4.26inch e-Paper (G)

User Manual

Revision History

Version	Content	Date	Page
1.0	New creation	2026/04/15	All

CONTENTS

1. OVERVIEW

The display is a reflective electrophoretic display module on an active matrix TFT substrate. The diagonal length of the active area is 4.26" and contains 800x480 pixels. The panel is capable of displaying 2-bit black, white, red and yellow images depending on the associated lookup table used. The circuitry on the panel includes an integrated gate and source driver, timing controller, oscillator, DC-DC boost circuit, and memory to store the frame buffer and lookup tables, and additional circuitry to control VCOM and border settings.

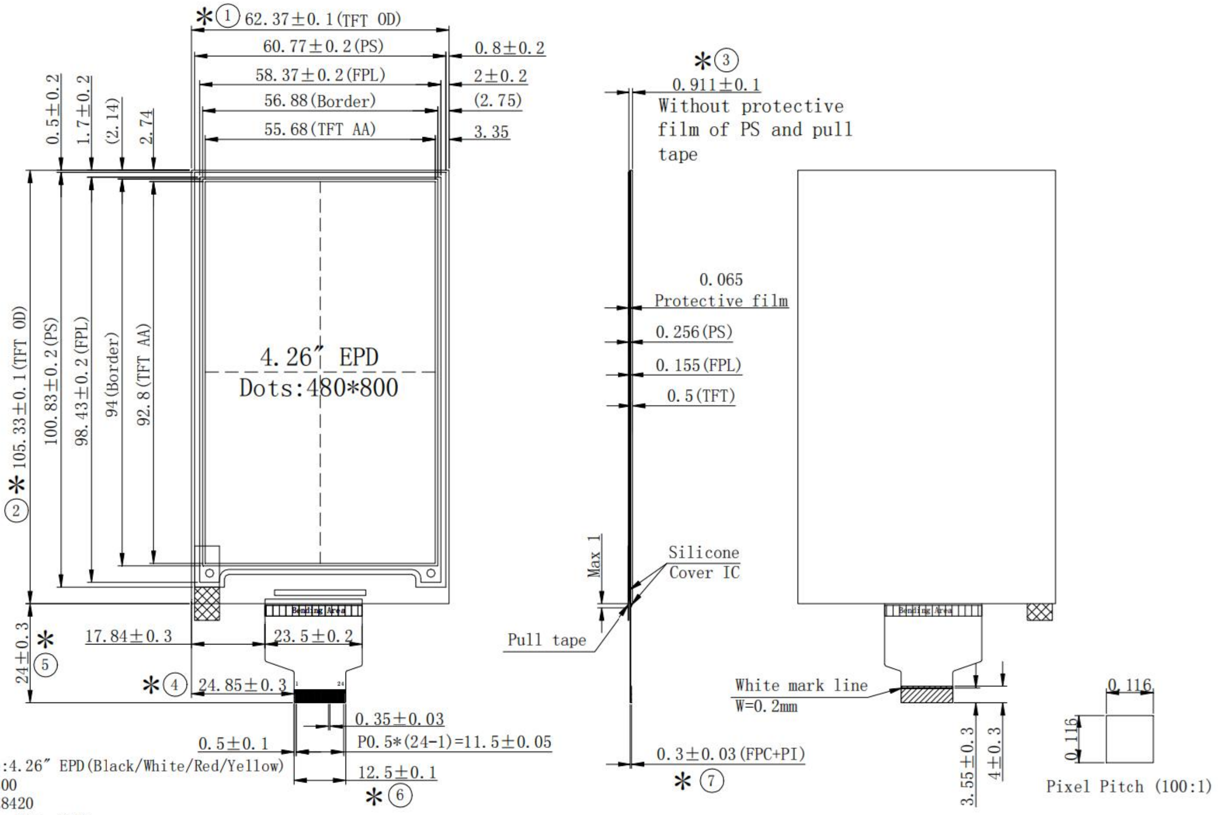
2. FEATURES

- ✧ Ultra-low power consumption
- ✧ Ultra-wide viewing angle
- ✧ On-chip display RAM
- ✧ Interface: 4-Wire SPI or 3-Wire SPI
- ✧ Wide range of operating temperature: 0℃ to 40℃
- ✧ Wide range of storage temperature: -25℃ to 60℃
- ✧ High reflectance and contrast TFT electrophoretic

3. MECHANICAL SPECIFICATIONS

No.	Item	Specifications	Unit
1	Dot Matrix	800(H)×480(V)	G*S
2	Screen Size	4.26	inch
3	Active Area	92.8(H)×55.68(V)	mm^2
4	Pixel Pitch	0.116×0.116	mm^2
5	Pixels Per Inch	219	-
6	TFT Area	105.33(H)×62.37(V)	mm^2
7	Outline Dimension	129.33(H)×62.37(V)×0.911(D)	mm^3
8	Pixel Configuration	Square	-
9	Driver IC	SSD2677	-
10	Module Weight	12.31±10%	g

