

深圳市华显美科技有限公司

TFT-LCD MODULE SPECIFITION FOR APPROVAL PRODUCT SPECIFICATIONS

For Customer: _____ : APPROVAL FOR SPECIFICATION

Customer Model No. _____ : APPROVAL FOR SAMPLE

Module No.: _____

Date : 2020.06.08

For Customer's Acceptance:

Approved By	Comment

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

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1. GENERAL DESCRIPTION

1.1 DESCRIPTION

is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	10.1”	inch
2	Number of Pixels	1200x3(RGB) x 1920	pixels
3	Active Area	135.360(W)x216.576(H)	mm
4	Pixel Pitch	0.1128*0.1128	mm
5	OutlineDimension	228.6(W) x 143(H) x2.40(D) mm	
6	Number of Colors	16.7M	-
7	Display Mode	Normally Black	-
8	ViewingDirection	IPS	
9	Pixel Arrangement	RGB vertical stripe	-
10	Luminance (cd/m ²)	250(TYP.)	nit
11	Contrast Ratio	800(TYP.)	
12	Surface Treatment	Anti-glare	-
13	Interface	MIPI	-
14	Backlight	White LED	-
15	Operation Temperature	-10~50	°C
16	Storage Temperature	-20~60	°C
17	Weight	TPD	g

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3. PIN DESCRIPTION

PIN NO.	Symbol	Description
1	NC	No connection
2	VDD	3.3V
3	VDD	3.3V
4	GND	Ground
5	Reset	Global reset pin 3.3V
6	NC	No connection
7	GND	Ground
8	MIPI_0N	-MIPI differential data input
9	MIPI_0P	+MIPI differential data input
10	GND	Ground
11	MIPI_1N	-MIPI differential data input
12	MIPI_1P	+MIPI differential data input
13	GND	Ground
14	MIPI_CKN	-MIPI differential clock input
15	MIPI_CKP	+MIPI differential clock input
16	GND	Ground
17	MIPI_2N	-MIPI differential data input
18	MIPI_2P	+MIPI differential data input
19	GND	Ground
20	MIPI_3N	-MIPI differential data input
21	MIPI_3P	+MIPI differential data input
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	GND	Ground
26	NC	No connection
27	PWMO	PWM control signal for LED driver(CABC)
28	NC	No connection
29	NC	No connection
30	GND	Ground

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31	LED-	LED Cathode
32	LED-	LED Cathode
33	NC	No connection
34	NC	No connection
35	NC	No connection
36	NC	No connection
37	NC	No connection
38	NC	No connection
39	LED+	LED Anode
40	LED+	LED Anode

4 Electrical Specifications

No.	Item	Min.	Typ.	Max.	Unit
1	Vcom voltage	3.73	4.73	5.73	V
2	Frame Rate	55	60	65	Hz
3	VGH voltage	19	20	21	V
4	VGLvoltage	-9.5	-8.5	-7.5	V

Note (1) Both VGH and VGL are TFT gate operation voltage.

Note (2) The setting of electrical parameters should follow the initial code specified by IVO. Vcom must be adjusted to optimize display quality.

Note (3) All the contents of electrical specifications and display fineness are guaranteed under normal Conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55±10%RH.

4.1 LED Back Light Specification

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	Vf	If=80mA	22.4	24	25.6	
Uniformity (with L/G)	ΔB_p	If=80mA	70	75	-	%
Luminance for LCM	/			250		cd/m ²

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4.2 Input Timing Table

1200RGBx1920 (4 Data Lanes)

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI data frequency	FDATA	955	999	1000	Mbps
Horizontal display area	THD	1200			pixel
HS period time	TH	1275	1341	1342	pixel
HS pulse width	THPW	1	1	1	pixel
HS back porch	THBP	32	60	60	pixel
HS front porch	THFP	42	80	81	pixel
Vertical display area	TVD	1920			H
VS period time	TV	1981	1981	1982	H
VS pulse width	TVPW	1	1	1	H
VS back porch	TVBP	25			H
VS front porch	TVFP	35	35	36	H

5 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes

Item	Conditions	Min.	Typ.	Max.	Unit	Note	
Transmittance	Center	3.5	3.9	-	%	Under C-light (1),(5),(7),(8)	
Contrast Ratio	Center	800	1000	-	-	(1),(3),(6),(7),(8) $\theta_x=\theta_y=0^\circ$	
Response Time	Rising + Falling	-	35	45	ms	(1),(4),(6),(7),(8) $\theta_x=\theta_y=0^\circ$	
CF Color Chromaticity (CIE1931)	Red x	Typ. -0.015	0.655	Typ. +0.015	-	Under C-light (1),(5),(8) $\theta_x=\theta_y=0^\circ$	
	Red y		0.316		-		
	Green x		0.268		-		
	Green y		0.569		-		
	Blue x		0.142		-		
	Blue y		0.096		-		
	White x		0.295		-		
	White y		0.324		-		
NTSC	CIE1931	60	67	-	%		
Viewing Angle (CR \geq 10)	Horizontal	Θ_{x+}	80	85	-	degree	(1),(2),(6),(7),(8)
		Θ_{x-}	80	85	-		
	Vertical	Θ_{y+}	80	85	-		
		Θ_{y-}	80	85	-		

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Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature(25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

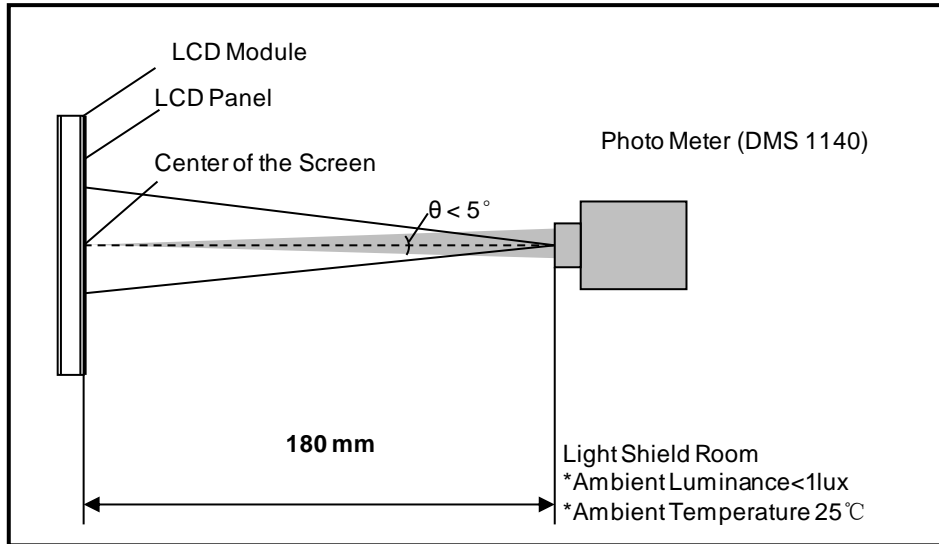


Figure1 Optical Characteristic Measurement Equipment and Method

Note (2) Definition of Viewing Angle

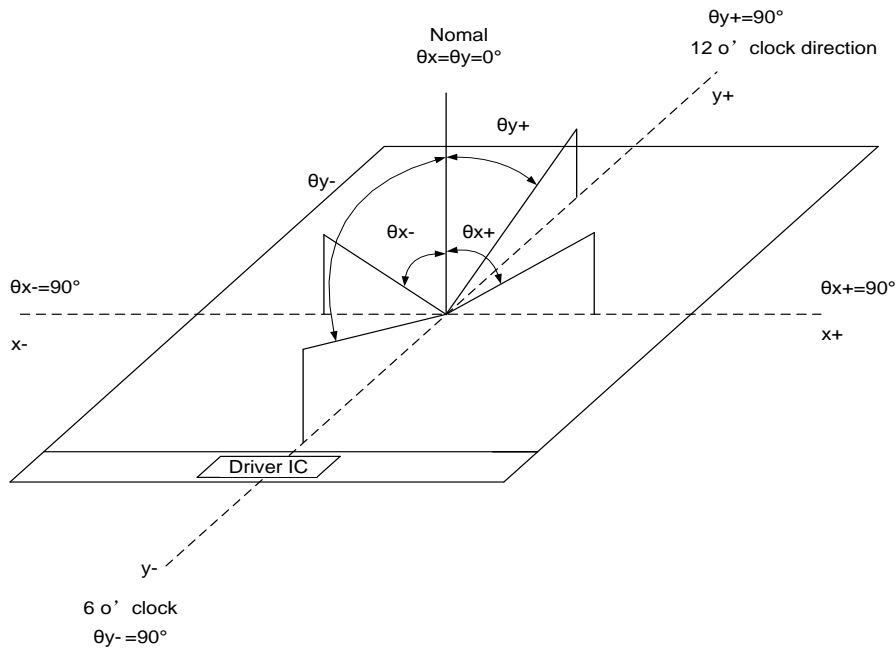


Figure 2 Definition of Viewing Angle

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Note (3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast ratio(CR)=the luminance of White pattern/the luminance of Black Pattern

Note (4) Definition Of Response Time

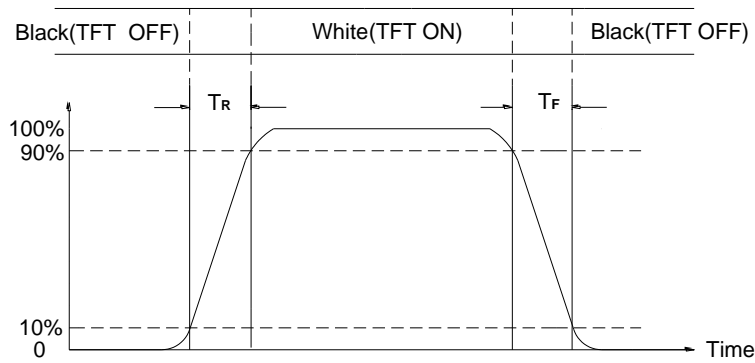


Figure 3 Definition of Response Time

Note (5) C-light Spectrum

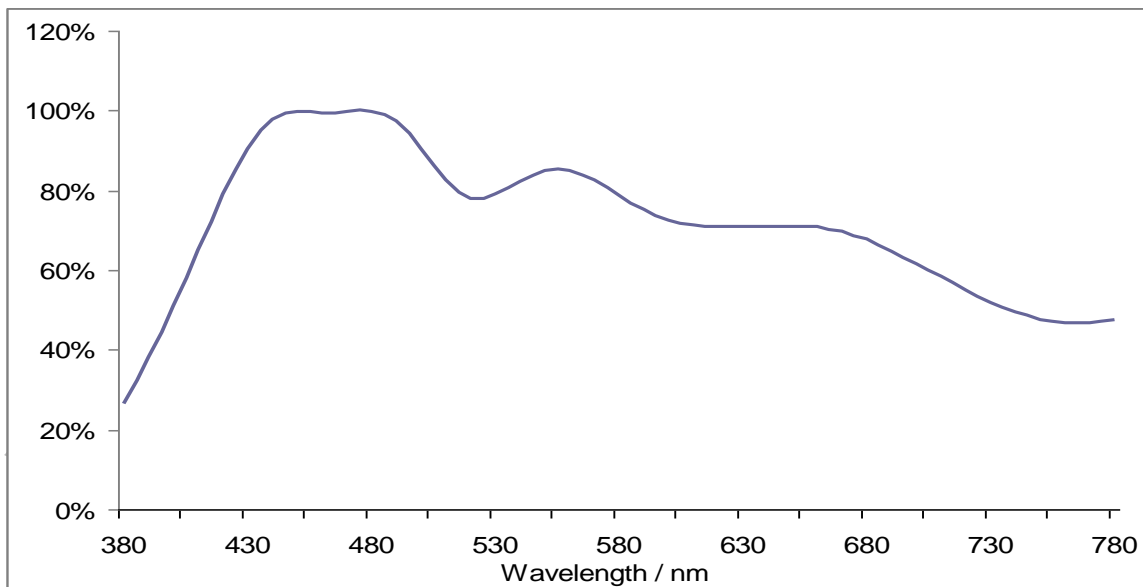


Figure 4 C-Light Spectrum

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Note (6) The Back Light Spectrum

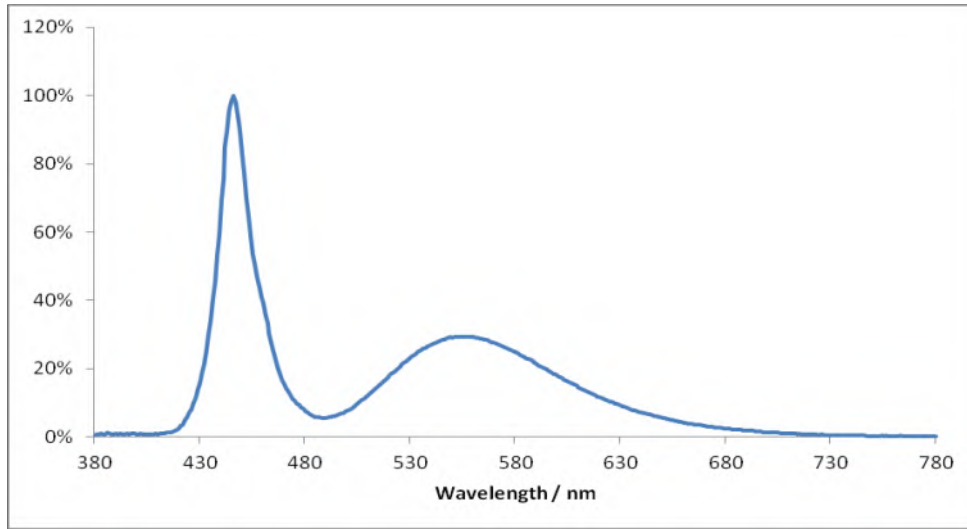


Figure 5 Back Light Spectrum

Note (7) The polarizer type: SLP-5115AS-10-T (HC)/CF, SLP-5115AG6-10-T (AG) /TFT.

Note (8) All optical data are based on IVO given system & nominal parameter & testing machine in this document.

Note (9) The direction of polarizer. It is recommended that customer should choose O Mode or E Mode according to the actual situation

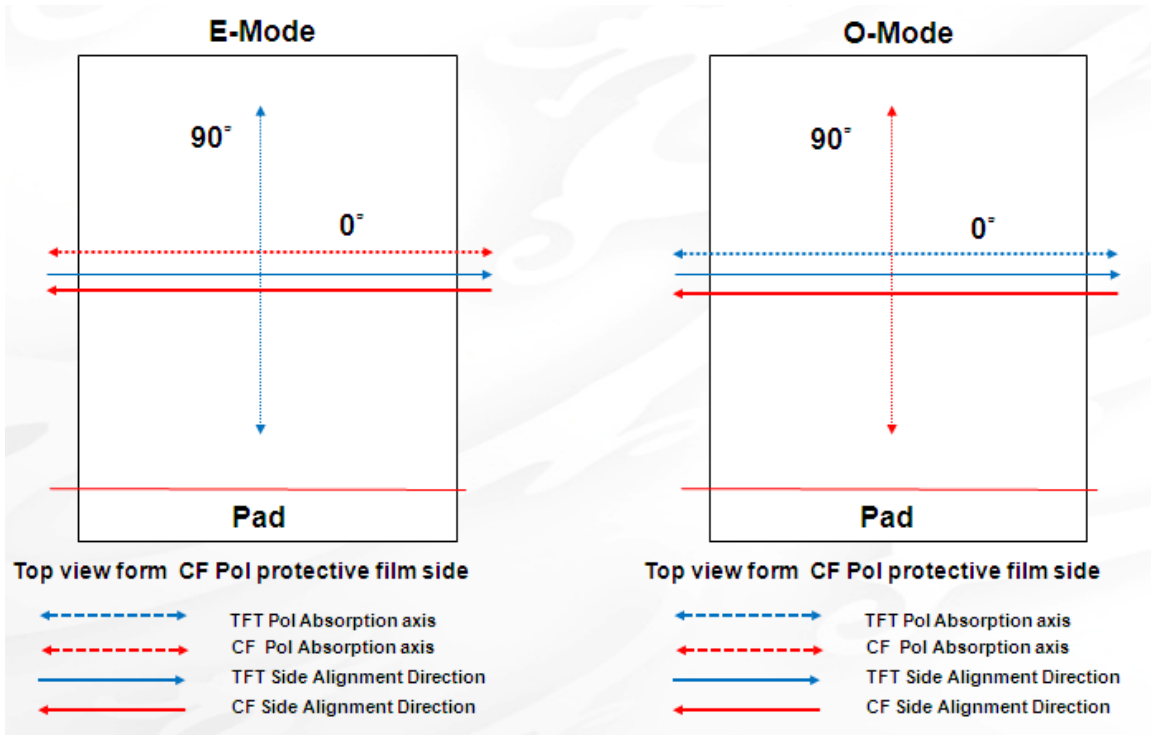


Figure 6 Polarizer Direction

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6 Pixel Format

The figure shows the relation of the input signals and LCD panel pixel format.

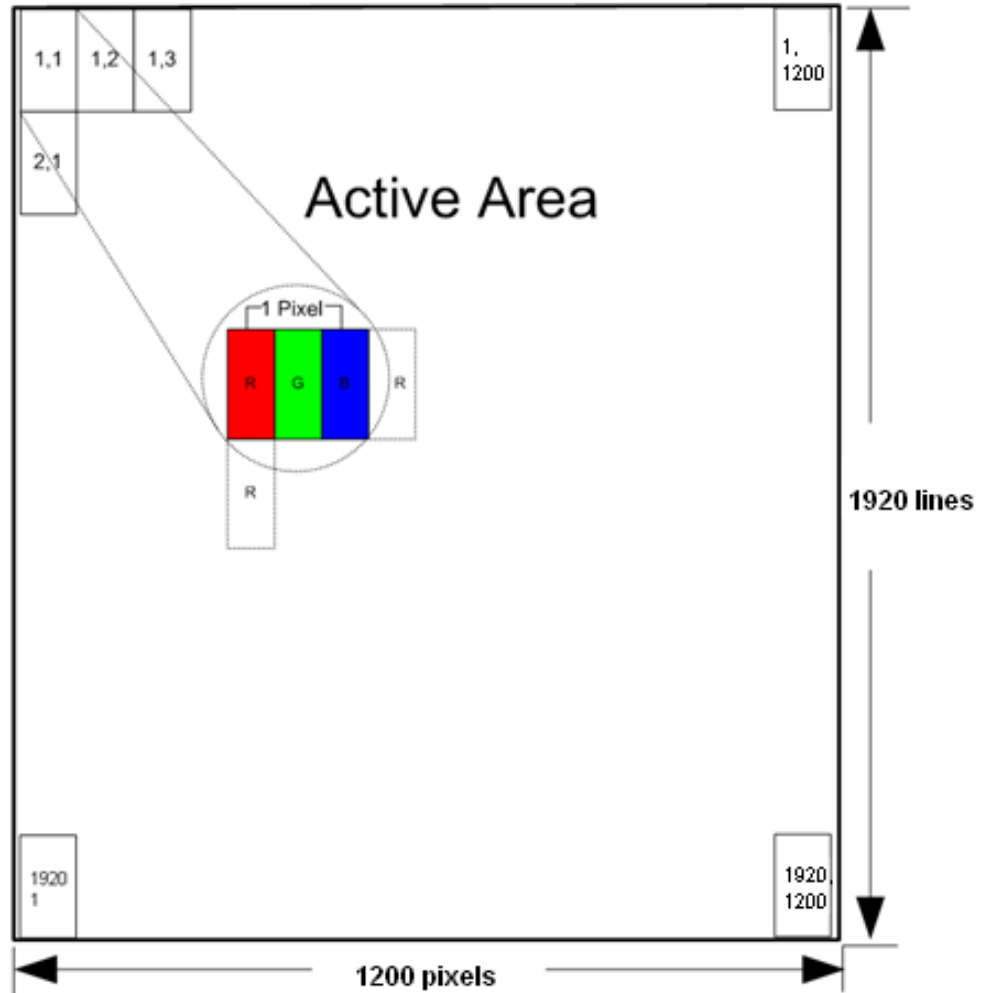


Figure 7 Pixel Format

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7 Cell Light-On Information

7.1 Cell Light-On Test Waveform

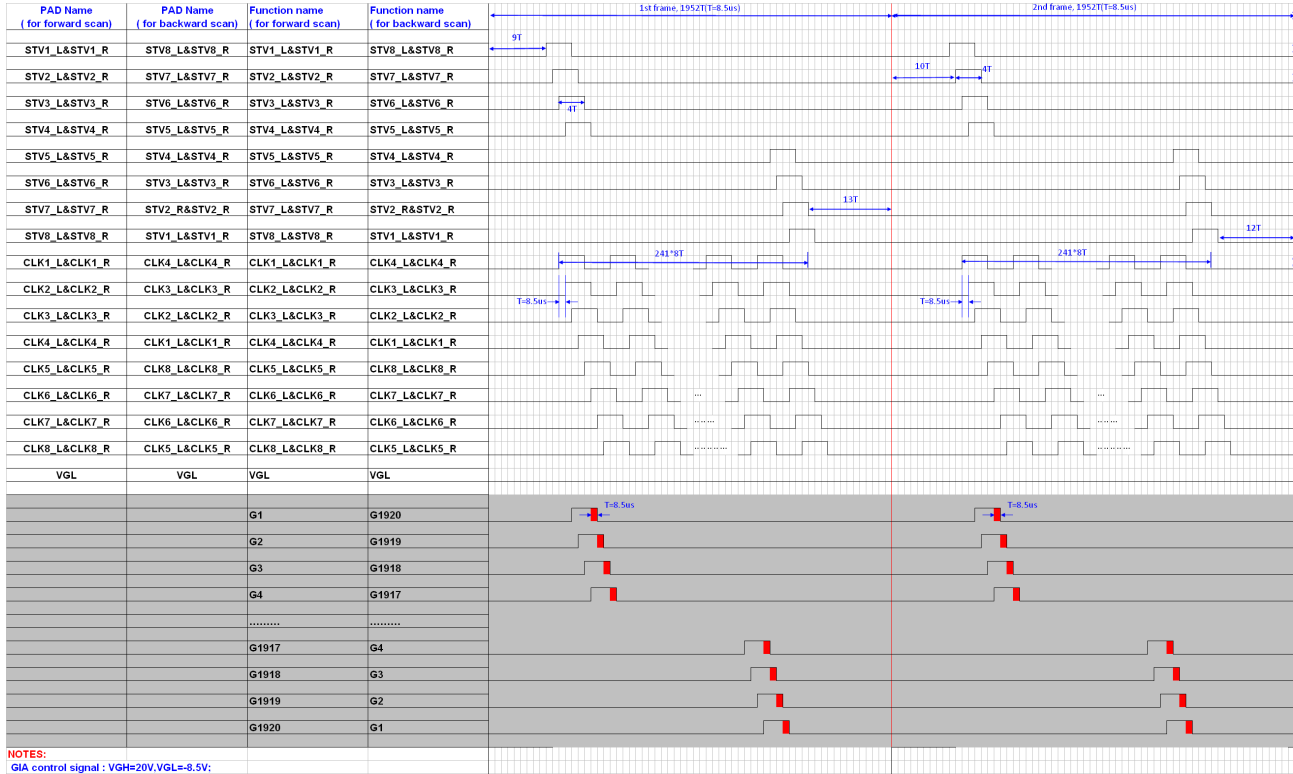


Figure 16 Cell Light-On Test Waveform

Item	Black	Gray	White
VGH(V)		20	
VGL(V)		-8.5	
VCOM(V)		4.23	
ADD(V)		17~25	
SE_VDH(V)	5.2	7.7	10.2
SE_VDL(V)	5.2	2.7	0.2
SO_VDH(V)	5.2	7.7	10.2
SO_VDL(V)	5.2	2.7	0.2

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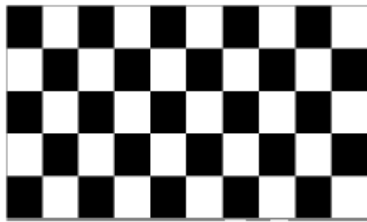
8.0 RELIABILITY SPECIFICATION

8.0.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=60°C; 72hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Storage	Ta=-20°C; 72hrs	IEC60068-2-1: 2007 GB2423.1-2008
High Temperature Operation	Ta=50°C; 72hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Operation	Ta=-10°C; 72hrs	IEC60068-2-1: 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50°C, 90%RH, 72Hrs(no condensation)	IEC60068-2-78: 2001 GB/T2423.3-2006
Thermal Shock	-20°C(0.5h) ~ 60°C(0.5h) / 10cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 2hrs	Note1

Note1:Condition of image sticking test :25°C ±2°C

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

8.0.2ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact:±3KV,Air:±8KV	1	IEC61000-4-2: 2001 GB/T17626.2-2006
	200pF, 0Ω, ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins