

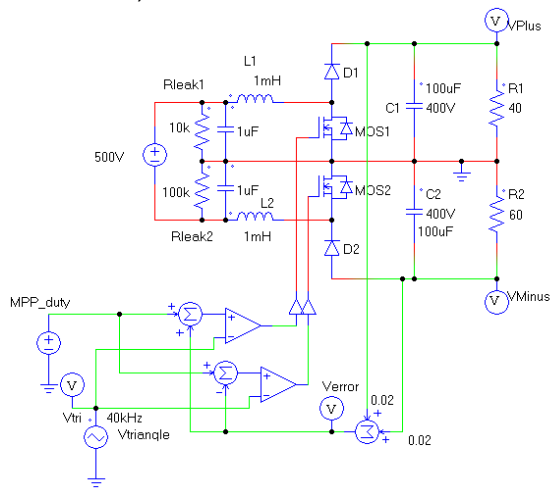
# Symmetrical Boost Concept for Solar Applications up to 1000V

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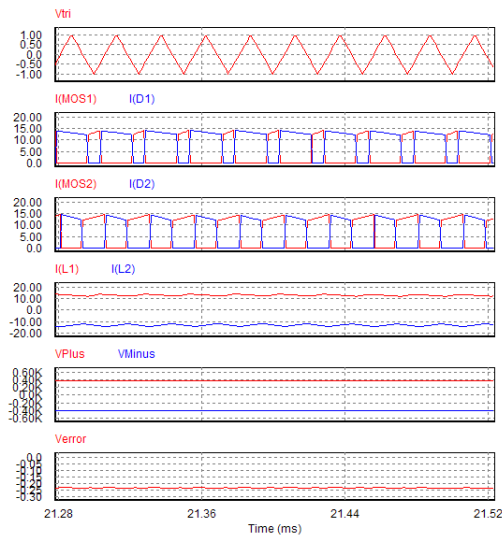
*In a transformerless solar inverter application the symmetry of split supply DC voltages with ground is an important issue. In the following a solution is shown for handling both input and output asymmetry in an MPP booster circuit. On top there is an example provided how to connect solar panel strings with different power and intensity conditions on a solar inverter environment.*

## High Efficiency with low Effort

The following circuit is able to adjust the MPP (maximum power point) of the solar panel, to correct the asymmetry of the Input while keeping the symmetry of the NP (neutral point) of the booster output. The circuit comprises 2 boost circuits: a positive and a negative. The symmetry will be achieved with a corrected PWM (pulse with modulation) of the boost circuits.



In the example here there is a very high non-symmetry in the input (10kΩ vs. 100kΩ) and at the output 40Ω vs. 60Ω load simulated.



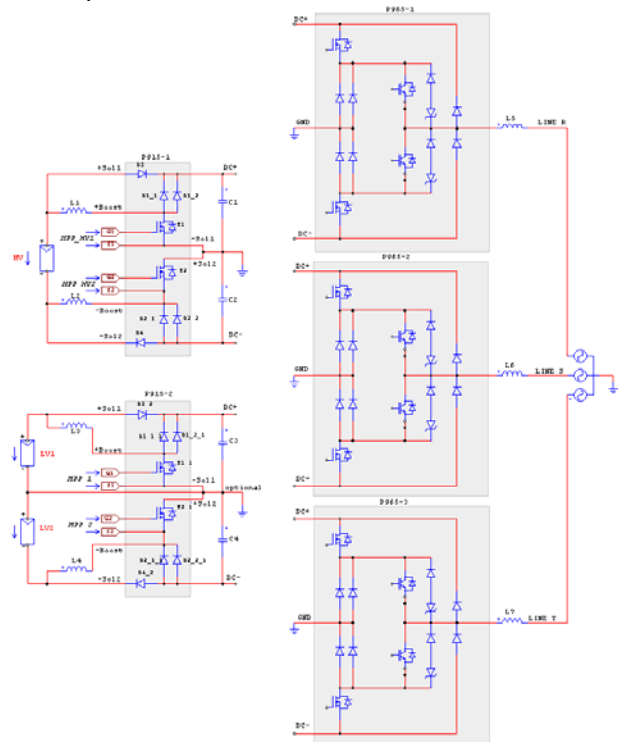
The result shows that it is possible to cover such conditions with such a simple boost circuit just with the right PWM signal which means just with the right software algorithm. For the control the following signals are required: Input voltage (for the MPP tracking) and the positive and the negative DC-

output voltages to be adjusted for symmetrical values.

## Multiple Input as a New Option

But it is not only possible to control a non symmetrical solar panel and load condition, but it is also possible to combine panels with different powers and MPP characteristics in the boosters.

In the following there is a solution for the connection of 2 “low voltage” solar strings and a “high voltage” string to a 3 phase NPC solar inverter. The input stages are designed based on 2 Vincotech P915 power modules, the output is build up with 3 Vincotech P965 mixed component 3 level power modules.



This is an example for using two lower voltages (125-500V) and a higher voltage (250-1000V) PVs with independent MPP tracking in a 3 phase output system (ca.24kW). By eliminating the optional GND connection to the LV1, LV2 allows independent MPP tracking for LV1 and LV2.