

DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 480272L TMH-PW-N

Product Specification

Version: 4

08.08.2018

GENERAL SPECIFICATION

MODULE NO. :

DEM 480272L TMH-PW-N

CUSTOMER

VERSION NO.	CHANGE DESCRIPTION	DATE
0	ORIGINAL VERSION	15.06.2016
1	GENERAL SPECIFICATIONS CHANGED	22.06.2016
2	ADD PACKAGE SPECIFICATION	01.07.2016
3	CHANGE PACKAGE SPECIFICATION	08.07.2016
4	ADD OPERATING CURRENT	08.08.2018

PREPARED BY: YH

DATE: 08.08.2018

APPROVEDBY: MH

DATE: 08.08.2018

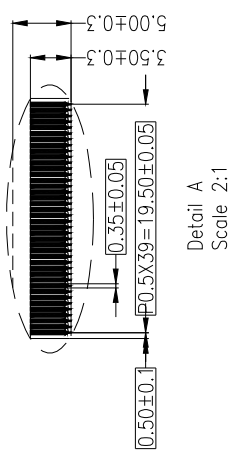
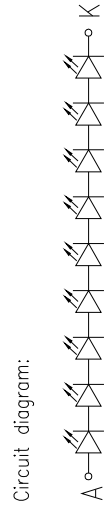
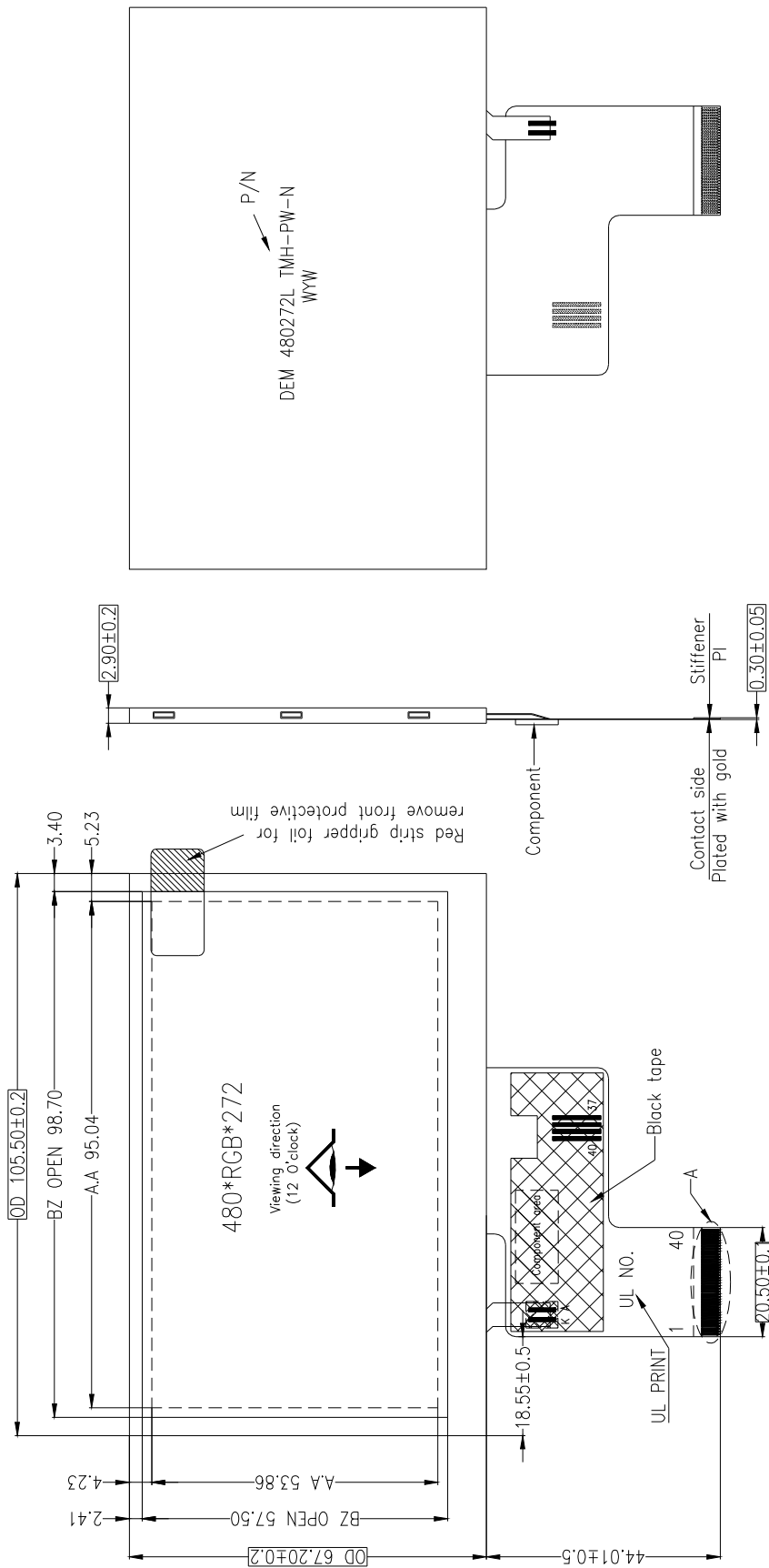
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1. GENERAL SPECIFICATIONS

