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## EXPERIMENT 3

### Half-Wave and Full-Wave Rectification

#### Objective

To calculate, compare, draw, and measure the DC output voltages of half-wave and full-wave rectifier circuits.

#### Tools and Equipments Required

DMM (Digital Multi Meter)	
DC Power Supply	
Function Generator	
2.2 kΩ	x 3
Silicon Diode	x 4

#### Theory and Descriptions

The primary function of half-wave and full-wave rectification systems is to establish a DC level from a sinusoidal input signal that has zero average (DC) level.

The half-wave voltage signal of Fig.2.1, normally established by a network with a single diode, has an average or equivalent DC voltage level equal to 31.8% of the peak voltage  $V_m$ .

That is 
$$V_{dc} = 0.318 \cdot V_{peak} \text{ volts} \quad (\text{half-wave}) \quad \text{eq.2.1}$$

The full-wave rectifier signal of Fig.2.1 has twice the average or DC level of the half-wave signal, or 63.6% of the peak value  $V_m$ .

That is 
$$V_{dc} = 0.636 \cdot V_{peak} \text{ volts} \quad (\text{full-wave}) \quad \text{eq.2.2}$$

For large sinusoidal inputs ( $V_m \gg V_T$ ) the forward-biased transition voltage  $V_T$  of a diode can be ignored. However, for situations when the peak value of the sinusoidal signal is not that much greater than  $V_T$ ,  $V_T$  can have a noticeable effect on  $V_{DC}$ .

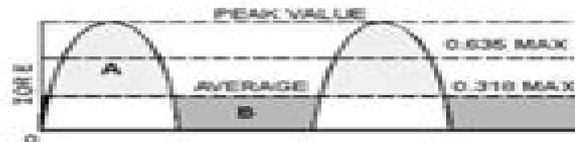


Figure 2.1 half- and full-wave rectified signal

# Experiment 3 Half Wave And Full Wave Rectification

**Xiang Xie**



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