



晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	研 華
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-640480GETNQW-TA0H
APPROVED BY	
DATE	

Approved For Specifications

Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2012/08/23	--	New Release	Eric

1. INTRODUCTION

This 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 , a driving circuit, touch panel 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 LVDS interface
- Wide range operation temperature

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)x9.1(D)---(Typ)	mm
Surface treatment	Antiglare , Hard-Coating(3H)	
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	V _{cc}	-0.5	5	V	
Signal Input Voltage	DCLK , DE R0~R5 G0~G5 B0~B5	-0.5	V _{cc} + 0.5	V	
Operation Temperature	Top	-20	70	°C	
Storage Temperature	Tstg	-30	80	°C	

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	
Power Voltage For VLED	V _{DD}	--	5.0	--	V	
Logic Input Voltage	V _{IH}	V _{CC} *0.7	--	V _{CC}	V	
	V _{IL}	0	--	V _{CC} *0.3	V	
ADJ Input Voltage	V _{IH}	3.0	--	5.0	V	
	V _{IL}	GND	--	0.3	V	

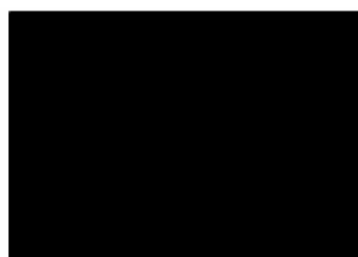
4-2 TFT LCD current consumption

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LCD Power Current	I _{cc}	-	106	-	mA	(1)
LED Power Current	I _{LED} (VLED=5V)	-	290	-	mA	

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



(a) 64 Gray Pattern



(b) Black Pattern

5. TOUCH PANEL ELECTRICAL SPECIFICATION

5-1 Touch Screen Panel Characteristics

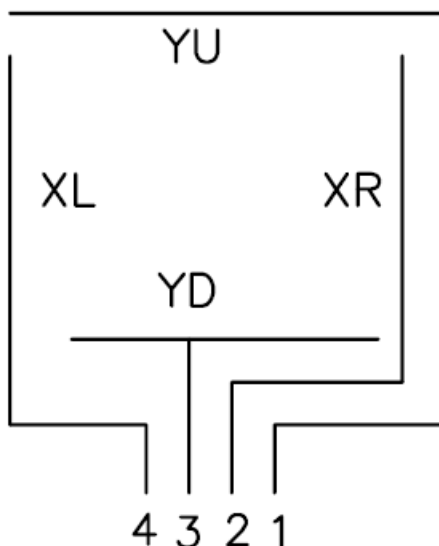
1. Operation Temperature : -20°C ~ +70°C
Storage Temperature : -30°C ~ +80°C
2. Life Time : > 1,000,000 times
3. Linearity : ≤ 1.5% after environmental & life test ≤ 3.0%
4. TOP ITO Film : Anti-Glare Hard Coating & Anti-Newton Ring

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

5-2 Touch Screen Pane & Interface



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

6. INTERFACE

LVDS J2: CSTAR CP100-S20G-H16

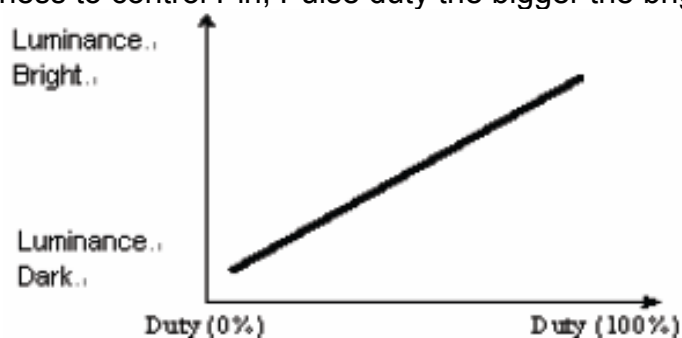
Pin no	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	Gnd	Power Ground
4	Gnd	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	Gnd	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	Gnd	Power Ground
11	IN2-	Transmission Data of Pixels 2
12	IN2+	Transmission Data of Pixels 2
13	Gnd	Power Ground
14	CLK-	Sampling Clock
15	CLK+	Sampling Clock
16	Gnd	Power Ground
17	NC	No Connect
18	NC	No Connect
19	Gnd	Power Ground
20	Gnd	Power Ground

LED J3: ENTERY 3808K-F04N-03L (Mating connector: ENTERY H2808K-P04N-02B)

