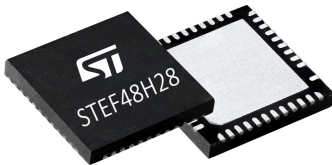


## 30 A electronic fuse for the 9 - 80 V DC rails



QFN42L – (7x7 mm)

Maturity status link

[STEF48H28](#)

### Features

- 30 A continuous current
- Input voltage range from 9 to 80 V
- Absolute maximum rating 95 V
- SMBUS™ interface
- PMBUS®™ V 1.3.1 commands compliant
- Adjustable UVLO and OVLO
- Integrated 1.7 mΩ power MOSFET
- Overcurrent protection with adjustable threshold and timeout
- Fast, adjustable short-circuit protection
- Thermal protection
- Power good, fault, and reset functions
- Programmable soft-start and turn-on delay time
- Precise current monitor signal
- Precise temperature monitor
- Digital voltage, current, power, energy, and temperature telemetry
- Parallel operation
- Integrated MOSFET diagnostic features
- Integrated black-box function
- Fault latch or auto-retry configuration
- -40 °C < T<sub>J</sub> < 125 °C operating temperature
- QFN42L (7x7 mm) package - IPC2221B 100 V spacing compatible

### Applications

- 48 V server and IT trays hotswap
- GPU and accelerators cards
- Industrial power distribution
- High power 24 - 48 V rail protection
- Telecom infrastructures

### Description

The **STEF48H28** is an advanced 30 A integrated electronic fuse for the 9 - 80 V DC power lines.

Connected in series to the main power rail, it provides protections from inrush, under/overvoltage, and overcurrent conditions. When an overload condition occurs, the device reacts with a (I x t) approach with adaptive time to shut down. The overcurrent protection curve can be customized to accommodate for pulsed overloads, typical of CPUs/GPUs. If the overload persists, the device disconnects the load from the bus.

A precise current monitor signal provides continuous information about the load current to the system controller IC. Similarly, a precise temperature sensor generates a monitor signal that permits the system controller to keep the device's power dissipation under control.

Adjustable insertion delay and soft-start time help control the in-rush current during startup operations.

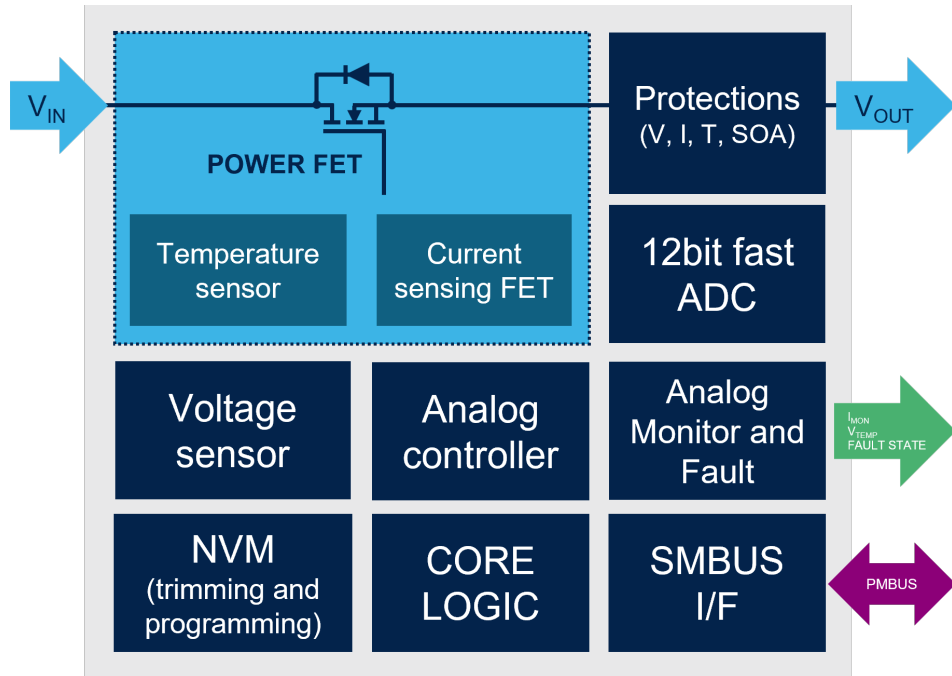
The device also embeds user-adjustable undervoltage/overvoltage lockout protection, power good, self-diagnostic, and thermal protection.

Telemetry and status information is available both in analog form and on the digital PMBUS® interface.

Multiple STEF48H28 can be connected in parallel to support high-power systems, such as AI servers and supercomputers.

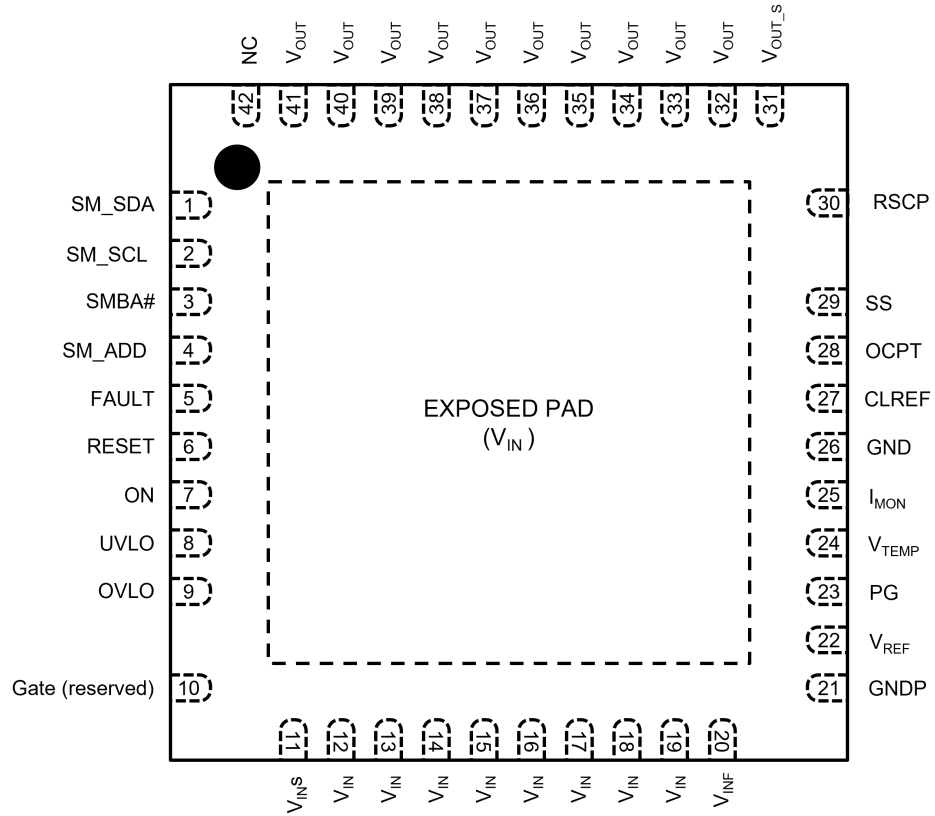
1 Diagram

Figure 1. Block diagram



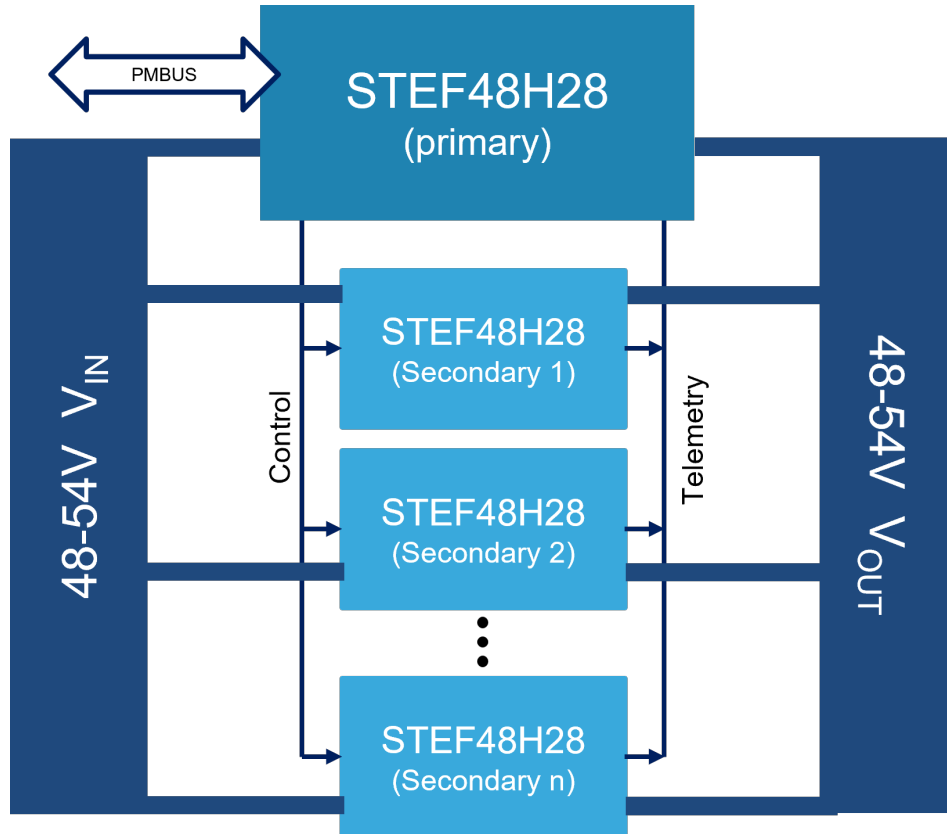
## 2 Pin configuration

Figure 2. Pin connection (top view)



### 3 Typical application circuit

Figure 3. Typical application diagram (multiple eFuses in parallel)



## 4 Device functional description

The STEF48H28 is a complete and robust fully integrated solution to monitor and protect electronic systems powered by DC voltages in a wide 9 to 80 V range. It provides undervoltage/overvoltage and overcurrent protection to the system, isolating a faulty load from the power supply or vice versa.

Once enabled, the device performs a soft, linear startup to minimize the inrush current into the output capacitor and to avoid startups into faulty loads.

This function is useful in hot-swappable boards/systems since it limits the voltage droop on the power bus supply voltage and prevents unwanted resets of the system power and interferences.

During normal operation, the eFuse works as a low-resistance power switch, therefore the output voltage follows the input one.

The device reacts to overcurrent events with a (I x t) approach: once overcurrent is triggered, a programmable safety timer starts. In case the overload lasts longer than the timer, or in case the die temperature hits the thermal protection threshold, the device goes into shutdown, the internal switch is turned-off, and the load is disconnected from the power supply.

The eFuse embeds a user-adjustable fast short-circuit protection too, which protects the device and the system from catastrophic output short-circuits.

The overcurrent protection and soft-start features are programmable by the users.

Two or more eFuses can be put in parallel to increase the total current. In this case only one STEF48H28 eFuse is configured as the “primary eFuse” and connected to the PMBUS® (if present), all the others act as “secondary eFuses”, wired to the primary to accomplish simultaneous operation.

With this configuration, the hot-swap block composed of several paralleled eFuses is interfaced to the system as if it was a single hot-swap controller/eFuse.

