PRODUCT SPECIFICATIONS

For Customer: _____ ☐ : APPROVAL FOR SPECIFICATION

Customer Model No. _____ ☐ : APPROVAL FOR SAMPLE

Module No.: *IE-A-1819CH04MP-CB-1* *Date : 2020.06.18*

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For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT
LC			

2. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared

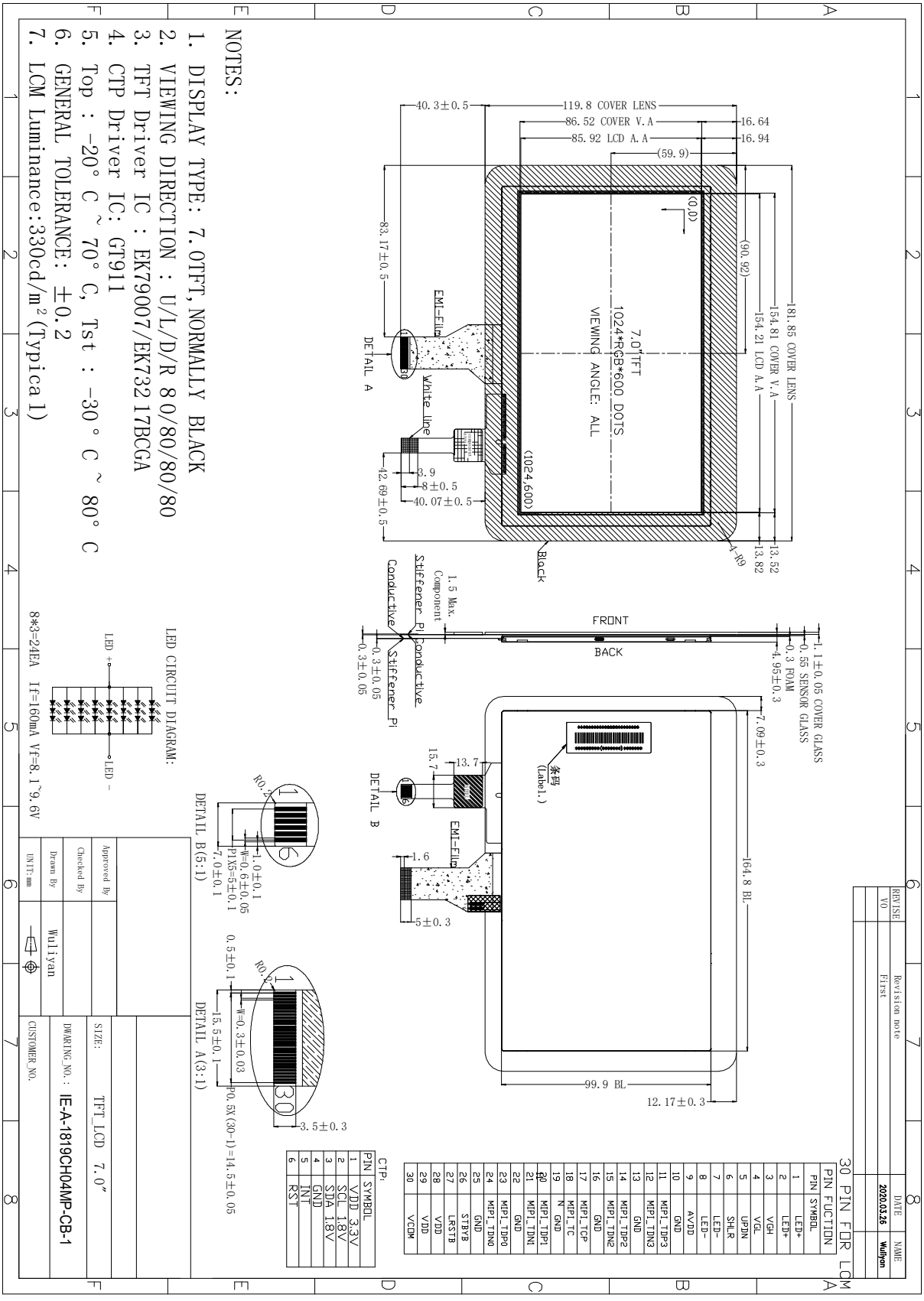
2020.03.26	V0	ALL	The first release	Stone
2020.06.18	V1	ALL	Update spec	LC

3. General Specifications

IE-A-1819CH04MP-CB-1 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light and CTP unit. The 7.0 '' display area contains 1024 x (RGB) x 600 *pixels and can display up to 16.7M colors. This product accords with ROHS environmental criterion..*

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	181.85X119.80X4.95	mm	
Active Area(W×H)	154.21(W)X85.92(H)	mm	
Number of Dots	1024 x 600	dots	
TFT Controller	EK79007+EK73217BCGA	-	
CTP driver	GT911	-	
Power Supply Voltage	1.8	V	
Backlight	3S8P-LEDs (white)	pcs	
Weight	---	g	
Interface	MIPI 4 Lane	-	

4.Outline.Drawing



PIN	SYMBOL
1	LED+
2	LED+
3	VGH
4	VGL
5	UPDN
6	SHLR
7	LED-
8	LED-
9	AVDD
10	GND
11	MIPI_TDP3
12	MIPI_TDN3
13	GND
14	MIPI_TDP2
15	MIPI_TDN2
16	GND
17	MIPI_TCP
18	MIPI_TC
19	N GND
20	MIPI_TDP1
21	MIPI_TDN1
22	GND
23	MIPI_TDP0
24	MIPI_TDN0
25	GND
26	STBYB
27	LRSTB
28	VDD
29	VDD
30	VCOM

PIN	SYMBOL
1	VDD 3.3V
2	SCL 1.8V
3	SDA 1.8V
4	GND
5	INT
6	RST

5. Absolute Maximum Ratings(Ta=25℃)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	-0.3	2.0	V	1，2
Power Supply Voltage	AVDD	-0.5	15.0	V	1，2
Power Supply Voltage	VCOM	-0.3	7.0	V	1，2
Power Supply Voltage	VGH	-0.3	42.0	V	1，2
Power Supply Voltage	VGL	-20	0.3	V	1，2
Power Supply Voltage	VDD_CTP	-0.3	4.0	V	1，2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. V_{DD} >V_{SS} must be maintained.

