LCD MODULE

SPECIFICATION

Model:	UE101WX-AB40-A024A
Version:	V1.0
Date:	20190718

☐ **Preliminary Specification** 样品规格书

☑ **Final Specification** 量产规格书

Customer Confirmation 客户确认

Approved by	Notes

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VIEWE Confirmation 优奕确认

Prepared by	Reviewed by	Approved by

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REVISION HISTORY

Revision 版本号	Date 日期	Contents of Revision Change 修改内容	Remark 备注
V1.0	2019.07.18	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

1) Pixel Arrangement：RGB Vertical Stripe
2) Interface Mode： LVDS
3) Driver IC：HX8245
4) Operation Temperature：-20~70℃
5) Storage Temperature：-30~80℃
6) Backlight Type：White LED
7) Display mode：Normally Black,
8) Pixel Density：142 PPI
9) LED life time：30,000 Hours

1.2 Mechanical Specification

Item 项目	Specification 规格	Unit 单位	Remark 备注
Pixel Driving element	IPS TFT	-	-
Screen Size	10.1	Inch	Diagonal
Resolution	1280(W)*3(RGB)*800(H)	Dots	40PIN
Interface	LVDS	-	8Bit
Module Power Consumption	LCD：1.98W(TYP.) BLU： 2.7W(TYP)/9.55W(MAX)	Watt	Typ.
Active Area	217.58(W)*136.36(H)	mm	-
Pixel pitch (W*H)	0.1695(W)*0.1695(H)	mm	-
Module Size (W*H*D)	228.3(W)*149.05(H)*4.6(D)	mm	-
Luminance	450	cd/m^2	Typ.
Viewing Direction	All	O'clock	-
Display Color	16.7M	Colors	(Real 8 bit)

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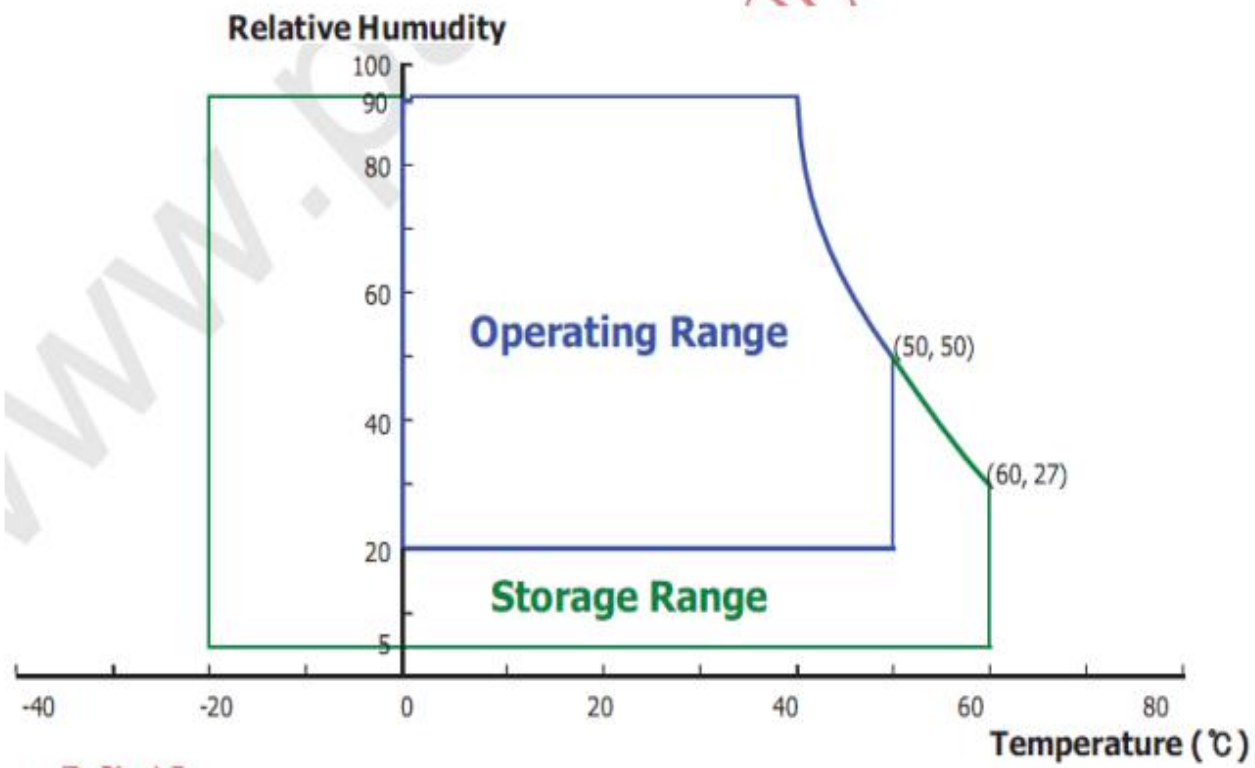
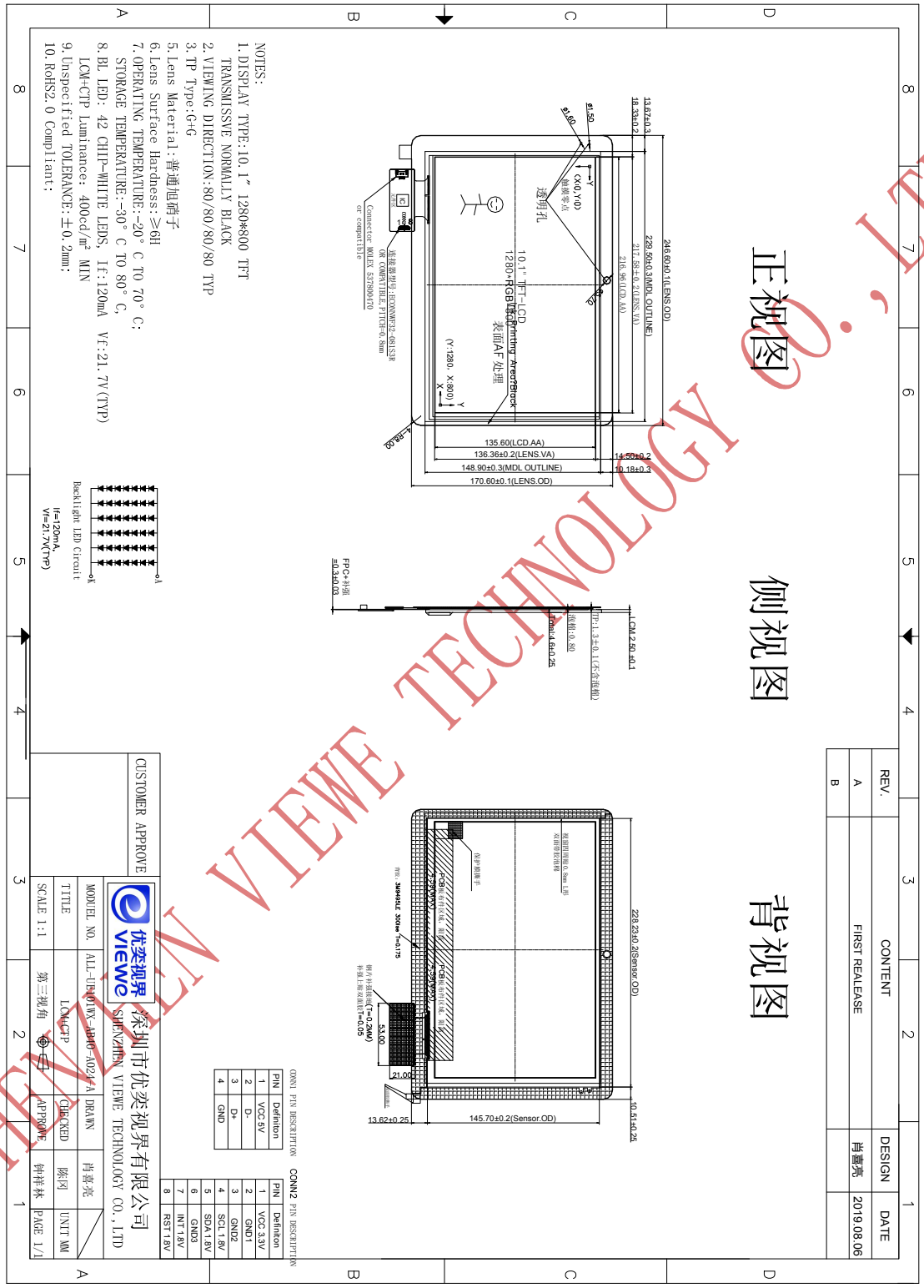
2. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage (LCD Module)	V_{DD}	-0.3	4.2	V	
Back-light Power Supply Voltage	HV_{DDOUT}	-0.3	18	V	
Back-light LED Current	I_{HVDD}	-	96	mA	
Back-light LED Reverse Voltage	V_R	-	2	V	
Operating Temperature	T_{OP}	0	+50	℃	1)
Storage Temperature	T_{ST}	-20	+60	℃	



3. MECHANICAL DRAWING



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4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

LCM	Symbol	I/O	Description
1	NC	-	NO Connection
2-3	VDD	P	Power supply VDDIN=3.3V(Typ)
4	VDD	P	Power supply VDC=3.3V(Typ)
5	NC	-	Power Ground
6	CLK EDID	I	CLK for EDID function use
7	Data EDID	IO	Data for EDID function use
8	Rin 0-	I	-LVDS differential data input
9	Rin 0+	I	+LVDS differential data input
10	GND	P	Power Ground
11	Rin 1-	I	-LVDS differential data input
12	Rin 1+	I	+LVDS differential data input
13	GND	P	Power Ground
14	Rin 2-	I	-LVDS differential data input
15	Rin 2+	I	+LVDS differential data input
16	GND	P	Power Ground
17	RxCLK-	I	-LVDS differential clock input
18	RxCLK+	I	+LVDS differential clock input
19	GND	P	Power Ground
20	Rin 3-	I	-LVDS differential clock input
21	Rin 3+	I	+LVDS differential clock input
22	CE-EN	I	Color engine enable
23-24	NC	-	No Connection
25	GND	P	Power Ground
26-27	NC	-	No Connection
28	GND	P	Power Ground
29-30	NC	-	No Connection
31-33	LED-GND	P	LED Ground
34	NC	-	No Connection
35	LED-PWM	I	LED driver PWM duty
36	LED-EN	I	LED driver enable
37	CABC_EN	I	CABC Enable Input
38-40	VLED	P	Power supply VLED=3~18V(Typ.)

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TP PIN	Symbol	I/O	Description
1	**TP-VCC3.3V**	P	TP_VDD(2.8V) Power Supply for TP
2-3	**GND**	P	Ground.
4	**SCL**	I	I2C clock signals for TP
5	**SDA**	I/O	I2C data signals for TP
6	**GND**	P	Ground.
7	**INT**	O	Interrupt signals for TP
8	**TP_RST**	I	The signal will reset the TP, Signal is active low
USB	Symbol	I/O	Description
1	**USB-VCC5V**	P	USB Power Supply 5V
2	**D-**	O	Differential input sensitivity
3	**D+**	I	Differential input sensitivity
4	**GND**	P	Ground.

I：Input；O：Output；P：Power

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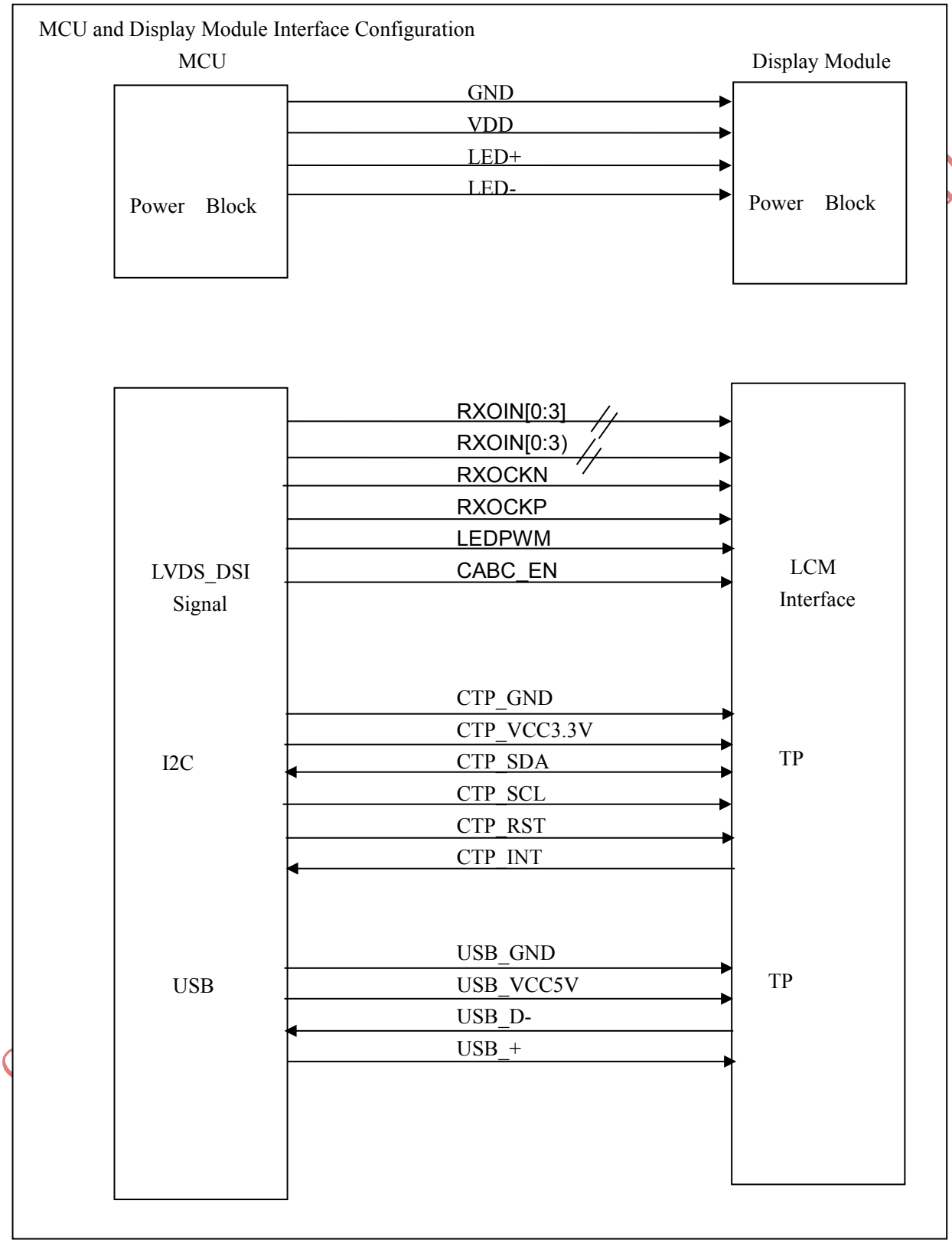
4.2 Block Diagra



5. ELECTRICAL CHARACTERISTICS

5.1 TFT-LCD Panel Driving Section

5.2 Light Driving Section

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Power Supply1 Voltage	VDD	2.8	3.3	3.6	V	-
Power Supply Current	I_{VDD}	-	30	-	mA	Note1
Logic Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	-
Logic Input Low Voltage	V_{IL}	0	-	0.3VDD	V	-
Panel Power Consumption	P_{VDD}	-	0.099	-	Watt	Note1
Module Power Consumption	P_{LCM}	-	1.1	-	Watt	Note1,2

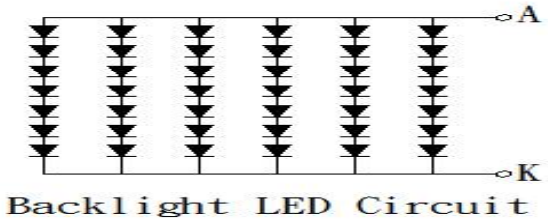
Note1:Measurement Conditions (Video Mode): Full Screen Red Pattern,IOVCC=2.8V,60Hz Refresh.

