

Display Elektronik GmbH

DATA SHEET

E-Paper Display

DEE D0601A1 – W

**1,0“ - 6-DIGIT
E-PAPER DISPLAY**

Product Specification

Ver.: 0

14.07.2015

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Specification for E-Paper Display

Model NO.: DEE D0601A1-W

Prepared by	Checked by	Approved by

Customer Approval

Customer	Approved by	Date of Approval

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Version	Content	Date	Producer
0	New Release	2015/07/14	MH

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1 General Description

This is a Segment Electrophoretic Display Module which can be used in portable smartcard

The module is integrated circuits including Segment drivers.

2 Features

- ◆ White Reflectance above 33%(0 minute)
- ◆ Contrast Ratio above 8:1(0 minute)
- ◆ Wide viewing angle
- ◆ Ultra low power consumption
- ◆ Reflective mode
- ◆ Bi-stable display
- ◆ Commercial temperature range

3 Application

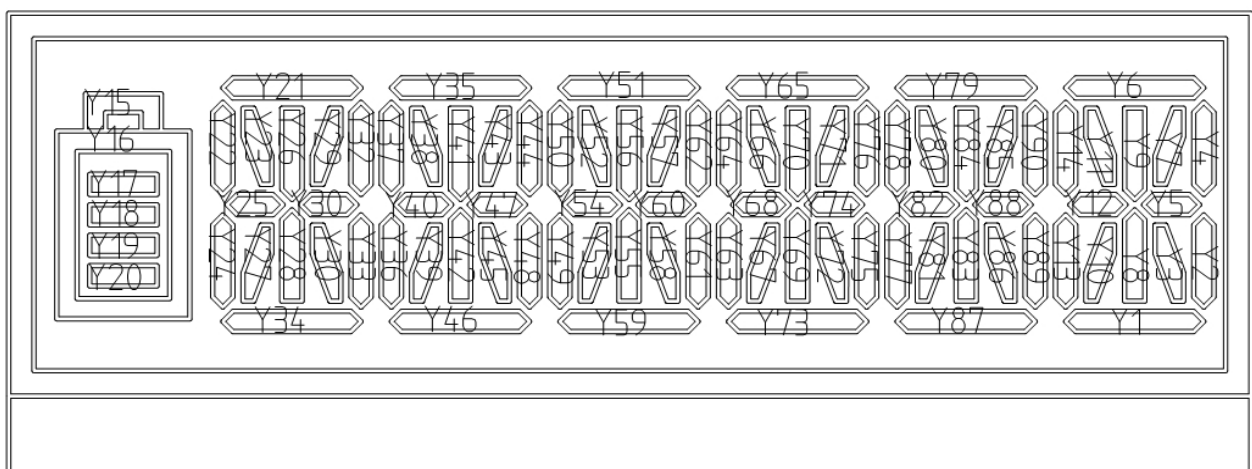
smartcard

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4 Pin Assignment

Table 1

PIN NAME	Description
SCL	2-wires serial interface clock input
SDA	2-wires serial interface data input or SPIEN pin
A1	Device ID setting bit1 or SPICK pin
A0	Device ID setting bit0 or SPIDATA pin
LOGICEN	Select the control interface LOGICEN=1 2-wires serial interface LOGICEN=0 SPI interface
VPP	Charge pump output pin about 30v
VX5	Charge pump output pin about 15v
VX4	Charge pump output pin about 7.5v
VX3	Charge pump output pin about 5v
VX2	Charge pump output pin about 2.5v
PP[1:5]	Positive terminal for charge pump capacitor
PM[1:5]	Negative terminal for charge pump capacitor
Y[1:122]	Hi-V channels output
VDD	Positive power source
VSS	Negative power source
V1D5	Charge pump reference Voltage



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5 Electrical Characteristics

5.1 Module Interface Description

This module can be driven by Controller.

5.2 Module DC Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Signal ground	VSS		-	0	-	V
Logic Voltage supply	VDD		2.2	3.0	3.6	V
	IVDD	update	-	TBD	-	mA
	Istop	Stop mode	-	TBD	-	μA
Gate Positive supply	VPP		14	15	30	V
	IVPP	update	-	TBD	-	μA
Operating temperature			0		50	°C
Storage temperature			-20	-	70	°C

6 Power On/Off Sequence and Driving flow-chart

To prevent the device from damage due to latch up, the power on/off sequence shown below must be followed.

When power on: VDD -> VPP -> Update

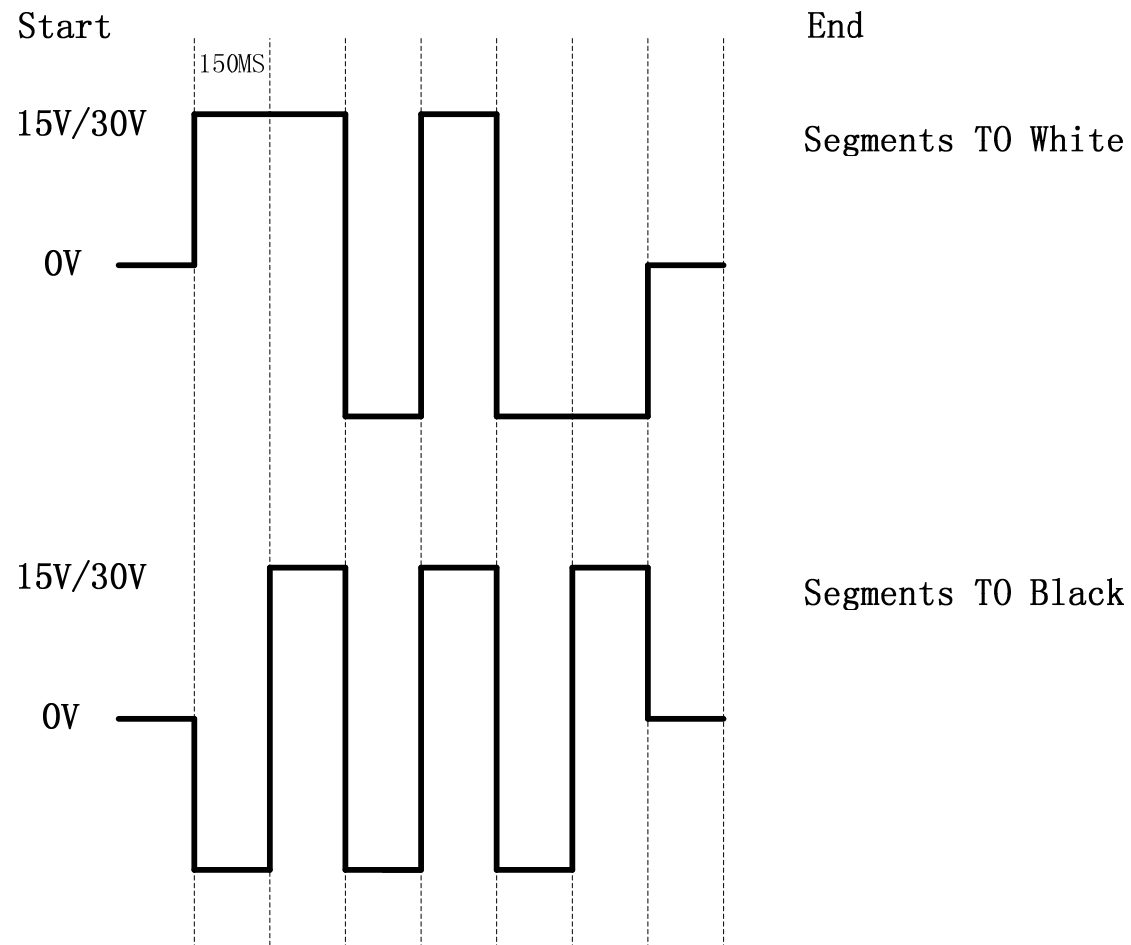
When power off: VPP -> VDD

Driving flow-chart:

1. Charge-Pump on
2. Send the reverse data of new image to the display
3. Send the black data to the display
4. Send the white data to the display
5. Send the black data to the display
6. Send the white data to the display

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7. Send the original data of new image to the display
8. Send "0x00" to the display, make sure all the segments and VCOM be at ground level.
9. Turn off the Charge Pump, Done.



Please note that there is a "Driving Balance" principle we must follow when driving a EPD display, it means the driving time for each segment be driven to "white" state must equal to the "black" state, otherwise the EPD display would be damaged. And all the segments(including VCOM) need to be driven to ground level.

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7 Mechanical Specifications

7.1 Dimension

PARAMETER	VALUE	UNIT	Remark
Display Resolution	90	segment	
Active Area Dimensions Diameter	23.54*6.54	mm	
Overall Dimensions Width	28.54	mm	
Height	29.64	mm	
Thickness	0.45	mm	
Mass of the Module	TBD	g	

7.2 Electrical Connector

SERVICE	CONNECTOR	NUMBER OF PINS
Interface	FPC pitch=0.5mm	49

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8 Optical Characteristics

Parameter	Conditions	Values			Units	Notes
		Min.	Typ.	Max		
White Reflectivity	0 minute	33	-	-	%	
Contrast Ratio (CR)	0 minute	8:1	-	-		1

(T_{amb}=25°C. Measurements are made with Eye-One Pro Spectrophotometer.)

Notes:

1. CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels

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9 Handling, Safety and Environment Requirements

Warning

The display 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 invalidates the warranty agreements.

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

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10 Reliability Test

TBD

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11 Block Diagram

