晶采光電科技股份有限公司
AMPIRE CO., LTD.

/SIMPLEPLUS Touch Displays

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AMA-070A05-DU2511-G010
APPROVED BY	
DATE	

☐ Preliminary Specification
☑ Formal Specification

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Approved by	Checked by	Organized by
Kokai	Simon	Tank

*This specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2018/2/8	--	New Release	Emil
2018/03/16	21,22	Corrected the mechanical drawing.	Emil
2023/06/05	3	Update Features	Tank
	5,6	Update LCD CHARACTERISTICS	
	8	Update Time Table	
	11	Update Interface	
	12	Update Optical Specifications	
	21,22	Update Drawing	
	23	Add Packing Drawing	

1.0 General Descriptions

7 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module.

This module is composed of a 7” TFT-LCD panel and backlight unit.

1.1 Features

- 7 inch (16:9 diagonal) configuration
- 262K colors (R , G , B, 6bit digital each)
- RoHS
- New LCD FOG
- Interface: 6bit TTL, 40pin (Only DE mode)
- Capacitive Touch Panel
  - Cover Lens (T=1.1mm)
  - Interface: USB

1.2 Product Summary

NO	Item	Specification	Remark
1	LCD Size	7.0 inch (Diagonal)	
3	Resolution	800 x 3 (RGB) x 480	
4	Display Mode	Normally Black.	
5	Pixel Pitch	0.1905 (W) x 0.1905(H) mm	
6	Active Area	152.4(W) x 91.44(H) mm	
8	Interface	RGB	
9	Color Arrangement	RGB-stripe	
10	Luminance	425 cd/m^2	cd/m^2
11	Viewing Direction	All direction	

2.0 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remakes
Supply Voltage	V_{CC}	-0.3	3.6	V	-
Input Voltage of Logic	V_I	-0.3	$V_{CC+0.3}$	V	Note 1
Operating Temperature	T_{OP}	-30	85	℃	Note 2
Storage Temperature	T_{ST}	-30	85	℃	Note 2

Note1: The rating is defined for the signal voltages of the interface such as CLK and pixel data pairs.

Note2: The maximum rating is defined as above based on the chamber temperature, which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Background color, contrast and response time would be different in temperatures other than 25℃.

-Operating under high temperature will shorten LED lifetime.

3.0 ELECTRICAL CHARACTERISTICS

3.1 LCD CHARACTERISTICS

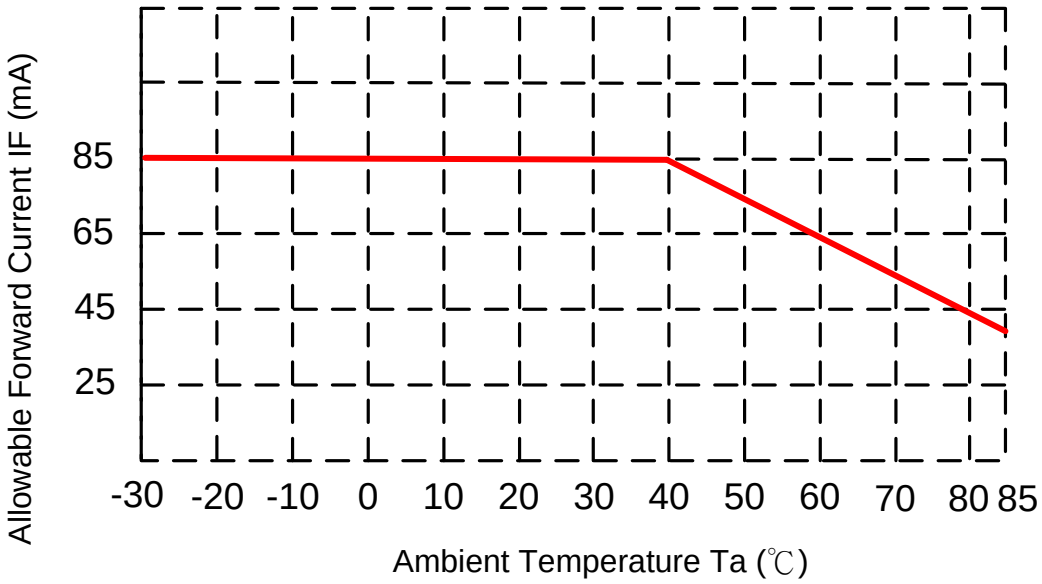
Item	Symbol	Min.	Typ.	Max.	Unit	Note
LCD Supply Voltage	V_{CC}	3.1	3.3	3.6	V	-
Logic Input Voltage	V_{IH}	$0.7V_{CC}$	-	V_{CC}		
	V_{IL}	GND	-	$0.3V_{CC}$	V	
LCD Supply Current	I_{CC}	-	T.B.D	-	mA	(1)
Power Supply Voltage For LED Driver	V_{LED}	11.7	12	12.3	V	(1)
Power Supply Current For LED Driver	I_{LED}	--	150	--	mA	V_{LED}=12V

Note1: Ta=25℃ , Display pattern : All White

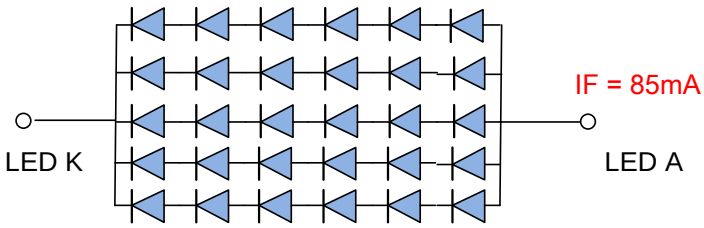
3.2 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Input Voltage	V_{LED}	11.7	12.0	12.3	V	
Input Current	I_{LED}	--	150	--	mA	100% PWM duty
DIM Frequency	Fpwm	500		20K	Hz	
DIM Signal Logic High	V_{IH}	1.2	3.3	5.0	V	
DIM signal logic Low	V_{IL}	0	--	0.4	V	
LED Forward Current	I_F	--	85	--	mA	Ta=25℃
LED Forward Voltage	V_F	--	18	--	V	I_F=85mA, Ta=25℃
LED life time			50,000	-	Hr	I_F=85mA, Ta=25℃

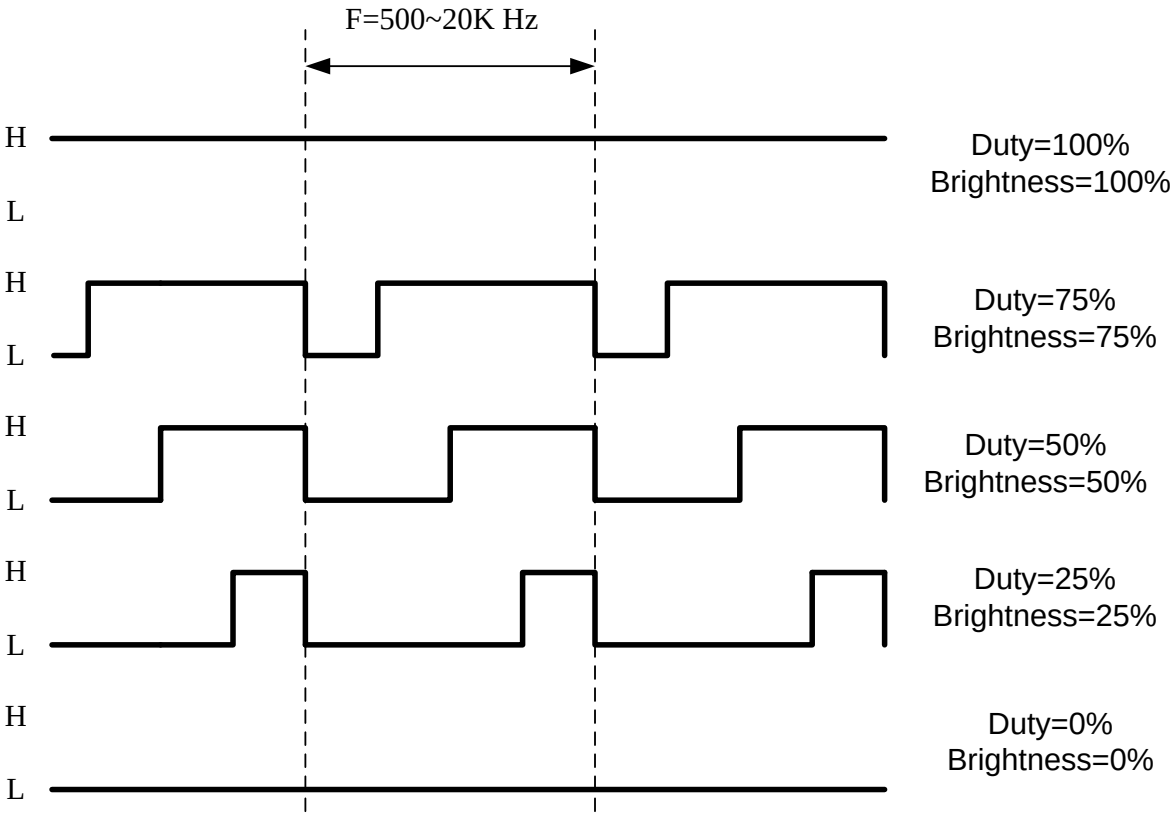
- The constant current source is needed for white LED back-light driving.
- When LCM is operated over 40℃ ambient temperature, the IF should be follow :



■ 6 LED Serial x 5 LED Parallel

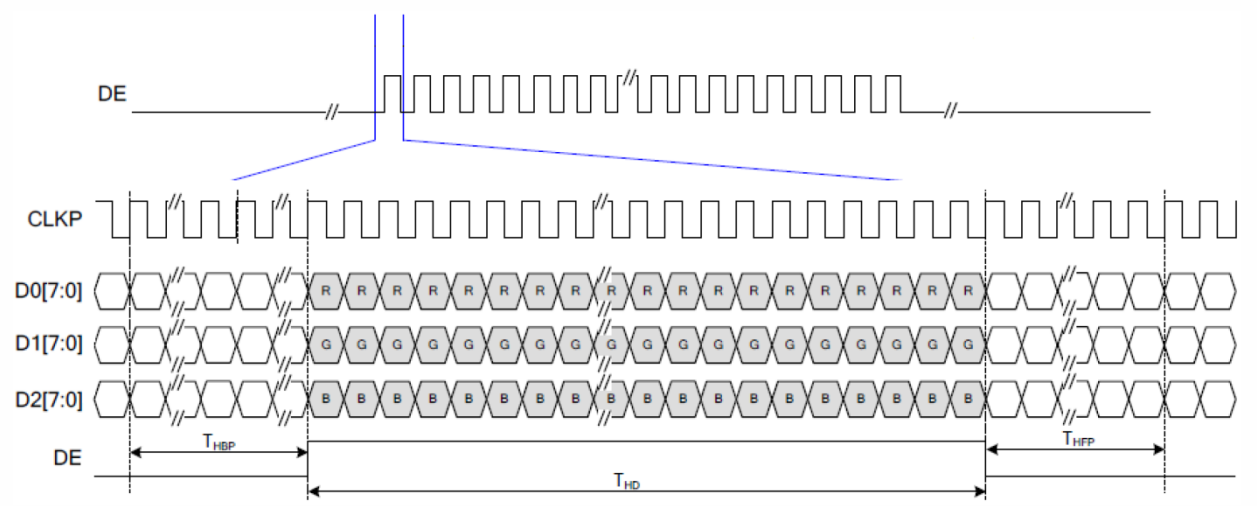


■ DIM Duty



4.0 TIMING

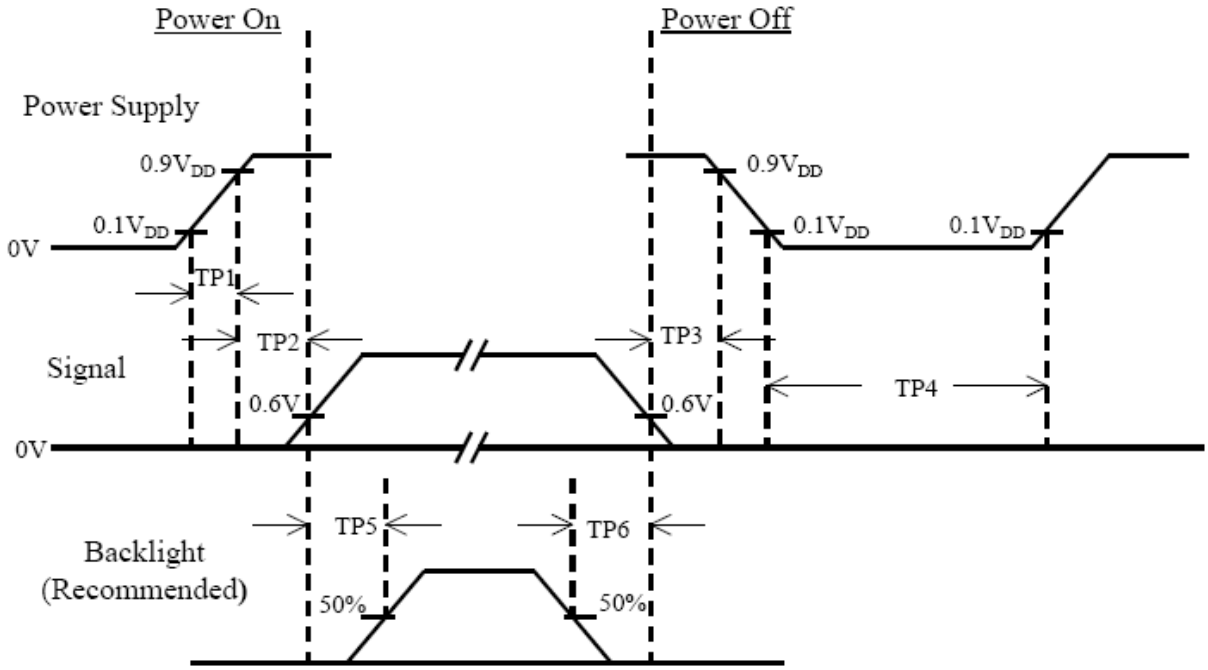
4.1 time table



Only DE mode for 800x480

Parameter	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CLK}	25.2	25.4	35.7	MHz
Horizontal display area	T_{HD}		800		CLK
HS period time	T_H	860	864	974	CLK
HS blanking	$T_{HFP} + T_{HBP}$	60	64	174	CLK
Vertical display area	T_{VD}		480		H
VS period time	T_V	488	490	611	H
VS blanking	$T_{VBP} + T_{VFP}$	8	10	131	H

4.3 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

Note：

(1) The supply voltage of the external system for the module input should be the same as the definition of VDD.

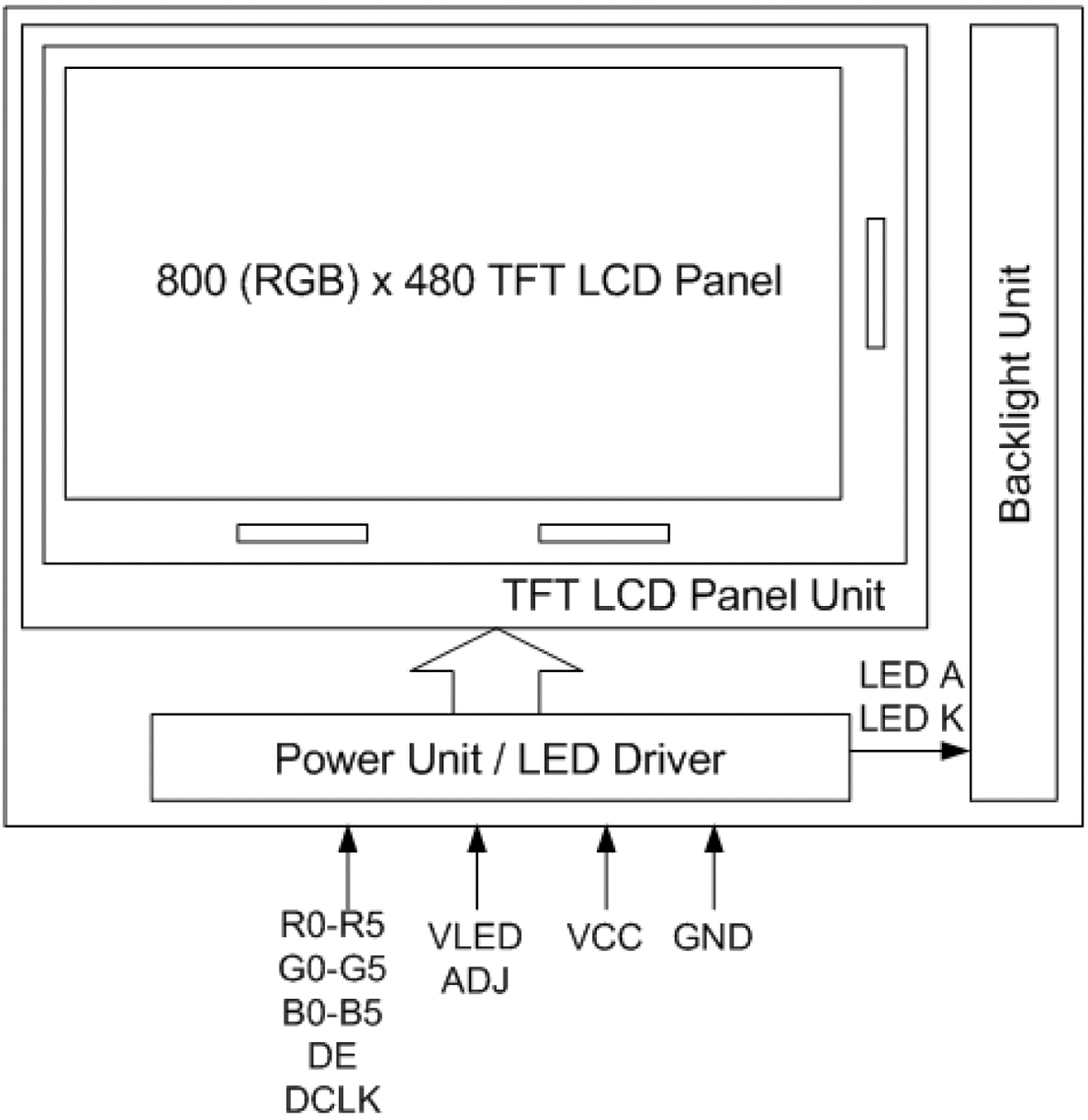
(2) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.

(3) In case of VDD = off level, please keep the level of input signal on the low or keep a high impedance.

(4) TP4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

5.0 BLOCK DIAGRAM



6.0 INTERFACE

Pin No	Symbol	Function
1	GND	Power Ground
2	V_{CC}	Power Supply for LCD
3	V_{CC}	Power Supply for LCD
4	V_{CC}	Power Supply for LCD
5	NC	Not Connection
6	NC	Not Connection
7	R0	Red data (LSB)
8	R1	Red data
9	R2	Red data
10	R3	Red data
11	R4	Red data
12	R5	Red data (MSB)
13	NC	Not Connection
14	NC	Not Connection
15	G0	Green data (LSB)
16	G1	Green data
17	G2	Green data
18	G3	Green data
19	G4	Green data
20	G5	Green data (MSB)
21	NC	Not Connection
22	NC	Not Connection
23	B0	Blue data (LSB)
24	B1	Blue data
25	B2	Blue data
26	B3	Blue data
27	B4	Blue data
28	B5	Blue data (MSB)
29	GND	Power Ground
30	DCLK	Clock Signals
31	NC	Not Connection
32	V_{CC}	Power Supply for LCD
33	V_{CC}	Power Supply for LCD
34	DE	Data Enable
35	VLED	LED Driver Power Supply Input.
36	VLED	
37	GND	Power Ground
38	GND	Power Ground
39	ADJ	LED PWM dimming signal
40	EN	LED backlight on/off, on=high level, off=low level.

7.0 Optical Specifications

7.1 TFT Optical Characteristics

Item		Symbol	Condition	Min	Typ.	Max	Unit	Remark
View Angles		θT	CR≧10		80	-	Degree	Note2
		θB			80	-		
		θL			80	-		
		θR			80	-		
Contrast Ratio		CR	θ=0°	800	1000	-		Note1 Note4
Response Time		$T_{ON+}T_{OFF}$	25℃	-	25	35	ms	Note1 Note3
Chromaticity	White	x		Typ. -0.05	0.312	Typ. +0.05		Note1 Note5
		y			0.367			
	Red	x			0.661			
		y			0.327			
	Green	x			0.282			
		y			0.576			
	Blue	x			0.134			
		y			0.105			
Uniformity		U		70	-	-	%	Note1、Note7
Luminance		L		340	425	-	cd/m^2	Note1、Note7

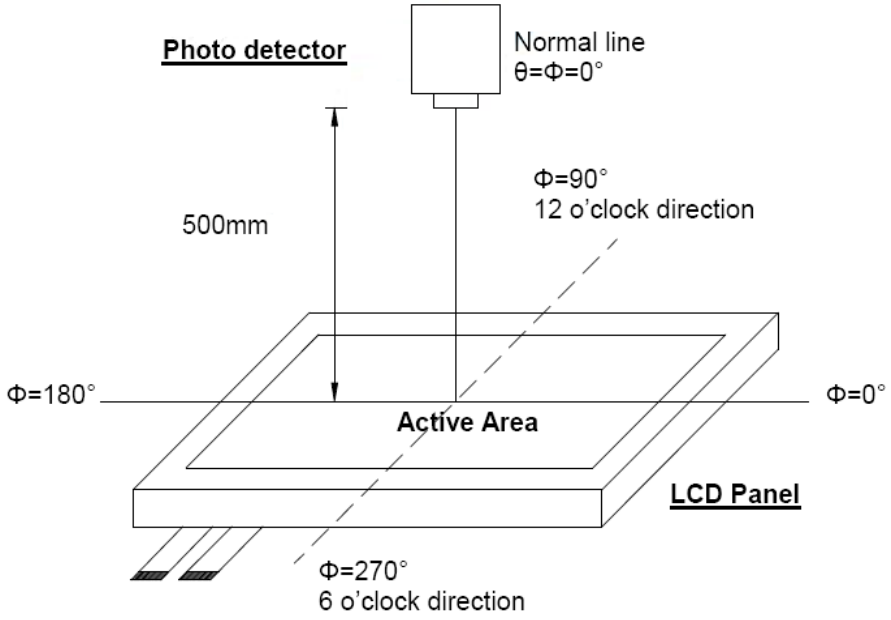
Test Conditions:

1. I_F= 85mA, the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note2.

Note 1: Definition of optical measurement system.

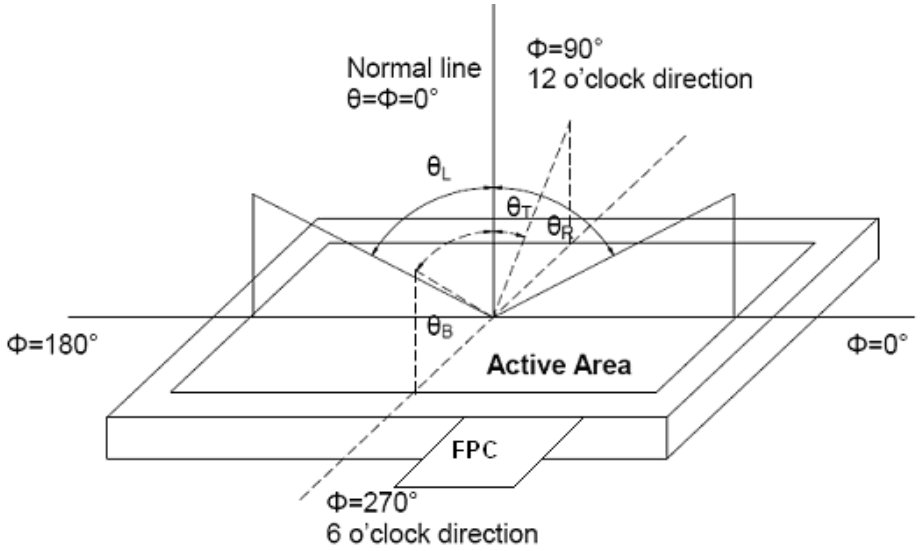
The optical characteristics should be measured in dark room. After 10 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Note 1 : Definition of optical measurement system.



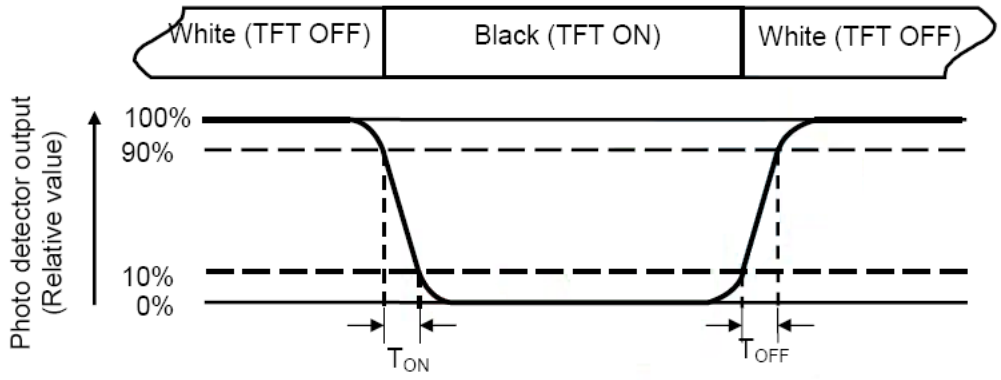
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view : 1° / Height : 500mm.)

Note 2 : Definition of viewing angle range



Note 3 : 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 4 : Definition of contrast ratio

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

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

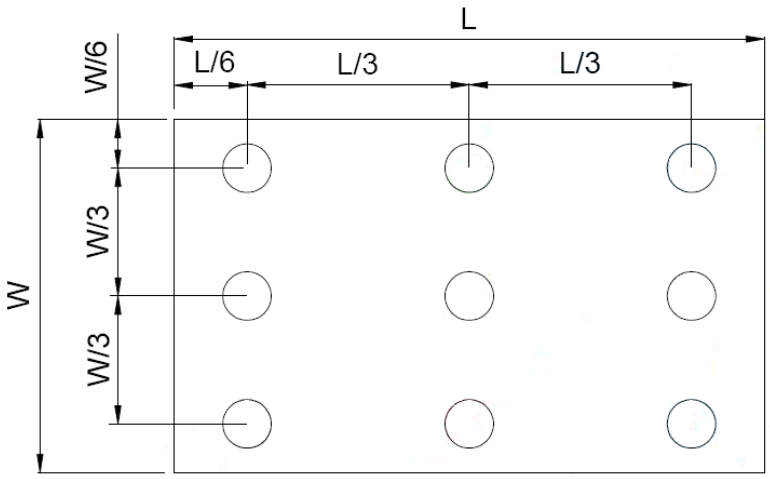
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

Note 7 : Definition of Luminance Uniformity

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

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

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



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

8.0 Projected capacitive-type TOUCH PANEL ELECTRICAL SPECIFICATION

Basic Characteristic

ITEM	SPECIFICATION
Type	Projective Capacitive Touch Panel
Activation	Multi-finger
X/Y Position Reporting	Absolute Position
Touch Force	No contact pressure required
Calibration	No need for calibration
Report Rate	Approx. 100 points/sec
Interface	USB
Control IC	ILI2511
Conductive susceptibility IEC/EN61000-4-6	10Vrms
Radiated Susceptibility IEC/EN61000-4-3	30V/m
Cover Glass	1.1mm chemically strength glass with black border
Bonding method	CG to sensor: optical bonding
	TP module to LCM: tape bonding

Specify the normal operating condition

(GND=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VIN	4.75	5.0	5.25	V	
Power Consumption	I_{VIN}		T.B.D		mA	

Interface

Pin No.	Symbol	Function
1	GND	POWER GND
2	D-	USB Data-
3	D+	USB Data+
4	VIN	USB power input 5V
5	NC	No connection
6	NC	No connection

9.0 Reliability Test Items

Test Item	Test Conditions	Note
High Temperature Operation	85±3°C , t=240 hrs	
Low Temperature Operation	-30±3°C , t=240 hrs	
High Temperature Storage	85±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	40°C, 85% RH , 240 hrs	1,2
Thermal Shock Test	-30°C (30min) ~ 85°C (30min) 50 cycles	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

Note 3 : The module shouldn't be tested more than one condition, and all the test conditions are independent.

Note 4 : All the reliability tests should be done without protective film on the module.

Definitions of life end point:

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

10.0 GENERAL PRECAUTION

10-1 Safety

Liquid crystal is poisonous. Do not put it your month. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

10-2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

10-3 Static Electricity

1. Be sure to ground module before turning on power or operation module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

10-4 Storage

1. Store the module in a dark room where must keep at +25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

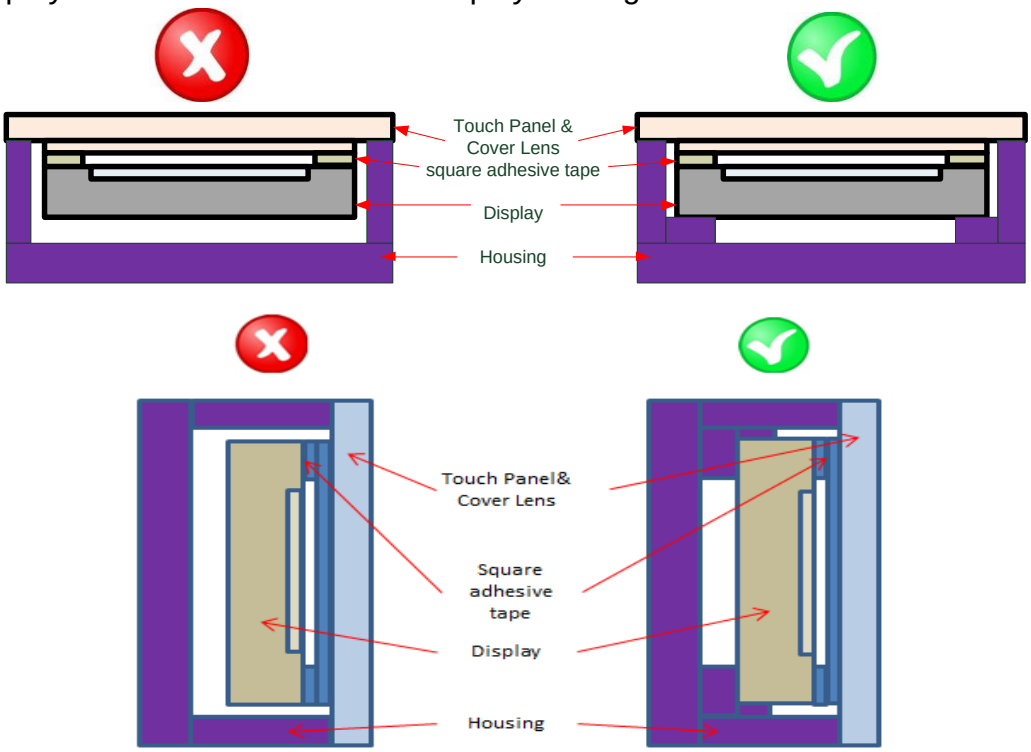
10-5 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

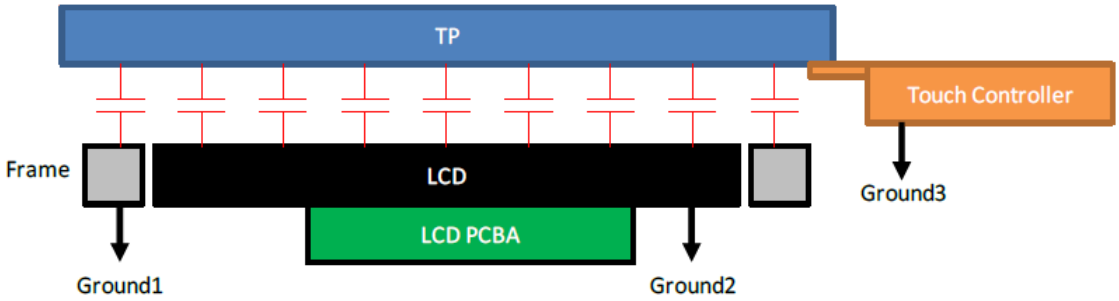
10-6 Mechanism (if the LCM using air bonding)

(1) Please mount LCD module by using mounting holes arranged in four corners tightly.

(2) The square adhesive tape which is between the touch panel and display can't provide well supporting in the long term and high ambient temperature condition. Whether upright or horizontal position the support holder which is in the back side of the display is needed. Do not let the display floating.



(3) TP needs to work in environment with stable stray capacitance. In order to minimize the variation in stray capacitance, all conductive mechanical parts must not be floating. Intermittent floating any conductive part around the touch sensor may cause significant stray capacitance change and abnormal touch function. It is recommended to keep all conductive parts having same electrical potential as the GND of the touch controller module.

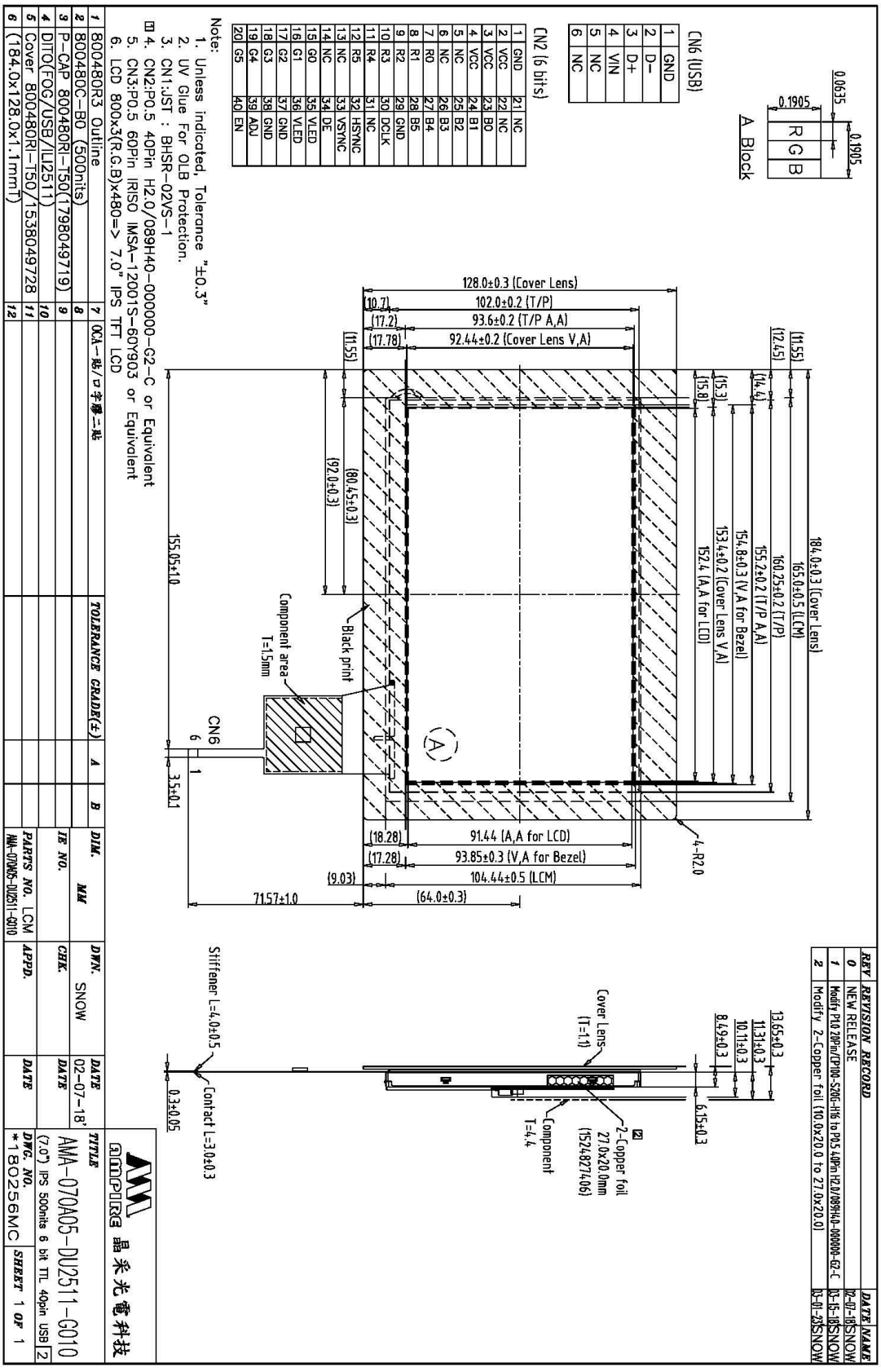


GND1, GND2 and GND3 should be connected together to have the same ground

10-7 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver

11.0 Outline Dimension



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	22-07-18	SNOW
1	Modify P1.0 20Pin/CP100-S20G-H16 to P0.5 40Pin 12.0/089H40-000000-G2-C	23-05-15	SNOW
2	Modify 2-Copper foil (10.0x20.0 to 27.0x20.0)	23-06-05	SNOW

1	800480R3 Outline	7	OCA-光/ロ字膠二貼	TOLERANCE CRADE(±)	A	B	DIM. MM	DWN. SNOW	DATE 02-07-18'
2	800480C-B0 (500nits)	8					IE NO.	CHK.	DATE
3	P-CAP 800480R-T50(179804971 9)	9						APPD.	DATE
4	DITO(FOG/USB/LI2511)	10					PARTS NO. LCM		
5	Cover 800480R-T50/153804972 8	11					NA-07A05-DU2511-G010		
6	(184.0x128.0x1.1mmT)	12							

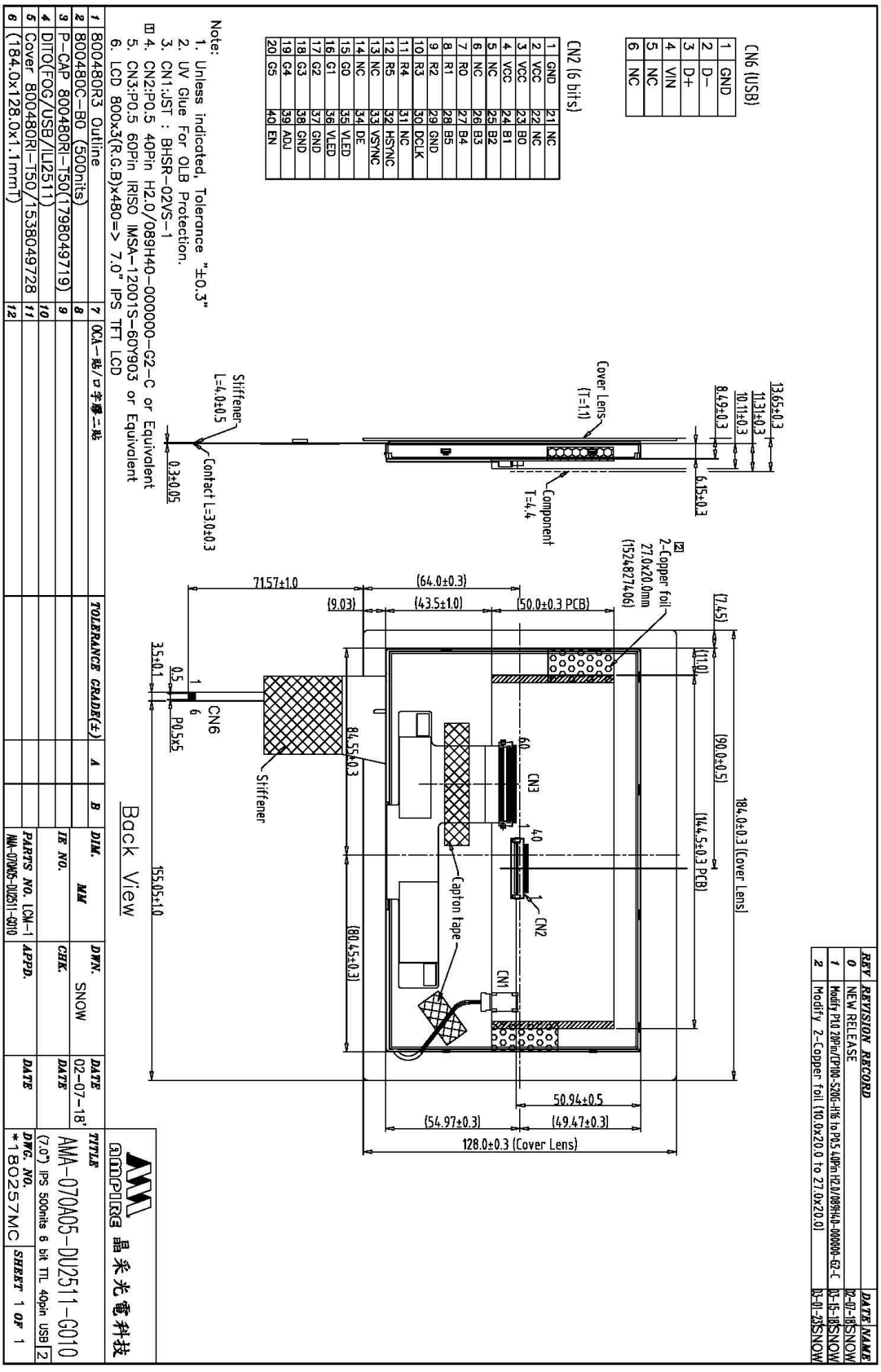
AMPIRE 晶采光電科技

TITLE: AMA-070A05-DU2511-G010

(7.0") IPS 500nits 6 bit TTL 40pin USB 2

DWG. NO. *180256MC

SHEET 1 OF 1



CN6 (USB)	
1	GND
2	D-
3	D+
4	VIN
5	NC
6	NC

CN2 (6 bits)			
1	GND	21	NC
2	VCC	22	NC
3	VCC	23	B0
4	VCC	24	B1
5	NC	25	B2
6	NC	26	B3
7	R0	27	B4
8	R1	28	B5
9	R2	29	GND
10	R3	30	DCLK
11	R4	31	NC
12	R5	32	HSYNC
13	NC	33	VSYNC
14	NC	34	DE
15	G0	35	VLED
16	G1	36	VLED
17	G2	37	GND
18	G3	38	GND
19	G4	39	ADJ
20	G5	40	EN

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	22-07-18	SNOW
1	Modify P1.0 20Pin/CP100-S20G-H16 to P0.5 40Pin H2.0/089H40-000000-G2-C	23-05-15	SNOW
2	Modify 2-Copper foil (10.0x20.0 to 27.0x20.0)	23-01-25	SNOW

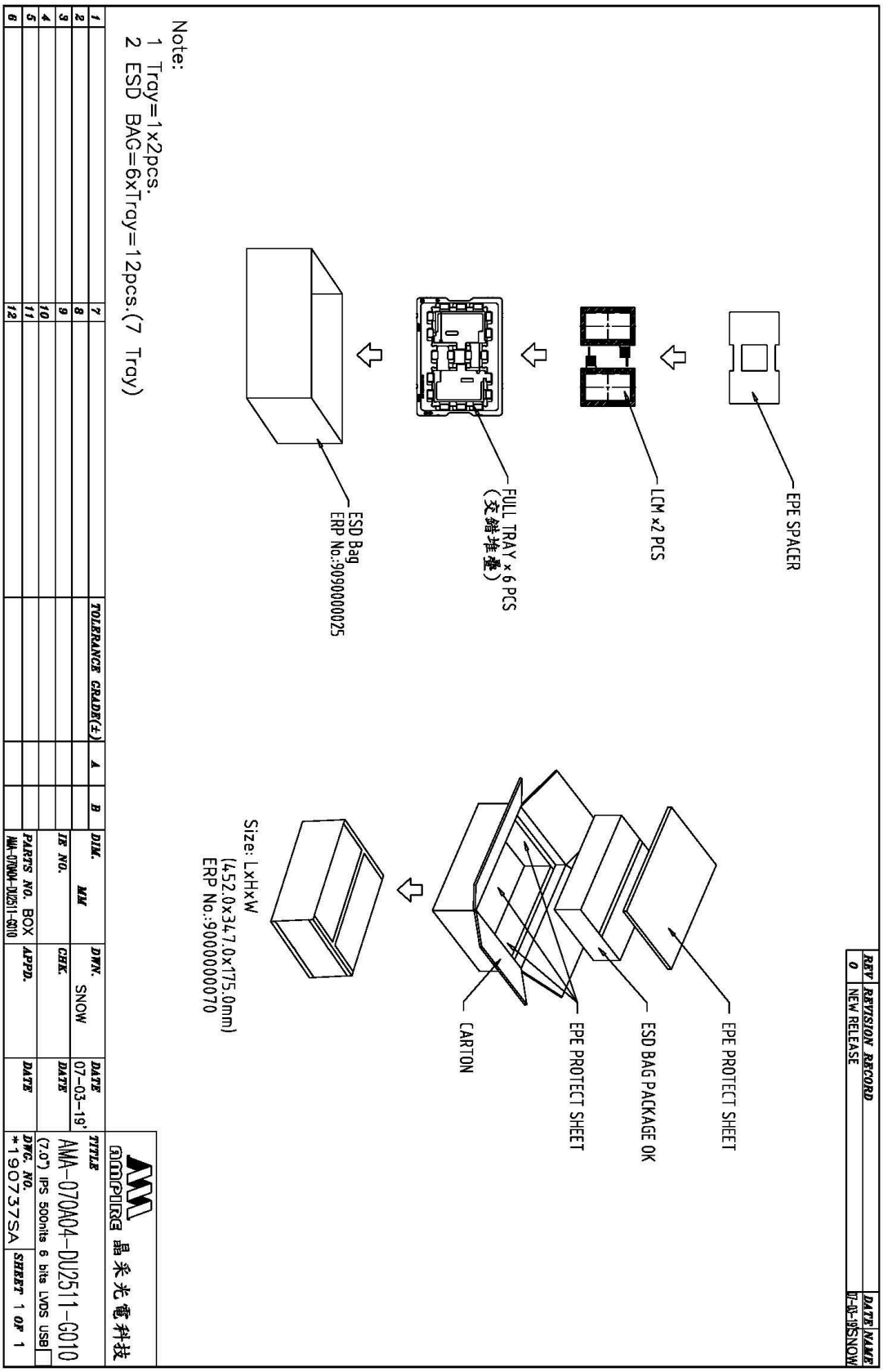
1	800480R3 Outline	7	OCA一张/ロ字爆二张	TOLERANCE	GRADE(±)	A	B	DIM.	MM
2	800480C-B0 (500nits)	8						IB NO.	
3	P-CAP 800480R1-T50(179804971 9)	9						CHK.	
4	DITO(FOG/USB/LI2511)	10						PARTS NO.	LCM-1
5	Cover 800480R1-T50/153804972 8	11						APPD.	
6	(184.0x128.0x1.1mmT)	12						DATE	

DWN.	SNOW	DATE	02-07-18'
CHK.		DATE	
APPD.		DATE	

晶采光電科技

TITLE	AMA-070A05-DU2511-G010
	(7.0") IPS 500nits 6 bit TTL 40pin USB 2
DWG. NO.	*180257MC
SHEET	1 OF 1

12.0 Packing


EPE SPACER
LCM x2 PCS
FULL TRAY x 6 PCS
(交錯堆疊)
ESD Bag
ERP No:9090000025
Size: LxHxW
(452.0x347.0x175.0mm)
ERP No:9000000070
CARTON
EPE PROTECT SHEET
ESD BAG PACKAGE OK
EPE PROTECT SHEET
EPE PROTECT SHEET
REV
0
REVISION RECORD
NEW RELEASE
DATE
07-03-19
NAME
SNOW
Note:
1 Tray=1x2pcs.
2 ESD BAG=6xTray=12pcs.(7 Tray)
TOLERANCE GRADE(±)
A
B
DIM.
MM
DWN.
SNOW
DATE
07-03-19'
CHK.
DATE
APPD.
DATE
IB NO.
PARTS NO. BOX
AM-070A04-DU2511-G010
TITLE
AMA-070A04-DU2511-G010
(7.0") IPS 500nits 6 bits LVDS USB
DWG. NO.
*190737SA
SHEET 1 OF 1