

Product Specification

SPECIFICATION FOR APPROVAL

() Preliminary Specification

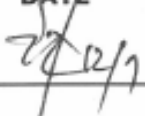

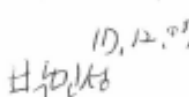
(●) Final Specification

Title	55.0" QWUXGA TFT LCD
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BUYER	General
SET MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LC550EGG
SUFFIX	FLM1

APPROVED BY	SIGNATURE DATE
/	_____
/	_____
/	_____

APPROVED BY	SIGNATURE DATE
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REVIEWED BY	
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PREPARED BY	
MinSung Park / Engineer	 17. 12. 07 _____

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

**TV Product Development Dept.
LG Display Co., Ltd.**

Product Specification

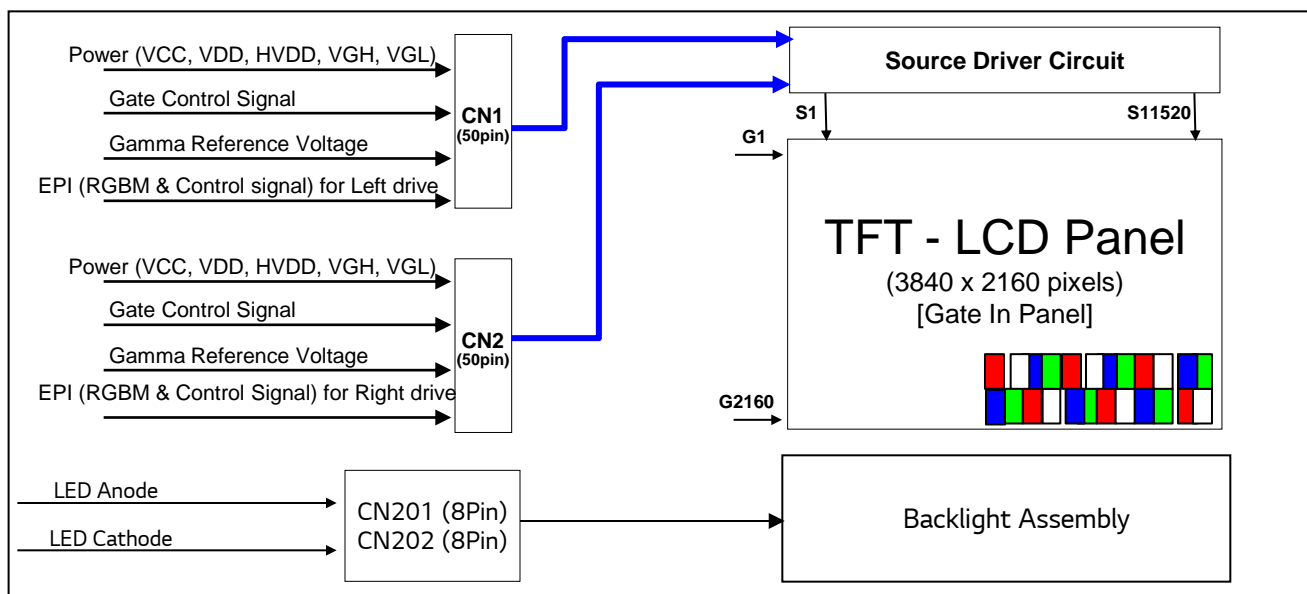
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1. General Description

The LC550EGG is a Color Active Matrix Liquid Crystal Display with an integral Light Emitting Diode (LED) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive display type which is operating in the normally black mode. It has a 54.64 inch diagonally measured active display area with QWUXGA resolution (2160 vertical by 3840 horizontal pixel array). Sub-pixels are constructed with Red, Green, Blue and White. Each pixel is divided into RGB or WRG or BWR or GBW or dots which are arranged in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 10-bit gray scale signal for each dot. Therefore, it can present a palette of more than 1.07Billion colors. It has been designed to apply the 10-bit 8 Lane V by One interface. It is intended to support LCD TV, PCTV where high brightness, super wide viewing angle, high color gamut, high color depth and fast response time are important.



General Features

Active Screen Size	54.64 inches(1387.8 mm) diagonal
Outline Dimension	1236.92(H) × 712.51(V) X 15.1 (B) (Typ.)
Pixel Pitch	0.315 mm x 0.315 mm
Pixel Format	3840 horiz. by 2160 vert. Pixels
Color Depth	8-bit, 16.7 M colors (※ 1.06B colors @ 10 bit (D) System Output)
Drive IC Data Interface	Source D-IC : 8-bit EPI, gamma reference voltage, and control signals Gate D-IC : Gate In Panel
Luminance, White	500 cd/m ² (Center 1point ,Typ.)
Viewing Angle (CR> 10)	Viewing angle free (R/L 178 (Min.), U/D 178 (Min.))
Power Consumption	Total 81.1W(Typ.) [Logic= 10.8W, LED Driver =70.3W (ExtVbr_B=100%)]
Weight	12.0 Kg (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment	Hard coating(2H), Anti-glare low reflection treatment of the front polarizer (Haze 3%(Typ.))

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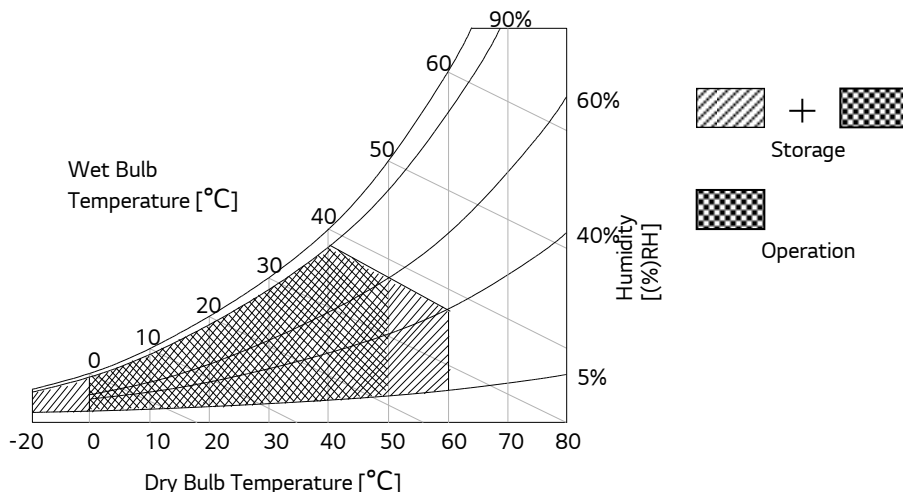
2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or permanent damage to the LCD module.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value		Unit	Note
		Min	Max		
Logic & EPI Power Voltage	VCC	-0.5	+2.2	V _{Dc}	1
Gate High Voltage	VGH	+18.0	+30.0	V _{Dc}	
Gate Low Voltage	VGL1,VGL2	-8.0	-4.0	V _{Dc}	
Source D-IC Analog Voltage	VDD	-0.3	+18.0	V _{Dc}	
Gamma Ref. Voltage (Upper)	VGMH	½VDD-0.3	VDD+0.5	V _{Dc}	
Gamma Ref. Voltage (Low)	VGML	-0.3	½ VDD+0.3	V _{Dc}	
LED Input Voltage	V _F	-	+123.8	V _{Dc}	
Panel Front Temperature	T _{SUR}	-	+68	°C	4
Operating Temperature	T _{OP}	0	+50	°C	2,3
Storage Temperature(without packing)	T _{ST}	-20	+60	°C	
Operating Ambient Humidity	H _{OP}	10	90	%RH	
Storage Humidity	H _{ST}	5	90	%RH	

- Notes**
1. Ambient temperature condition ($T_a = 25 \pm 2 \text{ }^\circ\text{C}$)
 2. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be Max 39°C, and no condensation of water.
 3. Gravity mura can be guaranteed below 40°C condition.
 4. The maximum operating temperatures is based on the test condition that the surface temperature of display area is less than or equal to 68°C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 68°C. The range of operating temperature may be degraded in case of improper thermal management in final product design.



