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Specification

Part Number : SCA05711-BFN-LNN

Customer : (A301)

APPROVED BY: (FOR CUSTOMER USE ONLY)	PCB VERSION: DATE:

SOLD BY	APPROVED BY	CHECKED BY	ISSUE DATE

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RECORD OF REVISION

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2008/11/12	2 (△1)	P13、14	11. Modify timing characteristics (a)Modify the data input format for RGB Mode (b) Modify the digital Serial RGB interface 1920x240 →1920x480 resolution
2009/08/21	3 (△2)	P5	6. Modify Electrical characteristics: Add the LED Life Time

3. General specifications

3.1 General specifications

It is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses the amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, a driver circuit and a back-light unit.

3.2 Features

- High image quality a-Si TFT LCD module.
- 262K color number.
- Support 18-bit parallel (RGB) input mode
- High contrast, high brightness
- Low power consumption.

4. Mechanical data

No	Item	Specification	Remark
1	Type	Transmissive	--
2	Display Mode	Normally White	--
3	Pixel Element	a-Si TFT	--
4	Screen Size	5.7 inch	--
5	Resolution	640(RGB) x 480	--
6	Color Number	262K	--
7	Active Area	115.2(W) x 86.4(L) (mm)	--
8	Pixel Size	0.06 x 0.18 (mm)	--
9	Color Arrangement	RGB-stripe	--
10	Assembly Type	COG	--
11	Back Light	LED	--
12	Viewing Direction	6 o'clock	--
13	Weight	TBD	--
14	Module Dimension	127.0(W) x 98.43(L) x 8.96(H)	--

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

(1) TFT-LCD Panel Absolute Maximum Ratings

Ta=25℃ GND=0V

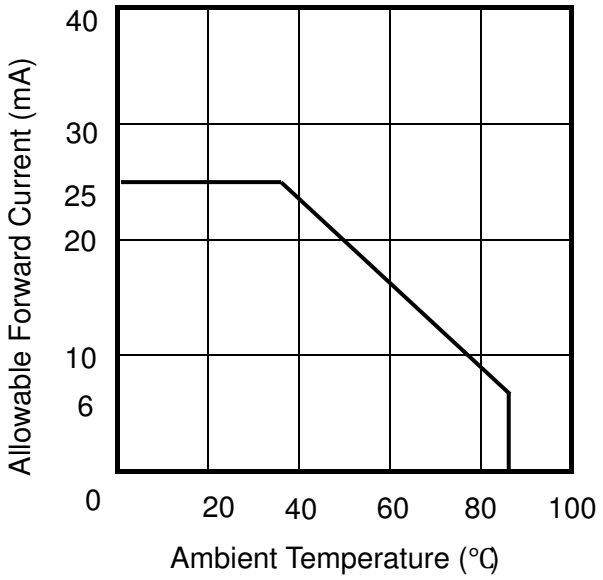
Item	Symbol	Condition	Standard Value		Unit	Remark
			Min.	Max.		
Power supply voltage	VCC	GND=0V	-0.3	7.0	V	
	Vi	--	-0.3	VCC+0.3	V	--

* If the LSI is used above these absolute maximum ratings, it may become permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are also exceeded, the LSI will malfunction and cause poor reliability.

5.2 Environmental absolute maximum ratings

Item	Symbol	Min.	Max.	Unit	Remark
Operation temperature range	Top	-20	70	℃	Ambient
Storage temperature range	Tst	-30	80	℃	Ambient

(1) Corrosive gas environment is not acceptable.
(2) TFT-LCD color will change slightly depending on environment temperature. This phenomenon is reversible.
(3) Current reduction rate of LED backlight is according to the graph indicated below:



6. Electrical characteristics

(1)TFT-LCD Module

Ta =25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply For LCD	VCC	--	3.3	--	V	--
Input Voltage	VIH	0.7VCC	--	VCC	V	H level
	VIL	0	--	0.3VCC	V	L level
LCD Power Current	IVCC	--	--	135	mA	--

(2) Back-Light Unit

Ta =25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply for LED	Vf	--	5.0	--	V	--
LED Power Current	If	--	120	--	mA	--
LED Life Time	Lf	20000	--	--	hrs	NOTE (1)

