Product Specifications

15.0” XGA Color TFT-LCD Module
Model Name: L150X1M-HB

Preliminary Specifications

1.0 General Description

This specification applies to the 15.0 inch Color TFT-LCD Module L150X1M-HB.

The display supports the XGA (1024(H) x 768(V)) screen format and 16.7M colors (RGB 8-bits data).

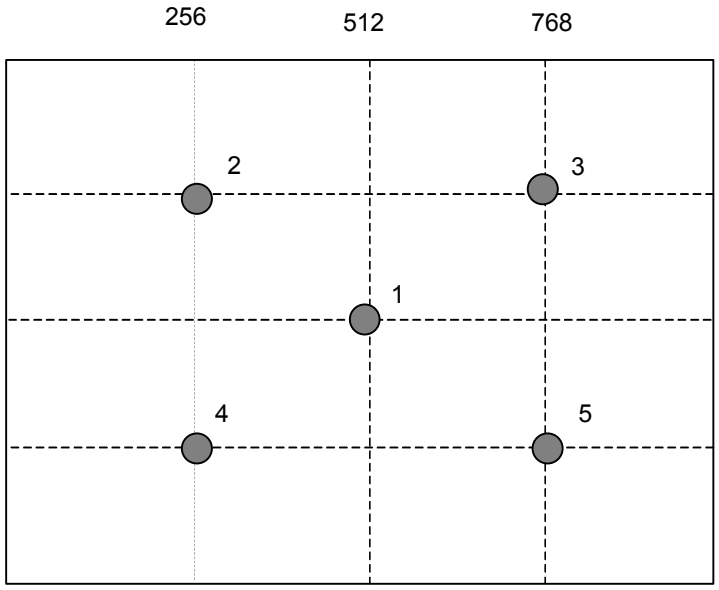
All input signals are 2 Channel TTL interface compatible.

This module does not contain an inverter card for backlight.

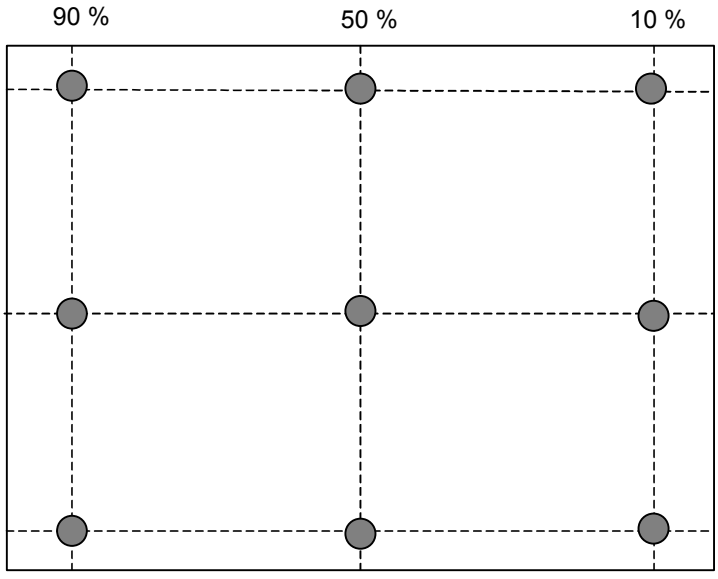
2.1 Display Characteristics

The following items are characteristics summary on the table under 25 ℃ condition:

ITEMS	Unit	SPECIFICATIONS
Screen diagonal	[mm]	381 (15")
Outline dimension	[mm]	352.5 x 263.5 x 16.5 (typ.)
Display Area	[mm]	304.128 (H) x 228.096(V)
Resolution		1024(R,G,B x 3) x 768
Pixel Pitch	[mm]	0.297 x 0.297
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN mode, Normally White
Average brightness	[cd/m^2]	450 (typ.) (note 1)
Brightness uniformity		80% (typ.) (note 2)
Luminance uniformity (TCO99)		1.7 (max.) (note 3)
Crosstalk		1.2% (max.) (note 4)
Contrast Ratio		400 : 1 (typ.)
Support color		Native 16.7 million(8-bit for R,G,B)
Color Gamut		62% (typ.)
Viewing angle CR=10		60(left),60(right),40(up),60(down)
Viewing angle CR=5		80(left),80(right),50(up),70(down)
Response Time	[msec]	35 (typ.)(Tr +Tf)
Nominal Input Voltage VDD	[Volt]	+3.3 V
Power Consumption (VDD line + CCFL line)	[Watt]	16 (typ.)
Electrical Interface		TTL 2 port (HSYNC,VSYNC,DCLK,DE,DATA)
Frame rate	[Hz]	60 (typ), 75 (max.)
Weight	[Grams]	1400 (typ.)
Temperature Range Operating Storage (Shipping)	 [^{o}C] [^{o}C]	 0 to +50 -20 to +60



Note 1: Average brightness is the average of brightness value at location 1 to 5 with all pixels displaying white.