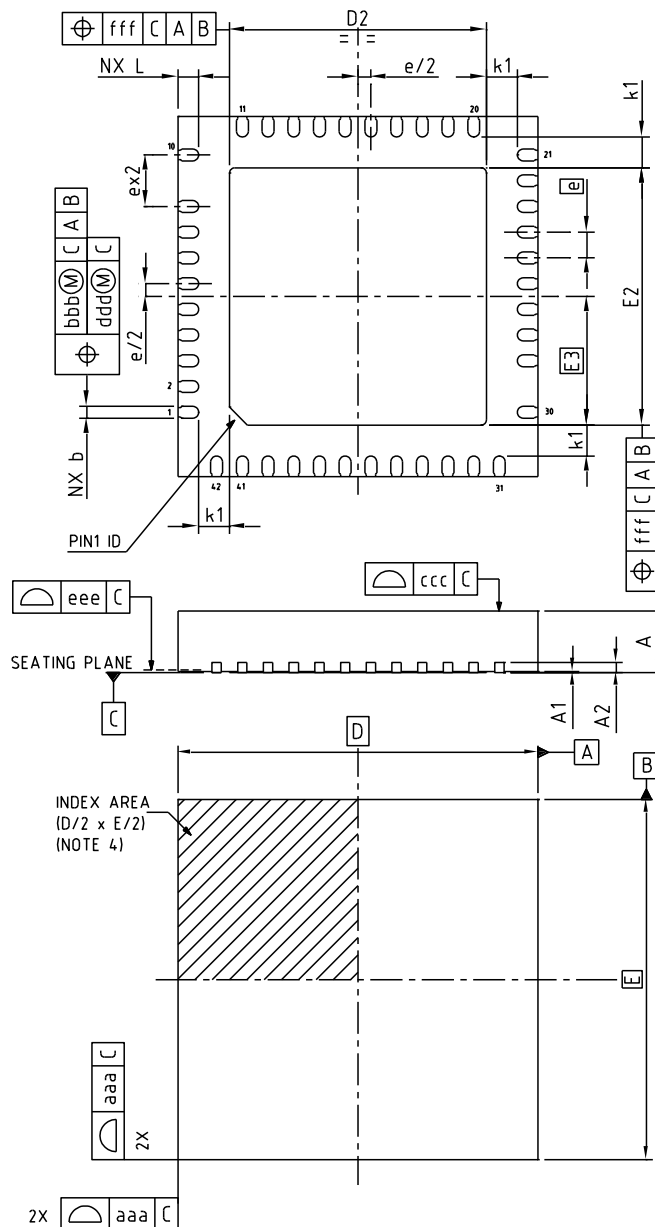
In fact, the primary eFuse provides telemetry (Voltage, Current, Power, and Temperature) and status information related to the whole block to the system, while managing the internal communications, fault management and propagation, and time sequencing among all the parallel devices.

## 5 Package information

To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 5.1 QFN42L package information

Figure 4. QFN42L package outline



**Table 1. QFN42L mechanical data**

Dim.	mm			Note
	Min.	Typ.	Max.	
A	1.10	1.20	1.30	(1)(2)
A1	0.00	0.02	0.05	(1) (2) (3)
A2	0.2 REF			(1) (2)
b	0.18	0.23	0.28	(1) (2) (4)
D	7.00 BSC			(1) (2)
D2	4.90	5.00	5.10	(1) (2)
e	0.5			(1) (2)
E	7.00 BSC			(1) (2)
E2	4.90	5.00	5.10	(1) (2)
E3	2.50 REF.			(1) (2)
L	0.35	0.40	0.45	(1) (2)
K1	0.50	0.60	0.70	(1) (2)
N	42			
<b>Tolerance of form and position</b>				
aaa	0.15			(1) (2) (5)
bbb	0.10			
ccc	0.08			
ddd	0.05			
eee	0.10			
fff	0.10			

1. Dimensioning and tolerancing schemes conform to ASME Y14.5M-1994.
2. All dimensions are in millimeters.
3. A1 is defined as the distance from the seating plane to the lowest point on the package body.
4. These dimensions apply to the flat section of the lead between 0.10 mm and 0.25 mm from the lead tip.
5. Datum A and B to be determined at datum plane C.



## Revision history

**Table 2. Document revision history**

Date	Revision	Changes
05-Nov-2024	1	Initial release.

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