HY17P68
DMM Configurations

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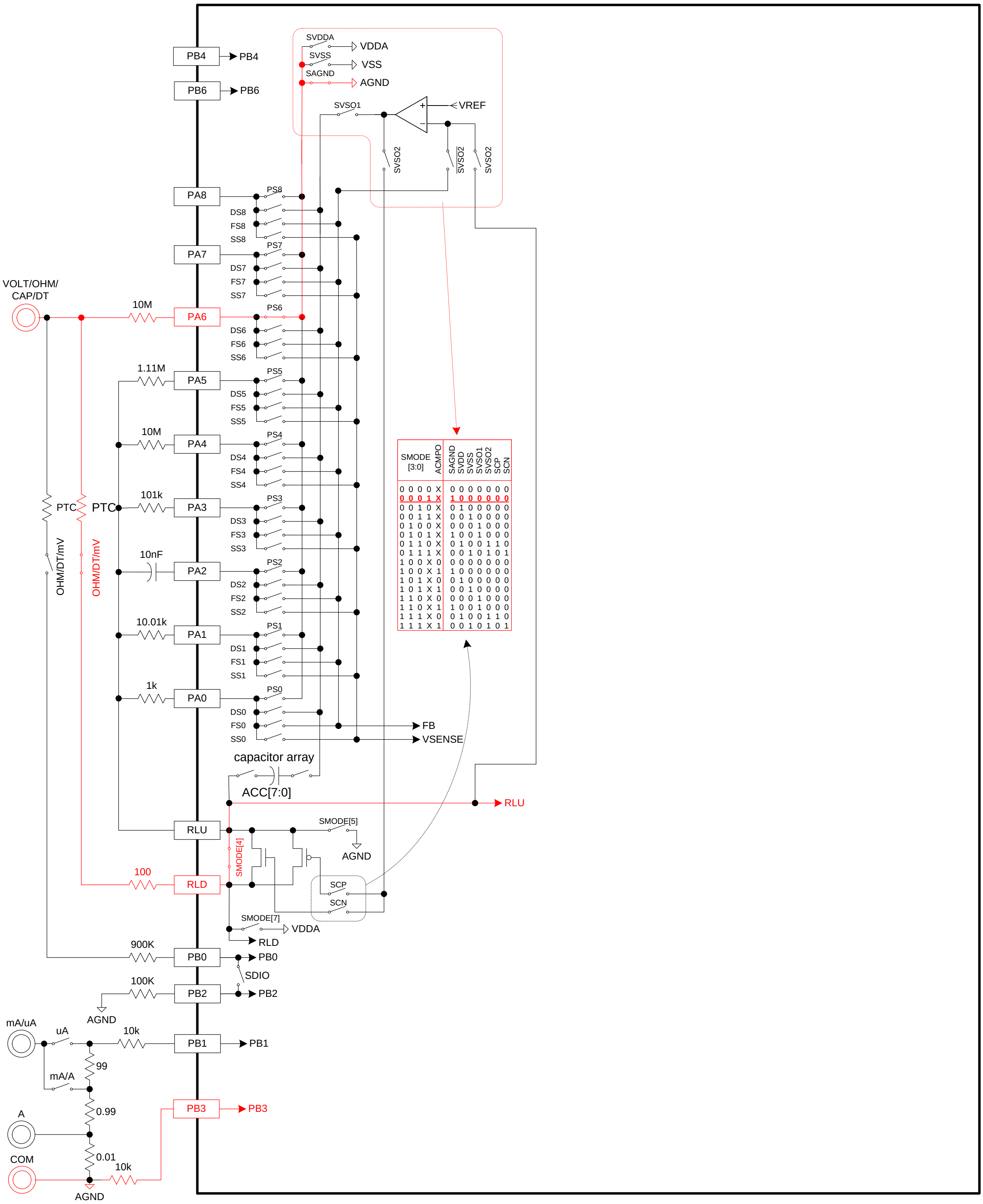
1. Millivolts(mV)

Due to high ADC input impedance, it is easily to sense 50/60Hz signal of the air that leads to unstable reading value after the testing probe was connected. It is recommended to connect input10MΩ to ground to reduce input impedance of DMM mV range.

The network configuration of 60mV and 600mV is similar. When measuring 60mV, it uses built-in OPA to amplify signal for 8 times then processing it in ADC.

The difference between DC and AC measurement is recommended to enable ADC Chopper function during DC measurement to reduce DC Offset and enable ADC Pre-Filter. On the contrary, it is not necessary to turn on Chopper in AC measurement.

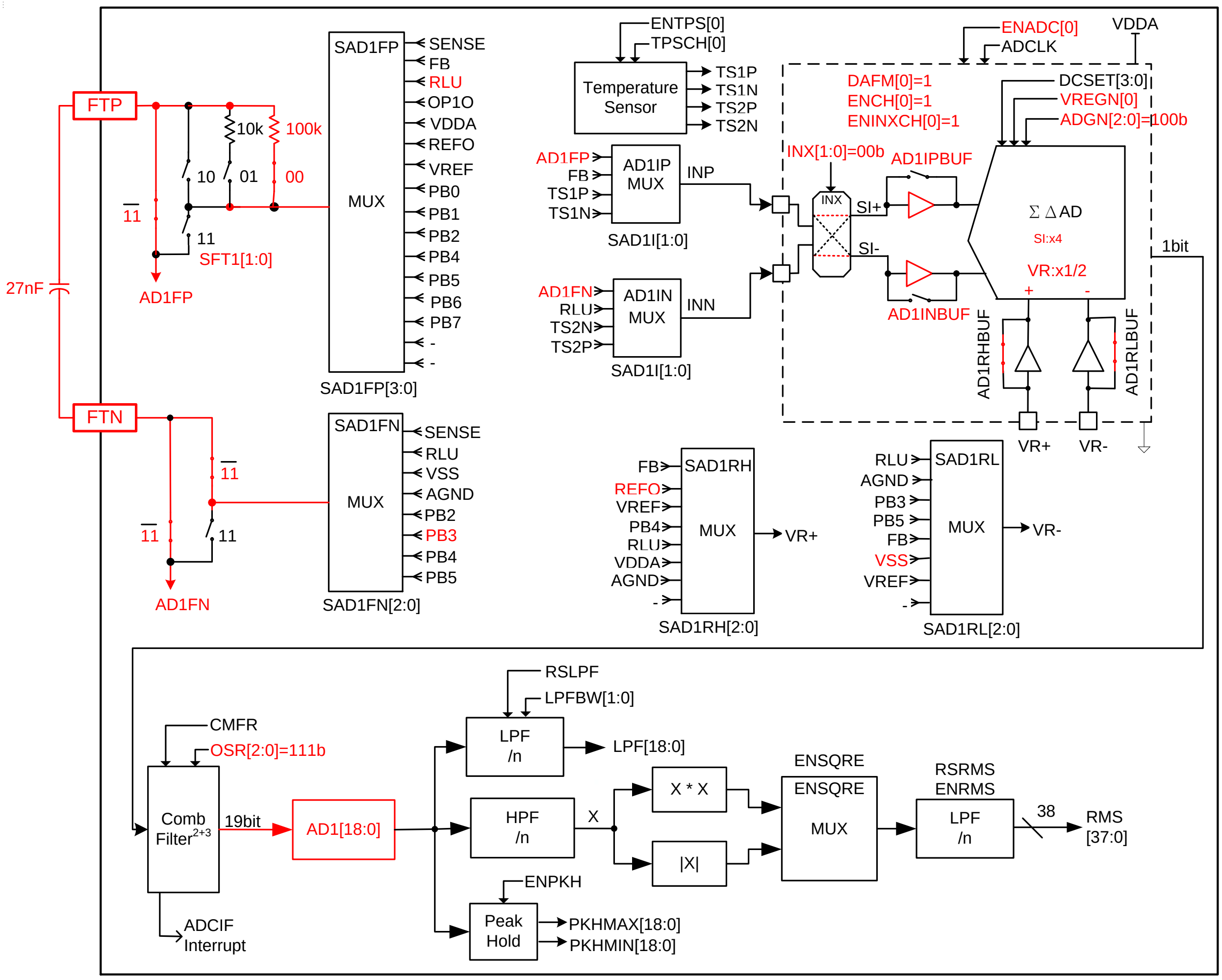
1.1. mV Input Network Configuration



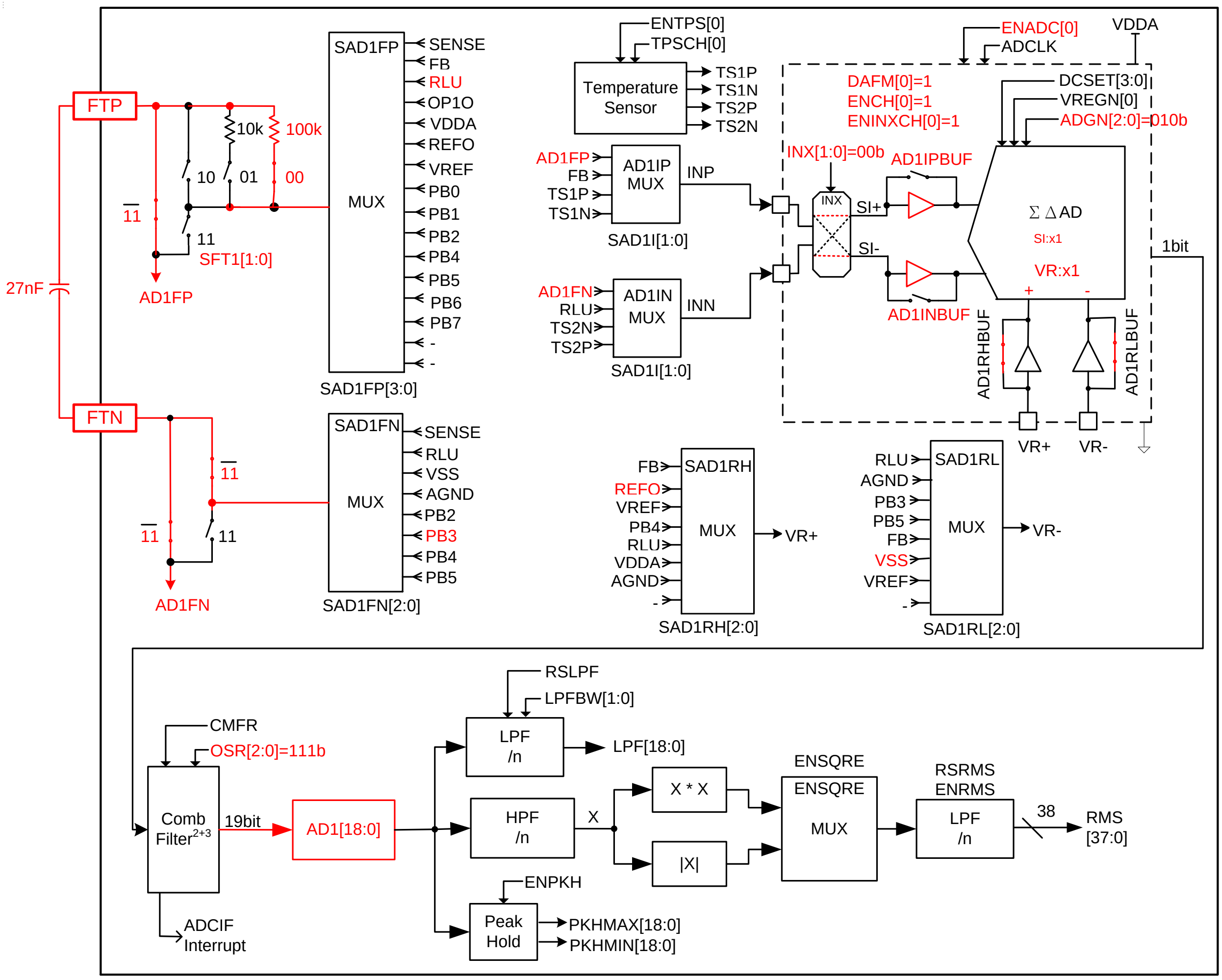
SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	**0**	**0**	**1**	**X**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

1.2. DC mV Measurement Network Configuration

1.2.1. ADC Settings(DC 60mV)

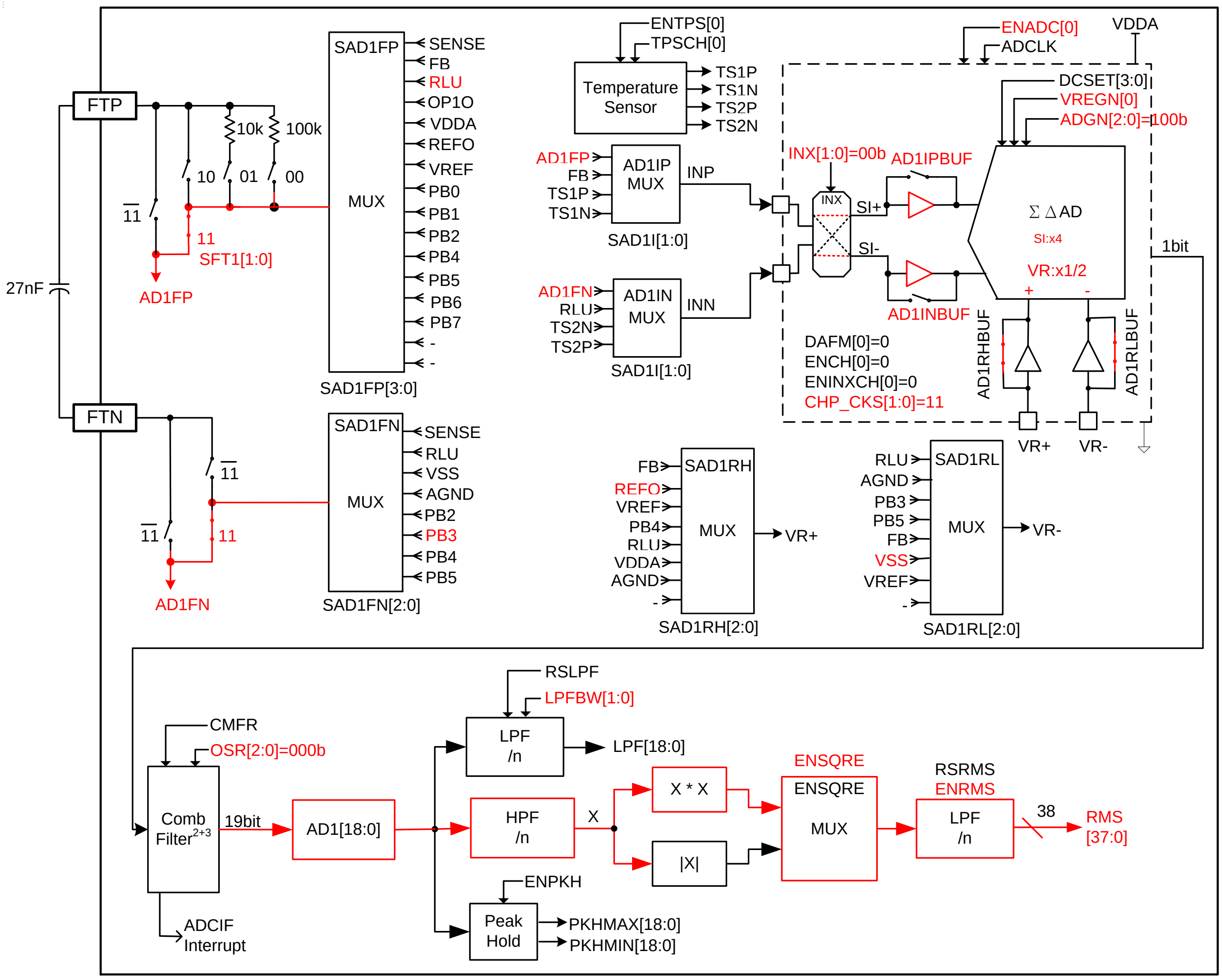


1.2.2. ADC Settings(DC 600mV)

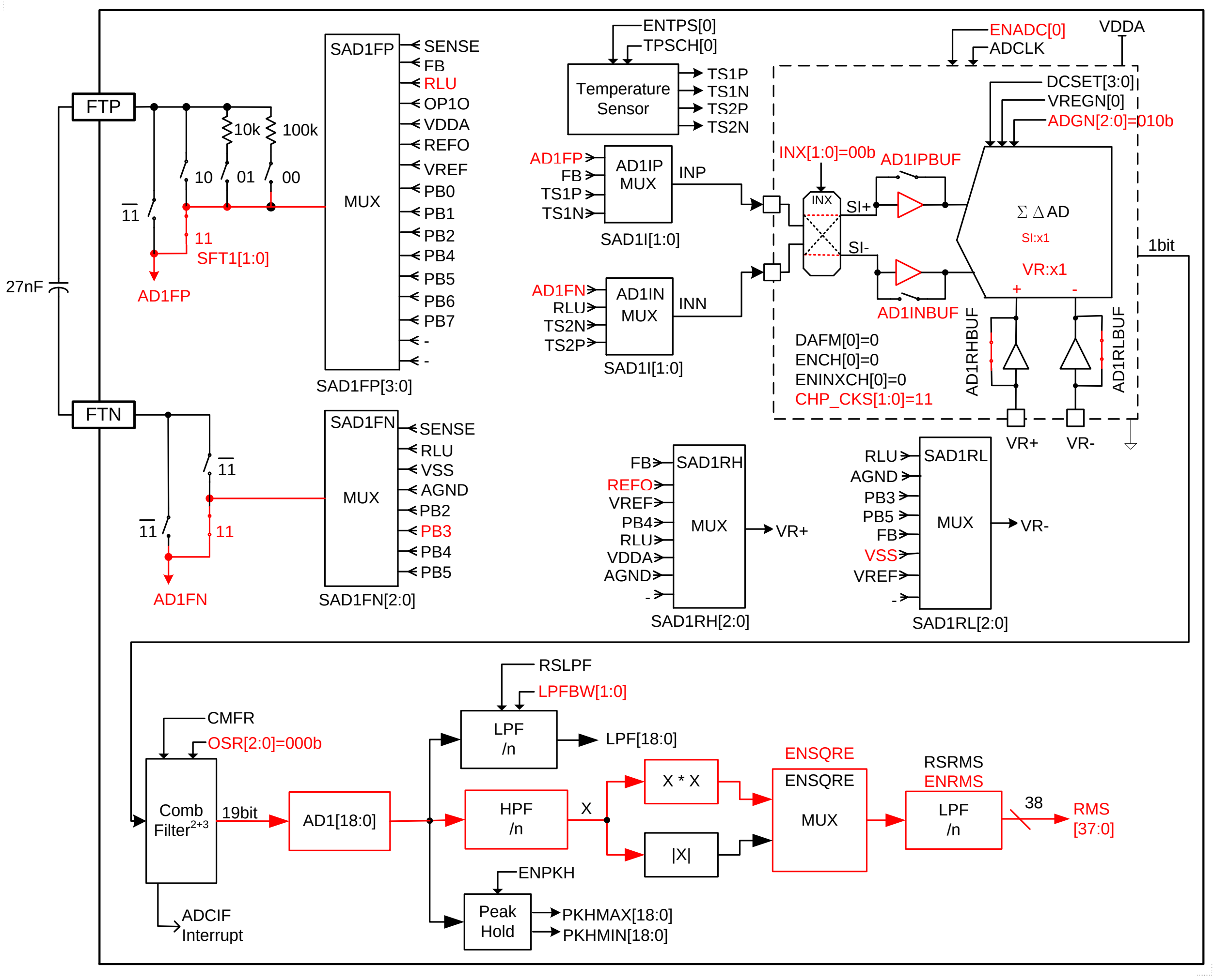


1.3. AC mV Measurement Network Configuration

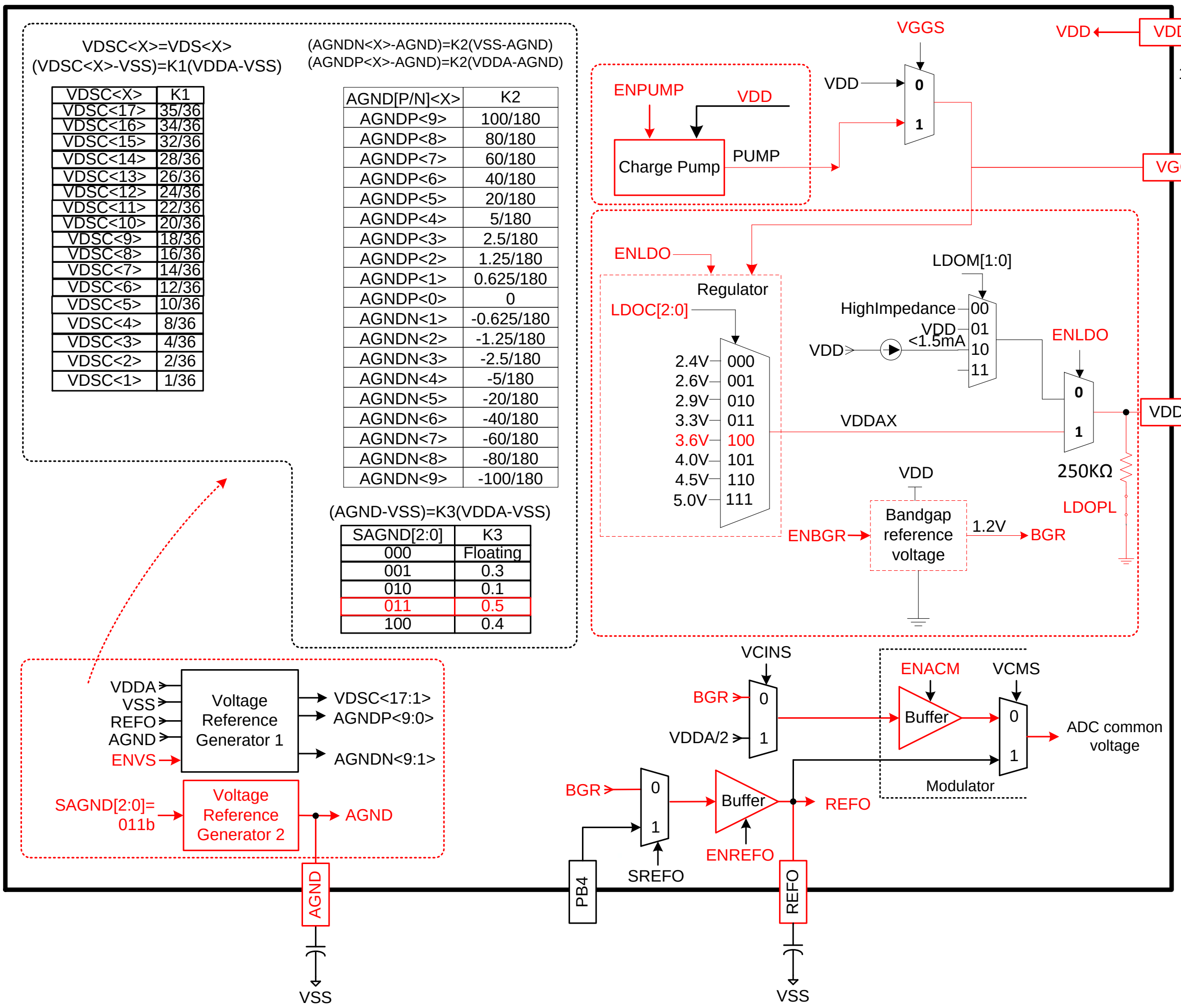
1.3.1. ADC Settings(AC 60mV)



1.3.2. ADC Settings(AC 600mV)



1.4. mV Function Power Supply Configuration



VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

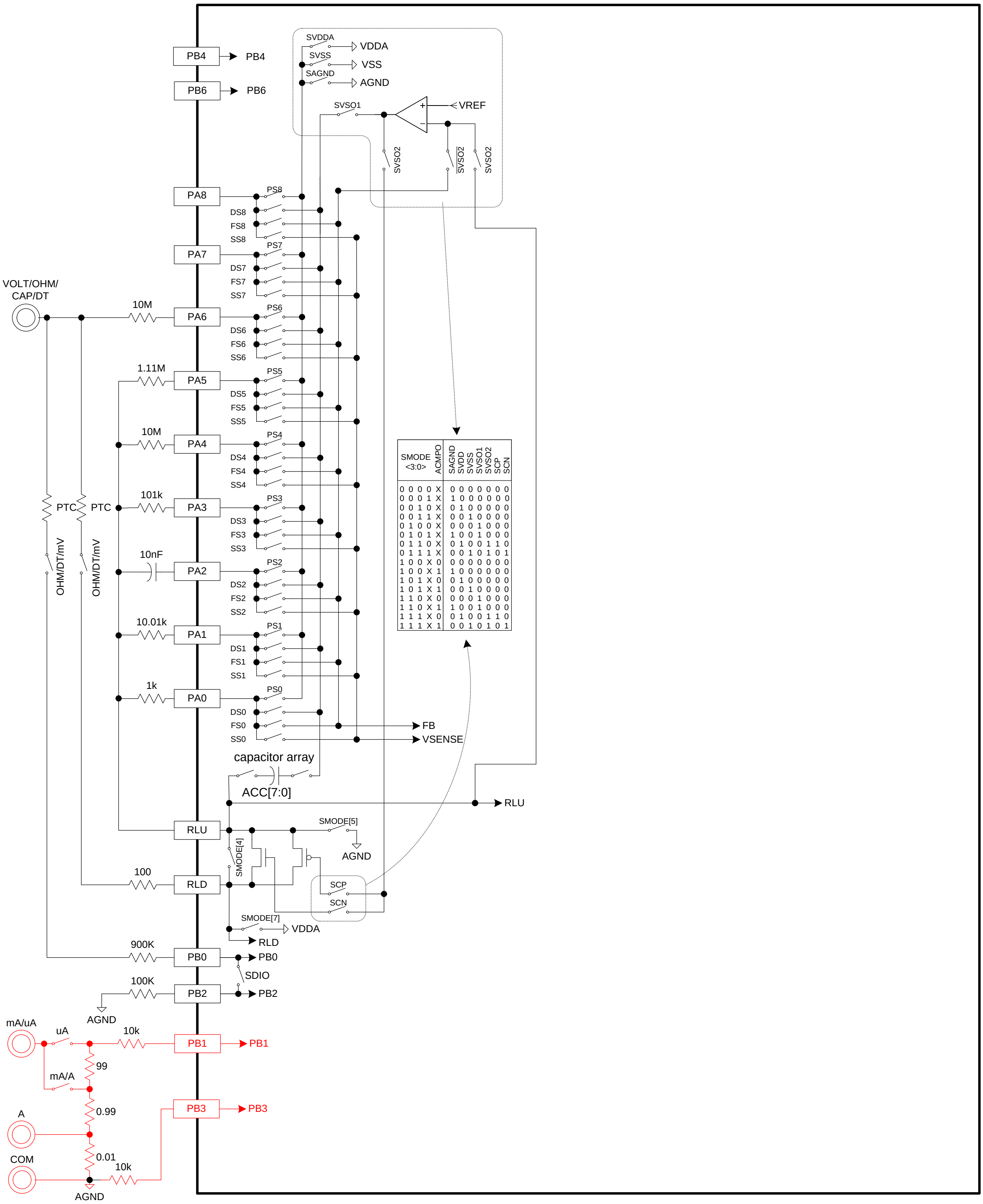
2. Current

Current measurement is similar with that of measuring mV. The difference is that in the Current measurement, there is a current-to-voltage resistance at the front end of the chip input. According to Ohm's law V=I*R, the greater the current, the greater the voltage drop on the resistance. The difference between μA, mA, and A measurement lies in the resistance of current to voltage, and the measured range of the chip is the same.

