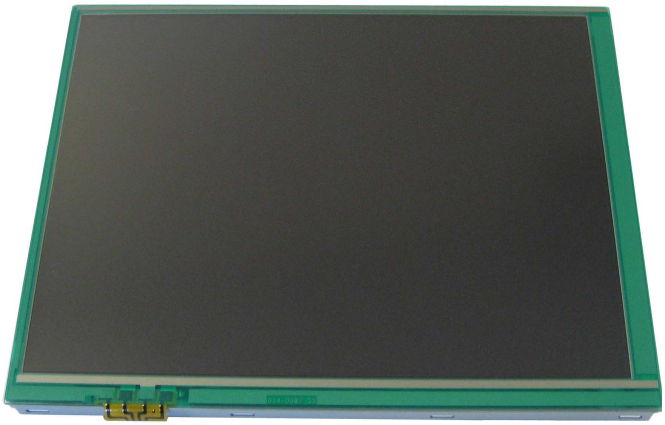
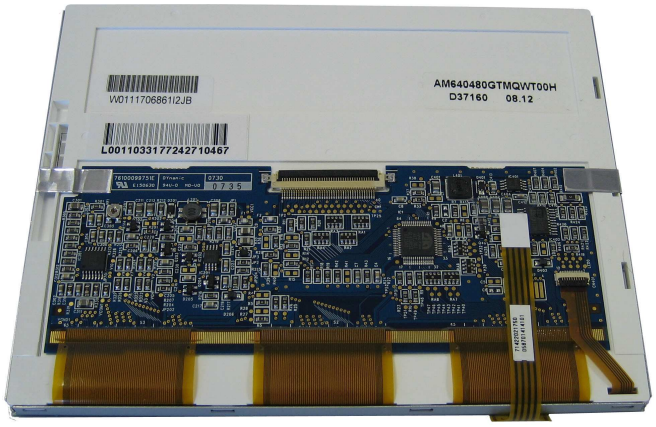
5.7″ Ampire VGA Touch TFT Datasheet

Rev. 1.0





Revision History

Date	Doc. Rev.	Supplier Revision	Changes
28-May-08	Rev. 1.0	1.0	Initial Release

晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-640480GTMQW-T00H
APPROVED BY	
DATE	

☑ Approved For Specifications
☐ Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2006/12/21	-	New Release	Edward
2007/03/22	-	Rename TF640480-02-0 to AM-640480GTMQW-T00H.	Edward
	-	Modify the paragraph arrange.	Edward
	-	Modify the Operation and Storage Temperature.	Edward
	4	Modify Absolute Max. Ratings.	Edward
	4-5	Modify Electrical Characteristics.	Edward
	7-8	Modify Interface Connection.	Edward
	9-10	Modify Input Signal.	Edward
	11	Modify Touch Panel Electrical Specification.	Edward
	12	Modify Optical Characteristics.	Edward
	14	Modify Reliability Test Conditions.	Edward

1. INTRODUCTION

Ampire Display Module AM640480G is a color active matrix TFT-LCD that uses amorphous silicon TFT as a switching device . This model is composed of a 5.7inch TFT-LCD panel, touch panel, a driving circuit and LED backlight system . This TFT-LCD has a high resolution (640(R.G.B) X 480) and can display up to 262,144 colors .

1-1. Features

- VGA Resolution
- 6 Bits color driver with 1 channel TTL interface
- Wide range operation temperature

1-2. Applications

- Portable TV
- Car PC
- Industrial application
- HMI (Human machine interface)

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display resolution(dot)	640RGB (W) x 480(H)	dots
Display area	116.16 (W) x 87.12 (H)	mm
Pixel pitch	0.1815 (W) x 0.1815 (H)	mm
Color configuration	R.G.B Vertical stripe	
Overall dimension	127.0(W)x98.43(H)x7.4(D)---(Typ)	mm
Surface treatment	Antiglare , Hard-Coating(3H)	
Brightness	220 nit(typ)	cd/m^2
Contrast ratio	300 : 1	
Backlight unit	LED	
Display color	262,144	colors
Viewing Direction	6 O'CLOCK	
Display Mode	Normally White	

3. ABSOLUTE MAX. RATINGS

ITEM	SYMBOL	MIN	MAX	UNIT	NOTE
Power Supply Voltage	Vcc	-0.5	5	V	
Signal Input Voltage	DCLK , DE R0~R5 G0~G5 B0~B5	-0.5	Vcc + 0.5	V	
Operation Temperature	Top	-5	60	℃	(1)
Storage Temperature	Tstg	-20	70	℃	(1)

NOTE :
1. If users use the product out off the environment operation range (temperature and humidity) , it will concern for visual quality.

4. ELECTRICAL CHARACTERISTICS

4-1 TFT LCD Module voltage

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Power Voltage For LCD	V_{CC}	3.0	3.3	3.6	V	(1)
Power Voltage For LED	V_{DD}	4.5	5.0	5.5	V	
Logic Input Voltage	VIH	V_{CC}*0.7	-	V_{CC}	V	
	VIL	0	-	V_{CC}*0.3	V	

NOTE : 1. Vcc – dip condition :
When 2.7V≦Vcc＜3.0V , td ≦10ms
Vcc＞3.0V , Vcc – dip condition should be same as Vcc turn-on condition

4-2 TFT LCD current comsumption

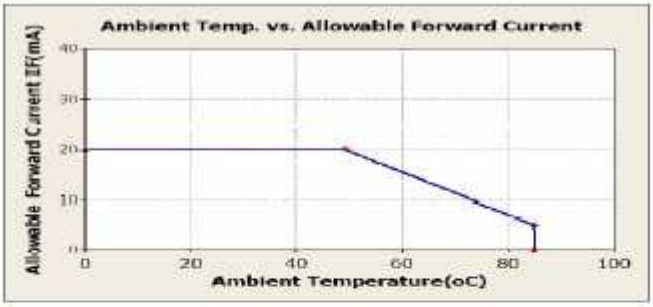
ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LCD Power Current	ICC	-	150	190	mA	(1)
LED Power Current	IDD	-	320	360	mA	(2)

