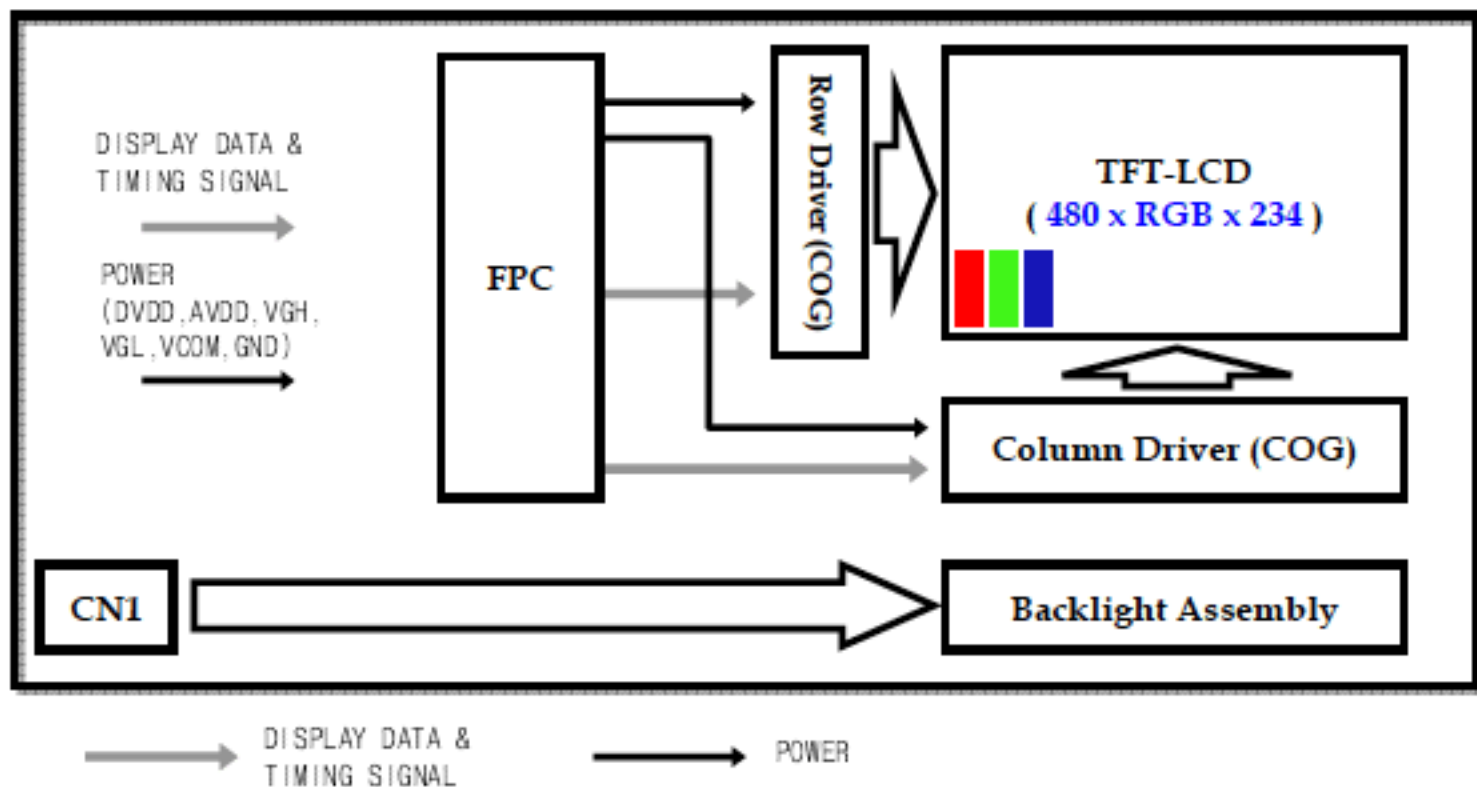# 1. Summary

This module utilizes amorphous silicon thin film transistors and a 17.07:9 aspect ratio. A 6.95" active matrix liquid crystal display allows 262,144 colors to be displayed.
The applications are Car Navigation System, Amusement and others AV system.

2. Features

- Utilizes a panel with a 17.07:9 aspect ratio, which makes the module suitable for use in wide-screen systems.
- The 6.95" screen produces a high resolution image that is composed of 112,320 pixel elements in a stripe arrangement.
- Wide viewing angle technology is employed.
  [The most suitable viewing direction is in the 6 o'clock direction.]
- By adopting an active matrix drive, a picture with high contrast is realized.
- A thin, light and compact module is accomplished through the use of COG mounting technology.
- By adopting a high aperture panel, high transmittance color filter and high transmission polarizing plates, transmittance ratio is realized.
- Gray scale or the brightness of the sub-pixel color is determined with a 6-bit gray scale signal.

DISPLAY DATA & TIMING SIGNAL

POWER
(DVDD, AVDD, VGH, VGL, VCOM, GND)

FPC

Row Driver (COG)

TFT-LCD
(480 x RGB x 234)

Column Driver (COG)

CN1

Backlight Assembly

DISPLAY DATA & TIMING SIGNAL

POWER

3. General Specification

Characteristic Item	Specification
Input Signal Type	Digital, RGB (6bit)
Display Mode	Normally White, Transmitting Type
Screen Size (Diagonal)	6.95"(176.574mm)
Aspect Ratio	17.07:9
Outline Dimension (W x H x D)	167.0mm (H) X 93.0mm (V) X 6.8mm (D)
Active Area	156.24(H) [mm] X 82.368(V) [mm] (Typ.)
Number Of dots	480(H) X 3(R, G, B) X 234(V)
Dot Pitch	0.1085(W) [mm] X 0.352(H) [mm]
Color Depth	6 Bit, 262,144 Colors
Pixel Pitch	0.3255mm(H) × 0.352mm(V)
Color Filter Array	RGB vertical stripes
Weight	175.5g
Backlight	CCFL
Surface Treatment	Anti-Glare Treatment

4-1. FPC Pin Configuration

Pin	Symbol	Description	Notes
1	VCOM	Voltage Applied To Color Filter Substrate	
2	VCOM	Voltage Applied To Color Filter Substrate	
3	GND	Ground	
4	VGL	Gate Driver Negative Voltage	
5	VGL	Gate Driver Negative Voltage	
6	GSPU	Gate Scanning Up Start Signal	4-1.1
7	U/D	Fixed 3.3v	4-1.1
8	GSC	Gate Driver Scanning Clock Pulse	
9	GOE	Gate Driver Output Enable Control	
10	GSPD	Gate Scanning Down Start Signal	4-1.1
11	GND	Ground	
12	GND	Ground	
13	VGH	Gate Driver Positive Voltage	
14	GND	Ground	
15	SSPR	Source Scanning Right Start Signal	4-1.1
16	DVDD	Power Voltage For Logic	
17	DVDD	Power Voltage For Logic	
18	DVDD	Power Voltage For Logic	
19	GND	Ground	
20	SSC	Source Driver Clock Input	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	AVDD	Power Line For Source Driver IC	
25	AVDD	Power Line For Source Driver IC	
26	POL	Polarity Control Signal	
27	SOE	Source Driver Output Enable Control	
28	L_R	Fixed 3.3v	4-1.1
29	REV	Pixel Data Inversion Signal	
30	R5	Red Data 5 [MSB]	

