



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-640480GJTNQW-TA2H
APPROVED BY	
DATE	

☐Approved For Specifications

☐Approved For Specifications & Sample

AMPIRE CO., LTD.

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2016/12/06	--	New Release	Simon

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 and LED backlight system and touch panel. 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
- 4 layers PCB for EMI reduction
- capacitive-type touch panel.
- For normal operation, there must be a cover lens of 0.7~4mm thickness to be put on the top of touch panel.**
- USB interface for touch control.

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)x10.575(D)---(Typ)	mm
Brightness	500	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	

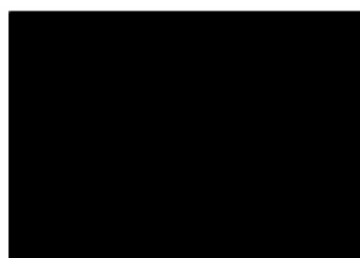
4-2 TFT LCD current consumption

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

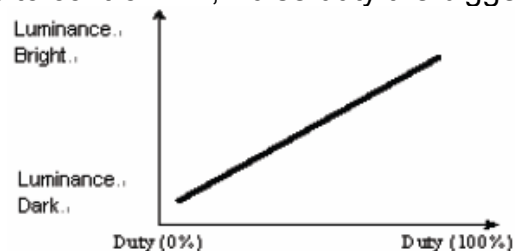
6. INTERFACE

LVDS CN1:

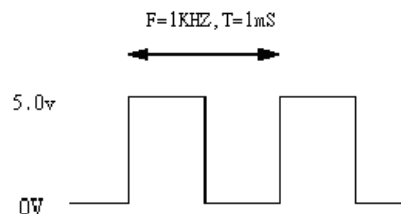
Pin no	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	Gnd	Power Ground
4	Gnd	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	Gnd	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	Gnd	Power Ground
11	IN2-	Transmission 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	VLED	Power Supply for LED Backlight : 5V
18	VLED	Power Supply for LED Backlight : 5V
19	Gnd	Power Ground
20	ADJ	LED backlight adjustment

NOTE :

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



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



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

7. AC Timing characteristic of the LVDS

7.1 Timing Parameter

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)

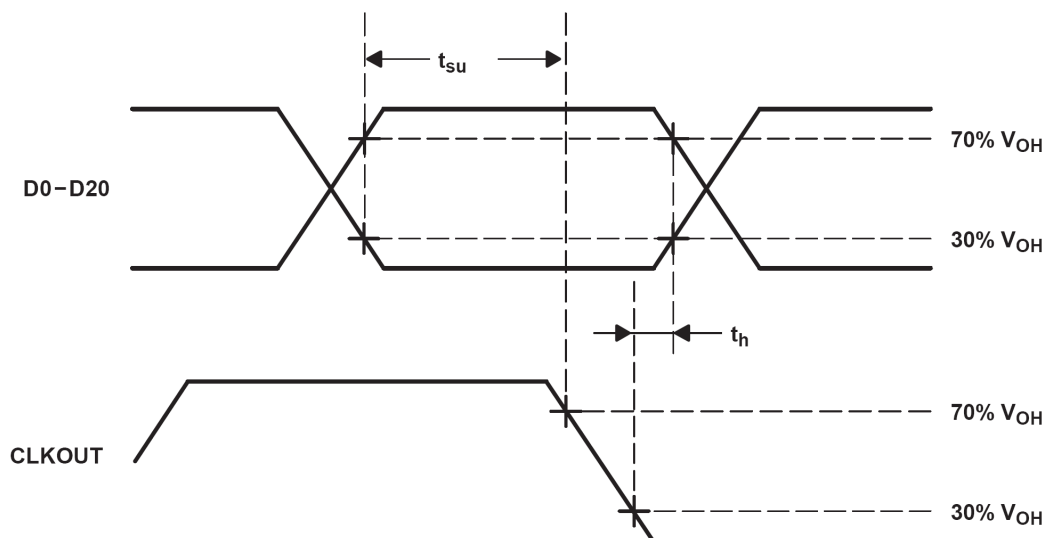


Figure 5. Setup and Hold Time Waveforms

PARAMETER MEASUREMENT INFORMATION (continued)

