SPECIFICATION
FOR
APPROVAL

(   ) **Preliminary Specification**

(◆) **Final Specification**

Title	10.1" HD TFT LCD

Customer	Acer
MODEL	WT3

SUPPLIER	LG Display Co., Ltd.
*MODEL	LP101WH4
Suffix	SLAA

*When you obtain standard approval,
please use the above model name without suffix

APPROVED BY	SIGNATURE
/	
/	
/	

Please return 1 copy for your confirmation with your signature and comments.

APPROVED BY	SIGNATURE
Mighty Paeng / S.Manager	
REVIEWED BY	
M. H. Kim / Manager	
PREPARED BY	
W.J. Jeon/ Enginer	

**Product Engineering Dept.
LG Display Co., Ltd**

Contents

RECORD OF REVISIONS

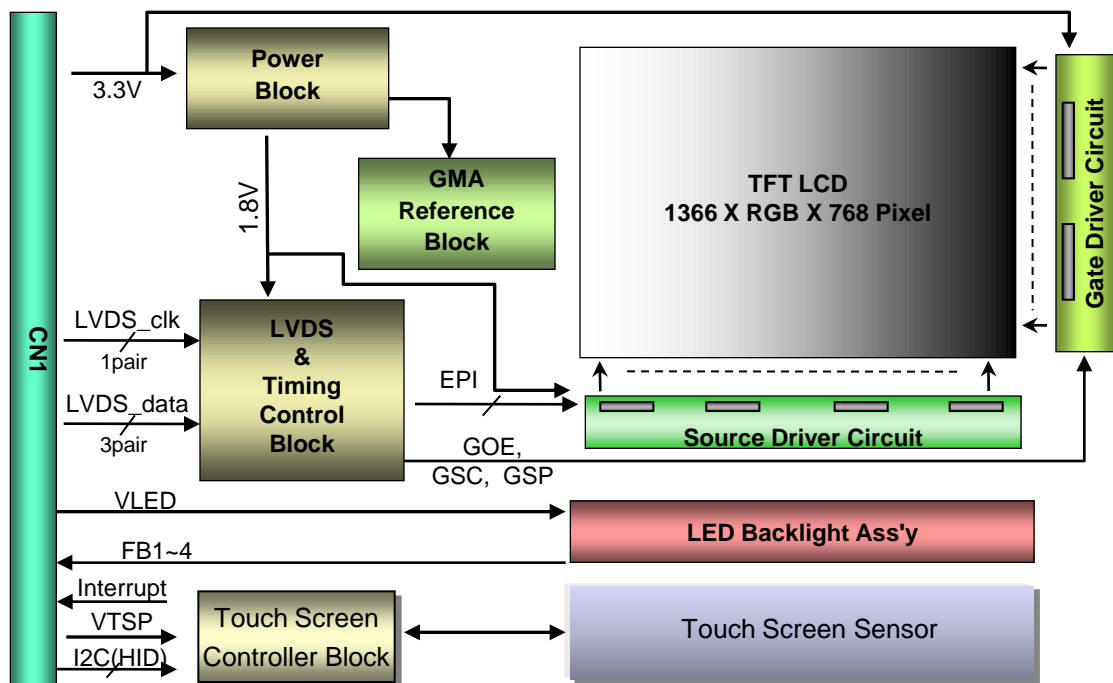| Revision No	Revision Date	Page	Description	EDID ver
0.0	2012. 08. 08		First Draft	V0.0
0.1	2012. 08. 13	15	Touch Power Sequence Update	V0.0
		20,21	2D Drawing Update	
1.0	2012.09.13		Final CAS	
1.1	2012.12.05	20,21	2D Drawing Update	

1. General Description

 The LP101WH4 is a Color Active Matrix Liquid Crystal Display with an integral LED backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally Black mode. This TFT-LCD has 10.1inches diagonally measured active display area with HD resolution(1366 horizontal by 768 vertical pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot, thus, presenting a palette of more than 16,777,216 colors.

 The LP101WH4 has been designed to apply the interface method that enables low power, high speed, low EMI.

 The LP101WH4 is intended to support applications where thin thickness, low power are critical factors and graphic displays are important. In combination with the vertical arrangement of the sub-pixels, the LP101WH4 characteristics provide an excellent flat display

LP101WH4 is the 'Total solution' model. It means it includes LCM & TSP
(TSP is assembled by a 'Direct Bonding' method)

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General Features

LCM

Active Screen Size	10.1 inches diagonal	
Outline Dimension	LCM	232.8$\pm$0.3 (H) × 138.15$\pm$0.3 (V) × 2.40 mm (max.)
Pixel Pitch	0.05430 mm × 0.16290 mm	
Pixel Format	1366 horiz. by 768 vert. Pixels RGB strip arrangement	
Color Depth	8-bit, 1,6,777,216 colors	
Luminance, White	315 cd/m^2(Typ., @I_{LED}=15mA) (w/ Touch) 350 cd/m^2(Typ., @I_{LED}=15mA) (w/o Touch)	
Power Consumption	Logic	0.55 W(typ.@Mosaic)
	B/L	1.56 W (typ.@ I_{LED}= 15mA)
Weight	LCM	150g (max.)
Display Operating Mode	Transmissive mode, normally Black	
Surface Treatment	Glare, low reflective treatment of the front polarizer, 2H	

TSP

|		
Active Screen Size	10.1 inches diagonal	
TSP Outline Dimension	254.3$\pm$0.1 (H) × 158.0$\pm$0.1 (V) × 1.2 mm (max. with resin)	
Sensor Active area	227.52(H) × 130.11(V) mm	
Cover View Area	223.72(H) × 126.31(V) mm	
Sensor Chanel Pitch	4.34mm (X) x 5.48mm (Y), Flooded-X Pattern	
Number of Sensor Chanel	30ea(X) x 42ea(Y)	
Power Consumption	0.36W (typ. @ VTSP=5V, 1-finger)	
Weight	90g (max.)	
Display Operating Mode	Transmissive mode, normally Black	
Surface Treatment	AF Coating (8H)	
Substrate	type	Projected Capacitive Add-on Touch Sensor Film, GF2
	Input Method	Single & Multi Finger
Cover Glass	**Gorilla2 0.55t**	

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2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values		Units	Notes
		Min	Max		
LCM Power Input Voltage	VCC	-0.3	4.0	V_{DC}	at $25 \pm 5°C$
DDC Power Input Voltage	V_{EDID}	-0.3	6.5	V	
Touch Power Input Voltage	V_{TSP}	-0.3	5.5V	V_{DC}	at $25 \pm 5°C$
LVDS Input Voltage	V_{SI}	-0.25	2.5	V	
EDID I2C Input Voltage	V_{I2C}	-0.3	$V_{EDID}+1$	V	
Touch Logic Voltage	V_{IO}	-0.3	3.7	V	
Operating Temperature	TOP	0	50	°C	1
Storage Temperature	HST	-20	60	°C	1
Operating Ambient Humidity	HOP	10	90	%RH	1
Storage Humidity	HST	10	90	%RH	1

Note : 1. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39°C Max, and no condensation of water.

Dry Bulb Temperature [℃]
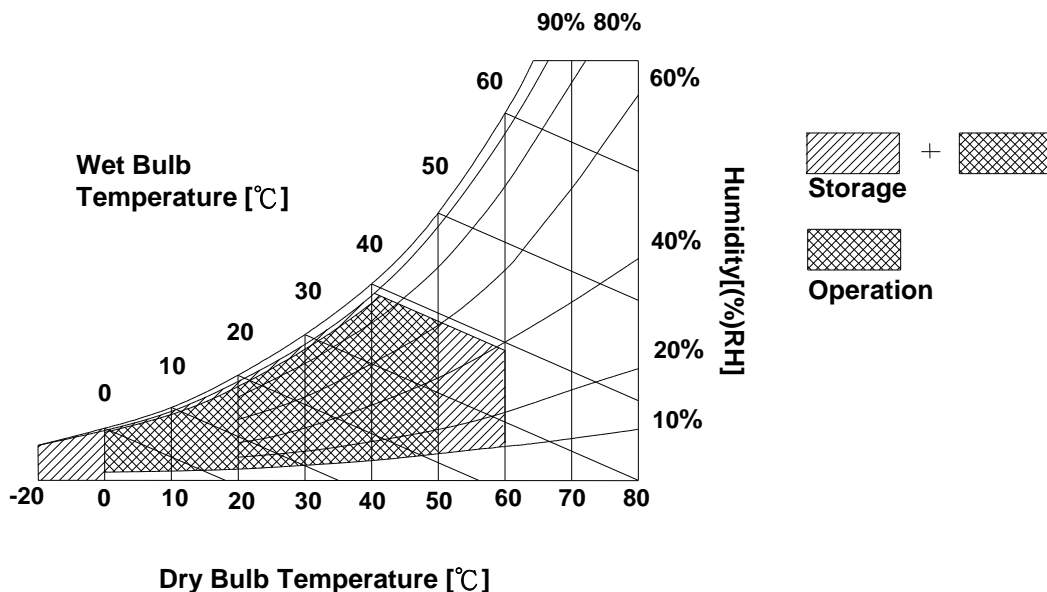
Product Specification

3. Electrical Specifications

3-1. Electrical Characteristics

LP101WH4 model requires 3 kinds of Power input to operate a LCM normally.
First one is to operate the LCD electronical components & TFT & Liquid crystal
Second one is to operate the LED Back Light
Third one is to operate the TSP

Table 2. ELECTRICAL CHARACTERISTICS

| Parameter	Symbol		Values		Unit	Notes
		Min	Typ	Max		
LOGIC :						
Power Supply Input Voltage	VCC	3.0	3.3	3.6	V_{DC}	1
Power Supply Input Current	I_{CC}	-	166	194	mA	2
Power Consumption	Pc	-	0.55	0.66	Watt	2
Power Supply Inrush Current	I_{CC_P}	-	-	2000	mA	3
Differential Impedance	Zm	90	100	110	Ohm	4
EDID Input Voltage	V_{EDID}	3.0	3.3	3.6	V	
EDID Input Current	I_{EDID}			10	mA	
LED Backlight : (without LED Driver)						
Operating Current per string	I_{LED}		15		mA	5
LED Power Consumption	P_{LED}		1.56	1.59	W	6
LED Vf			2.9	2.95	V	
Life Time		12,000	-	-	Hrs	7
Touch Panel						
Power Supply Input Voltage	V_{TSP}	3.6	5	5.5	V	
Power Supply Input Current	I_{TSP} 1-finger		71	82	mA	
	5-finger		65	75	mA	
	Idle		20		mA	
Power Consumption	P_{TSP}		0.36	0.41	Watt	8

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Note)
1. The measuring position is the connector of LCM and the test conditions are under 25℃, fv = 60Hz,
   Mosaic pattern.
2. The specified Icc current and power consumption are under
   the Vcc = 3.3V , 25℃, fv = 60Hz condition whereas Mosaic pattern
   is displayed and fv is the frame frequency.
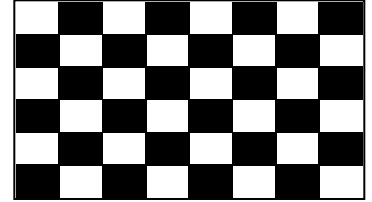
3. The below figures are the measuring Vcc condition and the Vcc control block LGD used.
   The Vcc condition is same the minimum of T1 at Power on sequence.

**Rising time
Vcc**

3.3V

90%

0V   10%

0.5ms
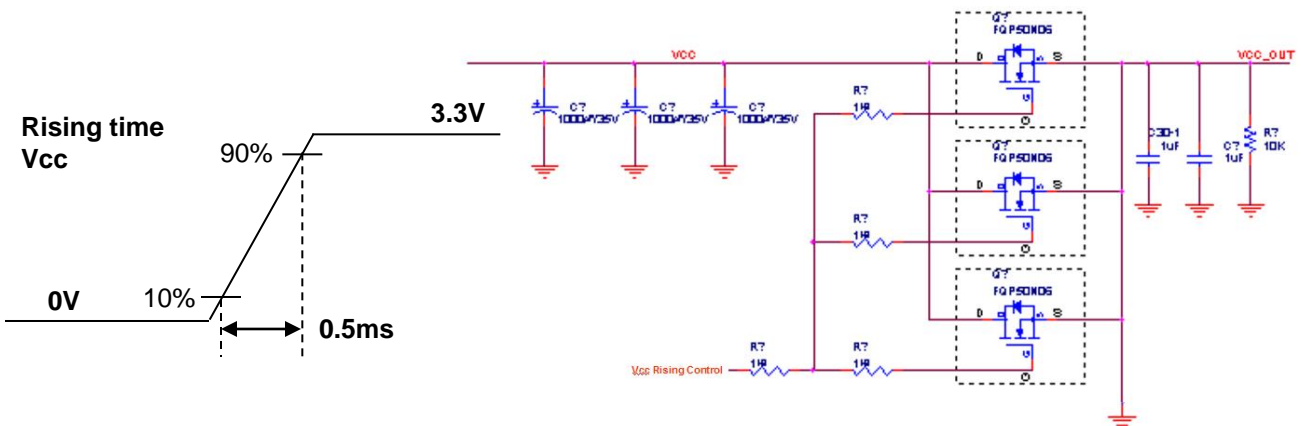
4. This impedance value is needed to proper display and measured form LVDS Tx to the mating connector.
5. The typical operating current is for the typical surface luminance (L_{WH}) in optical characteristics.
   I_{LED} is the current of each LEDs' string, LED backlight has strings on it.
6. The LED power consumption shown above does not include power of external LED driver circuit
   for typical current condition.
7. The life time is determined as the time at which the typical brightness of LCD is 50% compare to that of
   minimum value at the typical LED current. These LED backlight has 4 strings on it and the typical current
   of LED's string is base on 15mA.
8. The specified ITSP current and power consumption (PTSP) are under
   the VTSP = 5V , 25℃, 100Hz at 1-finger and Active mode.
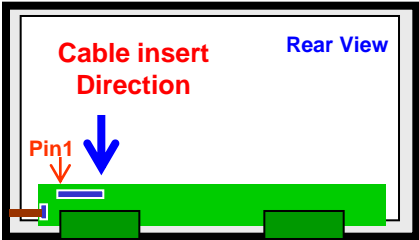
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3-2. Interface Connections

3-2-1. LCD Control Board Connection

This LCD employs two interface connections, a 39pin connector is used for the module electronics interface and the other connector is used for the integral backlight system.
The electronics interface connector is a model FH35C-39S-0.3SHW manufactured by HIROSE.
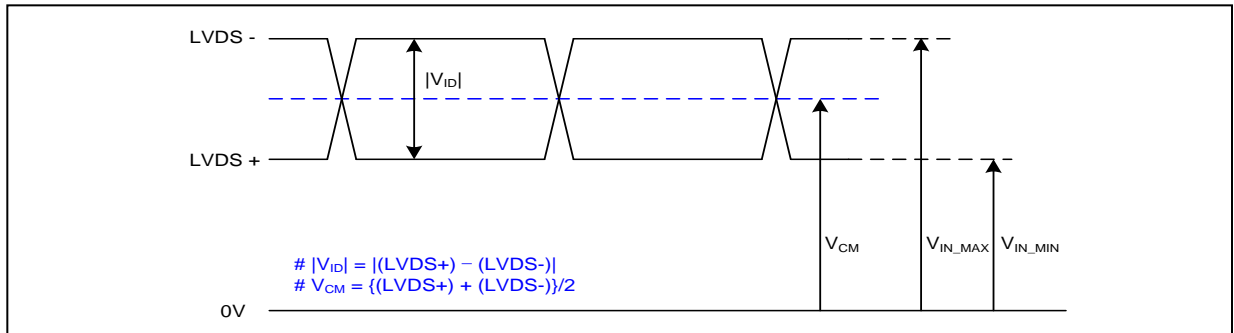
Table 3. MODULE CONNECTOR PIN CONFIGURATION (CN1)

Pin	Symbol	Description	Notes
1	NC	No Connection.	
2	VCC	Power Supply, 3.3V Typ.	**[Connector]**
3	VCC	Power Supply, 3.3V Typ.	FH35C-39S-0.3SHW(Hirose), 39pin
4	V EDID	DDC 3.3V power	
5	NC	No Connection (Reserved – LCD panel self test enable)	**[Connector pin arrangement]**
6	Clk EDID	DDC Clock	
7	DATA EDID	DDC Data	
8	R$_{IN}$ 0-	Negative LVDS differential data input	
9	R$_{IN}$ 0+	Positive LVDS differential data input	
10	GND	Ground	
11	R$_{IN}$ 1-	Negative LVDS differential data input	[LCD Module Rear View]
12	R$_{IN}$ 1+	Positive LVDS differential data input	
13	GND	Ground	
14	R$_{IN}$ 2-	Negative LVDS differential data input	
15	R$_{IN}$ 2+	Positive LVDS differential data input	**Cable insert** / **Rear View**
16	GND	Ground	**Direction**
17	CLKIN-	Negative LVDS differential clock input	
18	CLKIN+	Positive LVDS differential clock input	
19	GND	Ground	**Pin1**
20	R$_{IN}$ 3-	Negative LVDS differential data input	
21	R$_{IN}$ 3+	Positive LVDS differential data input	
22	GND	Ground	
23	VTSP	Power Supply, 3.6V ~ 5.5V	
24	VTSP	Power Supply, 3.6V ~ 5.5V	
25	GND	Ground	
26	I2C_CLK	I2C Clock for Touch	
27	I2C_Data	I2C Data for Touch	
28	Interrupt	MCU(Host) Alert	
29	RST	Reset for Touch	
30	NC	No Connection	
31	NC	No Connection	
32	VCD4	LED Cathode Feedback 4	
33	VCD3	LED Cathode Feedback 3	
34	VCD2	LED Cathode Feedback 2	
35	VCD1	LED Cathode Feedback 1	
36	NC	No Connection	
37	VLED	Power Supply for LED [Anode]	
38	VLED	Power Supply for LED [Anode]	
39	VLED	Power Supply for LED [Anode]	

3-3. LVDS Signal Timing Specifications

3-3-1. DC Specification

LVDS -

$|V_{ID}|$

LVDS +

V_{CM} V_{IN_MAX} V_{IN_MIN}

\# $|V_{ID}| = |(LVDS+) - (LVDS-)|$
\# $V_{CM} = \{(LVDS+) + (LVDS-)\}/2$

0V

Description	Symbol	Min	Max	Unit	Notes
LVDS Differential Voltage	$|V_{ID}|$	100	600	mV	-
LVDS Common mode Voltage	V_{CM}	0.6	1.8	V	-
LVDS Input Voltage Range	V_{IN}	0.3	2.1	V	-

3-3-2. AC Specification

T_{clk}

LVDS Clock

LVDS Data

t_{SKEW} ($F_{clk} = 1/T_{clk}$)
1) 85MHz > Fclk ≥ 65MHz : -400 ~ +400
2) 65MHz > Fclk ≥ 25MHz : -600 ~ +600
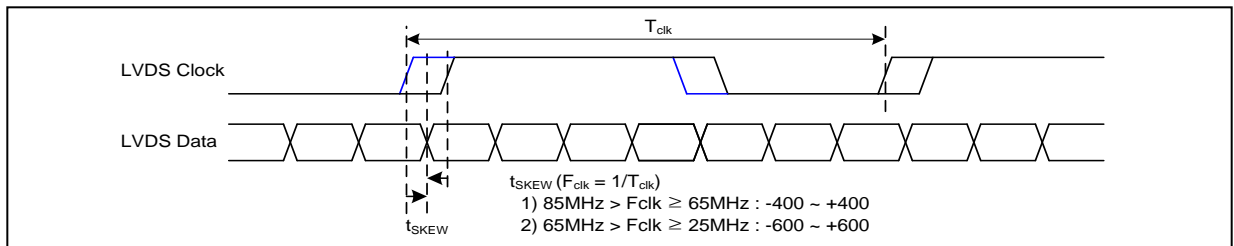
t_{SKEW}

Description	Symbol	Min	Max	Unit	Notes
LVDS Clock to Data Skew Margin	t_{SKEW}	- 400	+ 400	ps	85MHz > Fclk ≥ 65MHz
	t_{SKEW}	- 600	+ 600	ps	65MHz > Fclk ≥ 25MHz
LVDS Clock to Clock Skew Margin (Even to Odd)	t_{SKEW_EO}	- 1/7	+ 1/7	T_{clk}	-
Maximum deviation of input clock frequency during SSC	F_{DEV}	-	$\pm$ 3	%	-
Maximum modulation frequency of input clock during SSC	F_{MOD}	-	200	KHz	-

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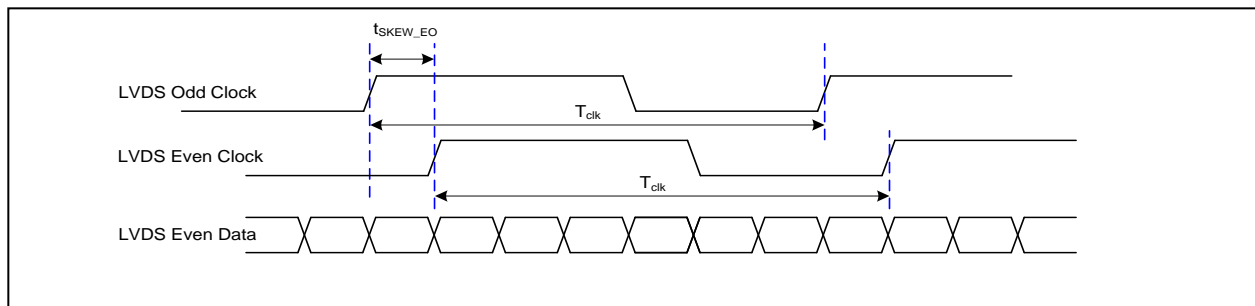
< Clock skew margin between channel >
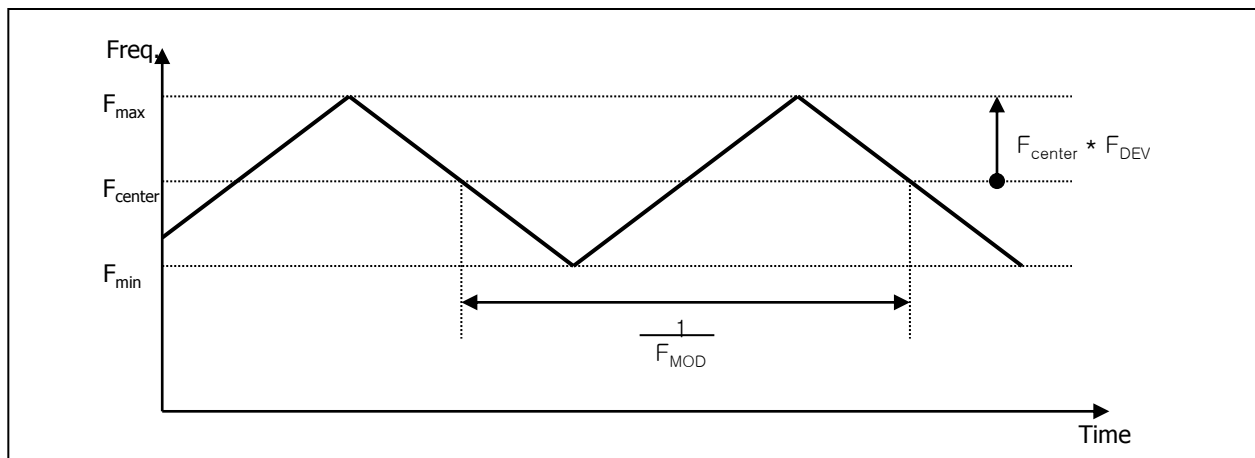
< Spread Spectrum >

3-3-3. Data Format

- LVDS 1 Port

< LVDS Data Format >

3-4. Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications and specifications of LVDS Tx/Rx for its proper operation.

Table 5. TIMING TABLE
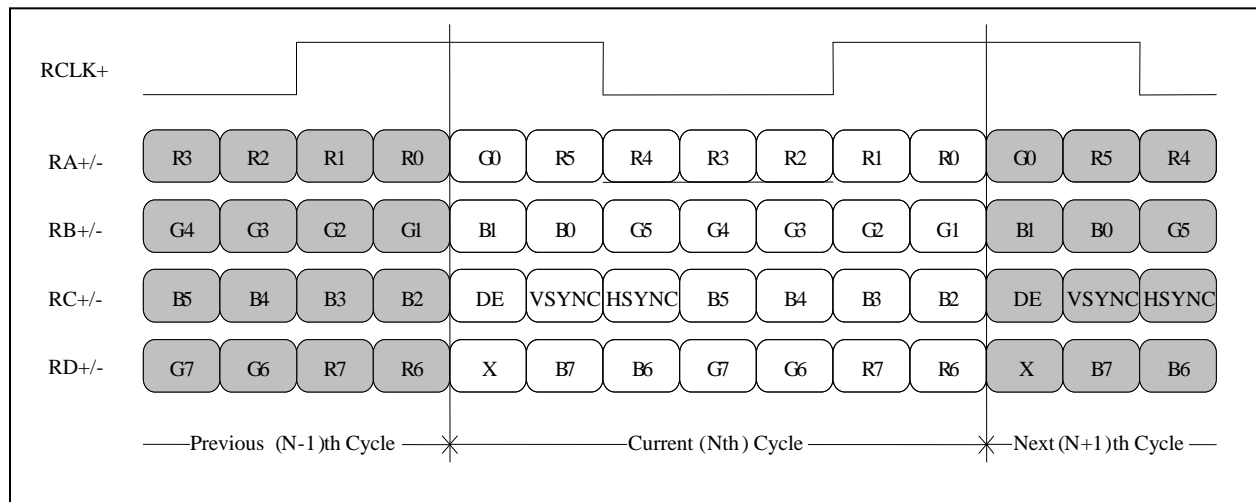
ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Frequency	f_{CLK}	69	72	75	MHz	1port
Hsync	Period	t_{HP}	1470	1526	1542	Tclk	
	Width	t_{WH}	24	32	40		
	Width-Active	t_{WHA}	-	1366	-		
Vsync	Period	t_{VP}	779	790	801	t_{HP}	
	Width	t_{VW}	2	5	8		
	Width-Active	t_{VWA}	-	768	-		
Data Enable	Horizontal back porch	t_{HBP}	72	80	88	tCLK	
	Horizontal front porch	t_{HFP}	8	48	48		
	Vertical back porch	t_{VBP}	8	14	20	t_{HP}	
	Vertical front porch	t_{VFP}	1	3	5		

3-5. Signal Timing Waveforms

Condition : VCC =3.3V
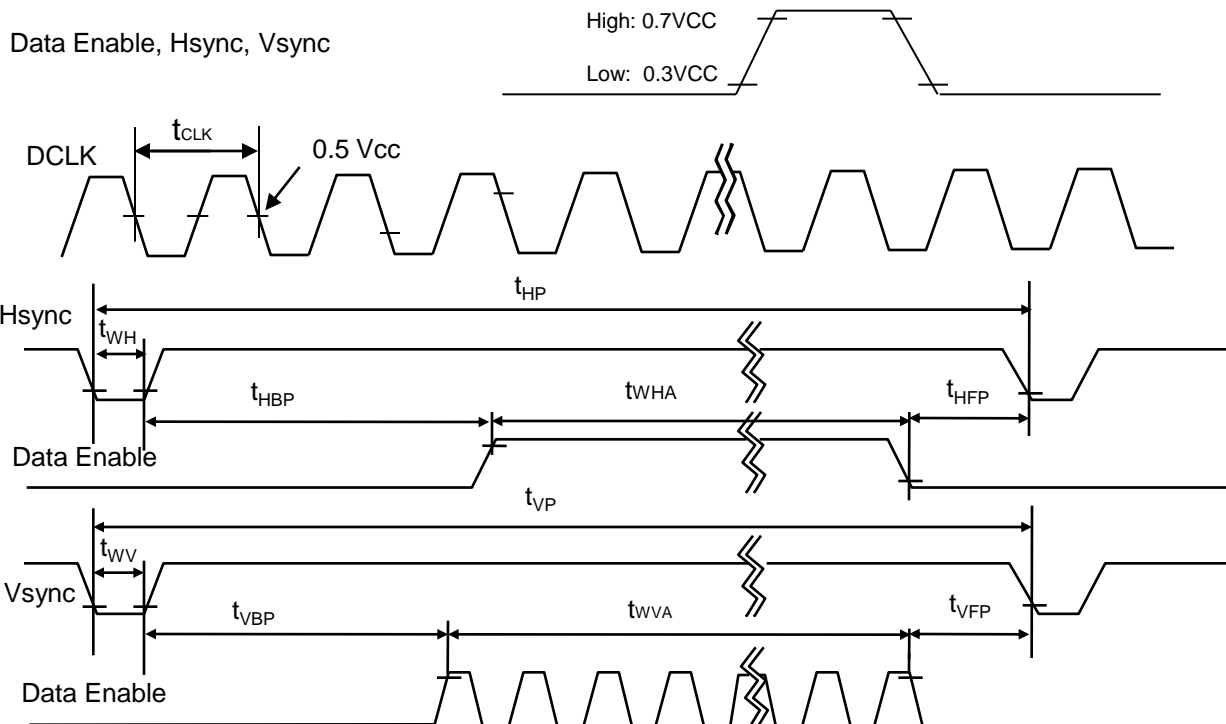
3-6. Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color ; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Table 7. COLOR DATA REFERENCE

Color		Input Color Data																						
		RED								GREEN								BLUE							
		MSB							LSB	MSB							LSB	MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	R7	R6	R5	R4	R3	R2	R1	R0	R7	R6	R5	R4	R3	R2	R1	R0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (01)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	...			...								...								...					
	RED (254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	...			...								...								...					
	GREEN (254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN (255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	...			...								...								...					
	BLUE (254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE (255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

3-7. Power Sequence

3-7-1. Power Sequence for LCM
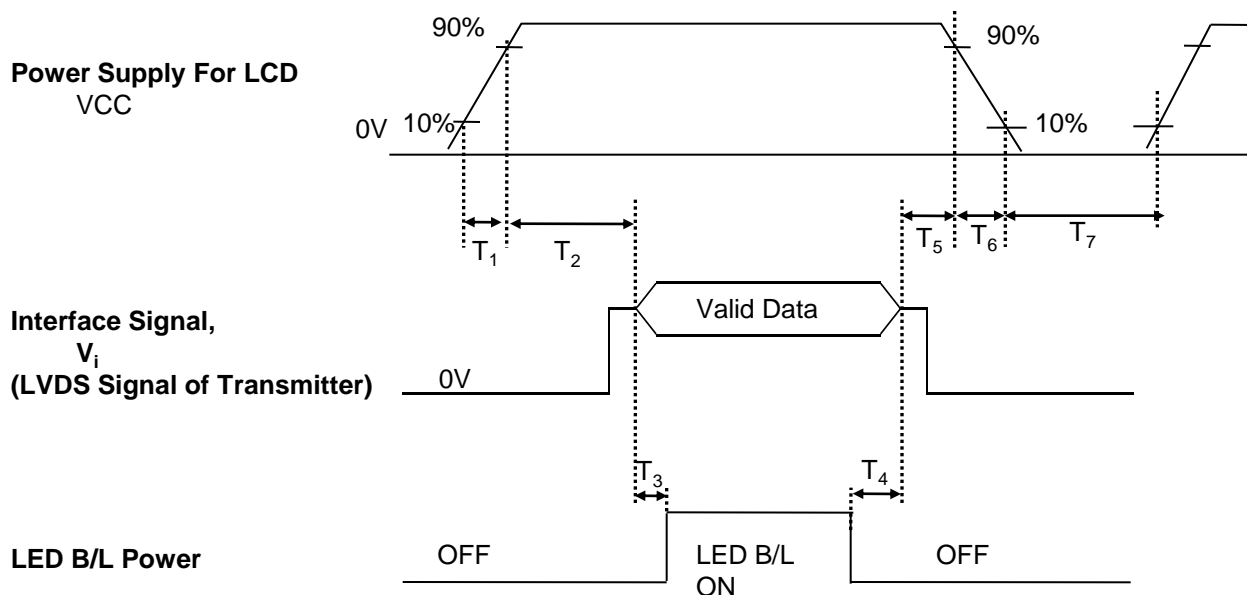
Table 8. POWER SEQUENCE TABLE

Parameter	Value			Units
	Min.	Typ.	Max.	
T_1	0.5	-	10	(ms)
T_2	0	-	50	(ms)
T_3	200	-	-	(ms)
T_4	200	-	-	(ms)
T_5	0	-	50	(ms)
T_6	0	-	10	(ms)
T_7	400	-	-	(ms)

Note)
1. Valid Data is Data to meet "3-3. Signal Timing Specifications"
2. Please avoid floating state of interface signal at invalid period.
3. When the interface signal is invalid, be sure to pull down the power supply for LCD VCC to 0V.
4. LED B/L power must be turn on after power supply for LCD and interface signal are valid.

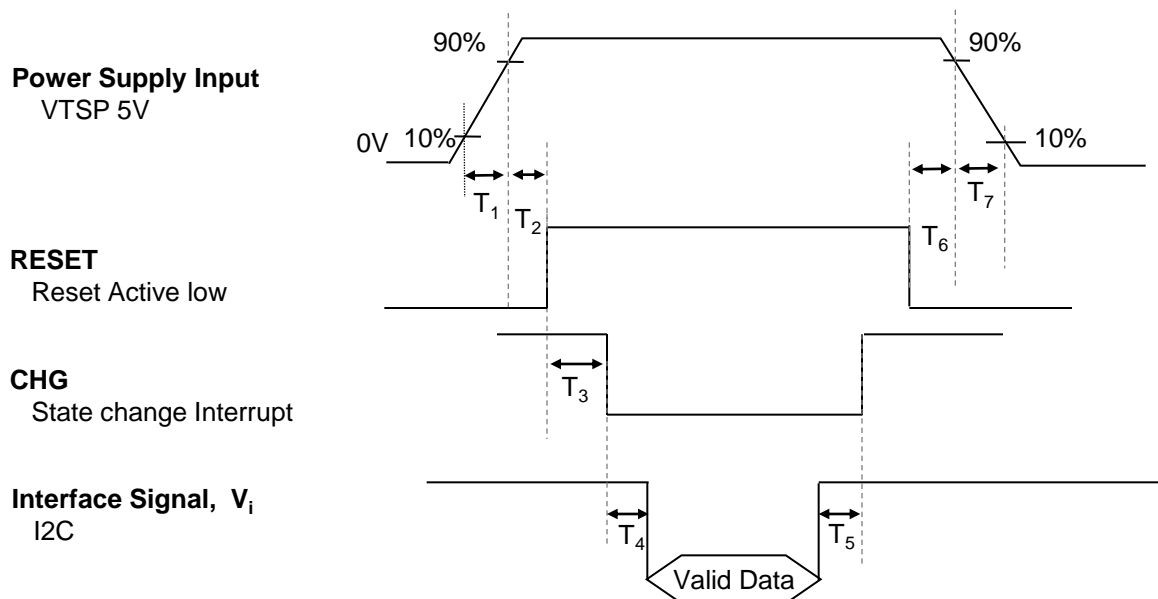Product Specification

3-7-2. Power Sequence for Touch

Power Supply Input
VTSP 5V

RESET
Reset Active low

CHG
State change Interrupt

Interface Signal, V$_i$
I2C

Table 9. POWER SEQUENCE TABLE

| Parameter	Value			Units
	Min.	Typ.	Max.	
T$_1$	0.5	-	10	ms
T$_2$	10	-	-	ns
T$_3$	-	154	-	ms
T$_4$	0.1	-	-	ms
T$_5$	-	-	0.5	ms
T$_6$	0	-	-	ns
T$_7$	-	-	10	ms

Transferring Data Bits
Each data bit transferred on the bus is accompanied by a pulse on the clock line. The level of the data line must be stable when the clock line is high ; the only exception to this rule is for generating START and STOP conditions.
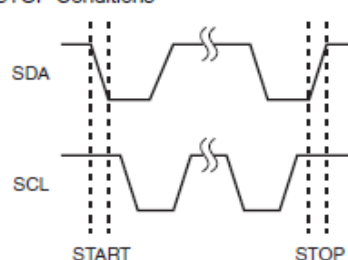
START and STOP conditions
START and STOP conditions are signaled by changing the level of the SDA line when the SCL line is high.
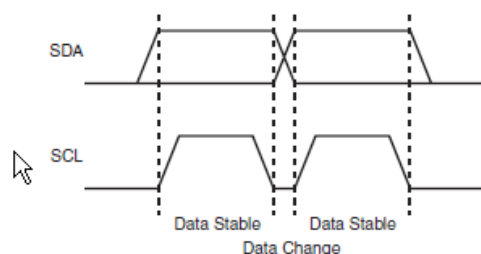
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4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 20 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and Θ equal to 0°.
FIG. 1 presents additional information concerning the measurement equipment and method.

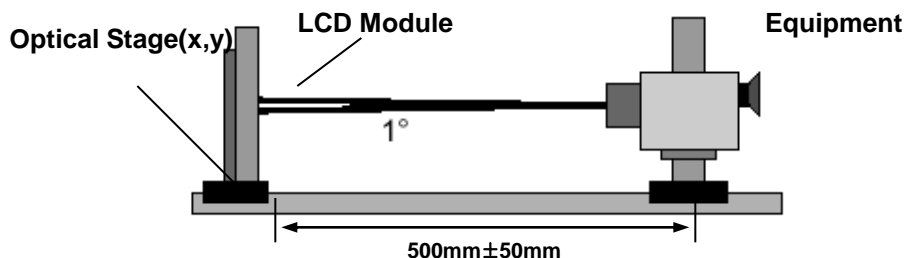### FIG. 1 Optical Characteristic Measurement Equipment and Method

Optical Stage(x,y)   **LCD Module**   **Equipment**

1°

500mm±50mm

Table 9. OPTICAL CHARACTERISTICS   Ta=25°C, VCC=3.3V, fv=60Hz, f$_{CLK}$= 72MHz, ILED = 15mA

Parameter		Symbol	Condition	Min	Typ	Max	Units	Notes
Average Luminance With Touch		LAVE	5 Points (ILED= 15mA)	268	315	-	cd/㎡	2
Average Luminance W/o Touch				297	350			
Luminance variation		δ $_{WHITE}$	5points	-	1.20	1.40		
			13 point	-	1.40	1.60		3
C/R		-	Center 1 Point	500	800	-	-	1
Response time			-	-	25	-	ms	4
Viewing angle	Horizontal	Θ	φx(Left,Right)	±80	±85	-	°	5
	Vertical	Θ	φyu(Up)	80	85	-		
		Θ	φyd(Down)	80	85	-		
Color Coordinates	RED	RX	0.567	0.597	0.627			
		RY	0.324	0.354	0.384			
	GREEN	GX	0.305	0.335	0.365			
		GY	0.537	0.567	0.597			
	BLUE	BX	0.121	0.151	0.181			
		BY	0.089	0.119	0.149			
	WHITE	WX	0.283	0.313	0.343			
		WY	0.299	0.329	0.359			
Gray Scale		-	-	Gamma 2.2				6

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Note)
1. Contrast Ratio(CR) is defined mathematically as

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the average of 5 point across the LCD surface 50cm from the surface with all pixels displaying white. For more information see FIG 1.

$$L_{WH} = \text{Average}(L_1, L_2, \ldots L_5)$$

3. The variation in surface luminance , The panel total variation (δ_{WHITE}) is determined by measuring L_N at each test position 1 through 17 and then defined as followed numerical formula. For more information see FIG 2.

$$\delta_{WHITE} = \frac{\text{Maximum}(L_1, L_2, \ldots L_{13})}{\text{Minimum}(L_1, L_2, \ldots L_{13})}$$

4. Response time is the time required for the display to transition from white to black (rise time, Tr_R) and from black to white(Decay Time, Tr_D). For additional information see FIG 3.

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The 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 4.

6. Gray scale specification   * f_V = 60Hz

Gray Level	Luminance [%] (Typ)
L0	0.11
L15	0.22
L31	0.89
L47	2.59
L63	5.58
L79	9.93
L95	15.4
L111	21.6
L127	28.7
L143	35.7
L159	43.3
L175	51.3
L191	59.9
L207	67.3
L223	75.3
L239	85.4
L255	100.0

Product Specification

FIG. 2 Luminance

<Measuring point for Average Luminance & measuring point for Luminance variation>

H,V : ACTIVE AREA
  A : H/4 mm
  B : V/4 mm
  H : 222.52 mm
  V : 125.11 mm

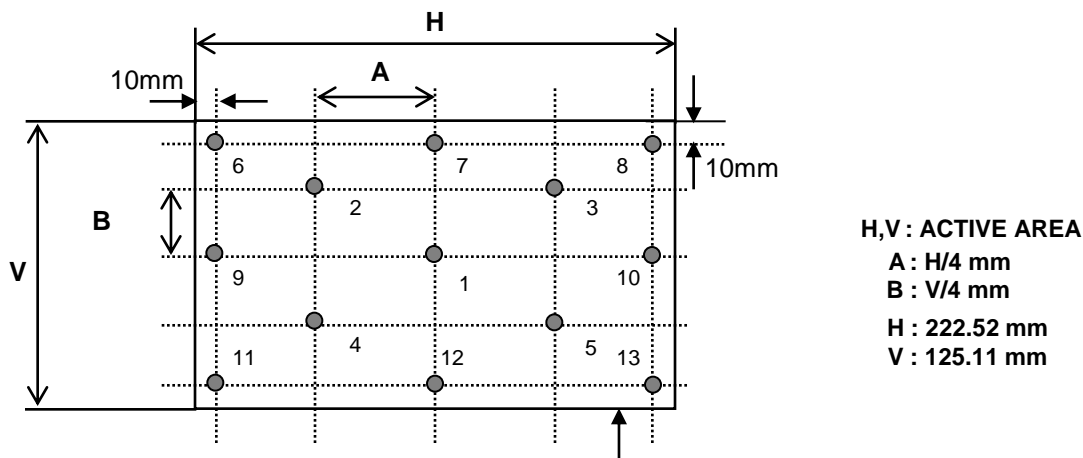### FIG. 3 Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".
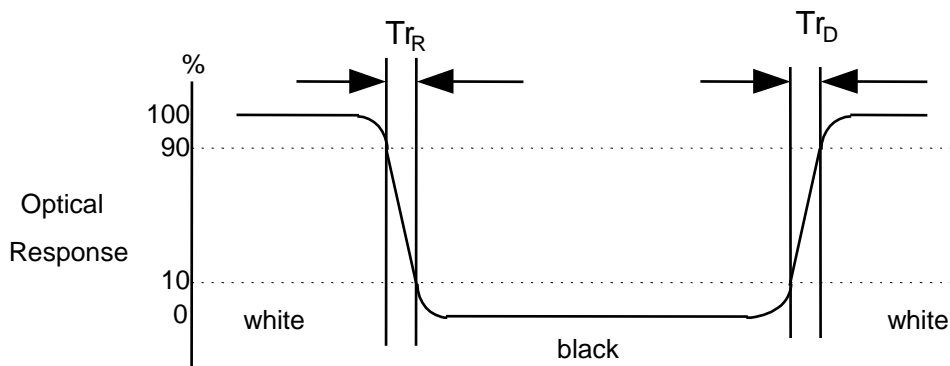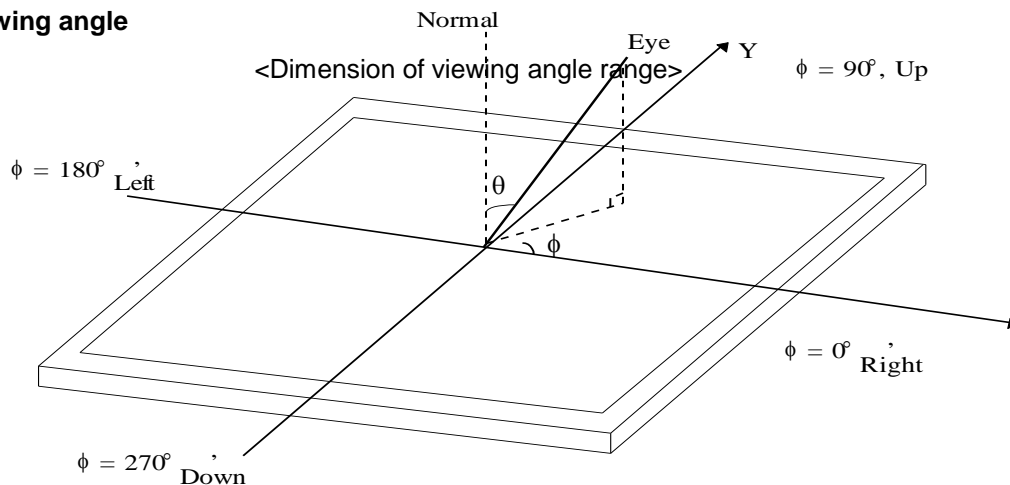

FIG. 4 Viewing angle

<Dimension of viewing angle range>
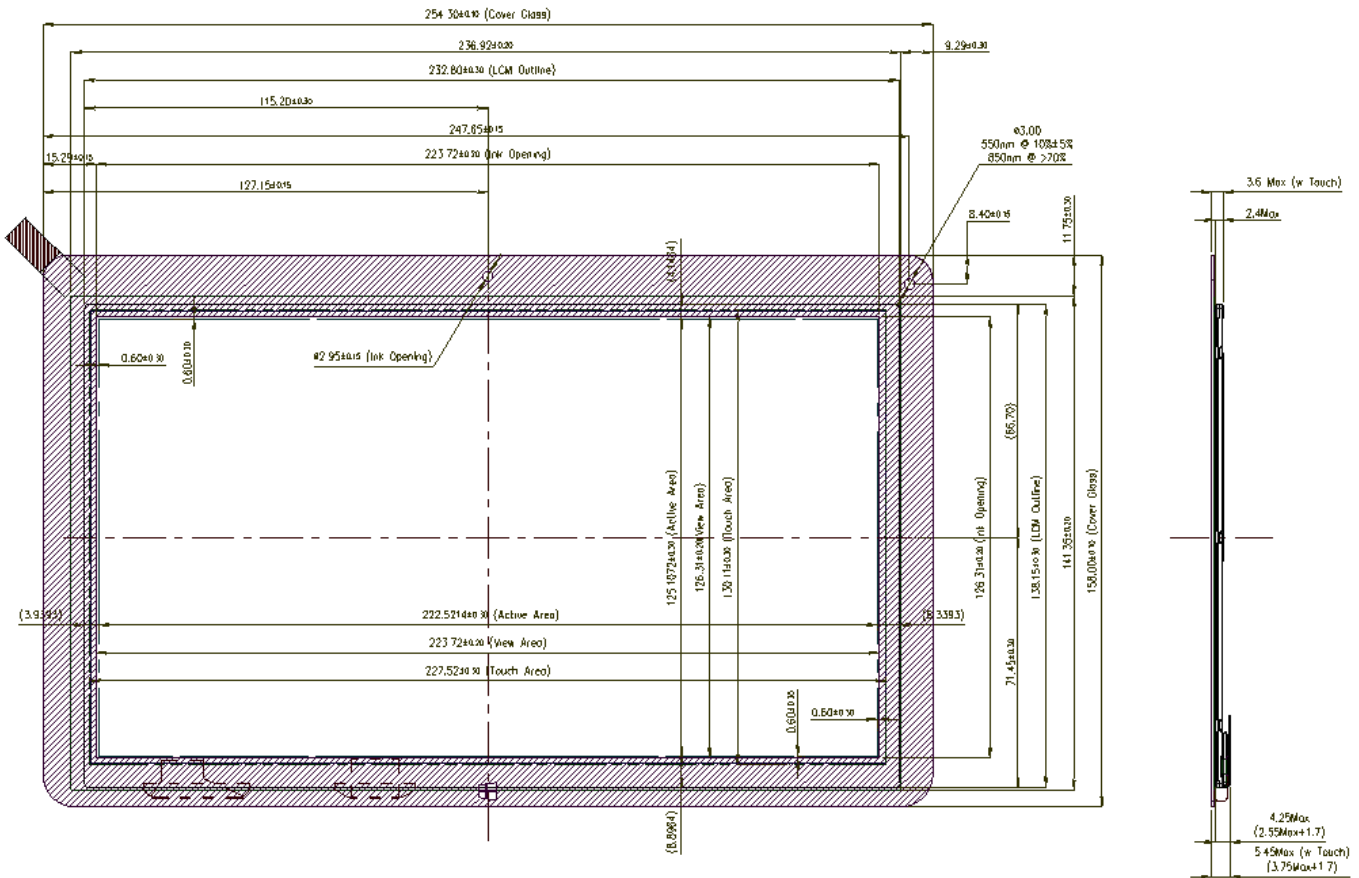
Product Specification

5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model LP101WH (TBD). In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal	232.8 ± 0.3mm (without bracket length)
	Vertical	138.15 ± 0.3mm (without bracket length)
	Thickness	2.40mm (max.)
Bezel Area	Horizontal	TBD
	Vertical	TBD
Active Display Area	Horizontal	222.5214mm
	Vertical	125.1072mm
Touch Screen Panel	Horizontal	254.3mm
	Vertical	158.00mm
	Thickness	1.20mm (max)
Weight	150g (Max.) w/o Touch, 240g (Max) w/ Touch	
Surface Treatment	LCD : Glare, low reflective treatment of the front polarizer, 2H Touch : AF Coating, 8H	
Viewing Angle	Viewing Angle(When Active area can be seen) ≤ 30˚	

Product Specification

<FRONT VIEW>

Product Specification

<REAR VIEW>

6. Key Part List

NO	ITEM	Description	Specification
1	SW0663	T-Con	Siliconworks, LVDS, EPI, 66BGA
2	SW9402	Source Driver IC	Siliconworks, EPI, 1026ch, 6/8bit
3	SW8026	Gate Driver IC	Siliconworks, 384ch
4	SM4033	PMIC	6 in 1, buck
5	mXT1386E	Touch Control IC	Atmel, mXT1386E(MCU) + mXT154E(ROIC) 3ea

7. Reliability

7-1. Environment test condition

No.	Test Item	Conditions
1	High temperature storage test	Ta= 60°C, 240h
2	Low temperature storage test	Ta= -20°C, 240h
3	High temperature operation test	Ta= 50°C, 50%RH, 240h
4	Low temperature operation test	Ta= 0°C, 240h
5	Vibration test (non-operating)	Sine wave, 10 ~ 500 ~ 10Hz, 1.5G, 0.37oct/min 3 axis, 1hour/axis
6	Shock test (non-operating)	Half sine wave, 180G, 2ms one shock of each six faces(I.e. run 180G 6ms for all six faces)
7	Altitude operating storage / shipment	0 ~ 10,000 feet (3,048m) 24Hr 0 ~ 40,000 feet (12,192m) 24Hr

{ Result Evaluation Criteria }
 There should be no change which might affect the practical display function when the display quality
test is conducted under normal operating condition.
 Touch sensor should be at room temperature for 24 hours when the reliability test finished.
When the reliability test is over, touch sensor need to be calibrated.
After calibration and execute the function test.
In the standard condition, it should be no touch abnormal function.

7-2. Mechanical test condition

No.	Test Item	Conditions	Pass Criteria	Notes
1	4-point Bending Test	ASTM C158 4point bending test	≥ 200MPa	1), a ≥ 25mm
2	FPC Pulling Test	25mm/min, pulling angle : 90˚	≥ 500g/cm	2)

Note 1)
 ASTM C158 4point bending test is a common test method used to measure edge strength of glass.
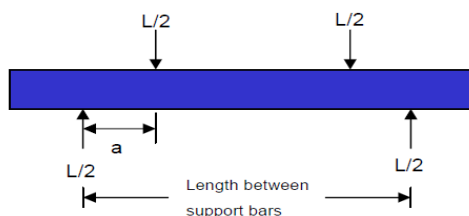
For linear stress/force relation
    Stress = $(3*L*a)/(b*h^2)$
where
 L = Load
 a = distance from support bar to
    load bar
 b = width of sample
 h = height (thickness) of sample

Product Specification

Note 2)
It should be cut FPC as 1cm width before FPC pulling test
FPC pulling test condition is peeling speed 25mm/min, pull-up angle 90˚.

Cutting 1cm
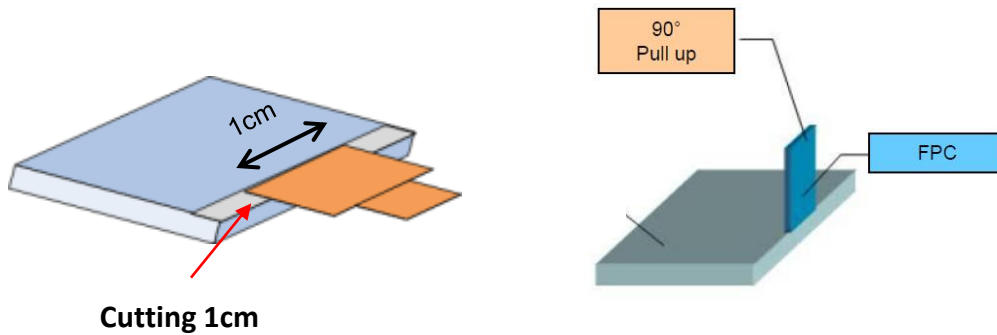
8. Touch Function Specifications

8-1. Test Equipment : K-9601 or equivalent

K-9601 is LGD's standard equipment for touch function test.
Test Pattern & condition observe Win8 Touch Test requirement.

8-2. Touch function specification

Touch function is satisfied with Win8 Touch requirement.

Product Specification

9. International Standards

9-1. Safety

a) UL 60950-1, Underwriters Laboratories Inc.
   Information Technology Equipment - Safety - Part 1 : General Requirements.

b) CAN/CSA C22.2 No.60950-1-07, Canadian Standards Association.
   Information Technology Equipment - Safety - Part 1 : General Requirements.

c) EN 60950-1, European Committee for Electrotechnical Standardization (CENELEC).
   Information Technology Equipment - Safety - Part 1 : General Requirements.

d) IEC 60950-1, The International Electrotechnical Commission (IEC).
   Information Technology Equipment - Safety - Part 1 : General Requirements.

9-2. EMC

a) ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHZ to 40GHz. "American National Standards Institute(ANSI), 1992

b) C.I.S.P.R "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." International Special Committee on Radio Interference.

c) EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." European Committee for Electrotechnical Standardization.(CENELEC), 1998
(Including A1: 2000)

10. Packing

10-1. Designation of Lot Mark

a) Lot Mark

A	B	C	D	E	F	G	H	I	J	K	L	M

A,B,C : SIZE(INCH)   D : YEAR
E : MONTH   F ~ M : SERIAL NO.

Note
1. YEAR

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mark	A	B	C	D	E	F	G	H	J	K

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	3	4	5	6	7	8	9	A	B	C

b) Location of Lot Mark

Serial No. is printed on the label. The label is attached to the backside of the LCD module.
This is subject to change without prior notice.

10-2. Packing Form

a) Package quantity in one box : 40 pcs

b) Box Size : 478*365*328 mm

11. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

11-1. MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted 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 module.
(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental to the polarizer.)
(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

11-2. OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
V=± 200mV(Over and under shoot voltage)

(2) Response time depends on the temperature.(In lower temperature, it becomes longer.)
(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time(required time that brightness is stable after turned on) becomes longer.
(4) 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.
(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.

11-3. ELECTROSTATIC DISCHARGE CONTROL

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.

11-4. PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

11-5. STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
(2) 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.

11-6. HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) When the 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.
(2) The protection film is attached to the polarizer with a small amount of glue. If some stress is applied to rub the protection film against the polarizer during the time you peel off the film, the glue is apt to remain on the polarizer.
Please carefully peel off the protection film without rubbing it against the polarizer.
(3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.
(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

Product Specification

EDID Data for ACER _ ver. 0.0

2012/8/2

	Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)	Value (Bin)
Header	0	00	Header		00	00000000
	1	01	Header		FF	11111111
	2	02	Header		FF	11111111
	3	03	Header		FF	11111111
	4	04	Header		FF	11111111
	5	05	Header		FF	11111111
	6	06	Header		FF	11111111
	7	07	Header		00	00000000
Vendor / Product EDID Version	8	08	ID Manufacture Name	LGD	30	00110000
	9	09	ID Manufacture Name		E4	11100100
	10	0A	ID Product Code	03C8h	C8	11001000
	11	0B	(Hex. LSB first)		03	00000011
	12	0C	ID Serial No. - Optional ("00h" If not used, Number Only and LSB First)		00	00000000
	13	0D	ID Serial No. - Optional ("00h" If not used, Number Only and LSB First)		00	00000000
	14	0E	ID Serial No. - Optional ("00h" If not used, Number Only and LSB First)		00	00000000
	15	0F	ID Serial No. - Optional ("00h" If not used, Number Only and LSB First)		00	00000000
	16	10	Week of Manufacture - Optinal	00 weeks	00	00000000
	17	11	Year of Manufacture	2012 years	16	00010110
	18	12	EDID structure version # = 1		01	00000001
	19	13	EDID revision # = 4		04	00000100
Display Parameters	20	14	Video input Definition = Input is a Digital Video signal Interface , Colo Bit Depth : 8 Bits per Primary Color , Digital Video Interface Standard Supported: Digital Interface is not defined		A0	10100000
	21	15	Horizontal Screen Size (Rounded cm) = 22 cm		16	00010110
	22	16	Vertical Screen Size (Rounded cm) = 13 cm		0D	00001101
	23	17	Display Transfer Characteristic (Gamma) = (gamma*100)-100 = Example:(2.2*100)-100=120		78	01111000
	24	18	Feature Support [Display Power Management(DPM) : Standby Mode is not supported, Suspend Mode is not supported, Active Off = Very Low Power is not supported ,Supportted Color Encoding Formats : RGB 4:4:4 ,Other Feature Support Flags : No_sRGB, Preferred Timing Mode, No_Display is continuous frequency (Multi-mode_Base EDID and Extension Block).]		02	00000010
Panel Color Coordinates	25	19	Red/Green Low Bits (RxRy/GxGy)		ED	11101101
	26	1A	Blue/White Low Bits (BxBy/WxWy)		E5	11100101
	27	1B	Red X Rx = 0.597		98	10011000
	28	1C	Red Y Ry = 0.354		5A	01011010
	29	1D	Green X Gx = 0.335		55	01010101
	30	1E	Green Y Gy = 0.567		91	10010001
	31	1F	Blue X Bx = 0.151		26	00100110
	32	20	Blue Y By = 0.119		1E	00011110
	33	21	White X Wx = 0.313		50	01010000
	34	22	White Y Wy = 0.329		54	01010100
Established Timings	35	23	Established timing 1 (Optional_00h if not used)		00	00000000
	36	24	Established timing 2 (Optional_00h if not used)		00	00000000
	37	25	Manufacturer's timings (Optional_00h if not used)		00	00000000
Standard Timing ID	38	26	Standard timing ID1 (Optional_01h if not used)		01	00000001
	39	27	Standard timing ID1 (Optional_01h if not used)		01	00000001
	40	28	Standard timing ID2 (Optional_01h if not used)		01	00000001
	41	29	Standard timing ID2 (Optional_01h if not used)		01	00000001
	42	2A	Standard timing ID3 (Optional_01h if not used)		01	00000001
	43	2B	Standard timing ID3 (Optional_01h if not used)		01	00000001
	44	2C	Standard timing ID4 (Optional_01h if not used)		01	00000001
	45	2D	Standard timing ID4 (Optional_01h if not used)		01	00000001
	46	2E	Standard timing ID5 (Optional_01h if not used)		01	00000001
	47	2F	Standard timing ID5 (Optional_01h if not used)		01	00000001
	48	30	Standard timing ID6 (Optional_01h if not used)		01	00000001
	49	31	Standard timing ID6 (Optional_01h if not used)		01	00000001
	50	32	Standard timing ID7 (Optional_01h if not used)		01	00000001

Product Specification

	Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)	Value (Bin)
Timing Descriptor #1	54	36	Pixel Clock/10,000 (LSB)	72 MHz @ 59.7 Hz	20	00100000
	55	37	Pixel Clock/10,000 (MSB)		1C	00011100
	56	38	Horizontal Active (HA) (lower 8 bits)	1366 pixels	56	01010110
	57	39	Horizontal Blanking (HB) (lower 8 bits)	160 pixels	A0	10100000
	58	3A	Horizontal Active (HA) / Horizontal Blanking (HB) (upper 4:4bits)		50	01010000
	59	3B	Vertical Avtive (VA)	768 lines	00	00000000
	60	3C	Vertical Blanking (VB) (DE Blanking typ.for DE only panels)	22 lines	16	00010110
	61	3D	Vertical Active (VA) / Vertical Blanking (VB) (upper 4:4bits)		30	00110000
	62	3E	Horizontal Front Porch in pixels (HF) (lower 8 bits)	48 pixels	30	00110000
	63	3F	Horizontal Sync Pulse Width in pixels (HS) (lower 8 bits)	32 pixels	20	00100000
	64	40	Vertical Front Porch in lines (VF) : Vertical Sync Pluse Width in lines (VS) (lower 4 bits) 3 lines : 5 lines		35	00110101
	65	41	Horizontal Front Porch/ Sync Pulse Width/ Vertical Front Porch/ Sync Pulse Width (upper 2bits)		00	00000000
	66	42	Horizontal Vedio Image Size (mm) (lower 8 bits)	223 mm	DF	11011111
	67	43	Vertical Vedio Image Size (mm) (lower 8 bits)	125 mm	7D	01111101
	68	44	Horizontal Image Size / Vertical Image Size (upper 4 bits)		00	00000000
	69	45	Horizontal Border = 0 (Zero for Notebook LCD)		00	00000000
	70	46	Vertical Border = 0 (Zero for Notebook LCD)		00	00000000
	71	47	Non-Interlace, Normal display, no stereo, Digital Separate [Vsync_NEG, Hsync_NEG (outside of V-sync)]		19	00011001
Timing Descriptor #2	72	48	Flag		00	00000000
	73	49	Flag		00	00000000
	74	4A	Flag		00	00000000
	75	4B	Data Type Tag (Descriptor Defined by manufacturer)		00	00000000
	76	4C	Flag		00	00000000
	77	4D	Descriptor Defined by manufacturer		00	00000000
	78	4E	Descriptor Defined by manufacturer		00	00000000
	79	4F	Descriptor Defined by manufacturer		00	00000000
	80	50	Descriptor Defined by manufacturer		00	00000000
	81	51	Descriptor Defined by manufacturer		00	00000000
	82	52	Descriptor Defined by manufacturer		00	00000000
	83	53	Descriptor Defined by manufacturer		00	00000000
	84	54	Descriptor Defined by manufacturer		00	00000000
	85	55	Descriptor Defined by manufacturer		00	00000000
	86	56	Descriptor Defined by manufacturer		00	00000000
	87	57	Descriptor Defined by manufacturer		00	00000000
	88	58	Descriptor Defined by manufacturer		00	00000000
	89	59	Descriptor Defined by manufacturer		00	00000000
Timing Descriptor #3	90	5A	Flag		00	00000000
	91	5B	Flag		00	00000000
	92	5C	Flag		00	00000000
	93	5D	Data Type Tag (Alphanumeric Data String (ASCII String))		FE	11111110
	94	5E	Flag		00	00000000
	95	5F	Alphanumeric Data String (ASCII String)	L	4C	01001100
	96	60	Alphanumeric Data String (ASCII String)	G	47	01000111
	97	61	Alphanumeric Data String (ASCII String)		20	00100000
	98	62	Alphanumeric Data String (ASCII String)	D	44	01000100
	99	63	Alphanumeric Data String (ASCII String)	i	69	01101001
	100	64	Alphanumeric Data String (ASCII String)	s	73	01110011
	101	65	Alphanumeric Data String (ASCII String)	p	70	01110000
	102	66	Alphanumeric Data String (ASCII String)	l	6C	01101100
	103	67	Alphanumeric Data String (ASCII String)	a	61	01100001
	104	68	Alphanumeric Data String (ASCII String)	y	79	01111001
	105	69	Manufacturer P/N(If<13 char--> 0Ah, then terminate with ASCⅡ code 0Ah,set remaining char = 20h)		0A	00001010
	106	6A	Manufacturer P/N(If<13 char--> 0Ah, then terminate with ASCⅡ code 0Ah,set remaining char = 20h)		20	00100000
	107	6B	Manufacturer P/N(If<13 char--> 0Ah, then terminate with ASCⅡ code 0Ah,set remaining char = 20h)		20	00100000

Product Specification

	Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)	Value (Bin)
Timing Descriptor #4	108	**6C**	Flag		**00**	00000000
	109	**6D**	Flag		**00**	00000000
	110	**6E**	Flag		**00**	00000000
	111	**6F**	Data Type Tag (Alphanumeric Data String (ASCII String))		**FE**	11111110
	112	**70**	Flag		**00**	00000000
	113	**71**	Alphanumeric Data String (ASCII String)	L	**4C**	01001100
	114	**72**	Alphanumeric Data String (ASCII String)	P	**50**	01010000
	115	**73**	Alphanumeric Data String (ASCII String)	1	**31**	00110001
	116	**74**	Alphanumeric Data String (ASCII String)	0	**30**	00110000
	117	**75**	Alphanumeric Data String (ASCII String)	1	**31**	00110001
	118	**76**	Alphanumeric Data String (ASCII String)	W	**57**	01010111
	119	**77**	Alphanumeric Data String (ASCII String)	H	**48**	01001000
	120	**78**	Alphanumeric Data String (ASCII String)	4	**34**	00110100
	121	**79**	Alphanumeric Data String (ASCII String)	-	**2D**	00101101
	122	**7A**	Alphanumeric Data String (ASCII String)	S	**53**	01010011
	123	**7B**	Alphanumeric Data String (ASCII String)	L	**4C**	01001100
	124	**7C**	Alphanumeric Data String (ASCII String)	A	**41**	01000001
	125	**7D**	Alphanumeric Data String (ASCII String)	A	**41**	01000001
Check	126	**7E**	Extension flag (# of optional 128 panel ID extension block to follow, Typ = 0)		**00**	00000000
	127	**7F**	Check Sum (The 1-byte sum of all 128 bytes in this panel ID block shall = 0)		**4D**	01001101