Staircase ADC

(a) basic circuit

(b) waveforms
Successive Approximation ADC

basic circuit
3-bit Flash ADC

\[ v_A = \frac{V_{\text{ref}}}{8} \quad v_B = \frac{2V_{\text{ref}}}{8} \quad v_C = \frac{3V_{\text{ref}}}{8} \]
\[ v_D = \frac{4V_{\text{ref}}}{8} \quad v_E = \frac{5V_{\text{ref}}}{8} \quad v_F = \frac{6V_{\text{ref}}}{8} \]
\[ v_G = \frac{7V_{\text{ref}}}{8} \]
Dual Slope ADC

(a) basic circuit
Sample and Hold

$v_C = v_{in}$

with $S$ closed

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General ADC

- analog signal
- low-pass pre-filter dc to $f_s/2$
- Sample and hold
- A/D $f_s = \text{sampling frequency}$
- digital signal processing

$f_s > 2 f_{\text{max}}$  where $f_{\text{max}} = \text{highest-frequency Fourier component of analog input}$