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-800600P4TMQW-TB0H
APPROVED BY	
DATE	

☑ Approved For Specifications
☐ Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2013/08/01	--	New Release	Tony
2013/08/07	8	Correct Contrast ratio	Tony

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, Touch Panel, LED driver unit and power circuit unit.

(1) Construction: 8" a-Si TFT active matrix, White LED Backlight and power circuit board.
(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)

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	200.4(W) x 141.0(H) x 11.75(D)	mm
Surface treatment	Anti-Glare	
Color arrangement	RGB-stripe	
interface	Digital	

3. ABSOLUTE MAX. RATINGS

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.5	5	V	
	VLED	-0.5	18		
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}	-	125	-	mA	Note 1,2 VCC=3.3V
Logic Input Voltage	Input Voltage	V_{IN}	0	-	V_{CC}	V	
	Logic input high voltage	V_{TH}	$0.7V_{CC}$	-	V_{CC}	V	Note 3
	Logic input low voltage	V_{TL}	GND	-	$0.3V_{CC}$	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.

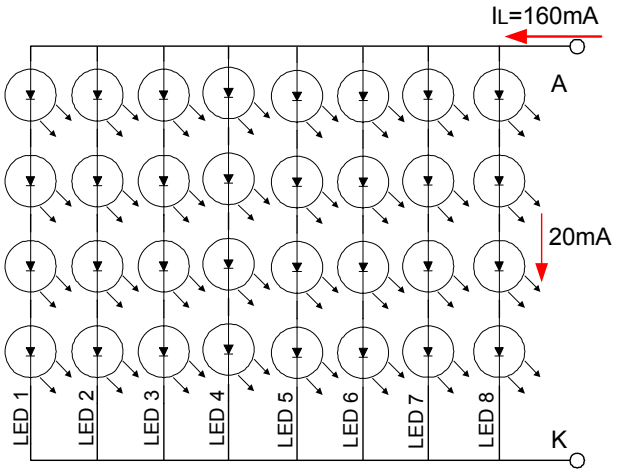
Note 3: DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

4-2 Backlight Driving Conditions

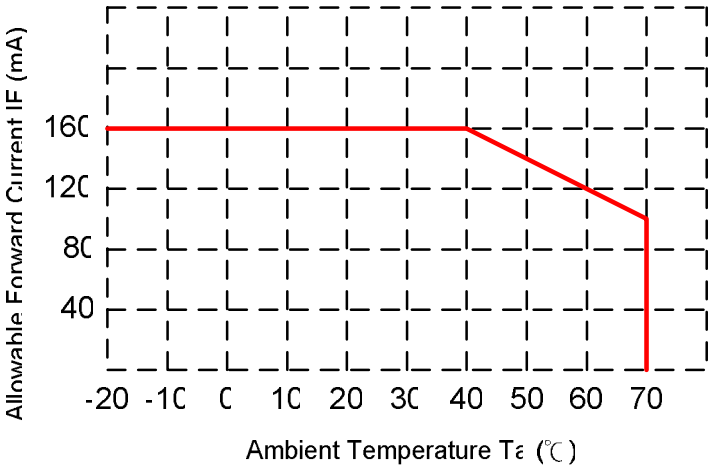
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED Driver voltage	VLED	4.5	5	5.5	V	
Power Supply Current For LED Driver	ILED	-	510	-	mA	VLED=5V VADJ=3.3V (duty 100%)
ADJ Input Voltage	V_{ADJ}	-	3.3	5	V	duty=100% Note(3)
LED voltage	V_{AK}	12	13.2	14.4	V	I_L =160mA Ta=25℃
LED current	I_L	144	160	178	mA	Ta=25℃
		--	120	--	mA	Ta=60℃
LED Life Time	-	--	25K	--	Hour	Note (2)

Note (1) The constant current source is needed for white LED back-light driving.
When LCM is operated over 60 deg.C ambient temperature, the I_L of the LED back-light should be adjusted to 120mA max

Note (2) Brightness to be decreased to 50% of the initial value.



