LCD MODULE

SPECIFICATION

Model:	UE043HV-RB40-L083A
Version:	V1.0
Date:	20231016

Customer Confirmation

Approved by	Notes

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

VIEWE Confirmation

Prepared by	Reviewed by	Approved by

REVISION HISTORY

Revision	Date	Contents of Revision Change	Remark
V1.0	20231016	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

1) Pixel Arrangement：RGB Vertical Stripe
2) Interface Mode： RGB 24BITS
3) Driver IC： ST7282A
4) Operation Temperature：-20~70℃
5) Storage Temperature：-30~80℃
6) Backlight Type：White LED
7) Display mode：Normally Black,
8) Pixel Density：128 PPI
9) LED life time：30,000 Hours

1.2 Mechanical Specification

Item	Specification	Unit	Remark
Pixel Driving element	IPS TFT	-	-
Screen Size	4.3	Inch	Diagonal
Resolution	480(W)*3(RGB)*272(H)	Dots	-
Interface	RGB 24bits	-	40PIN
Module Power Consumption	0.615	Watt	Typ.
Active Area	95.04(W)*53.86(H)	mm	-
Pixel pitch (W*H)	0.198(W)*0.198(H)	mm	-
Module Size (W*H*D)	105.36(W)*67.1(H)*2.88(D)	mm	-
Luminance	350	cd/m^2	Typ.
Viewing Direction	ALL	O'clock	-
Display Color	16M	Colors	24bits

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Remark
Power supply voltage	VDD	-0.5	3.96	V	Note1
LED forward current	I_F	-0.001	30	mA	For each led,Note1
LED Reverse Voltage	V_R	-	5	V	For each led,Note1
Operating temperature	T_{op}	-30	85	°C	Note1,2
Storage temperature	T_{st}	-30	85	°C	Note1,2
Humidity	H_{st}	10	90	%RH	Note1,3

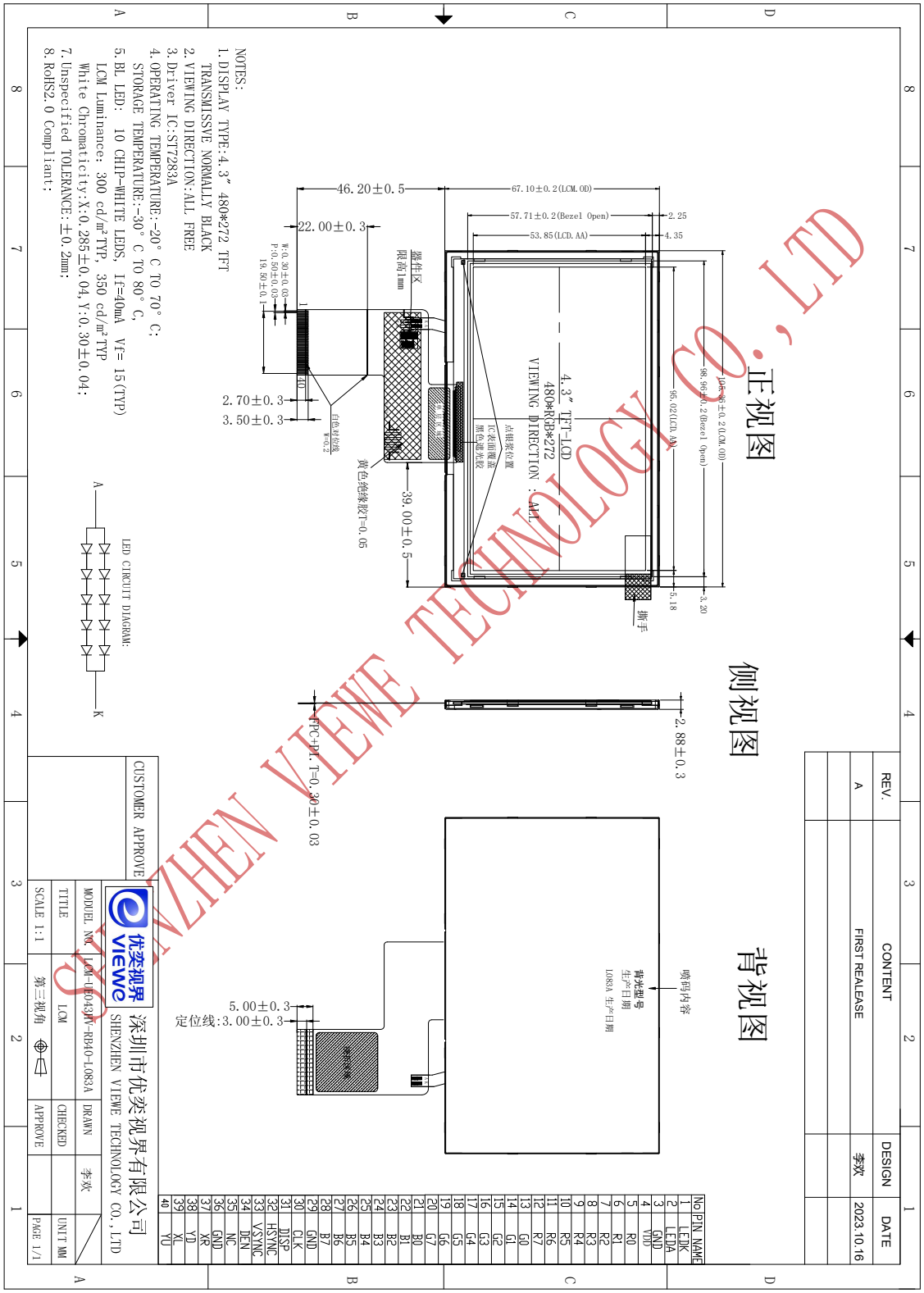
(Ta=+25°C,GND=0V)

Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

Note2: In case of temperature below 0℃,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60℃ , 90% RH MAX.
Temp. ＞60℃ , Absolute humidity shall be less than 90% RH.

3. MECHANICAL DRAWING



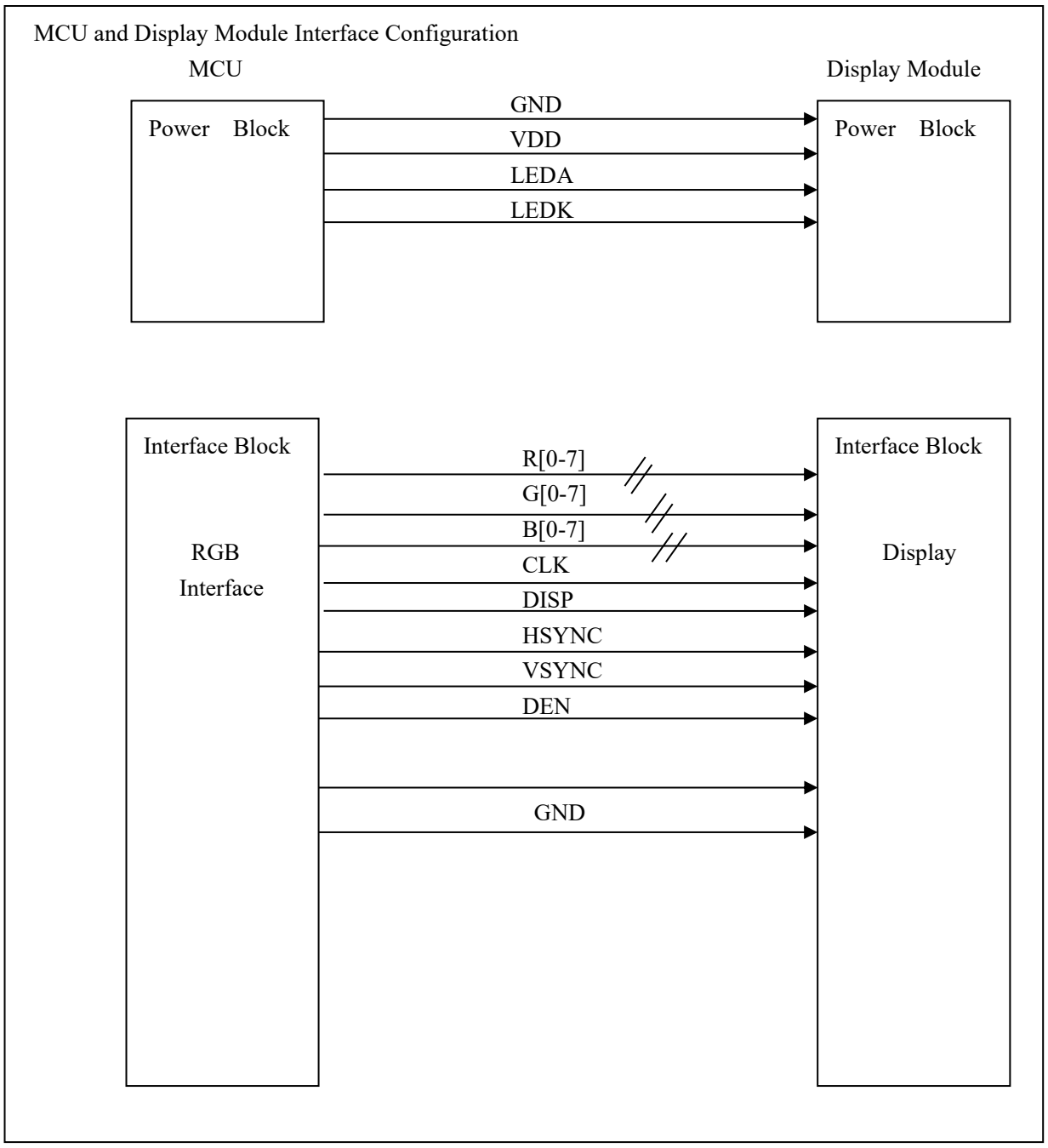
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin No.	Symbol	I/O	Description
1	LEDK	P	Power supply for backlight cathode
2	LEDA	P	Power supply for backlight anode
3	GND	P	Power Ground
4	VDD	P	Power supply to the internal logic power regulator(3.3V)
5-12	R0-R7	I	Red data input.
13-20	G0-G7	I	Green data input.
21-28	B0-B7	I	Blue data input.
29	GND	P	Power Ground
30	CLK	I	Pixel clock input pin, Negative polarity
31	DISP	I	Standby mode. Normally pulled high.
32	HSYNC	I	Horizontal sync signal, Negative polarity
33	VSYNC	I	Vertical sync signal, Negative polarity
34	DEN	I	Data input enable. Display access is enabled when DE is “H”
35	NC	I	Dummy
36	GND	P	Power Ground
37	XR	-	Dummy
38	YD	-	Dummy
39	XL	-	Dummy
40	YU	-	Dummy

I：Input；O：Output；P：Power

4.2 Block Diagram



5. ELECTRICAL CHARACTERISTICS

5.1 TFT-LCD Panel Driving Section

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	3.0	3.3	3.6	V	-
Power Supply Current	I_{VDD}	-	50	-	mA	Note1
Logic Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	-
Logic Input Low Voltage	V_{IL}	0	-	0.3VDD	V	-
Panel Power Consumption	P_{VDD}	-	0.165	-	Watt	Note1
Module Power Consumption	P_{LCM}	-	0.615	-	Watt	Note1,2

(Ta=+25°C,GND=0V)

Note1:Measurement Conditions (Video Mode): Full Screen Red Pattern,VDD=3.3V,60Hz Refresh.

Note2: P_{LCM}= P_{VDD}+ P_{BL}， About P_{BL} information, inference to 5.2 Back Light Driving Section.

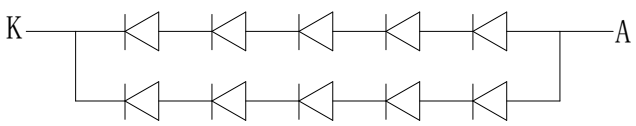
5.2 Back Light Driving Section

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Voltage	V_F	-	15	-	V	Note1
Forward Current	I_F	-	30	-	mA	Note1
Backlight Power consumption	P_{BL}	-	0.45	-	Watt	Note1
LED life time	-	30000	-	-	Hrs	Note2
LED Quantity			10		PCS	

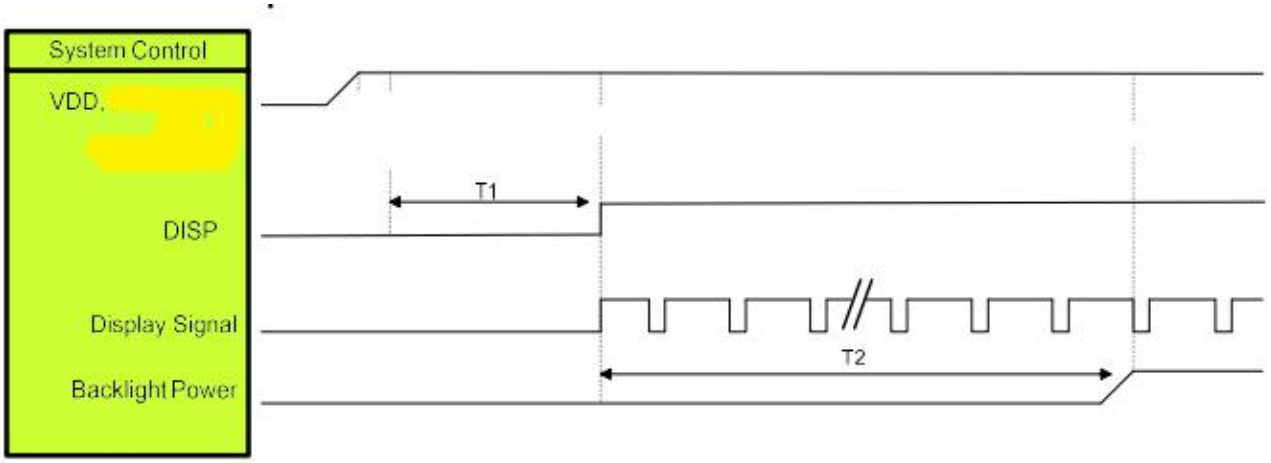
(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module

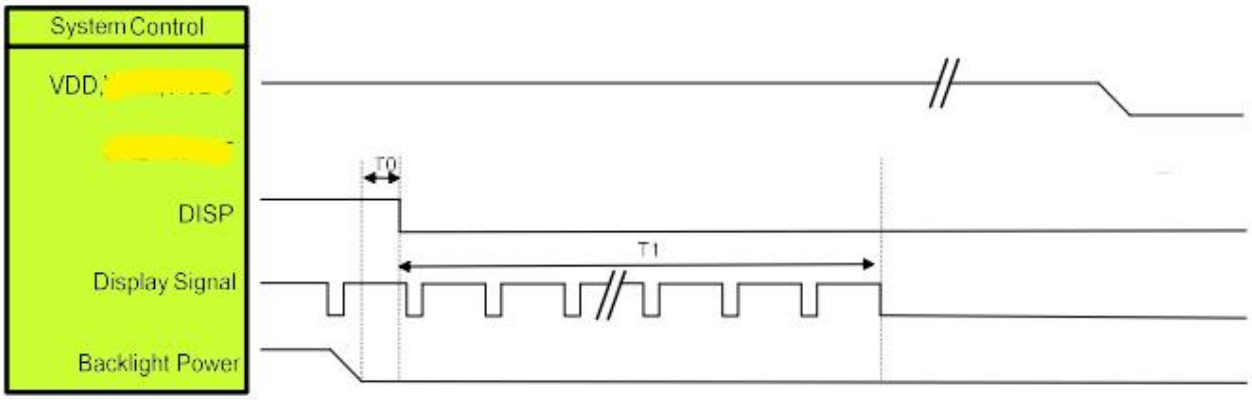
Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



