BOE

SEC Code	
Product description	TV080WXM-NS0
Size	8.00inch (203.1mm)
Version	Ver. 0
Supplier	BOEHF
Supplier Code	

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

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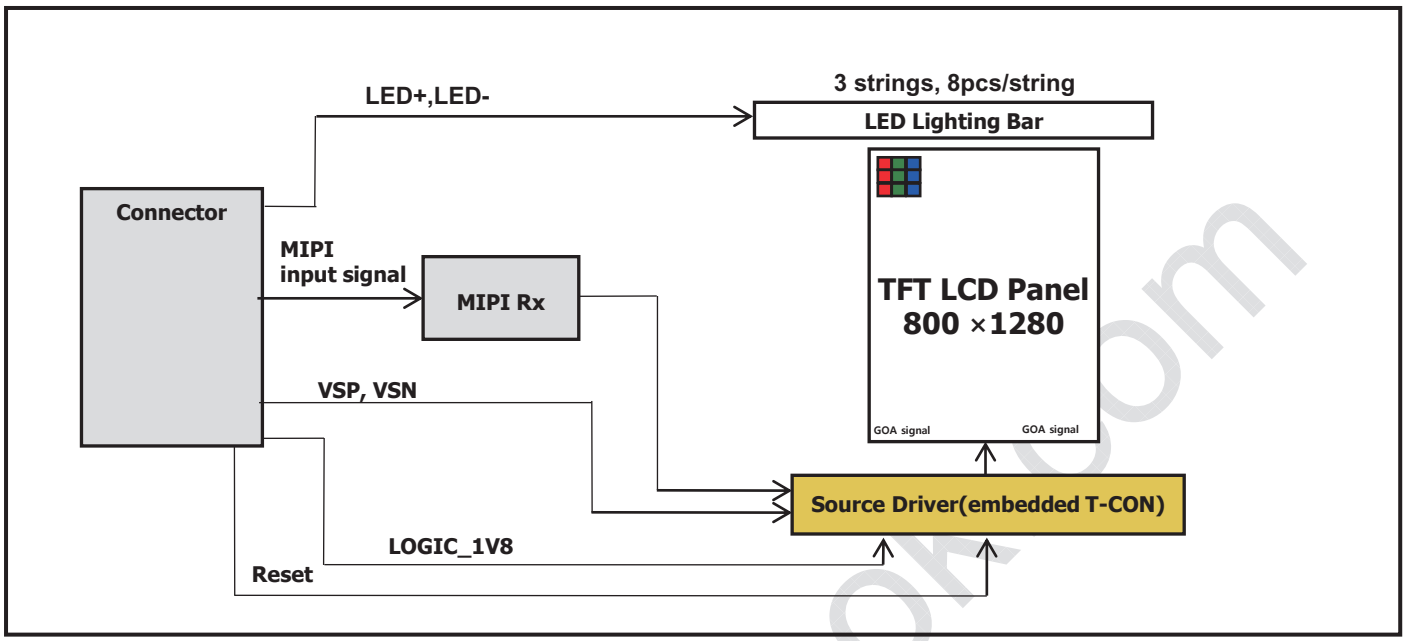
1. General Specification

A. Physical Specifications



Parameter	Specification	Unit	Remarks
Active area	8.00inch(203.1mm)	mm	107.64(H)×172.224(V)
Number of pixels	800(H) ×1280(V)	pixels	-
Pixel pitch	44.85(H) ×RGB×134.55(V)	um	-
Pixel arrangement	Pixels RGB stripe arrangement	-	-
Display colors	16.7M(Real 8bits)	colors	-
Display mode	Normally Black	-	HADS (PLS)
Pixel Domain	2 Domain	-	-
Outline Dimension	114.65(H) X 183.929(V) X 2.4(D) (typ.)	mm	Tolerance:±0.20mm
Weight	100.5 g (Typ.)	gram	Tolerance:±5.0g
Power Consumption	P_D : 0.22(max.)	Watt	White Pattern
	P_{BL} : 1.614(max.)		
	P_{total} : 1.834(max.)		
Surface Treatment	HC + LR	-	Upper Polarizer : HC + LR (Hardness : 2H) Lower Polarizer : AG 25
Back-light	Bottom edge side, 1-LED Lighting Bar Type	-	24* LED Array@3*8

편광판종류	반사율Spec.[%]		
	Min	Typ.	Max
HC + LR	1.01	2.50	3.00

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1. General Specification

C. Optical Specifications

1) Brightness= Max (=450nits)

주파수 : 51.2MHz 측정온도 : 상온(23℃) LED Current: 21.7mA

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	80	85	90	Deg.	Note 1
		Θ_9		80	85	90	Deg.	
	Vertical	Θ_{12}		80	85	90	Deg.	
		Θ_6		80	85	90	Deg.	
Viewing Angle range	Horizontal	Θ_3	CR > 100	75	80	90	Deg.	
		Θ_9		75	80	90	Deg.	
	Vertical	Θ_{12}		75	80	90	Deg.	
		Θ_6		75	80	90	Deg.	
Color Gamut[CTF]			-	50	55	60	%	-
Gray Scale Linearity		Δu'v'	Θ = 0	0.00	0.01	0.02	-	-
Color shift		Δu'v'	Θ = 60	0.00	0.01	0.02	-	-
Cross talk			-	-	-	1	%	-
Luminance Contrast ratio[CTF]		CR	Θ = 0	700	900	1300	-	Note 2
Luminance of White[CTF]	Center Points	Y_w	Θ = 0	360	450	540	cd/m^2	Note 3
White Luminance uniformity	9 Points	ΔY5		80	85	100	%	Note 4
Red Luminance uniformity	9 Points	ΔY5		80	85	100	%	Note 4
Green Luminance uniformity	9 Points	ΔY5		80	85	100	%	Note 4
Blue Luminance uniformity	9 Points	ΔY5		80	85	100	%	Note 4
Gray Luminance uniformity	9 Points	ΔY5		70	80	100	%	Note 4

*** White 관리는 White Balance (색온도, Deviation)로 관리함, 색온도 Spec 신뢰성 CS2000에 준함**
*** 양산시 광특성은 최대휘도 (Typ. 450nits)기준 광특성만 측정관리함**
*** 광특성 표준 계측기 : 삼성전자 무선사업부 신뢰성 시험 그룹 CS-2000**

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1. General Specification

C. Optical Specifications (Remark)

Notes : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

3. Center Luminance of white is defined as luminance values of 1point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display. The luminance is measured by CA310 when the LED current is set at 17mA.

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4. The White luminance uniformity on LCD surface is then expressed as : ΔY = Minimum Luminance of 9points / Maximum Luminance of 9points (see FIGURE 2).

5. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6.The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

7. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

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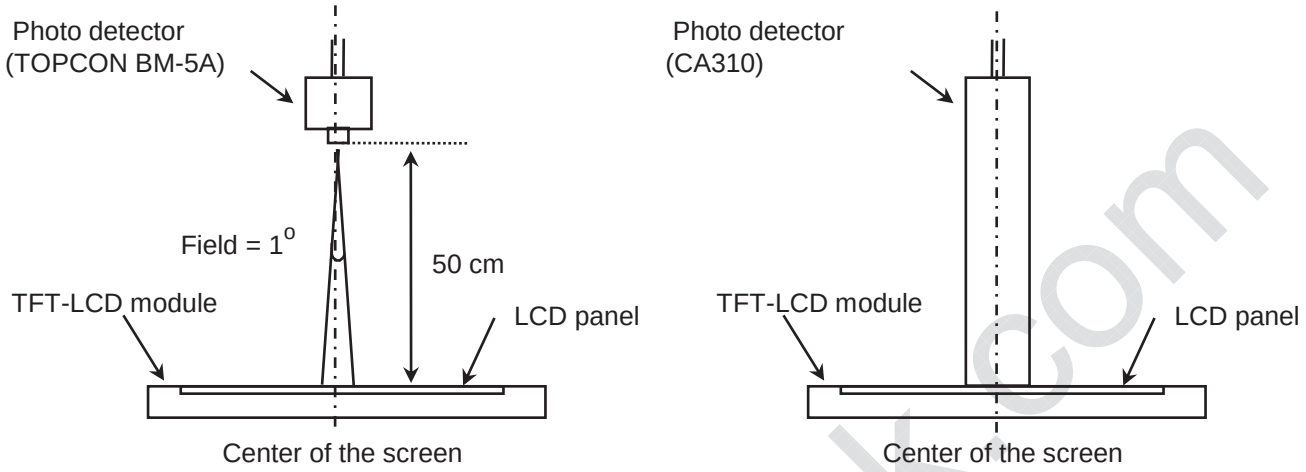
1. General Specification

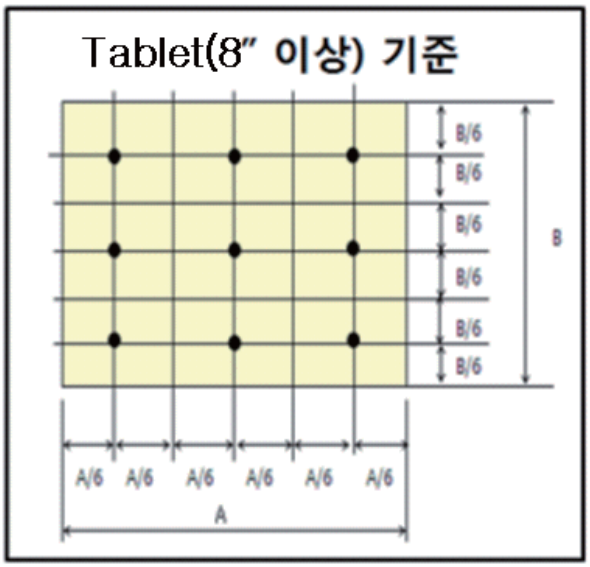
C. Optical Specifications (Remark)

Figure 1. Measurement Set Up



View angel range measurement setup Luminance , uniformity and color measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9 points)

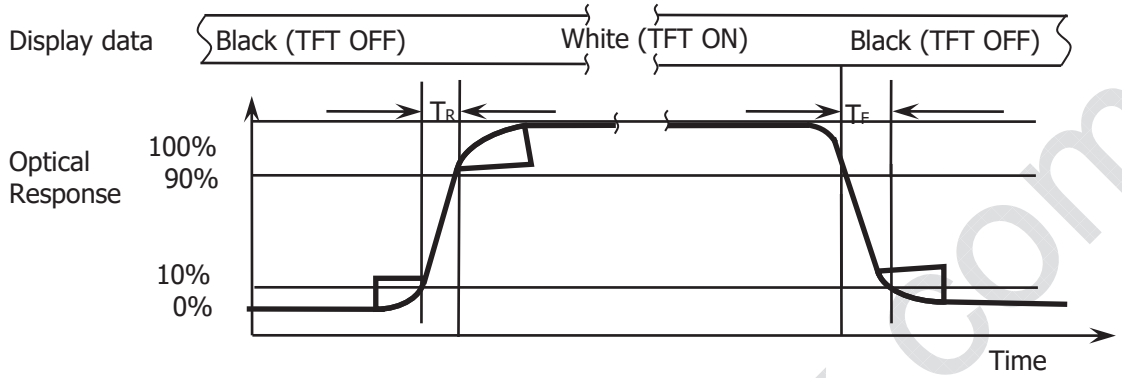


Center Luminance of white is defined as luminance values of center 5 point across the LCD surface. Luminance shall be measured with all pixels in the view fiel d set first to white. This measurement shall be taken at the locations shown in FIGU RE 2 for a total of the measurements per display.
The White luminance uniformity on LCD surface is then expressed as : ΔY9 = Mini mum Luminance of 9points / Maximum Luminance of 9points (see FIGURE 2).

1. General Specification

C. Optical Specifications (Remark)

Figure 3. Response Time Testing



The electro-optical response time measurements shall be made as shown in FIG URE 3 by switching the “data” input signal ON and OFF. The times needed for th e luminance to change from 10% to 90% is Tr and 90% to 10% is Td.