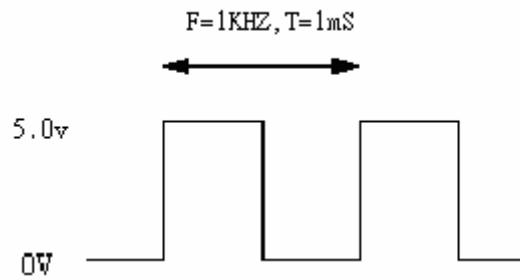
Pin no	Symbol	Function
1	VLED	Power Supply for LED 5V
2	GND	Power Ground
3	LED_ON	LED backlight ON/OFF, "H": LED ON, "L": LED OFF
4	PWM	PWM input for LED Brightness *Note

NOTE:

1. PWM adjusts brightness to control Pin, Pulse duty the bigger the brighter.

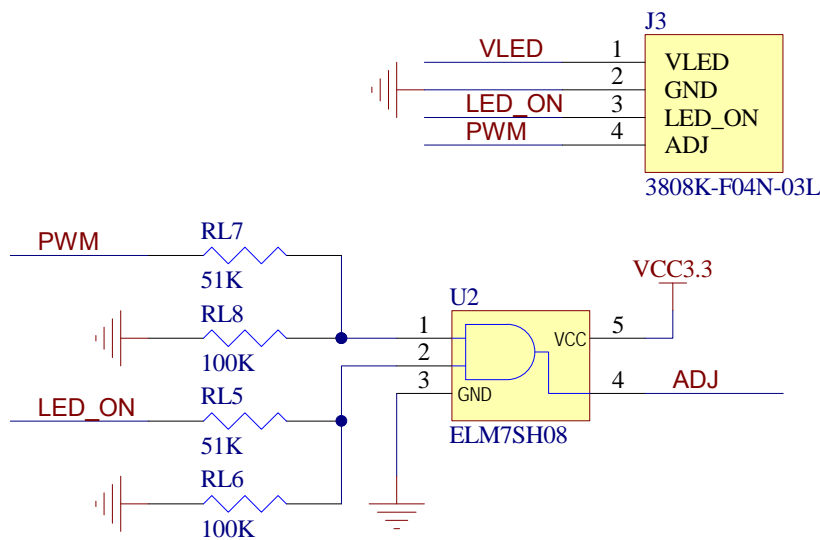


2. PWM signal = 0 ~ 5.0V, operation frequency: 100Hz~200 KHz



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

Schematic of LED_ON & PWM signal



7. AC Timing characteristic of the LVDS

Switching Characteristics

over recommended operating conditions (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP ⁽¹⁾	MAX	UNIT
t_{su}	Setup time, D0–D20 to CLKOUT↓	$C_L = 8 \text{ pF}$, See Figure 5	5			ns
t_h	Data hold time, CLKOUT↓ to D0–D20		5			ns
$t_{(RSKM)}$	Receiver input skew margin ⁽²⁾ (see Figure 7)	$t_c = 15.38 \text{ ns } (\pm 0.2\%)$, Input clock jitter < 50 ps, ⁽³⁾	550	700		ps
t_d	Delay time, CLKIN↑ to CLKOUT↓ (see Figure 7)	$V_{CC} = 3.3 \text{ V}$, $t_c = 15.38 \text{ ns } (\pm 0.2\%)$, $T_A = 25^\circ\text{C}$	3	5	7	ns
t_{en}	Enable time, $\overline{\text{SHTDN}}$ to phase lock	See Figure 7	1			ms
t_{dis}	Disable time, $\overline{\text{SHTDN}}$ to off state	See Figure 8	400			ns
t_t	Transition time, output (10% to 90% t_r or t_f) (data only)	$C_L = 8 \text{ pF}$	3			ns
t_t	Transition time, output (10% to 90% t_r or t_f) (clock only)	$C_L = 8 \text{ pF}$	1.5			ns
t_w	Pulse duration, output clock		0.50 t_c			ns

(1) All typical values are at $V_{CC} = 3.3 \text{ V}$, $T_A = 25^\circ\text{C}$.

(2) The parameter $t_{(RSKM)}$ is the timing margin available to allocate to the transmitter and interconnection skews and clock jitter. The value of this parameter at clock periods other than 15.38 ns can be calculated from $t_{RSKM} = t_c/14 - 550 \text{ ps}$.

(3) |Input clock jitter| is the magnitude of the change in input clock period.

