Thin Film Transistor LCD MODULE
MODEL: AWT-320240C35N04
Customer's No.:

Acceptance

10-1 Floor, No. 192, Tahtung Road,
Sec. 3, Hsi-Chih Dist,
New Taipei City, Taiwan

Approved and Checked by

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樺 叡 2017/08/07 NICK	樺 叡 2017/08/07 JOE		樺 叡 2017/08/07 TOM

REVISIONHISTORY

Version	Contents	Date	Note
A	First Issued.	2016/09/26	
B	**1. Modified Page 11 (2-2.1 Section):** Supply Voltage from 18.6V~22.2V to 16.8V~20.4V. **2. Modified Page 22(3.1 Section):** Add Red x-code, Red y-code, Green x-code, Green y-code, Blue x-code, Blue y-code, White x-code, White y-code, Brightness.	2017/03/07	
C	**Modified Page 22(3.1 Section):** Modified Red x-code, Red y-code, Green x-code, Green y-code, Blue x-code, Blue y-code, White x-code, White y-code, Brightness.	2017/08/02	
D	**1. Modified Page 5(1.3 Section):** Modified outline dimension from Rev. A to Rev. B. **2.Modified Page 10(2.1 Section):** Modified storage temperature range from -30~80˚C to -40~80˚C. **3.Modified Page 25(4.0 Section):** Modified low temperature storage from -30˚C, 200 hours to -40˚C, 120 hours.	2017/08/07	

CONTENTS

1. BASIC SPECIFICATION

1.1 Mechanical specifications

Items	Nominal Dimension	Unit
Active screen size	3.5” diagonal	-
Dot Matrix	320*RGB*240	Pixel
Module Size (W x H x T)	76.9 x 63.9 x 3.15	mm.
Active Area (W x H)	70.08 x 52.56	mm.
Dot Pitch (W x H)	0.219 x 0.219	mm.
Color depth	262K	color
Interface	1. 8/ 9/ 16/ 18-bit 6800-series / 8080-series Parallel Interface 2. Serial Peripheral Interface (SPI) 3. 18-/6-bit RGB interface (DEN, DOTCLK, HSYNC, VSYNC, DB[17:0]) 4. VSYNC interface (system interface + VSYNC) 5. WSYNC interface (system interface + WSYNC)	-
Driving IC Package	COG	-
Module weight	TBD	g

* The maximum color depth of this driver IC is 262K colors ,not 16.7M.

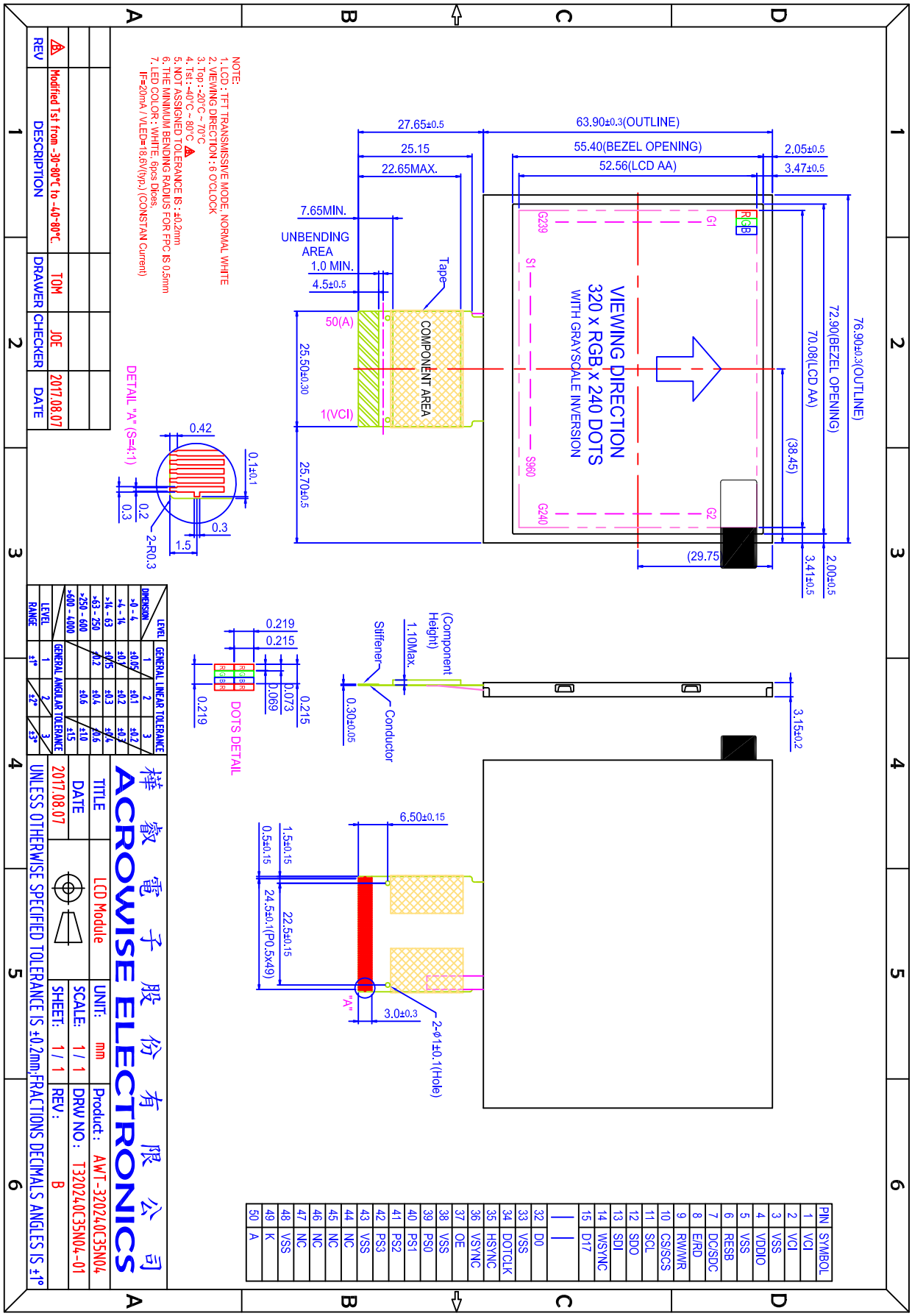
1.2 Display specification

Display	Descriptions	Note
LCD Type	a-Si TFT	-
LCD Mode	TN / Normal white	-
Polarizer Mode	Transmissive	-
Polarizer Surface	Normal	-
Pixel arrangement	RGB-stripe	-
Backlight Type	LED	-
Viewing Direction(Gray inversion)	6 O'clock Direction	1

