Product Specification Sheet

Customer: _____

Model Name: **MNG007QS1-3**

Date: **2023/01/06**

Version： **V01**

Customer's Approval		**CSOT**	
Signature	Date	Approved By	Date
		Reviewed By Qingzhu guan	Date 2023/01/06
		Prepared By: Junping li	Date 2023/01/06

Record of Revision

Version	Revise Date	Page	Content
V01	2023/01/06	All	Preliminary Specification

Contents

1. GENERAL DESCRIPTION

1.1 OVERVIEW

MNG007QS1-3 is a 16” TFT Liquid Crystal Display module with LED Backlight unit and 30 pins eDP interface. This module supports 1920 x 1200 WUXGA mode and can display 16.7M colors.

1.2 SPECIFICATION SUMMARY

i	Item	Specification	Unit	Note
1	LCD size	16	inch	
2	Resolution	1920 x RGB x 1200		
3	Pixel Arrangement	RGB		
4	Model Type	LCM		
5	TFT Technology	a Si		
6	Display mode	FFS, Normally Black	--	
7	Active Area	344.6784 (H)×215.424 (V)	mm	
8	pixel pitch	179.52(H)×179.52(V)	um	
9	Display Colors	16.7M(8bit)		
10	Contrast Ratio	1200:1(Typ)		
11	Color Gamut	NTSC 45% typ		
12	LCM Outline Dimension	349.68±0.30（H）× 224.42±0.30（V）×3.05±0.15(W/O PCB)；349.68±0.30（H）× 224.42±0.30（V）×5.30（max.）(W/PCB)	mm	1.1typ,1.6max (Outline to FPC+Cell tape)
13	Luminance	300(Typ)	nits	5 Points Average
14	Surface treatment(UP)	Anti-Glare	--	Pol.
15	Interface	eDP 1.2		2 lane@2.7G
16	HDR function	-		-
17	Method of Inversion	Column Inversion		
18	Power consumption of Panel	700(Max.)	mW	3.3V@Mosaic
	Power consumption of Backlight	3.6(Max.)	W	@300nits typ
19	Weight	410(Max)	g	

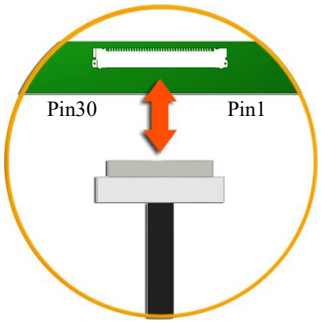
Note (1) The specified power consumption (with converter efficiency) is under the conditions at VCCS =3.3 V, fv =

60 Hz, LED_VCCS = Typ, fPWM = 200 Hz, Duty=100% and Ta = 25 ±2 ℃, whereas mosaic pattern is displayed.

2. MECHANICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Unit	Note
Unit outline dimensions	Width	349.38	349.68	349.98	mm	
	Height	224.12	224.42	224.72	mm	W/O PCBA
	Depth	2.90	3.05	3.20	mm	
Weight		-	-	410	g	

2.1 INTERFACE CONNECTION



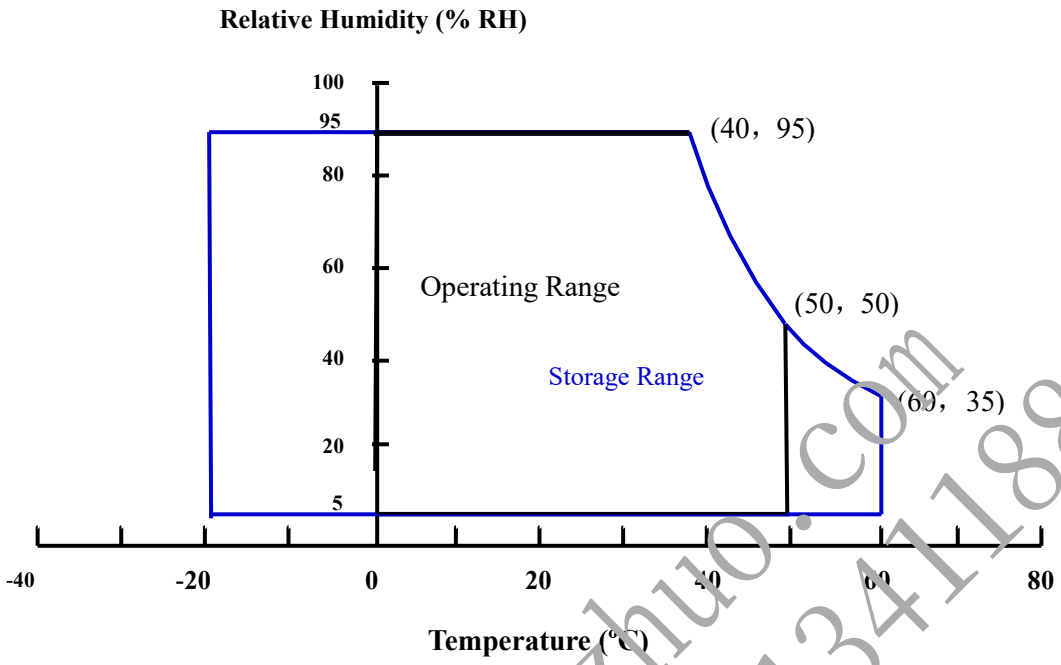
Please refer Appendix Outline Drawing for detail design.

Connector Part No.: STARCONN：300E30-1010KC-G3

3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-20	+60	ºC	(1)
Operating Ambient Temperature	T_{OP}	0	+50	ºC	(1), (2)



Note (1) (a) 95% RH Max. (Ta <= 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

(c) No condensation.

Note (2) The temperature of panel surface should be 0 ºC min. and 60 ºC max.

3.2 ELECTRICAL ABSOLUTE RATINGS

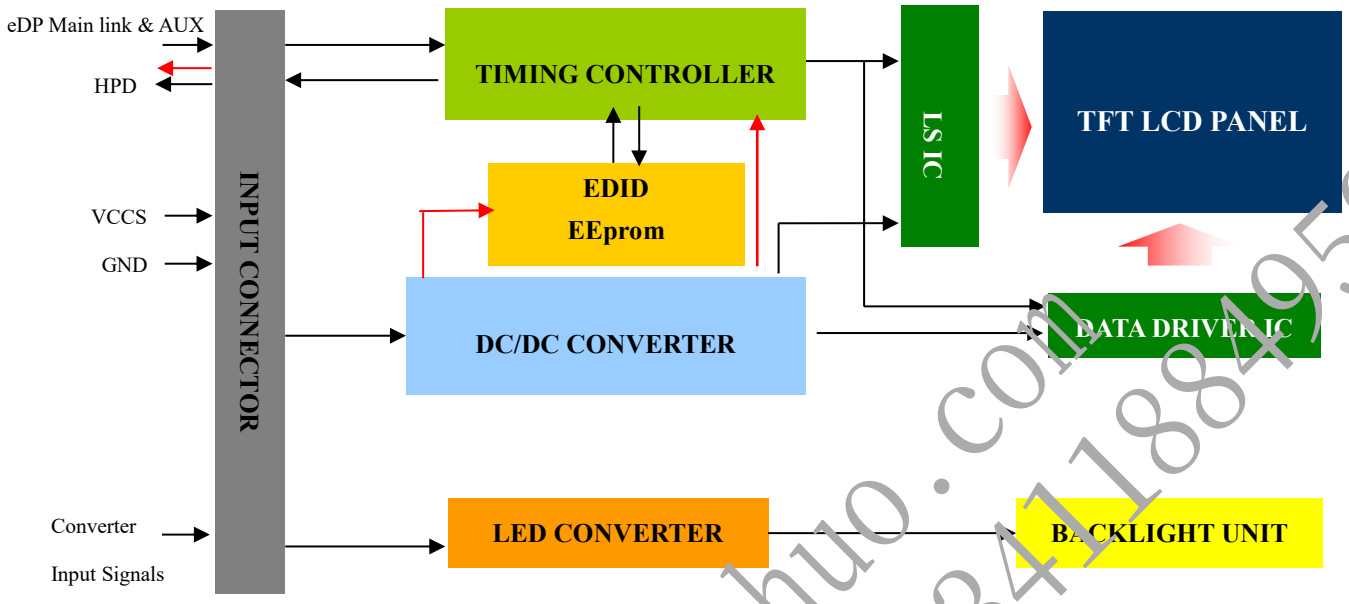
3.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCCS	-0.3	+4	V	(1)
Logic Input Voltage	V_{IN}	-0.3	+3.6	V	
Converter Input Voltage	LED_VCCS	-0.3	26	V	(1)
Converter Control Signal Voltage	LED_PWM,	-0.3	+3.6	V	(1)
Converter Control Signal Voltage	LED_EN	-0.3	+3.6	V	(1)

Note (1) Stresses beyond those listed in above “ELECTRICAL ABSOLUTE RATINGS” may cause permanent damage to the device. Normal operation should be restricted to the conditions described in “ELECTRICAL CHARACTERISTICS”.

4. ELECTRICAL SPECIFICATIONS

4.1 FUNCTION BLOCK DIAGRAM



4.2 INTERFACE CONNECTIONS

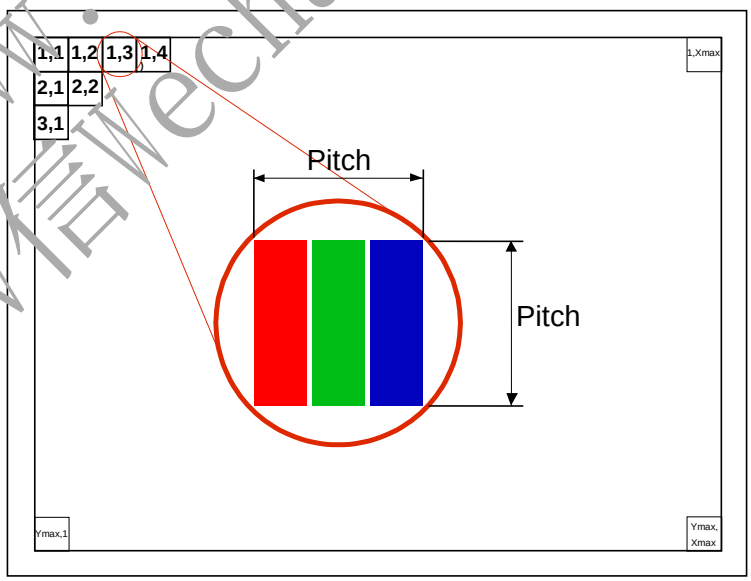
PIN ASSIGNMENT

Pin	Symbol	Description	Note
1	NC	No Connection (Reserve)	
2	H_GND	High Speed Ground	
3	ML1-	Complement Signal-Lane 1	
4	ML1+	True Signal-Main Lane 1	
5	H_GND	High Speed Ground	
6	ML0-	Complement Signal-Lane 0	
7	ML0+	True Signal-Main Lane 0	
8	H_GND	High Speed Ground	
9	AUX+	True Signal-Auxiliary Channel	
10	AUX-	Complement Signal-Auxiliary Channel	
11	H_GND	High Speed Ground	
12	VCCS	Power Supply +3.3V (typical)	
13	VCCS	Power Supply +3.3V (typical)	

14	BIST	Built-In Self Test (active high)	
15	GND	Ground	
16	GND	Ground	
17	HPD	Hot Plug Detect	
18	BL_GND	BL Ground	
19	BL_GND	BL Ground	
20	BL_GND	BL Ground	
21	BL_GND	BL Ground	
22	LED_EN	BL_Enable Signal of LED Converter	
23	LED_PWM	PWM Dimming Control Signal of LED Converter	
24	NC	No Connection	(2)
25	NC	No Connection	(2)
26	LED_VCCS	LED Power Supply	
27	LED_VCCS	LED Power Supply	
28	LED_VCCS	LED Power Supply	
29	LED_VCCS	LED Power Supply	
30	NC	No Connection (Reserve)	

Note (1) The pixel is shown in the following figure.

Note(2) This pin used for CSOT internally, please let it floating on customer side.



4.3 ELECTRICAL CHARACTERISTICS

4.4 LCD ELETRONICS SPECIFICATION

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		VCCS	3.0	3.3	3.6	V	(1)
BIST Control Level		BIST on	2.2	3.3	3.6	V	(1)
		BIST off	0	-	0.5	V	(1)
Ripple Voltage		V_{RP}	-	-	100	mV	(1)
Inrush Current		I_{RUSH}	-	-	1.5	A	(1)(2)
Power Supply Current	Mosaic	-	-	185	215	mA	(3)

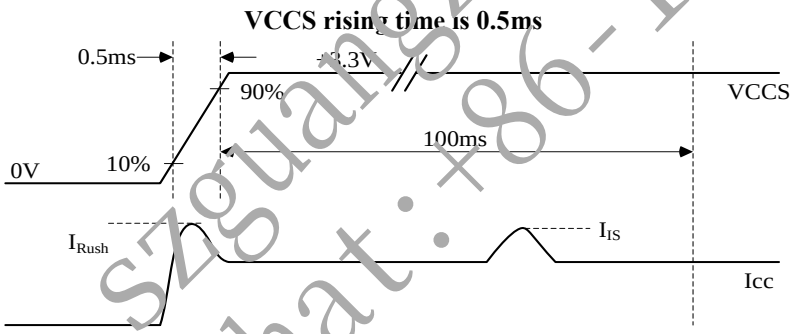
Note (1) The ambient temperature is Ta = 25 ± 2 ºC.

Note (2) I_{RUSH}: the maximum current when VCCS is rising

I_{IS}: the maximum current of the first 100ms after power-on

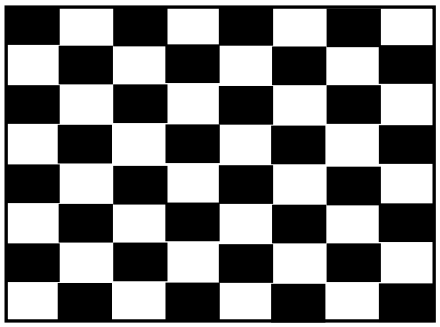
Measurement Conditions: Shown as the following figure.

Test pattern: Mosaic



Note (3) The specified power supply current is under the conditions at VCCS = 3.3 V, Ta = 25 ± 2 ºC, DC Current and f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

Mosaic Pattern



Active Area

LED CONVERTER SPECIFICATION

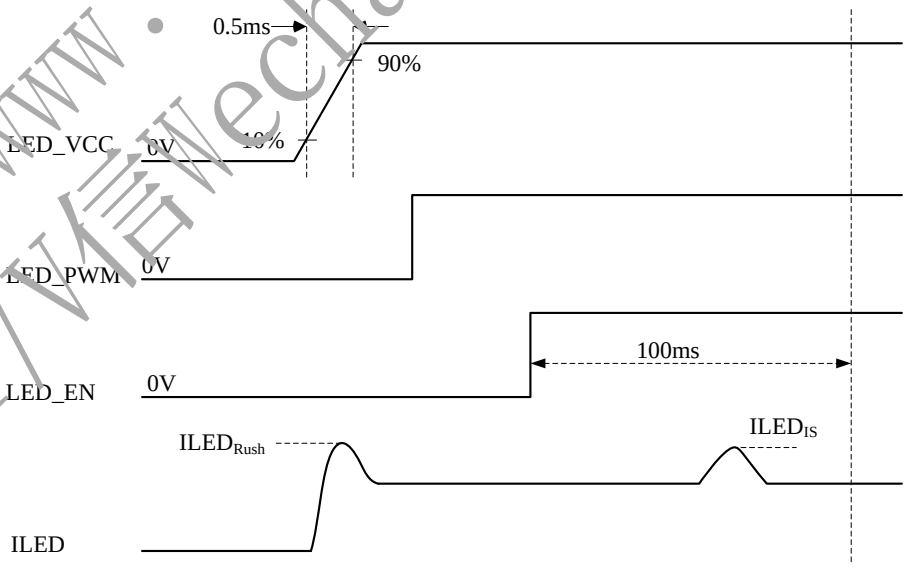
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Input power supply voltage		LED_Vccs	5.0	12.0	21.0	V	
Converter Inrush Current		$ILED_{RUSH}$	-	-	1.5	A	(1)
EN Control Level	Backlight On		1.5	-	3.6	V	
	Backlight Off		0	-	0.5	V	
PWM Control Level	PWM High Level		1.5	-	3.6	V	
	PWM Low Level		0	-	0.5	V	
PWM Control Duty Ratio			1	-	100	%	
PWM Control Permissive Ripple Voltage		V_{PWM_pp}	-	-	100	mV	
PWM Control Frequency		f_{PWM}	200	-	2000	Hz	
LED Power consumption		P_L	-	3.3	3.6	W	(2)
LED Power Current	LED_VCCS =Typ.	ILED	-	-	300	mA	(3)

Note (1) $ILED_{RUSH}$: the maximum current when LED_VCCS is rising.

$ILED_{IS}$: the maximum current of the first 100ms after power-on,

Measurement Conditions: Shown as the following figure. LED_VCCS = Typ, Ta = 25 ± 2 ºC, f_{PWM} = 200 Hz, Duty=100%.

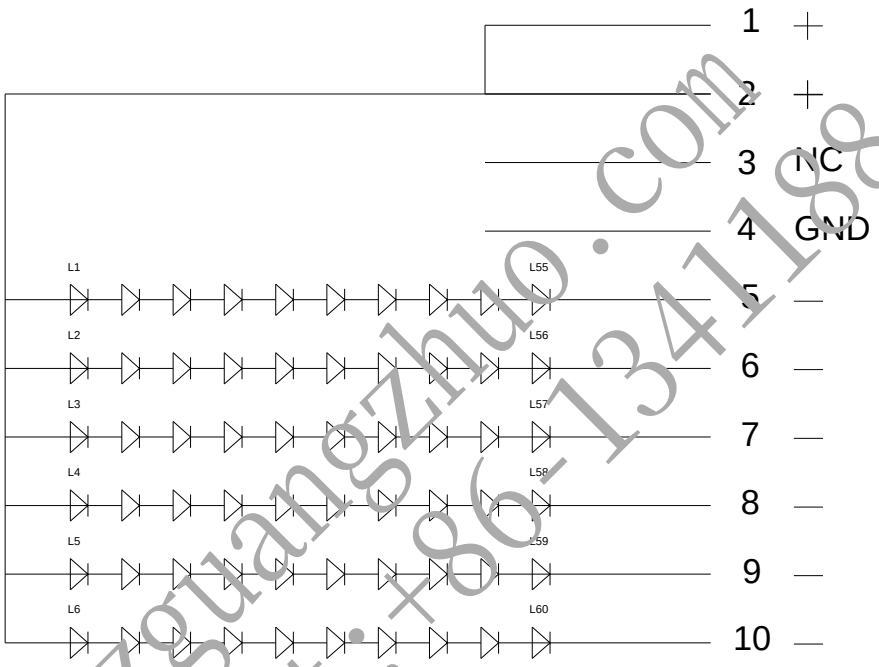
VLED rising time is 0.5ms



Note (2) $P_L = I_L \times V_L$ (With LED converter transfer efficiency);

Note (3) The specified LED power supply current is under the conditions at "LED_VCCS = Typ.", Ta = 25 ± 2 ºC, fPWM = 200 Hz, Duty=100%.

4.4.1 BACKLIGHT UNIT



Ta = 25 ± 2 ºC

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Power Supply Voltage	VL	-	-	29.0	V	(1)(2)
LED Light Bar Power Supply Current	IL	-	106.2	-	mA	(Duty100%)
Power Consumption	PL	-	-	3.08	W	(3)
LED Life Time	L_{BL}	15000	-	-	Hrs	(4)

Note (1) LED current is measured by utilizing a high frequency current meter :

Note (2) For better LED light bar driving quality, it is recommended to utilize the adaptive boost converter with current balancing function to drive LED light-bar.

Note (3) $P_L = I_L \times V_L$ (Without LED converter transfer efficiency)

Note (4) The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 °C and I_L = 20 mA(Per EA) until the brightness becomes ≦ 50% of its original value.

4.5 INPUT SIGNAL TIMING SPECIFICATIONS

4.5.1 eDP AUX Channel Characteristics

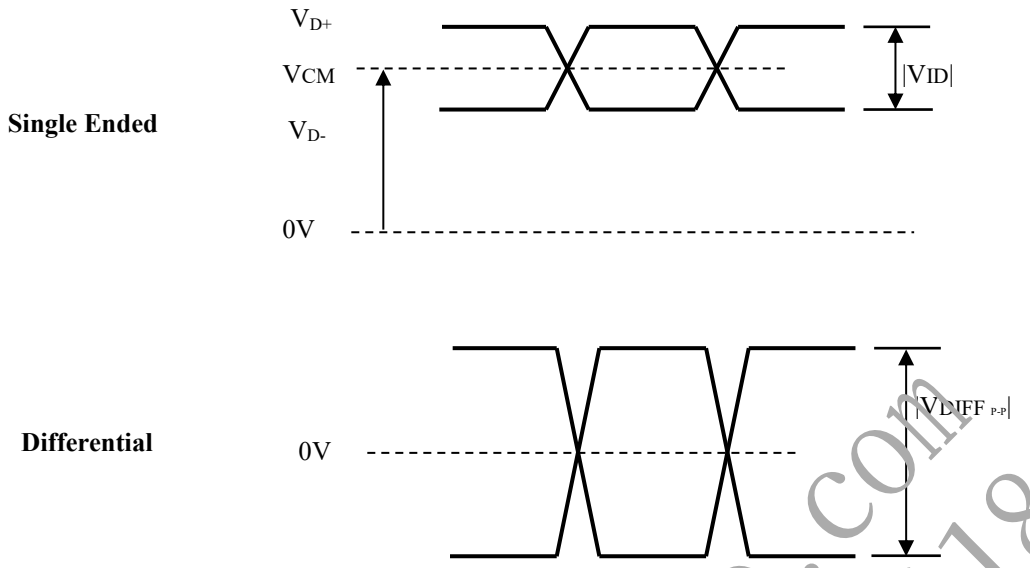
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Unit Interval for AUX channel	UI_{AUX}	0.4	-	0.6	μS	
Peak-to-peak voltage at TP1	$V_{AUX-DIFF-pp}$	0.39	-	1.38	V	
AUX DC Common mode Voltage	$V_{AUX-DC-CM}$	0	-	2	V	
AUX Short current limit	I_{AUX_SHORT}	-	-	90	mA	
AUX CH termination DC resistor	R_{AUX_TERM}	80	100	120	Ω	Differential input
AUX AC coupling capacitor	C_{AUX}	75	-	200	nF	
Number of pre-charge pulses	Pre-charge pulses	10		16		

4.5.2 eDP Main Link Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Link clock down spreading	Down_Spread_Amplitude	0		0.5	%	
Differential Peak-to-peak Input Voltage at Rx package pins	$V_{RX-DIFFpp}$	120	-	1200	mV	
Differential termination resistance	$R_{RX-TERM}$	90	100	110	Ω	
RX short circuit Current Limit	$I_{RX-SHORT}$	-	-	50	mA	
Lane Intra-pair Skew at RX package pins	$T_{RX-SKEW-INTRA-PAIR-High-Bit-Rate}$	-	-	50	ps	

4.5.3 eDP AUX Channel Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Hot plug Detect	V_{HPD}	2.25	-	3.6	V	



4.5.4 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	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
	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
	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
	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
	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
	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

	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Red	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gray	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Green	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Blue(0)/Dark	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(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gray	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Blue	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

