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-800600C4TMQW-B1H-B
APPROVED BY	
DATE	

☐ Preliminary Specification
■ Formal Specification

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This Specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2023/07/20	--	New Release	Mantle

1. Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8” TFT-LCD panel, LED backlight, LED driver unit and power circuit unit.

(1) Construction: 8” a-Si TFT active matrix, White LED Backlight and LED Driving circuit.
(2) Resolution (pixel): 800(R.G.B) X600
(3) Number of the Colors : 262K colors (R , G , B 6 bit digital each)
(4) LCD type : Transmissive , normally White
(5) Interface: RGB interface 40 pin
(6) Power Supply Voltage: 3.3V for logic voltage, 5.0V for LED driver power voltage.
(7) Viewing Direction: 6 O’clock (Gray Inversion)
(8) LCD Driver IC: EK79713+EK73215

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	8 inch (Diagonal)	
Resolution	800 x 3(RGB) x 600	dot
Dot pitch	0.0675(W) x 0.2025(H)	mm
Active area	162.0(W) x 121.5(H)	mm
Module size	183.0(W) x 141.0(H) x 8.36(D)	mm
Surface treatment	Anti-Glare	
Color arrangement	RGB-stripe	
interface	Digital	
Weight	T.B.D.	g

3. ABSOLUTE MAX. RATINGS

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.3	4.6	V	
	VLED	-0.3	6.0		
Input signal voltage	Vi	-0.3	VCC+0.3	V	Note 1
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	

Note 1: The product is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.
Signals include : DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

4. ELECTRICAL CHARACTERISTICS

4-1 Typical Operation Conditions

Item		Symbol	Values			Unit	Remark
			MIN	TYP	MAX		
Power Voltage		V_{CC}	3.0	3.3	3.6	V	Note 1,2
Power Consumption		I_{CC}	--	123	--	mA	Note 1,2 VCC=3.3V
LED Driver Power Voltage		V_{LED}	3.3	5.0	5.5	V	
LED Driver Current Consumption		I_{LED}	--	410	--	mA	VLED=5V VADJ=3.3V (duty 100%)
			--	750	--		VLED=3.3V VADJ=3.3V (duty 100%)
Logic Input Voltage	Input Voltage	V_{IN}	0	-	V_{CC}	V	
	Logic input high voltage	V_{TH}	$0.8V_{CC}$	-	V_{CC}	V	Note 3
	Logic input low voltage	V_{TL}	GND	-	$0.2V_{CC}$	V	Note 3

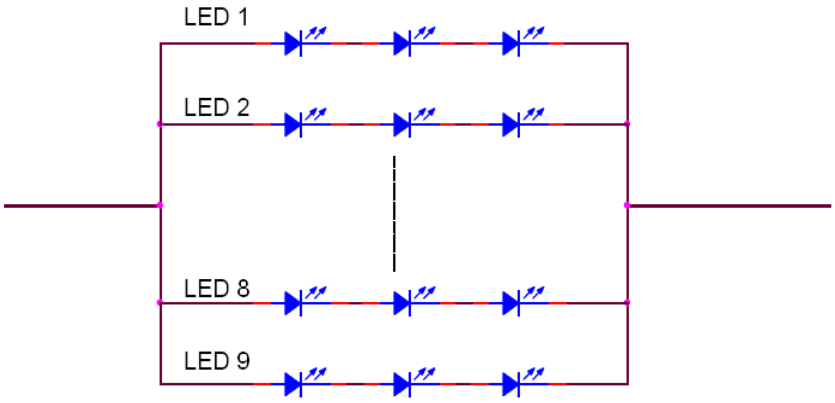
Note 1: Value for Power Board combined panel.
Note 2: VCC setting should match the signals output voltage (refer to Note 3) of customer's system board.
Note 3: DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

