MDT0350D3ISC-RGB	320 x 240	RGB Interface	TFT Module
Specification			
Version: 2	Date: 02/07/2021		
Revision			

1	01/01/2021	First issue	
2	02/07/2021	Pin table update	

Display Features			
Display Size	3.5"		
Resolution	320 x 240		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	3.3V		
Interface	RGB		
Brightness	400 cd/m^2		
Touchscreen	CTP		
Module Size	76.90 x 63.90 x 4.89mm		
Operating Temperature	-20°C ~ +70°C		
Pinout	54 way FFC	Box Quantity	Weight / Display
Pitch	0.5mm	---	---

* - For full design functionality, please use this specification in conjunction with the ST7272A specification.(Provided Separately)

Display Accessories	
Part Number	**Description**

Optional Variants		
Appearances		**Voltage**

General Specifications

Feature		Spec
Characteristics	Size	3.5 inch
	Resolution	320(horizontal)*240(Vertical)
	Interface	24bit-RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.219*0.219
	Pixel Configuration	R.G.B.Stripe
	Display Mode	Normally Black
	CTP Driver IC	GT911
	Driver IC	ST7272A
	Viewing Direction	Full view
Mechanical	LCM (W x H x D) (mm)	76.90*63.90*4.89
	Active Area(mm)	70.08*52.56
	Weight (g)	TBD
	LED Numbers	6 LEDs

Note 1: Requirements on Environmental Protection: RoHs
Note 2: LCM weight tolerance: +/- 5%

Input/Output Terminals

No.	Symbol	Description
1-2	VBL-	Backlight LED Cathode
3-4	VBL+	Backlight LED Anode.
5	Y1(NC)	Touch panel up side（NC）
6	X1(NC)	Touch panel right side（NC）
7	NC	-
8	RESET	System reset pin - Connect to VDD (pull high) in normal operation.
9	SPENB	Chip Select - Leave pin OPEN when not used
10	SPCK	Serial Clock - Leave pin OPEN when not used
11	SPDA	Serial Data - Leave pin OPEN when not used
12-19	B0~B7	Data bus
20-27	G0~G7	Data bus
28-35	R0~R7	Data bus
36	HSYNC	Line Synchronous Signal
37	VSYNC	Frame Synchronous Signal
38	DOTCLK	Dot-clock signal and oscillator source
39-40	NC	-
41-42	VDD	Power supply for logic operation
43	Y2(NC)	Touch panel bottom side（NC）
44	X2(NC)	Touch panel left side（NC）
45-47	NC	-
48	IF2（NC）	Control the input data format（NC）
49	IF1（NC）	Control the input data format（NC）
50	IF0（NC）	Control the input data format（NC）
51	NC	-
52	DEN	Display enable signal
53-54	GND	System Ground

CTP PIN-MAP

Pin	Signal	Description
1	GND	Ground
2	VDD	Power supply
3	INT	Interrupt request to the host
4	SDA	I2C data input and output
5	SCL	I2C clock input
6	REST	Reset Pin for CTP

Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.5	-	5.0	V	-
Operating Temperature	T_{OPR}	-20	-	70	℃	-
Storage Temperature	T_{STG}	-30	-	80	℃	

Timing characteristics

1. ELECTRICAL CHARACTERISTICS

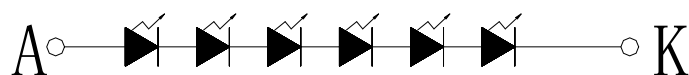| Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		V_{cc}	3.0	3.3	3.6	V	
		IOVCC	1.65	3.0	3.3		
Input Signal Voltage	Low Leve	V_{IL}	GND	-	0.1x VDD	V	
	High Level	V_{IH}	0.8x VDD	-	VDD	V	
Output Signal Voltage	Low Leve	V_{OL}	0	-	0.2*VDD	V	
	High Level	V_{OH}	0.8*VDD	-	VDD	V	

2. LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	20	-	mA	
Forward Voltage	V_F	16.2	19.2	20.4	V	
Backlight Power consumption	W_{BL}	-	0.384	-	W	
LED Lifetime		-	30000	-	Hrs	

Note 1: Each LED: IF =20 mA, VF =2.8~3.4V.

