timing	12
12	Optical Characteristics	15
13	Reliability Test	18
14	Packaging	19
15	Precautions	20
16	Outline Drawing	22
17	Definition of Labels	23
18	Incoming Inspection Standards	25

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**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

4

3. Module Numbering System

P T _____ - _____ - _____

1. 2. 3. 4. 5. 6. 7. 8. 9 10. 11. 12. 13. 14.

1. P-TEC TFT

2. LENGTH x WIDTH PIXELS

If third character is a zero, it is removed to shorten part number. Example: 240 x 320 = PT3224

3. DIAGONAL DIMENSIONS

Example: 3.5" display = 35 in part number

4. PRODUCT VERSION

Series assigned by P-tec

5. LCD MODE

T: TN
I: IPS
V: VA

6. POLARIZER

LM: Transmissive
LF: Transflective

7. BACKLIGHT COLOR

No Backlight: Left Blank
W: White
B: Blue/Green
S: Yellow/Green

8. VIEWING DIRECTION

D: 6 o'clock
U: 12 o'clock
F: Full Viewing Angle

9. A ~ Z CODE

Assigned by P-tec

11. TEMPERATURE RANGE

Normal: Left Blank
Wide: X

12. LUMINANCE

Blank: Normal (<300 nit)
M: Middle (>= 300 nit)
H: High (> 600 nit)

13. TOUCH PANEL OPTION

No TP: Left Blank
C: Capacitive TP
R: Resistive TP

14. SPECIAL CHARACTERS

Customer special requirements

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

5

4. Application

This specification is applied to the 4.3 inch supported TFT-LCD module With Transparent Touch Panel, and can display true 16.7M colors (8 bit/ color). The module is designed for PMP, GPS, DMB, other electronic products which require flat panel display of digital signal interface.

5. Features

- WQVGA (480×272 pixels) resolution.
- 8 bit MCU interface.
- LCD Controller :SSD1963

6. General Specifications

Item	Specifications	Unit
Screen Size	4.3 (Diagonal)	inch
Display Format	480RGB(H)×272(V)	dot
Active Area	95.04(H)×53.856(V)	mm
PIXEL Pitch	0.198(H)×0.198(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Anti-Glare and Hard Coating(3H)	-
Viewing Direction	6 O'clock (The Gray Inversion will appear at this direction)	-
Outline Dimension	105.5(W)×67.2(H)×8.0(D)	mm
Weight	57	g
RoHS Compliance	P-tec certifies this product to be in compliance with European Union Directive 2011/65/EU on the restriction of certain hazardous substances in electrical and electronic equipment.	-

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

6

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-30	+80	°C	(1)(2)
Operating Temperature	T _{OP}	-20	+70	°C	(1)(2)

Note1: Background color changes slightly depending on ambient temperature.

This phenomenon is reversible.

Note2: Please refer to item of RELIABILITY.

7.2 Electrical Absolute Ratings

7.2.1 TFT-LCD Module

(Ta=25±2°C, VSS=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VCC	-0.5	4.6	V	-

7.2.2 LED Driver Absolute Maximum Ratings

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Driver For EN	EN	-	6	V	(1)

Note (1) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded.

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

7

8. Electrical Characteristics

8.1 TFT-LCD Module

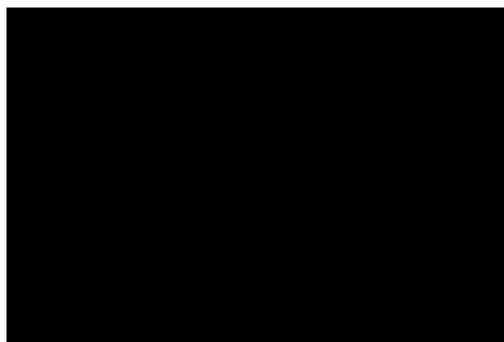
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Digital Power Supply Voltage	VCC	3.0	3.3	3.6	V	-
Input High Threshold Voltage	VIH	0.7VCC	-	VCC	V	-
Input Low Threshold Voltage	VIL	0	-	0.3 VCC	V	-
VSYNC Frequency	F _V	-	60	-	Hz	-
Digital Current	ICC	-	250	350	mA	-
Power Consumption	PC	-	0.825	1.155	W	(1)
Pixel Clock	PCLK	-	9.0	15.0	MHz	-

Note (1) The specified power consumption is under the conditions at VCC = 3.3V,

FV=60Hz, DCLK=9.0 MHz, whereas a power dissipation check Pattern below is displayed.

Black Pattern / 0 Gray



Active Area



8.2 LED Driver Unit

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
EN Voltage High	VIH	2.0	-	3.6	V	-
EN Voltage Low	VIL	0	-	0.8	V	-
LED Life Time(25°C)	-	50000	60000	-	hr	-

Note (1) The driving design of backlight unit is dependent on serial consideration of 10 LEDs.

(2) The LED life time is defined as the module brightness decrease to 50%, original brightness at Ta=25°C, $I_{LED} = 20mA$.



P-TEC

MODEL NO.

