

APATL0000685

**IPS Alpha Technology, Ltd.**

Date: Aug.21, 2009

**For Messrs. Panasonic Corporation Group**  
CUSTOMER'S ACCEPTANCE SPECIFICATIONS

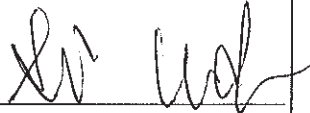
**Part Number: AX080A043E**  
**Panasonic Global Code: L5EDD8Q00047**  
**Panasonic Issue Number: L20080364**

CONTENTS

No.	Item	Sheet No.	Page
-	COVER	IPS4PS 2601-AX080A043E -4	1-1/2~2/2
-	RECORD OF REVISION	IPS4PS 2602-AX080A043E -4	2-1/1
-	DESCRIPTION	IPS4PS 2603-AX080A043E -4	3-1/1
1	ABSOLUTE MAXIMUM RATINGS	IPS4PS 2604-AX080A043E -4	4-1/2~2/2
2	INITIAL OPTICAL CHARACTERISTICS	IPS4PS 2605-AX080A043E -4	5-1/2~2/2
3	ELECTRICAL CHARACTERISTICS	IPS4PS 2606-AX080A043E -4	6-1/1
4	BLOCK DIAGRAM	IPS4PS 2607-AX080A043E -4	7-1/1
5	INTERFACE PIN ASSIGNMENT	IPS4PS 2608-AX080A043E -4	8-1/6~6/6
6	INTERFACE TIMING	IPS4PS 2609-AX080A043E -4	9-1/3~3/3
7	DIMENSIONAL OUTLINE	IPS4PS 2610-AX080A043E -4	10-1/2~2/2
8	LABEL FORMAT	IPS4PS 2611-AX080A043E -4	11-1/3~3/3
9	COSMETIC SPECIFICATIONS	IPS4PS 2612-AX080A043E -4	12-1/2~2/2
10	PRECAUTION	IPS4PS 2613-AX080A043E -4	13-1/3~3/3
11	PACKING	IPS4PS 2614-AX080A043E -4	14-1/3~3/3
12	RELIABILITY TEST	IPS4PS 2615-AX080A043E -4	15-1/1

Please return 1 copy with your signature on this page for approval.

Accepted by: \_\_\_\_\_

Proposed by:  \_\_\_\_\_

Date: \_\_\_\_\_

IPS Alpha Technology, Ltd.	Sheet No.	IPS4PS 2601 - AX080A043E - 4	Page	1-1/2
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**Panasonic Corporation Group**

Checklist of the items in the panasonic standard delivery specifications

Please check if the delivery specifications include the following items.  
(If a listed item is not includes, please make sure to describe the reason why it has not been included.)

Ver.1.1

No.	Item description	Listing check			Reason for not including (Ex: Under research, confidential)
1	Part No. reference table (The global part No. and manufacturer part No. must be listed for series part numbers)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
2	Part number structure (List the type, constant, class stc for a series part No.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
3	Place of production, factory name, country of origin	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
4	Electrical characteristics (Measuring circuit, measurement condition, dielectric strength, surge voltage, insulation resistance, rates capacity etc.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
5	Mechanical characteristics (Test method, terminal strength, tensile strength, anti-vibration, solder heat resistance, ease of soldering etc.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
6	External shape/dimensions (External shape drawing, simensions with tolerance)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
7	Structure/material (Construction, material)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
8	Functions (Semiconductor parts must include the functions)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
9	Microcomputer performance (Microcomputer products must include the CPU bus width (bit) )	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
10	Recommended circuit diagrams (Semiconductor parts must include a recommended circuit)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
11	Pattern diagrams of PCB (Semiconductor parts must include the PCB patterns)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
12	Environmental reliability warranty items (Anti-humidity, high/low temperature, thermal shock, life etc.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
13	Operating temperature range	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
14	Storage temperature range	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
15	Packaging specification (Simple package structure illustration, taping dimensions, stick dimensions, packaged quantity etc.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
16	Marking indication method	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
17	Strage period after opening (Semiconductor parts must include the storage environment and storage period after opening)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
18	Precautions for use	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
19	Temperature profile (Solder flow and reflow temperature profile)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
20	Failure rate (Exclude if it cannot be determined due to purchased item)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
21	Safty standards (Conforming standard information, UL/CSA, electricity safety law, PL law etc.)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
22	Process control chart	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
23	Export control checklist (Survey checklist against the export control law)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
24	Items subject to advance discussions (Verify the statement that all changes to delivery specifications shall be notified in advance)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
25	Manufacture's evaluation test data	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
26	Other materials determined necessary by the business unit	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	

Disclosure/Non-disclosure (NDA, blanket contract, etc.)	<input checked="" type="checkbox"/> Disclosure	<input type="checkbox"/> Non-disclosure	
Description of intellectual property right	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	

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**RECORD OF REVISION**

Date	The upper section : Previous revision The lower section : New revision		Summary
	Sheet No.	Page	
Mar.25, 2009	IPS4PS 2611-AX080A043E-1	11-2/2	Added Note 1) Added Rev.B : Changed Mold Frame
	IPS4PS 2611-AX080A043E-2	11-2/3	
	IPS4PS 2614-AX080A043E-1	14-2/2	Added packing specification for IPS Alpha Technology Europe, s.r.o. and
	IPS4PS 2614-AX080A043E-2	14-2/3	
	IPS4PS 2614-AX080A043E-1	14-2/2	Added the label sample of packing box for IPS Alpha Technology Europe, s.r.o. and
	IPS4PS 2614-AX080A043E-2	14-3/3	
May.14,2009	IPS4PS 2603-AX080A043E-2	3-1/1	Added Factory for IPS Alpha Technology, Ltd.(Mobara/Utsunomiya,Japan)
	IPS4PS 2603-AX080A043E-3	3-1/1	
	IPS4PS 2611-AX080A043E-2	11-1/3	Added Factory U : IPS Alpha Technology, Ltd.(Utsunomiya) Added Special mark Added Glass Maker B
	IPS4PS 2611-AX080A043E-3	11-1/3	
	IPS4PS 2611-AX080A043E-2	11-3/3	Added samples of the product labels by IPS Alpha Technology, Ltd.(Utsunomiya)
	IPS4PS 2611-AX080A043E-3	11-3/3	
Aug.21,2009	IPS4PS 2611-AX080A043E-3	11-2/3	Added Rev.C,D,E,F : Changed Backlight , EEFL and Lower frame
	IPS4PS 2611-AX080A043E-4	11-2/3	

IPS Alpha Technology, Ltd.

Date

Aug.21,2009

Sheet No.

IPS4PS 2602 AX080A043E-4

Page

2-1/1

**DESCRIPTION**

The following specifications are applied to the following IPS-Pro-TFT LCD module.

Note : Inverter for backlight unit is not built in this module.

Product Name : AX080A043E

Product Factory : IPS Alpha Technology, Ltd. (Mobara/Utsunomiya,Japan)  
IPS Alpha Technology Europe, s.r.o. (Czech Republic)

**General Specifications**

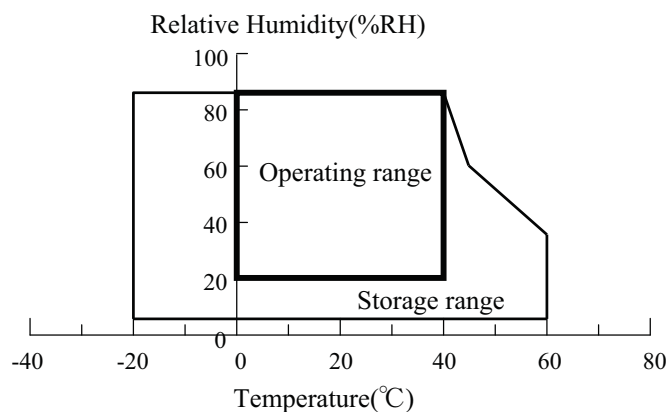
Effective display area	: (H) 697.685 × (V) 392.256	(mm)
Number of pixels	: (H) 1,366 × (V) 768	(pixels)
Pixel pitch	: (H) 0.51075 × (V) 0.51075	(mm)
Color pixel arrangement	: R+G+B vertical stripe	
Display mode	: Transmissive mode Normally black mode	
Top polarizer type	: Semi-Glare	
Number of colors	: 16,777,216	(colors)
Viewing angle range	: Super wide version (Horizontal & vertical : 178°, CR ≥ 10)	
Input signal	: 2-channel LVDS (LVDS : Low voltage differential signaling)	
Back light	: 14 pcs. of EEFL (EEFL : External electrode fluorescent lamp)	
External dimensions	: Typ. (H) 760.0 × (V) 450.0 × (t) (43.0)	(mm)
Weight	: Typ. 7,000	(g)

## 1. ABSOLUTE MAXIMUM RATINGS

### 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)
Vibration	-	4.9(0.5 G)	-	14.7(1.5 G)	m/s <sup>2</sup>	3)
Shock	-	29.4(3 G)	-	294(30 G)	m/s <sup>2</sup>	4)
Corrosive Gas	Not Acceptable		Not Acceptable		-	
Illumination at LCD Surface	-	50,000	-	50,000	lx	

- Note 1) Temperature and Humidity should be applied to the glass surface of a IPS-Pro TFT LCD module, not to the system installed with a module.  
The brightness of a EEFL tends to drop at low temperature. Besides, the life-time becomes shorter at low temperature.
- 2)  $T_a \leq 40\text{ }^\circ\text{C}$  ······Relative humidity should be less than 85 %RH max. Dew is prohibited.  
 $T_a > 40\text{ }^\circ\text{C}$  ······Relative humidity should be lower than the moisture of the 85 %RH at 40 °C.



- 3) Frequency of the vibration is between 15 Hz and 100 Hz. (Remove the resonance point) 1 hour.
- 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) The temperature of LCD front surface would be 65 °C in operating, it may affect the optical characteristics however it does not damage the function of the module.

### 1.2 Electrical Absolute Maximum Ratings

(1)TFT-LCD module

$V_{SS} = 0\text{ V}$

ITEM	SYMBOL	Min.	Max.	UNIT	NOTE
Power Supply Voltage	$V_{DD}$	0	13.2	V	
Input Voltage for logic	$V_I$	-0.3	4.0	V	1)
Electrostatic Durability	$V_{ESD0}$	±100		V	2),3)
	$V_{ESD1}$	±20		kV	2),4)

- Note 1) It is applied to pixel data signal and clock signal.
- 2) Discharge Coefficient : 250 pF - 100 Ω, Environmental : 25 °C - 70%RH
- 3) It is applied to I/F connector pins.
- 4) It is applied to the surface of a metallic bezel and a LCD panel.

## (2) Backlight unit

GND = 0 V

ITEM	SYMBOL	Min.	Max.	UNIT	NOTE
Input current	I <sub>L</sub>	-	8.0	mArms	1)
Input voltage	V <sub>L</sub>	-	(1,500)	Vrms	2)

- Note 1) The specification shall be applied to each EEFL. The specification is defined at ground line.  
2) The specification shall be applied at connector pins for a EEFL at start-up.

## 2. INITIAL OPTICAL CHARACTERISTICS

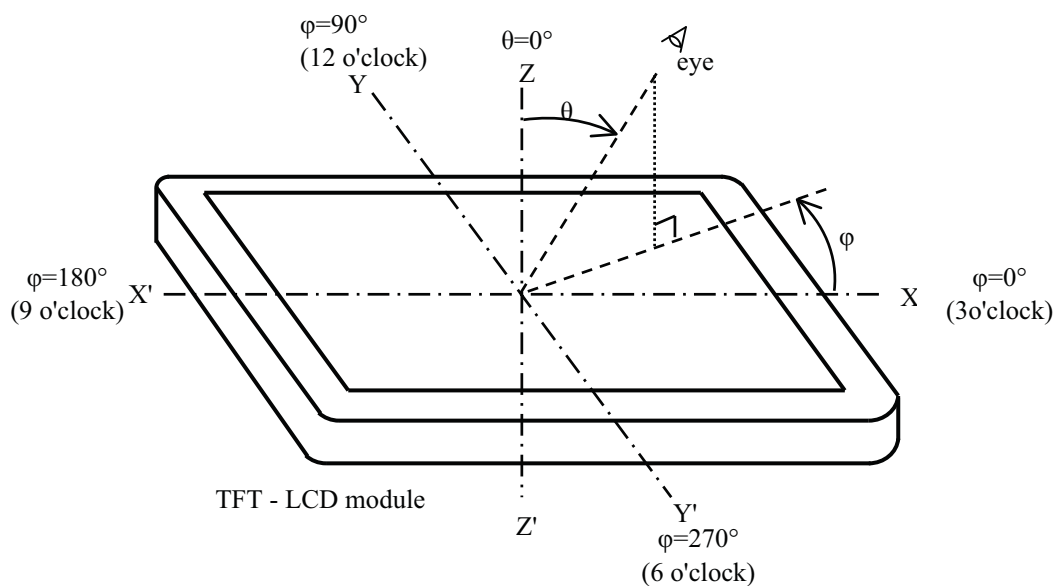
The following optical characteristics are measured under stable conditions. It takes about 30 minutes to reach stable conditions. The measuring point is the center of display area unless otherwise noted.

The optical characteristics should be measured in a dark room or equivalent state.

Measuring equipment : CS-1000A, or equivalent  
 Ambient Temperature =25 °C , V<sub>DD</sub>=12.0 V , f V=60 Hz ,  
 I<sub>L</sub>=7mA<sub>rms</sub> (on duty 100%)

ITEM	SYMBOL	CONDITION	Min.	Typ.	Max.	UNIT	NOTE	
Contrast ratio	CR	θ = 0 ° 1)	700	1200	-	-	2)	
Response time	Rise		ton	-	8	20	ms	3)
	Fall		toff	-	6	20	ms	3)
Brightness of white	B <sub>wh</sub>			350	450	-	cd/m <sup>2</sup>	
Brightness uniformity	B <sub>uni</sub>			-	-	30	%	4)
Color chromaticity (CIE)	Red		x	0.62	0.65	0.68	-	【Gray scale =255】
			y	0.30	0.33	0.36		
	Green		x	0.27	0.30	0.33		
			y	0.60	0.63	0.66		
	Blue		x	0.12	0.15	0.18		
		y	0.04	0.07	0.10			
	White	x	0.243	0.273	0.303			
		y	0.245	0.275	0.305			
Variation of color position (CIE)	Red	Δx	-	-	0.04	-	5) 【Gray scale =255】	
		Δy	-	-	0.04			
	Green	Δx	-	-	0.04			
		Δy	-	-	0.04			
	Blue	Δx	-	-	0.04			
		Δy	-	-	0.04			
	White	Δx	-	-	0.04			
		Δy	-	-	0.04			
Contrast ratio at 89 °	CR89	6)	10	-	-	-	Estimated value	
Image sticking	-	Mosaic pattern	Invisible			-	7)	

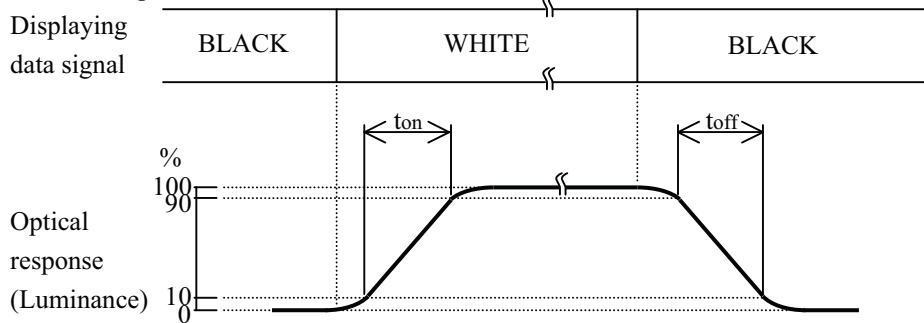
Note 1) Definition of viewing angle



Note 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.

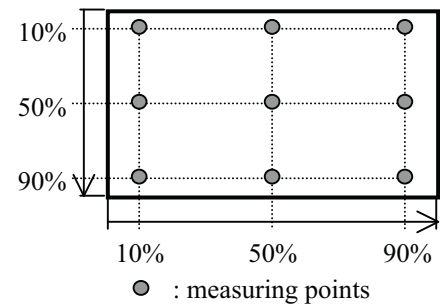
$$B_{uni} = \frac{|B_{max} \text{ or } B_{min} - B_{ave}|}{B_{ave}} \times 100$$

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

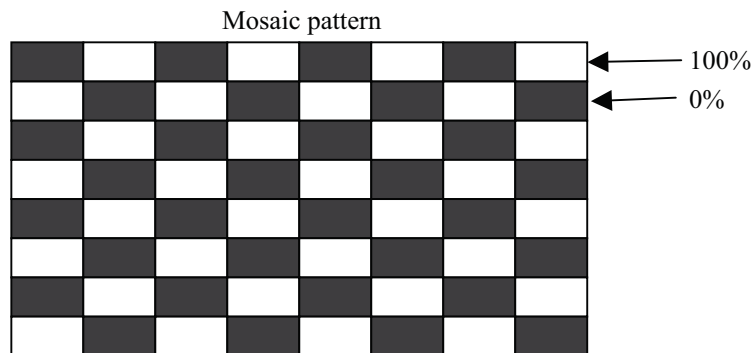
Variation of color position on CIE is defined as difference between colors at  $\theta = 0^\circ$  and at  $\theta = 50^\circ$  &  $\phi = 0^\circ, 90^\circ, 180^\circ, 270^\circ$ .

6) Contrast ratio at  $89^\circ$

Evaluation conditions are on horizontal & vertical axis

7) Image sticking

Condition : Operating mosaic pattern for 2 hours and gray scale ( 22 % ) for 1 hour.



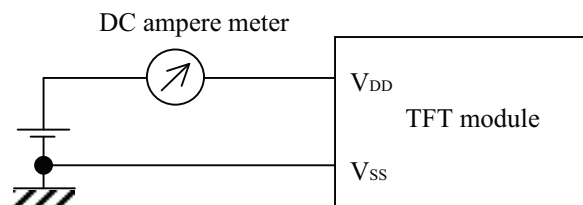


### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT-LCD module

ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE	
Power supply voltage	$V_{DD}$	11.4	12.0	12.6	V		
Power supply current	$I_{DD}$	-	0.7	1.0	A	1),2)	
Ripple voltage of power supply	$V_{DDR}$	-	-	350	mV		
LVDS select	High	$LVDS_{SEL}$	2.2	3.1	3.6	V	
	Low		0	0	0.6	V	

Note 1)  $f_V=60.0\text{Hz}$ ,  $f_{CLK}=66\text{MHz}$ ,  $V_{DD}=12.0\text{V}$ , and display pattern is horizontal stripe.



- 2) Current fuse is built in a module. Current capacity of power supply for  $V_{DD}$  should be larger than 4A, so that the fuse can be opened at the trouble of electrical circuit of module.

#### 3.2 Back light unit

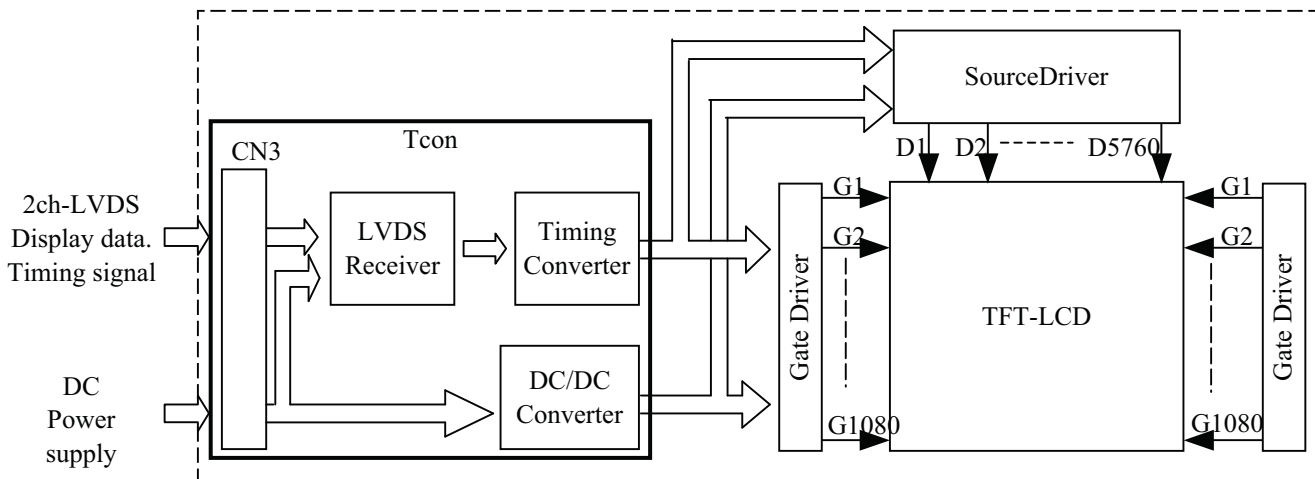
$T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$

ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE	
Input current	$I_L$	-	7.0	7.5	mArms	1)	
Input voltage	$V_L$	-	810	870	Vrms	$I_L=7\text{mArms}$ (duty100%)	
Established starting voltage	at $25^\circ\text{C}$	$V_s$	-	-	820	Vrms	
	at $0^\circ\text{C}$		-	-	985	Vrms	
Output frequency	f	55.0	57.0	58.0	kHz	2)	
EEFL life time	-	50,000	60,000	-	hours	3)	

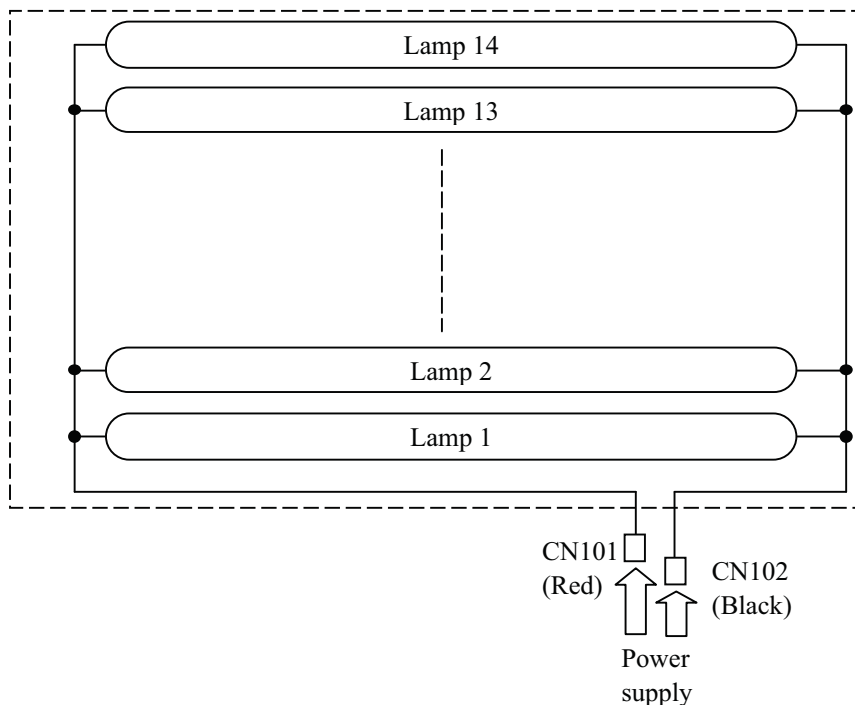
- Note 1) The specification shall be applied to each EEFL. The specification is defined at frame ground.
- 2) Frequency of power supply for EEFLs may cause the interference with IMAGE frequency and cause beat or flicker on the display. Therefore, it is recommended to configure EEFL frequency that does not cause interference.
- 3) Life time of a lamp is defined. The life is determined as the time at which brightness of the lamp is 50 % compared to that of initial value at that typical lamp current on condition of continuous operating at  $25 \pm 2^\circ\text{C}$ ,  $I_L = 7\text{mArms}$  (Duty 100%).

### 4. BLOCK DIAGRAM

#### 4.1 TFT-LCD module



#### 4.2 Back light unit



## 5. INTERFACE PIN ASSIGNMENT

### 5.1 TFT-LCD module

CN3:JAE FI-R51S-HF

(Matching connector : JAE FI-R51-HL)

PIN No.	SYMBOL	DESCRIPTION	NOTE
1	Vss	GND(0V)	2)
2	Test	Test mode	4)
3	AGW	Aging mode	5)
4	IC	Internally Connected, Keep Open	
5	IC		
6	IC		
7	LVDSSEL	Select LVDS Data Format	6)
8	NC	No Connection	
9	NC		
10	NC		
11	Vss		
12	RxA0-	ODD Pixel Data	3)
13	RxA0+		
14	RxA1-	ODD Pixel Data	3)
15	RxA1+		
16	RxA2-	ODD Pixel Data	3)
17	RxA2+		
18	Vss	GND(0V)	2)
19	CLKA-	ODD Pixel Clock	3)
20	CLKA+		
21	Vss	GND(0V)	2)
22	RxA3-	ODD Pixel Data	3)
23	RxA3+		
24	NC	No Connection	
25	NC		
26	Vss	GND(0V)	2)
27	Vss		

PIN No.	SYMBOL	DESCRIPTION	NOTE
28	RxB0-	EVEN Pixel Data	3)
29	RxB0+		
30	RxB1-	EVEN Pixel Data	3)
31	RxB1+		
32	RxB2-	EVEN Pixel Data	3)
33	RxB2+		
34	Vss	GND(0V)	2)
35	CLKB-	EVEN Pixel Clock	3)
36	CLKB+		
37	Vss	GND(0V)	2)
38	RxB3-	EVEN Pixel Data	3)
39	RxB3+		
40	NC	No Connection	
41	NC		
42	Vss	GND(0V)	2)
43	Vss		
44	Vss		
45	Vss		
46	Vss	No Connection	
47	NC		
48	VDD	Power Supply (typ.+12V)	1)
49	VDD		
50	VDD		
51	VDD		

- Note
- 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) Open : Normal mode. GND : Test mode.
  - 5) Open : Normal mode. GND : Aging mode.
  - 6) See page 8-3/6 & 8-4/6

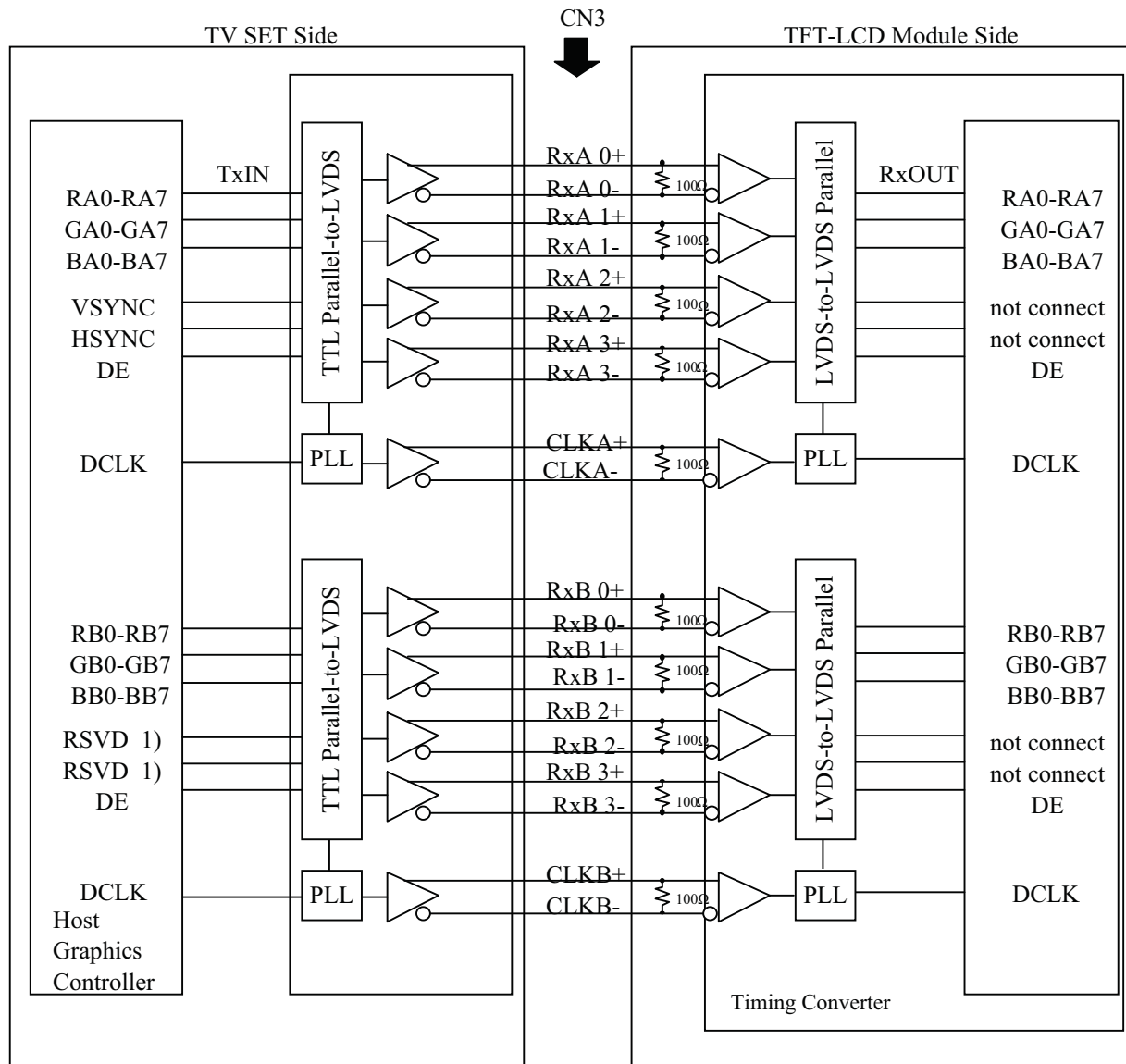
### 5.2 Back light unit

CN101 and CN102 : JST VYHP-02V

(Matching connector : JST S02B-VYLSS)

Pin No.	SYMBOL	Description	Note
1	HV	Power supply (High voltage)	
2	HV	Power supply (High voltage)	

## 5.3 Block diagram of interface



RA0~RA7, RB0~RB7 : Pixel R Data (7; MSB, 0; LSB)  
 GA0~GA7, GB0~GB7 : Pixel G Data (7; MSB, 0; LSB)  
 BA0~BA7, BB0~BB7 : Pixel B Data (7; MSB, 0; LSB)  
 DE : Data Enable

- Note 1) The system must have the transmitter to drive 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.

## 5. 4 LVDS interface

The LVDSSEL signal of CN3 pin No.7 specification is "L" or open.【LVDSSEL = L or open】

	SIGNAL	TRANSMITTER THC63LVDM83A		INTERFACE CONNECTOR		RECEIVER		TFT CONTROL
		PIN	INPUT	TV Set	TFT-LCD	PIN	OUTPUT	INPUT
24bit	RA0/RB0	51	Tx IN0	TA OUT0+	RxA/B 0+	27	Rx OUT0	RA0/RB0
	RA1/RB1	52	Tx IN1			29	Rx OUT1	RA1/RB1
	RA2/RB2	54	Tx IN2			30	Rx OUT2	RA2/RB2
	RA3/RB3	55	Tx IN3			32	Rx OUT3	RA3/RB3
	RA4/RB4	56	Tx IN4			33	Rx OUT4	RA4/RB4
	RA5/RB5	3	Tx IN6	TA OUT0-	RxA/B 0-	35	Rx OUT6	RA5/RB5
	GA0/GB0	4	Tx IN7	TA OUT1+	RxA/B 1+	37	Rx OUT7	GA0/GB0
	GA1/GB1	6	Tx IN8			38	Rx OUT8	GA1/GB1
	GA2/GB2	7	Tx IN9			39	Rx OUT9	GA2/GB2
	GA3/GB3	11	Tx IN12			43	Rx OUT12	GA3/GB3
	GA4/GB4	12	Tx IN13			45	Rx OUT13	GA4/GB4
	GA5/GB5	14	Tx IN14	TA OUT1-	RxA/B 1-	46	Rx OUT14	GA5/GB5
	BA0/BB0	15	Tx IN15			47	Rx OUT15	BA0/BB0
	BA1/BB1	19	Tx IN18			51	Rx OUT18	BA1/BB1
	BA2/BB2	20	Tx IN19			53	Rx OUT19	BA2/BB2
	BA3/BB3	22	Tx IN20			54	Rx OUT20	BA3/BB3
	BA4/BB4	23	Tx IN21	TA OUT2+	RxA/B 2+	55	Rx OUT21	BA4/BB4
	BA5/BB5	24	Tx IN22	TA OUT2-	RxA/B 2-	1	Rx OUT22	BA5/BB5
	HSYNC or RSVD1)	27	Tx IN24			3	Rx OUT24	HSYNC or RSVD1)
	VSYNC or RSVD1)	28	Tx IN25			5	Rx OUT25	VSYNC or RSVD1)
	DE/DE	30	Tx IN26			6	Rx OUT26	DE/DE
	RA6/RB6	50	Tx IN27			TA OUT3+	RxA/B 3+	7
	RA7/RB7	2	Tx IN5	34	Rx OUT5			RA7/RB7
	GA6/GB6	8	Tx IN10	41	Rx OUT10			GA6/GB6
	GA7/GB7	10	Tx IN11	42	Rx OUT11			GA7/GB7
BA6/BB6	16	Tx IN16	49	Rx OUT16	BA6/BB6			
BA7/BB7	18	Tx IN17	TA OUT3-	RxA/B 3-	50	Rx OUT17	BA7/BB7	
RSVD 1)	25	Tx IN23	DCLK		2	Rx OUT23	RSVD 1)	
	DCLK	31	TxCLK IN	TxCLK OUT+	RxCLKA/B IN+	26	RxCLK OUT	DCLK
				TxCLK OUT-	RxCLKA/B IN-			

RA0~RA7, RB0~RB7 : Pixel R Data (7; MSB, 0; LSB)

GA0~GA7, GB0~GB7 : Pixel G Data (7; MSB, 0; LSB)

BA0~BA7, BB0~BB7 : 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".

The LVDSSEL signal of CN3 pin No.7 specification is "H".【LVDSSEL = H】

	SIGNAL	TRANSMITTER THC63LVDM83A		INTERFACE CONNECTOR		RECEIVER		TFT CONTROL
		PIN	INPUT	TV Set	TFT-LCD	PIN	OUTPUT	INPUT
24bit	RA2/RB2	51	Tx IN0	TA OUT0+	RxA/B 0+	27	Rx OUT0	RA2/RB2
	RA3/RB3	52	Tx IN1			29	Rx OUT1	RA3/RB3
	RA4/RB4	54	Tx IN2			30	Rx OUT2	RA4/RB4
	RA5/RB5	55	Tx IN3			32	Rx OUT3	RA5/RB5
	RA6/RB6	56	Tx IN4			33	Rx OUT4	RA6/RB6
	RA7/RB7	3	Tx IN6			35	Rx OUT6	RA7/RB7
	GA2/GB2	4	Tx IN7			37	Rx OUT7	GA2/GB2
	GA3/GB3	6	Tx IN8	TA OUT1+	RxA/B 1+	38	Rx OUT8	GA3/GB3
	GA4/GB4	7	Tx IN9			39	Rx OUT9	GA4/GB4
	GA5/GB5	11	Tx IN12			43	Rx OUT12	GA5/GB5
	GA6/GB6	12	Tx IN13			45	Rx OUT13	GA6/GB6
	GA7/GB7	14	Tx IN14			46	Rx OUT14	GA7/GB7
	BA2/BB2	15	Tx IN15			47	Rx OUT15	BA2/BB2
	BA3/BB3	19	Tx IN18			51	Rx OUT18	BA3/BB3
	BA4/BB4	20	Tx IN19	TA OUT2+	RxA/B 2+	53	Rx OUT19	BA4/BB4
	BA5/BB5	22	Tx IN20			54	Rx OUT20	BA5/BB5
	BA6/BB6	23	Tx IN21			55	Rx OUT21	BA6/BB6
	BA7/BB7	24	Tx IN22			1	Rx OUT22	BA7/BB7
	HSYNC or RSVD1)	27	Tx IN24			3	Rx OUT24	HSYNC or RSVD1)
	VSYNC or RSVD1)	28	Tx IN25			5	Rx OUT25	VSYNC or RSVD1)
	DE/DE	30	Tx IN26			6	Rx OUT26	DE/DE
	RA0/RB0	50	Tx IN27	TA OUT3+	RxA/B 3+	7	Rx OUT27	RA0/RB0
	RA1/RB1	2	Tx IN5			34	Rx OUT5	RA1/RB1
	GA0/GB0	8	Tx IN10			41	Rx OUT10	GA0/GB0
	GA1/GB1	10	Tx IN11			42	Rx OUT11	GA1/GB1
BA0/BB0	16	Tx IN16	49			Rx OUT16	BA0/BB0	
BA1/BB1	18	Tx IN17	50			Rx OUT17	BA1/BB1	
RSVD 1)	25	Tx IN23	2			Rx OUT23	RSVD 1)	
	DCLK	31	TxCLK IN	TxCLK OUT+ TxCLK OUT-	RxCLKA/B IN+ RxCLKA/B IN-	26	RxCLK OUT	DCLK

RA0~RA7, RB0~RB7 : Pixel R Data (7; MSB, 0; LSB)

GA0~GA7, GB0~GB7 : Pixel G Data (7; MSB, 0; LSB)

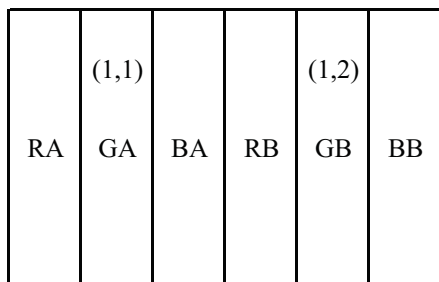
BA0~BA7, BB0~BB7 : Pixel B Data (7; MSB, 0; LSB)

DE : Data Enable

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

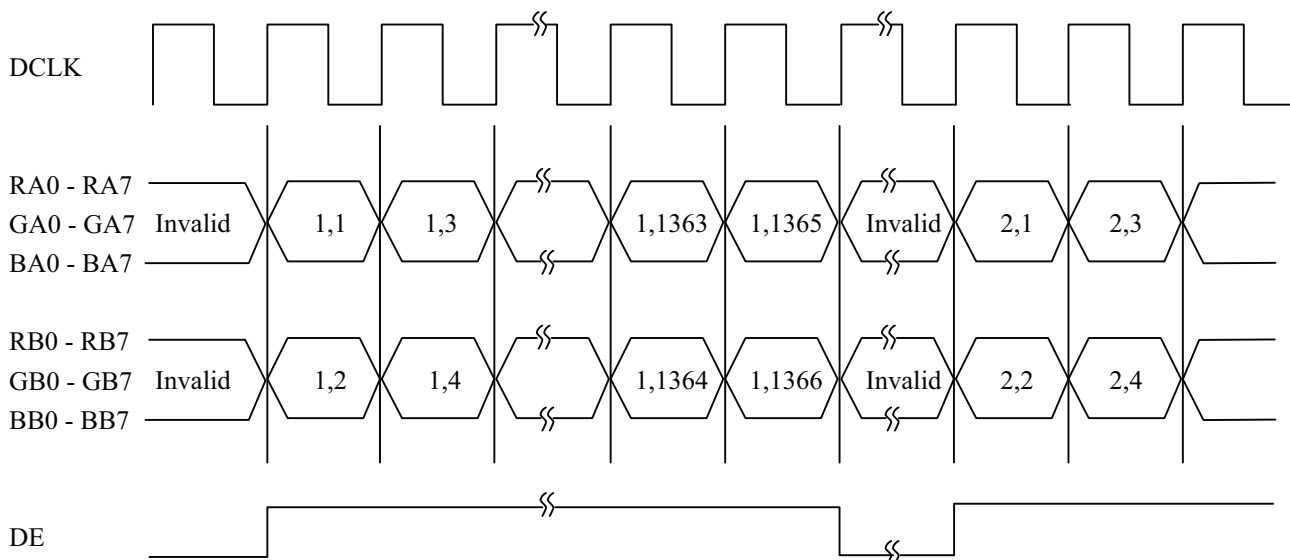
5.5 Correspondence between input data and display image

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



ODD pixel : RA0 - RA7 : R data  
 GA0 - GA7 : G data  
 BA0 - BA7 : B data  
 EVEN pixel RB0 - RB7 : R data  
 GB0 - GB7 : G data  
 BB0 - BB7 : B data

1, 1	1, 2	1, 3	-----	1, 1366
2, 1	2, 2	2, 3	-----	2, 1366
3, 1	3, 2	3, 3	-----	3, 1366
⋮	⋮	⋮		⋮
768, 1	768, 2	768, 3		768, 1366



5. 6 Relationship between display colors and input signals

Input Color		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	
	Green(255)	0	0	0	0	0	0	0	0	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	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	
	Yellow	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	
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	
	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	
	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	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	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	
	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	
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	
	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	
	Green (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	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	
	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	
	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	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Blue (254)	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	1	1	1	1	1	1	1	1	

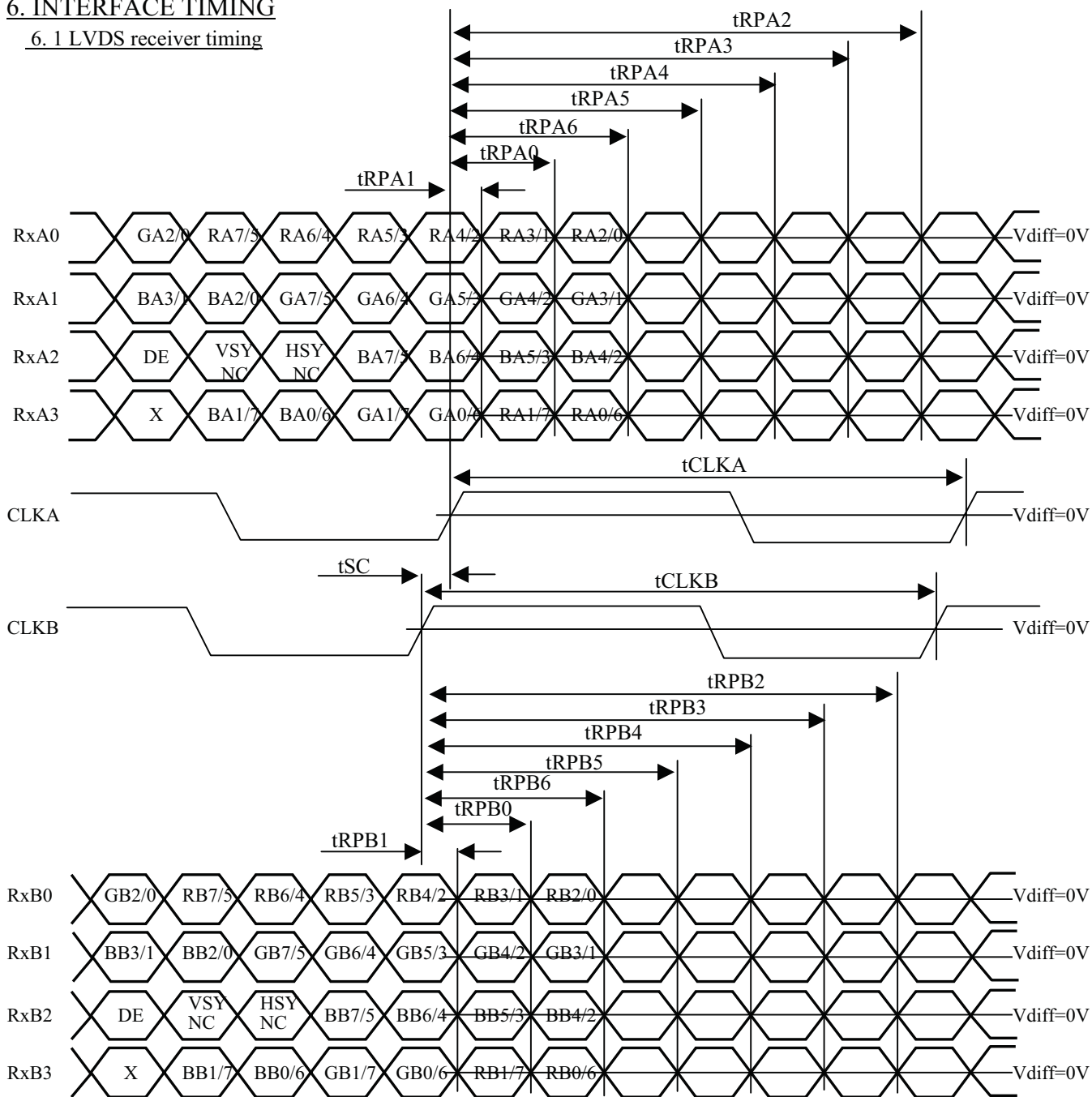
Note 1) Definition of gray scale :  
 Color(n) . . . . Number in parenthesis indicates gray scale level.  
 Larger n correspondsto brighter level.

2) Data : 1 : High, 0 : Low



## 6. INTERFACE TIMING

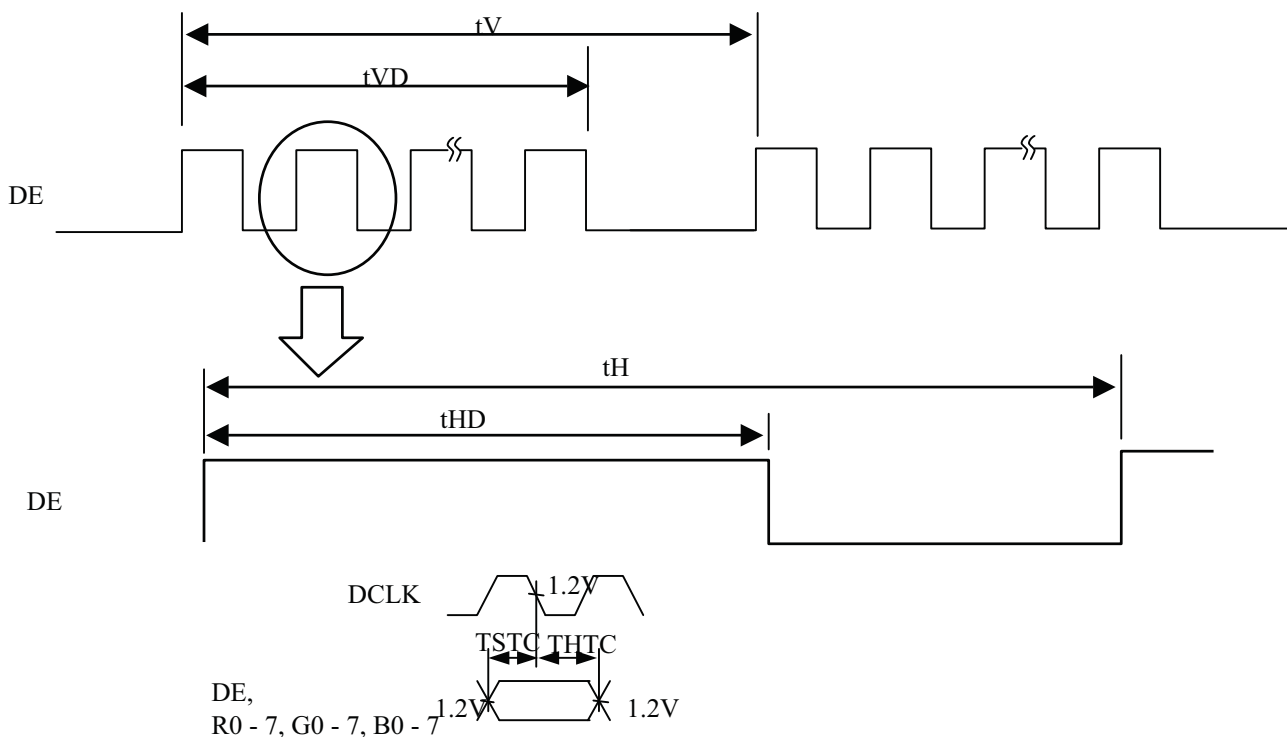
### 6.1 LVDS receiver timing



$$\begin{aligned}
 Rx*0 &= (Rx*0+) - (Rx*0-) & Rx*3 &= (Rx*3+) - (Rx*3-) \\
 Rx*1 &= (Rx*1+) - (Rx*1-) & CLK &= (CLK+) - (CLK-) \\
 Rx*2 &= (Rx*2+) - (Rx*2-)
 \end{aligned}$$

ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE	
CLK	Frequency	DCLK	64.0	67.5	72.5	MHz	=1/tclk
	CLK Skew	tSC	- 4.0	0	+ 4.0	ns	
Rx*0 Rx*1 Rx*2 Rx*3	0 data position	tRP0	1/7tCLK - 0.4	1/7tCLK	1/7tCLK + 0.4	ns	
	1st data position	tRP1	- 0.4	0	+ 0.4		
	2nd data position	tRP2	6/7tCLK - 0.4	6/7tCLK	6/7tCLK + 0.4		
	3rd data position	tRP3	5/7tCLK - 0.4	5/7tCLK	5/7tCLK + 0.4		
	4th data position	tRP4	4/7tCLK - 0.4	4/7tCLK	4/7tCLK + 0.4		
	5th data position	tRP5	3/7tCLK - 0.4	3/7tCLK	3/7tCLK + 0.4		
	6th data position	tRP6	2/7tCLK - 0.4	2/7tCLK	2/7tCLK + 0.4		

6.2 Synchronization signal timing



Note 1) Reference level for each timing signal is 1.2 V unless it is stated on the chart, high level voltage(VIH) and low level voltage(VIL) are defined as follows:

$$VIH \geq 2.0 V \quad VIL \leq 0.8 V$$

2) The timing of DCLK to other signals conforms to the specifications of LVDS transmitter.

I) 100Hz

2pxl/clock

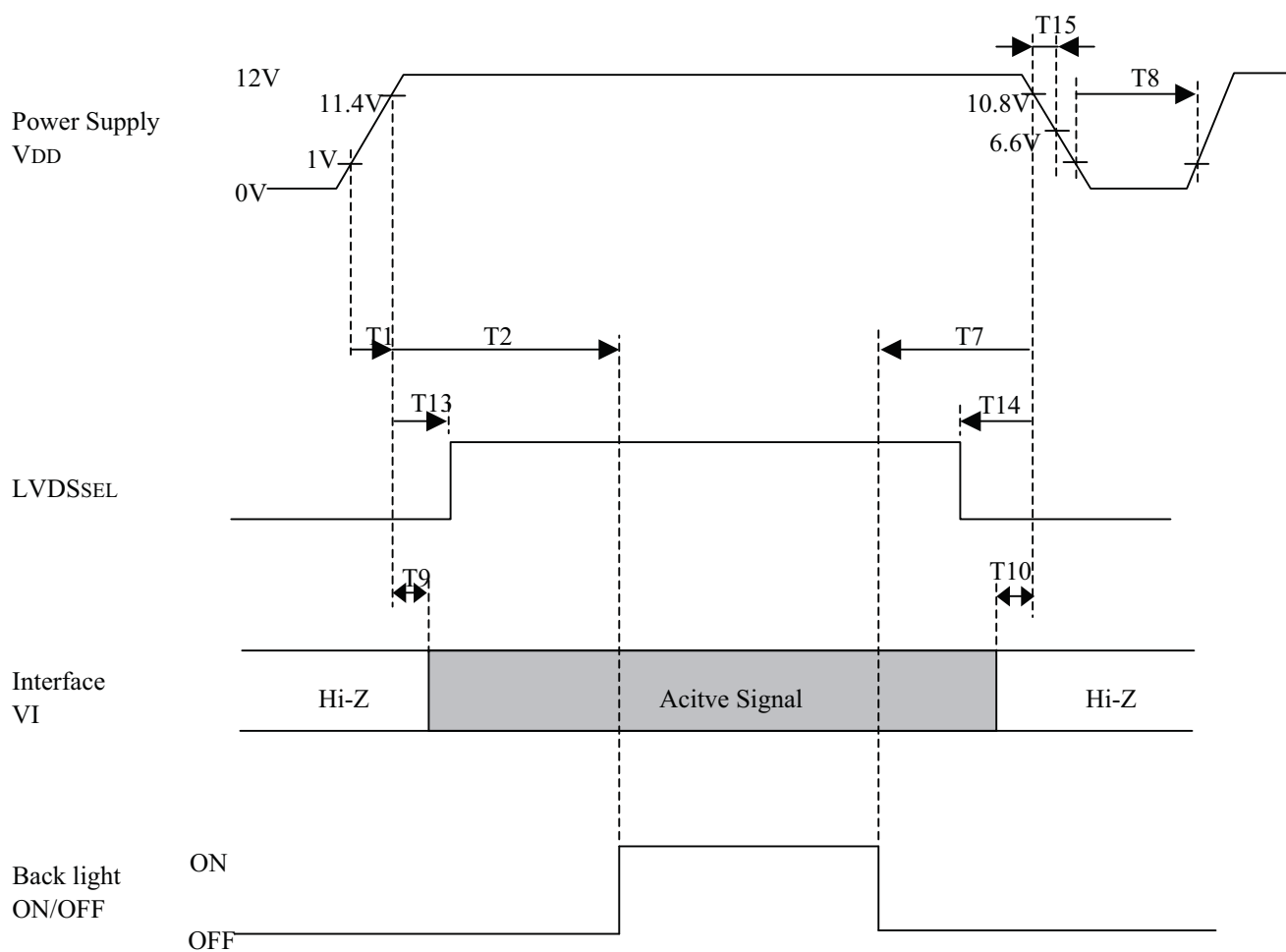
ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
DE	Vertical Frequency	fV	98	100	104	Hz	
	Vertical Period	tV	900	961	1500	tH	
	Vertical Valid	tVD	768			tH	
	Horizontal Frequency	fH	-	96.05	-	kHz	
	Horizontal Period	tH	700	702	1000	tCLK	
	Horizontal Valid	tHD	683			tCLK	

II) 120Hz

2pxl/clock

ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
DE	Vertical Frequency	fV	115	120	125	Hz	
	Vertical Period	tV	773	800	900	tH	
	Vertical Valid	tVD	768			tH	
	Horizontal Frequency	fH	-	96.05	-	kHz	
	Horizontal Period	tH	700	702	1000	tCLK	
	Horizontal Valid	tHD	683			tCLK	

### 6.3 Timing between interface signals power supply

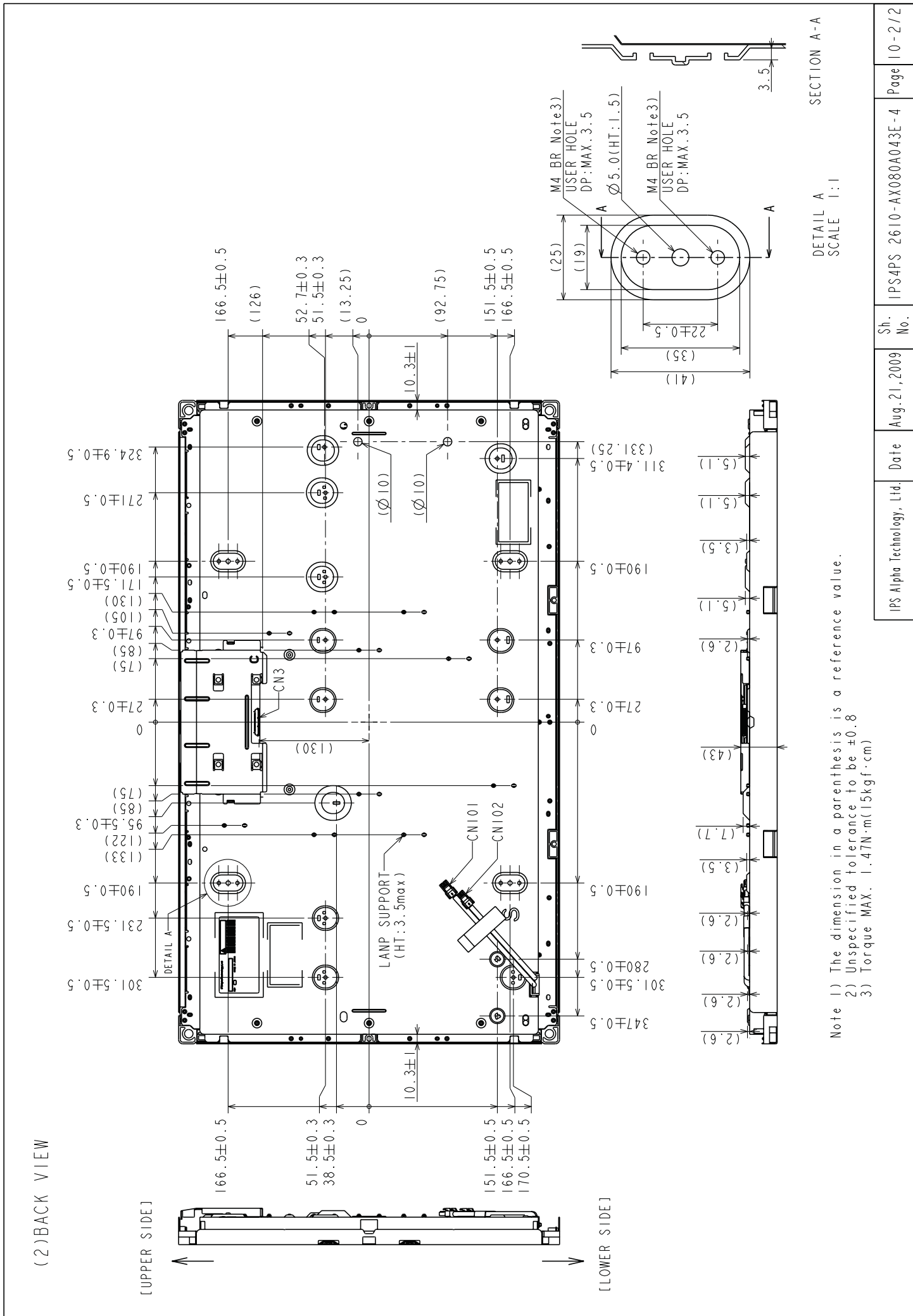


$$\begin{aligned}
 0 &\leq T1 \leq 10 \\
 350 &\leq T2 \\
 10 &\leq T9 \\
 0 &\leq T10 \\
 10 &\leq T13 \leq T2-150 \\
 0 &\leq T14
 \end{aligned}$$

$$\begin{aligned}
 0 &\leq T7 \\
 350 &\leq T8 \\
 20 &< T15
 \end{aligned}$$

Unit : ms





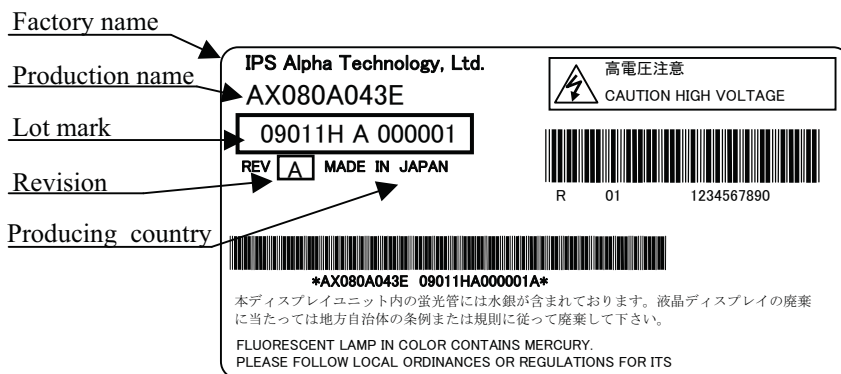
Sh. No.	IPS4PS 2610-AX080A043E-4	Date	Aug.21,2009	Page	10-2/2
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## 8. LABEL FORMAT

### 8.1 Label

The label is on the metallic bezel as shown in 7. External Dimensional.

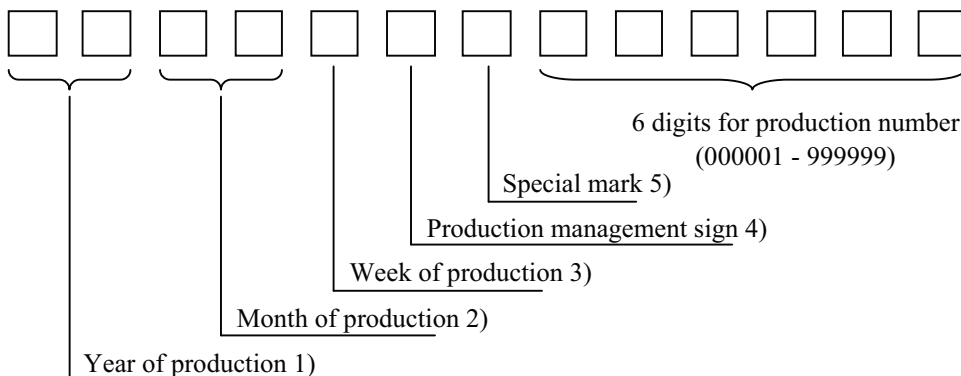
The style of character will be changed without notice.



### 8.2 Revision (REV.) control

REV. is the column for manufacturing convenience. A-Z except I and O may be written on this column.

### 8.3 Lot mark



Notes 1)

Mark	Year
09	2009
10	2010
11	2011

2)

Mark	Month	Mark	Month
01	1	07	7
02	2	08	8
03	3	09	9
04	4	10	10
05	5	11	11
06	6	12	12

3)

Week mark	Day
1	1~7
2	8~14
3	15~21
4	22~28
5	29~31

- 4) H : Made by IPS Alpha Technology, Ltd.(Mobara)  
 E : Made by IPS Alpha Technology Europe, s. r. o.  
 U : Made by IPS Alpha Technology, Ltd.(Utsunomiya)

5)

Mark	Liquid crystal		Color filter		Glass	
	Maker A	Maker B	Maker A	Maker B	Maker A	Maker B
A	○		○		○	
B		○	○		○	
C	○			○	○	
D		○		○	○	
J	○		○			○
K		○	○			○
L	○			○		○
M		○		○		○

## 8.4 Record of revision described on the label

Factory				Revision	Gate Driver		Mold frame		Backlight			EEFL		Lower frame	
$\alpha$ J	$\alpha$ U	$\alpha$ E	$\alpha$ M		MakerA GTI	MakerC 電線	Japan	Malaysia	( $\alpha$ J)	B <sup>2)</sup>	B <sup>3)</sup>	JAPAN	KOREA	Japan	Malaysia
○	○	—	—	A	○	—	○	—	○	—	—	○	—	—	○
○	○	○ <sup>1)</sup>	—	A	—	○	○	—	○	—	—	○	—	—	○
—	—	○ <sup>1)</sup>	—	B	—	○	—	○	○	—	—	○	—	—	○
—	—	○ <sup>1)</sup>	—	C	—	○	—	—	—	○	—	○	—	—	○
○	○	—	—	D	—	○	○	—	○	—	—	—	○	—	○
—	○	—	—	E	—	○	—	○	—	—	○	○	—	—	○
—	○	—	—	F	—	○	—	○	—	—	○	○	—	○	—

Note 1) Cushion tape thickness 0.8mm ( on metal frame of upper side and lower side )

Note 2) Dies made in Thailand. Backlight assembly manufactured by METCO.

Note 3) Dies made in Malaysia. Backlight assembly manufactured by METCO.

8.5 Samples of the product labels by production bases

Factory name → IPS Alpha Technology, Ltd.  
 Production name → AX080A043E  
 Lot mark → 09011H A 000001  
 Revision → REV A  
 Producing country → MADE IN JAPAN

高電圧注意  
CAUTION HIGH VOLTAGE

R 01 1234567890

\*AX080A043E 09011HA000001A\*

本ディスプレイユニット内の蛍光管には水銀が含まれております。液晶ディスプレイの廃棄に当たっては地方自治体の条例または規則に従って廃棄して下さい。  
 FLUORESCENT LAMP IN COLOR CONTAINS MERCURY.  
 PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR ITS

Product by IPS Alpha Technology, Ltd.

IPS Alpha Technology Europe, s.r.o.  
 AX080A043E  
 09011E A 000001  
 REV A  
 MADE IN Czech Republic

高電圧注意  
CAUTION HIGH VOLTAGE

R 01 1234567890

\*AX080A043E 09011EA000001A\*

本ディスプレイユニット内の蛍光管には水銀が含まれております。液晶ディスプレイの廃棄に当たっては地方自治体の条例または規則に従って廃棄して下さい。  
 FLUORESCENT LAMP IN COLOR CONTAINS MERCURY.  
 PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR ITS

Product by IPS Alpha Technology Europe, s.r.o.

IPS Alpha Technology, Ltd.  
 AX080A043E  
 09011U A 000001  
 REV A  
 MADE IN JAPAN

高電圧注意  
CAUTION HIGH VOLTAGE

R 01 1234567890

\*AX080A043E 09011UA000001A\*

本ディスプレイユニット内の蛍光管には水銀が含まれております。液晶ディスプレイの廃棄に当たっては地方自治体の条例または規則に従って廃棄して下さい。  
 FLUORESCENT LAMP IN COLOR CONTAINS MERCURY.  
 PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR ITS

Product by IPS Alpha Technology, Ltd.(Utsunomiya)

IPS Alpha Technology, Ltd.	Date	Aug.21,2009	Sheet No.	IPS4PS 2611 AX080A043E-4	Page	11-3/3
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## 9. COSMETIC SPECIFICATIONS

### 9.1 Condition for cosmetic inspection

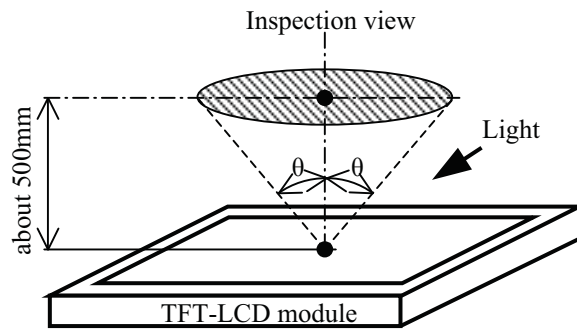
#### (1) Viewing zone

- 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)

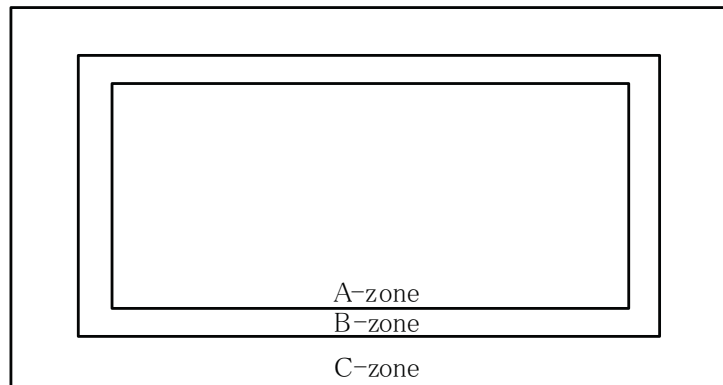


#### (2) Environmental

- 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) Backlight : when non-operating inspection, backlight should be off .

### 9.2 Definition of zone

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



### 9.3 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		
			Bright defect	Low bright defect				
Operating inspection	1	Dot defect	Sparkle mode	1-dot	0	4	pcs	1),2),4)
				2-dots	0		Units	1),2),5)
				3-dots	0			
				Density	0		pcs/φ20mm	1),2),6)
				Total	4		pcs	1),2)
			Black mode	1-dot	7		pcs	1),3),4)
				2-dots	0		Units	1),3),5)
				3-dots	0			
				Density	3		pcs/φ20mm	1),3),6)
				Total	7		pcs	1),3)
			Total	9		pcs	1)	
2	Line defect		Serious one is not allowed		-	-		
3	Uneven brightness		Serious one is not allowed		-	-		

	No	ITEM	Max. acceptable number		Unit	Note	
			Bright defect	Low bright defect			
Operating inspection	4	Stain inclusion (Line shape) W : width (mm) L : length (mm)	W ≤ 0.02	L : Ignore	Ignore	pcs	7)
			W ≤ 0.04	L ≤ 4.0	8		
				L > 4.0	0		
			W ≤ 0.08	L ≤ 2.0	8		
				L > 2.0	0		
	W > 0.08	-	(See dot shape)				
	5	Stain inclusion (Dot shape) D : ave. dia (mm)	D ≤ 0.22		Ignore	pcs	7)
			D ≤ 0.5		8		
			D > 0.5		0		
	6	Scratch on polarizer (Line shape) W : width (mm) L : length (mm)	W ≤ 0.02	L : Ignore	Ignore	pcs	8)
			W ≤ 0.08	L ≤ 20	10		
				L > 20	0		
W > 0.08			-	0			
7	Scratch on polarizer (Dot shape) D : ave. dia (mm)	D ≤ 0.2		Ignore	pcs	8)	
		D ≤ 0.6		10			
		D > 0.6		0			
Non operating inspection	8	Bubbles, peeling in polarizer [D : ave. dia (mm)]	D ≤ 0.2		Ignore	pcs	8)
			D ≤ 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 :

bright defect G > 24.3%

R > 24.3%

B > 24.3%

low bright defect 24.3% ≥ G > 4.1%

24.3% ≥ R > 7.8%

24.3% ≥ B > 18.0%

3) Black mode : brightness of dot is less than 70% at white. (visible to eye)

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 φ20mm

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.

## 10. PRECAUTION

Please pay attention to the followings when a TFT module with a backlight unit is used, handled and mounted.

### 10.1 Precaution to handling and mounting

- (1) Applying strong force to a part of the module may cause partial deformation of frame or mold, and cause damage to the display.
- (2) The module should gently and firmly be held by both hands. Never hold by just one hand in order to avoid any internal damage. Never drop or hit the module.
- (3) The module should be installed with mounting holes of a module.
- (4) Uneven force such as twisted stress should not be applied to a module when a module is mounted on the cover case. The cover case must have sufficient strength so that external force can not be transmitted directly to a module.
- (5) It is recommended to leave a space between a module and a holding board of a module so that partial force is not applied to a module.

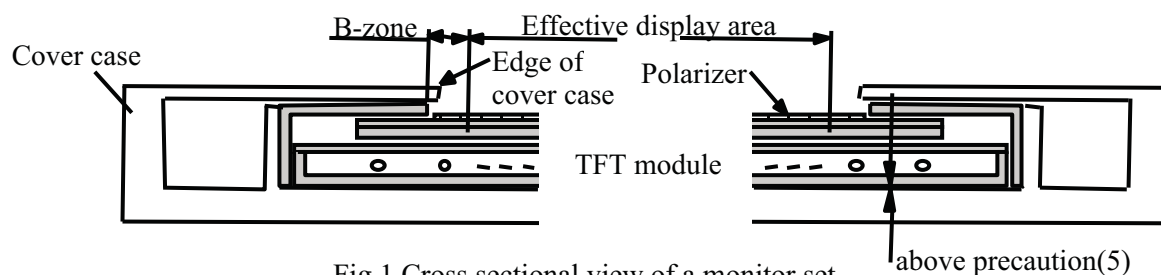


Fig.1 Cross sectional view of a monitor set

- (6) The edge of a cover case should be located inside more than 1mm from the edge of a module front frame.
- (7) A transparent protective plate should be added on the display area of a module in order to protect a polarizer and TFT cell. The transparent protective plate should have sufficient strength so that the plate can not touch a module by external force.
- (8) Materials included acetic acid and choline should not be used for a cover case as well as other parts and boards near a module. Acetic acid attacks a polarizer. Choline attacks electric circuits due to electro-chemical reaction.
- (9) The polarizer on a TFT cell should carefully be handled due to its softness, and should not be touched, pushed or rubbed with glass, tweezers or anything harder than HB pencil lead. The surface of a polarizer should not be stored in the IPS Alpha's shipping box.
- (10) 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 TFT cell. Other cleaning chemicals such as acetone, toluen and alcohol should not be used to clean adhesives because they cause chemical damage to a polarizer.
- (11) Saliva or water drops should be immediately wiped off. Otherwise, the portion of a polarizer may be deformed and its color may be faded.
- (12) The module should not be opened or modified. It may cause not to operate properly.
- (13) Metallic bezel of a module should not be handled with bare hand or dirty gloves. Otherwise, color of a metallic frame may become dirty during its storage. It is recommended to use clean soft gloves and clean finger stalls when a module is handled at incoming inspection process and production (assembly) process.
- (14) Lamp(EEFL) cables should not be pulled and held.

### 10.2 Precaution to operation

- (1) The ambient temperature near the operated module should be satisfied with the absolute maximum ratings. Unless it meets the specifications, sufficient cooling system should be adopted to system.
- (2) The spike noise causes the mis-operation of a module. The level of spike noise should be as follows:

$$-200\text{mV} \leq \text{over- and under- shoot of VDD} \leq +200\text{mV}$$

VDD including over- and under- shoot should be satisfied with the absolute maximum ratings.

- (3) Optical response time, luminance and chromaticity depend on the temperature of a TFT module. Response time and saturation time of EEFL luminance become longer at lower temperature operation.
- (4) Sudden temperature change may cause dew on and/or in the a module. Dew males damage to a polarizer and/or electrical contacting portion. Dew causes fading of displayed quality.
- (5) Fixed patterns displayed on a module for a long time may cause after-image. It will be recovered soon.
- (6) A 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.
- (7) Noise may be heard when a backlight is operated. If necessary, sufficient suppression should be done by system manufacturers.
- (8) The module should not be connected or removed while a main system works.
- (9) Inserting or pulling I/F connectors causes any trouble when power supply and signal dates are on-state. I/F connectors should be inserted and pulled after power supply and signal dates are turned off.

### 10.3 Electrostatic discharge control

- (1) Since a module consists of a TFT cell and electronic circuits with CMOS-ICs, which are very weak to electrostatic discharge, persons who are handling a module should be grounded through adequate methods such as a list band. I/F connector pins should not be touched directly with bare hands.
- (2) Protection film for a polarizer on a module should be slowly peeled off so that the electrostatic charge can be minimized.

### 10.4 Precaution to strong light exposure

- (1) A module should not be exposed under strong light. Otherwise, characteristics of a polarizer and color filter in a module may be degraded.

### 10.5 Precaution to storage

When modules 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. Modules 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 modules should be stored in the IPS Alpha's shipping box.

### 10.6 Precaution to handling protection film

- (1) The protection film for polarizers should be peeled off slowly and carefully by persons who are electrically grounded with adequate methods such as a list band. Besides, ionized air should be blown over during peeling action. Dusts on a polarizer should be blown off by an ionized nitrogen gun and so on.
- (2) The protection film should be peeling off without rubbing it to the polarizer. Because, if the film is rubbed together with the polarizer, since the film is attached to the polarizer with a small amount of adhesive, the adhesive may remain on a polarizer.
- (3) The module with protection film should be stored on the conditions explained in 10.5 (1). However, in case that the storage time is too long, adhesive may remain on a polarizer even after a protection film is peeled off. Besides, in case that a module is stored at higher temperature and/or higher humidity, adhesive may remain on a polarizer. The remained adhesive may cause non-uniformity of display image.
- (4) The adhesive can be removed easily with Normal-Hexane or Isopropyl alcohol. The remained adhesive or its vestige on the polarizer should be wiped off with absorbent cotton or other soft materials such as chamois slightly contained Normal-Hexane or Isopropyl alcohol.

### 10.7 Safety

- (1) Since a TFT cell and lamps are made of glass, handling to the broken module should be taken care sufficiently in order not to be injured. Hands touched liquid crystal from a broken cell should be washed sufficiently.

- (2) The module should not be taken apart during operation so that back-light drives by high voltage.

#### 10.8 Environmental protection

- (1) The TFT module contains cold cathode fluorescent lamps. Please follow local ordinance or regulations for its disposal.
- (2) Flexible printed circuits and printed circuits board used in a module contain small amount of lead. Please follow local ordinance or regulations for its disposal.

#### 10.9 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 IPS Alpha Technology, Ltd., 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.

#### 10.10 Precaution to setting inverter

- (1) Please use inverter output waveform that satisfies following formulae.

$$0.9 \cdot \sqrt{2} \cdot I_{rms} < |I_p| < 1.1 \cdot \sqrt{2} \cdot I_{rms}$$

$$0.9 \cdot \sqrt{2} \cdot I_{rms} < |I-p| < 1.1 \cdot \sqrt{2} \cdot I_{rms}$$

$I_p$  Peak value of lamp current at positive side

$I-p$  Peak value of lamp current at negative side

Also, please use sine wave with symmetric positive and negative wave that both area and peak of IL and VL waveforms are within 10% of asymmetry rate, and that do not develop spike wave. Otherwise there is a possibility to develop lighting defect.

- (2) After this product is stored for a long time, it might take longer to discharge lamp. It is recommended that auxiliary illuminant (LED, etc.) is set.
- (3) Since multiple lamps are closely-mounted to the backlight, please use inverter that output waveform is synchronized. If different phase inverter is used, it might cause luminance depression or short life span by phase difference.

#### 10.11 Others

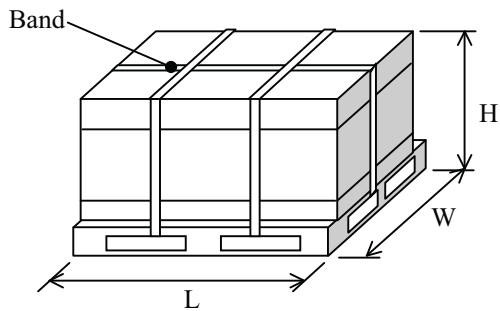
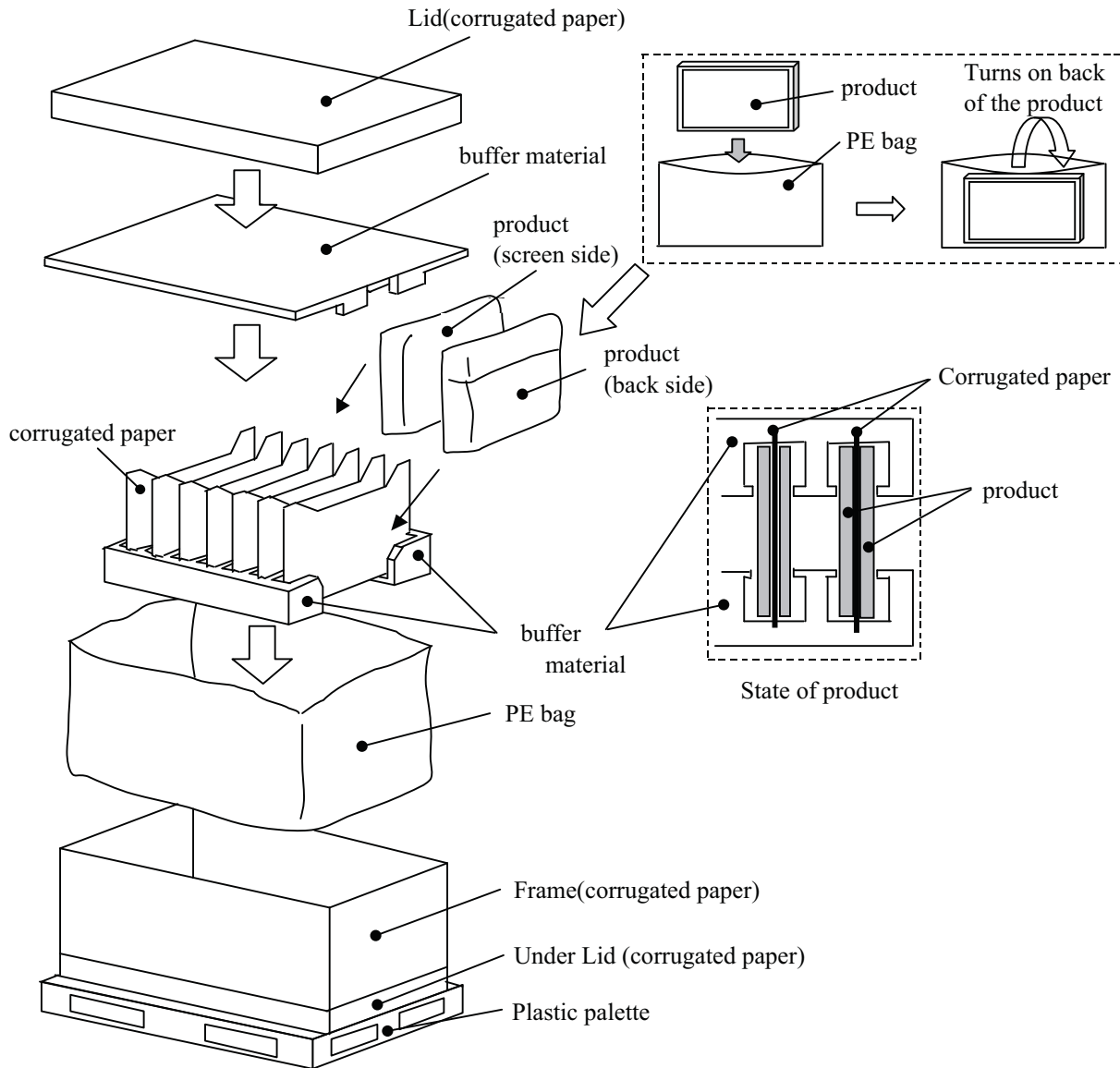
Electrical components which may not affect electrical performance are subjective to change without notice because of their availability.

IPS Alpha Technology, Ltd.	Date	Aug.21,2009	Sheet No.	IPS4PS 2613 AX080A043E-4	Page	13-3/3
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## 11.Packing

### 11.1 Precaution to handling and mounting

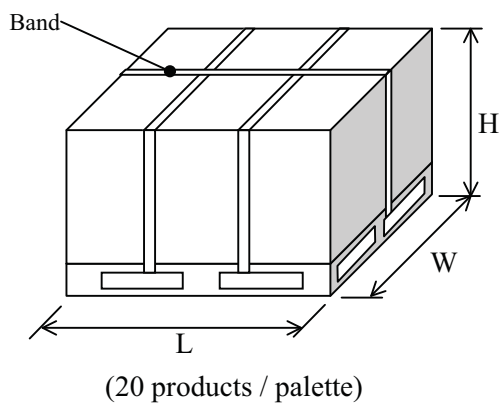
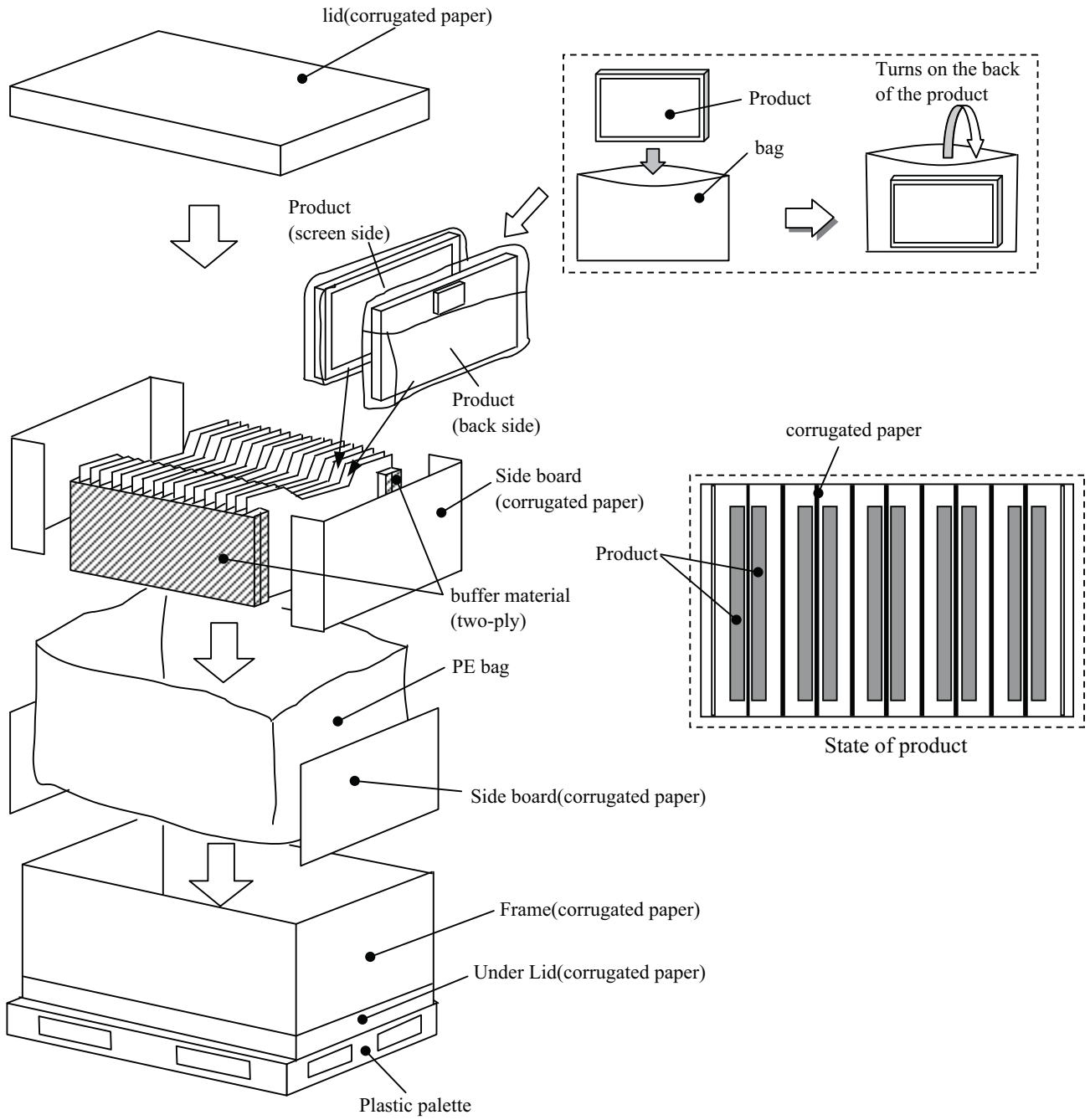
#### 1) Packing specification for IPS Alpha Technology, Ltd.(Japan)



( 16 products/palette )

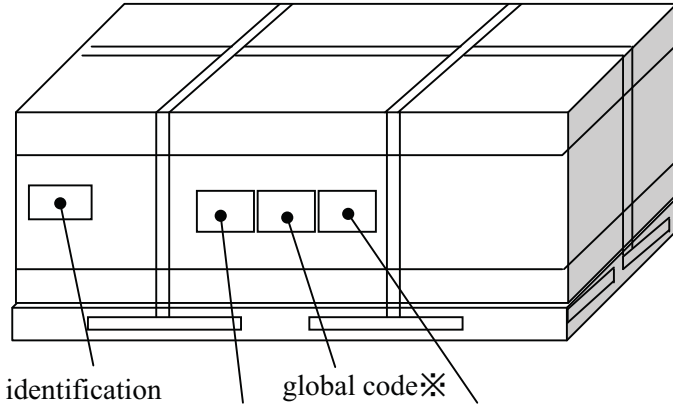
Size : 1210(L) × 1000(W) × 675(H)mm  
 Weight : 134kg

2) Packing specification for IPS Alpha Technology Europe, s.r.o.



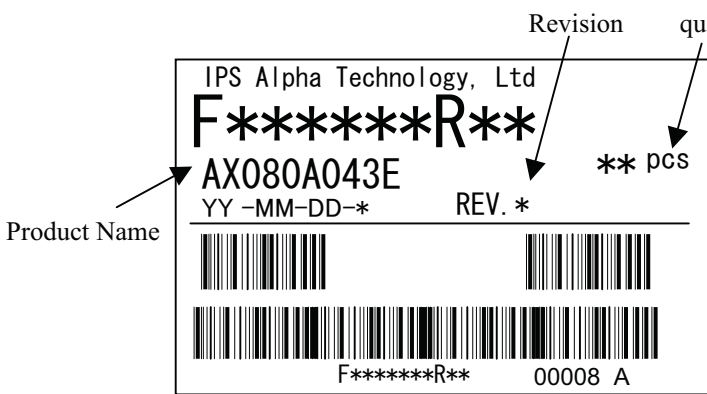
IPS Alpha Technology, Ltd.	Date	Aug.21,2009	Sheet No.	IPS4PS 2614 AX080A043E-4	Page	14-2/3
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11.2 Label sample of packing box

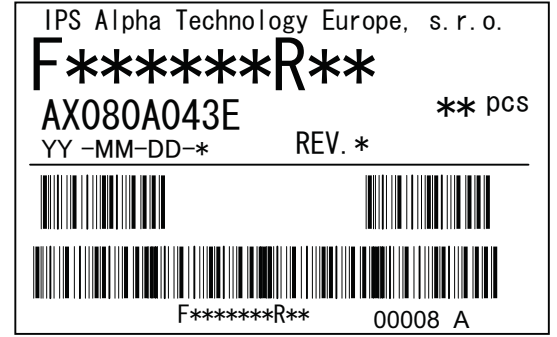


identification      global code※  
address※      wrapping indicatio ※

※Left and right are reversed occasionally.



Product by IPS Alpha Technology, Ltd.

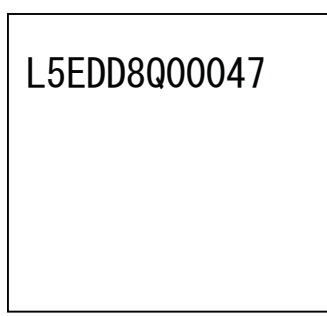


Product by IPS Alpha Technology Europe, s.r.o.

production slip (ex.)  
label size (102 × 70)



address (ex.)



global code (ex.)



wrapping indication (ex.)

IPS Alpha Technology, Ltd.	Date	Aug.21,2009	Sheet No.	IPS4PS 2614 AX080A043E-4	Page	14-3/3
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12. Reliability test

No.	Item	condition	Quantity	Period	
				determination	end
1	Low Temperature / Operating	Ta=0°C	3	500h	1000h
2	High Temperature / Operating	Ta=45°C	3	500h	1000h
3	High Temperature High Humidity / Operating	45°C 95%RH	3	500h	1000h
4	Low Temperature / Strage	Ta=-30°C	3	500h	1000h
5	High Temperature / Strage	Ta=70°C	3	500h	1000h
6	High Temperature High Humidity / Strage	45°C 95%RH	3	500h	1000h
7	Heat shock	-25/70°C 30min./30min.	3	100cy.	200cy.
8	Heat shock test for solder	-35/85°C 30min./30min.	3	200cy.	500cy.

## Result Evaluation

Display function should be kept.