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# Datasheet

## AUO

**A036FAB01.0**



AUO Display+

# CUSTOMER APPROVAL SHEET

<b>Company Name</b>	
<b>MODEL</b>	<b>A036FAB01.0</b>
<b>CUSTOMER APPROVED</b>	

- APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver. 0.1)
- APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver. 0.1)
- APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver. 0.1)
- CUSTOMER REMARK :

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Date :	2021/08/24

# Product Specification

## 3.6" COLOR TFT-LCD MODULE

**Model Name :** A036FAB01.0

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**Planned Lifetime:**

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**Phase-out Control:**

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**EOL Schedule:**

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<  > Preliminary Specification

<  > Final Specification

Note: The content of this specification is subject to change.

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Version	Revise Date	Page	Content
0.0	2020/04/30		First Draft
0.1	2020/12/29	5	Update Outline Dimension Drawing
		8	Update TP power consumption
		9	Update Input Timing
		10	Update Power on sequence
		11	Update Chromaticity R,G,B(x,y)

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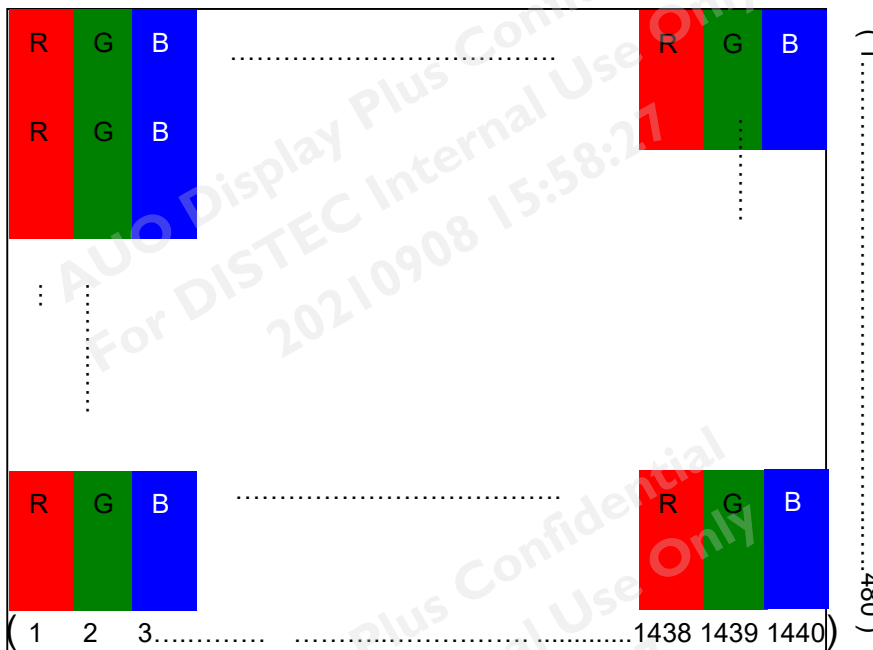
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**A. General Information**

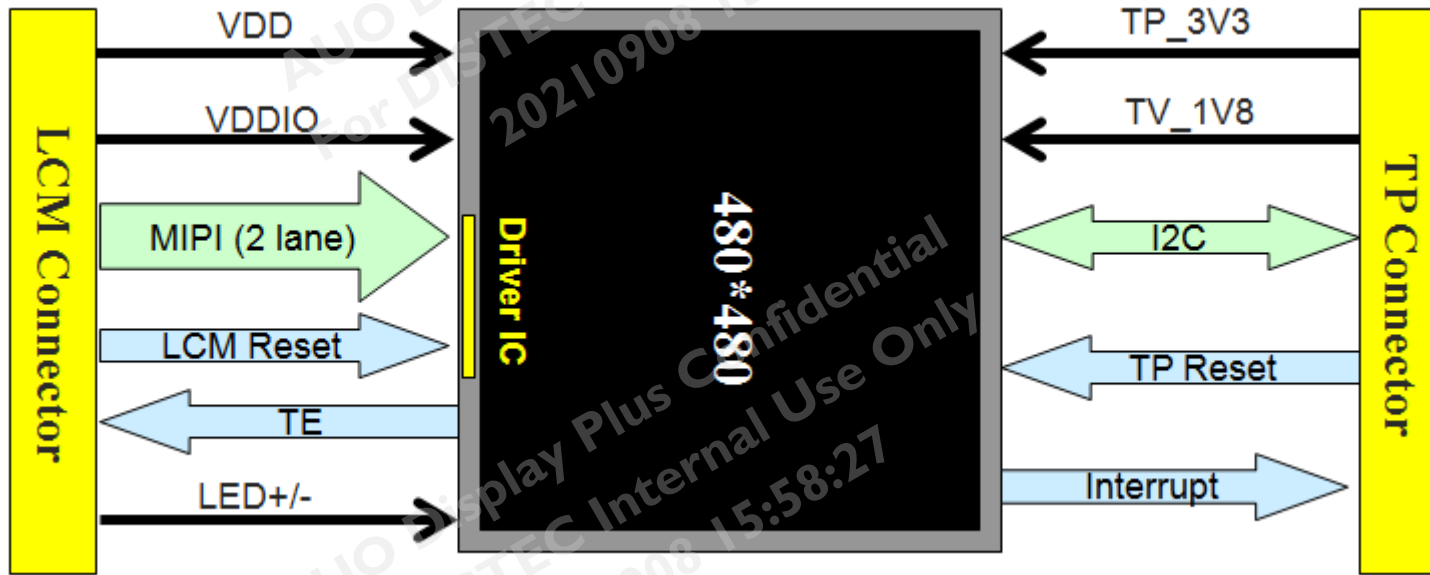
NO.	Item	Unit	Specification	Remark
1	Screen Size	inch	3.6(Diagonal)	
2	Display Resolution	dot	480RGB(H)x480(V)	
3	Overall Dimension	mm	79.9(H)x79.9(H) x3.22	Note 1
4	Active Area	mm	64.944(H) x 64.944(V)	
5	Pixel Pitch	mm	0.1353(H)x0.1353(V)	
6	Color Configuration	--	R. G. B. Stripe	Note 2
7	Color Depth	--	16.7M (8bit) colors	
8	NTSC Ratio	%	70	
9	Display Mode	--	Normally Black	
10	Panel surface Treatment	--	AF	
11	Weight	g	32.6(typ.)	
12	Panel Power Consumption	mW	142(typ.)	
13	Backlight Power Consumption	W	0.61(typ.)	
14	Touch Sensor Type		Projected Capacitive Touch Panel	
15	Touch Structure		On-cell TP	
16	Coverlens Thickness/Materials		1.1mm Gorilla3	
17	Touch Channel(X*Y)		11Rx , 11Tx	

Note 1: Not include backlight cable and FPC. Refer next page to get further information.

Note 2: Below figure shows dot stripe arrangement.



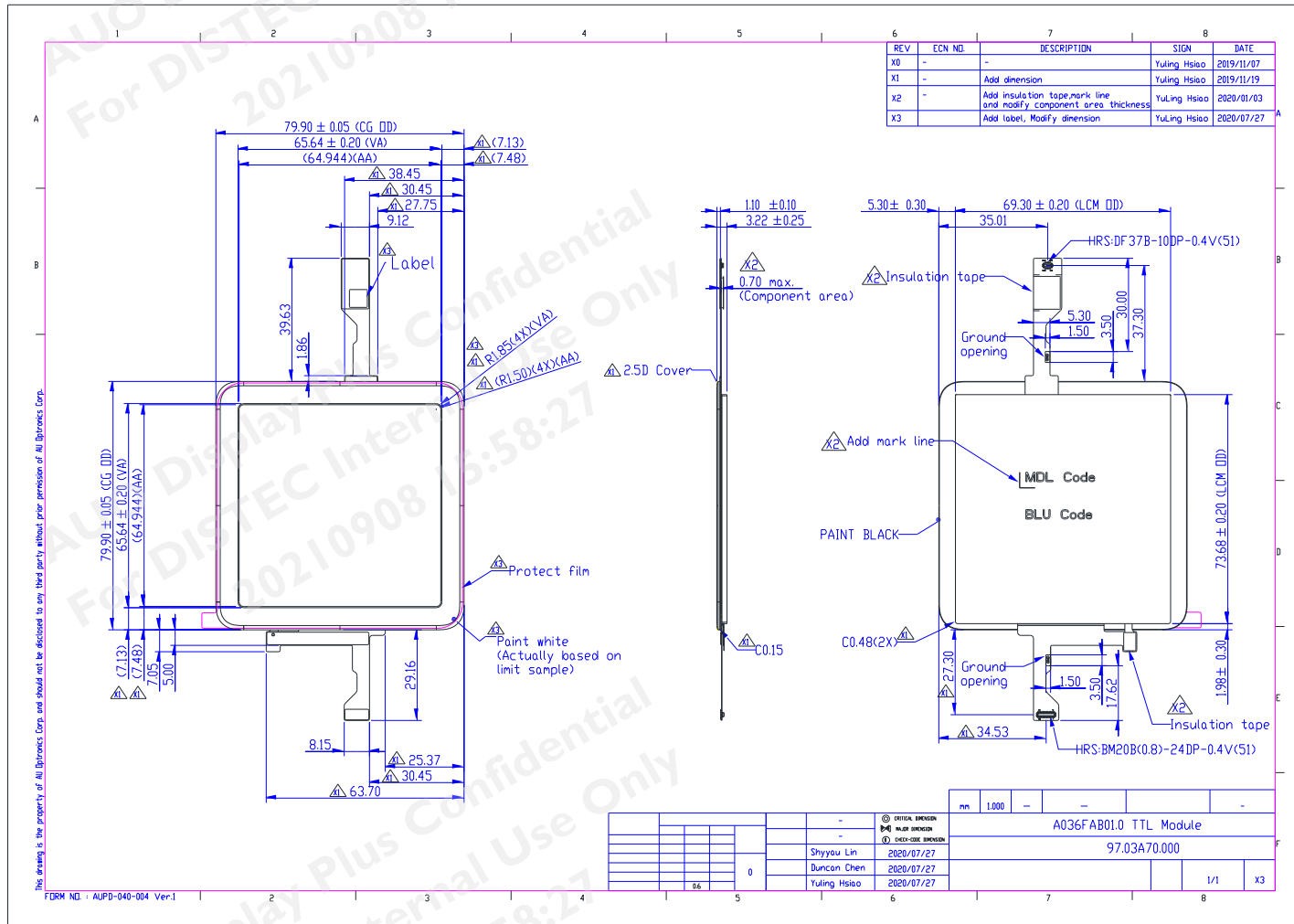
**B. Block Diagram**





**C. Outline Dimension**

**1. TFT-LCD Module – Front View/ Rear View (preliminary)**



## D. Electrical Specifications

### 1. TFT LCD Panel Pin Assignment

Connector Name / Designation	LCM Connector
Manufacturer	HIROSE
Connector Model Number	BM20B(0.8)-24DP-0.4V(51)
Mating Connector Model Number	BM20B(0.8)-24DS-0.4V(51)

NO.	Symbol	Description
1	LED_A	LED Anode
2	LED_K2	LED Cathode 2
3	NC	No connection
4	LED_K1	LED Cathode 1
5	TAMPER_LINE	Tamper mesh pin
6	GND	Ground
7	TAMPER_LINE	Tamper mesh pin
8	MIPI_D0_N	MIPI data signal 0 N
9	GND	Ground
10	MIPI_D0_P	MIPI data signal 0 P
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	MIPI_CLK_N	MIPI clock signal N
15	LCM RESET	LCM reset
16	MIPI_CLK_P	MIPI clock signal P
17	TE	Tearing Effective
18	GND	Ground
19	VDDIO	Logic power supply 1.8V
20	MIPI_D1_N	MIPI data signal 1 N
21	VDD	Anolog power supply 3.3V
22	MIPI_D1_P	MIPI data signal 1 P
23	VPP	OTP power
24	GND	Ground

## 2. TP Pin Assignment

Connector Name / Designation	LCM Connector
Manufacturer	HIROSE
Connector Model Number	DF37B-10DP-0.4V(51)
Mating Connector Model Number	DF37B-10DS-0.4V(51)

NO.	Symbol	Description
1	TAMPER_LINE	Tamper mesh pin
2	INT	TP interrupt
3	GND	Ground
4	TP_RESET	TP reset
5	TAMPER_LINE	Tamper mesh pin
6	GND	Ground
7	SDA	I2C SDA
8	TP_1V8	TP Logic power supply 1.8V
9	SCL	I2C SCL
10	TP_3V3	TP Analog power supply 3.3V

## 3. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Power Voltage	VDD	-0.3	4	V
	VDDIO	-0.3	4	V
	TP_3V3	-0.3	4	V
	TP_1V8	-0.3	4	V

Note 1: Maximum ratings are those values beyond which damages to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics chapter.

Note 2: Functional operation should be restricted under ambient temperature (25°C).

## 4. Electrical DC Characteristics

### a. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Power supply	VDD	2.5	3.3	3.6	V
	VDDIO	1.65	1.8	3.3	V
	TP_3V3	2.7	3.3	3.6	V
	TP_1V8	1.71	1.8	3.3	V
LCM Input voltage	VIH	VDDIOx0.7	-	VDDIO	V
	VIL	0	-	VDDIOx0.3	V
TP Input voltage	VTIH	TP_1V8x0.7	-	TP_1V8	V
	VTIL	0	-	TP_1V8x0.3	V

### b. Power Consumption

Parameter	Symbol	Typ.	Max.	Unit	Remark
Normal mode	I <sub>VDD+VDDIO</sub>	43	52	mA	Note 1
Sleep mode	I <sub>VDD+VDDIO</sub>	75	160	uA	
TP	I <sub>TP_3V3+TP_1V8</sub>	12	14.4	mA	

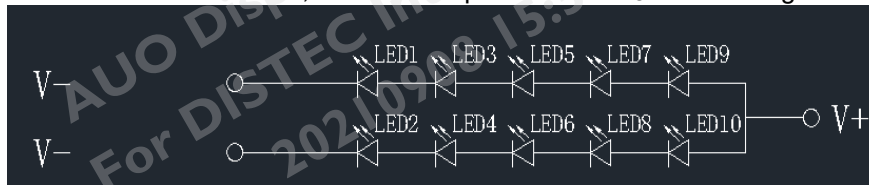
Note 1: Test condition: Red Pattern, Frame rate=75Hz, 25°C

### c. Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Lightbar current	I <sub>L</sub>	-	40	-	mA	Note 1, 2
LED Lightbar Voltage	V <sub>L</sub>		15.25	16.0	V	
Power consumption	P		0.61	-	W	
LED Lightbar life time		20,000	-	-	Hr	Note 1, 2, 3, 4

Note 1: LED backlight is LED lightbar type(10 pcs of LED).

Note 2: Definition of "LED Lifetime": brightness is decreased to 50% of the initial value. LED Lifetime is restricted under normal condition, ambient temperature = 25°C and LED lightbar current= 40mA



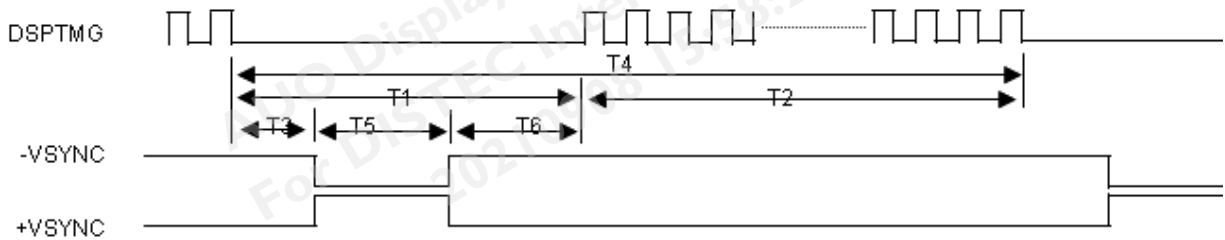
Note 3: The value is only for reference.

Note 4: If it operates with LED lightbar voltage more than 40mA, it maybe decreases LED lifetime.

### 5. Input Timing

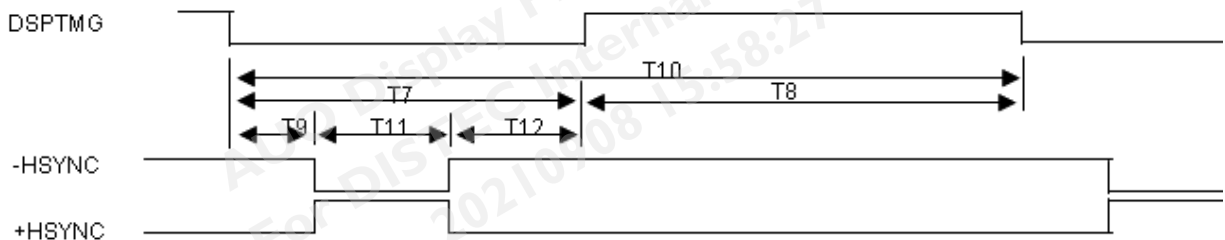
Parameter		Symbol	Typ	Unit
VSYNC	Back Porch	tVBP	5	Line
	Active Area	tVACT	480	Line
	Front Porch	tVFP	10	Line
	Pulse Width	tVP	2	Line
HSYNC	Back Porch	tHBP	20	DCLK
	Active Area	tHACT	480	DCLK
	Front Porch	tHFP	80	DCLK
	Pulse Width	tHP	20	DCLK

#### Vertical Timing



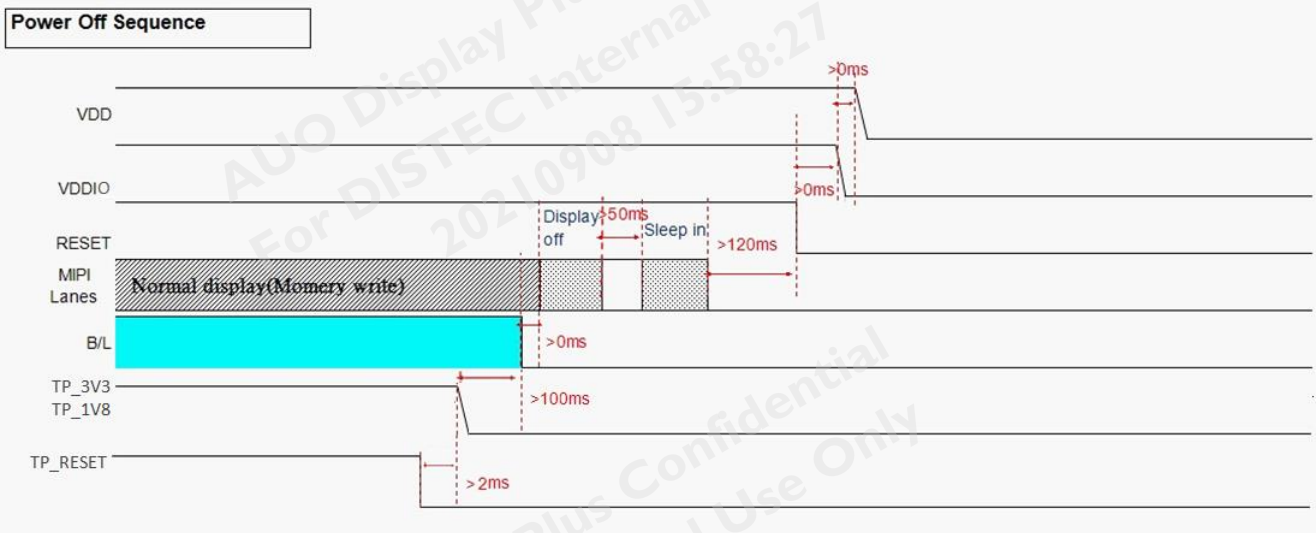
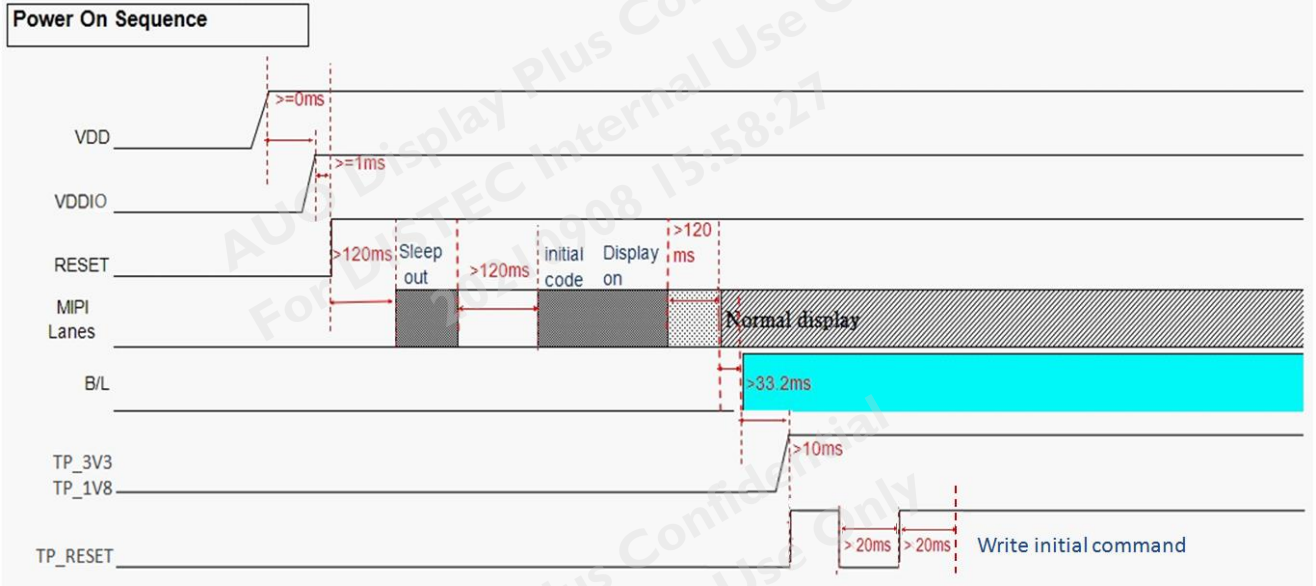
Item	T1 Vertical Blanking	T2 Active Field	T3 VSYNC Front Porch	T4 Frame Time	T5 VSYNC Width	T6 VSYNC Back Porch
Value	17 lines	480 lines	10 lines	497 lines	2 lines	5 lines

#### Horizontal Timing



Item	T7 Horizontal Blanking	T8 Active Field	T9 HSYNC Front Porch	T10 H line Time	T11 HSYNC Width	T12 HSYNC Back Porch
Value	120 dots	480 dots	80 dots	600 dots	20 dots	20 dots

### 6. Recommended Power ON/OFF Sequence



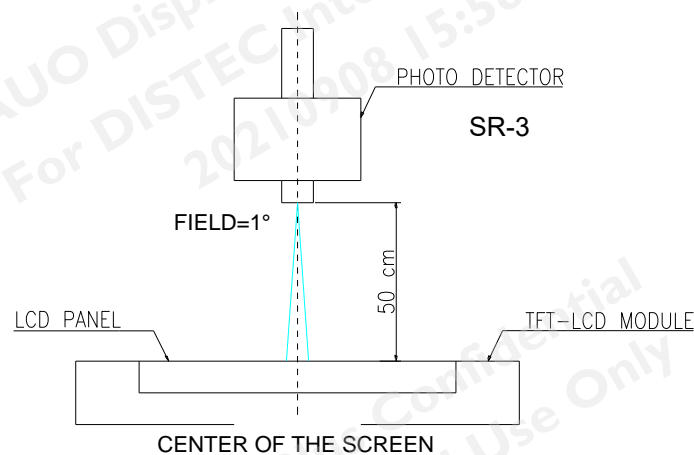
### E. Optical Specification

All optical specification is measured under typical condition (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response Time Rise Fall	Tr+Tf	$\theta=0^\circ$	--	--	35	ms	Note 3
Contrast ratio	CR	At optimized viewing angle	700	1000	--		Note 4
Viewing Angle Top Bottom Left Right		$CR \geq 10$	80	85	--	deg.	Note 5
Brightness	$Y_L$	$V_L = 12V$	--	450	--	cd/m <sup>2</sup>	Note 6
Chromaticity	White	X	$\theta=0^\circ$	0.285	0.315	0.345	
		Y	$\theta=0^\circ$	0.290	0.320	0.350	
	Red	X	$\theta=0^\circ$	0.613	0.643	0.673	
		Y	$\theta=0^\circ$	0.316	0.346	0.376	
	Green	X	$\theta=0^\circ$	0.313	0.343	0.373	
		Y	$\theta=0^\circ$	0.595	0.625	0.655	
	Blue	X	$\theta=0^\circ$	0.123	0.153	0.183	
		Y	$\theta=0^\circ$	0.027	0.057	0.087	
Uniformity	$\Delta Y_L$	%	75	80			Note 7

Note 1 : To be measured in the dark room. Ambient temperature =25℃, and LED lightbar current  $I_L = 40mA$ .

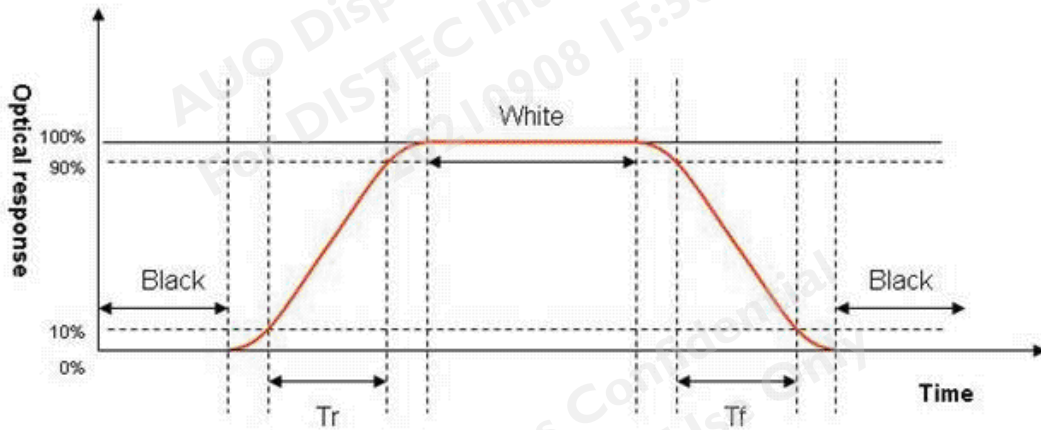
Note 2 :To be measured on the center area of panel with a viewing cone of 1°by Topcon luminance meter SR-3, after 10 minutes operation.



Note 3: Definition of response time:

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The output signals of photo detector are measured when the input signals are changed from "black" to "white"(rising time) and from "white" to "black"(falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.

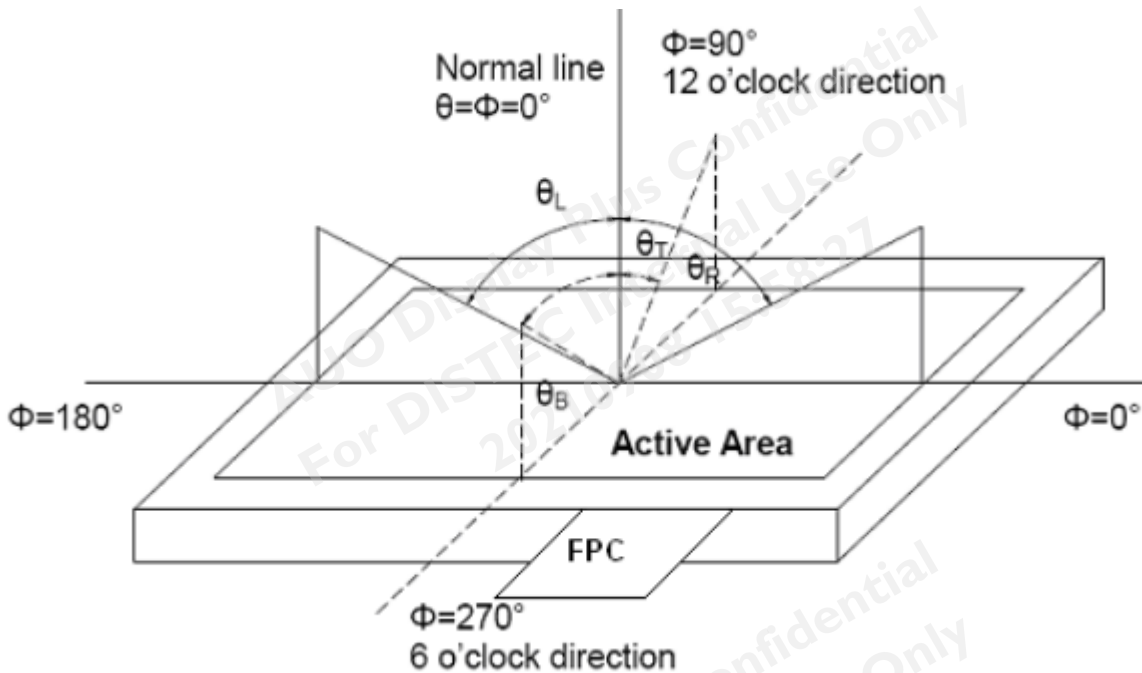


Note 4. Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" status}}{\text{Photo detector output when LCD is at "Black" status}}$$

Note 5. Definition of viewing angle,  $\theta$ , Refer to figure as below.

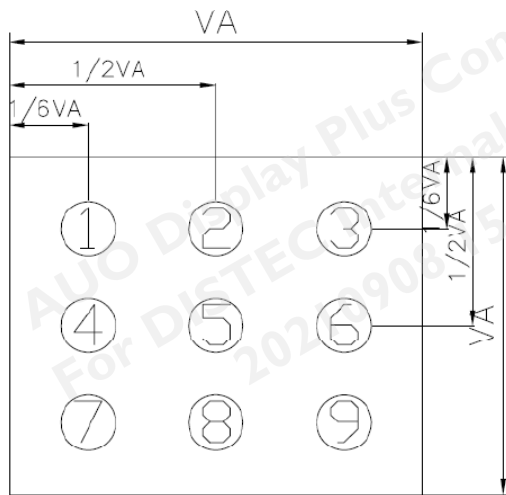


Note 6. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 7: Luminance Uniformity of these 9 points is defined as below:

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$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

**F. Reliability Test Items**

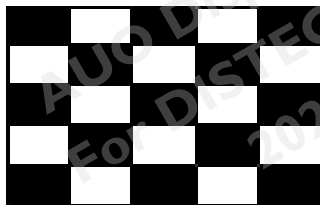
No.	Test items	Conditions	Remark
1	High Temperature Storage	Ta= 80°C      240Hrs	Note 1 & Note 2
2	Low Temperature Storage	Ta= -30°C      240Hrs	Note 1 & Note 2
3	High Temperature Operation	Tp= 70°C      240Hrs	Note 1 & Note 2
4	Low Temperature Operation	Ta= -20°C      240Hrs	Note 1 & Note 2
5	High Temperature & High Humidity	Tp= 60°C . 90% RH      240Hrs	Note 1 & Note 2
6	Image Sticking	25°C, 1hrs	Note 5
7	Vibration	Frequency range : 10~55Hz Stoke : 1.5mm Sweep : 10 ~ 55 ~ 10Hz 2 hours for each direction of X,Y,Z (6 hours for total)	Non-operation JIS C7021, A-10 condition A : 15 minutes
8	Mechanical Shock	100G . 6ms, ±X,±Y,±Z 3 times for each direction	Non-operation JIS C7021, A-7 condition C

Note 1: Ta: Ambient Temperature. Tp: Panel Surface Temperature

Note 2: In the standard conditions, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.

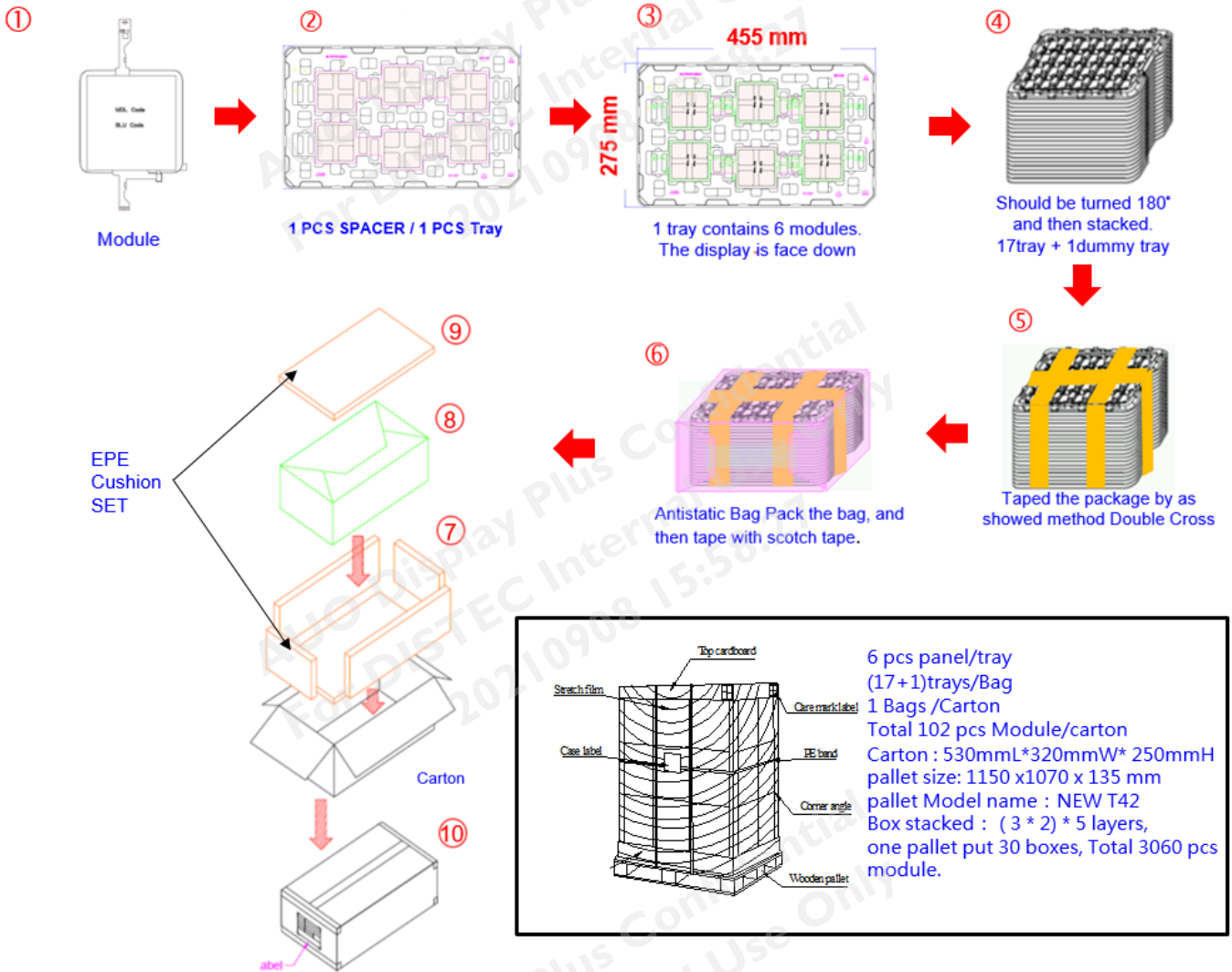
Note 3: All the cosmetic specification is judged before the reliability stress.

Note 5: Operate with 5×5 chess board pattern as figure and lasting time and temperature as the conditions. Then judge with 50% gray level after waiting 5 seconds , the mura must disappear.



## G. Packing and Marking

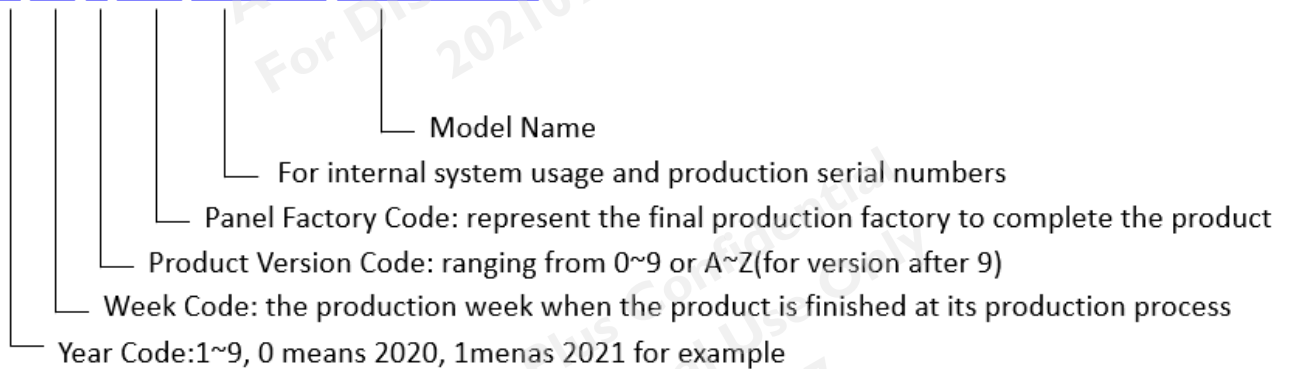
### 1. Packing Form (102pcs/Carton)



2. Module/Panel Label Information

The module/panel (collectively called as the "Product") will be attached with a label of Shipping Number which represents the identification of the Product at a specific location. Refer to the Product outline drawing for detailed location and size of the label. The label is composed of a 22-digit serial number and printed with code 39/128 with the following definition:

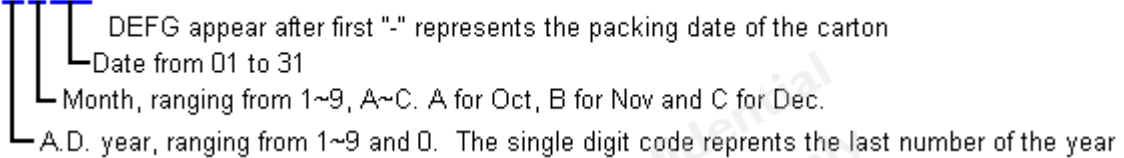
X XX 0 S06 XXXXXX A036FAB01



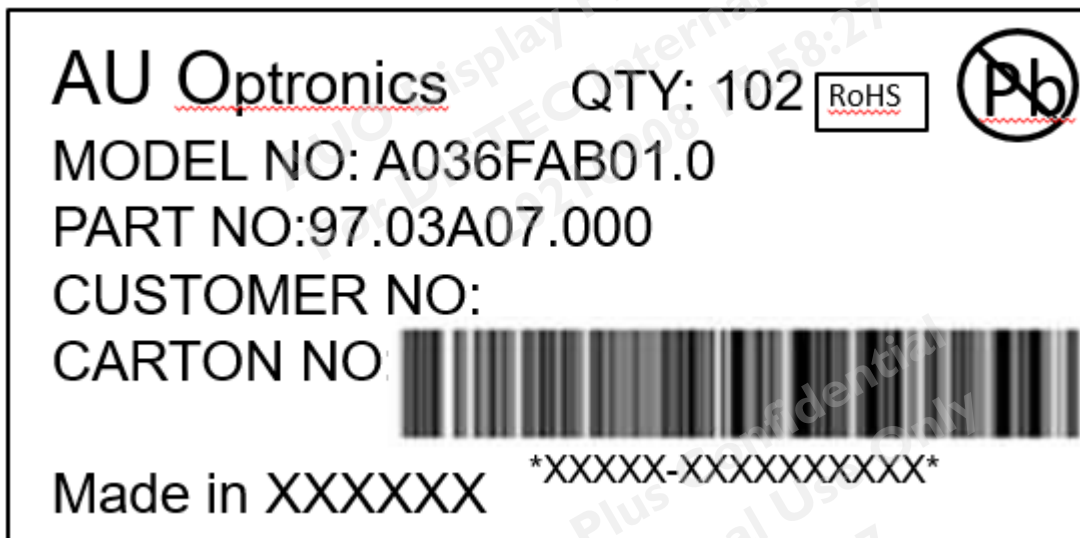
3. Carton Label Information

The packing carton will be attached with a carton label where packing Q'ty, AUO Model Name, AUO Part Number, Customer Part Number (Optional) and a series of Carton Number in 13 or 14 digits are printed. The Carton Number is appearing in the following format:

ABC-DEFG-HIJK-LMN



Refer to the drawing of packing format for the location and size of the carton label.



## H. Precautions

1. Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.
2. Adopt measures for good heat radiation. Be sure to use the module with in the specified temperature.
3. Avoid dust or oil mist during assembly.
4. Follow the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.
5. Less EMI: it will be more safety and less noise.
6. Please operate module in suitable temperature. The response time & brightness will drift by different temperature.
7. Avoid to display the fixed pattern (exclude the white pattern) in a long period, otherwise, it will cause image sticking.
8. Be sure to turn off the power when connecting or disconnecting the circuit.
9. Polarizer scratches easily, please handle it carefully.
10. Display surface never likes dirt or stains.
11. A dewdrop may lead to destruction. Please wipe off any moisture before using module.
12. Sudden temperature changes cause condensation, and it will cause polarizer damaged.
13. High temperature and humidity may degrade performance. Please do not expose the module to the direct sunlight and so on.
14. Acetic acid or chlorine compounds are not friends with TFT display module.
15. Static electricity will damage the module, please do not touch the module without any grounded device.
16. Do not disassemble and reassemble the module by self.
17. Be careful do not touch the rear side directly.
18. No strong vibration or shock. It will cause module broken.
19. Storage the modules in suitable environment with regular packing.
20. Be careful of injury from a broken display module.
21. Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity or other function issue.

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