Project No. 项目编号	WJFH116008A
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCM Switch FPC 1920RGB x 1080 Dots 11.6”TFT LCD
Signature by customer: 客户确认签章：	

编　　制	电子审核	结构审核	批　　准

公司地址：东莞市松山湖科技产业园工业北路 6 号

电话：0769-89295566, 22895999, 22898868

传真：0769-89201766, 22898863

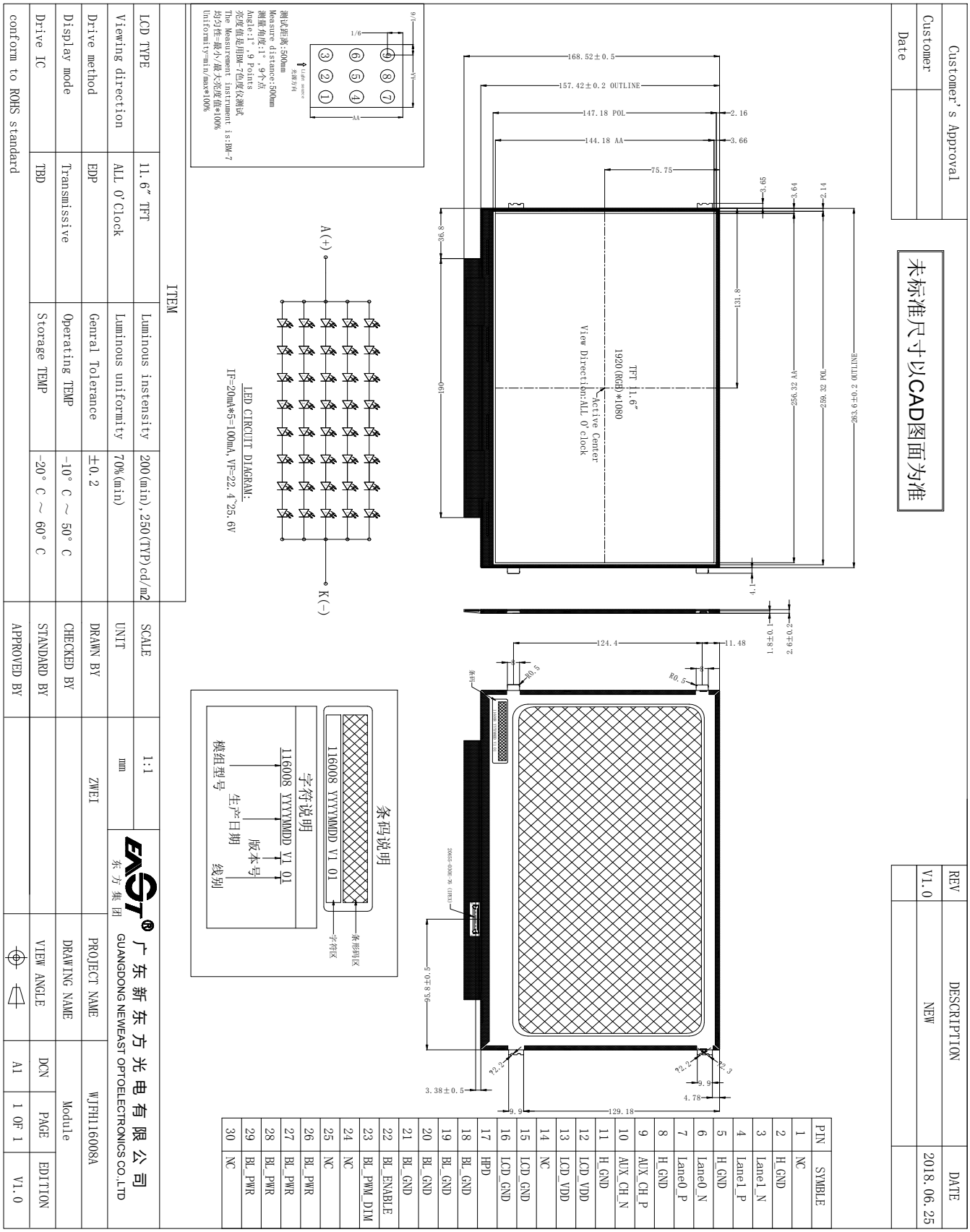
Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
A	2018.06.25	First Release.		

1. General Feature:

Item	Standard Value	Unit
Display Size	11.6”	--
Number of Pixels	1920(H)x3(RGB)x1080(V)	--
Active Area	256.32(H)*144.18(V)	mm
Pixel pitch	0.1335(H) × 0.1335(V)	mm
Outline Dimension	263.6(L) ×157.42(W) × 2.6(T)	mm
Pixel Arrangement	RGB vertical stripe	-
Display Mode	Normally Black	-
Number of color	16.7M	-
Viewing Direction	All Viewing direction	-
Surface Treatment	Anti-Glare	-
Interface	eDP interface	-
Driver IC	TBD	-
Driver Condition	3.3	V
Backlight	White LED	-
Touch Panel	No Touch Panel	-
Operation Temperature	-10~50	℃
Storage Temperature	-20~60	℃
Weight	TBD	g

2. Mechanical Dimension



PIN	SYMBLE
1	NC
2	H_GND
3	Lane1_N
4	Lane1_P
5	H_GND
6	Lane0_N
7	Lane0_P
8	H_GND
9	AUX_CH_P
10	AUX_CH_N
11	H_GND
12	LCD_VDD
13	LCD_VDD
14	NC
15	LCD_GND
16	LCD_GND
17	HPD
18	BL_GND
19	BL_GND
20	BL_GND
21	BL_GND
22	BL_ENABLE
23	BL_PWM_DIM
24	NC
25	NC
26	BL_PWR
27	BL_PWR
28	BL_PWR
29	BL_PWR
30	NC

ITEM			
LCD TYPE	11.6" TFT	Luminous instensity	200(min),250(TYP)cd/m2
Viewing direction	ALL 0'Clock	Luminous uniformity	70%(min)
Drive method	EDP	Genral Tolerance	±0.2
Display mode	Transmissive	Operating TEMP	-10° C ~ 50° C
Drive IC	TBD	Storage TEMP	-20° C ~ 60° C
conform to ROHS standard			

SCALE	1:1	广东新东方光电有限公司 GUANGDONG NEWEAST OPTOELECTRONICS CO.,LTD	
UNIT	mm	PROJECT NAME	WJFH116008A
DRAWN BY	ZWEI	DRAWING NAME	Module
CHECKED BY		VIEW ANGLE	
STANDARD BY		DCN	A1
APPROVED BY		PAGE	1 OF 1
		EDITION	V1.0

3. Input Terminals

3-1 Driving interface of PWB

Pin NO.	Symbol	Description
1	NC	Reserved for LCD
2	H_GND	High Speed Ground
3	Lane1_N	Complement Signal Link Lane 1
4	Lane1_P	True Signal Link Lane 1
5	H_GND	High Speed Ground
6	Lane0_N	Complement Signal Link Lane 0
7	Lane0_P	True Signal Link Lane 0
8	H_GND	High Speed Ground
9	AUX_CH_P	True Signal Auxiliary Channel
10	AUX_CH_N	Complement Signal Auxiliary Channel
11	H_GND	High Speed Ground
12	LCD_VDD	LCD logic and driver power(3.3V)
13	LCD_VDD	LCD logic and driver power(3.3V)
14	NC	Reserved for LCD manufacturer’s use
15	LCD_GND	LCD logic and driver ground
16	LCD_GND	LCD logic and driver ground
17	HPD	HPD signal pin
18	BL_GND	Backlight ground
19	BL_GND	Backlight ground
20	BL_GND	Backlight ground
21	BL_GND	Backlight ground
22	BL_ENABLE	Backlight ON/OFF
23	BL_PWM_DIM	System PWM
24	NC	Reserved for LCD manufacturer’s use
25	NC	Reserved for LCD manufacturer’s use
26	BL_PWR	Backlight power
27	BL_PWR	Backlight power
28	BL_PWR	Backlight power
29	BL_PWR	Backlight power
30	NC	Reserved for LCD manufacturer’s use

3-2 Backlight driving

The backlight system is an edge-lighting type with white-LED.

(It is usually required to measure under the following condition: Ta=25° C±2° C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	V_{BL}	7.0	12.0	21.0	V	BL_PWR
Inrush Current	$Irush_{BL}$	-	-	1.0	A	[Note 3-2-4]
Modulated light signal voltage	V_{PWM} H	1.85	–	VDD	V	BL_PWM_DIM
	V_{PWM} L	0	–	0.7	V	
Brightness Control Duty Ratio	Duty	1	–	100	%	[Note 3-2-1]
Brightness Control pulse width	T_{PWM}	5	–	–	μ s	[Note 3-2-2]
Brightness Control frequency	f_{PWM}	200	–	2,000	Hz	
LED-BL ON/OFF High voltage	V_{CNT}H	1.8	3.3	3.6	V	[Note 3-2-3]
LED-BL ON/OFF low voltage	V_{CNT}L	0	–	0.5	V	[Note 3-2-3]
Input signal pin current	I	–	V_{IN}/51k Ω	–	μ A	BL_ENABLE BL_PWM_DIM

[Note4-2-1] VPWM Input:100%=Max luminance 1%=Min luminance

[Note4-2-2] The minimum value of the dimming signal pulse width is assumed regulations of the width of high and the width of low

[Note4-2-3]BL_ENABLE : High = BL turn on ,low or open =BL turn off

3-2 eDP interface

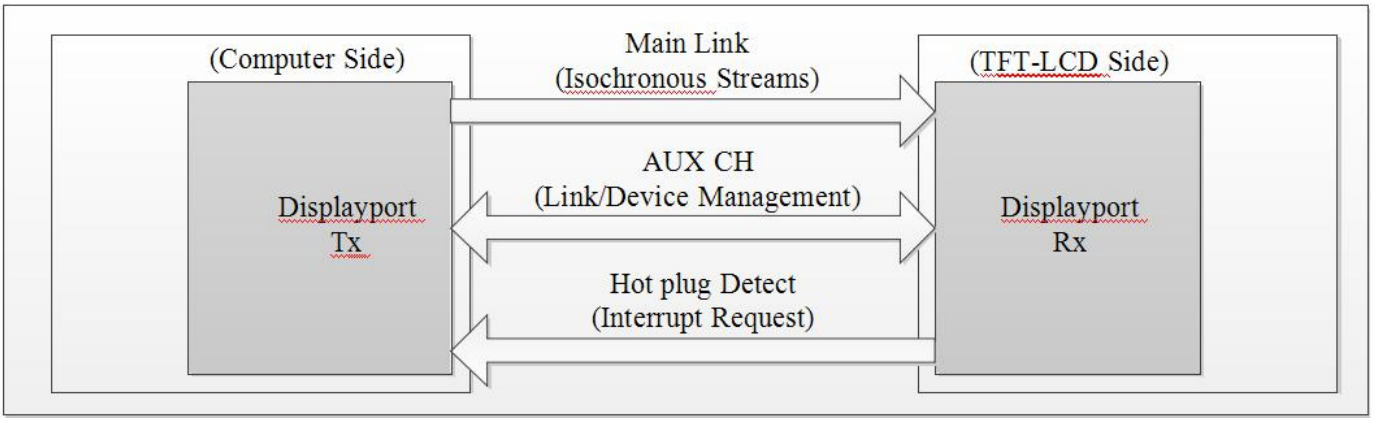


Fig3-
2-1 DP architecture

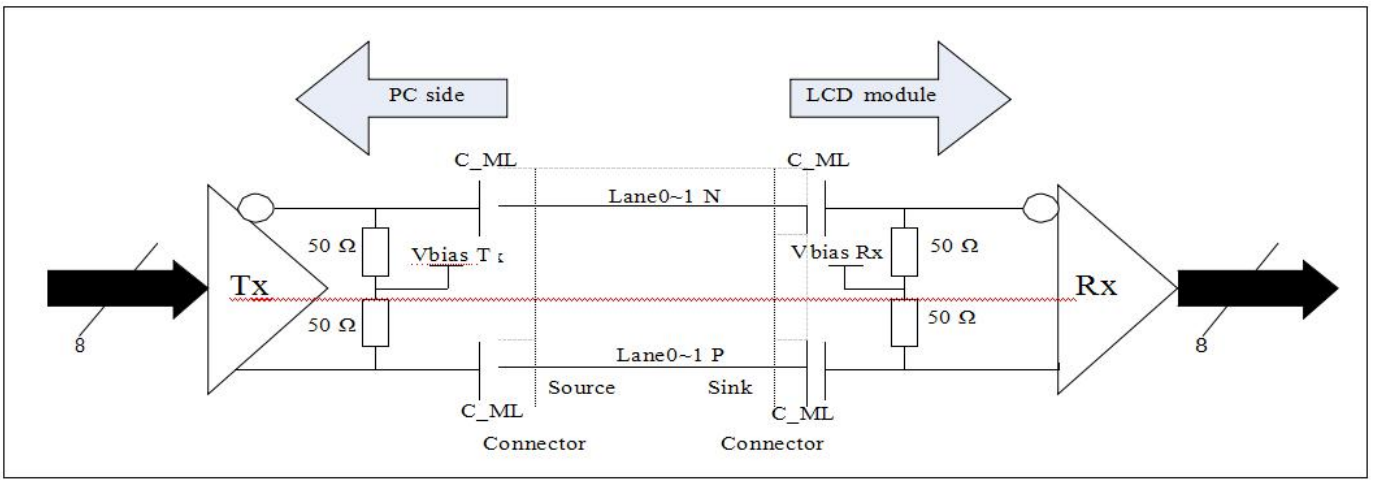


Fig.3-2-2 Main Link differential pair

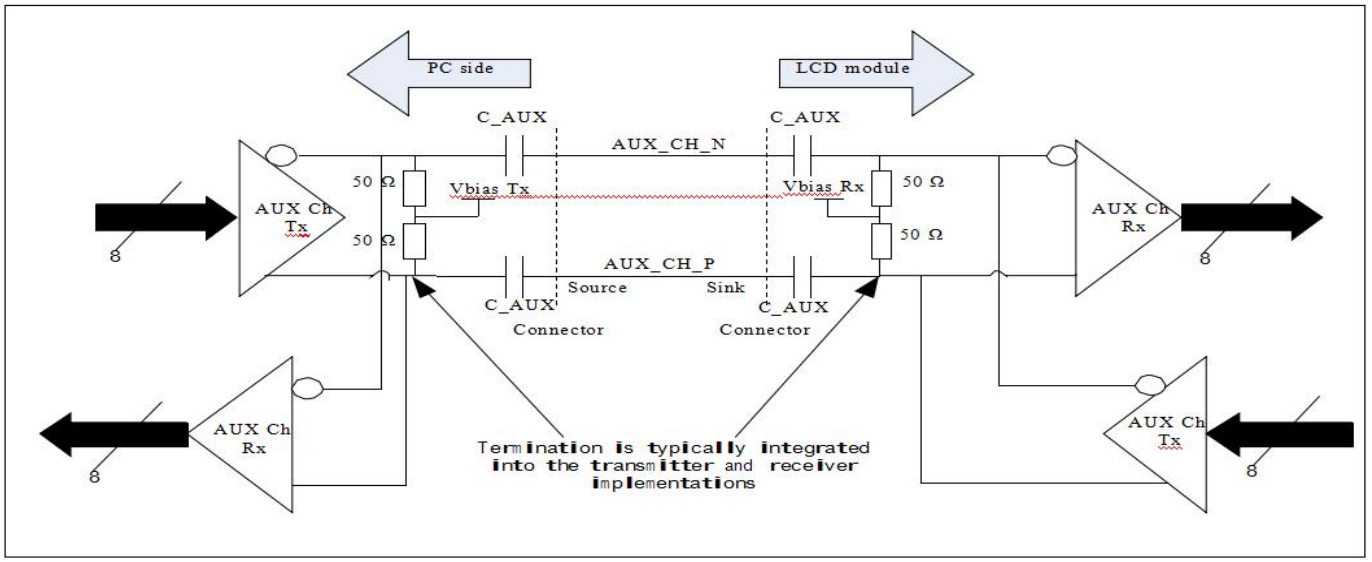


Fig.3-2-3 AUX Link differential pair

Lane0	Lane1
R0-7:0	R1-7:0
G0-7:0	G1-7:0
B0-7:0	B1-7:0
R2-7:0	R3-7:0
G2-7:0	G3-7:0
B2-7:0	B3-7:0
R4-7:0	R5-7:0
G4-7:0	G5-7:0
B4-7:0	B5-7:0

Fig.3-2-4 eDP 2lane 8bit input data mapping

4. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings		Unit	Remark
			Min.	Max.		
+3.3V supply voltage	VDD	Ta=25°C	-0.3	+4.0	V	
Backlight supply voltage	V_{BL}	Ta=25°C	-0.3	+26.5	V	
Input voltage(eDP)	VI	Ta=25°C	-0.3	+1.5	V	[Note 4-1]
Storage temperature(ambient)	Tstg	-	-20	+70	°C	[Note 4-2]
Operation temperature(ambient)	Topa	-	-10	+60	°C	

[Note 4-1] eDP signals

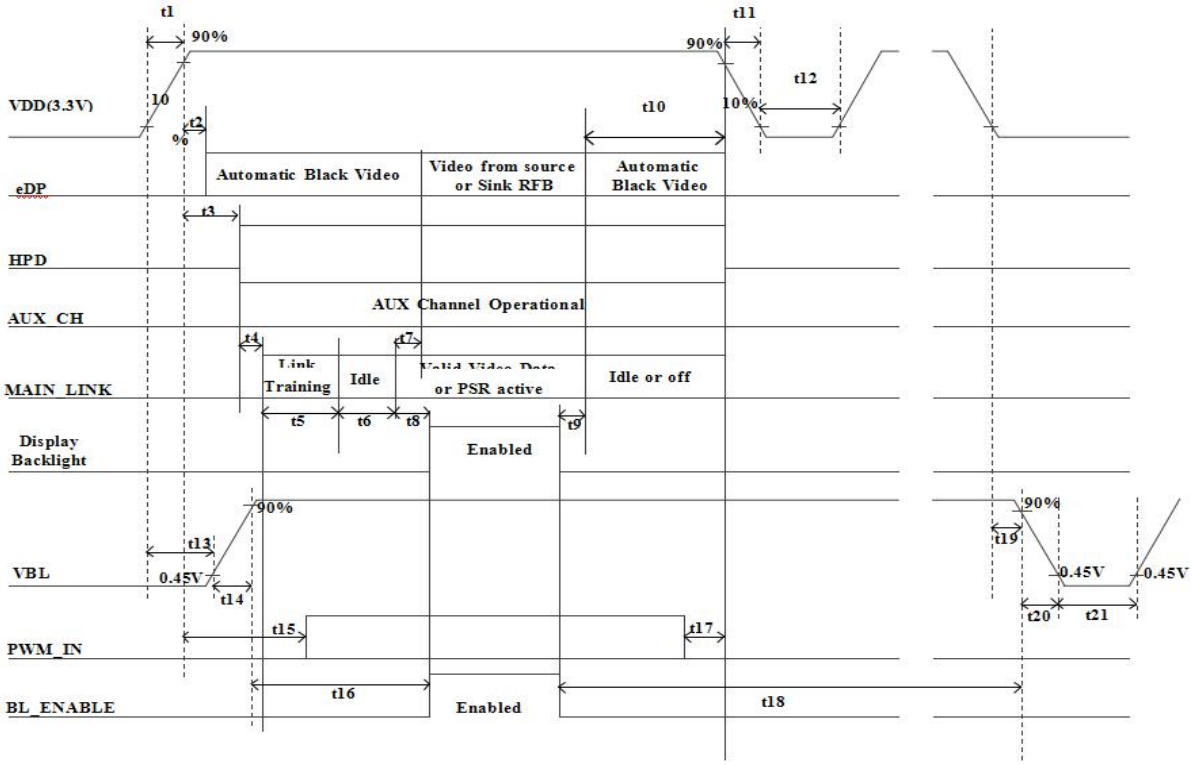
[Note 4-2] Humidity: 90%RH Max.at Ta≦+40° C.

Maximum wet-bulb temperature at +39° C or less at Ta>+40° C, No condensation.

5. Electrical Characteristics

DC Electrical Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
+3.3V supply voltage	VDD	+3.0	+3.3	+3.6	V	[Note 5-1-1]
Current dissipation	IDD	-	212	364	mA	[Note 5-1-2]
Inrush Current	Irush	-	-	1.0	A	[Note 5-1-3]
Permissible input ripple voltage	V_{RP}	-	-	100	mVp-p	VDD=+3.3V
eDP HPD Signal Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
HPD High level output voltage	VOH_{HPD}		VDD-0.1	-		
HPD Low level output voltage	VOL_{HPD}	-	0			
eDP AUX Channel Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Unit Interval for AUX channel	UI_{AUX}	0.4	0.5	0.6	μS	
Peak-to-peak voltage at TP1	$V_{AUX-DIFF-pp}$	0.32	-	1.36	V	
AUX DC Common mode Voltage	$V_{AUX-DC-CM}$	0	-	2.0	V	
AUX Short current limit	I_{AUX_SHORT}	-	-	90	mA	
AUX CH termination Cresistor	R_{AUX_TERM}	-	100	-	Ω	Differential input
AUX AC coupling capacitor	C_{AUX}	75	-	200	nF	
Number of pre-charge pulses	Pre-charge pulses	10	-	16	-	
eDP Main Link Receiver Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Link clock down spreading	Down_Spread_Amplitude	0		0.5	%	
Differential Peak-to-peak Input Voltage at Rx package pins	$V_{RX-DIFFp-p}$	120	-	1200	mV	
Differential Return Loss at 1.35GHz at Rx package pins	$RL_{RX-DIFF}$	9	-	-	dB	
Differential termination resistance	$R_{RX-TERM}$	-	100	-	Ω	
RX short circuit Current Limit	$I_{RX-SHORT}$	-	-	50	mA	
Lane Intra-pair Skew at RX package pins	$T_{RX-SKEW-INTRA-PAIR-High-Bit-Rate}$	-	-	TBD	ps	

[Note 5-1-1] ON-OFF conditions for supply voltage

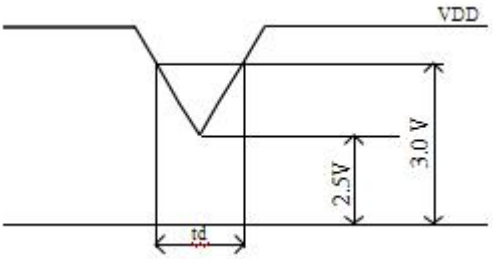


[Note] Do not keep the interface signal high-impedance or unusual signal when power is on

Symbol	Min	Max	Unit	Note
t1	0.5	10	ms	
t2	0	100	ms	
t3	0	100	ms	
(t4)	-	-	ms	
(t5)	-	-	ms	
(t6)	-	-	ms	
(t7)	0	50	ms	
(t8)			ms	
(t9)			ms	
(t10)	0	500	ms	
t11	1	50	ms	[Note1]
t12	500	-	ms	
(t13)	-	-	ms	
t14	0.5	10	ms	
t15	100		ms	
(t16)	-	-	ms	
t17	0	-	ms	
(t18)	-	-	ms	
t19	-	-	ms	
t20	0.1	-	ms	
t21	100		ms	

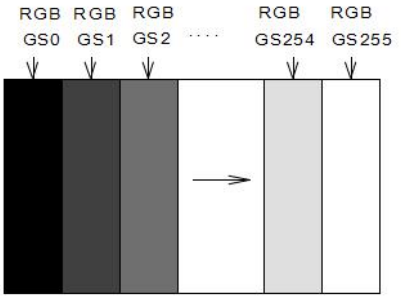
[Note 1]As for the power off sequence for VDD (t11), be sure to keep above mentioned timing.
If the VDD power off sequence timing is other than shown above, LCD may cause permanent damage.
*1 : As for the power sequence for backlight, it is recommended to apply above mentioned input timing.
If the backlight is light on and off at a timing other than shown above, displaying image maybe getdisturbed.

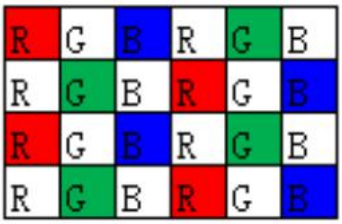
VDD-dip-conditions



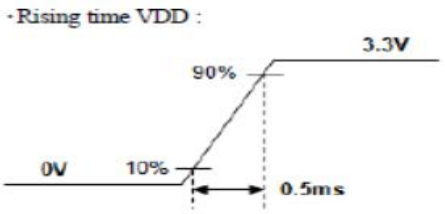
1) 2.5 V≦VDD＜3.0 V
td≦10 ms
Under above condition, the display image should return to an appropriate figure after VDD voltage recovers.
2）VDD＜2.5 V
VDD-dip conditions should also follow the ON-OFF conditions for supply voltage.

[Note 5-1-2]
Typical current condition: 16-gray-bar pattern.
VDD＝+3.3V
Maximum current condition: Vertical stripe pattern.
VDD＝+3.3V

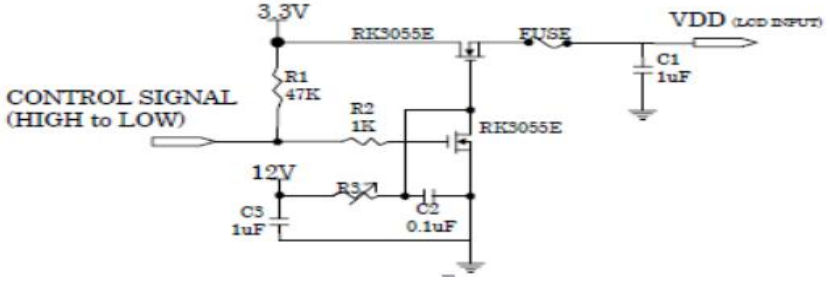




[Note 5-1-3]



·measurement condition :



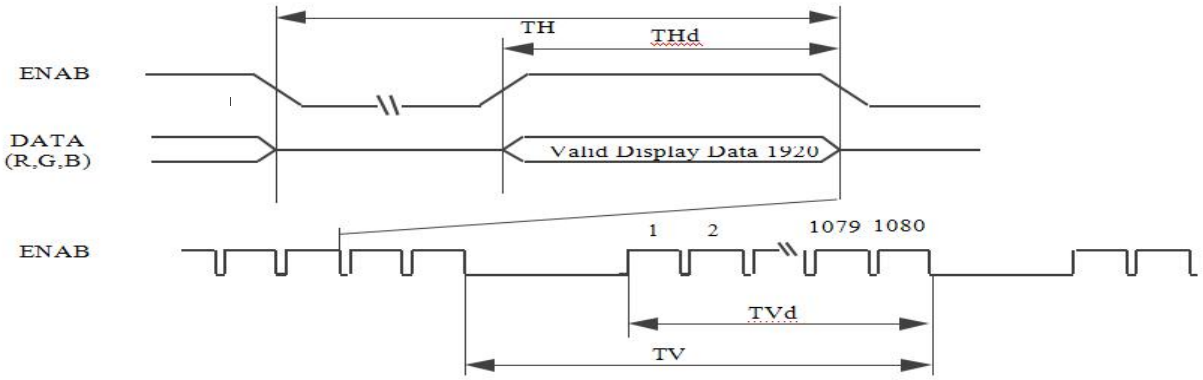
6. Timing characteristics of input signals

6-1iming Characteristics

VDD=+3.0V~+3.6,Ta=-10°C~+60°C

Paramete		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	$1/T_C$	–	138.5	–	MHz	[Note6-1-1]
Data enable signal	Horizontal period	TH	–	2080	–	clock	
				15.02		μs	
	Horizontal period (High)	THd	-	1920	-	clock	
	Vertical period	TV	–	1111	–	line	
			-	16.685	-	ms	
	Vertical period (High)	TVd	–	1080	–	line	

[Note 6-1-1] In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.



6-2. Input data signals and display position on the screen

Display position of input data(VH)

7. Input signal, basic display colors and gray scale of each color

	Colors & Gray Scale	Gray Scale	Data signal																							
			R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
			LSB							MSB	LSB							MSB	LSB							MSB
Basic Color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	⇩	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	⇩	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0: Low level voltage, 1: High level voltage

Each basic color can be displayed in 256 gray scales from 8 bit data signals.

According to the combination of 24 bit data signals, the 16.7M color display can be achieved on the screen.

8. EDID Specifications

8 - 1. EDID data structure

This is the EDID(Extended Display Identification Data) data formats to support displays as defined in the VESA Plug & Display.

Byte (decimal)	Byte (hex)	Field Name and Comments	Value (hex)	Value (binary)
0	00	Header	00	00000000
1	01	Header	FF	11111111
2	02	Header	FF	11111111
3	03	Header	FF	11111111
4	04	Header	FF	11111111
5	05	Header	FF	11111111
6	06	Header	FF	11111111
7	07	Header	00	00000000
8	08	EISA manufacture code =NCP	38	00111000
9	09	EISA manufacture code (Compressed ASCII)	70	01110000
10	0A	Product code (LM116LF1L01)	00	00000000
11	0B	Product code (hex,LSB first)	00	00000000
12	0C	LCD module Serial No (fixed “0”)	00	00000000
13	0D	LCD module Serial No (fixed “0”)	00	00000000
14	0E	LCD module Serial No (fixed “0”)	00	00000000
15	0F	LCD module Serial No (fixed “0”)	00	00000000
16	10	Week of manufacture	00	00000000
17	11	Year of manufacture - 1990 (ex 2000 – 1990 = 10) 2015-1990 = 25	19	00011001
18	12	EDID structure version # = 1	01	00000001
19	13	EDID revision # = 4	04	00000100
20	14	Video i/p definition = Digital 8bit DP support	A5	10100101
21	15	Max H image size(cm) = 26cm	1A	00011101
22	16	Max V image size(cm) = 15cm	0F	00010001
23	17	Display gamma (2.2×100) – 100 = 120	78	01111000
24	18	Feature support(stanby,suspend,RGB color/Prefer Time)	06	00000110
25	19	Red/Green Low bit(RxRy/GxGy)	DE	11011110
26	1A	Blue/White Low bit(BxBy/WxWy)	50	01010000
27	1B	Red X(Rx) (written value 0.64)	A3	10100011
28	1C	Red Y(Ry) (written value 0.33)	54	01010100
29	1D	Green X(Gx) (written value 0.3)	4C	01001100
30	1E	Green Y(Gy) (written value 0.6)	99	10011001
31	1F	Blue X(Bx) (written value 0.15)	26	00100110
32	20	Blue Y(By) (written value 0.06)	0F	00001111
33	21	White X(Wx) (written value 0.313)	50	01010000
34	22	White Y(Wy) (written value 0.329)	54	01010100
35	23	Established timings 1	00	00000000

36	24	Established timings 2	00	00000000
37	25	Established timings 3(Manufacture's reserved timing)	00	00000000
38	26	Standard timing ID1	01	00000001
39	27	Standard timing ID1	01	00000001
40	28	Standard timing ID2	01	00000001
41	29	Standard timing ID2	01	00000001
42	2A	Standard timing ID3	01	00000001
43	2B	Standard timing ID3	01	00000001
44	2C	Standard timing ID4	01	00000001
45	2D	Standard timing ID4	01	00000001
46	2E	Standard timing ID5	01	00000001
47	2F	Standard timing ID5	01	00000001
48	30	Standard timing ID6	01	00000001
49	31	Standard timing ID6	01	00000001
50	32	Standard timing ID7	01	00000001
51	33	Standard timing ID7	01	00000001
52	34	Standard timing ID8	01	00000001
53	35	Standard timing ID8	01	00000001
54	36	Detailed timing descriptor#1 fck/10000	1A	00011010
55	37	#1 fck	36	00110110
56	38	#1 Horizontal active 1920=780h 80h	80	10000000
57	39	#1 Horizontal blanking 160=0A0h A0h	A0	10100000
58	3A	#1 Horizontal active/Horizontal blanking 70h	70	01110000
59	3B	#1 Vertical active 1080=438h 38h	38	00111000
60	3C	#1 Vertical blanking 31=01Fh 1Fh	1F	00011111
61	3D	#1 Vertical active/Vertical blanking 40h	40	01000000
62	3E	#1 Horizontal sync , offset(Thfp) 48=030h 30h	30	00110000
63	3F	#1 Horizontal sync , width 32=020h 20h	20	00100000
64	40	#1 Vertical sync,offset / Vertical sync,width (offset=3h/width=5h)	35	00110101
65	41	#1 Horizontal sync offset/width/Vertical sync offset/width	00	00000000
66	42	#1 Horizontal image size 256.32 mm=100h 00h	00	00000000
67	43	#1 Vertical image size 144mm=090h 90h	90	10010000
68	44	#1 Horizontal image size / Vertical image size 10h	10	00010000
69	45	Horizontal boader	00	00000000
70	46	Vertical boader	00	00000000
71	47	Flags(Non-interlaced=0/non 3D=00/Degital separate=11/Horizontal polarity/Vertical polarity=00)	18	00011000
72	48	Detailed timing descriptor#1 fck/10000 (=110.92224MHz/10000=11092.224=2B54h)	54	01010100
73	49	#2fck	2B	00101011
74	4A	#2 Horizontal active 1920=780h 80h	80	10000000
75	4B	#2 Horizontal blanking 160=0A0h A0h	A0	10100000
76	4C	#2 Horizontal active/Horizontal blanking 70h	70	01110000
77	4D	#2 Vertical active 1080=438h 38h	38	00111000

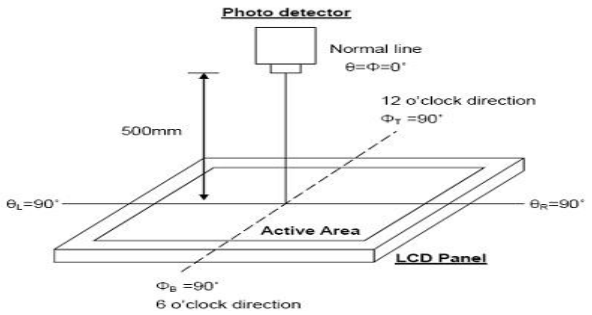
78	4E	#2 Vertical blanking 31=01Fh 1Fh	1F	00011111
79	4F	#2 Vertical active/Vertical blanking 40h	40	01000000
80	50	#2 Horizontal sync , offset(Thfp) 48=030h 30h	30	00110000
81	51	#2 Horizontal sync , width 32=020h 20h	20	00100000
82	52	#2 Vertical sync, offset / Vertical sync, width (offset=3h/width=5h)	35	00110101
83	53	#2 Horizontal sync offset/width/Vertical sync offset/width	00	00000000
84	54	#2 Horizontal image size 256.32mm=100h 00h	00	00000000
85	55	#2 Vertical image size 144mm=090h 90h	90	10010000
86	56	#2 Horizontal image size / Vertical image size 10h	10	00010000
87	57	Horizontal boader	00	00000000
88	58	Vertical boader	00	00000000
89	59	Flags(Non-interlaced=0/non 3D=00/Degital separate=11/Horizontal polarity/Verti cal	18	00011000
90	5A	Detailed timing descriptor #3	00	00000000
91	5B	Flag	00	00000000
92	5C	Reserved	00	00000000
93	5D	Dummy Descriptor	10	00010000
94	5E	Flag	00	00000000
95	5F	1st Dummy	00	00000000
96	60	2nd Dummy	00	00000000
97	61	3rd Dummy	00	00000000
98	62	4th Dummy	00	00000000
99	63	5th Dummy	00	00000000
100	64	6th Dummy	00	00000000
101	65	7th Dummy	00	00000000
102	66	8th Dummy	00	00000000
103	67	9th Dummy	00	00000000
104	68	10th Dummy	00	00000000
105	69	11th Dummy	00	00000000
106	6A	New line character #3 indicates end	00	00000000
107	6B	Padding with “blank” character	00	00000000
108	6C	Detailed timing descriptor #4	00	00000000
109	6D	Flag	00	00000000
110	6E	Reserved	00	00000000
111	6F	Display Product name	FC	11111100
112	70	Flag	00	00000000
113	71	Supplier P/N#1 (L)	4C	01001100
114	72	Supplier P/N#2 (C)	43	01000011
115	73	Supplier P/N#3 (1)	31	00110001
116	74	Supplier P/N#4 (1)	31	00110011
117	75	Supplier P/N#5 (6)	36	00110011
118	76	Supplier P/N#6 (L)	4C	01001100
119	77	Supplier P/N#7 (F)	46	01000110

120	78	Supplier P/N#8 (4)	31	00110100
121	79	Supplier P/N#9 (L)	4C	01001100
122	7A	Supplier P/N#10 (0)	30	00110000
123	7B	Supplier P/N#11 (1)	31	00110001
124	7C	Supplier P/N#12 ("space")	0A	00001010
125	7D	(If<13 char, then terminate with ASCII code 0Ah,set remaining char 20h)	20	00100000
126	7E	Extension flag	00	00000000
127	7F	Checksum	9D	00100000

9. Optical Characteristics

Item		Symbol	Min	Typ	Max	Unit	Note
Contrast Ratio		CR	700	1000	-		Note9-1 Note9-3
Luminance(center)		L	200	250	-	cd/m2	Note9-1 Note9-5 Note9-7
Luminous Uniformity		LU	70	75		%	Note9-7
Response Time		Rising+ Falling	-	25		ms	Note9-1 Note9-4
Viewing Angle K=Contrast Ratio>10	horizontal	θR	80	89	-	degree	Note9-2
		θL	80	89	-		
	vertical	θU	80	89	-		
		θD	80	89	-		
Color Chromaticity (CIE1931)	Red	X	TYP- 0.03	-	Typ+ 0.03	-	Note9-1 Note9-5 Note9-7
		Y		-			
	Green	X		-			
		Y		-			
	Blue	X		-			
		Y		-			
	White	X		0.306			
		Y		0.369			
Color gamut (NTSC ratio)		-	-	72		%	

