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Product Specifications

Customer	Standard
Description	ePaper Display Series
Model Name	ET071EP01-J
Date	2026/03/20
Revision	1.0

	Design Engineering		
	Approval	Check	Design

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1. Overview

This is a 7.09 ” a-Si, active matrix TFT, Electronic Paper Display (EPD) panel. The panel has such resolution (282dpi) that it is able to easily display fine patterns. Due to its bi-stable nature, the EPD panel requires very little power to update andneeds no power to maintain an image.

2. Feature

Si TFT active matrix Electronic Paper Display

(EPD)Three colors support:

White, Black, Red, Yellow ,Blue, Green

Resolution: 1200×1600

Ultra-low power consumption

Super Wide Viewing Angle - near 180°

Extra thin & light

SPI interface

RoHS compliant

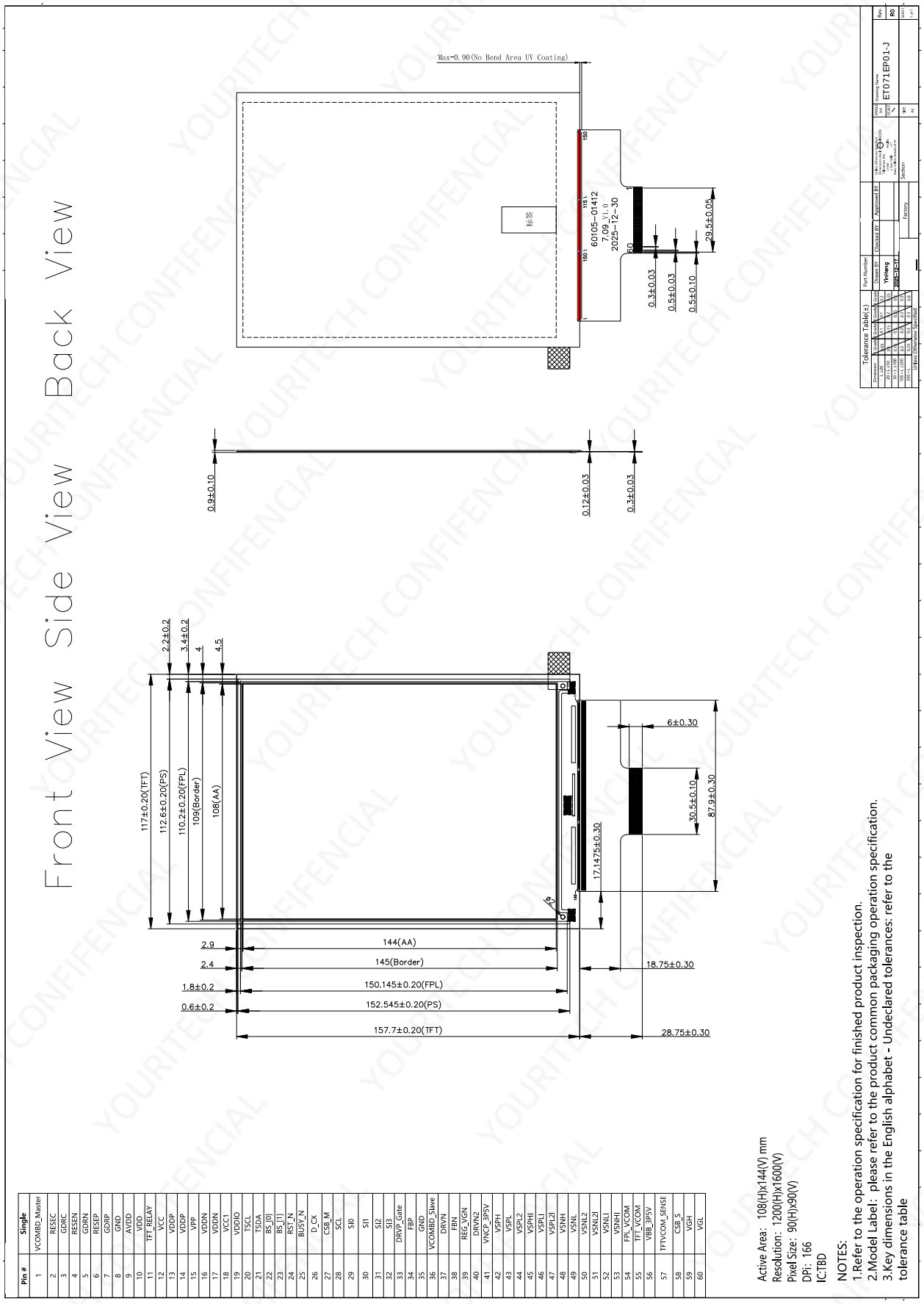
Operation temperature range: 0℃~50℃

3. General Specifications

Item	Specification	Unit	Note
Outline Dimension	117(H) x 157.7(V) x 0.9(T)	mm	(1)
Active Area	108(H) × 144(V)	mm	
Driver Element	a-Si TFT active matrix	-	
FPL	Spectra™ 6	-	
Pixel Number	1200(H)×1600(V)	pixel	
Pixel Pitch	90(H)x90(V)	um	
Pixel Arrangement	Vertical stripe	-	
Display Colors	Black/White/Red/Yellow/Blue/Green	-	
Surface Treatment	Anti-Glare, 3H	-	
COG Driver OTP layout	Follow BOE layout		
EPD driving Waveform	Provided and downloaded by BOE		

Note (1): Not including the FPC.

4. EPD Drawing



Pin #	Single
1	VCOMBD_Master
2	RESIC
3	GDRC
4	RESEN
5	GDRN
6	RESEP
7	GDRP
8	GND
9	AVDD
10	VDD
11	TFT_RELAY
12	VCC
13	VDDP
14	VDDP
15	VPP
16	VDDN
17	VDDN
18	VCC1
19	VDDIO
20	TSCL
21	TSDA
22	BS_[0]
23	BS_[1]
24	RST_N
25	BUSY_N
26	D_CK
27	CSB_M
28	SCL
29	SI0
30	SI1
31	SI2
32	SI3
33	DRVP_Gate
34	FBP
35	GND
36	VCOMBD_Slave
37	DRVN
38	FBN
39	REG_VGN
40	DRVN2
41	VNCP_3P5V
42	VSPH
43	VSPL
44	VSPL2
45	VSPHI
46	VSPLI
47	VSPL2I
48	VSNH
49	VSNL
50	VSNL2
51	VSNL2I
52	VSNLI
53	VSNHI
54	FPL_VCOM
55	TFT_VCOM
56	VBB_3P5V
57	TFTVCOM_SENSE
58	CSB_S
59	VGH
60	VGL

Figure 4.1 EPD Drawing

5. Mechanical Specifications

Item		Min.	Typ.	Max.	Unit	Note
Glass Size	Horizontal(H)	116.8	117	117.2	mm	
	Vertical(V)	157.5	157.7	157.9	mm	
	Thickness(T)	0.8	0.9	1.0	mm	(1)

Mechanical Specification

Note (1): Not including the Masking Film. (2) Weight for reference only.

6. FPC Specification

Item	Pin numbers	Pitch (mm)	Connector	Note
Golden Finger	60	0.5	CON60-0.5mm	

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-25	+60	ºC	(1),(3)
Storage Humidity	H_{ST}	40	70	%RH	(1),(3)
Operating Ambient Temperature	T_{OP}	0	+50	ºC	(1),(2),(3)
Operating Ambient Humidity	H_{OP}	40	70	%RH	(1),(2),(3)

7-1 Absolute Ratings of Environment

Note (1): (a)70 %RH Max. (Ta≦40ºC), 40%RH Min. (Ta≦ 60ºC) where Ta is ambient temperature.(b) No condensation and no frost in absolute ratings of Environment.

(c) Please store in original package without opening.

Note (2): The temperature of panel display surface area should be 10ºC Min. and 40ºC Max. Refresh time depends on operating temperature.

Note (3): Material is Moisture and UV sensitive. The absolute rating operating environments describes the boundary conditions for updating the display while the absolute rating storage environment describe the boundary conditions for a display not updating. While displays are rated to perform according to specification for the warranty period at the absolute specified operating environment, the better the storage condition, the better the E Ink displays will perform. Similar to other moisture and UV sensitive components, we recommend that our displays be stored in temperature and humidity control environments, and whenever possible, under above defined Optimal Storage Condition, away from sunlight, to optimize their performance.

7.2 Reliability Test Item

Item	Test Condition
Low Temperature Storage	-25℃ For 240H
High Temperature/Low Humidity Storage	60℃ 35%RH For 240H
High Temperature/Low Humidity Operation	50℃ / 30%RH For 240H
Low Temperature Operation	0℃ For 240H
High Temperature/High Humidity Operation	40 ℃ / 90%RH For 240H
High Temperature/High Humidity Storage	60 ℃ / 80%RH For 240H
Thermal Shock	1 Cycle:-25℃/30min → 60℃/30min, for 100 Cycles
ESD Gun	Air:+/-4KV，Contact:+/-2KV
Package Drop Test	Height:97cm 1Corner,3Edges&6Faces
Package Random VibrationTest	1.04G, 10Hz ~ 500Hz, Direction：X,Y,Z for 30min

7-2 Reliability Test Item

Note (1): No condensation and no frost during test. End of test, function, mechanical, and optical shall be satisfied.

Note (2): The test result and judgment are based on OTP driving waveform.

Note (3): Stay white pattern for storage and non-operation test.

8. Electrical Characteristics

8.1 Absolute Maximum Ratings of Panel

Parameter	Symbol	Value		Unit	Note
		Min	Max		
Supply Voltage	VDD, VDDIO	-0.5	3.6	V	
Ground	GND	-		-	Connect to Ground

T_a = 25 ± 2 ºC

8.2 Recommended Operation Conditions of Panel

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VDDIO	IO supply voltage		2.4	3.0	3.6	V
VDD	Logic Voltage supply		2.4	3.0	3.6	V
AVDD	Logic Voltage supply		2.4	3.0	3.6	V
VCC	Logic Voltage supply		1.3	1.35	1.4	V
VGH	Positive Gate driving voltage		26	27	28	V
VGL	Negative Gate driving voltage		-21	-20	-19	V
VSPH	Positive source driving voltage 1		-	Adjusted	-	V
VSPH2	Positive source driving voltage 2		-	Adjusted	-	V
VSNH	Negative source driving voltage 1		-	Adjusted	-	V
VSNH2	Negative source driving voltage 2		-	Adjusted	-	V
V_{IL}	Low level input voltage	Digital input pins	GND	-	0.2×VDD	V
V_{IH}	High level input voltage	Digital input pins	0.8×VDD	-	VDD	V
V_{OH}	High level output voltage	Digital output pins, I_{out}= 1 mA, VDD=2.4V	0.8×VDD	-	-	V
V_{OL}	Low level output voltage	Digital output pins, Iout= 1 mA, VDD=2.4V	GND	-	0.2×VDD	V
I_{STB}	stand-by current	Stand-by mode	-	TBD	-	uA
I_{DSLP}	deep sleep current	Deep sleep mode	-	TBD	-	uA

T_a = 25 ± 2 ºC

Note:
The Module operating current data is measured by using Oscilloscope, and extract the Mean value.

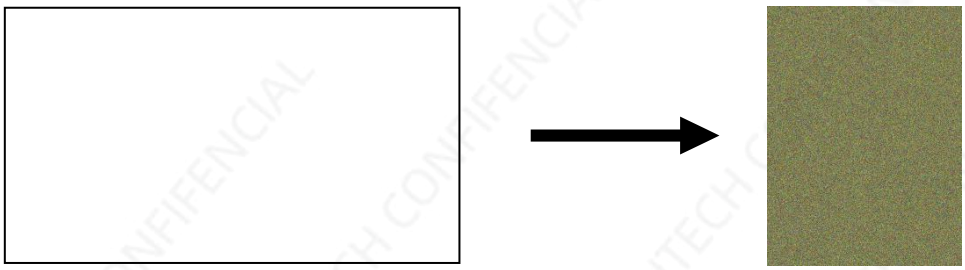
- The typical power consumption is measured using associated 25C waveform with f ollowing pattern transition:from full white pattern to color stripe pattern. (Note 3-1)
- The high loading power consumption is measured using associated 25C waveform with following patterntransition: from full white pattern to noise pattern (including random scattering of 4 colors)(Note 3-2)
- The minimum VDD value by 2.4V is based on typical application pattern with stable and continuing powersupply. It does not apply on high loading pattern.
- Vcom value has been set in the IC chip on the panel.