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



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	T=25°	--	25	30	msec	Note3
	TOFF		--	25	30	msec	
Contrast ratio	CR	Normal θ =Φ=0°	400	500	--	--	Note4
Color chromaticity	Rx		0.553	0.603	0.653	--	Note5 Note6
	Ry		0.275	0.325	0.375		
	Gx		0.254	0.304	0.354		
	Gy		0.502	0.552	0.602		
	Bx		0.088	0.138	0.188		
	By		0.086	0.136	0.186		
	Wx		0.264	0.314	0.364		
	Wy		0.288	0.338	0.388	--	
Luminance	L		320	400	--	cd/m^2	Note6
Transmittance	L		5.8	6.1	--	%	Note7

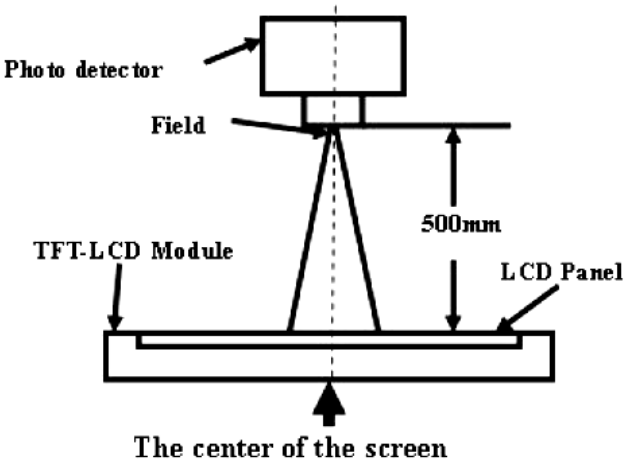
Test Conditions:

1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD

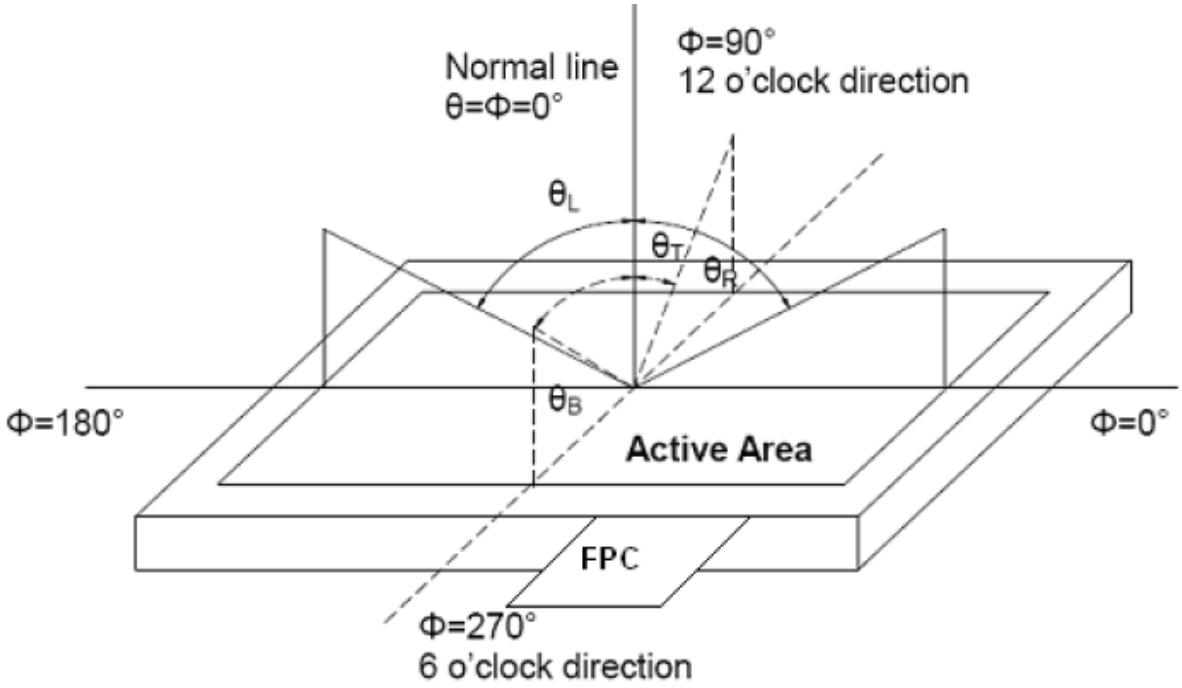
panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	BM-5A	1°
Luminance		
Lum Uniformity		
Chromaticity	SR-3A	
Response Time	TRD100	-

Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note 3: Definition of contrast ratio.

