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-800480L1TMQW-T00H
APPROVED BY	
DATE	

☐Approved For Specifications
☑**Approved For Specifications & Sample**

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2009/10/29	-	New Release	Emil
2010/01/14	-	Issued official part No. to AM-800480L1TMQW-T00H	Emil
2010/01/27	11	Include the Pin definition of TP FPC.	Emil
2010/03/10	-	Include specification of TP controller.	Emil
2010/04/09	16	Correct the coordinates of TP.	Emil
2010/04/30	26-27	Revise the Mechanical drawing.	Emil
2011/03/24	3	Correct the overall dimension	Kevin
2011/06/07	12	Add DE mode timing	Kevin
2011/10/07	12-15	Correct the AC Timing.	Emil
2012/04/12	3	Include the operating temp. of touch panel.	Emil
2012/04/12	5	Revise the LCD consumption current.	Emil

1. FEATURES

(1) Construction : a-Si TFT-LCD with driving system, White LED Backlight and projected capacitive touch panel.

(2) LCD type : Transmissive , Normally White

(3) Number of the Colors : 16.7M colors (R,G,B 8bit digital each)

(4) LCD Power Supply Voltage : 3.3V single power input, built-in power supply circuit.

(5) ROHS compliant.

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display size (diagonal)	5.0	inch
Resolution	800 (W) x RGB x 480 (H)	dot
Display area	110.6 (W) x67.4 (H)	mm
Pixel pitch	0.135 (W) x 0.135 (H)	mm
Overall dimension	118.5(W) x 135.0(H) x 4.81(D)	mm
Color configuration	R.G.B Vertical stripe	
Surface treatment	Antiglare(T.B.D)	
View Direction (Gray Inversion)	6 o'clock	
Power Consumption	20(Max)	watt

3. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power Supply for logic	VCC	-0.5	**5.0**	V	
Input Signal Voltage	VI	-0.5	VCC + 0.5	V	(1)
Operating Temperature of LCD	Top	-20	70	℃	(2)
Operating Temperature of Touch Panel	Top	-20	60	℃	
Storage Temperature	Tstg	-30	80	℃	

Note 1: Hsync, Vsync, DEN, DCLK, R0~R7, G0~G7, B0~B7

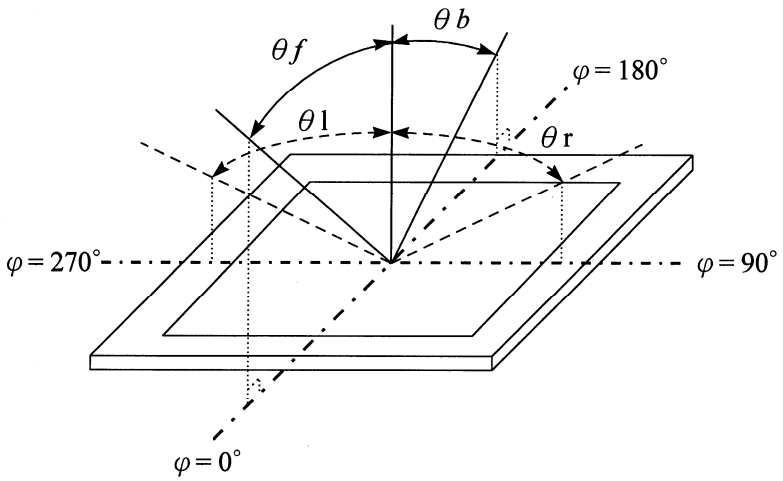
Note 2: Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

4. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Front	θ f	CR≧10	--	70	--	deg.	(1)(2)(3)
	Back	θ b		--	50	--		
	Left	θ l		--	70	--		
	Right	θ r		--	70	--		
Contrast ratio		CR	Θ=Φ=0°	150	250	--	--	(1)(3)
Response Time		T_r	Θ=Φ=0°	--	15	30	ms	(1)(4)
		T_f		--	35	50	ms	(1)(4)
Color chromaticity	Red	Rx	Θ=Φ=0°	0.585	0.615	0.645	--	(1)
		Ry		0.314	0.344	0.374		
	Green	Gx		0.277	0.307	0.337		
		Gy		0.532	0.562	0.592		
	Blue	Bx		0.103	0.133	0.163		
		By		0.120	0.150	0.180		
	White	Wx		0.279	0.309	0.339		
		Wy		0.320	0.350	0.380		
Luminance (ILED=120mA)		L	Θ=Φ=0°	--	360	--	cd/m^2	(1)(5)
Luminance Uniformity		ΔL	Θ=Φ=0°	70	-	-	%	(1)(5)(6)

Note 1: Ta=25°C. To be measured on the center area of panel after 10 minutes operation.

Note 2: Definition of Viewing Angle



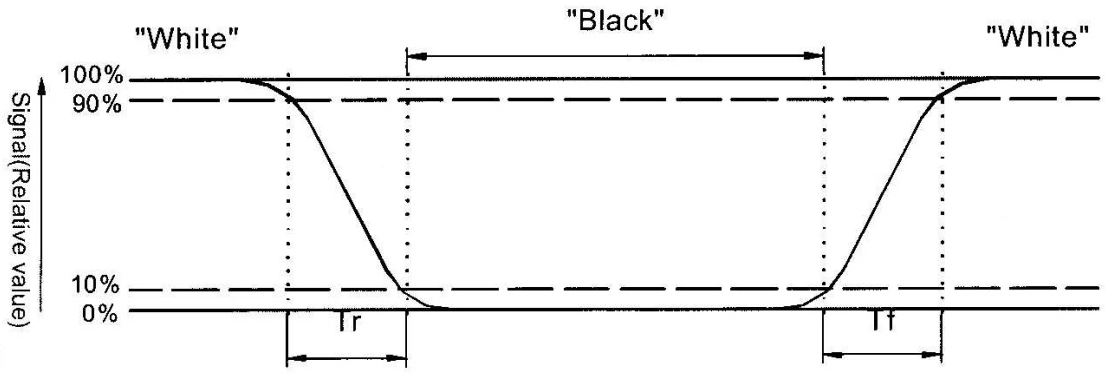
Note 3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

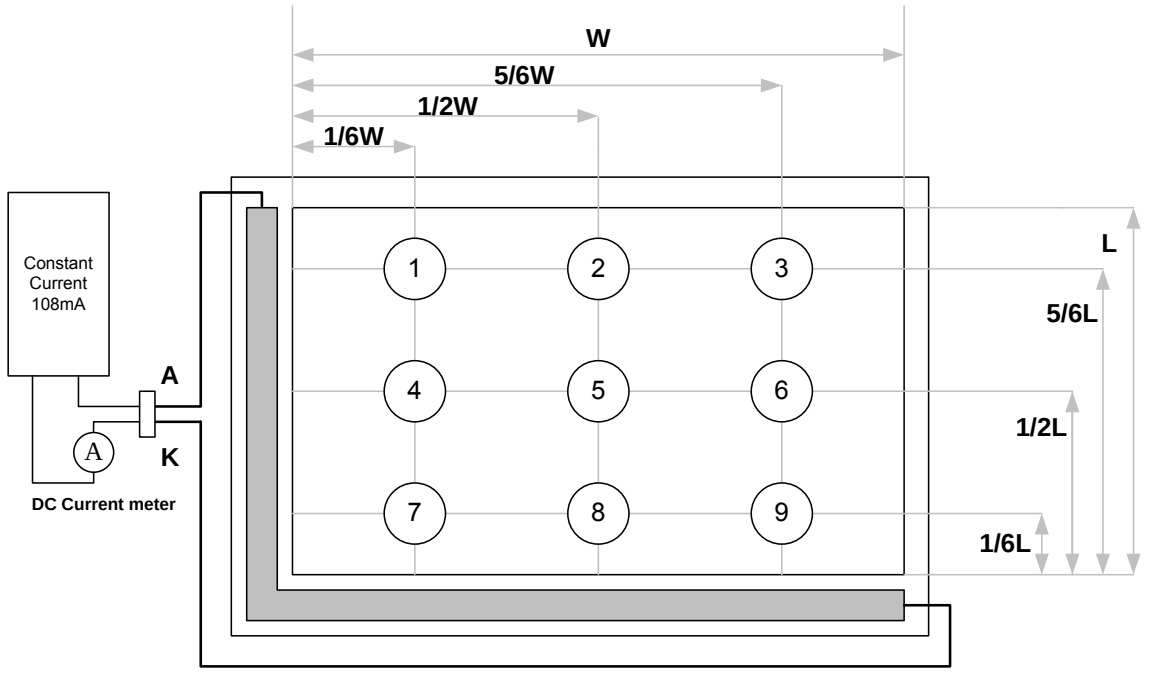
$$\text{Contrast ratio(CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector Output when LCD is at "Black" state}}$$

Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black" (rising time) respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 5 : Luminance is measured at point 5 of the display.



Note 6 : Definition of Luminance Uniformity

ΔL = [L(min.) of 9 points / L(max.) of 9 points] X 100%

5. ELECTRICAL CHARACTERISTICS

5.1 LCD driving

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power supply voltage		Vcc	3.0	3.3	3.6	V	
Input voltage for logic	H Level	V_{IH}	0.7 VCC	--	VCC	V	(1)
	L Level	V_{IL}	0	--	0.3 VCC	V	
Power Supply current		Icc	--	170	--	mA	(2)

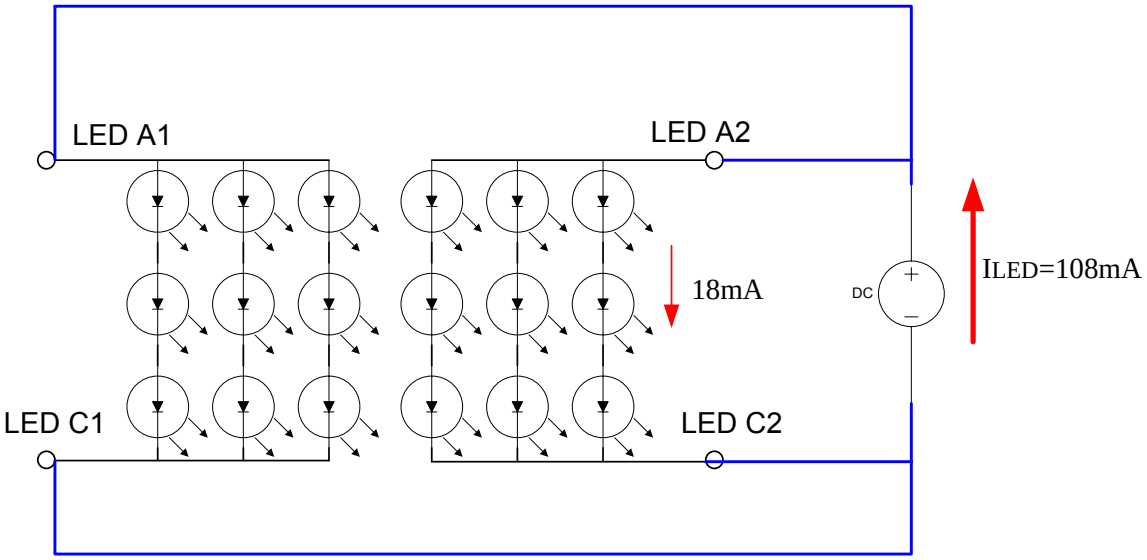
Note 1: Hsync, Vsync, DEN, DCLK, R0~R7, G0~G7, B0~B7

Note 2: fV =60Hz , Ta=25℃ , Display pattern : All Black

*:Will be reference only

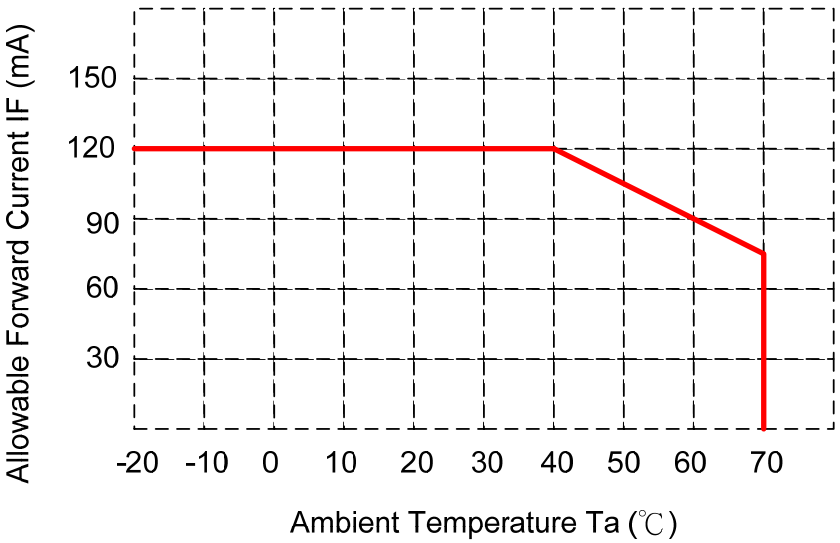
5.2 Electrical characteristic of LED Back-light

Paramenter	Symbol	Min.	Typ.	Max.	Unit	Condiction
LED voltage	V_{AK}	--	9.9	10.8	V	I_{LED} =108mA,Ta=25℃
LED forward current	I_{LED}	--	108	120	mA	Ta=25℃



■ The constant current source is needed for white LED back-light driving.

When LCM is operated over 60℃ ambient temperature, the I_{LED} of the LED back-light should be adjusted to 75mA max



5.3 Projected capacitive Touch Panel

5.3.1 Electrical Characteristics

Input Method : Finger Simulated stylus.
Insulation Impedance: Exceeds 20 Meg ohm or more at DC 10V
Operation voltage: 3.3V ~ 5V DC
Positional Accuracy: ± 1.5% in X and Y position within the viewing area (typical).
Interface:I2C

5.3.2 Durability Characteristics

Touch Durability: 300 million touches at a single point with 350 gram force.

