



深圳秋田微电子有限公司  
SHENZHEN AV-DISPLAY CO.,LTD.

# PMVA Technology

AV-Display Feb. 2011

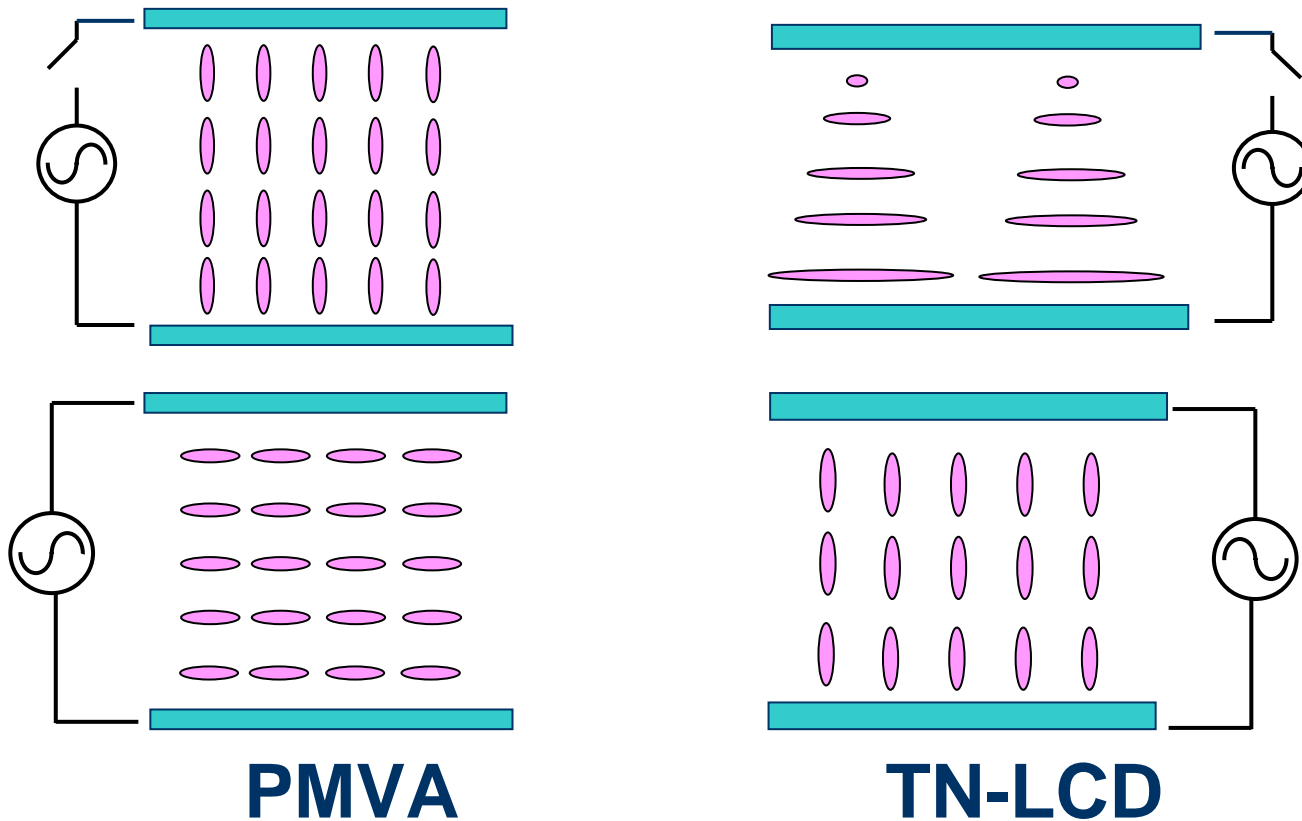


# Technology introduction

**Passive Matrix Vertical Alignment LCD** is one of the basic LCD modes. The main difference between PMVA and TN/STN is the alignment. For PMVA, the LC molecules is aligned perpendicularly to glass substrate. That is where the name PMVA comes from.

