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TFT DISPLAY SPECIFICATION



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.: **WFN0180A2TOXASNN000**

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: 2025/06/26			

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	2025/03/31		First issue
A	2025/06/26		Add backlight tape



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1.Module Classification Information

W	F	N	0180	A2	T	0X	A	S	N	N	0	00
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	N: Normal E : EFD M : MIP												
④	Display Size : 1.8" TFT												
⑤	Model serials no.												
⑥	Backlight Type :	F :	CCFL, White				T :	LED, White					
		S :	LED, High Light White				Z :	Nichia LED, White					
		N :	With out Backlight				A :	Front Light					
⑦	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	Operating Temperature		Normal temperature				Super Wide temperature					
		LCD tape		TN		IPS	VA	TN				IPS	VA
		View angle		6H	12H			6H	12H	O-Film	OD-Film		
		Reflective		AA	-	-	AT	AN	-	-	-	AW	AV
		Transflective		0B	0E	-	02	0M	0P	-	-	08	04
		Transmissive		0C	0F	0A	0T	0N	0Q	0R	0S	0W	0V
		Operating Temperature		Wide temperature									
		LCD tape		TN								IPS	VA
		View angle		6H	12H	2H	3H	9H	O-Film	OD-Film	All View		
		Reflective		AG	AJ	AB	-	-	-	-	05	AY	AX
		Transflective		0H	0K	-	0G	0D	0U	-	-	07	03
		Transmissive		0I	0L	-	-	-	0Z	0J	-	0Y	0X
		⑧	A :	TFT LCD						G :	TFT+ Screw holes		
B :	TFT+ Screw holes+ Control board						H :	TFT+ D/V board					
C :	TFT+ Screw holes + A/D board						I :	TFT+ Screw holes +D/V board					
D :	TFT+ Screw holes + A/D board + Control board						J :	TFT+ Power board					
E :	TFT+ Screw holes + Power board						Z :	TFT+ Power board (Embedded)					
F :	TFT+ Control board												
⑨	A : Analog	B : 6-bits parallel			D : Digital				E : eDP				
	L : LVDS	M : MIPI			S : SPI								
⑩	Interface:												
	A : 8Bit			B : 16Bit		E : eDP		H : HDMI		I : I2C Interface		M : MIPI	
	N : Without Control board			P : DP		R : RS232		S : SPI		U : USB			
⑪	TS:												
	A : CTP + Optical bonding			B : CTP + USB				C : CTP					
	D : CTP + USB + Optical bonding			E : RTP + Optical bonding				F : CG + Optical bonding					
	H : CTP + Only G-sensor			J : CTP + Only G-sensor + USB				L : CTP+ Hover Touch					
	N : Without TS			Q : in-cell				R : on-cell					
	T : RTP			U : CG				V : in-cell + CG					
	W : on-cell + CG												
⑫	Version:												
⑬	Serial No.: Serial number (00~99)												

2.Summary

WFN0180A2 is a 1.77-inch LCD cell with thin film transistors as active elements and contains 128(H) X 160(V) pixels. Each pixel is divided into red, green and blue dot, which are arranged in vertical stripe. The cell is normally black mode, and can be applied to the transmission type display.



3.General Specification

Item	Dimension	Unit
Size	1.77	inch
Dot Matrix	128 x RGB x 160(TFT)	dots
Module dimension	34.0 (W) x 45.83 (H) x 3.11 (D)	mm
Active area	28.032 x 35.040	mm
Pixel pitch	0.219 x 0.219	mm
LCD type	TFT, Normally Black, Transmissive	
View Angle	80/80/80/80	
Aspect Ratio	Portrait	
TFT IC	NV3023B or equivalent	
TFT Interface	SPI	
Backlight Type	LED, Normally White	
With /Without TP	Without TP	
Surface	Anti-Glare	

*Color tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°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. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C



5. Electrical Characteristics

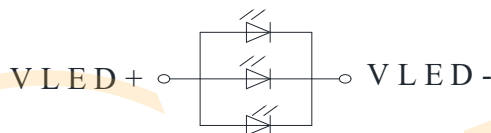
5.1. Operating conditions:

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	VCC	2.8	3.3	3.6	V
Supply LCM current	ICC	—	7	10.5	mA

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	—	—	60	—	mA	
LED voltage	VLED+	2.7	2.9	3.3	V	Note 1
LED Life Time	—	50,000	—	—	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Circuit diagram

Note 2 : $T_a = 25^\circ\text{C}$

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

Note 4 : The single LED lamp case

6.DC Characteristics

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	VIL	GND	-	0.3VCC	V	
High level input voltage	VIH	0.7VCC	-	VCC	V	



7.AC Characteristics

7.1. SPI 3-Wire Interface

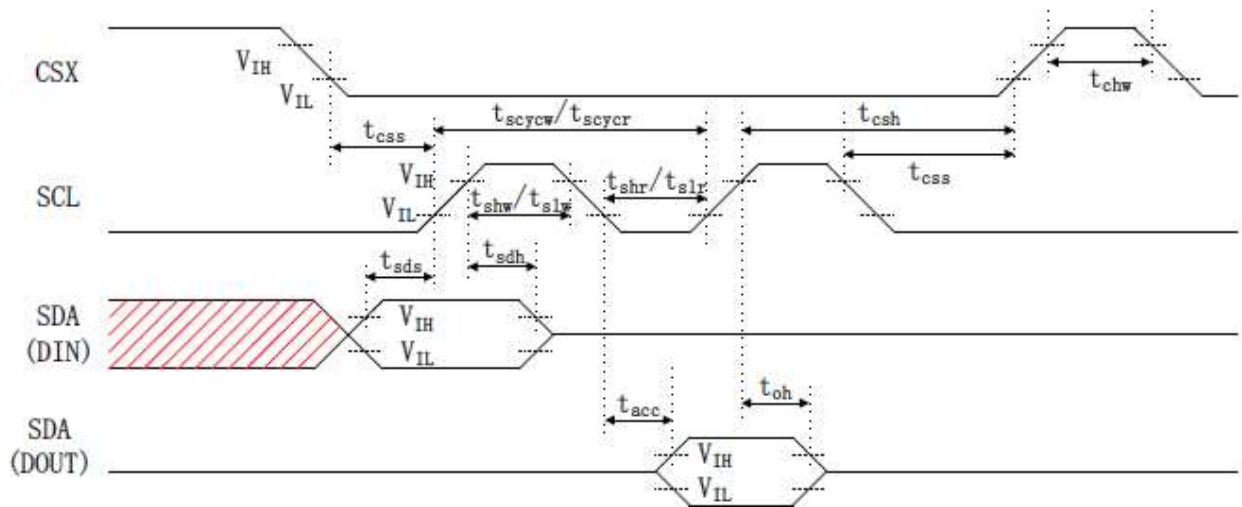


Table 1: 3-pin Serial Interface Characteristics

Signal	Symbol	Parameter	MIN	MAX	UNIT	Description
CSX	TCSS	Chip Select Setup Time	10		ns	
	TCSH	Chip Select Hold Time	30		ns	
	TCHW	Chip Select "H" Pulse Width	30		ns	
SCL	TSCYCW	Serial Clock Cycle(Write)	16		ns	
	TSHW	S"L""H" Pulse Width(Write)	8		ns	
	TSLW	S"L""L" Pulse Width(Write)	8		ns	
	TSCYCR	Serial Clock Cycle(Read)	150		ns	
	TSHR	S"L""H" Pulse Width(Read)	60		ns	
	TSLR	S"L""L" Pulse Width(Read)	60		ns	
SDA(DIN) /(DOUT)	TSDS	Data Setup Time	15		ns	
	TSDH	Data Hold Time	5		ns	
	TACC	Access Time	5	50	ns	CLmax=30pF CLmin=8pF
	TOH	Output Disable Time	10		ns	

