

Negative 36-V LDO Delivers Low-Noise Performance

Texas Instruments' TPS7A30 low dropout regulator (LDO) is being introduced as the industry's first negative 36-V LDO (Fig.1.) Offering very high PSRR and low output noise, the TPS7A30 may be paired with the TPS7A49 positive voltage LDO to achieve a total solution for powering precision analog applications. The TPS7A30 generates 200 mA, while the TPS7A49 produces 150 mA.

With its -3.0-V to -36-V input range, the TPS7A30 can provide the type of voltage stepdown normally associated with LDOs such as -5 V to -3.3 V while withstanding the transient voltages often encountered in industrial applications. This high input-voltage capability can reduce the need for discrete transient-protection diodes. The input range also benefits analog circuitry such as op amps, ADCs, and DACs, which may require clean bi-polar power rails such as ± 15 V. The TPS7A49 has a matching input range of +3.0 V to +36 V.

The LDOs are designed for noise-sensitive applications such as test equipment; industrial, networking and telecom equipment; base stations; microwave and radio links; noise filtering for receive, transmit and power amplifiers; and medical applications. PSRR for the TPS7A30 is specified as 72 dB at 1 kHz and 55 dB from 10 kHz to 700 kHz. Meanwhile, this LDO's output noise is a low 16 μ V rms from 10 kHz to 100 kHz.

LDO design typically involves a tradeoff of noise performance and quiescent current. However, the TPS7A30 achieves a typical I_Q of only 55 μ A at no load. Fig. 2. shows the TPS7A30 and the TPS7A49 in a dual supply application in which the LDOs generate clean ± 12 -V rails from ± 18 -V rails generated by a SWIFT dc-dc converter.

The TPS7A30/TPS7A49 linear regulator family is stable with any output capacitance greater than 2.2 μ F, enabling use of small, low-cost ceramic capacitors. The LDOs come in an adjustable version with an output voltage ranging from 1.22 V to 34 V. These LDOs also feature 1.5% nominal accuracy over load, line and temperature for better precision for VCOs, PLLs and ADCs. The TPS7A30 and TPS7A49 are available now in MSOP-8 PowerPAD packaging and are priced at \$1.50 and \$1.10, respectively, in quantities of 1,000. For details see www.ti.com/tps7A30-pr.

