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一众显示科技有限公司

TEAM SOURCE DISPLAY TECH. CO, LTD.

TFT-LCD Module Specification

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Module NO.: TST050WVBS-86C

Version: V1.0

☐ APPROVAL FOR SPECIFICATION ☐ APPROVAL FOR SAMPLE

For Customer's Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Organized by

Version No.	Date	Content	Remark
V1.0	2023-01-06	Initial Release	

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CONTENTS

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1 General Characteristics

ITEM	Specification	Unit
LCD Type	a-Si TFT,Transmissive,Normally Black,IPS	-
LCD Size	5.0	inch
Resolution (W x H)	800x (RGB) ×480	pixel
LCM size	120.70(H) x 75.80(V) x 2.95(D)	mm
Active Area	108.00 (H) x 64.80 (V)	mm
Dot Pitch	0.135(H)x 0.135(V)	mm
Viewing Direction	ALL o'clock	-
Color Depth	16.7M	-
Pixel Arrangement	RGB-stripe	-
Backlight Type	18 LEDs，60mA	-
Surface Treatment	Anti-glare	-
Interface Type	RGB-24bit	-
Input Voltage	3.3	V
With/Without TP	WithCTP(IC:FT5446)	-
Weight	TBD	g

Note 1: RoHS compliant

Note 2: LCM weight tolerance: ± 5%.

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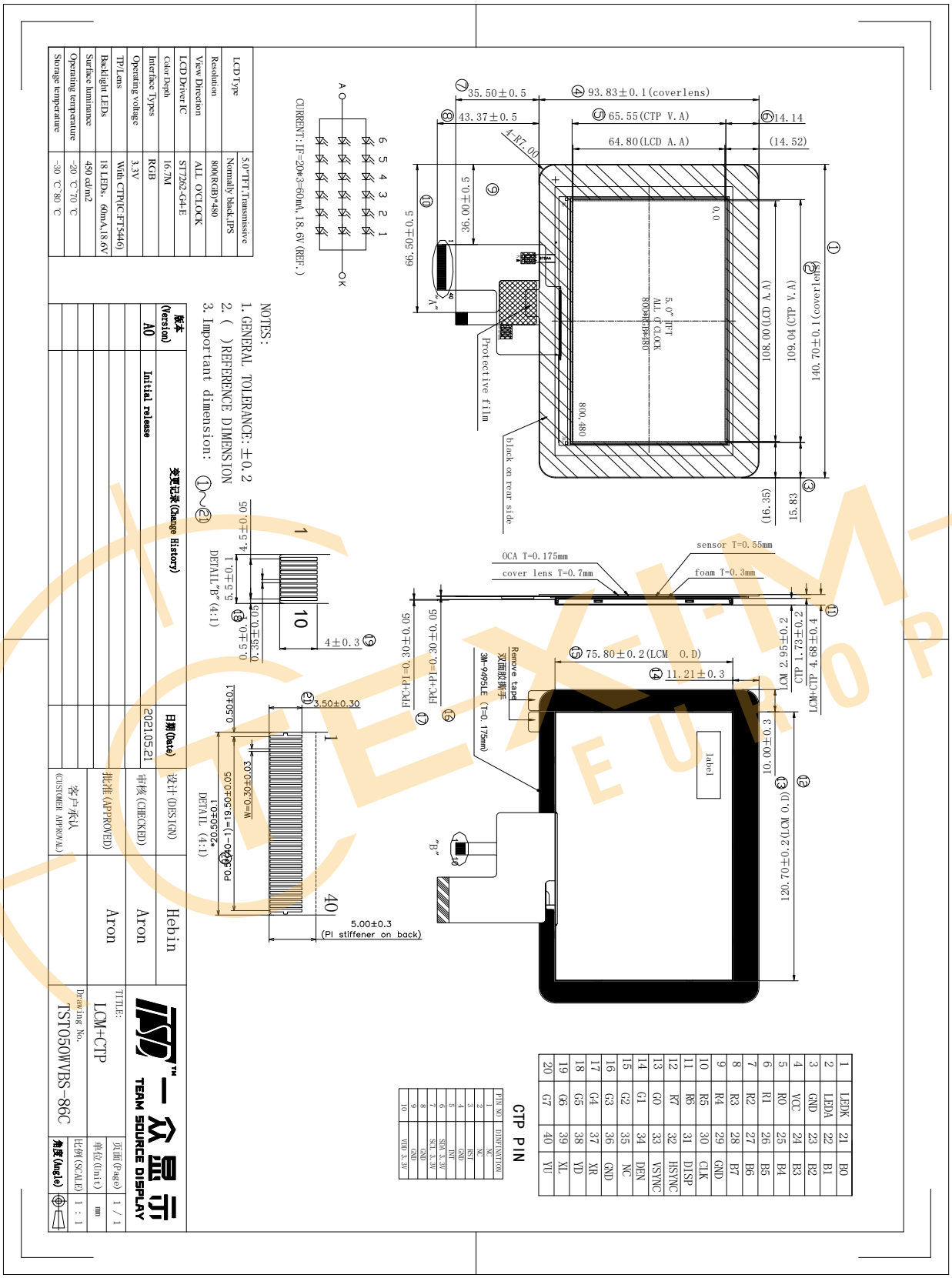
2 Product drawings



