PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No：FRD177C12006-A

For Customer's Acceptance	
Approved by	**Comment**

	Signature	Date
Prepared by		
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Contents

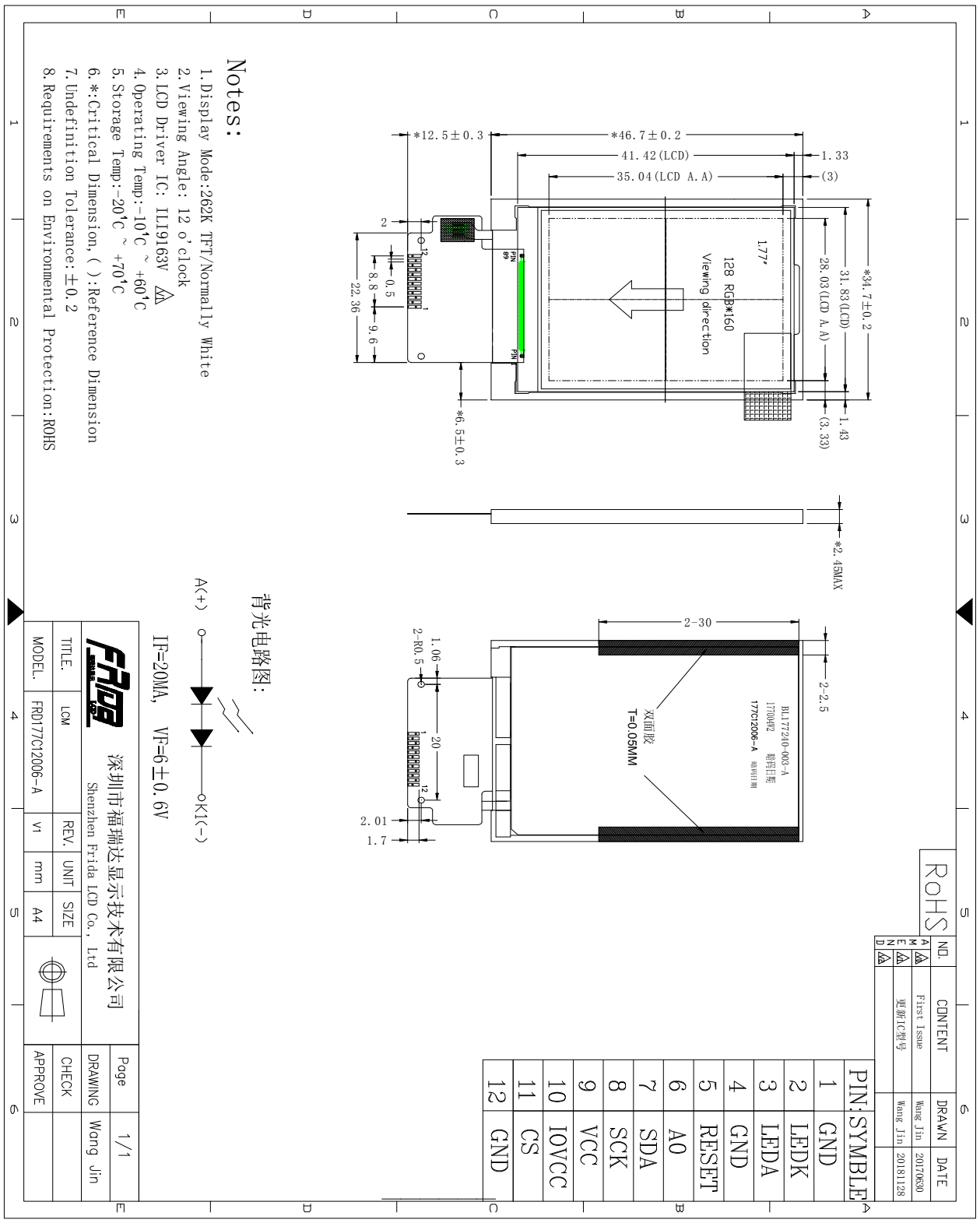
1. Document Revision History :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2018-11-28	First Release.	

2. General Description

No	Item	Specification	Remark
1	Screen Size	1.77 inch	
2	Display Mode	Normally White	
3	Resolution	128 × RGB × 160	
4	Active Area	28.03*35.04	mm
5	Outline Dimension	34.70*46.70*2.45(max)	mm
6	Viewing Direction	12 o’ clock	
7	Driver IC	ILI9163V	
8	Interface	4-line Serial Interface	
9	Back Light	White Led*2S	
10	Touch Panel	-	

3. Outline Dimension



4. Interface Specification

Pin No	Symbol	Description	Note
1	GND	Ground	
2	LEDK	Power Supply For LED Backlight Cathode Input	
3	LEDA	Power Supply For LED Backlight Anode Input	
4	GND	Ground	
5	RESET	Reset Signal input pin	
6	A0	Register selection signal	
7	SDA	Serial data input/output pin	
8	SCK	Serial clock signal	
9	VCC	Power Supply For LCD	
10	IOVCC	Power Supply For I/O	
11	CS	Chip selection signal pin	
12	GND	Ground	

5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VCC)	VCC	-0.3	+4.0	V	1
Power supply voltage(IOVCC)	IOVCC	-0.3	+3.3	V	1

Note:

1.VCC,IOVCC, GND must be maintained.