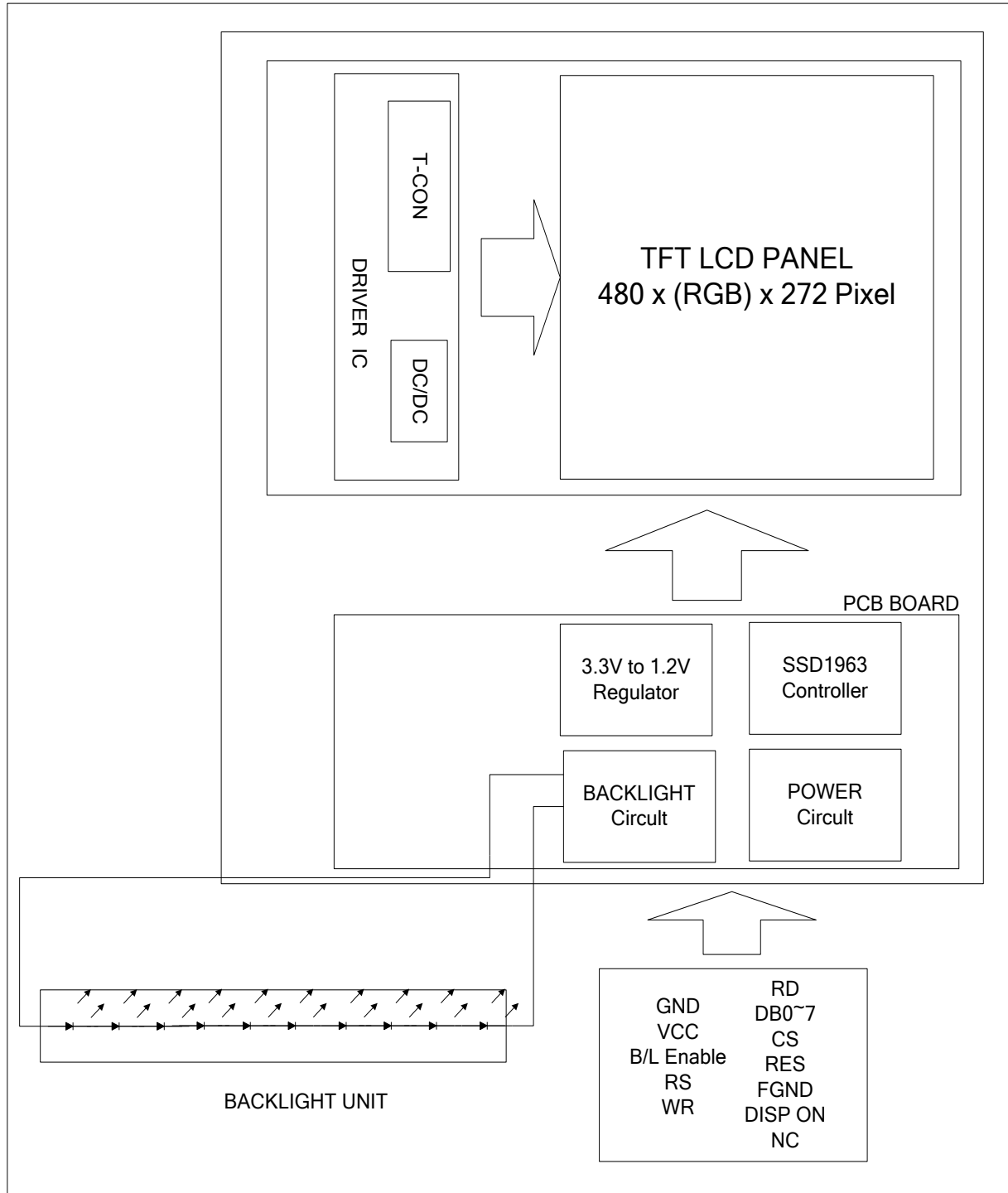
PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

9

9. Block Diagram

TFT-LCD Module with Backlight Unit



**10. Input / Output Terminals Pin Assignment****10.1 TFT-LCD Module****Recommendation CN:CF25201D0R0-10**

Pin No.	Symbol	Description
1	GND	Ground
2	VCC	POWER SUPPLY(+3.3V)
3	B/L ENABLE	Backlight control
4	RS	Data/Command select
5	WR	8080 mode: WR# (write strobe signal)
6	RD	8080 mode: RD# (read strobe signal)
7	DB0	Data bus
8	DB1	Data bus
9	DB2	Data bus
10	DB3	Data bus
11	DB4	Data bus
12	DB5	Data bus
13	DB6	Data bus
14	DB7	Data bus
15	CS	Chip select
16	RES	RESET
17	NC	NC
18	FGND	Ground
19	DISP ON	Display ON/OFF Signal
20	NC	NC

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

11

10.2 Pixel Data Format

8080 support 8-bit. Depending on the width of the data bus, the display data are packed into the data bus in different ways

Table: Pixel Data Format

Interface Cycle

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
8 bits	1 st																	R7	R6	R5	R4	R3	R2	R1	R0
	2 nd																	G7	G6	G5	G4	G3	G2	G1	G0
	3 rd																	B7	B6	B5	B4	B3	B2	B1	B0



11. Interface Timing

11.1 Timing Requirement

Clock Timing

Table 11-1 :Clock Input Requirements for CLK (PLL-bypass)

Symbol	Parameter	Min	Max	Units
F_{CLK}	Input Clock Frequency (CLK)		110	MHz
T_{CLK}	Input Clock period (CLK)	$1/f_{CLK}$		ns

Table 11-2 : Clock Input Requirements for CLK

Symbol	Parameter	Min	Max	Units
F_{CLK}	Input Clock Frequency (CLK)	2.5	50	MHz
T_{CLK}	Input Clock period (CLK)	$1/f_{CLK}$		ns

Table 11-3 : Clock Input Requirements for crystal oscillator XTAL

Symbol	Parameter	Min	Max	Units
F_{XTAL}	Input Clock Frequency	2.5	10	MHz
T_{XTAL}	Input Clock period	$1/f_{XTAL}$		ns

Parallel 8080-series Interface Timing

Table : Parallel 8080-series Interface Timing Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
f_{MCLK}	System Clock Frequency*	1	-	110	MHz
t_{MCLK}	System Clock Period*	$1/f_{MCLK}$	-	-	ns
t_{PWCSL}	Control Pulse High Width	Write 13 Read 30	$1.5 * t_{MCLK}$ $3.5 * t_{MCLK}$	-	ns
t_{PWCSh}	Control Pulse Low Width	Write (next write cycle) 80 Write (next read cycle) 80 Read 80	$1.5 * t_{MCLK}$ $9 * t_{MCLK}$ $9 * t_{MCLK}$	-	ns
t_{AS}	Address Setup Time	1	-	-	ns
t_{AH}	Address Hold Time	2	-	-	ns
t_{DSW}	Write Data Setup Time	4	-	-	ns
t_{DHW}	Write Data Hold Time	1	-	-	ns
t_{PWLW}	Write Low Time	12	-	-	ns
t_{DHR}	Read Data Hold Time	1	-	-	ns
t_{ACC}	Access Time	32	-	-	ns
t_{PWLr}	Read Low Time	36	-	-	ns
t_R	Rise Time	-	-	0.5	ns
t_F	Fall Time	-	-	0.5	ns
t_{CS}	Chip select setup time	2	-	-	ns
t_{CSH}	Chip select hold time to read signal	3	-	-	ns

* System Clock denotes external input clock (PLL-bypass) or internal generated clock (PLL-enabled)



