



# Specifications

## TFT-LCD module

**Model No: FRD430P40004-L**

**For Customer's Acceptance**

Approved by	Comment

	Signature	Date
Prepared by		
Checked by		
Approved by		



# DACHS



## Contents

No.	ITEM
1.	DOCUMENT REVISION HISTORY
2.	GENERAL DESCRIPTION
3.	OUTLINE DIMENSION
4.	TFT-LCM INTERFACE SPECIFICATION
5.	ABSOLUTE MAXIMUM RATINGS
6.	ELECTRICAL SPECIFICATIONS
7.	TIMING CHARACTERISTICS
8.	POWER SUPPLY CONFIGURATION
9.	OPTICAL SPECIFICATION
10.	RELIABILITY TEST ITEMS
11.	PACKAGE
12.	PRECAUTIONS
13.	INSPECTION STANDARD



深圳市福瑞达显示技术有限公司  
SHENZHEN FRIDA LCD CO.,LTD

Doc.No.: FRD430P40004-L

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PAGE : 3/18

**SPEC TITLE**  
DOCUMENT CONTROL SPECIFICATION

EFFECTIVE DATE : 2017-10-18

### 1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
A	2017-10-18	First Release.		



## 2.General Description

**FRD430P40004-L** 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, The panel size is 4.3 inch and the resolution is 480×272. High image quality a-Si TFT LCD module. Partial-screen display function is available. Sleep and Stand-by modes are available for power saving.

### 2.1 Features

No	Item	Specification	Remark
1	Display Mode	Normally White	
2	Screen Size	4.3 inch	
3	Resolution	480 × RGB × 272	
4	Color Number	262K	
5	Color Arrangement	TFT Active Matrix	
6	Driver IC	ST7282	
7	Back Light	White Led 7*1	
8	Viewing Direction	6 o'clock	
9	Interface	RGB 24-Bi t	
10	Surface Treatment	UV Cut	
11	touch panel	With CTP	
12	CTP Driver IC	FT5216	
13	Connector Type of CTP	I <sup>2</sup> C	

### 2.2 Application

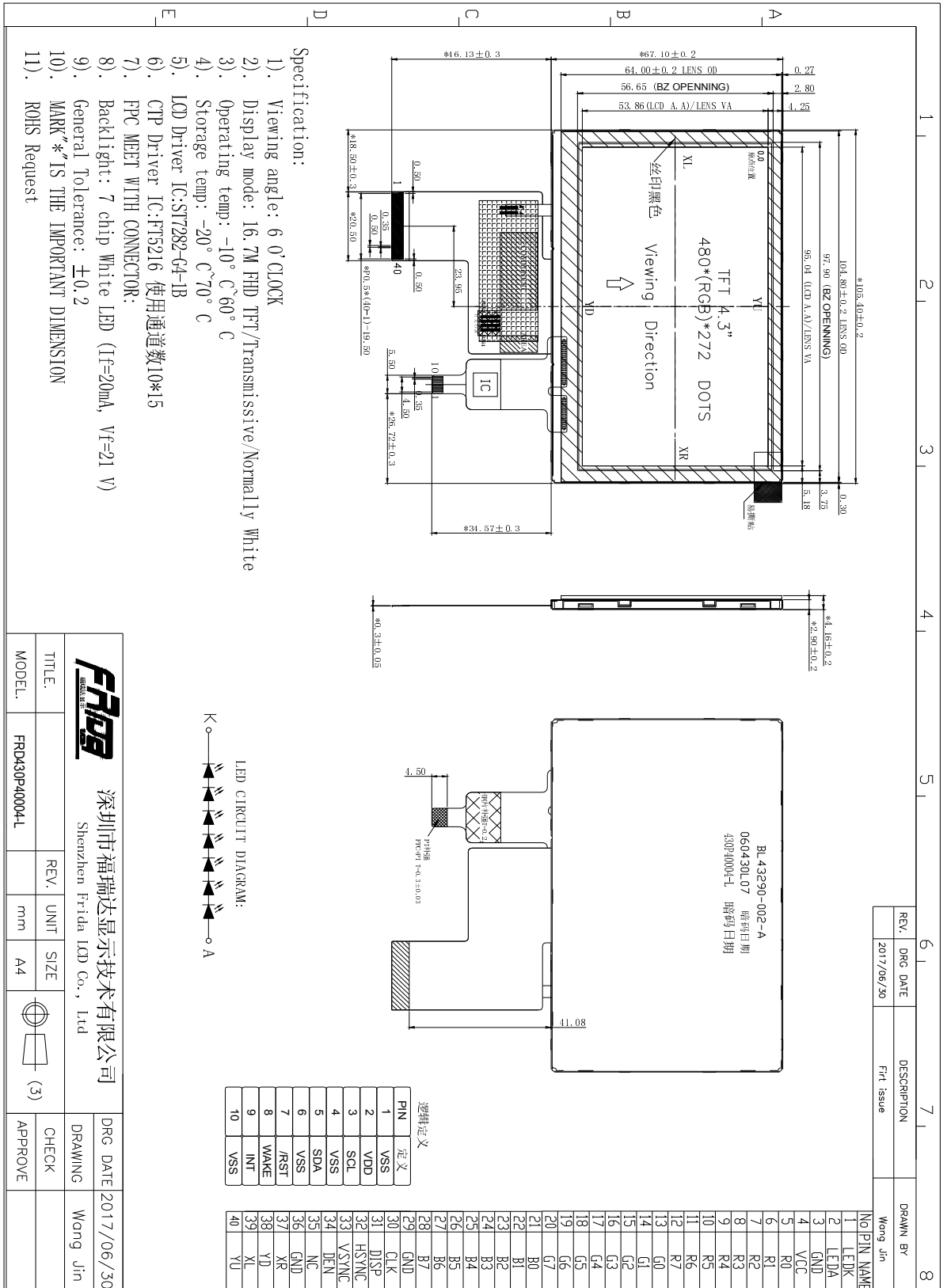
- ◆ Mobile phone.
- ◆ Portable multimedia device.

