DLC Display Co., Limited

德爾西顯示器有限公司

MODEL No: DLC0130BZOG

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Record of Revision

Date	Revision No.	Summary
2017-12-06	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC0130BZOG, AMOLED display module. It is composed of an AMOLED panel, driver IC and FPC. The1.30″ display area contains 360 (RGB) x 360 pixels.

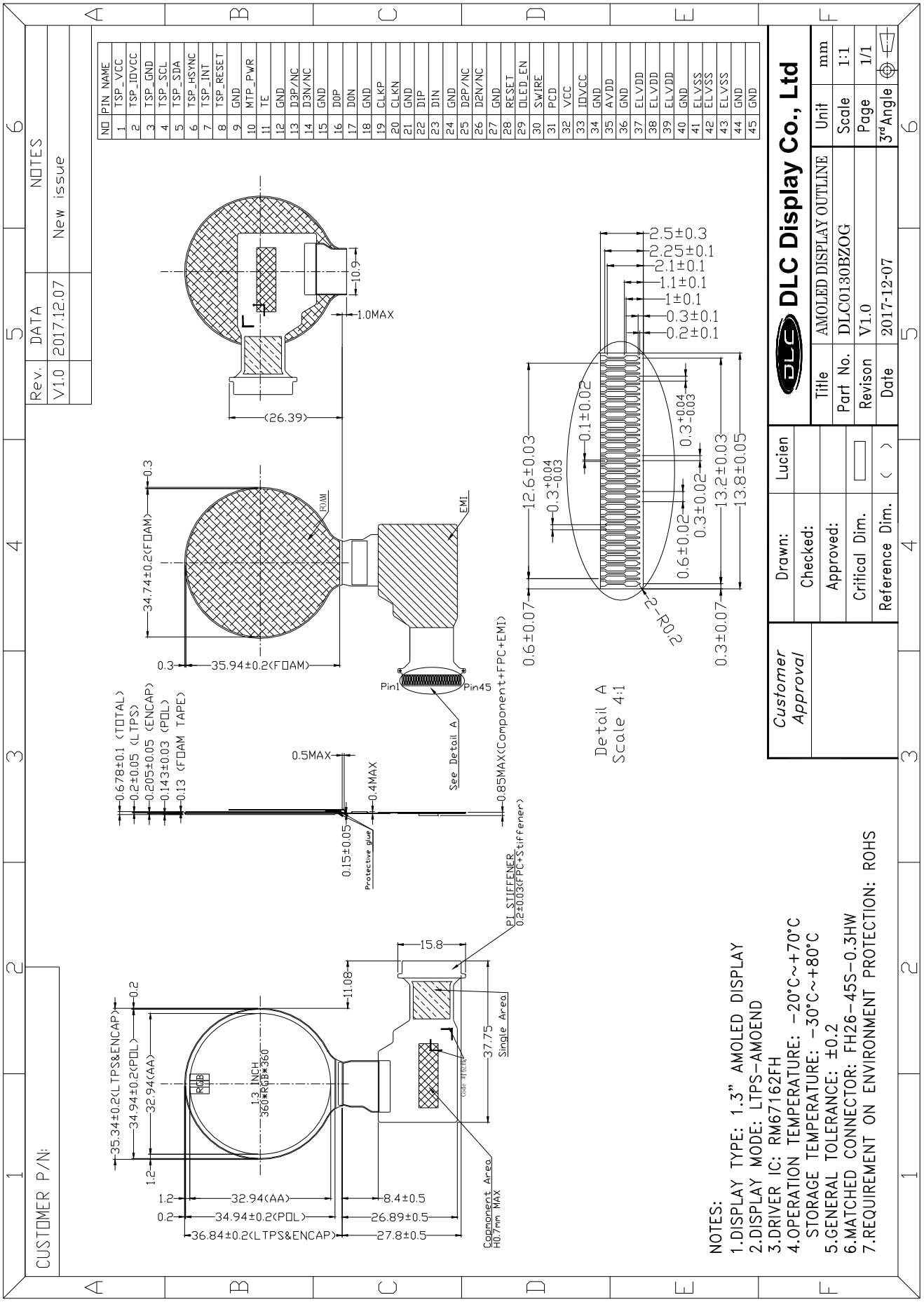
2. Application

Digital equipments which need display, instrumentation, remote control, electronic product.