2. Electrical Specification

A. Absolute maximum ratings

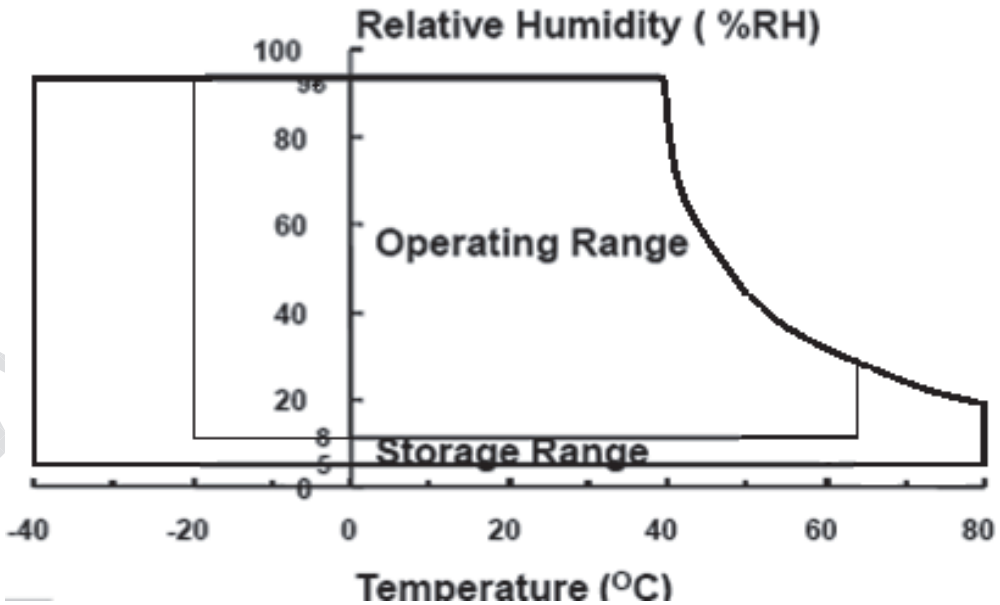
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed.

[VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.3	2.0	V	Note 1
Power Supply For LED	V_{LED}	21.6	24	V	
Operating Temperature	T_{OP}	-20	+65	℃	
Storage Temperature	T_{ST}	-30	+80	℃	

Notes : 1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

2. Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 OC ≥ Ta)
Maximum wet - bulb temperature at 39 OC or less. (Ta > 40 OC) No condensation.



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5. Electrical Specification

B. Electrical characteristics

[Ta =25±2 ℃]

Parameter			Symbol	Values			Unit	Note
				Min	Typ	Max		
Power Supply1 Input Voltage			PAVDD	5.1	5.4	5.7	Vdc	1
Power Supply1 Current			I_PAVDD	14	17	20	mA	
Power Supply2 Input Voltage			NAVDD	-5.7	-5.4	-5.1	Vdc	
Power Supply2 Current			I_NAVDD	8	11	14	mA	
Power Supply3 Input Voltage			VDD1V8	1.7	1.8	1.9	Vdc	
Power Supply3 Current			I_VDD1V8	6	9	13	mA	
Power Consumption	LOGIC	@PAVDD	P_PAVDD	70	92	114	mWatt	
		@NAVDD	P_NAVDD	40	60	81	mWatt	
		@LOGIC1V8	P_LOGIC1V8	10	16	25	mWatt	
		TOTAL	P_TOTAL	120	168	220	mWatt	
	BLU TOTAL		P_BLU TOTAL	1406	1510	1614	mWatt	
	TOTAL[CTF]		P_TOTAL	1526	1678	1834	mWatt	
Rush current			IRUSH	-	0.7	1	A	2

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for VDD1V8=1.8V,PAVDD=5.4V,NAVDD=-5.4V, frame rate f_V=60Hz and clock frequency = 68.4MHz. Test pattern of power supply current is : Min. ,Typ. And Max. @White Pattern
2. The duration of rush current is about 2ms and rising time of Power input is 1ms (min)

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2. Electrical Specification

B. Electrical characteristics

[Ta =25±2 ℃]

Items	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	IF	-	65.1	-	mA	24LEDs (8LED Serial, 3LED Parallel)
Forward Voltage	VF	21.6	23.2	24.8	V	
Backlight Power Consumption	-	1406	1510	1614	mW	
Operating Life Time	-	20000		-	Hrs	IF = 21.7mA Note 3

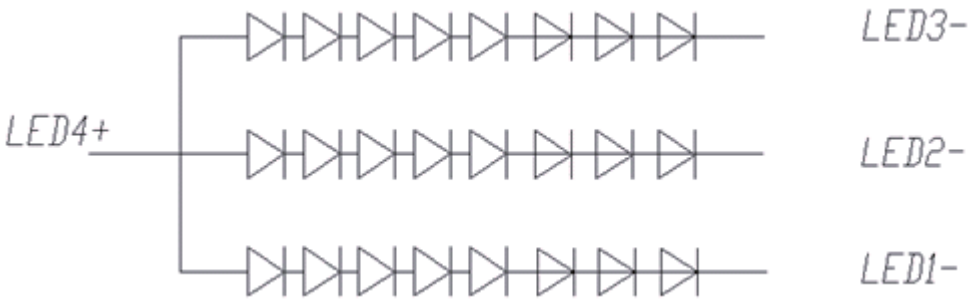
[Ta =60±2 ℃]

Items	Symbol	Min	Typ	Max	Unit	Remark
Operating Lift Time	-	15000		-	Hrs	IF = 21.7mA

Note1: The LED driving condition is defined for each LED module (8 LED Serial, 3 LED Parallel). For each LED: IF (1/3) =21.7mA, VF (1/5) =2.9 V

Note2: Under LCM operating, the stable forward current should be inputted. And forward voltage is for reference only.

Note3: IF is defined for one channel LED. Optical performance should be evaluated at Ta=25℃ 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% initial brightness. Typical operating life time is estimated data.



