Display Elektronik GmbH

DATA SHEET

OLED MODULE

DEP 480800A-RGB

3,7“ AM-OLED

Product Specification

Version: 1

23.06.2025

Revision History

Date	Rev. No.	Page	Summary
27.04.2025	0	ALL	FIRST ISSUE
23.06.2025	1	ALL	CORRECTED VERSION

Contents

* Description

This is a color active matrix AMOLED module using Low Temperature Polysilicon Thin Film Transistors as active switching devices. This module has a 3.7 Inch diagonally measured active area with 480horizontal by 800 vertical pixel arrays.

Each pixel is divided into RED and GREEN dots, or BLUE and GREEN dots, and two pixels share RED or BLUE dots which are arranged in vertical stripe and this module can display up to 16.7 Million colors.

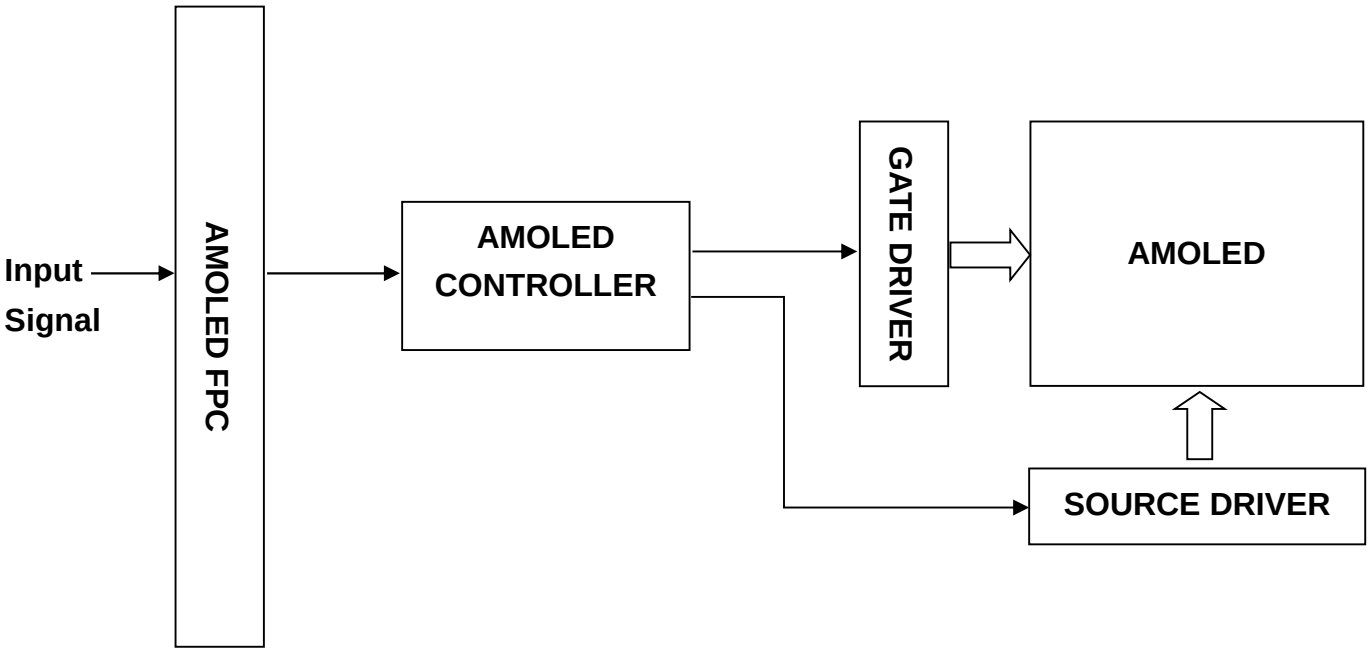
* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display Area (AA)	48.24 x 80.40 (3.7 Inch)	mm	-
Driver Element	TFT Active-Matrix	-	-
Display Colors	16.7 Million	colors	-
Number of Pixels	480 x (RGB) x 800	dots	-
Viewing Angle	ALL	o'clock	-
Controller IC	TL2796	-	-
LCM Interface	24-BIT-RGB	-	-
Display Mode	TBD	-	-
Operating Temperature	-30°C ~ +80°C	°C	-
Storage Temperature	-40°C ~ +85°C	°C	-

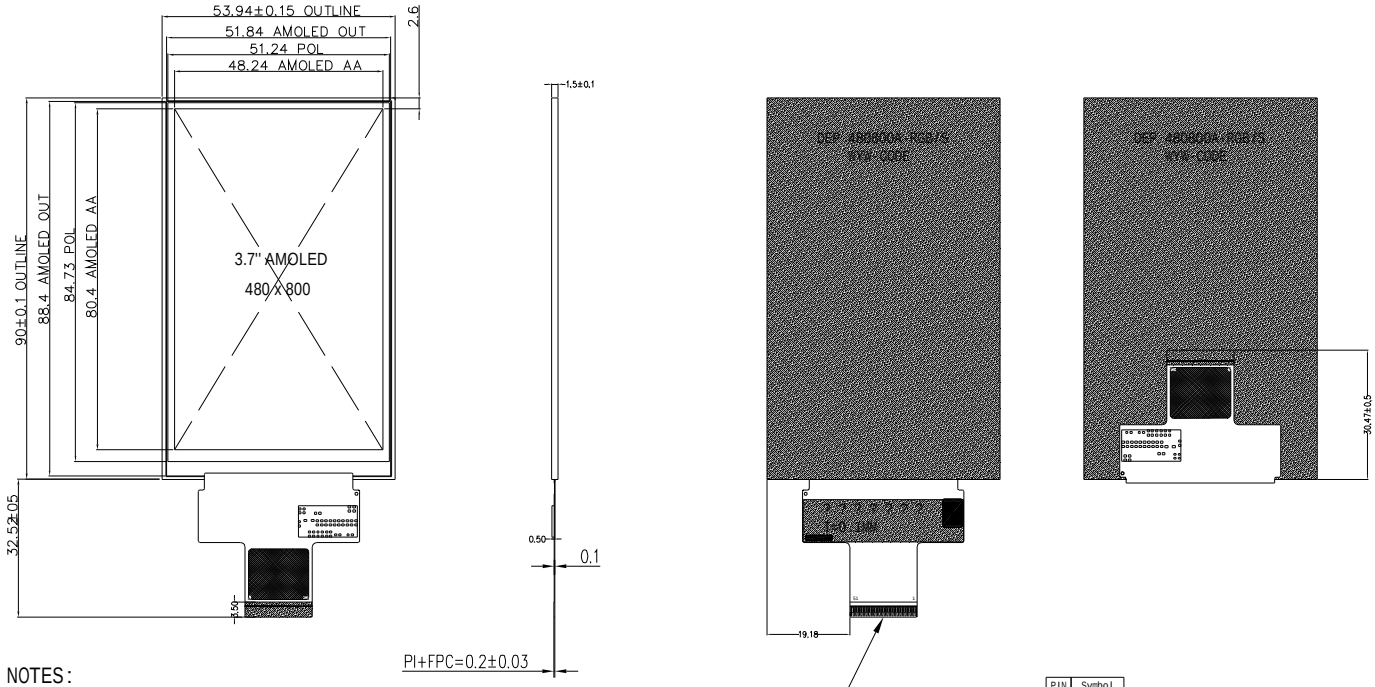
* Mechanical Information

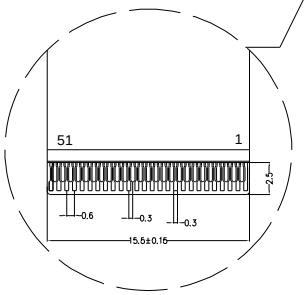
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	-	53.94	-	mm	-
	Vertical(V)	-	90.00	-	mm	-
	Depth(D)	-	1.50	-	mm	-
Weight		-	TBD	-	g	-

1. Block Diagram



2. Outline Dimension





NOTES:

1. Display mode: TBD
2. Resolution: 3.7",480*800
3. Operating Voltage: VCI:2.5~ 3.3V
   IOVCC:1.65~ 3.3V
   ELVDD:4.6V
   ELVSS:-4.9V
4. Operating Temp: -30? ~ 80?
5. Storage Temp: -40? ~ 85?
6. Unspecified tolerance: ±0.2
7. All radii without dimension : R0.3
8. LCD controller/driver:TL2796
9. Customer No.:
10. RoHS compliant

PIN	Symbol
1	GND
2	GND
3	ELVSS
4	ELVSS
5	NC
6	ELVDD
7	ELVDD
8	NC
9	IOVCC
10	VCI
11	EL_ON
12	CSB
13	SCL
14	SDI
15	SDO
16	ENABLE
17	VSYNC
18	HSYNC
19	GND
20	DOTCLK
21	GND
22	D23
23	D22
24	D21
25	D20
26	D19
27	D18
28	D17
29	D16
30	D15
31	D14
32	D13
33	D12
34	D11
35	D10
36	D9
37	D8
38	D7
39	D6
40	D5
41	D4
42	D3
43	D2
44	D1
45	D0
46	GND
47	RESETB
48	TEST2
49	TEST1
50	GND
51	GND

3. Input Terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground	P
2	GND	Ground	P
3	ELVSS	AMOLED power negative	P
4	ELVSS	AMOLED power negative	P
5	NC	-	-
6	ELVDD	AMOLED power positive	P
7	ELVDD	AMOLED power positive	P
8	NC	-	-
9	IOVCC	Power supply for I/O(1.7-3.3V)	I
10	VCI	Analog Voltage for Driver (2.6~3.3V)	I
11	EL_ON	DC-DC IC Enable	O
12	CSB	Chip select signal input (Low Active)	I
13	SCL	Serial data transfer clock input pin	I
14	SDI	Serial data input pin	I
15	SDO	Serial data output pin	O
16	ENABLE	Data enable signal pin for RGB I/F	I
17	VSYNC	Vertical sync signal of the RGB I/F	I
18	HSYNC	Horizontal sync signal of the RGB I/F	I
19	GND	Ground	P
20	DOTCLK	Dot clock signal of the RGB I/F	I
21	GND	Ground	P
22	D23	Unidirectional Data Bus	I/O
23	D22	Unidirectional Data Bus	I/O
24	D21	Unidirectional Data Bus	I/O
25	D20	Unidirectional Data Bus	I/O
26	D19	Unidirectional Data Bus	I/O
27	D18	Unidirectional Data Bus	I/O

28	D17	Unidirectional Data Bus	I/O
29	D16	Unidirectional Data Bus	I/O
30	D15	Unidirectional Data Bus	I/O
31	D14	Unidirectional Data Bus	I/O
32	D13	Unidirectional Data Bus	I/O
33	D12	Unidirectional Data Bus	I/O
34	D11	Unidirectional Data Bus	I/O
35	D10	Unidirectional Data Bus	I/O
36	D9	Unidirectional Data Bus	I/O
37	D8	Unidirectional Data Bus	I/O
38	D7	Unidirectional Data Bus	I/O
39	D6	Unidirectional Data Bus	I/O
40	D5	Unidirectional Data Bus	I/O
41	D4	Unidirectional Data Bus	I/O
42	D3	Unidirectional Data Bus	I/O
43	D2	Unidirectional Data Bus	I/O
44	D1	Unidirectional Data Bus	I/O
45	D0	Unidirectional Data Bus	I/O
46	GND	Ground	P
47	RESETB	Reset Signal (0: reset, 1: normal operation)	I
48	TEST2	Let it open	-
49	TEST1	Let it open	-
50	GND	Ground	P
51	GND	Ground	P

4. AMOLED Optical Characteristics

4.1 Optical Specification

Item		Symb	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal Viewing Angle	2000	--	--		(1)(2)
LCM Luminance		LV	White Mode	200	250	300	cd/m2	
Color Gamut		S(%)	vs. NTSC	--	105	--	%	(1)
Color Filter Chromacicity	White	W_X	--	-0.04	0.296	+0.04	--	(1)(4)
		W_Y	--		0.310			
	Red	R_X	--		0.658			
		R_Y	--		0.341			
	Green	G_X	--		0.205			
		G_Y	--		0.726			
	Blue	B_X	--		0.131			
		B_Y	--		0.043			
OLED Lifetime		--	50% Brightness drop @250cd/m2, Full White	--	30000	--	Hrs	--
Option View Direction		ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding: dark room

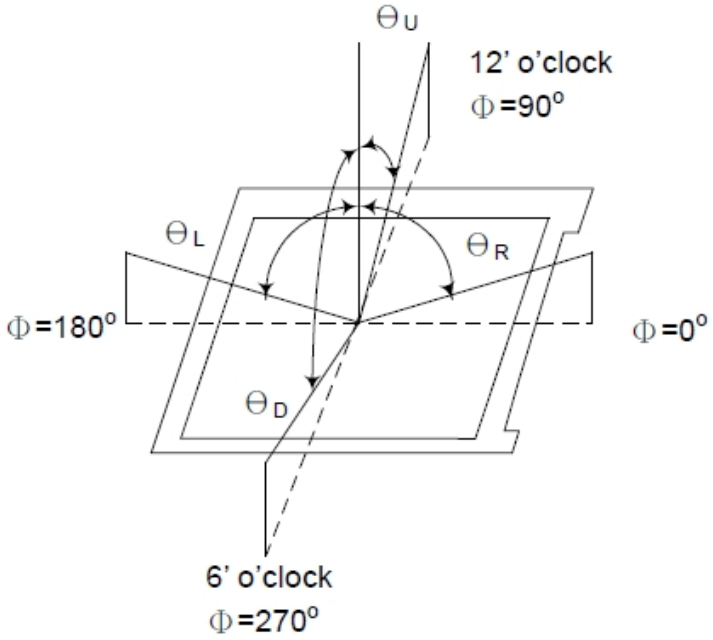
Ambient temperature: 25°C±2°C

15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

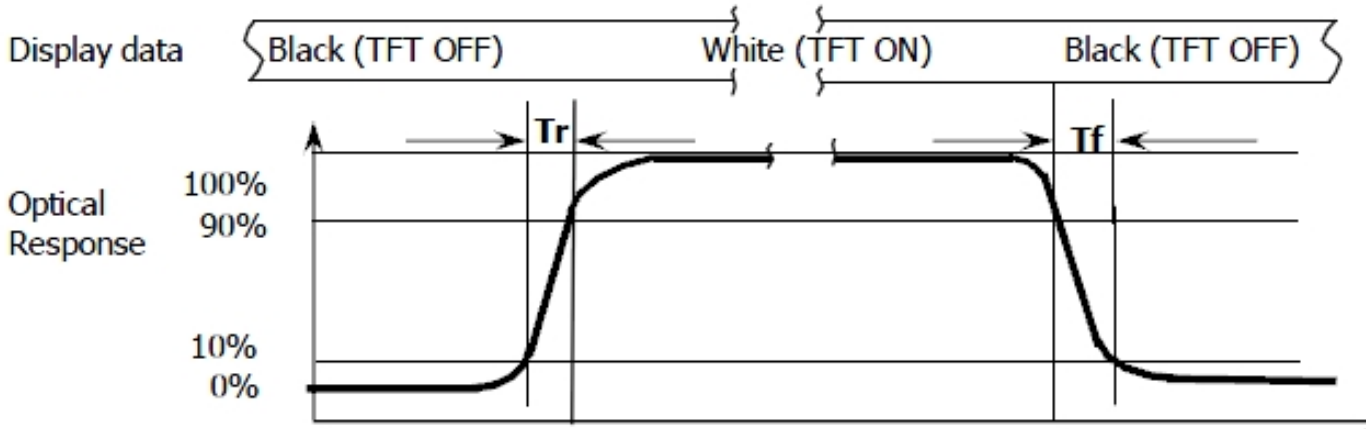
Note (1): Definition of Viewing Angle:



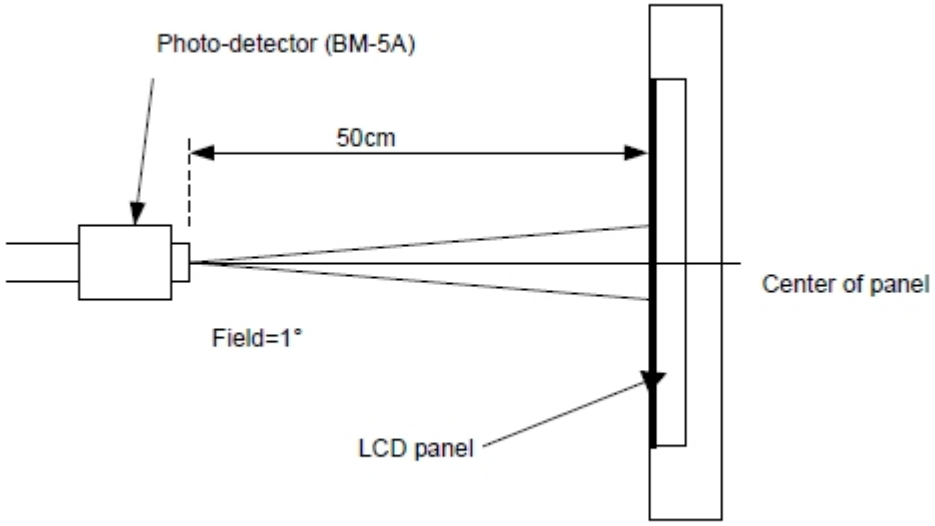
Note (2): Definition of Contrast Ratio(CR): measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time:



Note (4): Definition of optical measurement setup



5. AMOLED Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

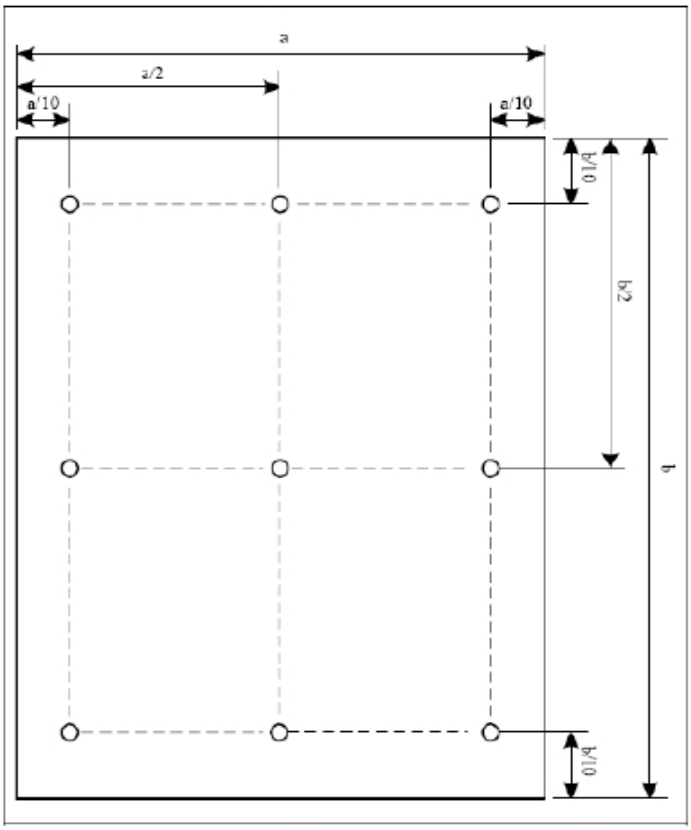
Characteristics	Symbol	Min.	Max.	Unit
Supply Voltage System	VCC	-0.3	3.3	V
	IOVCC	-0.3	3.3	V
Operating Temperature	T_{OP}	-30	+80	°C
Storage Temperature	T_{ST}	-40	+85	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics		Symbol	Min.	Typ.	Max.	Unit	Note
System	Analog/ Logic Vol.	VCC	2.5	2.9	3.3	V	--
		IOVCC	1.65	1.8	3.3	V	--
EL Power		ELVDD	4.5	4.6	4.7	V	--
		ELVSS	-6.2	-4.9	-2.5	V	--
Level Input Voltage		V_{IH}	0.8*IOVCC	--	IOVCC	V	--
		V_{IL}	-0.2	--	0.2*IOVCC	V	--
Level Output Voltage		V_{OH}	0.8*IOVCC	--	IOVCC	V	--
		V_{OL}	-0.2	--	0.2*IOVCC	V	--

NOTE 3: Luminance Uniformity of these 9 points is defined as below:



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

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

6. AMOLED AC Characteristic

6.1 RGB Interface Timing

Please refer to the following table for the setting limitation of RGB interface signals.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Horizontal Synchronization	hpw	--	4	--	PCLK
Horizontal Back Porch	hbp	--	15	--	PCLK
Horizontal Front Porch	hfp	--	15	--	PCLK
Horizontal Address	hdisp	--	480	--	PCLK
Vertical Synchronization	VS	--	1	--	Line
Vertical Back Porch	vbp	--	8	--	Line
Vertical Front Porch	vfp	--	12	--	Line
Vertical Address	vdisp	--	800	--	Line
Frame Rate	FR	--	60	--	Hz

Note:

PCLK_Active=Rising_Active;

HSYNC_Active=Low_Active;

VSYNC_Active=Low_Active;

DEN_Active=High_Active;

7. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	+80°C, 96h	No clearly visible defects or remarkable deterioration of display quality.However, any polarizer's deteriorations by the high temperature/ High humidity Storage test and the High temperature / High humidity Operation test are permitted. No function-related abnormalities.
Low Temperature Operating	-30°C, 96h	
High Temperature Storage	+85°C, 96h	
Low Temperature Storage	-40°C, 96h	
High Temperature & High Humidity Storage	+60°C, 90% RH, 96h	
Thermal Shock (Non-operation)	-40°C, 30 min ↔ 85°C, 30 min, Change time: 5min 20CYC.	

Note: The results must be measured after 2 hours later under room temperature keeping.

8. Cautions and Handling Precautions

8.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth.
In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the “Power ON” condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

8.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0°C to 35°C and relative humidity of less than 70%

(2) Do not store the AMOLED module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.