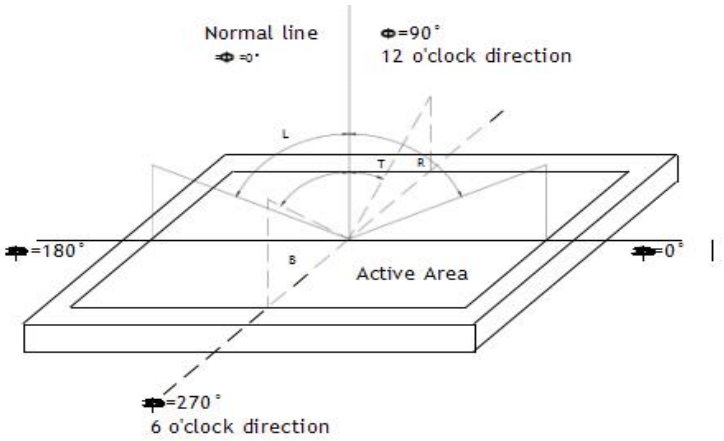
Note9-1: Definition of optical measurement system (BM-7)



Note9-2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

Note9-3: Definition of Response time



The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

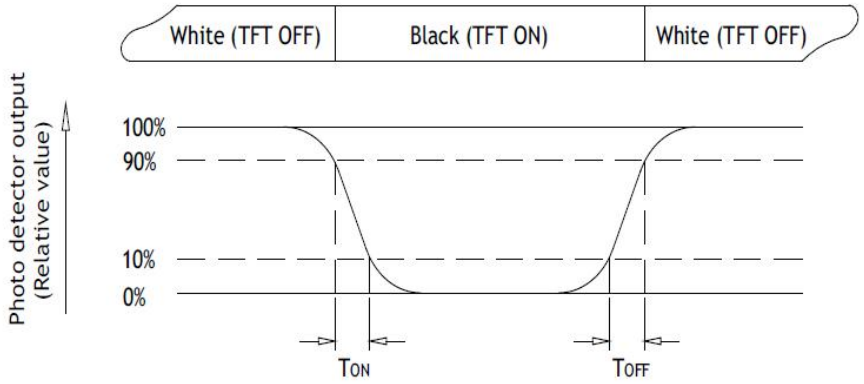


Fig. 5-3 Definition of response time

Note9-4: Definition of contrast ratio

$$\text{Contrast ratio(CR)}=\frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

"White state ": The state is that the LCD should drive by Vwhite.

"Black state": The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note9-5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

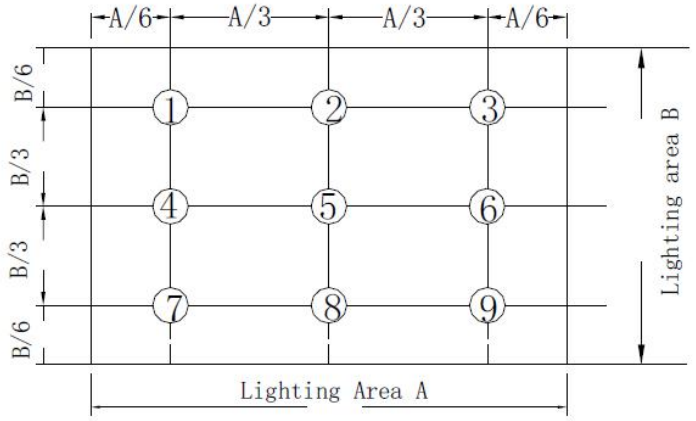
Note9-6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=60mA

Note9-7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas.Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L----Active area length, W---- Active area width



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

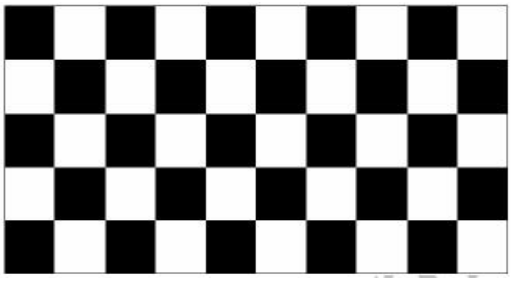
10. RELIABILITY TEST

10-1 Temperature and Humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	50℃ ; 120hrs	
High Temperature Storage	60℃ ; 120hrs	
High Temperature High Humidity Operation	40℃; 90%RH ; 120hrs (No condensation)	
Low Temperature Operation	0℃ ; 120hrs	
Low Temperature Storage	-20℃ ; 120hrs	
Thermal Shock	-20℃ (0.5hr) ~ 50℃ (0.5hr) ; 100 Cycles	Non-Operating
Image Sticking	25℃ ; 2hrs	1

Note 1: Condition of Image Sticking test：25℃ ±2℃

Operation with test pattern sustained for 4 hrs, then change to gray pattern immediately.After 5 mins, the mura must be disappeared completely .



(a) Test Pattern (chess board Pattern)

(b) Gray Pattern

10-2 Shock and Vibration

ITEMS	CONDITIONS
Packing Shock (Non-Operation)	● Shock level:980m/s^2 ● Waveform:1/2 Sine wave,6msec ● ±X, ±Y ±Z,each axis 1 times
Packing Vibration (Non-Operation)	● Frequency range:8-33.3HZ ● Stoke:1.0mm ● Sweep: 10Hz-50Hz ● x,y,z 2 hours for each direction

10-3 Electrostatic Discharge

TEST ITEM	CONDITIONS
ESD (Non-operation)	150pF,330Ω，Contact±4KV,Air :±8KV.Note 1
	200pF,0Ω，±200V Contact test.Note 2

Note:Measure Point:

1.LCD glass and metal bezel

2.IF connector pins

11. HANDLING PRECAUTION

(1) Don.t disassemble and reassemble the module by self.

(2) Acid, alkali, alcohol or touched directly by hand will damage the display.

(3) Static electricity will damage the module. Please configure grounding device.

(4)The strong vibration, shock, twist or bend will cause material damage, even module broken.

(5) It is easy to cause image sticking while displaying the same pattern for very long time.

(6) The response time, brightness and performance will vary from different temperature.

(7)12 months of the product term, the starry shipment date began to count.

- END -