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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.: **WFN0240A2TOGADNN000**

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: 2025/09/04			

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>



Winstar Display Co., LTD
華凌光電股份有限公司

MODLE NO :

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2025/05/13		First issue
A	2025/09/04		Add Transmittance and Reflection Ratio



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1.Module Classification Information

W	F	N	0240	A2	T	0G	A	D	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 : 2.4" 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									
		View angle		6H	12H	2H	3H	9H	O-Film	OD-Film	All View	IPS	VA
		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

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a transfective type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 2.4'TFT-LCD contains 240X320 pixels, and can display up to 65K/262K colors.



3.General Specifications

Item	Dimension	Unit
Size	2.4"	inch
Dot Matrix	240 x RGB x 320 (TFT)	dots
Module dimension	42.72 x 60.26 x 2.63	mm
Active area	36.72 x 48.96	mm
Pixel pitch	0.153 X 0.153	mm
LCD type	TFT, Normally White, Transflective	
Viewing Direction	3 O'clock	
TFT Interface	8/9/16/18Bit MCU 3/4SPI+16/18Bit RGB 3-line/4-line Serial	
Backlight Type	LED ,Normally White	
TFT Controller IC	ST7789 or Equivalent	
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

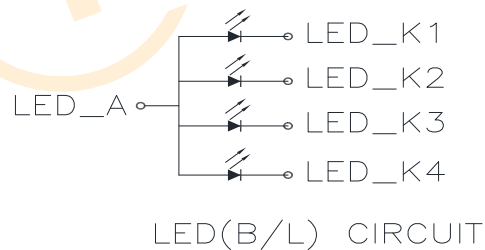
5.1. Operating conditions

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VCC	2.4	3.3	3.6	V	
Supply Voltage (Logic)	IOVCC	1.65	1.8	3.3		
Normal mode Current consumption	IDD	--	5	10	mA	
Level input voltage	VIH	0.7 Iovcc		Iovcc	V	
	VIL	GND		0.3Iovcc	V	
Level output voltage	VOH	0.8 Iovcc		Iovcc	V	
	VOL	GND		0.2 Iovcc	V	

5.2. LED driving conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	-	-	80	-	mA	-
LED voltage	VLEDA	2.7	3.1	3.3	V	Note 1
LED Life Time	-	50,000	-	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



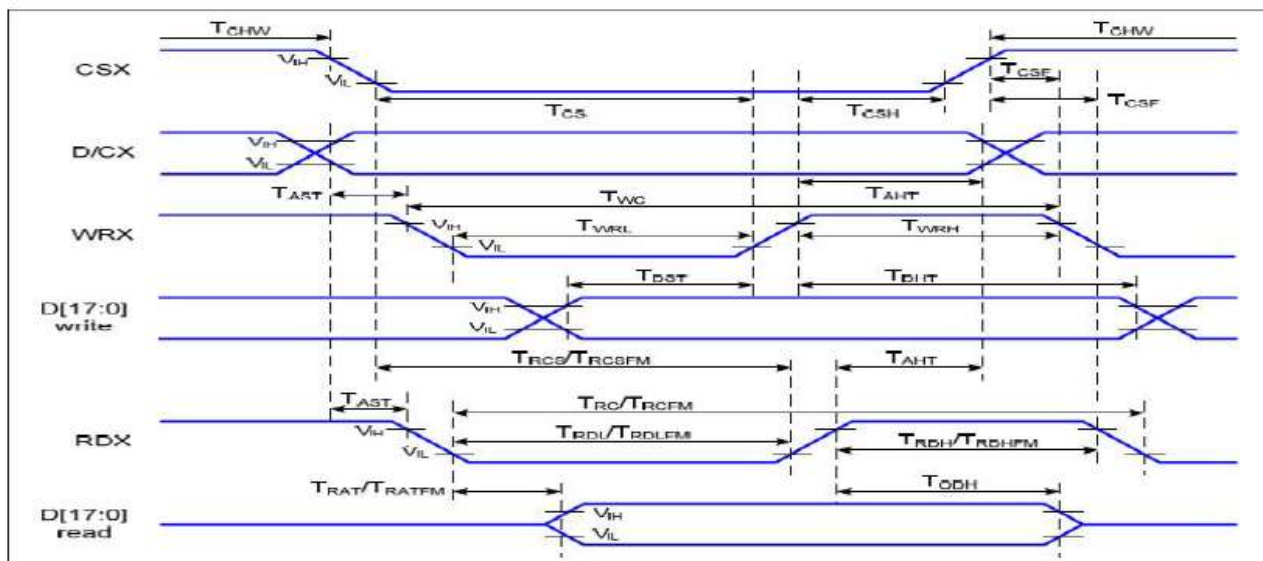
Note 2 : Ta = 25 °C

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

Note 4 : The single LED lamp case

6.AC Characteristic

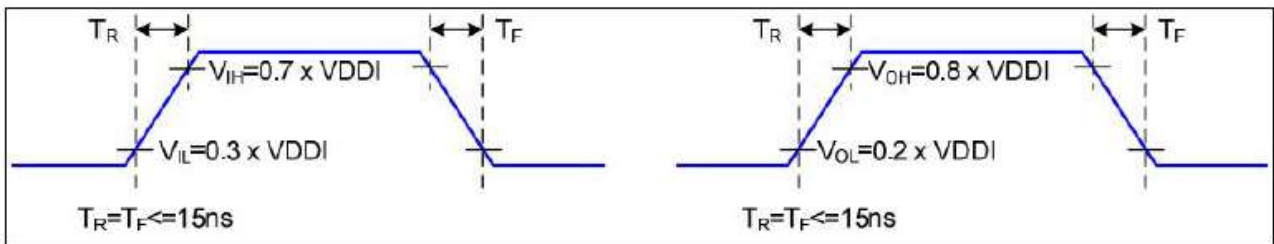
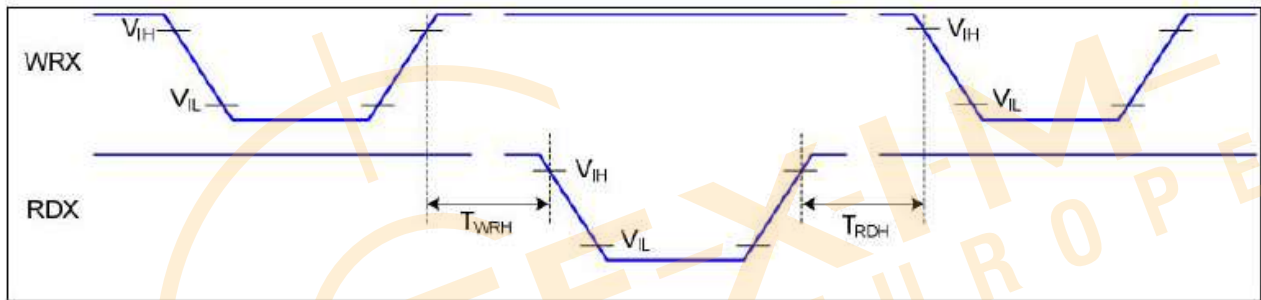
6.1. 8080 Series MCU Parallel Interface Timing Characteristics: 18/16/9/8-bit Bus



$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	T_{AST}	Address setup time	0		ns	
	T_{AHT}	Address hold time (Write/Read)	10		ns	
CSX	T_{CHW}	Chip select "H" pulse width	0		ns	
	T_{CS}	Chip select setup time (Write)	15		ns	
	T_{RCS}	Chip select setup time (Read ID)	45		ns	
	T_{RCSFM}	Chip select setup time (Read FM)	355		ns	
	T_{CSF}	Chip select wait time (Write/Read)	10		ns	
	T_{CSH}	Chip select hold time	10		ns	
WRX	T_{WC}	Write cycle	66		ns	
	T_{WRH}	Control pulse "H" duration	15		ns	
	T_{WRL}	Control pulse "L" duration	15		ns	
RDX(ID)	T_{RC}	Read cycle (ID)	160		ns	
	T_{RDH}	Control pulse "H" duration (ID)	90		ns	When read ID data
	T_{RDL}	Control pulse "L" duration (ID)	45		ns	

RDX(FM)	T_{RCFM}	Read cycle (FM)	450		ns	When read from frame memory
	T_{RDHFM}	Control pulse "H" duration(FM)	90		ns	
	T_{RDLFM}	Control pulse "L" duration(FM)	355		ns	
DB[17:0]	T_{DST}	Data setup time	10		ns	For CL=30pF
	T_{DHT}	Data hold time	10		ns	
	T_{RAT}	Read access time (ID)		40	ns	
	T_{RATFM}	Read access time (FM)		340	ns	
	T_{ODH}	Output disable time	20	80	ns	

Table 1 8080 Parallel Interface Characteristics**Figure 2 Rising and Falling Timing for I/O Signal****Figure 3 Write-to-Read and Read-to-Write Timing**

Note: The rising time and falling time (T_r , T_f) of input signal and fall time are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

6.2. Serial Interface Characteristics (3-line serial)

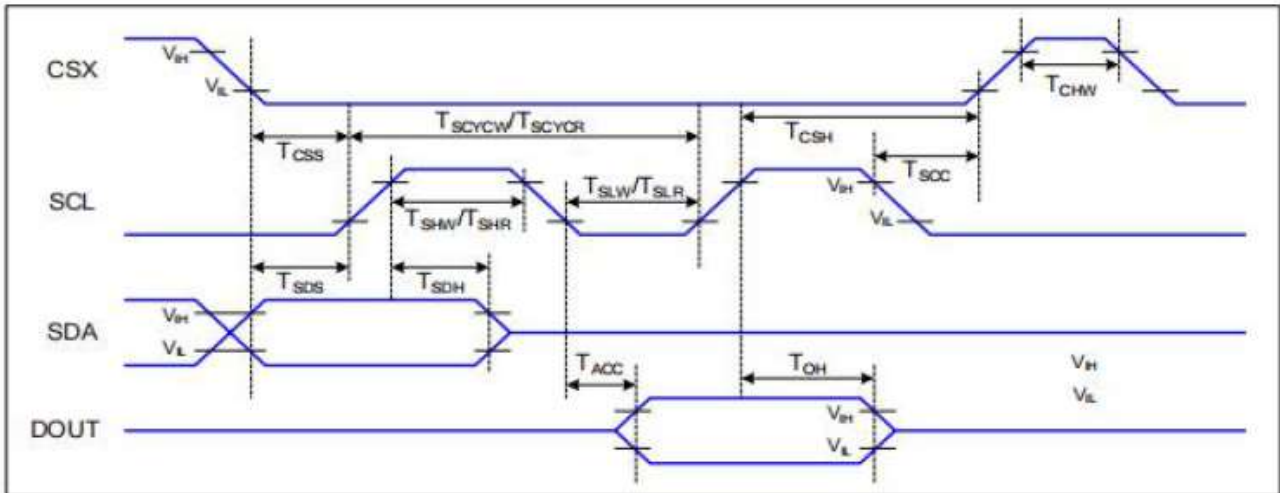


Figure 4 3-line serial Interface Timing Characteristics

$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (Write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	
	T_{SHW}	SCL "H" pulse width (Write)	7		ns	
	T_{SLW}	SCL "L" pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	7		ns	
	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum $CL=30pF$ For minimum $CL=8pF$
	T_{OH}	Output disable time	15	50	ns	

Table 2 3-line serial Interface Characteristics

Note1: The rising time and falling time (T_r , T_f) of input signal are specified at 15 ns or less.

Logic high and low levels are specified as 30% and 70% of V_{DDI} for Input signals.

Note2: In the read sequence of serial interface, the 500nsec delay time is needed between read command and first read clock.

6.3. Display Serial Interface Timing Characteristics (4-line SPI system)

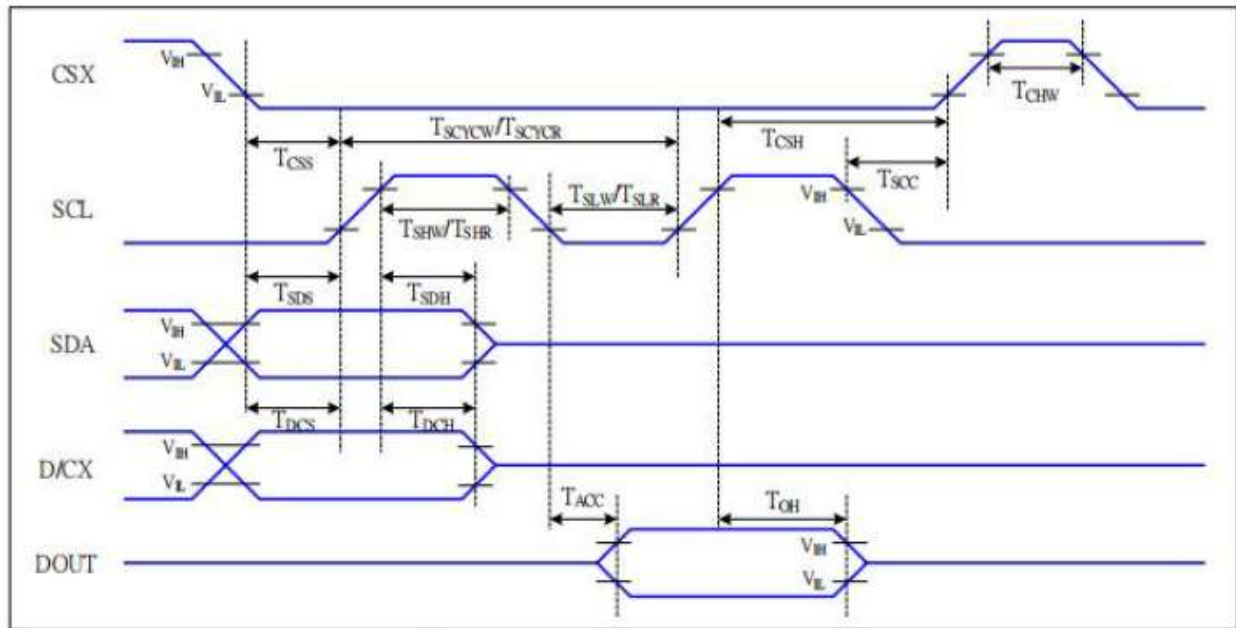


Figure 5 4-line serial Interface Timing Characteristics

$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (Write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	-write command & data ram
	T_{SHW}	SCL "H" pulse width (Write)	7		ns	
	T_{SLW}	SCL "L" pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	-read command & data ram
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
D/CX	T_{DCS}	D/CX setup time	10		Ns	
	T_{DCH}	D/CX hold time	10		ns	
SDA	T_{SDS}	Data setup time	7		ns	
(DIN)	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum $CL=30pF$ For minimum $CL=8pF$
	T_{OH}	Output disable time	15	50	ns	

Table 3 4-line serial Interface Characteristics

Note1: The rising time and falling time (T_r , T_f) of input signal are specified at 15 ns or less.
Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Note2: In the read sequence of serial interface, the 500nsec delay time is needed between read command and first read clock.

6.4. RGB Interface Characteristics

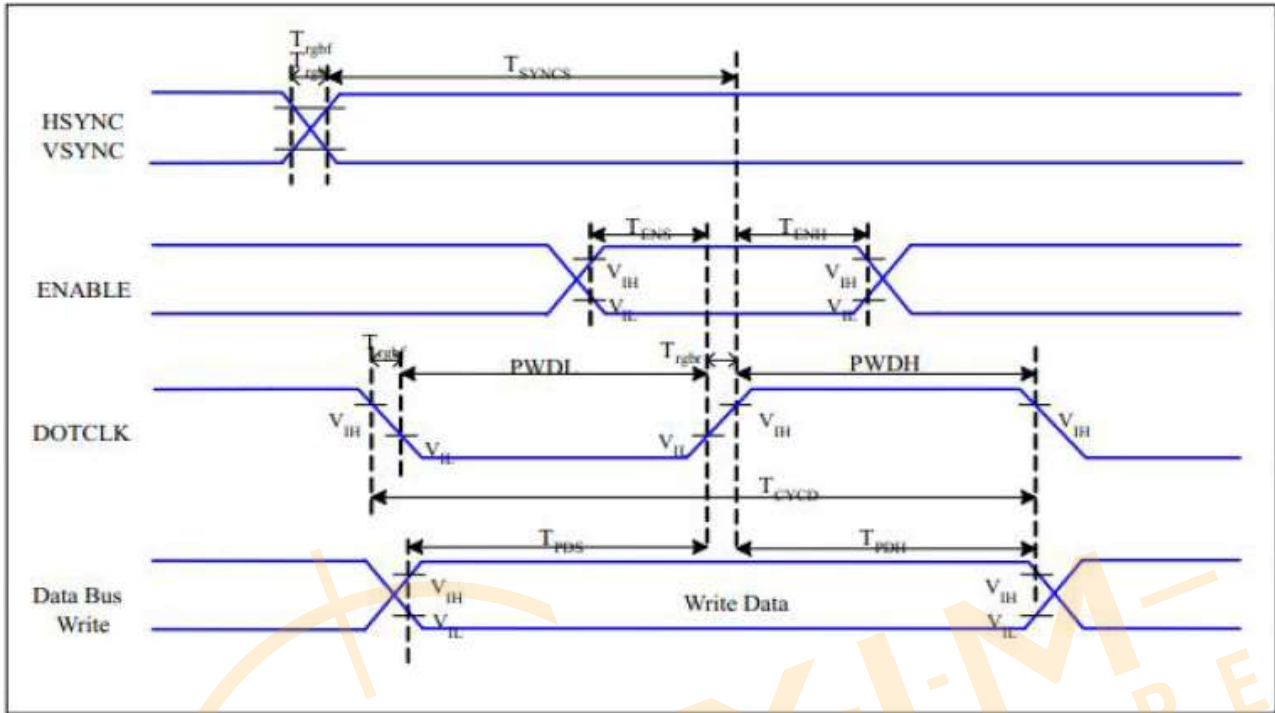


Figure 6 RGB Interface Timing Characteristics

$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

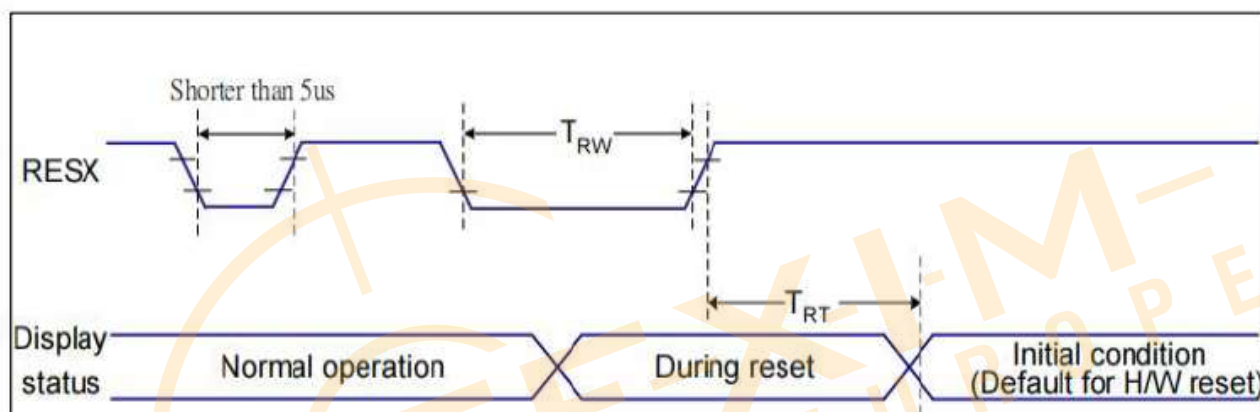
Signal	Symbol	Parameter	Min	Max	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYSNC, HSYNC Setup Time	30		ns	
ENABLE	T_{ENS}	Enable Setup Time	25		ns	
	T_{ENH}	Enable Hold Time	25		ns	
DOTCLK	P_{WDH}	DOTCLK High-level Pulse Width	60		ns	
	P_{WDL}	DOTCLK Low-level Pulse Width	60		ns	
	T_{CYCD}	DOTCLK Cycle Time	120		ns	
	T_{rghr}, T_{rghf}	DOTCLK Rise/Fall time		20	ns	
DB	T_{PDS}	PD Data Setup Time	50		ns	
	T_{PDH}	PD Data Hold Time	50		ns	

Table 4 18/16 Bits RGB Interface Timing Characteristics

Signal	Symbol	Parameter	Min	Max	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYNC, HSYNC Setup Time	35	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	35	-	ns	
	T_{ENH}	Enable Hold Time	35	-	ns	
DOTCLK	P_{WDH}	DOTCLK High-level Pulse Width	35	-	ns	
	P_{WDL}	DOTCLK Low-level Pulse Width	35	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	80	-	ns	
	$T_{\text{rghr}}, T_{\text{rghf}}$	DOTCLK Rise/Fall time	-	10	ns	
DB	T_{PDS}	PD Data Setup Time	35	-	ns	
	T_{PDH}	PD Data Hold Time	35	-	ns	

Table 5 6 Bits RGB Interface Timing Characteristics

6.5. Reset Timing Characteristics



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3Vr AGND=DGND=OVr Ta=25 °C

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1,6, 7)	ms

Notes:

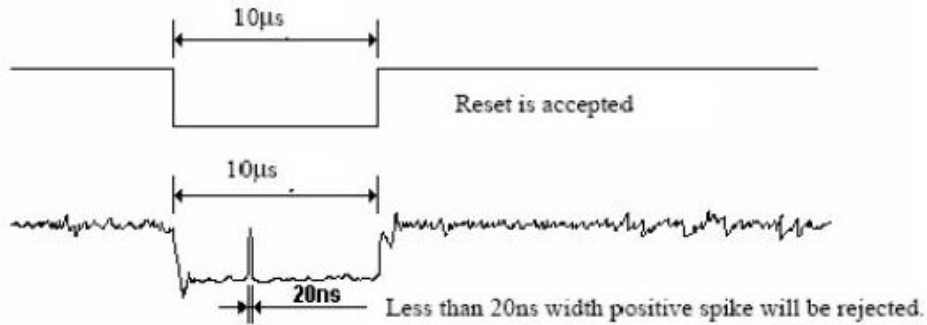
- The reset cancel includes also required time for loading ID bytes, VCOM setting from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (t_{PT}) within 5 ms after a rising edge of RESX.
- Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

- During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out -mode. The display remains the blank state in Sleep In -mode.) and then return to Default condition for Hardware

Reset.

4. *Spike Rejection also applies during a valid reset pulse as shown below:*



5. *When Reset applied during Sleep In Mode.*
6. *When Reset applied during Sleep Out Mode.*
7. *It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.*



7. Optical Characteristics

(Transflective)

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Transmittance (With Polarizer)		Rw(%)	$\theta=0^{\circ}$ Normal viewing angle	-	2.19	-	%	
Response time		Tr+ Tf		-	6	8	.ms	Note 3
Contrast ratio		CR		60	80	-	-	Note 4
Color Chromaticity	White	Wx	$\theta=0^{\circ}$ 、 $\Phi=0$	0.287	0.327	0.367	-	Note 2,5,6
		Wy		0.301	0.341	0.381	-	
Viewing angle	Hor.	θ_R	$CR\geq 10$	-	60	-	Deg.	Note 1
		θ_L		-	60	-		
	Ver.	Φ_T		-	60	-		
		Φ_B		-	60	-		
Brightness		-	-	200	250	-	cd/m ²	Center of display
Uniformity		(U)	-	80	-	-	%	Note 5

(Reflective)

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Reflection Ratio (With Polarizer)		Rw(%)	$\theta=0^\circ$ Normal viewing angle	-	17.54	-	%	
Response time		Tr+ Tf		-	5	7	.ms	Note 3
Contrast ratio		CR		-	15	-	-	Note 4
Viewing angle	Hor.	θ_R	$CR > 2$	-	55	-	Deg.	Note 1
		θ_L		-	55	-		
	Ver.	ϕ_T		-	60	-		
		ϕ_B		-	60	-		

Ta=25±2°C,

Note 1: Definition of viewing angle range

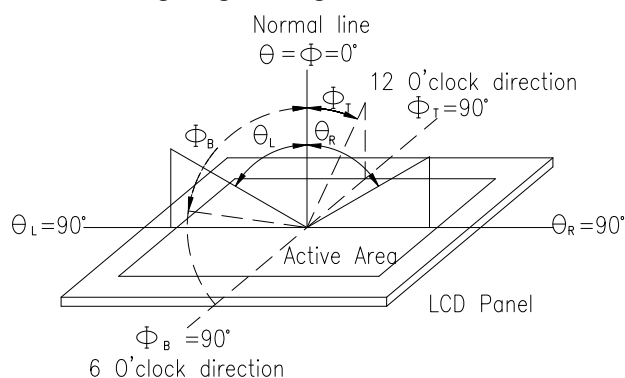


Fig. 7.1. Definition of viewing angle

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.

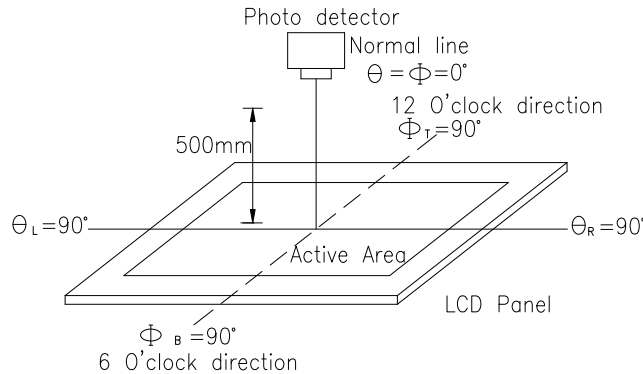
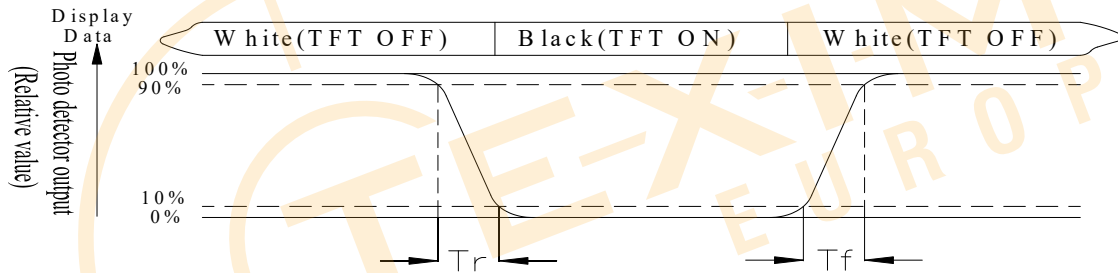


Fig. 7.2. Optical measurement system setup

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

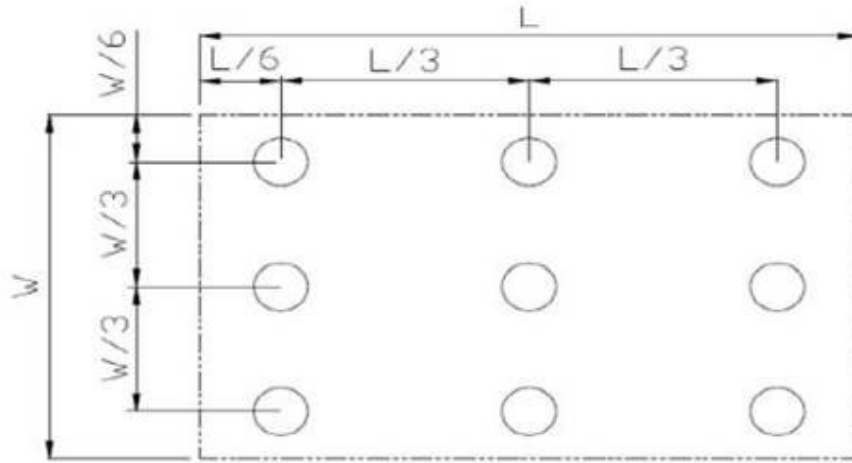


Fig7.3. Definition of uniformity

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.



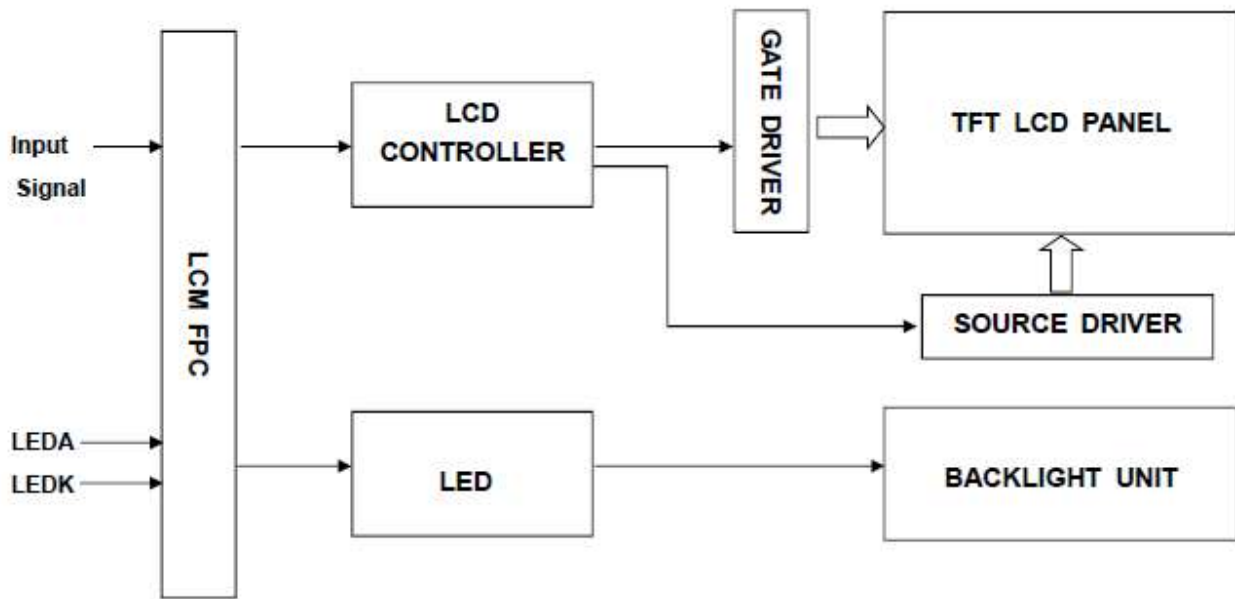
8.Interface

8.1. LCM PIN Definition

Pin No	Symbol	Description	I/O
1	NC	No connection	--
2	NC	No connection	--
3	NC	No connection	--
4	NC	No connection	--
5	GND	Ground.	P
6	GND	Ground.	P
7	VCC	Supply voltage(3.3V).	I
8	VCC	Supply voltage(3.3V).	I
9	IOVCC	Power Supply for I/O System.	I
10	SDO	SPI interface output pin. -The data is output on the falling edge of the SCL signal. -If not used, let this pin open.	O
11-28	DB17-DB0	18-bit parallel bi-directional data bus for MCU system and RGB i nterface mode. Fix to GND level when not in use	I/O
29	DIN(SDA)	Serial input signal. The data is latched on the rising edge of the SCL signal. fix this pin at IOVCC or GND when not in use.	I/O
30	PCLK	Dot clock signal for RGB interface operation. Fix this pin at IOVCC or GND when not in use.	I
31	DE	Data enable signal for RGB interface operation. fix this pin at IOVCC or GND when not in use.	I
32	HSYNC	Line synchronizing signal for RGB interface operation. fix this pin at IOVCC or GND when not in use.	I
33	VSNC	Frame synchronizing signal for RGB interface operation. fix this pin at IOVCC or GND when not in use.	I
34	RD	Read enable in 8080 MCU parallel interface. -If not used, please fix this pin at IOVCC or DGND.	I
35	WR(SPI-RS)	-Write enable in MCU parallel interface. Display data/command selection pin in 4-line serial interface. Second Data lane in 2 data lane serial interface. -If not used, please fix this pin at IOVCC or DGND.	I

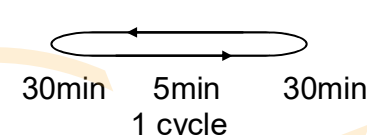
36	RS(SPI-SCL)	-Display data/command selection pin in parallel interface. -This pin is used to be serial interface clock. RS='1': display data or parameter. RS='0': command data. -If not used, please fix this pin at IOVCC or DGND.	I
37	CS	Chip select input pin ("Low" enable). fix this pin at IOVCC or GND when not in use.	I
38	RESET	This signal will reset the device and must be applied to properly initialize the chip.	I
39	IM0	18-bit parallel bi-directional data bus for MCU system and RGB interface mode. Fix to GND level when not in use	I
40	IM1		
41	IM2		
42	NC	No connection	-
43	LEDA	Anode pin of backlight	P
44	NC	No connection	-
45	LEDK	Cathode pin OF backlight	P

9. Block Diagram



10. Reliability

Content of Reliability Test (Super 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 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 96hrs	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 96hrs	2
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 96hrs	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 20 cycles of storage -10°C 25°C 60°C  30min 5min 30min 1 cycle	-10°C/60°C 20 cycles	2
Vibration test	Endurance test applying the vibration during transportation and using.	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz ~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±6KV(contact), ±8KV(air), RS=330Ω CS=150pF 5 times	4

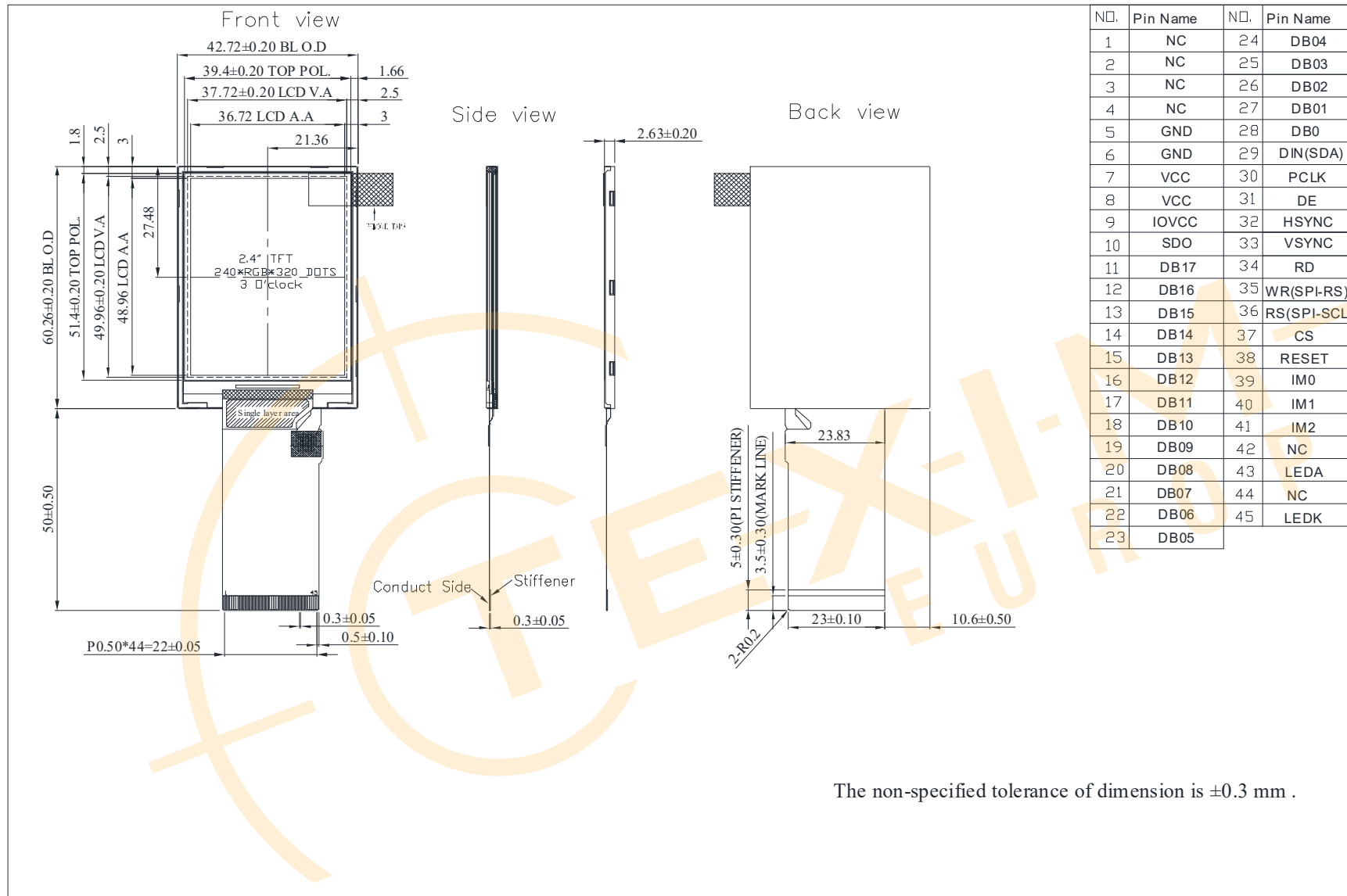
Note1: No dew condensation to be observed.

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

11. Contour Drawing





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 :

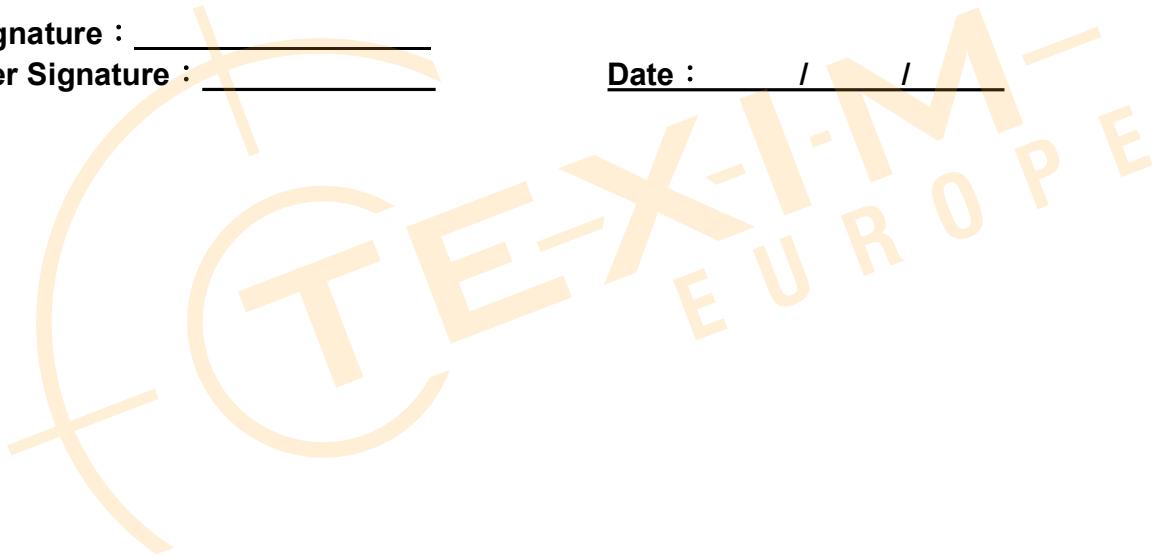
- | | | |
|------------------------------|-------------------------------|-------------------------------------|
| 1. Input Voltage : | ☐ Pass | ☐ NG , _____ |
| 2. Supply Current : | ☐ Pass | ☐ NG , _____ |
| 3. Driving Voltage for LCD : | ☐ Pass | ☐ NG , _____ |
| 4. Contrast for LCD : | ☐ Pass | ☐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



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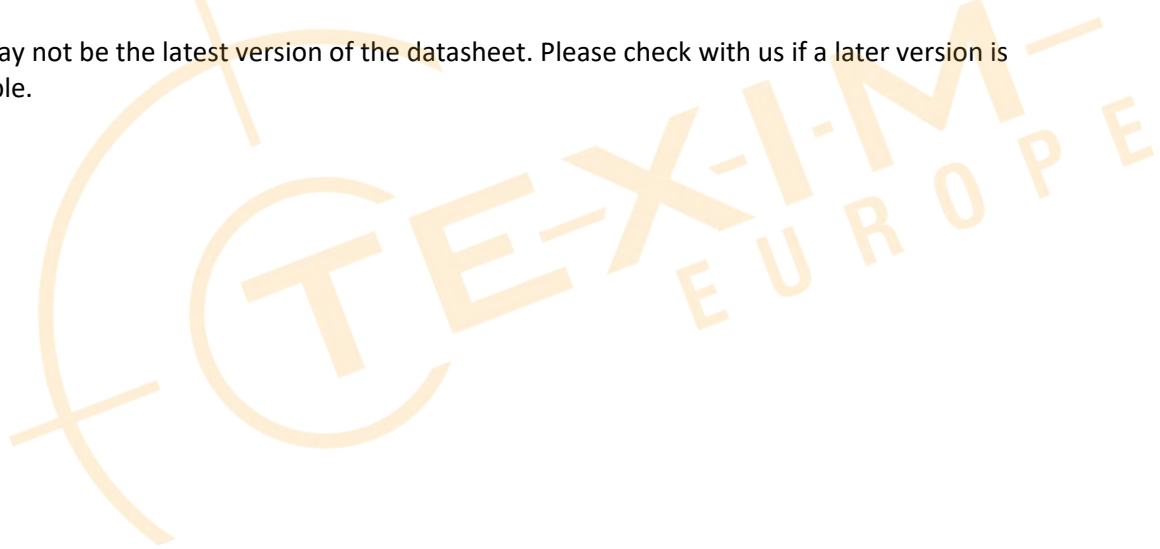
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All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts.

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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