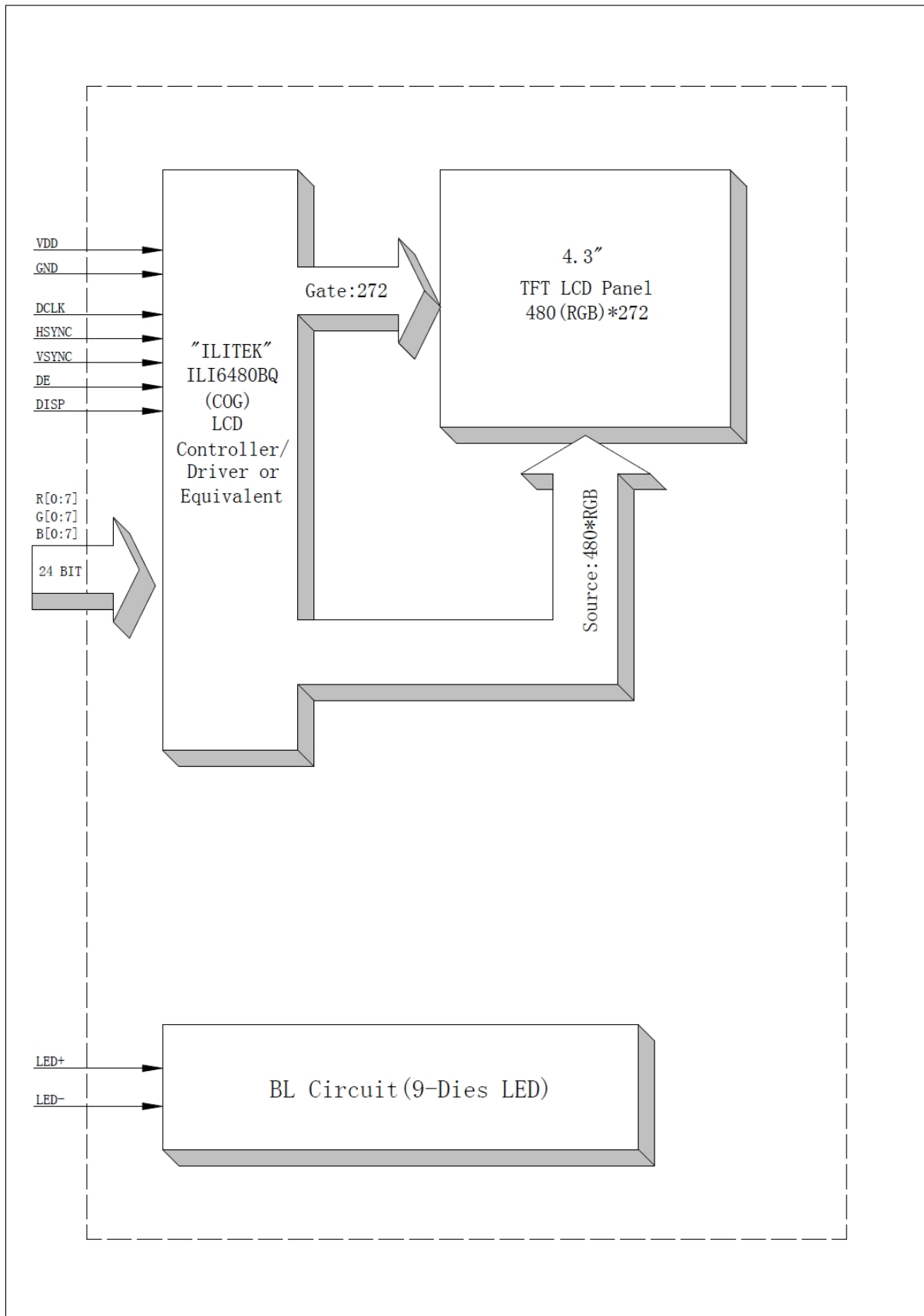
Item	Contents	Unit
LCD Type	TFT / TRANSMISSIVE	-
MODULE SIZE (WxHxT)	105.50 x 67.20 x 2.90	mm
ACTIVE SIZE (WxH)	95.04 x 53.86	mm
PIXEL PITCH (WxH)	0.198 x 0.198	mm
NUMBER OF DOTS	480 x RGB x 272	-
DIVER IC	ILI6480BQ	-
INTERFACE TYPE	24-BIT/18-BIT-RGB	-
TOP POLARIZER TYPE	ANTI-GLARE	-
RECOMMEND VIEWING DIRECTION	12:00	O'CLOCK
GRAY SCALE INVERSION DIRECTION	6:00	O'CLOCK
COLORS	16.7 Million	-
BACKLIGHT TYPE	9-DIES WHITE LED	-
TOUCH PANEL TYPE	WITHOUT	-
APPROX. WEIGHT	45	g

