MODEL NO : TM101DVHG01

MODEL VERSION: 00

SPEC VERSION : 1.2

ISSUED DATE: 2016-08-25

■**Preliminary Specification**
□**Final Product Specification**

Customer :

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Jinghao Jin	Longping Deng	Feng Qin

This technical specification is subjected to change without notice

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2016-05-09	Preliminary Specification Release	Jinghao Jin
1.1	2016-08-16	Update the max PWM frequency to 8KHZ	Jun Li
1.2	2016-08-25	Add Packing Drawing	Jinghao Jin

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1 General Specifications

Feature		Spec
Display Spec.	Size	10.1 inch
	Resolution	1024(RGB)×600
	Technology Type	a-si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.2175x0.2088
	Display Mode	TM, Normally White
	Surface Treatment	AG,HC(3H)
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	236.40 x 147.89 x 7.25
	Active Area(mm)	222.72 x 125.28
	With /Without TSP	With TSP
	Matching Connection Type	IPEX 20455-040E-76
	LED Numbers	20 LED
	Weight (g)	358
Electrical Characteristics	Interface	6/8 bit LVDS
	Color Depth	16.7M
	Driver IC	HX8282*1+HX8677*2
CTP	Interface	I2C
	Surface hardness	6H
	Structure	Glass Lens/Glass Sensor
	Touch Method	Bare finger or a conductive device being held
	Active Area (mm)	225.52 × 128.08
	Number of simultaneous touches	2 points multi-touch
	Minimum Touch Area(mm)	Φ6
	Finger Touch Pitch（mm）	TBD

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3: LCM weight tolerance: ± 5%

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2 Input/Output Terminals

2.1 TFT Pin Assignment

Recommended connector: IPEX 20453-040T-01 or compatible

Pin	Symbol	I/O	Description	Remark
1	NC	-	No connection(Reserve)	
2	VCCS	P	Power supply(3.3V typ)	
3	VCCS	P	Power supply(3.3V typ)	
4	VEDID	P	DDC 3.3V power	If EDID function is not used, please keep it floating.
5	NC	-	No connection(Reserved for TM test)	
6	CLKEDID	I	DDC clock	If EDID function is not used, please keep it floating.
7	DATAEDID	I	DDC data	
8	Rxin0-	I	LVDS differential data input	
9	Rxin0+	I		
10	VSS	P	Ground	
11	Rxin1-	I	LVDS differential data input	
12	Rxin1+	I		
13	VSS	P	Ground	
14	Rxin2-	I	LVDS differential data input	
15	Rxin2+	I		
16	VSS	P	Ground	
17	RxCLK-	I	LVDS differential clock input	
18	RxCLK+	I		
19	VSS	P	Ground	
20	Rxin3-	I	LVDS receiver signal channel 3. Pin 20&pin 21 connect to GND for 6bit LVDS input.	
21	Rxin3+	I		
22	VSS	P	Ground	
23	NC	-	No connection(Reserved for TM test)	
24	NC	-	No connection(Reserved for TM test)	
25	VSS	P	Ground	
26	NC	-	No connection(Reserved for TM test)	
27	SEL68	I	LVDS 6/8 bit selection control SEL68="H":8bit/SEL68="L" or NC:6bit	

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28	VSS	P	Ground	
29	SHLR	I	Left / Right shift control, SHLR =L : S1536→S1535→…→S2→S1 SHLR =H : S1→S2→…→S1535→ S1536(Default)	29
30	UPDN	I	Up / Down rotate control UPDN =L: G600→G599→…→G2→ G1(Default) UPDN =H: G1→G2→…→G599→G600	30
31	LED_GND	P	LED ground	
32	LED_GND	P	LED ground	
33	LED_GND	P	LED ground	
34	NC	-	No connection(Reserve)	
35	LED_PWM	I	PWM control signal of LED converter	
36	LED_EN	I	Enable control signal of LED converter	
37	NC	-	No connection(Reserve)	
38	LED_VCCS	P	LED power supply(12V typ)	
39	LED_VCCS	P	LED power supply(12V typ)	
40	LED_VCCS	P	LED power supply(12V typ)	

Note1: P: Power/GND; I: input pin; O: output
Note2: NC: Please Leave this pin Open.

2.2 CTP Pin Assignment

Matching connector FH34SRJ-6S-0.5SH

Pin No.	Symbol	I/O	Description	Remark
1	SCL	I	I2C clock input	
2	SDA	I/O	I2C serial data output/input	
3	INT	O	Interrupt to the host	
4	GND	P	Ground	
5	VCC	P	CTP power supply	
6	REST	I	Reset from the host	

Note1：I——Input, O——Output, P——Power/Ground

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3 Absolute Maximum Ratings

GND=0V

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VCCS	-0.5	3.96	V	
EDID drive Voltage	VEDID	-0.3	4.8	V	
Converter Input Voltage	LED_VCCS	-0.3	24	V	
Converter Control Signal Voltage	LED_PWM	-0.3	24	V	
Converter Control Signal Voltage	LED_EN	-0.3	24	V	
Operating Temperature	TOPR	-20	70	℃	
Storage Temperature	TSTG	-30	80	℃	
Relative Humidity Note1	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃＜Ta≤50℃
		--	≤55	%	50℃＜Ta≤60℃
		--	≤36	%	60℃＜Ta≤70℃
		--	≤24	%	70℃＜Ta≤80℃
Absolute Humidity	AH	--	≤70	g/m³	Ta＞70℃

Note1: Ta means the ambient temperature.
It is necessary to limit the relative humidity to the specified temperature range.
Condensation on the module is not allowed.

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4 Electrical Characteristics

4.1 Driving TFT LCD Panel

GND=0V, Ta=25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
Power Supply Voltage		VCCS	2.80	3.30	3.60	V	
Current of VCCS Power Supply		I_{VCCS}	-	20	-	mA	Note 1
Input Signal Voltage	Low Level	VIL	GND	-	0.3VCCS	V	
	High Level	VIH	0.7VCCS	-	VCCS	V	

Note1: To test the current dissipation, use “all Black Pattern”

4.2 Driving Backlight

Ta=25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
Power supply voltage		LED_VCC	3.3-	12V	24	V	
Power supply current		I_{LED}	-	400	-	mA	
Input voltage for PWM signal	High	VDFH1	2	-	LED_VCC	V	
	Low	VDFL1	0	-	0.8	V	
Input voltage for EN signal	High	VDFH2	2	-	LED_VCC	V	
	Low	VDFL2	0	-	0.8	V	
PWM frequency		fpwm	100	-	8K	Hz	
PWM duty cycle		Dim(Fpwm=100 ~10khz)	1	-	-	%	Dim setting must be always more than minimum
		Dim(Fpwm=10k hz~100khz)	10	-	-	%	
PWM pulse width		tPWH	5	-	-	us	
LED lifetime		--	-	30000	-	hrs	

Note1: Optical performance should be evaluated at Ta=25℃ only.

Note2: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4.3 DC Characteristics For CTP

Ta=25℃

Item	Min	Typ	Max	Unit	Note
power supply voltage	2.5	--	3.3	V	
IO voltage	1.65	--	3.3	V	
Power supply current		13		mA	Operating mode

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5 Timing Chart

5.1 Power sequence

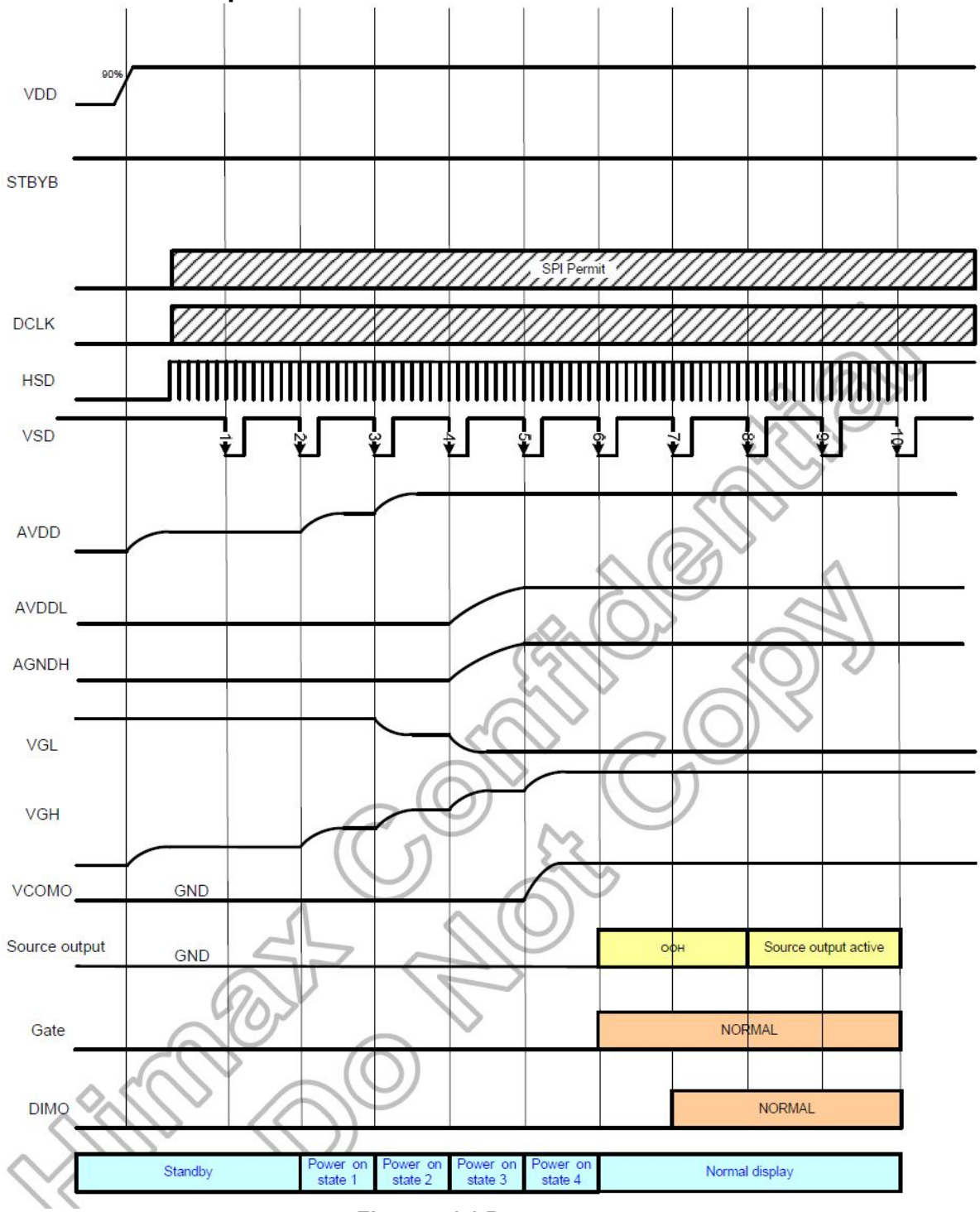


Figure 5.1.1 Power on sequence

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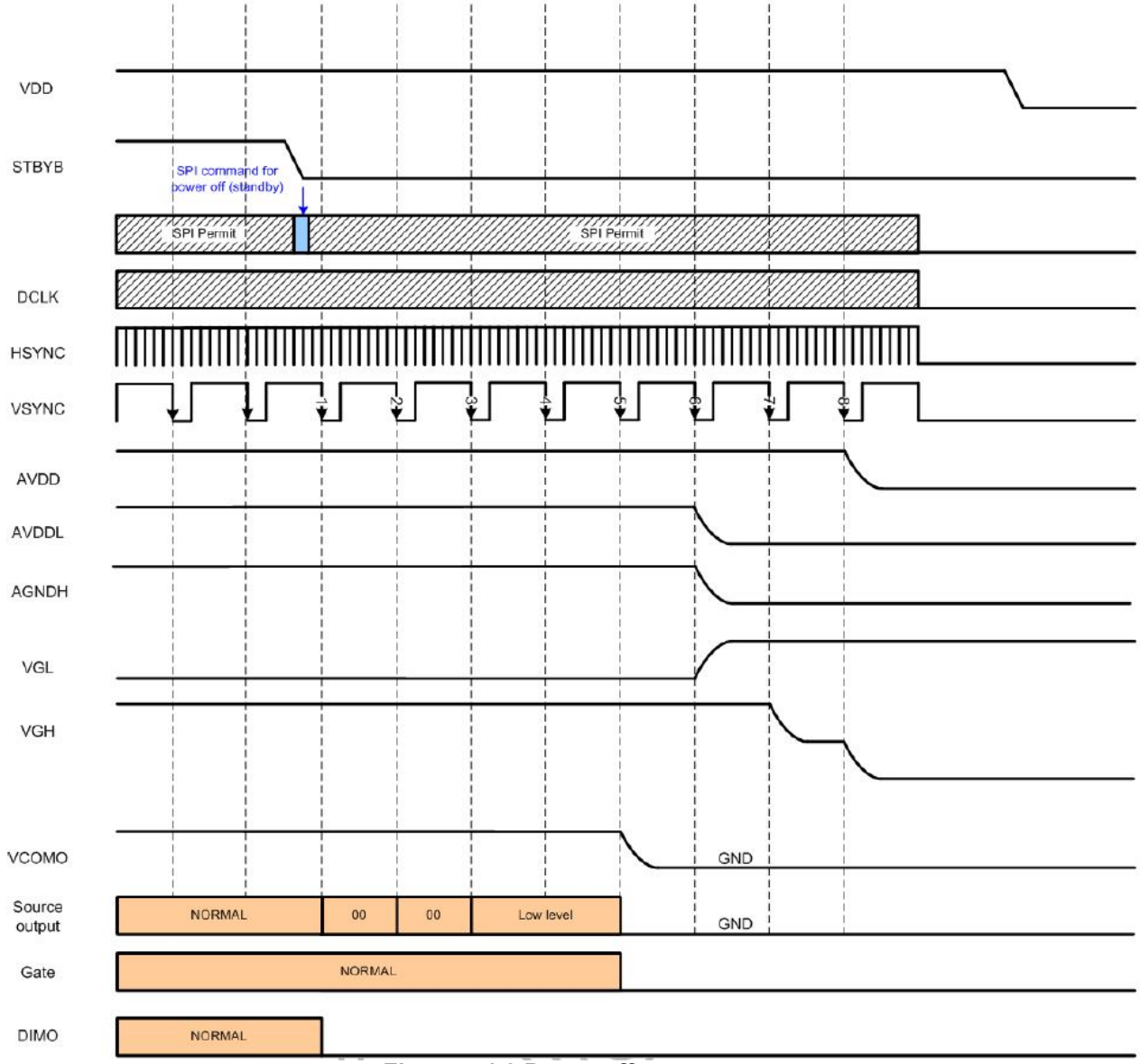


Figure 5.1.2 Power off sequence

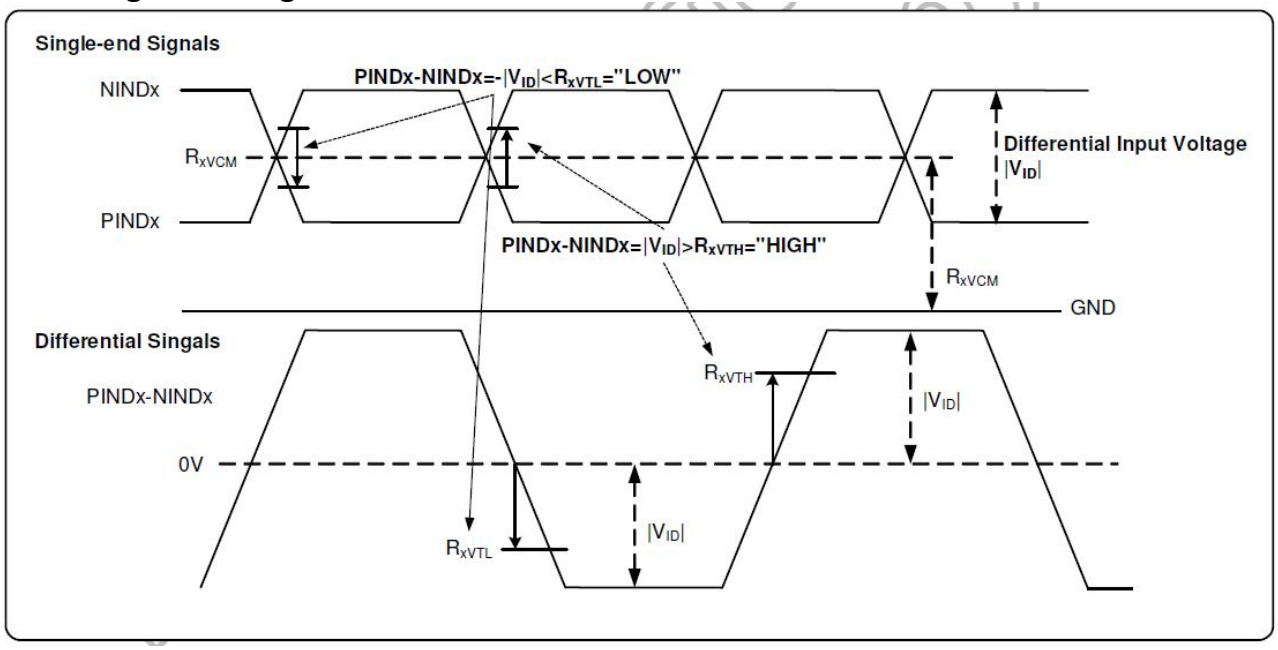
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5.2 LVDS signal timing characteristic

Electrical characteristics

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Differential input high Threshold voltage	R_{XVTH}	R_{XVCM}=1.2V	-	-	+0.1	V
Differential input low threshold voltage	R_{XVTL}	-	-0.1	-	-	V
Input voltage range **(Singled-end)**	R_{XVIN}	-	0	-	VDD-1.2+ $\|V_{ID}\|/2$	V
Differential input common mode voltage	R_{XVCM}	-	$\|V_{ID}\|/2$	-	VDD-1.2	V
Differential input voltage	$\| V_{ID} \|$	-	0.2	-	0.6	V
Differential input leakage Current	RV_{Xliz}	-	-10	-	+10	μA
LVDS digital operating Current	Iddlvds	Fclk=65MHz, VDD=3.3V	-	15	30	mA
LVDS digital stand-by Current	Istlvds	Clock & all functions are stopped	-	10	50	μA

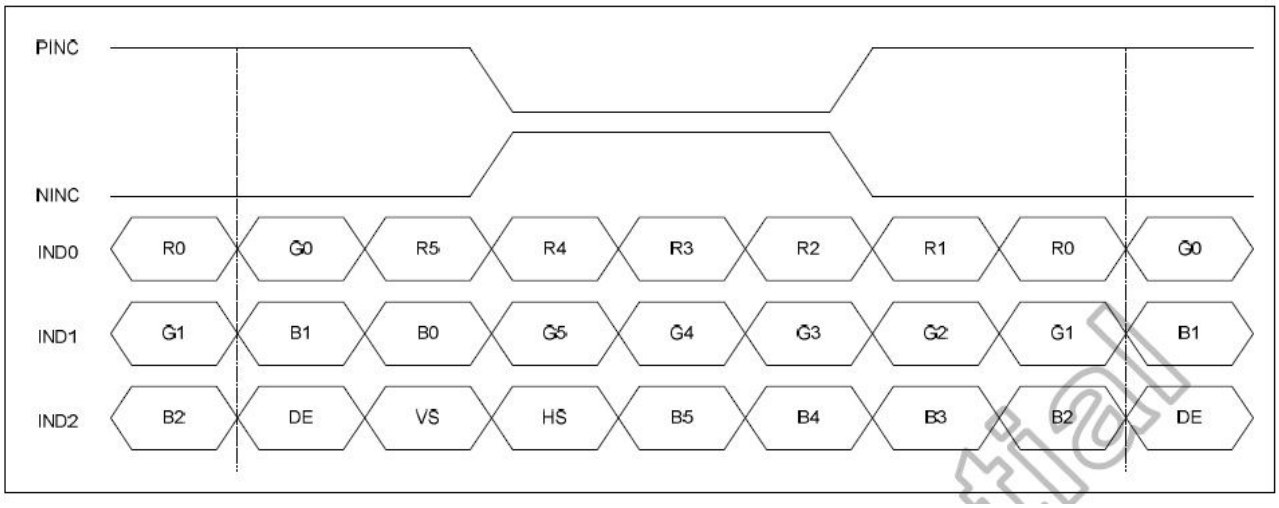
Single-end Signals



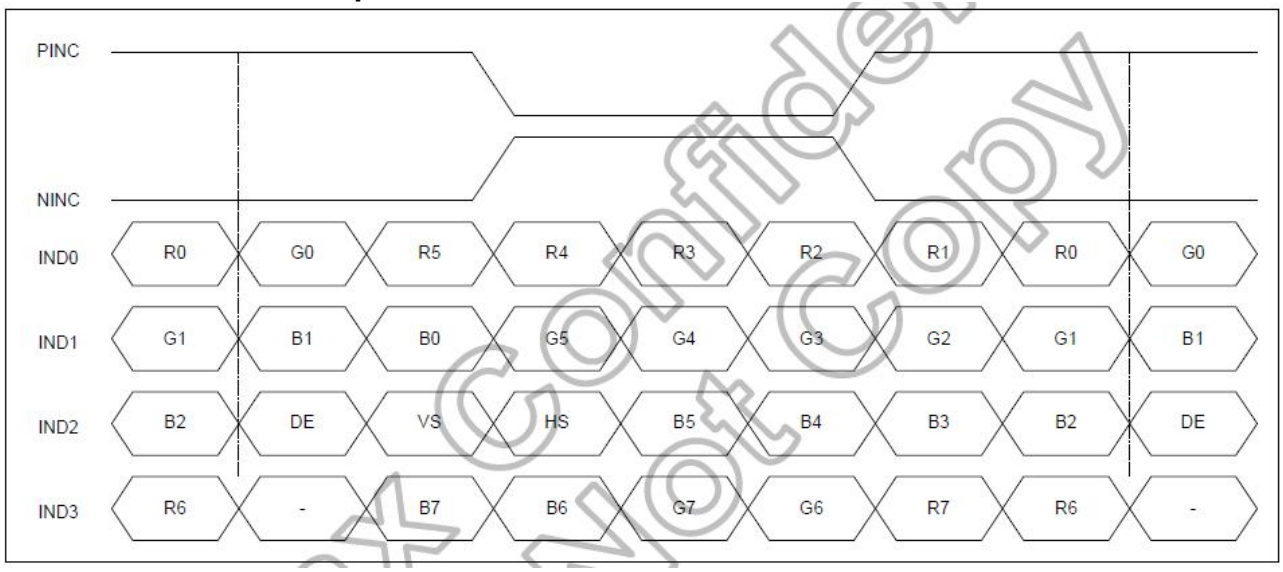
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5.3 LVDS data input format

6-bit mode data input



8-bit mode data input



5.4 Timing characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	40.8	51.2	67.2	MHz
Horizontal display area	thd		1024		DCLK
HSD period	th	1114	1344	1400	DCLK
HSD blanking	thb+ thfp	90	320	376	DCLK
Vertical display area	tvd		600		T_H
VSD period	tv	610	635	800	T_H
VSD blanking	tvbp+ tvfp	10	35	200	T_H

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5.5 Timing Chart for CTP

Note: Please refer to SSD2543QN4 data sheet for more details.

SSD2543QN4 supports the I2C interfaces, which can be used by a host rocessor or other devices. The I2C is always configured in the Slave mode. I2C Interface Timing Characteristics is shown in Fig 5.5

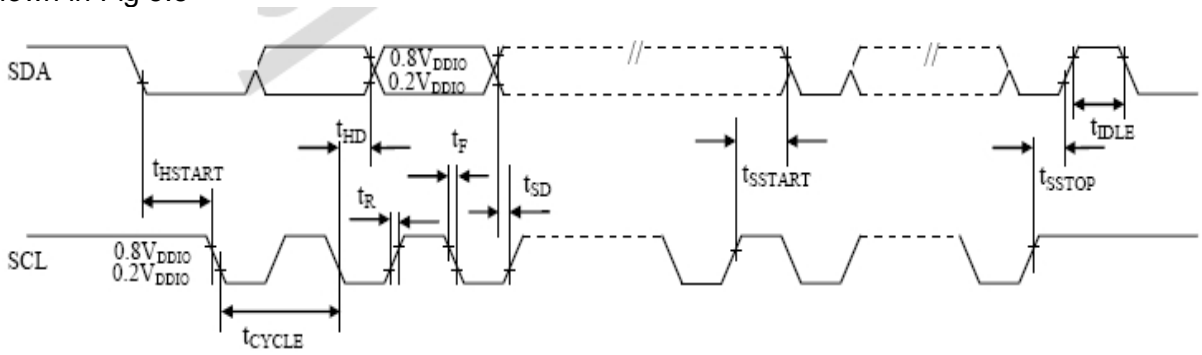


Fig 5.5 . I2C Interface Timing Characteristics

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6 Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	-	75	-	Degree	Note2,3
		θB		-	80	-		
		θL		-	80	-		
		θR		-	80	-		
Contrast Ratio		CR	θ=0°	600	800			Note 3
Response Time		T_{ON}	25℃	-	7	10	ms	Note 4
		T_{OFF}		-	9	18		
Chromaticity	**White**	x	Backlight is on	0.253	0.303	0.353		Note 1,5
		y		0.287	0.337	0.387		
	Red	x		0.531	0.581	0.631		Note 1,5
		y		0.279	0.329	0.379		
	Green	x		0.261	0.311	0.361		Note 1,5
		y		0.546	0.596	0.646		
	Blue	x		0.107	0.157	0.207		Note 1,5
		y		0.094	0.144	0.194		
Uniformity		U		70	80	-	%	Note 6
NTSC				-	47	-	%	Note 5
Luminance(With CTP)		L		-	360	-	cd/m^2	Note 7

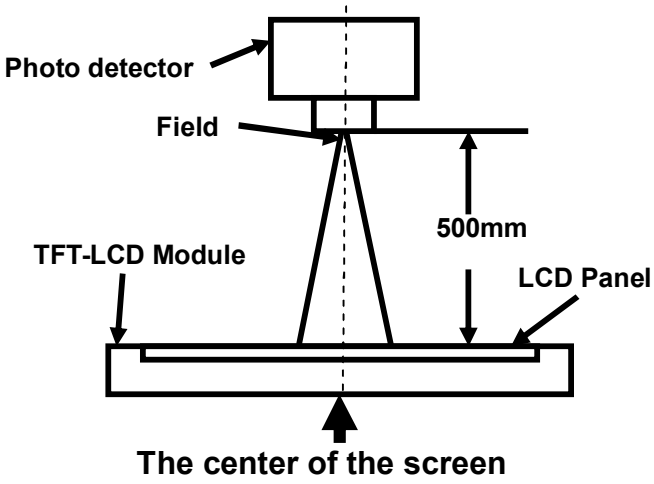
Test Conditions:

1. I_F= 20 mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

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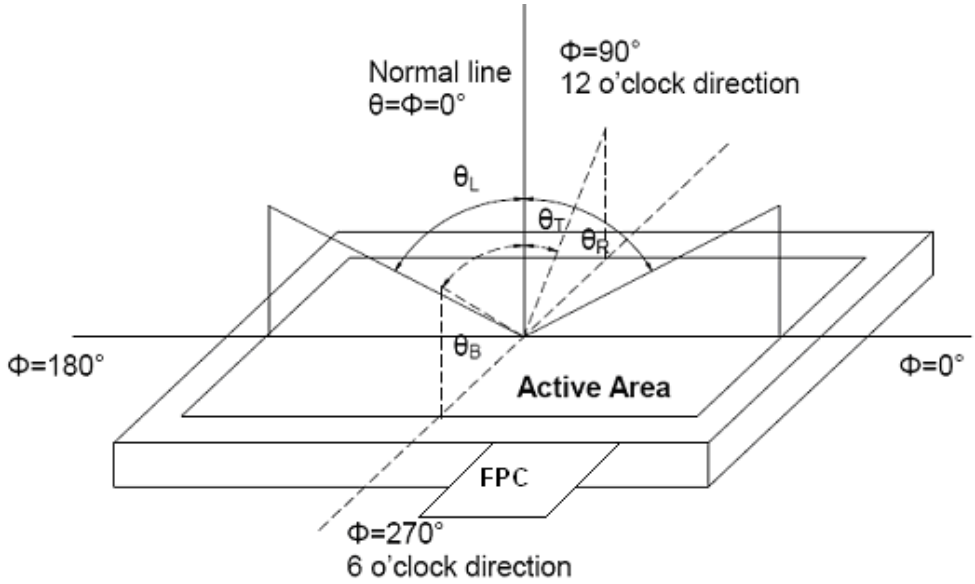
Note 1: Definition of optical measurement system.

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. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD。



Note 3: Definition of contrast ratio

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

"White state ": The state is that the LCD should drive by Vwhite.

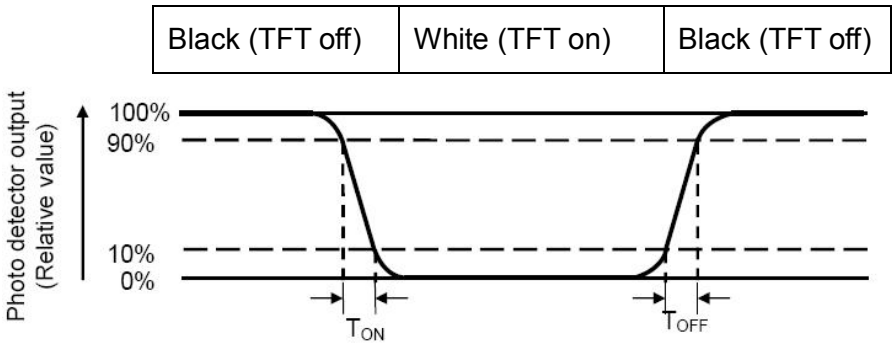
"Black state": The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

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Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

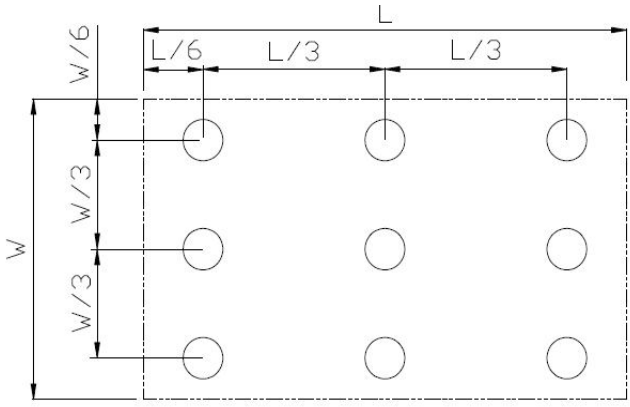
Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-------Active area length W----- Active area width



Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

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7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃,240hrs	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta= -20℃,240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +80℃,240hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -30℃,240 hrs	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+60℃, 90% RH 240 hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:5min,100 Cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	ESD	C=150pF, R=330Ω,9points/panel Air:± 15KV, 25times, Contact:± 8KV, 25 times,	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	Stroke:1.5G Sweep:10Hz~100Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	50G 20ms, ± X,± Y,± Z 3times, for each direction	IEC60068-2-27:1987 GB/T2423.5—1995

Note1: Ts is the temperature of panel's surface.

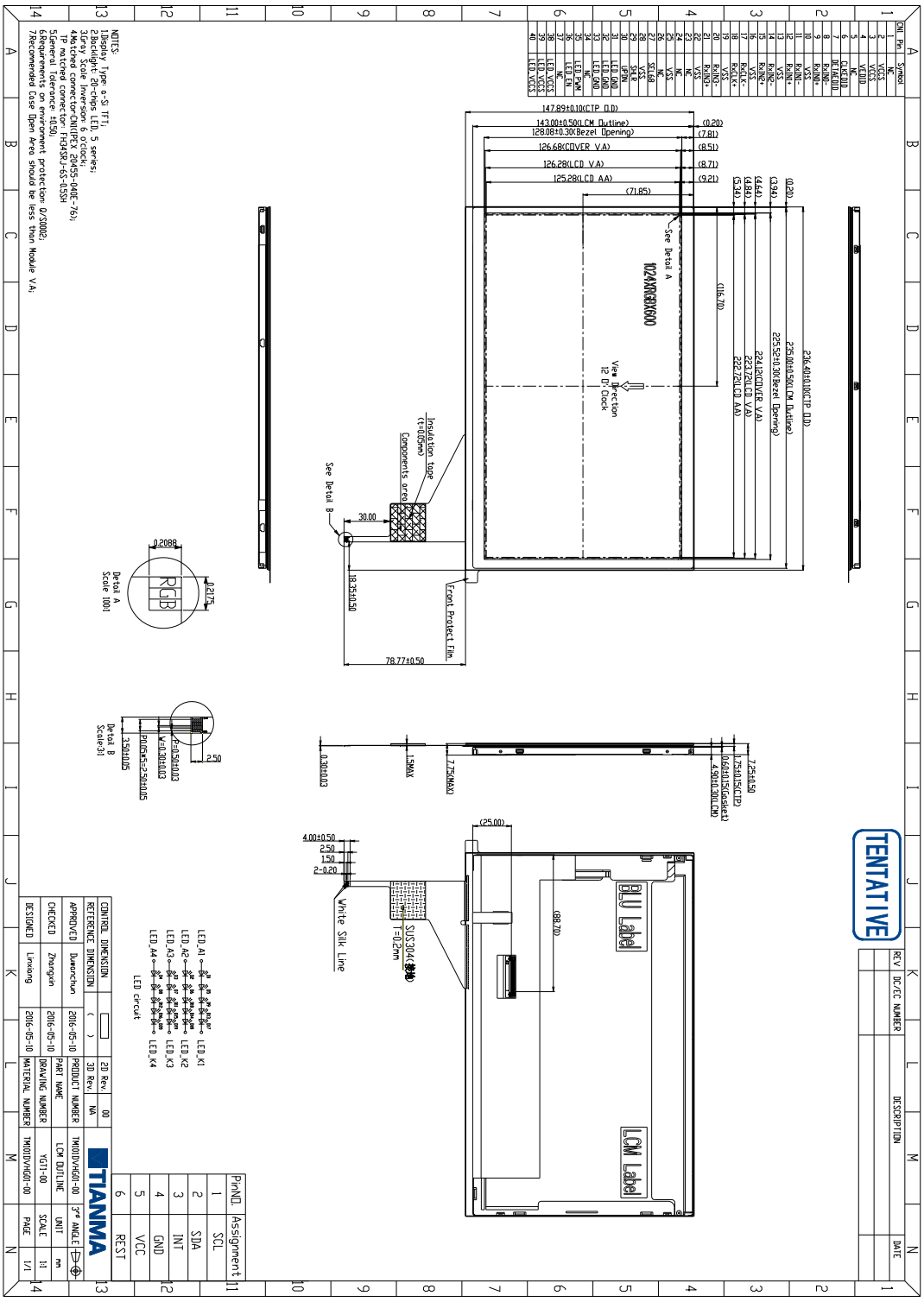
Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note4: 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 don't guarantee all of the cosmetic specification.