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3 Interface description

3.1 LCM interface description

PIN NO.	Symbol	description
1	LEDK	Backlight K Cathode input pin.
2	LEDA	Backlight A Anode input pin.
3	GND	System Ground. (0V)
4	VCC	Power supply +3.3V
5~12	R0~R7	Red Data BUS
13~20	G0~G7	Green Data BUS
21~28	B0~B7	Blue Data BUS
29	GND	System Ground. (0V)
30	CLK	Clock for input data. Data latched at rising/falling edge of this signal. Default is falling edge.
31	DISP	Standby mode control. (Normally pull high) DISP="L", enter standby mode for power saving. Timing controller and source driver will turn off, all outputs are Hi-Z. DISP="H", normal operation.
32	HSYNC	Horizontal sync input in digital parallel RGB. Negative polarity.
33	VSYNC	Vertical sync input in digital parallel RGB. Negative polarity.
34	DEN	Input data enable control. When DE mode, active High to enable data input. (Normally pull low)
35	NC	Not connection
36	GND	System Ground. (0V)
37	XR	RTP connection PIN
38	YD	RTP connection PIN
39	XL	RTP connection PIN
40	YU	RTP connection PIN

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3.2 CTP interface description

PIN NO.	Symbol	description
1	NC	Not connection
2	NC	Not connection
3	RST	CTP reset signal input pin
4	GND	System Ground. (0V)
5	INT	CTP interrupt signal output pin
6	SDA 3.3V	CTP I^2C data input/output
7	SCL 3.3V	CTP I^2C clock input
8	GND	System Ground. (0V)
9	GND	System Ground. (0V)
10	VDD 3.3V	CTP Power supply 3.3V