Current function will use ADC built-in programmable amplification (ADGN and VREGN) 8 times to increase gear selection.

The difference between DC and AC measurement is recommended to enable ADC Chopper function during DC measurement to reduce DC Offset and enable ADC Pre-Filter. On the contrary, it is not necessary to turn on Chopper in AC measurement.

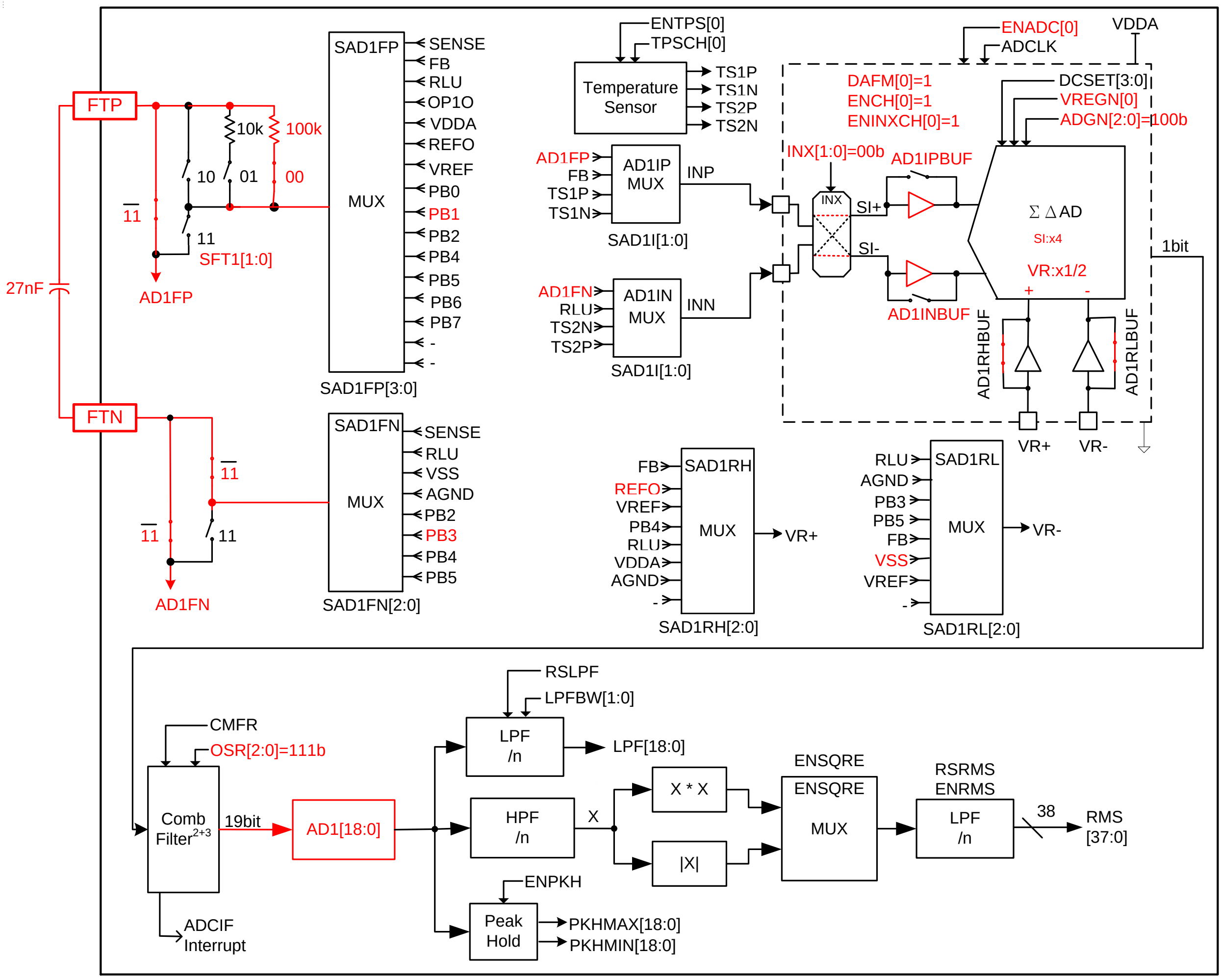
2.1. Current Input Network Configuration



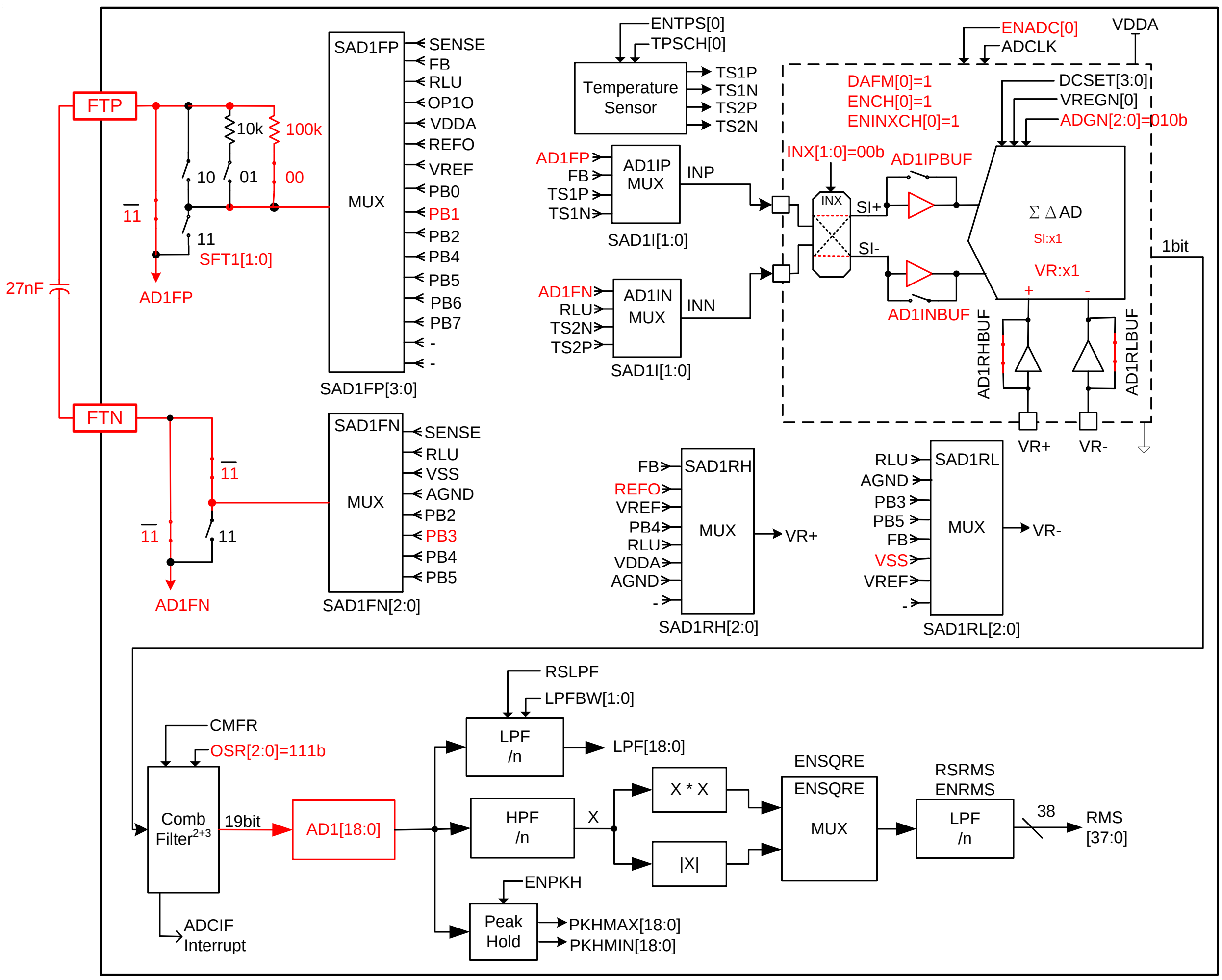
SMODE <3:0>				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

2.2. DC Current Measurement Network Configuration

2.2.1. ADC Settings(DC Lower Range)

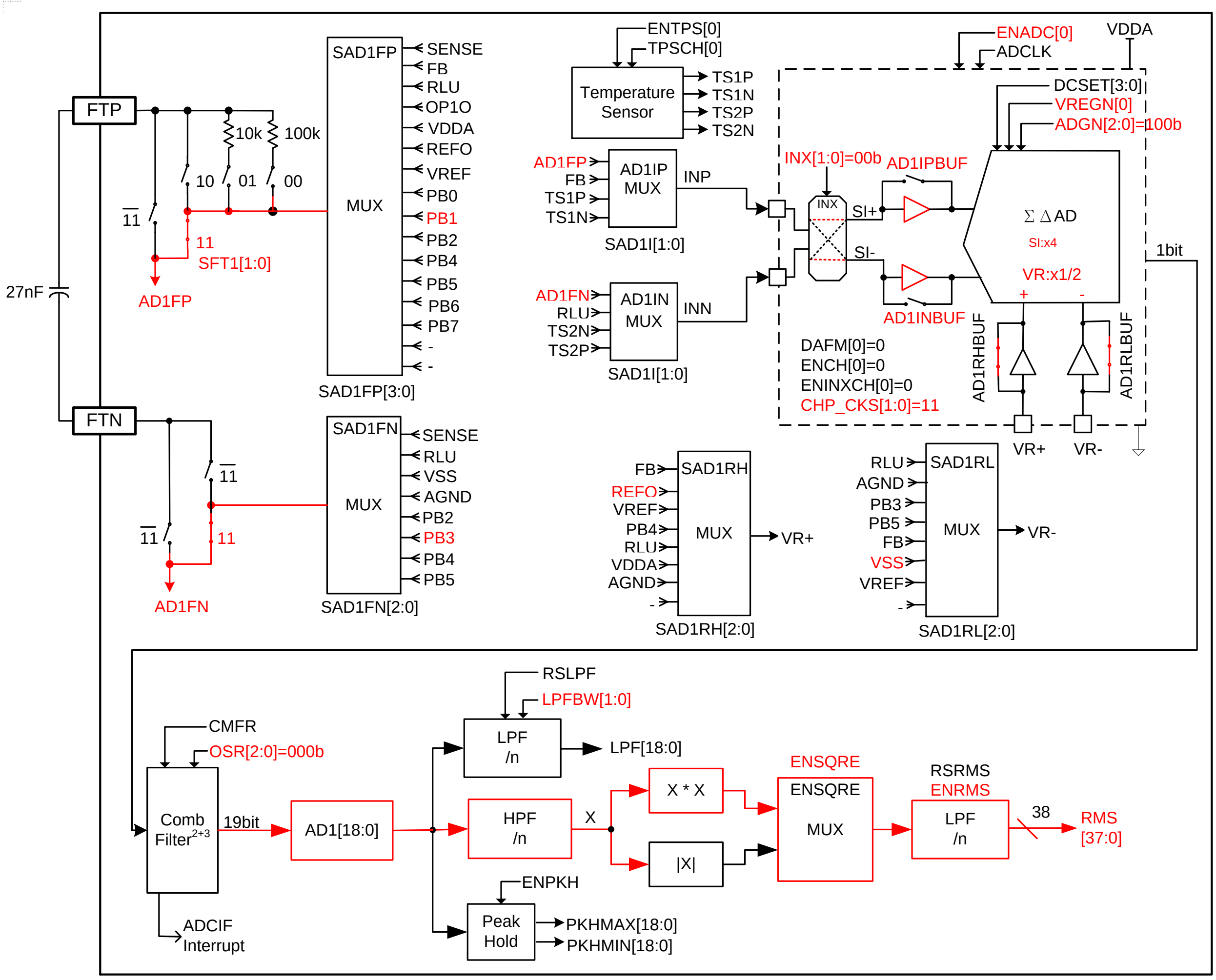


2.2.2. ADC Settings(DC Higher Range)

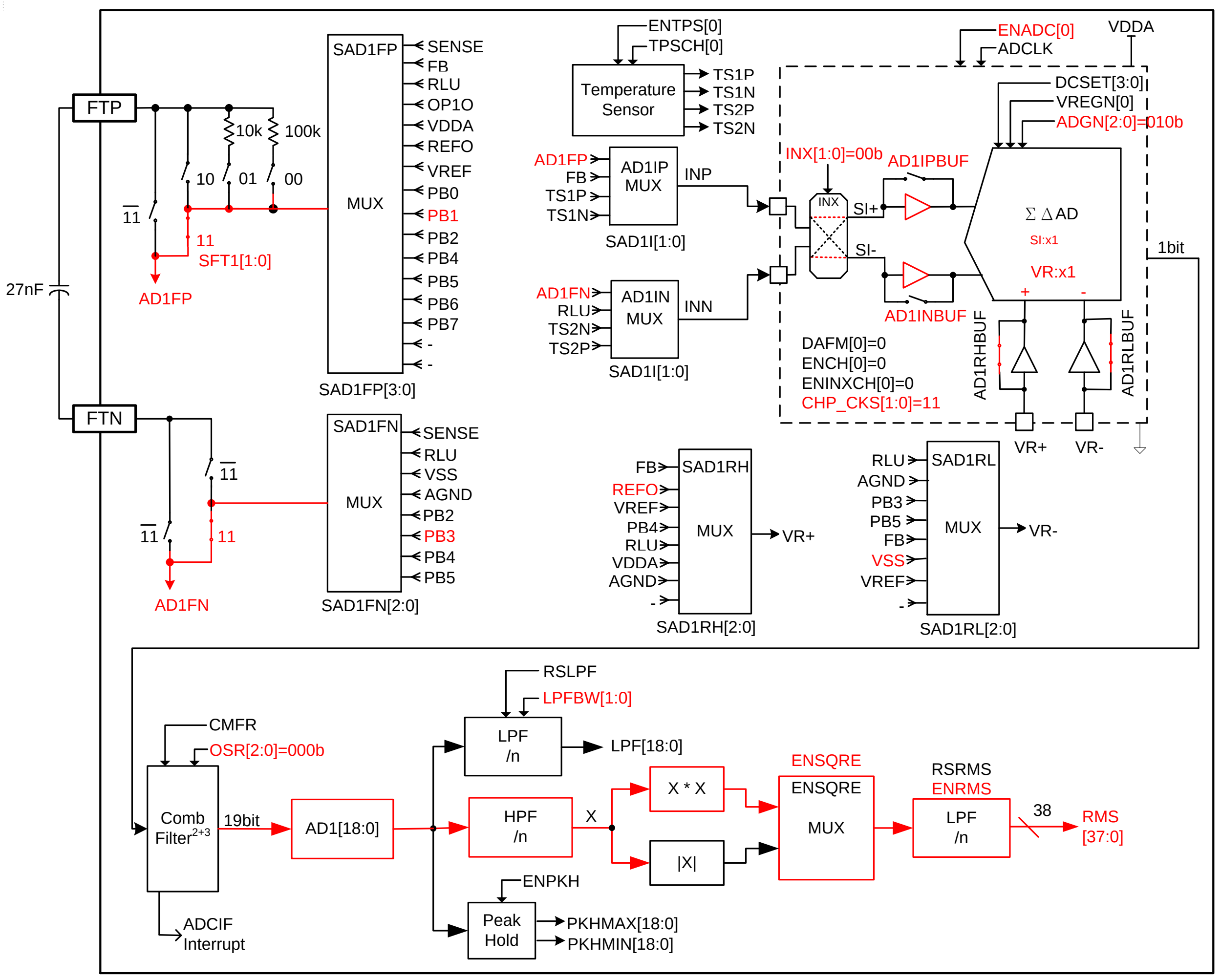


2.3. AC Current Measurement Network Configuration

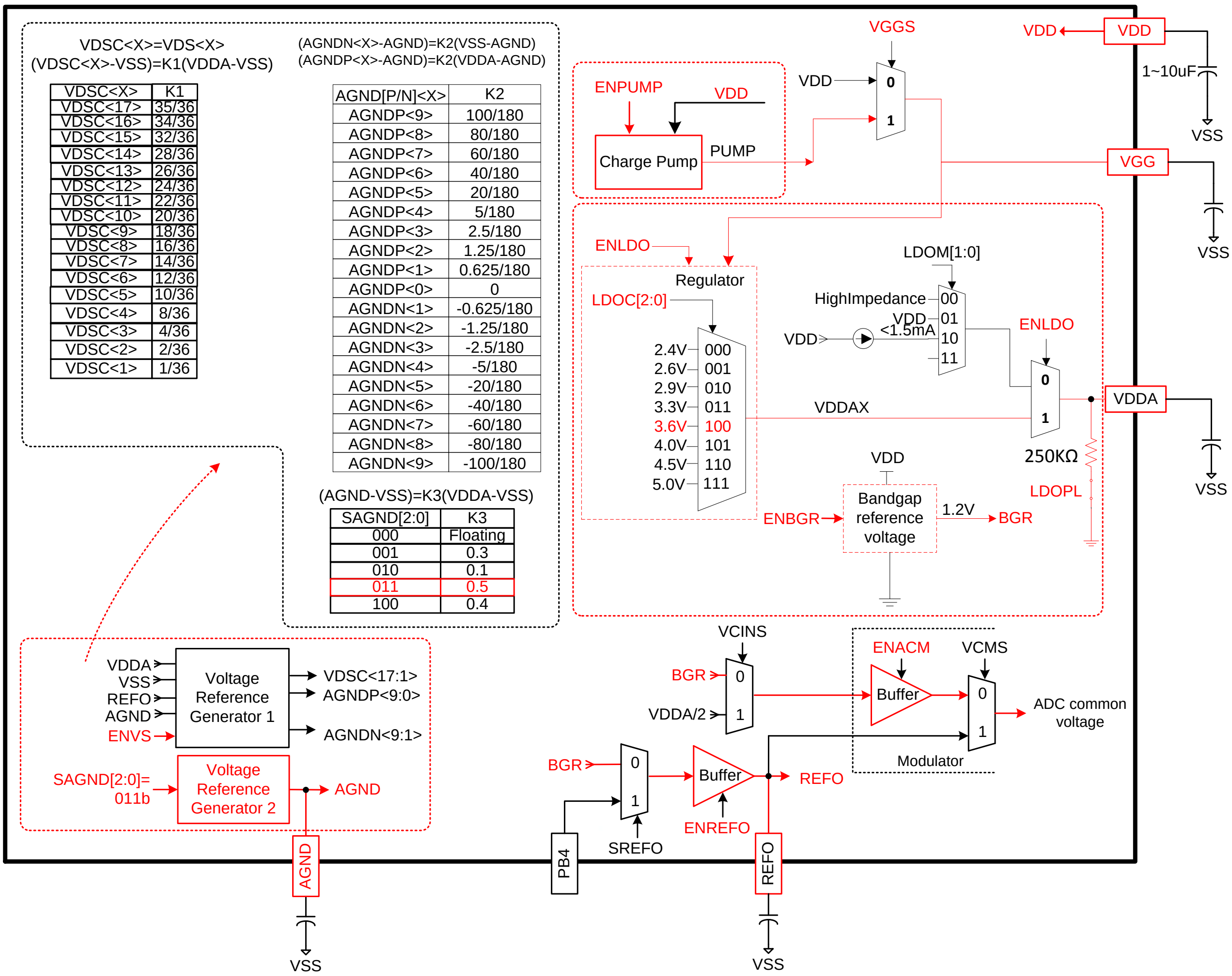
2.3.1. ADC Settings(AC Lower Range)



2.3.2. ADC Settings(AC Higher Range)



2.4. Current Function Power Supply Configuration



VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

3. Voltage

The voltage measurement needs to be attenuated by 10~10000 times before the voltage signal enters the ADC measurement loop.

The input voltage division formula of AC/DC voltage file is as follows:

$$6V_{\mathrm{Range}} \Rightarrow \mathrm{Vin} \times \frac{1.11\mathrm{M}\Omega}{1.11\mathrm{M}\Omega + 10\mathrm{M}\Omega} = \frac{\mathrm{Vin}}{10}$$

$$60V_{\mathrm{Range}} \Rightarrow \mathrm{Vin} \times \frac{101\mathrm{k}\Omega}{101\mathrm{k}\Omega + 10\mathrm{M}\Omega} = \frac{\mathrm{Vin}}{100}$$

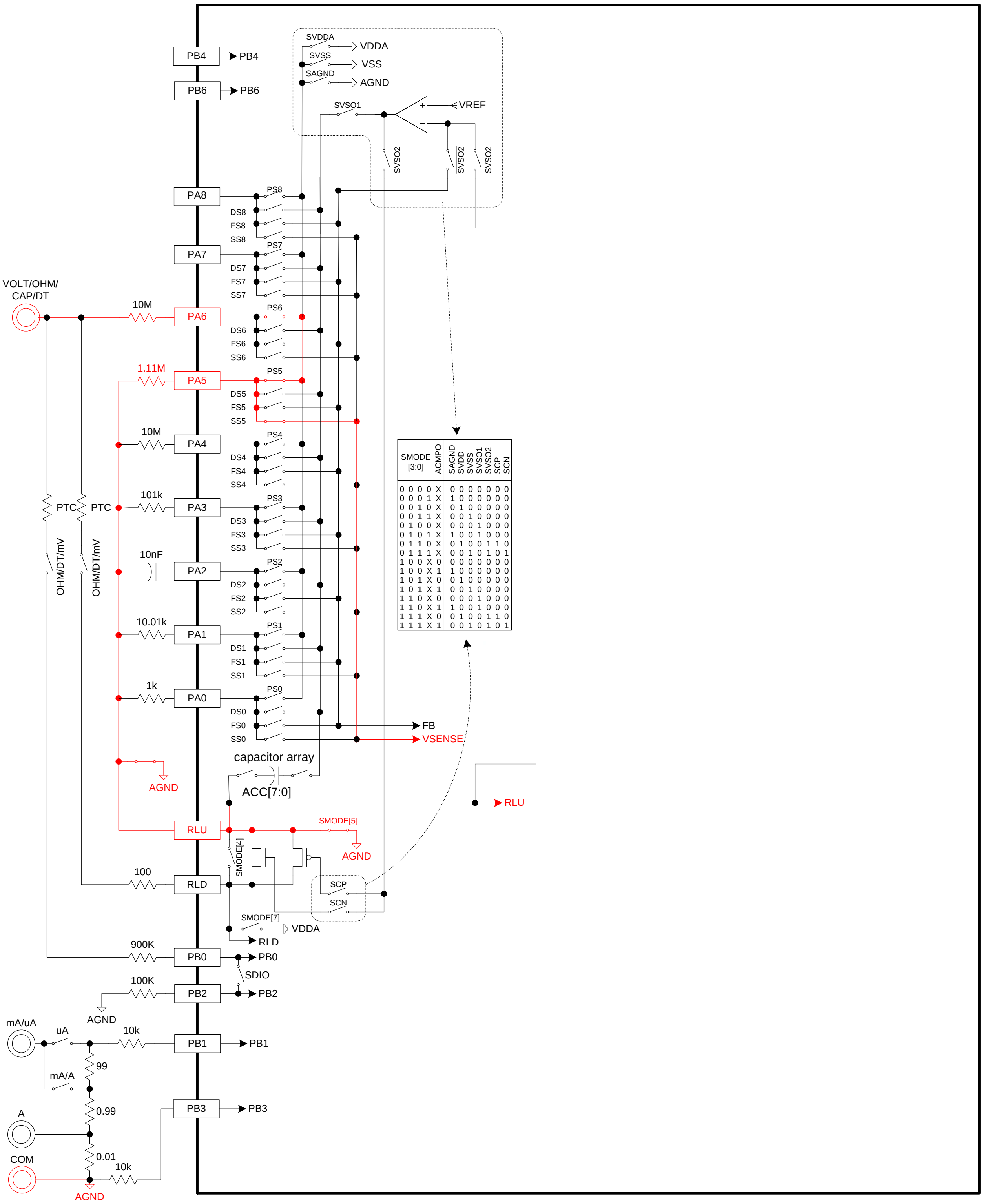
$$600V_{\mathrm{Range}} \Rightarrow \mathrm{Vin} \times \frac{10\mathrm{k}\Omega}{10\mathrm{k}\Omega + 10\mathrm{M}\Omega} = \frac{\mathrm{Vin}}{1000}$$

$$1000V_{\mathrm{Range}} \Rightarrow \mathrm{Vin} \times \frac{1\mathrm{k}\Omega}{1\mathrm{k}\Omega + 10\mathrm{M}\Omega} = \frac{\mathrm{Vin}}{10000}$$

The difference between DC and AC measurement is recommended to enable ADC Chopper function during DC measurement to reduce DC Offset and enable ADC Pre-Filter.

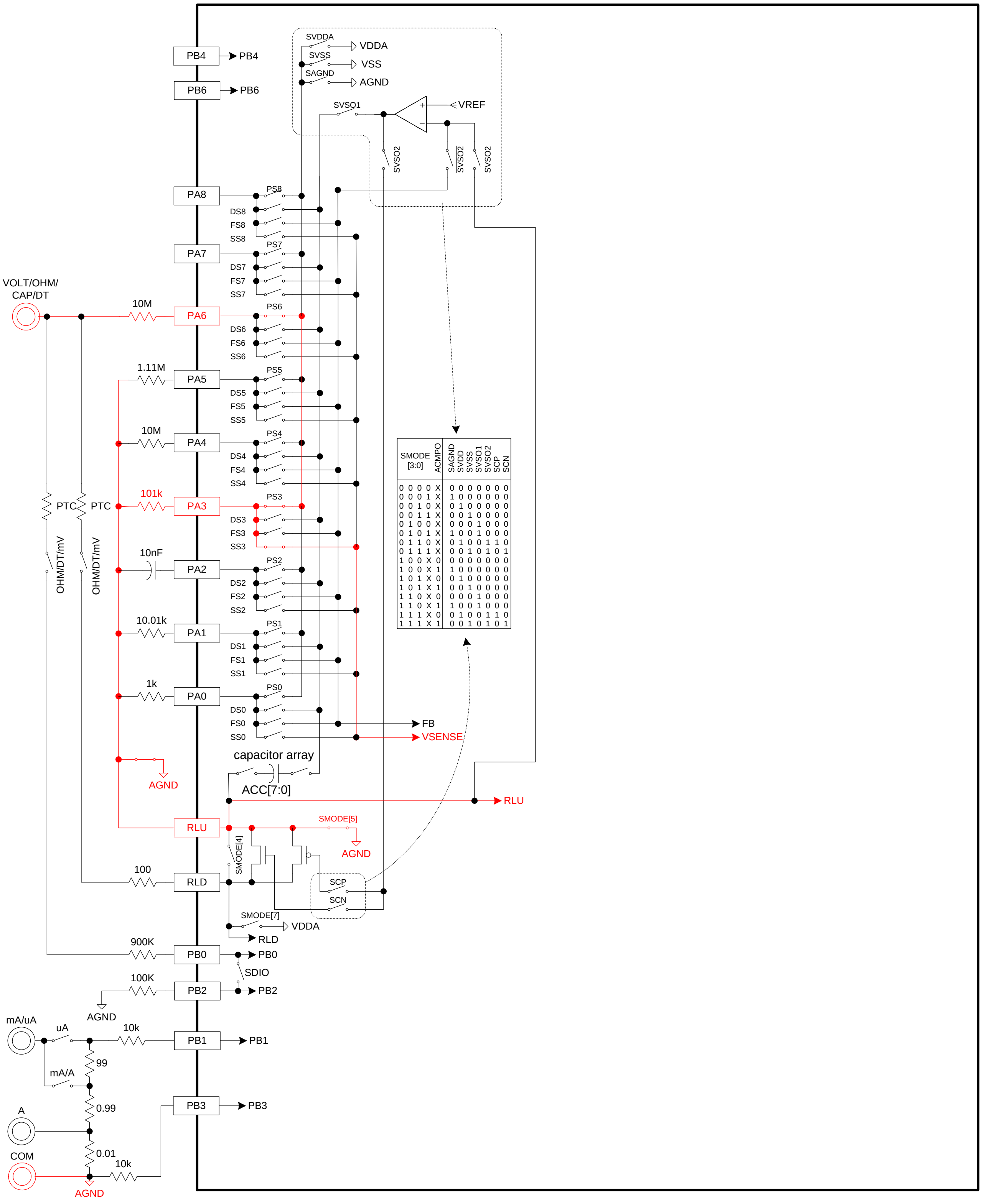
On the contrary, it is not necessary to turn on Chopper in AC measurement.

3.1. 6V Input Network Configuration



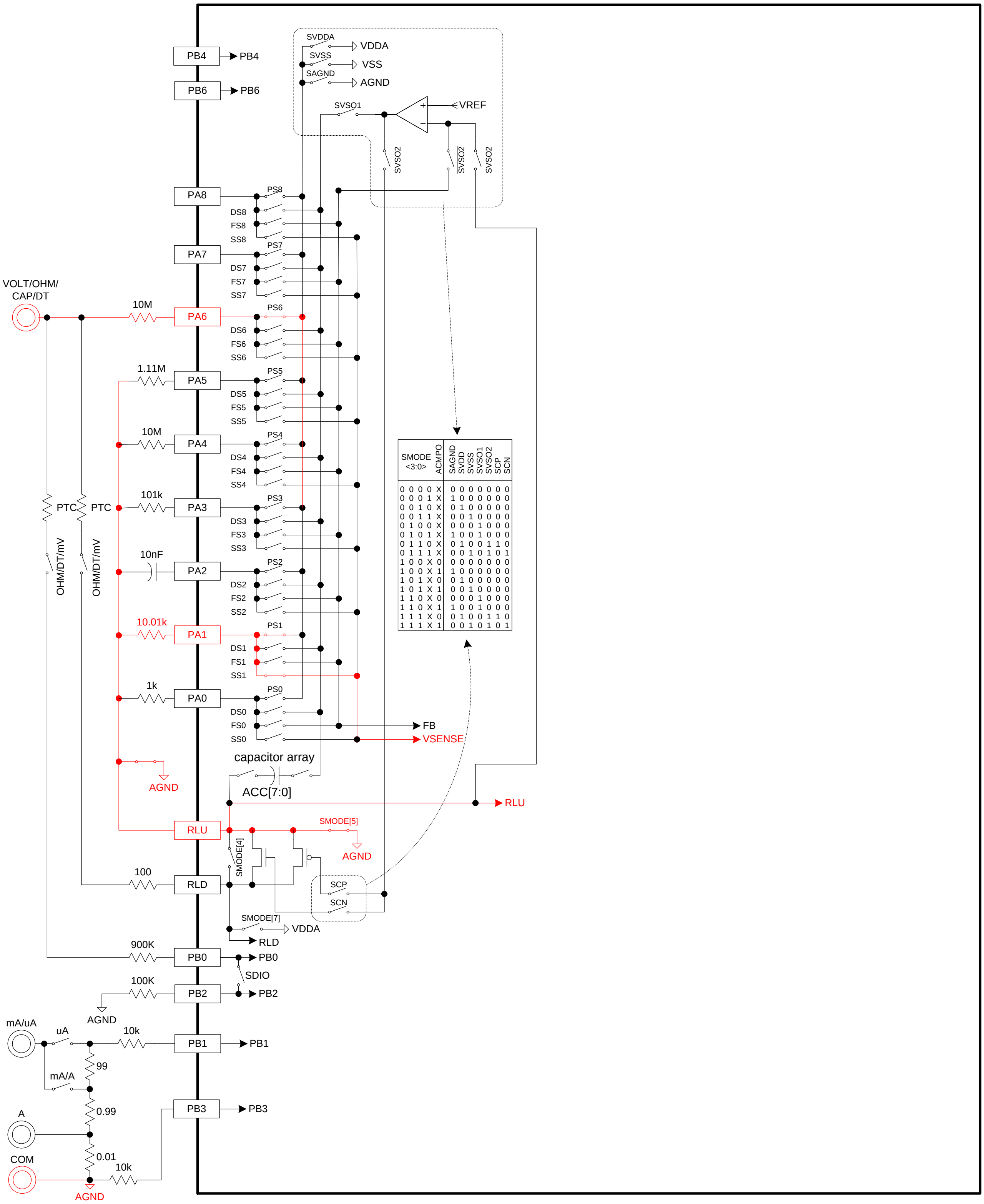
SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

3.2. 60V Input Network Configuration



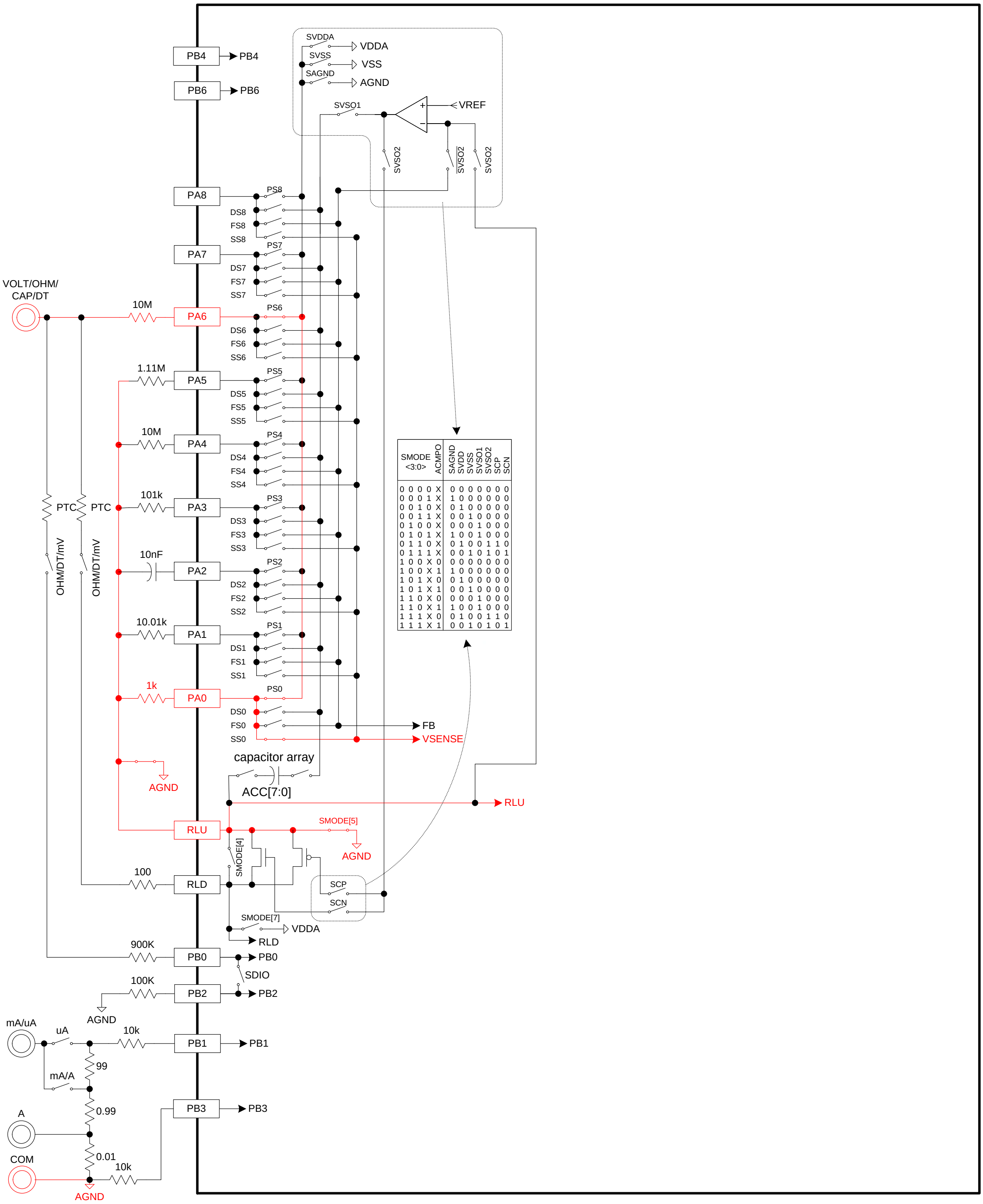
SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

3.3. 600V Input Network Configuration



SMODE <3:0>				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

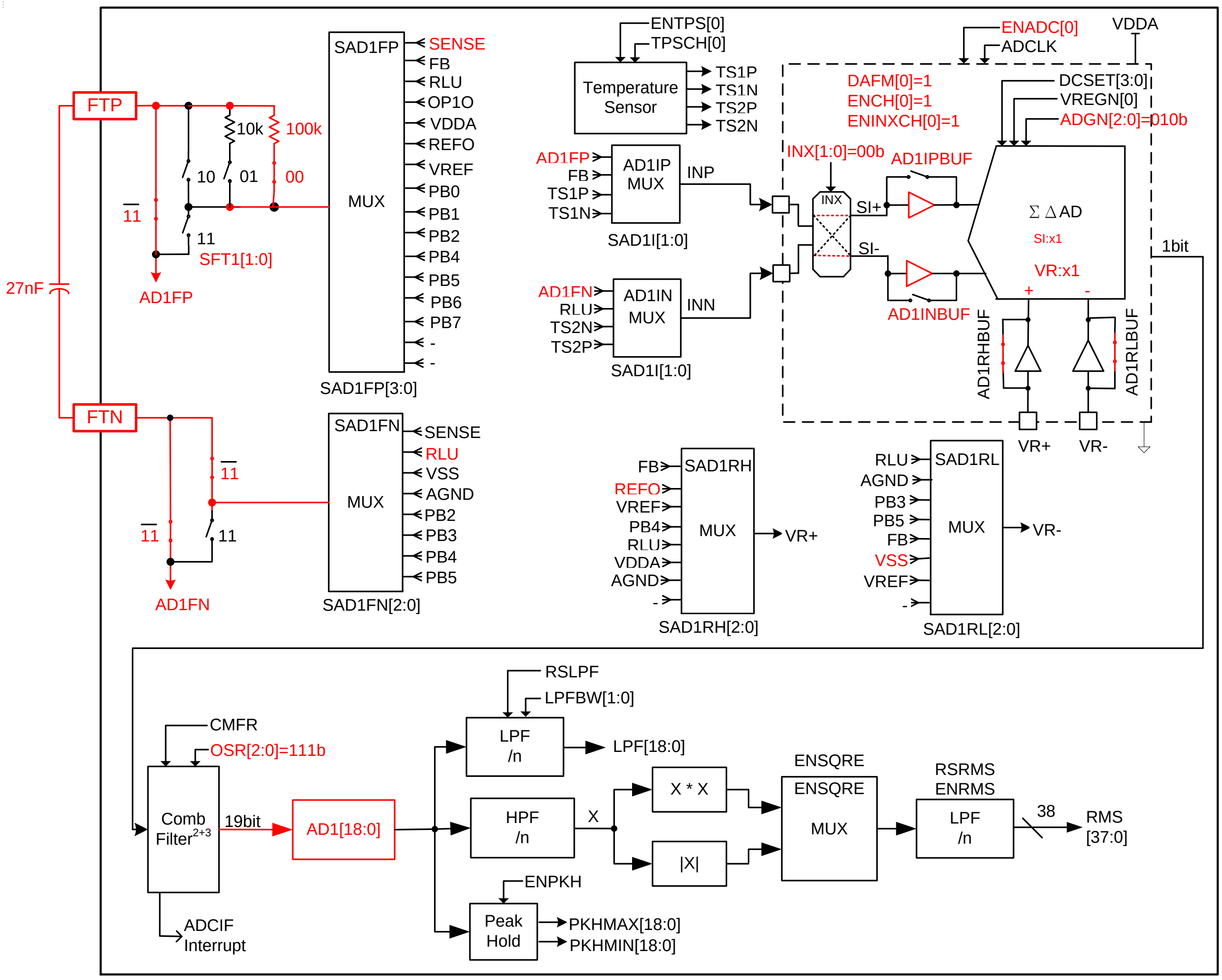
3.4. 1000V Input Network Configuration



SMODE <3:0>				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

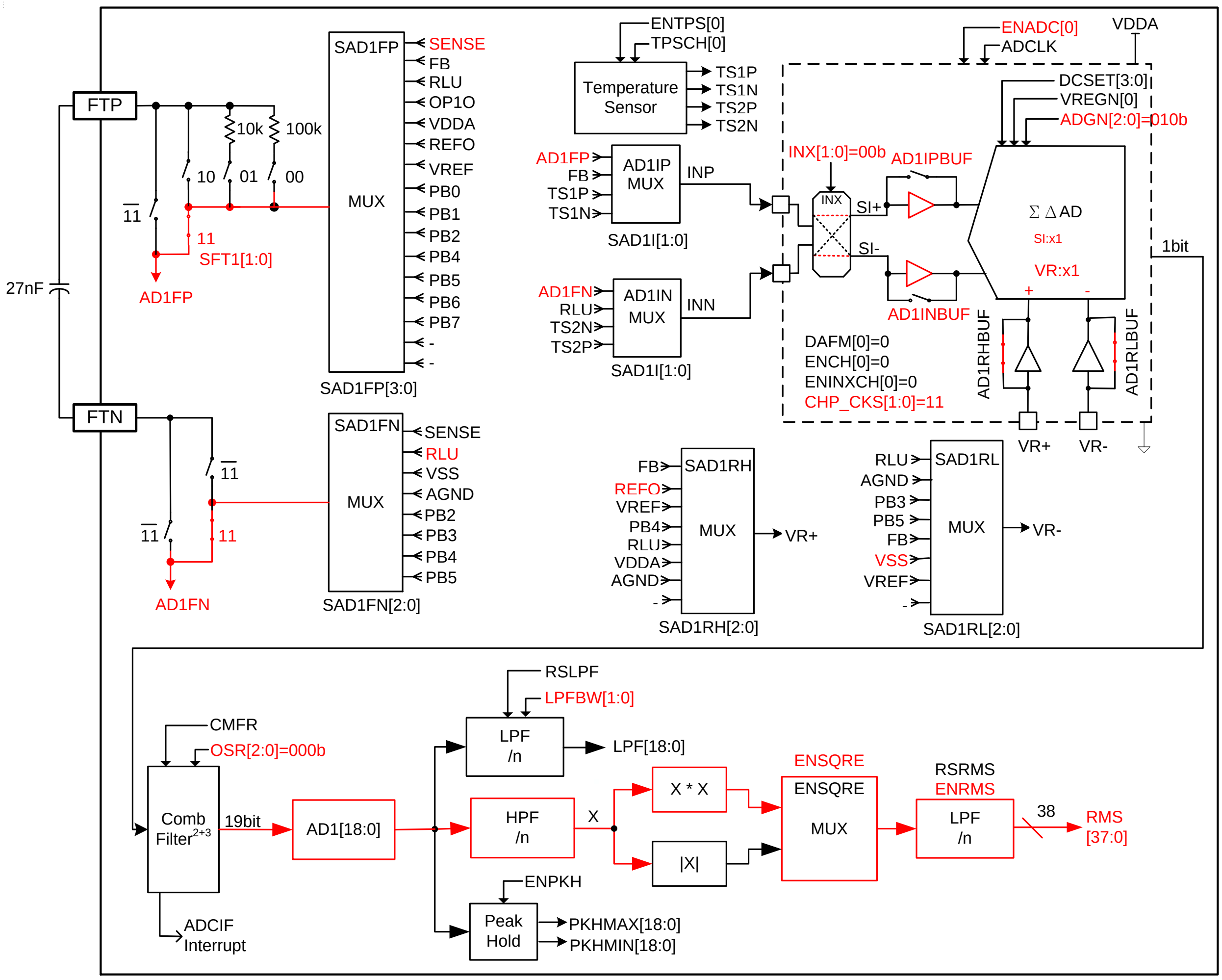
3.5. DCV Measurement Network Configuration

3.5.1. ADC Settings

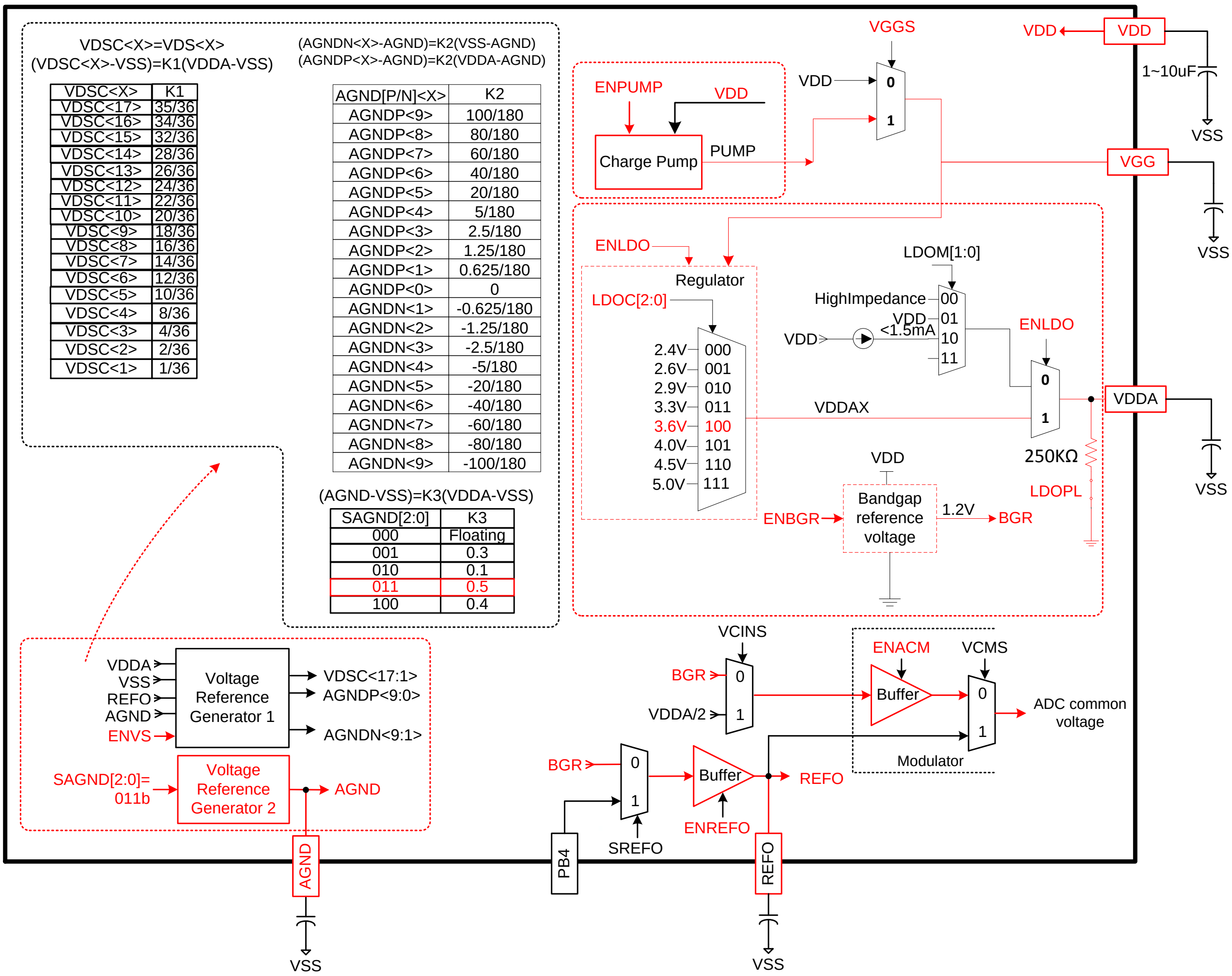


3.6. ACV Measurement Network Configuration

3.7. ADC Settings



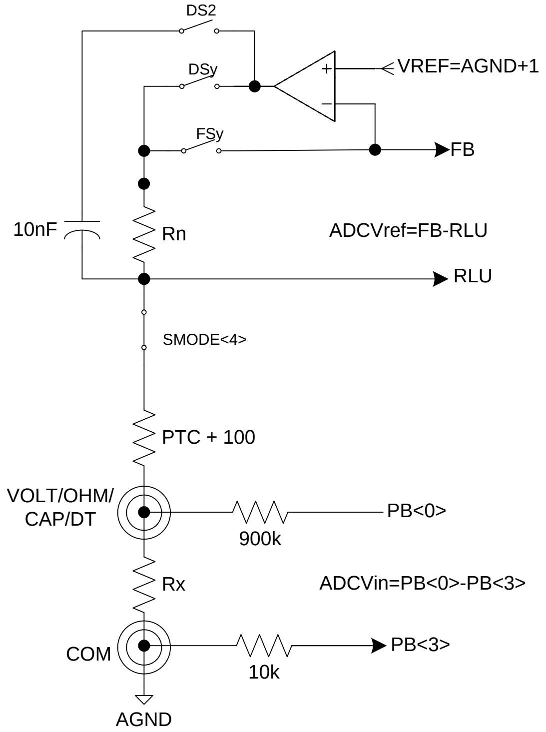
3.8. Voltage Function Power Supply Configuration



4. Resistor

The chip offers two ways to measure resistor, constant voltage and constant current measurement and different methods lead to diverse results. If the VREF used for output is AGNP or AGNDN, the ADC reference voltage must be REFO; otherwise, if the VREF used is VDSC, the ADC reference voltage must be VDDA.

Constant voltage or ratio resistor measurement, the formula is as follows:



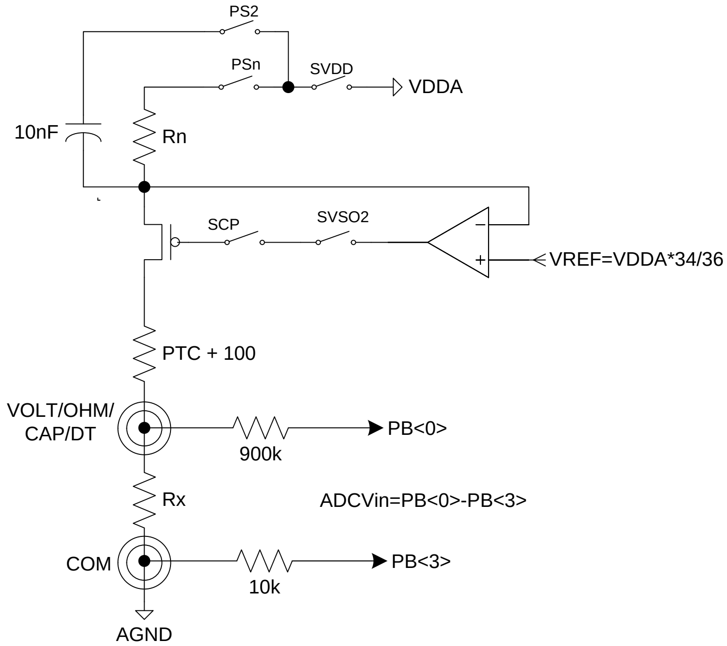
$$I_{Rx} = I_{Rn}$$

$$V_{Rx} = I_{Rx} \times R_x = \frac{V_{Rn}}{R_n} \times R_x$$

$$R_{Read} = \frac{V_{Rx}}{V_{Rn}} \times \text{Full Scale}$$

$$R_{Read} = \frac{ADCV_{in}}{ADCV_{ref}} \times \text{Full Scale}$$

Constant current measurement, the formula is as follows:

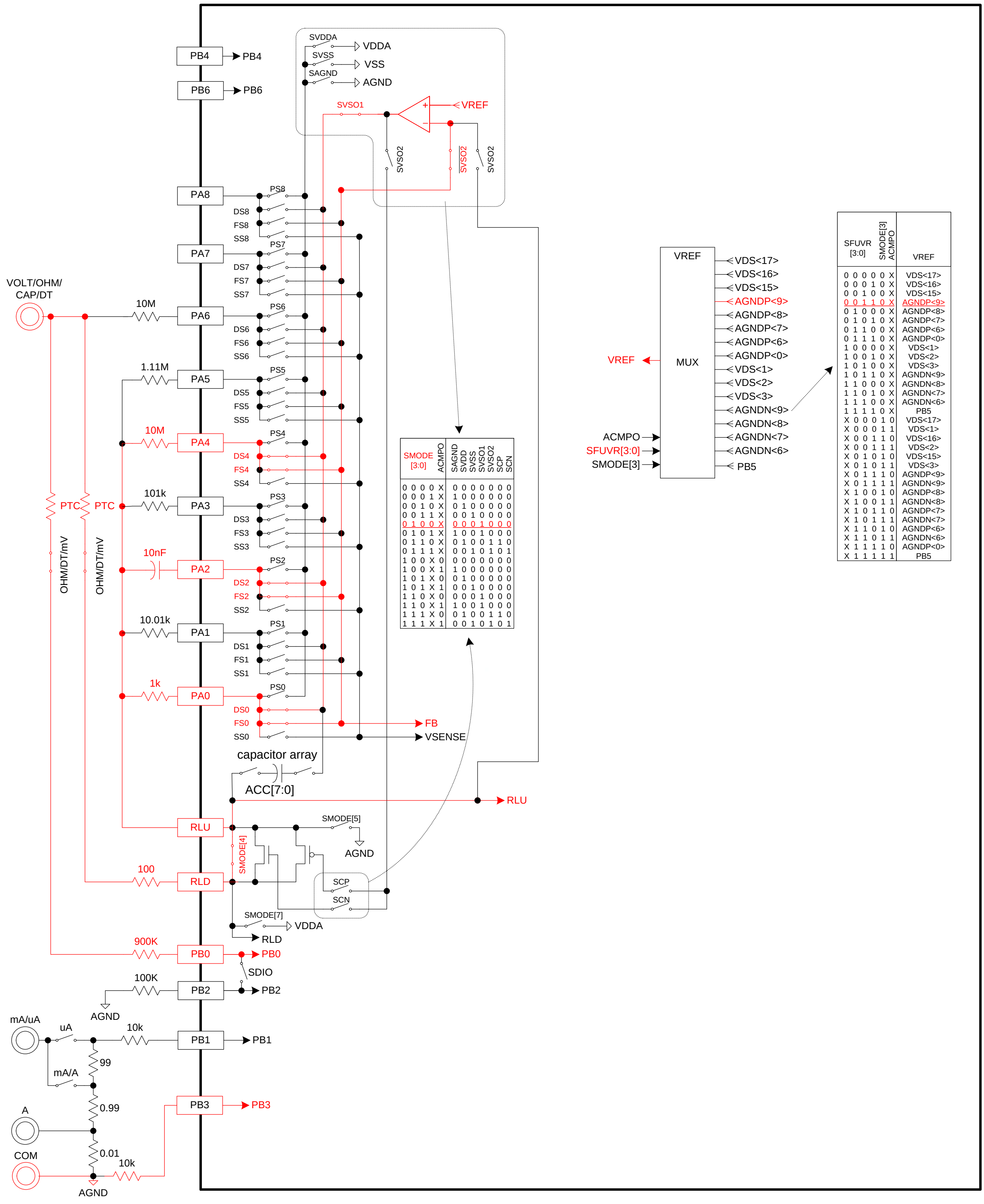


$$I_{Rx} = I_{Rn} = \frac{VDDA - VREF}{Rn}$$

$$R_{Read} = \frac{ADCV_{in}}{ADCV_{ref}} \times \text{Full Scale}$$

$$R_{Read} = \frac{Rx \times I_{Rx}}{ADCV_{ref}} \times \text{Full Scale}$$

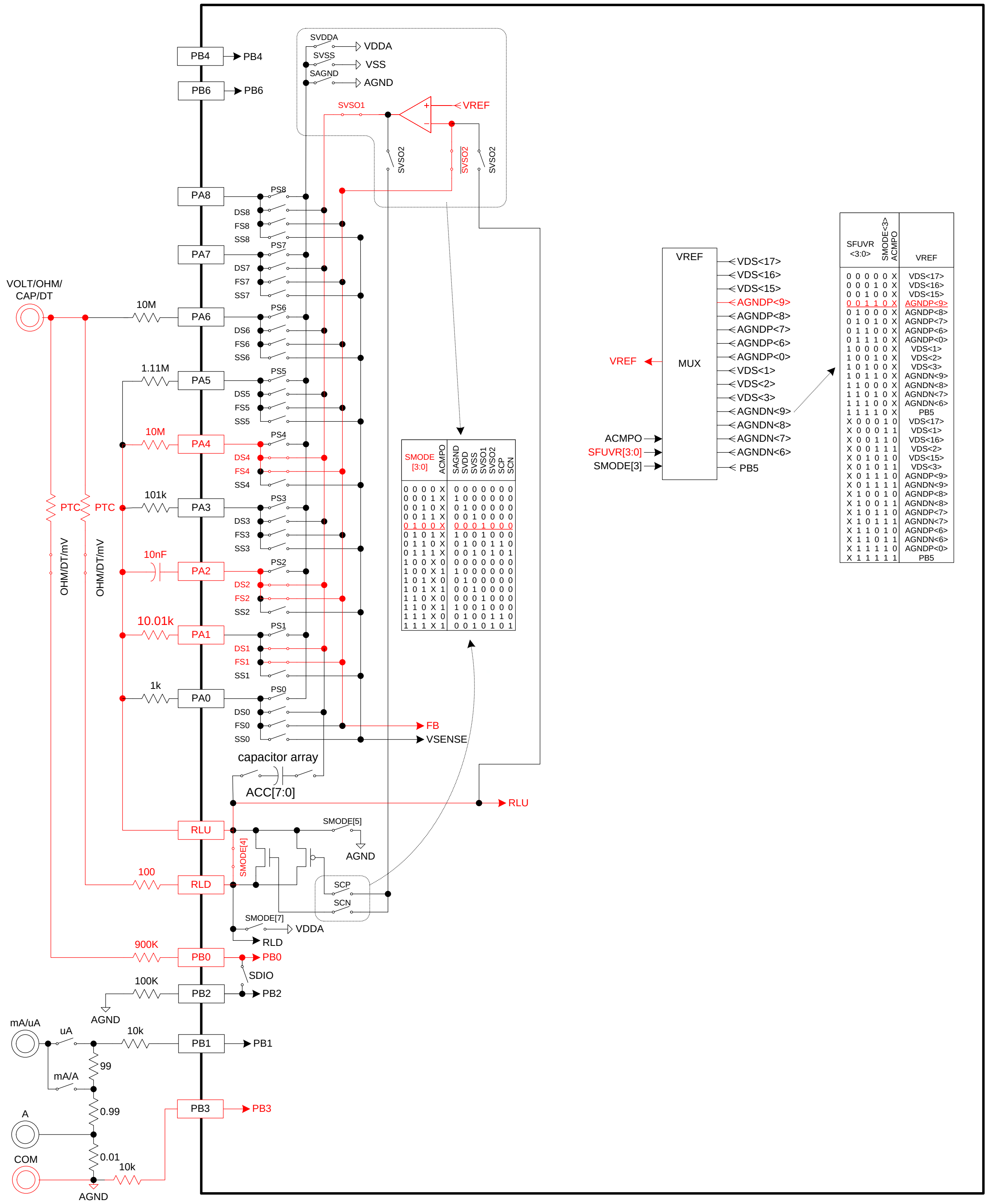
4.1. 600Ω Input Network Configuration



SMODE[3:0]	ACMPO	SAGND SVDD SVSS SVSO1 SVSO2 SCP SCN
0 0 0 0	X	0 0 0 0 0 0 0
0 0 0 1	X	1 0 0 0 0 0 0
0 0 1 0	X	0 1 0 0 0 0 0
0 0 1 1	X	0 0 1 0 0 0 0
0 1 0 0	X	0 0 0 1 0 0 0
0 1 0 1	X	1 0 0 1 0 0 0
0 1 1 0	X	0 1 0 0 1 1 0
0 1 1 1	X	0 0 1 0 1 0 1
1 0 0 X	0	0 0 0 0 0 0 0
1 0 0 X	1	1 0 0 0 0 0 0
1 0 1 X	0	0 1 0 0 0 0 0
1 0 1 X	1	0 0 1 0 0 0 0
1 1 0 X	0	0 0 0 1 0 0 0
1 1 0 X	1	1 0 0 1 0 0 0
1 1 1 X	0	0 1 0 0 1 1 0
1 1 1 X	1	0 0 1 0 1 0 1

SFUVR [3:0]	SMODE[3]	ACMPO	VREF
0 0 0 0	0	X	VDS<17>
0 0 0 1	0	X	VDS<16>
0 0 1 0	0	X	VDS<15>
0 0 1 1	0	X	AGNDP<9>
0 1 0 0	0	X	AGNDP<8>
0 1 0 1	0	X	AGNDP<7>
0 1 1 0	0	X	AGNDP<6>
0 1 1 1	0	X	AGNDP<0>
1 0 0 0	0	X	VDS<1>
1 0 0 1	0	X	VDS<2>
1 0 1 0	0	X	VDS<3>
1 0 1 1	0	X	AGNDN<9>
1 1 0 0	0	X	AGNDN<8>
1 1 0 1	0	X	AGNDN<7>
1 1 1 0	0	X	AGNDN<6>
1 1 1 1	0	X	PB5
X 0 0 0	1	0	VDS<17>
X 0 0 0	1	1	VDS<1>
X 0 0 1	1	0	VDS<16>
X 0 0 1	1	1	VDS<2>
X 0 1 0	1	0	VDS<15>
X 0 1 0	1	1	VDS<3>
X 0 1 1	1	0	AGNDP<9>
X 0 1 1	1	1	AGNDN<9>
X 1 0 0	1	0	AGNDP<8>
X 1 0 0	1	1	AGNDN<8>
X 1 0 1	1	0	AGNDP<7>
X 1 0 1	1	1	AGNDN<7>
X 1 1 0	1	0	AGNDP<6>
X 1 1 0	1	1	AGNDN<6>
X 1 1 1	1	0	AGNDP<0>
X 1 1 1	1	1	PB5

4.2. 6kΩ Input Network Configuration



SMODE[3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

SFUVR <3:0>				SMODE<3>	ACMPO	VREF
0	0	0	0	0	X	VDS<17>
0	0	0	1	0	X	VDS<16>
0	0	1	0	0	X	VDS<15>
0	0	1	1	0	X	AGNDP<9>
0	1	0	0	0	X	AGNDP<8>
0	1	0	1	0	X	AGNDP<7>
0	1	1	0	0	X	AGNDP<6>
0	1	1	1	0	X	AGNDP<0>
1	0	0	0	0	X	VDS<1>
1	0	0	1	0	X	VDS<2>
1	0	1	0	0	X	VDS<3>
1	0	1	1	0	X	AGNDN<9>
1	1	0	0	0	X	AGNDN<8>
1	1	0	1	0	X	AGNDN<7>
1	1	1	0	0	X	AGNDN<6>
1	1	1	1	0	X	PB5
X	0	0	0	1	0	VDS<17>
X	0	0	0	1	1	VDS<1>
X	0	0	1	1	0	VDS<16>
X	0	0	1	1	1	VDS<2>
X	0	1	0	1	0	VDS<15>
X	0	1	0	1	1	VDS<3>
X	0	1	1	1	0	AGNDP<9>
X	0	1	1	1	1	AGNDN<9>
X	1	0	0	1	0	AGNDP<8>
X	1	0	0	1	1	AGNDN<8>
X	1	0	1	1	0	AGNDP<7>
X	1	0	1	1	1	AGNDN<7>
X	1	1	0	1	0	AGNDP<6>
X	1	1	0	1	1	AGNDN<6>
X	1	1	1	1	0	AGNDP<0>
X	1	1	1	1	1	PB5

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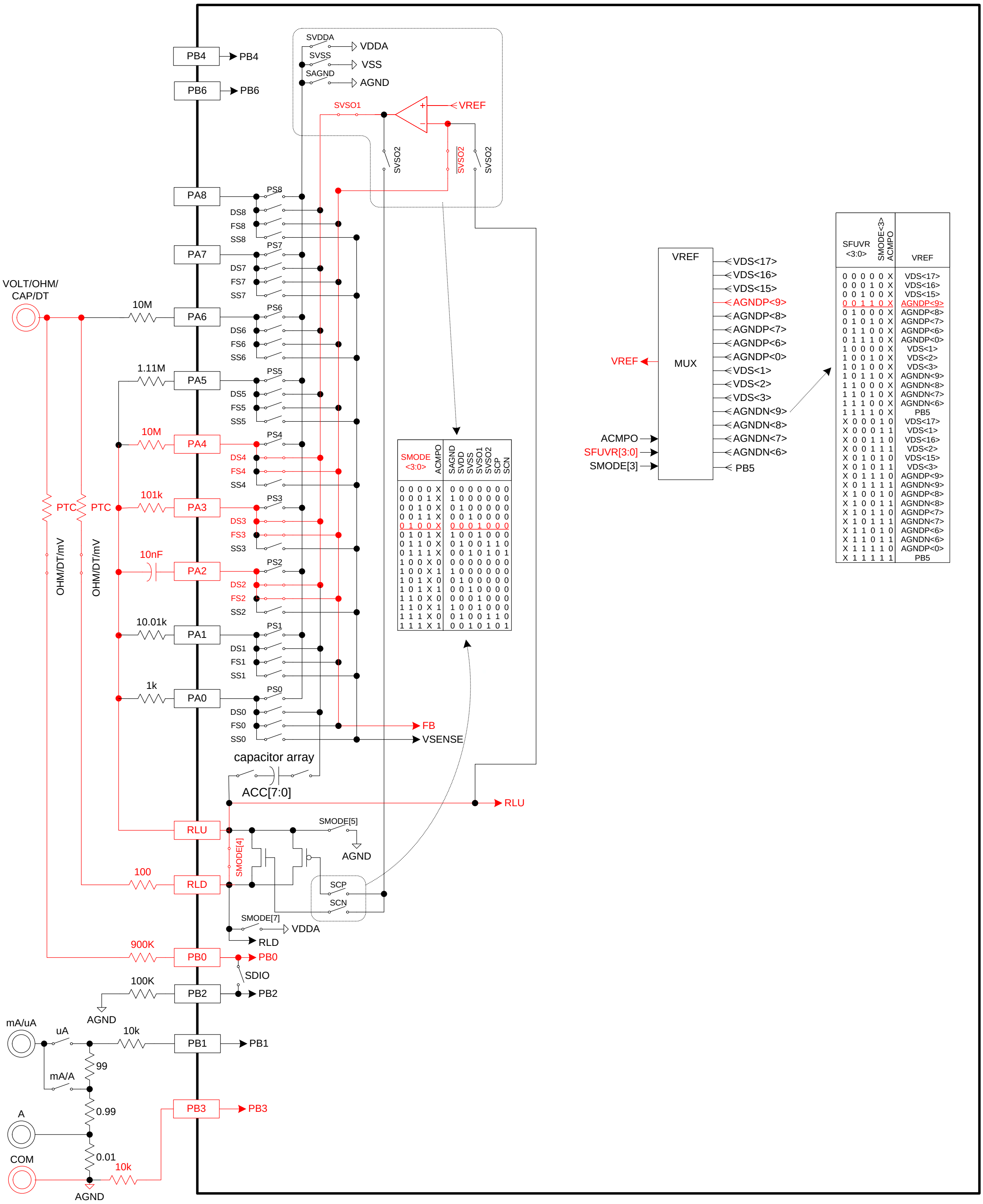
4.3. 60k Ω Input Network Configuration



SMODE<3:0>	ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0 0 0 0	X	0	0	0	0	0	0	0
0 0 0 1	X	1	0	0	0	0	0	0
0 0 1 0	X	0	1	0	0	0	0	0
0 0 1 1	X	0	0	1	0	0	0	0
0 1 0 0	X	0	0	0	1	0	0	0
0 1 0 1	X	1	0	0	1	0	0	0
0 1 1 0	X	0	1	0	0	1	1	0
0 1 1 1	X	0	0	1	0	1	0	1
1 0 0 X	0	0	0	0	0	0	0	0
1 0 0 X	1	1	0	0	0	0	0	0
1 0 1 X	0	0	1	0	0	0	0	0
1 0 1 X	1	0	0	1	0	0	0	0
1 1 0 X	0	0	0	0	1	0	0	0
1 1 0 X	1	1	0	0	1	0	0	0
1 1 1 X	0	0	1	0	0	1	1	0
1 1 1 X	1	0	0	1	0	1	0	1

SFUVR<3:0>	SMODE<3>	ACMPO	VREF
0 0 0 0	0	X	VDS<17>
0 0 0 1	0	X	VDS<16>
0 0 1 0	0	X	VDS<15>
0 0 1 1	0	X	AGNDP<9>
0 1 0 0	0	X	AGNDP<8>
0 1 0 1	0	X	AGNDP<7>
0 1 1 0	0	X	AGNDP<6>
0 1 1 1	0	X	AGNDP<0>
1 0 0 0	0	X	VDS<1>
1 0 0 1	0	X	VDS<2>
1 0 1 0	0	X	VDS<3>
1 0 1 1	0	X	AGNDN<9>
1 1 0 0	0	X	AGNDN<8>
1 1 0 1	0	X	AGNDN<7>
1 1 1 0	0	X	AGNDN<6>
1 1 1 1	0	X	PB5
X 0 0 0	1	0	VDS<17>
X 0 0 0	1	1	VDS<1>
X 0 0 1	1	0	VDS<16>
X 0 0 1	1	1	VDS<2>
X 0 1 0	1	0	VDS<15>
X 0 1 0	1	1	VDS<3>
X 0 1 1	1	0	AGNDP<9>
X 0 1 1	1	1	AGNDN<9>
X 1 0 0	1	0	AGNDP<8>
X 1 0 0	1	1	AGNDN<8>
X 1 0 1	1	0	AGNDP<7>
X 1 0 1	1	1	AGNDN<7>
X 1 1 0	1	0	AGNDP<6>
X 1 1 0	1	1	AGNDN<6>
X 1 1 1	1	0	AGNDP<0>
X 1 1 1	1	1	PB5

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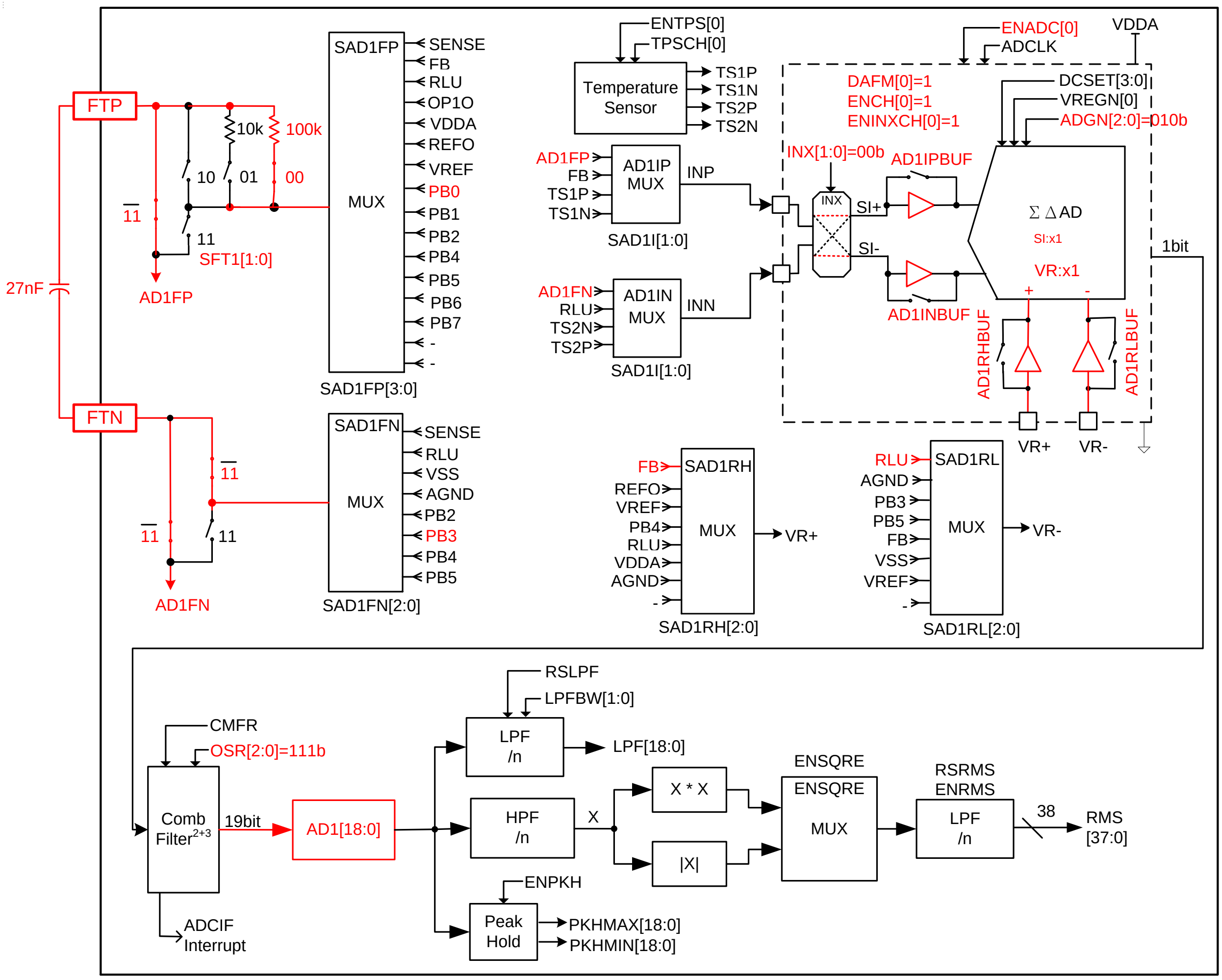
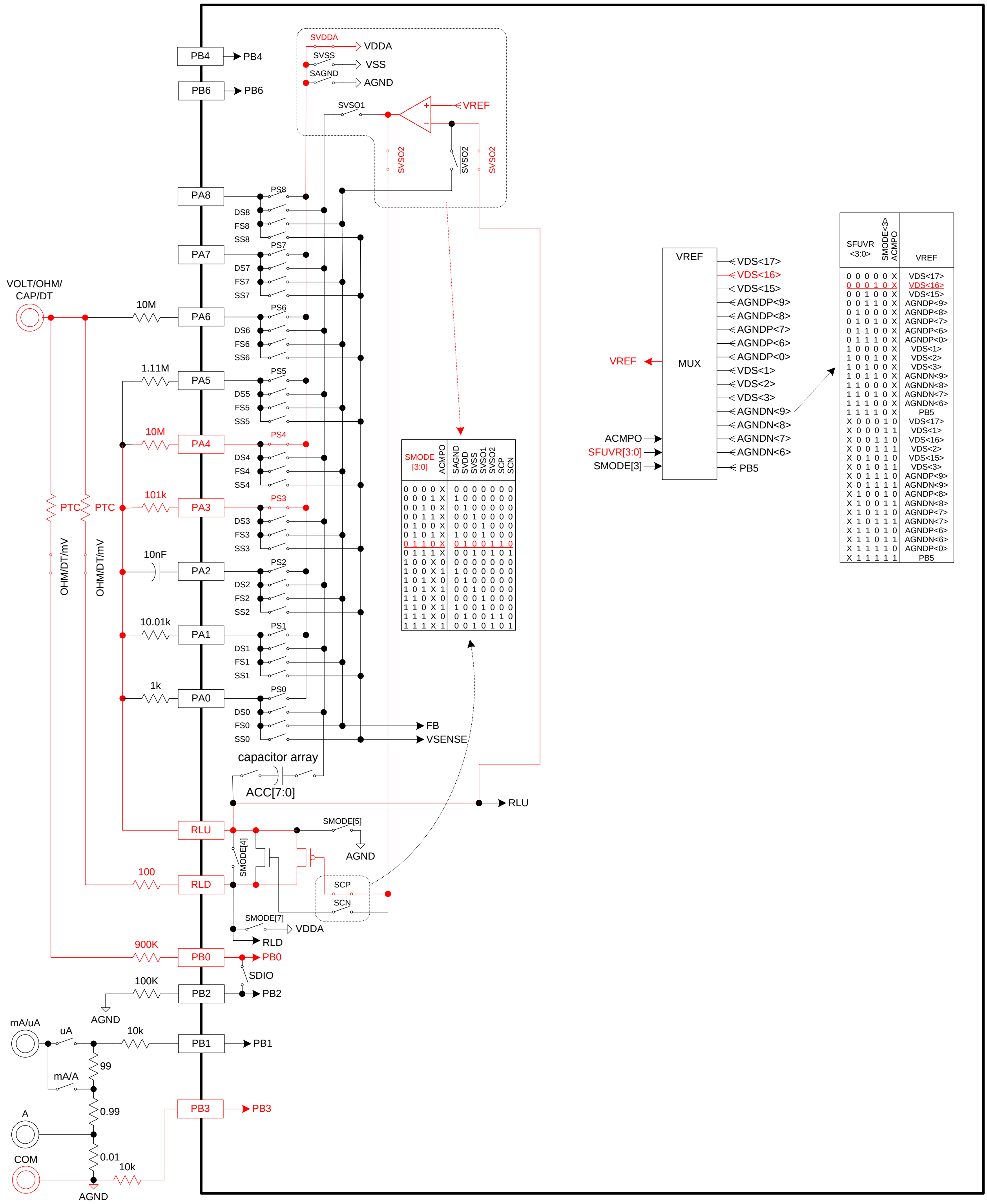
4.4. 600Ω~60kΩ Measurement Network Configuration



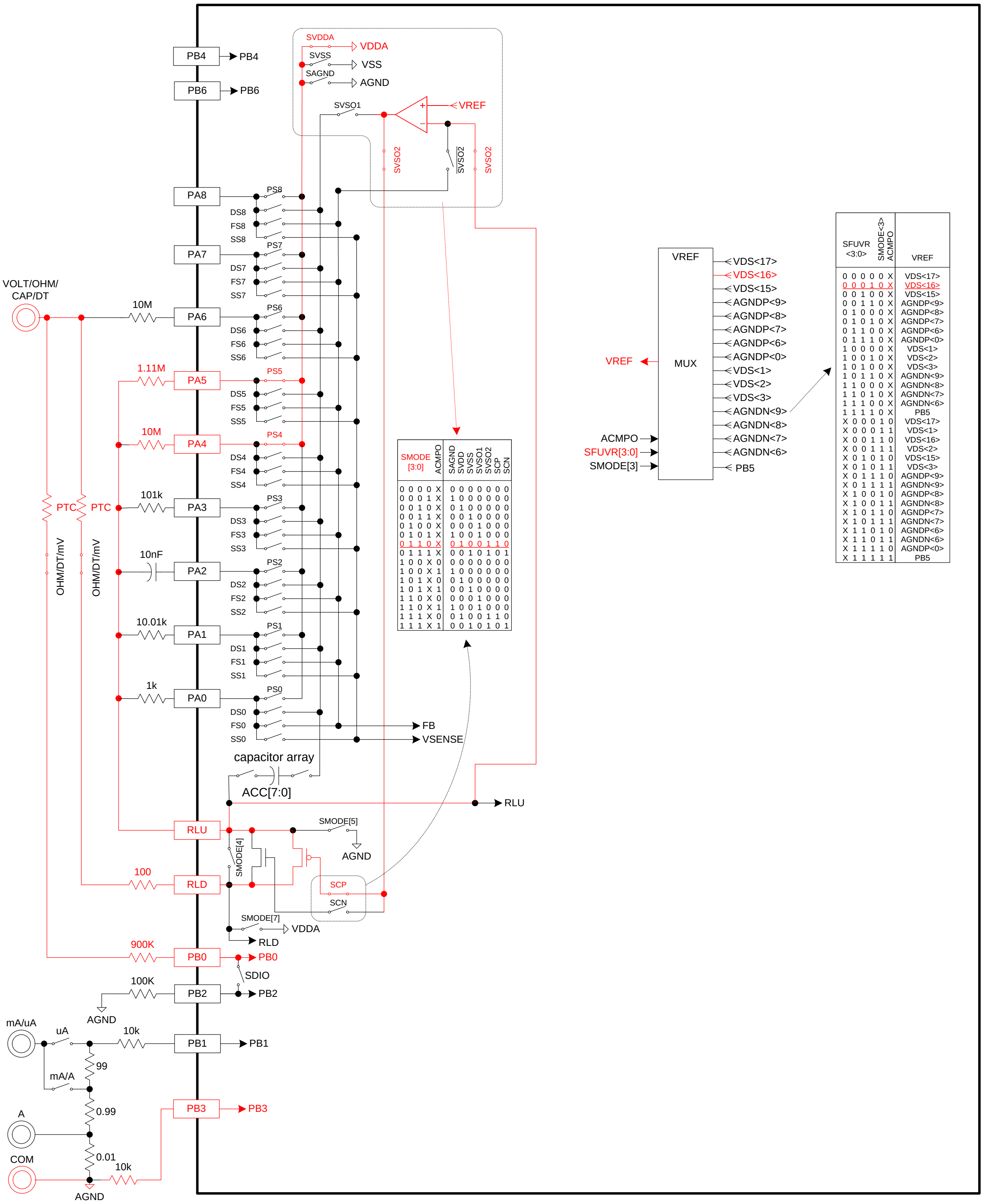
4.5. 600kΩ Input Network Configuration



SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

SFUVR <3:0>				SMODE<3>	ACMPO	VREF
0	0	0	0	0	X	VDS<17>
0	0	0	1	0	X	VDS<16>
0	0	1	0	0	X	VDS<15>
0	0	1	1	0	X	AGNDP<9>
0	1	0	0	0	X	AGNDP<8>
0	1	0	1	0	X	AGNDP<7>
0	1	1	0	0	X	AGNDP<6>
0	1	1	1	0	X	AGNDP<0>
1	0	0	0	0	X	VDS<1>
1	0	0	1	0	X	VDS<2>
1	0	1	0	0	X	VDS<3>
1	0	1	1	0	X	AGNDN<9>
1	1	0	0	0	X	AGNDN<8>
1	1	0	1	0	X	AGNDN<7>
1	1	1	0	0	X	AGNDN<6>
1	1	1	1	0	X	PB5
X	0	0	0	1	0	VDS<17>
X	0	0	0	1	1	VDS<1>
X	0	0	1	1	0	VDS<16>
X	0	0	1	1	1	VDS<2>
X	0	1	0	1	0	VDS<15>
X	0	1	0	1	1	VDS<3>
X	0	1	1	1	0	AGNDP<9>
X	0	1	1	1	1	AGNDN<9>
X	1	0	0	1	0	AGNDP<8>
X	1	0	0	1	1	AGNDN<8>
X	1	0	1	1	0	AGNDP<7>
X	1	0	1	1	1	AGNDN<7>
X	1	1	0	1	0	AGNDP<6>
X	1	1	0	1	1	AGNDN<6>
X	1	1	1	1	0	AGNDP<0>
X	1	1	1	1	1	PB5

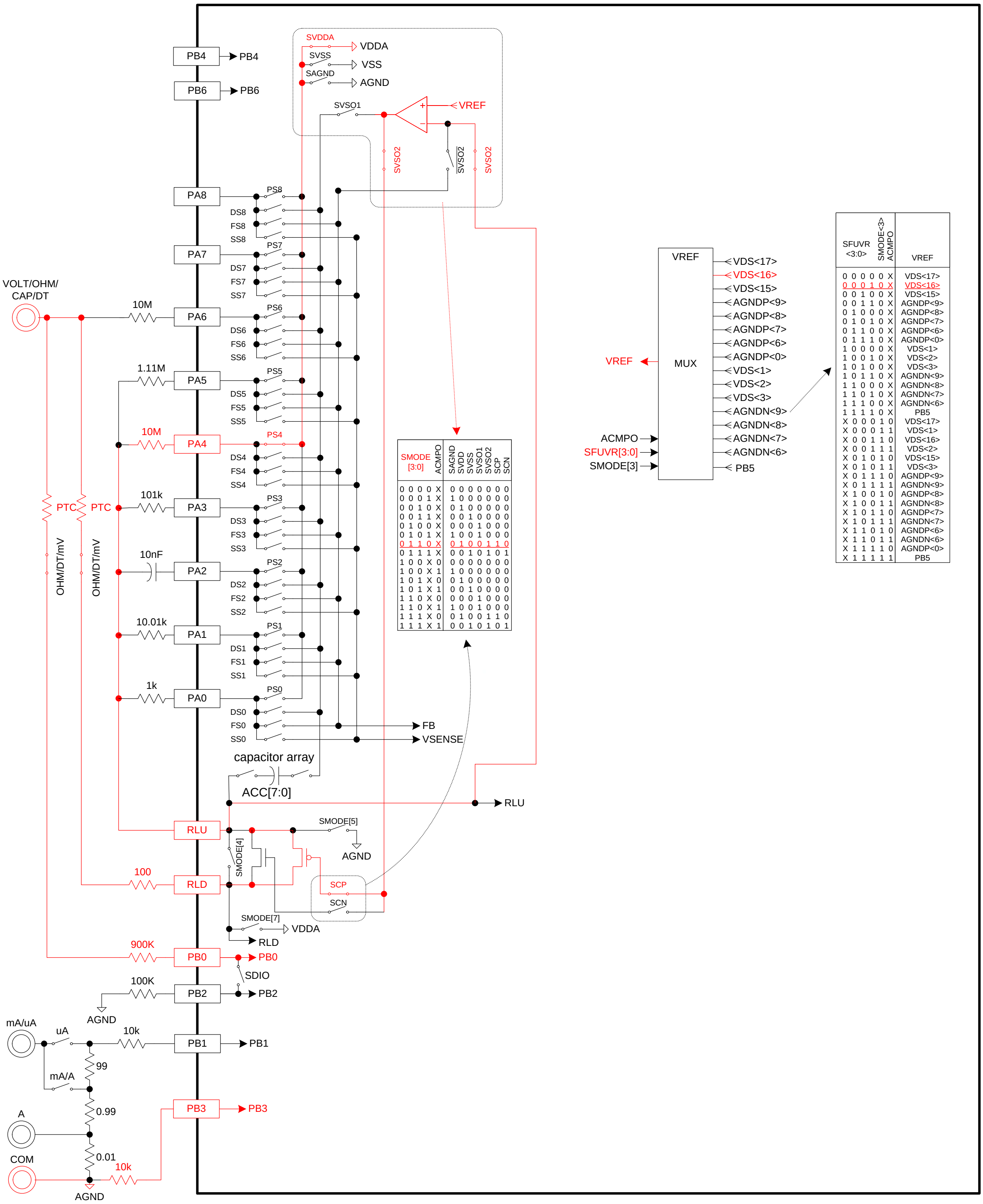
4.6. 6MΩ Input Network Configuration



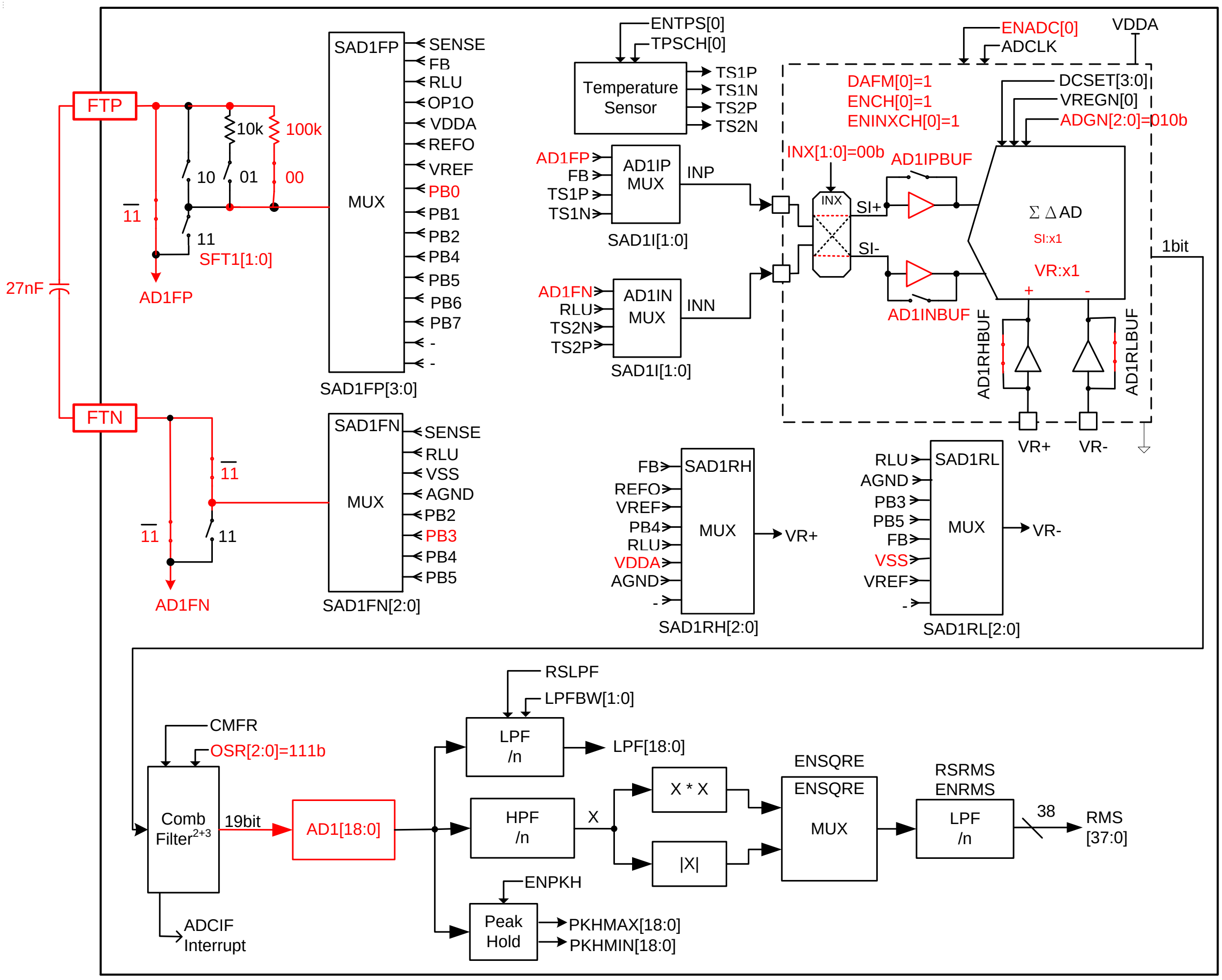
SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

SFUVR <3:0>				SMODE<3>	ACMPO	VREF
0	0	0	0	0	X	VDS<17>
0	0	0	1	0	X	VDS<16>
0	0	1	0	0	X	VDS<15>
0	0	1	1	0	X	AGNDP<9>
0	1	0	0	0	X	AGNDP<8>
0	1	0	1	0	X	AGNDP<7>
0	1	1	0	0	X	AGNDP<6>
0	1	1	1	0	X	AGNDP<0>
1	0	0	0	0	X	VDS<1>
1	0	0	1	0	X	VDS<2>
1	0	1	0	0	X	VDS<3>
1	0	1	1	0	X	AGNDN<9>
1	1	0	0	0	X	AGNDN<8>
1	1	0	1	0	X	AGNDN<7>
1	1	1	0	0	X	AGNDN<6>
1	1	1	1	0	X	PB5
X	0	0	0	1	0	VDS<17>
X	0	0	0	1	1	VDS<1>
X	0	0	1	1	0	VDS<16>
X	0	0	1	1	1	VDS<2>
X	0	1	0	1	0	VDS<15>
X	0	1	0	1	1	VDS<3>
X	0	1	1	1	0	AGNDP<9>
X	0	1	1	1	1	AGNDN<9>
X	1	0	0	1	0	AGNDP<8>
X	1	0	0	1	1	AGNDN<8>
X	1	0	1	1	0	AGNDP<7>
X	1	0	1	1	1	AGNDN<7>
X	1	1	0	1	0	AGNDP<6>
X	1	1	0	1	1	AGNDN<6>
X	1	1	1	1	0	AGNDP<0>
X	1	1	1	1	1	PB5

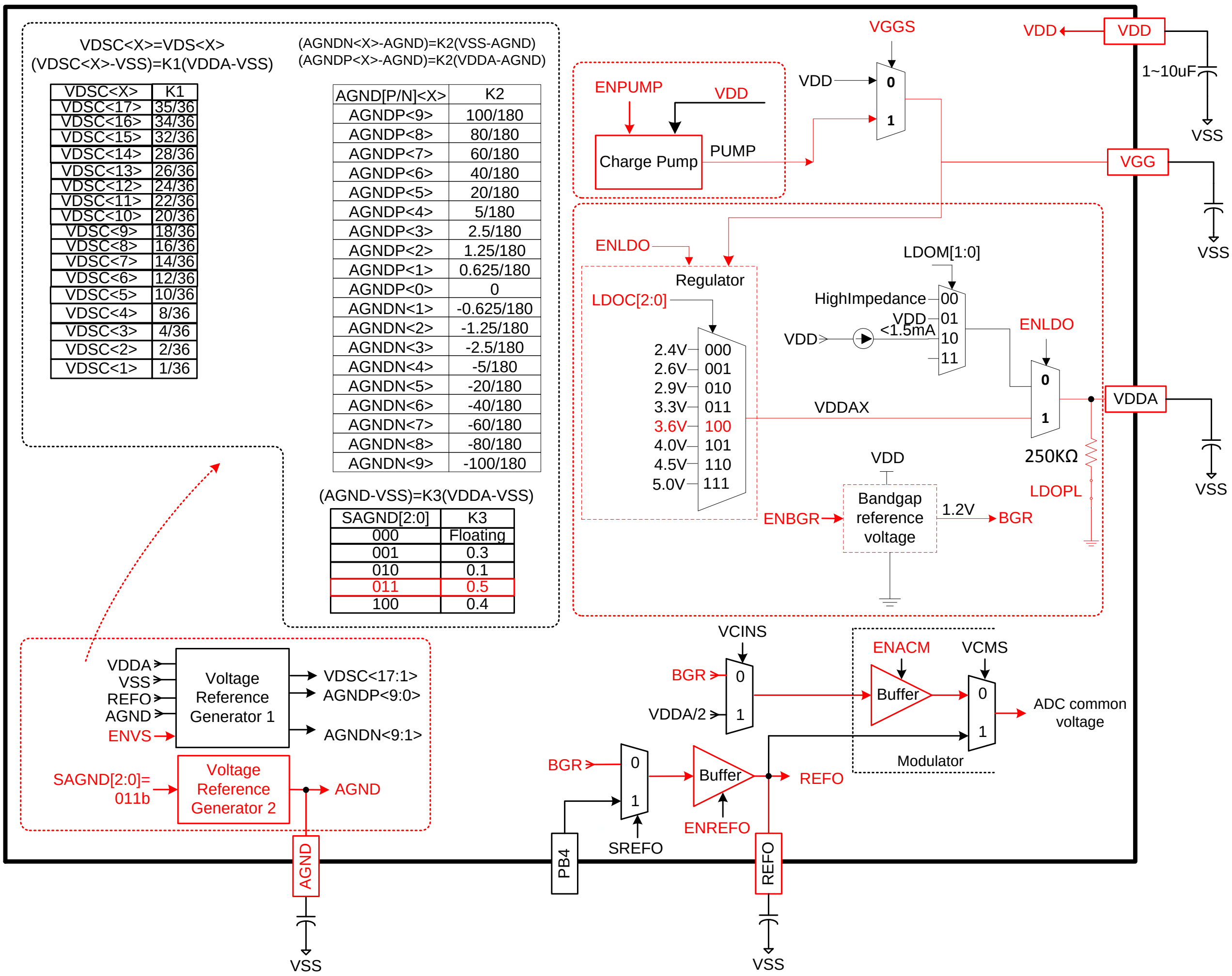
4.7. 60MΩ Input Network Configuration



4.8. 600kΩ~60MΩ Measurement Network Configuration



4.9. Resistor Function Power Supply Configuration



VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

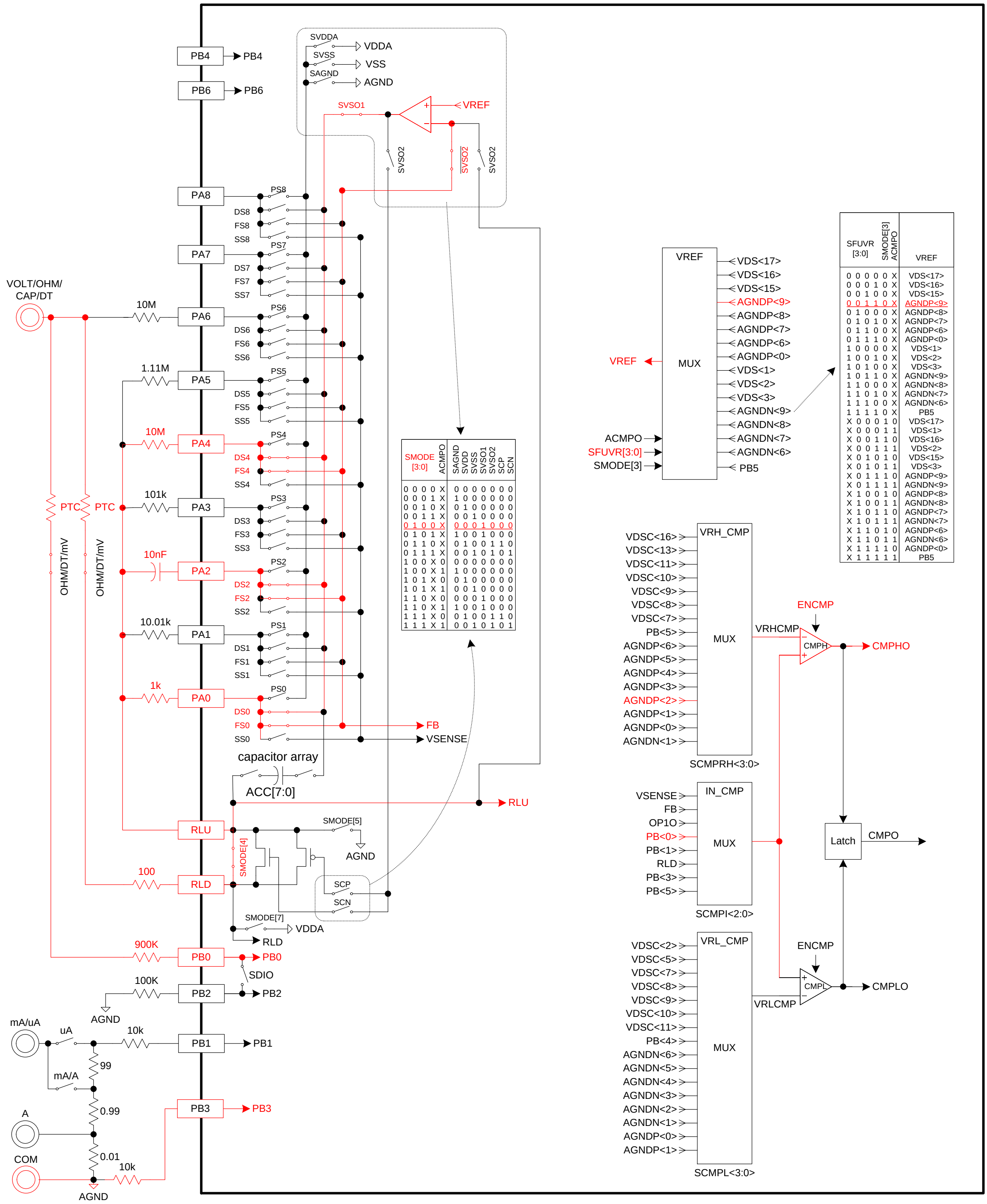
AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

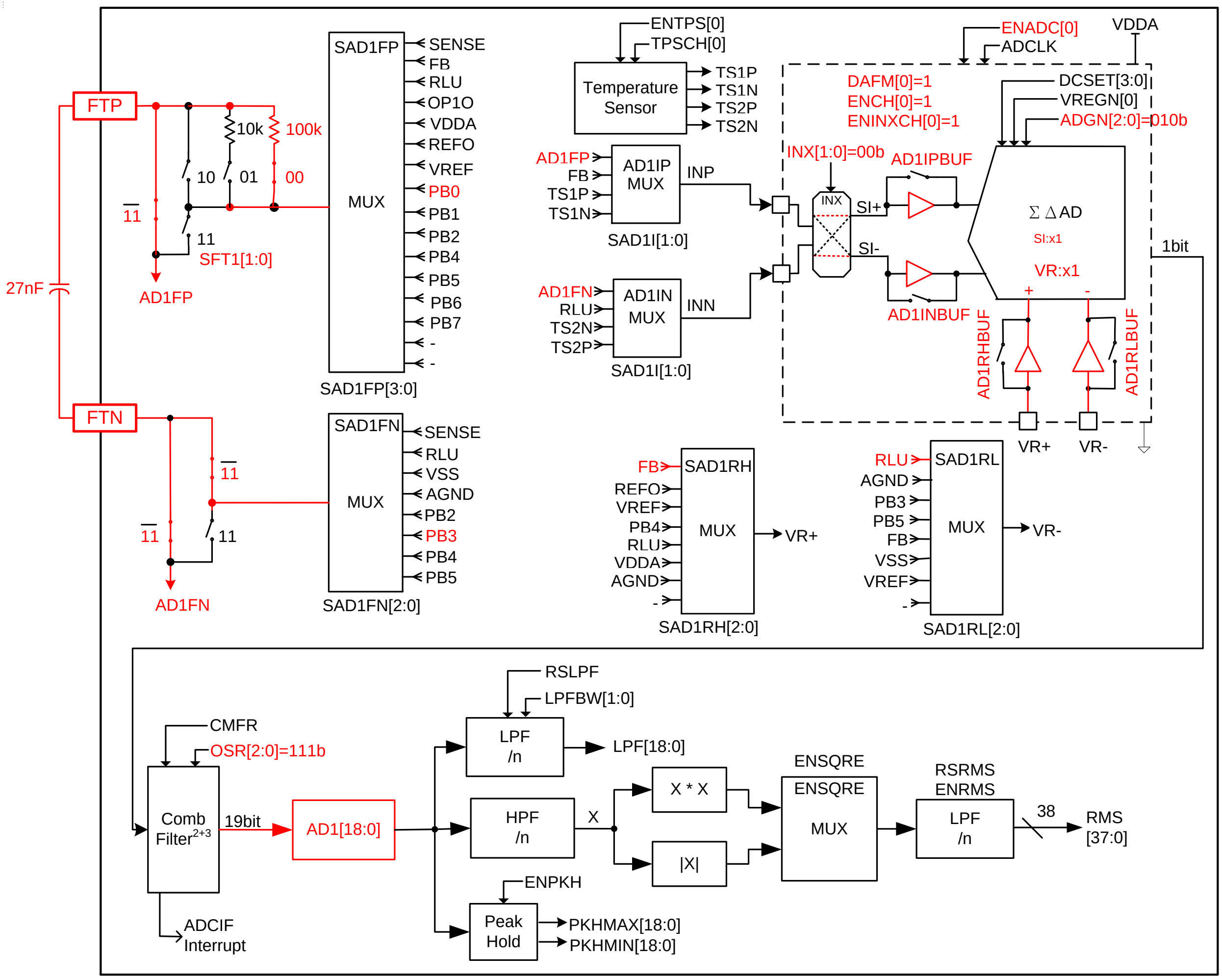
5. Continuity

Can use constant current or constant voltage output measurements. This case is positive constant voltage output measurement.

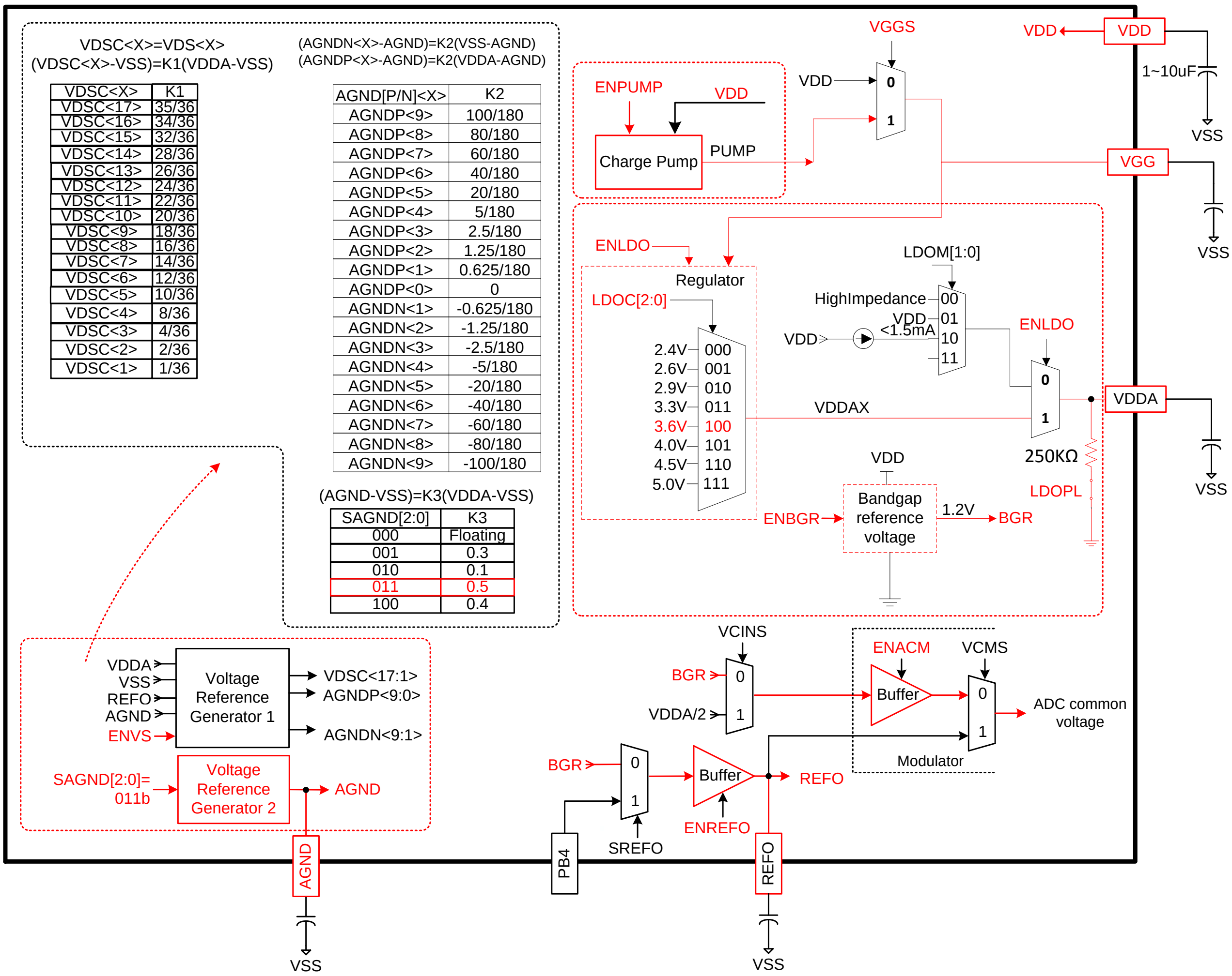
5.1. Continuity Input Network Configuration



5.2. Continuity Measurement Network Configuration



5.3. Continuity Function Power Supply Configuration



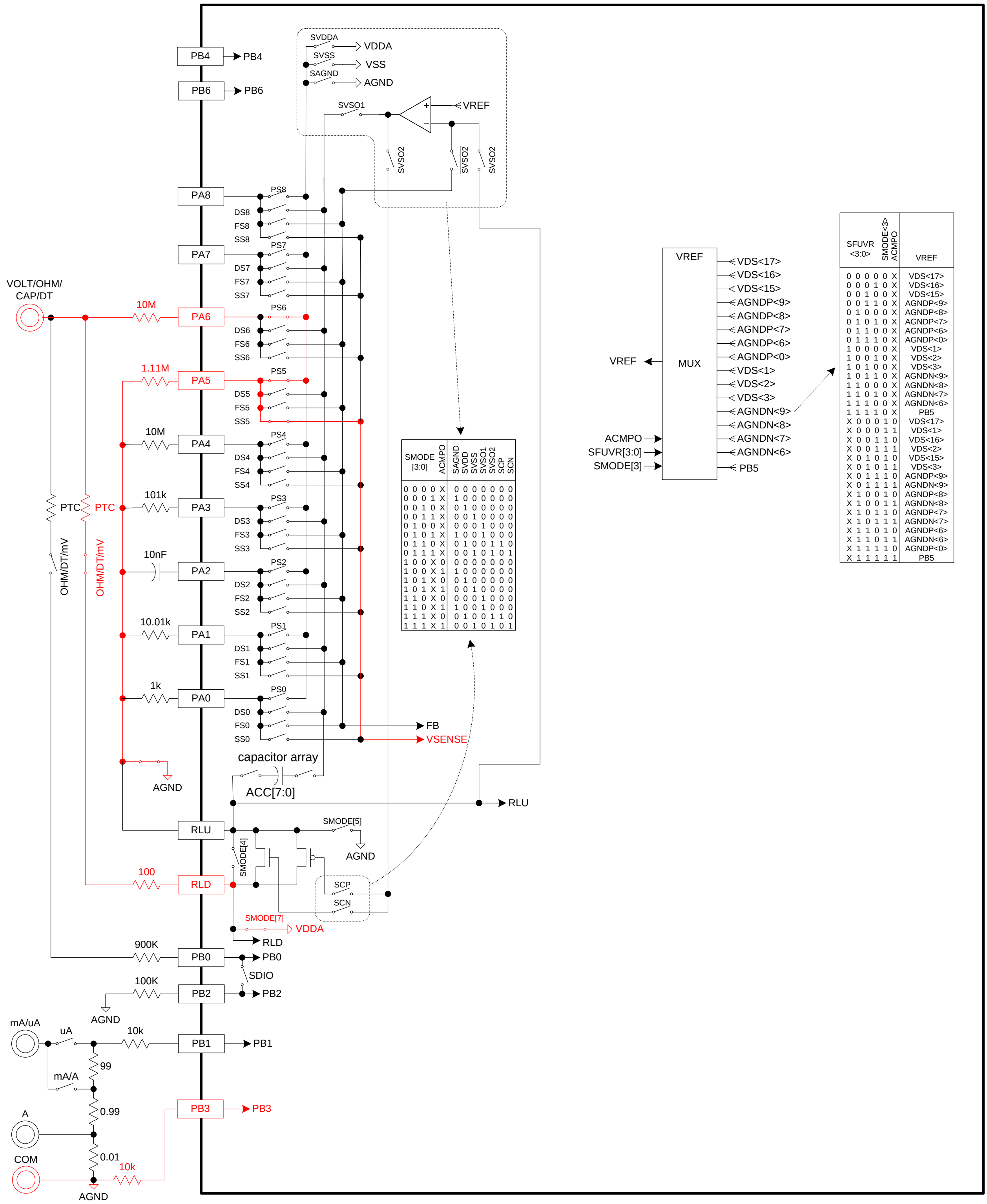
6. Diode

Diode function is to measure Forward Voltage or called PN Barrier Potential. This chip offers positive/negative constant current source or positive/negative constant voltage source measurement.

When constant current passed through diode, both edges of component will have voltage difference. The voltage is around 0.2V~1.5V, to prevent exceeding full scale. Thus, taking 900kΩ and 100kΩ to form 10 times attenuation.

6.1. Diode Input Network Configuration

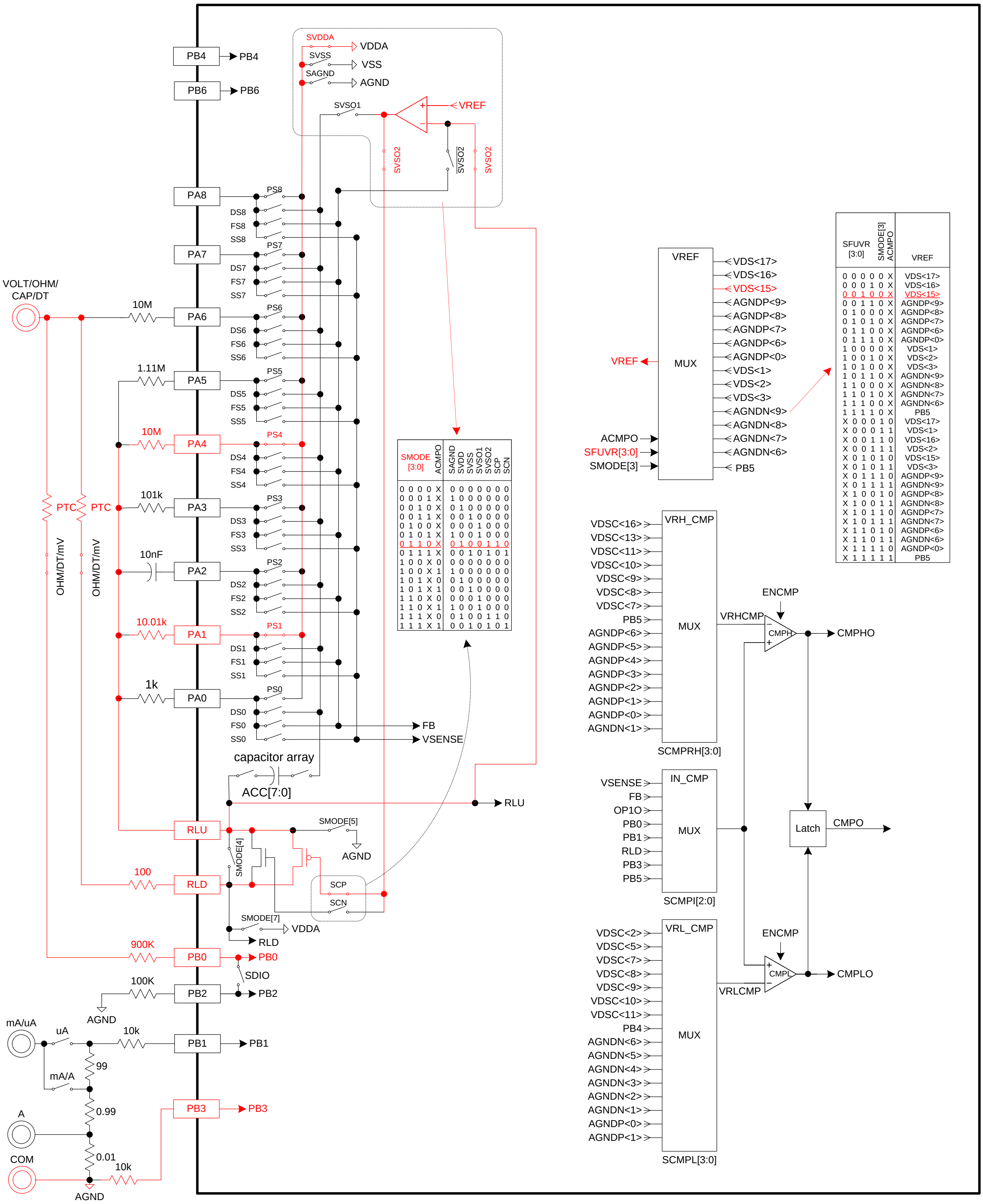
6.1.1. Positive Constant Voltage Source Network Configuration



SMODE [3:0]	ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0 0 0 0	X	0	0	0	0	0	0	0
0 0 0 1	X	1	0	0	0	0	0	0
0 0 1 0	X	0	1	0	0	0	0	0
0 0 1 1	X	0	0	1	0	0	0	0
0 1 0 0	X	0	0	0	1	0	0	0
0 1 0 1	X	1	0	0	1	0	0	0
0 1 1 0	X	0	1	0	0	1	1	0
0 1 1 1	X	0	0	1	0	1	0	1
1 0 0 X	0	0	0	0	0	0	0	0
1 0 0 X	1	1	0	0	0	0	0	0
1 0 1 X	0	0	1	0	0	0	0	0
1 0 1 X	1	0	0	1	0	0	0	0
1 1 0 X	0	0	0	0	1	0	0	0
1 1 0 X	1	1	0	0	1	0	0	0
1 1 1 X	0	0	1	0	0	1	1	0
1 1 1 X	1	0	0	1	0	1	0	1

SFUVR <3:0>	SMODE<3>	ACMPO	VREF
0 0 0 0	0	X	VDS<17>
0 0 0 1	0	X	VDS<16>
0 0 1 0	0	X	VDS<15>
0 0 1 1	0	X	AGNDP<9>
0 1 0 0	0	X	AGNDP<8>
0 1 0 1	0	X	AGNDP<7>
0 1 1 0	0	X	AGNDP<6>
0 1 1 1	0	X	AGNDP<0>
1 0 0 0	0	X	VDS<1>
1 0 0 1	0	X	VDS<2>
1 0 1 0	0	X	VDS<3>
1 0 1 1	0	X	AGNDN<9>
1 1 0 0	0	X	AGNDN<8>
1 1 0 1	0	X	AGNDN<7>
1 1 1 0	0	X	AGNDN<6>
1 1 1 1	0	X	PB5
X 0 0 0	1	0	VDS<17>
X 0 0 0	1	1	VDS<1>
X 0 0 1	1	0	VDS<16>
X 0 0 1	1	1	VDS<2>
X 0 1 0	1	0	VDS<15>
X 0 1 0	1	1	VDS<3>
X 0 1 1	1	0	AGNDP<9>
X 0 1 1	1	1	AGNDN<9>
X 1 0 0	1	0	AGNDP<8>
X 1 0 0	1	1	AGNDN<8>
X 1 0 1	1	0	AGNDP<7>
X 1 0 1	1	1	AGNDN<7>
X 1 1 0	1	0	AGNDP<6>
X 1 1 0	1	1	AGNDN<6>
X 1 1 1	1	0	AGNDP<0>
X 1 1 1	1	1	PB5

6.1.2. Positive Constant Current Source Network Configuration

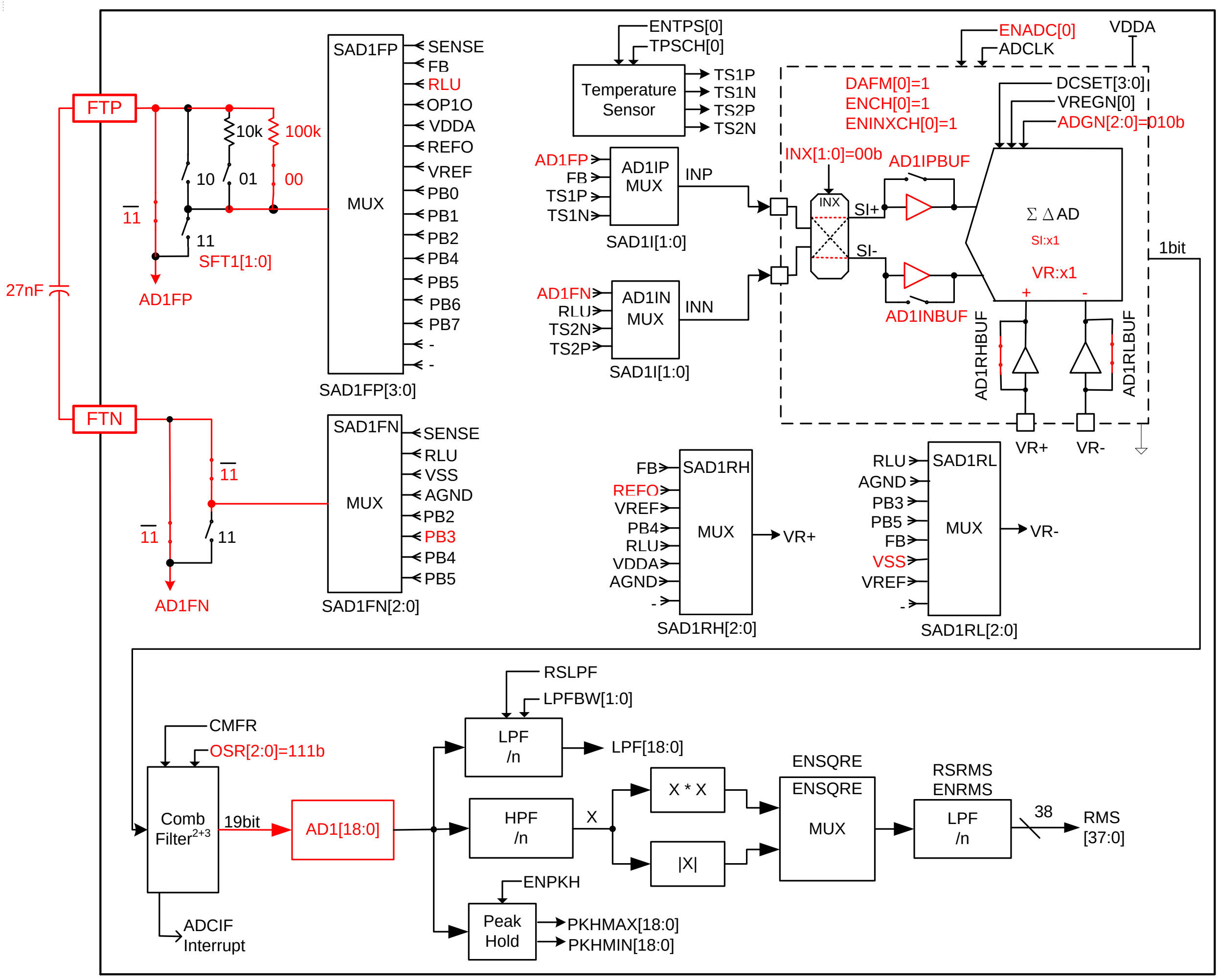


SMODE[3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

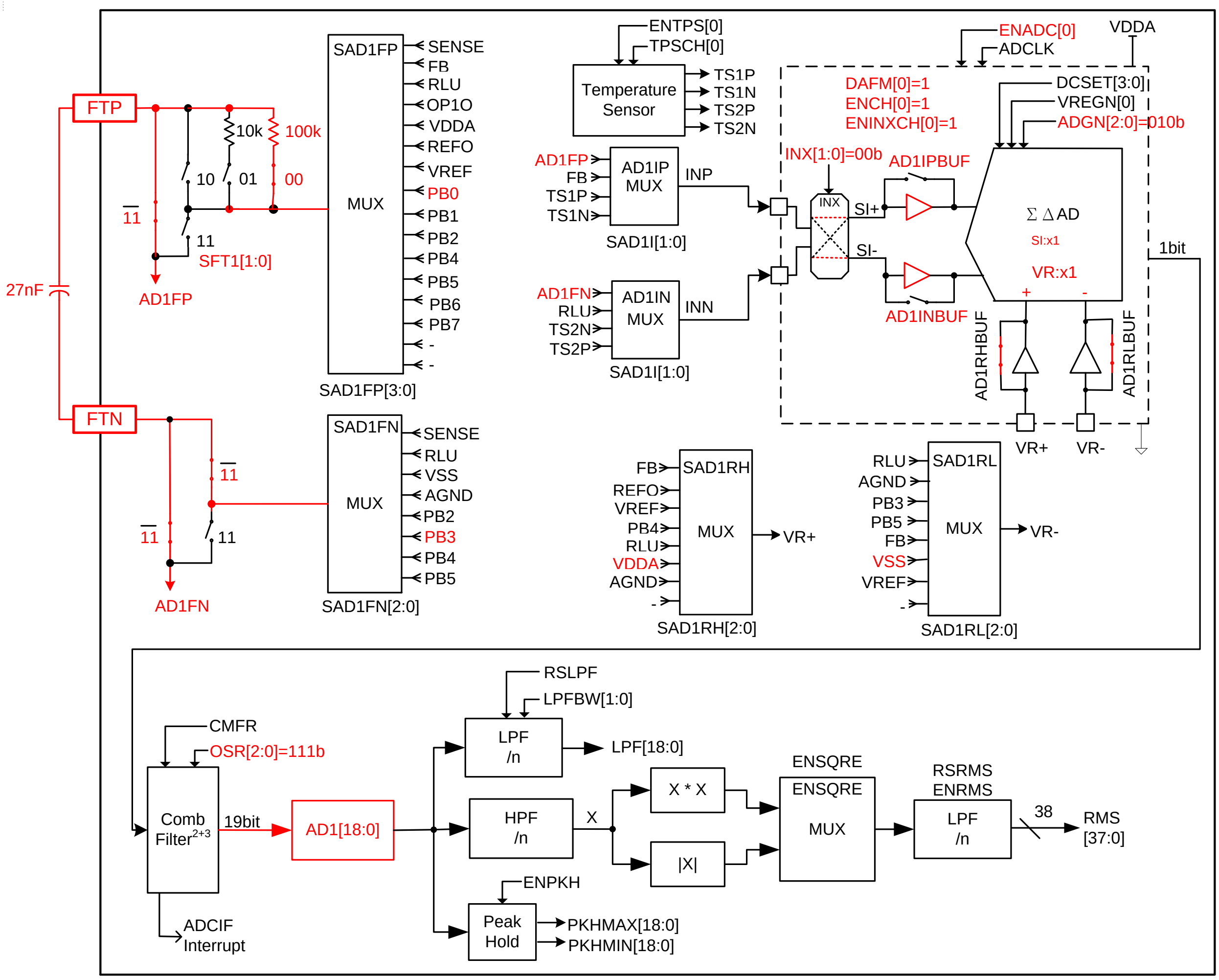
SFUVR[3:0]				SMODE[3]	ACMPO	VREF
0	0	0	0	0	X	VDS<17>
0	0	0	1	0	X	VDS<16>
0	0	1	0	0	X	VDS<15>
0	0	1	1	0	X	AGNDP<9>
0	1	0	0	0	X	AGNDP<8>
0	1	0	1	0	X	AGNDP<7>
0	1	1	0	0	X	AGNDP<6>
0	1	1	1	0	X	AGNDP<0>
1	0	0	0	0	X	VDS<1>
1	0	0	1	0	X	VDS<2>
1	0	1	0	0	X	VDS<3>
1	0	1	1	0	X	AGNDN<9>
1	1	0	0	0	X	AGNDN<8>
1	1	0	1	0	X	AGNDN<7>
1	1	1	0	0	X	AGNDN<6>
1	1	1	1	0	X	PB5
X	0	0	0	1	0	VDS<17>
X	0	0	0	1	1	VDS<1>
X	0	0	1	1	0	VDS<16>
X	0	0	1	1	1	VDS<2>
X	0	1	0	1	0	VDS<15>
X	0	1	0	1	1	VDS<3>
X	0	1	1	1	0	AGNDP<9>
X	0	1	1	1	1	AGNDN<9>
X	1	0	0	1	0	AGNDP<8>
X	1	0	0	1	1	AGNDN<8>
X	1	0	1	1	0	AGNDP<7>
X	1	0	1	1	1	AGNDN<7>
X	1	1	0	1	0	AGNDP<6>
X	1	1	0	1	1	AGNDN<6>
X	1	1	1	1	0	AGNDP<0>
X	1	1	1	1	1	PB5

6.2. Diode Measurement Network Configuration

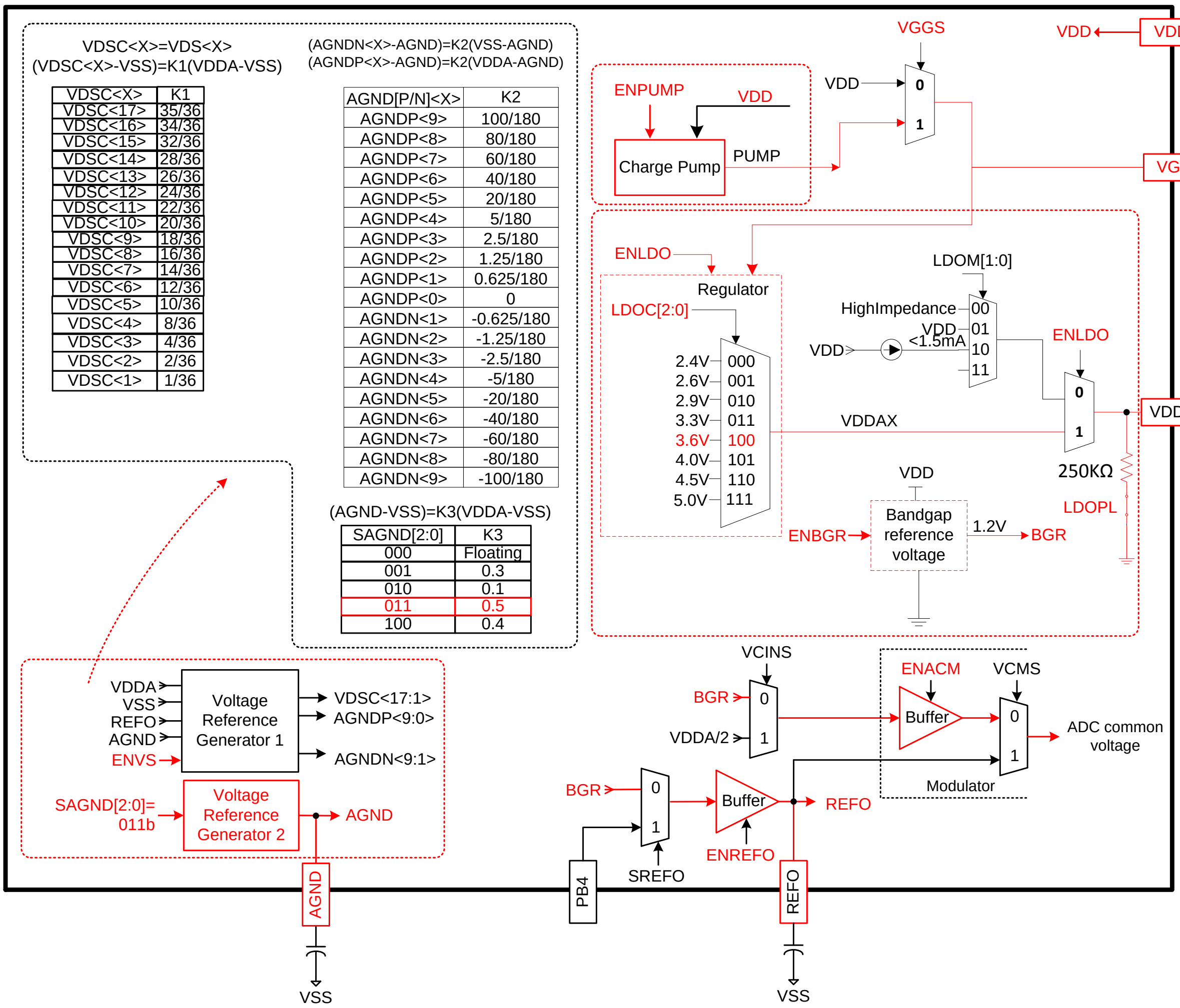
6.2.1. Positive Constant Voltage Source Measurement



6.2.2. Positive Constant Current Source Measurement



6.3. Diode Function Power Supply Configuration



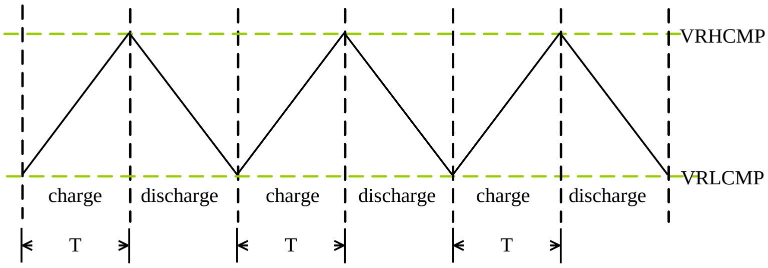
VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

7. Capacitance

There are two ways to measure capacitance, constant voltage and constant current output mode. Under low capacitance (<1µF), users need to use constant voltage output mode for testing whereas using constant current output mode to test high capacitance (>1µF). Capacitance measurement uses charge/discharge test cycle to gain the value.



$$\Delta Q = I \times t = C \times \Delta V$$

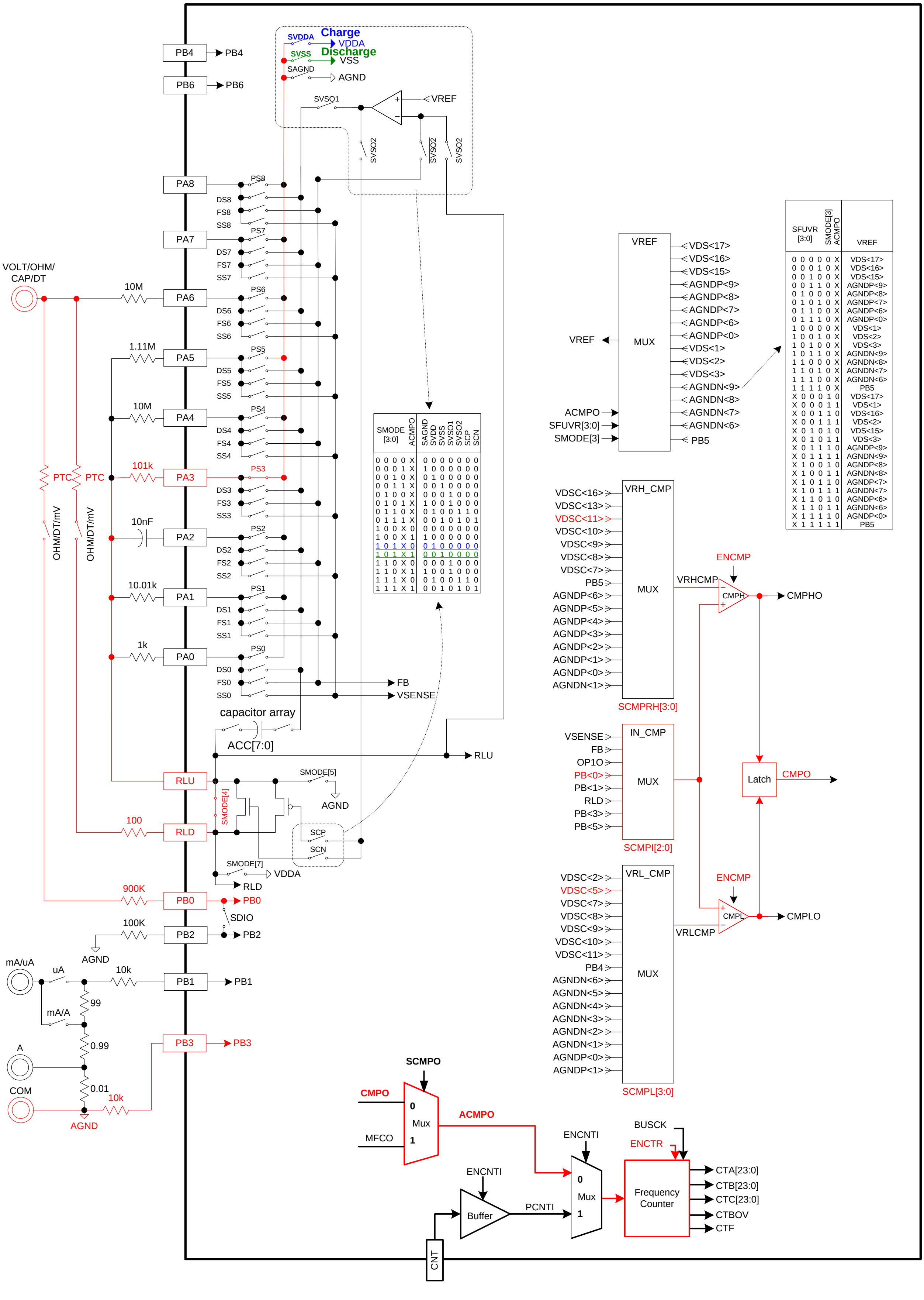
$$C = \frac{Q}{V} = \frac{I \times \Delta t}{V}$$

Capacitance measurement test procedure：

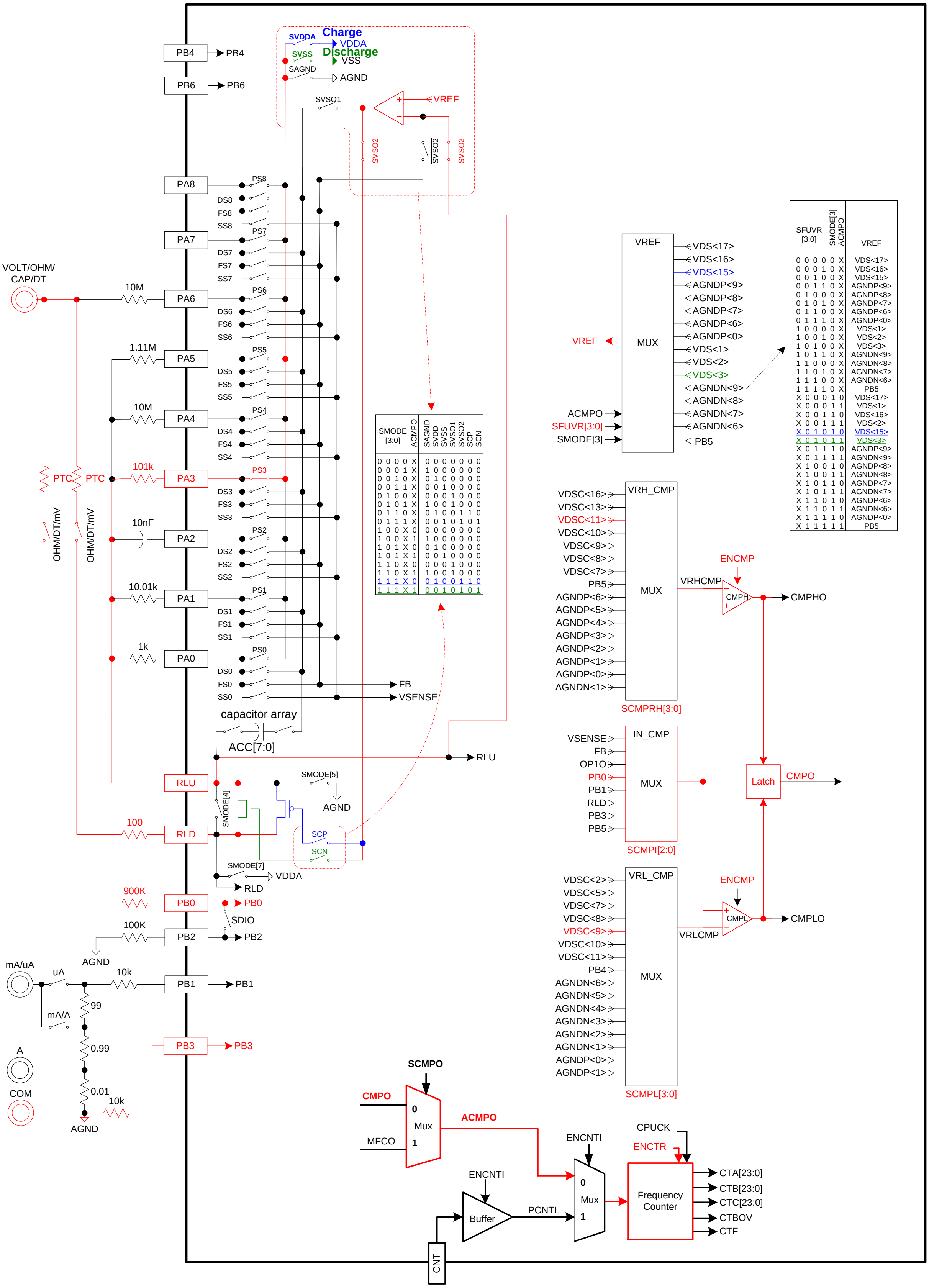
1. Select constant voltage (SMODE[5:0]=011010b) and constant current (SMODE[5:0]=001110b) test mode output.
2. Configure capacitor charge/discharge comparison voltage (VRHCMP、VRLCMP) and the actual charge/discharge of capacitor is decided by comparator, ACPO.
3. Configure CTA[23:8] initial value of Frequency Counter. When INTF0 register, CTF bit is 1, CTC[23:0] divided by CTB[23:0] to gain the cycle length.

If the VREF used for the output is AGNP or AGNDN, the comparison point used by the window comparator should also be AGNDP or AGNDN; on the contrary, if the VREF used is VDSC, the comparison point used by the window comparator should be VDSC.

7.1. 60-600nF(Constant Voltage Charge/Discharge Measurement) Network Configuration



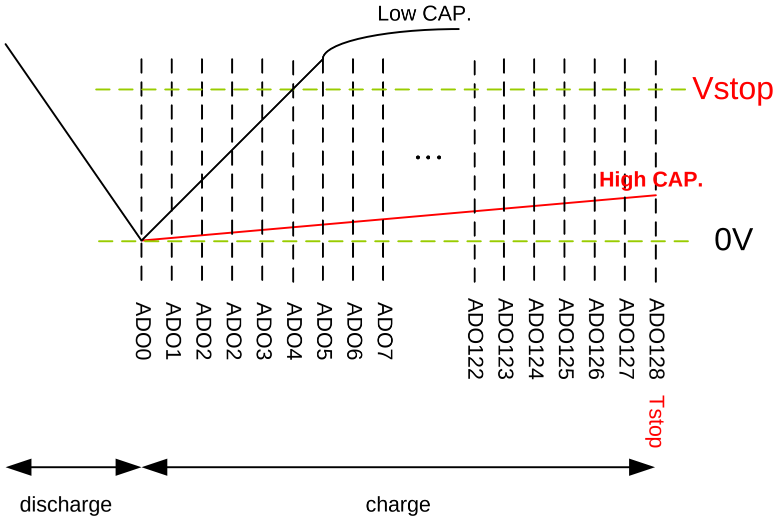
7.2. 6μF-60μF(Constant Current Charge/Discharge Measurement) Network Configuration



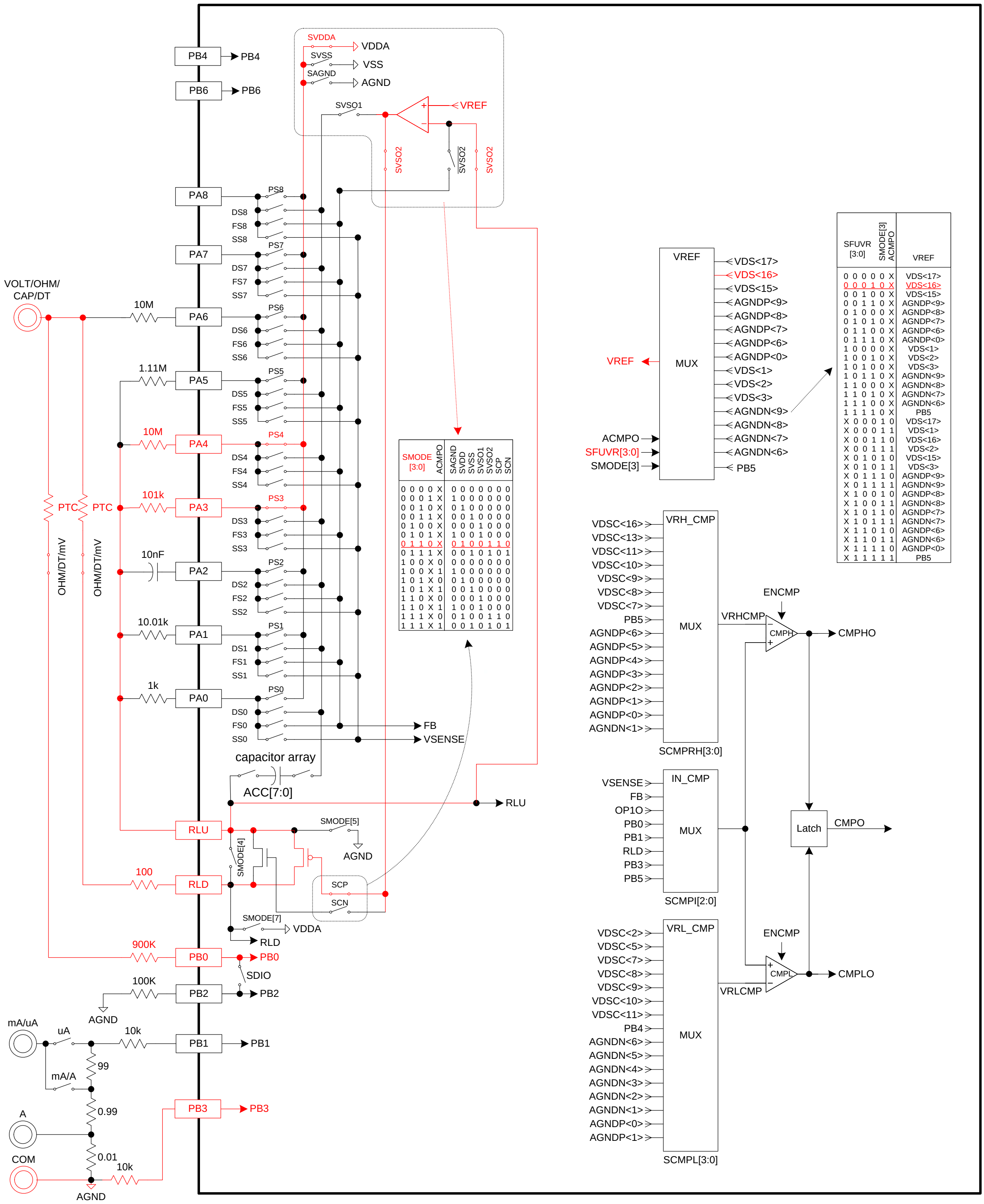
7.3. 600uF~60mF Capacitor Charging Input Network Setting

600uF~60mF capacitors require longer charge/discharge time, the only change of different ranges is the output current. Users can take the voltage difference under a fixed time (t) to gain capacitor value. The change of capacitor value and voltage value is an inverse ratio.

$$C = \frac{Q}{V} = I \times \frac{\Delta t}{\Delta V}$$



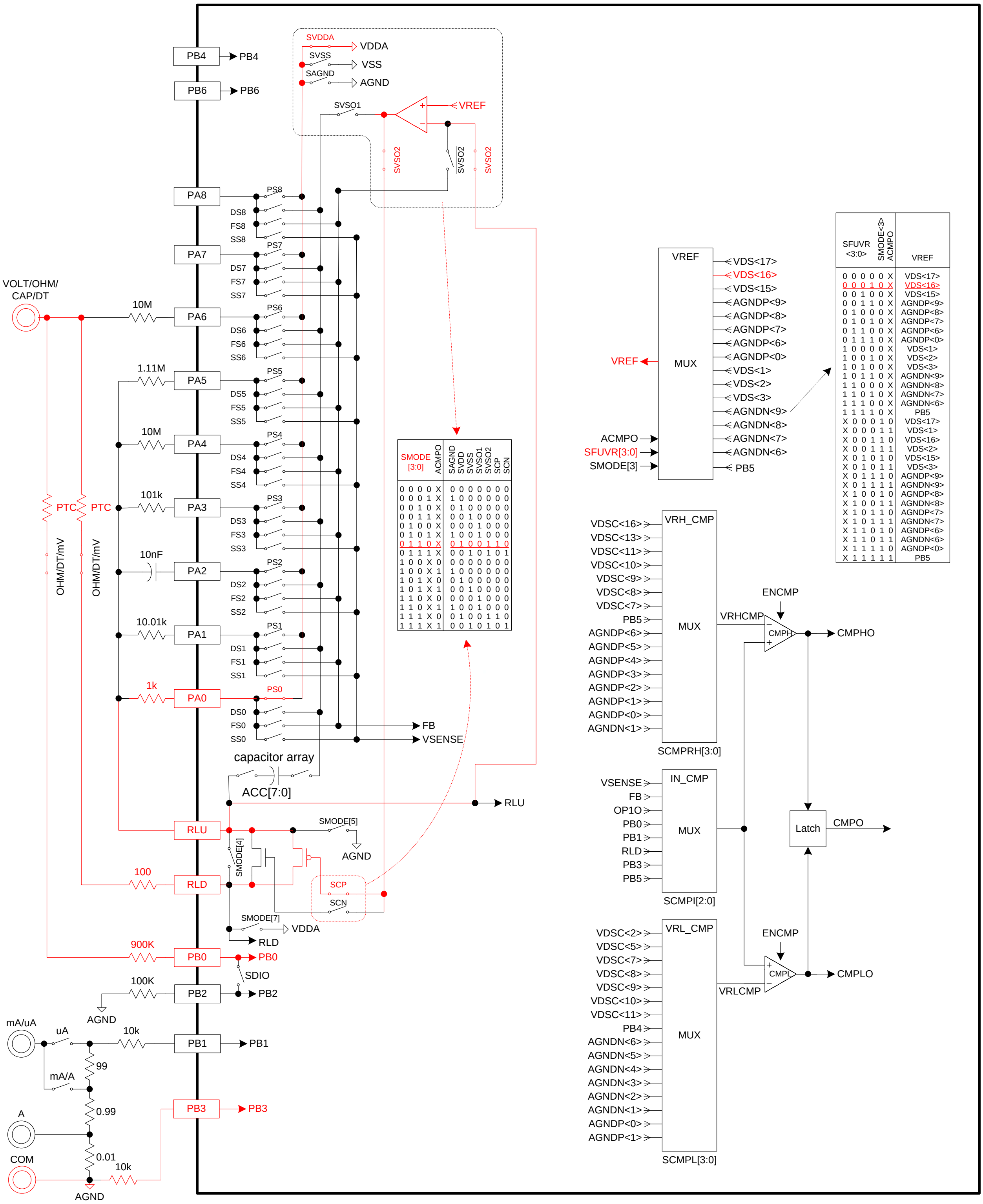
7.3.1. 600uF(Charge) Input Network Configuration



SMODE [3:0]				ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0	0	0	0	X	0	0	0	0	0	0	0
0	0	0	1	X	1	0	0	0	0	0	0
0	0	1	0	X	0	1	0	0	0	0	0
0	0	1	1	X	0	0	1	0	0	0	0
0	1	0	0	X	0	0	0	1	0	0	0
0	1	0	1	X	1	0	0	1	0	0	0
0	1	1	0	X	0	1	0	0	1	1	0
0	1	1	1	X	0	0	1	0	1	0	1
1	0	0	X	0	0	0	0	0	0	0	0
1	0	0	X	1	1	0	0	0	0	0	0
1	0	1	X	0	0	1	0	0	0	0	0
1	0	1	X	1	0	0	1	0	0	0	0
1	1	0	X	0	0	0	0	1	0	0	0
1	1	0	X	1	1	0	0	1	0	0	0
1	1	1	X	0	0	1	0	0	1	1	0
1	1	1	X	1	0	0	1	0	1	0	1

SFUVR [3:0]				SMODE[3]	ACMPO	VREF
0	0	0	0	0	X	VDS<17>
0	0	0	1	0	X	VDS<16>
0	0	1	0	0	X	VDS<15>
0	0	1	1	0	X	AGNDP<9>
0	1	0	0	0	X	AGNDP<8>
0	1	0	1	0	X	AGNDP<7>
0	1	1	0	0	X	AGNDP<6>
0	1	1	1	0	X	AGNDP<0>
1	0	0	0	0	X	VDS<1>
1	0	0	1	0	X	VDS<2>
1	0	1	0	0	X	VDS<3>
1	0	1	1	0	X	AGNDN<9>
1	1	0	0	0	X	AGNDN<8>
1	1	0	1	0	X	AGNDN<7>
1	1	1	0	0	X	AGNDN<6>
1	1	1	1	0	X	PB5
X	0	0	0	1	0	VDS<17>
X	0	0	0	1	1	VDS<1>
X	0	0	1	1	0	VDS<16>
X	0	0	1	1	1	VDS<2>
X	0	1	0	1	0	VDS<15>
X	0	1	0	1	1	VDS<3>
X	0	1	1	1	0	AGNDP<9>
X	0	1	1	1	1	AGNDN<9>
X	1	0	0	1	0	AGNDP<8>
X	1	0	0	1	1	AGNDN<8>
X	1	0	1	1	0	AGNDP<7>
X	1	0	1	1	1	AGNDN<7>
X	1	1	0	1	0	AGNDP<6>
X	1	1	0	1	1	AGNDN<6>
X	1	1	1	1	0	AGNDP<0>
X	1	1	1	1	1	PB5

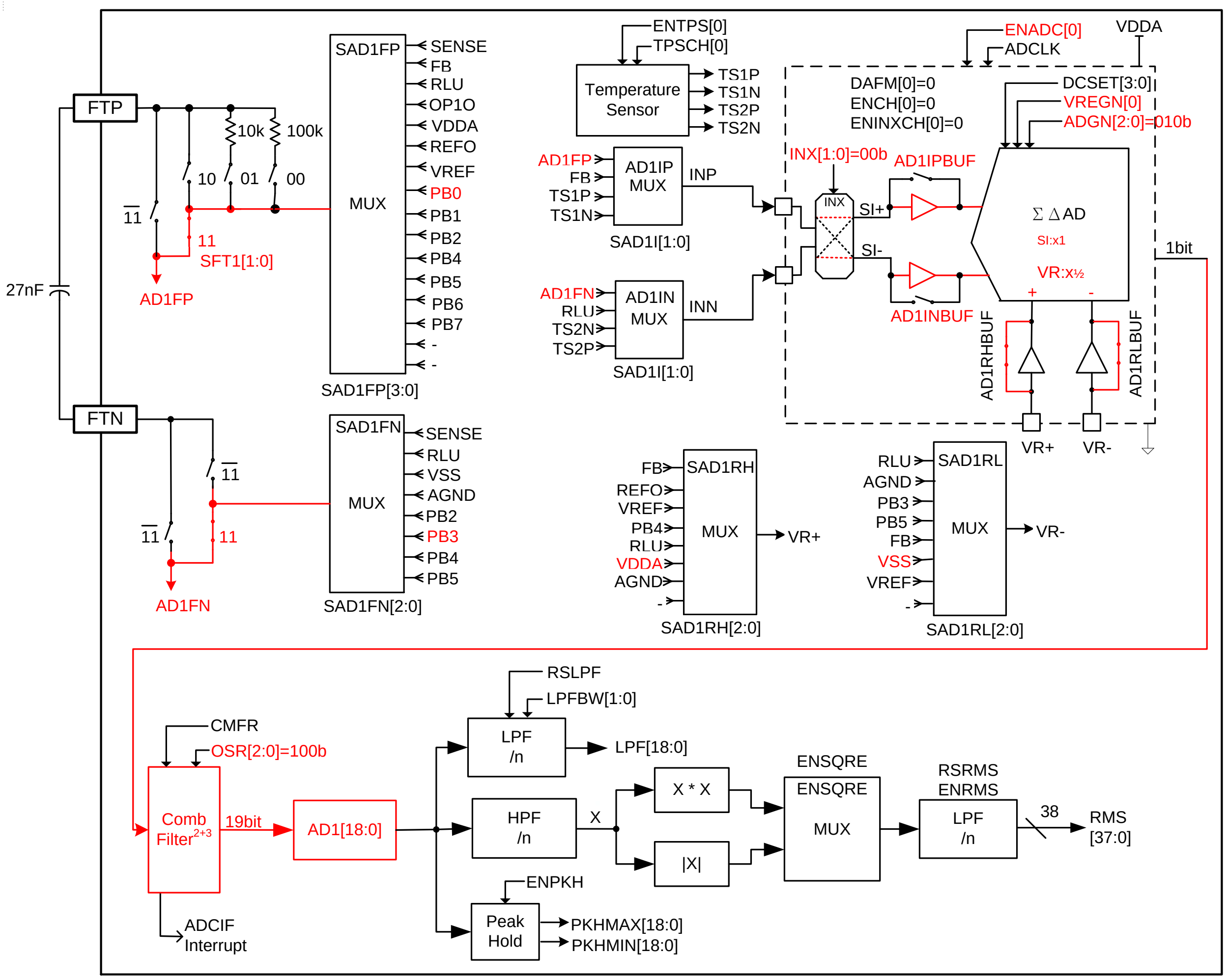
7.3.2. 6mF-60mF(Charge) Input Network Configuration



SMODE [3:0]	ACMPO	SAGND	SVDD	SVSS	SVSO1	SVSO2	SCP	SCN
0 0 0 0	X	0	0	0	0	0	0	0
0 0 0 1	X	1	0	0	0	0	0	0
0 0 1 0	X	0	1	0	0	0	0	0
0 0 1 1	X	0	0	1	0	0	0	0
0 1 0 0	X	0	0	0	1	0	0	0
0 1 0 1	X	1	0	0	1	0	0	0
0 1 1 0	X	0	1	0	0	1	1	0
0 1 1 1	X	0	0	1	0	1	0	1
1 0 0 X	0	0	0	0	0	0	0	0
1 0 0 X	1	1	0	0	0	0	0	0
1 0 1 X	0	0	1	0	0	0	0	0
1 0 1 X	1	0	0	1	0	0	0	0
1 1 0 X	0	0	0	0	1	0	0	0
1 1 0 X	1	1	0	0	1	0	0	0
1 1 1 X	0	0	1	0	0	1	1	0
1 1 1 X	1	0	0	1	0	1	0	1

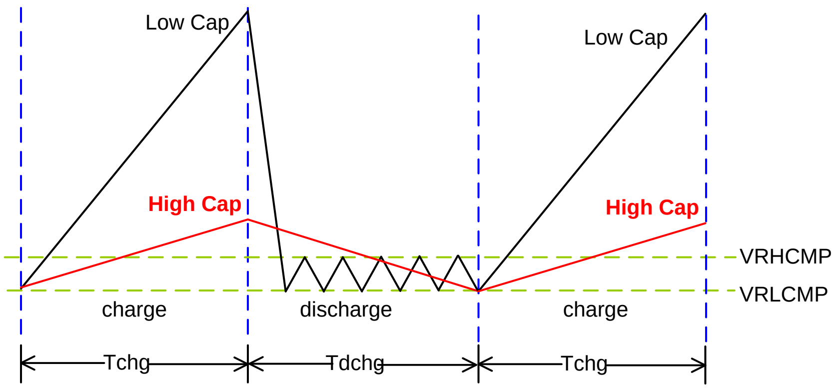
SFUVR <3:0>	SMODE<3>	ACMPO	VREF
0 0 0 0	0	X	VDS<17>
0 0 0 1	0	X	VDS<16>
0 0 1 0	0	X	VDS<15>
0 0 1 1	0	X	AGNDP<9>
0 1 0 0	0	X	AGNDP<8>
0 1 0 1	0	X	AGNDP<7>
0 1 1 0	0	X	AGNDP<6>
0 1 1 1	0	X	AGNDP<0>
1 0 0 0	0	X	VDS<1>
1 0 0 1	0	X	VDS<2>
1 0 1 0	0	X	VDS<3>
1 0 1 1	0	X	AGNDN<9>
1 1 0 0	0	X	AGNDN<8>
1 1 0 1	0	X	AGNDN<7>
1 1 1 0	0	X	AGNDN<6>
1 1 1 1	0	X	PB5
X 0 0 0	1	0	VDS<17>
X 0 0 0	1	1	VDS<1>
X 0 0 1	1	0	VDS<16>
X 0 0 1	1	1	VDS<2>
X 0 1 0	1	0	VDS<15>
X 0 1 0	1	1	VDS<3>
X 0 1 1	1	0	AGNDP<9>
X 0 1 1	1	1	AGNDN<9>
X 1 0 0	1	0	AGNDP<8>
X 1 0 0	1	1	AGNDN<8>
X 1 0 1	1	0	AGNDP<7>
X 1 0 1	1	1	AGNDN<7>
X 1 1 0	1	0	AGNDP<6>
X 1 1 0	1	1	AGNDN<6>
X 1 1 1	1	0	AGNDP<0>
X 1 1 1	1	1	PB5

7.4. 600μF~60mF Measurement Network Configuration



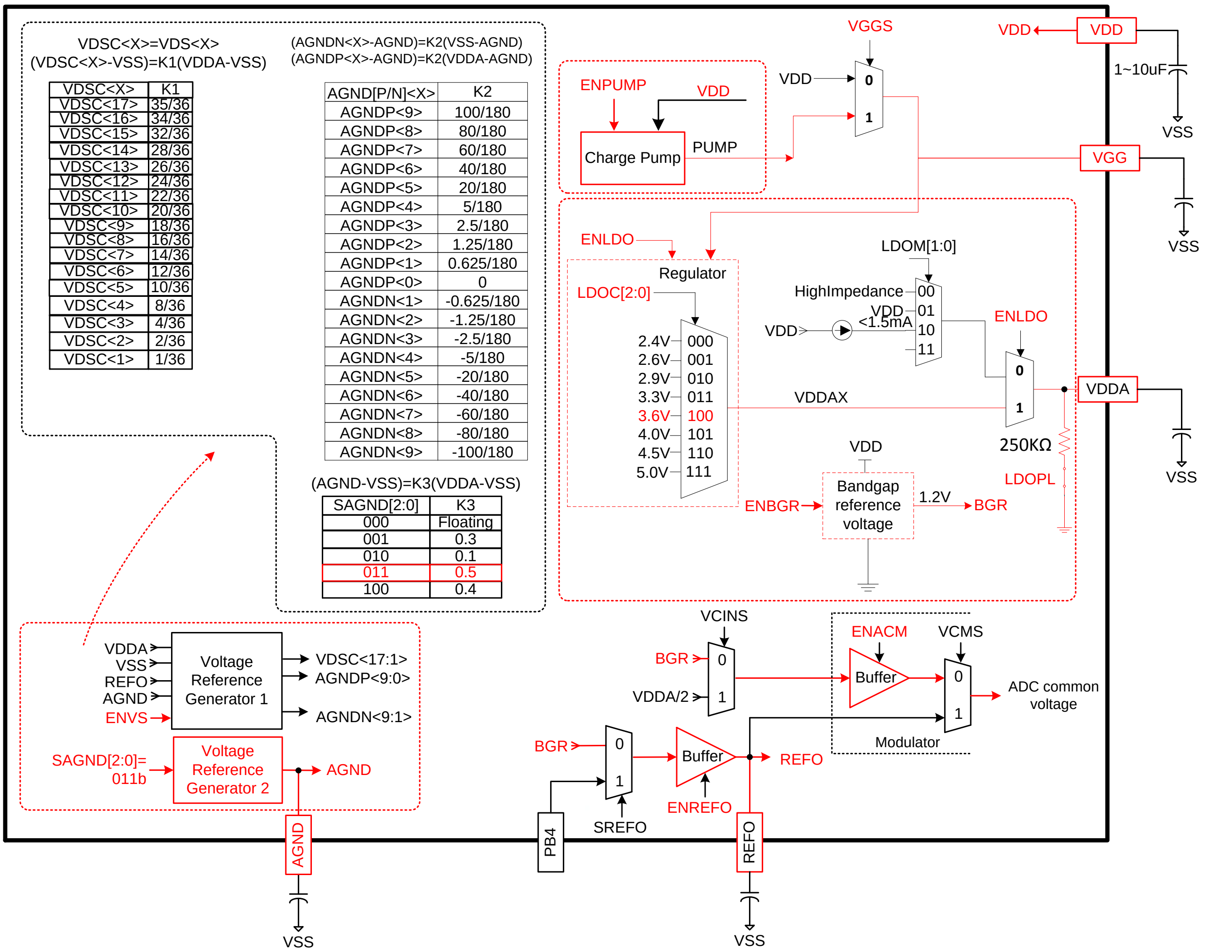
7.5. Discharge(600μF~60mF) Input Network Configuration

When discharging, set SMODE[3:0] to 1110b, and set the comparator close to AGND, so that the capacitor discharges itself close to 0V. Regardless of the capacitance, the charging and discharging time is fixed.



Charging and discharging diagram

7.6. Capacitance Function Power Supply Configuration



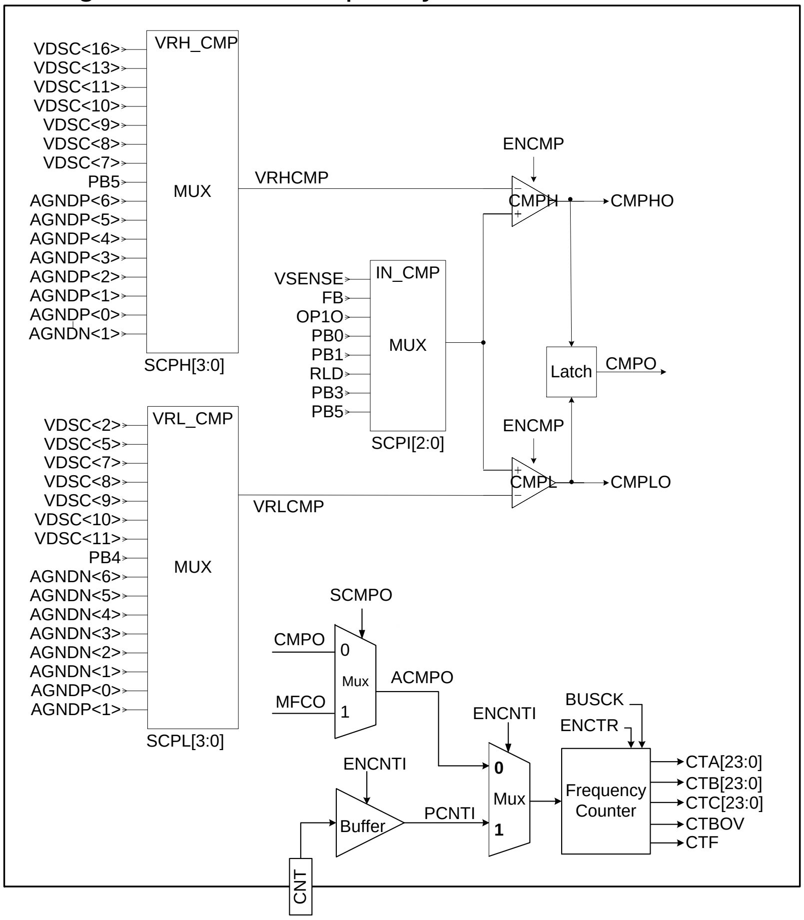
VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

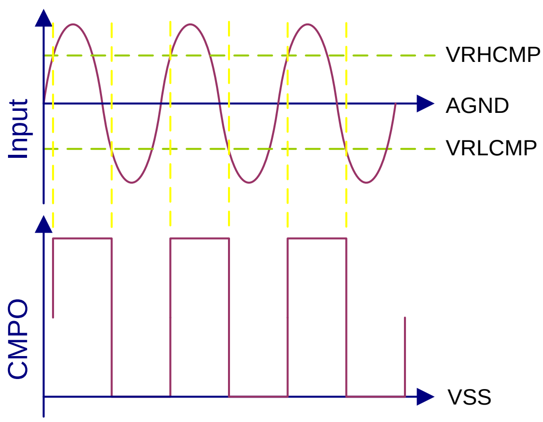
SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

8. Frequency

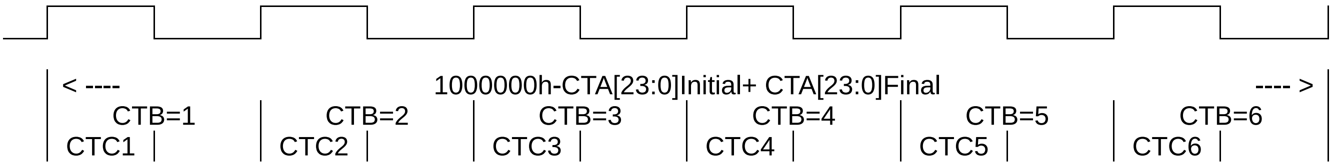
Frequency measurement can be divided into analog input and digital input. Analog input means that the voltage from PBx or PAx enters OPAMP with voltage follower or amplified 10 times, the signal is isolated from DC by capacitor, and then enter window comparator from PB5, and comparator output (CMPO) input to Frequency Counter; digital input refers to entering from CNT to Frequency Counter.



Analog input refers to the signal measurement suitable for positive and negative half cycles. The positive trigger point of the window comparator is VRHCMP; the negative trigger point is VRLCMP. When the analog input signal reaches the positive trigger point of the window comparator, COMP is High; when the signal reaches the negative trigger point of the window comparator, COMP is Low.



8.1. Example Of Frequency Counter Calculation



Calculation description (1kHz / 50% as an example)
FSYSCLK: system oscillator frequency is assumed to 4MHz
CTA[23:0]Initial: The default value before CTA counting, the CTA[23:8] program defaults to C000h, and CTA[7:0] is cleared to 00h
CTA[23:0]Final: The value after the CTA count is completed, CTA[23:0]Initial is C00000h, in the case of 1kHz, it is 000760h
CTB[23:0]: the number of cycles within the time, CTA[23:0]Initial is C00000h, in the case of 1kHz, it is 000419h
CTC[23:0]: the count of the total time of High, CTA[23:0]Initial is C00000h, when Duty 50% is 20043Ah

Count time:

T = [1000000h-CTA[23:0]Initial+ CTA[23:0]Final]/FSYSCLK
=(1000000h-C00000h +000760h)/3D0900h --- >hexadecimal
=(16777216-12582912+1888)/4000000=1.0490 --- >decimal

Standby signals frequency:

Freq = CTB[23:0]/T
= 1049/1.0490=1000 Hz

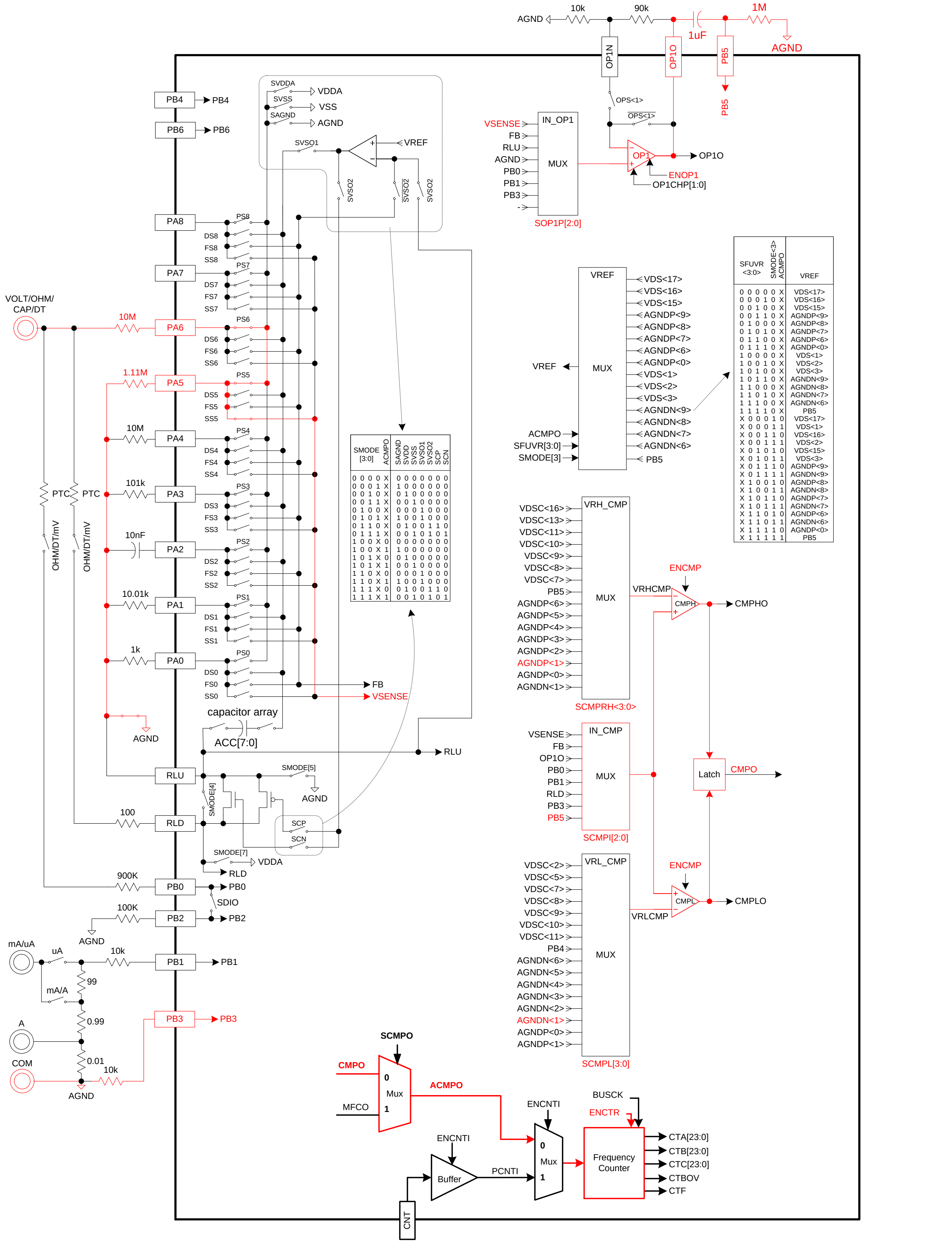
Standby signal, Duty Cycle:

Duty Cycle = CTC[23:0]/{1000000h-CTA[23:0]Initial + CTA[23:0]Final}
= 20043Ah/400760h --- >hexadecimal
= 2098234/4196192=0.5=50% --- >decimal

8.2. Analog Input

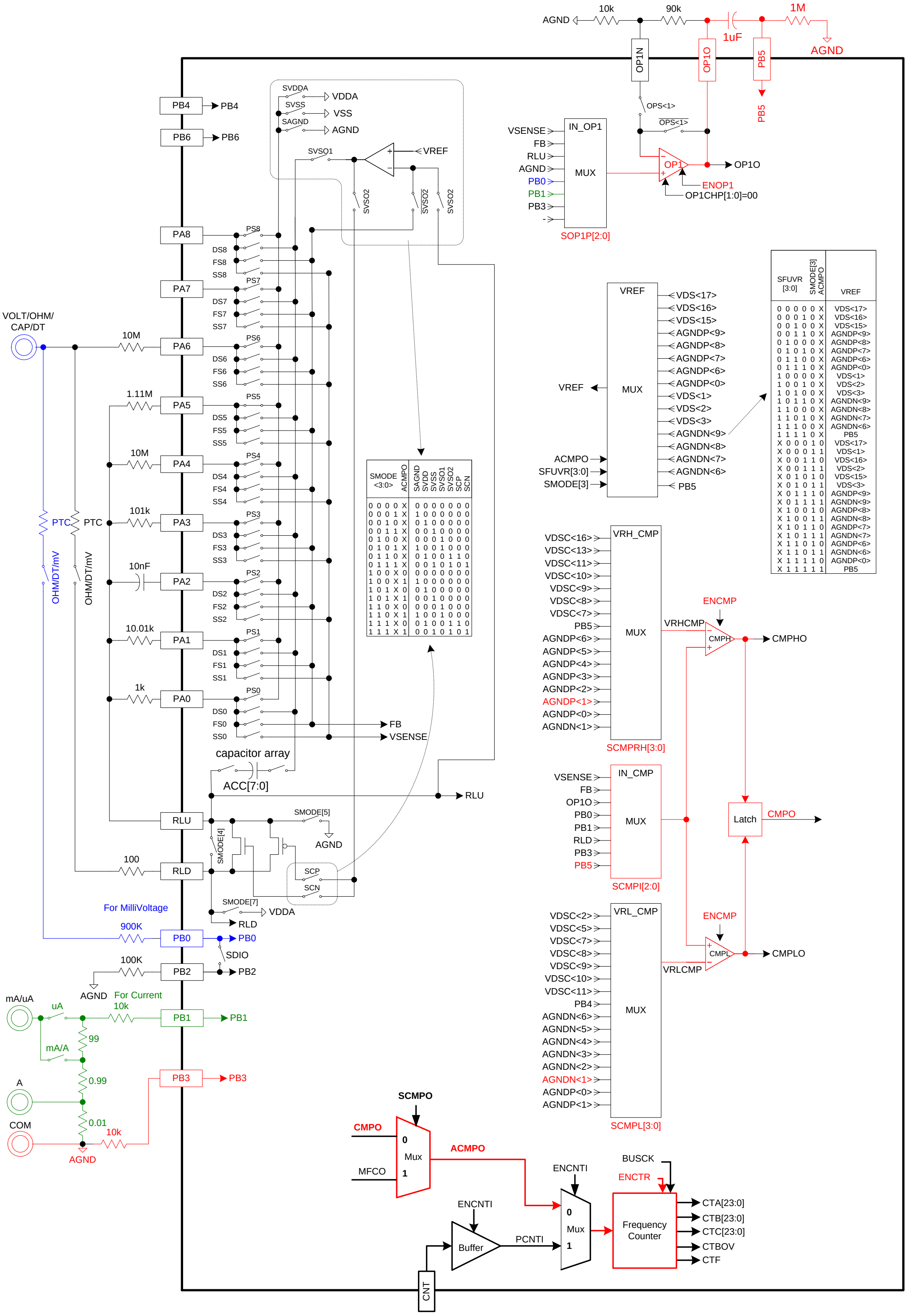
8.2.1. Voltage Input

The method of voltage and frequency measurement is to divide the voltage from PAn into OPAMP from internal SENSE. Please refer to "Voltage" chapter for input network settings.



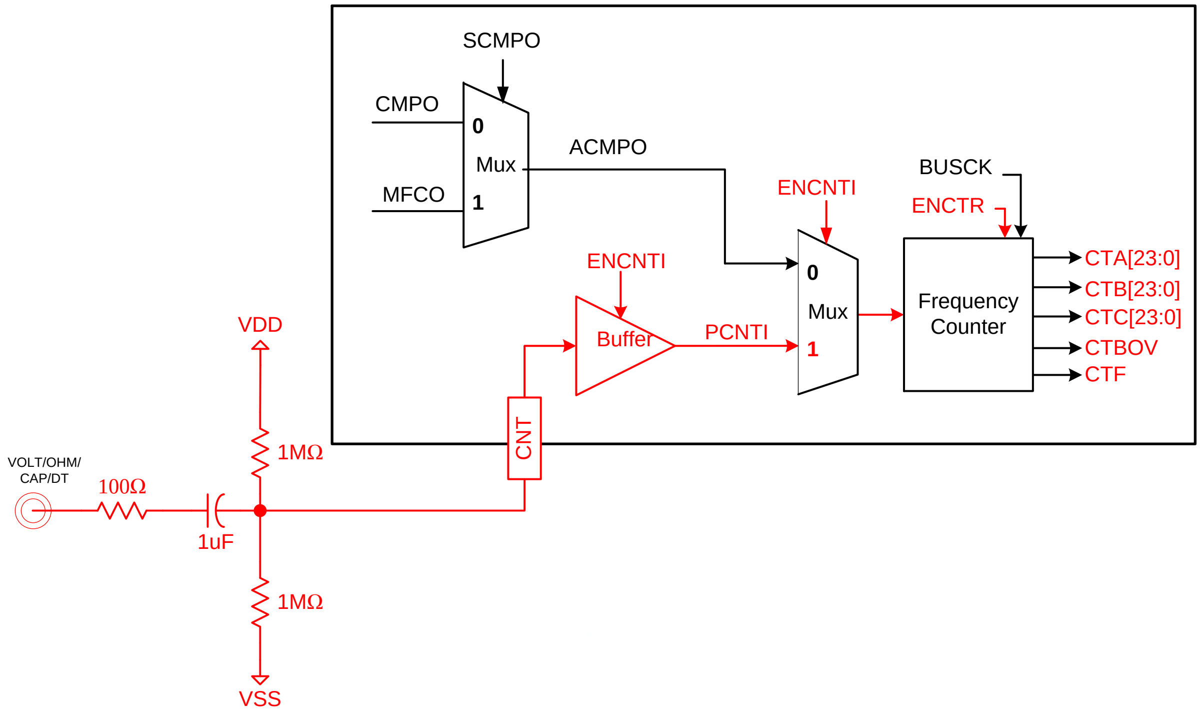
8.2.2. MilliVolt / Current Input

Low voltage or current and measuring frequency method is to enter OPAMP from PB0 or PB1. Please refer to "Millivolts" or "Current" chapter for input network settings.

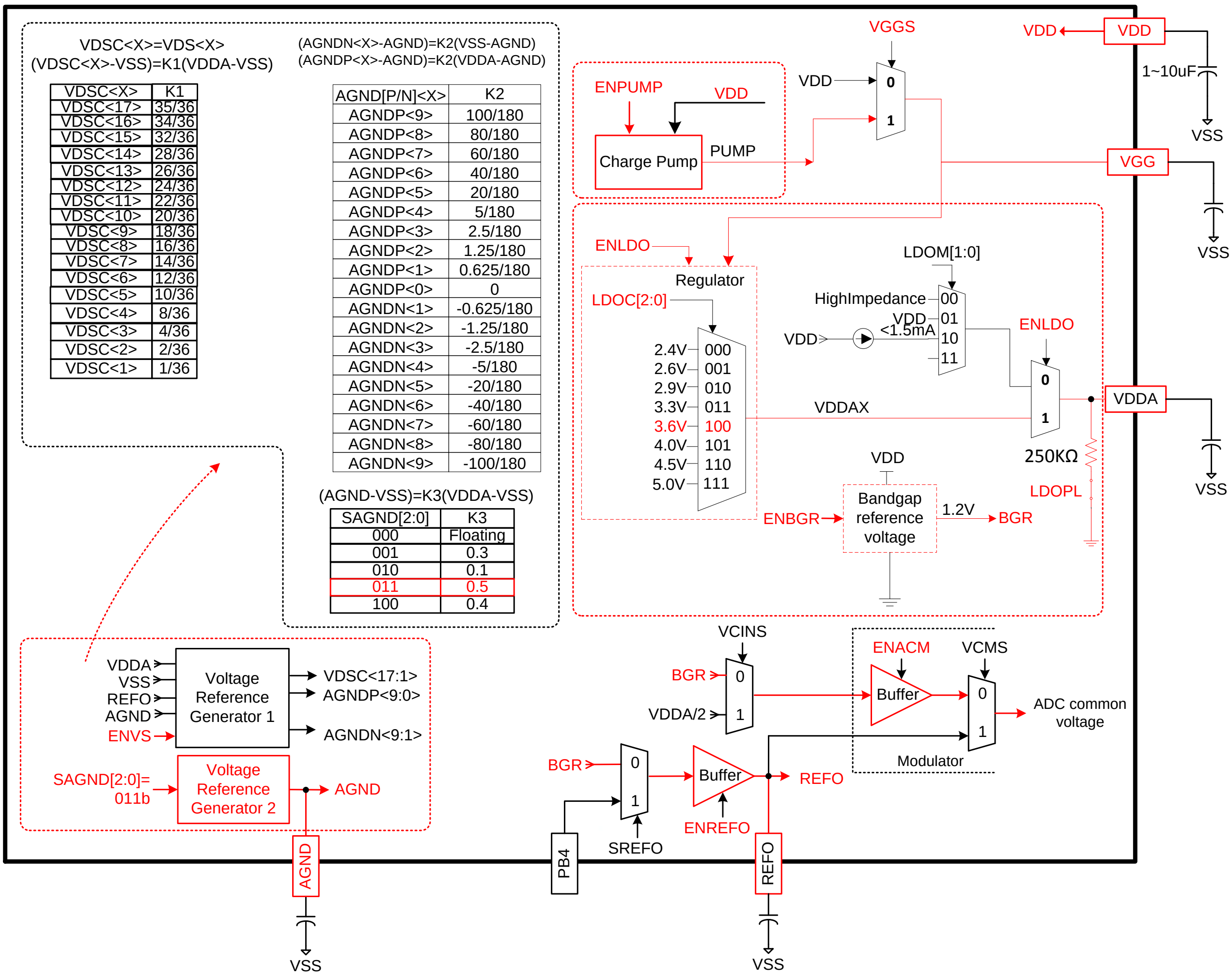


8.3. Digital Input
8.3.1. CNT Input

CNT (PT3.6) is a digital pin. When there is no signal input, the pin must be half the voltage of the digital power supply.



8.4. Frequency Function Power Supply Configuration



VDSC<X>	K1
VDSC<17>	35/36
VDSC<16>	34/36
VDSC<15>	32/36
VDSC<14>	28/36
VDSC<13>	26/36
VDSC<12>	24/36
VDSC<11>	22/36
VDSC<10>	20/36
VDSC<9>	18/36
VDSC<8>	16/36
VDSC<7>	14/36
VDSC<6>	12/36
VDSC<5>	10/36
VDSC<4>	8/36
VDSC<3>	4/36
VDSC<2>	2/36
VDSC<1>	1/36

AGND[P/N]<X>	K2
AGNDP<9>	100/180
AGNDP<8>	80/180
AGNDP<7>	60/180
AGNDP<6>	40/180
AGNDP<5>	20/180
AGNDP<4>	5/180
AGNDP<3>	2.5/180
AGNDP<2>	1.25/180
AGNDP<1>	0.625/180
AGNDP<0>	0
AGNDN<1>	-0.625/180
AGNDN<2>	-1.25/180
AGNDN<3>	-2.5/180
AGNDN<4>	-5/180
AGNDN<5>	-20/180
AGNDN<6>	-40/180
AGNDN<7>	-60/180
AGNDN<8>	-80/180
AGNDN<9>	-100/180

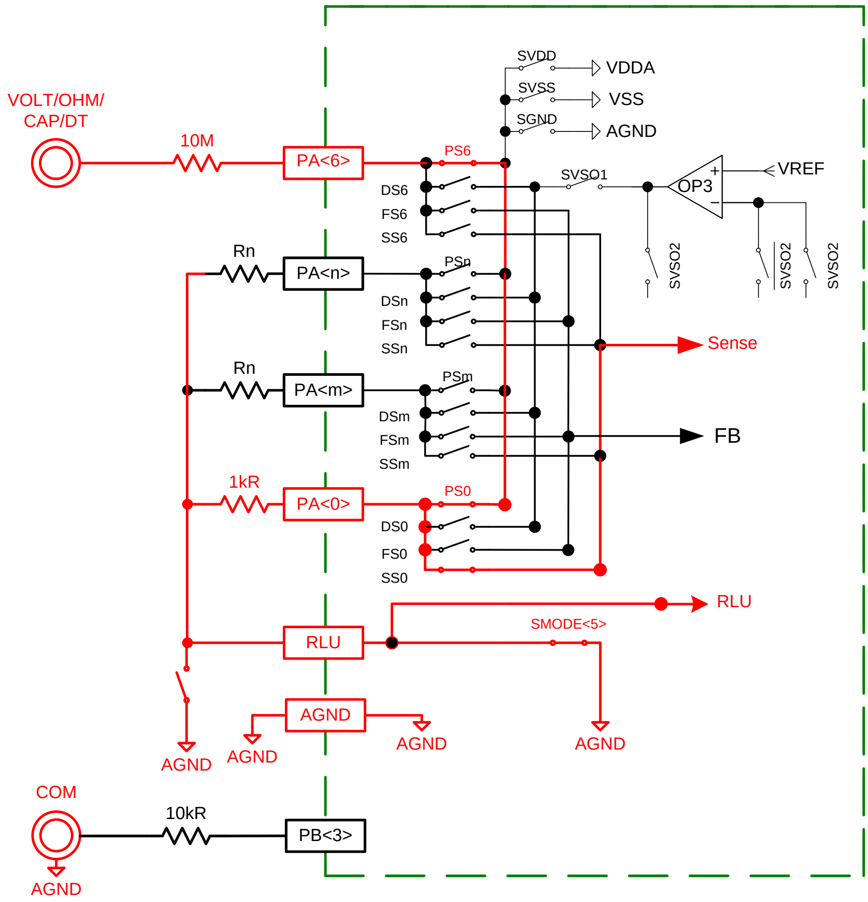
SAGND[2:0]	K3
000	Floating
001	0.3
010	0.1
011	0.5
100	0.4

9. Application Q&A

9.1. Why is there an error in the voltage function ADC negative terminal selection PBx?

Answer:

In many functional applications, PBx is used as AGND Sense, but in high voltage range, the internal SMODE[5] switch impedance is large, which will cause measurement errors. If the external RLU is not grounded, the Voltage function recommends that the ADC input select Sense-RLU.

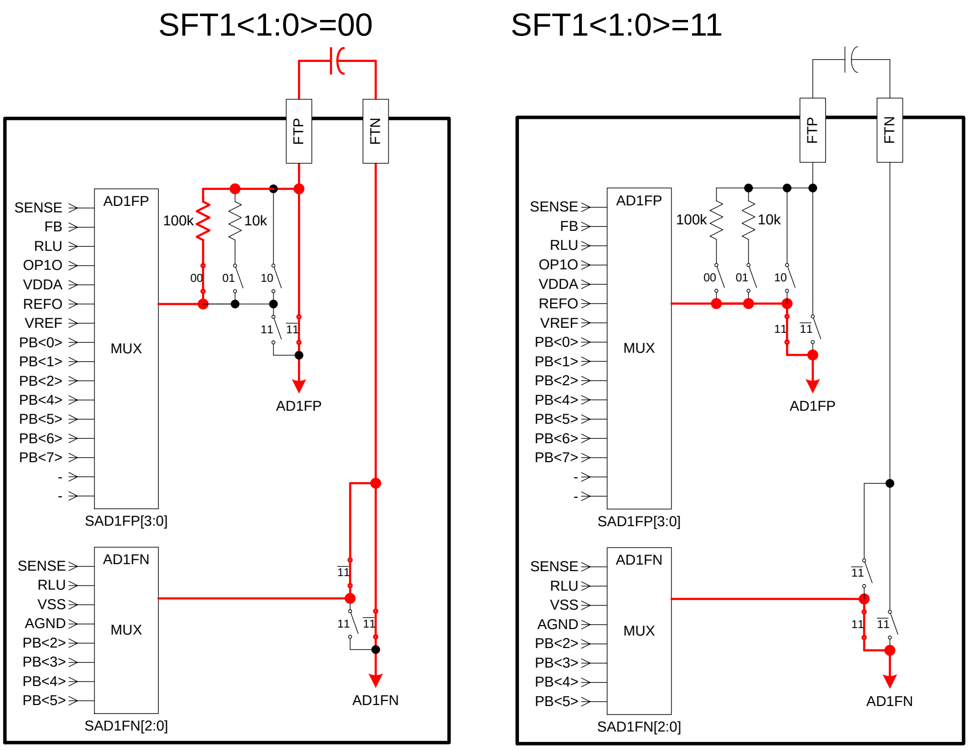


9.2. Continuity and 60MΩ response speed is too slow

Answer:

The reaction speed is too slow because the measurement circuit has a 27nF capacitor. When the meter input is not short-circuited, the 27nF capacitor is charged, and the discharge speed is too slow when the meter is short-circuited or when measuring large resistances.

If the Pre-Filter inside the chip is ignored during Continuity and 60MΩ measurement, the response speed can be accelerated, but the displayed value will be unstable.



10. Revision History

Major differences are stated thereinafter:

Version	Page	Date	Summary
V02	All	2021/02/25	First edition