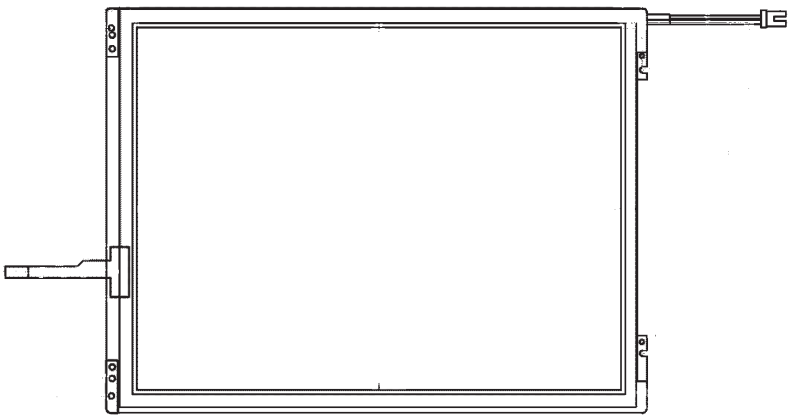
HANTRONIX

PRODUCT SPECIFICATION

HDA1040ST-AH

10.4”, TFT SVGA (800 X 600) COLOR LCD DISPLAY MODULE



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1. Overview

HDA1040ST-AH Display Module is a color active matrix a-Si TFT-LCM that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD panel , a driving circuit and 4-wire resistance touch Panel. This touch TFT LCD module has a high resolution (800 x (R.G.B) X 600) and can display up to 262,144 colors. Because it has built-in power supply circuit, the LCD power supply voltage is only 3.3V. The most important thing is that this touch module with high brightness LED backlight. The brightness is reach 800 cd/m^2 with the touch panel.

General specifications are summarized in the following table:

Item	Specifications	unit
Panel Size	10.4 (panel Diagonal)	inch
Display Area	211.2 (W) x 158.4(H)	mm
Number of Pixels	800(H) x 3(RGB) x 600(V)	-
Pixel pitch	88 (W) x 264 (H)	um
Overall dimension	236.0(W)x176.9(H)x7(D)	mm
Color configuration	R.GB -stripe	-
Display Mode	Normally white	mm
Number of colors	262,144	colors
Brightness	**800**	cd/m^2
Backlight Unit	LED	
Electrical Interface	LVDS 6 bits (data)	
Weight	300	g
Touch Panel	With 4-wire Resistance Touch Panel	
Surface Treatment	Anti-Glare 3H	

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Supply voltage range	VDD	-0.5	5	V	
Voltage range at any terminal	V_{IN}	-0.5	5	V	(1)
Operating Temperature	Top	-20	70	℃	
Storage Temperature	Tstg	-30	80	℃	

Note

(1): V_{IN} represents IN0±, IN1±, IN2±, CLK±

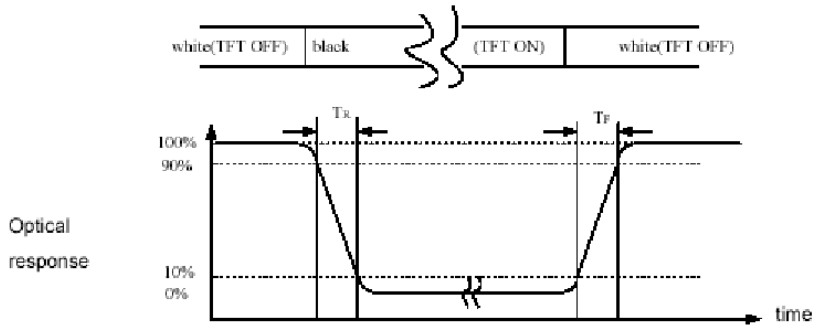
3. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response Time		$T_r + T_f$	Θ=Φ =0°	-	25	40	ms	(1)
Contrast ratio		CR		--	400	-	-	(2)(3)
Viewing Angle		ΘT	CR≧ 10	35	45	-	degree	(5)
		ΘB		55	65	-		
		ΘL		55	65	-		
		ΘR		55	65	-		
Luminance		L	Θ=Φ =0°	720	800	-	cd/m^2	(3)(4)
Luminance Uniformity		ΔL		70	80	-	%	(3)(4)
Color chromaticity	Red	Rx		0.550	0.600	0.650	-	
		Ry		0.296	0.346	0.396	-	
	Green	Gx		0.283	0.333	0.383	-	
		Gy		0.516	0.566	0.616	-	
	Blue	Bx		0.092	0.142	0.192	-	
		By		0.065	0.115	0.165	-	
	White	Wx		0.259	0.309	0.359	-	
		Wy		0.284	0.334	0.384	-	