Note 8 -1

The maximum power consumption

Note 8 -2

The Typical power consumption



9. Terminal Pin Assignment & Reference Circuit

9.1 Terminal Pin Assignment

No.	Signal	Typ	Function
1	VCOMBD_	P	VCOMBD driving voltage (Master)
2	RESEC	I	Current sense input pin for the control loop.(VCOM)
3	GDRC	O	N-Channel MOSFET gate drive control.(VCOM)
4	RESEN	I	Current sense input pin for the control loop. (VDDN)
5	GDRN	O	P-Channel MOSFET gate drive control pin. (VDDN)
6	RESEP	I	Current sense input pin for the control loop. (VDDP)
7	GDRP	O	N-Channel MOSFET gate drive control pin. (VDDP)
8	GND	P	Ground
9	AVDD	P	2.3~6V for analog voltage supply.(DC/DC)
10	VDD	P	2.3~3.6V for analog /digital voltage supply.
11	TFT_RELAY		
12	VCC	P	LDO output pin.
13	VDDP	P	Positive power supply for analog circuit.
14	VDDP	P	Positive power supply for analog circuit.
15	VPP		OTP program power.
16	VDDN	P	Negative power supply for analog circuit.
17	VDDN	P	Negative power supply for analog circuit.
18	VCC1	P	Positive power supply only for Oscilltor.
19	VDDIO	P	Power input for IO.
20	TSCL	I/O	I2C Interface to digital temperature sensor Clock pin
21	TSDA	I/O	I2C Interface to digital temperature sensor Data pin
22	BS_[0]	I	Input interface setting. Select 3 wire/ 4 wire/ Quad SPI
23	BS_[1]	I	Input interface setting. Select 3 wire/ 4 wire/ Quad SPI
24	RST_N	I	Reset.
25	BUSY_N	O	This pin indicates the driver status. Connect with a pull up
26	D_CX	I	Command/Data input. L: command H: data. (4-wire SPI).
27	CSB_M	I	Serial communication chip select.(Master)
28	SCL	I	Serial communication clock input.
29	SI0	I/O	Serial communication data input/output (3-wire/4-wire SPI).
30	SI1	I/O	Serial communication data input. Serial communication data
31	SI2	I	Serial communication data input. (Standard 4-wire SPI Quad
32	SI3	I	Serial communication data input. (Standard 4-wire SPI Quad
33	DRVP_Gate	O	Driving external N-MOSFET(VGP)
34	FBP	I	Positive charge pump(VGP) feedback pin.
35	GND	P	Ground

36	VCOMBD_S	O	VCOMBD driving voltage (Slave)
37	DRVN	O	Driving external BTJ. (VGN)
38	FBN	I	Negative charge pump feedback pin. (VGN)
39	REG_VGN	O	VGN internal reference voltage output.
40	DRVN2	O	Driving external BTJ. (VNCP_3P5V)
41	VNCP_3P5	P	Negative power supply for analog bias1 circuit. (for
42	VSPH	P	Positive Source driving voltage.
43	VSPL	P	Positive Source driving voltage.
44	VSPL2	P	Positive Source driving voltage.
45	VSPHI	P	Positive source voltage.
46	VSPLI	P	Positive source voltage.
47	VSPL2I	P	Positive source voltage.
48	VSNH	P	Negative source buffer output.
49	VSNL	P	Negative source buffer output.
50	VSNL2	P	Negative source buffer output.
51	VSNL2I	P	Negative source voltage.
52	VSNLI	P	Negative source voltage.
53	VSNHI	P	Negative source voltage.
54	FPL_VCOM	O	FPL_VCOM driving voltage
55	TFT_VCOM	O	TFT_VCOM driving voltage
56	VBB_3P5V	P	Negative power supply for analog bias2 circuit. (for
57	TFTVCOM_	-	TFT_VCOM_SENSE
58	CSB_S	I	Serial communication chip select.(Slave)
59	VGH	P	Positive Gate driving voltage
60	VGL	P	Negative Gate driving voltage

Note:

Type: I: Input
O: Output
C: Capacitor
P: Power

9.2 Panel Scan Directions

10. Panel AC Characteristics

10.1 MCU Interface Selection

In this module , there are 4-wire SPI and 3-wire SPI that can communicate with MCU.The MCU interface mode canset by hardware selection on BS1 pins. When it is “ Low ”,4-wire SPI is selected. When it is “ High ”, 3-wire SPI(9 bitsSPI) is selected.