## 3.Outline Dimension

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

Parameter	Specifications	Unit
Outline dimensions	105.40(W) × 67.10(H) × 4.16(D) (LCM, not include FPC)	mm
Active area	95.04(W) × 53.86(H)	mm
Resolution	480(H)×RGB×272(V) dots	-
Dot size	0.198(H)x0.198(V)	mm

Figure 1: Module specification of the module





#### 4.TFT-LCM Interface Specification

Pin No	Symbol	Description	Note
1	LEDK	Power supply Cathode input for backlight	
2	LEDA	Power supply Anode input for backlight	
3	GND	System Ground	
4	VCC	Power Supply For LCD(2.8V)	
5-12	R0-R7	Red data bus	
13-20	G0-G7	Green data bus	
21-28	B0-B7	Blue data bus	
29	GND	System Ground	
30	DCLK	Dot clock signal for DPI (RGB) interface operation.	
31	DISP	Control the LCM on or off	
32	HS	Line synchronizing signal for DPI (RGB) interface operation.	
33	VS	Frame synchronizing signal for DPI (RGB) interface operation.	
34	DE	Data enable signal for DPI (RGB) interface operation.	
35	NC	No connection	
36	GND	System Ground	
37	XR	Touch control pin/NC	
38	YD		
39	XL		
40	YU		

#### CTP Interface Specification

Pin No	Symbol	Description	Note
1	GND	System Ground	
2	VDD(2.8V)	Power supply input for CTP: 2.8V	
3	SCL(1.8V)	Serial clock signal	
4	GND	System Ground	
5	SDA(1.8V)	Serial data input signal	
6	GND	System Ground	
7	RESET(1.8V)	Reset Signal	
8	WAKE	Wake up signal	
9	INT(1.8V)	Interrupt signal	
10	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 (VCC)	VCC	-0.3	+4.0	V	1

Note:

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

### 5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-10°C	+60°C	-20°C	+70°C	Dry
Humidity (Note 1)	80% max. RH for Ta 40°C < 50% RH for 40°C < Ta Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

## 6. Electrical Specifications

### Typical Electrical Characteristics

At Ta = 25 °C, VCC = 2.6V to 3.3V.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCC-GND		2.6	3.3	3.6	V
Supply current (Logic & LCD)	ICC	VCC=2.8V	-	-	15	mA
Supply voltage of white LED backlight	VLED =V(BL+)-V(BL-)	Forward current =20 mA Number of LED dies = 7	-	21	-	V
Luminance (on the module surface)			-	TBD	-	cd/m <sup>2</sup>