Note2: P_{LCM}= P_{VCC}+ P_{BL}， About P_{BL} information, inference to 5.2 Back Light Driving Section.

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V_F	-	21.7	-	V	Note1
Forward Current	I_F	-	120	-	mA	Note1
Backlight Power consumption	P_{BL}	-	2.6	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity			42		PCS	

Note1: The LED driving condition is defined for each LED module (8 LED Serial, 2 LED Parallel)。
For each LED ： I_F=20mA,V_F=3.2V(Typ.),Ta=25℃。

Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



Backlight LED Circuit

If=120mA,
Vf=21.7V(TYP)

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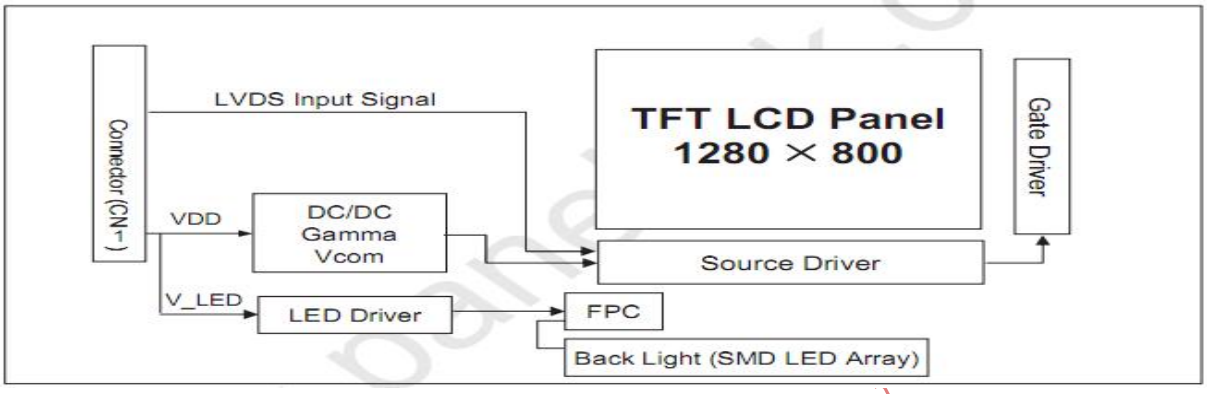
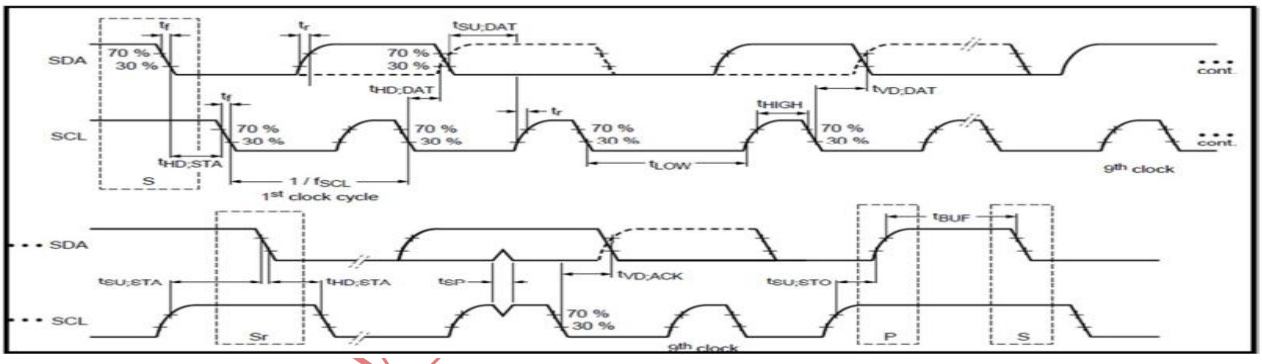
5.3 Power Sequence