3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

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

2. Background color changes slightly depending on ambient temperature. The phenomenon is reversible.

3. Ta<=40℃:85%RH MAX.

Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

6. Electrical Specifications

6.1 Electrical characteristics (Vss=0V ,Ta=25℃)

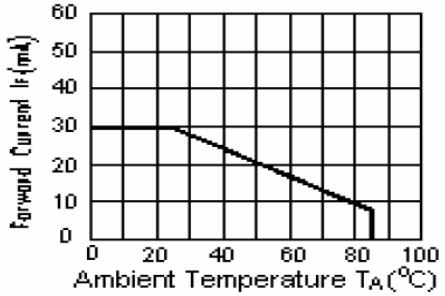
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	Ta=25℃	-	1.8	1.89	V	
Power supply		AVDD	Ta=25℃	9.1	9.6	10.1	V	
Power supply		VCOM	Ta=25℃	2.9	3.2	3.5	V	
Power supply		VGH	Ta=25℃	17	18	19	V	
Power supply		VGL	Ta=25℃	-7	-6	-5	V	
Power supply		VDD_CTP	Ta=25℃	-	3.3	3.4	V	
Input voltage	'H'	V_{IH}	Ta=25℃	0.7*VDD	-	VDD	V	
	'L'	V_{IL}	Ta=25℃	0	-	0.3*VDD	V	

6.1.1 Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	0.7	1.5	mA	VGH=18V
	I_{GL}	-	0.7	1.5	mA	VGL=-6V
	I_{VDD}	-	10	20	mA	VDD=1.8V
	I_{AVDD}	-	15	30	mA	AVDD=9.6V

6.2 LED backlight specification(VSS=0V ,Ta=25℃)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	Vf	If=160mA	8.1	9.0	9.6	V	
Uniformity	ΔBp	If=160mA	75	80	-	%	
Life Time	time	If=160mA	20K	-		hours	1



Note 1: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25

6.3 *Interface signals*

Pin No.	Symbol	I/O	Function
1-2	LED+	P	LED Anode
3	VGH	P	Gate on voltage
4	VGL	P	Gate off voltage
5	UPDN	I	Gate driver Up/Down scan control of gate driver
6	SHLR	I	Right/Left sequence control of source driver
7-8	LED-	P	LED Cathode
9	AVDD	P	Power supply for analog circuit
10	GND	P	Ground
11	MIPI_TDP3	I	MIPI-DSI Data differential signal input pins. (Data lane 3)
12	MIPI_TDN3	I	MIPI-DSI Data differential signal input pins. (Data lane 3)
13	GND	P	Ground
14	MIPI_TDP2	I	MIPI-DSI Data differential signal input pins. (Data lane 2)
15	MIPI_TDN2	I	MIPI-DSI Data differential signal input pins. (Data lane 2)
16	GND	P	Ground
17	MIPI_TCP	I	MIPI-DSI CLOCK differential signal input pins.
18	MIPI_TCN	I	MIPI-DSI CLOCK differential signal input pins.
19	GND	P	Ground
20	MIPI_TDP1	I	MIPI-DSI Data differential signal input pins. (Data lane 1)
21	MIPI_TDN1	I	MIPI-DSI Data differential signal input pins. (Data lane 1)
22	GND	P	Ground
23	MIPI_TDP0	I	MIPI-DSI Data differential signal input pins. (Data lane 1)
24	MIPI_TDN0	I	MIPI-DSI Data differential signal input pins. (Data lane 1)
25	GND	P	Ground
26	STBYB	I	Standby mode
27	LRSTB	I	Global reset pin. Active Low to enter Reset State. Normally pull high
28-29	VDD	P	Power Supply.
30	VCOM	P	Commom voltage

CTP interface

Pin No	Symbol	I/O	Function
1	VDD(3.3V)	P	CTP Power supply
2	SCL(1.8V)	I	Serial clock
3	SDA(1.8V)	I	Serial Input/output data bus
4	GND	P	Ground
5	INT	I	External Interrupt to the IC of CTP
6	RESET	I	Reset the display

