

Product Specification Sheet

Customer: _____

Model Name: **MNE507ZA1-1**

Date: **2022/01/27**

Version: **V04**

Customer's Approval		CSOT	
Signature	Date	Approved By	Date
		Reviewed By	Date
		Prepared By:	Date

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Record of Revision

Version	Revise Date	Page	Content
V01	2021/07/16	All	Preliminary Specification
V02	2021/08/19	P26~P32	Add EDID information
		P22~P23	Add Packaging Condition
V03	2021/12/01	P33	Follow customer requirement : add PET mark line
V04	2022/01/27	P19	Update color chromaticity follow Srgb 100% requirement

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1. General Description

1.1 Overview

MNE507ZA1-1 is a 14.5" TFT Liquid Crystal Display Low blue light module with LED Backlight unit and 40 pins eDP 1.4 interface. This module supports 2560 x 1600 mode and can display 1073.7M colors.

1.2 Specifications Summary

No.	Item	Specification	Unit	Note
1	LCD size	14.5	Inch	
2	Resolution	3072 x RGB x 1920		
3	Pixel Arrangement	RGB		
4	Model Type	LCM		
5	TFT Technology	LTPS		
6	Display mode	FFS, Normally Black		
7	Active Area	312.14592 (H) ×195.0912 (V)	mm	
8	pixel pitch	101.61(H)×101.61(V)	um	
9	Display Colors	1073.7M		@ 10bit
10	Contrast Ratio	1500:1(Typ)		
11	Color Gamut	sRGB 100% (typ) / 95% (min)	CIE1976	sRGB
12	LCM Outline Dimension	316.45×203.24×2.4(max)	mm	w/o FPC bent
13	Luminance	400(Typ)	nits	5 Points Average
14	CCT	5500~7000	K	
15	Low blue light ratio	50	%	Max
16	ΔE	<1		Ave
17	Response time	20 typ 25 max	ms	Tr+Tf
18	GTG AVG	15 Typ	ms	
19	Surface treatment(UP)	Anti-glare	--	Pol.
20	Interface	eDP 1.4		4lane@8.1G
21	PSR function	PSR2		-
22	LRR function	Y		-
23	HDR function	N		
24	Free sync function	Y		
25	G-sync function	Y		

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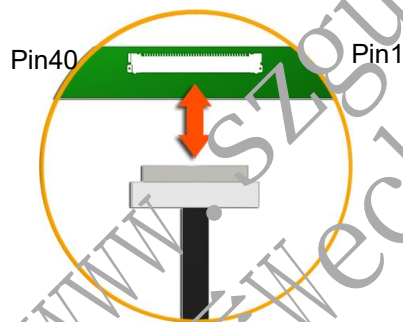
26	Adaptive sync function	Y		
27	BLU adjust method	DC		
28	Min/Max Refresh Rate	30~120	Hz	
29	Method of Inversion	Column		
30	Power consumption of Panel	1.4	W	3.3V@Mosaic
	Power consumption of Backlight	3.4	W	12V@400nits
31	Weight	245(Max)	g	

Note (1) The specified power consumption (with converter efficiency) is under the conditions at VCCS =3.3 V, LED_VCCS = Typ, fPWM = 200 Hz, Duty=100% and Ta = 25 ± 2 °C, whereas mosaic pattern is displayed.

2. Mechanical Specifications

Parameter		Min.	Typ.	Max	Unit	Note
Unit outline dimensions	Width	316.15	316.45	316.75	mm	
	Height	202.94	203.24	203.54	mm	w/o FPC bent
	Depth	2.0	2.2	2.4	mm	Thickness (body)
Weight			-	245	g	

2.1 Interface Connection



Please refer Appendix Outline Drawing for detail design.

Connector Part No.: 300E40-1010RA-G3

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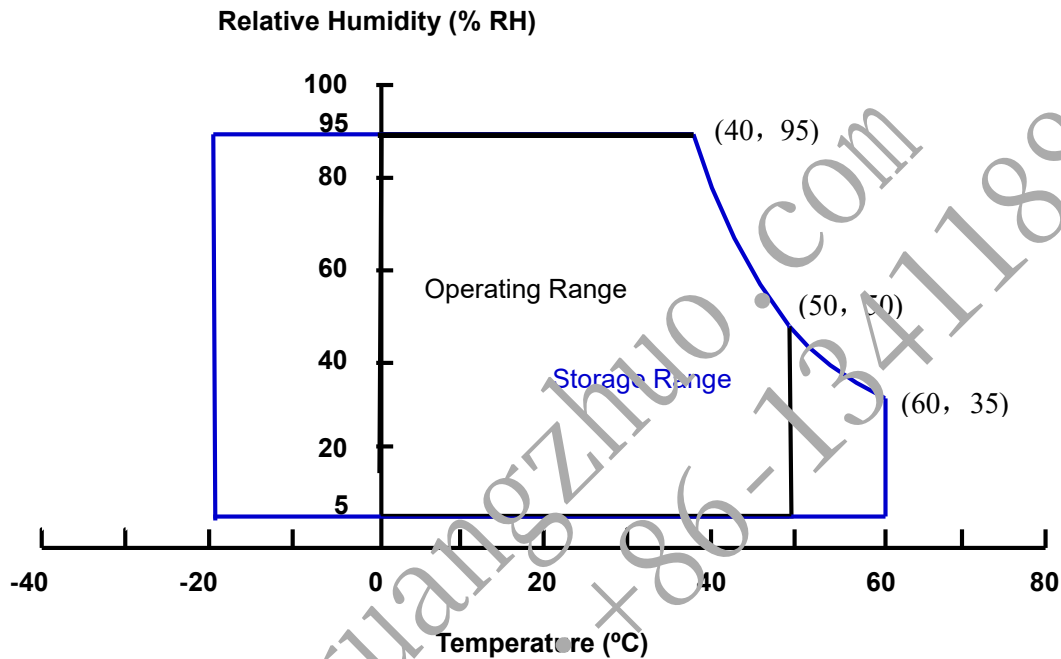
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3. Absolute Maximum Ratings

3.1 Absolute Ratings of Environment

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



Note (1)

- (a) 95% RH Max. (Ta ≤ 40 °C).
- (b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).
- (c) No condensation.

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

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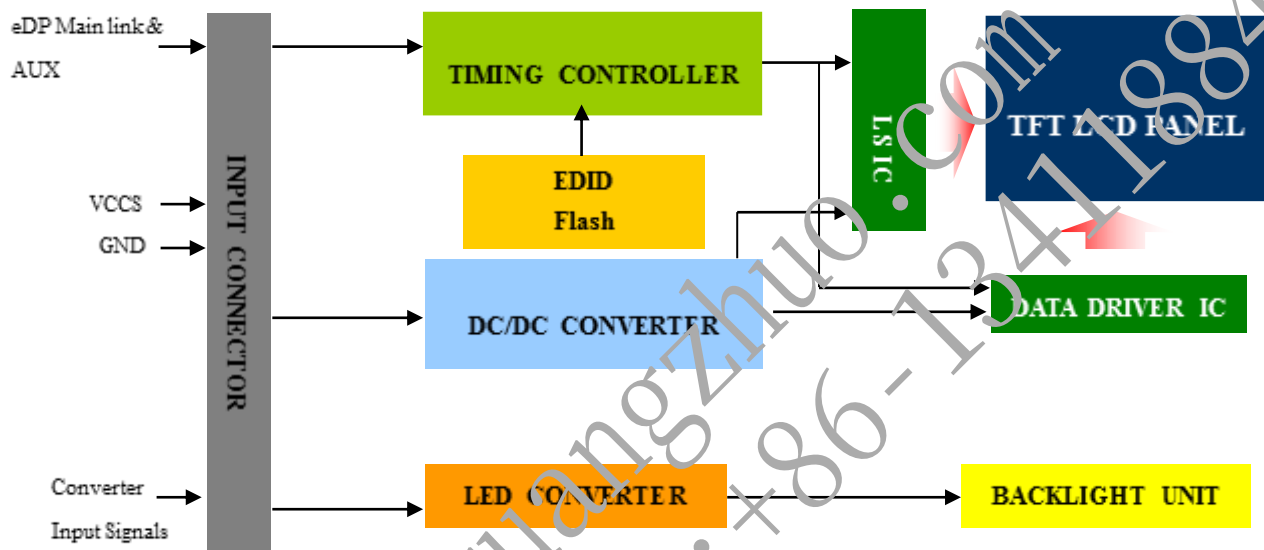
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Converter Input Voltage	LED_VCCS	-0.3	24	V	(1)
Converter Control Signal Voltage	LED_PWM,	-0.3	+3.6	V	(1)
Converter Control Signal Voltage	LED_EN	-0.3	+3.6	V	(1)

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	#01	I2C_TCON_SCL	For DDS function
2	#02	H_GND	
3	#03	Lane3_N	
4	#04	Lane3_P	
5	#05	H_GND	
6	#06	Lane2_N	
7	#07	Lane2_P	
8	#08	H_GND	
9	#09	Lane1_N	
10	#10	Lane1_P	
11	#11	H_GND	

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12	#12	Lane0_N	
13	#13	Lane0_P	
14	#14	H_GND	
15	#15	AUX_CH_P	
16	#16	AUX_CH_N	
17	#17	H_GND	
18	#18	LCD_VCC	
19	#19	LCD_VCC	
20	#20	LCD_VCC	
21	#21	LCD_VCC	
22	#22	LCD Self Test	
23	#23	LCD_GND	
24	#24	LCD_GND	
25	#25	LCD_GND	
26	#26	LCD_GND	
27	#27	HPD	
28	#28	BL_GND	
29	#29	BL_GND	
30	#30	BL_GND	
31	#31	BL_GND	
32	#32	BL_Enable	
33	#33	BL_PWM_DIM	
34	#34	I2C_TCON_SDA	For DDS function
35	#35	NC	For CSOT use
36	#36	BL_PWR	
37	#37	EL_PWR	
38	#38	BL_PWR	
39	#39	BL_PWR	
40	#40	NC	

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

Note (2) I2C using information:1.TCON I2C(DDS) address:111000010

2.PMIC address: 0100011x

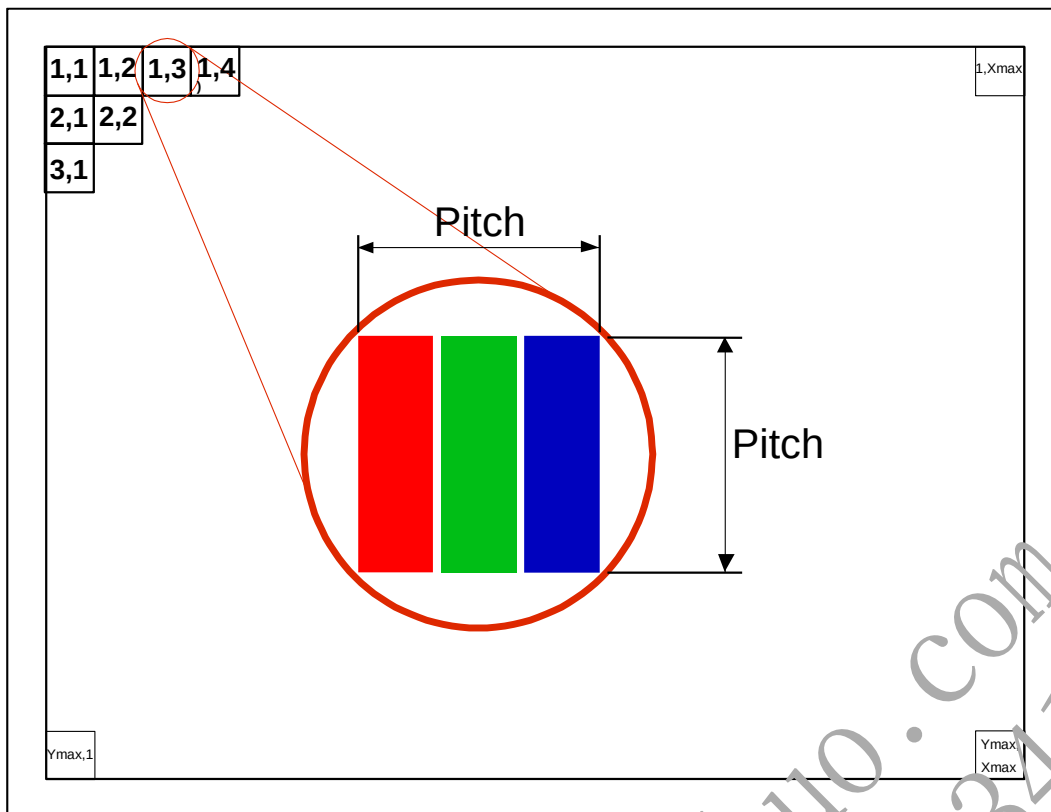
3.LED Driver: 0110100x

4.Level Shifter:0101111x

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4.3 Electrical Characteristics

4.3.1 LCD Electronics 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 I _{LCD}	-	450	500	mA	(3)
Power consumption	Mosaic P _{LCD}	-	-	1.4	W	(3)

Note (1) The ambient temperature is $T_a = 25 \pm 2^\circ\text{C}$.

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.

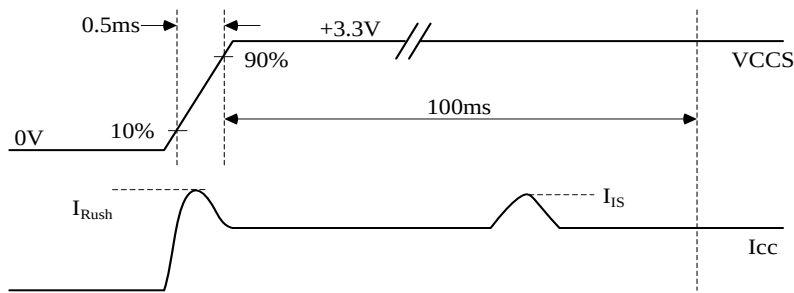
Test pattern: Mosaic

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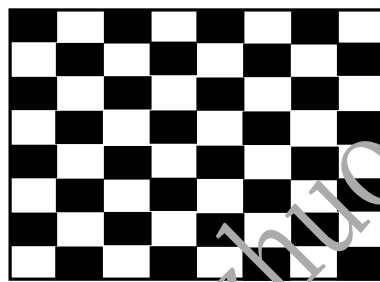
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VCCS rising time is 0.5ms



Note (3) The specified power supply current is under the conditions at VCCS = 3.3 V, $T_a = 25 \pm 2^\circ\text{C}$, DC Current and $f_v = 120\text{ Hz}$, 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		I _{LED_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 Permissible Ripple Voltage		V _{PWM_pp}	-	-	100	mV	
PWM Control Frequency		f _{PWM}	200	-	2000	Hz	
LED Power consumption		P _L	-	!	3.4	W	(2)
LED Power Current	LED_VCCS =Typ.	-	-	252	278	mA	(3)

Note (1) I_{LED_RUSH}: the maximum current when LED_VCCS is rising,

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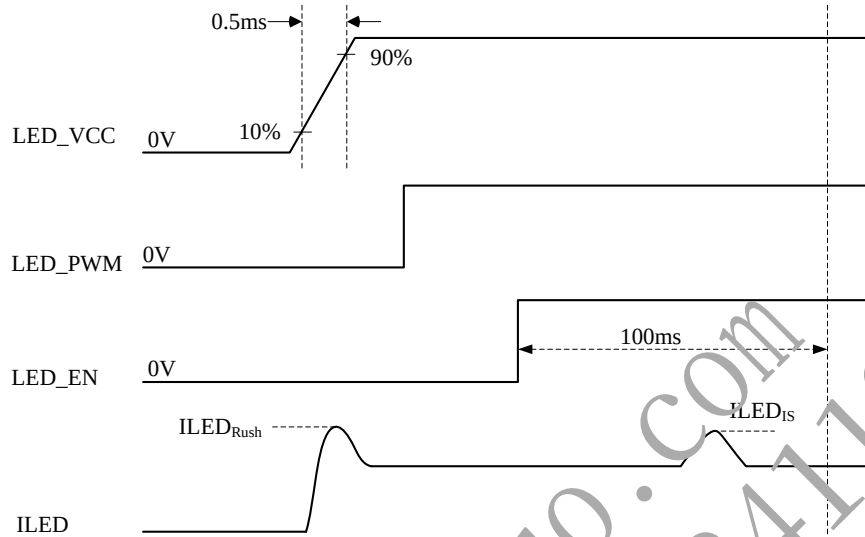
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I_{LEDIS}: the maximum current of the first 100ms after power-on,

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

VLED rising time is 0.5ms

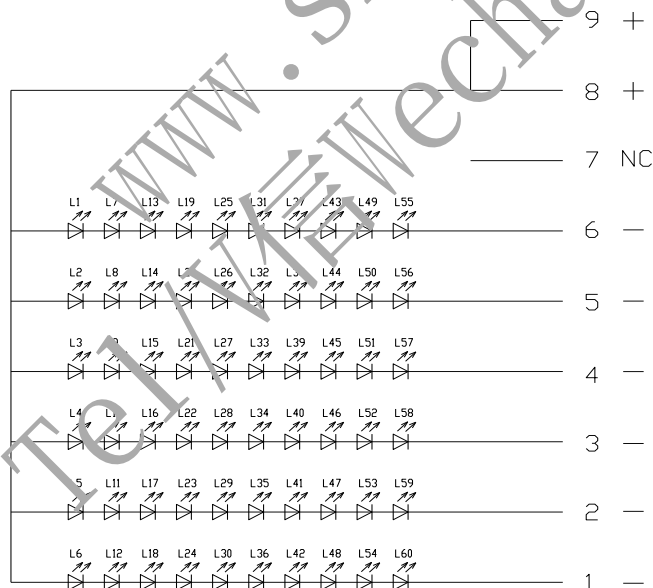


Note(2) $P_L = I_L \times V_L$ (With LED converter transfer efficiency),

Note (3) The specified LED power supply current is under the conditions at “LED_VCCS = Typ.”, Ta = 25 ± 2 °C, f_{PWM} = 200 Hz, Duty=100%.

4.3.2 Backlight Unit

60 LED PIN MAP



6P*10S

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Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Power Supply Voltage	VL	-	-	28.2	V	(1)(2) (Duty100%)
LED Light Bar Power Supply Current	IL	-	99.6	-	mA	
Power Consumption	PL	-	-	2.809	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 $\leq 50\%$ of its original value.

4.4 Input Signal Timing Specification

4.4.1 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}	0.18	0.2	1.38	V	
AUX DC Common mode Voltage	V _{AUX-DC-CM}	0	-	1.2	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		

4.4.2 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-DIFFp-p}	120	-	-	mV	For High Bit Rate Informative.
Differential termination resistance	R _{RX-TERM}	80	100	120	Ω	
RX short circuit Current Limit	I _{RX-SHORT}	-	-	50	mA	

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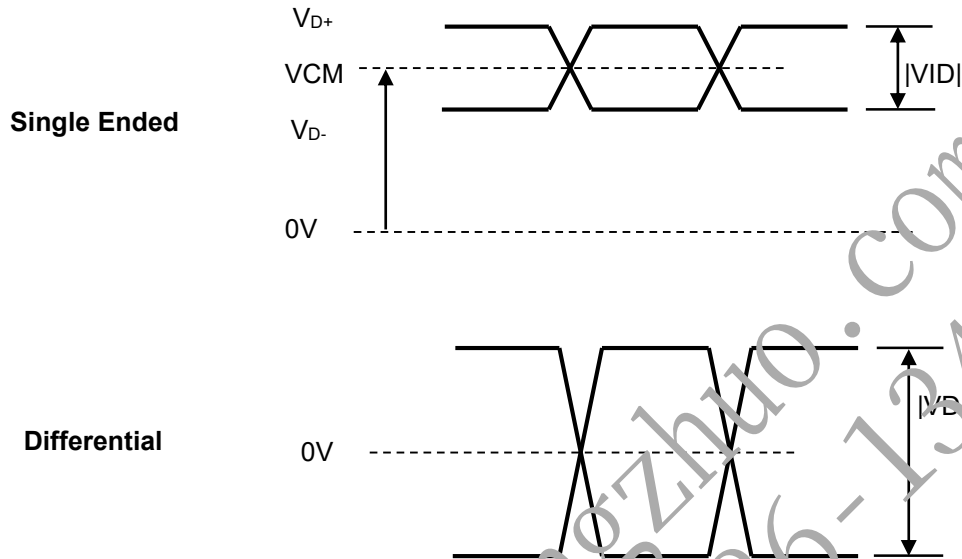
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Lane Intra-pair Skew at RX package pins	$T_{RX-SKEW-INTRA-PAIR-High-Bit-Rate}$	-	-	50	ps	
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4.4.3 eDP AUX Channel Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Hot plug Detect	VHPD	2.5	-	2.8	V	

Note (1) Display port interface related AC coupled signals are following VESA Display Port Standard V1.4b.



4.4.4 Color Data Input Assignment

The brightness of each primary color (red, green and blue) based on the 10-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									
	R	R	R	R	R	R	R	R	R	R	G	G	G	G	G	G	G	G	G	G	B	B	B	B	B	B	B	B	B	
	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0

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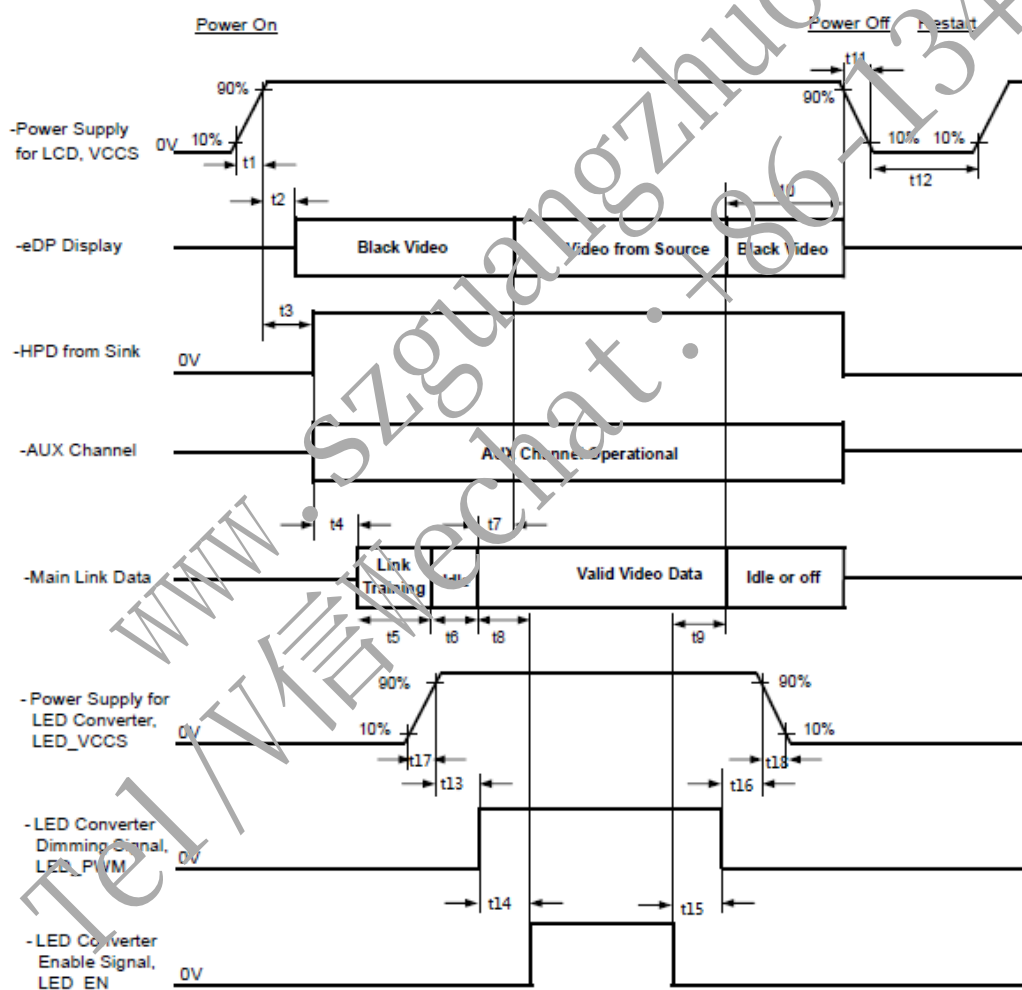
Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(1)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(2)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Red(1021)	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(1023)	1	1	1	1	1	1	1	1	1	1	0	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	0	0	0
Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Green(1021)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0
Green(1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0

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

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

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.



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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	
t5	Link training duration	-		-	ms	
t6	Link idle	-		-	ms	
t7	Delay from valid video data from Source to video on display	0		50	ms	
t8	Delay from valid video data from Source to backlight on	-		-	ms	
t9	Delay from backlight off to end of valid video data	-		-	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		-	ms	
t18	VBL power rail fall time, 90% to 10%	0		-	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

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5. Optical characteristics

Ta=25°C

	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing angle range	Left/Right	CR> 10	-	89	-	Deg.	(1), (3), (4), (6)
	Upper/Low		-	89	-		
	Left/Right	CR> 100	-	80	-	Deg.	
	Upper/Low		-	80	-	Deg.	
Contrast ratio	CR	$\theta=0$ deg.	1000	1500	-	-	(2), (4), (6)
Response time	GTG		-	15	-	ms	(5)
	Tr+Tf		-	20	25	ms	
Chromaticity of white	x		Typ. -0.025	0.3127	Typ. +0.025	-	(2), (6) Normal operation
	y			0.329		-	
Chromaticity of red	x			0.640		-	
	y			0.330		-	
Chromaticity of green	x			0.300		-	
	y			0.600		-	
Chromaticity of blue	x			0.150		-	
	y			0.060		-	
CCT	K		5500	-	7000		
Gamut	%		95%	100%		sRGB	
Luminance of White	Y_{Li}	-	340	400	480	cd/m ²	(7)
Half brightness viewing	--	-	-	25/25	-	[deg]	(3)
Half brightness viewing	-	-	-	25/25	-	[deg]	(3)
gamma	-	-	-	2.2	-	-	-
ΔE_{00} ave		-	-	-	1	-	-
Surface hardness	[H]	-	-	3	-	H	-
White uniformity 5pt	δW	$\theta=0$ deg.	80	-	-	%	(8)
White uniformity 13pt	δW	$\theta=0$ deg.	60	-	-	%	(2), (8)
Low blue light ratio	%	(415nm~455nm)/ (400nm~500nm)	-	-	50	%	-
Reflection ratio	%	-	-	-	6.5	%	-

※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.

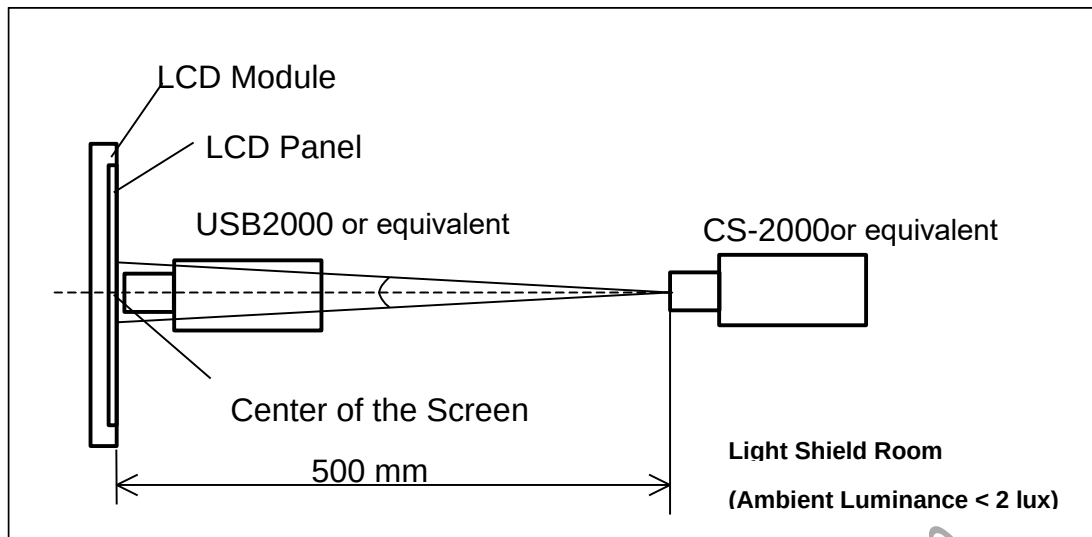
Note (1) Measurement of viewing angle range

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

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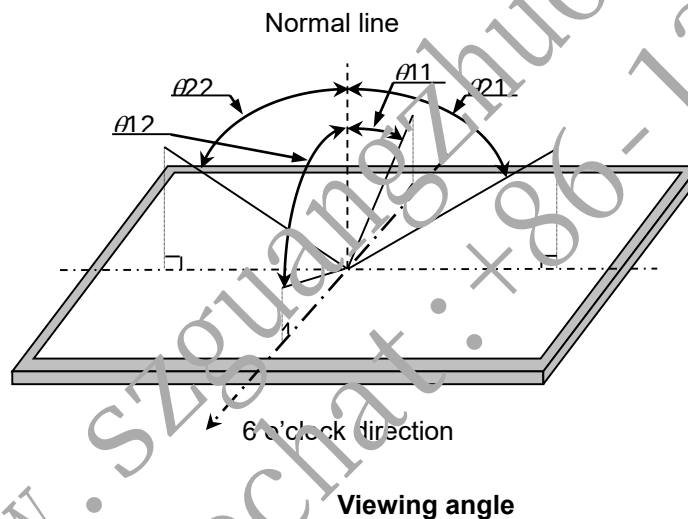
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Measurement of Contrast, Luminance, Chromaticity, White variation, Crosstalk and Color temperature variation

Note (3) Definitions of viewing angle range:



Note (4) Definition of contrast ratio:

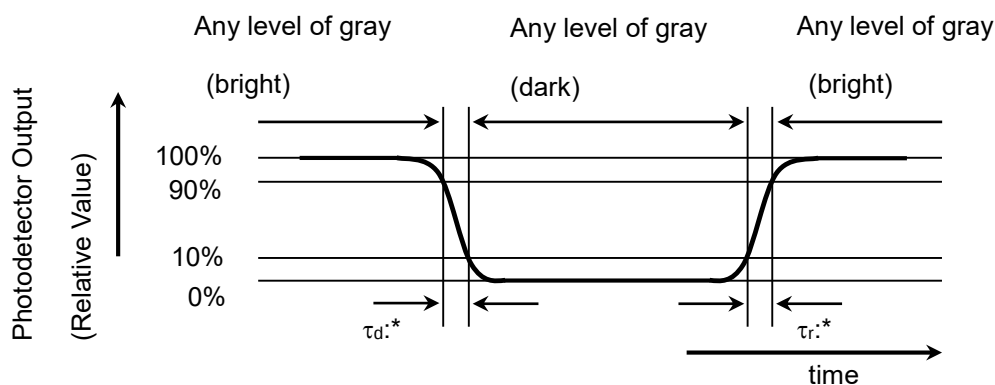
The contrast ratio is defined as the following.

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

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		Start Gray								
		0	31	63	95	127	159	191	223	255
End Gray	0									
	31									
	63									
	95									
	127									
	159									
	191									
	223									
	255									

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" ,

$$GTG_{ave} = \frac{t_{0-31} + t_{31-0} + t_{0-63} + t_{63-0} + \dots + t_{223-255} + t_{255-223}}{8 * 9}$$

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.

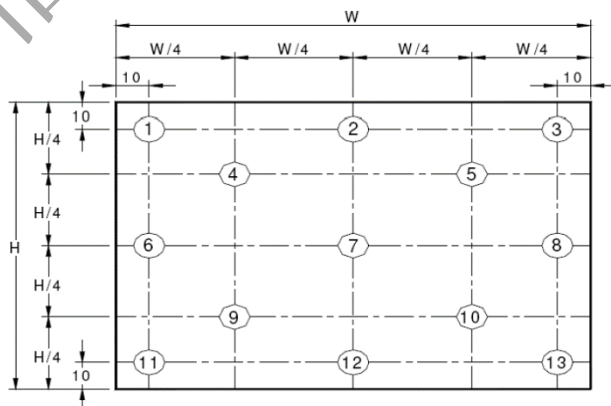


Fig.9-5

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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).

$$\delta_{w2} = \frac{\text{Maximum Luminance of 13 Points(Brightness)}}{\text{Minimum Luminance of 13 Points(Brightness)}}$$

6. Reliability Test Items

No.	Test Item	Conditions
1	High temperature storage test	60°C, 240h
2	Low temperature storage test	-20°C, 240h
3	Low temperature operation test	0°C, 500h
4	High temperature & high humidity operation test	50°C, 80%RH, 1000hrs±48hrs
5	Thermal shock test	-20°C/30min, 60°C/30min, 100cycles
6	TC	-20±2°C/15minutes±5%, 60±2°C/18minutes±5% 40cycles
7	Altitude test (Alt)	33.3±5% KPa (altitude 5000m), 24±2 hours
8	ON/OFF Test (On Off)	Room temperature (25±3°C), 500 hours (30sec. On / 30sec. Off, 30,000 cycles);
9	Life Test (Life)	Room temperature (25±3°C), 2000hrs±72hrs;
10	ESD	150pF[330Ω],Contact:±8KV,Air:±15KV
11	Vibration	1.5G, 10-200Hz, For x, y, z axis, 30min for each axis
12	Shock	(1) 50G 18msec. trapezoidal (2) 210G 3msec. half-sine 1 for each ± x, y, z direction, total 6 times for (1),(2) Power off

7. Display Quality

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

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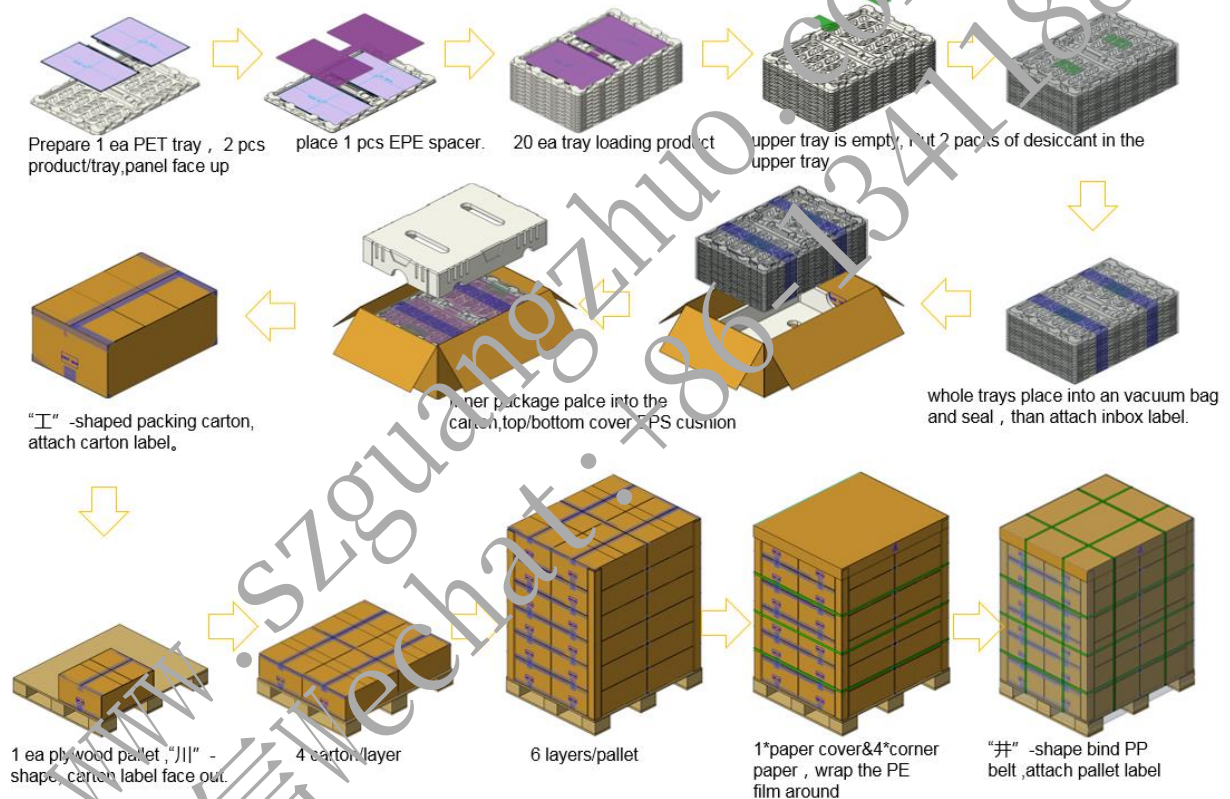
Any unauthorized use is prohibited.

8. Packaging Condition

8.1 Packing Specifications

Item	Specification	Remark
Carton(Box) Packing	40 PCS/Carton(Box)	20+1
Carton(Box) Packing Size	560mm(L)x460mm(W)x220mm(H)	Length x Width x Height
Pallet Packing	24 Carton(Box)/Pallet	4*6
Pallet Packing Size	1140mm(L)x945mm(W)x1450mm(H)	Length x Width x Height

8.2 Packing Method

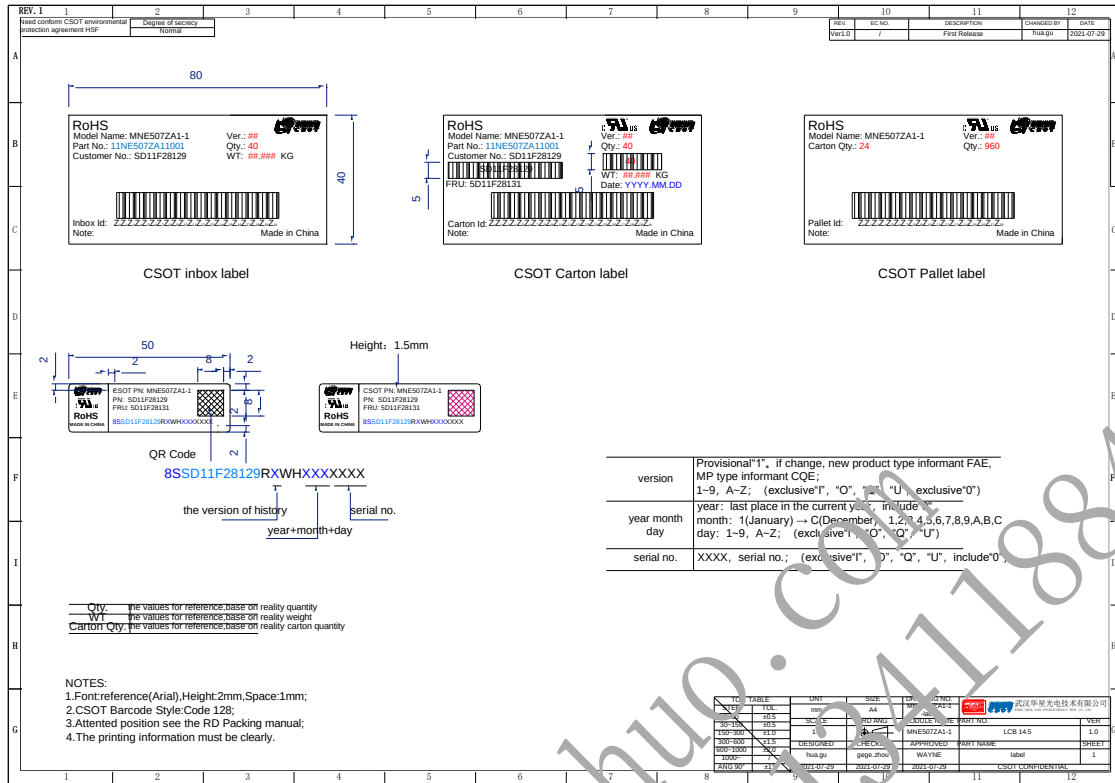


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8.3 Label



9. RoHS Directive

This LCD Module is compliant with RoHS Directive.

10. Handling Precautions

- 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.
- Be sure to design the cabinet so that the Module can be installed without any extra stress such as warp or twist.
- Since the front polarizer is easily damaged, pay attention not to scratch it.
- Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
- 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.
- This Open-cell has its circuitry PCBs on the side and should be handled carefully in order not to be stressed.

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- 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. (Peeling of 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 Cl₂ 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.

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Appendix. EDID Data Structure

Address	Address	Function	Value	Value	Value
(DEC)	(HEX)		Hex	DEC	BIN
0	0	Header	00	0	00000000
1	1		FF	255	11111111
2	2		FF	255	11111111
3	3		FF	255	11111111
4	4		FF	255	11111111
5	5		FF	255	11111111
6	6		FF	255	11111111
7	7		00	0	00000000
8	8	ID Manufacturer Name	0E	14	00001110
9	9		6F	111	01101111
10	0A	ID Product Code	10	16	00010000
11	0B		14	20	00010100
12	0C	32-bit serial No.	00	0	00000000
13	0D		00	0	00000000
14	0E		00	0	00000000
15	0F		00	0	00000000
16	10	Week of manufacture	00	0	00000000
17	11	Year of Manufacture	1F	31	00011111
18	12	EDID Structure Ver.	01	1	00000001
19	13	EDID revision #	04	4	00000100
20	14	Video input definition	B5	181	10110101
21	15	Max H image size	1F	31	00011111
22	16	Max V image size	14	20	00010100
23	17	Display Gamma	78	120	01111000
24	18	Feature support	03	3	00000011
25	19	Red/Green low bits	35	53	00110101
26	1A	Blue/White low bits	45	69	01000101
27	1B	Red x high bits	A9	169	10101001
28	1C	Red y high bits	53	83	01010011
29	1D	Green x high bits	4B	75	01001011
30	1E	Green y high bits	9E	158	10011110
31	1F	Blue x high bits	24	36	00100100
32	20	Blue y high bits	0D	13	00001101
33	21	White x high bits	50	80	01010000
34	22	White y high bits	54	84	01010100

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35	23	Established timing 1	00	0	00000000
36	24	Established timing 2	00	0	00000000
37	25	Established timing 3	00	0	00000000
38	26	Standard timing #1	01	1	00000001
39	27		01	1	00000001
40	28	Standard timing #2	01	1	00000001
41	29		01	1	00000001
42	2A	Standard timing #3	01	1	00000001
43	2B		01	1	00000001
44	2C	Standard timing #4	01	1	00000001
45	2D		01	1	00000001
46	2E	Standard timing #5	01	1	00000001
47	2F		01	1	00000001
48	30	Standard timing #6	01	1	00000001
49	31		01	1	00000001
50	32	Standard timing #7	01	1	00000001
51	33		01	1	00000001
52	34	Standard timing #8	01	1	00000001
53	35		01	1	00000001
54	36	Detailed timing/monitor descriptor #1	80	128	10000000
55	37		97	151	10010111
56	38		00	0	00000000
57	39		A0	160	10100000
58	3A		C0	192	11000000
59	3B		80	128	10000000
60	3C		50	80	01010000
61	3D		70	112	01110000
62	3E		30	48	00110000
63	3F		20	32	00100000
64	40		36	54	00110110
65	41		00	0	00000000
66	42		38	56	00111000
67	43		C3	195	11000011
68	44		10	16	00010000
69	45		00	0	00000000
70	46		00	0	00000000
71	47		18	24	00011000
72	48	Detailed timing/monitor descriptor #2	00	0	00000000

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73	49		00	0	00000000
74	4A		00	0	00000000
75	4B		FD	253	11111101
76	4C		00	0	00000000
77	4D		1E	30	00011110
78	4E		78	120	01111000
79	4F		F0	240	11110000
80	50		F0	240	11110000
81	51		4E	78	01001110
82	52		01	1	00000001
83	53		0A	10	00001010
84	54		20	32	00100000
85	55		20	32	00100000
86	56		20	32	00100000
87	57		20	32	00100000
88	58		20	32	00100000
89	59		20	32	00100000
90	5A	Detailed timing/monitor descriptor #3	00	0	00000000
91	5B		00	0	00000000
92	5C		00	0	00000000
93	5D		FE	254	11111110
94	5E		00	0	00000000
95	5F		43	67	01000011
96	60		53	83	01010011
97	61		4F	79	01001111
98	62		54	84	01010100
99	63		20	32	00100000
100	64		54	84	01010100
101	65		33	51	00110011
102	66		0A	10	00001010
103	67		20	32	00100000
104	68		20	32	00100000
105	69		20	32	00100000
106	6A		20	32	00100000
107	6B		20	32	00100000
108	6C	Detailed timing/monitor descriptor #4	00	0	00000000
109	6D		00	0	00000000
110	6E		00	0	00000000

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111	6F		FE	254	11111110
112	70		00	0	00000000
113	71		4D	77	01001101
114	72		4E	78	01001110
115	73		45	69	01000101
116	74		35	53	00110101
117	75		30	48	00110000
118	76		37	55	00110111
119	77		5A	90	01011010
120	78		41	65	01000001
121	79		31	49	00110001
122	7A		2D	45	00101101
123	7B		31	49	00110001
124	7C		0A	10	00001010
125	7D		20	32	00100000
126	7E	Extension flag	02	2	00000010
127	7F	Checksum	56	86	01010110
128	80	Tag	02	2	00000010
129	81	Revision Number	03	3	00000011
130	82	Length of Info Frame	0F	15	00001111
131	83	Global Declarations	00	0	00000000
132	84	HDR static metadata Tag Code [7:5], Length of data [4:0]	E6	230	11100110
133	85	Extended Tag Code(0x06)	06	6	00000110
134	86	Supported Electro-Optical Transfer Function	01	1	00000001
135	87	SM_0 =1: Static Metadata Type 1	01	1	00000001
136	88	Desired Content Max Luminance data	60	96	01100000
137	89	Desired Content Max Frame-average Luminance data	60	96	01100000
138	8A	Desired Content Min Luminance data	28	40	00101000
139	8B	Reserve	00	0	00000000
140	8C	Reserve	00	0	00000000
141	8D	Reserve	00	0	00000000
142	8E	Reserve	00	0	00000000
143	8F	Reserve	00	0	00000000
144	90	Reserve	00	0	00000000
145	91	Reserve	00	0	00000000
146	92	Reserve	00	0	00000000

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147	93	Reserve	00	0	00000000
148	94	Reserve	00	0	00000000
149	95	Reserve	00	0	00000000
150	96	Reserve	00	0	00000000
151	97	Reserve	00	0	00000000
152	98	Reserve	00	0	00000000
153	99	Reserve	00	0	00000000
154	9A	Reserve	00	0	00000000
155	9B	Reserve	00	0	00000000
156	9C	Reserve	00	0	00000000
157	9D	Reserve	00	0	00000000
158	9E	Reserve	00	0	00000000
159	9F	Reserve	00	0	00000000
160	A0	Reserve	00	0	00000000
161	A1	Reserve	00	0	00000000
162	A2	Reserve	00	0	00000000
163	A3	Reserve	00	0	00000000
164	A4	Reserve	00	0	00000000
165	A5	Reserve	00	0	00000000
166	A6	Reserve	00	0	00000000
167	A7	Reserve	00	0	00000000
168	A8	Reserve	00	0	00000000
169	A9	Reserve	00	0	00000000
170	AA	Reserve	00	0	00000000
171	AB	Reserve	00	0	00000000
172	AC	Reserve	00	0	00000000
173	AD	Reserve	00	0	00000000
174	AE	Reserve	00	0	00000000
175	AF	Reserve	00	0	00000000
176	B0	Reserve	00	0	00000000
177	B1	Reserve	00	0	00000000
178	B2	Reserve	00	0	00000000
179	B3	Reserve	00	0	00000000
180	B4	Reserve	00	0	00000000
181	B5	Reserve	00	0	00000000
182	B6	Reserve	00	0	00000000
183	B7	Reserve	00	0	00000000
184	B8	Reserve	00	0	00000000

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185	B9	Reserve	00	0	00000000
186	BA	Reserve	00	0	00000000
187	BB	Reserve	00	0	00000000
188	BC	Reserve	00	0	00000000
189	BD	Reserve	00	0	00000000
190	BE	Reserve	00	0	00000000
191	BF	Reserve	00	0	00000000
192	C0	Reserve	00	0	00000000
193	C1	Reserve	00	0	00000000
194	C2	Reserve	00	0	00000000
195	C3	Reserve	00	0	00000000
196	C4	Reserve	00	0	00000000
197	C5	Reserve	00	0	00000000
198	C6	Reserve	00	0	00000000
199	C7	Reserve	00	0	00000000
200	C8	Reserve	00	0	00000000
201	C9	Reserve	00	0	00000000
202	CA	Reserve	00	0	00000000
203	CB	Reserve	00	0	00000000
204	CC	Reserve	00	0	00000000
205	CD	Reserve	00	0	00000000
206	CE	Reserve	00	0	00000000
207	CF	Reserve	00	0	00000000
208	D0	Reserve	00	0	00000000
209	D1	Reserve	00	0	00000000
210	D2	Reserve	00	0	00000000
211	D3	Reserve	00	0	00000000
212	D4	Reserve	00	0	00000000
213	D5	Reserve	00	0	00000000
214	D6	Reserve	00	0	00000000
215	D7	Reserve	00	0	00000000
216	D8	Reserve	00	0	00000000
217	D9	Reserve	00	0	00000000
218	DA	Reserve	00	0	00000000
219	DB	Reserve	00	0	00000000
220	DC	Reserve	00	0	00000000
221	DD	Reserve	00	0	00000000
222	DE	Reserve	00	0	00000000