3. General Information

Item	Contents	Unit
Size	1.30	inch
Display Technology	AMOLED	/
Resolution	360(RGB)×360	/
Display Color	16.7M colors (24bits)	/
Interface	MIPI 1 lane/2 lane	/
Outline Dimension	35.34x 36.84 x 0.678	mm
Active Area	Φ32.94	mm
Driver IC	RM67162FH	/
Operating Temperature	-20℃ ~ +70℃	/
Storage Temperature	-30℃ ~ +80℃	/

4. Outline Drawing



5. Interface signals

PIN NO.	PIN NAME	DESCRIPTION
1	TSP_VCC	TP Power Supply (No connection)
2	TSP_IOVCC	TP Power Supply (No connection)
3	TP_GND	TP Ground (No connection)
4	TSP_SCL	Touch I2C clock (No connection)
5	TSP_SDA	Touch I2C data (No connection)
6	TSP_HSYNC	Multi-chip synchronization signal (No connection)
7	TP_INT	Touch State change interrupt (No connection)
8	TSP_RESET	TSP Reset signal. Active low. (No connection)
9	GND	Ground
10	MTP_PWR	MTP programming power supply pin. (8V typical) Must be left open or connected to DVSS in normal condition.
11	TE	Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command. When this pin is not activated, this pin is output low. If not used, please open this pin.
12	GND	Ground
13	D3P/NC	No connection
14	D3N/NC	No connection
15	GND	Ground
16	D0P	These pins are DSI –D0+/- differential data signals if MIPI interface is used
17	D0N	These pins are DSI –D0+/- differential data signals if MIPI interface is used
18	GND	Ground
19	CLKP	These pins are DSI –CLK+/- differential data signals if MIPI interface is used
20	CLKN	These pins are DSI –CLK+/- differential data signals if MIPI interface is used
21	GND	Ground
22	D1P	These pins are DSI –D1+/- differential data signals if MIPI interface is used
23	D1N	These pins are DSI –D1+/- differential data signals if MIPI interface is used
24	GND	Ground
25	D2P/NC	No connection
26	D2N/NC	No connection
27	GND	Ground

28	RESET	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
29	OLED_EN	Power IC enable control pin (Note: “H” = VDDI level, “L” = VSSI level.)
30	SWIRE	Swire protocol setting pin (Note: “H” = VDDI level, “L” = VSSI level.)
31	PCD	PCD (Panel Crack Detection) output pin
32	VCC	Input Voltage for analog power supply
33	IOVCC	Input voltage for logic/interface power supply
34	GND	Ground
35	AVDD	No connection
36	GND	Ground
37	ELVDD	Power supply for pixel circuit
38	ELVDD	Power supply for pixel circuit
39	ELVDD	Power supply for pixel circuit
40	GND	Ground
41	ELVSS	Power supply for pixel circuit
42	ELVSS	Power supply for pixel circuit
43	ELVSS	Power supply for pixel circuit
44	GND	Ground
45	GND	Ground

Recommended Connector: FH26-45S-0.3SHW

6. Environment Conditions

6.1 Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Supply voltage	VCC	-0.3	5.5	V	
	IOVCC	-0.3	5.5	V	
	ELVDD	0	6.0	V	
	ELVSS	-6.5	0	V	

6.2 Environment Conditions

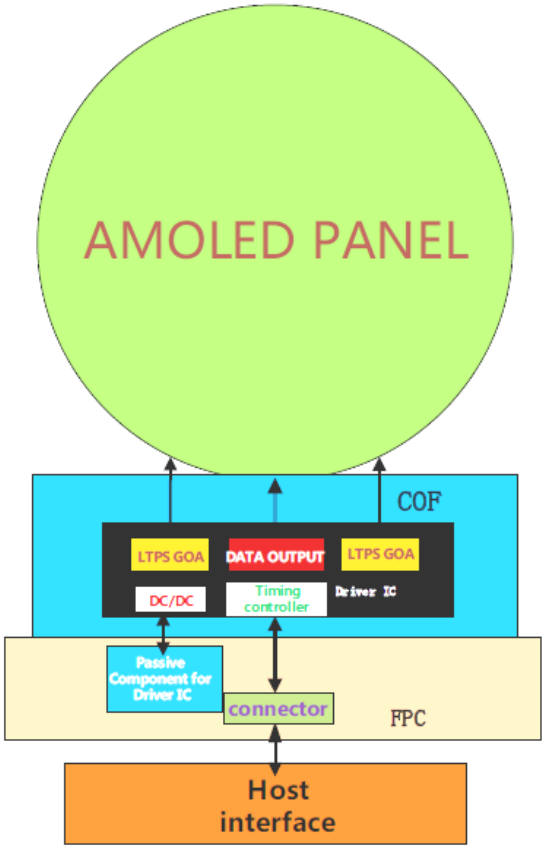
Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-20	70	℃	
Storage Temperature	TSTG	-30	80	℃	

7. Electrical Specifications

7.1 Electrical characteristics

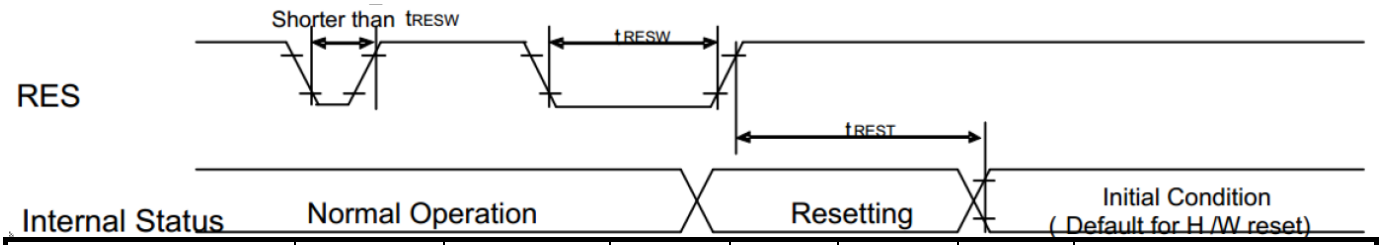
Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply voltage		VCC	2.7	3.3	3.6	V	
		IOVCC	1.65	1.8	3.3	V	
		ELVDD	4.55	4.60	4.65	V	
		ELVSS	-1.4	-2.2	-3.0	V	
Input voltage	"H" level	VIH	0.8×IOVCC	-	IOVCC	V	IOVCC= 1.65V~3.3V
	"L" level	VIL	0	-	0.2×IOVCC	V	
Output voltage	"H" level	VOH	0.8×IOVCC	-	IOVCC	V	I(OL)=+1mA I(OH)=-1mA
	"L" level	VOL	0	-	0.2×IOVCC	V	
Current	Sleep out mode	I_{VCI}	-	2.8	4.2	mA	Full white display
		I_{IOVCC}	-	1.6	2.4	mA	
		$I_{ELVDD/ELVSS}$	-	17	25.5	mA	
	Deep standby mode	I_{VCI}	-	1	3	uA	
		I_{IOVCC}	-	1	3	uA	
		$I_{ELVDD/ELVSS}$	-	-	-	mA	
Frame Frequency		f_{FRM}	-	60	-	Hz	

7.2 Module Block Diagram



8. Command/AC Timing

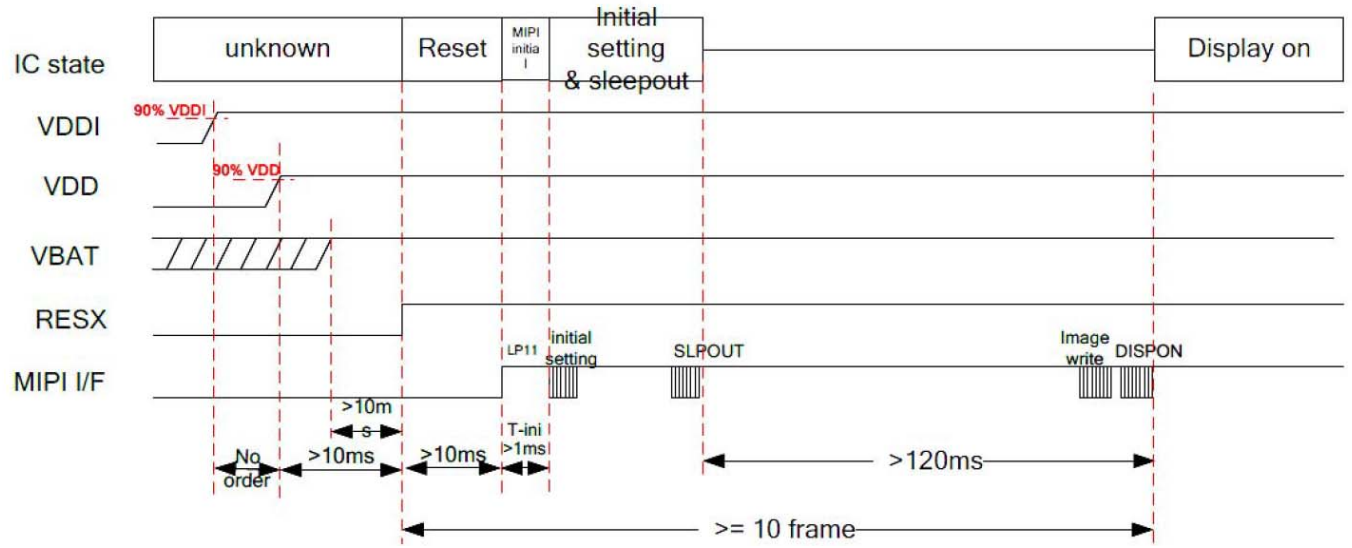
8.1 Reset Timing



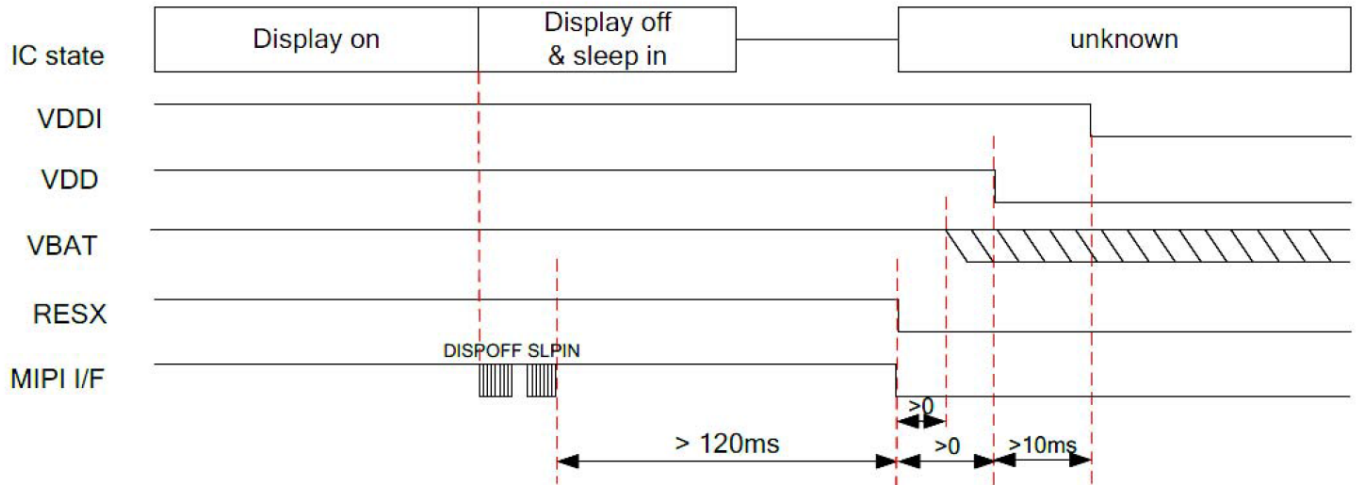
Item	Symbol	Related Pins	MIN	TYP	MAX	Unit	Remark
Reset low pulse width	tRESW	RESX	10			us	
Reset complete time	tREST				5	ms	When reset applied during Sleep in mod
					120	ms	When reset applied during Sleep out mode

8.2 Recommended Operating Sequence

Power on sequence



Power off sequence



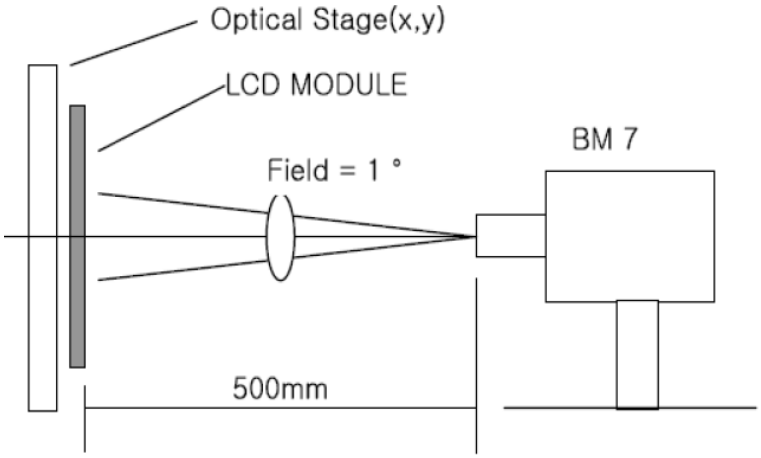
9. Optical Specification

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	10000	-	-		Note1 Note2
View Angles		ΘT	--	88	-	-	Degree	Note 4
Optical Switching Time		(Tr+Tf)/2	25℃	-	-	-	ms	Note1 Note3
Chromaticity	White	x	Brightness is on	0.275	0.295	0.315		Note5, Note1
		y		0.295	0.315	0.335		
	Red	x		0.635	0.665	0.695		
		y		0.309	0.339	0.369		
	Green	x		0.169	0.219	0.269		
		y		0.673	0.723	0.773		
	Blue	x		0.100	0.140	0.180		
		y		0.008	0.048	0.088		
Luminance		L		300	350	400	cd/m2	Note1 Note6
Brightness Uniformity				80	-	-	%	Note7
NTSC				85	100	-	%	
Gamma				2.0	2.2	2.4		
Lifetime				240	-	-	h	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃)

LED back-light: ON, Environment brightness < 150 lx

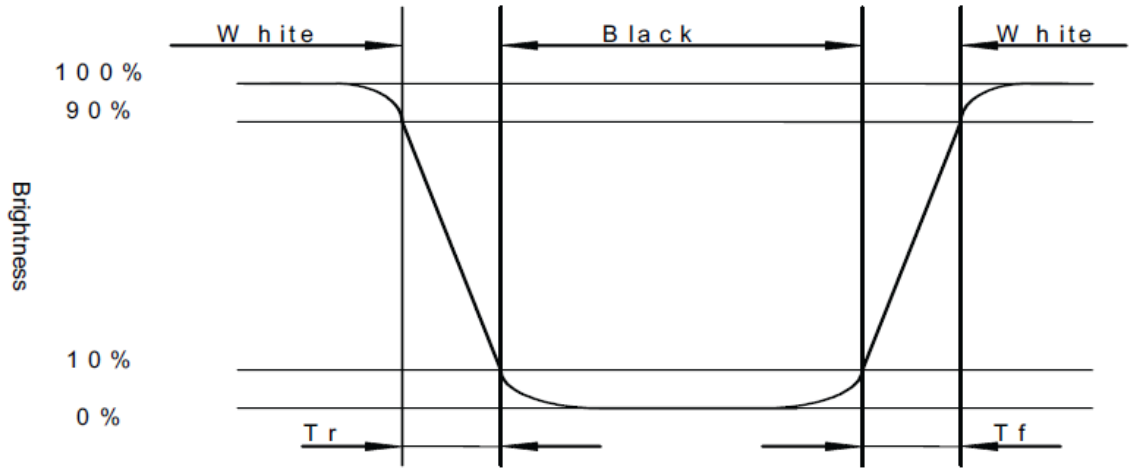


Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

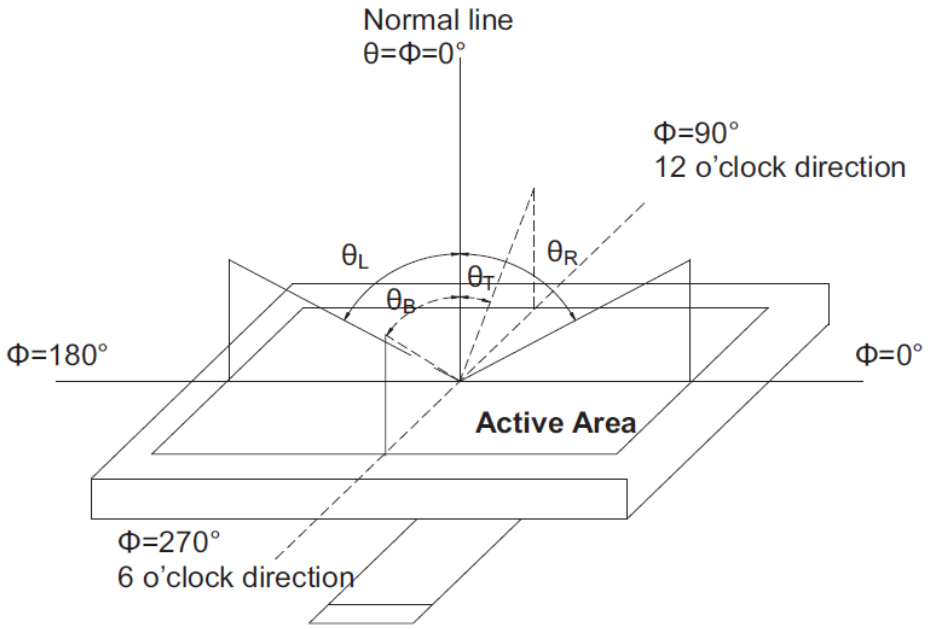
Note 3: Response time is defined as follow:

Response time is the time required for the display to transition from black to white (Rise Time, Tr) and from white to black(Decay Time, Tf).



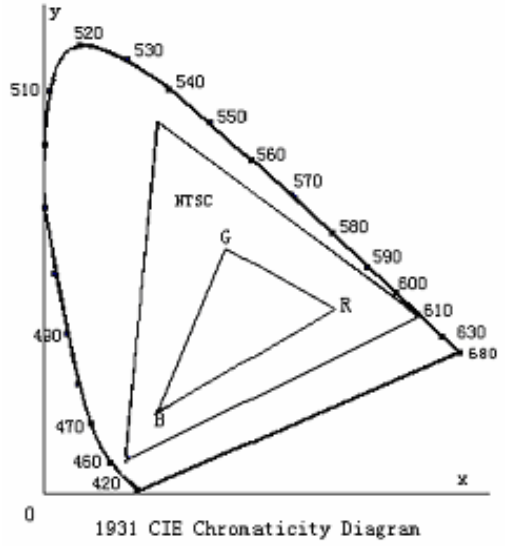
Note 4: Viewing angle range is defined as follow:

Viewing angle is measured at the center point of the LCD.



Note 5: Color chromaticity is defined as follow: (CIE1931)

Color coordinates measured at center point of LCD.



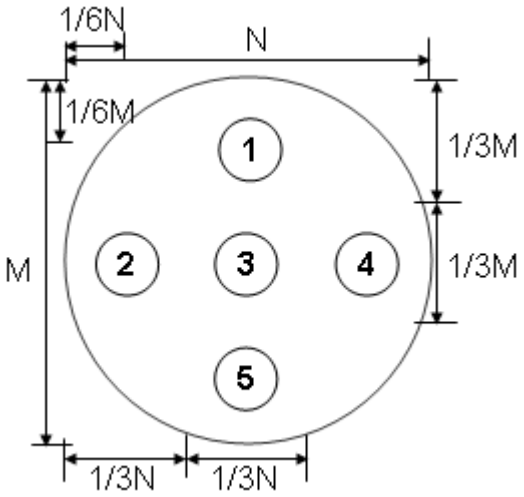
1931 CIE Chromaticity Diagram

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 6: Luminance is defined as follow:

Luminance is defined as the brightness of all pixels “White” at the center of display area on optimum contrast.

Note 7: Uniformity. Refer to figure as below



- Bp = Bp (Min.) / Bp (Max.)×100 (%)
- Bp (Max.) = Maximum brightness in 5 measured spots
- Bp (Min.) = Minimum brightness in 5 measured spots.

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70℃, 120hrs	Per table in below
2	Low Temp Operation	Ta=-20℃, 120hrs	Per table in below
3	High Temp Storage	Ta=+80℃, 120hrs	Per table in below
4	Low Temp Storage	Ta=-30℃, 120hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60℃, 90% RH 120 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30°C ~80°C，Dwell for 30 min. 100 cycles	Per table in below
7	ESD (Operation)	Voltage:±8KV, R: 330Ω, C: 150pF Air discharge, 10time	Per table in below
8	Vibration	Frequency ： 10Hz~55Hz~10Hz Amplitude：1.5mm, X，Y，Z direction for total 3hours (Packing condition)	Per table in below
9	Package Drop Test	Drop to the ground from 75cm height, one time, every side of carton. (Packing condition)	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the OLED Panel
Alignment of OLED Panel	No Bubbles in the OLED Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications Current consumption: within · 50% of initial value.
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display

11. Precautions for Use of OLED Modules

11.1 Safety

The liquid crystal in the OLED is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

11.2 Handling

A. The OLED and touch panel is made of plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
B. Do not handle the product by holding the flexible pattern portion in order to assure the reliability
C. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.
D. Provide a space so that the panel does not come into contact with other components.
E. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.
F. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.
G. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.
H. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

11.3 Static Electricity

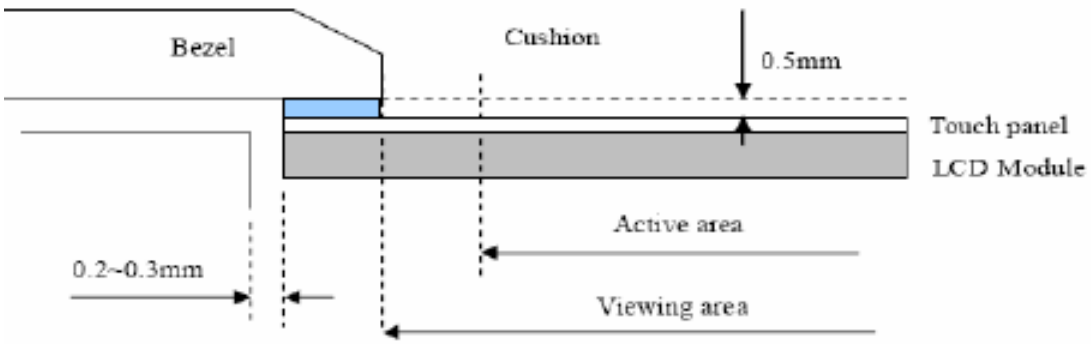
A. Ground soldering iron tips, tools and testers when they are in operation.
B. Ground your body when handling the products.
C. Power on the OLED module before applying the voltage to the input terminals.
D. Do not apply voltage which exceeds the absolute maximum rating.
E. Store the products in an anti-electrostatic bag or container.

11.4Storage

A. Store the products in a dark place at +25℃±10℃ with low humidity (40% RH to 60% RH). Don't expose to sunlight or fluorescent light.
B. Storage in a clean environment, free from dust, active gas, and solvent.

11.5 Cleaning

A. Do not wipe the touch panel with dry cloth, as it may cause scratch.
B. Wipe off the stain on the product by using soft cloth moistened with ethanol. Do not allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. Do not use any organic solvent or detergent other than ethanol.

11.6 Cautions for installing and assembling

Bezel edge must be positioned in the area between the Active area and View area. The bezel may press the touch screen and cause activation if the edge touches the active area. A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2 to 0.3mm for the outside dimensions of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.
In order to make the display assembly stable and firm, DLC recommends to design some supporting at the display backside, especially for the display with tape-attached touch panel, such supporting is important and essential, or else, the display may drop-off from front after some period of time.