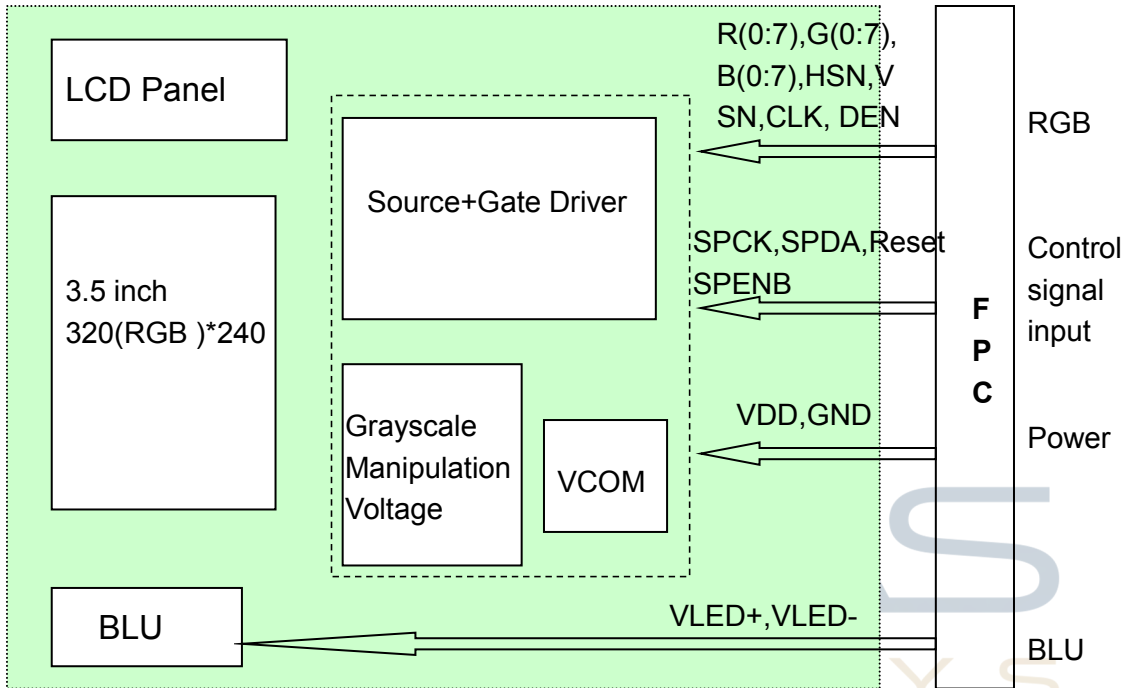Note 2: Optical performance should be evaluated at Ta=25℃ only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

CURRENT IF=20mA

Figure: LED connection of backlight(Constant Current)

3. Block Diagram

LCD Panel

3.5 inch
320(RGB)*240

Source+Gate Driver

Grayscale Manipulation Voltage

VCOM

BLU

R(0:7),G(0:7), B(0:7),HSN,VSN,CLK, DEN

SPCK,SPDA,Reset SPENB

VDD,GND

VLED+,VLED-

F P C

RGB

Control signal input

Power

BLU

Interface Timing

1. AC Electrical Characteristics

Test Condition: (VDD=VDDP=3.3V, VDDA=5.0V, GND=GNDA=GNDP=0V, TA= 25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
System Operation Timing						
VDD power source slew time	Tpor			1000	us	From 0V to 90% VDD
RSTB active pulse width	Trstb	40			us	VDD = 3.3V
Input Output Timing						
CLKIN clock time	Tclk	33.3/125	-	-	ns	Please refer to timing table(p.32)
HSD to CLKIN	Thc	-	-	1	CLKIN	
HSD width	Thwh	1	-	-	CLKIN	
VSD width	Tvwh	1	-	-	Th	
HSD period time	Th	60	63.56	67	us	
VSD setup time	Tvst	8	-	-	ns	
VSD hold time	Tvhd	10	-	-	ns	
HSD setup time	Thst	8	-	-	ns	
HSD hold time	Thhd	10	-	-	ns	
Data set-up time	Tdsu	8	-	-	ns	DIN[23:0] to CLKIN
Data hold time	Tdhd	10	-	-	ns	DIN[23:0] to CLKIN
DEN setup time	Tesd	12	-		ns	DEN to CLKIN
Time that VSD to 1st line data input	Tvs	2	13	127	Th	@CCIR601 / 8bit RGB HV mode Control by HDLY[6:0] setting Tvs = HDLY[6:0]
Time that CCIR_V to 1st line data input	Tvs	12	20	28	Th	@CCIR656 NTSC mode Control by HDLY[6:0] setting Tvs = HDLY[6:0]
Time that CCIR_V to 1st line data input	Tvs 17 25 33 Th					@CCIR656 PAL mode Control by HDLY[6:0] setting Tvs = HDLY[6:0]
Time that VSD to 1st line data input	Tvs	2	13	127	Th	@24bit RGB HV mode Control by HDLY[6:0] setting Tvs = HDLY[6:0]
Source output stable time 1	Tst	-	25	30	us	96% final, CL=30pF, RL=2K
Gate output stable time	Tgst	-	500	1000	ns	96% final, CL=40pF
VCOMOUT output stable time	Tcst	-	4	8	us	96% final, CL=33nF, RL=100ohm
3-wire serial communication AC timing						
Serial clock	Tspck	320	-	-	ns	
SPCK pulse duty		40	50	60	%	Tckh / Tspck
Serial data setup time	Tisu	120	-	-	ns	
Serial data hold time	Tihd	120	-	-	ns	
Serial clock high/low	Tckh/l	120	-	-	ns	
Chip select distinguish	Tcd	1	-	-	us	
SPENB to VSD	Tcv	1	-	-	us	
SPENB input setup time	Teck	150	-	-	ns	
SPENB input hold time	Tcke	150	-	-	ns	

2. DC Electrical Characteristics

Recommended Operating Range

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3.0	3.3	3.6	V	
IO Supply Voltage	VDDI	3.0	-	3.6	V	
Charge Pump Supply Voltage	PVDD	3.0	3.3	3.6	V	

DC Characteristics for Digital Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic-High Input Voltage	Vih	0.7VDDI	-	VDDI	V	
Logic-Low Input Voltage	Vil	DGND	-	0.3VDDI	V	
Logic-High Output Voltage	Voh	VDDI-0.4	-	VDDI	V	
Logic-Low Output Voltage	Vol	DGND	-	DGND+0.4	V	

