43" Full HD

High brightness color TFT-LCD module

Customer:

Customer Model name:

Model: TEC430LAGVN-L25

Date: Oct 19th, 2018

Version:

Note: This specification is subject to change without notice

Customer：	
Approved by ：	
Date：	

Approved	Prepared
Date:	**Date:**

Product Specification

Contents

Product Specification

RECORD OF REVISION

Version and Date	Page	Old description	New description	Remark
0.1　2016/08/30	All	First Edition for customer		
0.2　2017/06/30			Brightness: 2200 nits BLU power: 328W User holes: 400 x 400 mm	
0.3　2017/12/13			Brightness: 2500 nits BLU power: 254.4 W	
0.4　2018/06/06	24			
0.5　2018/10/19	13 24	BLU lifetime：50,000 hr 	BLU lifetime：100,000hr 	
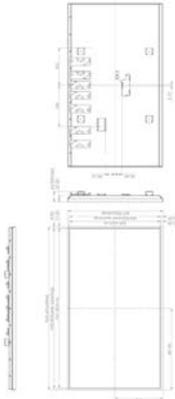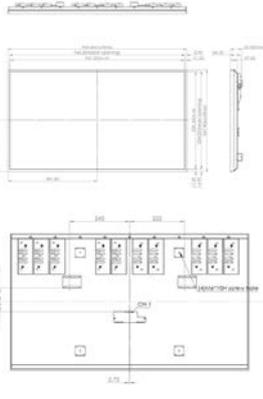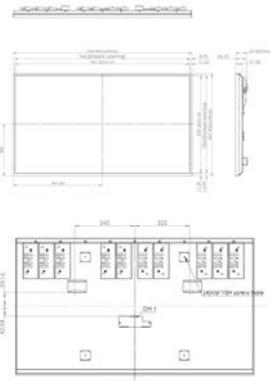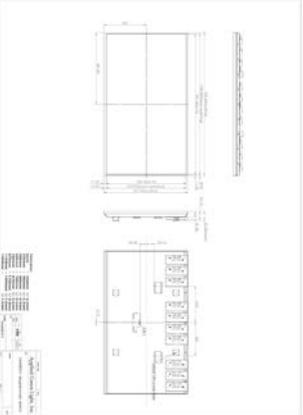
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1. HANDLING PRECAUTIONS

1) Since front polarizer is easily damaged, pay attention not to scratch it.

2) Be sure to turn off power supply when inserting or disconnecting from input connector.

3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.

6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.

7) Do not open or modify the Module Assembly.

8) Do not press the reflector sheet at the back of the module to any directions.

9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center.

10) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.

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2. General Description

2.1, Overview

TEC430LAGVN-L25 is a 42.51" Color Active Matrix Liquid Crystal Display composed of a TFT-LCD panel, a driver circuit, and a backlight system. The screen format is intended to support the Full HD (1920(H) x 1080(V)) screen and 16.7 M colors (8-bits/Color). All input signals are 2-channel LVDS interface compatible.

2.2 Features

- High brightness display, 2500nits.
- Hi-Tni TFT applied
- LED backlight with direct light design
- Long lifetime
- Wide operation temperature
- RoHS Compliance

2.3 Application

Industrial Application.

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2.4 Display Specifications

Items	Unit	Specification
Screen Diagonal	inch	42.51inches (1079.87 mm) diagonal
Active Area	mm	941.184 mm(H) x 529.416 mm
Pixels H x V	pixels	1920x3(RGB) x 1080
Pixels Pitch	mm	0.4902 mm x 0.4902 mm
Pixel Arrangement		RGB Vertical stripe
Display mode		Transmssive mode, normally black
White luminance (center)	Cd/m^2	2500 (Typ.)
Contrast ratio		1300 :1(Typ.)
Optical Response Time	msec	8.5 ms (Typ. on/off)
Normal Input Voltage VDD	Volt	12
Power Consumption	Watt	258.6 (Typ) Logic: 4.2 W(typ); BLU: 254.4 W(typ)
Weight	Grams	(TBD)
Physical size	mm	963.6(H) × 567.9(V) × 37.5(B) mm (Typ.) 62.5 mm to VESA
Electrical Interface		2 Channel LVDS
Support Colors		16.7M colors (RGB 8-bits)
Surface Treatment		Anti-Glare (Haze 1%), 3H

Temperature range
   Operating
   Storage (Shipping)
	
	^0C
	^0C
		
		-10 ~ 50
		-20 ~ 60

RoHS Compliance		RoHS Compliance

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2.5 Optical Characteristics

The following optical characteristics are measured under stable condition at 25 ^{0}C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right) CR$\geqq$20 (Left)	160	178		2
		Vertical (Up) CR$\geqq$20 (Down)	160	178		
Contrast Ratio		Normal Direction	800	1100		3
Response Time	msec	Gray to Gray		12	16	4
Color / Chromaticity Coordinates (CIE)		Red x	-0.05	0.64	+0.05	5
		Red y		0.33		
		Green x		0.31		
		Green y		0.60		
		Blue x		0.15		
		Blue y		0.06		
Color coordinates (CIE) White		White x		0.30		
		White y		0.33		
Center Luminance	Cd/m^2		2000	2500		6
Luminance Uniformity	%			70		7
Crosstalk (in 60 Hz)	%				4.0	

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Note 1: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.
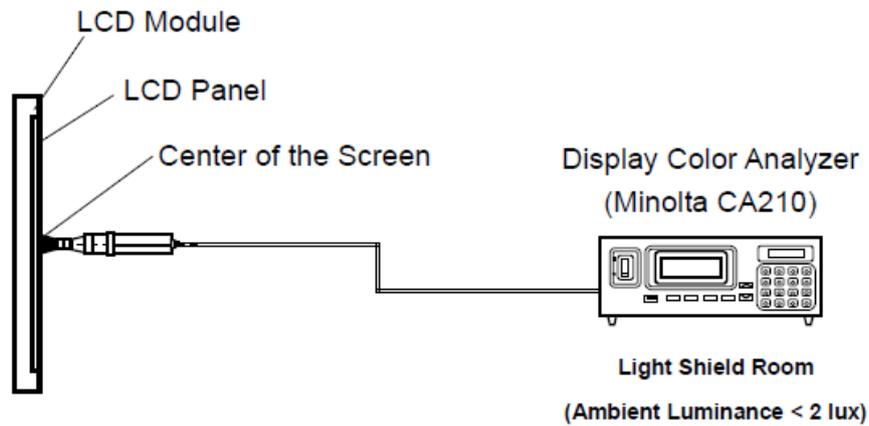
Note 2: Definition of viewing angle
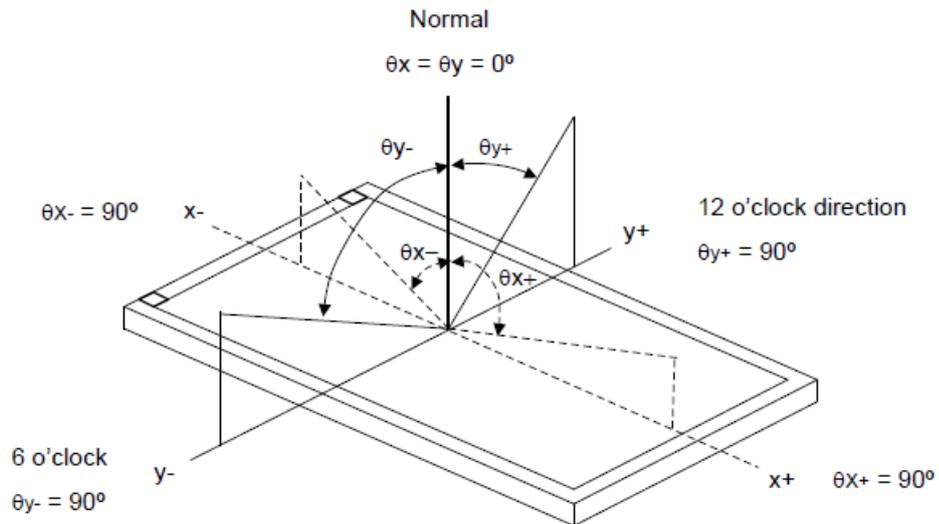
Note 3: Contrast ratio is measured by Minolta CA 210

Product Specification

Note 4: Definition of Response time

The output signals of photo detector are measured when the input signals are changed from "Full Black" to "Full White" (rising time), and from "Full White" to "Full Black" (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as below.
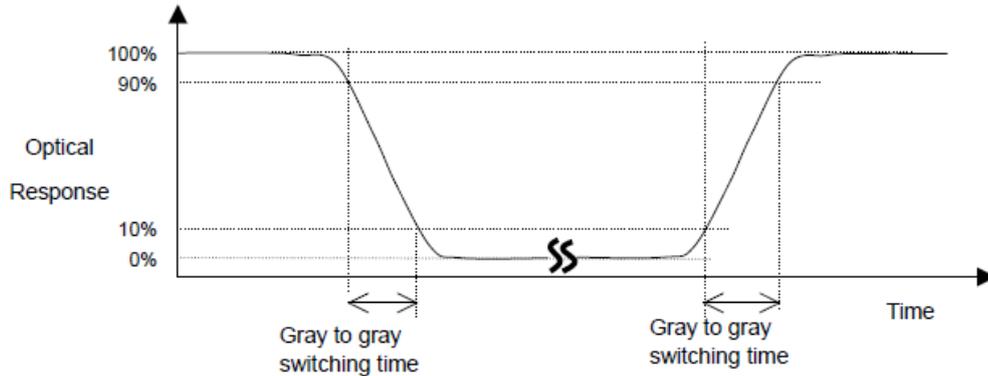
Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA 210

Note 6: Center luminance is measured by Minolta CA 210

Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA 210
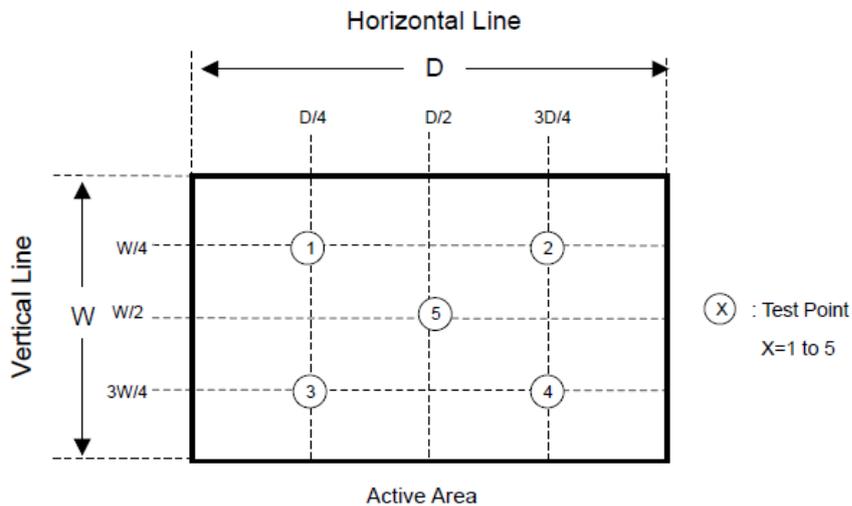
Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

3. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

3.1 TFT LCD Module

Items	Symbol	Min	Max	Unit	Conditions
Power supply voltage	Vcc	-0.3	14		Note 1
Logic/ LCD drive voltage	Vin	-0.3	4.0	Volt	Note 1

3.2 Backlight converter unit

Items	Symbol	Min	Max	Unit	Conditions
Light bar voltage	V_W		(TBD)	V	T=25 ^{0}C
Converter input voltage	V_{BL}	0	28	V	
Control signal level		-0.3	7	V	Note 1, 2

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.

3.3 Absolute Ratings of Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OP}	-10	-	50	^{0}C	Note 3
Operation Humidity	H_{OP}	5		90	%	
Storage temperature	T_{ST}	-20		60	^{0}C	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in Ta= 25℃

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to IIS (Incoming Inspection Standard).

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4. Electrical characteristics

4.1 Electrical Characteristic

4.1.1: DC Characteristics

Parameter		Symbol	Value			Unit	Note
			Min	Typ	Max		
Circuit :							
Power Input Voltage		V_{LCD}	10.8[TBD]	12.7[TBD]	14.0[TBD]	V_{DC}	
Power Input Current		I_{LCD}	-	350 (TBD)	455 (TBD)	mA	1
			-	550 (TBD)	715 (TBD)	mA	2
T-CON Option Selection Voltage	Input High Voltage	V_{IH}	1.62	-	1.98	V_{DC}	
	Input Low Voltage	V_{IL}	0	-	0.54	V_{DC}	
Power Consumption		P_{LCD}	-	4.2 (TBD)	5.5 (TBD)	Watt	1
Rush current		I_{RUSH}	-	-	5.0(TBD)	A	3

Note:

1. The specified current and power consumption are under the VLCD=12.0V, Ta=25 +/- 2°C, f_V=60Hz condition, and mosaic pattern(8 x 6) is displayed and fV is the frame frequency.

2. The current is specified at the maximum current pattern.

3. The duration of rush current is about 2ms and rising time of power input is 0.5ms (min.).

4. Ripple voltage level is recommended under ± 5% of typical voltage.

5. VLCD Should be under the maximum voltage include the ripple

6. Maximum of power input voltage is included with ripple.

White : 1023 Gray
Black :   0 Gray
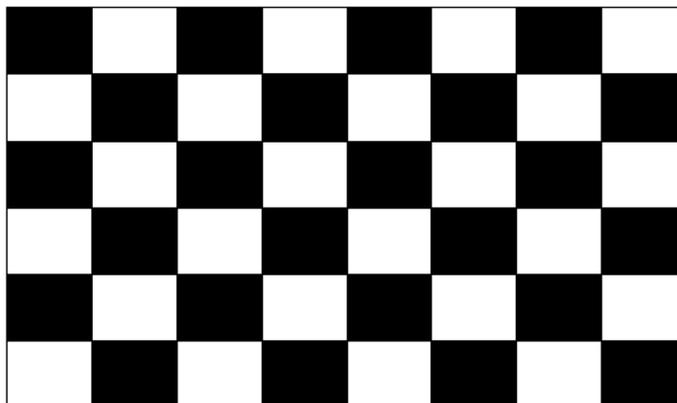
Mosaic Pattern(8 x 6)

Product Specification

4.1.2: Backlight Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Remarks (Test condition)
Input Voltage	Vin	21.6	24.0	26.4	V_{DC}	
Input current	Iin		10.6		A	Vin=24V, Dim=max
BLU power			254.4		W	
On/Off control	ON/OFF		3	5	V_{DC}	ON state
		-0.3		0.7		OFF state
Dimming control	DIMM	180	200	220	Hz	PWM
BLU lifetime			100,000		hrs	

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4.2 Interface Connections

4.2.1 LCD module

- LCD Connector(CN1): FI-RXE51S-HF(manufactured by JAE) or compatible

- Mating Connector : FI-R51HL(JAE) or compatible

No	Symbol	Description	No	Symbol	Description
1	NC or GND	No Connection or Ground (Note 4)	27	NC	No connection
2	NC	No Connection (Note 4)	28	R2AN	SECOND LVDS Receiver Signal (A-)
3	NC	No Connection (Note 4)	29	R2AP	SECOND LVDS Receiver Signal (A+)
4	NC	No Connection (Note 4)	30	R2BN	SECOND LVDS Receiver Signal (B-)
5	NC	No Connection (Note 4)	31	R2BP	SECOND LVDS Receiver Signal (B+)
6	NC	No Connection (Note 4)	32	R2CN	SECOND LVDS Receiver Signal (C-)
7	LVDS Select	'H' =JEIDA , 'L' or NC = VESA	33	R2CP	SECOND LVDS Receiver Signal (C+)
8	NC	No Connection (Note 4)	34	GND	Ground
9	NC	No Connection (Note 4)	35	R2CLKN	SECOND LVDS Receiver Clock Signal(-)
10	NC	No Connection (Note 4)	36	R2CLKP	SECOND LVDS Receiver Clock Signal(+)
11	GND	Ground	37	GND	Ground
12	R1AN	FIRST LVDS Receiver Signal (A-)	38	R2DN	SECOND LVDS Receiver Signal (D-)
13	R1AP	FIRST LVDS Receiver Signal (A+)	39	R2DP	SECOND LVDS Receiver Signal (D+)
14	R1BN	FIRST LVDS Receiver Signal (B-)	40	NC	No connection
15	R1BP	FIRST LVDS Receiver Signal (B+)	41	NC	No connection
16	R1CN	FIRST LVDS Receiver Signal (C-)	42	NC or GND	No Connection or Ground
17	R1CP	FIRST LVDS Receiver Signal (C+)	43	NC or GND	No Connection or Ground
18	GND	Ground	44	GND	Ground (Note 5)
19	R1CLKN	FIRST LVDS Receiver Clock Signal(-)	45	GND	Ground
20	R1CLKP	FIRST LVDS Receiver Clock Signal(+)	46	GND	Ground
21	GND	Ground	47	NC	No connection
22	R1DN	FIRST LVDS Receiver Signal (D-)	48	VLCD	Power Supply +12.0V
23	R1DP	FIRST LVDS Receiver Signal (D+)	49	VLCD	Power Supply +12.0V
24	NC	No connection	50	VLCD	Power Supply +12.0V
25	NC	No connection	51	VLCD	Power Supply +12.0V
26	NC or GND	No Connection or Ground	-	-	-

Notes 1. All GND (ground) pins should be connected together to the LCD module's metal frame.

2. All VLCD (power input) pins should be connected together.

3. All Input levels of LVDS signals are based on the **EIA 644** Standard.

4. **#1~#6 & #8~#9** NC (No Connection): These pins are used only for LGD (Do not connect)

5. Specific pin No. **#44** is used for "No signal detection" of system signal interface.

   It should be GND for NSB (No Signal Black) while the system interface signal is not.

   If this pin is "H", LCD Module displays AGP (Auto Generation Pattern).

Product Specification

4.2.2 Backlight module

Input Pin Assignment (CN2)

Pin & Connector Assignment:

Connector: CviLux CI0114M1HR0 or equivalent (Master)

Pin NO	Symbol	Description
1	VIN	DC +24V
2	VIN	DC +24V
3	VIN	DC +24V
4	VIN	DC +24V
5	VIN	DC +24V
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	NC	No connected
12	ON / OFF	OFF=0V; ON=+5V
13	DIMM	20~100%
14	NC	No connected

Connector: CviLux CI0114M1HR0 or equivalent (Slave)

Pin NO	Symbol	Description
1	VIN	DC +24V
2	VIN	DC +24V
3	VIN	DC +24V
4	VIN	DC +24V
5	VIN	DC +24V
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	NC	No connected
12	NC	No connected
13	NC	No connected
14	NC	No connected

4.3 Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

Timing Table (DE only Mode)

ITEM		Symbol	Min	Typ	Max	Unit	notes
Horizontal	Display Period	tHV	960	960	960	tCLK	1920 / 2
	Blank	tHB	100	140	240	tCLK	1
	Total	tHP	1060	1100	1200	tCLK	
Vertical	Display Period	tVV	1080	1080	1080	Lines	
	Blank	tVB	20	45	300	Lines	1
	Total	tVP	1100	1125	1380	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	notes
Frequency	DCLK	fCLK	60.00	74.25	78.00	MHz	
	Horizontal	fH	57.3	67.5	70	KHz	2
	Vertical	fV	47	60	63	Hz	2

Note:

1. The input of HSYNC & VSYNC signal does not have an effect on normal operation (DE Only Mode). If you use spread spectrum of EMI, add some additional clock to minimum value for clock margin.

2. The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rate and the horizontal frequency

3. Spread Spectrum Rate (SSR) for 50KHz ~ 100kHz Modulation Frequency (FMOD) is calculated by (7 – 0.06*Fmod), where Modulation Frequency (FMOD) unit is KHz. LVDS Receiver Spread spectrum Clock is defined as below figure

※ Timing should be set based on clock frequency.

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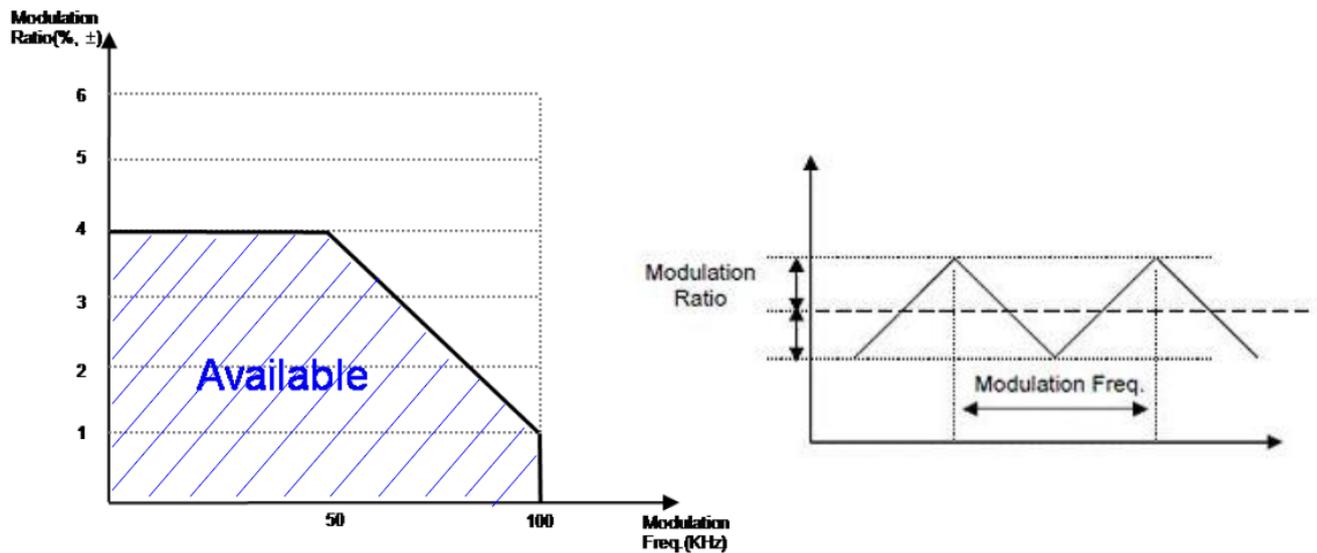
※ Please pay attention to the followings when you set Spread Spectrum Rate(SSR) and Modulation Frequency(FMOD)

1. Please set proper Spread Spectrum Rate(SSR) and Modulation Frequency (FMOD) of TV system LVDS output.

2. Please check FOS after you set Spread Spectrum Rate(SSR) and Modulation Frequency(FMOD) to avoid abnormal display. Especially, harmonic noise can appear when you use Spread Spectrum under FMOD 30 KHz.

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4.4 LVDS Signal Specification

4.4.1 LVDS Input Signal Timing Diagram
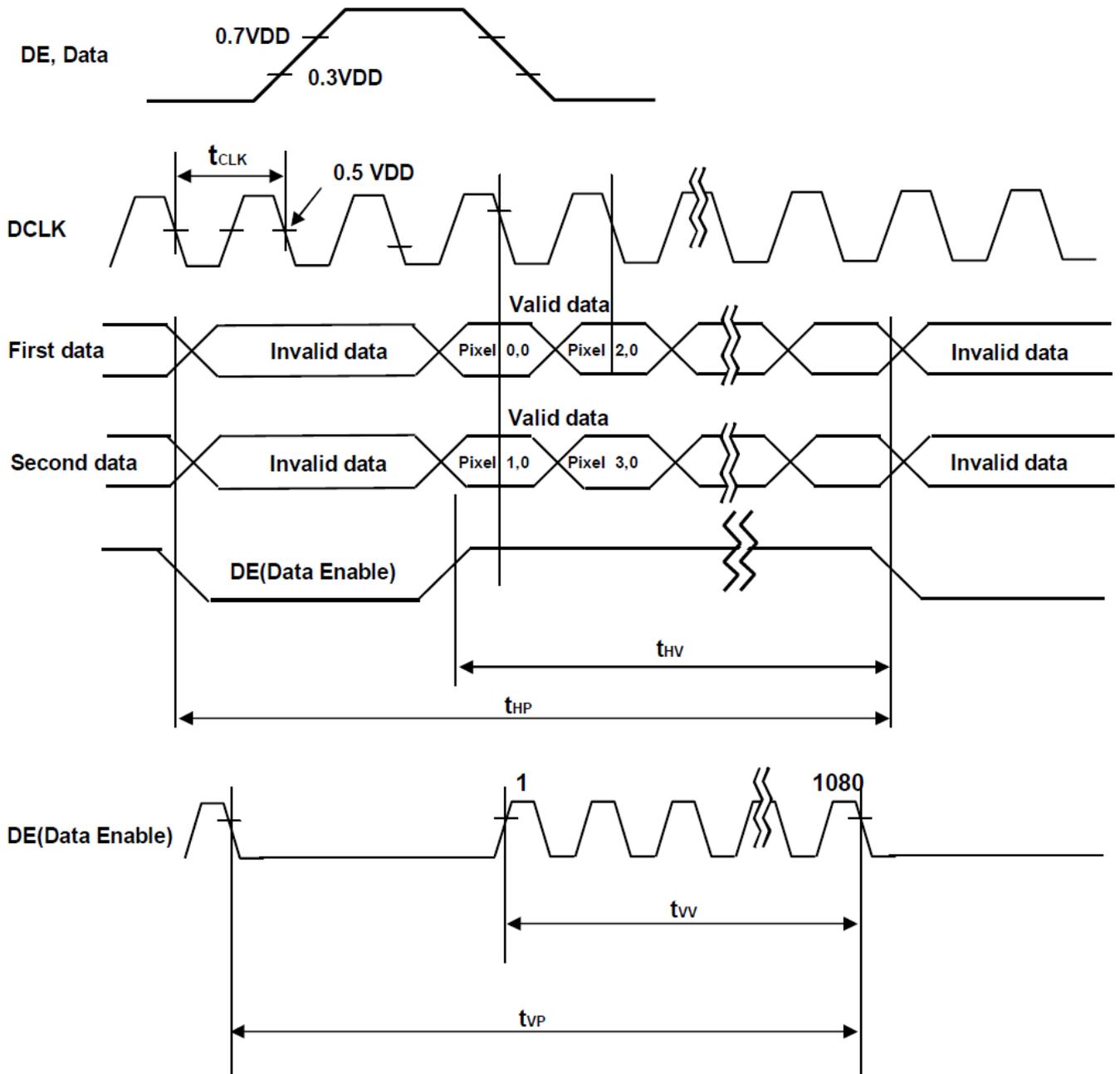
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4.4.2 LVDS Input Signal Characteristics

1) DC Specification

$V_{CM} = \{(LVDS\ +) + (\ LVDS\ -)\}/2$
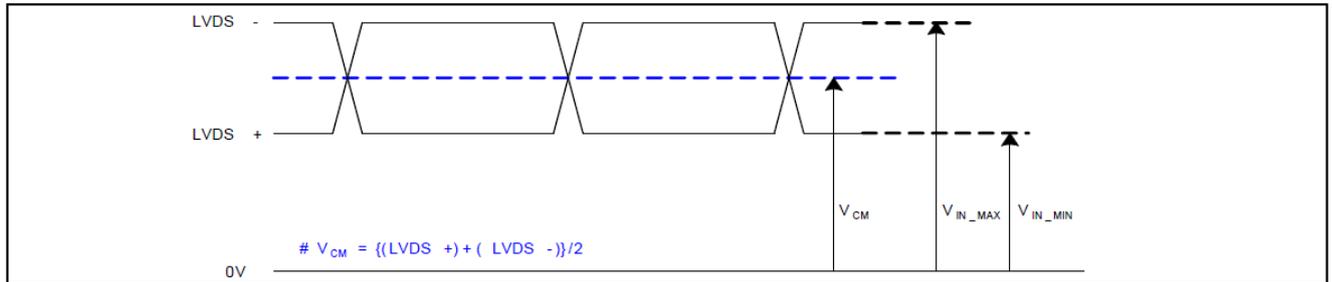
Description	Symbol	Min	Max	Unit	notes
LVDS Common mode Voltage	V_{CM}	1.0	1.5	V	-
LVDS Input Voltage Range	V_{IN}	0.7	1.8	V	-
Change in common mode Voltage	ΔVCM	-	250	mV	-

2) AC Specification
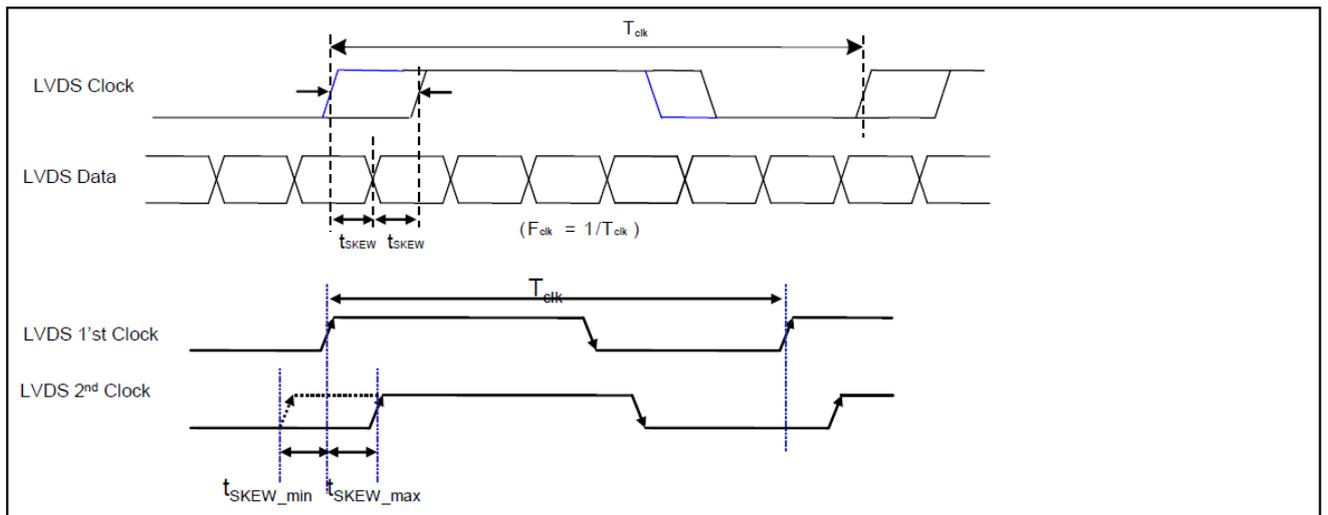
Description	Symbol	Min	Max	Unit	notes
LVDS Differential Voltage	V_{TH}	100	600	mV	Tested with Differential Probe
	V_{TL}	-600	-100	mV	2
LVDS Clock to Data Skew	t_{SKEW}	-	$|(0.2*T_{clk})/7|$	ps	-
Effective time of LVDS	t_{eff}	$|\pm 360|$	-	ps	-
LVDS Clock to Clock Skew (Even to Odd)	t_{SKEW_EO}	-	$|1/7*\ T_{clk}|$	ps	-

Note:

1. All Input levels of LVDS signals are based on the EIA 644 Standard.

2. LVDS Differential Voltage is defined within t_{eff}

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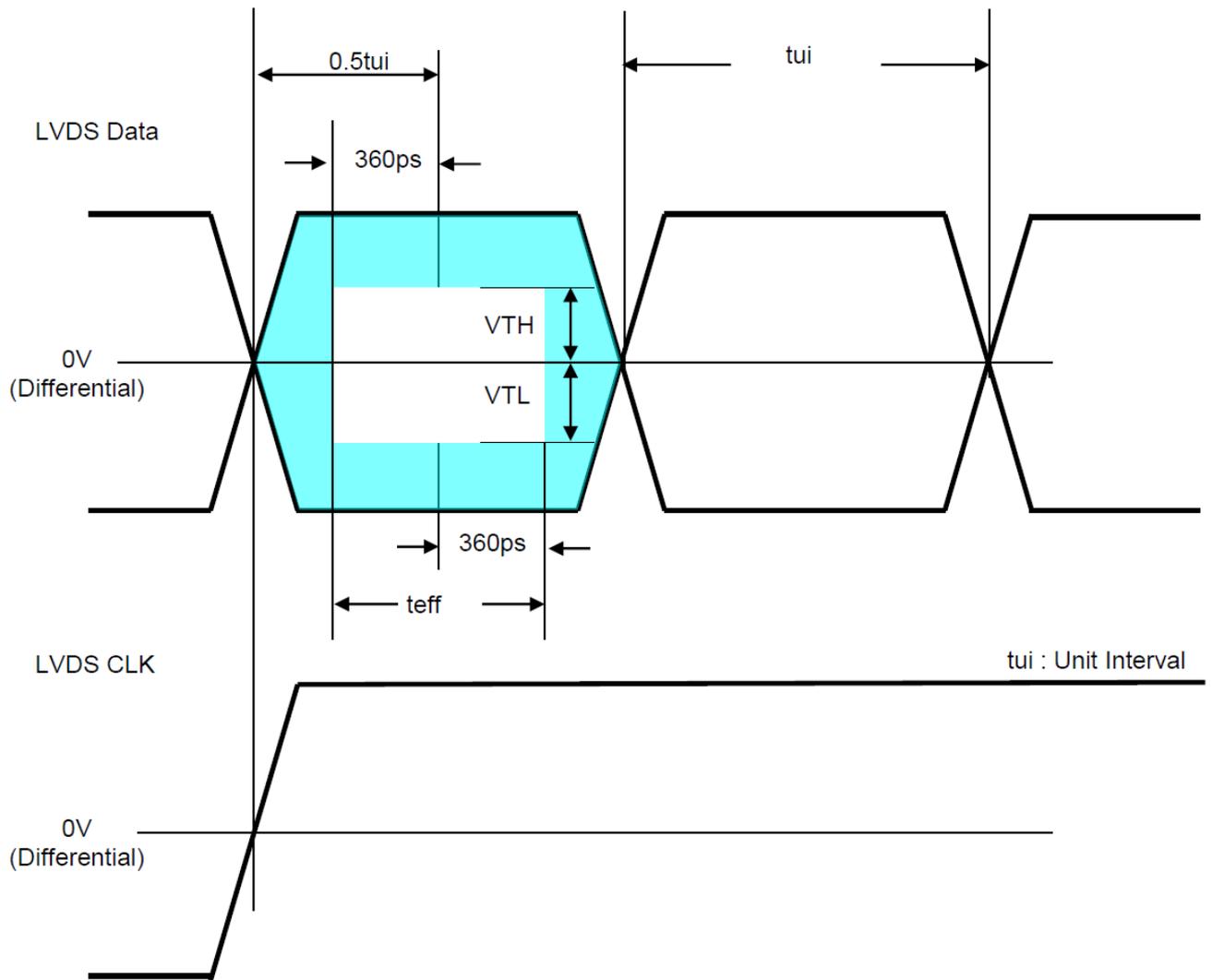
* This accumulated waveform is tested with differential probe

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4.5 Color Data Reference

The brightness of each primary color (red, green, blue) is based on the 8 bit gray scale data input for the color. The higher binary input, the brighter the color. Table below provides a reference for color versus data input.

COLOR DATA REFERENCE

| Color		Input Color Data																							
		RED MSB							LSB	GREEN MSB							LSB	BLUE MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
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	RED (000)	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 (001)	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 (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	GREEN (000)	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 (001)	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 (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	BLUE (000)	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 (001)	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 (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

4.6 Power Sequence for LCD

Power Supply For LCD V_{LCD}

Interface Signal (Tx_clock)

Vcm : LVDS Common mode Voltage

Valid Data

User Control Signal (LVDS_select)

Power for LED

LED ON
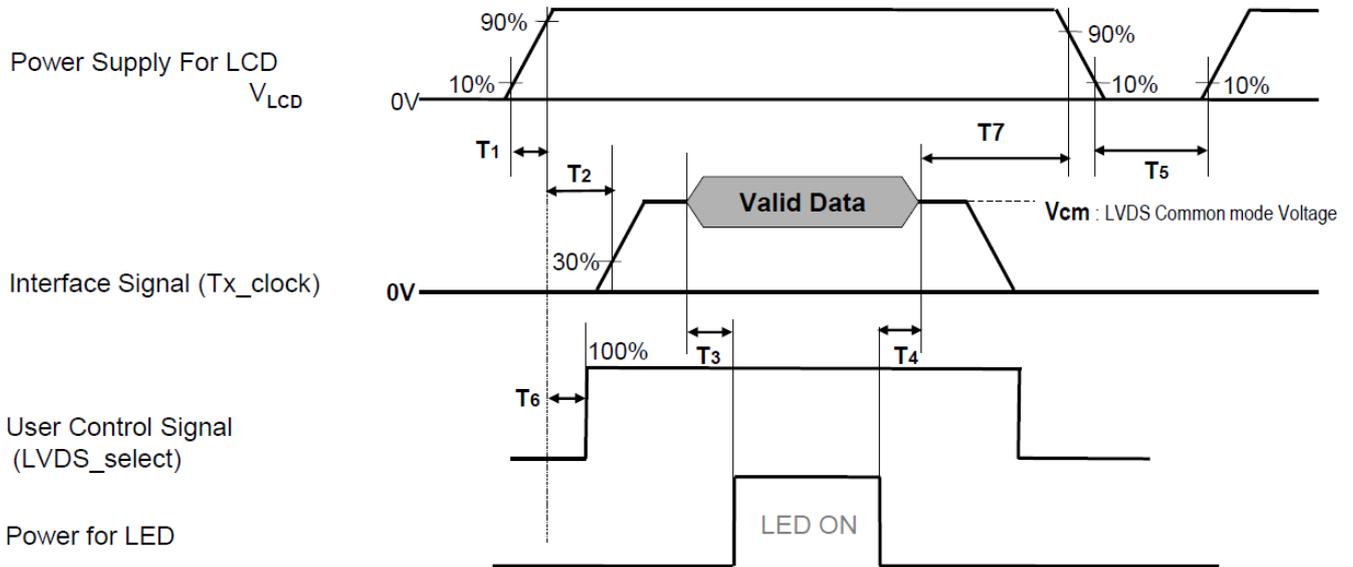
Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	0.5	-	20	ms	1
T2	0	-	-	ms	2
T3	400	-	-	ms	3
T4	100	-	-	ms	3
T5	1.0	-	-	s	4
T6	0	-	T2	ms	5
T7	0	-	-	ms	6

1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.

2. If T2 is satisfied with specification after removing LVDS Cable, there is no problem.

3. The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.

4. T5 should be measured after the Module has been fully discharged between power off and on period.

5. If the on time of signals (Interface signal and user control signals) precedes the on time of Power (VLCD), it will be happened abnormal display. When T6 is NC status, T6 doesn't need to be measured.

6. It is recommendation specification that T7 has to be 0ms as a minimum value.

※ Please avoid floating state of interface signal at invalid period.

※ When the power supply for LCD（VLCD）is off, be sure to pull down the valid and invalid data to 0V.

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5.0 Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 50℃, 50%RH, 300hours	3
Low Temperature Operation (LTO)	Ta= -10℃, 300hours	
High Temperature Storage (HTS)	Ta= 60℃, 300hours	
Low Temperature Storage (LTS)	Ta= -20℃, 300hours	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	1
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (Electrostatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point.	2
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point.	2

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: The test items are tested by open frame type chassis.

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6. Mechanical Characteristic

Item		Dimension	Unit	Note
Outline dimension	Horizontal	963.6mm	mm	
	Vertical	567.9mm	mm	
	Depth	37.5 mm	mm	Reference to Drawing (62.5 max at VESA)
Bezel opening	Horizontal	945.8	mm	
	Vertical	534.02	mm	
Active area	Horizontal	941.184mm	mm	
	Vertical	529.416mm	mm	
Weight	TBD		Kg	

Note:

1. The extra thermal management parts are NOT shown.
2. 400 x 400 mm VESA user holes centre outline.

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