PRODUCT SPECIFICATIONS

MODULE NO. : IE-TFT-0282432-12 **REVISION : V 2 . 0**

DRAWING BY : _____ **DATE : 2012-08-15**

APPROVED BY : _____ **DATE : _____**

FOR CUSTOMER'S APPROVAL

CHECK BY: _____ **DATE : _____**

APPROVED BY: _____ **DATE : _____**

OK ☐ **NG** ☐

COMMENT:

History of Versions and Modifications

Version	Modifications	Date
V1.0	Generation first version	May 13,2011
V2.0	Modify driver IC from ST7781 to ILI9341	Aug 15,2012

CONTENTS

NO.	ITEM	PAGE
-	Cover	1
-	History of Versions and Modifications	2
-	contents	3
1	General Specifications	4
2	Outline Drawing	5
3	Absolute Maximum Ratings	6
4	Led Backlight Specification and InterfaceSignal	7
5	Optical Characteristics	10
6	Cell test light waveform	12
7	Precautions for Use of LCD Modules	13

1.General Specifications

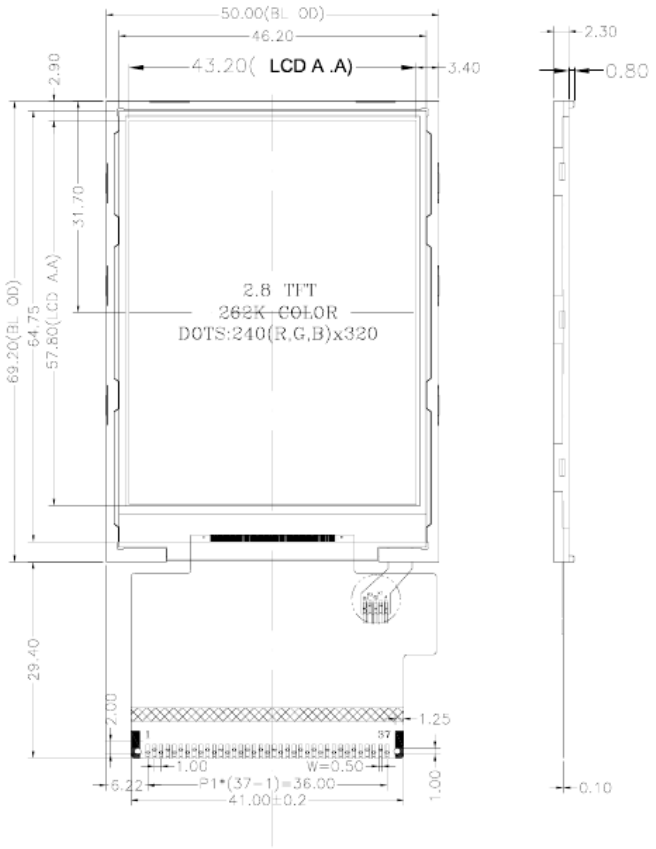
Item	Main LCD	Unit	Note
LCD Type	2.8'' TFT LCD	-	
Display color	262K		
LCD Duty	1/320	-	
LCD Bias	-	-	
Viewing Direction	12:00	’	
Viewing Area(W×H)	-	mm	
Active Area(W×H)	43.20X57.60	mm	
Number of Dots	240(R,G,B)×320	mm	
Dot Size(W×H)	-	mm	
Dot Pitch(W×H)		mm	
Controller	ILI9341		
V_{DD}	2.7~3.3V	V	
Outline Dimensions	Refer to outline drawing on next page		
Backlight	LED(white)	-	
Operating Temperature	-20～+70℃	-	
Storage Temperature	-30～+80℃	-	
Weight	TBD	g	
Data Transfer	8/16 bits parallel	-	
Display Type	Transmissive type	-	