4-2 Backlight Driving Conditions

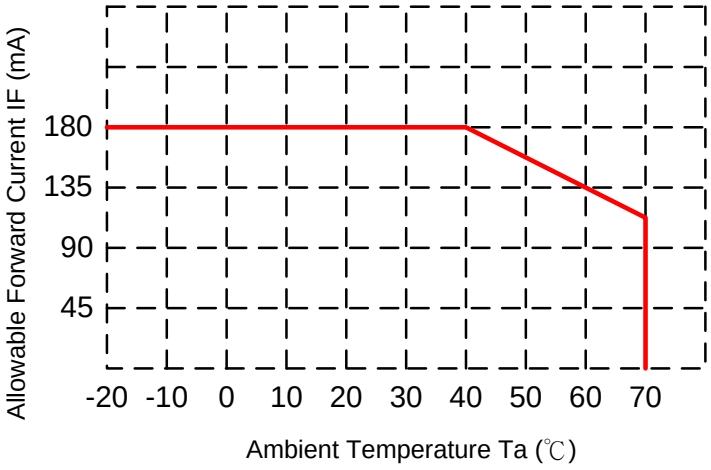
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED voltage	VL	--	9.9	10.5	V	Note 1
LED current	IL	162	180	198	mA	Note 1
LED life time	--	20,000	--	--	Hr	Note 2

Note 1 : The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL=180mA.

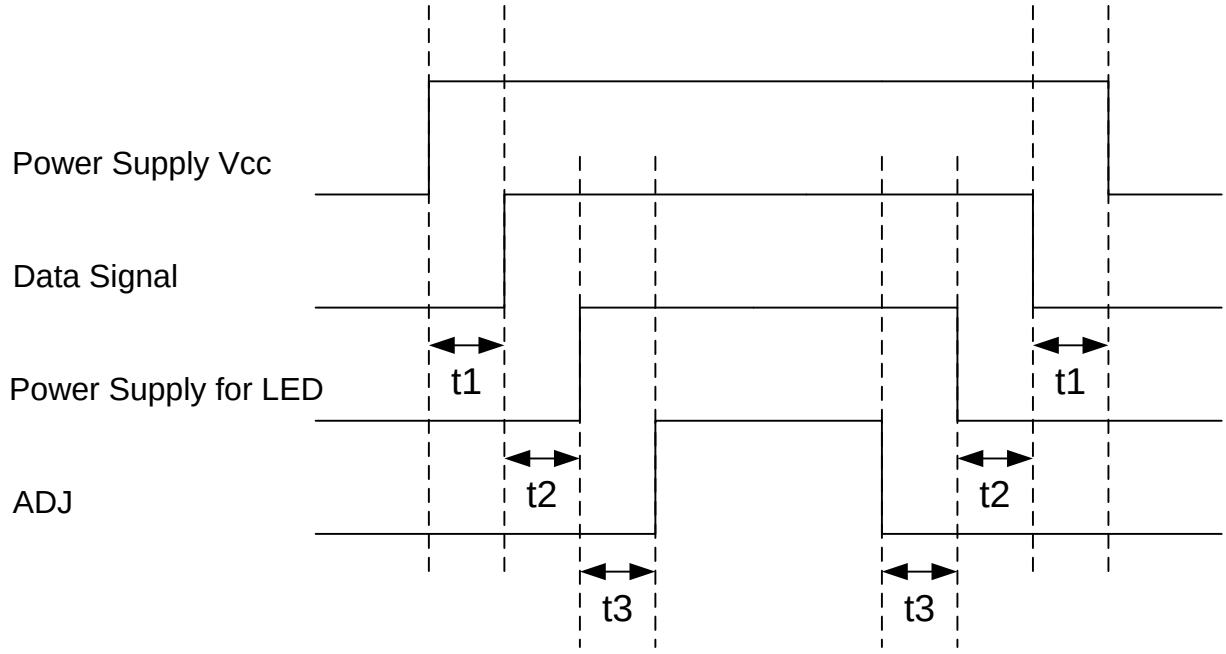
Note 2 : The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.



Note 3 : When LCM is operated over 40℃ ambient temperature, the ILED should be follow :



4-3 Power Sequence



t1 > 50 mSec

t2 ≥ 200 mSec

t3 ≥ 50 mSec

Note : Data Signal includes DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

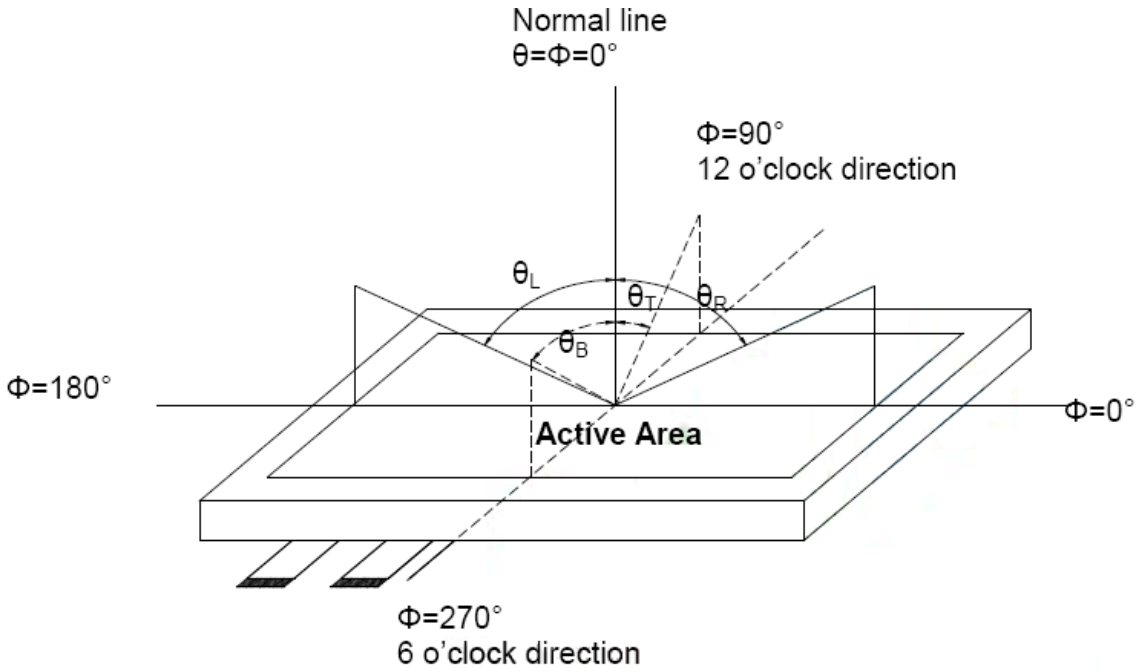
5. Optical Specifications

Item	Symbol	Condition	Values			Unit	Note
			Min.	Typ.	Max.		
Viewing angle (CR≧10)	θ L	Φ = 180° (9 o'clock)	60	70	--	degree	Note1
	θ R	Φ = 0° (3 o'clock)	60	70	--		
	θ T	Φ = 90° (12 o'clock)	40	50	--		
	θ B	Φ = 270° (6 o'clock)	60	70	--		
Response time	TON	Normal θ =Φ=0°	--	10	20	msec	Note3
	TOFF		--	15	30	msec	
Contrast ratio	CR		400	500	--	--	Note4
Color chromaticity	WX		0.26	0.31	0.36	--	Note5 Note6
	WY		0.28	0.33	0.38	--	
Luminance	L		200	250	--	cd/㎡	Note6
Luminance uniformity	YU		70	75	--	%	Note7

Test Conditions :

