

Version: 1.0

TECHNICAL SPECIFICATION
MODEL NO. : ED050SC3

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Please contact PVI or its agent for further information

Customer's Confirmation

Customer _____

Date _____

By _____

PVI's Confirmation

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Revision History

Rev.	Issued Date	Revised	Contents
1.0	August.15.2008	New	

TECHNICAL SPECIFICATION

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1. Application

The display is a TFT active matrix electrophoretic display, with associated interface and control logic, and a reference system design.

The 5" active area contains 800x600 pixels, and has full 1~4 bit display capabilities

An integrated circuit containing interface, timing and control logic is supplied with each panel.

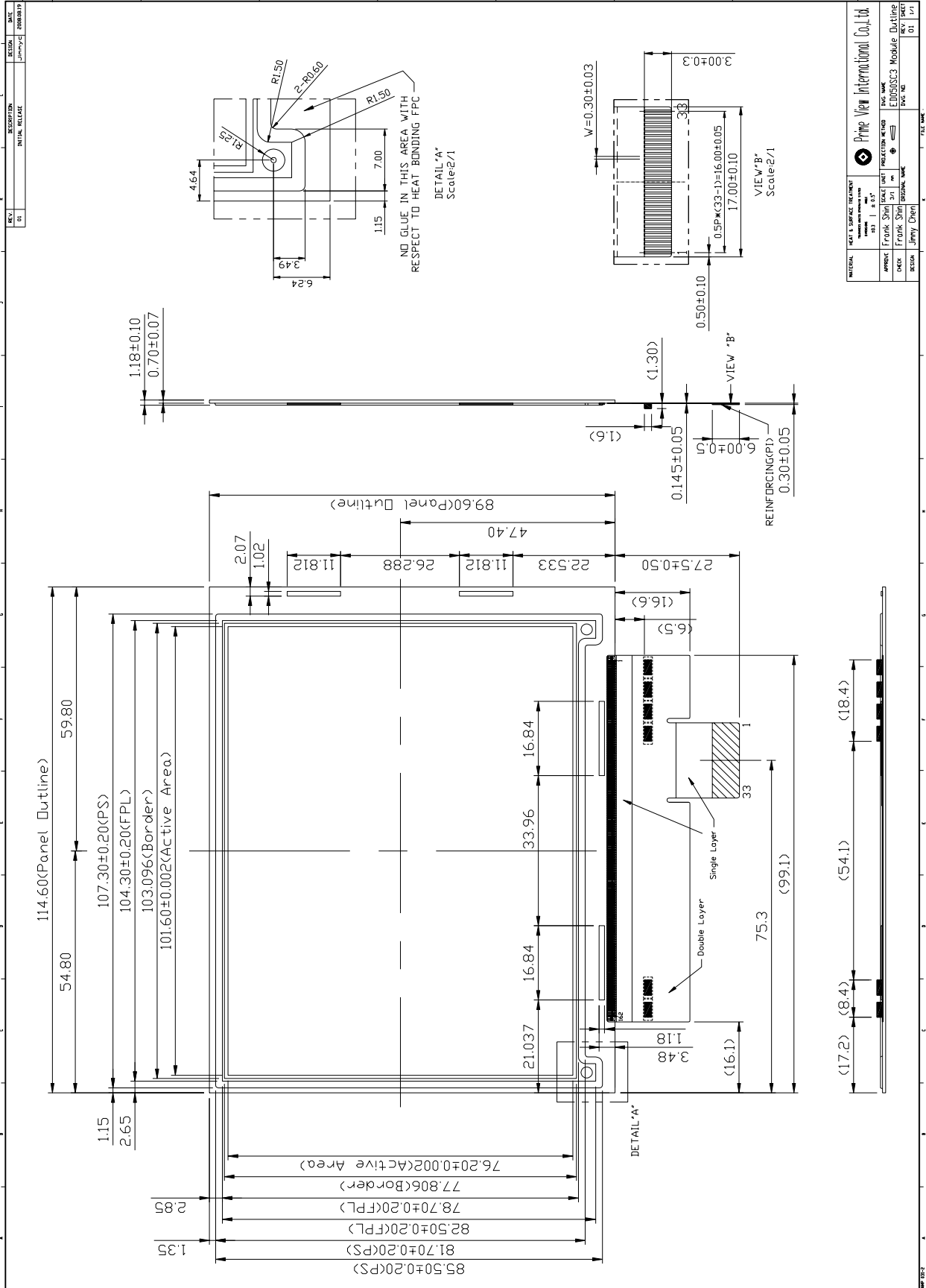
2. Features

- High contrast TFT electrophoretic
- 800x600 display
- High reflectance
- Ultra wide viewing angle
- Ultra low power consumption
- Pure reflective mode
- Bi-stable
- Commercial temperature range
- Landscape, portrait mode
- Antiglare hard-coated front-surface

3. Mechanical Specifications

Parameter	Specifications	Unit	Remark
Screen Size	5	Inch	
Display Resolution	800 (H) ×600(V)	Dot	
Active Area	101.6 (H)×76.2 (V)	mm	
Pixel Pitch	0.127(H)×0.127(V)	mm	
Pixel Configuration	Rectangle		
Outline Dimension	114.6(H) ×89.6(V) ×1.18(D) (panel area height) 114.6(H) ×89.6(V) ×2.0(D) (FPC area height with capacitor)	mm	Panel height is measured without released film
Module Weight	24±2	g	

4. Mechanical Drawing of EPD Module



MATERIAL	SCALE	DATE	DESIGNER	DATE	SCALE	PROJECT	NO.	REV.	DATE
PRIME VIEW INTERNATIONAL CO., LTD.	1:1				ED050SC3	Module Outline			

5. Input/Output Terminals

5-1) Pinout List

Pin #	Signal	Description
1	VNEG	Negative power supply source driver
2	NC	NO Connection
3	VPOS	Positive power supply source driver
4	NC	NO Connection
5	VSS	Ground
6	NC	NO Connection
7	VDD	Digital power supply drivers
8	XCL	Clock source driver
9	XLE	Latch enable source driver
10	XOE	Output enable source driver
11	XSHR	Shift direction source driver
12	XSTL2	Start pulse source driver
13	D0	Data signal source driver
14	D1	Data signal source driver
15	D2	Data signal source driver
16	D3	Data signal source driver
17	D4	Data signal source driver
18	D5	Data signal source driver
19	D6	Data signal source driver
20	D7	Data signal source driver
21	NC	NO Connection
22	VCOM	Common connection
23	NC	NO Connection
24	VGG	Positive power supply gate driver
25	NC	NO Connection
26	VEE	Negative power supply gate driver
27	NC	NO Connection
28	MODE2	Output mode selection gate driver
29	MODE1	Output mode selection gate driver
30	XRL	Shift direction gate driver
31	SPV	Start pulse 1st gate driver
32	CKV	Clock 1st gate driver
33	BORDER	Border connection

6. Electrical Characteristics

6-1) Panel interface description

This panel is driven by ASIC PVI-6001A or “Apollo” display controller ASIC. See control product specification for details.

6-2) Panel DC characteristics

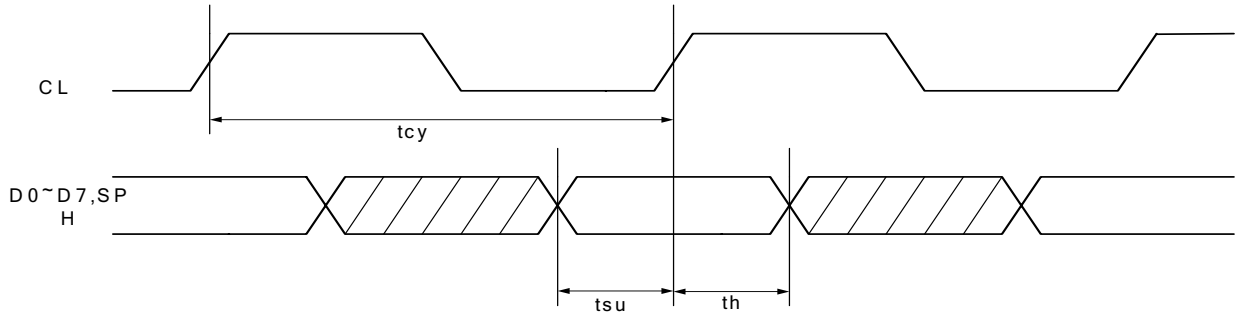
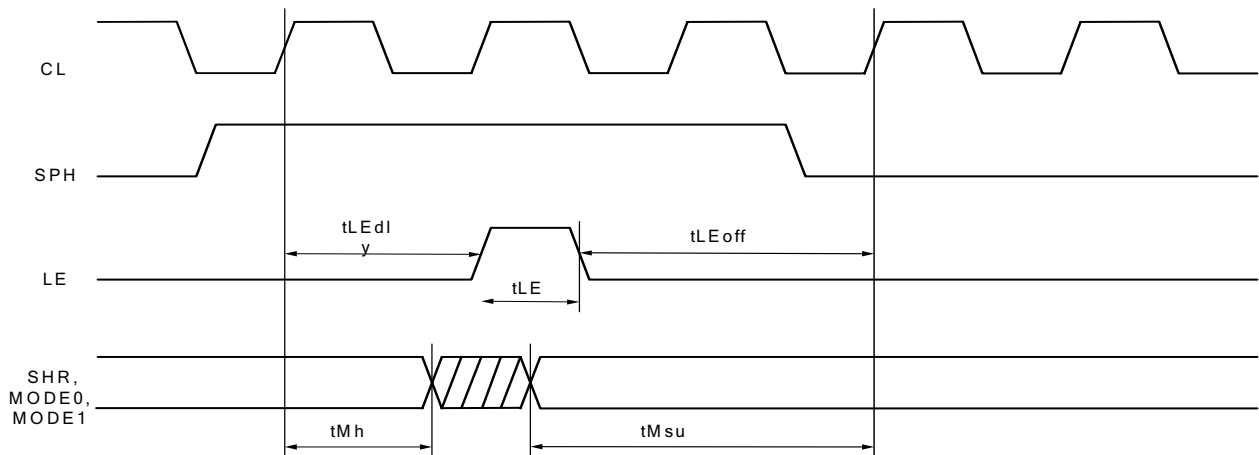
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Signal ground	V_{SS}		-	0	-	V
Logic Voltage supply	V_{DD}		3.0	3.3	3.6	V
	I_{VDD}	$V_{DD}=3.3V$	-	2	4	mA
Gate Negative supply	V_{EE}		-21	-20	-19	V
	I_{EE}	$V_{EE}=-20V$	-	1	3	mA
Gate Positive supply	V_{GG}		21	22	23	V
	I_{GG}	$V_{GG} = 22V$	-	0.82	2.46	mA
Source Negative supply	V_{NEG}		-15.4	-15	-14.6	V
	I_{NEG}	$V_{NEG} = -15V$	-	21.6	43.2	mA
Source Positive supply	V_{POS}		14.6	15	15.4	V
	I_{POS}	$V_{POS} = 15V$	-	24.1	48.2	mA
Asymmetry source	V_{Asym}	$V_{POS}+V_{NEG}$	-80	0	80	mV
Common voltage	V_{COM}		-2.5	Adjusted	-1.0	V
	I_{COM}		-	0.19	-	mA
Maximum power panel	P_{MAX}		-	-	1600	mW
Standby power panel	P_{STBY}		-	-	0.4	mW
Typical power panel	P_{TYP}		-	750	-	mW
Operating temperature			0	-	50	°C
Storage temperature			-25	-	70	°C
Maximum image update time at 25°C			-	1000	-	ms

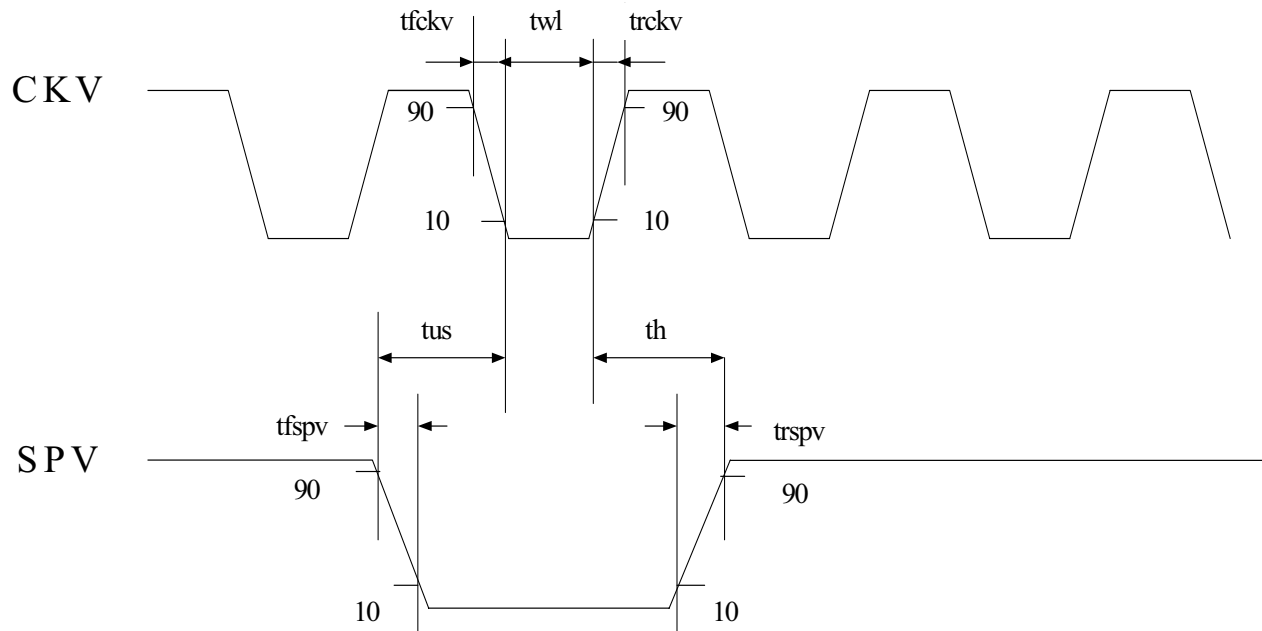
- The maximum power and maximum currents are specified for the worse case power consumption. This occurs when 2 horizontal inverted stripped images are displayed
- The typical power is the consumed power when “typical images” are displayed.
- The standby power is the consumed power when the panel controller is in standby mode.
- The listed electrical/optical characteristics are only guaranteed under the controller & waveform provided by PVI

6-3)Panel AC characteristics

VDD=3.0V to 3.6V, unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max.	Unit	App Pin
Clock frequency	fckv			200	kHz	CKV
Minimum "L" clock pulse width	twL	0.5			us	
Clock rise time	trckv			100	ns	
Clock fall time	tfckv			100	ns	
Data setup time	tSU	100			ns	CKV, SPV
Data hold time	tH	100			ns	
Pulse rise time	trspv			100	ns	SPV
Pulse fall time	tfspv			100	ns	
Clock CL cycle time	tcy	50		DC	ns	Below table
D0 .. D7, SPH setup time	tsu	8			ns	
D0 .. D7, SPH hold time	th	1			ns	
LE on delay time	tLEdly	40			ns	
LE high-level pulse width	tLEw	40			ns	
LE off delay time	tLEoff	40			ns	

CLOCK & DATA TIMING

OUTPUT LATCH / CONTROL SIGNALS




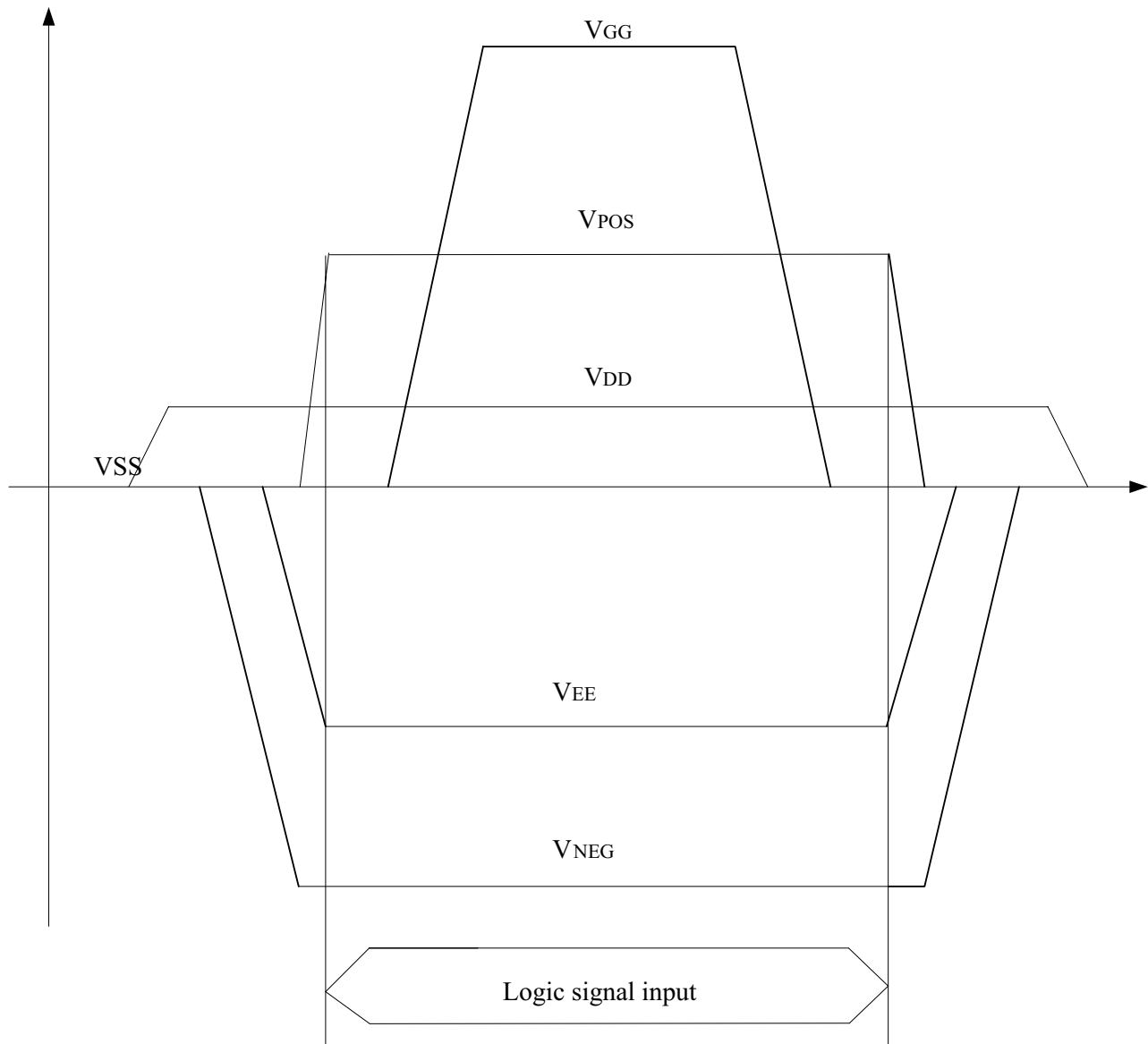
6-4) Power Consumption

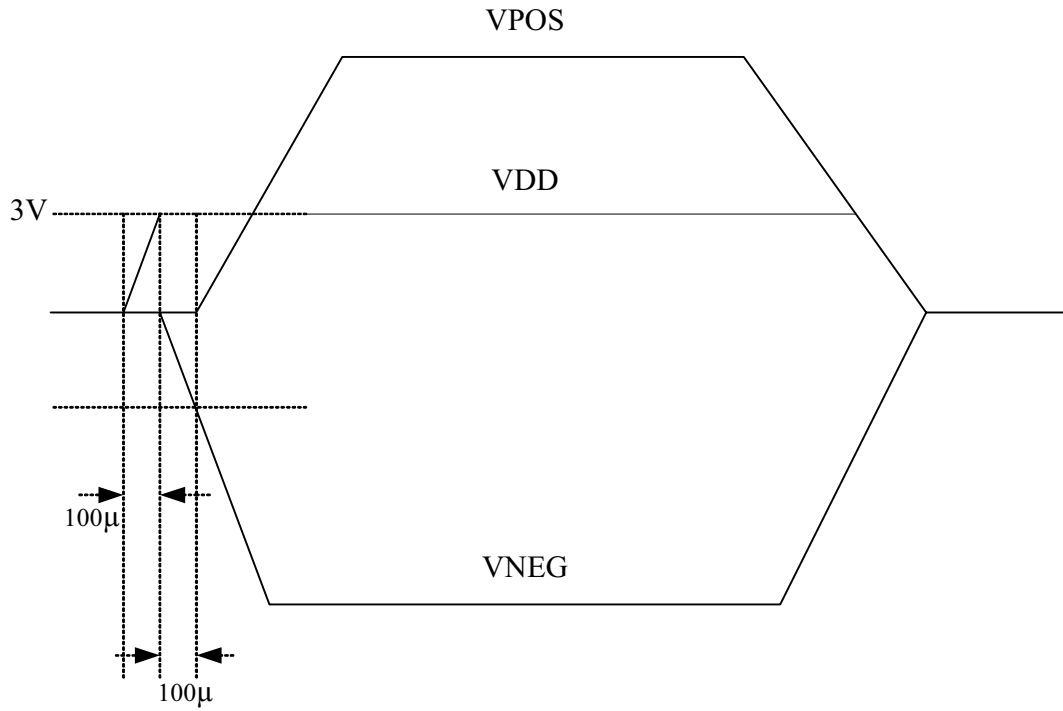
Parameter	Symbol	Conditions	TYP	Max	Unit	Remark
Maximum panel power consumption during update.	-	-	-	1600	mW	
Power consumption in standby mode	-	-	-	0.4	mW	
Typical panel power	-	-	750	-	mW	

7.Power on Sequence

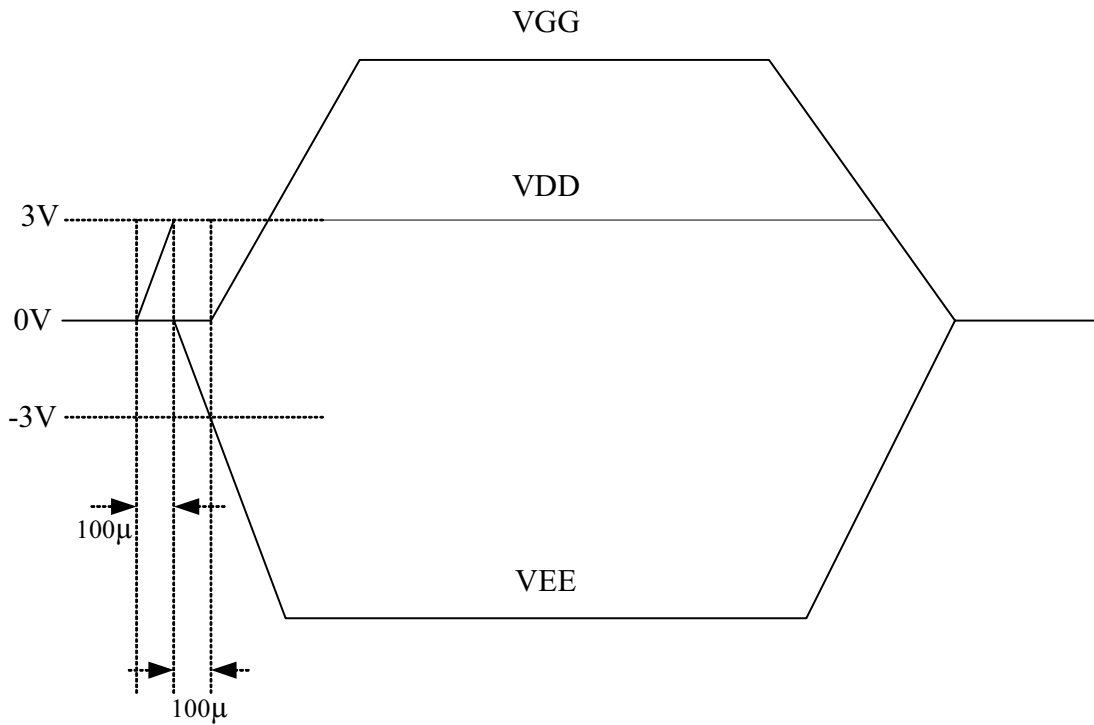
1. VSS → VDD → VNEG → VPOS (Source driver)
2. VEE → VGG(Gate driver)

* Power on sequence's timing chart as blew :



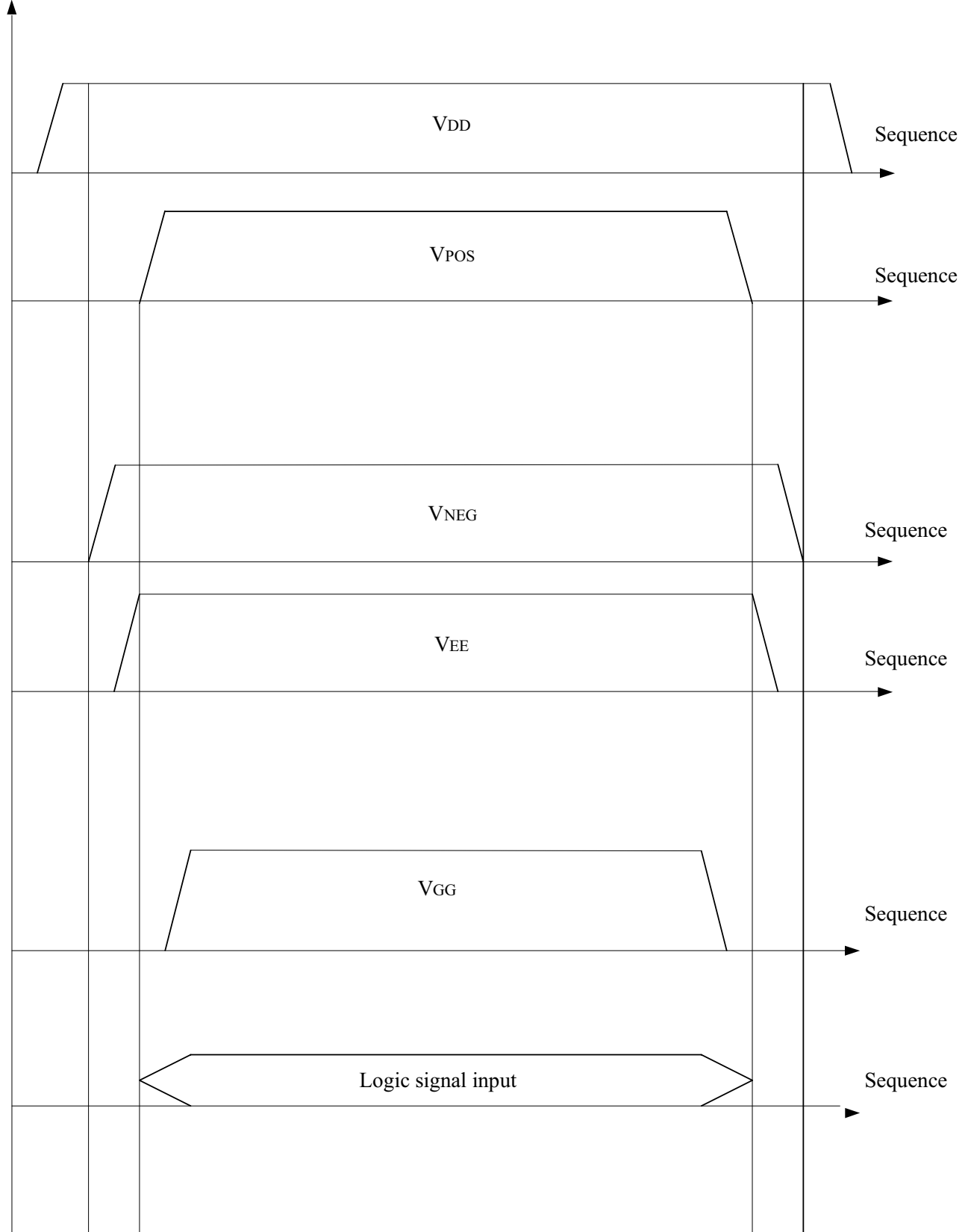


Power Ramp rate:3V/100 µ S(Max)



Power Ramp rate:3V/100 µ S(Max)

* It is expanded as blew.



8. Optical characteristics

8-1) Specifications

Measurements are made with that the illumination is under an angle of 30 degrees, the detection is perpendicular unless otherwise specified.

T = 25°C

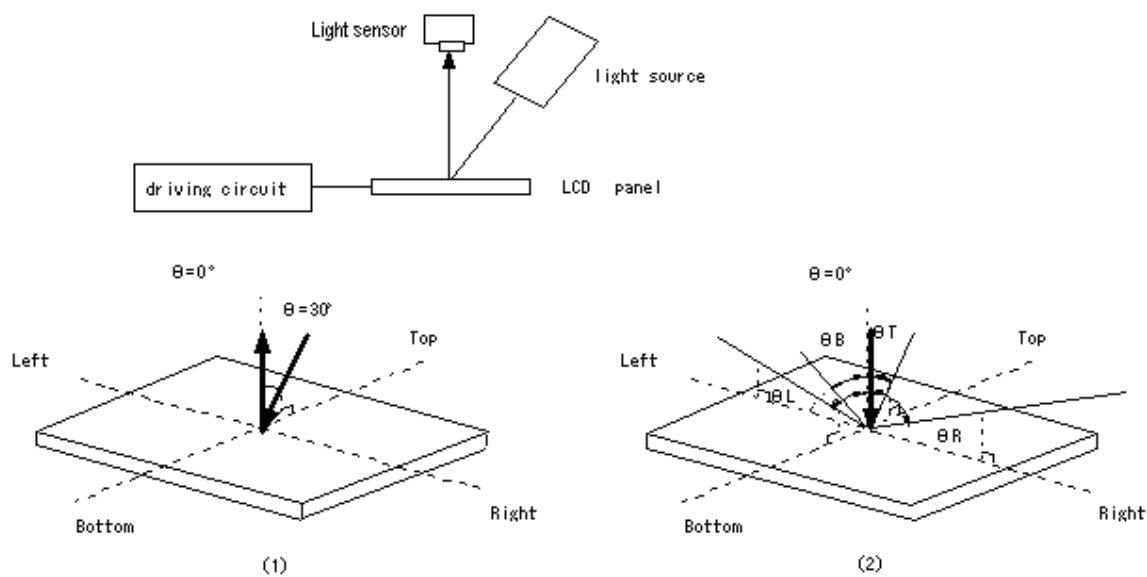
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT	Note
R	Reflectance	White	30	35	-	%	8-1
Gn	N _{th} Grey Level	-	-	$DS+(WS-DS) \times n / (m-1)$	-	L*	-
CR	Contrast Ratio	-	6	-	-		-
T _{update}	Update time	2~4-bit mode 1-bit mode		1000 540	-	ms ms	-

WS: White state, DS: Dark state, Gray state from Dark to White :DS、G1、G2...、Gn...、Gm-2、WS
m:4、8、16 when 2、3、4 bits mode

8-2) Definition of contrast ratio

The contrast ratio (CR) is the ratio between the reflectance in a full white area (Rl) and the reflectance in a dark area (Rd):

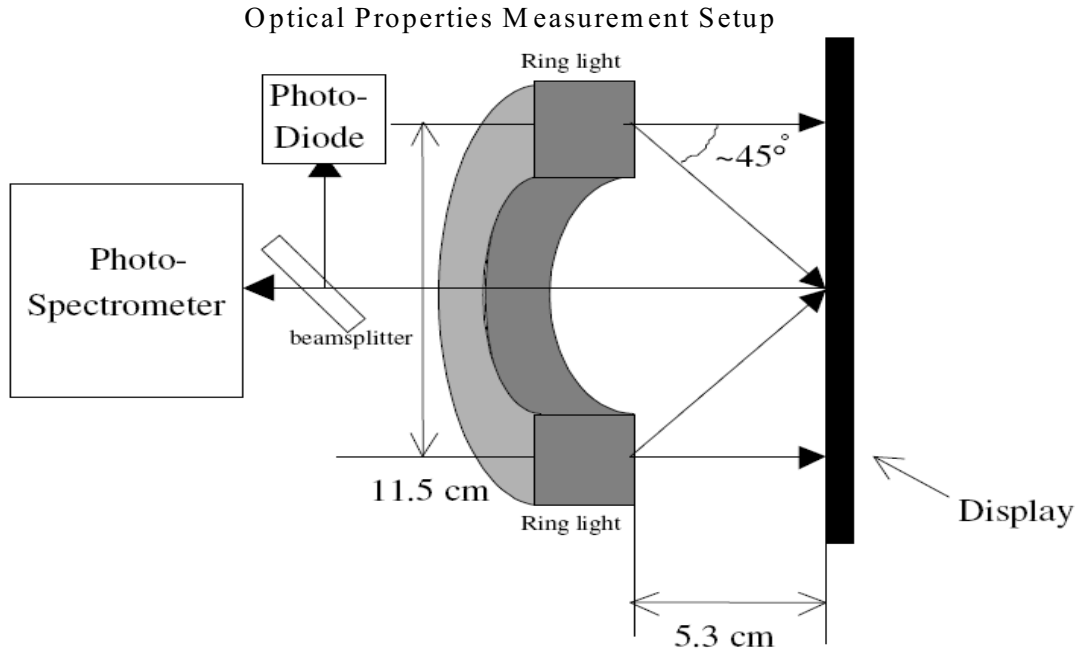
$$CR = Rl/Rd$$



Note 8-1

Luminance meter: Eye-One Pro Spectrophotometer

Only reflectivity effect is counted when using above optical measurement with Eye-One Pro Spectrophotometer .Some scattering effect will be counted in actual visual conditions and the measurement data will be higher. A second optical measurement method and related data by which scattering effect counted are listed for reference.



Method	SYMBOL	PARAMETER	CONDITIONS	MIN.	Luminance meter	UNIT
Reflectivity only	R	Reflectance	White	30	Eye-One Pro Spectrophotometer	%
Reflectivity & scattering	R	Reflectance	White	35	EOTS	

8-3) Reflection Ratio

The reflection ratio is expressed as:

$$R = \text{Reflectance Factor}_{\text{white board}} \times (L_{\text{center}} / L_{\text{white board}})$$

L_{center} is the luminance measured at center in a white area ($R=G=B=1$). $L_{\text{white board}}$ is the luminance of a standard white board. Both are measured with equivalent illumination source (see figure 8.3). The viewing angle shall be no more than 2 degrees.

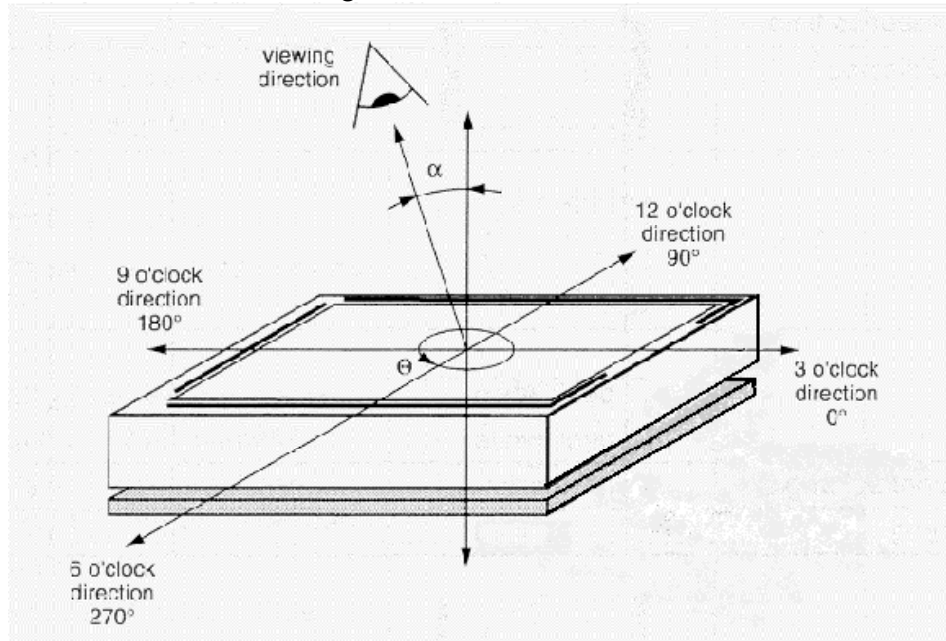


figure 8.3

α = declination / θ = azimuth

9.HANDLING, SAFETY AND ENVIROMENTAL REQUIREMENTS

WARNING
The display glass may break when it is dropped or bumped on a hard surface. Handle with care. Should the display break, do not touch the electrophoretic material. In case of contact with electrophoretic material, wash with water and soap.

CAUTION
The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.
Disassembling the display module can cause permanent damage and invalidate the warranty agreements.

Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged. Moreover the display is sensitive to static electricity and other rough environmental conditions.

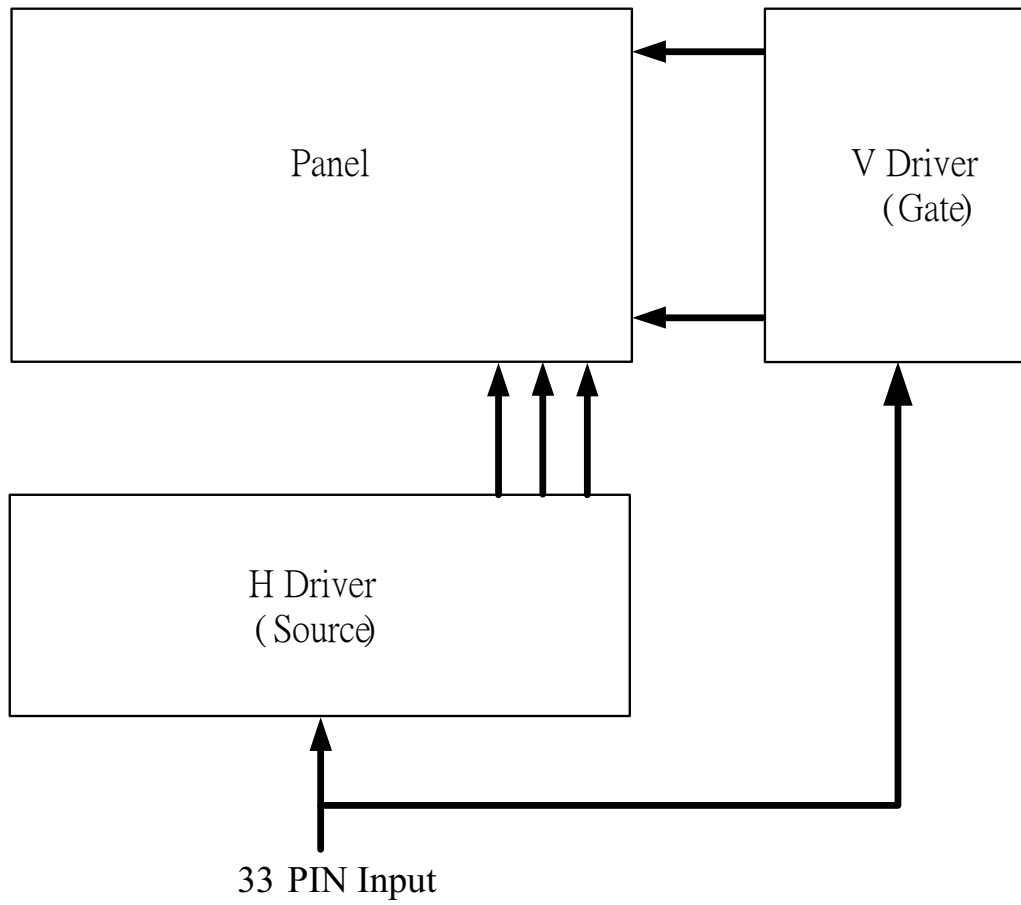
Data sheet status	
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