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

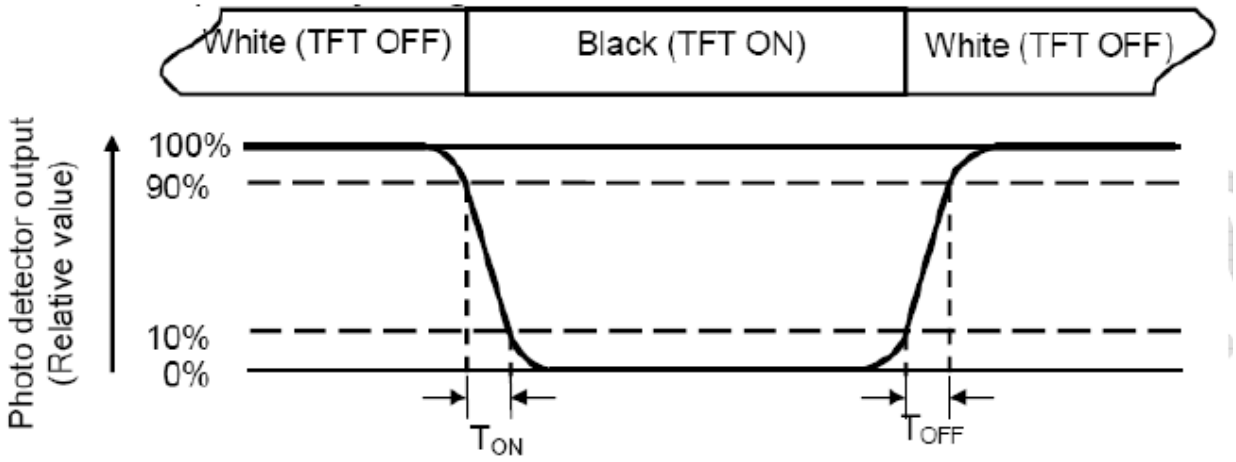
“White state “: The state is that the LCD should drive by Vwhite.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: 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 5: Definition of color chromaticity (CIE1931) Color coordinates measured at center point of LCD.

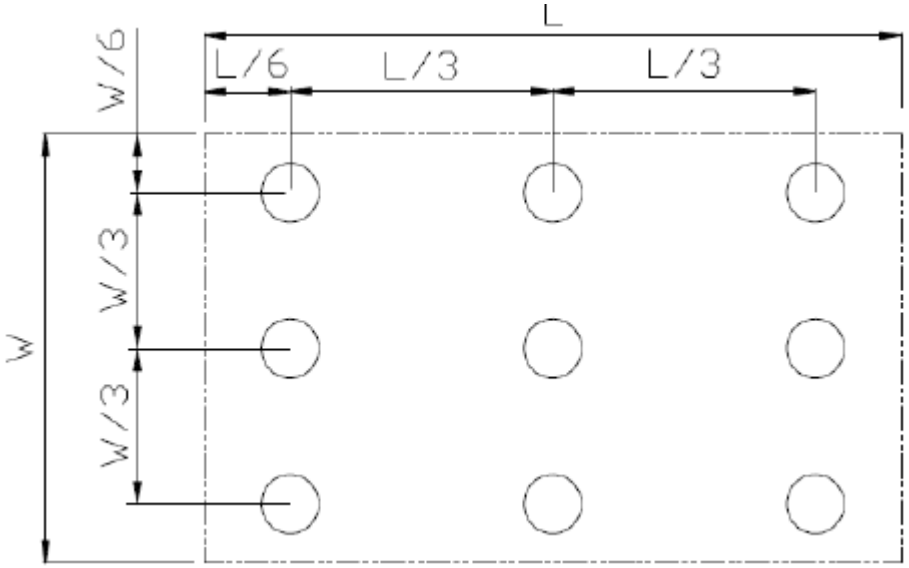
Note 6: Definition of Luminance Uniformity.

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at

the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

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



Lmax: The measured Maximum luminance of all measurement position.
Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance.
Measure the luminance of white state at center point.

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	

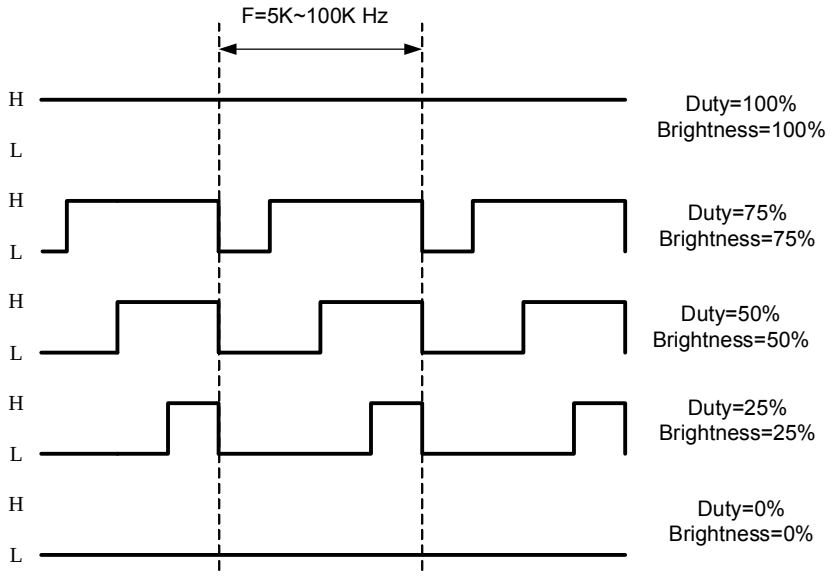
26	G1	I	Green data input	
27	G0	I	Green data input (LSB)	
28	GND	P	Power ground	
29	R5	I	Red data input (MSB)	
30	R4	I	Red data input	
31	R3	I	Red data input	
32	GND	P	Power ground	
33	R2	I	Red data input	
34	R1	I	Red data input	
35	R0	I	Red data input (LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
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.

