

SIEMENS (UNIT)

The siemens (symbol: S) is the SI derived unit of electric conductance. It is named after the German inventor and industrialist Ernst Werner von Siemens [[1]], and is equivalent to the now-obsolete mho. In English, it is siemens in both singular and plural.

Definition

For a device with electrical resistance R , the conductance G is defined as

$$G = \frac{1}{R} = \frac{I}{V},$$

Where

- G is the conductance,
- R is the resistance,
- I is the current through the device and
- V is the voltage "drop" (electrical potential difference) across the device.

The unit siemens for the conductance G is defined by $1 \text{ S} = 1 \text{ A/V} = 1 \text{ A}^2/\text{W} = 1 \text{ kg}^{-1} \cdot \text{m}^{-2} \cdot \text{s}^3 \cdot \text{A}^2 = 1 \text{ } \Omega^{-1}$.

Example: The conductance of a resistor with resistance 6 ohms is $G = 1/(6 \Omega) = 0.16... \text{ S}$.

SI multiples

Multiple	Name	Symbol	Multiple	Name	Symbol
100	siemens	S			
10 ¹	decasiemens	daS	10 ⁻¹	decisiemens	dS
10 ²	hectosiemens	hS	10 ⁻²	centisiemens	cS
10 ³	kilosiemens	kS	10 ⁻³	millisiemens	mS
10 ⁶	megasiemens	MS	10 ⁻⁶	microsiemens	μS
10 ⁹	gigasiemens	GS	10 ⁻⁹	nanosiemens	nS
10 ¹²	terasiemens	TS	10 ⁻¹²	picosiemens	pS
10 ¹⁵	petasiemens	PS	10 ⁻¹⁵	femtoiemens	fS
10 ¹⁸	exasiemens	ES	10 ⁻¹⁸	attosiemens	aS
10 ²¹	zettasiemens	ZS	10 ⁻²¹	zeptosiemens	zS
10 ²⁴	yottasiemens	YS	10 ⁻²⁴	yoctosiemens	yS

Mho

The siemens is equivalent to the now obsolete mho unit, which was derived from spelling ohm backwards and written with an upside-down capital Greek alphabet letter Omega: Ω , Unicode symbol U+2127 (Ω). The term siemens, as it is an SI unit, is used universally in science and primarily in electrical applications, while mho is still used primarily in electronic applications.

The upside down ohm symbol, while not an official SI unit, has the advantage of being less likely to be confused with a variable than the letter S when doing algebraic calculations by hand, where the usual typographical distinctions (such as italic for variables and roman for unit names) are difficult to maintain.

Furthermore, in some industries (like electronics) it is common to incorrectly write the symbol for second as S instead of s, causing potential confusion.

Source: [http://engineering.wikia.com/wiki/Siemens_\(unit\)](http://engineering.wikia.com/wiki/Siemens_(unit))