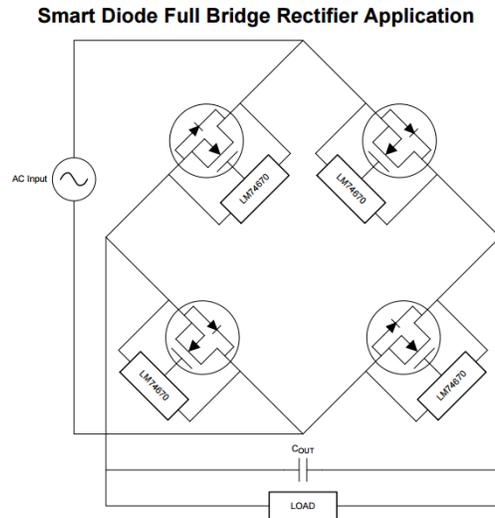


**Test Data
For TIDA00858
11/03/2015**



1. A novel Full Bridge Rectifier approach uses four LM74670-Q1 controller ICs combined with four N-Channel MOSFETs for forward conduction (Figure). This design accepts an AC input voltage up to 45V_{in} and provides rectified output voltage without forward diode drop.

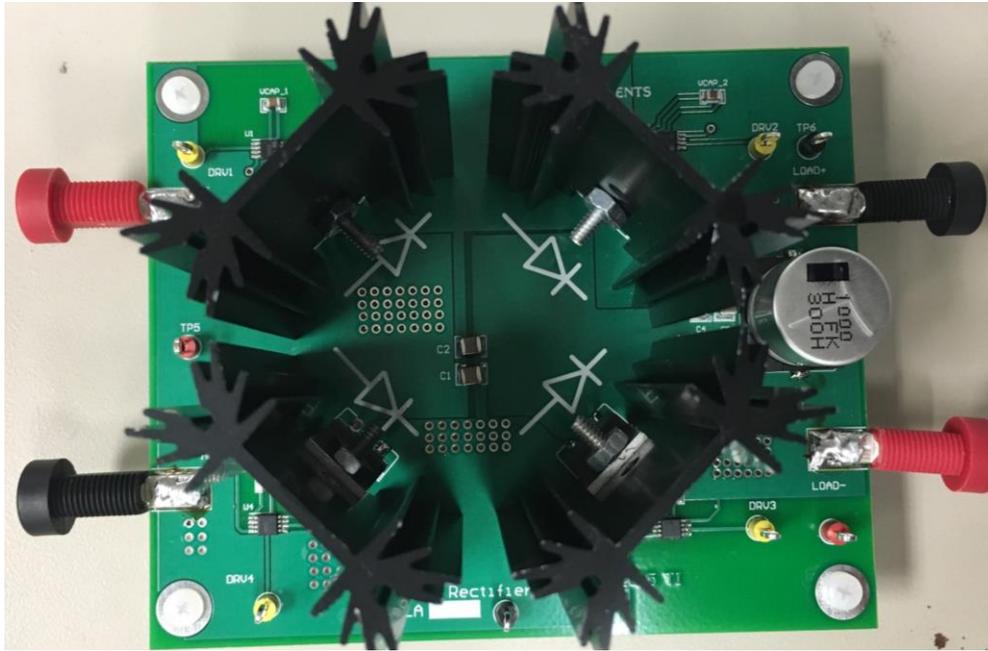


2. The MOSFETs used in this design can comfortably handle 100A output load current.

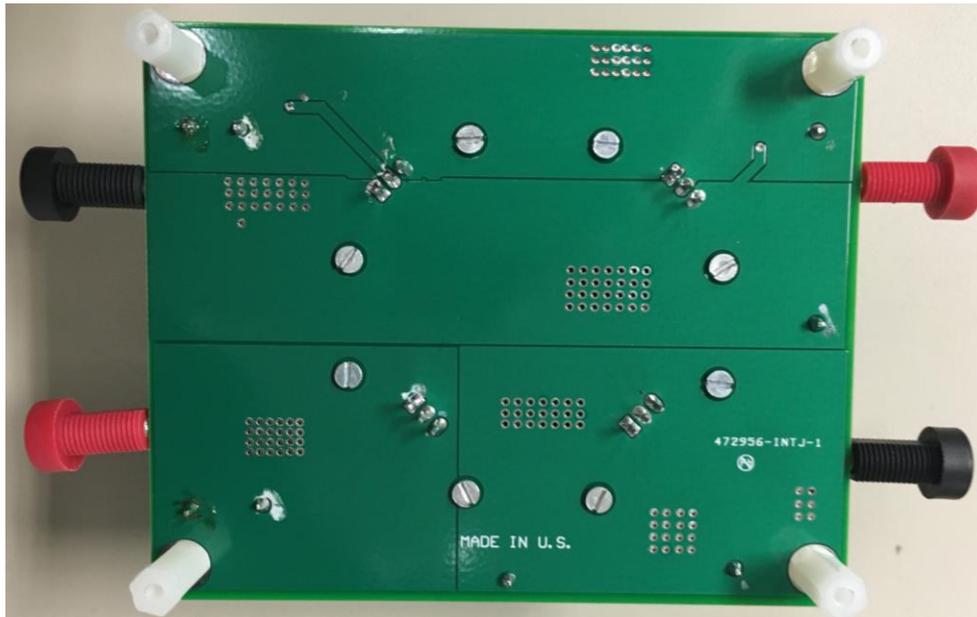
3. The LM74670-Q1 has zero I_Q and it's used to drive the NFET gate for forward condition. The forward voltage drop of NFETs is significantly smaller than a diode, therefore this TIDesign provides highly efficient alternative for diode bridge rectifier.

3. TIDA00858 Board Photos

Board Dimensions: 4217mil *3432mil



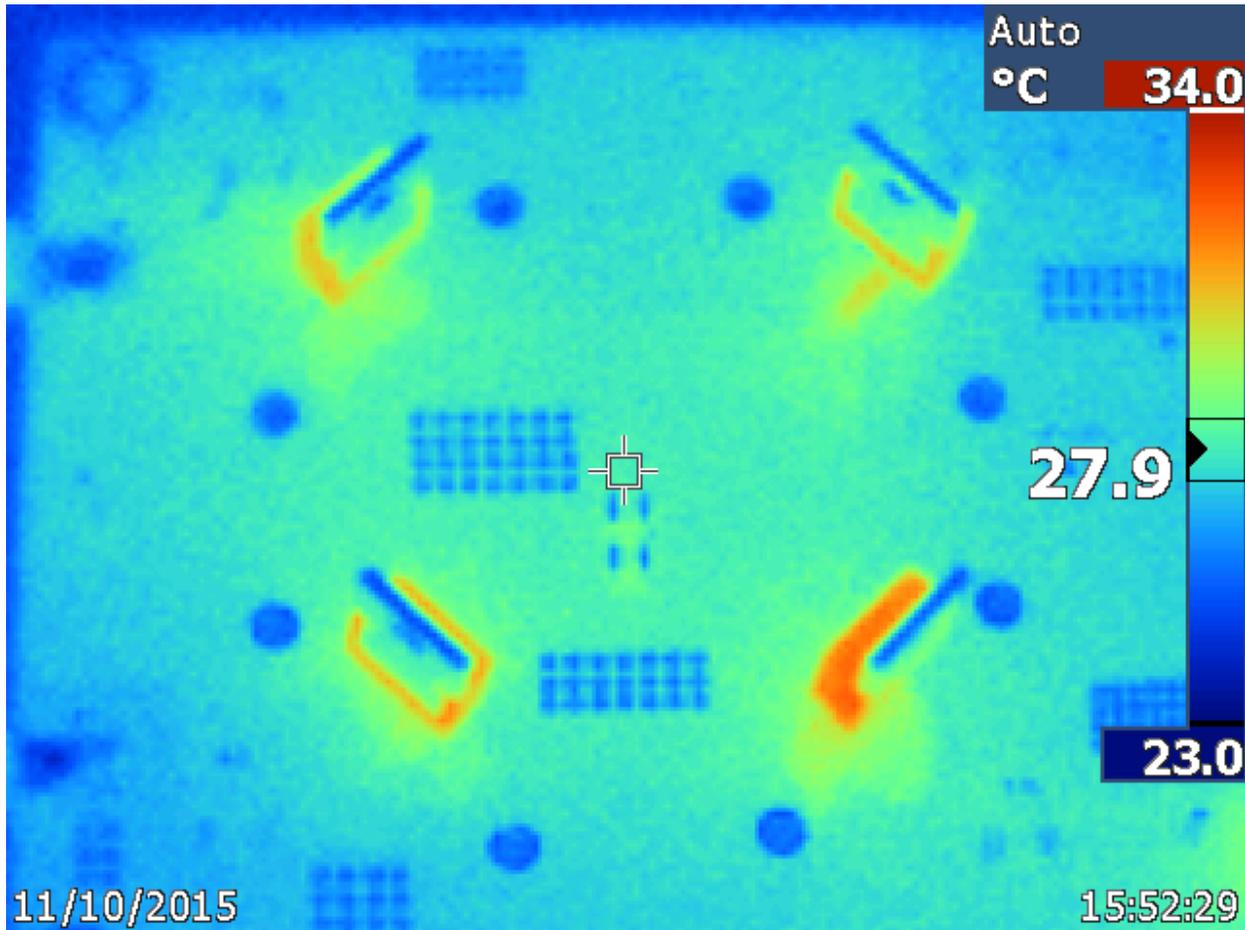
Board Photo (Top)



Board Photo (Bottom)

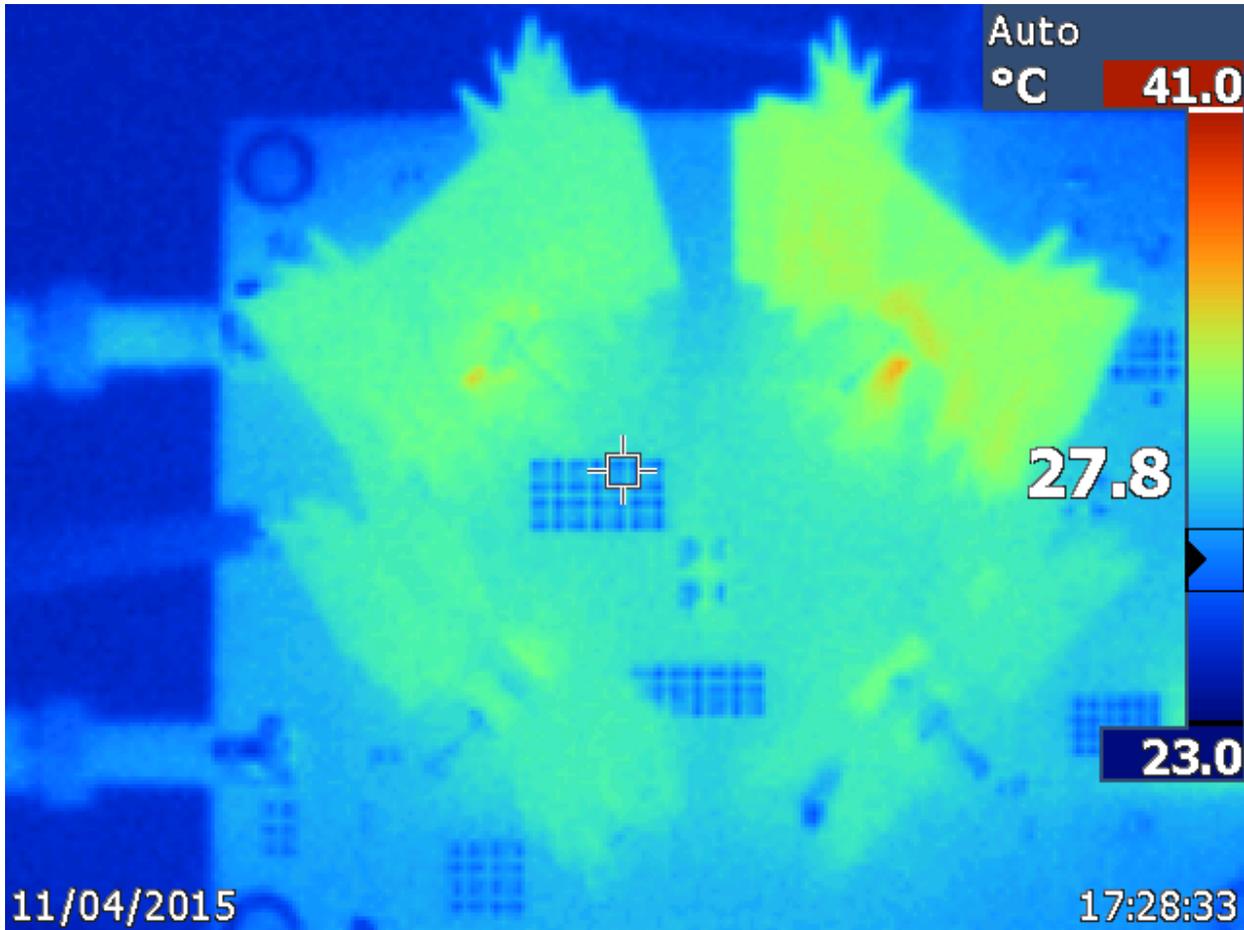
4. AC/DC Rectifier Test Results

4.1 Thermal Data at 10A without heat sinks



IR thermal image taken at steady state with 24V AC Vin and @ 10A load (no airflow)

4.2 Thermal Data at 20A

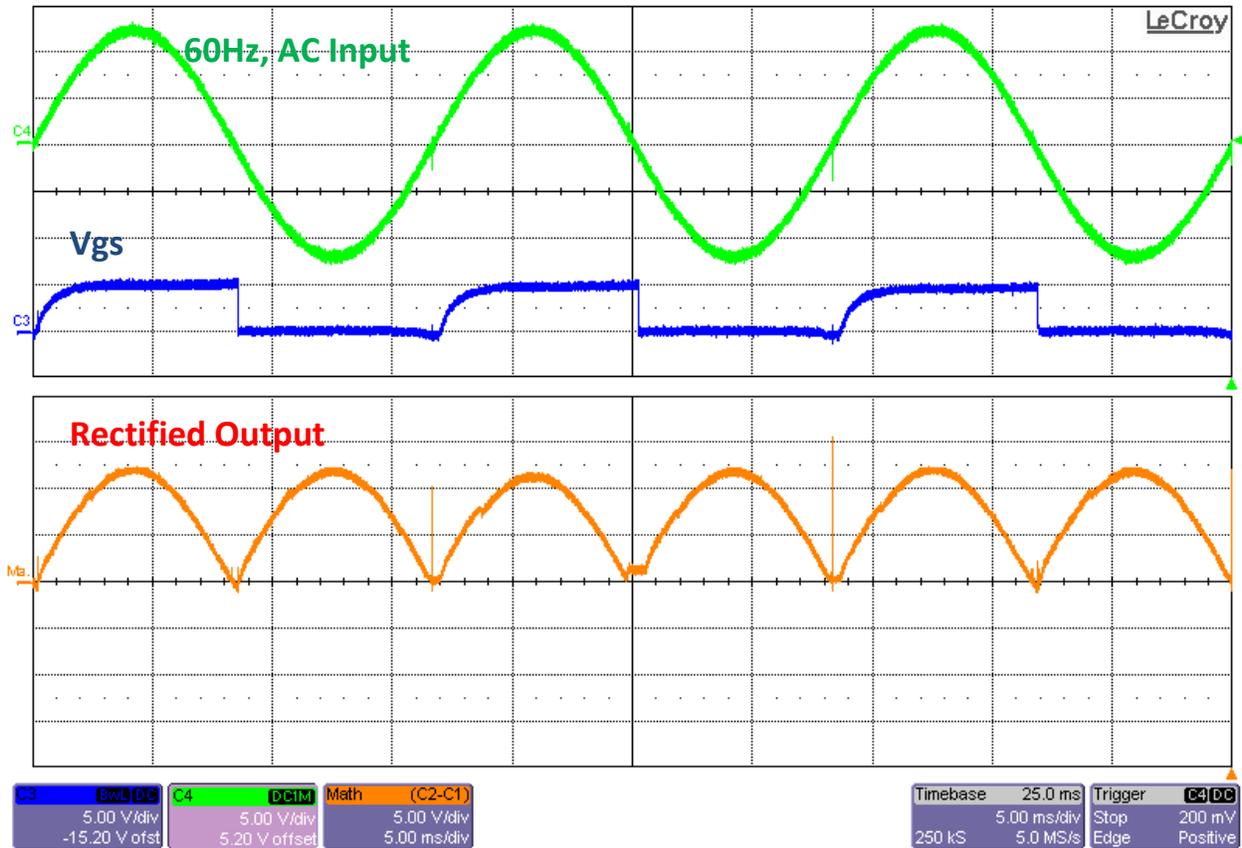


IR thermal image taken at steady state with 24V AC Vin and @ 20A load (no airflow)

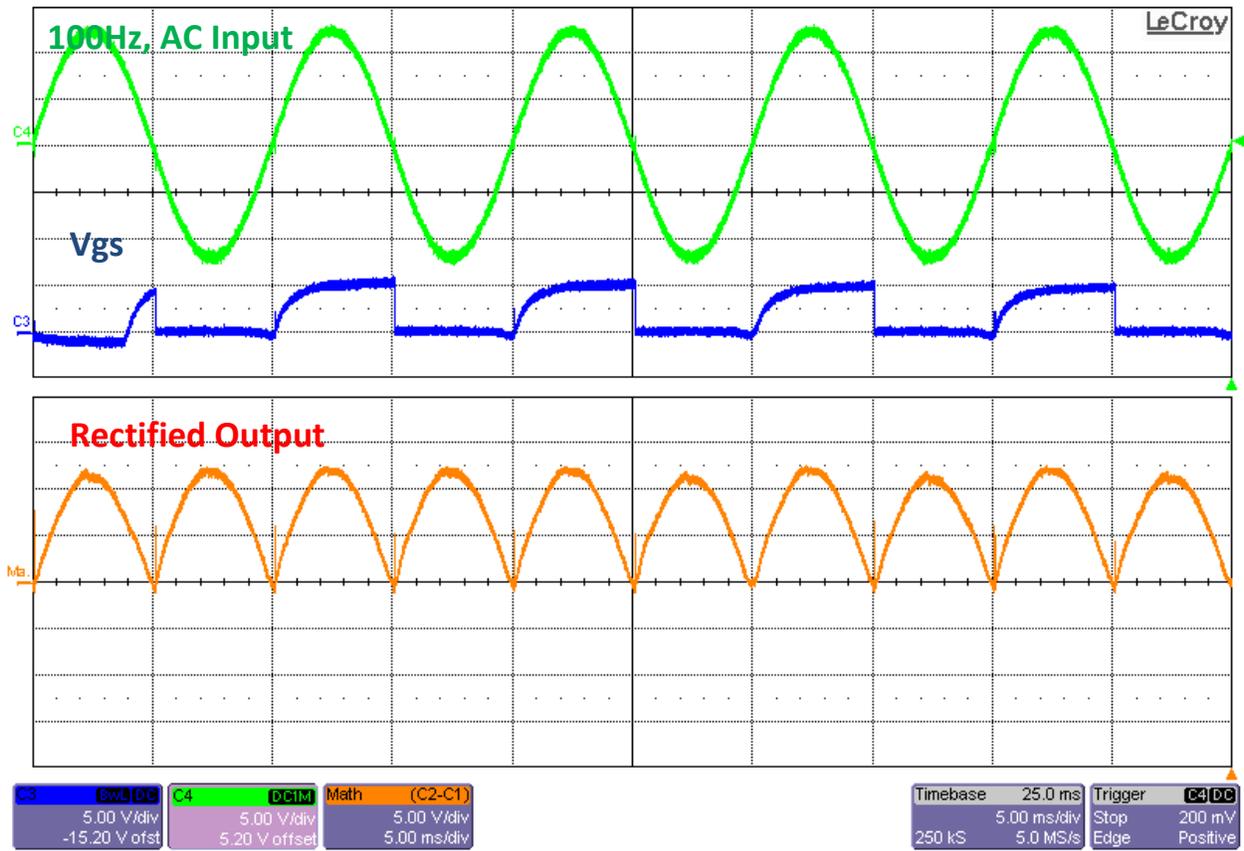
4.3 Waveforms

4.3.1 Rectifier Results with 5A Load Current and no output capacitor

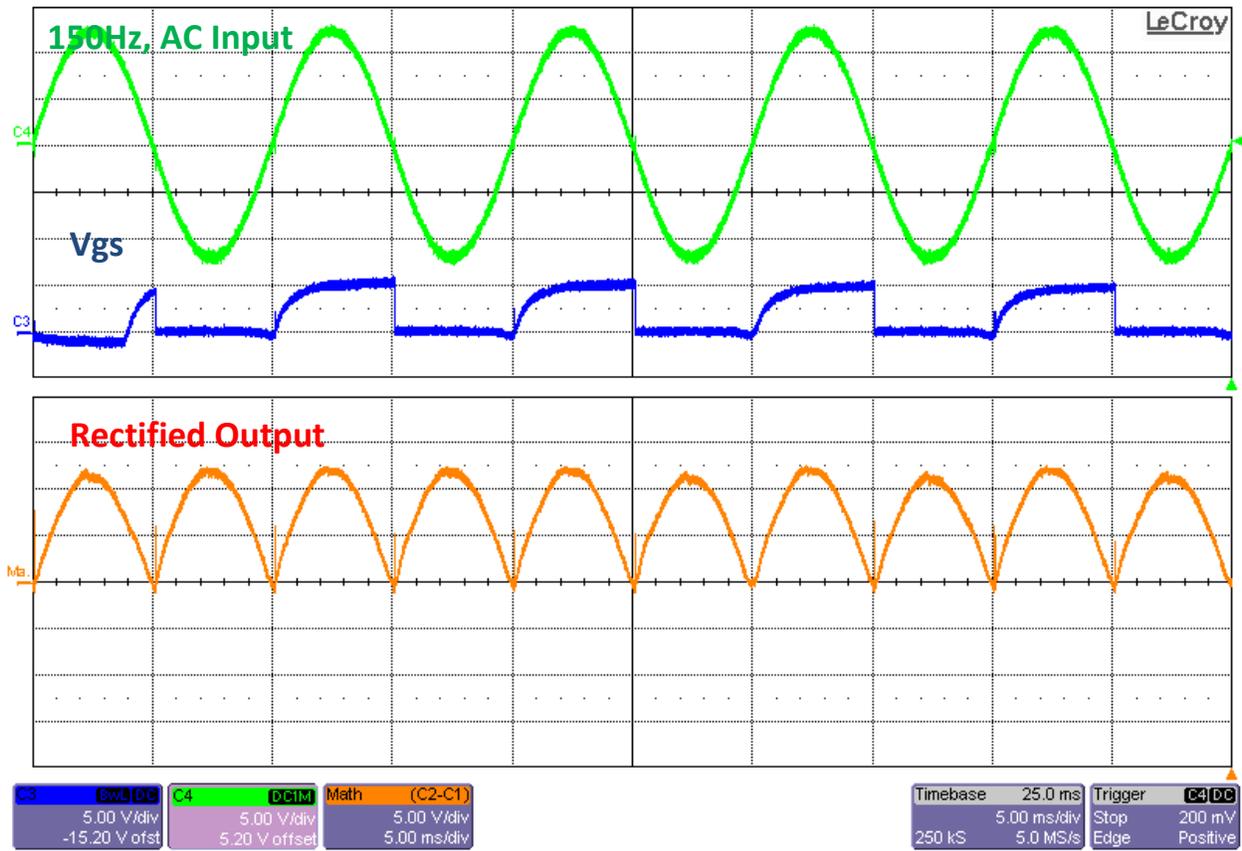
Full Bridge Rectifier Results with **60Hz**, 24V Peak to Peak VIN, @ 5A Output Load Current



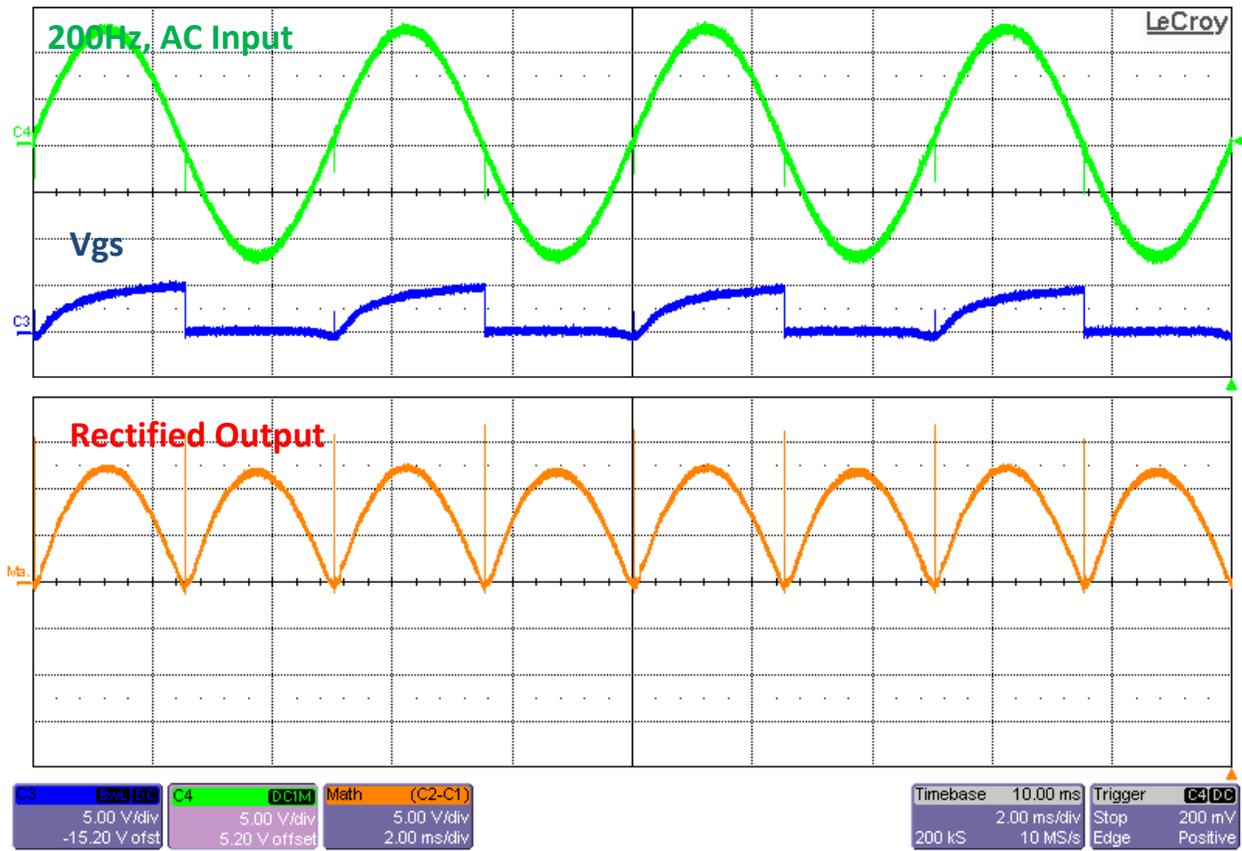
Full Bridge Rectifier at 60Hz AC Input frequencies

Full Bridge Rectifier Results with **100Hz**, 24V Peak to Peak VIN, @ 5A Output Load Current


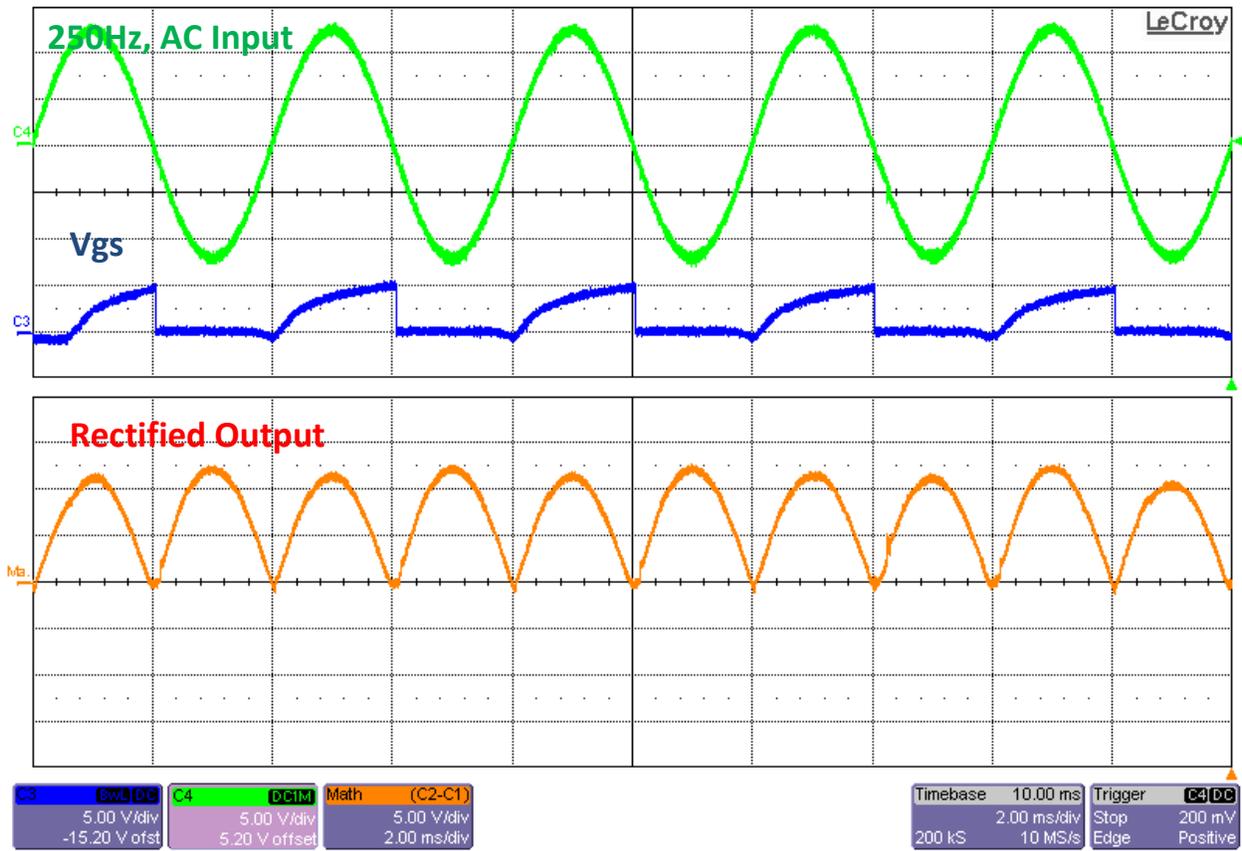
Full Bridge Rectifier at 100Hz AC Input frequencies

Full Bridge Rectifier Results with **150Hz**, 24V Peak to Peak VIN, @ 5A Output Load Current


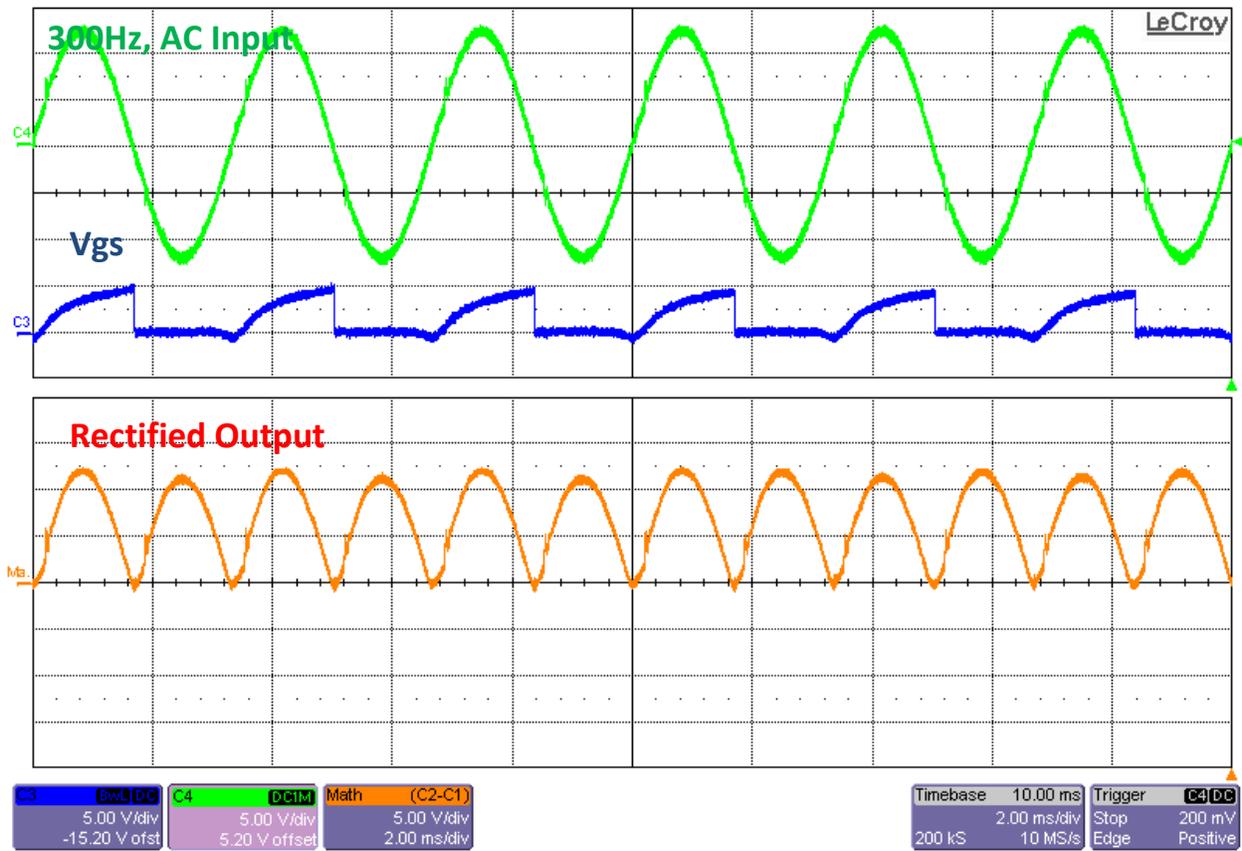
Full Bridge Rectifier at 150Hz AC Input frequencies

Full Bridge Rectifier Results with **200Hz**, 24V Peak to Peak VIN, @ 5A Output Load Current


Full Bridge Rectifier at 200Hz AC Input frequencies

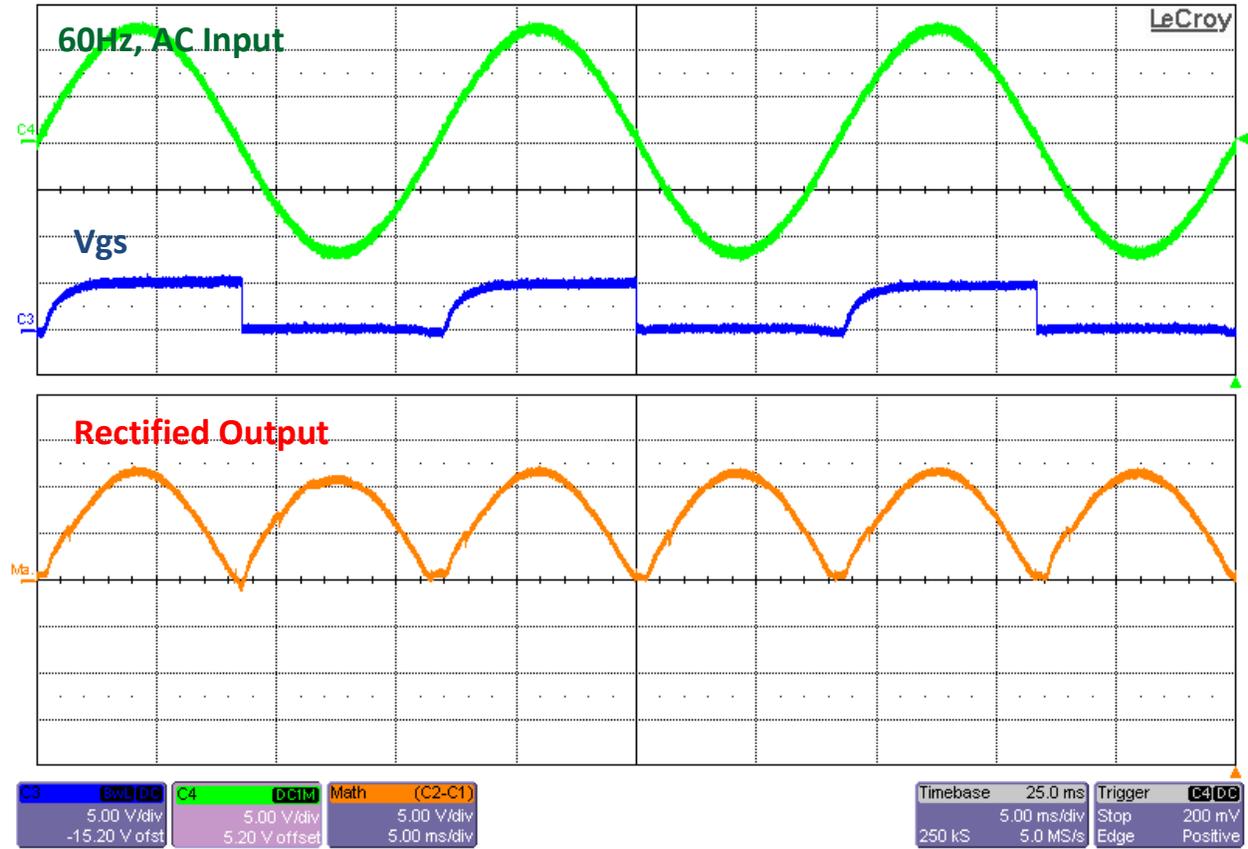
Full Bridge Rectifier Results with **250Hz**, 24V Peak to Peak VIN, @ 5A Output Load Current


Full Bridge Rectifier at 250Hz AC Input frequencies

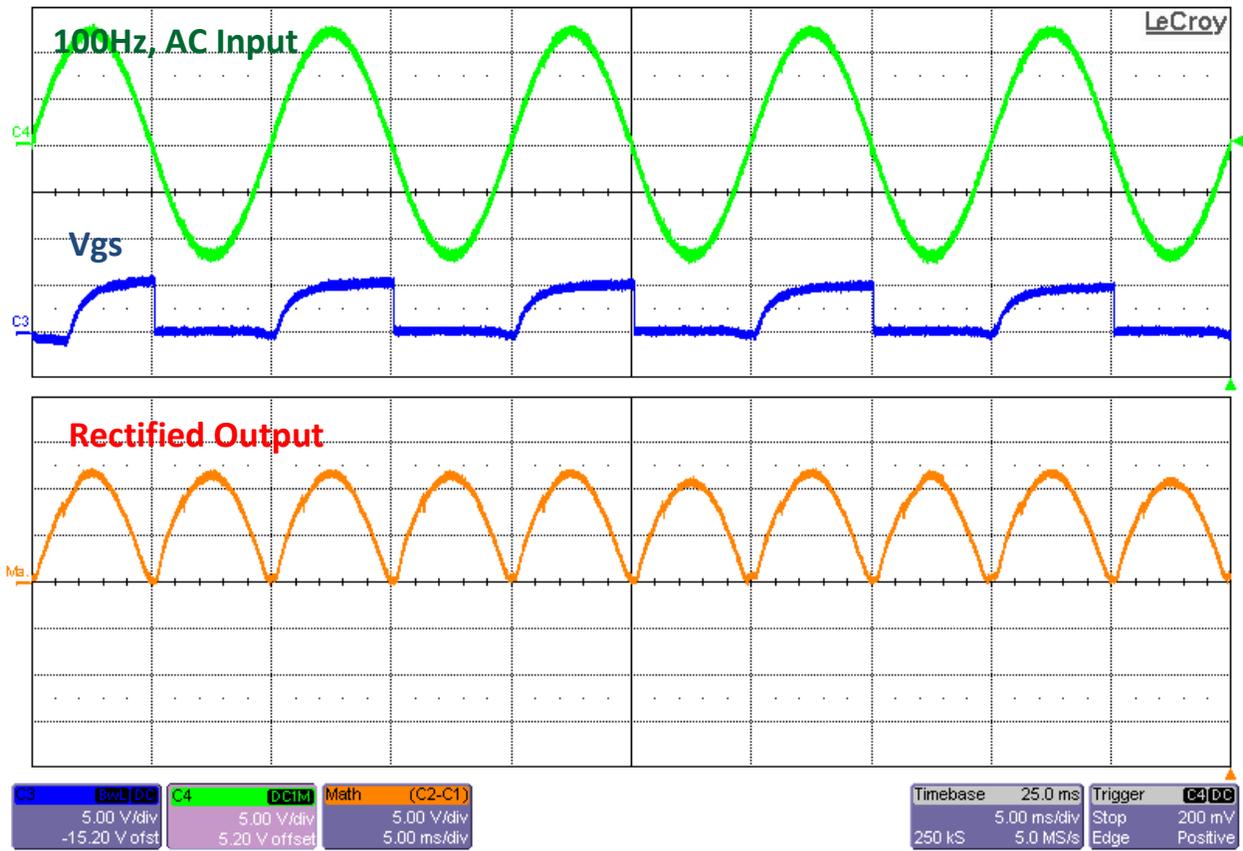
Full Bridge Rectifier Results with 300Hz, 24V Peak to Peak VIN, @ 5A Output Load Current

Full Bridge Rectifier at 300Hz AC Input frequencies

4.3.2 Rectifier Results with 10A Load Current and no output capacitor

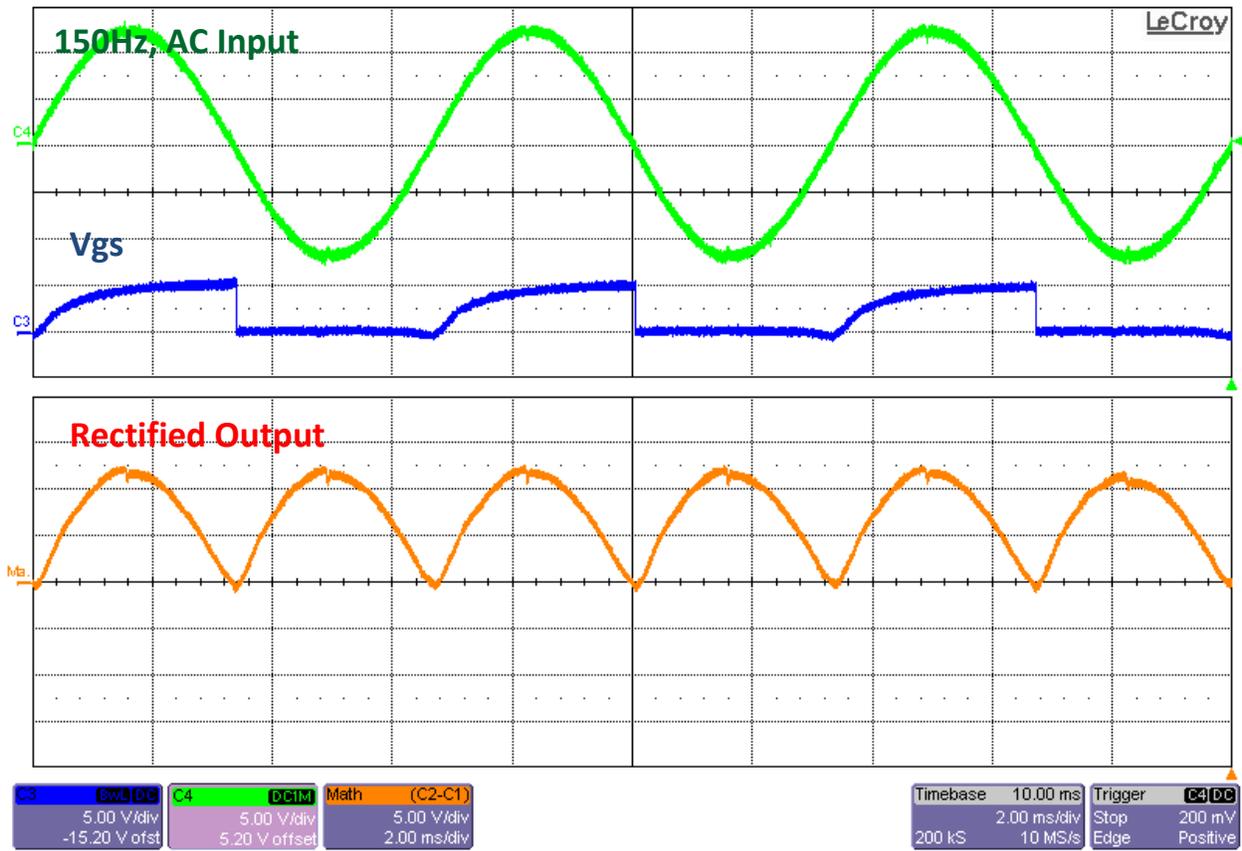
Full Bridge Rectifier Results with **60Hz**, 24V Peak to Peak VIN, @ 10A Output Load Current