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3. Electrical Specifications

3-1. Electrical Characteristics

It requires several power inputs. The VCC is the basic power of LCD Driving power sequence, Which is used to logic power voltage of Source D-IC and GIP.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit	Note
Logic & EPI Power Voltage	VCC	-	1.79	1.88	1.98	V _{DC}	
Logic High Level Input Voltage	V _{IH}	-	0.8VCC	-	VCC	V _{DC}	
Logic Low Level Input Voltage	V _{IL}	-	0	-	0.2VCC	V _{DC}	
Source D-IC Analog Voltage	VDD	-	16.4	16.6	16.8	V _{DC}	
Half Source D-IC Analog Voltage	H_VDD	-	7.9	8.1	8.3	V _{DC}	7
Gamma Reference Voltage	V _{GMH}	(GMA1 ~ GMA9)	H_VDD+0.2V	-	VDD-0.2	V _{DC}	
	V _{GML}	(GMA10 ~ GMA18)	0.2	-	H_VDD-0.2V	V _{DC}	
Common Voltage	V _{com}	Reverse	4.3	4.8	5.3	V	
V _{term}	V _{term}	CML Type V _{core_tx} =1.0V ~ 1.2V	V _{core_Tx} - 10%	V _{core_Tx}	V _{core_Tx} +10%	V	6
EPI input common voltage	V _{CM}	CML Type	0.75		V _{term} - V _{diff} /2	V	
EPI input differential voltage	V _{diff}	-	150	-	500	mV	
EPI Input eye diagram	V _{eye}	-	90	-	-	mV	
Gate High Voltage	V _{GH}	@ 25°C	27.7	28	28.3	V _{DC}	
		@ 0°C	29.7	30	30.3	V _{DC}	
Gate Low Voltage	V _{GL1}	-	-7.2	-7.0	-6.8	V _{DC}	
	V _{GL2}	-	-15.2	-15.0	-14.8	V _{DC}	
GIP Refresh Voltage	V _{GH} even/odd	-	V _{GL2}	-	V _{GH}	V	
GIP Start Pulse Voltage	V _{ST}	-	V _{GL2}	-	V _{GH}	V	
GIP Operating Clock	G _{CLK}	-	V _{GL2}	-	V _{GH}	V	
Total Power Current	I _{LCD}	-	-	850	1105	mA	1
		-	-	1300	1690	mA	2
Total Power Consumption	P _{LCD}	-	-	10.8	14.04	Watt	1

Note:

1. The specified current and power consumption are under the V_{LCD}=12.7V., 25 ± 2°C, f_v=60Hz condition whereas mosaic pattern(8 x 6) is displayed and f_v is the frame frequency.
2. The current is specified at the maximum current pattern.
3. The above spec is based on the basic model.
4. All of the typical gate voltage should be controlled within 1% voltage level
5. Ripple voltage level is recommended under ±5% of typical voltage
6. In case of EPI signal spec, refer to Fig 2 for the more detail.
7. HVDD Voltage level is half of VDD and it should be between Gamma9 and Gamma10.

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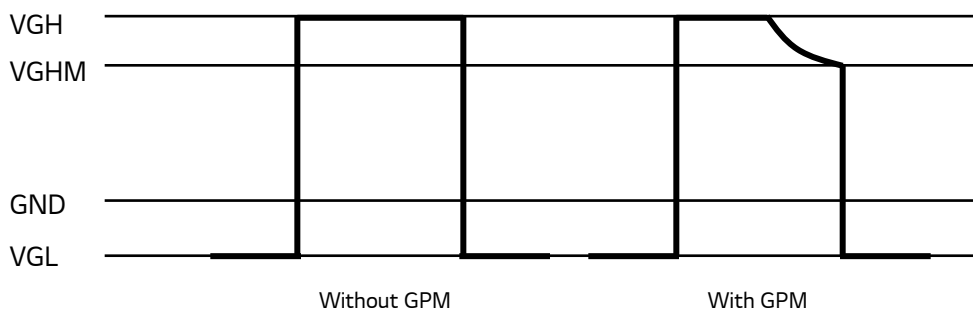


FIG. 1 Gate Output Wave form without GPM and with GPM

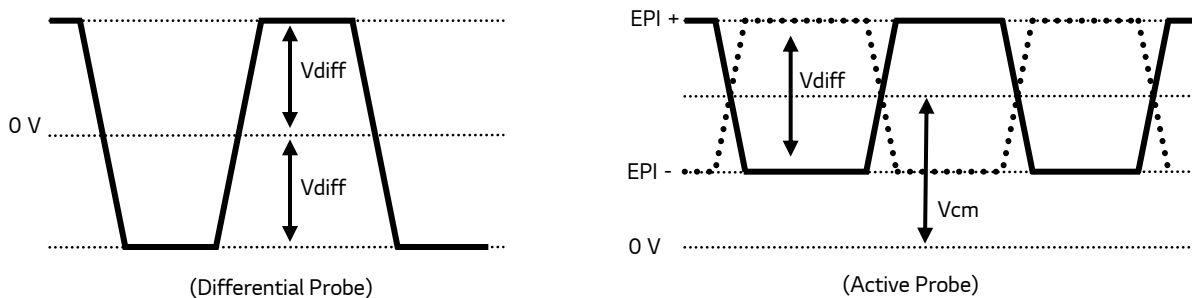


FIG. 2-1 EPI Differential signal characteristics

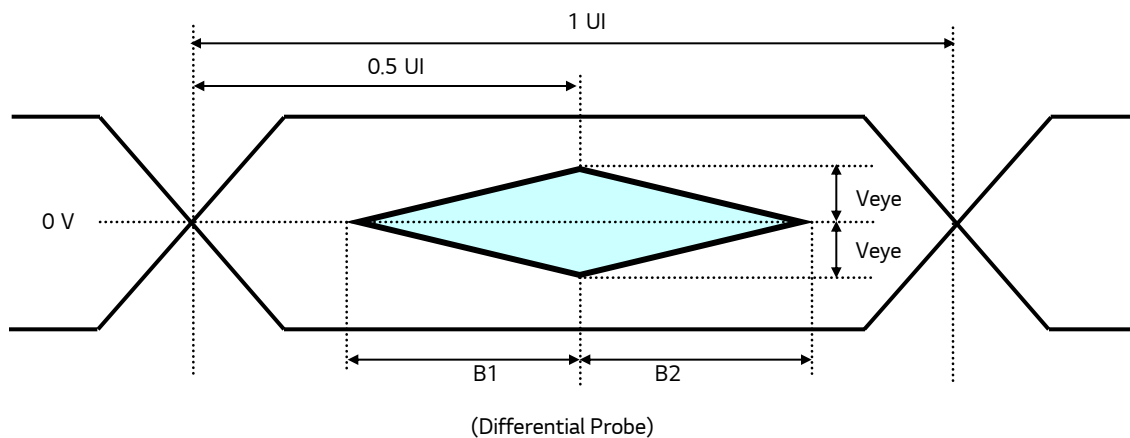


FIG. 2-2 Eye Pattern of EPI Input

*Source PCB

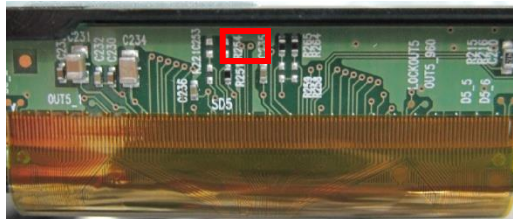


FIG. 3 Measure point

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Table 3. ELECTRICAL CHARACTERISTICS (Continue)

Ta=25±2°C, On Duty 100%

Parameter	Symbol	Values			Unit	Note	
		Min	Typ	Max			
Backlight Assembly :							
Forward Current (one array)	Anode	$I_{F (anode)}$		330		mAdc	2, 3
	Cathode	$I_{F (cathode)}$	104.5	110	115.5	mAdc	
Forward Voltage		V_F	99.4	106.6	113.8	Vdc	4
Forward Voltage Variation		ΔV_F			1.7	Vdc	5
Power Consumption		P_{BL}	-	70.3	75.1	W	6
Burst Dimming Duty		On duty	1		100	%	
Burst Dimming Frequency		1/T	95		182	Hz	7
LED Array : (APPENDIX-VI)							
Life Time			30,000			Hrs	8

Notes : The design of the LED driver must have specifications for the LED array in LCD Assembly.

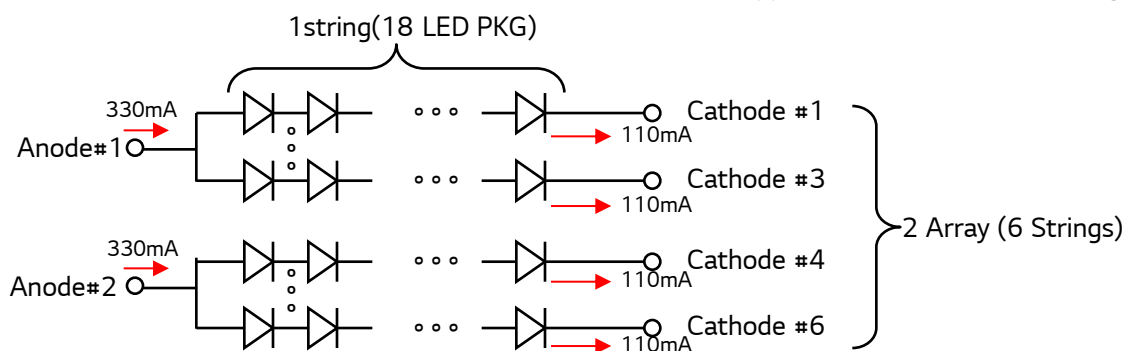
The electrical characteristics of LED driver are based on Constant Current driving type.

The performance of the LED in LCM, for example life time or brightness, is extremely influenced by the characteristics of the LED Driver. So, all the parameters of an LED driver should be carefully designed.

When you design or order the LED driver, please make sure unwanted lighting caused by the mismatch of the LED and the driver (no lighting, flicker, etc) has never been occurred. When you confirm it, the LCD-Assembly should be operated in the same condition as installed in your instrument.

1. Electrical characteristics are based on LED Array specification.
2. Specified values are defined for a Backlight Assembly. (IBL :2 LED array/LCM)
3. Each LED array has one anode terminal and three cathode terminals.

The forward current(I_F) of the anode terminal is 330mA and it supplies 110mA into three strings, respectively



4. The forward voltage(V_F) of LED array depends on ambient temperature (Appendix-VI)
5. ΔV_F means Max string V_F - Min string V_F in one Backlight. So V_F variation in a Backlight isn't over Max. 1.7V based on duty 100%
6. Maximum level of power consumption is measured at initial turn on.
Typical level of power consumption is measured after 1hrs aging at 25 ± 2°C.
7. The reference method of burst dimming duty ratio.
It is recommended to use synchronous V-sync frequency to prevent waterfall ($V_{sync} * 1 = \text{Burst Frequency}$)
Though PWM frequency is over 182Hz (max252Hz), function of backlight is not affected.
8. The life time is determined as the time at which brightness of the LED is 50% compared to that of initial value at the typical LED current on condition of continuous operating at 25 ± 2°C, based on duty 100%.

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3-2. Interface Connections

This LCD module employs two kinds of interface connection, two 60-pin FFC connector are used for the module electronics and 8-pin / 8-pin connectors are used for the integral backlight system.

3-2-1. LCD Module

- LCD Connector(CN1): TF06L-60S-0.5SH (manufactured by HIROSE), GF05G-60S-E2000 (manufactured by LS) , PF050-L60B-C21 (manufactured by UJU), 05002HR-H60Y(manufactured by YEONHO)

Table 4-1. MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	CLK1	GIP GATE Clock 1	31	GND	Ground
2	CLK2	GIP GATE Clock 2	32	NC	No Connection
3	CLK3	GIP GATE Clock 3	33	NC	No Connection
4	CLK4	GIP GATE Clock 4	34	GND	Ground
5	CLK5	GIP GATE Clock 5	35	EPI3_N	EPI Receiver Signal(3-)
6	CLK6	GIP GATE Clock 6	36	EPI3_P	EPI Receiver Signal(3+)
7	CLK7	GIP GATE Clock 7	37	GND	Ground
8	CLK8	GIP GATE Clock 8	38	EPI2_N	EPI Receiver Signal(2-)
9	CLK9	GIP GATE Clock 9	39	EPI2_P	EPI Receiver Signal(2+)
10	CLK10	GIP GATE Clock 10	40	GND	Ground
11	VGH	Gate High Voltage	41	EPI1_N	EPI Receiver Signal(1-)
12	VGH_ODD	GIP Panel VDD for Odd GATE TFT	42	EPI1_P	EPI Receiver Signal(1+)
13	VHG_EVEN	GIP Panel VDD for Even GATE TFT	43	GND	Ground
14	VGL2	Gate Low Voltage 2	44	V18	GAMMA VOLTAGE 18
15	GIP_RST	Reset Signal for GIP	45	V15	GAMMA VOLTAGE 15
16	VST	Vertical Start Pulse	46	V14	GAMMA VOLTAGE 14
17	VGL1	Gate Low Voltage 1	47	V13	GAMMA VOLTAGE 13
18	VCOM2	VCOM Left Bottom Input	48	V10	GAMMA VOLTAGE 10
19	VCOM_L_FB	VCOM Left Feed-Back Output	49	V9	GAMMA VOLTAGE 9
20	VCOM1	VCOM Left Top Input	50	V6	GAMMA VOLTAGE 6
21	GND	Ground	51	V5	GAMMA VOLTAGE 5
22	VDD	Driver Power Supply Voltage	52	V4	GAMMA VOLTAGE 4
23	VDD	Driver Power Supply Voltage	53	V1	GAMMA VOLTAGE 1
24	VDD	Driver Power Supply Voltage	54	FLASH_WP	Write protection for Flash memory
25	VDD	Driver Power Supply Voltage	55	FLASH_DO	Signal for Flash memory
26	HVDD	Half Driver Power Supply Voltage	56	FLASH_CS	Signal for Flash memory
27	VCC18	Logic & EPI Power Voltage	57	FLASH_DI	Signal for Flash memory
28	VCC18	Logic & EPI Power Voltage	58	GND	Ground
29	VCC12	Vterm Power Voltage	59	FLASH_CLK	Signal for Flash memory
30	LOCKOUT3	LOCKOUT3	60	VCC33	Flash memory Power voltage

**Note : 1. Please refer to application note for details.
(GIP & Half VDD & Gamma Voltage setting)**

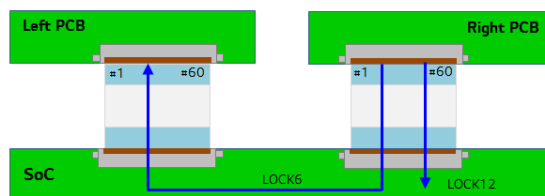
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- LCD Connector(CN1): TF06L-60S-0.5SH (manufactured by HIROSE), GF05G-60S-E2000 (manufactured by LS) , PF050-L60B-C21 (manufactured by UJU), 05002HR-H60Y(manufactured by YEONHO)

Table 4-2. MODULE CONNECTOR(CN2) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	NC	No Connection	31	LOCKIN3	LOCKIN3
2	NC	No Connection	32	VCC12	Vterm Power Voltage
3	NC	No Connection	33	VCC18	Logic & EPI Power Voltage
4	NC	No Connection	34	VCC18	Logic & EPI Power Voltage
5	GND	Ground	35	HVDD	Half Driver Power Supply Voltage
6	V18	GAMMA VOLTAGE 18	36	VDD	Driver Power Supply Voltage
7	V15	GAMMA VOLTAGE 15	37	VDD	Driver Power Supply Voltage
8	V14	GAMMA VOLTAGE 14	38	VDD	Driver Power Supply Voltage
9	V13	GAMMA VOLTAGE 13	39	VDD	Driver Power Supply Voltage
10	V10	GAMMA VOLTAGE 10	40	GND	Ground
11	V9	GAMMA VOLTAGE 9	41	VCOM1	VCOM Right Top Input
12	V6	GAMMA VOLTAGE 6	42	VCOM_FB	VCOM Right Feed-Back Output
13	V5	GAMMA VOLTAGE 5	43	VCOM2	VCOM Right Bottom Input
14	V4	GAMMA VOLTAGE 4	44	VGL1	Gate Low Voltage 1
15	V1	GAMMA VOLTAGE 1	45	VST	Vertical Start Pulse
16	GND	Ground	46	GIP_RST	Reset Signal for GIP
17	LOCKOUT6	LOCKOUT6	47	VGL2	Gate Low Voltage 2
18	GND	Ground	48	VHG_EVEN	GIP Panel VDD for Even GATE TFT
19	EPI6_N	EPI Receiver Signal(6-)	49	VGH_ODD	GIP Panel VDD for Odd GATE TFT
20	EPI6_P	EPI Receiver Signal(6+)	50	VGH	Gate High Voltage
21	GND	Ground	51	CLK10	GIP GATE Clock 10
22	EPI5_N	EPI Receiver Signal(5-)	52	CLK9	GIP GATE Clock 9
23	EPI5_P	EPI Receiver Signal(5+)	53	CLK8	GIP GATE Clock 8
24	GND	Ground	54	CLK7	GIP GATE Clock 7
25	EPI4_N	EPI Receiver Signal(4-)	55	CLK6	GIP GATE Clock 6
26	EPI4_P	EPI Receiver Signal(4+)	56	CLK5	GIP GATE Clock 5
27	GND	Ground	57	CLK4	GIP GATE Clock 4
28	NC	No Connection	58	CLK3	GIP GATE Clock 3
29	NC	No Connection	59	CLK2	GIP GATE Clock 2
30	GND	Ground	60	CLK1	GIP GATE Clock 1

**Note : 1. Please refer to application note for details.
(GIP & Half VDD & Gamma Voltage setting)**



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3-2-2. Backlight Module

[CN201]

1) LED Array assy Connector (Plug)

: HS100-L08N-N62 (black color, manufactured by UJU)

[CN202]