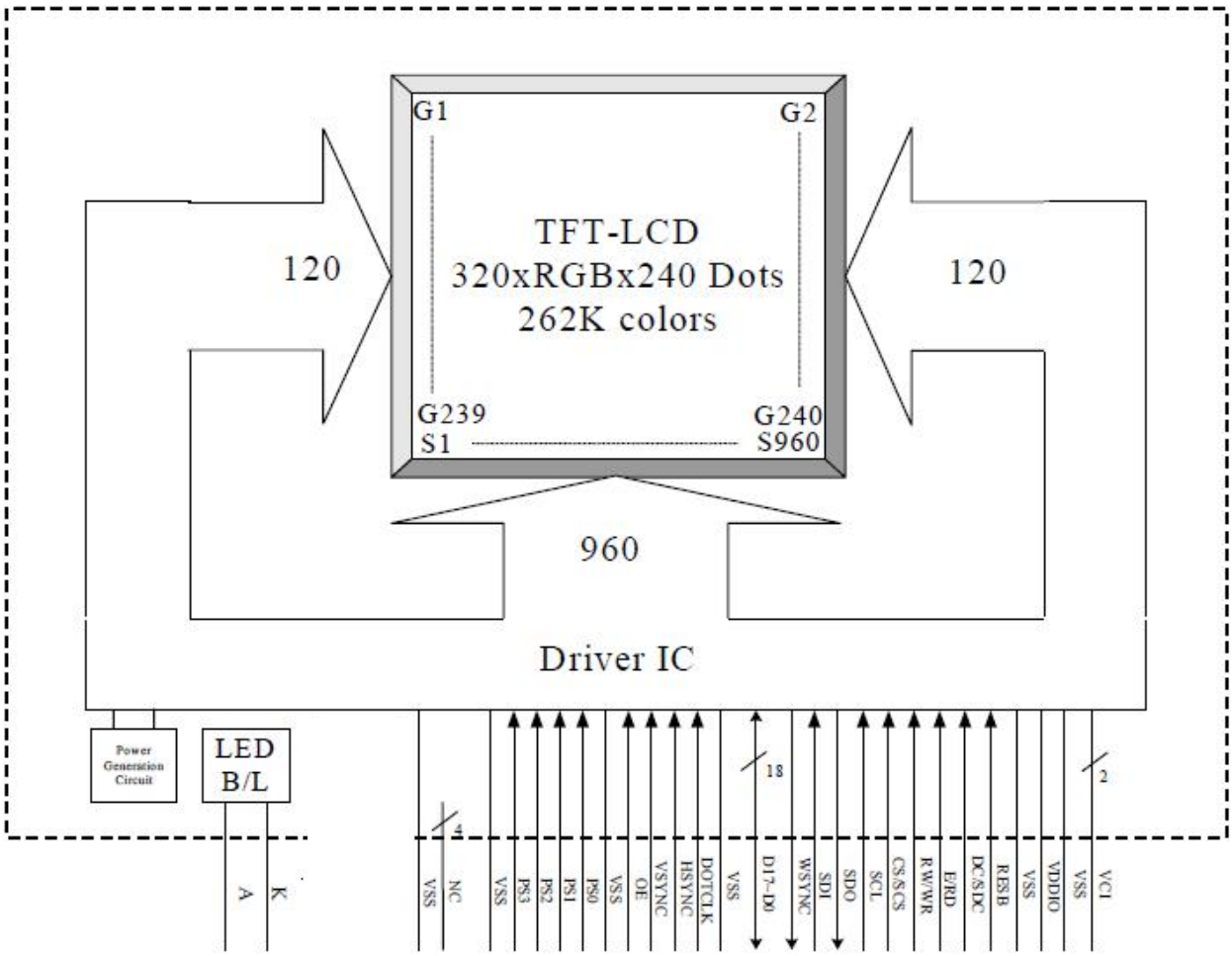
Color tone is slightly changed by temperature and driving voltage.

Note 1：The viewing direction defined in this specification is according to the rubbing direction of its TFT surface treatment by the TFT glass manufacturer. The grayscale inversion is at this direction as well. However, the optimal viewing direction for human view is normally where the color does NOT change to grayscale inversion, and this would be the opposite site of the specified viewing direction in this specification. In any case we advise customers to judge by themselves, and be aware of this phenomenon.

1.3 Outline dimension



1.4 Block diagram



1.5 Interface pin connection

Pin No.	Pin Name	I/O	Description
1~2	VCI	P	Booster input voltage pin.
3	VSS	P	System ground pin of the IC.
4	VDDIO	P	Voltage input pin for logic I/O.
5	VSS	P	System ground pin of the IC.
6	RESB	I	System reset pin. - An active low pulse at this pin will reset the IC, Connect to VDDIO in normal operation.
7	DC/SDC	I	Data or command. DC : Parallel Interface. SDC : Serial Interface.
8	E/RD	I	6800-system : E (enable signal) 8080-system : RD (read strobe signal) Serial mode : Not used and should be connected to VDDIO or Vss.
9	RW/WR	I	6800-system : RW (indicates read cycle when High, write cycle when Low) 8080-system : WR (write strobe signal)
10	CS/SCS	I	CS: Chip Select pin for 6800/8080 Parallel Interface. SCS: Chip Select pin for Serial Mode Interface.
11	SCL	I	Serial clock input.
12	SDO	O	Data output pin in serial interface.
13	SDI	I	Data input pin in serial interface.
14	WSYNC	O	Ram Write Synchronization output. -Leave it OPEN when not used.

Pin No.	Pin Name	I/O	Description
15	D17	I/O	For parallel mode, 8/9/16/18 bit interface. Please refer to Table 1. Unused pins should corniest to VSS.
16	D16		
17	D15		
18	D14		
19	D13		
20	D12		
21	D11		
22	D10		
23	D9		
24	D8		
25	D7		
26	D6		
27	D5		
28	D4		
29	D3		
30	D2		
31	D1		
32	D0		
33	VSS	P	System ground pin of the IC.
34	DOTCLK	I	Dot-clock signal and oscillator source.
35	HSYNC	I	Line Synchronization input.
36	VSYNC	I	Frame/Ram Write Synchronization input.
37	OE	I	Display enable pin from controller.
38	VSS	P	System ground pin of the IC.
39	PS0	I	Please refer to Table 1.
40	PS1		
41	PS2		
42	PS3		
43	VSS	P	System ground pin of the IC.
44~47	NC	-	No connection.
48	VSS	P	System ground pin of the IC.
49	K	P	Backlight LED's cathode.
50	A	P	Backlight LED's anode.

Table 1.

PS3	PS2	PS1	PS0	Interface Mode	Data bus input
0	0	0	0	16-bit 6800 parallel interface	D[17:10], D[8:1]
0	0	0	1	8-bit 6800 parallel interface	D[17:10]
0	0	1	0	16-bit 8080 parallel interface	D[17:10], D[8:1]
0	0	1	1	8-bit 8080 parallel interface	D[17:10]
0	1	0	0	9-bit generic D[17:9] (262k colour) + 3-wire SPI IF 65K color, D12 shorts to D17 internally	
0	1	0	1	16-bit generic (65k colour) + 3-wire SPI	
0	1	1	0	18-bit generic (262k colour) + 3-wire SPI	
0	1	1	1	6-bit generic D[17:12] (262k colour) + 3-wire SPI	
1	0	0	0	18-bits 6800 parallel interface	D[17:0]
1	0	0	1	9-bits 6800 parallel interface	D[17:9]
1	0	1	0	18-bit 8080 parallel interface	D[17:0]
1	0	1	1	9-bit 8080 parallel interface	D[17:9]
1	1	1	0	3-wire SPI	
1	1	1	1	4-wire SPI	

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Input Voltage	VCI	VSS-0.3	5.0	V
Supply Voltage	VDDIO	VSS-0.3	4.0	V
Operating Temperature range	TOP	-20	70	°C
Storage Temperature range	TST	-30	80	°C

2.2 DC Characteristics

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Power supply voltage	VCI	2.5	3.3	3.6	V	
Power supply pin of IO pins	VDDIO	1.4	3.3	3.6	V	
Current consumption	IVCI+IVDDIO	-	-	10	mA	NOTE
Dot Clock	DCK	-	5.5	8.2	MHz	

NOTE : The method to illuminate the LCD panel is using the 2-5-4commend under the measuring condition.

Measuring Condition :

Standard Value MAX.

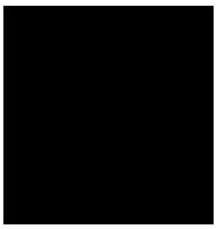
Ta = 25℃

VCI = 3.3V

VDDIO = 3.3V

Dot Clock = 5.5MHz

Display Patten = Checkered pattern



0 gray black pattern

2-2.1 Back-light Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition	Notes
Supply Current	If	-	20	-	mA	Ta=25°C	
Supply Voltage	Vf	16.8	18.6	20.4	V	Ta=25°C	
Half-Life	Lf	-	50000	-	Hr	Ta=25°C	1

Note1: The " Half-Life Time" is defined as the LED chip brightness decreases to 50% than original brightness, Based on Ta 25±2℃ ,60±10% RH condition .