2. EXTERNAL DIMENSIONS



- Remark:
1. Unmarked tolerance is ± 0.3
 2. All materials comply with RoHS
 3. ...:critical dimension
 4. WW:Product date code printing
Format: Y:year ,WW:week

3. BLOCK DIAGRAM



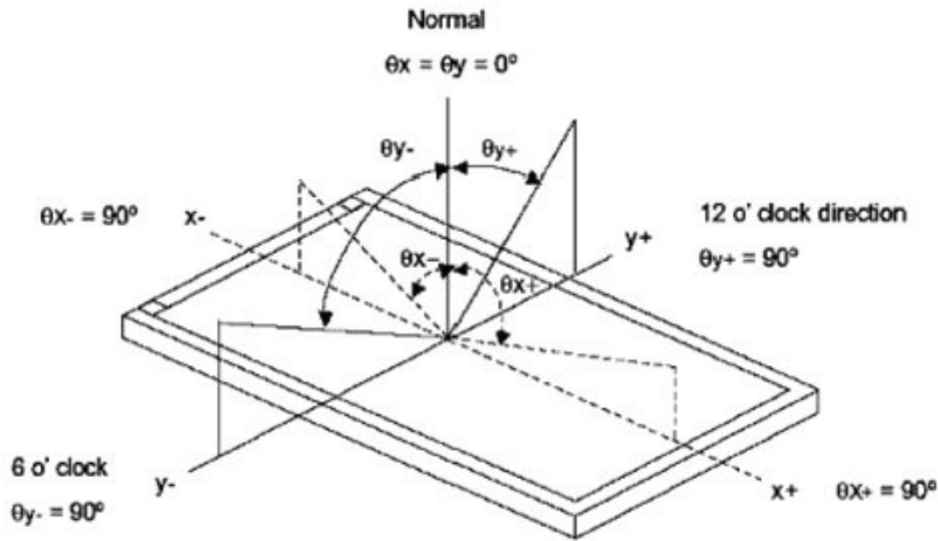
4. PIN ASSIGNMENT

Pin NO.	Symbol	Description
1	LED-	Cathode of LED backlight
2	LED+	Anode of LED backlight
3	GND	Power ground
4	VDD	Power supply
5-12	R0-R7	8-bit digital Red data input
13-20	G0-G7	8-bit digital Green data input
21-28	B0-B7	8-bit digital Blue data input
29	GND	Power ground
30	DCLK	Clock signal; latching data at the falling edge
31	DISP	Display control/standby mode selection DISP="low"; standby; DISP="high"; normal display(default);
32	HSYNC	Horizontal Sync Signal; Negative Polarity
33	VSYNC	Vertical Sync Signal; Negative Polarity
