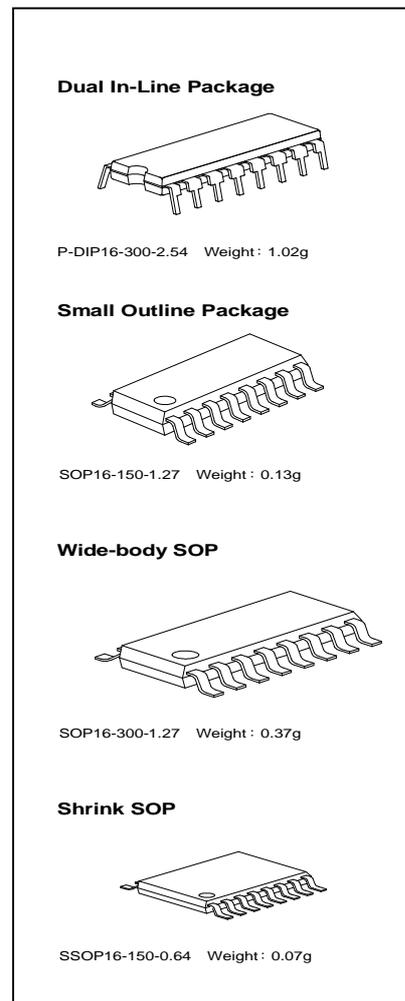


8-Bit Constant Current LED Sink Driver with Open/Short Circuit Detection

Features

- I Compatible with MBI5168 in package and electrical characteristics
- I Exploit **Share-I-O™** technique to provide two operation modes:
Normal Mode with the same functionality as MB5168,
Open-/Short-Circuit Detection mode to detect individual LED errors
- I 8 constant-current output channels
- I Constant output current invariant to load voltage change
- I Excellent output current accuracy,
between channels: < ±3% (max.), and
between ICs: < ±6% (max.)
- I Output current adjusted through an external resistor
- I Constant output current range: 5 -120 mA
- I Fast response of output current,
 \overline{OE} (min.): 200 ns @ $I_{out} < 60\text{mA}$
 \overline{OE} (min.): 400 ns @ $I_{out} = 60\sim 100\text{mA}$
- I 25MHz clock frequency
- I Schmitt trigger input
- I 3.3V~ 5V supply voltage
- I Optional for "Pb-free & Green" Package



Current Accuracy		Conditions
Between Channels	Between ICs	
< ±3%	< ±6%	$I_{OUT} = 10 \sim 100 \text{ mA}$, $V_{DS} = 0.8\text{V}$, $V_{DD} = 5.0\text{V}$

Product Description

MBI5169 succeeds MBI5168 and also exploits **PrecisionDrive™** technology to enhance its output characteristics. Furthermore, MBI5169 uses the idea of **Share-I-O™** technology to make MBI5169 backward compatible with MBI5168 in both package and electrical characteristics and extend its functionality for LED load Open-/Short-circuit Detection in LED display systems, especially LED traffic sign applications.

MBI5169 contains an 8-bit Shift Register and an 8-bit Output Latch, which convert serial input data into parallel output format. At MBI5169 output stages, eight regulated current ports are designed to provide uniform and constant current sinks with small skew between ports for driving LED's within a wide range of forward voltage (Vf) variations. Users may adjust the output current from 5 mA to 120 mA with an external resistor R_{ext} , which gives users flexibility in controlling the light intensity of LED's. MBI5169 guarantees to endure maximum 17V at the output ports. Besides, the high clock frequency up to 25 MHz also satisfies the system requirements of high volume data transmission.

By means of the **Share-I-O™** technique, MBI5169 adds new functionality on pins SDO, LE, and \overline{OE} of MBI5168 to provide an additionally effective function, Open-/Short-circuit Detection, without any extra pins. Thus, MBI5169 could be a drop-in replacement of MBI5168. The printed circuit board originally designed for MBI5168 may be also applied to MBI5169. In MBI5169 there are two operation modes and three phases: Normal Mode phase, Mode Switching transition phase, and Open-/Short-circuit Detection mode phase. The signal on the multiple function pin $\overline{OE}/\overline{SW}/\overline{ED}$ would be monitored. Once an one-clock-wide short pulse appears on the pin $\overline{OE}/\overline{SW}/\overline{ED}$, MBI5169 would enter the Mode Switching phase. At this moment, the voltage level on the pin LE/MOD is used for determining the next mode to which MBI5169 is going to switch.

In the Open-/Short-circuit Detection mode phase, the low-voltage-level signal $\overline{OE}/\overline{SW}/\overline{ED}$ can enable output channels and detect the status of the output current to tell if the driving current level is enough or not. The detected error status would be loaded into the 8-bit Shift Register and be shifted out via the pin SDO along with the signal CLK. Then system controller could read the error status and know whether the LED's are properly lit or not. In the Normal Mode phase, MBI5169 performs as MBI5168. Users can get detailed ideas about how MBI5169 works in the section **Operation Principle**.