LCD Nunmber: AT043TN25 V.2

HLY Module No.: HLY430ML506-07

CUSTOMER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
SUPPLIER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
	MiaoWang Nie		ShegPing Pan

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Contents

Document Revision History				
Change No.	Date	Subject And Reason	Version No.	Responser
1	10.10.07	New	01	MiaoWang Nie

1.0 General Description

1.1 Features

- 4.3 (16:9 diagonal) inch configuration
- 8-bit color depth with 256 gray-scale
- Parallel 24-bit RGB data input
- RoHS and Halogen-Free compliance

1.2 Applications

- ersonal Navigation Device
- Multimedia applications and Others AV system

1.3 General Specifications

Item	Specification	Unit
Outline Dimension	105.5 (H) x 67.2 (V) x 2.9 (D)	mm
Display area	95.04 (H) x 53.856 (V)	mm
Number of Pixel	480 RGB x 272	Dot
Pixel pitch	0.066 (H) x 0.198 (V)s	mm
Pixel Configuration	RGB stripe	
Display mode	Normally white	
Backlight	White LED	
Weight	TBD	g

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	VDD	-0.3	5	V	GND=0
Logic Signal Input Level	V	-0.3	5	V	

Note: (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) Ta =25±2℃

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-10	60	℃	
Storage Temperature	Tstg	-20	70	℃	

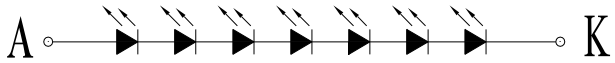
2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	-	20	-	mA	-	-
LED Voltage (Total)	VF	21	23.1	24.5	V	-	-
Life Time		-	25000	-	Hr.	I≦20mA	-
Color	White						

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2)Ta=25±2℃

(3)Test condition: LED Current 20mA



3.0 Optical Characteristics

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max	Unit	Note
Threshold voltage		Vsat		-	2.4	-		(6)
		Vth		-	1.4	-		(6)
LCM luminance (Center)		Y_L	I=20mA	320	350	—	cd/㎡	9 point AVG
Transmittance (With PZ)		T		—	6.78	—		
Contrast		CR	θ =0	480	600	_		(1) (2)
Response time	Rising	T_R		—	3	6	ms	(1) (3)
	Falling	T_F		—	7	14		
Color chromaticity (CIE 1931)	White	W_X		0.30	0.32	0.34		(1)(4) CF Glass C light
		W_Y		0.32	0.34	0.36		
Viewing angle	Hor.	θ_L	CR>10	65	75	—		
		θ_R		65	75	—		
	Ver.	θ_U		50	60	—		
		θ_D		60	70	—		
Optima View Direction		6 O' clock						(5)

3.2 Measuring Condition

■ Measuring surrounding : dark room

■ Ambient temperature : 25±2℃

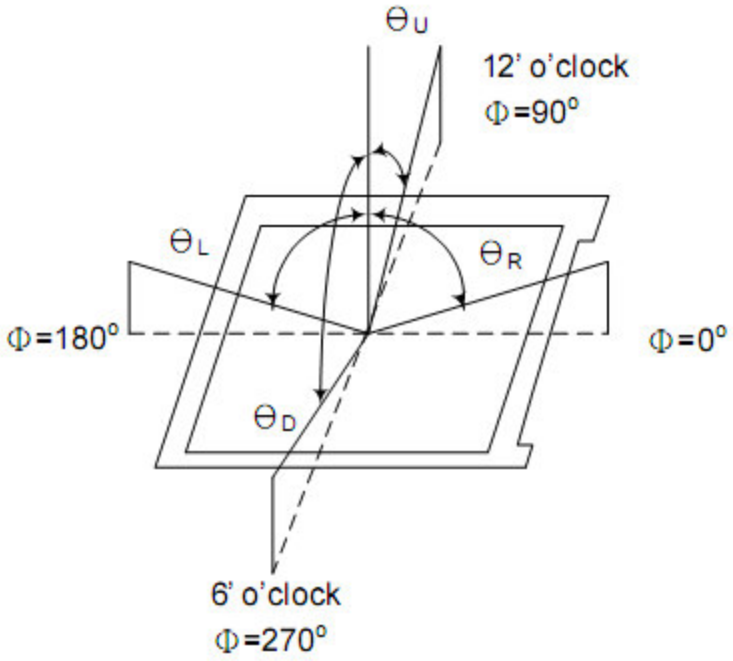
■The measured value of luminace and color coordinate bases HLY's BM-7

