WANXIN IMAGE
INCORPORATION

Product Specifications

4.3" TFT-LCD with Touch Panel Module
Model No. : WXCAT43-TG6#001

PD Dept.	PD Dept.	PD Dept.
Prepared by	Checked by	Approved by
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Contents

Records of Version

Version	Revise Date	Page	Content
1.0	2009-01-10	all	New released

1   General Description

WXCAT43-TG6#001 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit, a backlight unit, and a 4-wires analog resistive type touch panel. The panel size is 4.3 inch and the resolution is 480×272. The panel can display up to 16.7M colors and is suitable for portable device display application.

1.1   Features

◆   High image quality a-Si TFT LCD module.
◆   16:9 wide display
◆   16,777,216 color number.
◆   24bit RGB Interface
◆   High contrast, high brightness.
◆   Light weight, slim design.
◆   Low power consumption.
◆   Line inversion mode with stripe type.
◆   4-wires analog resistive type touch panel.

1.2   Application

◆   Display terminals for portable devices, such as
    ◈   GPS (Global Positioning System),
    ◈   DVB (Digital Video Broadcasting),
    ◈   DSC (Digital Still Camera),
    ◈   PMP (Portable Multimedia Player),
    ◈   Other devices which require high quality displays.

1.3 General Specification

No	Item	Specification	Remark
1	Type	Transmissive	
2	Display Mode	Normally White	
3	Pixel Element	a-Si TFT	
4	Screen Size	4.3 inch (diagonal)	
5	Resolution	480(RGB)×272	
6	Color Number	16,777,216	
7	Active Area	95.04×53.856 (mm)	
8	Dot Pitch	198×198(μm)	
9	Color Arrangement	RGB-stripe	
10	Assembly Type	COG	
11	Back Light	LED	
12	Viewing Direction	6 o'clock	
13	Module Dimension	105.5mm×67.2mm×4.05mm	
14	Power Supply	3.0~3.6 (V)	
15	Interface	RGB 24-bit	
16	Surface Treatment	UV Cut/Anti Glare	

1.3.1 Touch Panel

No	Item	Specification	Remark
1	Type	4 Wires Analog Resistive Type	
2	Input Mode	Special Stylus or Finger	
3	Surface Treatment	Anti-Glare Type	
4	Glass Thickness	0.7 (mm)	
5	Active Area	96.7 x 55.5 (mm)	
6	Viewing Area	98.70 x 57.0 (mm)	
7	Outline Dimension	104.9x66.6x1.15 (mm)	
8	Activation Force	$\leqq$80 (gf)	Finger/Stylus Within" guaranteed active area", but not on the age and Dot-Spacer.
9	Surface Hardness	$\geqq$3H	

2   Absolute Maximum Ratings

2.1   Electrical Absolute Maximum Ratings

2.1.1 TFT-LCD Panel Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply	VCI	-0.3	5.0	V	
analog voltage	VCIP	-0.3	5.0	V	
Logic Power supply	VDDIO	-0.3	4.0	V	

- If the LSI is used above these absolute maximum ratings, it may become permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are also exceeded, the LSI will malfunction and cause poor reliability.

2.1.2 Back-Light Unit

Ta=25℃

Item	Symbol	Min	Max	Unit	Remark
Forward current(series)	I_B	--	25	mA	--

2.1.3 Touch Panel

Ta=25℃

Item	Symbol	Min	Max	Unit	Remark
DC Voltage	V_{TP}	3	15	V	DC

2.2 Environment Absolute Maximum Ratings
2.2.1 TFT-LCD Module

Item	Symbol	Min	Max	Unit	Remark
Operation temperature range	Top	-20	70	℃	Ambient
Storage temperature range	Tst	-30	80	℃	Ambient

● Corrosive gas environment is not acceptable.

● TFT-LCD color will change slightly depending on environment temperature. This phenomenon is reversible. Current reduction rate of LED backlight is according to the graph indicated below:

Ambient Temperature (℃)
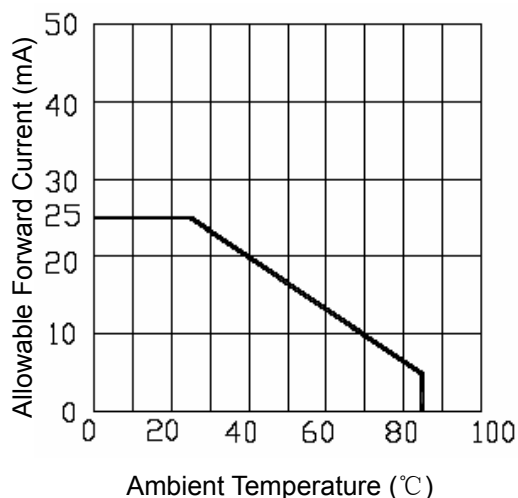
2.2.2 Touch Panel

Item		Symbol	Min	Max	Unit	Remark
Operation	Temperature	Top	-10	60	℃	Ambient
	Humidity	RHop	20	90	%	Maximum wet temperature is 38℃. No dew condensation.
Storage	Temperature	Tst	-20	70	℃	Ambient
	Humidity	RHst	10	90	%	Maximum wet temperature is 38℃. No dew condensation.

3   Electrical Characteristics

3.1   TFT-LCD Module

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Power supply	VCI	3.0	-	3.6	V
Power supply pin of IO pins	VDDIO	1.8	-	3.6	V
Input high voltage	V_{IH}	0.8*VDDIO	-	VDDIO	V
Input low voltage	V_{IL}	0	-	0.2*VDDIO	V
Clock frequency	f_{CLK}	-	9	15	MHz

3.2   Back-Light Unit

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Current	I_B	--	20	25	mA	
Forward voltage	V_F	--	25.6	28.8	V	
Power Consumption	P_{BL}	--	512	720	mW	

- Both of 4 LEDs in serial type.

- The luminous intensity of LED is strongly dependent on the driving current.

3.3   Touch Panel

Item	Direction	Value	Unit	Remark
Resistance between terminals	X (Film)	200 ~ 900		
	Y (Glass)	200 ~ 900		
Linearity	X	$\leqq 1.5$	%	Note 1
	Y	$\leqq 1.5$		
Chattering	--	$\leqq 10$	ms	
Insulation resistance	--	$\geqq 20M$		DC 25V

Note 1: Measurement condition of Linearity
Difference between actual voltage & theoretical voltage is an error at any points. Linearity is the value max. Error voltage divided by voltage difference on active area.

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I n c o r p o r a t i o n
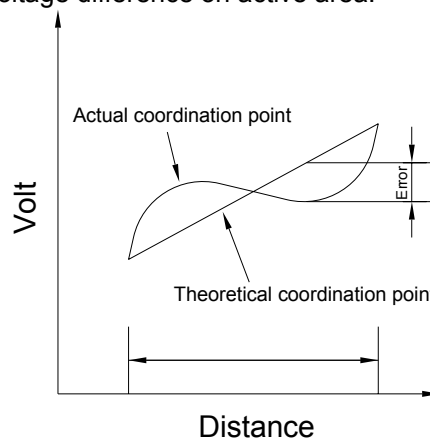
4 Optical Specification

4.1 TFT-LCD Module

Ta=25℃, Vci=3.3V, I$_B$=20mA

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Brightness		B		200	250	--	cd/m^2	with TP Note 1
				250	300			w/oTP Note 1
Contrast Ratio		CR	θ=0°	300	400	--	--	Note 2
Response Time	Rising : T$_r$		Normal viewing angle	--	25	40	ms	Note 3
	Falling : T$_f$							
Color Chromaticity (CIE 1931)	White	X	At the center of panel	0.261	0.311	0.361	--	
		Y		0.288	0.338	0.388		
	Red	X	Backlight On	0.533	0.583	0.633		
		Y		0.302	0.352	0.402		
	Green	X	Equipment: BM7 Field=2°	0.292	0.342	0.392		
		Y		0.542	0.592	0.642		
	Blue	X		0.095	0.145	0.195		
		Y		0.077	0.127	0.177		
Viewing Angle	Top	θ$_U$	CR≧10 Backlight On Equipment: BM7 Field=2°	--	50	--	Degrees	Note 4
	Bottom	θ$_D$		--	65	--		
	Left	θ$_L$		--	60	--		
	Right	θ$_R$		--	60	--		
Uniformity		Un	θ=0° Normal viewing angle Backlight On Equipment: BM7 Field=2°	70	80	--	%	Note 5

4.2 Touch Panel

Item	Specification	Remark
Light Transmission	≧(80%)	
Haze	≦(3%)	

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Note 1: The brightness test equipment setup

       I_B=20mA, Field=2° (As measuring "black" image, field=2° is the best testing condition)

BM-7

Field = 2°

50 cm

TFT-LCD Panel

The center of the screen
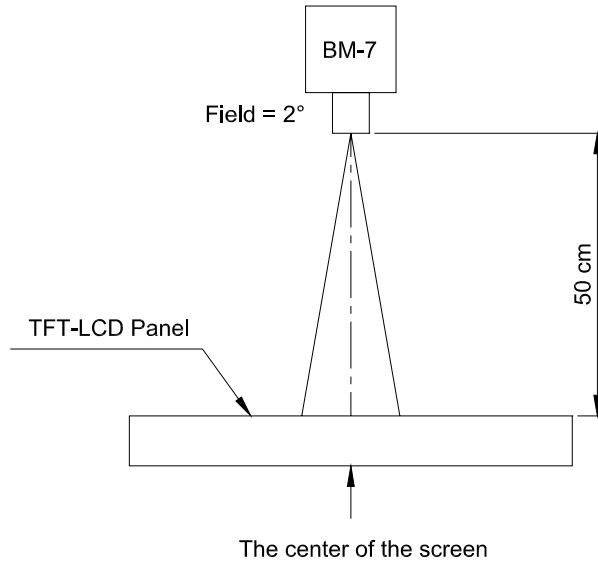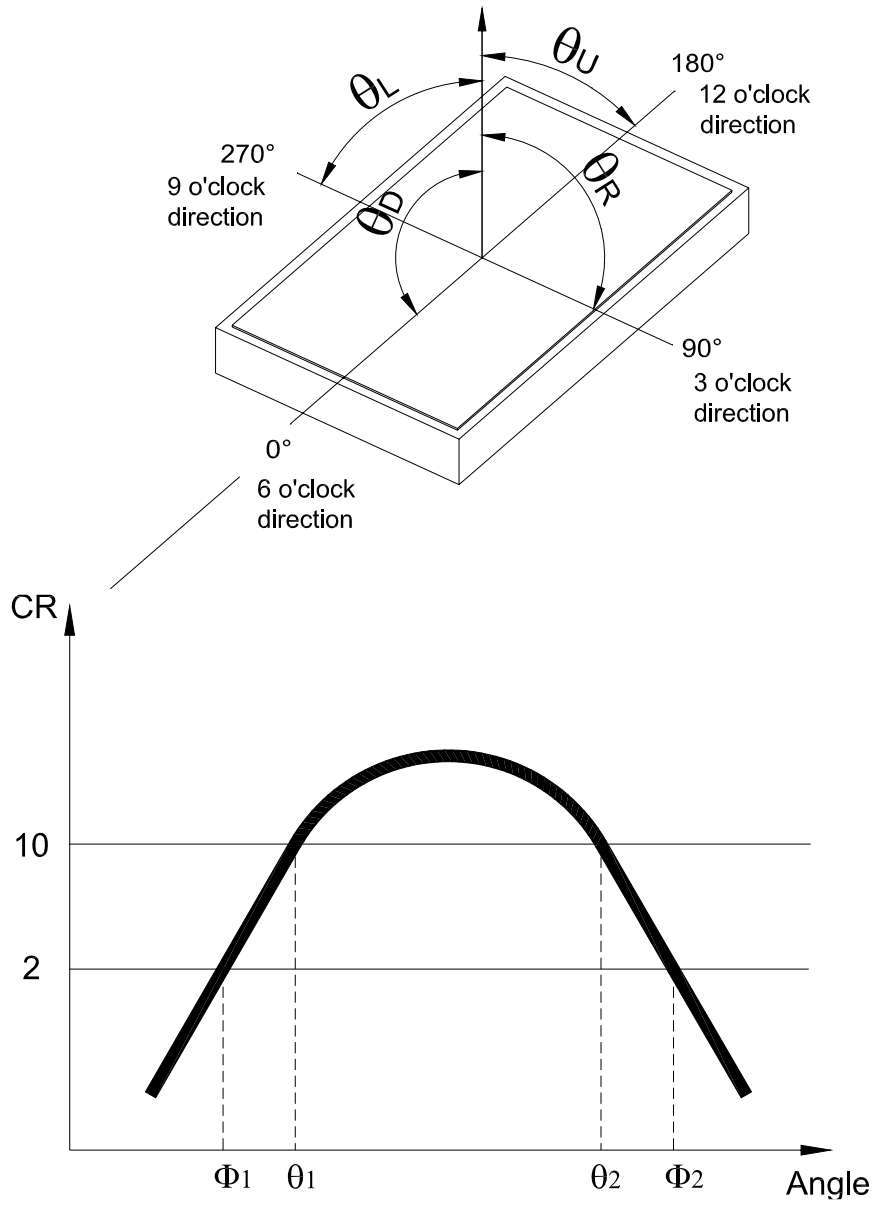
Note 2: Definition of contrast ratio (**C.R**)

$$C.R = \frac{\text{Brightness When LCD is at "White" State}}{\text{Brightness When LCD is at "Black" State}}$$
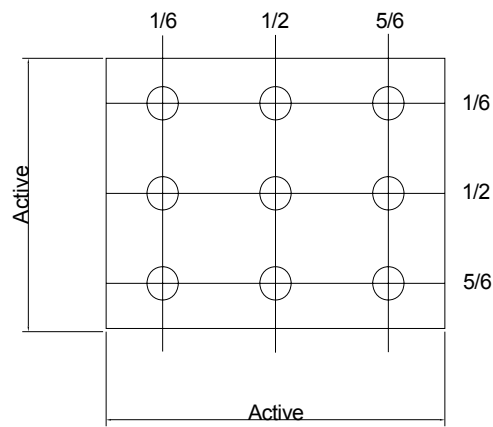
Note 3: Definition of response time

T_r T_f

100%

90%

10%

0%

Brightness (%)

Time (ms)

White(TFT OFF)   Black(TFT ON)   White(TFT OFF)
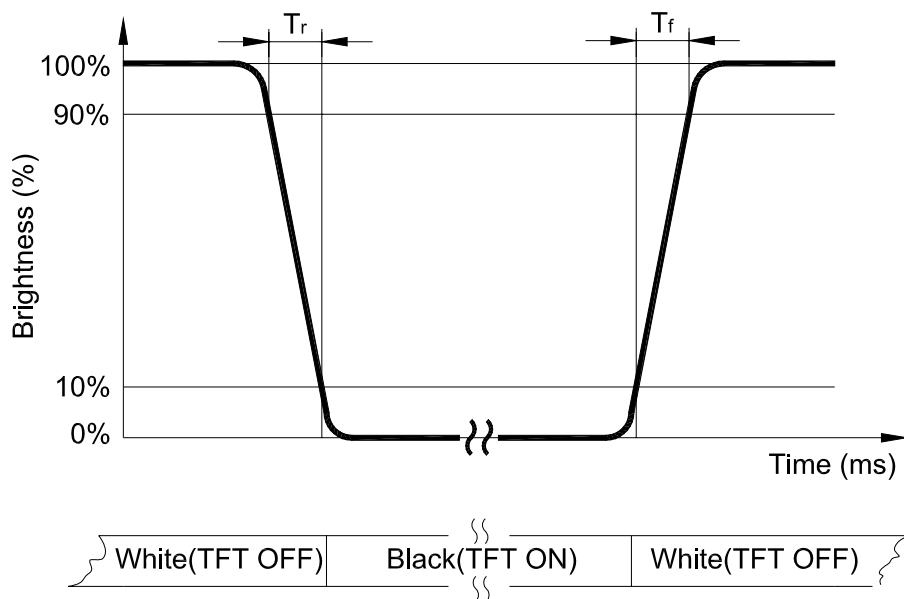
Note 4: Definition of viewing angle

Note 5: Definition of uniformity (**Un**)
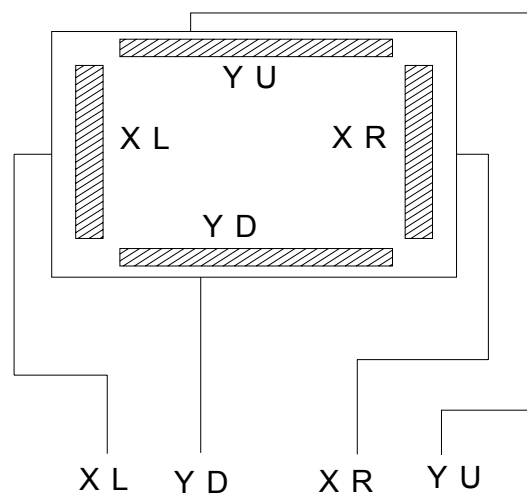
$$Un = \frac{Bmin}{Bmax} \times 100\%$$

5 Block Diagram

5.1 TFT-LCD Module

5.2 Touch Screen Panel

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I n c o r p o r a t i o n
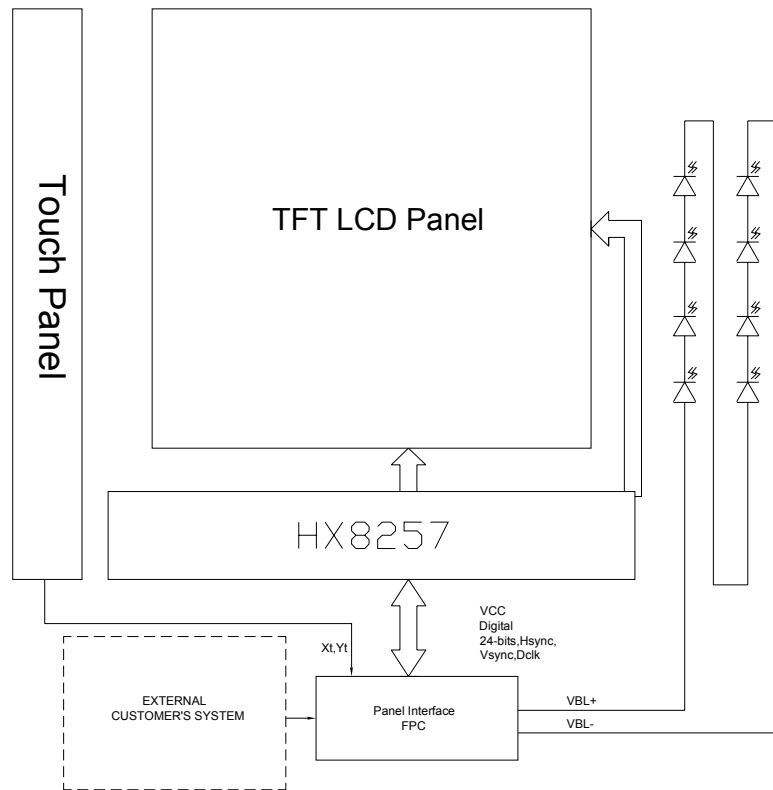
6 Interface Specification

Pin No	Symbol	Description	Input/Output	Note
1	VLED-	Backlight Cathode	I	
2	VLED+	Backlight Anode	I	
3	VCC/VSS	Power Supply (3.3V)/ Power Ground	I	
4	VCC	Power Supply (3.3V)	I	
5	R0	Data 0	I	
6	R1	Data 1	I	
7	R2	Data 2	I	
8	R3	Data 3	I	
9	R4	Data 4	I	
10	R5	Data 5	I	
11	R6	Data 6	I	
12	R7	Data 7	I	
13	G0	Data 8	I	
14	G1	Data 9	I	
15	G2	Data 10	I	
16	G3	Data 11	I	
17	G4	Data 12	I	
18	G5	Data 13	I	
19	G6	Data 14	I	
20	G7	Data 15	I	
21	B0	Data 16	I	
22	B1	Data 17	I	
23	B2	Data 18	I	
24	B3	Data 19	I	
25	B4	Data 20	I	
26	B5	Data 21	I	
27	B6	Data 22	I	
28	B7	Data 23	I	
29	VSS	Power Ground	I	
30	DCLK	Dot Clock Signal	I	
31	DISP	Display On/off Mode Control	I	
32	HSYNC	Horizontal Synchronization Signal	I	
33	VSYNC	Vertical Synchronization Signal	I	
34	DE	Input Data Enable Control	I	

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| 35	VDD	Power Supply	I	
36	VDD /VSS	Power Supply /Power Ground	I	
37	XR	Touch Panel Glass Terminal	I	
38	YD	Touch Panel Film Terminal	I	
39	XL	Touch Panel Glass Terminal	I	
40	YU	Touch Panel Film Terminal	I	

7   Interface Introduction

7.1   Power ON/OFF Control

When DISP pin is pulled "H", blank data is outputted for 10-frames first, from the falling edge of the following VSYNC signal. Similarly, when DISP is pulled "L", 10-frames of blank data will be outputted from the falling edge of the following VSYNC, too. The blank data would be gray level 0 for normally black LC (NBW="H"), and be gray level 255 for normally white LC (NBW="L").
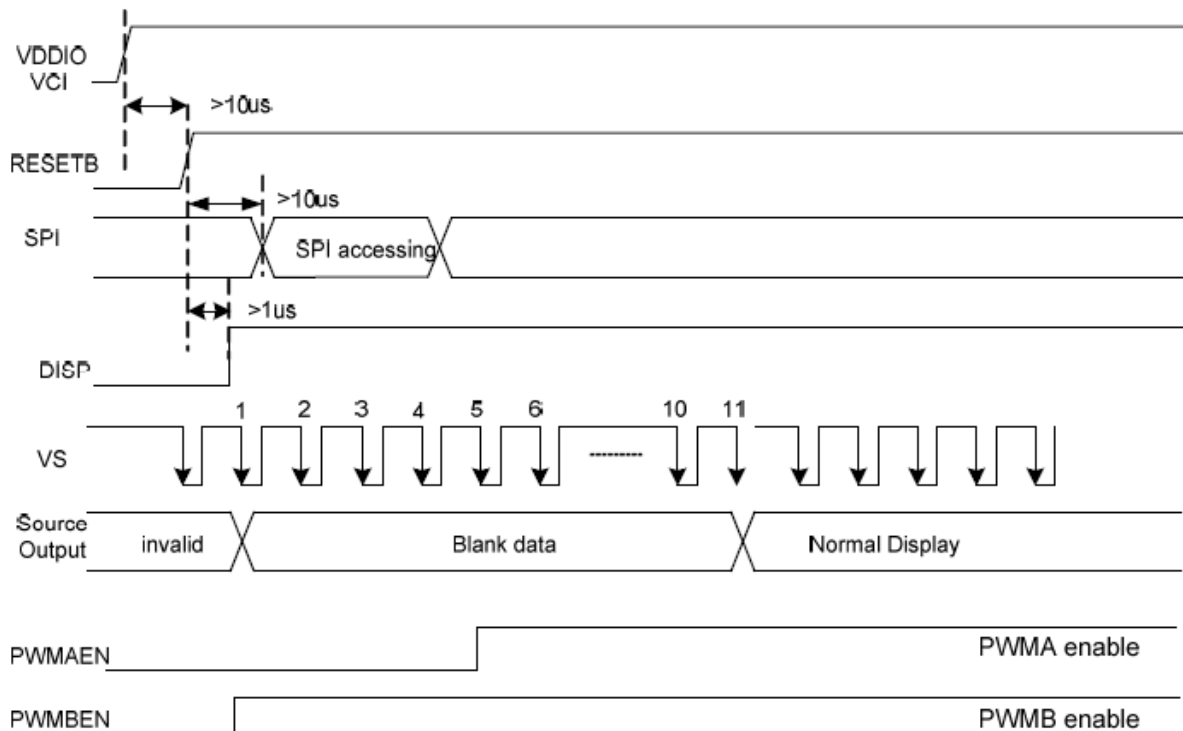
Power On Sequence

Power Off Sequence

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I n c o r p o r a t i o n
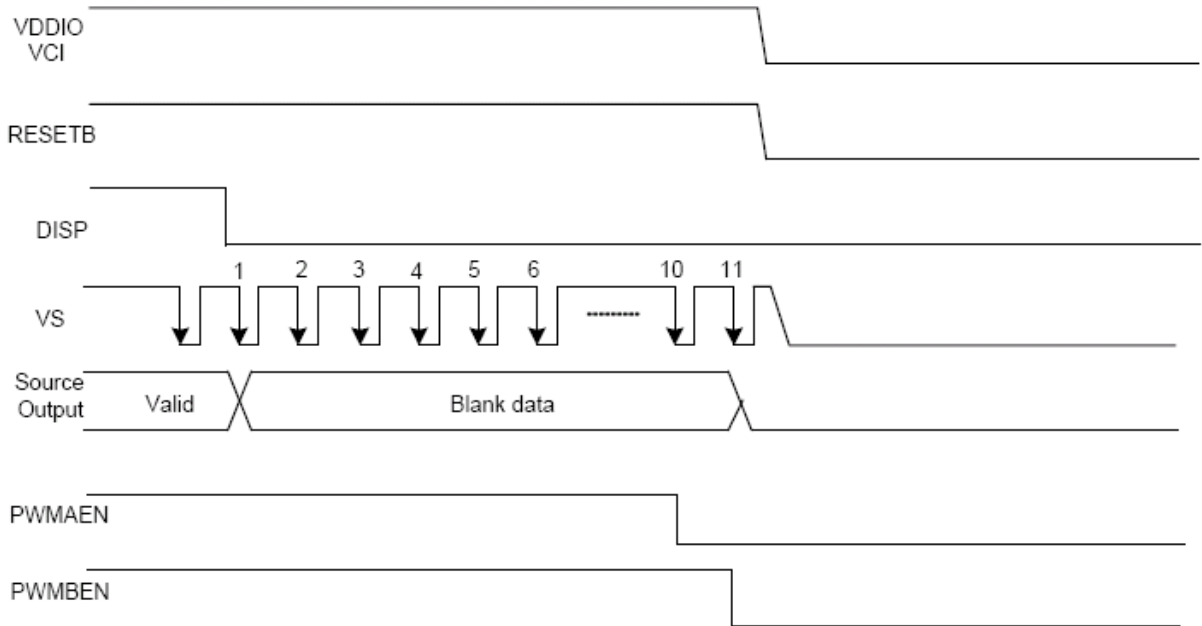
7.2 DC Characteristic

(Unless otherwise specified, Voltage Referenced to DVSS, VDDIO = 2.2V, TA = 25ºC)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
VDDIO	Power supply pin of IO pins	Recommend Operating Voltage Possible Operating Voltage	1.8	-	3.6	V
VCI	Booster Reference Supply Voltage Range	Recommend Operating Voltage Possible Operating Voltage	3 or VDDIO	-	3.6	V
Isleep	Sleep mode current			50		EA
Idp	Operating mode current	VCI=3.3V		13	15	mA
VCL	Negative VCI Output Voltage	No panel loading	-VCI	-	-VCI+0.7	V
VCIX2	VCIX2 primary booster efficiency(1)	No panel loading, ITO for VCIX2, VCI and VCHS = 10 Ohm	5.2	5.4	5.6	V
VDC	VDC Output Voltage	VDC[3:0]=1011	4.9	5	5.1	V
VGH	Gate driver High Output Voltage Booster efficiency(2)	No panel loading; 3x booster	84	89.5	-	%
		No panel loading; 4x booster	80	88.5	-	%
VGL	Gate driver Low Output Voltage	VGL = -2 x VDC	-10	-10	-9	V
VCOMH	VCOM High Output Voltage(3)		-3%	COMC+COMPP	3%	V
VCOML	VCOM Low Output Voltage(3)		-3%	COMC-COMPP	3%	V
VLCD	VLCD Output Voltage	VRH[5:0]=100100	4.41	4.51	4.61	V
VOH1	Logic High Output Voltage	I out = -100EA	0.9*VDDIO	-	VDD	V
VVD	Source Output Voltage Deviation		-	±20	±30	mV
VOS	Source Output Voltage Offset		-	-	±30	mV
VOL1	Logic Low Output Voltage	I out = 100EA	0	-	0.1*VDDIO	V
VIH1	Logic High Input voltage		0.8*VDDIO	-	VDDIO	V
VIL1	Logic Low Input voltage		0	-	0.2*VDDIO	V
IOH	Logic High Output Current Source	V out = VDD – 0.4V	50	-	-	EA
IOL	Logic Low Output Current Drain	V out = 0.4V	-	-	-50	EA
IOZ	Logic Output Tri-state Current Drain Source		-1	-	1	EA
IIL/I IH	Logic Input Current		-1	-	1	EA

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Note : (1) VCIX2 efficiency = VCIX2 / (2 x VCI) x 100%
(2) VGH efficiency = VGH / (VDC x n) x 100% (where n = booster factor)
(3) VCOML < 0V, VCOMH < VCIX2J

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I n c o r p o r a t i o n

7.3   AC Characteristics

7.3.1 Input Setup Timing Requirement

(TA =25ºC, VDDIO=1.8V to 3.6V, DVSS= 0V, tr (1)**=tf** (1)**=2ns)**

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DISP setup time	tdiss	10	-	-	ns
DISP hold time	tdish	10	-	-	ns
Clock period	PWCLK(2)	66.7	-	-	ns
Clock pulse high period	PWH(2)	26.7	-	-	ns
Clock pulse low period	PWL(2)	26.7	-	-	ns
Hsync setup time	ths	10	-	-	ns
Hsync hold time	thh	10	-	-	ns
Data setup time	tds	10	-	-	ns
Data hold time	tdh	10	-	-	ns
DE setup time	tdes	10	-	-	ns
DE hold time	tdeh	10	-	-	ns
Vsync setup time	tvhs	10	-	-	ns
Vsync hold time	tvhh	10	-	-	ns

Note: (1) tr, tf is defined 10% to 90% of signal amplitude.
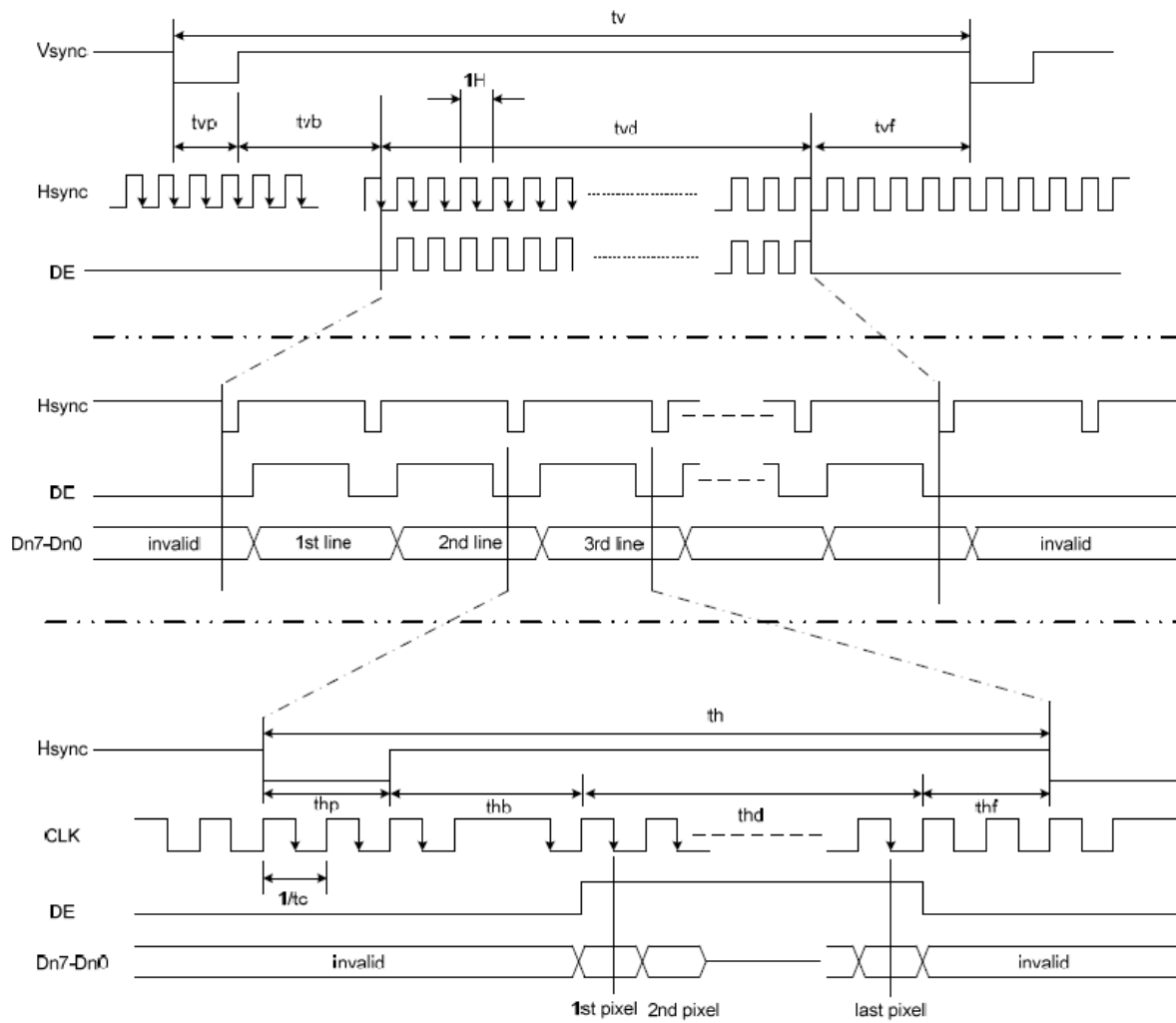   (2) For parallel interface, maximum clock frequency is 15MHz.
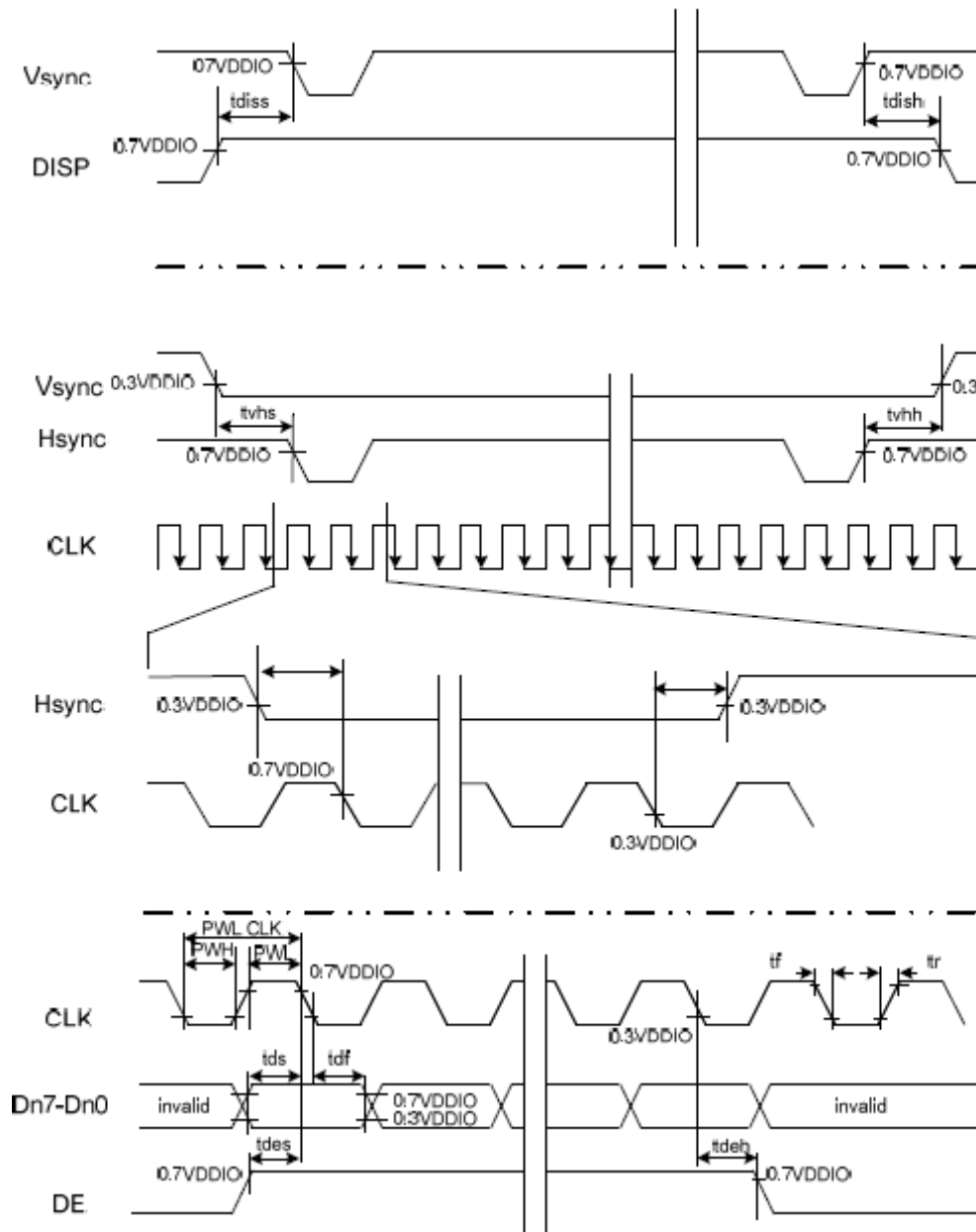
7.3.2 Parallel RGB Input Timing Requirement

(480RGBx272, TA =25⁰C, VDDIO=1.8V to 3.6V, DVSS= 0V)

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	fCLK(1)	-	9	15	MHz
Hsync cycle	1/th	-	17.14	-	KHz
Vsync cycle	1/tv	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp(2)	2	41	41	CLK
Horizontal back porch	thb(2)	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	511	H(1)
Vertical display period	tvd	272	272	272	H(1)
Vertical front porch	tvf	1	2	227	H(1)
Vertical pulse width	tvp(2)	1	10	11	H(1)
Vertical back porch	tvb(2)	1	2	11	H(1)

Note: (1) Unit: CLK=1/ fCLK , H=th,

(2)It is necessary to keep tvp+tvb=12 and thp+thb=43 in sync mode. DE mode is unnecessary to keep it.