10. Reliability test

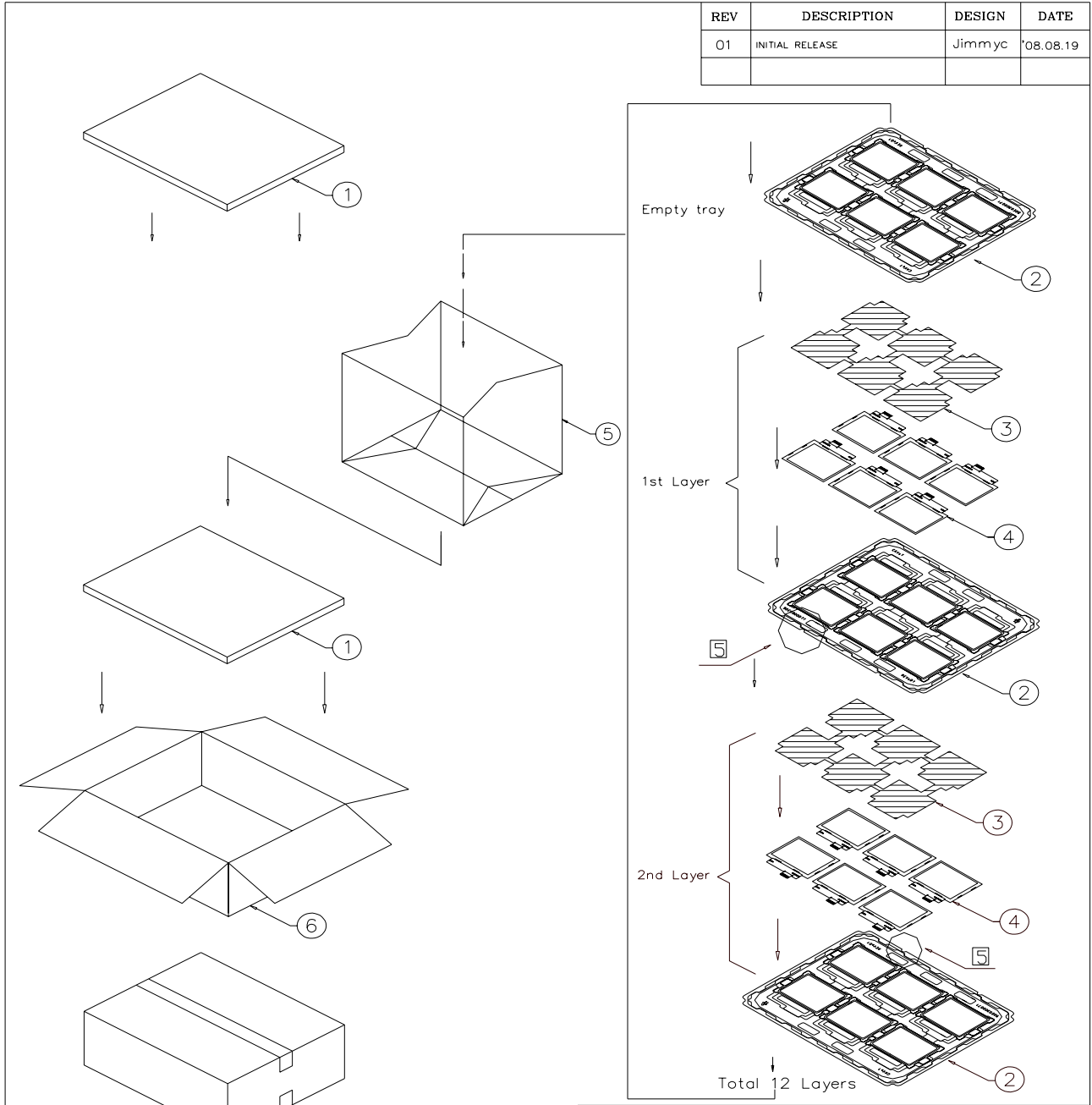
	TEST	CONDITION	METHOD	REMARK
1	High-Temperature Operation	T = +50°C, RH = 30% for 240 hrs	IEC 60 068-2-2Bp	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
2	Low-Temperature Operation	T = 0°C for 240 hrs	IEC 60 068-2-2Ab	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
3	High-Temperature Storage	T = +70°C, RH=23% for 240 hrs	IEC 60 068-2-2Bp	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
4	Low-Temperature Storage	T = -25°C for 240 hrs	IEC 60 068-2-1Ab	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
5	High-Temperature, High-Humidity Operation	T = +40°C, RH = 90% for 168 hrs	IEC 60 068-2-3CA	At the end of the test, electric, mechanical, specifications shall be satisfied.
6	High Temperature, High-Humidity Storage	T = +50°C, RH=80% for 240hrs	IEC 60 068-2-3CA	At the end of the test, electric, mechanical, specifications shall be satisfied.
7	Temperature Cycle	1 cycle:[-25°C 30min]→[+70°C 30 min] :100 cycles	IEC 60 068-2-14	At the end of the test, electric, mechanical, specifications shall be satisfied.
8	UV exposure Resistance	765 W/m ² for 168hrs,40°C	IEC60 068-2-5Sa	Optical characteristics shall be satisfied.
9	Package Vibration	1.04G, Frequency: 10~500Hz Direction: X,Y,Z Duration: 1 hours in each direction	Full packed for shipment	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
10	Package Drop Impact	Drop from height of 122 cm on concrete surface. Drop sequence: 1 corner, 3 edges, 6 faces One drop for each.	full packed for shipment	At the end of the test, electric, mechanical, and optical specifications shall be satisfied.
11	Electrostatic Effect (non-operating)	(Machine model)+/- 250V 0Ω, 200pF	IEC 62179, IEC 62180	At the end of the test, electric, mechanical, specifications shall be satisfied.
12	Altitude test Operation	700hPa (= 3000m)48Hr		At the end of the test, electric, mechanical, specifications shall be satisfied.
13	Altitude test Storage	260hPa (= 10000m)48Hr		At the end of the test, electric, mechanical, specifications shall be satisfied.
16	Stylus Tapping	POLYACETAL Pen: Top R:0.4mm Load: 300gf Speed: 5times/sec Total 13,500times,		Pass criteria – no glass breakage or damage to microcapsules.

Actual EMC level to be measured on customer application

11. Block Diagram



12.Packing



NOTE:

- 1. One layer include: 1 piece of cushion sheet, 6 pcs panel & 1 piece of tray.
- 2. Q'TY: 72 pcs panel/carton.
- 3. Dimension: 455*375*190mm
- 4. Weight: 4.7 KG
- 5. tray 需180°交叉堆疊，疊堆後可從側邊檢視圓弧防呆方向是否正確

ITEM	PART NO.	DESCRIPTION	QTY	REMARK
6	50-0100091	CARTON INTERNAL	1	
5	50-0500041	摺口袋450*380*700mm	1	抗靜電
4		EPD 5" Panel	72	
3	50E0200031	EPE CUSHION SHEET	12	抗靜電
2	50E0300071	PS TRAY	13	抗靜電
1	50-0300491	EPE FOAM	2	

MTL.SPEC.		UNSPECIFIED TOL'S		REMARK		
		ANGLE				
		ROUGHNESS				
APPROVE	Frank Shin	SCALE	UNIT	SHEET	元太科技股份有限公司 Prime View International Co.,Ltd. DWG.TITLE ED050SC3 PACKING DRAW	
CHECK	Frank Shin	1:1	mm	1 OF 1		
DESIGN	Jimmyc	MTL.NO.		DWG.NO.		
					REV. 01	A4 SIZE