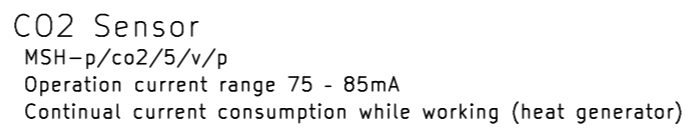
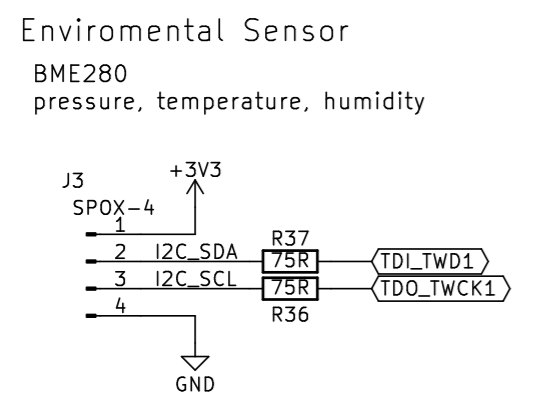
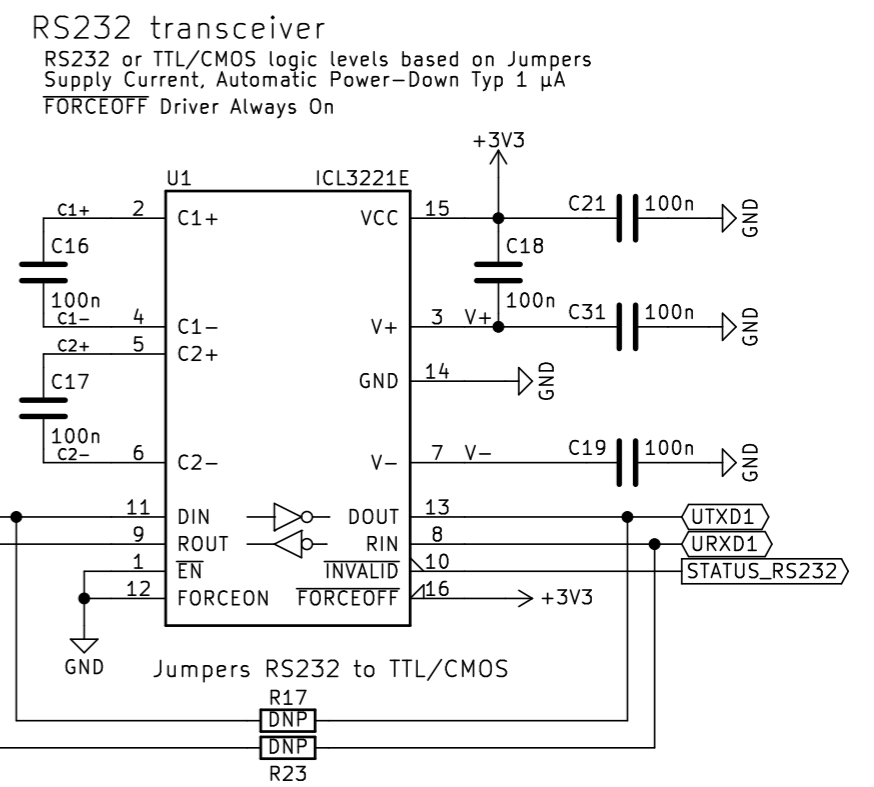
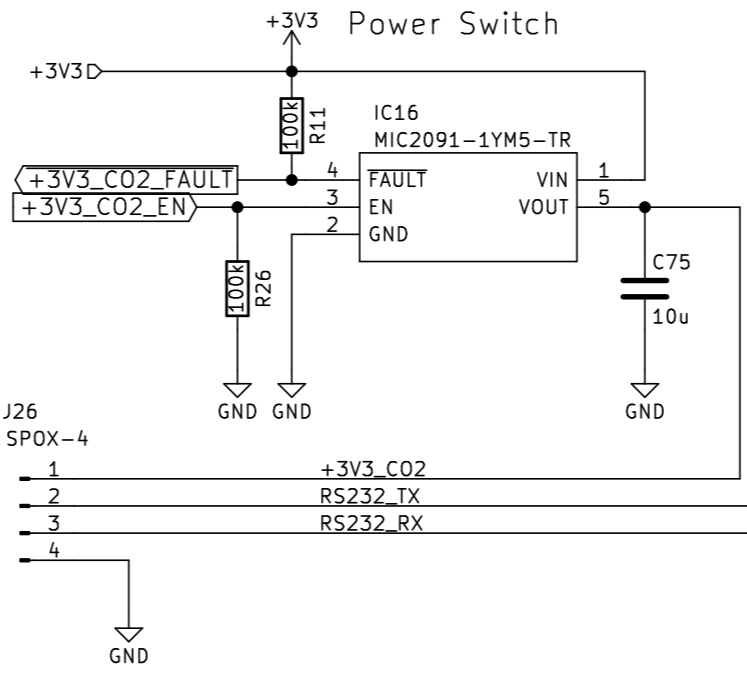
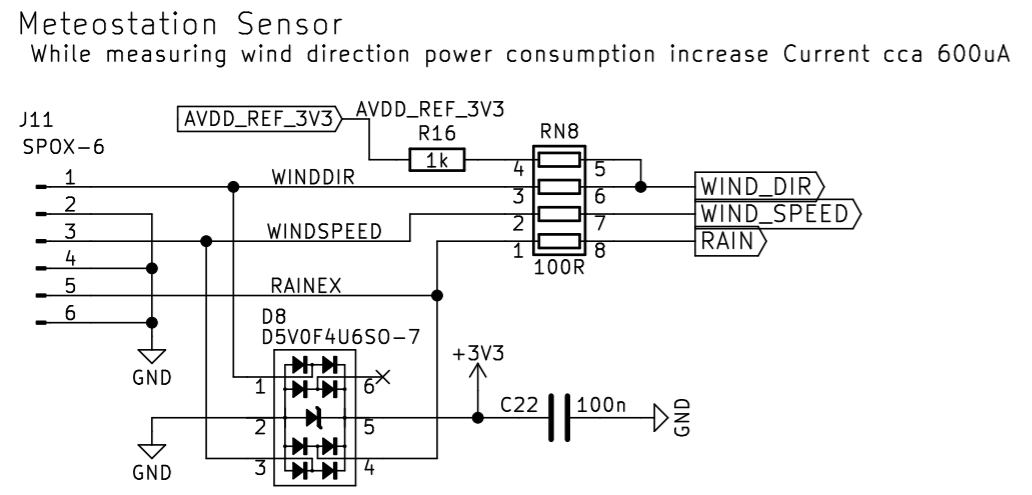
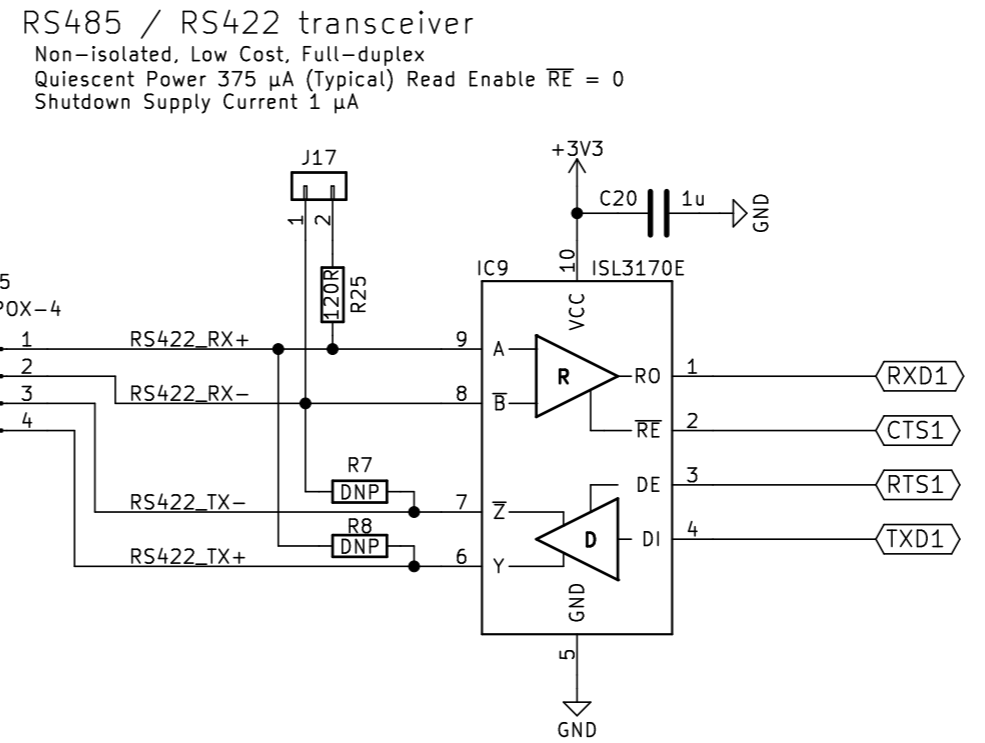
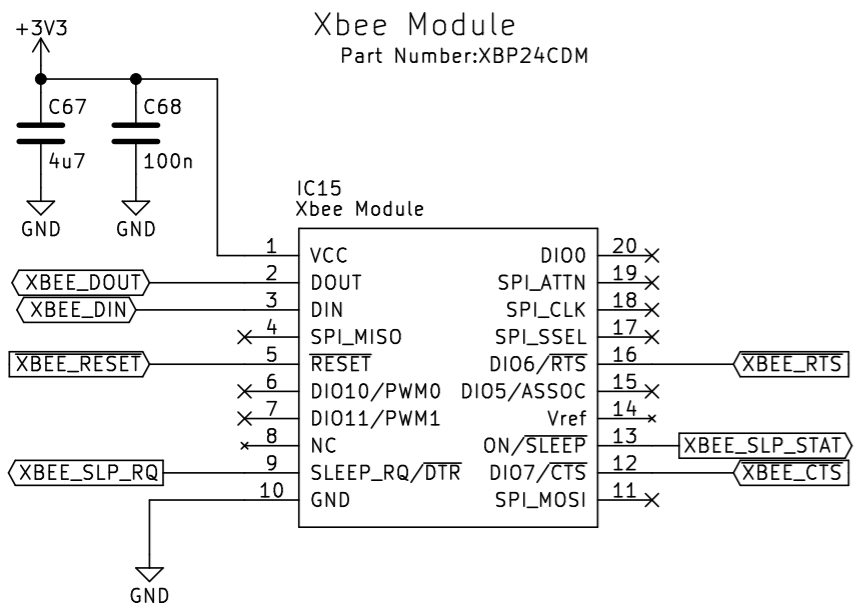
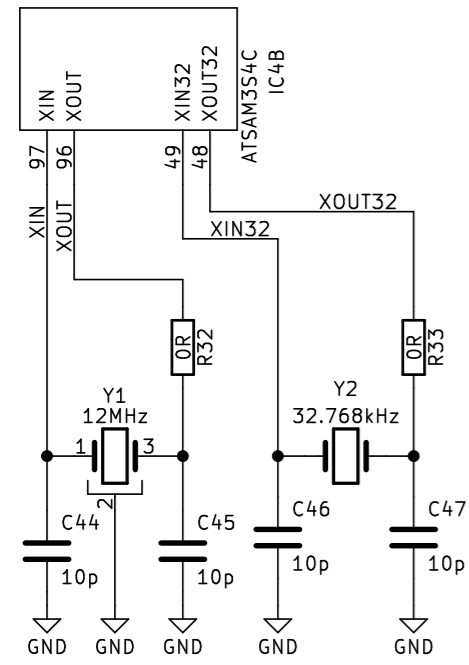


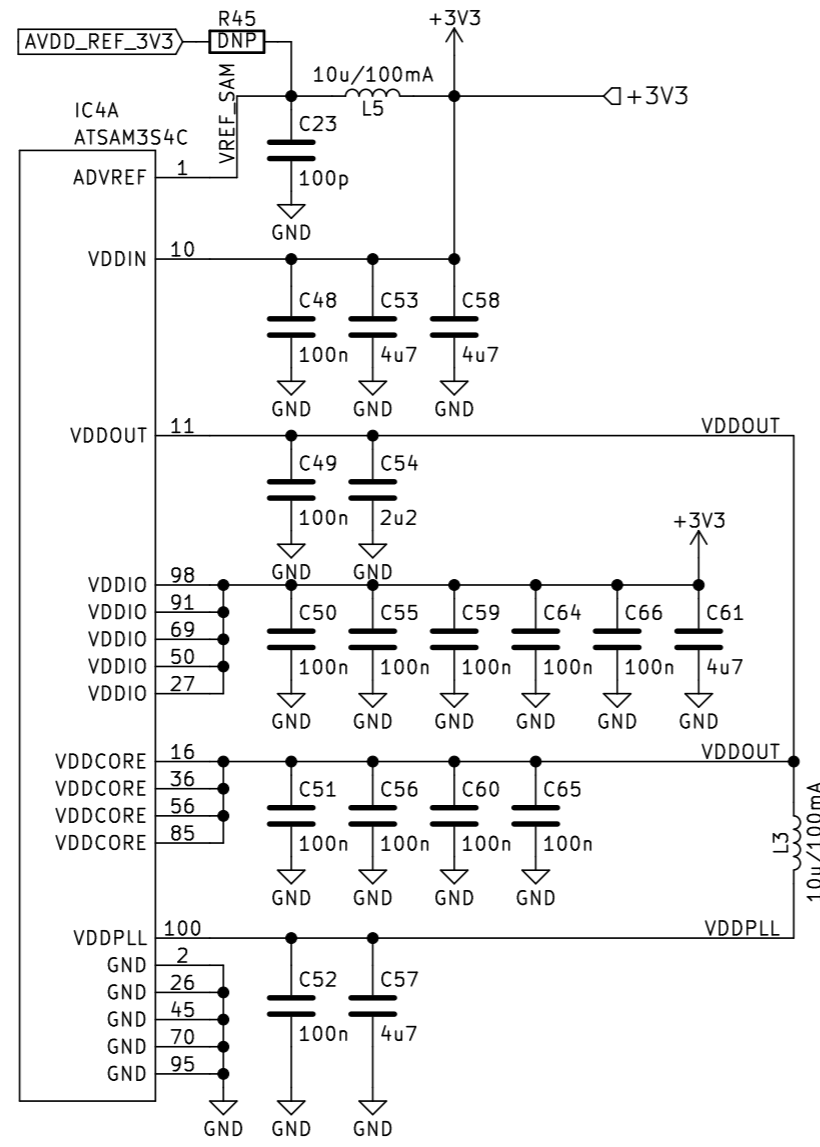
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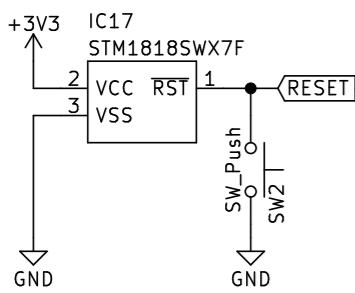
Crystal



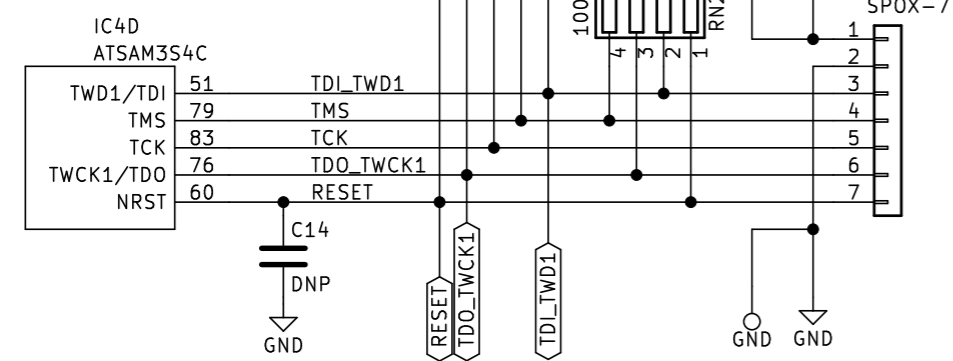
Power



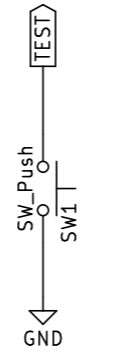
Reset Circuit



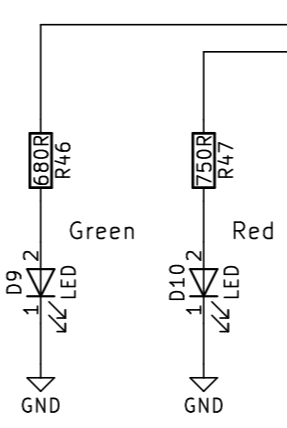
SWD



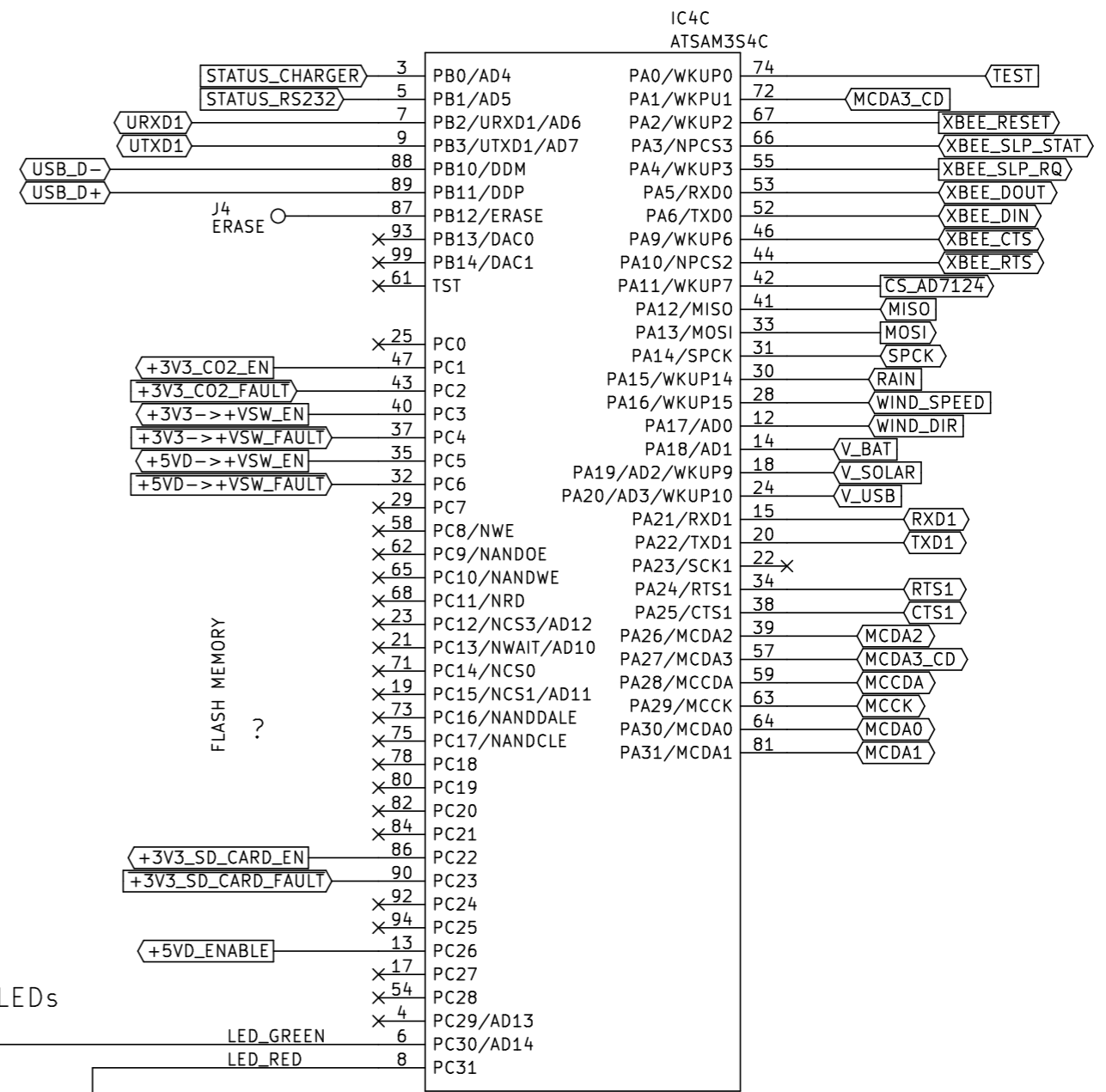
Test Switch



Status LEDs



Active Power Consumption 32 mA @ MCK 48 MHz
 Sleep Mode Fast start-up through WKUP0-15 pins
 Typical Current Consumption for Sleep Mode 14 mA @ MCK 48MHz
 Typical Current Consumption for Sleep Mode 20 µA @ MCK to Fast RC 32kHz
 Backup Mode RTT used, One WKUPx enabled
 Backup Current Typ up to 5 µA

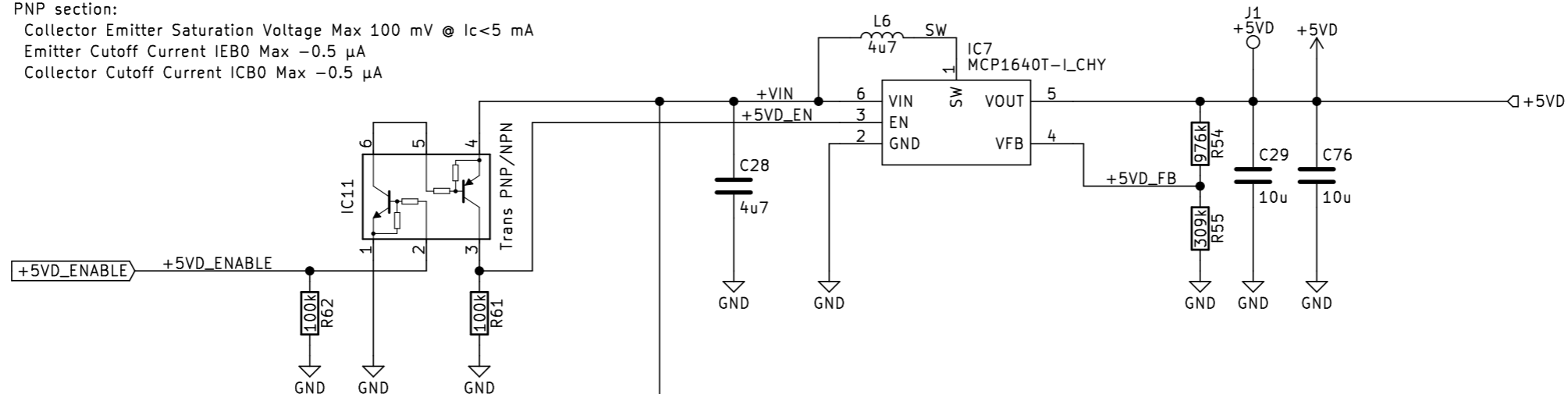


Boost converter +5V

Supply Voltage Reference and peripheral components
 Maximal Output Current 250 mA
 A logic high (>90% of VIN) will enable the regulator output.
 Case: $2.3\text{ V} - 2.3\text{ V} * 95\% = 0.115\text{ V}$ (Uce_sat_max) PNP pre-biased Transistor
 Quiescent Current - PFM Typ 19 uA
 Quiescent Current - PWM Typ 220 uA
 Output Ripple Voltage Typ 200 mV (100mA Iout)

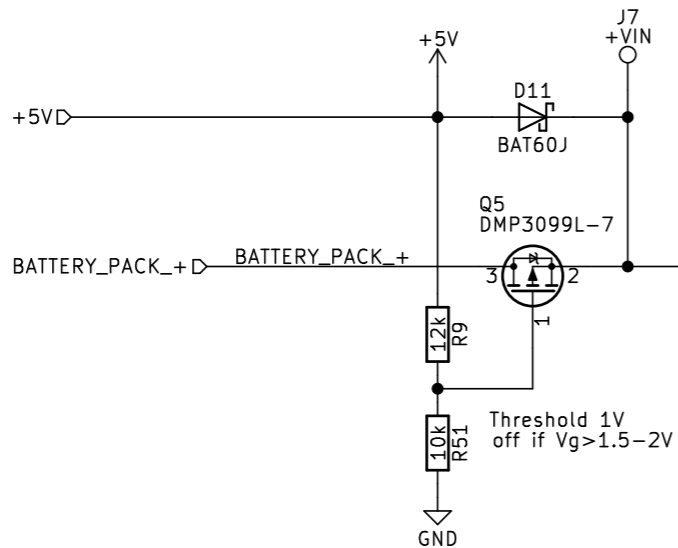
Enable Logic

Comp Pre-Biased Dual Trans 100kOhm
 PNP section:
 Collector Emitter Saturation Voltage Max 100 mV @ Ic < 5 mA
 Emitter Cutoff Current IEBO Max -0.5 uA
 Collector Cutoff Current ICBO Max -0.5 uA



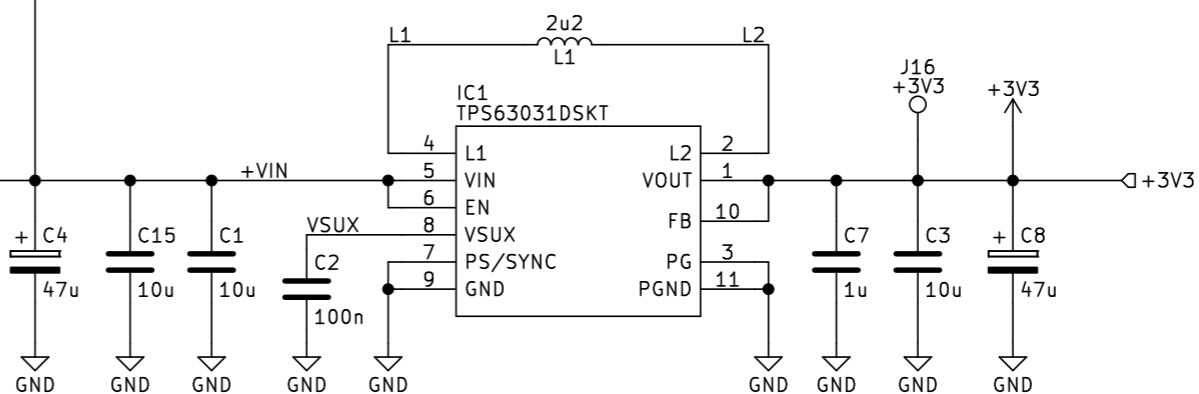
Power Switch

+5 / Battery



Buck-Boost converter +3V3

Vout = 3.3V
 Vin = 2.4V - 5.5V
 Up to 800-mA Output Current at 3.3 V in Step-Down Mode (VIN = 3.6 V to 5.5 V)
 Up to 500-mA Output Current at 3.3 V in Boost Mode (VIN > 2.4 V)
 Quiescent current 25 uA typ



Sheet: /Power Supply/
 File: file5A7F32FD.sch

Title:

Size: A4

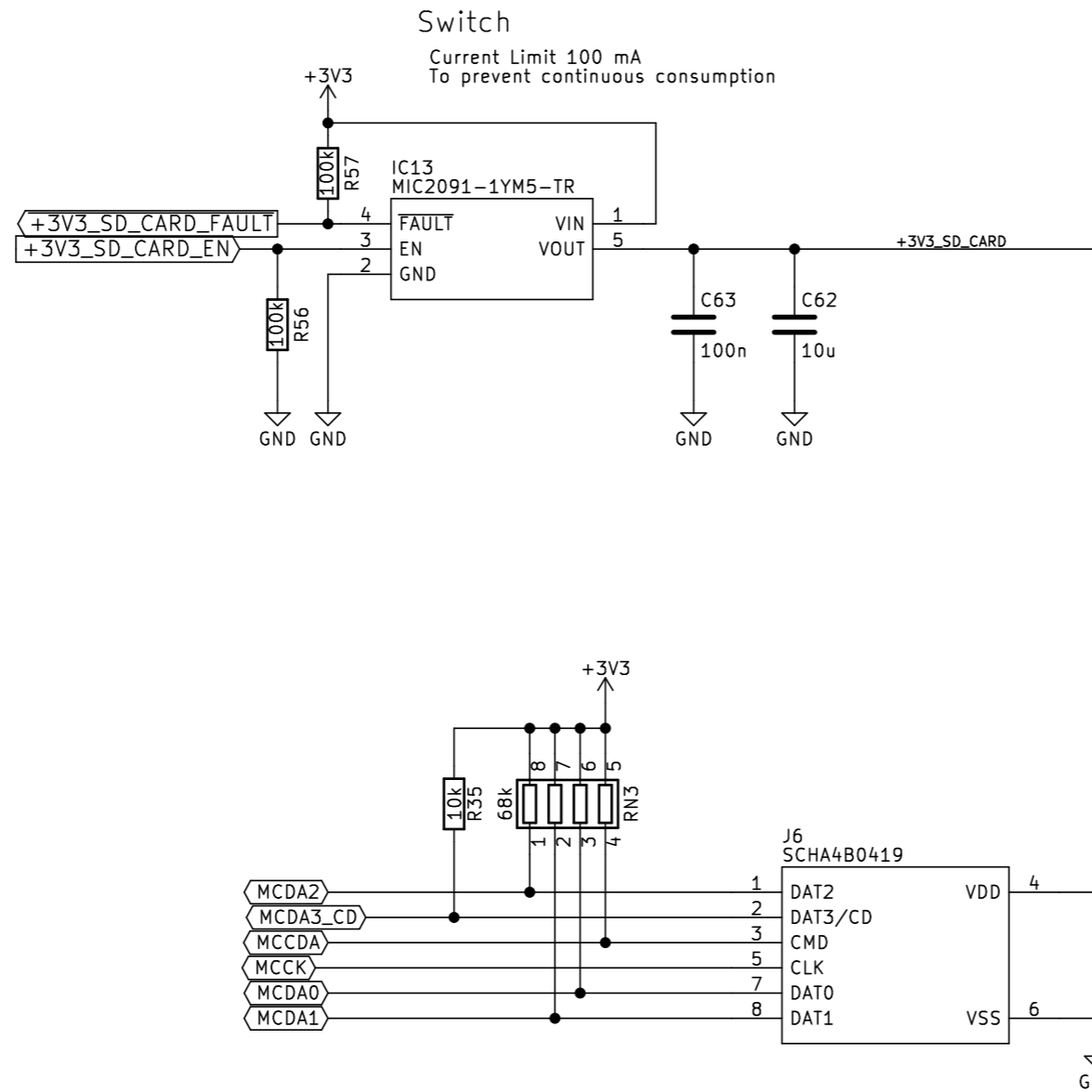
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+3V3D
↑
+3V3



SD Card

ESD on SD card?

Card Example: SFSD4096N3BM1T0-I-GE-2B1-STD
Maximal Current consumption 80mA

Memory

Serial Flash SST26WF080BT-104I/NP NOR Flash 4Mb SQI Flash Memory 1.8V
Parallel Flash SST39VF1681 2M x8 CMOS Multi-Purpose Flash Plus (MPF+)

Sheet: /Memory/
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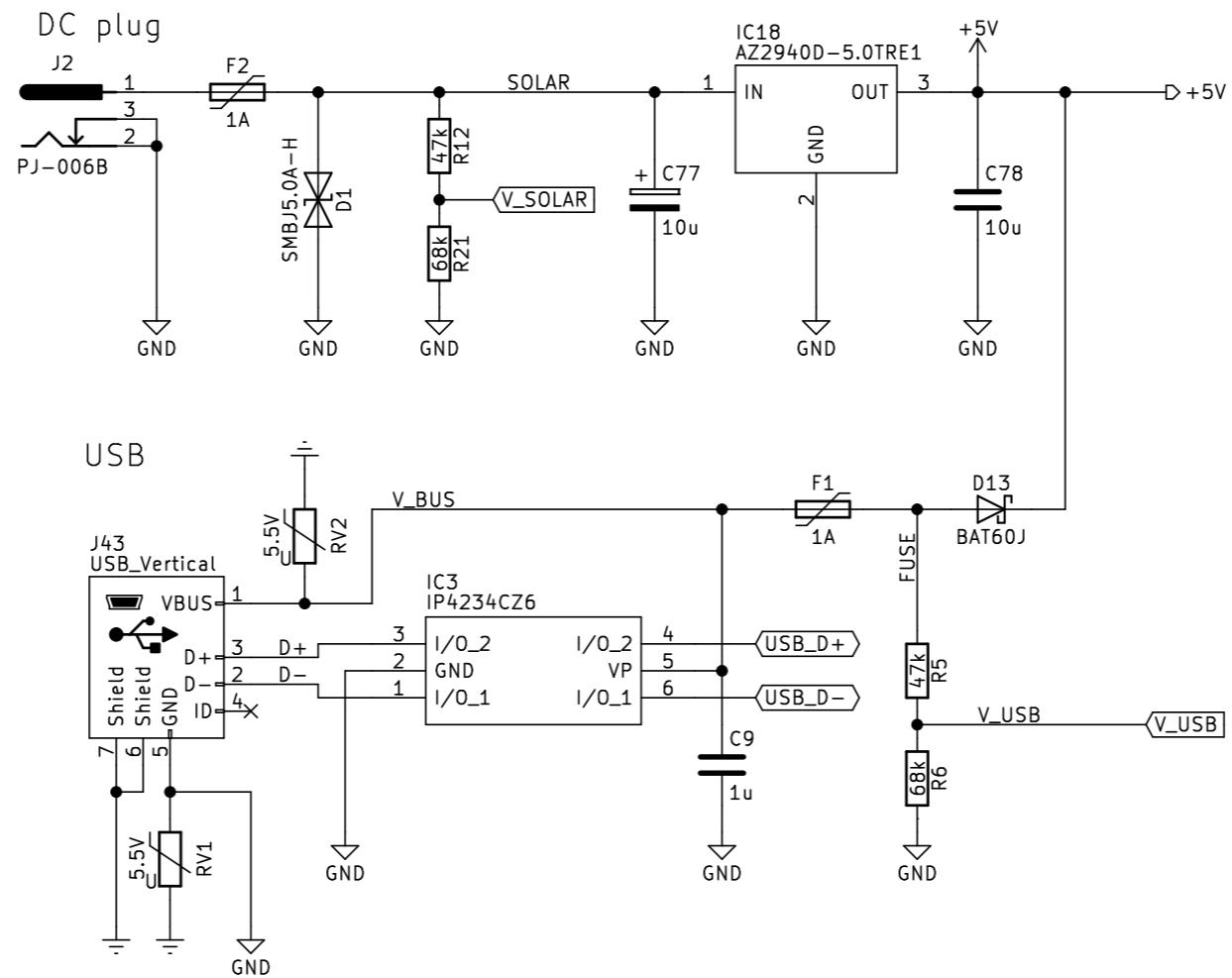
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Solar Cell
 Voc = 7 V
 peak power output around
 6 V at 378 mA

LDO +5V
 Output Current 1 A max
 Dropout Voltage 200 mV @ 500 mA Output Current



Sheet: /Power Input/
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Buck

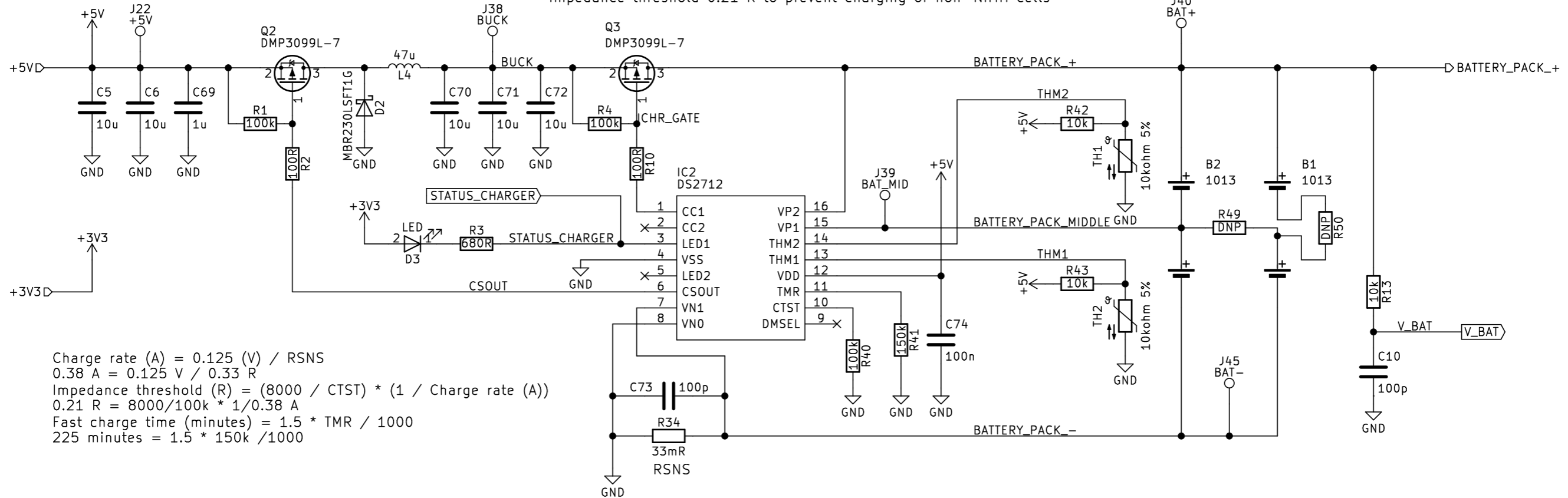
Charging current regulation
 Current input awg = $(V_{charge}/V_{in}) * \text{charge current} * \text{buck_efficiency}$
 Current input awg = $2.5 / 5 * 0.38 / 0.8 = 0.23 \text{ A}$

Battery Charger

Battery cell chemistry NiMH
 2 AA battery in series
 Charging current 380mA
 Fast charge time 225 minutes
 Impedance threshold 0.21 R to prevent charging of non-NiMH cells

Battery Pack

2 AA battery in series
 NiMH / Alkaline chemistry



Charge rate (A) = $0.125 \text{ (V)} / \text{RSNS}$
 $0.38 \text{ A} = 0.125 \text{ V} / 0.33 \text{ R}$
 Impedance threshold (R) = $(8000 / \text{CTST}) * (1 / \text{Charge rate (A)})$
 $0.21 \text{ R} = 8000/100k * 1/0.38 \text{ A}$
 Fast charge time (minutes) = $1.5 * \text{TMR} / 1000$
 225 minutes = $1.5 * 150k / 1000$

AA NiMH battery cell average properties:
 1900 mAh
 V = 1.2 V
 recharge lifetime 2100x

AA Alcalic Battery
 type: LR6
 V = 1.5V
 2700 mAh

<https://michaelbluejay.com/batteries/rechargeable.html>

Sheet: /NiMH Battery Charger/
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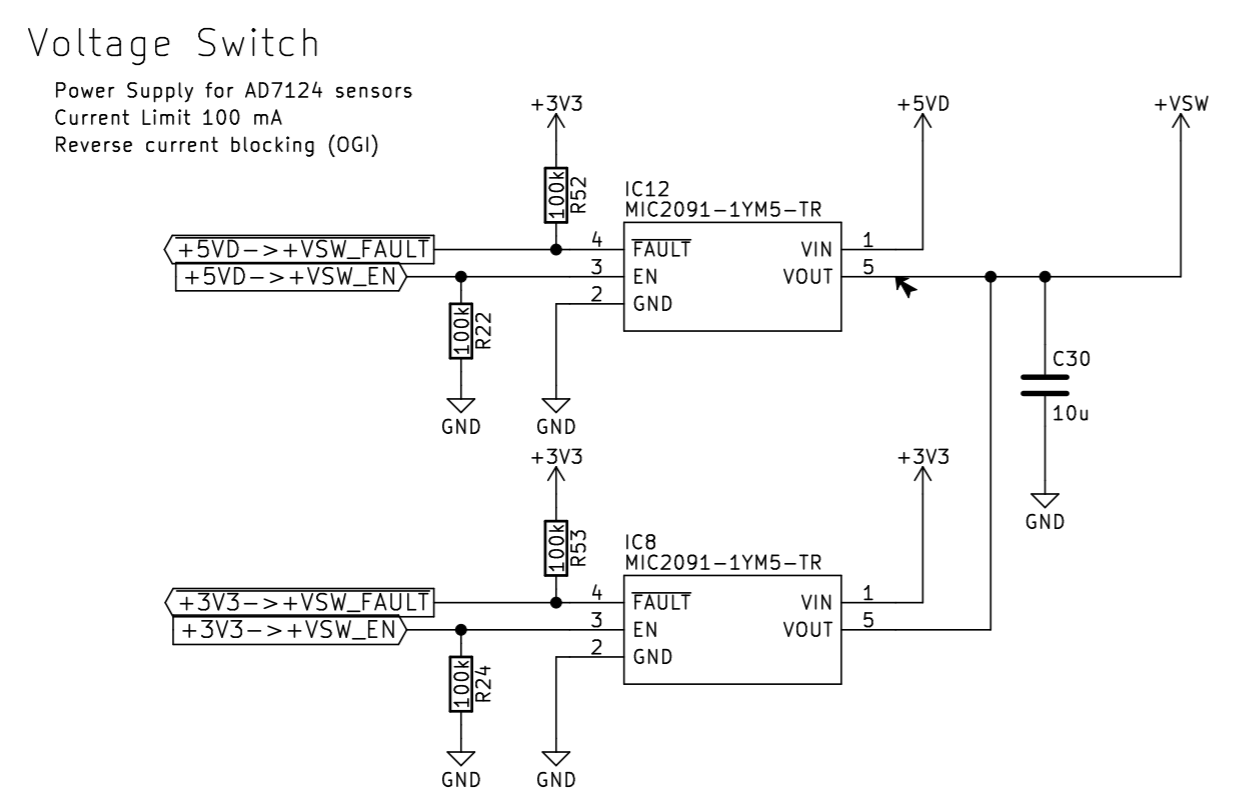
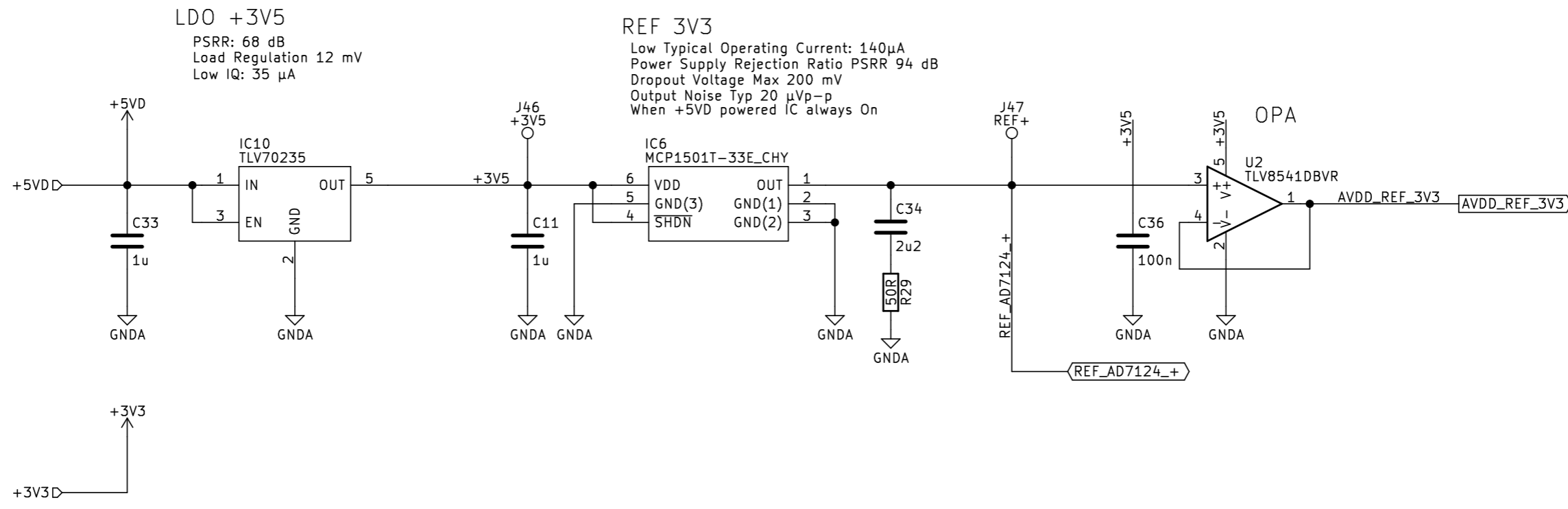
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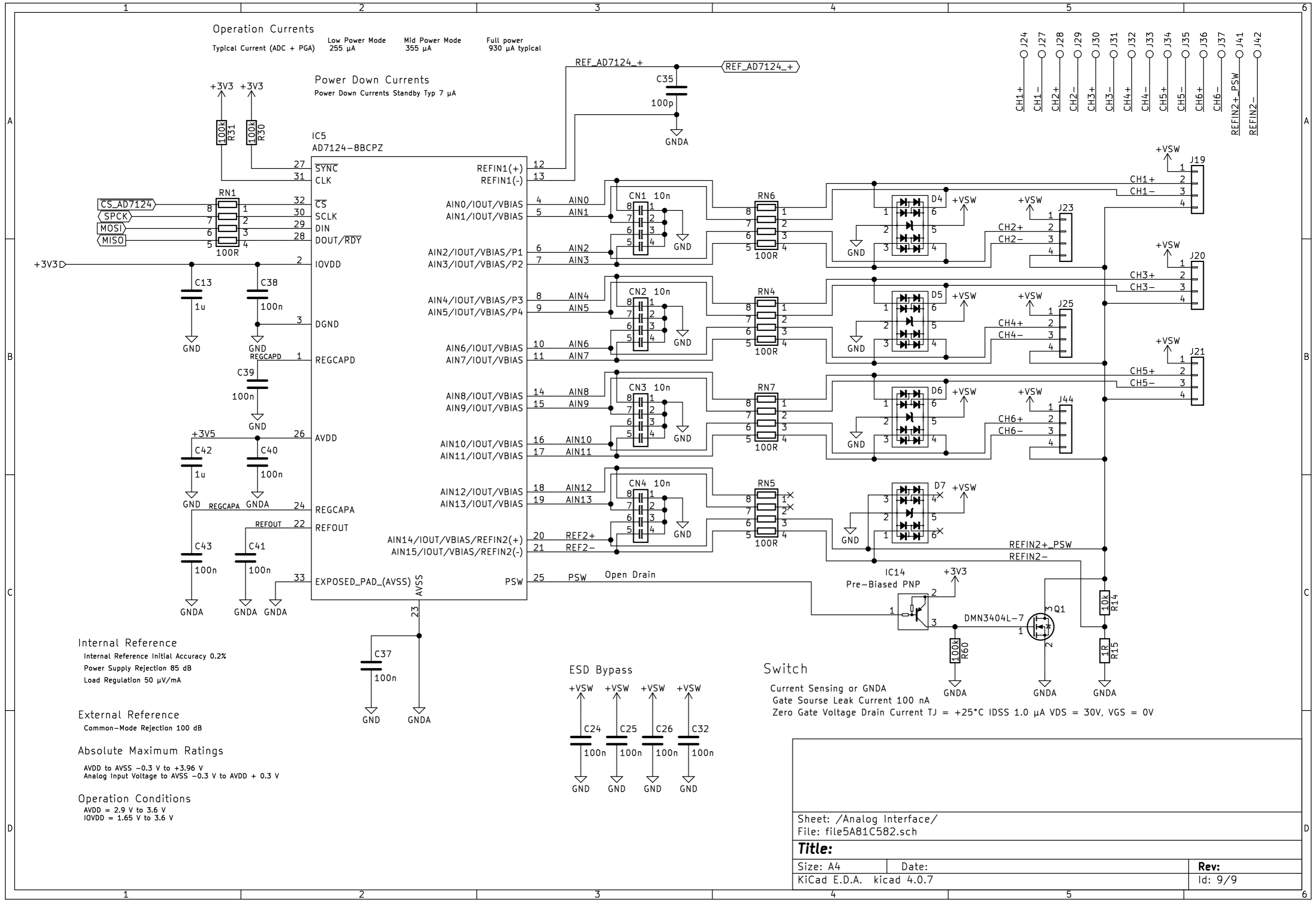
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Sheet: /Analog Power Supply/		Rev:
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Operation Currents

Typical Current (ADC + PGA)	Low Power Mode	Mid Power Mode	Full power
	255 μ A	355 μ A	930 μ A typical

Power Down Currents
Power Down Currents Standby Typ 7 μ A

Internal Reference
Internal Reference Initial Accuracy 0.2%
Power Supply Rejection 85 dB
Load Regulation 50 μ V/mA

External Reference
Common-Mode Rejection 100 dB

Absolute Maximum Ratings
AVDD to AVSS -0.3 V to +3.96 V
Analog Input Voltage to AVSS -0.3 V to AVDD + 0.3 V

Operation Conditions
AVDD = 2.9 V to 3.6 V
IOVDD = 1.65 V to 3.6 V

Switch
Current Sensing or GND
Gate Source Leak Current 100 nA
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ $I_{DSS} = 1.0 \mu\text{A}$ $V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$

Sheet: /Analog Interface/
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Title:

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KiCad E.D.A. kicad 4.0.7

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