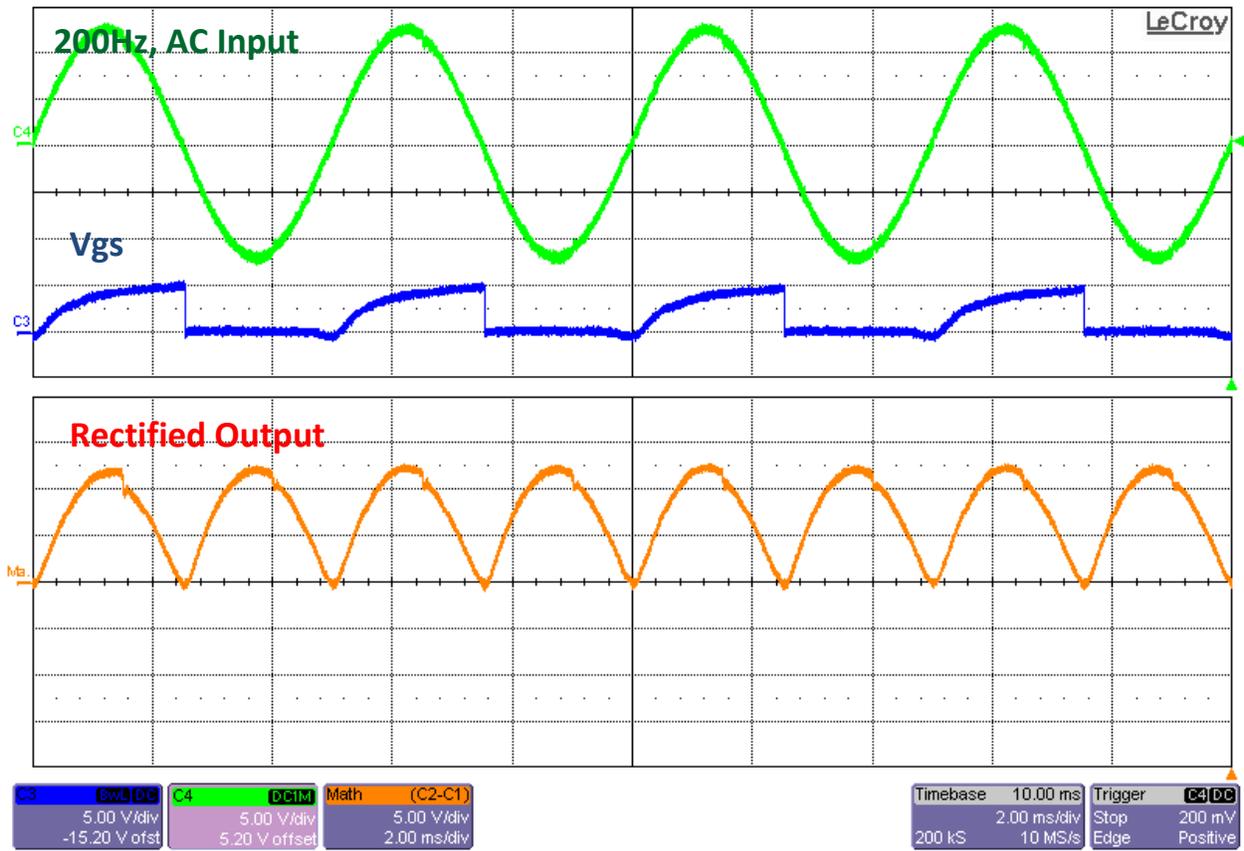
Full Bridge Rectifier at 60Hz AC Input frequencies

Full Bridge Rectifier Results with **100Hz**, 24V Peak to Peak VIN, @ 10A Output Load Current


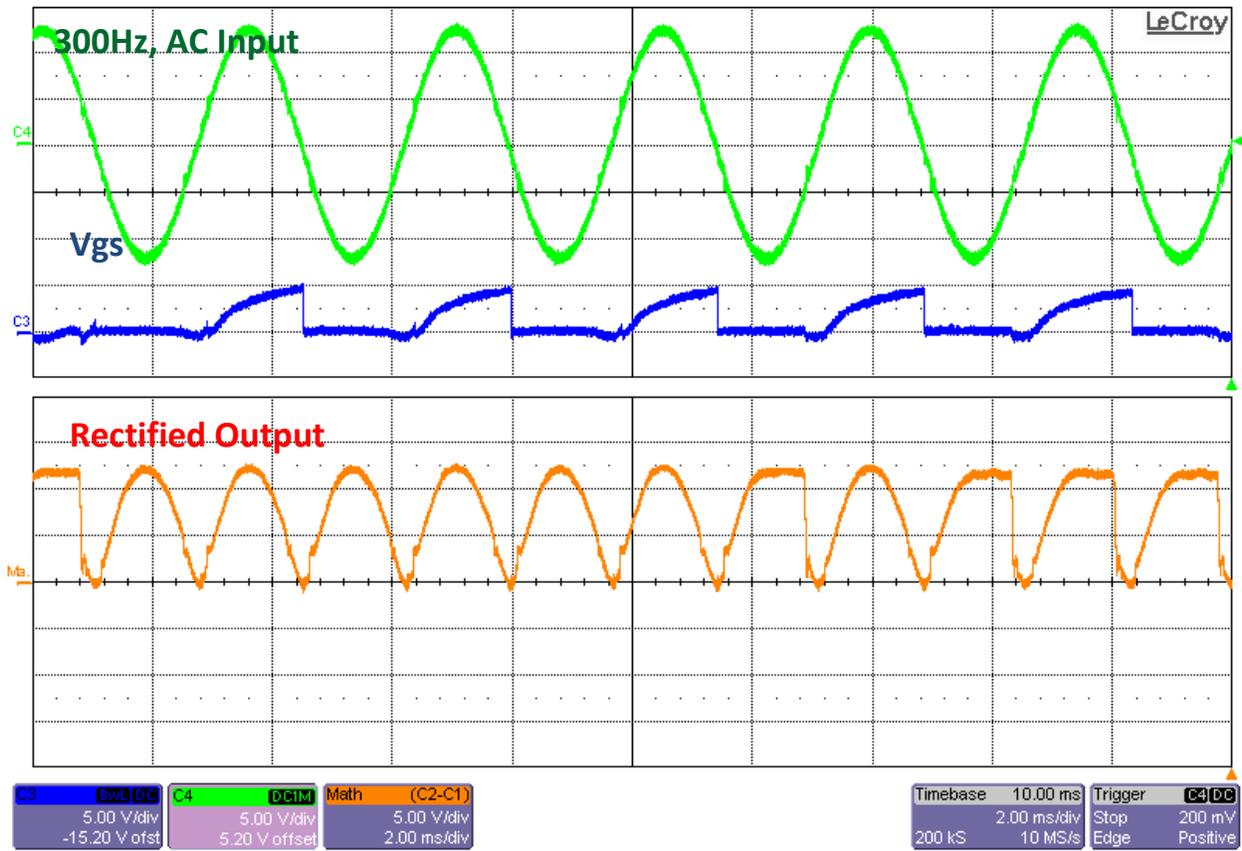
Full Bridge Rectifier at 100Hz AC Input frequencies

Full Bridge Rectifier Results with **150Hz**, 24V Peak to Peak VIN, @ 10A Output Load Current


Full Bridge Rectifier at 150Hz AC Input frequencies

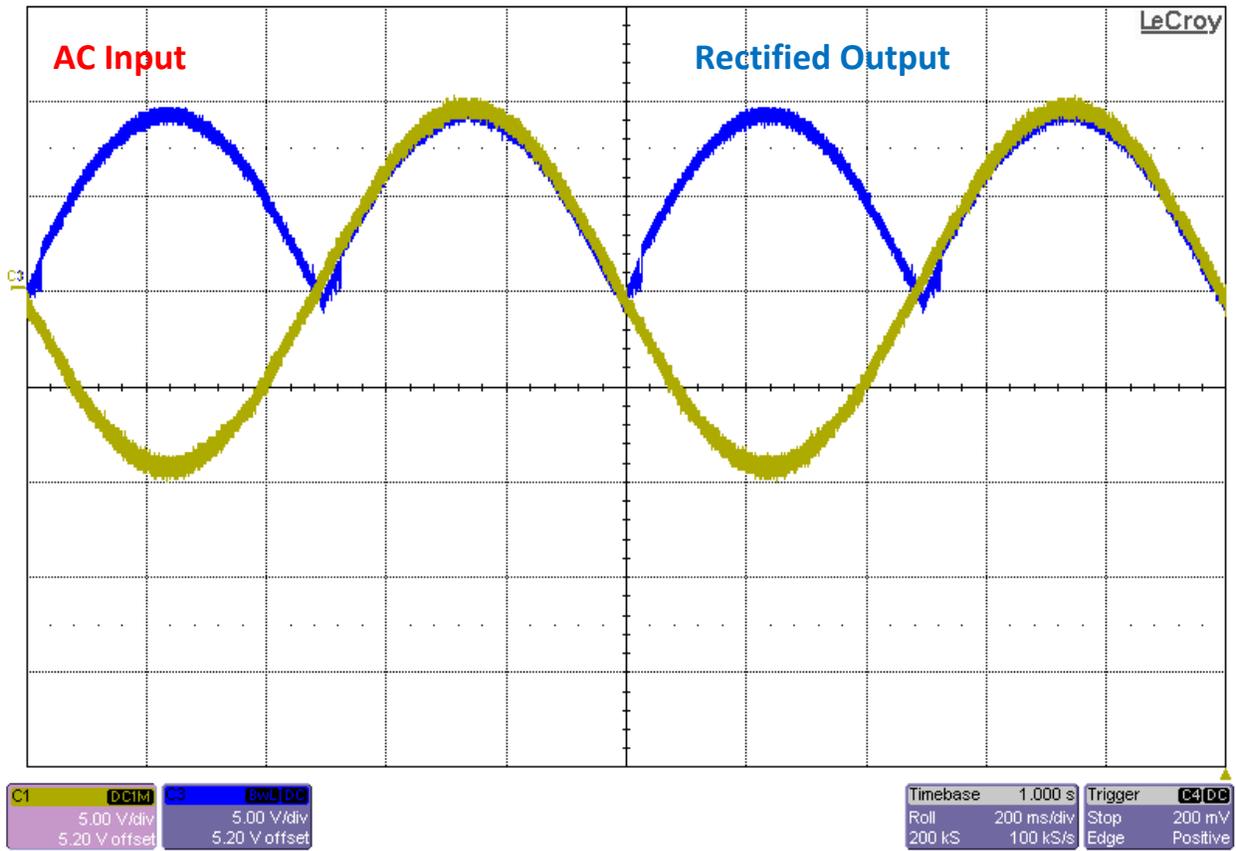
Full Bridge Rectifier Results with **200Hz**, 24V Peak to Peak VIN, @ 10A Output Load Current


Full Bridge Rectifier at 200Hz AC Input frequencies

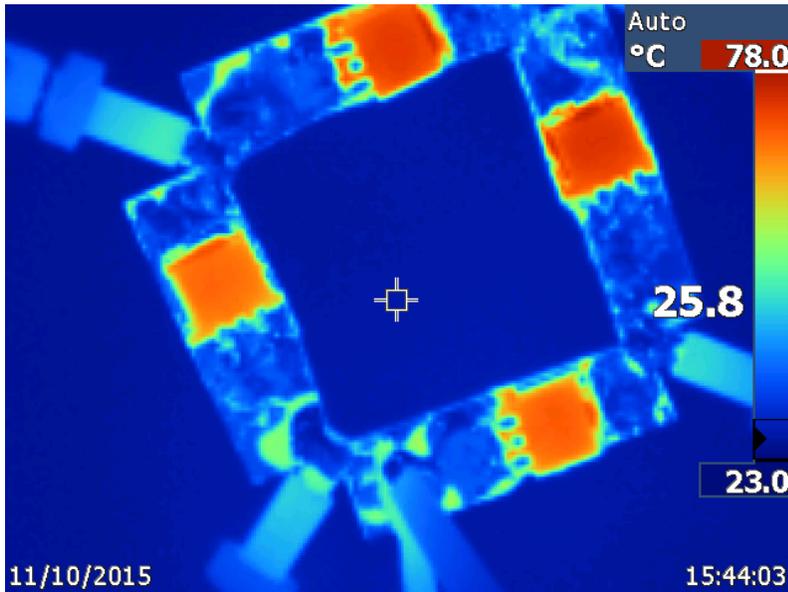
Full Bridge Rectifier Results with **300Hz**, 24V Peak to Peak VIN, @ 10A Output Load Current


Full Bridge Rectifier at 300Hz AC Input frequencies

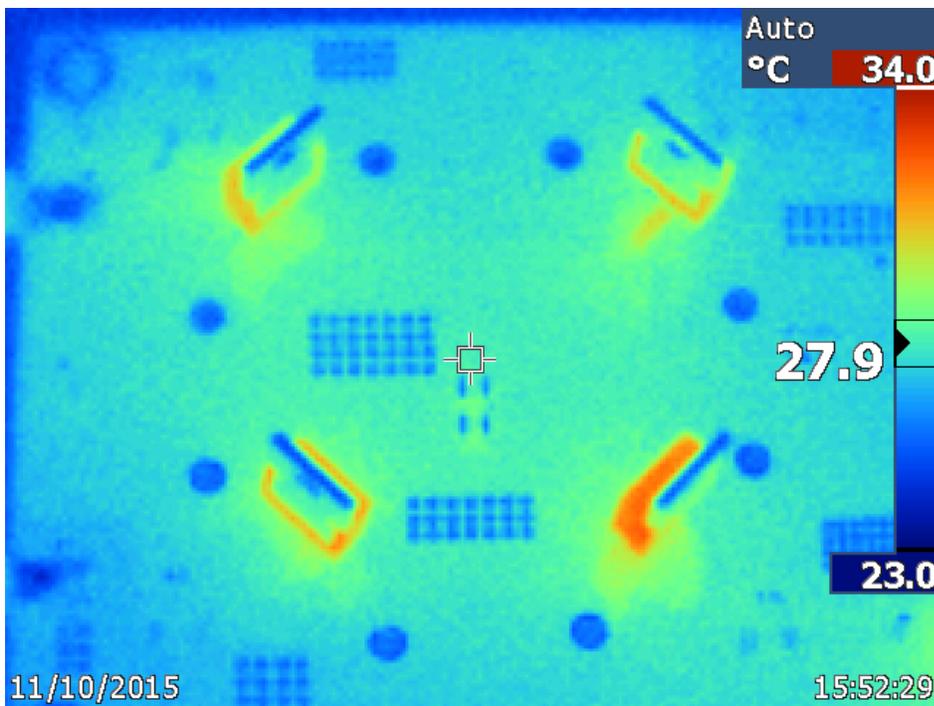
4.3.3 Rectifier Output without Diode Drop



5. Thermal Comparison with Diode Rectifier



Diode Rectifier IR thermal image taken at steady state with 24V AC Vin and @ 10A load (no airflow) without thermal management



LM74670-Q1 Rectifier IR thermal image taken at steady state with 24V AC Vin and @ 10A load (no airflow) without thermal management

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