

# Power Electronics Reference

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# Introduction

Just throwing together some concepts and examples for later reference

# 1 General Equations

## 1.1 Power and Energy

### 1.1.1 Instantaneous Power

This value is a positive real number if the element is supplying power, or is a negative real number if the element is consuming power.

$$p(t) = v(t)i(t)$$

- $p(t) :=$  Power at time  $t$ . (W)
- $v(t) :=$  Voltage at time  $t$ . (V)
- $i(t) :=$  Current at time  $t$ . (A)

### 1.1.2 Average Power

$$P = \frac{1}{T} \int_{t_o}^{t_o+T} p(t) dt \quad (W)$$

$$P = \frac{1}{T} \int_{t_o}^{t_o+T} v(t)i(t) dt \quad (W)$$

$$P = \frac{W}{T} \quad (W)$$

- $P :=$  Average power (W)
- $p(t) :=$  Instantaneous Power (W)
- $v(t) :=$  Instantaneous Voltage (V)
- $i(t) :=$  Instantaneous Current (A)
- $T :=$  Final time of average (Period in periodic sinusoidal signal) (s)
- $t_o :=$  Initial time of average (s)
- $W :=$  Work (J)

$$W = \int_{t_1}^{t_2} p(t) dt (J)$$

- $W :=$  Work (J)
- $p(t) :=$  Instantaneous Power

## Variables

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