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AMIS-4168x Behavior in Un-Powered Condition

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APPLICATION NOTE

Introduction

This document describes the behavior of the AMIS-4168x low speed fault tolerant CAN transceiver in un-powered condition.

Application Area

Today, in automotive applications, we can divide the ECU's in two groups, the "Clamp 15" and "Clamp 30" ECU's.

"Clamp 15" ECU's are only active when ignition is on. "Clamp 30" ECU's are always active, even when ignition is off.

A typical application is given in . When ignition is off, the "Clamp 15" ECU's will be un-powered. They are, however, still connected with the CAN-network. These "Clamp 15" ECU's are not allowed to load the CAN-network in this condition.

Test Results

The load on the CAN-network is given in for different boundary conditions: normal operation, loss of ground, loss of V_{bat} with a voltage range on the CAN-bus going from normal operation (0 V – 5 V), over extended range (0 V – 40 V) to EMC-range (-40 V – +40 V).

The load is expressed in leakage current. No bus termination is applied.

Table 1. TEST RESULTS

Condition	V on CANL / CANH	I_CANL	I_CANH
Normal Operation	5 V / 0 V	10 μ A	5 μ A
	0 V / 5 V	5 μ A	12 μ A
Loss of GND	5 V / 0 V	40 μ A	76 μ A
	0 V / 5 V	76 μ A	40 μ A
	5 V / 0 V	<< 1 μ A	<< 1 μ A
	0 V / 5 V	<< 1 μ A	<< 1 μ A
Loss of V_{bat}	0 V / 40 V	<< 1 μ A	<< 1 μ A
	40 V / 0 V	<< 1 μ A	<< 1 μ A
	0 V / 0 V	<< 1 μ A	<< 1 μ A
	40 V / 40 V	<< 1 μ A	<< 1 μ A
	-40 V / 0 V	500 μ A ¹	<< 1 μ A
	0 V / -40 V	<< 1 μ A	500 μ A ¹
	-40 V / -40 V	500 μ A ¹	500 μ A ¹
	-40 V / -40 V	500 μ A ¹	500 μ A ¹

Test results from C&S²
Internal measurements

- Under the worst case scenario the resistor of 130 k Ω (see Figure 2) can become as low as 80 k Ω . This gives a worst case current of 40 V / 80 k Ω = 500 μ A.
- Test was performed on the AMIS-41682. There is no difference on the CAN part between AMIS-41682 and AMIS-41683.

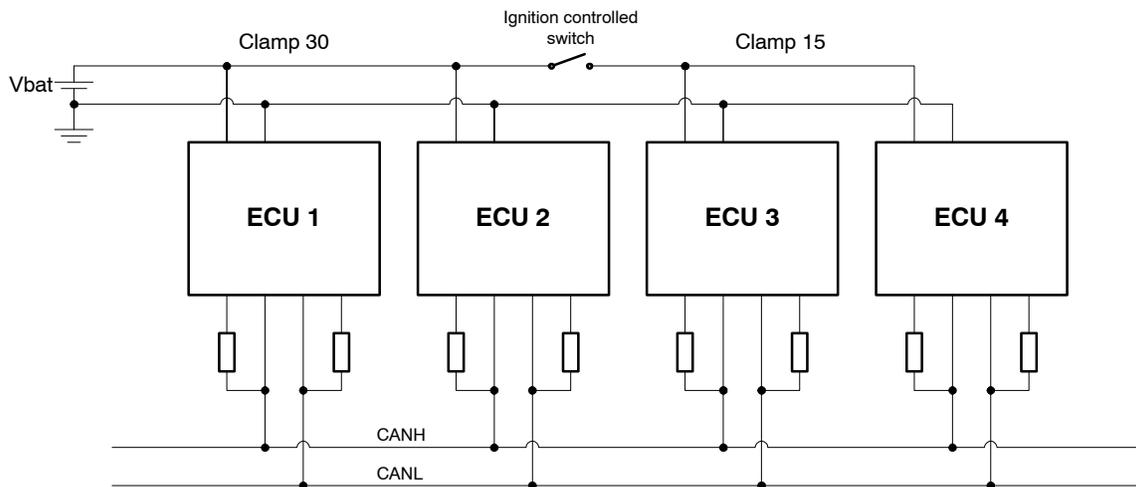


Figure 1. Typical Application

AND8367/D

The Simplified DC Equivalent Schematic is Given in Figure 2.

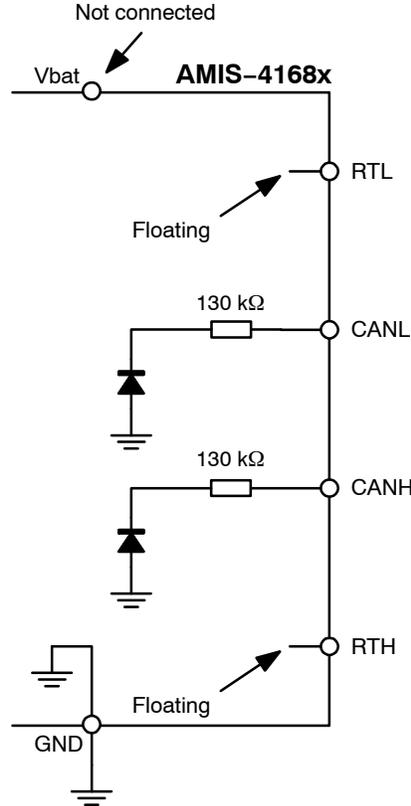


Figure 2. DC Equivalent Schematic of the AMIS-4168x in Unpowered Mode

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