Project No. 项目编号	TXW350049C0
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	**Standard LCD Module** **TFT：640*RGBx480Dots** **3.5”TFT LCD**

客户确认Customer Approval	
项目负责人Project Manager	
品质主管Director of Quality	
采购工程师Purchasing Engineer	

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1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by Tian Xian Wei Technology CO., LTD.
LCD specification: Dots 640xRGBx480.
As to basic specification of the driver IC, refer to the IC (NV3052C) specification and data book.
All material & processing of the LCD module should be Lead Free.

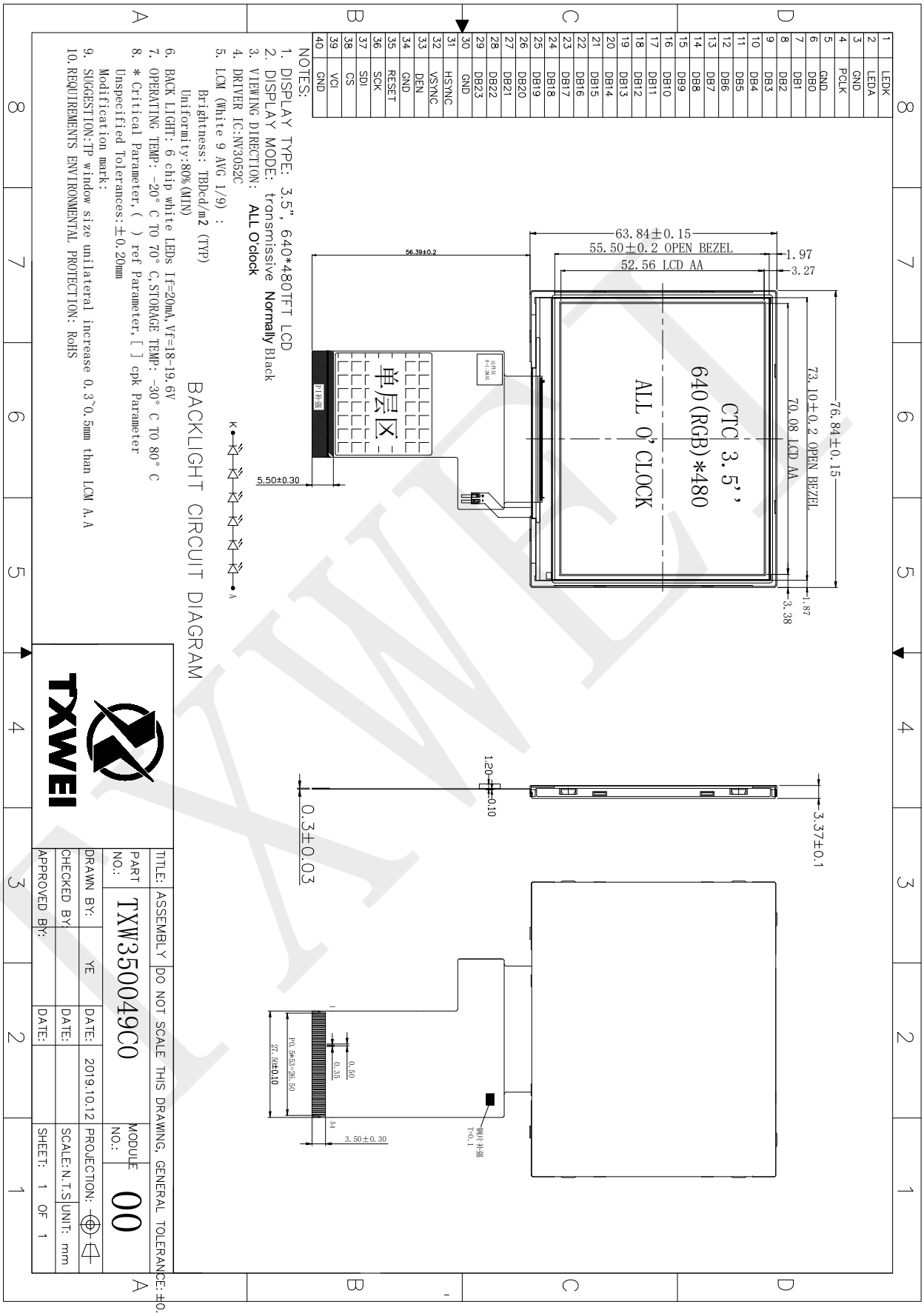
1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;
IPS Type LCD
640dot-segment and 480 dot-common outputs;
16.7M Color can be selected by software;
White LED back light;
24 bit RGB interface

1.3 Applications:

2. LCM General specification

ITEM	Sandard value	Unit
LCD Type	Normally black	--
Drive element	TFT active matrix	--
Number of pixels	640*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.1095(W) × 0. 1095 (H)	mm
Active area	70.08(W) × 52.56(H)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	NV3052C	
TFT interface	24 bit RGB Interface	-
Module Size(W*H*T)	76.84(W) ×63.84(H) ×3.37(D)	mm
Approx. Weight	TBD	g
Touch structure		
Touch Driver IC		-
Touch Interface		


NOTES:
1. DISPLAY TYPE: 3.5", 640*480TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL O'clock
4. DRIVER IC:NV3052C
5. LCM (White 9 AVG 1/9) :
Brightness: TBDcd/m2 (TYP)
Uniformity:80%(MIN)
6. BACK LIGHT: 6 chip white LEDs If=20mA,Vf=18-19.6V
7. OPERATING TEMP: -20° C TO 70° C,STORAGE TEMP: -30° C TO 80° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
Unspecified Tolerances:±0.20mm
Modification mark:
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS
BACKLIGHT CIRCUIT DIAGRAM
CTC 3.5''
640(RGB)*480
ALL O'CLOCK
单层区
63.84±0.15
55.50±0.2 OPEN BEZEL
52.56 LCD AA
73.10±0.2 OPEN BEZEL
70.08 LCD AA
76.84±0.15
56.39±0.2
5.50±0.30
1.97
3.27
1.87
3.38
1.20±0.10
3.37±0.1
0.3±0.03
3.50±0.30
TITLE: ASSEMBLY
DO NOT SCALE THIS DRAWING, GENERAL TOLERANCE: ±0.2
PART NO.: TXW350049C0
MODULE NO.: 00
DRAWN BY: YE
DATE: 2019.10.12
PROJECTION:
CHECKED BY:
DATE:
SCALE:N.T.S
UNIT: mm
APPROVED BY:
DATE:
SHEET: 1 OF 1

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T_{OPR}	-20	+70	°C
LCM Storage Temperature	T_{STG}	-30	+80	°C
TP Operating Temperature & Humidity(20% ~ 90%RH)	T_{OPR}			°C
TP SStorage Temperature & Humidity(20% ~ 90%RH)	T_{STG}			°C
Humidity	RH	-	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO				V
Supply Voltage for(DC/DC)	VDD	2.5	2.8	3.6	V
Supply Voltage for(DC/DC)	AVDD				V
Supply Voltage for(DC/DC)	AVEE				V
Current Consumption	I_{DD}	-	TBD	-	mA
	$I_{DD-SLEEP}$		TBD		uA

4.2 Back-Light Unit Characeristics

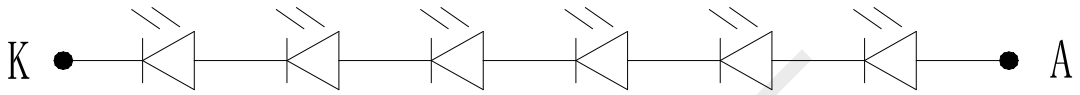
The back-light system is an edge-lighting type with 8 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	18	--	19.6	V	-
Forward current	I_F	--	20	-	mA	-
Luminance(With LCD)	Lv		400	--	cd/m^2	-
LED life time	N/A	----	30,000	--	Hr	Note 1

Note:

(1) The "LED life time" is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:

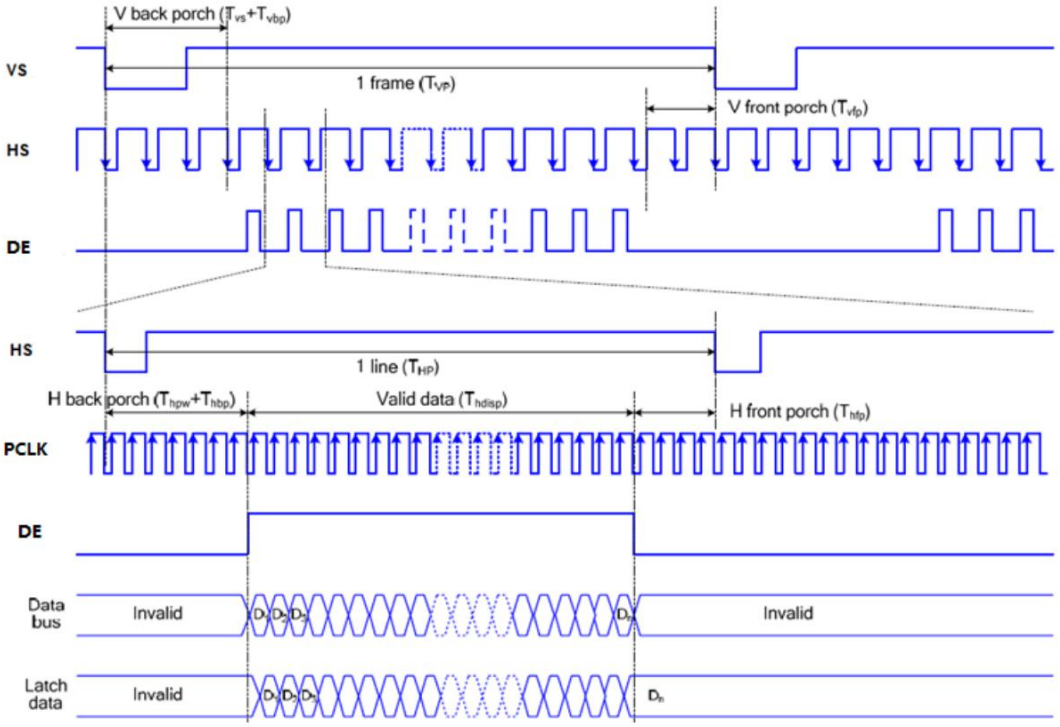


5. Module Function Description

Pin No.	Symbol	Description
1-2	LEDK	POWER SUPPLY- FOR BACKLIGHT CATHODE
3-4	LEDA	POWER SUPPLY+ FOR BACKLIGHT ANODE
5-7	NC	NC
8	RESET	RESET
9	SEKB	3-WIRE COMMUNICATION ENABLE.
10	SPCK	3-WIRE COMMUNICATION CLOCK INPUT. RISING EDGE LATCH.
11	SPDA	3-WIRE COMMUNICATION DATA INPUT/OUTPUT.
12-35	DB0-DB23	24-BIT MODE: DB[0:7]=B[0:7] ; DB[8:15]=G[0:7] ; DB [16:23]=R[0:7] DATA.
36	HSYNC	Horizontal sync. Signal in RGB I/F
37	VSYNC	Vertical sync. Signal in RGB I/F
38	DCLK	Pixel clock signal in RGB I/F
39-40	NC	NC
41-42	VDD	POWER SUPPLY
43-47	NC	NC
48	XR	XR
48	YD	YD
50	XL	XL
51	YU	YU
52	DE	Data enable signal in RGB I/F mode 1
53	GND	GND
54	GND	GND

6. Timing Characteristics

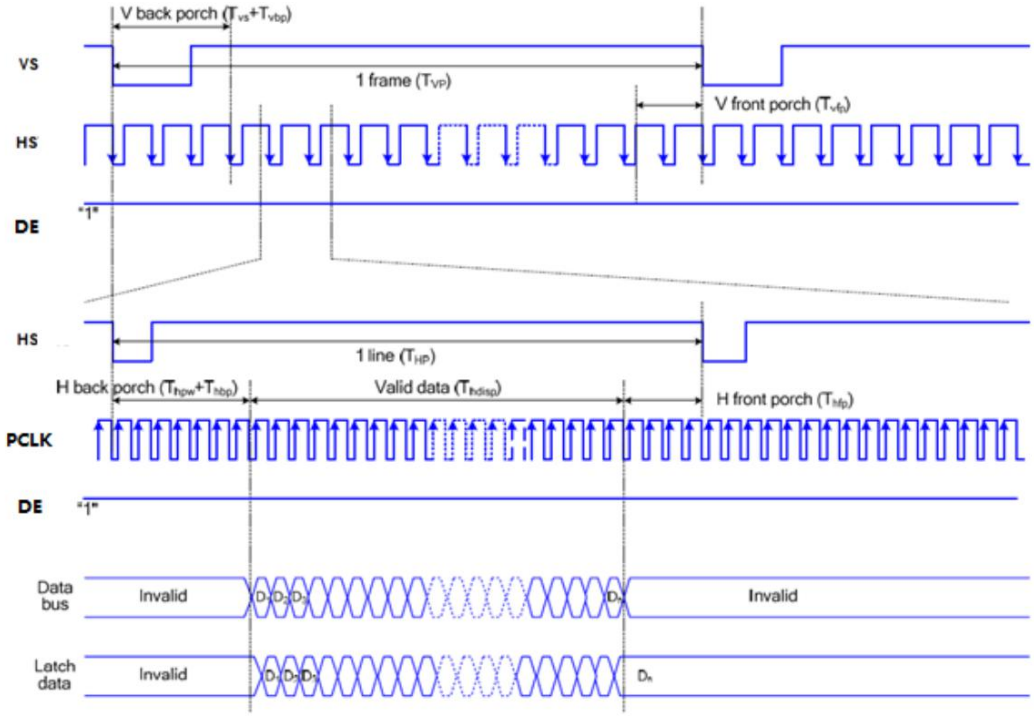
The timing chart of RGB interface DE mode is shown as follows.



Timing Chart of Signals in RGB Interface DE Mode

Note: The setting of front porch and back porch in host must match that in IC as this mode.

The timing chart of RGB interface SYNC mode is shown as follows.



Timing chart of RGB interface SYNC mode

Below Table provide the timing parameter by external Vertical-cycle

(Resolution for 720/640 horizontal x 1280 vertical display with Frame-Rate of 60Hz)

Parameters	Symbols	Min.	Typ	Max.	Unit
Horizontal Synchronization	hpw	-	2	-	PCLK
Horizontal Back Porch	hbp	-	42	-	PCLK
Horizontal Front Porch	hfp	-	44	-	PCLK
Hsync+ HBP+ HFP	-	-	88*Note1	-	PCLK
Horizontal Address (Display area)	hdisp	-	720	-	PCLK
Horizontal cycle	-	-	12.703	-	us
Vertical Synchronization	VS	-	2	-	Line
Vertical Back Porch	vbp	-	14	-	Line
Vertical Front Porch	vfp	-	16	-	Line
Vsync+ VBP+ VFP	-	-	32	-	Line
Vertical Address (Display area)	vdisp	-	1280	-	Line
Vertical cycle	-	-	16.66	16.181	ms
Frame-Rate	-	-	60	61.8	Hz

"-" means no limit.

Note : 1. If using Image Process Algorithm, Type value for H-blanking is minimum requirement.

7.Optical Characteristics

Items		Symbol	Condition	Specifications			Unit	
				Min.	Typ.	Max.		
Contrast Ratio		CR		-	800	-	-	All left side data are based on TIAN XIAN WEI product reference only
Response Time		$T_R + T_F$		-	25	-	ms	
				-	-	-	ms	
Chromaticity	Red	X_R			/		-	
		Y_R			/		-	
	Green	X_G			/		-	
		Y_G			/		-	
	Blue	X_B			/		-	
		Y_B			/		-	
	White	X_W		0.28	0.31	0.34	-	
		Y_W		0.29	0.32	0.35	-	
Viewing angle	Hor.	ϕ1(3 o'clock)	Center CR≥10	-	85	-	deg.	
		ϕ2(9 o'clock)		-	85	-		
	Ver.	θ2(12 o'clock)		-	85	-		
		θ1(6 o'clock)		-	85	-		
Uniformity					--		%	

