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TFT | CHARACTER | UWVD | FSC | SEGMENT | CUSTOM | REPLACEMENT

TFT Display Module

Part Number

E70RG38048LW2M450-N

Overview

800x480(165x100), 16/18/24 bit RGB Interface, WHITE LED backlight, Top view, Wide temp, Transmissive, No Touch Panel, 450 NITS, Controller: EK9713/EK7330, RoHS Compliant

General Description

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 5.0TFT-LCD contains 800x480 pixels, and can display up to 65K/262K/16.7M colors.

* Features

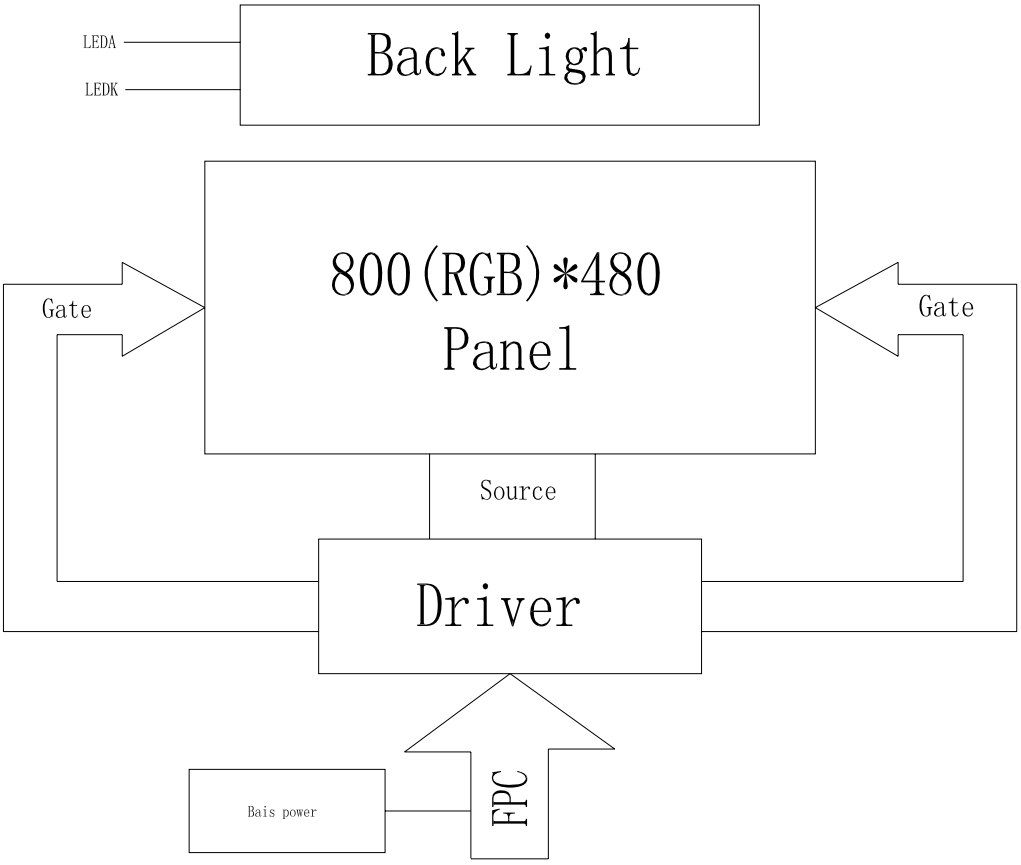
-Low Input Voltage: 3.3V(TYP)
-Display Colors of TFT LCD: 65K/262K/16.7M colors
- Interface: 16/18/24 bit RGB

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	154.08(H)*85.92 (V) (7.0inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	65K/262K/16.7M	colors	-
Number of pixels	800(RGB)*480	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.0642(H)*0.0.1790(V)	mm	-
Viewing angle	12:00	o'clock	-
Controller IC	EK9713/EK7330	-	-
Display mode	Transmissive/ Normally White	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

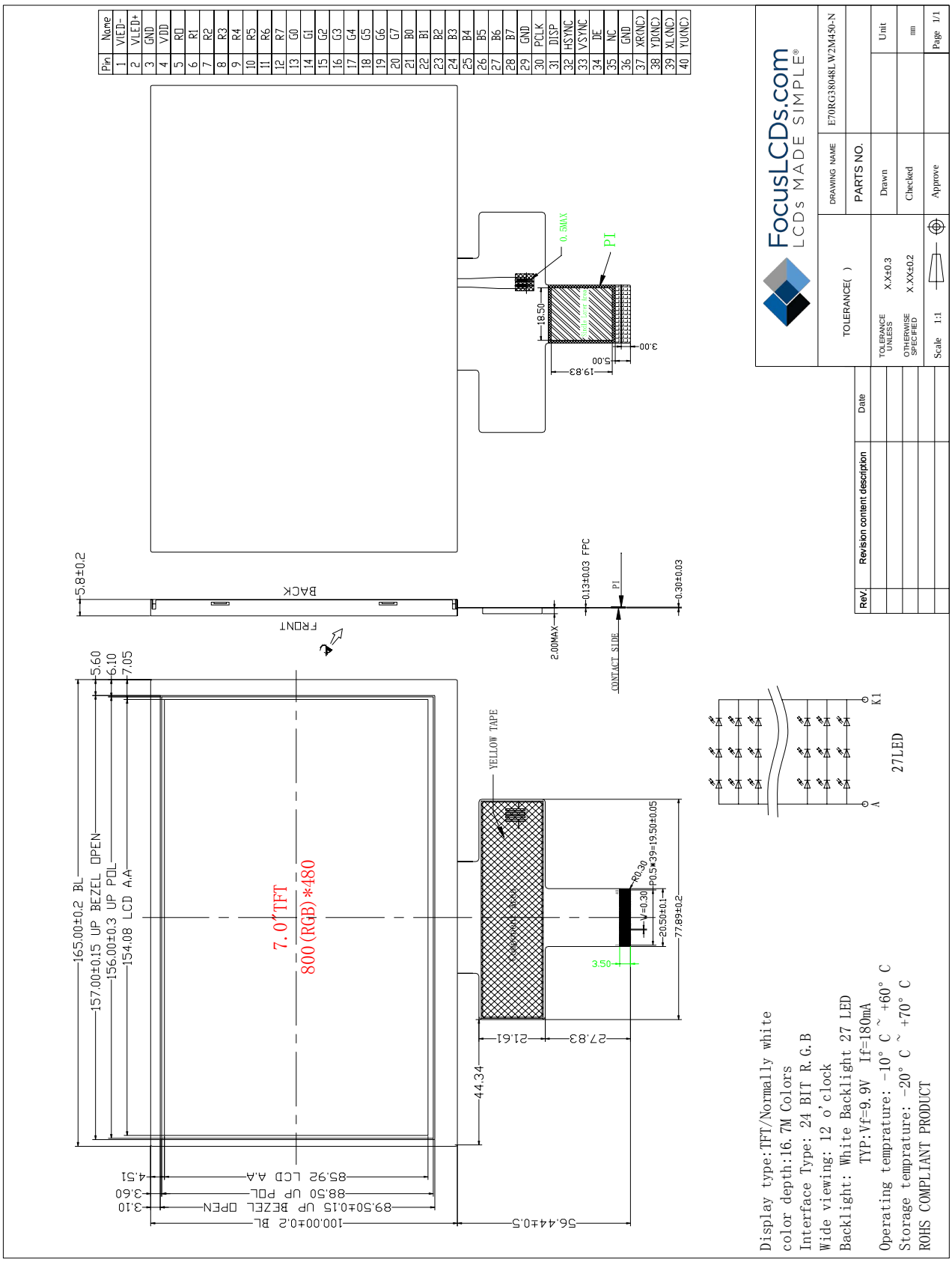
* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		165		mm	-
	Vertical(V)		100		mm	-
	Depth(D)		5.8		mm	-
Weight			TBD		g	-

