Design Description

***Reference Box***

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# Description

## Page 16

int16\_t O2\_Current; // (Val-12480) \* 0.004pA , 200pA

int16\_t Polarisation\_Voltage; // [mV]

int16\_t SensorTemp; // Val / 100 [°C]

int16\_t Impedance; // [kOhm] 1000

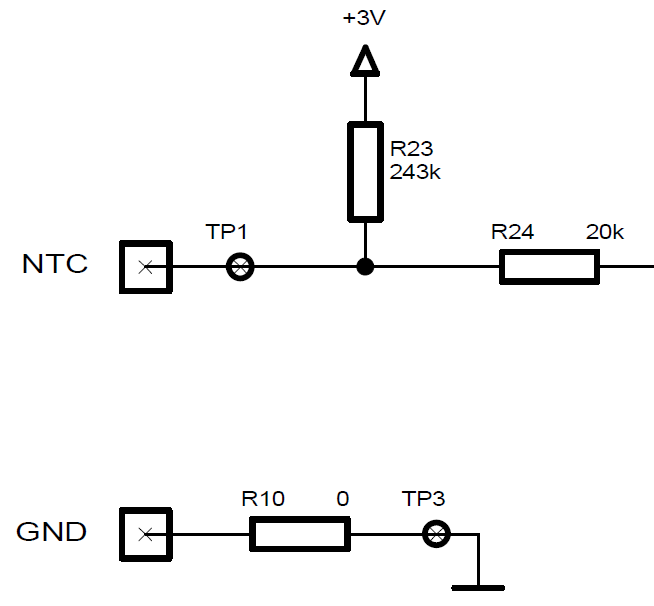
int16\_t OPA\_Voltage;

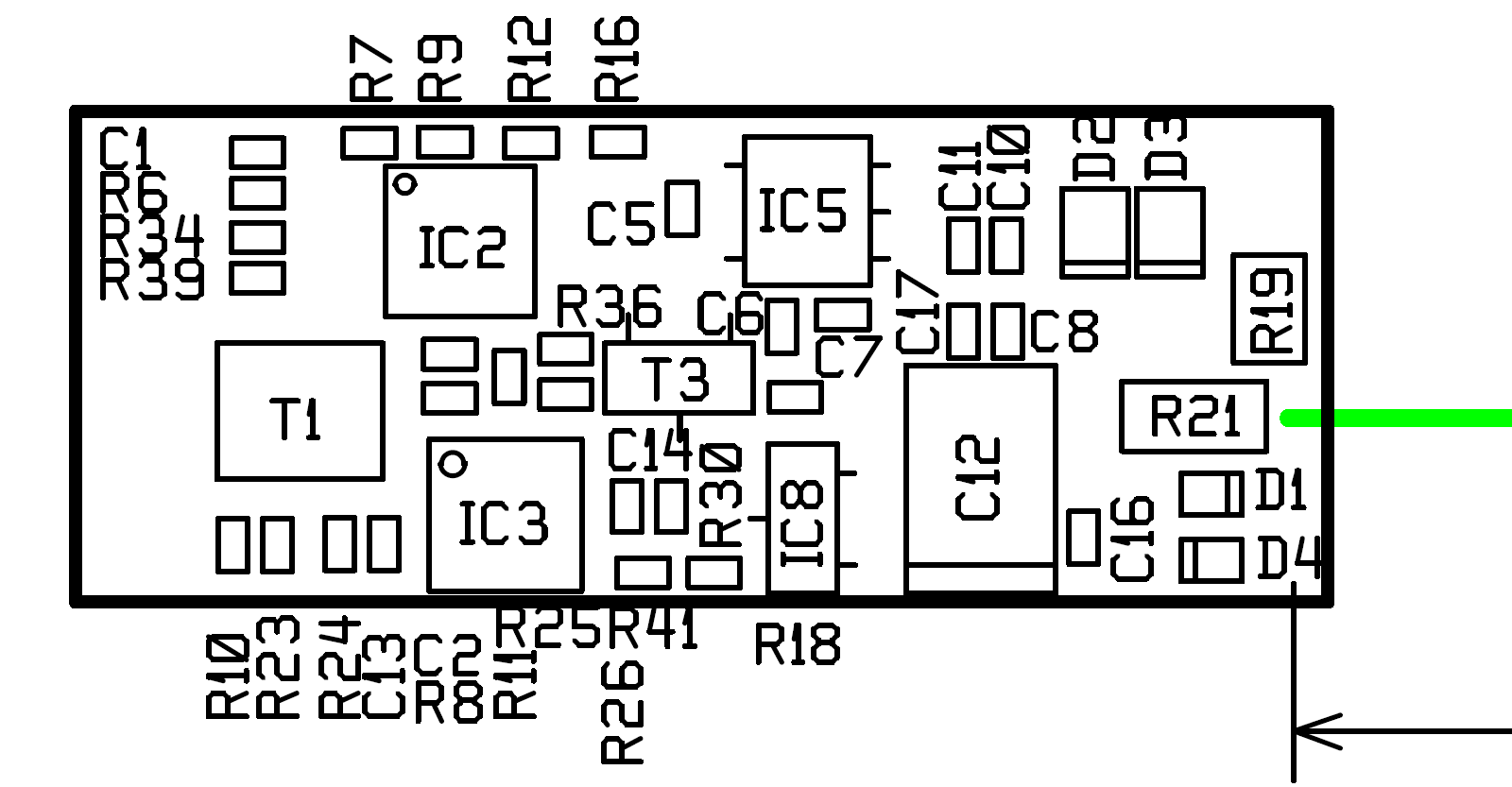
int16\_t NTC\_Raw; // [Ohm] ADC Value on ntc

int16\_t Anode\_Voltage; // [mV]

int16\_t Leakage; // [nA]

## Changes on PCB





R23=68kOhm / R10=4.7k

## NTC /PT1000 Calibration

### All known Values

#define Uo 3000.0 // mV

#define Rv = R23 im Schema 68000.0 // Ohm

#define R2 = R10 im Schema 4700.0 // Ohm

#define PT1000\_Resolution 0.0078125 // mV/incr

#define NTC\_Resolution 0.0625 // mV/incr

#define U\_PT1000\_Soll\_Temp1 20.0 // °C

#define U\_PT1000\_Soll\_Temp2 30.0 // °C

#define RNTC 22000.0 // at 25°C

NTC\_25Deg\_CalculatedSollValue = Uo/(Rv+R2+RNTC)\*(R2+RNTC)/NTC\_Resolution

#define NTC\_25Deg\_CalculatedSollValue 13533

### Measure NTC\_Raw Values under following conditions

1. Take a Reference Resistance of R=22kOhm 0.5% / 20ppm  
   and plug it to Temperature Input. The measured Value will be written to the Variable NTC\_25Deg\_MeasuredIstValue.

Example: NTC\_25Deg\_MeasuredIstValue= 13535

1. Take a Reference Resistance of PT1000 @20°C  
   and plug it to Temperature Input. The measured Value will be written to the Variable U\_PT1000\_Ist\_Temp1.

Example: U\_PT1000\_Ist\_Temp1= 30090

1. Take a Reference Resistance of PT1000 @30°C  
   and plug it to Temperature Input. The measured Value will be written to the Variable U\_PT1000\_Ist\_Temp2.

Example: U\_PT1000\_Ist\_Temp2= 30282

### PT1000 Calculations

PT1000\_Gain = (U\_PT1000\_Soll\_Temp2 - U\_PT1000\_Soll\_Temp1)/(U\_PT1000\_Ist\_Temp2 - U\_PT1000\_Ist\_Temp1);

PT1000\_Offset = (U\_PT1000\_Soll\_Temp2 - PT1000\_Gain\*U\_PT1000\_Ist\_Temp2);

Example: PT1000\_Gain = 0.052083333

Example: PT1000\_Offset= -1547.1875

**T**=(float) NTC\_Raw \*PT1000\_Gain+PT1000\_Offset;

### NTC Calculations

**NTC\_Offset** = NTC\_25Deg\_CalculatedSollValue - NTC\_25Deg\_MeasuredIstValue ;

**Untc2** =( NTC\_Raw + **NTC\_Offset**)\*NTC\_Resolution; // measured Untc + Urv

**Intc**=(Uo-**Untc2**)/Rv; // Intc

**pt3** = **Untc2**/**Intc**-R2; // Widerstandsberechnung

**T** = ((3740\*298.15)/((3740+log(**pt3**/22000)\*298.15)))-273.15;

## Implemented Calibration for Sensoradapter

Execute chapter 1.2.2 and store all measured Values in Page3

On Page3 Byte1 to Byte7 the

Byte 0: CS

Byte 1 + 2 NTC Calibvalue ( NTC\_25Deg\_MeasuredIstValue )

Byte 3 + 4 PT1000 20°C Calibvalue ( U\_PT1000\_Ist\_Temp1 )

Byte 5 + 6 PT1000 30°C Calibvalue ( U\_PT1000\_Ist\_Temp2 )