

TFT DISPLAY SPECIFICATION

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WINSTAR Display Co.,Ltd.
華凌光電股份有限公司



Winstar Display Co., LTD
華凌光電股份有限公司



WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: **WF43WTWAESNNO#**

APPROVED BY: (FOR CUSTOMER USE ONLY)	PCB VERSION: _____ DATA: _____
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2025/02/03			

TFT Display Inspection Specification: <https://www.winstar.com.tw/technology/download.html>

Precaution in use of TFT module: <https://www.winstar.com.tw/technology/download/declaration.html>



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MODLE NO :

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2024/11/28		First issue
A	2024/12/19		Add Static electricity test
B	2025/01/03		Modify Reliability
C	2025/02/03		TFT FPC changed to direct out



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1.Module Classification Information

W F 43 W T W A E S N N 0 #
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

①	Brand : WINSTAR DISPLAY CORPORATION												
②	Display Type : F→TFT Type, J→Custom TFT												
③	Display Size : 4.3” TFT												
④	Model serials no.												
⑤	Backlight Type :	F→CCFL, White S→LED, High Light White						T→LED, White Z→Nichia LED, White					
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	A→Transmissive, N.T, IPS TFT C→Transmissive, N. T, 6:00 ; F→Transmissive, N.T,12:00 ; I→Transmissive, W. T, 6:00 K→Transflective, W.T,12:00 L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00						Q→Transmissive, Super W.T, 12:00 R→Transmissive, Super W.T, O-TFT V→Transmissive, Super W.T, VA TFT W→Transmissive, Super W.T, IPS TFT X→Transmissive, W.T, VA TFT Y→Transmissive, W.T, IPS TFT Z→Transmissive, W.T, O-TFT					
⑦	A : TFT LCD B : TFT+SCREW HOLES+CONTROL BOARD C : TFT+ SCREW HOLES +A/D BOARD D : TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD E : TFT+ SCREW HOLES +POWER BOARD						F : TFT+CONTROL BOARD G : TFT+ SCREW HOLES H : TFT+D/V BOARD I : TFT+ SCREW HOLES +D/V BOARD J : TFT+POWER BD						
⑧	Resolution:												
	A	128160	B	320234	C	320240	D	480234	E	480272	F	640480	
	G	800480	H	1024600	I	320480	J	240320	K	800600	L	240400	
	M	1024768	N	128128	P	1280800	Q	480800	R	640320	S	480128	
	T	800320	U	8001280	V	176220	W	1280398	X	1024250	Y	1920720	
	Z	800200	2	1024324	3	7201280	4	19201200	5	1366768	6	1280320	
⑨	D: Digital L : LVDS M:MIPI												
⑩	Interface:												
	N	Without control board			A	8Bit		B	16Bit		H	HDMI	
	I	I2C Interface			R	RS232		S	SPI Interface		U	USB	
⑪	TS:												
	N	Without TS			T	Resistive touch panel			C	Capacitive touch panel (G-F-F)			
	G	Capacitive touch panel (G-G)					C1	Capacitive touch panel (G-F-F)+OCA					
	C2	Capacitive touch panel (G-F-F)+OCR					G1	Capacitive touch panel (G-G)+OCA					
	G2	Capacitive touch panel (G-G)+OCR					B	CTP+GG+USB					
⑫	Version: X:Raspberry pi												
⑬	Special Code	#:Fit in with ROHS directive regulations											

2.Summary

TFT 4.3" is a IPS transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT_LCD module, It is usually designed for industrial application and this module follows RoHs,



3.General Specifications

Item	Dimension	Unit
Size	4.3	inch
Dot Matrix	480 x RGBx272(TFT)	dots
Module dimension	105.5(W) x 67.2(H) x 2.95(D)	mm
Active area	95.04 x 53.856	mm
Pixel pitch	0.198 x 0.198	mm
LCD type	TFT, Normally Black, Transmissive	
Viewing Angle	80/80/80/80	
Aspect Ratio	16:9	
TFT Driver IC	NV3041A-01 or equivalent	
TFT Interface	4 Line data QSPI	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-30	—	+80	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. 60°C, 90% RH MAX. Temp. > 60°C, Absolute humidity shall be less than 90% RH at 60°C



5. Electrical Characteristics

5.1. Operating conditions:

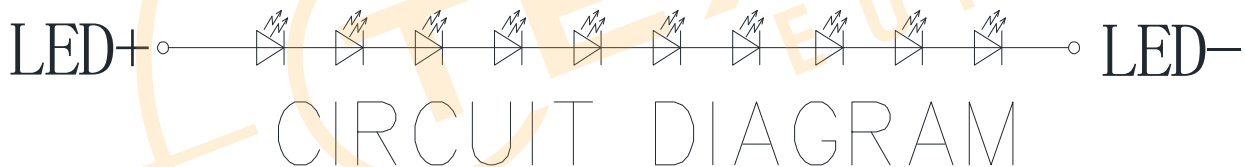
Item	Symbol	Min	Typ	Max	Unit	Remark
Power supply for analog circuit	V _{CI}	3.0	3.3	3.6	V	
Power supply for logic circuit	IOVCC	1.65	1.8	3.3	V	V _{CI} = 3.3V
Current for Driver	I _{VCI}	-	30	45	mA	V _{CI} = 3.3V
	I _{IOVCC}	-	20	30	mA	IOVCC=1.8V

Note 1 : This value is test for V_{CI}=3.3V , Ta=25 °C only, to avoid power supply noise, please avoid using driving conditions close to min, or max value

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	-	-	20	-	mA	-
Power Consumption	-	540	640	680	mW	-
LED voltage	V _{LED+}	27	32	34	V	Note 1
LED Life Time	-	50,000	-	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

6.AC Characteristics

6.1. Display Serial Interface (Quad-SPI)

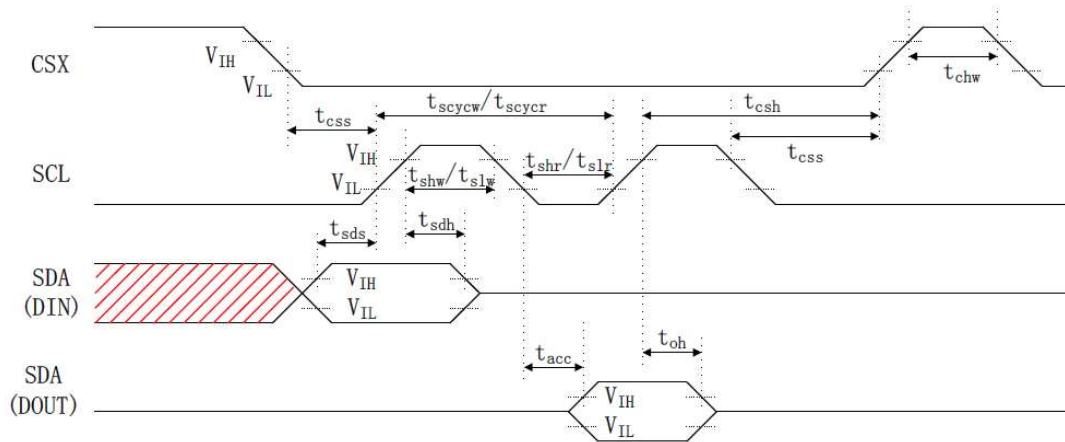


Figure 1

Signal	Symbol	Parameter	MIN	MAX	UNIT	Description
CSX	T_{CSS}	Chip Select Setup Time	10		ns	
	T_{CSH}	Chip Select Hold Time	30		ns	
	T_{CHW}	Chip Select "H" Pulse Width	30		ns	
SCL	T_{SCYCW}	Serial Clock Cycle(Write)	12.5		ns	QSPI 4 lane format (5-6-5): $T_{SCYCW} > 25\text{ns}$ (see "6.4.12.") QSPI 4 lane format (6-6-6): $T_{SCYCW} > 16\text{ns}$ (see "6.4.13") Other Format $T_{SCYCW} > 12.5\text{ns}$
	T_{SHW}	S"L" "H" Pulse Width(Write)	$T_{SCYCW}/2$		ns	
	T_{SLW}	S"L" "L" Pulse Width(Write)	$T_{SCYCW}/2$		ns	
	T_{SCYCR}	Serial Clock Cycle(Read)	150		ns	
	T_{SHR}	S"L" "H" Pulse Width(Read)	$T_{SCYCR}/2$		ns	
	T_{SLR}	S"L" "L" Pulse Width(Read)	$T_{SCYCR}/2$		ns	
SDA(DIN) (DOUT)	T_{SDS}	Data Setup Time	5		ns	
	T_{SDH}	Data Hold Time	5		ns	
	T_{ACC}	Access Time	5		ns	
	T_{OH}	Output Disable Time	10		ns	$CL_{max}=30\text{pF}$ $CL_{min}=8\text{pF}$

Table 1: Serial Interface Characteristics

Note 1: IOVCC=1.8 V, VCI= 3.3V, GND=0V. Ta= 25 °C

Note 2: The input signal rise time and fall time(T_r , T_f) is specified at 15 ns or less. Logic high and low levels are specified as 10% and 90% of IOVCC for Input signals.