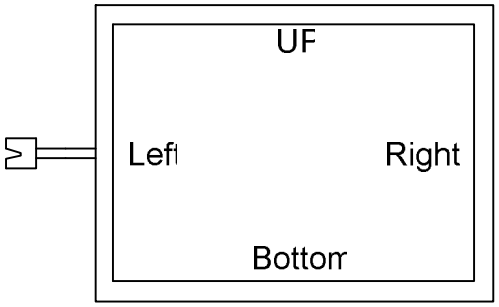
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	5K	20K	100K	Hz
ADJ signal logic level High	VIH	2.4V	--	VLED (5.0V)	V
ADJ signal logic level Low	VIL	0	--	0.8	V



(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	L/R	
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



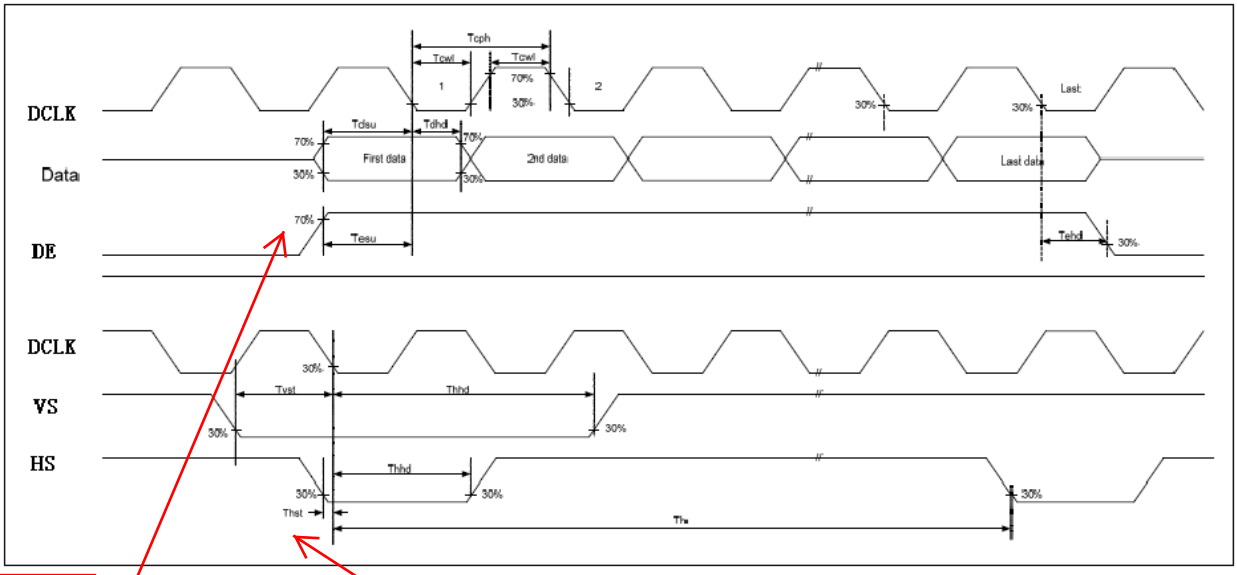
7. INTERFACE TIMING

7.1 TFT-LCD Input

VCC=3.3V, AVDD=12.5V, AGND=GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
DCLK Frequency	Fclk	-	40	50	MHz	-
DCLK Cycle Time	Tcph	20	25		ns	-
DCLK Pulse Width	Tcw	40%	50%	60%	Tcph	-
VSD Setup Time	Tvst	8	-	-	ns	-
VSD Hold Time	Tvhd	8	-	-	ns	-
HSD Setup Time	Thst	8	-	-	ns	-
HSD Hold Time	Thhd	8	-	-	ns	-
Data Setup Time	Tdsu	8	-	-	ns	Data to DCLK
Data Hold Time	Tdhd	8	-	-	ns	Data to DCLK
DE Setup Time	Tesu	8	-	-	ns	-
DE Hold Time	Tehd	8	-	-	ns	-