4. MECHANICAL DRAWING OF EPD MODULE



Specification
1. Display Type:4.26″ EPD(Black/White/Red/Yellow)
2. Format:480*800
3. Driver IC:SE8420
4. Operate temp: 0℃～40℃
Storage temp: -25℃～60℃
5. Dimensions denoted with * are the key control dimensions, with Ⓧ are the first sample inspection dimensions.
6. General Tolerance:±0.2
7. HSF Compliant

Pin Assignment

NO.	SYMBOL
1	NC
2	GDR
3	RESE
4	NC
5	VDHR
6	TSCL
7	TSDA
8	BS
9	BUSY_N
10	RST_N
11	DC
12	CS-N
13	CLK
14	DATA
15	VDDIO
16	VDD
17	GND
18	VDDD
19	VPP
20	VDH(VSH)
21	VGH
22	VDL(VSL)
23	VGL
24	VCOM

5. PIN ASSIGNMENT

No.	Name	Description
1	NC	No Connection
2	GDR	This pin is N-Channel MOSFET gate drive control pin
3	RESE	Current Sense Input for the control loop
4	NC	No Connection
5	VDHR	This pin is Positive Source driving voltage, VSH2 connect a stabilizing capacitor between VSH2 and VSS in the application circuit
6	TSCL	This pin is I2C Interface to digital temperature sensor Clock pin
7	TSDA	This pin is I2C Interface to digital temperature sensor Data pin
8	BS	This pin is for selecting 3-wire(H active) or 4-wire(L active) SPI interface
9	BUSY_N	This pin is Busy state output pin. When Busy is High, the operation of the chip should not be interrupted, and command should not be sent. For example, The chip would output Busy pin as High when -Outputting display waveform; or -Programming with OTP -Communicating with digital temperature sensor In the cascade mode, the BUSY pin of the slave chip should be left open
10	RST_N	This pin is reset signal input (Active Low)
11	DC	This pin is Data/Command control pin connecting to the MCU
12	CS_N	This pin is the chip select input connecting to the MCU
13	CLK	This pin is serial clock pin for interface
14	DATA	This pin is serial data pin for interface
15	VDDIO	Power input pin for the Interface. Connect to VCI in the application circuit
16	VDD	Core logic power pin. VDD can be regulated internally from VCI. A capacitor should be connected between VDD and VSS under all circumstances
17	GND	Ground
18	VDDD	Power input pin for the chip
19	VPP	Power Supply for OTP Programming
20	VDH(VSH)	This pin is Positive Source driving voltage, VSH1 connect a stabilizing capacitor between VSH1 and VSS in the application circuit
21	VGH	This pin is Positive Gate driving voltage. Connect a stabilizing capacitor between VGH and VSS in the application circuit
22	VDL(VSL)	This pin is Negative Source driving voltage. Connect a stabilizing capacitor between VSL and VSS in the application circuit
23	VGL	This pin is Negative Gate driving voltage. Connect a stabilizing capacitor between VGL and VSS in the application circuit
24	VCOM	This pin is VCOM driving voltage. Connect a stabilizing capacitor between VCOM and VSS in the application circuit

6. ELECTRICAL CHARACTERISTICS

6.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit	Remark
Logic supply voltage	V_{DD}	-0.5	+4.0	V	-
I/O supply voltage	V_{DDIO}	-0.5	+4.0	V	-
Logic Input voltage	V_{IN}	-0.5	V_{DDIO}+0.5	V	-
Operating Temp	T_{OP}	0	+40	℃	-
Storage Temp	T_{STG}	-25	+60	℃	-

Notes:

6-1-1: All of the voltages are on the basis of “VSS = 0V”.

6-1-2: Maximum ratings are those values beyond which damages to the device may occur. Functional operation should be restricted to the limits in the Panel DC Characteristics tables.

6.2 DC CHARACTERISTICS

The following specifications apply for: V_{SS}=0V, V_{CI}=3.3V, T_{OPR} =23ºC.

Parameter	Symbol	Condition	Applica-ble pin	Min.	Typ.	Max.	Unit
Supply Voltage	VDD	-	VDD	2.3	3.0	3.6	V
IO supply voltage	VDDIO	-	VDDIO	2.3	3.0	3.6	V
High level input voltage	V_{IH}	SDA SCL, CSB, D/C, RES, BS1	-	$0.8V_{VDDIO}$	-	-	V
Low level input voltage	V_{IL}	SDA SCL, CSB, D/C, RES, BS1	-	-	-	$0.2V_{VDDIO}$	V
High level output voltage	V_{OH}	SDA, BUSY	-	$0.8V_{VDDIO}$	-	-	V
Low level output voltage	V_{OL}	SDA, BUSY	-	-	-	$0.2V_{VDDIO}$	V
Typical power panel	P_{TYP}	-	-	-	39	-	mW
Standby power panel	P_{STPY}	-	-	-	0.006	0.018	mW
Typical operating current (white state)	I_{OPR}_V_{CI}	-	-	-	13	-	mA
Image update time	-	23℃	-	-	20	-	sec
Sleep mode current	I_{SLP}_V_{CI}	Ta=23℃ V_{DDIO}=V_{DD}=3V V_{GH}=20,V_{GL}=-20 V_{DH1}=15,V_{DL}=-	VCI	-	40	70	μA
Digital deep sleep current	I_{VDD}	Pattern no update, OSC off, V_{DD2}/V_{DD3}=3.0V, Ta=23 ℃	VCI		2	6	μA

Note: The power input must be kept in a stable value; ripple and noise are not allowed.