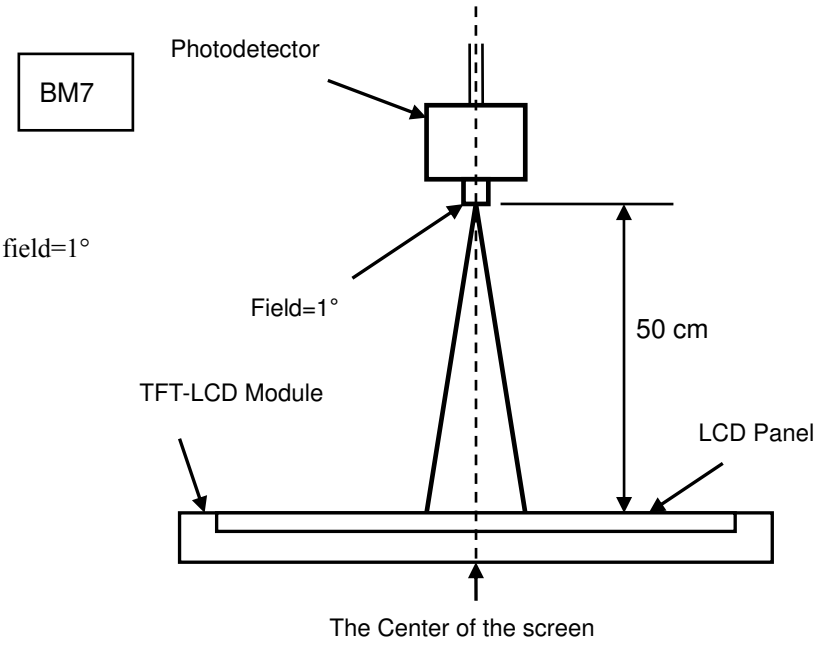
NOTE (1): The “LED Life Time” is defined as the module brightness decrease to 50% original brightness.

7. Optical characteristics

Ta = 25℃, If=120mA

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness		B	θ=0° Normal viewing angle At the center of panel	(200)	(240)	--	cd/m^2	(1)
Contrast Ratio		C/R		(250)	(350)	--	--	(2)
Response Time		Tr		--	(15)	--	ms	(3)
		Tf		--	(35)	--	ms	
Color chromaticity	Red	Rx		(0.56)	(0.61)	(0.66)	--	--
		Ry		(0.31)	(0.36)	(0.41)	--	--
	Green	Gx		(0.28)	(0.33)	(0.38)	--	--
		Gy		(0.52)	(0.57)	(0.62)	--	--
	Blue	Bx		(0.09)	(0.14)	(0.19)	--	--
		By		(0.06)	(0.11)	(0.16)	--	--
	White	Wx		(0.26)	(0.31)	(0.36)	--	--
		Wy		(0.29)	(0.34)	(0.39)	--	--
Viewing Angle	Top	θ_U	CR≧10 Backlight On	--	(60)	--	Degrees	(4)
	Bottom	θ_D		--	(45)	--		
	Left	θ_L		--	(60)	--		
	Right	θ_R		--	(60)	--		
Uniformity		Un	θ=0° Normal viewing angle	(70)	--	--	%	(5)

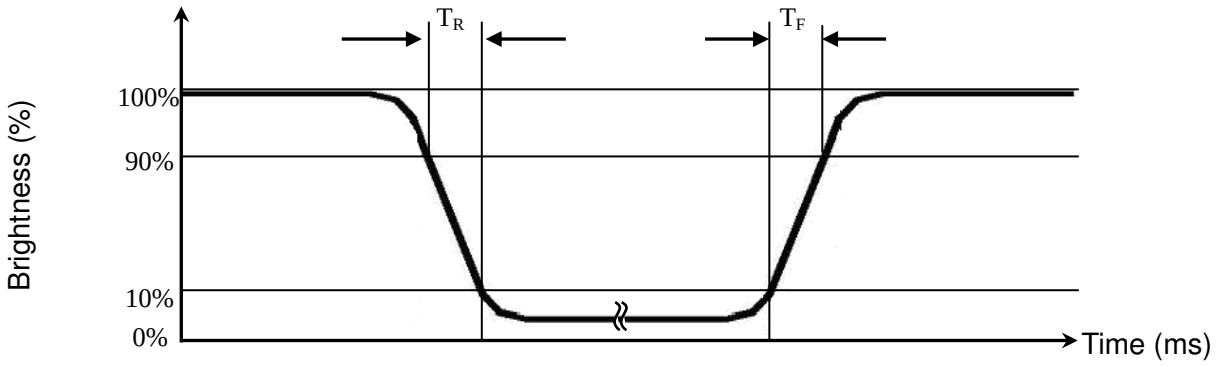
Note 1: The brightness test equipment setup

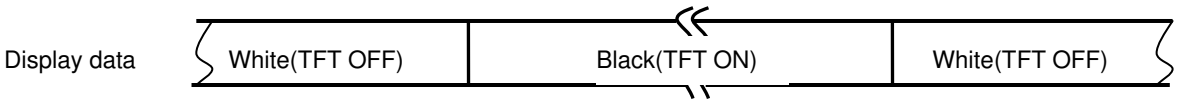


Note 2: Definition of contrast Ratio (C.R)

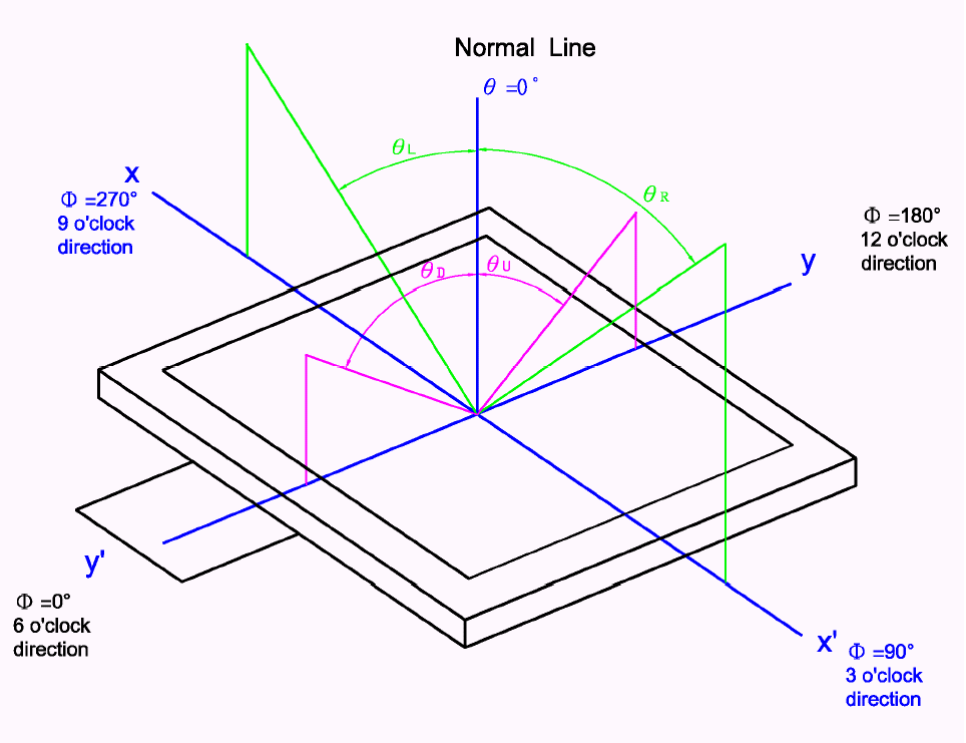
$$C.R = \frac{\textbf{Brightness When LCD is at “White” State}}{\textbf{Brightness When LCD is at “Black” State}}$$

