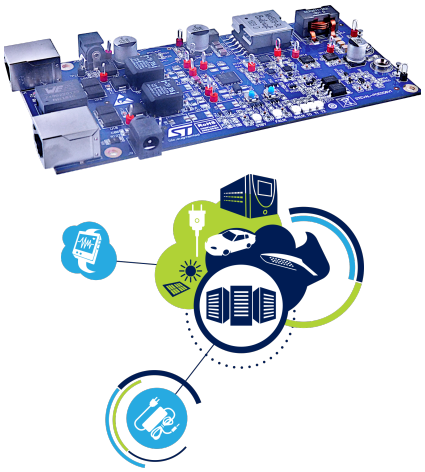
STEVAL-POE006V1

Data brief

3.3V/20A, active clamp forward converter, Power Over Ethernet (PoE) IEEE 802.3bt compliant reference design



Product summary	
High power PoE PD, 3 V up to 20 A active clamp forward evaluation board	STEVAL-POE006V1
PWM peak current mode controller for PoE and telecom systems	PM8804
IEEE802.3bt PoE-PD interface with integrated dual-active bridge	PM8805

Features

- Features of the PM8805 PoE-PD interface:
  - System in package integrating a double active bridge, a hot-swap MOSFET and a PoE-PD
  - Supports legacy high power, 4-pair applications
  - 100 V N-ch MOSFETs with 0.2 Ω total path resistance for each active bridge
  - Identifies which kind of PSE (standard or legacy) it is connected to and provides successful IEEE 802.3af/at/bt classification indication as a combination of the T0, T1 and T2 signals (open drain)
  - Smart operation mode selection through the STBY, FAUX and RAUX control signals
  - QFN 56 8x8mm package with 43 pins and 6 exposed pads
- Features of the PM8804 PWM controller:
  - PWM peak current mode controller
  - Input operating voltage up to 75 V
  - Internal high voltage start up regulator with 20 mA capability
  - Programmable fixed frequency up to 1 Mhz
  - Soft startup with settable time
  - Soft turn off (optionally disabled)
  - Dual 1 A_{PK}, low side complementary gate drivers
  - GATE2 can be turned off for reduced consumption
  - 80% maximum duty cycle with internal slope compensation
  - QFN 16 3x3mm package with exposed pad

Description

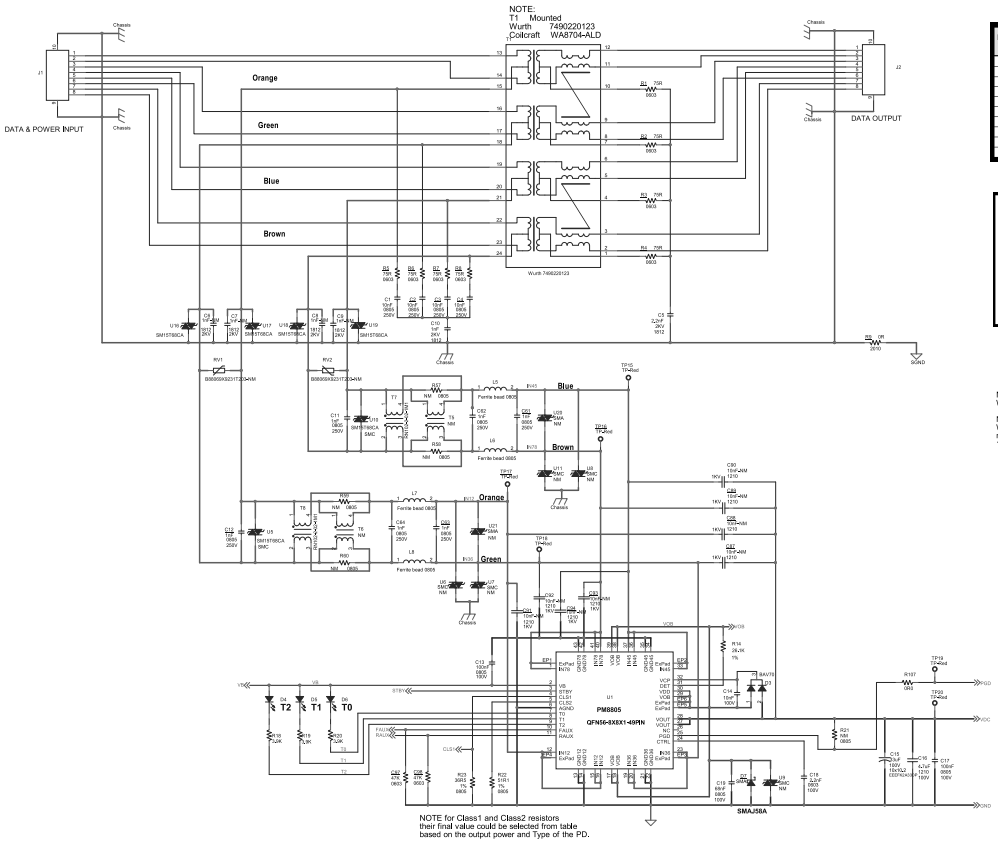
This reference design represents a 3.3 V, 20 A converter solution ideal for various applications including wireless access points, supplied with a PoE-PD interface and a DC-DC active clamp forward converter.

