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SPECIFICATION

VXT400HQI-01

☐ Preliminary Specification

☐ Final Specification



VICTRONIX COMPANY LIMITED

Made By:

Checked By:

Approved By:

Quality:

Date:

Note:

CUSTOMER:

Approved By:

Date:

Note:

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Document revision history:

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
V00	2013.08.02	First Release.	Tiger	
V01	2013.08.29	Update Inspection criteria	ZXP	
V02	2013.11.09	Modify the format	Tiger	
V03	2013.12.19	Modify the thickness	Tiger	

2. General Description

- 4.0”(diagonal), 320 (RGB) x 240pixels, 16.7M colors, Transmissive, TFT LCD module.
- Viewing Direction: 6 O’clock.
- Driving IC: ILI9322
- SPI-3W+24Bit-RGB interface
- Logic voltage: 2.7-3.6V (typ.).
- Without touch panel.

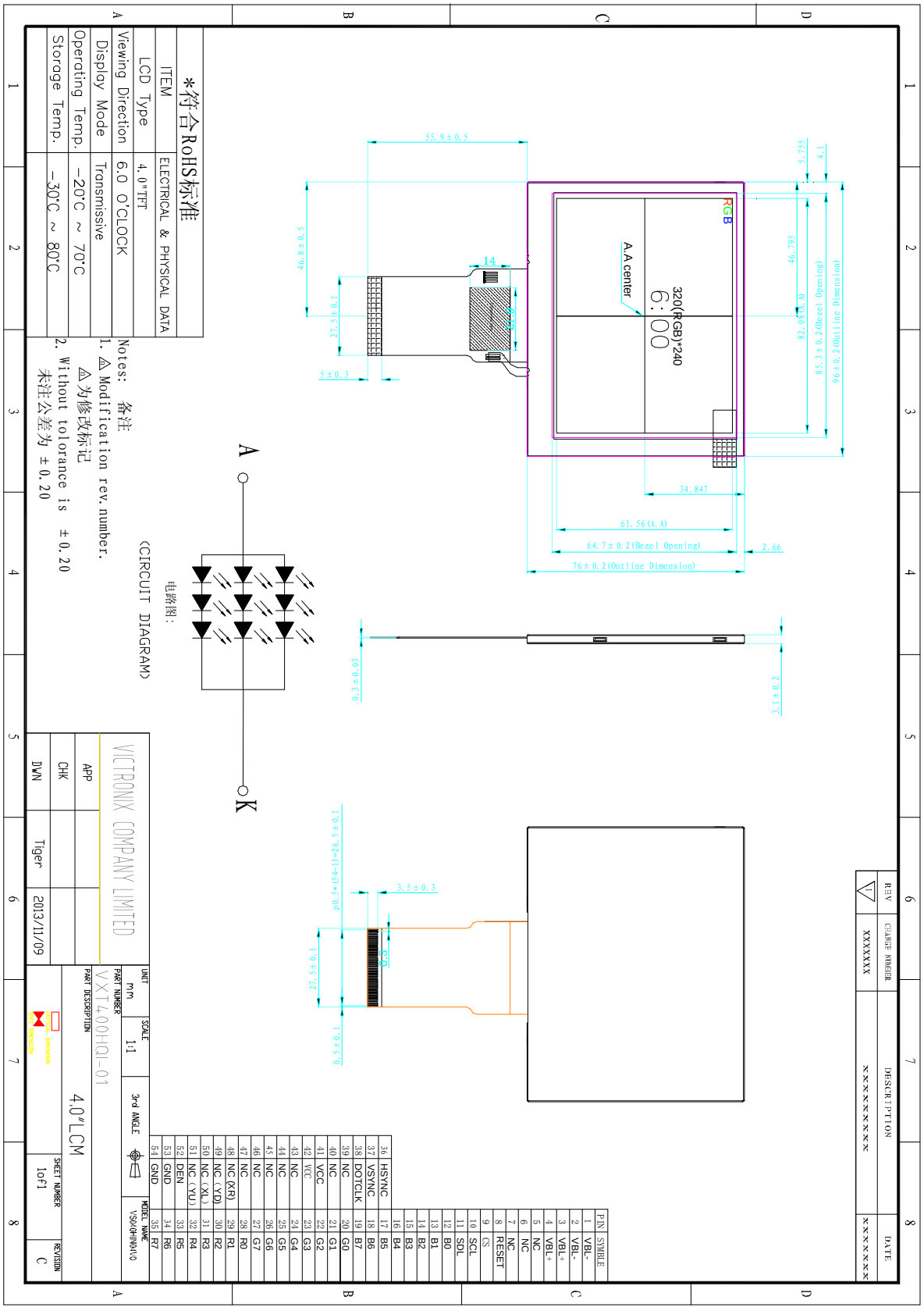
3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter		Specifications	Unit
Outline dimensions		96.0(W) x 76(H) x3.1(D)	mm
			mm
	active area	82.08(W) x 61.56(H)	
	Display format	320RGB(H) x240(V)	Pixels
	Color configuration	RGB stripes	-
Weight		TBD	grams