Pin	Symbol	Description	Notes
31	R4	Red Data 4	
32	R3	Red Data 3	
33	R2	Red Data 2	
34	R1	Red Data 1	
35	R0	Red Data 0 [LSB]	
36	G5	Green Data 5 [MSB]	
37	G4	Green Data 4	
38	G3	Green Data 3	
39	G2	Green Data 2	
40	G1	Green Data 1	
41	G0	Green Data 0 [LSB]	
42	B5	Blue Data 5 [MSB]	
43	B4	Blue Data 4	
44	B3	Blue Data 3	
45	B2	Blue Data 2	
46	B1	Blue Data 1	
47	B0	Blue Data 0 [LSB]	
48	VREF10	Voltage For Gamma Correction	
49	VREF9	Voltage For Gamma Correction	
50	VREF8	Voltage For Gamma Correction	
51	VREF7	Voltage For Gamma Correction	
52	VREF6	Voltage For Gamma Correction	
53	VREF5	Voltage For Gamma Correction	
54	VREF4	Voltage For Gamma Correction	
55	VREF3	Voltage For Gamma Correction	
56	VREF2	Voltage For Gamma Correction	
57	VREF1	Voltage For Gamma Correction	
58	GND	Ground	
59	SSPL	Source Scanning Left Start Signal	4-1.1
60	GND	Ground	

* Input connector for the operation : GF05A-60S-AF manufactured by LS Cable or equivalent.

[Note 4-1.1] Detail Description of Pin Functions

1. U_D is used as input pin for the vertical scanning direction. If U_D is 'H', GSPU is the Input Pin for the Gate Start Pulse(GSP). U_D 'H' is only available for LB070WQ7-TD02.

U_D	Output Shift	GSP Input Pin
H	From Up to Down	GSPU

2. L_R is used as input pin for the horizontal scanning direction. If L_R is 'H', SSPL is the Input Pin for the Source Start Pulse(SSP). L_R 'H' is only available for LB070WQ7-TD02.

L_R	Scanning Direction	SSP Input Pin
H	From Left to Right	SSPL

4-2. Backlight Pin Configuration

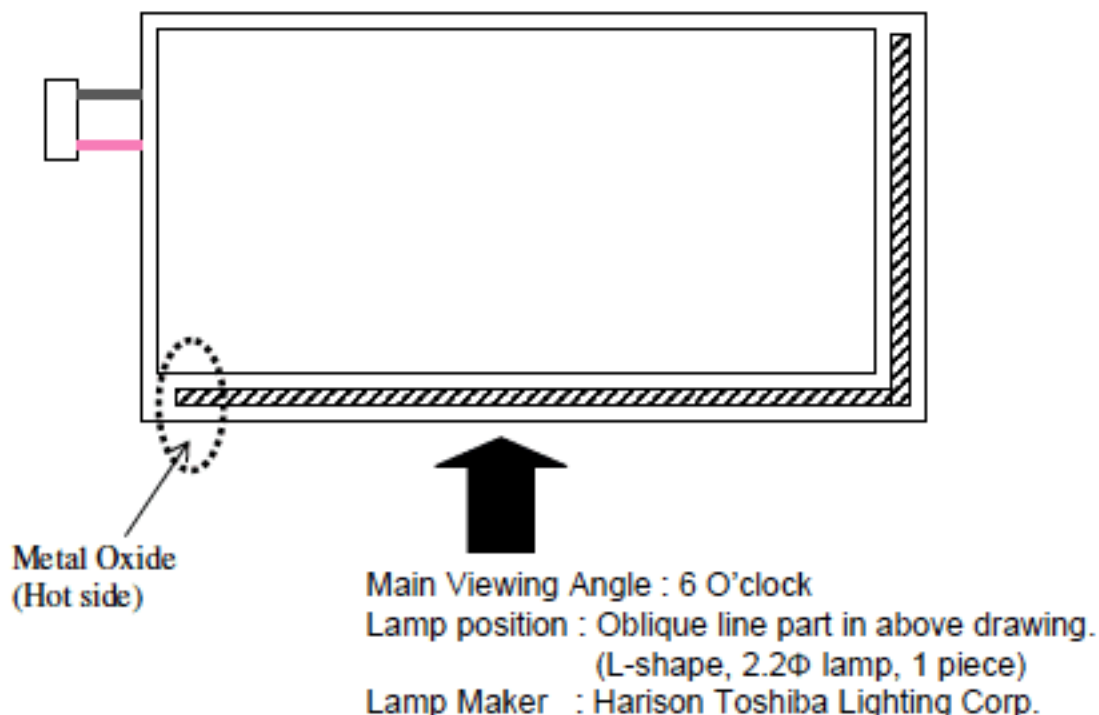| Terminal	Pin	Symbol	Function	Notes
CN1	1	HV	Power Supply For Lamp [High Voltage Side]	4-2.1
	-	-	-	-
	3	LV	Power Supply For Lamp [Low Voltage Side]	4-2.2

The backlight interface connector is a model **BHR-03VS-1** manufactured by JST.
The mating connector is **SM02(8.0)B-BHS-1-TB** or equivalent.

[Note 4-2.1] The wire color of high voltage side is pink.
[Note 4-2.2] The wire color of low voltage side is white. Connect the low voltage side of the DC/AC
inverter used to drive the fluorescent tube to GND of the inverter circuit.

4-3. Backlight Fluorescent Tube Structure

Metal Oxide
(Hot side)

Main Viewing Angle : 6 O'clock
Lamp position : Oblique line part in above drawing.
(L-shape, 2.2Φ lamp, 1 piece)
Lamp Maker : Harison Toshiba Lighting Corp.

5. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Logic Voltage	DVDD	-0.3	5	V	
Logic Input Voltage	V_{Logic} (Logic Input)	-0.3	DVDD+0.3	V	5-1
Gamma Reference Voltage	V_{GMA} (Vref 1~5)	0.4AVDD	AVDD+0.3		
	V_{GMA} (Vref 6~10)	-0.3	0.6AVDD	V	
Source Driver Voltage	AVDD	-0.3	13.5	V	
Gate Driver Voltage	VGH-VGL	-0.3	40	V	
	VGL	-20	0.3	V	
Lamp Current	IL	-	7.0 (25℃) 10.5 (-20℃)	mA(rms)	
Storage Temperature	Ta	-40	85	℃	5-2,3,4
Operating Temperature	Tp	-30	85	℃	5-2,3,4,5

[Note 5-1] GSC, GSPU, GSPD, U/D, GOE, SSC, SSPL, SSPR, REV, L/R, SOE, POL
[Note 5-2] This rating applies to all parts of the module and should not be exceeded.
[Note 5-3] Maximum wet-bulb temperature is 58℃. Condensation of dew must be avoided as electrical current leaks will occur, causing a degradation of performance specifications.
[Note 5-4] Ambient Temperature when the backlight is on(reference value).
[Note 5-5] The operating temperature only guarantees operation of the LCM and doesn't guarantee all the contents of Electro-optical specification.

6. Electrical Specification

6-1. Electrical Characteristics

Ta=25℃

Parameter			Symbol	Min.	Typ.	Max.	Unit	Notes
Logic Supply Voltage			DVDD	3.0	3.3	3.6	V	
Digital Input Signal	High Level		V_{IH}	0.7DVDD	-	DVDD	V	
	Low Level		V_{IL}	0	-	0.3DVDD	V	
Source Driver	Supply Voltage		AVDD	8.0	10.0	12.0	V	
	Gamma Correction Voltage		VREF	GND+0.1	-	AVDD-0.1	V	6-1.1
Gate Driver	TFT	Hi	VGH	10.0	18.5	20.0	V	
		Lo	VGL	-8.0	-6.8	-5.0	V	
		Voltage Difference	DVDD-VGL	5.0	-	20.0	V	
			VGH-VGL	10.0	-	38.0	V	
	Logic Supply Voltage		DVDD	3.0	3.3	3.6	V	
Color Filter Substrate Voltage			VCOM	3.0	4.5	6.0	V	
Source Driver	Supply Current		I_{AVDD}	-	-	35	mA	6-1.2
	Logic Voltage Supply Current		I_{DVDD-S}	-	-	7.5	mA	6-1.2
Gate Driver	High Voltage Current Consumption		I_{VGH}	-	-	1	mA	6-1.3
	Logic Current		I_{DVDD-G}	-	-	0.1	mA	6-1.3

[Note 6-1.1] Recommended Gamma Correction Voltage [VREF0 to VREF10]

Symbol	Typ.	Unit
VREF1	9.2	V
VREF2	8.7	V
VREF3	7.18	V
VREF4	6.23	V
VREF5	5.94	V
VREF6	4.435	V
VREF7	4.04	V
VREF8	3.01	V
VREF9	1.14	V
VREF10	0.57	V

[Note 6-1.2] V_{IH} = DVDD, V_{IL} = GND, SOE Pulse Width = 2.87us, f_{CLK} = 8.5MHz, AVDD = 10V,
V1 = 8V / V10 = 0.4V, with No Load.

[Note 6-1.3] V_{IH} = DVDD, V_{IL} = GND, GOE Pulse Width = 2.75us, f_{GSC} = 15.75kHz, fGSPU = 15.91Hz,
with Probe Load.

6-2. Power Sequence
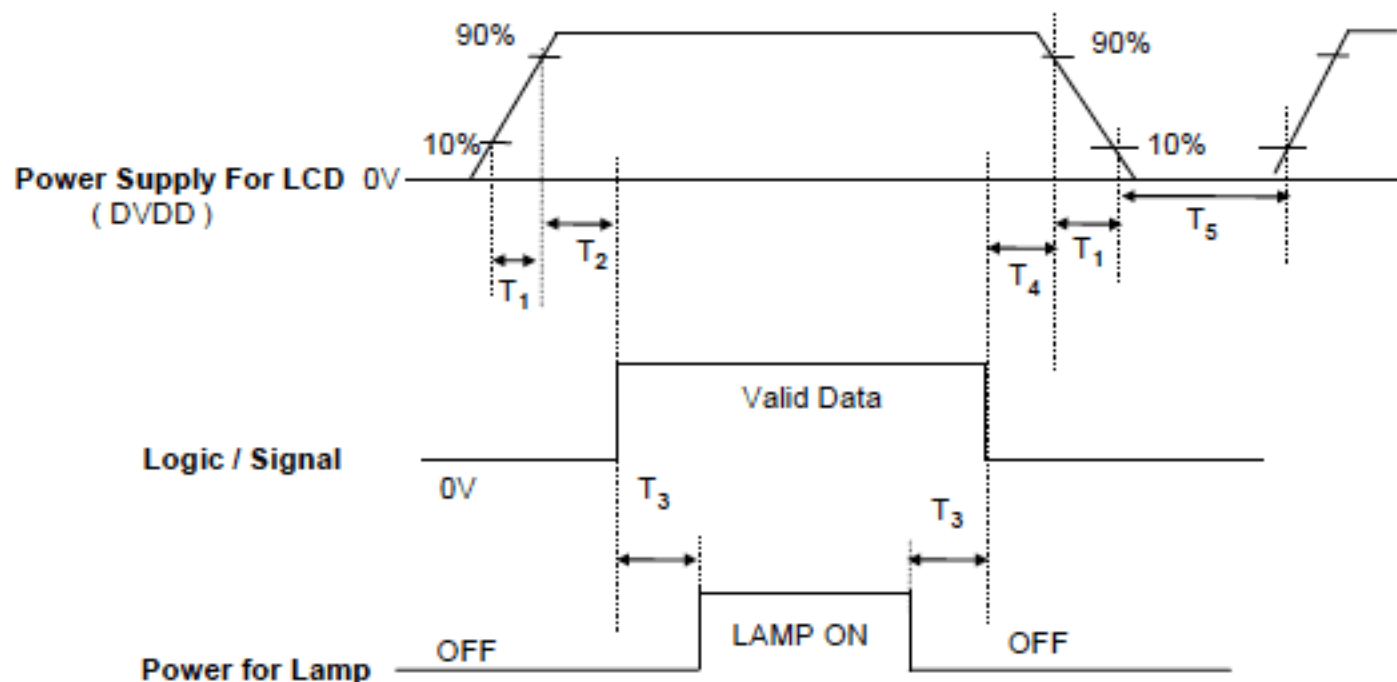
Parameter	Value			Unit
	Min.	Typ.	Max.	
T_1	0	-	10m	
T_2	100u	-	-	
T_3	200m	-	-	Sec
T_4	0	-	50m	
T_5	400m	-	-	

* Please avoid floating state of interface signal at invalid period.
* When the interface signal is invalid, be sure to pull down the power supply for LCD VCC to 0V.
* Lamp power must be turned on after power supply for LCD and interface signal are valid.

