

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: CH0700LFL-CT1

(Complied with RoHS)



ISSUE:AUG.17.2013

Spec Condition: preliminary

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CUSTOMER	CHEFREE		
APPROVAL	APPROVAL	CHECKER	PREPARE
	ch lee	ch lee	kevin

2.RECORD OF REVISION

[illegible]

3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1024(R.G.B) X 600
(2)	Module Size(mm)	181.6(W) X 127.6(H) X 9.25(D)
(3)	Active Area(mm)	153.6(H) X 90.0(V)
(4)	Pixel Pitch(mm)	0.15 (H) X 0.15(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)	TBD

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

Distributed by:

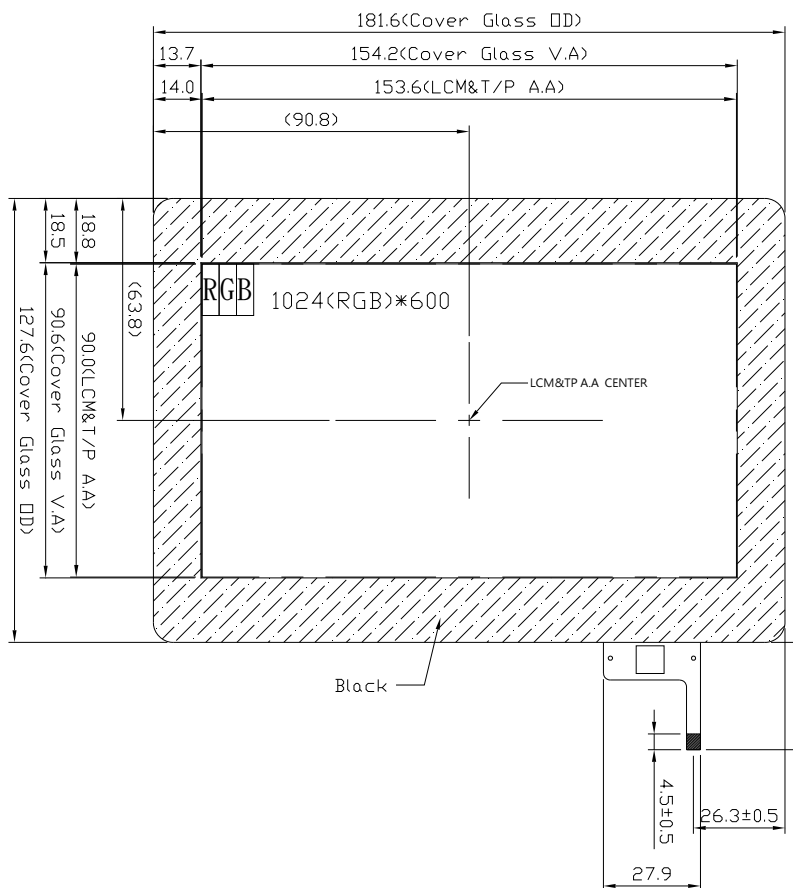


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4. OUTLINE DIMENSIONS

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

6	7	8	樣式 QT2-RD02-008
No.	修訂區域	修訂內容	作成
		新版	Swallow
			修訂日期
			2013.0V.07



NOTE:

1. Unit: mm

2. Tolerance is ±0.3mm unless noted.

3. CN1: MSB24013P20HA or Equivalent.

備考	單位: mm	投影法:	比例尺:
入庫	製圖 Swallow	130V07	名稱:
審查			7" 1024*600 LCM
承認			圖號
			CH0700LFL-ar0

5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION (CN1: MSB24013P20HA or Equivalent)

PIN NO.	SIGNAL	FUNCTION	REMARK
1	VDD	Power Voltage for digital circuit	
2	VDD	Power Voltage for digital circuit	
3	U/D	Up/Down Scan	Note 1
4	L/R	Left/Right Scan	Note 1
5	RXIN0-	Differential data Input,CH0(G0,R0~R5)	
6	RXIN0+	Differential data Input,CH0(G0,R0~R5)	
7	GND	Ground	
8	RXIN1-	Differential data Input,CH1(B0,B1,G1~G5)	
9	RXIN1+	Differential data Input,CH1(B0,B1,G1~G5)	
10	GND	Ground	
11	RXIN2-	Differential data Input,CH2(DE,B2~B5)	
12	RXIN2+	Differential data Input,CH2(DE,B2~B5)	
13	GND	Ground	
14	RXCLKIN-	Differential Clock Input	
15	RXCLKIN+	Differential Clock Input	
16	GND	Ground	
17	RXIN3-	Differential data Input,CH3(B6,B7,G6,G7,R6,R7)	
18	RXIN3+	Differential data Input,CH3(B6,B7,G6,G7,R6,R7)	
19	VLED	LED Driving Voltage	
20	ADJ	LED ADJ dimming	