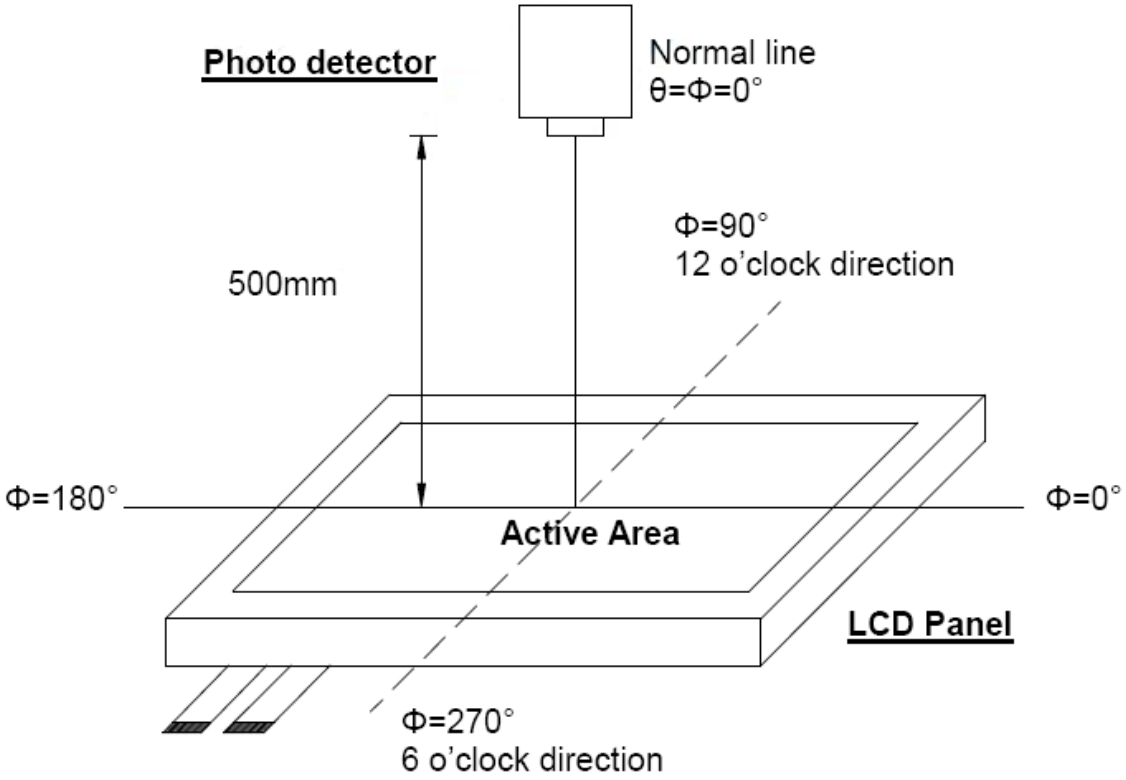
1. VCC = 3.3V, I_L = 180mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1 : Definition of viewing angle range



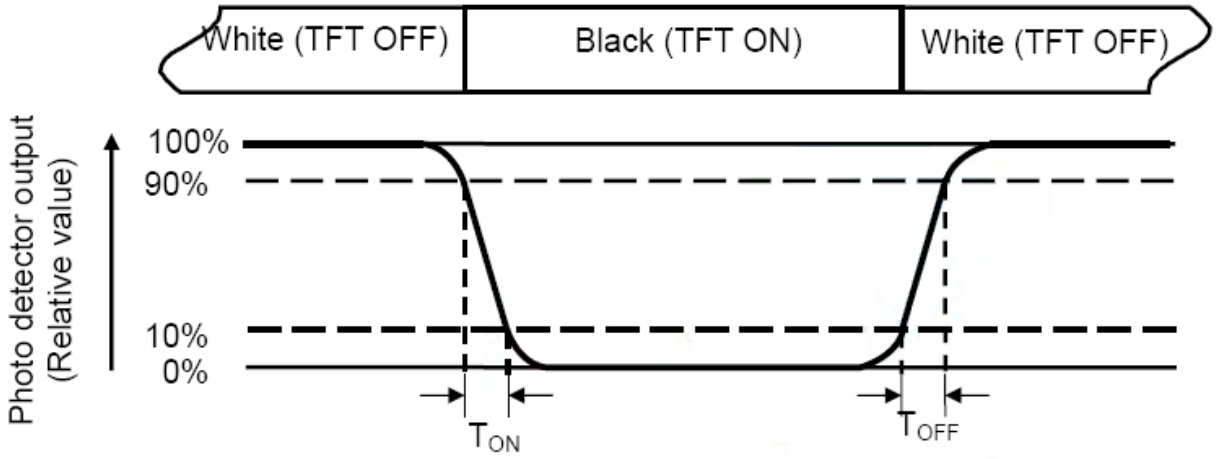
Note 2 : Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view : 1° / Height : 500mm.)