Input Clock and Data timing Diagram:



7.2 Recommended Timing Setting Of TCON

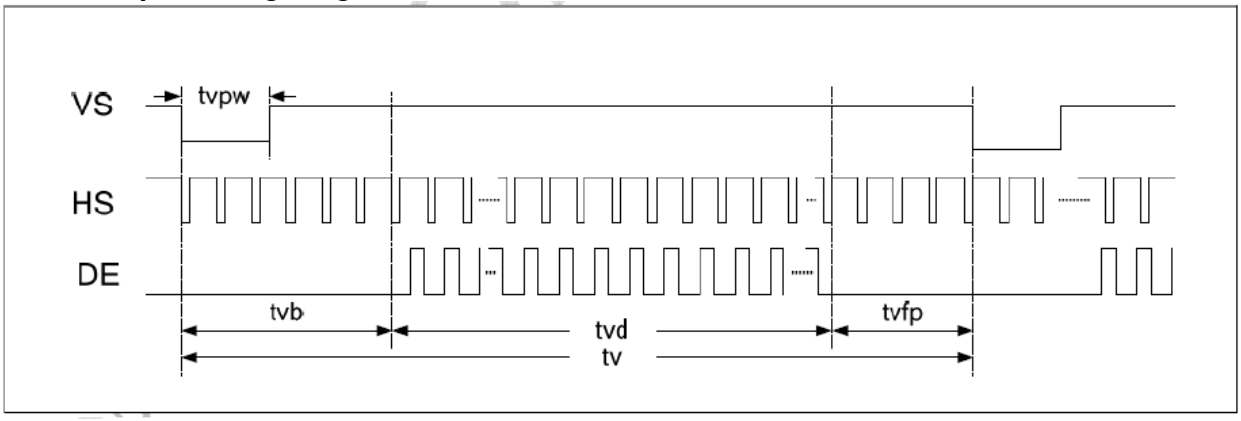
TCON (Embedded In Source IC) Input Timing (DCLK, HSD, VSD, DE)

VCC=3.3V, AVDD=12.5V, AGND=GND=0V, Ta=25℃

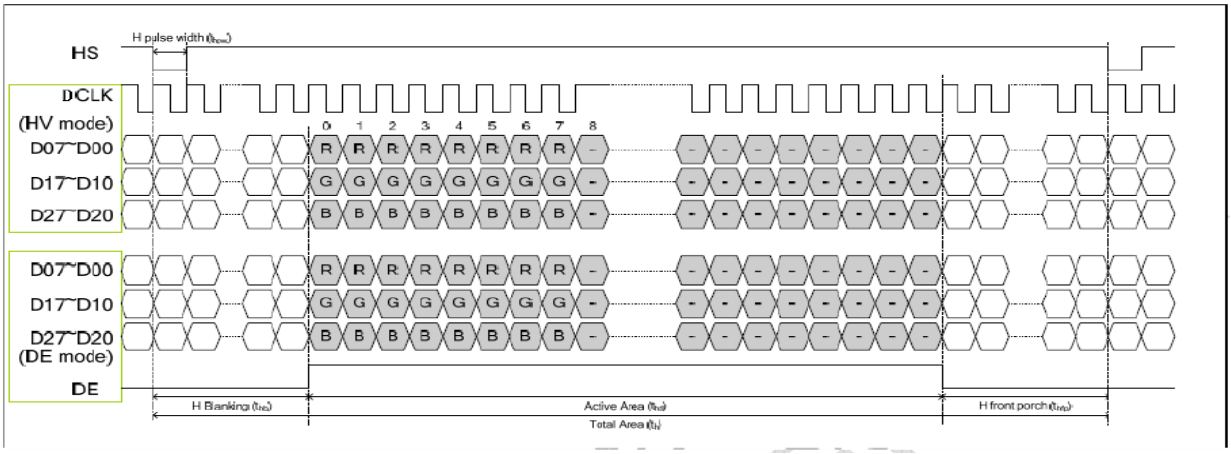
Parameter	Symbol	Min	Typ.	Max	Unit	Remark
DCLK	Fclk	-	40	50	MHz	-
	tclk	20	25	-	ns	-
HSD	th	-	1000	-	tclk	-
	thd	-	800	-	tclk	-
	thpw	1	48	-	tclk	-
	thb	-	88	-	tclk	-
	thfp	-	112	-	tclk	-
VSD	tv	-	660	-	th	-
	tvd	-	600	-	th	-
	tvpw	-	3	-	th	-
	tvb	-	39	-	th	-
	tvfp	-	21	-	th	-

Note: DE timing refer to HSD, VSD input timing.

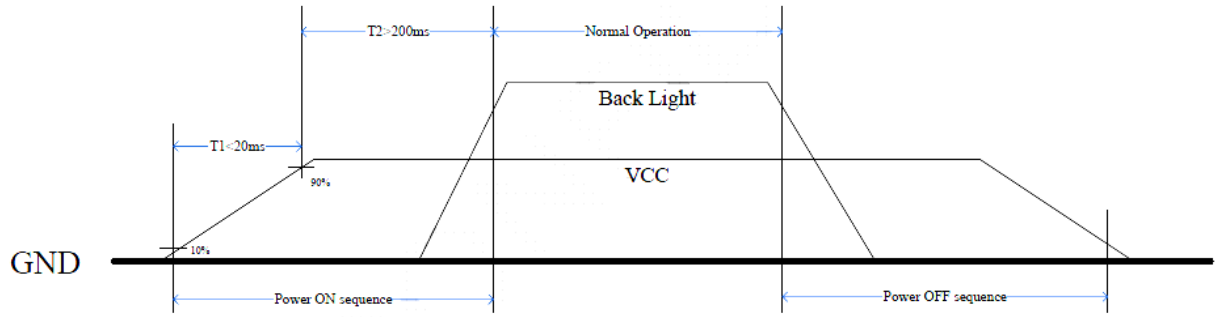
Vertical input timing Diagram:

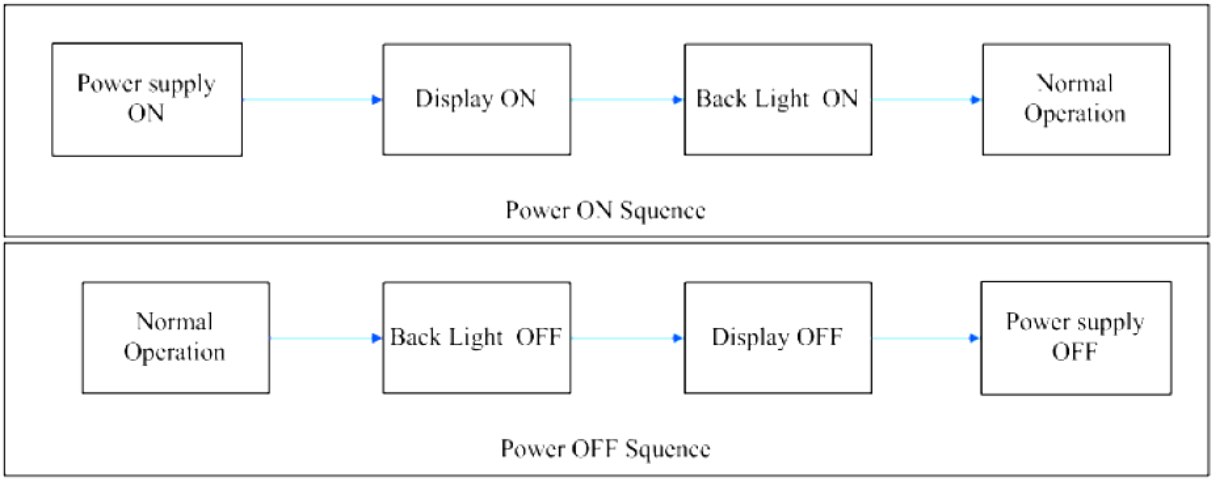


Horizontal input timing Diagram:



7.3 POWER ON/OFF SEQUENCE





8. Touch Panel Electrical Specification

Parameter	Condition	Standard Value
Terminal Resistance	X Axis	300 ~ 1100 Ω
	Y Axis	150 ~ 650 Ω
Insulating Resistance	DC 25 V	More than 20MΩ
Linearity	--	±1.5 %
Notes life by Pen	Note a	100,000 times(min)
Input life by finger	Note b	1,000,000 times (min)

Note A .

Notes area for pen notes life test is 10 x 9 mm.

Size of word is 7.5 x 6.75

Shape of pen end : R0.8

Load : 250 g

Note B

By Silicon rubber tapping at same point

Shape of rubber end : R8

Load : 200g

Frequency : 5 Hz

Interface

No.	Symbol	Function
1	Y1	Touch Panel Top Signal in Y Axis
2	X1	Touch Panel Right Signal in X Axis
3	Y2	Touch Panel Bottom Signal in Y Axis
4	X2	Touch Panel Left Signal in X Axis

9. 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) 100 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).

10. General Precautions

10-1 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.

10-2 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.

10-3 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.

10-4 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.

