Version :0.1

TECHNICAL SPECIFICATION

MODEL NO. : PD035VX9

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Please contact EIH or its agent for further information.

☐Customer's Confirmation

Customer _____

Date _____

By _____

☐PVI's Confirmation

Dep	FAE	Panel Design	Electronic Design	Mechanical Design	Product Verification	Prepared by
SIGN						

Revision History

Rev.	Issued Date	Revised Contents
0.1	Dec.13 ,2010	New

TECHNICAL SPECIFICATION
CONTENTS

1.Application

This data sheet applies to a color TFT LCD module, PD035VX9. The module applies to OA product, GPS, which require high quality flat panel display. If you must use in high reliability environment can't over reliability test condition.

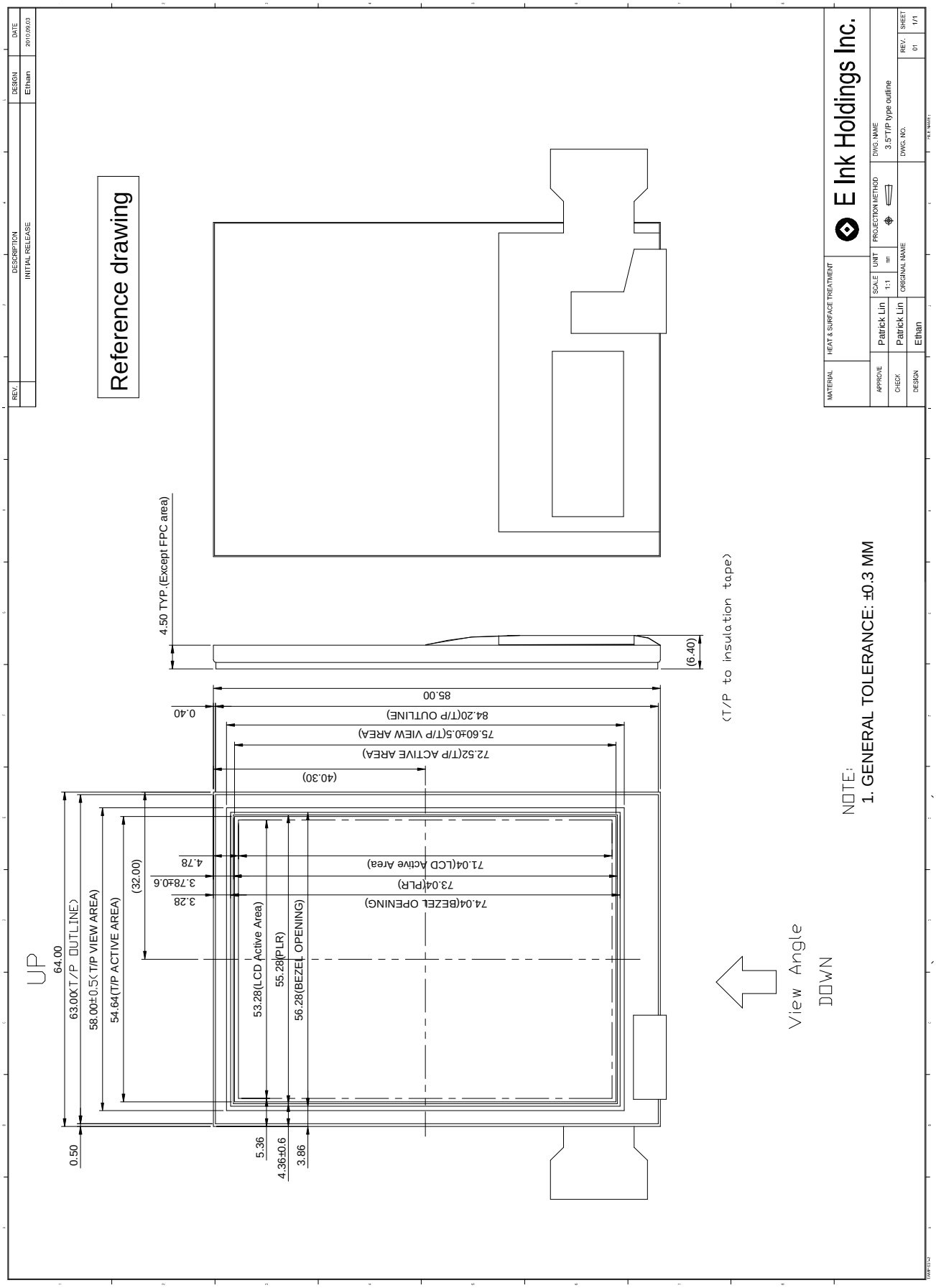
2. Features

. Amorphous silicon TFT LCD panel with LED back-light unit
. Pixel in stripe configuration
. Display Colors：262,144 colors
. Optimum Viewing Direction：6 o'clock
. Module with resistive type touch panel.

3.Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	3.5 (diagonal)	inch
Display Format	480×(R, G, B)×640	dot
Display Colors	262,144	
Active Area	53.28 (H)×71.04 (V)	mm
Pixel Pitch	0.111 (H)×0.111 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	64 (H)×85 (V)×4.5 (D) 64 (H)×85 (V)×6.4 (D) (Components side)	mm
Back-light	9-LEDs	
Weight	TBD	g
Surface treatment	Anti-Glare	
Surface treatment of Touch Panel	3H	
Display mode	Normally white	
Gray scale inversion direction	6 o'clock [ref to Note 13-2]	

4. Mechanical Drawing of TFT-LCD Module



5.Input / Output Terminals

TBD

6.Absolute Maximum Ratings:

VSS=0V, Ta=25℃

Item	Symbol	Unit	Value	Note
Supply voltage	VCI	V	-0.3~+5.0	
Supply voltage (Logic)	IOVCC,VCC	V	-0.3~+4.6	
Supply voltage (Digital)	VCORE	V	-0.3~+2.4	
Driver supply voltage	VGH-VGL	V	-0.3~+33.0	
Logic input voltage range	VIN	V	-0.3~IOVCC+0.3	
Logic output voltage range	VOUT	V	-0.3~IOVCC+0.3	
Operating temperature	Topr	℃	-40~+85	
Storage temperature	Tstg	℃	-55~+110	

7. Electrical Characteristics

7-1) Operation Condition

TBD

7-2) Backlight driving

TBD

8. Pixel Arrangement

TBD

9. Display Color and Gray Scale Reference

Color		Input Color Data																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	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
	Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
Red	Red (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (01)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (02)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Red (61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (01)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green (02)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Green (61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green (62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Blue (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (02)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue (62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

10. Block Diagram

TBD

11. Interface Timing

TBD

12. Power On Sequence

TBD

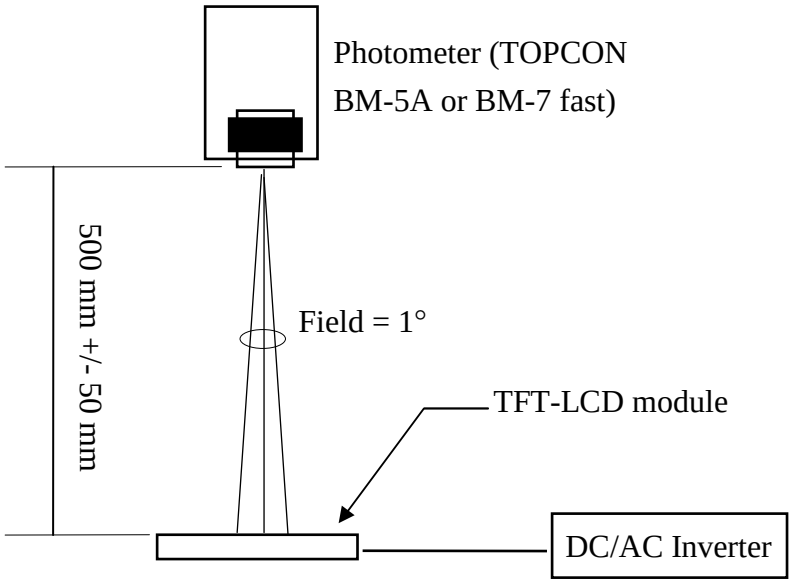
13. Optical Characteristics

13-1) Specification:

Ta=25℃

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ22、θ21	CR＞10	(70)	(75)	-	deg	Note 13-1
	Vertical	θ12		(45)	(50)	-	deg	
		θ11		(55)	(60)	-	deg	
Contrast Ratio		CR	At optimized viewing angle	(600)	(700)	-	-	Note 13-2
Response time	Rise	Tr	θ=0°	-	15	30	ms	Note 13-3
	Fall	Tf		-	10	20	ms	
Brightness		L	θ=0°/φ=0	--	400	-	cd/㎡	
Luminance Uniformity		U	-	(75)	(80)	-	%	Note 13-4
White Chromaticity		x	-	TBD	TBD	TBD	-	
		y	-	TBD	TBD	TBD	-	
Cross Talk		-	θ=0°	-	-	3.5	%	Note 13-5
LED life time		-	+25℃	TBD	TBD	-	Hr	

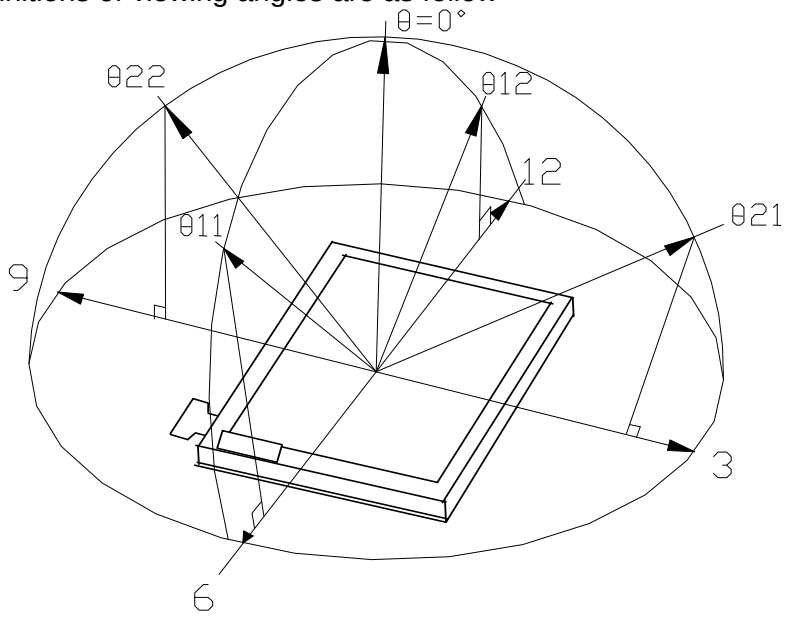
All optical measurements shall be performed after backlight being turned-on for 30 mins. The optical characteristics shall be measured in dark room (ambient illumination on panel surface less than 1 Lux). The measuring configuration shows as following figure.



Optical characteristics measuring configuration

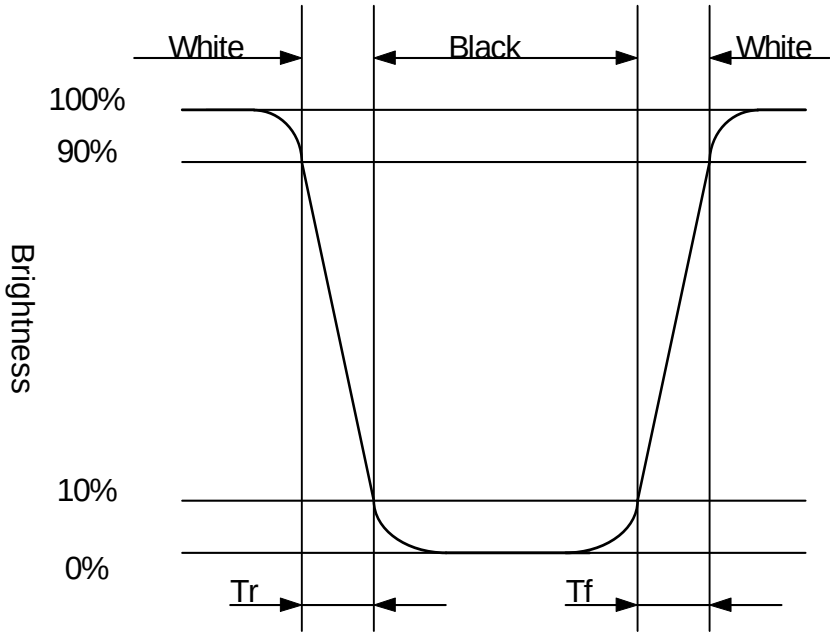
Topcon BM-5A or BM-7 fast luminance meter 1° field of view is used in the testing.

Note 13-1: The definitions of viewing angles are as follow



Note 13-2: The definition of contrast ratio $CR = \frac{\text{Luminance at gray level 63}}{\text{Luminance at gray level 0}}$

Note 13-3: Definition of Response Time T_r and T_f:



Note 13-4: The uniformity of LCD is defined as

$$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$$

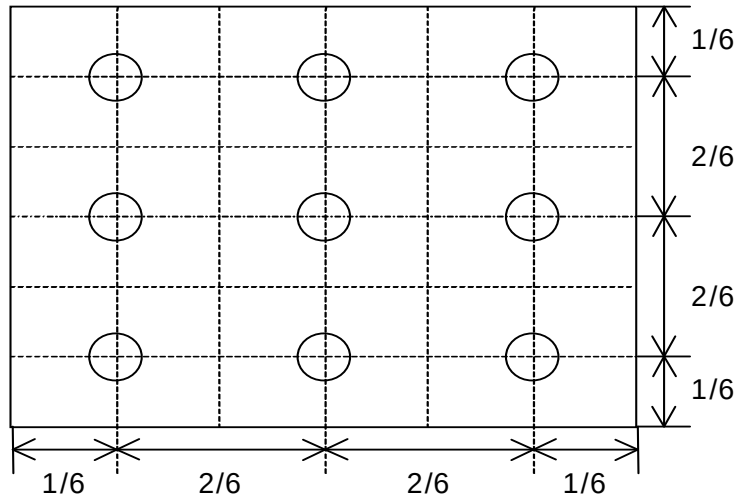
Luminance meter: BM-5A or BM-7 fast (TOPCON)

Measurement distance: 500 mm +/- 50 mm

Ambient illumination: < 1 Lux

Measuring direction: Perpendicular to the surface of module

The test pattern is white (Gray Level 63).



Note 13-5: Cross Talk (CTK) = $\frac{|YA-YB|}{YA} \times 100\%$

YA: Brightness of Pattern A

YB: Brightness of Pattern B

Luminance meter: BM-5A or BM-7 fast (TOPCON)

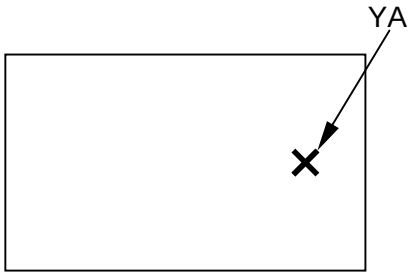
Measurement distance: 500 mm +/- 50 mm

Ambient illumination: < 1 Lux

Measuring direction: Perpendicular to the surface of module

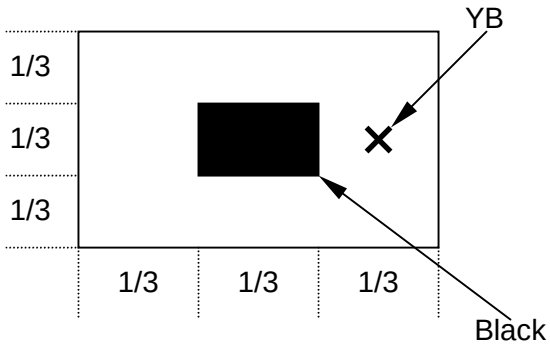
Pattern A

(Gray Level 31)



Pattern B

(Gray Level 31, except the black box in the center)



✕: Measuring Point (A and B are at the same point.)