Note 3: Definition of response time

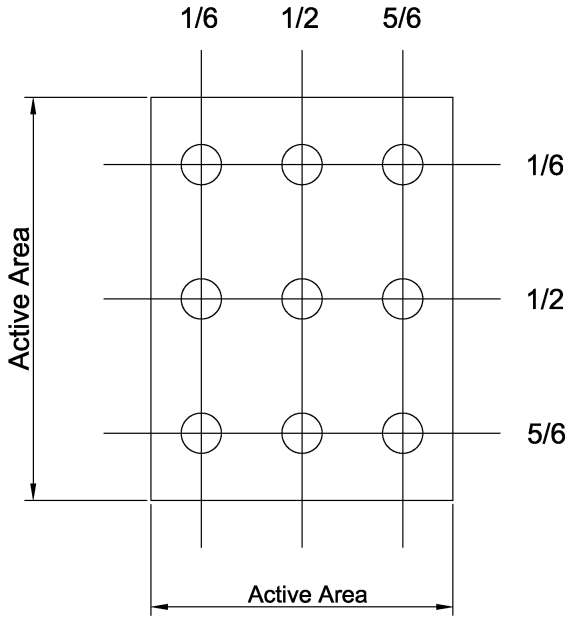




Note 4: Definition of viewing angle

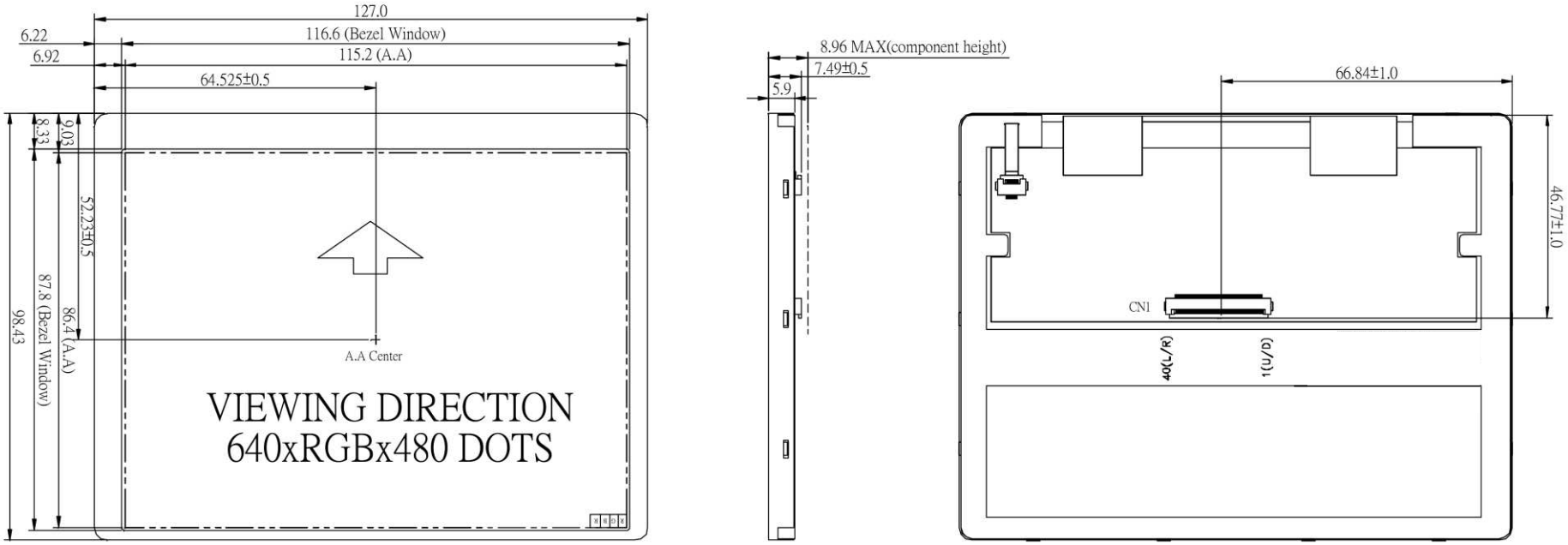


Note 5: Definition of uniformity (Un)



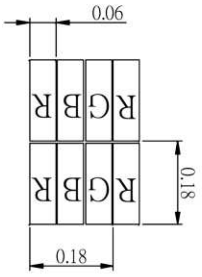
$$Un = \frac{\mathbf{Bmin}}{\mathbf{Bmax}} x100\%$$