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223	DF	Reserve	00	0	00000000
224	E0	Reserve	00	0	00000000
225	E1	Reserve	00	0	00000000
226	E2	Reserve	00	0	00000000
227	E3	Reserve	00	0	00000000
228	E4	Reserve	00	0	00000000
229	E5	Reserve	00	0	00000000
230	E6	Reserve	00	0	00000000
231	E7	Reserve	00	0	00000000
232	E8	Reserve	00	0	00000000
233	E9	Reserve	00	0	00000000
234	EA	Reserve	00	0	00000000
235	EB	Reserve	00	0	00000000
236	EC	Reserve	00	0	00000000
237	ED	Reserve	00	0	00000000
238	EE	Reserve	00	0	00000000
239	EF	Reserve	00	0	00000000
240	F0	Reserve	00	0	00000000
241	F1	Reserve	00	0	00000000
242	F2	Reserve	00	0	00000000
243	F3	Reserve	00	0	00000000
244	F4	Reserve	00	0	00000000
245	F5	Reserve	00	0	00000000
246	F6	Reserve	00	0	00000000
247	F7	Reserve	00	0	00000000
248	F8	Reserve	00	0	00000000
249	F9	Reserve	00	0	00000000
250	FA	Reserve	00	0	00000000
251	FB	Reserve	00	0	00000000
252	FC	Reserve	00	0	00000000
253	FD	Reserve	00	0	00000000
254	FE	Checksum(81~FD)	18	24	00011000
255	FF	Checksum(80~FE)	FE	254	11111110
256	100	EDID Extension Block Tag	70	112	01110000
257	101	Display ID version	13	19	00010011
258	102	section size	79	121	01111001
259	103	product Type identifier	00	0	00000000
260	104	extension count	00	0	00000000

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261	105	block tag	03	3	00000011
262	106	block rev	01	1	00000001
263	107	Payload	14	20	00010100
264	108	pixel clock	00	0	00000000
265	109		2F	47	00101111
266	10A		01	1	00000001
267	10B	timing options	05	5	00000101
268	10C	H-Active	FF	255	11111111
269	10D		0B	11	00001011
270	10E	H-Blanking	9F	159	10011111
271	10F		00	0	00000000
272	110	H-offset	2F	47	00101111
273	111		00	0	00000000
274	112	H-sync pulse width	1F	31	00011111
275	113		00	0	00000000
276	114	V-Active	7F	127	01111111
277	115		07	7	00000111
278	116	V-Blanking	4F	79	01001111
279	117		00	0	00000000
280	118	V-offset	02	2	00000010
281	119		00	0	00000000
282	11A	V-sync pulse width	05	5	00000101
283	11B		00	0	00000000
284	11C	Reserve	00	0	00000000
285	11D	Reserve	00	0	00000000
286	11E	Reserve	00	0	00000000
287	11F	Reserve	00	0	00000000
288	120	Reserve	00	0	00000000
289	121	Reserve	00	0	00000000
290	122	Reserve	00	0	00000000
291	123	Reserve	00	0	00000000
292	124	Reserve	00	0	00000000
293	125	Reserve	00	0	00000000
294	126	Reserve	00	0	00000000
295	127	Reserve	00	0	00000000
296	128	Reserve	00	0	00000000
297	129	Reserve	00	0	00000000
298	12A	Reserve	00	0	00000000

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299	12B	Reserve	00	0	00000000
300	12C	Reserve	00	0	00000000
301	12D	Reserve	00	0	00000000
302	12E	Reserve	00	0	00000000
303	12F	Reserve	00	0	00000000
304	130	Reserve	00	0	00000000
305	131	Reserve	00	0	00000000
306	132	Reserve	00	0	00000000
307	133	Reserve	00	0	00000000
308	134	Reserve	00	0	00000000
309	135	Reserve	00	0	00000000
310	136	Reserve	00	0	00000000
311	137	Reserve	00	0	00000000
312	138	Reserve	00	0	00000000
313	139	Reserve	00	0	00000000
314	13A	Reserve	00	0	00000000
315	13B	Reserve	00	0	00000000
316	13C	Reserve	00	0	00000000
317	13D	Reserve	00	0	00000000
318	13E	Reserve	00	0	00000000
319	13F	Reserve	00	0	00000000
320	140	Reserve	00	0	00000000
321	141	Reserve	00	0	00000000
322	142	Reserve	00	0	00000000
323	143	Reserve	00	0	00000000
324	144	Reserve	00	0	00000000
325	145	Reserve	00	0	00000000
326	146	Reserve	00	0	00000000
327	147	Reserve	00	0	00000000
328	148	Reserve	00	0	00000000
329	149	Reserve	00	0	00000000
330	14A	Reserve	00	0	00000000
331	14B	Reserve	00	0	00000000
332	14C	Reserve	00	0	00000000
333	14D	Reserve	00	0	00000000
334	14E	Reserve	00	0	00000000
335	14F	Reserve	00	0	00000000
336	150	Reserve	00	0	00000000

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337	151	Reserve	00	0	00000000
338	152	Reserve	00	0	00000000
339	153	Reserve	00	0	00000000
340	154	Reserve	00	0	00000000
341	155	Reserve	00	0	00000000
342	156	Reserve	00	0	00000000
343	157	Reserve	00	0	00000000
344	158	Reserve	00	0	00000000
345	159	Reserve	00	0	00000000
346	15A	Reserve	00	0	00000000
347	15B	Reserve	00	0	00000000
348	15C	Reserve	00	0	00000000
349	15D	Reserve	00	0	00000000
350	15E	Reserve	00	0	00000000
351	15F	Reserve	00	0	00000000
352	160	Reserve	00	0	00000000
353	161	Reserve	00	0	00000000
354	162	Reserve	00	0	00000000
355	163	Reserve	00	0	00000000
356	164	Reserve	00	0	00000000
357	165	Reserve	00	0	00000000
358	166	Reserve	00	0	00000000
359	167	Reserve	00	0	00000000
360	168	Reserve	00	0	00000000
361	169	Reserve	00	0	00000000
362	16A	Reserve	00	0	00000000
363	16B	Reserve	00	0	00000000
364	16C	Reserve	00	0	00000000
365	16D	Reserve	00	0	00000000
366	16E	Reserve	00	0	00000000
367	16F	Reserve	00	0	00000000
368	170	Reserve	00	0	00000000
369	171	Reserve	00	0	00000000
370	172	Reserve	00	0	00000000
371	173	Reserve	00	0	00000000
372	174	Reserve	00	0	00000000
373	175	Reserve	00	0	00000000
374	176	Reserve	00	0	00000000

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375	177	Reserve	00	0	00000000
376	178	Reserve	00	0	00000000
377	179	Reserve	00	0	00000000
378	17A	Reserve	00	0	00000000
379	17B	Reserve	00	0	00000000
380	17C	Reserve	00	0	00000000
381	17D	Reserve	00	0	00000000
382	17E	Reserve	54	84	01010100
383	17F	Checksum(80~FE)	90	144	10010000

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