PRODUCT SPECIFICATIONS

MODULE NO. : IE-TFT-0322432-RTP-12

DRAWING BY : _____ DATE : 2012-15 -17

DATE : _____ REVISION : V3.0

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	Feb 28,2009
V2.0	Modify driver IC from ili9325 to OTM3225A	Oct 19, 2010
V3.0	Modify driver IC from OTM3225 to ILI9341	Dec 15, 2012

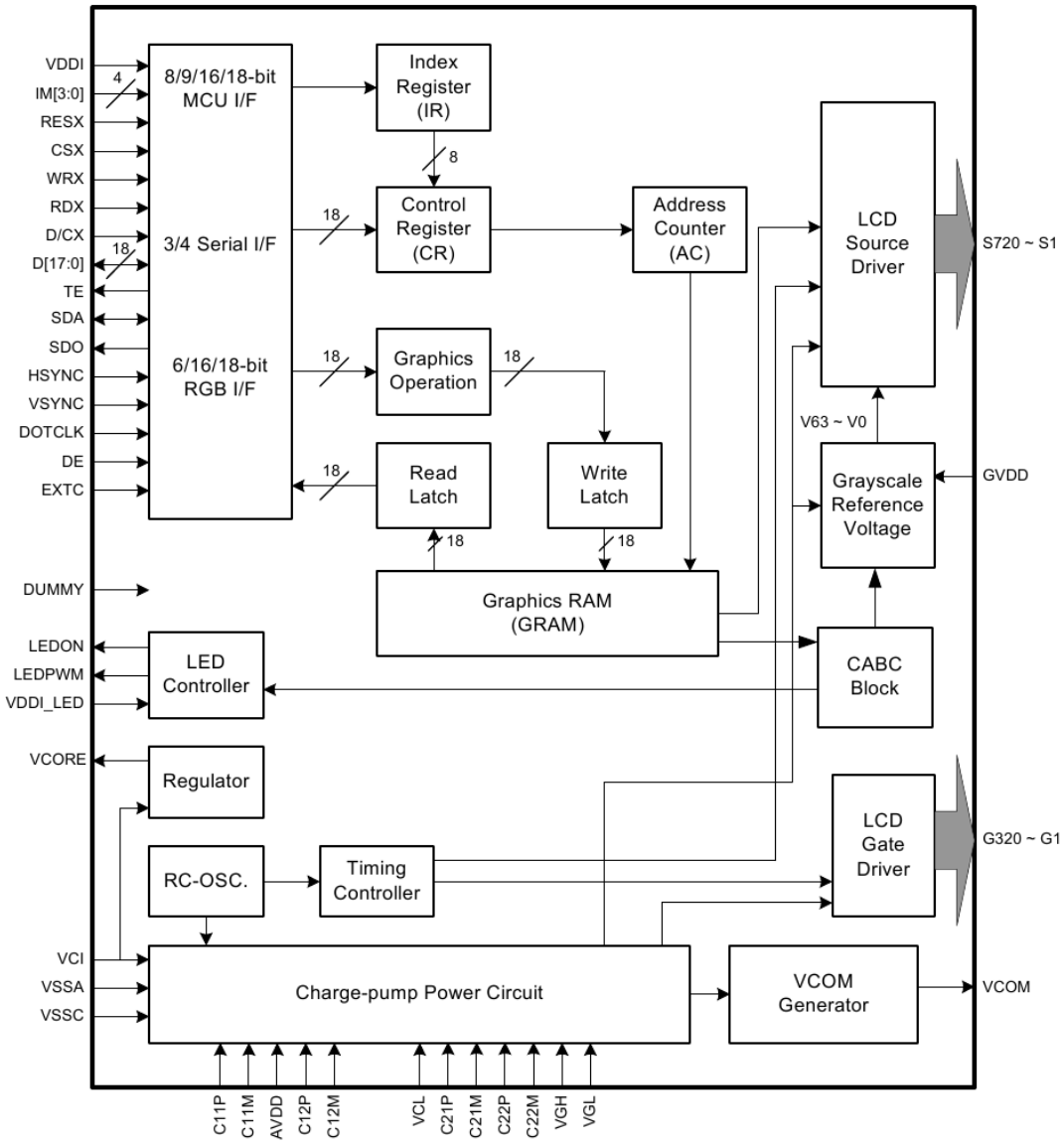
CONTENTS

1.General Specifications

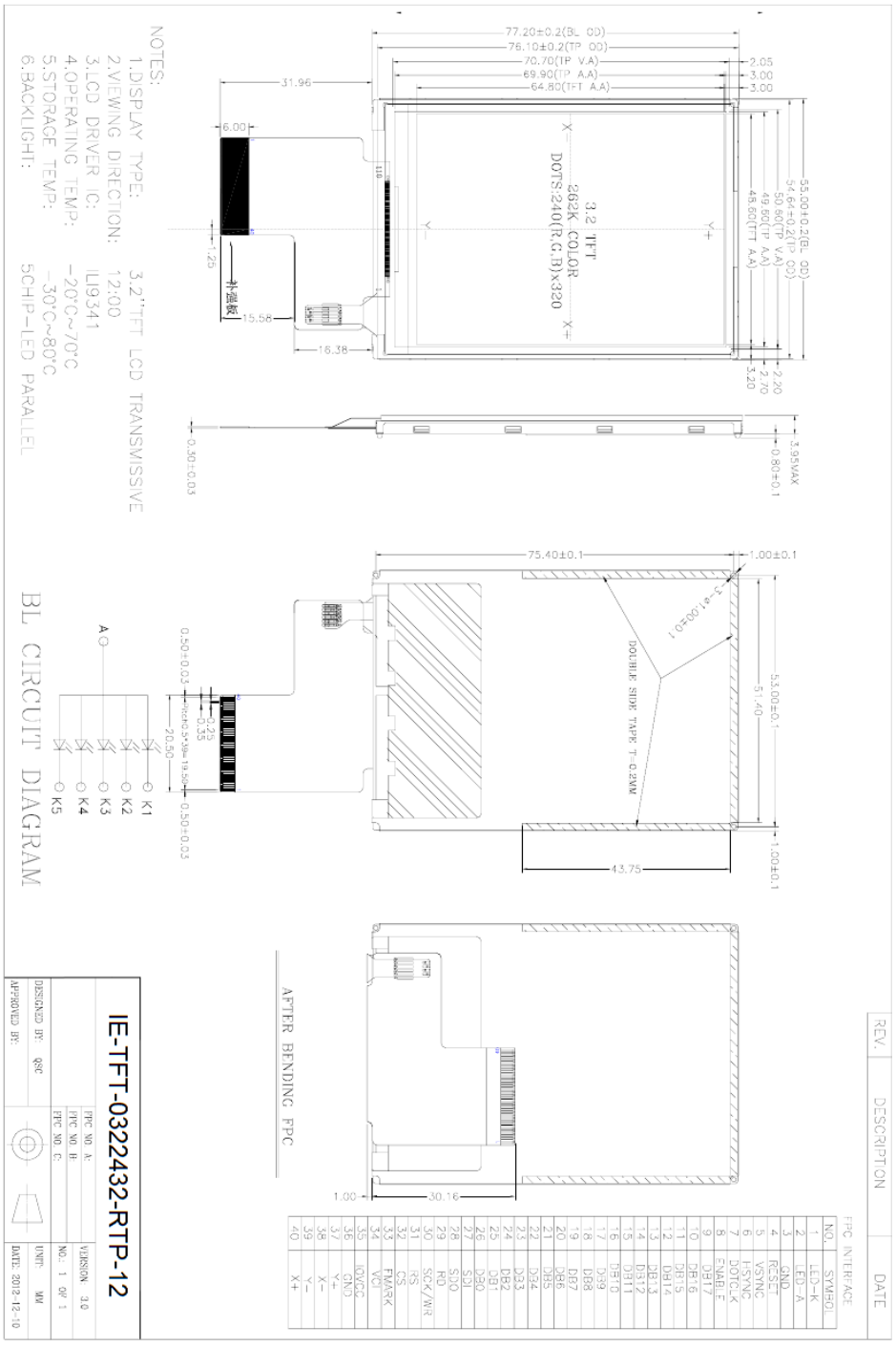
Item	Main LCD	Unit	Note
LCD Type	3.2'' TFT LCD	-	
Display color	262K		
LCD Duty	1/320	-	
LCD Bias	-	-	
Viewing Direction	12:00	O Clock	
Viewing Area(W×H)	-	mm	
Active Area(W×H)	48.60X64.80	mm	
Number of Dots	240(R,G,B)×320	mm	
Dot Size(W×H)	-	mm	
Dot Pitch(W×H)		mm	
Controller	ILI9341	-	
V_{DD}	2.7~3.3V	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	16/18bits parallel MCU/RGB	-	
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

2. Functional block diagram



3.Outline Drawing



FPC INTERFACE		
NO.	SYMBOL	
1	LED-K	
2	LED-A	
3	GND	
4	RESET	
5	VSYNC	
6	HSYNC	
7	DOTCLK	
8	ENABLE	
9	DB17	
10	DB16	
11	DB15	
12	DB14	
13	DB13	
14	DB12	
15	DB11	
16	DB10	
17	DB9	
18	DB8	
19	DB7	
20	DB6	
21	DB5	
22	DB4	
23	DB3	
24	DB2	
25	DB1	
26	DB0	
27	SDO	
28	SDI	
29	RD	
30	SCK/WR	
31	CS	
32	RS	
33	FMARK	
34	VCI	
35	IOVCC	
36	GND	
37	Y-	
38	Y+	
39	X-	
40	X+	

4. Absolute Maximum Ratings(Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage(1)	V_{BAT}	-	-	V	1,2
Power Supply Voltage(2)	V_{DD}	2.4	3.3	V	
Power Supply Voltage for Mail LCD	Vop	-	-	V	
Logic Signal Input Voltage	V_I	-0.3	V_{DD}+0.3	V	
Operating Temperature	Top	-20	+70	℃	
S torage Temperature	Tst	-30	+80	℃	

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. $V_{DD} > V_{SS}$ must be maintained.

5. LED Backlight Specification and Instruction Code

5.1 ABSOLUTE MAXIMUM RATINGS

(Ta=25°C.Unless specified,The Ambient temperature Ta=25°C)

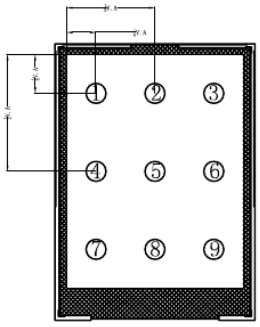
Item	Symbel	Conditions	Rating	Unit
* Absolute maximum forward current	Ifm		150	mA
* Peak forward current	Ifp	1 msec Plus 10% Duty Cycle	100	mA
Reverse Voltage	Vr		5	V
* Power dissipation	Pd		510	mW
Operating Temperature Range	Topr		−30~+70	°C
Storage Temperature Range	Tstg		−40~+80	°C

5.2 ELECTRICAL−OPTICAL CHARACTERISTICS

(Ta=25°C.Unless specified,The Ambient temperature Ta=25°C)

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	3.0	3.2	3.4	V	If= 75 mA
Reverse Current	Ir			−	μA	Vr= 5 V
Dominant wave length	λD	X 0.26 Y 0.26		X 0.30 Y 0.30	nm	If= 75 mA
Spectral Line Half width	△λ				nm	If= 75 mA
* Luminance	Lv	3000	−		cd/m²	If= 75 mA

The luminance is the average value of 9 points, and
The Lvmin./Lvmax. is more than 80% Typical
The measurement instrument is BM−7 luminance Colorimeter.The aperture is ø 5 mm. lifetime=50000h



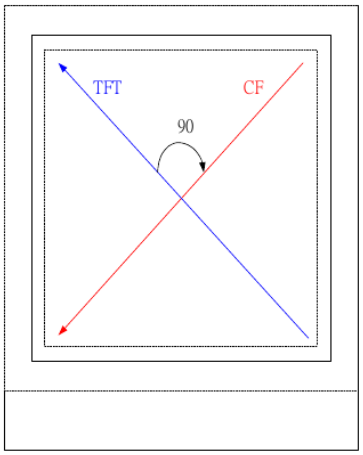
5.3 Interface Signal

Pin No.	Symbol	I/O	Description
1	LED-K	I	LED backlight Cathode
2	LED-A	I	LED backlight Anode
3	GND	I/O	Power ground
4	RESET	I	Reset signal pin
5	VSYNC	I	Frame synchronizing signal
6	HSYNC	I	Line synchronizing signal
7	CLK	I	Dot clock signal
8	DEN	I	Date ENEABLE signal for RGB interface operation
9	DB17	I/O	
10	DB16	I/O	
11	DB15	I/O	
12	DB14	I/O	
13	DB13	I/O	
14	DB12	I/O	
15	DB11	I/O	
16	DB10	I/O	
17	DB9	I/O	
18	DB8	I/O	
19	DB7	I/O	
20	DB6	I/O	
21	DB5	I/O	
22	DB4	I/O	
23	DB3	I/O	
24	DB2	I/O	
25	DB1	I/O	MPU Parallel interface bus and serial interface select
26	DB0	I/O	If use RGB Interface must select serial interface. * : Fix this pin at VDDI or VSS.
27	SDI	I/O	Serial data input
28	(SDO)	I	No connection
29	RD	I	Read execute control pin

IM3	IM2	IM1	IM0	MCU-Interface Mode	DB Pin in use	
					Register/Content	GRAM
0	0	0	0	80 MCU 8-bit bus interface Ⅰ	D[7:0]	D[7:0]
0	0	0	1	80 MCU 16-bit bus interface Ⅰ	D[7:0]	D[15:0]
0	0	1	0	80 MCU 9-bit bus interface Ⅰ	D[7:0]	D[8:0]
0	0	1	1	80 MCU 18-bit bus interface Ⅰ	D[7:0]	D[17:0]
0	1	0	1	3-wire 9-bit data serial interface Ⅰ	SDA: In/OUT	
0	1	1	0	4-wire 8-bit data serial interface Ⅰ	SDA: In/OUT	
1	0	0	0	80 MCU 16-bit bus interface Ⅱ	D[8:1]	D[17:10], D[8:1]
1	0	0	1	80 MCU 8-bit bus interface Ⅱ	D[17:10]	D[17:10]
1	0	1	0	80 MCU 18-bit bus interface Ⅱ	D[8:1]	D[17:0]
1	0	1	1	80 MCU 9-bit bus interface Ⅱ	D[17:10]	D[17:9]
1	1	0	1	3-wire 9-bit data serial interface Ⅱ	SDI: In SDO: Out	
1	1	1	0	4-wire 8-bit data serial interface Ⅱ	SDI: In SDO: Out	

Pin No.	Symbol	I/O	Description
30	WR	I	Write execute control pin
31	D/C	I	Register select signal
32	CS	I	Chip select signal
33	FMARK	O	Output a frame head pulse signal
34	VCI	I/O	Liquid crystal analog circuit power supply
35	IOVCC	I/O	I/O power supply
36	GND	I/O	Power Ground
37	Y+	I/O	Touch panel Y+
38	X-	I/O	Touch panel X-
39	Y-	I/O	Touch panel Y-
40	X+	I/O	Touch panel X+

6 . Viewing Direction



TFT Face up

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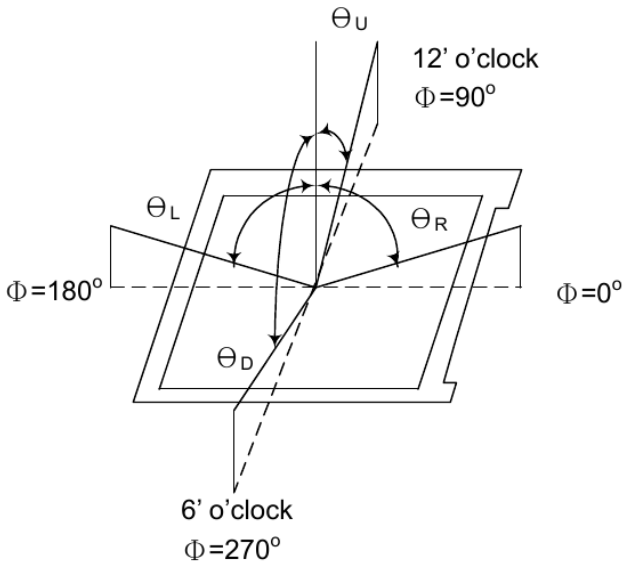

Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time : Sum of T_R and T_F

7. Electro-optical Units

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (without Polarizer)		T(%)	—	—	18.0	—	—	
Contrast Ratio		CR	Θ=0 Normal viewing angle — —	400	500	—	—	(1)(2)
Response time	Rising	T_R		—	4	8	msec	(1)(3)
	Falling	T_F		—	12	24		
Color gamut		S(%)			60		%	
Color chromaticity (CIE1931)	White	W_x		0.283	0.303	0.323		(1)(4) CF glass
		Wy		0.305	0.325	0.345		
	Red	Rx		0.606	0.626	0.646		
		Ry		0.314	0.334	0.354		
	Green	Gx		0.257	0.277	0.297		
		Gy		0.529	0.549	0.569		
	Blue	Bx		0.122	0.142	0.162		
		By		0.102	0.122	0.142		
Viewing angle	Hor.	Θ_L	CR>10	35	45	—		Viewing Angle base on using normal Polarizer , Reference Only
		Θ_R		35	45	—		
	Ver.	Θ_U		35	45	—		
		Θ_D		10	20	—		
Optima View Direction		12 O'clock						(5)

7.1 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2°C
- 15min. warm-up time.

7.2 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

8. Standard Specification for Reliability

No.	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±2℃96H Restore 4H at 25℃	1. After testing, cosmetic defects should not happen. 2.Total current consumption should not be over 10% of initial value.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 4H at 25℃	
3	High Temperature Operation	70℃±2℃ 48H Restore 4H at 25℃	
4	Low Temperature Operation	-20℃±2℃ 48H Restore 4H at 25℃	
5	High Temperature /Humidity Storage	40℃±2℃ 90%RH 48H	
6	Temperature Cycle	-30℃——25℃——80℃ 5min 30min ——25℃ , 5min after 10cycle, Restore 4H at 25℃	
7	Vibration Test (package state)	10Hz~150Hz, 100m/s2, 120min	Not allowed cosmetic and electrical defects.
8	Shock Test (package state)	Half- sine wave, 300m/s2, 18ms	
9	Atmospheric Pressure Test	25kPa 16H Restore 2H	
10	Cable Bending Test	Bending area and angle follow design document requirement	More than 50000 times

9. Precautions for Use of LCD Modules

9.1 Handling Precautions

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

9.1.2 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.

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

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

9.1.5 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

9.1.6 Do not attempt to disassemble the LCD Module.

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

9.1.8 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.

9.2 Storage precautions

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

9.2.2 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%

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

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