NOTE : (1) Typ : under 64 gray pattern Max : under black pattern

(a) 64 Gray Pattern

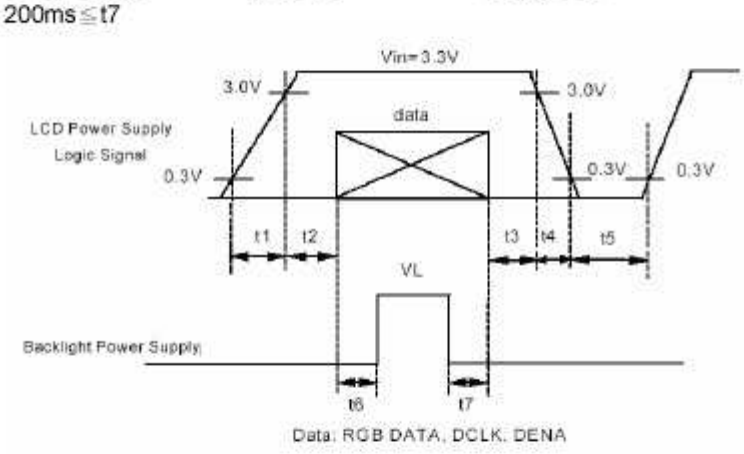
(b) Black Pattern

(2) Typ : When VDD is 3.3V Max : When VDD is 2.7V

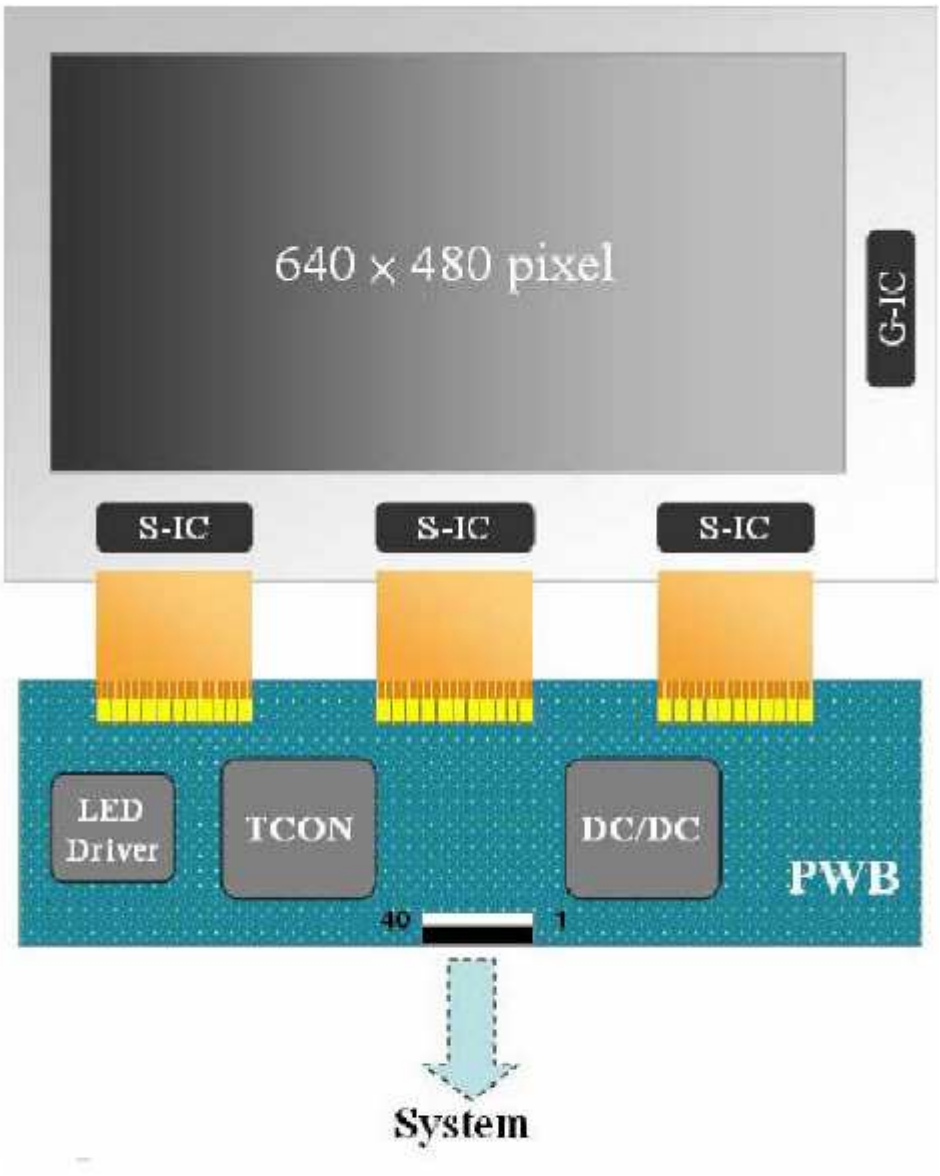


4-3 Power Signal sequence

t1≦10ms 50ms≦t2 0<t3≦50ms
0<t4≦10ms 1sec≦t5 200ms≦t6
200ms≦t7



5. BLOCK DIAGRAM

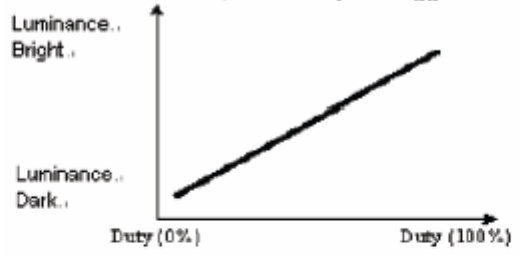


6. INTERFACE

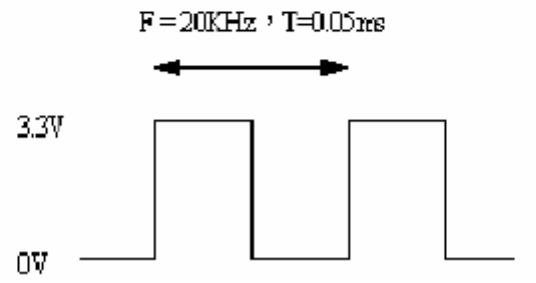
Pin no	Symbol	Function
1	U/D	Up or Down Display control
2	NC	Custom non-connect ; initial pull high = DE Mode
3	NC	NC
4	VLED	Power supply for digital circuit LED
5	VLED	Power supply for digital circuit LED
6	VLED	Power supply for digital circuit LED
7	Vcc	Power supply for digital circuit LCD
8	NC	NC
9	DE	Data Enable
10	Vss	Power ground
11	Vss	Power ground
12	ADJ	Adjust for LED brightness
13	B5	Blue data 5(MSB)
14	B4	Blue data 4
15	B3	Blue data 3
16	Vss	Power ground
17	B2	Blue data 2
18	B1	Blue data 1
19	B0	Blue data 0(LSB)
20	Vss	Power ground
21	G5	Green data 5(MSB)
22	G4	Green data 4
23	G3	Green data 3
24	Vss	Power ground
25	G2	Green data 2
26	G1	Green data 1
27	G0	Green data 0(LSB)
28	Vss	Power ground
29	R5	Red data 5(MSB)
30	R4	Red data 4
31	R3	Red data 3
32	Vss	Power ground
33	R2	Red data 2
34	R1	Red data 1
35	R0	Red data 0(LSB)
36	Vss	Power ground
37	Vss	Power ground
38	DCLK	Clock Signals
39	Vss	Power ground
40	L/R	Left or Right Display Control

NOTE :

1. ADJ adjust brightness to control Pin , Pulse duty the bigger the brighter.



2. ADJ signal = 0 ~ 3.3V , operation frequency : 20Khz



3. GND Pin must ground contact , can not be floating.

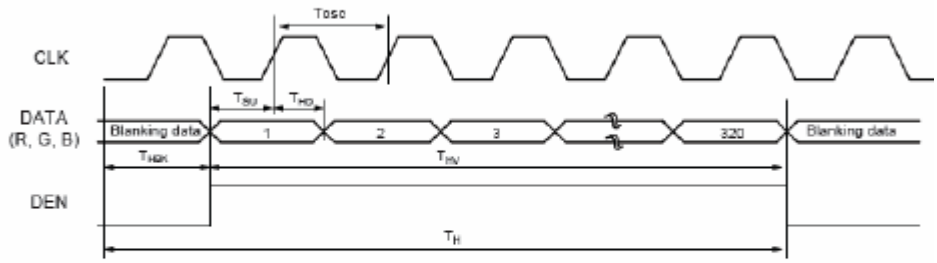
4. U/D and L/R are controlled function

L/R	U/D	Function
1	0	Normally display
0	0	Left and Right opposite
1	1	Up and Down opposite
0	1	Left and Right opposite , Up and Down opposite

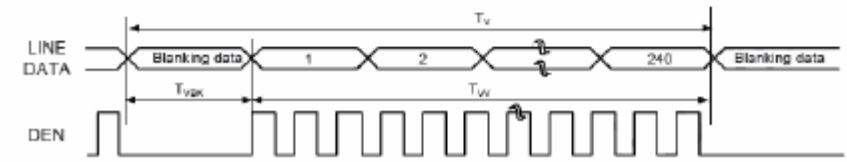
7. INPUT SIGNAL (DE mode only) :

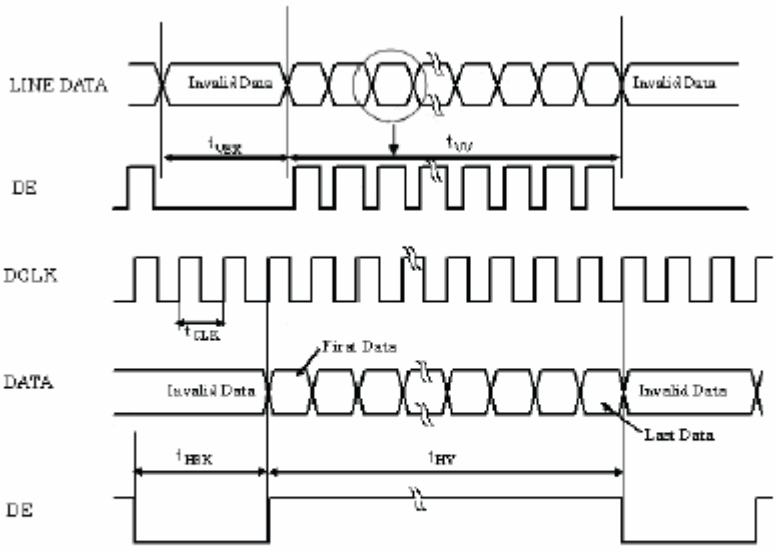
7-1 Timing chart

Horizontal Timing Sequence



Vertical Timing Sequence





7-2 Timing Specification

characteristics		Symbol	SPEC			UNIT
			Min	Typ	Max	
DCLK	Period	Tosc	33	40	43	ns
	Dot Clock	Fosc	23	25	30	MHz
	Horizontal Period	TH	750	800	900	Tosc
	Horizontal Valid	THV		640		
	Horizontal Blank	THBK	110	160	260	
	Vertical Period	TVP	515	525	560	TH
	Vertical Valid	TVV		480		
	Vertical Blank	TVBK	35	45	80	
	Vertical Frequency	FV	55	60	65	Hz

Remarks :
*1) High level of logic signal is 80%. Low level of logic signal is 20%.
*2) This module is operated by DE only mode.

7-3 Color Data Assignment

COLOR	Input Data	R DATA						G DATA						B DATA					
		R5 MSB	R4	R3	R2	R1	R0 LSB	G5 MSB	G4	G3	G2	G1	G0 LSB	B5 MSB	B4	B3	B2	B1	B0 LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)							0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)							0	0	0	0	0	0	0	0	0	0	0	0
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN (0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN (1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN (2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN (62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE (0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE (62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE (63)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

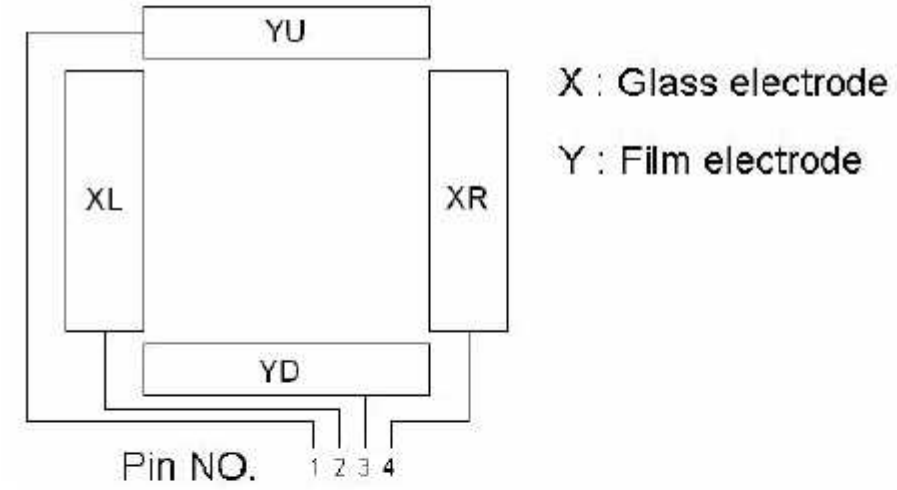
NOTE : (1) Definition of Gray Scale , Color(n) : n is series of Gray Scale
The more n value is the bright Gray Scale
(2) Data : 1-High , 0-Low

8. TOUCH PANEL ELECTRICAL SPECIFICATION

8.1 Touch Screen Panel Characteristics

1. Operation Temperature : -5℃ ~ +60℃
   Storage Temperature : -20℃ ~ +70℃
2. Life Time : > 1,000,000 times
3. Linearity : ≤ 1.5%
4. TOP ITO Film : Anti-Glare Hard Coating & Anti-Newton Ring
   Sheet Resistance : 380Ω~1180Ω ;
   BOTTOM GLASS : Sheet Resistance : 180Ω~470Ω
5. Tai Type : FPC Gold-plated
6. Meet for ROHS.
7. All Tolerance Without Marked : ±0.3
8. Insulating Resistance : More than 20MΩ at DC 25 V

8.2 Touch Screen Pane & Interface

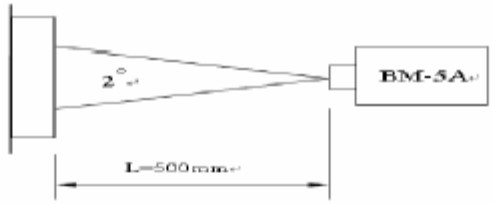


Pin No.	Symbol	I/O	Function
1	YU	Top	Top electrode – differential analog
2	XL	Left	Left electrode – differential analog
3	YD	Bottom	Bottom electrode – differential analog
4	XR	Right	Right electrode – differential analog

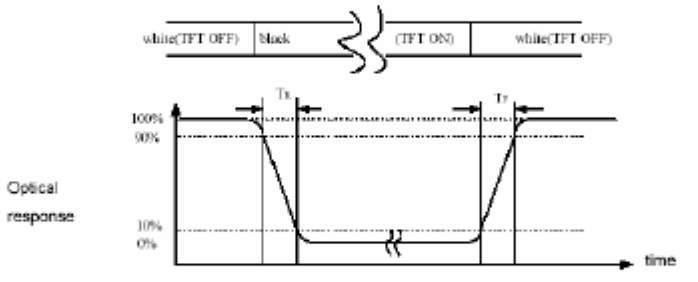
9. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response Time		T_r+T_f	Θ=Φ=0°	-	30	50	ms	(1)
Contrast ratio		CR		200	300	-	-	(2)(3)
Viewing Angle	Vertical	Θ	CR≧10	80	100	-	Deg.	(5)
	Horizontal	Φ		120	140	-		
Luminance		L	Θ=Φ=0°	180	220	-	cd/m^2	(3)(4)
Luminance Uniformity		ΔL		70	80	-	%	(3)(4)
Color chromaticity	Red	Rx	Θ=Φ=0°	0.570	0.610	0.650	-	(3)
		Ry		0.296	0.336	0.376		
	Green	Gx		0.290	0.330	0.370		
		Gy		0.534	0.574	0.614		
	Blue	Bx		0.106	0.146	0.186		
		By		0.070	0.110	0.150		
	White	Wx		0.273	0.313	0.353		
		Wy		0.289	0.329	0.369		

NOTE : Measure conditions : 25℃±2℃ , 60±10%RH under 10Lux , in the dark room
by BM-5A(TOPCON) ,viewing 2° , VCC=3.3V , VDD=3.3V



(1) Definition of Response Time (White-Black)



(2) Definition of Contrast Ratio

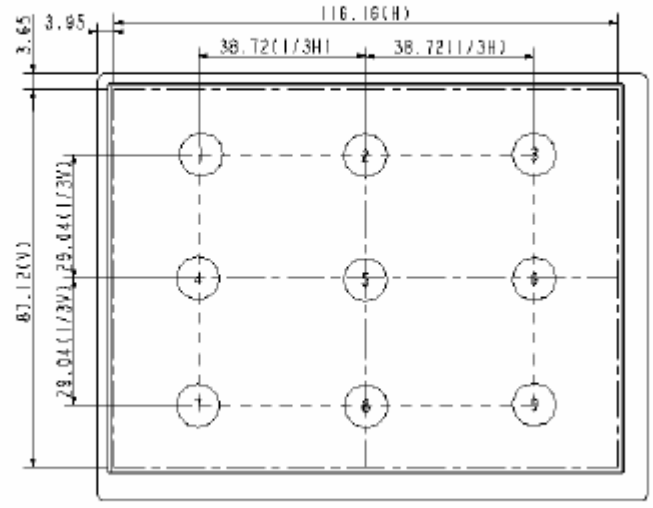
Measure contrast ratio on the below 5 points(refer to figurel,#1~#5point) and take the average value

Contrast ratio is calculated with the following formula :

Contrast Ratio(CR)=(White)Luminance of ON ÷ (Black)Luminance of OFF

(3) Definition of Luminance :

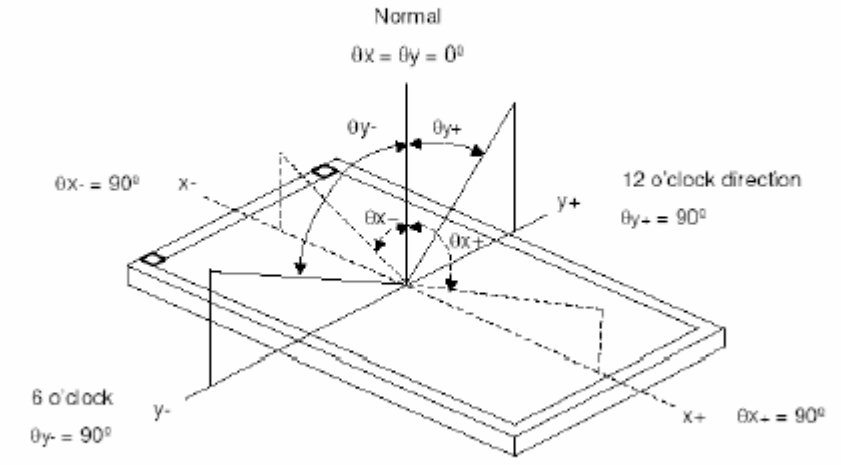
Measure white luminance on the same 5 points and take the average value



(4) Definition of Luminance Uniformity :
Measured Maximum luminance[L(MAX)] and Minimum luminance[L(MIN)] on the 5 points
Luminance Uniformity is calculated with the following formula :

ΔL =[L(MAX) / L(MIN) –1] X 100

(5) Definition of Viewing Angle



Φ =(Θx+)+(Θx-) Θ =(Θy+)+(Θy-)

10. RELIABILITY TEST CONDITIONS

ITEM	CONDITIONS
HIGH TEMPERATURE OPERATION	60℃ , 240Hrs
HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	60℃ , 90%RH , 240Hrs
HIGH TEMPERATURE STORAGE	70℃ , 240Hrs
LOW TEMPERATURE OPERATION	-5℃ , 240Hrs
LOW TEMPERATURE STORAGE	-20℃ , 240Hrs
THERMAL SHOCK	-5℃(1Hr) ~60℃(1Hr) 200Cycle
SHOCK (NON-OPERATIONS)	• 980m/S^2(equal t0 100G),6ms • (1/2 Sine wave),XYZ
VIBRATION (NON-OPERATIONS)	• Frequency range:8~33.3Hz 1stoke:1.3mm Vibration sinusoidal wave, perpendicular axis(both x,z axis:2Hrs,y axis :4Hrs) 1 sweep:2.9G , 33.3~400Hz 1cycle : 15min

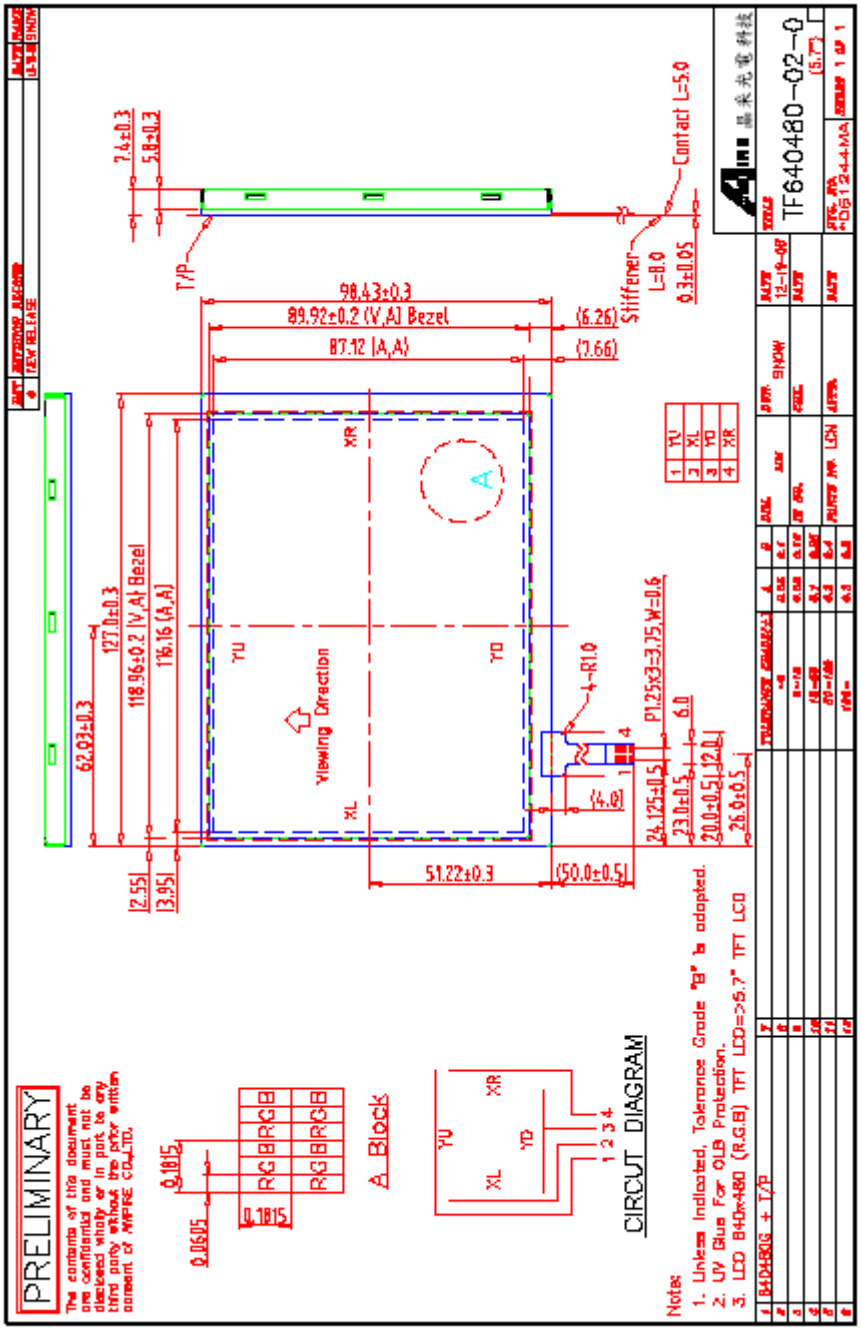
NOTE : Judgment standard