DC Characteristics for Analog Circuit

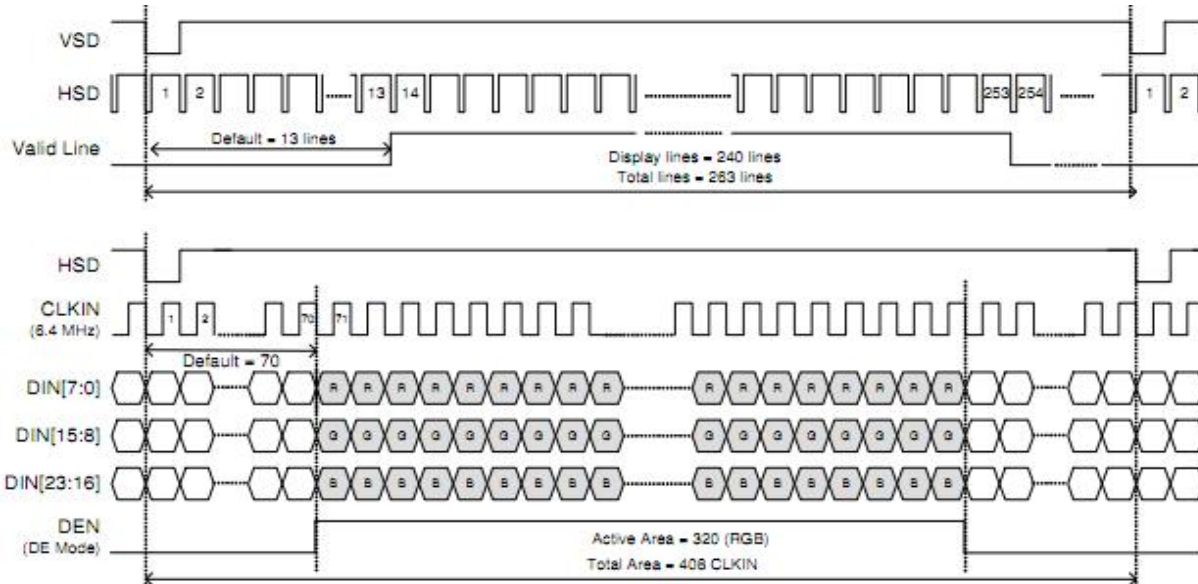| Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive High-Voltage Power	VGH	13	15	16.5	V	No Load@ FR=60Hz
Negative High-Voltage Power	VGL	-7	-10	-11	V	
Output Voltage Deviation	Vod	-	±35	±45	mV	
Standby Current	Isc	-		50	uA	
Operation Current	Ioc	-	20		mA	

3. 24 Bit RGB Mode

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

| Parallel 24-bit RGB Input Timing Table						
Item		Symbol	Min.	Typ.	Max.	Unit	Note
DCLK Frequency		Fclk	5	6	8	MHz	
DCLK Period		Tclk	125	167	200	ns	
HSYNC	Period Time	Th	325	371	438	DCLK	
	Display Period	Thdisp		320		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	SYNC mode back porch control by H_BLANKING[7:0] setting Thbp= H_BLANKING[7:0]
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	244	260	289	HSYNC	
	Display Period	Tvdisp		240		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	SYNC mode back porch control by V_BLANKING[7:0] setting Tvbp= V_BLANKING[7:0]
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

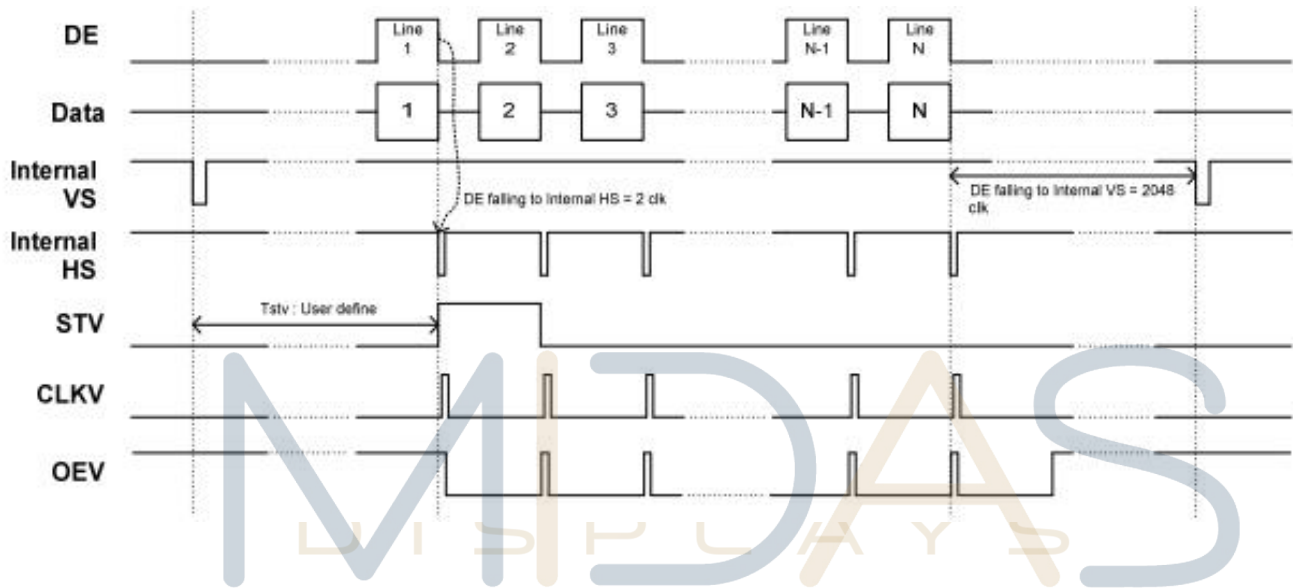Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