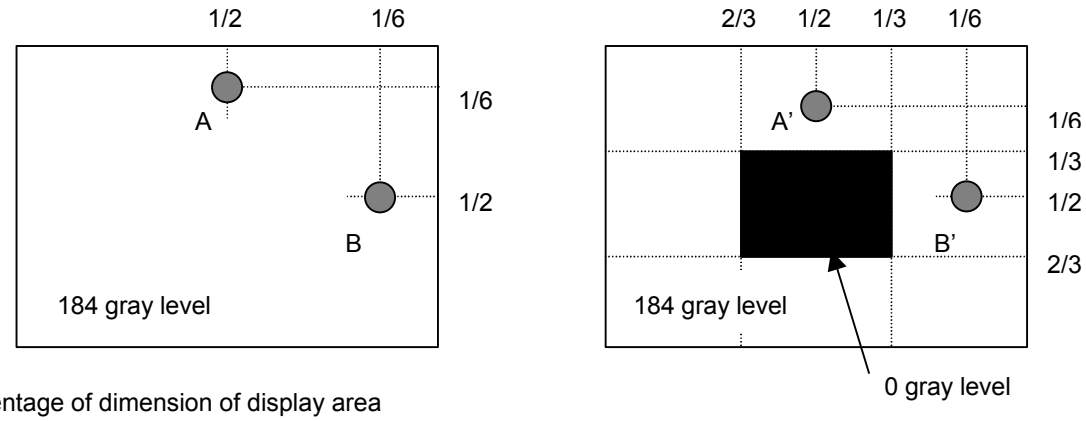
Note 2: Brightness uniformity of these 9 points is defined as below:

(Min. brightness / Max. brightness) x 100%

Note 3: TCO '99 Certification Requirements and test methods for environmental labeling of Display Report No. 2 defines Luminance uniformity as below:

((Lmax,+30deg. / Lmin,+30deg.) + (Lmax,-30deg. / Lmin,-30deg.)) / 2

Note 4:



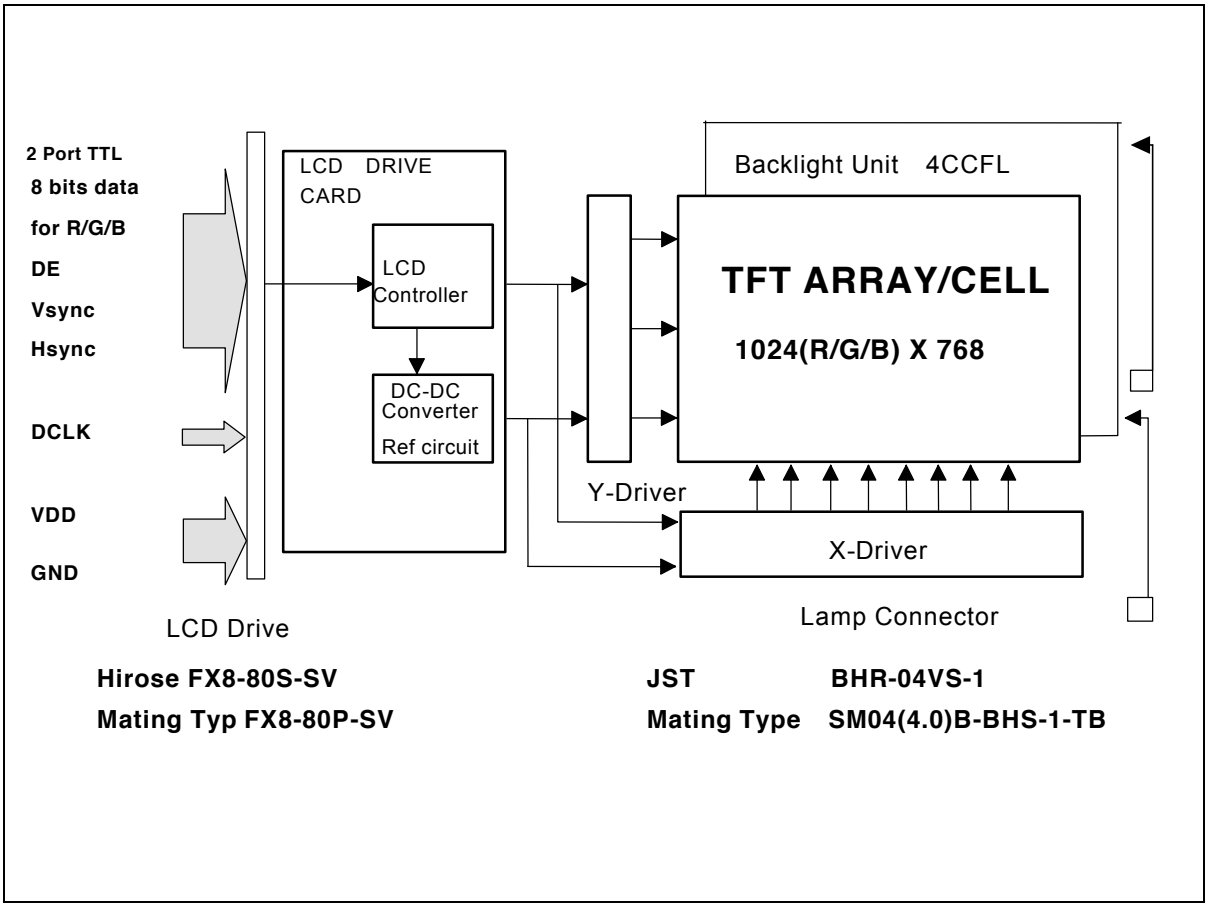
Unit: percentage of dimension of display area

