

Parallel Circuits

Objectives:

Identify a parallel circuit.

Recognize that the applied voltage is the same across each branch.

Calculate current in each branch of a parallel circuit.

Calculate total current from the sum of the individual branches of a parallel circuit.

Calculate total resistance in a parallel circuit.

Measure current across each branch in a parallel circuit.

Measure the applied voltage across each branch in a parallel circuit.

Measure total resistance in a parallel circuit.

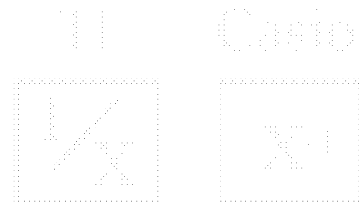
Parallel Circuit: Circuit with more than one path for current to flow.

Total Resistance: Inverse sum of all resistors.

$$R_T = (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1} \dots$$

Total Resistance is smaller than the smallest resistor.

Resistance decreases as more resistors are added.

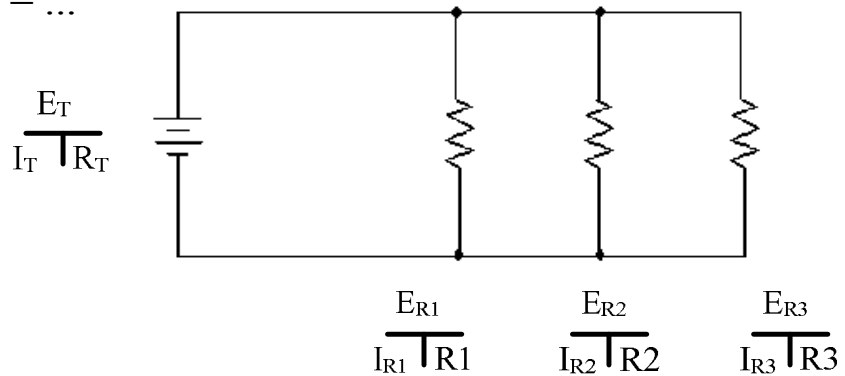


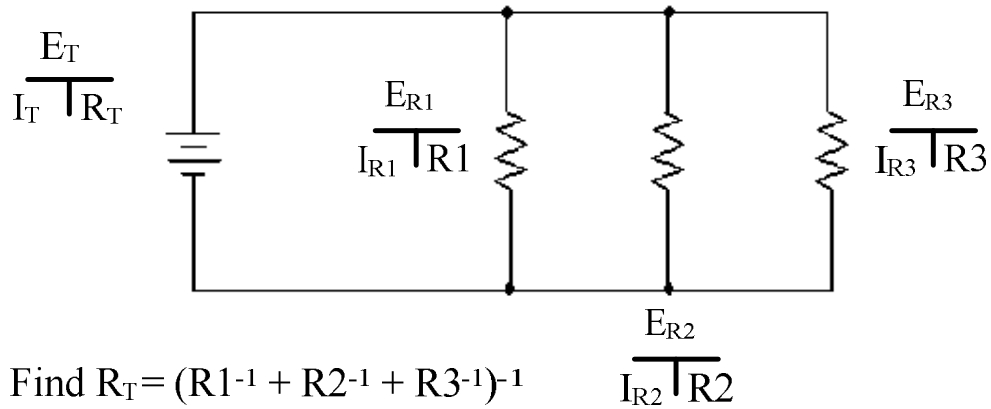
Total Current: Sum of all current branches.

$$I_T = I_{R1} + I_{R2} + I_{R3} + \dots$$

Total Voltage: Same throughout the circuit.

$$V_T = V_{R1} = V_{R2} = V_{R3} = \dots$$





Step 1. Find $R_T = (R1^{-1} + R2^{-1} + R3^{-1})^{-1}$

Step 2. Find $I_T = \frac{E_T}{R_T}$

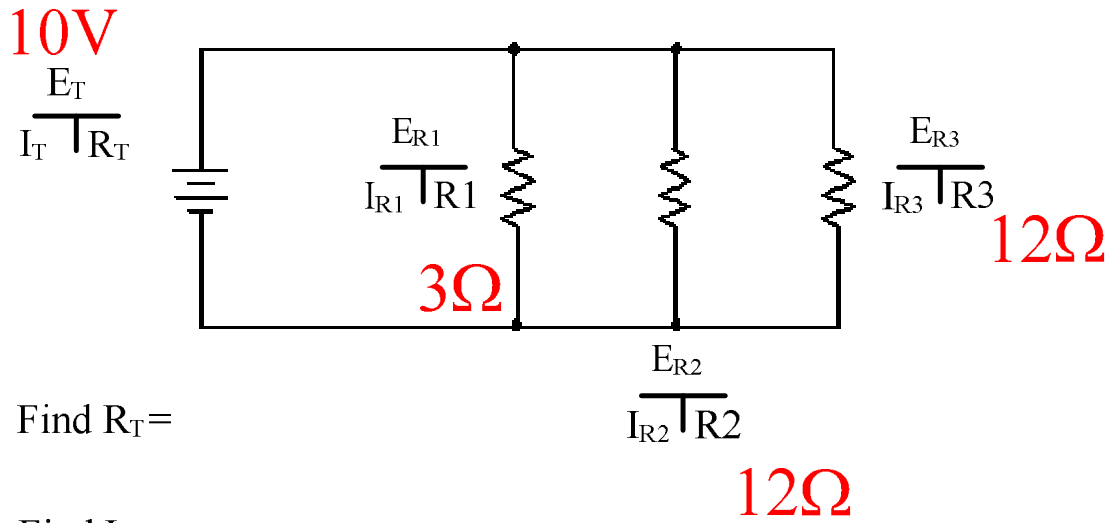
Step 3. Find Branch Currents

$$I_{R1} = \frac{E_T}{R1}$$

$$I_{R2} = \frac{E_T}{R2}$$

$$I_{R3} = \frac{E_T}{R3}$$

	V	I	R
Short	0V	Max	0Ω
Open	Max	0A	∞



Reveal

Step 1. Find $R_T =$

Reveal

Step 2. Find $I_T =$

Reveal

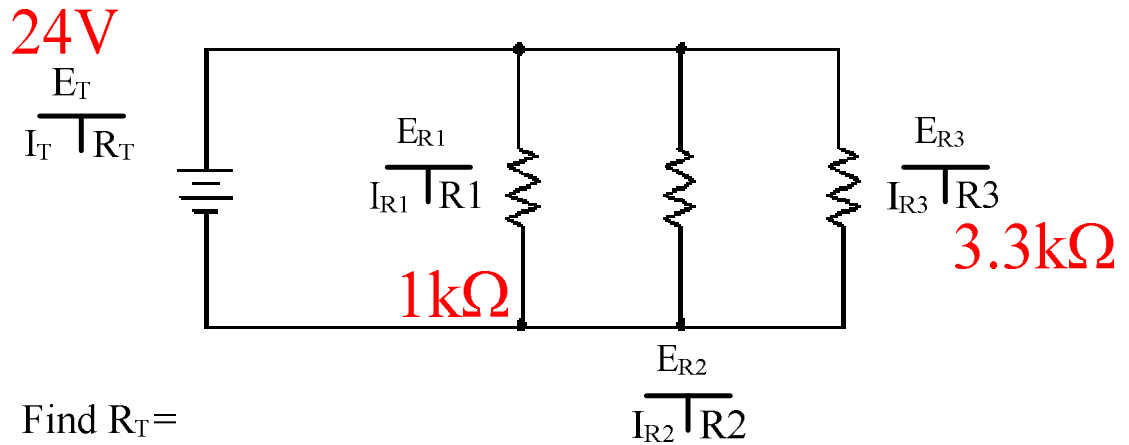
Step 3. Find Branch Currents

$I_{R1} =$

$I_{R2} =$

$I_{R3} =$

	V	I	R
Short	0V	Max	0Ω
Open	Max	0A	∞



Reveal

Step 1. Find $R_T =$

Reveal

Step 2. Find $I_T =$

$5.1mA$

Reveal

Step 3. Find Branch Currents

$I_{R1} =$

$R2 =$

$I_{R3} =$

	V	I	R
Short	0V	Max	0Ω
Open	Max	0A	∞