Note 3 : Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 4 : Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the “White” state}}{\text{Luminance measured when LCD on the “Black” state}}$$

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

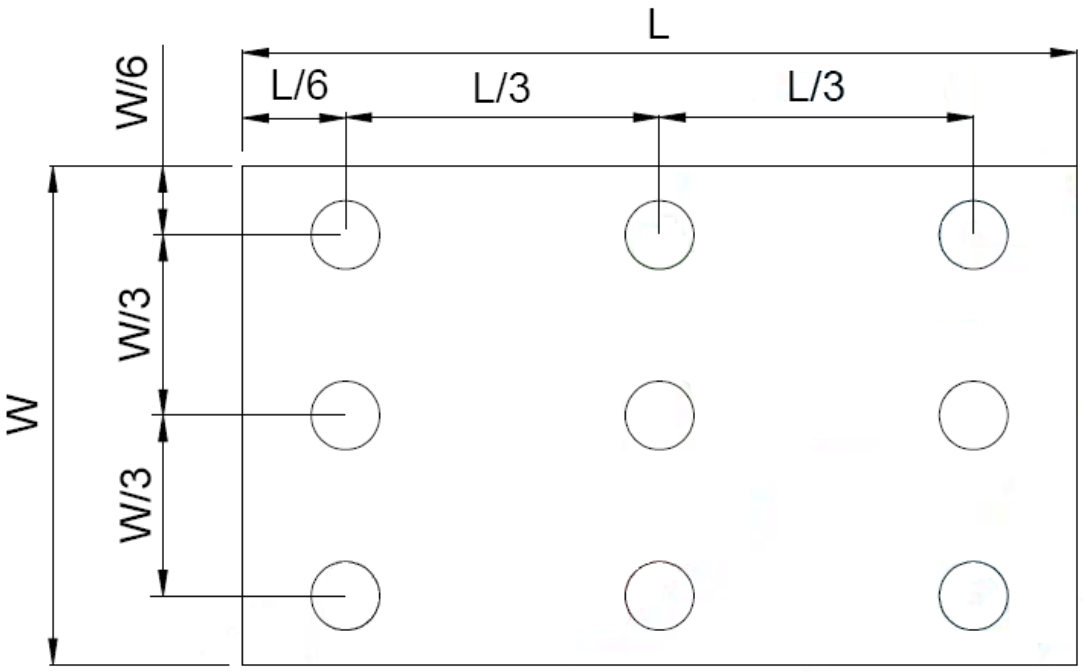
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

Note 7 : Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L ----- Active area length W ----- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

6. INTERFACE

TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Description	Note
1	VLED	P	Voltage for LED circuit (5.0V)	
2	VLED	P	Voltage for LED circuit (5.0V)	
3	ADJ	I	Adjust the LED brightness	(1)
4	GLED	P	Ground for LED circuit	
5	GLED	P	Ground for LED circuit	
6	VCC	P	Power supply for digital circuit (3.3V)	
7	VCC	P	Power supply for digital circuit (3.3V)	
8	MODE	I	DE or SYNC mode control	(2)
9	DE	I	Data enable	
10	VSYNC	I	VSYNC signal input	
11	HSYNC	I	HSYNC signal input	
12	GND	P	Power ground	
13	B5	I	Blue data input (MSB)	
14	B4	I	Blue data input	
15	B3	I	Blue data input	
16	GND	P	Power ground	
17	B2	I	Blue data input	
18	B1	I	Blue data input	
19	B0	I	Blue data input (LSB)	
20	GND	P	Power ground	
21	G5	I	Green data input (MSB)	
22	G4	I	Green data input	
23	G3	I	Green data input	
24	GND	P	Power ground	
25	G2	I	Green data input	

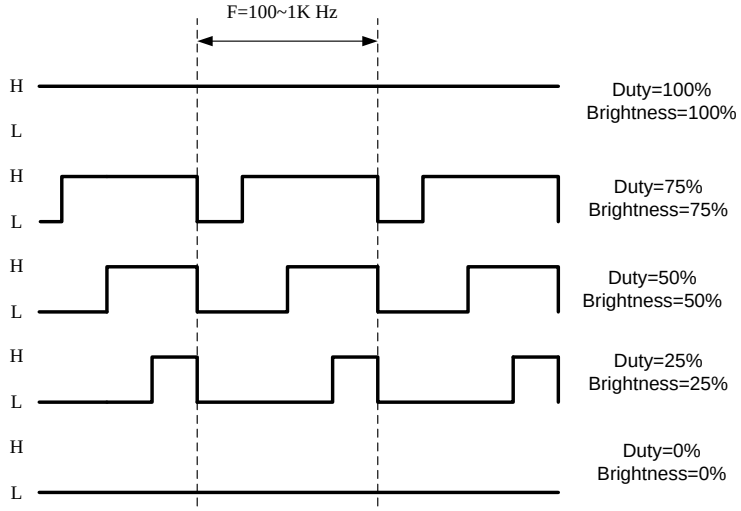
26	G1	I	Green data input	
27	G0	I	Green data input (LSB)	
28	GND	P	Power ground	
29	R5	I	Red data input (MSB)	
30	R4	I	Red data input	
31	R3	I	Red data input	
32	GND	P	Power ground	
33	R2	I	Red data input	
34	R1	I	Red data input	
35	R0	I	Red data input (LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	L/R	I	Select left to right scanning direction	(3)
40	U/D	I	Select up or down scanning direction	(3)

I : input, O : output, P : power

NOTE :

(1) Pin3: ADJ is PWM signal input. It is for brightness control.

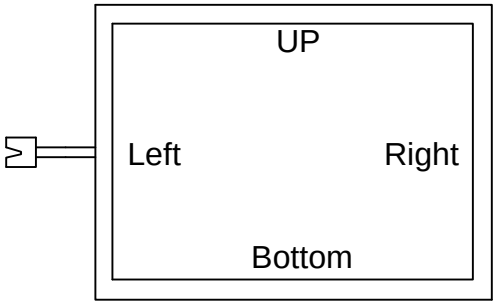
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	100	--	1K	Hz
ADJ signal logic level High	VIH	2V	--	VLED (5.0V)	V
ADJ signal logic level Low	VIL	0	--	0.5	V



(2) DE Mode, Mode="H",HSYNC floating and VSYNC floating
HV Mode, Mode="L" and DE floating

(3) Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	R/L	
GND	VCC	Up to Down, Left to Right
VCC	GND	Down to Up, Right to Left
GND	GND	Up to Down, Right to Left
VCC	VCC	Down to Up, Left to Right



7. INPUT SIGNAL :

7-1 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	10	12	Ns	
HS hold time	T_{hhd}	8	10	12	Ns	
VS setup time	T_{vst}	8	10	12	Ns	
VS hold time	T_{vhd}	8	10	12	Ns	
Data setup time	T_{dsu}	8	10	12	Ns	
Data hold time	T_{dhd}	8	10	12	Ns	
DE setup time	T_{esu}	8	10	12	Ns	
DE hold time	T_{ehd}	8	10	12	Ns	
VDD Power On Slew rate	T_{POR}	1	2	20	ms	
RSTB pulse width	T_{Rst}	10	20	50	us	
CLKIN cycle time	T_{coh}	20	25	30	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	

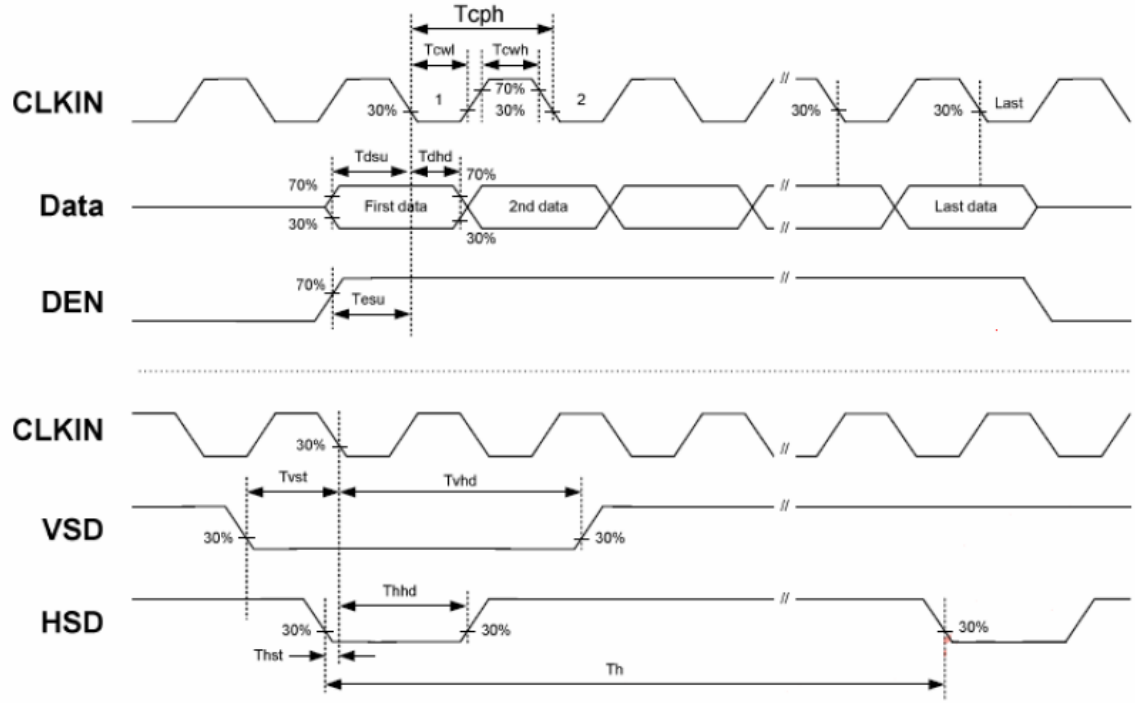
7-2 Timing

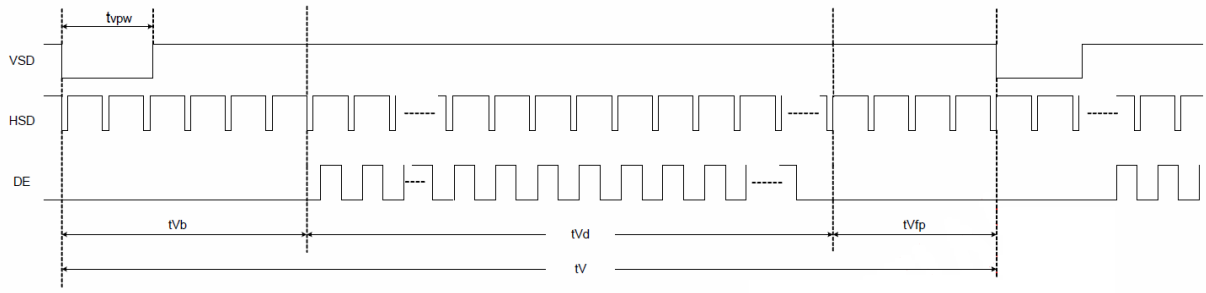
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd		800		DCLK	
DCLK Frequency	fclk	33	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	6	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd		600		TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	3	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

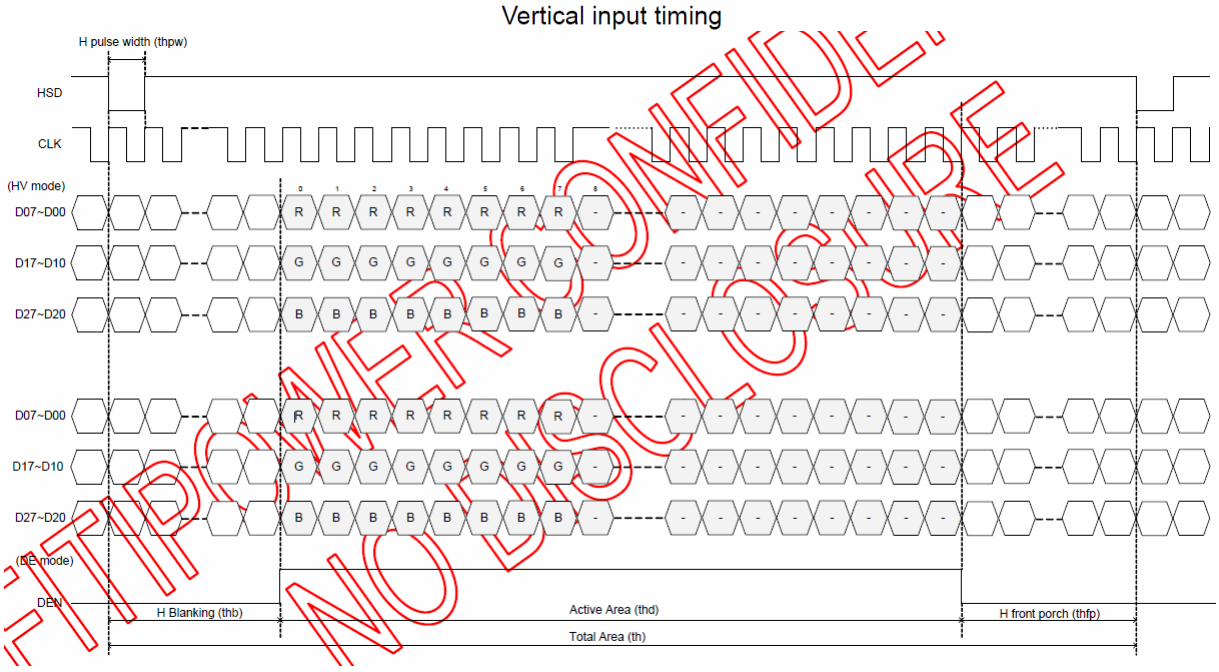
Note: Frame rate is 60±5Hz

7-3 Input Clock and Data Timing Diagram





Vertical input timing



8. RELIABILITY TEST CONDITIONS

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=240 hrs	
Low Temperature Operation	-20±3°C , t=240 hrs	
High Temperature Storage	80±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Thermal Shock Test	-20°C (30min) ~ 70°C (30min) 20 cycles	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note(1) Condensation of water is not permitted on the module.

Note(2) The module should be inspected after 1 hour storage in normal conditions (15-35°C, 45-65%RH).

Note(3) The module shouldn't be tested over one condition, and all the tests are independent.

Note(4) All reliability tests should be done without the protective film.

Definitions of life end point:

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

9. General Precautions

9-1 Safety

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

9-2 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.

9-3 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.

9-4 Storage

1. Store the module in a dark room where must keep at +25±10℃ 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.

9-5 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.

9-5 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.

10. OUTLINE DIMENSION