## 7. Timing Characteristics

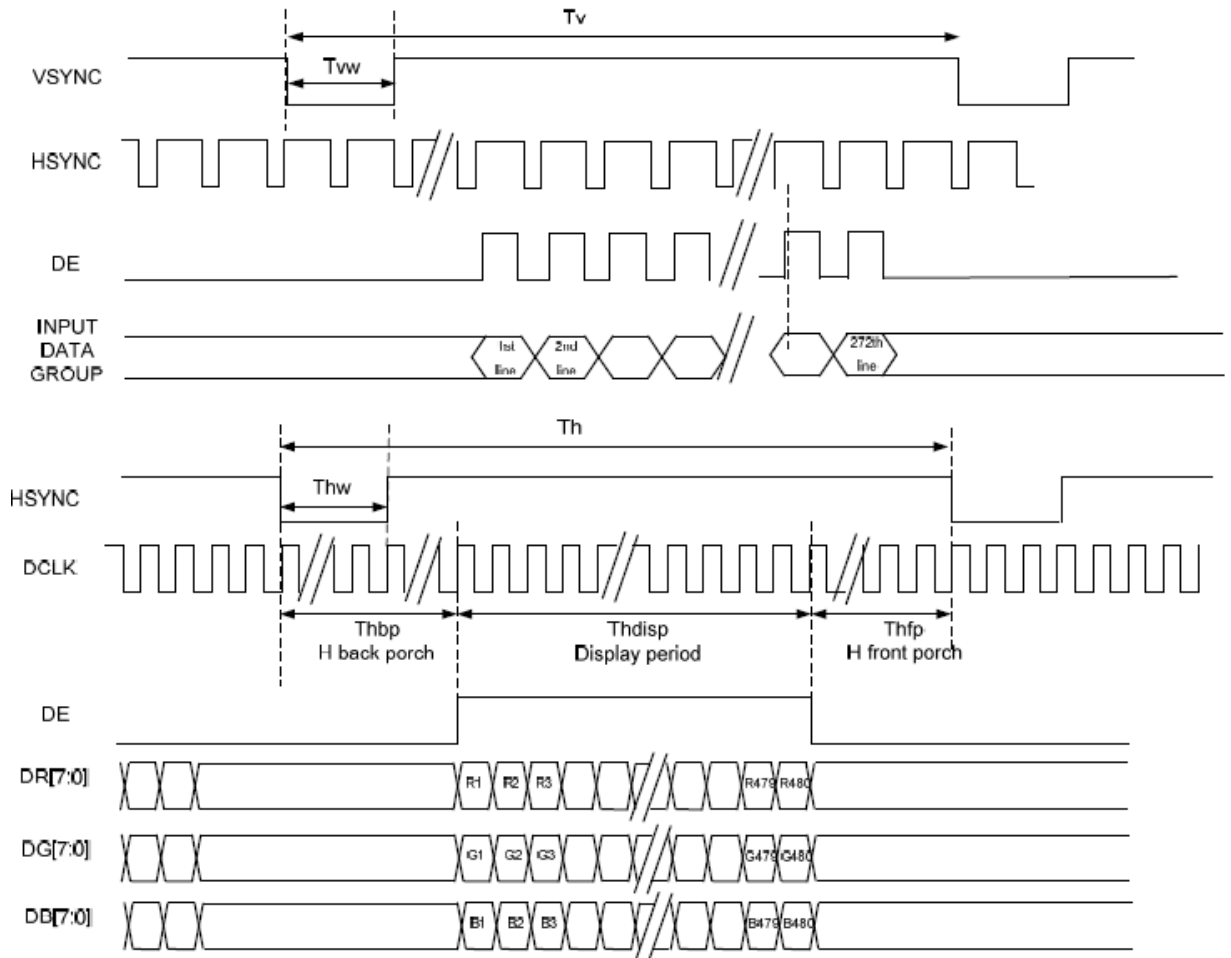
### RGB Input Timing Table

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

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

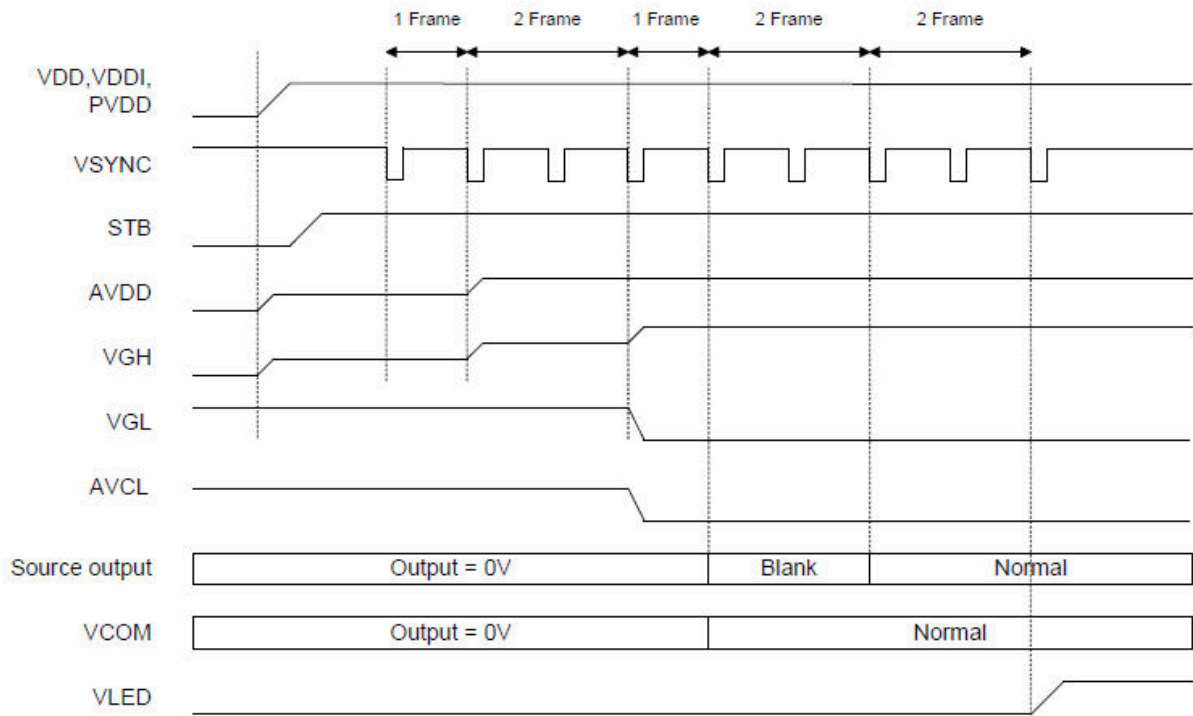


### SYNC-DE Mode Timing Diagram

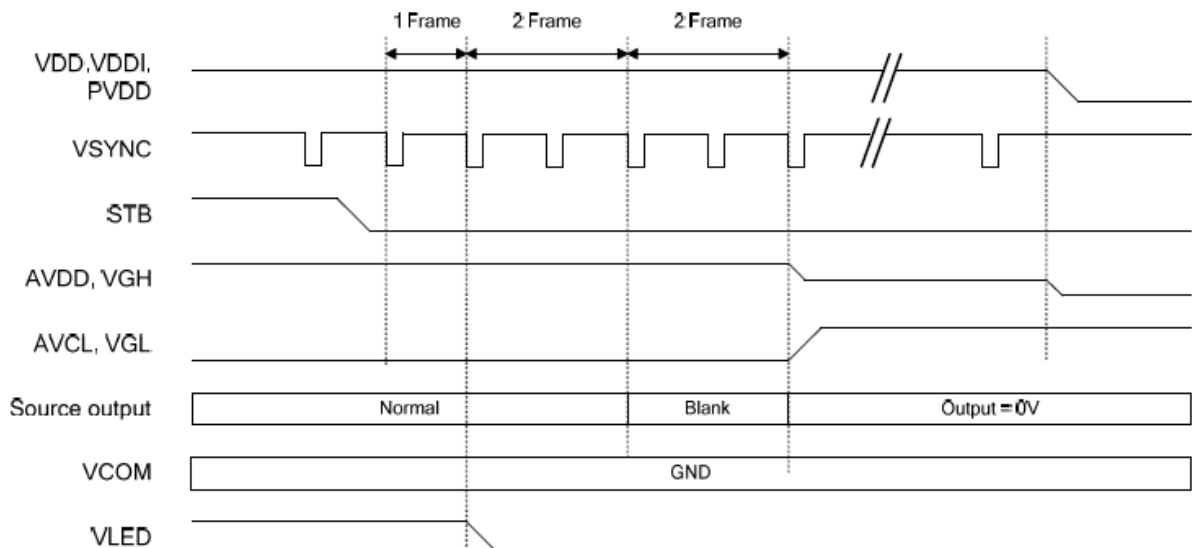


## 8.Power Supply Configuration

### Power On Sequence



### Power Off Sequence

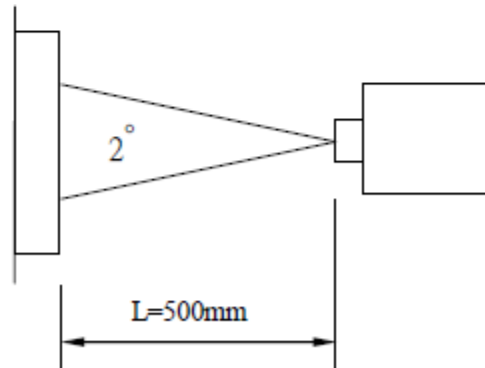


## 9.Optical Specification

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Transmittance	T		5.6	5.9		%	Note 2