4. Input Data Timing

5. Vertical Timing Diagram (HV Mode)
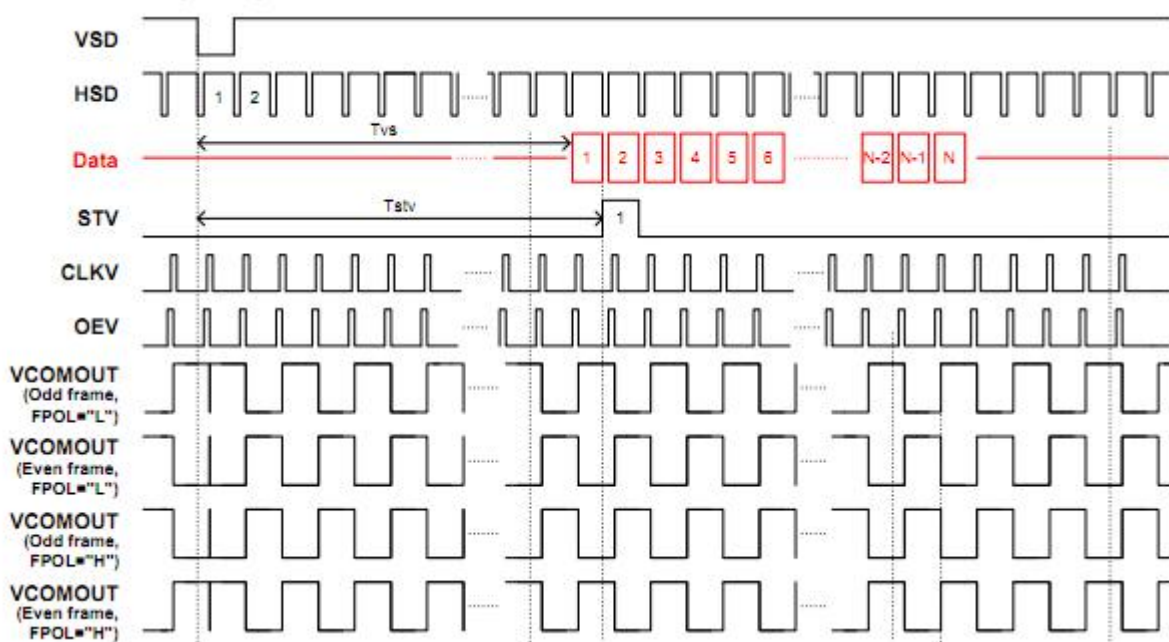
6. Vertical Timing Diagram (DE Mode)

Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Tr+Tf	-	-	50	80	ms	FIG.1	Note4
Contrast Ratio		CR		-	600	-	-	FIG.2	Note1
Surface luminance		LV	θ=0°	350	400	-	cd/m2	FIG.2	Note2
Luminance uniformity		Yu	θ=0°	75	80	-	%	FIG.2	Note3
NTSC		-	θ=0°	-	50	-	%	FIG.2	Note5
Viewing angle		θ Cr>10	∅=90°	-	80	-	deg	FIG.3	Note6
			∅=270°	-	80	-	deg	FIG.3	
			∅=0°	-	80	-	deg	FIG.3	
			∅=180°	-	80	-	deg	FIG.3	
Chromaticity	Red	R$_X$	θ=0° ∅=0° Ta=25°	TBD	TBD	TBD	-	FIG.2 CIE1931	Note5
		R$_Y$		TBD	TBD	TBD	-		
	Green	G$_X$		TBD	TBD	TBD	-		
		G$_Y$		TBD	TBD	TBD	-		
	Blue	B$_X$		TBD	TBD	TBD	-		
		B$_Y$		TBD	TBD	TBD	-		
	White	W$_X$		TBD	TBD	TBD	-		
		W$_Y$		TBD	TBD	TBD	-		

Note1. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

$$\text{Contrast ratio} = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON's BM-5 or BM-7 photo detector or compatible.

Note2. Definition of surface luminance.

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3, ...,Pn)

Note3. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance.For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,......,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,......,Pn)}}$$

Note4. Definition of response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black"state.Rise time (Tr) is the time between photo detector output intensity changed from 90% to 10%. And fall time (Tf) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity,The x,y value is determined by screen active area center position P5.For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. Angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope or DMS series Instruments or compatible.