PARAMETER MEASUREMENT INFORMATION (continued)

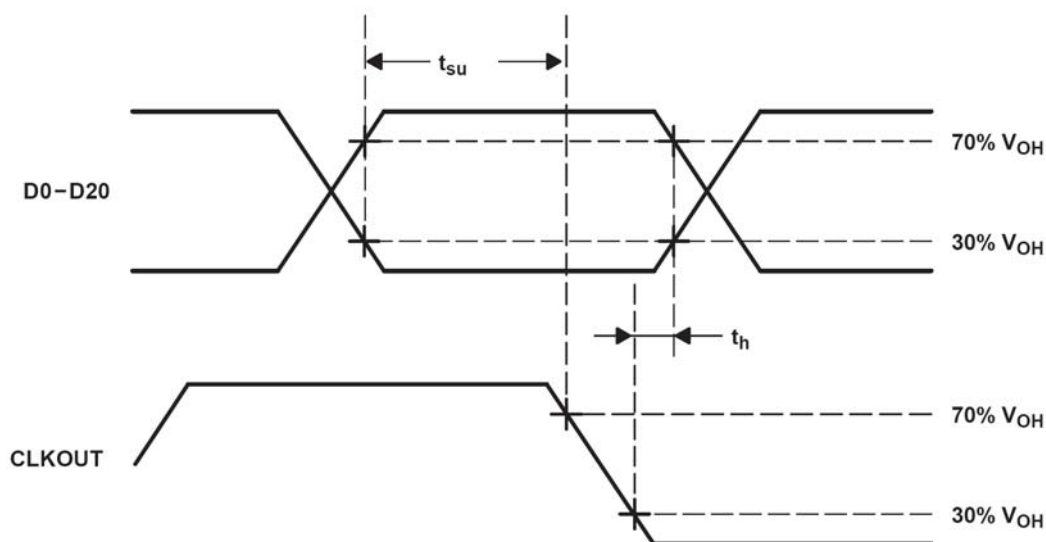


Figure 5. Setup and Hold Time Waveforms

PARAMETER MEASUREMENT INFORMATION (continued)

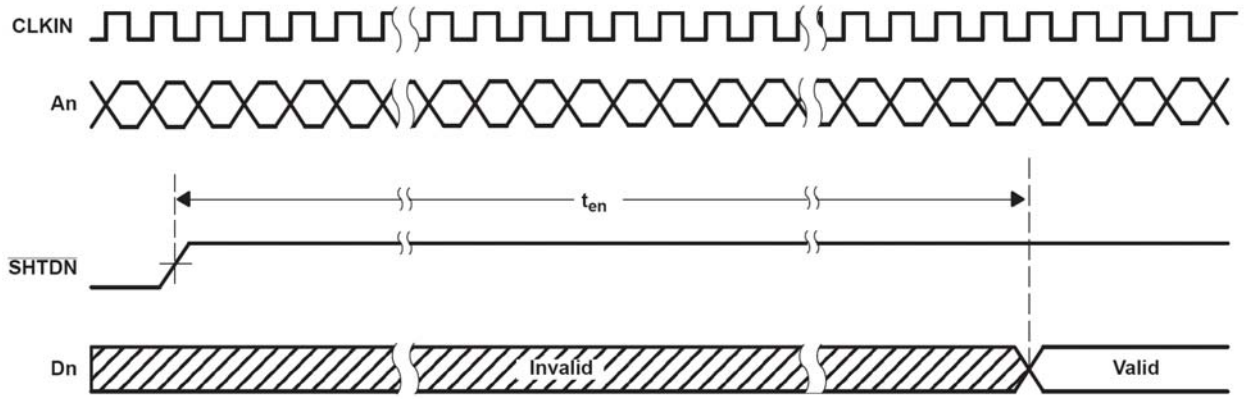


Figure 7. Enable Time Waveforms

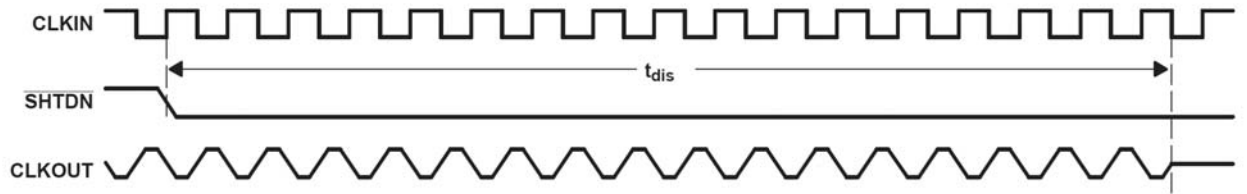


Figure 8. Disable Time Waveforms

8. INPUT SIGNAL

8-1 Timing Specification.