The PoE-PD interface is based on the PM8805 system in package device with two active bridges and an IEEE 802.3bt compliant Powered Device (PD) interface. It can be used in all medium-to-high power 2P and 4P high efficiency PoE and PoE+ applications.

The DC-DC active clamp forward converter is designed around the PM8804 PWM controller, which is an integrated solution for smart and efficient 48 V converters, featuring a programmable oscillator for the switching frequency, adjustable slope compensation, dual complementary low-side drivers with programmable dead time, programmable soft start, soft turn off and a programmable current sense blanking time.

1 Schematic diagrams

Figure 1. STEVAL-POE006V1 circuit schematic (1 of 3)



PD Requested Class	Number of PSE class events	Assigned Class	Power Available at the PD PI	Outputs	
				T0	T1
any	0	0	13.0 W	1	1
0	1	0	13.0 W	1	1
1	1	1	3.84 W	1	1
2	1	2	6.49 W	1	1
3 to 8	1	3 or 0	13.0 W	1	1
4 to 8	2 or 3	4	25.5 W	0	1
5	4	5	40.0 W	1	0
6 to 8	4	6	51.0 W	1	0
7	5	7	62.0 W	0	0
8	5	8	71.3 W	0	0

PD class	CLS1 resistor (Ω)	CLS2 resistor (Ω)	Min (mA)	Max (mA)
Class 0	2k	2k	0	4.0
Class 1	150	150	9.0	12.0
Class 2	80.6	80.6	17.0	20.0
Class 3	51.1	51.1	26.0	30.0
Class 4	36.5	36.5	36.0	44.0
Class 5	36.5	2K	36 / 0	44 / 4
Class 6	36.5	150	36 / 9	44 / 12
Class 7	36.5	80.6	36 / 17	44 / 20
Class 8	36.5	51.1	36 / 26	44 / 30

NOTE for Resistors
Where not indicated the body is 0603 and tolerance 5%

NOTE for Capacitors
Where not indicated the body is 0603, the voltage is 100V
material X7R and tolerance 10%
100nF 100V is X7R 10% 0805.