5.3 Power On/Off Sequence



Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms

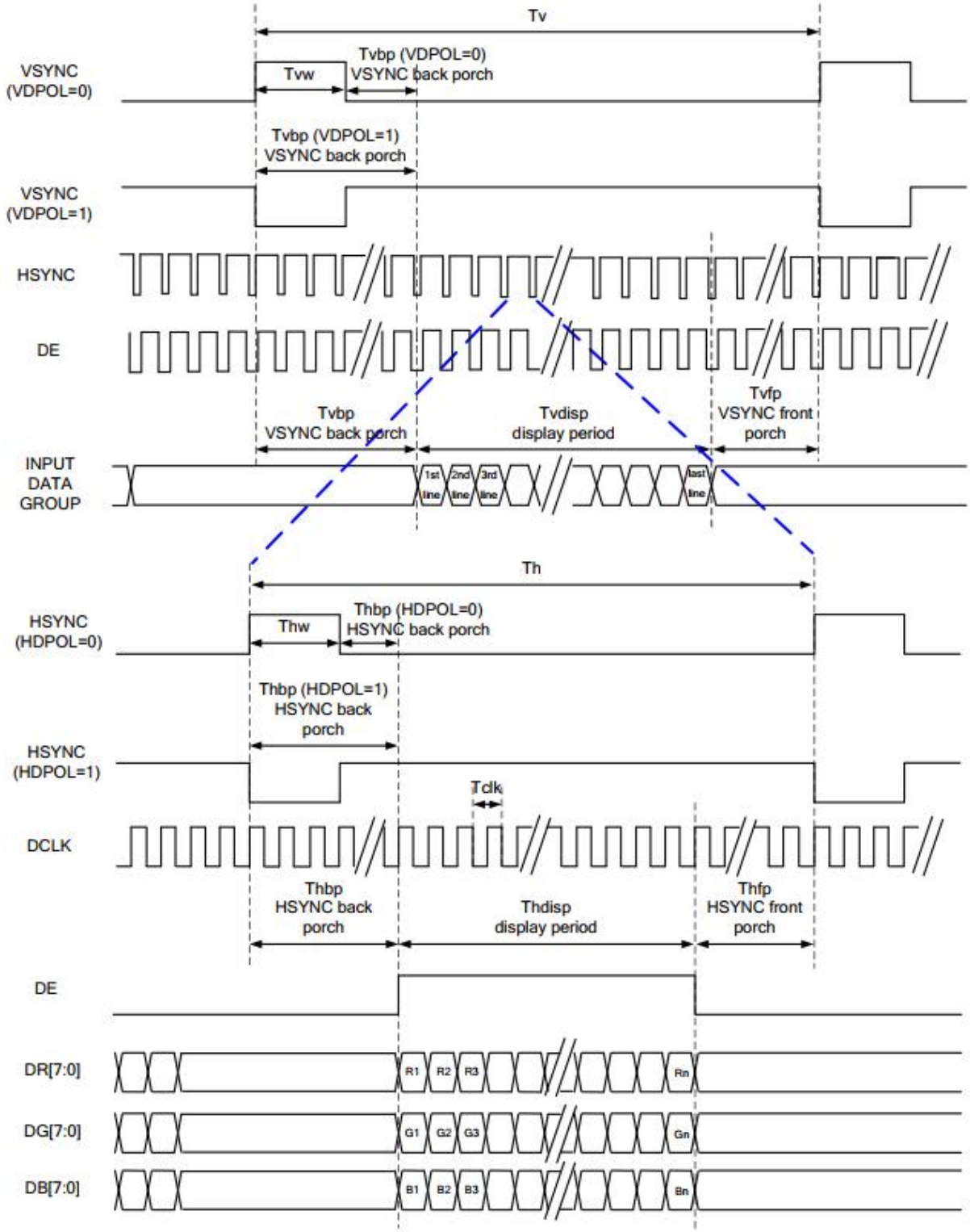
GRB RESET is internal reset, power on automatic reset.。

5.4 Timing Characteristics

(Ta=+25°C,GND=0V)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

5.5 Timing Diagram

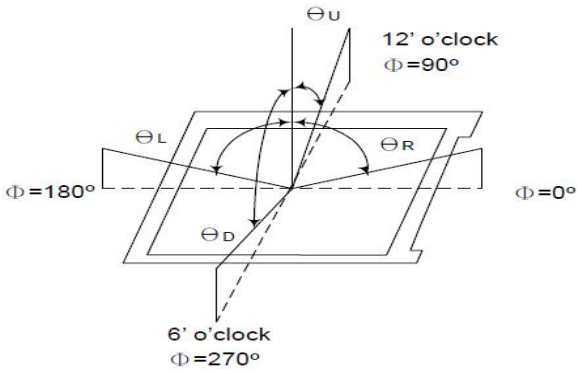


6. OPTICAL CHARACTERISTICS

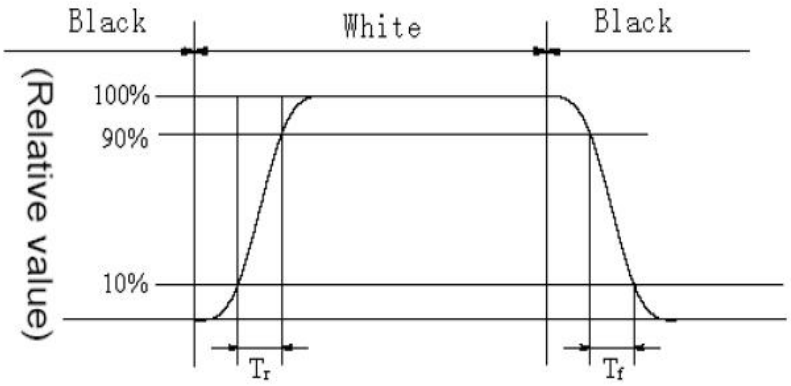
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Contrast Ratio	C/R	θ = 0°	800	1000	-	-	Note(4)
NTSC Ratio	S	θ =0°	45	50	-	%	Note(7)
Luminance	L	600	200	350	-	cd/m2	Note(5)
Luminance uniformity	U_W	θ =0°	-	80	-	%	Note(3)
Response Time	T_R+ T_F	25 °C	-	-	40	ms	Note(2)
Color Coordination	W_X	θ = 0° (Center) Normal viewing angle B/L On	-0.04	0.285	+0.04	NTSC (x,y)	Note(6)
	W_Y			0.30			
	R_X			0.608			
	R_Y			0.323			
	G_X			0.317			
	G_y			0.549			
	B_X			0.145			
	B_Y			0.138			
Viewing Angle	θ_L	C/R>10	80	85	-	Degree	Note(1)
	θ_R		80	85	-		
	θ_U		80	85	-		
	θ_D		80	85	-		

Test Conditions:
1. VDD=3.3V, I_F=20mA (Backlight current), the ambient temperature is+25°C.
2. The test systems refer to Note 8.