34	DE	Data input enable. Active High to enable the data input
35	NC	No Connection
36	GND	Power ground
37	NC	No Connection
38	NC	No Connection
39	NC	No Connection
40	NC	No Connection

5. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
			MIN	TYP.	MAX		
Luminance	L	$I_L = 20\text{mA}$	500	550	600	Cd/m ²	
Contrast Ratio	CR	$\theta = 0^\circ$	400	500			
Response Time	T_{ON}	25°C		10	20	ms	
	T_{OFF}			15	30		
CIE Color Coordinate	Red	X_R					
		Y_R					
	Green	X_G					
		Y_G					
	Blue	X_B					
		Y_B					
	White	X_W	0.27	0.31	0.35		
		Y_W	0.31	0.35	0.39		
Viewing Angle	Hor.	θ_{X+}	60	70		Degree	
		θ_{X-}	60	70			
	Ver.	θ_{Y+}	40	50			
		θ_{Y-}	60	70			
Uniformity	Un		80			%	

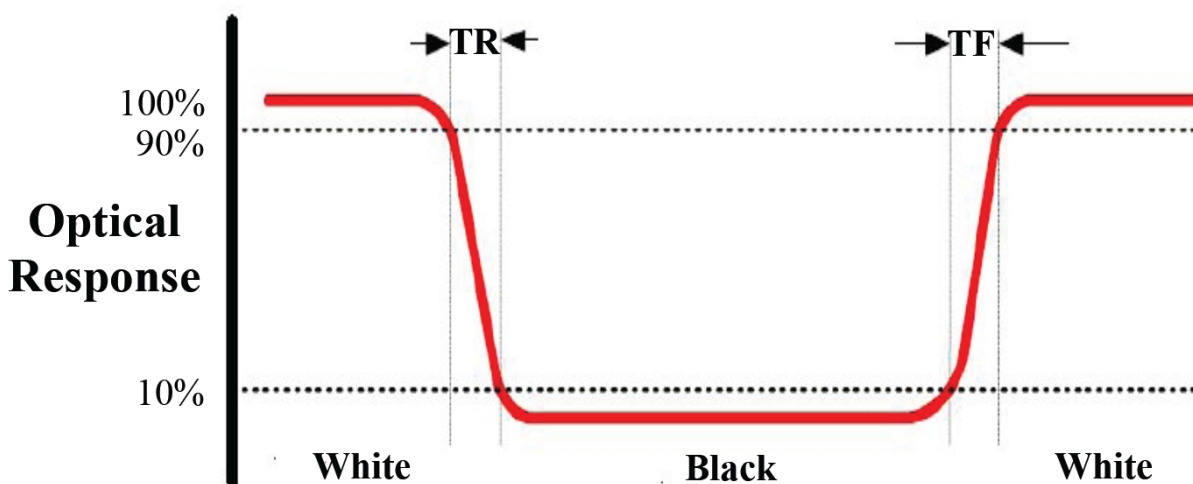
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

