Low-Loss, Low-Cost and Small-Size Adjustable Bulk Input Capacitance

Description

- Adjustable bulk input capacitance consists of a base capacitance C_{BASE} in parallel with an adjust capacitance C_{ADJUST} that may compensate fluctuation between crest and valley voltages in a rectified DC bus
- The base capacitance C_{BASE} has a low value, high voltage rating
- The adjust capacitance C_{ADJUST} has a high value, low voltage rating
- In valley region the C_{ADJUST} capacitance remains in parallel with base C_{BASE} capacitance
- In crest region the C_{ADJUST} capacitance is switched off from the bus
- Control circuit powered from an internal low voltage supply detects bus voltage increase above a threshold to switch C_{ADJUST} off from the bus

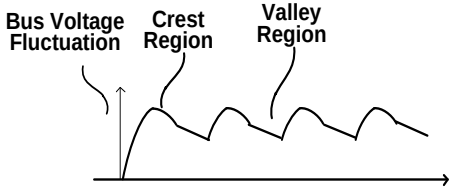

Figure 1. Rectified bus voltage crest-valley fluctuation

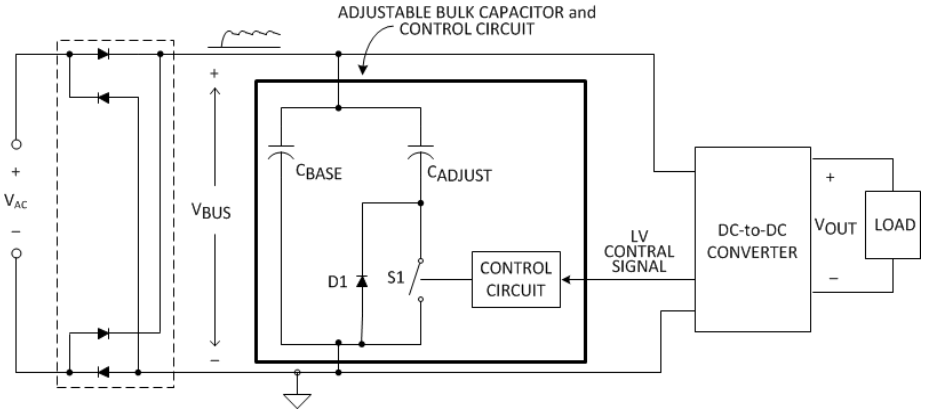

Figure 2. Adjustable bulk capacitance and control circuit

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Benefits

- Improves performance and may provide compliance with the requirements of crest and valley voltage fluctuation (ripple) in a rectified DC bus from low load to high load
- Reduces cost and size of the total input bulk capacitance
- Base capacitance C_{BASE} with high voltage rating has a low value to be cost and size effective
- Adjust capacitance C_{ADJUST} with high value has a low voltage rating to be cost and size effective
- There is loss reduction due to low voltage supply of the detection and control circuitry
- **Could be used with:** Wide ac input range (universal) power converters that may require high value high voltage rating bulk capacitance.

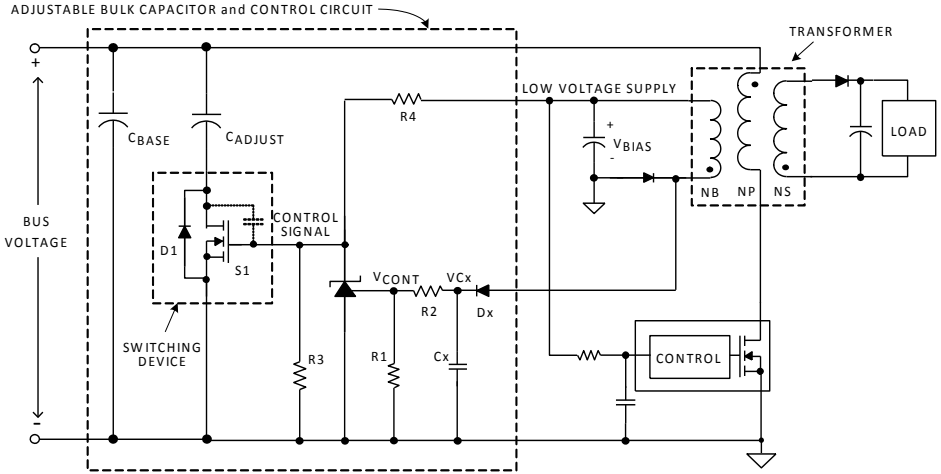

Figure 3. Detailed schematic of the adjustable bulk capacitance and control circuit

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