$| L_A - L_{A'} | / L_A \times 100\% = 1.2\%$ max., L_A and L_B are brightness at location A and B

$| L_B - L_{B'} | / L_B \times 100\% = 1.2\%$ max., $L_{A'}$ and $L_{B'}$ are brightness at location A' and B'

2.2 Functional Block Diagram

The following diagram shows the functional block of 15.0 inches Color TFT-LCD Module:



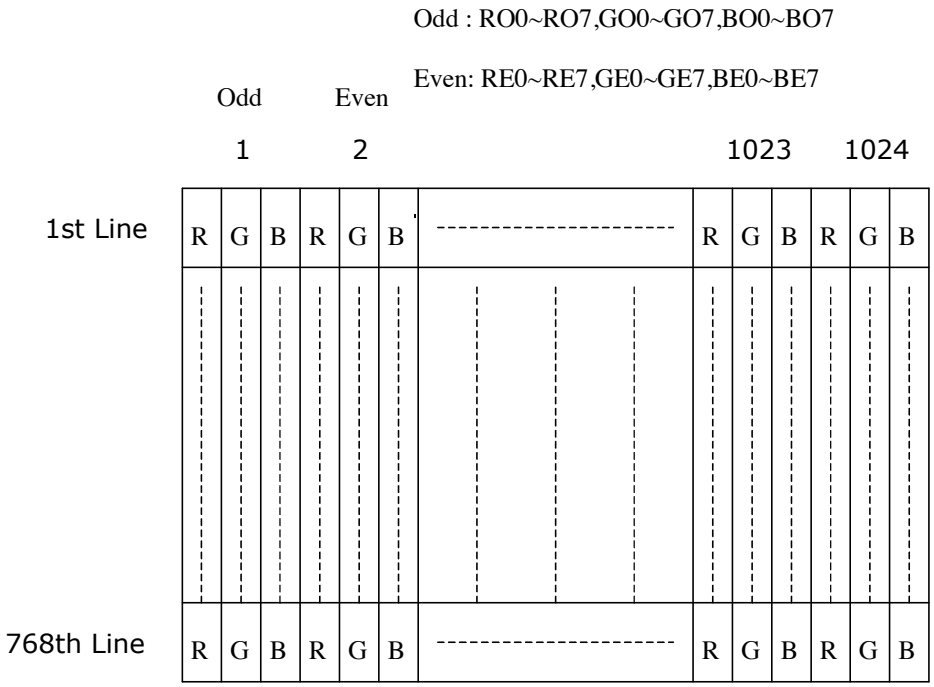
2.3 Optical Characteristics

The optical characteristics are measured under stable conditions at 25℃ (Room Temperature):

Item	Unit	Conditions	Min.	Typ.	Max.
Viewing Angle	[degree]	Horizontal (Right)	50	60(80)	
	[degree]	CR = 10(5) (Left)	50	60(80)	
CR: Contrast Ratio	[degree]	Vertical (Up)	30	40(50)	
	[degree]	CR = 10(5) (Down)	50	60(70)	
Contrast ratio		Normal Direction	300	400	-
Response Time	[msec]	Raising Time Ton (10%-90%)	-	11	22
	[msec]	Falling Time Toff (90%-10%)	-	24	48
	[msec]	Raising + Falling	-	35	70
Color / Chromaticity Coordinates (CIE)		Red x	0.603	0.633	0.663
		Red y	0.306	0.336	0.366
		Green x	0.264	0.294	0.324
		Green y	0.574	0.604	0.634
		Blue x	0.115	0.145	0.175
		Blue y	0.067	0.097	0.127
Color Coordinates (CIE) White		White x	0.283	0.313	0.343
		White y	0.299	0.329	0.359
Brightness Uniformity	[%]		75	80	-
White Luminance at CCFL 6.0 mA (center point)	[cd/m^2]		400	450	-

2.4 Pixel format image

Following figure shows the relationship of the input signals and LCD pixel format.



3.0 Electrical characteristics

3.1 Absolute Maximum Ratings

Absolute maximum ratings of the module is as following:

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+4.0	[Volt]	
CCFL Inrush current	ICFLL	6	7	[mA]	Note 1
CCFL Current	ICFL	6	7.5	[mA] rms	
Operating Temperature	TOP	0	+50	[°C]	Note 2
Operating Humidity	HOP	20	85	[%RH]	Note 2
Storage Temperature	TST	-20	+60	[°C]	Note 2
Storage Humidity	HST	5	95	[%RH]	Note 2

Note 1 : Duration=50 msec

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.

3.2 Module Interface Connectors

3.2.1 Connector type

Connector Name	Interface Connector
Manufacturer	Hirose or compatible
Type / Part Number	FX8-80S-SV
Mating Housing/Part Number	FX8-80P-SV

3.2.2 Pin Configuration

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	ground	41	GND	Ground
2	RO0	Red data 0(odd),LSB	42	GE0	Green data 0(even),LSB
3	RO1	Red data 1(odd)	43	GE1	Green data 1(even)
4	RO2	Red data 2(odd)	44	GE2	Green data 2(even)
5	RO3	Red data 3(odd)	45	GE3	Green data 3(even)
6	GND	Ground	46	GND	Ground
7	RO4	Red data 4(odd)	47	GE4	Green data 4(even)
8	RO5	Red data 5(odd)	48	GE5	Green data 5(even)
9	RO6	Red data 6(odd)	49	GE6	Green data 6(even)
10	RO7	Red data 7(odd),MSB	50	GE7	Green data 7(even),MSB

11	GND	Ground	51	GND	Ground
12	GO0	Green data 0(odd),LSB	52	BE0	Blue data 0(even),LSB
13	GO1	Green data 1(odd)	53	BE1	Blue data 1(even)
14	GO2	Green data 2(odd)	54	BE2	Blue data 2(even)
15	GO3	Green data 3(odd)	55	BE3	Blue data 3(even)
16	GND	Ground	56	GND	Ground
17	GO4	Green data 4(odd)	57	BE4	Blue data 4(even)
18	GO5	Green data 5(odd)	58	BE5	Blue data 5(even)
19	GO6	Green data 6(odd)	59	BE6	Blue data 6(even)
20	GO7	Green data 7(odd),MSB	60	BE7	Blue data 7(even),MSB
21	GND	Ground	61	GND	Ground
22	BO0	Blue data 0(odd),LSB	62	GND	Ground
23	BO1	Blue data 1(odd)	63	DCLK	Data input clock
24	BO2	Blue data 2(odd)	64	GND	Ground
25	BO3	Blue data 3(odd)	65	GND	Ground
26	GND	Ground	66	HSYNC	Horizontal sync signal
27	BO4	Blue data 4(odd)	67	GND	Ground
28	BO5	Blue data 5(odd)	68	GND	Ground
29	BO6	Blue data 6(odd)	69	DE	Data enable signal
30	BO7	Blue data 7(odd),MSB	70	VSYNC	Vertical sync signal
31	GND	Ground	71	VDD	Power supply +3.3V
32	RE0	Red data 0(even),LSB	72	VDD	Power supply +3.3V
33	RE1	Red data 1(even)	73	VDD	Power supply +3.3V
34	RE2	Red data 2(even)	74	VDD	Power supply +3.3V
35	RE3	Red data 3(even)	75	VDD	Power supply +3.3V
36	GND	Ground	76	NC	No connection
37	RE4	Red data 4(even)	77	NC	No connection
38	RE5	Red data 5(even)	78	Reserved	Reserved for MFG test
39	RE6	Red data 6(even)	79	NC	No connection
40	RE7	Red data 7(even),MSB	80	GND	Ground

3.3 Backlight Connectors

3.3.1 Connector type

Connector Name / Designation	For Lamp Connector
Manufacturer	JST or compatible
Type / Part Number	BHR-04VS-1
Mating Type / Part Number	SM04(4.0)B-BHS-1-TB

3.3.2 Pin Configuration

Pin	Symbol	Description
1	HV	Lamp High Voltage
2	LV	Lamp Low Voltage
3	NC	No connection
4	GND	Ground

