PHOENIX DISPLAY INTERNATIONAL, INC.

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SPECIFICATION FOR LCD MODULE

CUSTOMER	
PART NUMBER	PDI314C-02A
DESCRIPTION	3.22" TFT 240 x 320
VERSION	0
ISSUE DATE	

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1. GENERAL DESCRIPTION

PDI314C-02A is a Transmissive type color active matrix liquid crystal display (LCD), which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver IC, FPC, Backlight and Touch screen. The following table described the features of TST314C-02A

2. FEATURES

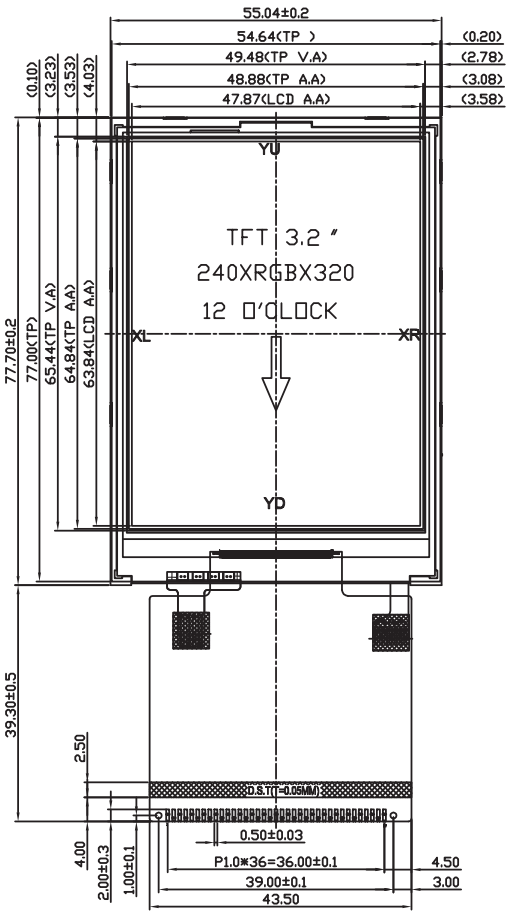
Display Mode	TFT LCD, Normally white, Transmissive Type,
Color Pixel Arrangement	RGB vertical Strip
Driver IC.	ILI9341
Number of colors	65 K color
Interface	MPU I/F(8/9/16/18 bit) , RGB I/F (18 bit)
Viewing Direction	12 O'clock
Lifetime of Module	50,000H

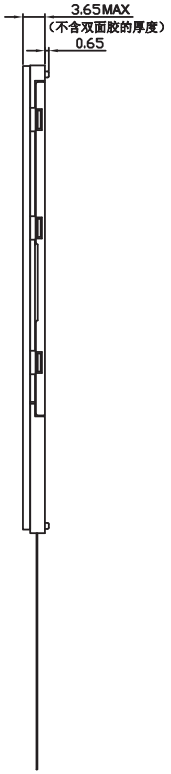
3. MECHANICAL SPECIFICATION

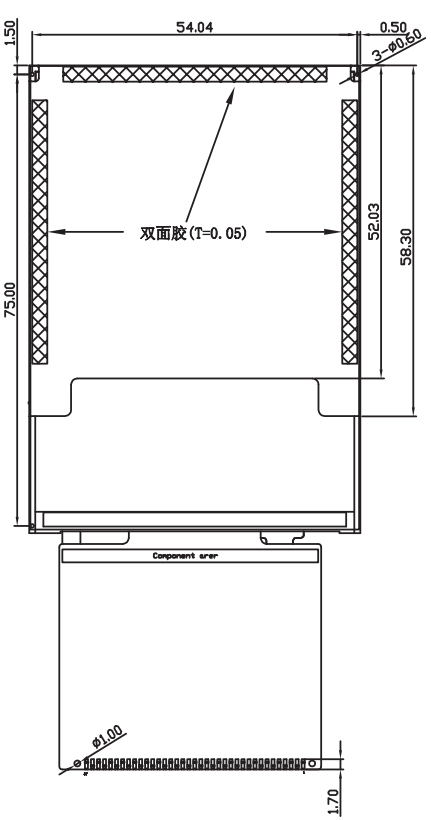
Item	Specifications	Unit
Dimensional outline	55.04(H)×77.7(V)×2.4(M)*	Mm
Number of Pixels	240(H)× 3(R,G,B) × 320(V)	Dot
Pixel Pitch	0.2025(H) × 0.2025(V)	Mm
Active area	47.87(H)×63.84 (V)	Mm

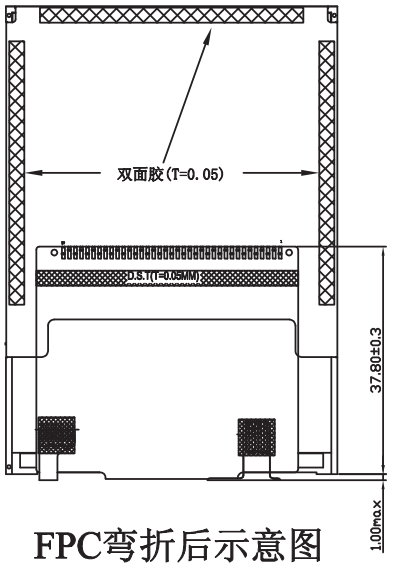
*note : This isn't include FPC.

