10.1" TFT LCM

PRODUCT SPECIFICATIONS

MODULE NO.: T1010B-50-A

DOTS: 1024RGB*600

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2011.09.29	-	First Issued.	Sally

TABLE OF CONTENTS

1. GENERAL DESCRIPTION

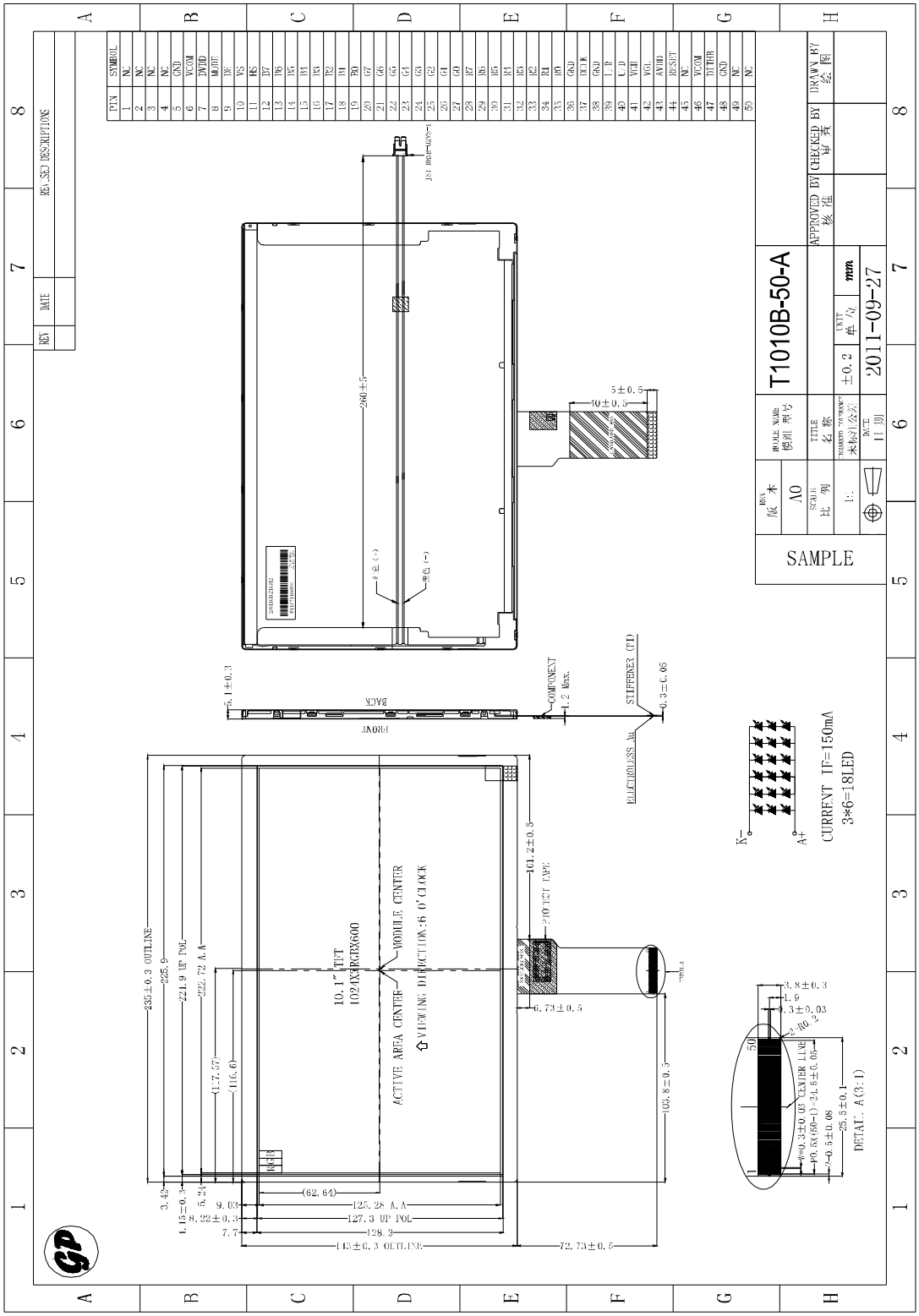
1.1 DESCRIPTION

BD-101B-50-A is a color active matrix thin film transistor (TFT) TN 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, This TFT LCD has a 10.1-inch diagonally measured active display area with WSVGA resolution (1,024vertical by 600 horizontal pixel array).

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	10.1”	inch
2	Number of Pixels	1024×RGB (3) ×600	pixels
3	Active Area	222.72(H)x 125.28(V)	mm
4	Pixel Pitch	0.2175(H)×0.2088(V)	mm
5	Outline Dimension	235(W)×143(H)×5.1(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally White	-
8	Viewing Direction	6 o’clock	-
9	Display Format	RGB vertical stripe	-
10	Luminance (cd/m^2)	150(TYP.)	nit
11	Contrast Ratio	450(TYP.)	
12	Surface Treatment	Anti-Glare	-
13	Interface	TTL	-
14	Backlight	White LED	-
15	Operation Temperature	-20~70	℃
16	Storage Temperature	-30~80	℃
17	Weight	-	g

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

No.	Symbol	Function	Remark
1	NC	No connection	
2	NC	No connection	
3	NC	No connection	
4	NC	No connection	
5	GND	Power ground	
6	VCOM	Common voltage	
7	DVDD	Digital Power	
8	MODE	DE/SYNC mode select	Note1
9	DE	Data Input Enable	
10	VS	Vertical sync input	
11	HS	Horizontal sync input	
12	B7	Blue data(MSB)	
13	B6	Blue data	
14	B5	Blue data	
15	B4	Blue data	
16	B3	Blue data	
17	B2	Blue data	
18	B1	Blue data	
19	B0	Blue data(LSB)	
20	G7	Green data(MSB)	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	
24	G3	Green data	
25	G2	Green data	
26	G1	Green data	
27	G0	Green data(LSB)	
28	R7	Red data(MSB)	
29	R6	Red data	
30	R5	Red data	
31	R4	Red data	
32	R3	Red data	
33	R2	Red data	
34	R1	Red data	
35	R0	Red data(LSB)	
36	GND	Power Ground	
37	DCLK	Dot data clock	

38	GND	Power Ground	
39	L/R	Left or Right Display Control	Note2
40	U/D	Up / Down Display Control	Note3
41	VGH	Positive Power for TFT	
42	VGL	Negative Power for TFT	
43	AVDD	Analog Power	
44	RESET	Global reset pin	
45	NC	No connection	
46	VCOM	Common Voltage	
47	DITHB	Dithering function	Note4
48	GND	Power Ground	
49	NC	No connection	
50	NC	No connection	

Note1: DE/SYNC mode select . Normally pull high.
When MODE = H , DE mode
When MODE = L , SYNC mode

Note2: Source Driver internal shift register is controlled by this pin as shown below: Normally pull high.
SHLR=H: SO1→ SO2→ SO3→ …→SO1536 (Default)
SHLR=L: SO1536→ SO1535→ SO1534→…→SO1

Note3: Gate Driver Up/down scan setting. Normally pull low.
When UPDN=H, reverse scan.
STV1 output vertical start pulse and UD pin output "H" to Gate driver
When UPDN=L, normal scan. (Default)
STV2 output vertical start pulse and UD pin output "L" to Gate driver

Note4: Dithering function enable control .Normally pull low
When DITHB =H ,Enable internal dithering function
When DITHB = L , Disable internal dithering function .

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Conditions
Digital Supply Voltage	DVDD	-0.5	5	V	
TFT Gate on voltage	VGH	-	-	V	
TFT Gate off voltage	VGL	-	-	V	
Analog power supply voltage	AVDD	-0.5	15	V	

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

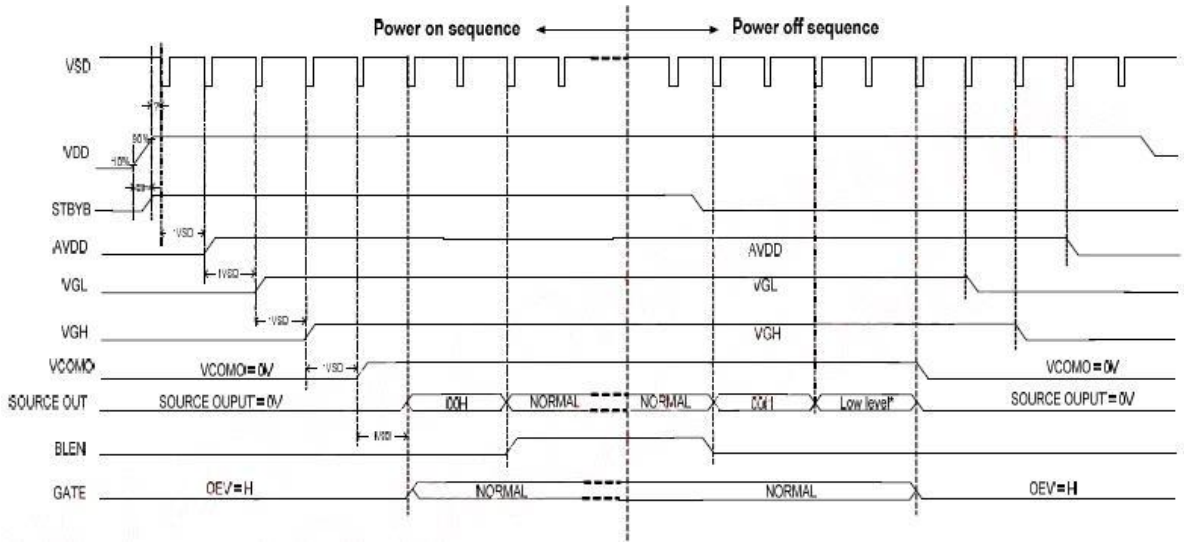
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
TFT Gate on voltage	VGH	18.3	19.3	20.3	V	
TFT Gate off voltage	VGL	-8.5	-7.5	-6.5	V	
TFT Common electrode voltage	VCOM	3.0	3.2	3.4	V	
Analog power supply voltage	AVDD	8.0	8.2	8.4	V	
Digital Power Supply Voltage	DVDD	-	3.2	-	V	

4.3 Current Consumption

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Gate on Current	IVGH	VGH =19.3V	-	0.6	-	mA	
Gate off Current	IVGL	VGL= -7.5 V	-	6.2	-	mA	
Digital Current	IDVDD	DVDD = 3.2V	-	196.8	-	mA	
Analog Current	IAVDD	AVDD = 8.2 V	-	6.18	-	mA	

4.4POWER ON/OFF SEQUENCE

Power-On/Off Timing Sequence:



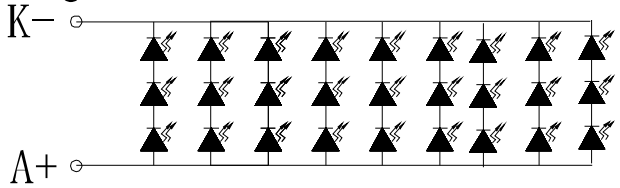
*Note : Low level = 3FH , when NBW = L (Normally white)
Low level = 00H , when NBW = H (Normally black)

4.5 BACK LIGHT UNIT

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current ILED			150		mA	27LEDS
Forward voltage	VF	9.3	9.9	10.5	v	0IF=180mA 27LEDS
Reverse current	IR			50	μA	VR=10V,1LED
Luminous tolerance	I IV-M point5	75			%	(Min/Max)×100
	IV-M point13	70				
Power dissipation	Pd	1575			mW	27 LEDS
Peak forward current	IFP	100			mA	1LED
Reverse Voltage	VR	10			V	1LED

4.5.1Internal Circuit Diagram



CURRENT IF=180mA 3*9=27LED

5.INPUT SIGNAL TIMING

5.1AC ELECTRICAL CHARACTERISTICS

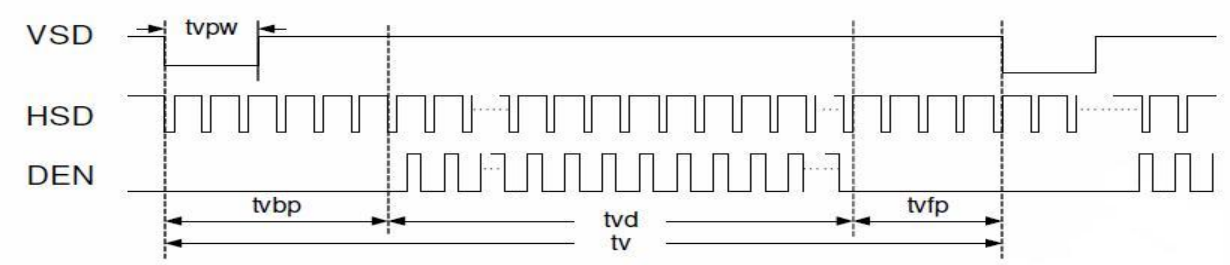
5.1. 1. TTL Mode AC Electrical Characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
VDD Power On Slew rate	T_{POR}	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width	T_{Rst}	50	-	-	us	DCLK=65MHz
DCLK cycle time	T_{cph}	14	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	
VSD setup time	T_{vst}	5	-	-	ns	
VSD hold time	T_{vhd}	5	-	-	ns	
HSD setup time	T_{hst}	5	-	-	ns	
HSD hold time	T_{hhd}	5	-	-	ns	
Data set-up time	T_{dsu}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
Data hold time	T_{dhd}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
DE setup time	T_{esu}	5	-	-	ns	
DE hold time	T_{ehd}	5	-		ns	
Output stable time	T_{sst}	-	-	6	us	10% to 90% target voltage.CL=90pF, R=10K ohm(Cascade)
				3		Dual gate

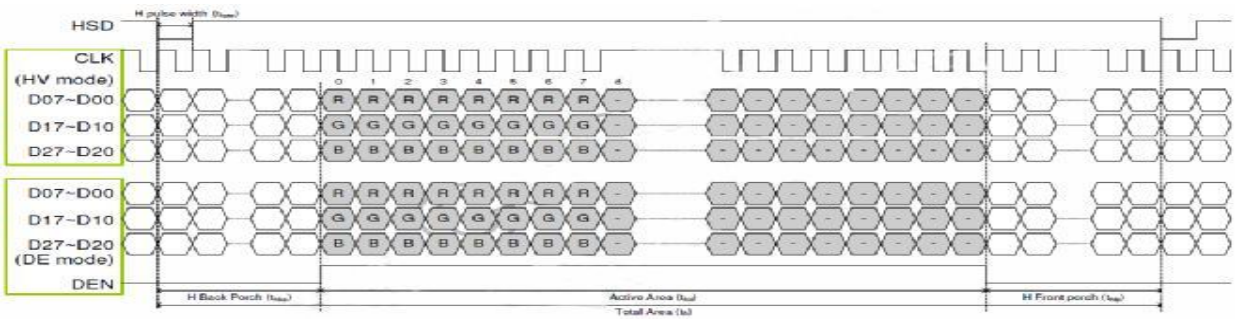
5.2DATA INPUT FORMAT

5.2.1 TTL Mode Data Input Format

Vertical Timing



Horizontal Timing



5.3PARALLEL RGB INPUT TIMING TABLE

5.3.1DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency @ Frame rate = 60Hz	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+ thfp	90	320	376	DCLK
Vertical display area	tvd		600		TH
VSYNC period time	tv	610	635	800	TH
VSYNC blanking	tvbp+ tvfp	10	35	200	TH

5.3.2HV mode

Horizontal input timing

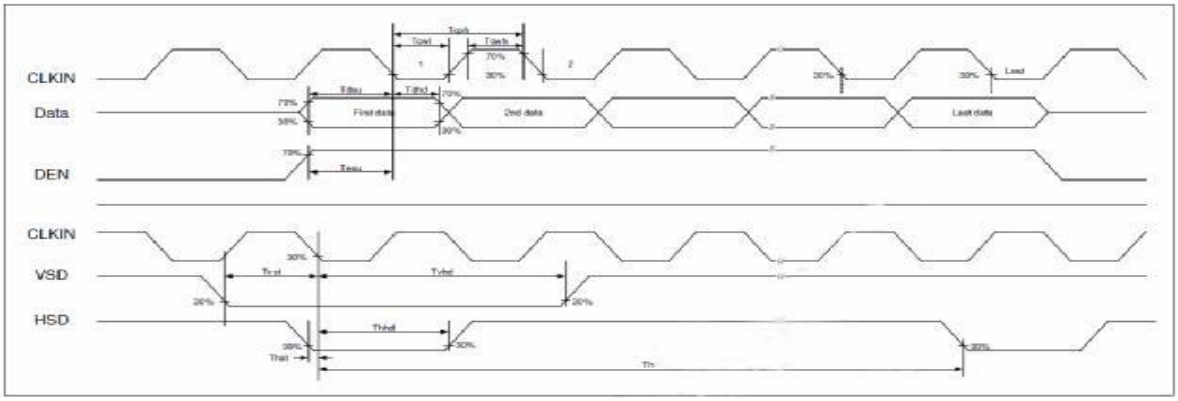
Parameter		Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DCLK Frequency @ Frame rate = 60Hz		fclk	44.9	51.2	63	MHz
Horizontal Display Area		thd		1024		DCLK
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw		1		DCLK
	Typ.			-		
	Max.			140		
HSYNC blanking		thb	160	160	160	
HSYNC front porch		thfp	16	160	216	

Vertical input timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		TH
VSYNC period time	tv	624	635	750	TH
VSYNC pulse width	tvpw	1	-	20	TH
VSYNC Blanking (tvb)	tvb		23		TH
VSYNC Front porch (tvfp)	tvfp	1	12	127	TH

5.4 TIMING DIAGRAM

5.4.1 Input Clock and Data Timing Diagram

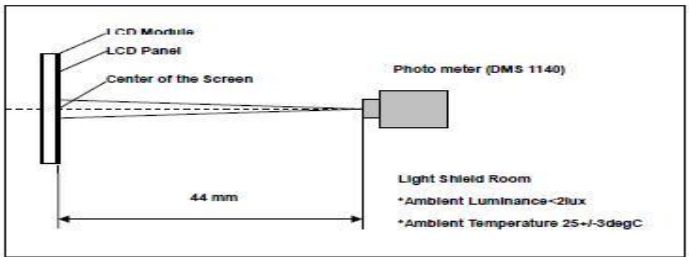


6. OPTICAL CHARACTERISTICS

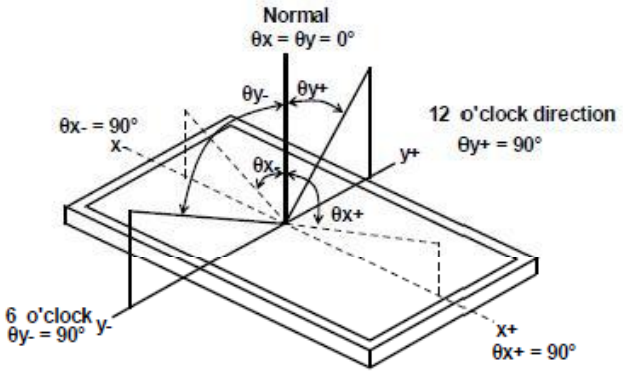
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	400	450	-		Note1 Note3
luminance		YL	130	150	-	cd/m2	Note1 Note5
Luminous tolerance		I IV-M point5	75			%	Note1 Note6
		IV-M point13	70				
Response Time		Rising + Falling	-	8	–	ms	Note1 Note4
Viewing Angle K=Contrast Ratio>10	Horizontal	θy^+	40	45	-	degree	Note1 Note2
		θy^-	40	45	-		
	Vertical	θx^+	10	15	-		
		θx^-	30	35	-		
Color Chromaticity (CIE1931)	Red	x	0.536	0.566	0.596		Note1
		y	0.313	0.343	0.373		
	Green	x	0.281	0.311	0.341		
		y	0.567	0.597	0.627		
	Blue	x	0.118	0.148	0.178		
		y	0.088	0.118	0.148		
	White	x	0.240	0.280	0.320		
		y	0.288	0.328	0.368		
Color gamut (NTSC ratio)				50		%	Note1

Note1: Measurement Setup

The LCD module should be stabilized at given temperature for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.