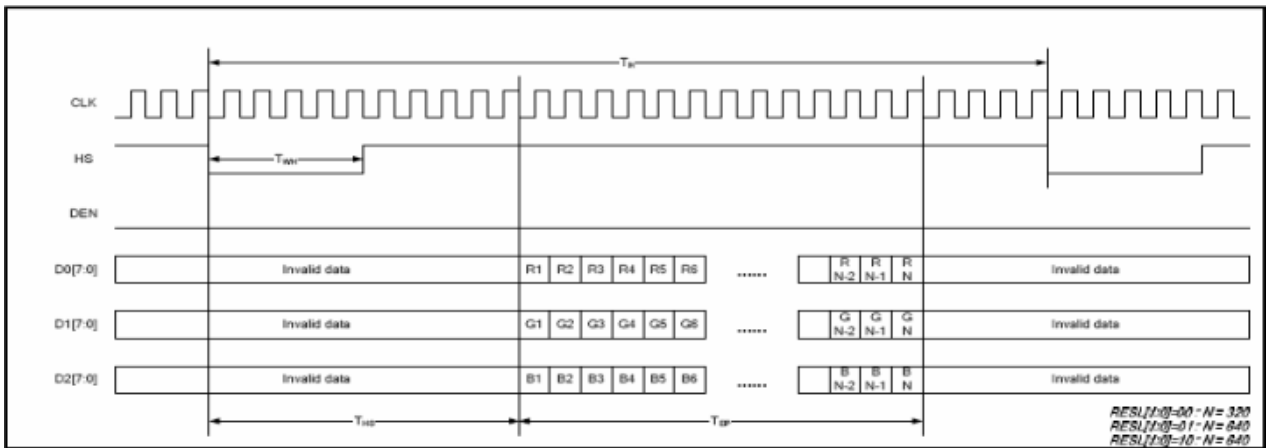
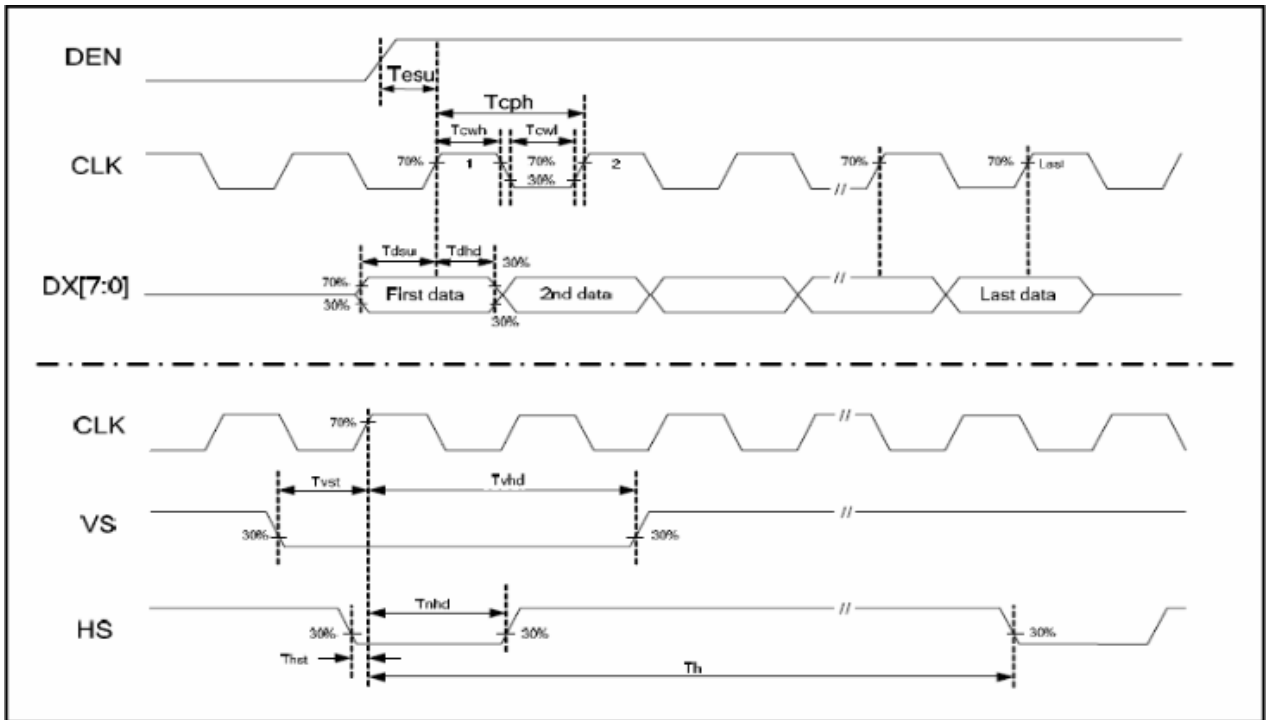
PARAMETER	Symbol	Min.	Typ.	Max	Unit
CLK frequency	F_{CPH}		25.175		MHz
CLK period	T_{CPH}	-	39.7	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	800	-	T_{CPH}
HS pulse width	T_{WH}	5	30	-	T_{CPH}
HS-first horizontal data time	T_{HS}	112	144	175	T_{CPH}
DEN pulse width	T_{EP}	-	640	-	T_{CPH}
VS 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 $STHD[5:0] = 00000$)

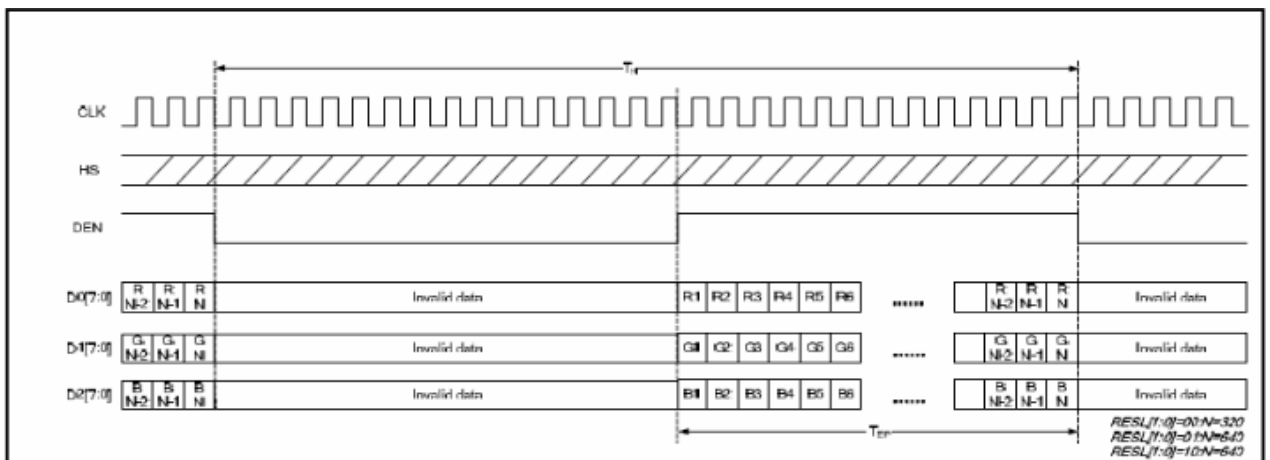
PARAMETER	Symbol	Min.	Typ.	Max	Unit
OEV pulse width	T_{OEV}		100	-	T_{CPH}
CKV pulse width	T_{CKV}	-	96	-	T_{CPH}
HS-CKV time	T_1	-	52	-	T_{CPH}
HS-OEV time	T_2	-	8	-	T_{CPH}
HS-POL time	T_3	-	72	-	T_{CPH}
STV setup time	T_{SUV}	-	46	-	T_{CPH}
STV pulse width	T_{WSTV}	-	1	-	T_H

8-2 Timing chart

Clock and Data input waveforms



Parallel RGB SYNC Mode Horizontal Data Format



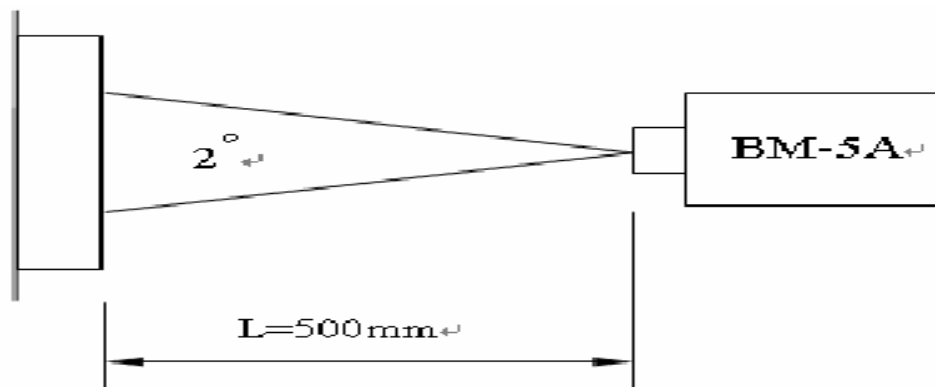
Parallel RGB DE Mode Horizontal Data Format

9. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast ratio	CR	Point - 5 $\Theta = \Phi = 0^\circ$	200	250	--	--	(1)(2)(3)	
Luminance	Lw		--	400	-	cd/m ²	(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 \geq 10 Point – 5	80	100	-	Deg.	(1)(2)(4)
	Horizontal	Φ		120	140	-		
Color chromaticity	Red	Rx	Point - 5 $\Theta = \Phi = 0^\circ$	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°C ± 2°C, 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:

$$\text{Contrast Ratio (CR)} = (\text{White}) \text{ Luminance of ON} \div (\text{Black}) \text{ Luminance of OFF}$$

(3) Definition of Luminance:

Measure white luminance on the point 5 as figure9-1

(4) Definition of Luminance Uniformity

Measure white luminance on the point 1 ~ 9 as figure9-1

$$\Delta L = [L(\text{MIN}) / L(\text{MAX})] \times 100\%$$

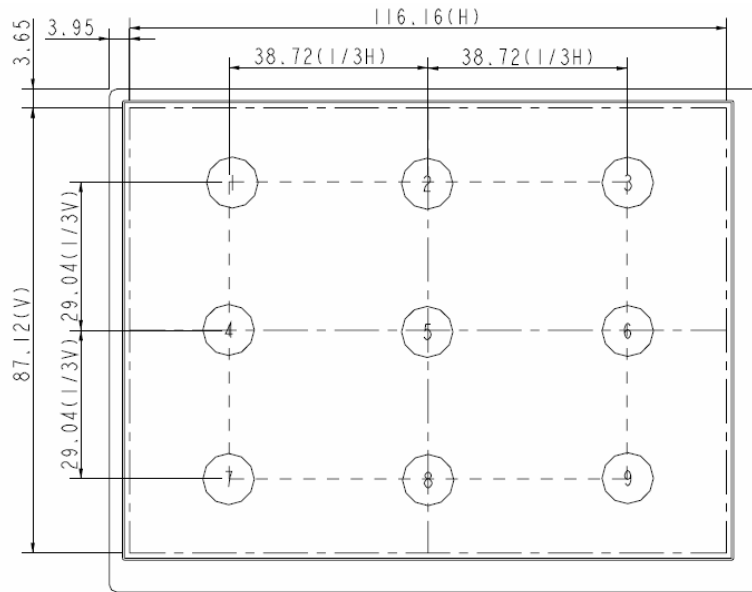


Fig9-1 Measuring point

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

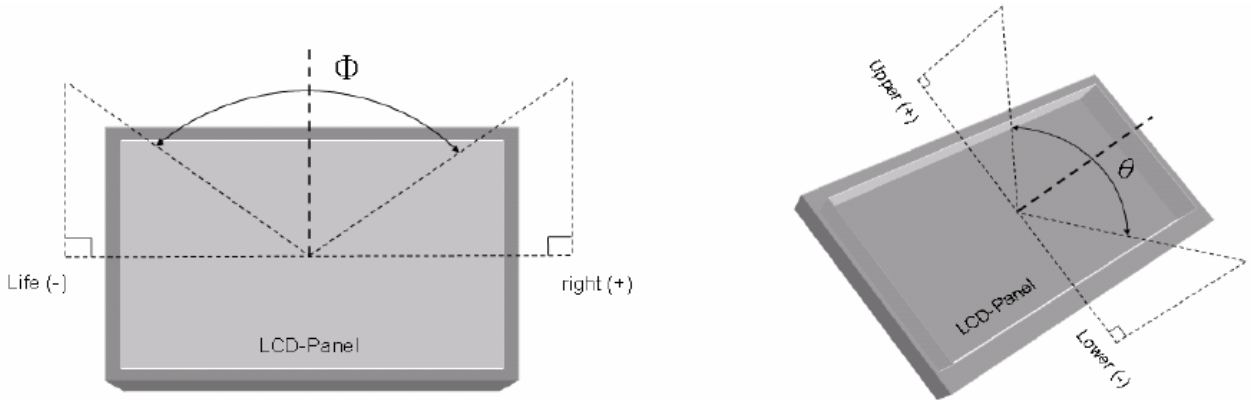


Fig9-2 Definition of Viewing Angle

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

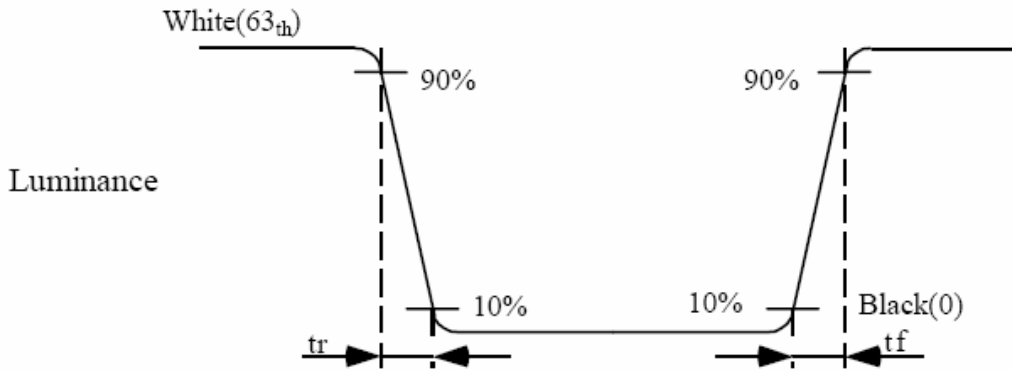


Fig9-3 Definition of Response Time(White-Black)

10 RELIABILITY TEST CONDITIONS

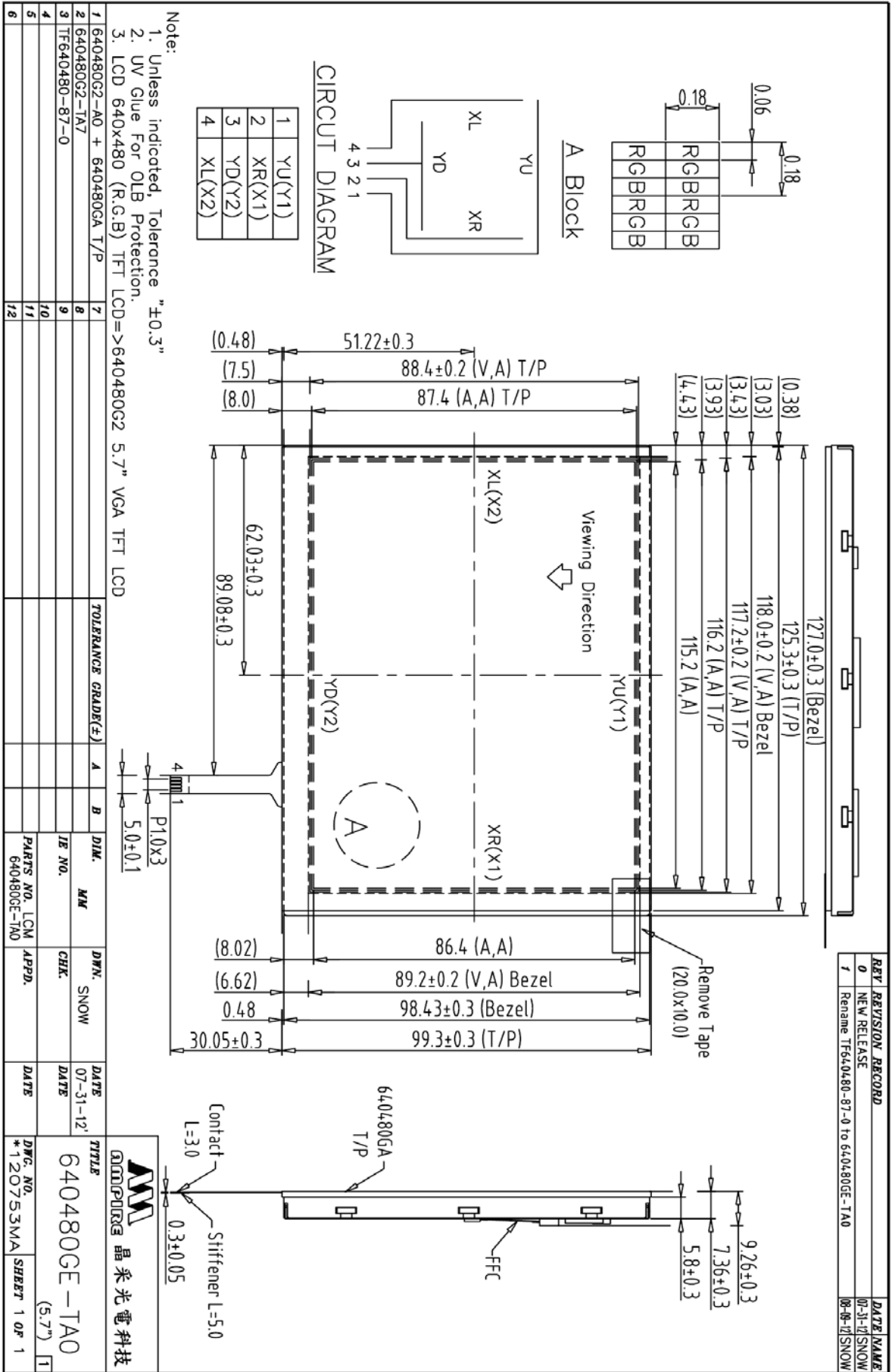
ITEM	CONDITIONS
HIGH TEMPERATURE OPERATION	70°C , 240Hrs*
HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	40°C , 90%RH , 240Hrs*
HIGH TEMPERATURE STORAGE	80°C , 240Hrs*
LOW TEMPERATURE OPERATION	-20°C , 240Hrs*
LOW TEMPERATURE STORAGE	-30°C , 240Hrs*
THERMAL SHOCK	-30°C (0.5Hr) ~70°C (0.5Hr) * 50Cycle

