Modbus Issue Data

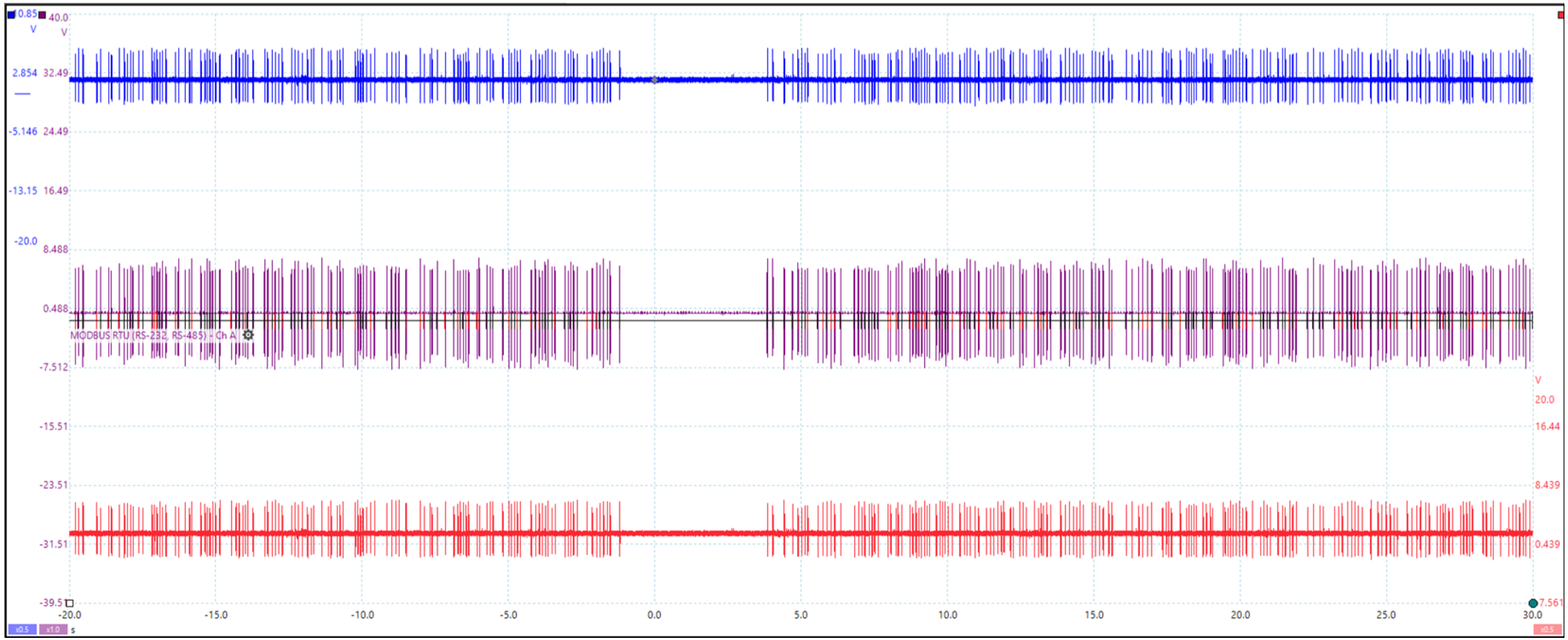
Issue Description

- There is an issue on the B but not A where the voltage drops and then crashes the SN65HVD07. The driver needs to be reset to resolve the modbus issue.

A

Differential

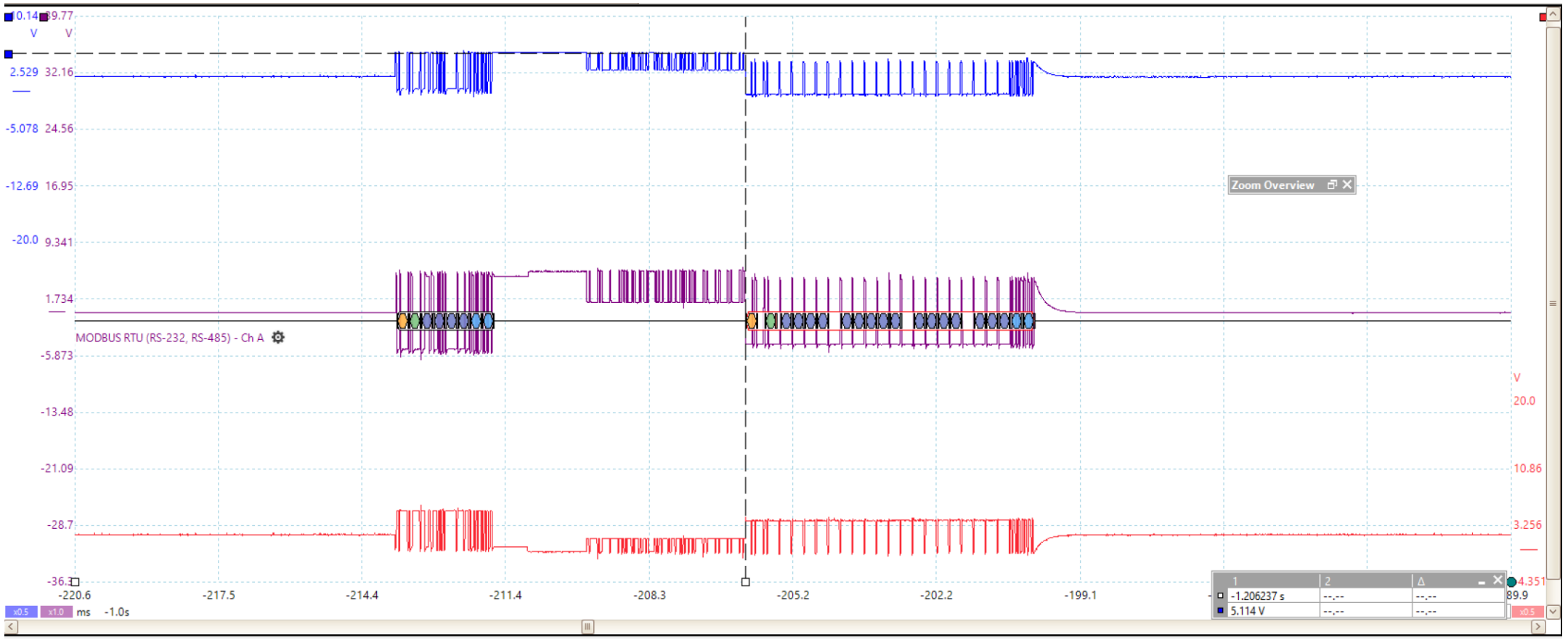
B



A

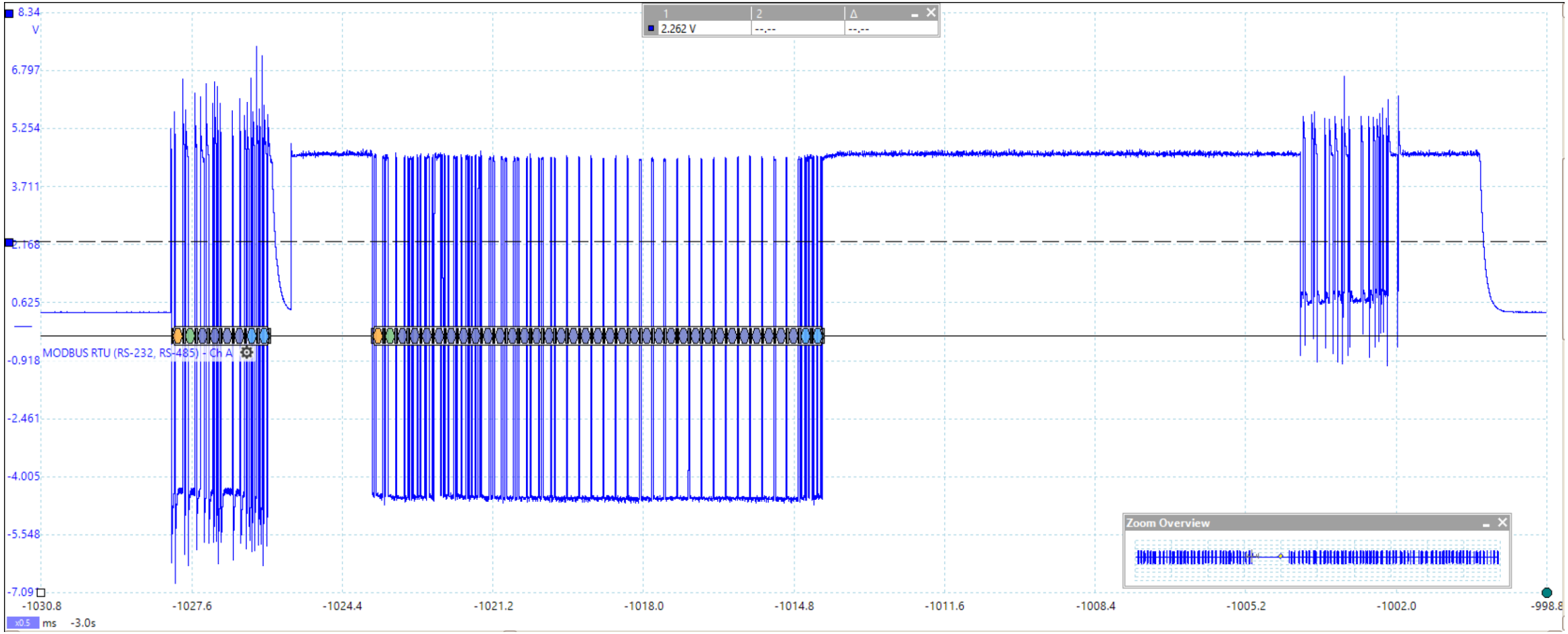
Differential

B



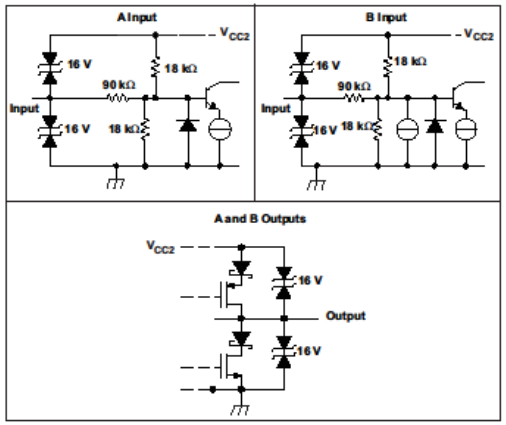
New Differential Data from 8/6/2023

Differential



Data Sheets

Master

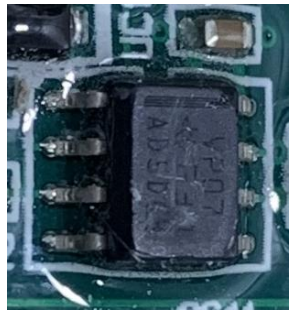


IEC SAFETY LIMITING VALUES

Safety limiting intends to prevent potential damage to the isolation barrier upon failure of input or output circuitry. A Failure of the IO can allow low resistance to ground or the supply and, without current limiting, dissipate sufficient power to overheat the die and damage the isolation barrier potentially leading to secondary system failures.

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
I_S	Safety input, output, or supply current	DW-16	θ_{JA} = 212°C/W, V_I = 5.5 V, T_J = 170°C, T_A = 25°C			128	mA
T_S	Maximum case temperature	DW-16				150	°C

The safety-limiting constraint is the absolute maximum junction temperature specified in the absolute maximum ratings table. The power dissipation and junction-to-air thermal impedance of the device installed in the application hardware determines the junction temperature. The assumed junction-to-air thermal resistance in the Thermal Characteristics table is that of a device installed in the JESD51-3, Low Effective Thermal Conductivity Test Board for Leaded Surface Mount Packages and is conservative. The power is the recommended maximum input voltage times the current. The junction temperature is then the ambient temperature plus the power times the junction-to-air thermal resistance.



CHIP INFO

VP06
TI Logo 23M
AD5DG4

Slave

6 Function Tables

Table 6-1. DRIVER

INPUT	ENABLE	OUTPUTS	
D	DE	A	B
H	H	H	L
L	H	L	H
X	L	Z	Z
Open	H	H	L
X	Open	Z	Z

Table 6-2. RECEIVER

DIFFERENTIAL INPUTS(1)	ENABLE	OUTPUT
$V_{ID} = V_A - V_B$	$\overline{RE}$	R
$V_{ID} \le -0.2$ V	L	L
-0.2 V < V_{ID} < -0.01 V	L	?
-0.01 V ≤ V_{ID}	L	H
X	H	Z
Open Circuit	L	H
Short Circuit	L	H
IDLE Bus	L	H
X	Open	Z

(1) H = high level; L = low level; Z = high impedance; X = irrelevant; ? = indeterminate

6.1 Receiver Failsafe

The differential receiver is "failsafe" to invalid bus states caused by:

- open bus conditions such as a disconnected connector,
- shorted bus conditions such as cable damage shorting the twisted-pair together, or
- idle bus conditions that occur when no driver on the bus is actively driving

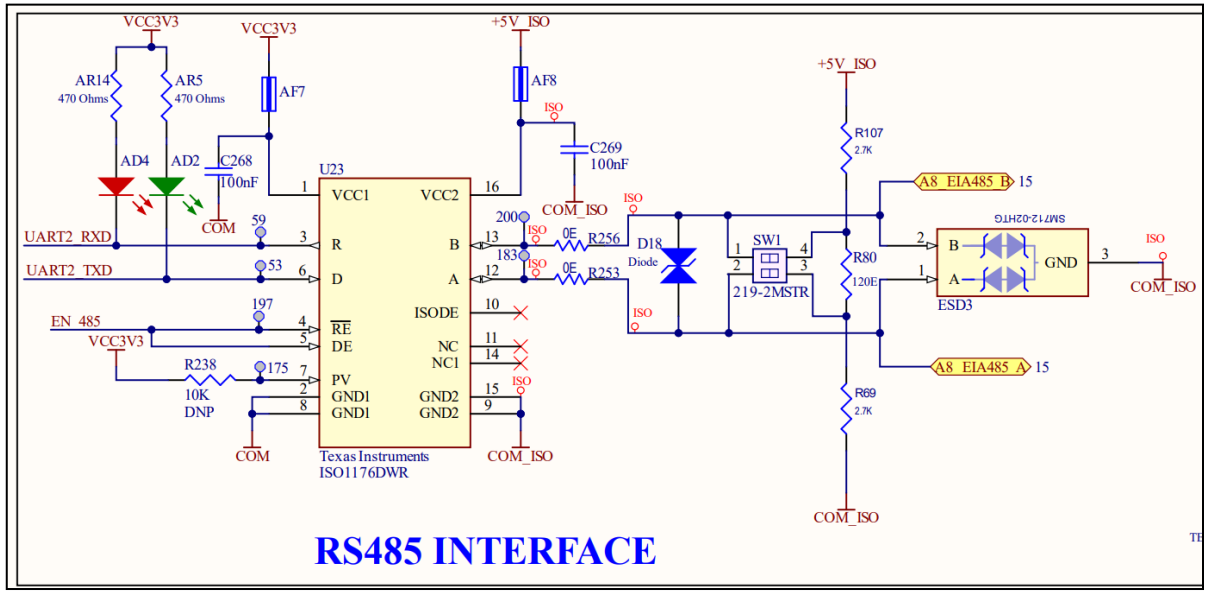
In any of these cases, the differential receiver outputs a failsafe logic High state, so that the output of the receiver is not indeterminate.

Receiver failsafe is accomplished by offsetting the receiver thresholds so that the "input indeterminate" range does not include zero volts differential. To comply with the RS-422 and RS-485 standards, the receiver output *must* output a High when the differential input V_{ID} is more positive than +200 mV, and *must* output a Low when the V_{ID} is more negative than -200 mV. The receiver parameters which determine the failsafe performance are V_{IT+} and V_{IT-} and V_{HYS}. As seen in the Receiver Electrical Characteristics table, differential signals more negative than -200 mV will always cause a Low receiver output. Similarly, differential signals more positive than +200 mV will *always* cause a High receiver output.

When the differential input signal is close to zero, it will still be above the V_{IT+} threshold, and the receiver output is High. Only when the differential input is more negative than V_{IT-} will the receiver output transition to a Low state. So, the noise immunity of the receiver inputs during a bus fault condition includes the receiver hysteresis value V_{HYS} (the separation between V_{IT+} and V_{IT-}) as well as the value of V_{IT+}.

Modbus Schematics

Master



Slave