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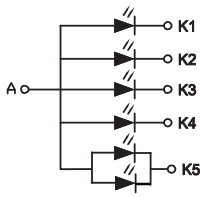






FPC弯折后示意图
展开出货

NO.	Pin name
1	GND
2	VDD
3	VDD
4	CS
5	RS
6	WR
7	RD
8	RESET
9	DB0
10	DB1
11	DB2
12	DB3
13	DB4
14	DB5
15	DB6
16	DB7
17	DB8
18	DB9
19	DB10
20	DB11
21	DB12
22	DB13
23	DB14
24	DB15
25	GND
26	Y-
27	X-
28	Y+
29	X+
30	LED-1
31	LED-2
32	LED-3
33	LED-4
34	LED-5
35	LED-A
36	LED-A
37	GND



NOTES:
1.)THE TOLERANCE UNLESS CLASSFIED ±0.2mm
THE R FOR NOT ASSIGNED 0.5±0.1mm
2.)LCD TYPE:a-Si TFT
3.)DRIVER IC:ILI9341
4.) ROHS Compliant

Dwg Title			
Dwg No.			Date 2011-09-16
Scale	Unit mm	Tol. ±0.5	
Drawn	Checked	Approved	

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5. MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
Operation Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	
Power supply voltage1	VCC, IOVCC	-0.3	+4.6	V	

6. Pin Assignment

Please refer to the drawing

Select a mode to interface to an MPU. In serial interface operation, the IM0 pin is used to set the ID bit of device code.

IM3	IM2	IM1	IM0/ ID	Interface Mode	DB Pin	Colors
0	0	0	0	Setting disabled	-	-
0	0	0	1	Setting disabled	-	-
0	0	1	0	80-system 16-bit interface	DB17-10, DB8-1	262,144 see Note 1
0	0	1	1	80-system 8-bit interface	DB17-10	262,144 see Note 2
0	1	0	*(ID)	Clock synchronous serial interface	-	65,536
0	1	1	0	Setting disabled	-	-
0	1	1	1	Setting disabled	-	-
1	0	0	0	Setting disabled	-	-
1	0	0	1	Setting disabled	-	-
1	0	1	0	80-system 18-bit interface	DB17-0	262,144
1	0	1	1	80-system 9-bit interface	DB17-9	262,144
1	1	0	0	Setting disabled	-	-
1	1	0	1	Setting disabled	-	-
1	1	1	0	Setting disabled	-	-
1	1	1	1	Setting disabled	-	-

Notes: 1. 65,536 colors in one transfer mode
2. 65,536 colors in two transfers mode

Note2:

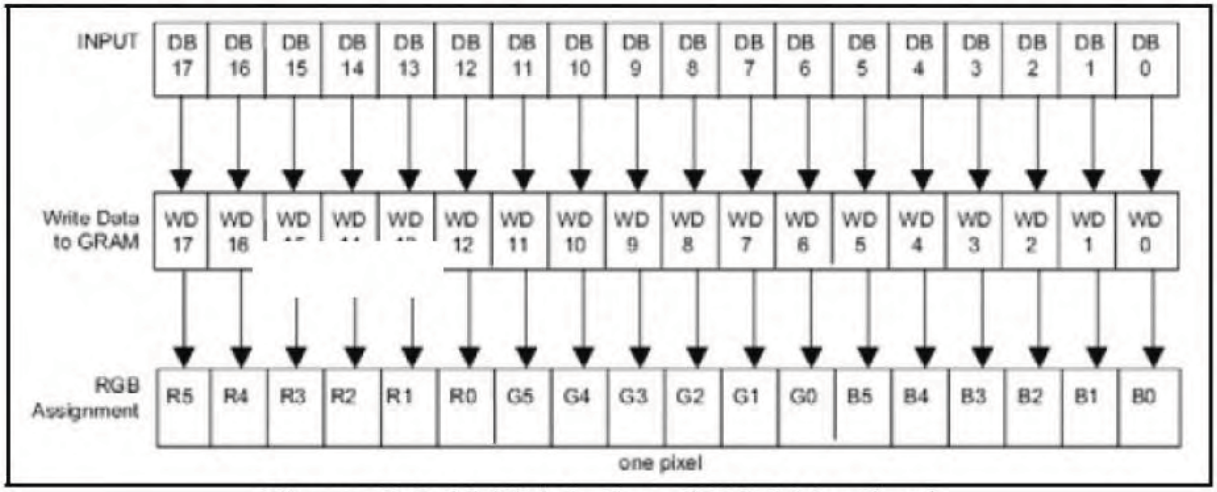


Figure 6-8 18-bit interface (262,144 colors)

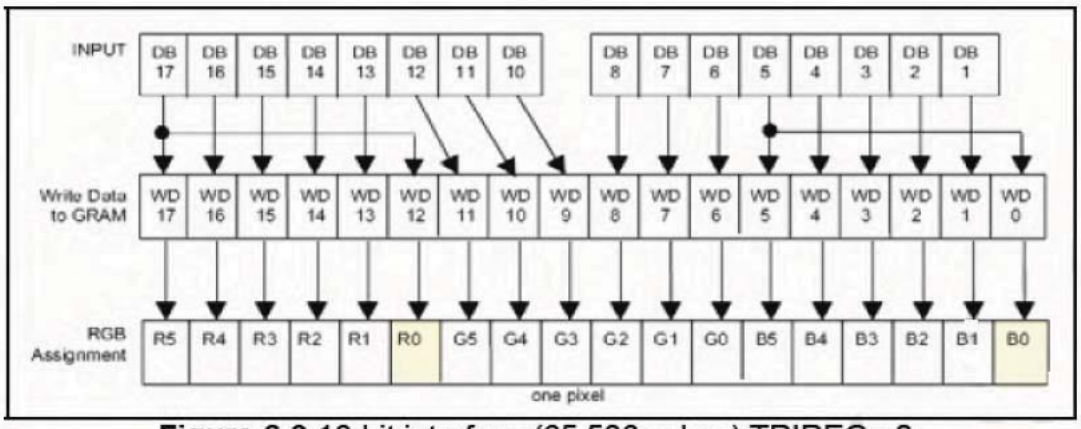


Figure 6-9 16-bit interface (65,536 colors) TRIREG= 0

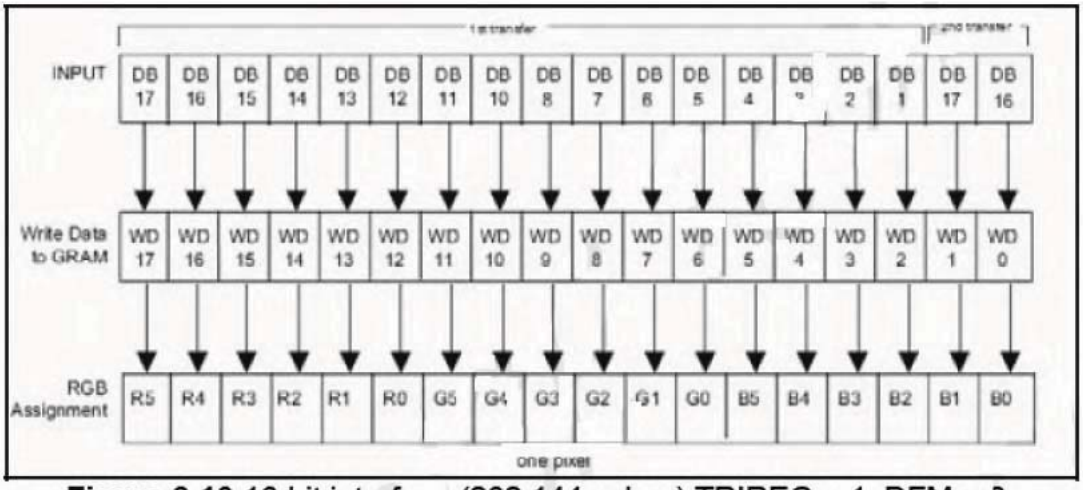


Figure 6-10 16-bit interface (262,144 colors) TRIREG = 1, DFM = 0

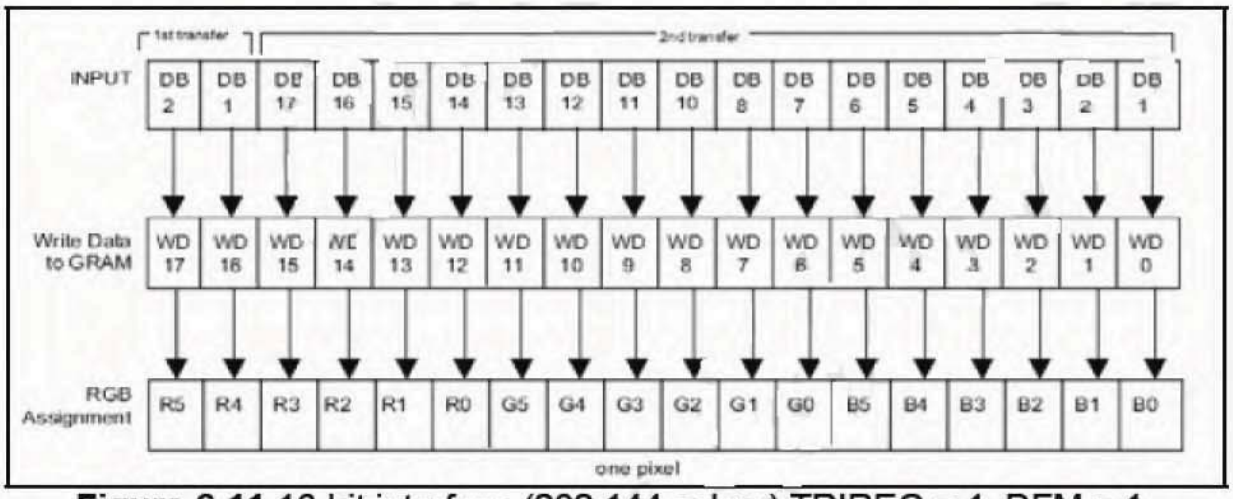


Figure 6-11 16-bit interface (262,144 colors) TRIREG = 1, DFM = 1

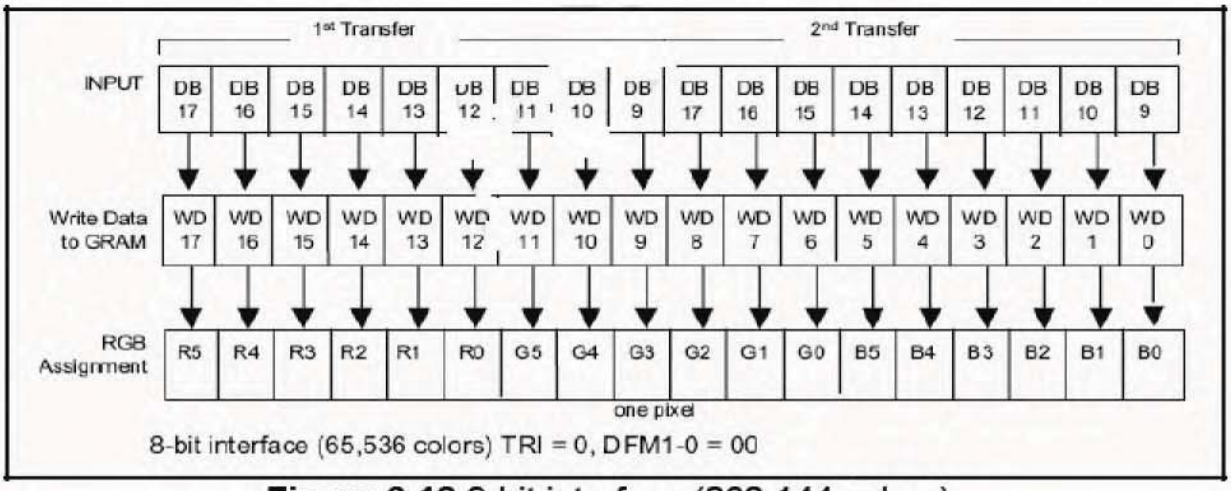


Figure 6-12 9-bit interface (262,144 colors)