FIG.1.The definition of response Time
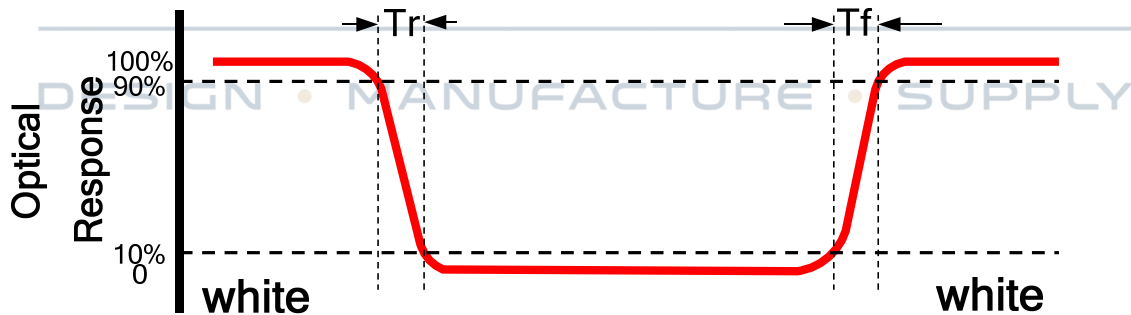
FIG.2. Measuring method for contrast ratio, surface luminance,
luminance uniformity, CIE (x,y) chromaticity

Size : S≤5"(see Figure a) A : 5 mm B : 5 mm

H,V : Active area

Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter BM-5 or

BM-7 or compatible (see Figure c).

Figure a

Size : 5"＜S≤12.3"(see Figure b) H,V : Active area

Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure b.

measurement instrument : TOPCON's luminance meter BM-5 or
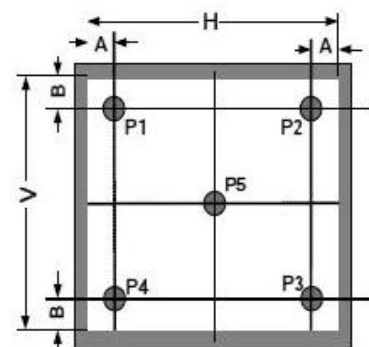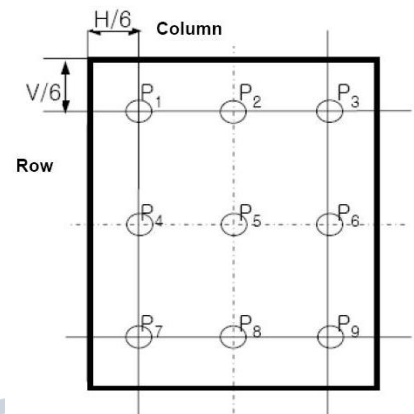
BM-7 or compatible (see Figure c).

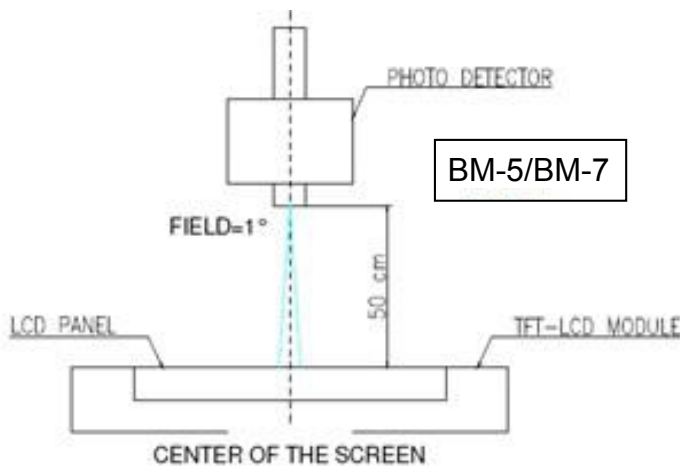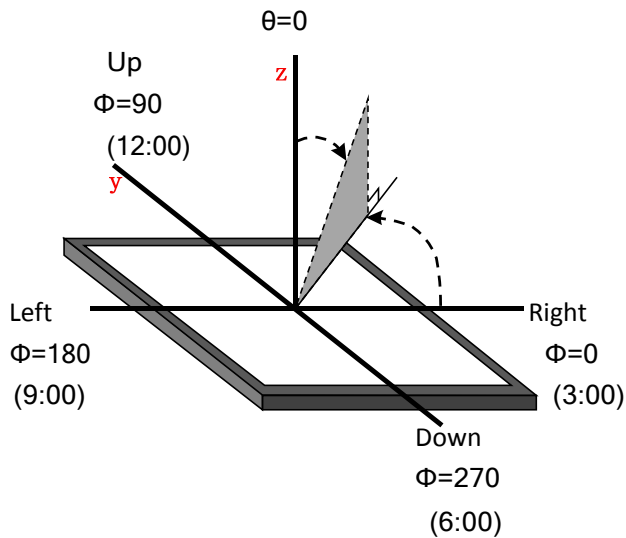BM-5/BM-7

Figure c

Figure b

FIG.3.The definition of viewing angle

Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +85℃, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -30℃, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +85℃,96hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30℃, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation	Ta= +60℃, 90% RH max,96 hours	IIEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 20 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14:1984, GB2423.22-2002
7	ESD	C=150pF, R=330 Ω, 5 points/panel , Air:±8KV, 5 times Contact: ±4KV, 5 times (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.5mm , Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10-1995
9	Mechanical Shock (Non-operation)	Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995

Notes:

1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

1).Air bubble in the LCD;

2).Seal leak

3).Non-display

4).missing segments

5).Glass crack

6).CR reduction >40%

7).IDD increase >100%

8).Brightness reduction >50%

9).Color coordinate tolerance >0.05

2.≤7.0 inch：The size of sample is 5pcs；

  ＞7.0 inch：The size of sample is 2pcs；

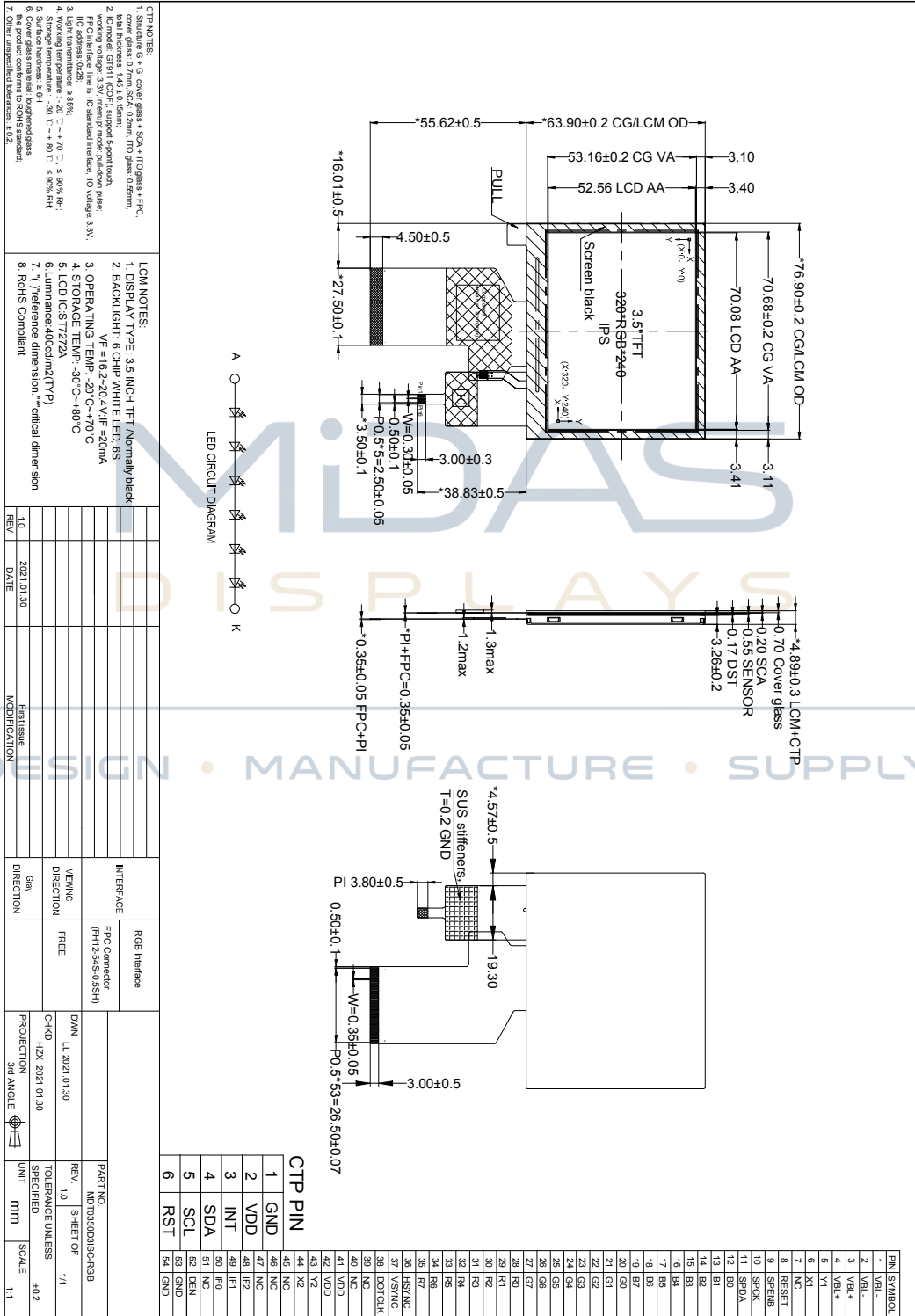3. One test sample must complete each test item;

4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5.In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module.

DESIGN · MANUFACTURE · SUPPLY

MechanicalDrawing

CTP NOTES:
1. Structure G+G: cover glass + SCA + ITO glass + FPC,
cover glass 0.7mm,SCA 0.02mm, ITO glass 0.8mm,
total thickness 1.45±0.15mm.
2. IC model: GT911 (COF), support 5-point touch,
working voltage: 3.3V. Interrupt mode: pull-down pulse;
FPC interface: line is IIC standard interface. IO voltage 3.3V;
IIC address 0x28.
3. Light transmittance ≥ 85%.
4. Working temperature: -20℃~+70℃, ≤ 90%RH;
5. Storage temperature: -30℃~+80℃, ≤ 90% RH
6. Surface hardness ≥ 6H
7. Cover glass material: toughened glass,
the product conforms to ROHS standard;
7. Other unspecified tolerances: ±0.2.

LCM NOTES:
1. DISPLAY TYPE: 3.5 INCH TFT Normally black
2. BACKLIGHT: 6 CHIP WHITE LED, 6S
   VF = 16.2-20.4V/IF =20mA
3. OPERATING TEMP: -20℃~+70℃
4. STORAGE TEMP: -30℃~+80℃
5. LCD IC:ST7272A
6. Luminance 400cd/m2(TYP)
7. "( )"reference dimension
8. RoHS Compliant

*16.01±0.5
*27.50±0.1
-4.50±0.5
PULL

*55.62±0.5
*63.90±0.2 CG/LCM OD
53.16±0.2 CG VA — 3.10
52.56 LCD AA — 3.40
70.68±0.2 CG VA
70.08 LCD AA
*76.90±0.2 CG/LCM OD
3.11
3.41

Screen black
3.5"TFT
320*RGB*240
IPS
(X320, Y240)

*38.83±0.5
-3.00±0.3
W=0.30±0.05
0.50±0.1
P0.5*5=2.50±0.05
*3.50±0.1

LED CIRCUIT DIAGRAM
A
K

*0.35±0.05 FPC+PI
*PI+FPC=0.35±0.05
1.2max
1.3max
3.26±0.2
0.17 DST
0.55 SENSOR
0.20 SCA
0.70 Cover glass
*4.89±0.3 LCM+CTP

*4.57±0.5
SUS stiffeners
T=0.2 GND
PI 3.80±0.5
0.50±0.1
W=0.35±0.05
P0.5*53=26.50±0.07
3.00±0.5
19.30

INTERFACE: RGB Interface
FPC Connector (FH12-54S-0.5SH)
VIEWING DIRECTION: FREE
Gray DIRECTION

REV 1.0
DATE 2021.01.30
First issue
MODIFICATION

DWN LL 2021.01.30
CHKD HZX 2021.01.30
PART NO. MDT0350ISC-RGB
REV. 1.0
SHEET OF 1/1
TOLERANCE UNLESS SPECIFIED ±0.2
PROJECTION 3rd ANGLE
UNIT mm
SCALE 1:1

CTP PIN	
1	GND
2	VDD
3	INT
4	SDA
5	SCL
6	RST

PIN	SYMBOL
1	VBL-
2	VBL-
3	VBL+
4	VBL+
5	Y1
6	X1
7	NC
8	RESET
9	SPENB
10	SPCK
11	SDA
12	B0
13	B1
14	B2
15	B3
16	B4
17	B5
18	B6
19	B7
20	G0
21	G1
22	G2
23	G3
24	G4
25	G5
26	G6
27	G7
28	R0
29	R1
30	R2
31	R3
32	R4
33	R5
34	R6
35	R7
36	HSYNC
37	VSYNC
38	DOTCLK
39	NC
40	NC
41	VDD
42	VDD
43	Y2
44	X2
45	NC
46	NC
47	NC
48	IF2
49	IF1
50	IF0
51	NC
52	DEN
53	GND
54	GND

TFT-LCD Module Inspection Criteria

1. Scope

The incoming inspection standards shall be applied to TFT –LCD Modules (hereinafter Called "Modules") that supplied by Midas Displays.

2. Incoming Inspection

The customer shall inspect the modules within twenty calendar days of the delivery
date（the "inspection period）at its own cost. The result of the inspection（acceptance or
rejection）shall be recorded in writing, and a copy of this writing will be promptly sent to
The seller, If the results of the inspecting from buyer does not send to the seller within twenty
Calendar days of the delivery date. The modules shall be regards as acceptance.
Should the customer fail to notify the seller within the inspection period, the buyers
Right to reject the modules shall be lapsed and the modules shall be deemed to have
Been accepted by the buyer

3. Inspection Sampling

3.1. Lot size: Quantity per shipment lot per model
3.2. Sampling type: Normal inspection, Single sampling
3.3. Inspection level: II
3.4. Sampling table: MIL-STD-105E
3.5. Acceptable quality level （AQL ）
Major defect: AQL=0.65 Minor defect: AQL=1.00

4. Inspection Conditions

4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) ％RH
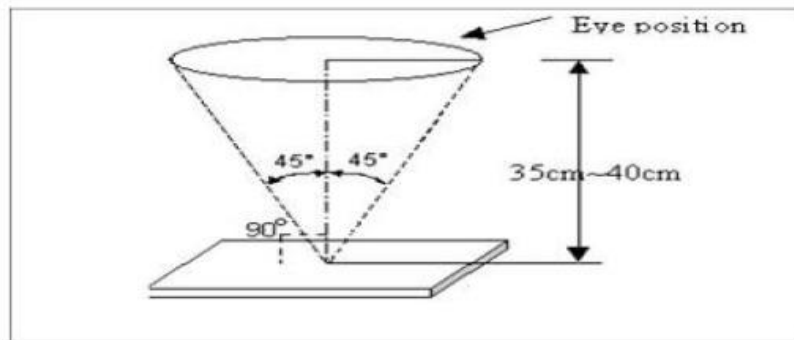c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
4.2 Viewing distance
The distance between the LCD and the inspector's eyes shall be at least 35±5 ㎝.
4.3 Viewing Angle
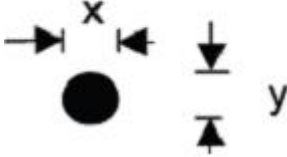U/D: 45 °/45°, L/R: 45°/45°

5. Inspection Criteria

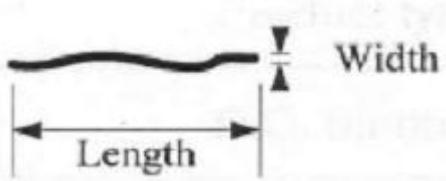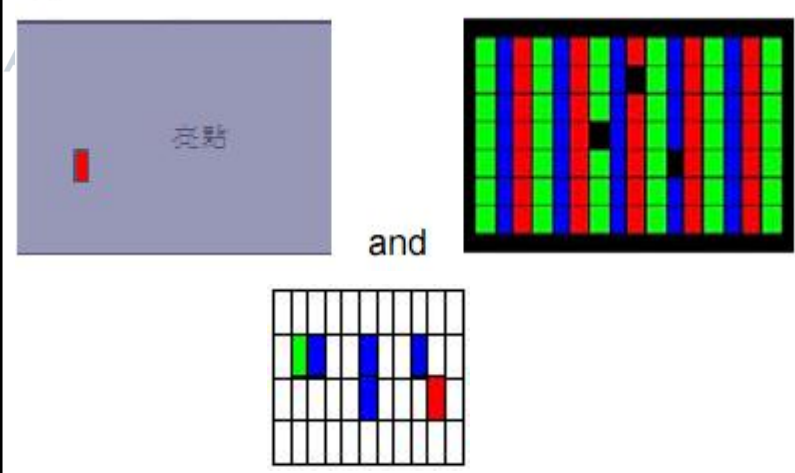Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

5.1 Major defect

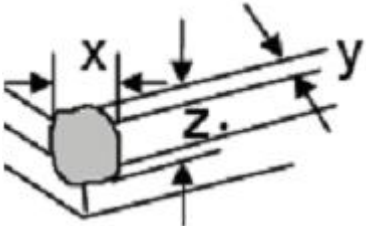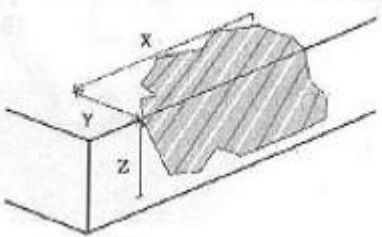| Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
`5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

5.2 Minor defect

Item No	Items to be inspected	Inspection standard	
5.2.1	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $$\varphi = (x+y)\,/2$$ 	
		Size φ(mm)	Acceptable Quantity
		φ≤0.05	Ignore
		0.05 < φ≤0.15	2
		0.15<φ	Not allowed

5.2.2	Polarizer dirt, particle	Size Φ(mm)		Acceptable Quantity
		Φ≤0.15		1
		Φ>0.15		Not allowed

5.2.3	Line Defect Including Black line White line Scratch	**Define:**		
		Width(mm) Length(mm)		Acceptable Quantity
		W≤0.05		Ignore
		0.05 < W≤0.1 L≤1.5		1
		0.1 < W，or L>1.5		Not allowed

5.2.4	Polarizer Dent/Bubble	Not allowed			

Bright and Black dot define:

and

Two Adjacent Dot

Inspection pattern: Full white、Full black、Red、green and blue screens

Item	Acceptable Quantity		
	I	O	Note
Black dot defect	1		(5mm≤Distance)
Bright dot defect	1		

(5.2.5 Electrical Dot Defect)

			Two Adjacent Dot	Not allow	
5.2.6	Glass defect	1.Corner Fragment:			
		Size(mm)		Acceptable Quantity	
		X≤2mm Y≤1mm Z≤T		Ignore T：Glass thickness X: Length Y: Width Z: thickness	
		2. Side Fragment:			
		Size(mm)		Acceptable Quantity	
		X≤5.0mm Y ≤1mm Z≤T		T：Glass thickness X: Length Y: Width Z: thickness	
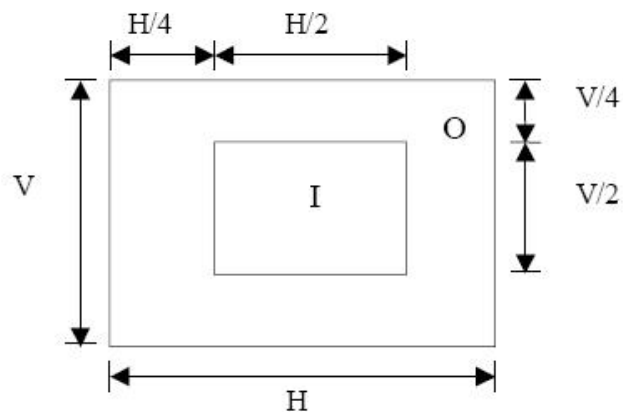
I area & O area

Note: 1). Dot defect is defined as the defective area of the dot area is larger than
         50% of the dot area.
      2). The distance between two bright dot defects (red, green, blue, and white)
          should be larger than 15mm.
      3). The distance between black dot defects or black and bright dot defects should be more than 5mm apart.
      4). Polarizer bubble is defined as the bubble appears on active display area. The
          defect of polarizer bubble shall be ignored if the polarizer bubble appears on the
          outside of active display area.

6. Mechanics specification

As for the outside dimension, weight of the modules, please refer to product specification
For more details

Precautions for Use of LCD modules

1. Handling Precautions

1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- 一 Isopropyl alcohol
- 一 Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- 一 Water
- 一 Ketene
- 一 Aromatic solvents

1.6. Do not attempt to disassemble the LCD Module.

1.7. If the logic circuit power is off, do not apply the input signals.

1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

1.8.1. Be sure to ground the body when handling the LCD Modules.

1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

2. Storage Precautions

2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored   for a long time, the recommend condition is:

Temperature : 0℃ 〜 40℃ Relatively humidity: ≤80%

2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

3. Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.