Overview

The following provides an explanation of the standard terms used when using fuse links for semiconductor protection. Further definitions can be found in EN 60269-1.

Rated breaking capacity

The rated breaking capacity is the highest prospective short-circuit current I_p that the fuse link can blow under prescribed conditions at 1.1 rated voltage.

Rated frequency

The rated frequency is the frequency for which the fuse link is rated with regard to power dissipation, current, voltage, characteristic curve and breaking capacity.

Rated voltage U_n

The rated voltage is the designated voltage of the fuse and according to which test conditions and operational voltage limits are determined.

For SITOR fuse links, the rated voltage is always the r.m.s. value of an AC voltage.

Rated current I_n

The rated current of a fuse link is the designated current of the fuse link and is the current up to which it can be continuously loaded under prescribed conditions (see page 2/78) without adverse affects.

Operational class

The operational class is the designation of the function class of a fuse link in connection with the object to be protected.

- gS operational class:
  Full range semiconductor safety fuse for use in safety switching devices
- gR operational class:
  Full range semiconductor protection
- aR operational class:
  Back-up semiconductor protection

Let-through current I_c

The let-through current I_c is the maximum instantaneous value of the current reached during a switching operation of the fuse.

Let-through current characteristic curve

The let-through current characteristic curve specifies the value of the let-through current at 50 Hz as a function of the prospective current.

Function class

The function class means the ability of a fuse link to carry specific currents without damage and to switch off over-currents within a certain range (breaking capacity range).

Function class a

Back-up fuses:
Fuse links, that carry currents at least up to their rated current and can interrupt currents above a specific multiple of their rated current up to their rated breaking capacity.

Function class g

Full range fuses:
Fuse links that can continuously carry currents up to at least their rated current and can interrupt currents from the smallest melting current through to the rated breaking capacity.

I^2t value

The I^2t value (joule integral) is the integral of the current squared over a specific time interval:

$$I^2t = \int_{t_0}^{t_1} i^2 \mathrm{d}t$$

Specifies the I^2t values for the melting process (I^2t_s) and for the shutdown cycle (I^2t_A, sum of melting and quenching I^2t value).

Power dissipation

Power dissipation is the power loss during the load of a fuse link with its rated current under prescribed conditions.

Peak arc voltage $\hat{U}_s$

The peak arc voltage is the highest value of the voltage that occurs at the contacts of the fuse link during the arc quenching time.

Residual value factor RW

The residual value factor is a reduction factor for determining the permissible load period of the fuse link with currents that exceed the permissible load current I_n' (see rated current I_n).

Prospective short-circuit current I_p

The prospective short-circuit current is the r.m.s. value of the line-frequency AC component, or the value of the direct current to be expected in the event of a short-circuit occurring after the fuse, were the fuse to be replaced by a component of negligible impedance.

Virtual time t_v

The virtual time is the time span calculated when a I^2t value is divided by the square of the prospective current:

$$t_v = \frac{\int i^2 \mathrm{d}t}{I_p^2}$$

The time/current characteristic curve gives the virtual melting time t_{vs}.

Varying load factor WL

The varying load factor is a reduction factor for the rated current with varying load states.

Recovery voltage U_w

The recovery voltage (r.m.s. value) is the voltage that occurs at the contacts of a fuse link after the power is cut off.

Time/current characteristic curve

The time/current characteristic curve specifies the virtual time (e.g. the melting time) as a function of the prospective current under specific operating conditions.