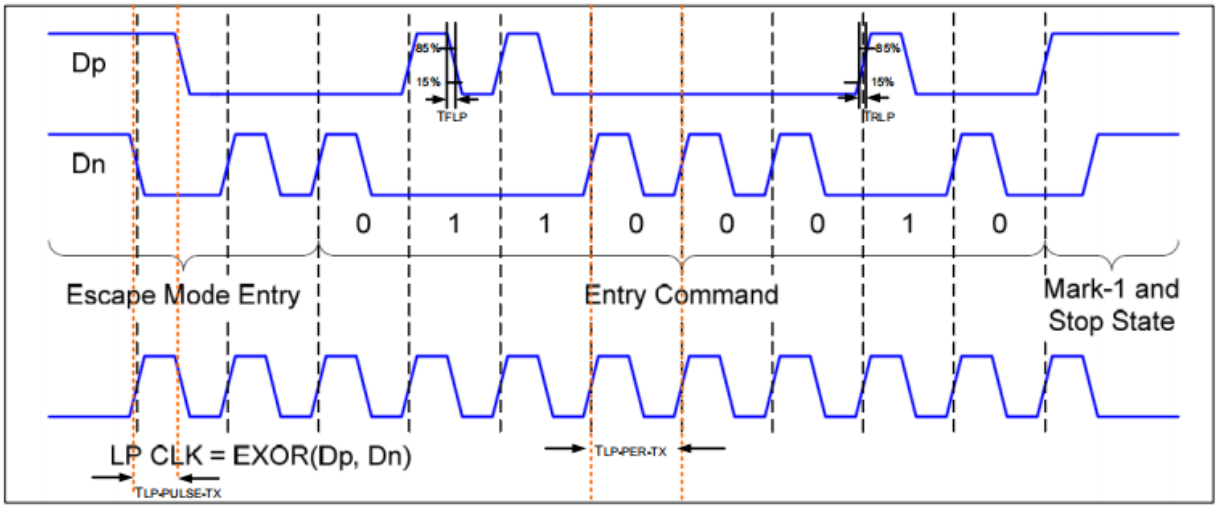
CTP Characteristics

Item	Specification	Remarks
CTP Structure	G+G	-
Outline Dimension	181.85×119.8	mm
Total Thickness	2.15	mm
View Area	154.81×86.52	mm
TP size	7.0	inch
Interface Type	IIC	-
Operation Temperature	-20℃~+70℃，≤90%RH	-
Storage Temperature	-30℃~+80℃，≤90%RH	-
Glass Thickness	1.1	mm
Resolution	1024*600	Dots
Surface hardness	≥6H	-
Control IC	GT911	-
Transparency	≥85%	-
Connection Type	FPC	-

6.4 AC Characteristics

6.4.1 LP Transmitter AC Specification

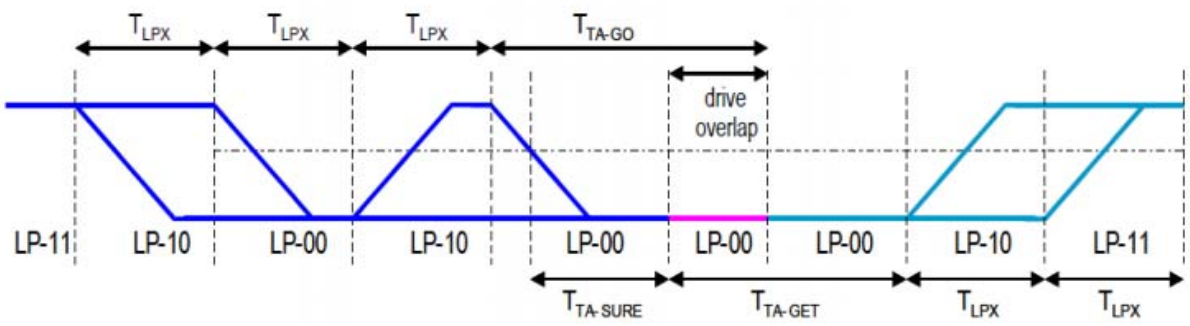
Parameter		Symbol	Min	Typ	Max	Units	Notes
15%~85% rising time and falling time		T_{RLP} /T_{FLP}	-	-	25	ns	-
30%~85% rising time and falling time		T_{REOT}	-	-	35	ns	-
Pulse width of LP exclusive-OR clock	First LP EXOR clock pulse after STOP state or Last pulse before stop state	$T_{LP-PULSE-TX}$	40	-	-	ns	-
	All other pulses		20	-	-	ns	-
Period of the LP EXOR clock		$T_{LP-PER-TX}$	90	-	-	mV/ns	-
Slew Rate @C_{LOAD} =0pF		δ V/δ t_{SR}	30	-	500	mV/ns	-
Slew Rate @C_{LOAD} =5pF			30	-	200	mV/ns	-
Slew Rate @C_{LOAD} =20pF			30	-	150	mV/ns	-
Slew Rate @C_{LOAD} =70pF			30	-	100	mV/ns	-
Load Capacitance		T_{RLP}	-	-	70	pF	-



6.4.2 Turnaround Procedure

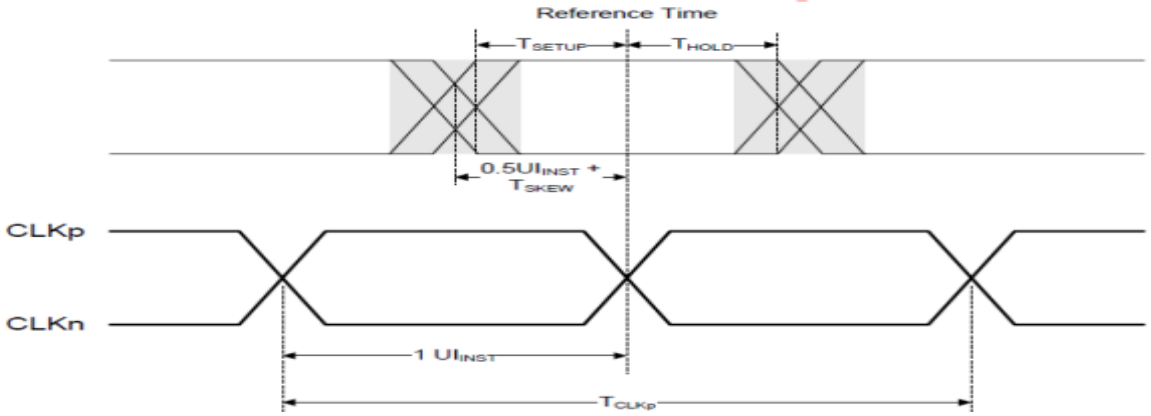
Turnaround Procedure Operation Timing Parameters

Parameter	Symbol	Min	Typ	Max	Units
Length of any Low-Power state period: Master side	T_{LPX}	50	-	75	ns
Length of any Low-Power state period: Slave side	T_{LPX}	50	55.56	58.34	ns
Ratio of T_{LPX}(Master)/ T_{LPX} (Slave) between Master and Slave side	Ratio T_{LPX}	2/3	-	3/2	
Time-out before new TX side start driving	$T_{TA-Sure}$	T_{LPX}	-	2T_{LPX}	ns
Time to drive LP-00 by new TX	T_{TA-GET}	-	5T_{LPX}	-	ns
Time to drive LP-00 after Turnaround Request	T_{TA-GO}	-	4T_{LPX}	-	ns



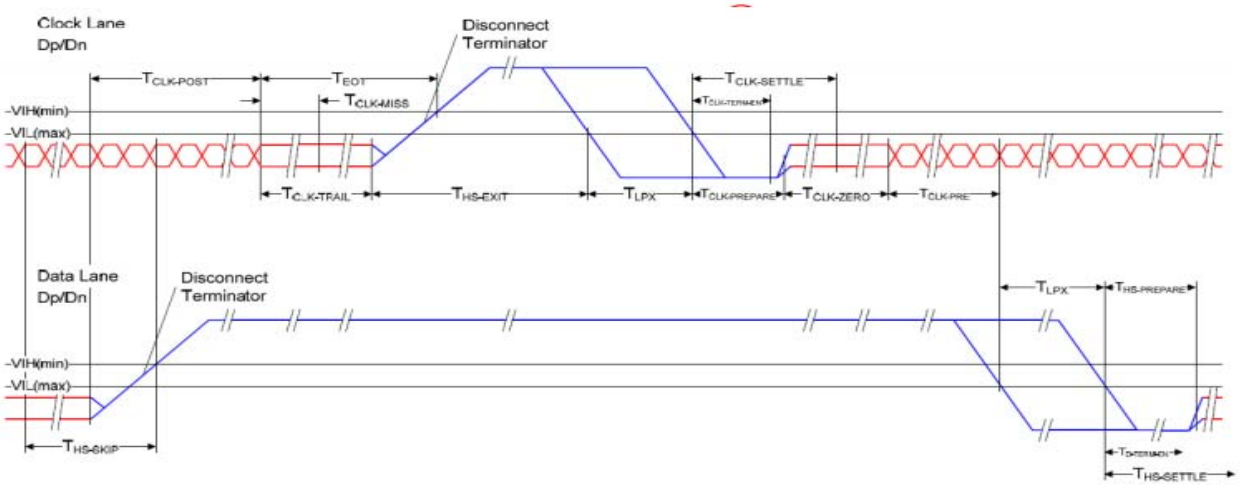
6.4.3 High speed transmission

Parameter	Symbol	Min	Typ	Max	Units
UI instantaneous	UI_{INST}	2	-	12.5	ns
Data to Clock Skew(measured at transmitter)	$T_{SKEW(TX)}$	-0.15	-	0.15	UI_{INST}
Data to Clock Setup time(measured at receiver)	$T_{SETUP(RX)}$	0.15	-	-	UI_{INST}
Data to Clock Hold time(measured at receiver)	$T_{HOLD(RX)}$	0.15	-	-	UI_{INST}
20%~80% rise time and fall time	T_R, T_F	150	-	-	ps
		-	-	0.3	UI_{INST}



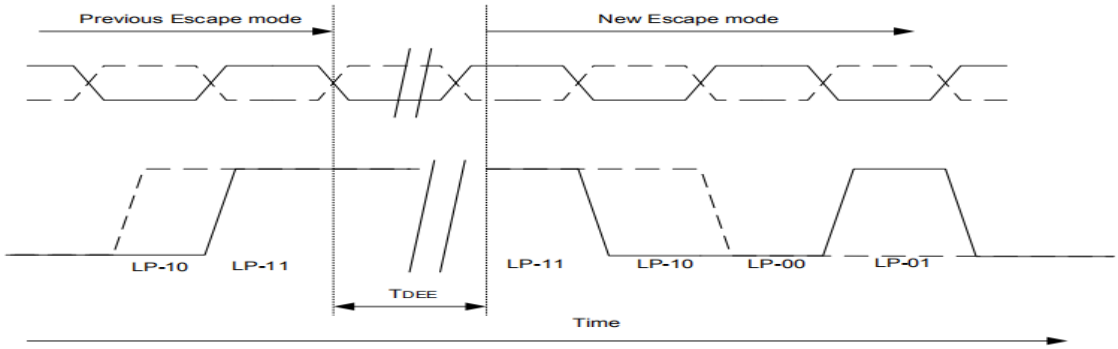
6.4.4High Speed Clock Transmission

Parameter	Symbol	Min	Typ	Max	Units
Time that the transmitter shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52UI	-	-	ns
Detection time that the clock has stopped toggling	$T_{CLK-MISS}$	-	-	60	ns
Time to drive LP-00 to prepare for HS clock transmission	$T_{CLK-PREPARE}$	38	-	95	ns
Minimum lead HS-0 drive period before starting clock	$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	300	-	-	ns
Time to enable Clock Lane receiver line termination measured from when Dn cross $V_{IL,MAX}$	$T_{HS-TERM-EN}$	-	-	38	ns
Minimum time that the HS clock must be prior to any associated data lane beginning the transmission from LP to HS mode	$T_{CLK-PRE}$	8	-	-	UI
Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60	-	-	ns



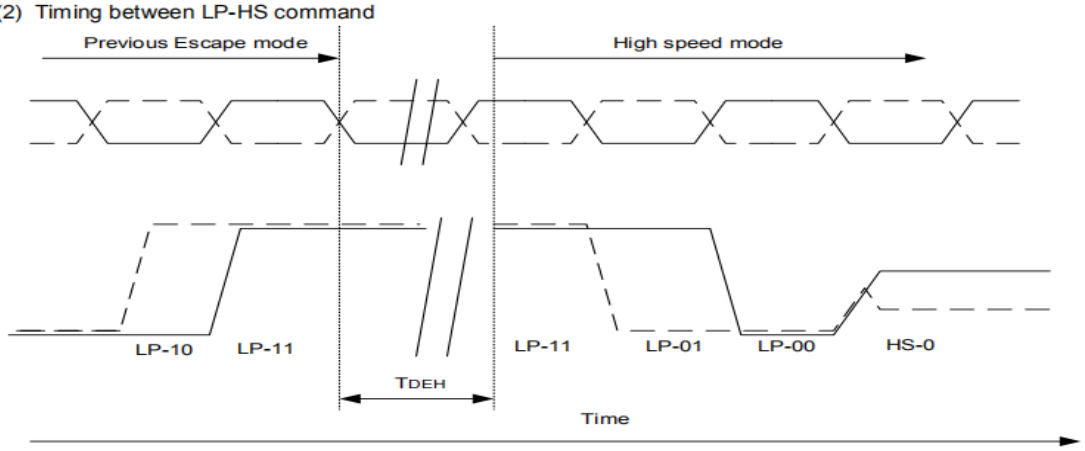
6.4.5 LP11 timing request between data transformation

(1) Timing between LP-LP command



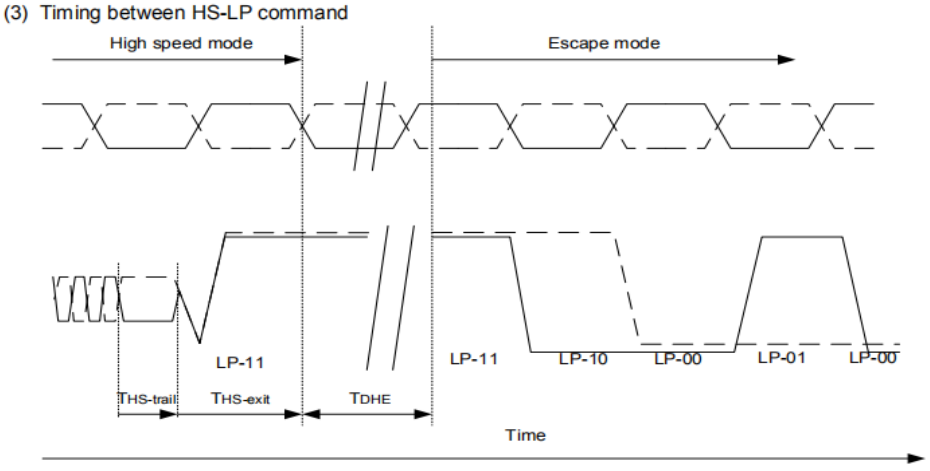
Parameter	Symbol	Min	Typ	Max	Unit
LP-11 delay to start of the new Escape Mode Entry	TDEE	150	-	-	ns

(2) Timing between LP-HS command



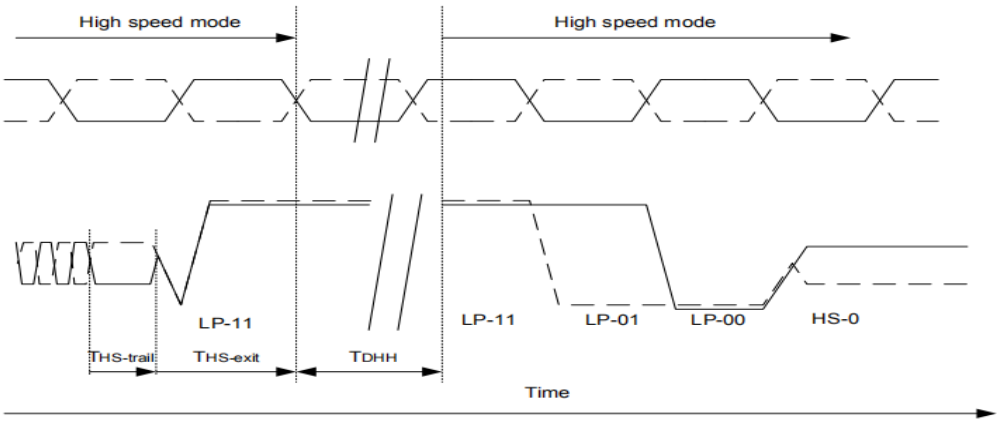
Parameter	Symbol	Min	Typ	Max	Unit
LP-11 delay to start of the Entering High Speed Mode	TDEH	Max(150,32UI)	-	-	ns

(3) Timing between HS-LP command



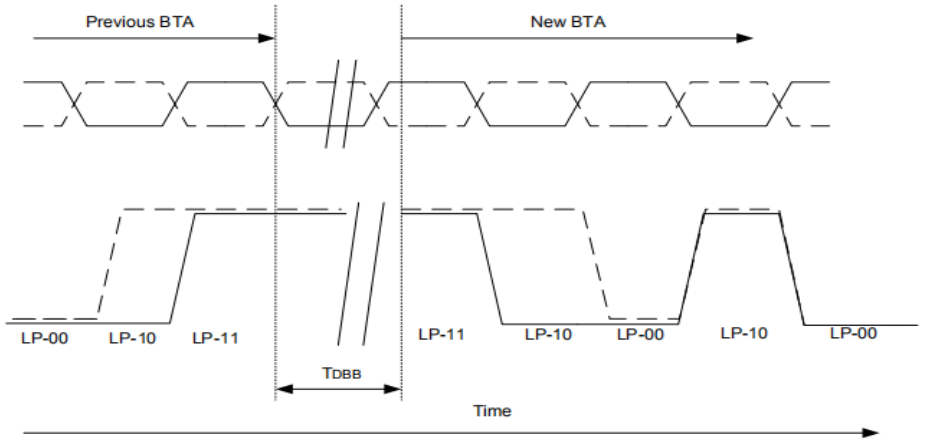
Parameter	Symbol	Min	Typ	Max	Unit
LP-11 delay to start of the Escape Mode Entry	TDHE	Max(150,32UI)	-	-	ns

(4) Timing between HS-HS command



Parameter	Symbol	Min	Typ	Max	Unit
LP-11 delay to start of the Entering High Speed Mode	TDHH	Max(150,32UI)	-	-	ns

(5) Timing between BTA-BTA command



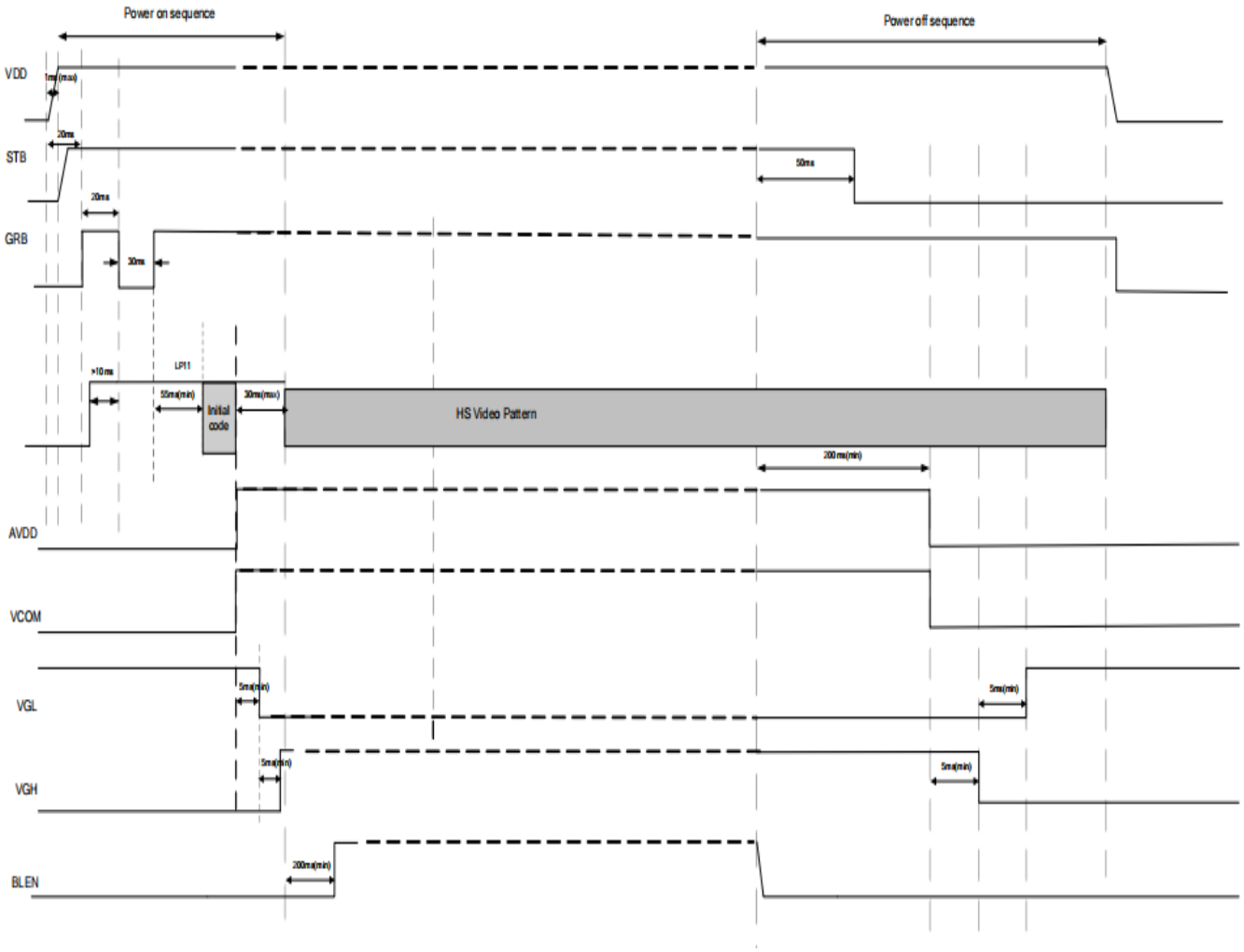
Parameter	Symbol	Min	Typ	Max	Unit
LP-11 delay to start of the new BTA	TDBB	150	-	-	ns

6.5 Input timing table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
MIPI (4 Lane) @Frame rate=60Hz	-	-	340	-	Mbps
DCLK frequency @Frame rate=60Hz	F_{DCLK}	-	52	-	MHZ
HSYNC period time	T_H	-	1354	-	DCLK
Horizontal display area	T_{HD}	-	1024	-	DCLK
HSYNC pulse width	T_{HPW}	-	10	-	DCLK
HSYNC back porch	T_{HBP}	-	160	-	DCLK
HSYNC front porch	T_{FBP}	-	160	-	DCLK
VSYNC period time	T_V	-	636	-	H
Vertical display area	T_{VD}	-	600	-	H
VSYNC pulse width	T_{VPW}	-	1	-	H

VSYNC back porch	T_{VBP}	-	23	-	H
VSYNC front porch	T_{VFP}	-	12	-	H

6.6 Power on/off sequence



7. *Optical Characteristics*

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	θ=0° =0°	-	330	-	Cd/m^2	1
Uniformity	⊿Bp		75	80	-	%	1,2
Viewing Angle	3:00	Cr≥10	70	80	-	Deg	3

	6:00			70	80	-		
	9:00			70	80	-		
	12:00			70	80	-		
Contrast Ratio	Cr		*Ta*=25℃ =0°	600	800		-	4
Response Time	$T_{r+}T_f$			-	25	40	ms	5
Color of CIE Coordinate	W	x	*θ*=0° =0°	-0.05	0.31	+0.05	-	1,6
		y			0.34		-	
	R	x			0.62		-	
		y			0.33		-	
	G	x			0.29		-	
		y			0.54		-	
	B	x			0.15		-	
		y			0.15		-	

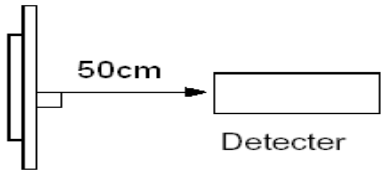
Note：The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 (Φ5mm)

Measuring condition:

- *Measuring surroundings: Dark room.*
- *Measuring temperature: Ta=25℃.*
- *Adjust operating voltage to get optimum contrast at the center of the display.*

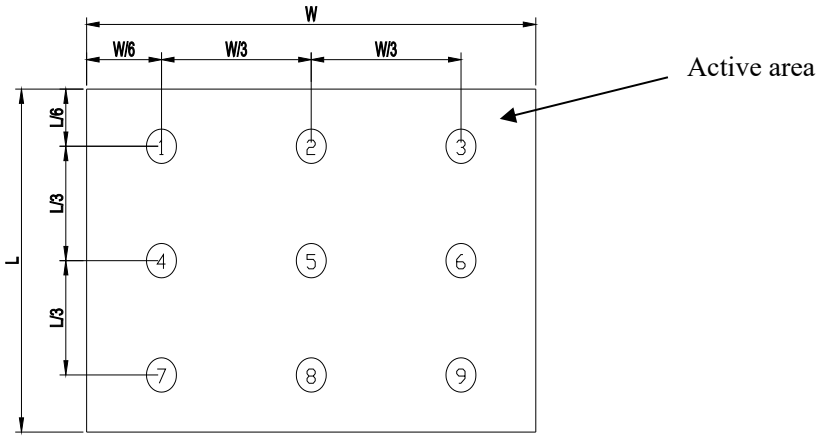
Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.



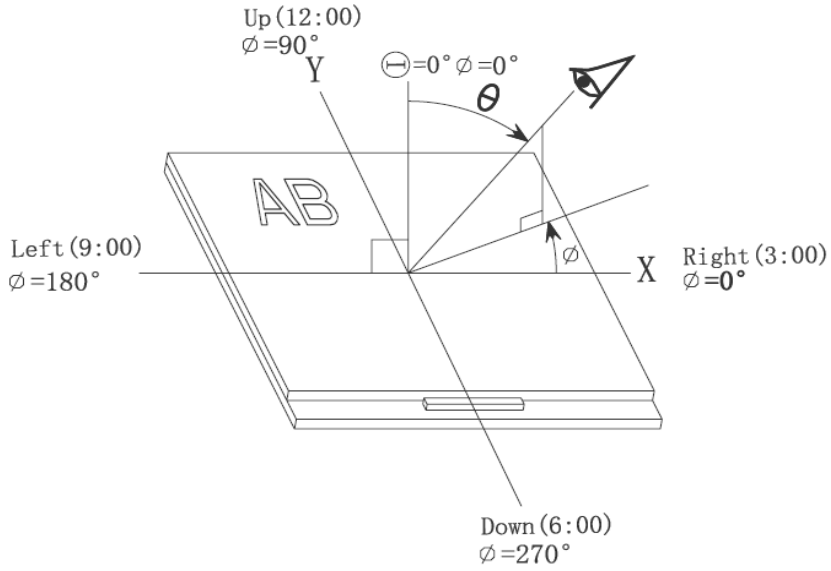
Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)
Bp (Max.) = Maximum brightness in 9 measured spots

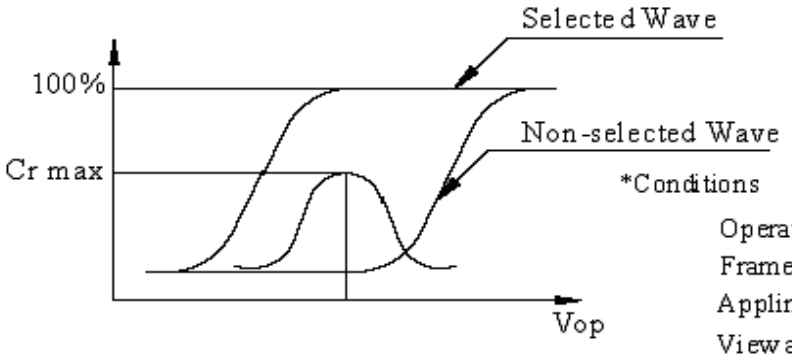
Bp (Min.) = Minimum brightness in 9 measured spots.