NOTE :

- These items are measured by BM-5A(TOPCON) or CA-1000(MINOLTA) in the dark room (no ambient light)

(1) Definition of Response Time (White-Black)



(2) Definition of Contrast Ratio

Measure contrast ratio on the below 5 points(refer to figurel,#1~#5point) and take the average value

Contrast ratio is calculated with the following formula :

Contrast Ratio(CR)=(White)Luminance of ON ÷ (Black)Luminance of OFF

(3) Definition of Luminance :

Measure the luminance of white state at **center point**.

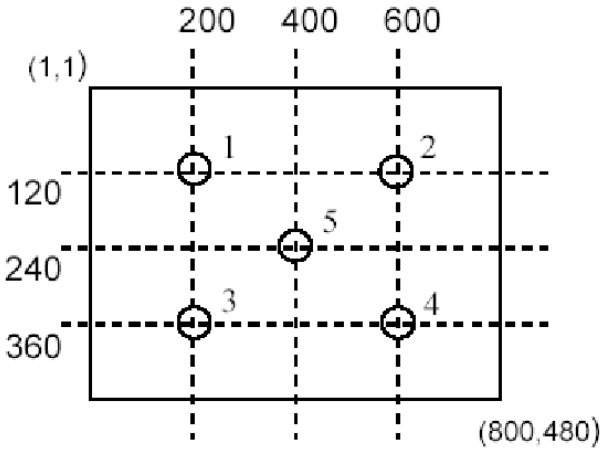


Fig.1 Measuring point

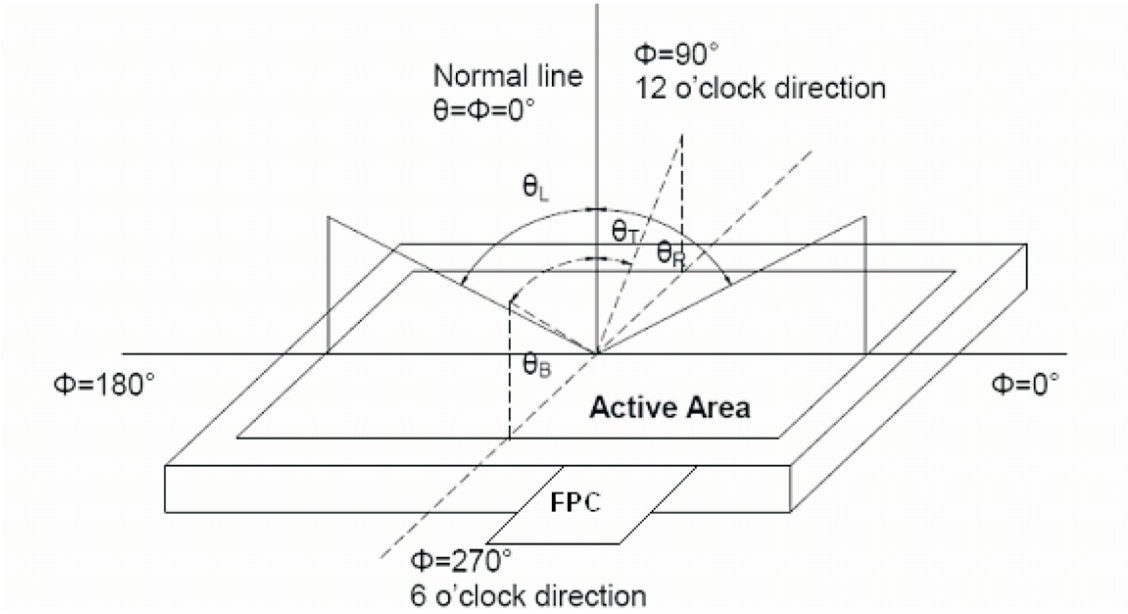
(4)Definition of Luminance Uniformity :

Measured Maximum luminance[L(MAX)] and Minimum luminance[L(MIN)] on the 5 points

Luminance Uniformity is calculated with the following formula :