1. Block Diagram



2. Outline dimension



3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	VLED-	Cathode pin OF backlight	P
2	VLED+	Anode pin of backlight	P
3	GND	Ground.	P
4	VDD	Supply voltage(3.3V).	P
5	R0	Red data input.	I/O
6	R1	Red data input.	I/O
7	R2	Red data input.	I/O
8	R3	Red data input.	I/O
9	R4	Red data input.	I/O
10	R5	Red data input.	I/O
11	R6	Red data input.	I/O
12	R8	Red data input.	I/O
13	G0	Green data input.	I/O
14	G1	Green data input.	I/O
15	G2	Green data input.	I/O
16	G3	Green data input.	I/O
17	G4	Green data input.	I/O
18	G5	Green data input.	I/O
19	G6	Green data input.	I/O
20	G7	Green data input.	I/O
21	B0	Blue data input.	I/O
22	B1	Blue data input.	I/O
23	B2	Blue data input.	I/O
24	B3	Blue data input.	I/O
25	B4	Blue data input.	I/O
26	B5	Blue data input.	I/O

27	B6	Blue data input.	I/O
28	B7	Blue data input.	I/O
29	GND	Ground.	P
30	PCLK	Dot clock signal for RGB interface operation Fix this pin at VCI or GND when not in use.	I
31	DISP	Standby setting for testing, it should be connected to VDDIO in normal operation mode. If connected to GND, the IC is in standby mode.	I
32	HSYNC	Line synchronizing signal for RGB interface o peration. fix this pin at VCI or GND when not in use	I
33	VSYNC	Frame synchronizing signal for RGB interface operation. fix this pin at VCI or GND when not in use.	I
34	DE	Data enable signal for RGB interface operatio n. fix this pin at VCI or GND when not in use.	I
35	NC	NC	
36	GND	Ground.	P
37	XR(NC)	Touch panel Right Glass Terminal	A/D
38	YD(NC)	Touch panel Bottom Film Terminal	A/D
39	XL(NC)	Touch panel LIFT Glass Terminal	A/D
40	YU(NC)	Touch panel Top Film Terminal	A/D

4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥10)	θ_L	Φ=180°(9 o'clock)	60	70	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	60	70	-		
	θ_T	Φ=90°(12 o'clock)	40	50	-		
	θ_B	Φ=270°(6 o'clock)	60	70	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5
	W_Y		0.28	0.33	0.38	-	
Transmittance	$T_{\%}$		-	5.11	-	-	-

Test Conditions:

1. V_{CC}=3.3V, AV_{DD}=10V, the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

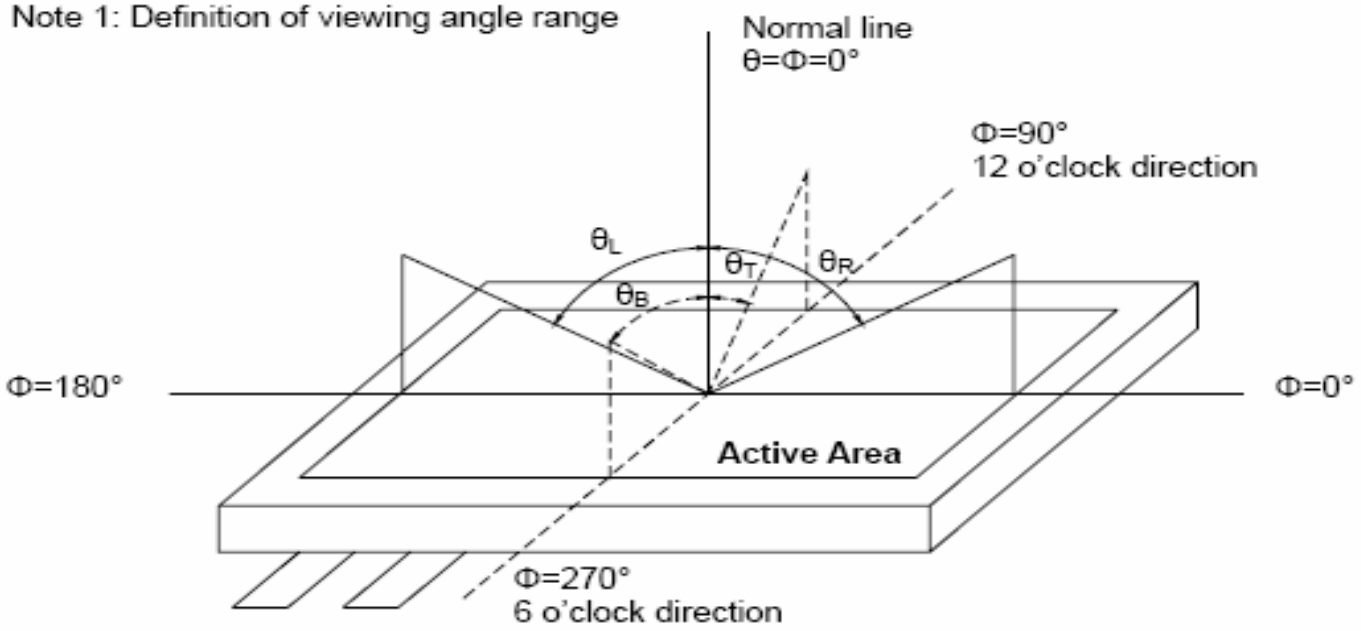


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. The optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