igure 1: Outline Drawing



4. Interface signals

Table 2: Pin assignment

Pin No.	Symbol	Description
1,2	VBL-	Backlight LED Cathode
3,4	VBL+	Backlight LED Anode.
5~7	NC	NC
8	RESET	Reset Signal pin (“Low” is enable)
9	CS	Chip select
10	SCL	Serial Clock.
11	SDI	Serial Data
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	NC
41-42	VCC	Power supply for logic operation
43-51	NC	NC
52	DEN	Display enable signal
53-54	GND	System Ground

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD)	VCC	-0.3	+3.6	V	1

Note:

1. VCC, GND must be maintained.
2. The modules may be destroyed if they are used beyond the absolute maximum ratings.

6. Electrical Specifications

6.1 Typical Operation Conditions (At Ta = 25 °C,)

Table 4

Items	Symbol	Min.	Typ.	Max.	Unit	Note
Internal logic Power	Vcc	2.7	3.3	3.6	V	
Analog power supply	Vci	2.7	3.3	3.6	V	
Interface I/O power	IOVcc	1.65	3.3	3.6	V	
Output signal high	VOH	0.8*IOVc	-	IOVCC	V	
Output signal low	VOL	GND	-	0.2*IOVcc	V	
Input signal high	VIH	0.7*IOVc	-	IOVcc	V	
Input signal low	VIL	GND	-	0.3*IOVcc	V	
Input leakage current	I1N	-1	-	1	uA	
Digital standby	IST		10	50	uA	DCLK stop and inputs are
Digital operating	ICC		TBD	TBD	mA	DCLK=25MHz, VCC=3.3V
Pull high/low resistor	RP	150K	200K	300K	ohm	Digital input pads

6.2 Backlight Driving Conditions

Table 5

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply voltage of white LED backlight	VL	9.6	10	10.5	V	Note 1
Current for LED backlight	IL	58	60	70	mA	
Uniformity	△	75	80	-	%	
Luminance (on the module surface,BM-7)	LV	300	350	-	cd/m^2	
LED life time	-	20,000	-	-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =60mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL =60mA. The LED lifetime could be decreased if operating IL is lager than 60mA.

7. Optical Characteristics

Table 7: Optical specifications

Items		Symbol	Condition	Specifications			Unit	Note
				Min.	Typ.	Max.		
Contrast Ratio		CR		400	500	-	-	
Response Time		T_R		-	2	4	ms	
		T_F		-	6	12	ms	
Chromaticity	Red	X_R		0.586	0.636	0.686	-	
		Y_R		0.300	0.350	0.400	-	
	Green	X_G		0.261	0.311	0.361	-	
		Y_G		0.501	0.551	0.601	-	
	Blue	X_B		0.084	0.134	0.184	-	
		Y_B		0.101	0.151	0.201	-	
	White	X_W		0.261	0.311	0.361	-	
		Y_W		0.300	0.353	0.400	-	
Viewing angle	Hor.	ϕ1(3 o'clock)	Center CR≥10		75	-	deg.	
		ϕ2(9 o'clock)			75	-		
	Ver.	θ2(12 o'clock)			70	-		
		θ1(6 o'clock)			60	-		
NTSC ratio					50		%	

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):