Surface Resistance and ESD

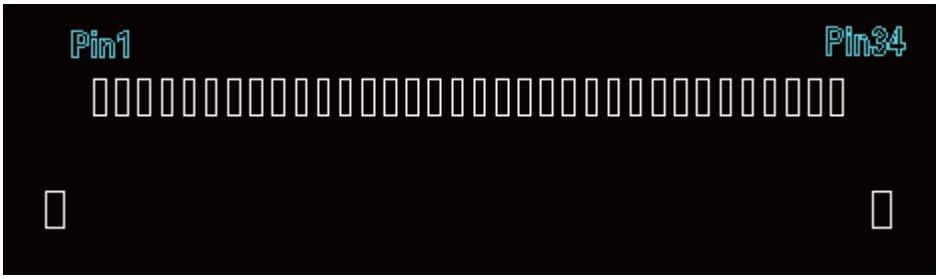
Checking condition : room temperature and 40~70%RH

	Surface Resistance (Ohm/sq)	ESD
Reel	10E4~10E6	<50V
Cover Tape	10E9~10E11	<50V
Carrier Tape	10E4~10E6	<50V
Aluminum Bag	10E9~10E11	<50V

2. Electrical Specification

C. Connector Pin assignment

Pin. No.	Pin-Name	I/O	Description	SPEC
1	PAVDD	P	LCD analog power supply	5.4±0.3V 50mA
2	PAVDD	P	LCD analog power supply	5.4±0.3V 50mA
3	NC	-	No connection	-
4	NAVDD	P	LCD analog power supply	-5.4±0.3V 50mA
5	NAVDD	P	LCD analog power supply	-5.4±0.3V 50mA
6	NC	-	No connection	-
7	VDD1V8	P	Digital circuit IO power supply.	1.8±0.1V 30mA
8	PWM	O	CABC PWM control signal for brightness of the LED backlight.	1.8V Logic
9	BC-C	O	Turn on/off signal of BL	1.8V Logic
10	RESET	I	Global reset	1.8V Logic
11	GND	P	Ground	-
12	D2P	I/O	MIPI data 2 Positive signal	-
13	D2N	I/O	MIPI data 2 negative signal	-
14	GND	P	Ground	-
15	D1P	I/O	MIPI data 1 Positive signal	-
16	D1N	I/O	MIPI data 1 negative signal	-
17	GND	P	Ground	-
18	CLKP	I/O	MIPI CLK Positive signal	-
19	CLKN	I/O	MIPI CLK negative signa	-
20	GND	P	Ground	-
21	D0P	I/O	MIPI data 0 Positive signal	-
22	D0N	I/O	MIPI data 0 negative signal	-
23	GND	P	Ground	-
24	D3P	I/O	MIPI data 3 Positive signal	-
25	D3N	I/O	MIPI data 3 negative signal	-
26	GND	P	Ground	-
27	NC	-	OTP flasing pin, only used for BOE	-
28	FB1	P	LED cathode	21.7mA
29	FB2	P	LED cathode	21.7mA
30	FB3	P	LED cathode	21.7mA
31	NC	-	No connection	-
32	VLED	P	LED anode	65.1mA
33	VLED	P	LED anode	
34	NC	-	No connection	-



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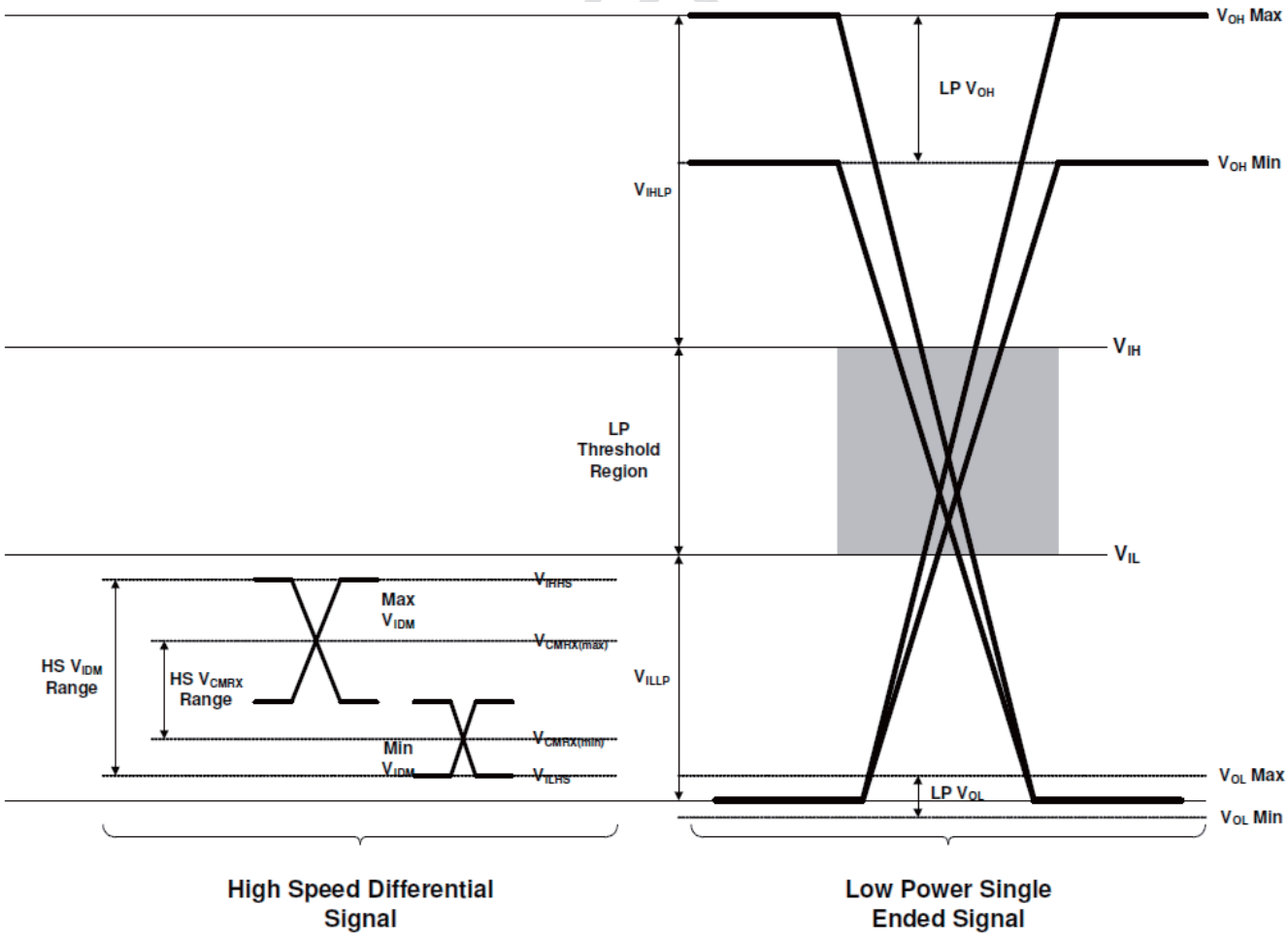
2. Electrical Specification

D. Timing Parameters

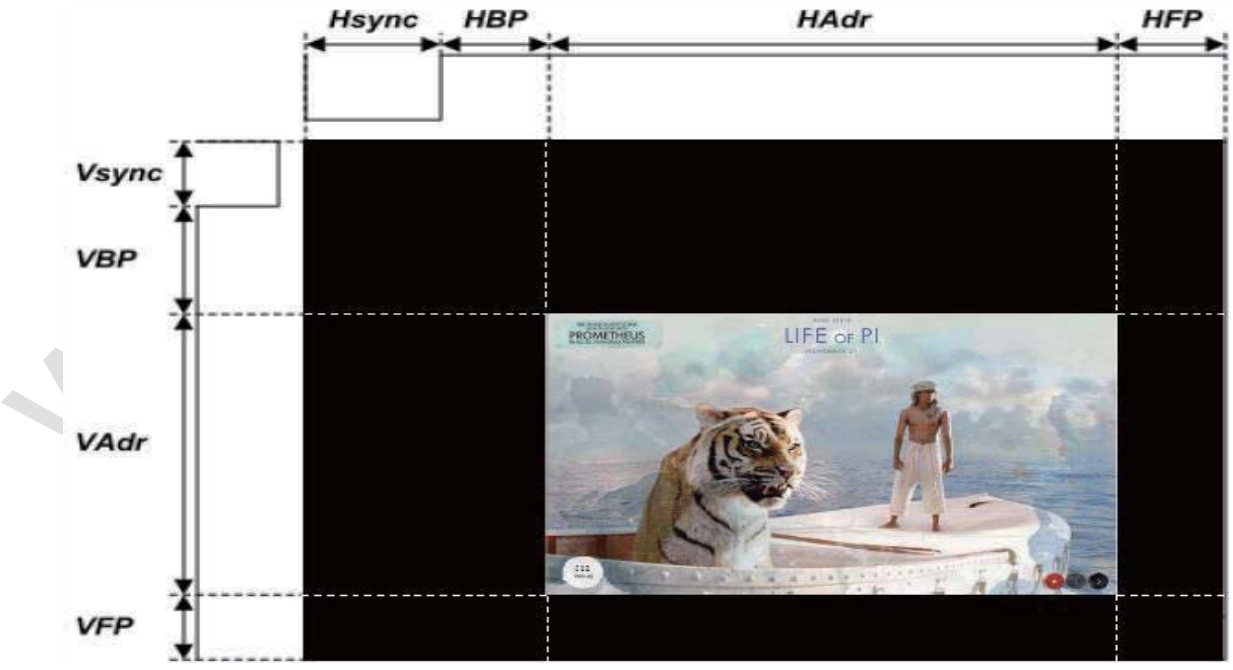
Parameter	Symbol	Min	Typ	Max	Unit	Condition
MIPI digital operation current	I_{VCCIF}	8	11	15	mA	-
MIPI digital stand-by current	$I_{VCCIFST}$	-	200	-	uA	-
MIPI Characteristics for High Speed Receiver						
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV	
Single-ended input high voltage	V_{IHHS}	-	-	460	mV	
Common-mode voltage	V_{CMRXDC}	70	-	330	mV	
Differential input impedance	Z_{ID}	90	100	110	Ω	
Differential input high threshold	VIHHS	-	-	70	mV	
Differential input high threshold	VIHHS	-70	-	-	mV	
MIPI Characteristics for Low Power Receiver						
Pad signal voltage range	V_I	-50	-	1350	mV	
Output low level	V_{OL}	-50	-	50	mV	
Output high level	V_{OH}	1.1	1.2	1.3	V	



2. Electrical Specification

E. MIPI Timing Parameter

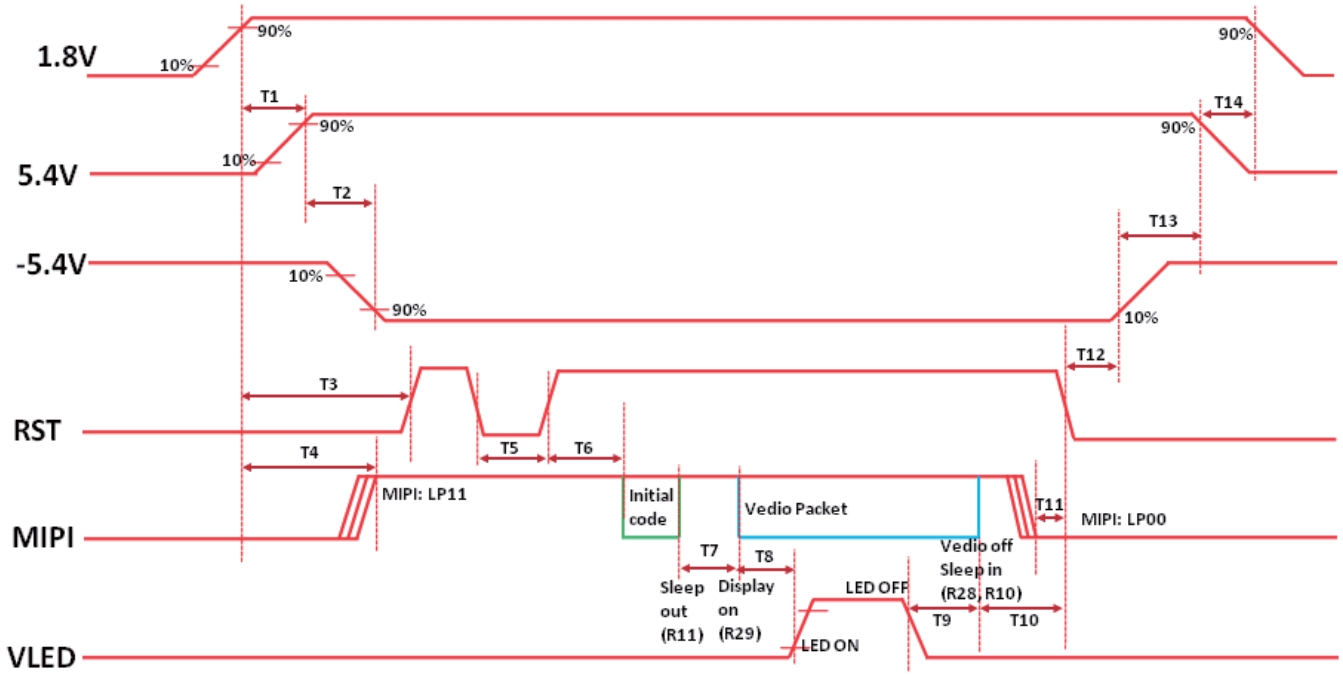
Item	Symbol	Min	Typ	Max	Unit	Remarks
Pixel CLK	Tpixclk		68.43		MHz	-
MIPI CLK	Period	2	2.08	2.17	ns	-
	Frequency	460	480	500	Mbps	-
Hsync	Period	16			Tpixclk	-
	Frequency		77.76		KHz	-
Vsync	Period	2			Line	-
	Frequency		60	-	Hz	-
Horizontal Active Display Term rgb vporch 8 6 2 rgb hporch 16 48 16	HAdr		800	-	Tpixclk	-
	HBP	48			Tpixclk	-
	HFP	16			Tpixclk	-
	Total		880		Tpixclk	-
Vertical Active Display Term	Vadr		1280	-	Line	-
	VBP	6			Line	-
	VFP	8			Line	-
	Total		1296		Line	-



2. Electrical Specification

F. Power Sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.



Check Item		SPEC
Power on	t1	0.01~5ms
	t2	1~10ms
	t3	20~100ms
	t4	0~T3 ms
	t5	0.01~1ms
	t6	50~100ms
	t7	120~200ms
	t8	35ms
Power off	t9	35ms
	t10	50~100ms
	t11	0ms
	t12	0ms
	t13	0ms
	t14	0ms

Notes:

1. When the power supply VDD1V8 is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
   Back Light must be turn on after power for logic and interface signal are valid.

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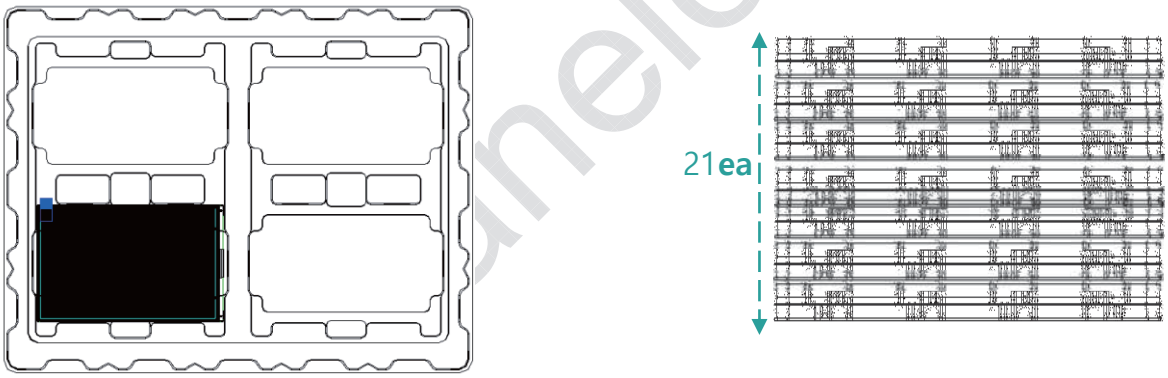
3. Packing Form

A. Packing Description

Packing Condition	Contents
Packing type	PET + Antistatic Backing packing type
PET material model	PET (10^6~10^9Ω/sq)
PET packing type	PET Tray
Number of panels per PET	4 pieces
Number of PET per inner box	21units (20units + 1 unit empty)
Number of inner box per pallet	16 ea
Number of panels per inner box	80 pieces
Number of panels per pallet	1280pieces



picture 1

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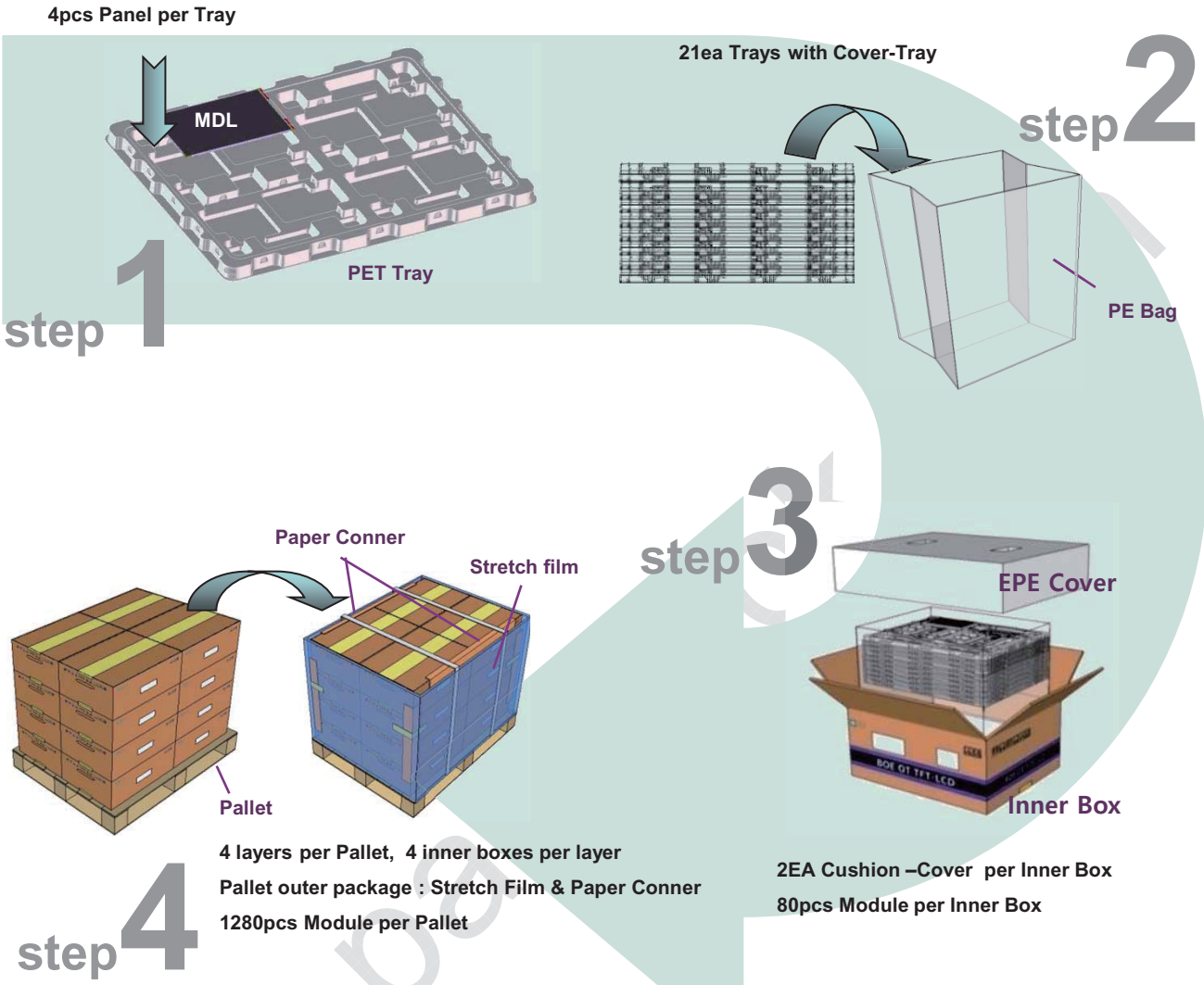
3. Packing Form

C. Description of packing procedure



No.	Description	Quantity
1	TFT-LCD	1280pcs/Pallet
2	Module/PET Tray	4pcs
3	PET Tray	21 ea (1ea : empty) / Inner Box
4	Inner Box	16ea/Pallet
5	PE Bag	16ea/Pallet
6	Paper Conner	6ea/Pallet
7	Belt tape	1,440-1,488 cm
8	**Stretch Film**	28 ~ 30M
9	Distribution label	1pcs

※ Standard packing dimensions is 510×410×252mm, it would be observed strictly.

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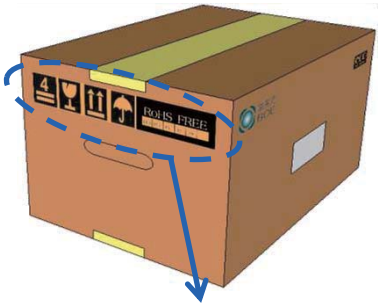
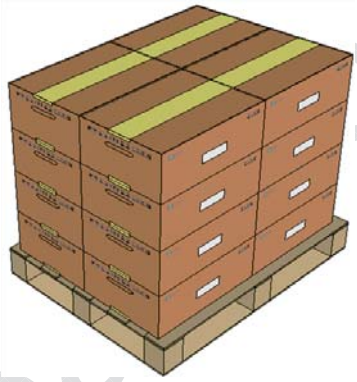
3. Packing Form

C. Description of packing procedure (picture)

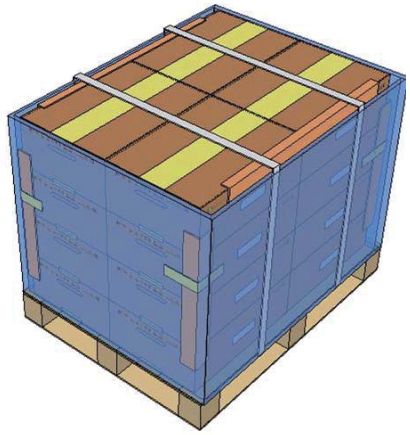
Inner Box



Inner Box On Pallet



Protective film & Paper Corner



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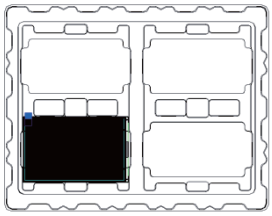
3. Packing Form

D. ESD measurement



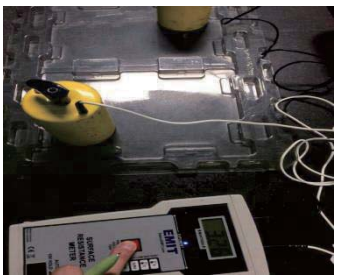
Features
: Good Electrical Conductivity
: Good Dimensional Stability
: Good Stiffness / Toughness Balance
: Low plough-out

Properties	Test Methods	Units	Kenneled
Base Polymer	-	-	PET
Thickness	Thickness gauge	mm	1.0±0.3
Surface Resistivity	ASTM D257	Ω / sq	$1\times10^{6\sim9}$
ESD	ESD Tester	V	＜100

Test Result

ITEM	Spec	Test1	Test2	Test3	Test4	Test5	Test Result
Value(Ω / sq)	$1\times10^{6\sim9}$	3.76×10^{8}	3.23×10^{7}	1.06×10^{8}	6.07×10^{8}	6.48×10^{7}	OK
Voltage(V)	＜100	0.09	0.05	0.07	0.07	0.08	OK

Test Methods



1. Put Tray On Marble platform
2. Put Electrostatic Tester On Tray (Inside & Outside)
3. Test Frequency : 4 times on Inside , 4 times On Outside
   (Test Result is Max Value)
4. Test Tray Q'ty : 5 ea

4. Mechanical Specifications

A. Mechanical Characteristics

FIGURE 5 shows mechanical outlines for the model TV070WXM-NS0.
Other parameters are shown in Table below.

<Dimensional Parameters>

Parameter	Specification	Unit
Active Area	107.64(H)×172.224(V)	-
Number of pixels	800(H) X1280 (V) (1 pixel = R + G + B dots)	-
Pixel pitch	44.85(H) ×RGB×134.55(V)	-
Pixel arrangement	RGB Vertical stripe	-
Display colors	16.7M	-
Display mode	Normally Black	-
Dimensional outline	114.65(H) X 183.929(V) X 2.4(D) (typ.)	mm
Weight	100.5± 5g	gram
Back-light	LED	-
Panel Thickness	0.8(typ.)	mm

Polarizer Hardness.

The surface of the LCD has a hard coating to reduce scratching.

Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 150lux.

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4. Mechanical Specifications

B. HANDLING & CAUTIONS

(1) Cautions when taking out the module
Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module
As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
Do not pull the interface connector in or out while the LCD module is operating.
Put the module display side down on a flat horizontal plane.
Handle connectors and cables with care.

(3) Cautions for the operation
When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere
Dew drop atmosphere should be avoided.
Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics
Do not apply fixed pattern data signal to the LCD module at product aging.
Applying fixed pattern for a long time may cause image sticking.