5.3.1 Power On/Off Sequence



5.4 Timing Characteristics

5.40 I2C AC Characteristics



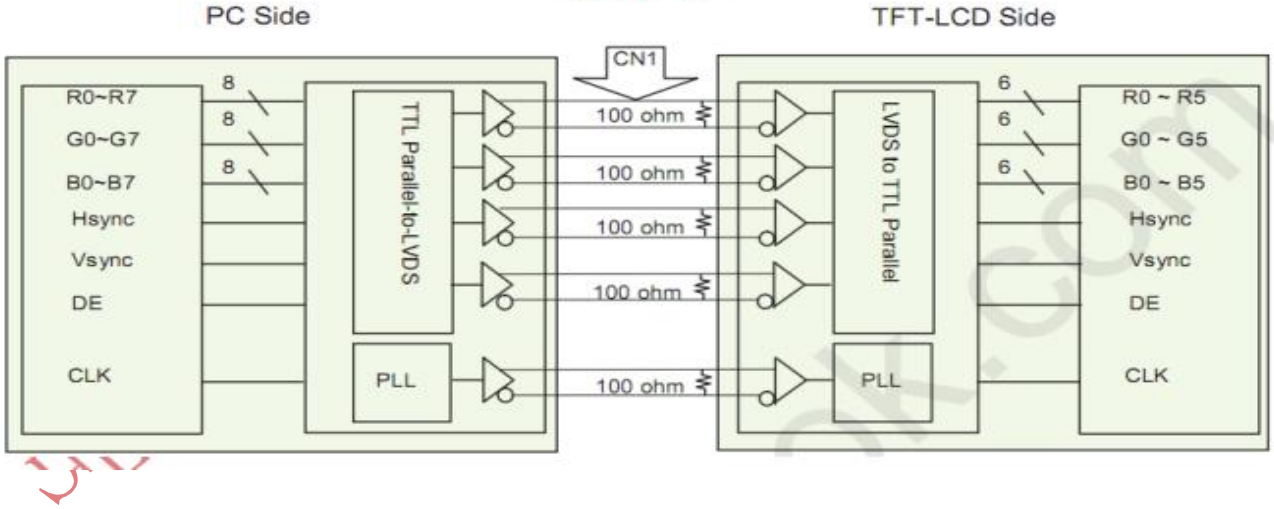
Parameter	Symbol	Standard-mode		Fast-mode		Unit
		Min	Max	Min	Max	
SCL clock frequency	f_{SCL}	0	100	0	400	kHz
Hold time START condition	$t_{HD;STA}$	4.0	-	0.6	-	us
LOW period of the SCL clock	t_{Low}	4.7	-	1.3	-	us
HIGH period of the SCL clock	t_{High}	4.0	-	0.6	-	us
Set-up time for a repeated START condition	$t_{SU;STA}$	4.7	-	0.6	-	us
Data hold time	$t_{HD;DAT}$	300	-	300	-	ns
Data set-up time	$t_{SU;DAT}$	250	-	100	-	ns
Rise time of both SDA and SCL signals (30% to 70%)	t_r	-	1000	20	300	ns
Fall time of both SDA and SCL signals (70% to 30%)	t_f	-	300	20	300	ns
Set-up time for STOP condition	$t_{SU;STO}$	4.0	-	0.6	-	us
Bus free time between a STOP and START condition	t_{BUF}	4.7	-	1.3	-	us
Capacitive load for each bus line	C_b	-	400	-	400	pF
Noise margin at the LOW level for each connected device	V_{nL}	$0.1V_{DD}$	-	$0.1V_{DD}$	-	V
Noise margin at the HIGH level for each connected device	V_{nH}	$0.2V_{DD}$	-	$0.2V_{DD}$	-	V

Table 5-5: USB DC Characteristics

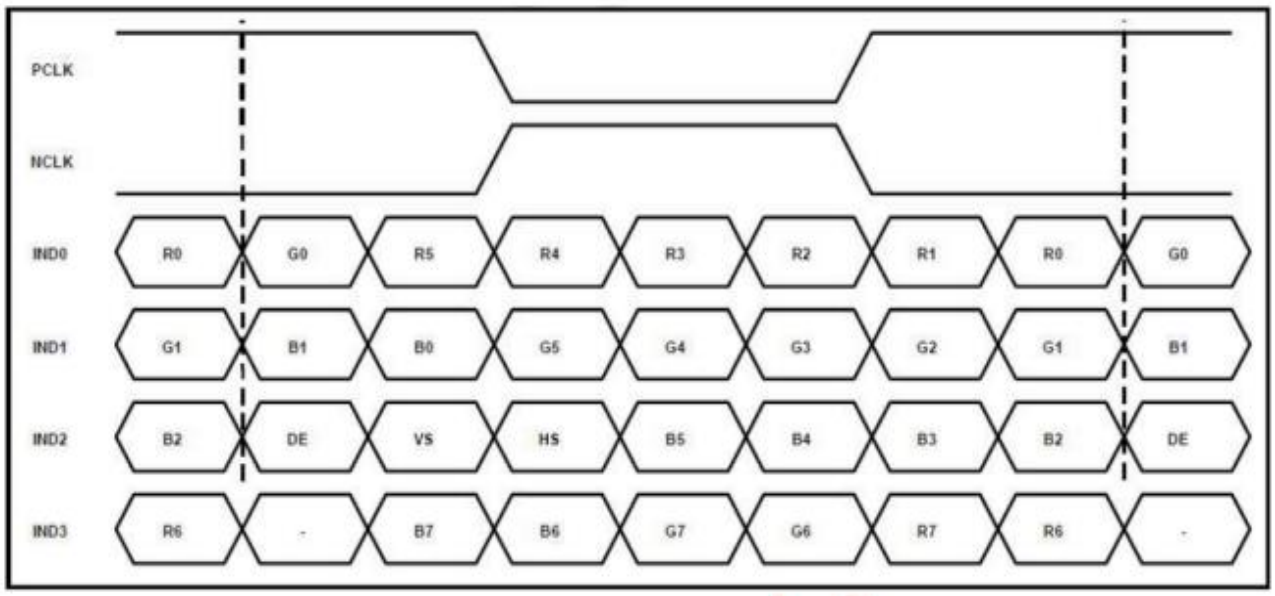
Item	Symbol	Min	Typ.	Max	Unit	Condition
Input Low	V_{IL}			0.8	V	
Input High (driven)	V_{IH}	2.0			V	
Differential input sensitivity	V_{DI}	0.2			V	(D+) – (D-)
Differential common-mode range	V_{CM}	0.8		2.5	V	Includes V_{DI} range
Single-ended receiver threshold	V_{SE}	0.8		2.0	V	
Receiver hysteresis	V_{RH}		200		mV	
Output low (driven)	V_{OL}	0		0.3	V	
Output high (driven)	V_{OH}	2.8		3.6	V	
Output signal cross voltage	V_{CRS}	1.3		2.0	V	
Pull-up resistor	R_{PU}	1.425		1.575	kΩ	
Pull-down resistor	R_{PD}	14.25		15.75	kΩ	
Termination Voltage for upstream port pull up (RPU)	V_{TRM}	3.0		3.6	V	

5.4.1 AC Characteristics

LVDS interface

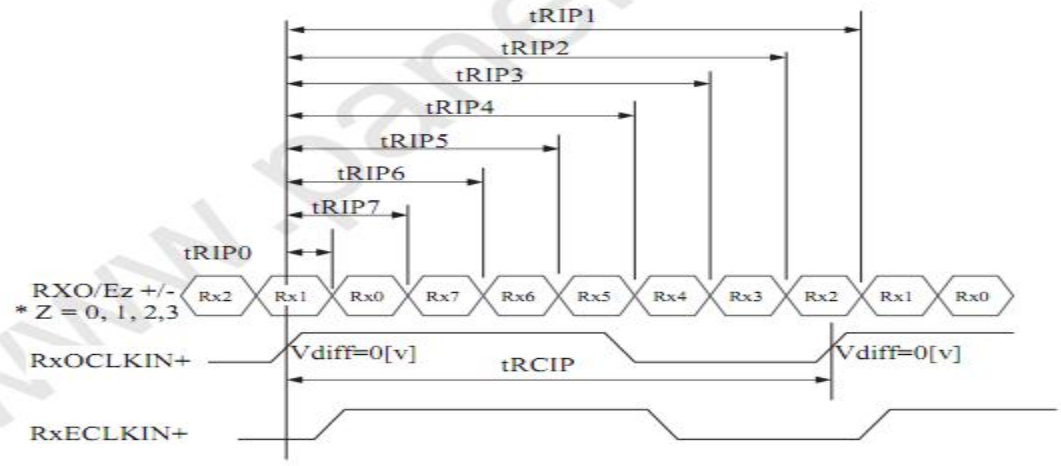


LVDS Input signal



LVDS Rx Interface Timing Parameter

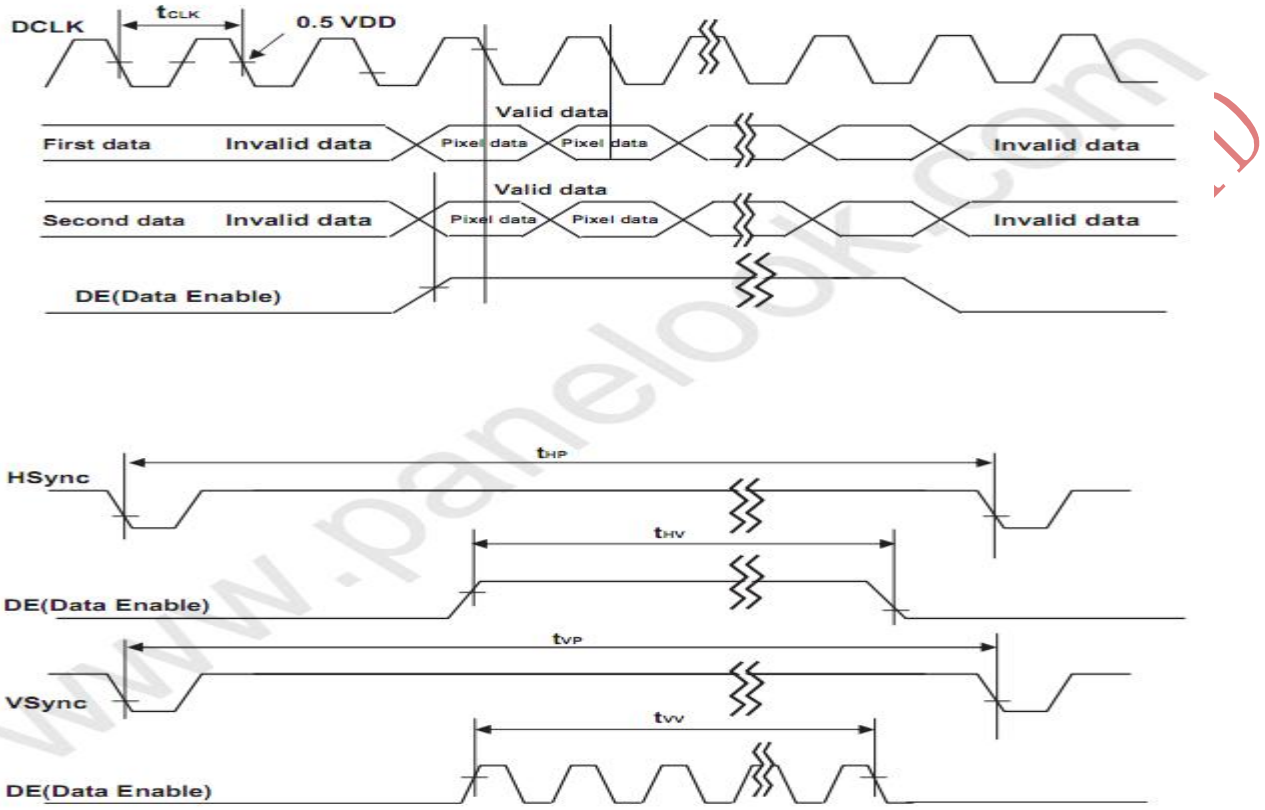
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	14.88	19.53	24.51	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRICP/7-0.4	tRICP/7	tRICP/7+0.4	nsec	
Input Data 2	tRIP7	2 ×tRICP/7-0.4	2 ×tRICP/7	2 ×tRICP/7+0.4	nsec	
Input Data 3	tRIP6	3 ×tRICP/7-0.4	3 ×tRICP/7	3 ×tRICP/7+0.4	nsec	
Input Data 4	tRIP5	4 ×tRICP/7-0.4	4 ×tRICP/7	4 ×tRICP/7+0.4	nsec	
Input Data 5	tRIP4	5 ×tRICP/7-0.4	5 ×tRICP/7	5 ×tRICP/7+0.4	nsec	
Input Data 6	tRIP3	6 ×tRICP/7-0.4	6 ×tRICP/7	6 ×tRICP/7+0.4	nsec	
Input Data 7	tRIP2	7 ×tRICP/7-0.4	7 ×tRICP/7	7 ×tRICP/7+0.4	nsec	



* Vdiff = (RXO/Ez+)-(RXO/Ez-),.... ,(RXO/ECLK+)-(RXO/ECLK-)

5.5 Timing Diagram

5.5.1 Horizontal /Vertical Timings



5.5.3 Timing Parameters

Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock	Frequency	1/Tc	60	65	80	MHz
	Cycle	Tc	16.66	15.38	12.5	ns
Data Enable	Horizontal Period	THd	1280	1280	1280	Tc
	Horizontal Cycle	TH	1310	1330	1560	TC
		TH_time	19.5	20.46	21.83	ns
	Vertical Period	TVd	800	800	800	TC
	Vertical Cycle	TV		812		TC

6. OPTICAL CHARACTERISTICS

Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	θ = 0°	600	800	-	-	Note(4)
NTSC Ratio	S	θ =0°	-	50	-	%	Note(7)
Luminance	L	θ =0°	425	400	-	cd/m2	Note(5)
Luminance uniformity	U_W	θ =0°	75	80	-	%	Note(3)
Response Time	T_R+ T_F	25 °C	-	25	35	ms	Note(2)
Color Coordination	W_X	θ = 0° (Center) Normal viewing angle B/L On	-0.03	0.313	+0.03	NTSC (x,y)	Note(6)
	W_Y			0.329			
	R_X			0.600			
	R_Y			0.340			
	G_X			0.315			
	G_y			0.565			
	B_X			0.150			
	B_Y			0.125			
Viewing Angle	θ L	C/R>10	-	80	-	Degree	Note(1)
	θ R		-	80	-		
	θ U		-	80	-		
	θ D		-	80	-		

Test Conditions:

1. VDD=3.3V, I_F=80mA (Backlight current), the ambient temperature is+25℃.
2. The test systems refer to Note 8.

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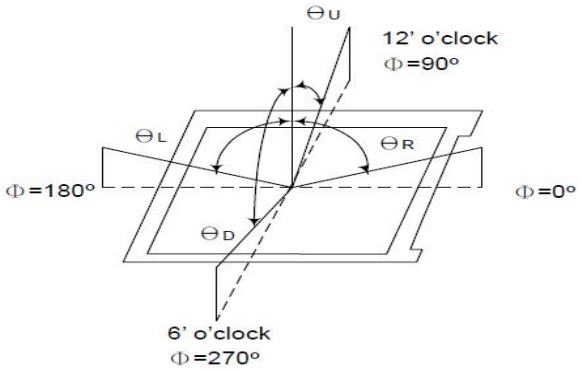
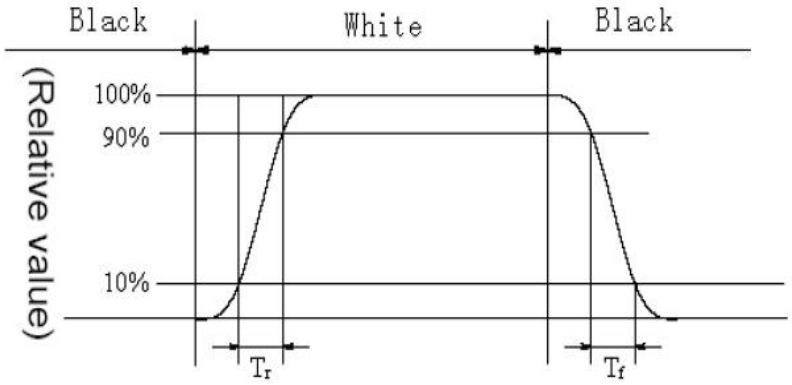
Note1: Definition of Viewing Angle: The viewing angle range that the CR>10