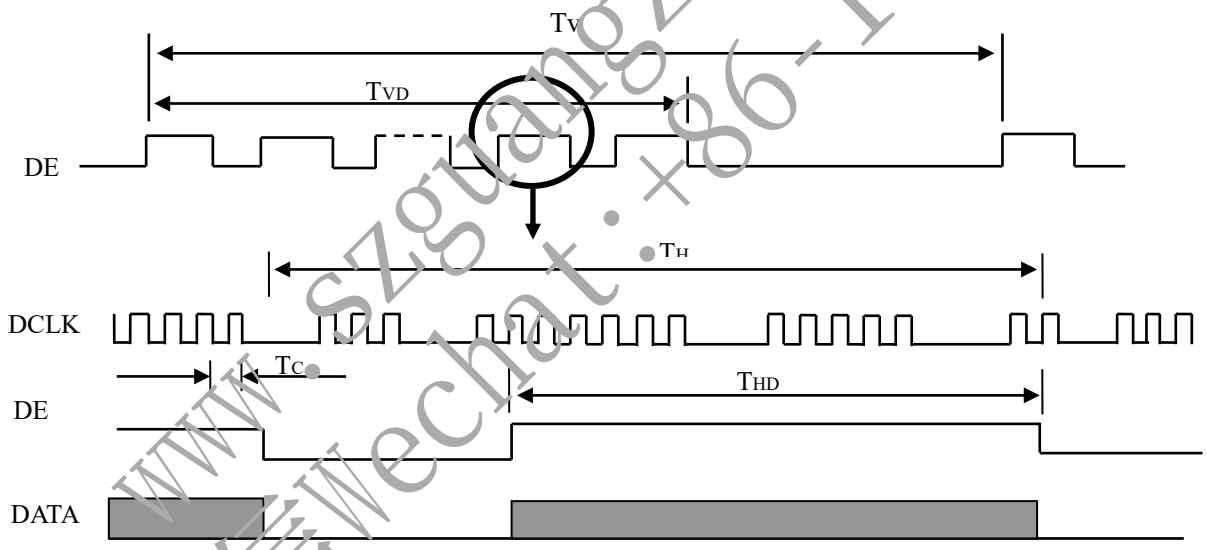
4.6 DISPLAY TIMING SPECIFICATIONS

The input signal timing specification is showed as the following table and timing diagram.

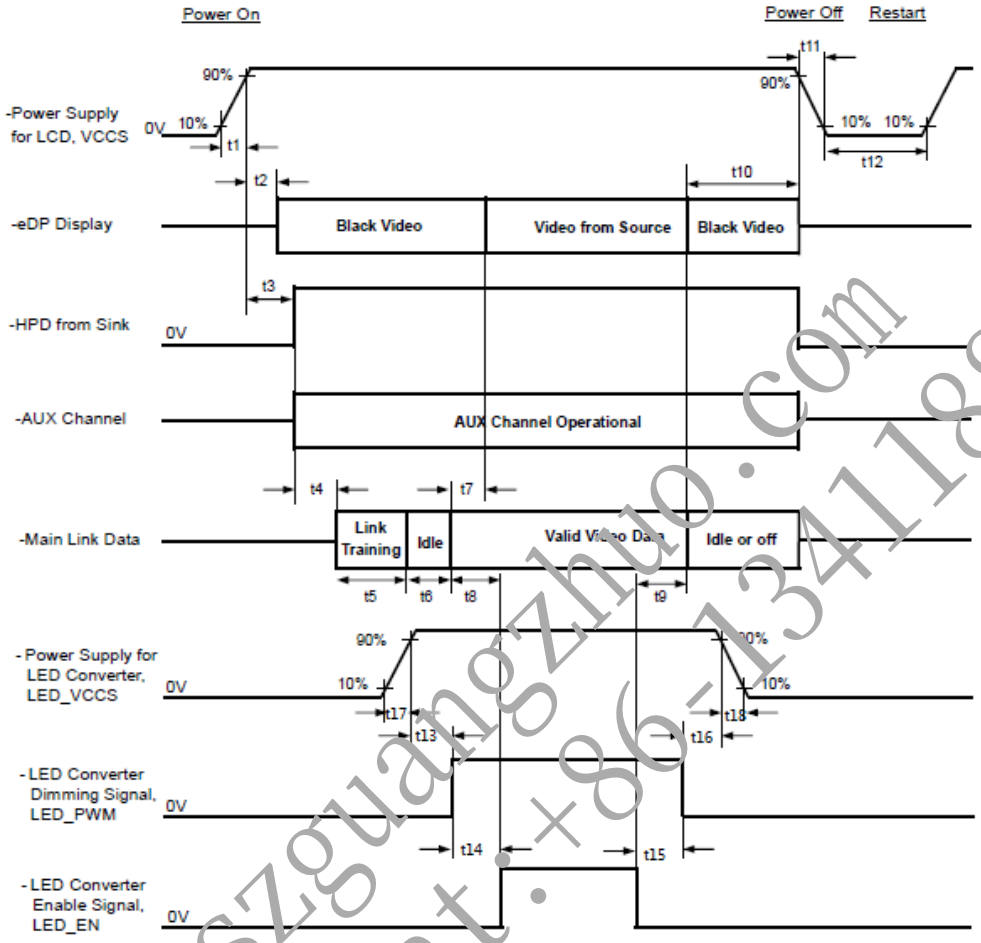
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	-	158.49	-	MHz	-
DE	Vertical Total Time	TV	-	1246	-	TH	-
	Vertical Active Display Period	TVD	1200	1200	1200	TH	-
	Vertical Active Blanking Period	TVB	-	46	-	TH	-
	Horizontal Total Time	TH	-	2120	-	Tc	-
	Horizontal Active Display Period	THD	1920	1920	1920	Tc	-
	Horizontal Active Blanking Period	THB	-	200	-	Tc	-

Note (1) Display timing signal should be contained and transferred by Display Port Main Link stream data packing described in VESA Display Port Standard V1.4b

INPUT SIGNAL TIMING DIAGRAM



4.7 POWER ON/OFF SEQUENCE



Symbol	Description	Min	Typ.	Max	Unit	Note
t1	Power rail rise time, 10% to 90%	0.5		10	ms	
t2	Delay from LCD,VCCS to eDP Display	0		200	ms	
t3	Delay from LCD,VCCS to HPD high	0		200	ms	
t4	Delay from Sink AUX to link training initialization	-		-	ms	(5)
t5	Link training duration	-		-	ms	(5)
t6	Link idle	-		-	ms	(5)
t7	Delay from valid video data from Source to video on display	0		50	ms	
t8	Delay from valid video data from Source to	50		-	ms	(5)

	backlight on					
t9	Delay from backlight off to end of valid video data	0		-	ms	
t10	Delay from end of valid video data from Source to power off	0		500	ms	
t11	VCCS power rail fall time, 90% to 10%	1		10	ms	(1)
t12	VCCS Power off time	500		-	ms	
t13	Delay from VCC to PWM	0		-	ms	
t14	Delay from PWM to LED ENABLE	0		-	ms	
t15	Delay from LED ENABLE to PWM Disable	0		-	ms	
t16	Delay from PWM Disable to VBL 90%	0		-	ms	
t17	Delay from VBL 10% to VBL 90%	0.5		-	ms	
t18	VBL power rail fall time, 90% to 10%	0.5		-	ms	

Note (1) Please follow the power on/off sequence described above. Otherwise, the LCD module might abnormal display or be damaged.

Note (2) Please avoid floating state of interface signal at invalid period. When the interface signal is invalid, be sure to pull down the power supply of LCD VCCS to 0 V.

Note (3) The backlight must be turned on after the power supply for the logic and the interface signal is valid. The backlight must be turned off before the power supply for the logic and the interface signal is invalid.

Note (4) Please follow the LED backlight power sequence as above. If the customer could not follow, it might cause backlight flash issue during display ON/OFF or damage the LED backlight controller

Note (5) T4+T5+T6+T8 > 80ms

5. Optical characteristics

Ta=25°C

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing angle range	Horizontal	θ21	CR＞10	-	89	-	Deg.	(1), (3), (4), (6)
		θ22		-	89	-		
	Vertical	θ11		-	89	-	Deg.	
		θ12		-	89	-	Deg.	

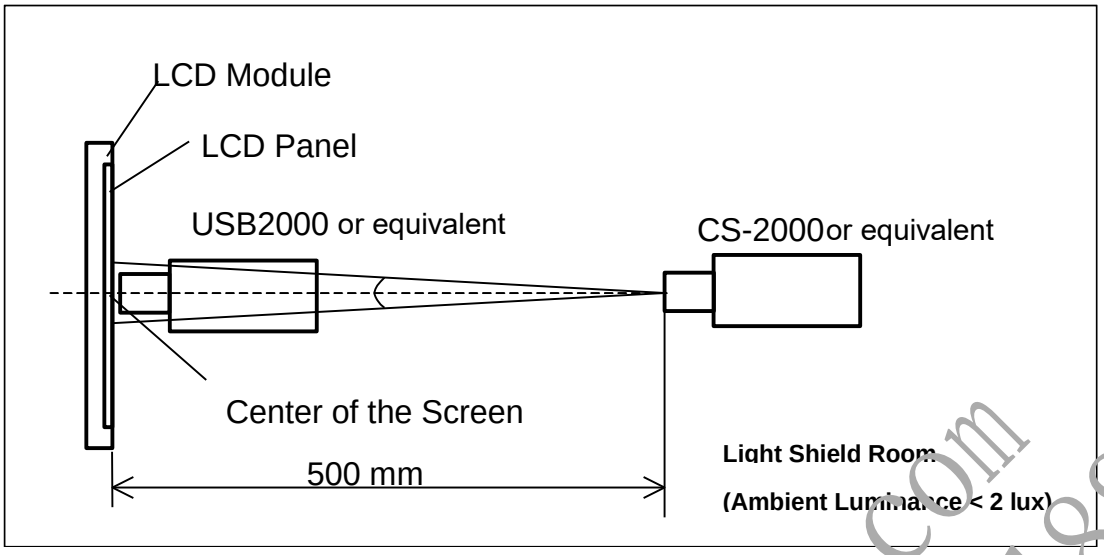
Contrast ratio	CR		1000	1200		-	(2), (4), (6)
Response time	$\tau_r+\tau_d$		-	20	25	ms	(5)
Chromaticity of white	x			0.313		-	
	y			0.329		-	
Chromaticity of red	x			0.578		-	
	y	θ=0 deg.	Typ.	0.361	Typ.	-	(2), (6)
Chromaticity of green	x		-0.03	0.351	+0.03	-	Normal operation
	y			0.582		-	
Chromaticity of blue	x			0.163		-	
	y			0.117		-	
Gamut	%			NTSC45%		%	
Luminance of White	Y_{LI}		-	300	-	cd/m²	(7)
Half brigthness viewing angle (Left/Right)	--			20/20		[deg]	(3)1
Half brigthness viewing angle (Upper/Lower)				20/20		[deg]	(3)
Sgamma	-		2.0	2.2	2.4		
Surface hardness	[H]			3		H	
White uniformity 5pt	δ_W	θ=0 deg.		-	125	%	(8)
White uniformity 13pt	δ_W	θ=0 deg.		-	150	%	(2), (8)

※The measurement shall be taken 5 minutes after lighting the LCM at the following rating.

※The optical characteristics shall be measured in a dark room or equivalent.

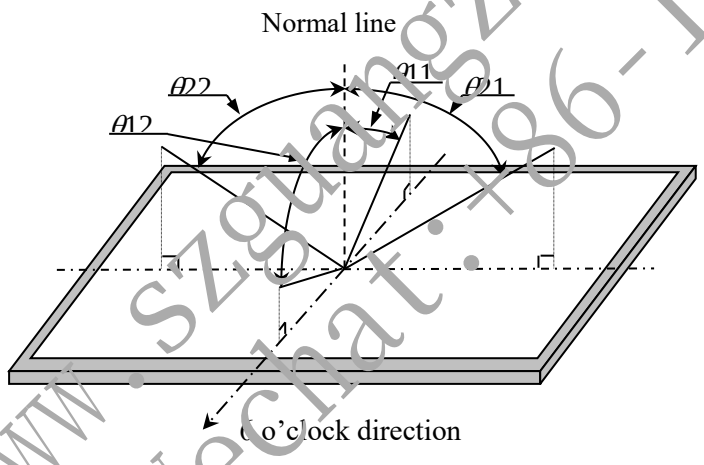
Note (1) Measurement of viewing angle range

Note (2) Measurement of luminance and Chromaticity and Contrast.



Measurement of Contrast, Luminance, Chromaticity, White variation, Crosstalk and Color temperature variation

Note (3) Definitions of viewing angle range:

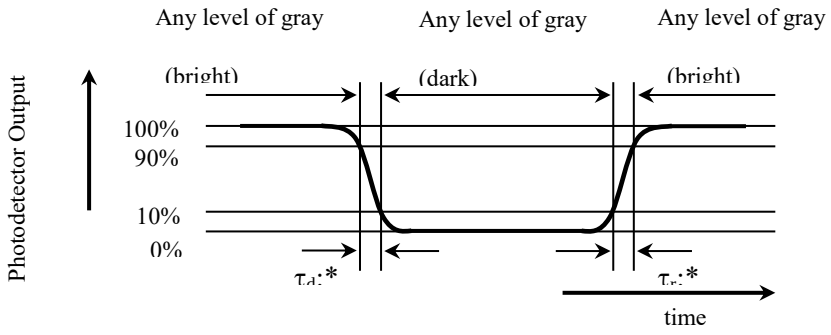


Viewing angle

Note (4) Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio} = \frac{\text{Luminance(Brightness) with all pixels white}}{\text{Luminance(Brightness) with all pixels Black}}$$



Response time

Note (5) Definition of response time:

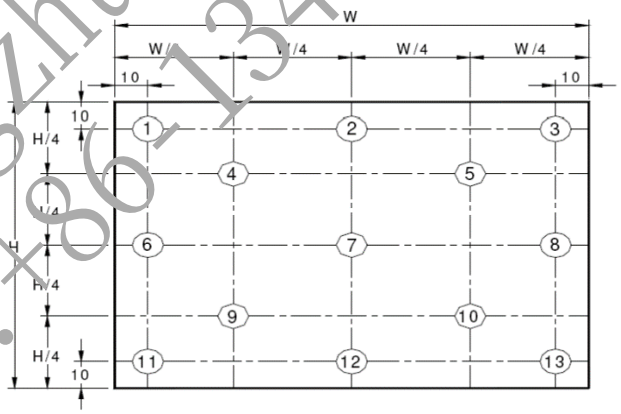
The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white" .

Note (6) This shall be measured at center of the screen.

Note (7) The Luminance of White is the average of 5 points measurements (4,5,7,9,10) showing in the Fig.9-5.

Note (8) Definition of white uniformity:

White uniformity of 5 points is defined as the following with 5 measurements(4,5,7,9,10).



$$\delta_{W1} = \frac{\text{Maximum Luminance of 5 Points(Brightness)}}{\text{Minimum Luminance of 5 Points(Brightness)}}$$

White uniformity of 13 points is defined as the following with 13 measurements(1~13).

$$\delta_{W2} = \frac{\text{Maximum Luminance of 13 Points(Brightness)}}{\text{Minimum Luminance of 13 Points(Brightness)}}$$

Fig.9-5

6. Reliability Test Items

No.	Test Item	Conditions
1	Low temperature storage test	-20±2℃, 240±8 hours
2	High temperature storage test	60±2℃, 240±8 hours
3	Low temperature operation test	0±2℃,240hrs±8hrs
4	High temperature operation test	50±2℃, 240±8 hours
5	High temperature & high humidity operation test	50℃±2℃/80±3%%RH，240hrs±8hrs
6	Thermal shock test	-20±2℃/30minutes±5%、60±2℃/30minutes±5% 100cycles
7	ESD	150pF[330Ω]，Contact: ±8KV，Air: ±15KV

[Result Evaluation Criteria] Under the display quality test condition with normal operation state.

Do not change these condition as such changes may affect practical display function.