7.2. SPI 4-Wire Interface

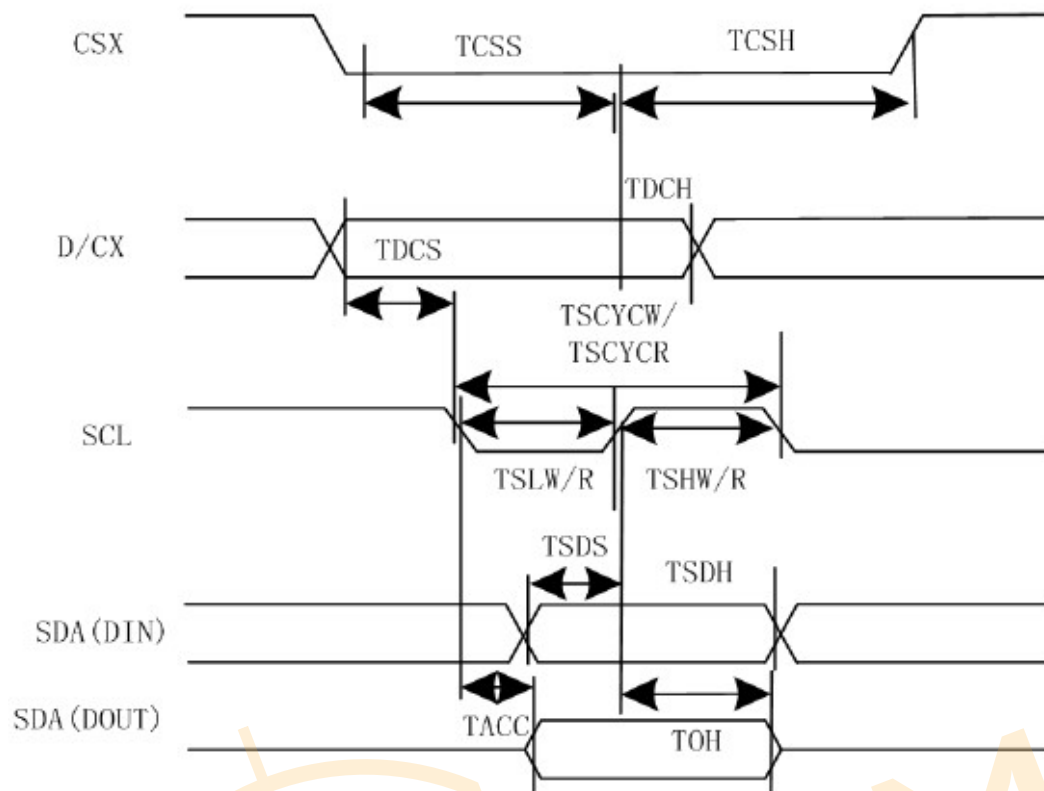


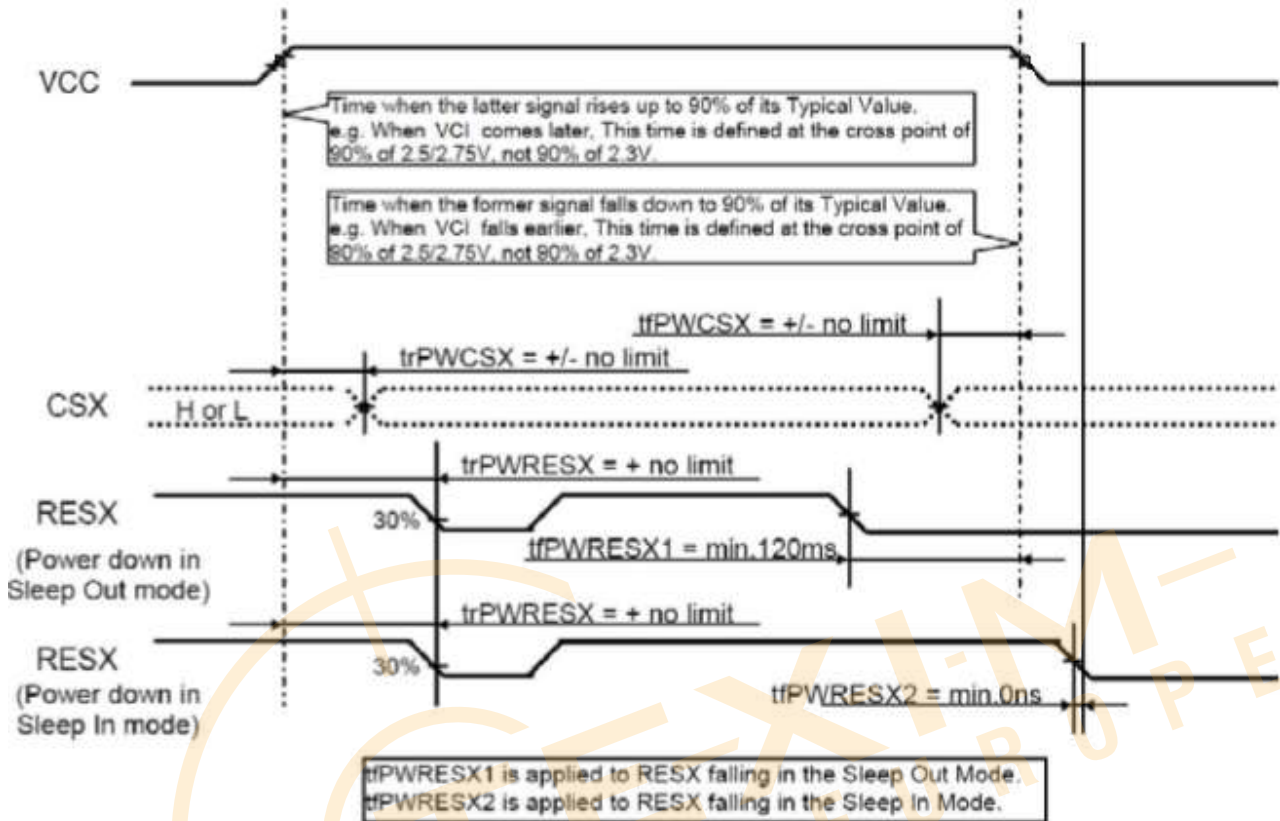
Table 2: 4 pin Serial Interface Characteristics

Signal	Symbol	Parameter	MIN	MAX	UNIT	Description
CSX	TCSS	Chip Select Setup Time	10		ns	
	TCSH	Chip Select Hold Time	30		ns	
	TCHW	Chip Select "H" Pulse Width	30		ns	
SCL	TSCYCW	Serial Clock Cycle(Write)	16		ns	
	TSHW	S"L""H" Pulse Width(Write)	8		ns	
	TSLW	S"L""L" Pulse Width(Write)	8		ns	
	TSCYCR	Serial Clock Cycle(Read)	150		ns	
	TSHR	S"L""H" Pulse Width(Read)	60		ns	
	TSLR	S"L""L" Pulse Width(Read)	60		ns	
D/CX	TDCS	D/CX Setup Time	5		ns	
	TDCH	D/CX Hold Time	5		ns	
SDA(DIN) (DOUT)	TSDS	Data Setup Time	9.5		ns	
	TSDH	Data Hold Time	5		ns	
	TACC	Access Time	5	50	ns	CLmax=30pF CLmin=8pF
	TOH	Output Disable Time	10		ns	

8.Power ON/OFF Sequence

8.1. Case 1 - RESX line is held high or Unstable by Host at Power On

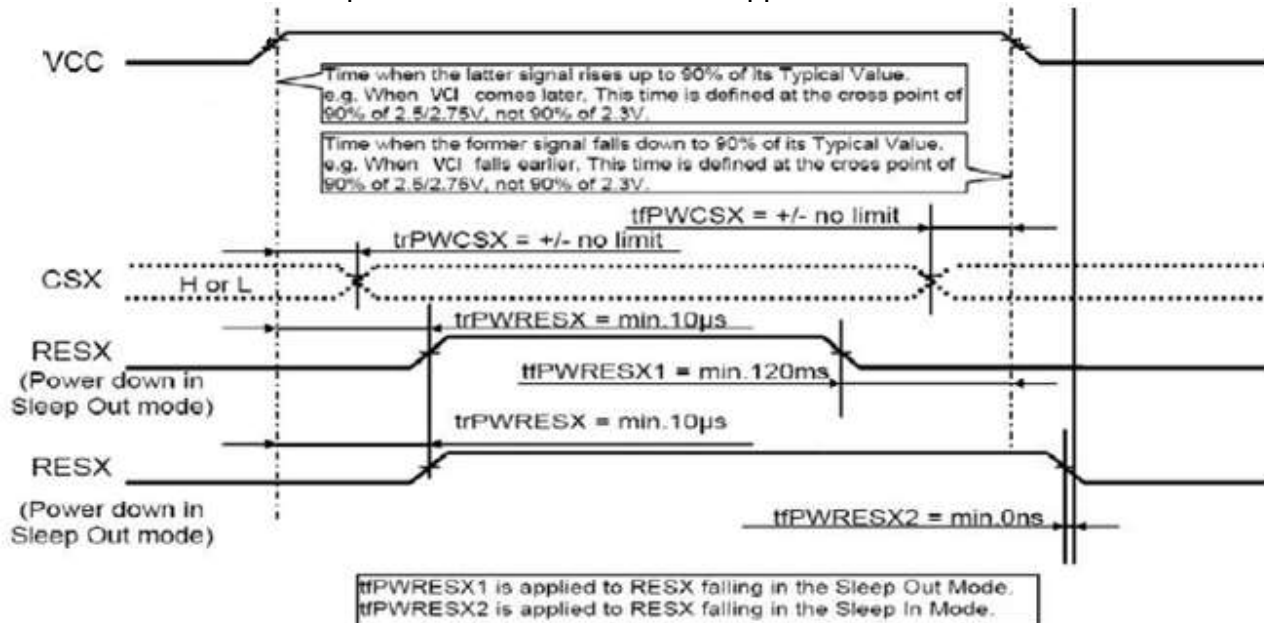
If RESX line is held high or unstable by the host during Power On, then a Hardware Reset must be applied after VCC have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

8.2. Case 2 - RESX line is held low by Host at Power On

If RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for minimum 10 μ sec after VCC have been applied.



Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

9.Data input format

9.1. Serial Interface

The Module uses a 3-wire 9-bit serial interface or 4-pins/8-bit bi-directional interface for communication between the micro controller and the LCD driver chip. The 3-pins serial use: CSX (chip enable), SCL (serial clock) and SDA (serial data input/output) and the 4-pins serial use: CSX (chip enable), D/CX (data/ command select), SCL (serial clock), and SDA (serial data input/output).

Table 3 Serial Interface Type Selection

4WSPI	Interface	Read back selection
0	3-Pins Serial Interface	Via the read instruction (8-bit , 24-bit and 32-bit read parameter)
1	4-Pins Serial Interface	Via the read instruction (8-bit , 24-bit and 32-bit read parameter)

9.2. Command/Data Write

The write mode of the interface means the micro controller writes commands and data to the LCD driver. 3-pins serial data packet contains a control bit D/CX and a transmission byte, but in 4-pins serial case, data packet contains just transmission byte and control bit D/CX is transferred by the D/CX pin. If D/CX is “low”, the transmission byte is interpreted as a command byte. If D/CX is “high”, the transmission byte is stored in the display data RAM (Memory write command), or command register as parameter.

Any instruction can be sent in any orders to the Driver. The MSB is transmitted first. The serial interface is initialized when CSX is high status. In this state, SCL clock pulse or SDA data have no effect. A falling edge on CSX enables the serial interface and indicated the start of data transmission.

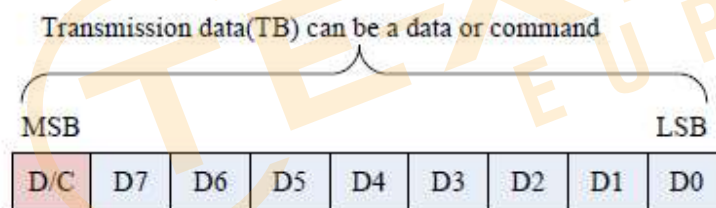


Figure 1: SPI 3-Wire Write Data Format

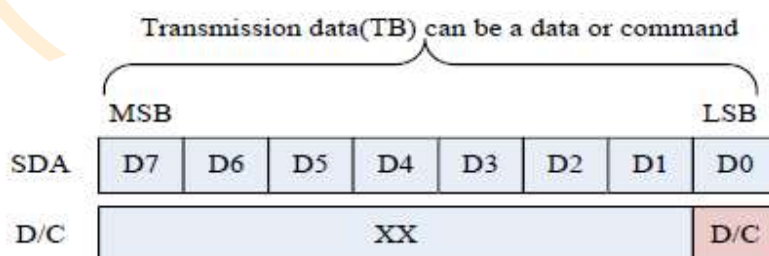


Figure 2: SPI 4-Wire Write Data Format

When CSX is “high”, SCL clock is ignored. At the falling edge of CSX, SCL can be high or low. SDA is sampled at the rising edge of SCL. D/CX indicates, whether the byte is command code (D/CX='0') or parameter/RAM data (D/CX='1'). If CSX stays low after the last bit of command/data byte, the serial interface expects the D/CX bit (3-pin serial interface) or D7 (4-pins serial interface) of the next byte at the next rising edge of SCL.

9.3. Command/Data Read

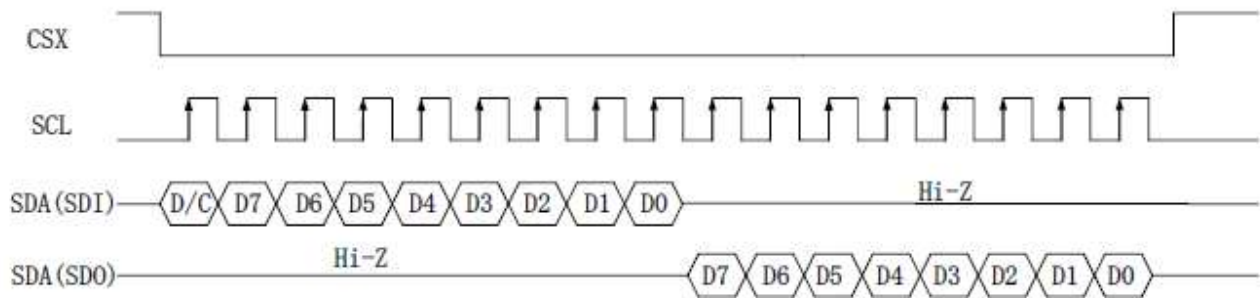


Figure 3: SPI 3-Wire 8-bit Read Operation
(For 'DAH/DBH/DCH/0Ah/0Bh/0Ch/0Dh/0Eh/0Fh' Command)

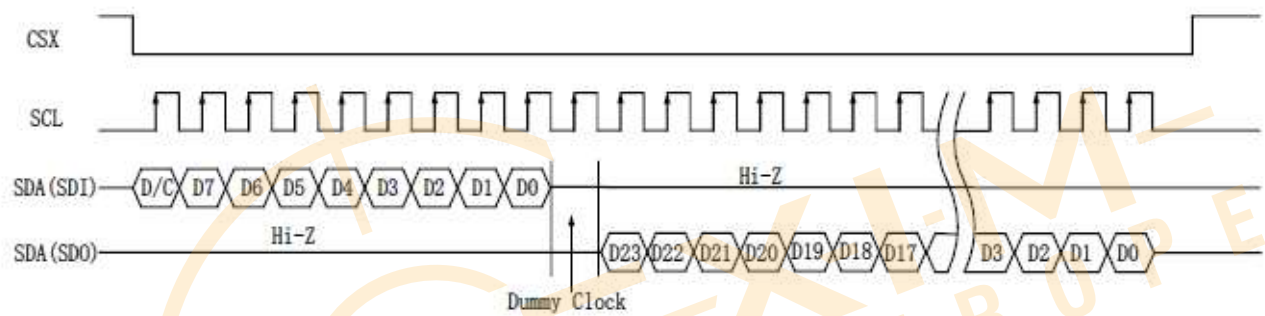


Figure 4: SPI 3-Wire 24-bit Read Operation
(For '04H' Command with one dummy clock)

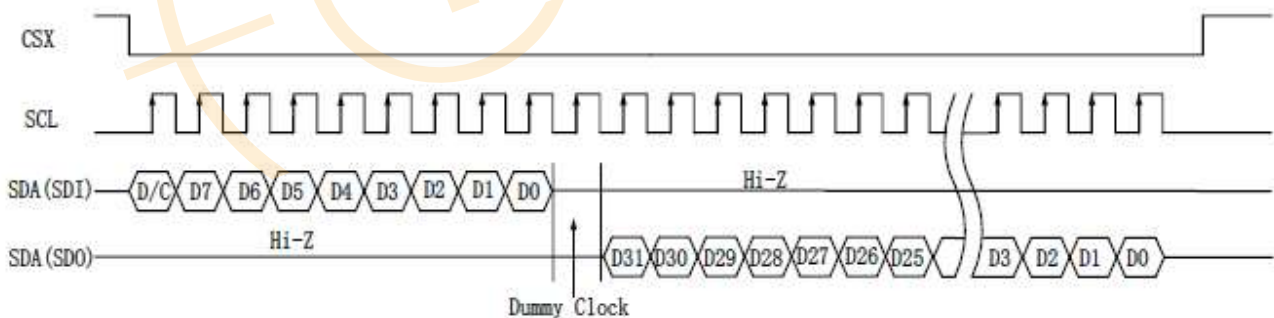


Figure 5: SPI 3-Wire 32-bit Read Operation
(For '09H' Command with one dummy clock)

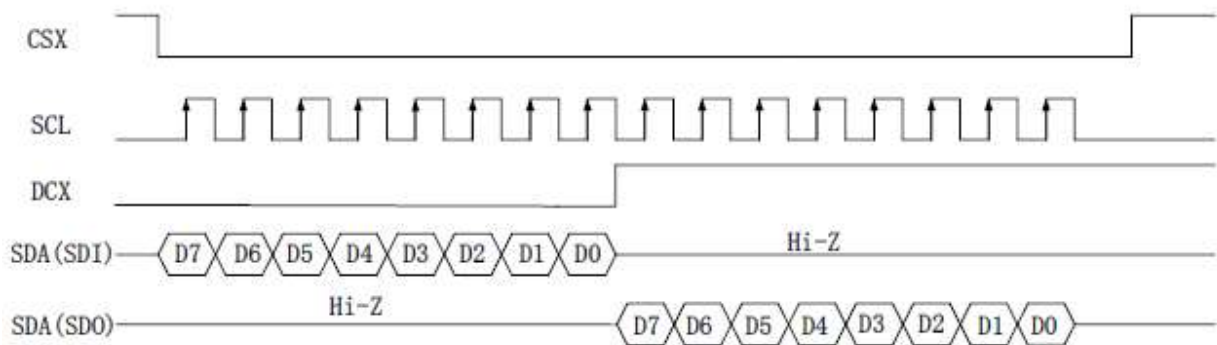


Figure 6: SPI 4-Wire 8-bit Read Operation
(For 'DAH/DBH/DCH/0Ah/0Bh/0Ch/0Dh/0Eh/0Fh' Command)

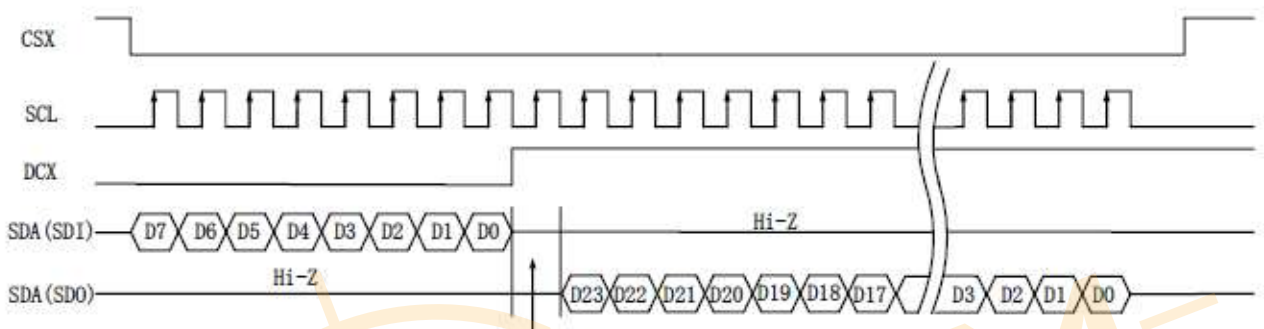


Figure 7: SPI 4-Wire 24-bit Read Operation
(For '04H' Command with one dummy clock)

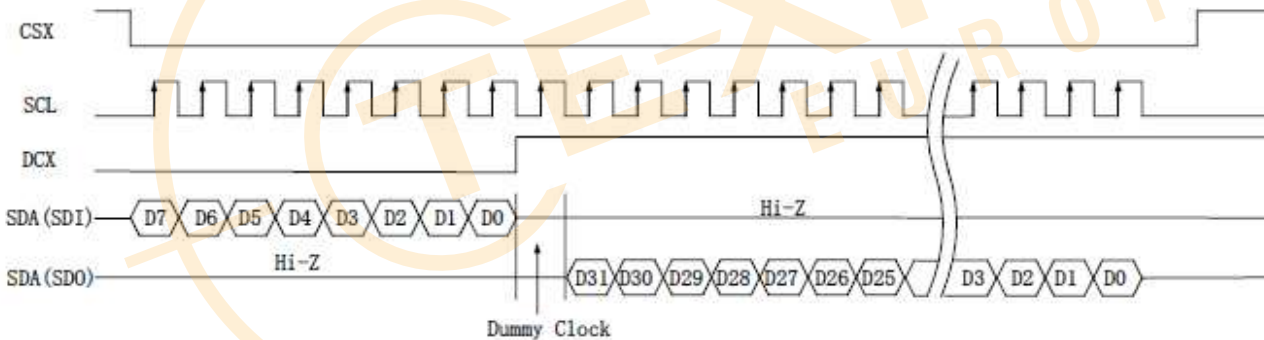


Figure 8: SPI 4-Wire 32-bit Read Operation
(For '09H' Command with one dummy clock)

10. Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	$\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$	-	35	-	.ms	Note 3
Contrast ratio		CR	At optimized viewing angle	1000	1500	-	-	Note 4
Color Chromaticity	White	Wx	$\theta=0^{\circ}$ 、 $\Phi=0$	0.248	0.298	0.348		Note 2,6,7
		Wy		0.275	0.325	0.375		
Viewing angle	Hor.	Θ R	$CR\geq 10$	70	80	-	Deg.	Note Note 1
		Θ L		70	80	-		
	Ver.	Φ T		70	80	-		
		Φ B		70	80	-		
Brightness		-	-	500	600	-	cd/m ²	Center of display
Uniformity		(U)	-	80	-	-	%	Note 5

Ta=25±2°C

Note 1: Definition of viewing angle range

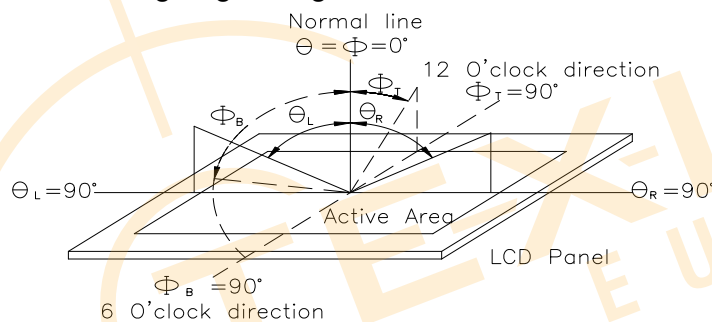


Fig.10.1. Definition of viewing angle

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.

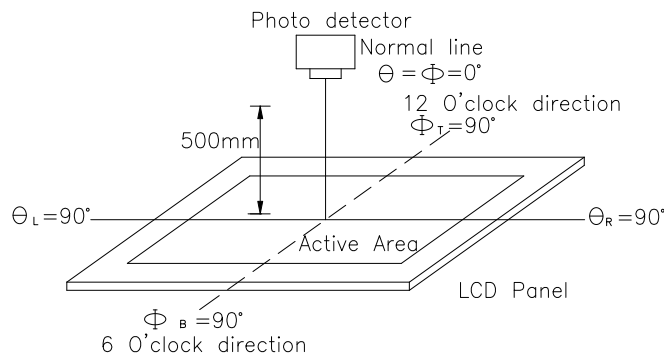
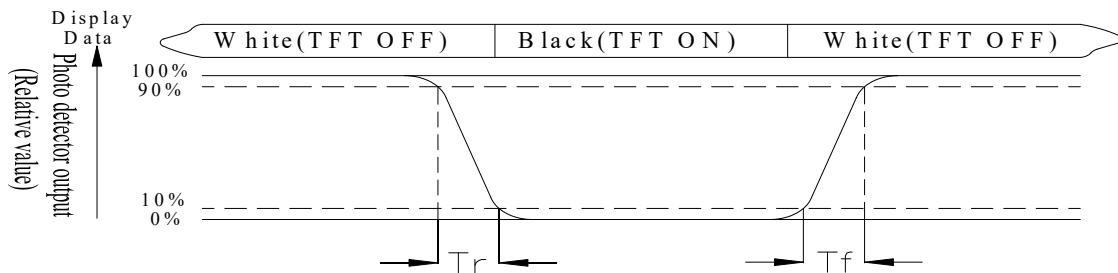


Fig. 10.2. Optical measurement system setup

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.

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

L = Active area length

W = Active area width

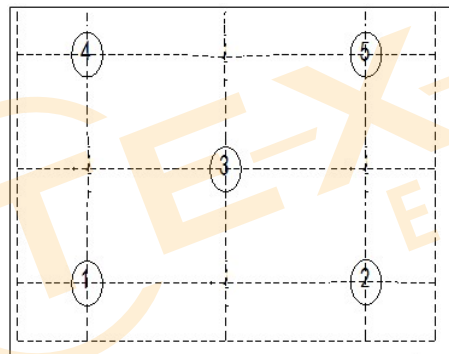


Fig10.3. Definition of uniformity

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.

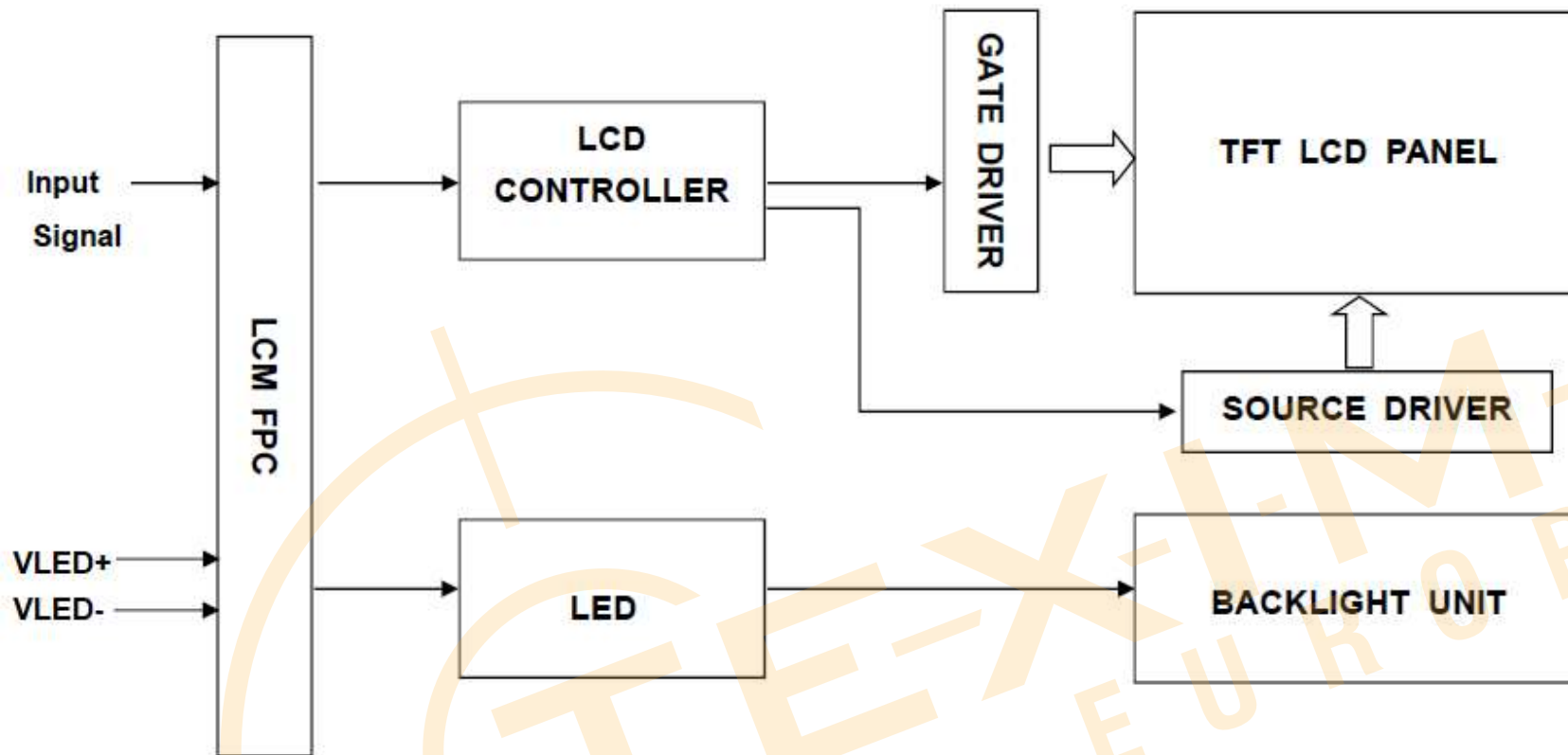
11.Interface

11.1. LCM PIN Definition

Pin no	Symbol	Function	Remark
1	VLED+	Back light anode	
2	VLED-	Back light cathode	
3	SPI4W (VCC=4 WIRE)	SPI4W='1', SPI 4 Wire Serial SPI4W='0', SPI 3 Wire Serial	
4	VCC	Power Supply.	
5	GND	Ground	
6	CS	Chip enable (CSX)	
7	RST	Reset signal (RESX)	
8	SDA	Serial input/output signal in serial interface mode.	
9	SCL	In Serial Interface, this is used as SCL.	
10	D/C	Data/ command selection. (D/CX)	

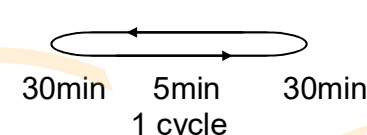


12. Block Diagram



13. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°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 240hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 240hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 240hrs	2
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 240hrs	1,2
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 240hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20°C 25°C 70°C  30min 5min 30min 1 cycle	-20°C/70°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=±TBDV(contact) ,±TBDV(air), RS=330Ω CS=150pF 10 times	4

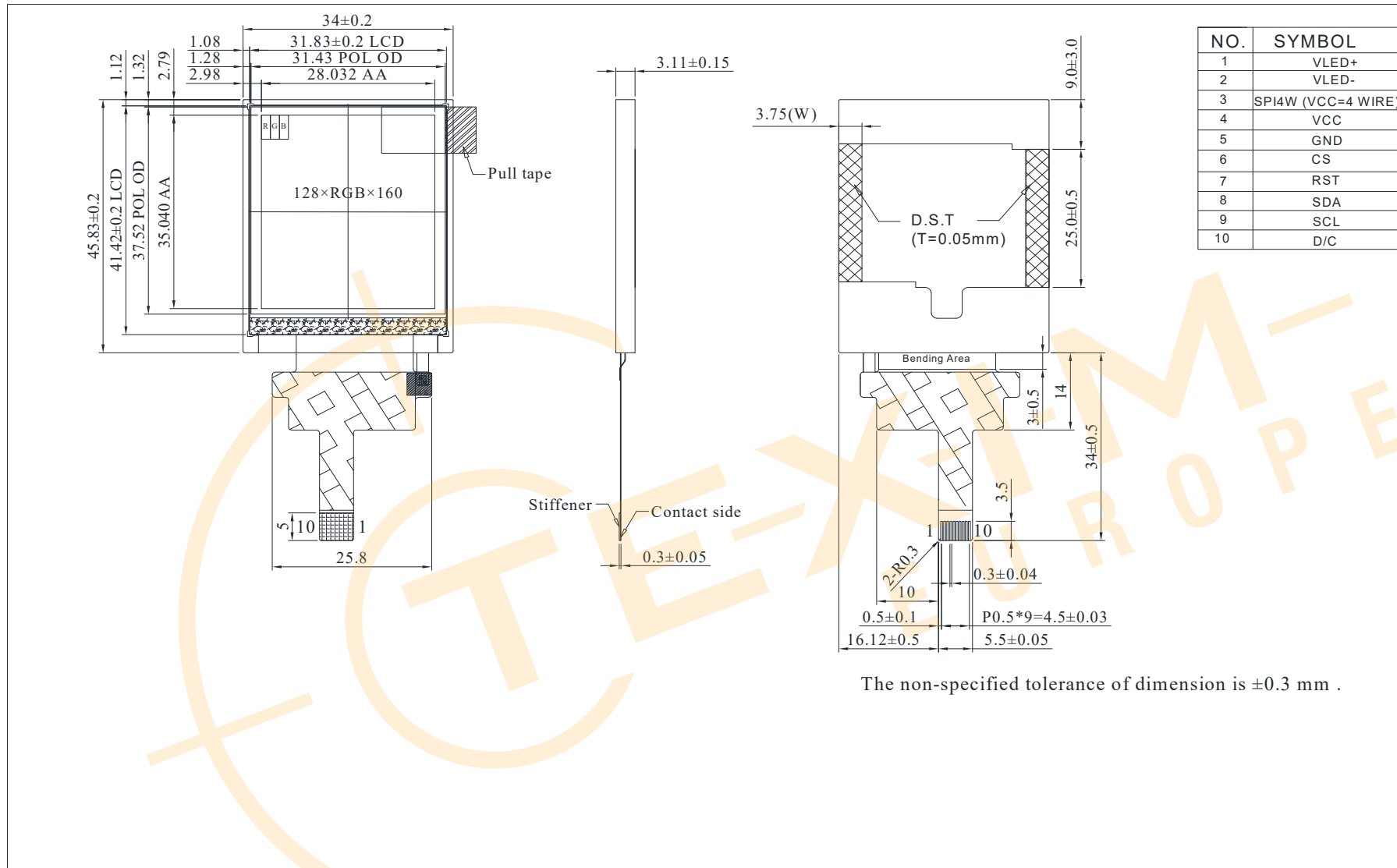
Note1: No dew condensation to be observed.

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

14. Contour Drawing



15.Initial Code For Reference

```

void NV3023B(void)
{
    //-----reset sequence-----//
    SPI_RST = 1;
    delay_ms(1); // Delay 1ms
    SPI_RST = 0;
    delay_ms(10); // Delay 10ms
    SPI_RST = 1;
    delay_ms(10); // Delay 120ms
    //-----display and color format setting-----//
    NV3023B_CMD_W(0xff);
    NV3023B_DATA_W(0xa5);
    NV3023B_CMD_W(0x3a);
    NV3023B_DATA_W(0x55);
    NV3023B_CMD_W(0x3e);
    NV3023B_DATA_W(0x00);
    NV3023B_CMD_W(0x51);
    NV3023B_DATA_W(0x16);
    NV3023B_CMD_W(0x52);
    NV3023B_DATA_W(0x11);
    NV3023B_CMD_W(0x53);
    NV3023B_DATA_W(0x13);
    NV3023B_CMD_W(0x63);
    NV3023B_DATA_W(0x0f);
    NV3023B_CMD_W(0x64);
    NV3023B_DATA_W(0x0f);
    NV3023B_CMD_W(0x82);
    NV3023B_DATA_W(0x00);
    NV3023B_CMD_W(0x83);
    NV3023B_DATA_W(0x13);
    NV3023B_CMD_W(0x84);
    NV3023B_DATA_W(0x02);
    NV3023B_CMD_W(0x85);
    NV3023B_DATA_W(0x89);
    NV3023B_CMD_W(0x87);
    NV3023B_DATA_W(0x16);
    NV3023B_CMD_W(0x88);
    NV3023B_DATA_W(0x14);
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    NV3023B_CMD_W(0x93);
    NV3023B_DATA_W(0x63);
    NV3023B_CMD_W(0x96);
    NV3023B_DATA_W(0x82);
    NV3023B_CMD_W(0x97);
    NV3023B_DATA_W(0x00);
    NV3023B_CMD_W(0x98);
    NV3023B_DATA_W(0x00);

```

```
NV3023B_CMD_W(0x99);
NV3023B_DATA_W(0x01);
NV3023B_CMD_W(0xb1);
NV3023B_DATA_W(0x05);
NV3023B_CMD_W(0xb2);
NV3023B_DATA_W(0x88);
NV3023B_CMD_W(0xb4);
NV3023B_DATA_W(0x34);
NV3023B_CMD_W(0xb3);
NV3023B_DATA_W(0x04);
NV3023B_CMD_W(0xc3);
NV3023B_DATA_W(0x10);
NV3023B_CMD_W(0xe6);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x44);
NV3023B_DATA_W(0x00);
//----- gamma setting-----//
NV3023B_CMD_W(0x70);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x71);
NV3023B_DATA_W(0x02);
NV3023B_CMD_W(0x72);
NV3023B_DATA_W(0x05);
NV3023B_CMD_W(0x73);
NV3023B_DATA_W(0x0B);
NV3023B_CMD_W(0x74);
NV3023B_DATA_W(0x13);
NV3023B_CMD_W(0x75);
NV3023B_DATA_W(0x0B);
NV3023B_CMD_W(0x76);
NV3023B_DATA_W(0x14);
NV3023B_CMD_W(0x77);
NV3023B_DATA_W(0x0B);
NV3023B_CMD_W(0x78);
NV3023B_DATA_W(0x08);
NV3023B_CMD_W(0x79);
NV3023B_DATA_W(0x1D);
NV3023B_CMD_W(0x7a);
NV3023B_DATA_W(0x03);
NV3023B_CMD_W(0x7b);
NV3023B_DATA_W(0x07);
NV3023B_CMD_W(0x7c);
NV3023B_DATA_W(0x05);
NV3023B_CMD_W(0x7d);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x7e);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x7f);
NV3023B_DATA_W(0x0a);
NV3023B_CMD_W(0xa0);
NV3023B_DATA_W(0x0F);
```

NV3023B_CMD_W(0xa1);
NV3023B_DATA_W(0x3C);
NV3023B_CMD_W(0xa2);
NV3023B_DATA_W(0x0C);
NV3023B_CMD_W(0xa3);
NV3023B_DATA_W(0x12);
NV3023B_CMD_W(0xa4);
NV3023B_DATA_W(0x0C);
NV3023B_CMD_W(0xa5);
NV3023B_DATA_W(0x05);
NV3023B_CMD_W(0xa6);
NV3023B_DATA_W(0x5D);
NV3023B_CMD_W(0xa7);
NV3023B_DATA_W(0x06);
NV3023B_CMD_W(0xa8);
NV3023B_DATA_W(0x09);
NV3023B_CMD_W(0xa9);
NV3023B_DATA_W(0x5C);
NV3023B_CMD_W(0xaa);
NV3023B_DATA_W(0x0D);
NV3023B_CMD_W(0xab);
NV3023B_DATA_W(0x19);
NV3023B_CMD_W(0xac);
NV3023B_DATA_W(0x19);
NV3023B_CMD_W(0xad);
NV3023B_DATA_W(0x0F);
NV3023B_CMD_W(0xae);
NV3023B_DATA_W(0x3F);
NV3023B_CMD_W(0xaf);
NV3023B_DATA_W(0x0C);
NV3023B_CMD_W(0xC5);
NV3023B_DATA_W(0x01);
NV3023B_CMD_W(0x94);
NV3023B_DATA_W(0x07);
NV3023B_CMD_W(0x95);
NV3023B_DATA_W(0x07);
NV3023B_CMD_W(0xff);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x21);
NV3023B_CMD_W(0x11);
NV3023B_CMD_W(0x36);
NV3023B_DATA_W(0x88);
NV3023B_CMD_W(0x35);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0x3A);
NV3023B_DATA_W(0x55);
NV3023B_CMD_W(0xB2);
NV3023B_DATA_W(0x0C);
NV3023B_DATA_W(0x0C);
NV3023B_DATA_W(0x00);
NV3023B_DATA_W(0x33);

NV3023B_DATA_W(0x33);
NV3023B_CMD_W(0xB7);
NV3023B_DATA_W(0x00);
NV3023B_CMD_W(0xBB);
NV3023B_DATA_W(0x36);
NV3023B_CMD_W(0xC0);
NV3023B_DATA_W(0x2C);
NV3023B_CMD_W(0xC2);
NV3023B_DATA_W(0x01);
NV3023B_CMD_W(0xC3);
NV3023B_DATA_W(0x13);
NV3023B_CMD_W(0xC4);
NV3023B_DATA_W(0x20);
NV3023B_CMD_W(0xC6);
NV3023B_DATA_W(0x0F);
NV3023B_CMD_W(0xD6);
NV3023B_DATA_W(0xA1);
NV3023B_CMD_W(0xD0);
NV3023B_DATA_W(0xA4);
NV3023B_DATA_W(0xA1);
NV3023B_CMD_W(0xE0);
NV3023B_DATA_W(0xF0);
NV3023B_DATA_W(0x08);
NV3023B_DATA_W(0x0E);
NV3023B_DATA_W(0x09);
NV3023B_DATA_W(0x08);
NV3023B_DATA_W(0x04);
NV3023B_DATA_W(0x2F);
NV3023B_DATA_W(0x33);
NV3023B_DATA_W(0x45);
NV3023B_DATA_W(0x36);
NV3023B_DATA_W(0x13);
NV3023B_DATA_W(0x12);
NV3023B_DATA_W(0x2A);
NV3023B_DATA_W(0x2D);
NV3023B_CMD_W(0xE1);
NV3023B_DATA_W(0xF0);
NV3023B_DATA_W(0x0E);
NV3023B_DATA_W(0x12);
NV3023B_DATA_W(0x0C);
NV3023B_DATA_W(0x0A);
NV3023B_DATA_W(0x15);
NV3023B_DATA_W(0x2E);
NV3023B_DATA_W(0x32);
NV3023B_DATA_W(0x44);
NV3023B_DATA_W(0x39);
NV3023B_DATA_W(0x17);
NV3023B_DATA_W(0x18);
NV3023B_DATA_W(0x2B);
NV3023B_DATA_W(0x2F);
NV3023B_CMD_W(0x2A);

```
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x9F);  
NV3023B_CMD_W(0x2B);  
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x00);  
NV3023B_DATA_W(0x9F);  
NV3023B_CMD_W(0x29);  
delay_ms(10);  
}
```





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) : | ☐ 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 :** _____

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5 、 Electronic Characteristics of Module :

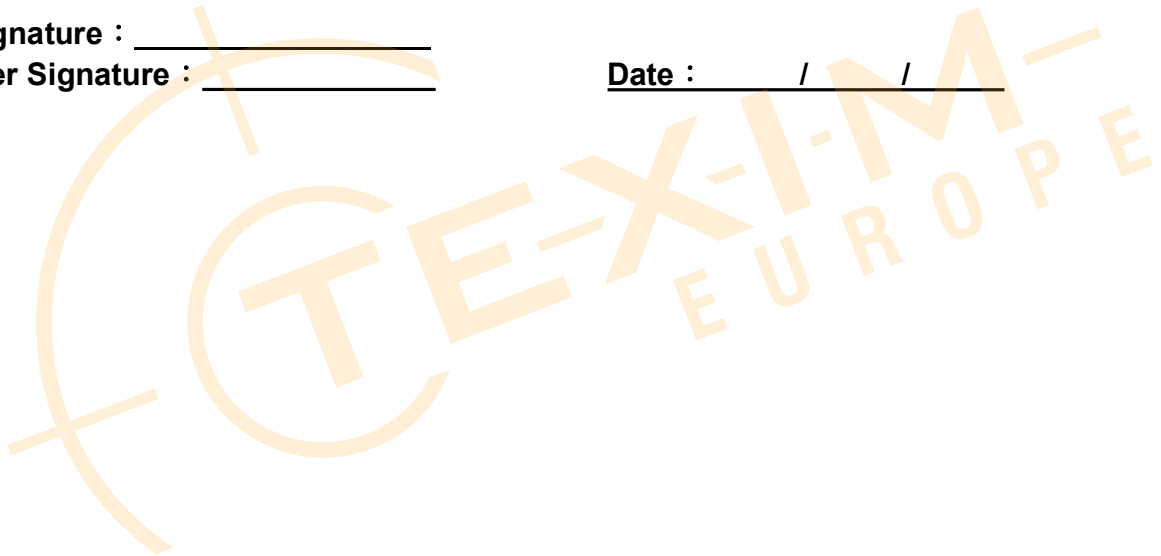
- | | | |
|------------------------------|-------------------------------|-------------------------------------|
| 1. Input Voltage : | ☐ Pass | ☐ NG , _____ |
| 2. Supply Current : | ☐ Pass | ☐ NG , _____ |
| 3. Driving Voltage for LCD : | ☐ Pass | ☐ NG , _____ |
| 4. Contrast for LCD : | ☐ Pass | ☐ 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 : / /



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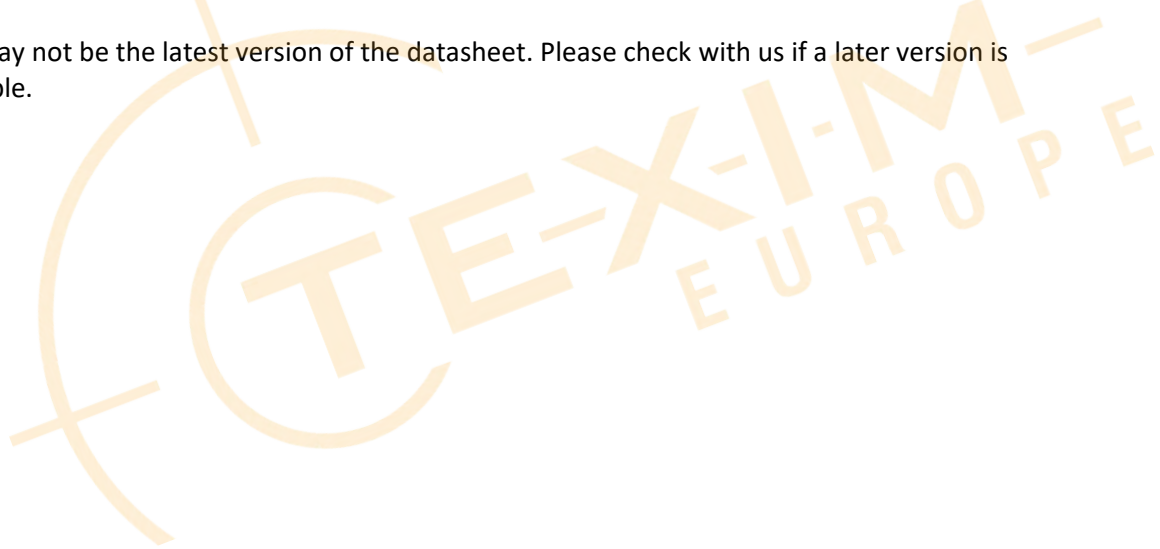
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Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time.

All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts.

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

This may not be the latest version of the datasheet. Please check with us if a later version is available.





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