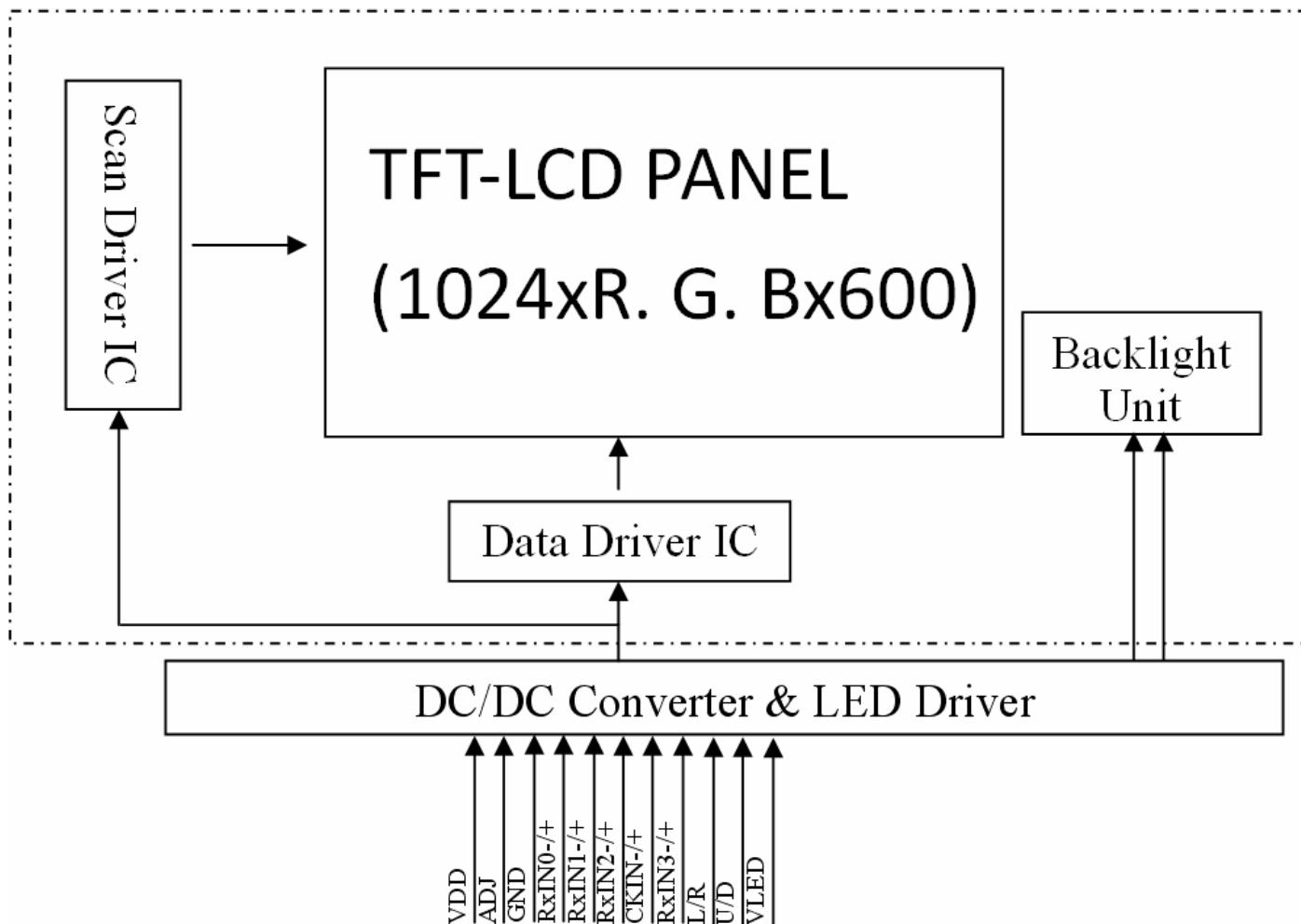
Note1:

U/D	L/R	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down

5.2 CTP PIN ASSIGNMENT

PIN NO.	SIGNAL	FUNCTION
1	VCC	Power Supply For Digital Circuit
2	GND	Ground
3	SCL	I2C Clock Input
4	SDA	I2C Data Input and Output
5	INT	External Interrupt to the Host
6	/RES	External Reset , Low is Active
7	WAKE	Please Connect VCC

6. BLOCK DIAGRAM



7.ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply Voltage For Digital	VDD	-0.3	5.0	V	
Logic Output Voltage	V _I	-0.5	5.0	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient Temperature(°C)	-20	60	-25	70	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=60°C & -20°C ≤ 240Hrs.

Note 4 : Storage Ta=50°C & H=60% ≤ 240Hrs.

8. ELECTRICAL CHARACTERISTICS

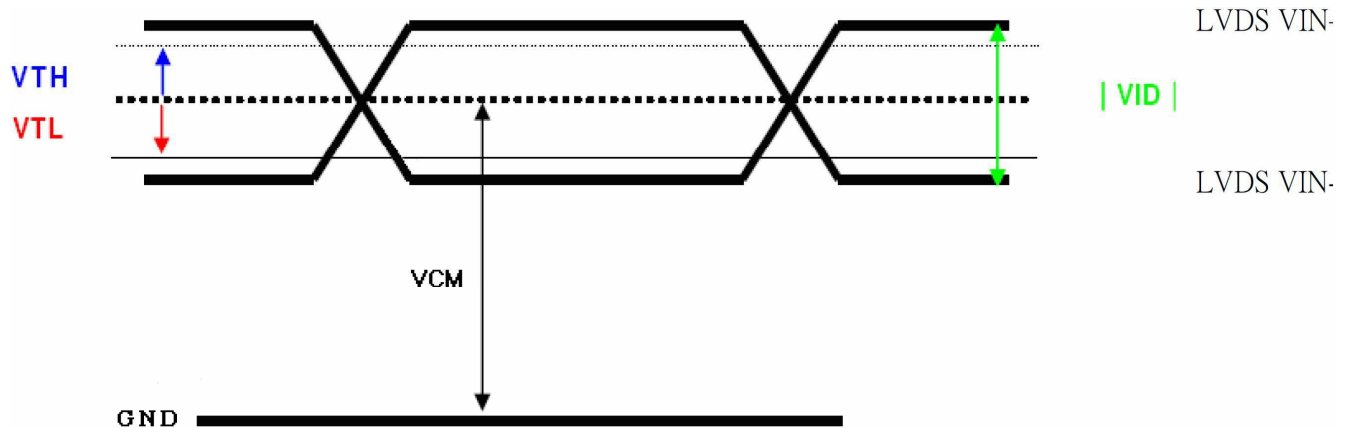
8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For Digital	VDD	3.0	3.3	3.6	V	
	IDD*	-	(150)	-	mA	VDD=3.3V
Input High Voltage	V _{IH}	0.7 x VDD	-	VDD	V	
Input Low Voltage	V _{IL}	GND	-	0.3 x VDD	V	
Logic Input Voltage (LVDS: IN+, IN-)	V _{CM}	VID /2	-	2.4- VID /2	V	Note1
	VID	200	-	600	mV	Note1
	V _{TH}	-	-	100	mV	V _{CM} =1.2V
	V _{TL}	-100	-	-	mV	

*Test pattern Black.