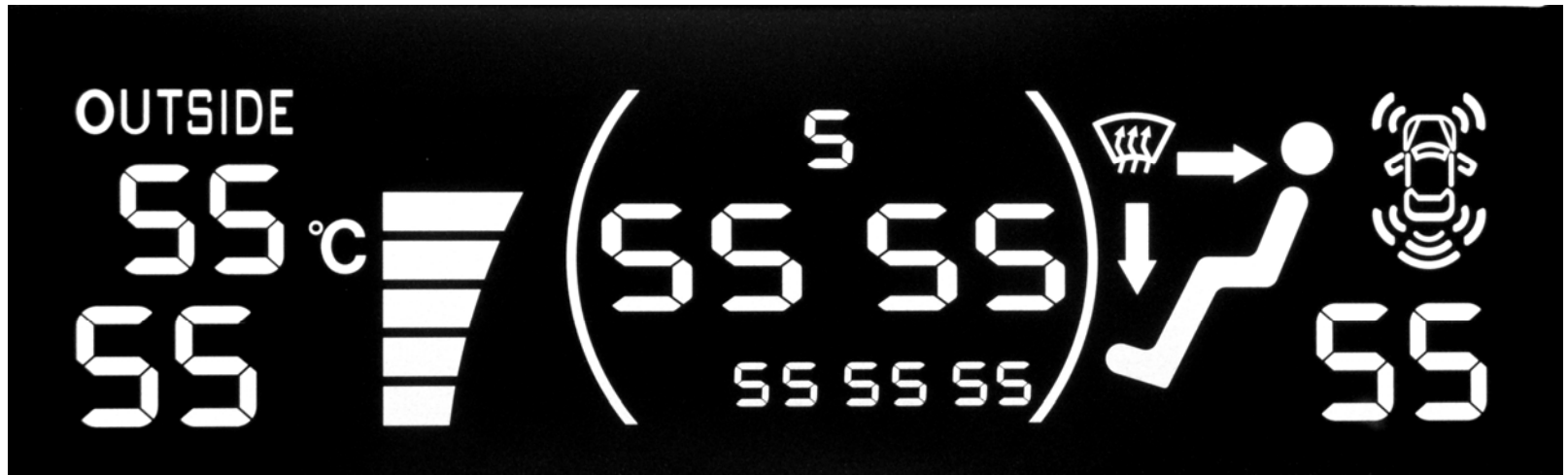


# LC molecule alignment





# PMVA with white backlight



Suitable for all backlight



# Features of PMVA

- True black background
- Ultra high contrast ratio:  
1000:1 or even higher
- Ultra wide viewing cone:
- Temperature independence:  
Background color doesn't change at  $-30\text{ }^{\circ}\text{C} \sim 80\text{ }^{\circ}\text{C}$
- Suitable for all backlight



# Different versions for different applications

1. General Version
2. High Duty Version
3. High Reliability Version
4. Full Viewing Angle Version
5. Field Sequential Color Version



# (1) General version PMVA

- Operating temperature:  
-20 °C ~70 °C
- Storage temperature:  
-30 °C ~80 °C
- Contrast Ratio: > 1000:1
- Duty: static, 1/2 ~1/4
- Operating Voltage:  
1/4duty, 1/3bias: 3.5V~8.0V  
(3.0V@ 70 °C Storage)  
Static : 2.6~4.5V  
(2.2V@ 70 °C Storage)
- Viewing cone:  
Vertical: +80° , -20 °  
Horizontal: ±80°





## (2) High duty version PMVA

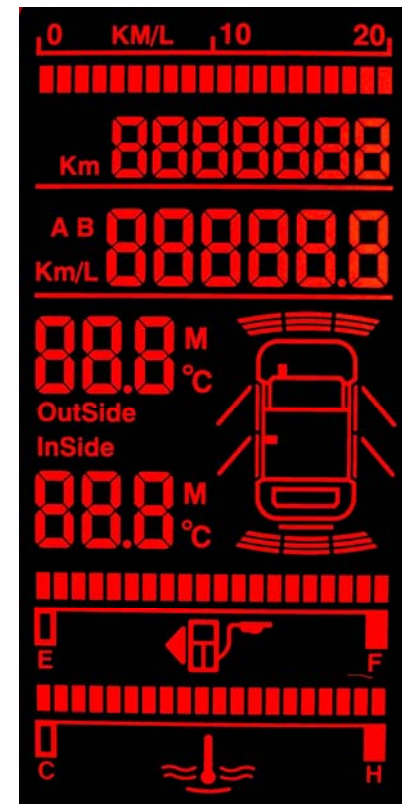
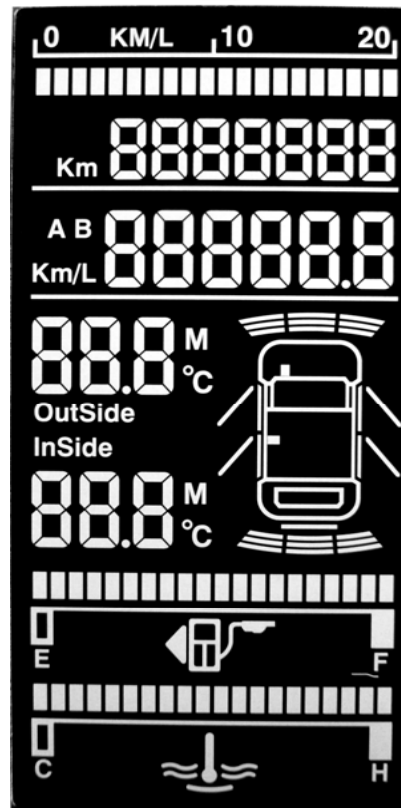
- Operating temperature:  $-20\text{ }^{\circ}\text{C}\sim 70\text{ }^{\circ}\text{C}$
- Storage temperature:  $-30\text{ }^{\circ}\text{C}\sim 80\text{ }^{\circ}\text{C}$
- Contrast Ratio:  $> 500:1$
- Duty: 1/8 (1/16 duty under developing)
- Operating Voltage: 5.0V~10.0V @ 1/8 duty
- Viewing cone: Vertical:  $+80^{\circ}$  ,  $-10^{\circ}$  , Horizontal:  $\pm 80^{\circ}$





## (3) High reliability version PMVA

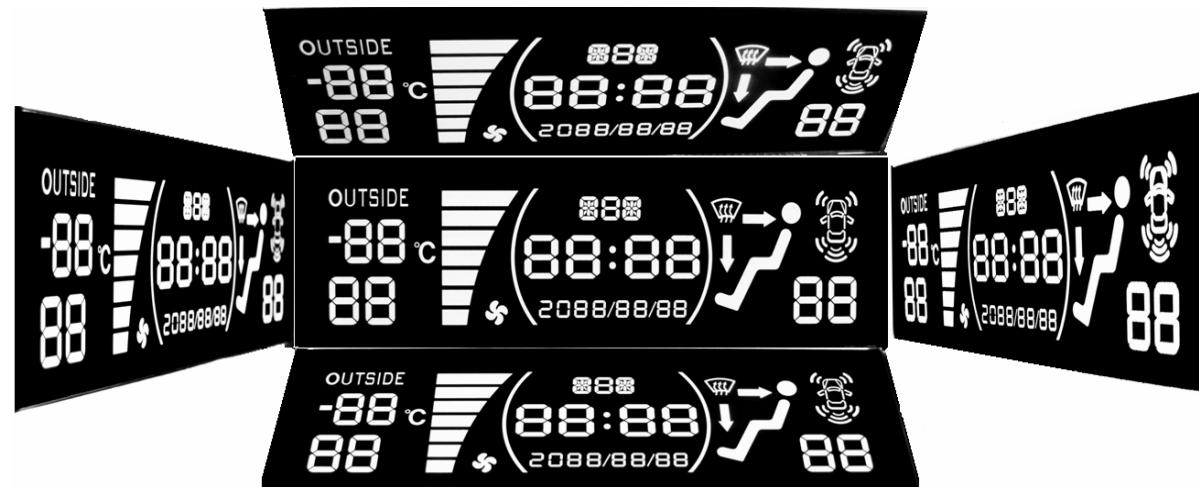
- Operating temperature:  
-30 °C~80 °C ,
- Storage temperature:  
-40 °C~90 °C ,  
80°C × 90%RH × 500H
- Contrast Ratio: > 500:1
- Duty: static, 1/2 ~1/4
- Operating Voltage:  
4.5V~9.0V @ 1/4 duty
- Viewing cone:  
Vertical: +80° , -20° ,  
Horizontal: ± 80°





## (4) Full viewing angle version PMVA

- Operating Temp.:  
-20 °C ~ 70 °C
- Storage Temp.:  
-30 °C ~ 80 °C
- Contrast Ratio:  
> 1000:1
- Duty: static
- Operating Voltage:  
2.6V ~ 4.5V
- Viewing cone:

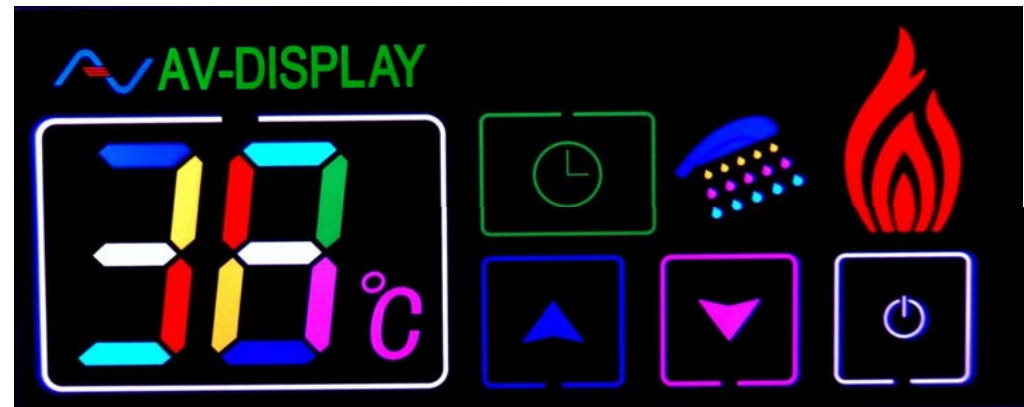


Vertical:  $\pm 85^\circ$  , Horizontal:  $\pm 85^\circ$



## (5) Field Sequential Color Version PMVA

- Operating temperature:  
0 °C~70 °C
- Storage temperature:  
-30 °C~70 °C
- Duty: **Static**
- Contrast Ratio: > 500:1
- Operating Voltage:  
3.0~5.0V for VDD
- Viewing cone:  
Vertical:  $\pm 80^\circ$  ,  $-10^\circ$  ,Horizontal:  $\pm 80^\circ$
- Color: 8 colors





# Applications----Automotive



Dashboard

Radio/CD player panel

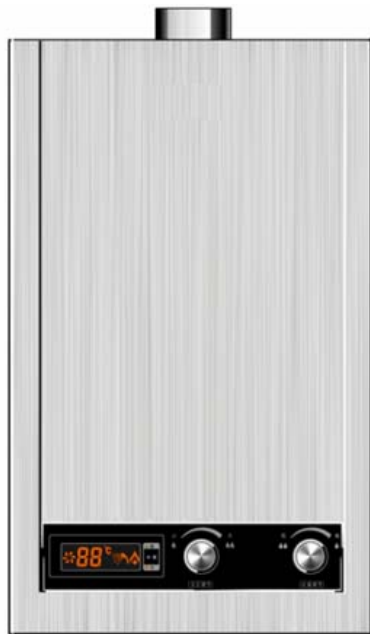


Air conditioner panel



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# Applications: House using---Water heater





# Applications: House using---Washer





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# Applications: House using--- Refrigerator





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# Applications: House using---Air-conditioner





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# Applications: House using---Audio player





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# Applications: House using---Coffee machine





## Other applications

- Medical instrument
- Industry: control board





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# Thank you !

**The End**