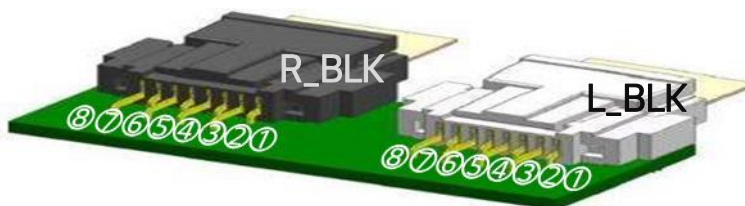
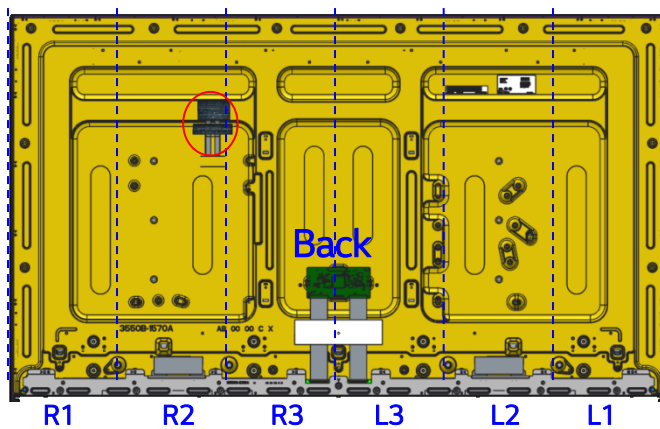
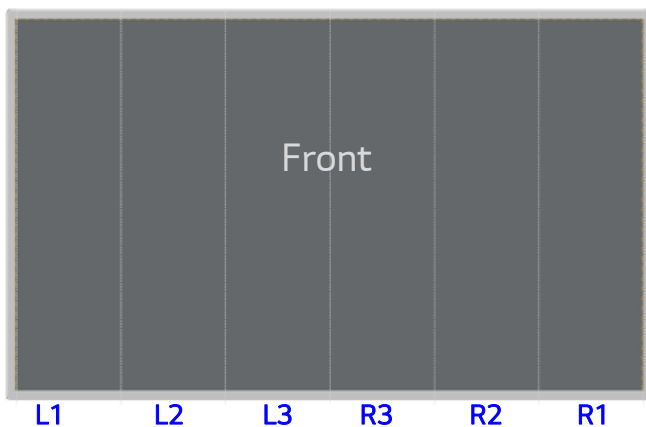
1) LED Array assy Connector (Plug)

: HS100-L08N-N62-A (White color, manufactured by UJU)

Table 5. BACKLIGHT CONNECTOR PIN CONFIGURATION(CN201,CN202)

No	Symbol	Description	Note
1	R1 Cathode	LED Output Current	
2	R2 Cathode	LED Output Current	
3	R3 Cathode	LED Output Current	
4	N.C	Open	
5	N.C	Open	
6	N.C	Open	
7	N.C	Open	
8	Anode_R	LED Input Current for R1~R3	

No	Symbol	Description	Note
1	Anode_L	LED Input Current for L1~L3	
2	N.C	Open	
3	N.C	Open	
4	N.C	Open	
5	N.C	Open	
6	L3 Cathode	LED Output Current	
7	L2 Cathode	LED Output Current	
8	L1 Cathode	LED Output Current	



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3-3. Signal Timing Specifications

Table 6. Timing Requirements

Parameter	Symbol	Condition	Min	Typ	Max	Unit	notes
Unit Interval	UI	-	0.33	-	0.667	ns	
Effective Veye width time	B1&B2	-	0.25	-	-	UI	Fig. 2
Modulation Ratio of SSC	Vspread	@100KHz	-	-	1	%	1
1 st data to SOE rising time	Ts1	-	3	-	-	Packet	Fig.4
SOE rising to last data	Ts4	-	0	-	-	Packet	Fig.4
Last data to SOE falling	Ts5	-	10	-	-	Packet	Fig.4
EPI Bandwidth	BW	-	2.0	-	3.05	GBPS	

notes : 1. VModulation Ratio of SSC for 20KHz ~ 100kHz Modulation Frequency is calculated by $(3 - 0.02 * F_{mod})$, where F_{mod} unit is KHz.

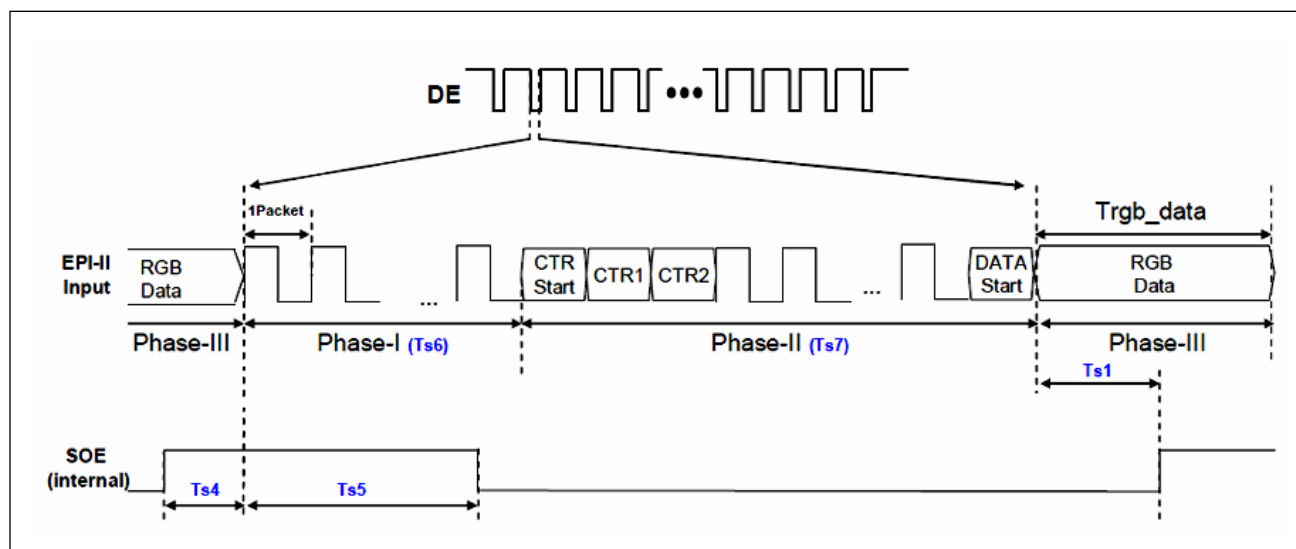


FIG 4. SOE Width & Timing

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3-5. Power Sequence

3-5-1. LCD Driving circuit

Power Supply For LCD VCC

Power Supply For LCD
VDD, HVDD, VGH, Gamma Ref.
VoltagePower Supply For LCD
VGL1, VGL2

GIP Signal For LCD

Power For LED

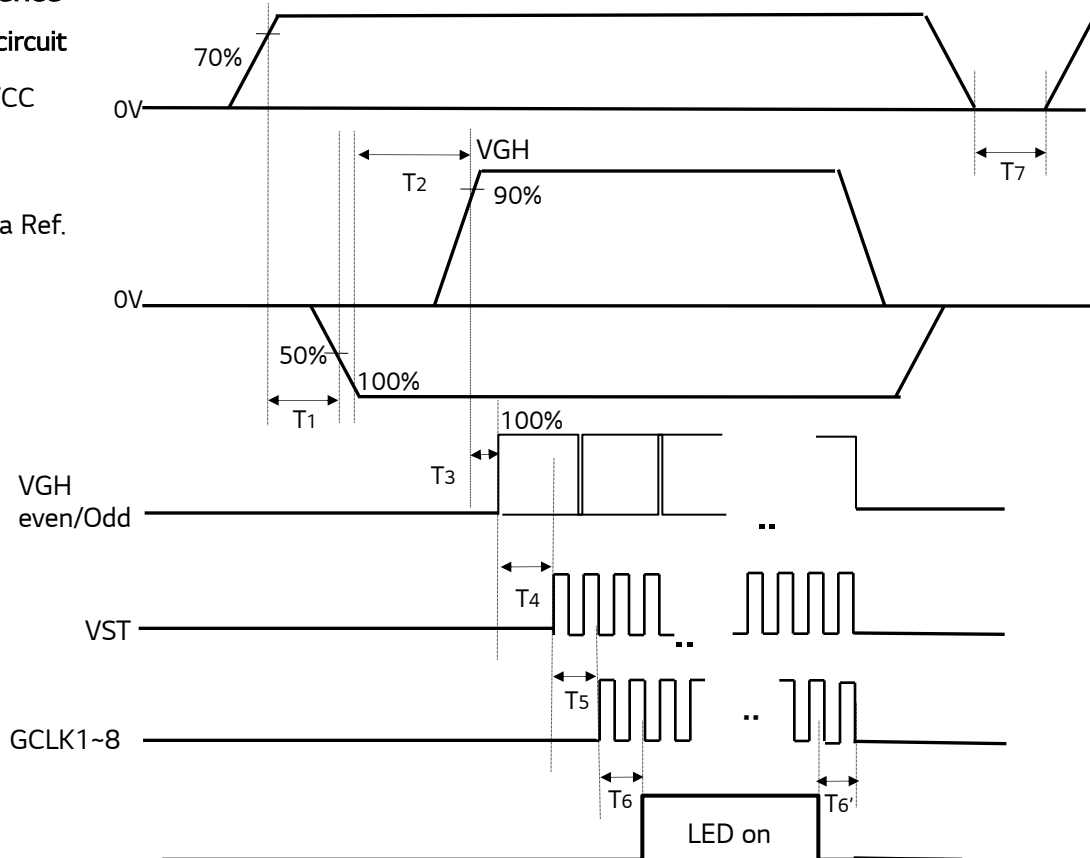


Table 7. POWER SEQUENCE

Ta= 25±2°C, fv=60Hz,

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	0.5	-	-	ms	
T2	0.5	-	-	ms	
T3	0	-	-	ms	
T4	10	-	-	ms	2
T5	0	-	-	ms	
T6 / T6'	20	-	-	ms	6
T7	2	-	-	s	

Note : 1. Power sequence for Source D-IC must follow the Case1 & 2.

※ Please refer to Appendix IV for more details.

2. VGH even & odd can not be "High at the same time.

3. Power Off Sequence order is reverse of Power On Condition including Source D-IC.

4. GCLK On/Off Sequence

:GCLK5 → GCLK4 → GCLK3 → GCLK2 → GCLK1 → GCLK10 → GCLK9 → GCLK8 → GCLK7 → GCLK6

5. VDD_odd/even transition time should be within V_blank

6. In case of T6', If there is no abnormal display, no problem

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4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable in a dark environment at $25\pm 2^{\circ}\text{C}$. The values are specified at distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0° . FIG. 6 shows additional information concerning the measurement equipment and method.

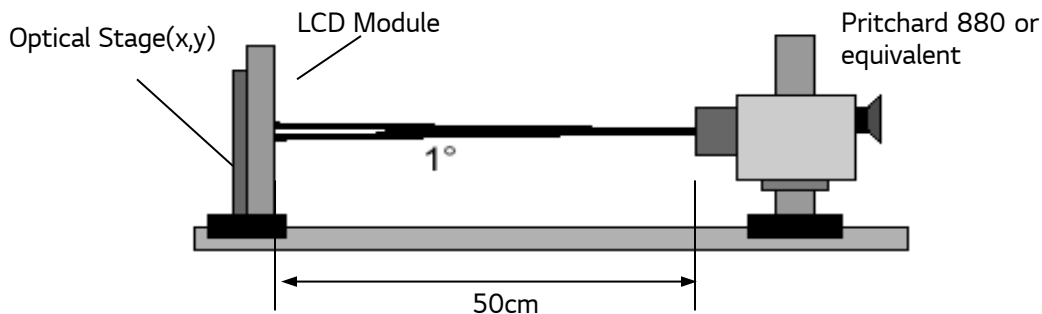


FIG. 6 Optical Characteristic Measurement Equipment and Method

$T_a = 25\pm 2^{\circ}\text{C}$, $V_{\text{LCD}} = 12.0\text{V}$, $f_v = 60\text{Hz}$, $D_{\text{clk}} = 74.25\text{MHz}$,

User Option : #16pin "L" (Low Power Mode), "H" (High Luminance), EXT_{VB}-B = 100%

Table 8. OPTICAL CHARACTERISTICS

Parameter	Symbol	Value			Unit	notes	
		Min	Typ	Max			
Contrast Ratio	CR	800	1200	-		1	
Surface Luminance, white	L_{WH} 2D	400(H) 270(L)	500(H) 330(L)		cd/m ²	2	
Luminance Variation	δ_{WHITE} 9P	65			%	3	
Response Time	Gray-to-Gray	G to G	8	12	ms	4	
Color Coordinates [CIE1931]	RED	Rx	0.646	Typ +0.03		2	
		Ry	0.331				
	GREEN	Gx	0.302				
		Gy	0.621				
	BLUE	Bx	0.152				
		By	0.049				
	WHITE	Wx	0.281				
	Wy	0.288					
Color Temperature			10,000		K		
Color Gamut	DCI		84		%		
Viewing Angle (CR>10)							
	x axis, right($\phi=0^{\circ}$)	θ_r (x axis)	89	-	-	degree	5
	x axis, left ($\phi=180^{\circ}$)	θ_l (x axis)	89	-	-		
	y axis, up ($\phi=90^{\circ}$)	θ_u (y axis)	89	-	-		
	y axis, down ($\phi=270^{\circ}$)	θ_d (y axis)	89	-	-		
Gray Scale			-	-	-		6

Product Specification

notes : 1. Contrast Ratio(CR) is defined mathematically as :

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

It is measured at center 1-point.

2. Optical Characteristics is determined after the unit has been 'ON' and 1 Hour after lighting the backlight in a dark environment at $25 \pm 2^\circ\text{C}$. Surface luminance is the luminance value at center 1-point across the LCD surface 50cm from the surface with all pixels displaying white.

For more information see the FIG. 6

※L : Low Power Mode, H : High Luminance Mode.

3. The variation in surface luminance, δWHITE is defined as :

$$\delta\text{WHITE}(9\text{P}) = \text{Minimum (Lon1, Lon2~ Lon8, Lon9)} / \text{Maximum (Lon1, Lon2~ Lon8, Lon9)} * 100$$

Where Lon1 to Lon9 are the luminance with all pixels displaying white at 9 locations.

For more information, see the FIG. 7.

4. Response time is the time required for the display to transit from G(N) to G(M) (Rise Time, Tr_R) and from G(M) to G(N) (Decay Time, Tr_D). For additional information see the FIG. 8. ($N < M$)

※ G to G Spec stands for average value of all measured points.

Photo Detector : RD-80S / Field : 2°

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 module surface. For more information, see the FIG. 9.

6. Gray scale specification

Gamma Value is approximately 2.2. For more information, see the Table 9.

Table 9. GRAY SCALE SPECIFICATION

Gray Level	Luminance [%] (Typ)
L0	0.09
L15	0.28
L31	1.05
L47	2.50
L63	4.69
L79	7.67
L95	11.47
L111	16.11
L127	21.64
L143	28.07
L159	35.43
L175	43.73
L191	52.99
L207	63.23
L223	74.47
L239	86.72
L255	100

	Gray Level	Gamma Ref.
Positive Voltage	L0	Gamma9
	L63	Gamma6
	L127	Gamma5
	L255	Gamma1
Negative Voltage	L255	Gamma18
	L127	Gamma14
	L63	Gamma13
	L0	Gamma10

Product Specification

Measuring point for surface luminance & measuring point for luminance variation.

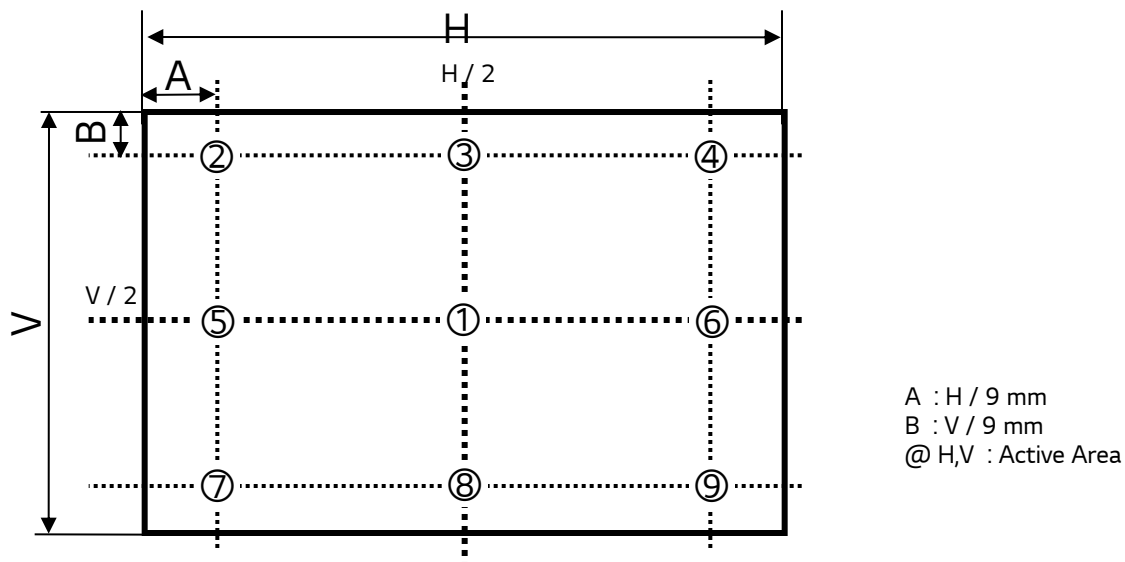


FIG. 7 9 Points for Luminance Measure

Response time is defined as the following figure and shall be measured by switching the input signal for "Black" ~ "White" and "White" ~ "Black".

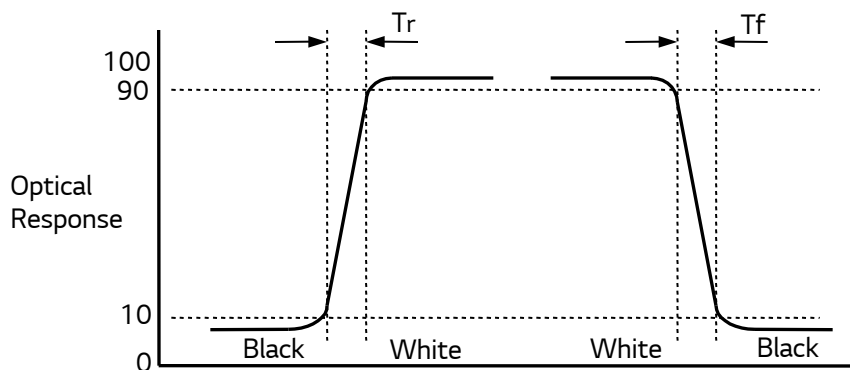


FIG. 8 Response Time

Product Specification

Dimension of viewing angle range

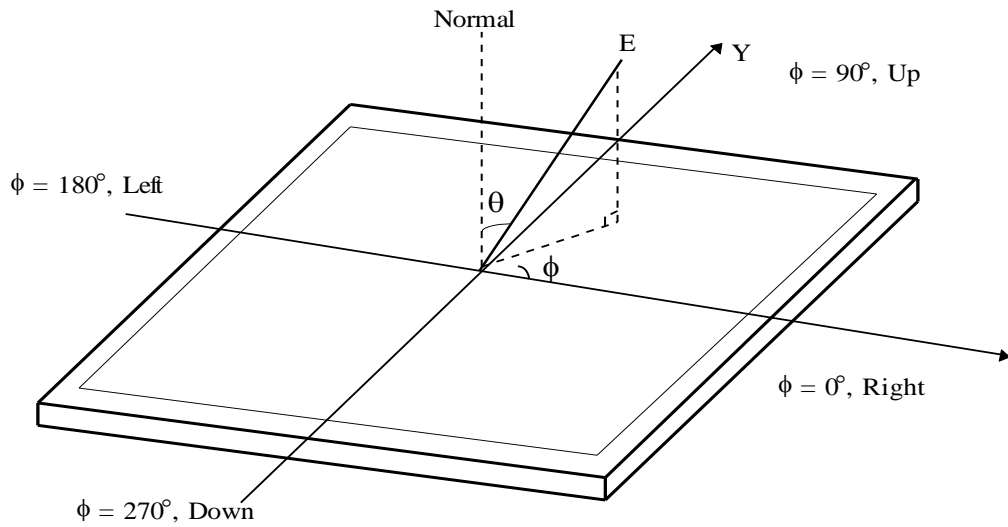


FIG.9 Viewing Angle

Product Specification

5. Mechanical Characteristics

Table 10 provides general mechanical characteristics.

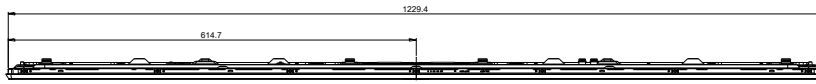
Table 10. MECHANICAL CHARACTERISTICS

Item	Value	
Outline Dimension	Horizontal	1236.92 mm
	Vertical	712.51 mm
	Depth	15.1 mm
Bezel Area	Horizontal	1231.6 mm
	Vertical	684.9 mm
Active Display Area	Horizontal	1209.6 mm
	Vertical	680.4 mm
Weight	12.0Kg (Typ.), 12.6 kg (Max.)	
Case Top	Material	SUS-like PCM
	Case Top Color	Meteor Titan (HCC12B)
	LG Logo Color	Silver (LGE Pantone 877C)

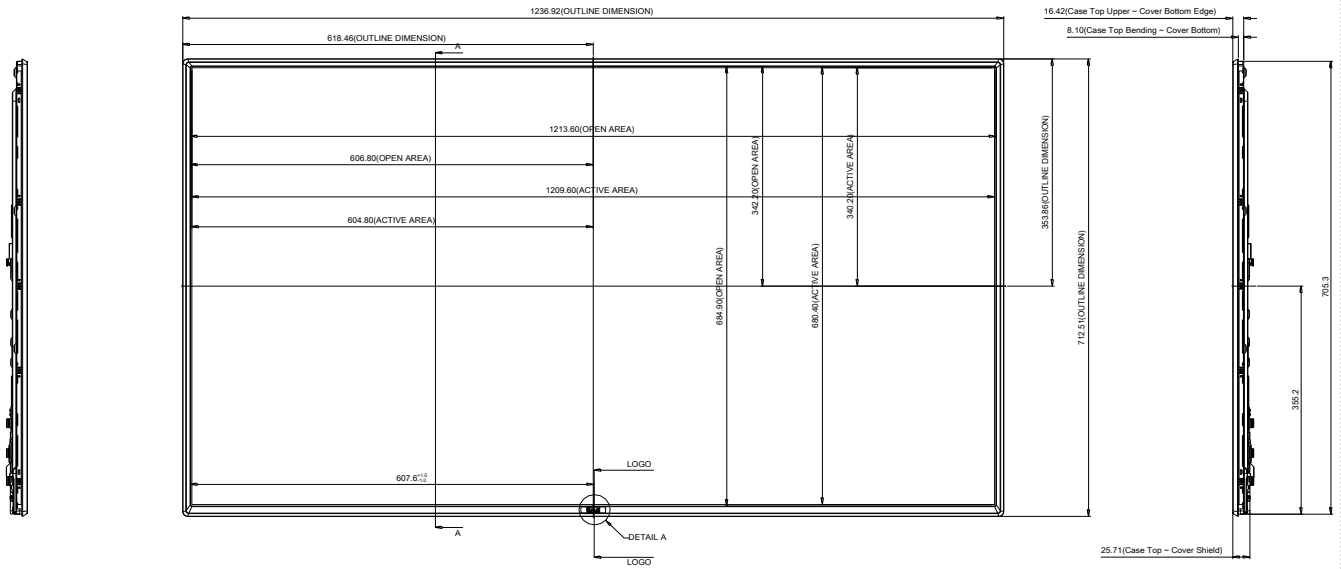
Note : Please refer to a mechanic drawing in terms of tolerance at the next page.

Product Specification

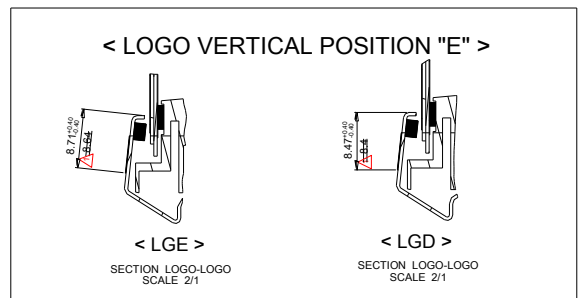
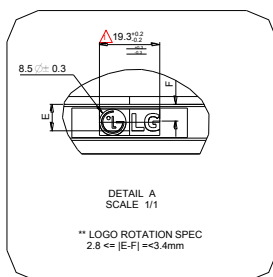
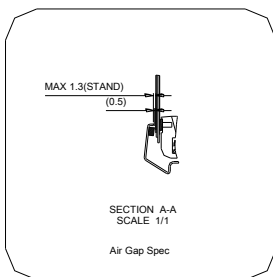
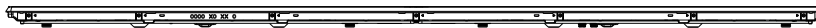
[FRONT VIEW]