3.3 Measuring Equipment

■ TOPCON BM-7

■ Measuring spot size : field 2°

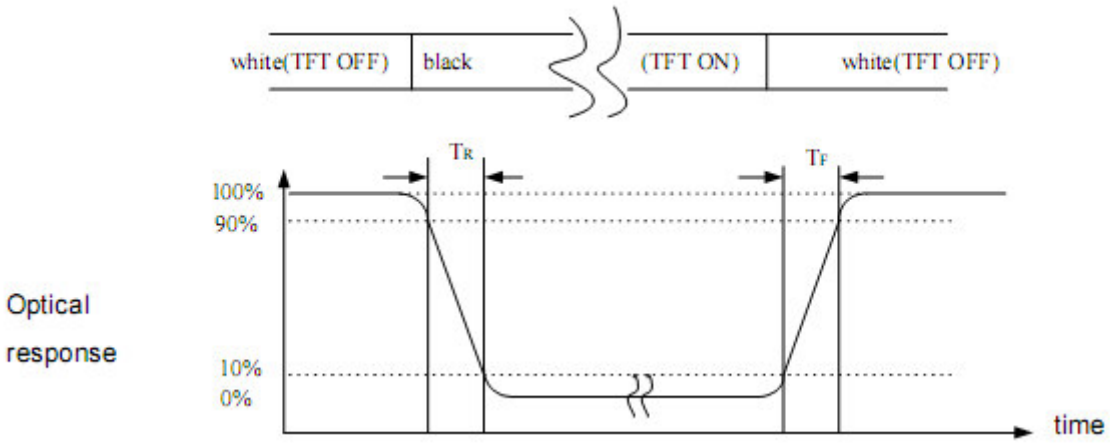
Note (1) Definition of Viewing Angle :



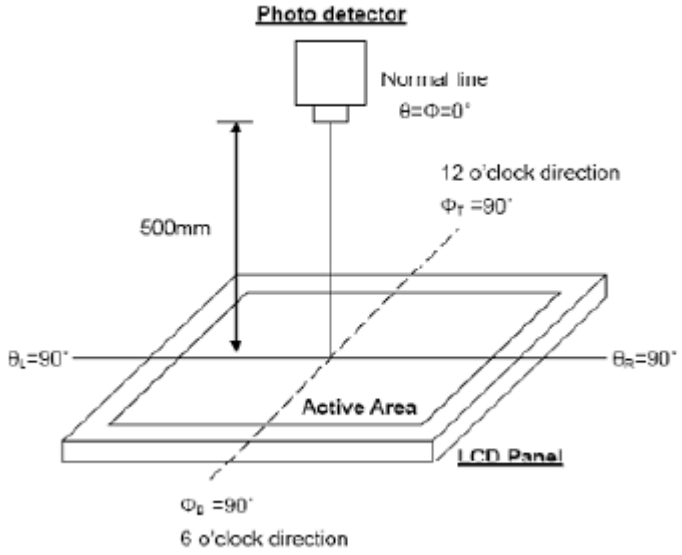
Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

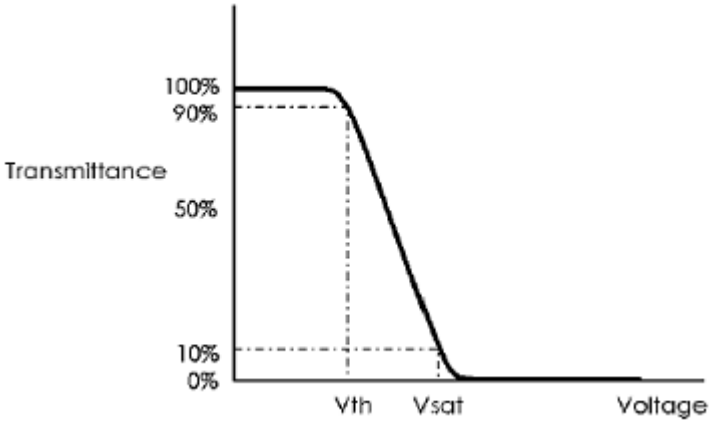
Note (3) Definition of Response Time : Sum of T_r and T_f



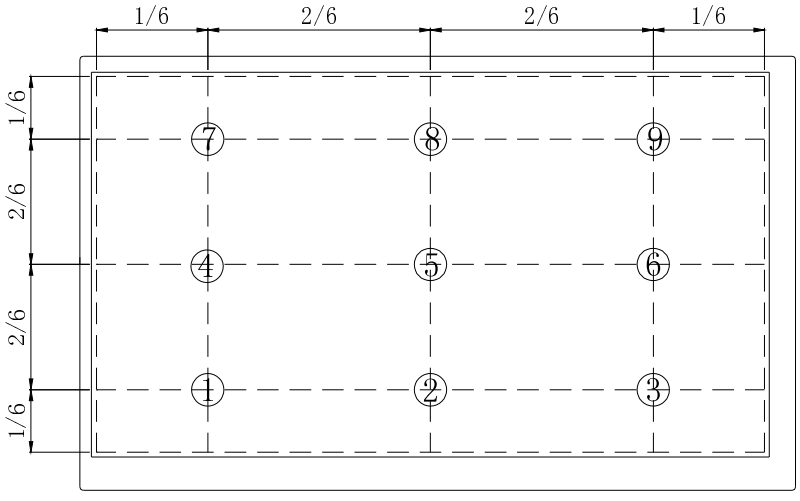
Note (4) Definition of optical measurement setup



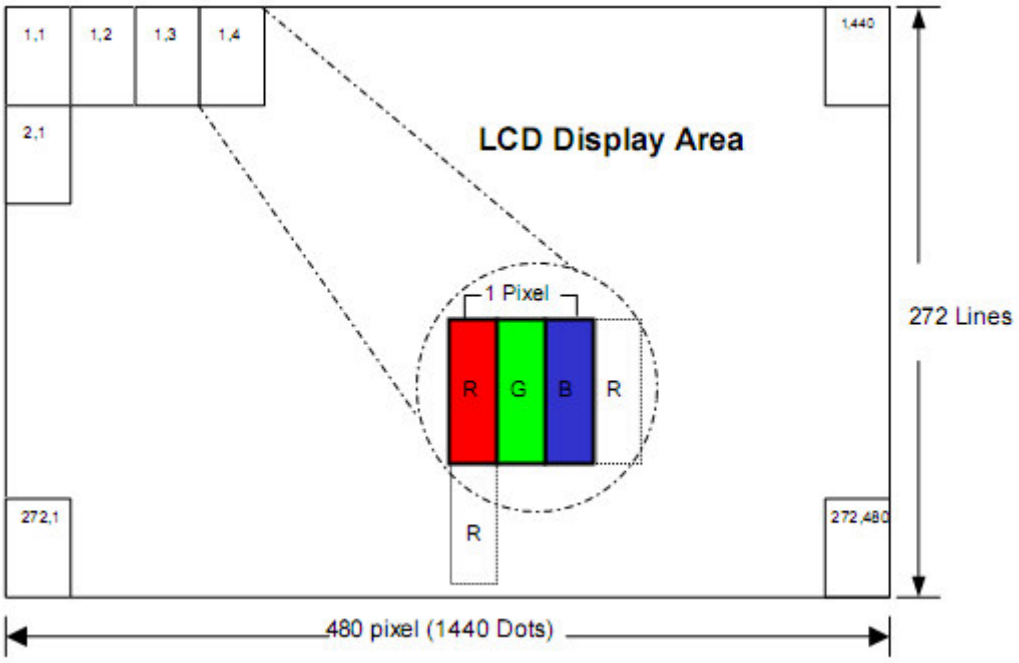
Note (5) Definition of Vsat and Vth (at 20℃)



Note (6) Definition of brightness uniformity



4.0 Block Diagram



5.0 INPUT INTERFACE PIN ASSIGNMENT

LCM PIN Definition

FPC connector is used for electronics interface. The recommended model isFH19SC-40S-0.5SH (05) manufactured by HIROSE.

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED-}	P	Power for LED backlight cathode	
2	V_{LED+}	P	Power for LED backlight anode	
3	GND	P	Power ground	
4	V_{DD}	P	Power voltage	
5	R0	I	Red data (LSB)	
6	R1	I	Red data	
7	R2	I	Red data	
8	R3	I	Red data	
9	R4	I	Red data	
10	R5	I	Red data	
11	R6	I	Red data	
12	R7	I	Red data (MSB)	
13	G0	I	Green data (LSB)	
14	G1	I	Green data	
15	G2	I	Green data	
16	G3	I	Green data	
17	G4	I	Green data	
18	G5	I	Green data	
19	G6	I	Green data	
20	G7	I	Green data (MSB)	

21	B0	I	Blue data (LSB)	
22	B1	I	Blue data	
23	B2	I	Blue data	
24	B3	I	Blue data	
25	B4	I	Blue data	
26	B5	I	Blue data	
27	B6	I	Blue data	
28	B7	I	Blue data (MSB)	
29	GND	P	Power ground	
30	CLK	I	Pixel clock	
31	DISP	I	Display on/off	
32	NC	-	No connection	
33	NC	-	No connection	
34	DE	I	Data Enable	
35	NC	-	No connection	
36	GND	P	Power ground	
37	NC	-	No connection	
38	NC	-	No connection	
39	NC	-	No connection	
40	NC	-	No connection	

I: input, O: output, P: Power

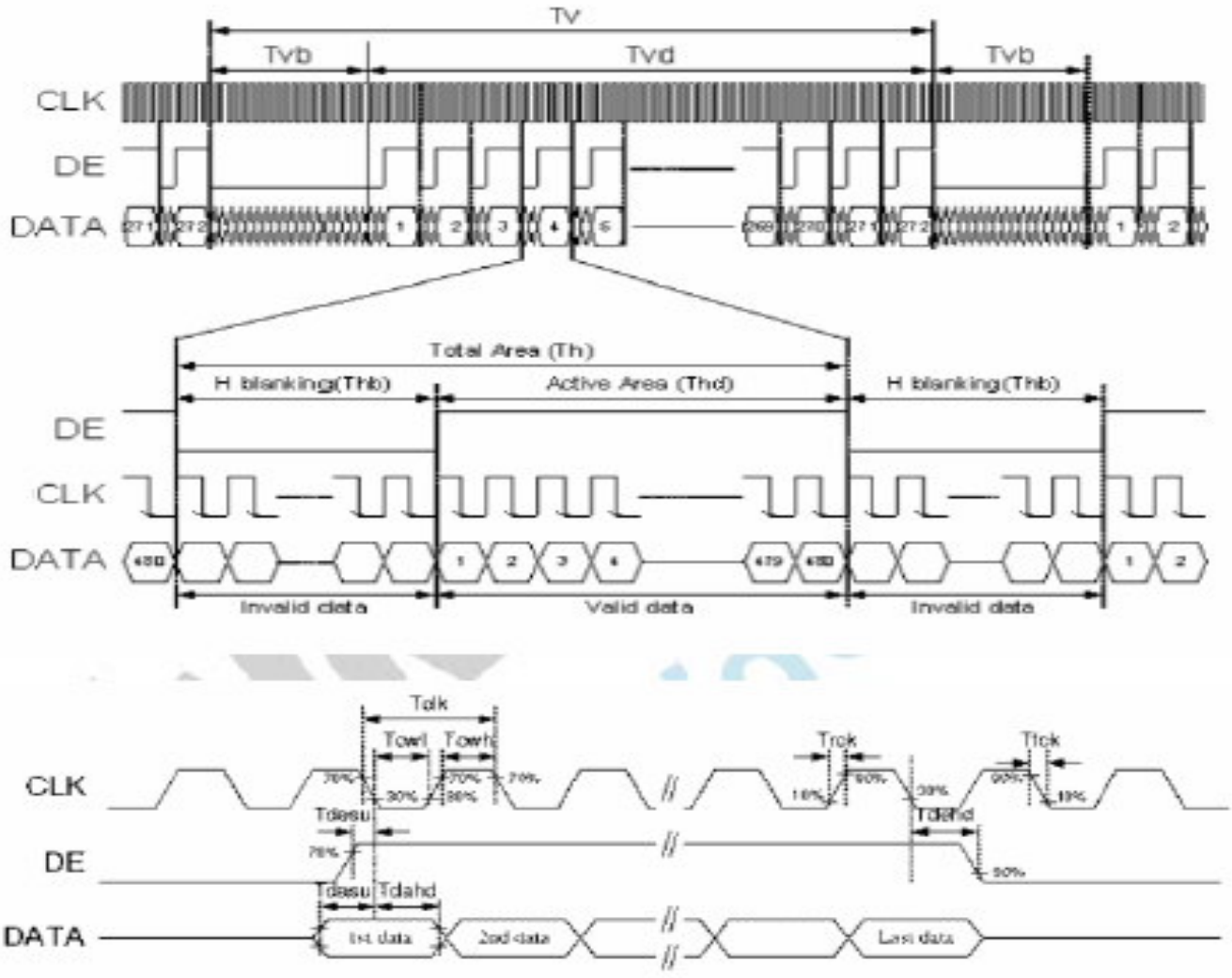
6.0. Timing Characteristics

6.1 Timing Conditions

Parallel DE mode RGB input timing table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
CLK frequency	fclk	7	9	12	MHz
DEV period time	Tv	277	288	400	H
DEV display area	Tvd		272		H
DEV blanking	Tvb	5	16	128	H
DEH period time	Th	520	525	800	CLK
DEH display area	Thd		480		CLK
DEH blanking	Thb	40	45	320	CLK
CLK cycle time	Tclk	83	110	143	ns
Clock width of high level	Tcwh	40	50	60	%
Clock width of low level	Tcwl	40	50	60	%
Clock rising time	t_{rck}		-	9	ns
Clock falling time	t_{fck}		-	9	ns
Data Setup Time	t_{desu}	10	-	-	ns
Data Hold Time	t_{dahd}	10	-	-	ns
DE Setup Time	t_{desu}	10	-	-	ns
DE Hold Time	t_{dehd}	10	-	-	ns

6.2. Timing Diagram

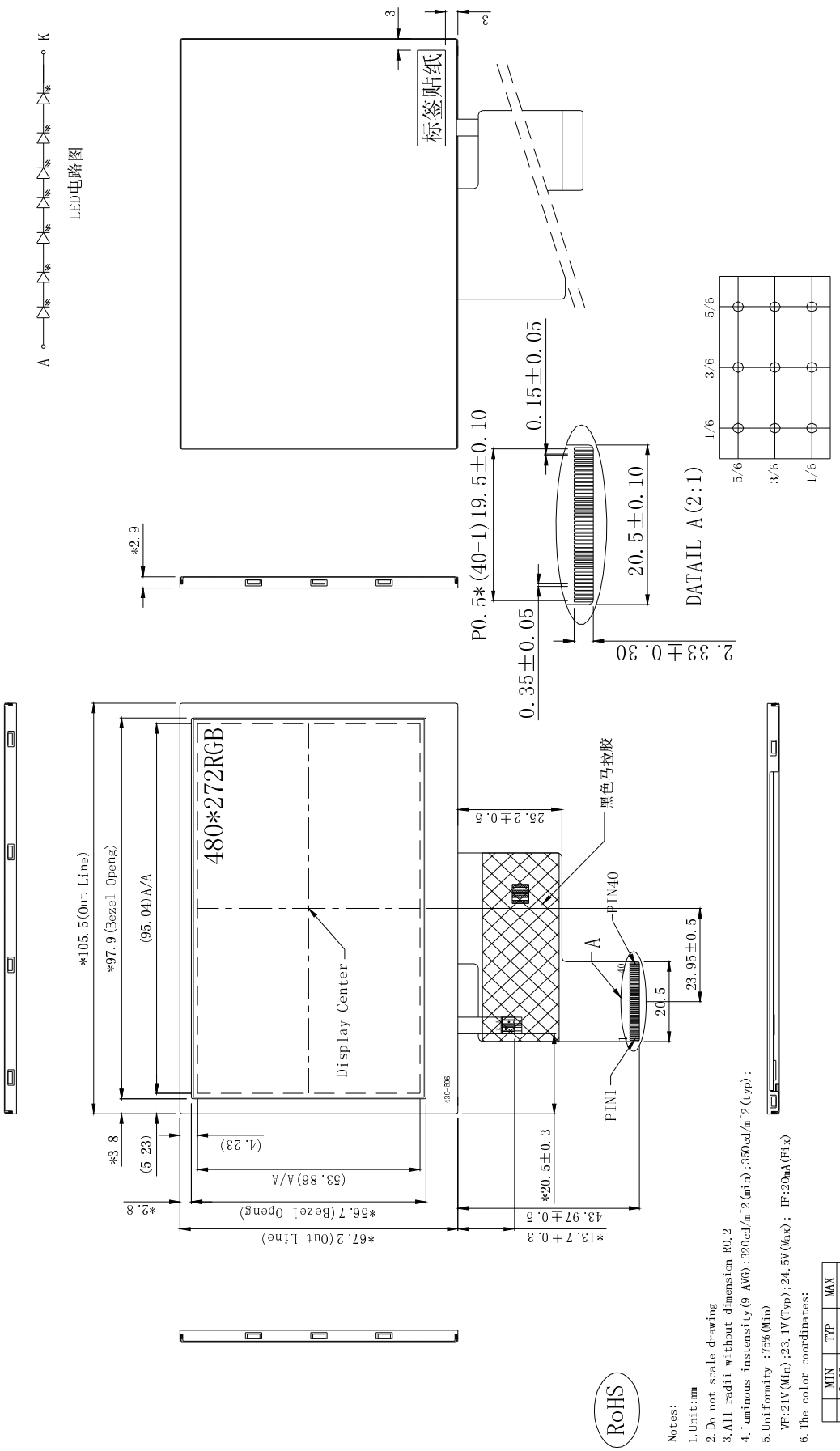


7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+70℃,96hrs	
2	Low Temperature Storage	Ta=-20℃,96hrs	
3	High Temperature Operation	Ta=+60℃,96hrs	
4	Low Temperature Operation	Ta=-10℃,96hrs	
5	High Temperature and High Humidity (operation)	Ta=+60℃,90%RH,96hrs	
6	Thermal Cycling Test (non operation)	-20℃(0.5hr)→+70℃(0.5hr),200cycles	
7	Vibration	1.Random:1.04G,10-500HZ,X,Y,Zdirection 30min/each direction 2.Sweep sine:1.5G, 5~500Hz, X/Y/Z,30min/each direction	
8	Shock	100G,6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
9	Vibration (with carton)	Random:1.04Grms, 10~500Hz, X/Y/Z 45min/each direction Fixed:5Hz, 1.5Grms, X/Y/Z 45min/each direction	
10	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202
11	Electrostatic Discharge	±200V,200PF,0Ω1 time/each terminal	

Note: All tests above are practiced at module type.
There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

8.0 Outline dimension



RoHS

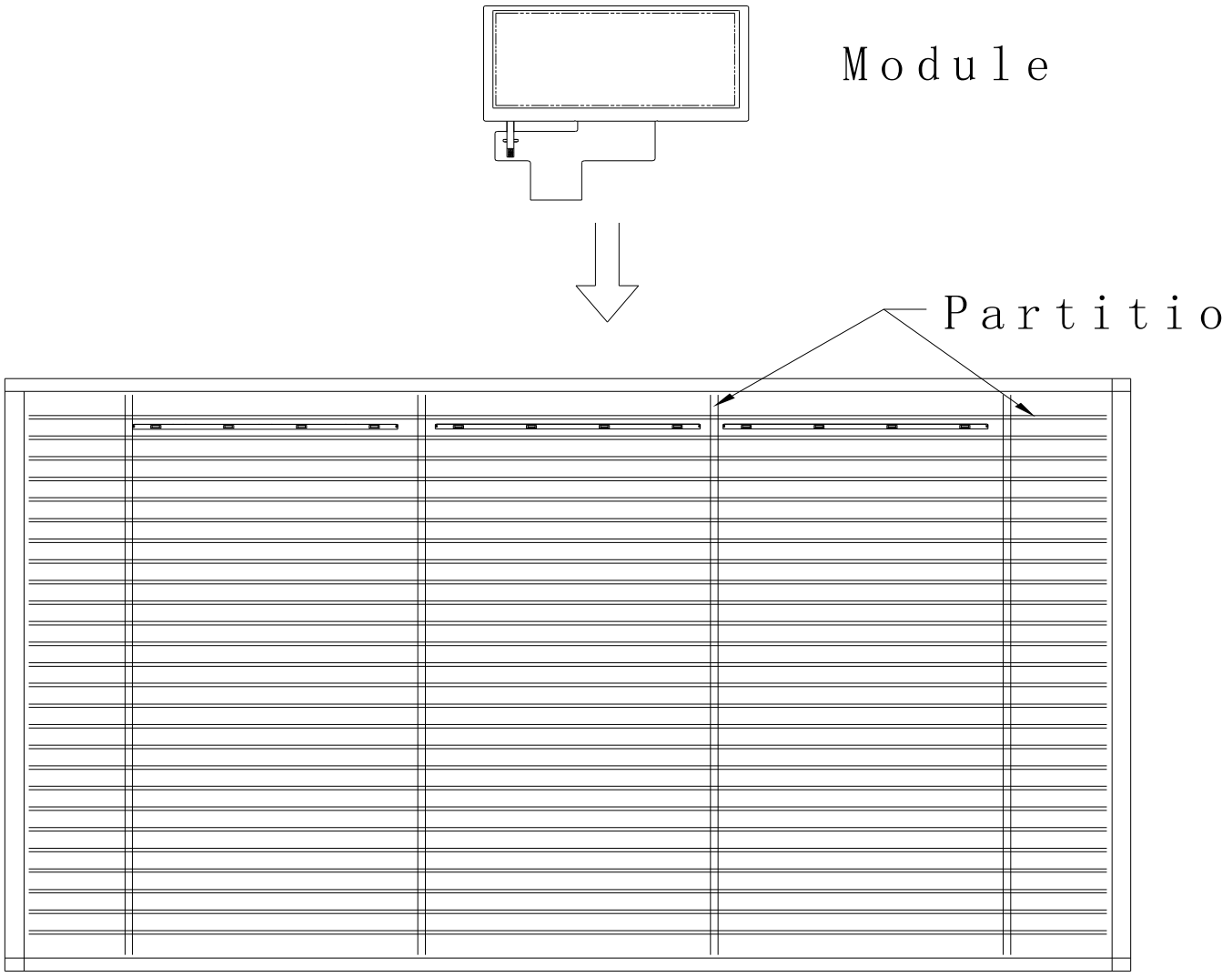
Notes:

1. Unit:mm
2. Do not scale drawing
3. All radii without dimension R0.2
4. Luminous instensity(9 AVG):320cd/m^2(min);350cd/m^2(typ);
5. Uniformity :75%(Min)
   VF:21V(Min);23.1V(Typ);24.5V(Max); IF:20mA(Fix)
6. The color coordinates:

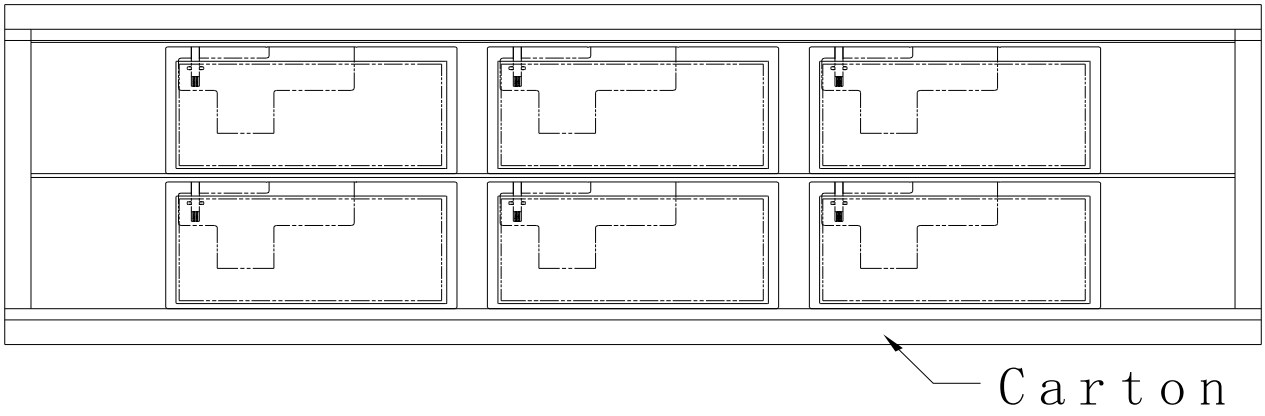
	MIN	TYP	MAX
x	0.30	0.32	0.34
y	0.32	0.34	0.36

7. ⚠ Modification rev.number.
8. draft angle 1.0°
9. Genral Tolerance:±0.2
10. Mark mold cavity indentification in recess approximately where indicated.
11. "*" For important dimension;( ) for reference dimention.
12. RoHs must be complied.(Use Lead-free process)

9 Packing form



Total:150PCS Module/Carton



10.0 GENERAL PRECAUTION

10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

10.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. INNOLUX does not warrant the module, if customers disassemble or modify the module.

10.3 Breakage of LCD Panel

10.3.1. If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquidcrystal, and do not contact liquid crystal with skin.
10.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.
10.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
10.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.4 Electric Shock

10.4.1. Disconnect power supply before handling LCD module.
10.4.2. Do not pull or fold the LED cable.
10.4.3. Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

10.5 Absolute Maximum Ratings and Power Protection

10.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmentaltemperature, etc., otherwise LCD module may be damaged.
10.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
10.5.3. It's recommended to employ protection circuit for power supply.

10.6 Operation

10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
10.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
10.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
10.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.
10.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent. 11.7

10.7 Operation

Please mount LCD module by using mounting holes arranged in four corners tightly.

10.8 Static Electricity

10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.8.2. Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

10.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise,display characteristics may be changed.

10.10 Disposal

When disposing LCD module, obey the local environmental regulations.