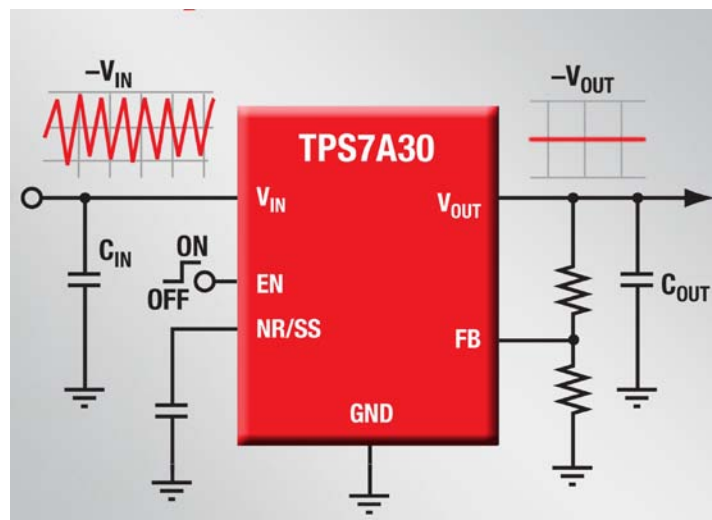
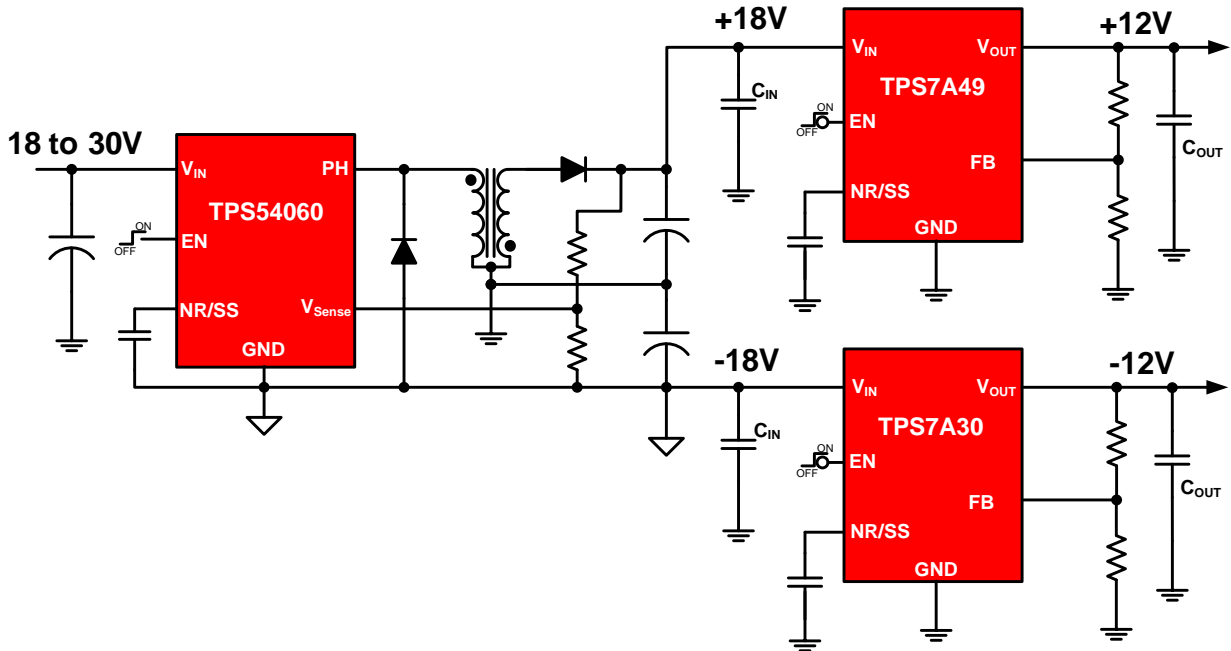
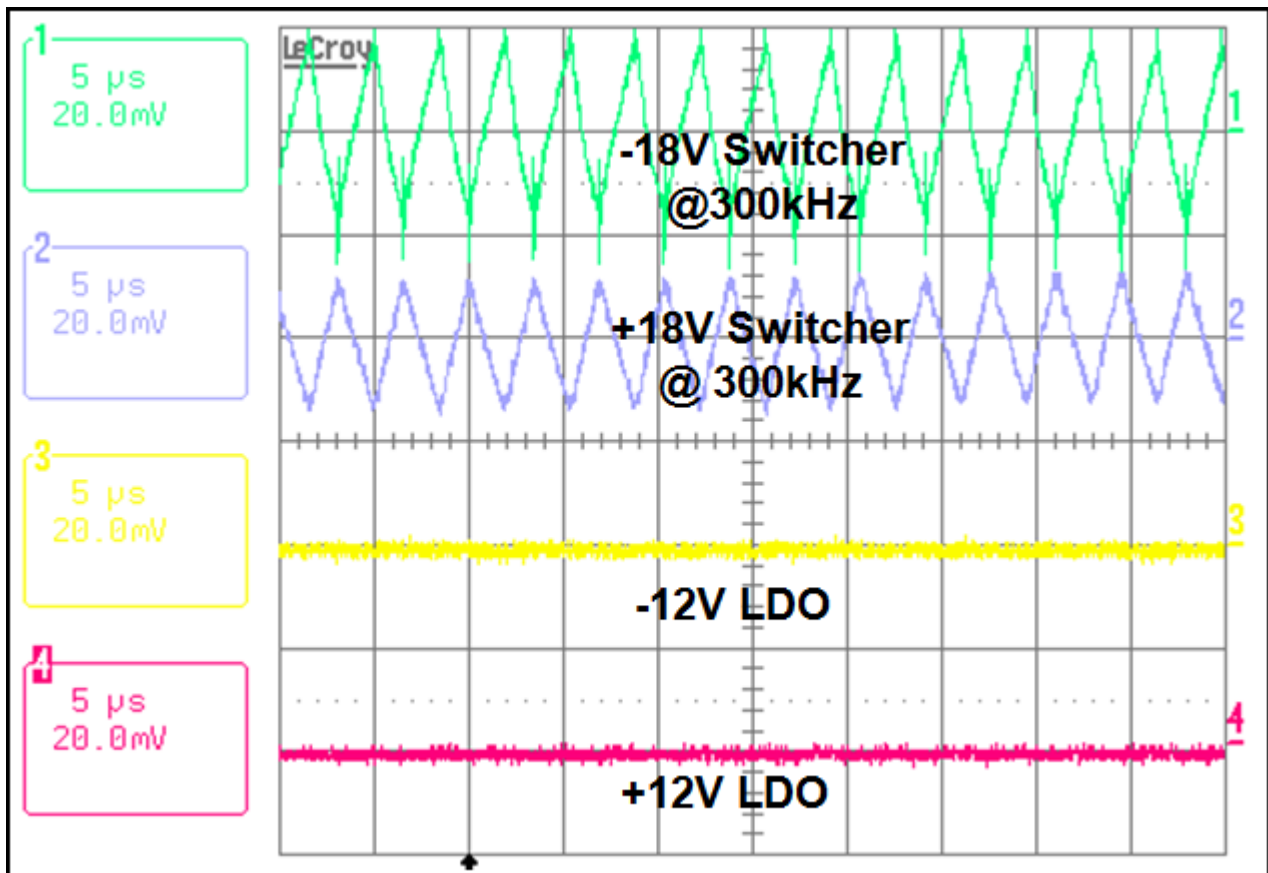


Fig. 1. With its wide, -3.0-V to -36-V input range, the TPS7A30 LDO can generate the negative supply rails needed in industrial applications while reducing the need for transient voltage protection.



(a)



(b)

Fig. 2. The TPS7A30 negative LDO may be paired with the TPS7A49 positive LDO to generate the clean supply rails required for powering precision analog circuitry (a). In this example, the LDOs greatly attenuate the ripple generated by the TPS54060 SWIFT dc-dc converter (b).