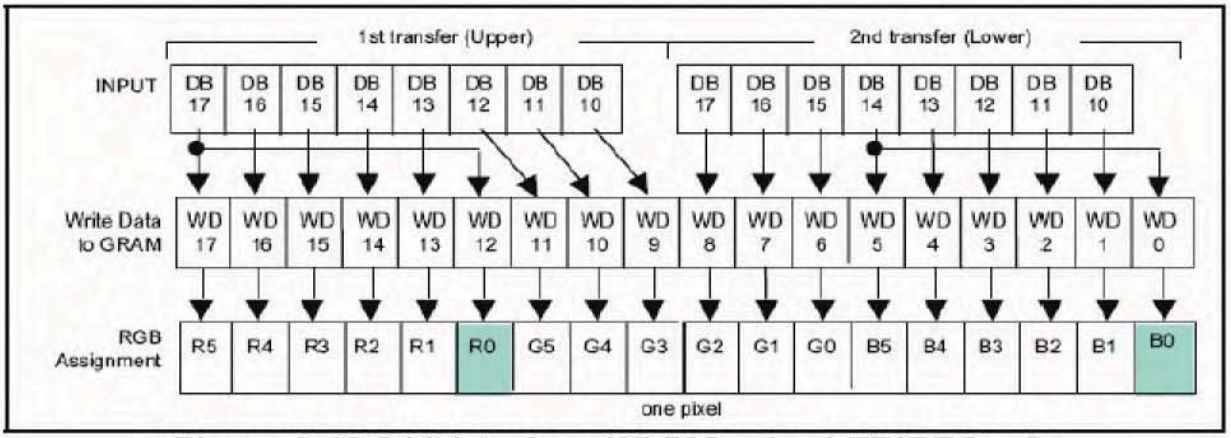


Figure 6-13 8-bit interface (65,536 colors) TRIREG = 0

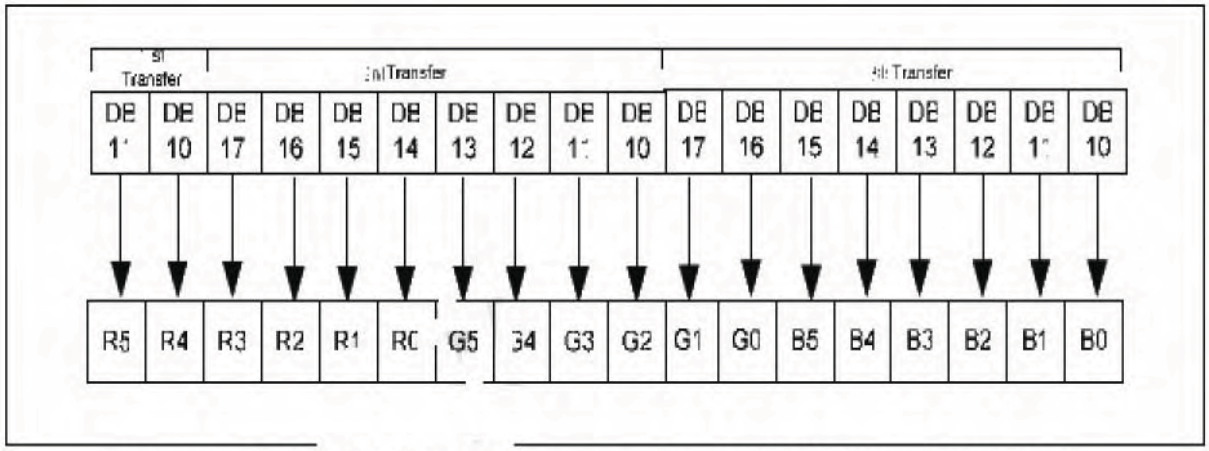