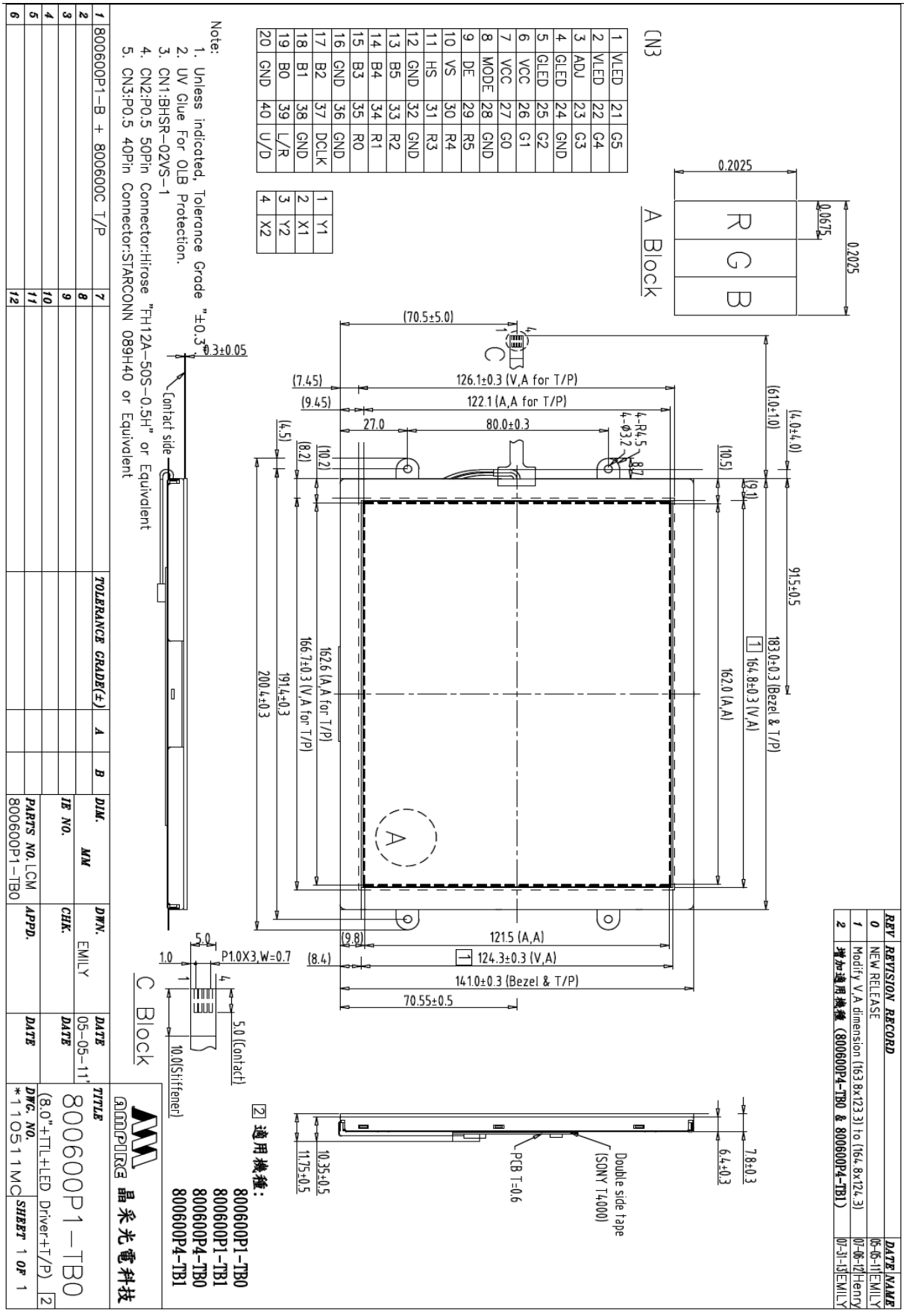
10-5 Cleaning

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.

10-6 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
3. 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.

11. OUTLINE DIMENSION



1	VLED
2	VLED
3	ADJ
4	GLED
5	GLED
6	VCC
7	VCC
8	MODE
9	DE
10	VS
11	HS
12	GND
13	B5
14	B4
15	B3
16	GND
17	B2
18	B1
19	B0
20	GND

21	G5
22	G4
23	G3
24	GND
25	G2
26	G1
27	G0
28	GND
29	R5
30	R4
31	R3
32	GND
33	R2
34	R1
35	R0
36	GND
37	DCLK
38	GND
39	L/R
40	U/D

1	Y1
2	X1
3	Y2
4	X2

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	05-05-11	EMILY
1	Modify V.A dimension (163.8x123.3) to (164.8x124.3)	07-06-12	Henry
2	增加適用機種 (800600P4-TB0 & 800600P4-TB1)	07-01-13	EMILY