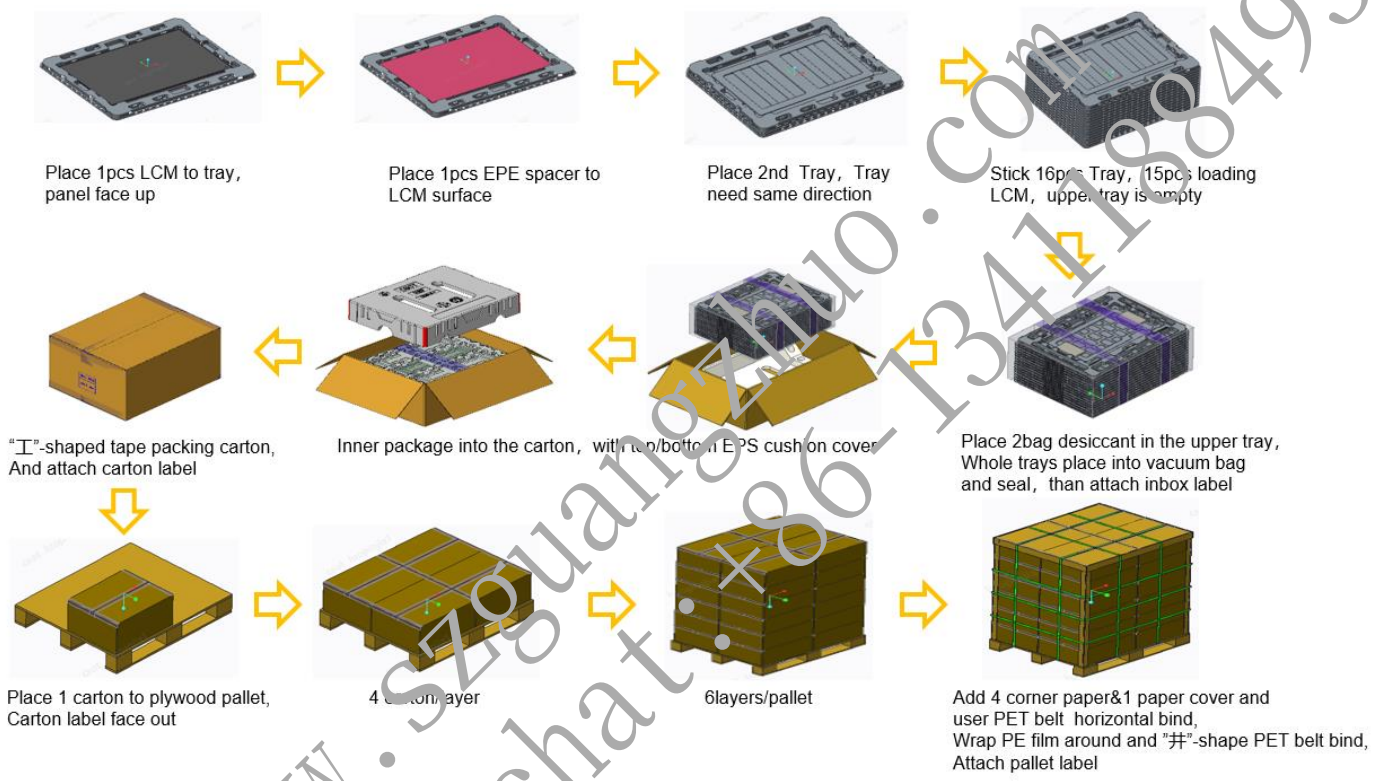
[Normal operation state] temperature：+ 15℃~+ 35℃，Humidity：45~75%，Atmospheric pressure：86~106kPa

7. Display Quality

The display quality of the color TFT-LCD Module shall be in compliance with the Incoming Inspection Standard.

8. Packaging Condition

8.1 Carton Packing



8.2 Label

8.3.1 Module label

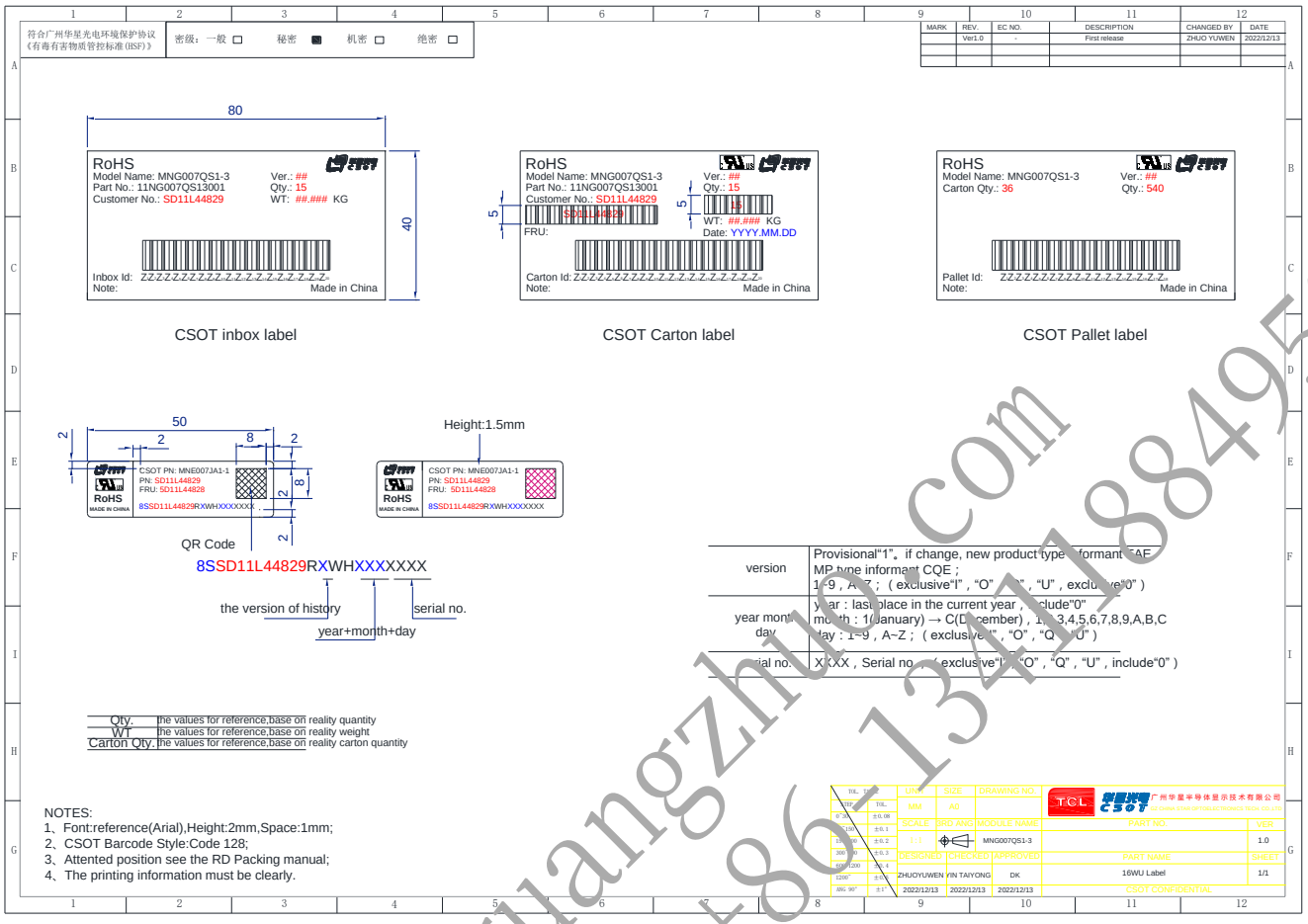
Model Name ： MNG007QS1-3

Part No.： 11NG007QS13001

Lenovo PN: SD11L44829

FRU: 5D11L44828

8S Code: 8SSD11L44829R1GZXXXXXXX



9. RoHS Directive

This LCD Module is compliant with RoHS Directive.

10. Handling Precautions

a) Be sure to turn off the power supply when inserting or disconnecting the cable.

Please insert for too much stress not to join a connector in the case of insertion of a connector.

b) Be sure to design the cabinet so that the Module can be installed without any extra stress such as warp or twist.

c) Since the front polarizer is easily damaged, pay attention not to scratch it.

d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.

g) Since CMOS LSI is used in this Module, take care of static electricity and injure the human earth when handling. Observe all other precautionary requirements in handling components.

h) This Open-cell has its circuitry PCBs on the side and should be handled carefully in order not to be stressed.

i) Laminate film is attached to the Module surface to prevent it from being scratched. Peel the laminate film off slowly just before the use with strict attention to electrostatic charges. Ionized air shall be blown over during the action. Blow off the 'dust' on the polarizer by using an ionized nitrogen gun, etc. Working under the following environments is desirable.

