

Doc. Number A

- ☐ Tentative Specification
☐ Preliminary Specification
☒ Approval Specification

MODEL NO.f G155BGE SUFFIXf L01

CustomerA

APPROVED BY

SIGNATURE

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Notef

Product Version f

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CONTENTS

1. GENERAL DESCRIPTION	5
1.1 OVERVIEW	5
1.2 GENERAL SPECIFICATIONS	5
2. MECHANICAL SPECIFICATIONS	5
3. ABSOLUTE MAXIMUM RATINGS	5
3.1 ABSOLUTE RATINGS OF ENVIRONMENT	5
3.2 ELECTRICAL ABSOLUTE RATINGS	6
3.2.1 TFT LCD MODULE	6
3.2.2 BACKLIGHT CONVERTER.....	6
4. ELECTRICAL SPECIFICATIONS.....	6
4.1 FUNCTION BLOCK DIAGRAM	Y
4.2. INTERFACE CONNECTIONS	Y
4.3 ELECTRICAL CHARACTERISTICS	10
4.3.1 LCD ELETRONICS SPECIFICATION	10
4.3.2 Vcc Power Dip Condition.....	12
4.3.3 BACKLIGHT UNIT.....	12
4.4 LVDS INPUT SIGNAL SPECIFICATIONS	13
4.4.1 LVDS DATA MAPPING TABLE	13
4.4.2 COLOR DATA INPUT ASSIGNMENT	14
4.5 DISPLAY TIMING SPECIFICATIONS	15
4.6 POWER ON/OFF SEQUENCE.....	1Y
5. OPTICAL CHARACTERISTICS	1C
5.1 TEST CONDITIONS	1...
5.2 OPTICAL SPECIFICATIONS	1...
6. RELIABILITY TEST ITEM	22
6. PACKING.....	23
Y.1 PACKING SPECIFICATION.....	錯誤! 尚未定義書籤。
Y.2 PACKING METHOD.....	22
p. CMI MODULE LABEL	25
C. PRECAUTIONS	26
...1 ASSEMBLY AND HANDLING PRECAUTIONS	26
...2 STORAGE PRECAUTIONS	26
...3 OPERATION PRECAUTIONS	26
...4 SAFETY PRECAUTIONS	2Y
...5 SAFETY STANDARDS	2Y

...6 OTHER	2Y
Appendix. OUTLINE DRAWING	2p

REVISION HISTORY

Version	Date	Page	Description
2.0	Nov.5, 2012	All	Spec Ver.2.0 was first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

G155BGE-L01 is a 15.5" TFT Liquid Crystal Display module with WLED Backlight unit and 30 pins 1ch-LVDS interface. This module supports 1366 x Y65 HD mode and can display up to 16.7M colors. The converter module for Backlight is built in.

1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Screen Size	15.51" real diagonal		
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1366 x R.G.B. x Y65	pixel	-
Pixel Pitch	0.3 (H) x 0.3 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	16.7M	color	-
Transmissive Mode	Normally white	-	-
Surface Treatment	AG type, 3H hard coating, Haze 25	-	-
Luminance, White	300	cd/m2	
Color Gamut	Y2% of NTSC(Typ.)	-	-
TCO	TCO 5.0 compliance		
Power Consumption	Total 15.2 W @ cell 3 W , BL 15.2 W		(1)

Note (1) The specified power consumption f Total= cell (reference 4.3.1)+BL (reference 4.3.3)

2. MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	42...5Y	430.3Y	430.5Y	mm	(1)
	Vertical (V)	254.1	254.6	255.1	mm	
	Thickness (T)	-	16.1	16.6	mm	
Bezel Area	Horizontal	413.1	413.4	413.Y	mm	
	Vertical	233.Y	234	234.3	mm	
Active Area	Horizontal	-	40...5	-	mm	
	Vertical	-	230.4	-	mm	
Weight		-	1550	1650	g	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	60	°C	(1)
Operating Ambient Temperature	TOP	0	60	°C	(1), (2)

Note (1)

(a) .0 %RH Max. (Ta <= 40 °C).

(b) Wet-bulb temperature should be 3...°C Max. ($T_a > 40\text{ }^{\circ}\text{C}$).

(c) No condensation.

Note (2) The temperature of panel surface should be 0 °C min. and 60 °C max.

3.2 ELECTRICAL ABSOLUTE RATINGS

3.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCCS	-0.3	6.0	V	(1)
Logic Input Voltage	V _{IN}	-0.3	3	V	

3.2.2 BACKLIGHT CONVERTER

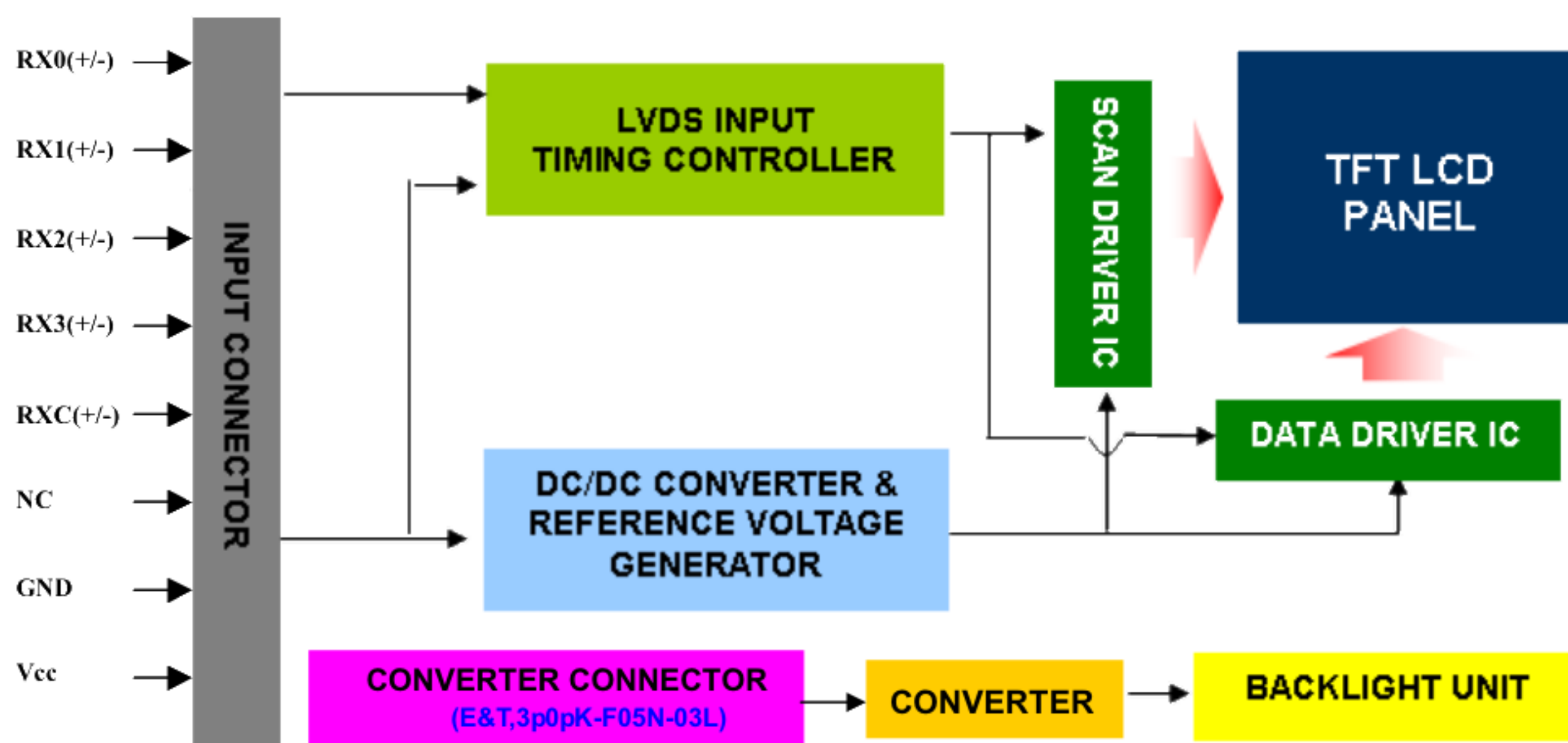
Item	Symbol	Value			Unit	Note
		Min.	Typ	Max.		
Converter Voltage	LED_V _{in}	0	12.0	15.0	V	(1), (2) Duty=100%
Enable Voltage	LED_EN	0	3.3	5.0	V	
Backlight Adjust	LED_PWM	0	3.3	5.0	V	(1), (2) Pulse Width ≤ 10msec. and Duty ≤ 10%

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for input pin of LED light bar at $T_a=25\pm2\text{ }^{\circ}\text{C}$ (Refer to 4.3.3 and 4.3.4 for further information).

4. ELECTRICAL SPECIFICATIONS

4.1 FUNCTION BLOCK DIAGRAM



4.2. INTERFACE CONNECTIONS

LVDS I/O PIN ASSIGNMENT

Pin	Name	Description
1	NC	Not connection, this pin should be open.
2	NC	Not connection, this pin should be open.
3	NC	Not connection, this pin should be open.
4	GND	Ground
5	RX0-	Negative LVDS differential data input. Channel 0
6	RX0+	Positive LVDS differential data input. Channel 0
7	GND	Ground
8	RX1-	Negative LVDS differential data input. Channel 1
9	RX1+	Positive LVDS differential data input. Channel 1
10	GND	Ground
11	RX2-	Negative LVDS differential data input. Channel 2
12	RX2+	Positive LVDS differential data input. Channel 2
13	GND	Ground
14	RXCLK-	Negative LVDS differential clock input.
15	RXCLK+	Positive LVDS differential clock input.
16	GND	Ground
17	RX3-	Negative LVDS differential data input. Channel 3
18	RX3+	Positive LVDS differential data input. Channel 3
19	GND	Ground
20	NC	For LCD internal use only, Do not connect
21	NC	For LCD internal use only, Do not connect
22	NC	For LCD internal use only, Do not connect
23	GND	Ground
24	GND	Ground
25	GND	Ground

Pin	Name	Description
26	Vcc	+5.0V power supply
2Y	Vcc	+5.0V power supply
25	Vcc	+5.0V power supply
2...	Vcc	+5.0V power supply
30	Vcc	+5.0V power supply

Note (1) Connector Part No.f

FOXXCON GS23302-0111R-YH or MSCKT240YP30H (STM) or equivalent

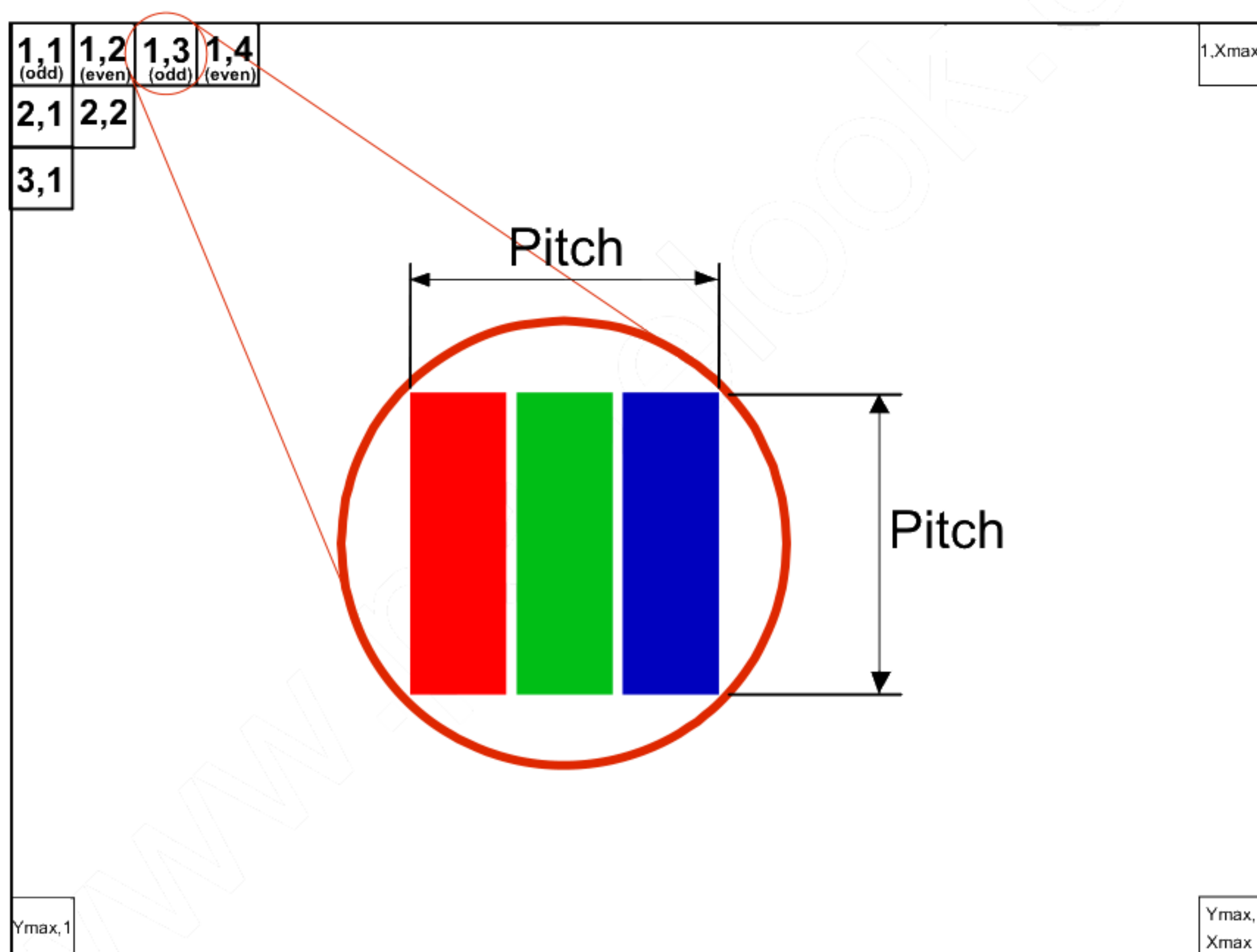
Note (2) User's connector Part Nof

Mating Wire Cable Connector Part No.f FI-X30H(JAE) or FI-X30HL(JAE)

Mating FFC Cable Connector Part No.f 21Y00Y-013001 (P-TWO) or JF05X030-1 (JAE).

Note (3) The first pixel is odd.

Note (4) Input signal of even and odd clock should be the same timing.



BACKLIGHT PIN ASSIGNMENT

Pin	Symbol	Description
1	N.C	Not connection, this pin should be open
2	LED_PWM	Brightness External PWM Control
3	LED_EN	Backlight ON/OFF
4	GND	Converter Ground
5	LED_Vin	Converter Input Voltage

Note (1) Connector Part No.f

E&T,3505K-F05N-03L or equivalent

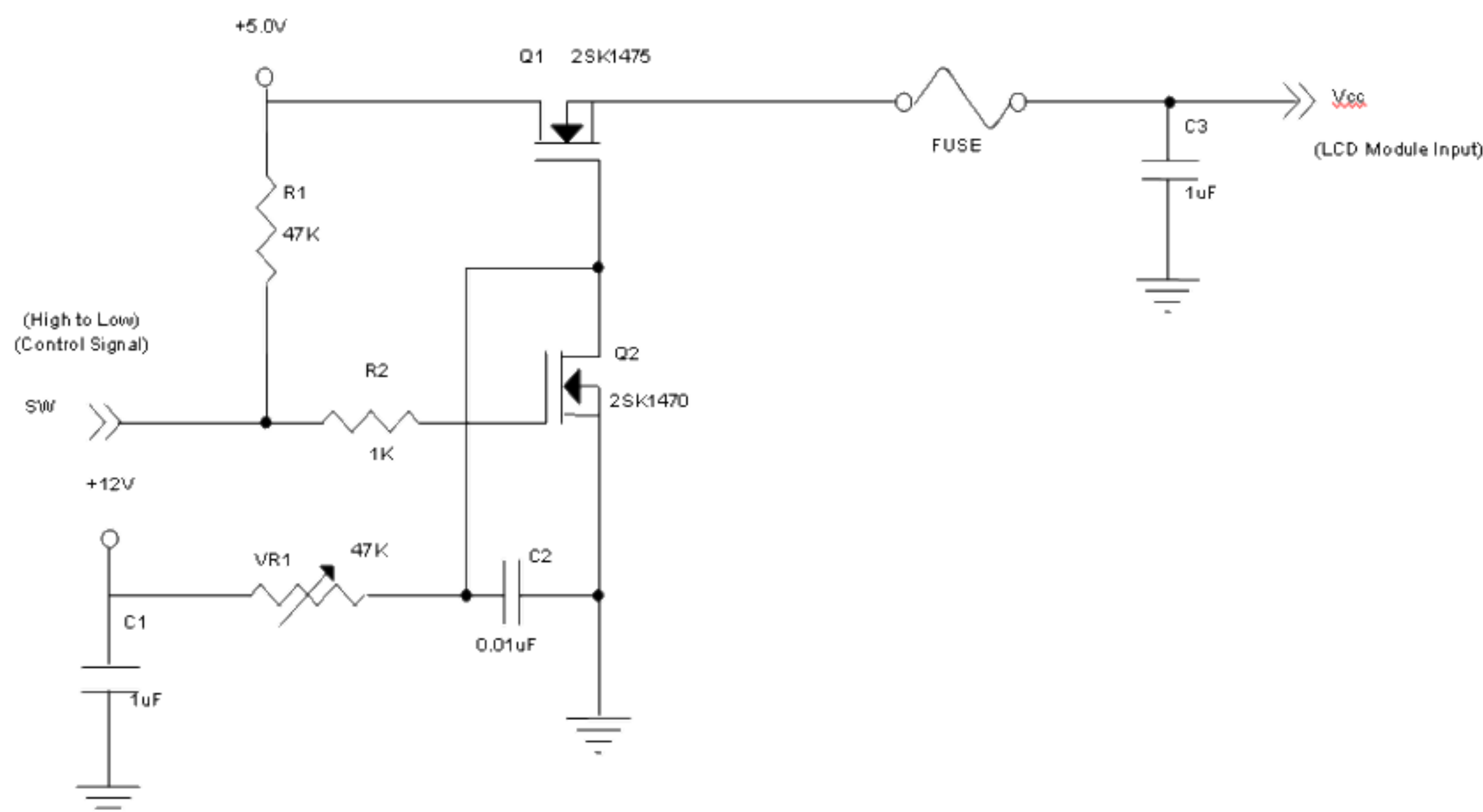
4.3 ELECTRICAL CHARACTERISTICS

4.3.1 LCD ELETRONICS SPECIFICATION

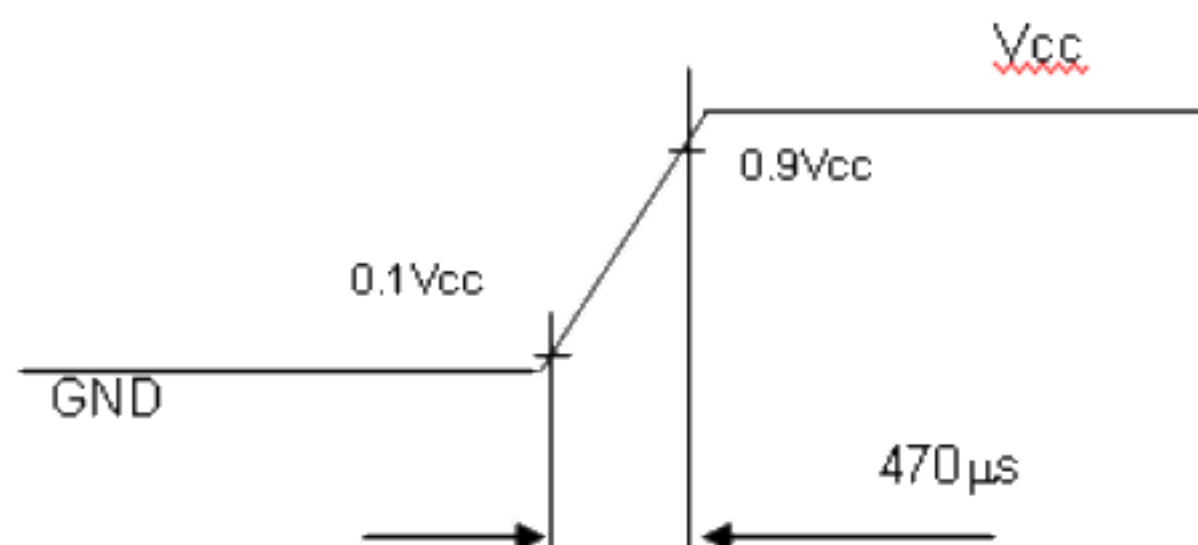
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V _{CC}	4.5	5.0	5.5	V	-
Ripple Voltage	V _{RP}			300	mV	-
Rush Current	I _{RUSH}			3	A	(2)
Power Supply Current	White		0.41	0.54	A	(3)a
	Black		0.5Y	0.Y6	A	(3)b
	Vertical Stripe		0.6	0.5	A	(3)c
Power Consumption	PLCD		3.0	4.0	Watt	(4)
LVDS differential input voltage	V _{id}	200		600	mV	
LVDS common input voltage	V _{ic}	1.0	1.2	1.4	V	

Note (1) The ambient temperature is $T_a = 25 \pm 2^\circ\text{C}$.

Note (2) Measurement Conditionsf



V_{CC} rising time is 470μs



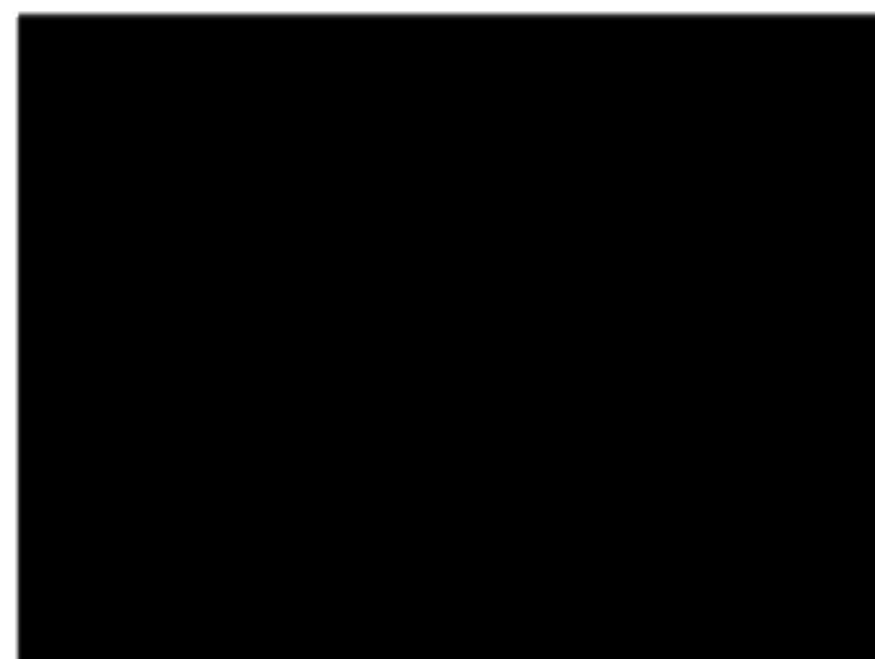
Note (3) The specified power supply current is under the conditions at $V_{CC} = 5.0\text{ V}$, $T_a = 25 \pm 2\text{ }^{\circ}\text{C}$, $F_r = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

a. White Pattern



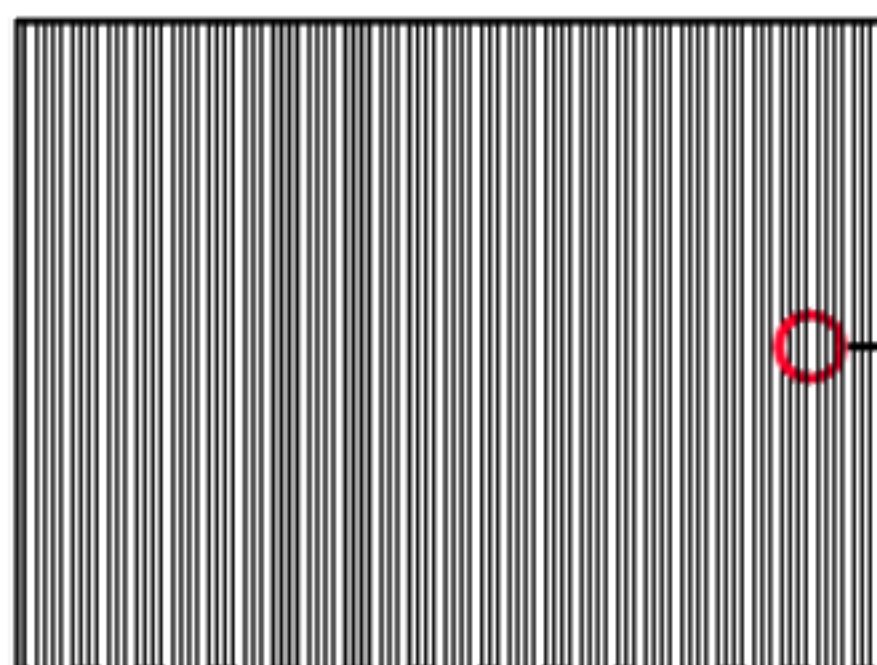
Active Area

b. Black Pattern

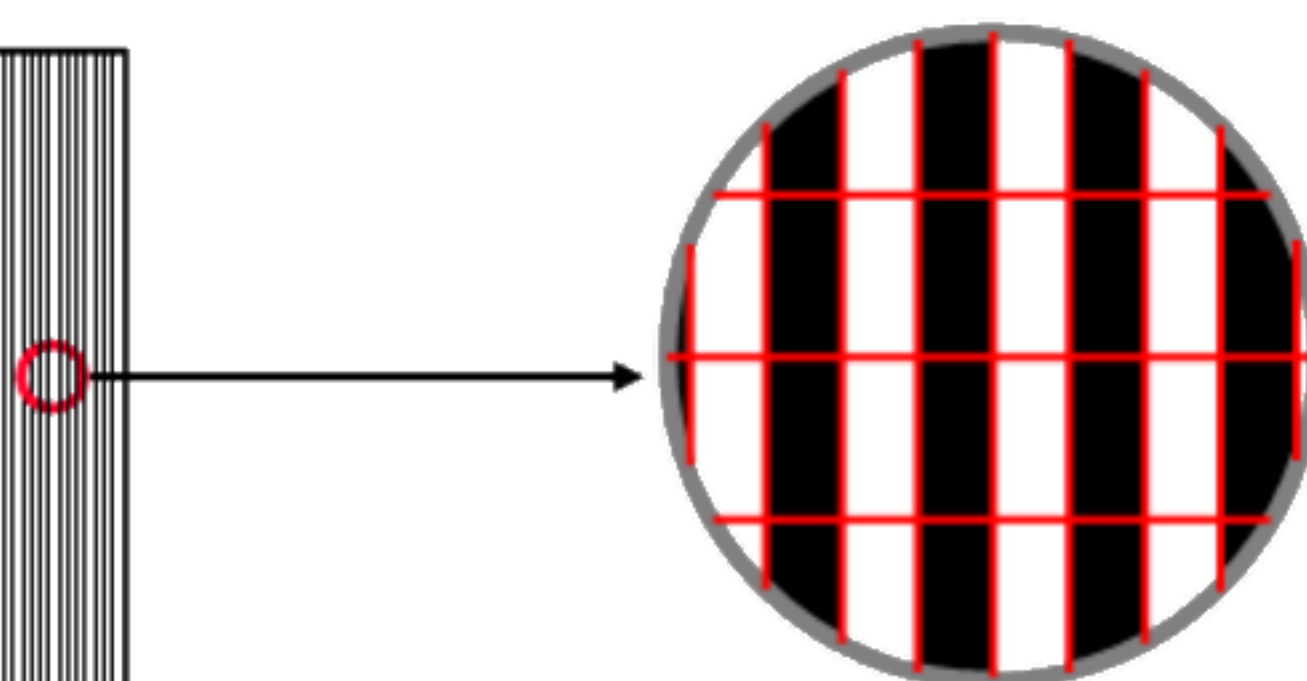


Active Area

c. Vertical Stripe Pattern

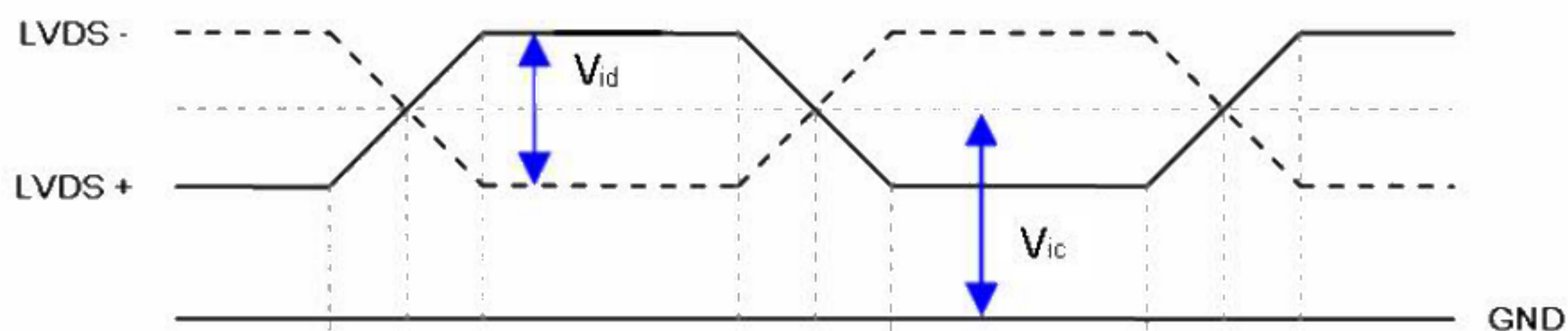


Active Area

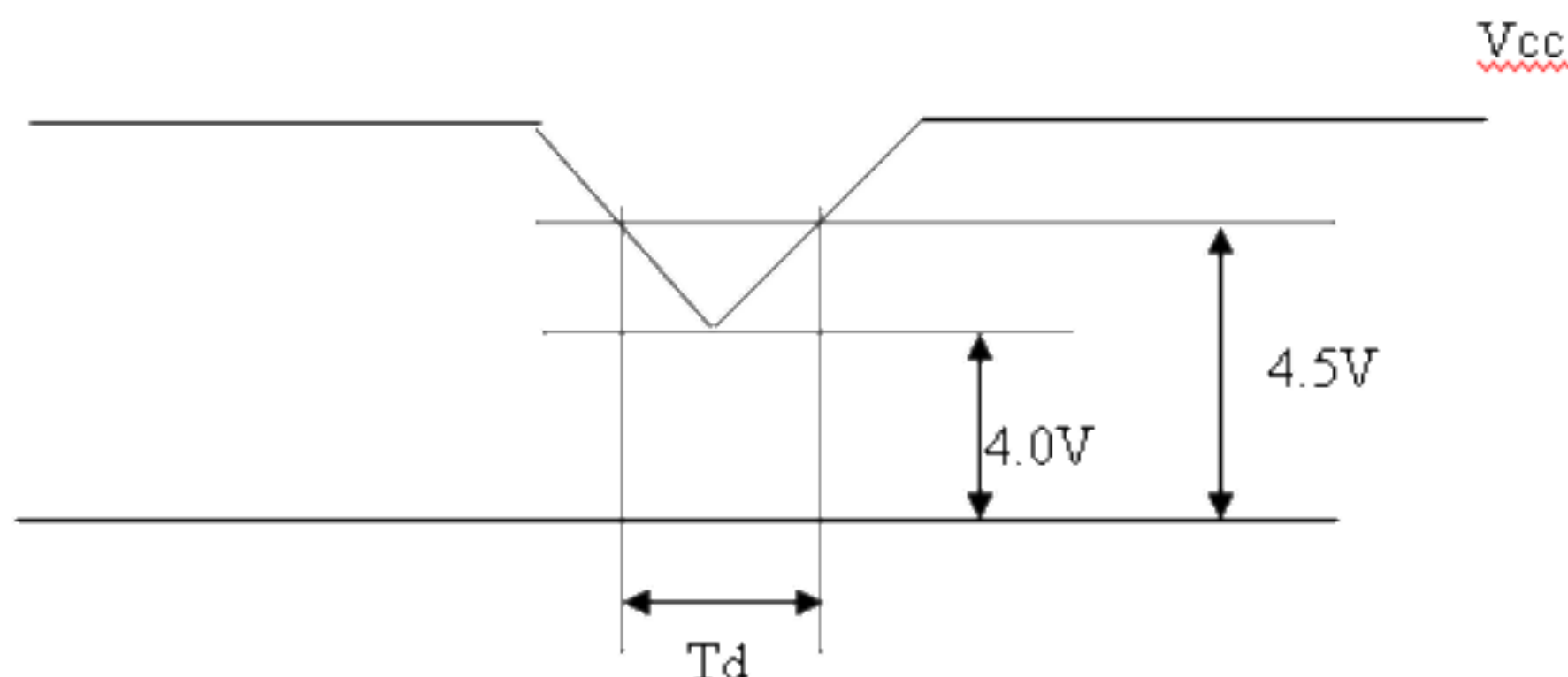


Note (4) The power consumption is specified at the pattern with the maximum current.

Note (5) VID waveform condition



4.3.2 Vcc Power Dip Condition

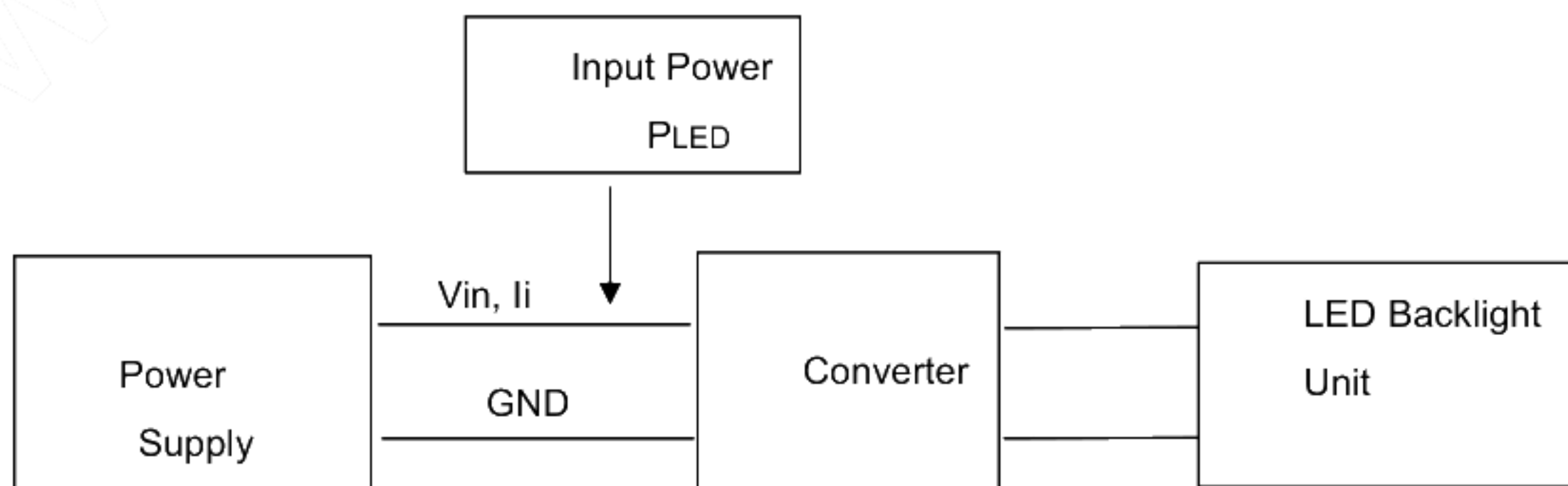


Dip Condition f $4.0V \leq V_{cc} \leq 4.5V$, $T_d \leq 20mS$

4.3.3 BACKLIGHT UNIT

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Power Supply Voltage		LED_Vin	10.5	12.0	13.2	V	
Converter Power Supply Current		Ii	----	1.25	1.4	A	@LED_Vin= 12V Duty=100%
Converter Input Rush Current		Iirsh			3	A	@LED_Vin rising = 1mS
Power Consumption		P _{LED}		15.2		W	@ LED_Vin = 12V Duty=100%
EN Control Level	Backlight on	LED_EN	2.0	3.3	5.0	V	
	Backlight off		0	0	0.5		
PWM Control Level	PWM High Level	LED_PWM	2.0	3.3	5.0	V	
	PWM Low Level		0	0	0.15		
PWM Control Duty Ratio			10	--	100	%	
PWM Control Frequency		f _{PWM}	200	200	10k	Hz	
LED Life Time		L _L	50,000			Hrs	(2)

Note (1) LED current is measured by utilizing a high frequency current meter as shown belowf



Note (2) The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at $T_a = 25 \pm 2^\circ\text{C}$ and $I = (50)\text{mA}$ (per chip) until the brightness becomes $\leq 50\%$ of its original value.

Note (3) If PWM control frequency is applied in the range less than 1KHz, The “waterfall” phenomenon on the screen may be found. To avoid this issue, It's a suggestion that PWM control frequency should follow the criterion as below.

$$(N+0.4)*f < f_{\text{pwm}} < (N+0.6)*f$$

f_{pwm} f PWM control frequency

f f Frame rate

N f Integer ($N \geq 3$)

4.4 LVDS INPUT SIGNAL SPECIFICATIONS

4.4.1 LVDS DATA MAPPING TABLE

LVDS Channel 0	LVDS output	DY	D6	D4	D3	D2	D1	D0
	Data order	G0	R5	R4	R3	R2	R1	R0
LVDS Channel 1	LVDS output	D15	D15	D14	D13	D12	D...	D5
	Data order	B1	B0	G5	G4	G3	G2	G1
LVDS Channel 2	LVDS output	D26	D25	D24	D22	D21	D20	D1...
	Data order	DE	NA	NA	B5	B4	B3	B2
LVDS Channel 3	LVDS output	D23	D1Y	D16	D11	D10	D5	D2Y
	Data order	NA	BY	B6	GY	G6	RY	R6

4.4.2 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 5-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
RY	R6	R5	R4	R3	R2	R1	R0	GY	G6	G5	G4	G3	G2	G1	G0	BY	B6	B5	B4	B3	B2	B1	B0		
Basic Colors	Black	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	
	Green	0	0	0	0	0	0	0	0	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	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	
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	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
Gray Scale Of Red	Red(0) / Dark	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)	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(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	f0	0	0	0	0	0	0	0	0	0	0	0	f0
	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
Gray Scale Of Green	Green(0) / Dark	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(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Green(2)	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	f	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(253)	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(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	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
Gray Scale Of Blue	Blue(0) / Dark	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(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	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

Note (1) 0f Low Level Voltage, 1f High Level Voltage

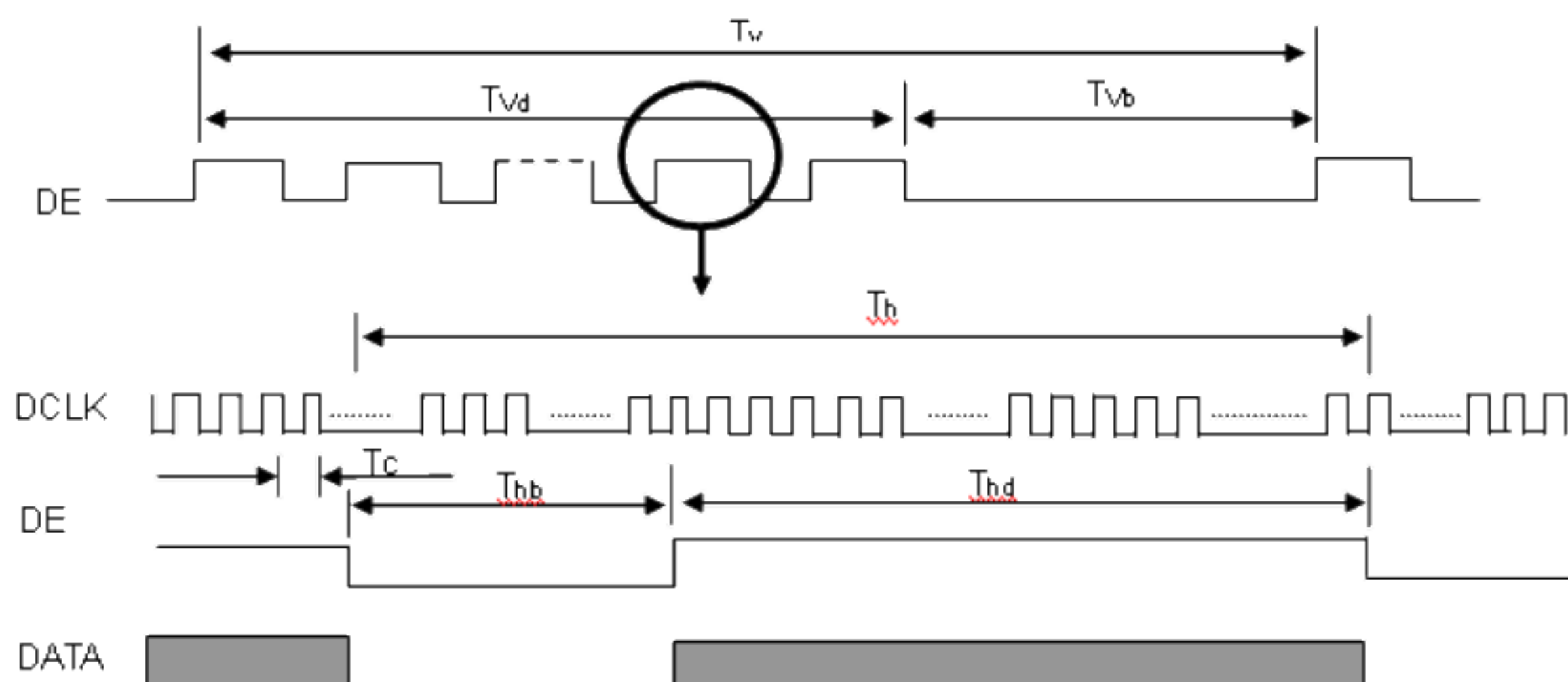
4.5 DISPLAY TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

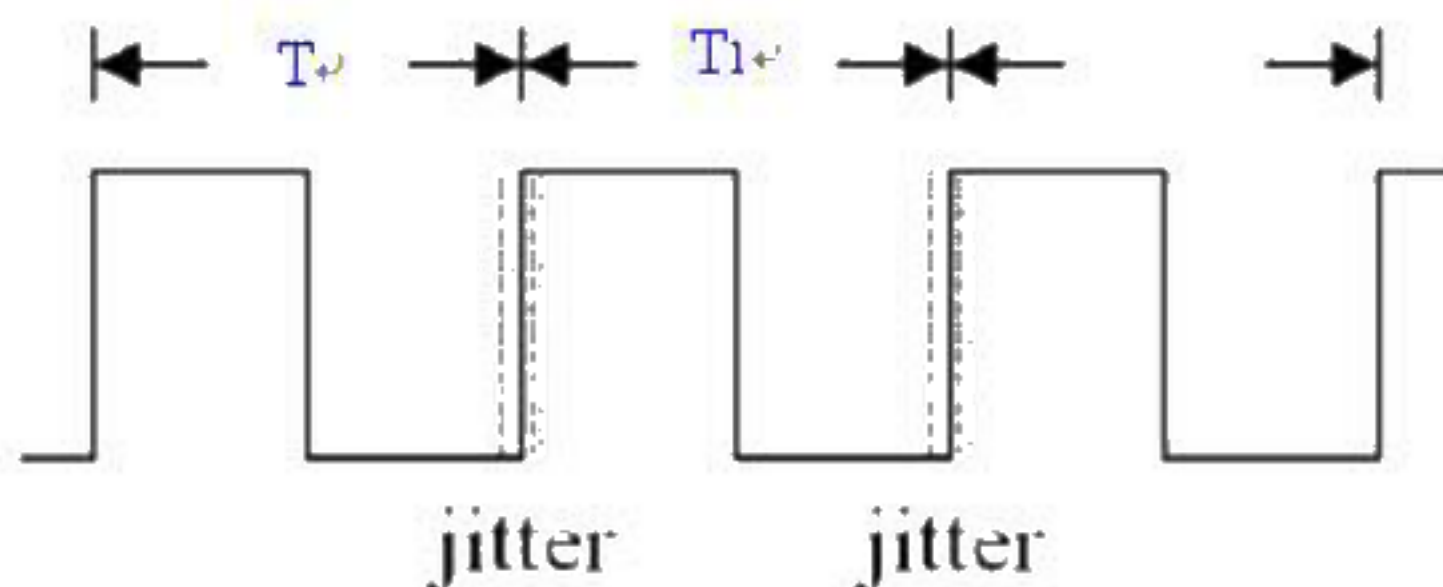
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	Fc	60	Y6	.6	MHz	-
	Period	Tc		13.0		ns	
	Input cycle to cycle jitter	T _{rd}			200	ns	(1)
	Input Clock to data skew	TLVCCS	-400		+400	ps	(2)
	Spread spectrum modulation range	F _{clkin_mod}	Fc*.5%		Fc*102%	MHz	(3)
	Spread spectrum modulation frequency	F _{SSM}			200	KHz	
Vertical Display Term	Frame Rate	Fr	50	60	Y5	Hz	Tv=Tvd+Tvb
	Total	Tv	500	506	515	Th	-
	Active Display	Tvd	Y65	Y65	Y65	Th	-
	Blank	Tvb	Tv-Tvd	35	Tv-Tvd	Th	-
Horizontal Display Term	Total	Th	1500	1560	15Y0	Tc	Th=Thd+Thb
	Active Display	Thd	1366	1366	1366	Tc	-
	Blank	Thb	Th-Thd	1.4	Th-Thd	Tc	-

Notef Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

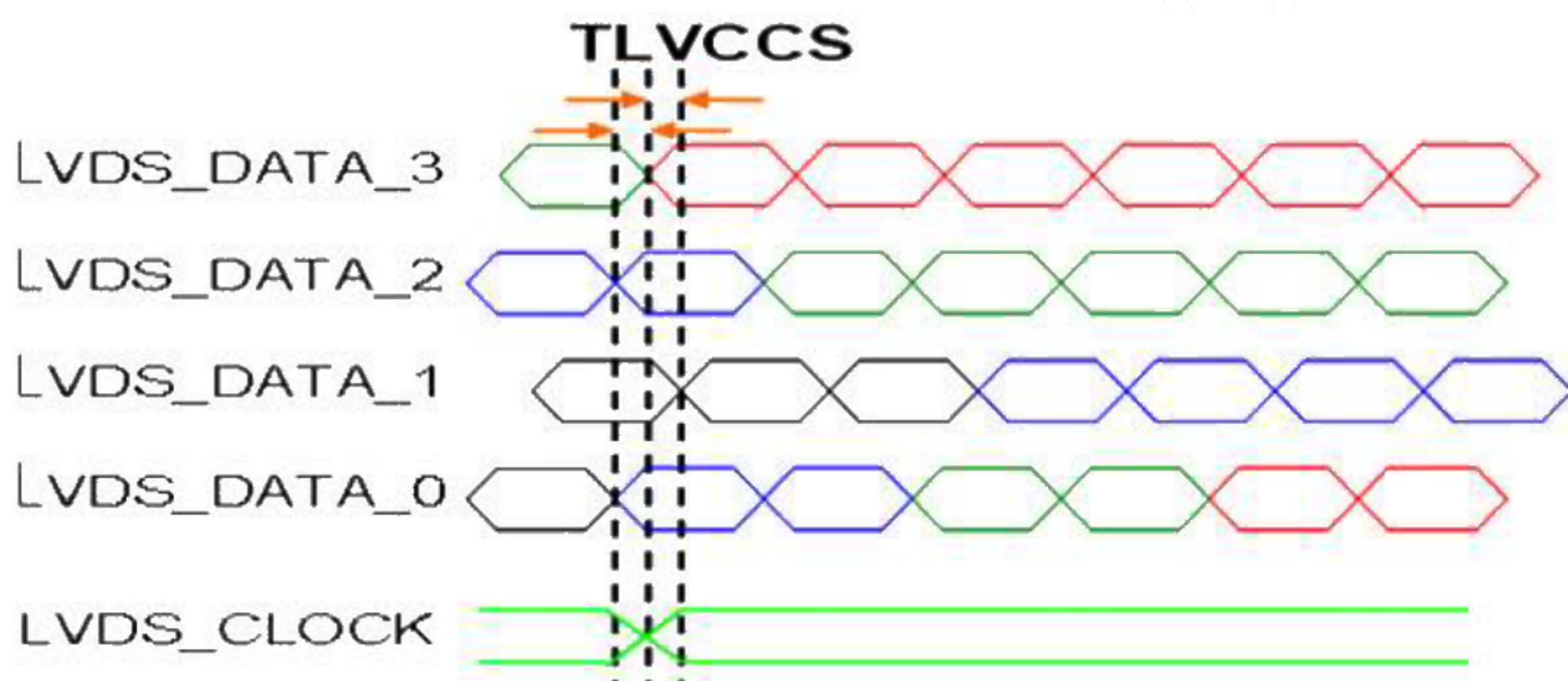
INPUT SIGNAL TIMING DIAGRAM



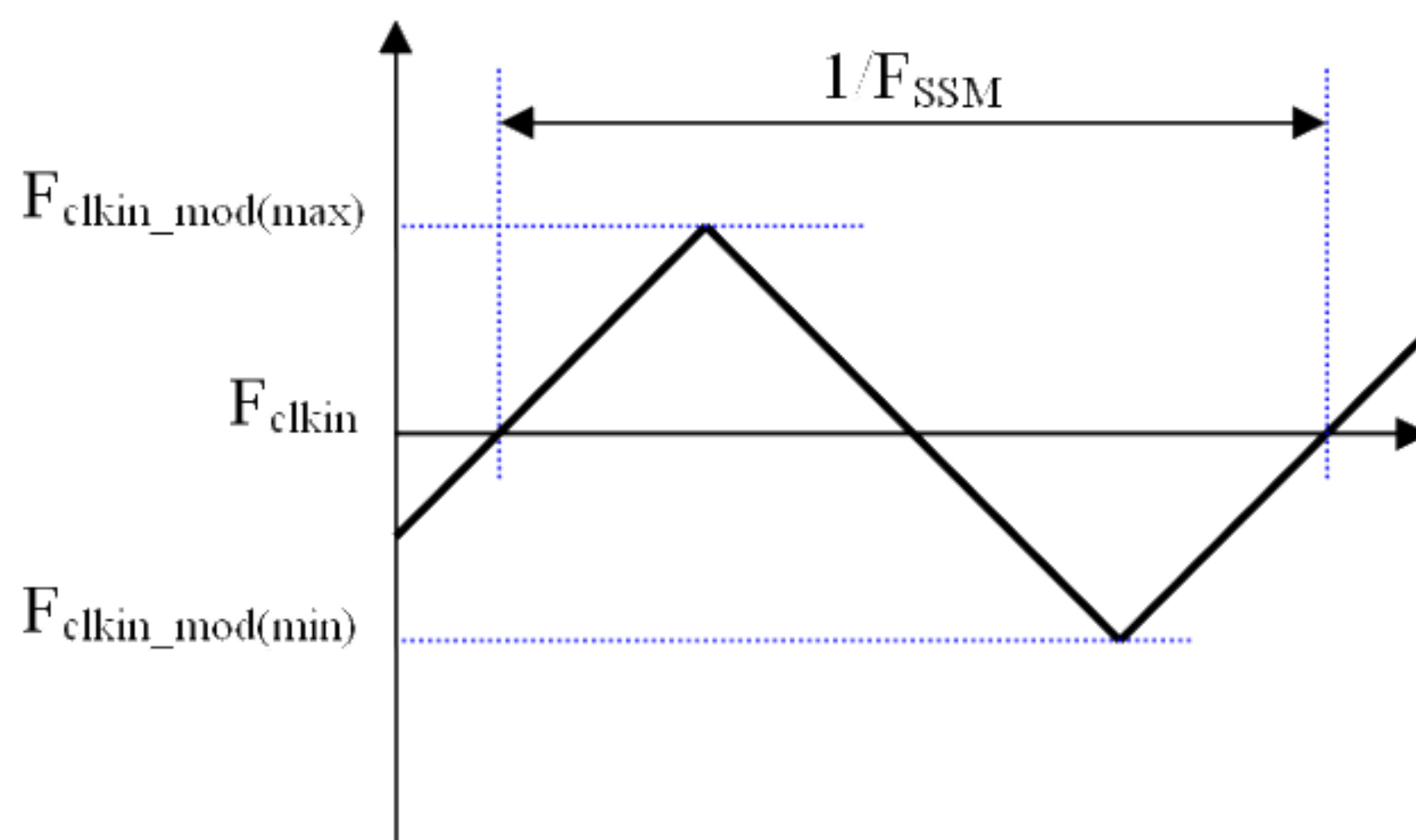
Note (1) The input clock cycle-to-cycle jitter is defined as below figures. $Trcl = |T_1 - T_1|$



Note (2) Input Clock to data skew is defined as below figures.

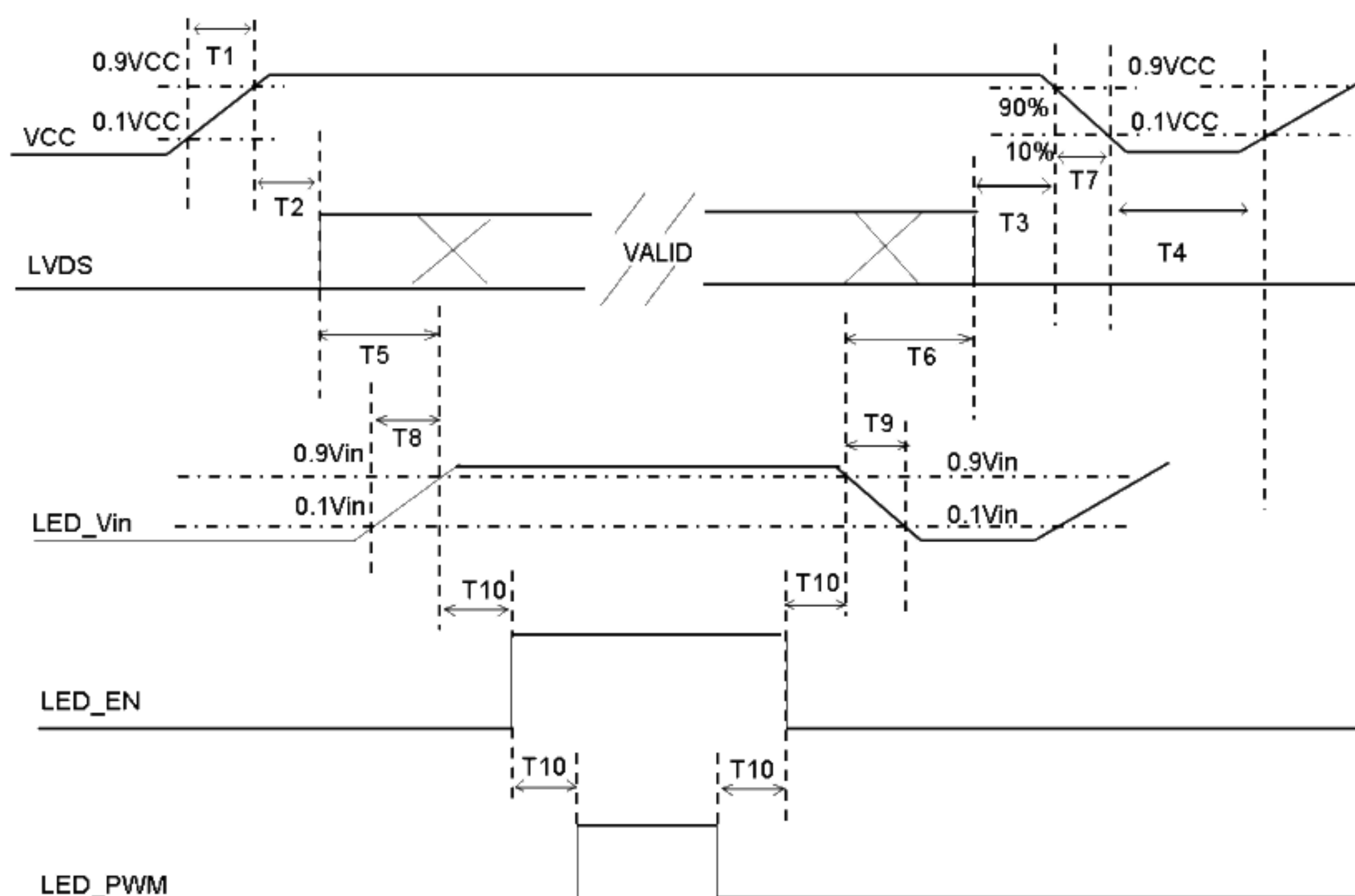


Note (3) The SSCG (Spread spectrum clock generator) is defined as below figures.



4.6 POWER ON/OFF SEQUENCE

The power sequence specifications are shown as the following table and diagram.



Timing Specifications

Parameters	Values			Units
	Min	Typ.	Max	
T1	0.5	-	5	ms
T2	0	-	50	ms
T3	0	-	50	ms
T4	500	-	-	ms
T5	430	-	-	ms
T6	Y0	-	-	ms
TY	5	-	100	ms
T5	5	-	30	ms
T...	0	-	10	ms
T10	10	-	-	ms

Note (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

Note (2) When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.

Note (3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.

Note (4) T4 should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

Note (6) CMI won't take any responsibility for the products which are damaged by the customers not following the Power Sequence.

Note (Y) There might be slight electronic noise when LCD is turned off (even backlight unit is also off). To avoid this symptom, we suggest "Vcc falling timing" to follow "TY spec".

5. OPTICAL CHARACTERISTICS

5.1 TEST CONDITIONS

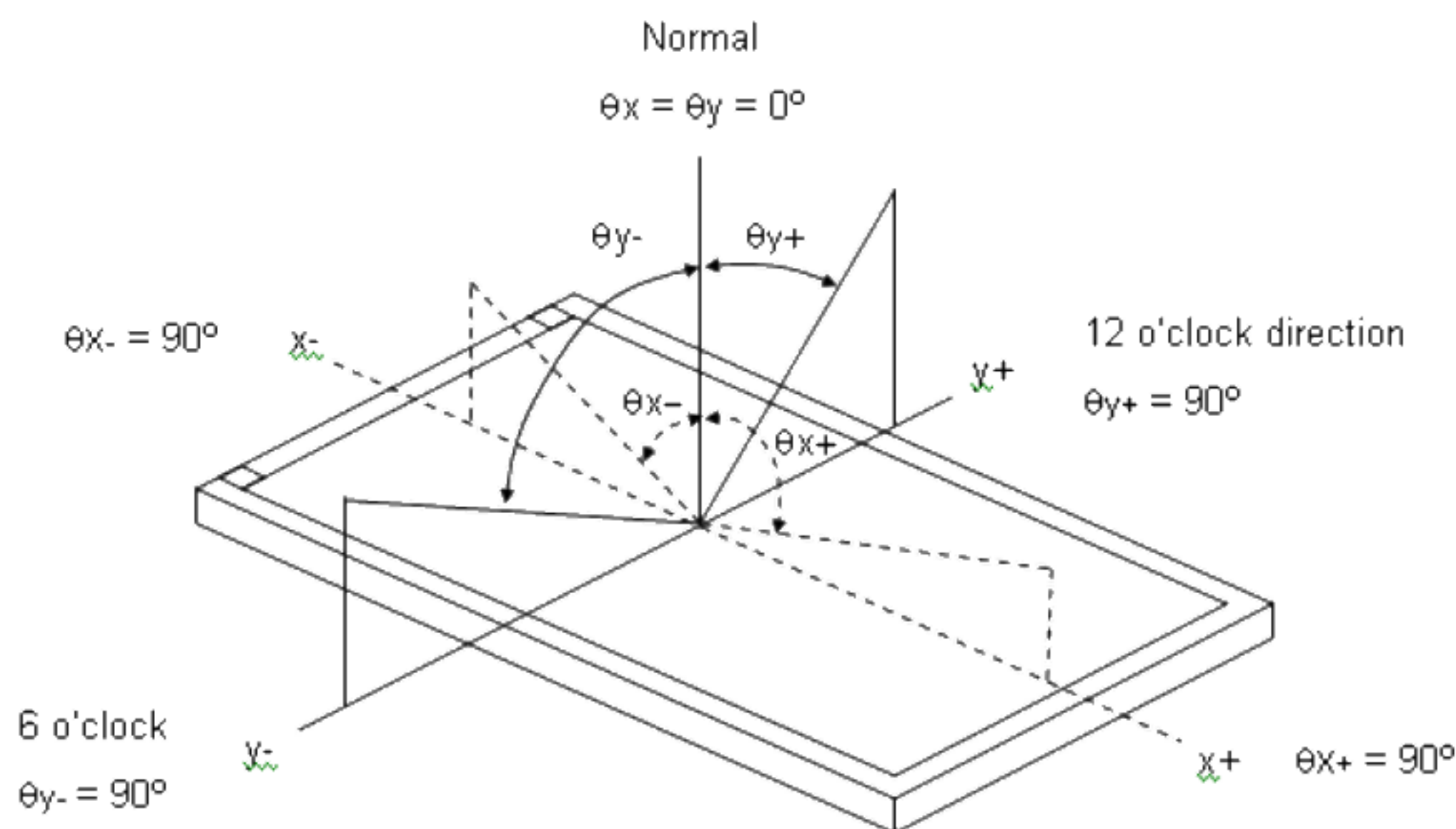
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V _{CC}	3.2	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Current	I _{PIN}	50 ± 1.5	mA _{DC}
PWM Duty Ratio	D	100	%

5.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 5.2. The following items should be measured under the test conditions described in 5.1 and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity (CIE 1.31)	Red	Rx	$\theta_x=0^\circ, \theta_Y=0^\circ$ CS-2000 R=G=B=255 Gray scale	Typ – 0.05	0.643	Typ + 0.05	-	(1), (5)
		Ry			0.342			
	Green	Gx			0.313			
		Gy			0.615			
	Blue	Bx			0.153			
		By			0.05...			
	White	Wx			0.313			
		Wy			0.32...			
	Center Luminance of White (Center of Screen)				L _C			
Contrast Ratio		CR	Y00	1000	-	-	(2), (5)	
Response Time		T _R	$\theta_x=0^\circ, \theta_Y=0^\circ$	-	1.5	2.5	ms	(3)
		T _F		-	3.5	5.5		
White Variation		W	$_x=0, _Y=0$	Y5	-	-	%	(5), (6)
Viewing Angle	Horizontal	$\theta_{x-} + \theta_{x+}$	CR ≥ 10	150	1Y0	-	Deg.	(1), (5)
	Vertical	$\theta_{y-} + \theta_{y+}$		140	160	-		
Viewing Angle	Horizontal	$\theta_{x-} + \theta_{x+}$	CR ≥ 5	160	1Y5	---	Deg.	(1), (5)
	Vertical	$\theta_{y-} + \theta_{y+}$		150	1Y0	---		

Note (1) Definition of Viewing Angle (θ_x , θ_y)f



Note (2) Definition of Contrast Ratio (CR)f

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

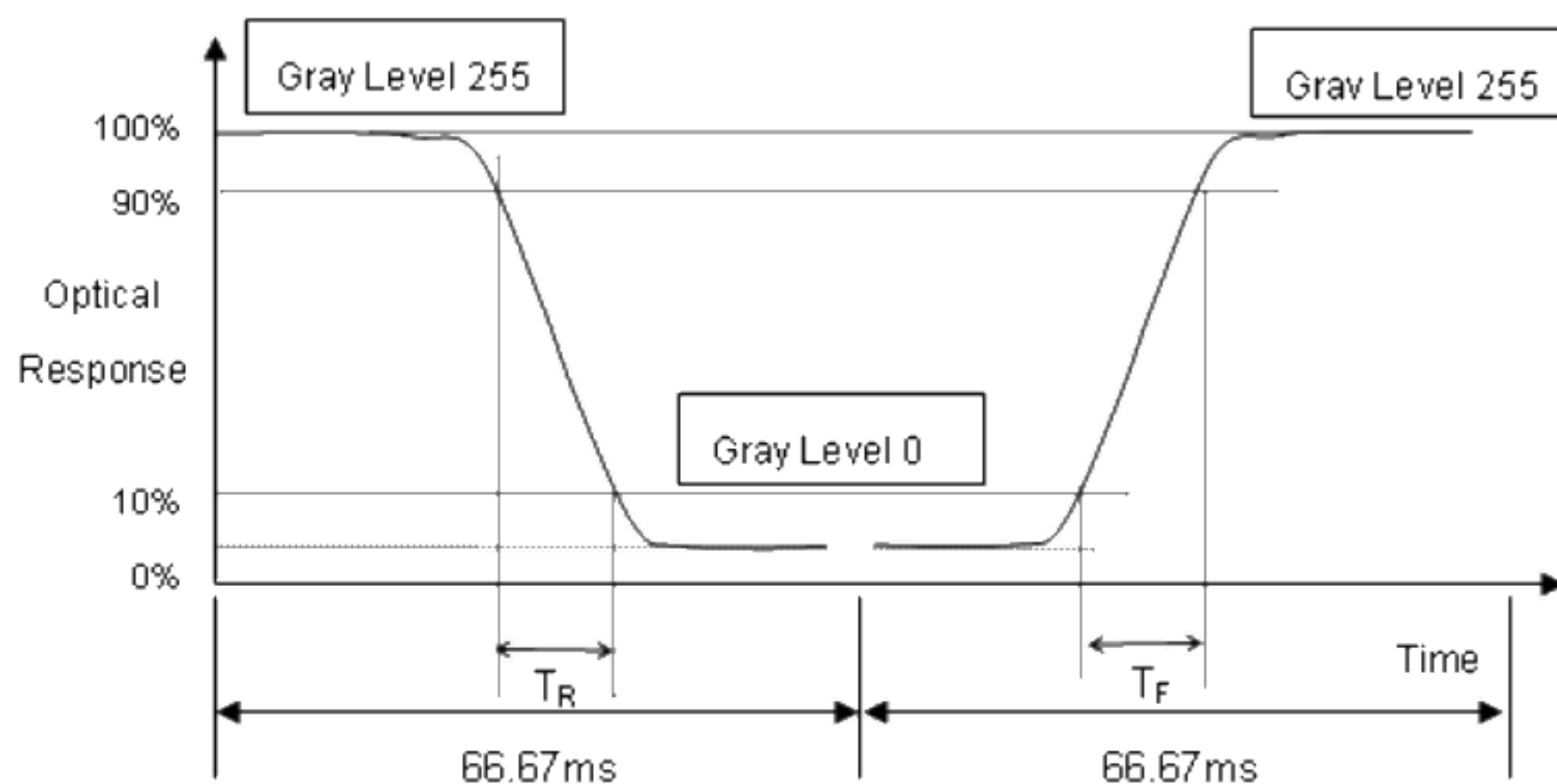
L_{255} Luminance of gray level 255

L_0 Luminance of gray level 0

$$CR = CR(5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R , T_F)f



Note (4) Definition of Luminance of White (L_c)f

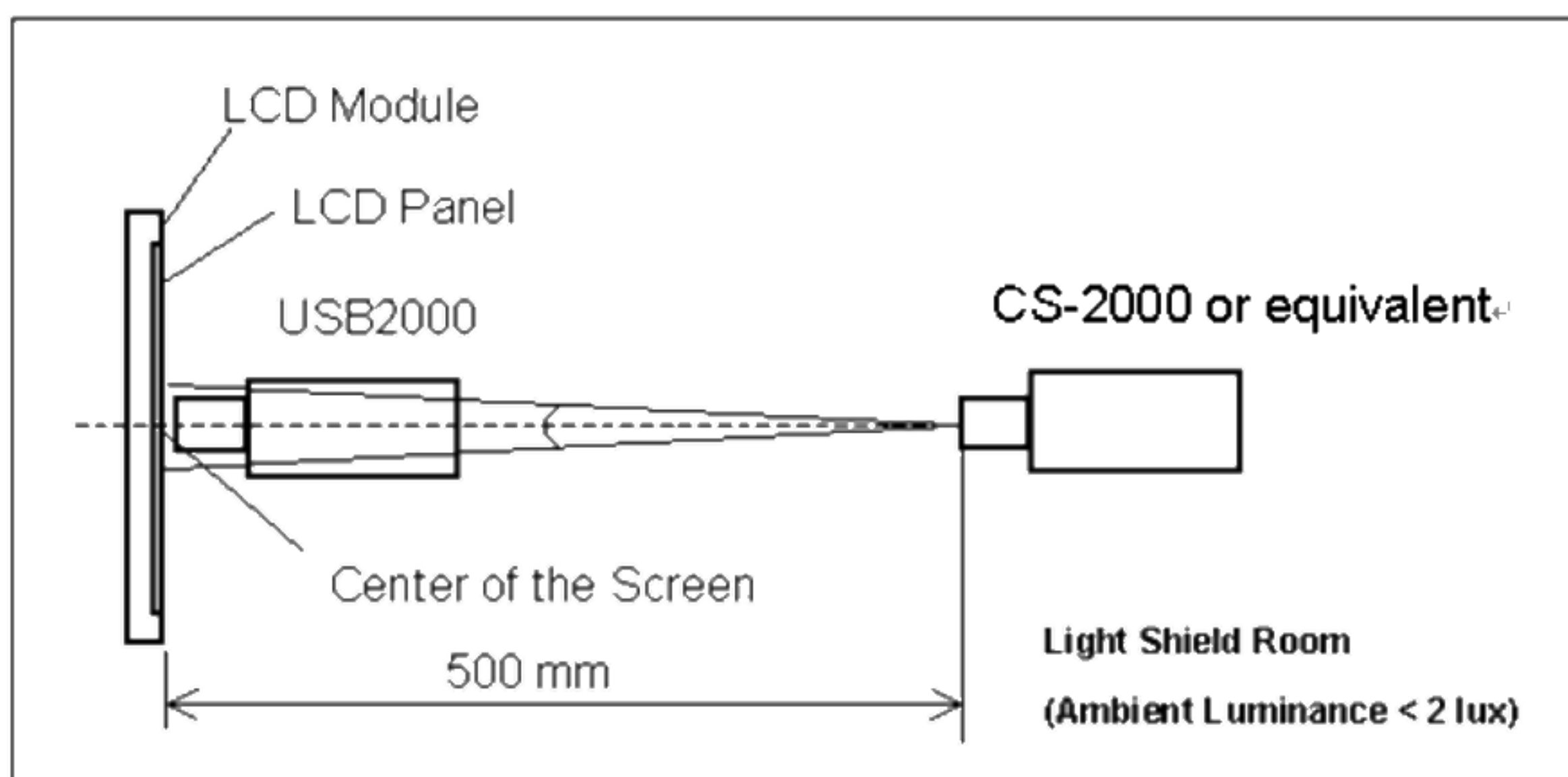
Measure the luminance of gray level 255 at center point

$$L_c = L(5)$$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setupf

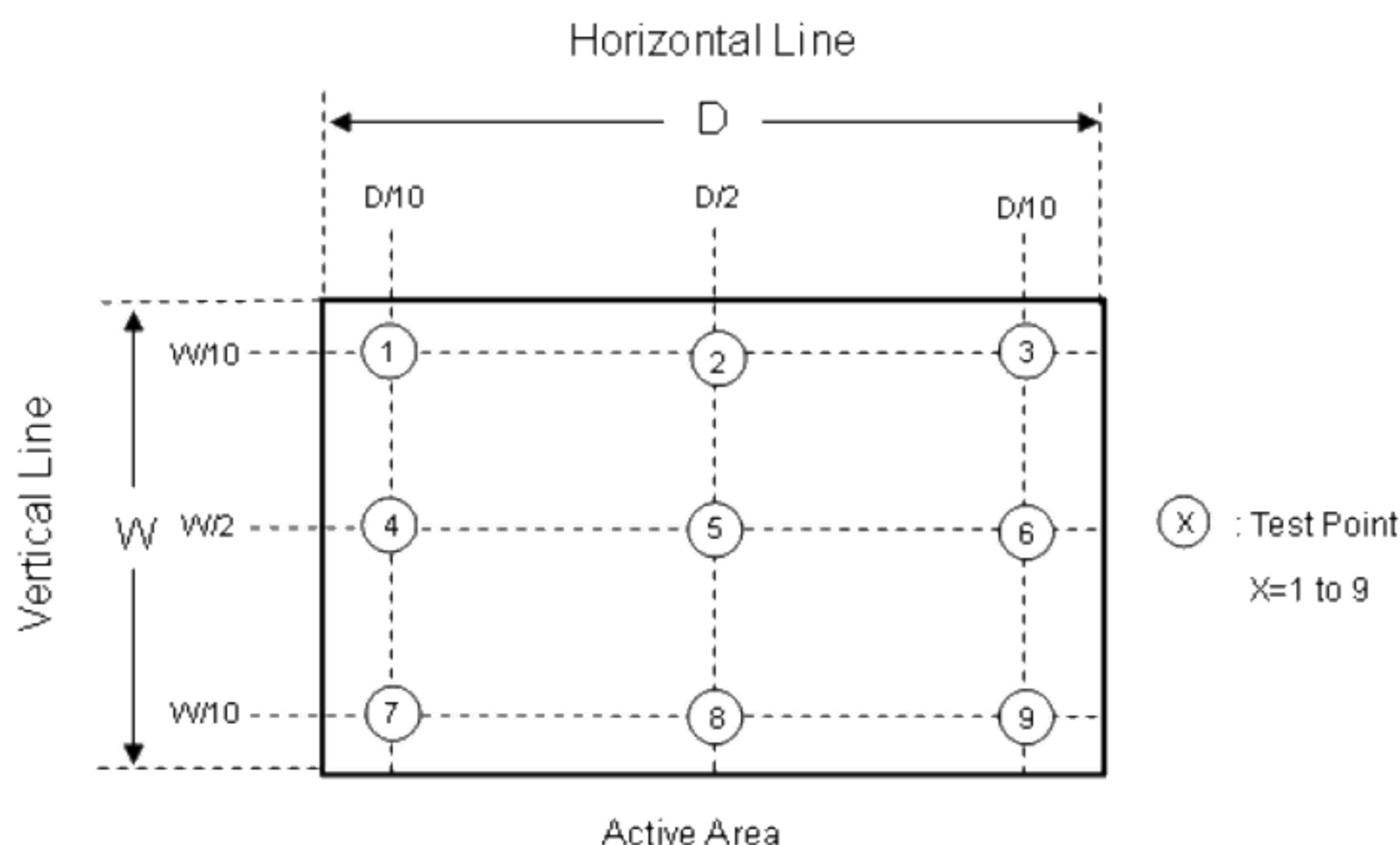
The LCD module should be stabilized at given temperature for 40 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 40 minutes in a windless room.



Note (6) Definition of White Variation (δW)f

Measure the luminance of gray level 255 at .. points

$$\delta W = (\text{Minimum } [L(1) \sim L(\dots)] / \text{Maximum } [L(1) \sim L(\dots)]) * 100\%$$



6. RELIABILITY TEST ITEM

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50°C , 50%RH, 240hours	
High Temperature Operation (HTO)	(Ta= 60°C , 50%RH , 240hours)	
Low Temperature Operation (LTO)	Ta= 0°C , 240hours	
High Temperature Storage (HTS)	Ta= 60°C , 240hours	
Low Temperature Storage (LTS)	Ta= -20°C , 240hours	
Vibration Test (Non-operation)	Accelerationf 1.5 Grms Wavef Half-sine Frequencyf 10 - 300 Hz Sweepf 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Accelerationf 50 G Wavef Half-sine Active Timef 11 ms Direction f ± X, ± Y, ± Z.(one time for each Axis)	
Thermal Shock Test (TST)	-20°C/30min , 60°C / 30min , 100 cycles	
On/Off Test	25°C , On/10sec , Off /10sec , 30,000 cycles	
ESD (Electro Static Discharge)	Contact Dischargef ± 5KV, 150pF(330Ω)	
	Air Dischargef ± 15KV, 150pF(330Ω)	
Altitude Test	Operationf10,000 ft / 24hours Non-Operationf30,000 ft / 24hours	

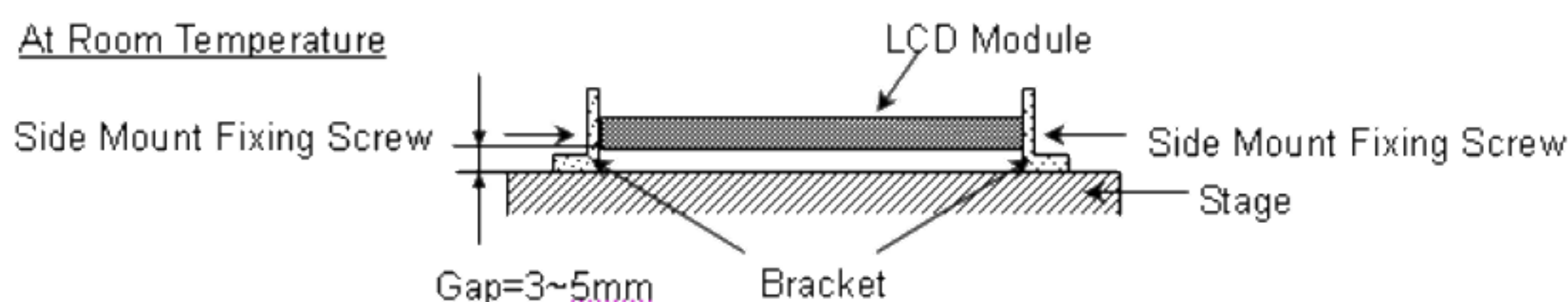
Note (1) criteria f Normal display image with no obvious non-uniformity and no line defect.

Note (2) Evaluation should be tested after storage at room temperature for more than two hour

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

The fixing condition is shown as belowf

At Room Temperature



6. PACKING

Y.1 PACKING SPECIFICATIONS

- (1) 5pcs LCD modules / 1 Box
- (2) Box dimensions 525(L)*254(W)*360(H)mm
- (3) Weight approximately 21Kg (5 modules per box)

Y.2 PACKING METHOD

- (1) Carton Packing should have no failure in the following reliability test items.

Test Item	Test Conditions	Note
Vibration	ISTA STANDARD Random, Frequency Range 2 – 200 Hz Top & Bottom 30 minutes (+Z), 10 min (-Z), Right & Left 10 minutes (X) Back & Forth 10 minutes (Y)	Non Operation
Dropping Test	1 Angle, 3 Edge, 6 Face, 46 cm	Non Operation

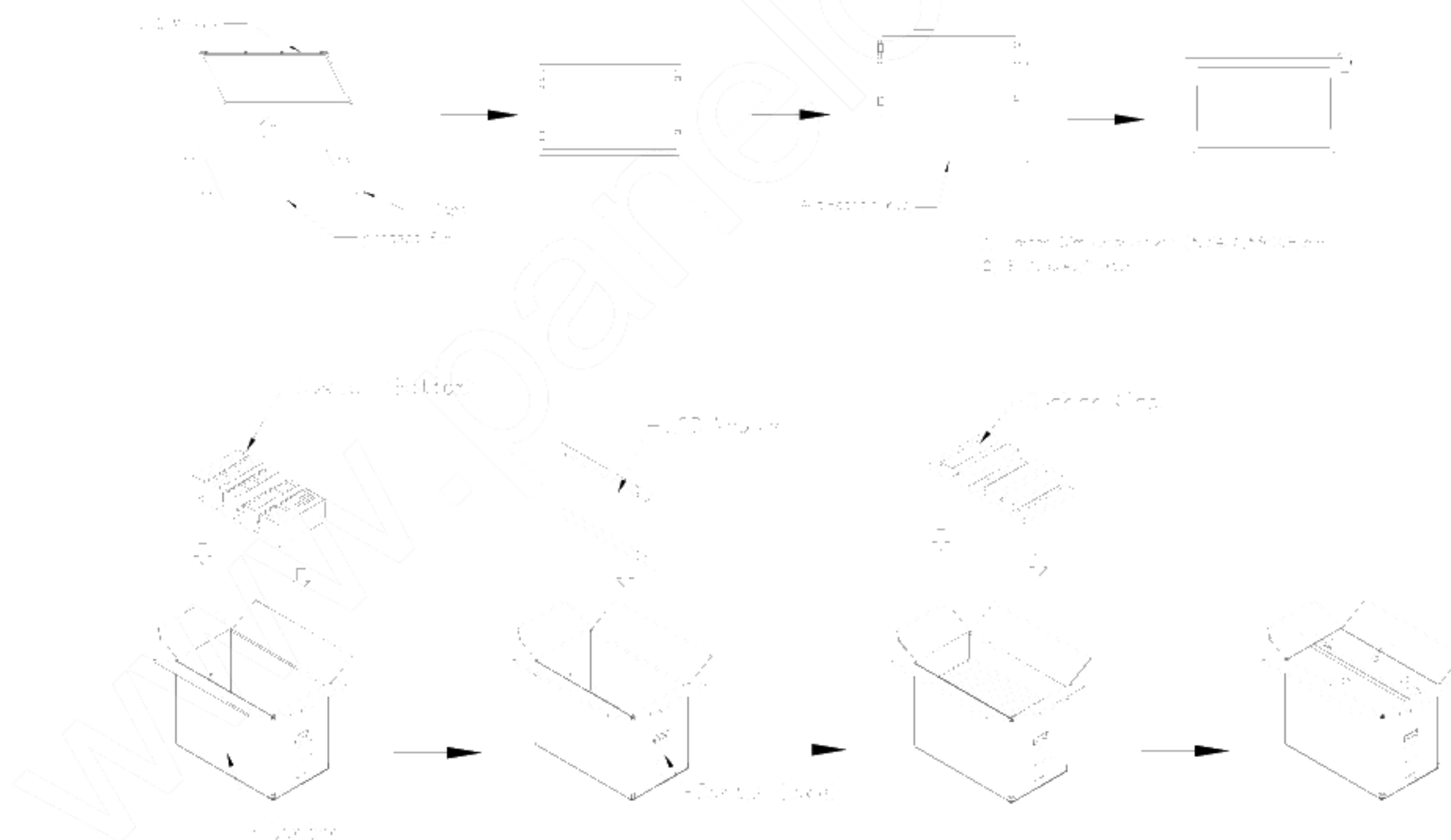


Figure. 6-1 Packing

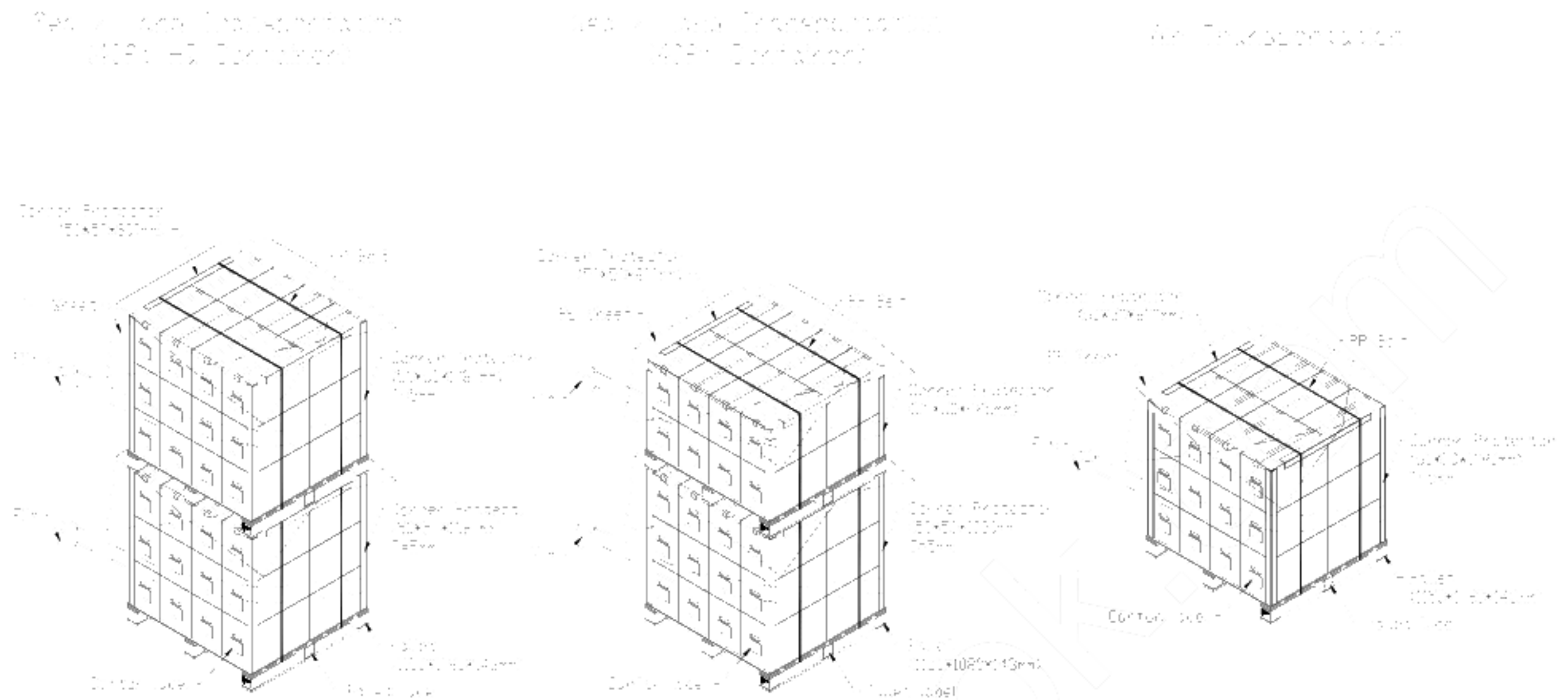


Figure. 6-2 Packing

p. CMI MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Model Namef G155BGE-L01

(b) Revisionf Rev. XX, for examplef A0, A1... B1, B2... or C1, C2...etc.

(c) CMI barcode definitionf

Serial IDf XX-XX-X-XX-YMD-L-NNNN

Code	Meaning	Description
XX	CMI internal use	-
XX	Revision	Cover all the change
X	CMI internal use	-
XX	CMI internal use	-
YMD	Year, month, day	Yearf 0~..., 2001=1, 2002=2, 2003=3...2010=0, 2011=1, 2012=2... Monthf 1~12=1, 2, 3, ~, ..., A, B, C Dayf 1~31=1, 2, 3, ~, ..., A, B, C, ~, W, X, Y, exclude I, O, and U.
L	Product line #	Line 1=1, Line 2=2, Line 3=3, ...
NNNN	Serial number	Manufacturing sequence of product

(d) Customer's barcode definitionf

Serial IDf CM-I5LE10X-X-X-XX-L-XX-L-YMD-NNNN

Code	Meaning	Description
CM	Supplier code	CMI=CM
I5E10	Model number	M155BGE-L10= I5E10
X	Revision code	Non ZBDf 1,2,~,5,.. / ZBDf A~Z
X	Source driver IC code	Century=1, CLL=2, Demos=3, Epson=4, Fujitsu=5, Himax=6, Hitachi=Y, Hynix=5, LDI=..., Matsushita=A, NEC=B, Novatec=C, OKI=D, Philips=E, Renasas=F, Samsung=G, Sanyo=H, Sharp=I, TI=J, Topro=K, Toshiba=L, Windbond=M, ILITEK=Q, Fiti=Y, None IC =Z
X	Gate driver IC code	
XX	Cell location	Tainan Taiwan=TN, Ningbo China=CN, Hsinchu Taiwan=SC
L	Cell line #	1,2,~,...,A,B,~,Y,Z
XX	Module location	Tainan, Taiwan=TN □Ningbo China=NP, Shenzhen China=SH
L	Module line #	1,2,~,...,A,B,~,Y,Z
YMD	Year, month, day	Yearf 0~..., 2001=1, 2002=2, 2003=3...2010=0, 2011=1, 2012=2... Monthf 1~12=1, 2, 3, ~, ..., A, B, C Dayf 1~31=1, 2, 3, ~, ..., A, B, C, ~, T, U, V
NNNN	Serial number	By LCD supplier

(e) FAB ID(UL Factory ID)f

Region	Factory ID
TWCM1	GEMN
NBCMI	LEOO
NBCME	CANO
NHCM1	CAPG

C. PRECAUTIONS

C.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- (4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- (5) Do not pull the I/F connector in or out while the module is operating.
- (6) Do not disassemble the module.
- (Y) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (5) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- (..) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (10)When ambient temperature is lower than 10°C may reduce the display quality. For example, the response time will become slowly.

C.2 STORAGE PRECAUTIONS

- (1) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0°C to 35°C and relative humidity of less than Y0%
- (2) Do not store the TFT – LCD module in direct sunlight
- (3) The module should be stored in dark place. It is prohibited to apply sunlight or fluorescent light in storing

C.3 OPERATION PRECAUTIONS

- (1) The LCD product should be operated under normal condition.

Normal condition is defined as below f

Temperature f 20±15°C

Humidityf 65±20%

Display pattern f continually changing pattern(Not stationary)

- (2) If the product will be used in extreme conditions such as high temperature, high humidity, high altitude, display pattern or operation time etc...It is strongly recommended to contact CMI for application engineering advice. Otherwise, its reliability and function may not be guaranteed.

C.4 SAFETY PRECAUTIONS

- (1) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (2) After the module's end of life, it is not harmful in case of normal operation and storage.

C.5 SAFETY STANDARDS

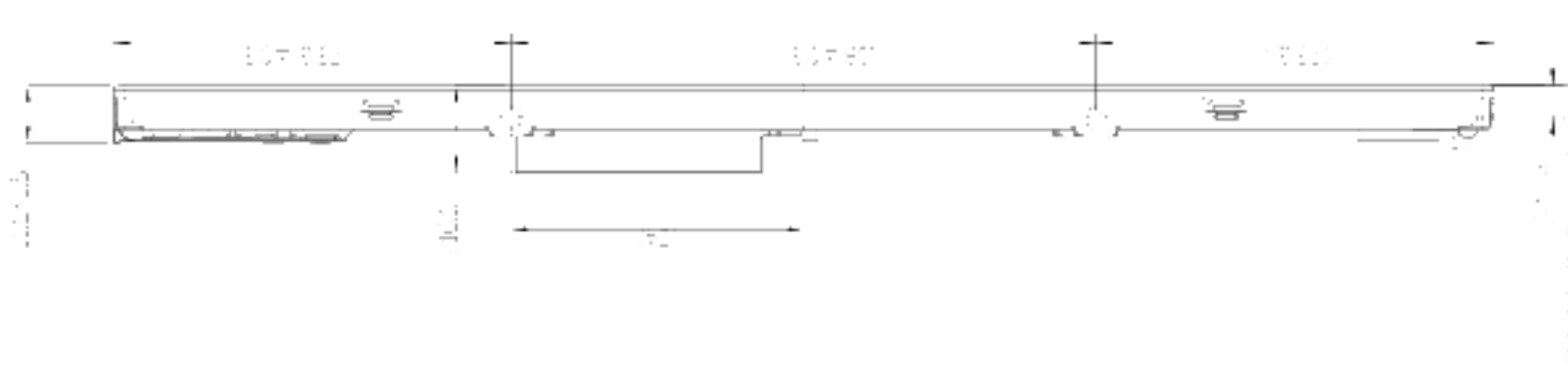
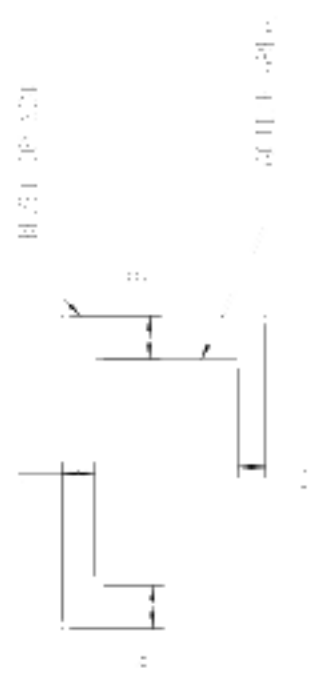
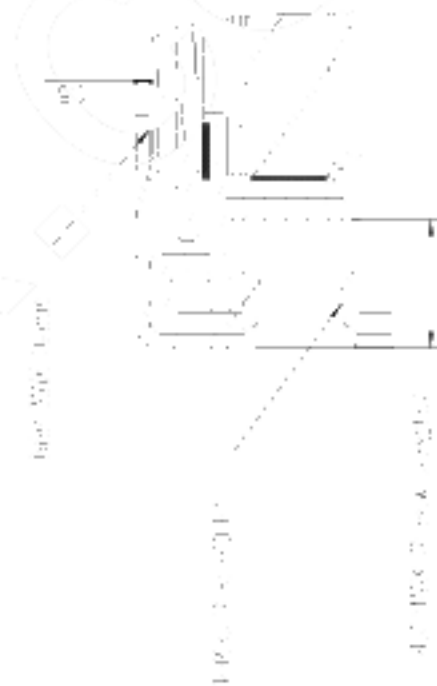
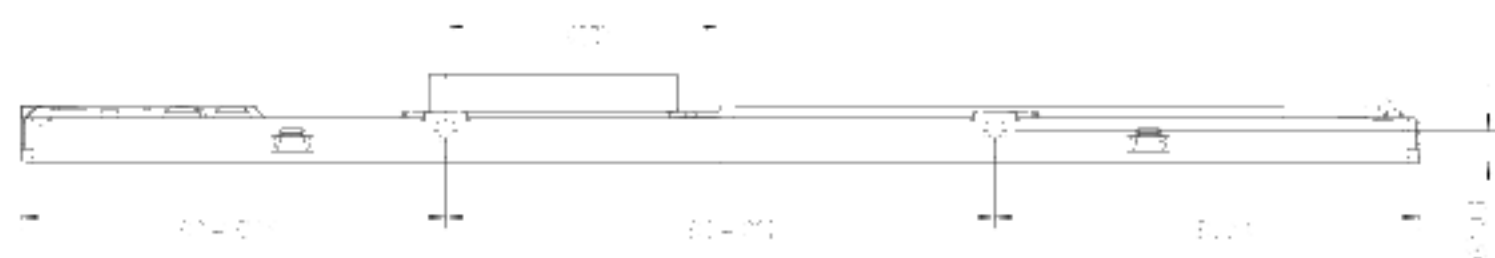
The LCD module should be certified with safety regulations as follows:

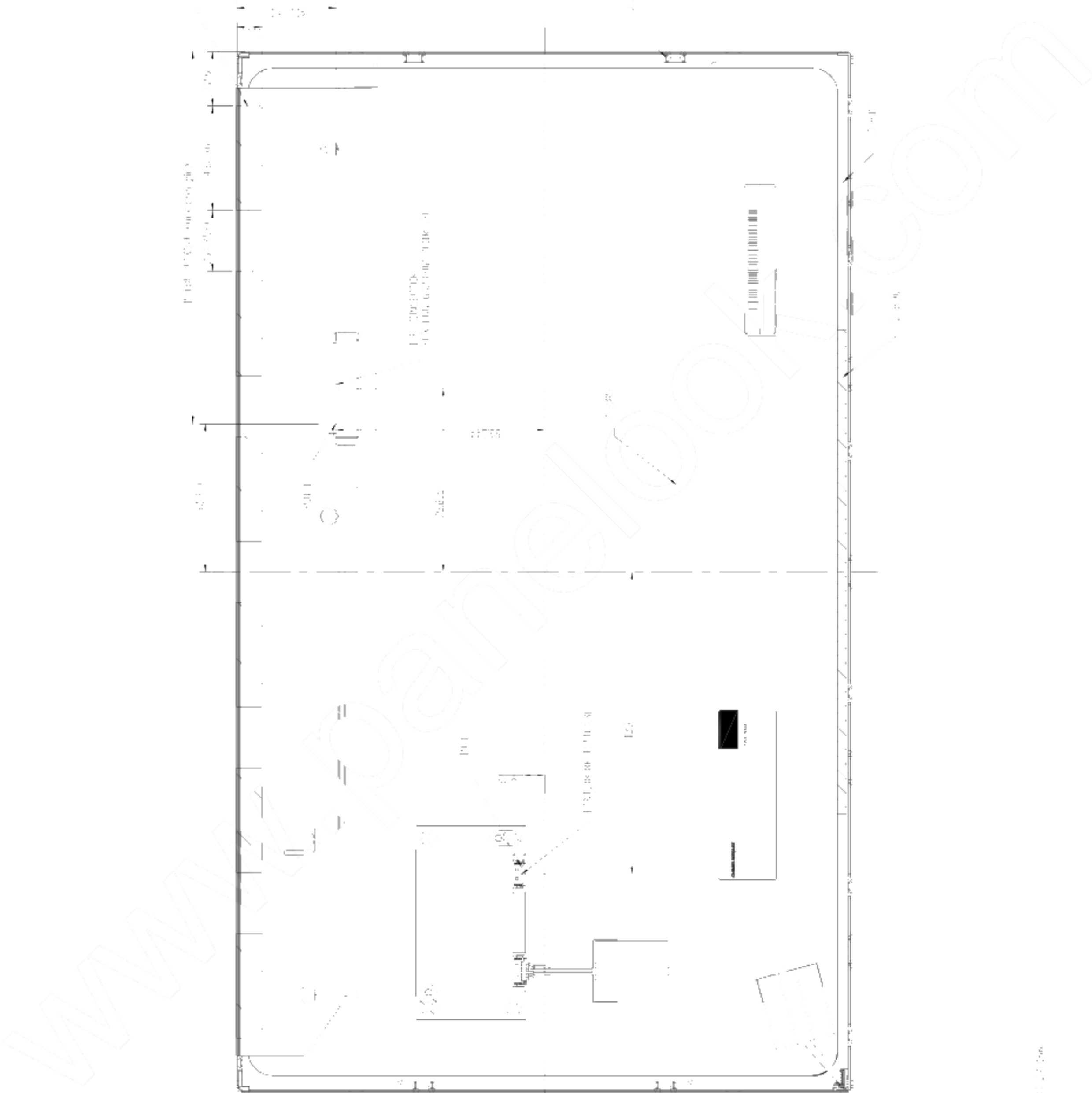
- (1) UL60.50-1 or updated standard.
- (2) IEC60.50-1 or updated standard.

C.6 OTHER

When fixed patterns are displayed for a long time, remnant image is likely to occur.

APPENDIX. OUTLINE DRAWING

[illegible]



1. The plan shows the layout of the building and the location of the rooms. The dimensions are given in meters.

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PROJECT INFORMATION									
Project Name	[Project Name]			Client	[Client Name]			Location	[Location]
Architect	[Architect Name]			Engineer	[Engineer Name]			Scale	[Scale]
Sheet No.	[Sheet No.]			Revision	[Revision]			Date	[Date]

Rev.	Description	Date
1	Initial Design	2023-10-27
2	Revised Design	2023-10-27
3	Final Design	2023-10-27