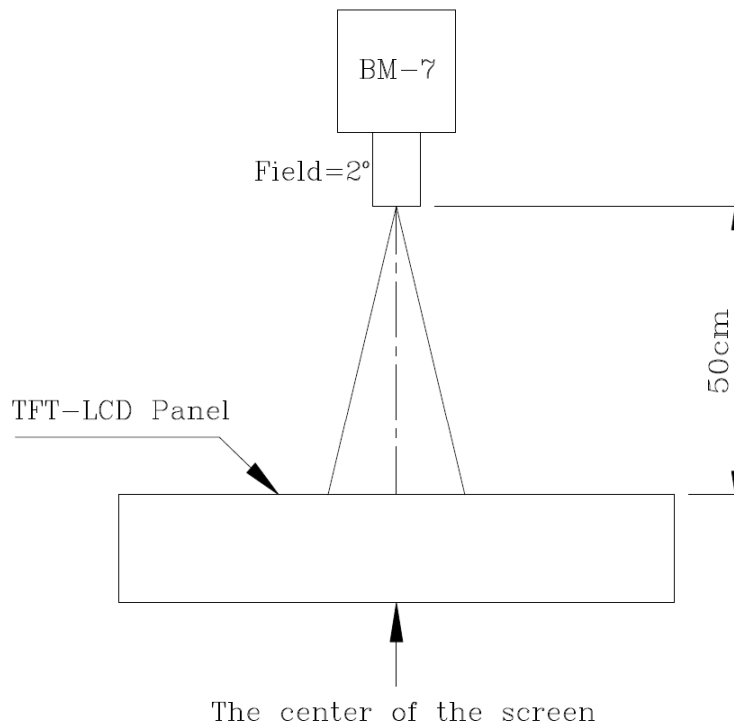
Note 3: Definition of Response Time (T_r, T_f)



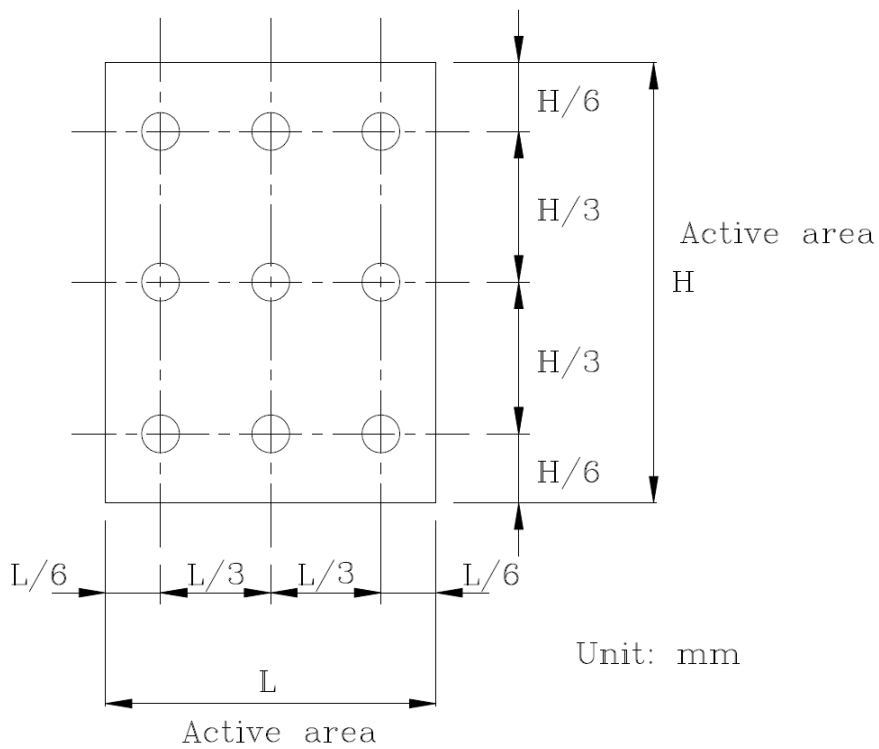
Note 4: Definition of Luminance

① The Brightness Test Equipment Setup

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



② The Brightness Test Point Setup



6. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply Voltage for Analog	VDD	-0.3	4.5	V
Supply Voltage for Logic	VDD	-0.3	4.5	V
Supply Current (One LED)	I _{LED}		30	mA
Operating Temperature	T _{OP}	-20	+70	°C
Storage Temperature	T _{ST}	-30	+80	°C