Note1 : LVDS signal



8.2 BACKLIGHT UNITS

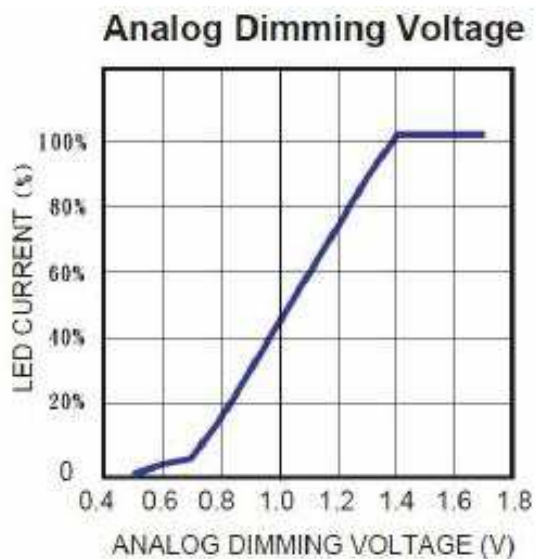
Ta=25°C

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage		VLED	11.7	12	12.3	V
LED Driving Current		ILED	-	220	300	mA
Brightness Control	Analog dimming	ADJ	0.7	-	1.4	V _{DC}
	PWM dimming		1.4	-	5.0	V _{P-P}
ADJ Frequency		-	100	-	1000	Hz
LED Life Time		-	50000	-	-	Hr

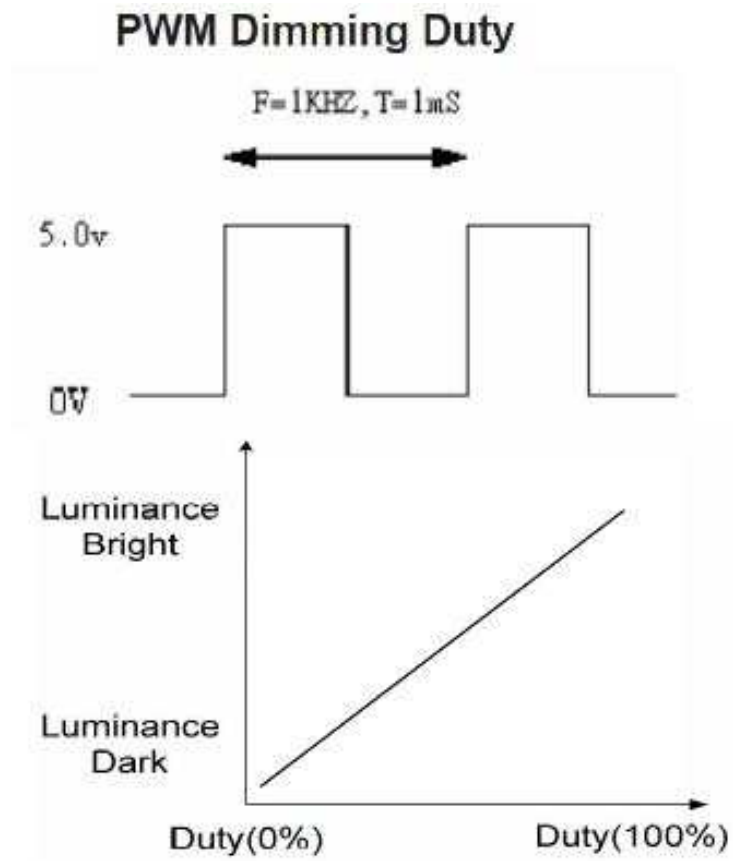
Note 1: If the module is driven at high ambient temperature & humidity condition. The operating life will be reduced.

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

Note 3: 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.



Note 4: ADJ signal $V_{p-p} = 1.4 \sim 5.0V$, operation frequency: $100Hz \sim 1\text{ kHz}$



9. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR	Viewing	500	700	-	-	Note (1)
Response Time	TR+TF	Normal	-	25	50	ms	Note (2)
Chromaticity	White	x	(0.249)	(0.299)	(0.349)	-	Note (4)
		y	(0.273)	(0.323)	(0.373)	-	
Viewing Angle	Hor.	Θ_{X+}	65	75	-	Deg.	Note (3)
		Θ_{X-}	65	75	-		
	Ver.	Θ_{Y+}	60	70	-		
		Θ_{Y-}	65	75	-		
Luminance	L	PWM=100%	(400)	(500)	-	cd/m2	
Luminance uniformity	YU		70	-	-	%	Note (5)

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

The contrast ratio can be calculated by the following expression.

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

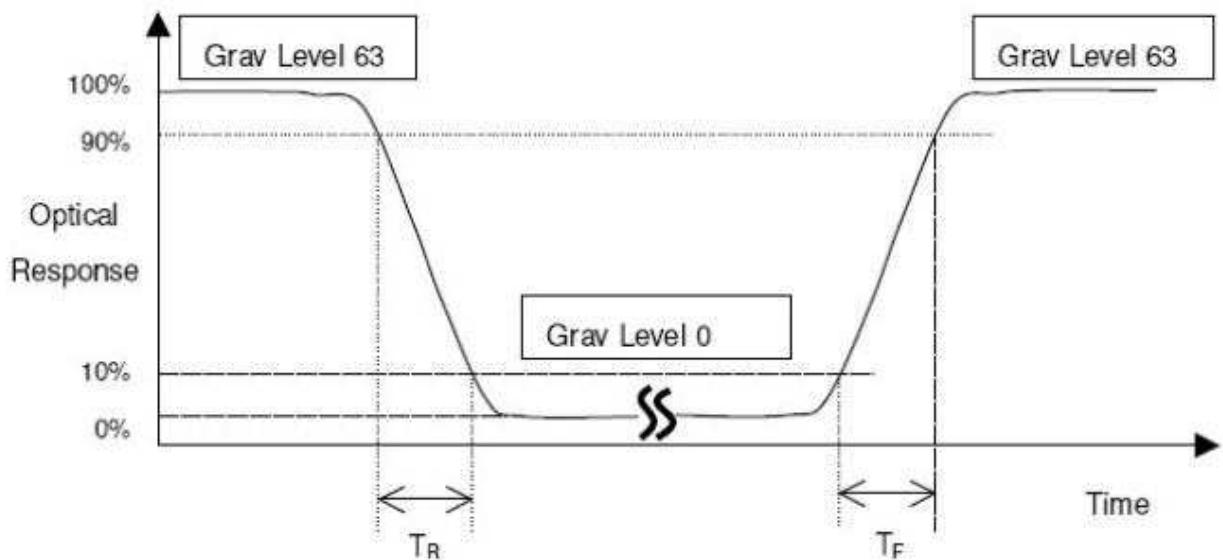
L63: Luminance of gray level 63

L0: Luminance of gray level 0

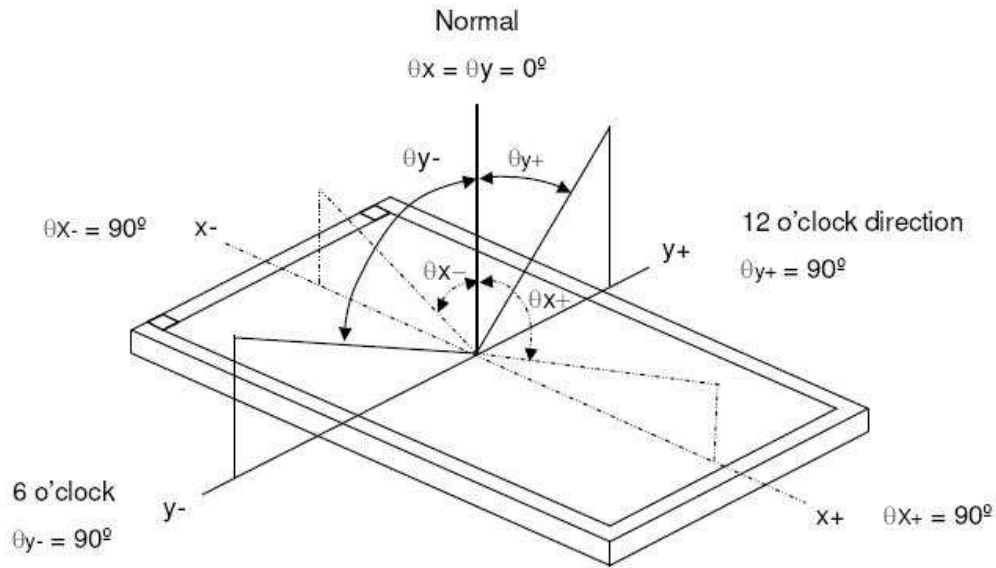
$$CR = CR(5)$$

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):

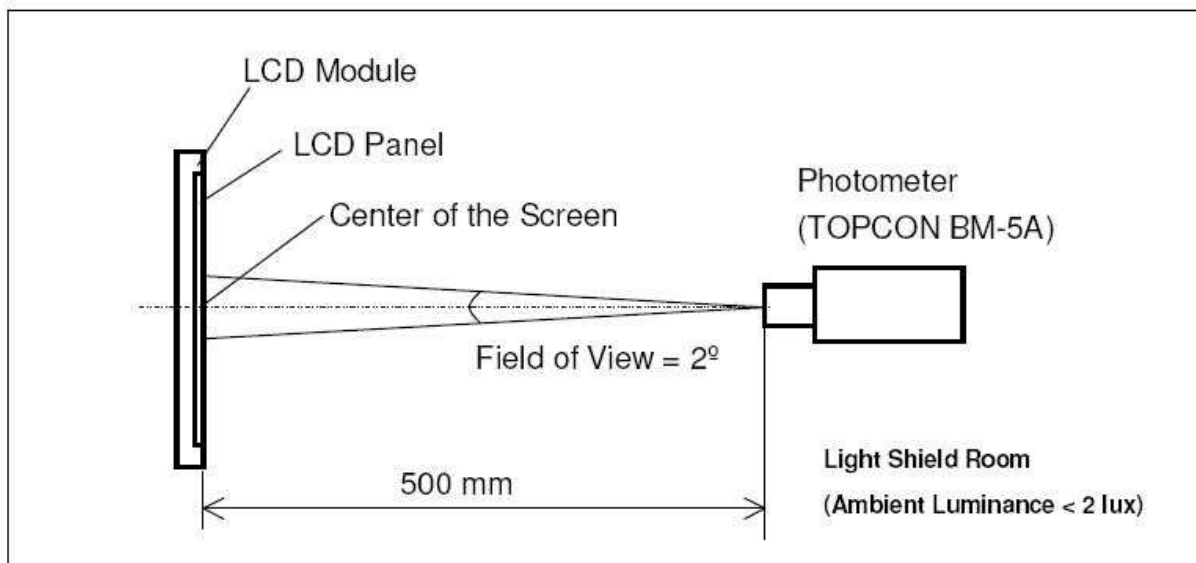


*Note(3) Definition of Viewing Angle

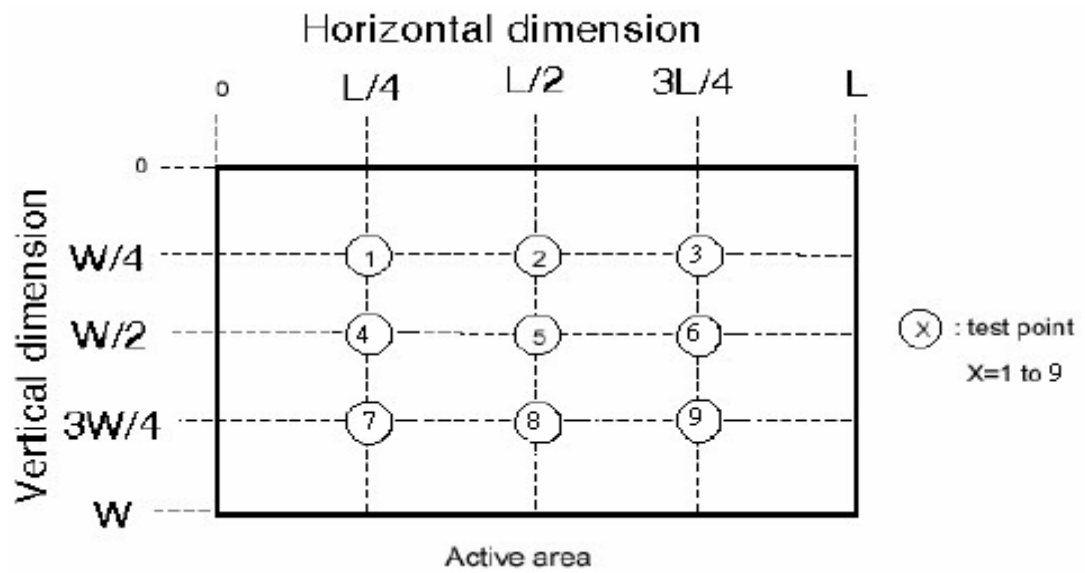


*Note (4) Measurement Set-Up:

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)

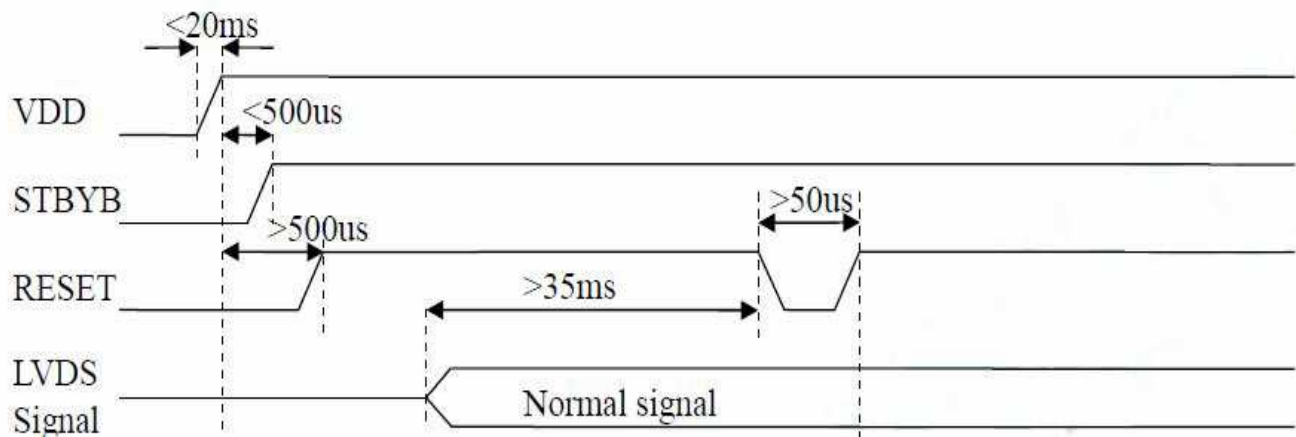


$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% > 70\%$$

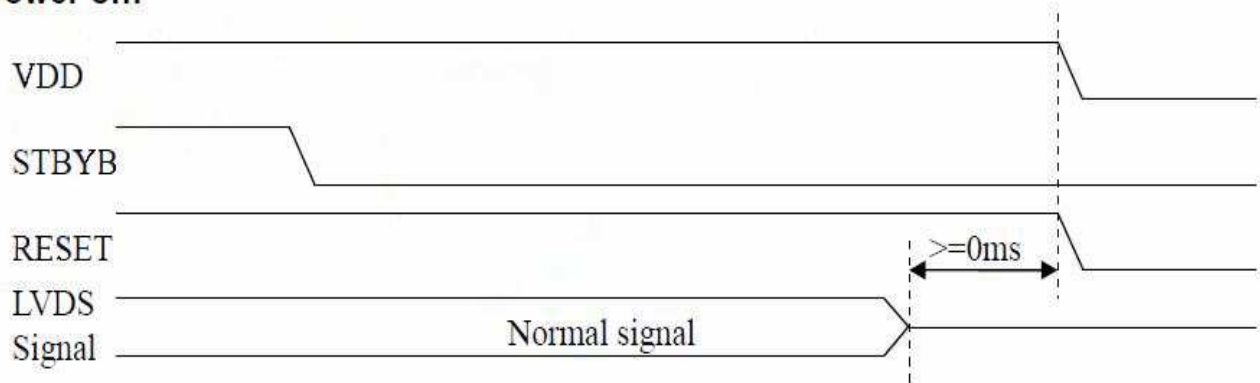
10. TIMING SPECIFICATIONS

10.1 POWER SIGNAL SEQUENCE

a. Power on:



b. Power off:

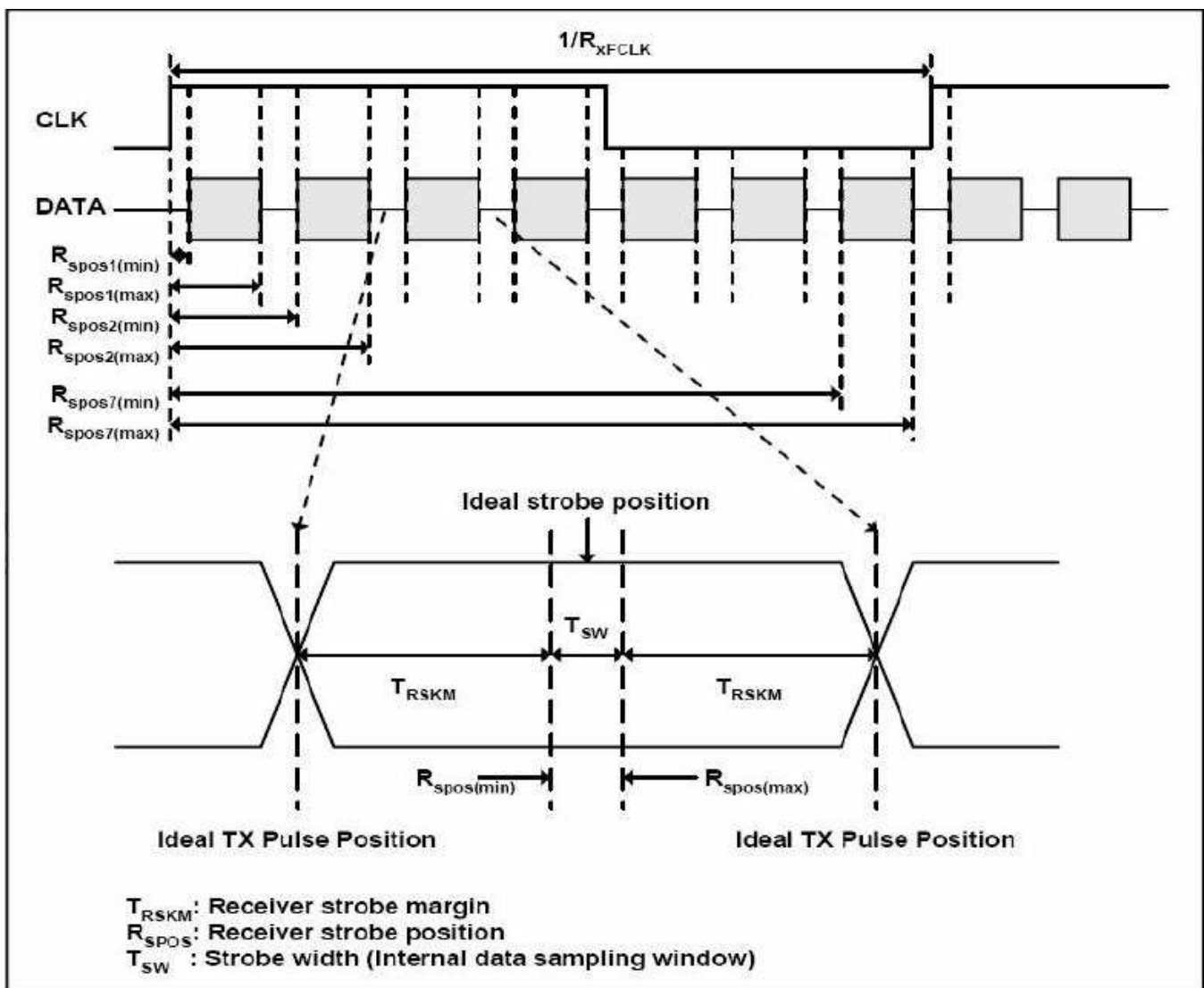
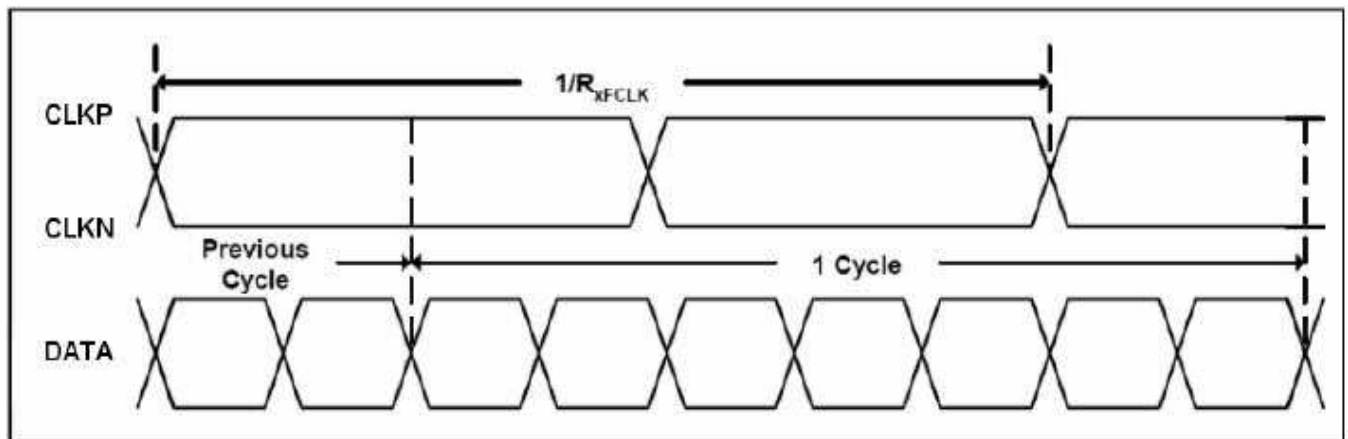


10.2 Timing Characteristics of Input Signals

ITEM				SYMBOL	MIN.	TYP.	MAX.	UNIT
LVDS input signal sequence	CLK Frequency**			tclk	40.8	51.2	67.2	MHz
LCD input signal sequence(Input LVSD Transmitter)	DENA	Horizontal	Horizontal total Time	t _H	1114	1344	1400	tCLK
			Horizontal effective Time	t _{HA}	1024			tCLK
			Horizontal Blank Time	t _{HB}	90	320	376	tCLK
		Vertical	Vertical total Time	t _V	610	635	800	t _H
			Vertical effective Time	t _{VA}	600			t _H
			Vertical Blank Time	t _{VB}	10	35	200	t _H