Signal	Symbol	Parameter	MIN	MAX	UNIT	Description
CSX	T_{CSS}	Chip Select Setup Time	10		ns	
	T_{CSH}	Chip Select Hold Time	30		ns	
	T_{CHW}	Chip Select "H" Pulse Width	30		ns	
SCL	T_{SCYCW}	Serial Clock Cycle(Write)	12.5		ns	
	T_{SHW}	S "L" "H" Pulse Width(Write)	$T_{SCYCW}/2$		ns	
	T_{SLW}	S "L" "L" Pulse Width(Write)	$T_{SCYCW}/2$		ns	
	T_{SCYCR}	Serial Clock Cycle(Read)	150		ns	
	T_{SHR}	S "L" "H" "Pulse Width(Read)	$T_{SCYCR}/2$		ns	
	T_{SLR}	S "L" "L" Pulse Width(Read)	$T_{SCYCR}/2$		ns	
D/CX	T_{DCS}	D/CX Setup Time	5		ns	
	T_{DCH}	D/CX Hold Time	5		ns	
SDA(DIN) (DOUT)	T_{SDS}	Data Setup Time	5		ns	
	T_{SDH}	Data Hold Time	5		ns	
	T_{ACC}	Access Time	5		ns	
	T_{OH}	Output Disable Time	10		ns	CLmax=30pF CLmin=8pF

Table 2: 4 wire Serial Interface Characteristics

Note 1: IOVCC=1.8 V, VCI= 3.3V, GND=0V. Ta= 25 °C

Note 2: The input signal rise time and fall time (tr, tf) is specified at 15 ns or less. Logic high and low levels are specified as 10% and 90% of IOVCC for Input signals.

6.2. Display Date Writing Format

1.QSPI 4 lane RGB format(5-6-5)

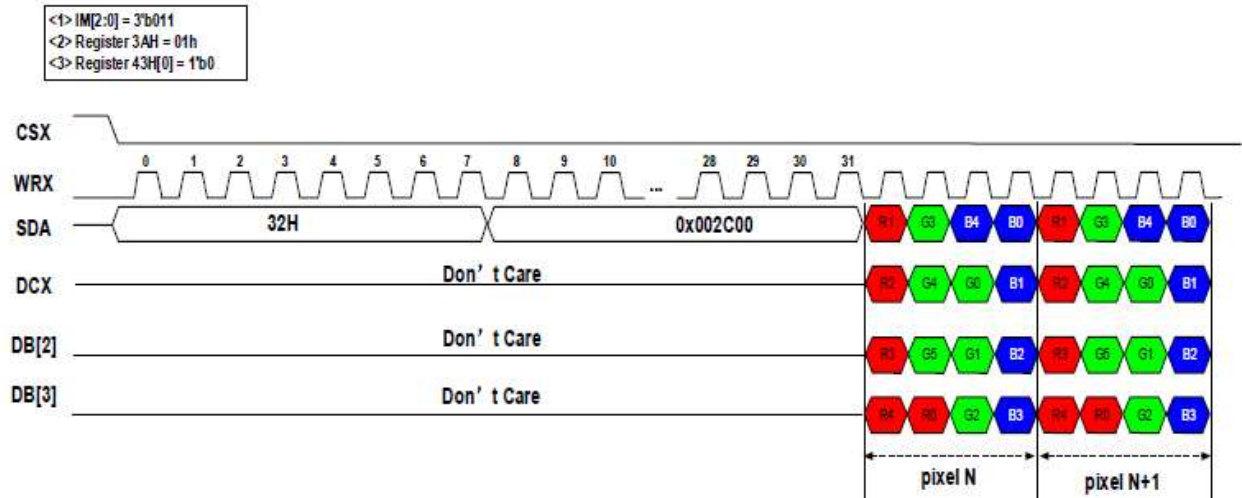


Figure 3

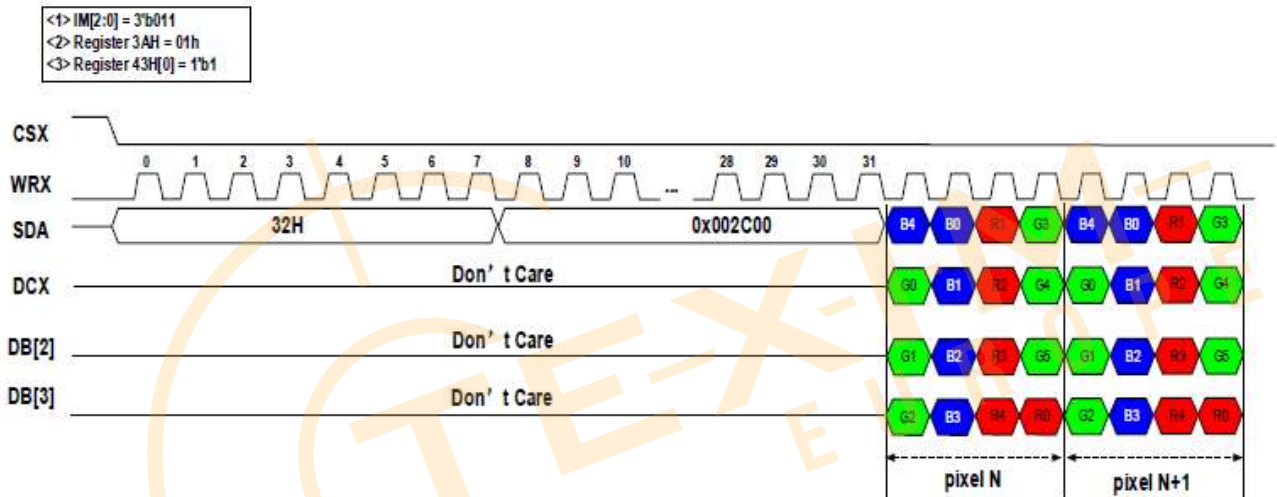


Figure 4

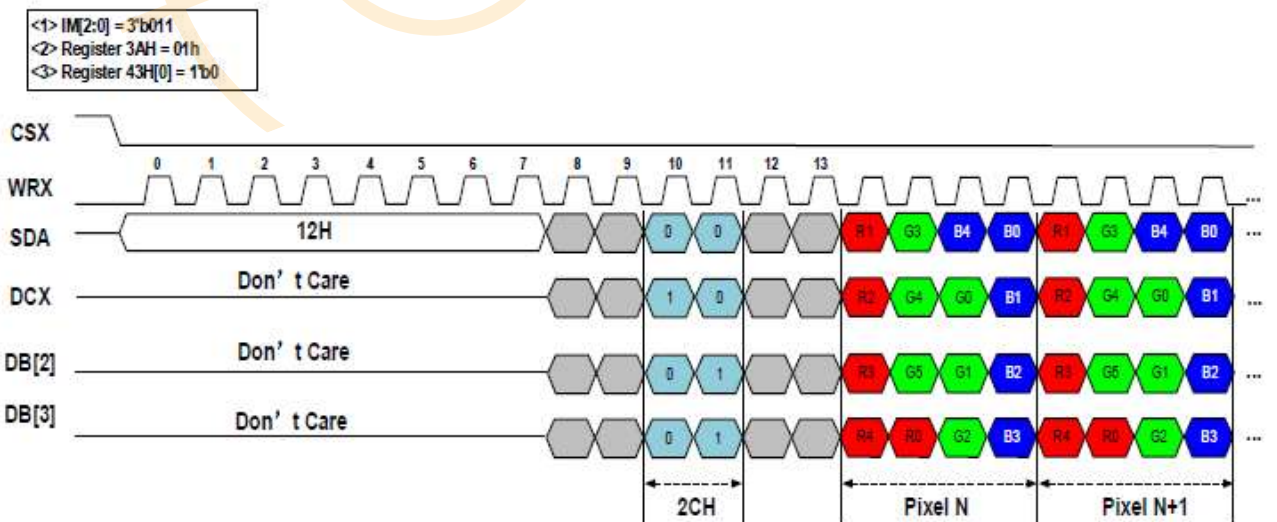


Figure 5

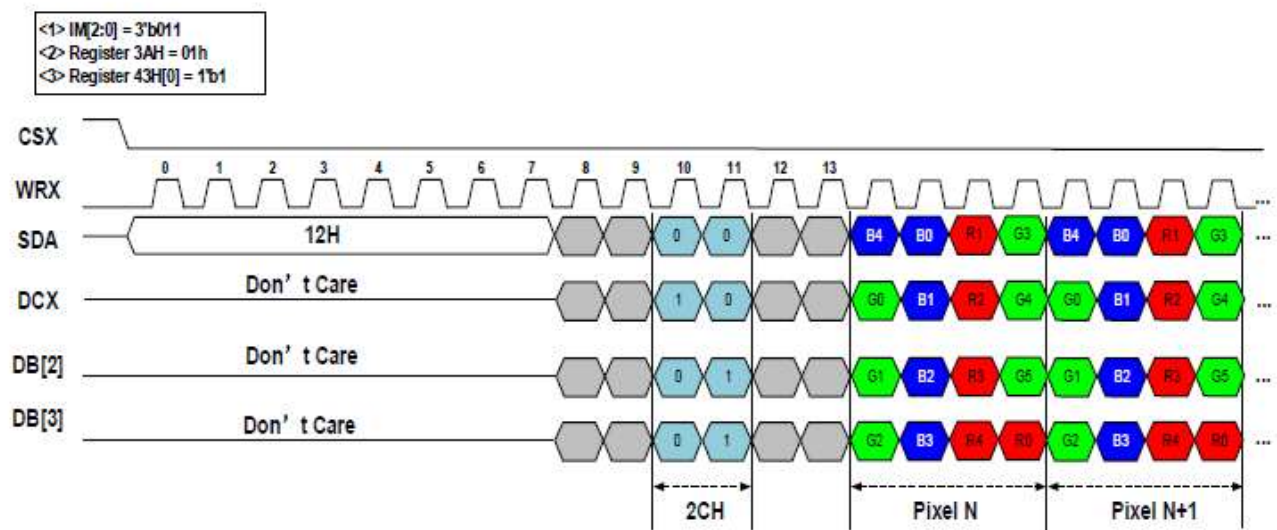


Figure 6



2.QSPI 4 lane RGB format(6-6-6)

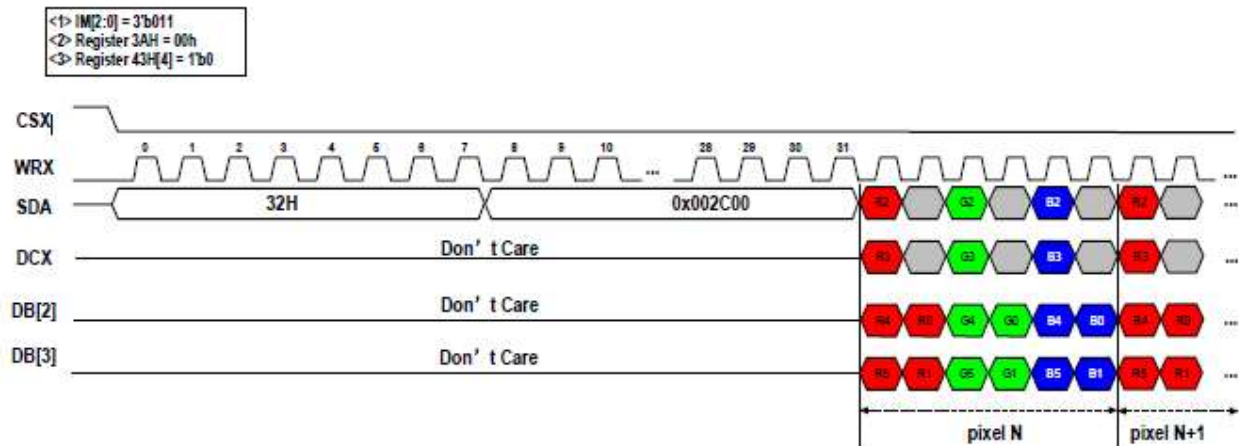


Figure 7

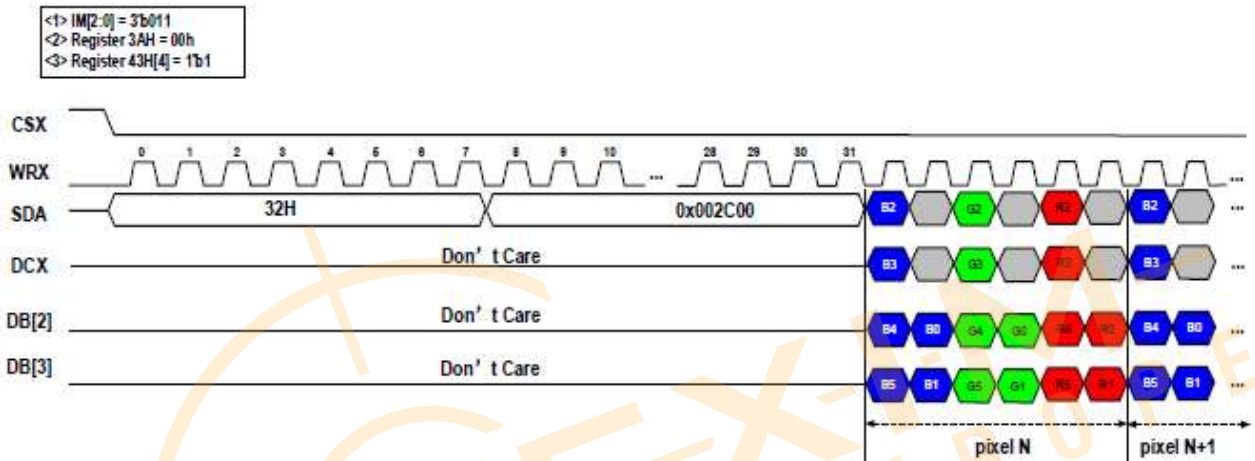


Figure 8

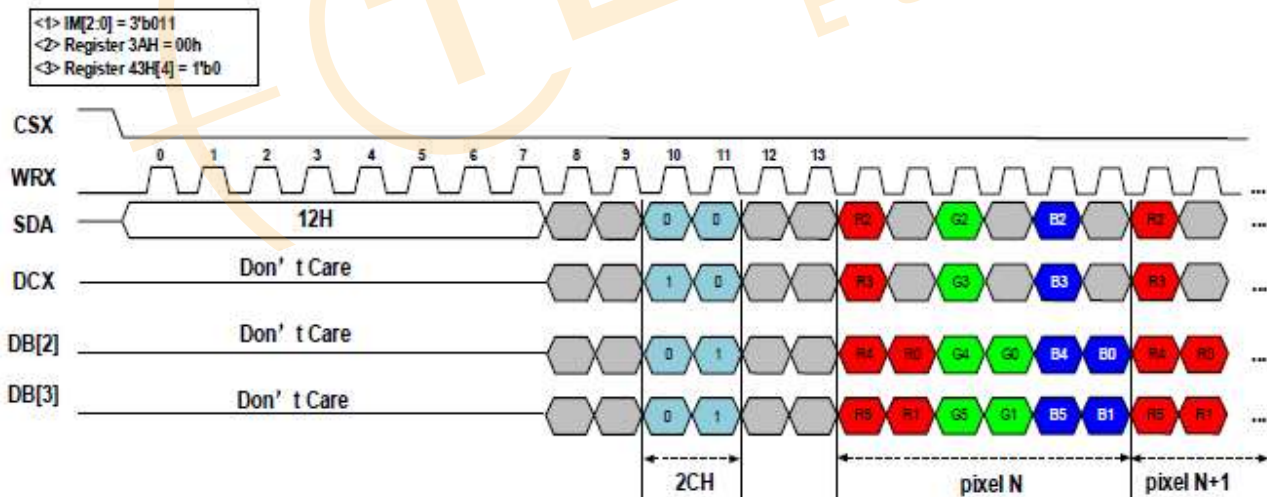
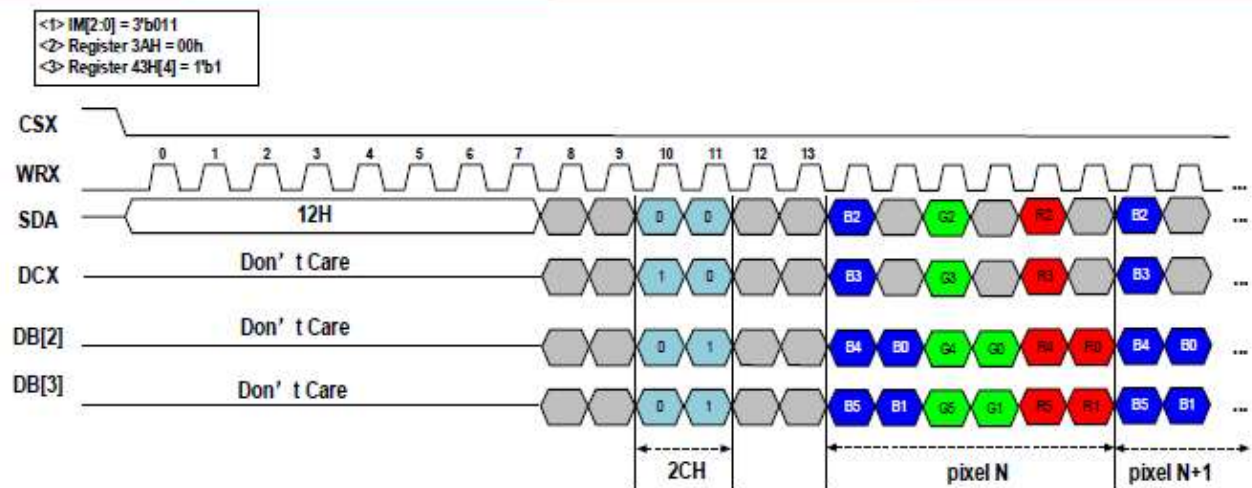