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

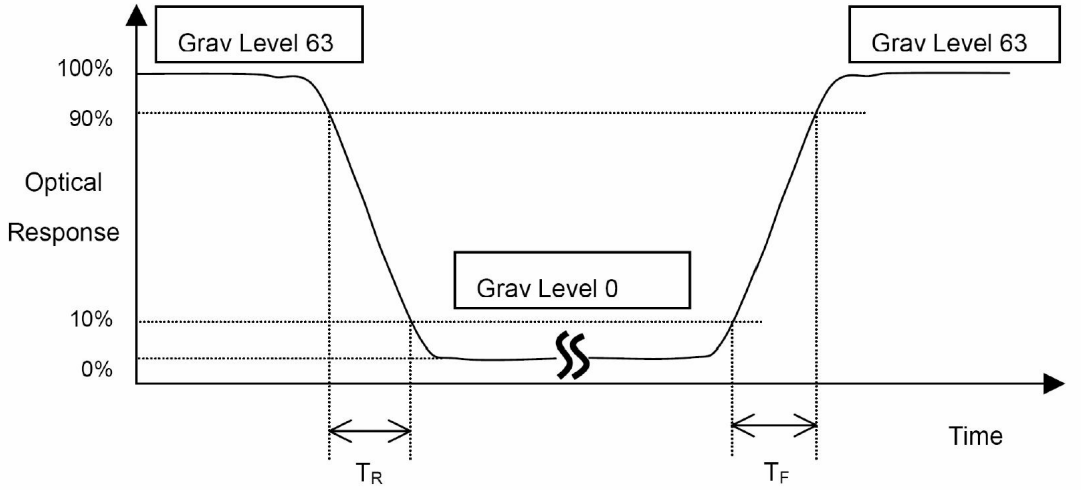
L63: Luminance of gray level 63

L0: Luminance of gray level 0

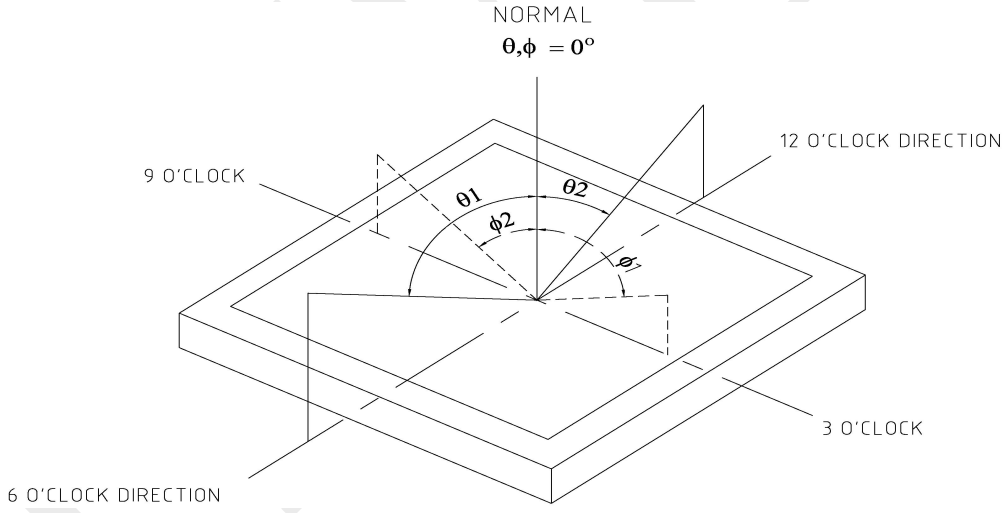
CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):



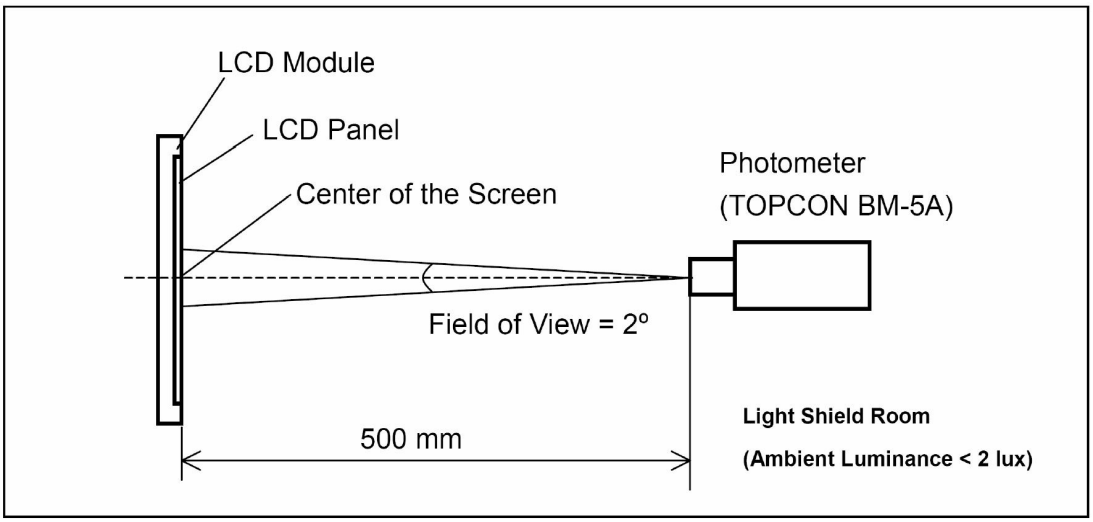
Note 3: Viewing Angle



The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



8. Reliability Test Item

Test Item	Test Condition	Judgment	Remark
High Temp. Storage	80℃, 240hrs	Note 1	Note 2 Note 3 Note 4
Low Temp. Storage	-30℃, 240hrs	Note 1	
High Temp. Operation	70℃, 240hrs	Note 1	
Low Temp Operation	-20℃, 240hrs	Note 1	
High Temp & Hum Operation	60℃ 90%RH,240hrs	Note 1	
Thermal Shock (non-operation)	-30℃(30min)~80℃(30min),50cycle	Note 1	

Note1: Pass: Normal display image with no obvious non-uniformity and no line defect.
Fail: No display image, obvious non-uniformity, or line defects.
Partial transformation of the module parts should be ignored.
Note2: All tests above are practiced at module type.
Note3: All the cosmetic specification is judged before the reliability stress.
Note4: Evaluation should be tested after storage at room temperature for two hours.

9. Packing Method----TBD

- END -