



PRODUCT SPECIFICATION

DATE : 27. May. 2011

MODEL : L3200-L02PD

The Information Described in this Specification is Preliminary and can be changed without prior notice

DS Electron Inc.		Customer Approval	
Prepared by	Approved by	Prepared by	Approved by

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

#243, Sin-gal-ri, Jiksan-eup, Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea

Contents

Revision History	3p
General Description	4p
General Information	4p
1. Absolute Maximum Ratings	5p
1.1 Environmental absolute Maximum Ratings	
1.2 Electrical Absolute Maximum Ratings	
1.3 LED Unit absolute Maximum Ratings	
2. Optical Characteristics	7p
3. Electrical Characteristics	10p
3.1 Electrical Characteristics	
3.2 Block Diagram	
3.3 Back Light Unit	
3.4 LED Drive DC-DC Converter	
4. Interface PIN Assignment	13p
4.1 Input (CN1) Pin assignment	
4.2 Block Diagram of Interface	
4.3 LVDS Interface (VESA format)	
4.4 Correspondence between input data & Display image	
4.5 Relationship between display colors & Input signals	
5. Interface Timing	18p
5.1 LVDS receiver timing	
5.2 Synchronization Signal Timing	
5.3 Timing between interface signal power supply	
6. Cosmetic Specifications	21p
6.1 Condition for cosmetic inspection	
6.2 Definition of zone	
6.3 Cosmetic Specifications	
7. Outline Dimension	23p
7.1 Front View	
7.2 Rear View	
8. Packing	25p
8.1 Carton (Internal Package)	
8.2 Packing Specification	
9. Marking	26p
9.1 Product Label	
9.2 Packing box attach	
10. Precaution	27p
10.1 Handling	
10.2 Precaution to storage	
10.3 Operation	
10.4 Use restrictions and limitations	
10.5 Others	

*** Revision History**

Date	Rev.	Page	Summary
27.May.2011	00	ALL	First issued

General Description

Description

L3200-L02PD is a color active matrix liquid crystal display (LCD) that uses amorphous silicon TFT(Thin Film Transistor) as switching components. This model is composed of a TFT LCD panel, a driver circuit and an integral Light Emitting Diode (LED) back light unit. The resolution of a 31.5" is 1366 x 768 and this model can display up to 16.7 million colors with wide viewing angle of 85° or higher in all directions. This panel is intended to support applications to provide an excellent performance for Flat Panel Display such as Multimedia TV, Display terminals for AV application.

Features

- RoHS compliance (Pb-free)
- High contrast ratio, High aperture ratio
- Wide viewing angle ($\pm 170^\circ$)
- High speed response
- HD (1366 x 768 pixels) resolution (16:9)
- Low power consumption
- LED Backlight (1 Edge)
- LVDS (Low Voltage Differential Signaling) interface (1pixel/clock)

General Information

Items	Specificatio	Unit	Note
Module Size	734.3(W _{TYP}) x 432.5(H _{TYP})	mm	±1.0mm
	14.8(B)/25.1(D)		
Weight	5,000(Max)	g	
Pixel Pitch	0.51075(H) x 0.51075(V)	mm	
Active Display Area	697.685(H) x 392.256(V)	mm	
Display Colors	16.7M	colors	
Number of Pixels	1366 x 768	pixel	
Pixel Arrangement	R+G+B vertical stripe		
Display Mode	Transmissive, Normally Black		
Luminance of White	350(Typ.)	cd/m ²	450(Option)
Power Consumption	50(Typ.)	watt	

1. Absolute Maximum Ratings

If the condition exceeds maximum ratings, it can cause malfunction or unrecoverable damage to the device.

1.1 Environmental absolute Maximum Ratings

ITEM	Operating		Storage		Unit	Note
	Min.	Max.	Min.	Max.		
Temperature	0	50	-20	60	°C	1),5),6)
Humidity	2)		2)		%RH	1),6)
Vibration	-	4.9(0.5G)	-	9.8(1.0G)	m/s ²	3),6)
Shock	-	29.4(3G)	-	196(20G)	m/s ²	4),6)
Corrosive Gas	Not Acceptable		Not Acceptable		-	6)

Note 1) Temperature and Humidity should be applied to the glass surface of a TFT module, not to the system installed with a module.

The temperature at the center of rear surface should be less than 70°C on the condition of operating.

2) $T_a \leq 40^\circ\text{C}$ ······Relative humidity should be less than 85%RH max. Dew is prohibited.

$T_a > 40^\circ\text{C}$ ······Relative humidity should be lower than the moisture of the 85%RH at 40°C.

3) Frequency of the vibration is between 15Hz and 100Hz. (Remove the resonance point)

4) Pulse width of the shock is 10 ms.

5) Long operation under low temperature may cause some portion of display area to be reddish for several minutes after turning on the product.

However, it does not affect the characteristics and reliability of the product.

6) Environmental Absolute Maximum Ratings is Based on General TFT standard module.

The users have a responsibility in considering ability of other parts of LCD module and LCD module process.

1.2 Electrical Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	0	13.2	V	
Input Voltage for Logic	V1	-	4.0	v	1)
Electrostatic Durability	VESD0	±100		V	

Note 1) It is applied to pixel data signal and clock signal.

2) Discharge coefficient : 200pF-250Ω, Environmental : 25°C-70%RH

3) It is applied to I/F connector pins.

1.3 LED Unit absolute Maximum Ratings

Item	Symbol	Max.	Unit	Note
Operating Temperature Range	Top	-30 ~ 85	°C	
Storage temperature Range	T _{ST}	-40 ~ 100	°C	
Junction Temperature	T _j	125	°C	
Forward Current	I _f	200	mA	@LED Module (42 LEDs x2)
	I _{fp}	-	mA	
Forward Voltage	V _f	150.4	V	
	V _{fp}	-	V	
Thermal Resistance, Junction to PCB	R _{th, JS}	30	K/W	

1.4 Environmental Absolute Ratings of Module

Storage Condition: With shipping package

Storage temperature range : 25±10 °C

Storage humidity range: 60%RH or less

2. Optical Characteristics

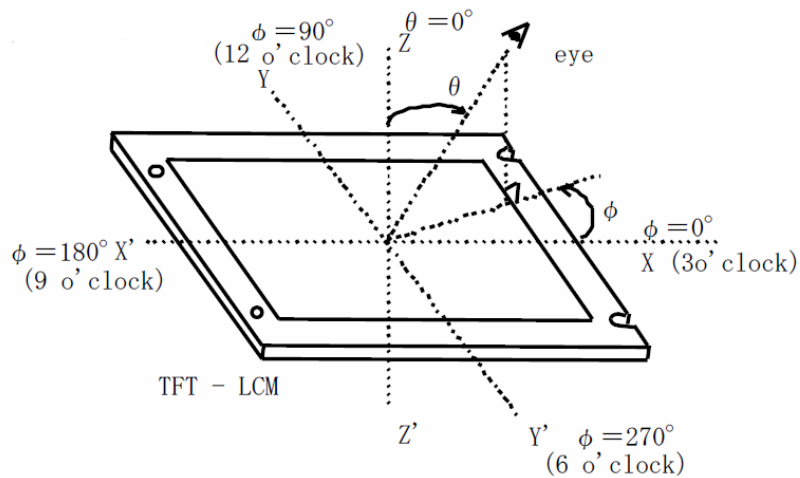
The measuring point is the center of display area unless otherwise noted. The optical characteristics should be measured in a dark room or equivalent. Measuring equipment:

TOPCON BM-7

($T_a = 25 \pm 2^\circ\text{C}$, $V_{DD} = 12\text{V}$, $f_v = 60\text{Hz}$, $f_{DCLK} = 75\text{MHz}$, $EXTVBR_B=100\%$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio	C/R		700	1200	-		2)
Response Time	Rising	Tr	-	8	20	msec	5)
	Falling	Tf	-	6	20		
Luminance of White	Y		-	350	-	cd/m ²	6)
Color Chromaticity (CIE 1931)	Red	Rx	0.570	0.600	0.630	-	7),8)
		Ry	0.270	0.300	0.330		
	Green	Gx	0.300	0.330	0.360		
		Gy	0.570	0.600	0.630		
	Blue	Bx	0.115	0.145	0.175		
		By	0.025	0.055	0.085		
	White	Wx	0.260	0.290	0.320		
		Wy	0.265	0.295	0.325		
Color Gamut	-		-	-	62	%	7)
Viewing Angle	Hor.	θ_L	75	85	-	Degree	8)
		θ_R	75	85	-		
	Ver.	θ_U	75	85	-		
		θ_D	75	85	-		
Brightness Uniformity	B _{uni}		-	-	25	%	4)

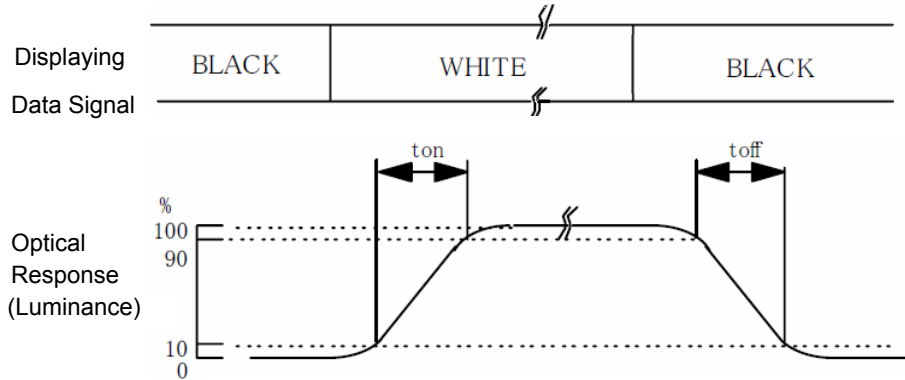
Note 1) Definition of Viewing Angle



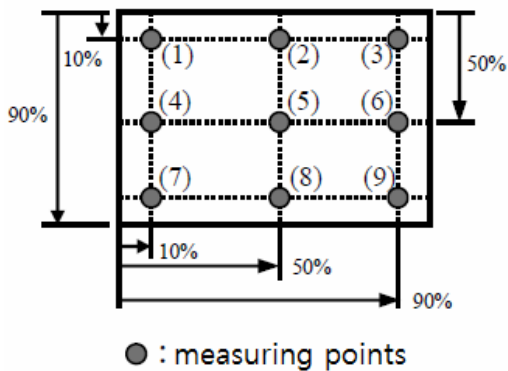
2) Definition of Contrast Ratio (CR)

$$CR = \frac{\text{(Luminance at displaying WHITE)}}{\text{(Luminance at displaying BLACK)}}$$

3) Definition of Response Time



4) Definition of Brightness Uniformity Display pattern is white (255 level). The brightness



uniformity is defined as the following equation. Brightness at each point is measured, and average, maximum and minimum brightness is calculated.

$$B_{uni} = \frac{B_{max} \text{ or } B_{min} - B_{ave}}{B_{ave}} \times 100$$

where, B_{max} = Maximum brightness
 B_{min} = Minimum brightness
 B_{ave} = Average brightness

$$B_{ave} = \frac{\sum_{k=1}^9 (B(k))}{9}$$

5) Variation of color position on CIE

Variation of color position on CIE is defined as difference between colors at $\theta=0^\circ$ and at $\theta=50^\circ$ & $\phi=0^\circ, 90^\circ, 180^\circ, 270^\circ$.

6) Contrast ratio at 89°

Evaluation conditions are on horizontal & vertical axis

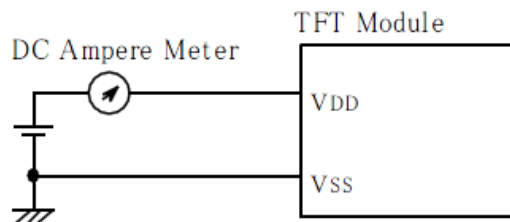
3. Electrical Characteristics

3.1 Electrical Characteristics

It requires two power inputs. One is employed to power for the LCD circuit. The other is used for the LED backlight and LED Driver circuit.

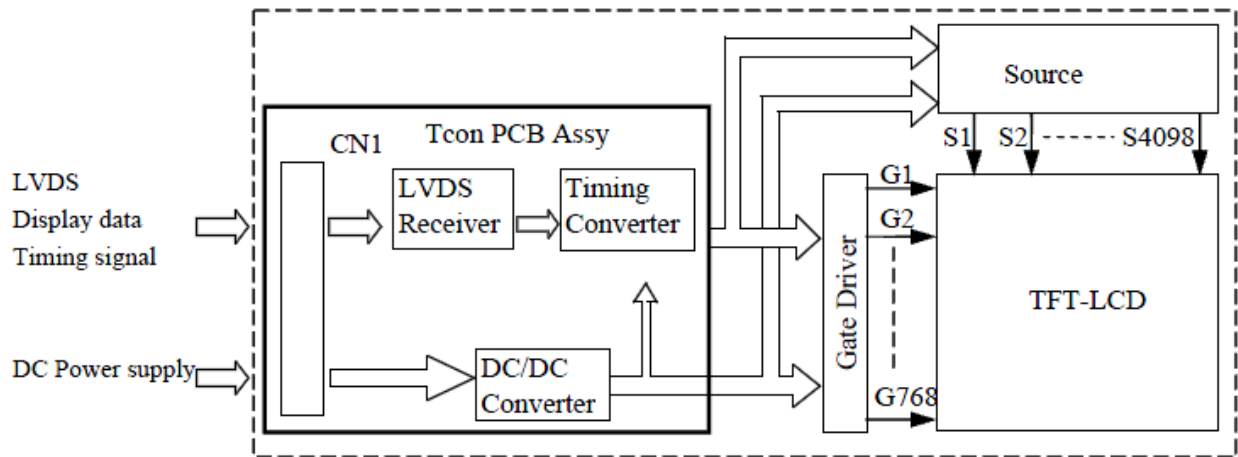
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply	V_{DD}	11.4	12.0	12.6	V	
Current of Power Supply	I_{DD}	-	0.4	0.8	A	1),2)
Ripple voltage of power Supply	V_{DDR}	-	-	350	mV	

Note (1) $f_V = 60\text{Hz}$, $f_{DCLK} = 85\text{MHz}$, $V_{DD} = 12.0\text{V}$, DC Current, and display pattern is white raster



(2) Current fuse is built in a module. Current capacity of power supply for VDD Should be larger than 4A, so that the fuse can be opened at the trouble of electrical circuit of module.

3.2 Block Diagram



3.3 Back Light Unit

The back light unit contains 84 White LEDs.

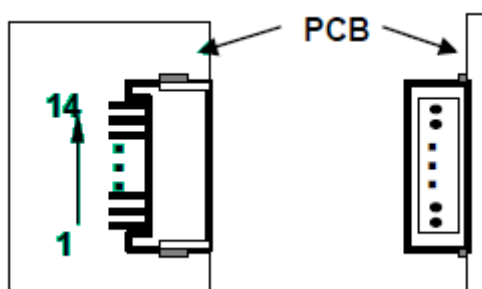
Master

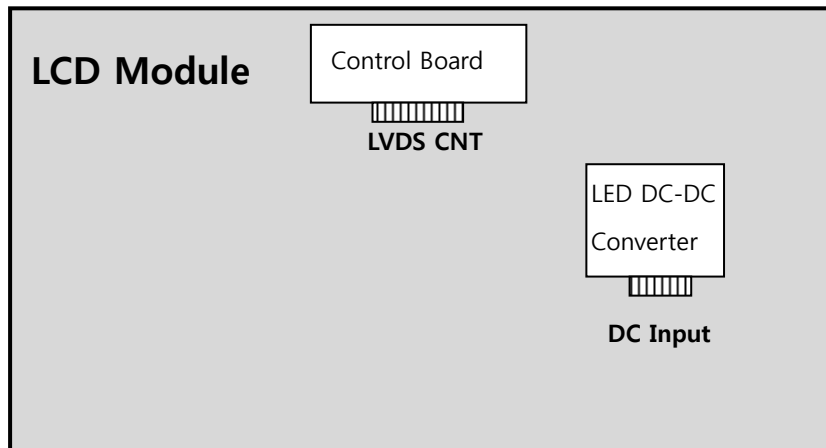
- LED Driver Connector: 20022WR-14B1(Yeonho) or Equivalent
- Mating Connector: 20022HS-14 or Equivalent

LED DRIVER CONNECTOR PIN CONFIGURATION

Pin No	Symbol	Description	note
1	VIN	Input Supply Voltage +24.0V	
2	VIN	Input Supply Voltage +24.0V	
3	VIN	Input Supply Voltage +24.0V	
4	VIN	Input Supply Voltage +24.0V	
5	NC	No Connection	
6	GND	Power/Signal Return	
7	GND	Power/Signal Return	
8	GND	Power/Signal Return	
9	GND	Power/Signal Return	
10	NC	No Connection	
11	Error_out	Operation Status Output Normal Operation(GND), Abnormal Operation(Open collector)	
12	ENA	Backlight On/Off control Signal	
13	NC	No Connection	
14	EX_DIM	External Dimming Control Signal(External PWM Pulse)	

◆ Rear view of LCM





Ta=25 ± 2°C

Item	Symbol	Min.	Typ.	Max.		Note
Operating Life Time	H	50,000	-	-	Hour	1)

Note (1) It is defined as the time to take until the brightness reduces to 50% of its original value. [Operating condition : Ta = 25±2°C]

3.4 LED Drive DC-DC Converter

Items 1)	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Input Voltage	Vin	-	21.6	24.0	26.4	V	Ta=25±2 °C
Input Current	Iin	Vin= 24.0V Ext_dim= 100%	-	2.2	-	Adc	2),3)
Output Current	I _{LED}	Vin=24.0V Ext_dim = 100%	-	140	-	mArms	
Frequency	PWM	Vin=24.0V	120	-	180	Hz	
Backlight On/Off	ON	Vin=24.0V	2.4	-	5.25	V	-
	OFF		0	-	0.8		

Note 1) All data is measured after 60min warm-up.

2) Test Equipment

-DC current Probe : PCR 2000LA

-Oscilloscope : Bandwidth 20MHz

3) PWM Duty(%) = (T_{on} / T_{total}) * 100

4. Interface PIN Assignment

4.1 Input (CN1) Pin assignment

CN1: JAE FI-X30SSLA-HF (Matching connector : JAE FI- X30C2L)

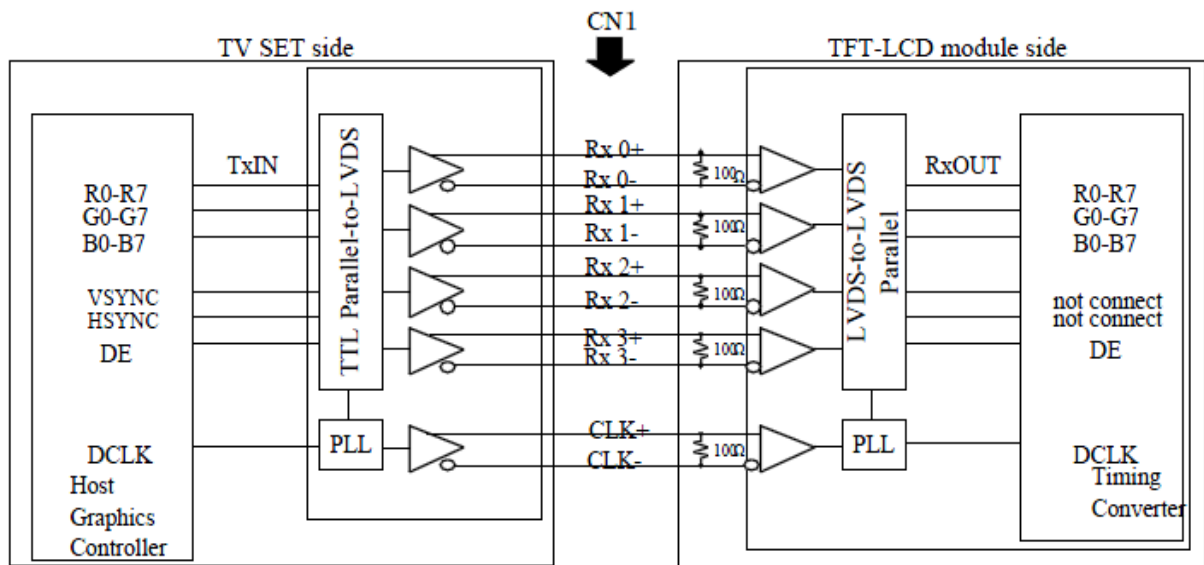
Pin No.	SYMBOL	Description	Note
1	VDD	Power Supply (typ.+12V)	1)
2	VDD		
3	VDD		
4	VDD		
5	VSS	GND(0V)	2)
6	VSS		
7	VSS		
8	VSS		
9	IC	Internally Connected, Keep Open	
10	IC		
11	VSS	GND(0V)	2)
12	Rx0-	Pixel Data	3)
13	Rx0+		
14	VSS	GND(0V)	2)
15	Rx1-	Pixel Data	3)
16	Rx1+		
17	VSS	GND(0V)	2)
18	Rx2-	Pixel Data	3)
19	Rx2+		
20	VSS	GND(0V)	2)
21	CLK-	Pixel Clock	3)
22	CLK+		
23	VSS	GND(0V)	2)
24	Rx3-	Pixel Data	3)
25	Rx3+		
26	VSS	GND(0V)	2)
27	NC	No Connection	
28	NC		
29	NC		
30	VSS	GND(0V)	2)

Notes 1) All VDD pins shall be connected to +12.0V(Typ.).

2) All VSS pins shall be grounded. Metal bezel is internally connected to VSS.

3) Rx n+ and Rx n- (n=0,1,2,3) should be wired by twist-pairs or side-by-side FPC patterns, respectively.

4.2 Block Diagram of Interface



R0~R7 : Pixel R Data (7; MSB, 0; LSB)
 G0~G7 : Pixel G Data (7; MSB, 0; LSB)
 B0~B7 : Pixel B Data (7; MSB, 0; LSB)
 DE : Data Enable

Note 1) The system must have the transmitter to driver the module.

2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially

4.3 LVDS Interface (VESA format)

	SIGNAL	TRANSMITTER THC63LVDM83A		INTERFACE CONNECTOR	RECEIVER		TFT CONTROL	
		PIN	INPUT		PIN	INPUT	INPUT	
24bit	R0	51	Tx IN0	Rx 0+	27	Rx OUT0	R0	
	R1	52	Tx IN1		29	Rx OUT1	R1	
	R2	54	Tx IN2		30	Rx OUT2	R2	
	R3	55	Tx IN3		32	Rx OUT3	R3	
	R4	56	Tx IN4		33	Rx OUT4	R4	
	R5	3	Tx IN6		Rx 0-	35	Rx OUT6	R5
	G0	4	Tx IN7			37	Rx OUT7	G0
	G1	6	Tx IN8	Rx 1+	38	Rx OUT8	G1	
	G2	7	Tx IN9		39	Rx OUT9	G2	
	G3	11	Tx IN12		43	Rx OUT12	G3	
	G4	12	Tx IN13		45	Rx OUT13	G4	
	G5	14	Tx IN14		46	Rx OUT14	G5	
	B0	15	Tx IN15		Rx 1-	47	Rx OUT15	B0
	B1	19	Tx IN18			51	Rx OUT18	B1
	B2	20	Tx IN19	Rx 2+	53	Rx OUT19	B2	
	B3	22	Tx IN20		54	Rx OUT20	B3	
	B4	23	Tx IN21		55	Rx OUT21	B4	
	B5	24	Tx IN22		1	Rx OUT22	B5	
	RSVD 1)	27	Tx IN24		Rx 2-	3	Rx OUT24	RSVD 1)
	RSVD 1)	28	Tx IN25			5	Rx OUT25	RSVD 1)
	DE	30	Tx IN26		Rx 3+	6	Rx OUT26	DE
	R6	50	Tx IN27	7		Rx OUT27	R6	
	R7	2	Tx IN5	Rx 3-		34	Rx OUT5	R7
G6	8	Tx IN10	41			Rx OUT10	G6	
G7	10	Tx IN11	42	Rx OUT11		G7		
B6	16	Tx IN16	49	Rx OUT16		B6		
B7	18	Tx IN17	50	Rx OUT17		B7		
RSVD 1)	25	Tx IN23	2	Rx OUT23	RSVD 1)			
	DCLK	31	TxCLK IN	CLK+ CLK-	26	RxCLK OUT	DCLK	

R0 ~ R7: Pixel R Data (7; MSB, 0; LSB)

G0 ~ G7: Pixel G Data (7; MSB, 0; LSB)

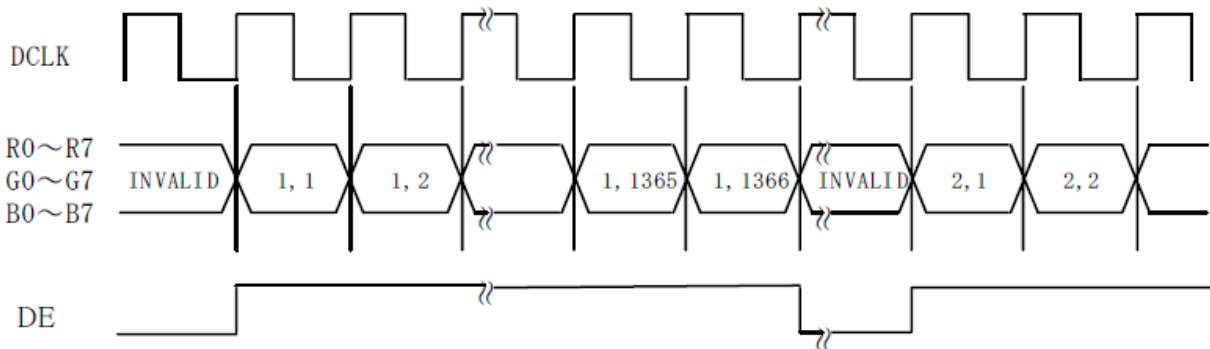
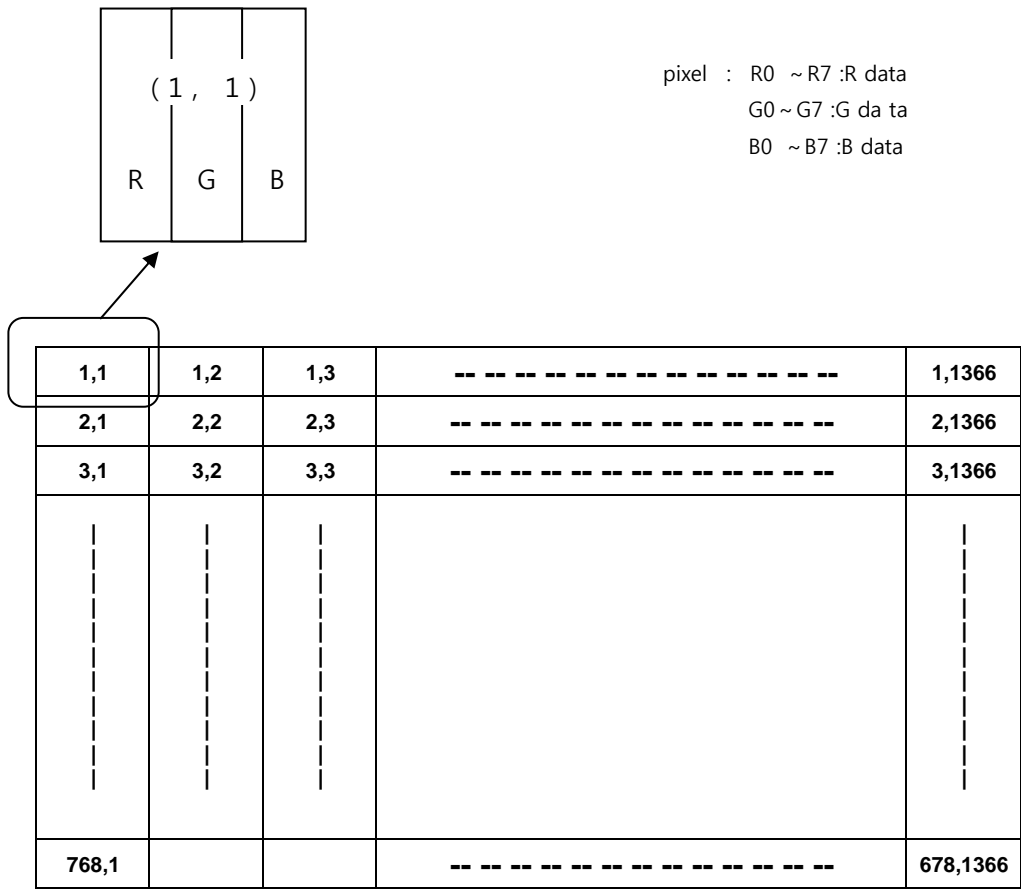
B0 ~ B7: Pixel B Data (7; MSB, 0; LSB)

DE: Data Enable

Note 1) RSVD (reserved) pins on the transmitter shall be tied to "H" or "L".

4.4 Correspondence between input data & Display image

Display data of adjacent one pixel is latched during one cycle of DCLK.



4.5 Relationship between display colors & Input signals

color	Input	Red Data								Green Data								Blue Data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB				LSB				MSB				LSB				MSB				LSB			
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(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(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(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
	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	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)	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
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	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	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
	Green (1)	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 (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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	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	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
	Blue (1)	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 (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	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

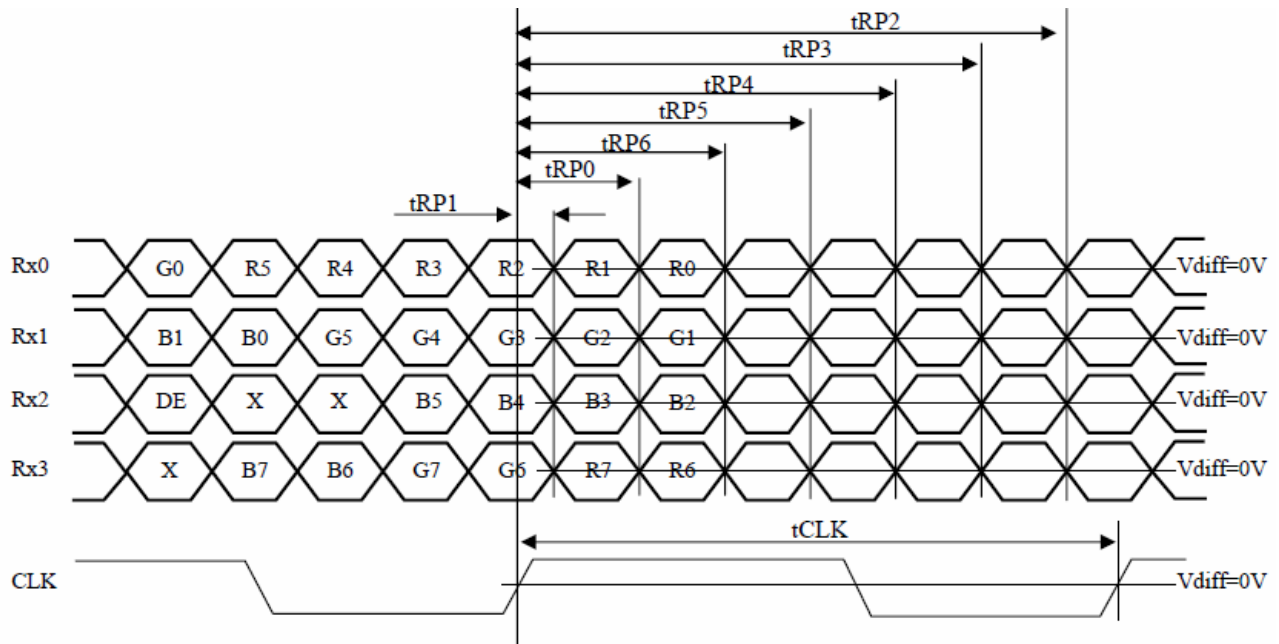
Notes 1) Definition of gray scale:

Color(n) · · · · Number in parenthesis indicates gray scale level. Larger n corresponds to brighter level.

2) Data: 1: High, 0: Low

5. Interface Timing

5.1 LVDS receiver timing



$$Rx0=(Rx0+)-(Rx0-)$$

$$Rx1=(Rx1+)-(Rx1-)$$

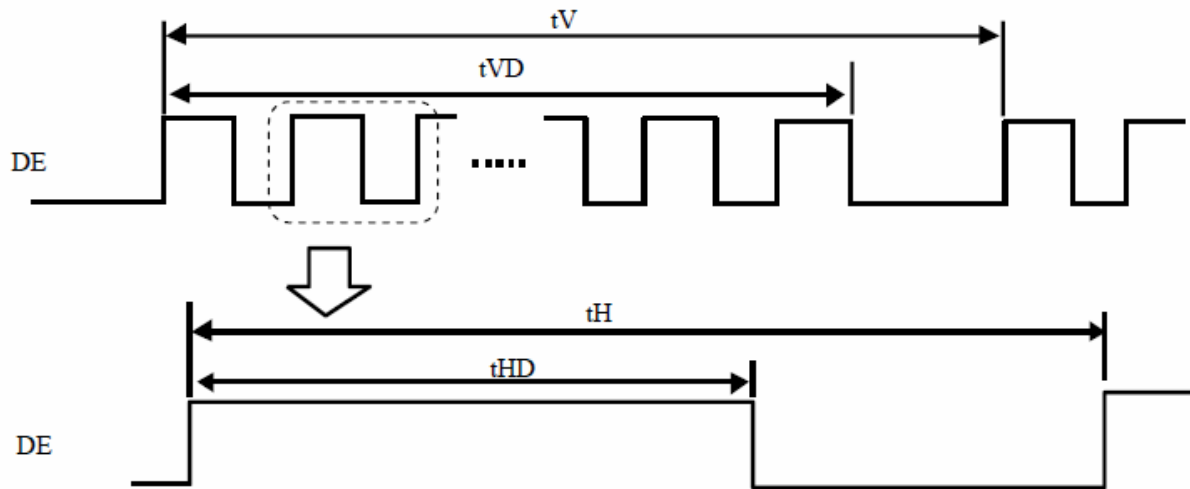
$$Rx2=(Rx2+)-(Rx2-)$$

$$Rx3=(Rx3+)-(Rx3-)$$

$$CLK=(CLK+)-(CLK-)$$

ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
CLK	Frequency (at 60 Hz)	DCLK	68	78	87	MHz	=1/tCLK
	Frequency (at 50 Hz)		78	85	87	MHz	=1/tCLK
Rx0 Rx1 Rx2 Rx3	0 data position	tRP0	$1/7t_{CLK} - 0.4$	$1/7t_{CLK}$	$1/7t_{CLK} + 0.4$	ns	
	1st data position	tRP1	-0.4	0	0.4		
	2nd data position	tRP2	$6/7t_{CLK} - 0.4$	$6/7t_{CLK}$	$6/7t_{CLK} + 0.4$		
	3rd data position	tRP3	$5/7t_{CLK} - 0.4$	$5/7t_{CLK}$	$5/7t_{CLK} + 0.4$		
	4th data position	tRP4	$4/7t_{CLK} - 0.4$	$4/7t_{CLK}$	$4/7t_{CLK} + 0.4$		
	5th data position	tRP5	$3/7t_{CLK} - 0.4$	$3/7t_{CLK}$	$3/7t_{CLK} + 0.4$		
	6th data position	tRP6	$2/7t_{CLK} - 0.4$	$2/7t_{CLK}$	$2/7t_{CLK} + 0.4$		

5.2 Synchronization Signal Timing



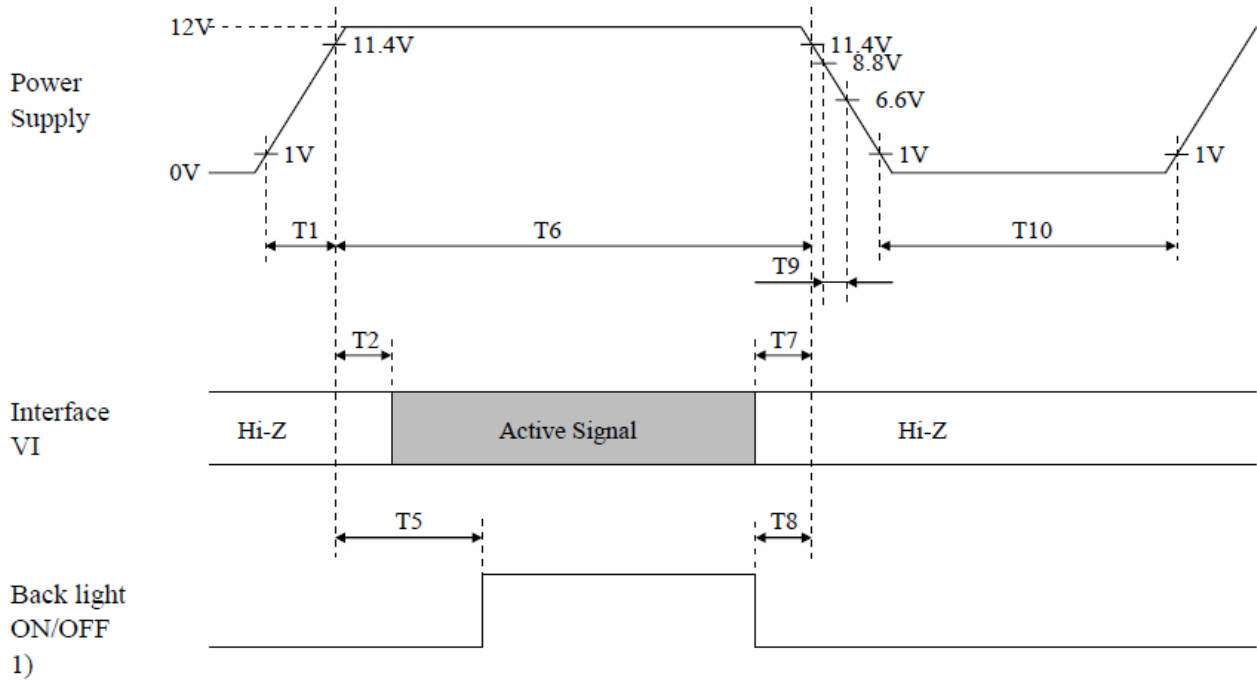
I) 60Hz

	ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
DE	Vertical frequency	fV	46	60	62	Hz	
	Vertical period	tV	773	800	1050	tH	
	Vertical valid	tVD	768			tH	
	Horizontal frequency	fH	39.6	48	49.6	kHz	
	Horizontal period	tH	1400	1771	2000	tCLK	
	Horizontal valid	tHD	1366			tCLK	

II) 50Hz

	ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
DE	Vertical frequency	fV	46	50	62	Hz	
	Vertical period	tV	773	860	1050	tH	
	Vertical valid	tVD	768			tH	
	Horizontal frequency	fH	39.6	43	49.6	kHz	
	Horizontal period	tH	1400	1814	2000	tCLK	
	Horizontal valid	tHD	1366			tCLK	

5.3 Timing between interface signal power supply



SYMBOL	Min.	Typ.	Max.	UNIT
T1	0	-	10	ms
T2	30	-	-	ms
T3	0	-	T5-150	ms
T5	500	-	-	ms
T6	500	-	-	ms
T7	0	-	-	ms
T8	0	-	-	ms
T9	20	-	-	ms
T10	2	-	-	ms

Note 1) In all periods, the backlight ON/OFF signal voltage should be lower than the backlight power supply voltage.

6. Cosmetic Specifications

6.1 Condition for cosmetic inspection

(1) Viewing zone

- a) The figure shows the correspondence between eyes (of inspector) and TFT-LCD module.

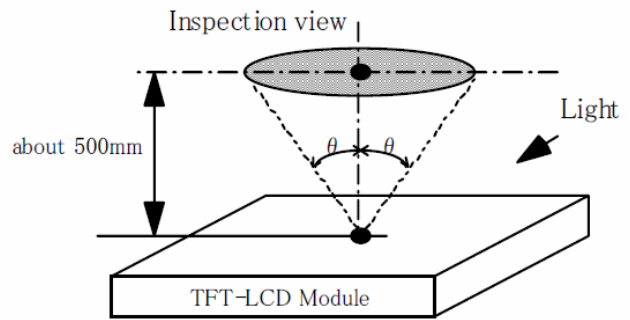
$\theta \leq 45^\circ$: when non-operating inspection

$\theta \leq 5^\circ$: when operating inspection

- b) Inspection should be executed only from front side and only A-zone.

Cosmetic of B-zone and C-zone are ignore.

(refer to 9.2 Definition of zone)



(2) Environmental

- a) Temperature: 25 degrees

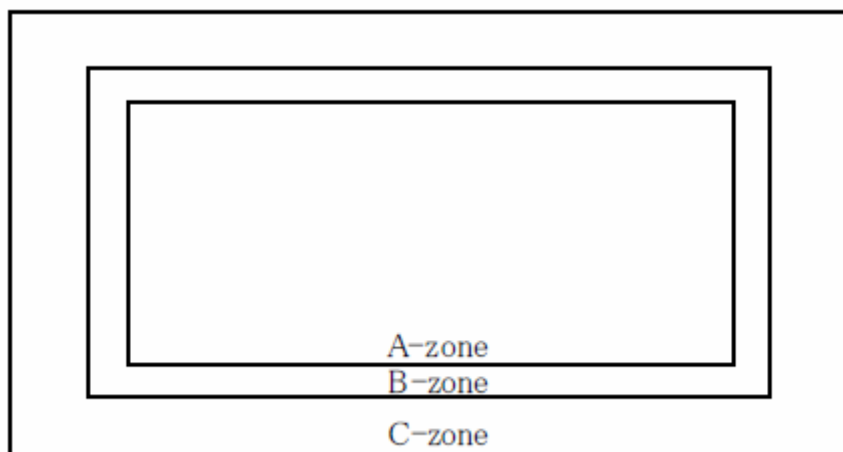
- b) Ambient light: about 700 lx and non-directive when operating inspection.

: about 1000 lx and non-directive when non-operating inspection.

- c) Back-light : when non-operating inspection, back-light should be off .

6.2 Definition of zone

- A-zone: Display area (pixel area)
- B-zone: Area between A-zone and C-zone
- C-zone: Metallic bezel area



6.3 Cosmetic Specifications

When displaying conditions are not stable (ex. at turn on or off), the following specifications are not applied.

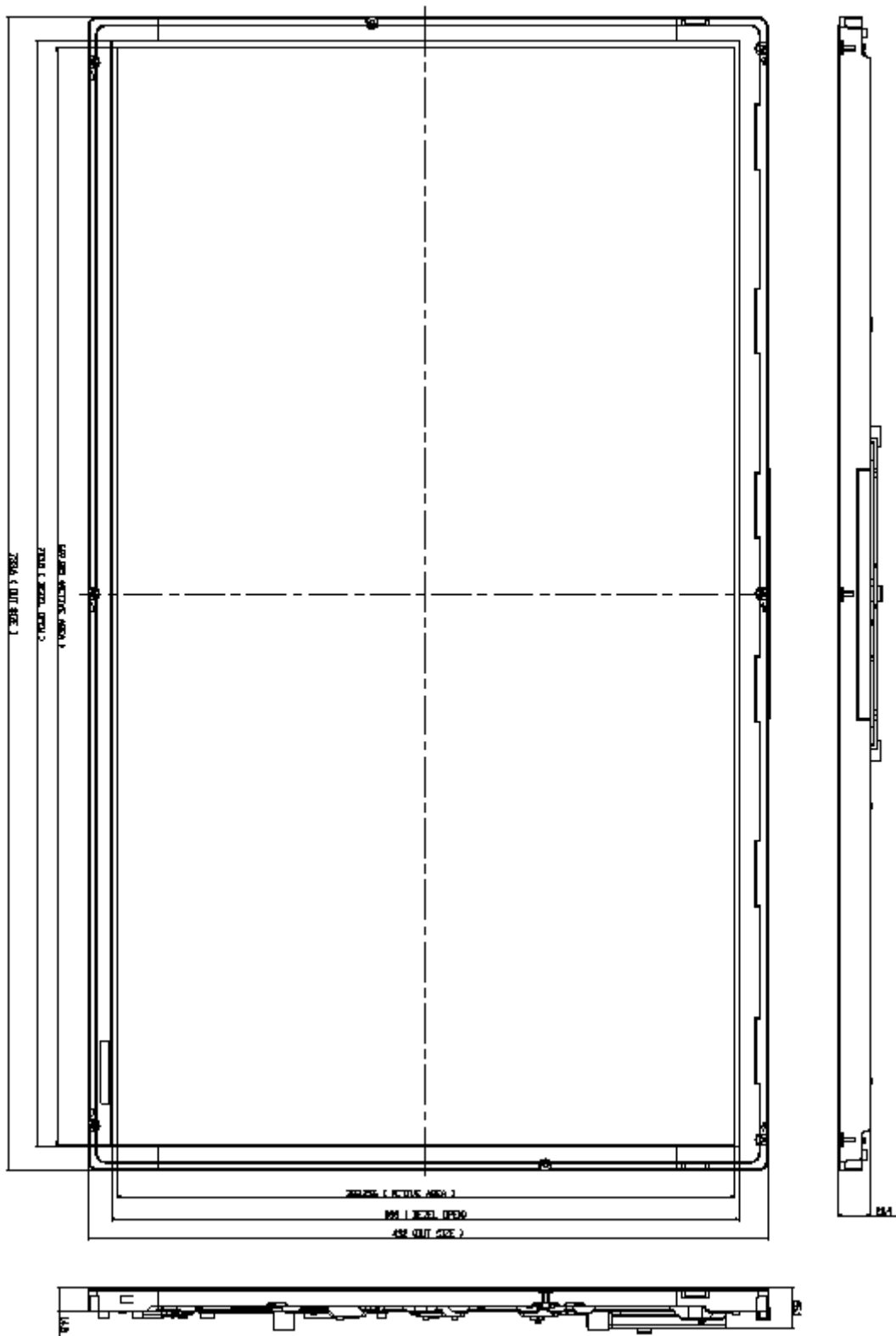
	No	ITEM		Max. acceptable number		Unit	Note	
				A-zone				
				S grade	A grade			
Operating inspection	1	Dot defect	Sparkle mode	1-dot	0	2	pcs	1),2),4)
				2-dots	0	0	Units	1),2),5)
				3-dots	0	0		
				Density	0	2	pcs/ ϕ 20mm	1),2),6)
				Total	0	2	pcs	1),2)
			Black mode	1-dot	5	7	pcs	1),3),4)
				2-dots	1	1	Units	1),3),5)
				3-dots	0	0		
				Density	3	4	pcs/ ϕ 20mm	1),3),6)
				Total	5	7	pcs	1),3)
			Total		5	7	pcs	1)
	2	Line defect			Serious one is not allowed		-	-
	3	Uneven brightness			Serious one is not allowed		-	-
	4	Stain inclusion (Line shape) W : width (mm) L : length (mm)	W \leq 0.02	L : Ignore	Ignore		pcs	7)
			W \leq 0.04	L \leq 4.0	8			
				L > 4.0	0			
			W \leq 0.08	L \leq 2.0	8			
L > 2.0				0				
W > 0.08	-	(See dot shape)						
5	Stain inclusion (Dot shape) D : ave. dia (mm)	D \leq 0.22		Ignore		pcs	7)	
		D \leq 0.5		8				
		D > 0.5		0				
6	Scratch on polarizer (Line shape) W : width (mm) L : length (mm)	W \leq 0.02	L : Ignore	Ignore		pcs	8)	
		W \leq 0.08	L \leq 20	10				
			L > 20	0				
		W > 0.08	-	0				
7	Scratch on polarizer (Dot shape) D : ave. dia (mm)	D \leq 0.2		Ignore		pcs	8)	
		D \leq 0.6		10				
		D > 0.6		0				
8	Bubbles, peeling in polarizer (D : ave. dia (mm))	D \leq 0.2		Ignore		pcs	8)	
		D \leq 0.5		10				
		D > 0.5		0				
9	Wrinkles on polarizer			Serious one is not allowed.		-	-	

Note 1) Dot defect: defect area > 1/2 dot

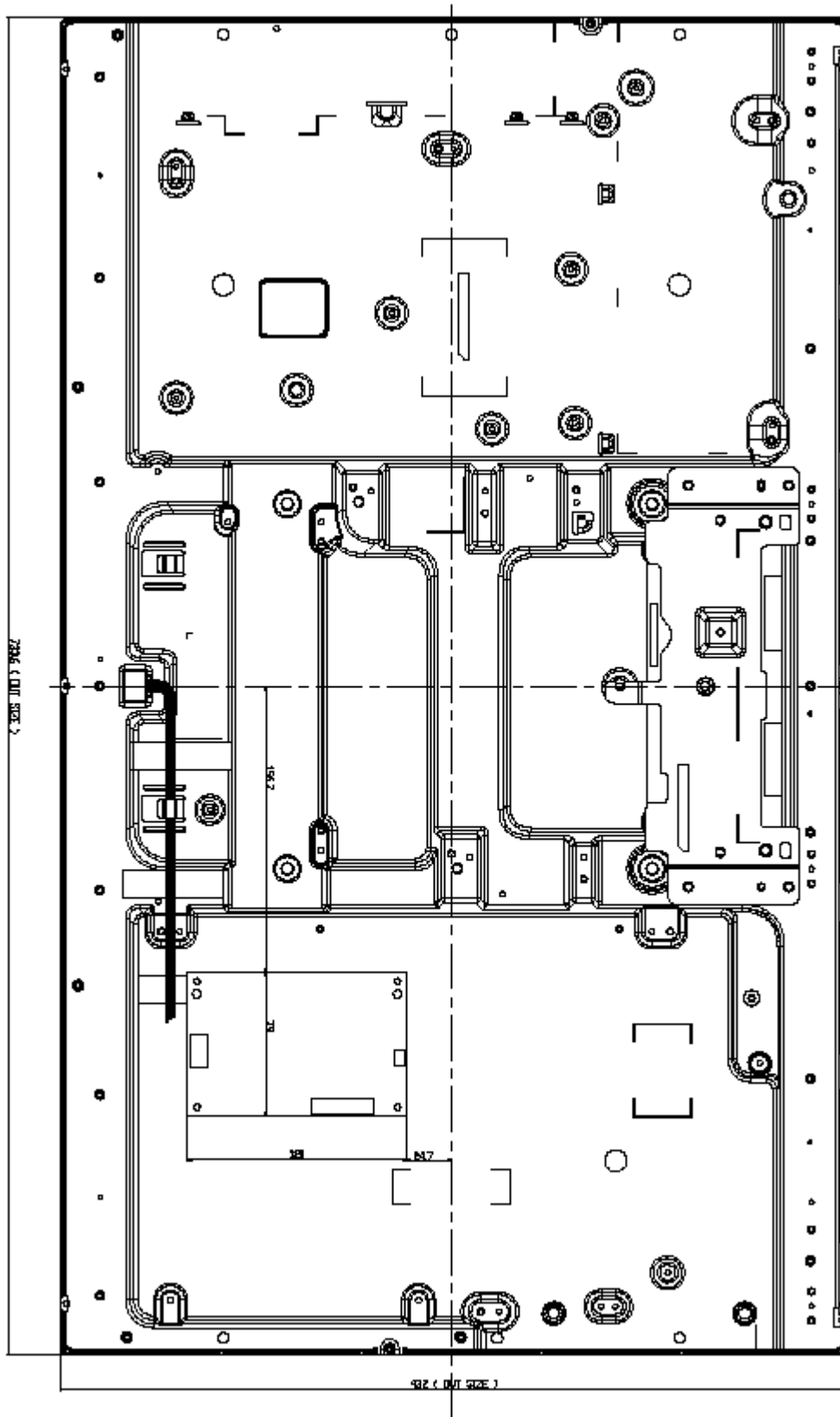
- 2) Sparkle mode: brightness of dot is more than 30% at black. (Visible to eye)
- 3) Black mode: brightness of dot is less than 70% of L255 brightness.
- 4) 1 dot: defect dot is isolated, not attached to other defect dot.
- 5) N dots: N defect dots are consecutive. (N means the number of defects dots)
- 6) Density: number of defect dots inside 20mm ϕ .
- 7) Those stains which can be wiped out easily are acceptable.
- 8) Polarizer area inside of B-zone is not applied.
- 9) No major (serious) defects when viewed in gray scale mode.

7. Outline Dimension

7.1 Front View



7.2 Rear View



- The back plate could be changed by customer request.

8. Packing

8.1 Carton (Internal Package)

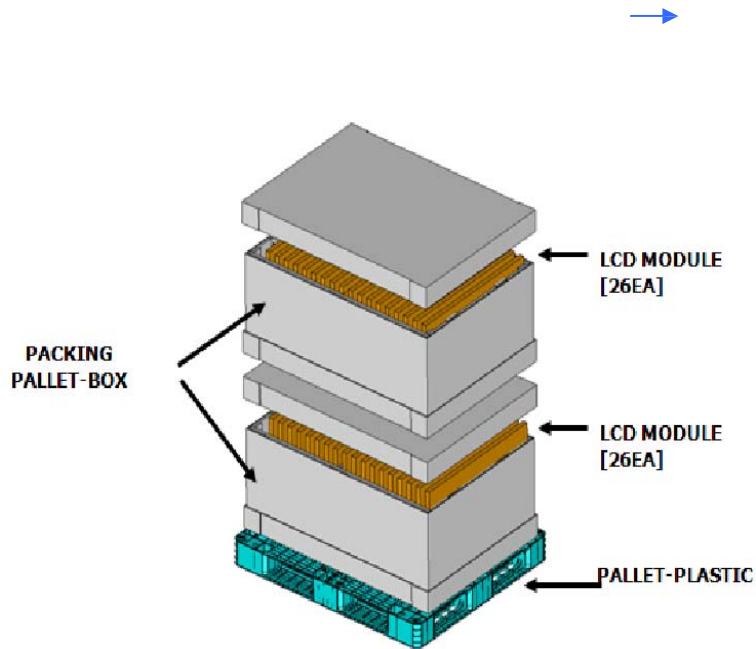
(1) Packing

Form

Corrugated fiberboard box and corrugated cardboard as shock absorber

(2) Packing

Method



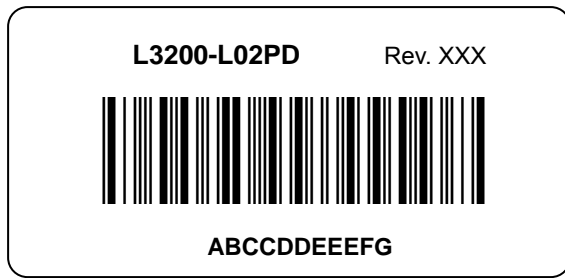
8.2 Packing Specification

Item	Specification	Rem
LCD Packing	52ea / (Packing- Pallet Box)	
Pallet	1Box / Pallet	
Packing Direction	Vertical	
Total Pallet Size	TBD	
Total Pallet Weight	312Kg	

9. Marking

9.1 Product Label

The barcode label is pasted on each product



No.	Item	Description	Code Marking
①	Product name	L3200-L02PD	DSE inner management
②	Revision code	XXX	X: 0~9
③	Lot number	ABCCDDEEEFG	A: Line A~Z B: Product code A~Z C: Year 00~99 D: Month 01~12 E: Lot no. 001~999 F: TFT Cell G: BLU Power
④	Bar code		DSE inner management

9.2 Packing box attach



10. Precaution

10.1 Handling

- 1) When the Module is assembled, it should be attached to the system firmly using all mounting holes.
Be careful not to twist and bend the Module.
- 2) Because the converter use high voltage, it should be disconnected from power before it is assembled or disassembled.
- 3) Refrain from strong mechanical shock and / or any force to the Module.
In addition to damage, this may cause improper operation or damage to the Module and LED back light.
- 4) The polarizer on a Module should carefully be handled due to its softness, and should not be touched, pushed or rubbed with glass, tweezers or anything than HB pencil lead. The surface of a polarizer should not be touched and rubbed with bare hand, greasy clothed or dusty clothes.
The surface of a polarizer should be gently wiped with absorbent cotton, chamois or other soft materials slightly contained petroleum benzene when the surface becomes dirty. Normal-hexane or Isopropyl alcohol as cleaning chemicals is recommended in order to clean adhesives which fix front/rear polarizers on a Module. Other cleaning chemicals such as acetone, toluene and alcohol should not be used to clean adhesives because they cause chemical damage to a polarizer.
- 5) 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, legs or clothes, it must be washed away with soap thoroughly.
- 6) Protect the module from Electrostatic discharge. Otherwise the ASIC IC or Semiconductor would be damaged.
- 7) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- 8) Do not disassemble the Module.
- 9) Do not disassemble shield case of inverter & LVDS board.
- 10) Do not connect N.C pins.
- 11) Protection film for polarizer on the Module should be slowly peeled off just before use so that the electrostatic charge can be minimized. Must put on antistatic glove while handle a module
- 12) Pins of I/F connector should not be touched directly with bare hands.

10.2 Precaution to storage

When Module for replacement are stored for a long time, following precautions should be taken care of:

- 1) Modules should be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during storage. TFT open cells should be stored at 0 to 35°C at normal humidity (60%RH or less).
- 2) The surface of polarizers should not come in contact with any other object. It is recommended that LCMs should be stored in the DSE's shipping box.

10.3 Operation

- 1) Do not connect or disconnect the Module in the "Power On" condition.
- 2) Power supply should always be turned on/off by the "Power on/off sequence"
- 3) The Module has high frequency circuits. Sufficient suppression to electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be effective to minimize the interference.
- 4) The cable between the back light connector and its inverter power supply should be connected directly with a minimized length. A longer cable between the back light and the inverter may cause lower luminance of LED and may require higher startup voltage(Vs).
- 5) Fixed patterns displayed on a Module for a long time may cause after-image. It will be recovered soon.

10.4 Use restrictions and limitations

- 1) This product is not authorized for use in life support devices or systems, military applications or other applications which pose a significant risk of personal injury.
- 2) In no event shall DS Electron inc., be liable for any incidental, indirect or consequential damages in connection with the installation or use of this product, even if informed of the possibility thereof in advance. These limitations apply to all causes of action in the aggregate, including without limitation breach of contract, breach of warranty, negligence, strict liability, misrepresentation and other torts.
- 3) The Modul should not be exposed under strong light. Otherwise, characteristics of a polarizer and color filter in a Module may be degraded.

10.5 Others

Electrical components which may not affect electrical performance are subjective to change without notice because of their availability.