6.3 PANEL DC CHARACTERISTICS (DRIVER IC INTERNAL REGULATORS)

The following specifications apply for: V_{SS}=0V, V_{CI}=3.3V, T_{OPR} =23ºC.

Parameter	**Symbol**	**Condition**	**Applicable pin**	**Min.**	**Typ.**	**Max.**	**Unit**
VCOM output voltage	V_{COM}	-	V_{COM}	-	-2.0	-	V
Positive Source output voltage	V_{SH}	-	S_0~S_{799}	-	+15	-	V
Negative Source output voltage	V_{SL}	-	S_0~S_{799}	-	-15	-	V
Positive gate output voltage	V_{GH}	-	G_0~G_{479}	-	+20	-	V
Negative gate output voltage	V_{GL}	-	G_0~G_{479}	-	-20	-	V

6.4 OPTICAL SPECIFICATIONS

Measurements are made with that the illumination is under an angle of 45 degrees, the detection is perpendicular unless otherwise specified.

Symbol	**Parameter**	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**	**Notes**
R	White Reflectivity	White	28	-	-	%	6-4-1
CR	Contrast Ratio	indoor	20	-	-	-	6-4-2
T_{UPDATE}	Image update time	23℃	-	20	-	sec	-
T_{LIFE}	Life	T_{OPR}	-	1000,000 times or 5 years	-	-	-

Notes:

6-4-1: Luminance meter: Eye-One Pro Spectrophotometer.

6-4-2: CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels.

6.5 AC ELECTRICAL CHARACTERISTICS

Serial Peripheral Interface

Table Serial Peripheral Interface Timing Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
t_{CSS}	CSB select setup time	60			ns
t_{SCH}	CSB select hold time	65			ns
t_{SCC}	CSB deselect setup time	25			ns
t_{CHW}	CSB deselect hold time	100			ns
t_{SCYCW}	Serial clock cycle (Write)	50			ns
t_{SHW}	SCL "H" pulse width (Write)	25			ns
t_{SLW}	SCL "L" pulse width (Write)	25			ns
t_{SCYCL}	Serial clock cycle (Read)	400			ns
t_{SHR}	SCL "H" pulse width (Read)	180			ns
t_{SLR}	SCL "L" pulse width (Read)	180			ns
t_{SDS}	Data setup time	30			ns
t_{SDH}	Data hold time	30			ns
t_{DCS}	DC setup time	40			ns
t_{DCH}	DC hold time	40			ns
t_{ACC}	Access time			100	ns
t_{OH}	Output disable time	15			ns

Note: All timings are based on 20% to 80% of VDDIO-GND

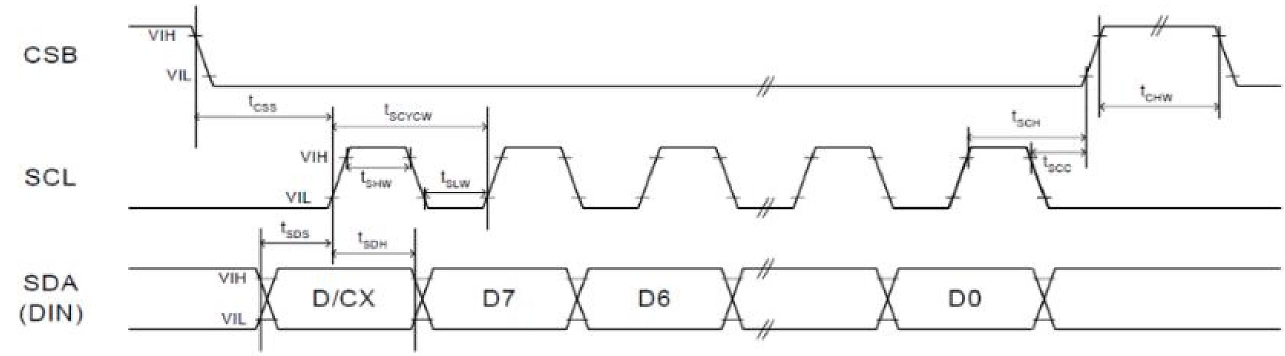


Figure 3-wire SPI characteristics (write mode)

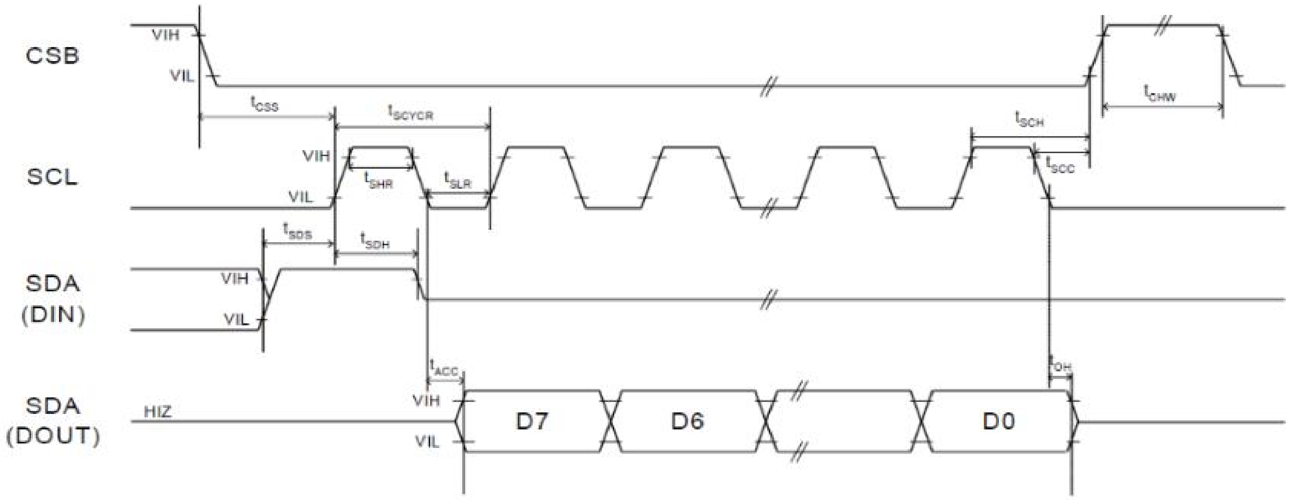


Figure 3-wire SPI characteristics (read mode)

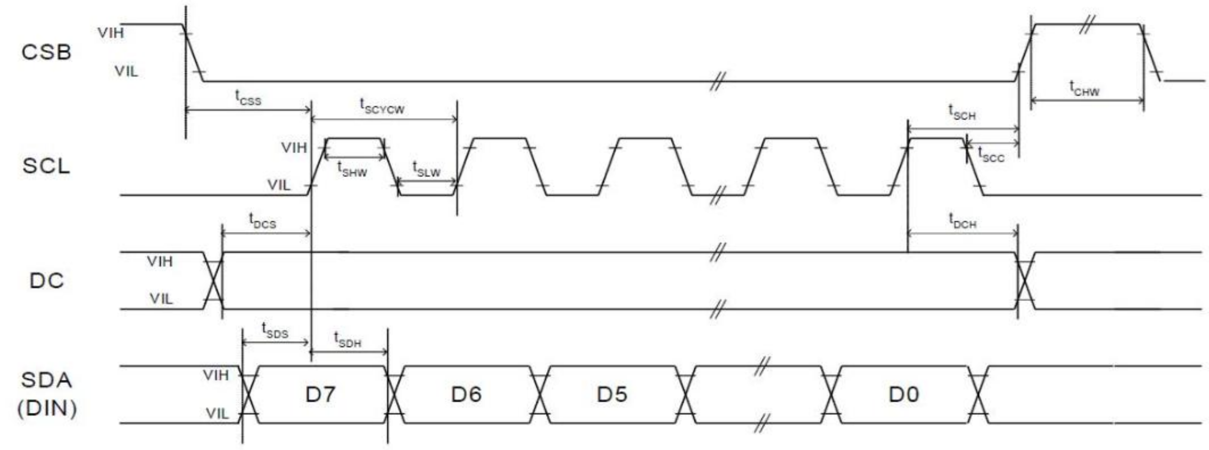


Figure 4-wire SPI characteristics (write mode)

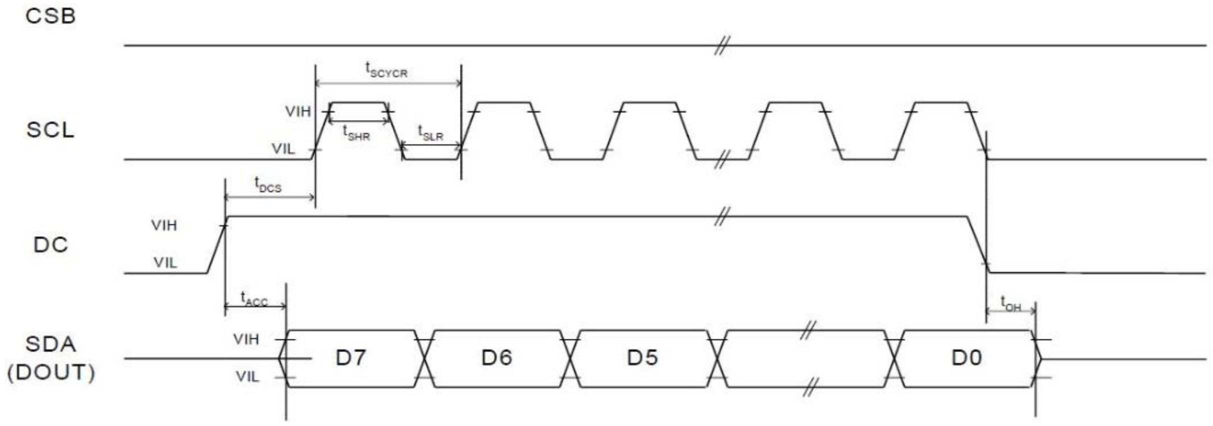
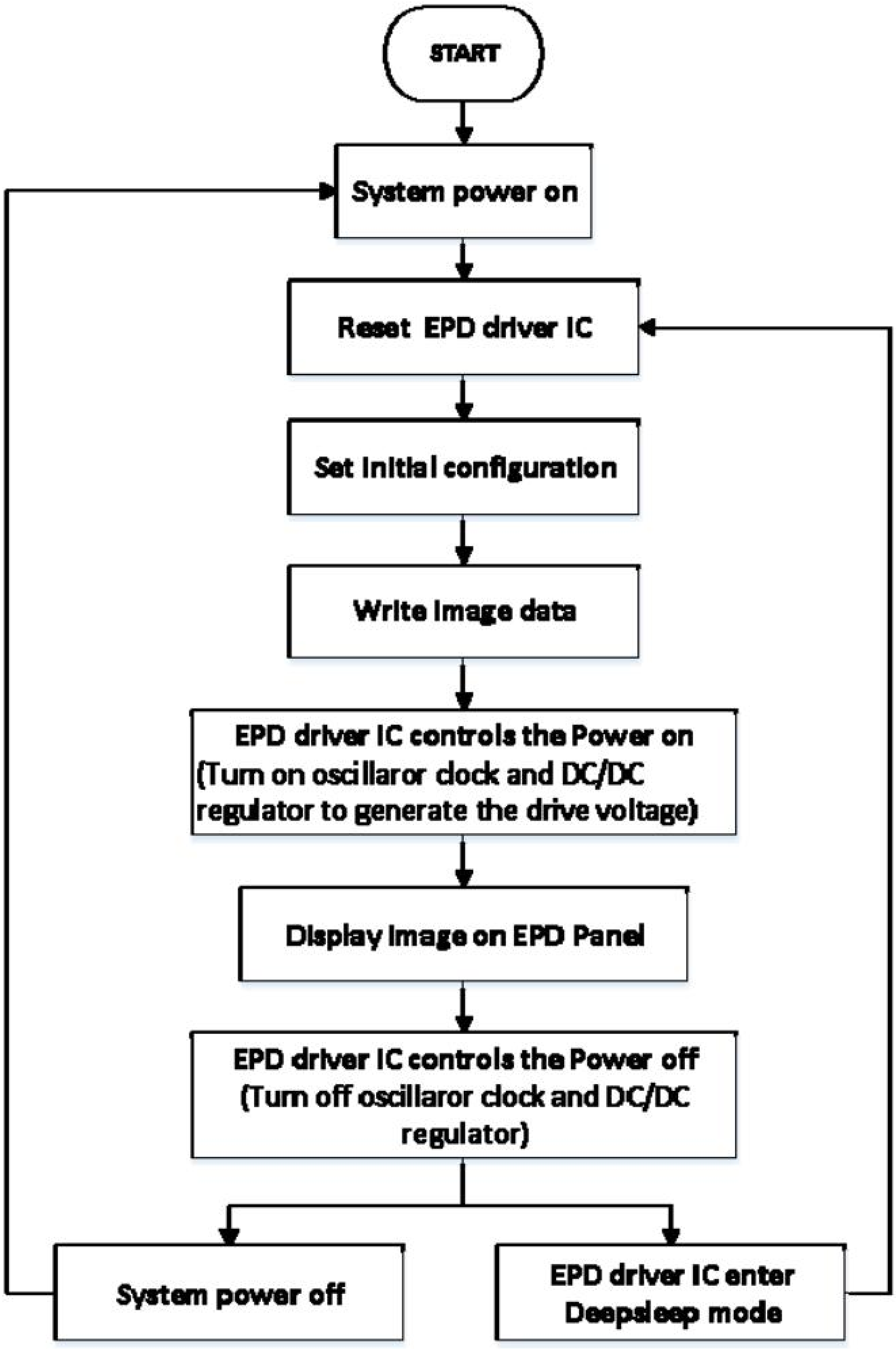


Figure 4-wire SPI characteristics (read mode)

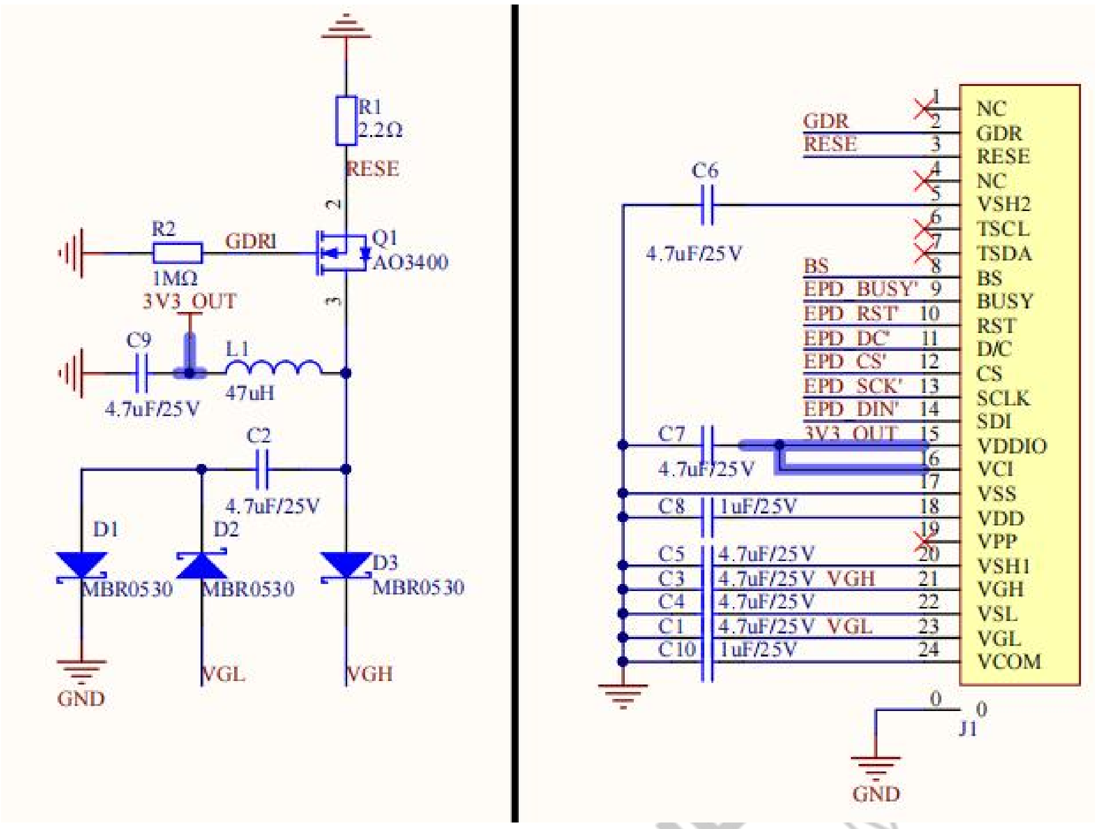
7. FUNCTIONAL SPECIFICATIONS AND APPLICATION CIRCUIT

7.1 POWER ON/POWER OFF SEQUENCE



7.2 TYPICAL APPLICATION CIRCUIT WITH SPI INTERFACE

Schematic of application circuit



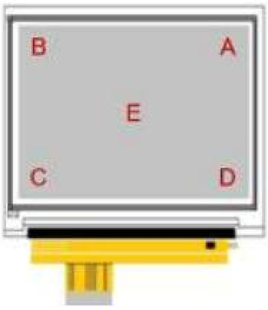
7.3 DISPLAY CONTROL INSTRUCTIONS

Refer to SSD2677 IC Specification.

8. RELIABILITY

No.	Test Item	Test Condition	Quantity
1	Low-Temperature Storage	T = -25℃, White screen state, for 240h	5pcs
2	Low-Temperature Operation	T = 0°C, 240h; Put the product into the experimental procedure, run it in the temperature box, and check it every 24 hours	5pcs
3	High-Temperature Operation	T = 40°C, RH = 35%, 240h; Put the product into the experimental procedure, run it in the temperature box, and check it every 24 hours	5pcs
4	High-Temperature Storage	T=60ºC，RH=35%; White screen state, for 240h	5pcs
5	High-Temperature, High-Humidity	T=40ºC，RH=90%; White screen state, for 240h	5pcs
6	Temperature Cycle	1 cycle:[-25°C 30min]→[+60 °C 30 min]; 100 cycles	5pcs
7	High-Temperature/ High-humidity Storage	T=50ºC，RH=90%; White screen state, for 240h	5pcs
8	UV Exposure Resistance	765W/m² for 168hrs, T = 40°C, RH=35%	5pcs
9	ESD Contact discharge	Air±8KV,Contact±6KV, Test 5 points; Each point discharge 10 times. Time interval is not less than 1 second	5pcs

ESD test locations



Test and measurement conditions:

After the end of the experiment, the sample was taken out of the temperature chamber, and stood at room temperature for 1h, and then the sample was inspected for appearance, function and optical inspection.

Criteria for qualification (pass the test if all qualified) :

(1) The product can be normal refreshed.
(2) There are no new point defects or line defects in the display screen.
(3) No discoloration, blurred handwriting and barcode can be read on the complex screen.

9. OUTGOING QUALITY CONTROL SPECIFICATIONS

9.1 SAMPLING METHOD

(1) GB/T 2828.1, inspection level Ⅱ, normal inspection, single sample inspection
(2) AQL: Major 0.4; Minor 0.65

9.2 INSPECTION CONDITIONS

The environmental conditions for test and measurement are performed as follows.

Temperature: 23±3℃

Humidity: 55±15%R.H

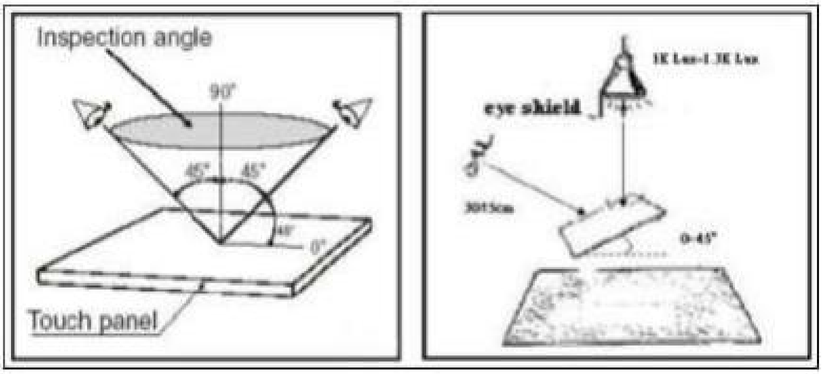
Inspection of illuminance: 800~1500Lux

Inspection time: signal face 5-10s

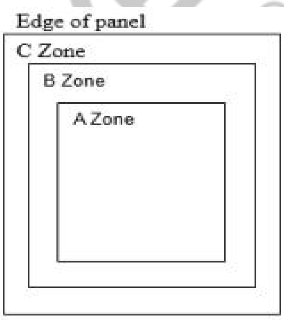
Distance between the Panel & Eyes: 30±10cm

Viewing angle from the vertical in each direction: ±45°

(See the sketch below)



9.3 QUALITY ASSURANCE ZONES



Zone A: Active Area

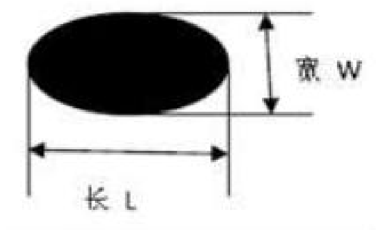
Zone B: Black Frame Area

Zone C: Outside Black Frame Area

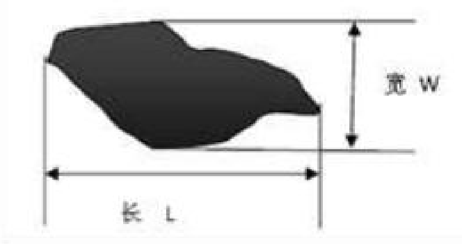
9.4 INSPECTION STANDARDS

Defects Definition of Φ&L&W (Unit: mm)

9.4.1 Dot defects:

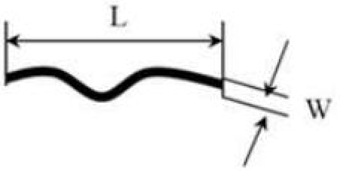


ΦD=Max(L,W)

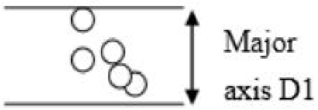


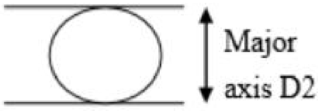
ΦD=Max(L,W)

9.4.2 line defect:

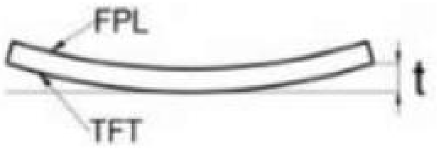


9.4.3 Small bubble aggregation and large bubble definition:



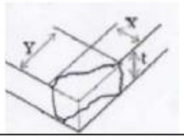


9.4.4 TFT warpage:



10. GENERAL INSPECTION STANDARDS

10.1 APPEARANCE DEFECTS

NO.	ITEM	CRITERIA	Acceptable range	Method	Defect level	Area
1	Spotty (black spots, white spots, foreign bodies, air bubbles, bumps)	D≦0.25mm	Ignore	Film Card	Minor	Zone A
		0.25mm＜D≦0.5 mm, Distance≥5mm	N≦4			
		D>0.5 mm	N=0			
		0.1mm< D≦0.25 mm(Dense point)	N≦3/cm2			
2	POOR LINEAR SHAPE (foreign body, glass scratch)	L≦2mm, W≦0.1mm	Ignore	Film Card	Minor	Zone A
		2mm<L≦8mm, 0.1<W≦0.5mm	N≦4			
		L>8mm, W>0.5mm Note: FPL Lacerations are not allowed	N=0			
	steel pit	Long strip pits are not allowed	N=0	Sight Check	Minor	Zone A
3	Glass Crack	Extensional cracks are not allowed 	N=0	Sight Check	Major	Zone B,C
4	Edge breakage	X≤3mm,Y≤0.5mm, It does not affect the electrode 	N≦2	Sight Check/ Microscope	Minor	Zone C
5	Chip Package Chip Off	X≤2mm，Y≤2mm, It does not affect the electrode(FPC edge) X≤1mm，Y≤1mm, It does not affect the electrode((Not FPC edge) 	N≦2	Sight Check/ Microscope	Minor	Zone C
6	Dirt	Wipe-clean dirt	Ignore	Sight Check	Minor	Zone A,B
7	Silicone	The maximum diameter of a single bubble cannot exceed 2mm	N≤2	Sight Check/ Film card	Minor	Zone C
		Crack is not allowed and there are no visible impurities in the glue of the lead part	N=0			
		The adhesive must completely cover the ACF, lead area and IC and should be applied evenly	N=0			
		No glue leakage, no obvious lack of glue in the lead area	N=0			

NO.	ITEM	CRITERIA	Acceptable range	Method	Defect level	Area
		Glue height exceeds PS surface	N=0			
		FPC Front overflow glue width>0.5mm or Back side overflow glue width>1mm	N=0			
8	Edge Sealing Adhesive	No glue leakage	N=0	Sight Check/ Film card	Major	Zone C
		The height of sealant exceeds PS surface	N=0		Minor	
		The edge sealing adhesive shall not leak the TFT glass substrate	N=0			
		Judging Ok of water-blocking area ≥0.7 mm of PS edge sealant	N=0		Minor	
9	Protective film	Foreign body in protective film	N=0	Sight Check	Minor	Zone A
		The protective film punctures and injures FPL	N=0			
10	Pull Tape	Attachment position is wrong Cannot tear up the protective film	N=0	Sight Check	Minor	Zone C
11	FPC	FPC has break, scratch, gold finger stripping or oxidation, dirty, residual glue	N=0	Sight Check	Major	Zone C
12	Glass edge bulge	X≤3mm，Y≤0.3mm	N≦1	Sight Check	Minor	Zone C
13	Warping	t＞1mm （3.5inch below） t＞3mm （3.5inch above）	N=0	Plug Gage	Minor	Zone C
14	Chromatism	Color difference in silver paste area (Not in Zone A)	Ignore	Sight Check	Minor	Zone C
		FPL Peeling occurs, chromatic aberration occurs	N=0	Sight Check	Major	Zone A,B
		The color difference of side loss of FPL in zone B ≥1/2 width	N=0	Sight Check	Major	Zone A,B
15	Silver pulp point	FPL and TFT substrate conduction, silver point <1.0mm (Both single silver point and double silver point should meet this specification)	N=0	Film card	Major	Zone C
16	Inkjet code	The ink jet printing font is clear, identifiable, and cannot be missing	N=0	Sight Check	Minor	Zone C

10.2 DISPLAYING DEFECTS

NO.	ITEM	CRITERIA	Acceptable range	Method	Defect level	Area
1	Poor DOT SHAPE (black, white, group White)	D≦0.25mm	Ignore	Film Card	Major	Zone A
		0.25mm < D≦0.5mm, Distance≥5mm	N≦4			
		D>0.5mm	N=0			
		0.1mm< D≦0.25 mm(Dense point)	N≦3/cm2			
2	Line defects	White or black lines running through the entire screen under any operation interface 	N=0	Sight Check	Major	Zone A
3	ghost	Ghosts appear only during screen switching	Ignore	Sight Check	Major	Zone A
4	Flash Point	Flash point occurs during screen switching only	Ignore	Sight Check	Major	Zone A
5	Flash Line	Flash line occurs during screen switching only	N=0	Sight Check	Major	Zone A
6	Display screen error	Unable to display a fixed screen correctly	N=0	Sight Check	Major	Zone A
7	Display abnormal	No display, The red matrix darkens, Note fuzzy, bar code can not be scanned,	N=0	Sight Check	Major	Zone A
8	Residual image	Residual Image Inspection (visual, final judgment reference optical specification)	N=0	Sight Check	Major	Zone A
9	Mura Anomaly	White/gray. Mura doesn' t allow it	N=0	Sight Check	Major	Zone A

10.3 IDENTIFICATION AND PACKAGING INSPECTION

NO.	ITEM	CRITERIA	Method	Defect level
1	Package	(1). The products are completely placed in the anti-static tray without overlapping. (2). Products with different models cannot be mixed in one internal packaging bag. (3) There is a desiccant in the packaging bag, with good internal packaging and no expansion of the packaging bag. (4) The Tray model, quantity and way used for packaging meet the requirements of product specifications.	Sight Check	Minor
2	Inner and outer packing	(1) No obvious deformation, damage, dampness or dirt on the packing case; (2) The type, quantity and method of the packing case used shall meet the requirements of the product specification. (3) There is no font or unclear design in the outer packing box.	Sight Check	Minor
3	Labels for inner and outer cases	(1). Any unnecessary marks or marks are not allowed to exist; (2). The label information such as model, specification, quantity, weight, material number, month label and environmental protection label should be clear and correct, which should be in line with product specifications or marked according to customer requirements.	Sight Check	Minor

11. HANDLING, SAFETY, AND ENVIRONMENTAL REQUIREMENTS

WARNING

The display glass may break when it is dropped or bumped on a hard surface. Handle with care.
Should the display break, do not touch the electrophoretic material. In case of contact with electrophoretic material, wash with water and soap.

CAUTION

The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.

Disassembling the display module can cause permanent damage and invalidate the warranty agreements.

Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged. Moreover the display is sensitive to static electricity and other rough environmental conditions.

Data sheet status

Product specification	The data sheet contains final product specifications.

Limiting values

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information

Where application information is given, it is advisory and dose not form part of the specification.

Storage conditions

Under the conditions of temperature 10~30℃ and humidity 30~70%, The storage time was 12 months.