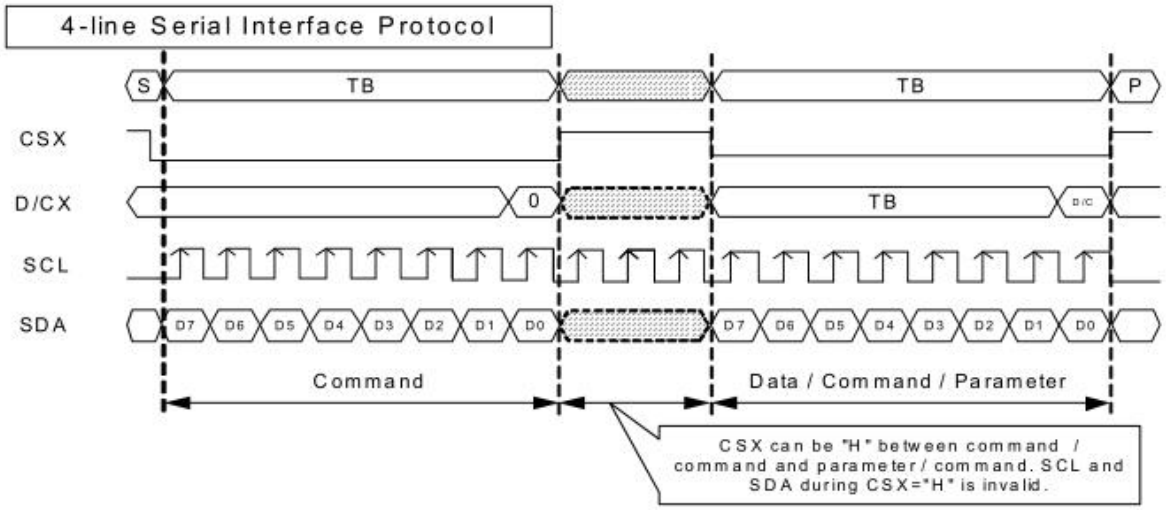
2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

6. Electrical Specifications

At Ta = 25 ℃, VCC = 2.5V to 4.0V, IOVCC=1.65V to 3.3V, GND=0V.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCC-GND	-		2.5	2.8	4.0	V
Supply voltage (I/O)	IOVCC-GND	-		1.65	1.8	3.3	V
Supply current (Logic & LCD)	IOVCC			-	-	-	mA
Supply voltage of white LED backlight	VLED	Forward current =20mA Number of LED = 2		5.4	6.0	6.6	V

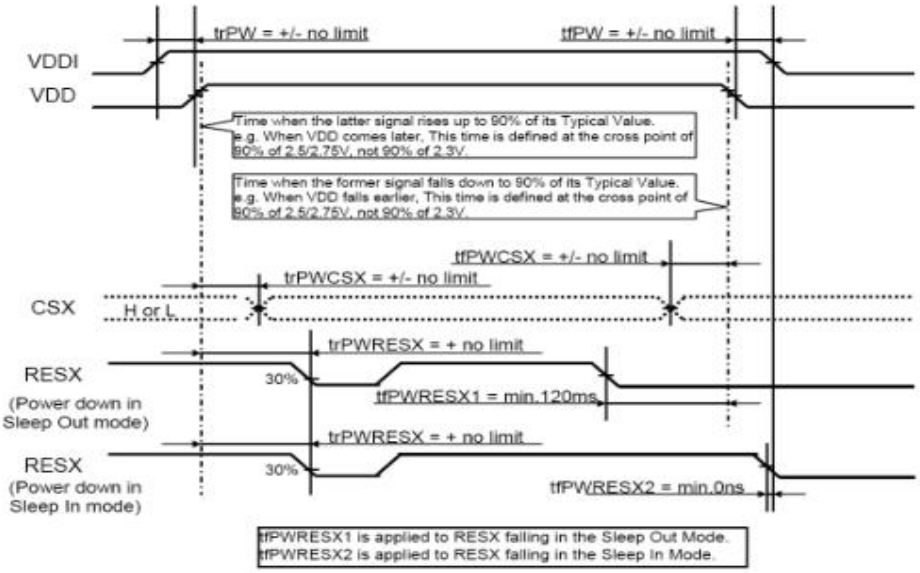
7.Timing Characteristics



8.Power Supply Configuration

9.1 Case 1 – RESX line is held high or Unstable by Host at Power –On

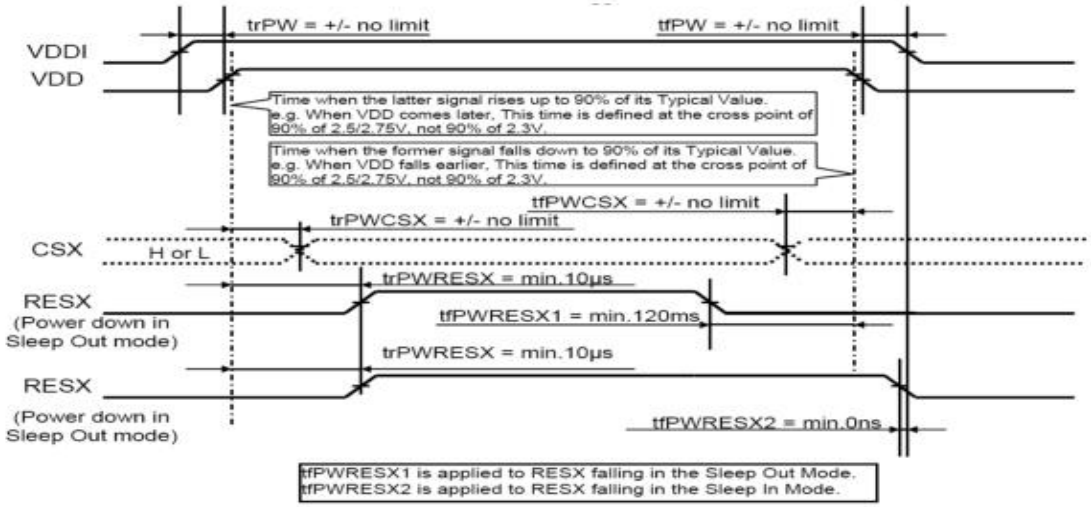
If RESX line is held high or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and VDDI have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

9.2 Case 2 – RESX line is held Low by Host at Power On

If RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for minimum 10µsec after both VCI and VDDI have been applied.



Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

9.Optical Specification

Item 项目	Symbol 符号	Condition 条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Note 备注
Response time 响应时间	Tr+Tf	Θ=0° Ø=0° Ta=25°C	-	30	60	ms	1
Contrast ratio 对比度	Cr		200	300	-	-	2
Color gamut 饱和度	S(%)		-	55	-	%	-
Luminance uniformity 均匀度	δWHITE		80	-	-	%	3
Viewing angle range 视角范围	Θx+	CR≧10	-	45	-	deg	4
	Θx-		-	45	-	deg	
	Θy+		-	45	-	deg	
	Θy-		-	20	-	deg	
LCM Luminance LCM 亮度	Lv	Θ=0° Ø=0° Ta=25°C	-	TBD	-	Cd/m^2	5
CIE (X,Y) Chromaticity 色度坐标	White(X)		-	TBD	-	-	6
	White(Y)		-	TBD	-	-	

Note1.Response time is the time required for the display to transition from White to black(Rise Time,Tr)and from black to white(Decay Time,Tf).For additional information see FIG1...

Note2.contrast Ratio(CR) is defined mathematically by the following formula ,For more information see FIG2.

Contrast Ratio(CR)=Average Surface Luminance with all white pixels/ Average Surface Luminance with all black pixels

Note3.The uniformity in surface luminance(WHITE) is determined by measuring luminance at eath test position,and then dividing the maximum luminance of all white pixels by minimum luminance of all white pixels,For more information seeFIG2.

WHITE=Minimum Surface Luminance with all white pixels(P1,P2,.....)/Maximum Surface Luminance with all white pixels(P1,P2,.....)

Note4.Viewing angle is the angel at which contrast ratio is greater than a specific value.For TET

module,the specific value of contrast ratio is 10.For monochrome and color stn module,the specific value of contrast ratio is2.The 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 FIG3

Note5. Surface luminance is the LCD surface luminance with all white pixels,For more information see FIG2.

LV=Average Surface Luminance with all white pixels(P1,P2,.....)

Note6.CIE(X,Y)chromaticity is the Center point value.For more information see FIG2.