1	800600P1-B + 800600C T/P	7		TOLERANCE GRADE(±)	A	B	DIM.	MM	
2		8						IE NO.	
3		9						CHK.	EMILY
4		10							DATE
5		11						PARTS NO.	LCM
6		12						APPD.	DATE

DWN.	DATE
EMILY	05-05-11
CHK.	DATE
APPD.	DATE

晶采光電科技 AMPIRE

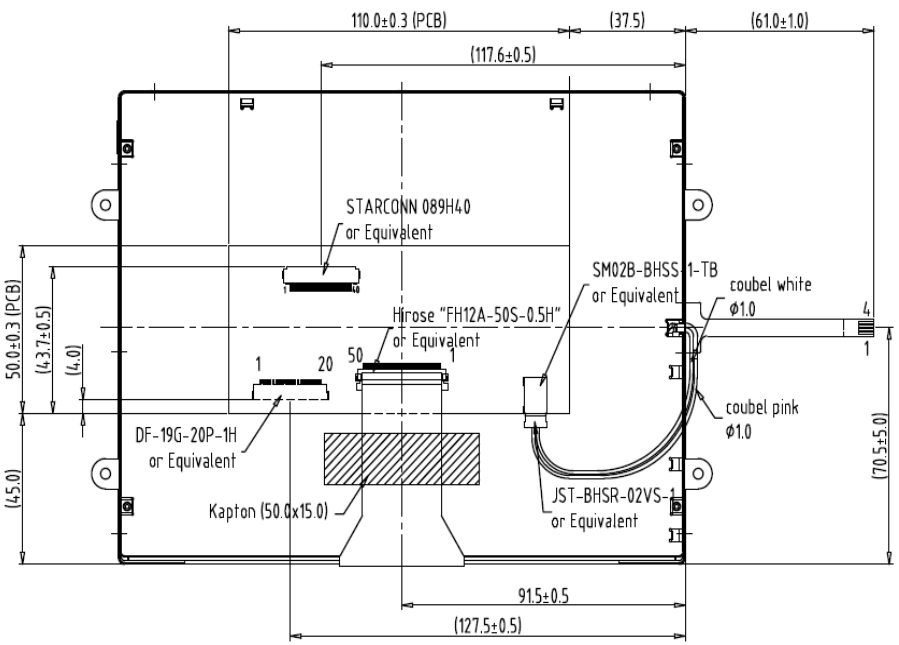
TITLE	800600P1-TB0 (8.0"+TTL+LED Driver+T/P) 2
DWG. NO.	*1105111MC
SHEET 1 OF 1	

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	05-05-11	EMILY
1	增加適用機種 (800600P4TB0 & 800600P4-TB1)	07-31-13	EMILY

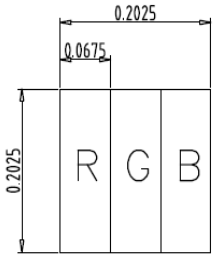
CN3

1	VLED	21	G5
2	VLED	22	G4
3	ADJ	23	G3
4	GLED	24	GND
5	GLED	25	G2
6	VCC	26	G1
7	VCC	27	G0
8	MODE	28	GND
9	DE	29	R5
10	VS	30	R4
11	HS	31	R3
12	GND	32	GND
13	B5	33	R2
14	B4	34	R1
15	B3	35	R0
16	GND	36	GND
17	B2	37	DCLK
18	B1	38	GND
19	B0	39	L/R
20	GND	40	U/D

1	Y1
2	X1
3	Y2
4	X2



Back View



A Block

Note:
1. Unless indicated, Tolerance Grade "±0.3".
2. UV Glue For OLB Protection.
3. CN1:BHSR-02VS-1
4. CN2:P0.5 50Pin Connector:Hirose "FH12A-50S-0.5H" or Equivalent
5. CN3:P0.5 40Pin Connector:STARCONN 089H40 or Equivalent

[1] 適用機種:
800600P1-TB0
800600P1-TB1
800600P4-TB0
800600P4-TB1

1	800600P1-B + 800600C T/P	7		TOLERANCE GRADE(±)	A	B	DIM. MM	DWN. EMILY	DATE 05-05-11
2		8					IE NO.	CHK.	DATE
3		9							
4		10							
5		11					PARTS NO. LCM-1 800600P1-TB0	APPD.	DATE
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AMPIRE 晶采光電科技

TITLE: 800600P1-TB0 (8.0"+TTL+LED Driver+T/P) [1]

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Date : 2013/08/01 AMPIRE CO., LTD. 22