DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 1024600P VMH-PW-N

Product Specification ***Version:0***

21.03.2022

GENERAL SPECIFICATION

MODULE NO. :

DEM 1024600P VMH-PW-N

CUSTOMER

VERSION NO.	CHANGE DESCRIPTION	DATE
0	Original Version	21.03.2022

PREPARED BY: YK DATE: 21.03.2022

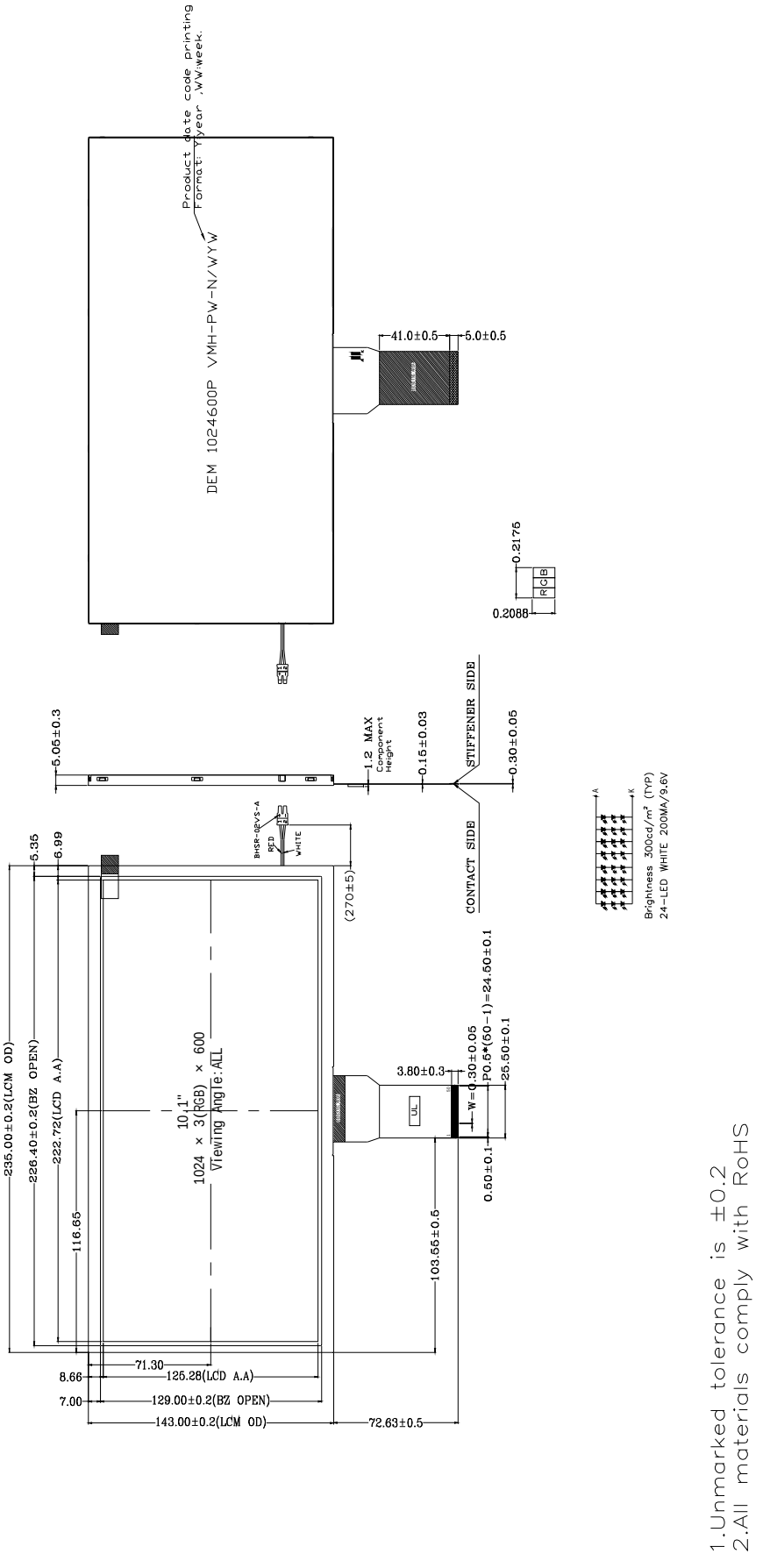
APPROVEDBY: WH DATE: 21.03.2022

CONTENTS

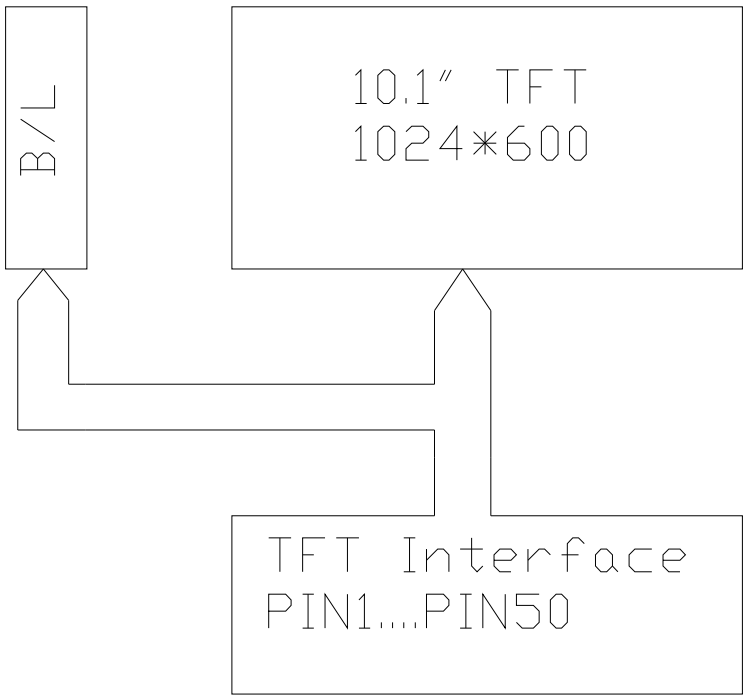
1. GENERAL SPECIFICATIONS

ITEM	STANDARD VALUE	UNIT
LCD SIZE	10.1 TFT	inch
LCD TYPE	TFT/IPS/ NORMALLY BLACK/TRANSMISSIVE	
MODULE SIZE	235.00 x 143.00 x 5.05	mm
ACTIVE AREA	222.72 x 125.28	mm
PIXEL PITCH (W*H)	0.2175 x 0.2088	
NUMBER OF PIXELS	1024 x 600	
DRIVER IC	EK73215 + EK79001H	
INTERFACE TYPE	RGB	
RECOMMEND VIEWING DIRECTION	ALL	O’clock
GRAY SCALE INVERSION DIRECTION	-	O’clock
COLORS	16.7 MILLION	
BACKLIGHT TYPE	24-DIES WHITE LED	
TOUCH PANEL TYPE	WITHOUT	

2. EXTERNAL DIMENSIONS



3. BLOCK DIAGRAM



4. PIN ASSIGNMENT

PIN NO.	SYMBOL	DESCRIPTION	REMARK
1	NC	No connection	
2	NC	No connection	
3	NC	No connection	
4	NC	No connection	
5	GND	Power ground	
6	VCOM	Common voltage	
7	DVDD	Power for Digital Circuit	
8	MODE	DE/SYNC mode select	Note 1
9	DE	Data input enable	
10	VS	Vertical sync signal	
11	HS	Horizontal sync signal	
12	B7	Blue data	
13	B6	Blue data	
14	B5	Blue data	
15	B4	Blue data	
16	B3	Blue data	
17	B2	Blue data	
18	B1	Blue data	
19	B0	Blue data	
20	G7	Green data	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	
24	G3	Green data	
25	G2	Green data	
26	G1	Green data	
27	G0	Green data	
28	R7	Red data	
29	R6	Red data	
30	R5	Red data	
31	R4	Red data	
32	R3	Red data	
33	R2	Red data	

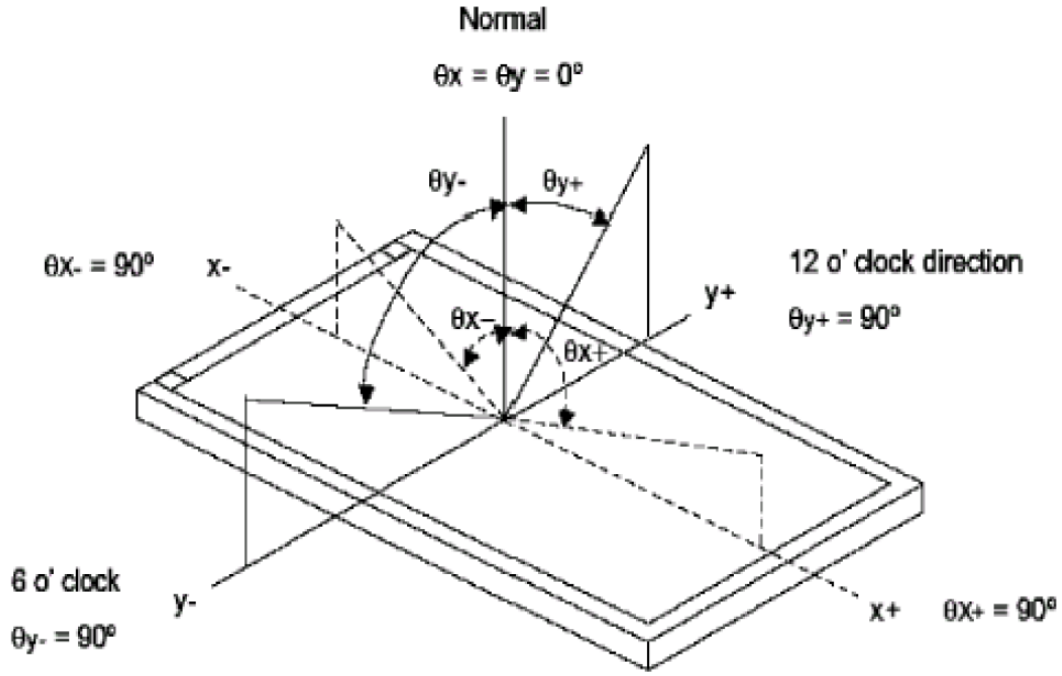
34	R1	Red data	
35	R0	Red data	
36	GND	Power ground	
37	DCLK	Clock signal	
38	GND	Power ground	
39	L/R	Left/right select	Note 2
40	U/D	Up/down select	Note 3
41	VGH	Gate ON Voltage	
42	VGL	Gate OFF Voltage	
43	AVDD	Power for Analog Circuit	
44	RESET	Global reset pin	
45	NC	No connection	
46	VCOM	Common voltage	
47	DITHB	Dithering function	Note 4
48	GND	Power ground	
49	NC	No connection	
50	NC	No connection	

Note 1: DE / SYNC mode select .Normally pull high
When MODE =H : DE mode.
When MODE =L : SYNC mode.
Note 2: Source Right or Left sequence control. Normally pull high.
When L/R = H :S1→S2→S3.....→S1536
When L/R = L: S1536→.....S3→S2→S1
Note 3 : Gate Up or Down scan control. Normally pull low.
When U/D = H, STV1 output vertical start pulse and UD pin output logical " 1" to Gate driver.
When U/D = L, STV2 output vertical start pulse and UD pin output logical " 0" to Gate driver.
Note 4 : Dithering function enable control. Normally pull low
When DITHB = H, Enable internal dithering function
When DITHB = L, Disable internal dithering function.

5. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	I_L=200mA		300		Cd/㎡	
Contrast ratio		CR	θ =0 °		800			
Response time		T_{ON}	25℃		30	40	ms	
		T_{OFF}						
CIE COLOUR COORDINATE	RED	RX	VIEWING NORMAL ANGLE	TYP. - 0.03	0.605	TYP. + 0.03		
		RY			0.336			
	GREEN	GX			0.297			
		GY			0.552			
	BLUE	BX			0.139			
		BY			0.132			
	WHITE	WX			0.307			
		WY			0.338			
VIEWING ANGLE	Hor.	θ x+	CR≥10		85		Degree	
		θ x-			85			
	Ver.	θ y+			85			
		θ y-			85			