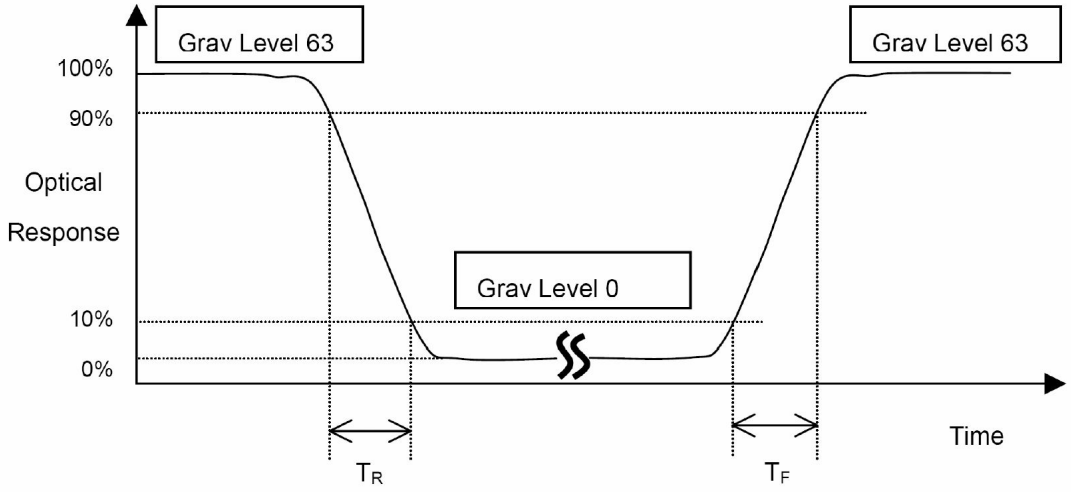


Figure 3

Note 3: Viewing Angle

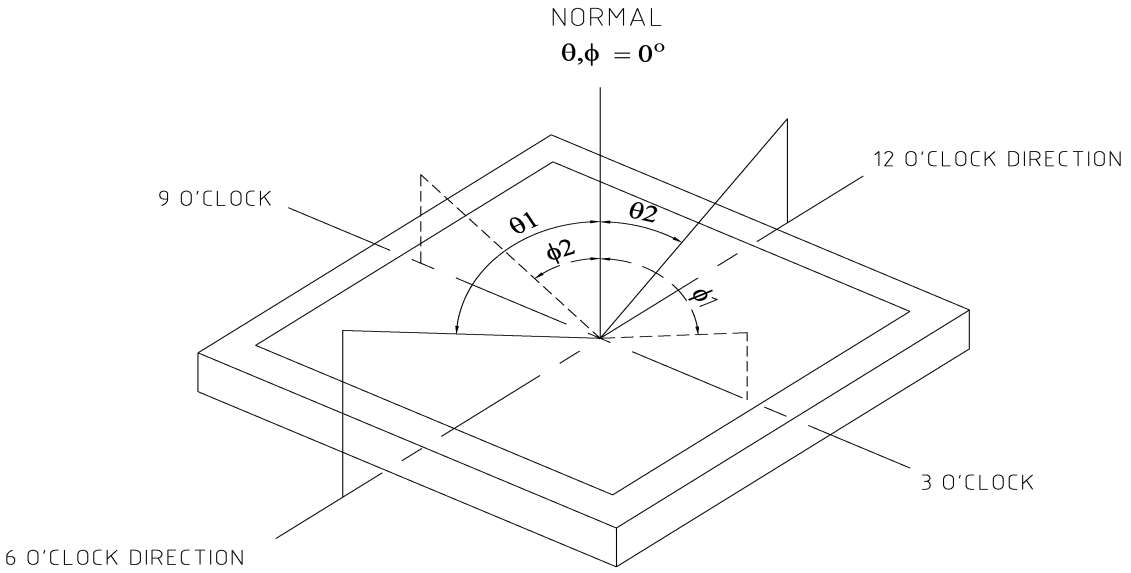


Figure 4

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.

