Product Specification

Model Name	BI050WXGPT V1.0
Description	Standard AM-OLED Module 5.0" WXGA 720(RGB)x1280 Dots
Date	2017/3/17
Version	1.0

Customer Approval	
Date	

Table of Contents

1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2016/12/10	First Release.	
2.0	2017/3/17	Update Optical Characteristics**.**	

2. General Specifications

Feature		Spec
Characteristics	Size	5 inch
	Resolution	720(horizontal)*1280(Vertical)
	Interface	MIPI 4 line
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	-
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally black
	LCD Driver IC	TBD
	Touch IC	S3402
	Viewing Direction	ALL
Mechanical	LCM (W x H x D) (mm)	65.92*118.64*1.00
	Active Area(mm)	61.92 x110.88
	Weight (g)	TBD

Note 1: Requirements on Environmental Protection: RoHs
Note 2: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

No.	Symbol	Description
1	GND	Ground
2	NC	No connected
3	TP_RESX	Touch panel reset.
4	TP_SCL	Touch panel I2C clock.
5	TP_SDA	Touch panel I2C data.
6	TP_INT	Touch panel interrupt output.
7	TP_VDDI	Touch panel digital supply.
8	TP_VCC	Touch panel analog supply.
9	NC	No connected.
10	VCI	Driver IC analog supply.
11	GND	Ground
12	D3N	MIPI DSI data3-
13	D3P	MIPI DSI data3+
14	GND	Ground
15	D0N	MIPI DSI data0-
16	D0P	MIPI DSI data0+
17	GND	Ground
18	CKN	MIPI DSI clock-
19	CKP	MIPI DSI clock+
20	GND	Ground
21	D1N	MIPI DSI data1-
22	D1P	MIPI DSI data1+
23	GND	Ground
24	D2N	MIPI DSI data2-
25	D2P	MIPI DSI data2+
26	GND	Ground
27	VDDI	Driver IC digital suppy.
28	RESX	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
29	TE	Sync signal from driver IC
30	OTP_PWR	Driver IC R/W use only,system side must floating
31-33	NC	No connected.
34-38	VBAT	Panel power supply
39	GND	Ground

4. Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit
Power IC Power supply	VBAT	-	+4.5	V
Digital Power supply	VDDI	-0.3	+2.0	V
Analog Power supply	VCI	-0.3	+4.0	V
Touch analog power supply	TP_VCC	-0.3	+4.0	V
Touch digital power supply	TP_VDDI	-0.3	+2.0	V

Note : If the module exceeds the absolute maximum ratings, it may be damaged permanently.

5. Electrical Characteristics

5.1 Operation Conditions

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Panel Power supply		VBAT	2.9	3.7	4.5	V	
Digital Power supply		VDDI	1.65	1.8	1.95	V	
Analog Power supply		VCI	2.7	3.1	3.6	V	
Input Signal Voltage	H Level	V_{IH}	0.8*VDDI	-	VDDI	V	RESX
	L Level	V_{IL}	0	-	0.2*VDDI	V	
Output Signal Voltage	H Level	V_{OH}	0.7*VDDI	-	VDDI	V	TE
	L Level	V_{OL}	0	-	0.3*VDDI	V	
Touch analog power supply		TP_VCC	2.7	3.1	3.6	V	
Touch digital power supply		TP_VDDI	1.65	1.8	1.95	V	

Note 1: The operation is guaranteed under the recommended operating conditions only. The operation is not guaranteed if a quick voltage change occurs during the operation. To prevent the noise, a bypass capacitor must be inserted into the line closed to the power pin.

5.2 Display Current Consumption

Mode	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Normal	I_{BAT}	VBAT = 3.7V VCI = 3.1V VDDI = 1.8V	-	300	360	mA	Note1
	I_{VCI}		-	60	80	mA	Note2
	I_{VDDI}		-	1	10	mA	Note2
Deep Standby (DSTB=1)	$I_{OVDD/OVSS}$		-	-	<1	mA	Note3
	I_{VCI}		-	-	<1	mA	Note3
	I_{VDDI}		-	-	<1	μA	Note3

Note 1: VBAT input 2.9V, I_{BAT} maximum current enhance to 460mA.

Note 2: Based on white pattern. MIPI-DSI frame rate 60Hz video mode.

Note 3: Display off. RESX = high

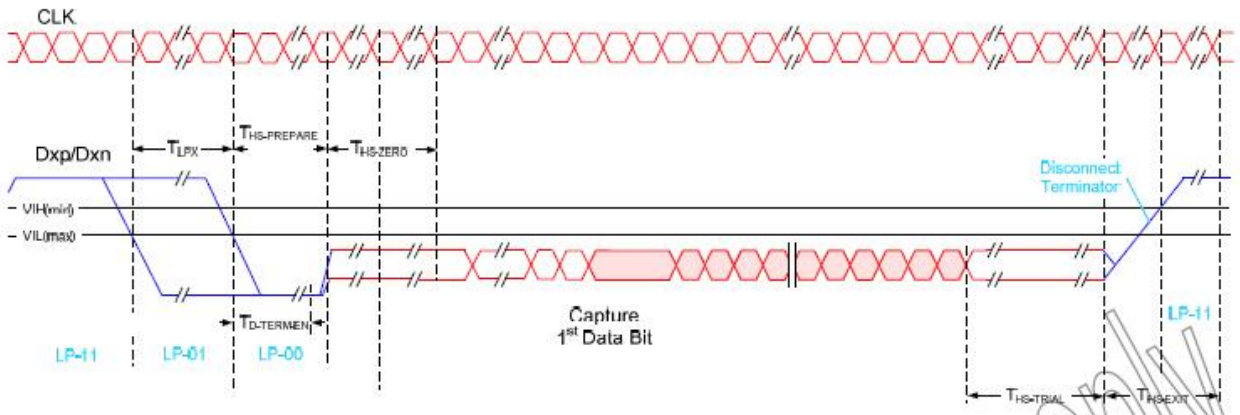
5.3 Touch Panel Current Consumption

Mode	Symbol	Condition	min	Typ.	Max	Unit
Active (1 finger)	I_{TP_VDDI}	TP_VDDI = 1.8V TP_VCC=3.1V Report Rate: 100Hz Doze Interval: 30 ms (26Rx x 15Tx)	-	13	14.3	mA
	I_{TP_VCC}		-	12.5	13.75	mA
Active (10 finger)	I_{TP_VDDI}		-	18.5	20.35	mA
	I_{TP_VCC}		-	12.5	13.75	mA
Normal Operation	I_{TP_VDDI}		-	0.4	0.44	mA
	I_{TP_VCC}		-	0.35	0.39	mA
Sensor Sleep (Deep sleep)	I_{TP_VDDI}		-	13.3	14.6	μA
	I_{TP_VCC}		-	8	8.8	μA

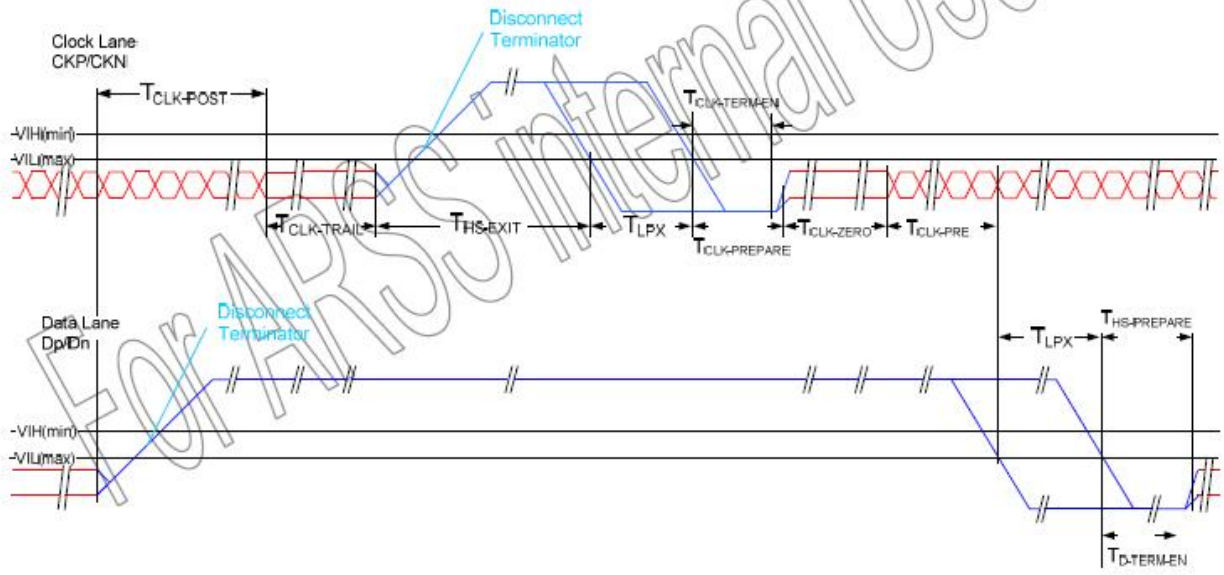
6. AC Characteristics

6.1 Display AC Characteristics

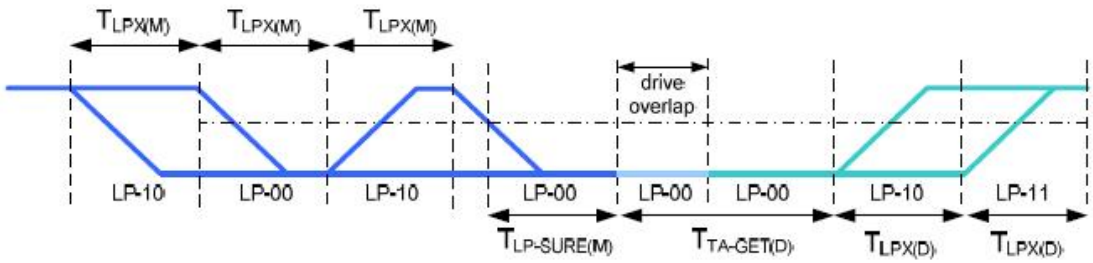
HS Data Transmission Burst



HS clock transmission



Turnaround Procedure



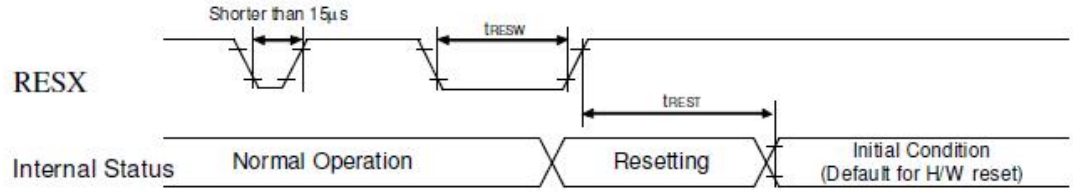
Timing Parameters

Symbol	Description	Min	Typ	Max	Unit
$T_{CLK-POST}$	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of $T_{HS-TRAIL}$ to the beginning of $T_{CLK-TRAIL}$.	60ns + 52*UI			ns
$T_{CLK-TRAIL}$	Time that the transmitter drives the HS-0 state after the last payload clock bit of a HS transmission burst.	60			ns
$T_{HS-EXIT}$	Time that the transmitter drives LP-11 following a HS burst.	300			ns
$T_{CLK-TERM-EN}$	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		38	ns
$T_{CLK-PREPARE}$	Time that the transmitter drives the Clock Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission.	38		95	ns
$T_{CLK-PRE}$	Time that the HS clock shall be driven by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8			UI
$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	$T_{CLK-PREPARE}$ + time that the transmitter drives the HS-0 state prior to starting the Clock.	300			ns
$T_{D-TERM-EN}$	Time for the Data Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		35 ns +4*UI	
$T_{HS-PREPARE}$	Time that the transmitter drives the Data Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission	40ns + 4*UI		85 ns + 6*UI	ns

$T_{HS-PREPARE} + T_{HS-ZERO}$	$T_{HS-PREPARE}$ + time that the transmitter drives the HS-0 state prior to transmitting the Sync sequence.	145ns + 10*UI			ns
$T_{HS-TRAIL}$	Time that the transmitter drives the flipped differential state after last payload data bit of a HS transmission burst	60ns + 4*UI			ns
$T_{LPX(M)}$	Transmitted length of any Low-Power state period of MCU to display module	50		150	ns
$T_{TA-SURE(M)}$	Time that the display module waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(M)}$		$2*T_{LPX(M)}$	ns
$T_{LPX(D)}$	Transmitted length of any Low-Power state period of display module to MCU	50		150	ns
$T_{TA-GET(D)}$	Time that the display module drives the Bridge state (LP-00) after accepting control during a Link Turnaround.	$5*T_{LPX(D)}$			ns
$T_{TA-GO(D)}$	Time that the display module drives the Bridge state (LP-00) before releasing control during a Link Turnaround.	$4*T_{LPX(D)}$			ns
$T_{TA-SURE(D)}$	Time that the MPU waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(D)}$		$2*T_{LPX(D)}$	ns

6.2 Display RESET Timing Characteristics

Reset input timing



Timing Parameters

Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	15	-	-	-	µs
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-		-	120	When reset applied during Sleep out mode	ms

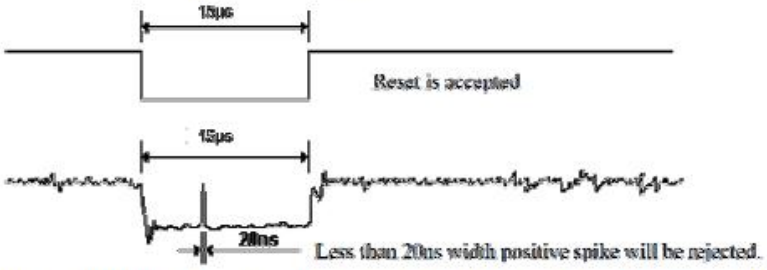
Note 1. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 5µs	Invalid Reset
Longer than 15µs	Valid Reset
Between 5µs and 15µs	Reset Initialization Precedure

Note 2. 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 H/W reset.

Note 3. During Reset Complete Time, data 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.

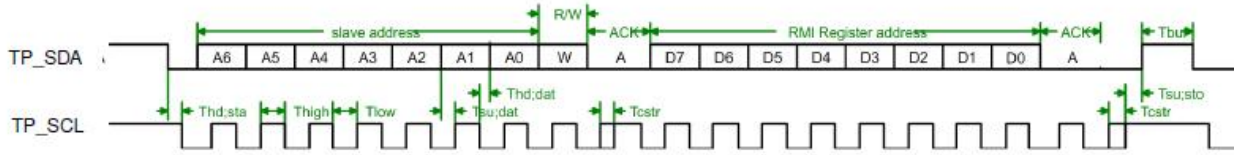
Note 4. Spike Rejection also applies during a valid reset pulse as shown below:



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

6.3 Touch Panel Timing Characteristics

I2C timing

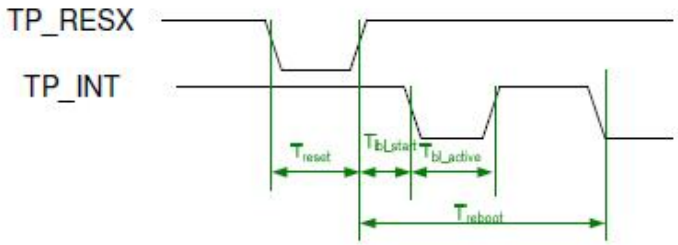


Timing Parameters

Symbol	Parameter	Standard- Mode Host		Fast-Mode Host		Unit
		Min.	Max.	Min.	Max.	
fSCL	SCL clock frequency	-	100	-	400	kHz
Tcstr	Stretch time	-	25	-	25	µs
Thd;sta	Hold time (repeated) START condition. After this period, the first clock pulse is generated.	4.0	-	0.6	-	µs
Tlow	LOW period of the SCL clock	4.7	-	1.3	-	µs
Thigh	HIGH period of the SCL clock	4.0	-	0.6	-	µs
Tsu;sta	Set-up time for a repeated START condition	4.7	-	0.6	-	µs
Thd;dat	Data hold time	0	3.45	0	0.9	µs
Thd;dato	Data out hold time	-	0	-	0	µs
Tsu;dat	Data set-up time	250	-	100	-	ns
Tr	Rise time of both SDA and SCL signals	-	1000	20 + 0.1 Cb	300	ns
Tf	Fall time of both SDA and SCL signals	-	3000	20 + 0.1 Cb	300	ns
Tsu;sto	Set-up time for STOP condition	4.0	-	0.6	-	µs
Tbuf	Bus free time between a STOP and START condition	4.7	-	1.3	-	µs
Cb	Capacitive load for each bus line	-	400	-	400	pF
VnL	Noise margin at the LOW level for each connected device (including hysteresis)	0.1 TP_VDDI		0.1 TP_VDDI		V
VnH	Noise margin at the HIGH level for each connected device (including hysteresis)	0.2 TP_VDDI	-	0.2 TP_VDDI	-	V

Touch Panel RESET Timing Characteristics

Reset input timing

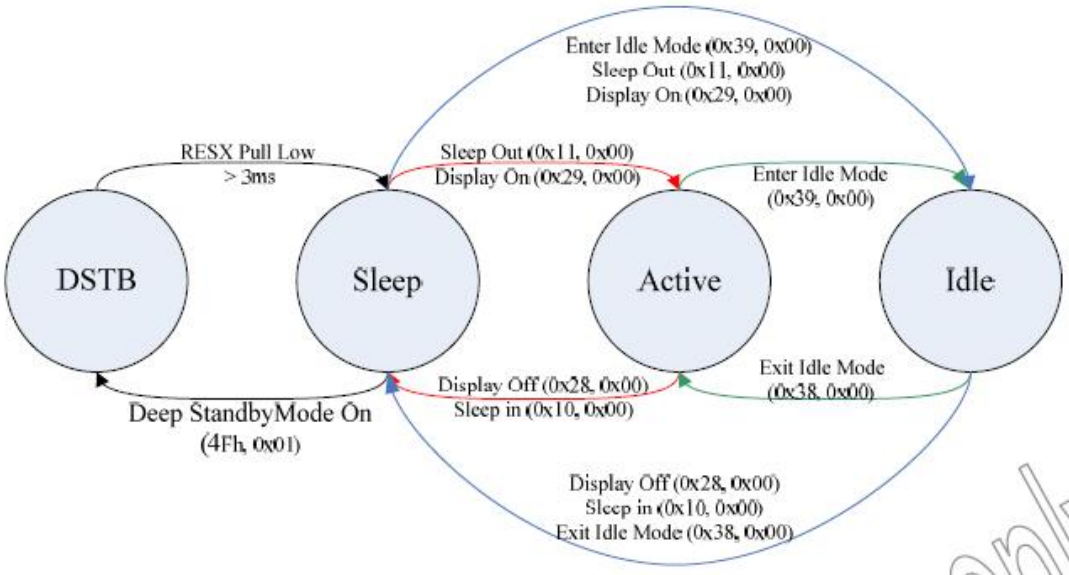


Timing Parameters

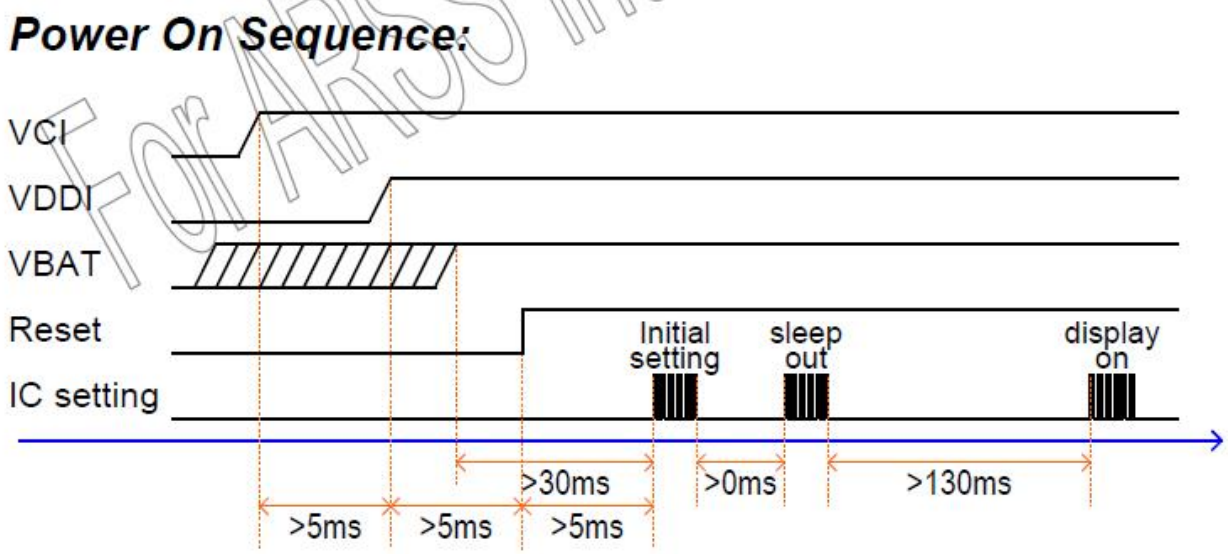
Symbol	Min.	Max.	Unit
T_{reset} (TP_RESX)	100	-	ns
T_{bl_start}	-	2	ms
T_{bl_active}	-	11	ms
T_{reboot}	-	16	ms

6.4 Operating Sequence

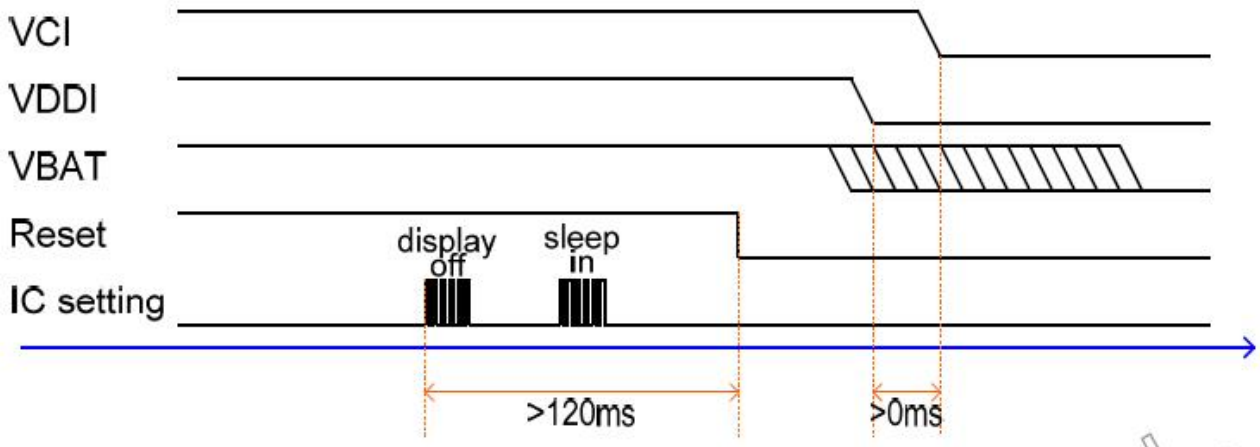
State Diagram



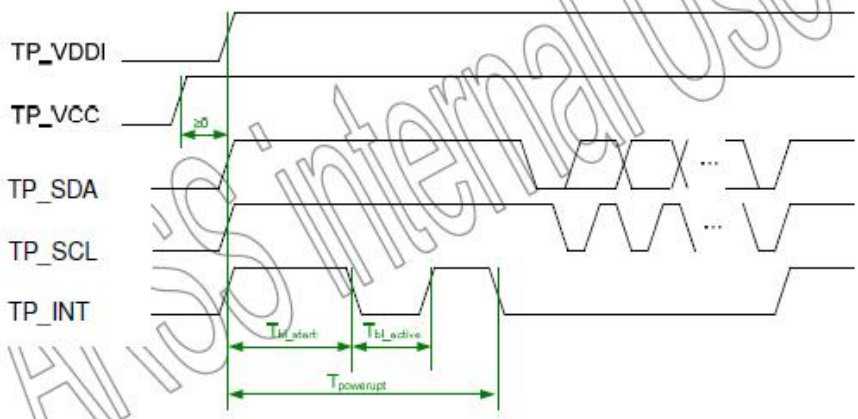
Display Power on / off Sequence



Power Off Sequence:



Touch Panel Power on Sequence

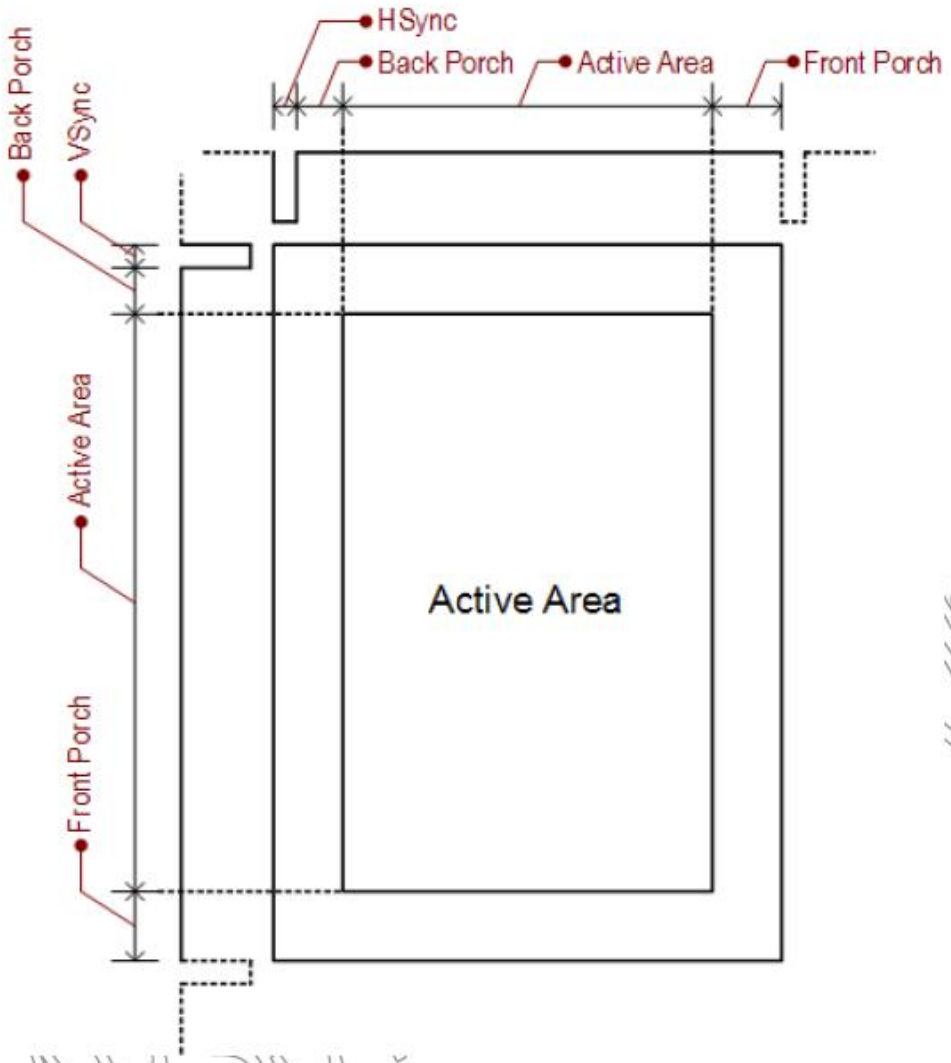


Symbol	Min.	Max.	Unit
$T_{powerupt}$	-	60	ms
T_{bl_start} (bootloader start)	-	46	ms
T_{bl_active} (bootloader active)	-	11	ms

Display Initial Setting

Item	Parameter qt'y	address	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1	5	F0	55	AA	52	08	00						
2	3	B0	00	10	10								
3	1	BA	60										
4	7	BB	00	00	00	00	00	00	00				
5	8	C0	C0	04	00	20	02	E4	E1	C0			
6	8	C1	C0	04	00	20	04	E4	E1	C0			
7	5	F0	55	AA	52	08	02						
8	5	EA	7F	20	00	00	00						
9	1	CA	04										
10	1	E1	00										
11	1	E2	0A										
12	1	E3	40										
13	4	E7	00	00	00	00							
14	8	ED	48	00	E0	13	08	00	91	08			
15	6	FD	00	08	1C	00	00	01					
16	11	C3	11	24	04	0A	02	04	00	1C	10	F0	00
17	5	F0	55	AA	52	08	03						
18	1	E0	00										
19	6	F1	00	00	00	00	00	15					
20	1	F6	08										
21	5	F0	55	AA	52	08	05						
22	5	C3	00	10	50	50	50						
23	2	C4	00	14									
24	1	C9	04										
25	5	F0	55	AA	52	08	01						
26	3	B0	06	06	06								
27	3	B1	14	14	14								
28	3	B2	00	00	00								
29	3	B4	66	66	66								
30	3	B5	44	44	44								
31	3	B6	54	54	54								
32	3	B7	24	24	24								
33	3	B9	04	04	04								
34	3	BA	14	14	14								
35	3	BE	22	38	78								
36	1	35	00										

Display Timing



Name	Qt'y	Unit
Frame Rate	60	Hz
Line Time	12.75	us
H total	752	dot
H sync	5	dot
H back porch	11	dot
H active area	720	dot
H front porch	16	dot
V total	1312	line
V sync	5	line
V back porch	11	line
V active area	1280	line
V front porch	16	line

6.5 Touch Specifications

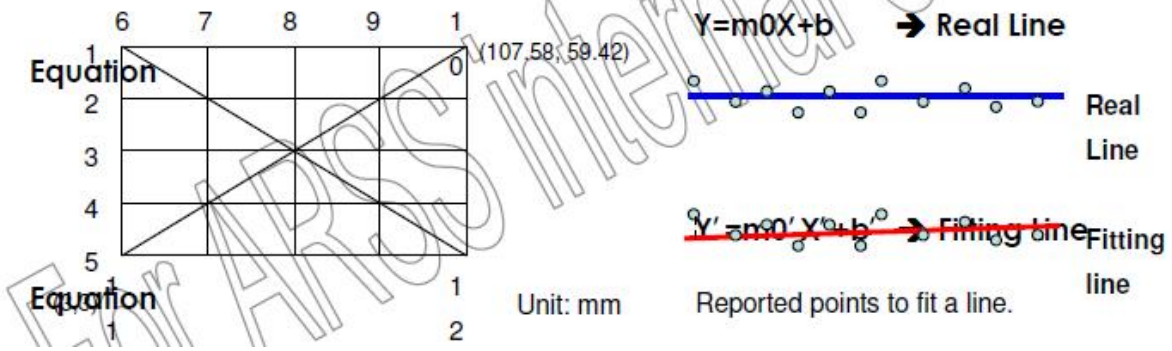
No.	Item		Spec.	Remark
1	Touch IC		S3402	Synaptics
2	Multi-Finger		10	
3	Report Rate		≧ 100Hz	
4	Performance	Accuracy.	≦2.0mm	Note 1
		Linearity	≦2.0mm	
5	Wakeup Gesture	Double tape	0.6se >Δt >(1/ report rate)	Δt=Ttape1-Ttape2
		Swipe	ΔS > 20mm & 50mm/sec>V>20mm/sec	ΔS :swipe distance V :swipe velocity

Note 1: Draw straight lines on the X axis, Y axis and diagonal axis with 6mm diameter copper slug at 50mm/sec drawing speed. And, drawing area is defined as below figure shown, which according to AA area and slig size.

Accuracy= Max{|(y-m0x-b)/(m0^2+1)^0.5|}

Linearity= Max{|(y-m0'x-b')/(m0'^2+1)^0.5|}

where (x,y)s are the TP IC reported coordinates,



E. Touch Panel IIC address

Reading Manufacturer ID：

IIC address (7 bits) = 0x20

Although a host would not normally need to read the Manufacturer ID register provided by the RMI4 interface, reading this register is a good first step in verifying that the host and Touch Controller are communicating. The Manufacturer ID register belongs to the group of Function $01 query registers. The addresses of these registers vary between different Synaptics RMI4-over-I2C Touch Controllers.

The Manufacturer ID register always returns data $01. Figure A gives an example of the resulting bus transaction, in the format typically used to describe I2C transactions. The symbol meanings are listed in Table A. The shaded areas indicate bus activity by the Touch Controller. In this example, assume the slave address of the device is $20, with the Manufacturer ID register at $E1.

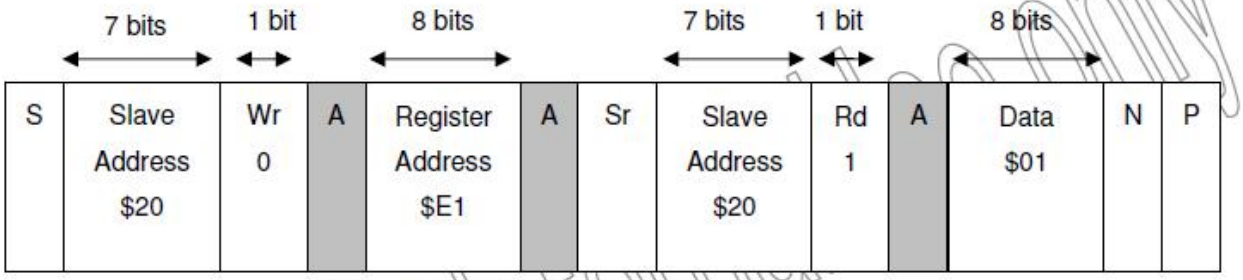


Figure A. Read Manufacturer ID command

Tabel A.

Symbol	*Meaning*
S	I2C bus Start condition. This is a falling edge on SDA while SCL is high.
Sr	Repeated Start condition. Same as S. Note that hosts that cannot generate Repeated Starts may use a Stop condition (P) followed by a another Start (S) instead.
P	I2C Stop condition. This is a rising edge on SDA while SCL is high.
A	I2C acknowledge (ACK). The data receiver pulls SDA low during a high pulse on SCL driven by the transmitter.
N	I2C not acknowledge (NACK). The data receiver lets SDA remain high during a high pulse on SCL driven by the transmitter.
Wr	'Write' bit. This has a value of 0.
Rd	'Read' bit. This has a value of 1.

Using register：

A. Page Select

Addr	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Access
0x00FF	Page Select	Page								W
Description		Set Page 0=0x00								

B. Communicating :

Address=0x0006 is used to read coordinate. It must continue to read 10 fingers data every time

Page 0x00 Registers									
Addr	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Access
0x0006	F12_2D_DATA01(00)/00 Object Type and Status 0	Object Type and Status								R W
	F12_2D_DATA01(00)/01 Object Data 0	X LSB								R W
	F12_2D_DATA01(00)/02 Object Data 0	X MSB								R W
	F12_2D_DATA01(00)/03 Object Data 0	Y LSB								R W
	F12_2D_DATA01(00)/04 Object Data 0	Y MSB								R W
	F12_2D_DATA01(00)/05 Object Data 0	Z								R W
	F12_2D_DATA01(00)/06 Object Data 0	Wx								R W
	F12_2D_DATA01(00)/07 Object Data 0	Wy								R W
Description		Object Type and Status (F12_2D_Data1(N)/0) ○ 0x00 = No object ○ 0x01 = Finger ○ 0x02 = Stylus ○ 0x03 = Palm ○ 0x04 = Unclassified ○ 0x05 = Reserved ○ 0x06 = Gloved Finger X and Y position data (MSB) These registers report the most-significant bits of the absolute X and Y position data. X and Y position data (LSB) This register contains the least-significant bits for both the X and Y absolute position information. Z This field reports the amount of finger contact or finger signal strength, which often serves as a rough estimate of finger pressure. When Z = 0, the								

	position cannot be measured and the X and Y Position registers are left unchanged. By default Z is taken as 0 whenever the device's built-in algorithms determine that no finger is present. Wx, Wy These fields report the estimated finger width as an unsigned integer, where 0 represents an extremely narrow finger and 15 represents an extremely wide contact such as a palm laid flat on the sensor. The ratio of Wx and Wy provides an estimate of the finger contact aspect ratio.	

7. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Tr+Tf	-	-	-	1	ms	FIG.1	Note4
Contrast Ratio		CR		10000	-	-	-	FIG.2	Note1
Surface luminance		LV	θ =0°	250	300	-	cd/m2	FIG.2	Note2
Luminance uniformity		Yu	θ =0°	70	-	-	%	FIG.2	Note3
NTSC		-	θ =0°	80	100	-	%	FIG.2	Note5
Viewing angle		θ_T	Center CR≥10	80	-	-	deg	FIG.3	Note6
		θ_B		80	-	-	deg	FIG.3	
		θ_L		80	-	-	deg	FIG.3	
		θ_R		80	-	-	deg	FIG.3	
Chromaticity	Red	R_X	θ =0° ∅=0° Ta=25°	0.645	0.675	0.705	-	FIG.2 CIE1931	Note5
		R_Y		0.295	0.325	0.355	-		
	Green	G_X		0.186	0.236	0.286	-		
		G_Y		0.661	0.711	0.761	-		
	Blue	B_X		0.090	0.130	0.170	-		
		B_Y		0.025	0.065	0.105	-		
	White	W_X		0.28	0.30	0.32	-		
		W_Y		0.29	0.31	0.33	-		

Note1. Definition of contrast ratio

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

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

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON’s BM-5 or BM-7 photo detector or compatible.

Note2. 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)

Note3. 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.

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

Note4. 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%.

For additional information see FIG1.

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.

FIG.1.The definition of response Time

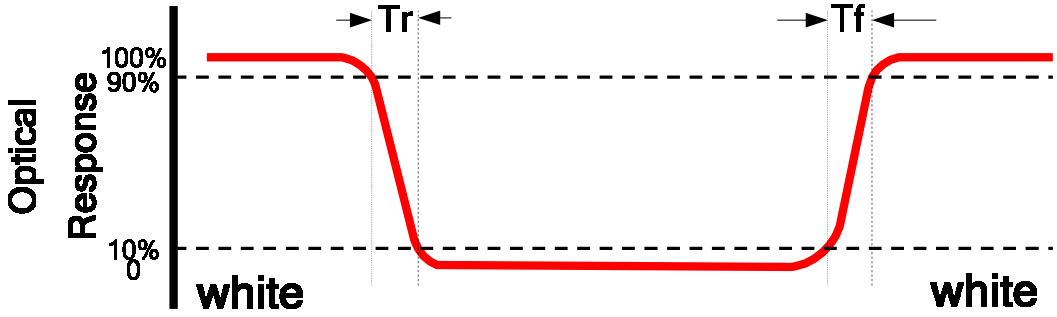


FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

Size : S≤5”(see Figure a) A : 5 mm B : 5 mm
H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure a.
measurement instrument : TOPCON’s luminance meter BM-5 or BM-7 or compatible (see Figure c).

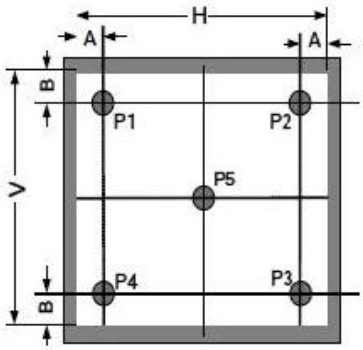


Figure a

Size : 5”＜S≤12.3”(see Figure b) H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure b.
measurement instrument : TOPCON’s luminance meter BM-5 or BM-7 or compatible (see Figure c).

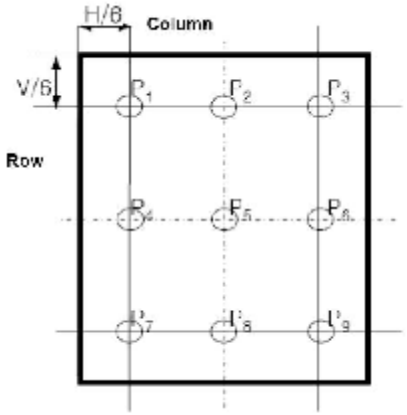


Figure b

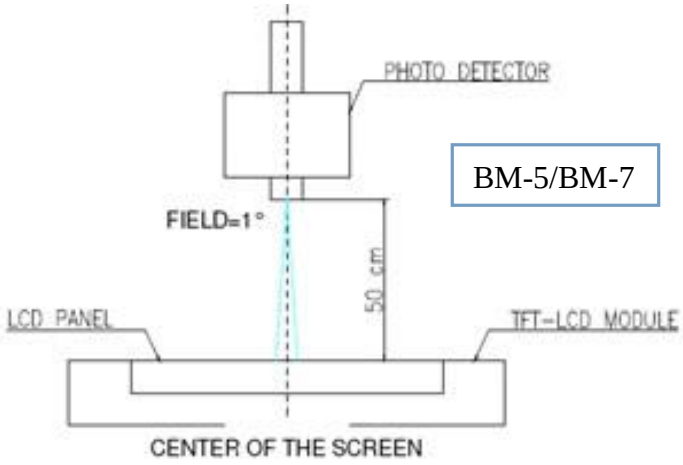
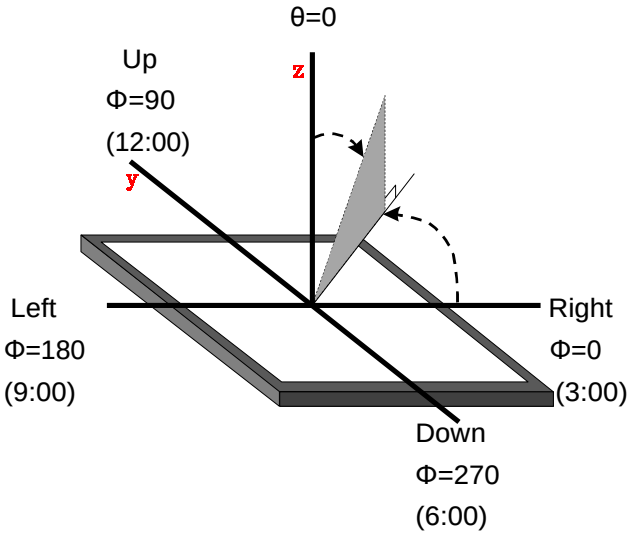


Figure c

FIG.3.The definition of viewing angle

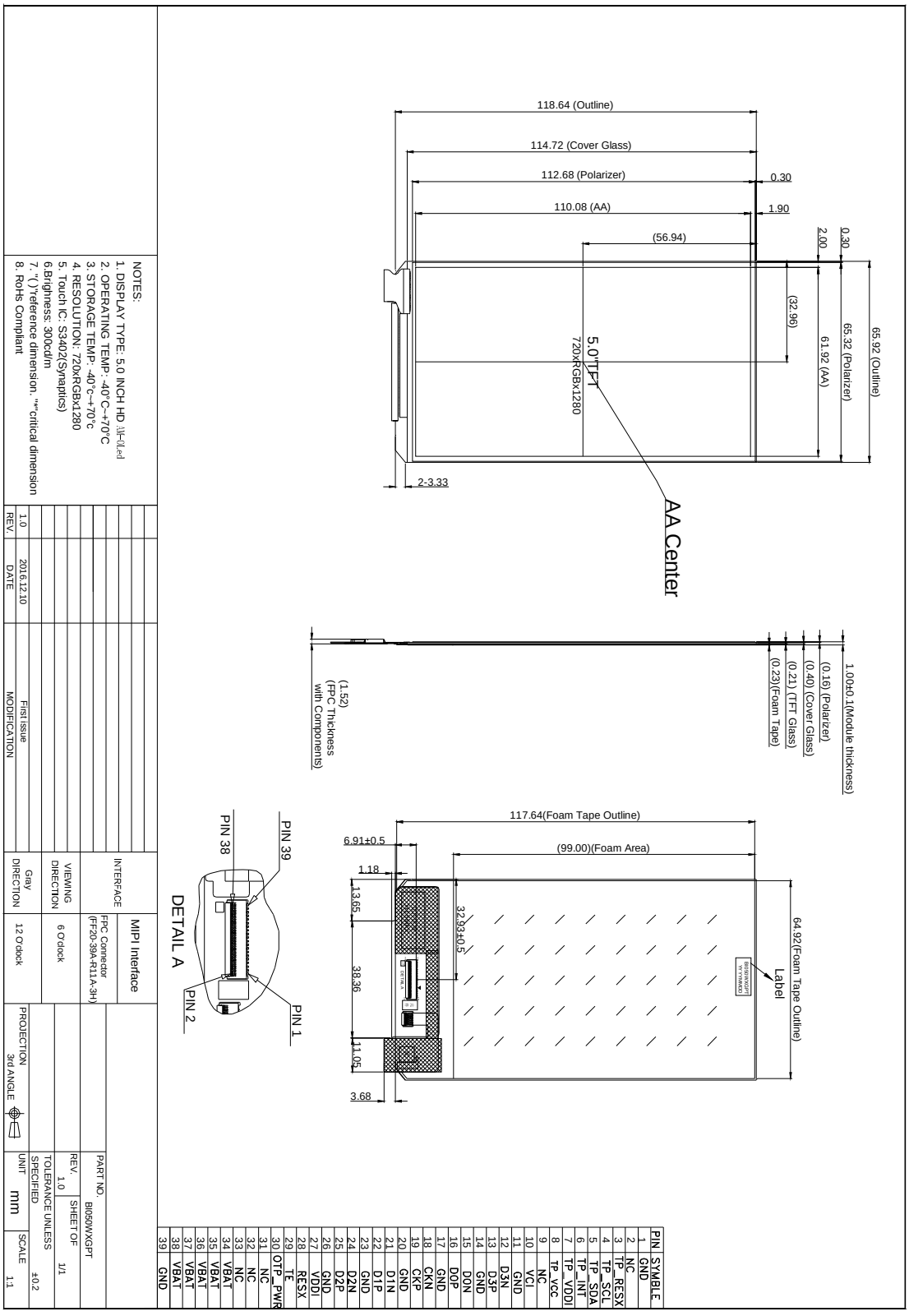


8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -40℃, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +70℃, 120hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -40℃, 120hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max,120 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-20℃ 30 min ~ +60℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. Ts is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.
3. The size of sample is 5pcs.

9. Mechanical Drawing



PIN	SYMBLE
1	GND
2	NC
3	TP_RESX
4	TP_SCL
5	TP_SDA
6	TP_INT
7	TP_VDDI
8	TP_VCC
9	NC
10	VCI
11	GND
12	D3N
13	D3P
14	GND
15	D0N
16	D0P
17	GND
18	CKN
19	CKP
20	GND
21	D1N
22	D1P
23	GND
24	D2N
25	D2P
26	GND
27	VDDI
28	RESX
29	TE
30	OTP_PWR
31	NC
32	NC
33	NC
34	VBAT
35	VBAT
36	VBAT
37	VBAT
38	VBAT
39	GND

NOTES:
1. DISPLAY TYPE: 5.0 INCH HD Δk-OLed
2. OPERATING TEMP: -40°C~+70°C
3. STORAGE TEMP: -40°c~+70°c
4. RESOLUTION: 720xRGBx1280
5. Touch IC: S3402(Synaptics)
6.Brightness: 300cd/m
7. "()"reference dimension. "*"critical dimension
8. RoHs Compliant

REV.	DATE	MODIFICATION
1.0	2016.12.10	First issue

INTERFACE	MIPI Interface
	FPC Connector (FH20-39A-R11A-3H)
VIEWING DIRECTION	6 O'clock
Gray DIRECTION	12 O'clock

PROJECTION 3rd ANGLE

PART NO.	BI050WXGPT
REV.	1.0
SHEET OF	1/1
TOLERANCE UNLESS SPECIFIED	±0.2
UNIT	mm
SCALE	1:1

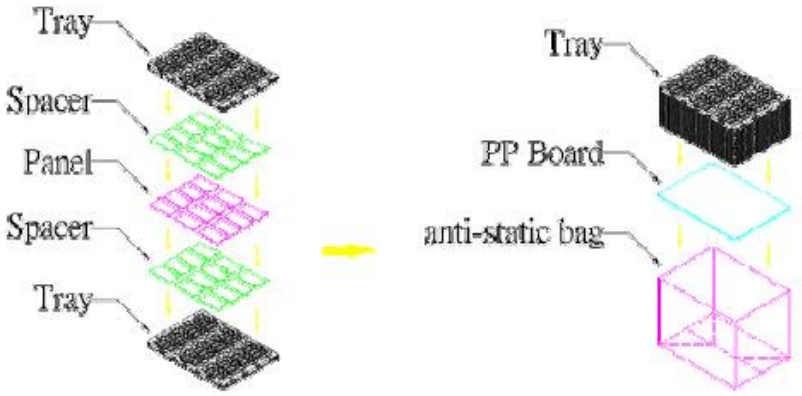
10. Packing

Packing Method

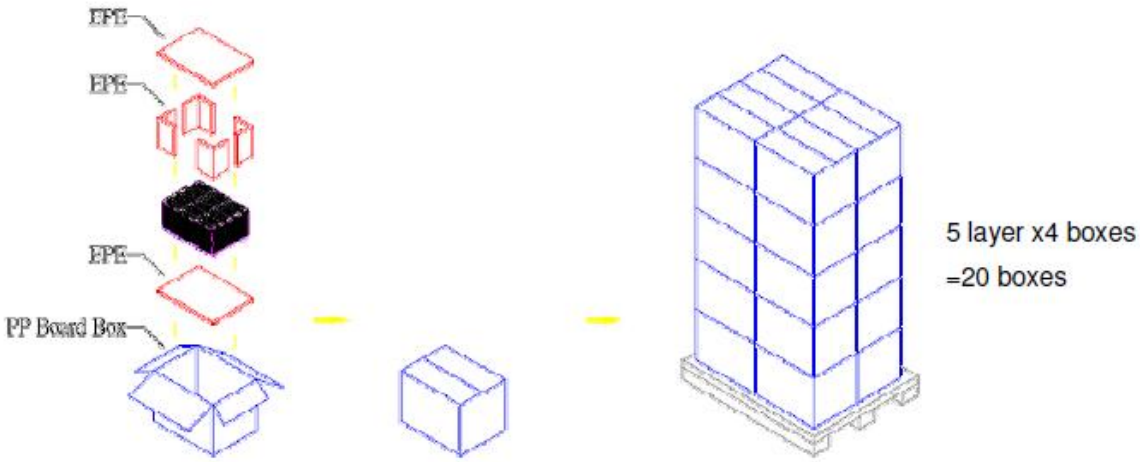
紙箱尺寸:546mm x 406mm x 278mm

棧板尺寸:1150mmx840mmx132mm

1set for 20 tray (8pcs) +1 tray(空) =160pcs module



(1tray 8 OLED, 2 spacer)



11. TFT-LCD Module Inspection Criteria

11.1 Scope

The incoming inspection standards shall be applied to TFT －LCD Modules (hereinafter Called "Modules") that supplied by factory.

11.2 Incoming Inspection

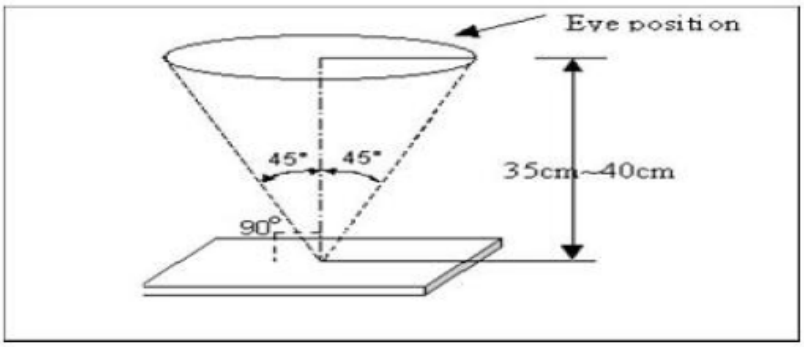
The customer shall inspect the modules within twenty calendar days of the delivery date（the “inspection period）at its own cost. The result of the inspection（acceptance or rejection）shall be recorded in writing, and a copy of this writing will be promptly sent to The seller, If the results of the inspecting from buyer does not send to the seller within twenty Calendar days of the delivery date. The modules shall be regards as acceptance. Should the customer fail to notify the seller within the inspection period, the buyers Right to reject the modules shall be lapsed and the modules shall be deemed to have Been accepted by the buyer

11.3 Inspection Sampling

3.1. Lot size: Quantity per shipment lot per model
3.2. Sampling type: Normal inspection, Single sampling
3.3. Inspection level: II
3.4. Sampling table: MIL-STD-105E
3.5. Acceptable quality level （AQL ）
Major defect: AQL=0.65 Minor defect: AQL=1.00

11.4 Inspection Conditions

4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) ％RH
c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
4.2 Viewing distance
The distance between the LCD and the inspector’s eyes shall be at least 35±5 ㎝.
4.3 Viewing Angle
U/D: 45 ° /45°, L/R: 45° /45°



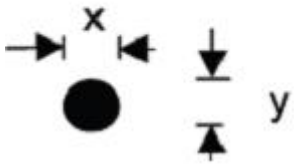
11.5 Inspection Criteria

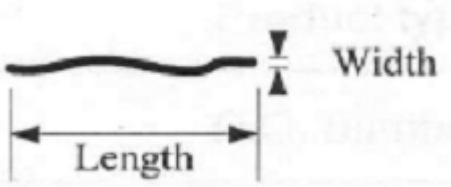
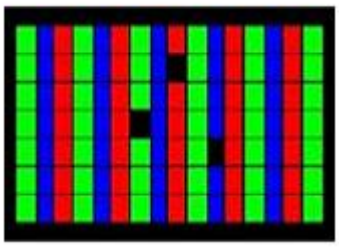
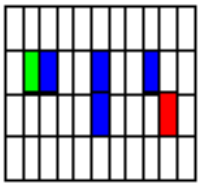
Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

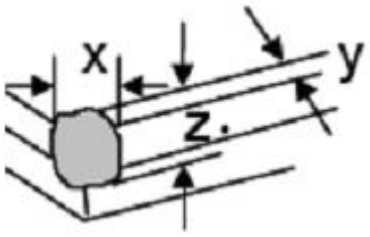
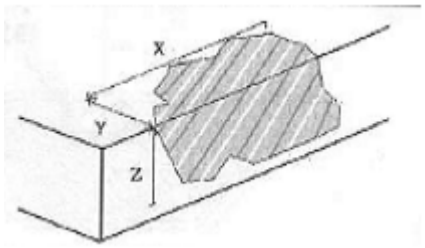
11.5.1 Major defect

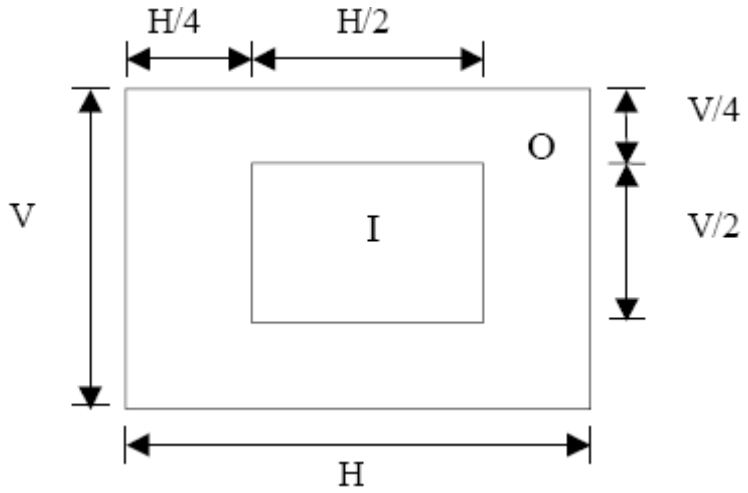
Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
`5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

11.5.2 Minor defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th colspan="2">Inspection standard</th></tr>
<tr><td rowspan="5">5.2.1</td><td rowspan="5">Spot Defect
Including Black spot White spot
Pinhole Foreign particle
Polarizer dirt</td><td colspan="2">For dark/white spot is defined
$\varphi = (x+y) / 2$
 
</td></tr>
<tr><td>Size φ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.2</td><td>Ignore</td></tr>
<tr><td>0.2 < ϕ≤0.5</td><td>3</td></tr>
<tr><td>0.5 < ϕ</td><td>Not allowed</td></tr>
</table>

<table>
<tr><td rowspan="4">5.2.2</td><td rowspan="4">Line Defect
Including Black line
White line Scratch</td><td colspan="2">Define:
 
</td></tr>
<tr><td>Width(mm)
Length(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>W≤0.05</td><td>Ignore</td></tr>
<tr><td>0.05 ＜W≤0.1
L≤2.5</td><td>3</td></tr>
<tr><td>0.1＜W，or L>2.5</td><td>Not allowed</td></tr>
<tr><td rowspan="6">5.2.3</td><td rowspan="6">Polarizer
Dent/Bubble</td><td>Sizeφ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>ϕ≤0.2</td><td>Ignore</td></tr>
<tr><td>0.2 ＜ ϕ≤0.3</td><td>2</td></tr>
<tr><td>0.3 ＜ ϕ≤0.5</td><td>1</td></tr>
<tr><td>0.5＜ϕ</td><td>Not allowed</td></tr>
<tr><td>Total QTY</td><td>3</td></tr>
<tr><td rowspan="6">5.2.4</td><td rowspan="6">Electrical Dot
Defect</td><td colspan="2">Bright and Black dot define:
 
and


Two Adjacent Dot</td></tr>
<tr><td colspan="2">Inspection pattern: Full white、Full black、Red、green and blue screens</td></tr>
<tr><td rowspan="2">Item</td><td colspan="2">Acceptable Quantity</td></tr>
<tr><td>I</td><td>O</td><td>Note</td></tr>
<tr><td>Black dot defect</td><td colspan="2">2</td><td rowspan="2">ϕ≤0.15
(5mm≤Distance)</td></tr>
<tr><td>Bright dot defect</td><td colspan="2">1</td></tr>
<tr><td>Total Dot</td><td colspan="2">1</td><td></td></tr>
</table>

<table>
<tr><td rowspan="4">5.2.5</td><td rowspan="4">Glass defect</td><td colspan="2">1.Corner Fragment:
 
</td></tr>
<tr><td>Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>X≤3mm
Y≤1mm
Z≤T</td><td>Ignore
T： Glass thickness
X: Length
Y: Width
Z: thickness</td></tr>
<tr><td colspan="2">2. Side Fragment:
 
</td></tr>
<tr><td>Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>X≤5.0mm
Y ≤1mm
Z≤T</td><td>T： Glass thickness
X: Length
Y: Width
Z: thickness</td></tr>
</table>



I area & O area

Note: 1). Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.

2). The distance between two bright dot defects (red, green, blue, and white) should be larger than 15mm.

3). The distance between black dot defects or black and bright dot defects should be more than 5mm apart.

4). Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.

11.6 Mechanics specification

As for the outside dimension, weight of the modules, please refer to product specification For more details

12. Precautions for Use of LCD modules

12.1 Handling Precautions

12.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

12.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

12.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

12.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

12.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketene
- Aromatic solvents

12.1.6. Do not attempt to disassemble the LCD Module.

12.1.7. If the logic circuit power is off, do not apply the input signals.

12.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

12.1.8.1. Be sure to ground the body when handling the LCD Modules.

12.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

12.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

12.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

12.2 Storage Precautions

12.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

12.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

12.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

12.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.