Figure 6-14 8-bit interface 262 colors) TRIREG = 1, DFM=0.

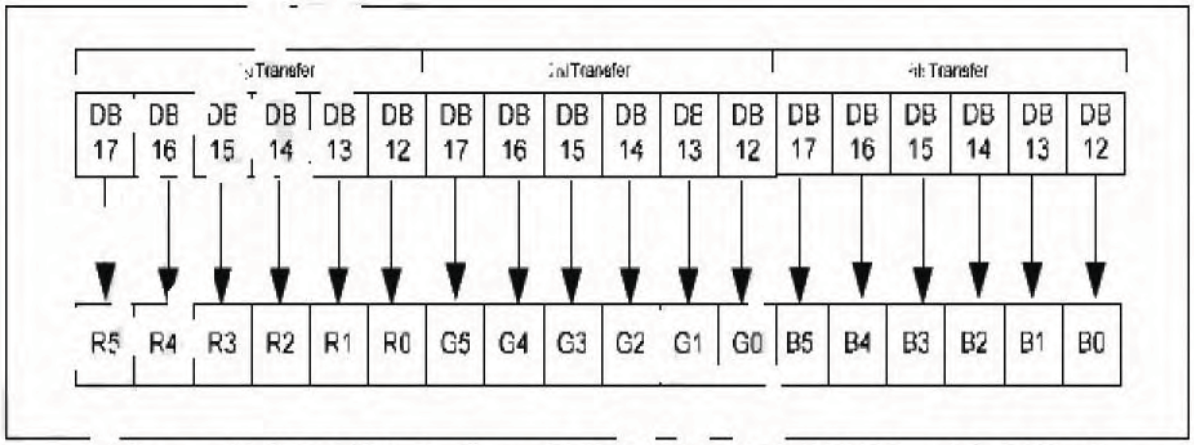
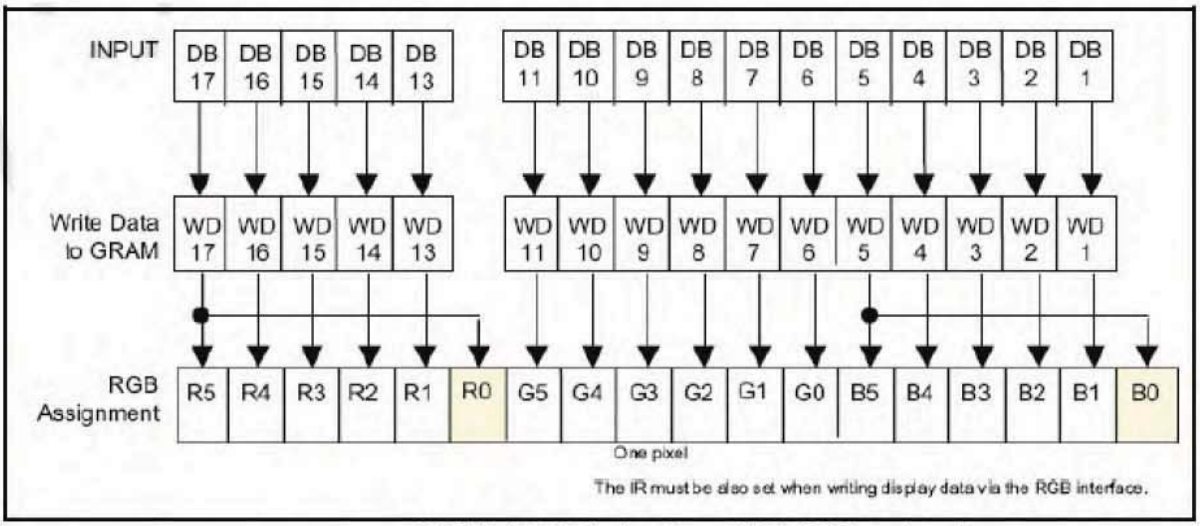
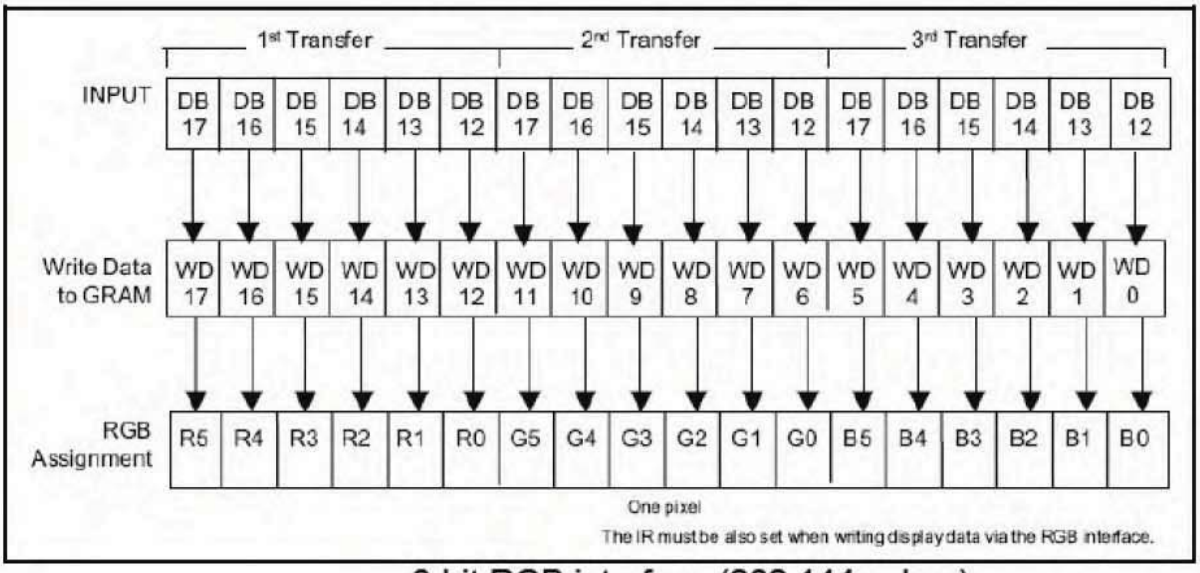