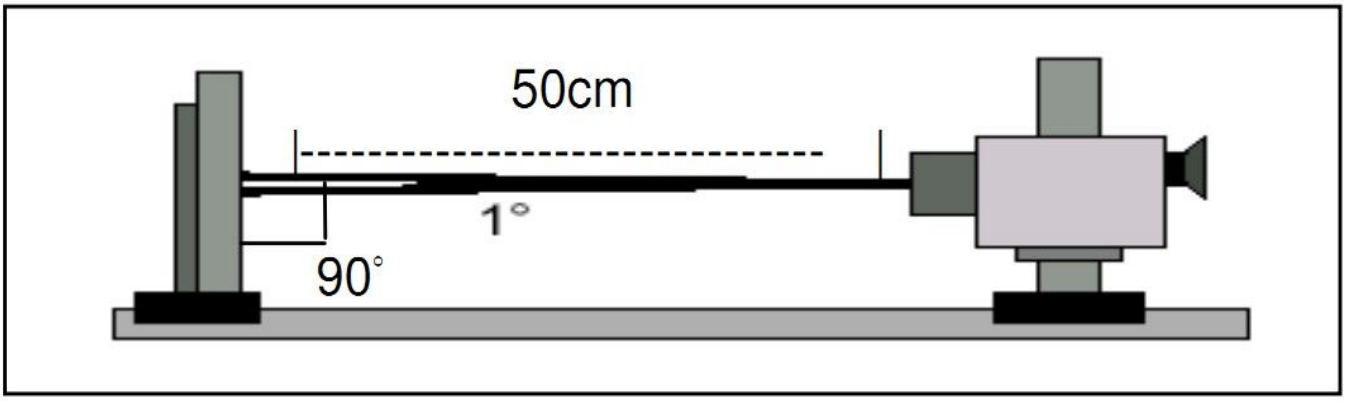
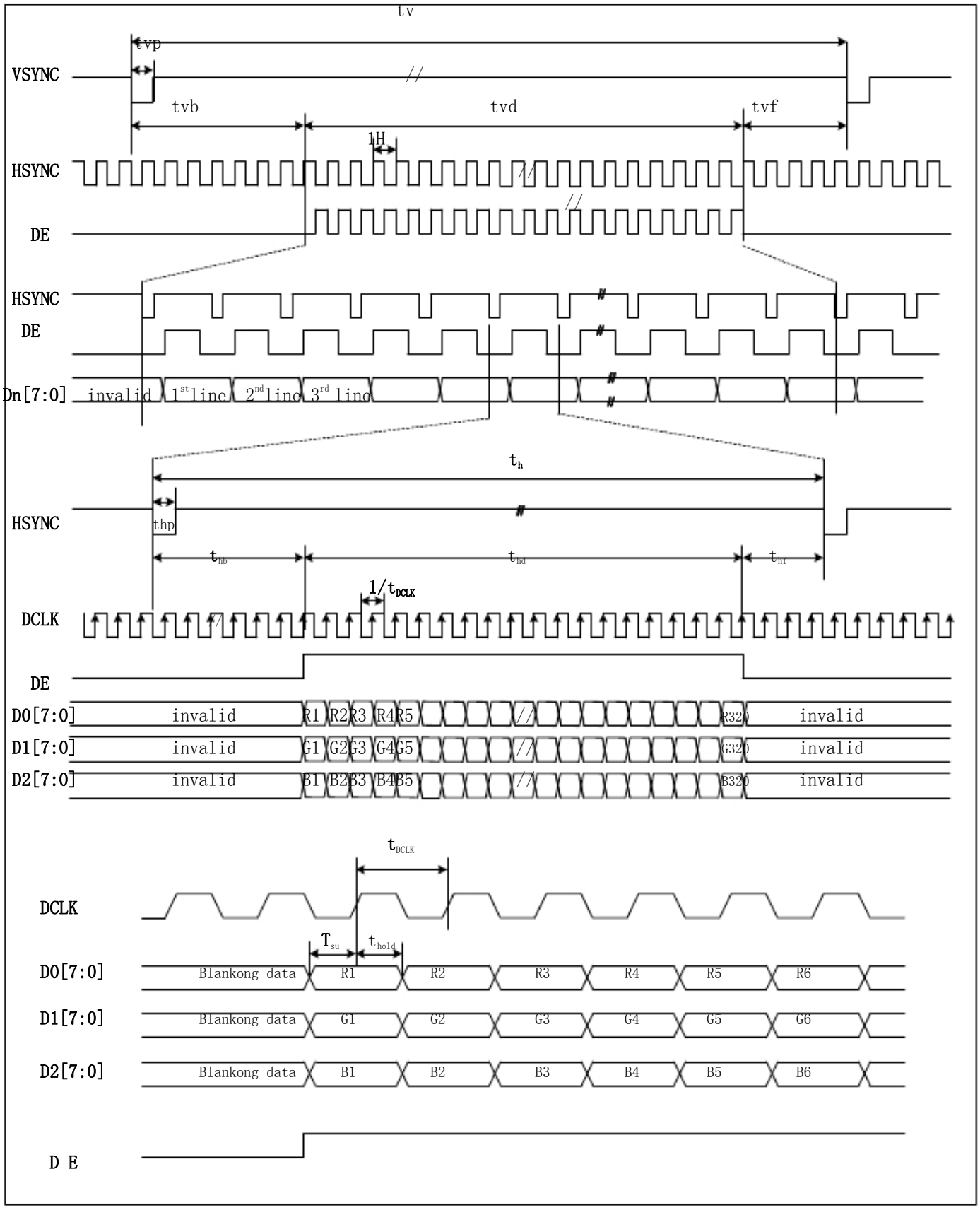