- All workers wear conductive shoes, conductive clothes, conductive fingerstalls and grounding belts without fail.
- Use Ionized blower for electrostatic removal, and peel of the laminate film with a constant speed. (Peelingof it at over 2 seconds)

j) The polarizer surface on the panel is treated with Anti Glare . In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.

k) Do not expose the LCD Module to a direct sunlight, for a long period of time to protect the Module from the ultra violet ray.

l) When handling LCD Modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the Modules.

m) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if it gets inside your eye or mouth by mistake.

n) Disassembling the Module can cause permanent damage and should be strictly avoided. (Except for protection film of the panel.)

o) Be careful when using it for long time with fixed pattern display as it may cause afterimage. (Please use a screen saver etc., in order to avoid an afterimage.)

p) If a minute particle enters in the Module and adheres to an optical material, it may cause display non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole if you intend to install a fan.

q) Epoxy resin (amine series curing agent), silicone adhesive material (dealcoholization series and oxime series), tray forming agent (azo compound) etc, in the cabinet or the packing materials may induce abnormal

display with polarizer film deterioration regardless of contact or noncontact to polarizer film.

Be sure to confirm the component of them.

r) Do not use polychloroprene. If you use it, there is some possibility of generating Cl_2 gas that influences the reliability of the connection between LCD panel and driver IC.

s) Do not put a laminate film on LCD Module, after peeling of the original one. If you put on it, it may cause discoloration or spots because of the occurrence of air gaps between the polarizer and the film.

t) Ground module bezel to stabilize against EMI and external noise.

Appendix. EDID DATA STRUCTURE:

Address (DEC)	Address (HEX)	Field Name & Comments	Set Value (HEX)	Set Value (BIN)	Set Value (DEC)
0	0	Header	0	00000000	0
1	1	Header	FF	11111111	255
2	2	Header	FF	11111111	255
3	3	Header	FF	11111111	255
4	4	Header	FF	11111111	255
5	5	Header	FF	11111111	255
6	6	Header	FF	11111111	255
7	7	Header	0	00000000	0
8	8	EISA Manuf. Code LSB	0E	00001110	14
9	9	Compressed ASCII	6F	01101111	111
10	0A	Product Code	30	00110000	48
11	0B	hex, LSB first	16	00010110	22
12	0C	32-bit ser #	0	00000000	0
13	0D	ID S/N - option	0	00000000	0
14	0E	ID S/N - option	0	00000000	0
15	0F	ID S/N - option	0	00000000	0

16	10	Week of manufacture		30	00110000	48
17	11	Year of manufacture		20	00100000	32
18	12	EDID Structure Ver		1	00000001	1
19	13	EDID revision #		4	00000100	4
20	14	Video input def.		A5	10100101	165
21	15	Max H image size		23	00100011	35
22	16	Max V image size		16	00010110	22
23	17	Display Gamma		78	01111000	120
24	18	Feature support (no DPMS, Active off, RGB, timing BLK 1)		3	00000011	3
25	19	Red/Green Low bits (RxRy/GxGy)	**Default value.**	F2	11110010	242
26	1A	Blue/White Low bits (BxBy/WxWy)	**These will**	45	01000101	69
27	1B	Red X Rx	**Updated to actual performance after measured**	93	10010011	147
28	1C	Red Y Ry		5C	01011100	92
29	1D	Green X Gx		5A	01011010	90
30	1E	Green Y Gy		93	10010011	147
31	1F	Blue X Bx		29	00101001	41
32	20	Blue Y By		1F	00011111	31
33	21	White X Wx		50	01010000	80

34	22	White Y Wy	54	01010100	84
35	23	Established timings 1	0	00000000	0
36	24	Established timing 2	0	00000000	0
37	25	Established timing 3	0	00000000	0
38	26	Standard timing #1	1	00000001	1
39	27	Standard timing #1	1	00000001	1
40	28	Standard timing #2	1	00000001	1
41	29	Standard timing #2	1	00000001	1
42	2A	Standard timing #3	1	00000001	1
43	2B	Standard timing #3	1	00000001	1
44	2C	Standard timing #4	1	00000001	1
45	2D	Standard timing #4	1	00000001	1
46	2E	Standard timing #5	1	00000001	1
47	2F	Standard timing #5	1	00000001	1
48	30	Standard timing #6	1	00000001	1
49	31	Standard timing #6	1	00000001	1
50	32	Standard timing #7	1	00000001	1
51	33	Standard timing #7	1	00000001	1
52	34	Standard timing #8	1	00000001	1
53	35	Standard timing #8	1	00000001	1
54	36	Pixel Clock LSB	EA	11101010	234
55	37	Pixel Clock HSB	3D	00111101	61
56	38	Horizontal Active (lower 8 bits)	80	10000000	128
57	39	Hor blanking (lower 8 bits)	C8	11001000	200
58	3A	Horizontal Active/Horizontal blanking (upper4:4 bits)	70	01110000	112

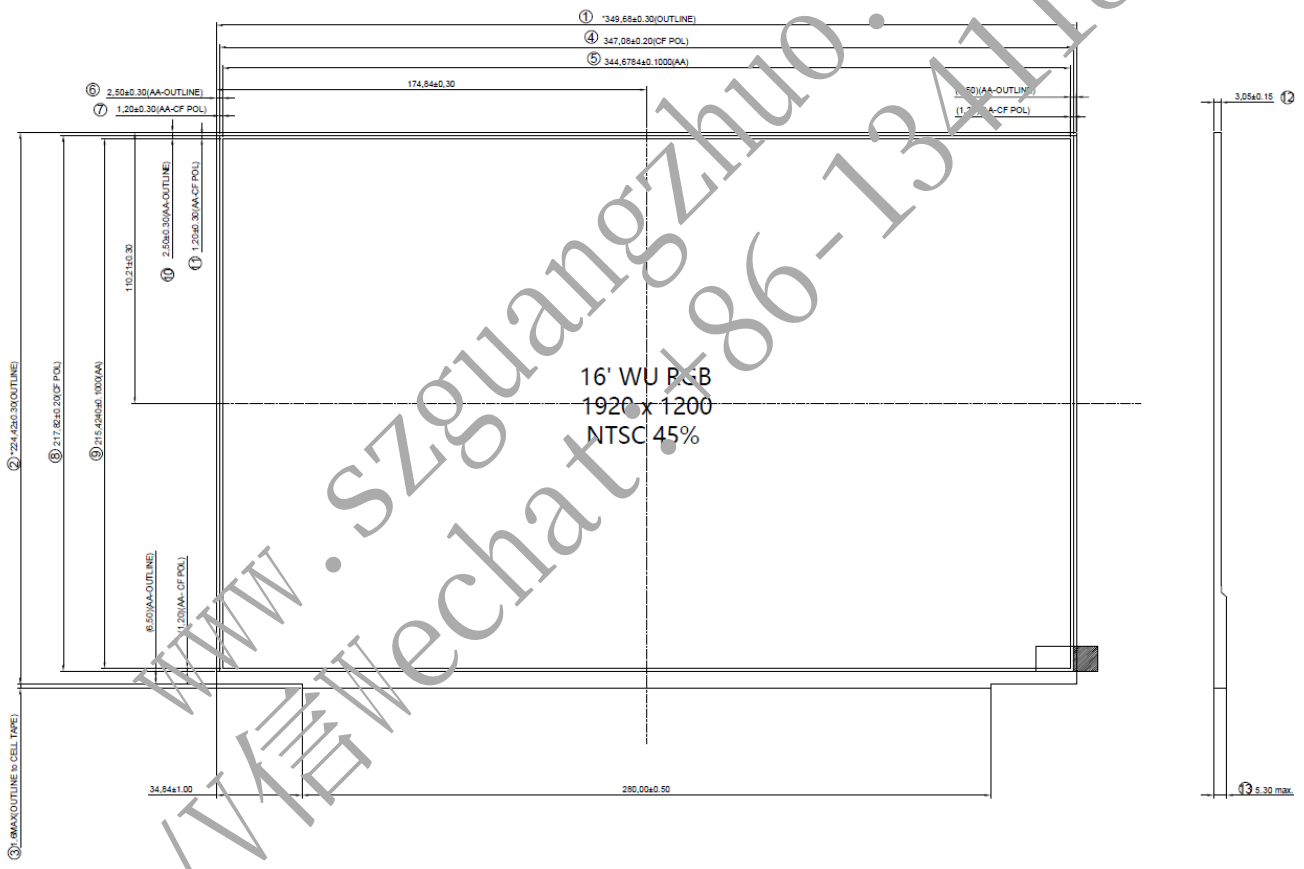
59	3B	Vertcal active(lower 8 bits)	B0	10110000	176
60	3C	Vertical blanking(lower 8 bits)	2E	00101110	46
61	3D	Vertical Active : Vertical Blanking (upper4:4 bits)	40	01000000	64
62	3E	Horizontal Sync Offset	30	00110000	48
63	3F	Horizontal Sync Pulse Width	20	00100000	32
64	40	Vertical Sync Offset , Sync Width	36	00110110	54
65	41	Horizontal Vertical Sync Offset/Width upper 2 bits	0	00000000	0
66	42	Horizontal Image Size	59	01011001	89
67	43	Vertical image Size	D7	11010111	215
68	44	Horizontal Image Size / Vertical image size	10	00010000	16
69	45	Horizontal Border = (0 for Notebook LCD)	0	00000000	0
70	46	Vertical Border = (0 for Notebook LCD)	0	00000000	0
71	47	Signal (non-int, norm, no stero, sep sync, neg pol)	1A	00011010	26
72	48	Pixel Clock LSB	0	00000000	0
73	49	Pixel Clock HSB	0	00000000	0
74	4A	Horizontal Active (lower 8 bits)	0	00000000	0
75	4B	Hor blanking (lower 8 bits)	FD	11111101	253
76	4C	Horizontal Active/Horizontal blanking (upper4:4 bits)	0	00000000	0
77	4D	Vertcal active(lower 8 bits)	30	00110000	48