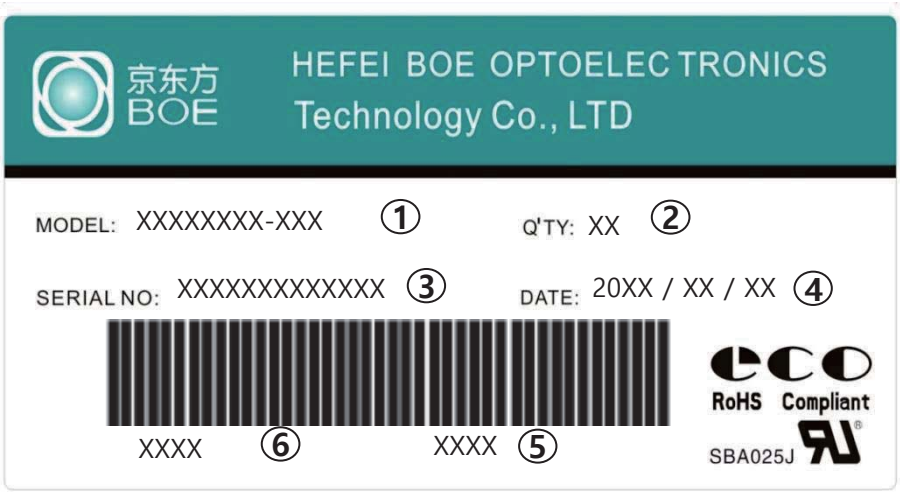
(6) Other cautions
Do not disassemble and/or re-assemble LCD module.
Do not re-adjust variable resistor or switch etc.
When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

BOE

4. Mechanical Specifications

C. LABEL

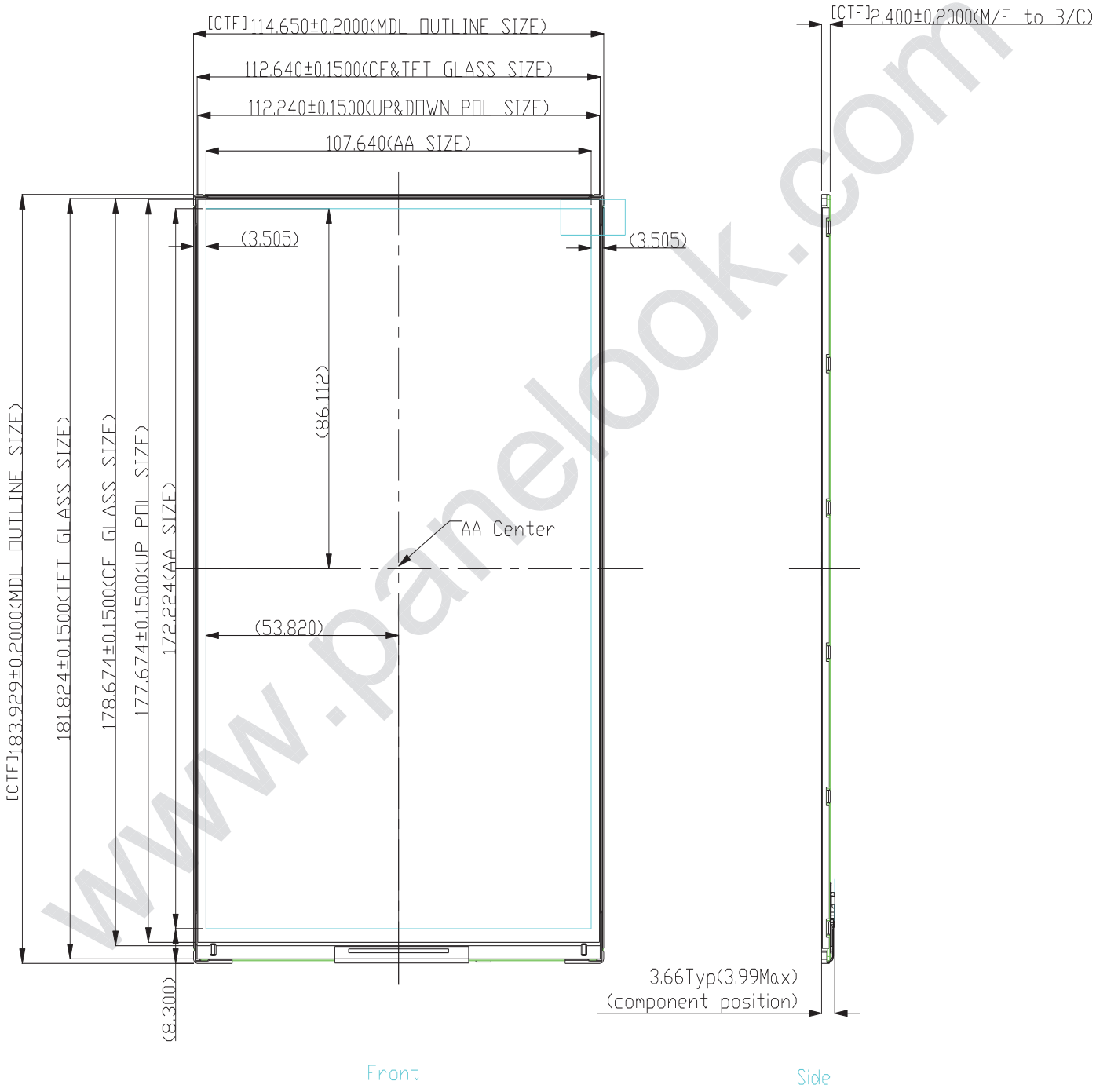
Box label



Label Size:
110 mm (L) 56 mm (W)
Contents
1. FG-CODE
2. Box 제품 수량
3. Box ID, Code Rule
4. Box Packing Date
5. FG-CODE뒤4자리
6.고객단 제품 코드

번호	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	4	J	P	3	1	2	7	0	0	0	1	H	D
Description	GBN Code		Grade	B3	년도		월	Rev	서열번호				

4. Mechanical Specifications



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5. Initial Code

HWRESET
delay 20
R01
delay 100
RF0 5A 5A
RF1 5A 5A
RFC A5 A5
RD0 00 10
delay 10
R11
delay 120
R29