8. Outline dimension



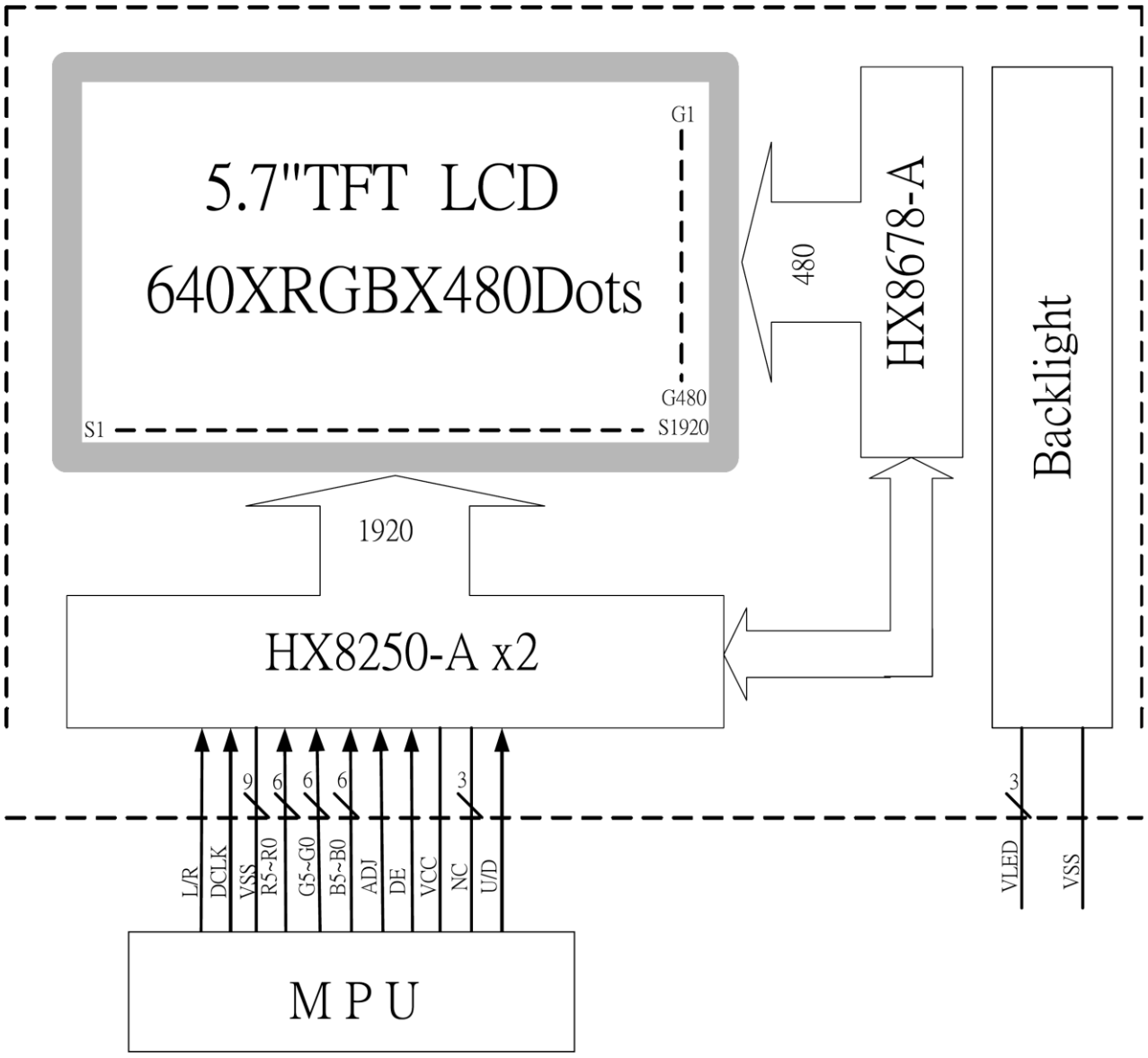
NOTE :

1. LCD : TFT TRANSMISSIVE TYPE , NORMAL WHITE
2. VIEWING DIRECTION : 6 O'CLOCK
3. Top : −20~70°C , Tst : −30~80°C
4. DRIVER IC : SOURCE : HX8250−A, GATE : HX8678−A
5. LED BACKLIGHT COLOR : WHITE , 18 PCS DICE
6. CONSTANT VOLTAGE : Vin=5.0 V(Typ)
7. TOLERANCE FOR NOT ASSIGNED : ±0.3mm
8. RoHS−COMPLIANT
9. CN1 : 6705−E40N−00R(E&T)



