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LITEMAX

SSD0683-M

6.8” LED B/L LCD

User Manual

Approved by	Checked by	Prepared by

LITEMAX Electronics Inc.
8F, No.137, Lane 235, Bau-chiau Rd.,
Shin-dian Dist., New Taipei City, Taiwan
R.O.C.
Tel : 886-2-8919-1858
Fax: 886-2-8919-1300
Homepage: http://www.litemax.com

Record of Revision

Version and Date	Page	Old Description	New Description	Remark
May/15/2026	all		Initial release	

Contents

1 General Description

The SSD0683-M is a 6.8 inch color TFT-LCD display with special aspect ratio 6:16 and wide resolution 480 x 1280. It is Litemax's Spanpixel series product which designed for brightness 700 nits with power efficiency LED backlight.

1.1 Features

- Ultra-Wide Screen (6 : 16)
- High Resolution 480x1280
- Brightness 700 nits
- LED Backlight
- PCAP(Multi-Touch)
- Wide viewing angle
- Support Touchscreen
- Low Power Consumption

1.2 General Specifications

Model Name	SSD0683-M
Description	6.8" LCD, 700 nits LED backlight, 480x1280
Screen Size	6.8"
Display Area (mm)	60.22(H) x 160.59(V)
Brightness (Typical)	700 cd/m2
Resolution	480x1280
Aspect Ratio	6:16
Contrast Ratio (Typical)	800:1
Pixel Pitch (mm)	0.1263(H) x 0.1263(V)
Pixel Per Inch (PPI)	201
Viewing Angle	170°(H),170°(V)
Color Saturation (NTSC)	72%
Display Colors	16.7M
Response Time (Typical)	30ms
Panel Interface	MIPI
Touch Interface	USB
Input Interface	HDMI
Input Power	USB (DC 5V)
Power Consumption	3.8W
Dimensions (mm)	71(W) x 193.6(H) x 25.56(D)
Bezel Size(U/B/L/R)	12.35/12.35/5.41/5.41 mm
Weight (Net)	0.35kg
Operating Temperature	-20°C~70°C
Storage Temperature	-30°C~80°C

SSD= Panel + LED Driving Board + AD Control Board + Chassis + PCAP

1.3 Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Power Supply Voltage for LCM	VDD3.3V	-0.3	6.6	V	
Power Supply Voltage for LCM	VCC1.8V	-0.3	5.5	V	
Operating temperature	TOPR	-20	70	℃	
Storage temperature	TSTR	-30	80	℃	

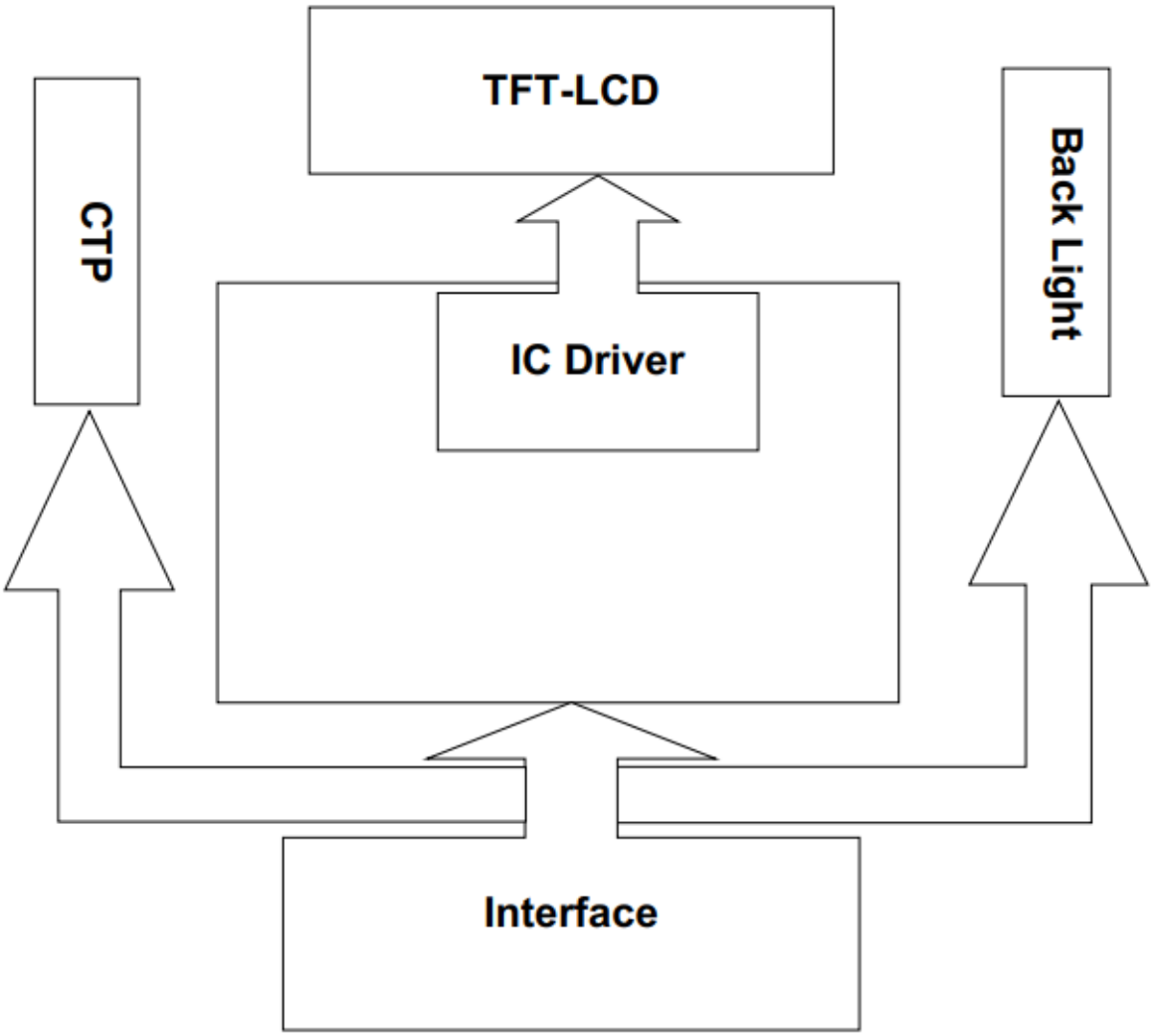
2 DC characteristics

2.1 Basic DC characteristic

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Power Supply Voltage for LCM		VDD3.3	2.7	3.3	3.3	V	---
		VCC1.8	1.65	1.8	3.3	V	---
Power Supply Current for LCM		IVDD3.3	---	70	---	mA	---
Input Voltage	L level	VIL	GND	---	0.3*VCC 1.8	V	---
	H level	VIH	0.7*VCC 1.8	---	VCC1.8	V	
Power Supply Voltage for CTP	USB	TP_VDD5V	4.8	5	5.2	V	---
	I2C	CTP_VDD3.3	3.14	3.3	3.46	V	---

3 Module Function Description

3.1 Block Diagram Of LCM



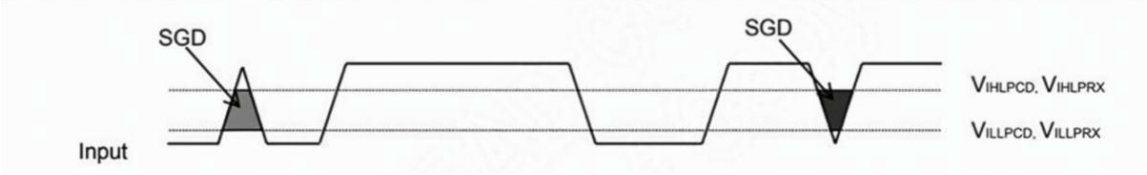
3.2 MIPI Pin Description

PIN NO.	Symbol	I/O	Description
1	TP_VCC5V	P	Power supply for CTP (USB interface)
2	TP_ twistpair-	I/O	USB Data-
3	TP_ twistpair+	I/O	USB Data+
4	TP_GND	P	Ground
5	GND	P	Ground
6	D3N	I	Negative MIPI differential data inputs
7	D3P	I	Positive MIPI differential data inputs
8	GND	P	Ground
9	D2N	I	Negative MIPI differential data inputs
10	D2P	I	Positive MIPI differential data inputs
11	GND	P	Ground
12	CKN	I	Negative MIPI differential clock inputs
13	CKP	I	Positive MIPI differential clock inputs
14	GND	P	Ground
15	D1N	I	Negative MIPI differential data inputs
16	D1P	I	Positive MIPI differential data inputs
17	GND	P	Ground
18	D0N	I/O	Negative MIPI differential data inputs
19	D0P	I/O	Positive MIPI differential data inputs
20	GND	P	Ground
21	GND	P	Ground
22	VCC1.8	P	LCM logic power supply.Vcc1.8=1.8V
23	VCC1.8	P	LCM logic power supply.Vcc1.8=1.8V
24	NC	-	No conncection
25	NC	-	No conncection
26	RSTB1.8	I	Touch reset pin. Active low to enter reset state
27	CTP_VDD3.3	P	Power supply for CTP (I2C interface)
28	GND	P	Ground
29	LEDA	P	LED Anode
30	LEDA	P	LED Anode
31	CTP_RST	I	Global reset pin. Active low to enter reset state
32	CTP_INT	O	Interrupt Pin
33	CTP_SDA	I/O	CTP I2C Data
34	CTP_SCL	I	CTP I2C Clock
35	LEDK	P	LED Cathode
36	LEDK	P	LED Cathode
37	GND	P	Ground
38	VDD3.3	P	LCM Anolog power supply.VDD3.3=3.3V
39	VDD3.3	P	LCM Anolog power supply.VDD3.3=3.3V
40	NC	-	No conncection

3.3 DSI DC Characteristics

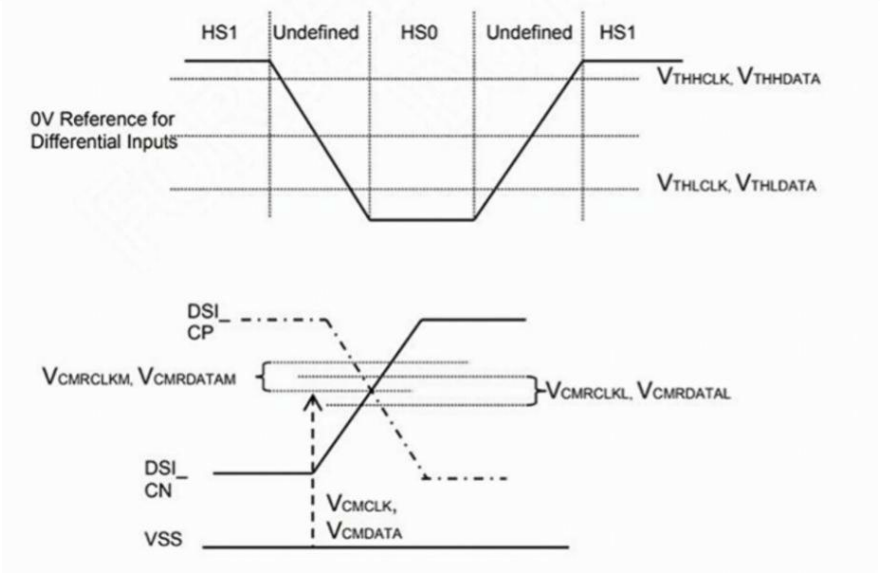
LP Mode

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
Logic high level input voltage	V_{IHLPCD}	LP-CD	450	-	1350	mV
Logic low level input voltage	V_{ILLPCD}	LP-CD	0	-	200	mV
Logic high level input voltage	V_{IHLPRX}	LP-RX(CLK, D0)	880	-	1350	mV
Logic low level input voltage	V_{ILLPRX}	LP-RX(CLK, D0)	0	-	550	mV
Logic low level input voltage	$V_{ILLPRXULP}$	LP-RX(CLK ULP mode)	0	-	300	mV
Logic high level output voltage	V_{OHLPTX}	LP-TX(D0)	1.1	-	1.3	V
Logic low level output voltage	V_{OLLPTX}	LP-TX(D0)	-50	-	50	mV
Logic high level input current	V_{IH}	LP-CD, LP-RX	-	-	10	uA
Logic low level input current	V_{IL}	LP-CD, LP-RX	-10	-	-	uA
Input pulse rejection	SGD	DSI-CLK+/-, DSI-D0+/1	-	-	300	Vps



High Speed Mode

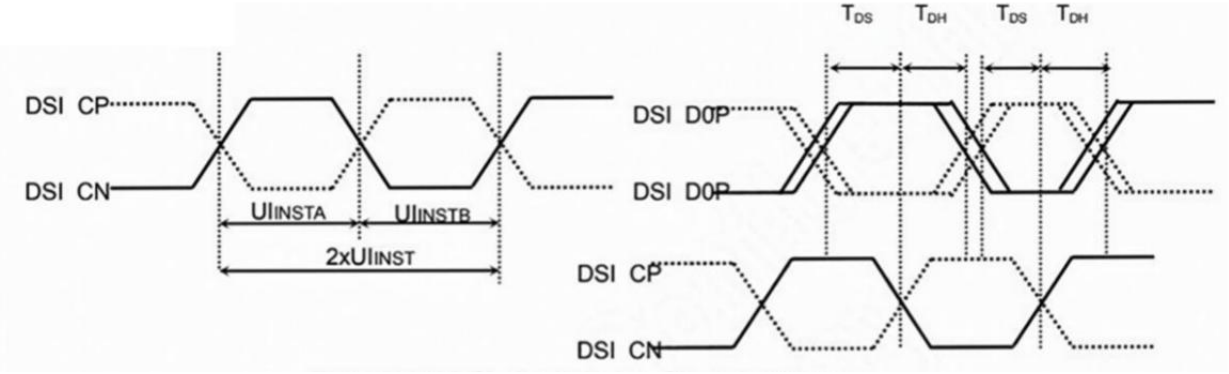
Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
Input common mode	V_{CMCLK} V_{CMDATA}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	70	-	330	mV
Input common mode variation <450 MHZ	$V_{CMRCLKL}$ $V_{CMRDATAL}$	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-50	-	50	mV
Input common mode variation >450 MHZ	$V_{CMRCLKM}$ $V_{CMRDATAM}$	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-	-	100	mV
Low-level differential Input threshold	V_{THLCLK} $V_{THLDATA}$	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-70	-	-	mV
High-level differential Input threshold	V_{THHCLK} $V_{THHDATA}$	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-	-	70	mV
Single ended input low voltage	V_{ILHS}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-40	-	-	mV
Single ended input high voltage	V_{IHHS}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-	-	460	mV
Differential input termination resistor	R_{TERM}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	80	100	125	Ω
Single-ended threshold voltage for termination enable	V_{TERMEN}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-	-	450	mV
Termination capacitor	C_{TERM}	DSI_CP/DSI_CN DSI_D0P/DSI_D0P	-	-	-	pF



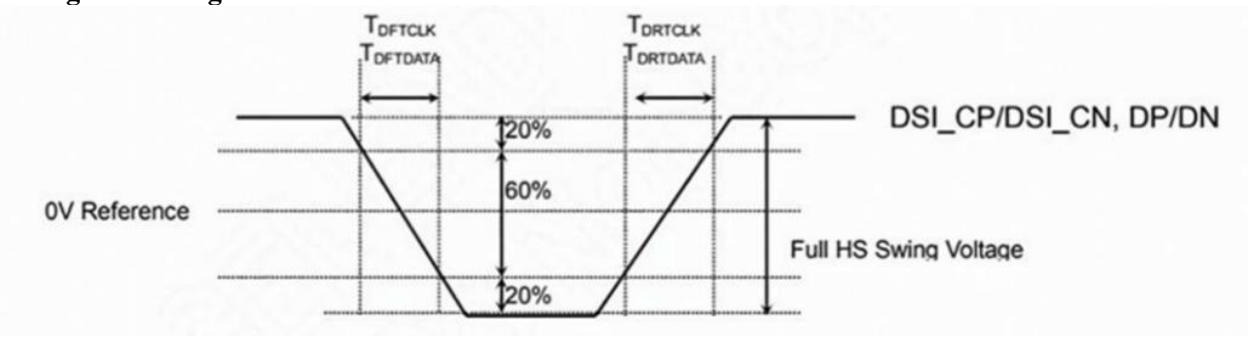
3.4 DSI AC Characteristics

High Speed Mode

DSI clock timing characteristics



Rising and falling time on clock and data channel

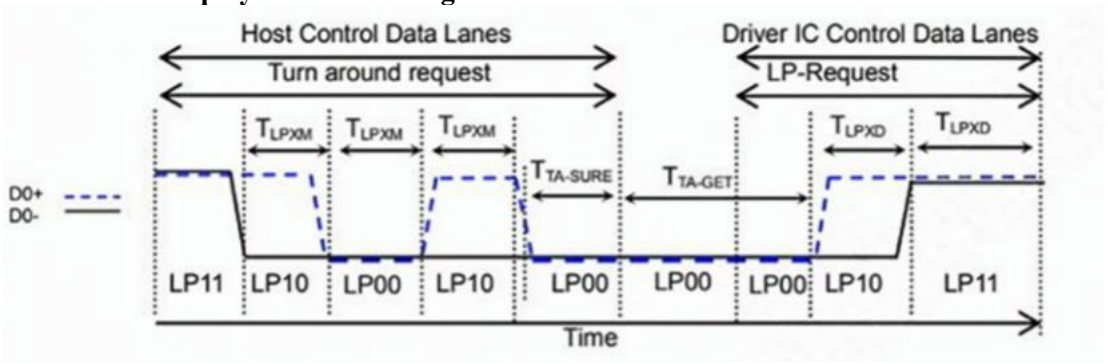


DSI High Speed Mode Characteristics

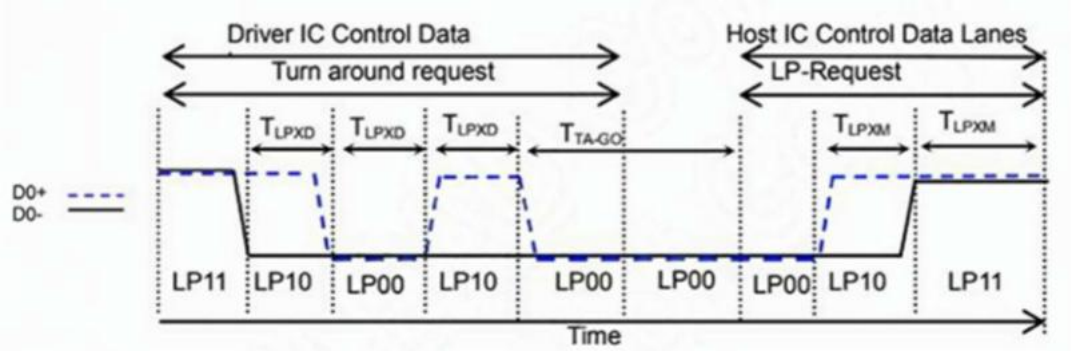
(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, T_A = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	2xUINST	4LANE：3.30 3LANE：2.85 @ VDDD=1.8V	-	25	ns
	UI instantaneous	UINSTA UINSTB	4LANE：1.67 3LANE：1.43 @ VDDD=1.8V	-	12.5	ns
DP/DN	Data to clock setup time	TDS	0.15xUI	-	-	ps
	Data to clock hold time	TDH	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	TDRTCLK	150	-	0.3UI	ps
	Differential fall time for clock	TDFTCLK	150	-	0.3UI	ps
DP/DN	Differential rise time for data	TDRTDATA	150	-	0.3UI	ps
	Differential fall time for data	TDFTDATA	150	-	0.3UI	ps

BTA from Host to Display Module Timing



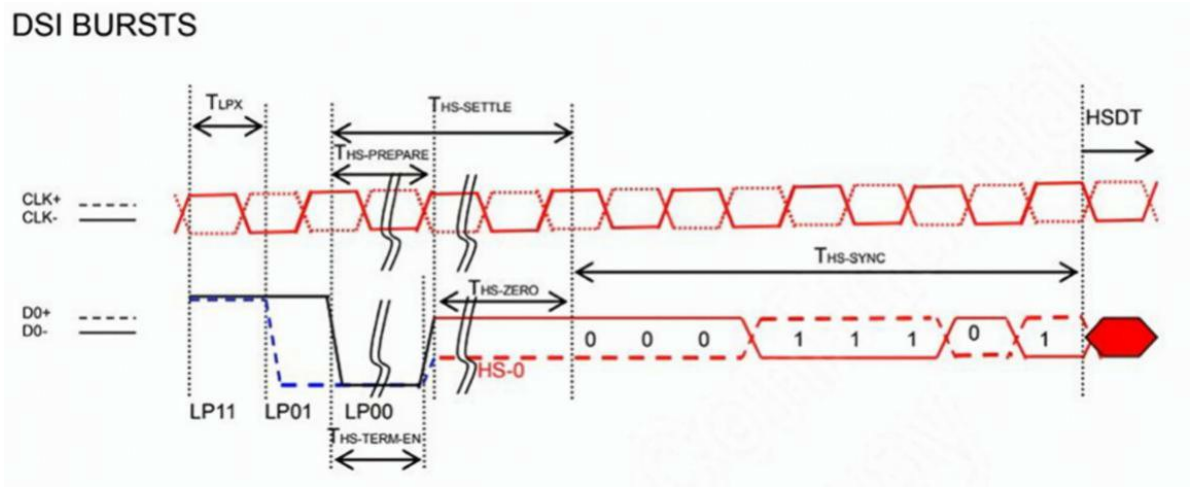
BTA from Display Module to Host



DSI Low Power Mode Characteristics

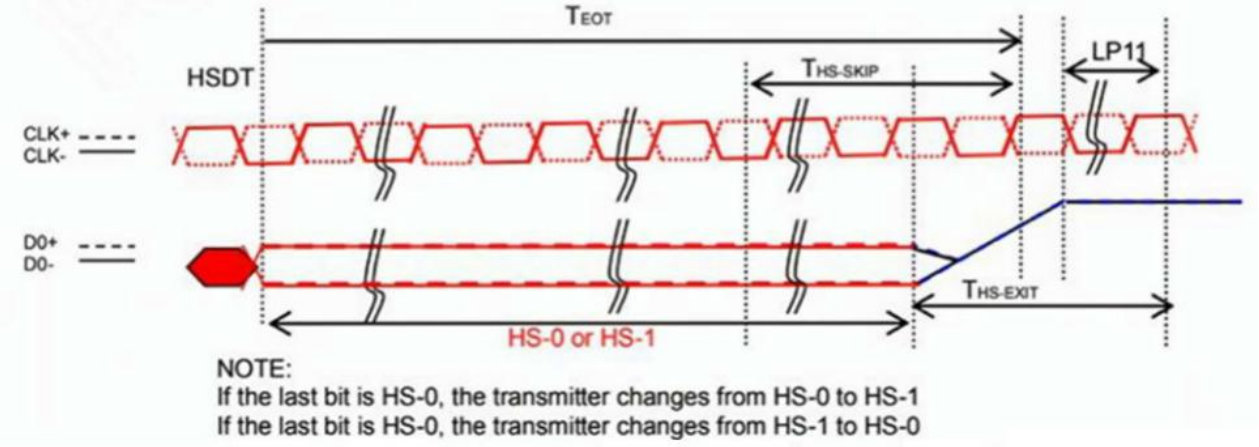
(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, T_A = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host→ Display module	T_{LPXM}	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module →Host	T_{LPXD}	50	-	-	ns
	Time-out before the MPU start driver	$T_{TA-SURE}$	T_{LPXD}	-	2xT_{LPXD}	ns
	Time to drive LP-00 by display module	T_{TA-GET}	5xT_{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	4xT_{LPXD}	-	-	ns



DSI Low Power Mode to High Speed Mode Timing

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11	T_{LPX}	50	-	-	ns
	Time to Driver LP-00 to prepare for HS transmission	$T_{HS-PREPARE}$	40+4UI	-	85+6UI	ns
	Time to enable data receiver line termination	$T_{HS-TERM-EN}$	-	-	35+4xUI	ns
	Time to drive LP-00 by display module	T_{TA-GET}	5xT_{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	4xT_{LPXD}	-	-	ns



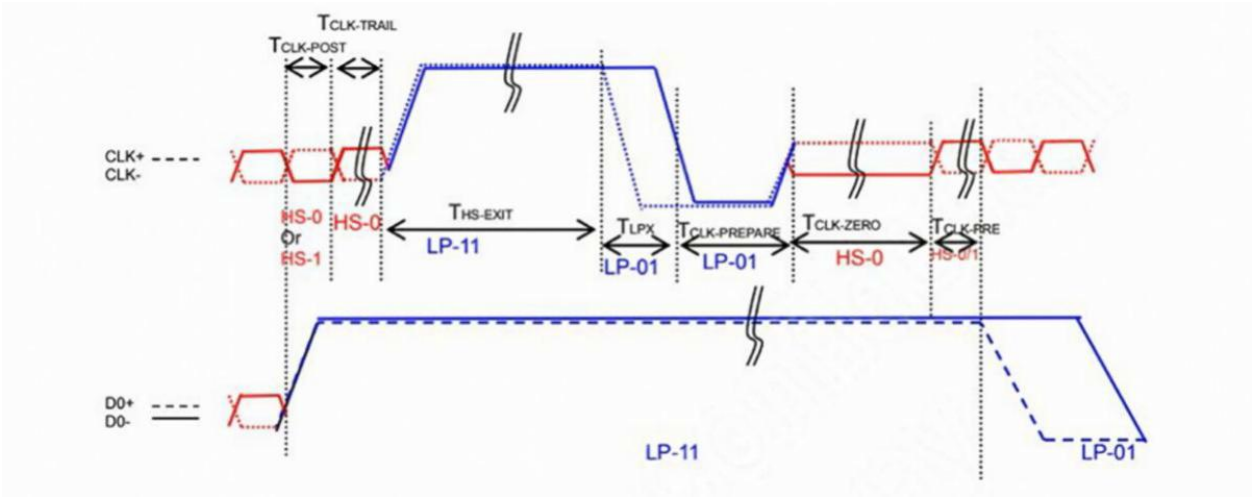
NOTE:
If the last bit is HS-0, the transmitter changes from HS-0 to HS-1
If the last bit is HS-0, the transmitter changes from HS-1 to HS-0

DSI Low Power Mode to High Speed Mode Timing

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Time-Out at Display Module to Ignore Transition Period of EoT	$T_{HS-SKIP}$	40	-	55+4xUI	ns
	Time to Driver LP-11 after HS Burst	$T_{HS-EXIT}$	100	-	-	ns

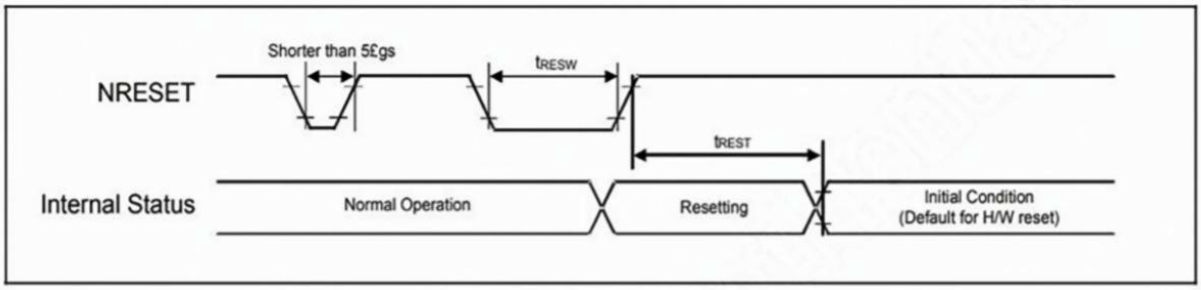
Clock Lanes High Speed Mode to/from Low Power Mode Timing

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60	-	-	ns
	Time to drive LP-11 after HS burst	$T_{HS-EXIT}$	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	$T_{CLK-PREPARE}$	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	$T_{CLK-TERM-EN}$	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	300	-	-	ns
	Time that the HS clock shall be driven prior to any associated data Lane beginning the transition from LP to HS mode	$T_{CLK-PRE}$	8xUI			



3.5 Reset Timing

Reset Input Timing



Reset Input Timing

Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width(1)	NRESET	10	-	-	-	µs
tREST	Reset complete time(2)	-	15	-	-	When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

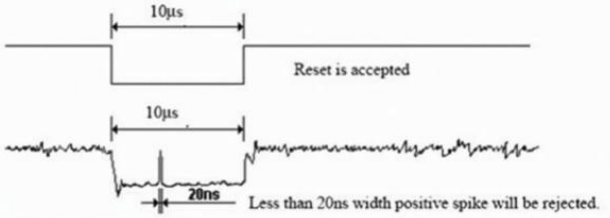
Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset according to the following table.

NRESET Pulse	Action
Shorter than 5 µs	Reset Rejected
Longer than 10 µs	Reset
Between 5 µs and 10 µs	Reset Start

(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.

(3) During Reset Complete Time, ID 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 15ms after a rising edge of NRESET.

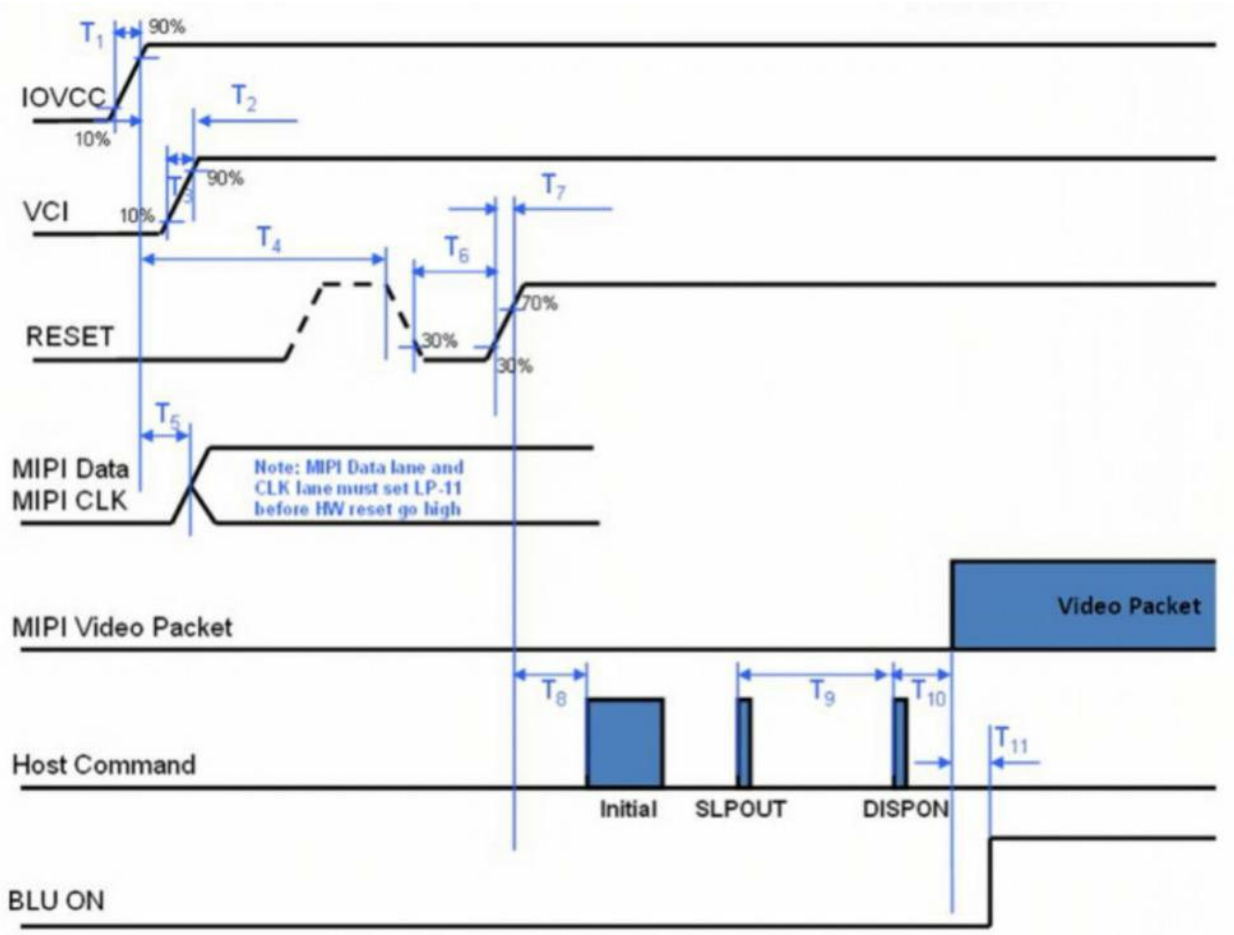
(4) Spike Rejection also applies during a valid reset pulse as shown as below:



(5) It is necessary to wait 15msec after releasing NRESET before sending commands. Also Sleep Out command cannot be sent for 120msec.

4 Power on/off sequence

4.1 Power on sequence

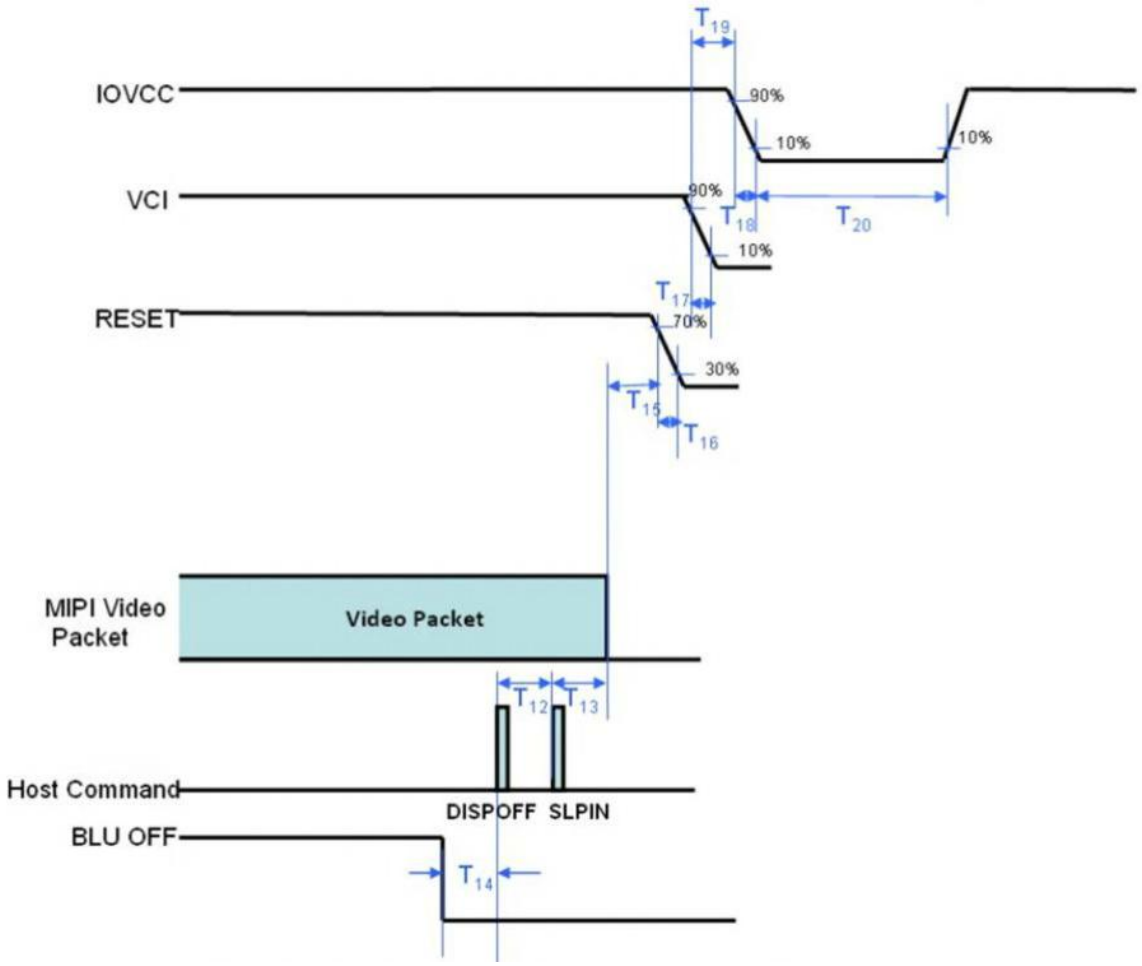


	Min.	Typ.	Max.	Unit
T1	0.01	-	10	ms
T2		No Limit		ms
T3	0.01	-	10	ms
T4	1	-	-	ms
T5	1	-	-	ms
T6	10	-	-	us
T7		No Limit		ns
T8	15	-	-	ms
T9	120	-	-	ms
T10		No Limit		ms
T11	100	150	-	ms

NOTE: 1.) IOVCC in the under fomat just is the VCC1.8 of the LCM interface

2.) VCI in the under fomat just is the VDD3.3 of the LCM interface

4.1 Power off sequence



	Min.	Typ.	Max.	Unit
T12	2	-	-	Frame
T13	2	-	-	Frame
T14	40	100	-	ms
T15	10	-	-	ms
T16	No Limit			ms
T17	No Limit			ms
T18	No Limit			ms
T19	No Limit			ms
T20	100			ms

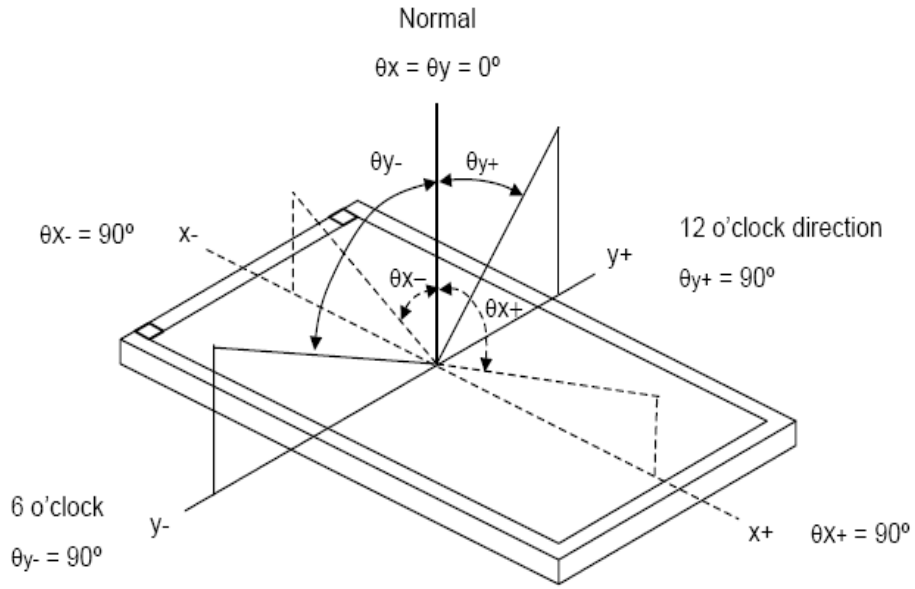
NOTE: 1.) IOVCC in the under fomat just is the VCC1.8 of the LCM interface
2.) VCI in the under fomat just is the VDD3.3 of the LCM interface

5 Optical Specification

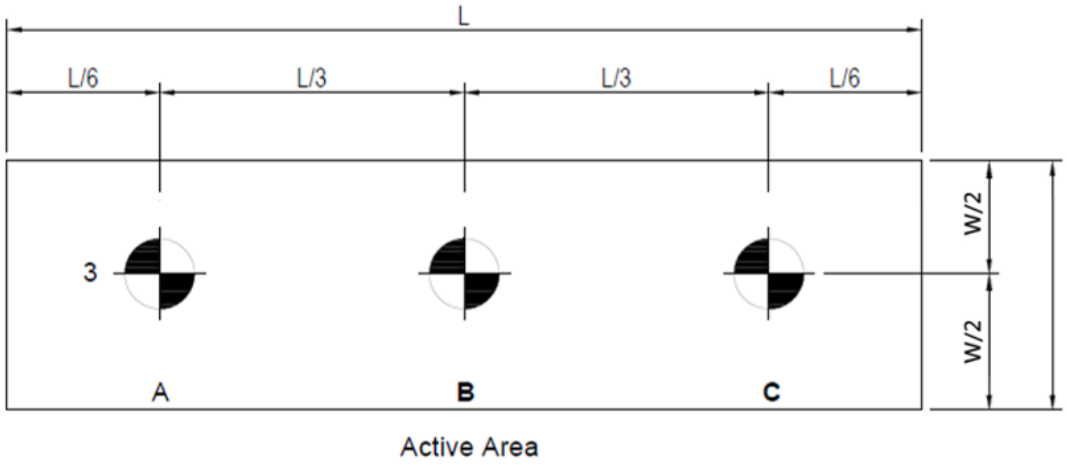
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.563	0.593	0.623	-	Test Mode: (2) (3)
		Ry		0.288	0.318	0.348	-	
	Green	Gx		0.274	0.304	0.334	-	
		Gy		0.532	0.562	0.592	-	
	Blue	Bx		0.121	0.151	0.181	-	
		By		0.043	0.073	0.103	-	
	White	Wx		0.229	0.259	0.289	-	
		Wy		0.234	0.264	0.294	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	630	700	910	cd/m^2	
Uniform		Lu			93		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	720:1	800:1	-	-	Test Mode: (4)
Color Saturation		NTSC			72		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		85		Deg	Test Mode: (1)
		θx-			85			
	Vertical	θy+			85			
		θy-			85			

Test Mode：

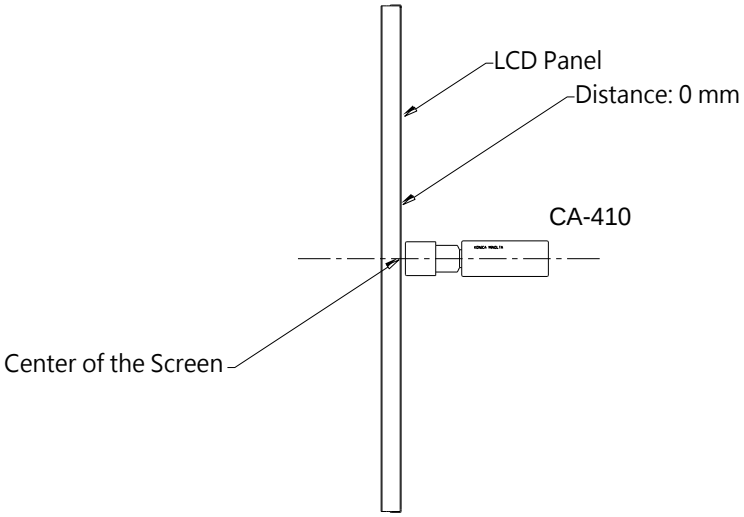
(1) Definition of Viewing Angle (θx , θy):



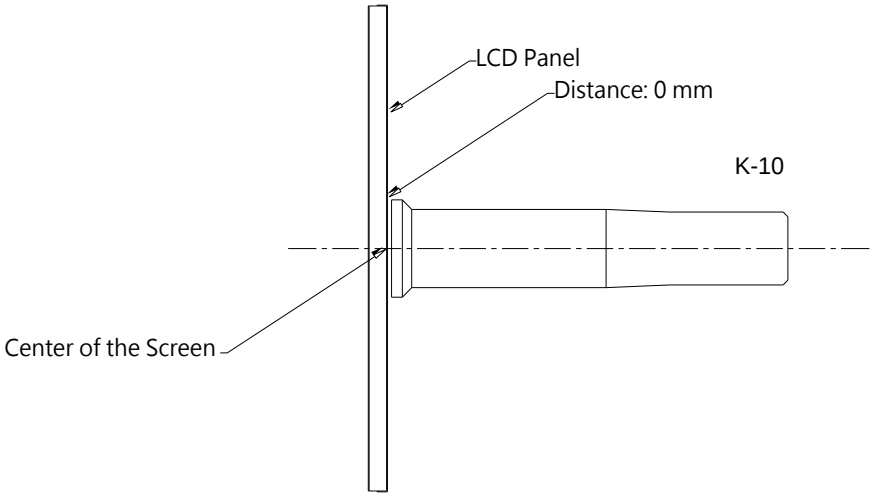
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:

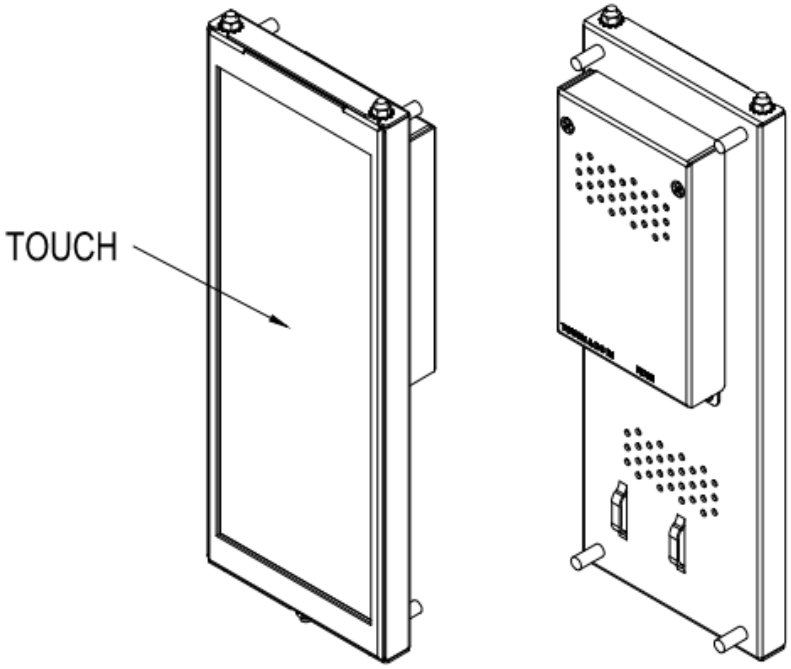


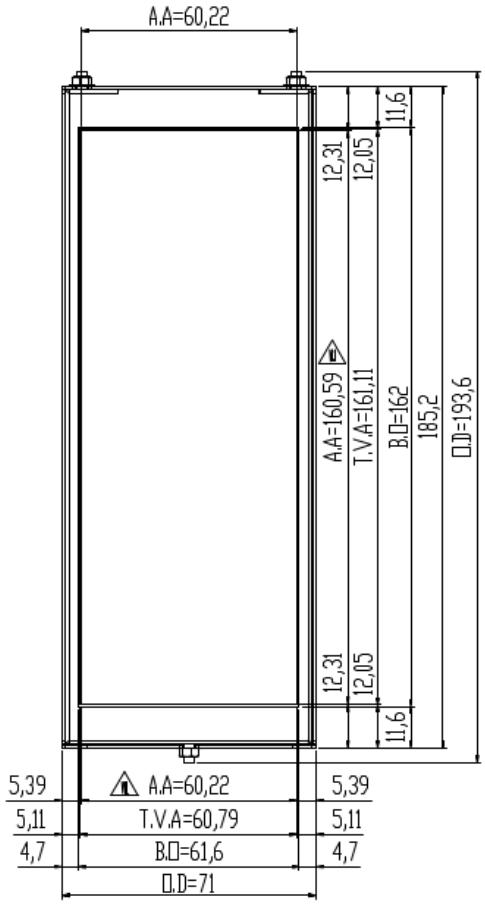
(4) Klein K-10 Measurement Setup:

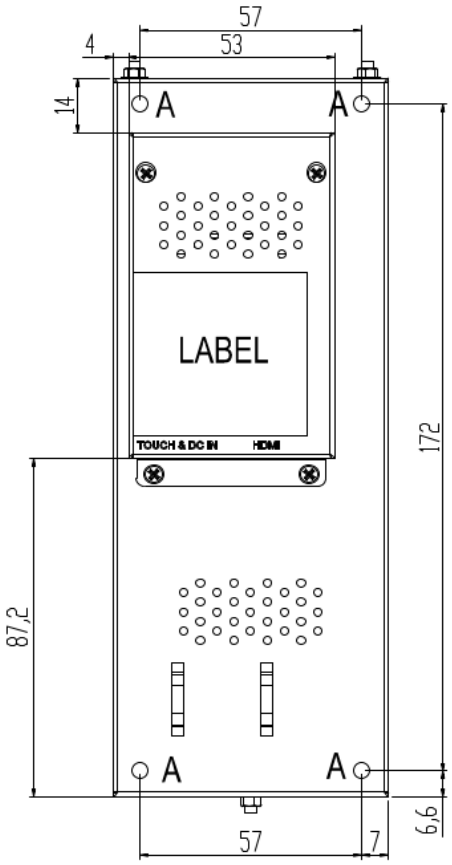


6 Mechanical Drawing

Outline Dimensions Unit: mm






57
53
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LABEL
TOUCH & DC IN
HDMI
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87,2
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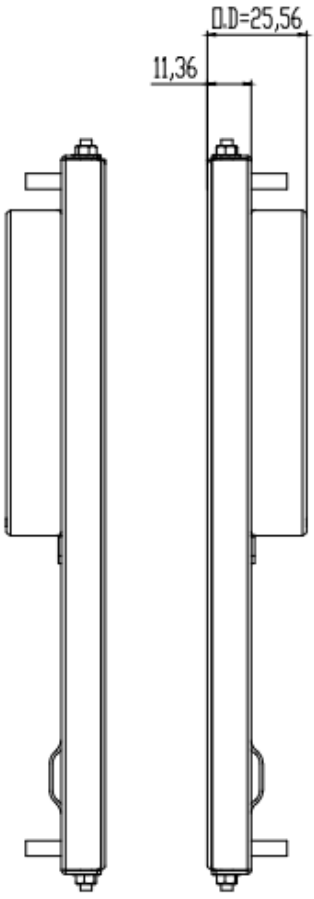
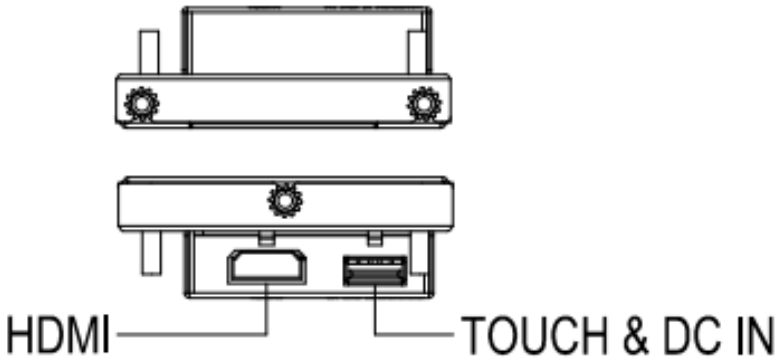
7


O.D=25,56
11,36



Note:
O.D : Outline Dimension
B.O : Bezel Opening
T.V.A : Touch View Area
A.A : LCD Active Area
A: 4-M4 FH L=9mm

7 AD6911H Board Functions

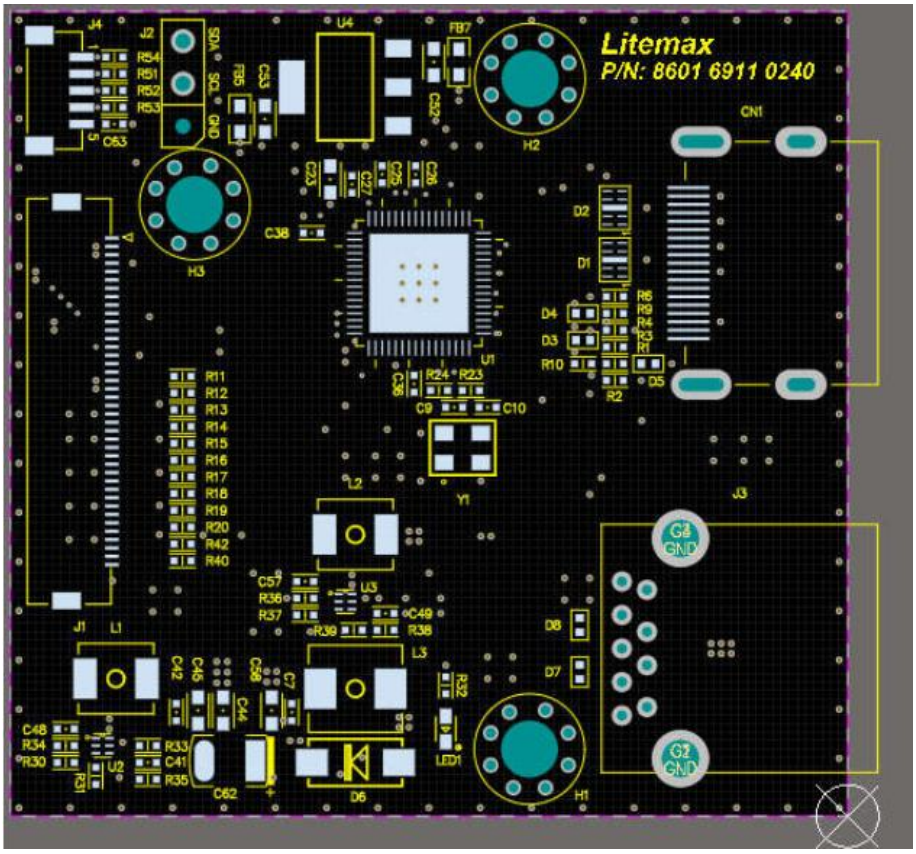
We developed this A/D board to support industrial high brightness and commercial applications. This is a HDMI to MIPI bridge board, include backlight driver.

Operating Characteristics

Input Voltage	5V
Input Current	0.75A (Max.)
Power Interface	USB 3.0
Video Interface	HDMI 1.4
Touch	USB 3.0 / I2C
Power Consumption	3.75W (Max.)
Backlight Output	12.5V / 0.15A

Mechanical Characteristics

Dimension: 50 x 48mm



Connector and Pin Define

I/O : J3 (Standard USB 3.0 - A type)

PIN No	Symbol	Description
1	VBUS	System Power 5V
2	D-	USB 2.0 for Touch
3	D+	USB 2.0 for Touch
4	GND	Ground
5	NC	--
6	NC	--
7	GND	Ground
8	NC	--
9	NC	--

Connector : J4 (JST BM05B-SRSS or Compatible)

PIN NO	Symbol	Description
1	SCL	I2C for Touch
2	SDA	I2C for Touch
3	INT	Interrupt
4	RST	Reset
5	GND	Ground

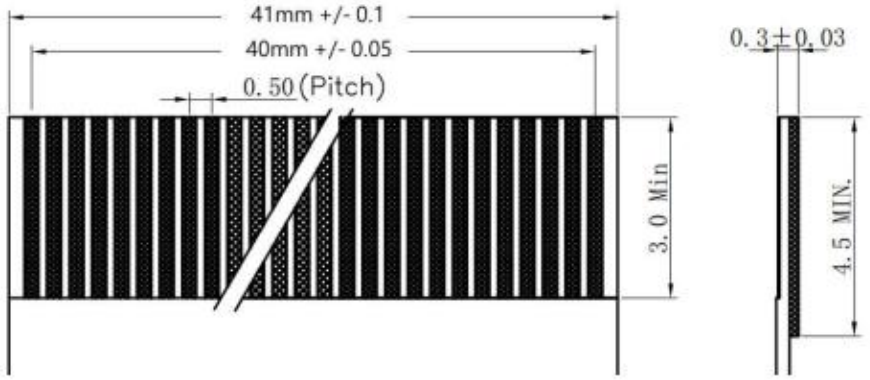
I/O : CN1 (Standard HDMI A Type)

Pin	Function	Pin	Function	Pin	Function
1	TMDS Data2+	9	TMDS Data0-	17	GND
2	Shield	10	TMDS Clock+	18	HDMI +5V
3	TMDS Data2-	11	Shield	19	HPD
4	TMDS Data1+	12	TMDS Clock-		
5	Shield	13	CEC		
6	TMDS Data1-	14	NC		
7	TMDS Data0+	15	HDMI_SCL		
8	Shield	16	HDMI_SDA		

Connector : J1 (0.5mm FFC)

Pin	Function	Pin	Function	Pin	Function
1	NC	15	1.8V	29	CLKN
2	3.3V	16	NC	30	GND
3	3.3V	17	NC	31	D2P
4	GND	18	1.8V	32	D2N
5	LEDK	19	1.8V	33	GND
6	LEDK	20	GND	34	D3P
7	SCL	21	GND	35	D3N
8	SDA	22	D0P	36	GND
9	INT	23	D0N	37	GND
10	RST	24	GND	38	D+
11	LEDA	25	D1P	39	D-
12	LEDA	26	D1N	40	5V
13	GND	27	GND		
14	3.3V	28	CLKP		

FFC Detail :



8 Precautions

8.1 Handling and Mounting Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.
(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.
(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.
(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(12) Do not disassemble the module.
(13) Do not pull or fold the lamp wire.
(14) Pins of I/F connector should not be touched directly with bare hands.

8.2 Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.
(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

8.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the LCD module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
(3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
(7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
(8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
(9) Do not display the fixed pattern for a long time because it may cause image sticking.
(10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
(11) Black image or moving image is strongly recommended as a screen save.
(12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
(13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
(14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
(15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
(16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

9 Disclaimer

All information in this document are subject to change, please constant LiteMax for any new design.