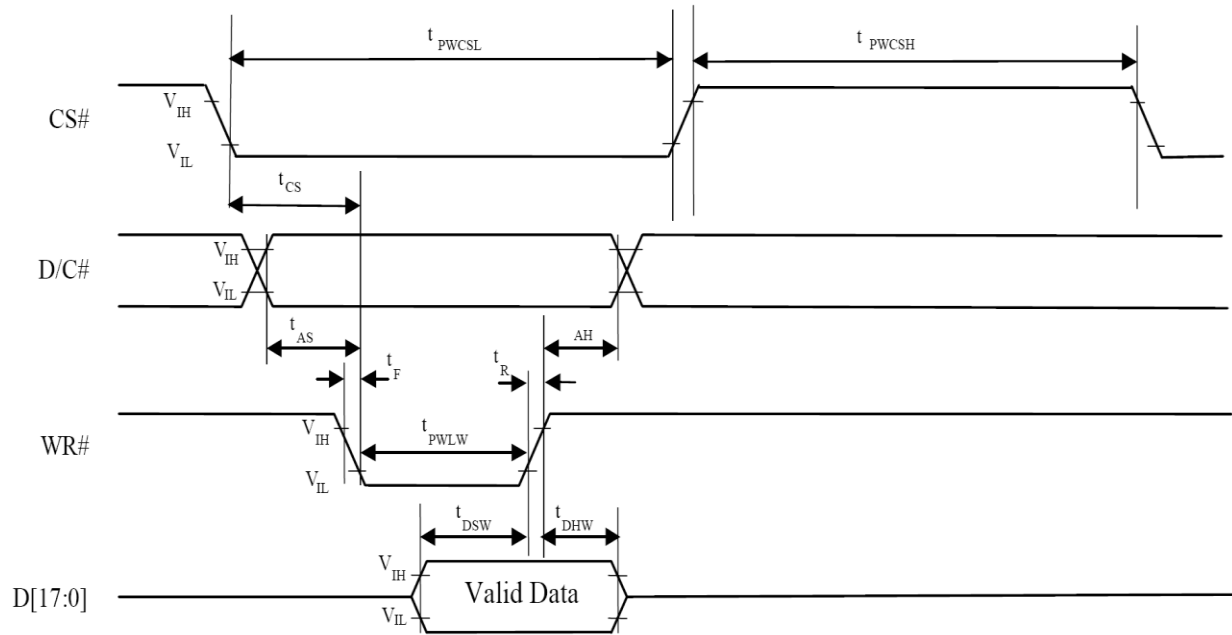
P-TEC

MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

13





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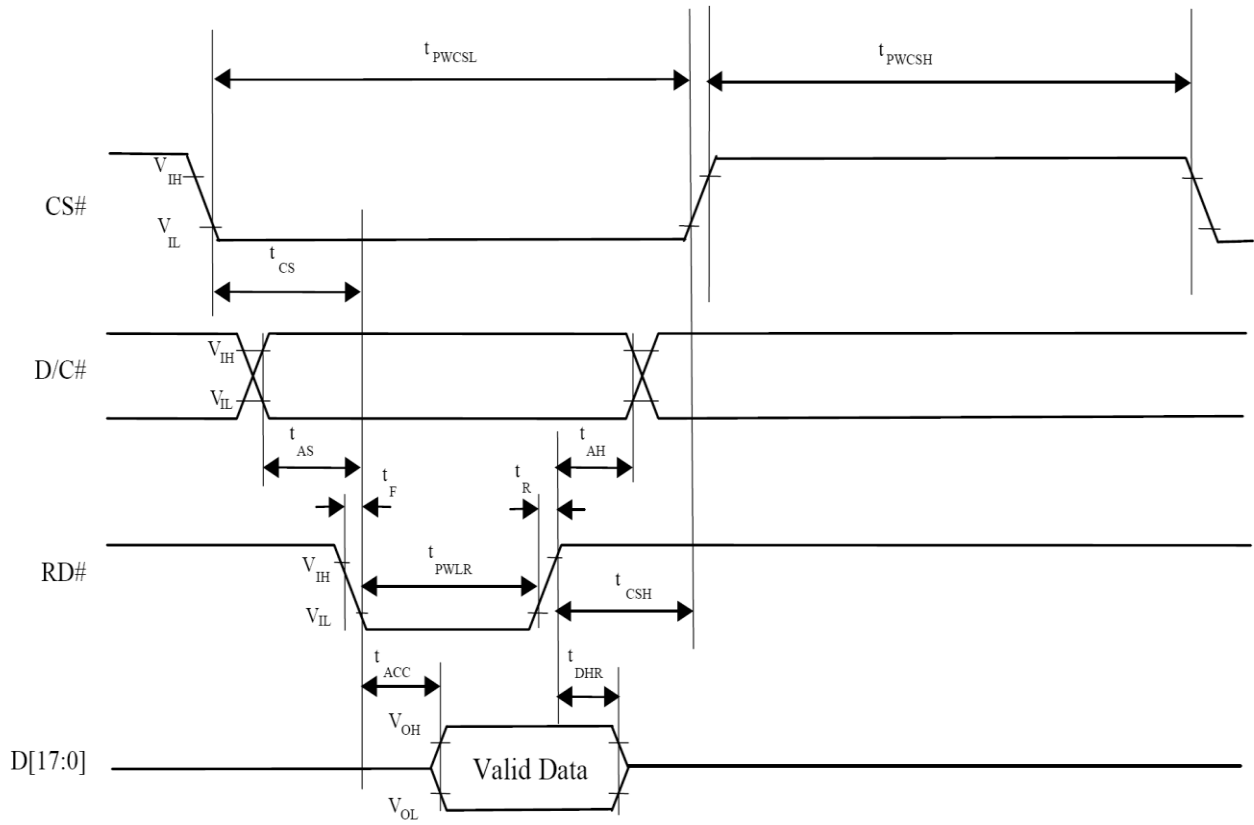
MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

14

Parallel 8080-series Interface Timing Diagram (Read Cycle)



**12. Optical Characteristics**

The optical characteristics should be measured in a dark environment (≤ 1 lux) or equivalent state with the methods shown in Note (5).