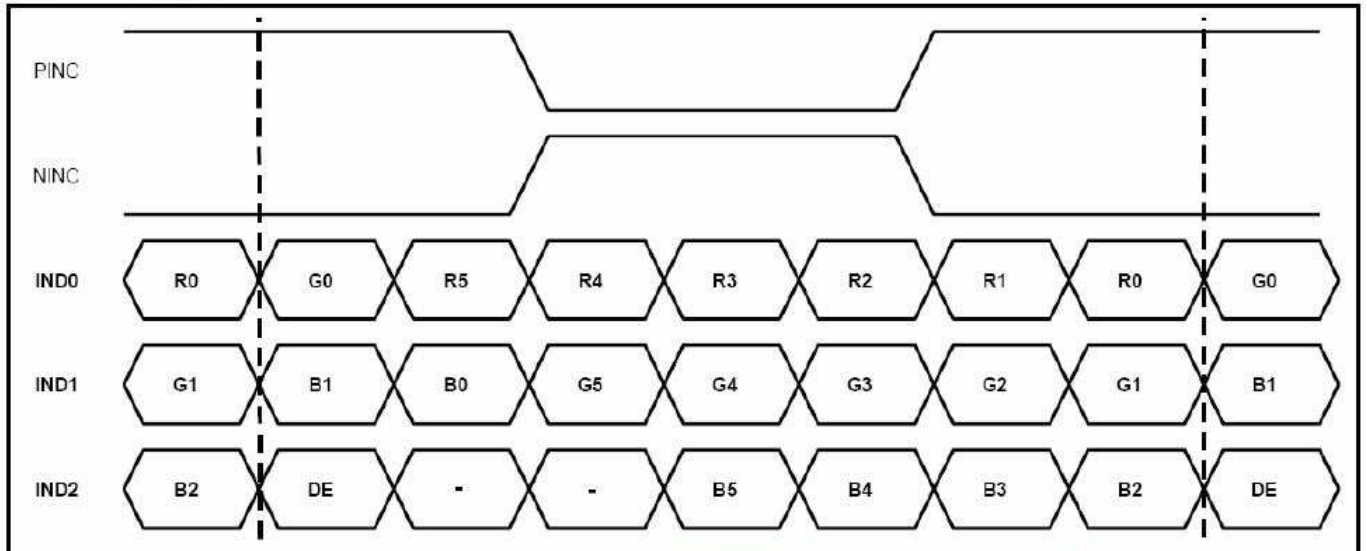
**Frame rate = 60Hz

10.3 Timing Sequence(Timing Chart)

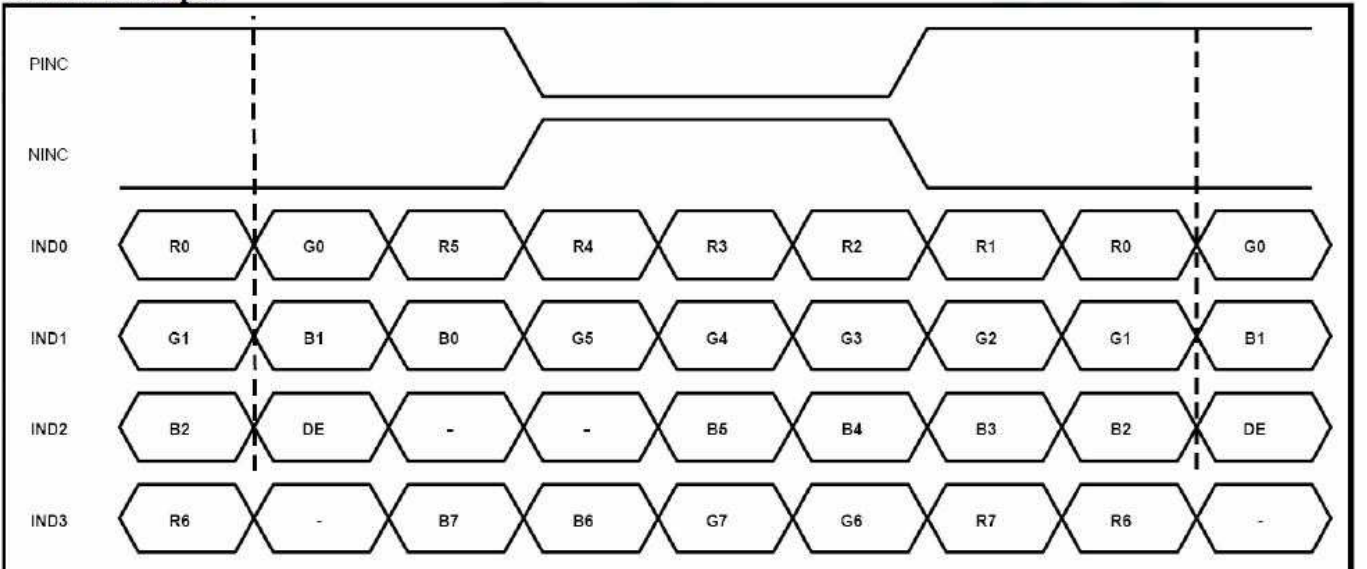


10.4 LVDS Input Data Mapping

6bit LVDS input



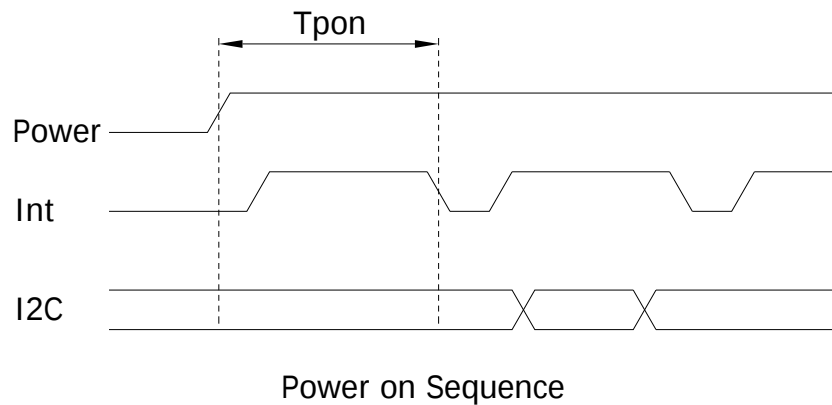
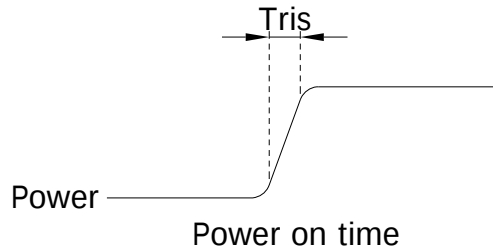
8bit LVDS input