6-3. Power On/Off Sequence

6-3.1 Power On Sequence

Parameter		Timing				Notes
		Min.	Typ.	Max.	Unit	
Power On	t1	100u	10m	-	Sec	6-3.1
	t2	0	-	-		
	t3	1m	-	-		
	t4	t3+1m	130m	-		
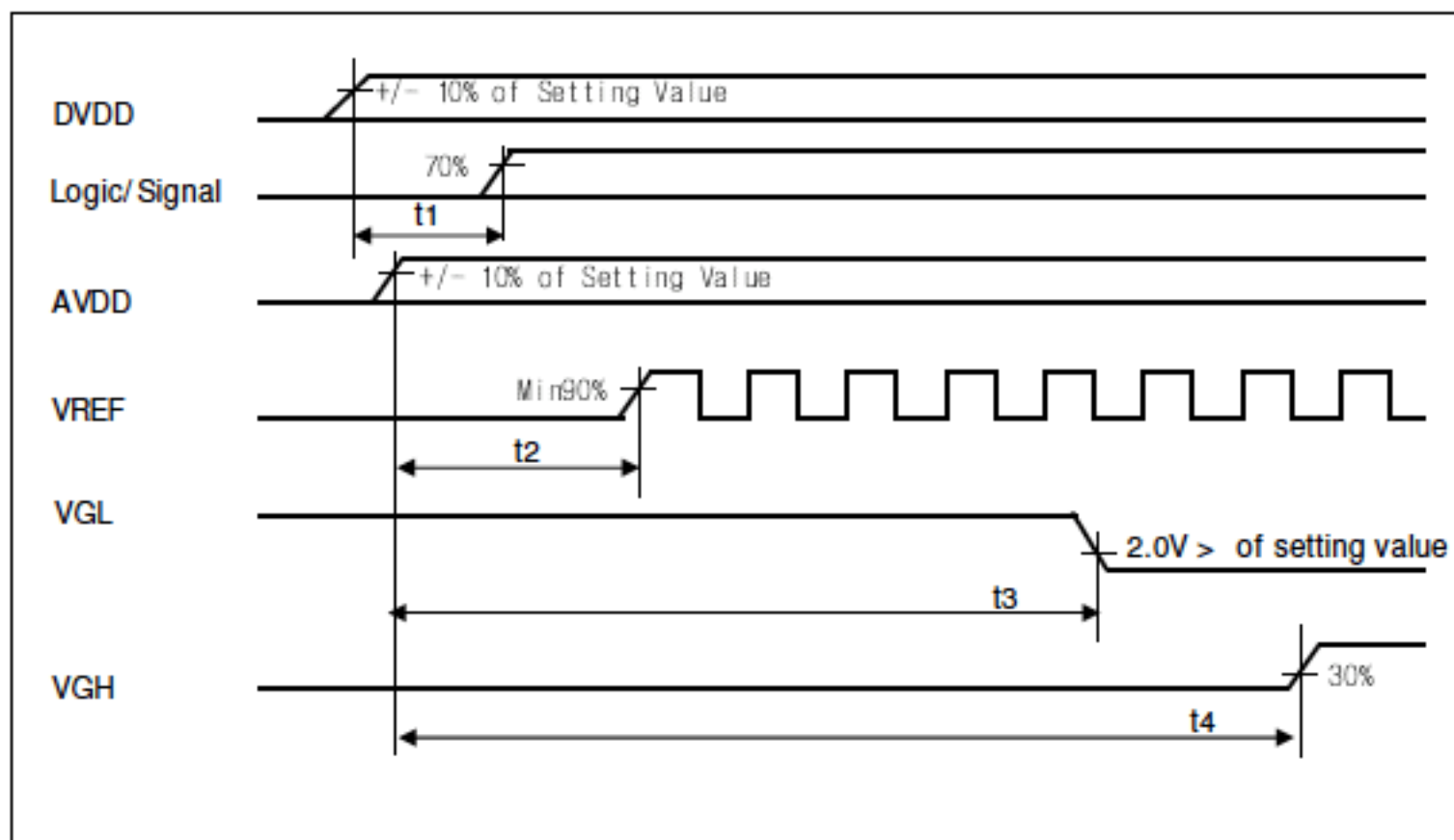
[Note 6-3.1] AVDD must be supplied later than DVDD.

6-3.2 Power Off Sequence

Parameter		Timing				Notes
		Min.	Typ.	Max.	Unit	
Power On	t7	0m	-	-		
	t8	0m	-	-	Sec	6-3.2
	T9	0m	-	-		
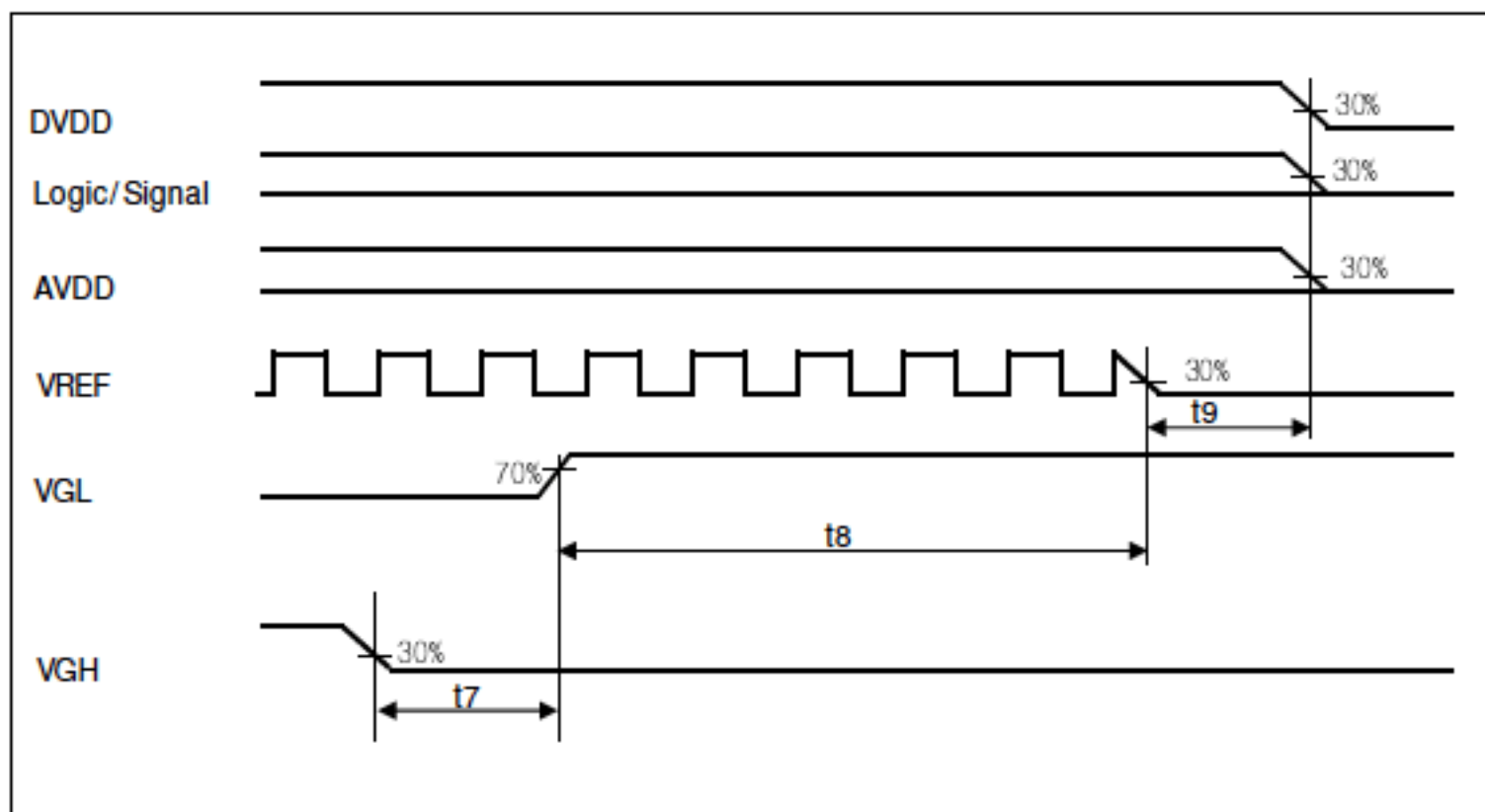
[Note 6-3.2] Power on Sequence must be observed to restart LCM after Power off.

