

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: CH0+00@DL-00&

(Complied with RoHS)



ISSUE:OCT.05.2012

Spec Condition: preliminary

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APPROVAL	APPROVAL	CHECKER	PREPARE
	<i>ch lee</i>	<i>ch lee</i>	<i>cloud</i>

2.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
0.1	2012.10.05	ALL	Preliminary specification was first issued.

3.MECHANICAL SPECIFICATIONS

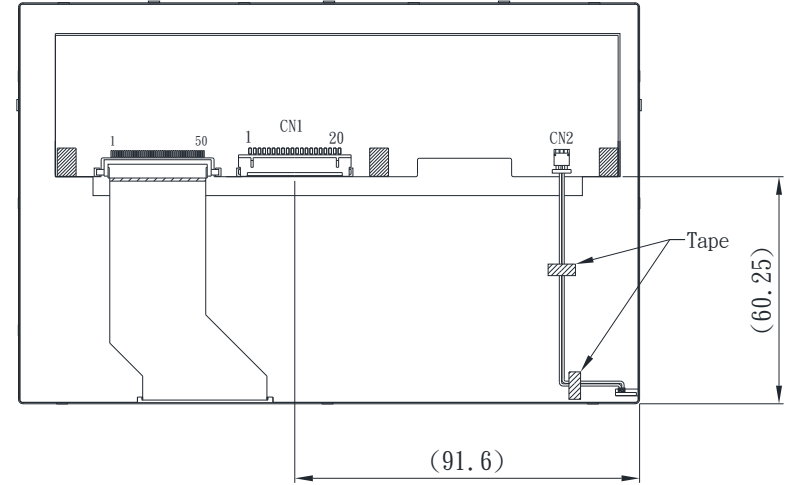
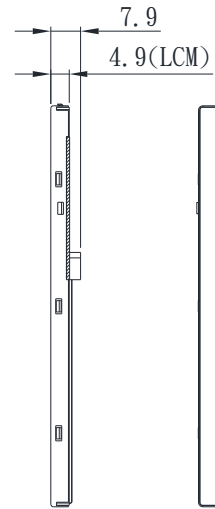
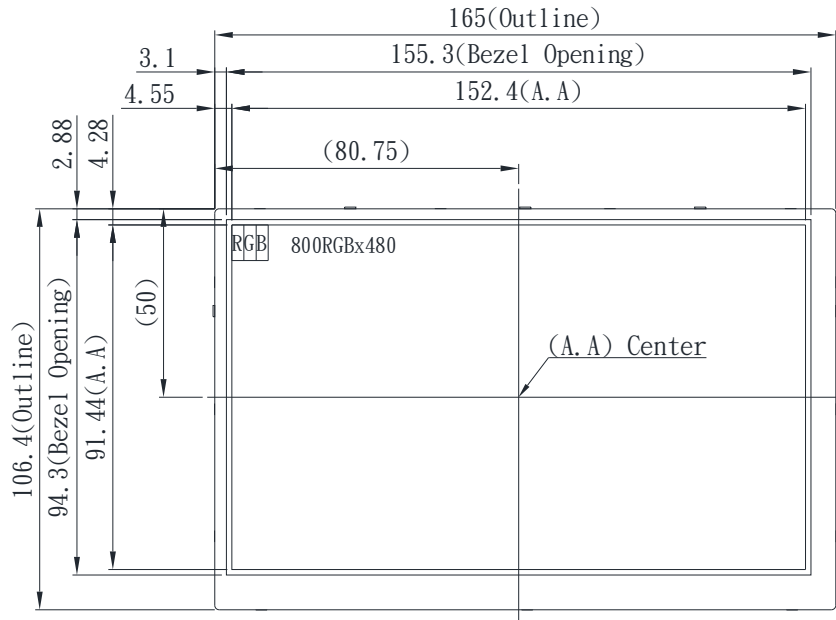
(1)	Number Of Dots (Dots)	800(R.G.B) X 480
(2)	Module Size(mm)	165.0(W) X 106.4(H) X 8.0(D)
(3)	Active Area(mm)	152.4(H) X 91.44(V)
(4)	Pixel Pitch(mm)	0.1905(H) X 0.1905(V)
(5)	LCD Model	TFT , Transmissive, Normally/White
(6)	Polarizer Model	Anti-glare
(7)	LED Backlight Color	White
(8)	Viewing Direction	12 O'clock
(9)	Gray Scale Inversion Direction	6 O'clock
(10)	Color Configuration	R.G.B Stripe
(11)	Module Weight(g)	140 ± 5%

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

4. OUTLINE DIMENSIONS

1	2	3	4
文件題目	圖號	頁	次頁
發行日	舊版日	登入號碼	機密等級

7		8 樣式 QT3-RD-E-0004-003	
No.	修訂區域	修訂內容	作成 修訂日期
		新版	Tim 2012.10.03



A
B
C
D
E

2

NOTE:

- 1. UNIT:mm
- 2. General tolerance:±0.3mm
- 3. CN1:MS240420G or Equivalet

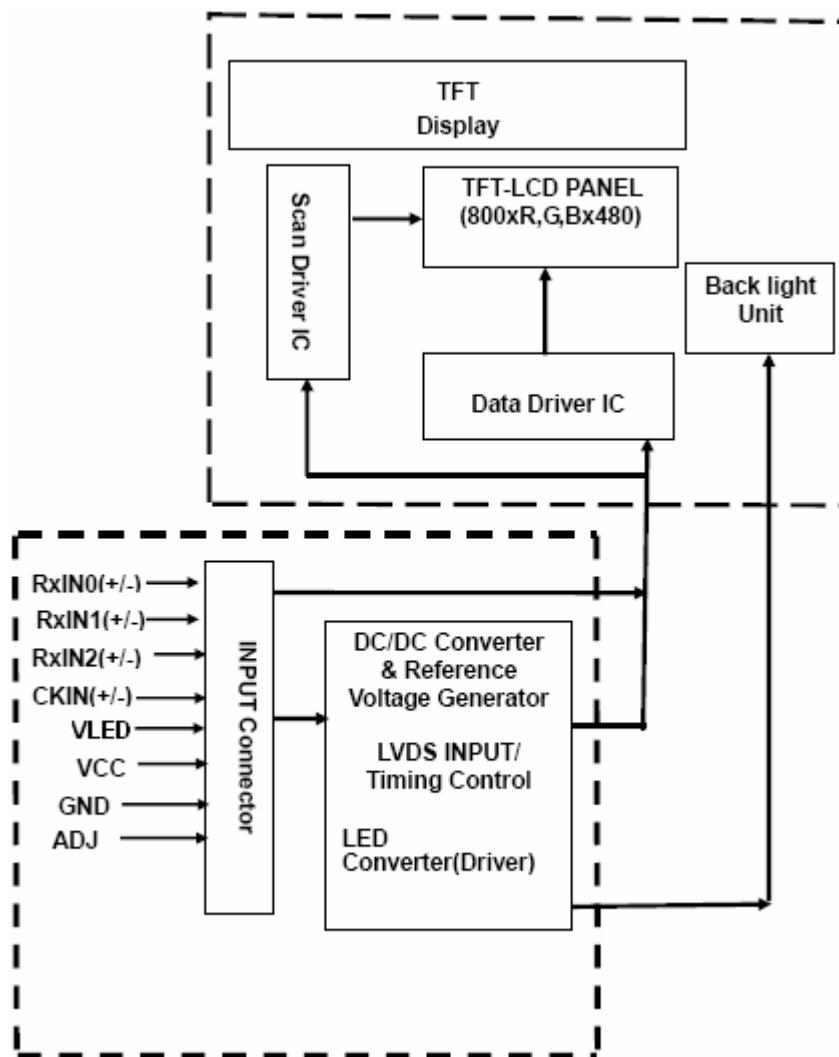
備考	單位:mm		投影法:	比例尺: 1:1	F
入庫	製圖 Tim	121003	名稱: 7" LCM	圖號 CH0700LDL-002	
	審查				
	承認				

5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION (CN1 Connector: MS240420 G or Equivalent)

PIN No.	SIGNAL	FUNCTION
1	VCC	Power Supply For Digital Circuit
2	VCC	Power Supply For Digital Circuit
3	GND	Ground
4	GND	Ground
5	RxIN0-	Differential Data Input, CH0(G0,R5~R0)
6	RxIN0+	Differential Data Input, CH0(G0,R5~R0)
7	GND	Ground
8	RxIN1-	Differential Data Input, CH1(B1,B0,G5~G1)
9	RxIN1+	Differential Data Input, CH1(B1,B0,G5~G1)
10	GND	Ground
11	RxIN2-	Differential Data Input, CH2(DE,B5~B2)
12	RxIN2+	Differential Data Input, CH2(DE,B5~B2)
13	GND	Ground
14	CKIN-	Differential Clock Input
15	CKIN+	Differential Clock Input
16	GND	Ground
17	VLED	Power Supply For LED Driver Circuit
18	VLED	Power Supply For LED Driver Circuit
19	GND	Ground
20	ADJ	Brightness Control For LED B/L

6. BLOCK DIAGRAM



7. ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply Voltage	VCC	-0.3	+7.0	V	
Logic Output Voltage	V _I	-0.3	VCC+0.3	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2,3
Humidity(% RH)	-	90	-	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=70°C & -20°C ≤ 240Hrs.

Note 4 : Storage Ta=60°C & H=90% ≤ 240Hrs.

8. ELECTRICAL CHARACTERISTICS

8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Voltage for LCD	VCC	3.0	3.3	3.6	V
	ICC	-	(175)	(262)	mA
Input High Voltage	V _{IH}	0.7*VCC	-	VCC	V
Input Low Voltage	V _{IL}	GND	-	0.3*VCC	V
Output High Voltage	V _{OH}	0.8VCC	-	VCC	V
Output Low Voltage	V _{OL}	GND	-	0.2VCC	V

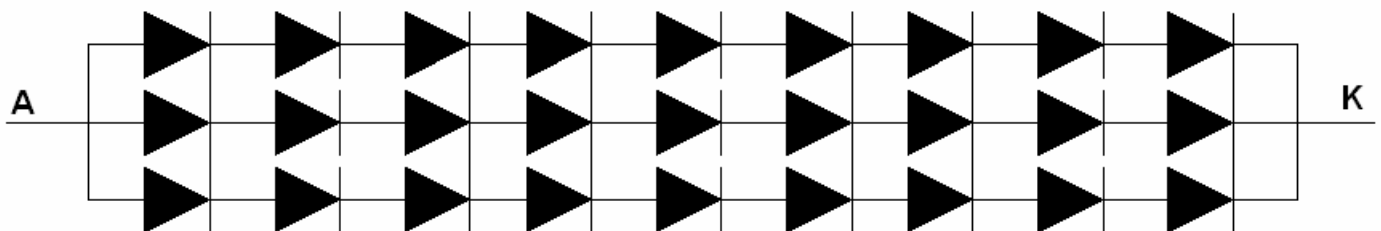
8.2 BACKLIGHT UNITS

Ta=25°C

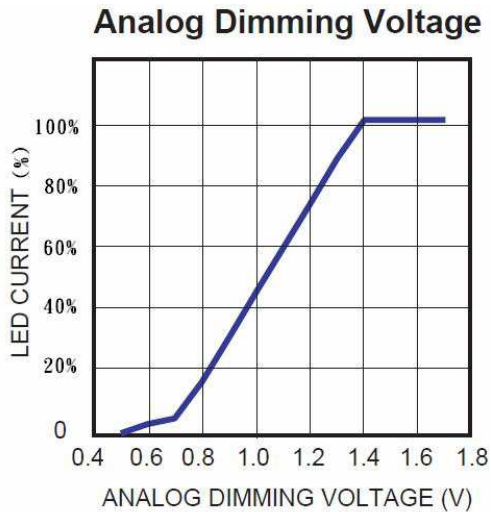
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK	
LED Driving Voltage	VLED	4.5	5	12	V		
LED Driving Current	ILED	-	TBD	-	mA	(VLED=5V)	
		-	330	-	mA	(VLED=12V)	
Brightness control	Analog dimming	ADJ	0.7	-	1.4	V _{DC}	Note 3
	PWM dimming		1.4	-	5.0	V _{P-P}	Note 4
ADJ Frequency	-	100	-	1000	Hz		
LED Life Time	-	40,000	-	-	Hr		

Note 1: If the module is driven at high ambient temperature & humidity condition. The operating life will be reduced.

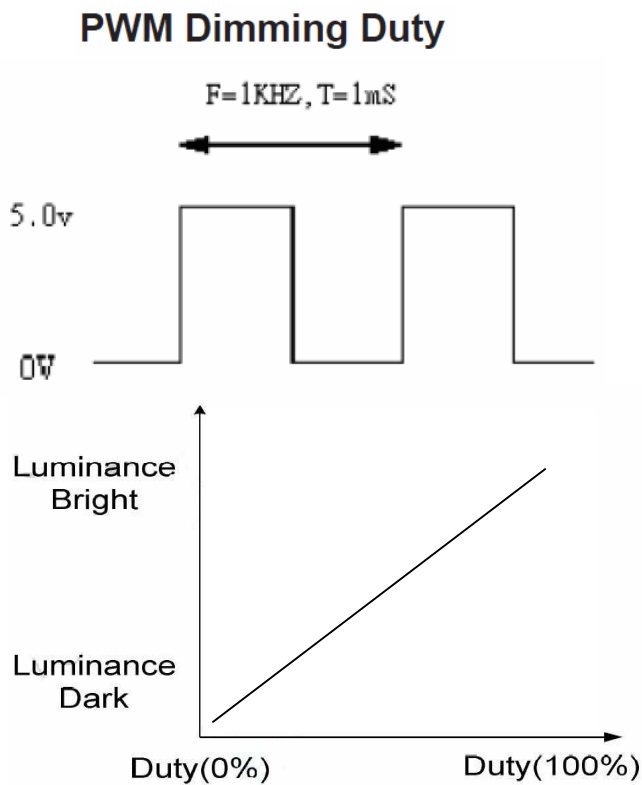
Note 2: Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.