Figure 5

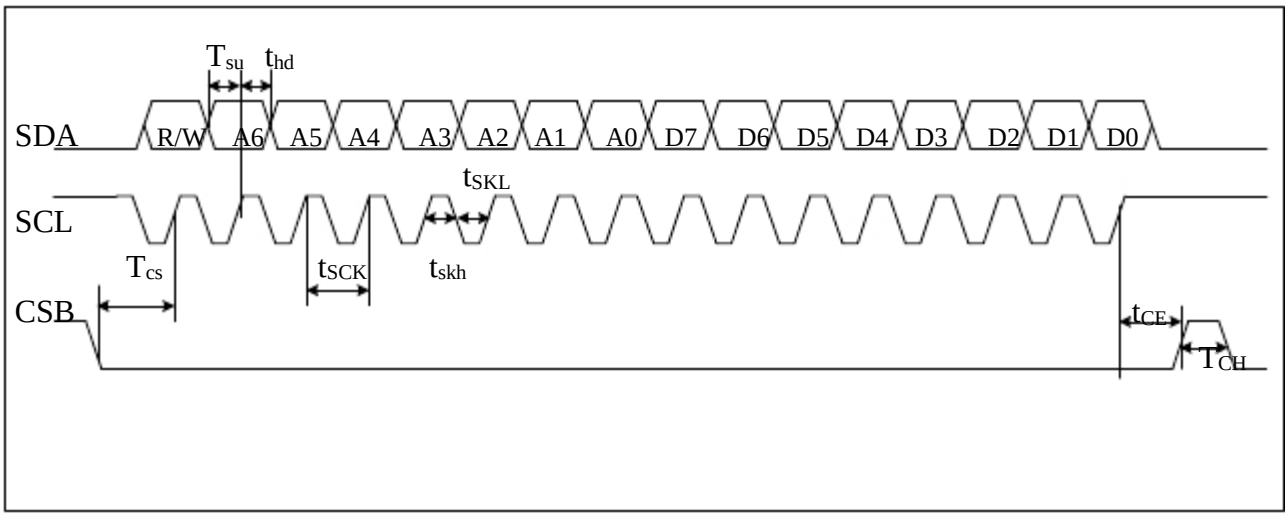
8. data input Characteristics

24-bit Parallel RGB Interface



Parameter	Symbol	Min.	Typ.	Max.	Unit.	Note
DCLK Frequency	1/tDCLK	-	6.4	11	MHz	
Horizontal Period	th	-	408	-	tDCLK	
Horizontal Display	thd	320	320	320	tDCLK	
Horizontal Back Porch	thb	-	38	-	tDCLK	
Horizontal Front Porch	thf	-	50	-	tDCLK	
Horizontal Pulse Width	thp	1	1	-	tDCLK	
Vertical Period	tv	-	262	-	th	
Vertical Display Period	tvd	240	240	240	th	
Vertical Back Porch	tvb	2	18	-	th	
Vertical Front Porch	tvf	2	4	-	th	
Vertical Pulse Width	tvp	1	1	-	th	
Data setup time	tsu	12	-	-	ns	
Data hold time	thold	12	-	-	ns	