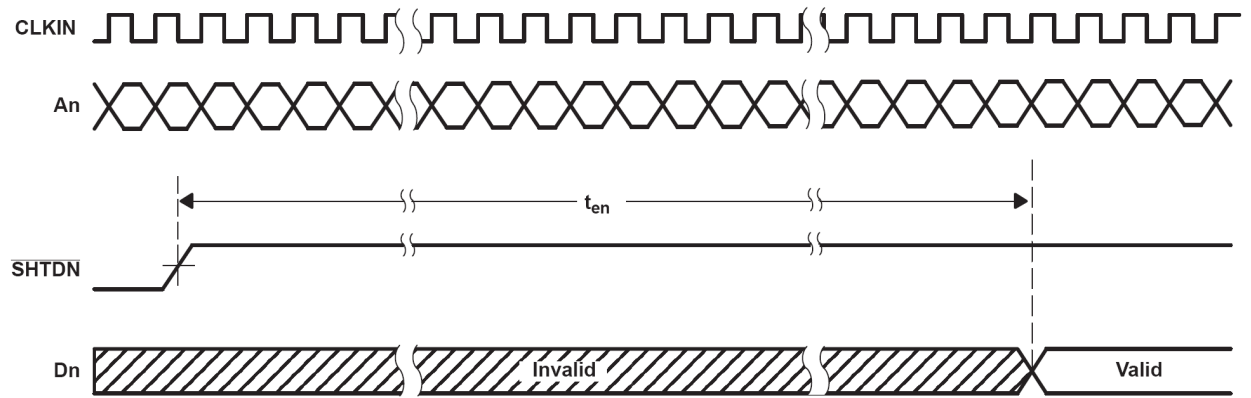


Figure 7. Enable Time Waveforms

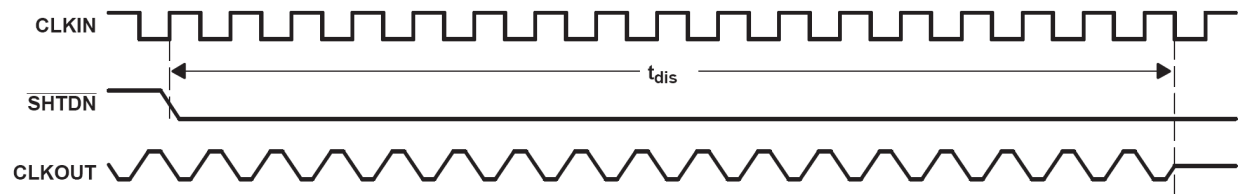


Figure 8. Disable Time Waveforms

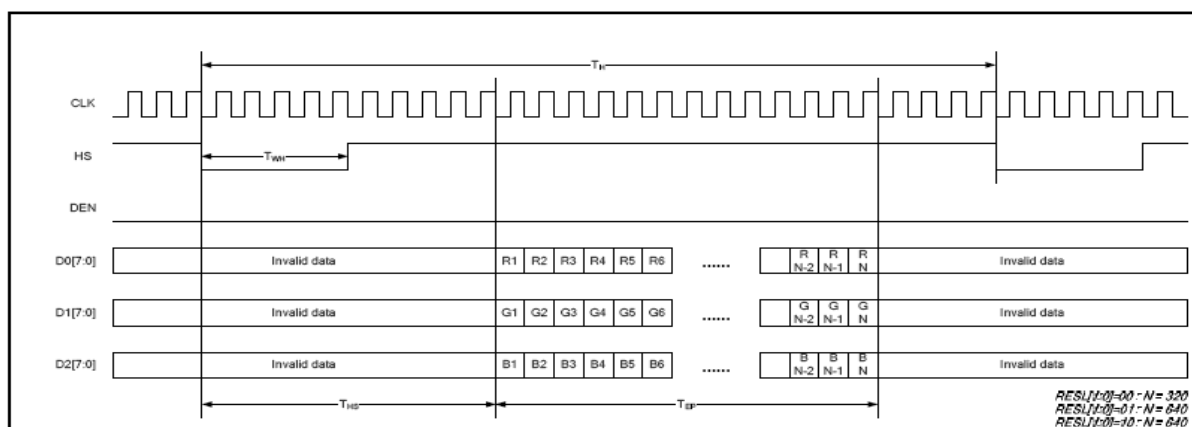
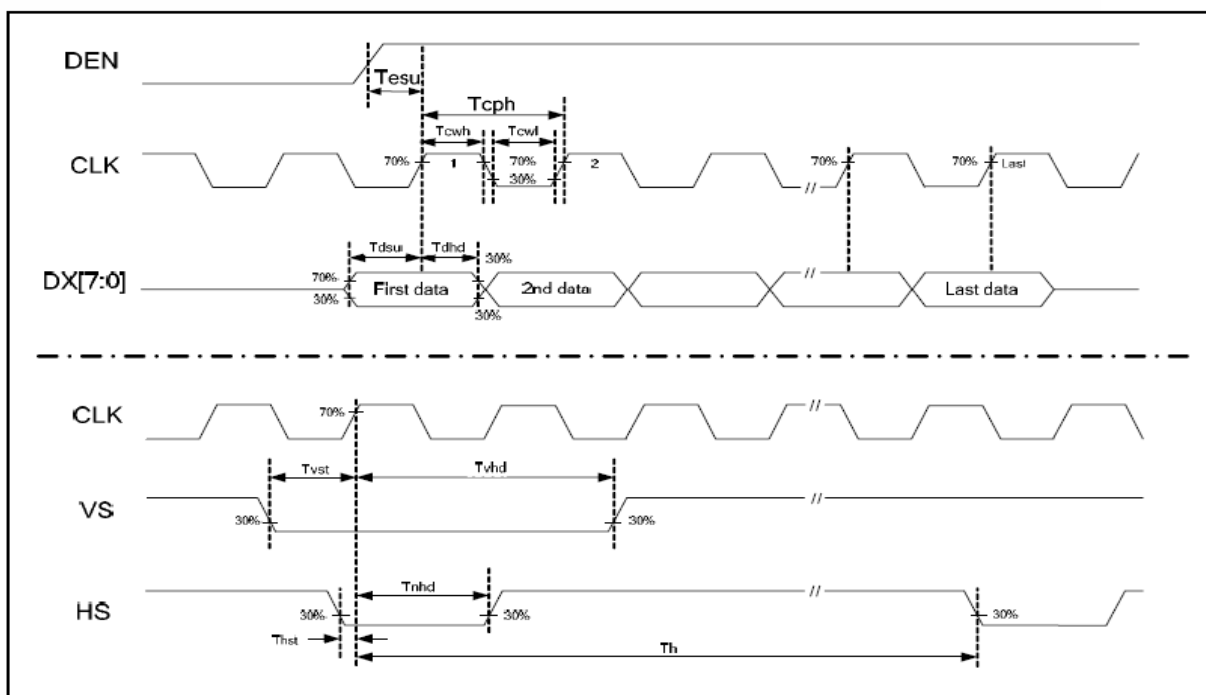
7.2 Recommended Input Timing of LVDS transmitter

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

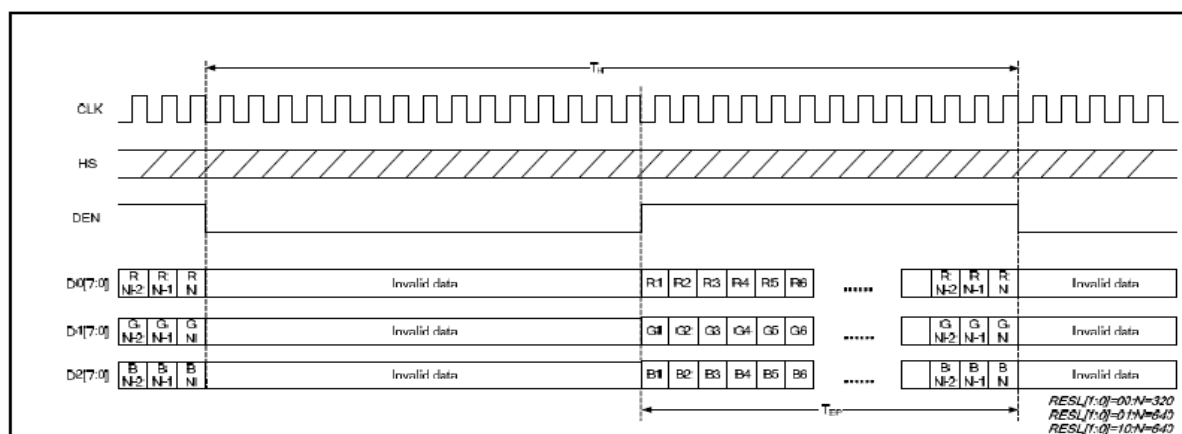
Note: When SYNC mode is used, 1st data start from 144th CLK after HS falling (when $STHD[5:0]=00000$)

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

Clock and Data input waveforms



Parallel RGB SYNC Mode Horizontal Data Format



Parallel RGB DE Mode Horizontal Data Format

8. Projected capacitive-type touch panel

For normal operation, there must be a cover lens of 0.7~4mm thickness to be put on the top of touch panel.

Touch Control for USB interface

Pin No	Symbol	Function
1	VCC	Power Supply for TP controller
2	D+	Data+
3	D+	Data+
4	GND	Ground
5	D-	Data-
6	D-	Data-
7	NC	
8	NC	

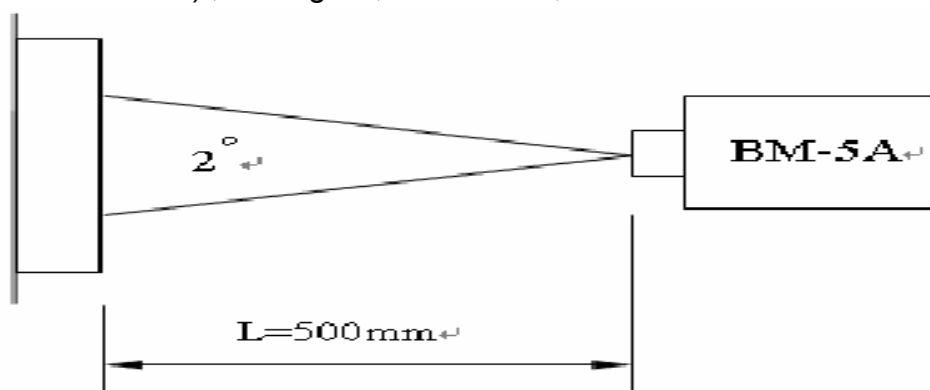
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Power Voltage For TP controller	VCC	--	5.0	--	V

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		350	400	500	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		
LED life time			Ta = 25℃		20K		hour	(1)(6)	

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

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

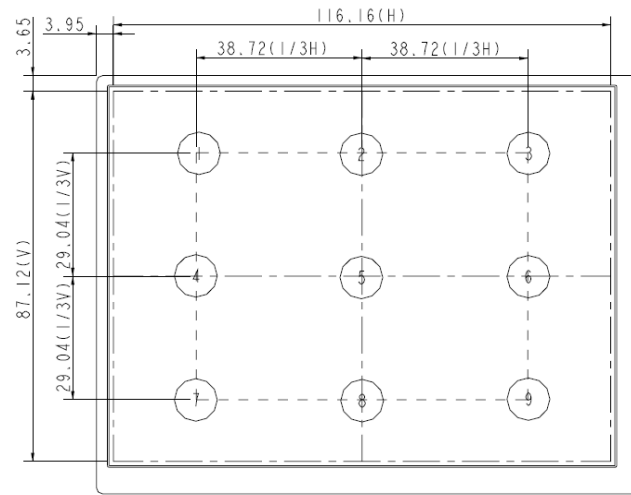


Fig9-1 Measuring point

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

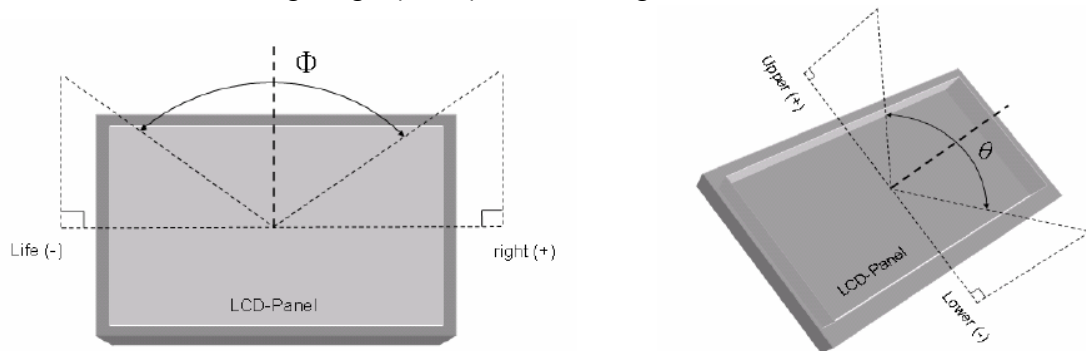


Fig9-2 Definition of Viewing Angle

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

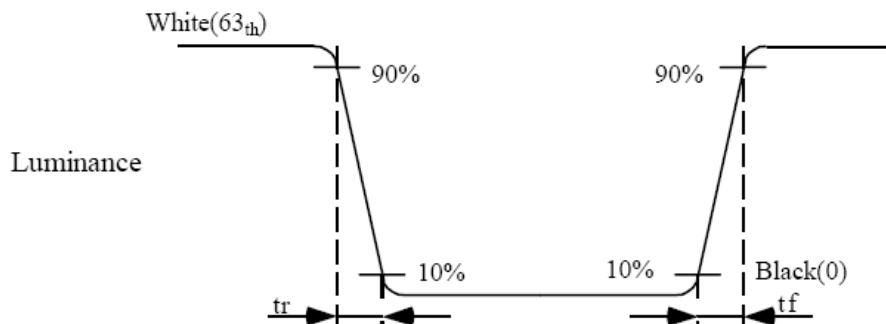


Fig9-3 Definition of Response Time(White-Black)

(6) End of Life shall be determined by the time when any of the following is satisfied under continuous lighting at 25°C .

- Intensity drops to 50% of the Initial Value (Min. Luminance)
- Based on LED
- It is an estimative value

10. RELIABILITY TEST CONDITIONS

ITEM	CONDITIONS
HIGH TEMPERATURE OPERATION	70℃ , 240Hrs
HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	60℃ , 90%RH , 240Hrs
HIGH TEMPERATURE STORAGE	80℃ , 240Hrs
LOW TEMPERATURE OPERATION	-20℃ , 240Hrs
LOW TEMPERATURE STORAGE	-30℃ , 240Hrs
THERMAL SHOCK	-30℃ (0.5Hr) ~80℃ (0.5Hr) 200Cycle

11. General Precautions

11-1 Safety

Liquid crystal is poisonous. Do not put it your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

11-2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

11-3 Static Electricity

1. Be sure to ground module before turning on power or operation module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

11-4 Storage

1. Store the module in a dark room where must keep at $+25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

11-5 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

11-6 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.

Technical drawing of the 640480GJ-TA2 TFT LCD assembly. The drawing includes a top view showing the bezel, cover lens, and viewing direction. It also includes a side view showing the cover lens, stiffener, and component area. Dimensions are provided in millimeters with tolerances. A table at the bottom lists the parts and their specifications.

Top View Dimensions:

- Overall width: 62.03 ± 0.3
- Overall height: 127.0 ± 0.3 (Bezel & Cover lens)
- Bezel width: 124.06 ± 0.3 (T/P Sensor)
- Bezel height: 118.0 ± 0.2 (V, A) Bezel
- Viewing Direction: Indicated by a dashed line and arrow.
- Remove tape: Indicated by a dashed line and arrow.
- Component area: $30.0 \times 30.0 \times 1.6$ (Max.)
- Contact L: 3.0
- Stiffener: $L = 4.0$
- Cover lens: $T = 1.1$
- Stiffener: $L = 4.0$
- Component area: $30.0 \times 30.0 \times 1.6$ (Max.)
- Contact L: 3.0
- Stiffener: $L = 4.0$

Side View Dimensions:

- Overall height: 10.575 ± 0.3
- Bezel height: 9.175 ± 0.3
- Bezel width: 5.8 ± 0.3

Table:

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	12-01-16	SNOW

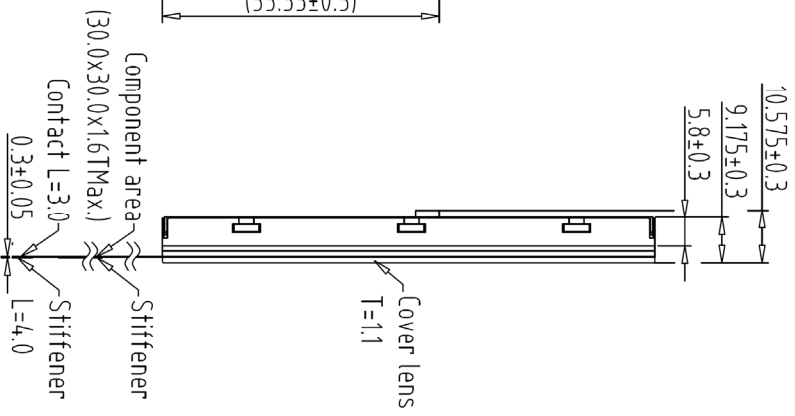
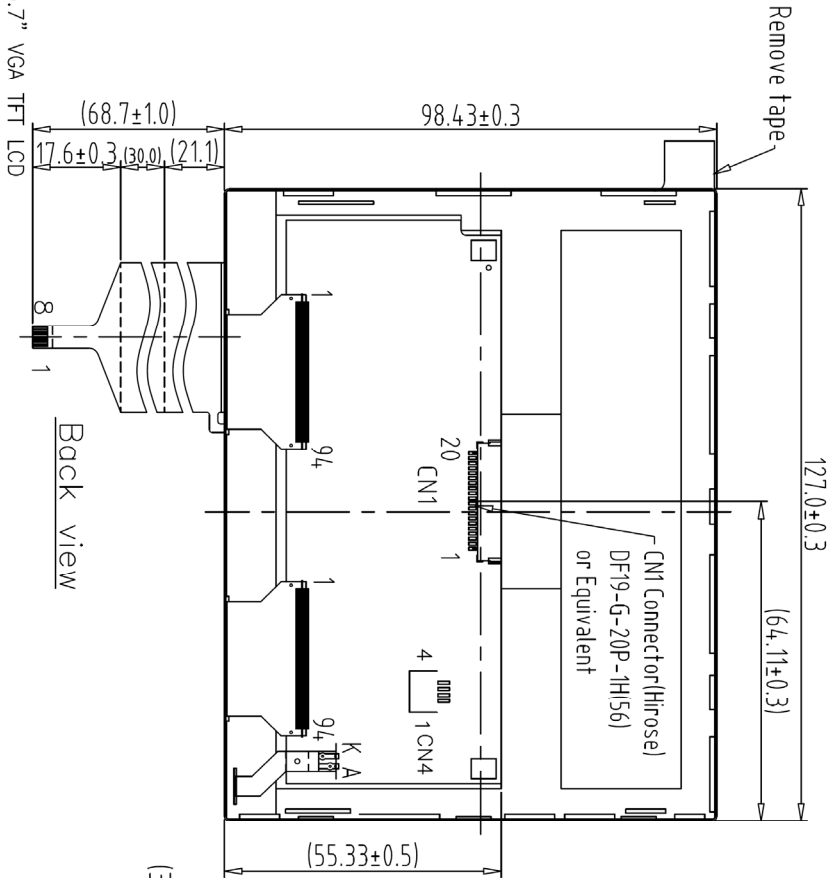


T/P (USB)

1	VCC
2	D+
3	D-
4	GND
5	D-
6	D-
7	NC
8	NC

CN1

1	VCC	11	RXIN2-
2	VCC	12	RXIN2+
3	GND	13	GND
4	GND	14	CKIN-
5	RXIN0-	15	CKIN+
6	RXIN0+	16	GND
7	GND	17	VLED
8	RXIN1-	18	VLED
9	RXIN1+	19	GND
10	GND	20	ADJ



1	640480G4-A0	7				TOLERANCE GRADE(±)	A	B	DIM.	MM	DWN.	SNOW	DATE	12-01-16	TITLE	640480GJ-TA2	DWG. NO.	*161202MA	SHEET	1 OF 1
2	640480GJ-TA0	8							IE NO.		CHK.		DATE			USB (5.7")				
3		9																		
4		10																		
5		11																		
6		12																		

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