**Boost Converter**

**1) Centre Shading**

The input voltage and current at the boost converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 7063 W, the average output voltage at 420.2 V and the average output current of 16.81 A. The average value of PV power was at 7171 W and the PV current and PV voltage were at 195.8 V and 36.63 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7144 W, the average output voltage at 422.6 V and the average output current of 16.9 A. The average value of PV power was at 7240 W and the PV current and PV voltage were at 198.7 V and 36.43 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 8130 W, the average output voltage at 450.8 V and the average output current of 18.03 A. The average value of PV power was at 8224 W and the PV current and PV voltage were at 186.8 V and 44.02 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4582 W, the average output voltage at 338.4 V and the average output current of 13.54 A. The average value of PV power was at 4582 W and the PV current and PV voltage were at 197.0 V and 23.57 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7245 W, the average output voltage at 425.6V and the average output current of 17.02 A. The average value of PV power was at 7322 W and the PV current and PV voltage were at 193.7 V and 37.80 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6998 W, the average output voltage at 418.3 V and the average output current of 16.73 A. The average value of PV power was at 7090 W and the PV current and PV voltage were at 194.4V and 36.47 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9683 W, the average output voltage at 492.0 V and the average output current of 19.68 A. The average value of PV power was at 9792 W and the PV current and PV voltage were at 186.4 V and 52.53 A respectively.

**Buck-Boost Converter**

**1) Centre Shading**

The input voltage and current at the buck-boost converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 6970 W, the average output voltage at 417.4 V and the average output current of 16.7 A. The average value of PV power was at 7130 W and the PV current and PV voltage were at 197.7 V and 36.07 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7036 W, the average output voltage at 419.4 V and the average output current of 16.78 A. The average value of PV power was at 7248 W and the PV current and PV voltage were at 196.1 V and 36.95 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 8039 W, the average output voltage at 448.3 V and the average output current of 17.93 A. The average value of PV power was at 8218 W and the PV current and PV voltage were at 190.5 V and 43.15 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4466 W, the average output voltage at 334.1 V and the average output current of 13.37 A. The average value of PV power was at 4592 W and the PV current and PV voltage were at 199.3 V and 23.04 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7126 W, the average output voltage at 422.1V and the average output current of 16.88 A. The average value of PV power was at 7216 W and the PV current and PV voltage were at 189.8 V and 38.02 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6904 W, the average output voltage at 415.5 V and the average output current of 16.62 A. The average value of PV power was at 7059 W and the PV current and PV voltage were at 195.7V and 36.07 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9614 W, the average output voltage at 490.3 V and the average output current of 19.61 A. The average value of PV power was at 9805 W and the PV current and PV voltage were at 183.5 V and 53.43 A respectively.

**Cuk Converter**

**1) Centre Shading**

The input voltage and current at the cuk converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 6988 W, the average output voltage at 418 V and the average output current of 16.72 A. The average value of PV power was at 7123 W and the PV current and PV voltage were at 192.1 V and 37.09 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7005 W, the average output voltage at 418.5 V and the average output current of 16.74 A. The average value of PV power was at 7250 W and the PV current and PV voltage were at 198.2 V and 36.59 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 8069 W, the average output voltage at 449.1 V and the average output current of 17.97 A. The average value of PV power was at 8211 W and the PV current and PV voltage were at 186.1 V and 44.12 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4543 W, the average output voltage at 337.0 V and the average output current of 13.48 A. The average value of PV power was at 4643 W and the PV current and PV voltage were at 193.7 V and 23.97 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7118 W, the average output voltage at 421.9V and the average output current of 16.87 A. The average value of PV power was at 7298 W and the PV current and PV voltage were at 197.7 V and 36.92 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6928 W, the average output voltage at 416.2 V and the average output current of 16.65 A. The average value of PV power was at 7070 W and the PV current and PV voltage were at 191.0V and 37.02 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9602 W, the average output voltage at 489.9 V and the average output current of 19.6 A. The average value of PV power was at 9787 W and the PV current and PV voltage were at 181.2 V and 54.01 A respectively.

**Positive Output Super-Lift Luo Converter**

**1) Centre Shading**

The input voltage and current at the positive output super-lift luo converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 7126 W, the average output voltage at 422.1 V and the average output current of 16.88 A. The average value of PV power was at 7162 W and the PV current and PV voltage were at 194.0V and 36.93 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7216 W, the average output voltage at 424.7V and the average output current of 16.99 A. The average value of PV power was at 7245 W and the PV current and PV voltage were at 196.1 V and 36.95 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 8165 W, the average output voltage at 451.8 V and the average output current of 18.07 A. The average value of PV power was at 8224 W and the PV current and PV voltage were at 186.9 V and 44.00 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 3370 W, the average output voltage at 307.0 V and the average output current of 12.28 A. The average value of PV power was at 3810 W and the PV current and PV voltage were at 138.1 V and 27.59 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7245 W, the average output voltage at 425.8V and the average output current of 17.03 A. The average value of PV power was at 7336 W and the PV current and PV voltage were at 196.0 V and 37.44 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7037 W, the average output voltage at 419.4 V and the average output current of 16.78 A. The average value of PV power was at 7095 W and the PV current and PV voltage were at 192.8V and 36.8 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9717 W, the average output voltage at 492.5 V and the average output current of 19.71 A. The average value of PV power was at 9795 W and the PV current and PV voltage were at 181.9 V and 53.84 A respectively.

**SEPIC**

**1) Centre Shading**

The input voltage and current at the sepic converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 6953 W, the average output voltage at 416.9 V and the average output current of 16.68 A. The average value of PV power was at 7020 W and the PV current and PV voltage were at 188.5V and 37.23 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7023 W, the average output voltage at 419 V and the average output current of 16.76 A. The average value of PV power was at 7105 W and the PV current and PV voltage were at 190.8 V and 37.24 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 800 W, the average output voltage at 447.2 V and the average output current of 17.89A. The average value of PV power was at 8220 W and the PV current and PV voltage were at 190.4 V and 43.18 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4400 W, the average output voltage at 331.6 V and the average output current of 13.27 A. The average value of PV power was at 331.6 W and the PV current and PV voltage were at 201.5 V and 22.33 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7087 W, the average output voltage at 420.9V and the average output current of 16.84 A. The average value of PV power was at 7310 W and the PV current and PV voltage were at 193.1 V and 37.85 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6874 W, the average output voltage at 414.5 V and the average output current of 16.58 A. The average value of PV power was at 7095 W and the PV current and PV voltage were at 192.9V and 36.79 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9668 W, the average output voltage at 496.1 V and the average output current of 19.67 A. The average value of PV power was at 9801 W and the PV current and PV voltage were at 185.4 V and 52.85 A respectively.

**Zeta**

**1) Centre Shading**

The input voltage and current at the zeta converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 6996 W, the average output voltage at 418.2 V and the average output current of 16.73 A. The average value of PV power was at 7099 W and the PV current and PV voltage were at 198.4V and 35.77 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7059 W, the average output voltage at 420.1V and the average output current of 16.8A. The average value of PV power was at 7177 W and the PV current and PV voltage were at 200.3 V and 35.83 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7946 W, the average output voltage at 445.7 V and the average output current of 17.83 A. The average value of PV power was at 8147 W and the PV current and PV voltage were at 183.7 V and 44.34 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4472 W, the average output voltage at 334.4 V and the average output current of 13.38 A. The average value of PV power was at 4637 W and the PV current and PV voltage were at 193.2 V and 24.01 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7087 W, the average output voltage at 420.9V and the average output current of 16.84A. The average value of PV power was at 7310 W and the PV current and PV voltage were at 193.1 V and 37.85 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6874 W, the average output voltage at 414.5 V and the average output current of 16.58 A. The average value of PV power was at 7095 W and the PV current and PV voltage were at 192.9V and 36.79 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9668 W, the average output voltage at 496.1 V and the average output current of 19.67 A. The average value of PV power was at 9801 W and the PV current and PV voltage were at 185.4 V and 52.85 A respectively.

**Ultra-Lift Luo Converter**

**1) Centre Shading**

The input voltage and current at the ultra-lift luo converter is nothing but the PV voltage and PV current. From the above waveforms, at steady state, we can see that the converter gives average output power of 6824 W, the average output voltage at 413.0 V and the average output current of 16.52 A. The average value of PV power was at 7112 W and the PV current and PV voltage were at 191.6V and 37.11 A respectively.

**2) Corner Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6911 W, the average output voltage at 415.7V and the average output current of 16.63 A. The average value of PV power was at 7164 W and the PV current and PV voltage were at 192/77V and 37.17 A respectively.

**3) Diagonal Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 7912 W, the average output voltage at 444.7 V and the average output current of 17.79 A. The average value of PV power was at 8192 W and the PV current and PV voltage were at 185.3 V and 44.20 A respectively.

**4) Frame Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 4432 W, the average output voltage at 332.9 V and the average output current of 13.32 A. The average value of PV power was at 4557 W and the PV current and PV voltage were at 188.3 V and 24.20 A respectively.

**5) Random Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6982 W, the average output voltage at 417.8V and the average output current of 16.01 A. The average value of PV power was at 7280 W and the PV current and PV voltage were at 192.0 V and 37.92 A respectively.

**6) Right Side End Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 6746 W, the average output voltage at 410.7 V and the average output current of 16.43 A. The average value of PV power was at 7069 W and the PV current and PV voltage were at 191.0V and 37.01 A respectively.

**7) Uniform Shading**

From the above waveforms, at steady state, we can see that the converter gives average output power of 9472 W, the average output voltage at 485.5 V and the average output current of 19.42 A. The average value of PV power was at 9787 W and the PV current and PV voltage were at 181.3 V and 53.98 A respectively.