6-4. Lamp Characteristics

Parameter	Symbol	Values Min.	Values Typ.	Values Max.	Unit	Notes
Operating Voltage	VBL	565 (6.5mARMS)	580 (6.0mARMS)	730 (3.0mARMS)	VRMS	6-4.1
Operating Current	IBL	3.0	6.0	6.5	mARMS	6-4.2
Power Consumption	PBL	-	3.48	3.83	W	6-4.3
Operating Frequency	fBL	40	-	60	kHz	6-4.4
		40	-	80		6-4.5
Discharge Stabilization Time	Ts	-	-	3	Min	6-4.6
Life Time (+25℃,I_{BL}=6.0mArms)	-	12,000	15,000	-	Hrs	6-4.7
Life Time (-30℃,I_{BL}=9.0mArms)	-	3,000	-	-	cycle	6-4.7
Established Starting Voltage at 25℃ at -30 ℃	Vs	- -	- -	1,480 1,780	VRMS VRMS	6-4.8

[Note 6-4.1] The variance of the voltage is ± 10%.
[Note 6-4.2] The typical operating current is for the typical surface luminance (LwH) in optical characteristics.
[Note 6-4.3] The lamp power consumption shown above does not include loss of external inverter.
　　　　　　The applied lamp current is a typical one.
[Note 6-4.4] This frequency range means the range to keep within ± 10% change of electrical and optical
　　　　　　characteristics.
[Note 6-4.5] This frequency range means not affecting to lamp life and reliability characteristics.
　　　　　　(The lamp frequency should be selected as different as possible from display horizontal
　　　　　　synchronous signal (Including harmonic frequency of this scanning frequency) to avoid "Beat"
　　　　　　interference which may be observed on the screen as horizontal stripes like moving wave.
　　　　　　This phenomenon is caused by interference between lamp (CCFL) lighting frequency and
　　　　　　LCD horizontal synchronous signal.)
[Note 6-4.6] The time needed to achieve not less than 95%brightness of the center part of lamp.
　　　　　　The brightness of the lamp after lighted for 5 minutes is defined as 100%.
[Note 6-4.7] "Life time" (Ta= +25℃) is defined as the lamp brightness decrease to 50% original brightness
　　　　　　at IBL=Typ., in continuous lighting.
　　　　　　"Life time" (Ta= -30℃) is defined as the number of cycle(5minutes On / 5minutes Off)
　　　　　　at IBL=9.0mARMS in on/off cycle condition.
[Note 6-4.8] The "Established Starting Voltage" means the minimum voltage for inverter to turn on the CCFL
　　　　　　normally in the LCD module. However this isn't the values that we can assure stability of
　　　　　　starting lamp on condition that the module is installed in your set.
　　　　　　It should be careful that "Established Starting Voltage" is changed by an increase of
　　　　　　stray capacitance in your set, inverter method, value of ballast capacitor in your inverter and so on.
　　　　　　Especially, the value of "Established Starting Voltage" is higher in low temperature condition than
　　　　　　in normal temperature condition, because impedance of CCFL is increased.
　　　　　　"The voltage above Vs should be applied to the lamps for more than 1 second for start-up.
　　　　　　Otherwise, the lamps may not be turned on. The used lamp current is the lamp
　　　　　　typical current."

Note) Requirements for a system inverter design, which is intended to have a better display performance, a better power efficiency and a more reliable lamp, are following. It shall help increase the lamp lifetime and reduce leakage current. Inverter should be designed to be subject to the conditions below
  A. The asymmetry rate of the inverter waveform should be less than 10%.
  B. The distortion rate of the waveform should be within $\sqrt{2} \pm 10\%$.
     * Inverter output waveform had better be more similar to ideal sine wave.
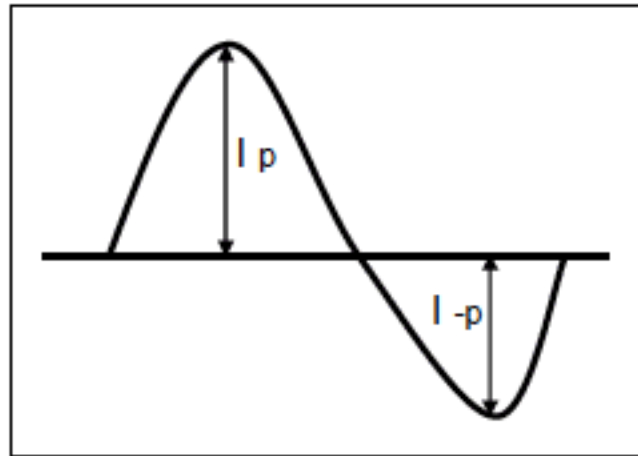
* Asymmetry rate:

$$(|I_p - I_{-p}|) / I_{RMS} * 100\%$$

•Distortion rate:

$$I_p \ (\text{or} \ I_{-p}) / I_{RMS}$$

C. There should not be any spikes in the waveform.
D. Lamp current should not exceed the "Max." value under the "Operating Temperature" (it is prohibited to exceed the "Max." value even if it is operated in the guaranteed temperature). When lamp current exceed the maximum value for a long time, it may cause a smoking and ignition.
   Therefore, it is recommended that the inverter have the current limited circuit that is used as a protection circuit and/or the lamp current-controlled inverter.

※ Do not attach a conducting tape to lamp connecting wire.
   If the lamp wire attach to a conducting tape, TFT-LCD Module has a low luminance and the inverter has abnormal action. Because leakage current is occurred between lamp wire and conducting tape.

6-5. Timing Characteristics of Input Signals

Ta=25℃

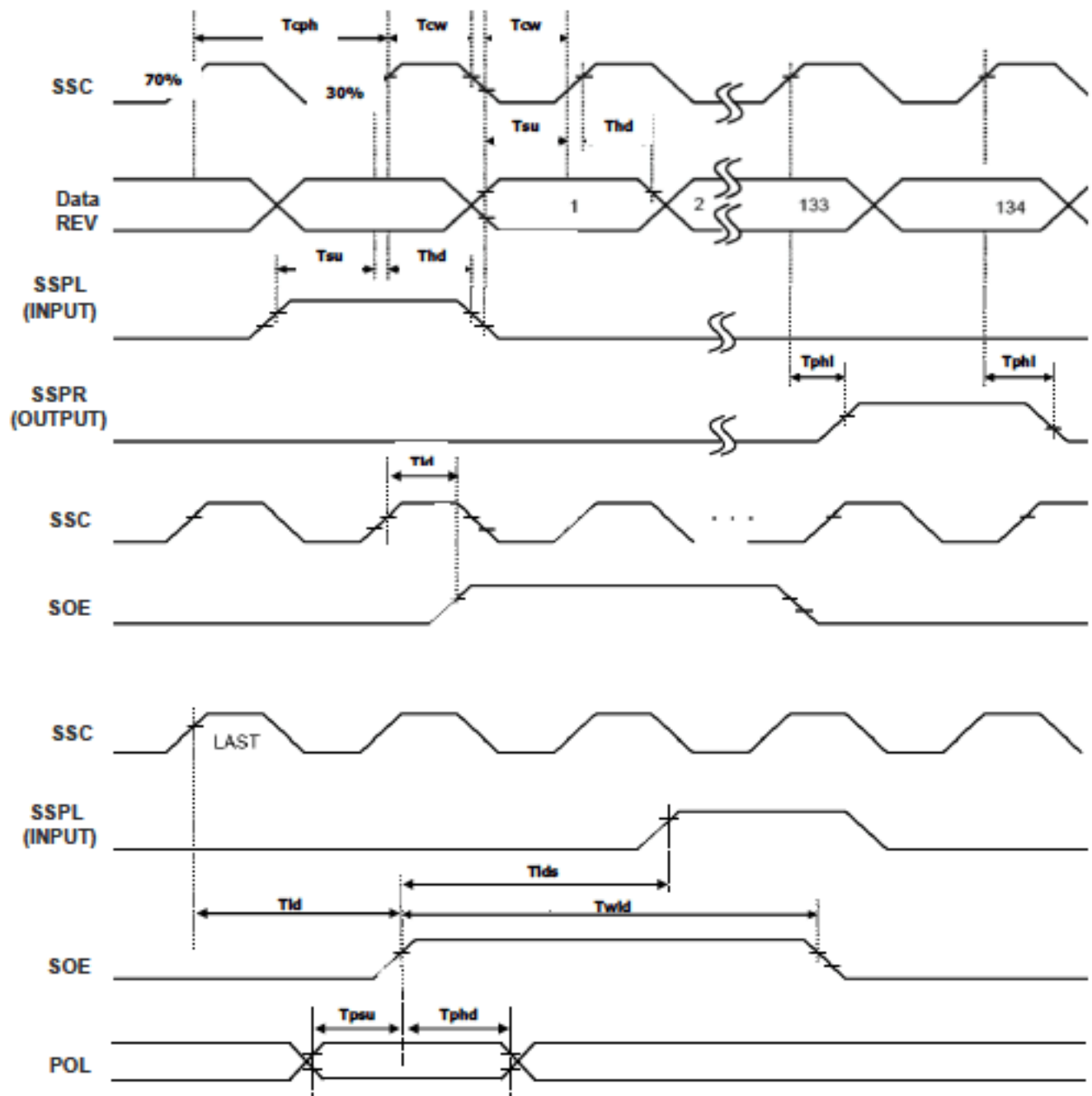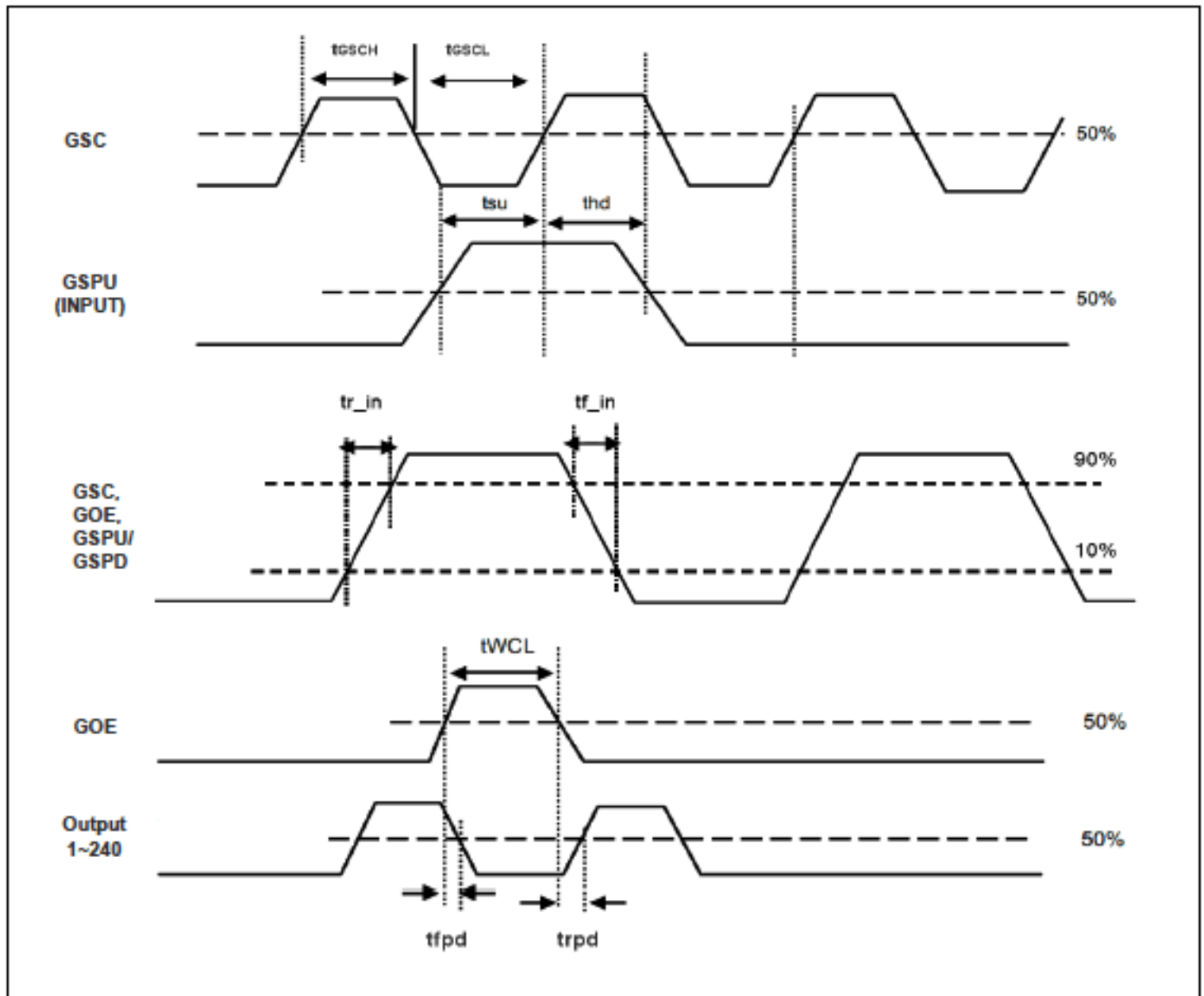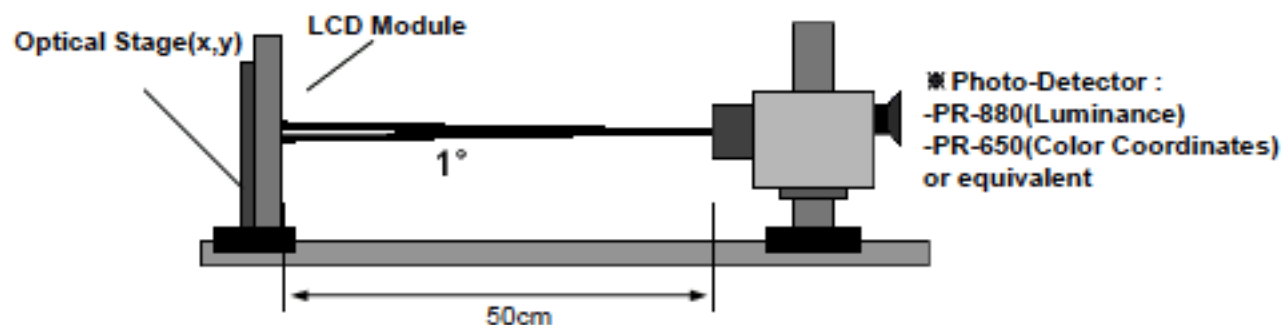|	Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
S	SSC Frequency	Fclk	7.7	8.5	10.5	MHz	Fig. 1
	SSC Pulse Width	Tcw	40%	-	60%	Tcph	
O	DATA/REV/SSPL/SSPR Setup Time	Tsu	4	-	-	ns	
	DATA/REV/SSPL/SSPR Hold Time	Thd	2	-	-	ns	
U	SSPR Delay Time	Tphl	6	10	15	ns	
	Time That the last data to SOE	Tld	1			Tcph	
R	SOE Pulse Width	Twld	2	-	-	Tcph	
C	Time that SOE to SSPL	Tlds	5	-	-	Tcph	
E	POL Set up Time	Tpsu	6	-	-	ns	
	POL Hold Time	Tphd	6	-	-	ns	
G	GSC Frequency	fGSC	13.7	15.18	16.7	kHz	Fig. 2
	GSC,GOE,GSPU/GSPD Rising Time	tr_in	-	-	150	ns	
A	GSC,GOE,GSPU/GSPD Falling Time	tf_in	-	-	150	ns	
	GSC Pulse Width	tGSCH, tGSCL	3	-	-	us	
T	GSPU / GSPD Setup Time	tsu	700	-	-	ns	
E	GSPU / GSPD Hold Time	thd	700	-	-	ns	
	GOE Pulse Width	tWCL	1			us	
	Output Delay Time	trpd, tfpd	-	-	500	ns	

