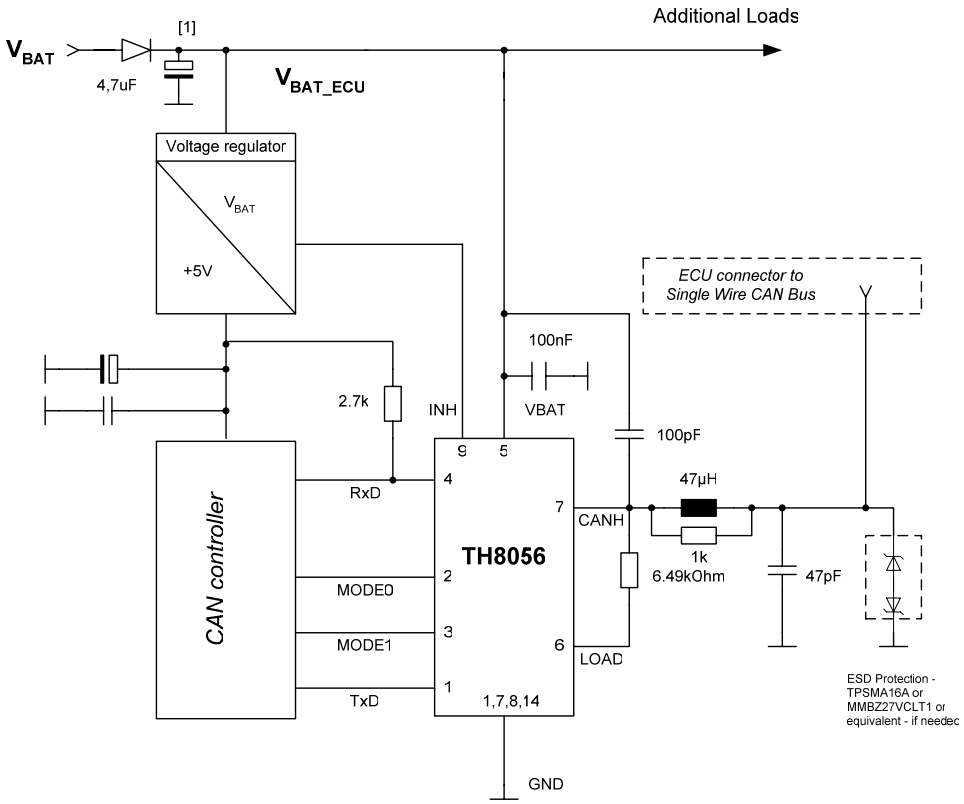
1 Scope

This document describes application hints for using the Melexis Enhanced Single Wire CAN Transceiver TH8056 by using a reservoir capacitor > 500uF on pin Vbat.

ATTENTION! This application note is only valid if the used application circuitry differs from the standard application circuitry according to Single Wire CAN Physical Layer Specification GMW3089 V2.3 section 3.12.1 (see Figure 1). The GMLAN Device Test Specification GME6718GS will always be passed with the standard application circuitry. The following hints are only necessary for special applications which are using an additional reservoir capacitor > 500uF on pin Vbat.