Note3: When the ADJ pin voltage rises from 0.7VDC to 1.4VDC, the LED current will change from 0% to 100% of the maximum LED current.



Note4: ADJ signal $V_{p-p} = 1.4 \sim 5.0V$, operation frequency: 100Hz ~ 1 kHz



9. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK	
Contrast Ratio	CR	Viewing	300	400	-	-	Note (1)	
Response Time	TR	Normal	-	5	10	ms	Note (2)	
	TF	Angle	-	15	20	ms		
Chromaticity	White	x	0.26	0.31	0.36	-	Note (4)	
		y						0.28
Viewing Angle	Hor.	Θ_{X+}	Viewing	60	70	-	Deg.	Note (3)
		Θ_{X-}		Angle	60	70		
	Ver.	Θ_{Y+}	$\Theta_X = \Theta_Y$ $= 0^\circ$	40	50	-		
		Θ_{Y-}		CR ≥ 10	50	60		
Luminance	L		900	1000	-	cd/m ²		
Luminance uniformity	YU	PWM=100%	70	75	-	%	Note (5)	

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

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

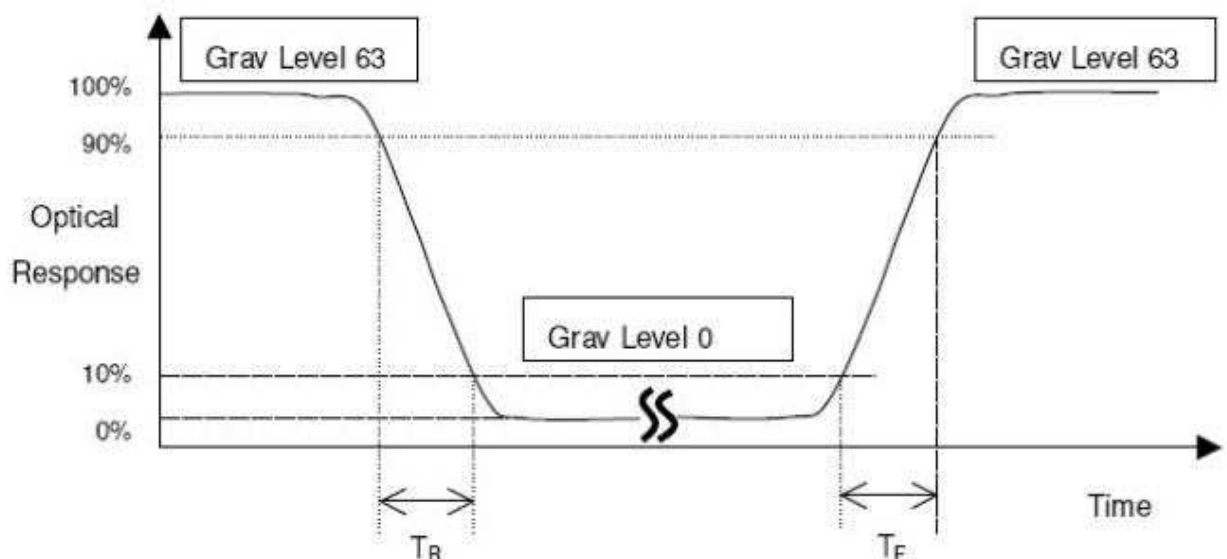
L63: Luminance of gray level 63

L0: Luminance of gray level 0

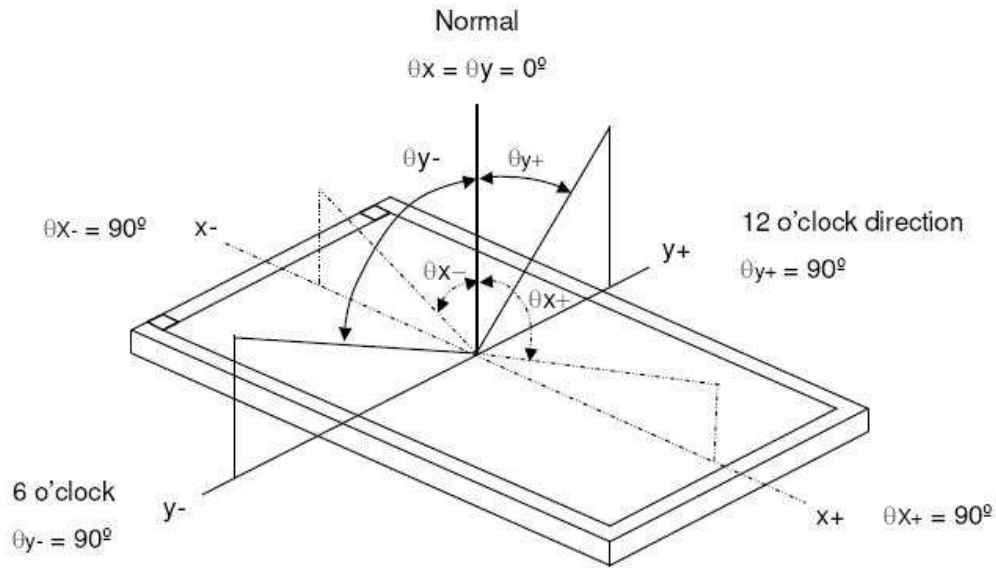
$$CR = CR (5)$$

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):

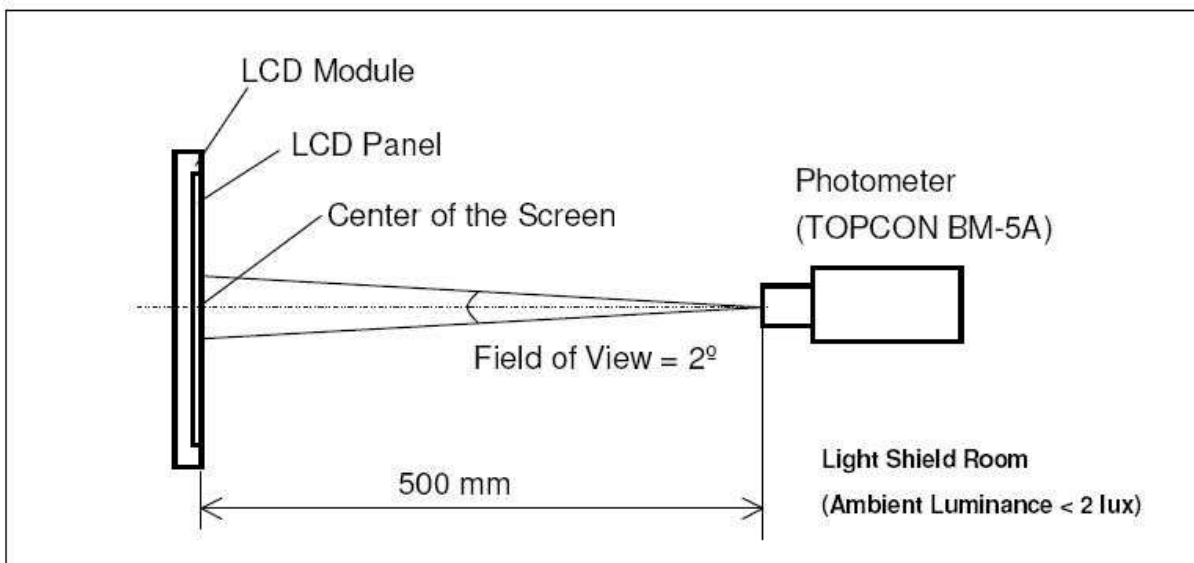


*Note(3) Definition of Viewing Angle

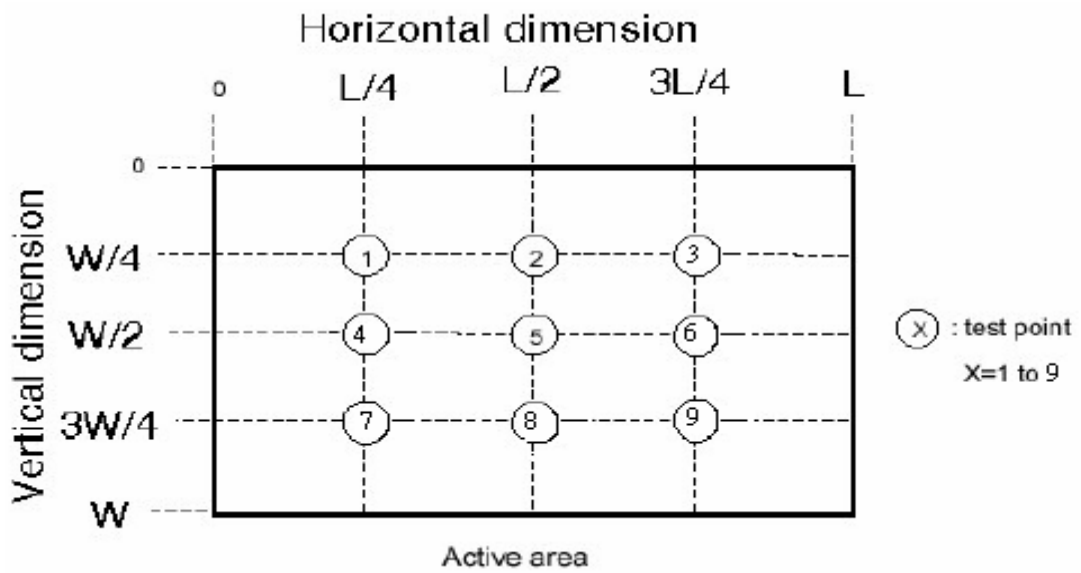


*Note (4) Measurement Set-Up:

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)



$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% > 70\%$$

10. TIMING SPECIFICATIONS

10.1.1 AC Electrical Characteristics

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	6	-	-	ns
HS hold time	T_{hhd}	6	-	-	ns
VS setup time	T_{vst}	6	-	-	ns
VS hold time	T_{vhd}	6	-	-	ns
Data setup time	T_{dsu}	6	-	-	ns
Data hold time	T_{dhd}	6	-	-	ns
DE setup time	T_{esu}	6	-	-	ns
Source output settling time	T_{ST}	-	-	15	μ s
Source output loading R	R_{SL}	-	2	-	K ohm
Source output loading C	C_{SL}	-	60	-	pF

10.1.2 Resolution : 800x480

- sync mode

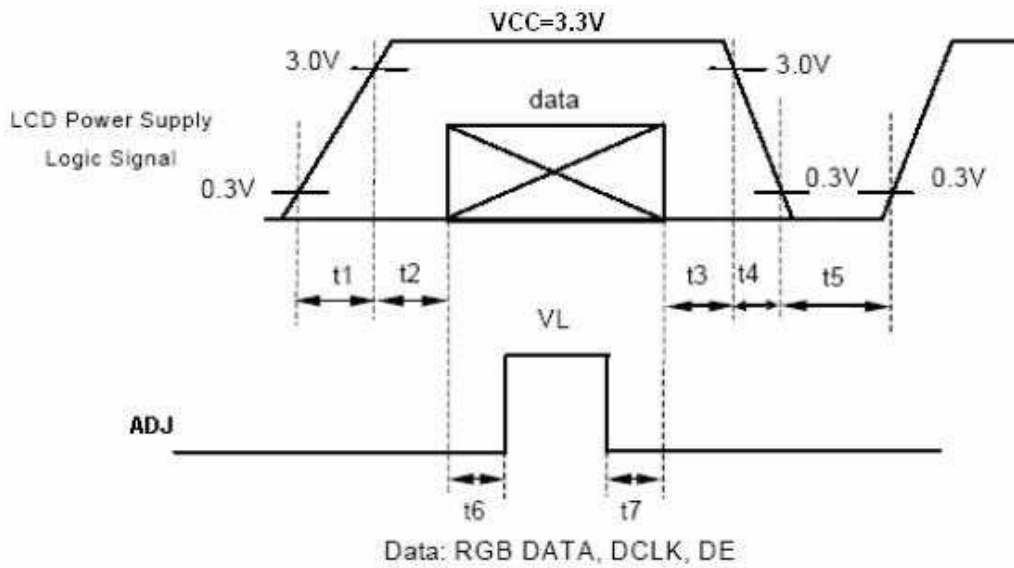
PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	-	33.26	-	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	930	1056	1057	T_{CPH}
HS pulse width	T_{WH}	1	128	-	T_{CPH}
HS-first horizontal data time	T_{HS}	STHD[7:0]+88 ⁽¹⁾			T_{CPH}
HS Active Time	T_{HA}	-	800	-	T_{CPH}
VS period	T_V	-	525	-	T_H
VS pulse width	T_{VW}	1	2	-	T_H
VS-DE time	T_{VS}	STVD[6:0]+8			T_H
VS Active Time	T_{VA}	-	480	-	T_H

- DE mode

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	25	33.26	50	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

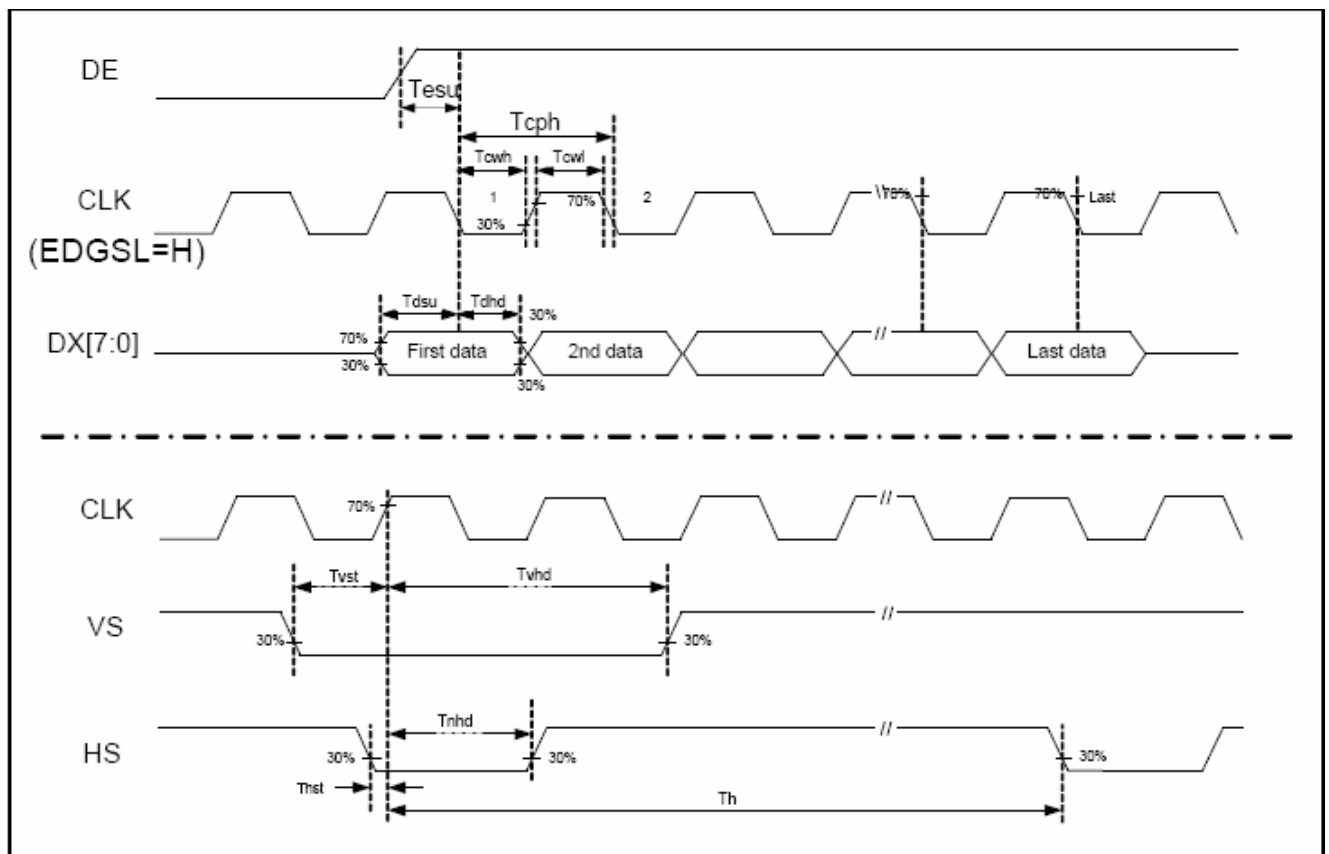
PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DE Horizontal Period	T_{HP}	1000	1056	1200	T_{CLK}
DE Horizontal Valid	T_{HV}	800	800	800	
DE Horizontal Blank	T_{HBK}	200	256	400	
DE Vertical Period	T_{VP}	490	525	590	T_{HP}
DE Vertical Valid	T_{VV}	480	480	480	
DE Vertical Blank	T_{VBK}	10	45	110	
DE Vertical Frequency	FV	51	60	70	Hz

10.2 POWER SIGNAL SEQUENCE

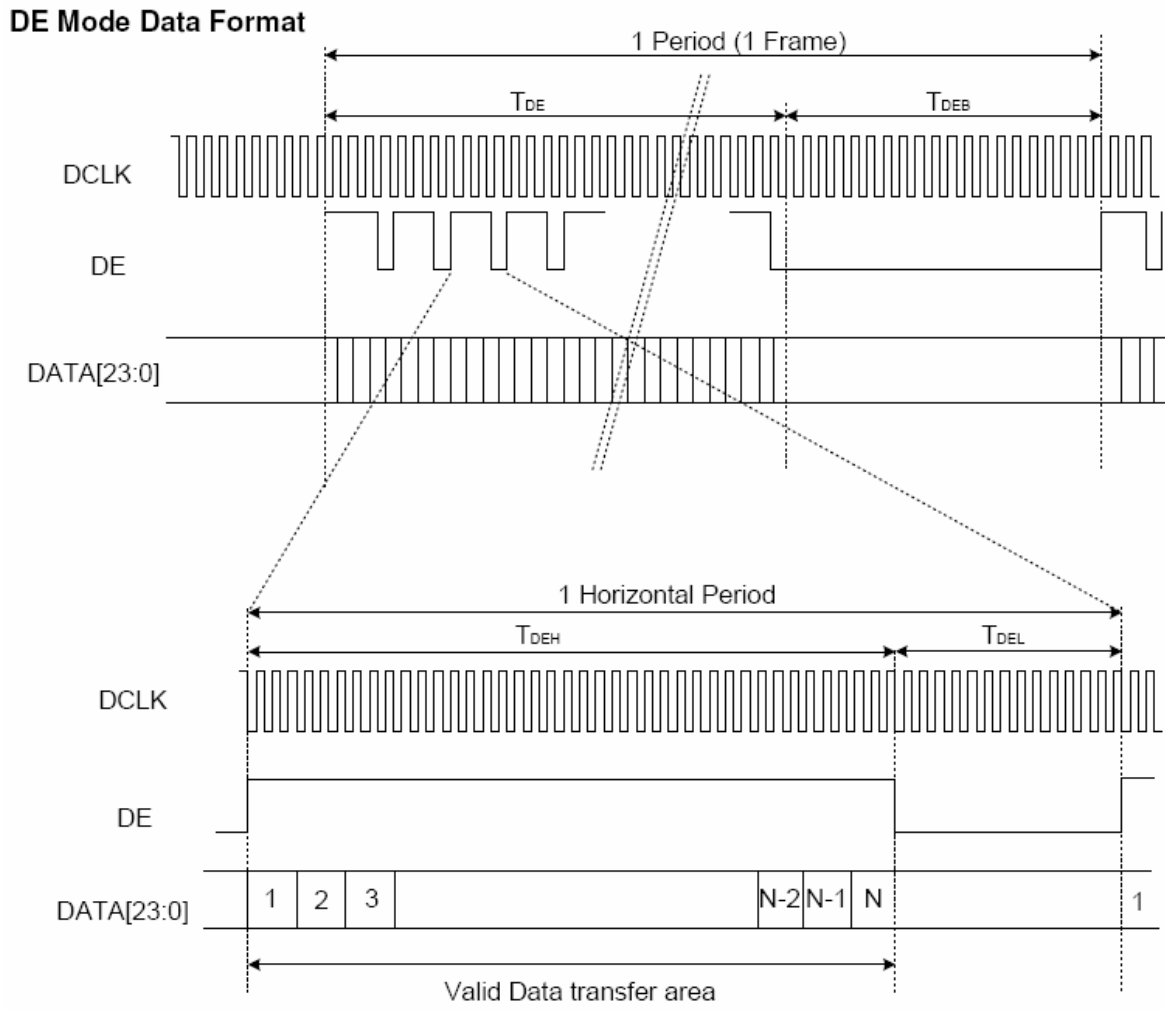


PARAMETER	MIN.	TYP.	MAX.	UNIT
T1	-	-	10	ms
T2	50	-	-	ms
T3	0	-	50	ms
T4	0	-	10	ms
T5	60	-	-	ms
T6	200	-	-	ms
T7	200	-	-	ms

10.3 CLOCK AND DATA WAVEFORMS

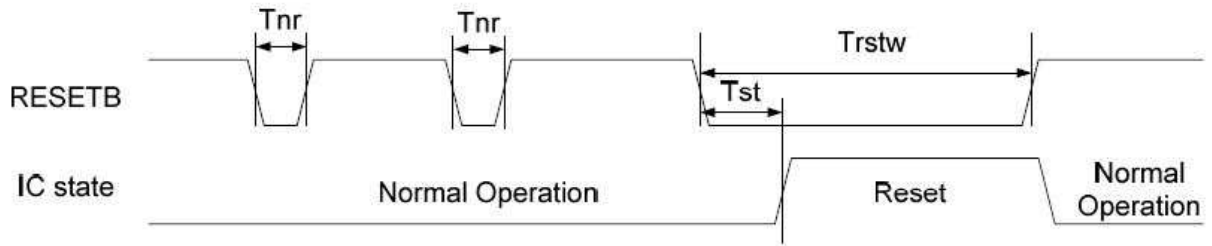


10.4 DATA INPUT FORMAT



10.5 HARDWARE RESET TIMING

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
RESETB low pulse width	T_{rstw}	10	-	-	μs
Negative noise pulse width	T_{nr}		-	4	μs
Reset start time	T_{st}	4	-		μs



11. RELIABILITY TEST

Ta = 25°C

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-30±3°C	240HRS	
3	High Temperature Humidity Storage	60°C 90%RH	240HRS	NOTE(2)
4	High Temperature Operation	70°C	240HRS	NOTE(2)
5	Low Temperature Operation	-20°C	240HRS	NOTE(2)
6	Temperature Cycle	-30°C ← -25°C → 80°C (30min) (5min) (30min)	10CYCLE	NOTE(2)

NOTE (1): a. THE MODULE SHOULD WORK PROPERLY.

b. BEFORE AND AFTER FUNCTION TEST, THE DIFFERENCE OF CONSUMPTIVE CURRENT SHOULD BE WITHIN 10%

NOTE (2): a. THE MODULE SHOULD WORK PROPERLY.

b. THE MODLUE WON'T BE DEFORMATIVE, COLOR CHANGEABLE OR BROKEN.

c. THE MODULES CAN'T BE APART.

NOTE (3): BEFORE COSMETIC AND FUNCTION TEST, THE PRODUCT MUST HAVE ENOUGH RECOVERY TIME, AT LEAST 2 HOURS AT ROOM TEMPERATURE.

12. PACKAGE METHOD

TBD