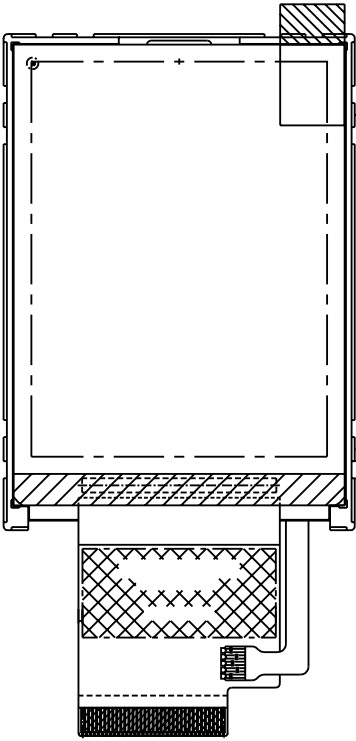




PRODUCT SPECIFICATION

HDA240A

240 x 320 TFT, COLOR GRAPHICS
LCD DISPLAY MODULE



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GENERAL SPECIFICATION

ITEM	CONTENTS
Module Size	43.6 (W) * 87.0 (H) * 3.0 (T) mm
Display Size	2.4 inch
Display Format	240(RGB)* 320 Pixels
Active Area	36.72 (W) * 48.96 (H) mm
Pixel Pitch	0.153 * 0.153 mm
LCD Type	TFT (262K)/ Transmissive / Positive
View Angle	12 O'clock (The Gray Inversion will appear at this direction)
Controller IC	ILI9325
Backlight Driver type	External Power
DC to DC circuit	Build-In
Approx. Weight	11.0g

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ABSOLUTE MAXIMUM RATING(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Humidity
Supply Voltage	V _{CI} -V _{SS}	-0.3	-	+4.6	Volt	-
Supply Voltage	V _{CC} -V _{SS}	-0.3	-	+4.6	Volt	-
Operating Temperature	Top	-20	-	+70	°C	Note1
Storage Temperature	Tst	-30	-	+80	°C	Note2

Note1: Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Ta ≤ 70°C: 75%RH max

Ta > 70°C: absolute humidity must be lower than the humidity of 75%RH at 70°C

Note2: Ta at -30°C will be <48hrs, at 80 °C will be <120hrs

ELECTRO-OPTICAL CHARACTERISTICS (Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
A supply voltage to the internal logic	V _{CC} -V _{SS}	-	-	2.8	-	Volt
A supply voltage to the analog circuit.	V _{CI} -V _{SS}	-	-	2.8	-	Volt
Power Supply Current for LCM	IDD	V _{CC} =2.8V	-	5.5	7.7	mA

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OPTICAL CHARACTERISTICS

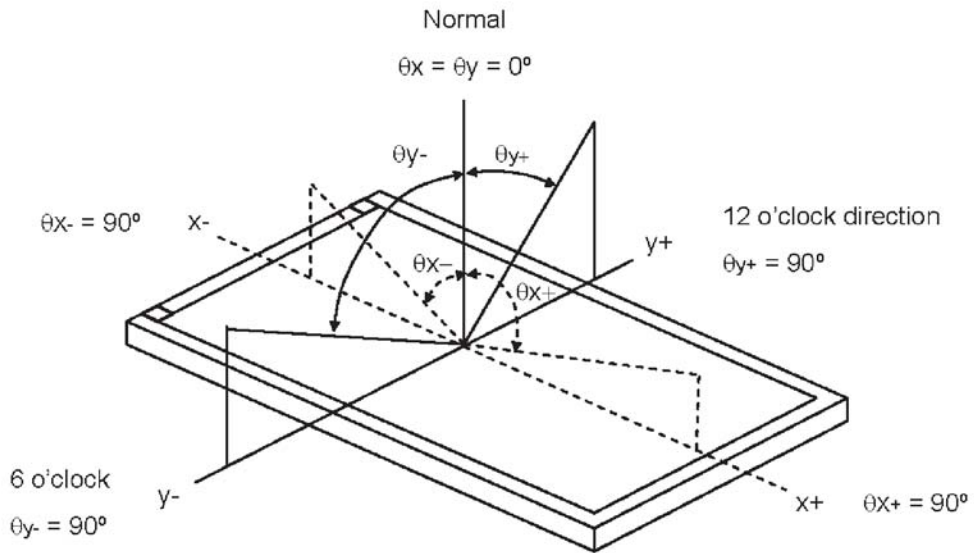
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio	CR	$\theta_x=0^\circ, \theta_y=0^\circ$	-	(300)	-	-	(2)
Response Time	T_{R+T_F}	Viewing Normal Angle	-	(30)	-	ms	(3)
Viewing angle	Horizontal	θ_{x+}	-	60	-	Degree	(1),(4)
		θ_{x-}	-	60	-		
	Vertical	θ_{y+}	-	60	-		
		θ_{y-}	-	45	-		

Color of CIE coordinate:

Item	Symbol	Condition	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red	x	0.59	0.64	0.69
		y	0.29	0.34	0.39
	Green	x	0.29	0.34	0.39
		y	0.53	0.58	0.63
	Blue	x	0.09	0.14	0.19
		y	0.05	0.10	0.15
	White	x	0.25	0.30	0.35
		y	0.27	0.32	0.37

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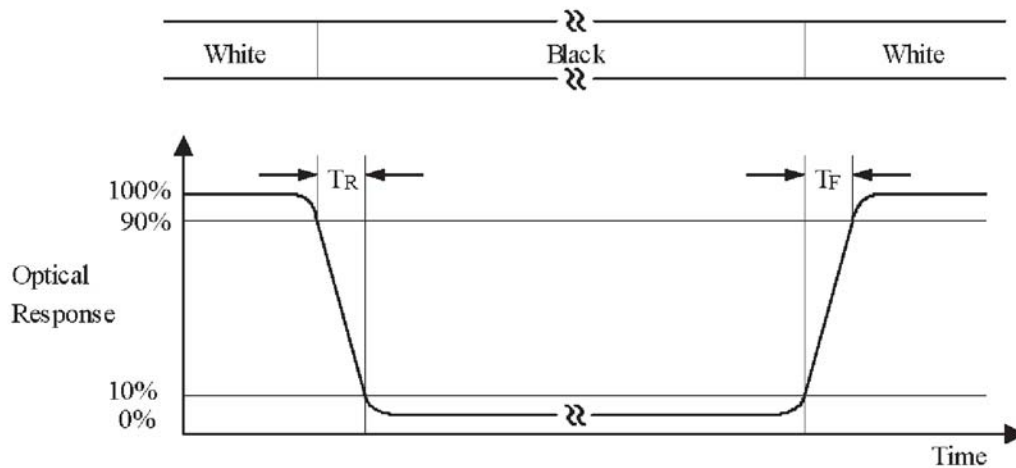
Note (1). Definition of Viewing Angle (θ_x , θ_y):



Note (2). Definition of Contrast Ratio (CR):

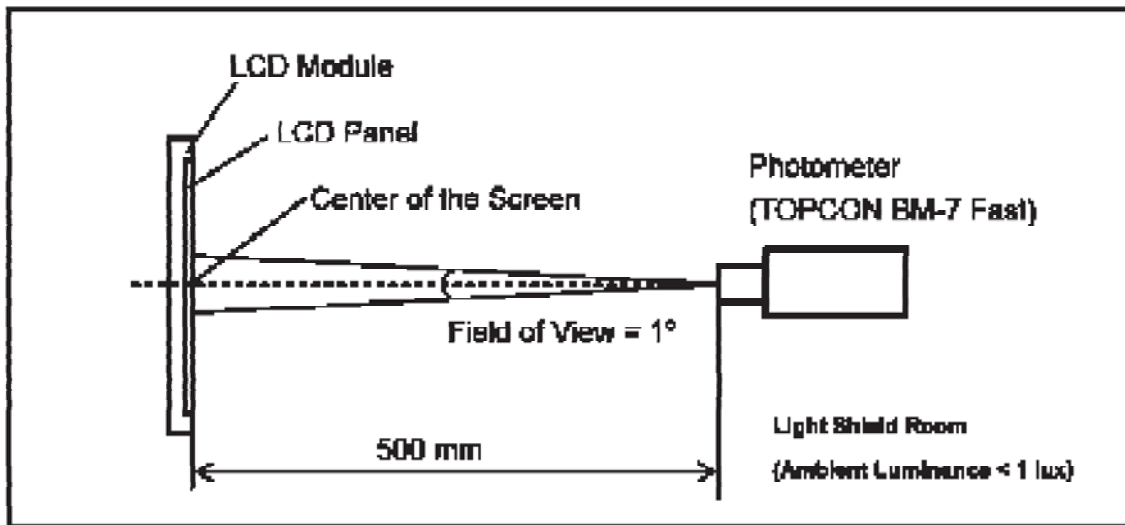
$$CR = \frac{\text{Luminance (brightness) all pixels "White"}}{\text{Luminance (brightness) all pixels "dark"}}$$

Note (3). Definition of Response Time (T_R , T_F):



Note (4). Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.



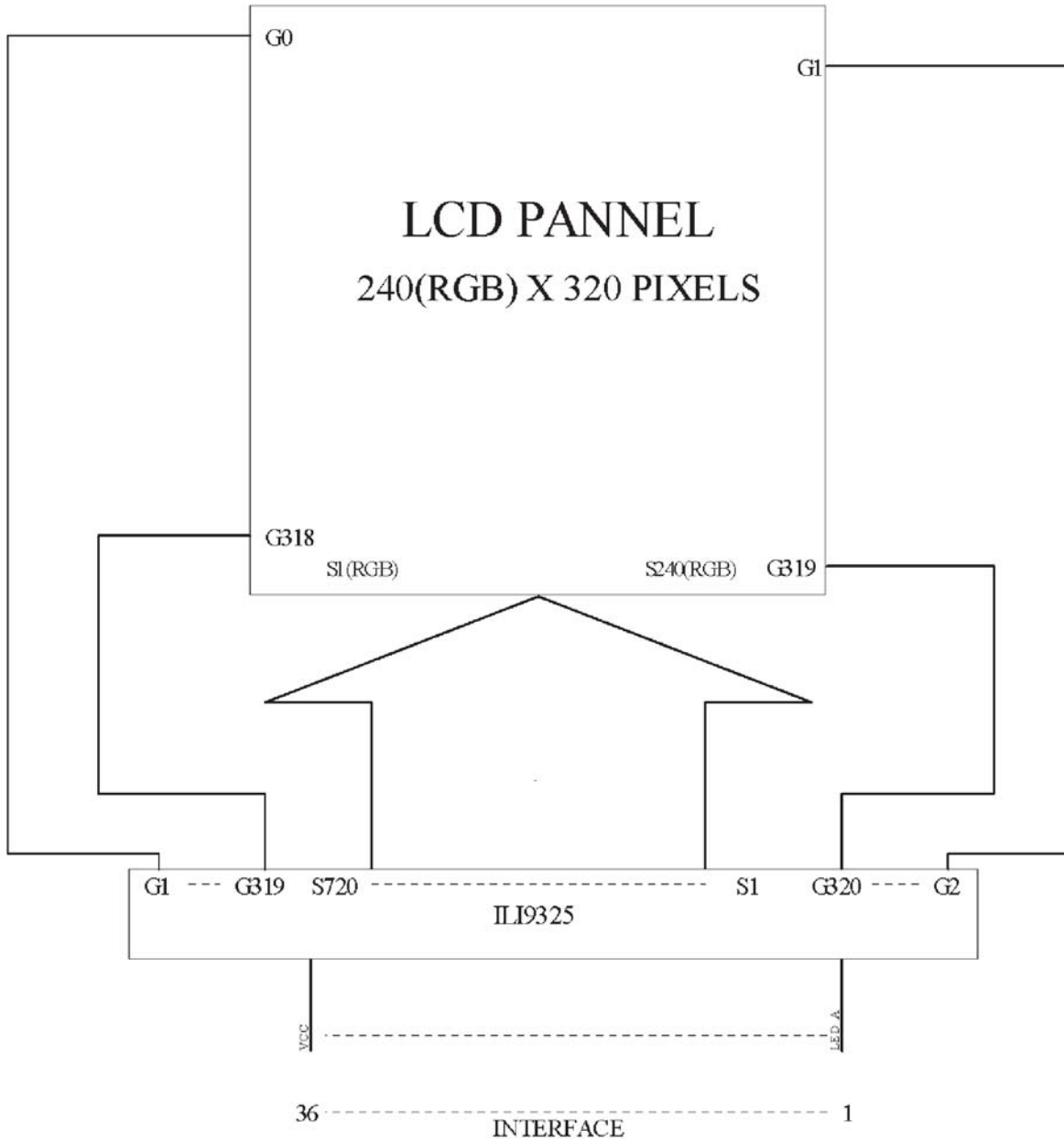
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INTERFACE PIN ASSIGNMENT

No.	Symbol	Function
1	LED_A	LEDA1 Anode
2	LED_A	LEDA2 Anode
3	LED_K	LEDK1 Cathode
4	LED_K	LEDK2 Cathode
5	NC	No Connection
6	VSS	Ground
7	NC	No Connection
8~11	NC	No Connection
12	nRESET	A reset pin. Initializes the ILI9325 with a low input. Be sure to execute a power-on reset after supplying power.
13~30	D17~D0	An 18-bit parallel bi-directional data bus for MPU system interface mode 8-bit I/F: DB[17:10] is used. 9-bit I/F: DB[17:9] is used. 16-bit I/F: DB[17:10] and DB[8:1] is used. 18-bit I/F: DB[17:0] is used. Unused pins must be fixed GND level.

No.	Symbol	Function
31	nRD	A read strobe signal and enables an operation to read out data when the signal is low. Fix to either IOVcc or GND level when not in use.
32	nWR/SCL	A write strobe signal and enables an operation to write data when the signal is low. Fix to either IOVcc or GND level when not in use.
33	RS	A register select signal. Low: select an index or status register High: select a control register Fix to either IOVcc or GND level when not in use.
34	nCS	A chip select signal. Low: the ILI9325 is selected and accessible High: the ILI9325 is not selected and not accessible Fix to the GND level when not in use.
35	VCI	A supply voltage to the analog circuit.
36	VCC	A supply voltage to the internal logic

BLOCK DIAGRAM



Hardware:

IM[0,1,2,3]:0,1,0,0 → i80-system 16 bit interface

Set VcomH voltage: internal volume adjustment

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BACKLIGHT

1. Standard Lamp Styles (Edge Lighting Type):

The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:

2. The Main Advantages of the LED Backlight are as Following:

2.1 The brightness of the backlight can simply be adjusted.
By a resistor or a potentiometer.

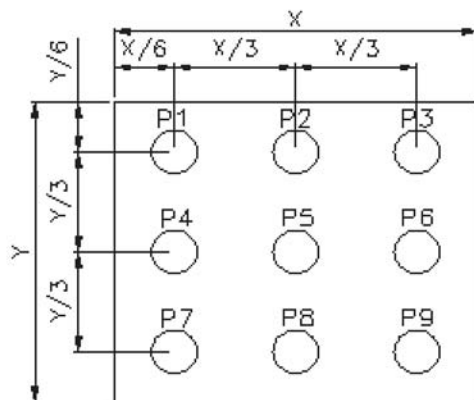
3. Data About LED Backlight:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	15	15	15	mA	V=13.2V	-
Supply Voltage	V	-	13.2	-	V	If=15mA	-
Reverse Voltage	V _R	-	-	5	V	If=15mA	-
Luminous Intensity for LCM	I _v	-	135	-	Cd/m ²	If=15mA	1
Uniformity for LCM	-	-	80	-	%	If=15mA	2
Color	White						

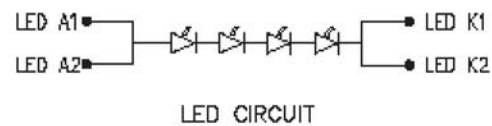
NOTE:

1. Average Luminous Intensity of P1-P9
2. Uniformity = Min/Max * 100%

Measured Method: (X*Y: Light Area)



Internal Circuit Diagram



(Effective spatial Distribution)

Hole Diameter \varnothing 3mm ; 1 to 9 per Position Measured Luminous

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RELIABILITY

Environmental Test

NO.	Test Item	Test Condition	Test Time	Note
1	Low temperature storage	-30±2°C	240H	—
2	High temperature storage	80±2°C	240H	—
3	Low temperature operation	-20±2°C	240H	—
4	High temperature operation	70±2°C	240H	—
5	High temperature/ Humidity storage	60±2°C 90%±5%RH	240H	Without dewing
6	Thermal shock storage	-30°C(30min)→25°C(5min)→ +80°C(30min)	10 cycles	—

Mechanical Test

NO.	Test Item	Test Condition	Note
1	Vibration test	Sweep for 1 min at 10Hz , 55Hz , 10Hz , amplitude 1.5mm 15 minutes each in the X , Y and Z directions(Total 45 minutes)	Non operation state
2	Drop test	One angle, three edges and six sides. 75cm above the ground(no weight difference)	Non operation state

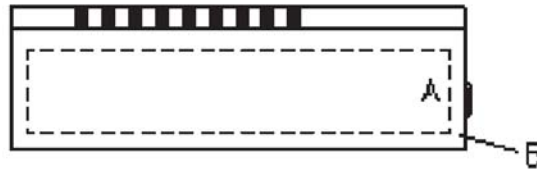
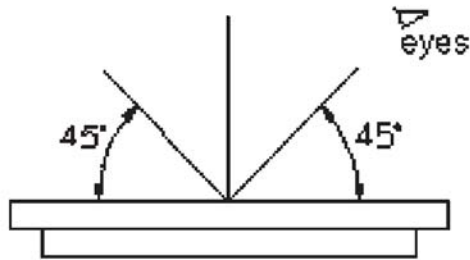
LIFE TIME

Item	Description
1.	Functions, Performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±10°C) , normal humidity(45±20%RH),and in area not exposed to direct sun light. (Expect Backlight)

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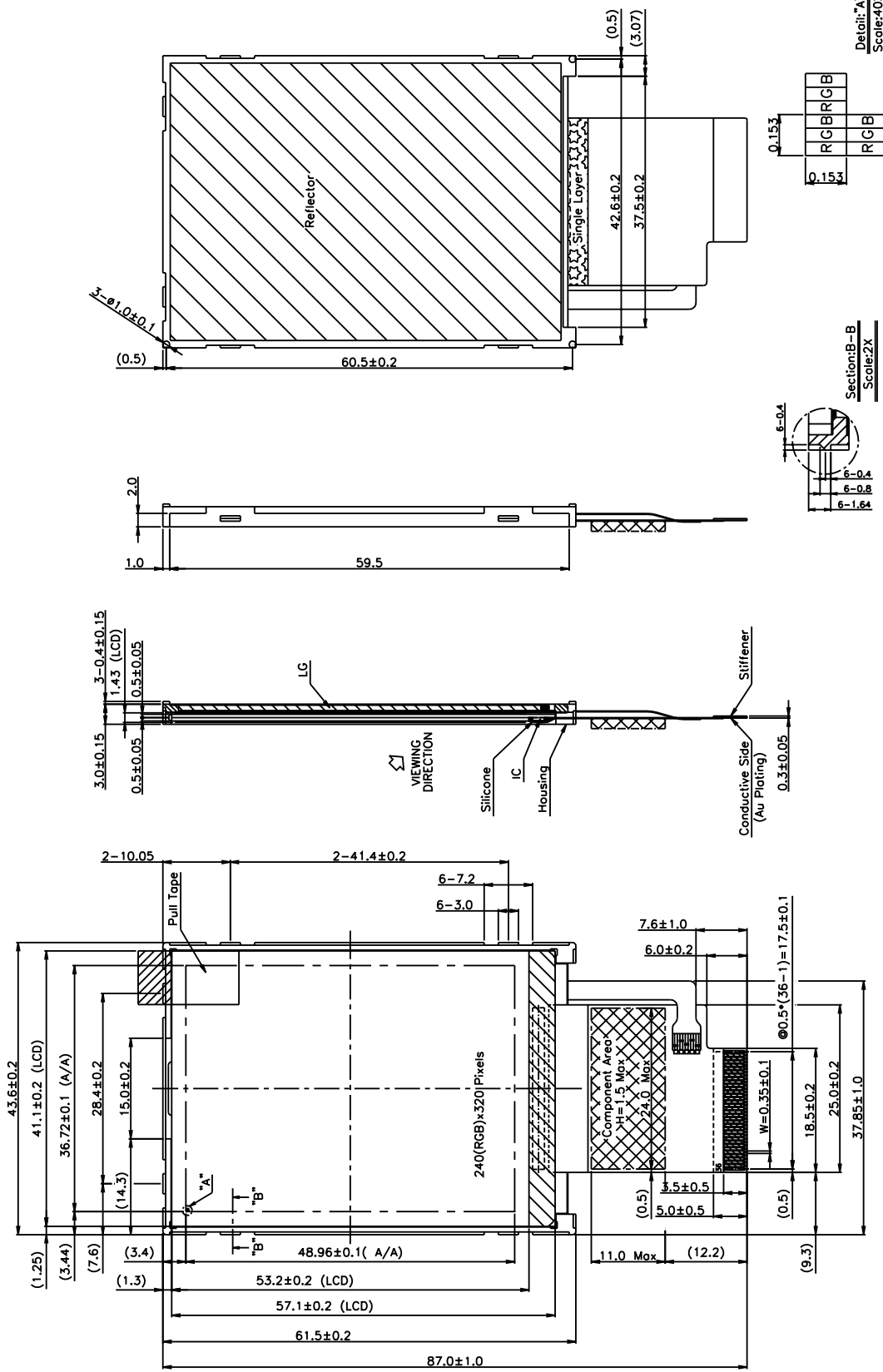
Standard of the product appearance test

- Manner of appearance test
 - The test must be under 20W×2 or 40W fluorescent light , and the distance of view must be at 30cm.
 - When test the model of transmissive product must add the reflective plate.
 - The test direction is base on about 45° of vertical line.



- Definition of area :
 - A area: viewing area
 - B area: out of viewing area(outside viewing area)

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Detail: "A"
Scale: 40X

Section: B-B
Scale: 2X