(Gray Level 0)

14. Handling Cautions

14-1) Mounting of module

a) Please power off the module when you connect the input/output connector.
b) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
c) Protective film (Laminator) is applied on surface to protect it against scratches and dirt. It is recommended to peel off the laminator before use and taking care of static electricity.
d) Please following the tear off direction as figure 14-1 to remove the protective film as slowly as possible, so that electrostatic charge can be minimized.

14-2) Precautions in mounting

a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth.
b) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.
c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.
d) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.

14-3) Adjusting module

a) Adjusting volumes on the rear face of the module have been set optimally before shipment.
b) Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described may not be satisfied.

14-4) Others

a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.
b) Store the module at a room temperature place.
c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.
d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel. Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet. Wash it out immediately with soap.
e) Observe all other precautionary requirements in handling general electronic components.
f) Please adjust the voltage of common electrode as material of attachment by 1 module.

14-5) Polarizer mark

The polarizer mark is to describe the direction of wide view angle film how to match up with the rubbing direction.

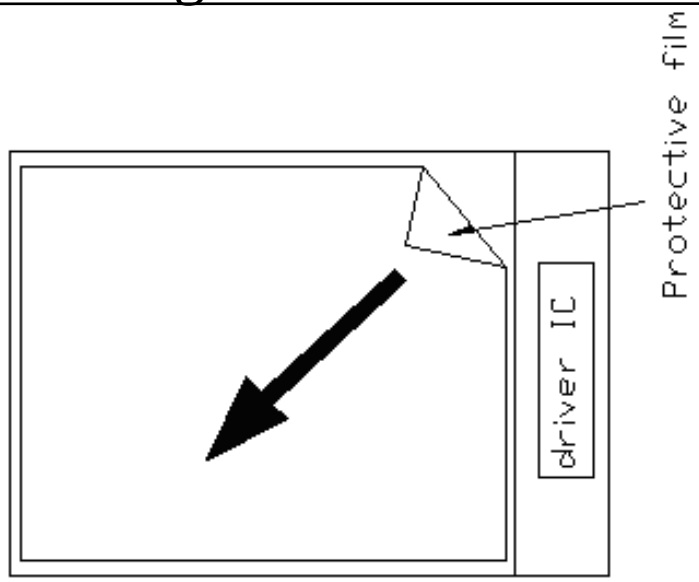


Figure 14-1 the way to peel off protective film

15. Reliability Test

No	Test Item	Test Condition
1	High Temperature Storage Test	Ta = +80℃, 240 hrs
2	Low Temperature Storage Test	Ta = -30℃, 240 hrs
3	High Temperature Operation Test	Ta = +70℃, 240 hrs
4	Low Temperature Operation Test	Ta = -20℃, 240 hrs
5	High Temperature & High Humidity Operation Test	Ta = +60℃, 90%RH, 240 hrs (No Condensation)
6	Thermal Cycling Test (non-operating)	-30℃→ +80℃, 100 Cycles 30min 30min
7	Vibration Test (non-operating)	Frequency：10 ~ 55 H_Z Amplitude：1 mm Sweep time: 11 mins Test Period: 6 Cycles for each direction of X, Y, Z
8	Shock Test (non-operating)	100G, 6ms Direction: ±X, ±Y, ±Z Cycle: 3 times
9	Electrostatic Discharge Test (non-operating)	200pF , 0Ω ±200V 1 time / each terminal

[Criteria]

1. In the standard conditions, there is not display function NG issue occurred. (including :line defect ,no image) All the cosmetic specification is judged before the reliability stress

16. Packing Diagram

TBD