9.Block diagram

9.1 TFT-LCD Module (Interface System Structure)



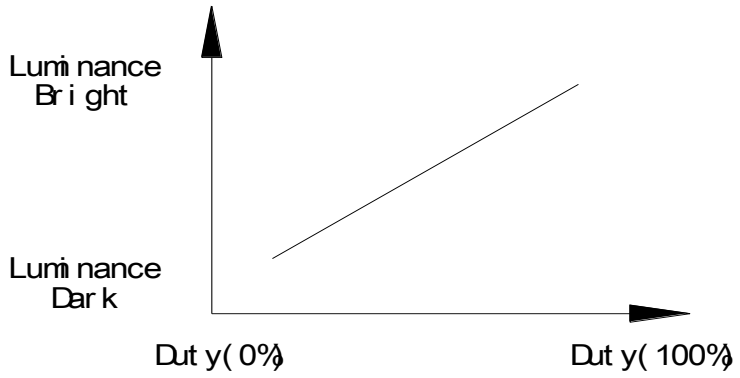
10. Input Terminal Pin Assignment

10.1 Input Signal & Power

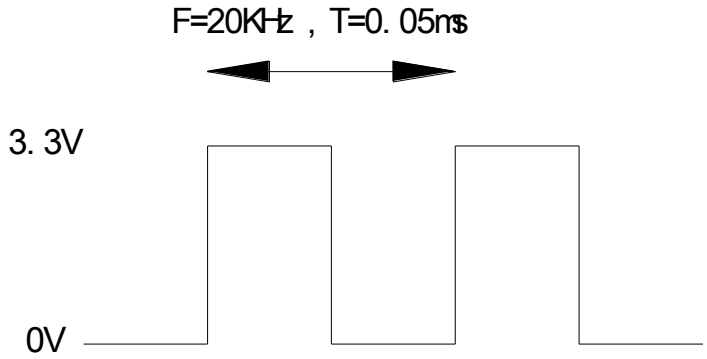
Pin no	Symbol	Description	Remark
1	U/D	Up or Down Display Control	NOTE(3)
2	NC	No Connection	-
3	NC	No Connection	-
4	VLED	Power Supply for LED	-
5	VLED	Power Supply for LED	-
6	VLED	Power Supply for LED	-
7	VCC	Power Supply for Digital Circuit LCD	-
8	NC	No Connection	-
9	DE	Rata Enable	-
10	VSS	Ground	-
11	VSS	Ground	-
12	ADJ	Adjust for LED Brightness	NOTE(1) (2)
13	B5	Blue Data Input(MSB)	-
14	B4	Blue Data Input	-
15	B3	Blue Data Input	-
16	VSS	Ground	-
17	B2	Blue Data Input	-
18	B1	Blue Data Input	-
19	B0	Blue Data Input(LSB)	-
20	VSS	Ground	-
21	G5	Green Data Input(MSB)	-
22	G4	Green Data Input	-
23	G3	Green Data Input	-
24	VSS	Ground	-
25	G2	Green Data Input	-
26	G1	Green Data Input	-
27	G0	Green Data Input(LSB)	-
28	VSS	Ground	-
29	R5	Red Data Input(MSB)	-
30	R4	Red Data Input	-
31	R3	Red Data Input	
32	VSS	Ground	-
33	R2	Red Data Input	-

Pin no	Symbol	Description	Remark
34	R1	Red Data Input	-
35	R0	Red Data Input(LSB)	-
36	VSS	Ground	-
37	VSS	Ground	-
38	DCLK	Clock Signals	-
39	VSS	Ground	-
40	L/R	Left or Right Display Control	NOTE(3)

NOTE(1)：ADJ adjust brightness to control Pin，Pulse duty the bigger the brighter



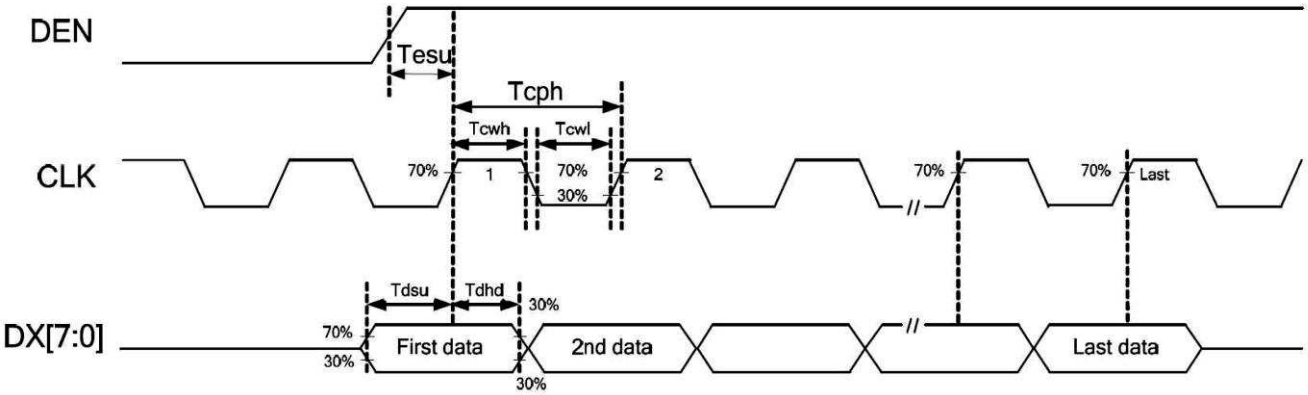
NOTE (2)：ADJ signal = 0~3.3V，operation frequency：20KHz