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

7. ELECTRICAL CHARACTERISTICS

7.1 INPUT POWER

ITEM	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VDD	3.0	3.3	3.6	V	
Supply Voltage for Logic	VDD	3.0	3.3	3.6	V	
Power Supply Current	IDD		15		mA	DCLK=9MHz
Input Voltage	V _{IL}	GND	-	0.3VCC	V	
	V _{IH}	0.7VCC	-	VCC	V	
Input Leakage Current	I _{LKG}	-1		1	uA	

7.2 BLACKLIGHT DRIVING CONDITIONS

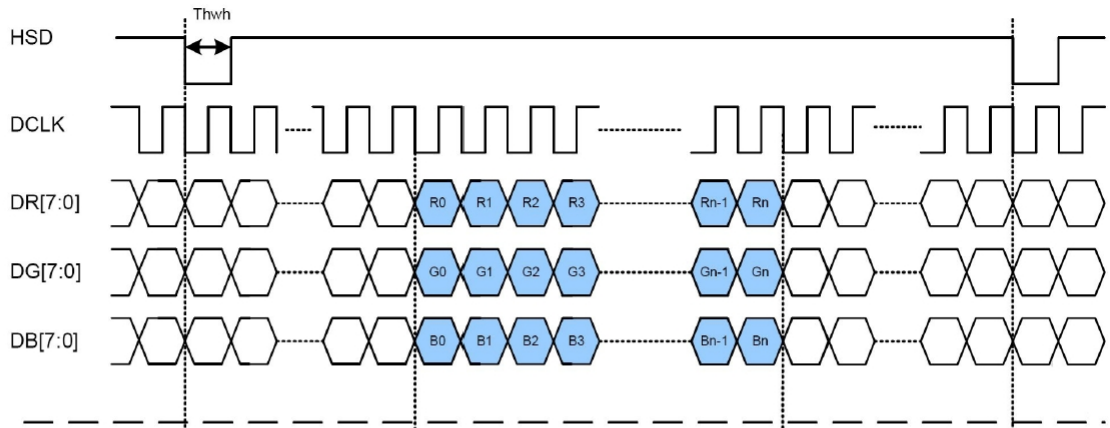
Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V _F	27	28.8	30.6	V	I _I =20mA
Current for LED Backlight	I _L	15	20	25	mA	
Power Consumption	P		0.576		W	
LED Lifetime		50.000			Hr	Note

Note: brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

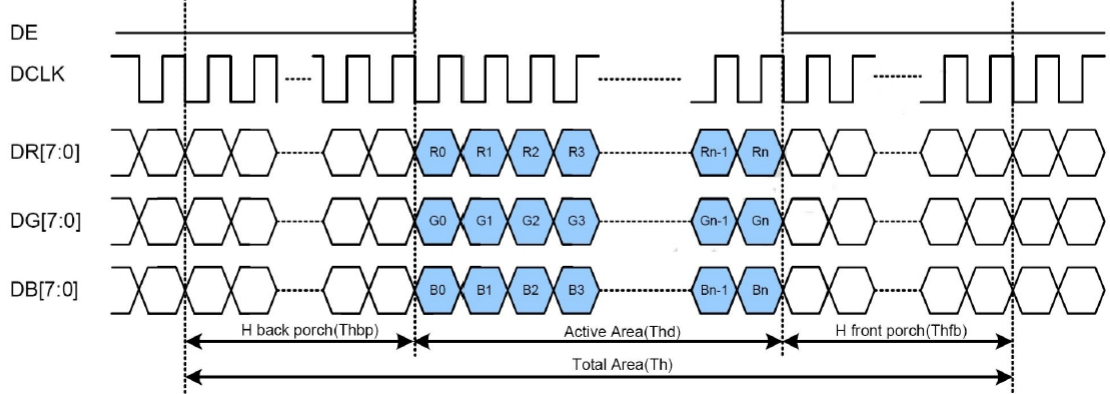
7.3 TIMING CHARACTERISTICS

7.3.1 PARALLEL RGB MODE TIMING DIAGRAM

(HV Mode)



(DE Mode)

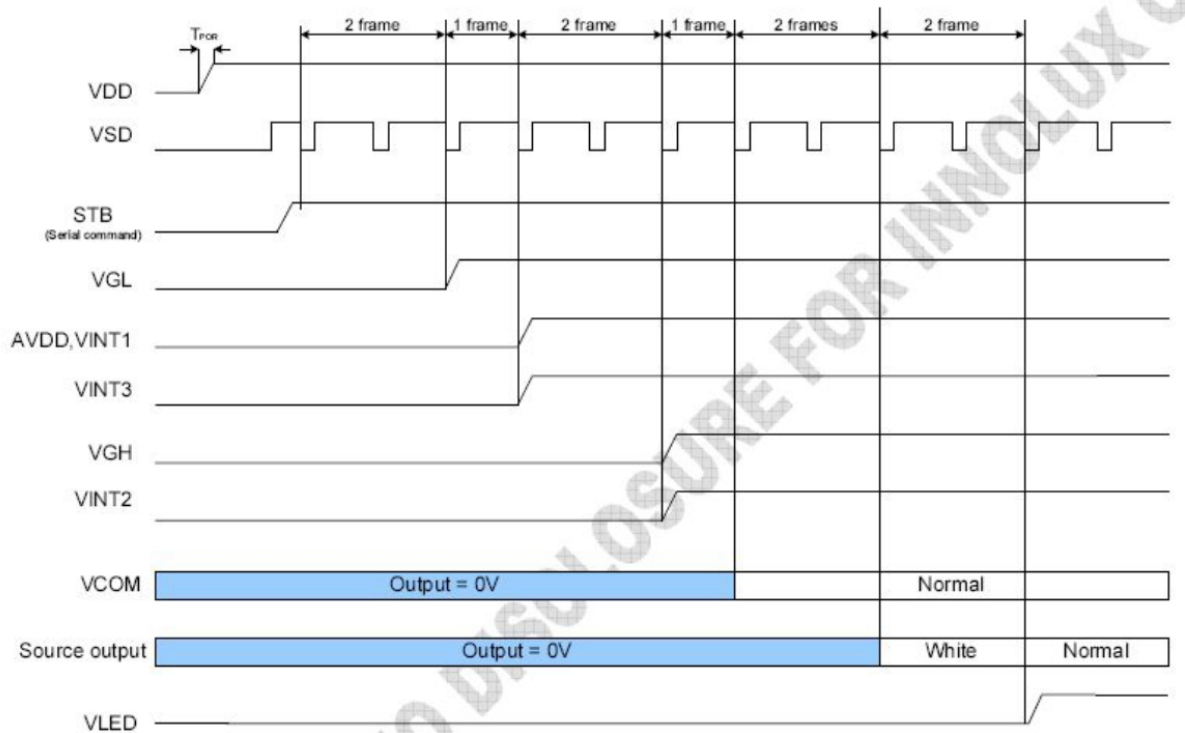


7.3.2 PARALLEL RGB TIMING TABLE

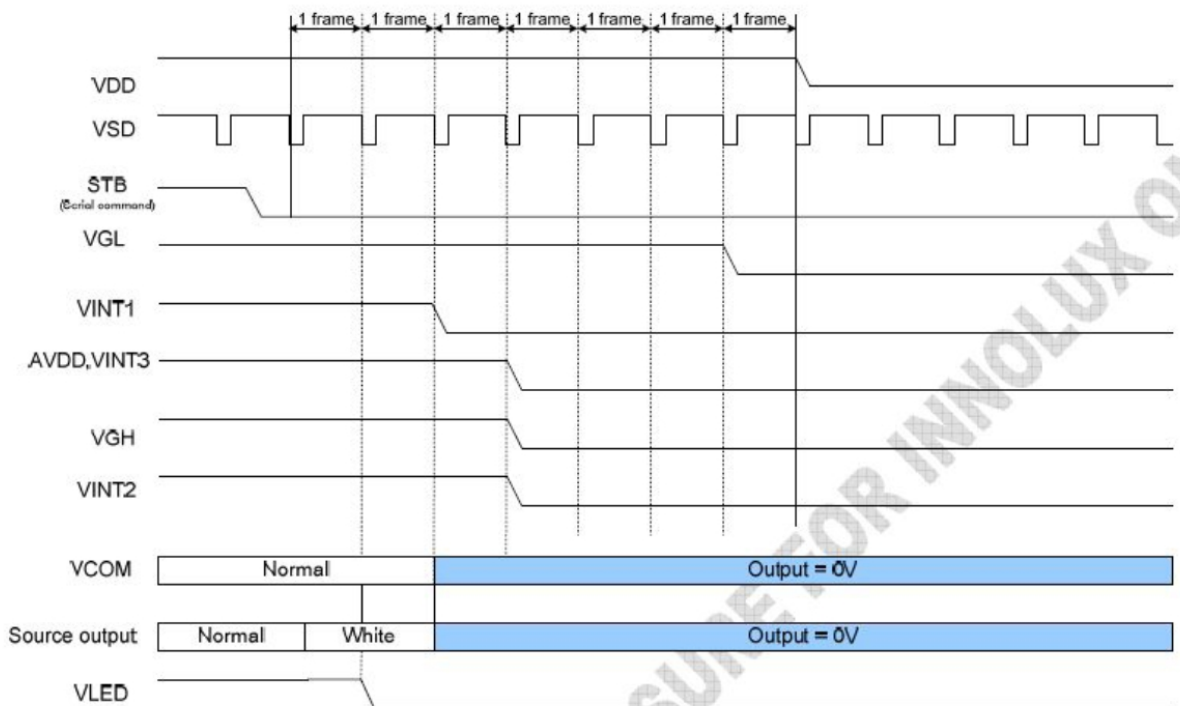
Parameter	Symbol	Value			Unit
		Min	Typ	Max	
DCLK frequency	fclk	5	9	12	MHz
VSD period time	Tv	277	288	400	H
VSD display area	Tvd	272			H
VSD back porch	Tvb	3	8	31	H
VSD front porch	Tvfp	2	8	97	H
HSD period time	Th	520	525	800	DCLK
HSD display area	Thd	480			DCLK
HSD back porch	Thbp	36	40	255	DCLK
HSD front porch	Thfp	4	5	65	DCLK

7.3.3 POWER ON/OFF SEQUENCE

Power on



Power off



8. RELIABILITY TEST

No.	Item	Description
01	High Temperature operation	The sample should be allowed to stand at 70°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80°C for 240 hours under no-load condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -30°C for 240 hours under no-load condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 60°C, 90%RH MAX for 240 hours under no-load condition , then taking it out and drying it at normal temperature for 2 hours.
06	Operate at high temperature and humidity	60°C, 90%RH , 240 hours
07	Thermal shock storage	The sample should be allowed to stand the following 10 cycles: -30°C for 30 minutes->normal temperature for 5 minutes-> +80°C for 30 minutes -> normal temperature for 5 minutes, as one cycle.
08	Packing vibration	Frequency range:10HZ~55HZ Amplitude of vibration:1.5mm Sweep time:12min X,Y, Z 2 hours for each direction.
09	Packing drop test	According to ASTM-D-5327
10	Electrical static	Air: $\pm 4KV$ 150Pf/330 Ω 5 times

9. 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 substances 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 polarizer 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°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

10. 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.