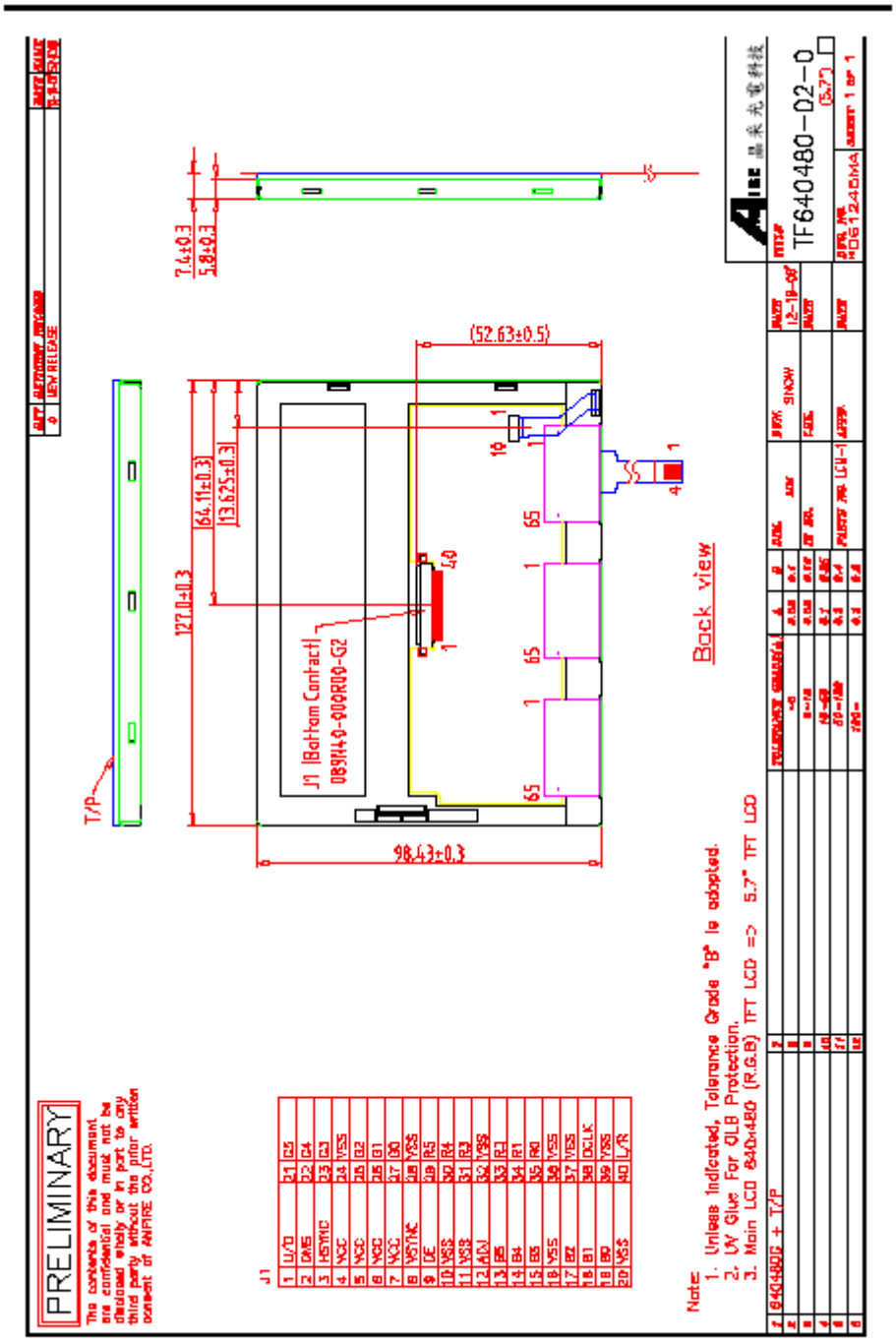
The Judgment of the above test should be made as follow :

Pass : Normal display image with no obvious non-uniformity and no line defect . Partial transformation of the module parts should be ignored.

Fail : No display image , obvious non-uniformity or line defect

11. OUTLINE DIMENSION




TF640480-02-0
Back view
PRELIMINARY
Note:
1. Unless Indicated, Tolerance Grade "B" is adopted.
2. UV Glue For OLB Protection.
3. Main LCD 640x480 (R.G.B) TFT LCD => 5.7" TFT LCD
(52.63±0.5)
98.43±0.3
127.0±0.3
64.11±0.3
13.625±0.3
7.6±0.3
5.8±0.3
J1 (Bottom Contact)
T/P

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