Winstar Display Co., LTD
華凌光電股份有限公司
WEB: http://www.winstar.com.tw *E-mail: winstar@winstar.com.tw*

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF101ATCAHLNGZ#

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	**PCB VERSION:** **DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2016/01/21			

TFT Display Inspection Specification: http://www.winstar.com.tw/service.php

MODLE NO：

RECORDS OF REVISION	**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2016/01/13		First issue
A	2016/01/21		Modify Static electricity test

Contents

1.Module Classification Information

W	F	101	A	T	C	A	H	L	N	G	Z	#
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：10.1” TFT		
④	Model serials no.		
⑤	Backlight Type：	F→CCFL, White S→LED, High Light White	T→LED, White
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	C→Transmissive, N. T, 6:00 ; I→Transmissive, W. T, 6:00 F→Transmissive, N.T,12:00 ; L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00 Q→Transmissive, Super W.T, 12:00 X→Transmissive, W.T, VA TFT V→Transmissive, Super W.T, VA TFT R→Transmissive, Super W.T, O-TFT Z→Transmissive, W.T, O-TFT A→Transmissive, N.T, IPS TFT Y→Transmissive, W.T, IPS TFT	
⑦	A：TFT LCD B：TFT+FR+CONTROL BOARD C：TFT+FR+A/D BOARD D：TFT+FR+A/D BOARD+CONTROL BOARD E：TFT+FR+POWER BOARD F：TFT+CONTROL BOARD	G：TFT+FR H：TFT+D/V BOARD I：TFT+FR+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	P :1280800
	S:480128	T:800320					
⑨	D: Digital L：LVDS						
⑩	Interface： N：without control board A：8Bit B：16Bit						
⑪	TS：N：Without TS T：resistive touch panel C：capacitive touch panel (G-F-F) G：capacitive touch panel(G-G)						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

2.Summary

This technical specification applies to 10.1’ color TFT-LCD panel. The 10.1’ color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3.General Specifications

Item	Dimension	Unit
Size	10.1	inch
Dot Matrix	1024 RGB X 600	dots
Module dimension	235(W) x143(H) x 5.36(D)	mm
Active area	222.72 (H) x 125.28(V)	mm
Dot pitch	0.2175(W) x 0.2088(H)	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED,Normally White	
CPT FW Version	03	
With /Without TP	With CTP	
Surface	Glare	

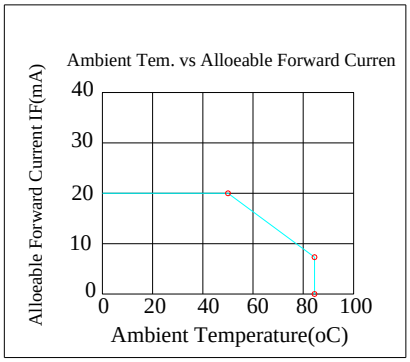
*Color tone slight changed by temperature and driving voltage.

4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-10	—	+60	℃
Storage Temperature	TST	-20	—	+70	℃

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

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



5.Electrical Characteristics

5.1. Typical Operation Conditions (At Ta = 25 °C,)

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	VDD	3	3.3	3.6	V	-
Supply Voltage For Touch Logic	VDDT	2.8		3.3	V	-
Analog Power Supply Voltage	AVDD	--	10.4	11	V	-
Gate On Power Supply Voltage	VGH	20	21	22	V	-
Gate Off Power Supply Voltage	VGL	-8.5	-8	-7	V	-
Common Power Supply Voltage	VCOM	--	3.8	--	V	Note1
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	-
	VIL	GND	-	0.3*DVDD	V	

Note1.Please adjust VCOM to make the flicker level be minimum.

5.2. Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply voltage of white LED backlight	VL	8.4	9.6	10.8	V	Note 1
Current for LED backlight	IL	135	140	150	mA	
Uniformity	Δ	70	75	-	%	
LED life time	-	20,000	-	-	Hr	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =140mA.
Note 2: The “LEDlife time” is defined as the module brightness decrease to 50%original brightness at Ta=25℃ and IL =140mA. The LED lifetime could be decreased if operating IL is lager than 140mA.

6.Timing Characteristics

DE mode

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	1024	-	DCLK	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz	
One Horizontal Line	th	1114	1344	1400	DCLK	
HS Blanking	Thb+thfp	90	320	376	DCLK	
Vertical display area	tvd	-	600	-	H	
VSYNC period time	tv	610	635	800	H	
VSYNC blanking	tvb+tvfp	10	85	200	H	

7.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0° 、Φ=0°	-	4	-	.ms	Note 3
		Tf		-	4	-	.ms	Note 3
Contrast ratio		CR	At optimized viewing angle	-	600	-	-	Note 4
Color Chromaticity	White	Wx	θ =0° 、Φ=0	0.245	0.295	0.345	-	Note 2,5
		Wy		0.281	0.331	0.381	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	-	65	-	Deg.	Note 1
		ΘL		-	65	-		
	Ver.	ΦT		-	55	-		
		ΦB		-	65	-		
Brightness		-	-	100	120	-	cd/m^2	Center of display

Ta=25±2℃

Note 1: Definition of viewing angle range

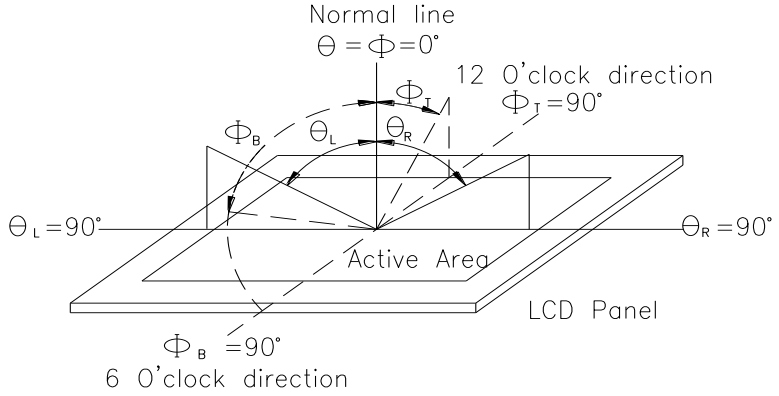


Fig. 7.1. Definition of viewing angle

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.

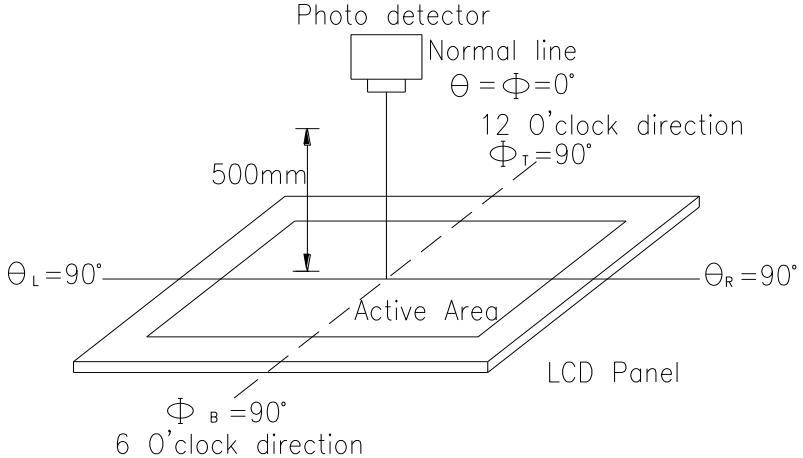
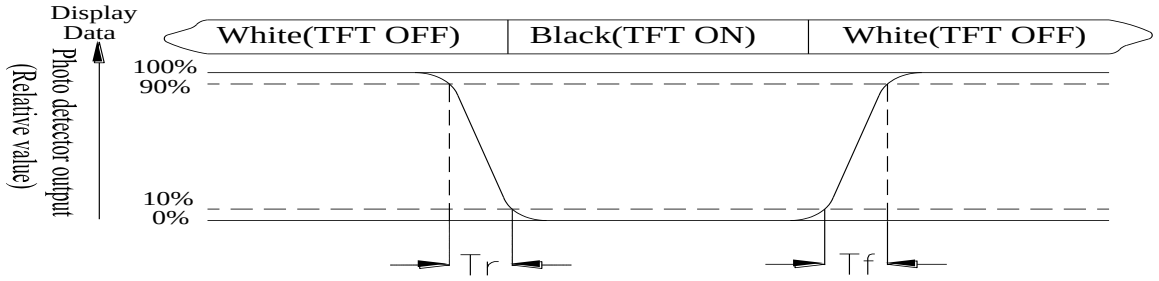


Fig. 7.2. Optical measurement system setup

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, Tr, is the time between photo detector output intensity changed from 90%to 10%. And fall time, Tf, 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: White Vi = V_{i50} ± 1.5V
Black Vi = V_{i50} ± 2.0V
“±” means that the analog input signal swings in phase with VCOM signal.
“±” means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

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. TFT LCD MODULE

PinNo.	Symbol	Description
1	VCOM	Common voltage
2	VDD	Digital power
3	VDD	Digital power
4	NC	Not connect
5	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=1μF)
6	STBYB	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timing control, source driver will turn off, all output are high-Z
7	GND	Digital ground
8	RXIN0-	Negative LVDS differential data inputs
9	RXIN0+	Positive LVDS differential data inputs
10	GND	Digital ground
11	RXIN1-	Negative LVDS differential data inputs
12	RXIN1+	Positive LVDS differential data inputs
13	GND	Digital ground
14	RXIN2-	Negative LVDS differential data inputs
15	RXIN2+	Positive LVDS differential data inputs
16	GND	Digital ground
17	RXCLKN-	Negative LVDS differential clock inputs
18	RXCLKN+	Positive LVDS differential clock inputs
19	GND	Digital ground
20	RXIN3-	Negative LVDS differential data inputs
21	RXIN3+	Positive LVDS differential data inputs
22	GND	Digital ground
23	NC	Not connect
24	NC	Not connect
25	GND	Digital ground
26	NC	Not connect
27	NC	Not connect
28	SELB	6-bit/8-bit input select SELB = L , 8-bit ; SELB = H , 6-bit
29	AVDD	Analog power
30	GND	Digital ground
31	LED-	LED Cathode
32	LED-	LED Cathode
33	L/R	Left or right display control
34	U/D	Up / down display control
35	VGL	Negative power for TFT
36	NC	Not connect
37	NC	Not connect

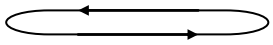
38	VGH	Positive power for TFT
39	LED+	LED Anode
40	LED+	LED Anode

8.2. CTP PIN Definition

Pin	Symbol	Function	Remark
1	VSS	Ground for analog circuit	
2	VDDT	Power Supply : +3.3V	
3	SCL	I2C clock input	
4	NC	No connect	
5	SDA	I2C data input and output	
6	NC	No connect	
7	/RST	External Reset, Low is active	
8	/WAKE	External interrupt from the host	
9	/INT	External interrupt to the host	
10	VSS	Ground for analog circuit	

9.Reliability

Content of Reliability Test (Wide temperature, -10℃~60℃)

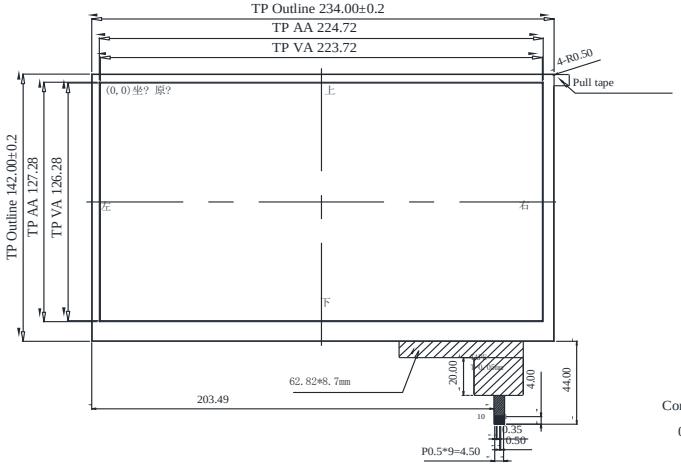
Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	70℃ 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-20℃ 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	60℃ 96hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-10℃ 96hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -10℃ 25℃ 60℃  30min 5min 30min 1 cycle	-10℃/60℃ 10 cycles	——
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm 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=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	——

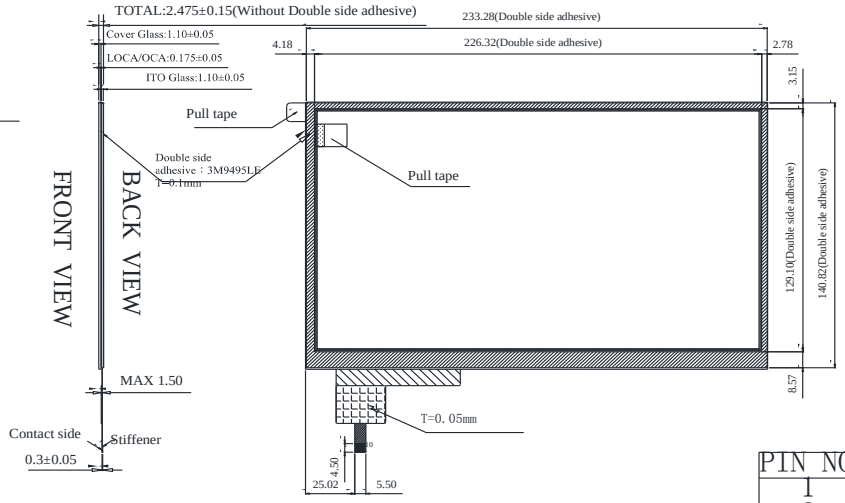
Note1: No dew condensation to be observed.

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.

10.Touch Panel Information



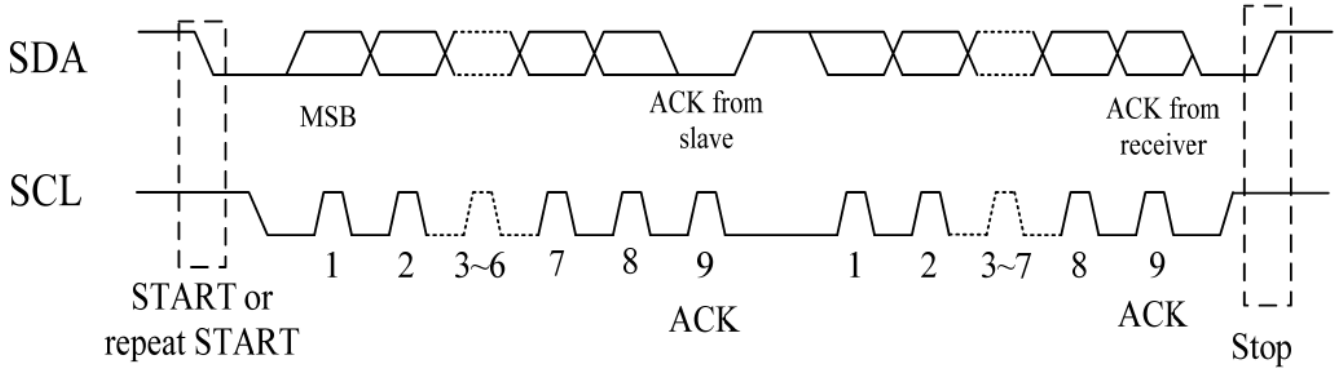


FRONT VIEW SIDE VIEW BACK VIEW

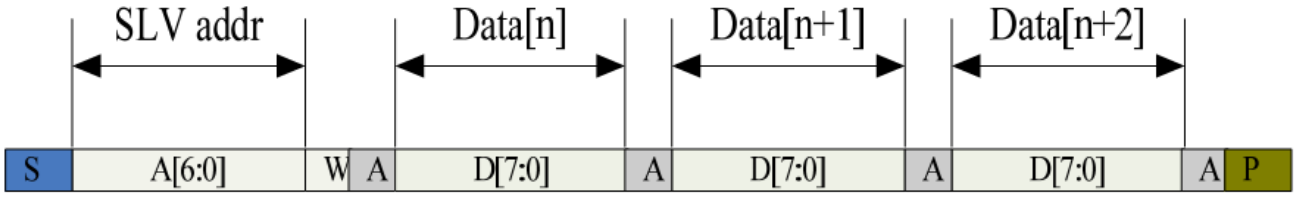
PIN NO.	SYMBOL
1	VSS
2	VDDT
3	SCL
4	NC
5	SDA
6	NC
7	/RST
8	/WAKE
9	/INT
10	VSS

The non-specified tolerance of dimension is ±0.3mm.

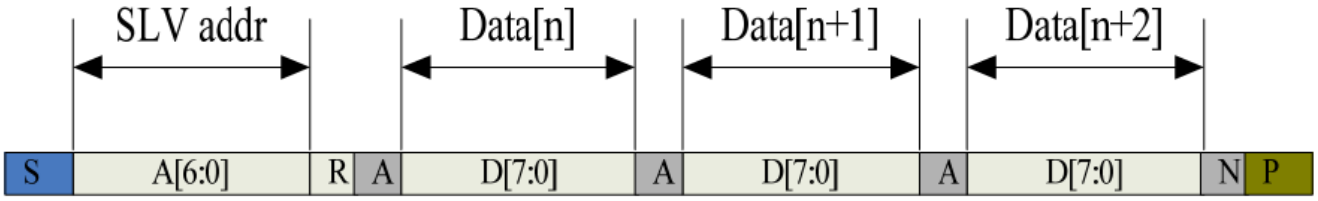
CTP I2C Timing:



I2C Serial Data Transfer Format



I2C master write, slave read



I2C master read, slave write

Mnemonics	Description
S	12C Start or 12C Restart
A[6:0]	Slave address A[6:4]:3'b011 A[3:0]:data bits are identical to those of 12CCON[7:4]register
W	1'b0:Write
R	1'b1:Read
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet(if this bit is missing, S will indicate the end of the current packet and beginning of the next packet)

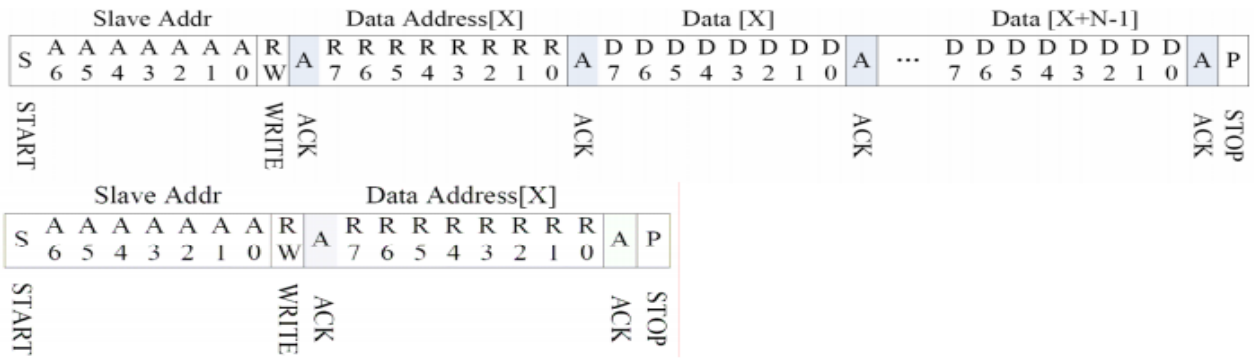
Lists the meanings of the mnemonics used in the above figures

Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) ST ART condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup time for STOP condition	us	4.0	\

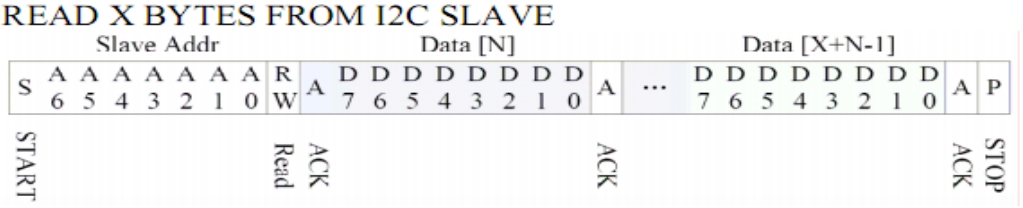
Interface Timing Characteristics

AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA.HERE IS THE TIMING TO GET TOUCH DATA.

WRITE BYTES TO I2C SLAVE



READ X BYTES FROM I2C SLAVE



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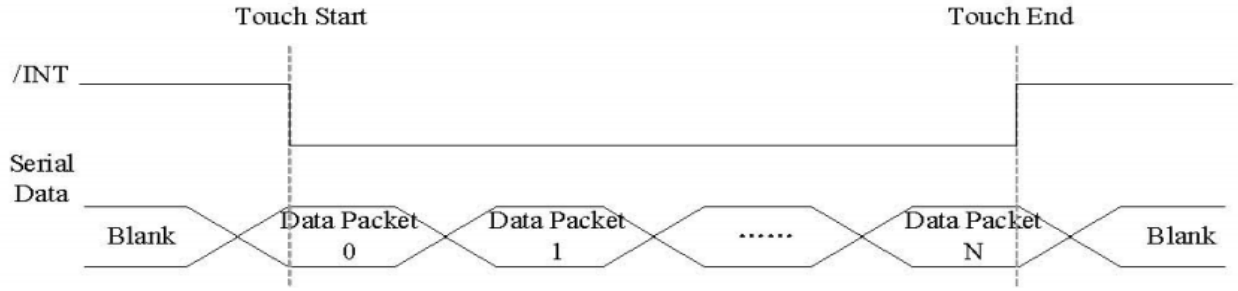


Address: 0X38

TOUCH DATA READ PROTOCOL

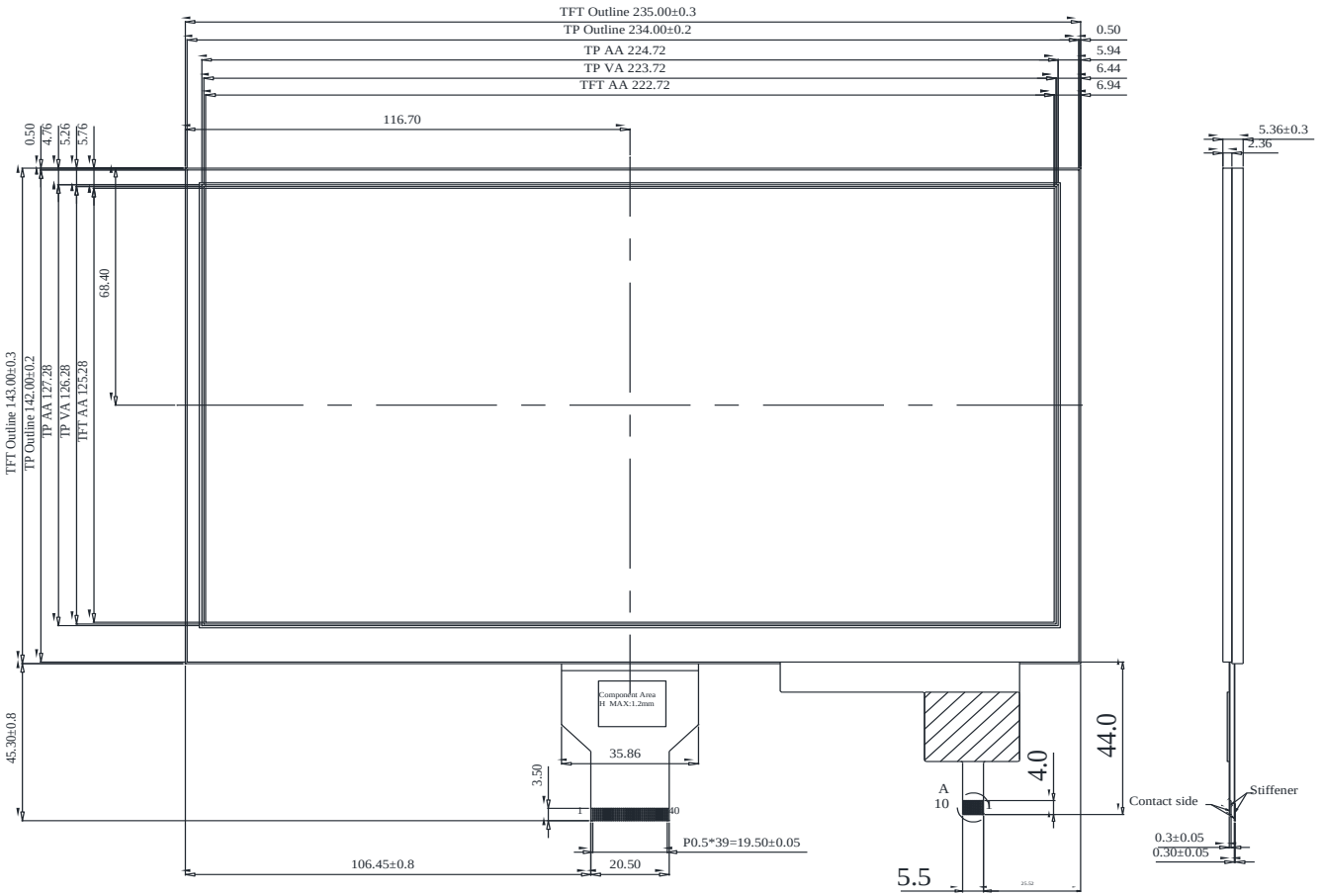
NAME	VALUE	DESCRIPTION
START CH	0X00	START COMMAND FOR CTPM TOUCH DATA PACKET,HOST MUST SEND CTPM A START CH COMMAND BEFORE READ TOUCH DATA
Lst READ BYTE～ LAST READ BYTE		TOUCH DATA PACKET SENT BY CTPM,EACH BYTE HAS 8-BIT DATA ,A TOUCH DATA PACKET CONSISTS OF N BYTE

A DATA PACKET STARTS WITH A HEADER AND ENDS WITH CRC CODE,AS FOR 5 POINTS DATA PACKET,THE LENGTH OF THE PACKET IS ALWAYS 26 BYTES IN SPITE OF ACTUAL TOUCH POINTS.

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	Devide__Mode	—	Device Model[2:0]			—				RW
01h	Gest__ID	Gesture ID[7:0]								R
02h	TD__Status	—				Number of touch points[3:0]				R
03h	Touch1__XH	1st Event Flag		—		1st Touch X Position[11:8]				R
04h	Touch1__XL	1st Touch X Position[7:0]								R
05h	Touch1__YH	1st Touch ID[3:0]				1st Touch Y Position[11:8]				R
06h	Touch1__YL	1st Touch Y Position[7:0]								R
09h	Touch2__XH	2nd Event Flag		—		2nd Touch X Position[11:8]				R

0Ah	Touch2__XL	2nd Touch X Position[7:0]	R	0Ah	Touch2__ XL
0Bh	Touch2__YH	2nd Touch ID[3:0]	2ndTouch Y Position[11:8]	0Bh	Touch2__ YH
0Ch	Touch2__YL	2nd Touch Y Position[7:0]	R	0Ch	Touch2__ YL
0Fh	Touch3__XH	3rdEvent Flag	—	3rdTouch X Position[11:8]	R
10h	Touch3__XL	3rd Touch X Position[7:0]			R
11h	Touch3__YH	3rdTouch ID[3:0]		3rdTouch Y Position[11:8]	R
12h	Touch3__YL	3rd Touch Y Position[7:0]			R
15h	Touch4__XH	4thEvent Flag	—	4thTouch X Position[11:8]	R
16h	Touch4__XL	4th Touch X Position[7:0]			R
17h	Touch4__YH	4thTouch ID[3:0]		4thTouch Y Position[11:8]	R
18h	Touch4__YL	4th Touch Y Position[7:0]			R
1Bh	Touch5__XH	5thEvent Flag	—	5thTouch X Position[11:8]	R
1Ch	Touch5__XL	5th Touch X Position[7:0]			R
1Dh	Touch5__YH	5thTouch ID[3:0]		5thTouch Y Position[11:8]	R
1Eh	Touch5__YL	5th Touch Y Position[7:0]			R

11.Contour Drawing

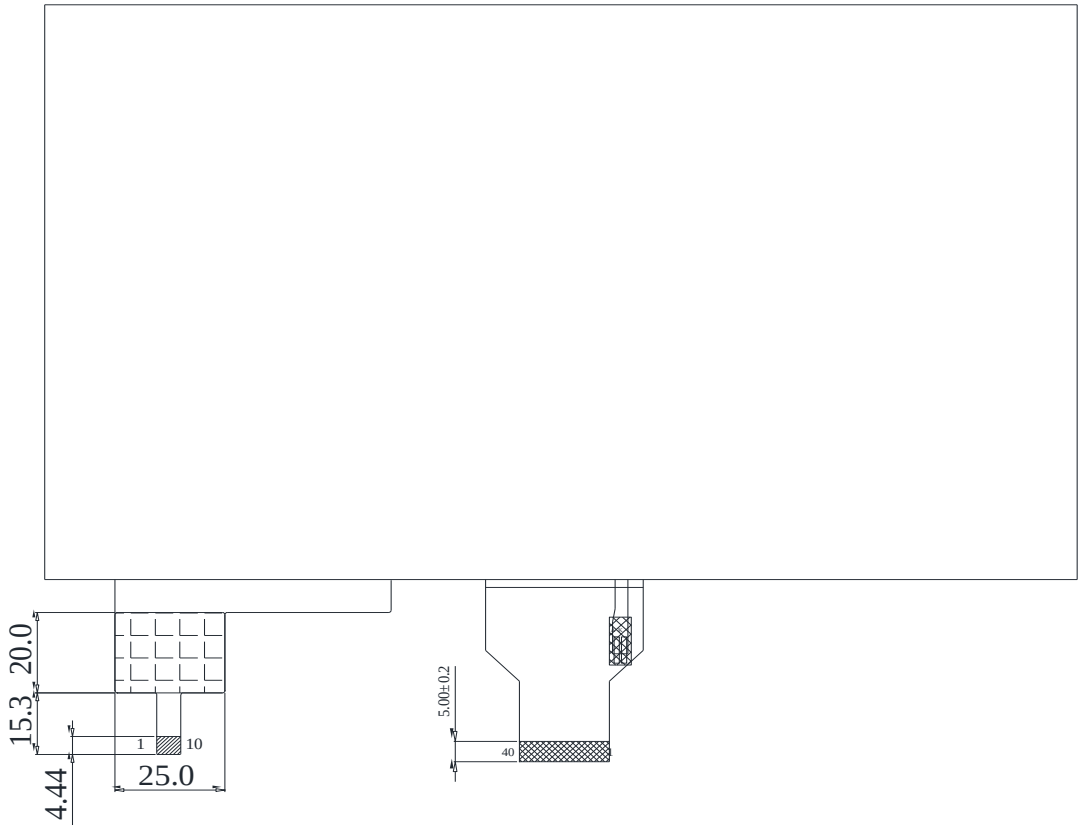


PIN NO.	SYMBOL
1	VCOM
2	VDD
3	VDD
4	NC
5	Reset
6	STBYB
7	GND
8	RXin0-
9	RXin0+
10	GND
11	RXin1-
12	RXin1+
13	GND
14	RXin2-
15	RXin2+
16	GND
17	RXCLKN-
18	RXCLKN+
19	GND
20	RXin3-

PIN NO.	SYMBOL
21	RXin3+
22	GND
23	NC
24	NC
25	GND
26	NC
27	NC
28	SELB
29	AVDD
30	GND
31	LED-
32	LED-
33	L/R
34	U/D
35	VGL
36	NC
37	NC
38	VGH
39	LED+
40	LED+

The non-specified tolerance of dimension is ±0.3mm.

PIN NO.	SYMBOL
1	VSS
2	VDDT
3	SCL
4	NC
5	SDA
6	NC
7	/RST
8	/WAKE
9	/INT
10	VSS



The non-specified tolerance of dimension is ±0.3mm.

winstar

LCM Sample Estimate Feedback Sheet

Module Number： _____

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 Specification：

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 Type)： □ 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** <<

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：** / /