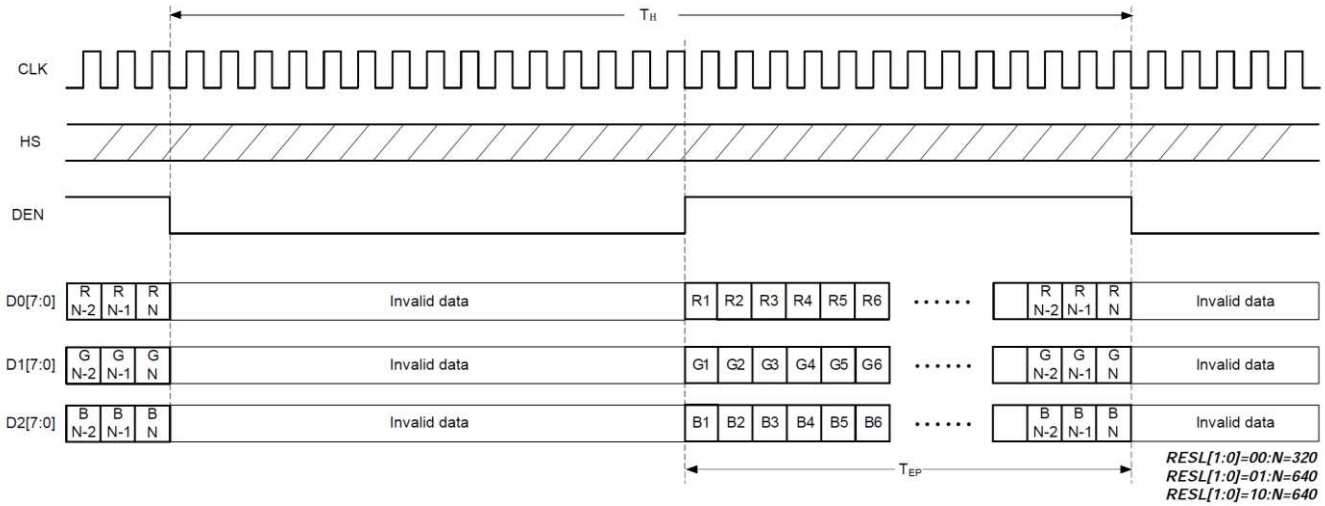
NOTE (3)：U/D & L/R are controlled function

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

11. Timing Characteristics



11.1 Data input format for RGB Mode ⚠1



⚠1

Digital Serial RGB interface (1920x480 resolution)

Item	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)

Item	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

12. Driver IC Control Algorithms

1. Refer to the data Sheet of LCD DRIVER IC1 HX8250 or equivalent
2. Refer to the data Sheet of LCD DRIVER IC2 HX8678 or equivalent

13. Reliability Test Items

No.	Test items	Conditions	Remark
1	High temperature storage	80℃ 240H	--
2	Low temperature storage	-30℃ 240H	--
3	High temperature & high humidity storage	60℃, 90% RH, 240H	--
4	Vibration test	Freq.:10 ~ 55~10 Hz, Amp.:1.5 mm 1H for each direction of X, Y, Z	Non-operation
5	Thermal Shock	-30℃,30 min /80℃,30 min , 20 cycles	Static
6	High temperature operation	70℃ 240H	--
7	Low temperature operation	-20℃ 240H	--
8	High temperature & high humidity operation	50℃, 90% RH, 240H	Operating
Criterion: There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.			

14. General Precautions

Please pay attentions to the followings as using the LCD module.

14.1 Handling

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the polarizer permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(I) Do not disassemble the LCD module.

14.2 Storage

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.

14.3 Operation

(a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms should always obeyed to avoid damaging the LSI and electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

14.4 Others

(a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

(b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.

(c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized