



NXP LFAK MOSFETs PH2525L and PH5525L application

25-A POL converter with over 90% efficiency using LFAK MOSFETs

This small, low-cost design, which combines NXP MOSFETs in LFAK packages with a PWM controller from Texas Instruments, uses industry-standard construction and operating conditions to deliver an output current of up to 25 amps and an efficiency of over 90%.

Key features

- ▶ Output current up to 25 amps
- ▶ Efficiency above 90%
- ▶ Input from 5 to 13 volts
- ▶ Output voltage from 0.8 to 5 volts
- ▶ Selectable output voltage
- ▶ Components used:
 - NXP 2.5 m Ω sync FET PH2525L
 - NXP 5.5 m Ω control FET PH5525L
 - Texas Instruments PWM controller TPS40071

This point-of-load (POL) converter combines NXP MOSFETs, housed in loss-free packages (LFAK), and a PWM controller TPS40071 from Texas Instruments.

The SOT669 LFAK package has the same compact footprint of an SO8 package. By using an underside thermal pad electrically connected to the Drain, NXP's LFAK MOSFETs enable a superior level of on-resistance and thermal performance.



With adequate airflow, the POL converter provides continuous output currents up to 25 A with an efficiency of over 90%.

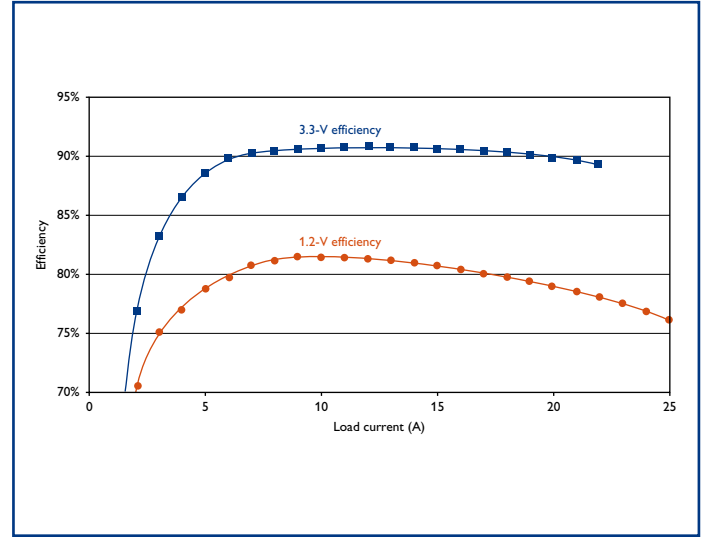
Using LFAK MOSFETs reduces the footprint of the design. Implemented in a four-layer board, the POL converter measures 3.2 x 6.0 cm. Large pad areas on the Drain and Source are used to dissipate the heat generated by the MOSFETs.

The POL converter uses 25-V MOSFETs to create a single-phase buck converter that has a full operating range of from 5 to 13 V with a nominal input voltage of 12 V. The NXP PH2525L is a 2.5-m Ω sync FET, and the NXP PH5525L is a 5.5-m Ω control FET.

The output voltage (V_O) is set to 1.2 V and is adjustable from 0.8 to 5.0 V with a single resistor. Changes in the output voltage should be accompanied by adjustments in the current-limit resistor.

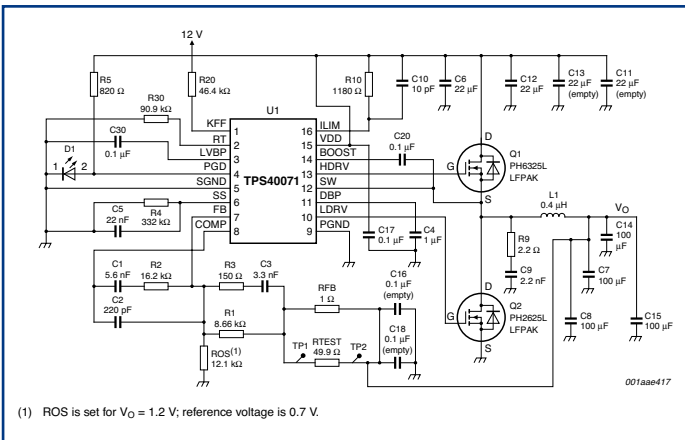
The efficiency diagram is plotted for V_O voltages of 1.2 and 3.3 V. The input voltage for both sweeps is 12 V, and the switching frequency is 500 kHz. The maximum current swept is the level that produces FET case temperatures of 90 °C. Airflow is 1.0 m/s (200 LFM). With greater airflow, higher currents can be achieved.

The Texas Instruments PWM controller provides several benefits, including a voltage operating range of 4.5 to 28 V, a high-side current limit, source and sink drivers, and anti-cross conduction protection.



Implemented in a four-layer PC board, the 25-A POL converter measures 3.2 x 6.0 cm

Efficiency in the 25-A POL converter is over 90%



Block diagram of the 25-A POL converter