78	4E	Vertical blanking(lower 8 bits)	3C	00111100	60
79	4F	Vertical Active : Vertical Blanking (upper4:4 bits)	4B	01001011	75
80	50	Horizontal Sync Offset	4B	01001011	75
81	51	Horizontal Sync Pulse Width	10	00010000	16
82	52	Vertical Sync Offset , Sync Width	1	00000001	1
83	53	Horizontal Vertical Sync Offset/Width upper 2 bits	0A	00001010	10
84	54	Horizontal Image Size	20	00100000	32
85	55	Vertical image Size	20	00100000	32
86	56	Horizontal Image Size / Vertical image size	20	00100000	32
87	57	Horizontal Border = (0 for Notebook LCD)	20	00100000	32
88	58	Vertical Border = (0 for Notebook LCD)	20	00100000	32
89	59	Signal (non-int, norm, no stero, sep sync, neg pol)	20	00100000	32
90	5A	descriptor#3	0	00000000	0
91	5B	Reserved for definition	0	00000000	0
92	5C	Reserved for definition	0	00000000	0
93	5D	ASCII String	FE	11111110	254
94	5E	Reserved for definition	0	00000000	0
95	5F	Manufacture	43	01000011	67
96	60	Manufacture	53	01010011	83
97	61	Manufacture	4F	01001111	79
98	62	Manufacture	54	01010100	84

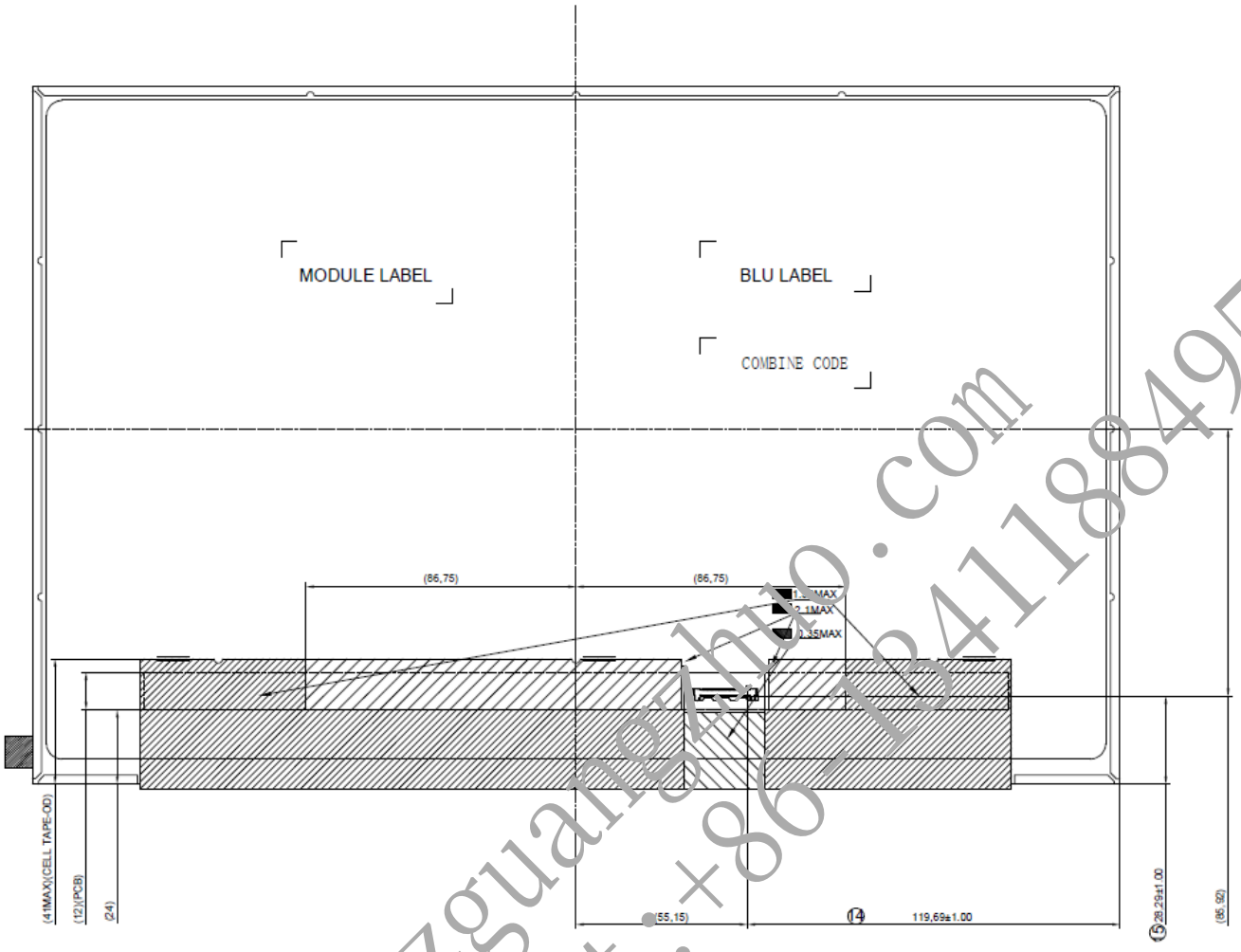
99	63	Manufacture	20	00100000	32
100	64	Manufacture	54	01010100	84
101	65	Manufacture	39	00111001	57
102	66	Reserved for definition	0A	00001010	10
103	67	Reserved for definition	20	00100000	32
104	68	Reserved for definition	20	00100000	32
105	69	Reserved for definition	20	00100000	32
106	6A	Reserved for definition	20	00100000	32
107	6B	Reserved for definition	20	00100000	32
108	6C	descriptor #4	0	00000000	0
109	6D	Reserved for definition	0	00000000	0
110	6E	Reserved for definition	0	00000000	0
111	6F	Reserved for definition	FE	11111110	254
112	70	Reserved for definition	0	00000000	0
113	71	Manufacture P/N	4D	01001101	77
114	72	Manufacture P/N	4E	01001110	78
115	73	Manufacture P/N	47	01000111	71
116	74	Manufacture P/N	30	00110000	48
117	75	Manufacture P/N	30	00110000	48
118	76	Manufacture P/N	37	00110111	55
119	77	Manufacture P/N	51	01010001	81
120	78	Manufacture P/N	53	01010011	83
121	79	Manufacture P/N	31	00110001	49
122	7A	Manufacture P/N	2D	00101101	45
123	7B	Manufacture P/N	33	00110011	51
124	7C	Reserved for definition	0A	00001010	10
125	7D	Reserved for definition	20	00100000	32

126	7E	Extension Flag	0	00000000	0
127	7F	Checksum	6B	01101011	107
		Default Value. This will calculated based on color values			

Appendix. OUTLINE DRAWING



Front side



Bottom side