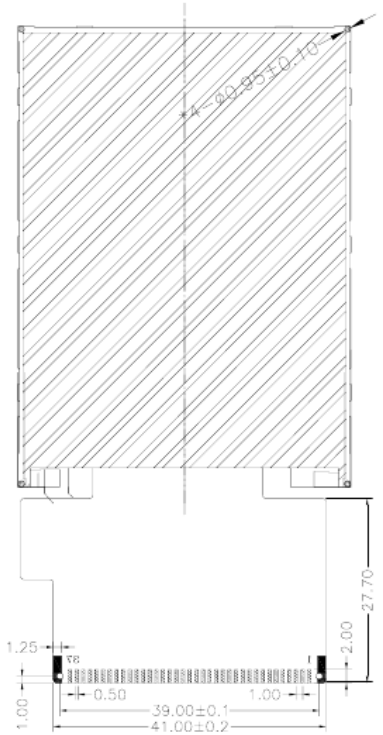
Note 1: Select by software, and color tune is slightly changed by temperature and driving voltage.

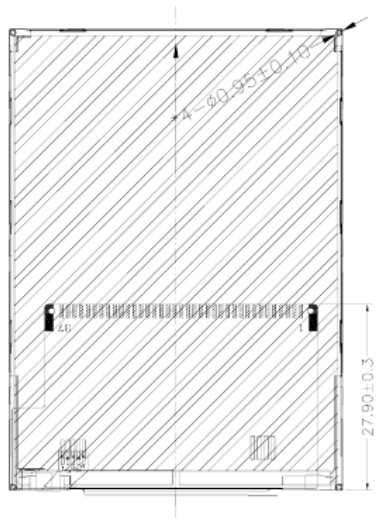
Note 2: TBD- To Be Determined.

Note 3: Requirements on Environmental Protection:RoHS

REV.	DESCRIPTION	DATE





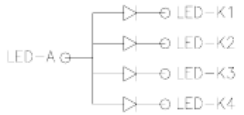


FPC INTERFACE

NO.	SYMBOL
1	DB1
2	DB2
3	DB3
4	DB4
5	GND
6	VDD
7	/CS
8	RS
9	/WR
10	/RD
11	NC
12	X+(XR)
13	Y-(YD)
14	X-(XL)
15	Y+(YU)
16	LED-A
17	LED-1
18	LED-2
19	LED-3
20	LED-4
21	NC
22	DB5
23	DB10
24	DB11
25	DB12
26	DB13
27	DB14
28	DB15
29	DB16
30	DB17
31	/RESET
32	IOVCC
33	VCI
34	GND
35	DB6
36	DB7
37	DB8

NOTES:

1.DISPLAY TYPE: 2.8"TFT LCD TRANSMISSIVE
2.VIEWING DIRECTION: 12:00
3.LCD DRIVER IC: ILI9341v
4.OPERATING TEMP: -20°C~70°C
5.STORAGE TEMP: -30°C~80°C
6.BACKLIGHT: 4CHIP-LED PARALLEL



LED CIRCUIT DIAGRAM

IE-TFT-0282432-12

LCM NO.:	FPC NO. A:	VERSION: 1.0
	FPC NO. B:	NO.: 1 OF 1
	FPC NO. C:	
DESIGNED BY: QSC		UNIT: MM
APPROVED BY:		DATE: 2011-05-18

3. Absolute Maximum Raings

ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
Operating Ambient Temperature	T_{OP}	-20	+70	℃	
Operating Ambient Humidity	H_{OP}	10	90	% (RH)	
Storage Temperature	T_{STG}	-30	+80	℃	
Storage Humidity	H_{STG}	10	90	% (RH)	

Note 1.

The absolute maximum ratings are the values that must not be exceeded at any time for this product. It is not allowed for any of these ratings to be exceeded. Should a product be used with any of the absolute maximum ratings exceeded, the characteristics of the product may not be recovered, or in an extreme case, the product may be permanently destroyed.

Therefore, when designing a system incorporating the product, make sure that adequate attentions be paid to the variations in the supply voltages, the characteristics of parts that are connected, surges in the input and output lines, and the ambient temperatures.

Note 2.

This specification applys after the driver IC mounting and the FPC mounting.

(This specification isn't applicable at time of driver IC un-mounting and FPC un-mounting.)

LCD should keep the condition that dew dosen't storage in case of driver IC un-mounting and FPC un-mounting. Dew may break the LCD. Especially part is very weak for dew.

4. LED backlight specification and Interface Signal

4.1 LED backlight specification

Item(项目)	Symbol (符号)	最小值 Min.	典型值 Typ.	最大值 Max.	Units (单位)	Condition (条件)
Forward Voltage (正向电压)	Vf	3.0	3.3	3.6	V	**If= 60 mA**
Reverse Current (反向电流)	Ir			60	μA	**Vr= 5 V**
CIE *(色坐标)	X	0.283		0.320		**If= 60 mA**
	Y	0.276		0.320		
Luminance *(亮度)	Lv	2800			cd/m²	
Uniformity (均匀性)	Δ	80			%	

4.2 Interface Signal

Pin No.	Symbol	I/O	Description
1	DB1	I	Data bus
2	DB2	I	
3	DB3	I	
4	DB4	I	
5	GND	I	Power Ground
6	VDD	I	Analog power supply voltage.(2.9-3.3V)
7	/CS	I/O	Chip select input pin
8	RS	I/O	Instruction /data select input pin
9	/WR	I/O	Write execution control pin
10	/RD	I/O	Read execution control pin
11	NC	I/O	No connection
12	X+	I/O	Touch panel X+
13	Y-	I/O	Touch panel Y-
14	X-	I/O	Touch panel X-
15	Y+	I/O	Touch panel Y+
16	LED-A	I/O	Anode for Backlight
17	LED-1	I/O	Cathode 1 for Backlight
18	LED-2	I/O	Cathode 2 for Backlight
19	LED-3	I/O	Cathode 3 for Backlight
20	LED-4	I/O	Cathode 4 for Backlight
21	NC	I/O	No connection
22	DB5	I	Data bus
23	DB10	I	
24	DB11	I	
25	DB12	I	
26	DB13	I	
27	DB14	I	
28	DB15	I	
29	DB16	I	

Pin No.	Symbol	I/O	Description
30	DB17	I	Data bus
31	/RESET	I	System reset
32	IOVCC	I	I/O interface supply voltage.(1.8-3.3V)
33	VCI	I	Liquid crystal analog circuit power supply (2.9-3.3V)
34	GND	I	Power Ground
35	DB6	I	Data bus
36	DB7	I	
37	DB8	I	

5. Optical Characteristics

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Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		T	CR 10	60	70	-	Degree	Note 2
		B		50	60	-		
				60	70	-		
				60	70	-		
Contrast Ratio		CR	°	400	500	-		Note1
Response Time		T_{ON}	25	-	25	30	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	C-light		0.298			Note5 Note1
		y			0.354			
	Red	x			0.649			
		y			0.323			
	Green	x			0.289			
		y			0.588			
	Blue	x			0.133			
		y			0.133			
NTSC					65	-	%	Note 5
Transmittance		T			5.7	-	%	Note1

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

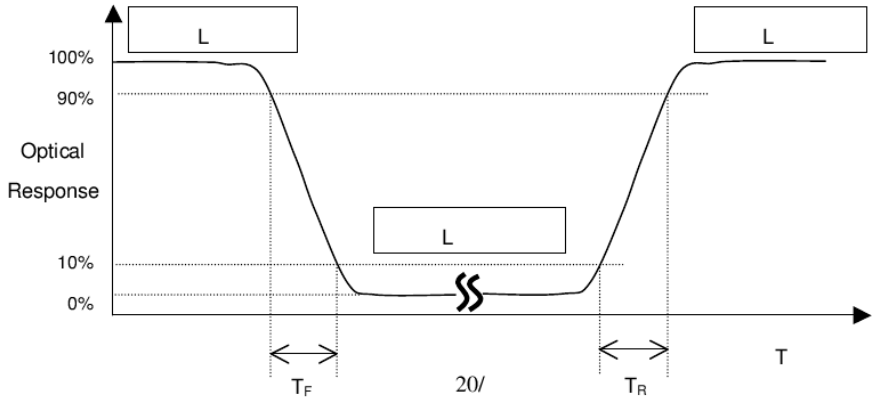
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

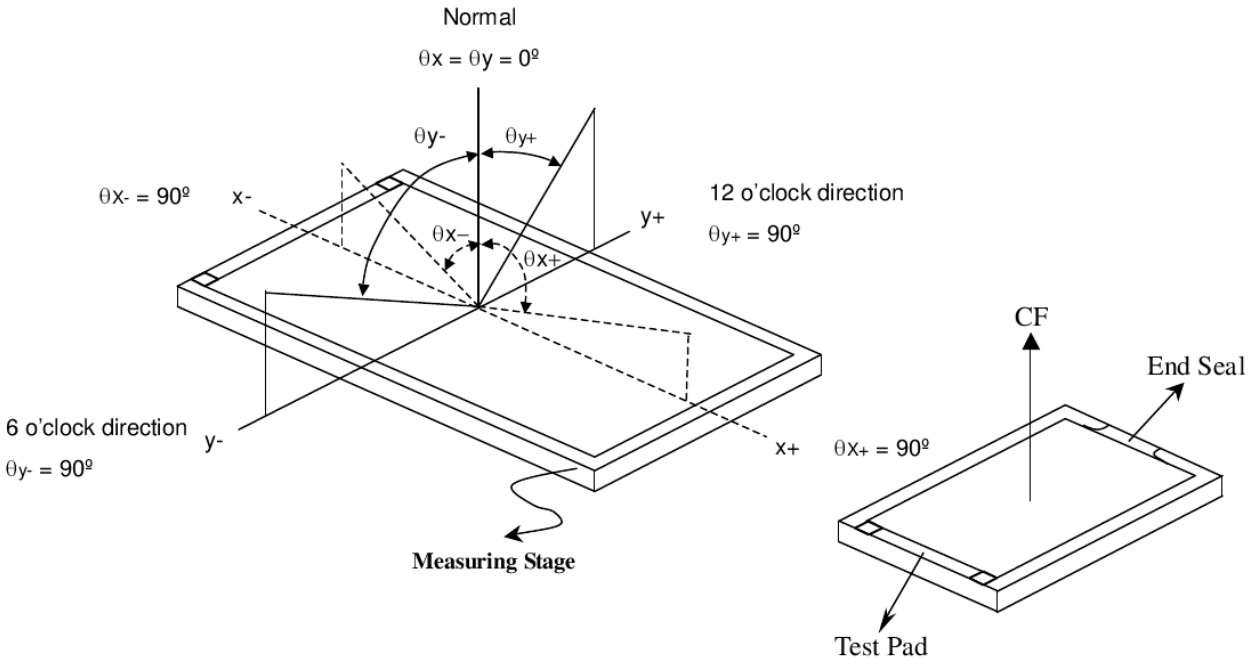
CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (T_R, T_F):

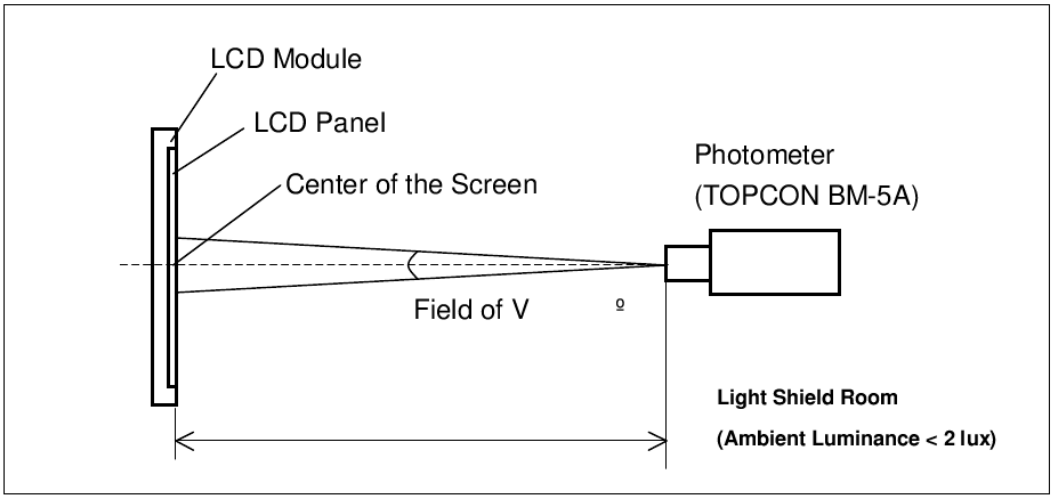


*Note(3) Definition of Viewing Angle :



*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.



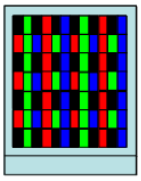
6. Cell test light waveform

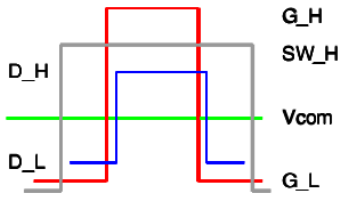
Frame	G_ODD	G_EVEN	D_ODD	D_EVEN	SW	Vcom
White (W)	H	H	L	L	G_ODD & G_EVEN	DC/GND
Black (BK)	H	H	H	H	G_ODD & G_EVEN	DC/GND
Gray (GY)	H	H	Gray	Gray	G_ODD & G_EVEN	DC/GND
STRIPE_ODD (SO)	H	H	L	H	G_EVEN	DC/GND
STRIPE_EVEN (SE)	H	H	H	L	G_ODD	DC/GND
Dot (D)	H/L	L/H	H	H	G_ODD / G_EVEN	DC/GND

Display Mode: TN, Normally White

Frame seq. : W→BK→W→GY→W→SO→W→SE→W→D→W

Every Frame stay >2sec.





Ex. LC=5V, Vcom=0V

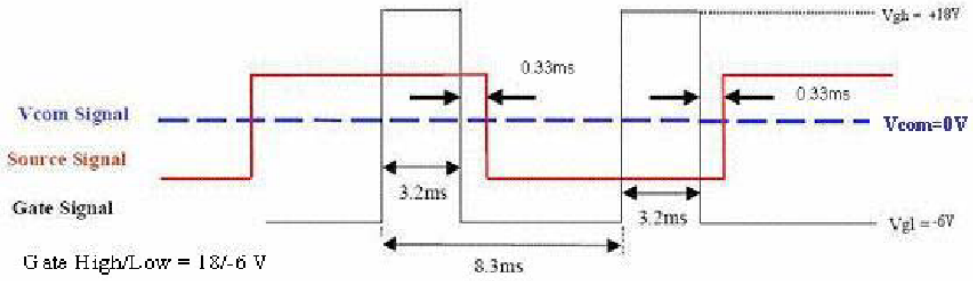
Data H=+/-5V, Data L=0V, Data Gray=+/-2.5V

Gate H=10V above, Gate L=-5V

SW_H=10V above (on duty), SW_L=-5V (not on duty)

Just suggestion!

6.1 Timing



Gate High/Low = 18/-6 V

LC = 4V

Then V com = 0V DC

Data High/Low = V com ± 5V

Data freq = 60Hz

G freq. = 120Hz

7. Precautions for Use of LCD Modules

7.1 Handling Precautions

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

7.1.2 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.

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

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

7.1.5 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:

— Isopropyl alcohol

— Ethyl alcohol

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

— Water

— Ketone

— Aromatic solvents

7.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

d. 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.

7.2 Storage precautions

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

7.2.2 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%

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

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