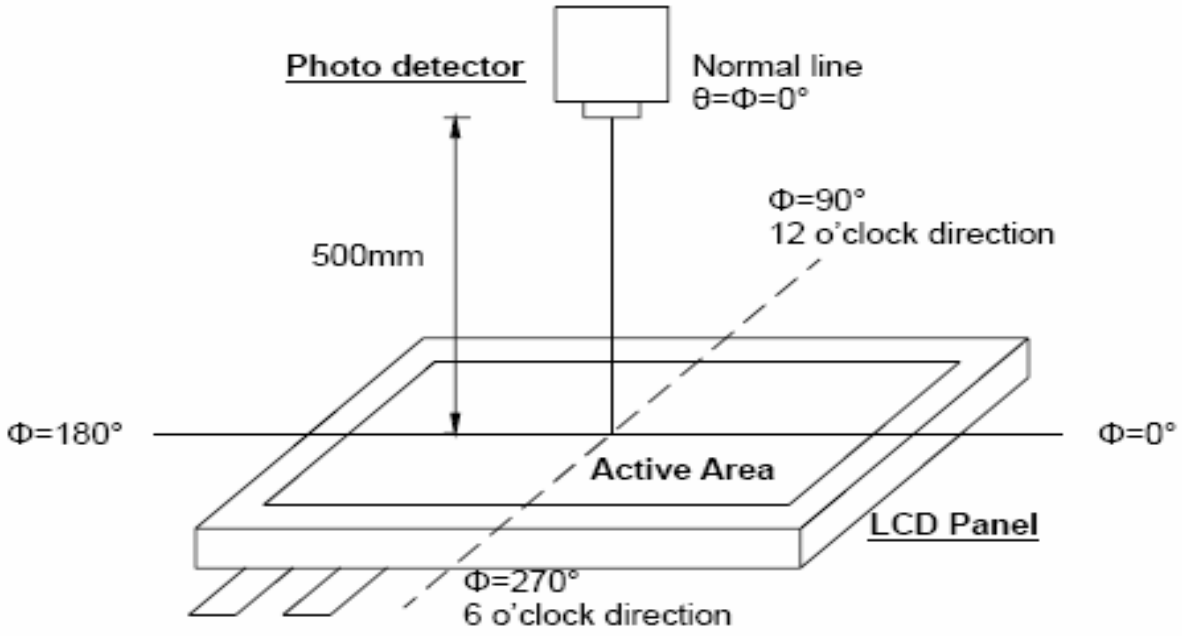


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

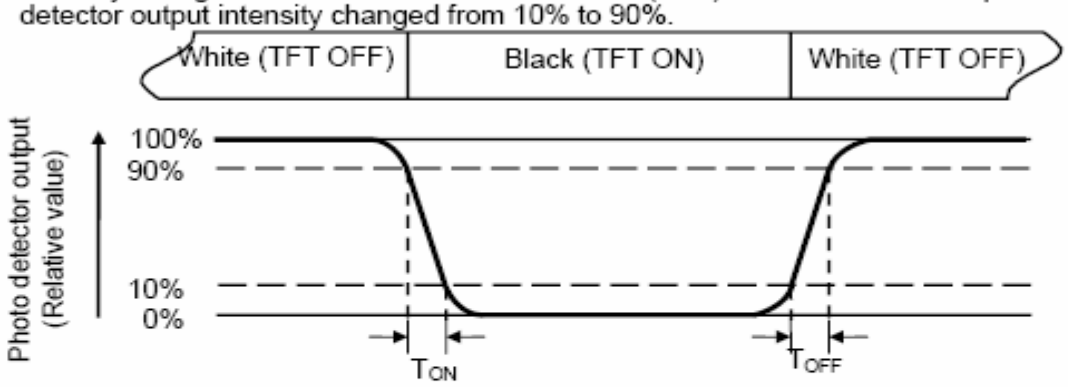


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD	-0.5	5.0	**V**
Digital interface supple Voltage	VDDIO	-0.5	VDD+0.3	**V**
Operating temperature	T_{OP}	-20	+70	℃
Storage temperature	T_{ST}	-30	+80	℃

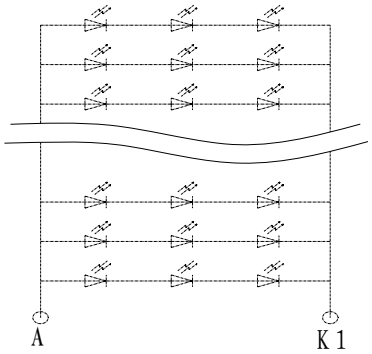
5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3..3	3.6	V	
Digital interface supple Voltage	VDDIO	3.0	3.3	3.6	V	
Normal mode Current consumption	IDD	--	150	--	mA	
Level input voltage	VIH	0.7VDDIO		VDDIO	V	
	VIL	GND		0.3VDDIO	V	
Level output voltage	V_{OH}	0.8VDDIO		VDDIO	V	
	V_{OL}	GND		0.2VDDIO	V	

5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 27chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	135	180	--	mA	
Forward Voltage	V_F	--	9.6	--	V	
LCM Luminance	L_V	450	--	--	cd/m2	IF=180mA
Uniformity	AVg	80	--	--	%	