Figure 6-15 8-bit interface (262K colors) TRIREG = 1, DFM=1



16-bit RGB interface (65,563 colors)



6-bit RGB interface (262,144 colors)

7. ELECTRICAL CHARACTERISTICS

7.1.LCM DC CHARACETRISTIC

Typical operating conditions (GND=AVSS=0V)

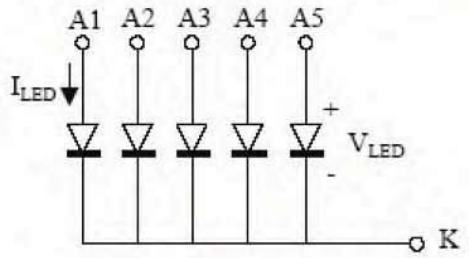
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power supply		VCC	2.5	-	3.3	V	
		IOVCC	1.65	-	3.3		
Driver Input signal voltage	H	V_{IH}	0.8*IOVCC	-	IOVCC	V	
	L	V_{IL}	GND	-	0.2*IOVCC	V	
Driver output signal voltage	H	V_{OH}	0.8*IOVCC	-	-	V	
	L	V_{OL}	-	-	0.2*IOVCC	V	
Power consumption		P_{LCD}	-	30	-	mW	*1

Note:

***1: Not include backlight.**

7.2.BACKLIGHT CHARACETRISTIC

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power Consumption	P	288	330	450	mW	Backlight unit
LED Current	I_{LED}	18	20	25	mA	Single LED
LED Voltage	V_{LED}	3.2	3.3	3.6	V	Single LED

