eFuses Enhance Efficiency In 12-V Hot-Swap Applications

Nexperia's NPS3102A and NPS3102B electronic fuses (eFuses) are low-ohmic (17 mΩ), high-current (13.5 A), resettable electronic fuses offering protection of downstream loads from exposure to excessive voltages while also protecting power supplies from load faults and large inrush currents.

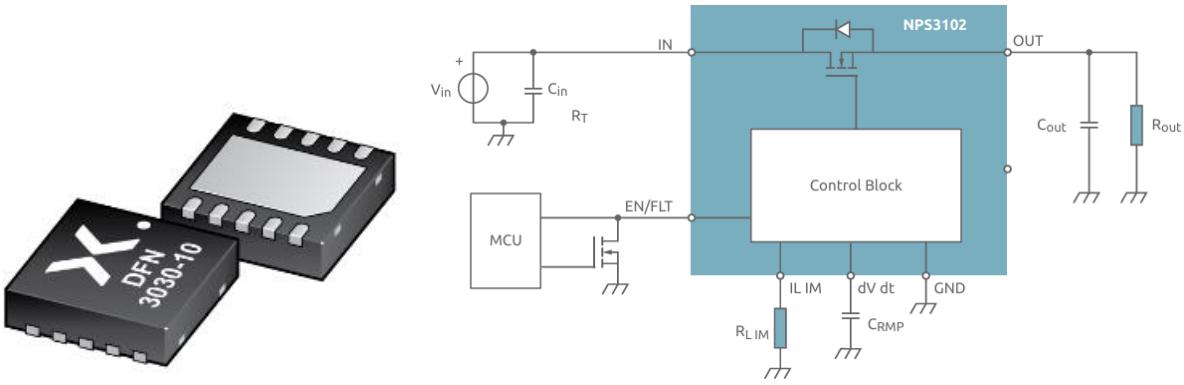
These devices have a wide input voltage range (21-V abs. max) and have an integrated low-resistance pass MOSFET which minimizes voltage drop and power loss. This feature helps to increase operating efficiency beyond that attainable from similar competing devices in the same package type, according to the vendor (see the figure).

These eFuses have been designed for use in various 12-V hot-swap applications including enterprise communication and storage equipment found in data centers. Among the specific products that may benefit are solid-state and hard-disk drives, servers, ethernet switches and routers. Additionally, the eFuses can be used to protect mobile communications infrastructure like 5G radio-heads and industrial automation equipment like programmable logic controllers (PLCs).

The current clamp limit can be adjusted in the 2-A to 13.5-A range using a resistor at the ILIM pin, which can also be used to measure load current in real time. Both devices include a built-in overvoltage clamp that limits the output voltage during an input overvoltage condition, with a 2-µs short-circuit protection response time.

The pass-FET in the NPS3102A must be manually reset after a fault event whereas the NPS3102B integrates an auto-retry block, which safely attempts to reenable the pass-FET without the need for user intervention. Apart from having the ability to quickly protect systems against input and output overvoltages and large inrush currents, the eFuses are designed to protect the downstream loads from high current fault conditions given their 10% current limiting accuracy.

The NPS3102A and NPS3102B are available in DFN3030-10/SOT8037-1 leadless plastic packages measuring 3.0 x 3.0 x 0.75 mm. To learn more, see the eFuse page.



(a) (b)

Figure. The NPS3102A and NPS3102B resettable electronics fuses with a low-resistance (17-mΩ) FET that minimizes power dissipation. According the vendor, these devices offer increased efficiency versus similar competing devices in the same package type. The product package (a) and typical eFuse application circuit (b) are shown here.