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**MODEL NO :** TM101JDHG30  
**MODEL VERSION:** 00  
**SPEC VERSION :** V2.1  
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Preliminary Specification  
 Final Product Specification

Customer : \_\_\_\_\_

Approved by	Notes

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This technical specification is subjected to change without notice

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## 2 Input/Output Terminals

### 2.1 TFT LCD Panel

Connector type: JAE HD1S040HA1 or compatible  
Mating Connector: IPEX 20453-040T-1 or compatible

No	Symbol	I/O	Description	Comment
1	NC	-	No Connection	
2	VDD	P	Power Supply +3.3V	
3	VDD	P	Power Supply +3.3V	
4	VDD	P	Power Supply +3.3V	
5	NC	-	No Connection	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	Rxin0-	I	-LVDS differential data input(R0~R5,G0)	
9	Rxin0+	I	+LVDS differential data input(R0~R5,G0)	
10	GND	P	Power ground	
11	Rxin1-	I	-LVDS differential data input(G1~G5,B0~B1)	
12	Rxin1+	I	+LVDS differential data input(G1~G5,B0~B1)	
13	GND	P	Power ground	
14	Rxin2-	I	-LVDS differential data input(B2~B5,HS,VS,DE)	
15	Rxin2+	I	+LVDS differential data input(B2~B5,HS,VS,DE)	
16	GND	P	Power ground	
17	RxCLK-	I	-LVDS differential data input	
18	RxCLK+	I	+LVDS differential data input	
19	GND	P	Power ground	
20	Rxin3-	I	-LVDS differential data input(R6~R7,G6~G7,B6~B7)	Connect to GND
21	Rxin3+	I	+LVDS differential data input(R6~R7,G6~G7,B6~B7)	in 6 bit mode
22	GND	P	Power ground	
23	NC	-	No Connection	
24	NC	-	No Connection	
25	GND	P	Power ground	
26	NC	-	No Connection	
27	SEL6/8	-	SEL6/8="H", 6bit; SEL6/8="L", 8bit	
28	GND	P	Power ground	
29	NC	-	No Connection	
30	NC	-	No Connection	
31	VLED_GND	P	VLED Ground	
32	VLED_GND	P	VLED Ground	
33	VLED_GND	P	VLED Ground	
34	NC	-	No Connection	
35	VLED_PWM	P	Backlight dimming control (NC: 100% duty cycle)	
36	VLED_EN	P	Backlight on/off control (1 or NC: ON, 0: OFF)	
37	NC	-	No Connection	
38	VLED	P	Backlight power supply	
39	VLED	P	Backlight power supply	
40	VLED	P	Backlight power supply	

Note: I/O definition:

I---Input P---Power/Ground

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## 3 Absolute Maximum Ratings

### 3.1 Driving TFT LCD Panel

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Voltage Input	Vin	-0.50	5.00	V	Note1
Operating Temperature	T <sub>op</sub>	-20.0	70.0	°C	
Storage Temperature	T <sub>st</sub>	-30.0	80.0	°C	
Relative Humidity (Note2)	RH	--	≤95	%	Ta≤40°C
		--	≤85	%	40°C<Ta≤50°C
		--	≤55	%	50°C<Ta≤60°C
		--	≤36	%	60°C<Ta≤70°C
		--	≤24	%	70°C<Ta≤80°C
Absolute Humidity	AH	--	≤70	g/m <sup>3</sup>	Ta>70°C

Table 3.1 absolute maximum rating

Note1: Input voltage include Rxin0-/, Rxin1-/, Rxin2-/, Rxin3-/, RxCLK-/, SEL6/8,VDD.

Note2: 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

VCC=3.3V,GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply Voltage	VDD	3.00	3.30	3.60	V	
Power supply ripple	Vp-p	-	-	100	mV	
Power supply current	IDD	-	280	-	mA	
Power consumption	P	-	924	-	mW	Note1
Differential input voltage	Vid	200	-	600	mV	
Differential input common voltage	Vcm	-	1.2	-	V	
Differential input threshold voltage	Low level	VTL	-100	-	-	mV
	High level	VTH	-	-	100	mV
Inrush current	Irush	-	-	1.5	A	

Table 4.1 LCD module electrical characteristics

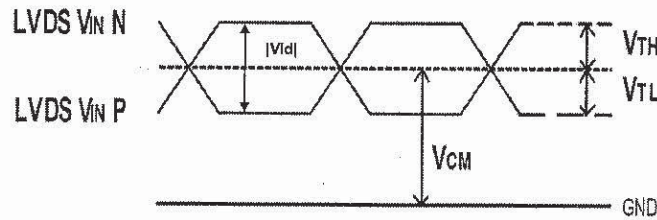


Figure 4.1 LVDS DC characteristics

Note1: To test the current dissipation, using the "color bar" testing pattern shown as below:

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

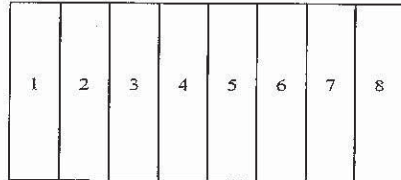


Figure 4.1.2 Current dissipation testing pattern

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4.2 Driving Backlight

Ta=25°C

Item	Symbol	Min	Typ	Max	Unit	Remark
Backlight power supply voltage	VLED	5.5	12	12.5	V	
Backlight power supply current	I_LED	-	322	-	mA	
Backlight power consumption	P_LED	-	3864	-	mW	
Input voltage for VLED_PWM signal	High level	-	2.0	-	5.0	V
	Low level	-	0	-	0.4	V
Input voltage for VLED_EN	High level	-	2.0	-	5.0	V
	Low level	-	0	-	0.4	V
VLED_PWM frequency	Fpwm	200	-	20k	HZ	
VLED_PWM duty	D	5	-	100	%	Note1
Operating Life Time	-	-	50000	-	hrs	Note2

Note 1: According to LED driver IC characteristics, the minimum value of VLED\_PWM duty may vary with VLED\_PWM frequency, higher the frequency, bigger the duty.

Note 2: Optical performance should be evaluated at Ta=25°C only.

If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.

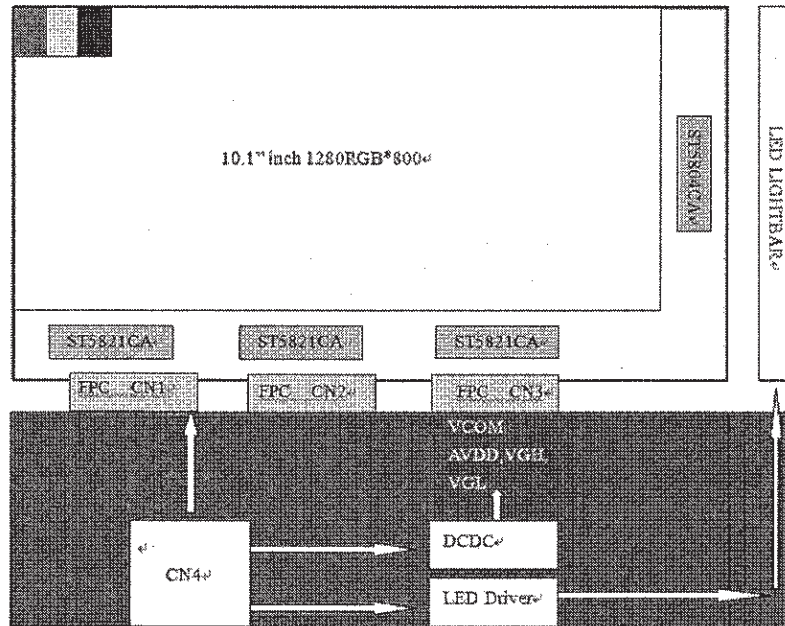
Operating life means brightness goes down to 50% of initial brightness.

Typical operating life time is estimated data.

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4.3 Block Diagram



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5 Timing Chart

5.1 LVDS signal timing characteristics

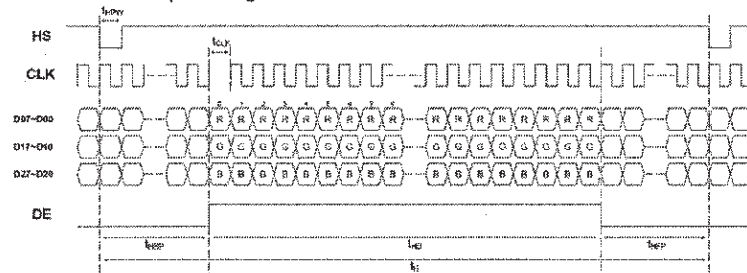
VCC=3.3V, GND=0V, Ta=25°C

Parameter	Symb of	Min	Typ	Max	Unit	Remark
CLK frequency	$1/t_{clk}$	62.5	68.2	78.1	MHz	
Horizontal blanking time	$t_{HBT}$	20	69	164	talk	$t_{hbp} + t_{HFP}$
Horizontal back porch	$t_{HBP}$	-	5	164- $t_{HFP}$	talk	
Horizontal display area	$t_{HD}$	-	1280	-	talk	
Horizontal front porch	$t_{HFP}$	15	64	159	talk	
Horizontal period	$t_H$	1300	1349	1444	talk	
Horizontal pulse width	$t_{HPW}$	-	1	256	talk	
Vertical blanking time	$t_{VBT}$	5	42	101	tH	$t_{VBP} + t_{VFP}$
Vertical back porch	$t_{VBP}$	-	2	101- $t_{VFP}$	tH	
Vertical display area	$t_{VD}$	-	800	-	tH	
Vertical front porch	$t_{VFP}$	3	40	99	tH	
Vertical period	$t_V$	803	842	901	tH	
Vertical pulse width	$t_{VPW}$	-	1	128	tH	
Frame Rate	F	-	60	-	HZ	

Table 5.1 timing parameter

5.2 Input Clock and Data timing Diagram:

Horizontal input timing



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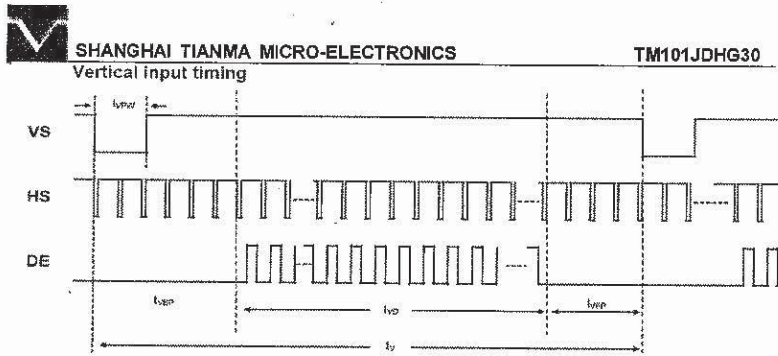
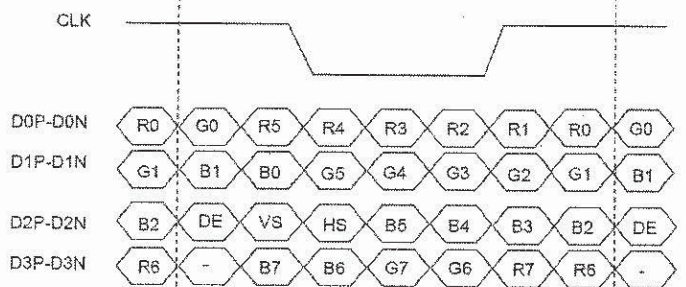


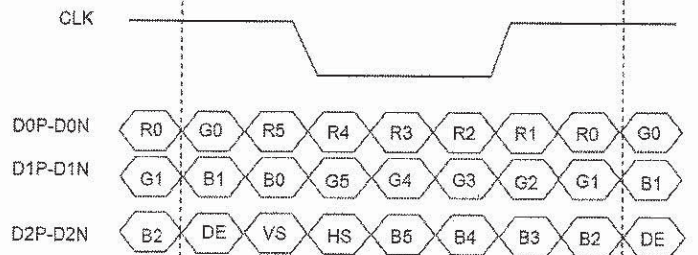
Figure 5.2 Input signal data timing

5.3 LVDS data input format

8-bit mode data input



6-bit mode data input



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5.4 Power On/Off Sequence

Item	Symbol	Min	Typ	Max	Unit	Remark
VDD on to VDD stable	Tp1	0.5	-	10	ms	
VDD stable to signal on	Tp2	0	-	50	ms	
Signal on to VLED_EN on	Tp3	200	-	-	ms	
PWM on to VLED_EN on	Tp4	0	-	200	ms	
VLED to PWM on	Tp5	10	-	-	ms	
VLED on to VLED stable	Tp6	0.5	-	10	ms	
VDD off time	Tp7	0	-	10	ms	
VDD off to next VDD on	Tp8	500	-	-	ms	
Signal off before VDD off	Tp9	0	-	50	ms	
VLED_EN off before signal off	Tp10	200	-	-	ms	
VLED_EN off before PWM off	Tp11	0	-	200	ms	
PWM off before VLED off	Tp12	10	-	-	ms	

Table 5.1 Power on/off sequence

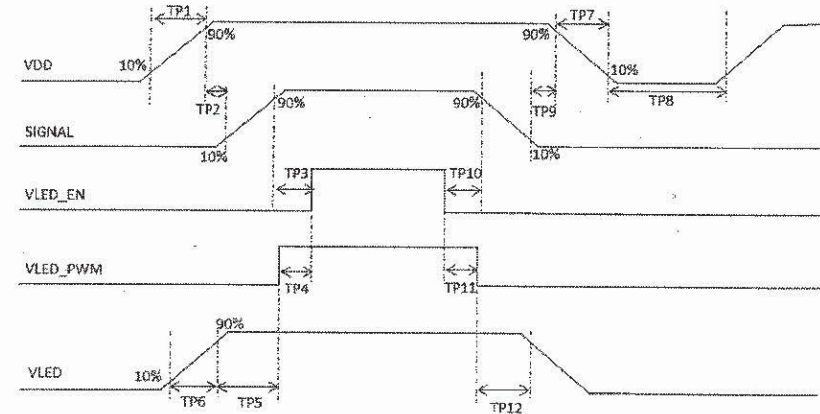


Figure 5.2 Interface power on/off sequence

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## 6 Optical Characteristics

### 6.1 Optical Specification

Ta=25°C

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	
View Angles	$\theta T$	CR $\approx$ 10	75	85	-	Degree	Note 2	
	$\theta B$		75	85	-			
	$\theta L$		75	85	-			
	$\theta R$		75	85	-			
Contrast Ratio	CR	$\theta=0^\circ$	600	800	-	-	Note1 Note3	
Response Time	$T_{ON}$	25°C	-	10	15	ms	Note1	
	$T_{OFF}$		-	15	25		Note4	
Chromaticity	White	Backlight is on	x	0.252	0.302	0.352	-	Note5 Note1
			y	0.277	0.327	0.377		
	Red		x	0.528	0.578	0.628		
			y	0.272	0.322	0.372		
	Green		x	0.296	0.346	0.396		
			y	0.528	0.578	0.628		
	Blue		x	0.104	0.154	0.204		
			y	0.042	0.092	0.142		
Uniformity	U	-	75	80	-	%	Note1 Note6	
NTSC	-	-	-	50	-	%	Note 5	
Luminance	L	-	400	500	-	cd/m <sup>2</sup>	Note1 Note7	

#### Test Conditions:

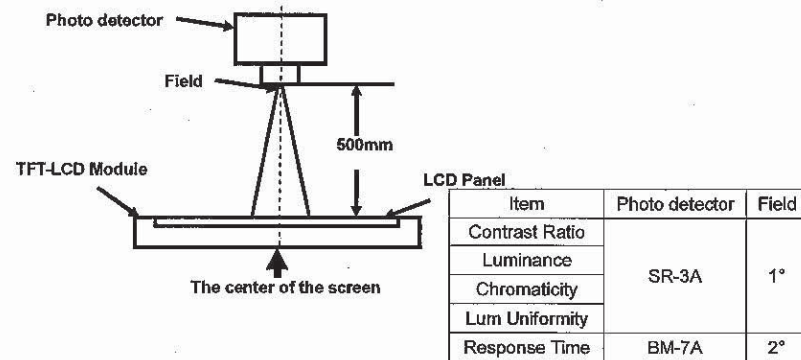
- The ambient temperature is 25±2°C, humidity is 65±7%.
- The test systems refer to Note 1 and Note 2.

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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 by CONOSCOPE(ergo-80).

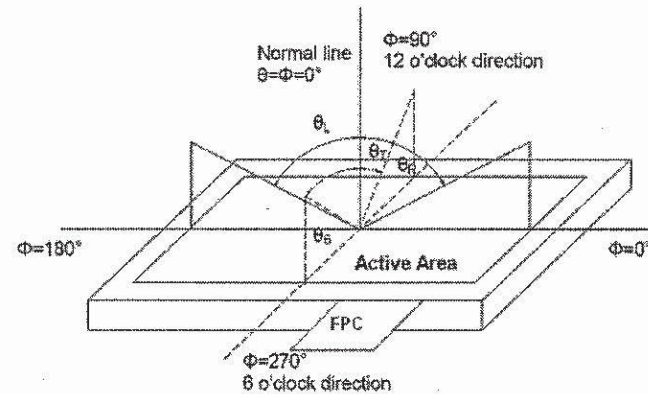


Fig. 1 Definition of viewing angle

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Note 3: Definition of contrast ratio

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

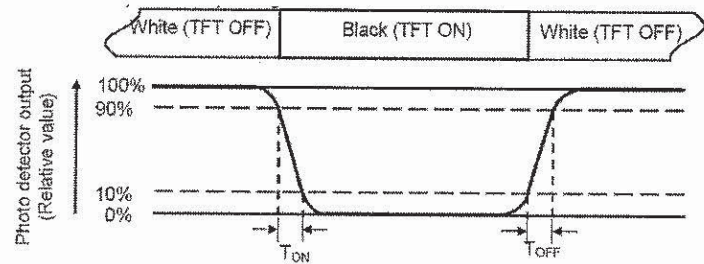
"White state": The state is that the LCD should driven by  $V_{\text{white}}$ .

"Black state": The state is that the LCD should driven by  $V_{\text{black}}$ .

$V_{\text{white}}$ : To be determined     $V_{\text{black}}$ : To be determined.

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 ( $T_{\text{ON}}$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_{\text{OFF}}$ ) 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.

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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.

$$\text{Luminance Uniformity (U)} = L_{\text{min}} / L_{\text{max}}$$

L—Active area length W—Active area width

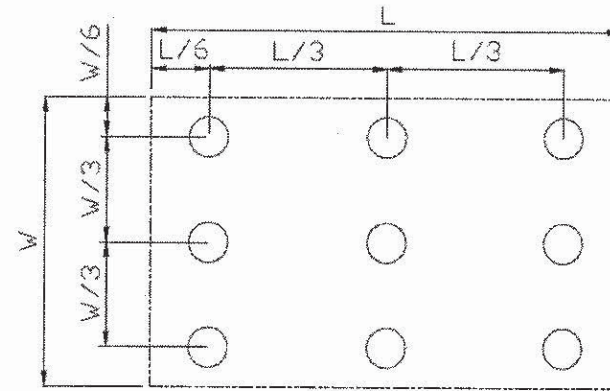


Fig. 2 Definition of uniformity

$L_{\text{max}}$ : The measured maximum luminance of all measurement position.

$L_{\text{min}}$ : 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	Remark
1	High Temperature Operation	Ts=+70°C, 240hrs	(Note1) IEC60068-2-1:2007,GB2423.2-2008
2	Low Temperature Operation	Ta=-20°C, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage (non-operation)	Ta=+80°C, 240hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage (non-operation)	Ta=-30°C, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & High Humidity Operation	Ta = +60°C, 90% RH max,240 hours	(Note2) IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30°C 30 min~+80°C 30 min, Change time:5min,100cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	Electro Static Discharge (operation)	C=150pF,R=330Ω; Contact:±4kV, 5times; Air:±8kV,5times;	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2hours for each direction of X,Y,Z (6 hours total)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Shock (non-operation)	60G 6ms, ±X,±Y,±Z 3 times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80 cm,1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

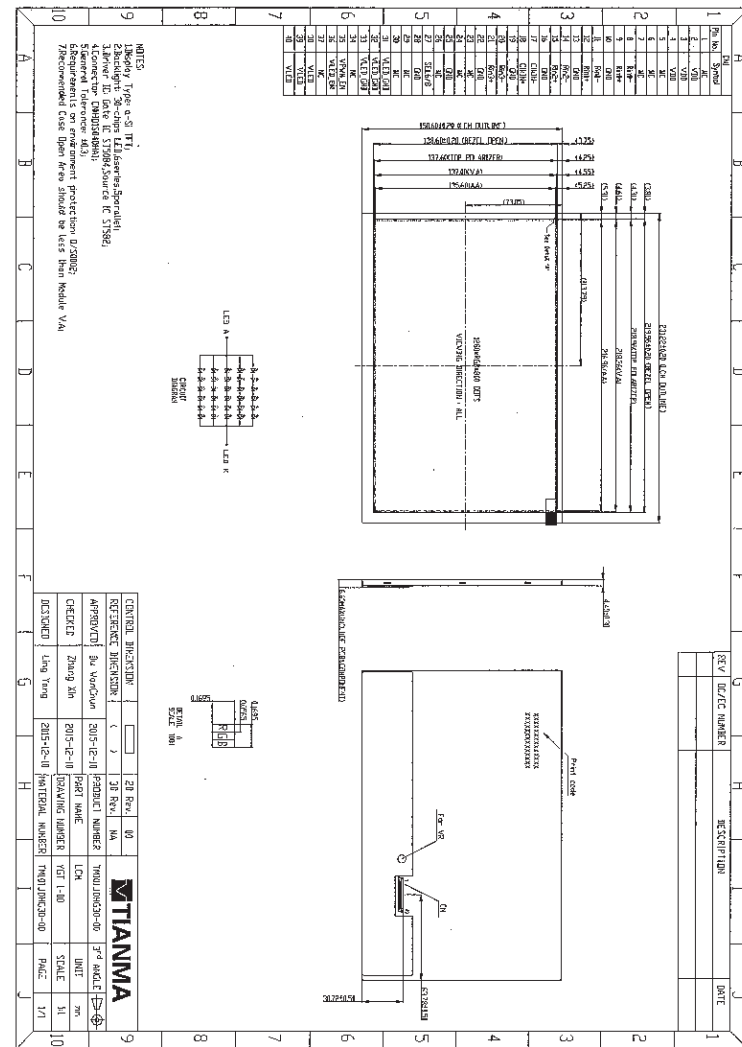
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

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8 Mechanical Drawing



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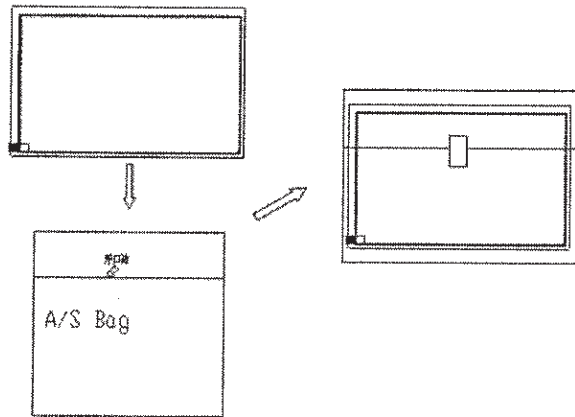
TM101JDHG30

9 Packing Drawing

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101JDHG30	231.22x150.60x4.30	0.28	19	
2	Dust-Proof Bag	PE	700x545mm	0.046	1	
3	Anti-Static Bag	PE	246x240mm	0.004	1	
4	Partition_1	Corrugated paper	527x348x217mm	1.571	1	
5	Partition_2	Corrugated Paper	505x332x5mm	0.098	2	
6	Corrugated Bar	Corrugated Paper	527x244x7mm	0.057	2	
7	Carton	Corrugated paper	544x365x250mm	1.12	1	
8	Total weight(Kg)		8.371kg ±5%			

The packing method is shown as below:

9.1 Put module into anti-static bag



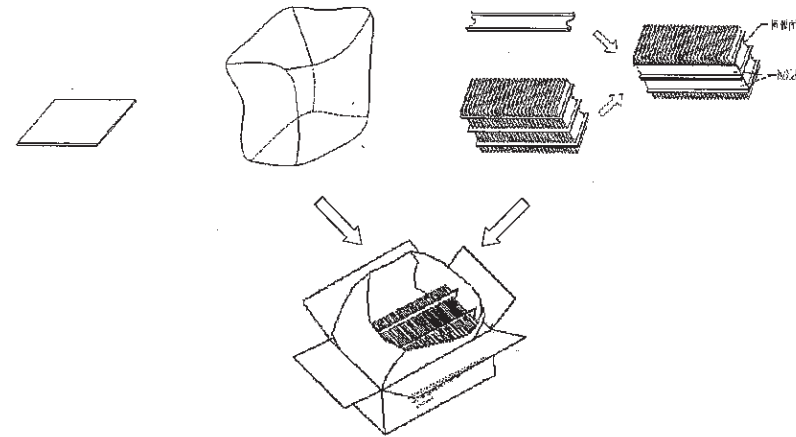
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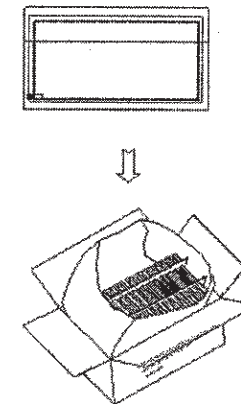
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9.2 Dummy packing assembling



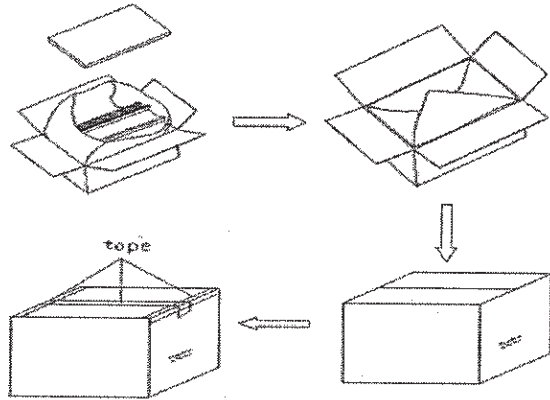
9.3 LCD module assembling



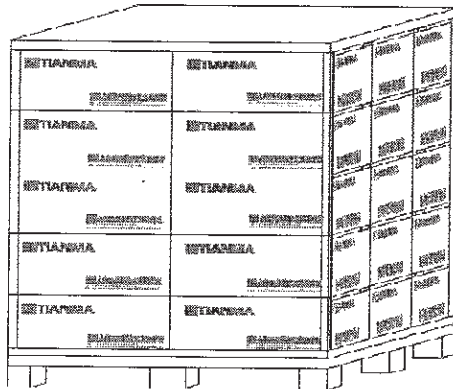
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## 9.4 Box sealent



## 9.5 Stacking method(2x3x5)



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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°C ~ 40°C      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

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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