Fig. 1 Source D-IC Timing Diagram

Fig. 2 Gate D-IC Timing Diagram

7. Electro-optical Characteristics

7-1. Electro-optical Characteristics (Room Temperature)

Ta=25°C, DVDD=3.3V, AVDD=10.0V, fv=60Hz, fclk= 8.5MHz, IBL = 6.0mARMS

Parameter		Symbol	Condition	Values			Unit	Notes
				Min.	Typ.	Max.		
Contrast Ratio		CR	Optimal	400	500	-	-	7-1.1, Fig 3.
Viewing Angle	x axis, right(Φ=0°)	Θr	CR≥10	55	65	-	degree	7-1.2, Fig 3.
	x axis, left (Φ=180°)	Θl		55	65	-	degree	
	y axis, up (Φ=90°)	Θu		40	50	-	degree	
	y axis, down (Φ=270°)	Θd		50	60	-	degree	
Response Time	Rise Time	TrR	Θ=0	-	15	25	ms	7-1.3, Fig 3.
	Decay Time	TrD		-	25	35	ms	
Luminance		L	Center	360	450	-	cd/m²	Fig 3.
Luminance Uniformity		δWHITE	9 point	-	1.25	1.40	-	7-1.4, Fig 3.
Color Coordinates	Wx		Center	0.270	0.300	0.330	-	Fig 3.
	Wy			0.290	0.320	0.350	-	
	Rx		Center	0.560	0.590	0.620	-	Fig 3.
	Ry			0.315	0.345	0.375	-	
	Gx			0.286	0.316	0.346	-	
	Gy			0.505	0.535	0.565	-	
	Bx			0.127	0.157	0.187	-	
	By			0.114	0.144	0.174	-	

Fig. 3 Optical Characteristic Measurement Equipment and Method

Optical Stage(x,y)
LCD Module
1°
50cm

※ **Photo-Detector :**
-PR-880(Luminance)
-PR-650(Color Coordinates)
or equivalent

Measuring Condition ;
-Measuring surroundings : Dark Room
-Measuring temperature : Ta=25℃
-Adjust operating voltage to get optimum contrast at the center of the display.
-Measured value at the center point of LCD panel after more than 30 minutes while backlight turning on.
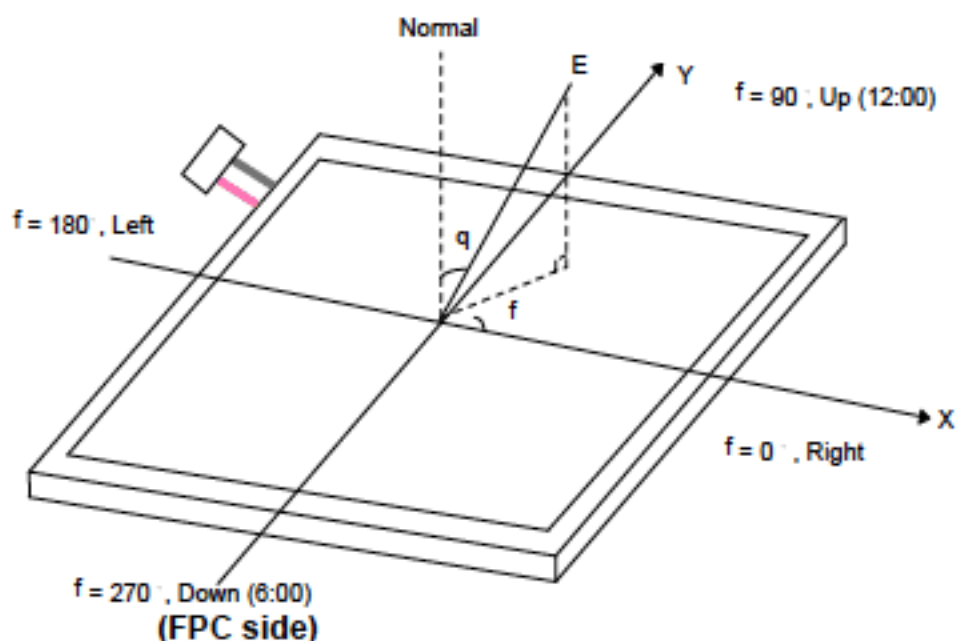
[Note 7-1.1]

Contrast ratio is defined as follows ;

$$\text{Contrast Ratio(CR)} = \frac{\text{Photo detector output with LCD being "white"}}{\text{Photo detector output with LCD being "black"}}$$
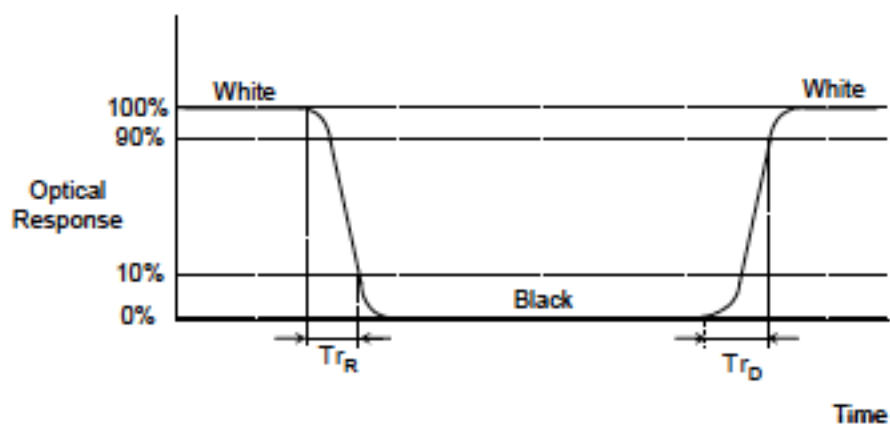
[Note 7-1.2]

Viewing angle range is defined as follows;

Normal

E

Y

$f = 90$; Up (12:00)

$f = 180$, Left

q

f

X

$f = 0$, Right

$f = 270$, Down (6:00)

(FPC side)

[Note 7-1.3]

Response time is obtained by measuring the transition time of photo detector output, when input signals are applied to make center point "black" and "white".