Figure 2. **STEVAL-POE006V1 circuit schematic (2 of 3)**

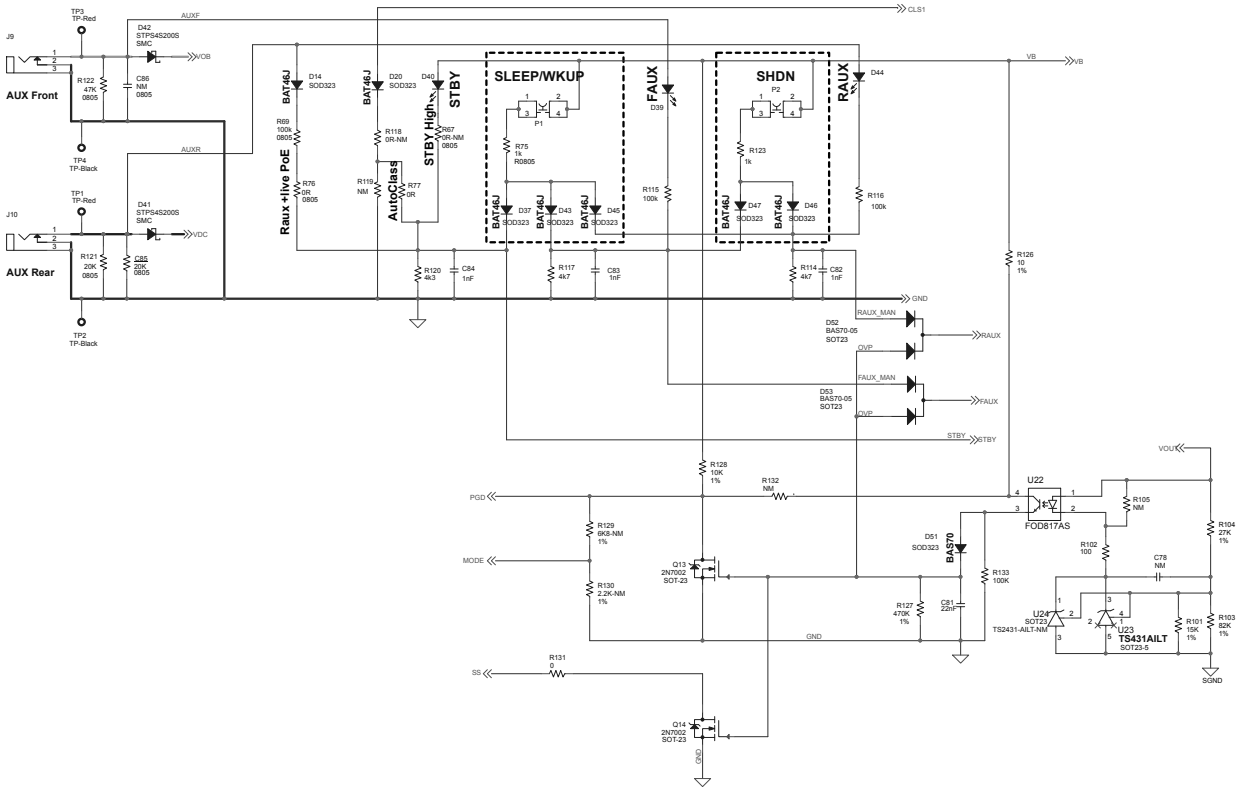
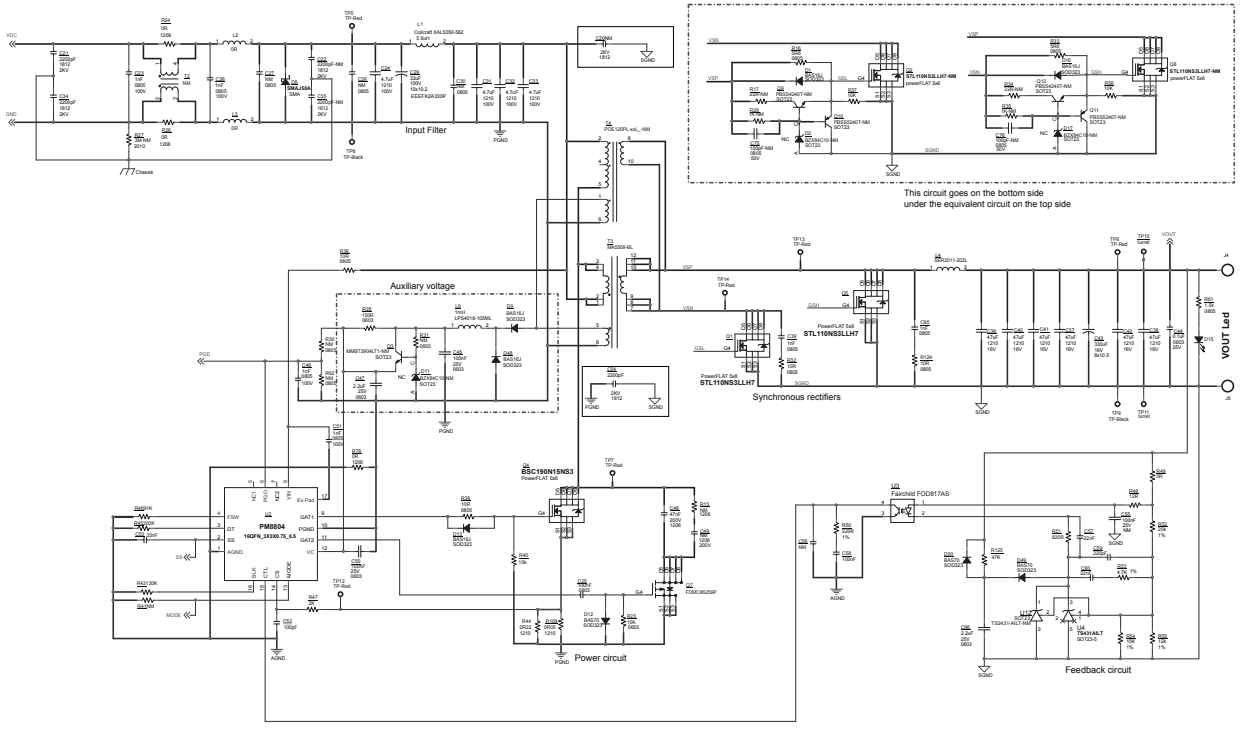


Figure 3. **STEVAL-POE006V1 circuit schematic (3 of 3)**



Revision history

Table 1. Document revision history

Date	Version	Changes
20-Dec-2018	1	Initial release.
07-May-2019	2	Updated document title. Minor changes to cover page Features and Description.
14-Jun-2019	3	Minor text changes.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

STMicroelectronics:
STEVAL-POE006V1