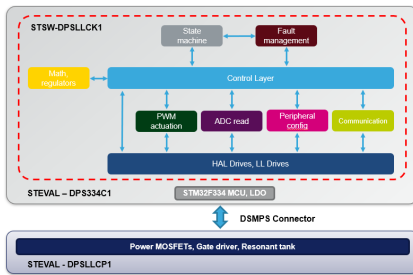


STM32F334 full bridge LLC firmware package for STEVAL-DPSLLCK1



Features

- Designed for STM32F334x microcontroller
- IAR Embedded workbench toolchain
- Power MOSFET driving with high resolution timer (HRTIM), 217 ps resolution
- Switching frequency: 120 to 250 kHz in closed loop operation, starting from 380 kHz at power on
- Adaptive synchronous rectification (SR) algorithm
- Burst mode for light loads to improve efficiency
- Frequency start-up to avoid current spikes at power on
- PI voltage control loop performed at 50 kHz
- Fan driving logic based on output power and temperature
- Fast overcurrent protection
- Undervoltage and overvoltage protection on input and output
- Over-temperature protection
- Failed start-up procedure
- LED driving logic according to faults and internal state machine
- Open loop operation mode
- Serial user interface
- Doxygen and LaTeX documentation

Description

The STSW-DPSLLCK1 firmware package for the STEVAL-DPSLLCK1 3 kW full bridge LLC converter kit includes the application code to regulate the output voltage, as well as all the protection and control features. The firmware comes loaded on the STEVAL-DPS334C1 digital control board and runs on the embedded STM32F334R8 microcontroller. It can be modified with the IAR Embedded Workbench toolchain.

The primary side MOSFETs are driven by 50% duty cycle PWM signals, with an appropriate dead time for each leg to ensure ZVS operation and avoid input voltage shoot-through. The PI voltage regulator runs at 50 kHz and provides the PWM switching period for primary side devices to adjust the voltage gain of the resonant tank and regulate the output voltage to the desired 48 V.

When the board is powered on, the start-up procedure decreases the frequency linearly from 380 kHz down to the value given by control loop, to avoid current spikes.

An adaptive SR algorithm based on V_{DS} sensing drives the secondary side MOSFETs and reduces conduction losses, while Burst mode operation for light loads reduces switching losses and improves converter efficiency.

The control FW also provides fast overcurrent protection, undervoltage and overvoltage protection on the input and output, and an over-temperature protection.

An additional PWM signal is used to drive the fan on the power board at a speed that is determined from the output load and heatsink temperature.

The serial user interface allows you to change the main parameters of the converter and enable or disable control features like open loop operation.

Product summary	
firmware package for STEVAL-DPSLLCK1 evaluation board	STSW-DPSLLCK1
3 kW power supply evaluation kit	STEWAL-DPSLLCK1
Application	Digital Power

Revision history

Table 1. Document revision history

Date	Version	Changes
12-Apr-2018	1	Initial release.
09-Apr-2020	2	Updated description and product summary. Added cover image.

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