Contrast Ratio	CR	*1)	250	350	--	--	Note 3
Response Time	Tr+ Tf	*3)	-	30	45	ms	Note 4
Viewing Angle	Vertical	$\theta$ *2)	CR $\geq$ 10	90	110	--	Note 5
	Horizontal	$\phi$ *2)		110	130	--	
Color Filter Chromacity with C light	White	x y	$\theta = \phi = 0^\circ$	0.282	0.302	0.322	Note 6
				0.318	0.338	0.358	
	Red	x y	$\theta = \phi = 0^\circ$	0.586	0.606	0.626	
				0.305	0.325	0.345	
	Green	x y	$\theta = \phi = 0^\circ$	0.283	0.303	0.323	
				0.547	0.567	0.587	
Blue	x y	$\theta = \phi = 0^\circ$	0.127	0.147	0.167		
			0.121	0.161	0.181		
NTSC			-	50%	-		

Note 1.Ambient condition : 25°C $\pm$ 2°C , 60 $\pm$ 10%RH , under 10 Lux in the darkroom .

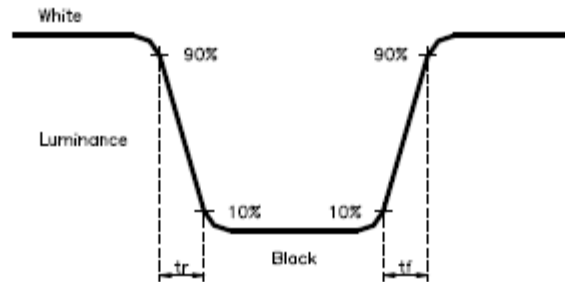
Note 2.Measure device : BM-5A (TOPCON) , viewing cone=2° , I<sub>L</sub>=20mA .



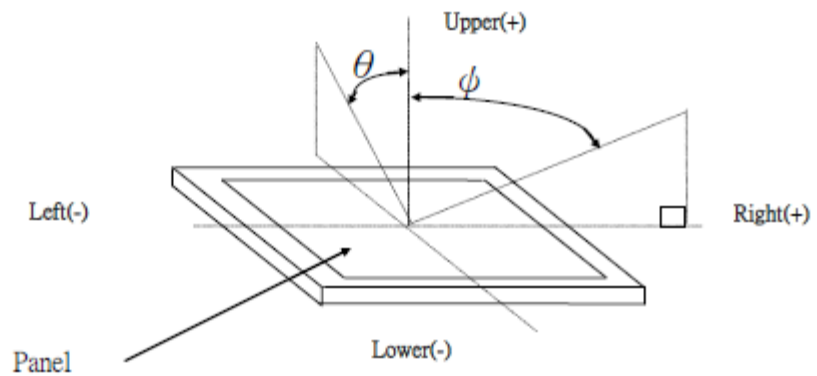
Note 3. Definition of Contrast Ratio :

$$CR = \text{White Luminance (ON)} / \text{Black Luminance (OFF)}$$

Note 4. Definition of response time : The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 5. Definition of view angle( $\theta$  ,  $\psi$ ) :



