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-640480G2TNQW-T01H-A
APPROVED BY	
DATE	

☐Approved For Specifications
☐Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2010/11/15	-	New Release	Kevin

1. INTRODUCTION

Ampire Display Module AM640480G2 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
- Touch Panel connector suggestion: CSF-1283-04IT or equivalents.

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	115.2 (W) x 86.4 (H)	mm
Pixel pitch	0.18 (W) x 0.18 (H)	mm
Color configuration	R.G.B Vertical stripe	
Overall dimension	127.0(W)x98.43(H)x 9.9 (D)	mm
Brightness	400	cd/m^2
Contrast ratio	250 : 1	
Backlight unit	LED	
Display color	262,144	Colors
Viewing Direction	12 o'clock	
Display Mode	Normally White	

3. ABSOLUTE MAXIMUM 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	-20	70	℃	(1)
Storage Temperature	Tstg	-30	80	℃	(1)

4. ELECTRICAL CHARACTERISTICS

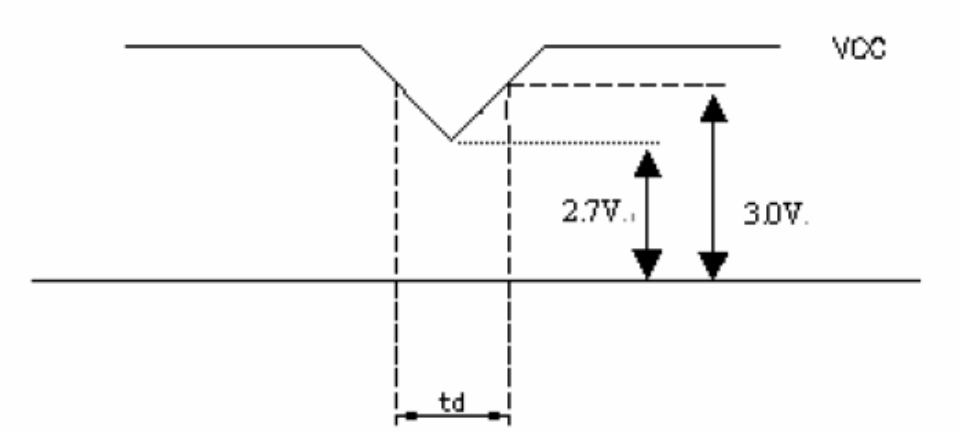
4-1 TFT LCD Module voltage

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}	--	5	--	V	
Logic Input Voltage	VIH	V_{CC}*0.7	--	V_{CC}	V	
	VIL	0	--	V_{CC}*0.3	V	
ADJ Input Voltage	VIH	3.0	--	3.3	V	
	VIL	GND	--	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 consumption

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LCD Power Current	Icc	-	**82**	**-**	mA	(1)
LED Power Current	I_{LED}	-	**290**	**-**	mA	(2)

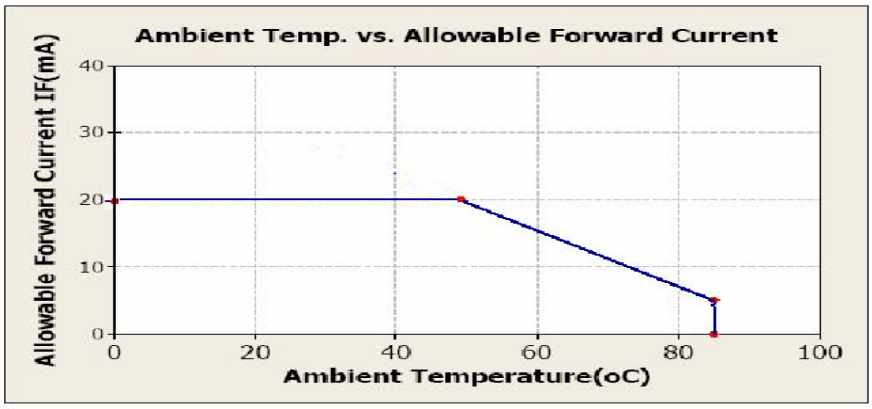
NOTE : (1) Typ : under 64 gray pattern Max : under black pattern

(a) 64 Gray Pattern

(b) Black Pattern

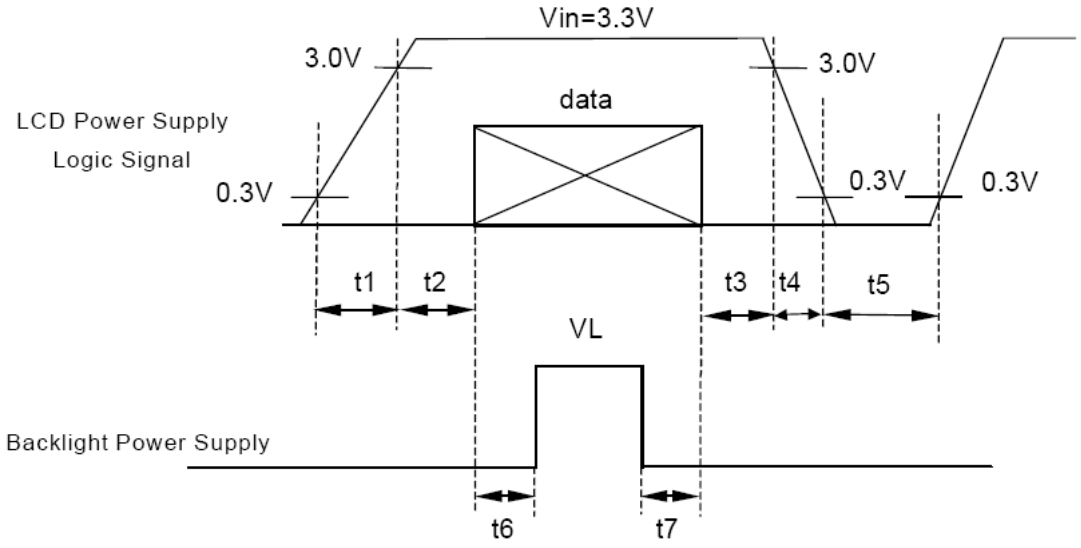
(2) Typ : When V_{LED} is 5.0V Max : When V_{LED} is 4.5V

One LED Dice :



4-3 Power Signal sequence All of information as below are to be define.

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



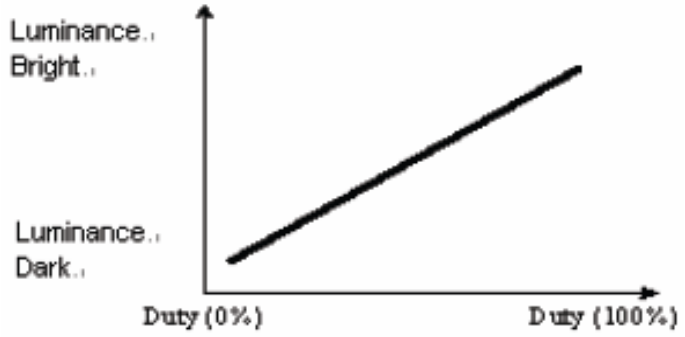
Data: RGB DATA, DCLK, DENA

6. INTERFACE

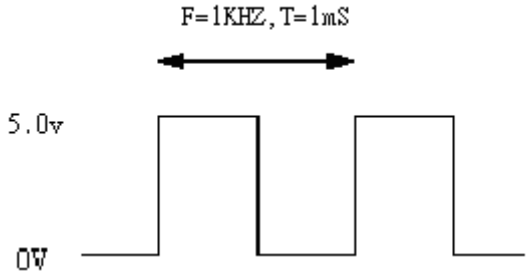
Pin No	Symbol	Function
1	U/D	Up or Down Display Control
2	(NC)	No connection
3	Hsync(NC)	Horizontal SYNC. (Sync mode used)
4	VLED	Power Supply for LED
5	VLED	Power Supply for LED
6	VLED	Power Supply for LED
7	Vcc	Power Supply for LCD
8	Vsync(NC)	Vertical SYNC. (Sync mode used)
9	DE	Data Enable
10	XL	Left electrode – differential analog
11	YU	Top electrode – differential analog
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	XR	Right electrode – differential analog
37	YD	Bottom electrode – differential analog
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 ~ 5.0V , operation frequency : 300~1KHz



3. VSS 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 :

7-1 Timing Specification.

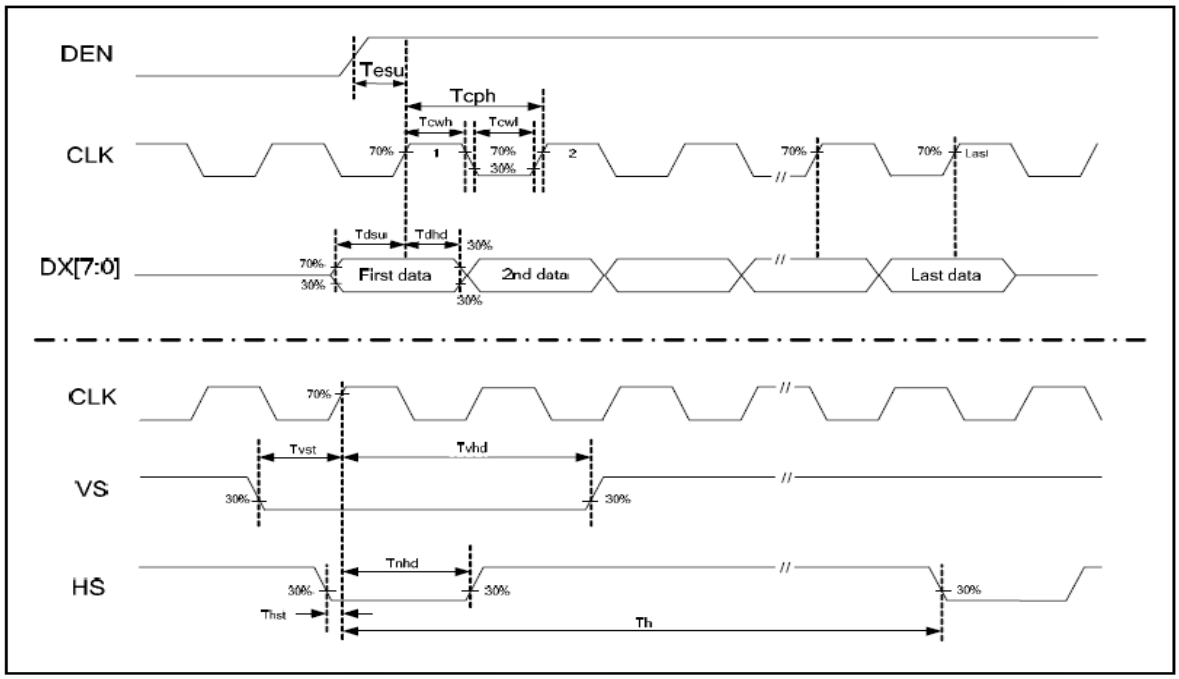
PARAMETER	Symbol	Min.	Typ.	Max	Unit
CLK frequency	F_{CPH}		25.175		MHz
CLK period	T_{CPH}	-	39.7	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	800	-	T_{CPH}
HS pulse width	T_{WH}	5	30	-	T_{CPH}
HS-first horizontal data time	T_{HS}	112	144	175	T_{CPH}
DEN pulse width	T_{EP}	-	640	-	T_{CPH}
VS pulse width	T_{WV}	1	3	5	T_H
VS-DEN time	T_{STV}	-	35	-	T_H
VS period	T_V	-	525	-	T_H

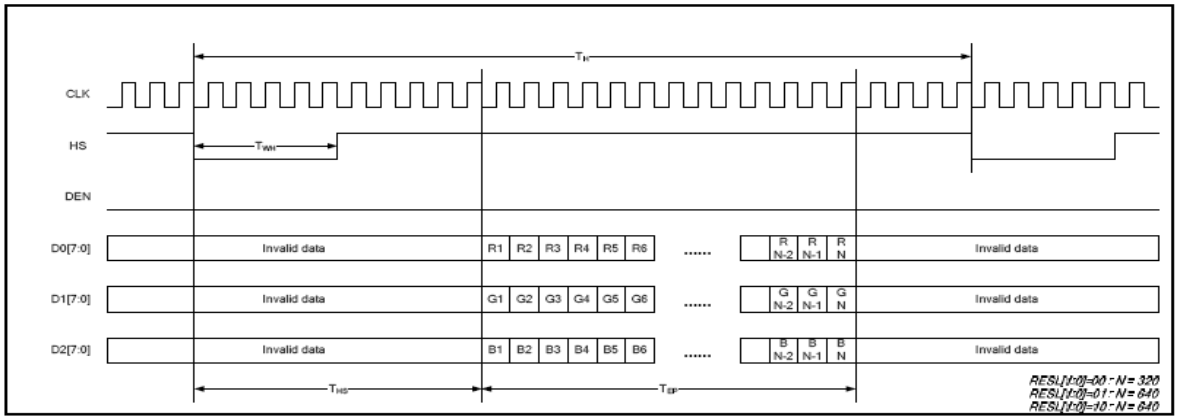
Note: When SYNC mode is used, 1st data start from 144th CLK after HS falling (when STHD[5:0]=00000)

PARAMETER	Symbol	Min.	Typ.	Max	Unit
OEV pulse width	T_{OEV}		100	-	T_{CPH}
CKV pulse width	T_{CKV}	-	96	-	T_{CPH}
HS-CKV time	T_1	-	52	-	T_{CPH}
HS-OEV time	T_2	-	8	-	T_{CPH}
HS-POL time	T_3	-	72	-	T_{CPH}
STV setup time	T_{SUV}	-	46	-	T_{CPH}
STV pulse width	T_{WSTV}	-	1	-	T_H

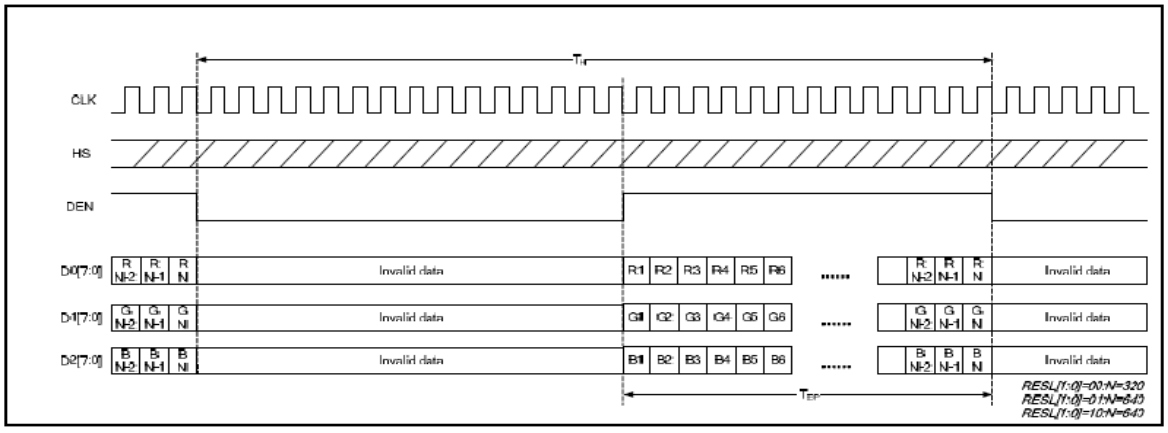
7-2 Timing chart

Clock and Data input waveforms





Parallel RGB SYNC Mode Horizontal Data Format



Parallel RGB DE Mode Horizontal Data Format

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	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	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

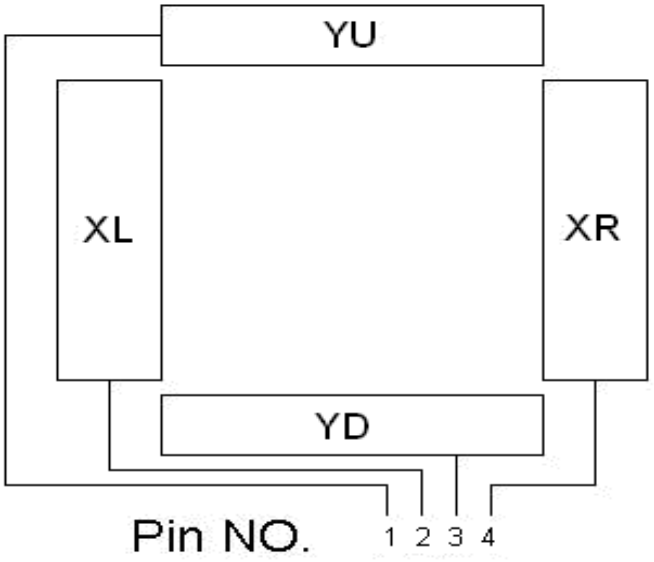
NOTE : (1) Definition of Gray Scale , Color(n) : n is series of Gray Scale
The more n value is the bright Gray Scale
(2) Data : 1-High , 0-Low

8. TOUCH PANEL ELECTRICAL SPECIFICATION

8.1 Touch Screen Panel Characteristics

1. Operation Temperature : -20℃ ~ +70℃
   Storage Temperature : -30℃ ~ +80℃
2. Life Time : > 1,000,000 times
3. Linearity : ≤ 1.5% after environmental & life test ≤ 3.0%
4. TOP ITO Film : Anti-Glare Hard Coating & Anti-Newton Ring
   Sheet Resistance : 300Ω~1000Ω；
   BOTTOM GLASS : Sheet Resistance : 100Ω~800Ω
5. Tai Type : FPC Gold-plated
6. Meet for ROHS.
7. Insulating Resistance : More than 20MΩ at DC 25 V

8.2 Touch Screen Pane & Interface



X : Glass electrode

Y : Film electrode

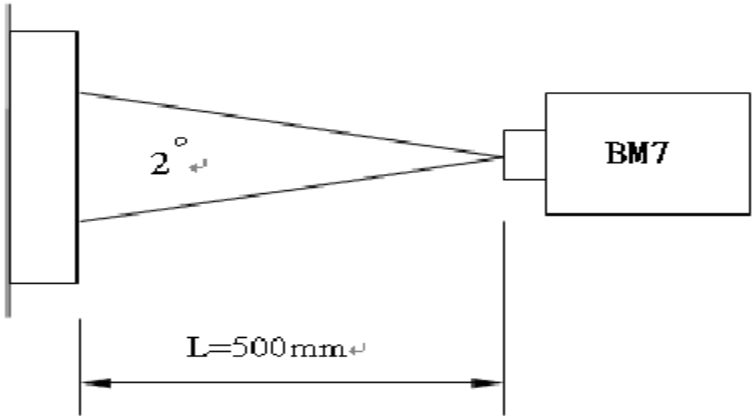
Pin No.	Symbol	I/O	Function
1	YU	Top	Top electrode – differential analog
2	XL	Left	Left electrode – differential analog
3	YD	Bottom	Bottom electrode – differential analog
4	XR	Right	Right electrode – differential analog

9. OPTICAL CHARACTERISTICS

Item			Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast ratio			CR	Point - 5 Θ=Φ=0°	200	250	--	--	(1)(2)(3)
Luminance			Lw		--	400	-	cd/m²	(1)(3)
Luminance Uniformity			ΔL		70	75	-	%	(1)(3)
Response Time (White – Black)			$T_r + T_f$		--	50	--	ms	(1)(3)(5)
Viewing Angle	Vertical		Θ	CR≧10 Point – 5	80	100	-	Deg.	(1)(2)(4)
	Horizontal		Φ		120	140	-		
Color chromaticity		Red	Rx	Point - 5 Θ=Φ=0°	0.566	0.616	0.666	--	(1)(3)
			Ry		0.302	0.352	0.402		
		Green	Gx		0.308	0.358	0.408		
			Gy		0.518	0.568	0.618		
		Blue	Bx		0.096	0.146	0.196		
			By		0.086	0.136	0.186		
		White	Wx		0.296	0.346	0.396		
			Wy		0.328	0.378	0.428		

NOTE :

(1) Measure conditions : 25℃±2℃ , 60±10%RH under 10Lux , in the dark room by BM-7TOPCON) ,viewing 2° , VCC=3.3V , VDD=3.3V



(2) Definition of Contrast Ratio :

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

(3) Definition of Luminance :
Definition of Luminance Uniformity
Measure white luminance on the point 5 as figure9-1
Measure white luminance on the point 1 ~ 9 as figure9-1

∆L = [L(MIN) / L(MAX)] X 100%

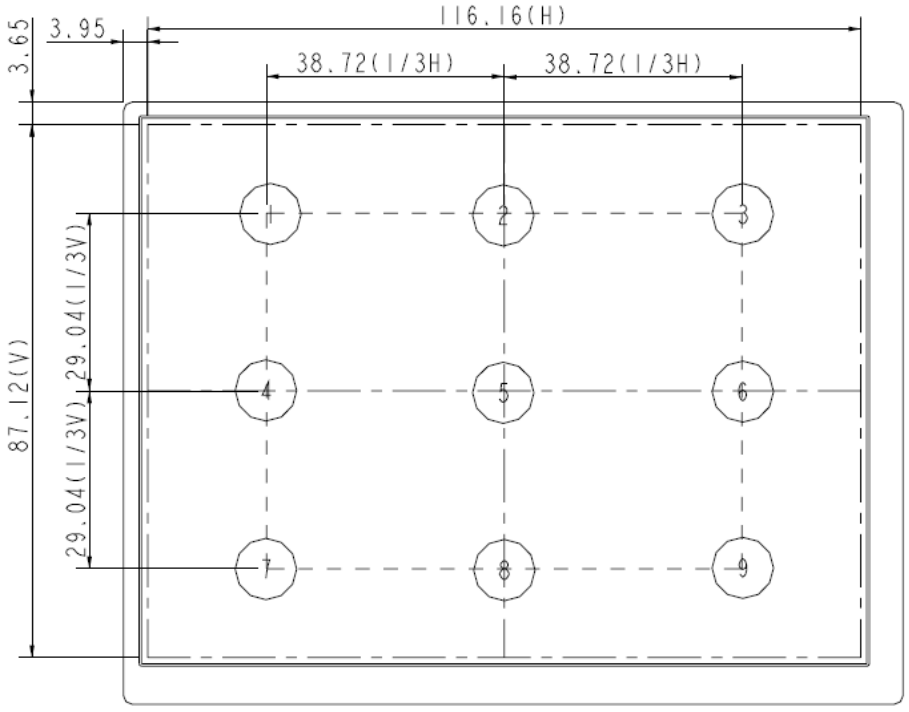


Fig9-1 Measuring point

(4) Definition of Viewing Angle(Θ, Φ), refer to Fig9-2 as below :

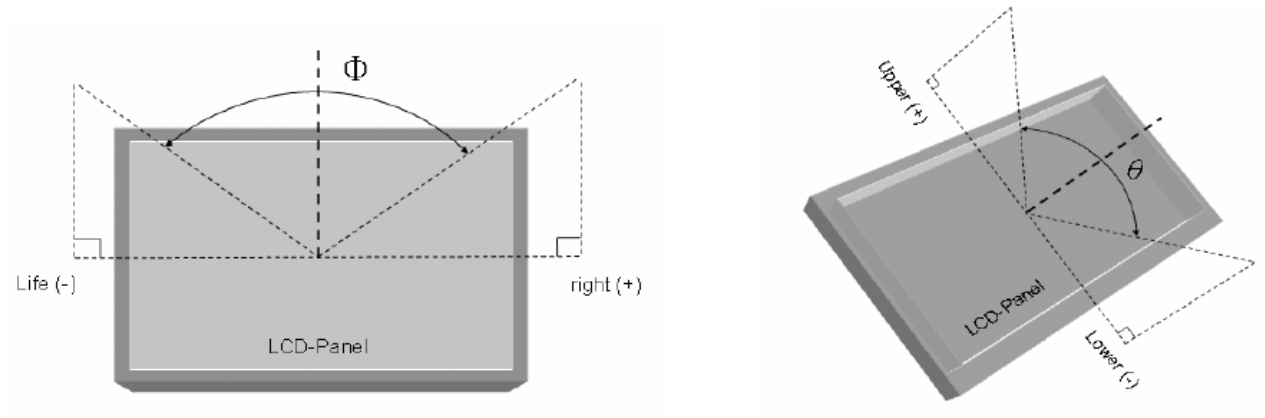


Fig9-2 Definition of Viewing Angle

(5) Definition of Response Time.(White – Black)

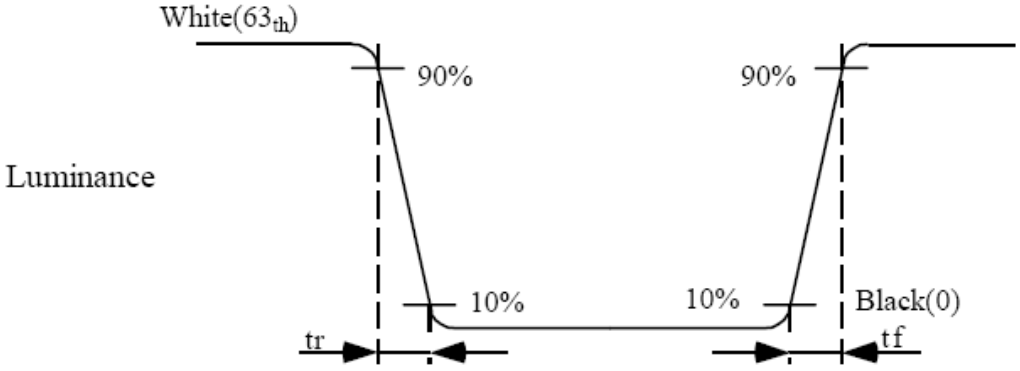


Fig9-3 Definition of Response Time(White-Black)

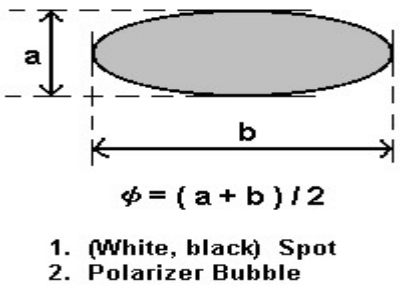
9 INCOMING INSPECTION STANDARD FOR TFT-LCD PANEL

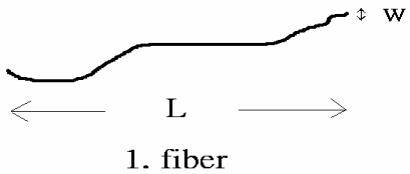
DEFECT TYPE			LIMIT						Note
VISUAL DEFECT	INTERNAL	SPOT	φ＜0.15mm			Ignore			Note1
			0.15mm≦φ≦0.5mm			N≦4			
			0.5mm＜φ			N=0			
		FIBER	0.03mm<W≦0.1mm, L≦5mm			N≦3			Note1
			1.0mm＜W, 1.5mm＜L			N=0			
		POLARIZER BUBBLE	φ＜0.15mm			Ignore			Note1
			0.15mm≦φ≦0.5mm			N≦2			
			0.5mm＜φ			N=0			
		Mura	It' OK if mura is slight visible through 6%ND filter						
ELECTRICAL DEFECT	BRIGHT DOT		A Grade			B Grade			
			C Area	O Area	Total	C Area	O Area	Total	Note3
			N≦0	N≦2	N≦2	N≦2	N≦3	N≦5	Note2
	DARK DOT		N≦2	N≦3	N≦3	N≦3	N≦5	N≦8	
	TOTAL DOT		N≦4			N≦5	N≦6	N≦8	Note2
	TWO ADJACENT DOT		N≦0	N≦1 pair	N≦1 pair	N≦1 pair	N≦1 pair	N≦1 pair	Note4
	THREE OR MORE ADJACENT DOT		NOT ALLOWED						
	LINE DEFECT		NOT ALLOWED						

(1) One pixel consists of 3 sub-pixels, including R,G, and B dot.(Sub-pixel = Dot)

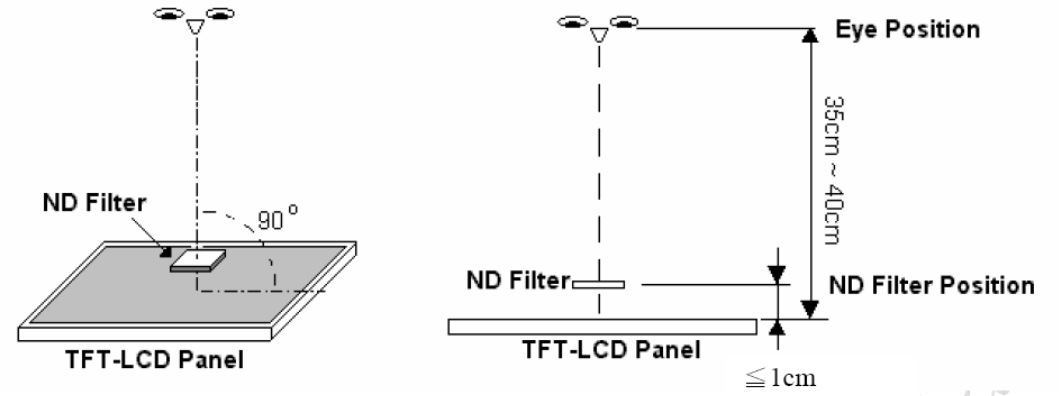
(2) LITTLE BRIGHT DOT ACCEPTITABLE UNDER 6 % ND-Filter

[Note1] W : Width[mm], L : Length[mm], N : Number, φ : Average Diameter

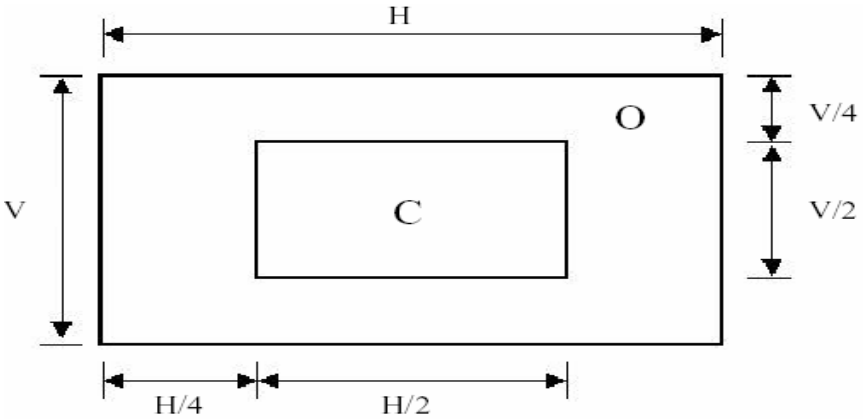




[Note2] Bright dot is defined through 6% transmission ND Filter as following.



[Note3]

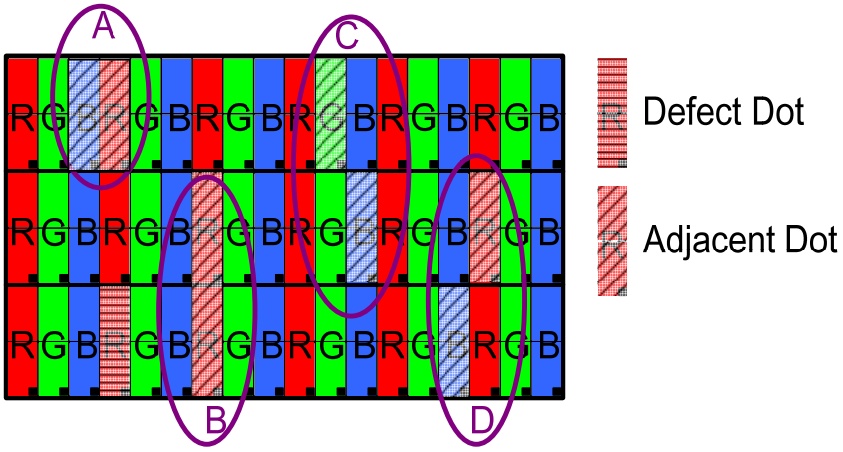


C Area: Center of display area

C Area: Outer of display area

[Note4]

Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dart adjacent dot. And they will be counted 2 defect dots in total quantity.



(1) The defects that are not defined above and considered to be problem shall be reviewed and discussed by both parties.

(2) Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

10. RELIABILITY TEST CONDITIONS

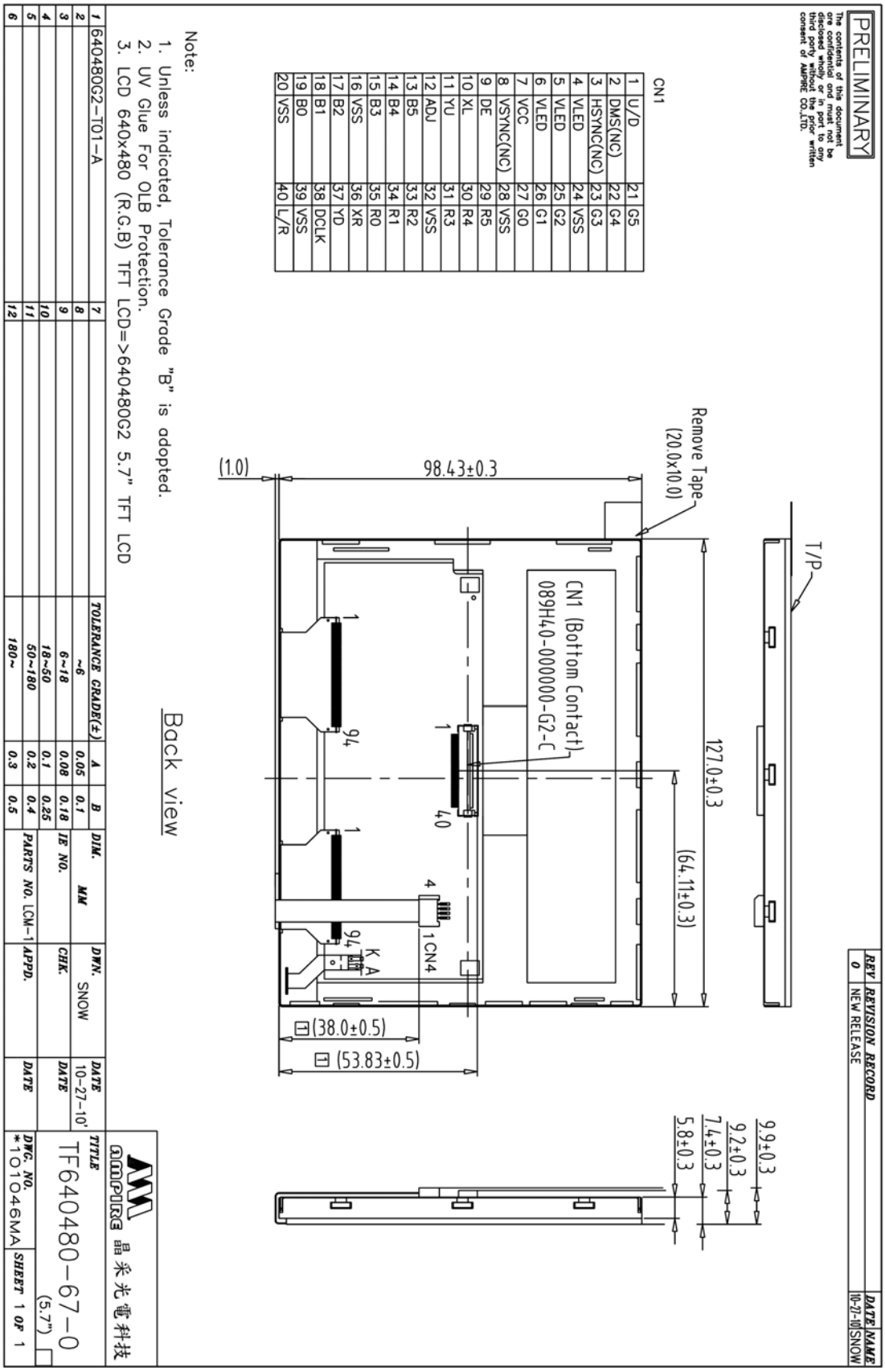
ITEM	CONDITIONS
HIGH TEMPERATURE OPERATION	70℃ , 240Hrs*
HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	40℃ , 90%RH , 240Hrs*
HIGH TEMPERATURE STORAGE	80℃ , 240Hrs*
LOW TEMPERATURE OPERATION	-20℃ , 240Hrs*
LOW TEMPERATURE STORAGE	-30℃ , 240Hrs*
THERMAL SHOCK	-20℃(0.5Hr) ~70℃(0.5Hr) * 50Cycle

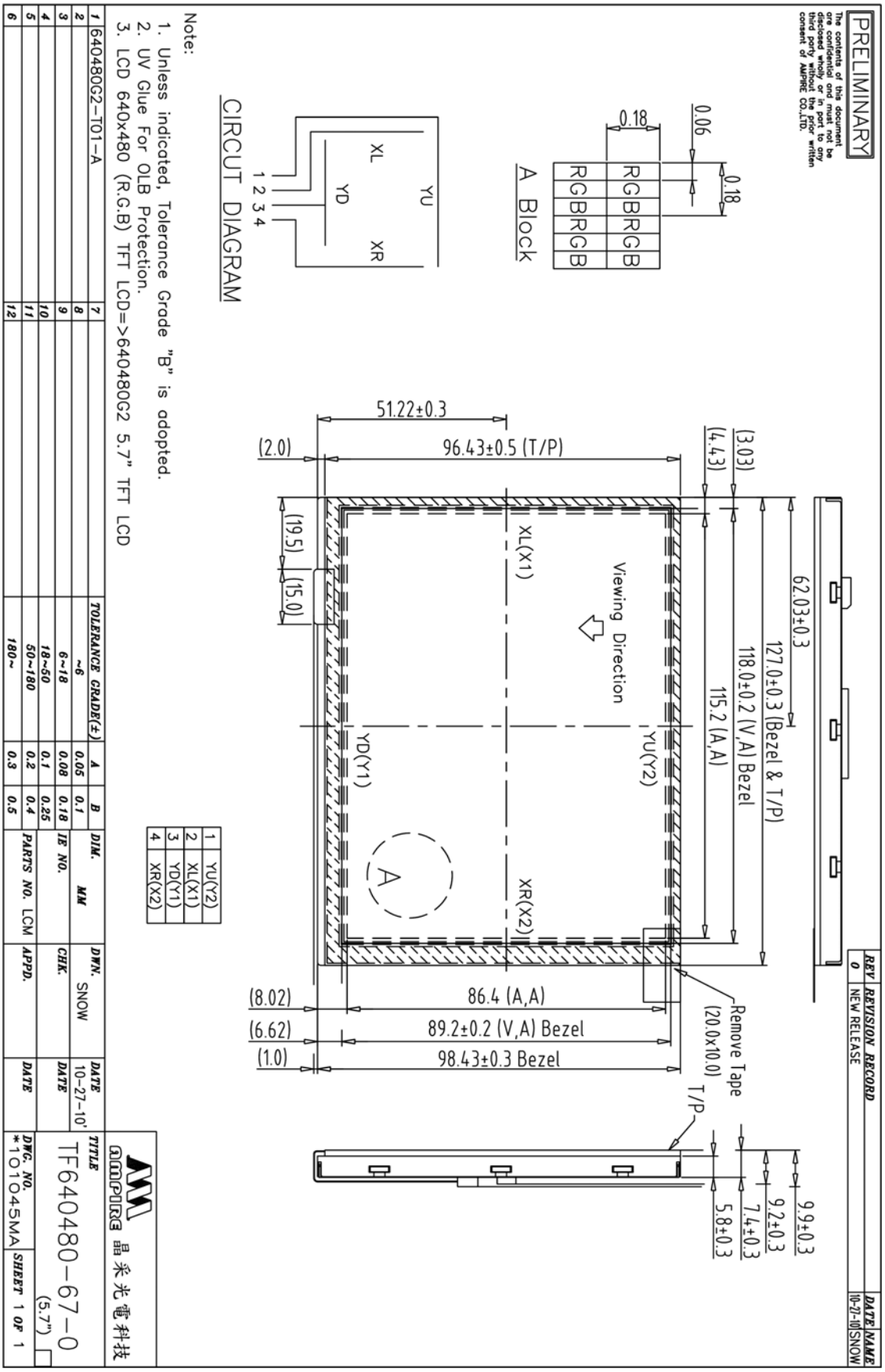
Note* : After 24 hr room temp. and test .

10.1 OTHERS

AMIPRE will provide one year warranty for all products and three months warrantee for all repairing products.

11. OUTLINE DIMENSION




PRELIMINARY
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A Block
RGBRGB
RGBRGB
0.18
0.06
0.18
CIRCUT DIAGRAM
YU
XL
XR
YD
1 2 3 4
Note:
1. Unless indicated, Tolerance Grade "B" is adopted.
2. UV Glue For OLB Protection.
3. LCD 640x480 (R.G.B) TFT LCD=>640480G2 5.7" TFT LCD
51.22±0.3
96.43±0.5 (T/P)
(2.0)
(3.03)
(4.43)
(19.5)
(15.0)
XL(X1)
Viewing Direction
YU(Y2)
YD(Y1)
XR(X2)
A
62.03±0.3
127.0±0.3 (Bezel & T/P)
118.0±0.2 (V,A) Bezel
115.2 (A,A)
(8.02)
86.4 (A,A)
(6.62)
89.2±0.2 (V,A) Bezel
(1.0)
98.43±0.3 Bezel
Remove Tape
(20.0x10.0)
T/P
9.9±0.3
9.2±0.3
7.4±0.3
5.8±0.3
1 YU(Y2)
2 XL(X1)
3 YD(Y1)
4 XR(X2)
REV. REVISION RECORD
0 NEW RELEASE
DATE 10-27-10 NAME SNOW
640480G2-T01-A
TOLERANCE GRADE(±)
~6 0.05 0.1
6~18 0.08 0.18
18~50 0.1 0.25
50~180 0.2 0.4
180~ 0.3 0.5
DIM. MM
IE NO.
PARTS NO. LCM
DWN. SNOW
CHK.
APPD.
DATE 10-27-10'
DATE
DATE
TITLE
TF640480-67-0
(5.7")
DWG. NO. *101045MA
SHEET 1 OF 1