PRODUCT SPECIFICATION

MODEL NO: SEL1307A0

< ◇ > PRELIMINARY SPECIFICATION

< ◆ > APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

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1. GENERAL DESCRIPTION

The SEL1307A0 model is a Color TFT LCD supplied by Selectronic. This Module has a 10.4 inch diagonally measured active display area with 1024 X RGB X 100 resolutions. Each pixel is divided into Red, Green and Blue sub-pixels and dots that are arranged in vertical stripes. LCD color is determined with Dithering 65K Color signal for each pixel. The SEL1307A0 has been designed to apply the interface method that enables low power, high speed, and high contrast.

2. FEATURES

Display Mode	Transmissive Type
	a-Si color TFT LCD, Normally white type
Screen Size	10.4 inch
Display Format	Graphic 1024*RGB*100 Stripe type
Color	65K color
Interface	RGB IF(16 bit)
Driver IC	HX8282-A*1, HX8678-C*1
Viewing Direction	6 o'clock (Gray inversion: 12 o'clock)
Weight	103.96 g

3. MECHANICAL SPECIFICATION

Item	Specifications	Unit
Dimensional outline	288.92(W)×41.5(H)*×6.32(D)	mm
Resolution	1024×(R, G, B)×100	dot
Active area	264.192(W)×25.8(H)	mm
Pixel pitch	0.258(W)×0.258(H)	mm
Polarizer	Anti-Glare	

Note: Without FPC

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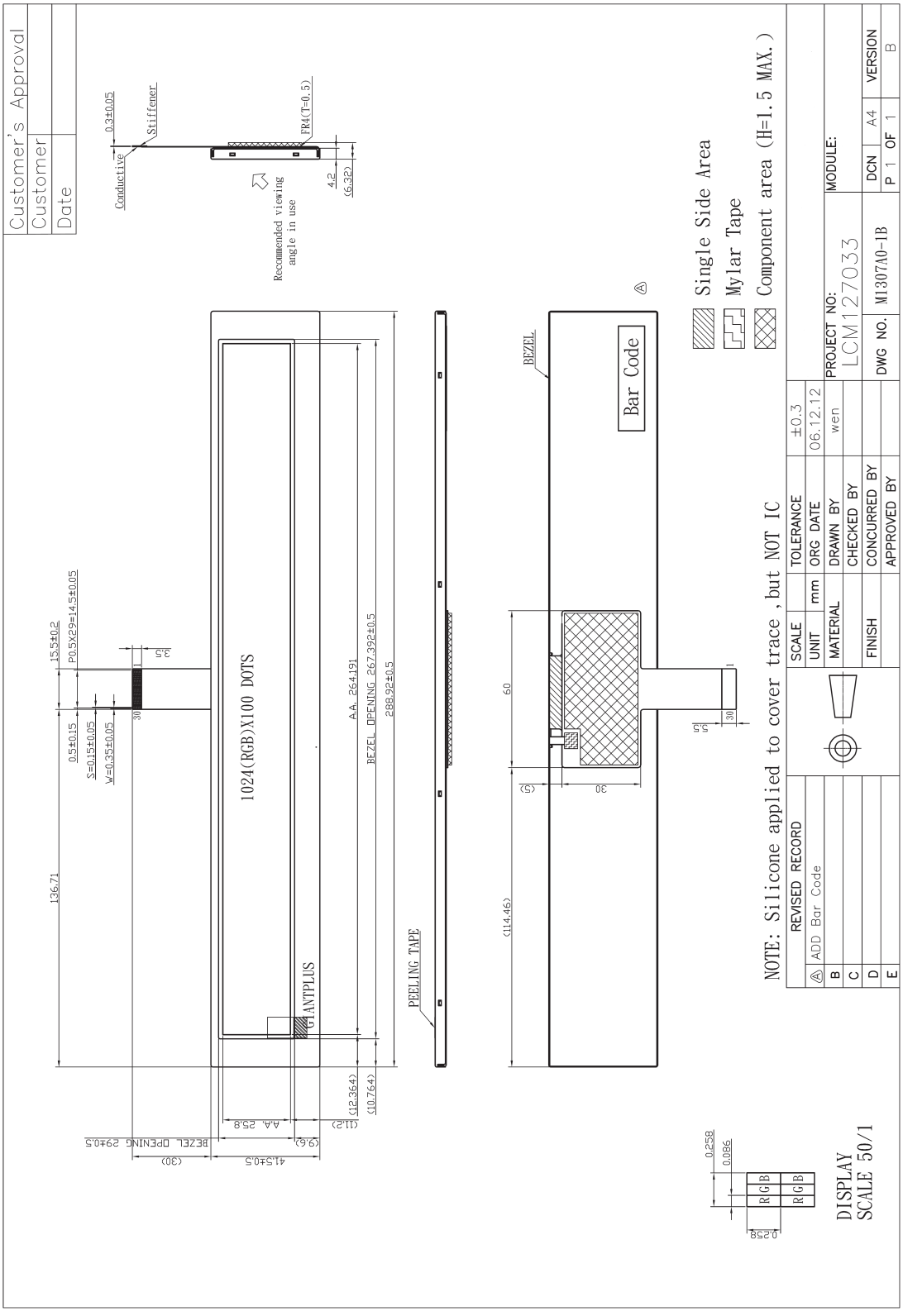
4. MECHANICAL DIMENSION



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5. MAXIMUM RATINGS

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

Item	Symbol	Values		Unit	Condition
		Min.	Max.		
Operation Temperature	T_{op}	0	50	℃	
Storage Temperature	T_{stg}	-10	60	℃	
Humidity	H_{stg}	-	90	%RH	Note1

Note1: $T_A \leqq 40$℃ Without dewing

6. ELECTRICAL CHARACTERISTIC

6.1.TFT LCD Characteristic

Typical operating conditions (GND=AVSS=0V)

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power supply for LCD	Voltage	VDD	3.0	3.3	3.6	V	
	Current	Idd	-	-	65	mA	
Driver Input signal voltage	H	V_{IH}	0.7*VDD	-	VDD	V	
	L	V_{IL}	0	-	0.3*VDD	V	

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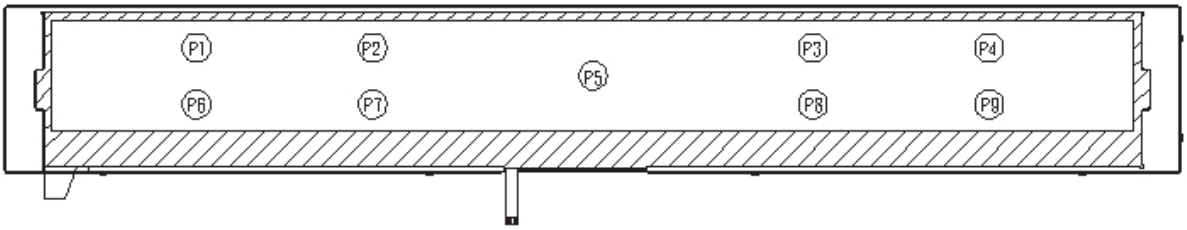
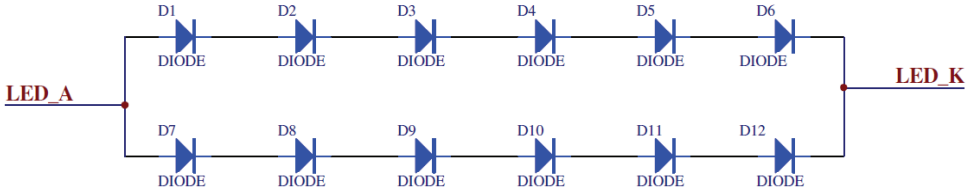
6.2.Backlight Characteristic

Item		Symbol	Values			Unit	Remark
			Min.	Typ.	Max.		
Power Consumption		P_{LED}	-	792.0	878.4	mW	
Power supply for LED	Voltage	I_{LED}	-	19.8	21.6	V	
	Current	V_{LED}	-	40	50	mA	
Luminous color		White					





a. Test Instrument: BM-7 (Distance =500mm; Field = 1。)
b. Light Source: White LED * 12
c. Uniformity = (Min. Brightness / Max. Brightness)*100%
d. Uniformity ≧ 70%
e. The "LED decay life time" is defined as the brightness decrease to 50% original Brightness that the ambient temperature is 22℃and LED dice current=20mA.

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7. MODULE FUNCTION DESCRIPTION

7.1. PIN Description

NO.	Pin Name	Functions	Remark
1	VDD	Power supply	
2	VSS	Ground	
3	B0	Blue data	
4	B1	Blue data	
5	B2	Blue data	
6	B3	Blue data	
7	B4	Blue data	
8	VSS	Ground	
9	G0	Green data	
10	G1	Green data	
11	G2	Green data	
12	G3	Green data	
13	G4	Green data	
14	G5	Green data	
15	VSS	Ground	
16	R0	Red data	
17	R1	Red data	
18	R2	Red data	
19	R3	Red data	
20	R4	Red data	
21	VSS	Ground	
22	DCLK	Clock signal	
23	VSS	Ground	
24	HSYNC	Horizontal sync signal	
25	VSS	Ground	
26	VSYNC	Vertical sync signal	
27	VSS	Ground	
28	DE	Data enable	
29	LED_K	Cathode, Backlight LED	
30	LED_A	Anode, Backlight LED	

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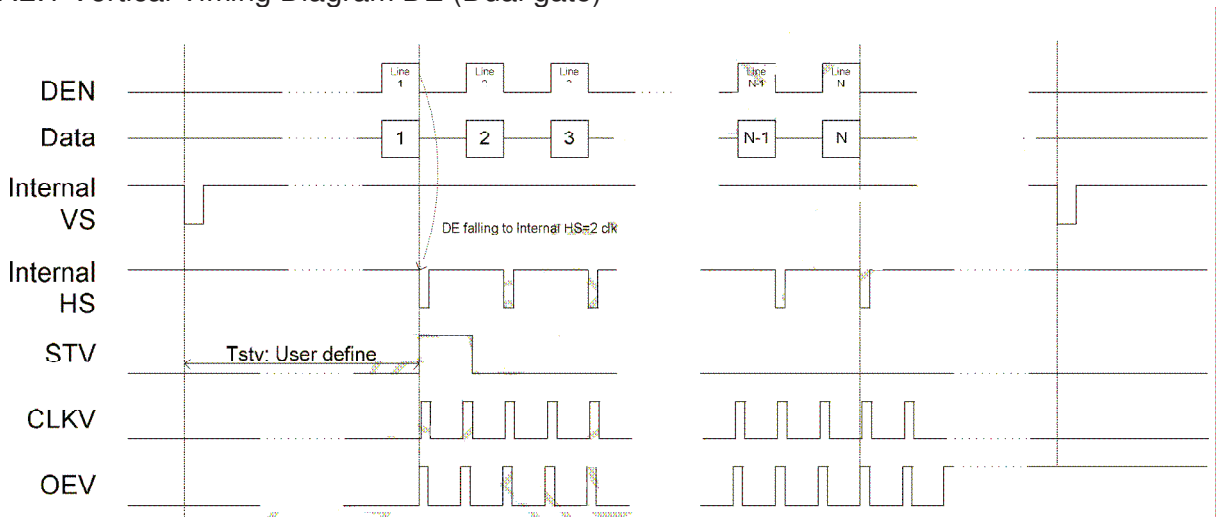
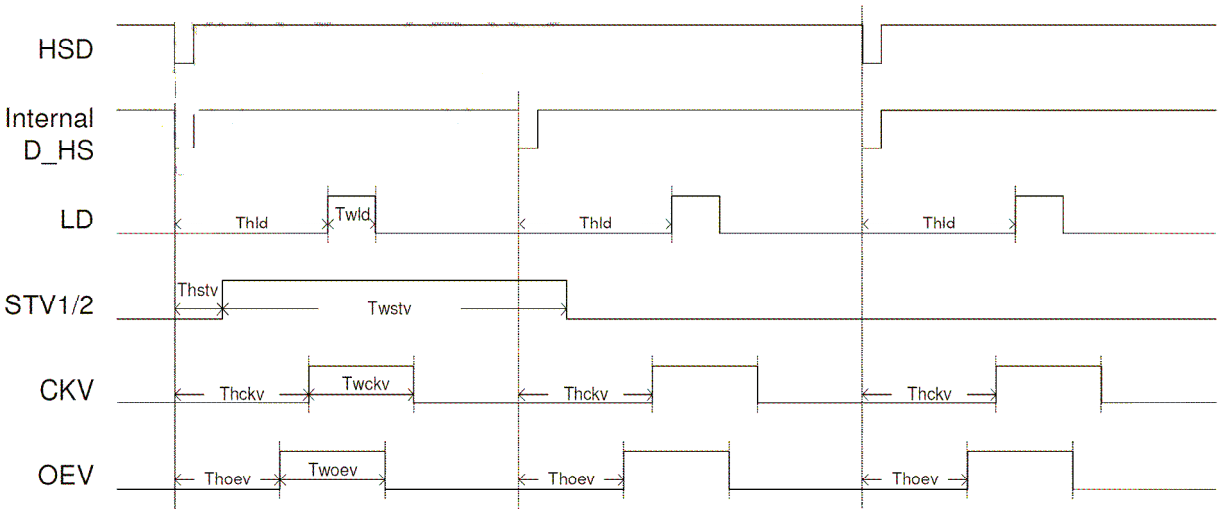
7.2. Timing Characteristics

7.2.1 Vertical Timing Diagram DE (Dual gate)

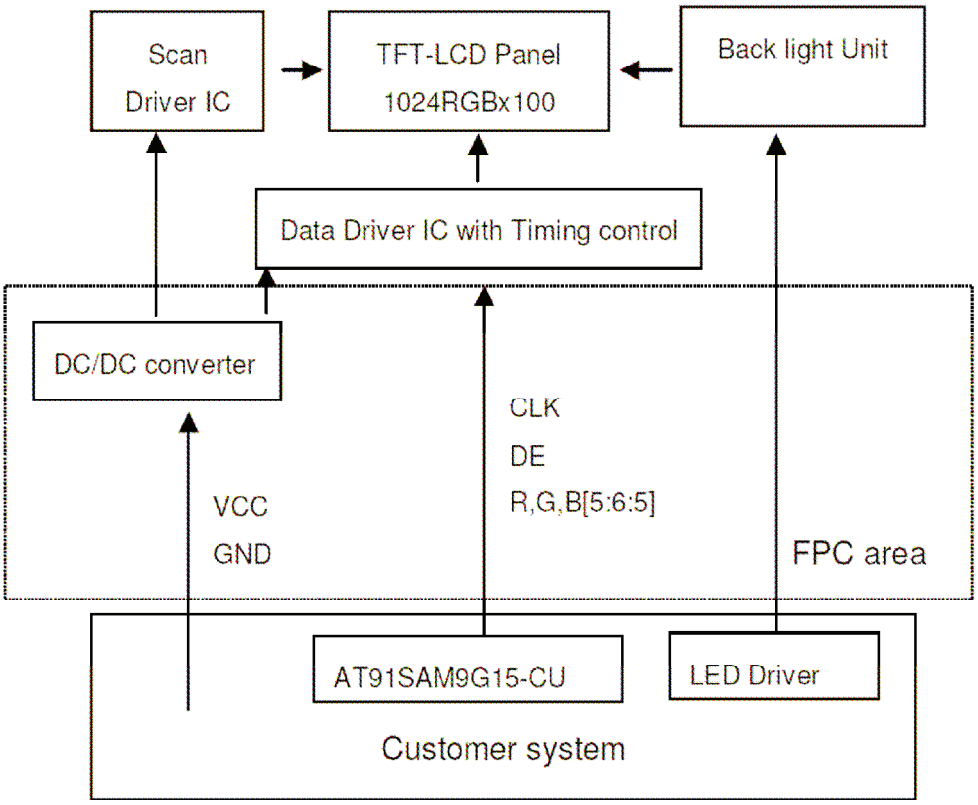


7.2.2 Gate Output Timing Diagram (Dual gate)



Parameter	Symbol	1024*RGB*130 Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk		25		MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th		1344		DCLK
HSD Blanking	thb+ thfp		320		DCLK
Vertical Display Area	tvd		130		T_H
VSD Period	tv		310		T_H
VSD Blanking	tvbp+ tvfp		180		T_H

7.3. Block Diagram



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8. ELECTRO-OPTICAL CHARACTERISTICS

8.1.Optical characteristics

The following items are measured under stable conditions. The optical characteristics should be measured in dark room or equivalent state with the methods shown in Note 1.

LED backlight transmissive module:

Item	Symbol	Temp.	Min.	Typ.	Max.	Unit	Conditions
Response time	Tr+ Tf	25℃	-	25	50	ms	θ=0° , ϕ=0° (Note 2)
Contrast ratio	CR	25℃	200	300	-	-	θ=0° , ϕ=0° LED:ON,LIGHT:OFF (Note 3)
Brightness	L		200	250	-	cd/m2	
Viewing Angle 12”/6”/9”/3”	Degree		60/50/60/60				(Note 5) CR≧10

8.2.CIE(x, y) chromaticity

Parameter		Symbol	Min.	Typ.	Max.	Units	Note
CIE color Coordinates	White	Wx	0.287	0.337	0.387	-	BM5; 2° angle (Note 4)
		Wy	0.298	0.348	0.398		
	Red	Rx	0.528	0.578	0.628		
		Ry	0.283	0.333	0.383		
	Green	Gx	0.343	0.393	0.443		
		Gy	0.493	0.543	0.593		
	Blue	Bx	0.108	0.158	0.208		
		By	0.092	0.142	0.192		
	NTSC	39				%	

*Note 1: C light source, for panel only.

Note:

1. Test equipment setup

After stabilizing and leaving the panel alone at a given temperature for 30 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-5A with a viewing angle of 1° at a distance of 50cm and normal direction.

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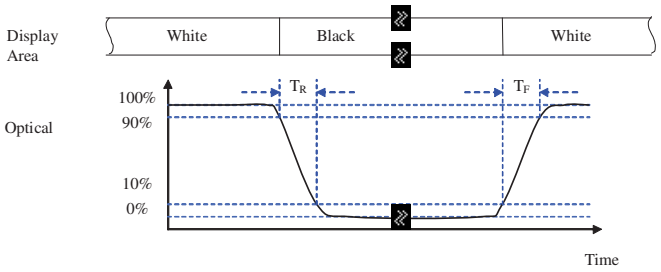
2. Definition of response time: T_R and T_F

The figure below is the output signal of the photo detector.



3. Definition of contrast ratio:

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness measured when LCD is at “white state”}}{\text{Brightness measured when LCD is at “black state”}}$$

White $V_i=V_{i50\%}\pm1.5V$

Black $V_i=V_{i50\%}\,\mu\,2.0V$

”±” means that the analog input signal swings in phase with VCOM signal.

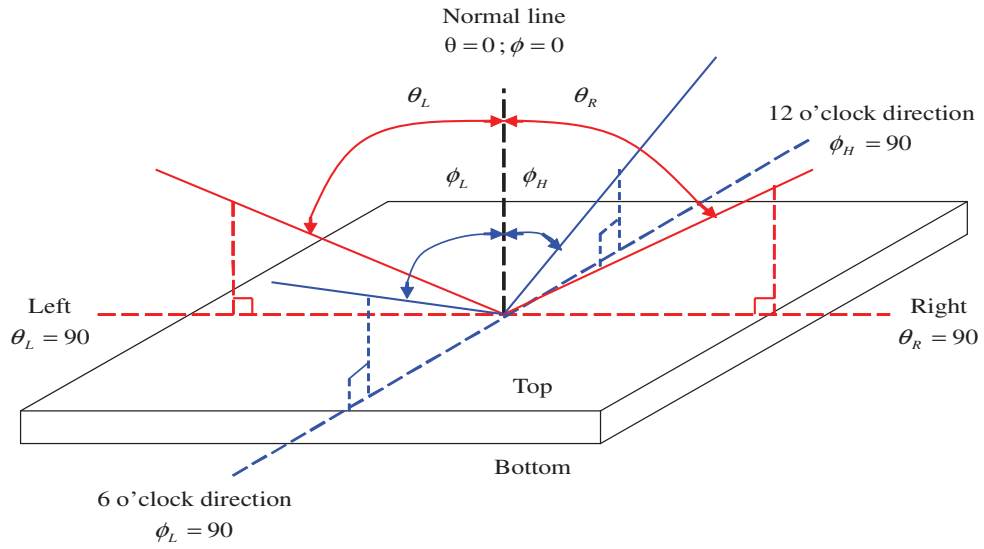
”μ” means that the analog input signal swings out of phase with VCOM signal.

Vi50%: The analog input voltage when transmission is 50%.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

4. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

5. Definition of viewing angle:



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9. RELIABILITY

9.1. MTTF

The LCD module shall be designed to meet a minimum MTTF value of 50,000 hours with normal condition. (25℃ in the room without sunlight; not include life time of backlight)

9.2. TESTS

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Operating	50℃ 240 hrs	◦ No defect of operational function in room temperature are allowable(23±5℃). ° Leakage current should be below double of initial value.
2	Low Temperature Operating	0℃ 240 hrs	
3	High Temperature Non-Operating	60℃ 240 hrs	
4	Low Temperature Non-Operating	-10℃ 240 hrs	
5	High Temperature/ Humidity Non-Operating	50℃ ; 90%RH ; 240 hrs	
6	Temperature Shock Non-Operating	-20℃ ⟷ 70℃ (60min) (5min) (60min) 10CYCLES	
7	Electro-static Discharge (IEC 61000-4-2)	HBM: ±2kv	

Note 1: Test after 24 hours in room temperature.
Note 2: The sampling above is individually for each reliability testing condition.
Note 3: The color fading of polarizing filter should not care.
Note 4: All of the reliability testing chamber above, is using D.I. water.(Min value:1.0 MΩ-cm)
Note 5: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

9.3. Color performance

No.	ITEM	Criterion (initial)
1	Luminance	>50%
2	NTSC	>70%
3	Contrast Ratio	>50%

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10.INSPECTION CRITERIA

10.1. Inspection Conditions

10.1.1.Environmental conditions

The environmental conditions for inspection shall be as follows

Room temperature: 23±5℃

Humidity: 50±20%RH

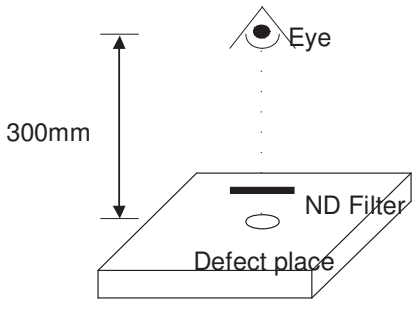
10.1.2.The external visual inspection

With a single 1000±200lux fluorescent lamp as the light source, the inspection was in the distance of 30cm or more from the LCD to the inspector's eyes.

10.2. Light Method

10.2.1.Environment lamp under 1000±200 lux, Viewing direction for inspection over 30 ㎝

10.2.2.The distance from eye to defect around 300mm, the distance from ND Filter to defect around 25~30mm



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10.3. Classification Of Defects

10.3.1.Major defect

A major defect refers to a defect that may substantially degrade usability for product applications.

10.3.2.Minor defect

A minor defect refers to a defect which is not considered to be able substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation.

Notes: If the LCD/LCM ’s cosmetic and display performance do not specify in “inspection criterion”, it should be based on these delivered samples.

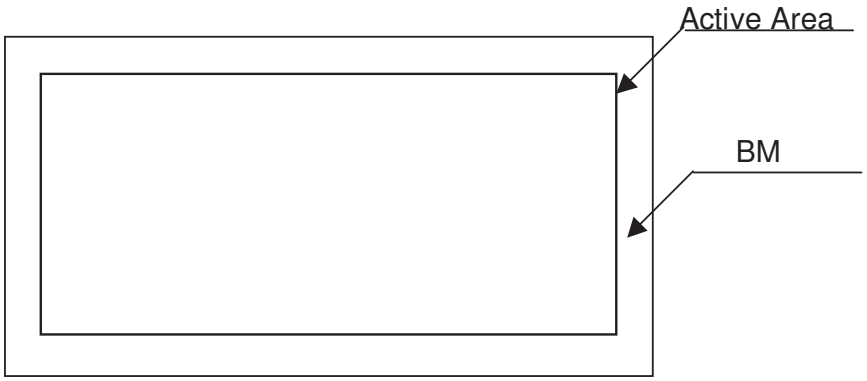
10.4. Sampling & Acceptable Quality Level

Level II, MIL-STD-105E

	Major	Minor
Cosmetic	1.0 %	1.5 %
Electrical-display	0.4%	0.65 %

10.5. Definition Of Inspection Area

A.A: Active Area



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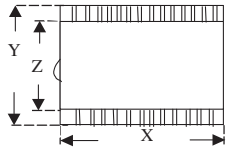
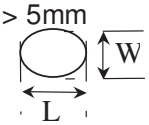
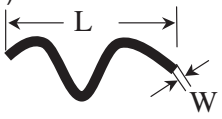
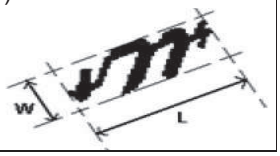
10.6. Items and Criteria

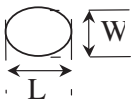
10.6.1.Visual inspection criterion in cosmetic

(1) Glass defect

No	Defect	Criteria	Remark
1	Dimension (Major)	By engineering diagram	
2	Cracks (Major)	Extensive crack 【Reject】	

(2) LCM appearance defect

No	Defect	Criteria		Remark
1	Round type (Minor)	Spec.	Permissible Q'ty	1. ϕ =(L+W)/2, L: Length, W: Width 2. Disregard if out of A.A. 3. Distance between two points > 5mm 
		ϕ <0.20mm	Disregard	
		0.20mm≦ ϕ ≦0.6mm	4	
		0.6mm< ϕ	0	
2	Scratch (Minor)	Spec.	Permissible Q'ty	1.L: Length, W: Width 2. Disregard if out of A.A. 3. No more than two lines in each square centimeter (cm^2) 
		W≦0.02mm and L≦15mm	Disregard	
		0.02mm<W≦0.1mm and L≦15mm	5	
		W>0.1mm or L>15mm	0	
3	Fiber (Minor)	Spec.	Permissible Q'ty	1.L: Length, W: Width 2. Disregard if out of A.A. 3. No more than two lines in each square centimeter (cm^2) 
		W≦1.5mm and L≦2.0mm	5	
		W>1.5mm or L>2.0mm	0	

4	Polarizer Bubble / Dent (Minor)	Spec.	Permissible Q'ty	1. ϕ =(L+W)/2 , L: Length, W: Width 2. Disregard if out of A.A. 3. Distance between two points > 5mm 4. No more than two lines in each square centimeter (cm^2) 
		ϕ <0.30mm	Disregard	
		0.30mm≦ ϕ ≦0.6mm	4	
		0.6mm< ϕ	0	

(3) FPC

No	Defect	Criteria	Remark
1	Copper peeling (Minor)	Copper peeling 【Reject】	

(4) Black tape

No	Defect	Criteria	Remark
1	Shift (Minor)	IC exposed 【Reject】	
2	No black tape (Minor)	No black tape 【Reject】	

(5) Silicon

No	Defect	Criteria	Remark
1	Amount of silicon (Minor)	ITO exposed 【Reject】	

(6) Bezel

No	Defect	Criteria	Remark
1	Oxidized spot (Minor)	Oxidized spot, rust 【Reject】	
2	Outline deformation (Minor)	By engineering diagram	
3	Greasiness (Minor)	Greasiness 【Reject】	
4	Spots, round Type (Minor)	H≦By engineering diagram 【Disregard】	H=Total height (thickness)
5	Plating (Minor)	Bubble, peeling 【Reject】	

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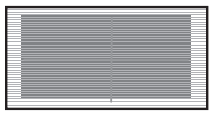
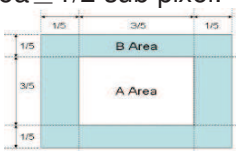
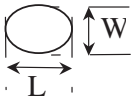
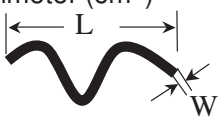
10.6.2.LCM electrical criterion

(1).LCM electrical criterion

<table>
<tr><th>No</th><th>Defect</th><th colspan="4">Criteria</th><th>Remark</th></tr>
<tr><td>1</td><td>No display
(Major)</td><td colspan="4">Not allowed</td><td>  </td></tr>
<tr><td>2</td><td>Missing line
(Major)</td><td colspan="4">Not allowed</td><td>  </td></tr>
<tr><td>3</td><td>Darker or lighter line
(Major)</td><td colspan="4">Not allowed</td><td>  </td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Bright / Dark point
(Minor)</td><td></td><td>A Area</td><td>B Area</td><td>Total</td><td rowspan="4">1.1sub-pixel: 1R or 1G or 1B 2.Point defect area≧1/2 sub pixel.
  </td></tr>
<tr><td>Bright point</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Dark dot point</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Bright +Dark point</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Round type
(Minor)</td><td colspan="3">Spec.</td><td>Permissible Q'ty</td><td rowspan="4">1. ϕ =(L+W)/2,
L: Length, W: Width
2. Disregard if out of A.A.
3. Distance between two points > 5mm
  </td></tr>
<tr><td colspan="3">ϕ <0.20mm</td><td>Disregard</td></tr>
<tr><td colspan="3">0.20mm≦ ϕ ≦0.6mm</td><td>4</td></tr>
<tr><td colspan="3">0.6mm< ϕ</td><td>0</td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">Scratch
(Minor)</td><td colspan="3">Spec.</td><td>Permissible Q'ty</td><td rowspan="4">1.L: Length, W: Width
2. Disregard if out of A.A.
3. No more than two lines in each square centimeter (cm²)
  </td></tr>
<tr><td colspan="3">W≦0.02mm and L≦15mm</td><td>Disregard</td></tr>
<tr><td colspan="3">0.02mm<W≦0.1mm and L≦15mm</td><td>5</td></tr>
<tr><td colspan="3">W>0.1mm or L>15mm</td><td>0</td></tr>
</table>

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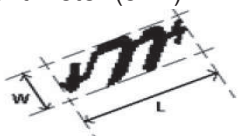
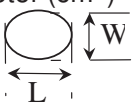
7	Fiber (Minor)	Spec.	Permissible Q'ty	1.L: Length, W: Width 2. Disregard if out of A.A. 3. No more than two lines in each square centimeter (cm^2) 
		W≦1.5mm and L≦2.0mm	5	
		W>1.5mm or L>2.0mm	0	
8	Polarizer Bubble / Dent (Minor)	Spec.	Permissible Q'ty	1. ϕ =(L+W)/2 , L: Length, W: Width 2. Disregard if out of A.A. 3. Distance between two points > 5mm 4. No more than two lines in each square centimeter (cm^2) 
		ϕ <0.30mm	Disregard	
		0.30mm≦ ϕ ≦0.6mm	4	
		0.6mm< ϕ	0	
9	Mura (Minor)	By 2% ND filter invisible		

10.6.3.Others

1. Issues that are not defined in this document shall be discussed and agreed with both parties. (Customer and supplier)
2. Unless otherwise agreed upon in writing, the criteria shall be applied to both parties. (Customer and supplier)
3. Polarizer, more than 0.5mm in size reduction rejected.

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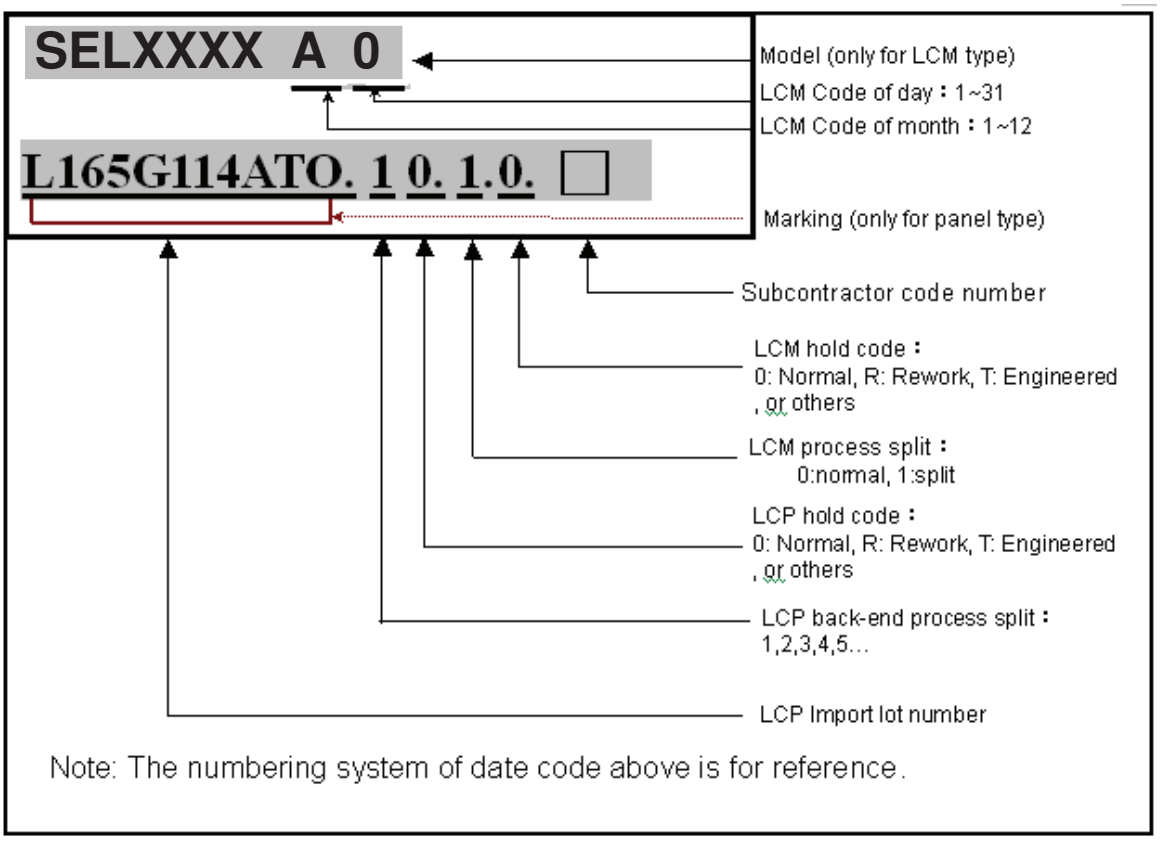
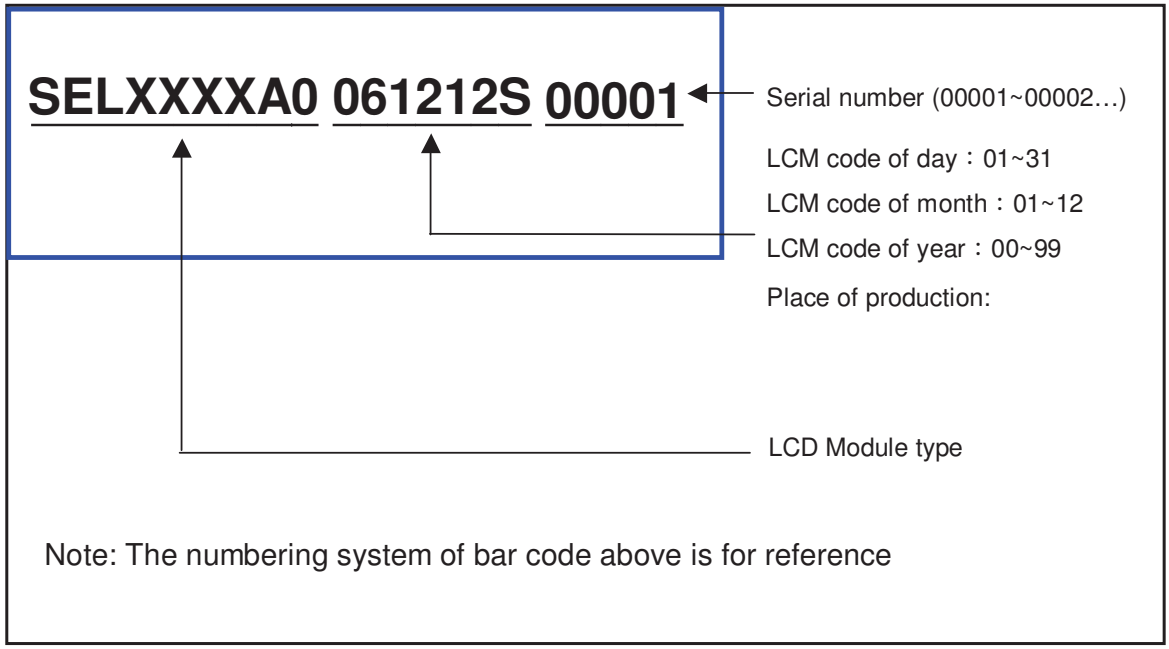
11.ILLUSTRATION OF LCD DATE CODE



Note: The numbering system of date code above is for reference.

12.ILLUSTRATION OF LCD BAR CODE



Note: The numbering system of bar code above is for reference

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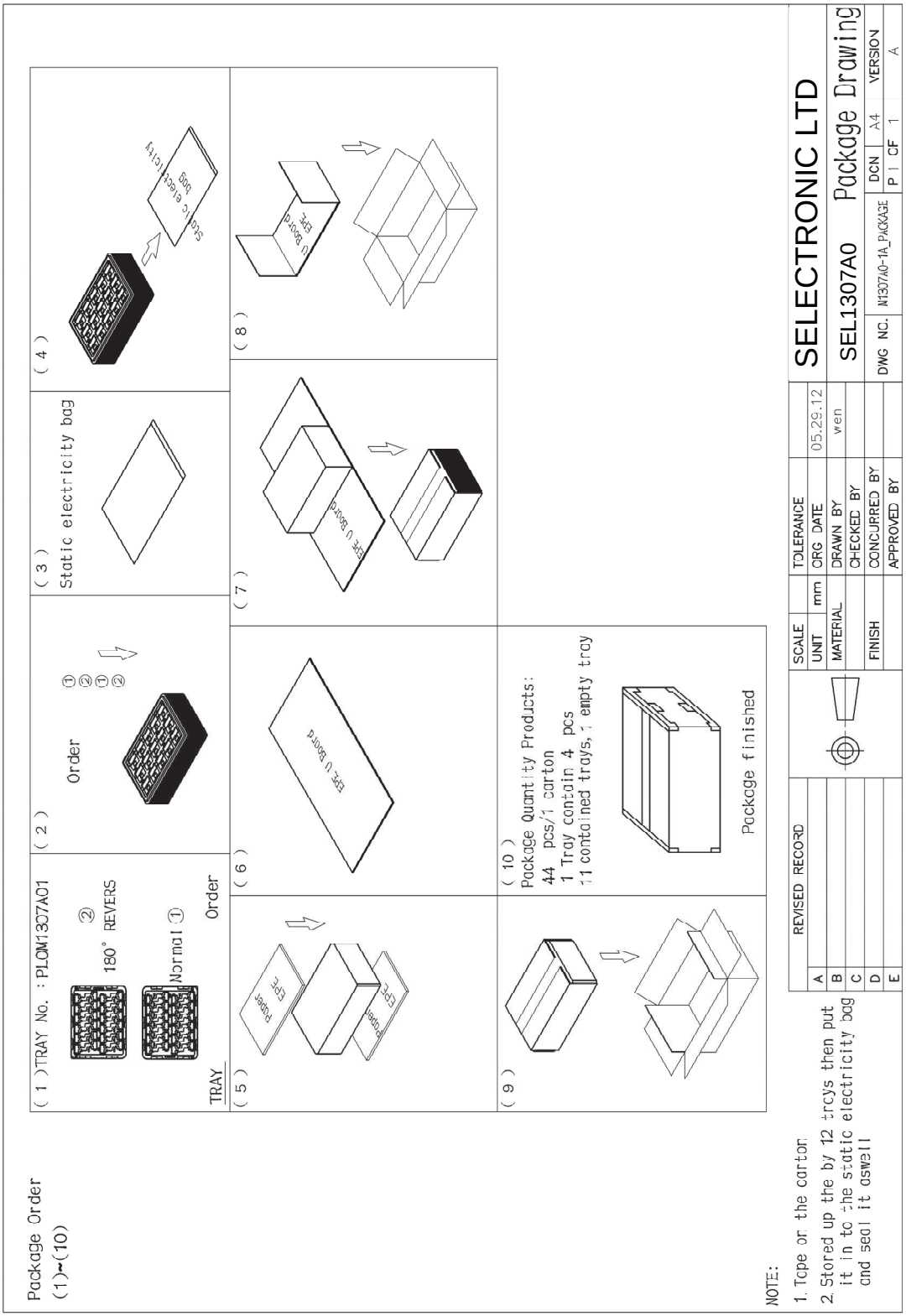
13.PACKAGE DRAWING



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14.RoHS COMPLIANT WARRANTY

RoHs Hazardous substances including:

- Cd< 100 ppm
- Pb< 1000 ppm
- Hg< 1000 ppm
- Cr +6 < 1000 ppm
- PBDE < 1000 ppm
- PBB < 1000 ppm

15.PRECAUTIONS FOR USE

15.1. Safety

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

15.2. Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 23±5℃ and the humidity is below 50±20%RH.
(2) Store in anti-static electricity container.
(3) Store in clean environment, free from dust, active gas, and solvent.
(4) Do not place the module near organics solvents or corrosive gases.
(5) Do not crush, shake, or jolt the module.
(6) Do not exposed to direct sun light of fluorescent lamps.

15.3. Installing LCD Module

Attend to the following items when installing the LCM.
(1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.
(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

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15.4. Precautions For Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.
(2) Driving the LCD in the voltage above the limit will shorten its lifetime.
(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
(4) When turning the power on, input each signal after the positive/negative voltage becomes stable.
(5) Do not apply water or any liquid on product which composed of T/P.

15.5. Handling Precautions

(1) Avoid static electricity which can damage the CMOS LSI; please wear the wrist strap when handling.
(2) The polarizing plate of the display is very fragile. so, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface; it may cause display abnormal .
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9) Do not apply water or any liquid on product, which composed of T/P.

15.6. Warranty

(1) The period is within 12 months since the date of shipping out under normal using and storage conditions.
(2) The warranty will be avoided in case of defect induced by customer.

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16.REVISION HISTORY

Version	Revise record	Date
A	New version	2012/6/4

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