5.3.3 Environmental Characteristics

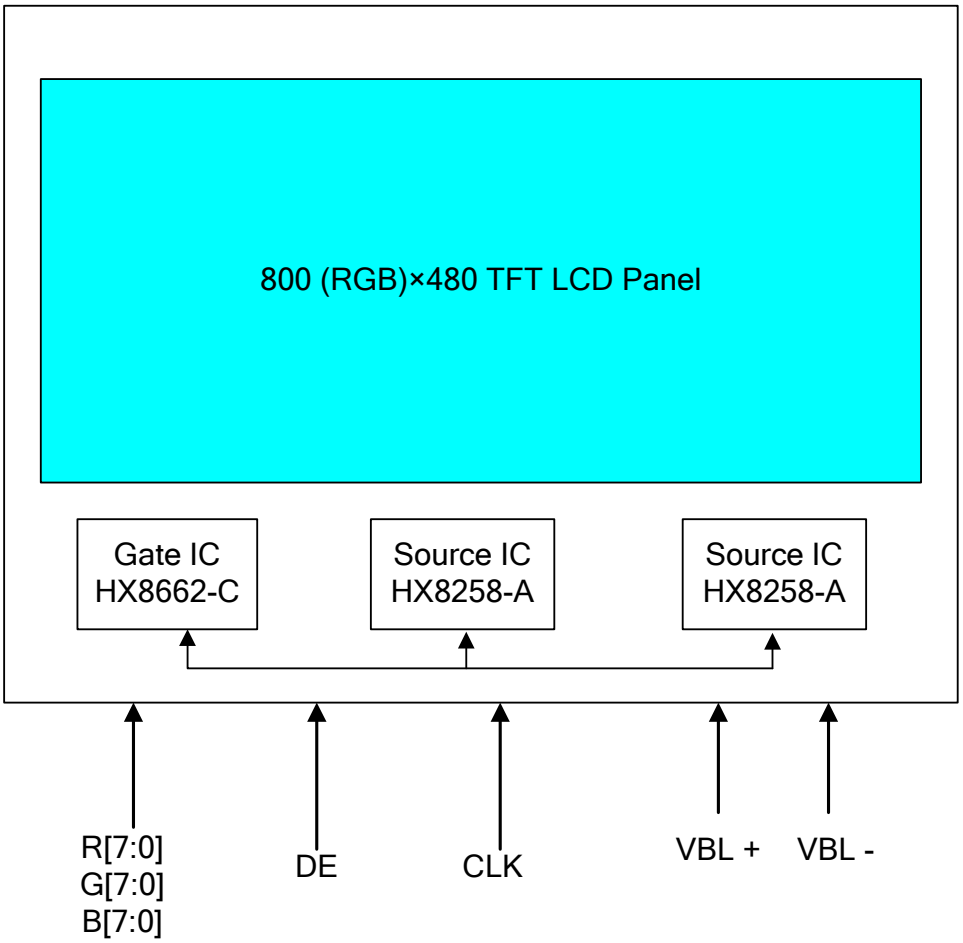
Operation Conditions: High temperature and relative humidity (RH): tested at +50 °C at 90% RH non-condensing for 240 hours
Low and high temperature : -15°C~70 °C, 50% relative humidity, non-condensing

Storage Conditions **:** Low and high temperature : -30°C~80 °C, 50% relative humidity, non-condensing

5.3.4 Touch Activation Characteristics

Finger Simulated Stylus	25~50 grams of force
Pen Stylus (Active)	25~50 grams of force

6. BLOCK DIAGRAM



7. INTERFACE PIN ASSIGNMENT

Pin No	Symbol	Function
1	GND	Power Ground
2	GND	Power Ground
3	VCC	3.3V Power Supply for LCD
4	VCC	3.3V Power Supply for LCD
5	R0	Red Data 0 (LSB)
6	R1	Red Data 1
7	R2	Red Data 2
8	R3	Red Data 3
9	R4	Red Data 4
10	R5	Red Data 5
11	R6	Red Data 6
12	R7	Red Data 7 (MSB)
13	G0	Green Data 0 (LSB)
14	G1	Green Data 1
15	G2	Green Data 2
16	G3	Green Data 3
17	G4	Green Data 4
18	G5	Green Data 5
19	G6	Green Data 6
20	G7	Green Data 7 (MSB)
21	B0	Blue Data 0 (LSB)
22	B1	Blue Data 1
23	B2	Blue Data 2
24	B3	Blue Data 3
25	B4	Blue Data 4
26	B5	Blue Data 5
27	B6	Blue Data 6
28	B7	Blue Data 7(MSB)
29	GND	Power Ground
30	DCLK	Clock Signals
31	DISP	Display on/off (High: on, Low :off)
32	HSYNC	Horizontal SYNC signal.
33	VSYNC	Vertical SYNC signal
34	DENA	Data Enable signal (to settle the viewing area)
35	NC	No Connect
36	NC	No Connect
37	NC	No Connect
38	NC	No Connect
39	SC	Scan direction control (Low= Reverse, High= Normal)
40	GND	Power Ground
41	GND	Power Ground

42	LED C1	LED cathode 1
43	LED A1	LED anode 1
44	LED C2	LED cathode 2
45	LED A2	LED anode 2

Remark:

1. GND Pin must ground contact, can not be floating.

2. SC are controlled function

(L/R)	(U/D)	Function
1	0	Normally display
0	1	Left and Right opposite , Up and Down opposite

Pin definition of TP FPC:

Pin No	Symbol	Function
1	GND	Ground terminal.
2	SDA	I2C Interface
3	SCL	
4	VDD	Power Supply for TP controller
5	INT	IRQ Terminal
6	XRES	Terminal of Reset TP controller.

8. INTERFACE TIMING

8.1. LCD Interface

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	6	-	-	ns
HS hold time	T_{hhd}	6	-	-	ns
VS setup time	T_{vst}	6	-	-	ns
VS hold time	T_{vhd}	6	-	-	ns
Data setup time	T_{dsu}	6	-	-	ns
Data hold time	T_{dhd}	6	-	-	ns
DEN setup time	T_{esu}	6	-	-	ns
Source output settling time	T_{ST}	-	-	15	µs
Source output loading R	R_{SL}	-	2	-	kΩ
Source output loading C	C_{SL}	-	60	-	pF
Repair OP output loading C	C_{RL}	-	150	-	pF
Repair OP output settling time	T_{RT}	-	-	15	µs
POL output delay time	T_{DP}	-	-	40	ns