Pin Name	Data/Command Interface		Control Signal		
Bus interface	SDA	SCL	CS#	D/C#	RES#
SPI4	SDIN	SCLK	CS#	D/C#	RES#
SPI3	SDIN	SCLK	CS#	L	RES#

Table 1 0 -1 MCU interface assignment under different bus interface mode

Note: L is connected to VSS; H is connected to VCI

10.2 MCU Serial Interface (4-wire SPI)

The 4-wire SPI consists of serial clock SCL, serial data SDA，D/C#，CS#.

Function	CS#	D/C#	SCL
Write Command	L	L	↑
Write data	L	H	↑

Table 1 0 -2 Control pins of 4-wire Serial Peripheral interface

Note: ↑ stands for rising edge of signal

SDA is shifted into an 8-bit shift register in the order of D7, D6, ... D0. The data byte in the shift register is writtento the Graphic Display Data RAM (RAM) or command register in the same clock. Under serial mode, only writeoperations are allowed.

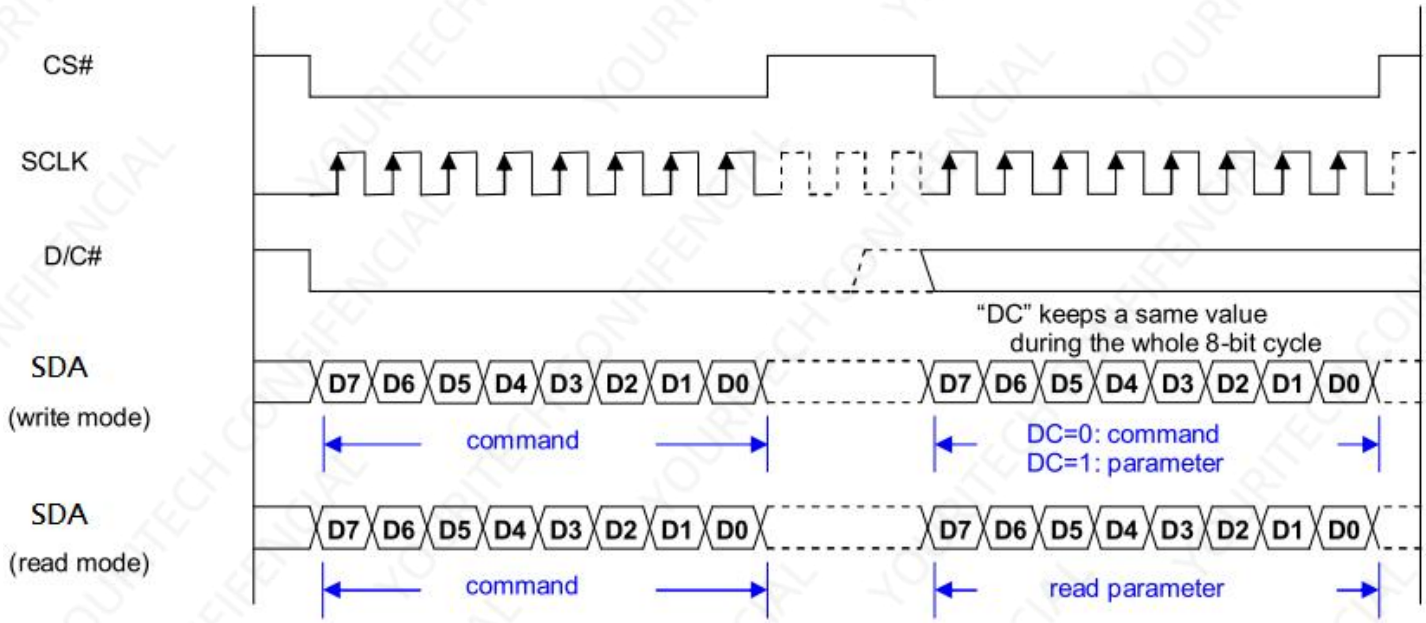


Figure 1 0 -1 Write procedure in 4-wire SPI mode

10.3 MCU Serial Interface (3-wire SPI)

The 3-wire serial interface consists of serial SCL，serial data SDA and CS#.

In 3-wire SPI mode，the pin D/C# can be connected to an external ground.

The operation is similar to 4-wire serial interface while D/C# pin is not used. There are altogether 9-bits will beshifted into the shift register on every ninth clock in sequence: D/C# bit , D/C bit, D7 to D0 bit，

The D/C# bit (first bitof the sequential data)will determine the following data byte in shift register is written to the Display Data RAM(D/C#bit =1) or the command register (D/C# bit = 0). Under serial mode , only write operations are allowed.

Function	CS#	D/C#	SCL
Write command	L	Tie to Low	↑
Write data	L	Tie to Low	↑

Table 1 0 -3 Control pins of 3-wire Serial Peripheral interface

Note: ↑ stands for rising edge of signal

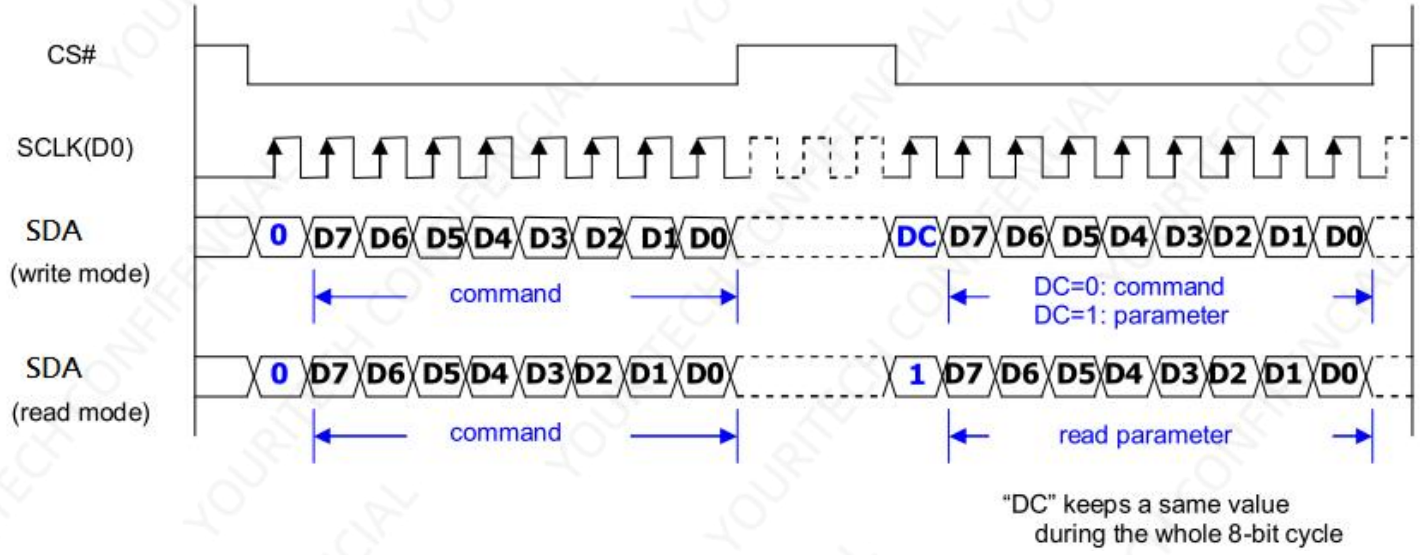


Figure 1 0 -2 Write procedure in 3-wire SPI mode

11. Optical Characteristics

11.1 Test Conditions

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

Symbol	Parameter	Conditions	Temperature	Min	Typ.	Max	Unit	Note
R	Reflectance	White	25℃	30	34	-	%	Note 6-1
CR	Contrast Ratio	-	25℃	15	22	-	-	-
T_{update}	Update time	-	25℃	-	27	-	sec	-

11.2 Optical Specifications

Symbol	Parameter	Conditions	Temperature	L* Typ.	a* Typ.	b* Typ.	△E2000 Max.	Note
WS	White State L*/a*/b* value	White	25℃	66	-4	-2	6	Note 6-1
DS	Dark State L*/a*/b* value	Dark	25℃	10	9.5	-11	6	Note 6-1
RS	Red State L*/a*/b* value	Red	25℃	26.5	41	29	6	Note 6-1
YS	Yellow State L*/a*/b* value	Yellow	25℃	65	-12	67	6	Note 6-1
BS	Blue State L*/a*/b* value	Blue	25℃	32	6	-40	6	Note 6-1

GS	Green State L*/a*/b* value	Green	25℃	34	-22	8	8	Note 6-1

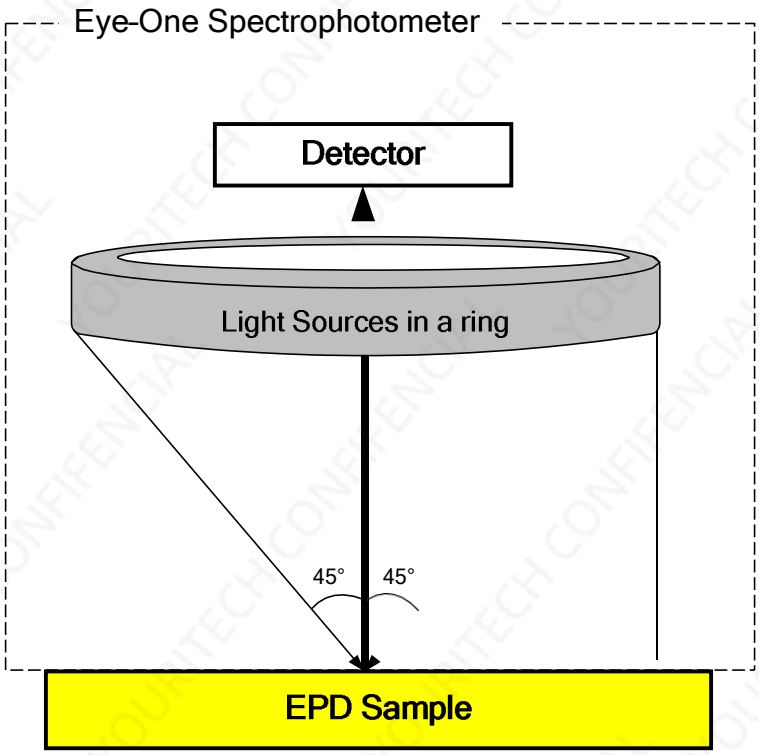
Note WS: White state, DS: Dark state, RS: Red state, YS: Yellow state, BS: Blue state, GS: Green state ;

Note 11-1: Luminance meter: Eye-One Pro3 plus Spectrophotometer

Note 11-2：ΔE2000 follows official CIEDE2000 color difference formula definition. The color of blue and green state will be in the range of BS and GS_ΔE2000 maximum value and the reference point is the typical value.

11.3 Definition of contrast ratio

The contrast ratio (CR) is the ratio between the reflectance in a full white area (Rl) and the reflectance ina dark area (Rd): CR = Rl/Rd



11.4 Reflection Ratio

The reflection ratio is expressed as:

R = Reflectance Factorwhite board x (Lcenter / Lwhite board)

L_{center} is the luminance measured at center in a white area (R=G=B=1). $L_{white\ board}$ is the luminance of astandard white board. Both are measure with equivalent illumination source. The viewing angle shallbe no more than 2 degrees.

12. Handling Safety And Environmental Requirements

WARNING
The display module should be kept flat or fixed to a rigid, curved support with limited bending along the long axis. It should not be used for continual flexing and bending. Handle with care. Should the display break do not touch any material that leaks out. In case of contact with the leaked material then 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.
IPA solvent can only be applied on active area and the back of a glass. For the rest part, it is not allowed.
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.
Mounting Precautions
(1) It`s recommended that you consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.
(2) It`s recommended that you attach a transparent protective plate to the surface in order to protect the EPD. Transparent protective plate should have sufficient strength in order to resist external force.
(3) You should adopt radiation structure to satisfy the temperature specification.
(4) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the PS at high temperature and the latter causes circuit break by electro-chemical reaction.
(5) Do not touch, push or rub the exposed PS with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of PS for bare hand or greasy cloth. (Some cosmetics deteriorate the PS)
(6) When there is dust on the surface, gently wipe it with absorbent cotton or a dust-free cloth. It is recommended to use anhydrous ethanol to clean the adhesive used to attach PS.
(7) Wipe off saliva or water drops as soon as possible. Their long time contact with PS causes deformations and color fading.
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.

Product Environmental certification
ROHS
REMARK
All The specifications listed in this document are guaranteed for module only. Post-assembled operation or component(s) may impact module performance or cause unexpected effect or damage and therefore listed specifications is not warranted after any Post-assembled operation.