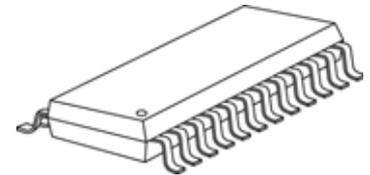


# 16-Channel Constant Current LED Driver With 16-bit PWM Control and Dot-Correction

## Features

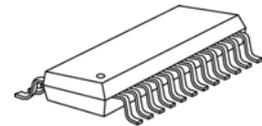
- 16 constant-current output channels
- Constant output current range per channel: 2~60mA  
2~60mA @ 5V supply voltage  
2~45mA @ 3.3V supply voltage
- Excellent output current accuracy,
  - Between channels:  $<\pm 1.5\%$  (typ.);
  - Between ICs:  $<\pm 3\%$  (typ.)
- Visual effect control
  - Patented S-PWM technology to improve refresh rate
  - 16-bit or 12-bit gray scale control
  - 8-bit dot-correction
  - 7-bit linear programmable output current gain
- Error detection control
  - In-message error detection:  
on-the-fly, data-in error-out
  - Compulsory individual LED open/short-circuit detection:  
full panel, data independent  
silent error detection in 700ns
  - Configurable short-circuit detection threshold voltage
  - Thermal protection
- Flexible operation modes
  - Auto synchronization mode/manual synchronization mode
  - One-shot mode/continuous mode
  - Disable/enable command
- EMI reduction
  - Staggered delay of output, preventing from current surge
  - Selectable switching speed of output channels ( $t_{OR}$ ,  $t_{OF}$ )
- Maximum data clock frequency: 30MHz
- Maximum gray scale clock frequency: 33MHz
- Schmitt trigger input
- Backward compatible with MBI5026 and MBI5030 in package

### Small Outline Package



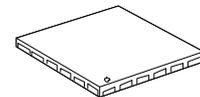
GF: SOP24-300-1.00

### Thin Shrink SOP



GTS: TSSOP24-173-0.65

### QFN



GFN: QFN24-4\*4-0.5

## Application

- Full-color LED display

## Product Description

MBI5040 is a 16-channel constant current LED driver with selectable 16-/12-bit gray scale control and 8-bit dot correction. MBI5040 provides constant current ranging from 2mA to 60mA for each output channel. The output current can be set by an external resistor. MBI5040 adopts **Share-I-O™** technology to be backward compatible with MBI5026 and MBI5030 in package and to extend the functionality, such as in-message error detection, compulsory error detection, thermal protection, and current gain control in LED display systems.

With Scrambled-PWM (S-PWM) technology, MBI5040 enhances pulse width modulation by scrambling the “on” time into several “on” periods, so that MBI5040 is able to increase visual refresh rate and reduce flickers. In addition, MBI5040 provides 16-bit gray scale control to enrich the color of image, allowing to present video images with 65,536 gray scales. MBI5040 also provides 8-bit dot correction to individually calibrate the deviated brightness and color of LEDs. Moreover, the preset current of MBI5040 can be further adjusted by 128 steps for LED global brightness adjustment.

With in-message error detection, MBI5040 can detect individual LED for both open- and short-circuit errors on-the-fly without extra components. Additionally, to enhance the system reliability, MBI5040 is built with thermal protection functions.