Note1: Definition of Viewing Angle: The viewing angle range that the CR>10

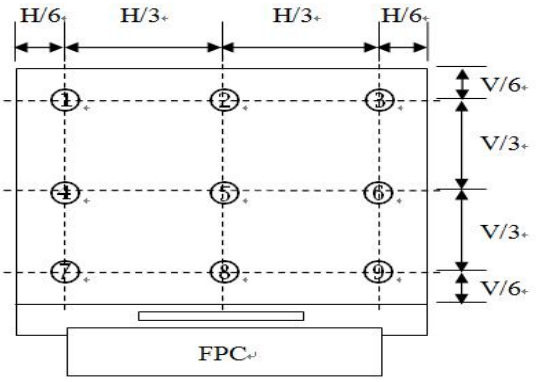


Note2: Definition of Response time: Sum of T_R and T_F



Note 3: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$



Note4: Definition of Contrast Ratio (CR): measured at the center point of panel

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

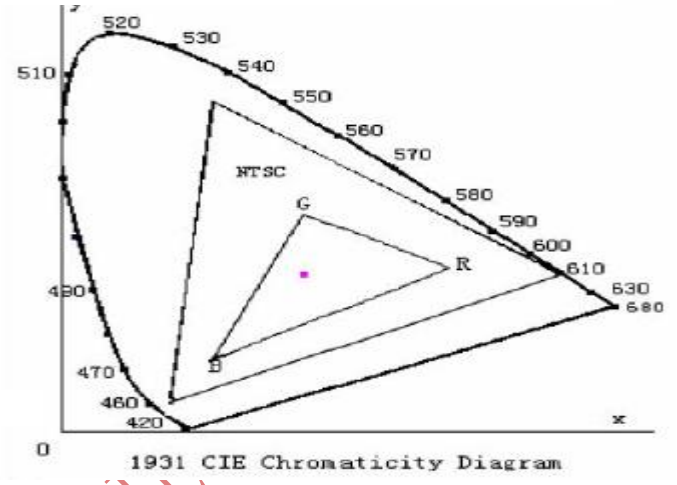
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

Color coordinates of white & red, green, blue measured at center point of LCD.

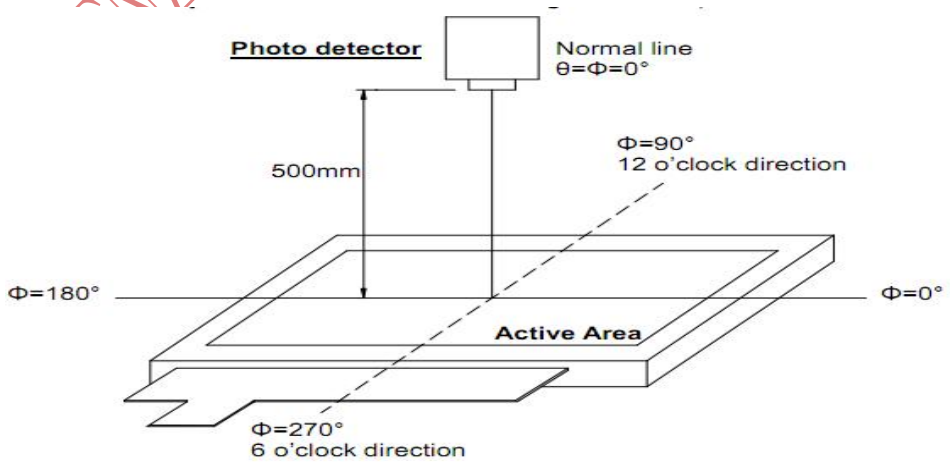
Note 7: Definition of NTSC ratio:

$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



Note 8: Definition of optical measurement system.

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



7. RELIABILITY

Item	Test Condition	Remark
High Temperature Storage	Ta =+80°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta =+70°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-10°C/30min Δ+60°C /30min for 30cycles,Transfer time less than 5min	Note2,3
Thermal humidity storage Test	50°C x 90%RH / 96Hours	Note2,3
Package Vibration Test	Frequency: 10Hz~55Hz,Amplitude:1.5mm, 1 hrs for each direction of X, Y, Z	Note2
Packing shock test	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces.	Note2

Inspection after Test:

Note1:Ta is the ambient temperature of samples.

Note 2: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note 3: Before cosmetic and function tests , the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: 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.

8. PACKAGE DRAWING