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	300	(450)	-	-	(2),(5)
Response Time		$T_{R+} T_F$		-	20	-	ms	(3)
Luminance (Center)		LC		500	(650)	-	cd/m ²	(4),(5)
Brightness uniformity		B _{UNI}		70	(75)	-	%	(5),(6)
Color Chromaticity	Red	R _x		0.570	0.620	0.670	-	(1),(5)
		R _y		0.290	0.340	0.390	-	
	Green	G _x		0.290	0.340	0.390	-	
		G _y		0.510	0.560	0.610	-	
	Blue	B _x		0.090	0.140	0.190	-	
		B _y		0.050	0.100	0.150	-	
	White	W _x		0.260	0.310	0.360	-	
		W _y		0.270	0.320	0.370	-	
Viewing Angle	Horizontal	θ_{x+}	CR \geq 10	55	(65)	-	deg.	
		θ_{x-}		55	(65)	-		
	Vertical	θ_{y+}		40	(50)	-		
		θ_{y-}		50	(60)	-		



P-TEC

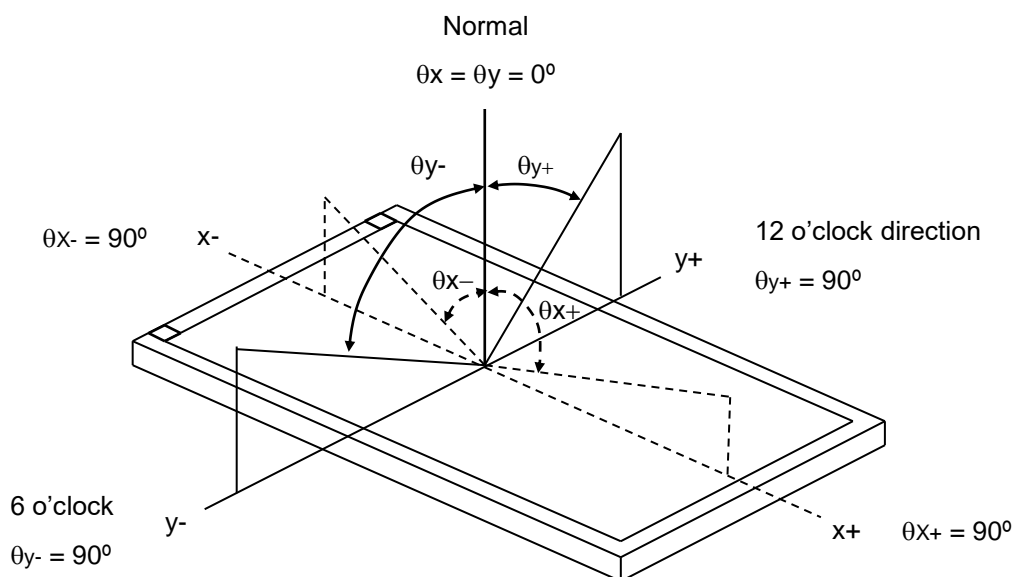
MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

16

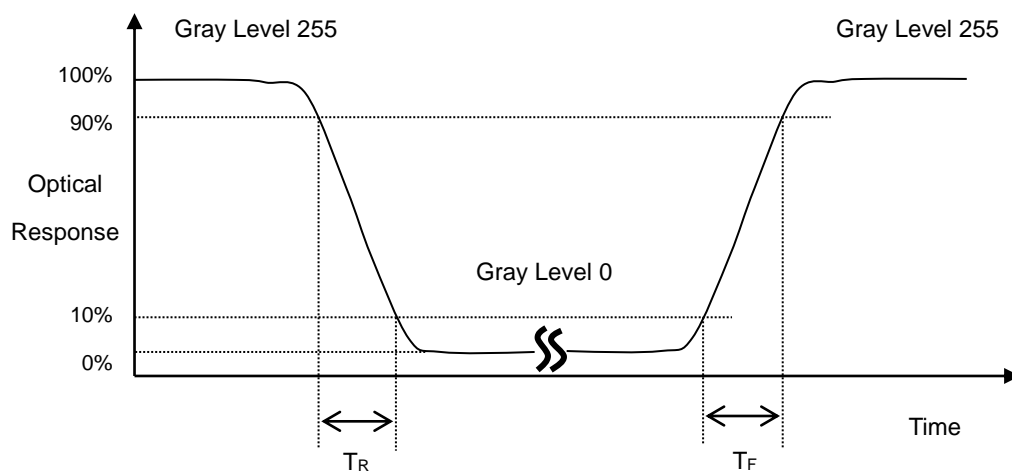
Note (1) Definition of Viewing Angle (θ_x , θ_y):



Note (2) Definition of Contrast Ratio (CR):

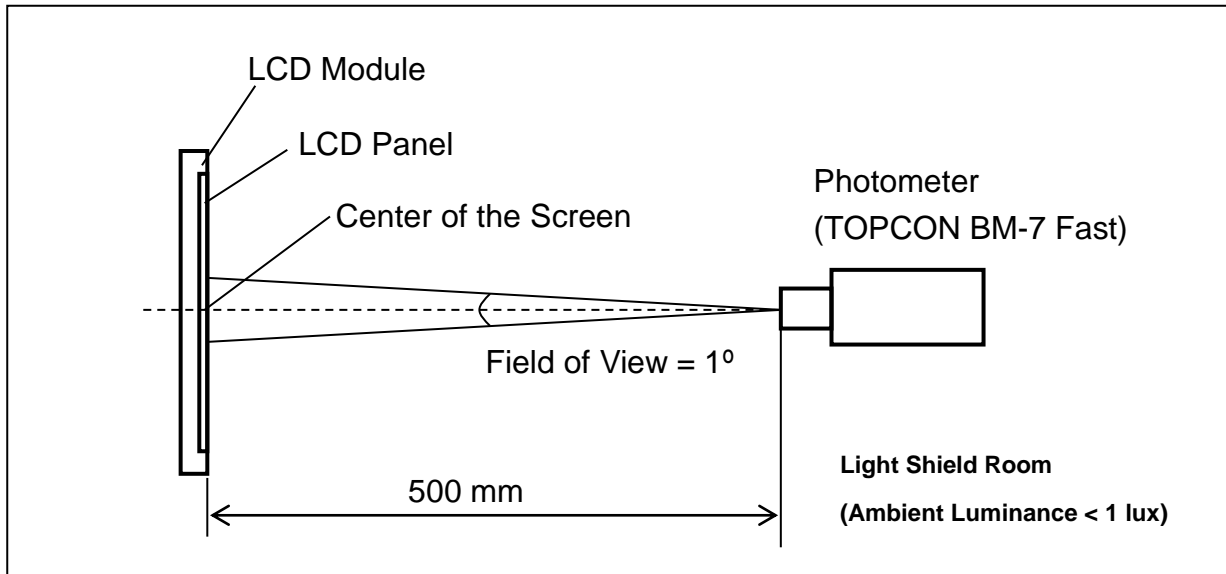
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note (3) Definition of Response Time (T_R , T_F):

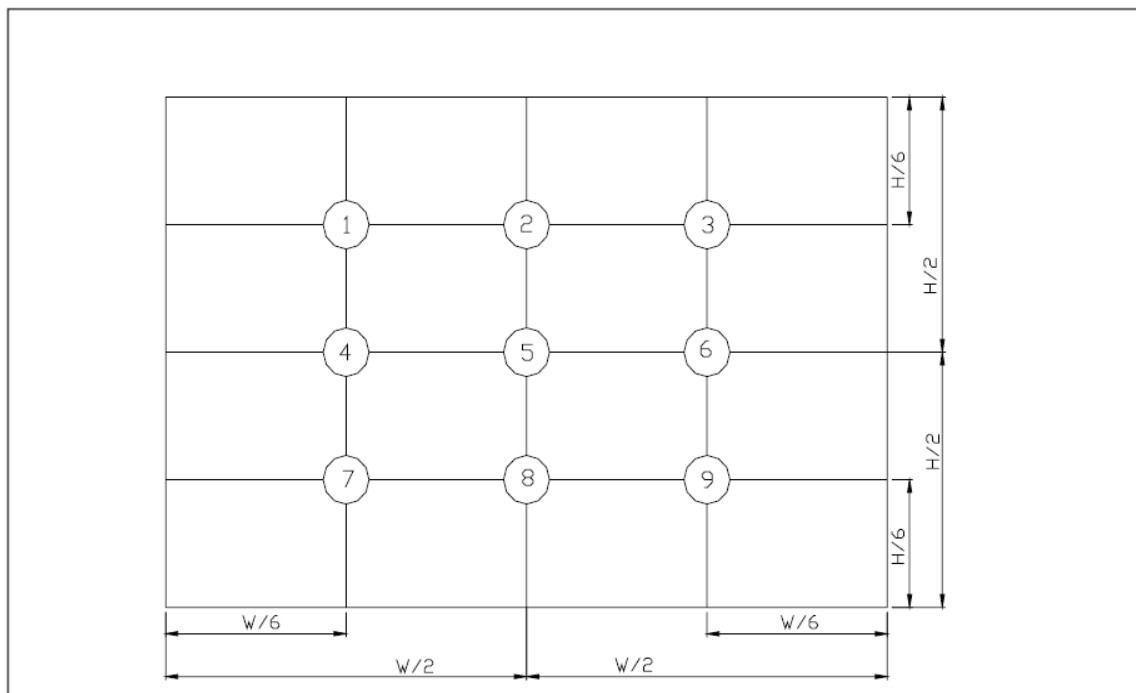


**Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a dark room or equivalent condition.

**Note (5) Definition of brightness uniformity**

Brightness uniformity = (Min Luminance of 9 points) / (Max Luminance of 9 points) × 100%



(單位 : mm)



13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T _a = 80°C 240 hours	(1),(3),(4)
2	Low Temperature Storage Test	T _a = -30°C 240 hours	(1),(3),(4)
3	High Temperature Operation Test	T _S = 70°C 240 hours	(2),(3),(4)
4	Low Temperature Operation Test	T _a = -20°C 240 hours	(1),(3),(4)
5	High Temperature and High Humidity Operation Test	T _a =60°C 90%RH 240 hours	(3),(4)
6	Electro Static Discharge Test (non-operating)	-Panel Surface/Top Case : 150pF, 330Ω Air: ±15kV, Contact: ±8kV	(3)
7	Mechanical Shock Test (non-operating)	Half sine wave, 100G, 6ms 3 times shock of each six surfaces	(3)
8	Vibration Test (non-operating)	Sine wave, 10 ~ 55 ~ 10Hz, 3 axis, 2 hours/axis	(3)
9	Thermal Shock Test (non-operating)	-20°C(30min) ~ 70°C(30min),100 cycles	(3),(4)
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	(3)

Note 1: T_a is the ambient temperature of samples.

Note 2: T_s is the temperature of panel's surface.

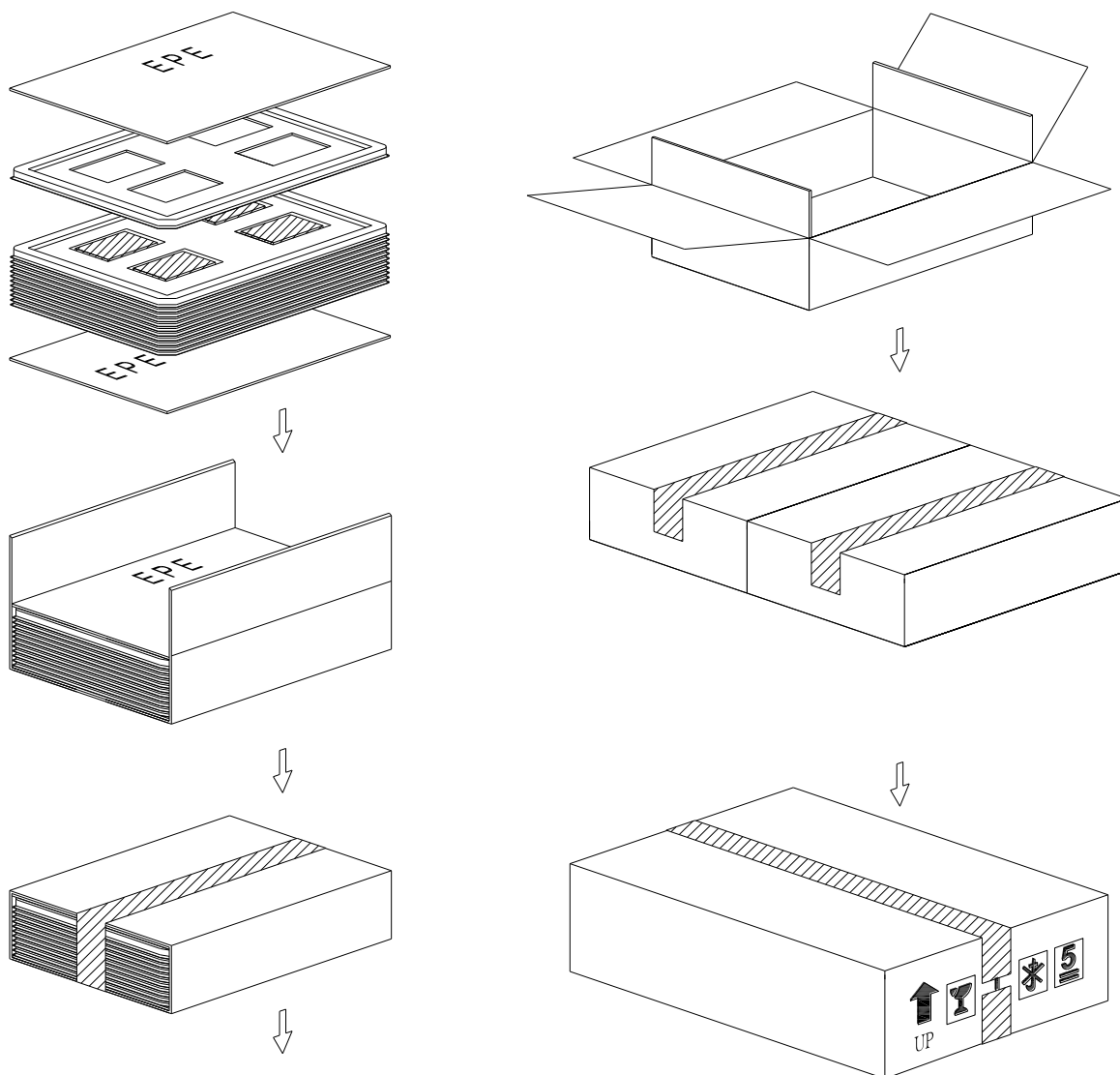
Note 3: In the standard condition, there shall be no practical problem that may affect the display function.

After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.



14. Packaging



	PARTS LIST				
	ITEM	SIZE (LxW xH) unitmm	M A T E R I A L	Q T Y	NOTE
1	TRAY	372.0x262.0x18.3	PS	20	
2	CARD BOARD (P1)	945.0x275.0x3.5	CARTON	2	
3	CARD BOARD (P2)	816.0x375.0x3.5	CARTON	2	
4	CARD BOARD (P3)	375.0x265.0x3.5	CARTON	4	
5	INTERNAL BOX (B2)	400.0x290.0x150.0	CARTON	2	
6	EXTERNAL BOX (B1)	600.0x420.0x170.0	CARTON	1	
7	PRODUCT	105.5x67.2x8		72	



15. Precautions

15.1 Assembly and Handling Precautions


- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) It's recommended to assemble or to install a module into the user's system in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) Don't apply pressure or impulse to the module to prevent the damage of LCD panel and Backlight.
- (4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.
- (5) Do not plug in or pull out the I/F connector while the module is in operation.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) Moisture can easily penetrate into LCD module and may cause the damage during operation.
- (9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD module in the specified storage conditions.
- (10) When ambient temperature is lower than 10°C, the display quality might be reduced. For example, the response time will become slow.

15.2 Safety Precautions

- (1) 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.
- (2) After the module's end of life, it is not harmful in case of normal operation and storage.

15.3 Terms of Warrant

- (1) Acceptance inspection period
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period
The period is within twelve months since the date of shipping out under normal using and storage conditions.

 P-TEC	MODEL NO.		PAGE
	PT482743A-TLMWD-EH13	SPEC & SAMPLE	21

15.4 Caution

This P-tec LCD module has been specifically designed for use only in electronic devices in the areas of audio control, office automation, industrial control, home appliances, etc. The modules should not be used in applications where module failure could result in physical harm or loss of life, and P-tec expressly disclaims any and all liability relating in any way to the use of the module in such applications.



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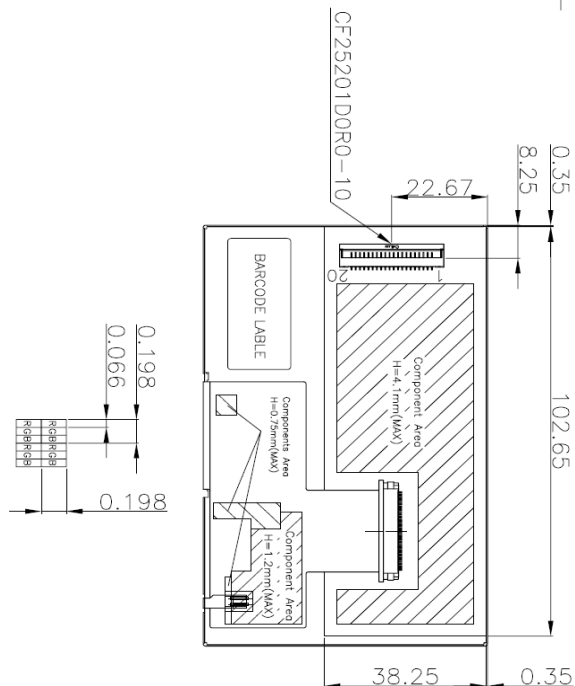
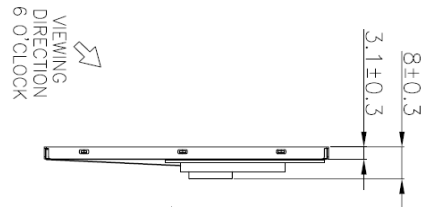
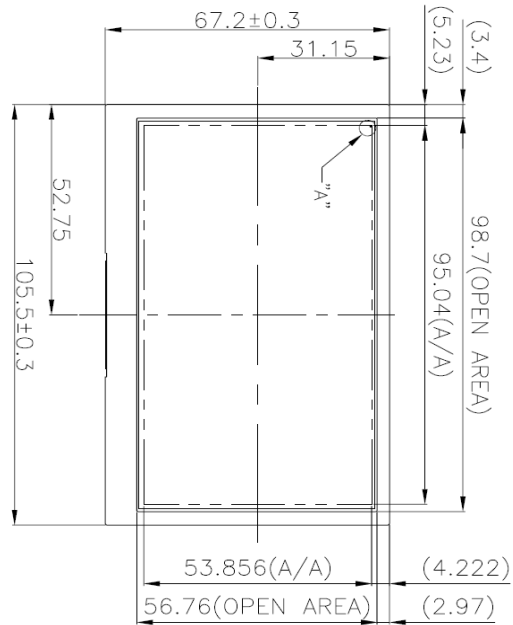
MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

22

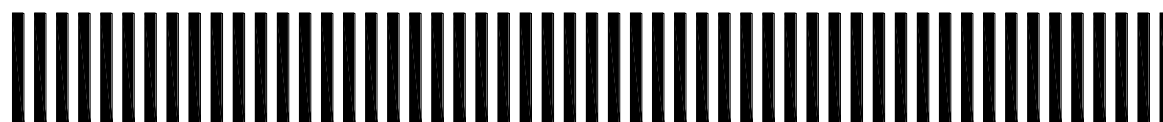
16.Outline Drawing



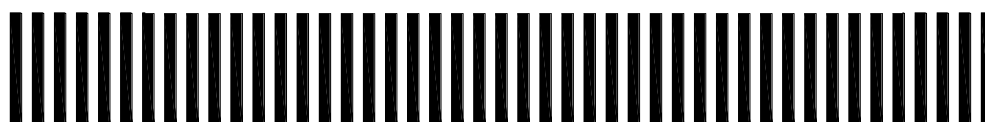
Detail "A"
Scale: 30X

**17. Definition of Labels**

The bar code nameplate is pasted on each module as illustration, and its definitions are as following explanation.



PT482743A-TLMWD-EH13

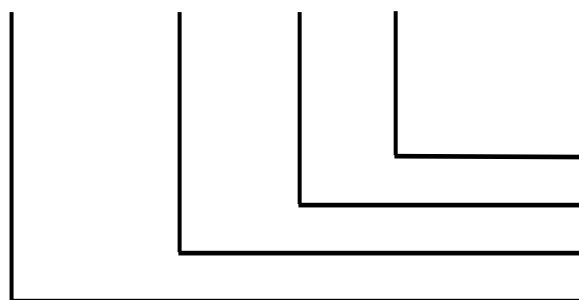


ABCDEFGHIJKL

(a) Module Name : PT482743A-TLMWD-EH13

(b) Serial ID :

A B C D E F G H I J K L



Serial No.
Factory Code
Manufactured Date
Screen Size

Serial ID includes the information as below :

(a) Screen size (Diagonal) : Inch Code (ABCD)

3.5" → 0350

10.4" → 1040

(b) Manufactured Date : Year, Month, Day (EFG)

Year (E)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mark	0	1	2	3	4	5	6	7	8	9
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Mark	A	B	C	D	E	F	G	H	I	J

**P-TEC****MODEL NO.**

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

24

Month (F)

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

Day (G)

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mark	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Mark	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	

(c) Factory Code (H) :

For P-TEC internal use.

(d) Serial No. (IJKL) :

Manufacturing sequence of product, for example: 0001~9999.

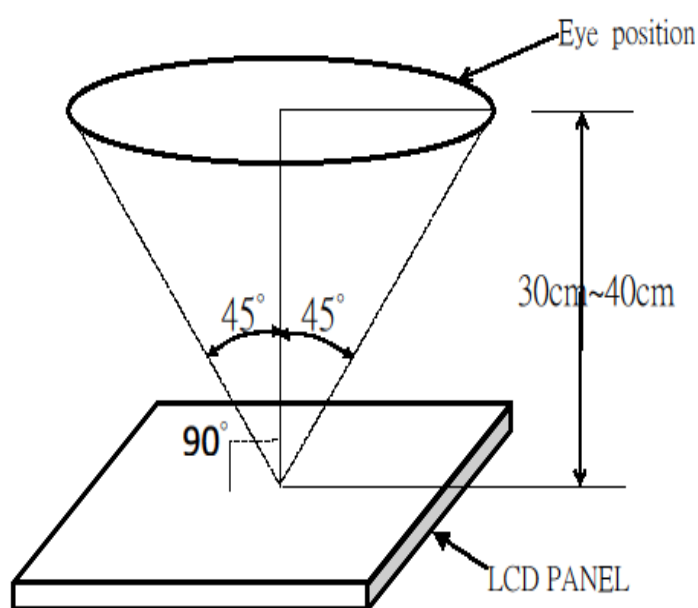


18. Incoming Inspection Standards

18.1 The environmental condition of inspection

The environmental condition and visual inspection shall be conducted as below.

- (1) Ambient temperature $25 \pm 5^{\circ}\text{C}$
- (2) Humidity: 45 ~ 65 % RH
- (3) Viewing distance is approximately 30 ~ 40 cm
- (4) Viewing angle is normal to the LCD panel as Fig _1 ($\pm 45^{\circ}$)
- (5) Ambient Illumination: 300 ~ 500 Lux for external appearance inspection



Fig_1

18.2 The defects classify of AQL as following:

- (1) Test method :According to [ANSI/ASQC Z 1.4](#) .General Inspection Level II take a single time
- (2) The defects classify of AQL as following:

Class of defects	AQL	Definition
Major	0.65%	It is defect that is likely to result in failure or to reduce materially the usability of the intended function.
Minor	1.5%	It is a defect that will not result in functioning problem with deviation classified.



P-TEC

MODEL NO.

PT482743A-TLMWD-EH13

SPEC & SAMPLE

PAGE

26

18.3 Inspection Parameters

Item		Specification/Description				Note	
Display	Function	No Display				-	
		Malfunction				-	
Operating	Contrast ratio	Out of Spec				-	
	Line defect	No obvious Vertical and Horizontal line defect in bright , dark and colored.				-	
	Point Defect (red ,green ,blue ,dark ,white)	Item	Acceptable number			Note: 1 、 4 、 5 、 6	
			A	B	Total		
		BRIGHT DOT		N≤2	N≤2		N≤7
		DARK DOT		N≤3	N≤4		
		TOTAL DOT		N≤4	N≤5		
		TWO ADJACENT DOT		NOT ALLOWED			
	THREE OR MORE ADJACENT DOT		NOT ALLOWED				
External Inspection (non-operating or operating)	Scratch (in display area)	L(mm)	W(mm)	Acceptable number		Note:2	
		L≤2.5	W≤0.1	4			
		L>2.5	W>0.1	0			
	Polarizer dent or bubble (in display area)	Dimension(mm)		Acceptable number		Note:3	
		D≤0.25		Disregard			
		D≤0.5		4			
	Line Shape (Particles and Lint in display area)	L(mm)	W(mm)	Acceptable number		Note:2	
		-	W≤0.07	Disregard			
		L≤5	W≤0.1	4			
		L≥5	W≥0.1	0			
	Dot Shape (Particle in Display area)	Dimension(mm)		Acceptable number		Note:3	
		D≤0.25		Disregard			
		D≤0.5		4			





P-TEC

MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

27

Item		Specification/Description	Note
External Inspection (non-operating or operating)	mura	Has the non-uniform phenomenon 	
		Weak defect will be defined as mura if it can be observed through ND filter 6% 	



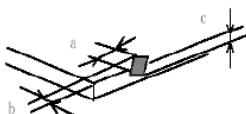
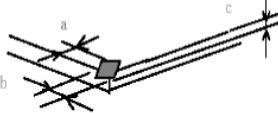
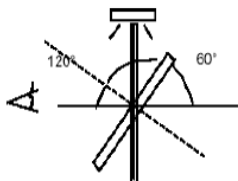

P-TEC

MODEL NO.

PT482743A-TLMWD-EH13 SPEC & SAMPLE

PAGE

28

Item		Specification/Description			Note
Touch Panel	Scratch	L(mm)	W(mm)	Acceptable number	Note:2
		$L \leq 10$	$W < 0.05$	Disregard	
			$0.05 \leq W < 0.1$	$N \leq 4$	
			$W \geq 0.1$	0	
	Foreign Materials (Linear shape)	$L \leq 10$	$W < 0.05$	Disregard	Note:2
			$0.05 \leq W < 0.1$	$N \leq 3$	
			$W \geq 0.1$	0	
	Foreign Materials (Circular shape)	Dimension(mm)		Acceptable number	Note:3
		$D \leq 0.25$		Disregard	
		$0.25 < D \leq 0.5$		$N \leq 6$	
		$D > 0.5$		0	
	Glass chipping			$a \leq 5\text{mm}$ $b \leq 3\text{mm}$ $c \leq t$ (t : Glass think)	Note:7
				$a \leq 3\text{mm}$ $b \leq 3\text{mm}$ $c \leq t$ (t : Glass think)	Note:7
	Newton-ring	(In case of doubtful situations) Observe on 60° from the product surface under a white Fluorescent lamp(3-wavelength lamp). 		Average diameter $\leq 1/3$ Touch Panel area Disregard.	Note:7
	Membrane Drum			$H \leq 0.35\text{mm}$	

Note1. The definition of dot defect : The dot defect was judged after repair and the size of a defective dot over 1/2 of whole dot is regarded as one defective dot.



P-TEC

MODEL NO.

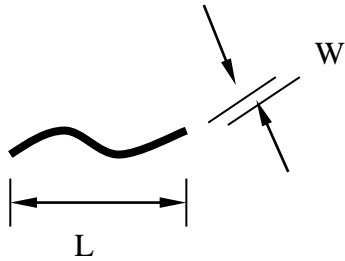
PT482743A-TLMWD-EH13

SPEC & SAMPLE

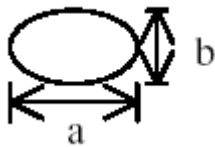
PAGE

29

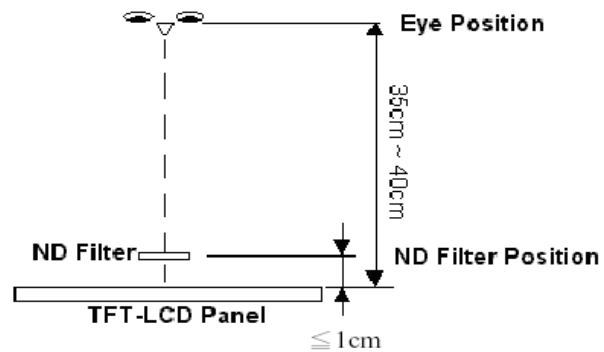
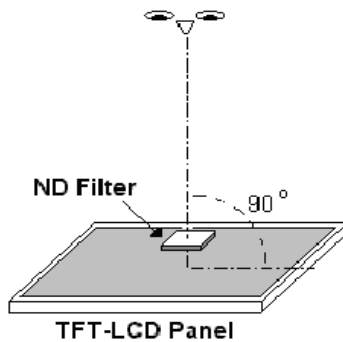
Note2.



Note3. D : Diameter $D=(a+b)/2$



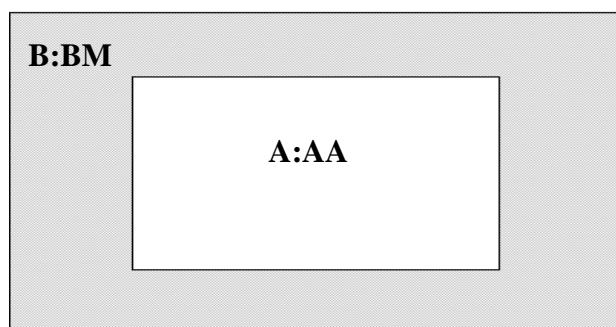
Note4. Bright dot is defined through 6% transmission ND Filter as following.



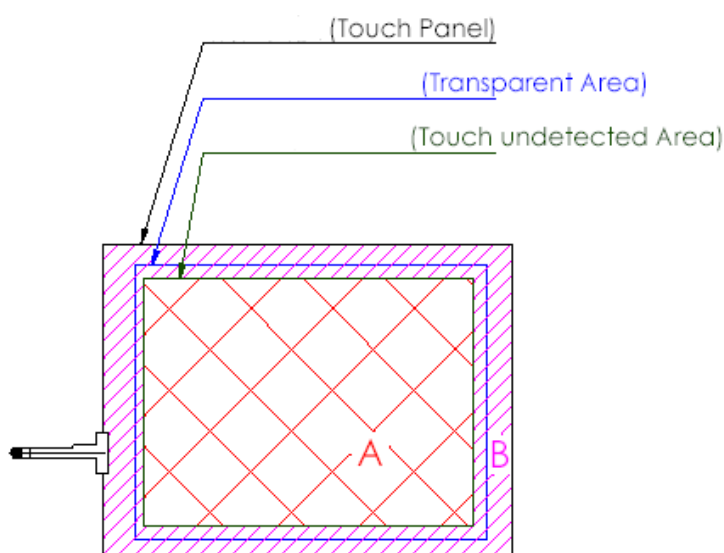
Note5. ADJACENT DOT



Note6.



Note7.



A area : Without any defect point effect on normal operation.

B area : None-specify

18.4 Handling of LCM

- (1) Don't give external shock.
- (2) Don't apply excessive force on the surface.
- (3) Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- (4) Don't operate it above the absolute maximum rating.
- (5) Don't disassemble the LCM.