

Table 1

The analogy and comparison between heat and electric conductions.

Physical quantities, transport laws and equations	Electric conduction	Heat conduction
Transferred non- dissipative quantity	Electric charge, Q_e	Heat, Q_h
Potential	Electric potential (voltage), V	Thermal potential (temperature), T
Resistance	Electric resistance, R_e	Thermal resistance, R_h
Flow	Electric current, i	Heat flow, q
Conduction coefficient	Electric conductivity, σ	Thermal conductivity, k
Capacity	Electric capacity, c_e	Heat capacity, c_h
Transferred dissipative quantity	Electric potential energy, $E_e = \frac{1}{2}Q_e V$	Entransy, $G = \frac{1}{2}Q_h T$
Transport law	Ohm's law, $i = -\sigma \nabla V$	Fourier's law, $q = -k \nabla T$
One-dimensional transport equation	$\dot{Q}_e = \frac{\Delta V}{R_e}$	$\dot{Q}_h = \frac{\Delta T}{R_h}$