Note 3: The definition of viewing angle:
Refer to the graph below marked by θ and Φ



Note 4: Definition of contrast ratio.(Test LCD using DMS501)



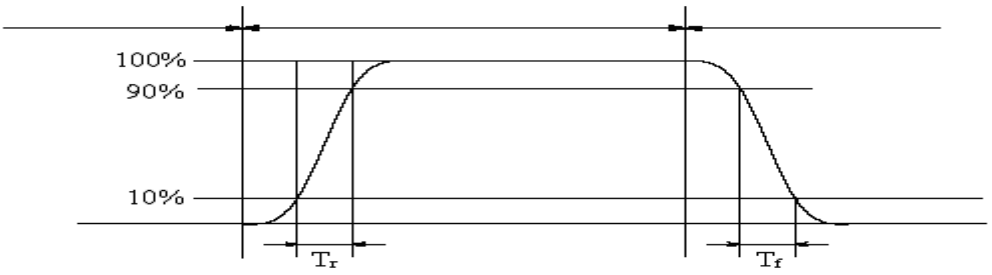
*Conditions

Operating Voltage	:	Vop
Frame Frequency	:	70Hz
Appling Waveform	:	1/N duty 1/a bias
View angle (θ, Φ)	:	(0°, 0°)

$$Contrast\ ratio(Cr) = \frac{Brightness\ of\ selected\ dots}{Brightness\ of\ non-selected\ dots}$$

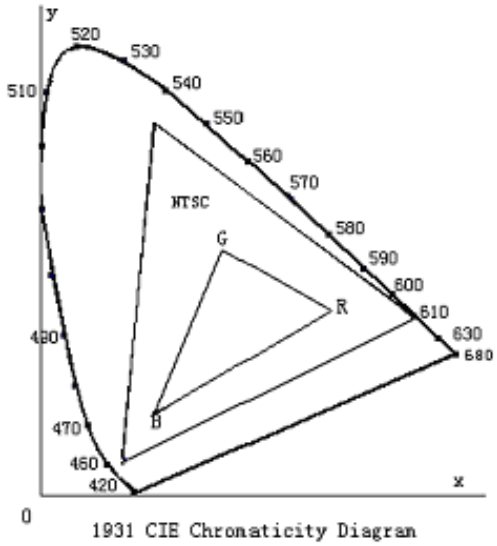
Note 5: Definition of Response time. (Test LCD using DMS501):

The output signals of photo detector are measured when the input signals are changed from"black"to"white"(rising time) and from" white"to "black"(falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.Refer to figure as below.



The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

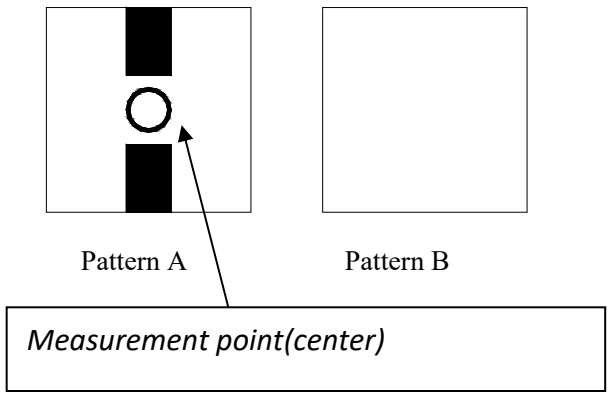


1931 CIE Chromaticity Diagram

Color gamut:

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

Note 7: Definition of cross talk.
*Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100*



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±2℃ 96H Restore 2H at 25℃ Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 2H at 25℃ Power off	
3	HighTemperature Operation	70℃±2℃ 96H Restore 2H at 25℃ Power on	
4	Low Temperature Operation	-20℃±2℃ 96H Restore 4H at 25℃ Power on	
5	High Temperature/Humidity Operation	60℃±2℃ 90%RH 96H Power on	
6	Temperature Cycle	–30℃←————→80℃ 30min 5min 30min after 5 cycle, Restore 2H at 25℃ Power off	

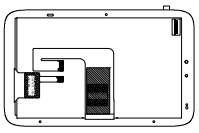
Note: Operation: Supply 1.8 V for logic system.

The inspection terms after reliability test, as below

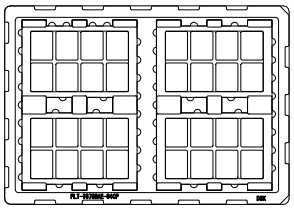
ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

9. Drawing Of Packing

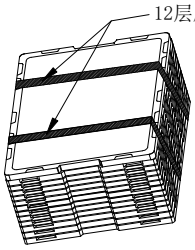
Drawing Of Packing
包装方式



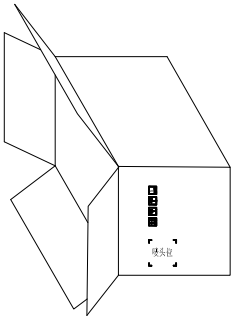
单PCS LCM



每盘装4PCS



12盘为1捆，最顶1盘为空盘，
产品共计44 PCS



外纸箱包装

Part No.:	
Q'ty:	
Date:	

唛头

Notes:
注意
This Drawing Provide the reference only ,Don't do the examination according
此图仅做为参考,不做为检测依据

REVSION 版 本	A1	☑ 正式规格 ☐ 临时规格	REVISER 修订人	MODEL NO 产品料号	APPROVED BY 覈 準	CHECKED BY 審 覈	DRAWN BY 製 作
DATE 日 期	2019.11.07			IE-A-1819CH04MP-CB-1			
PAGE 頁 碼	1/1		吴丽艳				

10. *Precautions for Use of LCD Modules*

10.1 Handling Precautions

10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol — Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water — Ketone — Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

10..1.7 If the logic circuit power is off, do not apply the input signals.

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage precautions

10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃
Relatively humidity: ≤80%

10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 ***The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.***

END