9 Serial Peripheral Interface (SPI)



SPI Timing Specification

Items	Symbol	Min.	Typ.	Max.	Unit	Note
CSB to SCL Setup time	t_{CS}	50	-	-	ns	
CSB to SCL Hold time	t_{CE}	50	-	-	ns	
SCL Period	t_{SCK}	50	-	-	ns	
SCL High Period	t_{SKH}	25	-	-	ns	
SCL Low Period	t_{SKL}	25	-	-	ns	
Data Setup Time	t_{SU}	15	-	-	ns	
Data Hold Time	t_{HD}	15	-	-	ns	
CSB High Pulse Period	t_{CH}	50	-	-	ns	

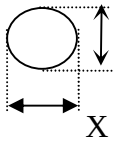
10.Environmental / Reliability Test

Table 8

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	60±3℃;96H	the inspection of appearance and function character.
	Wide temperature	70±3℃;96H	
Low temperature storage	Normal temperature	-10±3℃;96H	
	Wide temperature	-20±3℃;96H	
High temperature /humidity storage	Normal temperature	50℃±3℃,85%±3%RH;96H	
	Wide temperature	60℃±3℃,85%±3%RH;96H	
High temperature operation	Normal temperature	60±3℃;96H	No objection of the function character; no fatal objection of the appearance.
	Wide temperature	70±3℃;96H	
Low temperature operation	Normal temperature	-10±3℃;96H	
	Wide temperature	-20±3℃;96H	
High temperature /humidity operation	Normal temperature	40℃±3℃,85%±3%RH;96H	
	Wide temperature	50℃±3℃,85%±3%RH;96H	
Temperature Shock	Normal temperature	-10±3℃,30min→60±3℃,30 min;10cycle	inspect the objections appearance、function & the whole structure
	Wide temperature	-20±3℃,30min 70±3,30min;10cycle	The inspection of appearance、function & the whole structure

11. Inspection Criteria

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

<table>
<tr><th>No</th><th>Item</th><th>Criterion for defects</th><th>Defect type</th></tr>
<tr><td>1</td><td>Black/white s
defect（in
displaying）</td><td>
black/white spot definition
$\Phi = \frac{(x+y)}{2}$


1. black/white spot defect (I)
<table>
<tr><th rowspan="2">area
size（mm）</th><th colspan="3">Acceptable number</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.10＜Φ≤0.15</td><td colspan="2">3</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">2</td></tr>
<tr><td>Φ＞0.25</td><td colspan="2">0</td></tr>
</table>
2. black/white spot defect (II)
<table>
<tr><th rowspan="2">area
size（mm）</th><th colspan="3">Acceptable number</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.3</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.30＜Φ≤0.50</td><td colspan="2">5 (spac ebetween is 20mm)</td></tr>
<tr><td>0.50＜Φ≤1.00</td><td colspan="2">3(spac ebetween is 50mm)</td></tr>
<tr><td>1.00＜Φ</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>2</td><td>Black/white l
defect（in
displaying）</td><td>
1. black/white line defect (I)
<table>
<tr><th colspan="2">size（mm）</th><th colspan="3">Acceptable number</th></tr>
<tr><th rowspan="2">L(length)</th><th rowspan="2">W(width)</th><th colspan="3">area</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>10＜L</td><td>0.03＜
W≤0.04</td><td colspan="2">5</td><td rowspan="4">ignore</td></tr>
<tr><td>5.0＜
L≤10</td><td>0.04＜
W≤0.06</td><td colspan="2">3</td></tr>
<tr><td>1.0＜
L≤5.0</td><td>0.06＜
W≤0.07</td><td colspan="2">2</td></tr>
<tr><td>L≤1.0</td><td>0.07＜</td><td colspan="2">1</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

	W≤0.09			

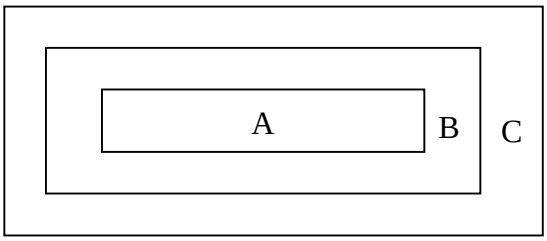
2. black/white line defect(II)

size(mm)		Acceptable number		
L(length)	W(width)	area		
		A	B	C
20＜L	0.05＜ W≤0.07	5		ignore
10＜L≤20	0.07＜ W≤0.09	3		
5.0＜L≤10	0.09＜ W≤0.10	2		
L≤5.0	0.10＜ W≤0.15	1		

<table>
<tr>
<td>3</td>
<td>Blemish & foreign matters</td>
<td>
1. dot (LCD)
<table>
<tr><td rowspan="3">size(mm)</td><td colspan="3">Acceptable number</td></tr>
<tr><td colspan="3">area</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.10＜Φ≤0.15</td><td colspan="2">2</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">1</td></tr>
<tr><td>0.25＜Φ</td><td colspan="2">0</td></tr>
</table>
2. blemish（on touch panle or between touch panel ane LCD）
<table>
<tr><td rowspan="3">size(mm)</td><td colspan="3">Acceptable number</td></tr>
<tr><td colspan="3">AREA</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="3">ignore</td></tr>
<tr><td>0.10＜Φ≤0.15</td><td colspan="2">1</td></tr>
<tr><td>0.15＜Φ</td><td colspan="2">0</td></tr>
</table>
3.line（LCD/touch panle）
<table>
<tr><td colspan="2">size(mm)</td><td colspan="3">Acceptable number</td></tr>
<tr><td rowspan="2">L(length)</td><td rowspan="2">W(width)</td><td colspan="3">area</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Ignore</td><td>W≤0.02</td><td colspan="2">5</td><td rowspan="4">ignore</td></tr>
<tr><td>L≤3.0</td><td>0.02＜
W≤0.03</td><td colspan="2">3</td></tr>
<tr><td>L≤2.0</td><td>0.03＜
W≤0.05</td><td colspan="2">2</td></tr>
<tr><td>---</td><td>W＞0.05</td><td colspan="2">Treat with dot</td></tr>
</table>
</td>
<td>Minor</td>
</tr>
<tr>
<td>4</td>
<td>Stain on LCD panel</td>
<td>Stain which cannot be removed even when wiped lightly with a soft cloth or similar cleaning too are</td>
<td>Minor</td>
</tr>
</table>

	surface	rejectable	
5	Rust in bezel	Rust which is visible in the bezel is rejectable	Minor
6	Defect of land surface contact	Evident crevices which is visble are rejectable	Minor
7	Parts mounting	(1) failure to mount parts (2) parts not in the specification are mounted (3) polarith, for example,is reversed	Major Major Major
8	Parts alignment	(1) LSI,IC lead width is more than 50% beyond pad outline (2) Chip component is off center and more than 50% of the leads is off the pad outline	Minor Minor
9	Conductive foreign matter	(1) on open space(gnd,manual solder)solder ball is allowed up toΦ0.1mm(1EA). (2) In case of shield space is allowed up toΦ0.2mm(1EA)	Major
10	Faculty PWB correction	(1) due to PWB copper foil pattern burnout,the patter is connected,using a jumper wire for repair;2 or more places corrected per PWB (2) short circuited part is cut,and no resist coating has been performed.	Minor Minor

area definition



LCD inspection area

A：active area

B：visible area

C：outside of visible area（Invisible area after assembling）

Visible Defect in area c，but it cannot affect product’s quality ，it is allowed .

12. Suggestions for using LCD modules

12.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don’t disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
   - Be sure to ground the body when handling the LCD modules.
   - Tools required for assembling, such as soldering irons, must be properly grounded.
   - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
   - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

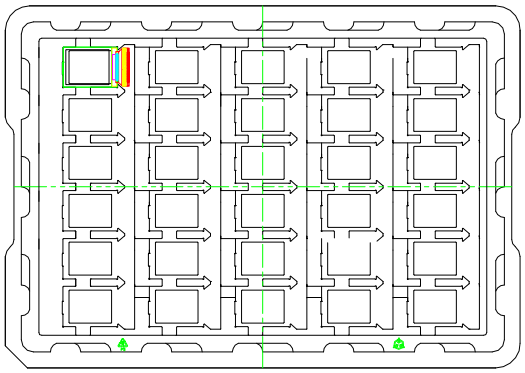
12.2 Storage

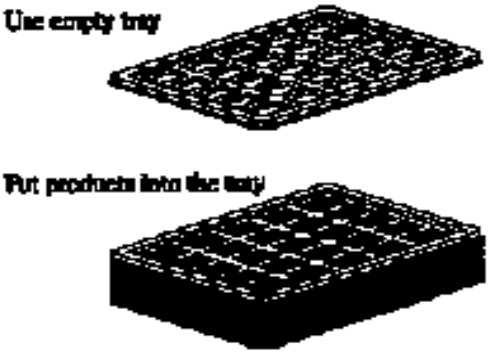
1. Store in an ambient temperature of 5 to 45 。C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.

14. Packing (Reference only)

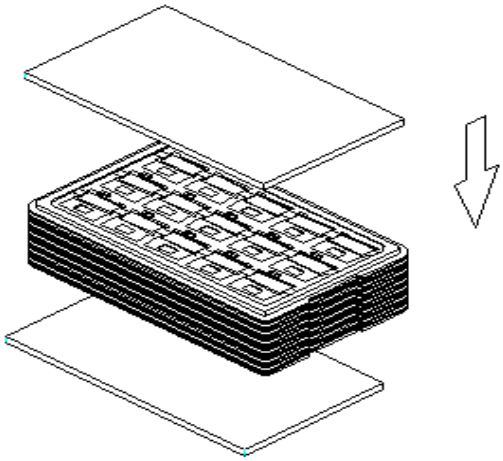
14.1 Packing Method

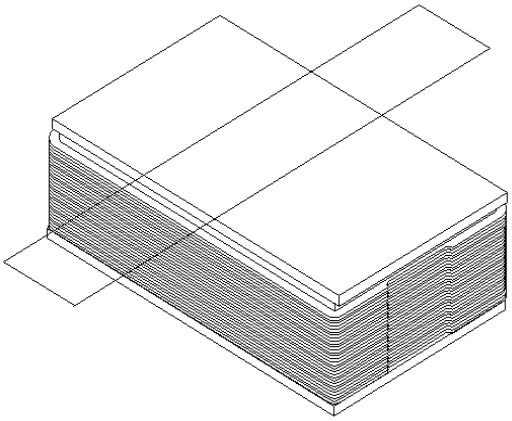
(1) (2)



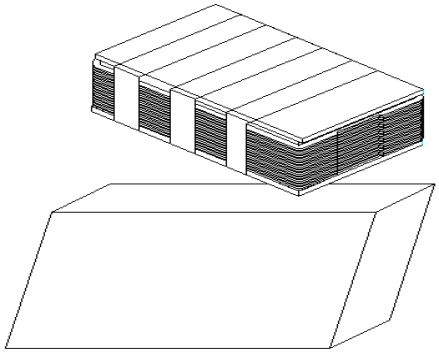


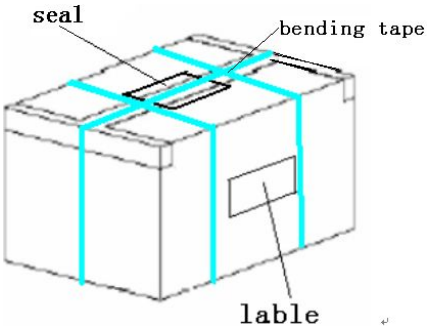
(3) (4)





(5) (6)





1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

The box label followed by is affixed to a shipped product at the specified location on each packing box.

1) Label Size: 80 mm (L) ´ 60 mm (W)

2) Contents

- Model : VXT400HQI-01
- Q`ty : Quantity in one box
- Serial No. : Refer the description as below.
- Date : Packing Date
- FG Code : FG Code of Product