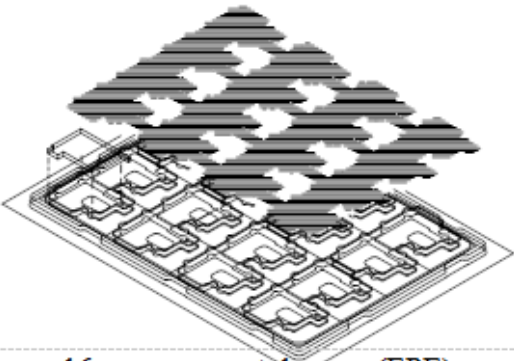
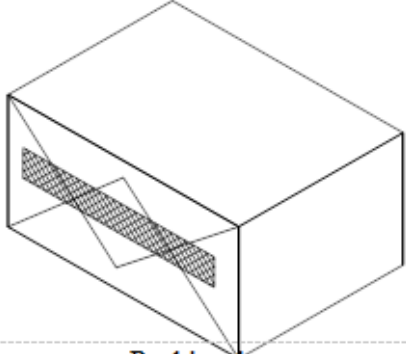
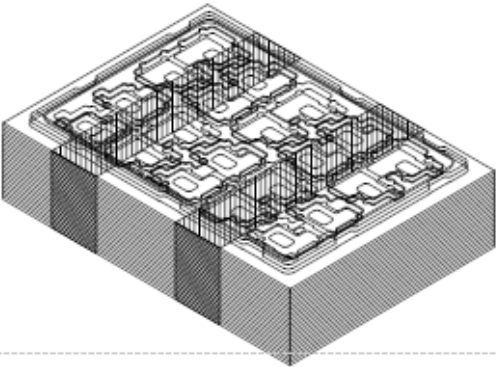
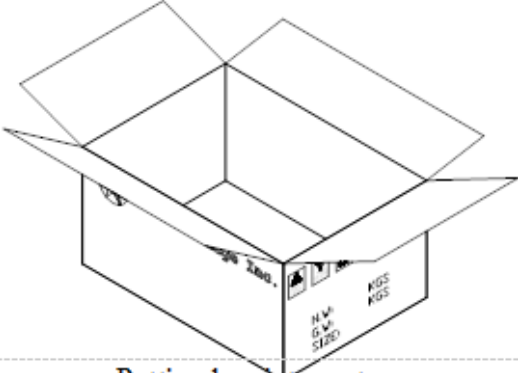
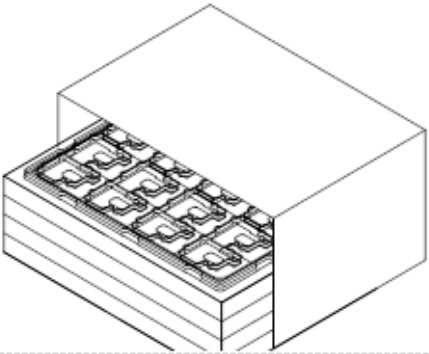
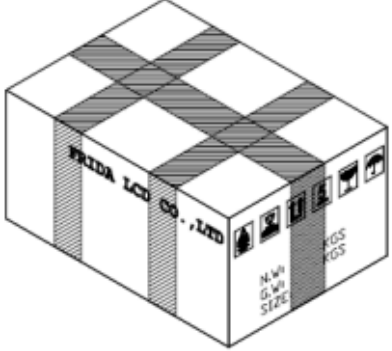
Note 6. Light source: C light.



### 10. Reliability Test Items

Item	Test Condition		Criterion
High Temperature Storage	70 °C, 120 hrs		There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.
Low Temperature Storage	-20 °C, 120 hrs		
High Temp. & High Humidity Storage	60 °C, 80% RH, 120 hrs		
Vibration Test (Non-operating)	Freq.:10~55~10 Hz, Amp.:1.5mm 1 hr for each direction of X, Y, Z		
Electrostatic Discharge Test (Non-operating)	Terminals	150 pF, 0 Ω, ±300 V, Contact	
	Panel	150 pF, 330 Ω, ±8 KV, Air	
Thermal Shock (Static)	-20°C, 30 min /70°C, 30 min, 20 cycles		
High Temperature Operation	60 °C, 120 hrs		
Low temperature Operation	-10 °C, 120 hrs		
High Temperature & High Humidity (Operating)	40 °C, 70% RH, 120 hrs		
FPC Peeling Strength Test	Pull speed: 50 mm/min, +90°,		

## 11. Package

<p>1</p>  <p>16 pcs per tray + 1 cover (EPE)</p>	<p>4</p>  <p>Packing bag</p>
<p>2</p>  <p>25 trays + 1 dummy tray = 400 ps</p>	<p>5</p>  <p>Putting bag into carton Protected by 6 pieces of cushion EPE sheet</p>
<p>3</p>  <p>Putting trays into anti-electrostatic bag</p>	<p>6</p> 

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	REV : A	PAGE : 15/18
<b>SPEC TITLE</b> DOCUMENT CONTROL SPECIFICATION	EFFECTIVE DATE : 2017-10-18	

## 12.Precautions

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

### 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 touch panel surface 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.
- (j) Do not lift the FPC of Touch Panel.

### 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.

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	REV : A	PAGE : 16/18
<b>SPEC TITLE</b> DOCUMENT CONTROL SPECIFICATION	EFFECTIVE DATE : 2017-10-18	

Excessive weight will cause deformation and damage of carton box.

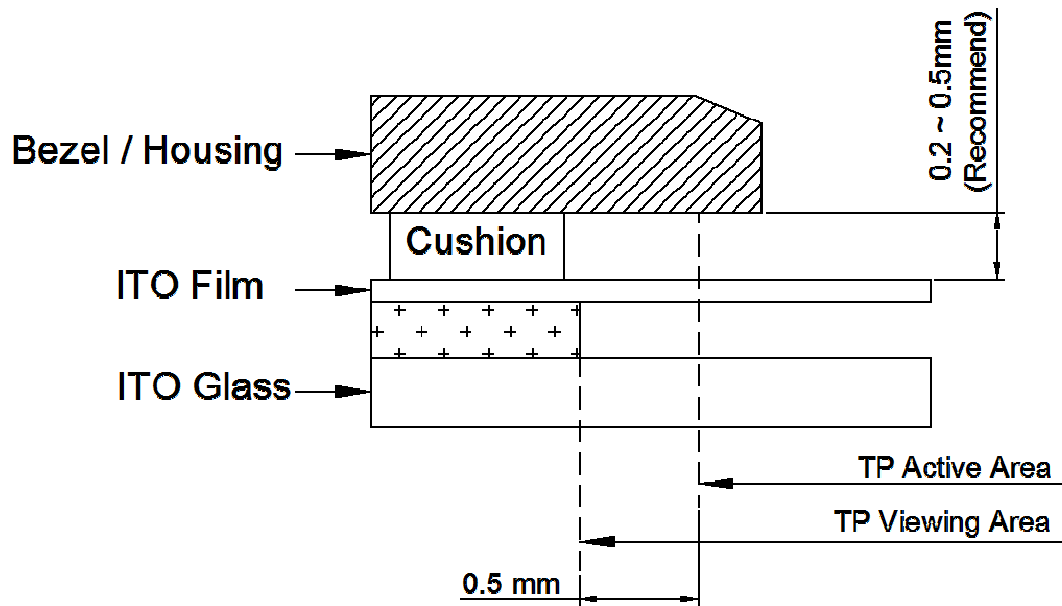
### **Operation**

- (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 above 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.
- (h) Most of the touch screens have air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the liquid is accumulated near the air vent.
- (i) For the fragility of ITO film, it should avoid to use too tapering pen as the input material.

### **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:





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

### 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.



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Doc.No.: FRD430P40004-L

REV : A

PAGE : 18/18

**SPEC TITLE**  
DOCUMENT CONTROL SPECIFICATION

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### 13. Inspection standard

TBD



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