

# 一種兼備節能和高顯色功能的LED戶外顯示屏系統 An Energy-Saving, Wide-Color Gamut LED Display System

應用多電平脈寬調制電流LED驅動技術的優質二維調光顯示屏系統  
2D dimming of high-quality outdoor LED display panel based on Multi-level PWM driving

專利申請編號及國家: 201310111015.0 (中國)

## 特色與優點

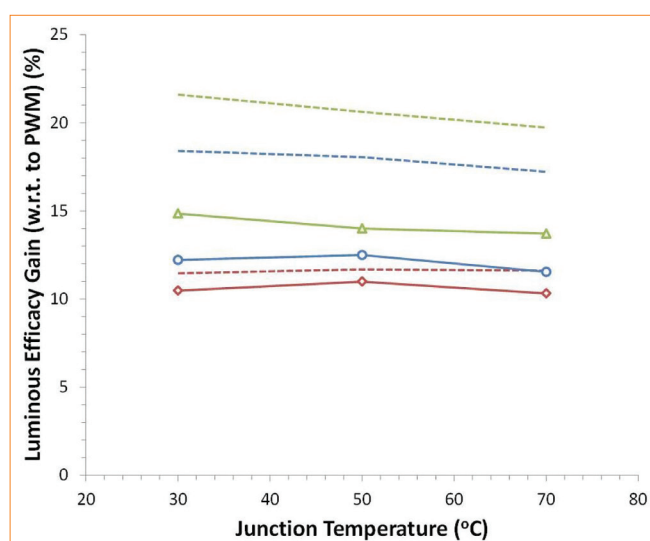
- 節能
- 高顯色度
- 低成本實現方法
- 兼容現有的LED顯示屏系統

## 應用

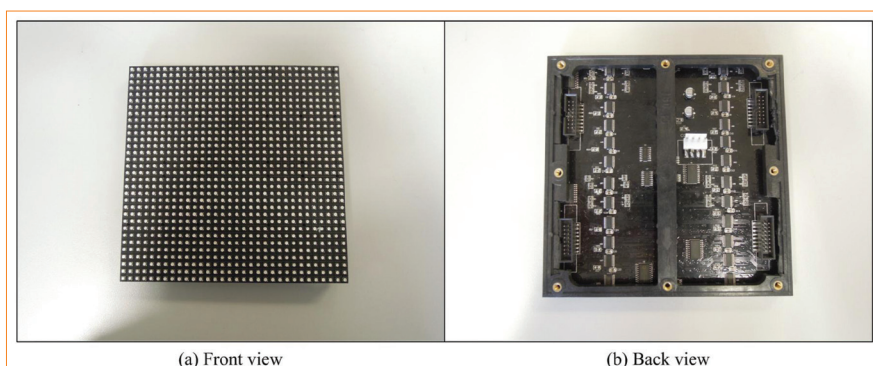
- 戶外LED顯示屏
- 任何可調光的LED照明系統

## 獎項

第41屆瑞士日內瓦國際發明展 - 金獎 (2013年4月)



以上三條顏色線，虛線代表最大可實現光效增益值，實線代表多電平LED驅動技術可達到的光效增益值  
For each of the 3 colors, dashed lines indicate the maximum achievable luminous efficacy gain, and solid lines with marks indicate the luminous efficacy gain achieved by using MPWM



(a) Front view

(b) Back view

每套LED模組包含32x32 LED像素  
Single LED module consisting of 32x32 LED pixels

The proposed system employs a low-cost method for implementing the multi-level Pulse-Width-Modulated (PWM) driving technology on wide-area outdoor LED display panel. The multi-level PWM driving technology gives rise to a two-dimensional dimming of each LED pixel and results in a color gamut that is much wider than the existing commercial systems. Because of the physical characteristics of LEDs, this driving technology also offers the additional advantage of higher energy efficiency than the conventionally driven systems. Moreover, the implementation of this technology only brings a very small increase in the hardware cost.

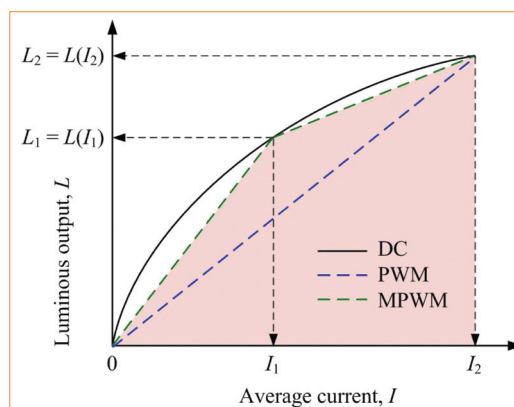
### Principal Investigator

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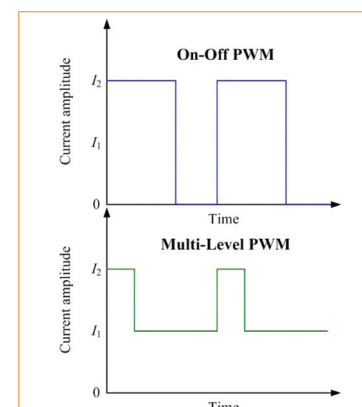
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最大可實現光效增益值隨着平均電流數值的變化圖 ( $I_2=2I_1$ )  
Maximum luminous efficacy gain over PWM is obtained with  $I_2=2I_1$



PWM和多電平PWM驅動電流波形  
PWM and Multi-level PWM driving waveforms

Patent Application No: 201310111015.0 (PRC)

## Special Features and Advantages

- Significant energy saving
- Wide color gamut
- Low-cost implementation
- Functionally compatible with existing LED display systems

## Applications

- Wide-area outdoor LED display panel
- Any dimmable LED lighting systems

## Award

Gold Medal – 41st International Exhibition of Inventions of Geneva, Switzerland (April 2013)

