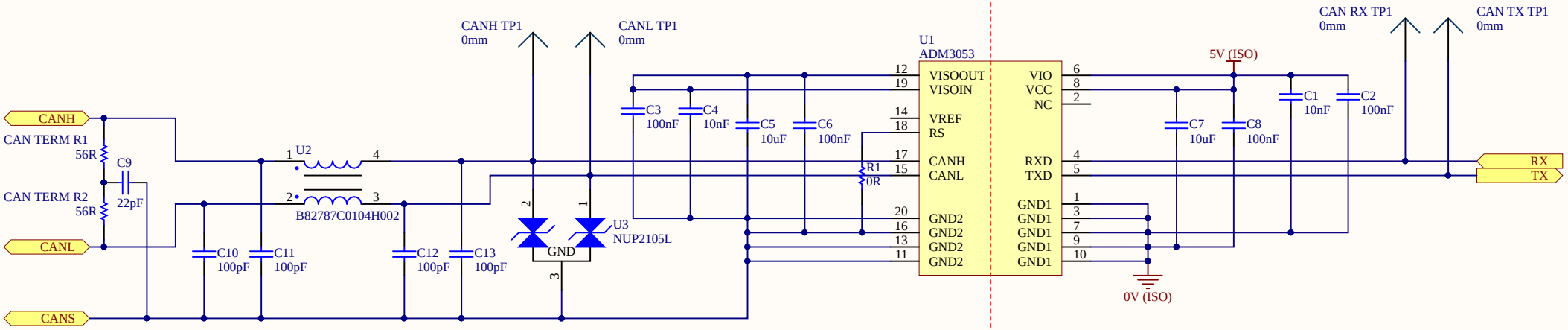
VEHICLE

ISOLATED

POWER CONSUMPTION
650mW: CAN ISOLATOR



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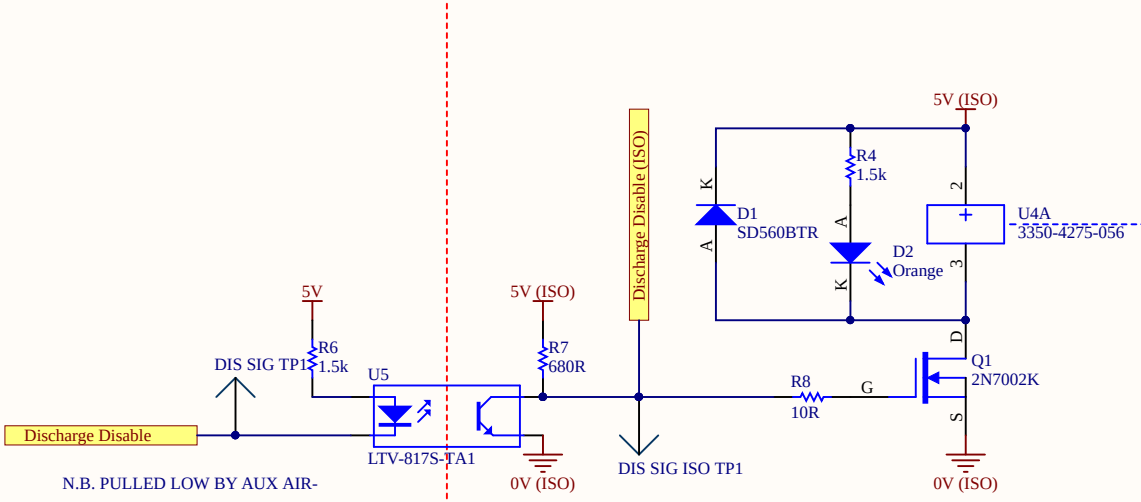
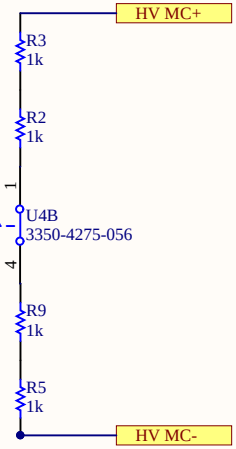
Date: 6/03/2020		Sheet of
File: C:\Users\..\CAN.SchDoc		Drawn By:

VEHICLE | MICROCONTROLLER | MICROCONTROLLER | ISOLATED



Consider Replacing with this!
https://www.digikey.com/products/en?mpart=3350-4275-056&v=1835



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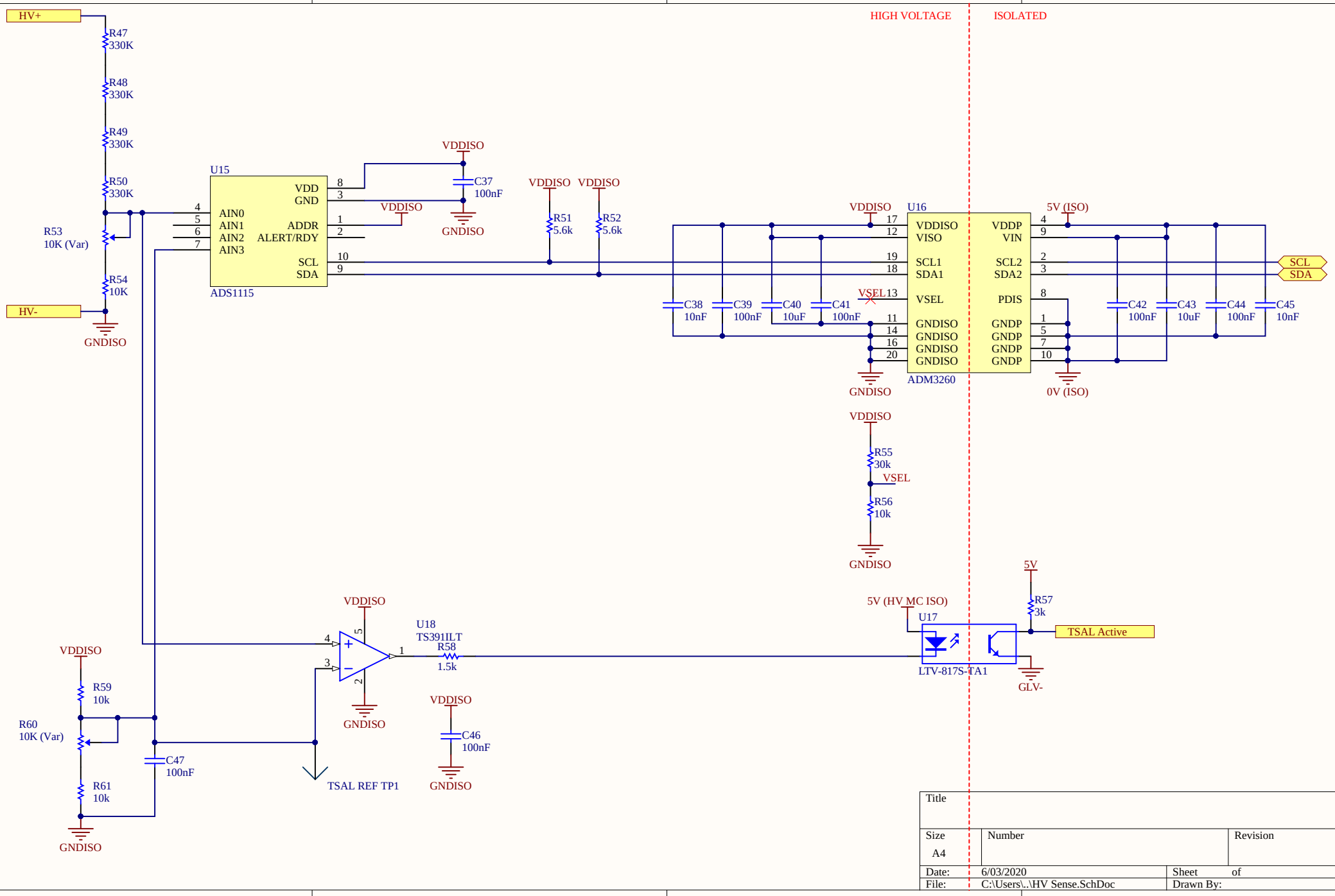
HIGH VOLTAGE
ISOLATED
HV+
R47
330K
R48
330K
R49
330K
R50
330K
R53
10K (Var)
R54
10K
HV-
GNDISO
U15
VDD
GND
ADDR
ALERT/RDY
SCL
SDA
AIN0
AIN1
AIN2
AIN3
ADS1115
VDDISO
C37
100nF
R51
5.6k
R52
5.6k
U16
VDDISO
VISO
SCL1
SDA1
VSEL
GNDISO
VDDP
VIN
SCL2
SDA2
PDIS
GNDP
ADM3260
5V (ISO)
0V (ISO)
SCL
SDA
C38
10nF
C39
100nF
C40
10uF
C41
100nF
C42
100nF
C43
10uF
C44
100nF
C45
10nF
R55
30k
VSEL
R56
10k
U18
TS391ILT
R58
1.5k
R59
10k
R60
10K (Var)
R61
10k
C47
100nF
C46
100nF
TSAL REF TP1
5V (HV MC ISO)
U17
LTV-817S-TA1
5V
R57
3k
TSAL Active
GLV-
Title
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Number
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Date:
6/03/2020
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File:
C:\Users\..\HV Sense.SchDoc
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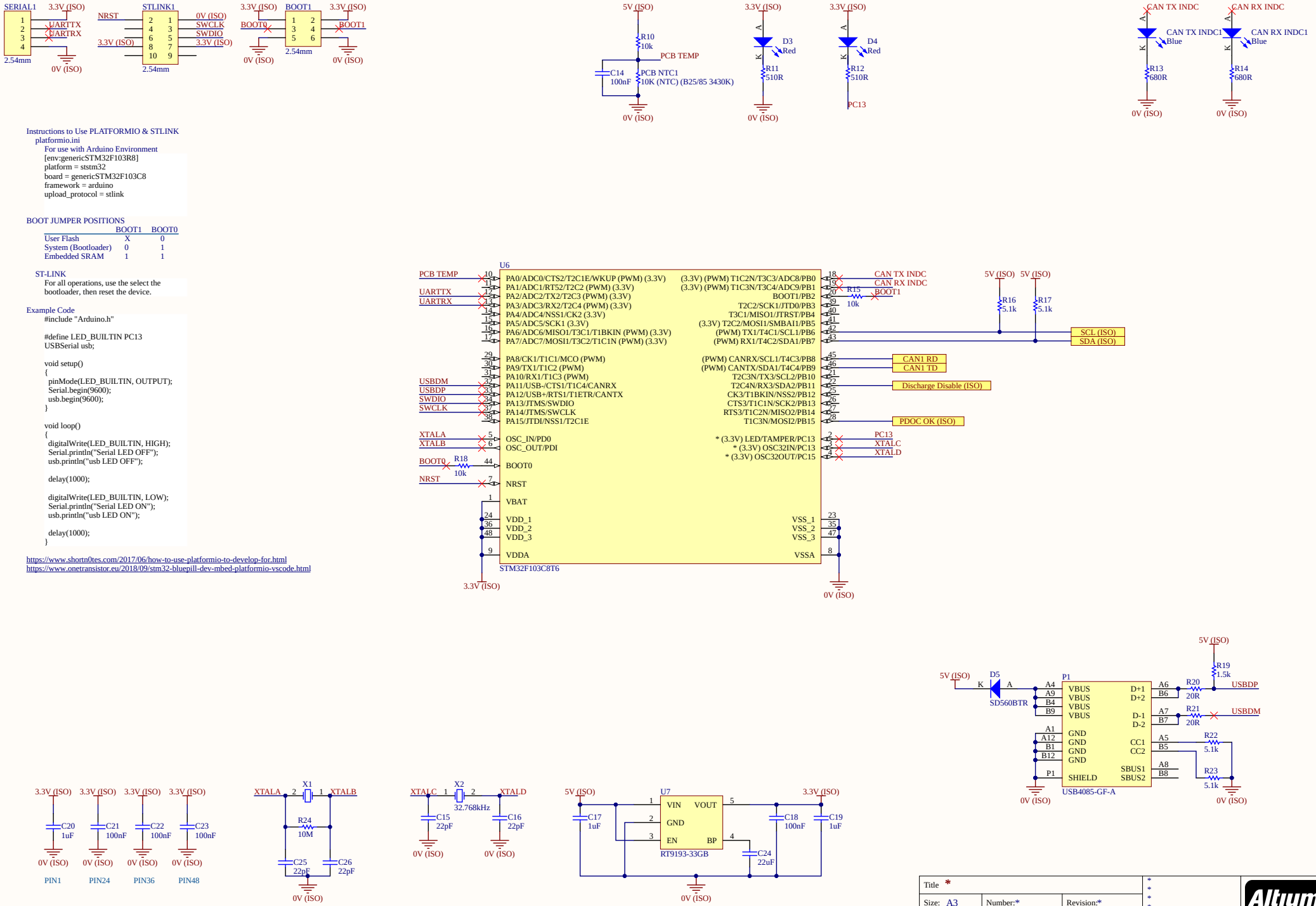
SERIAL1
3.3V (ISO)
UARTTX
UARTRX
0V (ISO)
2.54mm
NRST
STLINK1
3.3V (ISO)
0V (ISO)
SWCLK
SWDIO
3.3V (ISO)
2.54mm
3.3V (ISO)
BOOT0
BOOT1
3.3V (ISO)
0V (ISO)
2.54mm
0V (ISO)
5V (ISO)
R10
10k
PCB TEMP
C14
100nF
PCB NTC1
10K (NTC) (B25/85 3430K)
0V (ISO)
3.3V (ISO)
D3
Red
R11
510R
0V (ISO)
3.3V (ISO)
D4
Red
R12
510R
PC13
CAN TX INDC
CAN TX INDC1
Blue
R13
680R
0V (ISO)
CAN RX INDC
CAN RX INDC1
Blue
R14
680R
0V (ISO)
Instructions to Use PLATFORMIO & STLINK
platformio.ini
For use with Arduino Environment
[env:genericSTM32F103R8]
platform = ststm32
board = genericSTM32F103C8
framework = arduino
upload_protocol = stlink
BOOT JUMPER POSITIONS
BOOT1 BOOT0
User Flash X 0
System (Bootloader) 0 1
Embedded SRAM 1 1
ST-LINK
For all operations, use the select the bootloader, then reset the device.
Example Code
#include "Arduino.h"
#define LED_BUILTIN PC13
USBSerial usb;
void setup()
{
pinMode(LED_BUILTIN, OUTPUT);
Serial.begin(9600);
usb.begin(9600);
}
void loop()
{
digitalWrite(LED_BUILTIN, HIGH);
Serial.println("Serial LED OFF");
usb.println("usb LED OFF");
delay(1000);
digitalWrite(LED_BUILTIN, LOW);
Serial.println("Serial LED ON");
usb.println("usb LED ON");
delay(1000);
}
https://www.shortn0tes.com/2017/06/how-to-use-platformio-to-develop-for.html
https://www.onetransistor.eu/2018/09/stm32-bluepill-dev-mbed-platformio-vscode.html
U6
PCB TEMP
UARTTX
UARTRX
USBDM
USBDP
SWDIO
SWCLK
XTALA
XTALB
BOOT0
R18
10k
NRST
PA0/ADC0/CTS2/T2C1E/WKUP (PWM) (3.3V)
PA1/ADC1/RTS2/T2C2 (PWM) (3.3V)
PA2/ADC2/TX2/T2C3 (PWM) (3.3V)
PA3/ADC3/RX2/T2C4 (PWM) (3.3V)
PA4/ADC4/NSS1/CK2 (3.3V)
PA5/ADC5/SCK1 (3.3V)
PA6/ADC6/MISO1/T3C1/T1BKIN (PWM) (3.3V)
PA7/ADC7/MOSI1/T3C2/T1C1N (PWM) (3.3V)
PA8/CK1/T1C1/MCO (PWM)
PA9/TX1/T1C2 (PWM)
PA10/RX1/T1C3 (PWM)
PA11/USB-/CTS1/T1C4/CANRX
PA12/USB+/RTS1/T1ETR/CANTX
PA13/JTMS/SWDIO
PA14/JTMS/SWCLK
PA15/JTDI/NSS1/T2C1E
OSC_IN/PD0
OSC_OUT/PDI
BOOT0
NRST
VBAT
VDD_1
VDD_2
VDD_3
VDDA
(3.3V) (PWM) T1C2N/T3C3/ADC8/PB0
(3.3V) (PWM) T1C3N/T3C4/ADC9/PB1
BOOT1/PB2
T2C2/SCK1/JTD0/PB3
T3C1/MISO1/JTRST/PB4
(3.3V) T2C2/MOSI1/SMBAI1/PB5
(PWM) TX1/T4C1/SCL1/PB6
(PWM) RX1/T4C2/SDA1/PB7
(PWM) CANRX/SCL1/T4C3/PB8
(PWM) CANTX/SDA1/T4C4/PB9
T2C3N/TX3/SCL2/PB10
T2C4N/RX3/SDA2/PB11
CK3/T1BKIN/NSS2/PB12
CTS3/T1C1N/SCK2/PB13
RTS3/T1C2N/MISO2/PB14
T1C3N/MOSI2/PB15
* (3.3V) LED/TAMPER/PC13
* (3.3V) OSC32IN/PC13
* (3.3V) OSC32OUT/PC15
VSS_1
VSS_2
VSS_3
VSSA
STM32F103C8T6
3.3V (ISO)
0V (ISO)
CAN TX INDC
CAN RX INDC
R15
10k
BOOT1
5V (ISO)
R16
5.1k
5V (ISO)
R17
5.1k
SCL (ISO)
SDA (ISO)
CAN1 RD
CAN1 TD
Discharge Disable (ISO)
PDOC OK (ISO)
PC13
XTALC
XTALD
5V (ISO)
D5
SD560BTR
P1
VBUS
GND
SHIELD
D+1
D+2
D-1
D-2
CC1
CC2
SBUS1
SBUS2
USB4085-GF-A
R19
1.5k
R20
20R
USBDP
R21
20R
USBDM
R22
5.1k
R23
5.1k
0V (ISO)
3.3V (ISO)
C20
1uF
C21
100nF
C22
100nF
C23
100nF
0V (ISO)
PIN1
PIN24
PIN36
PIN48
X1
XTALA
XTALB
R24
10M
C25
22pF
C26
22pF
0V (ISO)
X2
32.768kHz
XTALC
XTALD
C15
22pF
C16
22pF
0V (ISO)
5V (ISO)
U7
VIN
GND
EN
VOUT
BP
RT9193-33GB
C17
1uF
C18
100nF
C19
1uF
C24
22uF
3.3V (ISO)
0V (ISO)
Title *
Size: A3
Number:*
Revision:*
Date: 6/03/2020
Time: 5:09:34 PM
Sheet * of *
File: C:\Users\patri\Google Drive\ts_19\Car\5. P&E\Future Schematics\ts_20-Discharge-Module\200306 Discharge Module R2\Microc
Altium

https://www.cantherm.com/wp-content/uploads/2017/05/CWF_11x17_OCT_2014_1.pdf

HIGH VOLTAGE ISOLATED

PDOC NTC1
2.54mm

PDOC TEMP AMP OUT TP1

PDOC TEMP REF TP1

U20
TS391ILT

U19
LTV-817S-TA1

U21
ADS1115

U22
ADM3260

PDOC OK

SCL

SDA

The PDOC (Precharge/Discharge Overcurrent) is intended to limit the failure of the precharge resistor by monitoring its temperature in in the case of a failure of a resistor will break the safety loop.

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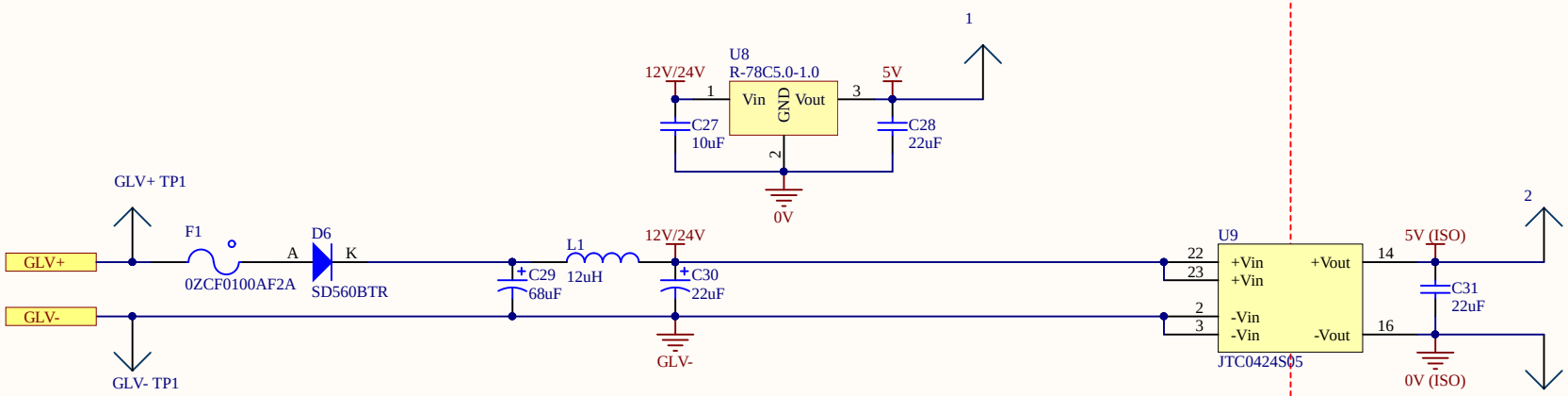
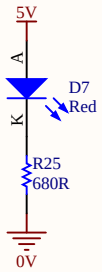
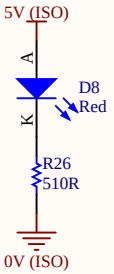
VEHICLE

ISOLATED

2W: POWER OUTPUT







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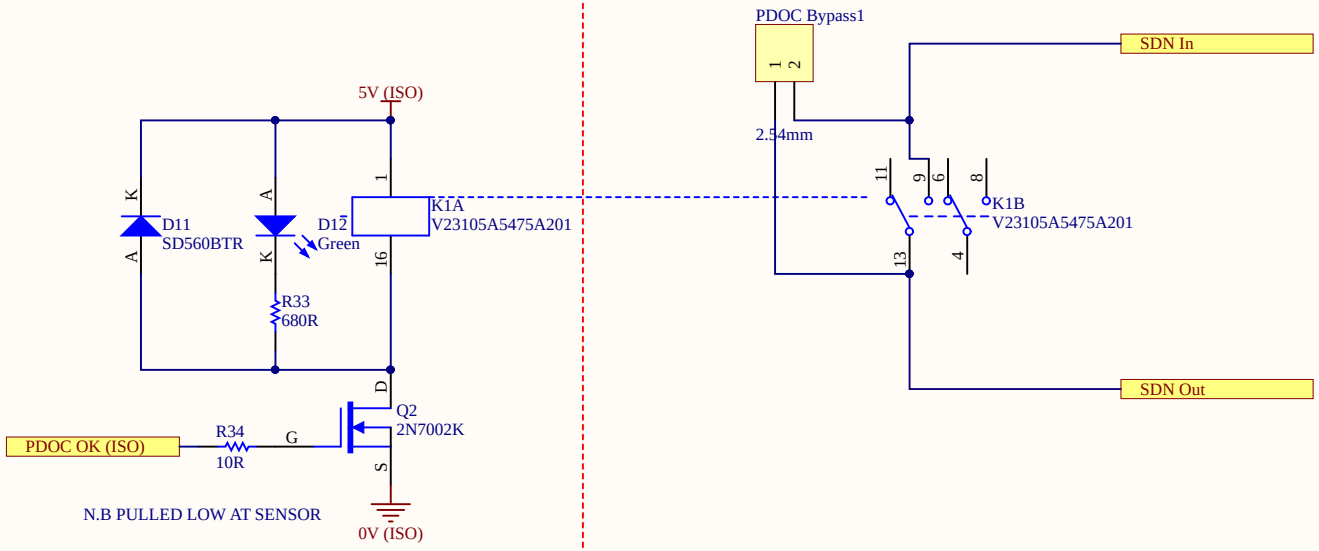
ISOLATED

VEHICLE



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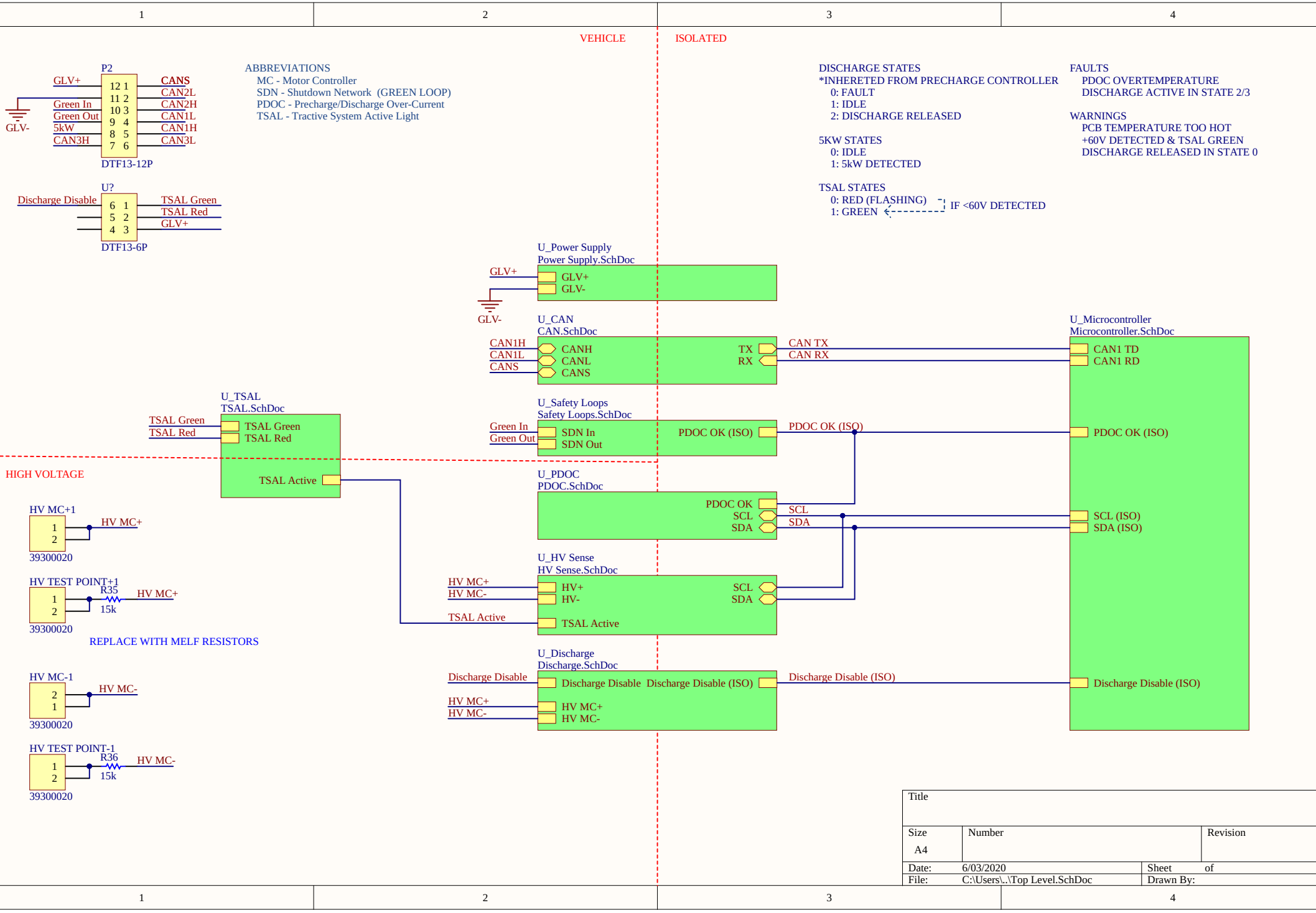
VEHICLE
ISOLATED
P2
GLV+
Green In
Green Out
5kW
CAN3H
GLV-
12 1
11 2
10 3
9 4
8 5
7 6
CANS
CAN2L
CAN2H
CAN1L
CAN1H
CAN3L
DTF13-12P
U?
Discharge Disable
TSAL Green
TSAL Red
GLV+
6 1
5 2
4 3
DTF13-6P
ABBREVIATIONS
MC - Motor Controller
SDN - Shutdown Network (GREEN LOOP)
PDOC - Precharge/Discharge Over-Current
TSAL - Tractive System Active Light
DISCHARGE STATES
*INHERETED FROM PRECHARGE CONTROLLER
0: FAULT
1: IDLE
2: DISCHARGE RELEASED
5KW STATES
0: IDLE
1: 5kW DETECTED
TSAL STATES
0: RED (FLASHING)
1: GREEN
IF <60V DETECTED
FAULTS
PDOC OVERTEMPERATURE
DISCHARGE ACTIVE IN STATE 2/3
WARNINGS
PCB TEMPERATURE TOO HOT
+60V DETECTED & TSAL GREEN
DISCHARGE RELEASED IN STATE 0
U_Power Supply
Power Supply.SchDoc
GLV+
GLV-
GLV+
GLV-
U_CAN
CAN.SchDoc
CAN1H
CAN1L
CANS
CANH
CANL
CANS
TX
RX
CAN TX
CAN RX
U_Microcontroller
Microcontroller.SchDoc
CAN1 TD
CAN1 RD
U_TSAL
TSAL.SchDoc
TSAL Green
TSAL Red
TSAL Green
TSAL Red
TSAL Active
U_Safety Loops
Safety Loops.SchDoc
Green In
Green Out
SDN In
SDN Out
PDOC OK (ISO)
PDOC OK (ISO)
PDOC OK (ISO)
HIGH VOLTAGE
U_PDOC
PDOC.SchDoc
PDOC OK
SCL
SDA
SCL
SDA
SCL (ISO)
SDA (ISO)
HV MC+1
1
2
HV MC+
39300020
HV TEST POINT+1
1
2
R35
15k
HV MC+
39300020
REPLACE WITH MELF RESISTORS
U_HV Sense
HV Sense.SchDoc
HV MC+
HV MC-
HV+
HV-
SCL
SDA
TSAL Active
TSAL Active
HV MC-1
2
1
HV MC-
39300020
U_Discharge
Discharge.SchDoc
Discharge Disable
Discharge Disable
Discharge Disable (ISO)
Discharge Disable (ISO)
HV MC+
HV MC-
HV MC+
HV MC-
HV TEST POINT-1
1
2
R36
15k
HV MC-
39300020
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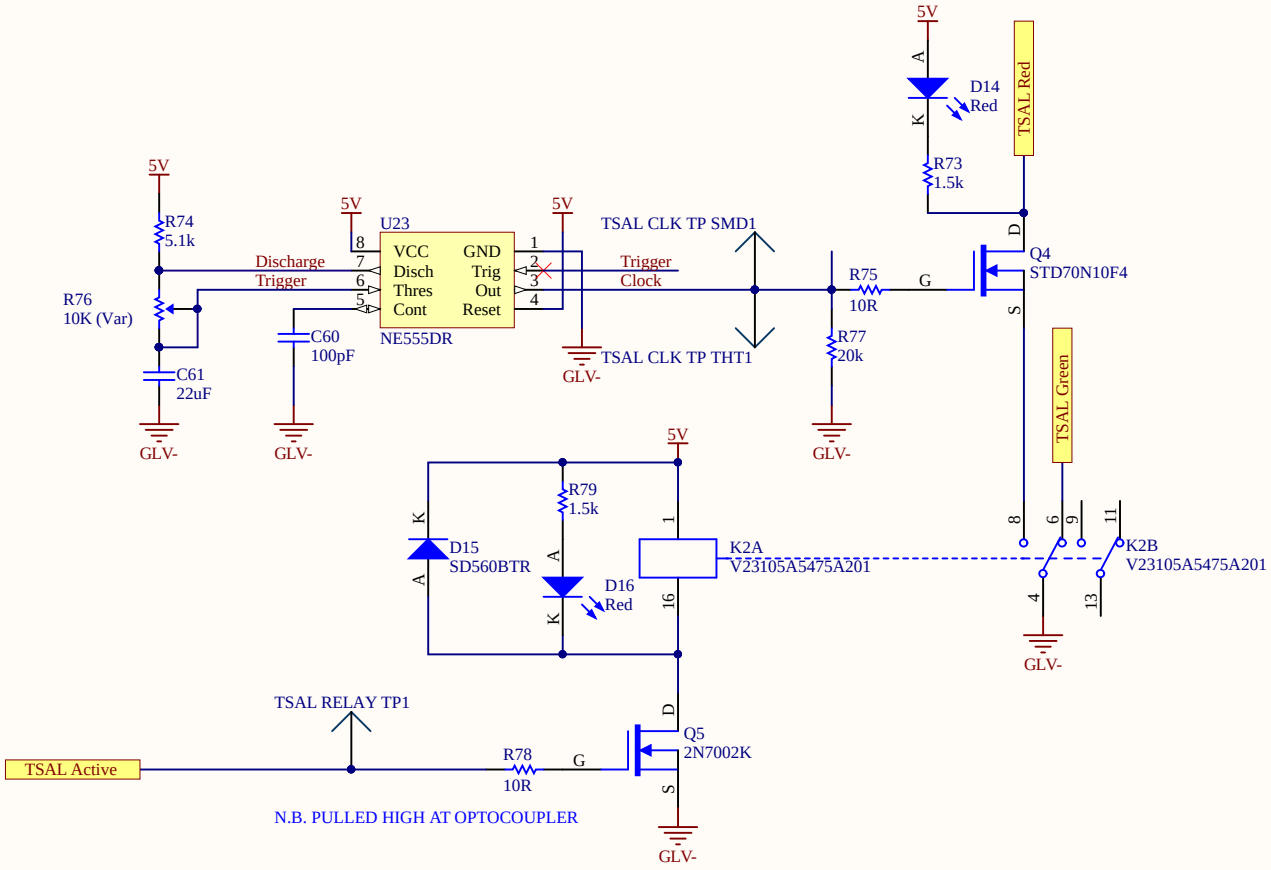
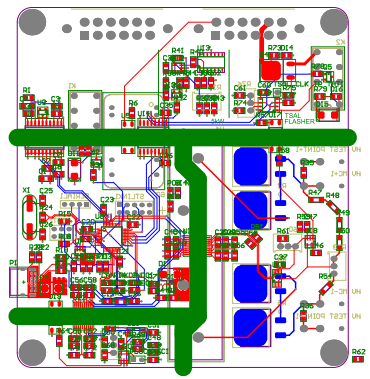
VEHICLE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