




Product Specifications

Customer	
Description	2.7" TFT EPD Panel
Model Name	EM027AS011
Date	2011/06/08
Doc. No.	1P008-00
Revision	01

Customer Approval	
Date	
The above signature represents that the product specifications, testing regulation, and warranty in the specifications are accepted	

	Design Engineering		
	Approval	Check	Design
			

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- CONTENTS -

REVISION HISTORY	-----	3
1. GENERAL DESCRIPTION	-----	4
1.1 OVERVIEW		
1.2 FEATURES		
1.3 APPLICATION		
1.4 GENERAL SPECIFICATIONS		
1.5 MECHANICAL SPECIFICATIONS		
2. ABSOLUTE MAXIMUM RATINGS	-----	6
2.1 ABSOLUTE RATINGS OF ENVIRONMENT		
3. ELECTRICAL CHARACTERISTICS	-----	7
3.1 ABSOLUTE MAXIMUM RATINGS OF PANEL		
3.2 RECOMMENDED OPERATION CONDITIONS OF PANEL		
4. APPLICATION CIRCUIT BLOCK DIAGRAM	-----	8
5. INPUT TERMINAL PIN ASSIGNMENT	-----	9
5.1 INPUT TERMINAL PIN ASSIGNMENT		
5.2 REFERENCE CIRCUIT		
6. OPTICAL CHARACTERISTICS	-----	11
6.1 TEST CONDITIONS		
6.2 OPTICAL SPECIFICATIONS		
7. PACKING	-----	12
8. PRECAUTIONS	-----	14
9. DEFINITION OF LABELS	-----	15

REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver 01	2011/6/8	All	All	Product specification first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

This is a 2.7" a-Si, active matrix TFT, Electronic Paper Display (EPD) panel. The panel has such high resolution (117 dpi) that it is able to easily display fine patterns such as Japanese Kanji and barcodes. Due to its bi-stable nature, the EPD panel requires very little power to update and needs no power to maintain an image.

1.2 FEATURES

- a-Si TFT active matrix Electronic Paper Display
- High Resolution: 264 x 176
- Ultra low power consumption
- Super Wide Viewing Angle - near 180°
- Extra thin & light
- SPI interface

1.3 APPLICATION

- Electronic shelf labels (ESLs)
- e-POP/e-POS systems
- Electronic bulletins

1.4 GENERAL SPECIFICATIONS

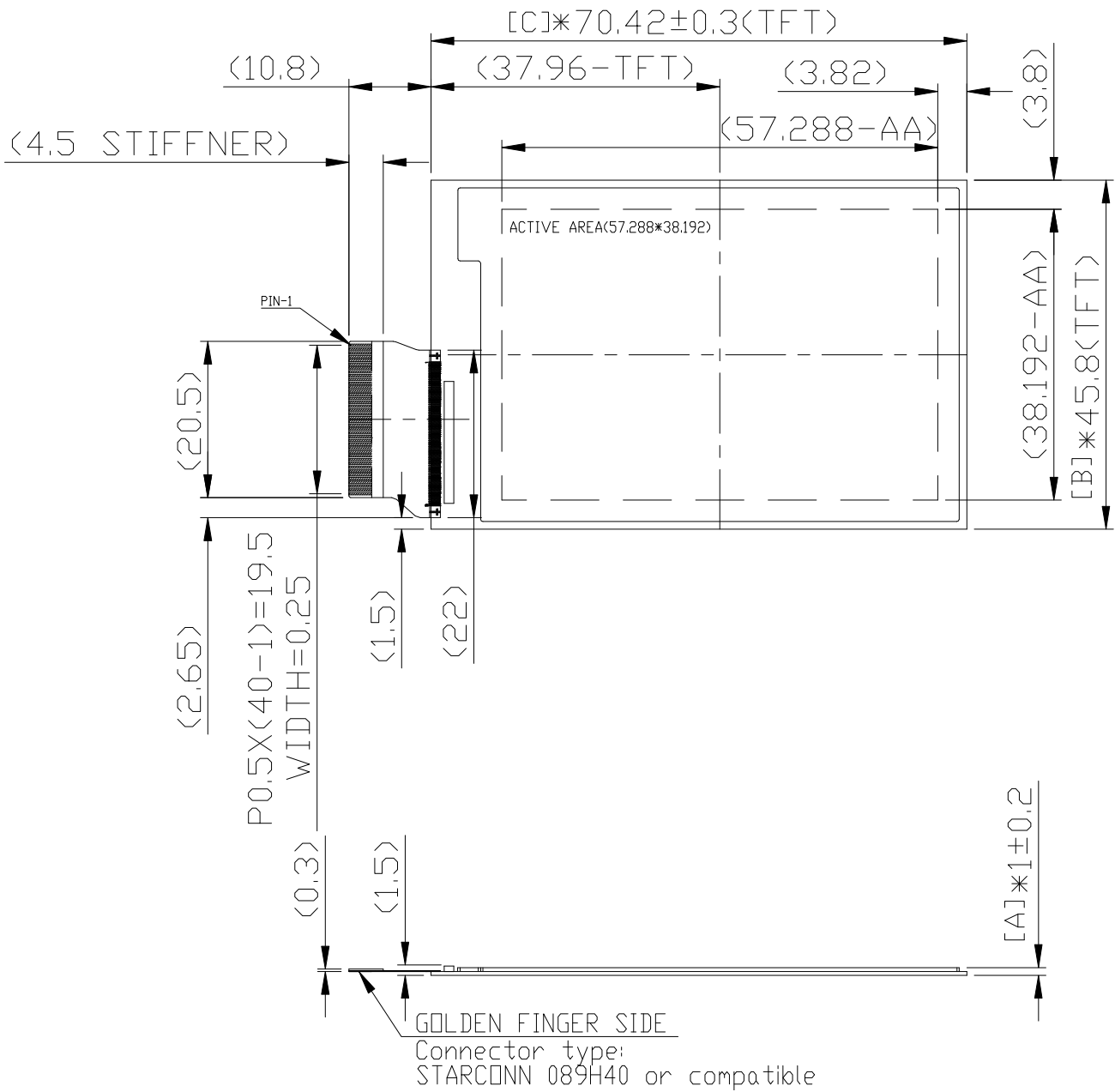
Item	Specification	Unit	Note
Outline Dimension	70.42(H) x 45.8(V) x 1.0(T)	mm	(1)
Active Area	57.288(H) x 38.192 (V)	mm	
Driver Element	a-Si TFT active matrix	-	
Pixel Number	264 x 176	pixel	
Pixel Pitch	0.217 x 0.217 (117dpi)	mm	
Pixel Arrangement	Vertical stripe	-	
Display Colors	Black/White	-	
Surface Treatment	Anti-Glare	-	

Note (1) Not include FPC.

1.5 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note
Glass Size	Horizontal(H)	70.42		mm	
	Vertical(V)		45.8	mm	
	Thickness(T)	---	1.0	mm	(1)
Weight	---	6.3		g	

Note (1) Not include Masking Film.



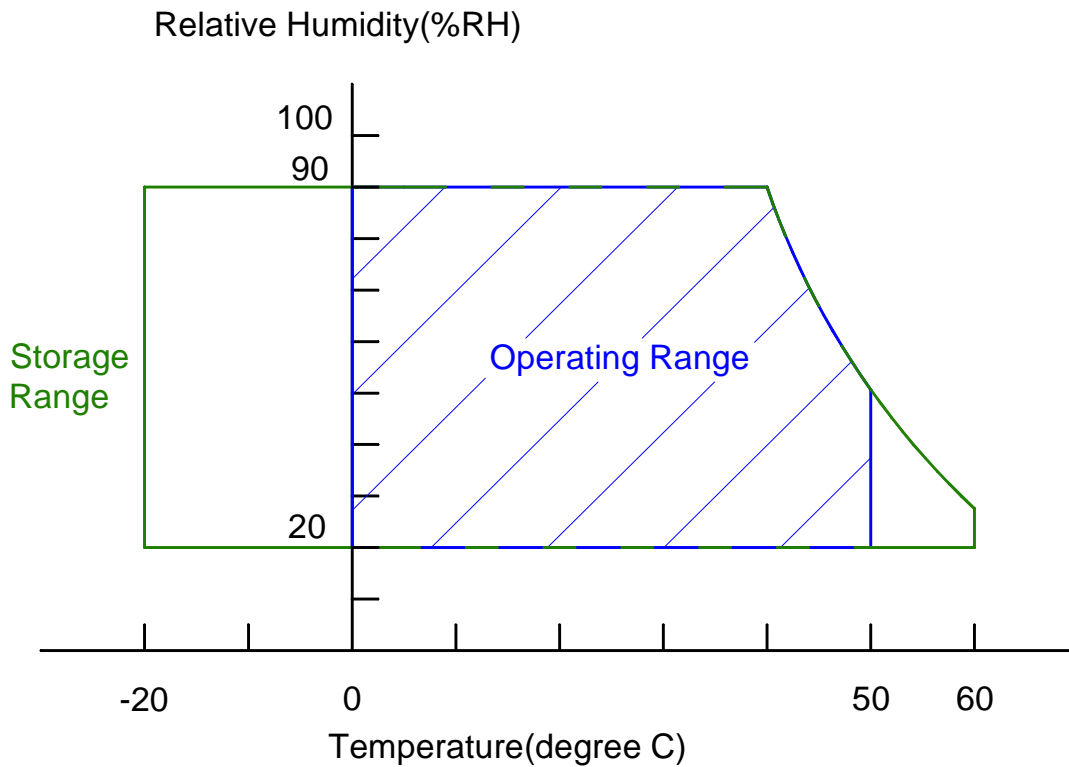
2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	+60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	+50	°C	(1), (2)

Note (1) (a) 90 %RH Max. (Ta ≤ 40 °C).
 (b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).
 (c) No condensation.

Note (2) The temperature of panel display surface area should be 0 °C Min. and 50 °C Max. Refresh time depends on operation temperature.



3. ELECTRICAL CHARACTERISTICS

3.1 ABSOLUTE MAXIMUM RATINGS OF PANEL

Ta = 25 ± 2 °C

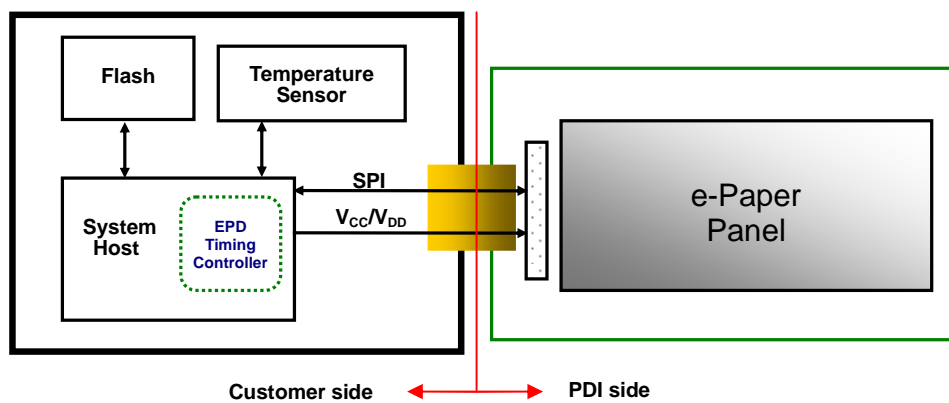
Parameter	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power	V _{DD}	-0.3	5.0	V	
Analog Power	V _{CC}	-0.3	5.0	V	

3.2 RECOMMENDED OPERATION CONDITIONS OF PANEL

Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Digital Power	V _{DD}	2.7	3.0	3.3	V	
Analog Power	V _{CC}	2.7	3.0	3.3	V	

4. APPLICATION CIRCUIT BLOCK DIAGRAM

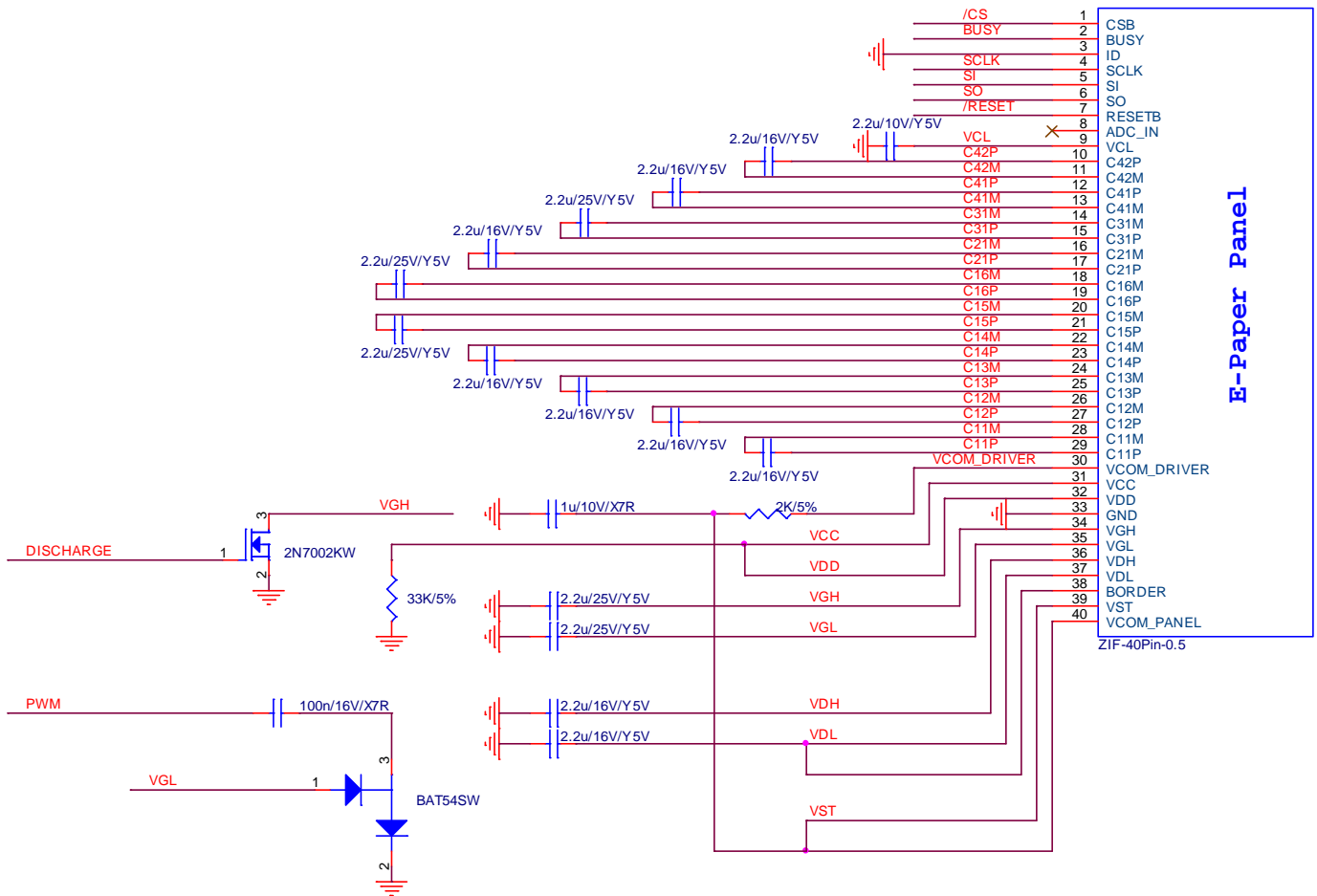


5. INPUT TERMINAL PIN ASSIGNMENT & REFERENCE CIRCUIT

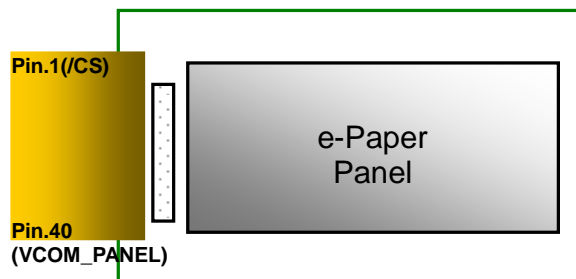
5.1 INPUT TERMINAL PIN ASSIGNMENT

No	Signal	I/O	Connected to	Function
1	/CS	I	MCU	Chip Select. Low enable
2	BUSY	O	MCU	When BUSY = 1, EPD stays in busy state that EPD ignores any input data from SPI.
3	ID	I	Ground	Set ID to 0
4	SCLK	I	MCU	Clock for SPI
5	SI	I	MCU	Serial input from host MCU to EPD
6	SO	O	MCU	Serial output from EPD to host MCU
7	/RESET	I	MCU	Reset signal. Low enable
8	ADC_IN	-	-	Not connected
9	VCL	C	Capacitor	
10	C42P	C	Charge-Pump	
11	C42M	C	Capacitor	
12	C41P	C	Charge-Pump	
13	C41M	C	Capacitor	
14	C31M	C	Charge-Pump	
15	C31P	C	Capacitor	
16	C21M	C	Charge-Pump	
17	C21P	C	Capacitor	
18	C16M	C	Charge-Pump	
19	C16P	C	Capacitor	
20	C15M	C	Charge-Pump	
21	C15P	C	Capacitor	
22	C14M	C	Charge-Pump	
23	C14P	C	Capacitor	
24	C13M	C	Charge-Pump	
25	C13P	C	Capacitor	
26	C12M	C	Charge-Pump	
27	C12P	C	Capacitor	
28	C11M	C	Charge-Pump	
29	C11P	C	Capacitor	
30	VCOM_DRIVER	RC	Resistor & Capacitor	Vcom source from driver IC
31	VCC	P	VCC	Power for analog circuit
32	VDD	P	VDD	Power for digital circuit
33	GND	P	Ground	
34	VGH	C	Capacitor	
35	VGL	C	Capacitor	
36	VDH	C	Capacitor	
37	VDL	C	Capacitor	
38	BORDER	P	VDL	Connect to VDL for white frame border
39	VST	P	VCOM_PANEL	
40	VCOM_PANEL	C	Capacitor	Vcom to panel

5.2 REFERENCE CIRCUIT



Note (1) Pin.1 location



6. OPTICAL CHARACTERISTICS

6.1 TEST CONDITIONS

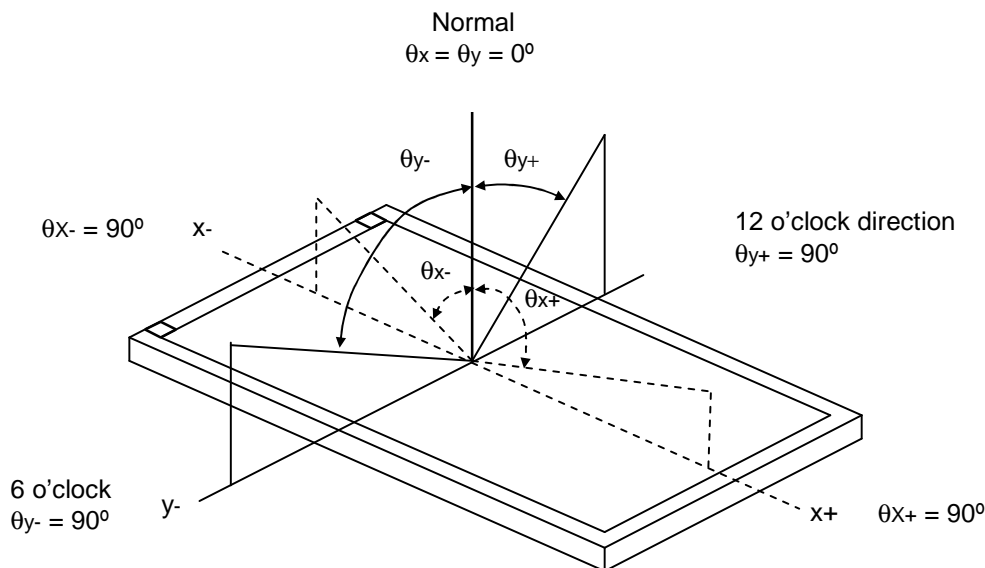
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V _{CC} & V _{DD}	3.0	V

6.2 OPTICAL SPECIFICATIONS

Item	symbol	Rating			Unit	Note
		Min.	Typ.	Max.		
Contrast Ratio	CR	5	10	---	---	$\theta_x = \theta_y = 0(1), (2)$
Refresh time	Tr	---	3	---	sec	(2)
Reflectance	R%	---	32	---	%	(3)

Not include Masking Film. Driven and optical measured by PDI waveform and CM-700d.

Note (1) Definition of Viewing Angle (θ_x, θ_y):



(2) 1.5 second is the refresh time at 25°C. The refresh time and contrast ratio are easy to be changed due to different films, display performance requirement, and ambient temperature. The refresh time is times of that at room temperature.

(3) Definition of Reflectance (R%):

The reflectance can be calculated by the following expression.

$$\text{Reflectance}(R\%) = L(\text{White}) / L(\text{Std. White}) * 100\%$$

L(White): Luminance of white

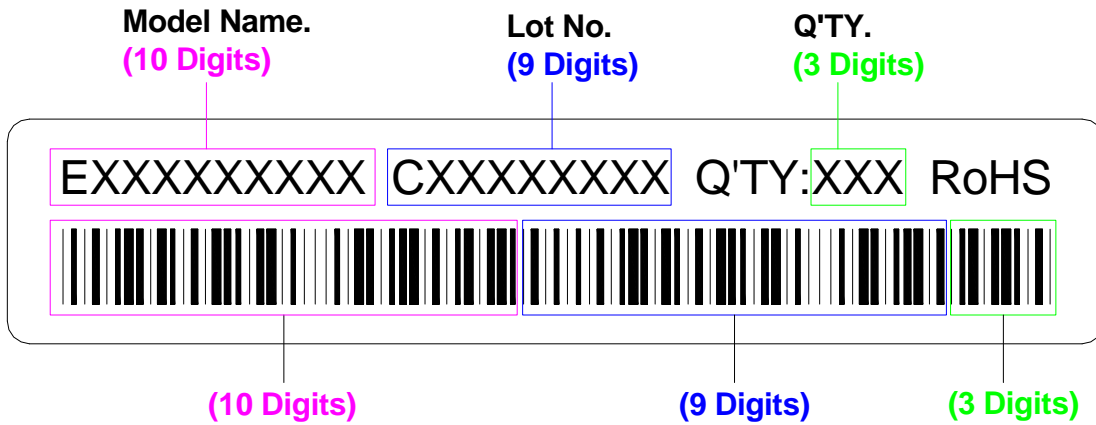
L(Std. White): Luminance of the standard white plate, which is made of BaCO₃

7. PACKING TBD

8. PRECAUTIONS

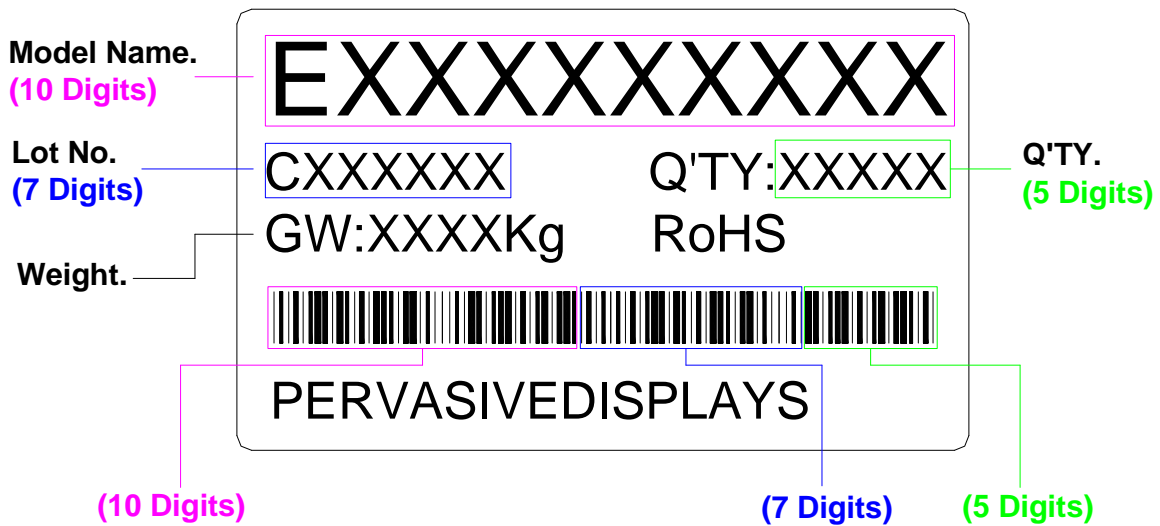
- (1) Do not apply rough force such as bending or twisting to the EPD panel during assembly.
- (2) It is recommended to assemble or install EPD panels in a clean working area. Dust and oil may cause electrical shorts or degrade the PS film.
- (3) Do not apply pressure to the EPD panel in order to prevent damaging it.
- (4) Always follow the correct power-on sequence in turning on the EPD panel. This will help prevent a short circuit "latchup" of the ICs.
- (5) Do not plug in or pull out the I/F connector while the EPD panel is in operation.
- (6) Do not disassemble or reassemble the EPD panel.
- (7) Use a soft dry cloth without chemicals for cleaning. The surface of the PS film is very soft and easily scratched.
- (8) Be mindful of moisture to avoid its penetration into the EPD panel, which may cause damage during operation.
- (9) High temperature, high humidity, sunlight or fluorescent light may degrade the EPD panel's performance. Please do not expose the unprotected EPD panel to high temperature, high humidity, sunlight, or fluorescent for long periods of time. It is highly recommended to store the EPD panel in a dark place without condensation, a temperature range of 20°C to 30°C, and humidity from 40%RH to 60%RH.
- (10) The ink used for marking the Panel ID number is erased easily by solvent. Please avoid using solvent to clean the EPD panel.

9. DEFINITION OF LABELS



Bar Code=Model Name.+Lot No.+Q'TY.(22 Digits)

Carton Label



Bar Code=Model Name.+Lot No.+Q'TY.(22 Digits)

Pallet Label