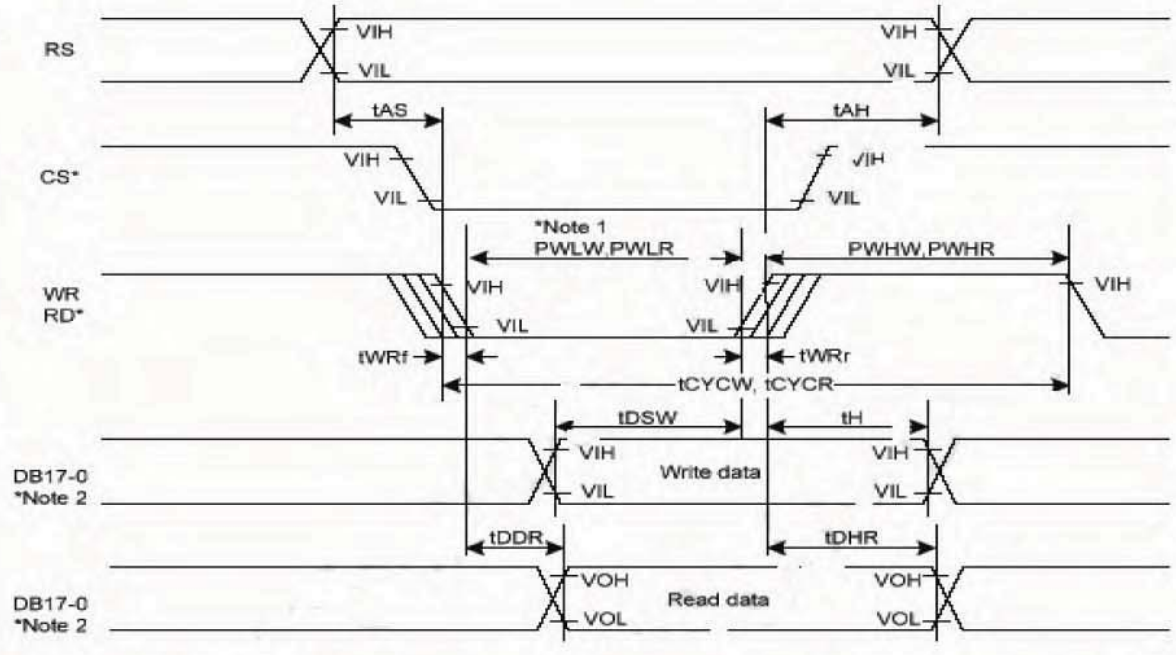


7.3.AC CHARACETRISTIC

A.80-system (18-bit / 16-bits) bus interface

Normal write operation (HWM=0 or 1), IOVCC=1.65V~3.30V

Item	Symbol		Unit	Min.	Typ.	Max.
Bus cycle time	Write	tCYCW	ns	125	-	-
	Read	tCYCR	ns	450	-	-
Write low-level pulse width		PWLW	ns	45	-	-
Read low-level pulse width		PWLR	ns	170	-	-
Write high-level pulse width		PWHW	ns	70	-	-
Read high-level pulse width		PWHR	ns	250	-	-
Write/Read rise/ fall time		tWRr, WRf	ns	-	-	25
Setup time	Write (RS to CS*,WR*)	tAS	ns	0	-	-
	Read (RS to CS*, RD*)		ns	10	-	-
Address Hold Time		tAH	ns	2	-	-
Write data setup time		tDSW	ns	25	-	-
Write data hold time		tH	ns	10	-	-
Read data delay time		tDDR	ns	-	-	150
Read data hold time		tDHR	ns	5	-	-



Note1: PWLW and PWLR are defined by the overlap period when CS is "Low" and WR* or RD* is "Low".
*Note2: Unused DB pins must be fixed at "IOVcc 1" or "IOGND 1".

B. Clock-synchronized serial interface

Normal Write Function (HWM=0), High-speed Write Function (HWM=1), IOVCC=1.65~3.30V)

Item	Symbol		Unit	Min.	Typ.	Max.
Serial Time Clock Cycle	Write (received)	tSCYC	ns	100	-	20.000
	Read (transmitted)	tSCYC	ns	350	-	20.000
Serial Clock high-level width	Write (received)	tSCH	ns	40	-	-
	Read (transmitted)	tSCH	ns	150	-	-
Serial Clock low-level width	Write (received)	tSCL	ns	40	-	-
	Read (transmitted)	tSCL	ns	150	-	-
Serial clock rise/fall time		tSCr, tSCf	ns	-	-	20
Chip select setup time		tCSU	ns	20	-	-
Chip select hold time		tCH	ns	60	-	-
Serial input data setup time		tSISU	ns	30	-	-
Serial input data hold time		tSIH	ns	30	-	-
Serial output data delay time		tSOD	ns	-	-	130
Serial output data hold time		tSOH	ns	5	-	-

C. RGB interface

18-/ 16- bit RGB interface (HWM=0 or 1), IOVCC=1.65~3.30V

Item	Symbol	Unit	Min.	Typ.	Max.
VSYNC/HSYNC Setup time	TSYNCS	clock	0	-	1
ENABLE Setup time	TENS	ns	10	-	-
ENABLE Hold time	TENH	ns	20	-	-
DOTCLK low-level pulse width	PWDL	ns	40	-	-
DOTCLK high-level pulse width	PWDH	ns	40	-	-
DOTCLK cycle time	TCYCD	ns	100	-	-
Data setup time	TPDS	ns	10	-	-
Data hold time	TPDH	ns	40	-	-
DOTCLK, VSYNC and HSYNC rise/fall time	Trgbr Trgbf	ns	-	-	25