2-3 COMMAND

1. LCD_Initial_SSD2119:(for 16bit 8080 interface)

COMMAND	CODE	DESCRIPTION
R00H	0001	OSCEN=1
R10H	0000	Sleep=0
R07H	0033	Display control. CM=0
R11H	6870	65K color, X, Y auto increase ,updated in horizontal direction
R02H	0600	line inversion
R03H	4A38	VGH/VGL= 5/-3
R01H	70EF	Gate lines =240
R0FH	0000	Start scan line = 0
R25H	A000	Frame frequency
R28H	0006	Enable R25, R29 register
R12H	0999	Sleep mode
R26H	3800	Analogue setting
R0BH	5308	Frequency
R0CH	0004	VCIX2
R0DH	000F	VLCD63
R0EH	1B00	VCOML
R1EH	00B5	VCOMH
R44H	EF00	HAS and HEA station
R45H	0000	Vertical address start station
R46H	013F	Vertical address end station
R30H	0000	Gamma B control 1
R31H	0101	Gamma B control 2
R32H	0100	Gamma B control 3
R33H	0305	Gamma B control 4
R34H	0707	Gamma B control 5
R35H	0305	Gamma B control 6
R36H	0707	Gamma B control 7
R37H	0201	Gamma B control 8
R3AH	1200	Gamma B control 9
R3BH	0900	Gamma B control 10
R22H	--	Write data to RAM

2. LCD_Initial_SSD2119:(for 18bit+3wire SPI and 4wire SPI)

COMMAND	CODE	DESCRIPTION
R00H	0001	OSCEN=1
R10H	0000	Sleep=0
R07H	0033	Display control. CM=0
R11H	4E70	DFM[1:0] : 262k Color Mode DenMode = 1 : RGB interface ignore HSYNC, VSYNC pin and HBP, VBP WMode = 1 : Write RAM from Generic RGB data (POR, if PS:00xx)
R02H	0600	line inversion
R03H	6A38	VGH/VGL=5/-3
R01H	70EF	Gate lines =240
R28H	0006	Enable R25, R29 register
R12H	0999	Sleep mode
R26H	3800	Analogue setting
R0CH	0004	VCIX2
R0DH	000F	VLCD63
R0EH	1B00	VCOML
R1EH	00B5	VCOMH
R15H	0058	Entry mode
R30H	0000	Gamma B control 1
R31H	0101	Gamma B control 2
R32H	0100	Gamma B control 3
R33H	0305	Gamma B control 4
R34H	0707	Gamma B control 5
R35H	0305	Gamma B control 6
R36H	0707	Gamma B control 7
R37H	0201	Gamma B control 8
R3AH	1200	Gamma B control 9
R3BH	0900	Gamma B control 10
R22H	--	Write data to RAM

2.4 AC Characteristics

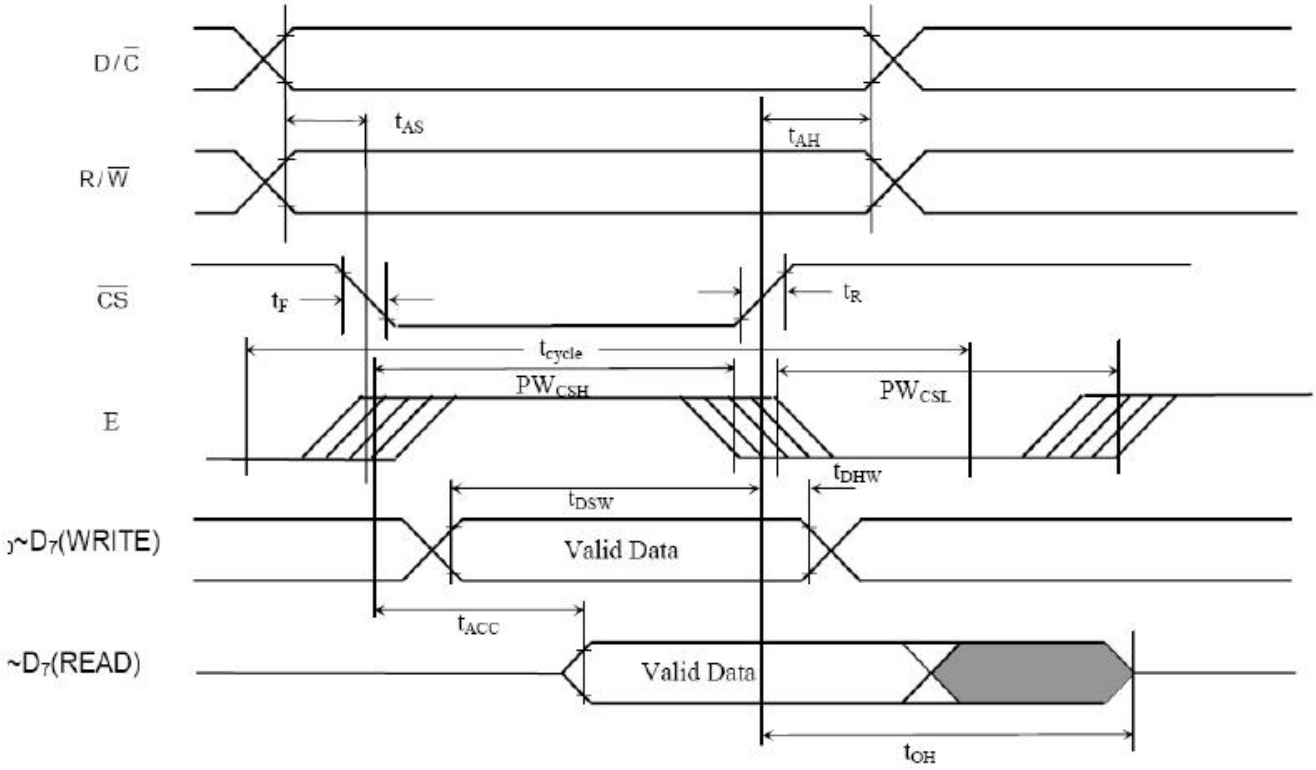
2-4-1 Parallel 6800 Timing Characteristics

(T_A = -40 to 85°C, V_{DDIO} = 1.4V to 3.6V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	75	-	-	ns
t_{cycle}	Clock Cycle Time (read cycle)	1000	-	-	ns
t_{AS}	Address Setup Time (R/$\overline{W}$)	0	-	-	ns
t_{AH}	Address Hold Time (R/$\overline{W}$)	0	-	-	ns
t_{DSW}	Data Setup Time (D0~D7, WRITE)	5	-	-	ns
t_{DHW}	Data Hold Time (D0~D7, WRITE))	5	-	-	ns
t_{ACC}	Data Access Time (D0~D7, READ)	250	-	-	ns
t_{OH}	Output Hold time (D0~D7, READ)	100	-	-	ns
PW_{CSL}	Pulse width /CS low (write cycle)	40	-	-	ns
PW_{CSH}	Pulse width /CS high (write cycle)	25	-	-	ns
PW_{CSL}	Pulse width /CS low (read cycle)	500	-	-	ns
PW_{CSH}	Pulse width /CS high (read cycle)	500	-	-	ns
t_R	Rise time (/CS)	-	-	4	ns
t_F	Fall time (/CS)	-	-	4	ns

Note: CS can be pulled low during the write cycle, only /RW is needed to be toggled

Parallel 6800-series Interface Timing Characteristics



2-4-2 Parallel 8080 Timing Characteristics

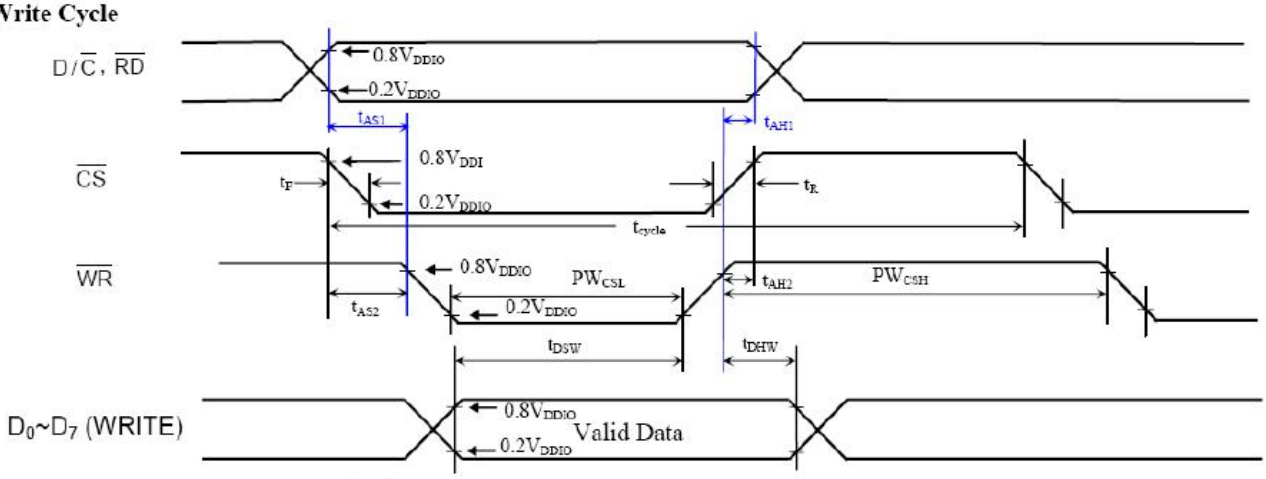
(T_A = -40 to 85°C, V_{DDIO} = 1.4V to 3.6V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	75	-	-	ns
t_{cycle}	Clock Cycle Time (read cycle)	1000	-	-	ns
t_{AS1}	Address Setup Time between (R/$\overline{W}$) and D/$\overline{C}$	0	-	-	ns
t_{AH1}	Address Hold Time between (R/$\overline{W}$) and D/$\overline{C}$	0	-	-	ns
t_{AS2}	Address Setup Time between (R/$\overline{W}$) and $\overline{CS}$	0	-	-	ns
t_{AH2}	Address Hold Time between (R/$\overline{W}$) and $\overline{CS}$	0	-	-	ns
t_{DSW}	Data Setup Time (D0~D7, WRITE)	5	-	-	ns
t_{DHW}	Data Hold Time (D0~D7, WRITE))	5	-	-	ns
t_{ACC}	Data Access Time (D0~D7, READ)	250	-	-	ns
t_{OH}	Output Hold time (D0~D7, READ)	100	-	-	ns
PW_{CSL}	Pulse width /CS low (write cycle)	40	-	-	ns
PW_{CSH}	Pulse width /CS high (write cycle)	25	-	-	ns
PW_{CSL}	Pulse width /CS low (read cycle)	500	-	-	ns
PW_{CSH}	Pulse width /CS high (read cycle)	500	-	-	ns
t_R	Rise time (/CS)	-	-	4	ns
t_F	Fall time (/CS)	-	-	4	ns

Note: CS can be pulled low during the write cycle, only /RW is needed to be toggled

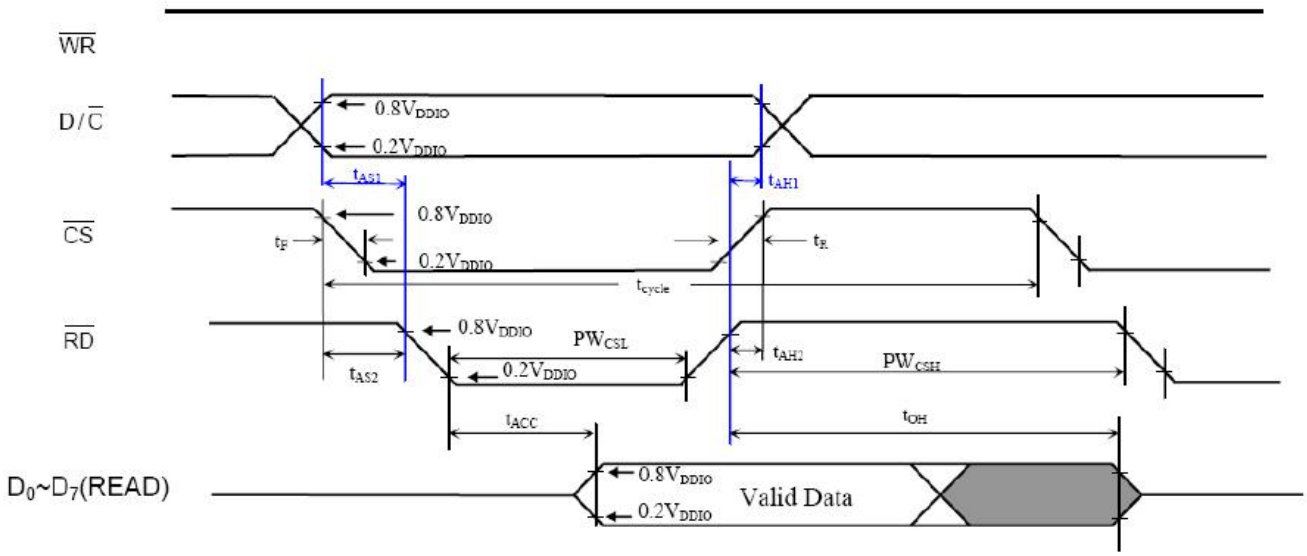
Parallel 8080-series Interface Timing Characteristics

Write Cycle



Remark: It's highly recommended that $\overline{RD}$ remains high for the whole write cycle

Read Cycle

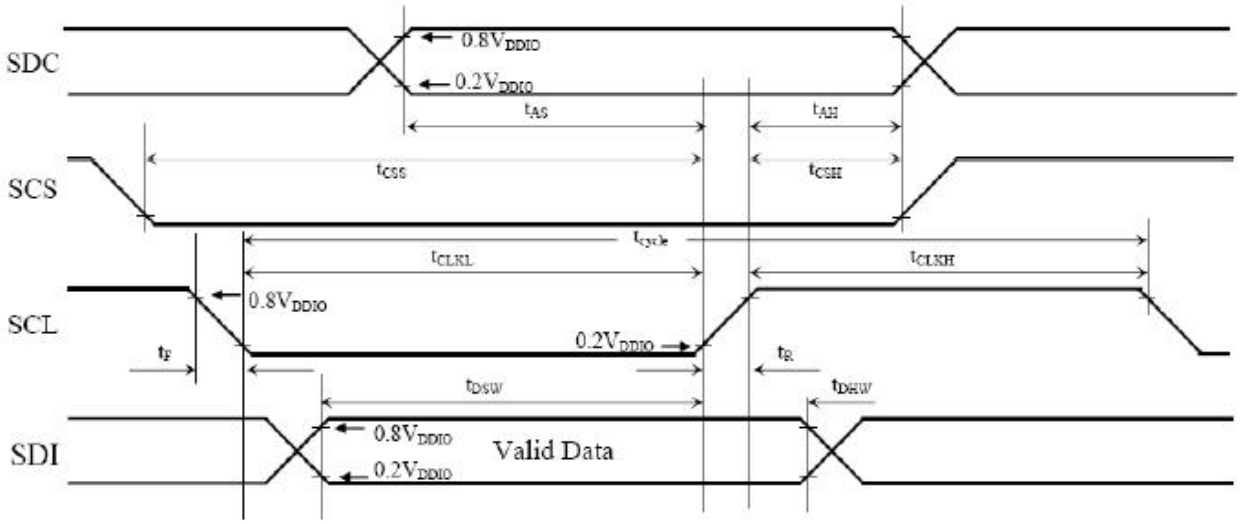


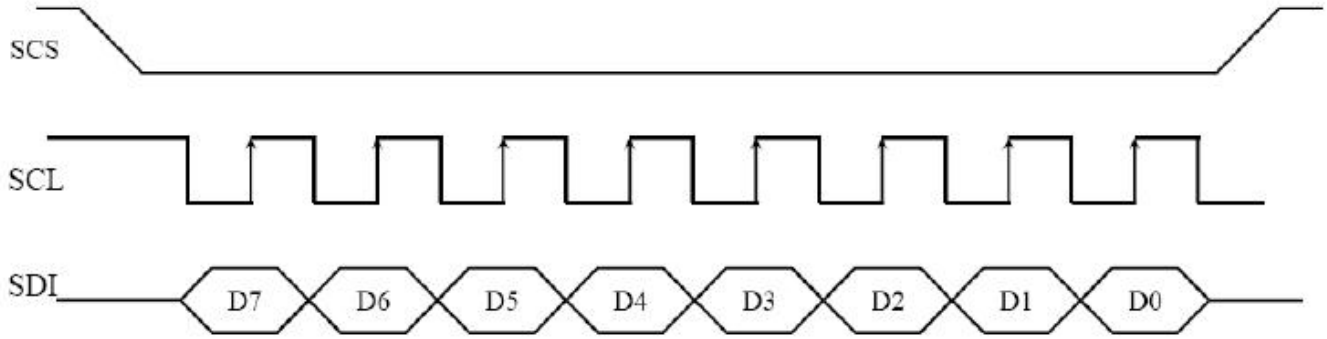
2-4-3 Serial Timing Characteristics

(T_A = -40 to 85°C, V_{DDIO} = 1.4V to 3.6V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	77	-	-	ns
f_{CLK}	Serial Clock Cycle Time SPI Clock tolerance = +/- 2 ppm	-	-	15	MHz
t_{AS}	Register select Setup Time	4	-	-	ns
t_{AH}	Register select Hold Time	5	-	-	ns
t_{CSS}	Chip Select Setup Time	2	-	-	ns
t_{CSH}	Chip Select Hold Time	10	-	-	ns
t_{DSW}	Write Data Setup Time	5	-	-	ns
t_{OHW}	Write Data Hold Time	10	-	-	ns
t_{CLKL}	Clock Low Time	38	-	-	ns
t_{CLKH}	Clock High Time	38	-	-	ns
t_R	Rise time	-	-	4	ns
t_F	Fall time	-	-	4	ns

4 wire Serial Timing Characteristics





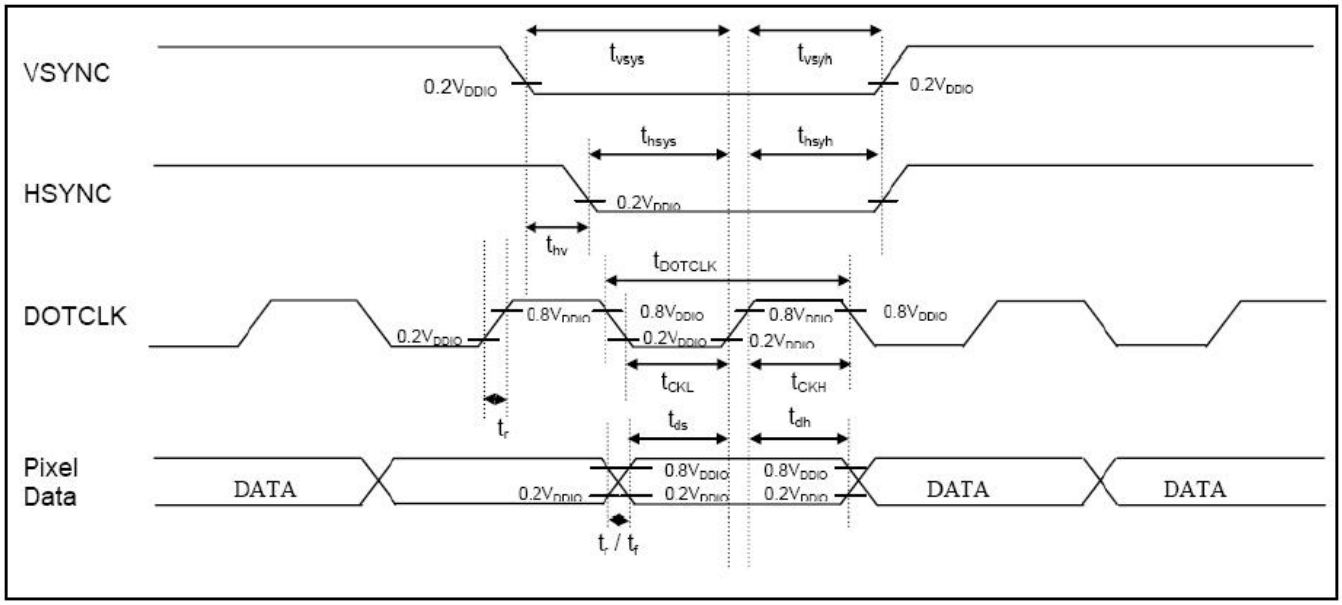
2-4-4 RGB Timing Characteristics

(T_A = -40 to 85°C, V_{DDIO} = 1.4V to 3.6V)

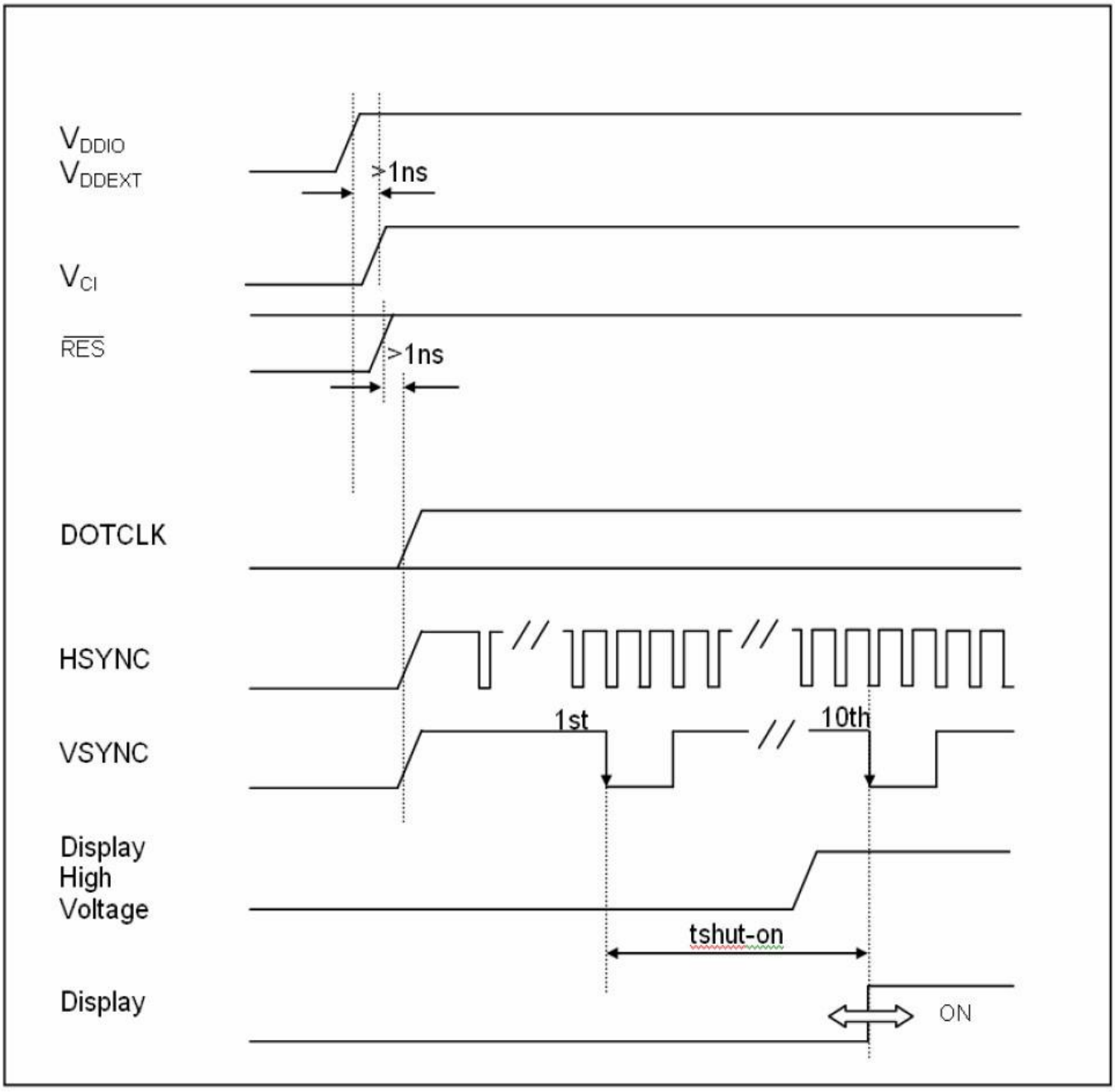
Symbol	Parameter	Min	Typ	Max	Unit
f_{DOTCLK}	DOTCLK Frequency (70Hz frame rate)	1	5.5	8.2	MHz
t_{DOTCLK}	DOTCLK Period	122	182	1000	us
t_{VSYS}	Vertical Sync Setup Time	20	-	-	ns
t_{VSYH}	Vertical Sync Hold Time	20	-	-	ns
t_{HSYS}	Horizontal Sync Setup Time	20	-	-	ns
t_{HSYH}	Horizontal Sync Hold Time	20	-	-	ns
t_{HV}	Phase difference of Sync Signal Falling Edge	0	-	320	t_{DOTCLK}
t_{CLK}	DOTCLK Low Period	61	-	-	ns
t_{CKH}	DOTCLK High Period	61	-	-	ns
t_{DS}	Data Setup Time	25	-	-	ns
t_{DH}	Data hold Time	25	-	-	ns
t_{RES}	Reset pulse width	8			ns

Note: External clock source must be provided to DOTCLK pin of SSD2119. The driver will not operate in absence of the clocking signal.

RGB Timing Characteristics

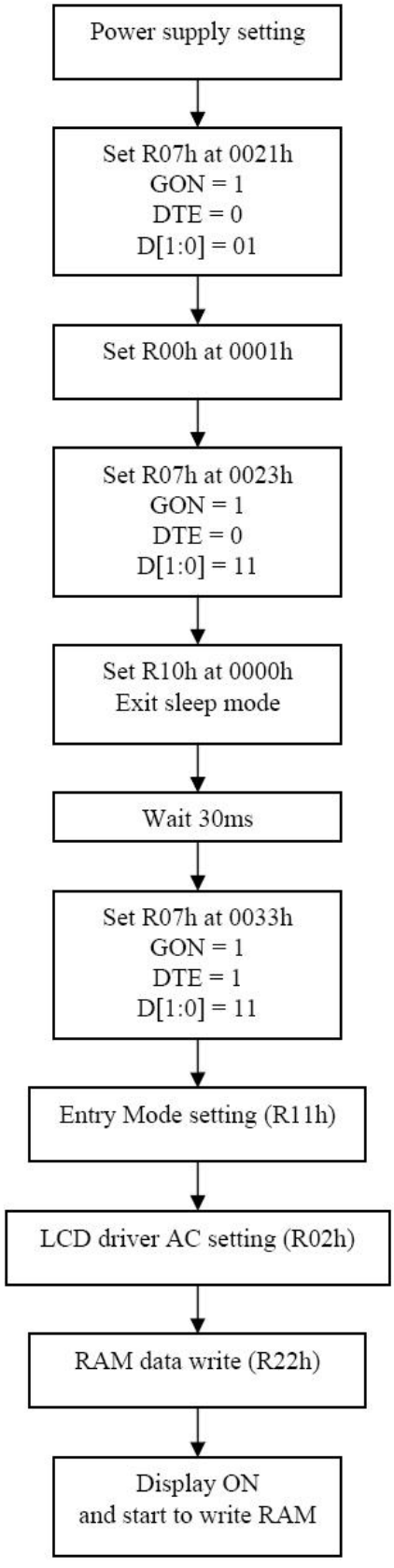


2-4-5 Power Up Sequence

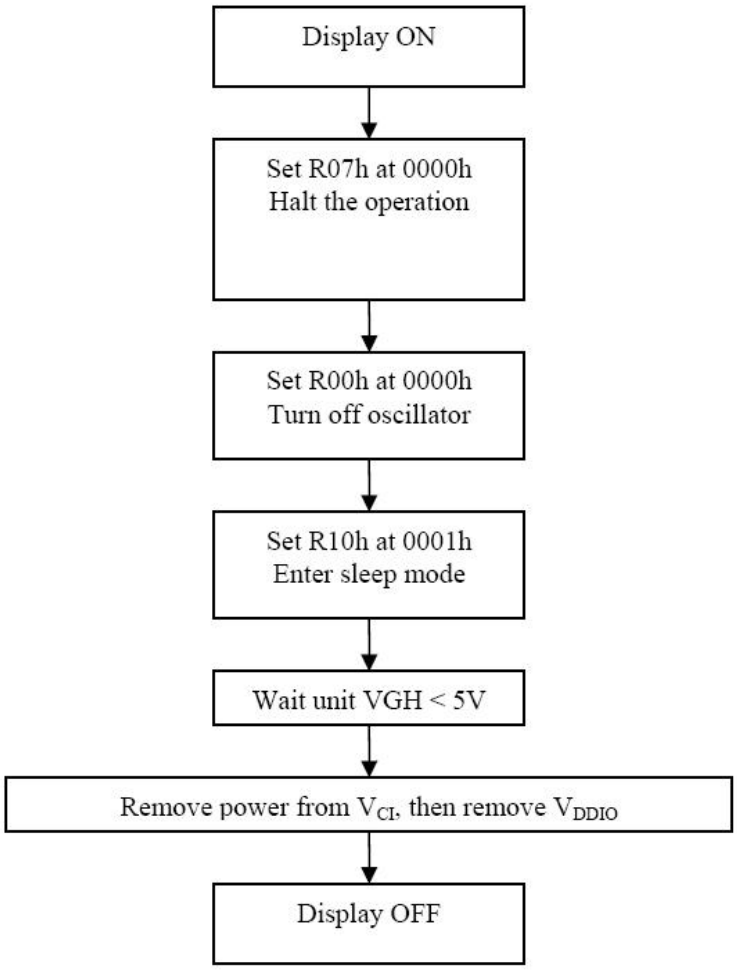


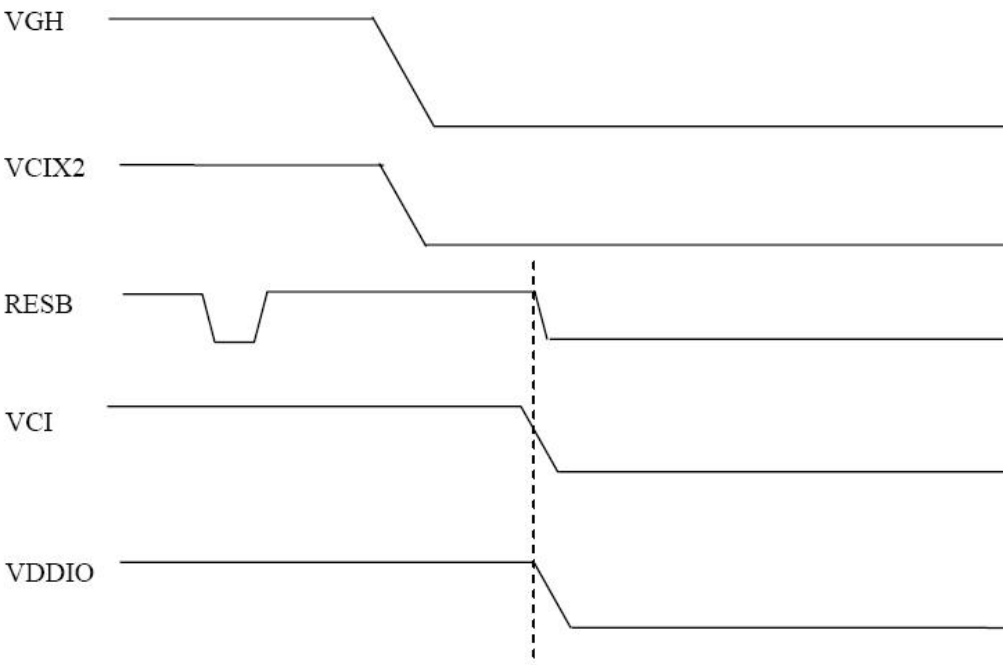
2-5 DISPLAY SETTING SEQUENCE

2-5-1 Display ON Sequence



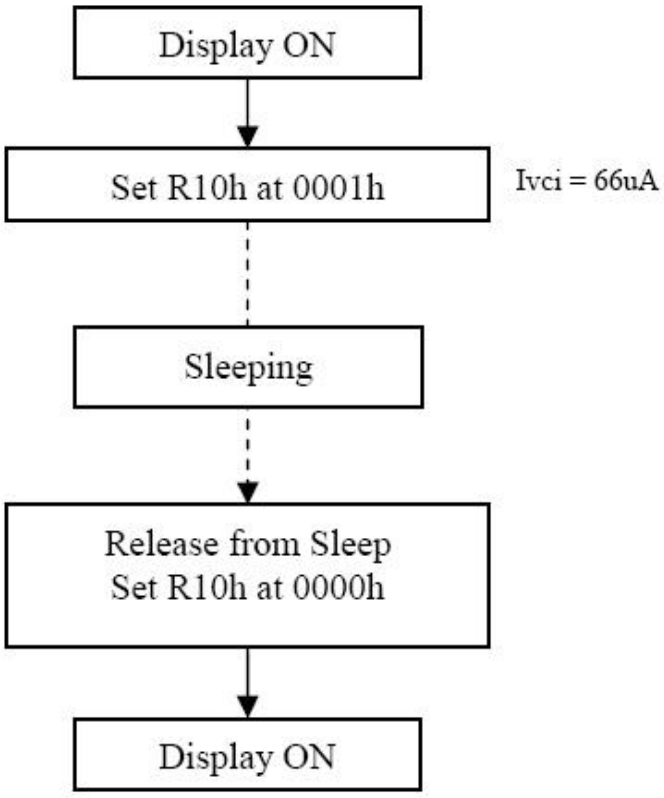
2-5-2 Display OFF Sequence





Note:
1. VDDIO should be the last to fall, or VCI/VDDIO could be power off at the same time
2. If OTP is active in the application, the OTP programming voltage should be turned off and cap

2-5-3 Sleep Mode Display Sequence



3. OPTICAL CHARACTERISTICS

3.1 CHARACTERISTICS

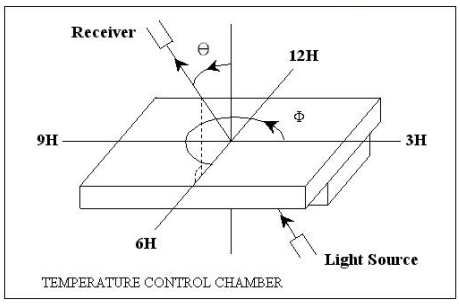
Electrical and Optical Characteristics

No.	Item			symbol / temp.		Min.	Typ.	Max.	Unit	Note
1	Response Time			Tr+Tf	θ=Φ=0°	-	25	-	ms	2
2	Viewing Angle	Hor.	Cr>=10	θ_{2+}	Φ=0°	60	70	-	degree	3
				θ_{2-}	Φ=180°	60	70	-		
		Ver.		θ_{1+}	Φ=270°	60	70	-		
				θ_{1-}	Φ=90°	45	60	-		
3	Contrast Ratio			Cr	25 °C	150	200		-	4
4	Red x-code			Rx	25 °C	0.573	0.623	0.673	-	5
	Red y-code			Ry		0.304	0.354	0.404		
	Green x-code			Gx		0.332	0.382	0.432		
	Green y-code			Gy		0.538	0.588	0.638		
	Blue x-code			Bx		0.090	0.140	0.190		
	Blue y-code			By		0.046	0.096	0.146		
	White x-code			Wx		0.288	0.338	0.388		
	White y-code			Wy		0.309	0.359	0.409		
	Brightness			Y		450	500	-	cd/m^2	
5	Brightness Uniformity				25 °C	80	-	-	%	6

3.2 DEFINITION OF OPTICAL CHARACTERISTICS

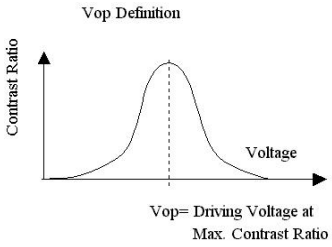
Measurement condition :

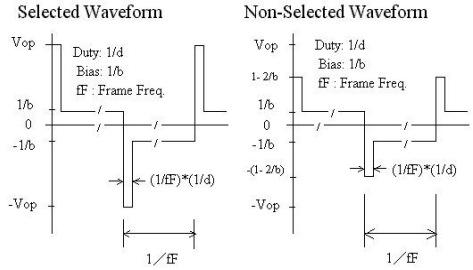
Transmissive and Transflective type



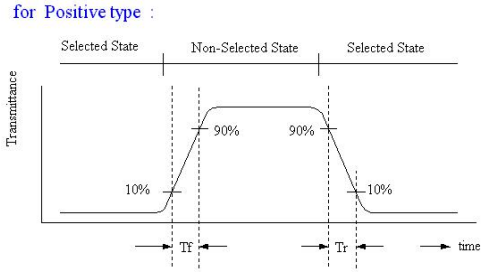
PHOTAL LCD-5000

[Note 1] Definition of LCD Driving Vop and Waveform :

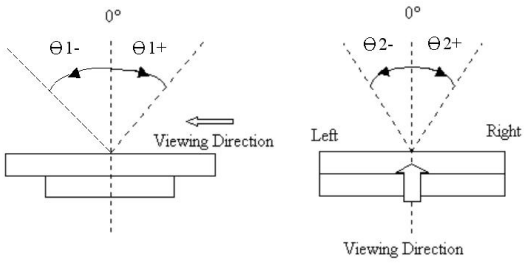




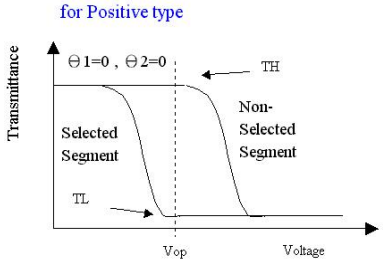
[Note 2] Definition of Response Time



[Note 3] Definition of Viewing Angle :

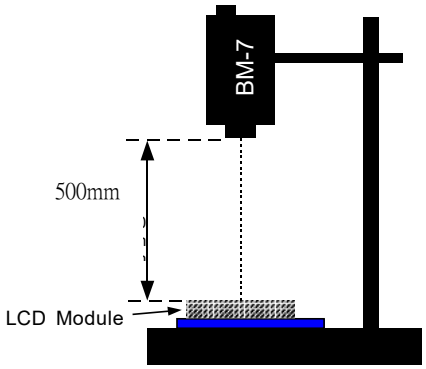


[Note 4] Definition of Contrast Ratio :

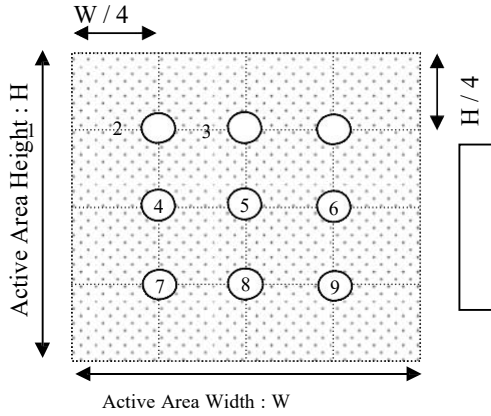


$$\text{Contrast Ratio} = \frac{TH}{TL}$$

[Note 5] Definition of measurement of Color Chromaticity and Brightness

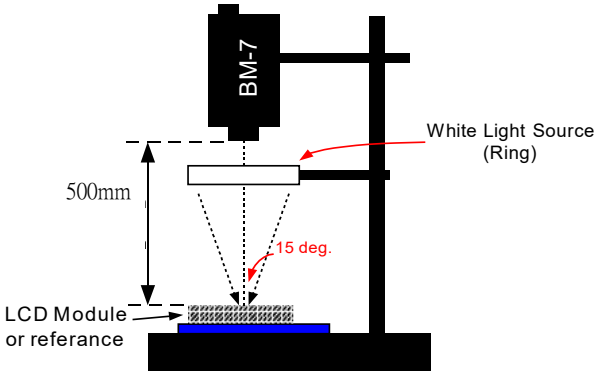


[Note 6] Definition of Brightness Uniformity



$$\text{Brightness Uniformity} = \frac{\text{Minimum Brightness of Point 1~9}}{\text{Maximum Brightness of Point 1~9}}$$

[Note 7] Definition of Measurement of Reflectance



4. RELIABILITY :

Item No	Items	Condition	Note
1	High temperature operating	70˚C, 200 hours	1
2	Low temperature operating	-20˚C, 200 hours	1
3	High temperature storage	80˚C, 200 hours	1
4	Low temperature storage	-40˚C, 120 hours	1
5	High temperature & humidity	60˚C, 90%RH, 100 hours	2
6	Thermal Shock storage	-30˚C, 30min.<=> 80˚C, 30min. 10 Cycles	1
7	Vibration test	10 => 55 =>10 => 55 => 10 Hz , within 1 minute Amplitude : 1.5mm. 15 minutes for each Direction (X,Y,Z)	
8	Drop test	Packed, 100CM free fall, 6 sides, 1 corner, 3edges	
9	Life time	50,000 hours 25˚C, 60%RH, Specification condition driving	

Note 1: The product move into the room temperature for at least 2 hours with no condensation.
Note 2: The product move into the room temperature for at least 24 hours with no condensation.
Note 3: Please change the display picture (autorun) during operating mode. Avoid displaying static images to avoid image sticking , and the image sticking is accelerated by temperature.

* One single product test for only one item.
* Judgment after test: keep in room temperature for more than 2 hours.
- Current consumption < 2 times of initial value.
- Contrast > 1/2 initial value.
- Function: work normally.

5. PRODUCT HANDLING AND APPLICATION

□ PRECAUTION FOR HANDLING LCM

- The LCD module contains a C-MOS LSI. People who operate the LCM should wear ESD protection eguipement to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take LCM from its packaging bag until it is assembled.
- Peel off the LCM protective film slowly since static electricity may be generated.
- Pay attention to the humidity of the work shop, 50~60%RH is satisfactory.
- Use a non-leak iron for soldering LCM.
- Do not touch the display surface or connection terminals area with bare hands. Smudges on the display surface reduce the insulation between terminals.
- Cautions for soldering to LCM:

  Condition for soldering I/O terminals:
  Temperature at iron tip: 350℃±15℃.
  Soldering time: 3~4sec./ terminals.
  Type of solder: Eutectic solder(rosin flux filled).

□ **PRECAUTION IN USE OF LCD**

- Do not contact or scratch the front surface and the contact pads of a LCD panel with hard materials such as metal or glass or with one's nail.
- To clean the surface , wipe it gently with soft cloth dampened by alcohol.
- Do not attempt to wiped off the contact pads.
- Keep LCD panels away from direct sunlight , also avoid them in high-temperature & high humidity environment for a long period.
- Do not drive LCD panels by DC voltage.
- Do not expose LCD panels to organic solvent.
- Liquid in LCD is hazardous substance. In case a contact with liquid crystal material is occured, be sure to immediately wash such material away by soap and water.
- The polarizer is easily damaged and should be handle with special care. Don't press or rub it with hard objects.

□ PRECAUTION FOR STORING AND USE OF LCM

- To avoid degradation of the device , do not store the module under the conditions of direct sunlight , high temperature or high humidity . Keep the module in bags designed to prevent static electricity charging under low temperature / normal humidity conditions(avoid high temperature / high humidity and low temperature below 0℃)
- Never use the LCD , LCM under 45 Hz , the liquid crystal will decomposition and cause permently damage on display !!

□ USING ON MEDICAL CARE , SAFETY OR HAZARDOUS APPLICATION OR SYSTEM

- For the application in medical care, safety and hazardous prodcuts or systems, an authorization from URT is required. ACROWISE will not responsible for any damage or loss which caused by the products without any authorization given by ACROWISE.
- This product is not allowed to be designed and used for military application and/or purpose.
- The delivery of this product to the countries and/or regions where the embargoes are imposed by U.N. is prohibited.
- The application and delivery of this product must comply with Startegic High-Tech Commodities (SHTC) export control and the sales to the embargoed and/or sanctioned countries or regions are strictly prohibited.

6. INSPECTION STANDARD

6.1. QUALITY

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

6.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM U.R.T. TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10 ℃ ~ 40 ℃ ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

6.1.2. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION, A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (SAME AS MIL-STD-105E) , LEVEL Ⅱ SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %
TOTAL	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

6.1.3. WARRANTY POLICY

U.R.T. WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. U.R.T. WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCT WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF U.R.T.

6.2. CHECKING CONDITION

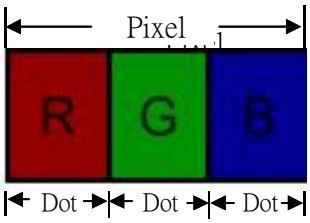
6.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA FROM VIEWING DIRECTION.

6.2.2. CHECKER SHALL SEE OVER 300±25 mm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

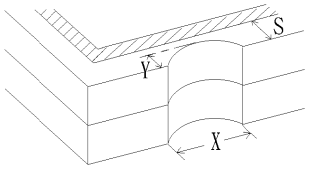
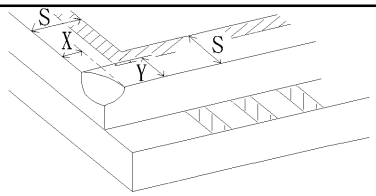
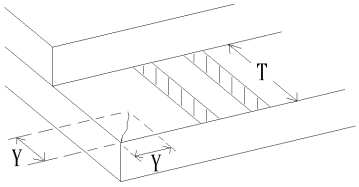
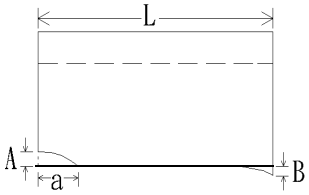
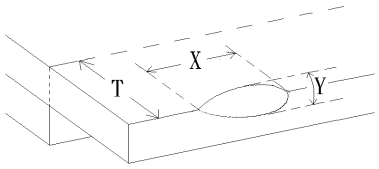
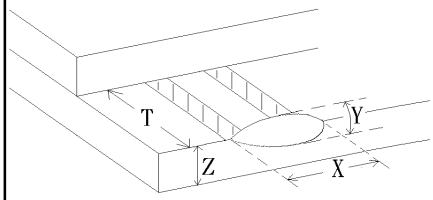
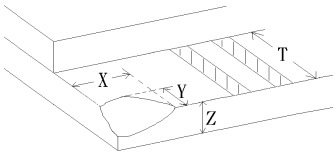
6.3. INSPECTION PLAN

CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....REJECTED QUANTITY SHORT OR OVER.....REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREA ……..REJECTED	Minor
	6. BLEMISH、BLACK SPOT、 WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	7. BLEMISH、BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD.....REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST、VOP、 CHROMATICITY … ETC)	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT、LINE、CHARACTER ....REJECTED	Critical
	12.SHORT CIRCUIT、 WRONG PATTERN DISPLAY	NON DISPLAY、WRONG PATTERN DISPLAY、CURRENT CONSUMPTION OUT OF SPECIFICATION..... REJECTED	Critical
	13. PIN HOLE、PATTERN DEFORMITY	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

6.4. STANDARD OF VISUAL INSPECTION

<table>
<tr><th>NO.</th><th>CLASS</th><th>ITEM</th><th>JUDGEMENT</th></tr>
<tr><td>6.4.1</td><td>MINOR</td><td>BLACK AND WHITE SPOT
FOREIGN MATERIEL
DUST IN THE CELL
BLEMISH
SCRATCH</td><td>(A) ROUND TYPE: unit : mm.
<table>
<tr><th>DIAMETER (mm.)</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>Φ ≦ 0.1</td><td>DISREGARD</td></tr>
<tr><td>0.1 < Φ ≦ 0.3</td><td>3(Distance>5.0mm)</td></tr>
<tr><td>0.25 < Φ</td><td>0</td></tr>
</table>
NOTE: Φ=(LENGTH+WIDTH)/2
(B) LINEAR TYPE: unit : mm.
<table>
<tr><th>LENGTH</th><th>WIDTH</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>------</td><td>W ≦0.03</td><td>DISREGARD</td></tr>
<tr><td>L ≦5.0</td><td>0.03 < W ≦0.07</td><td>3(Distance>5.0mm)</td></tr>
<tr><td>------</td><td>0.07< W</td><td>FOLLOW ROUND TYPE</td></tr>
</table></td></tr>
<tr><td>6.4.2</td><td>MINOR</td><td>BUBBLE IN POLARIZER
DENT ON POLARIZER</td><td>unit : mm.
<table>
<tr><th>DIAMETER</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>Φ ≦0.2</td><td>DISREGARD</td></tr>
<tr><td>0.2 < Φ ≦ 0.5</td><td>2(Distance>5.0mm)</td></tr>
<tr><td>0.5 < Φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>6.4.3</td><td>MINOR</td><td>Dot Defect</td><td>
<table>
<tr><th>Items</th><th>ACC. Q'TY</th></tr>
<tr><td>Bright dot</td><td>N≦4(Distance>5.0mm)</td></tr>
<tr><td>Dark dot</td><td>N≦4(Distance>5.0mm)</td></tr>
</table>
Pixel Define :
 

Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.
Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.
Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.</td></tr>
</table>

No.	Class	Item	Judgment
6.4.4	Minor	LCD glass chipping.	 Y>S Reject
6.4.5	Minor	LCD glass chipping.	 X or Y>S Reject
6.4.6	Major	LCD glass crack.	 Y>(1/2) T Reject
6.4.7	Major	LCD glass scribe defect.	 1. a>L/3, A>1.5mm Reject 2. B : According to dimension
6.4.8	Minor	LCD glass chipping. (on the terminal area)	 Φ = (x+y)/2>2.5mm Reject
6.4.9	Minor	LCD glass chipping. (on the terminal surface)	 Y>(1/3)T Reject
6.4.10	Minor	LCD glass chipping.	 Y>T Reject