SET : TOP



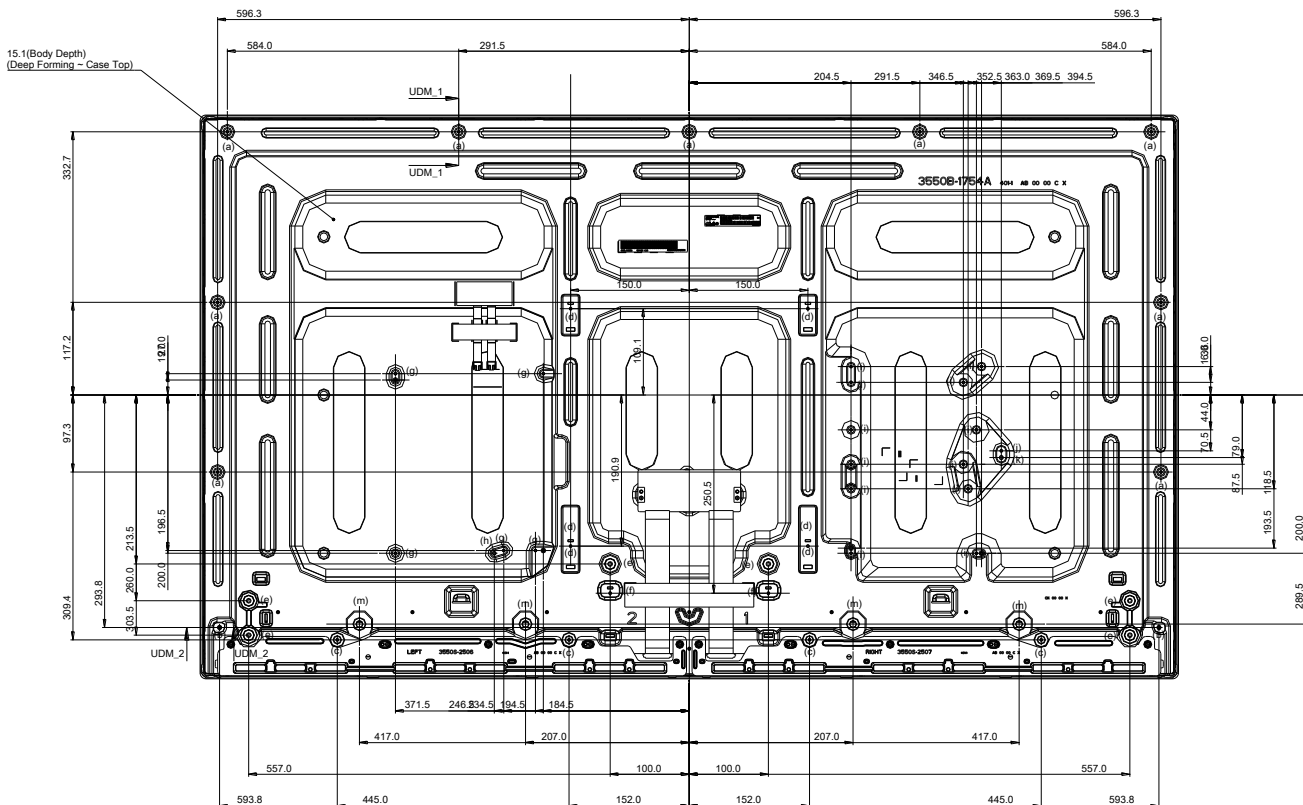
SET : DOWN



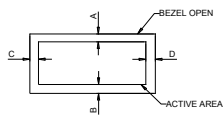
Product Specification

[REAR VIEW]

SET : TOP

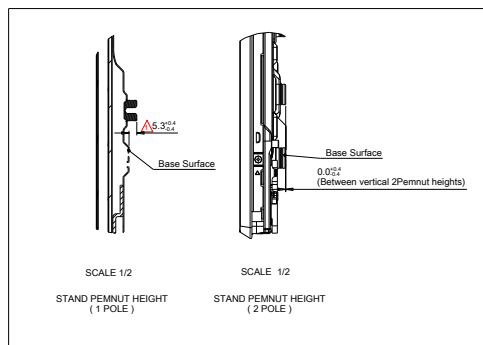


SET : DOWN

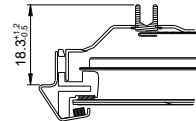
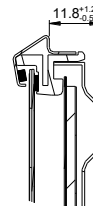


- NOTES
1. Unspecified tolerance is $\pm 1.0\text{mm}$.
 2. Tilt and partial disposition tolerance of display area as following.
 - (a) X-Direction : $\pm 2.0\text{mm}$
 - (b) Y-Direction : $\pm 2.0\text{mm}$
 3. CNT Specification is
 - Left(White Color) : HS100-L08N-N62-A(LUU Elec.)
 - Right(Black Color) : HS100-L08N-N62(LUU Elec.)
 4. Max Torque : Refer to table.
 5. Max Depth(Screw) : Refer to table.
 6. The same feature means the same dimension.
 7. Designer's approval is required before mass-production.
 8. CAS Version : 0.3

ITEM	TAP	UDM HEIGHT (mm)	MAX DEPTH (mm)	TORQUE (Kgf.cm)	Notes
(a)	M3.0	3.7	3.2	Max 6.0	9ea
(b)	M3.0	5.7	2.4	Max 6.0	2ea
(c)	M3.0	4.0	3.6	Max 6.0	4ea
(d)	M3.0	1.4	7.0	Max 6.0	6ea
(e)	M4.0	10.0	6.0	Max 8.0	6ea
(f)	M3.0	3.5	7.0	Max 6.0	2ea
(g)	M3.0	4.5	4.0	Max 6.0	5ea
(h)	M4.0	4.5	4.0	Max 8.0	1ea
(i)	M3.0	9.8	7.0	Max 6.0	12ea
(j)	M3.0	4.6	4.0	Max 6.0	1ea
(k)	M4.5	4.6	4.0	Max 8.0	1ea
(m)	$\varnothing 6.0$	9.1	7.0	-	4ea



$\Delta < \text{UDM POINT HEIGHT} >$



Date	Version
16.06.24	0.0
16.07.26	0.1
16.10.25	0.2
16.11.01	0.3
17.02.28	0.4
17.05.17	0.5

Product Specification

6. Reliability

Table 11. ENVIRONMENT TEST CONDITION

No.	Test Item	Condition
1	High temperature storage test	Ta= 60°C 90% 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 50°C 50%RH 500h
4	Low temperature operation test	Ta= 0°C 500h
5	Humidity condition Operation	Ta= 40 °C ,90%RH
6	Altitude operating storage / shipment	0 - 16,400 ft 0 - 40,000 ft
7	Vibration test (non-operating)	Wave form : Random Vibration Level 0.5Grms Bandwidth : 10 ~ 300Hz Duration : X, Y, Z Each direction Per 10min
8	Shock test (non-operating)	Shock Level : 20G Waveform : Half Sine Wave, 11ms Duration : X, Y, Z One time each direction
9	Panel Push Test (Module Condition)	Max 6kgf

Note : Before and after Reliability test, LCM should be operated with normal function.

Product Specification

7. International Standards

7-1. Safety

- a) UL 60065, Underwriters Laboratories Inc.
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- b) CAN/CSA C22.2 No.60065:03, Canadian Standards Association.
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- c) IEC 60065, The International Electrotechnical Commission (IEC).
Audio, Video and Similar Electronic Apparatus - Safety Requirements.

7-2. Environment

- a) RoHS, Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011

Product Specification

8. Packing

8-1. Information of B/Ass'y Label

a) Lot Mark

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

A,B,C : SIZE(INCH)

E : MONTH

D : YEAR

F ~ M : SERIAL NO.

notes

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 front side of the Left Source PCB.
This is subject to change without prior notice.

8-2. Packing Form

a) Package quantity in one Pallet : 18 pcs

b) Pallet Size : 1440 mm(W) X 1140 mm(D) X 960 mm(H)

Product Specification

9. Precautions

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

9-1. Mounting Precautions

- (1) You must mount a module using specified mounting holes (Details refer to the drawings).
- (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 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 benzine. 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.
- (10) Touching the LED Driver might cause an electric shock and damage to LED Driver. Please always use antistatic tools when handling the LED Driver

9-2. Operating Precautions

- (1) Response time depends on the temperature.(In lower temperature, it becomes longer.)
- (2) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, Stable time(required time that brightness is stable after turned on) becomes longer
- (3) 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.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) 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.

Product Specification

9-3. 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.

9-4. Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

9-5. 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.
- (3) Storage condition is guaranteed under packing conditions.
- (4) The phase transition of Liquid Crystal in the condition of the low or high storage temperature will be recovered when the LCD module returns to the normal condition.

9-6. Handling Precautions for Protection Film

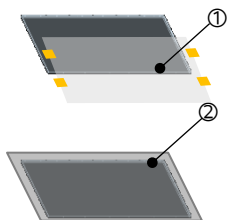
- (1) The protection film is attached to the bezel with a small masking tape.
When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) 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 bezel after the protection film is peeled off.
- (3) You can remove the glue easily. When the glue remains on the bezel 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

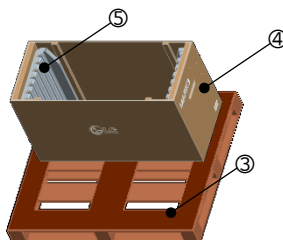
APPENDIX- I

■ Pallet Ass'y

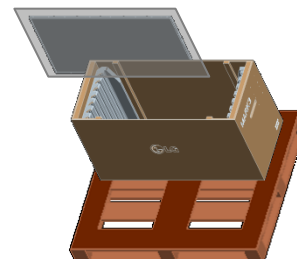
1



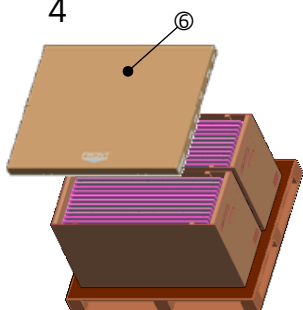
2



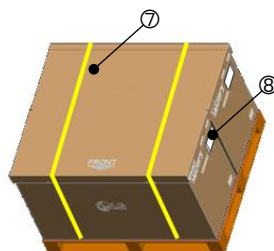
3



4



5



NO.	DESCRIPTION	MATERIAL
①	Protect Film	PET
②	AL BAG	AL
③	PALLET	PLYWOOD 1440×1140×134.5mm
④	PACKING,BOTTOM	PAPER
⑤	PACKING,SIDE RIB	EPS
⑥	PACKING, TOP	PAPER
⑦	BAND,CLIP	STEEL , PP
⑧	LABEL	YUPO 80G 100X70

Product Specification

APPENDIX- II-1

■ LCM Label



■ Production site

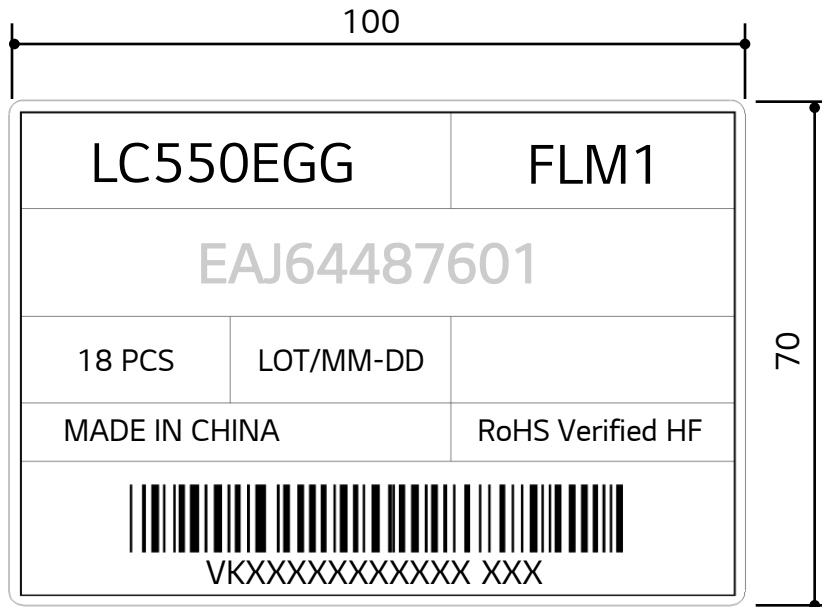
- LG Display (Guangzhou) Co., LTD

Notes : The origin of LCM Label will be changed according to the production site.

Product Specification

APPENDIX- II-2

■ Pallet Label



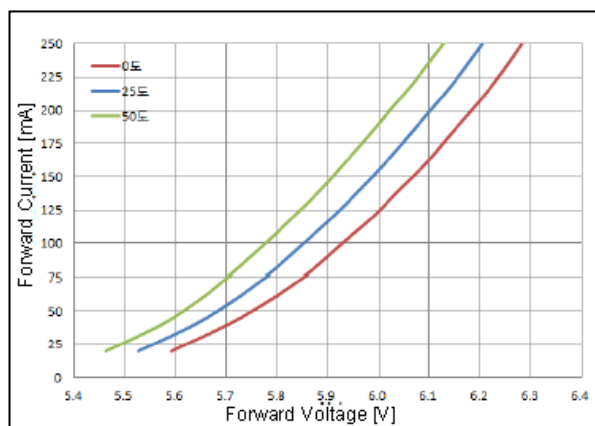
Product Specification

APPENDIX- III

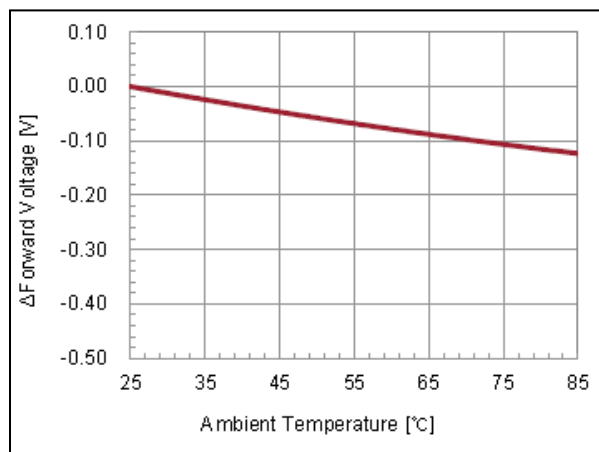
■ LED Array Electrical Spec

Items	Symbol	Condition	Min	Typ	Max	Unit
Array Operating Voltage	V_f	$I_{fM}=330mA$ ¹⁾	99.4	106.6	113.8	V
	ΔV_f ²⁾	$I_{fM}=330mA$	-	-	1.7	V

■ Forward Current vs. Forward Voltage



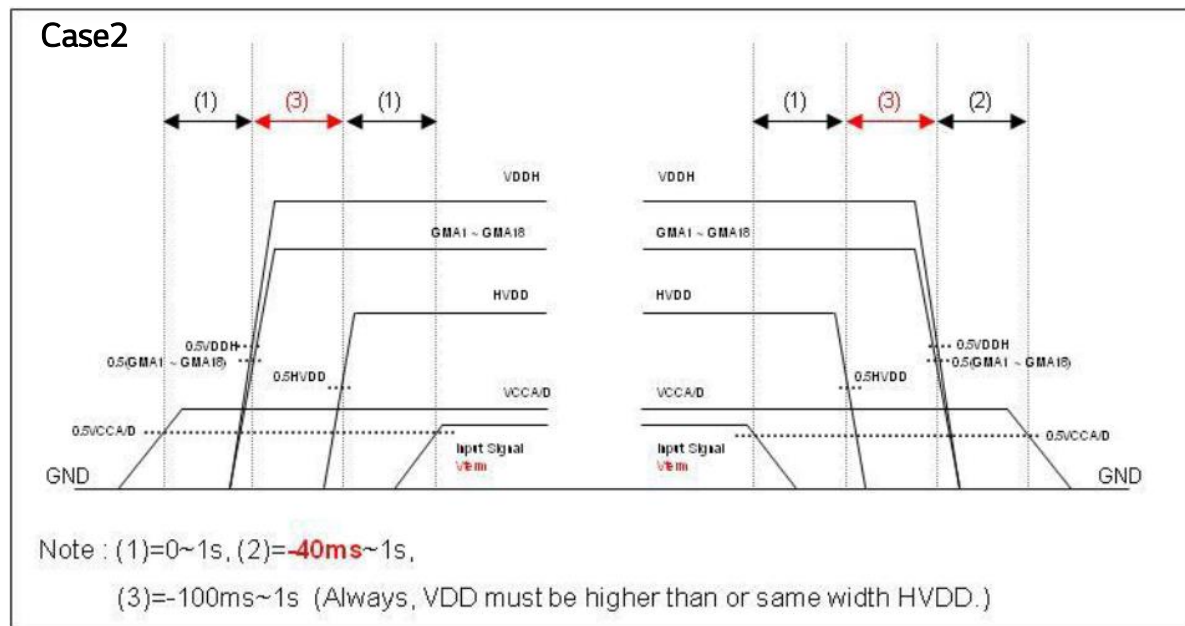
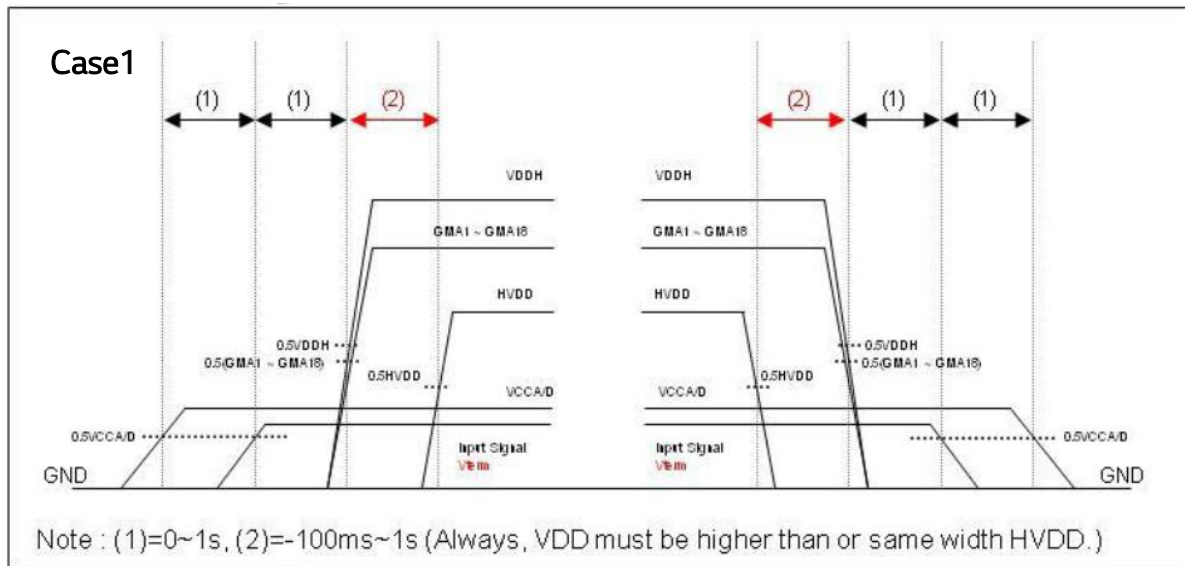
■ Ambient Temperature vs. Forward Voltage



Product Specification

APPENDIX- IV

■ Source D-IC Power Sequence



- Input Signal : EPI

APPENDIX - V

■ The reference method of BL dimming

It is recommended to use synchronous V-sync frequency to prevent waterfall
(Vsync * 2 =P-Dim Frequency)