

Negative / Positive-Negative / Low-Power Isolated Power Supply Solutions

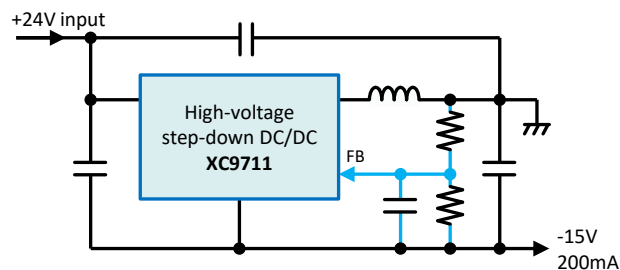
■ Negative & Positive-Negative Power Supply for Biasing

● Technical trend and challenges

- Negative or positive-negative power supply required for bias power supplies for operational amplifiers.
- Inverting DC/DC converters are limited, presenting challenges in cost, performance, and availability.

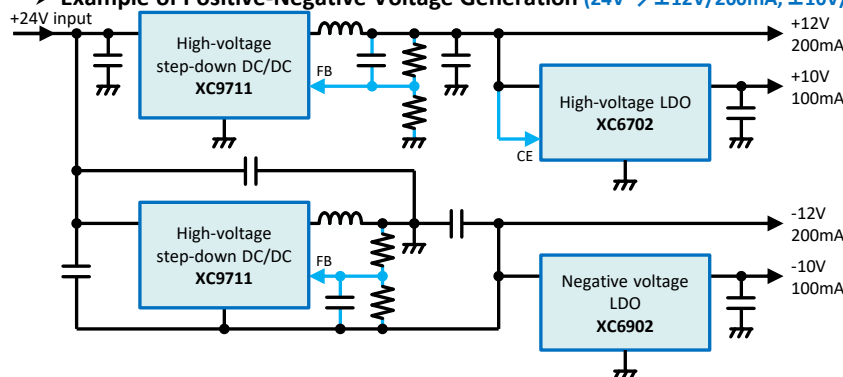
● TOREX Proposal : Generating Negative Voltage Using a Step-Down DC/DC

➤ Example of Generating Negative Voltage (24V → -15V/200mA)



- Negative voltage output using the step-down DC/DC, **XC9711/XC9714**.
- “**DC/DC Simulation**”: Select XC9711(inverting) for simulation.

➤ Example of Positive-Negative Voltage Generation (24V → ±12V/200mA, ±10V/100mA)



- Using the step-down DC/DC **XC9711** to output ±12V from 24V
- Following the DC/DC, a high-speed LDO **XC6702**, and negative voltage LDO **XC6902** output ±10V.

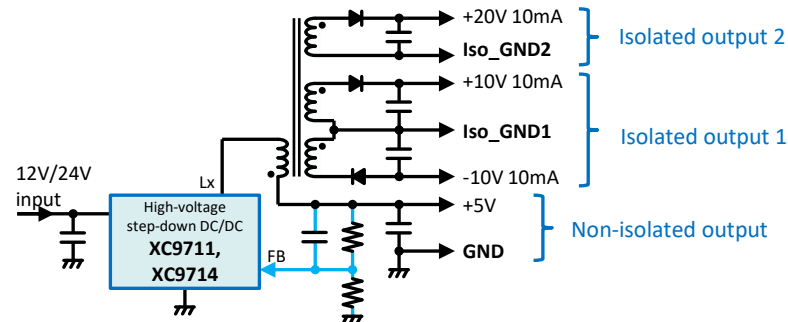
■ Low-Power Isolated Power Supply (~0.5W)

● Technical trend and challenges

- Isolated power supplies are required for various industrial sensors, gate drives, and low-speed communications.
- The challenge lies in easily creating low-cost/compact isolated power supplies.

● TOREX Proposal : Generating an Isolated Supply using a Step-Down DC/DC

➤ Example of Generating a Low-Power Isolated Power Supply



- By replacing the coil in a step-down DC/DC with a transformer/coupling inductor, an isolated, floating power supply is created.
 - Multi-channel : Achieved by altering the transformer winding configuration.
 - Negative supply : Achieved by modifying the secondary-side connections.
- Using a 1:1 coupling inductor enables the creation of non-isolated positive/negative power supplies or functionally equivalent isolated power supplies.
- As there is no feedback on the isolated side, add an LDO on the secondary side if voltage accuracy is required.
- PWM control is recommended for the step-down DC/DC converter. Set the MODE pin to F-PWM. If the secondary-side power is high, it is necessary to also pass output current through the primary side.