Application note MLX10801
Power LED driver for automotive applications
Power saving low side coil driver
Electronic fuse

Microelectronic Integrated Systems

1. Scope

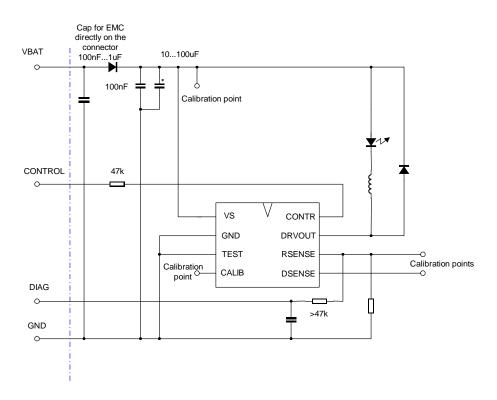The following document describes the use of the MLX10801 on systems needing a diagnostic function

2. General

A Diagnostic function has not been implemented in the low cost Automotive LED Driver MLX10801. This is not required in the majority of single source (e.g. interior lighting) applications.
Different lighting systems and applications will require different system diagnostic solutions. One possible solution for a typical 'bulb outage' detection is described.

3. Application diagrams

3.1. LED module with a diagnostic function using an ADC in the diagnosing system

On the IC pin RSENSE a low pass filter has been added. The module pin DIAG will represent now a DC voltage proportional to the average current of the LED.

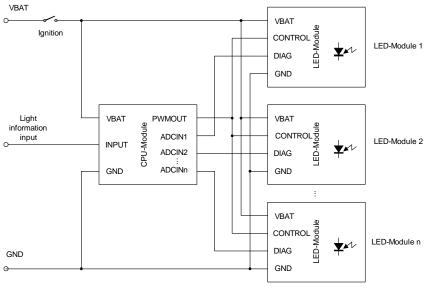This DC voltage can be measured by the diagnosing system by means of an ADC.
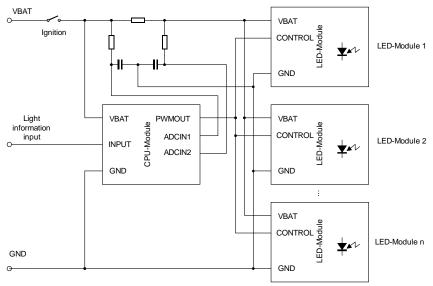
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The minimum value of the 47k in the low pass filter is needed due to short circuit protection of this module pin against VBAT and GND.

The disadvantage of this method is, that for every LED module a separate ADC channel is needed as shown in the following figure. Anyway this method allows to diagnose, which module is failing.

A simplified method using only 2 ADC channels for n LED-Modules would be to measure just the voltage drop in the supply line as shown in the following figure. The needed resolution depends on the number of connected modules.
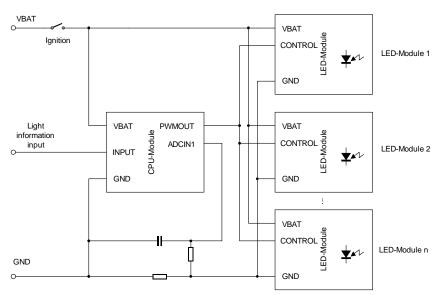

The current measurement in the supply could be changed to the current measurement in the ground lines of the LED modules. Just one ADC channel is needed as the next figure shows,

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The ground shift of the LED modules due to the sense resistor is not a problem, in the LED-Modules is an internal protection resistor on the LED-Module pin CONTR.

3.2. LED module with a diagnostic function using just a logic information in the diagnosing system

Some small electronic must be added to the LED-Module in order to build up this function.
The idea is to realise a hard wired OR of all n LED-Modules connected to the diagnosing system.
In case of a failure a logic "L" is given to the diagnosing system.
Attention must be drawn to the fact:

- to keep the LED-Module pin DIAG short circuit protected against GND and VBAT. It depends on the architecture of the whole system, if this request is really needed.
- to add no additional current in sleep mode
- to have one central pull up, which can be connected to any voltage.

The electronic just observes the voltage drop over the coil. Due to the switching principle, only ½ period is observed. The non observed period is handled by a capacitor keeping the actual state.
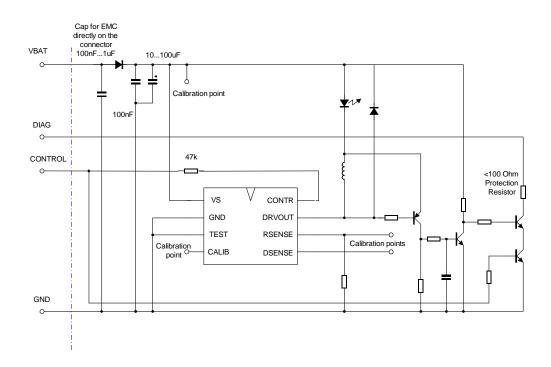The electronic insures too, that the sleep mode is not interpreted as failure due to the fact, that the voltage drop over the coil is zero in this case.
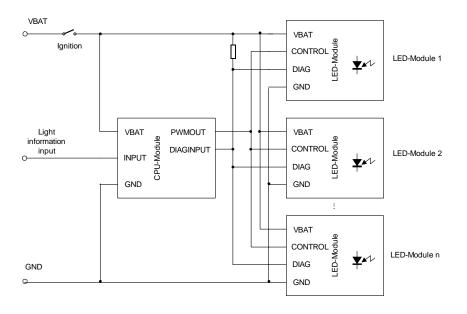
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3.3. Conclusion

Diagnosis, in case it is requested, can be added in different manners by means of some external electronics.

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