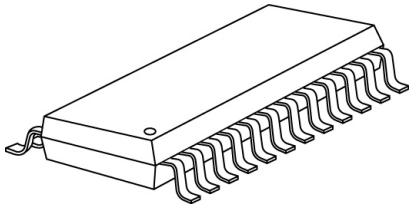
16-Channel Constant Current LED Driver With Silent Error Detection and Power Saving Modes

Features

- Package compatible with MBI5026
- 16 constant-current output channels
  Constant output current range: 3~80mA
  - 10~80mA @ 5V supply voltage
  - 3~60mA @ 3.3V supply voltage
- Compulsory error detection
  - Data-independent full panel detection
  - Error detection current: 0.1mA@700ns
  - Individual LED open- and short-circuit detection
  - Leakage and short to ground diagnosis
  - Pre-settable threshold voltage for short-circuit detection and leakage diagnosis
  - Thermal protection
- Power saving modes to save supply current of LED driver
  - Sleep mode
  - 0-Power mode
- Excellent output current accuracy,
  - Between channels: <±1.5% (typ.);
  - Between ICs: <±3% (typ.)
- Fast response to achieve uniform output current, $\overline{OE}$ (min.): 40ns (V_{DD}=5V, I_{OUT}=20mA)
- Staggered delay of output, preventing from current surge
- 30MHz clock frequency
- Schmitt trigger input

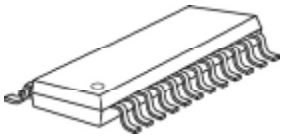
Small Outline Package



GF: SOP24-300-1.00

GD: SOP24-300-1.27

Shrink SOP



GP: SSOP24L-150-0.64

Product Description

MBI5037 is an enhanced 16-channel constant current LED sink driver with advanced error detection functions and smart power-saving modes. MBI5037 succeeds MBI5026 and also exploits **PrecisionDrive™** technology to enhance its output characteristics. Furthermore, MBI5037 uses the concept of **Share-I-O™** technology to make MBI5037 package compatible with MBI5026 and extend its advanced functions, such as silent LED open circuit detection, silent LED short detection, leakage diagnosis, and temperature warning. In addition, MBI5037 features two power saving modes: sleep mode and 0-Power mode to increase the power efficiency.

MBI5037 contains a 16-bit shift register and a 16-bit output latch, which convert serial input data into parallel output format. At MBI5037 output stages, sixteen regulated current output ports are designed to provide uniform and constant current sinks with small current variation between current output ports for driving LEDs within a wide range of forward voltage (V_F) variations. Users may adjust the output current from 3mA to 80mA with an external resistor R_{ext}, which gives users flexibility in controlling the light intensity of LEDs. MBI5037 guarantees to endure maximum 17V at the output ports. Besides, the high clock frequency up to 30MHz also satisfies the system requirements of high-volume data transmission.

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MBI5037 provides “compulsory silent error detection”. Once the dedicated command is issued, all of the current output ports will be turned on in about 700ns interval with current 0.1mA. The image will not be impacted since the turn-on duration and current are so small. All of the current output ports are detected no matter the corresponding data are zero or one, and therefore, users may read the error status and know whether the LEDs are properly lit or not. Moreover, the threshold voltage for short-circuit detection and leakage diagnosis is settable to comply with the variation of different LED forward voltage.

Additionally, to ensure the system reliability, MBI5037 is built with thermal error flag to prevent IC from over temperature (160°C).

MBI5037 also features two power saving modes: sleep mode and 0-Power mode. MBI5037 can enter the sleep mode by command. The sleep mode is suitable for LED display panels when the panels only need to be turned on occasionally or when the system does not have power switch. In the 0-Power mode, if all the output data are 0, MBI5037 will save the power automatically.

With the **Share-I-O™** technique, MBI5037 could be a drop-in replacement of PrecisionDrive™ series LED drivers (16-channel). The printed circuit board originally designed for MBI5026 may be also applicable to MBI5037, if the $\overline{OE}$ is controllable.