CUSTOMER APPROVAL SHEET

Company Name	**E-Ray**
MODEL	**H497TLB01.4**
CUSTOMER APPROVED	**Title :** **Name :**

- ☐ **APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver.____)**
- ☐ **APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver.____)**
- ☐ **APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver.____)**
- ☐ **CUSTOMER REMARK :**

Doc. version :	1.8
Total pages :	28
Date :	2015/07/21

Product Specification

5.0" Color AMOLED w/t On-Cell Touch Module

MODEL NAME: H497TLB01.4

AUO Product P/N: 95.04H60.400

< ◆ >Preliminary Specification
< >Final Specification

Note: The content of this specification is subject to change.

Record of Revision

Version	Revise Date	Page	Content
0.0	Aug. 23, 2013		First Draft
0.1	Aug. 28, 2013		Add EE setting
0.2	Oct. 16, 2013		Spec. modified.
0.3	Nov. 6, 2013	15,16,18,21	Change Power on sequence and Power off sequence.
0.4	Nov. 28, 2013	18 ~ 21	Change Initial code.
0.5	Dec. 13, 2013	18 ~ 21	Add VESA standard / Change power consumption & initial code/ Module
0.6	Jan. 08, 2014	6	Revised pin 27 MIPI DSI data3+, pin 28 MIPI DSI data3-
0.7	Apr, 02, 2014	21	Add description on Display Timing
0.8	Nov. 06, 2014	4	Add VIDEO mode on Driver IC remark
0.8	Nov. 06, 2014	28	Add Precaution
0.9	Dec. 30, 2014	8	Update white pattern current & max current
1.0	Jan. 09, 2015	4	Touch IC supports wakeup gesture (double click and swipe)
		22	Revised optical Spec: color temperature
		27	Revised reliability test condition
1.1	Jan. 14, 2015	5~7	Add TP Spec
1.2	Jan. 23, 2015	5	Add TP discription.
		20	Modified initial code
		34~35	Glass thickness tolerance
1.3	Mar.09, 2015		Modified format, add uniformity Spec.
1.4	Mar.12, 2015	20	Add color temperature.
1.5	Mar.19, 2015	5	Modified connector model name
1.6	May. 08, 2015	27, 28	Add Main FPC silver ink, alignment mark, and EMI tape.
1.7	May. 19, 2015	4	Add description of NC
		20	Modifed viewing angle CR, cross talk description
	May. 28, 2015	6	Modified Pin assignment: OVDD Detect
	May.29. 2015	15	Add more discription of power-on sequence
1.8	Jul., 21, 2015	20~22	Add Touch Panel IIC address
		6	Modified Pin assignment (Pin 32)
		17	Modified initial code
		30~31	Drawing: modifed EMI tape

Contents

A. General Specification

1. AMOELD Panel Physical Specifications

No.	Item	Spec.	Remark
1	Screen Size (inch)	4.97”	
2	Display Resolution (dot)	720xRGBx1280	
3	Active Area (mm)	61.92 (H)×110.08(V)	
4	Pixel Configuration	Real R.G.B	
5	Display Color	16.7M	
6	Interface	MIPI DSI	VIDEO mode
7	Outline Dimension (mm)	65.92 (H) × 118.64(V) × 1.00(T)	AMOLED w/ on-cell touch function
8	Touch IC	S3402	Synaptics
9	Multi-Finger Touch	10	

2. FPC Pin Assignment

Recommended connector: 39pins ZIF connector P/N: FF20-39A-R11A-B-3H

#	Pin_name	I/O	Description
1	GND	Power	Ground
2	NC		No connection
3	TP_RESX	I	Touch panel reset
4	TP_SCL	I/O	Touch panel I2C clock
5	TP_SDA	I/O	Touch panel I2C data
6	TP_INT	I/O	Touch panel interrupt output
7	TP_VDDI	Power	Touch panel digital supply
8	TP_VCC	Power	Touch panel analog supply
9	NC		No connection
10	VCI	Power	Driver IC analog supply
11	GND	Power	Ground
12	D3N	I	MIPI DSI data3-
13	D3P	I	MIPI DSI data3+
14	GND	Power	Ground
15	D0N	I/O	MIPI DSI data0-
16	D0P	I/O	MIPI DSI data0+
17	GND	Power	Ground
18	CKN	I	MIPI DSI clock-
19	CKP	I	MIPI DSI clock+
20	GND	Power	Ground
21	D1N	I	MIPI DSI data0-
22	D1P	I	MIPI DSI data0+
23	GND	Power	Ground
24	D2N	I	MIPI DSI data2-
25	D2P	I	MIPI DSI data2+

26	GND	Power	Ground
27	VDDI	Power	Driver IC digital supply
28	RESX	I	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
29	TE	O	Sync signal from driver IC
30	OTP_PWR	Power	Driver IC R/W use only，system side must floating
31	NC		No connection
32	NC		No connection
33	NC		No connection
34	VBAT	Power	panel power supply
35	VBAT	Power	panel power supply
36	VBAT	Power	panel power supply
37	VBAT	Power	panel power supply
38	VBAT	Power	panel power supply
39	GND	Power	Ground

Note. I:Input pin; O: Output pin; P:Power pin; NC: No connection n; I/O: In-out pin

3. Absolute Maximum Ratings

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.

B. DC Characteristics

A. 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.

B. 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

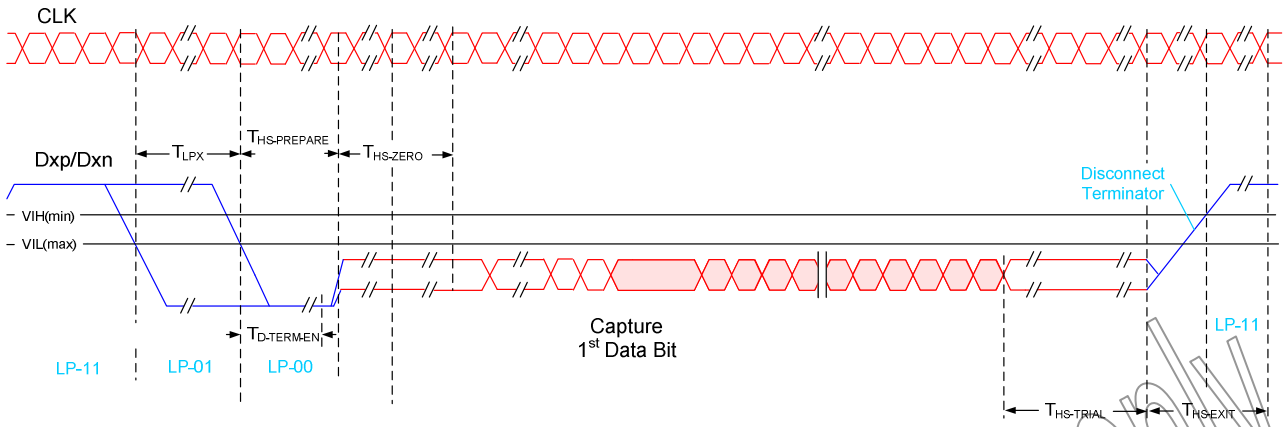
C. Touch Panel Current Consumption

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

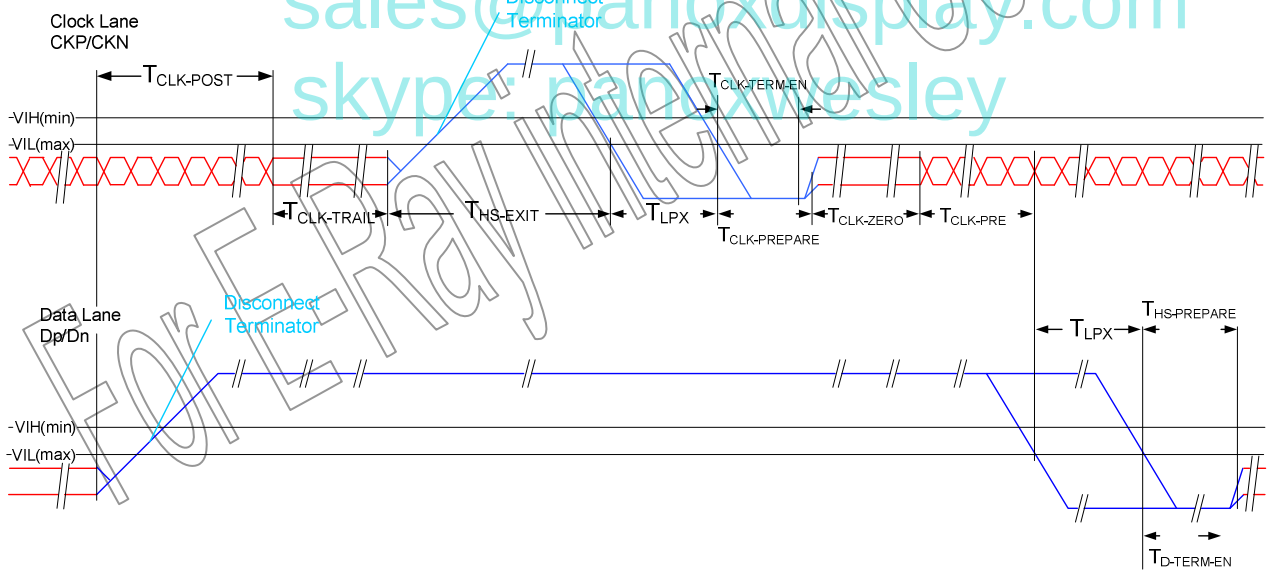
C. AC Characteristics

1. Display AC Characteristics

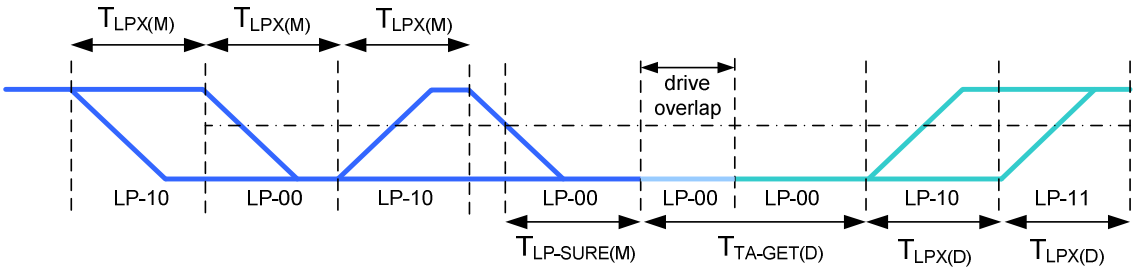
HS Data Transmission Burst



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