Figure 9



7.Power sequence

7.1. Power On Sequence

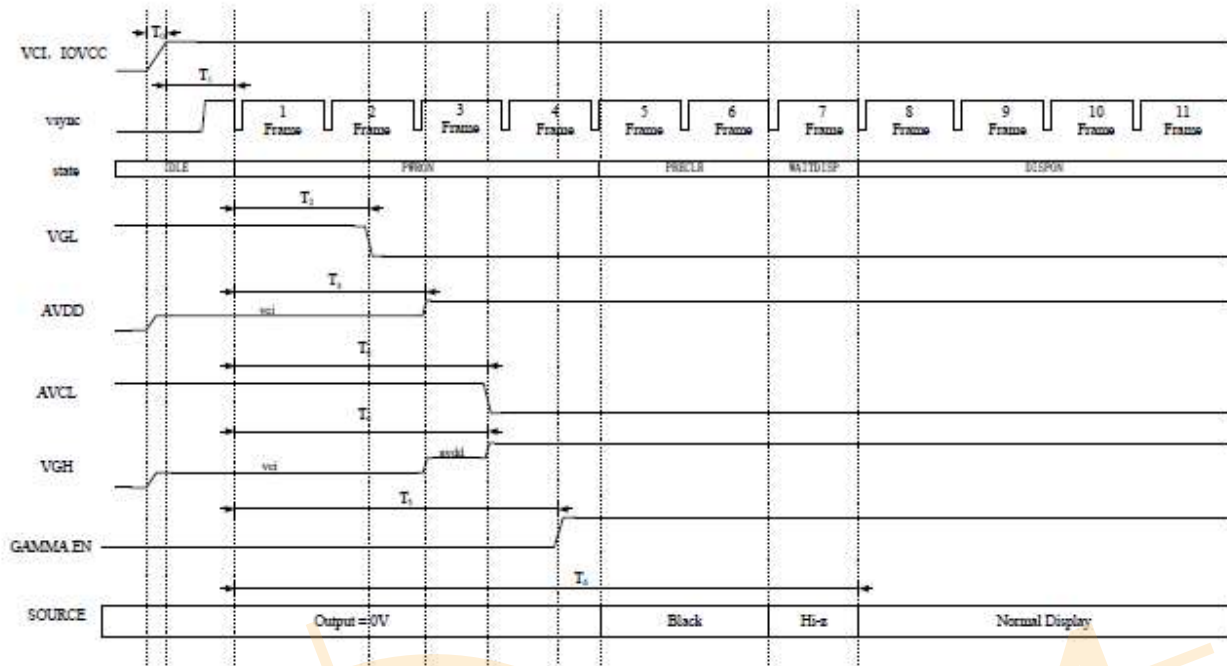


Figure 11

Symbol	Description	Min. Time	Unit
T_0	Determined by the external power	$\varnothing$ Notat	ms
T_1	Time from stable VCL, IOVCC (reset finished) set-up to Command "11H"	Decide by 11H command	ms
T_2	Time from Command "11H" to VGL voltage stabilization	23	ms
T_3	Time from Command "11H" to AVDD voltage stabilization	30.7	ms
T_4	Time from Command "11H" to AVCL/VGH voltage stabilization	40.8	ms
T_5	Gamma output enable	55.3	ms
T_6	Source normal display	Decide by 29H command	ms

Table 3

Note1: Condition: AVDD and AVCL without stabilized capacitance

7.2. Power Off Sequence

When host sends "10H" command, State from WAIT_PD to PWRDOWN, in which power disabled sequentially.

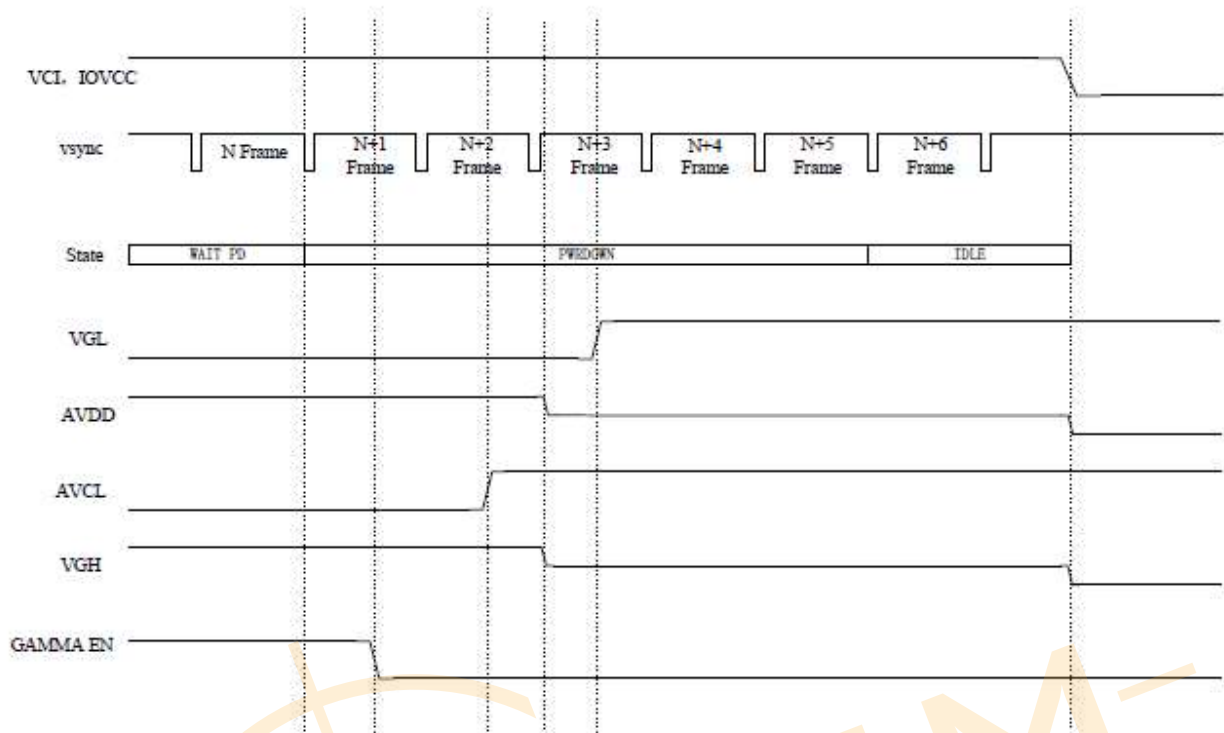


Figure 12

8. Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	$\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$	-	30	40	ms	Note 3
Contrast ratio		CR	At optimized viewing angle	640	800	-	-	Note 4
Color Chromaticity	White	Wx	$\theta=0^{\circ}$ 、 $\Phi=0$	0.27	0.32	0.37	-	Note 2,6,7
		Wy		0.295	0.345	0.395	-	
Viewing angle	Hor.	ΘR	$CR\geq 10$	70	80	-	Deg.	Note 1
		ΘL		70	80	-		
	Ver.	ΦT		70	80	-		
		ΦB		70	80	-		
Brightness		-	-	400	500	-	cd/m ²	Center of display
Uniformity		(U)	-	75	-	-	%	Note 5

Ta=25±2°C, IL=20mA

Note 1: Definition of viewing angle range

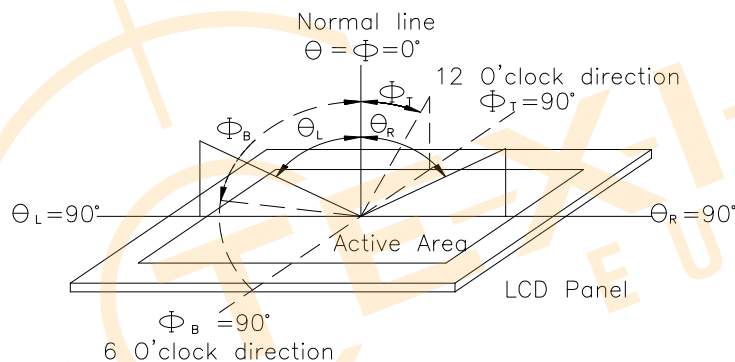


Fig. 8.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

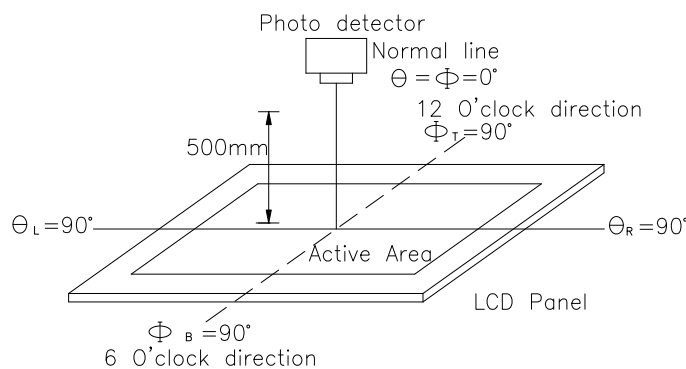
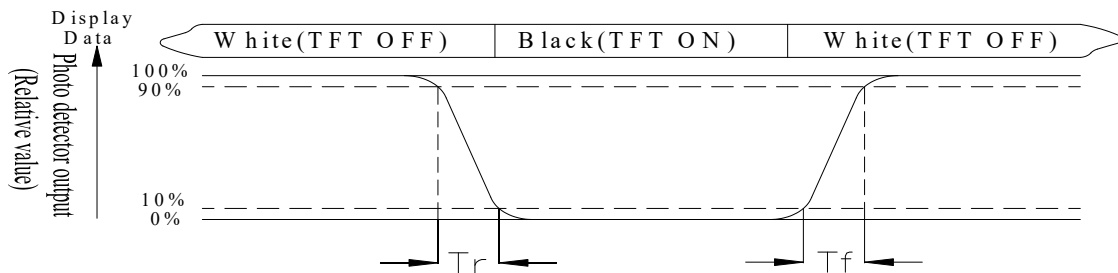


Fig. 8.2. Optical measurement system setup

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_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%.



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\min}/L_{\max} \times 100\%$$

L = Active area length

W = Active area width

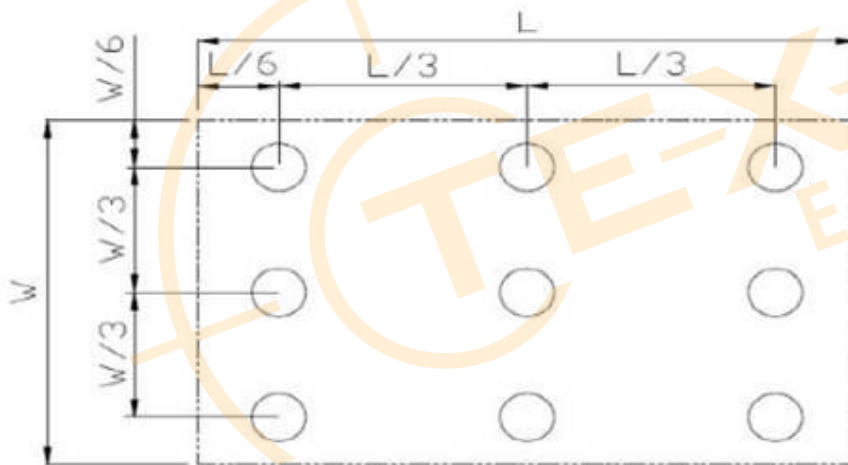


Fig 8.3. Definition of uniformity

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

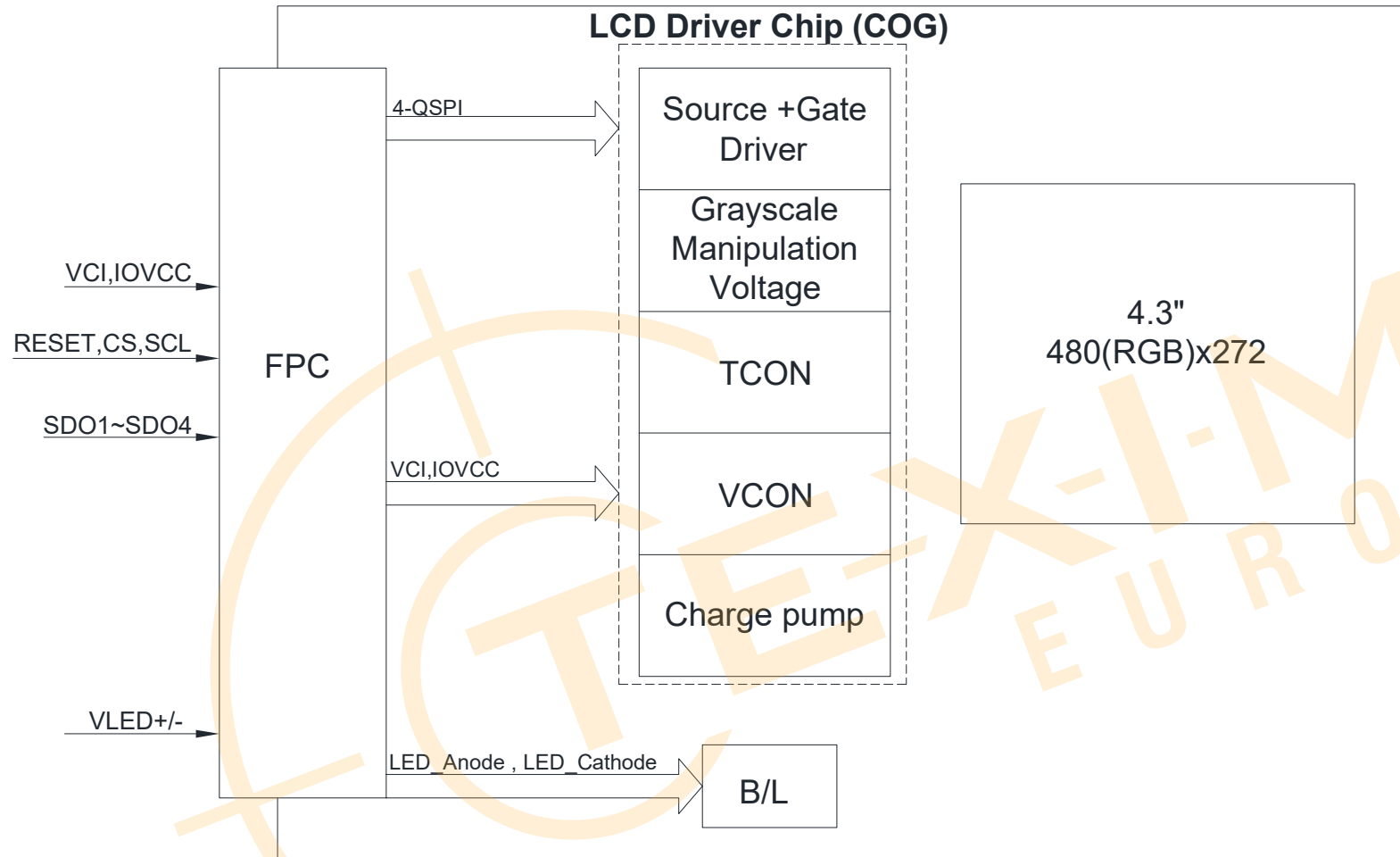
Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

9.Interface

9.1. LCM PIN Definition

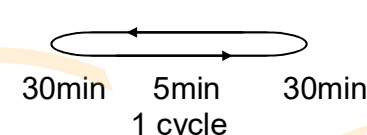
Pin	Symbol	Function	Remark
1	VLED-	Power for LED backlight cathode	
2	VLED+	Power for LED backlight anode	
3	NC	No connection	
4	VCI	Power supply for analog circuit	
5	IOVCC	Power supply for digital interface I/O pins	
6	GND	Ground	
7	RESET	Reset.	
8	GND	Ground	
9	CS	Chip select, internal pull high. (CSX)	
10	SCL	This pin is used serial interface clock	
11	GND	Ground	
12	SDO1	SPI bi-direction data pin (SDA)	
13	SDO2	Std-SPI(4 wire): command or parameter select. Quard-SPI: the second data pin (DCX)	
14	SDO3	The third pin of Quard-SPI (DB[2])	
15	SDO4	The fourth pin of Quard-SPI (DB[3])	
16	GND	Ground	
17	TE	Tearing effect output pin is used to synchronize MCU frame writing, activated by S/W command. When this pin is not activated (TE function OFF), this pin is GND level.	
18	GND	Ground	

10. Block Diagram



11. Reliability

Content of Reliability Test (Wide temperature, -30°C~80°C)

Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	80°C 200hrs	2
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-30°C 200hrs	1,2
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -30°C 25°C 80°C  30min 5min 30min 1 cycle	-30°C/80°C 10 cycles	2
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±6KV(contact), ±8KV(air), RS=330Ω CS=150pF 10 times	4

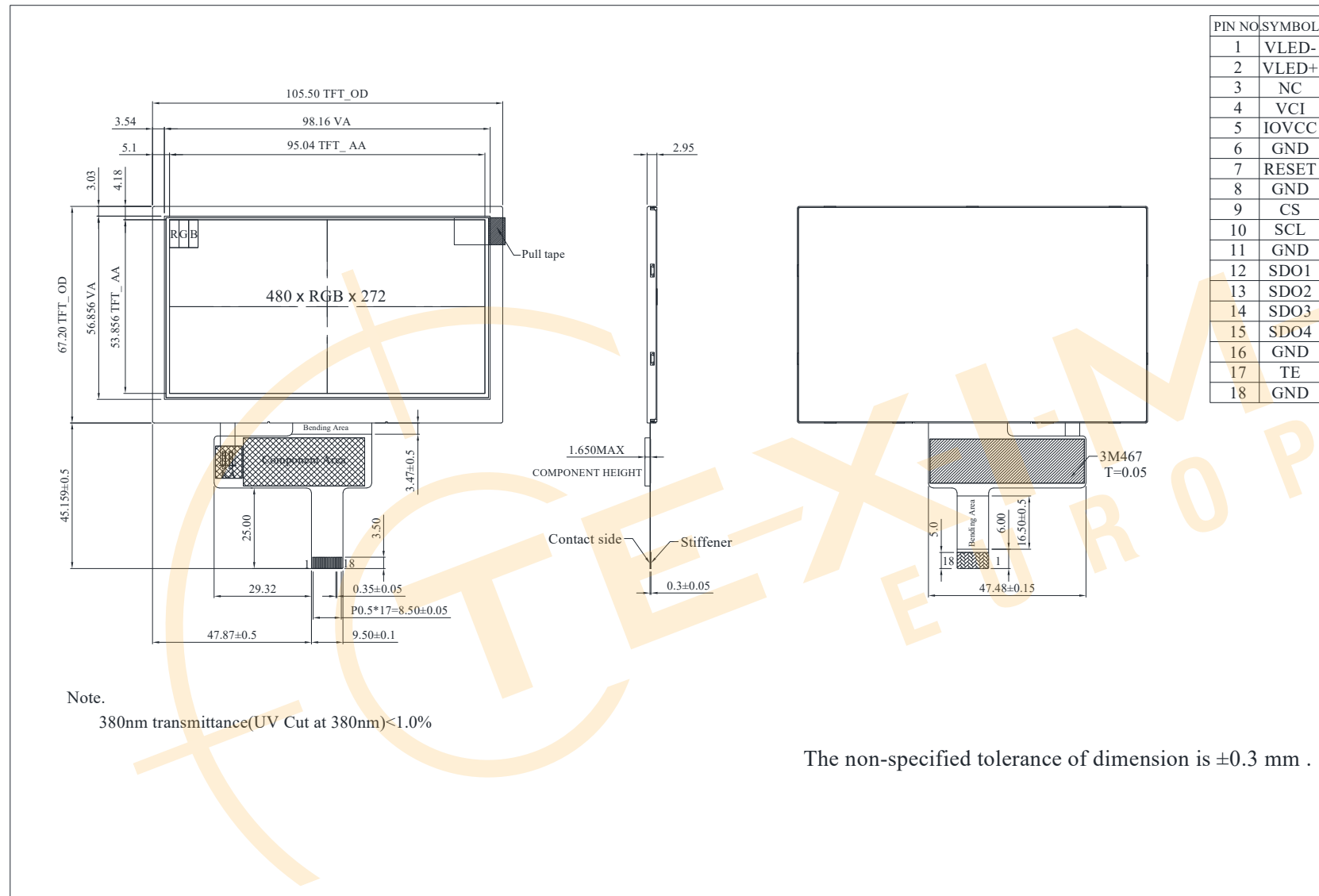
Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

Note4: Endurance test applying the electric stress to the finished product housing

12. Contour Drawing



13.Initial Code For Reference

```

void LCD_43W_Init(void)
{
    qspi_simulation_res = 1;
    delay_ms(80);
    qspi_simulation_res = 0;
    delay_ms(80);
    qspi_simulation_res = 1;
    delay_ms(150);

    //-----Start Initial Code -----//
    qspi_simulation_write_cmd(0xff);
    qspi_simulation_write_data(0xa5);
    qspi_simulation_write_cmd(0xE7); // TE_output_en
    qspi_simulation_write_data(0x10);
    qspi_simulation_write_cmd(0x35); // TE_interface_en
    qspi_simulation_write_data(0x01);
    qspi_simulation_write_cmd(0x3A);
    qspi_simulation_write_data(0x01); // 00---666//01--565
    qspi_simulation_write_cmd(0x40);
    qspi_simulation_write_data(0x01); // 01:IPS/00:TN
    qspi_simulation_write_cmd(0x41);
    qspi_simulation_write_data(0x03); // 01--8bit//03--16bit
    qspi_simulation_write_cmd(0x55);
    qspi_simulation_write_data(0x01);
    qspi_simulation_write_cmd(0x44); // VBP
    qspi_simulation_write_data(0x15); // 21
    qspi_simulation_write_cmd(0x45); // VFP
    qspi_simulation_write_data(0x15); // 21
    qspi_simulation_write_cmd(0x7d); // vdds_trim[2:0]
    qspi_simulation_write_data(0x03); // 2.07V

    qspi_simulation_write_cmd(0xc1); // avdd_clp_en avdd_clp[1:0] avcl_clp_en
    avcl_clp[1:0]
    qspi_simulation_write_data(0xab); // 6.74V/-5.16V
    qspi_simulation_write_cmd(0xc2); // vgh_clp_en vgl_clp[2:0]
    qspi_simulation_write_data(0x17);
    qspi_simulation_write_cmd(0xc3); // vgl_clp_en vgl_clp[2:0]
    qspi_simulation_write_data(0x10); //-10.951
    qspi_simulation_write_cmd(0xc6); // avdd_ratio_sel avcl_ratio_sel vgh_ratio_sel[1:0]
    vgl_ratio_sel[1:0]
    qspi_simulation_write_data(0x3a); // 35

    qspi_simulation_write_cmd(0xc7); // mv_clk_sel[1:0] avdd_clk_sel[1:0] avcl_clk_sel[1:0]
    qspi_simulation_write_data(0x25); // 2e
    qspi_simulation_write_cmd(0xc8); // VGL_CLK_sel
    qspi_simulation_write_data(0x00);

    qspi_simulation_write_cmd(0x7a); // user_vgsp

```

```
qspi_simulation_write_data(0x67); // 5f
qspi_simulation_write_cmd(0x6f); // user_gvdd
qspi_simulation_write_data(0x3f); // 3f
qspi_simulation_write_cmd(0x78); // user_gvcl
qspi_simulation_write_data(0x37); // 4a

qspi_simulation_write_cmd(0x73); // osc
qspi_simulation_write_data(0x08);
qspi_simulation_write_cmd(0x74);
qspi_simulation_write_data(0x12);
qspi_simulation_write_cmd(0xc9);
qspi_simulation_write_data(0x00);
qspi_simulation_write_cmd(0x67);
qspi_simulation_write_data(0x11);
// gate_ed
qspi_simulation_write_cmd(0x51); // gate_st_o[7:0]
// qspi_simulation_write_data(0x4b);
qspi_simulation_write_data(0x20);
qspi_simulation_write_cmd(0x52); // gate_ed_o[7:0]
qspi_simulation_write_data(0x7c);
qspi_simulation_write_cmd(0x53); // gate_st_e[7:0]
// qspi_simulation_write_data(0x45);
qspi_simulation_write_data(0x1c);
qspi_simulation_write_cmd(0x54); // gate_ed_e[7:0]
qspi_simulation_write_data(0x77);

qspi_simulation_write_cmd(0x46); // fsm_hbp_o[5:0]
qspi_simulation_write_data(0x0a);
qspi_simulation_write_cmd(0x47); // fsm_hfp_o[5:0]
qspi_simulation_write_data(0x2a);
qspi_simulation_write_cmd(0x48); // fsm_hbp_e[5:0]
qspi_simulation_write_data(0x0a);
qspi_simulation_write_cmd(0x49); // fsm_hfp_e[5:0]
qspi_simulation_write_data(0x1a);
qspi_simulation_write_cmd(0x56); // src_ld_wd[1:0] src_ld_st[5:0]
qspi_simulation_write_data(0x43);

qspi_simulation_write_cmd(0x57); // pn_cs_en src_cs_st[5:0]
qspi_simulation_write_data(0x42);
qspi_simulation_write_cmd(0x58); // src_cs_p_wd[6:0]
qspi_simulation_write_data(0x3c);
qspi_simulation_write_cmd(0x59); // src_cs_n_wd[6:0]
qspi_simulation_write_data(0x64);
qspi_simulation_write_cmd(0x5a); // src_pchg_st_o[6:0]
qspi_simulation_write_data(0x41);
qspi_simulation_write_cmd(0x5b); // src_pchg_wd_o[6:0]
qspi_simulation_write_data(0x3c);
qspi_simulation_write_cmd(0x5c); // src_pchg_st_e[6:0]
qspi_simulation_write_data(0x02);
qspi_simulation_write_cmd(0x5d); // src_pchg_wd_e[6:0]
qspi_simulation_write_data(0x3c);
```

```

qspi_simulation_write_cmd(0x5e); // src_pol_sw[7:0]
qspi_simulation_write_data(0x1f);
qspi_simulation_write_cmd(0x60); // src_op_st_o[7:0]
qspi_simulation_write_data(0x80);
qspi_simulation_write_cmd(0x61); // src_op_st_e[7:0]
qspi_simulation_write_data(0x3f);
qspi_simulation_write_cmd(0x62); // src_op_ed_o[9:8] src_op_ed_e[9:8]
qspi_simulation_write_data(0x21);
qspi_simulation_write_cmd(0x63); // src_op_ed_o[7:0]
qspi_simulation_write_data(0x07);
qspi_simulation_write_cmd(0x64); // src_op_ed_e[7:0]
qspi_simulation_write_data(0xe0);
qspi_simulation_write_cmd(0x65); // chopper
qspi_simulation_write_data(0x01); // 01-A2,02--A1
qspi_simulation_write_cmd(0xca); // avdd_mux_st_o[7:0]
qspi_simulation_write_data(0x20);
qspi_simulation_write_cmd(0xcb); // avdd_mux_ed_o[7:0]
qspi_simulation_write_data(0x52);
qspi_simulation_write_cmd(0xcc); // avdd_mux_st_e[7:0]
qspi_simulation_write_data(0x10);
qspi_simulation_write_cmd(0xcd); // avdd_mux_ed_e[7:0]
qspi_simulation_write_data(0x42);
qspi_simulation_write_cmd(0xd0); // avcl_mux_st_o[7:0]

qspi_simulation_write_data(0x20);
qspi_simulation_write_cmd(0xd1); // avcl_mux_ed_o[7:0]
qspi_simulation_write_data(0x52);
qspi_simulation_write_cmd(0xd2); // avcl_mux_st_e[7:0]
qspi_simulation_write_data(0x10);
qspi_simulation_write_cmd(0xd3); // avcl_mux_ed_e[7:0]
qspi_simulation_write_data(0x42);
qspi_simulation_write_cmd(0xd4); // vgh_mux_st[7:0]
qspi_simulation_write_data(0x0a);
qspi_simulation_write_cmd(0xd5); // vgh_mux_ed[7:0]
qspi_simulation_write_data(0x32);
qspi_simulation_write_cmd(0xe5); // DVDD_TRIM
qspi_simulation_write_data(0x06); // 1.65 05
qspi_simulation_write_cmd(0xe6); // ESD_CTRL
qspi_simulation_write_data(0x00);
qspi_simulation_write_cmd(0x6e); // LVD_en
qspi_simulation_write_data(0x14);
// gamma 01 20240416
qspi_simulation_write_cmd(0x80); // gam_vrp0 63
qspi_simulation_write_data(0x08);
qspi_simulation_write_cmd(0xa0); // gam_VRN0 63
qspi_simulation_write_data(0x08);
qspi_simulation_write_cmd(0x81); // gam_vrp1 62
qspi_simulation_write_data(0x09);
qspi_simulation_write_cmd(0xa1); // gam_VRN1 62-
qspi_simulation_write_data(0x08);
qspi_simulation_write_cmd(0x82); // gam_vrp2 61

```

```
qspi_simulation_write_data(0x07);
qspi_simulation_write_cmd(0xA2); // gam_VRN2 61-
qspi_simulation_write_data(0x06);
qspi_simulation_write_cmd(0x83); // gam_vrp3 2
qspi_simulation_write_data(0x37);
qspi_simulation_write_cmd(0xA3); // gam_VRN3 2-
qspi_simulation_write_data(0x37);
qspi_simulation_write_cmd(0x84); // gam_vrp4 1
qspi_simulation_write_data(0x38);
qspi_simulation_write_cmd(0xA4); // gam_VRN4 1-
qspi_simulation_write_data(0x38);
qspi_simulation_write_cmd(0x85); // gam_vrp5 0
qspi_simulation_write_data(0x3f); // 2a~39-0.43
qspi_simulation_write_cmd(0xA5); // gam_VRN5 0-
qspi_simulation_write_data(0x3f);

qspi_simulation_write_cmd(0x86); // gam_prp0 50
qspi_simulation_write_data(0x27); // 33
qspi_simulation_write_cmd(0xA6); // gam_PRN0 50-
qspi_simulation_write_data(0x28); // 2a

qspi_simulation_write_cmd(0x87); // gam_prp1 14
qspi_simulation_write_data(0x3b); // 2d
qspi_simulation_write_cmd(0xA7); // gam_PRN1 14-
qspi_simulation_write_data(0x3b); // 2d
qspi_simulation_write_cmd(0x88); // gam_pkp0 59
qspi_simulation_write_data(0x07); // 0b
qspi_simulation_write_cmd(0xA8); // gam_PKN0 59-
qspi_simulation_write_data(0x07); // 0b
qspi_simulation_write_cmd(0x89); // gam_pkp1 57
qspi_simulation_write_data(0x0e); // 14
qspi_simulation_write_cmd(0xA9); // gam_PKN1 57-
qspi_simulation_write_data(0x0e); // 14
qspi_simulation_write_cmd(0x8a); // gam_pkp2 54
qspi_simulation_write_data(0x16); // 1a
qspi_simulation_write_cmd(0xAa); // gam_PKN2 54-
qspi_simulation_write_data(0x17); // 1a
qspi_simulation_write_cmd(0x8b); // gam_PKP3 44
qspi_simulation_write_data(0x0f);
qspi_simulation_write_cmd(0xAb); // gam_PKN3 44-
qspi_simulation_write_data(0x0e);
qspi_simulation_write_cmd(0x8c); // gam_PKP4 38
qspi_simulation_write_data(0x14);
qspi_simulation_write_cmd(0xAc); // gam_PKN4 38-
qspi_simulation_write_data(0x14);
qspi_simulation_write_cmd(0x8d); // gam_PKP5 32
qspi_simulation_write_data(0x12);
qspi_simulation_write_cmd(0xAd); // gam_PKN5 32-
qspi_simulation_write_data(0x12);
qspi_simulation_write_cmd(0x8e); // gam_PKP6 26
qspi_simulation_write_data(0x10); // 16
```

```
qspi_simulation_write_cmd(0xAe); // gam_PKN6 26-
qspi_simulation_write_data(0x10); // 13
qspi_simulation_write_cmd(0x8f); // gam_PKP7 20
qspi_simulation_write_data(0x13); // 1c
qspi_simulation_write_cmd(0xAf); // gam_PKN7 20-
qspi_simulation_write_data(0x12); // 0a
qspi_simulation_write_cmd(0x90); // gam_PKP8 10
qspi_simulation_write_data(0x05);
qspi_simulation_write_cmd(0xB0); // gam_PKN8 10-
qspi_simulation_write_data(0x04);
qspi_simulation_write_cmd(0x91); // gam_PKP9 6
qspi_simulation_write_data(0x0e); // 0e
qspi_simulation_write_cmd(0xB1); // gam_PKN9 6-
qspi_simulation_write_data(0x0e); // 0e
qspi_simulation_write_cmd(0x92); // gam_PKP10 4
qspi_simulation_write_data(0x14);
qspi_simulation_write_cmd(0xB2); // gam_PKN10 4-
qspi_simulation_write_data(0x14);
```

```
qspi_simulation_write_cmd(0x11); // exit sleep
qspi_simulation_write_data(0x00);
delay_ms(200);
qspi_simulation_write_cmd(0x29); // display on
qspi_simulation_write_data(0x00);
delay_ms(120);
```

```
}
```





winstar

LCM Sample Estimate Feedback Sheet

Module Number : _____

Page: 1

1、Panel Specification :

- | | | |
|----------------------------|-------------------------------|-------------------------------------|
| 1. Panel Type : | ☐ Pass | ☐ NG , _____ |
| 2. View Direction : | ☐ Pass | ☐ NG , _____ |
| 3. Numbers of Dots : | ☐ Pass | ☐ NG , _____ |
| 4. View Area : | ☐ Pass | ☐ NG , _____ |
| 5. Active Area : | ☐ Pass | ☐ NG , _____ |
| 6. Operating Temperature : | ☐ Pass | ☐ NG , _____ |
| 7. Storage Temperature : | ☐ Pass | ☐ NG , _____ |
| 8. Others : | _____ | |

2、Mechanical

- | | | |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. PCB Size : | ☐ Pass | ☐ NG , _____ |
| 2. Frame Size : | ☐ Pass | ☐ NG , _____ |
| 3. Material of Frame : | ☐ Pass | ☐ NG , _____ |
| 4. Connector Position : | ☐ Pass | ☐ NG , _____ |
| 5. Fix Hole Position : | ☐ Pass | ☐ NG , _____ |
| 6. Backlight Position : | ☐ Pass | ☐ NG , _____ |
| 7. Thickness of PCB : | ☐ Pass | ☐ NG , _____ |
| 8. Height of Frame to PCB : | ☐ Pass | ☐ NG , _____ |
| 9. Height of Module : | ☐ Pass | ☐ NG , _____ |
| 10. Others : | ☐ Pass | ☐ NG , _____ |

3、Relative Hole Size :

- | | | |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. Pitch of Connector : | ☐ Pass | ☐ NG , _____ |
| 2. Hole size of Connector : | ☐ Pass | ☐ NG , _____ |
| 3. Mounting Hole size : | ☐ Pass | ☐ NG , _____ |
| 4. Mounting Hole Type : | ☐ Pass | ☐ NG , _____ |
| 5. Others : | ☐ Pass | ☐ NG , _____ |

4、Backlight Specification :

- | | | |
|--|-------------------------------|-------------------------------------|
| 1. B/L Type : | ☐ Pass | ☐ NG , _____ |
| 2. B/L Color : | ☐ Pass | ☐ NG , _____ |
| 3. B/L Driving Voltage (Reference for LED Temperature) : | ☐ Pass | ☐ NG , _____ |
| 4. B/L Driving Current : | ☐ Pass | ☐ NG , _____ |
| 5. Brightness of B/L : | ☐ Pass | ☐ NG , _____ |
| 6. B/L Solder Method : | ☐ Pass | ☐ NG , _____ |
| 7. Others : | ☐ Pass | ☐ NG , _____ |

>> **Go to page 2** <<



Winstar Module Number : _____

Page: 2

5、Electronic Characteristics of Module :

- | | | |
|------------------------------|-------------------------------|-------------------------------------|
| 1. Input Voltage : | ☐ Pass | ☐ NG , _____ |
| 2. Supply Current : | ☐ Pass | ☐ NG , _____ |
| 3. Driving Voltage for LCD : | ☐ Pass | ☐ NG , _____ |
| 4. Contrast for LCD : | ☐ Pass | ☐ NG , _____ |
| 5. B/L Driving Method : | ☐ Pass | ☐ NG , _____ |
| 6. Negative Voltage Output : | ☐ Pass | ☐ NG , _____ |
| 7. Interface Function : | ☐ Pass | ☐ NG , _____ |
| 8. LCD Uniformity : | ☐ Pass | ☐ NG , _____ |
| 9. ESD test : | ☐ Pass | ☐ NG , _____ |
| 10. Others : | ☐ Pass | ☐ NG , _____ |

6、Summary :

Sales signature : _____

Customer Signature : _____

Date : / /

Disclaimer

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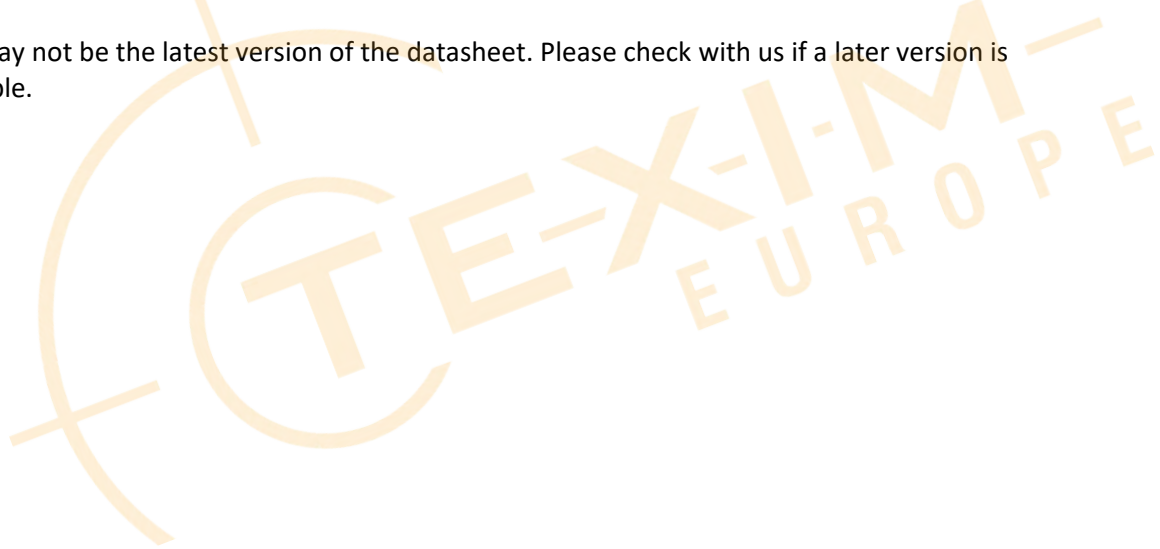
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Please contact us if you have any questions about the contents of the datasheet.

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Headquarters & Warehouse

Elektrostraat 17
NL-7483 PG Haaksbergen
The Netherlands

T: +31 (0)53 573 33 33
E: info@texim-europe.com
Homepage: www.texim-europe.com



The Netherlands

Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
E: nl@texim-europe.com



Belgium

Zuiderlaan 14, box 10
B-1731 Zellik

T: +32 (0)2 462 01 00
E: belgium@texim-europe.com



UK & Ireland

St Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
E: uk@texim-europe.com



Germany

Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
E: germany@texim-europe.com



Germany

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: muenchen@texim-europe.com



Austria

Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
E: austria@texim-europe.com



Nordic

Stockholmsgade 45
2100 Copenhagen

T: +45 88 20 26 30
E: nordic@texim-europe.com



Italy

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: italy@texim-europe.com