White   White

100%
90%

Optical
Response

10%

0%   Black

Tr_R Tr_D

Time

The panel total variation (δ_{WHITE}) is determined by measuring LN at each test position 1 through 9.
The panel total variation (δ_{WHITE}) is defined as follows ;

$$\text{Panel total variation } (\delta_{WHITE}) = \frac{\text{Maximum}(L1, L2, L3, L4, L5, L6, L7, L8, L9)}{\text{Minimum}(L1, L2, L3, L4, L5, L6, L7, L8, L9)}$$

H,V : Active Area
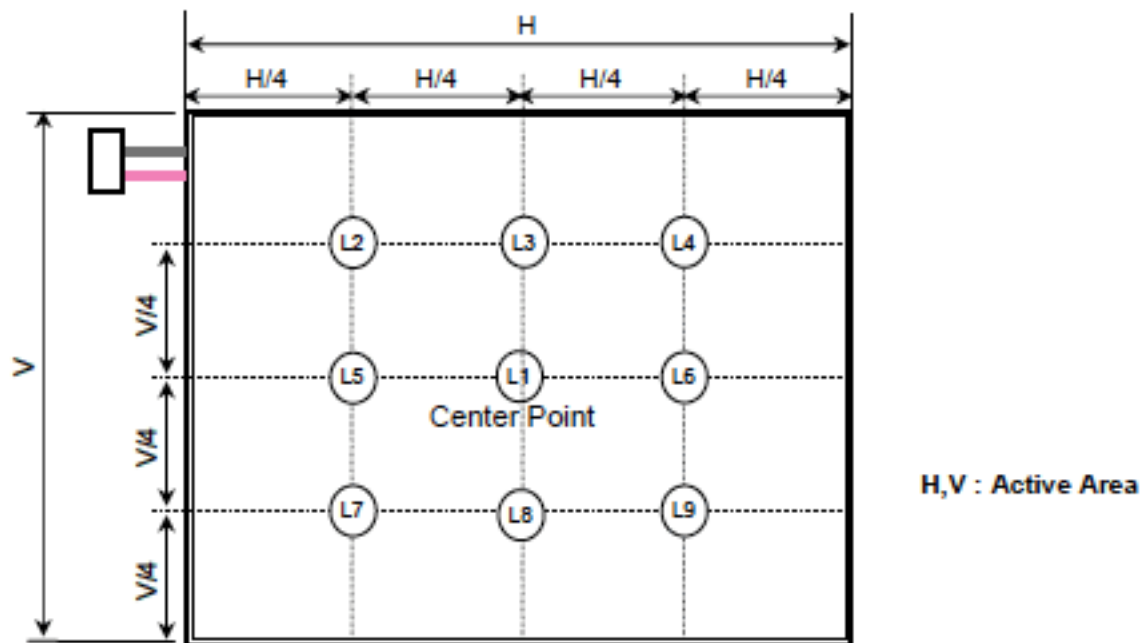
7-2. Electro-optical Characteristics (Low Temperature)

DVDD=3.3V, AVDD=10.0V, fv=60Hz, fclk= 8.5MHz

Parameter	Symbol	Condition	Values	Unit	Notes
The initial-stage of luminance at low-temperature (-20℃)	L_{low}	Center	50% of the stable luminance at 25℃ (Typ.)	%	7-2.1,2,3,4

[Note 7-2.1] The initial-stage of luminance is defined as follows ;

$$L_{low} = \frac{\text{The luminance after 1minute from start-up under over-driving current}}{\text{The stable luminance at 25℃ under typical operating current}} \times 100 \ (\%)$$
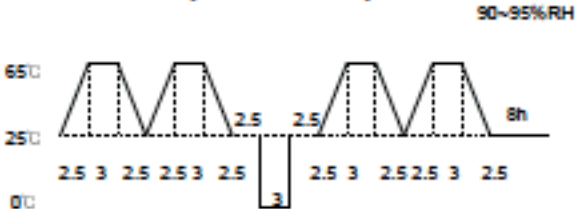
[Note 7-2.2] The starting temperature is Ta= − 20℃.

[Note 7-2.3] The over-driving current is IBL-OD = 10.0mARMS_DUTY 100%

[Note 7-2.4] It is highly recommended to use over-driving current(10.0mARMS) no longer than 2minutes.

8. Mechanical Characteristics

Parameter	Specification		Unit
Outline Dimension	Width	167.0	mm
	Height	93.0	mm
	Depth	6.8	mm
Bezel Area	Width	158.0	mm
	Height	84.2	mm
Active Display Area	Width	156.24	mm
	Height	82.368	mm
Weight	175.5		g

9. Reliability Test

No.	Test Items	Test Condition	Notes
1	High Temperature Storage Test	T_a =85℃ 240h	9-1,2,3
2	Low Temperature Storage Test	T_a =-40℃ 240h	9-1,2,3
3	High Temperature Operation Test	T_p =85℃ 240h	9-1,2,3
4	Low Temperature Operation Test	T_a =-30℃ 240h	9-1,2,3
5	High Temperature and High Humidity Operation Test	T_a =65℃ 90%RH 240h	9-1,2,3
6	Light-proof	UV Exposure, Ta=65 225.6kJ/m^2@ 340nm 144h	
7	Thermal Shock Test (non-operating)	-40℃ (0.5h) ~ 85℃ (0.5h) / 300 cycles	
8	Dew Condensation	-30℃ (0.5h,non-operation) ⇔ 25℃ 95%RH(10m operation) , 10 cycles	
9	Thermal Cycle (non-operating)	1Cycle = 48h, 5 cycles	
10	Electro Static Discharge Test	-Panel Surface/Top_case : 150pF ±15kV 150Ω (Direct Discharge, Five Times) -FPC Input Terminal : 200pF ±200V 0Ω	
11	Shock Test (non-operating)	980m/s^2 , t=6ms X,Y,Z direction 2 Times	
12	Vibration Test (non-operating)	5~10 Hz Amplitude 25mm 10~30 Hz 3.7 × 9.8 m/s^2 30~50 Hz 1.6 × 9.8 m/s^2 50~80 Hz 0.7 × 9.8 m/s^2 80~100 Hz 0.3 × 9.8 m/s^2 X,Y,Z direction 8min × 2 sweep Each direction 96h	
13	Terminal Intensity (non-operating)	Loading 500g, ± 90 degree from outside of terminal	
14	Push Test (non-operating)	Using push and pull gage on the center point with diameter 12.7mm bar, pressure 5 × 9.8N	
15	Withstand pressure (non-operating)	5 × 10^4 Pa , 2h	

[Note 9-1] T_a = Ambient Temperature, T_p = Panel Surface Temperature
[Note 9-2] In the Reliability Test, performance is confirmed after leaving in room temp.
[Note 9-3] In the standard condition, there shall be no practical problems that may affect the display function.

10. International Standards

10-1. Safety

a) UL 60950-1:2003, First Edition, Underwriters Laboratories, Inc.,
Standard for Safety of Information Technology Equipment.
b) CAN/CSA C22.2, No. 60950-1-03 1st Ed. April 1, 2003, Canadian Standards Association,
Standard for Safety of Information Technology Equipment.
c) EN 60950-1:2001, First Edition,
European Committee for Electrotechnical Standardization(CENELEC)
European Standard for Safety of Information Technology Equipment.

10-2. 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 Electro technical Standardization.(CENELEC), 1998
(Including A1: 2000)