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8 Mechanical Drawing



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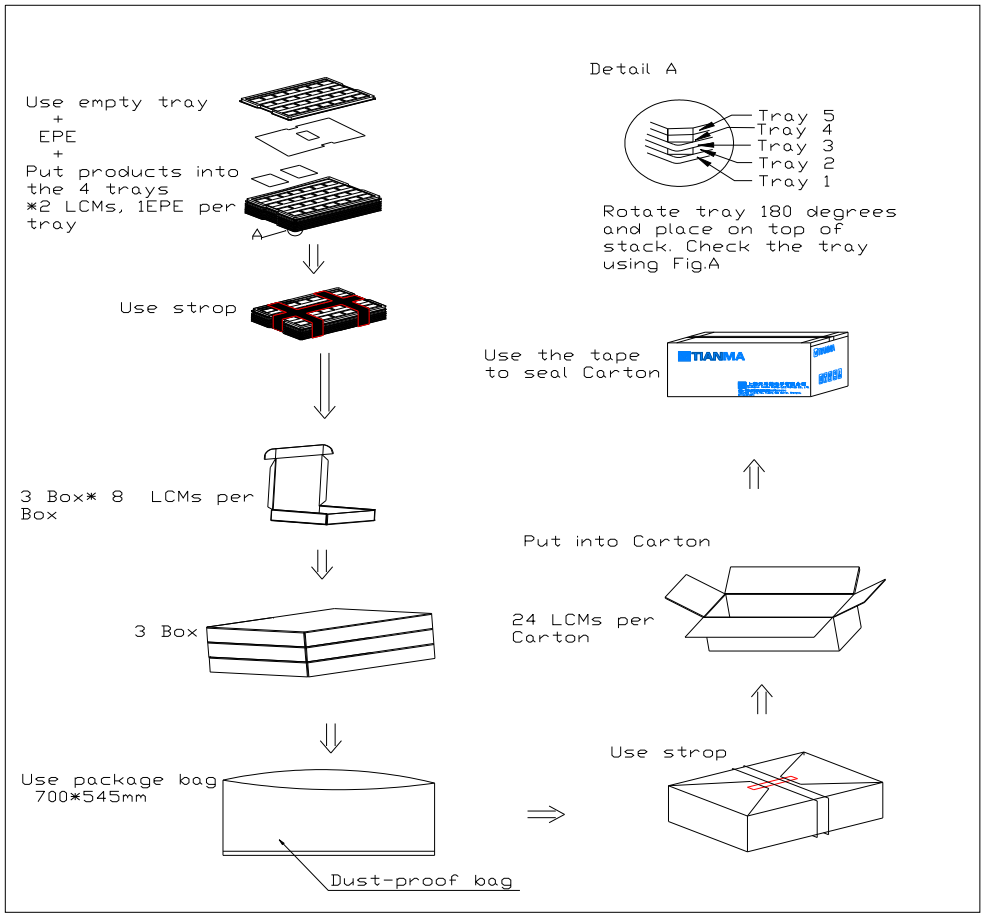
9 Packing Drawing

1.包装材料规格表(Packaging Material)-Per Carton

No	Item	Model (Materiel)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM Module	TM101DVHG01-00	236.40×147.89×7.25	TBD	24	
2	Tray	PET（transmittance）	485×330×17.7	TBD	15	
3	Dust-Proof Bag	PE	700×545×0.05	TBD	1	
4	BOX	Corrugated Paper	520×345×74	0.369	3	
5	EPE	EPE	393.18*235.4*1.0	TBD	12	
6	Carton	Corrugated Paper	544×365×250	0.76	1	
	Total Weight	TBD				

2.包装数量规格(Packaging Specification and Quantity)

(1) LCM quantity per tray: 2row×1column = 2
(2) Total LCM quantity in Carton: Number of PET trays 12× quantity per tray 2=24
Note: Please refer to the data from “estimated report about the dimension and stack of Carton ”about stacking carton



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10 Precautions for Use of LCD Modules

10.1 Handling Precautions

10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5 If the display surface is contaMinated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

10.1.7 If the logic circuit power is off, do not apply the input signals.

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage precautions

10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

10.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

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