

Application Note What Is Joule

Subject: What is a JOULE? A joule rating indicates how much energy the surge protector can absorb before it fails. The higher the number, the greater the protection provided. The terms power and energy have been used somewhat synonymously. These two terms do not mean the same thing but there are occasions when they may be used interchangeably. Power is the ability to do work and is measured in watts. Energy is usually computed by multiplying the amount of power by the length of time the power is used. One watt of power working for one second is known as a wattsecond, or as a joule of energy.

If a 100 watt lamp is turned on for one second, it uses 100 joules of energy. During the time it is working, it is dissipating 100 watts of power. As you can see time is a very important part of this specification. If time is not given then the specification has no meaning. If you are comparing joule specifications, you must use the same time frame.

Most of the specifications are based on standard transient waveforms that have been developed to simulate or represent the transient overvoltage environment. These transient suppression standards were developed to serve three needs:

- 1) They are a useful "guide" to designers.
- 2) They give transient component manufacturing standards to which their components can be characterized and specified.
- 3) They give standard for compliance testing.

These standard transient waveform are stated as 8 X 20 microseconds, 10 X 1000 microseconds, etc on the specification sheets. IEEE has many standards with difference waveforms and the UL tests products using these standards.

The following figure is an example of a standard transient waveform.