3.4 Signal Electrical Characteristics

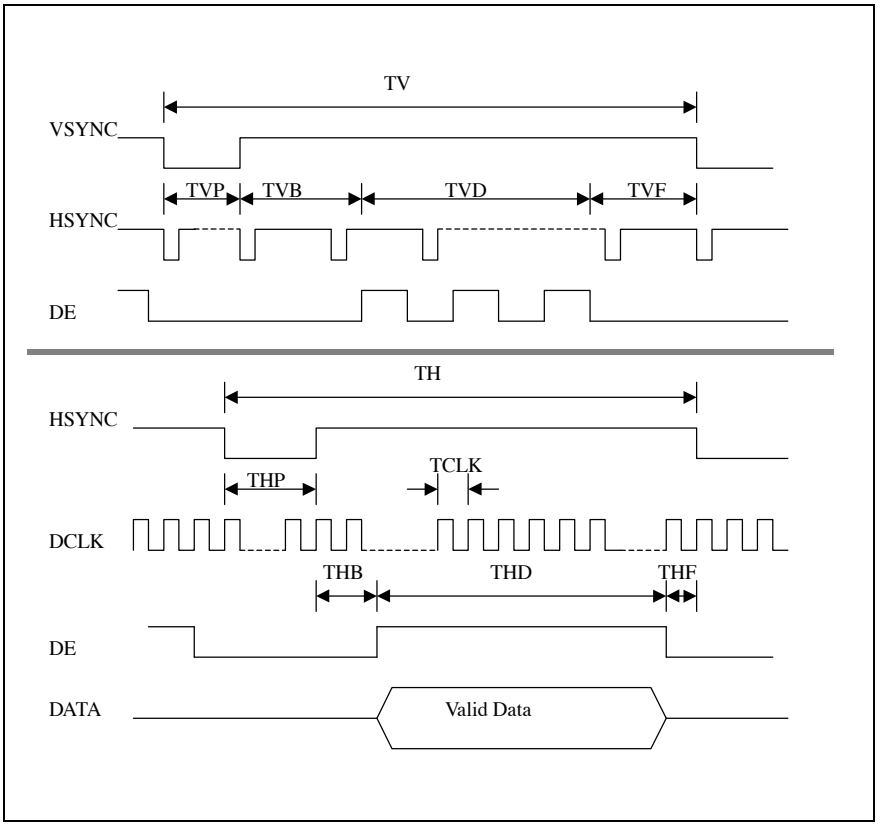
Each signal characteristics are as follows;

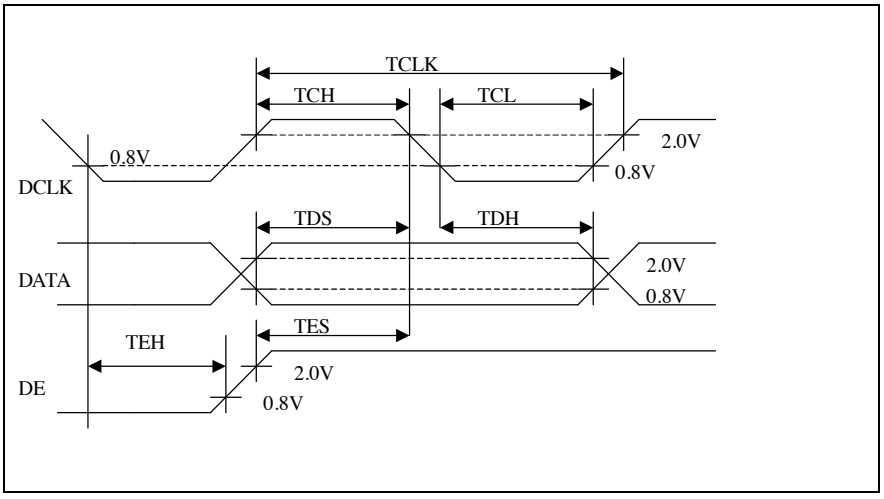
Item	Symbol	Min	Typ	Max	Unit
LCD Drive voltage	VDD	+3.0	+3.3	+3.6	[V]
“High” input signal voltage	Vih	2.0	-	-	[V]
“Low” input signal voltage	Vil	-	-	0.8	[V]

3.5 Interface Timings
3.5.1 Timing Characteristics

Signal	Item	Symbol	MIN	TYP	MAX	Unit
DCLK	Frequency	1/TDCLK	-	32.5	40.0	MHz
	Period	TDCLK	25	30.8	-	ns
	High time	TCH	0.4	0.5	0.6	TDCLK
	Low time	TCL	0.4	0.5	0.6	TDCLK
DATA	Setup time	TDS	5	-	-	ns
	Hold time	TDH	5	-	-	ns
Data Enable	Setup time	TES	5	-	-	ns
	Hold time	TEH	5			ns
Horizontal sync	Frequency	1/TH	-	48	60	KHz
	Pulse width	THP	2	68	-	TDCLK
Horizontal Signal	Back –porch	THB	1	80	-	TDCLK
	Display period	THD	512	512	512	TDCLK
	Front-porch	THF	0	12	-	TDCLK
Vertical sync	Frequency	1/TV	-	60	75	Hz
	Pulse width	TVP	1	6	-	TH
Vertical Signal	Back –porch	TVB	7	29	64	TH
	Display period	TVD	768	768	768	TH
	Front-porch	TVF	1	3	-	TH

3.5.2 Timing Definition





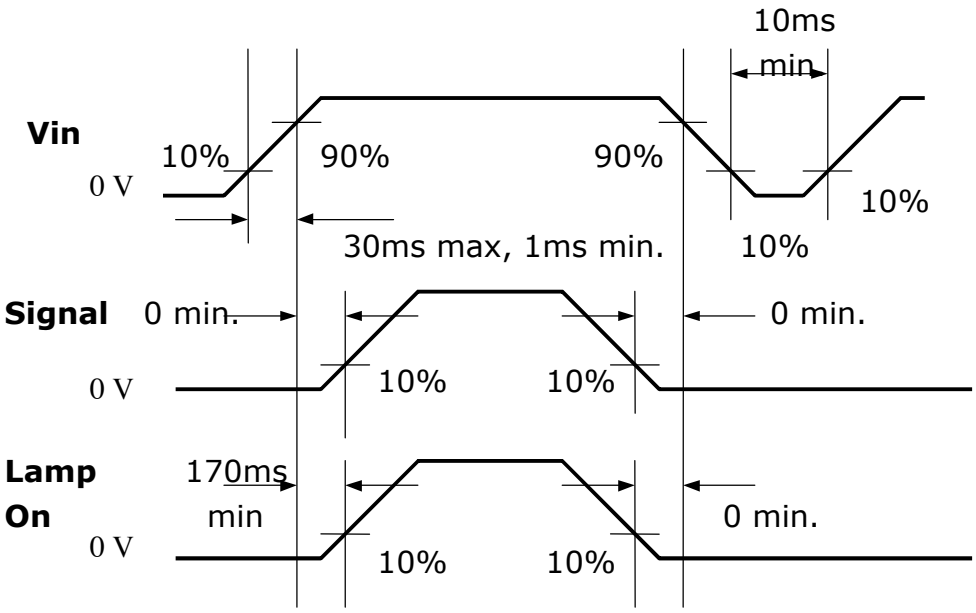
3.6 Power Consumption

Input power specifications are as follows;

Symbol	Parameter	Min	Typ	Max	Units	Condition
VDD	LCD Drive Voltage	3.0	3.3	3.6	[V]	
IDD	LCD Drive Current	-	600	700	[mA]	VDD=3.3v, All Black Pattern
PDD	LCD Drive power consumption	-	2.0	2.3	[Watt]	VDD=3.3v, All Black Pattern
VDDrp	Allowable LCD Drive Ripple Voltage			100	[mV] p-p	
VDDns	Allowable LCD Drive Ripple Noise			100	[mV] p-p	

3.7 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as follows. Interface signals are also shown in the chart.



4.0 Backlight Characteristics

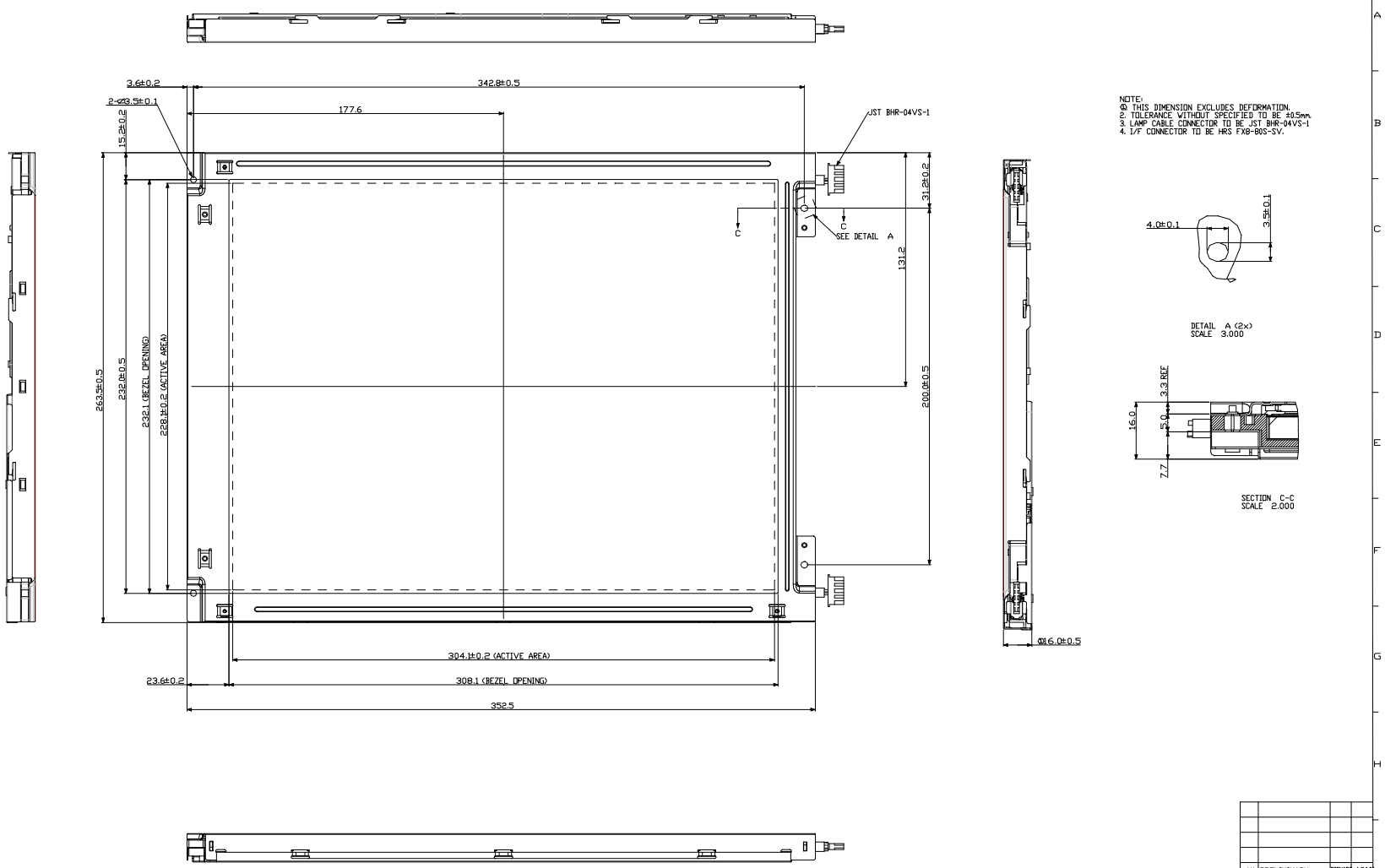
4.1 Signal for Lamp connector

Pin #	signal Name
1	Lamp High Voltage
2	Lamp High Voltage
3	No Connection
4	Ground

4.2 Parameter guide line for CCFL Inverter

Symble	Parameter	Min	Typ	Max	Units	Condition
(L255)	White Luminance	400	450	-	[cd/m^2]	(Ta=25℃)
ISCFL	CCFL standard current	5.5	6.0		[mA] rms	(Ta=25℃)
IRCFL	CCFL operation range	-	6.0	6.5	[mA] rms	(Ta=25℃)
ICFL	CCFL Inrush current	-	6.0	7	[mA]	**Note 1**
fCFL	CCFL Frequency	40	50	60	[KHz]	(Ta=25℃) **Note 2**
ViCFL (0℃)	CCFL Ignition Voltage			1250	[Volt] rms	(Ta= 0℃) **Note 4**
ViCFL (25℃) (reference)	CCFL Ignition Voltage			950	[Volt] rms	(Ta= 25℃) **Note 4**
VCFL	CCFL Discharge Voltage (Reference)	585	650	715	[Volt] rms	(Ta=25℃) **Note 3**
PCFL	CCFL Power consumption	12	14.3	17.2	[Watt]	(Ta=25℃) **Note 3**

Note 1: Duration=50 [msec]
Note 2: CCFL Frequency should be carefully determined to avoid interference between inverter and TFT LCD
Note 3: Calculator value for reference (ICFL×VCFL=PCFL)
Note 4: CCFL inverter should be able to give out a power that has a generating capacity of over 1350 voltage. Lamp units need 1350 voltage minimum for ignition

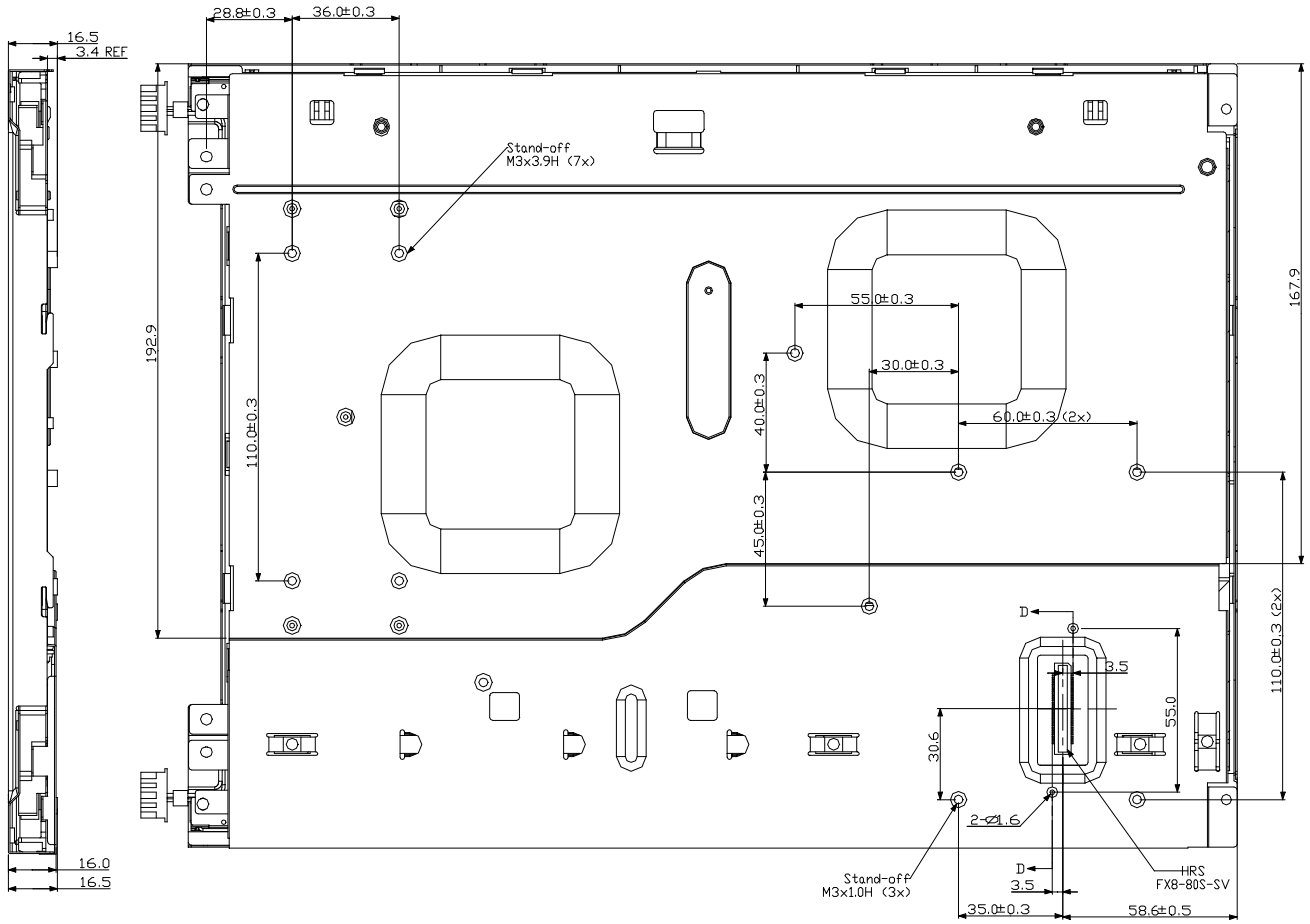


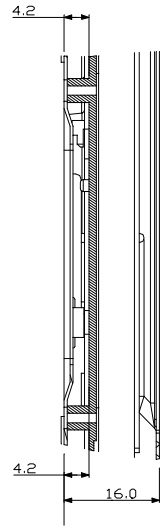
REV	DESCRIPTION	SIGN	DATE
X1	PRELIMINARY	RICHARD	4/14,20

UNITS OR ASSEMBLY	L150X1M	NAME	REFERENCE DRAWING
DRN	RICHARD LIN	4/14,20	MATERIAL
DSN	RICHARD LIN	4/14,20	FINISH / QTY
CKD	H K	4/14,20	
APPD	TONY	4/17,20	Acer Display Technology,Inc.

LIMITS UNLESS OTHERWISE NOTED				
1~6	±0.1	250~1000	±0.8	
6~30	±0.2	1000~2000	±1.2	
30~100	±0.3	2000~	±2.0	
100~300	±0.5	ANG	±1/2°	

SCALE 1/1 DIM IN M.M
MOLD NO.
SHEET 1 OF 2
DOCUMENT NO.
DRAWING NO.





SECTION D-D
SCALE 2.000

REV	DESCRIPTION	SIGN	DATE
0	FIRST RELEASE	RICHARD	11/09,00

UNITS OR ASSEMBLY	L150X1M	NAME	REFENERCE DRAWING
DRN	RICHARD LIN 4/14,00	MATERIAL	
DSN	RICHARD LIN 4/14,00	FINISH	QTY
CKD	H K 4/14,00	Acer Display Technology,Inc.	
APPD	TONY 4/17,00		

SCALE	DIM IN	M.M
LIMITS UNLESS OTHERWISE NOTED		
1–6	±0.1	300–1000 ±0.8
6–30	±0.2	1000–2000 ±1.2
30–100	±0.3	2000– ±2.0
100–300	±0.5	ANG ±1/2°

STOCK NO.

SHEET 2OF2

DOCUMENT NO.

DRAWING NO. 57.V0591.001