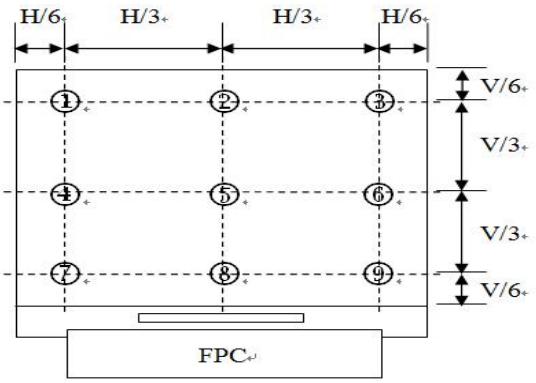


Note2: Definition of Response time: Sum of T_R and T_F



Note 3: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$



Note4: Definition of Contrast Ratio (CR): measured at the center point of panel

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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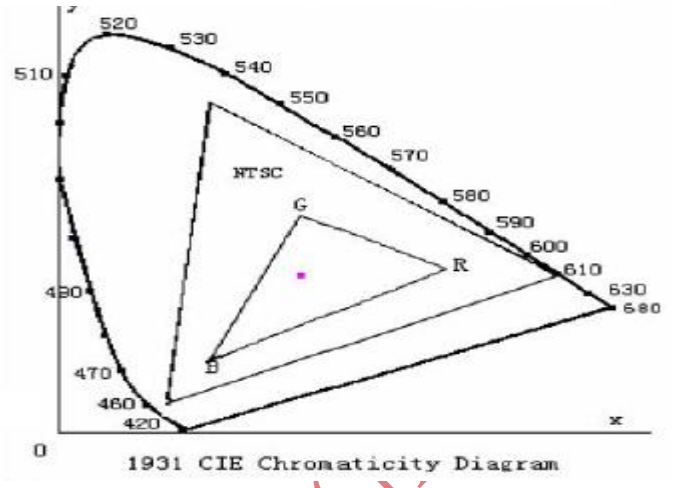
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

Color coordinates of white & red, green, blue measured at center point of LCD.

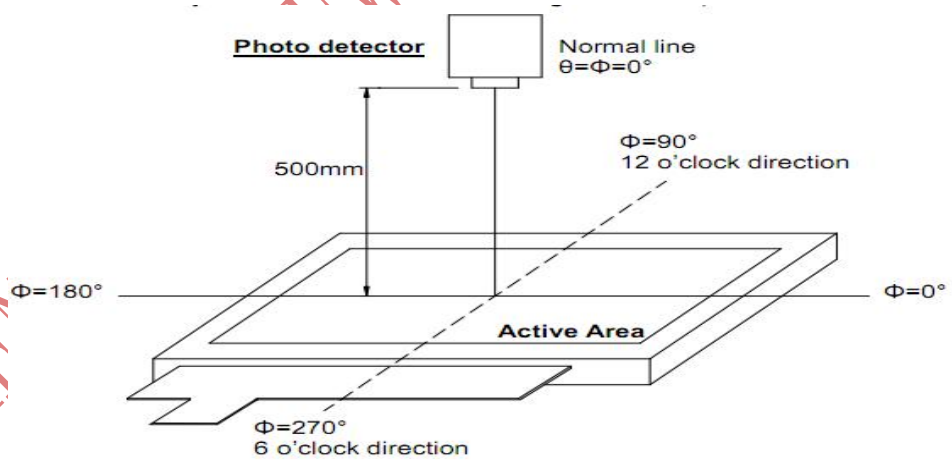
Note 7: Definition of NTSC ratio:

$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



Note 8: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.(Response time is measured by Photo detector TOPCON BM-7, Field of view: 1°/Height: 500mm.)



7. RELIABILITY

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage	Ta =+80°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta =+70°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-30°C/30min ⇆+80°C /30min for 30cycles,Transfer time less than 5min	Note2,3
Thermal humidity storage Test	60°C x 90%RH / 1000Hours	Note2,3
Package Vibration Test	10~500Hz 49m/s2 (5G)8h × 3(±X、±Y、±Z)，1.3mm	Note2

Inspection after Test:

Note1:Ta is the ambient temperature of samples.

Note 2: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note 3: Before cosmetic and function tests , the product must have enough recovery time, at least 2 hours at room temperature.

Note 4:Condition of Image Sticking test：25 ℃± 2 ℃

Operation with test pattern sustained for 2 hrs, then change to gray pattern immediately.

After 5 mins, the mura must be disappeared completely .

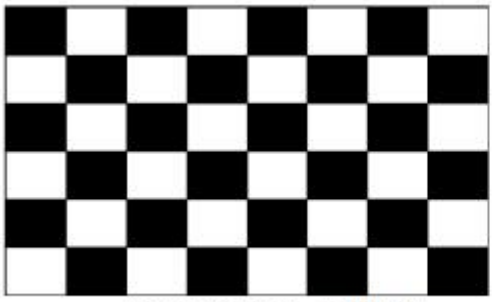


Image Sticking –pattern

Mid-Gray pattern

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8. PACKAGE DRAWING