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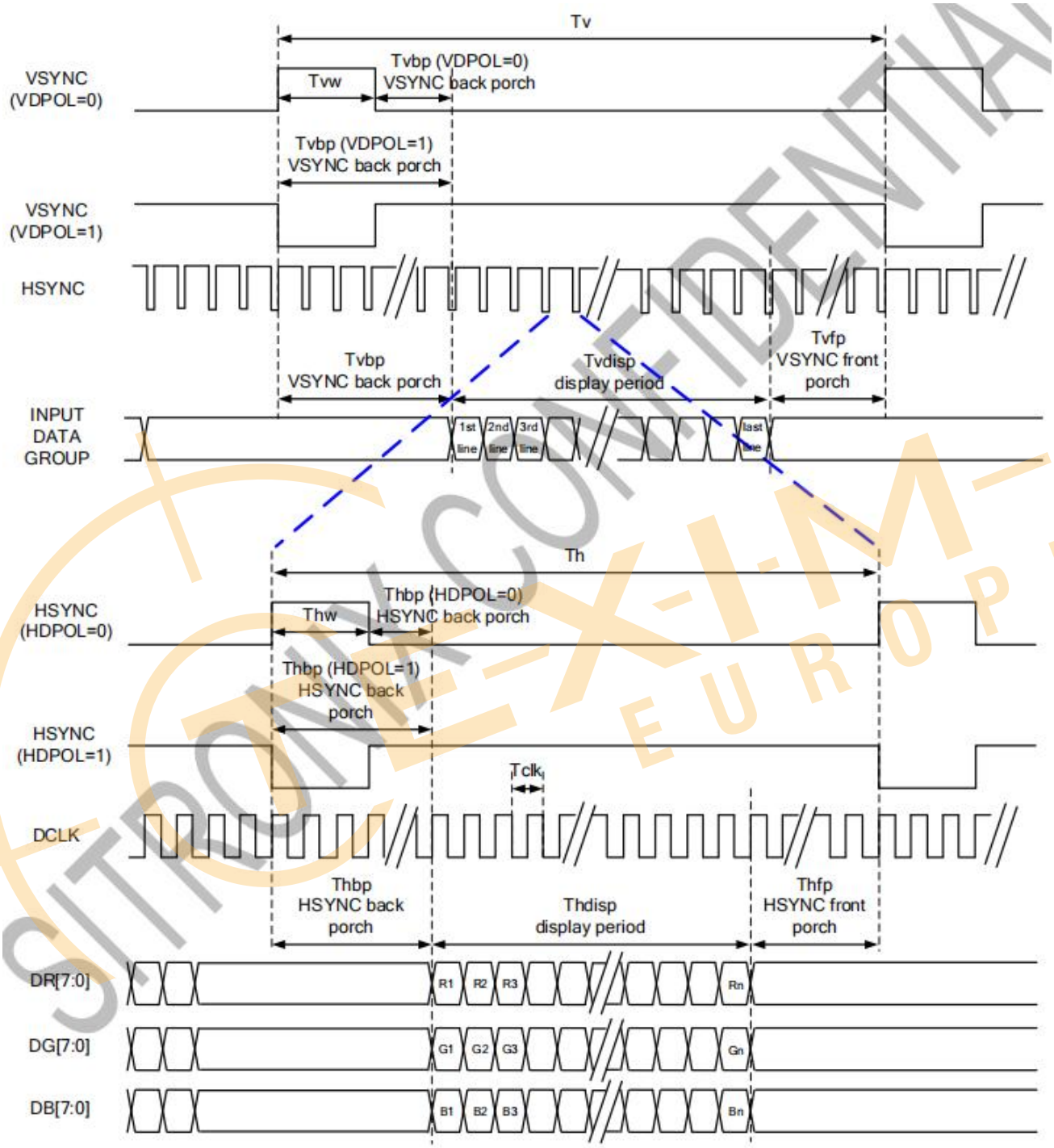
4 Timing Characteristics

4.1 SYNC Mode



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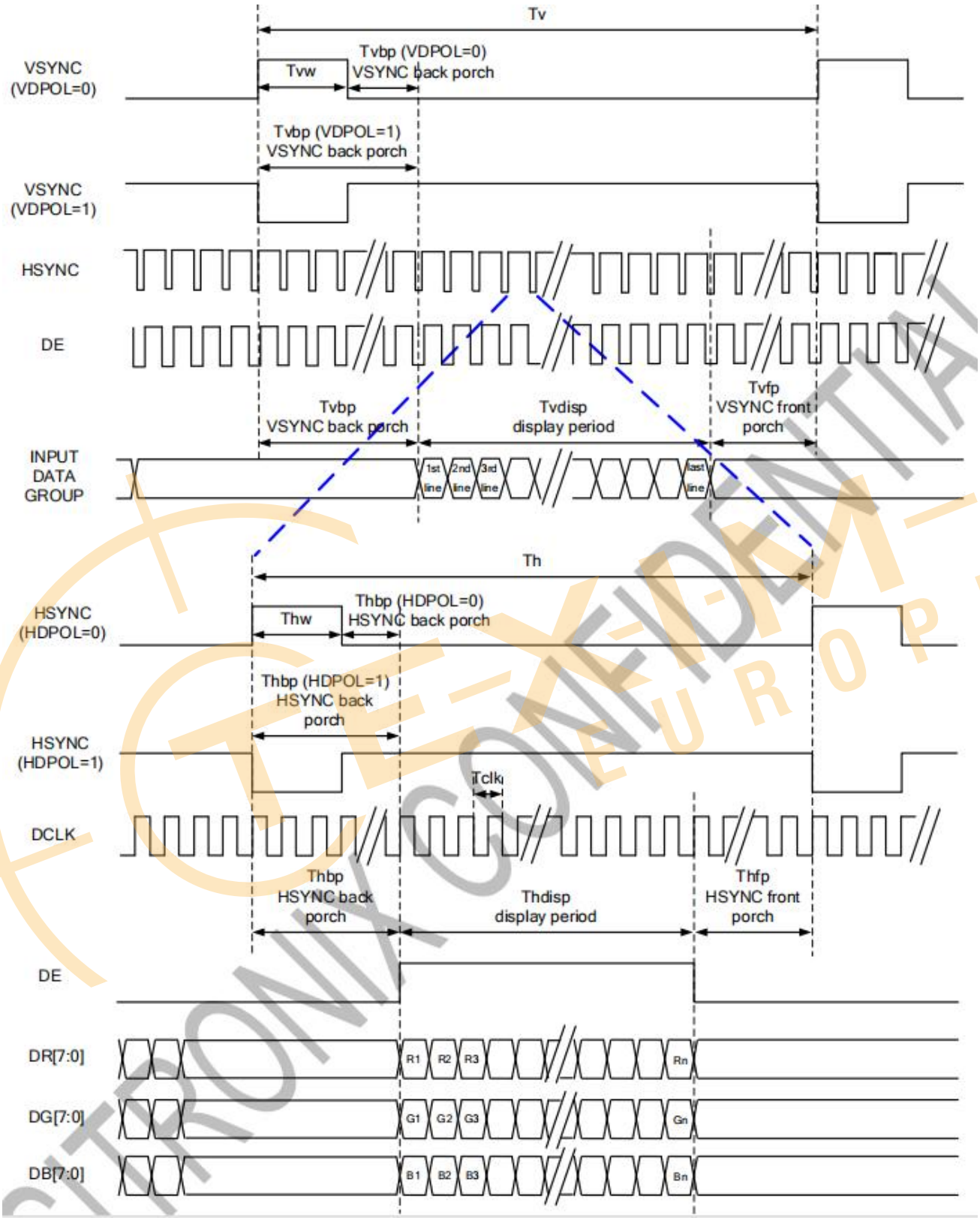
4.2 SYNC-DE Mode



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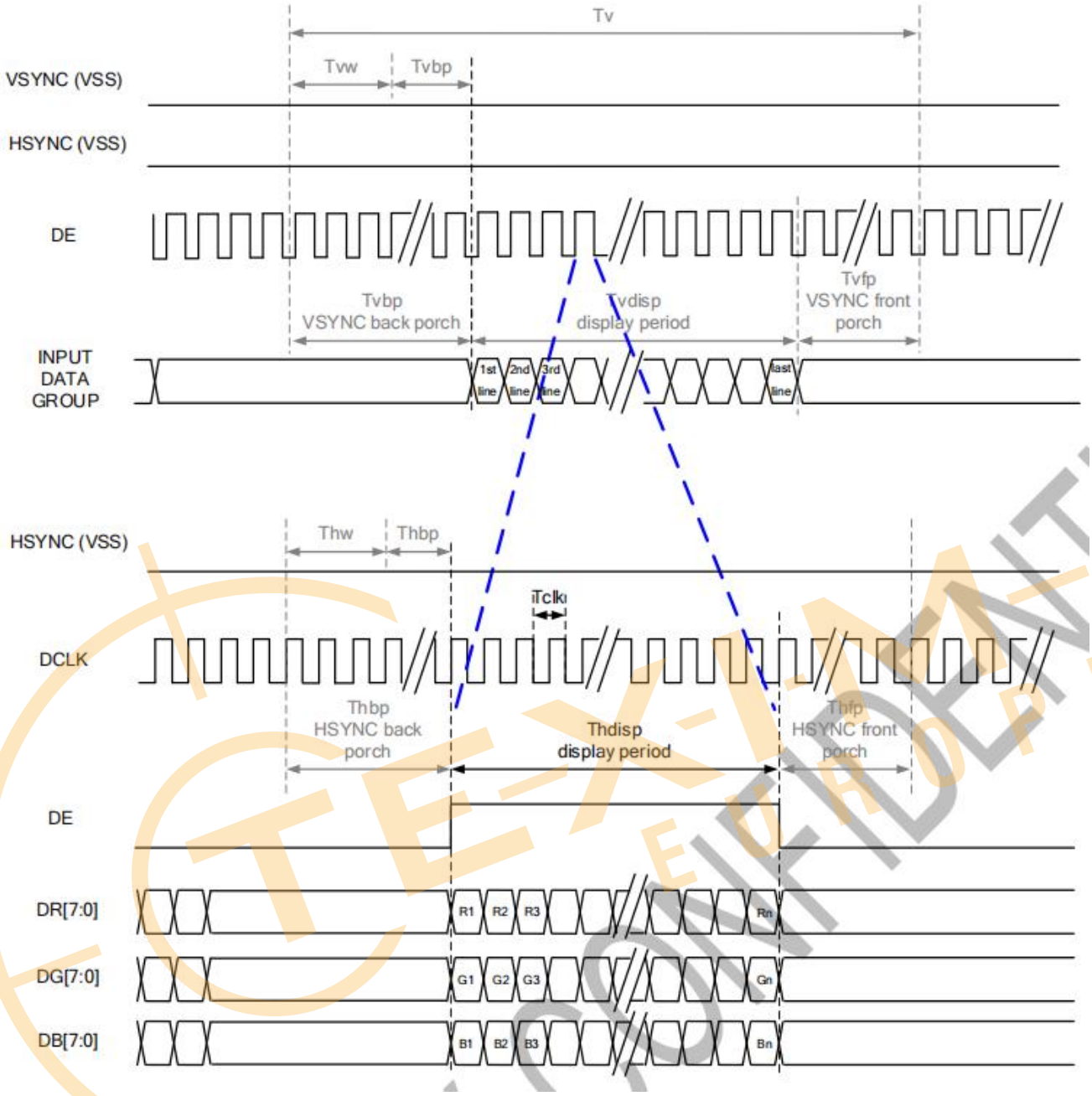
4.3 DE Mode



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4.4 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

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5 Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage (Analog)	VDD~GND	-0.3	4.0	V
Logic signal voltage(I/O)	IOVDD~GND	-0.3	4.0	V
Operating Temperature	TOP	-20	70	° C
Storage Temperature	TST	-30	80	° C
Humidity	RH	-	90%(Max 60° C)	RH

6 Electrical Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Analog operating voltage	VDD	3.0	3.3	3.6	V
Logic operating voltage	VDDI	1.65	-	VDD	
Input Voltage ' H ' level	VIH	0.7VDDI	-	VDDI	
Input Voltage ' L ' level	VIL	GND	-	0.3VDDI	
Output Voltage ' H ' level	VOH	VDDI-0.4	-	VDDI	
Output Voltage ' L ' level	VOL	GND	-	GND+0.4	

7 Backlight Characteristics

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Voltage for LED backlight	V_f	-	18.6	-	V
Current for LED backlight	I_f	-	60	-	mA
Power consumption	Wbl	-	1116	-	mW
Uniformity	Avg	80	-	-	%
LED Life Time	-	30000	40000	-	Hrs

Note:

1.The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C, 60%RH ±5 %.

2. The life time of LED will be reduced if LED is driven by high current, high ambient temperature and humidity conditions.

3. Typical operating life time is an estimated data.

4. Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded .Functional operation should be restricted to the conditions described under normal operating conditions.

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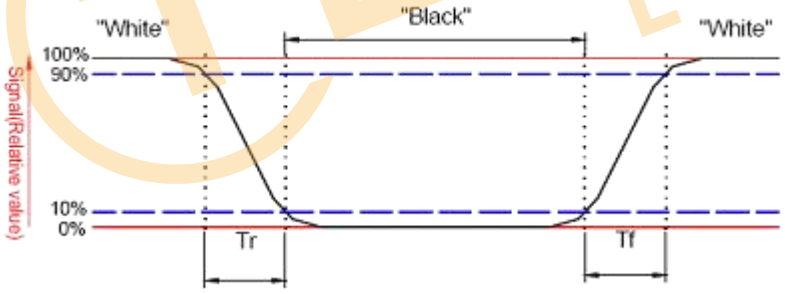
8 LCD Optical specifications

Item	Symbol	Condition	Specification			Unit	Remark
			Min	Typ	Max		
Response time (By Quick)	Tr+Tf	-	-	30	40	ms	Note 2
Contrast ratio	CR	-	-	800	-	-	Note 3
Surface luminance	Lv	θ= 0°	400	450	-	Cd/m^2	Note 4
Luminance uniformity	Yu	θ= 0°	80	-	-	%	Note 6
NTSC	-	θ= 0°	45	50	-	%	Note 6
Viewing angle	Top	CR≧10	-	80	-	Deg.	Note 7
	Bottom	CR≧10	-	80	-		
	Left	CR≧10	-	80	-		
	Right	CR≧10	-	80	-		
CIE(x,y) chromaticity	Wx	θ= 0°	Typ -0.04	0. 2983	Typ +0.04		Note 5
	Wy			0. 3441			
	Rx			0. 6301			
	Ry			0. 3482			
	Gx			0. 3205			
	Gy			0. 6256			
	Bx			0. 1507			
	By			0. 0857			

Note 1: Ambient temperature = 25°C.

Note 2: Definition of response time:

The output signals of TRD-100 are measured when the input signals are changed to “White” (falling time) and from “White” to “Black” (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.



Note 3: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Measured at the center area of the LCD.

Note 4:Definition of surface luminance

Surface luminance is the luminance with all pixels displaying white

Note 5: For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON’s BM-7 photo detector or compatible.

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Size : S≤4.3”(see Figure A B)
H,V : Active area
Light spot size=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure B.
measurement instrument : TOPCON’s luminance meter BM-7 or compatible.

Size : 4.3<S≤12.3”(see Figure A C)
H,V : Active area
Light spot size=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure C.
measurement instrument : TOPCON’s luminance meter BM-7 or compatible.

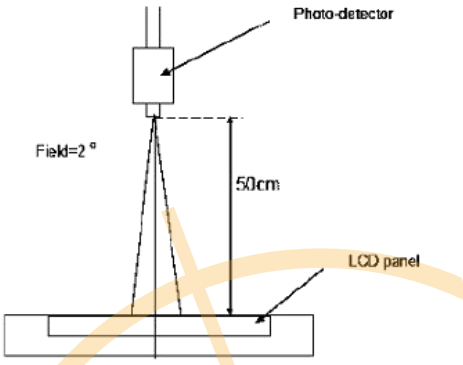


Figure A

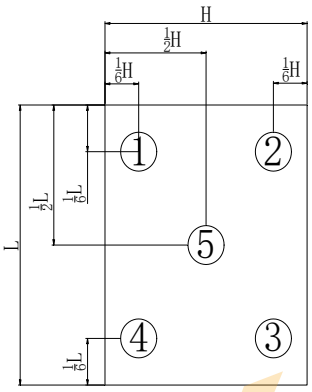


Figure B

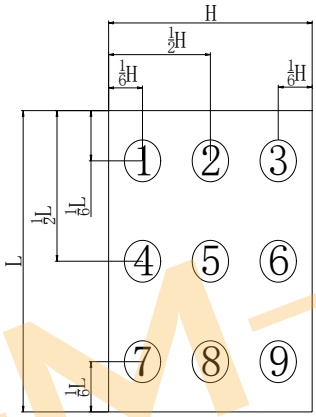
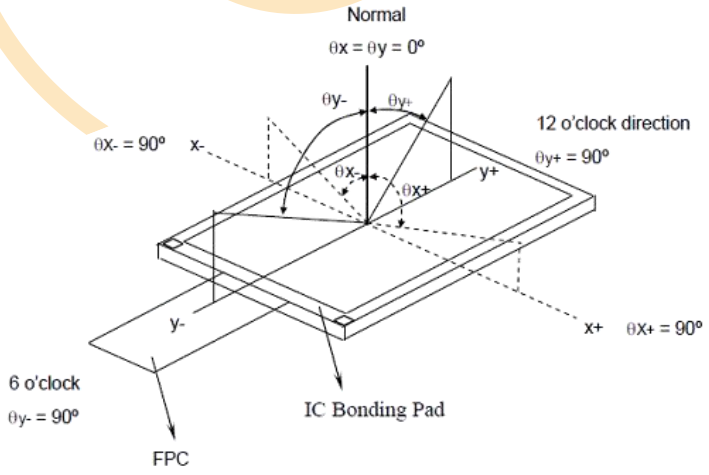


Figure C

Note 6:Definition of Luminance Uniformity
Active area is divided into 5 or 9 measuring areas,Every measuring point is placed at the center of each measuring area
Bmax: The measured maximum luminance of all measurement position.
Bmin: The measured minimum luminance of all measurement position.
Luminance Uniformity (Yu)= (Bmin/Bmax)x100%
Note 7: Definition of viewing angle



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9 Touch Panel specifications

9.1Mechanical characteristics

DESCRIPTION	INL SPECIFICATION	REMARK
Touch Panel Size	5.0	
Outline Dimension (OD)	140.70(H) x 93.83(V) mm	Cover Lens Outline
Product Thickness	1.73mm(±0.2)	
Glass Thickness	0.7mm	
Ink View Area	109.04x65.55mm	
Input Method	5 Fingers	
Activation Force	Touch	
Surface Hardness	≥6H	

9.2 Electrical characteristics

DESCRIPTION		SPECIFICATION
Operating Voltage		DC 2.8~3.3V
Power Consumption (IDD)	Active Mode	12~4.5mA
	Sleep Mode	TBD
Interface		I^2C
Controller IC		FT5446DQS
I^2C address		-
Resolution		800*480

9.3 Interface timing characteristics

PARAMETER	MIN	MAX	UNIT
SCL Frequency	-	400K	Hz
Bus Free Time Between a STOP and START Condition	1.3	-	uS
Hold Time (repeated) START Condition	0.6	-	uS
Data Setup Time	100	-	nS
Setup Time for Repeated START Condition	0.6	-	uS
Setup Time for STOP Condition	0.6	-	uS

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10 RELIABILITY TEST

NO.	TEST ITEM	TEST CONDITION	INSPECTION AFTER TEST
1	High Temperature Storage	80±2°C/96 hours	Inspection after 2~4 hours storage at room temperature and humidity. The condensation is not accepted. The sample shall be free from defects: 1. Air bubble in the LCD 2. Seal leak 3. Non-display 4. Missing segments 5. Glass crack
2	Low Temperature Storage	-30±2°C/96 hours	
3	High Temperature Operating	70±2°C/96 hours	
4	Low Temperature Operating	-20±2°C/96 hours	
5	Temperature Cycle	-30±2°C ~ 25~ 80± 2°C × 10 cycles (30 min.) (5min.) (30min.)	
6	Damp Proof Test	60°C ±5°C × 90%RH/96 hours	
7	Vibration Test	Frequency 10Hz~55Hz Stroke: 1.5mm Sweep: 10Hz~150 Hz~10Hz 2 hours For each direction of X, Y, Z	
8	Packing Drop Test	Height: 50 cm 1 corner, concrete floor	
9	Electrostatic Discharge Test	C=150pF, R=330 Ω Air: ±8KV 150pF/330Ω 30 times Contact: ±4KV,20 times	

11 Suggestions for using LCD modules

11.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated, clean it with soft cloth. If the LCM is severely contaminated, use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer. The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don't disassemble the LCM.
8. 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 modules.
- Tools required for assembling, such as soldering irons, must be properly grounded.

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- To reduce the amount of static electricity generated, do not conduct assembling 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.

9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

11.2 Storage

1. Store in an ambient temperature of 5 to 45 C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.

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