

Sensor Protection

Protecting sensors simply and securely

Sensors are used everywhere in the world. Whether they are battery driven or powered from the grid, it is important to have suitable protection for electronics. For this purpose, SCHURTER offers such SMD fuses for primary and secondary protection. These fuses stand out due to their compact design, low power dissipation and a tight time tolerance for tripping.

Sensors of various types help monitor and control processes. They relieve people of tasks, particularly in dangerous environments, and simplify work processes. Often sensors are equipped with a sort of "intelligence" in the form of electronics that process the sensor signal. Further, many sensors have a communications interface so they can transfer data over a network to a central computer. The application range of sensors is equally large and continues to grow: smoke alarms, motion detectors, temperature sensors, humidity sensors, level detectors, smart meters as well as flow and volume metering are just a few of the application areas, whereby this list could continue indefinitely.



Smart meters provide one of many applications for sensors (Source: shutterstock)

Secondary protection

Many sensors are fed with power independent of the power grid. Instead, they have either a battery or get the required energy from an autonomous system, for example a solar system. In order to function in such autonomous systems, sensors must meet equally high requirements, which among other things, include maintenance requirements and the desired service life. Accordingly, battery operated devices should consume as little power as possible so as to achieve a long, maintenance-free operating time. Further, effective overcurrent protection is essential for providing the necessary protection of sensitive components in case of a malfunction. Among the safety-related technical aspects are a short, precise response time and high reliability in both low and high temperatures of course

over the entire service life of the sensor. A compact form factor and a good price/performance ratio are additional key criteria.



Smoke detector reliability and long life are important properties (Source: shutterstock)

Because batteries in autonomous systems have very high power density, a short circuit can be all it takes to start a fire. To prevent damage to electronics and the environment, overcurrent protection is thus indispensable. This can be implemented both with an active solution as well as with a simple fuse. Here fuses offer clear advantages: compared to active solutions they are more reliable and take up less space. In addition, the latest-generation fuses are convincing because of very low power dissipation and precise tripping characteristics.

The USx line from SCHURTER — low-loss and precise acting

In order to meet the requirements of sensor protection in an optimal way, SCHURTER developed the USx line for overcurrent protection in secondary circuits. The USx line consists of six types (see Table 1) in various SMD sizes from 0402 to 1206 and with rated currents from 50 mA to 25 A. Considerable breaking capacity as large as 600 A at rated voltages of up to 125 VAC/VDC make the chip fuses in the USx line unique in the market. The partially gold-plated contacts also have a positive impact on usability, storage life and the electrical qualities of USx fuses.

The special design of these chip fuses also results in a low voltage drop. For example, it is only 87 mV for the 0.2 A design of the USFF

1206 at rated voltage. For the 1 A version of the USF 0402, the voltage drop at rated voltage is a low 65 mV, a feature which no other product on the market claims.

A further aspect that makes the USx line special is the tripping time. For the USFF 1206 and for a tenfold rated current, the UL 248-14 standard prescribes a tripping time between 0.1 and 1 millisecond; the SCHURTER fuse reacts with a typical tripping time as short as 0.5 milliseconds with a tolerance band of from 0.4 to 0.6 milliseconds (see figure 1). These performance characteristics also do not change even under high pulsed loads such as those that can arise in an environment with electronically commuted motors.

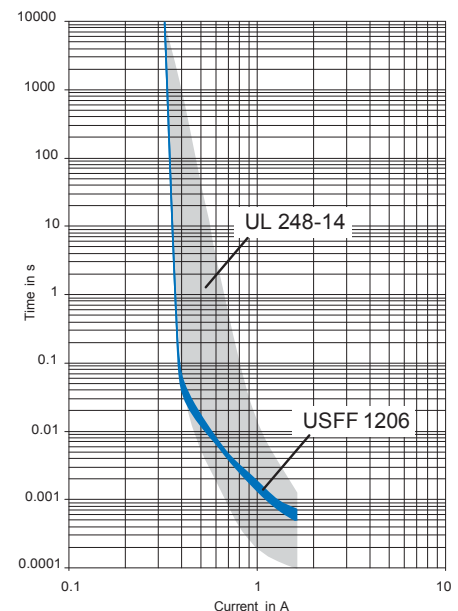


Figure 1: Precise trigger time window of the USFF 1206 (160 mA) compared with the UL 248-14

Primary protection

Sensor applications can in some cases be attached to the power grid. This applies especially for those with more intelligence. Examples include smart power meters that are used in a "smart grid". In places where sensors are connected to the power grid, they need primary protection that can handle short circuits and grid spikes such as those that can arise from a lightning strike close to the equipment. Here, too, fuses are very well suited for protecting sensors. They offer the same advantages as protection in secondary circuits: precise response time, reliable tripping

across a wide temperature range during the entire service life of the fuse, low power consumption, compact design and an attractive price/performance ratio. Today, fuses in the SMD form factor have no problem achieving the performance of the well-known 5x20 cartridge fuses and can replace them.

The UMx line from SCHURTER — compact with high performance

The UMT-H, UMF 250 and UMT 250 SMD fuses were developed for primary protection on SMD circuit boards. They are designed for rated voltages as large as 277 VAC,

respectively 250 VDC and are available with various current ratings (see Table 2). With a high breaking capacity extending up to 1500 A, the UMx line offers the ideal solution when dealing with high fault currents. The cuboidal design of the UMx line meets all the requirements of SMD technology as regards processing. Based on their encapsulated qualities, they can also be used in potentially explosive atmospheres. The model UMT 250 is also available with pre-attached clips.

Specifications







Secondary protection						
	USF 0402	USF 0603	USF 1206	USFF 1206	USI 1206	UST 1206
Rated voltage	- 24 - 32 VDC	32 VAC 32 - 63 VDC	32 - 125 VAC 63 - 125 VDC	125 VAC 63 VDC	32 VAC 63 VDC	32 VAC 63 VDC
Rated current	0.375 - 5 A	0.5 - 5 A	0.375 - 4 A	0.05 - 0.25 A	0.5 - 6.3 A	7 - 25 A
Breaking capacity	35 A	50 A	50 - 600 A	100 A	63 - 600 A	100 - 600 A
Characteristics	Super-quick-acting FF	Super-quick-acting FF	Super-quick-acting FF	Super-quick-acting FF	Quick-acting F	Time-lag T
Dimensions [mm]	1.05 x 0.55	1.6 x 0.8	3.2 x 1.6	3.2 x 1.6	3.2 x 1.6	3.2 x 1.6
Approvals	cURus	cURus	cURus	cURus	VDE, cURus	cURus

Table 1: USx line





Primary protection				
	UMF 250	UMT 250	UMT-H	UMZ 250 (Clip)
Rated voltage	250 VAC 125 VDC	250 - 277 VAC 250 VDC	277 VAC 250 VDC	277 VAC 250 VDC
Rated current	0.5 - 10 A	0.08 - 10 A	0.16 - 16 A	0.08 - 4 A
Breaking capacity	100 - 200 A	35 - 200 A	1500 A	35 - 200 A
Characteristics	Flink F	Time-lag T	Time-lag T	Time-lag T
Dimensions [mm]	3 x 10.1	3 x 10.1	5.3 x 16	4 x 4.2 x 11.1
Approvals	VDE, cURus	VDE, UL, cURus, CQC, PSE, KC	VDE, cURus	VDE, cURus

Table 2: UMx line

Customer first

SCHURTER is a competent partner in the circuit protection field. The company supports its customers with the knowledge: whenever the standard product is not enough, then SCHURTER will tailor a solution for you.

Company

SCHURTER continues to be a progressive innovator and manufacturer of electronic and electrical components worldwide. Our products ensure safe and clean supply of power, while making equipment easy to use. We offer a broad range of standard products including circuit protection, connectors, EMC products, switches and input systems, as well as electronic manufacturing services. Moreover, SCHURTER is ready to work with

our customers to meet their application specific requirements, not covered in our standard range. You can rely on SCHURTER's global network of companies and partners to guarantee a high level of local service and product delivery.

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