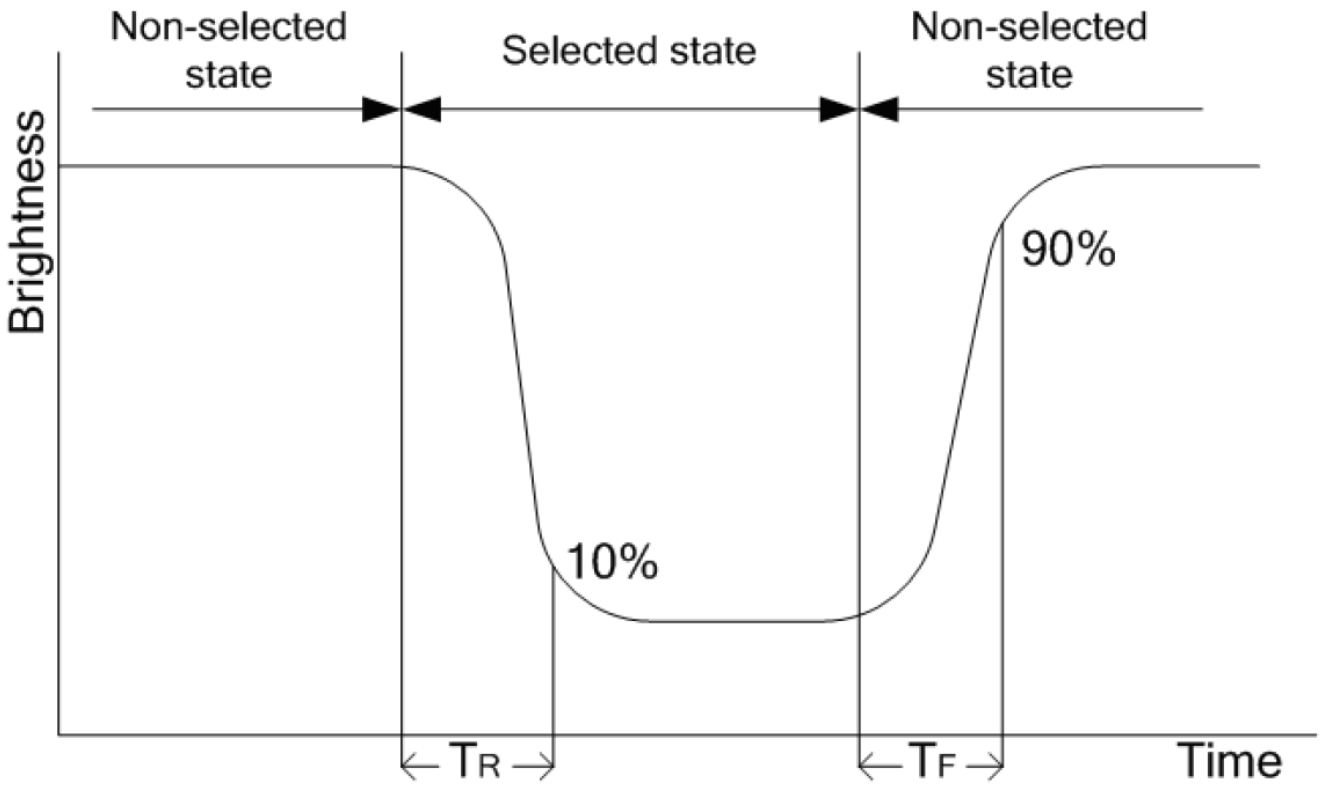
Note 1 : Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

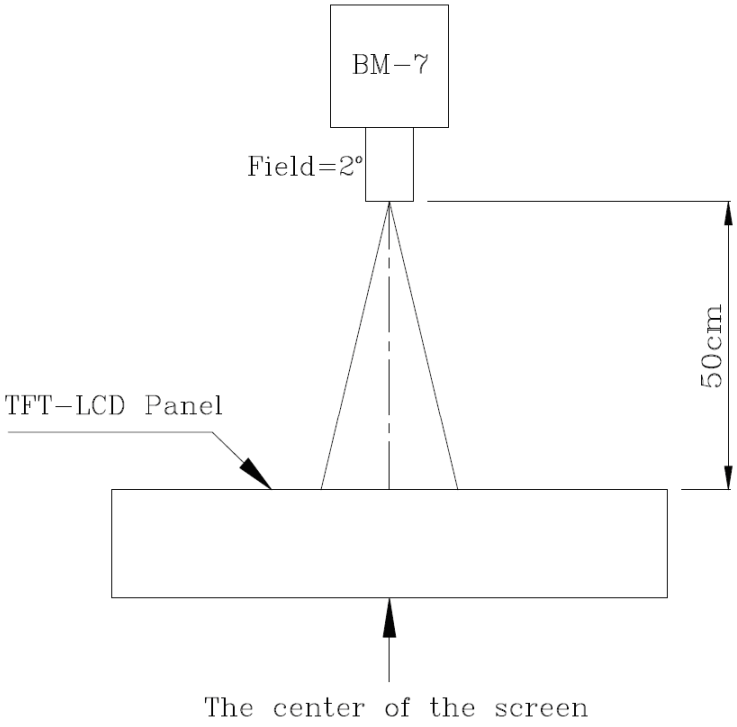
Note 3: Definition of response time (T_R, T_F)