? **L =[L(MIN) / L (MAX)] X 100%**

(5)Definition of Viewing Angle



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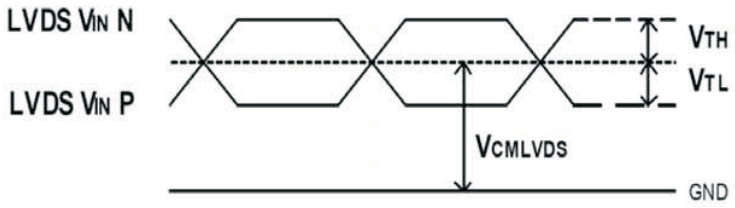
4. ELECTRICAL CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max	Unit	Remarks
LVDS Differential input high threshold	V_{TH}	-	-	100	mV	V_{CMLVDS}=1.2V
Threshold LVDS Differential input low	V_{TL}	-100	-	-	mV	
Differential input voltage `	V_{ID}	0.1	-	0.6	V	
LVDS input common mode Voltage	V_{CMLVDS}	VID /2	-	1.4-(V_{ID}/2)	V	
Input current	I_{IN}	-10	-	10	uA	
Supply Voltage	VDD	3.0	3.3	3.6	V	
Common Electrode Driving Signal	VCOM	-	4.36	-	V	Note (1)
Sync Frequency	FVD	-	60	70	H	
VDD Power Consumption	I_{DD}	-	260	380	mA	Note (2)



LVDS DC timing diagram

Note (1) : The value may be different for different LCM.

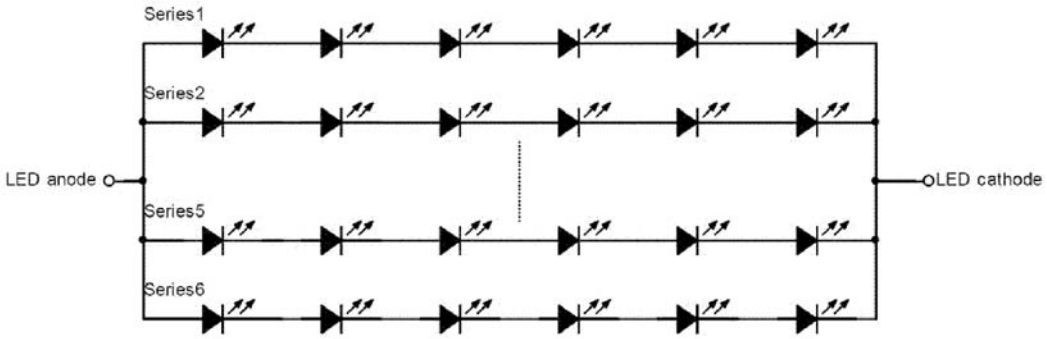
Note (2) : To test the current dissipation, using the “color bar” testing pattern shown as below:

Current dissipation testing pattern

5. Backlight Driving Circuit

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Forward Current	I_F	-	280	-	mA	Note 1
Forward Voltage	V_F	18.6	19.2	19.8	V	Note 1
Backlight Power Consumption	W_{BL}	-	5376	-	mW	Note 1
Operating Life Time	-	40000	45000	-	hr	Note 2

Note 1: LED connection of backlight shown as below:



Note2: Optical performance should be evaluated at Ta=25℃ only.

If LED is driven by high ambient temperature & humidity condition. The life time of LED will be reduced.

Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

6. Touch Panel Electrical Specification

Parameter	Condition	Standard Value
Terminal Resistance	X Axis	340 ~ 1090 Ω
	Y Axis	180 ~ 470 Ω
Insulating Resistance	DC 25 V	More than 20MΩ
Linearity	--	±1.5 %
Pen writing Durability	Note A	100,000 times(min)
Input life by finger	Note B	1,000,000 times (min)

Note A .

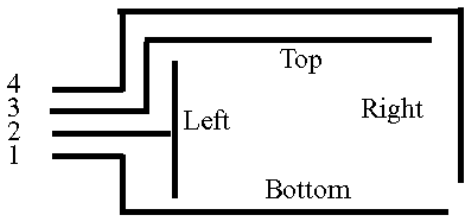
- Writing length 35 mm.
- Writing speed: 300mm/sec.
- Shape of pen end : R0.8
- Load : 250 g

Note B

- By Silicon rubber tapping at same point
- Shape of rubber end : R8
- Load : 200g
- Frequency : 5 Hz

Interface

No.	Symbol	Function
1	YB	Touch Panel Bottom Signal
2	XL	Touch Panel Left Signal
3	YT	Touch Panel Top Signal
4	XR	Touch Panel Right Signal



7. INTERFACE

LVDS CONNECTOR:

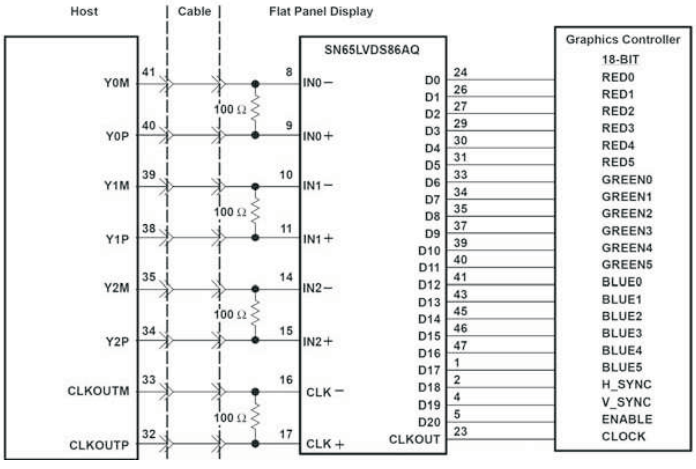
Connector : Starconn 107A20-0021RA-G3-R
Matching connector : Hirose DF19K-20P-1H (56)

Pin no	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	Gnd	Power Ground
4	Gnd	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	Gnd	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	Gnd	Power Ground
11	IN2-	Transmission Data of Pixels 2
12	IN2+	Transmission Data of Pixels 2
13	Gnd	Power Ground
14	CLK-	Sampling Clock
15	CLK+	Sampling Clock
16	Gnd	Power Ground
17	NC	No Connect
18	NC	No Connect
19	Gnd	Power Ground
20	Gnd	Power Ground

Back Light Connector:

Connector : JST BHSR-02VS-1

Pin No	Symbol	Function	Wire Color
1	LEDA	LED driving anode (high voltage)	Red
2	LEDK	LED driving cathode (low voltage)	White



8. AC Timing characteristic of the LVDS

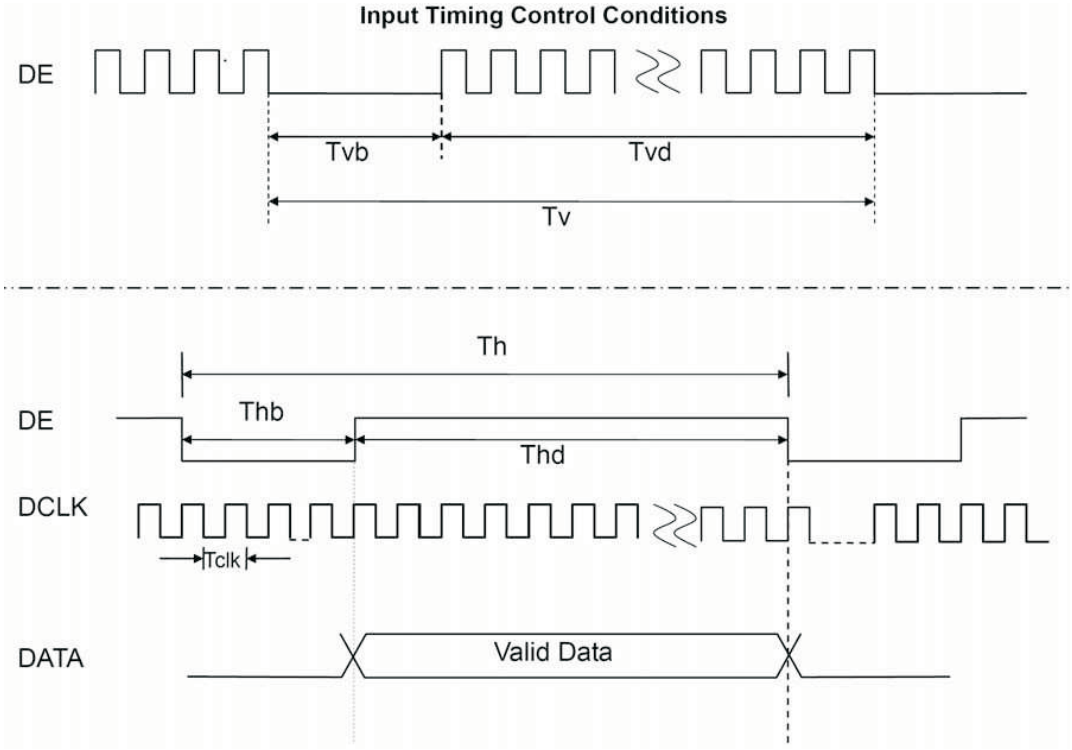
Timing Parameter:

Item	Symbol	Min	Typ	Max	Unit	Condition
Clock period	tLVCP	20.0	25	31.25	ns	
Clock high time	tLVCH		14.29		ns	
Clock low time	tLVCL	-	10.71	-	n5	
PLL wake-up time	tLVPLL				? '5	
Input skew marign	tLVSKM	400			ps	f=85MHz

Recommended Input Timing of LVDS transmitter

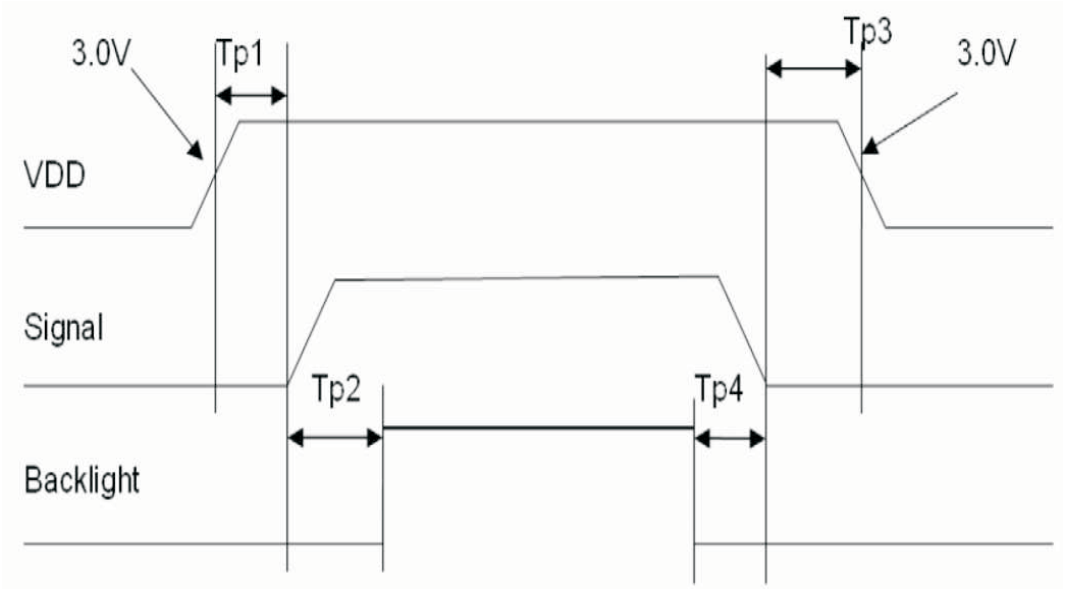
Parameter		Symbol	Min.	Typ.	Max.	Unit
Dclk frequency		1/Tclk	32	40	50	MHz
Horizontal Section	Horizontal total	Th	866	1056	1064	Tclk
	Horizontal blanking	Thb	66	256	264	Tclk
	Valid Data Width	Thd	800	800	800	Tclk
Vertical Section	Frame rate	-	-	60	70	Hz
	Vertical total	Tv	604	628	800	Th
	Vertical blanking	Tvb	4	28	200	Th
	Valid Data Width	Tvd	600	600	600	Th

Note : DE signal is necessary.



Power *On/* Off Sequence

Item	Symbol	Min.	Typ.	Max.	Unit
VDD 3.0V to signal starting	Tp1	0	-	50	ms
Signal starting to backlight on	Tp2	150	-	-	ms
Signal off to VDD 3.0V	Tp3	0	-	50	ms
Backlight off to signal off	Tp4	150	-	-	ms



9 . QUALITY AND RELIABILITY

9.1 TEST CONDITIONS

Tests should be conducted under the following conditions : Ambient temperature : 25 ± 5°C
Humidity : 60 ± 25% RH.

9.2 SAMPLING PLAN

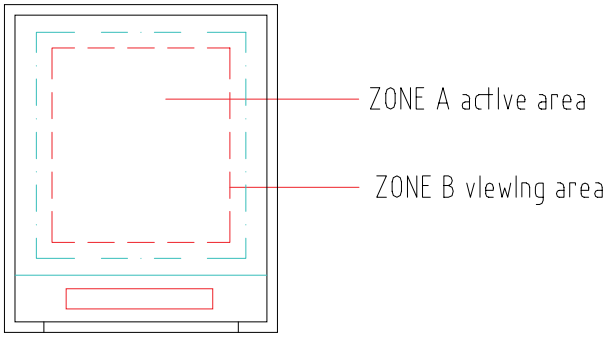
Sampling method shall be in accordance with MIL-STD-105E , level II, normal single sampling plan .

9.3 ACCEPTABLE QUALITY LEVEL

A major defect is defined as one that could cause failure to or materially reduce the usability of the unit for its intended purpose. A minor defect is one that does not materially reduce the usability of the unit for its intended purpose or is an infringement from established standards and has no significant bearing on its effective use or operation.

9.4 APPEARANCE

An appearance test should be conducted by human sight at approximately 30 cm distance from the LCD module under florescent light. The inspection area of LCD panel shall be within the range of following limits.



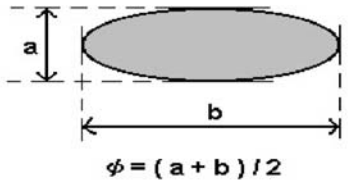
9.5 INCOMING INSPECTION STANDARD FOR TFT-LCD PANEL

DEFECT TYPE			LIMIT						Note
VISUAL DEFECT	INTERNAL	SPOT	φ <0.15mm		Ignore				Note1
			0.15mm≦ φ ≦ 0.5mm		N≦ 4				
			0.5mm <φ		N=0				
		FIBER	0.03mm<W≦ 0.1mm, L≦ 5mm		N≦ 3				Note1
			1.0mm <W, 1.5mm <L		N=0				
		POLARIZER BUBBLE	φ <0.15mm		Ignore				Note1
			0.15mm≦ φ ≦ 0.5mm		N≦ 2				
			0.5mm <φ		N=0				
		Mura	It' OK if mura is slight visible through 6%ND filter						
ELECTRICAL DEFECT	BRIGHT DOT		A Grade			B Grade			
			C Area	O Area	Total	C Area	O Area	Total	Note3
			N≦ 0	N≦ 2	N≦ 2	N≦ 2	N≦ 3	N≦ 5	Note2
	DARK DOT		N≦ 2	N≦ 3	N≦ 3	N≦ 3	N≦ 5	N≦ 8	
	TOTAL DOT		N≦ 4			N≦ 5	N≦ 6	N≦ 8	Note2
	TWO ADJACENT DOT		N≦ 0	N≦ 1 pair	N≦ 1 pair	N≦ 1 pair	N≦ 1 pair	N≦ 1 pair	Note4
	THREE OR MORE ADJACENT DOT		NOT ALLOWED						
	LINE DEFECT		NOT ALLOWED						

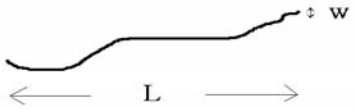
(1) One pixel consists of 3 sub-pixels, including R,G, and B dot.(Sub-pixel = Dot)

(2) LITTLE BRIGHT DOT ACCEPTABLE UNDER 6 % ND-Filter

[Note1] W : Width[mm], L : Length[mm], N : Number, φ : Average Diameter



1. (White, black) Spot
2. Polarizer Bubble



1. fiber

[Note2] Bright dot is defined through 6% transmission ND Filter as following.

9.6 Reliability Test

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=96 hrs	
Low Temperature Operation	-20±3°C , t=96 hrs	
High Temperature Storage	80±3°C , t=96 hrs	1,2
Low Temperature Storage	-30±3°C , t=96 hrs	1,2
Thermal Shock Test	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 5 cycle	1,2
Humidity Test	60 °C, Humidity 90%, 96 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

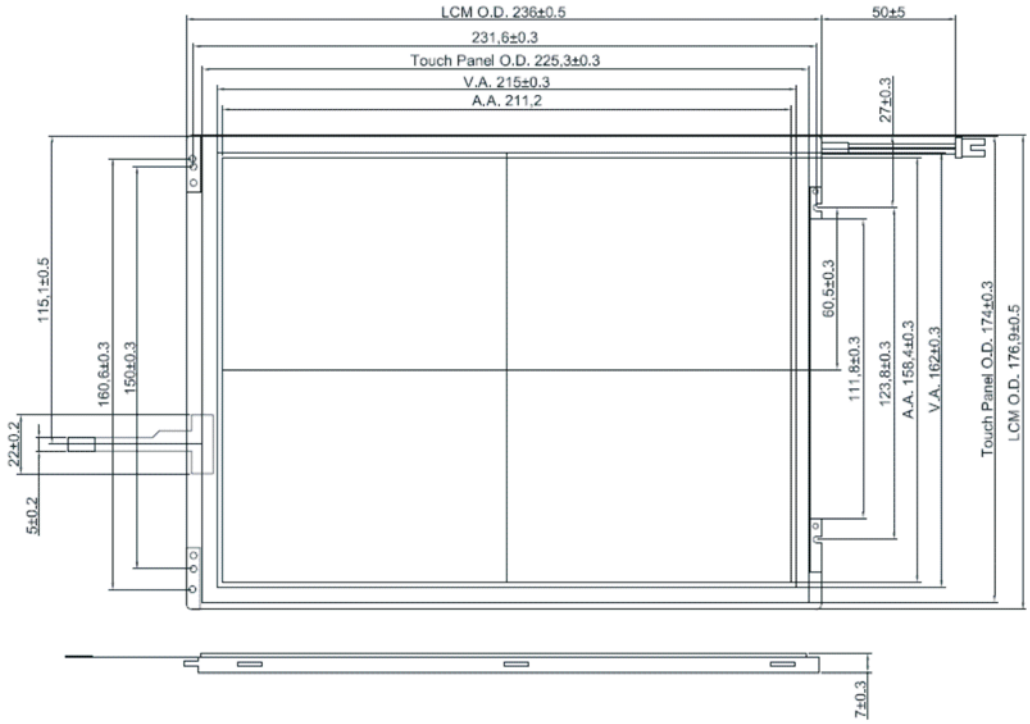
Definitions of life end point :

- ? Current drain should be smaller than the specific value.
- ? Function of the module should be maintained.
- ? Appearance and display quality should not have degraded noticeably.
- ? Contrast ratio should be greater than 50% of the initial value.

11. OUTLINE DIMENSION

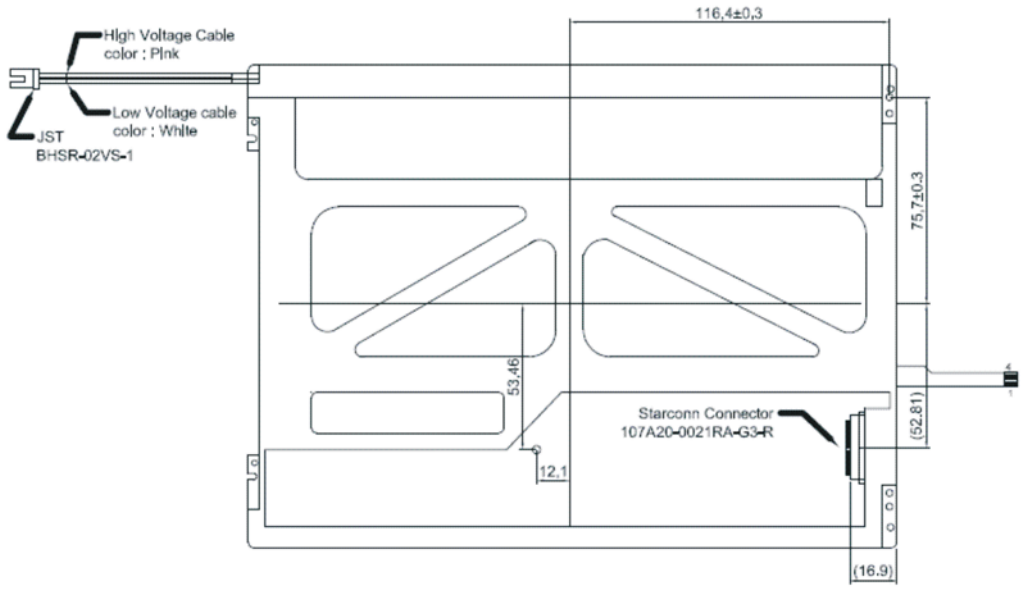
11.1 Front Side

Unit : mm



11.2 Rear side

Unit : mm



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