SPECIFICATION

YAOYU
TECHNOLOGY

YMFG-G320240E-4DPSWSD

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Version 1.01

4/F, Block B, Tianxia Industrial Area Zhoushi Rd, Shiyan Town, Baoan District, Shenzhen, China
Tel: (86)-0755-26554918 Fax: (86)-0755-26734918
WebSite: http://www.yaoyu-lcm.com

RECORDS OF REVISION

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September 27, 2007	1.01	Amend wrappage and address		ynn	

CONTENTS

1. GENERAL SPECIFICATIONS：

1-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by YAOYU TECHNOLOGY to Customer。

1-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

1-3 MODULE NAME:

YMFG-G320240E-4DPSWSD

2. FEATURES：

2-1 MAIN LCD (LARGE)

Item	Standard Value
Display Type	320 *240 dots
LCD Type	FSTN, Transflective,Positive,,Extended TEMP
Driver Condition	LCD Module: 1/240 Duty, 1/16Bias
Viewing Direction	6 O'clock
Backlight Type	WHITE EDGE LED B/L
Weight	TBD
Interface	4-BIT MPU interface
Driver IC	Driver IC: IST3025,IST3026

3. MACHANICAL SPECIFICATIONS：

ITEM	SPECIFICATIONS	UNIT
OUTLINE DIMEMSIONS	92.0(L) X70.5(W) X5.5max(H)(excluded fpc) 92.0(L) X88.9(W) X5.5max(H)(included fpc)	mm
VIEWING AREA	78.78(L) x59.58(W)	mm
ACTIVE AREA	76.78(L) X57.58(W)	mm
DISP.CONSTRUCTION	320 * 240 dots	---
DOT SIZE	0.22(L) x 0.22(W)	mm

DOT PITCH	0.24(L) x 0.24(W)	mm
ASSY.TYPE	COG	---
WEIGHT	TBD	g

Note : For detailed information please refer to LCM drawing

4. ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD	Ta=25℃	0.3	—	7.0	V
POWER SUPPLY FOR LCD DRIVING	Vlcd	Ta=25℃	0.3	—	+40	V
INPUT VOLTAGE	VIN	Ta=25℃	-0.3	—	VDD+0.3	V
OPERATION TEMPERATURE	TOPR	---	-20	—	70	℃
STORAGE TEMPERATURE	TSTG	---	- 30	—	80	℃
Storage Humidity	H_D	Ta < 40 °C	-		90	%RH

NOTES:

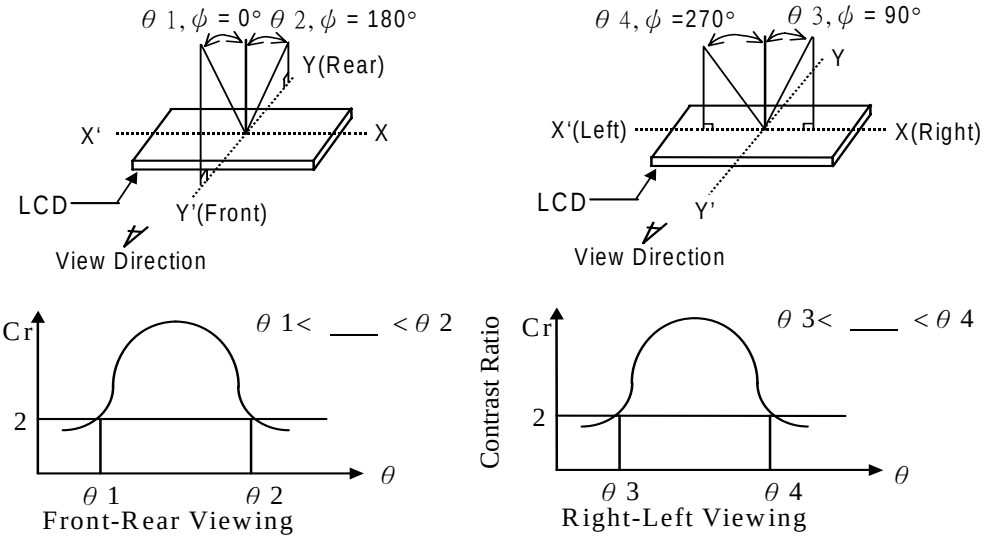
(1) LCM should be grounded during handling LCM.

5. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY VOLTAGE	VDD－VSS	Ta= +25℃	3.0	3.3	3.6	V
POWER SUPPLY FOR LCD DRIVING	Vlcd	Ta= +25℃	-	21.5	-	V
INPUT VOLTAGE “H” LEVEL	VIH	—	0.8VDD	—	VDD	V
INPUT VOLTAGE “L” LEVEL	VIL	—	VSS	—	0.2VDD	V
OUTPUT VOLTAGE “H” LEVEL	VOH	IOH=-0.5mA	0.8VDD	—	VDD	V
OUTPUT VOLTAGE “L” LEVEL	VOL	IOL=0.5mA	VSS	—	0.2VDD	V
Supply Current	I_{DD}	V_{DD} = 3.3 V	-	3	5	mA
LCM Driver Voltage	V_{OP}	V_0–V_{ss} (-20°C)	-	-	-	V
		V_0 –V_{ss} (25°C)	-	21.5	-	
		V_0 –V_{ss} (70°C)	-	-	-	

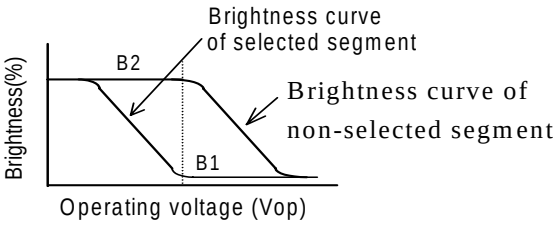
6.OPTICAL CHARACTERISTICS

(1) DEFINITION OF VIEWING ANGLE

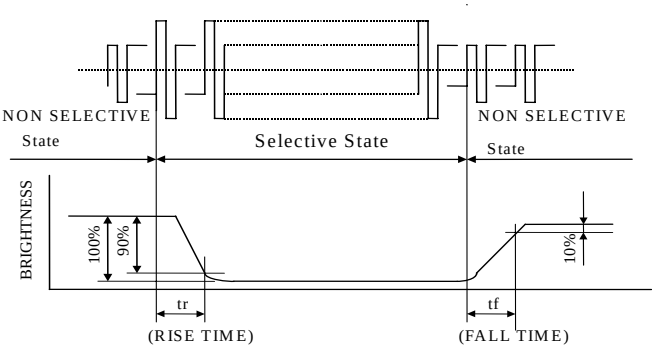


(2) DEFINITION OF CONTRAST

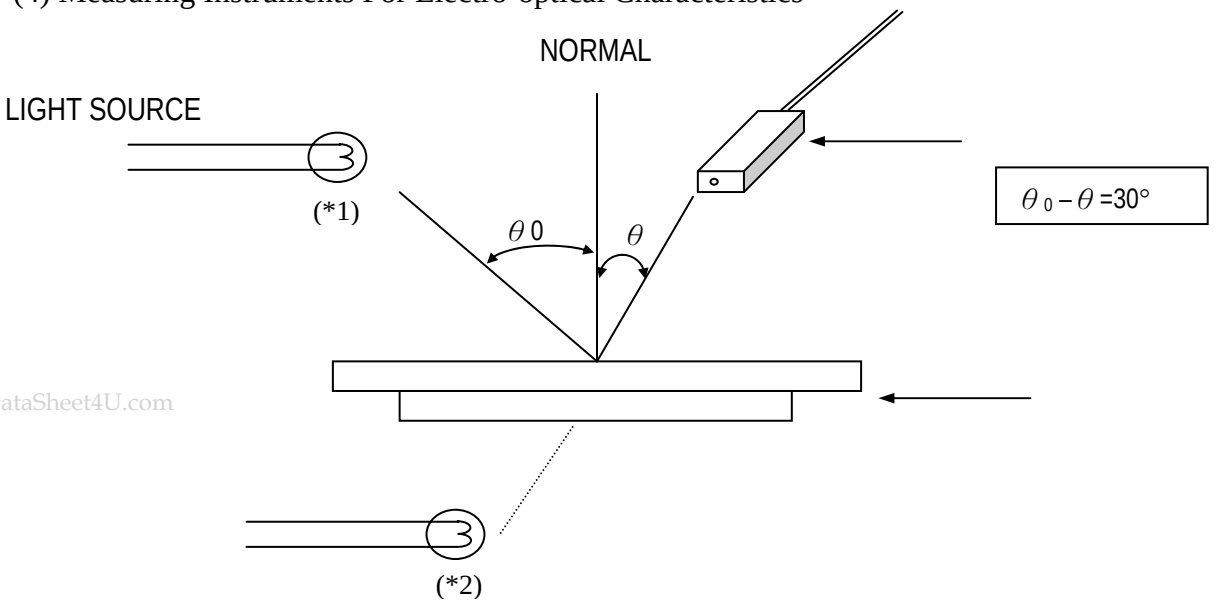
$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



(3) DEFINITION OF RESPONSE



(4) Measuring Instruments For Electro-optical Characteristics



7.0 Backlight Characteristics

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	120	mA
Reverse Voltage	VR	Ta =25°C	-	5	V
Power Dissipation	PO	Ta =25°C	-	0.6	W
Operating Temperature	T_{OP}	-	-20	70	℃
Storage Temperature	T_{ST}	-	-30	80	℃

Electrical / Optical Characteristics

Ta =25℃

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=120 mA	2.9	3.1	3.3	V
Reverse Current	IR	VR=8V	-	-	0.2	mA
Average Brightness (with LCD) *1	IV	IF=120 mA	-	-	-	cd/m^2
Uniformity *1 (with LCD) *1	△B	IF=120mA	70%	-	-	*2
Color	WHITE					

*1 This vaule will be changed while mass production . testing by BM7
*2：△B=B(min) / B(max)

8.TIMING CHARACTERISTICS

(1).IST3025 TIMING CHARACTERISTICS

AC Characteristics

(Segment Mode) (V_{SS} = V_5 = 0 V, V_{DD} = +2.5 to +5.5 V, V_0 = +10.0 to +40.0 V, T_{OPR} = -30 to +85 ℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	NOTE
Shift clock period	t_{WCK}	t_R, t_F≤ 11 ns	125			ns	1
Shift clock "H" pulse width	t_{WCKH}		51			ns	
Shift clock "L" pulse width	t_{WCKL}		51			ns	
Data setup time	t_{DS}		30			ns	
Data hold time	t_{DH}		40			ns	
Latch pulse "H" pulse width	t_{WLPH}		51			ns	
Shift clock rise to latch pulse rise time	t_{LD}		0			ns	
Shift clock fall to latch pulse fall time	t_{SL}		51			ns	
Latch pulse rise to shift clock rise time	t_{LS}		51			ns	
Latch pulse fall to shift clock fall time	t_{LH}		51			ns	
Enable setup time	t_S		36			ns	
Input signal rise time	t_R				50	ns	2
Input signal fall time	t_F				50	ns	2
/DISPOFF removal time	t_{SD}		100			ns	
/DISPOFF "L" pulse width	t_{WDL}		1.2			µs	
Output delay time (1)	t_D	C_L= 15 pF			78	ns	
Output delay time (2)	t_{PD1}, t_{PD2}	C_L= 15 pF			1.2	µs	
Output delay time (3)	t_{PD3}	C_L= 15 pF			1.2	µs	

NOTES :

1. Takes the cascade connection into consideration.
2. (t_{WCK}- t_{WCKH}- t_{WCKL})/2 is maximum in the case of high speed operation.

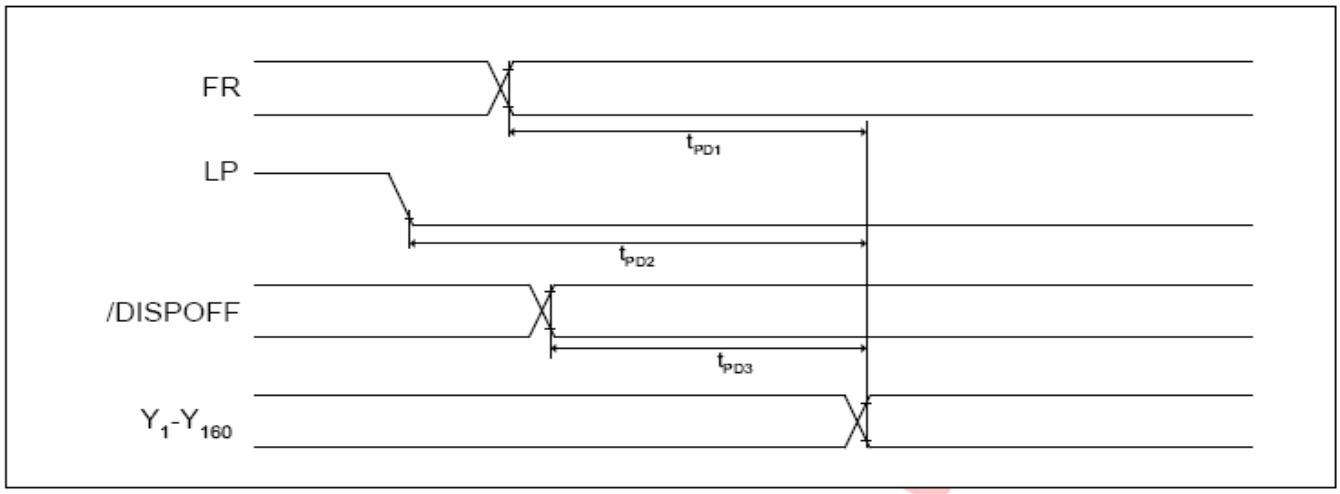


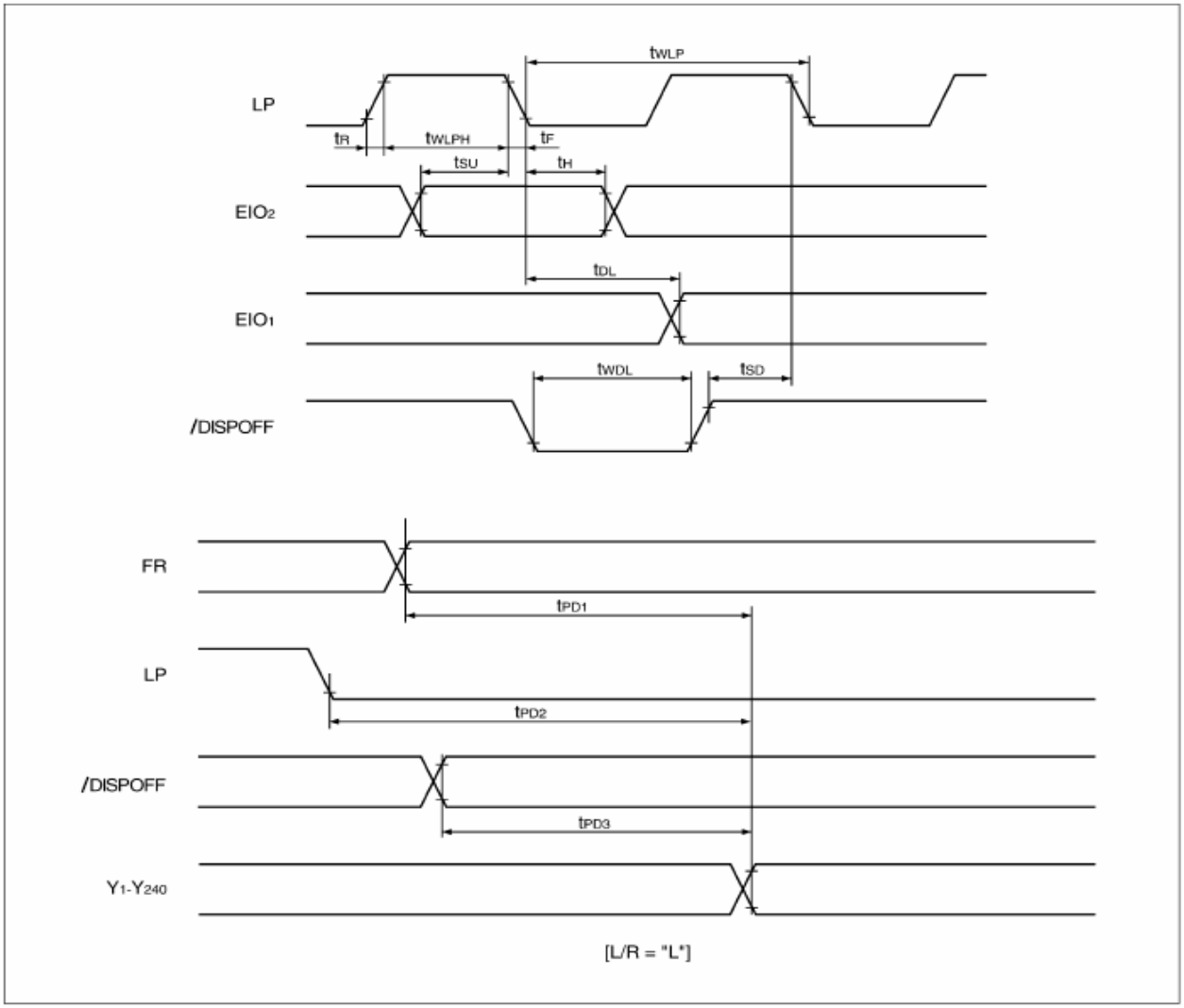
Fig.8 Timing Characteristics(3)

(2).IST3026TIMING CHARACTERISTICS

(Common Mode) (V_{SS} = V_5 = 0 V, V_{DD} = +2.5 to +5.5 V, V_0 = +15.0 to +40.0 V, T_{OPR} = -30 to +85 ℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Shift clock period	t_{WLP}	t_R, t_F ≤ 20 ns	250			ns
Shift clock "H" pulse width	t_{WLPH}	V_{DD} = +5.0 ± 0.5V	15			ns
		V_{DD} = +2.5 to + 4.5V	30			ns
Data setup time	t_{SU}		30			ns
Data hold time	t_H		50			ns
Input signal rise time	t_R				50	ns
Input signal fall time	t_F				50	ns
/DISPOFF removal time	t_{SD}		100			ns
/DISPOFF "L" pulse width	T_{WDL}		1.2			µs
Output delay time (1)	t_{DL}	C_L= 15 pF			200	ns
Output delay time (2)	t_{PD1}, t_{PD2}	C_L= 15 pF			1.2	µs
Output delay time (3)	t_{PD3}	C_L= 15 pF			1.2	µs

Timing Chart of Common Mode

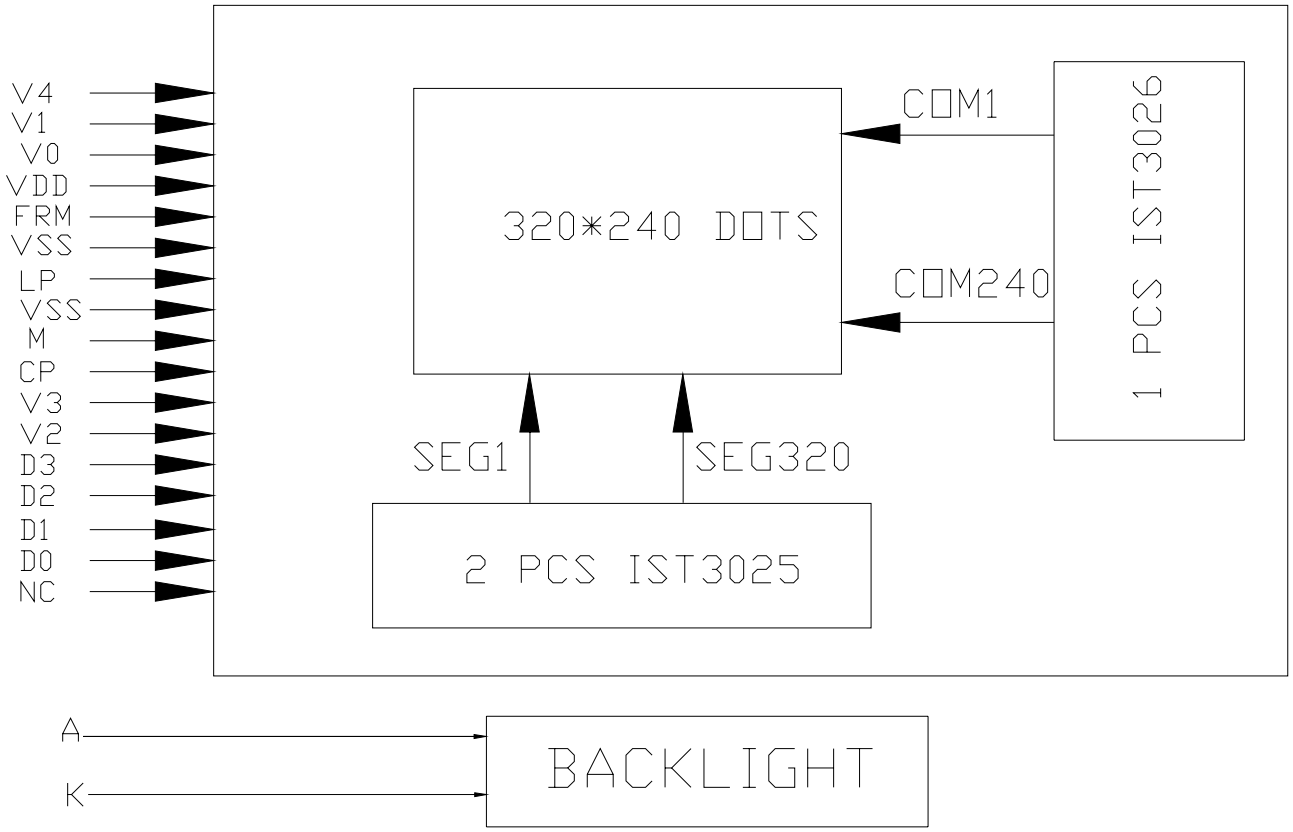


9. PIN ASSIGNMENT

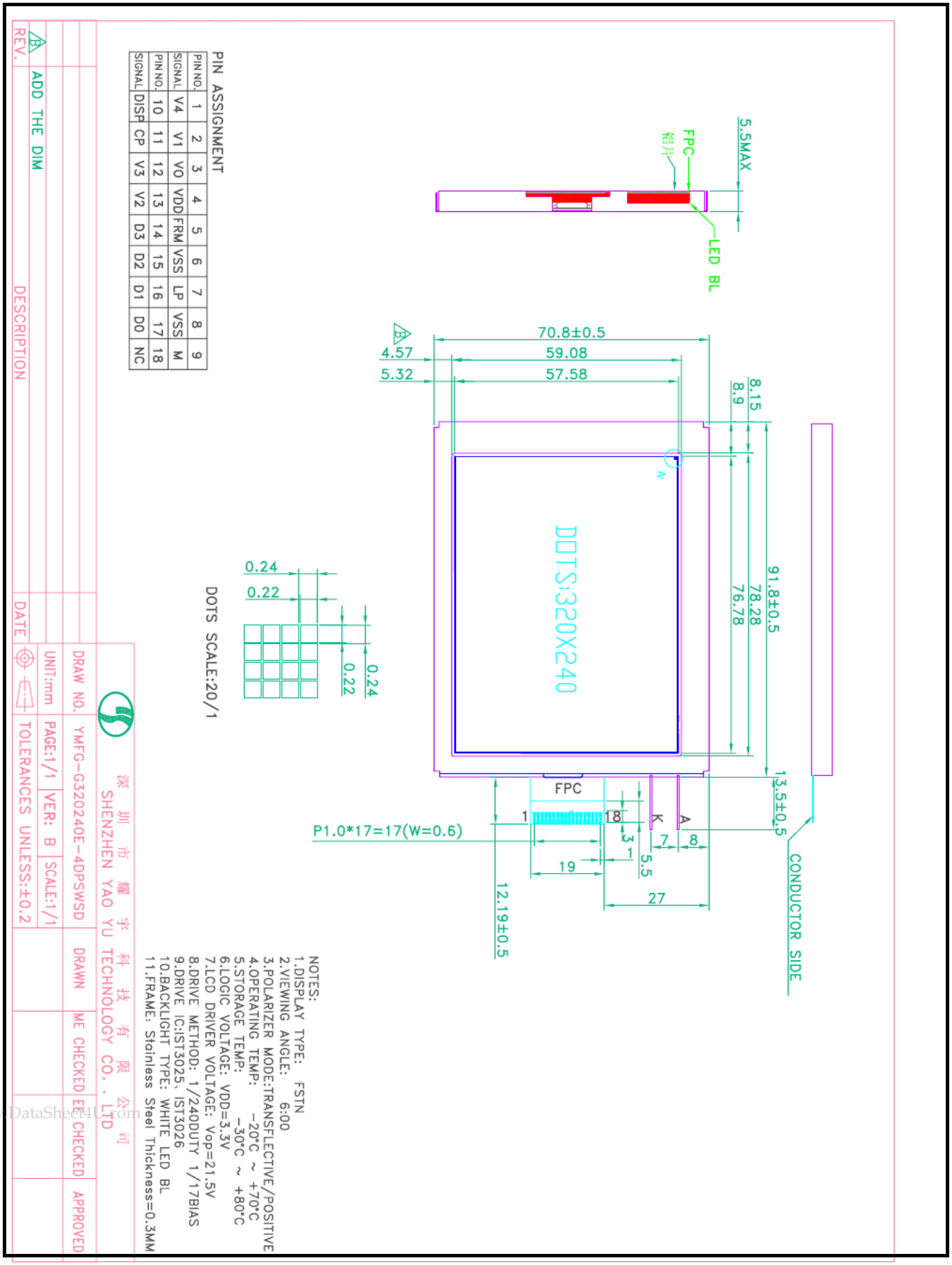
Pin NO.	Symbol	Input/Output	Description
1,2,3	V4,V1,V0	I	Power supply for LCD drive
4	VDD	I	SUPPLY LOGIC VOLTAGE
5	FRM	I	Scan start pulse
6	VSS	I	POWER Ground
7	LP	I	Dot data shift clock for X driver
8	VSS	I	POWER Ground

9	M	I	Frame signal
10	**/DISP**	I	DISPLAY CONTROL
11	CP	I	Dot data latch pulse
12,13	V3,V2	I	Power supply for LCD drive
14~17	D3~D0	I/O	Input pins for display data
18	**NC**		NOT CONNECTOR

10. BLOCK DIAGRAM



11.OUTLINE DIMENSIONS



12. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
OPERATING TEMPERATURE	TOPR	-20℃～+70℃	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
STORAGE TEMPERATURE	TSTG	-30℃～+80℃	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
HUMIDITY	—	See Note	WITHOUT CONDENSATION

13.RELIABITY

13-1 RELIABILITY TEST

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERTURE +70℃ 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE -20℃ 240HRS	
STORAGE TEMPERATURE	HIGH TEMPERTURE +80℃ 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE - 30℃ 240HRS	
HUMIDITY	40℃ 90%RH 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	• Operating Time: thirty minutes exposure for each direction (X,Y,Z) • Sweep Frequency: 10～55Hz (1 min) • Amplitude: 1.5mm	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	-20℃(30mins) ←→70℃(30mins) 10 cycles	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

*NOTE: TEST CONDITION

(1)TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP. SET AT 25±2℃, HUMIDITY SET AT 60±5%RH

(2) OPERATING STATE: SAMPLES SUBJECT TO THE TESTS SHALL BE IN " OPERATING" CONDITION

14. Precaution for Use

The following precautions should be followed, since this module contains precise parts.

(1) Do not store module for an extended periods of time under the conditions of high temperature and high humidity.

(2) Avoid using or storing the module in areas that expose it to direct sunlight or ultraviolet rays.

(3) Use protective finger covers when handling the module to avoid scratching or staining the module.

(4) Care should be taken not to expose the module to static electricity, because the module contains C-MOS LSI's.

(5) The LSI is sensitive to light.
The user's product should be designed so that LSI is not exposed to any light during operation.

(6) During installation, cover the display area with acrylic protection plates to protect the polarizer plate and LCD cells.

(7) Do not apply any excessive shocks to the module because the module contains sensitive LCD cells. Do not use a module, which has experienced strong mechanical shock.

(8) Care should be taken when the power supply turns on as following.
(a) Do not apply any input signals before the supplying voltage is applied.
(b)Do not turn off the power supply while any input signals are applied.

Caution

(1) Dangerous. Do not shock glass because glass can break.

(2) If module breaks, do not touch it directly.
(Glass could stick or cut skin.)

(3) Do not swallow Liquid Crystal.
(In case of broken LCD panel, do not swallow liquid crystal even if there is no proof that liquid crystal is poisonous.)

(4) If liquid crystal is exposed to skin, wash the area thoroughly with alcohol or soap.

(5) When disposing of the product, please observe industrial waste disposal laws in each country and district.

(6) In case of injury, give immediate treatment and consult with a doctor.

(7) This product is constructed precisely. Don't disassemble or modify.

※ Neglecting this mark can cause injury to humans and damage to materials