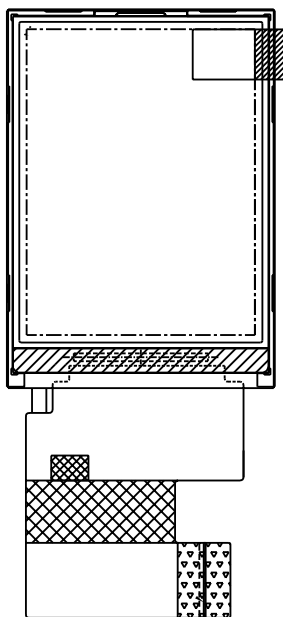




PRODUCT SPECIFICATION

HDA240C

2.4', QVGA TFT COLOR GRAPHICS
LCD DISPLAY MODULE



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GENERAL SPECIFICATION

ITEM	CONTENTS
Module Size	43.12 (W) * 97.46 (H) * 3.4 (D) 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(Micro Reflective)
View Angle	12 O'clock (The Gray Inversion will appear at this direction)
Controller IC	HX8347A
Backlight Driver type	External Power
DC to DC circuit	Build-In
Approx. Weight	14.9g

ABSOLUTE MAXIMUM RATING(Ta=25℃ GND=0V)

Item	Symbol	Min.	Type	Max.	Unit	Humidity
Supply Voltage	IOVCC-GND	-0.3	-	+4.6	Volt	-
Operating Temperature	Top	-20	-	+70		Note1
Storage Temperature	Tst	-30	-	+80		Note2

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

Note2: Ta≤70℃: 75%RH max.

Note3: Please refer to item of RELIABILITY.

ELECTRO-OPTICAL CHARACTERISTICS (Ta = 25℃)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply	IOVCC-GND	-	-	2.8	-	Volt
Power Supply Current for LCM	IDD	IOVCC =2.8V	-	6	8.5	mA
Current consumption during sleeping mode	IST	IOVCC=2.8V Ta=25℃	-	200	300	uA

OPTICAL CHARACTERISTICS

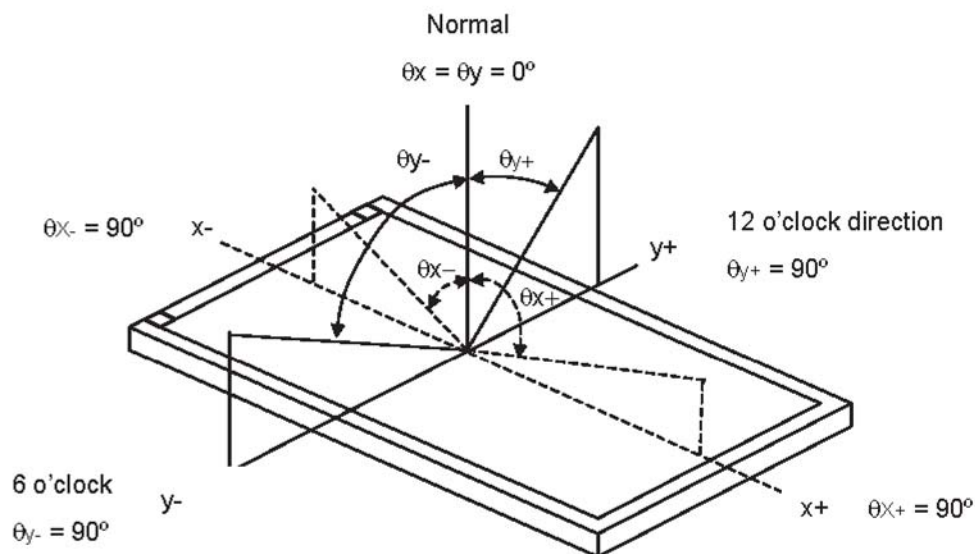
The optical characteristics should be measured in a dark environment (1 lux)
or equivalent state with the methods shown in Note (4).

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)	(40)	ms	(3)
Viewing angle	Horizontal	θ_{x+}	CR $\geq$ 10	-	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	$\theta = \phi = 0^\circ$ LED Backlight Color Degree	0.62	0.67	0.72
		y		0.25	0.30	0.35
	Green	x		0.33	0.38	0.43
		y		0.52	0.57	0.62
	Blue	x		0.09	0.14	0.19
		y		0.03	0.08	0.13
	White	x		0.28	0.33	0.38
		y		0.27	0.32	0.37

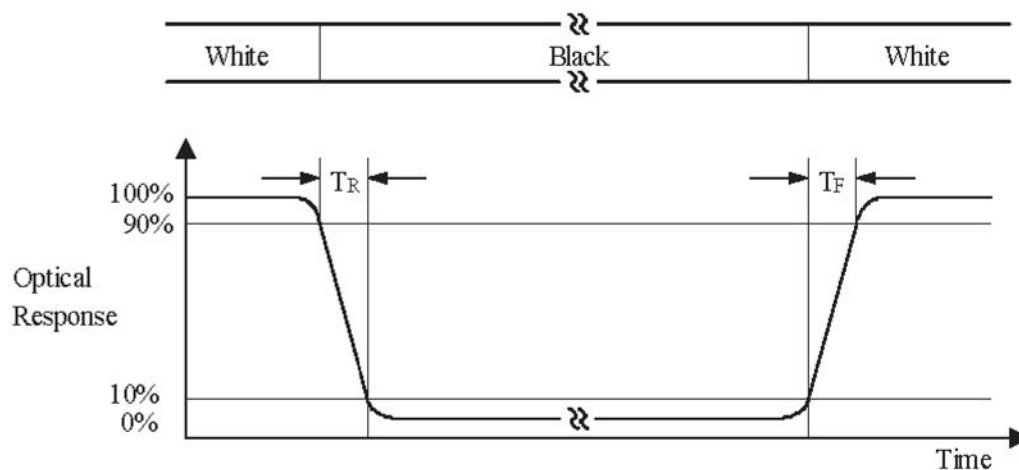
Note (1). Definition of Viewing Angle (θ_x , θ_y):



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

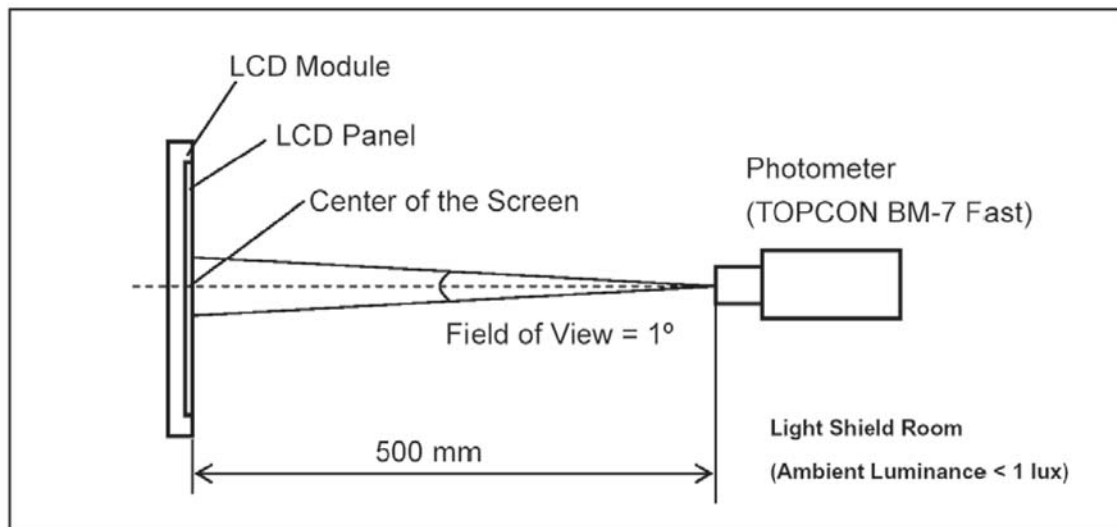
$$CR = \frac{\text{Luminance (brightness) all pixels "White"}}{\text{Luminance (brightness) all pixels "dark"}}$$

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	NC	Not connect.
2	NC	Not connect.
3	NC	Not connect.
4	NC	Not connect.
5	nRESET	Reset pin. Setting either pin low initializes the LSI. Must be reset after power is supplied.
6	VSYNC	Frame synchronizing signal. Has to be fixed to IOVCC level if is not used.
7	HSYNC	Frame synchronizing signal. Has to be fixed to IOVCC level if is not used.
8	DOTCLK	Dot clock signal. Has to be fixed to GND level if is not used.
9	ENABLE	A data ENABLE signal in RGB I/F mode. Has to be fixed to GND level if unused
10~27	D17~D0	18-bit data bus for RGB interface 16-bit bus: use D17~D13, D11~D1 and D12, D0 unused. 18-bit bus: use D17~D0. Those unused pins have to open.
28	SDO	Serial data output. If not use, let it to open.
29	SDI	Serial data input pin. If not used, please let it connected to IOVCC or GND.
30	NC	Not connect
31	SCL	The signal for command or parameter select under parallel mode Low: command. High: parameter. When under serial interface, it servers as SCL.
32	NC	Not connect
33	nCS	Chip select signal. Low: chip can be accessed; High: chip cannot be accessed. Must be connected to GND if not in use.
34	GND	Ground
35	IOVCC	A supply voltage to the interface pins.

No.	Symbol	Function
36	GND	Ground
37	GND	Ground
38	LED-	LED Cathode
39	LED+	LED Anode

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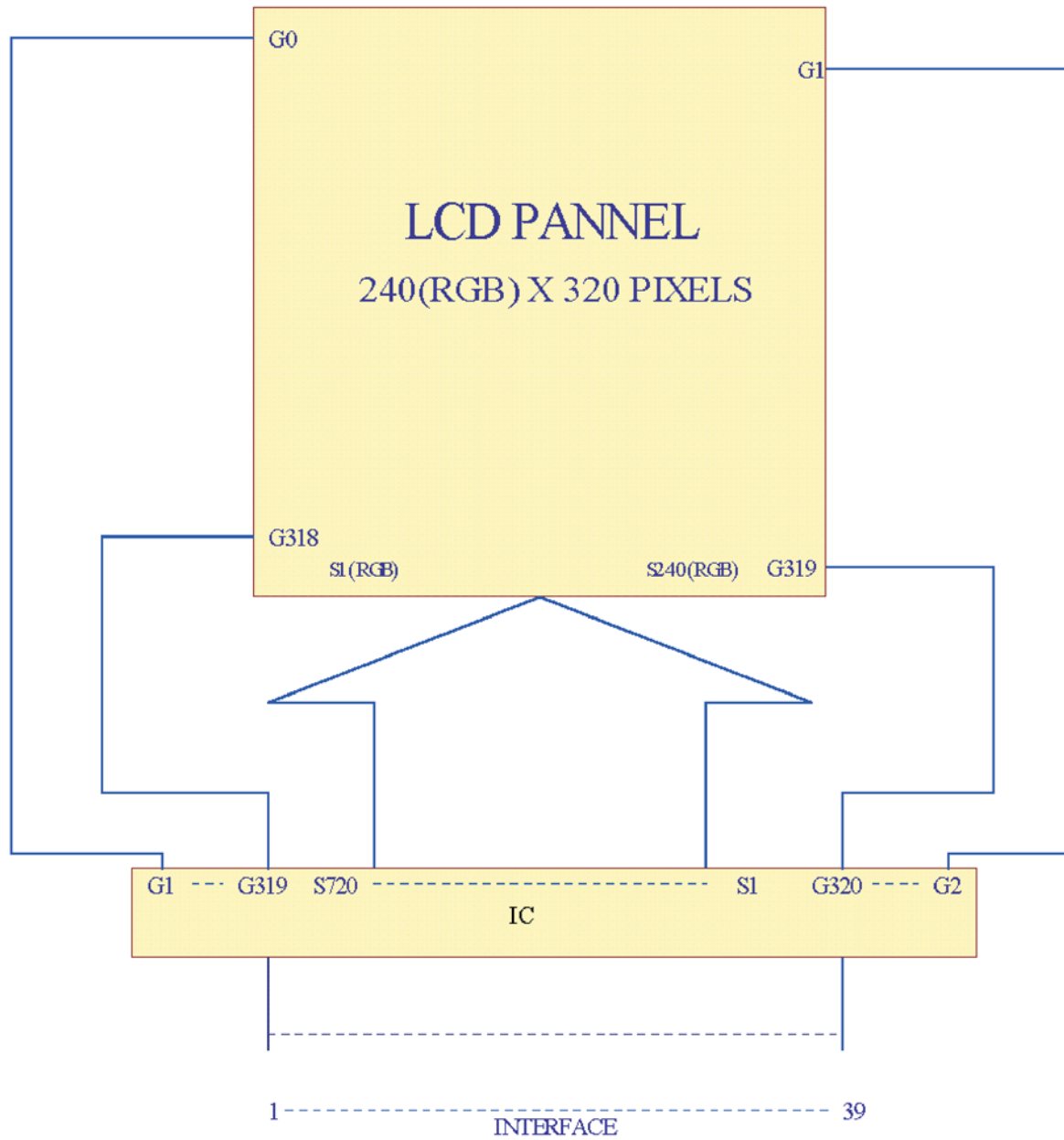
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BLOCK DIAGRAM



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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:

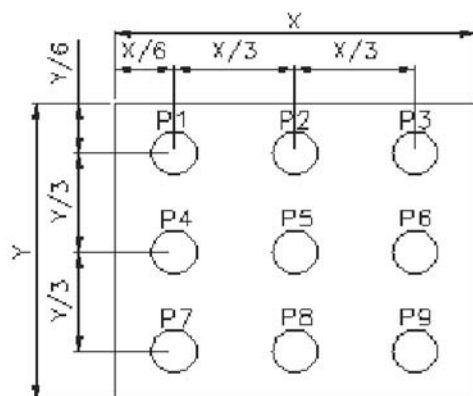
PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	If	-	20	-	mA	V=13.2V	-
Supply Voltage	V	-	13.2	-	V	If=20mA	-
Reverse Voltage	V _R	-	-	5	V	If=20mA	-
Luminous Intensity for LCM	I _v	280	350	-	Cd/m ²	If=20mA	1
Uniformity for LCM	-	80	-	-	%	If=20mA	2
Color	White						

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 $\varnothing 3\text{mm}$; 1 to 9 per Position Measured Luminous

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 dewling
6	Thermal shock storage	-30°C(30min)→25°C(5min)→ +80°C(30min)	10 cycles	-

Mechanical Test

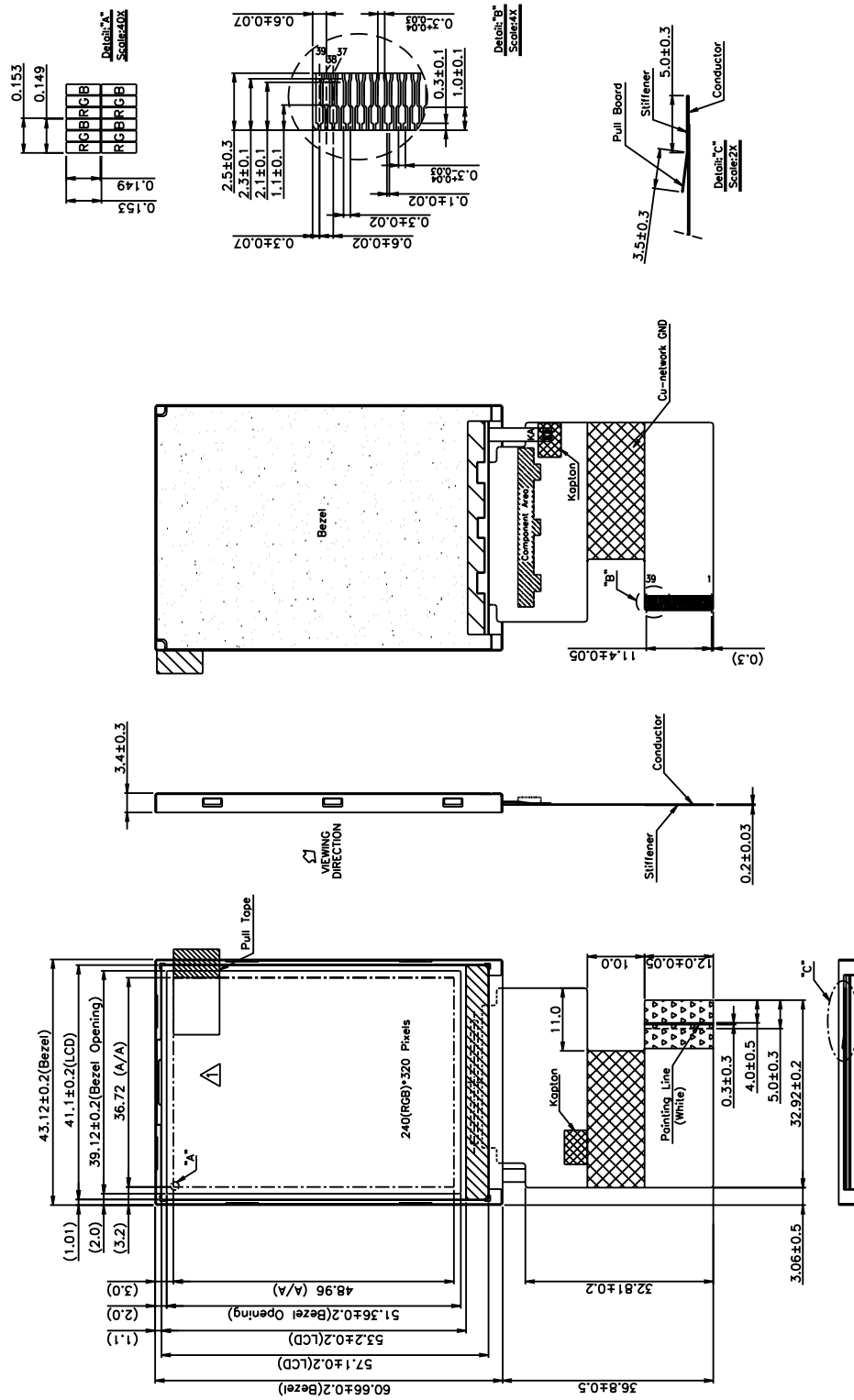
NO.	Test Item	Test Condition	Note
1	Vibration test	Sweep for 1 min at 10Hz , 55Hz , 10Hz , amplitude 1.5mm 15 minutes each in the X , Y and Z directions(Total 45 minutes)	Non operation state
2	Drop test	One angle, three edges and six sides. 75cm above the ground(no weight difference)	Non operation state

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. (Except backlight)

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LCM DRAWING



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