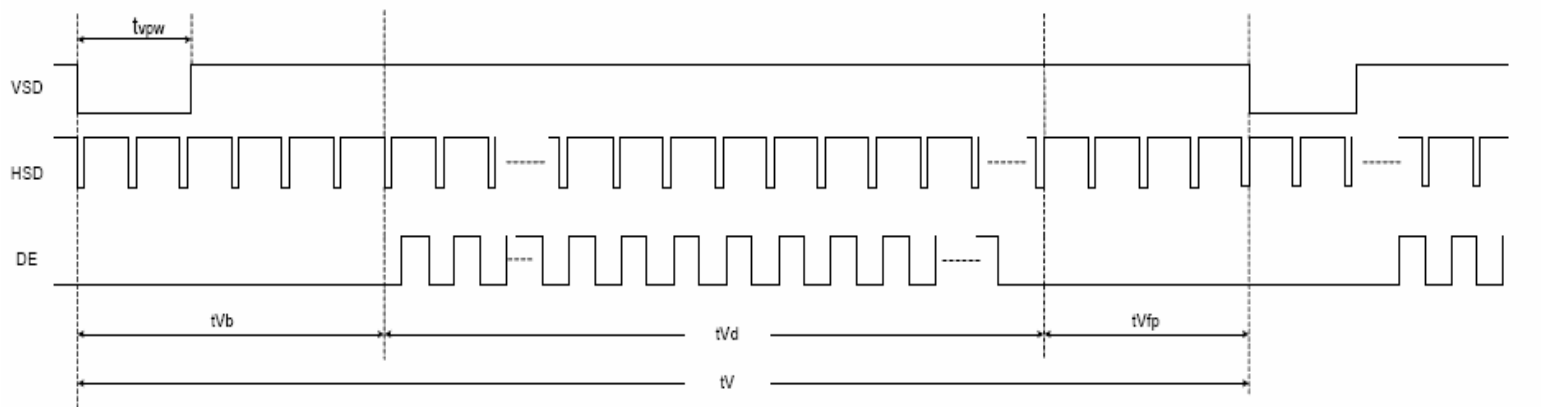


Serial line 3 and 9 27LED

6. AC Characteristic

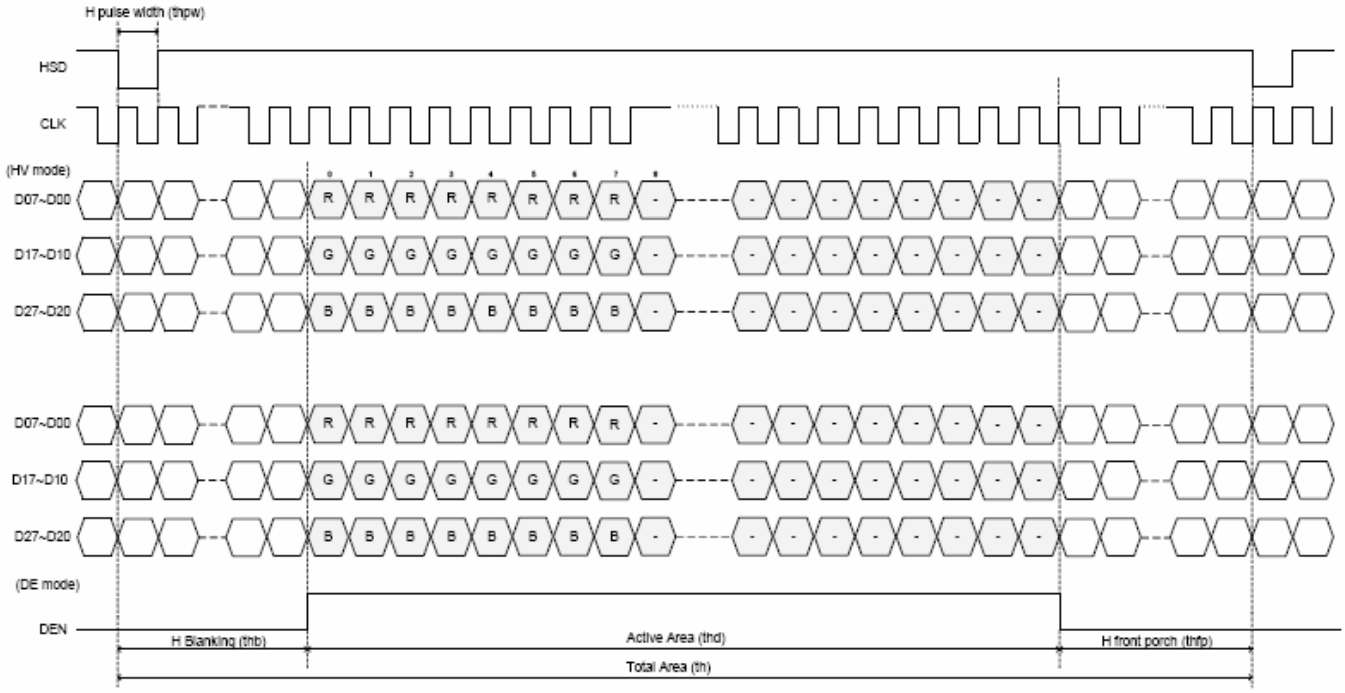
6.1. Display Timing characteristics

6.1.1 Vertical input timing



Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd		480		H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

6.1.2 Horizontal input timing



Parameter		Symbol	Value			Unit
Horizontal display area		thd		800		DCLK
DCLK frequency		fclk	Min.	Typ.	Max	
			-	33.3	50	MHz
1 Horizontal Line		th	862	1056	1200	DCLK
HSD pulse width	Min.	thpw		1		
	Typ.			-		
	Max.			40		
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	