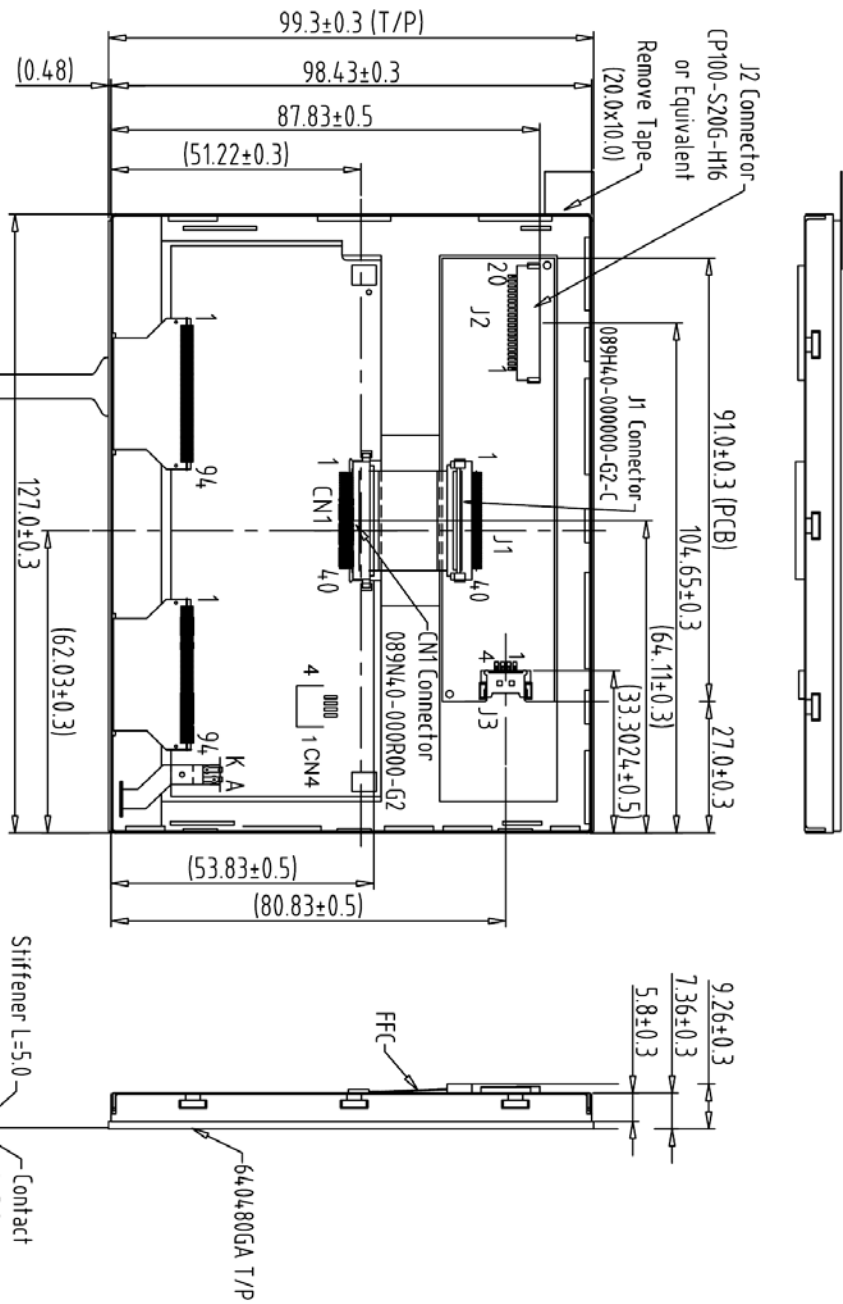
Note*: After 24 hr room temp. and test .

10.1 OTHERS

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

11 OUTLINE DIMENSION





J3	
1	VLED
2	GND
3	LED_ON
4	PWM

J2	
1	VDD
2	VDD
3	GND
4	GND
5	INO-
6	INO+
7	GND
8	IN1-
9	IN1+
10	GND
11	IN2-
12	IN2+
13	GND
14	CLK-
15	CLK+
16	GND
17	INC
18	INC
19	GND
20	GND

- Note:
1. Unless indicated, Tolerance "±0.3"
 2. UV Glue For OLB Protection.
 3. LCD 640x480 (R.G.B) TFT LCD=>640480G2 5.7" VGA TFT LCD
 4. J3: ENTERY 3808K-F04N-03L or Equivalent, Mating Connector: ENTERY H208K-P04N-02B or Equivalent

1	640480G2-A0 + 640480GA T/P	7	TOLERANCE GRAD(F)	A	B	MM	DWN.	SNOW	DATE	DWG. NO.	SHEET
2	640480G2-TA7	8							07-31-12	640480GE-TA0	(5.7") 1
3	TF640480-87-0	9					CHK.		DATE	*120754MA	SHEET 1 OF 1
4		10									
5		11									
6		12									