2 Recommended application circuitry



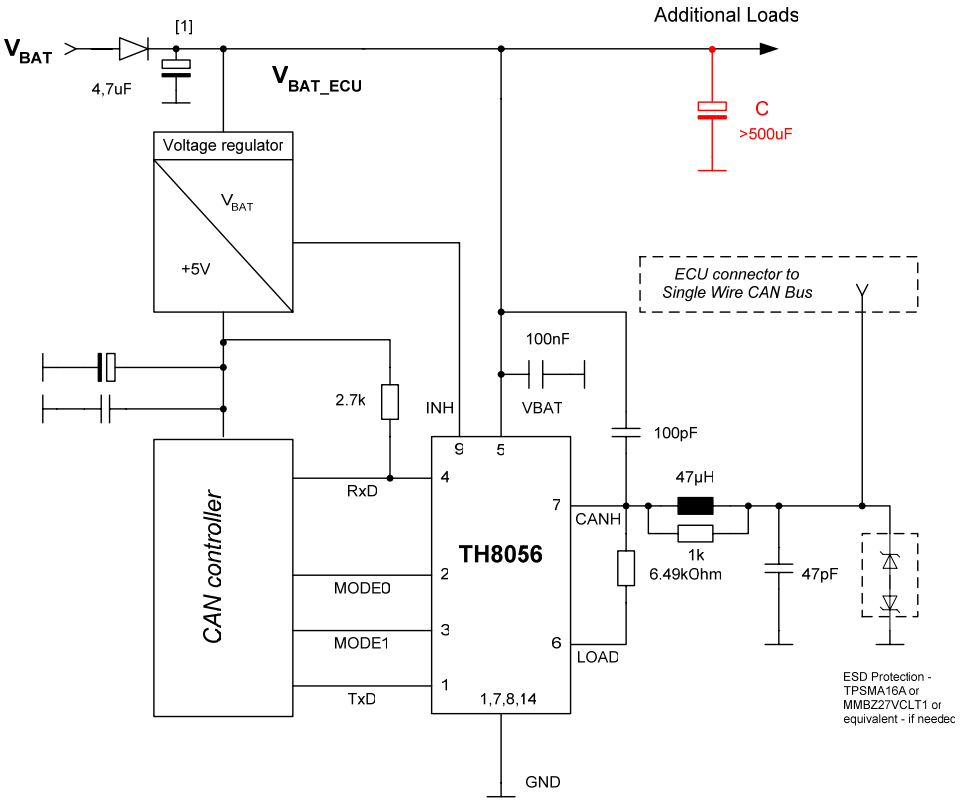
[1] recommended capacitance at VBAT_ECU > 1uF (immunity to ISO7637/1 test pulses)

Figure 1 Application circuitry according GMW3089 V2.3

This recommended application circuitry of the TH8056 fulfills completely the GMLAN Device Test Specification GME6718GS Rev. 1.7.

3 Special application circuitry including a reservoir capacitor > 500µF

The following application circuitry uses an additional reservoir capacitor >500µF on the pin Vbat, which differs from the recommended application circuitry of the Single Wire CAN Physical Layer Specification GMW3089 V2.3 section 3.12.1.



[1] recommended capacitance at VBAT_ECU > 1uF (immunity to ISO7637/1 test pulses)

Figure 2 Special application circuitry

This special application circuitry of the TH8056 fulfills the GMLAN Device Test Specification GME6718GS Rev 1.7 **except** section 2.11.6 (Bus short to battery).
The test described in section 2.11.6 will not fulfilled under following conditions:

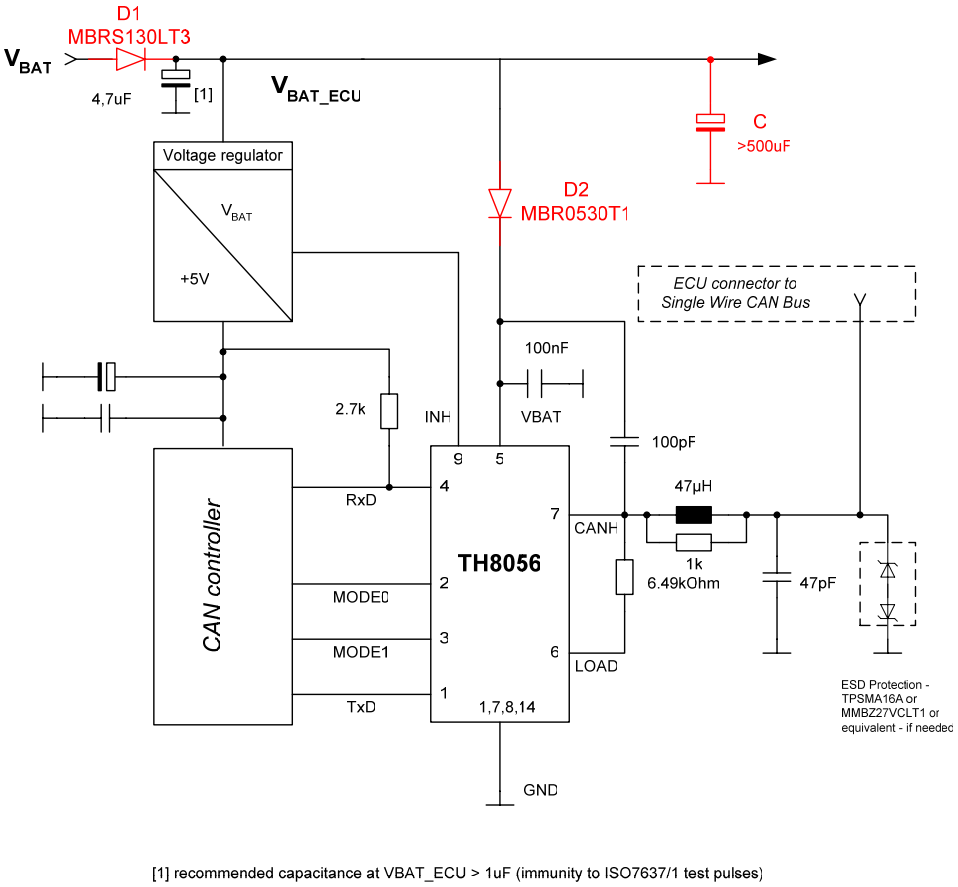
- Using of reservoir capacitors greater than 500µF
- A very short rise time of the voltage at pin CANH
- No current limitation of the power supply available

To fulfill the GMLAN Device Test Specification GME6718GS Rev 1.7 without any exceptions a small change of the external components is necessary.

There are three different solutions possible:

- Adding reverse protection diode between reservoir capacitor and TH8056 (see 3.1)
- Adding a series resistor > 51Ohm to the reservoir capacitor (see 3.2)
- Adding a series resistor > 51Ohm in parallel with a diode to the reservoir capacitor (see 3.3)

3.1 Solution 1 - Adding reverse protection diode D between reservoir capacitor and TH8056

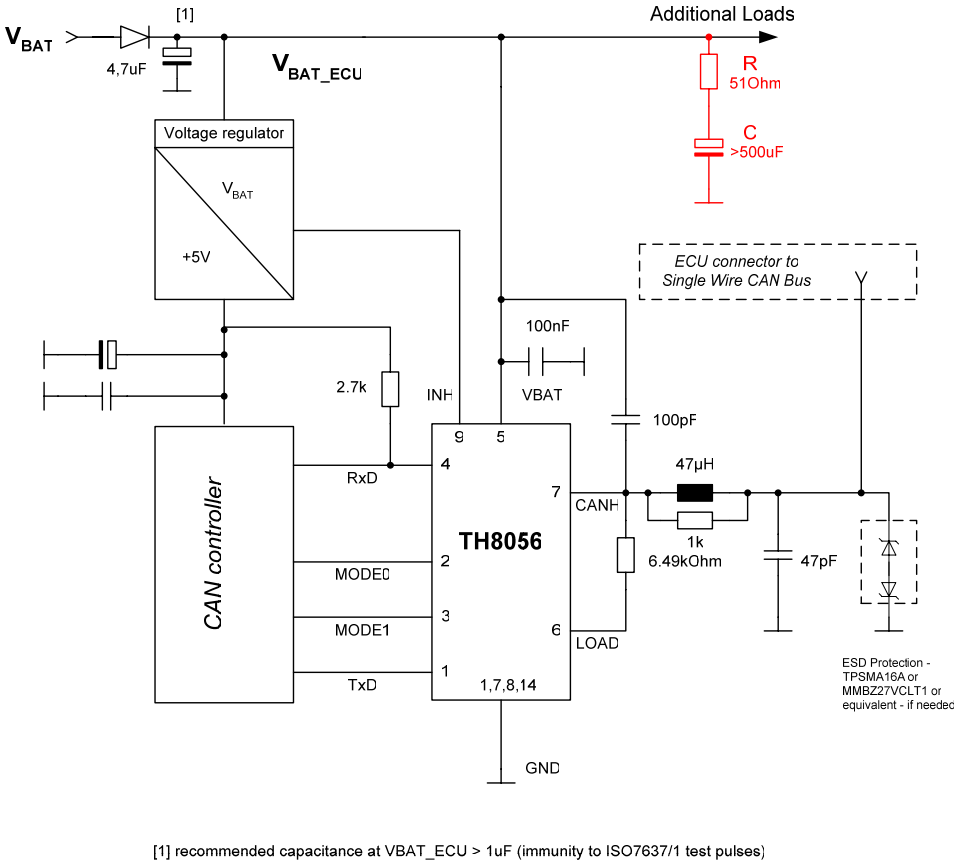


[1] recommended capacitance at VBAT_ECU > 1uF (immunity to ISO7637/1 test pulses)

Figure 3 Solution 1

The module will be powered from the battery through the first reverse polarity protection diode. The capacitor will be charged to battery voltage. Only the transceiver will be powered through the second reverse polarity diode with the additional voltage drop. To be compliant with GM3089, the added diode D2 should provide a low forward voltage drop. Also the original reverse protection diode D1 should be replaced by a schottky diode.

3.2 Solution 2 - Adding a series resistor R > 51Ohm to the reservoir capacitor

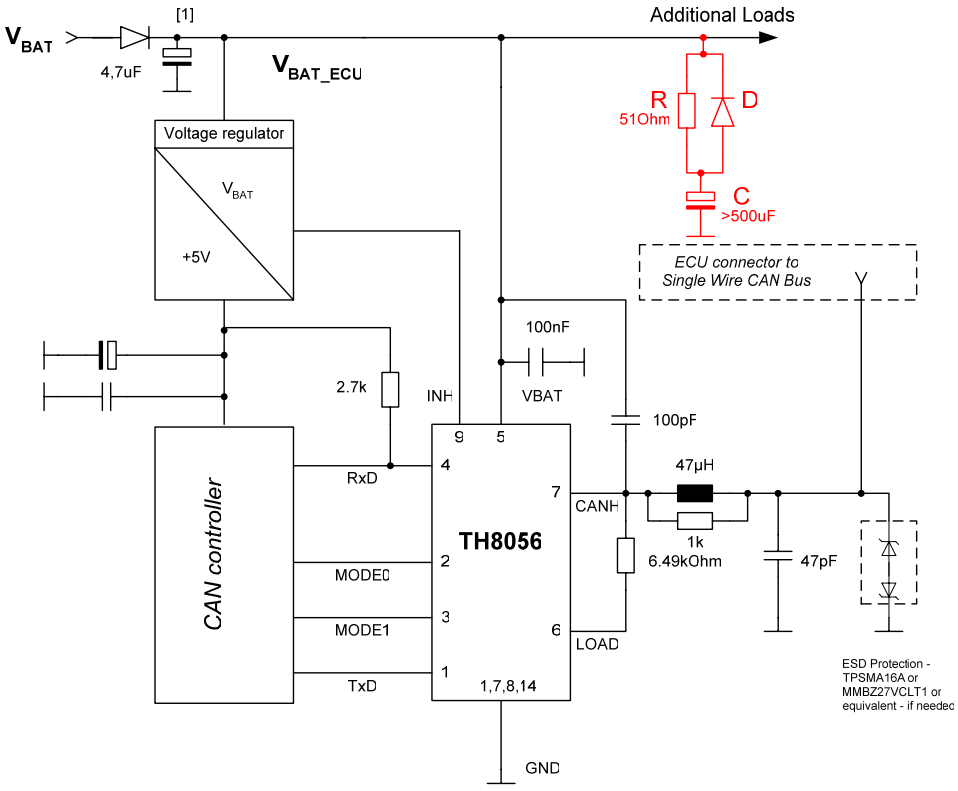


[1] recommended capacitance at VBAT_ECU > 1uF (immunity to ISO7637/1 test pulses)

Figure 4 Solution 2

In normal application mode the 51Ohm series resistor R has no influence to the module behaviour (in accordance to GMW3089). The module will be powered from the battery through the reverse polarity protection diode. The capacitor C will be charged to battery voltage.
For the cranking pulse the module will be powered by the capacitor C. The current consumption of the transceiver is approximately 5mA with no bus traffic during cranking. Current consumption of the other components is estimated at approximately 50mA and a voltage drop caused by the resistor R is 2.5V. This has an influence on the available time of the connected microcontroller to save contents in an EEPROM or other time critical activities. This limitation can be improved by increasing the value of the capacitor C.

3.3 Solution 3 - Adding a series resistor R > 51Ohm in parallel with a diode D to the reservoir capacitor



[1] recommended capacitance at VBAT_ECU > 1uF (immunity to ISO7637/1 test pulses)

Figure 5 Solution 3

In normal application mode the 51Ohm series resistor has no influence to the module behaviour (in accordance to GMW3089). The module will be powered from the battery through the reverse polarity protection diode. The capacitor will be charged to battery voltage. In case of cranking pulse the module will be powered by the capacitor.
The voltage drop via the resistor caused by the current consumption of the module will be clamped to 0.4 to 1.0 V due to the forward biased diode. In this case minimal 10% of the available voltage margin is lost. The recommendation is that the added diode should be the same as the reverse polarity diode.

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