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8   Outline Dimension

See next page.

Module Specifications

1. 4.3" Transmissive, Normally-White TFT-LCD Module
2. Resolution: 480 (RGB) x 272
3. Driver IC: HX8257
4. Interface: Parallel RGB-24 bit
5. Backlight: 8LEDs in Serial

4.3" TFT-LCD
480(RGB) x 272
Viewing Direction
(6 o'clock)

Touch Panel

No Coverlay
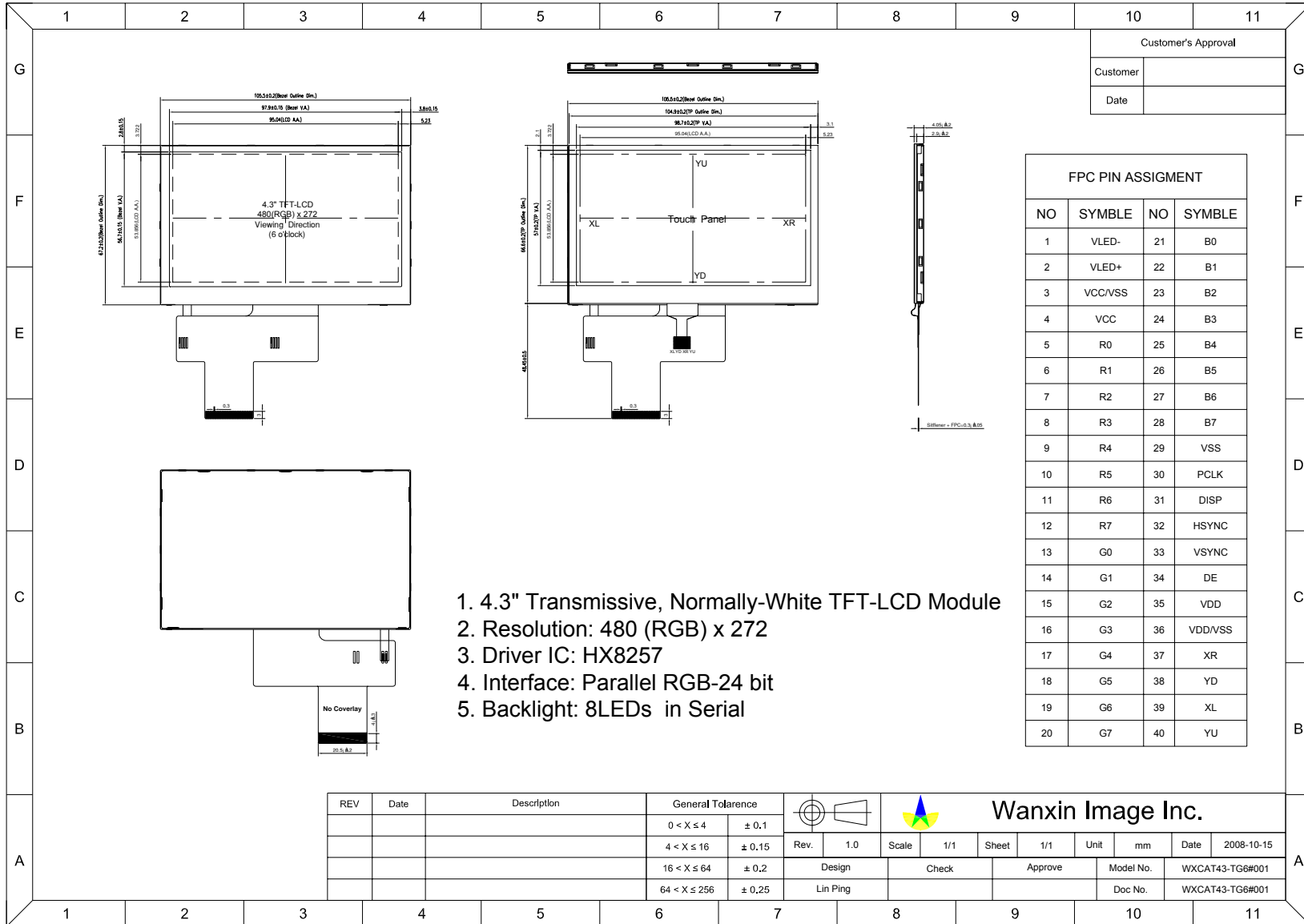
Customer's Approval

Customer	
Date	
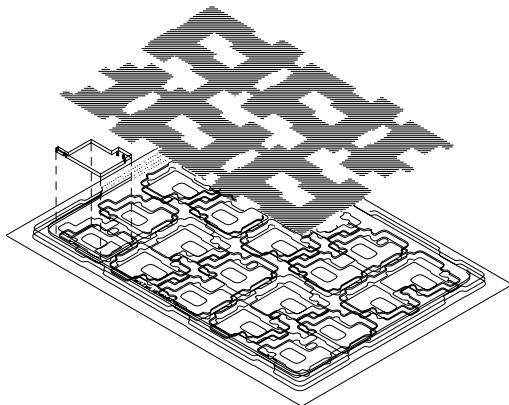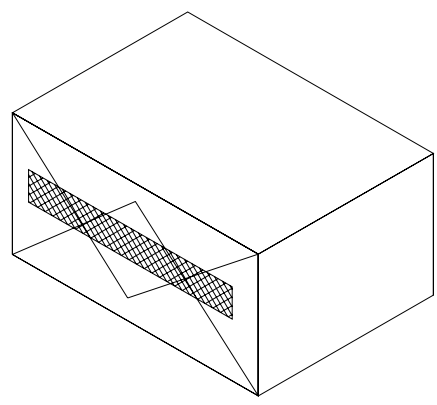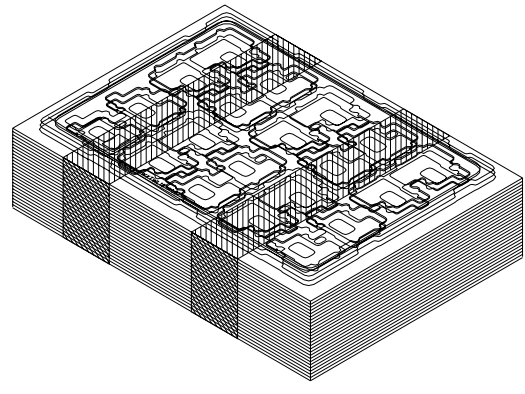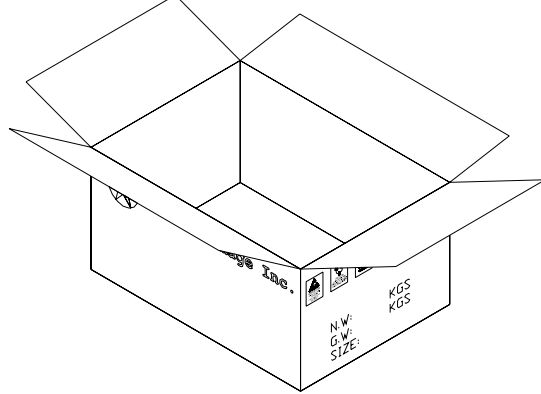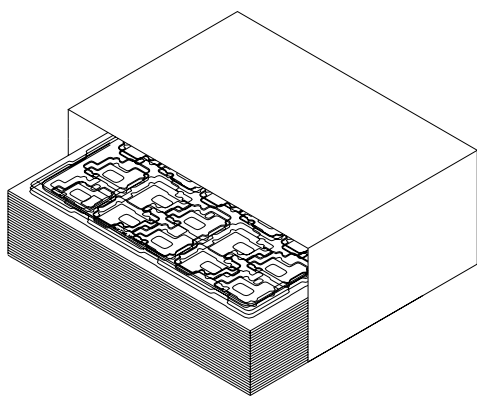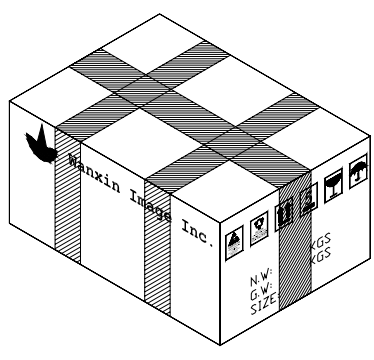
FPC PIN ASSIGMENT

NO	SYMBLE	NO	SYMBLE
1	VLED-	21	B0
2	VLED+	22	B1
3	VCC/VSS	23	B2
4	VCC	24	B3
5	R0	25	B4
6	R1	26	B5
7	R2	27	B6
8	R3	28	B7
9	R4	29	VSS
10	R5	30	PCLK
11	R6	31	DISP
12	R7	32	HSYNC
13	G0	33	VSYNC
14	G1	34	DE
15	G2	35	VDD
16	G3	36	VDD/VSS
17	G4	37	XR
18	G5	38	YD
19	G6	39	XL
20	G7	40	YU

REV	Date	Description	General Tolarence		
			0 < X ≤ 4	± 0.1	
			4 < X ≤ 16	± 0.15	
			16 < X ≤ 64	± 0.2	
			64 < X ≤ 256	± 0.25	

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Rev.	1.0	Scale	1/1	Sheet	1/1	Unit	mm	Date	2008-10-15
Design		Check		Approve		Model No.		WXCAT43-TG6#001	
Lin Ping						Doc No.		WXCAT43-TG6#001	

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I n c o r p o r a t i o n

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9 Package

1	4
8 pcs per tray + 1 cover (EPE)	Packing bag
2	5
25trays + 1 dummy tray = 200 pcs Packing 26 trays with sealing tape	Putting bag into carton Protected by 6 pieces of cushion EPE sheet
3	6
Putting trays into anti-electrostatic bag	Packing carton with sealing tape Carton outline size: 417×310×262 (mm)

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I n c o r p o r a t i o n

10 Precautions

Please pay attentions to the followings as using the LCD module.

10.1 Handling

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the polarizer permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(i) Do not disassemble the LCD module.

10.2 Storage

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.

10.3 Operation

(a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms stated in chapter 8 should always obeyed to avoid damaging the LSI and electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

10.4 Touch Panel Mounting Notes

(a) If a cushion is used between bezel/housing and film must be choose as free as enough to absorb the expansion and contraction to avoid the distortion of film.

(b) The cushion must be placed out of the Viewing Area.

(c) Bezel/Housing edge must be posited between Key Area and Viewing Area. The edge enters the Key Area may cause unexpected input if the gap is too narrow or foreign particles like dusts exist between Bezel/Housing and ITO film.

(d) Mounting example:

Bezel / Housing

Cushion

ITO Film

ITO Glass

TP Active Area

TP Key Area

TP Viewing Area

0.2 mm   0.3 mm
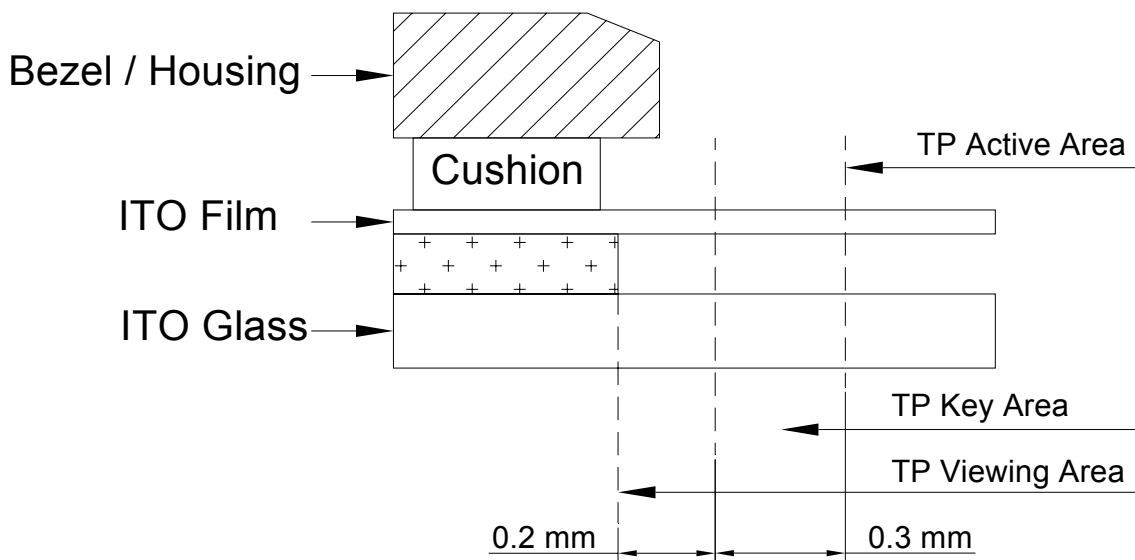
The corner part has conductivity. Do not touch any metal part after mounting.

10.5 Others

(a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

(b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.

(c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.