6-bit RGB interface (HWM=0 or 1), IOVCC=1.65~3.30V

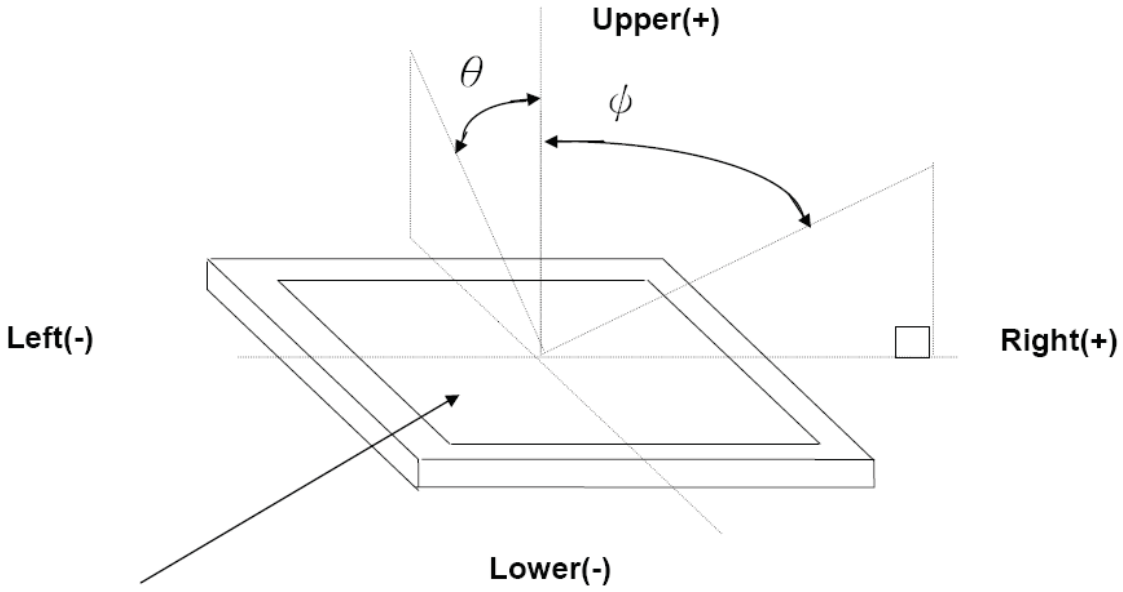
Item	Symbol	Unit	Min.	Typ.	Max.
VSYNC/HSYNC setup time	TSYNCS	clock	0	-	1
ENABLE setup time	TENS	ns	10	-	-
ENABLE hold time	TENH	ns	25	-	-
DOTCLK low-level pulse width	PWDL	ns	25	-	-
DOTCLK high-level pulse width	PWDH	ns	25	-	-
DOTCLK cycle time	TCYCD	ns	60	-	-
Data setup-time	TPDS	ns	10	-	-
Data hold time	TPDH	ns	25	-	-
DOTCLK, VSYNC, and HSYNC rise/fall time	Trgb Ttrgbf	ns	-	-	25

8. ELECTRO-OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
Brightness		L	White pattern	160	200	-	cd/m^2	
Response time		T_R+T_F	$\Theta=\phi=0$	-	25	-	ms	Note 2
Contrast ratio		CR	At the center point of A.A.	300	350	-		
Color Chromaticity	White	W_x	$\Theta=\phi=0$	0.273	0.313	0.353		Note 2
		W_y		0.289	0.329	0.369		
Viewing Angle	Horizontal		CR≧10	-	110	-	Degree	
	Vertical			-	120	-		

Note.1 These items are measured by C light.

Note.2 Definition of Viewing Angle(θ, ϕ),refer to Fig.1 as below：



I. **CF substrate**

Fig.1 Definition of Viewing Angle

9. RELIABILITY

9.1.MTTF

The LCD module shall be designed to meet a minimum MTTF value of 50,000 hours with normal condition. (25°C in the room without sunlight; not include life time of backlight).

9.2.Tests

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Operating	70℃ 240 hrs	◦ No defect of Operational function in room temperature are allowable. ◦ Leakage current should be below double of initial value.
2	Low Temperature Operating	-20℃ 240 hrs	
3	High Temperature Non-Operating	80℃ 240 hrs	
4	Low Temperature Non-Operating	-30℃ 240 hrs	
5	High Temperature/ Humidity Non-Operating	50℃,90%RH 240 hrs	
6	Temperature Shock Non-Operating	-30℃ ◀⟷▶ 80℃ (30min) (5min) (30min) 10 CYCLES	
7	Electro-static Discharge	HBM: ±2KV	

Note 1: Test after 24 hours in room temperature.
Note 2: The sampling above is individually for each reliability testing condition.
Note 3: The color fading of polarizing filter should not care.
Note 4: All of the reliability testing chamber above, is using D.I. water.(Min value:1.0 MΩ-cm)
Note 5: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

9.3.Color performance

No.	ITEM	Criterion (initial)
1	Luminance	>50%
2	NTSC	>70%
3	Contrast Ratio	>50%

10.RoHS COMPLIANT WARRANTY

RoHs Hazardous substances including:

- Cd< 100 ppm
- Pb< 1000 ppm
- Hg< 1000 ppm
- Cr +6 < 1000 ppm
- PBDE < 1000 ppm
- PBB < 1000 ppm

11.PRECAUTIONS FOR USE

11.1.Safety

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

11.2.Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 23±5°C and the humidity is below 50±20%RH.
(2) Store in anti-static electricity container.
(3) Store in clean environment, free from dust, active gas, and solvent.
(4) Do not place the module near organics solvents or corrosive gases.
(5) Do not crush, shake, or jolt the module.
(6) Do not exposed to direct sun light of fluorescent lamps.

11.3.Installing LCD Module

Attend to the following items when installing the LCM.

(1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.
(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The

measurement tolerance should be ±0.1mm.

11.4.Precautions For Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.
(2) Driving the LCD in the voltage above the limit will shorten its lifetime.
(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
(4) When turning the power on, input each signal after the positive/negative voltage becomes stable.
(5) Do not apply water or any liquid on product which composed of T/P.

11.5.Handling Precautions

(1) Avoid static electricity which can damage the CMOS LSI; please wear the wrist strap when handling.
(2) The polarizing plate of the display is very fragile. so, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface; it may cause display abnormal .
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9) Do not apply water or any liquid on product, which composed of T/P.

11. 6.arranty

(1) The period is within 12 months since the date of shipping out under normal using and storage conditions.
(2) The warranty will be avoided in case of defect induced by customer.