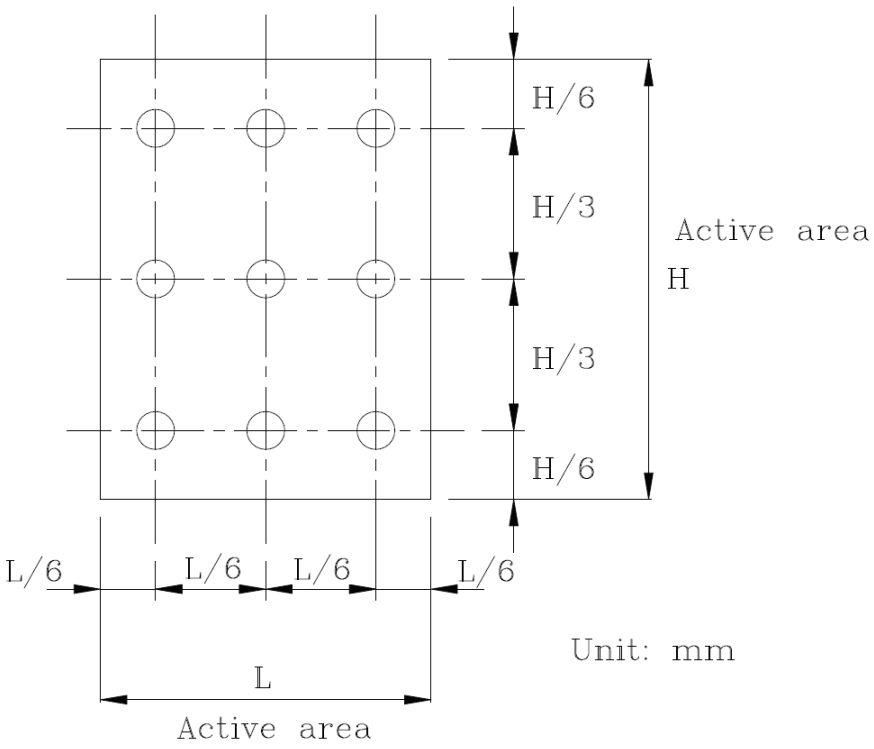
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2° (As measuring "black" image, field=2° is the best testing condition)



②The Brightness Test Point Setup



6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Power Supply Voltage	VDD	-0.5	5.0	V
Operating temperature	Top	-20	+70	℃
Storage temperature	Tst	-30	+80	℃

7. ELECTRICAL CHARACTERISTICS

7.1 BLACKLIGHT DRIVING CONDITIONS

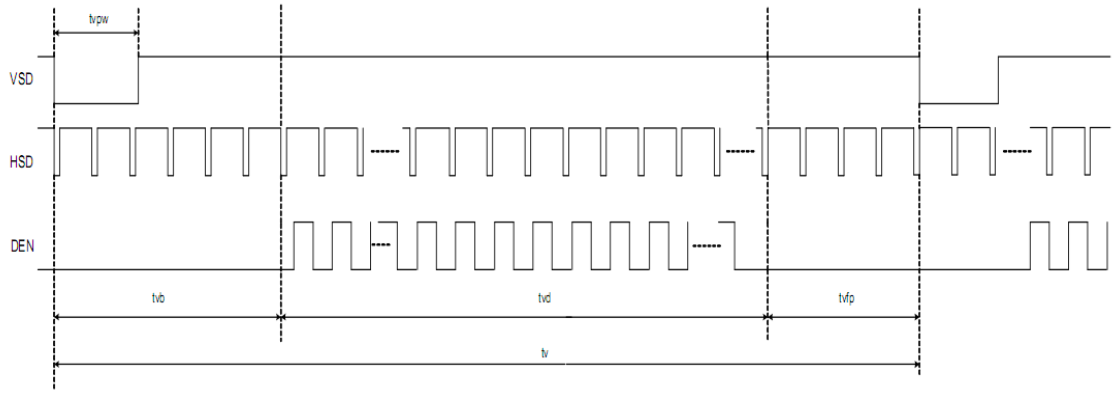
ITEM	SYMBOL	SPECIFICATIONS			UNIT	REMARK
		MIN	TYP.	MAX		
Supply Voltage	Vf		9.6		V	
Supply Current	IL		200		mA	
Power consumption	P		1.92		W	
LED lifetime		30,000			H_r	

7.2 ELECTRICAL CHARACTERISTICS

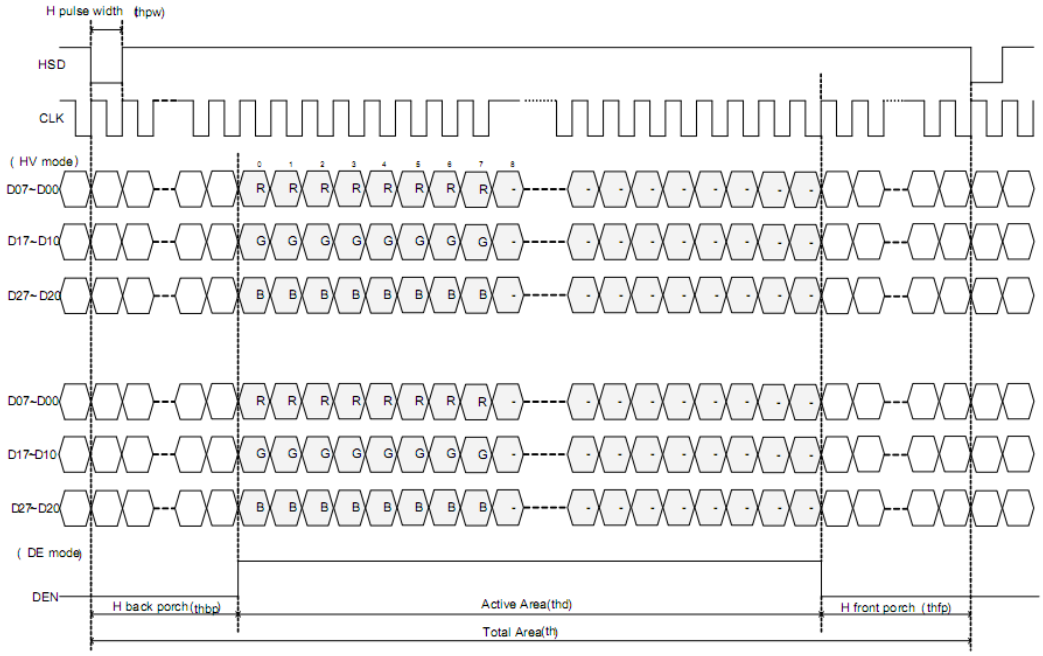
ITEM	SYMBOL	MIN	TYP.	MAX	UNIT
Power Supply	VDD	3.0	3.3	3.6	V
	AVDD		9.6		V
	VGH		18		V
	VGL		-6		V
	VCOM	4.0		4.4	V
Input voltage	Vil	GND	-	0.3VDD	V
	Vih	0.7VDD	-	VDD	V

8.TIMING CHARACTERISTICS

8.1 Vertical input timing



8.2 Horizontal input timing



DE mode

DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode Horizontal input timing						
Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		–			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode(2)

Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	–	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

9. RELIABILITY TEST

NO.	TEST ITEM	CONDITIONS
1	HIGH TEMPERATURE STORAGE	TA=80℃ 96H
2	LOW TEMPERATURE STORAGE	TA=-30℃ 96H
3	HIGH TEMPERATURE OPERATION	TA=70℃ 96H
4	LOW TEMPERATURE OPERATION	TA=-20℃ 96H
5	HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	+60℃,90%RH 96H
6	THERMAL SHOCK	-30℃→+80℃, 0.5H:5CYCLES

10. LCD MODULES HANDLING PRECAUTIONS

- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If

- the substance come into contact with your skin or clothes promptly wash it off using soap and water.

- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.

- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  -Be sure to ground the body when handling the LCD module.
  -Tools required for assembly, such as soldering irons, must be properly grounded.
  -To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  -The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

- Storage precautions
  When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0℃).Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

11. OTHERS

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.

- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.

- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections.