CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: CH170CLJL-001

(Complied with RoHS)

ISSUE:DEC.12.2013

Spec Condition:preliminary

CUSTOMER		CHEFREE	
APPROVAL			

2.RECORD OF REVISION

REV	DATE	PAGE	SUMMARY
0.1	2013.12.12	ALL	Preliminary specification was first issued.

3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1280(R.G.B) X 1024
(2)	Module Size(mm)	358.5(H) X 296.5(V) X17 (D) *
(3)	Active Area(mm)	337.920(H) X 270.336(V)
(4)	Pixel Pitch(mm)	0.264 (H) X 0.264(V)
(5)	LCD / Polarizer Model	TFT , Transmissive, Normally/White
(6)	Backlight Color	White, LED
(7)	Surface Treatment	Anti-glare, Hard-Coating(3H)
(8)	Electrical Interface	LVDS Interface
(9)	Color Configuration	R.G.B. Vertical Stripe
(10)	Module Weight(g)	TBD

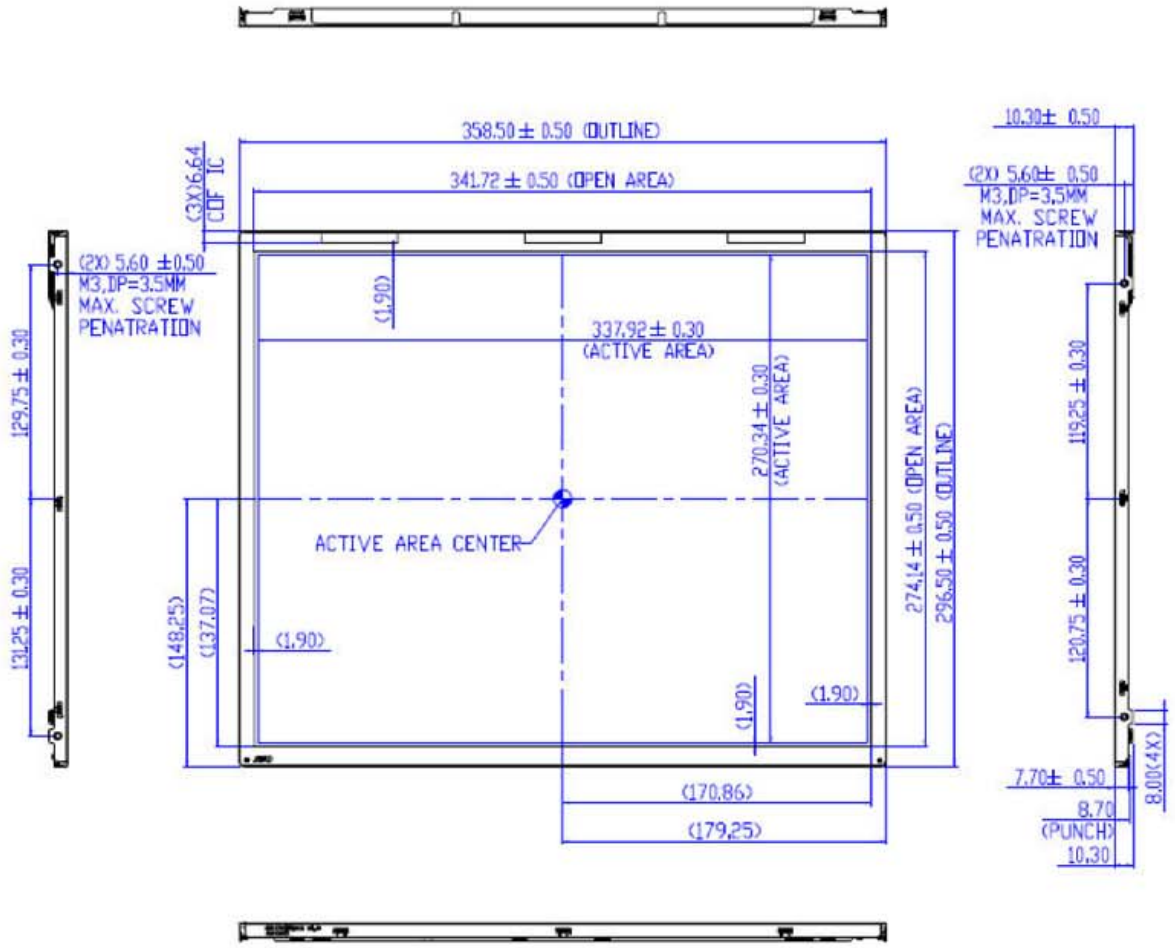
Note 1.Viewing direction for best image quality is different from TFT definition, there is the 180 degrees shift.

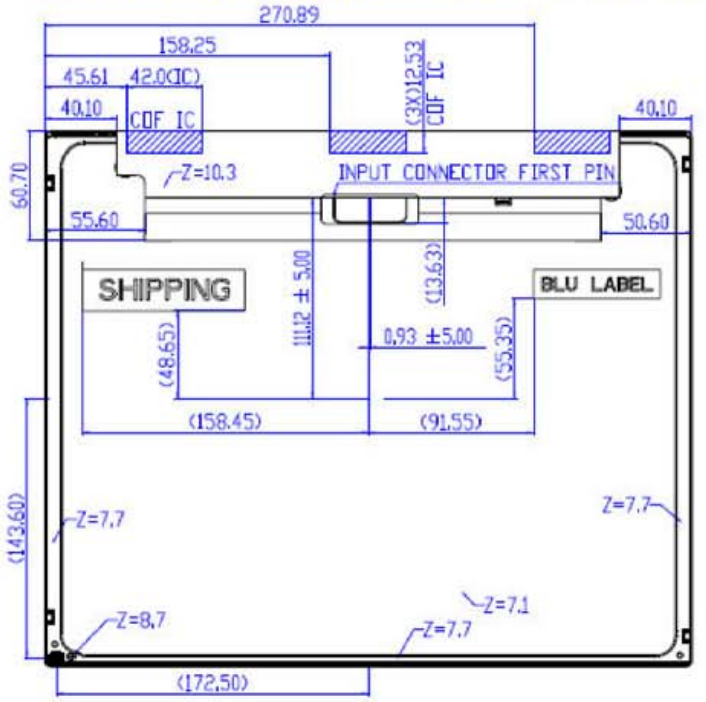
1	2	3	4	5	6	7	8 樣式 QT3-RD-E-0004-003

文件題目	圖號	頁	次頁
發行日	舊版日	登入號碼	機密等級

No.	修定區塊	修 訂 內 容	作 成	修訂日期
		新版	Alan	2013.06.25

4. OUTLINE DIMENSIONS





NOTE:
1. Unit:mm
2. Without Tolerance ±0.3
3. CN1:MSB240420HD or Compatible
4. CN2：3808K-F05N-02R or Compatible

備考		單位:mm	投影法:	比例尺: 1:1
入庫	製圖 Alan 130625	名稱: 17" LCM		圖號 CH170CLJL-001
	審查			
	承認			

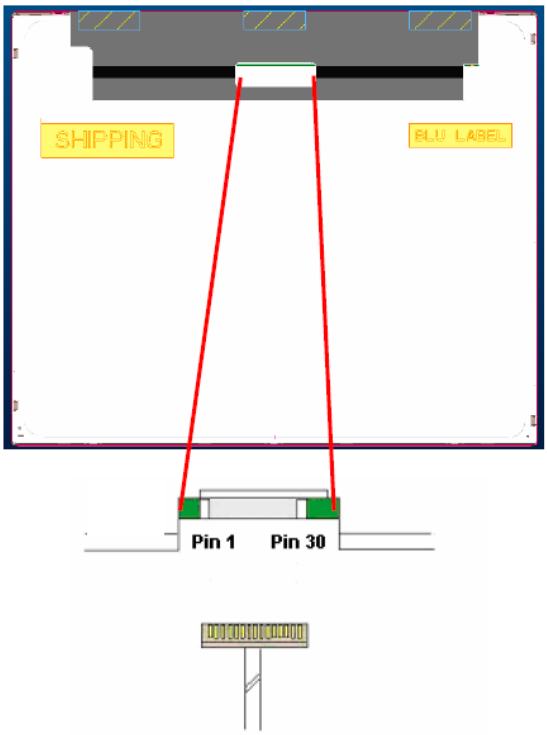
5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION

Connector: FI-XB30LLSLA-HF15 or Equivalent

PIN #	SIGNAL NAME	DESCRIPTION
1	RxO0-	Negative LVDS differential data input (Odd data)
2	RxO0+	Positive LVDS differential data input (Odd data)
3	RxO1-	Negative LVDS differential data input (Odd data)
4	RxO1+	Positive LVDS differential data input (Odd data)
5	RxO2-	Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
6	RxO2+	Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RxOC-	Negative LVDS differential clock input (Odd clock)
9	RxOC+	Positive LVDS differential clock input (Odd clock)
10	RxO3-	Negative LVDS differential data input (Odd data)
11	RxO3+	Positive LVDS differential data input (Odd data)
12	RxE0-	Negative LVDS differential data input (Even data)
13	RxE0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxE1-	Negative LVDS differential data input (Even data)
16	RxE1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RxE2-	Negative LVDS differential data input (Even data)
19	RxE2+	Positive LVDS differential data input (Even data)
20	RxEC-	Negative LVDS differential clock input (Even clock)
21	RxEC+	Positive LVDS differential clock input (Even clock)
22	RxE3-	Negative LVDS differential data input (Even data)
23	RxE3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	GND	Power Ground (For AUO test Aging+HVS mode)
26	NC	No contact
27	GND	Power Ground
28	VCC	+5.0V Power Supply
29	VCC	+5.0V Power Supply
30	VCC	+5.0V Power Supply

Note1: Start from left side



Note2: Input signals of odd and even clock shall be the same timing.

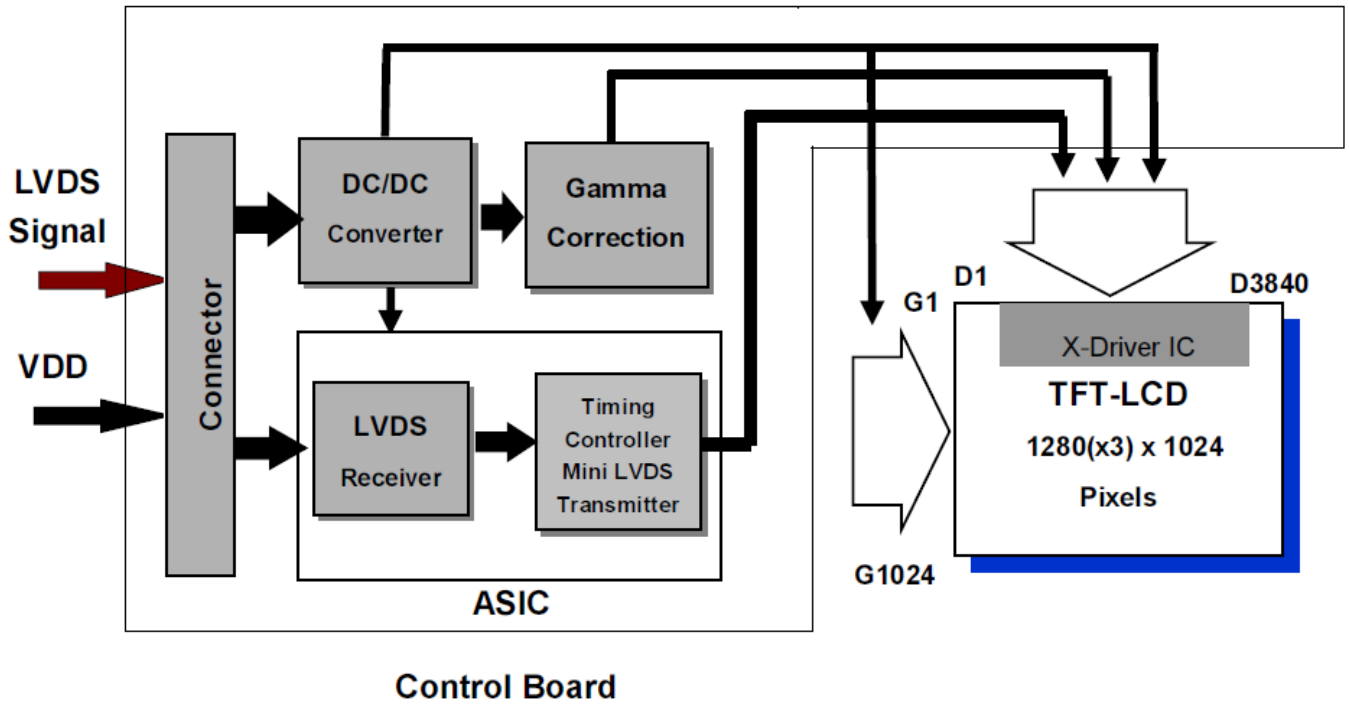
Note3: Please follow PSWG.

5.2 LED INTERFACE CONNECTOR

Connector: CviLux CI0106M1HR0-LF or Equivalent

PIN NO.	SYMBOL	FUNCTION	REMARK
1	VIN	12V	
2	VIN	12V	
3	Enable	3V-On / 0V-Off	
4	Dimming	0V-Max. brightness / 3V-Min. brightness	
5	GND	Ground	
6	GND	Ground	

6. BLOCK DIAGRAM



7.ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Voltage	VDD	-0.3	6	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(℃)	-10	60	-20	70	Note 1,2,3
Humidity(% RH)	10	90	10	90	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation Ta=60℃ & -10℃ ≦ 240Hrs.

Note 4 : Operation Ta=50℃ & RH=80% ≦ 240Hrs.

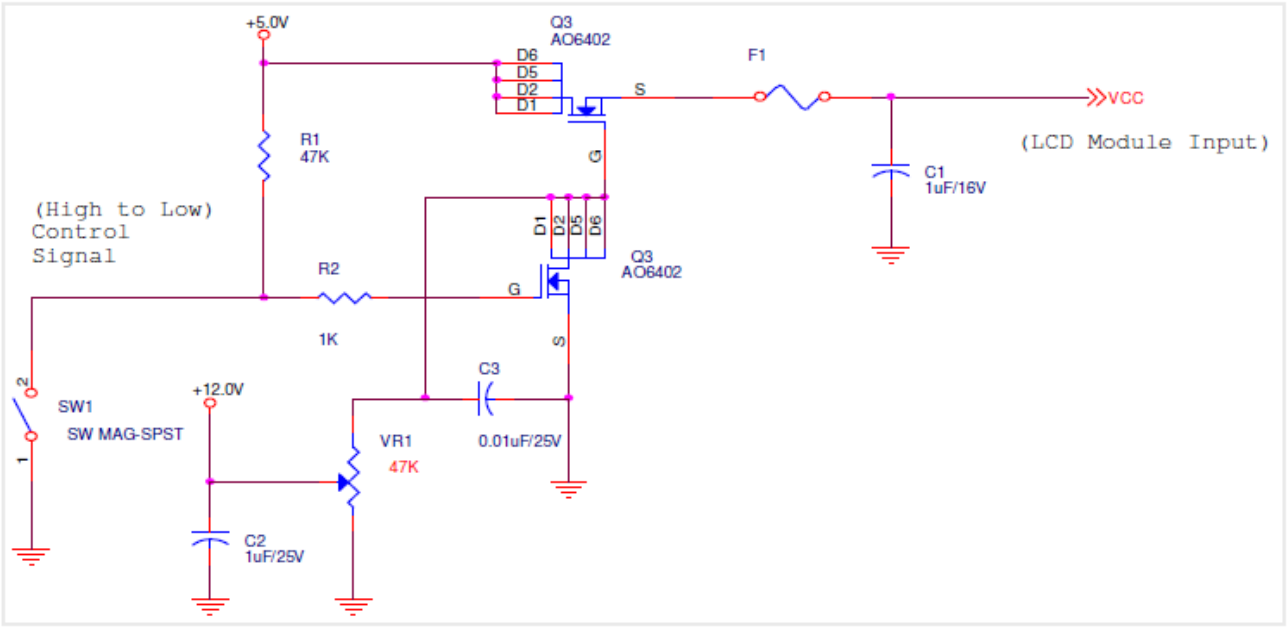
8.ELECTRICAL CHARACTERISTICS

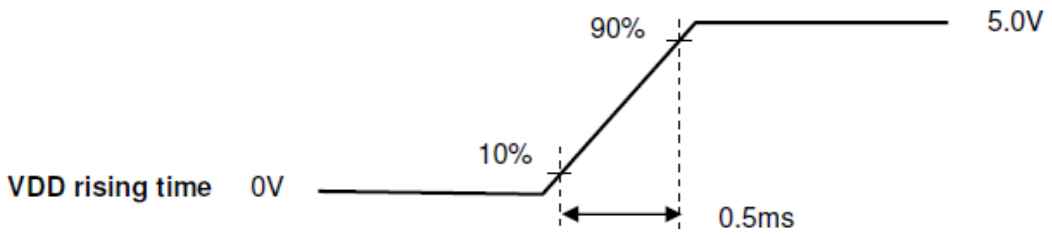
8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	4.5	5.0	5.5	V	-
	IDD	-	600	720	mA	5V/Black pattern
	PDD	-	3	-	W	5V/Black Pattern
	Irush	-	-	3	A	Note1

Note 1: Measure Condition





8.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when Vin is off

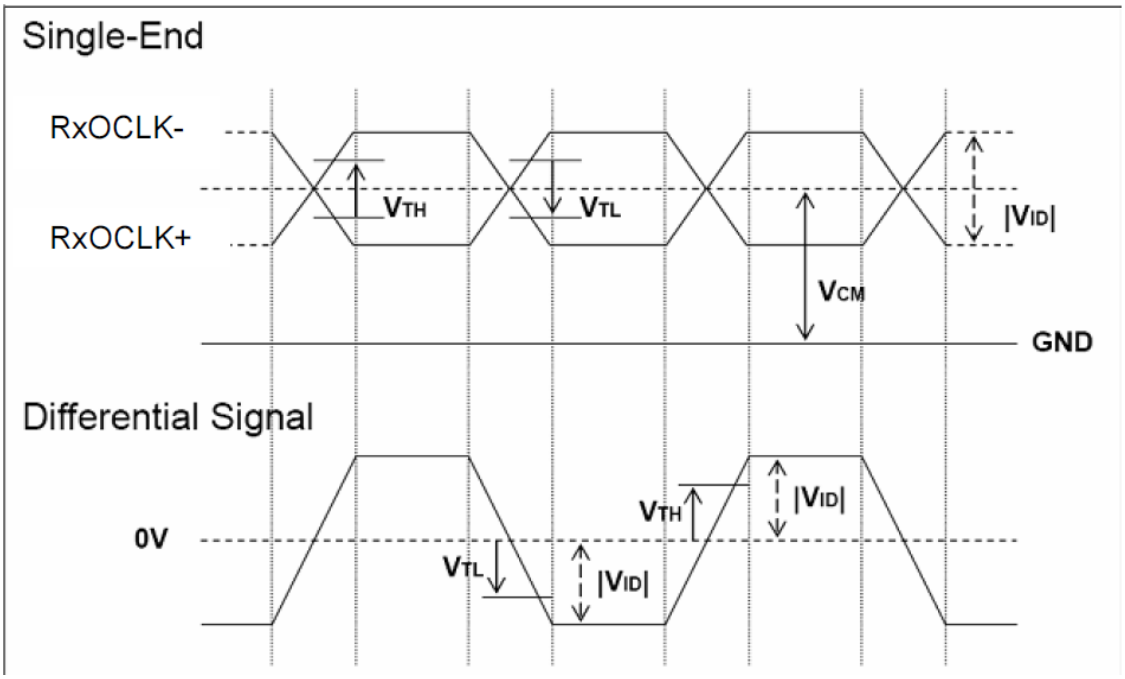
It is recommended to refer the specifications of SN75LVDS82DGG (Texas Instruments) in detail.

Characteristics of each signal are as following:

Symbol	Description	Min	Typ	Max	Units	Condition
V_{TH}	LVDS Differential Input High Threshold	-	-	+100	[mV]	V_{CM} = 1.2V
V_{TL}	LVDS Differential Input Low Threshold	-100	-	-	[mV]	V_{CM} = 1.2V
$\lvert V_{ID} \rvert$	LVDS Differential Input Voltage	100	-	600	[mV]	
V_{CM}	LVDS Common Mode Voltage	+1.0	+1.2	+1.5	[V]	V_{TH}-V_{TL} = 200mV

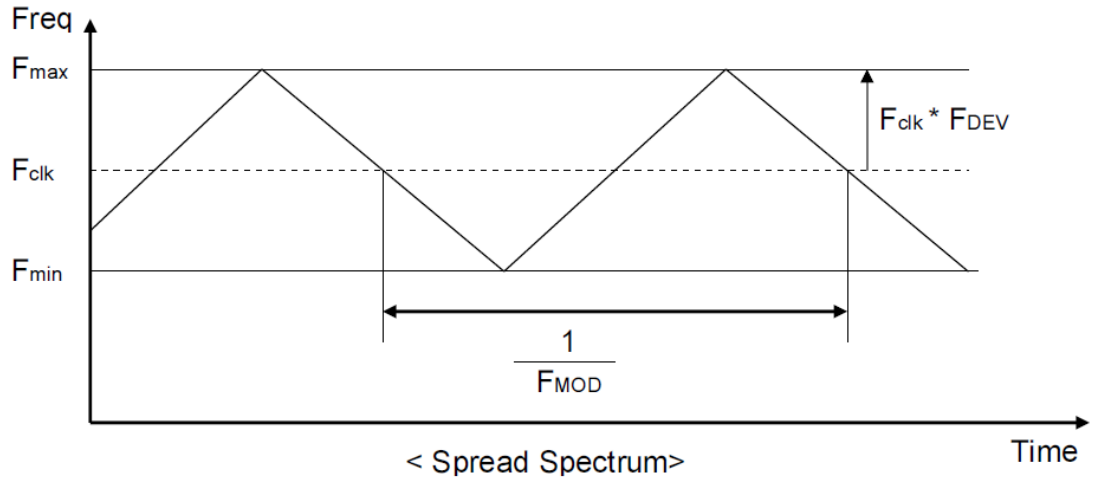
LVDS Signal Waveform:

Use RxOCLK- & RxOCLK+ as example



AC Characteristics:

Symbol	Description	Min	Max	Unit	Remark
F_{DEV}	Maximum deviation of input clock frequency during Spread Spectrum	-	± 3	%	
F_{MOD}	Maximum modulation frequency of input clock during Spread Spectrum	-	200	KHz	

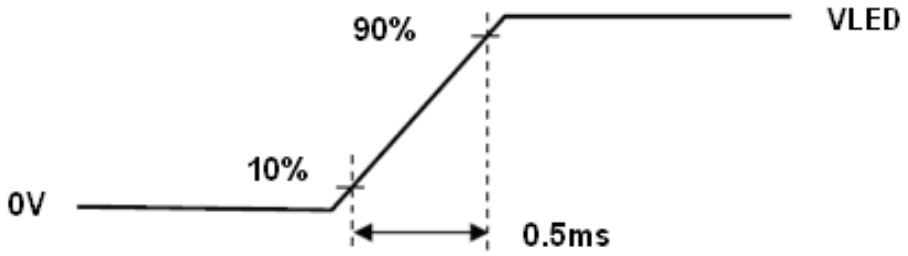


Fclk: LVDS Clock Frequency

8.2 BACKLIGHT CHARACTERISTICS Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Input	VLED	10.8	12	13.2	V	Note 2
LED Power Consumption	PLED	-	-	TBD	W	Note 2
ON/OFF Control	ON/OFF	0	-	3	V	ON3V;OFF0V
Dimming Control	DIM	0	-	3	V	Max. 0V; Min. 3V
LED Life Time	LT	40,000	-	-	Hours	Note 1

Note 1: The LED life time define as the estimated time to 50% degradation of initial luminous.
Note 2: A higher LED power supply voltage will result in better power efficiency. Keep the VLED between 12V and 13.2V is strongly recommended.



VLED rising time

9.OPTICAL CHARACTERISTICS

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	600	1000	-	-	Note (1)
Response Time		TR		-	3.8	-	ms	Note (2)
		TF		-	1.2	-	ms	
		TR+TF		-	5	-	ms	
Chromaticity	White	Wx		TBD	TBD	TBD	-	Note (4)
		Wy		TBD	TBD	TBD	-	
	Red	Rx		TBD	TBD	TBD	-	
		Ry		TBD	TBD	TBD	-	
	Green	Gx		TBD	TBD	TBD	-	
		Gy		TBD	TBD	TBD	-	
	Blue	Bx		TBD	TBD	TBD	-	
		By		TBD	TBD	TBD	-	
Viewing Angle	Hor.	Θx+	Viewing Angle Θx=Θy=0° CR≧10	75	85	-	Deg.	Note (3)
		Θx-		75	85	-		
	Ver.	ΘY+		75	85	-		
		ΘY-		75	85	-		
Lminance		L	CENTER	560	700	-	cd/m2	
Uniformity				65	75		%	Note (5)

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

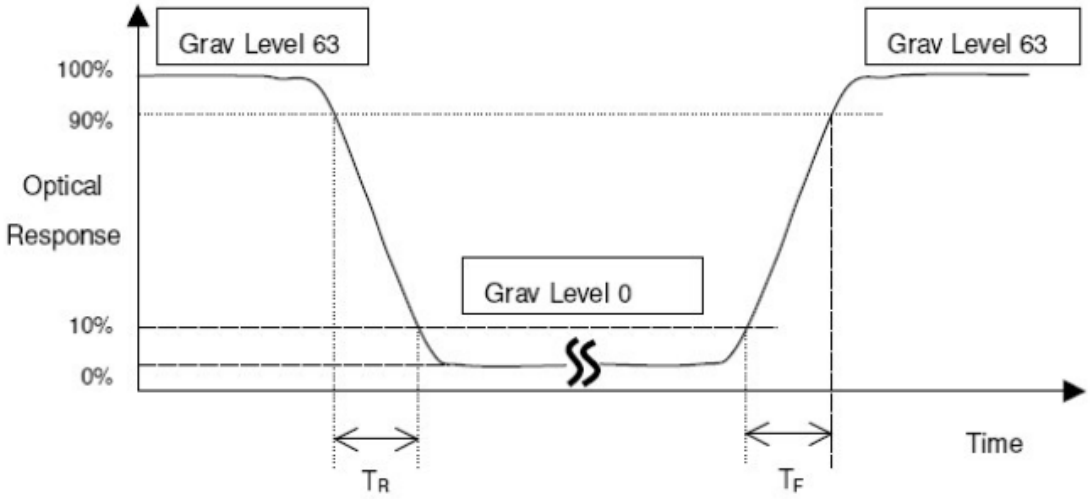
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

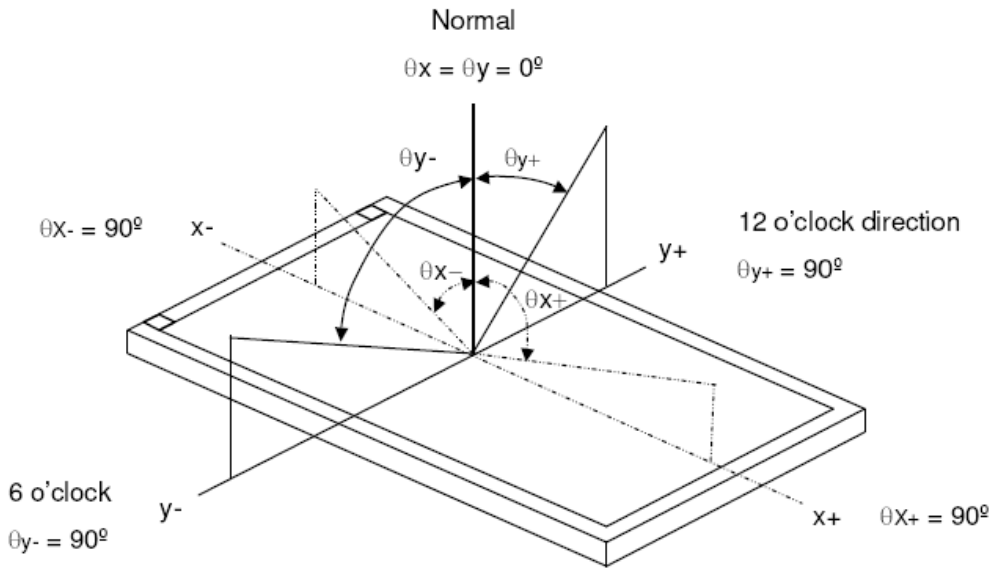
CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (T_R, T_F):

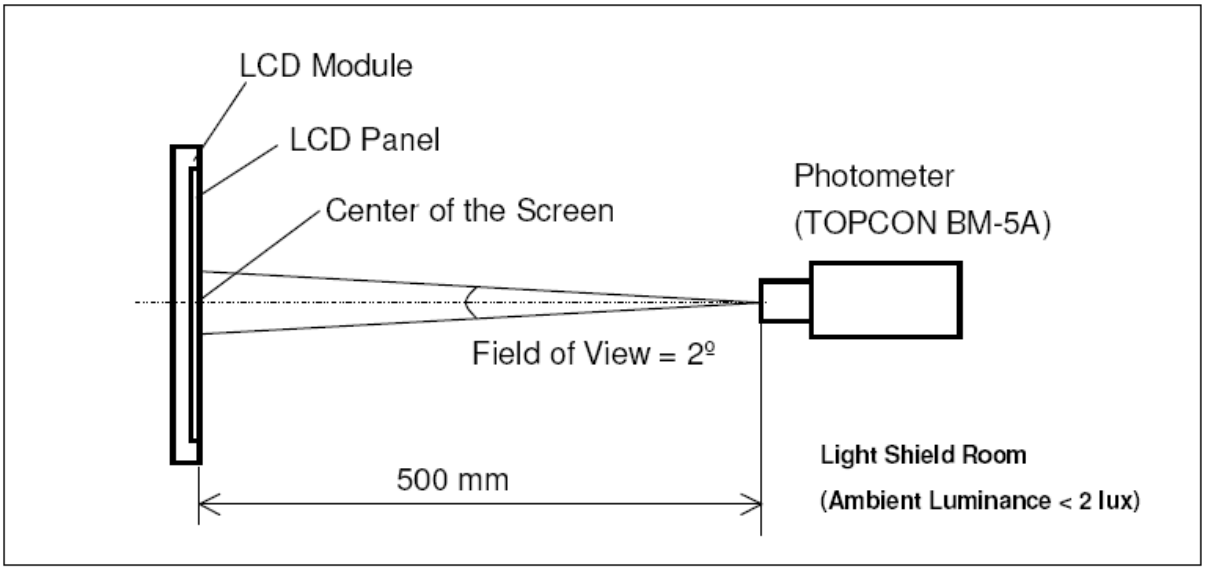


*Note(3) Definition of Viewing Angle

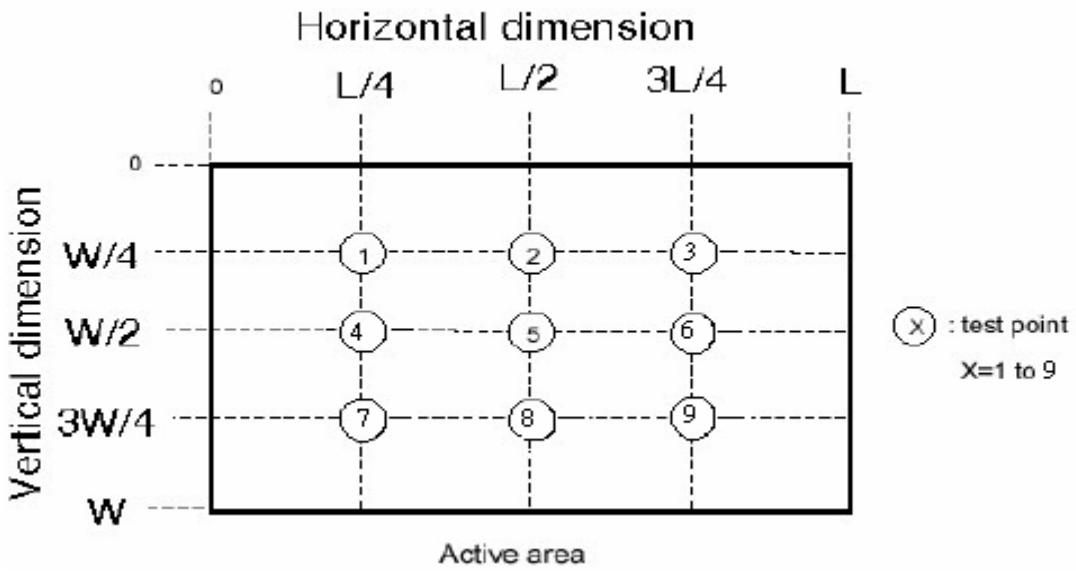


*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note (5)



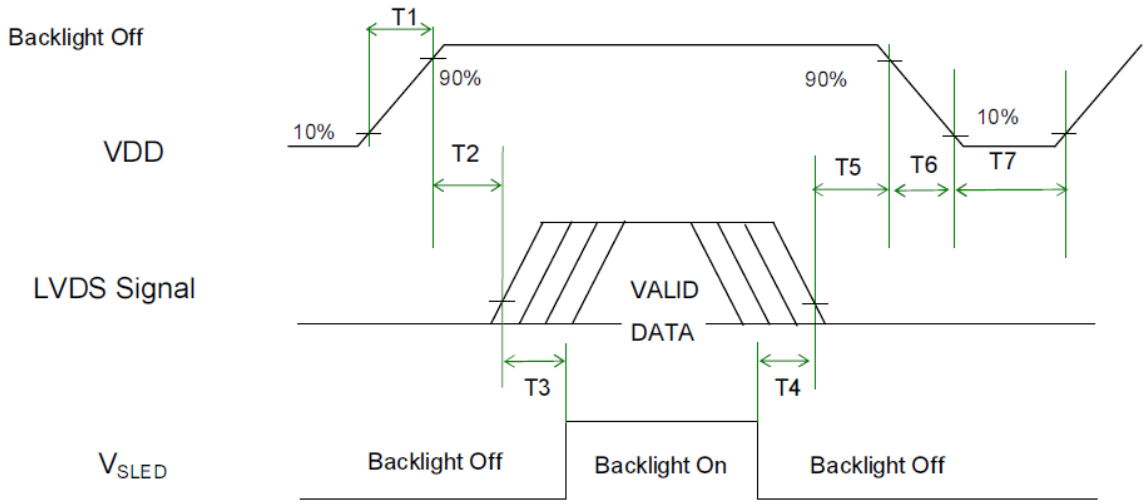
$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}}\right) \times 100\% > 75\%$$

10. TIMING SPECIFICATIONS

10.1 POWER SIGNAL SEQUENCE

VDD power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.a. Power on sequence:

Power Sequence



Power ON/OFF sequence timing

Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T1	0.5	-	10	[ms]	
T2	0	-	50	[ms]	
T3	500	-	-	[ms]	
T4	100	-	-	[ms]	
T5	0		50	[ms]	***Note 3-5*** ***Note 3-6***
T6	0	-	150	[ms]	***Note 3-6***
T7	1000	-	-	[ms]	

Note: The values of the table are follow PSWG.

10.2 TIMING CHARACTERISTICS

10.2.1. Interface Timings

Basically, interface timings described here is not actual input timing of LCD module but output timing of SN75LVDS82DGG (Texas Instruments) or equivalent.

Symbol	Description		Min.	Typ.	Max.	Unit	Remark
Tv	Vertical Section	Period	1036	1066	1873	Th	
Tdisp (v)		Active	1024	1024	1024	Th	
Tblk (v)		Blanking	12	42	849	Th	
Fv		Frequency	50	60	76	Hz	
Th	Horizontal Section	Period	730	844	1320	Tclk	
Tdisp (h)		Active	640	640	640	Tclk	
Tblk (h)		Blanking	90	204	680	Tclk	
Fh		Frequency	37.8	54	68.4	KHz	***Note 3-3***
Tclk	LVDS Clock	Period	50	60	76	ns	1/Fclk
Fclk		Frequency	51.8	64	93.7	MHz	***Note 3-4***

Note: The equation is listed as following. Please don't exceed the above recommended value.

Fh (Min.) = Fclk (Min.) / Th (Min.);

Fh (Typ.) = Fclk (Typ.) / Th (Typ.);

Fh (Max.)= Fclk (Max.) / Th (Min.);

Note: The equation is listed as following. Please don't exceed the above recommended value.

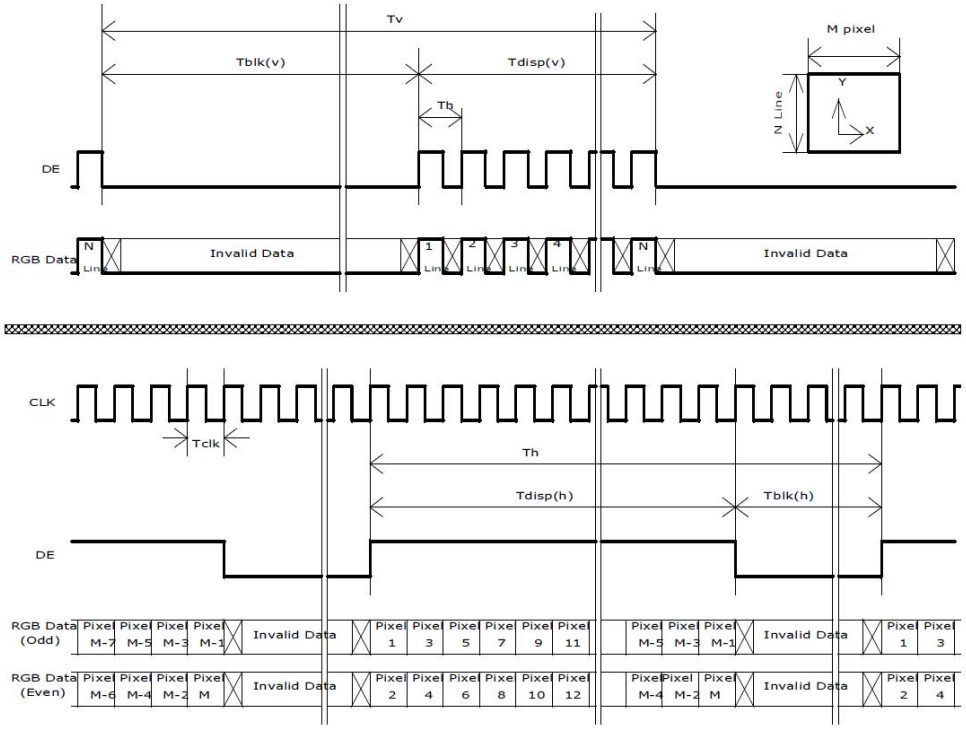
Fclk (Min.) = Fv (Min.) x Th (Min.) x Tv (Min.);

Fclk (Typ.) = Fv (Typ.) x Th (Typ.) x Tv (Typ.);

Fclk (Max.) = Fv (Max.) x Th (Typ.) x Tv (Typ.);

10.2.2. Timing Diagram of Interface Signal

Timing Characteristics



11. RELIABILITY TEST

Environment test conditions are listed as following table. Ta = 25℃

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 60℃, 50%RH, 300hours	3
Low Temperature Operation (LTO)	Ta= -10℃, 300hours	
High Temperature Storage (HTS)	Ta= 70℃, 300hours	
Low Temperature Storage (LTS)	Ta= -20℃, 300hours	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	1
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point.	2
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point.	2

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: The test items are tested by open frame type chassis.

12.PRECAUTIONS FOR USE

12.1 Safety

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

12.2 Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 23±5°C and thehumidity is below 50±20%RH.
(2) Store in anti-static electricity container.
(3) Store in clean environment, free from dust, active gas, and solvent.
(4) Do not place the module near organics solvents or corrosive gases.
(5) Do not crush, shake, or jolt the module.

12.3 Handling Precautions

(1) Avoid static electricity which can damage the CMOS LSI.
(2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface.
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9) When the module is assembled, it should be attached to the system firmly,Be careful not to twist and bend the module.
(10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time,staining and discoloration may occur.
(11) If the liquid crystal material leaks from the panel,it should be kept away from the eyes or mouth.In case of contact with hands,legs or clothes, it must be washed away thoroughly with soap.

12.4 Warranty

(1)Acceptance inspection period

The period is within one month after the arrival of contracted commodity at the buyer's factory site.

(2) Applicable warrant period

The period is within 12 months since the date of shipping out under normal using and storage conditions.