- **Sync mode**

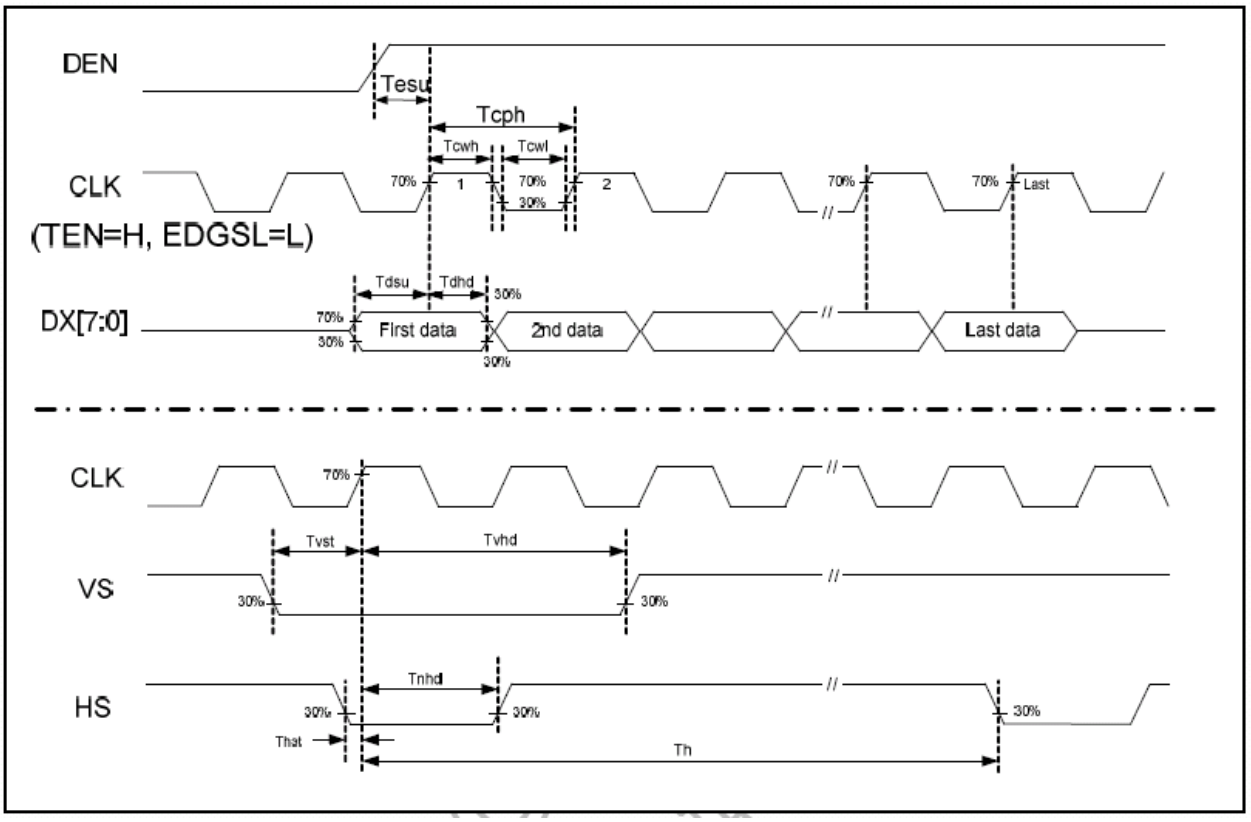
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	29.93	33.26	36.59	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	930	1056	1057	T_{CPH}
HS pulse width	T_{WH}	1	128	-	T_{CPH}
HS-first horizontal data time	T_{HS}	STHD[7:0]+88			T_{CPH}
HS Active Time	T_{HA}	-	800	-	T_{CPH}
VS period	T_V	490	525	526	T_H
VS pulse width	T_{WV}	1	2	-	T_H
VS-DE time	T_{VS}	STVD[6:0]+8			T_H
VS Active Time	T_{VA}	-	480	-	T_H

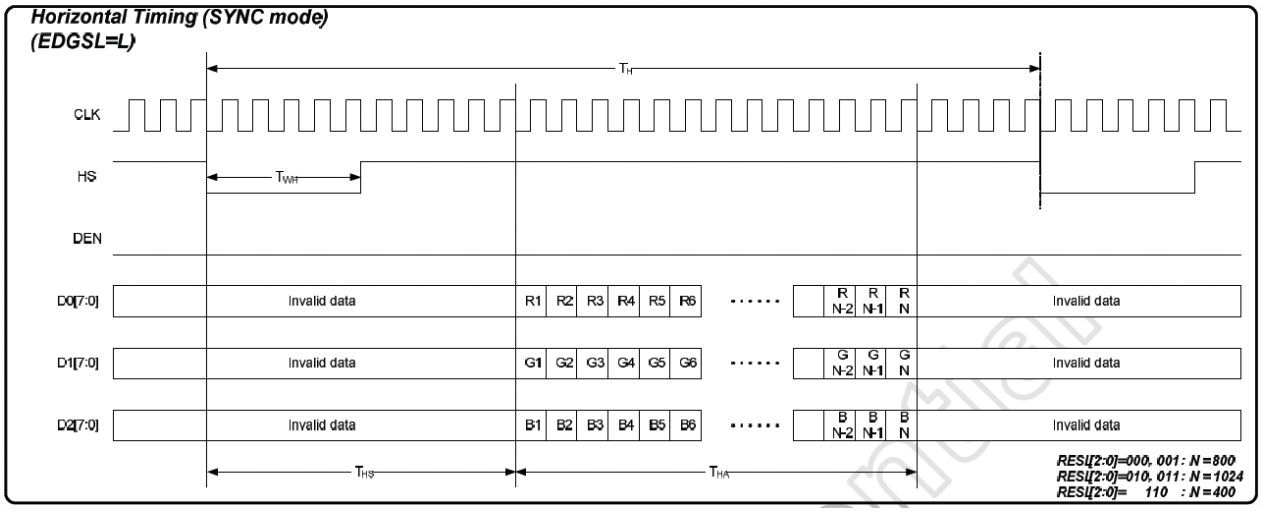
Note: (1) $T_{HS}+T_{HA}<T_H$

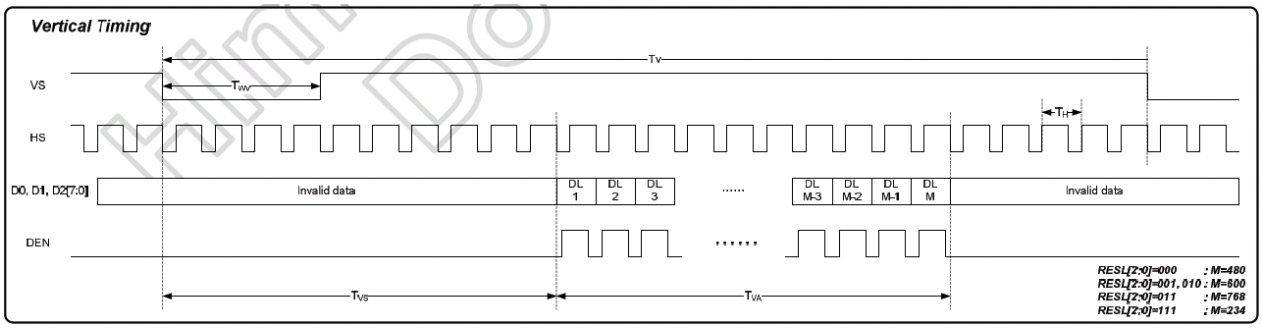
- **DE mode**

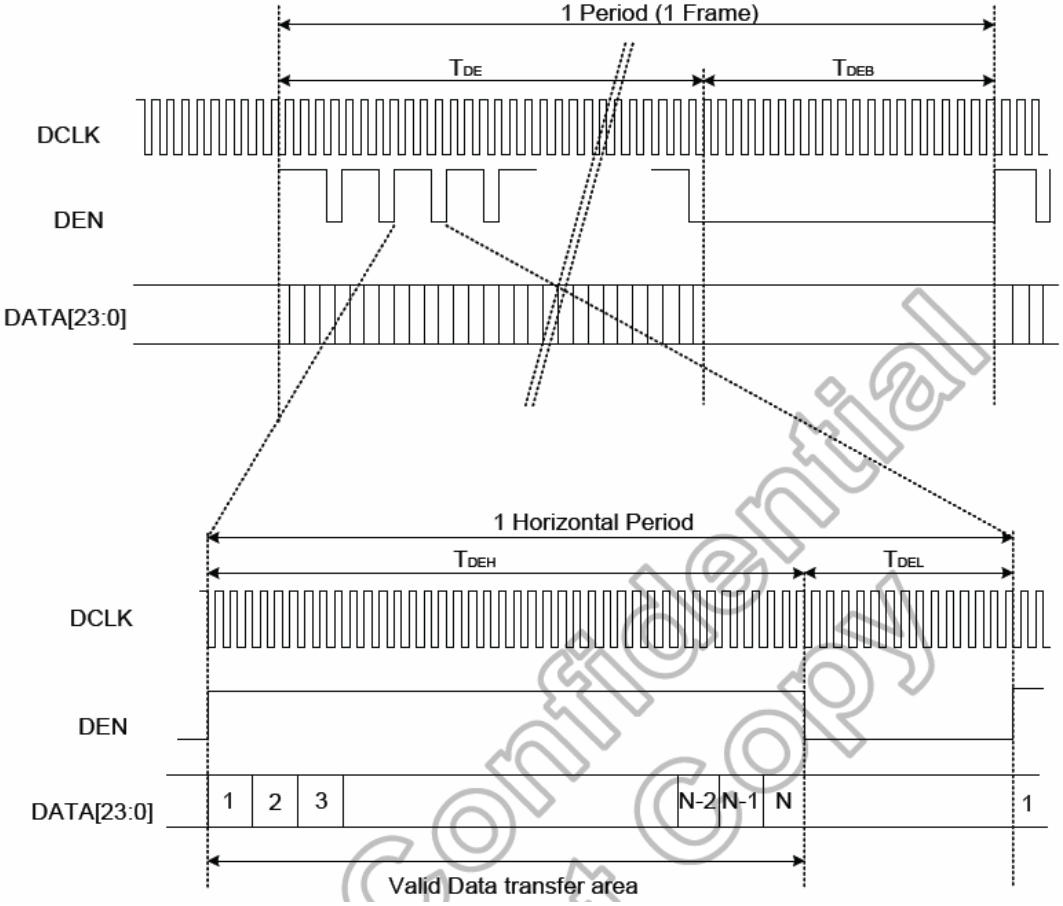
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	29.93	33.26	36.59	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
OEV pulse width	T_{OEV}	-	150	-	T_{CPH}
CKV pulse width	T_{CKV}	-	133	-	T_{CPH}
DE(internal)-STV time	T_1	-	4	-	T_{CPH}
DE(internal)-CKV time	T_2	-	40	-	T_{CPH}
DE(internal)-OEV time	T_3	-	23	-	T_{CPH}
DE(internal)-POL time	T_4	-	157	-	T_{CPH}
STV pulse width	-	-	1	-	T_H


DEN
Tesu
Tcph
Tcwh
Tcwl
CLK
(TEN=H, EDGSL=L)
70%
30%
1
2
Last
Tdsu
Tdhd
DX[7:0]
First data
2nd data
Last data
CLK
Tvst
Tvhd
VS
Tnhd
HS
Thst
Th


Horizontal Timing (SYNC mode)
(EDGSL=L)
TH
CLK
HS
TWH
DEN
D0[7:0]
D1[7:0]
D2[7:0]
Invalid data
R1 R2 R3 R4 R5 R6
G1 G2 G3 G4 G5 G6
B1 B2 B3 B4 B5 B6
R N-2 R N-1 R N
G N-2 G N-1 G N
B N-2 B N-1 B N
THS
THA
RESL[2:0]=000, 001 : N = 800
RESL[2:0]=010, 011 : N = 1024
RESL[2:0]= 110 : N = 400

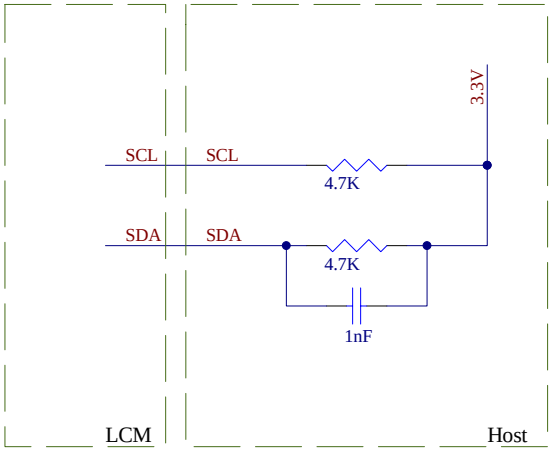

Vertical Timing
TV
VS
TWV
TH
HS
D0, D1, D2[7:0]
Invalid data
DL 1
DL 2
DL 3
DL M-3
DL M-2
DL M-1
DL M
DEN
TVS
TVA
RESL[2:0]=000 : M=480
RESL[2:0]=001, 010 : M=600
RESL[2:0]=011 : M=768
RESL[2:0]=111 : M=234

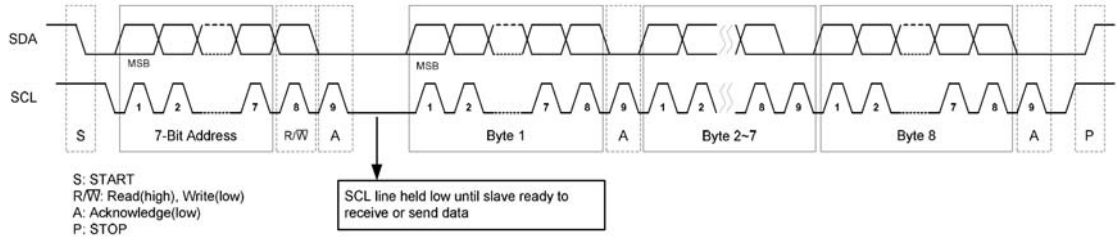


8.2.1 I2C Interface (T/P Controller)

ST1332 equipped with I2C provide two wires, serial data (SDA) and serial clock (SCL), to carry information transfers at up to 400 kbit/s(Fast mode). ST1332 plays a slave role in I2C transfer. Both SDA and SCL are bidirectional lines, connected to IOVDD via pull-up resistors. All transactions begin with a START (S) and can be terminated by a STOP (P). 7-Bit address follows START to recognize device. Each bye is 8-bit length and followed by an acknowledge bit. A HIGH to LOW transition on the SDA line while SCL is HIGH defines a START condition. A LOW to HIGH transition on the SDA line while SCL is HIGH defines a STOP condition.

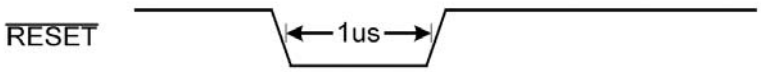
The data on the SDA line must be stable during the HIGH period of the clock. The HIGH or LOW state of the data line can only change when the clock signal on the SCL line is LOW.



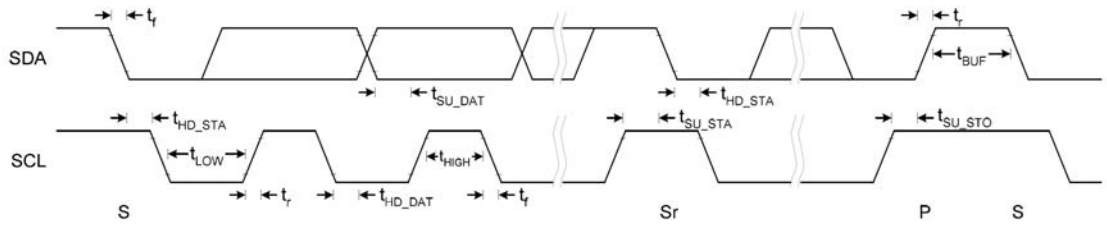


* 7-Bit Address=0x55
* Read mode only.

Master can reset ST1332 through RESET pin. RESET pin is low active and needs hold low for 1us to take effect.



8.2.2 AC Timing of I2C Interface

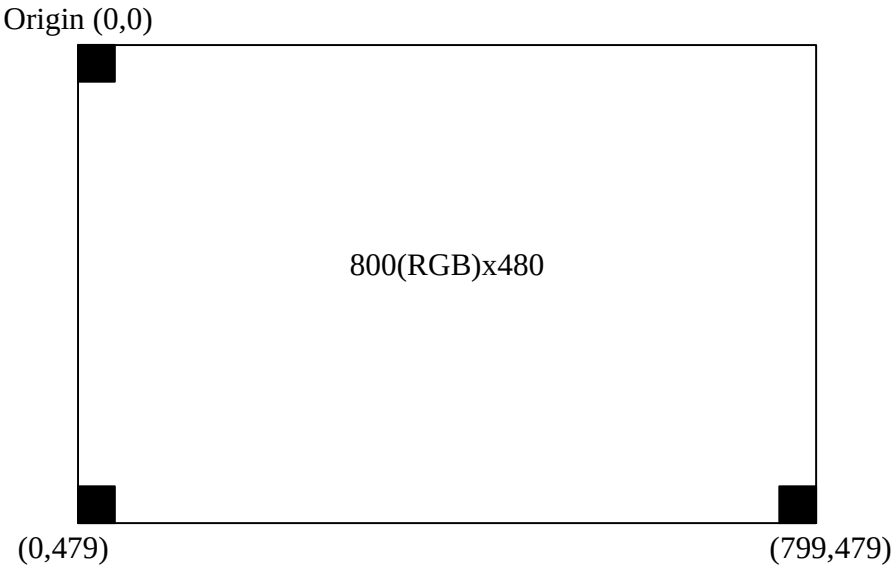


Conditions: VDD = IOVDD = 3.3V, GND = 0V, T_A = 25°C

Symbol	Parameter	Rating			Unit
		Min.	Typ.	Max.	
f_{SCL}	SCL clock frequency	0	-	400	kHz
t_{LOW}	Low period of the SCL clock	1.3	-	-	us
t_{HIGH}	High period of the SCL clock	0.6	-	-	us
t_f	Signal falling time	-	-	300	ns
t_r	Signal rising time	-	-	300	ns
t_{SU_STA}	Set up time for a repeated START condition	0.6	-	-	us
t_{HD_STA}	Hold time (repeated) START condition. After this period, the first clock pulse is generated	0.6	-	-	us
t_{SU_DAT}	Data set up time	100	-	-	ns
t_{HD_DAT}	Data hold time	0	-	0.9	us
t_{SU_STO}	Set up time for STOP condition	0.6	-	-	us
t_{BUF}	Bus free time between a STOP and START condition	1.3	-	-	us
C_b	Capacitive load for each bus line	-	-	400	pF

8.2.3 TP controller register table

Reg. Addr.	Name	Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0x10	Proximity/finger	Reserve				Fingers			
0x11	Gesture	Reserve							
0x12	XY0 Coord. (High byte)	Valid	X0_H				Y0_H		
0x13	X0 Coord. (Low byte)	X0_L							
0x14	Y0 Coord. (Low byte)	Y0_L							
0x15	XY1Coord. (High byte	Valid	X1_H				Y1_H		
0x16	X1 Coord. (Low byte)	X1_L							
0x17	Y1 Coord. (Low byte)	Y1_L							



8.2.4 Sample Code

```
if((ReadINT())==0)
 {
  {
    I2C_EE_BufferRead(pbuffer,0xAB,8);   // Device Addr.=0x55
    PCT_Z[0]=(u16) ((u16)(pbuffer[0]));      // Register 0x10
    PCT_Z[1]=(u16) ((u16)(pbuffer[1]));      // Register 0x11
    PCT_Z[2]=(u16) ((u16)(pbuffer[2]));      // Register 0x12
    PCT_Z[3]=(u16) ((u16)(pbuffer[3]));      // Register 0x13
    PCT_Z[4]=(u16) ((u16)(pbuffer[4]));       // Register 0x14
    PCT_Z[5]=(u16) ((u16)(pbuffer[5]));      // Register 0x15
    PCT_Z[6]=(u16) ((u16)(pbuffer[6]));      // Register 0x16
    PCT_Z[7]=(u16) ((u16)(pbuffer[7]));      // Register 0x17

     if (PCT_Z[2]>0x007F)
      {
        PCT_Z[8]=(u16) ((u16)((pbuffer[2]&0x0070)<<4|pbuffer[3]));
        PCT_Z[9]=(u16) ((u16)((pbuffer[2]&0x0007)<<8|pbuffer[4]));
      }

     if (PCT_Z[5]>0x007F)
      {
        PCT_Z[10]=(u16) ((u16)((pbuffer[5]&0x0070)<<4|pbuffer[6]));
        PCT_Z[11]=(u16) ((u16)((pbuffer[5]&0x0007)<<8|pbuffer[7]));
      }
      PCT_X[0]=PCT_Z[8];     // Coord.X0
      PCT_Y[0]=PCT_Z[9];     // Coord.Y0
      PCT_X[1]=PCT_Z[10];    // Coord.X1
      PCT_Y[1]=PCT_Z[11];    // Coord.Y1
 }
}
```

9. DISPLAYED COLOR AND INPUT DATA

DATA SIGNAL

COLOR		INPUT DATA																							
		R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1	1	1
RED	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(1)	0	0	0	0	0	0	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	0	0	0	0	0	0	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

10. QUALITY AND RELIABILITY

10.1. Test Conditions

Tests should be conducted under the following conditions :

Ambient temperature : 25 ± 5°C

Humidity : 60 ± 25% RH.

10.2. Sampling Plan

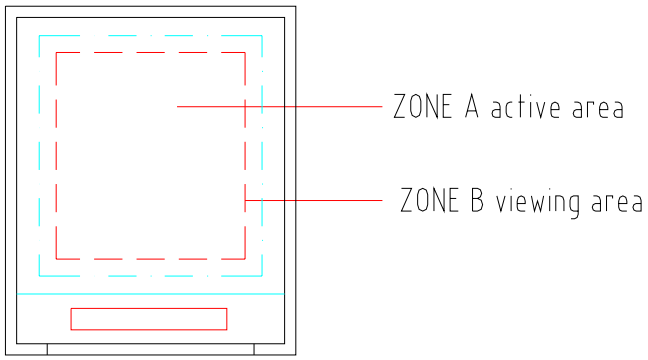
Sampling method shall be in accordance with MIL-STD-105E , level II, normal single sampling plan .

10.3. Acceptable Quality Level

A major defect is defined as one that could cause failure to or materially reduce the usability of the unit for its intended purpose. A minor defect is one that does not materially reduce the usability of the unit for its intended purpose or is an infringement from established standards and has no significant bearing on its effective use or operation.

10.4. Appearance

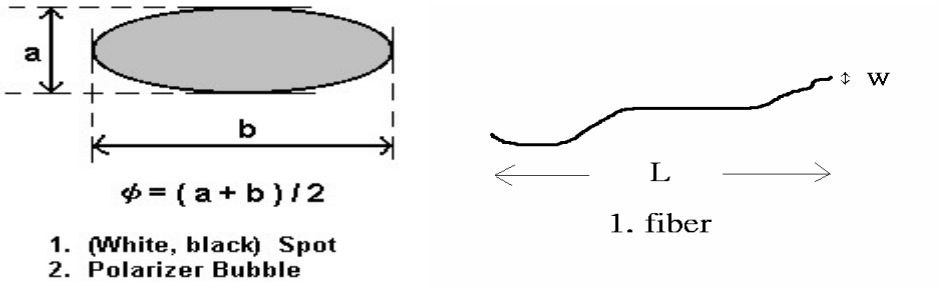
An appearance test should be conducted by human sight at approximately 30 cm distance from the LCD module under florescent light. The inspection area of LCD panel shall be within the range of following limits.



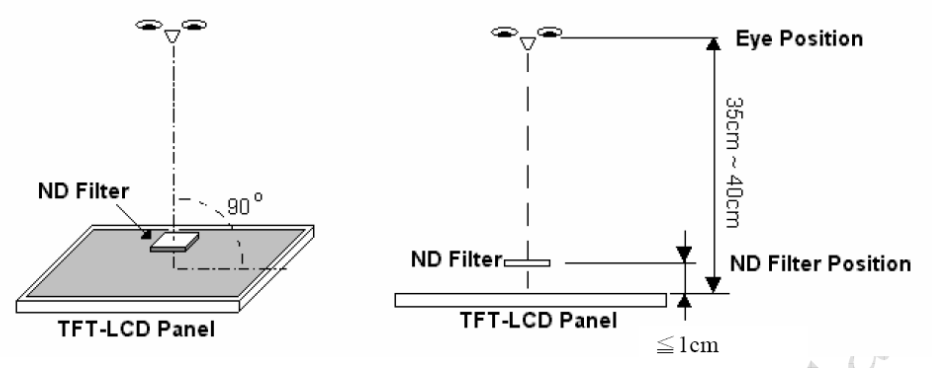
10.5. Incoming Inspection Standard

Defect Type			Limit						Note
Visual Defect	Internal	Spot	φ＜0.15mm			Ignore			(1)
			0.15mm≦φ≦0.5mm			N≦4			
			0.5mm＜φ			N=0			
		Fiber	0.03mm<W≦0.1mm, L≦5mm			N≦3			(1)
			1.0mm＜W, 1.5mm＜L			N=0			
		Polarizer Bubble	φ＜0.15mm			Ignore			(1)
			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			A Grade			B Grade			
		Bright Dot	C Area	O Area	Total	C Area	O Area	Total	(3)
			N≦0	N≦2	N≦2	N≦2	N≦3	N≦5	(2)
		Dark Dot	N≦2	N≦3	N≦3	N≦3	N≦5	N≦8	
		Total Dot	N≦4			N≦5	N≦6	N≦8	(2)
		Two Adjacent Dot	N≦0	N≦1 pair	N≦1 pair	N≦1 pair	N≦1 pair	N≦1 pair	(4)
		Three or More Adjacent Dot	Not Allowed						
		Line Defect	Not Allowed						

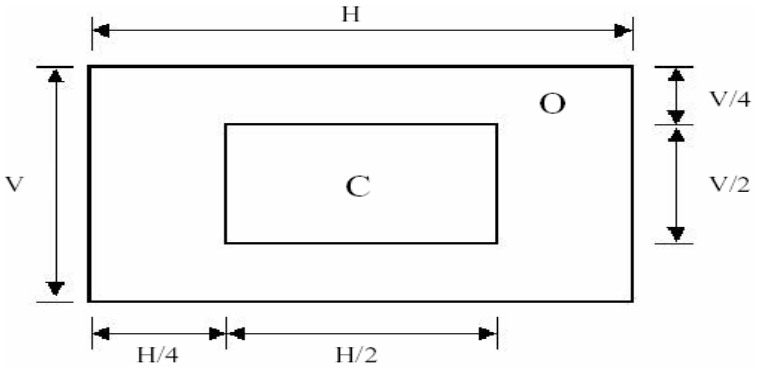
[Note1] W : Width[mm], L : Length[mm], N : Number, φ: Average Diameter



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



[Note3]

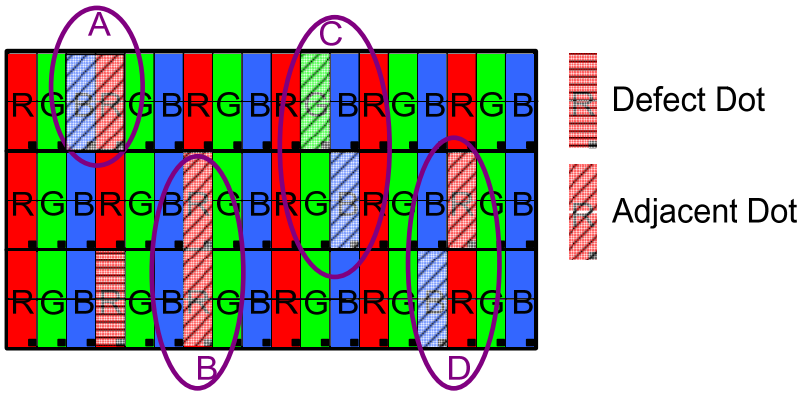


C Area: Center of display area

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.

10.6. Reliability Test

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
Thermal Shock Test	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 5 cycle	1,2
Humidity Test	40 °C, Humidity 90%, 96 hrs	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).

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.

11. USE PRECAUTIONS

11.1. Handling precautions

1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzene and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
4) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

11.2. Installing precautions

1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off.

11.3. Storage precautions

1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

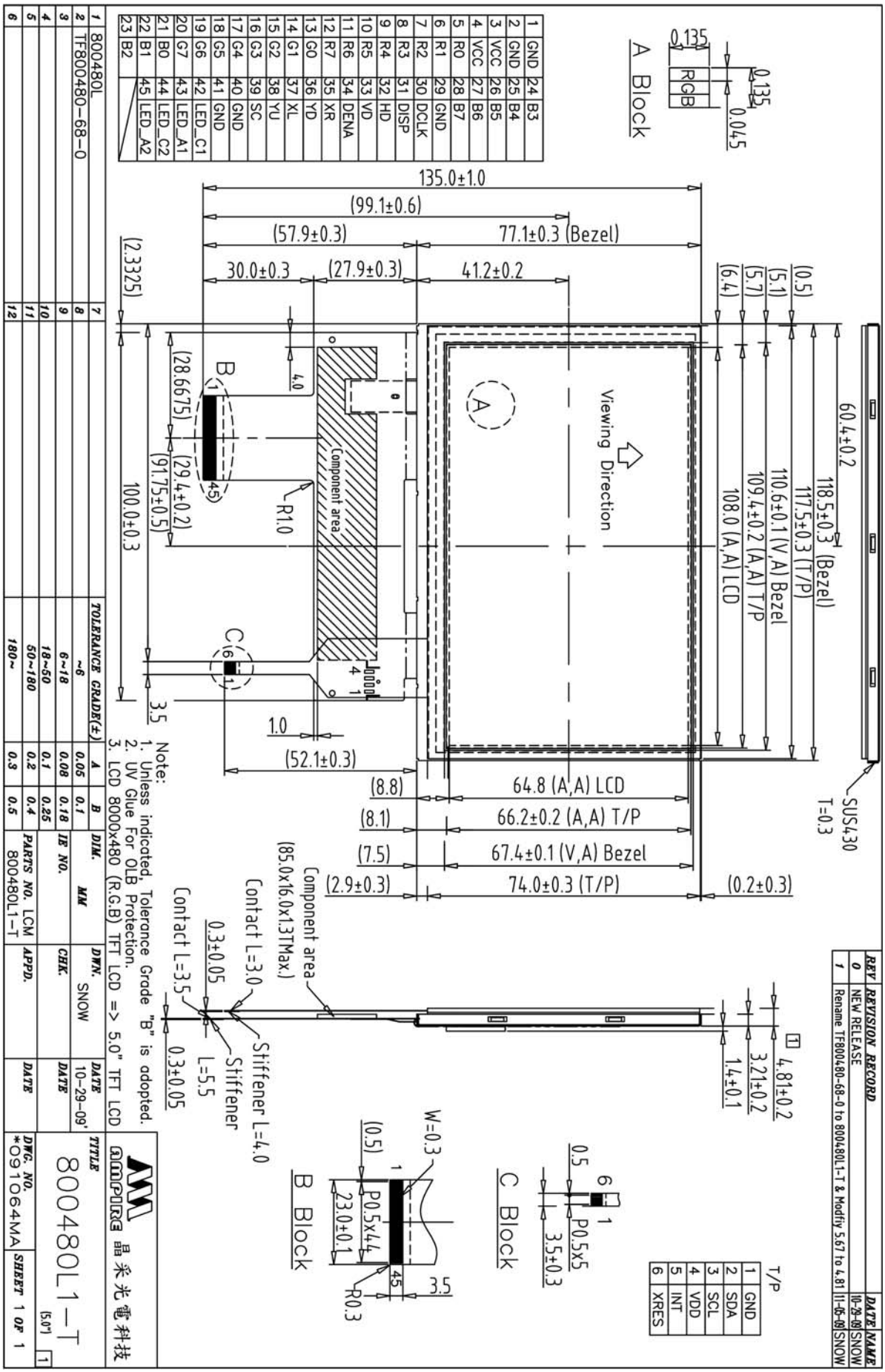
11.4. Operating precautions

1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.
4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
5) Make certain that each signal noise level is within the standard (L level: 0.2VCC or less and H level: 0.8VCC or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.
7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.
8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

11.5. Other

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

11. OUTLINE DIMENSION



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	10-29-09	SNOW
1	Rename TF800480-68-0 to 800480L1-T & Modfiy 5.67 to 4.81	11-06-09	SNOW

1	GND	24	B3																				
2	GND	25	B4																				
3	VCC	26	B5																				
4	VCC	27	B6																				
5	R0	28	B7																				
6	R1	29	GND																				
7	R2	30	DCLK																				
8	R3	31	DISP																				
9	R4	32	HD																				
10	R5	33	VD																				
11	R6	34	DENA																				
12	R7	35	XR																				
13	G0	36	YD																				
14	G1	37	XL																				
15	G2	38	YU																				
16	G3	39	SC																				
17	G4	40	GND																				
18	G5	41	GND																				
19	G6	42	LED_C1																				
20	G7	43	LED_A1																				
21	B0	44	LED_C2																				
22	B1	45	LED_A2																				
23	B2																						

1	800480L	7																					
2	TF800480-68-0	8																					
3		9																					
4		10																					
5		11																					
6		12																					

TOLERANCE GRADE(±)	A	B
~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
IB NO.	
CHK.	
APPD.	
DATE	

DWN.	DATE
SNOW	10-29-09'
DATE	

PARTS NO.	LCM
800480L1-T	

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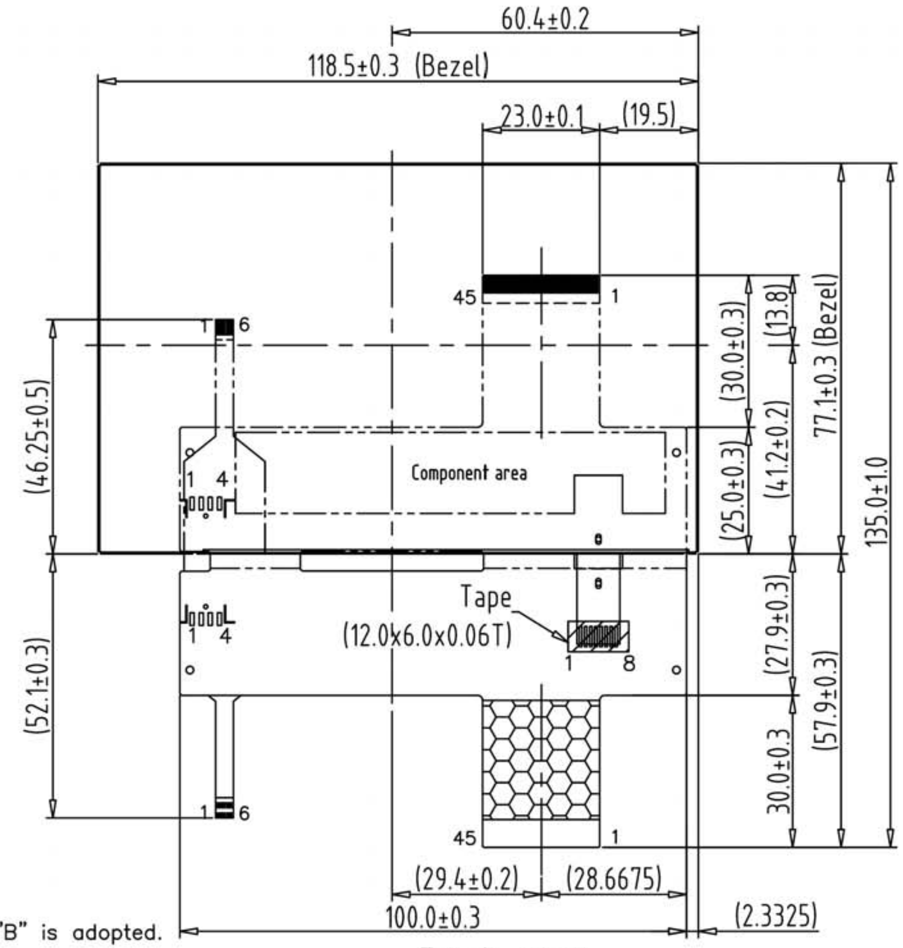
TITLE	DWG. NO.	
800480L1-T (5.0")	*091064-MA	1
	SHEET 1 OF 1	

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	10-29-09	SNOW
1	Rename TF800480-68-0 to 800480L1-T & Modfiy 5.67 to 4.81	11-05-09	SNOW



Back view

Note:
1. Unless indicated, Tolerance Grade "B" is adopted.
2. UV Glue For OLB Protection.
3. LCD 8000x480 (R.G.B) TFT LCD => 5.0" TFT LCD

				TOLERANCE GRADE(±)	A	B	DIM.	DWN.	DATE
1	800480L	7					MM	SNOW	10-29-09'
2	TF800480-68-0	8		~6	0.05	0.1			
3		9		6~18	0.08	0.18	IE NO.	CHK.	DATE
4		10		18~50	0.1	0.25			
5		11		50~180	0.2	0.4	PARTS NO. LCM-1	APPD.	DATE
6		12		180~	0.3	0.5	800480L1-T		

AMPIRE 晶采光電科技

TITLE: 800480L1-T (5.0") 1

DWG. NO. *091065MA | SHEET 1 OF 1