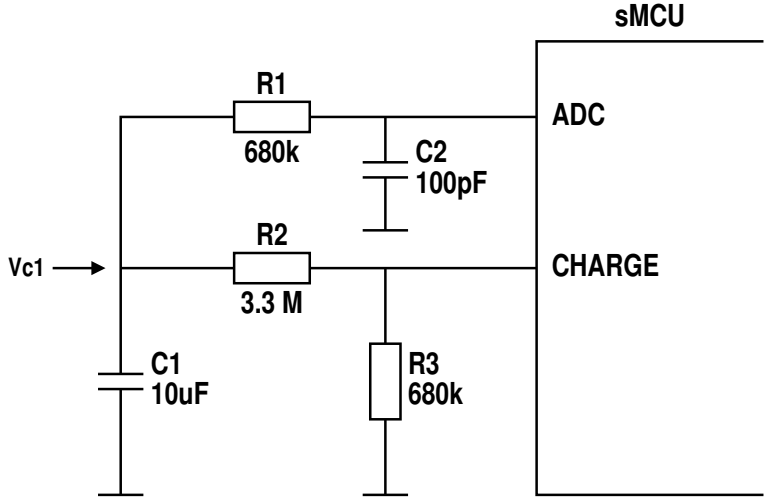
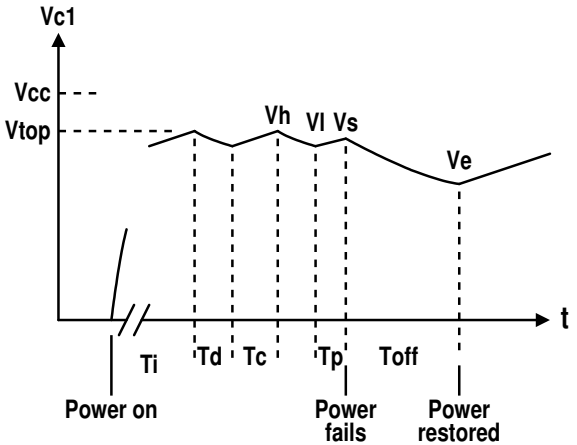


R1, R2 protect C1 from GPIO upsets
C1, R2 control RC timing
R3 pulls CHARGE low when off
C2 filter, ADC buffer (optional)

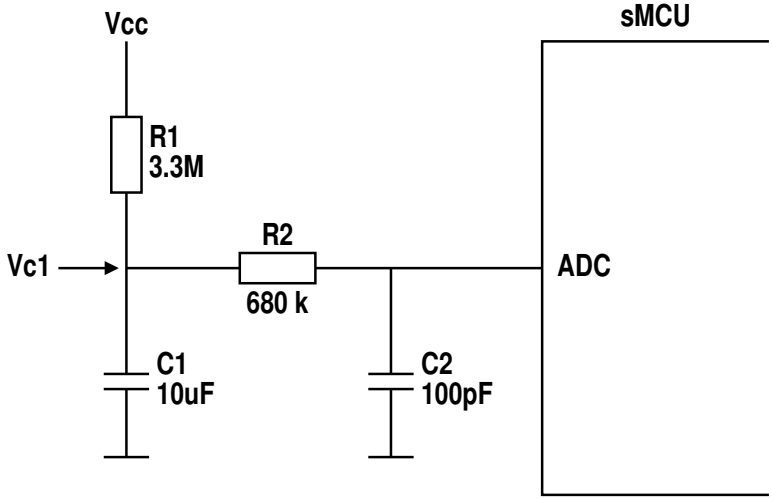
Phase	ADC	CHARGE
Charge	H	H
Discharge	Z	Z
Sample	ADC	Z



Vcc = supply voltage (3.3 V)
Vtop = end of charge, 90% of Vcc (?)
Vmin = Vl goal, 90% of Vtop (?)
Vh = measured high voltage
Vl = measured low voltage
Vs = measured/estimated start voltage
Vs = f(Vh or Vl, Tp, T)
Ve = measured end voltage

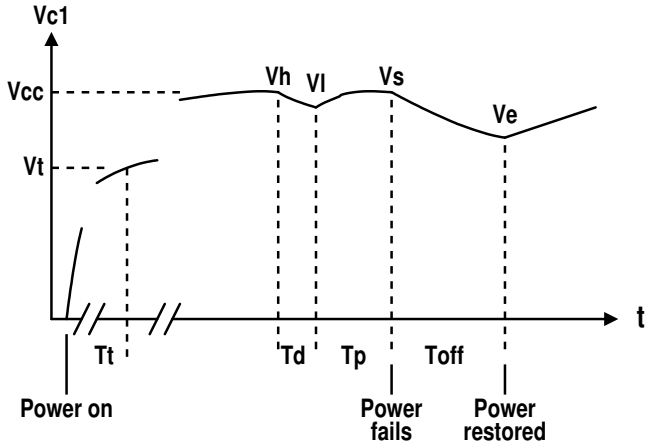
Ti = initial charge time
determined by reaching Vtop
Td = discharge time, f(Vtop, Vmin, T)
Tc = charge time, f(Vtop, Vl, T)
Tp = partial charge/discharge time
Toff = calculated off time, f(Vs, Ve, T)
T = timing coefficient, f(Vtop, Ti)
(needs continuous recalibration)

Design proposed by Joerg Reisenweber



C1, R1 control RC timing
R2 protects C1 from GPIO upsets
C2 filter, ADC buffer (optional)

Phase	ADC
Discharge	L
Idle	Z
Sample	ADC
Fast charge	H

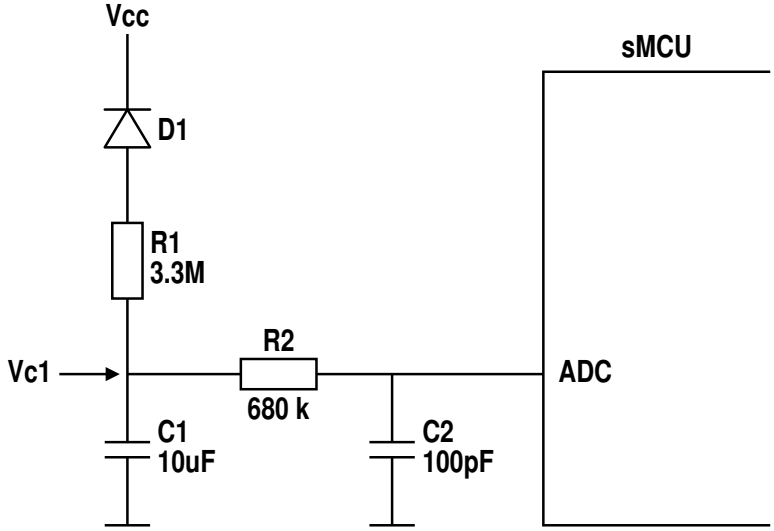


Vcc = supply voltage (3.3 V)
Vt = voltage at calibration point
Vmin = Vl goal, 90% of Vcc (?)
Vh = measured high voltage
Vl = measured low voltage
Vs = measured/estimated start voltage
Vs = f(Vh or Vl, Tp, T)
Ve = measured end voltage

Tt = calibration time
Td = discharge time, f(Vcc, Vmin, T)
Tp = partial charge/discharge time
Toff = calculated off time, f(Vs, Ve, T)

T = timing coefficient, f(Vt, Tt)
(needs continuous recalibration)

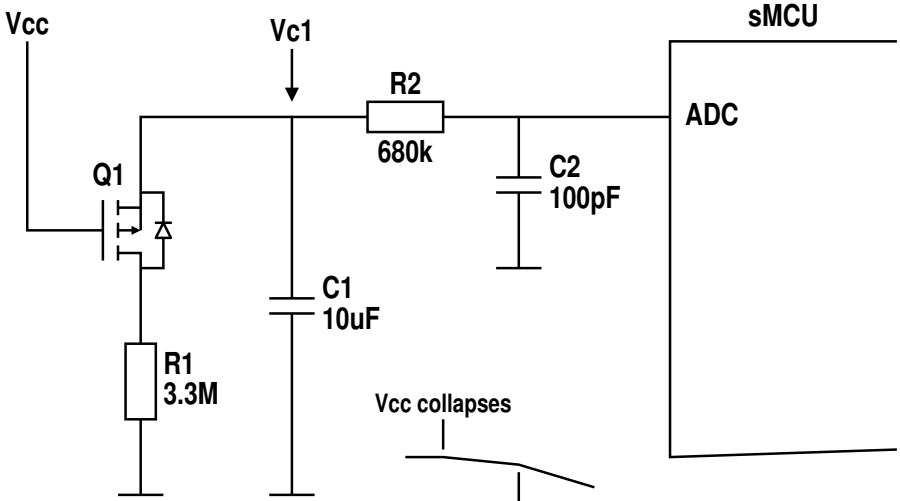
Based on design proposed by Joerg Reisenweber



D1 prevents uncommanded charging
C1, R1 control RC timing
R2 protects C1 from GPIO upsets
C2 filter, ADC buffer (optional)

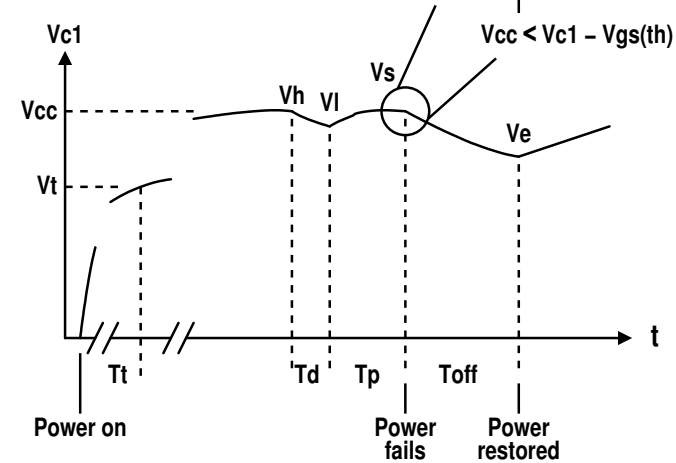
Phase	ADC
Discharge	L
Idle	H
Sample	ADC

Based on design proposed by Joerg Reisenweber



Q1 enables pull–down R1
when Vcc < Vc1 – Vgs(th)
C1, R1 control RC timing
C1, R1 control RC timing
R2 protects C1 from GPIO upsets
C2 filter, ADC buffer (optional)

Phase	ADC
Discharge	L
Idle	H
Sample	ADC



Vcc = supply voltage (3.3 V)
Vt = voltage at calibration point
Vmin = Vl goal, 90% of Vcc (?)
Vh = measured high voltage
Vl = measured low voltage
Vs = measured/estimated start voltage
Vs = f(Vh or Vl, Tp, T)
Ve = measured end voltage

Tt = calibration time
Td = discharge time, f(Vcc, Vmin, T)
Tp = partial charge/discharge time
Toff = calculated off time, f(Vs, Ve, T)

T = timing coefficient, f(Vt, Tt)
(needs continuous recalibration)

Based on design proposed by Joerg Reisenweber