Note2:Definition of Viewing Angle



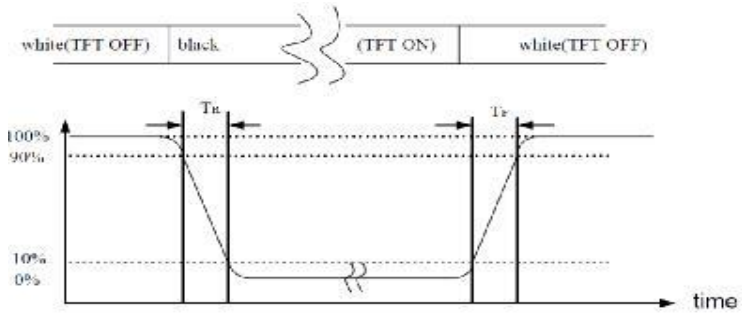
Note3:Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note4:Definition of Response Time (TR, TF)



Note5:Definition of Luminance White

Measure the luminance of gray level 63 at center point and 5 points.

Center of Luminance = Y1

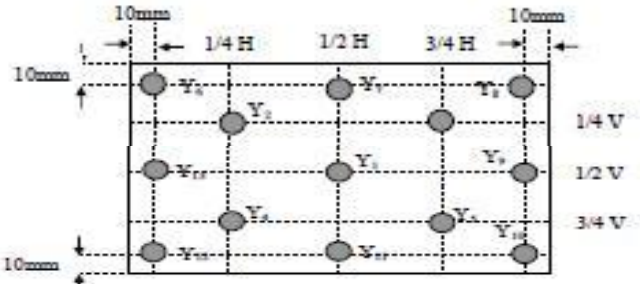
$$\text{Average Luminance of 5 points} = \frac{Y_1 + Y_2 + Y_3 + Y_4 + Y_5}{5}$$

Note6: Definition of Luminance Uniformity(Variation)

Measure the luminance of gray level 63 at 13 points.

$$\text{Uniformity of 13 points} = \frac{\text{Min Luminance of Y1~Y13}}{\text{Max Luminance of Y1~Y13}} \times 100\%$$

$$\text{Uniformity of 5 points} = \frac{\text{Min Luminance of Y1~Y5}}{\text{Max Luminance of Y1~Y5}} \times 100\%$$



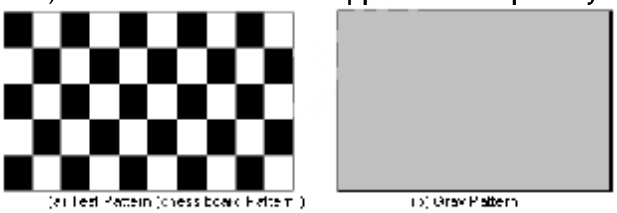
7. RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=80℃; 240hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Storage	Ta=-30℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature Operation	Ta=70℃，240Hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Operation	Ta=-20℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=60℃，90%RH，240Hrs(no condensation)	IEC60068-2-78：2001 GB/T2423.3-2006
Thermal Shock	-30℃(0.5h) ~ 80℃(0.5h) / 100 cycles	Start with cold temperature， End with high temperature， IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃；4hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

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



7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s2,6ms, ±x,y,z 3times for direction	IEC60068-2-27：1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32：1990 GB/T2423.8-1995

7.3ESD

Test item	Conditions		Remark
Electro Static Discharge Test (non-operation)	150pF，330Ω， Contact:±4KV,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