SPECIFICATION FOR TFT MODULE

PART NUMBER : IPS060A101A

CUSTOMER NO. :

Rev No. : A

AVD	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE	*(signature)*	*(signature)*	*(signature)*
DATE	2023.08.03	2023.08.03	2023.08.03

	SIGNATURE	DATE
CUSTOMER APPROVAL		

Notes :

1. Please contact GTK before assigning your product based on this module specification.

2. To improve the quality of product, and this product specification is subject to change without any notice.

REVISION RECORD

Rev No.	Rev date	Contents	Remarks
O	2022-07-08	First release	Preliminary
A	2023-08-03	Update EXTERNAL DIMENSIONS	P5

CONTENTS

1. GENERAL INFORMATION

No.	Item	Contents	Unit
1	LCD size	6.0 inch(DIAGONAL)	/
2	Display mode	IPS/NORMALLY BLACK/Transmissive	/
3	Viewing direction(eye)	FREE	/
4	Gray scale inversion direction	-	/
5	Resolution(H*V)	2160*1080 Pixels(TFT)/1080*2160 Dots(CTP)	/
6	Module size (L*W*H)	149.53*76.52*4.30	mm
7	Active area (L*W)	136.08*68.04	mm
8	Pixel pitch (L*W)	0.063*0.063	mm
9	Interface type	MIPI interface(TFT)/I2C(CTP)	/
10	Color Depth	16.7M	/
11	Module power consumption	2.01(Appr)	W
12	Back light type	EDGE,WHITE	/
13	Driver IC	XM91080 OR COMPATIBLE(TFT) MXT336U(CTP)	/
14	Weight	100(Appr)	G

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power supply input voltage for TFT	VDD	-0.3	1.95	V	
Power supply input voltage for CTP	VCC	-0.3	3.6	V	
Backlight current (normal temp.)	ILED	-	100	mA	
Operation temperature	Top	-20	+70	℃	Note1
Storage temperature	Tst	-30	+80	℃	Note1
Humidity	RH	20%	90%	/	Note1

Note1 :

1).The relative humidity and temperature range are as below sketch,90%RH Max.

2).The maximum wet bulb temperature $\leqq 40℃$ and without dewing.
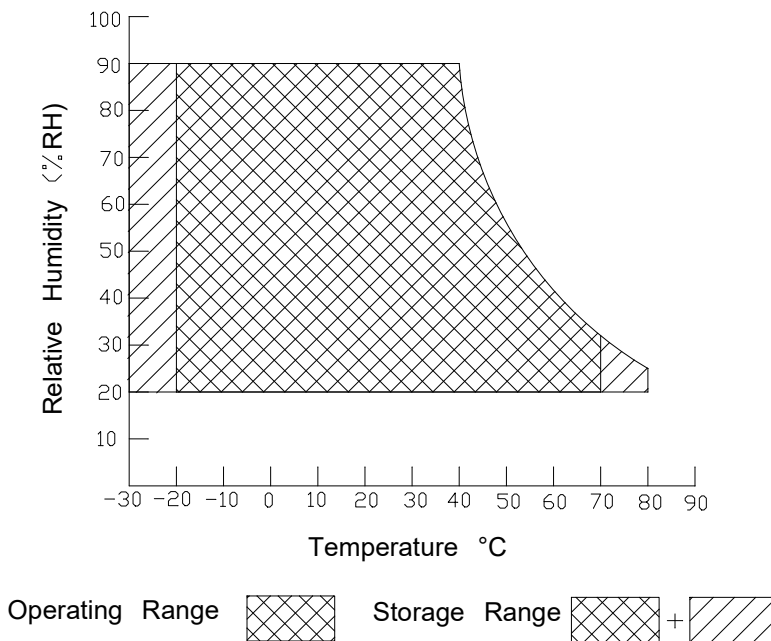
3. ELECTRICAL CHARACTERISTICS

TFT DC CHARACTERISTICS(at Ta=25℃)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power supply input voltage	VDD	3.1	3.3	3.5	V	
I/O logic voltage	IOVCC	1.65	1.8	1.95	V	
Input voltage 'H' level	VIH	0.7IOVCC	-	IOVCC	V	
Input voltage 'L' level	VIL	VSS	-	0.3IOVCC	V	
Power supply current	IVDD	-	27	-	mA	
TFT gate on voltage	VGH	-	-	-	V	
TFT gate off voltage	VGL	-	-	-	V	
Analog power supply voltage	AVDD	-	-	-	V	
TFT common electrode voltage	VCOM	-	-	-	V	Note1

Note1 : The value is just the reference value. The customer can optimize the setting value by the different D-IC
VCOM must be adjusted to optimize display quality, as Crosstalk and Contrast Ratio etc..

CTP DC CHARACTERISTICS(at Ta=25℃)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power supply input voltage	VDD	3.1	3.3	3.47	V	Note1
Input Power ripple	Vpp	-	-	30	mV	
I/O Signal Voltage	VDDIO	3.1	3.3	3.47	V	Note1
Input voltage 'H' level	VIH	0.7VDDIO	-	VDDIO	V	
Input voltage 'L' level	VIL	VSS	-	0.3VDDIO	V	
Operating Current (Normal Mode)	IVCC	-	-	-	mA	
Operating Current (Sleep mode)	IVCC	-	-	-	mA	

Note1 : If you need more information of CTP,please refer to our Spec of CTP.

4. BACKLIGHT CHARACTERISTICS

(at Ta=25℃,RH=60%)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED forward voltage	VF	22.4	24.0	26.4	V	
LED forward current	IF	-	80	-	mA	IF=40*2mA
LED power consumption	PLED	-	1.92	-	W	Note1
Number of LED	-		16		PCS	
Connection mode	-	8 in series 2 in parallel			/	
LED life-time	-	-	50000	-	Hrs	Note2

Note1 : Calculator value for reference : IF*VF = PLED

Note2 : The LED life-time define as the estimated time to 50% degradation of initial brightness at Ta=25℃ and
IF =80mA. The LED lifetime could be decreased if operating IF is larger than 80mA.

5. TOUCH PANEL CHARACTERISTICS

(at Ta=25℃)

Item	Description	Remark
Product Structure	G+G	
Surface Hardness	6H	Pencil，Loading 500g，45 deg
Touch Count Max	10 point	
I2C Slave Address*	0x4a	
Origin of Coordinate*	top left corner	
FW version	-	

6. EXTERNAL DIMENSIONS

Revision History

REV.	SYMBOL	DESCRIPTION	NAME	DATE
O		FIRST ISSUE		JUN-16-2022
A		CHANGE THE TFT CONTOUR WIDTH AND FPC		AUG-26-2022
B		CHANGE DIMENSIONAL TOLERANCE		DEC-05-2022
C		CHANGE PIN DEFINE AND PIN SEQUENCE		MAR-03-2023
D		CHANGE CTP IC		AUG-01-2023
E		ADD FOAM GASKET		MAR-25-2022
F		ADD TFT PRINTING CODE		APR-12-2022
G		CHANGE FPC AND ADD TAPE		APR-28-2022
H		ADD FEATURE DEPENDENT SYMBOL		MAY-05-2022
I		ADD PROTECTIVE FILM		MAY-24-2022

TFT PIN DEFINITION

PIN No.	SYMBOL	PIN No.	SYMBOL
1	NC	21	MIPI_D3P
2	VDD	22	GND
3	VDD	23	NC
4	NC	24	NC
5	RESET	25	GND
6	GND	26	NC
7	GND	27	NC
8	MIPI_D2N	28	IOVCC
9	MIPI_D2P	29	GND
10	GND	30	GND
11	MIPI_D0N	31	LEDK
12	MIPI_D0P	32	LEDK
13	GND	33	NC
14	MIPI_CKN	34	NC
15	MIPI_CKP	35	NC
16	GND	36	NC
17	MIPI_D1N	37	NC
18	MIPI_D1P	38	NC
19	GND	39	LEDA
20	MIPI_D3N	40	LEDA

TP PIN DEFINITION

PIN No.	SYMBOL
1	VDD
2	GND
3	SCL
4	SDA
5	INT
6	RESET
7	NC

DETAIL A(10:1)

CONSTANT CURRENT: 80mA,24.0V(REF.)
BACKLIGHT DRIVER CIRCUIT DIAGRAM
LEDA / LEDK

FPC BENDING DIAGRAM
FPC BENDING SHIPMENT

PARAMETERS

ITEM	PARAMETERS
LCD SIZE	6.0 inch(DIAGONAL)
LCD TYPE	IPS/NORMALLY BLACK
RESOLUTION(H*V)	2160*1080 PIXELS
POLARIZER TYPE	TRANSMISSIVE
TFT IC	XM91080 OR COMPATIBLE
BACKLIGHT	EDGE,WHITE
CONNECTOR	ZIF
CTP ID DISTINGUISH FROM	/
CTP IC	MXT336U
VIEWING DIRECTION(EYE)	FREE
OPERATING TEMPERATURE	-20°C TO +70°C
STORAGE TEMPERATURE	-30°C TO +80°C
POWER SUPPLY INPUT FOR TFT	3.3V(VDD)/1.8V(IOVCC)
POWER SUPPLY INPUT FOR CTP	3.3V(VDD)/3.3V(IO signal voltage)
CTP COORDINATE ORIGIN	TOP LEFT CORNER
OPERATING SYSTEM	ANDROID&WINDOWS

Title Block

RoHS/REACH COMPLIANT	YES
UNMARKED TOLERANCE	±0.30
SCALE	FIT
SHEET	1 OF 1
UNIT	mm
REV.	I
TITLE	CTP MODULE
PART NO.	
MODULE NO.	
CUSTOMER NO.	

	NAME	DATE
DRAWN		AUG-01-2023
CHECKED		AUG-01-2023
APPROVED		AUG-01-2023

MODULE NO.
AVD-T600T-CN-006-C
XXXXXXXXXX YYYYMMDD DATE
LOT NO.

PRINTING CONTENT SCALE: 3/1
PRINTING CONTENT SCALE: 3/1

NOTES:
1. PRODUCT BRIGHTNESS: 900cd/m2(TYP)
2. BACKLIGHT LIFE: 50Khours(TYP)
3. PULL UP SDA\SCL ON MAINBOARD

MARK"*" ARE IMPORTANT DIMENSIONS. MARK"()" ARE REFERENCE DIMENSIONS. MARK"★" ARE SPECIAL CHARACTERISTICS RELATED TO SAFETY. MARK"☆" ARE SPECIAL CHARACTERISTICS IRRELEVANT TO SAFETY. MARK"●" ARE IMPORTANT CHARACTERISTICS EXCEPT FOR THE SPECIAL CHARACTERISTICS.

CTP IC: MXT336U
STEEL STIFFENER T=0.2MM
DOUBLE-SIDED ADHESIVE T=0.05MM
GASKET(T=0.2)

THE PE GASKET WITH GLUE ON SINGLE SIDED, T=0.2MM
WHITE SILKSCREEN LINE W=0.20MM

7. ELECTRO - OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time	Tr+ Tf	-	-	25	-	ms	FIG.1	Note 1
Contrast ratio	Cr		800	1200	-	-	FIG.2	Note 2
Surface luminance	Lv	θ=0°	800	1000	-	cd/m^2	FIG.2	Note 3
Luminance uniformity	Yu	θ=0°	75	80	-	%	FIG.2	Note 4
NTSC	-	θ=0°	-	70	-	%	FIG.2	Note 5
Viewing angle	θ	∅=90°	-	-	-	deg	FIG.3	Note 6
		∅=270°	-	-	-	deg	FIG.3	
		∅=0°	-	-	-	deg	FIG.3	
		∅=180°	-	-	-	deg	FIG.3	
CIE (x,y) chromaticity	Red x	θ=0° ∅=0° Ta=25℃	Typ -0.04	0.64	Typ +0.04	-	FIG.2 CIE1931	Note 5
	Red y			0.34		-		
	Green x			0.31		-		
	Green y			0.60		-		
	Blue x			0.15		-		
	Blue y			0.06		-		
	White x			0.31		-		
	White y			0.36		-		

Note1. 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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%. For additional information see FIG1.

Note2.Definition of contrast ratio
Contrast ratio(Cr) is defined mathematically by the following formula.
For more information see FIG.2.

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

Measured at the center area of the LCD

Note3.Definition of surface luminance
Surface luminance is the luminance with all pixels displaying white.
For more information see FIG.2.
Lv = Average Surface Luminance with all white pixels(P1,P2,P3, ...,Pn)

Note4.Definition of luminance uniformity
The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance.For more information see FIG.2.

$$Yu = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,......,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,......,Pn)}}$$

Note5. Definition of color chromaticity (CIE1931)
CIE (x,y) chromaticity,The x,y value is determined by screen active area center position P5.For more information see FIG.2.

Note6. Definition of viewing angle
Viewing angle is the angle at which the contrast ratio is greater than 10. angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.
For more information see FIG.3.
For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope or DMS series Instruments or compatible. For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON's BM-7 photo detector or compatible.

FIG.1. The definition of response Time
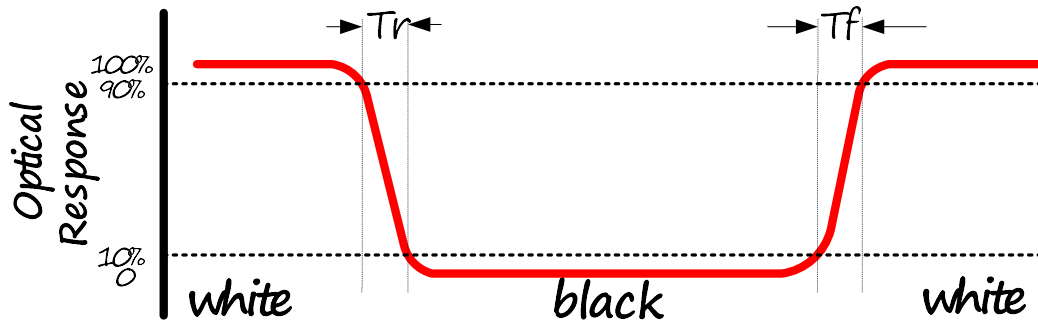
FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

Note ：The TFT module should be stabilized at a given temperature for 10 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 10 minutes in a windless room.

H,V : Active area

Light spot size $\varnothing$ =5mm (CS-2000/BM-7)50cm distance or compatible distance from the LCM surface to detector lens.

Test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter CS-2000/BM-7 or compatible ,see Figure b.
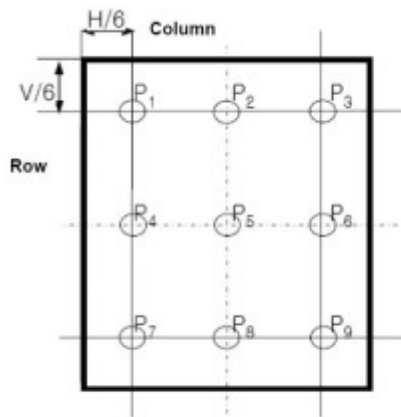
Figure a
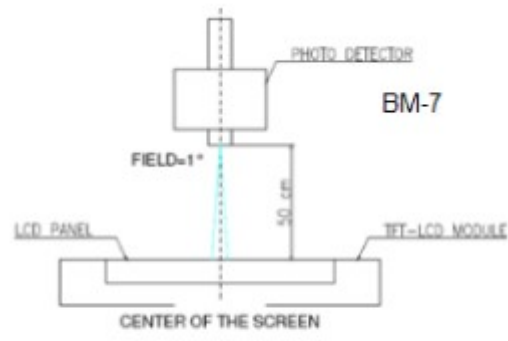
Figure b

FIG.3. The definition of viewing angle
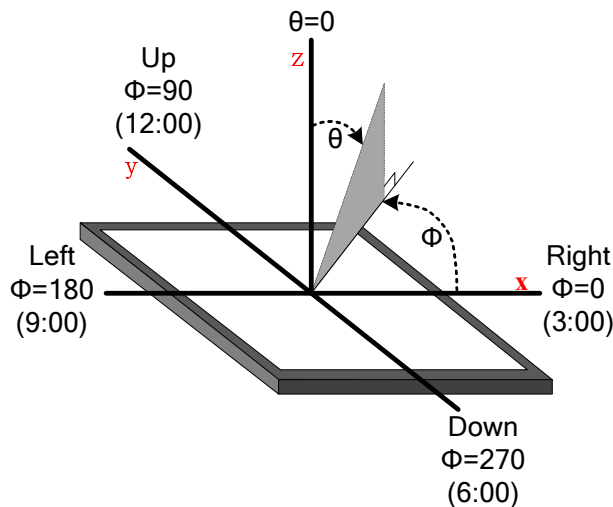
8. INTERFACE DESCRIPTION

TFT Module Interface description

Interface No.	Name	I/O or connect to	Description
1	NC	/	/
2-3	VDD	P	Power for POWER IC
4	NC	/	/
5	RESET	I	Reset low
6	NC	/	/
7	GND	P	Ground
8	MIPI_D2N	I/O	Negative polarity of low voltage differential data signal
9	MIPI_D2P	I/O	Positive polarity of low voltage differential data signal
10	GND	P	Ground
11	MIPI_D0N	I/O	Negative polarity of low voltage differential data signal
12	MIPI_D0P	I/O	Positive polarity of low voltage differential data signal
13	GND	P	Ground
14	MIPI_CKN	I/O	Negative polarity of low voltage differential clock signal
15	MIPI_CKP	I/O	Positive polarity of low voltage differential data signal
16	GND	I	Ground
17	MIPI_D1N	I/O	Negative polarity of low voltage differential data signal
18	MIPI_D1P	I/O	Positive polarity of low voltage differential data signal
19	GND	I	Ground
20	MIPI_D3N	I/O	Negative polarity of low voltage differential data signal
21	MIPI_D3P	I/O	Positive polarity of low voltage differential data signal
22	GND	I	Ground
23-24	NC	/	/
25	GND	I	Ground
26-27	NC	/	/
28	IOVCC	P	Power Supply for I/O ,1.65V-1.95V
29	NC	/	/
30	GND	I	Ground
31-32	LEDK	P	Power for LED backlight(Cathode)
33-38	NC	/	/
39-40	LEDA	P	Power for LED backlight(Anode)

I: input, O: output, P: Power,NC or / : No connection

CTP interface description;

Interface No.	Name	I/O or connect to	Description
1	VDD	P	Power Supply of CTP
2	GND	P	Ground
3	SCL	I	Serial interface clock
4	SDA	I/O	Serial interface date
5	INT	O	State change interrupt
6	RESET	I	Reset low
7	NC	/	/

I: input, O: output, P: Power,NC or / : No connection

9. AC CHARACTERISTICS
TFT Module AC CHARACTERISTICS

High Speed Data Transmission: Data-Clock Timing
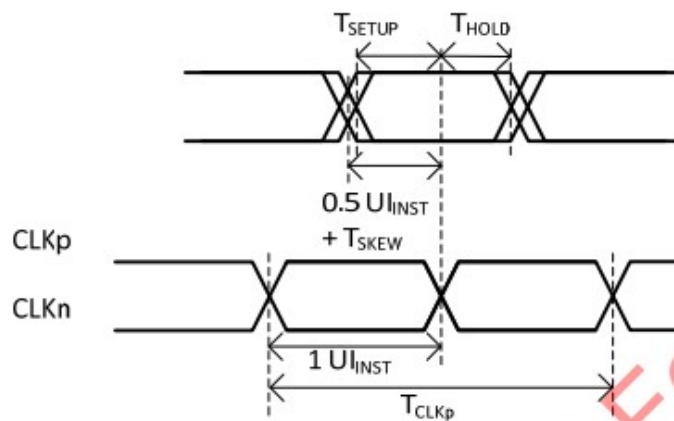
Figure 4. High Speed Data Transmission: Data-Clock Timing

Parameter	Symbol	Specification			Unit	Notes
		Min	Typ	Max		
UI instantaneous	UI_{INST}	1		12.5	ns	Note1,2
Data to Clock Skew [measured at transmitter]	$T_{SKEW}[TX]$	-0.15		0.15	UI_{INST}	
Data to Clock Setup Time [measured at receiver]	$T_{SETUP}[RX]$	-0.15		0.15	UI_{INST}	
Data to Clock Hold Time [measured at receiver]	$T_{HOLD}[RX]$	-0.15		0.15	UI_{INST}	
20% - 80% rise time and fall time	t_R/t_F	100			ps	Note3
				0.3	UI_{INST}	

Note:

1. This value corresponds to a minimum 300 MHz data rate

2. MIPI speed limitation: Per lane bandwidth is 1.2Gbps

3. Applicable for all HS bit rates. However, to avoid excessive radiation, bit rates ≤ 1.2 Gbps (UI ≥ 0.8334ns), should not use values below 100 ps.

Timing for DSI Video mode

Symbol	Parameter	Condition	Min	Typ	Max	Units
BR$_{PHY}$	Bit rate per Lane	HD (720RGB x 1280)	300	-	1200	Mbps
t$_L$	Line time	HD (720RGB x 1280)	-	12.70 (Note 1)	-	us
t$_{HBP}$	Horizontal back porch	HD (720RGB x 1280)	TBD	-	-	us
t$_{HACT}$	Time for image data	4 data lane	TBD	-	(Note 2)	us
HACT	Active pixels per line	HD (720RGB x 1280)		720	-	pixels
t$_{HFP}$	Horizontal front porch		TBD	-	-	us
VSA	Vertical sync active		2 (Note 3)	-	-	H
VBP	Vertical back porch		2 (Note 3)	-	-	H
VACT	Active lines per frame	HD (720RGB x 1280)	1280 (Note 3)			H
VFP	Vertical front porch		4 (Note 3)	-	-	H

Note:

1. Frame rate (Typ)= 60Hz, and VBP=16 / VFP=16

2. $t_{HACT}(Max)=t_L - t_{HFP} - t_{HBP}$

3. (VSA + VBP + VACT + VFP) must be a multiple of VCK/XVCK phase number.
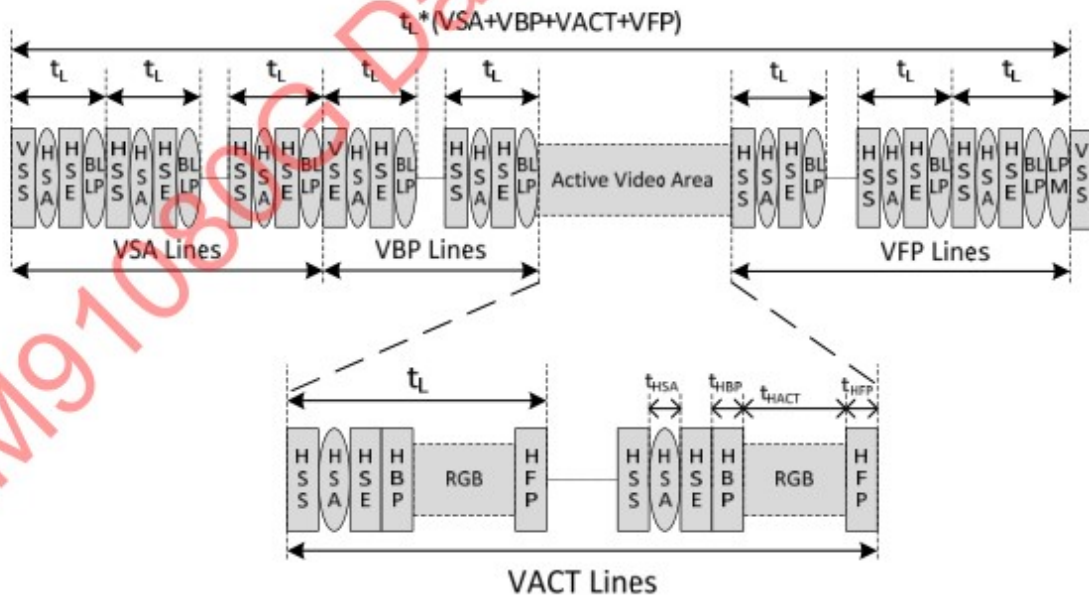
Figure 3. Video Mode Interface Timing
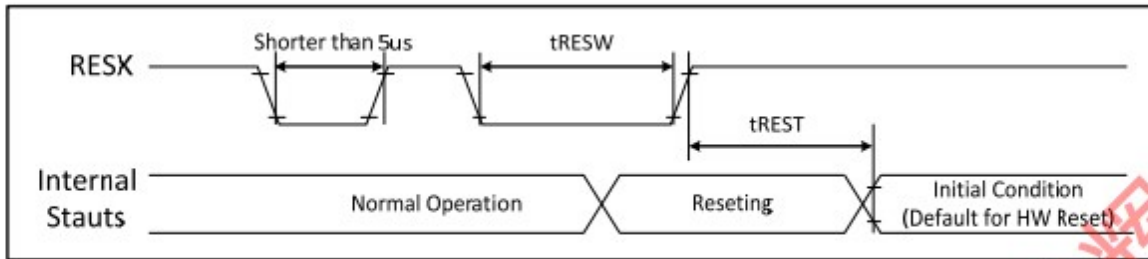
Figure 5. Reset Input Timing

Symbol	Parameter	Related Pins	Spec.			Unit	Note
			Min.	Typ.	Max.		
tRESW	Reset low pulse width	RESX	10	-	-	μs	-
tREST	Reset complete time	-	-	-	5	ms	During Sleep in mode
tREST	Reset complete time	-	-	-	120	ms	During Sleep out mode

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 5μs	Reset low pulse width
Longer than 10μs	Reset complete time
Between 5μs and 10μs	Reset start (by voltage and temperature condition)

During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120ms, when Reset Starts in Sleep Out mode. The display remains the blank state in Sleep In mode) and then return to Default condition for H/W reset. During Reset Complete Time, ID1/ID2/ID3/ID4 and VCOM value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 5ms after a rising edge of RESX. Spike Rejection also applies during a valid reset pulse as shown below:
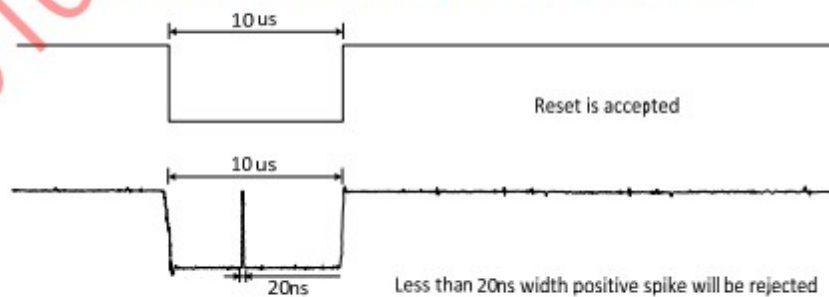
Figure 6. Reset Timing

It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120 msec.

CTP AC CHARACTERISTICS

Communication speed is 400Kbps or less.

Parameter	Min	Typ	Max	Units	Notes
Power on to CHG line low	–	35	–	ms	Vdd supply for POR VddIO supply for external reset
Hardware reset to $\overline{\text{CHG}}$ line low	–	38	–	ms	
Software reset to $\overline{\text{CHG}}$ line low	–	55	–	ms	

Note 1: Any CHG line activity before the power-on or reset period has expired should be ignored by the host. Operation of this signal cannot be guaranteed before the power-on/reset periods have expired.

Timing Specifications
TOUCH LATENCY

SPEED

Parameter	Min	Typ	Max	Units	Notes
Power on to CHG line low	–	35	–	ms	Vdd supply for POR VddIO supply for external reset
Hardware reset to $\overline{CHG}$ line low	–	38	–	ms	
Software reset to $\overline{CHG}$ line low	–	55	–	ms	

Note 1: Any CHG line activity before the power-on or reset period has expired should be ignored by the host. Operation of this signal cannot be guaranteed before the power-on/reset periods have expired.

10. POWER SEQUENCE
TFT Module POWER SEQUENCE
To prevent the device damage from latch up and Improve subjective display effect,the power ON/OFF sequence shown below must be followed.
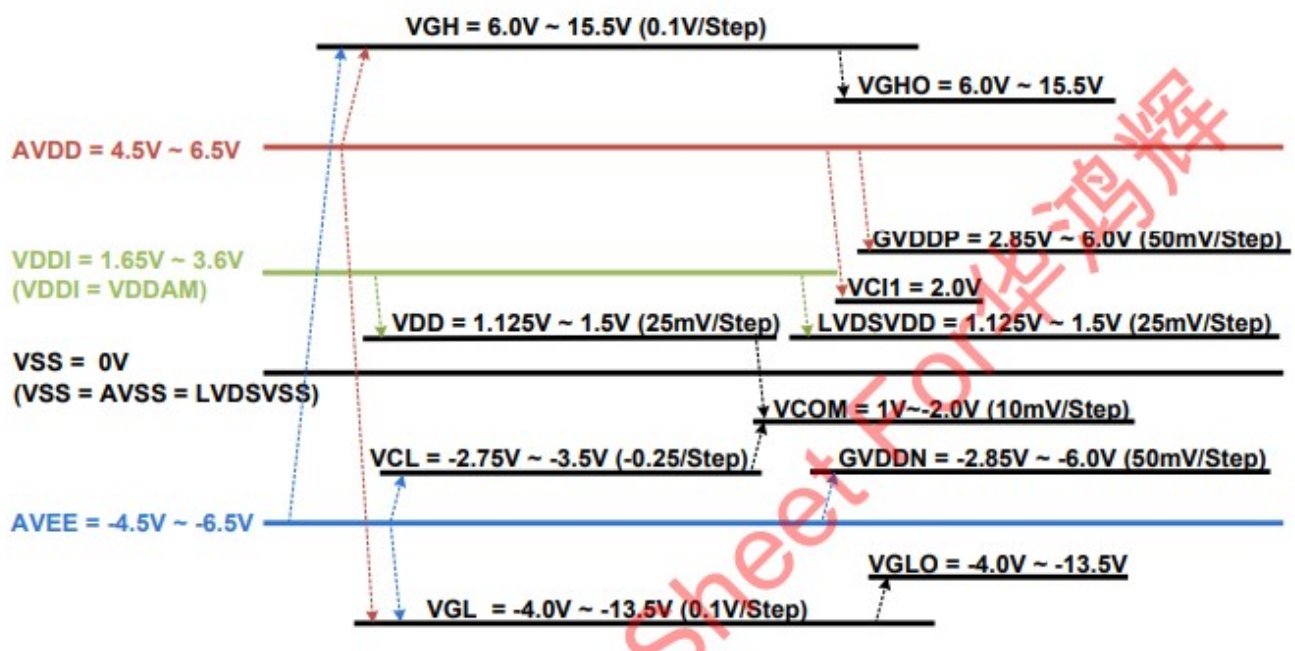
CTP POWER SEQUENCE
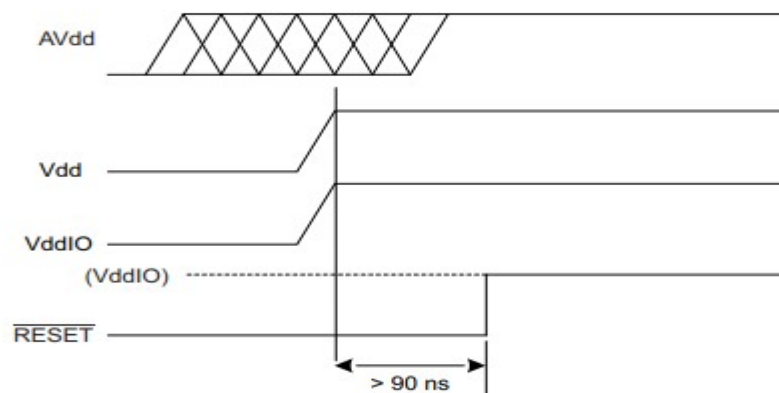
Note: When using external $\overline{RESET}$ at power-up, VddIO must not be enabled after Vdd

11. RELIABILITY TEST CONDITIONS

No.	Test item	Test condition	Inspection after test
11.1	High temperature storage test	+80℃/120 hours	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects : 1.Current changing value before test and after test is 50% larger; 2. Function defect : Non-display,abnormal-display,missing lines, Short lines,ITO corrosion; 3.Visual defect : Air bubble in the LCD,Seal leak,Glass crack.
11.2	Low temperature storage test	-30℃/120 hours	
11.3	High temperature operating test	+70℃/120 hours	
11.4	Low temperature operating test	-20℃/120 hours	
11.5	Thermal Shock (non-operation)	-30℃ ←→ +80℃/10cycles (30min.)(<30sec.) (30min.)	
11.6	High temperature high humidity test	+60℃*90% RH/120 hours	
11.7	Vibration test for Packaging	Frequency : 250 r/min Amplitude : 1 inch Time: 45min	
11.8	Drop test for Packaging	Drop direction: 1 corner/3 edges/6 sides 10 times	
		Packing weight(kg) / Drop height(cm): ＜11 → 80±1.6 11≦G＜21 → 60±1.2 21≦G＜31 → 50±1.0 31≦G＜40 → 40±0.8	
11.9	ESD test	Air discharge: ±8KV, 10times Contact discharge: ±4KV, 10times	

Remark :
1.The test samples should be applied to only one test item.
2.Sample size for each test item is 3~5pcs.
3.For High temperature high humidity test, Pure water(Resistance>10MΩ) should be used.
4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
5.B/L evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence B/L has.
6.Failure judgment criterion: Basic specification, Electrical characteristic, Mechanical characteristic, Optical characteristic.
7.After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

12. INSPECTION CRITERION

Refer to 《Inspection Criterion for MTP Products-To customer》, DOCUMENT NO.: AVD(WI)-00-QA-051

13. HANDLING PRECAUTIONS
13.1 Mounting method
The LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.
Extreme care should be needed when handling the LCD modules.
13.2 Caution of LCD handling and cleaning
When cleaning the display surface, Use soft cloth with solvent
[recommended below] and wipe lightly :
●.Isopropyl　alcohol
●.Ethyl alcohol
Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.
Do not use the following solvent :
●.Water
●.Aromatics
Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated :
●.Soldering flux
●.Chlorine (Cl) , Sulfur (S)
If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.
If ITO corrosion happen by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.
13.3 Caution against static charge
The LCD module use C-MOS LSI drivers, so we recommended that you :
Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.
13.4 Packing
Module employ LCD elements and must be treated as such.
●.Avoid intense shock and falls from a height.
●.To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity.
13.5 Caution for operation
●.It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
●.An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
●.Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
●.If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
●.A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.
●.Usage under the maximum operating temperature, 50%Rh or less is required.
●.When fixed patterns are displayed for a long time,remnant image is likely to occur.
13.6 Storage
In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.
●.Storing in an ambient temperature 10℃ to 30℃, and in a relative humidity of 45% to 75%. Don't expose to sunlight or fluorescent light.
●.Storing in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
●.Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature

range.
●.Storing with no touch on polarizer surface by the anything else.
It is recommended to store them as they have been contained in the inner container at the time of delivery from us.

13.7 Safety
●.It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
●.When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

14. PRECAUTION FOR USE

14.1 A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

14.2 On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.
●.When a question is arisen in this specification.
●.When a new problem is arisen which is not specified in this specifications.
●.When an inspection specifications change or operating condition change in customer is reported to AVD, and some problem is arisen in this specification due to the change.
●.When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

15. PACKING SPECIFICATION
Please consult our technical department for detail information.

16. INITIALIZATION CODE
Please consult our technical department for detail information.

17. HSF COMPLIANCE
●.This products complies with ROHS 2011/65/EU and 2015/863/EU、REACH 1907/2006/EC requirements, and the packaging complies with 94-62-EC.