FIG1. The definition of Response time

响应时间定义

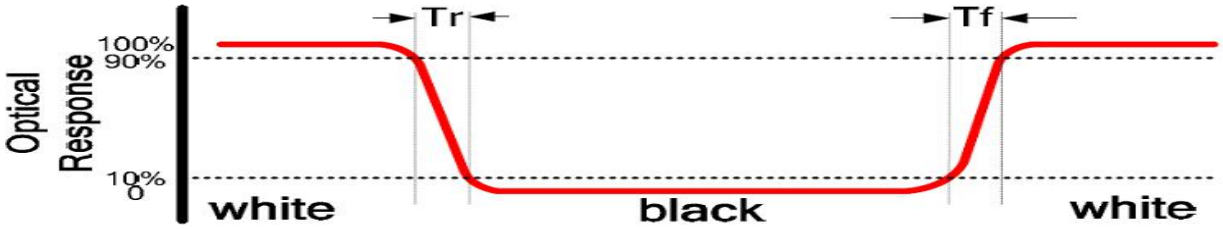
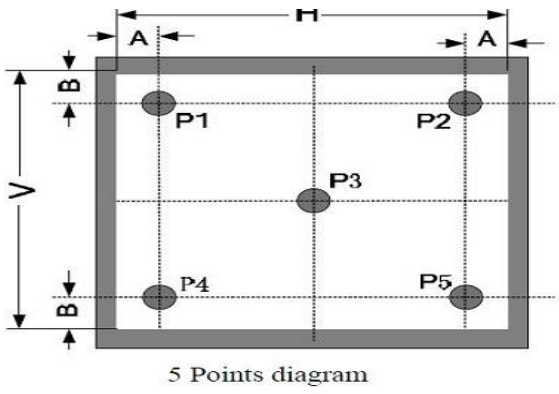
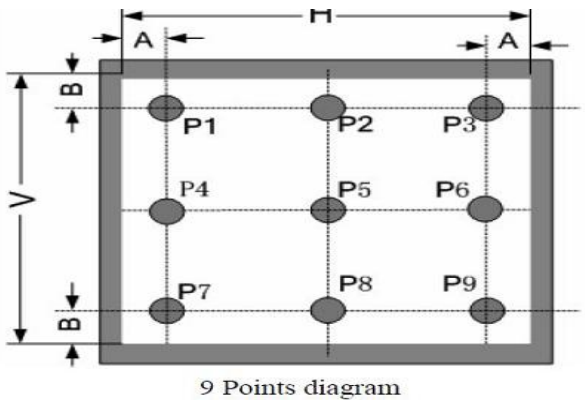


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

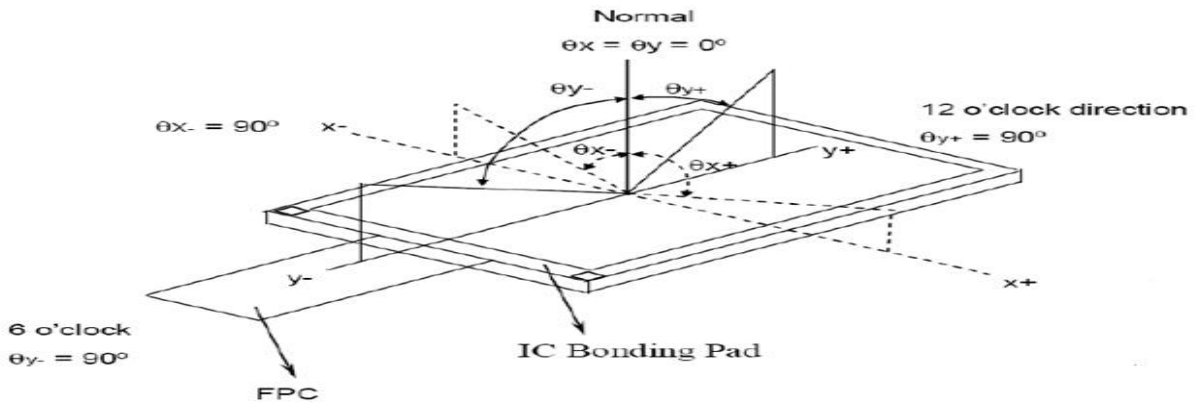


5 Points diagram



9 Points diagram

FIG 3 The definition of viewing angle 视角定义


Normal
θx = θy = 0°
θy-
θy+
θx- = 90°
x-
θx-
θx+
y+
12 o'clock direction
θy+ = 90°
y-
x+
6 o'clock
θy- = 90°
IC Bonding Pad
FPC

10.Reliability Test Items

Item	Test Condition	Criterion
High Temperature Storage	70 ℃, 48 hrs	Note1,Note2
Low Temperature Storage	-20 ℃, 48 hrs	
High Temp. & High Humidity Storage	40 ℃, 80％ RH, 48hrs	
Thermal Shock (Static)	-20℃, 30 min /70℃, 30 min, 20 cycles	
High Temperature Operation	60 ℃, 48 hrs	
Low temperature Operation	-10 ℃, 48 hrs	

Note1:Evaluation should be tested after storage at room temperature for two hours.
Note2:
Pass: Normal display image no line defect.
Fail: No display image, or line defects.
Partial transformation of the module parts should be ignored.

11.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. 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.

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.