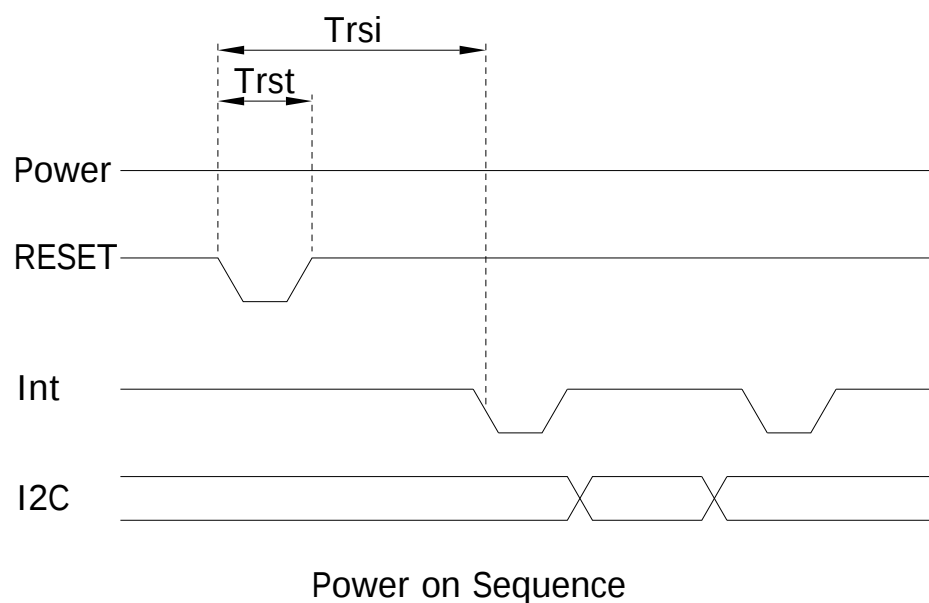
Note: Support DE timing mode only, SYNC mode not supported.

10.5 CTP POWER SUPPLY VOLTAGE SEQUENCE

INT and I2C should be pulled down to be low before powering on. The signal of waking up should be set be high after powering on. INT signal will be sent the host after initializing all parameters and then start to report points to the host



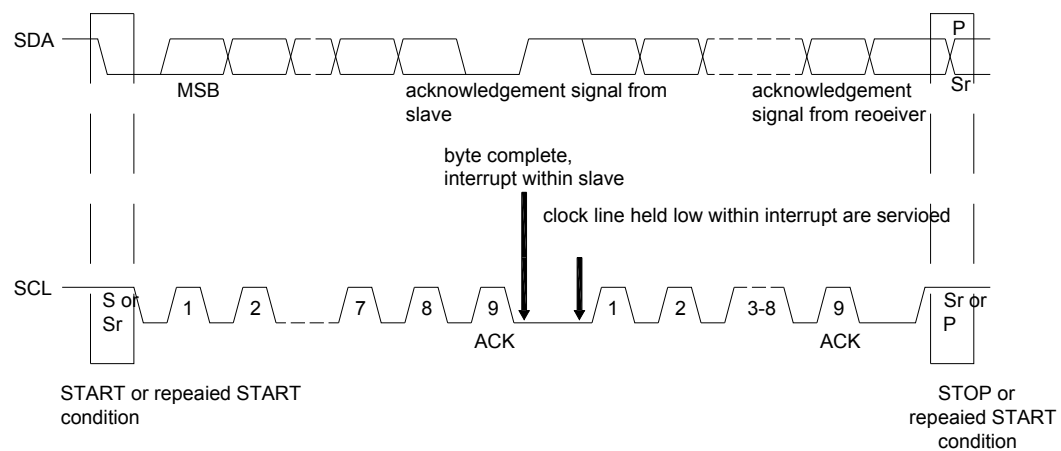
Reset time must be enough to guarantee reliable reset. The time of starting to report point after resetting approach to the time of starting to report point after power on.



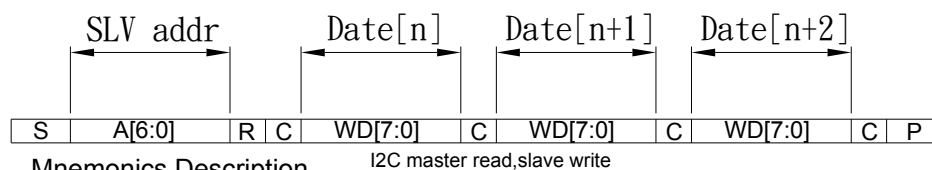
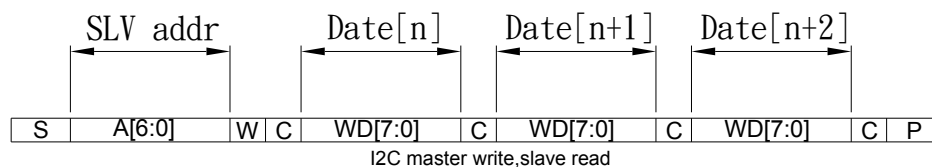
ITEM	DESCRIPTION	MIN.	MAX.	UNIT
Tris	Rise time from 0.1VCC to 0.9VCC	-	10	ms
Tpon	Time of starting to report point after powering on	300	-	ms
Trst	Time of starting to report point after resetting	300	-	ms
Trst	Rese time	5	-	ms

10.6 CTP I2C BUS INTERFACE

The I2C is always configured in the Slave mode.



I2C Serial Data Transfer Format



Mnemonics Description

ITEM	DESCRIPTION
S	I2C Start or I2C Restart
A[6:0]	Slave address A[6:4]:3'b011 A[3:0]:data bits are identical to those of I2CCON[7:4]register
W	1'b0;Write
R	1'b1;Read
C	ACK
P	STOP : the indication of the end of a packet(if this bit is missing , Swill indicate the end of the current packet and beginning of the next packet)

I2C Interface timing Characteristics is shown in Table

I2C Timing Characteristics

ITEM	MIN.	MAX.	UNIT.
SCL frequency	0	400	KHz
Bus free time between a STOP and START condition	4.7	-	µs
Hold time (repeated) START condition	4.0	-	µs
Data setup time	250	-	µs
Setup time for a repeated START condition	4.7	-	µs
Setup Time for STOP condition	4.0	-	µs

11. RELIABILITY TEST

Ta = 25°C

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	70°C	240HRS	
2	Low Temperature Storage	-25±3°C	240HRS	
3	High Temperature Humidity Storage	50°C 60%RH	240HRS	NOTE(2)
4	High Temperature Operation	60°C	240HRS	NOTE(2)
5	Low Temperature Operation	-20°C	240HRS	NOTE(2)
6	Temperature Cycle	-25°C ← 25°C → 70°C (30min) (5min) (30min)	100CYCLE	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